

# PRIMEQUEST 2000 Series Intel Network Controllers iSCSI Boot Installation and Configuration

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April 2016

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# 1 Introduction

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iSCSI (Internet SCSI) is a protocol for linking servers and data storage facilities, similar to the Fibre Channel Protocol (FCP). iSCSI means "SCSI over Internet Protocol". iSCSI boot allows a server to be booted remotely from a drive in an iSCSI-based Storage Area Network (SAN).

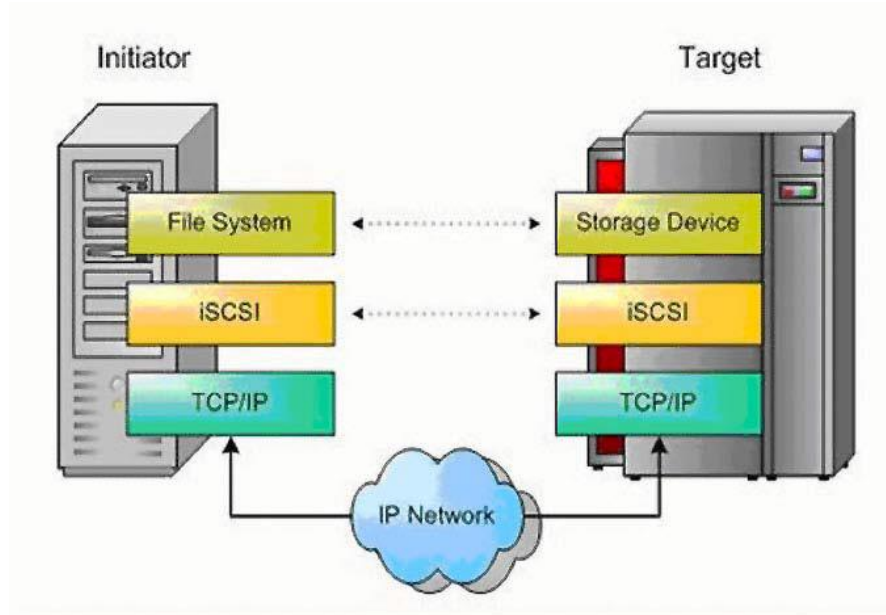


Figure 1: iSCSI connection

This manual describes how to configure a PRIMEQUEST server equipped with Intel network controllers for iSCSI boot, focusing on the following issues:

- Configuring the system BIOS and network controllers
- Associating an iSCSI initiator with the iSCSI target
- Recording the iSCSI target name, TCP port number, iSCSI LUN, and authentication details

## Configuring the iSCSI Target

Configuration of the iSCSI target varies according to the iSCSI target vendor. In this document the various vendors cannot be covered in detail. The general steps include:

- Creating an iSCSI target
- Associating an iSCSI initiator with the iSCSI target
- Recording the iSCSI target name, TCP port number, iSCSI LUN, and authentication details

Refer to the iSCSI target vendor's documentation for the specific steps associated with the selected iSCSI target device. After the target has been configured, the following information should be collected from the target:

- The iSCSI target IQN
- The iSCSI target IP address
- The iSCSI target TCP port number
- The iSCSI target CHAP ID & secret

The exact configuration process of a PRIMERGY server for iSCSI depends on the operating system.

## References

RFC 3720, "Internet Small Computer Systems Interface (iSCSI)", <http://www.ietf.org/rfc/rfc3720.txt>

RFC 4173, "Bootstrapping Clients using the Internet Small Computer System Interface (iSCSI) Protocol", <http://www.ietf.org/rfc/rfc4173.txt>

## 1.1 General Notes

- NIC Teaming is not supported with iSCSI Boot. For failover support, a multipath connection can be used instead.
- Please disable the STP (Spanning Tree Protocol) on switch ports, which are connected to NIC's, running iSCSI Boot.
- Tagged VLAN is not supported with iSCSI Boot.
- iSCSI Boot interface cannot be configured as "Virtual Network Adapter" under Hyper-V
- Do not use iSCSI Boot and WOL on the same Interface.
- IPv6 is not supported with iSCSI Boot.
- Windows Core installation is not supported with iSCSI Boot.
- If the driver for the device in use for iSCSI Boot is uninstalled via Device Manager, Windows will blue screen on reboot and the OS will have to be re-installed.
- ServerView OS installation is supported in version 11.15.05 or later.
- Use a single path configuration until the installation of the operating system and multipath driver is completed. After installing the operating system and multipath driver, connect the LAN cable to restore the original state.
- Multipath configuration with mixed I/O Unit(1GbE) and I/O Unit(10GbE) are not supported.

## 2 iSCSI Boot with Windows Server 2012 R2

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This chapter describes how to configure your server with Windows Server 2012 R2 to support iSCSI boot with Intel LAN controllers.

### 2.1 Installation Overview

Configuring a system to support iSCSI boot under Windows Server 2012 R2 consists of the following steps:

- Configuring the iSCSI Target (please see the documentation provided by the iSCSI target manufacturer.)
- Configuring the LAN Controller (see "iSCSI Boot Configurations" on page 19).
- Installing Windows Server 2012 R2 on an iSCSI Target (see page 8).

With Windows Server 2012 R2, you can configure a multipath connection (MPIO connection) using operating system resources. For detailed information, refer to chapter "Configuring an MPIO Connection with Windows" on page 10.

### 2.2 System Requirements

The following hardware and software are required to configure the iSCSI Boot environment.

Required hardware

- PRIMEQUEST 2000 series main unit  
I/O Unit(1GbE) or I/O Unit(10GbE)  
(iSCSI Boot using a PCI Express card with Intel Network Controller is not supported.)
- iSCSI storage unit and LAN switch

The latest driver can be downloaded from the following website.

Driver website

<http://support.ts.fujitsu.com/Download/>

## 2.3 iSCSI Boot with Windows Server

iSCSI boot is possible both in legacy mode and in UEFI mode.

If you want to perform the iSCSI boot in legacy mode, follow the information for configuring the LAN controllers in "iSCSI Boot Configurations in Legacy Mode" on page 19.

If you want to perform the iSCSI boot in UEFI mode, refer to the information for configuring the LAN controllers in "iSCSI Boot Configurations in UEFI Mode" on page 29.

## 2.4 Installing Windows Server 2012 R2 on an iSCSI Target

Installing Windows Server 2012 R2 with ServerView installation Manager is supported for the PRIMEQUEST. Please use ServerView installation Manager to install the OS and bundled software.

If you want to install Windows Server 2012 R2 without ServerView installation Manager, then you do the following steps.

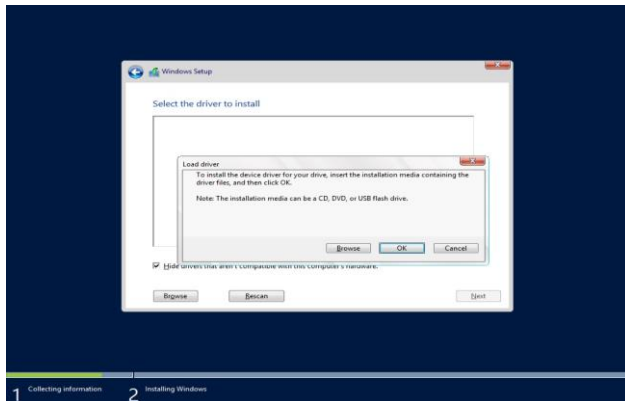
1. Switch on the server and insert the operating system DVD. The system connects to the iSCSI target and boots from the DVD.
2. Once the boot process is completed, the entry menu of the Windows setup is displayed.  
Select the user interface language, time zone as well as the country variant of the connected keyboard and click Next.
3. The Windows Server 2012 R2 welcome screen is displayed.  
Click Install Now. Continue working your way through the wizard until you come to the "Where do you want to install Windows" screen.
4. Click Load Driver to load the network driver currently released for your controller, even if the LUN is already displayed.  
To do this, you first need to connect a medium with the required drivers (e.g. via CD or USB device).



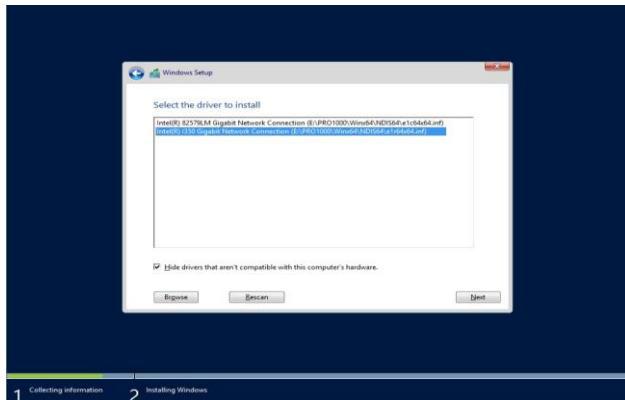
5. After clicking Load driver, you can use the Browse button to select the correct driver for your adapters.

I/O Unit (1GbE): <path>\PRO1000\Winx64\NDIS64

I/O Unit (10GbE): <path>\PROXGB\Winx64\NDIS64



6. Select the required driver, and confirm by clicking Next.



7. Then select the required installation target (target LUN), and confirm your selection by clicking Next.

8. If no iSCSI target LUN is displayed in this menu, there are two possible reasons:

- The iSCSI parameters in the controller's firmware setup do not match the corresponding parameters in the configuration of the iSCSI target. In this case you will need to check the iSCSI parameters in the controller's firmware setup (see chapter "iSCSI Boot Configurations" on page 19), and restart the Windows setup.
- No drivers or incorrect drivers were installed. Make sure that the correct drivers are installed.

9. Follow the instructions of the wizard to the end and then close it.

## 3 Configuring an MPIO Connection with Windows

With Windows Server 2012 R2, you can configure a multipath connection (MPIO connection) to an iSCSI target using operating system resources. This enhances the availability of the server when booting and in day-to-day operations. If the primary port fails, the secondary port takes over its function.

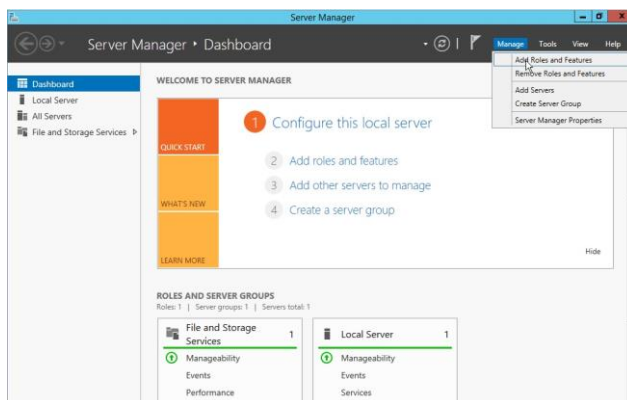
The following steps are required to configure a multipath connection:

1. Activating multipath support
2. Configuring the multipath connection in the iSCSI Software Initiator
3. Configuring the primary and secondary ports using the iSCSI Boot Configuration Utility.

For port configuration using the Intel iSCSI Boot Configuration Utility, refer to chapter "iSCSI Boot Configurations" on page 19.

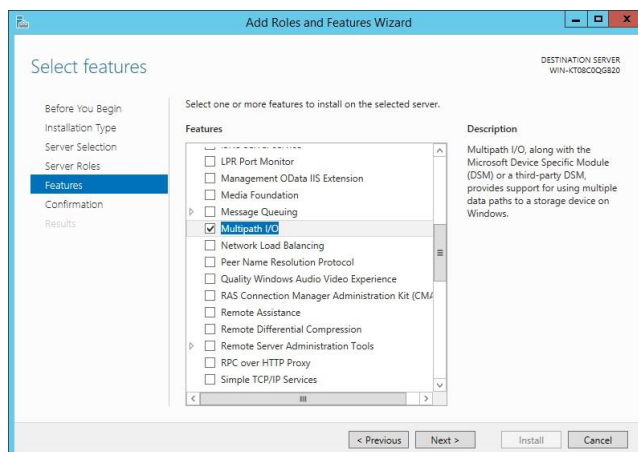
### 3.1 Activating MPIO Support

1. Start the Windows Server Manager, open the Manage menu, and click Add Roles and Features.

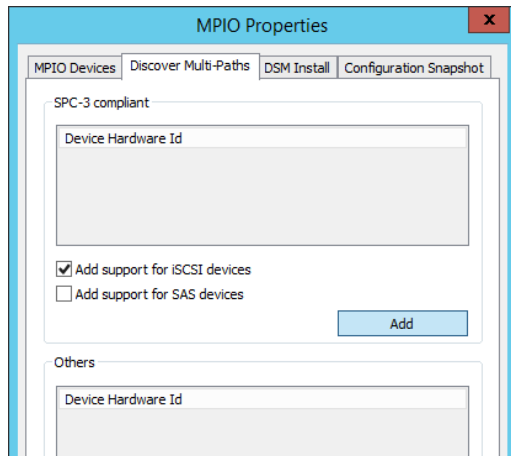


2. The Select Features window opens.

Work your way through the wizard and when you reach the "Features" step, select Multipath I/O, and click Next.

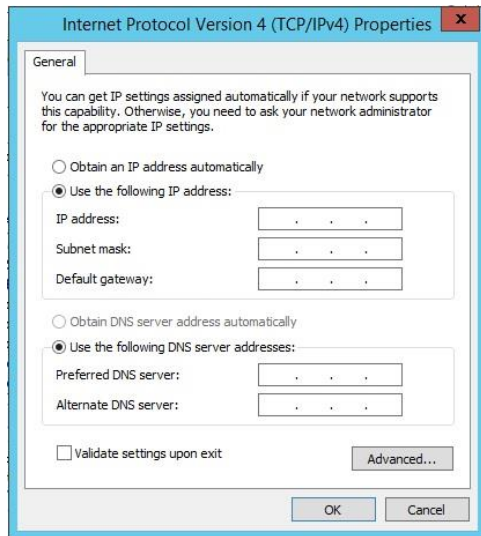


3. Follow the instructions of the wizard to the end.
4. After restarting Windows (if necessary), start the program MPIO (Server Manager – Tools – MPIO).
5. Open the Discover Multi-Paths tab and activate the Add support for iSCSI devices option. Click Add.
6. Click Ok and close the program. Now a restart may be required.

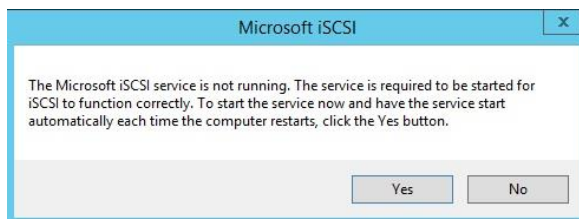


### 3.2 Configuring MPIO in the iSCSI Software Initiator

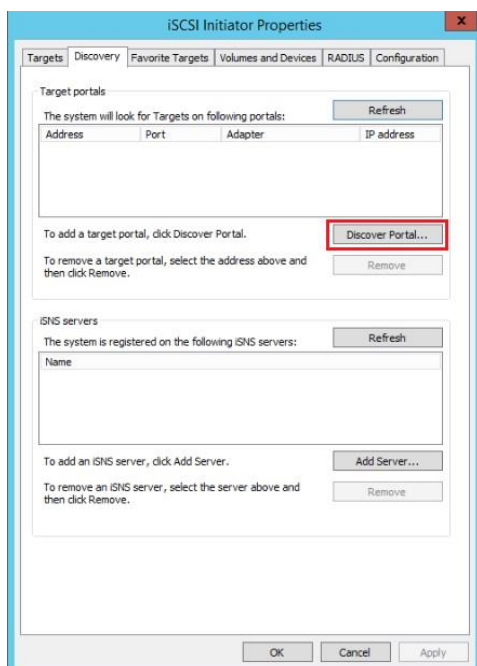
1. Set the IP address of the secondary port and connect the Ethernet cable.



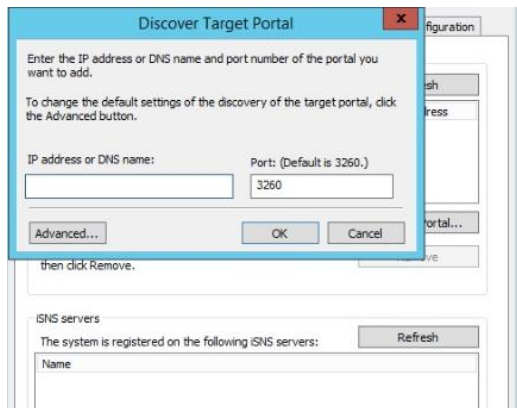
2. Start the Microsoft iSCSI Initiator.
3. If the following message appears, click Yes.



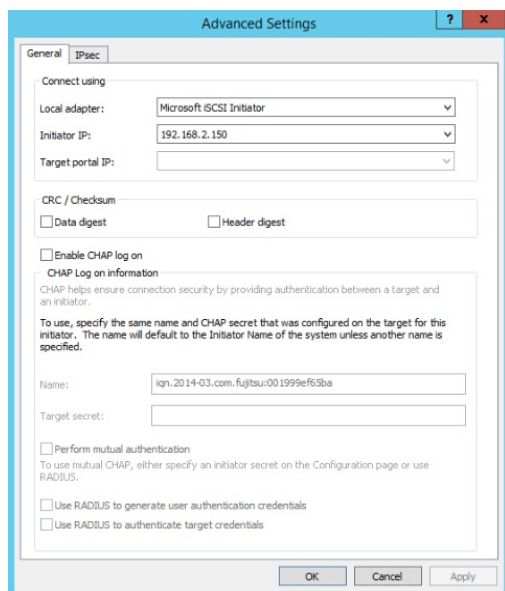
4. Select the Discovery tab and click Discover Portal to open the Add Target Portal dialog.



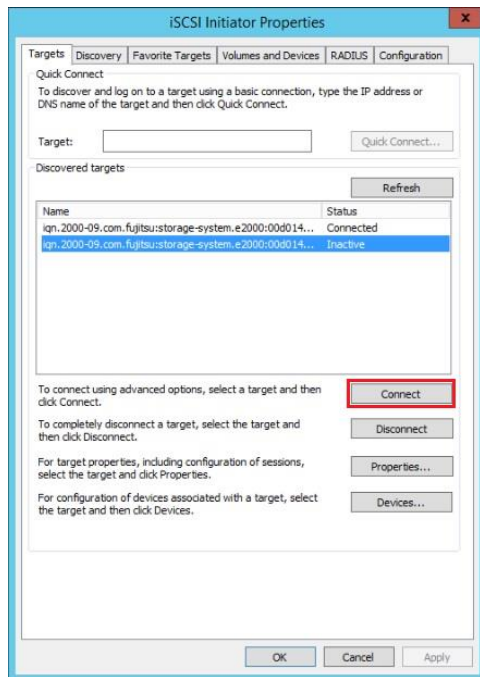
5. Enter the IP address and the port number (Port:) of the secondary port and click Advanced to open the Advanced Settings dialog.



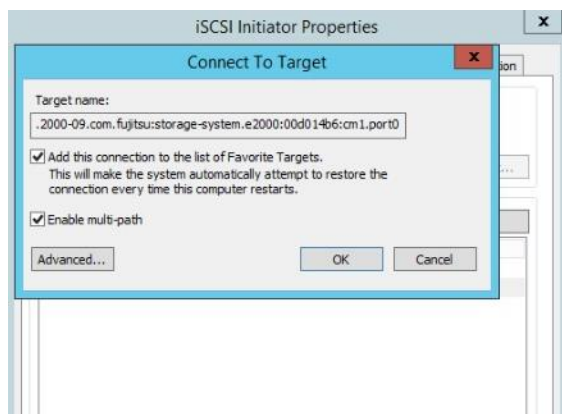
6. In the General tab, select Local adapter and Source IP for the secondary port, and click OK.



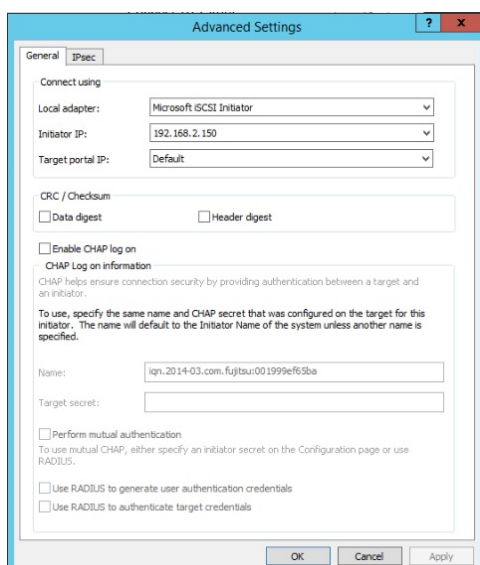
7. Select the Targets tab and click Connect to open the Connect to Target dialog.



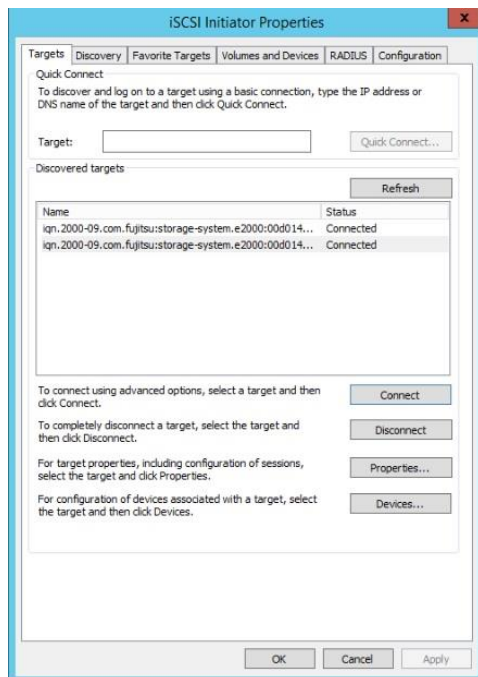
8. Enable the Add this connection (...) and Enable multi-path checkboxes, and click Advanced to open the Advanced Settings dialog.



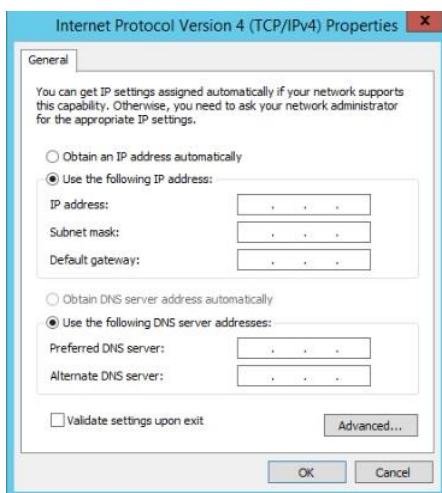
9. In the General tab, select Local adapter as the Target portal (IP) and click Ok.



10. Check that the status of the iSCSI target is "Connected"

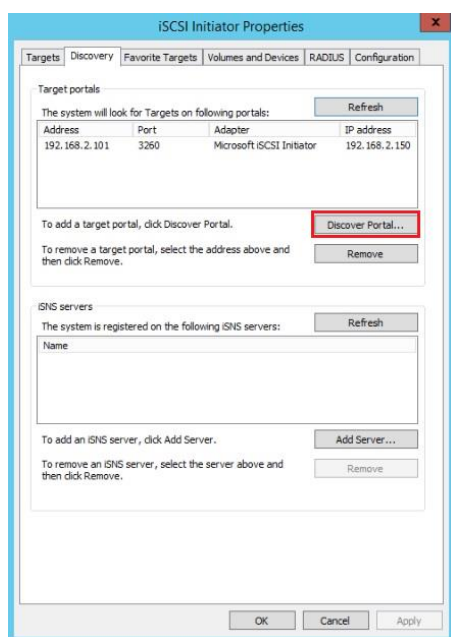


11. Restart the system and configure the second port in the relevant menu depending on whether you are using the legacy mode or UEFI mode (see "iSCSI Boot Configurations in Legacy Mode" on page 19 or "iSCSI Boot Configurations in UEFI Mode" on page 29).
12. Disconnect the Ethernet cable from the primary port and start the windows.
13. After the Windows has started, set the IP address of the primary port and connect the Ethernet cable.

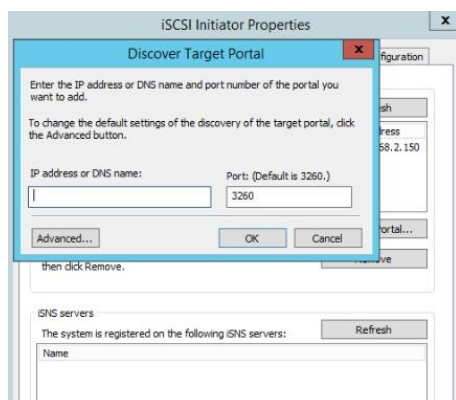


14. Start the Microsoft iSCSI Initiator.

15. Select the Discovery tab and click Discover Portal to open the Add Target Portal dialog.

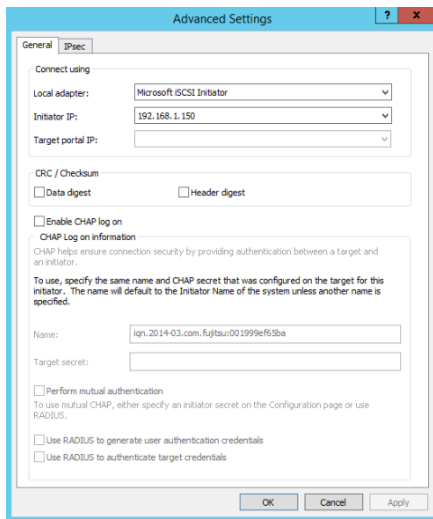


16. Enter the IP address and the port number (Port:) of the primary port and click Advanced to open the Advanced Settings dialog.

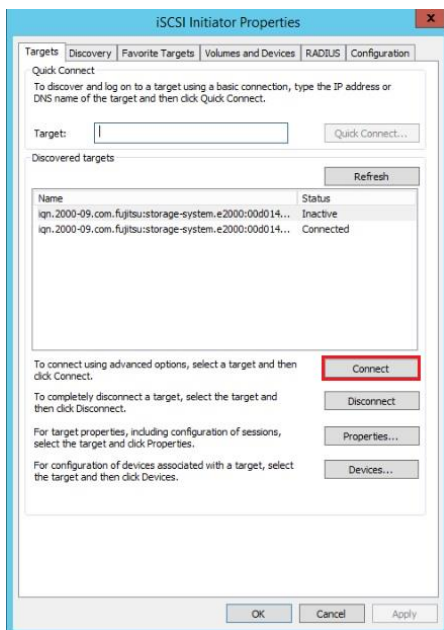




17. In the General tab, select Local adapter and Source IP for the primary port, and click OK.



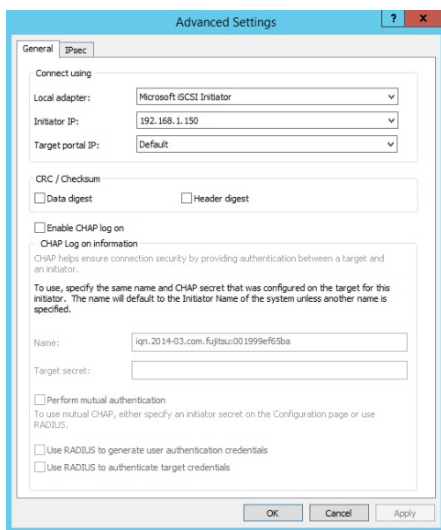
18. Select the Targets tab and click Connect to open the Connect to Target dialog.



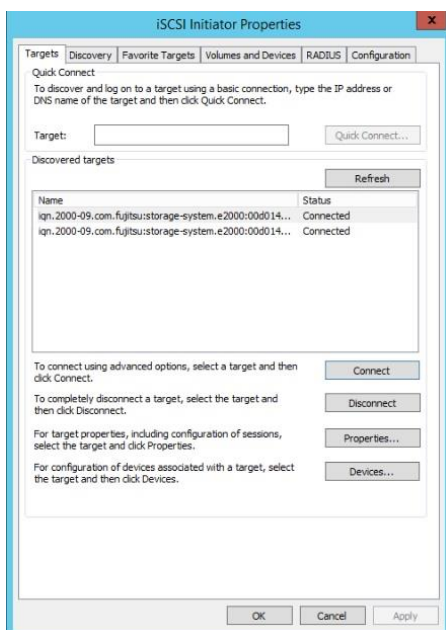
19. Enable the Add this connection (...) and Enable multi-path checkboxes, and click Advanced to open the Advanced Settings dialog..



20. In the General tab, select the primary adapter as the Target portal (IP) and click Ok.



21. Check that the status of the iSCSI target is "Conncted"



## 4 iSCSI Boot Configurations

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This chapter explains the configuration options for the iSCSI boot. For information on the legacy mode configuration options, see "iSCSI Boot Configurations in Legacy Mode" on page 19. For information on the UEFI mode configuration options, see "iSCSI Boot Configurations in UEFI Mode" on page 29.

### 4.1 iSCSI Boot Configurations in Legacy Mode

#### 4.1.1 Configuring Controller for iSCSI Boot

In the system BIOS, you must activate the Option ROM Scan for the controller in question to be able to call the Intel iSCSI Boot Configuration Utility for configuring the controller.

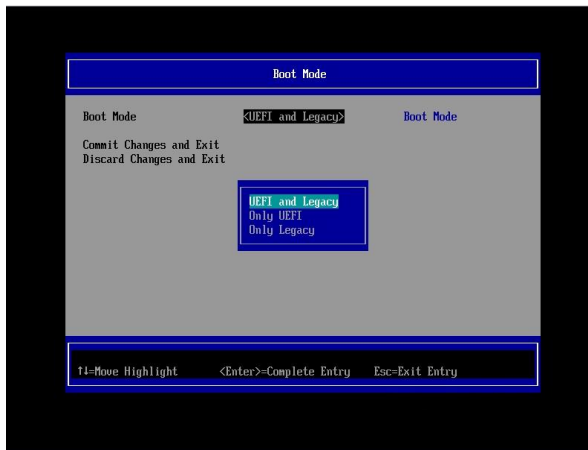
##### 4.1.1.1 PCI Subsystem configuration Menu

1. Start the Partition.

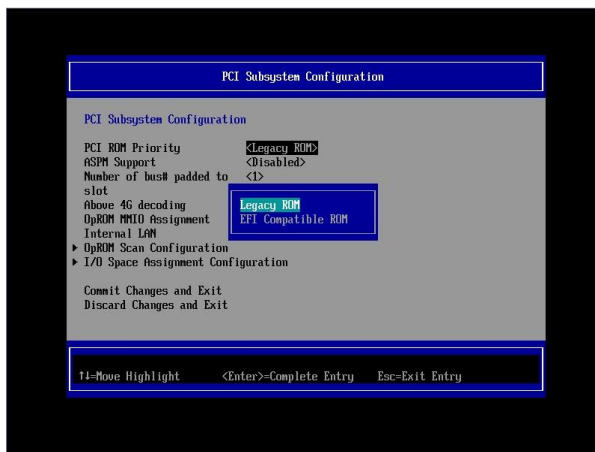
During FUJITSU logo appears, press any key (except the [Enter] key) to display the Boot Manager front page.



2. Select [Boot Maintenance Manager].
3. Select [Boot Mode].
4. Select [Boot Mode] and open the submenu.  
Set the parameter to "UEFI and Legacy" or "Only Legacy".
5. Select [Commit Changes and Exit], and then press the [Enter] key.



6. Press the [Esc] key to return to the Boot Manager front page.
7. Select [Device Manager].
8. Select [PCI Subsystem Configuration].
9. Select [PCI ROM Priority] and open the submenu.  
Set the parameter to "Legacy ROM".
10. Select [Commit Changes and Exit], and then press the [Enter] key.



#### 4.1.1.2 LAN Remote Boot Configuration

1. Start the Partition.
2. Select [Device Manager].
3. Select [LAN Remote Boot Configuration].
4. Select the entry of the LAN controller that you want to configure for iSCSI Boot and set the parameter for this controller to "Legacy iSCSI".
5. Select [Commit Changes and Exit], and then press the [Enter] key.



#### Notes

- Please do not mix "Legacy iSCSI" and "UEFI(PXE/iSCSI)"
- Activate the Option ROM Scan only for the controller you want to use for iSCSI boot.

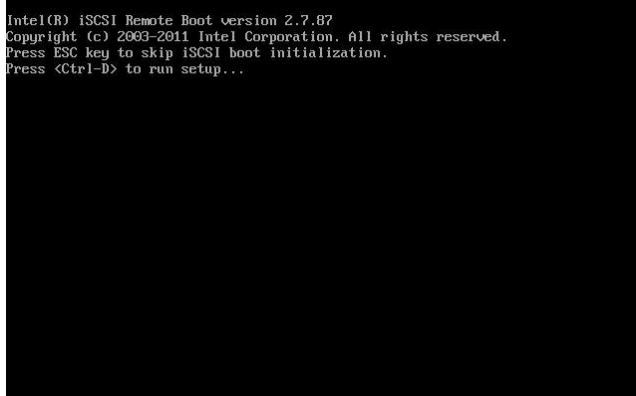
### 4.1.2 Intel iSCSI Boot Configuration Utility

The menus of the Intel iSCSI Boot Configuration Utility allow you to make the settings for the iSCSI boot.

To configure the network controller for iSCSI boot, restart the system.

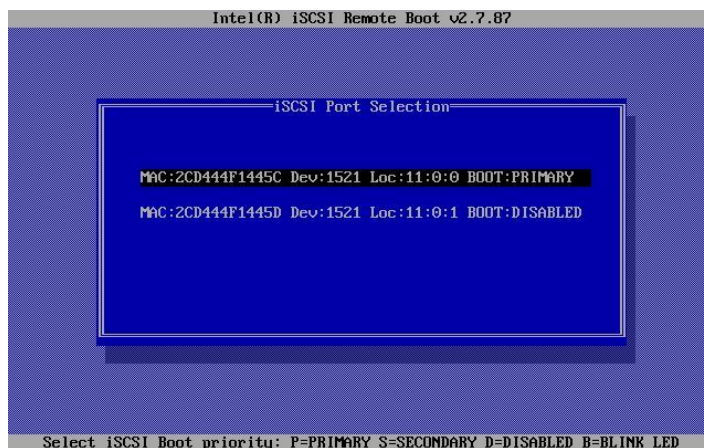
When the message "Press <Ctrl-D> to run setup..." is displayed, press [Ctrl]+[D].

The Intel iSCSI Boot Configuration Utility starts.



#### 4.1.2.1 iSCSI Port Selection Menu

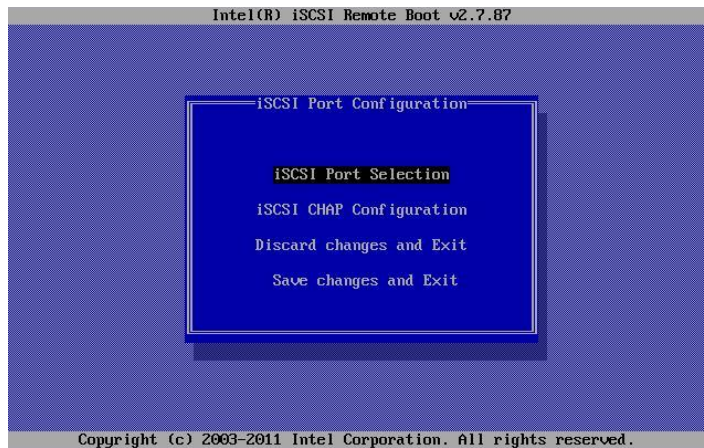
The first menu of the Intel iSCSI Boot Configuration Utility displays a list of iSCSI boot-capable adapters. For each adapter port the associated PCI device ID, PCI bus/device/function location, and a field indicating iSCSI boot status is displayed. Up to 10 iSCSI boot-capable ports can be displayed within the port selection menu. If there are more iSCSI boot-capable adapters, these are not listed in the menu.



Use the arrow keys to select the required controller and press the "Enter" key to go to the iSCSI Boot Configuration menu (see section "iSCSI Port Configuration Menu"). Press the [Esc] key to leave the screen.

P(PRIMARY)	One network port in the system can be selected as the primary boot port by pressing the [P] key when highlighted. The primary boot port will be the first port used by the Intel iSCSI Boot Configuration Utility to connect to the iSCSI target. Only one port may be selected as a primary boot port.
S(SECONDARY)	One network port in the system can be selected as the secondary boot port by pressing the [S] key when highlighted. The secondary boot port will only be used to connect to the iSCSI target disk if the primary boot port fails to establish a connection. Only one port may be selected as a secondary boot port (see also chapter "Configuring an MPIO Connection with Windows" on page 10).
D(Disable)	Pressing the [D] key with a network port highlighted will disable iSCSI boot on that port.
B(BLINK LED)	Pressing the [B] key with a network port highlighted will blink an LED on that port.

#### 4.1.2.2 iSCSI Port Configuration Menu

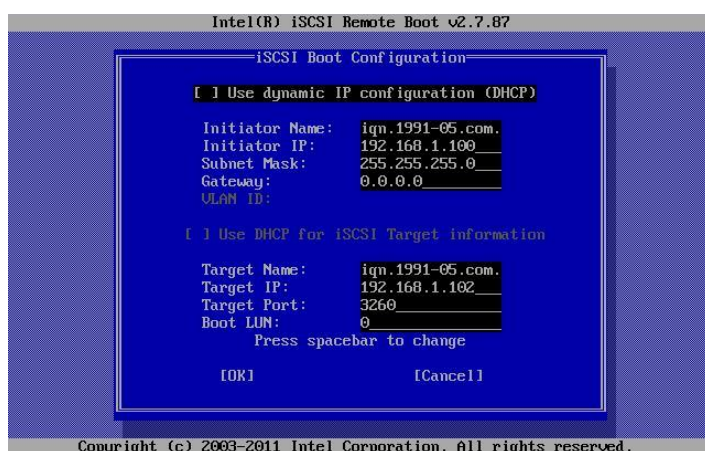


iSCSI Port Selection	Selecting this option will take you to the iSCSI Boot Configuration menu. This menu is described in detail in the section below and will allow you to configure the iSCSI parameters for the selected network port.
iSCSI CHAP Configuration	Selecting this option will take you to the iSCSI CHAP Configuration menu. This menu is described in detail in the section below.
Discard Changes and Exit	Selecting this option will discard all changes made in the iSCSI Boot Configuration and iSCSI CHAP Configuration menus, and return back to the iSCSI Port Configuration menu.
Save Changes and Exit	Selecting this option will save all changes made in the iSCSI Boot Configuration and iSCSI CHAP Configuration menus. After selecting this option, you will return to the iSCSI Port Configuration menu.



#### 4.1.2.3 iSCSI Boot Configuration Menu

This menu allows you to configure the iSCSI boot and IP parameters for a specific port. The iSCSI settings can be configured manually or retrieved dynamically from a DHCP server.



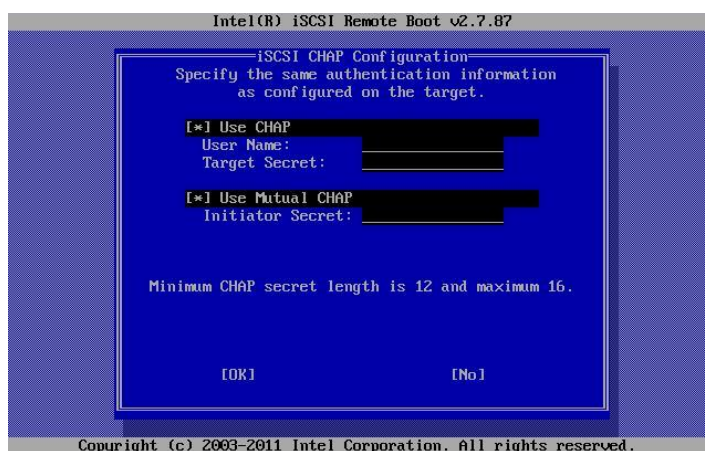
Use Dynamic IP Configuration (DHCP)	Selecting this checkbox will cause iSCSI boot to attempt to get the client IP address, subnet mask, and gateway IP address from a DHCP server. If this checkbox is enabled, these fields will not be visible.
Initiator Name	Enter the iSCSI initiator name to be used by iSCSI boot when connecting to an iSCSI target. The value entered in this field is global and used by all iSCSI boot enabled ports in the system. This field may be left blank if the Use DHCP for iSCSI Target information checkbox is enabled.
Initiator IP	Enter the client IP address to be used for this port as static IP configuration in this field. This IP address will be used by the port during the entire iSCSI session. This option is visible if DHCP is not enabled.
Subnet Mask	Enter the IP subnet mask in this field. This should be the IP subnet mask used on the network which the selected port will be connecting to for iSCSI. This option is visible if DHCP is not enabled.
Gateway	Enter the IP address of the network gateway in this field. This field is necessary if the iSCSI target is located on a different sub-network than the selected iSCSI boot port. This option is visible if DHCP is not enabled.
Use DHCP for iSCSI Target Information	Selecting this checkbox will cause iSCSI boot to attempt to gather the iSCSI target's IP address, IP port number, iSCSI target name, and SCSI LUN ID from a DHCP server on the network.
Target Name	Enter the IQN name of the iSCSI target in this field. This option is visible if DHCP for iSCSI target is not enabled.

Target IP	Enter the target IP address of the iSCSI target in this field. This option is visible if DHCP for iSCSI target is not enabled.
Target Port	TCP Port Number (default: 3260 for iSCSI).
Boot LUN	Enter the LUN ID of the boot disk on the iSCSI target in this field. This option is visible if DHCP for iSCSI target is not enabled.

#### 4.1.2.4 iSCSI CHAP Configuration Menu

iSCSI boot supports Mutual CHAP MD5 authentication with an iSCSI target.

iSCSI boot uses the MD5 Message Digest Algorithm developed by RSA Data Security, Inc.



Use CHAP	Selecting this checkbox will enable CHAP authentication for this port. CHAP allows the target to authenticate the initiator. After activating CHAP, you must enter a user name and password for the target.
User Name	Enter the CHAP user name in this field. This must be the same as the CHAP user name configured on the iSCSI target.
Target Secret	Enter the CHAP password in this field. This must be the same as the CHAP password configured on the iSCSI target and must be between 12 and 16 characters in length. This password must differ from the password in the Initiator Secret field.
Use Mutual CHAP	Selecting this checkbox will enable Mutual CHAP authentication for this port. Mutual CHAP allows the initiator to authenticate the target. After enabling Mutual CHAP authentication, an initiator password must be entered. Mutual CHAP can only be selected if Use CHAP is selected.
Initiator Secret	Enter the Mutual CHAP password in this field. This must be the same as the CHAP password configured on the iSCSI target and must be between 12 and 16 characters in length. This password must differ from the password in the Target Secret field.

The CHAP Authentication feature of this product requires the following acknowledgments:

This product includes cryptographic software written by Eric Young (eay@cryptsoft.com). This product includes software written by Tim Hudson (tjh@cryptsoft.com).

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit <http://www.openssl.org>. A complete licensing statement can be found here.

### 4.1.3 Checking the Connection

During the boot process you can see whether a connection to the target was established:

The following screen is displayed for a short time in legacy mode if it was possible to establish a connection to the iSCSI target.

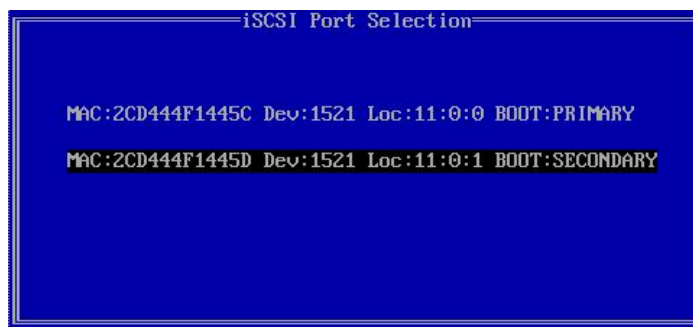
```
Initializing adapter configuration - MAC address(001517001EF2).
Using STATIC configuration for primary port, please wait.
iSCSI Target Name       : ign.1984-05.com.dell:powervault.6001c23000c3506e000000
004720061d
iSCSI Target IP Address : 10.10.70.125
LUN ID: 0               Port: 3260
iSCSI Initiator IP      : 10.10.70.120
iSCSI Gateway IP        : 0.0.0.0
iSCSI Initiator Name     : ign.1991-05.com.microsoft:organiza-q2viau

Initializing adapter configuration - MAC address(001517001EF3).
Using STATIC configuration for secondary port, please wait.
iSCSI Target Name       : ign.1984-05.com.dell:powervault.6001c23000c3506e000000
004720061d
iSCSI Target IP Address : 10.10.70.125
LUN ID: 0               Port: 3260
iSCSI Initiator IP      : 10.10.70.120
iSCSI Gateway IP        : 0.0.0.0
iSCSI Initiator Name     : ign.1991-05.com.microsoft:organiza-q2viau

Attempting to connect to target disk using MAC address(001517001EF2)
LUN: 0  DEVICE: DELL MD3000i 136.23 GB
```

### 4.1.4 Configure the boot sequence

If you want to change the boot order, you need to set the Primary and Secondary in the iSCSI Port Selection menu.



## 4.2 iSCSI Boot Configurations in UEFI Mode

### 4.2.1 Configuring Controller for iSCSI Boot

Before starting with the configuration of the iSCSI boot in UEFI mode, you need to configure various settings in the BIOS.

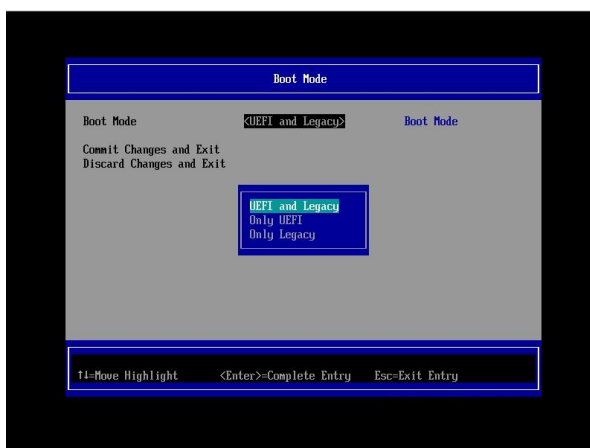
#### 4.2.1.1 PCI Subsystem configuration Menu

1. Start the Partition.

During FUJITSU logo appears, press any key (except the [Enter] key) to display the Boot Manager front page.

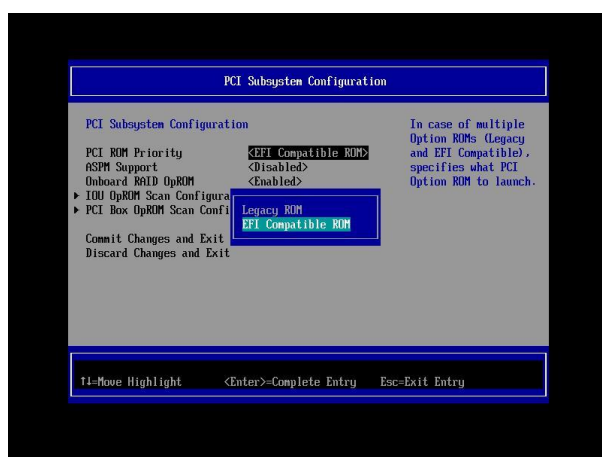


2. Select [Boot Maintenance Manager].
3. Select [Boot Mode].
4. Select [Boot Mode] and open the submenu.
5. Set the parameter to "UEFI and Legacy" or "Only UEFI".
6. Select [Commit Changes and Exit], and then press the [Enter] key.



7. Press the [Esc] key to return to the Boot Manager front page.
8. Select [Device Manager].
9. Select [PCI Subsystem Configuration].
10. Select [PCI ROM Priority] and open the submenu.  
Set the parameter to "EFI Compatible ROM".

11. Select [Commit Changes and Exit], and then press the [Enter] key.



#### 4.2.1.2 LAN Remote Boot Configuration

1. Start the Partition.

During FUJITSU logo appears, press any key (except the [Enter] key) to display the Boot Manager front page.

2. Select [Device Manager].

3. Select [LAN Remote Boot Configuration].

4. Select the entry of the LAN controller that you want to configure for iSCSI Boot and set the parameter for this controller to "UEFI(PXE/iSCSI)".

5. Select [Commit Changes and Exit], and then press the [Enter] key.



#### Notes

- Please do not mix "Legacy iSCSI" and "UEFI(PXE/iSCSI)"
- Activate the Option ROM Scan only for the controller you want to use for iSCSI boot.

## 4.2.2 iSCSI Boot Configuration Menu

To configure the network controller for iSCSI boot, restart the system. Boot into the BIOS again.

In the Device Manager Menu, you can first view the adapter properties and configurations.

If several adapters are connected, you can then use this and other information to decide which port you want to configure.

You then need to call the iSCSI configurations in the Device Manager Menu.

### 1. Start the Partition.

During FUJITSU logo appears, press any key (except the [Enter] key) to display the Boot Manager front page.



### 2. Select [Device Manager].

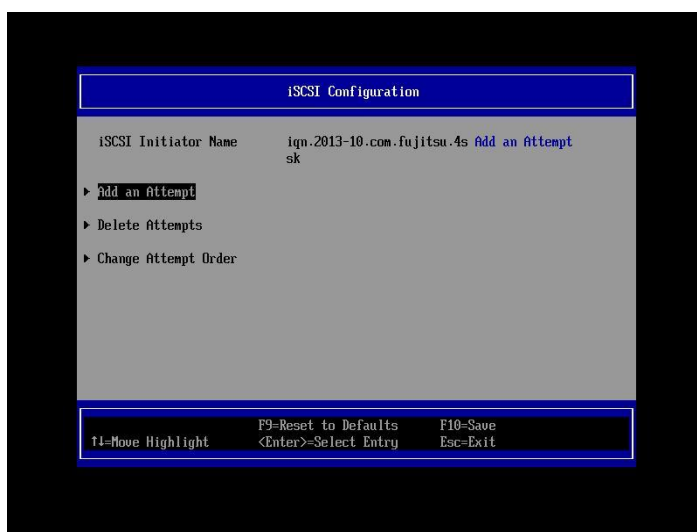
### 3. Select [iSCSI Configuration].

### 4. Enter the name of the initiator. Note that the iSCSI initiator name as well as the other information below must comply with a specific syntax.

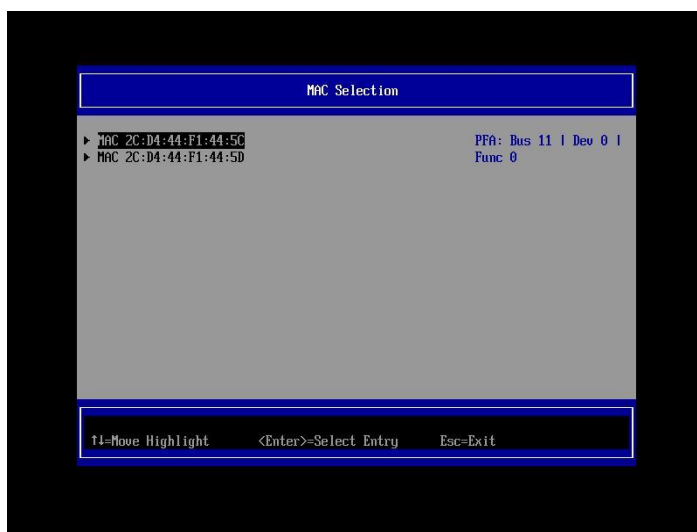


iSCSI Initiator Name	Enter the iSCSI initiator name to be used by iSCSI boot when connecting to an iSCSI target. The value entered in this field is global and used by all iSCSI boot enabled ports in the system.
Add an Attempt	Selecting this option will take you to the Attempt Configuration menu. This menu is described in detail in the section below and will allow you to configure the iSCSI parameters for the selected network port.
Delete Attempts	Use to delete attempts.
Change Attempt Order	Use to change the order of attempts.

5. Add a new attempt with the required adapter in Add an Attempt.



6. Use the arrow keys to select the required controller and press the "Enter" key to go to the Attempt Configuration menu.





7. Enter the parameters to be used in Add an Attempt, and confirm these by clicking Save Changes.

Attempt Configuration		
iSCSI Attempt Name	<input type="text" value="1"/>	The human name defined for this attempt.
iSCSI Mode	<Enabled>	
Internet Protocol	<IP4>	
Connection Retry Count	101	
Connection Establishing Timeout	11000	
ISID	2CD44F1445C	
Enable DHCP	<input type="checkbox"/>	
Initiator IP Address	192.168.1.100	
Initiator Subnet Mask	255.255.255.0	
↓		
F1=Move Highlight	F9=Reset to Defaults <Enter>=Select Entry	F10=Save Esc=Exit

Attempt Configuration		
Enable DHCP	<input type="checkbox"/>	Back to Previous Page
Initiator IP Address	192.168.1.100	
Initiator Subnet Mask	255.255.255.0	
Gateway	0.0.0.0	
Target Name	iqn.2012-12.com.fujitsu.7 ssk	
Target IP Address	192.168.1.102	
Target Port	132601	
Boot LUN	0	
Authentication Type	<None>	
Save Changes		
▶ Back to Previous Page		
F1=Move Highlight	F9=Reset to Defaults <Enter>=Select Entry	F10=Save Esc=Exit

You can configure the following information:

iSCSI Attempt Name	Enter a unique name for this attempt configuration.
iSCSI Mode	Enables or Disables iSCSI Boot for a selected iSCSI boot attempt. The default setting is Disabled. You must change this setting from Disabled to Enabled to create a boot attempt.
Internet Protocol	The iSCSI IP Address type. Select IPv4.
Connection Retry Count	<p>Number of times to retry the iSCSI connection. Enter a value from 0 to 16. The default setting is 0 (no retries).</p> <p>Note If the iSCSI connection fails, you might need to change this value from the default setting.</p>
Connection Establishing Timeout	<p>The iSCSI connection timeout value in milliseconds. Enter a value in milliseconds from 100 to 20000. The default setting is 1000 milliseconds.</p> <p>This is the time in milliseconds the system will wait for a connection until it times out. The minimum is 100ms and the maximum is 20 secs.</p> <p>Note If the iSCSI connection fails, you might need to change this value from the default setting.</p>
ISID	The iSCSI ISID in 6-byte OUI-format. Default value are derived from MAC address. Only last 3 bytes are configurable.
Enable DHCP	<p>By selecting Enabled, iSCSI boot will attempt to retrieve the client IP address, subnet mask, and gateway IP address from a DHCP server. The default setting is Disabled.</p> <p>If the parameter is set to Enabled, the input fields for the settings obtained automatically (initiator IP, subnet mask, gateway IP) are not visible.</p>
Initiator IP Address	Enter the client IP address to be used for this port as static IP configuration in this field. This IP address will be used by the port during the entire iSCSI session. This option is visible if DHCP is not enabled
Initiator Subnet Mask	Enter the IP subnet mask in this field. This should be the IP subnet mask used on the network which the selected port will be connecting to for iSCSI. This option is visible if DHCP is not enabled.

Gateway	Enter the IP address of the network gateway in this field. This field is necessary if the iSCSI target is located on a different sub-network than the selected iSCSI boot port. This option is visible if DHCP is not enabled.
Target Name	Enter the IQN name of the iSCSI target in this field. This option is visible if DHCP for iSCSI target is not enabled.
Target IP	Enter the target IP address of the iSCSI target in this field. This option is visible if DHCP for iSCSI target is not enabled.
Target Port	TCP Port Number (default: 3260 for iSCSI).
Boot LUN	Enter the LUN ID of the boot disk on the iSCSI target in this field. This option is visible if DHCP for iSCSI target is not enabled.
Authentication Type	Here you can configure whether you want to use an authentication method. If you select None, all other parameters are hidden. If you select CHAP, these parameters are shown.
CHAP Type	Here you can configure whether the authentication method is to be one-way CHAP (the target authenticates the initiator, but the initiator does not authenticate the target) or "Mutual CHAP" (both the target and initiator authenticate each other). If one-way CHAP authentication is enabled, only the following two options CHAP Name and CHAP Secret are displayed. If mutual CHAP authentication is enabled, the options Reverse CHAP Name and Reverse CHAP Secret are also displayed.
CHAP Name	Enter the CHAP user name in this field. This must be the same as the CHAP user name configured on the iSCSI target.
CHAP Secret	Enter the CHAP password in this field. This password must be identical to the password configured on the iSCSI target. It must contain 12 to 16 characters. This password must differ from the password in the Reverse CHAP Secret field.
Reverse CHAP Name	Enter the Mutual CHAP user name in this field. This must be the same as the CHAP user name configured on the iSCSI target.
Reverse CHAP Secret	Enter the Mutual CHAP password in this field. This password must be identical to the password configured on the iSCSI target. It must contain 12 to 16 characters. This password must differ from the password in the CHAP Secret field.
Save Chages	Selecting this option will save all changes made in the attempt configuration.
Back to Previous Page	Selecting this option will return to the previous page.

The CHAP Authentication feature of this product requires the following acknowledgments:

This product includes cryptographic software written by Eric Young (eay@cryptsoft.com). This product includes software written by Tim Hudson (tjh@cryptsoft.com).

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit <http://www.openssl.org>. A complete licensing statement can be found here.

#### 4.2.3 Checking the Connection and Preparing for Installation

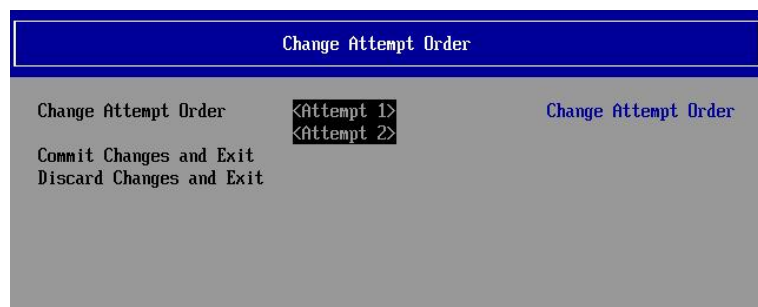
For iSCSI booting in UEFI mode, the connection to the iSCSI target can be tested by booting to the EFI Shell. When doing so, the following entry is displayed:



#### 4.2.4 Configure the boot sequence

If you have more than one linking settings, you may set the sequence.

If you want to change the boot order, you need to set the sequence in the Change Attempt Order menu.



## 5 Configuring iSCSI Crash Dump

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Windows Server 2012 R2 allows installing crash dump functionality for servers started via iSCSI boot. In case of a system crash, the crash dump is stored to the iSCSI target LUN from which the crashed server was booted.

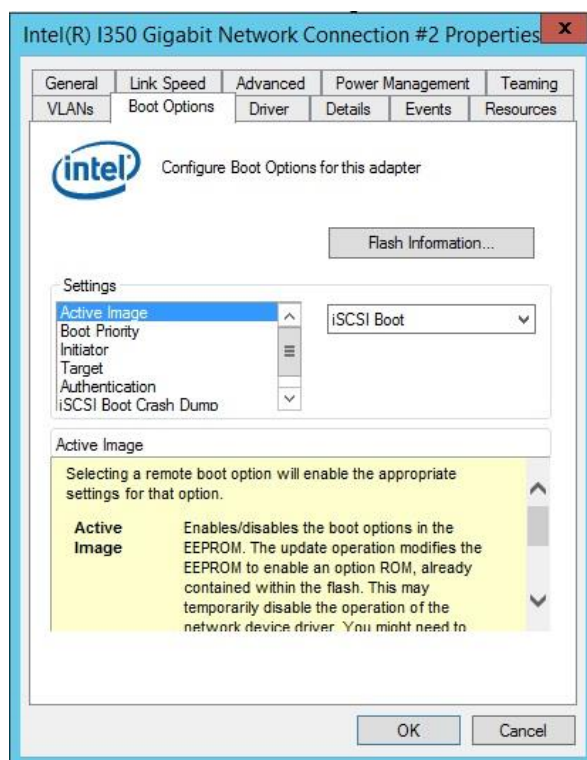
Crash dump file generation is supported for iSCSI-booted Windows Server 2012 R2 by the Intel iSCSI Crash Dump Driver.

To set up crash dump support, follow these steps:

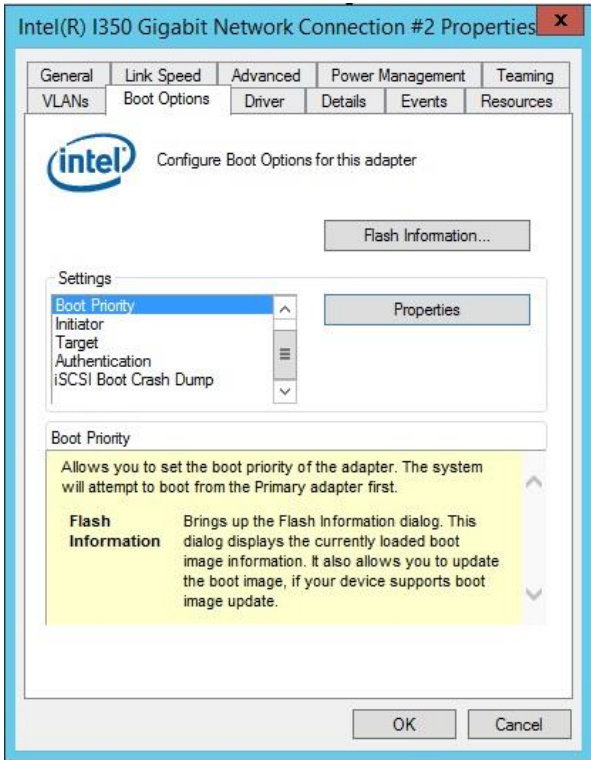
1. Set up Windows iSCSI boot as described in this documentation.
2. Make sure that the Intel(R) PROSet for Windows Device Manager is installed.
3. Open the properties of your network adapter:

Server Manager → Tools → Computer Manager → Device Manager → Network Adapter → right-click Properties

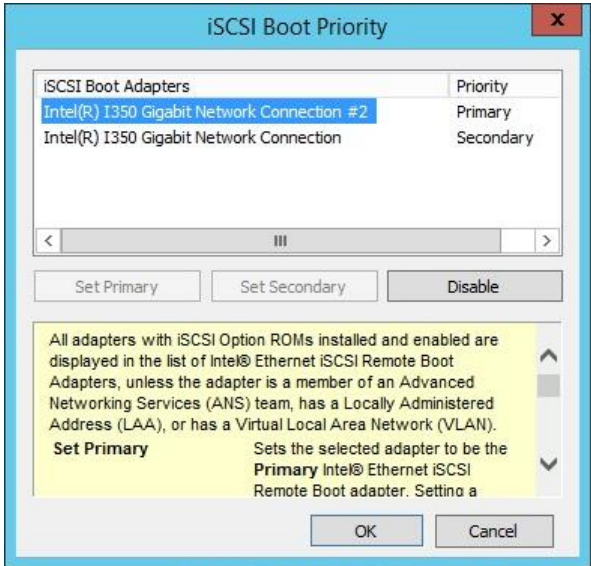
4. Confirm the Active image entry in the selection list is iSCSI Boot.



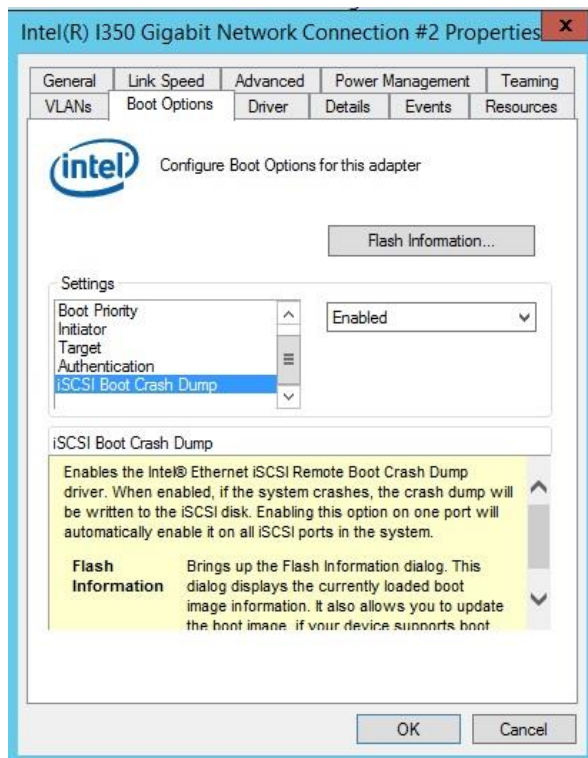
5. Select the Boot Priority in the selection list and click Properties.



6. Confirm the iSCSI Boot priority is correct.



7. Set the iSCSI Crash Dump entry in the selection list to Enabled.



8. Confirm this setting by clicking OK and then restart the server.

## 6 Troubleshooting

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This chapter lists problems that can occur when using Intel iSCSI Boot.

Problem	Resolution
Error message displayed: "Failed to detect link"	iSCSI Boot was unable to detect link on the network port. Check the link detection light on the back of the network connection. The link light should illuminate green when link is established with the link partner.
Error message displayed: "DHCP Server not found!"	iSCSI was configured to retrieve an IP address from DHCP but no DHCP server responded to the DHCP discovery request. This issue can have multiple causes: <ul style="list-style-type: none"><li>• The DHCP server may have used up all available IP address reservations.</li><li>• The client iSCSI system may require static IP address assignment on the connected network.</li><li>• There may not be a DHCP server present on the network.</li><li>• Spanning Tree Protocol (STP) on the network switch may be preventing the iSCSI Boot port from contacting the DHCP server. Refer to your network switch documentation on how to disable Spanning Tree Protocol.</li></ul>
Error message displayed: "Invalid iSCSI connection information"	The iSCSI configuration information received from DHCP or statically configured in the setup menu is incomplete and an attempt to login to the iSCSI target system could not be made. Verify that the iSCSI initiator name, iSCSI target name, target IP address, and target port number are configured properly in the iSCSI setup menu (for static configuration) or on the DHCP server (for dynamic BOOTP configuration).



Problem	Resolution
Error message displayed: "Unsupported SCSI disk block size!"	The iSCSI target system is configured to use a disk block size that is not supported by iSCSI Boot. Configure the iSCSI target system to use a disk block size of either 512, 1024, or 2048 in bytes.
Error message displayed: "ERROR: Could not establish TCP/IP connection with iSCSI target system."	iSCSI Boot was unable to establish a TCP/IP connection with the iSCSI target system. Verify that the initiator and target IP address, subnet mask, port and gateway settings are configured properly. Verify the settings on the DHCP server if applicable. Check that the iSCSI target system is connected to a network accessible to the iSCSI Boot initiator. Verify that the connection is not being blocked by a firewall.
Error message displayed: "ERROR: CHAP authentication with target failed."	The CHAP user name or secret does not match the CHAP configuration on the iSCSI target system. Verify the CHAP configuration on the iSCSI Boot port matches the iSCSI target system CHAP configuration. Disable CHAP in the iSCSI Boot setup menu if it is not enabled on the target.
Error message displayed: "ERROR: Login request rejected by iSCSI target system."	A login request was sent to the iSCSI target system but the login request was rejected. Verify the iSCSI initiator name, target name, LUN number, and CHAP authentication settings match the settings on the iSCSI target system. Verify that the target is configured to allow the iSCSI Boot initiator access to a LUN.
Error message displayed: "ERROR: iSCSI target not found."	Target IP address, however an iSCSI target with the specified iSCSI target name could not be found on the target system. Verify that the configured iSCSI target name and initiator name match the settings on the iSCSI target.

Problem	Resolution
Error message displayed: "ERROR: iSCSI target can not accept any more connections."	The iSCSI target cannot accept any new connections. This error could be caused by a configured limit on the iSCSI target or a limitation of resources (no disks available).
Error message displayed: "ERROR: iSCSI target has reported an error."	An error has occurred on the iSCSI target. Inspect the iSCSI target to determine the source of the error and ensure it is configured properly.
Error message displayed: "ERROR: There is an IP address conflict with another system on the network."	<p>A system on the network was found using the same IP address as the iSCSI Option ROM client.</p> <ul style="list-style-type: none"> <li>• If using a static IP address assignment, attempt to change the IP address to something which is not being used by another client on the network.</li> <li>• If using an IP address assigned by a DHCP server, make sure there are no clients on the network which are using an IP address which conflicts with the IP address range used by the DHCP server.</li> </ul>

## Glossary

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CHAP	Challenge Handshake Authentication Protocol. An authentication protocol in which the authentication agent (typically a network server) sends the client program a random value that is used only once.
DHCP	Dynamic Host Configuration Protocol. A protocol for assigning dynamic IP addresses to devices on a network.
FQDN	Fully Qualified Domain Name. An Internet address which consists of a hostname and a domain name of the form www.intel.com.
IQN	iSCSI Qualified Name. A naming convention supported by iSCSI to uniquely identify an iSCSI initiator or target.
iSCSI Initiator	A client device that connects to the iSCSI service offered by an iSCSI target. Similar in concept to a SCSI controller that plugs into a PC system.
iSCSI Target	A server device that offers the iSCSI service to an iSCSI initiator. Similar in concept to a SCSI drive used in a PC system.
PXE	Pre-Boot eXecution Environment. An environment to bootstrap computers using a network interface card rather than using local media.
UNDI	Universal Network Device Interface. An application programming interface (or API) for network interface cards. Most commonly associated with PXE.

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PRIMEQUEST 2000 Series  
Intel Network Controllers  
iSCSI Boot Installation and Configuration  
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