ETERNUS
Disk storage systems

Server Connection Guide (iSCSI)
for Windows®
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 Windows® server via an iSCSI.

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, Windows® server, OS used, adapters, drivers, etc.

This document references the following documents:

• Server Support Matrix
• ETERNUS Disk storage systems Server Connection Guide (iSCSI) ETERNUS Disk Storage System Settings for ETERNUS2000
• ETERNUS Disk storage systems Server Connection Guide (iSCSI) ETERNUS Disk Storage System Settings for ETERNUS4000, ETERNUS8000

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.

The Contents and Structure of this Manual

This document is composed of the following seven chapters:

• Chapter 1  Workflow
  This section describes how to connect a server to the ETERNUS Disk storage system.

• Chapter 2  Checking the Server Environment
  This section describes which servers can be connected to ETERNUS Disk storage systems.

• Chapter 3  Notes
  This section describes various issues that should be noted when connecting a server to ETERNUS Disk storage systems.

• Chapter 4  Installing and Setting Up ETERNUSmgr
  This describes how to install ETERNUSmgr.

• Chapter 5  Setting Up the ETERNUS Disk Storage Systems
  This describes how to use ETERNUSmgr to set up the ETERNUS Disk storage systems.
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• Chapter 6 Setting Up the Server
  This section describes how to connect a server running Windows® to the ETERNUS Disk storage system.

• Chapter 7 Notes on Operation
  This section describes various settings required for operation.

"Microsoft iSCSI Software Initiator iSCSICLI Commands" and "iSCSICLI Setting Examples" are provided as appendices.

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

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• The company names and product names mentioned in this document are registered trademarks or trademarks of their respective companies.
Naming Conventions

■ Product names

- "Windows Server® 2003" represents the following products.
  - Microsoft® Windows Server® 2003, Enterprise Edition
  - Microsoft® Windows Server® 2003, Datacenter Edition
- "Windows Server® 2008 R2" represents the following products.
  - Microsoft® Windows® Web Server 2008 R2
  - Microsoft® Windows Server® 2008 R2 Standard
  - Microsoft® Windows Server® 2008 R2 Enterprise
  - Microsoft® Windows Server® 2008 R2 Datacenter
  - Microsoft® Windows Server® 2008 R2 for Itanium-based Systems
- "Windows Server® 2008" represents the following products.
  - Microsoft® Windows Server® 2008 Standard
  - Microsoft® Windows Server® 2008 Enterprise
  - Microsoft® Windows Server® 2008 Datacenter
  - Microsoft® Windows Server® 2008 for Itanium-based Systems

■ Other Names

- The iSCSI interface modules used by the ETERNUS Disk storage system are referred to as "iSCSI port" or "CA".
- The iSCSI interface modules used by the server are referred to as "LAN cards". In addition to the above names, "network interface card" (NIC), "LAN adapter", or "LAN board" may also be used.
- "iSCSI cable" refers to the cable that is used to connect the ETERNUS Disk storage system and server over an iSCSI interface. "LAN cable" and "twisted pair cable" are alternative names for this cable.

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Chapter 1  Workflow

This chapter describes how to connect the ETERNUS Disk storage systems to a server. The workflow is shown below.

**Workflow**

1. **Check the Server**
   - Check that the hardware, OS, LAN cards, and onboard LANs of the server will allow the ETERNUS Disk storage system to be connected to.
   - Also, check the notes for operation.
   - Refer to "Chapter 2 Checking the Server Environment" (page 11)
   - Refer to "Chapter 3 Notes" (page 12)

(Connect via LAN card)  (Connect via onboard LAN)

2. **Install the LAN Cards**
   - Install the LAN cards in the server.
   - Refer to "6.1 Installing the LAN Cards" (page 20)

3. **Install the LAN Card Driver(s)**
   - Install the appropriate driver(s) for the LAN cards.
   - Refer to "6.2.1 Installing the LAN Driver" (page 21)
Chapter 1  Workflow

4 Install the iSCSI Initiator
   Install the appropriate initiator driver(s) for the iSCSI cards.
   Refer - *6.2.2 Installing the iSCSI Initiator* (page 21)

5 Install the ETERNUS Disk Storage System Driver
   Install the driver that is required to access the ETERNUS Disk storage system.
   Refer - *6.2.3 Installing the ETERNUS Disk Storage System Driver* (page 22)

6 Check the Registry Information
   Change the registry information of the items that have been installed.
   Refer - *6.3 Changing the Registry Information (iSCSI initiator/LAN driver)* (page 25)

7 Connect the iSCSI Cables
   Connect the server and the ETERNUS Disk storage system using suitable iSCSI cables.
   Refer - *6.4 Connecting the Cables* (page 27)

8 Change the Driver Parameters
   Set up the ETERNUS Disk storage system connection environment in the server.
   Change the driver parameters of the iSCSI initiator.
   Refer - *6.6 Setting Up the iSCSI Initiator Driver Parameters* (page 28)

(Connection with authentication)  (Connection without authentication)
Chapter 1 Workflow

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(Connection with authentication)  (Connection without authentication)

Set Up CHAP Authentication
Set up the information required to perform the connection authentication.

- "6.7 CHAP Authentication Settings" (page 33)

Check the Connected Devices
Check the ETERNUS Disk storage system connection status from the server.

- "6.8 Checking the ETERNUS Disk Storage Systems' Connection Status" (page 41)

Create the Disk Partitions
Create partitions on the ETERNUS Disk storage system disks that will be accessed by the server.

- "7.1 Creating the Disk Partitions" (page 42)
Chapter 2  Checking the Server Environment

2.1 Hardware
Refer to the "Server Support Matrix".

2.2 Basic Software
Refer to the "Server Support Matrix".

2.3 Network Interface Cards
Refer to the "Server Support Matrix".

2.4 Multipath Configuration
Refer to the "Server Support Matrix".
Chapter 3  Notes

This chapter describes various points that should be noted when connecting the ETERNUS Disk storage system to a server.

3.1  LAN Card Connection Notes

- Use of the following is recommended for storage system reliability:
  - Multiple connection paths between the server and ETERNUS Disk storage system
  - Path redundancy capable drivers for the ETERNUS Disk storage system
    With a path redundancy capable driver, a multipath environment automatically increases the redundancy and reliability of the connections between ETERNUS Disk storage systems and the servers.
  - When the PRIMEQUEST 500/400 series is connected to an ETERNUS Disk storage system, LUN recognition by the Windows® Plug and Play function is not guaranteed.
  - For a multi-port LAN card, a configuration that connects the two ports on the LAN card to different storage systems is recommended.

3.2  Installing Multiple LAN Cards

- Only a single type of LAN card should be installed. LAN cards of different types cannot be used together, nor with iSCSI HBAs.
- When installing multiple LAN cards, record the relation between the PCI slot location and the port name of the LAN card as you install the LAN cards one by one. You can check the port name of the LAN card by clicking [Start] - [Settings] - [Network Connection].

3.3  Driver Notes

- Some ETERNUS Disk storage system drivers support the use of path redundancy (path fail-over). For more information, refer to the following URL:
3.4 LAN Switch Notes

- When multiple ETERNUS Disk storage systems are connected to a single server, each ETERNUS Disk storage system iSCSI name must be unique.
- When installing two LAN cards to one server for path redundancy, connect each LAN card to different LAN switches. If they are connected to the same LAN switch, a single point of failure results in loss of redundancy.

- Recommended configuration

- Incorrect configuration (loss of redundancy)
3.5 LAN Switch Connection Notes

- As with an FC-SAN, because of the large data flows (traffic volumes) the iSCSI LAN is assumed to be a dedicated LAN separate from the business and management LANs, and constructed with its own LAN switch.
- iSCSI LAN redundancy is achieved by the use of multipaths.
- For IP network security reasons too, it is useful to separate the iSCSI LAN (for data transfers) and management LAN (for administration) to prevent cross-access between them (use of VLAN to separate the LAN segments is recommended).

Example LAN switch connection configuration

*1: In this system configuration, multipaths provide redundant connections between the servers and storage system. LAN switches #1 and #2 provide physical separation of the network paths.
*2: A separate LAN segment is provided in the LAN switch (using the switch VLAN function) for each grouping of business servers and disk storage systems (equivalent to the FC zones).
3.6 Network Setting Notes

With an iSCSI connection, SCSI commands are sent between the server and ETERNUS Disk storage system via an IP network. Because IP addresses are used to identify devices on the IP network, a network-unique IP address will be required for each server and ETERNUS Disk storage system iSCSI adapter used. In addition, a special network group not used for any other connection must be specified for all the server and ETERNUS Disk storage system connection ports.

Example of IP address

- : Network group for 192.168.1.x
- : Network group for 192.168.2.x
When an iSCSI interface is used for connection, each connected device is identified by an IP address and iSCSI name. Since the connected servers are managed by iSCSI name within the ETERNUS Disk storage system, all connected servers must be assigned a different iSCSI name.

When connecting multiple servers using LAN cards, be sure to use a different iSCSI name for each server. If the name is duplicated, there is a high risk of volume damage.

The iSCSI name, Alias name, and CHAP authentication information should be specified according to the following conditions:

- **iSCSI name**
  - Up to 221 characters comprising some iqn or eui format combination of lower-case alphanumerics, "-" (minus), ":" (colon), and "." (dot) symbols.

- **Alias name**
  - Used by the administrator to simplify network management. (Optional)
  - Up to 16 arbitrary alphanumerics characters

- **User name**
  - Up to 223 alphanumeric characters

- **Password**
  - 12 to 16 alphanumeric characters

The normal LAN connections and iSCSI LAN connections (for the ETERNUS Disk storage system) should be kept separate from each other.

Various Windows Server® 2008 R2 or Windows Server® 2008 standard multipath driver (msdsm) settings can be adjusted, such as the load balance policy and retry count. However the following settings should not be changed from their default values.

<table>
<thead>
<tr>
<th>Screen name</th>
<th>Parameters that may not be changed</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPIO tab of Multi-Path Disk Device properties</td>
<td>Load balance policy, [Details] button, [Edit] button</td>
</tr>
<tr>
<td>Details of DSM</td>
<td>Timer counter (path checking period, enable path checking, number of retries, retry interval, PDO deletion period)</td>
</tr>
<tr>
<td>Details of MPIO paths</td>
<td>Path status</td>
</tr>
</tbody>
</table>

3.8 ETERNUS Multipath Driver Notes

When V2.0L16 or earlier versions of ETERNUS Multipath Driver for Windows Server® 2008 R2 or Windows Server® 2008 are used, some LUNs may not be recognized when the OS is restarted. This problem can be avoided by setting target binding in the server.

Target binding must be set using the iSCSICLI, which is the iSCSI Software Initiator command line tool. Since this setting is overwritten when settings are performed via Microsoft® iSCSI Software Initiator, other iSCSI-related settings must also be performed using the iSCSICLI. Refer to "Appendix A Microsoft iSCSI Software Initiator iSCSICLI Commands" (page 43) for details about iSCSICLI commands that are necessary for target binding and ETERNUS Disk storage system connection. Also, examples of settings via batch files using the iSCSICLI are described in "Appendix B iSCSICLI Setting Examples" (page 46).

3.9 Windows Server® 2008 R2, Windows Server® 2008 Connection Notes

When file copies and other operations are performed for a disk device that is connected with iSCSI in a Windows Server® 2008 R2 or a Windows Server® 2008 environment, an iScsiPrt error may be output in the system event log.

This event can be prevented by disabling the Delayed ACK. For more details, refer to the Microsoft web-site for KB981482.
Chapter 4 Installing and Setting Up ETERNUSmgr

If ETERNUSmgr is to be used, install it according to the directions given in the "ETERNUSmgr Install Guide". After the installation, set up ETERNUSmgr following the instructions in the "ETERNUSmgr User Guide".
Chapter 5  Setting Up the ETERNUS Disk Storage Systems

Set up the ETERNUS Disk storage systems using ETERNUSmgr.

ETERNUS Disk storage systems’ setup can be performed independently of server setup. For details on how to perform these settings, refer to the "ETERNUS Disk storage systems Server Connection Guide (iSCSI) ETERNUS Disk Storage System Settings for ETERNUS2000” or "ETERNUS Disk storage systems Server Connection Guide (iSCSI) ETERNUS Disk Storage System Settings for ETERNUS4000, ETERNUS8000”, and "ETERNUSmgr User Guide".
Chapter 6  Setting Up the Server

This chapter describes how to connect the ETERNUS Disk storage system to a server using a LAN card.

6.1 Installing the LAN Cards

Install the LAN card when the server is turned off. For the installation procedure, refer to the User Guide provided with the server. When using the onboard LAN card, skip this procedure and go to the next step.

Caution  When installing multiple LAN cards, record the relation between the PCI slot location and the port name of the LAN card as you install the LAN cards one by one. You can check the port name of the LAN card by clicking [Start] - [Settings] - [Network Connection].

6.2 Installing the Driver

Start the server and install necessary drivers. The drivers listed below are necessary:

- LAN card driver
  - LAN driver
- iSCSI Software Initiator
  - Supported version of Microsoft® iSCSI Software Initiator
- ETERNUS Disk storage system drivers
  - Install either of the following drivers depending on the type of connection.
    - Single-path configuration
      - The ETERNUS2000, ETERNUS4000, and ETERNUS8000 may be connected to using a standard OS driver and installation of the ETERNUS Device Driver is not required.
    - Multipath configuration
      - ETERNUS Multipath Driver
      - Standard Multipath Driver (msdsm) for Windows Server® 2008
6.2 Installing the Driver

6.2.1 Installing the LAN Driver

Install the LAN driver according to the procedure below.
When using the onboard LAN card, skip this procedure and go to the next step.
iSCSI network connection IP addresses must be set before the ETERNUS Disk storage system is connected.

Procedure

1. When installing the LAN driver, refer to the instructions provided with the LAN card.
2. Check that the driver has correctly been installed.

End of procedure

6.2.2 Installing the iSCSI Initiator

For Windows Server 2003, install the Microsoft® iSCSI Software Initiator according to the procedure below.

Procedure

1. Download Microsoft® iSCSI Software Initiator from the Microsoft® web-site.
2. Install the driver as directed in the instructions provided with it.
   Also note the following issue:
   • Installing the Microsoft® iSCSI Software Initiator
     Microsoft® iSCSI Software Initiator Version 2.02 or later is equipped with a module (Microsoft MPIO Multipathing Support for iSCSI) that supports multipath control. Installing this module prevents the ETERNUS Multipath Driver from performing multipath control.
Install Microsoft® iSCSI Software Initiator Version 2.02 or later after clearing the [Microsoft MPIO Multipathing Support for iSCSI] checkbox, as shown below.

3 Check that the driver has correctly been installed.

End of procedure

6.2.3 Installing the ETERNUS Disk Storage System Driver

- Configuring ETERNUS Multipath

Install the driver for ETERNUS Disk storage systems as required.

Refer to "3.3 Driver Notes" (page 12) for notes about drivers in cases such as when connecting the server to the ETERNUS Disk storage system in multipath configuration and using the path redundancy control (path fail-over) function, and for when single-path connection is used between the ETERNUS Disk storage system and server.

For the procedure about how to install (or uninstall), set up, and use the drivers for ETERNUS Disk storage systems, refer to the software manuals.
Configuring the Windows Server® 2008 Standard Multipath Driver (msdsm)

Environment

- Installing Multipath I/O

Procedure

1. Select the "Multipath I/O" checkbox in the "Select Features" screen, and install the Multipath I/O function.

2. Restart the server.

End of procedure

- Detailed setup for MPIO

Perform settings to apply the installed Multipath I/O to the ETERNUS Disk storage system.

Procedure

1. Click [Control Panel] – [MPIO].

The MPIO properties window appears.
2 In the MPIO properties window, select the [MIPO-ed Devices], and click the [Add] button.

3 Enter the ID of the ETERNUS Disk storage system that is to be connected in the [Device Hardware Id] field.
   For ETERNUS2000, enter "FUJITSU E2000" for the ID.
   For ETERNUS4000, enter "FUJITSU E4000" for the ID.
   For ETERNUS8000, enter "FUJITSU E8000" for the ID.

   A space must be entered between "FUJITSU" and "E...".

End of procedure
6.3 Changing the Registry Information (iSCSI initiator/LAN driver)

Modify the registry value "MaxPendingRequests" for the iSCSI initiator driver.

**Procedure**

1. Click [Run] from the [Start] menu. The [Run] dialog box appears.
2. Enter "regedit" in [Open] and click the [OK] button.

The registry editor starts.
3 Follow the path described below:
\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Class\{4D36E97B-E325-11CE-BFC1-08002BE10318}\xxxx\Parameters\MaxPendingRequests

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default</td>
<td>REG_SZ</td>
<td>Value not set</td>
</tr>
<tr>
<td>NumberOfConnections</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxSendLength</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxReceiveLength</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxSendTimeout</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxReceiveTimeout</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxConnections</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxPendingRequests</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxRequests</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxRequestTimeout</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxReceive</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxSend</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxSegmentLength</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxUser</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxSession</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxTarget</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxLink</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxObject</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxDevice</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
<tr>
<td>MaxGrant</td>
<td>REG_DWORD</td>
<td>0x00000000 (0)</td>
</tr>
</tbody>
</table>

Caution Check that the xxxx (4-digit number) under the key described above is iSCSI and go to the next step.

4 Modify the registry value.
Change the value data of "MaxPendingRequests" to "28" in hexadecimal ("40" in decimal number).

The default value is "ff" in hexadecimal ("255" in decimal number).

5 Turn off the server.
The settings will be enabled after a reboot of the server.

End of procedure
6.4 Connecting the Cables

Check that the ETERNUS Disk storage system and server are both turned off. Connect the ETERNUS Disk storage system iSCSI port and server LAN card port using an iSCSI cable.

When connecting a server to the ETERNUS Disk storage system through a LAN switch, make sure it is turned off too, and then use an iSCSI cable to connect the ETERNUS Disk storage system iSCSI port and LAN switch port and another iSCSI cable to connect the server LAN card port and (different) LAN switch port.
6.5 Turning on the Devices

To turn on all connected devices, use the following procedures:

<table>
<thead>
<tr>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
</tbody>
</table>

**Caution**

Before turning the server on, check that the ETERNUS Disk storage systems and LAN switches are all "Ready". If the server is turned on and they are not "Ready", the server will not be able to recognize the ETERNUS Disk storage systems. Also, when the ETERNUS Disk storage system power supply is being controlled by a connected server, make sure that the ETERNUS Disk storage system does not shut down before the connected servers. Similarly, the LAN switches must also be turned off after the connected servers have been shut down. If turned off, data writes from the running server cannot be saved to the ETERNUS Disk storage systems, and already saved data may also be affected.

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6.6 Setting Up the iSCSI Initiator Driver Parameters

Use the Microsoft® iSCSI Software Initiator to set the iSCSI initiator driver parameters, as follows:

<table>
<thead>
<tr>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
</tbody>
</table>
4. The current iSCSI name is displayed in [Initiator Node Name]. To change the iSCSI name, click the [Change] button. When using the default iSCSI name displayed in [Initiator Node Name], also click the [Change] button. This allows you to continue to use the above iSCSI name even after changing the “computer name” of the server.

5. Enter the iSCSI name and click the [OK] button.

Caution: If changing the LAN card's iSCSI name results in inconsistency with the ETERNUS Disk storage system settings (“6.7.1 CHAP Authentication” (page 33)), redo Step 8 and the rest of the procedure given in “6.7.1 CHAP Authentication” (page 33)” to confirm the changed iSCSI name.

6. Click the [Discovery] tab and then click the [Add] button.
7 In the [IP address or DNS name] field, enter the IP address of the ETERNUS Disk storage system iSCSI port that is to be connected to, and click the [Advanced] button.

- The address set in the ETERNUS Disk storage system iSCSI TCP/IP settings should be entered as the IP address of the ETERNUS Disk storage system.
  - For ETERNUS2000
  - For ETERNUS4000 or ETERNUS8000

- The port number is automatically set to "3260" and should not be changed.

The [Advanced Settings] window appears.

8 Click the [General] tab.
9. Select "Microsoft iSCSI Initiator" for [Local adapter] and set the Initiator server IP address in [Source IP] under [Connect by using]. Then, click the [OK] button. The settings of CHAP authentication can also be made. For details of the settings, refer to "6.7 CHAP Authentication Settings" (page 33).

10. Click the [OK] button.

11. Click the [Targets] tab.
12. Check the connection and click the [Log On] button. If the connection is OK, the ETERNUS Disk storage system iSCSI name should appear in [Targets] and the [Status] should be "Inactive".

---

**Caution**

Even if the connection is correctly made, the above may not appear in [Targets]. Perform the following steps.  
- Check that the cables are connected correctly.  
- Click the [Refresh] button.
13 Select the [Automatically restore this connection when the system boots] checkbox and click the [Advanced] button.

14 Select “Microsoft iSCSI Initiator” for [Local adapter]. Next, set the Initiator server IP address and the ETERNUS Disk storage system IP address/port number (for example, 192.168.1.64 / 3260), in [Source IP] and [Target Portal] respectively under [Connect by using]. Then, click the [OK] button.

15 Click the [OK] button.
If the logon is successful, the [Status] of the ETERNUS Disk storage system iSCSI name displayed in the [Targets] tab window should change to “Connected”.

End of procedure

6.7 CHAP Authentication Settings

The following two types of authentication are available:

- **CHAP Authentication**
  The ETERNUS Disk storage system authenticates the server. Secrets are set to the target only and all servers attempting to access the target need to start logon sessions with target using the same secrets.

- **Bidirectional CHAP Authentication**
  The ETERNUS Disk storage system and the server authenticate each other. Different secrets are set to each target in the Storage Area Network (SAN) and to each side of the transmission.

If authentication is to be used, certain type-dependent settings are required. Authentication will also need to be set up on the ETERNUS Disk storage system side to match that of the server. If these authentication settings are omitted, unauthenticated connections will be established. If CHAP authentication is set up on the ETERNUS Disk storage system side only, a result of “Authentication Failure” will be produced when the server attempts to log on.

### 6.7.1 CHAP Authentication

Server-side CHAP authentication should be set up as follows:

**Procedure**

1. Start the Microsoft® iSCSI Software Initiator.
   Double-click on the Microsoft iSCSI Initiator icon.
2. Click the [Discovery] tab.
3. Select the iSCSI port of the server to which the authentication settings are set and click the [Add] button.

![Add Target Portal window]

The [Add Target Portal] window will appear.

4. In the [IP address or DNS name] field, enter the IP address of the ETERNUS Disk storage system iSCSI port that is to be connected to, and click the [Advanced] button.

![Advanced Settings window]

The [Advanced Settings] window appears.

5. Set “Microsoft iSCSI Initiator” in [Local adapter], set the Initiator server IP address in [Source IP] under [Connect by using], and click the [OK] button. Then, select the [CHAP logon information] checkbox, specify [User name] and [Target secret], and click the [OK] button.
Chapter 6  Setting Up the Server
> 6.7  CHAP Authentication Settings

Click the [Targets] tab.

Check the connection and click the [Log On] button. When CHAP authentication is complete and the connection is OK, the ETERNUS Disk storage system iSCSI name should appear in [Targets] and the [Status] should be "Inactive".

Select the [Automatically restore this connection when the system boots] checkbox and click the [Advanced] button.

Even if CHAP authentication is working, the ETERNUS Disk storage system iSCSI name sometimes fails to appear in [Targets]. Clicking the [Refresh] button may help.

The [Log On to Target] window will appear.
Check that "Microsoft iSCSI Initiator" is set for [Local adapter], Initiator server IP address is set in [Source IP], and the ETERNUS Disk storage system IP address/port number (for example, 192.168.1.64 / 3260) is set in [Target Portal] under [Connect by using]. Then, select the [CHAP logon information] checkbox, specify [User name] and [Target secret], and click the [OK] button.

Click the [OK] button.

If the logon is successful, the [Status] of the ETERNUS Disk storage system iSCSI name displayed in the [Targets] window of the [Targets] tab should change to "Connected".
6.7.2 Bidirectional CHAP Authentication

Server-side bidirectional CHAP authentication should be set up as follows:

**Procedure**

1. Start the Microsoft® iSCSI Software Initiator.  
   Double-click on the Microsoft iSCSI Initiator icon.

2. Select the [General] tab and click the [Secret] button.

   ![Microsoft iSCSI Initiator Properties](image)

3. Enter the password under [Enter a secure secret] and then click the [OK] button.  
   [Enter a secure secret] must be specified with 12 to 16 alphanumeric characters.  
   Clicking the [OK] button makes the password specified in [Enter a secure secret] disappear.

   ![CHAP Secret Setup](image)

   **Caution**  
   The [Enter a secure secret] set here must match the [Password] of the CHAP Authentication (ETERNUS2000) or Set CA Parameters (ETERNUS4000, ETERNUS8000) for the ETERNUS Disk storage system.

4. Click the [Discovery] tab.
5. Select the iSCSI port of the server to which the authentication settings are set and click the [Add] button.

The [Add Target Portal] window will appear.

6. In the [IP address or DNS name] field, enter the IP address of the ETERNUS Disk storage system iSCSI port that is to be connected to, and click the [Advanced] button.

The [Advanced Settings] window appears.

7. Set “Microsoft iSCSI Initiator” in [Local adapter], set the Initiator server IP address in [Source IP] under [Connect by using], and click the [OK] button. Then, select the [CHAP logon information] checkbox, and specify [User name] and [Target secret]. Select the [Perform mutual authentication] checkbox, and click the [OK] button.
8 Click the [OK] button.

9 Click the [Targets] tab.

10 Check the connection and click the [Log On] button.

When bidirectional CHAP authentication is complete and the connection is OK, the ETERNUS Disk storage system iSCSI name should appear in [Targets] and the [Status] should be "Inactive".

![Image of iSCSI configuration settings]

The [Log On to Target] should appear.

11 Select the [Automatically restore this connection when the system boots] checkbox and click the [Advanced] button.

![Image of advanced options for iSCSI connection]

Even if bidirectional CHAP authentication is working, the ETERNUS Disk storage system iSCSI name sometimes fails to appear in [Targets]. Clicking the [Refresh] button may help.

![Image of refresh button]
12 Check that "Microsoft iSCSI Initiator" is set for [Local adapter], Initiator server IP address is set in [Source IP], and the ETERNUS Disk storage system IP address/port number (for example, 192.168.1.64 / 3260) is set in [Target Portal] under [Connect by using]. Then, select the [CHAP logon information] checkbox, and specify [User name] and [Target secret]. Select the [Perform mutual authentication] checkbox, and click the [OK] button.

![Screenshot of Advanced Settings](image)

13 Click the [OK] button.

![Screenshot of Target Properties](image)

If the logon is successful, the [Status] of the ETERNUS Disk storage system iSCSI name displayed in the [Targets] window of the [Targets] tab should change to "Connected".

End of procedure
6.8 Checking the ETERNUS Disk Storage Systems' Connection Status

The following items can be set and displayed in the ETERNUS Multipath Driver main window when the ETERNUS Multipath Driver is used.

- ETERNUS Disk storage systems' connection status
- Connected LUNs
- Path status
- Path restoration or release

These describe ETERNUS Disk storage systems' connection status and the checking of paths.

**Procedure**

1. Start up ETERNUS Disk storage systems (assuming that LUNs are already set up), and check that it is "Ready" before starting up the server.
2. When the server is Ready, start up ETERNUS Multipath Manager.
3. The main window will appear.
   
   The status of the ETERNUS Disk storage systems connected to the server and path status can be checked.

For details on ETERNUS Multipath Manager operations, refer to the manual provided with the ETERNUS Multipath Driver.

End of procedure
Chapter 7  Notes on Operation

7.1  Creating the Disk Partitions

Create disk partitions as necessary, using the following procedure.

Procedure

1  Open [Disk Management] via [Computer Management].
   If unsigned disks exist, a query about whether or not to sign disks for the connected devices is made.

2  Sign disks and create partitions as necessary.

Note

- This setup can also be used to upgrade to dynamic disks.
- 2TB or larger disks must be converted to GPT disks.

End of procedure

7.2  Setting Up the Cluster Configuration

If configuring a cluster (WSFC/MSCS), install the cluster related applications, as necessary.
After cluster configuration is finished, recheck the registry information according to the instructions in "6.3 Changing the Registry Information (iSCSI initiator/LAN driver)" (page 25). Correct the information, if necessary.
## Appendix A  Microsoft iSCSI Software Initiator

### iSCSICLI Commands

The following section shows iSCSICLI commands that are related to iSCSI settings and an overview of these commands. For more details, refer to "Microsoft iSCSI Software Initiator Users Guide".

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1 Command | NodeName <node name>  
Parameter | iSCSI name of the initiator  
Description | This command sets the iSCSI name of the iSCSI initiator. |
| 2 Command | CHAPSecret <CHAP secret>  
Parameter | Password of the initiator  
Description | This command sets the password of the iSCSI initiator (Only when bidirectional CHAP is used). |
| 3 Command | AddiSNSServer <iSNS Server Address>  
Parameter | IP address of the iSNS server  
Description | This command adds an iSNS server (Only when an iSNS server is used). |
| 4 Command | QAddTargetPortal <Portal IP Address> [CHAP Username] [CHAP Password]  
Parameter | IP address of the iSCSI port on the ETERNUS Disk storage system  
[CHAP Username]: User name of the target (Only when CHAP is used)  
[CHAP Password]: Password of the target (Only when CHAP is used)  
Description | This command adds an iSCSI port of the ETERNUS Disk storage system. |
| 5 Command | ListTargets  
Parameter | N/A  
Description | This command displays the added iSCSI port of the ETERNUS Disk storage system. |
### 6 Command

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| **LoginTarget** | `<TargetName>`: iSCSI name of the target  
`<ReportToPNP>`: When "T" or "t" is input, a LUN is recognized as a device by the OS  
`<TargetPortalAddress>`: IP address of the iSCSI port on the ETERNUS Disk storage system  
`<TargetPortalSocket>`: TCP port number 3260  
`<Username>`: CHAP user name that is used to log in to the target  
`<Password>`: CHAP password that is used to log in to the target  
`<AuthType>`: The login authentication method 0 when not using CHAP  
1 when using CHAP  
2 when using bidirectional CHAP  
`<Mapping Count>`: The number of LUNs  
`<Target Lun>`: LUN of the ETERNUS Disk storage system  
`<OS Bus>`: Bus number  
`<Os Target>`: Target ID that the OS uses  
`<OS Lun>`: LUN that the OS uses |
| **Description** | This command logs in to the target. This command specifies `<OS Lun>` from `<Target Lun>` for the same number of times as the number of LUNs that is specified in `<Mapping Count>`. Specify "*" (asterisk) for arguments that do not need to be specified. |

### 7 Command

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ReportTargetMappings</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>This command displays the target mapping status.</td>
</tr>
</tbody>
</table>
### Command: PersistentLoginTarget

**Parameter**
- `<TargetName>`: iSCSI name of the target
- `<TargetToPNP>`: When "T" or "t" is input, a LUN is reported to the OS as a device
- `<TargetPortalAddress>`: IP address or DNS name of the iSCSI port on the ETERNUS Disk storage system
- `<TargetPortalSocket>`: TCP port number 3260
- `<Username>`: CHAP user name that is used to log in to the target
- `<Password>`: CHAP password that is used to log in to the target
- `<AuthType>`: The login authentication method
  - 0 when not using CHAP
  - 1 when using CHAP
  - 2 when using bidirectional CHAP
- `<Mapping Count>`: The number of LUNs
- `<Target Lun>`: LUN of the ETERNUS Disk storage system
- `<OS Bus>`: Bus number
- `<Os Target>`: Target ID that the OS uses
- `<OS Lun>`: LUN that the OS uses

**Description**
This command sets persistent login to the target. This command specifies `<OS Lun>` from `<Target Lun>` for the same number of times as the number of LUNs that is specified in `<Mapping Count>`. Specify "*" (asterisk) for arguments that do not need to be specified.

### Command: ListPersistentTargets

**Parameter**
- N/A

**Description**
This command displays the persistent login setting status.

### Command: BindPersistentDevices

**Parameter**
- N/A

**Description**
This command recognizes the device for which target binding is performed and links service startup.
Appendix B  iSCSICLI Setting Examples

B.1  iSCSI Connection Setting Procedure using the iSCSICLI

The following section shows the procedure for performing iSCSI connection settings using the iSCSICLI:

**Procedure**

1. Stop the service that is running on the server.
2. Clear all the settings that are related to iSCSI.
   - 2-1 Execute the following command to start Microsoft® iSCSI Software Initiator.
     
     ```
     C:\>iscsicpl
     ```
   - 2-2 Click the [Discovery] tab to delete all the entries of the iSCSI port.
   - 2-3 Click the [Favorite Targets] tab to delete all the entries of the favorite targets.
   - 2-4 Click the [Volumes and Devices] tab to delete all the entries of the volume list.
   - 2-5 Click the [OK] button.
3. Set target binding using the iSCSICLI.
   - To use the iSNS server and CHAP authentication, perform settings in this step. The following examples of settings that use batch files are provided.
     - An example of a setting that only performs target binding
       "B.2 Target Binding Setting Example" (page 49)
     - An example of a target binding setting that includes iSNS server addition and CHAP authentication setting
       "B.3 Target Binding Setting Example that Includes iSNS Server Addition and CHAP Authentication Setting" (page 52)
4 Check the target binding settings.

Execute the following command:

```bash
C:\> iscsicli ListPersistentTargets
Microsoft iSCSI Initiator Version 6.1 Build 7600
Total of 2 persistent targets
  Target Name : iqn.2000-09.com.fujitsu:storage-system.e4000m4:0000b93-cm0port0
  Address and Socket : 192.168.1.110 3260
  Session Type : Data
  Initiator Name : Root\ISCSIPRT\0000_0
  Port Number : <Any Port>
  Security Flags : 0x0
  Version : 0
  Information Specified: 0x20
  Login Flags : 0x0
  Username :
  Session Id : 0-0
  Target Name :
  Initiator :
  Initiator Scsi Device :
  Initiator Bus : 0
  Initiator Target Id : 10
    Target Lun: 0x0 <--> OS Lun: 0x0
    Target Lun: 0x100 <--> OS Lun: 0x1
    Target Lun: 0x200 <--> OS Lun: 0x2
    Target Lun: 0x300 <--> OS Lun: 0x3
    Target Lun: 0x400 <--> OS Lun: 0x4

  Target Name : iqn.2000-09.com.fujitsu:storage-system.e4000m4:0000b93-cm1port0
  Address and Socket : 192.168.2.110 3260
  Session Type : Data
  Initiator Name : Root\ISCSIPRT\0000_0
  Port Number : <Any Port>
  Security Flags : 0x0
  Version : 0
  Information Specified: 0x20
  Login Flags : 0x0
  Username :
  Session Id : 0-0
  Target Name :
  Initiator :
  Initiator Scsi Device :
  Initiator Bus : 0
  Initiator Target Id : 20
    Target Lun: 0x0 <--> OS Lun: 0x0
    Target Lun: 0x100 <--> OS Lun: 0x1
    Target Lun: 0x200 <--> OS Lun: 0x2
    Target Lun: 0x300 <--> OS Lun: 0x3
    Target Lun: 0x400 <--> OS Lun: 0x4

The operation completed successfully.
```

Check that the Initiator Target Id values are correctly set and that the LUNs (Target Lun) of the ETERNUS Disk storage system correspond to the LUNs that the OS uses (OS Lun).

5 Restart the server.
6 Check that paths are normally configured using ETERNUS Multipath Manager. For more details, refer to the ETERNUS Multipath Driver manual.

7 Perform settings for device recognition and service startup synchronization. Execute the following command to complete the settings that allow the device for which target binding is performed to be recognized at the next OS startup and that allow the service to start up synchronously at the next OS startup.

```
C:\>iscsicli BindPersistentDevices
```

**Note**
- Once settings are made, they are not deleted when the server is restarted.
- When the system configuration is changed (for example, LUNs are added or the iSCSI name is changed), perform the settings related to the iSCSI connection again by repeating Step 1 to Step 7.

End of procedure
This section provides an example of a batch file that is used in the environment shown below to bind target ID: 10 with CM#0 CA#1 Port#0 and to bind target ID: 20 with CM#1 CA#1 Port#0. The settings of an iSNS server and CHAP are not included.

<table>
<thead>
<tr>
<th>Server</th>
<th>Initiator name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>iqn.1991-05.com.microsoft:rx300s5-4</td>
</tr>
<tr>
<td></td>
<td>LAN Port#1 192.168.1.20</td>
</tr>
<tr>
<td></td>
<td>LAN Port#2 192.168.2.20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Switching HUB#1</th>
<th>Switching HUB#2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target ID 10</td>
<td>Target ID 20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ETERNUS Disk storage system</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM#0 CA#1 Port#0 192.168.1.120</td>
</tr>
<tr>
<td>LUN#0 iqn.2000-09.com.fujitsu:storage-system.e4000m4:00000b93-cm0port0</td>
</tr>
<tr>
<td>CM#1 CA#1 Port#0 192.168.2.120</td>
</tr>
<tr>
<td>LUN#1 iqn.2000-09.com.fujitsu:storage-system.e4000m4:00000b93-cm1port0</td>
</tr>
<tr>
<td>LUN#2</td>
</tr>
</tbody>
</table>
@echo off

rem # iSCSI initiator name
set INITIATOR_NAME=iqn.1991-05.com.microsoft:rx300s5-4

rem # Target portal IP address
set TARGET_IP1=192.168.1.110
set TARGET_IP2=192.168.2.110

rem # Target portal port number
set TARGETPORTALSOCKET=3260

rem # Target IQN
set TARGET_IQN1=iqn.2000-09.com.fujitsu:storage-system.e4000m4:00000b93-cm0port0
set TARGET_IQN2=iqn.2000-09.com.fujitsu:storage-system.e4000m4:00000b93-cm1port0

rem # Count of Logical Unit
set MAPPINGCOUNT=3

rem # Logical Unit number(hex)
rem # You should input LUN like as following format;
rem #
rem # ETERNUS 0x0  = 0x0000000000000000
rem # ETERNUS 0x1  = 0x0000000000000100
rem # ETERNUS 0x2  = 0x0000000000000200
rem # ....
rem # ETERNUS 0xff = 0x000000000000ff00
rem #
set TARGET_LUN1=0x0000000000000000
set TARGET_LUN2=0x0000000000000100
set TARGET_LUN3=0x0000000000000200

rem # TARGET ID(dec)
rem # You should assign fixed number for all target
rem # those are connected to a server.
rem #
set TARGET_ID1=10
set TARGET_ID2=20

rem # Running iSCSICLI commands
rem #
rem # set Initiator IQN
rem #
iscsicli NodeName %INITIATOR_NAME%

rem # set target portal IP
rem #
iscsicli QAddTargetPortal %TARGET_IP1%
iscsicli QAddTargetPortal %TARGET_IP2%

Use a 14-digit hexadecimal number + "00" between 0x0000000000000000 and 0x000000000000ff00 to specify the logical unit numbers that are set in the ETERNUS Disk storage system. "0" cannot be omitted.

Use decimal numbers between 0 and 254 to specify any target IDs.
### B.2 Target Binding Setting Example

```plaintext
rem #---------------------------------
rem # login to Target
rem #---------------------------------
iscsicli LoginTarget %TARGET_IQN1% T %TARGET_IP1% %TARGETPORTALSOCKET% * * * * * * * * * * * * *
%MAPPINGCOUNT% %TARGET_LUN1% 0 %TARGET_ID1% 0 %TARGET_LUN2% 0 %TARGET_ID1% 1 %TARGET_LUN3% 0
%TARGET_ID1% 2
iscsicli LoginTarget %TARGET_IQN2% T %TARGET_IP2% %TARGETPORTALSOCKET% * * * * * * * * * * * * *
%MAPPINGCOUNT% %TARGET_LUN1% 0 %TARGET_ID2% 0 %TARGET_LUN2% 0 %TARGET_ID2% 1 %TARGET_LUN3% 0
%TARGET_ID2% 2

rem #---------------------------------
rem # set PersistentLoginTarget
rem #---------------------------------
iscsicli PersistentLoginTarget %TARGET_IQN1% T %TARGET_IP1% %TARGETPORTALSOCKET% * * * * * * * * * * * * *
%MAPPINGCOUNT% %TARGET_LUN1% 0 %TARGET_ID1% 0 %TARGET_LUN2% 0 %TARGET_ID1% 1 %TARGET_LUN3% 0
%TARGET_ID1% 2
iscsicli PersistentLoginTarget %TARGET_IQN2% T %TARGET_IP2% %TARGETPORTALSOCKET% * * * * * * * * * * * * *
%MAPPINGCOUNT% %TARGET_LUN1% 0 %TARGET_ID2% 0 %TARGET_LUN2% 0 %TARGET_ID2% 1 %TARGET_LUN3% 0
%TARGET_ID2% 2

rem #---------------------------------
rem # reboot
rem #---------------------------------
echo "Reboot the system to reflect iSCSI configuration."
echo "After booting up the system, execute following;"
echo "iscsicli BindPersistentDevices"
```

Specify *** for arguments such as Username and Password that do not need to be specified.
B.3 Target Binding Setting Example that Includes iSNS Server Addition and CHAP Authentication Setting

This section provides an example of a batch file that is used in the environment shown below to set the iSNS server and bidirectional CHAP, to bind target ID: 6 with CM#0 CA#1 Port#0, and to bind target ID: 8 with CM#1 CA#1 Port#0.
@echo off

rem # Configuration
rem # iSCSI initiator name
rem #---------------------------------
set INITIATOR_NAME=iqn.1991-05.com.microsoft:rx300s5-4

set ISNS_SERVER1=192.168.1.1
set ISNS_SERVER2=192.168.2.1

set TARGET_IP1=192.168.1.120
set TARGET_IP2=192.168.2.120

set TARGETPORTALSOCKET=3260

set TARGET_IQN1=iqn.2000-09.com.fujitsu:storage-system.e4000m4:00000b93-cm0port0
set TARGET_IQN2=iqn.2000-09.com.fujitsu:storage-system.e4000m4:00000b93-cm1port0

set CHAP_SECRET=e4000-e4000-e4
set USER_NAME=fujitsu
set PASSWORD=irohanihoheto
set AUTHTYPE=2

set MAPPINGCOUNT=4

set TARGET_LUN1=0x0000000000000000
set TARGET_LUN2=0x0000000000000100
set TARGET_LUN3=0x0000000000000200
set TARGET_LUN4=0x0000000000000300

set TARGET_ID1=6
set TARGET_ID2=8

These lines are not necessary when an iSNS server is not used.

This line is not necessary for unidirectional CHAP.

Use a 14-digit hexadecimal number + "00" between 0x0000000000000000 and 0x00000000000000ff to specify the logical unit numbers that are set in the ETERNUS Disk storage system. "0" cannot be omitted.

Use decimal numbers between 0 and 254 to specify any target IDs.
Appendix B  iSCSICLI Setting Examples

B.3 Target Binding Setting Example that Includes iSNS Server Addition and CHAP Authentication Setting

```bash
rem ####################################################################
rem # Running iSCSICLI commands
rem ####################################################################

rem #---------------------------------
rem # set Initiator IQN
rem #---------------------------------
iscsicli NodeName %INITIATOR_NAME%

rem #---------------------------------
rem # set CHAP secret
rem # only to use mutual-CHAP
rem #---------------------------------
iscsicli CHAPSecret %CHAP_SECRET%

rem #---------------------------------
rem # set iSNS server IP address
rem # only to use iSNS server
rem #---------------------------------
iscsicli AddiSNSServer %ISNS_SERVER1%
iscsicli AddiSNSServer %ISNS_SERVER2%

rem #---------------------------------
rem # set target portal IP
rem #---------------------------------
iscsicli QAddTargetPortal %TARGET_IP1% %USER_NAME% %PASSWORD%
iscsicli QAddTargetPortal %TARGET_IP2% %USER_NAME% %PASSWORD%

rem #---------------------------------
rem # login to Target
rem #---------------------------------
iscsicli LoginTarget %TARGET_IQN1% T %TARGET_IP1% %TARGETPORTALSOCKET% * * * * * * * * * %USER_NAME% %PASSWORD% %AUTHTYPE% * %MAPPINGCOUNT% %TARGET_LUN1% 0 %TARGET_ID1% 0 %TARGET_LUN2% 0 %TARGET_ID1% 1 %TARGET_LUN3% 0 %TARGET_ID1% 2 %TARGET_LUN4% 0 %TARGET_ID1% 3
iscsicli LoginTarget %TARGET_IQN2% T %TARGET_IP2% %TARGETPORTALSOCKET% * * * * * * * * * %USER_NAME% %PASSWORD% %AUTHTYPE% * %MAPPINGCOUNT% %TARGET_LUN1% 0 %TARGET_ID2% 0 %TARGET_LUN2% 0 %TARGET_ID2% 1 %TARGET_LUN3% 0 %TARGET_ID2% 2 %TARGET_LUN4% 0 %TARGET_ID2% 3

rem #---------------------------------
rem # set PersistentLoginTarget
rem #---------------------------------
iscsicli PersistentLoginTarget %TARGET_IQN1% T %TARGET_IP1% %TARGETPORTALSOCKET% * * * * * * * * * %USER_NAME% %PASSWORD% %AUTHTYPE% * %MAPPINGCOUNT% %TARGET_LUN1% 0 %TARGET_ID1% 0 %TARGET_LUN2% 0 %TARGET_ID1% 1 %TARGET_LUN3% 0 %TARGET_ID1% 2 %TARGET_LUN4% 0 %TARGET_ID1% 3
iscsicli PersistentLoginTarget %TARGET_IQN2% T %TARGET_IP2% %TARGETPORTALSOCKET% * * * * * * * * * %USER_NAME% %PASSWORD% %AUTHTYPE% * %MAPPINGCOUNT% %TARGET_LUN1% 0 %TARGET_ID2% 0 %TARGET_LUN2% 0 %TARGET_ID2% 1 %TARGET_LUN3% 0 %TARGET_ID2% 2 %TARGET_LUN4% 0 %TARGET_ID2% 3

rem #---------------------------------
rem # reboot
rem #---------------------------------
echo "Reboot the system to reflect iSCSI configuration."  
echo "After booting up the system, execute following;"  
echo "iscsicli BindPersistentDevices"
```

These lines are not necessary when an iSNS server is not used.

Specify **"** for arguments that do not need to be specified.

This line is not necessary for unidirectional CHAP.
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