



HS22, HS22v, HX5

Boot from SAN with QLogic on IBM UEFI system.

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Acknowledgements

Thank you to the many people who have contributed and reviewed this document to make it better.

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Change Notification

Change revision	Description of changes	Date
1.0	Initial release	June 10 2011

Terminology

Name	Acronym	More details
Logical Unit Number	LUN	Logical drive on the SAN
World Wide Port Name	WWPN	
World Wide Name	WWN	
Host Bus Adapter	HBA	The fiber card (QLogic)

Overview

Remote boot, boot from SAN or SAN boot is the term used when booting a system disks located on a Storage Area Network (SAN) disk. The server operating system is installed on a Logical Unit Number (LUN) or remote disk that is defined on the storage. This document will provide information on how to setup a Boot from SAN environment using UEFI based blades such as HS22.

To perform this task, you will require some knowledge on the SAN disks and SAN switches that are only very briefly covered in this document. It is strongly recommended checking for interoperability before proceeding with such a setup.

Some key links for checking interoperability:

[Serverproven](#)

[Interoperability Guide - IBM BladeCenter](#)

[IBM System Storage Interoperation Center \(SSIC\)](#)

Many steps are required to perform boot from SAN. Missing a single step may lead to failure so it is important to follow this guide step by step. If you do not succeed at first try, it is recommended to go through this document again reviewing each step one by one again. Just about all of the issues encountered in boot from SAN are due to bad configuration and not hardware issues.

Common BladeCenter to SAN attachments

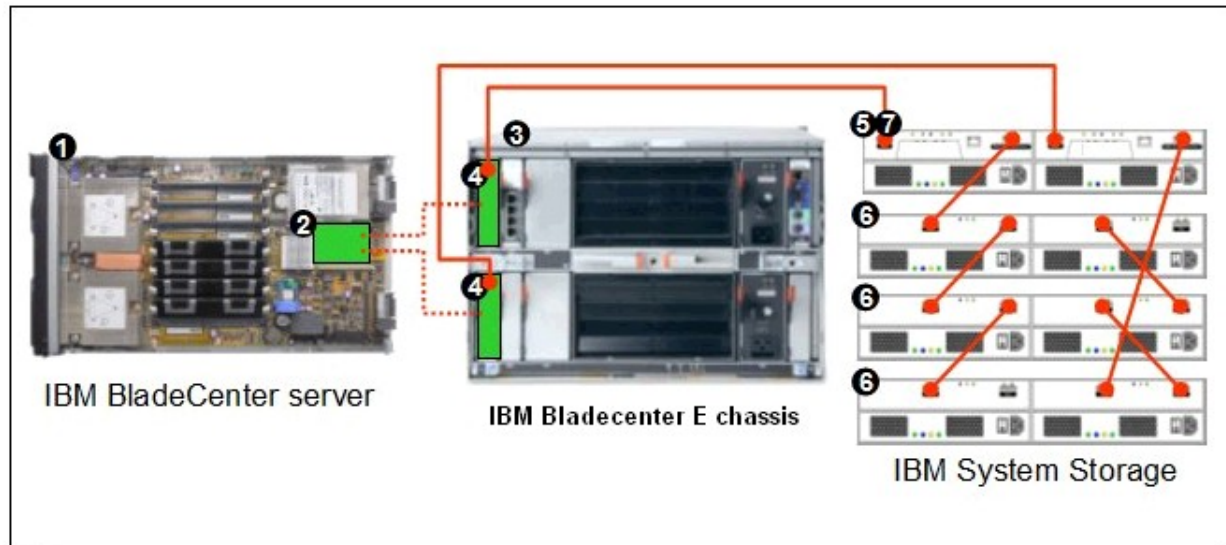


Diagram reference	Description	Quantity
1	IBM BladeCenter HS21, HS22 or other supported server	1 to 14
2	QLogic Fibre Channel Expansion Card (CFFv, CIOv)	1 per server
3	Supported BladeCenter chassis	1
4	Supported Fibre Channel Switch module or Pass-thru Module	1 or 2
5	IBM System Storage (Single or Dual Controller)	1
6	Optional IBM System Storage EXP (Single or Dual ESM)	1 to 3
7	DS3000 Partition Expansion License (software)	1

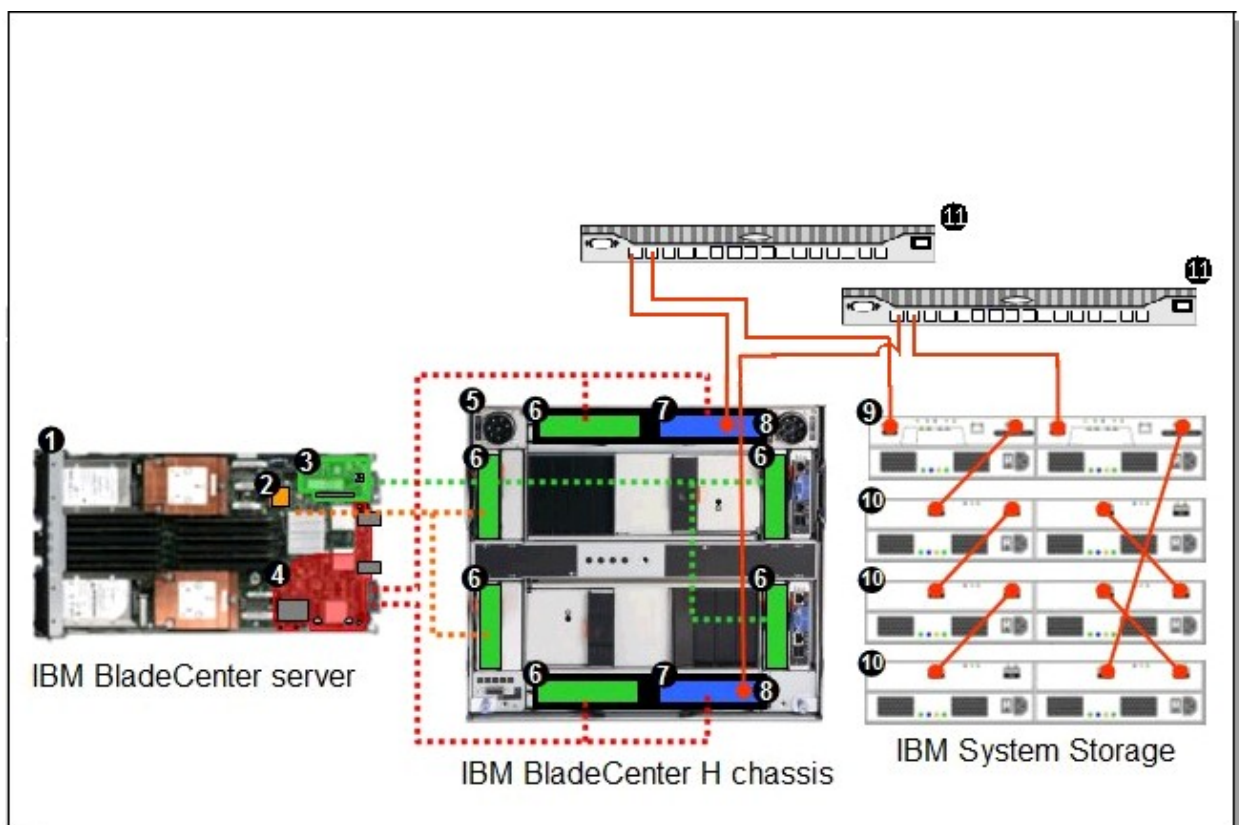
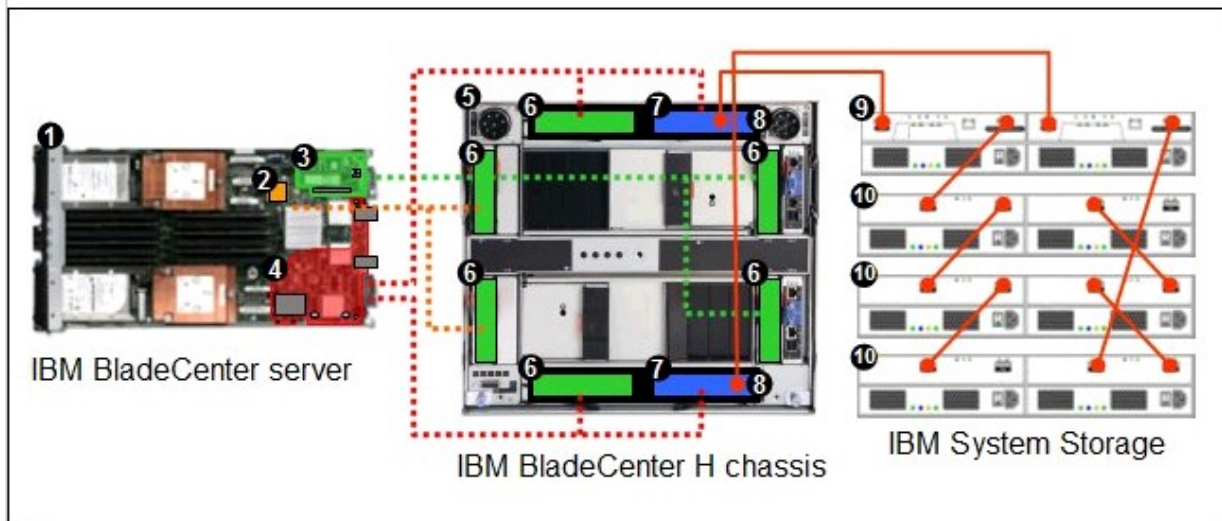


Diagram reference	Description	Quantity
1	IBM BladeCenter HS21, HS22 or other supported server	1 to 14
2	Ethernet controller on the system board of the server	1 per server (2 port)
3	Expansion Card (CIOv) for IBM BladeCenter (can be Ethernet, Fiber Infiniband or other. Technology must match with the IO module in bay 3 and 4 (see 6))	1 per server
4	Combo (CFFH) QLogic Ethernet (Broadcom) and FC Expansion (QLogic) Card for IBM BladeCenter	1 per server
5	BladeCenter H chassis	1

6	Ethernet or fiber Switch Modules routing signals from the integrated controller 2 , CIOv card 3 , and CFFH Ethernet ports of the QLogic expansion card 4 . Technology must match with the on-board and added in components (see 2 3 4)	6
7	Fibre Channel Switch Modules	2
8	Multi-Switch Interconnect Module	2
9	IBM System Storage (Single or Dual Controller)	1
10	Optional: IBM System Storage EXP (Single or Dual ESM)	1 to 3
11	Optional: External fiber switch	

Tested environment

Many boot from SAN environments are possible.

This document was mainly written with the following setup:

Bladecenter H machine type 8852

HS22 machine type 7870

UEFI	P9E151B	1.12
Blade Sys Mgmt Processor	YUOO91K	1.25
QLogic 8 gb / Broadcom 1 gb cffh card		
PN 44X1942	FRU 44X1943	
BIOS	2.09	
EFI	2.27	
FCode	3.14	
Firmware	5.03.09	

Brocade 8 gb fiber channel switch

PN 44X1925	FRU 44X1927
Firmware 6.2.0_bc3	

QLogic 8gb fiber channel switch

PN 44X1911	FRU 44X1914
Firmware 7.10.0.10.0	

Firmware levels here are only listed as reference. It is strongly recommended to update to the latest levels.

This document will have some mentions for QLogic ciov

QLogic 8 gb ciov card

PN 44X1947	FRU 44X1948
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It is strongly recommended to use the **latest drivers and firmware** and not use the versions documented here.

Although this document is built specifically for Blade HS22, doing boot from SAN on other systems such as HS22v or HX5, x3550 m2, x3650 m2, x3550 m3, x3650 m3 and other systems is very similar.

Before you get started

It is strongly recommended to update to the latest firmware levels on the system prior to starting to work on a boot from SAN installation. Many known issues are already resolved through firmware or driver.

To simplify the update it is recommended using a tool such as Bootable Media Creator (BoMC) to update your machine firmware.

You can obtain BoMC from this link

<http://www.ibm.com/support/entry/portal/docdisplay?brand=5000008&Indocid=TOOL-CENTER>

Or obtain precreated BoMC ISO already built for you here:

ftp://testcase.boulder.ibm.com/eserver/fromibm/xseries/BoMC_x.xx_DVD_latest_XXXXXXX_xxxx.iso

By default BoMC will not update the fiber Host Bus Adapter (HBA), so make sure you **manually select** the HBA update when prompted. This is by design to make sure the levels you are installing are validated with your SAN disk vendor.

There are also multiple known symptoms that have been resolved with firmware, driver updates and through settings.

It is recommended review the following articles before proceeding.

[RETAIN tip: H202550](#) QLogic link to Brocade Switch fails, stuck in G-Port

[RETAIN tip: H202210](#) Best practices for 8 Gigabit Fibre Channel

The most important pieces involved for a boot from SAN are the following:

System BIOS / UEFI ([Blades](#)) ([Servers](#))

Host Bus Adapter (HBA) BIOS (Brocade, Emulex, QLogic)

Host Bus Adapter (HBA) driver (Brocade, Emulex, QLogic)

QLogic driver and BIOS can be downloaded from the following links

Use the QLogic **SAN boot driver** (if applicable to your situation)

http://driverdownloads.qlogic.com/QLogicDriverDownloads_UI/IBM.aspx?companyid=6

<http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter>

<http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FSystemx>

The QLogic CIOV card also has an EDC code. Refer to retain tip [H202210](#) for more details. The CFFH card does not require any EDC update.

Load UEFI default settings

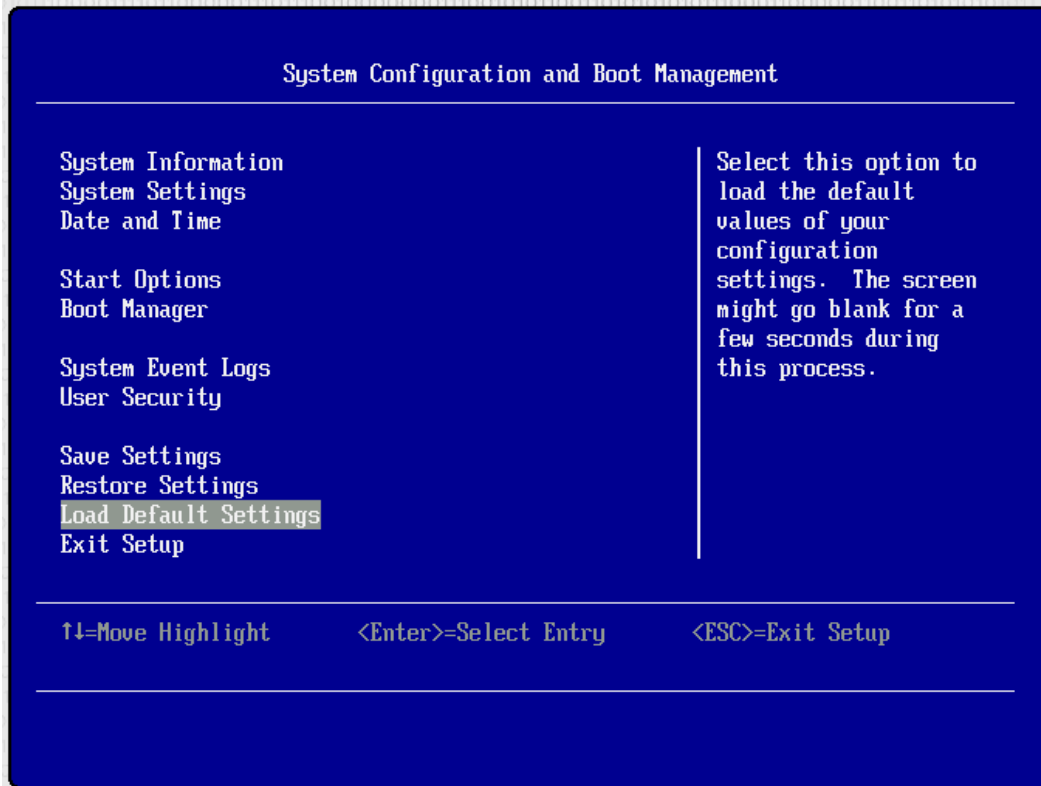
To make sure we're starting on the same baseline, load the UEFI default settings.

Load UEFI (BIOS) default settings

At POST press F1

Highlight "Load Default Settings"

Press <Enter>

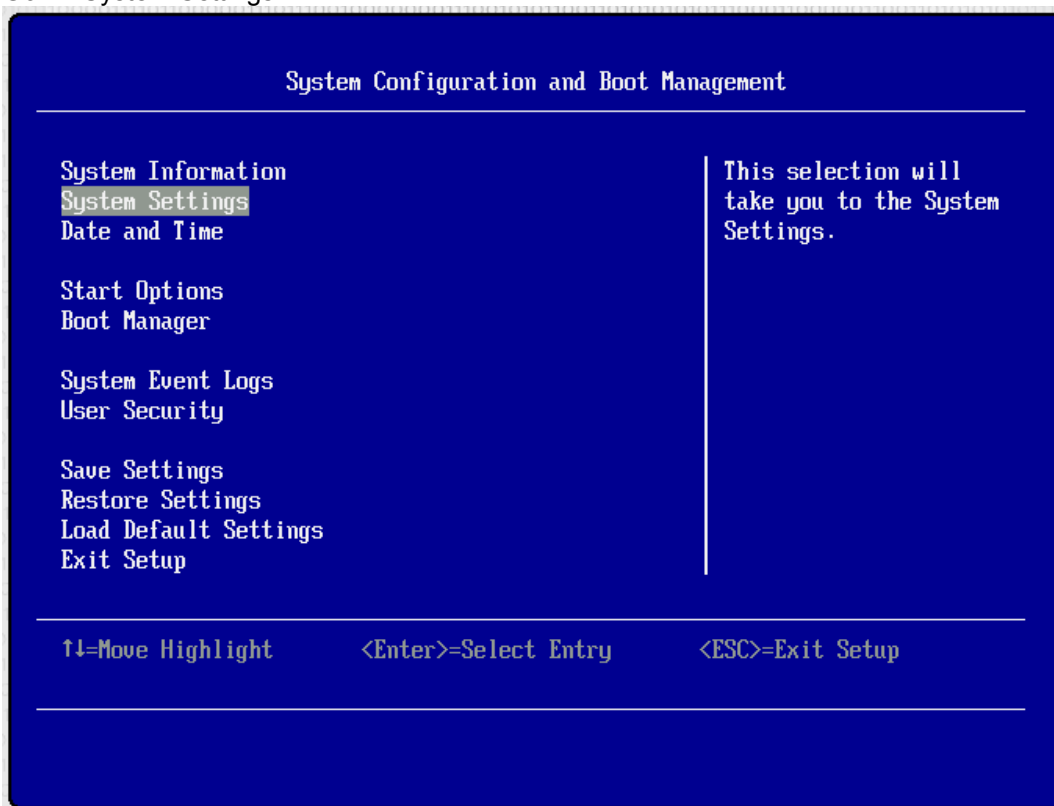


Disable on-board SAS controller

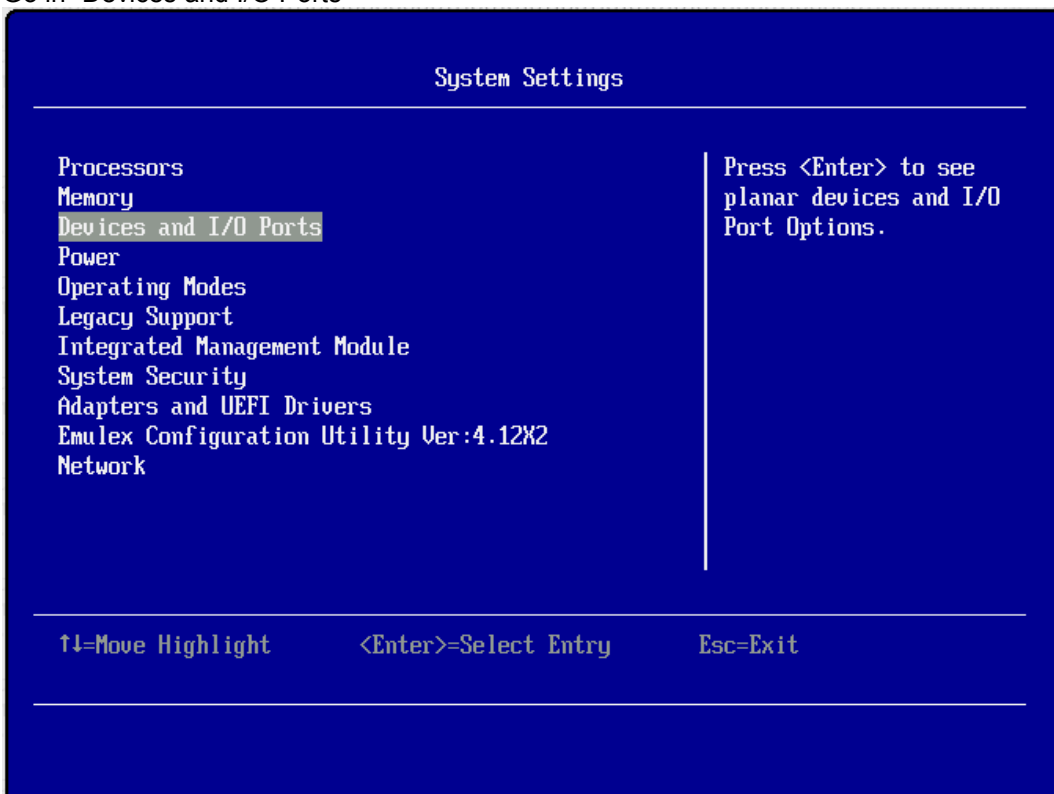
In most cases, you probably want to disable the on-board planar SAS controller (since you don't plan to use local disks, but want to boot from SAN).

This is not a mandatory step, but will save time at boot if you do not use the controller.

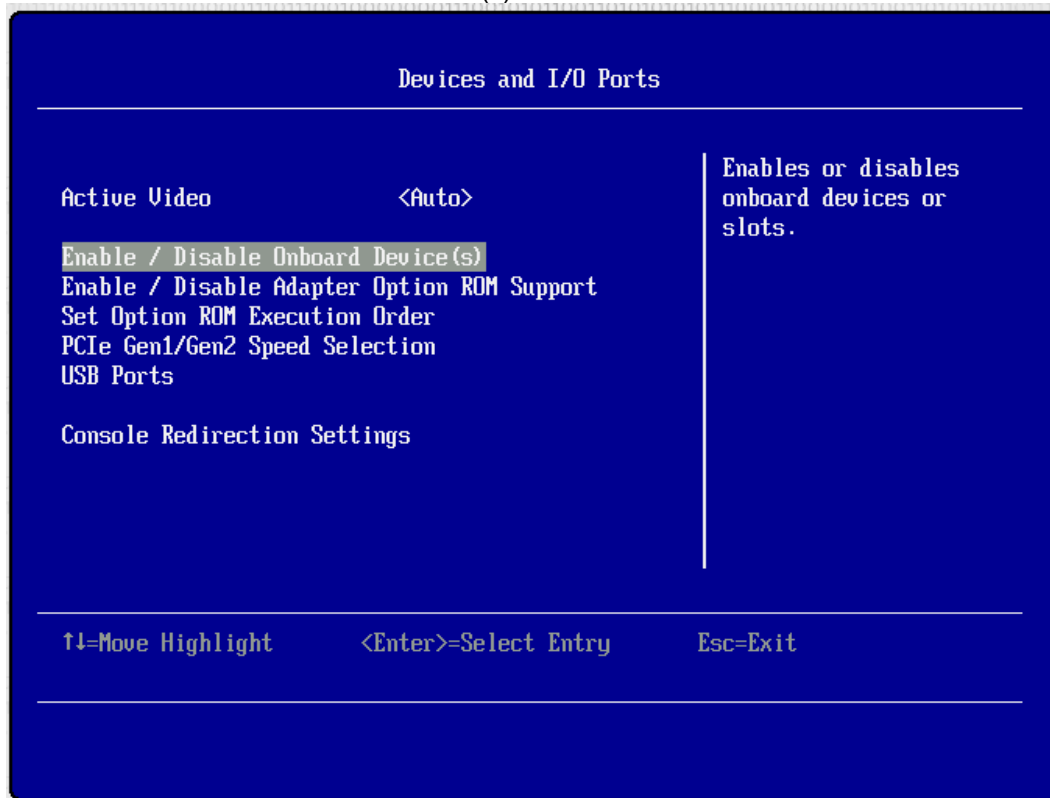
Go in "System Settings"



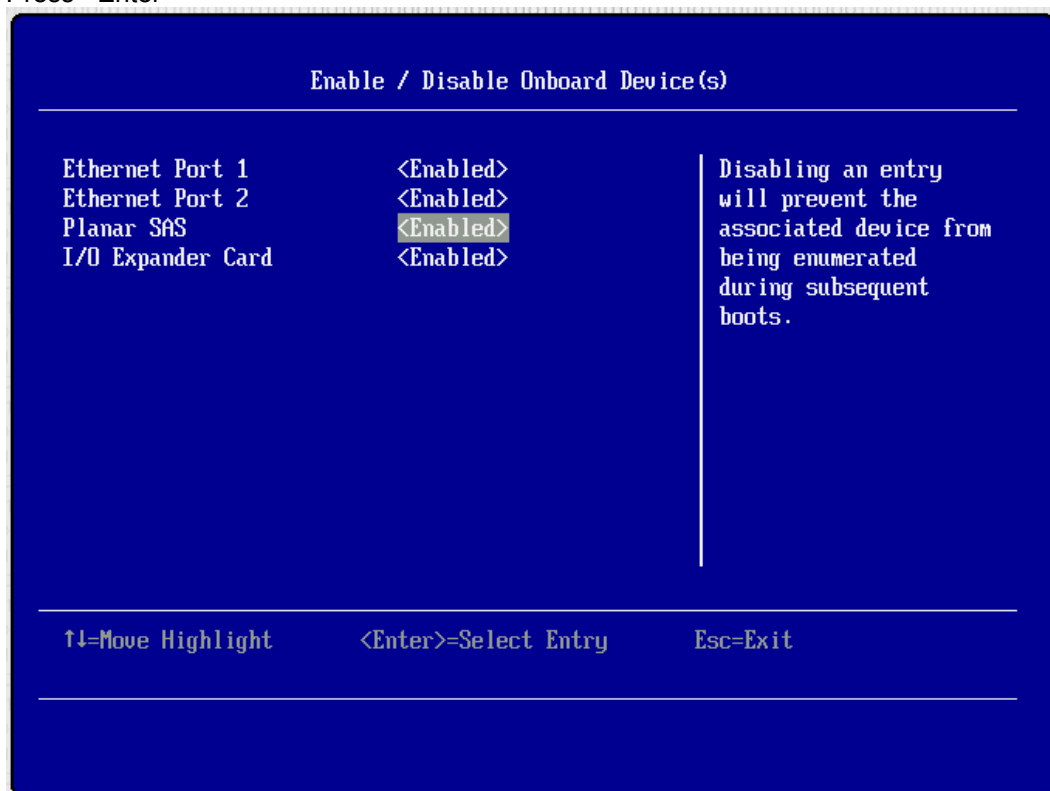
Go in "Devices and I/O Ports"



Go in "Enable / Disable Onboard Device(s)"



Highlight "Planar SAS"
Press <Enter>



Highlight "Disabled"
Press <Enter>

Enable / Disable Onboard Device(s)		
Ethernet Port 1	<Enabled>	Disabling an entry will prevent the associated device from being enumerated during subsequent boots.
Ethernet Port 2	<Enabled>	
Planar SAS	<Enabled>	
I/O Expander Card	<Enabled>	
Blade Expander Card	<Enabled>	
	<div>Disabled Enabled</div>	
<hr/>		
↑↓=Move Highlight	<Enter>=Complete Entry	Esc=Exit Entry
<hr/>		

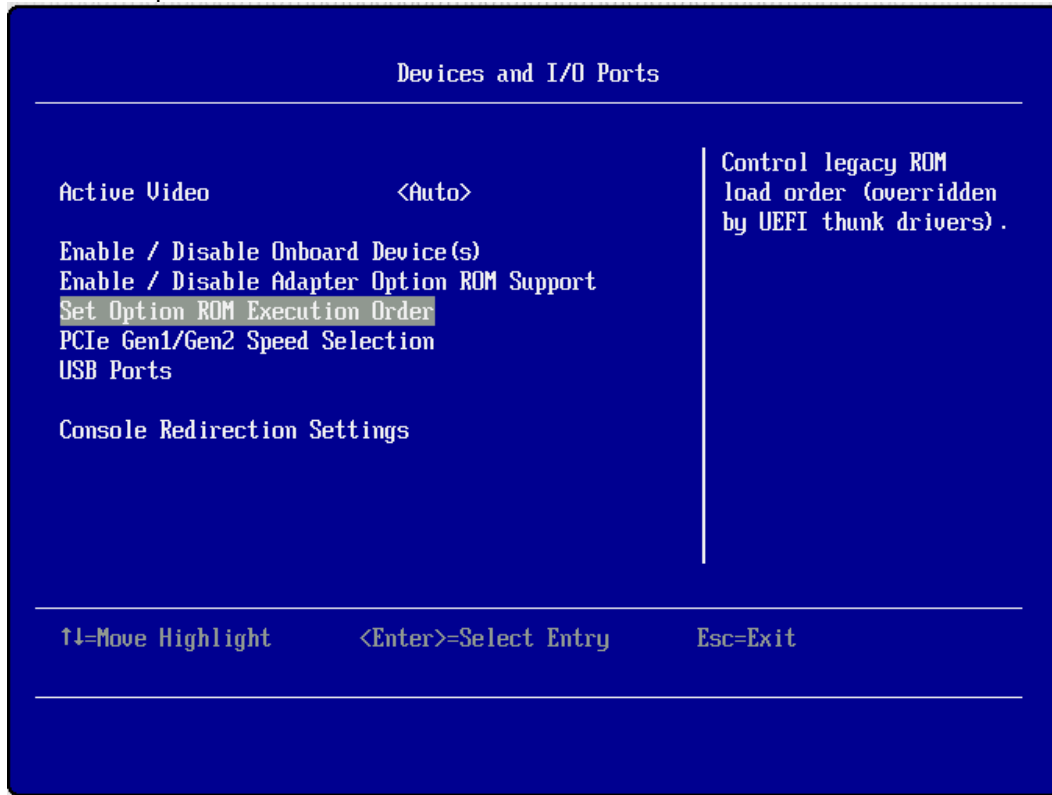
The screen should look like this after the change
Press <Esc>

Enable / Disable Onboard Device(s)		
Ethernet Port 1	<Enabled>	Disabling an entry will prevent the associated device from being enumerated during subsequent boots.
Ethernet Port 2	<Enabled>	
Planar SAS	<Disabled>	
I/O Expander Card	<Enabled>	
<hr/>		
↑↓=Move Highlight	<Enter>=Select Entry	Esc=Exit
<hr/>		

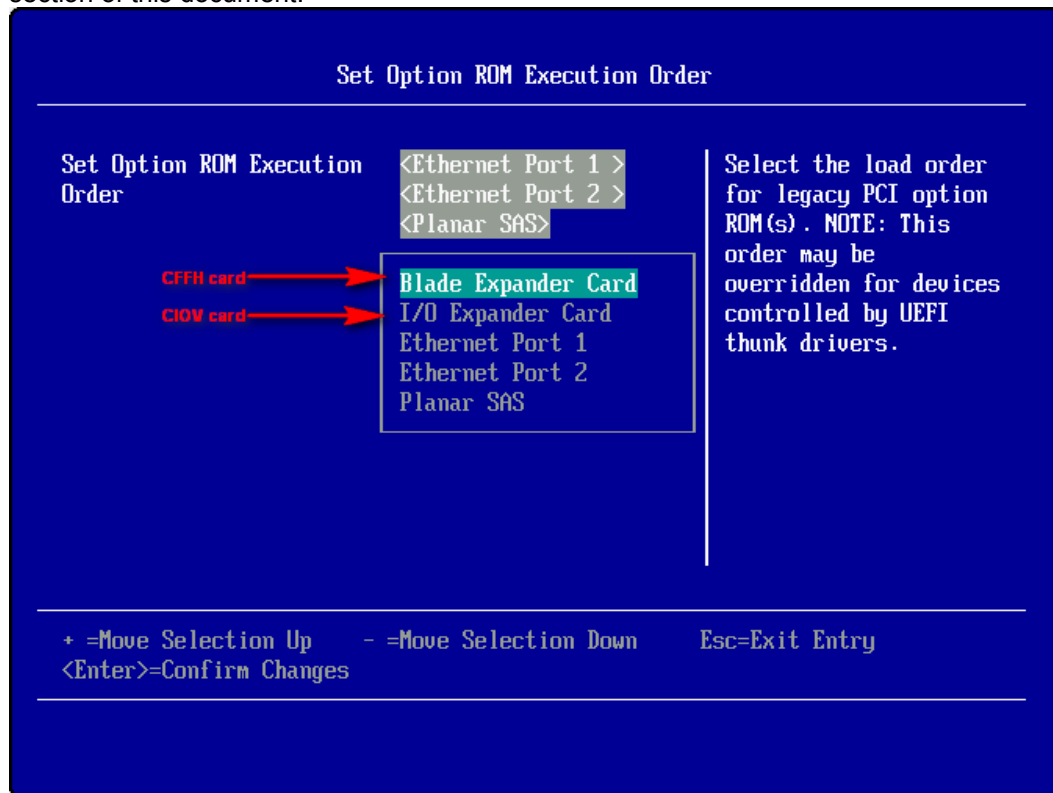
Set the QLogic card as the 1st boot device in UEFI

This step is not mandatory, but will optimize your boot sequence.

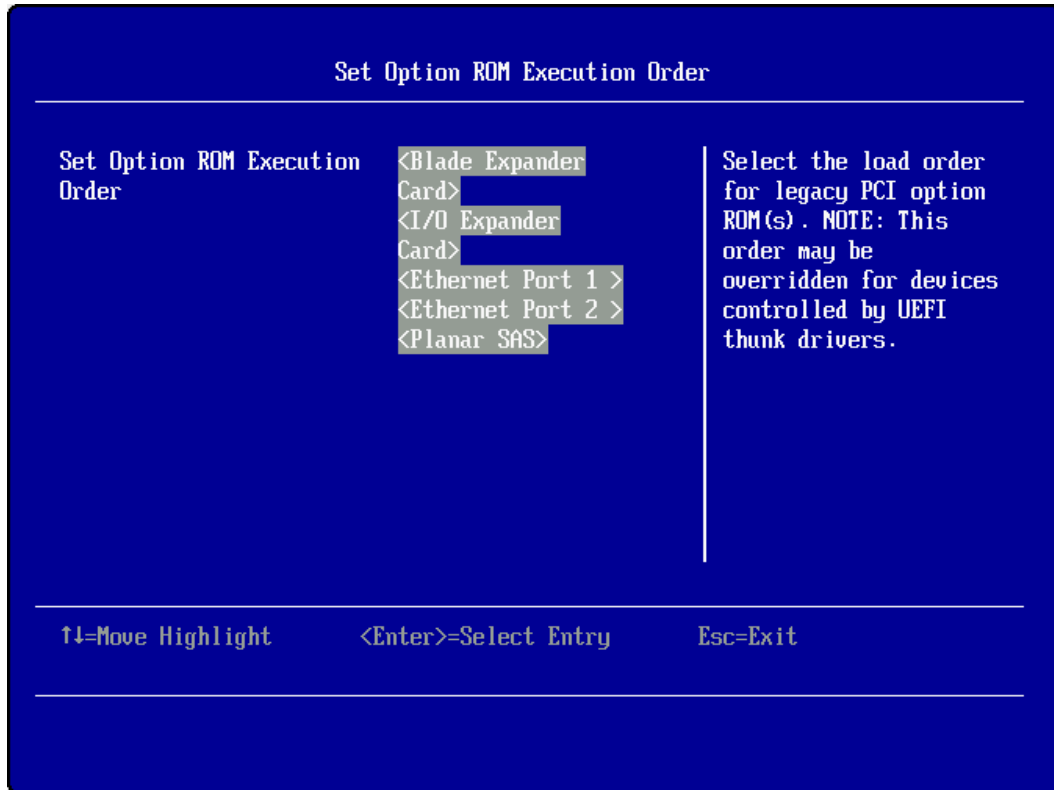
Go in "Set Option ROM Execution Order"



Using the using arrow keys with the + and – keys, put the card you want to boot from at the top
For a CFFH card put Blade Expander card at the top
For a CIOV card put I/O Expander Card at the top
Press <Enter> when done
For help determining if you have a CIOV or CFFH card, see your inventory from the Advanced Management Module (AMM) -> Hardware inventory or review the Redbooks pages in the reference section of this document.



If you want to boot from the CFFH card 1st, the screen should look like this.
Screen may vary based on the adapters installed in your system.
Press <Esc> when done.



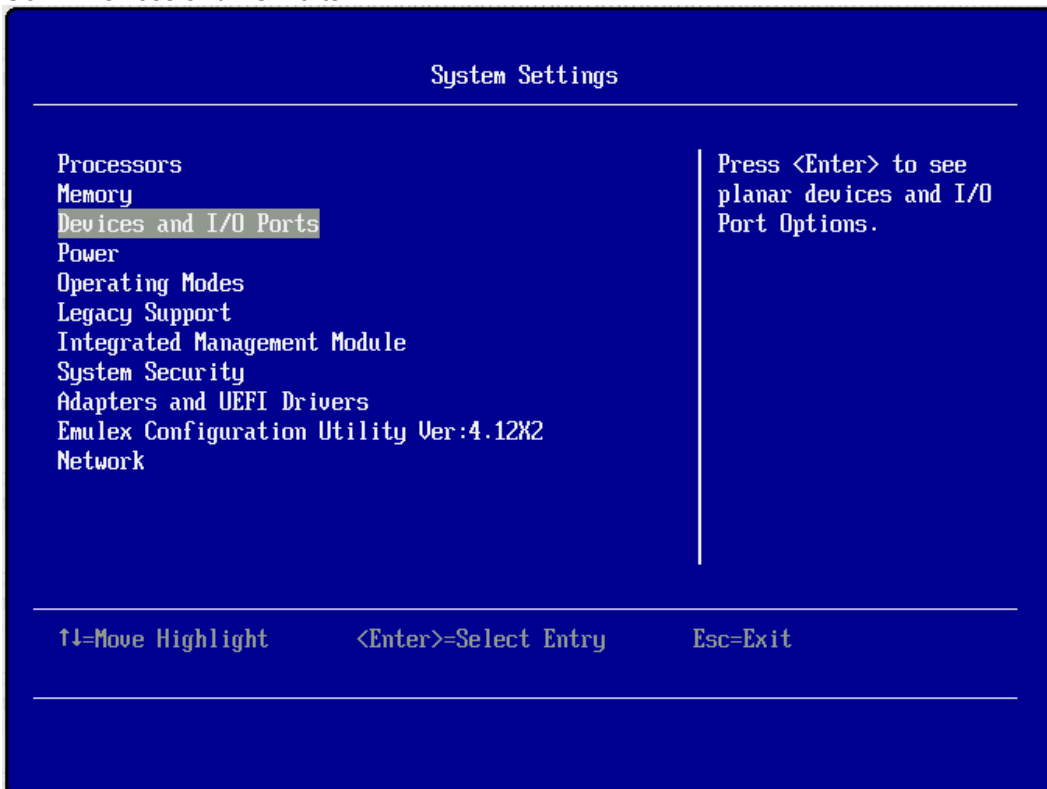
Set the QLogic card generation to gen 1 (Only required on certain 4gb HBA)

To ensure stability if you have a 4gb QLogic HBA, you may have to change the PCI generation setting to GEN 1. It is strongly recommended to review Retain tip [H197193](#).

Go in “System Settings”



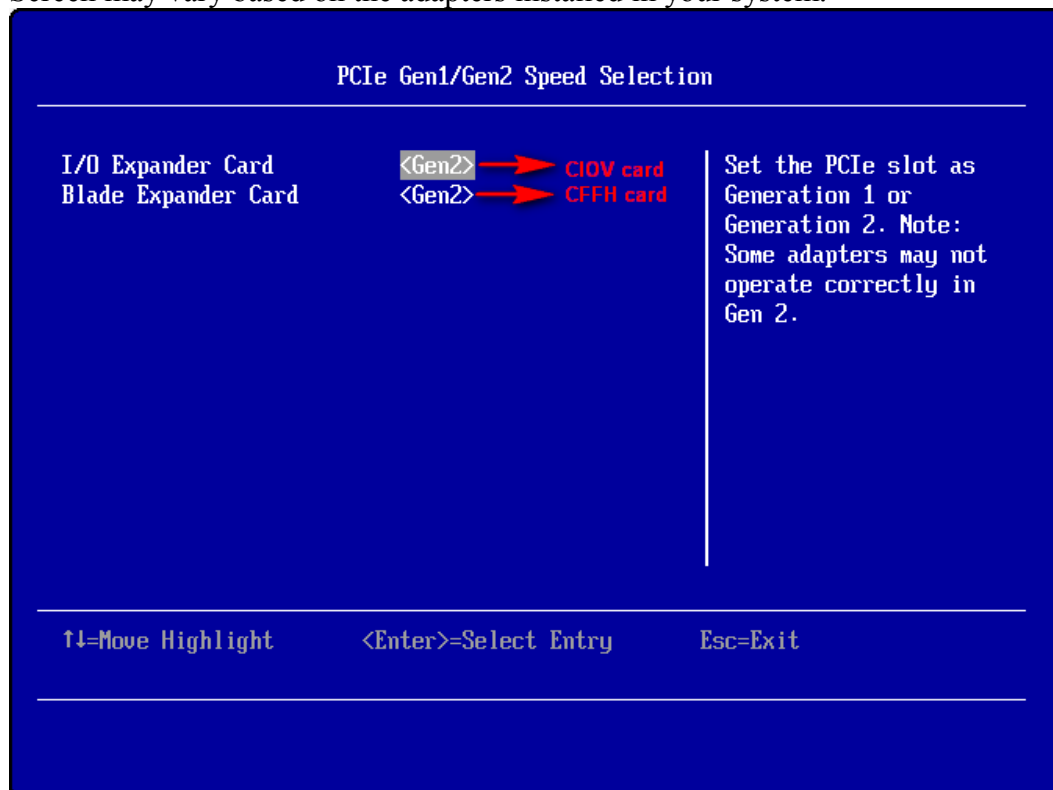
Go in “Devices and I/O Ports”



Highlight your adapter that you wish to change the gen setting.

Then press <Enter>

Screen may vary based on the adapters installed in your system.



Select "Gen1"

Press <Enter>



After the change, the screen should look like this.
Screen may vary based on the adapters installed in your system.
Press <<ESC>>

PCIe Gen1/Gen2 Speed Selection		
I/O Expander Card	<Gen1>	Set the PCIe slot as Generation 1 or Generation 2. Note: Some adapters may not operate correctly in Gen 2.
Blade Expander Card	<Gen2>	
<hr/>		
↑↓=Move Highlight	<Enter>=Select Entry	Esc=Exit
<hr/>		

Press <Esc> again to go back to the main menu
Save the settings

System Configuration and Boot Management		
System Information	Select this option to save the changes and commit them to IMM. The screen might go blank for a few seconds during this process.	
System Settings		
Date and Time		
Start Options		
Boot Manager		
System Event Logs		
User Security		
Save Settings		
Restore Settings		
Load Default Settings		
Exit Setup		
<hr/>		
↑↓=Move Highlight	<Enter>=Select Entry	<ESC>=Exit Setup
<hr/>		

Configure QLogic card for boot from SAN

What you must know:

Boot from SAN occurs on a single path. Initial install must be done with a single path.

The redundancy only occurs later when the operating system is installed and when the multi-path driver is installed.

The QLogic HBA in the HS22 is a dual port HBA. You can boot from either ports, but all must be in place for the boot and the installation to work.

At this stage, many things must be in place on the SAN for this to work.

- **You must zone your switches.**

The zoning of this precise Host Bus Adapter (HBA) port must be done

Zoning is done on the fiber switch. Some people may decide to function with an open fabric without any zoning, but over time, this is likely to fail or cause problems.

The zone should contain 1 HBA WWPN and the 1 SAN disk controller WWPN

- o This can be done on a Brocade switch using the Zone Admin function.
- o This can be done on a QLogic switch using the Zoning -> Edit Zoning option
- o This can be done on a Cisco switch using the device manager -> FC -> Quick config wizard. Use the cli for more advanced configurations.

- The SAN disk must have a Logical drive (also called LUN) created.

- o **The LUN may require that you wait for it to be fully initialized before using it.**

When you create a LUN normally a synchronize process starts. Some storage may allow you to work with this LUN while it is synchronizing. Other storage may require that you wait for the LUN to be fully initialized. Refer to your storage documentation on your SAN disk storage for details on how it operates.

- o **The LUN must be mapped to a single HBA WWPN** (you should not map both WWPN yet)

Only later you will map it to both HBA WWPN. At install time, it is very important to restrict this to a single path. Not doing so can result in Windows Blue Screen of Death (BSOD) or other installation issues.

- o **The LUN must be set on the correct path you want to boot from.**

In most IBM SAN this is referred to as the preferred path.

The preferred path must be set to communicate to your HBA WWPN.

The LUN on most SAN will be presented to a single controller at a time. This LUN can move from controller A to controller B.

At install time, the operating system does not have its redundant driver loaded so it does not handle redundant paths. To work around this issue, you need to provide a single path.

If you are booting through HBA port 0 (this port 0 has a WWPN) and this port 0

communicates to controller A1, then your preferred path for your LUN should be A on the SAN disk.

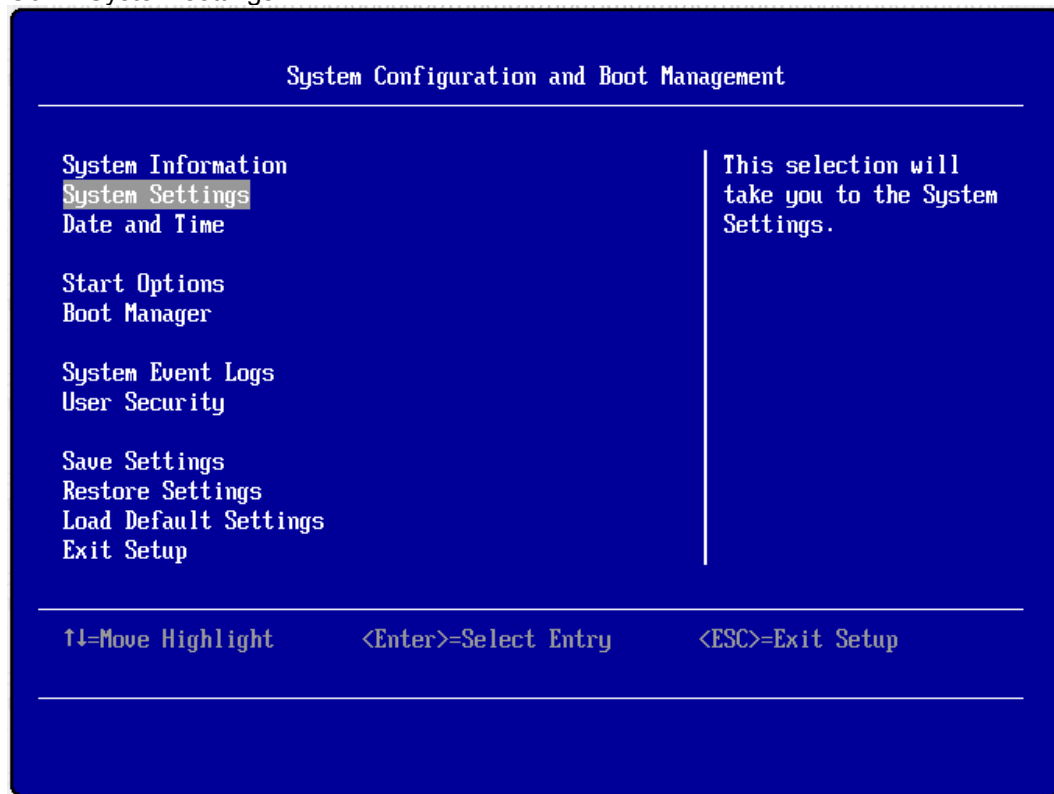
If you are booting through HBA port 0 (this port 0 has a WWPN) and this port 0

communicates to controller B1, then your preferred path for your LUN should be B on the SAN disk.

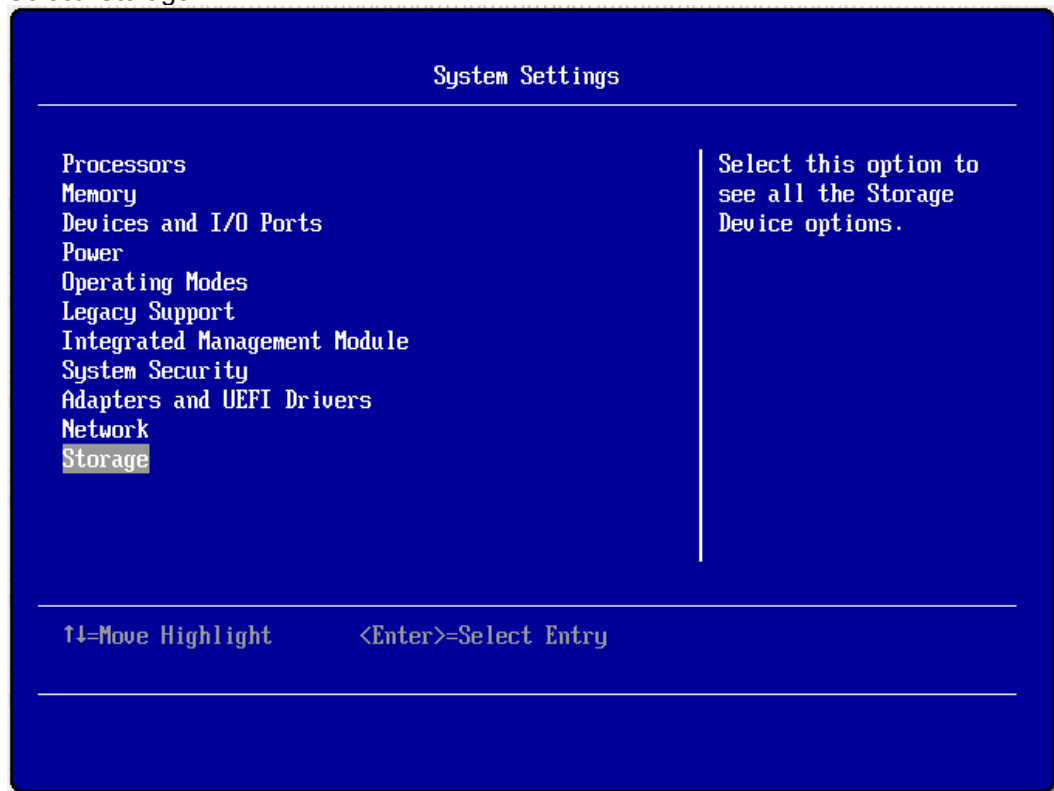
The preferred path is normally very easy to change in the SAN disk settings.

It is important to know your environment, cabling and setup. This can all be validated by checking cable connections, SAN disk configuration or logs.

Go in "System settings".



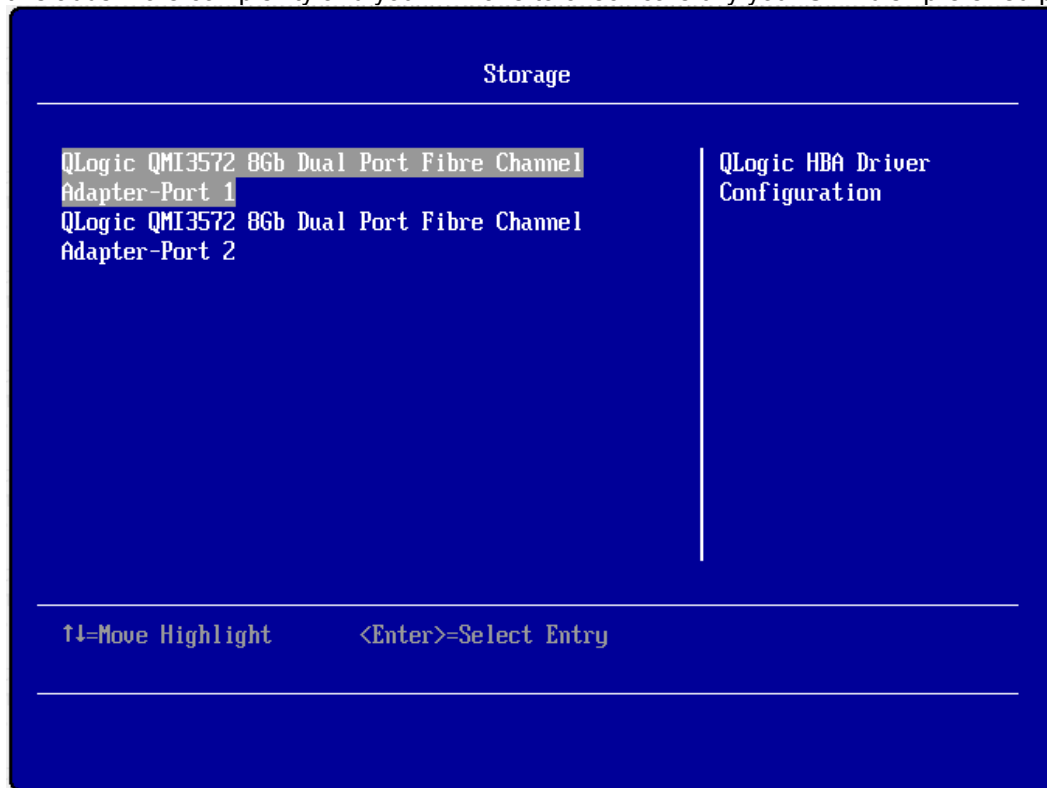
Select "Storage".



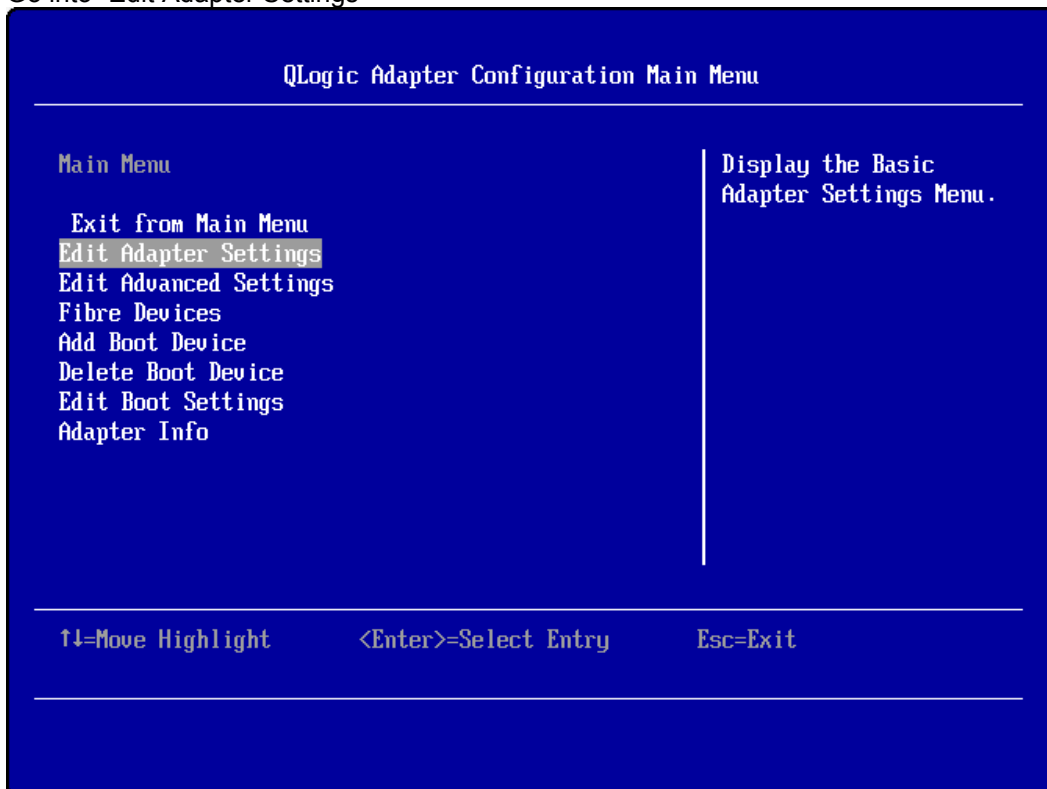
You should see 2 QLogic fiber ports

Select the port you wish to boot from and press <Enter>

Note: for optimal performance, you should consider to boot half your blades from one port and half from the other port and also consider splitting the load on the different San disk controller ports. Be careful as this adds more complexity and you will have to check carefully your SAN disk preferred paths.



Go into "Edit Adapter Settings"



From this menu, you want to make sure the following settings are set:

- "Connection Option" is set to "Point To Point"
- "Data Rate " is set to a fixed speed. Although it is not mandatory, it has been observed in many cases that it is best to set the speed to a fixed speed. See [RETAIN tip: H202210](#) for the latest details.

Edit Adapter Settings

Edit Adapter Settings

Back to Main Menu

Save Changes

Enable Hard Loop ID

<Disabled>

Hard Loop ID (dec)

101

Loop Reset Delay (dec)

151

FC Tape

<Enabled>

Frame Size

<2048>

Connection Option

<Point To Point>

Data Rate

< 8 Gb/s >

↑↓=Move Highlight

<Enter>=Select Entry

Esc=Exit

Click inside center of viewable video to control the blade's mouse

determines the Fibre Channel data rate.

Highlight "Save Changes"
Press <Enter>

Edit Adapter Settings

Edit Adapter Settings

Back to Main Menu

Save Changes

Enable Hard Loop ID

<Disabled>

Hard Loop ID (dec)

101

Loop Reset Delay (dec)

151

FC Tape

<Enabled>

Frame Size

<2048>

Connection Option

<Point To Point>

Data Rate

< 8 Gb/s >

↑↓=Move Highlight

<Enter>=Select Entry

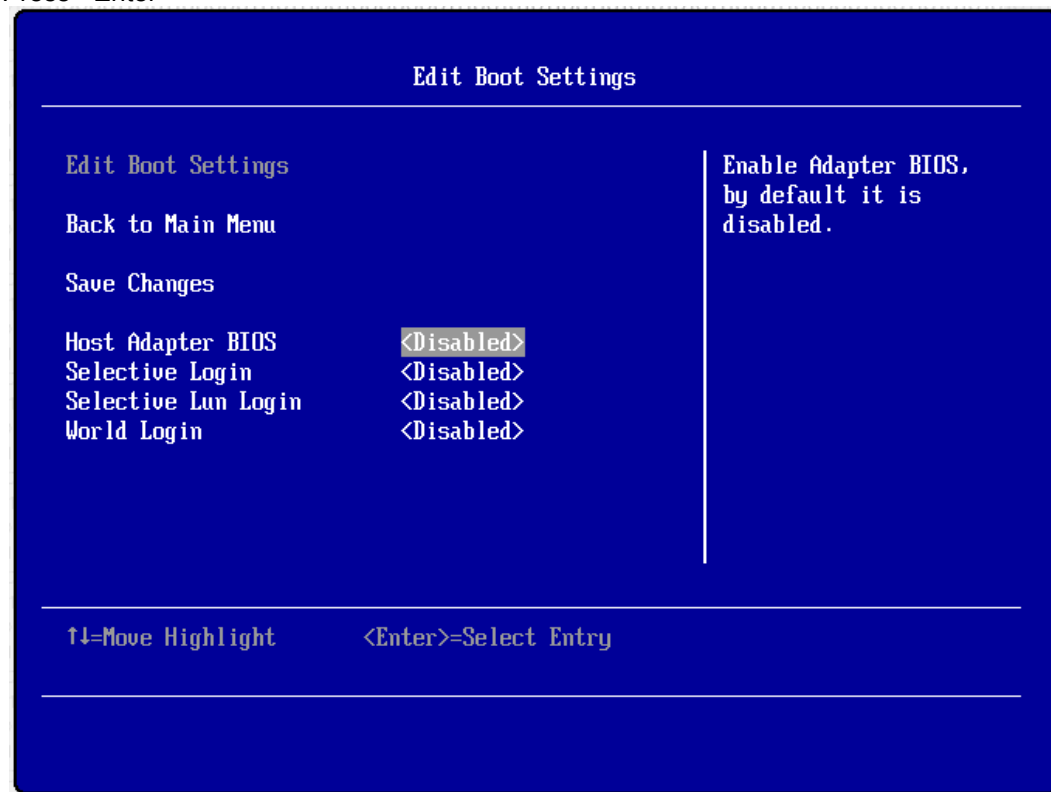
Esc=Exit

Save Changes

Go into "Edit boot settings"



Highlight "Host Adapter BIOS"
Press <Enter>



Select "Enabled"
Then Press <Enter>

Edit Boot Settings

Edit Boot Settings Back to Main Menu Save Changes Host Adapter BIOS Selective Login Selective Lun Login World Login	<div style="border: 1px solid black; padding: 5px; display: inline-block;"><div style="border: 1px solid black; padding: 2px; display: inline-block;"><Di Disabled</div><div style="border: 1px solid black; padding: 2px; display: inline-block;"><Di Enabled</div><div style="border: 1px solid black; padding: 2px; display: inline-block;"><Di</div><div style="border: 1px solid black; padding: 2px; display: inline-block;"><Disabled></div></div>
---	--

Enable Adapter BIOS,
by default it is
disabled.

↑↓=Move Highlight <Enter>=Complete Entry Esc=Exit

The screen should look like this.
Highlight "Save Changes"
Press <Enter>

Edit Boot Settings

Edit Boot Settings Back to Main Menu Save Changes Host Adapter BIOS Selective Login Selective Lun Login World Login	<div style="border: 1px solid black; padding: 5px; display: inline-block;"><div style="border: 1px solid black; padding: 2px; display: inline-block;"><Enabled></div><div style="border: 1px solid black; padding: 2px; display: inline-block;"><Disabled></div><div style="border: 1px solid black; padding: 2px; display: inline-block;"><Disabled></div><div style="border: 1px solid black; padding: 2px; display: inline-block;"><Disabled></div></div>
---	--

Save Changes

↑↓=Move Highlight <Enter>=Select Entry

This brings you to the following screen.

QLogic Adapter Configuration Main Menu	
Main Menu	Display the Edit Boot Settings Menu.
Exit from Main Menu	
Edit Adapter Settings	
Edit Advanced Settings	
Fibre Devices	
Add Boot Device	
Delete Boot Device	
Edit Boot Settings	
Adapter Info	
<hr/>	
↑↓=Move Highlight	<Enter>=Select Entry Esc=Exit
<hr/>	

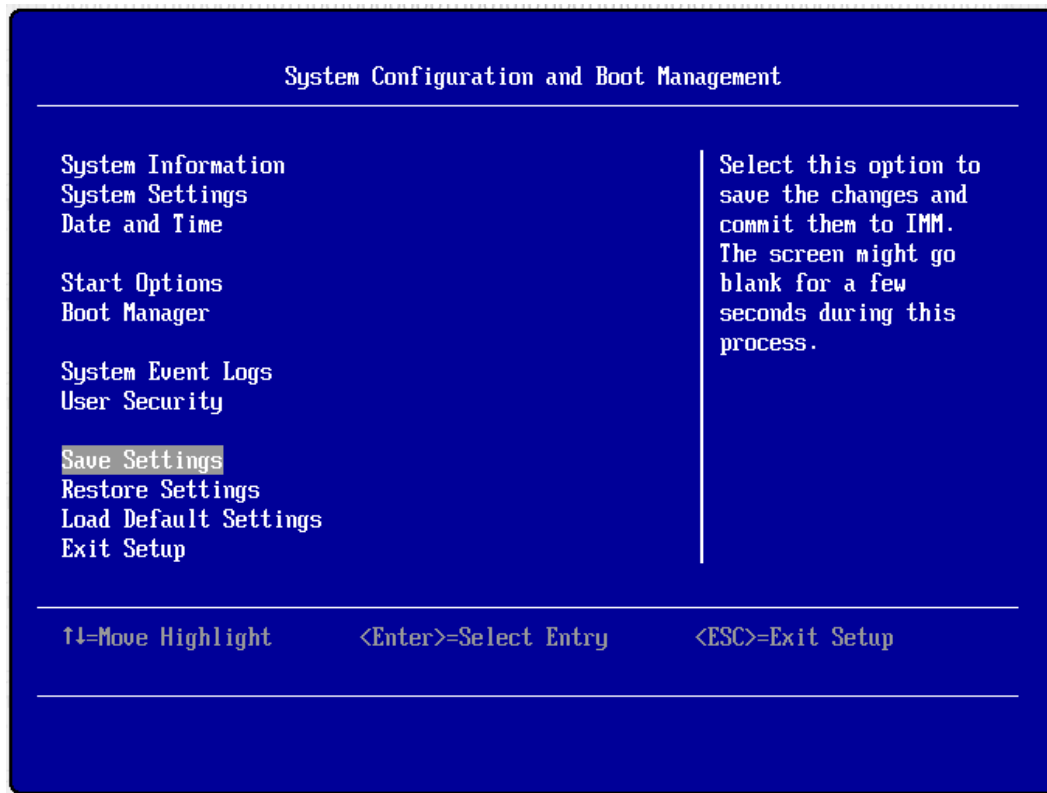
Go in "Adapter Info"

From this screen,, it is useful to take note of the WWPN and view the revision levels of the adapter. Make sure you are using the latest codes levels.

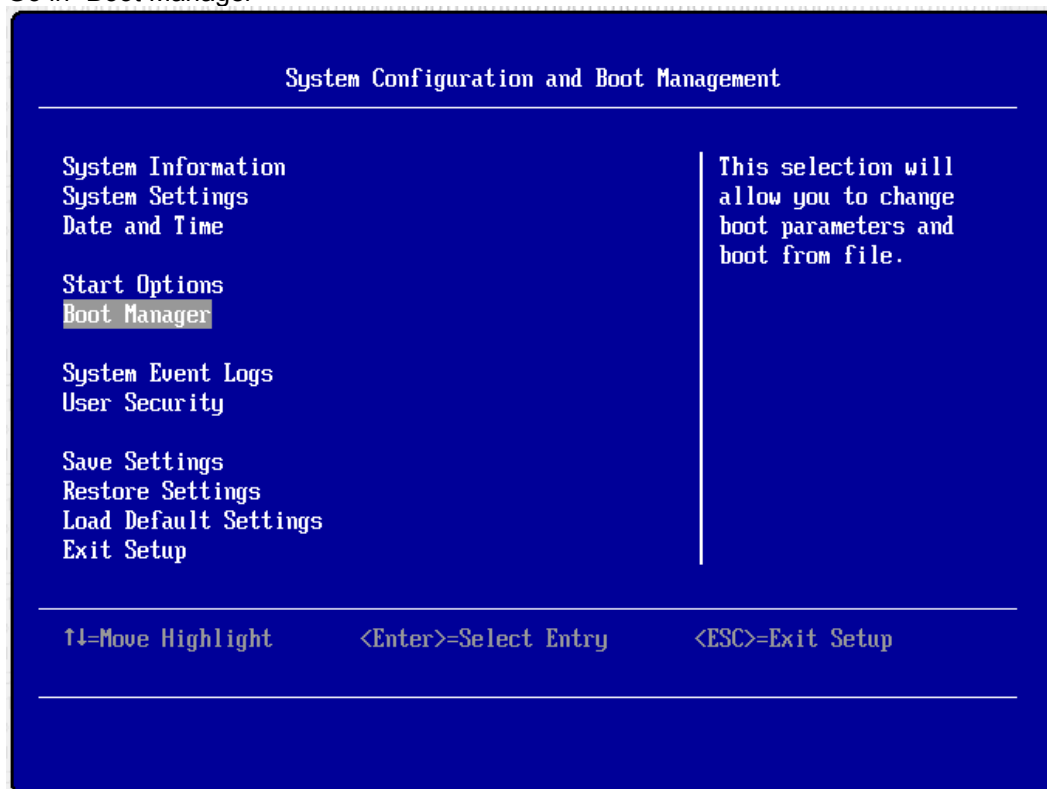
Press <Esc> when done.

Adapter Info	
Adapter Info	Driver Configuration Menu
Back to Main Menu	
Adapter Model:	QMI3572
Adapter Path:	PciRoot (0x0) /Pci (0x3,0x0) /Pci (0x0,0x0)
Adapter WWPN:	2100001B32928548
Adapter WWNN:	2000001B32928548
Adapter UEFI Driver version:	2.27
Adapter BIOS Driver version:	2.09
Adapter FCode Driver version:	3.14
..more ↓	
<hr/>	
↑↓=Move Highlight	<Enter>=Select Entry Esc=Exit
<hr/>	

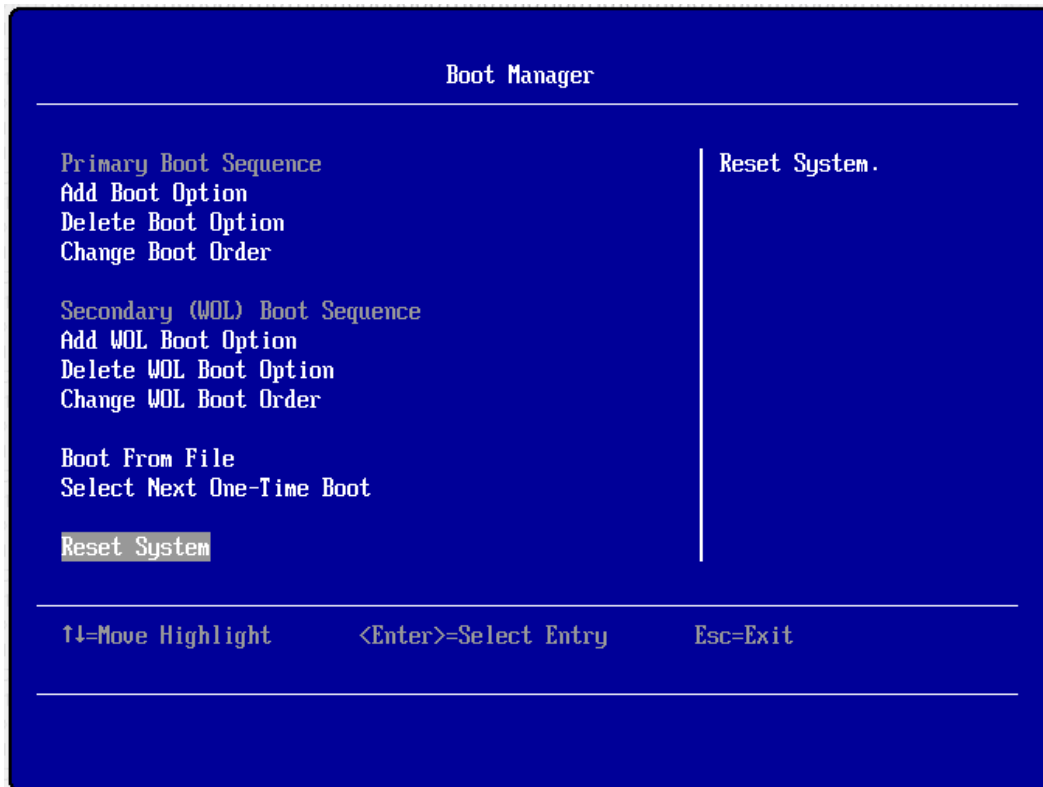
Press <Esc> 3 times until you see the "System Configuration and Boot Management"
Highlight "Save Settings"
Press <Enter>



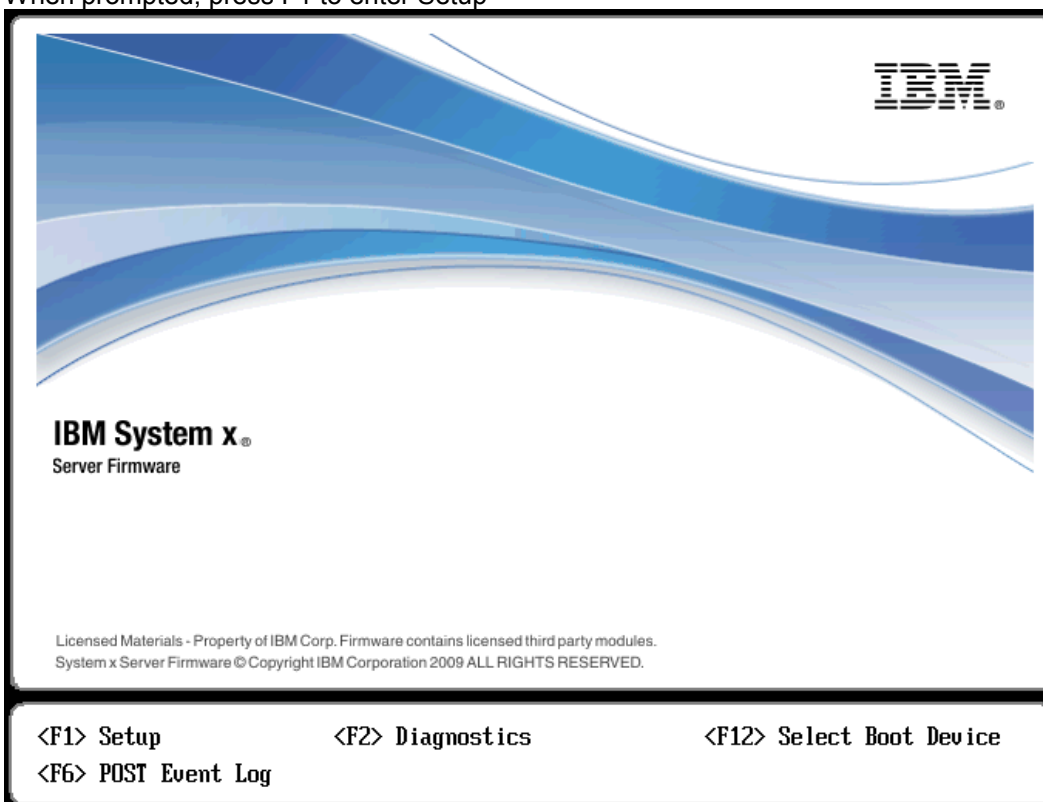
Go in "Boot Manager"



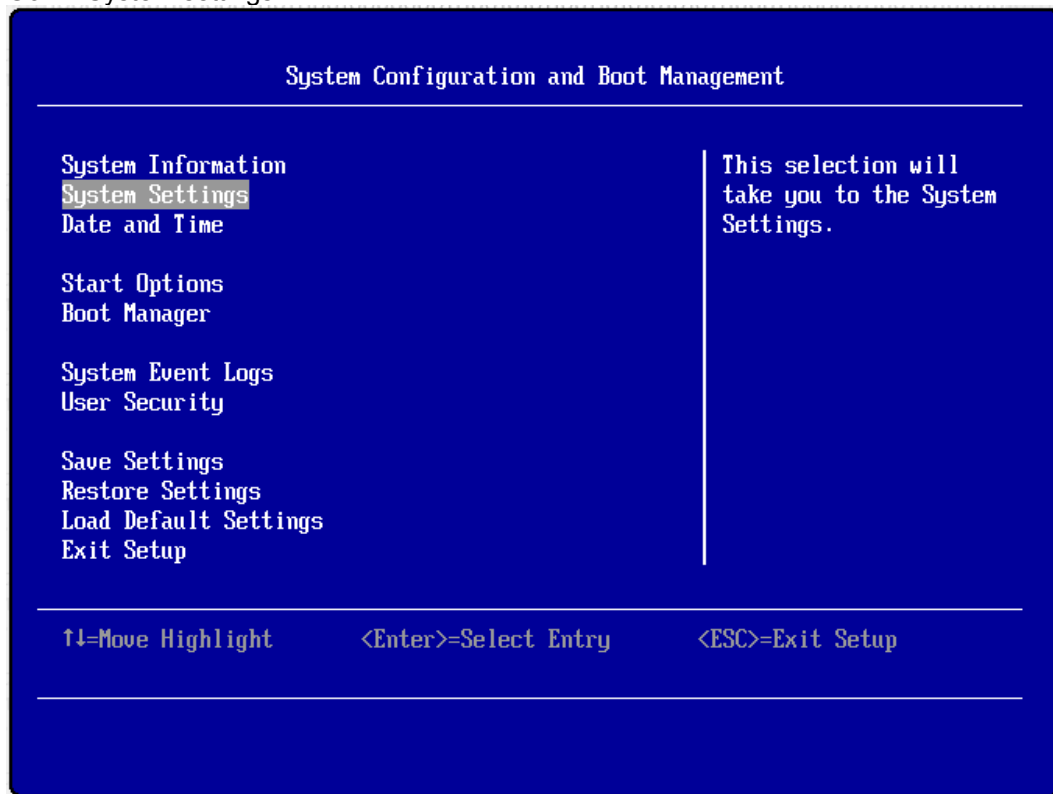
Highlight "Reset System"
Press <Enter>



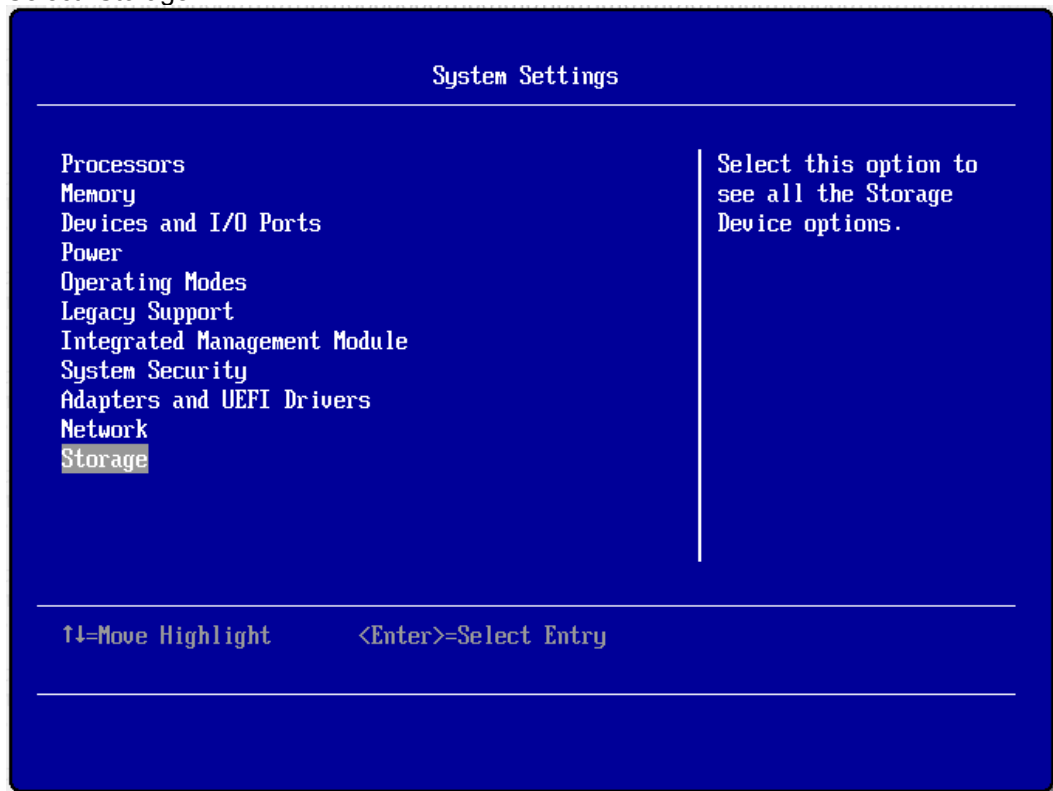
This will reset the system
When prompted, press F1 to enter Setup



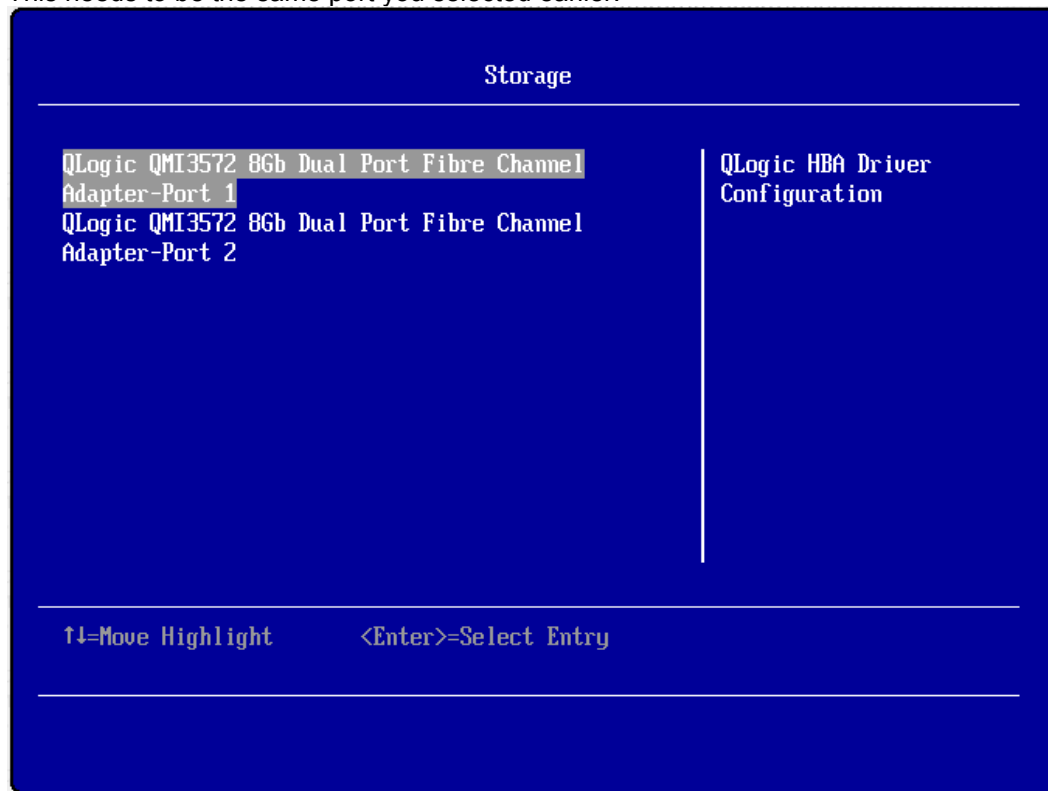
Go in "System settings".



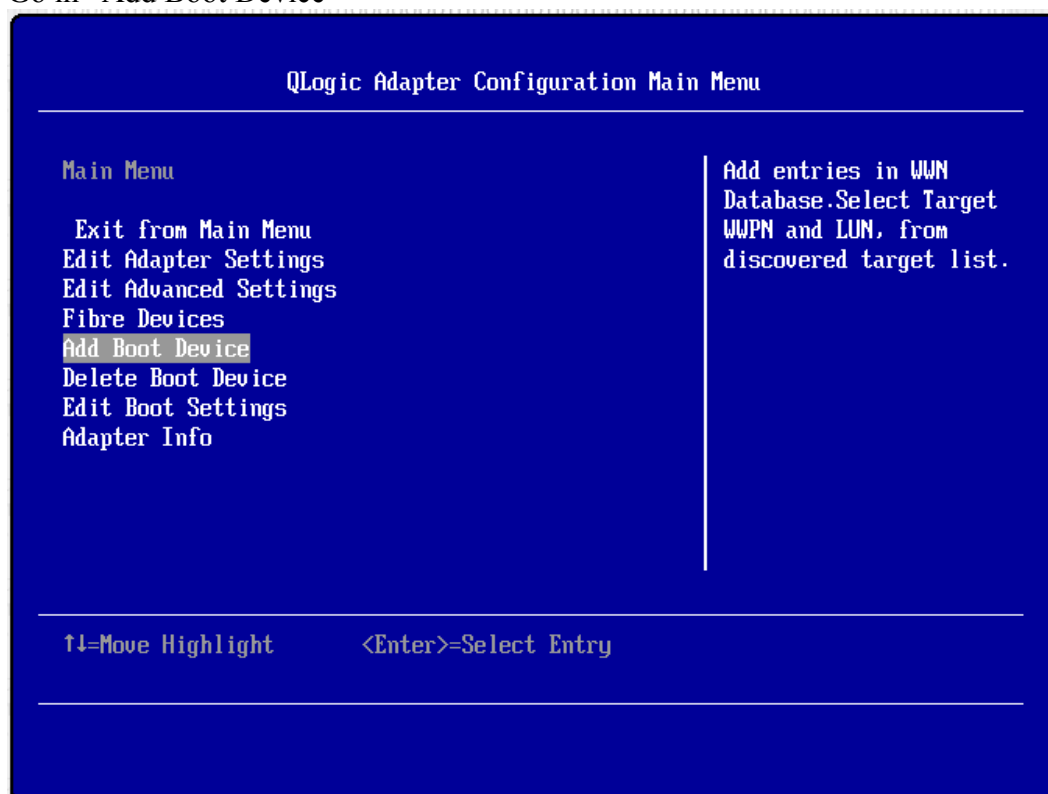
Select "Storage".



You should see 2 QLogic fiber ports
Select the port you wish to boot from and press <Enter>
This needs to be the same port you selected earlier.



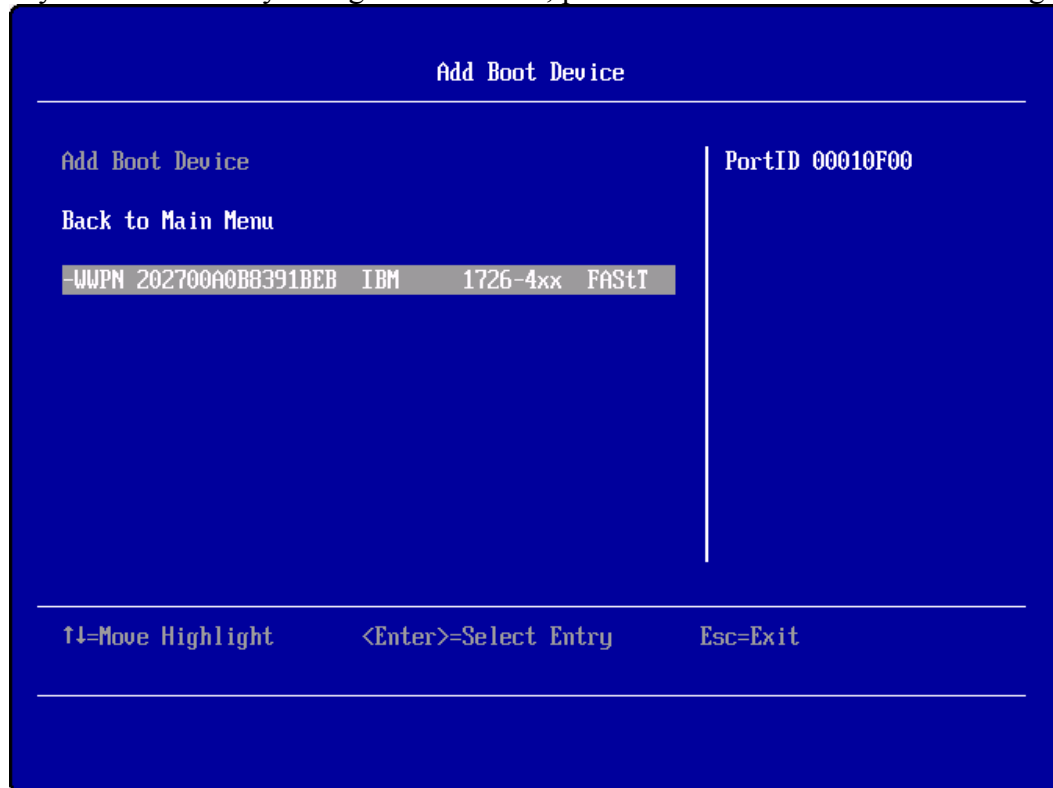
Go in "Add Boot Device"



Select your Storage device

Press <Enter>

If you do not see any storage devices here, please read below for troubleshooting.



Troubleshooting

For you to see your storage, many steps must have been done as documented above.

- **You must zone your switches.**
 - The zone should contain 1 HBA WWPN and the 1 SAN disk controller WWPN
- The SAN disk must have a Logical drive (also called LUN) created.
 - o **The LUN may require that you wait for it to be fully initialized before using it.**
 - o **The LUN must be mapped to a single HBA WWPN**
 - o **The LUN must be set on the correct path you want to boot from.**

If all this is done and no devices show up you can try the following:

- Make sure you QLogic BIOS was updated.
 - Have the switch initiate the port login.
 - Log in the fiber switch
 - Select the Blade port
 - Disable the Blade port
 - Enable the Blade port
 - Wait 30 seconds and make sure the port is logged in.
 - Retry the "Add Boot Device" from the blade.
 - Reboot the blade and go back in F1. If any changes to the SAN disk storage were done while you were in F1 setup, you must reboot for the UEFI to rescan the available disks.
 - Change the fiber switch configuration
 - If you have multiple switches communicating to one another, set the Brocade switch into gateway mode or QLogic switch into transparent mode.
- For more information about this see:
<http://www.redbooks.ibm.com/abstracts/redp4343.html?Open>
or the Brocade documentation: **Access Gateway Administration guide**
- Confirm switch name server can see the WWPN of your HBA and the WWPN of your SAN disk storage.
 - From the Name server, certain switches can show accessible devices. Make sure the 2 devices you are trying to get to communicate together show up.
 - Go through the checklist again "At this stage, many things must be in place on the SAN for this to work"

Tip: it's very easy to make a mistake. Delete your zone and re-create it. Delete your mapping and remap. Once remapped, check preferred path.

Select the LUN you want to boot from.

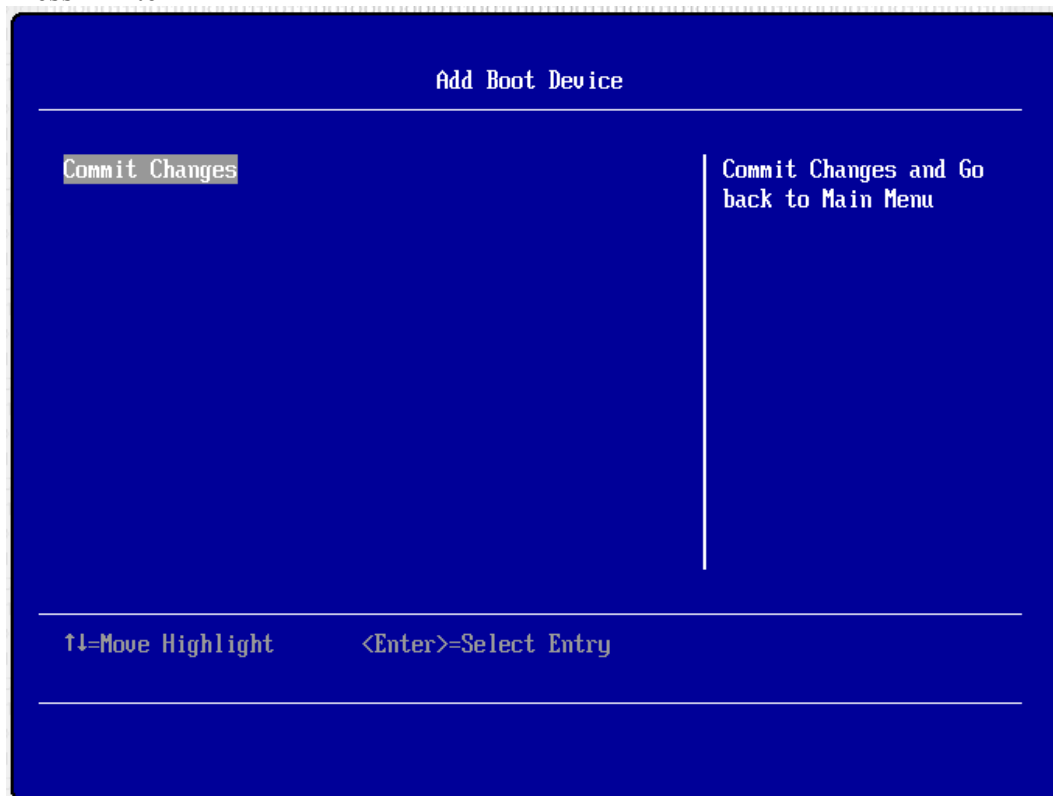
Press <Enter>

Some operating system require that this LUN is LUN 0 (as shown below) in order to boot from. If you see a LUN with a number other then 0, you may want to sign into your SAN disk storage device and reassign to LUN 0. Then reboot the blade again and restart this part of the procedure.

Add Boot Device	
Previous Form	LUN Number
-LUN 0000000000000000	
<hr/>	
↑↓=Move Highlight	<Enter>=Select Entry
<hr/>	

Highlight “Commit Changes”

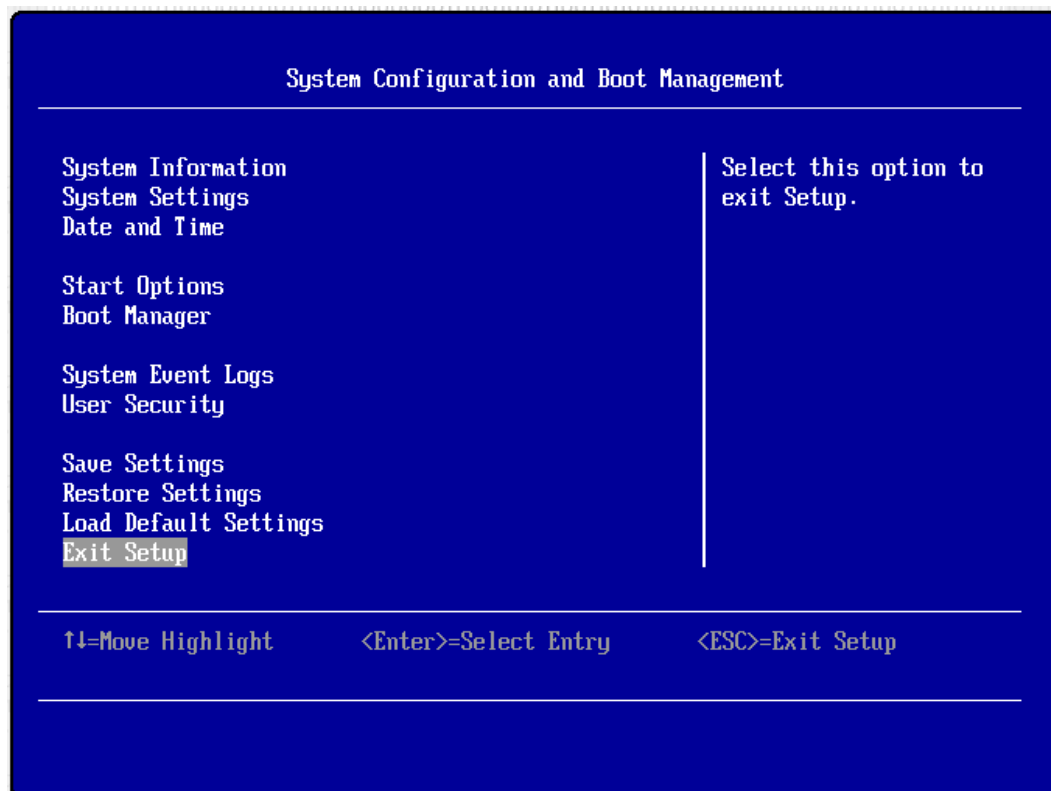
Press <Enter>



Press <Esc>



Press <Esc> 3 more times to return to the “System Configuration and Boot Management” menu.



If you are installing your operating system in UEFI mode, continue to the next page.
If you are installing in Legacy mode, go to Installing Windows 2008 in legacy mode.
If you are not certain if you want to install in UEFI or MBR, go to the next pages.

Installing Windows 2008 x64 or Windows 2008 R2 (x64) in UEFI mode

This section will show you how to install Windows 2008 x64 (64 bit).

Whether you are installing Windows, Linux or VMware the main lines are the same.

Boot from the media using the desired method (UEFI or legacy)

(if needed) Input drivers for the storage devices

Select a storage device (disk) to install the operating system.

It is important to know if your operating system is UEFI compliant or not.

List of UEFI compliant operating systems at the time this document was written:

Windows 2008 x64, Windows 2008 R2 (x64)

Linux SLES 11 sp1, RHEL 6

Note: The following operating systems can be installed in both UEFI and Legacy mode.

For all other non-UEFI compliant OS see section below for installing in Legacy mode.

Generally, if you are installing a UEFI compliant operating system, it is recommended to install in UEFI mode for performance reasons. UEFI also gives you access to new features such as booting from a GPT partitioned disk (instead of MBR). GPT is no longer limited to a 2 TB boot drive. However you may have some software that require the use of MBR (such as older backup software). So choose carefully. Once the operating system is installed, the only way to change the mode is to delete all and reinstall.

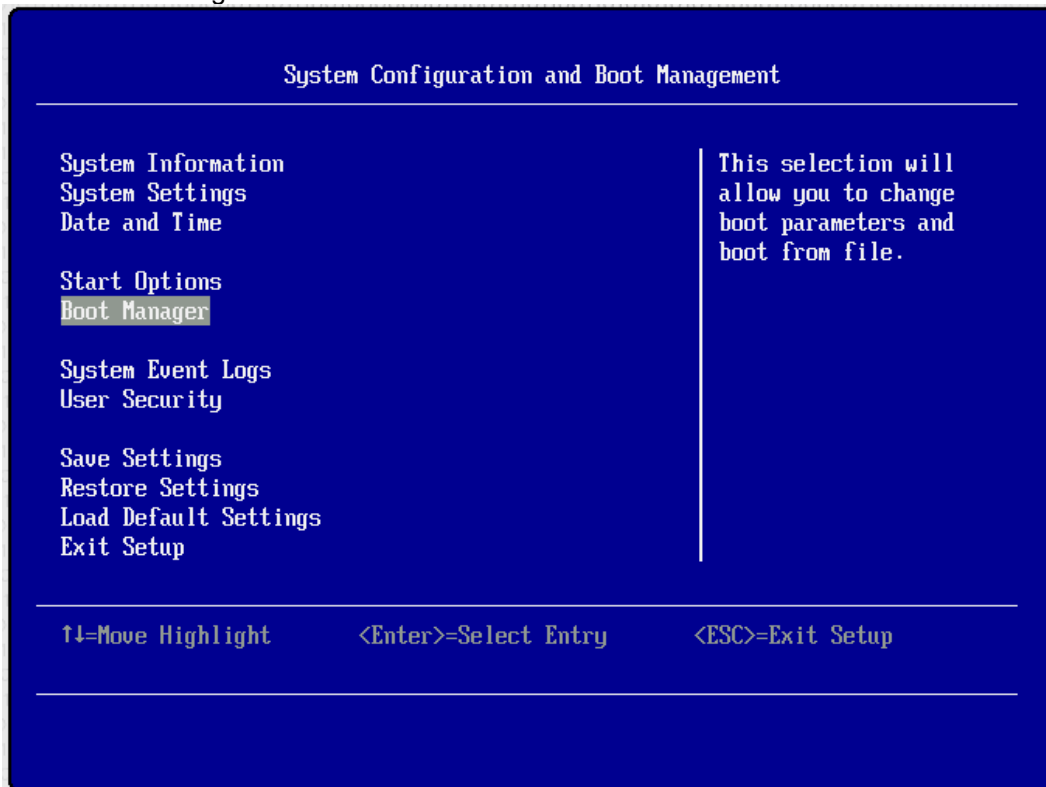
How to boot the Windows DVD in UEFI mode.

You can boot the Windows media simply by putting the Windows 2008 x64 DVD in the DVD-ROM drive and letting the machine boot.

Note: Depending of when you insert the Windows DVD during the system POST, you could boot the media in UEFI or in legacy. To fully control the boot, it is recommended to follow the instructions below.

At POST go in F1 Setup.

Go in "Boot Manager"



Go in "Boot From File"

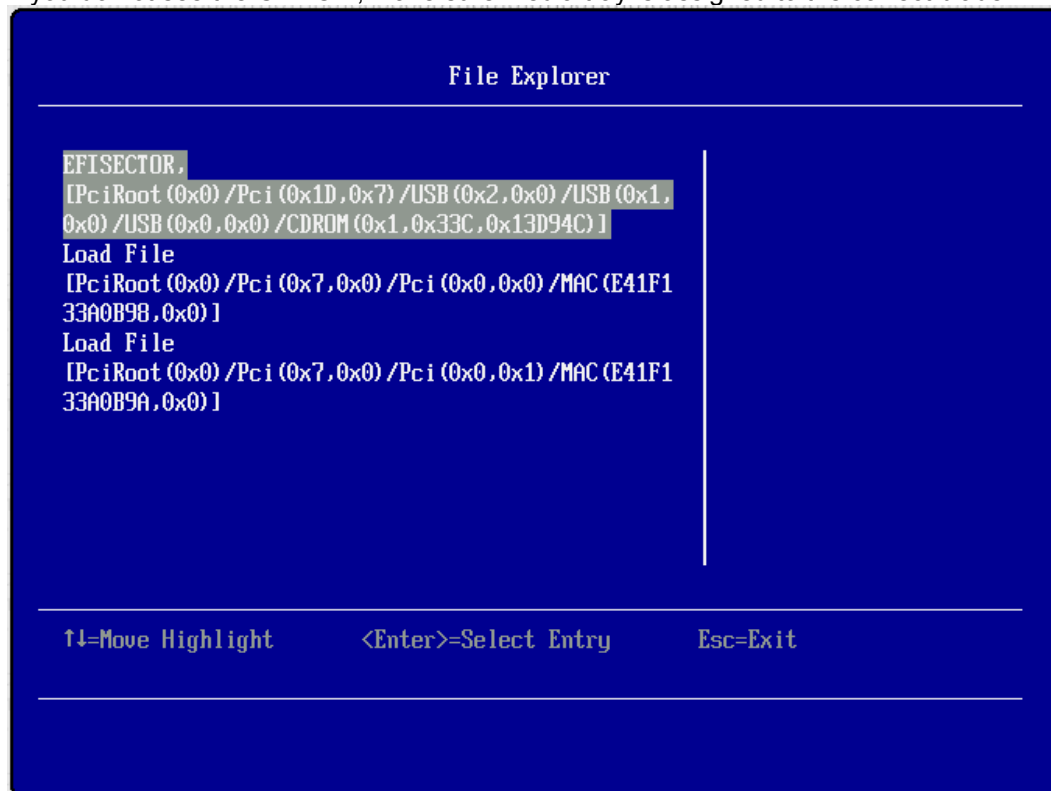


Here I am booting from an HS22 shared DVD-ROM/CD-ROM.

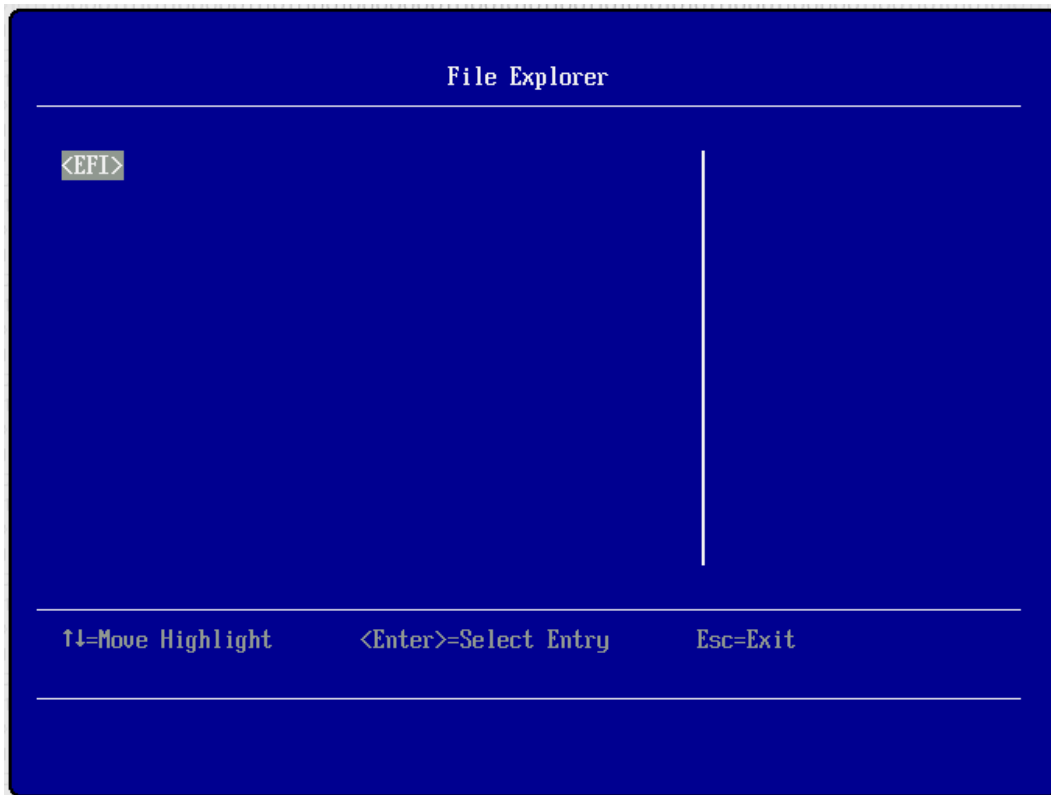
The DVD-ROM in the media tray is considered a USB device.

So select "EFISECTOR, ... USB... CDROM..."

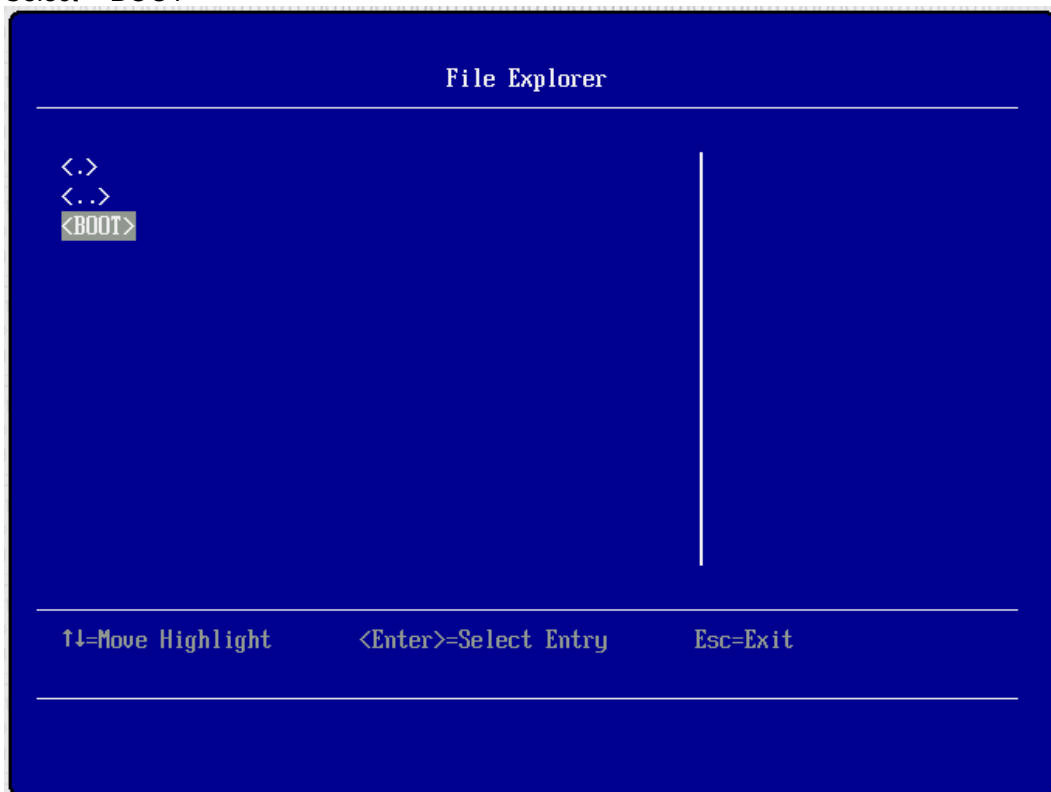
If you do not see the CDROM, make sure media tray is assigned to the correct blade.



Now you are browsing the DVD
Select "<EFI>"

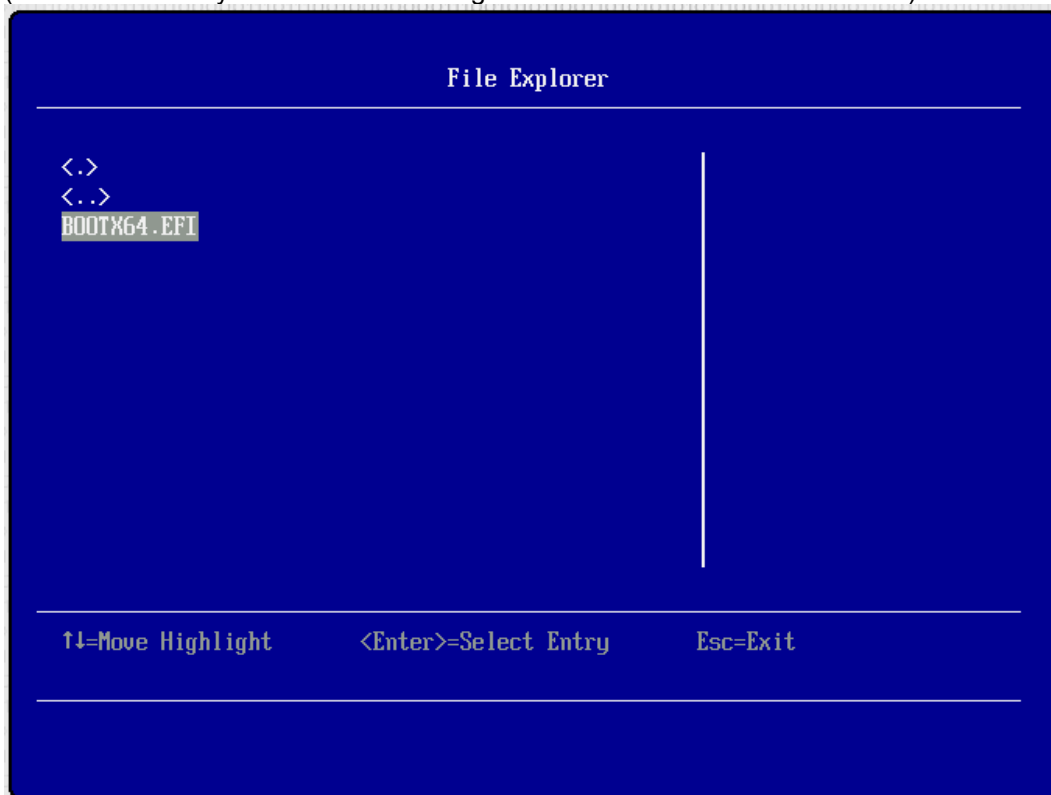


Select "<BOOT>"



Select "BOOTX64.EFI"

(This filename may be different if booting other versions of Windows or Linux)



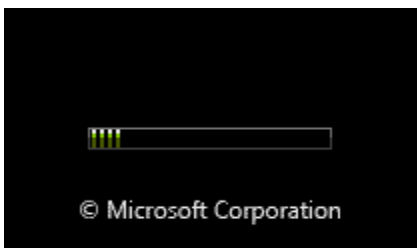
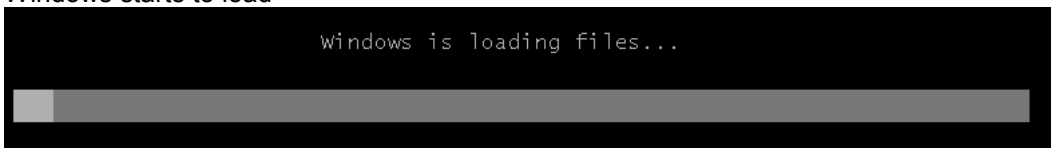
The DVD starts to load.

If prompted, make sure you press a key so that the DVD will start to boot.

If you do not press a key, you will return to the UEFI setup screen.



Windows starts to load



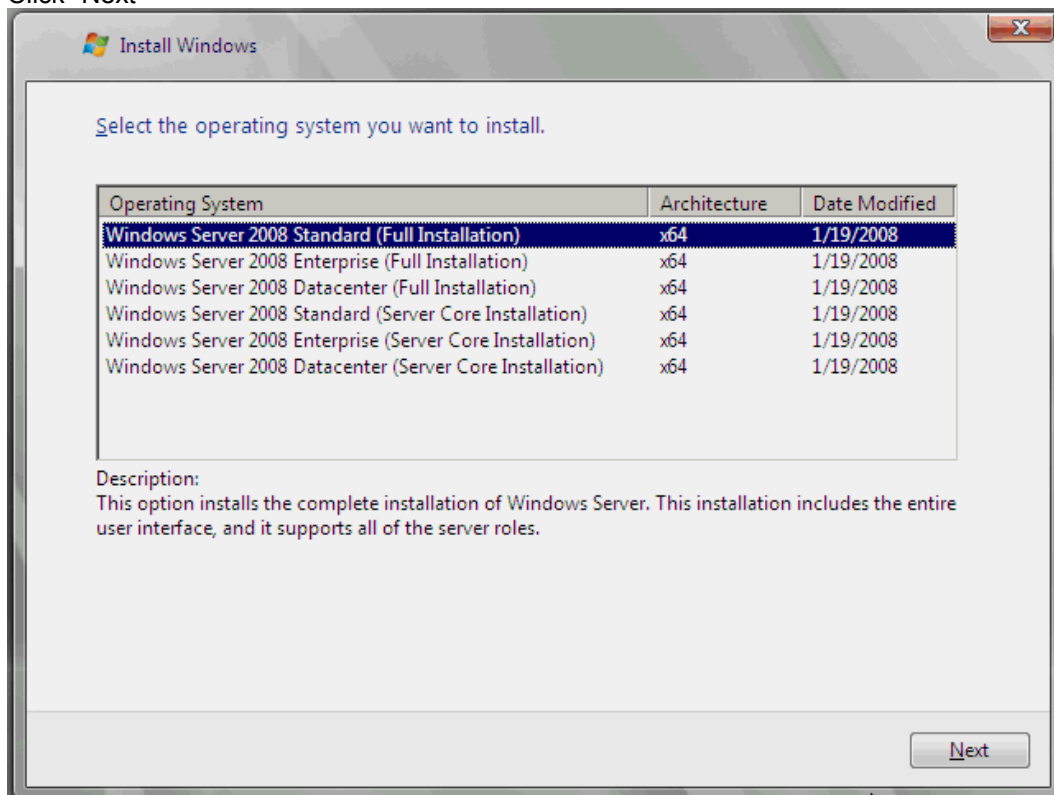
Select your preferences
Click "Next".



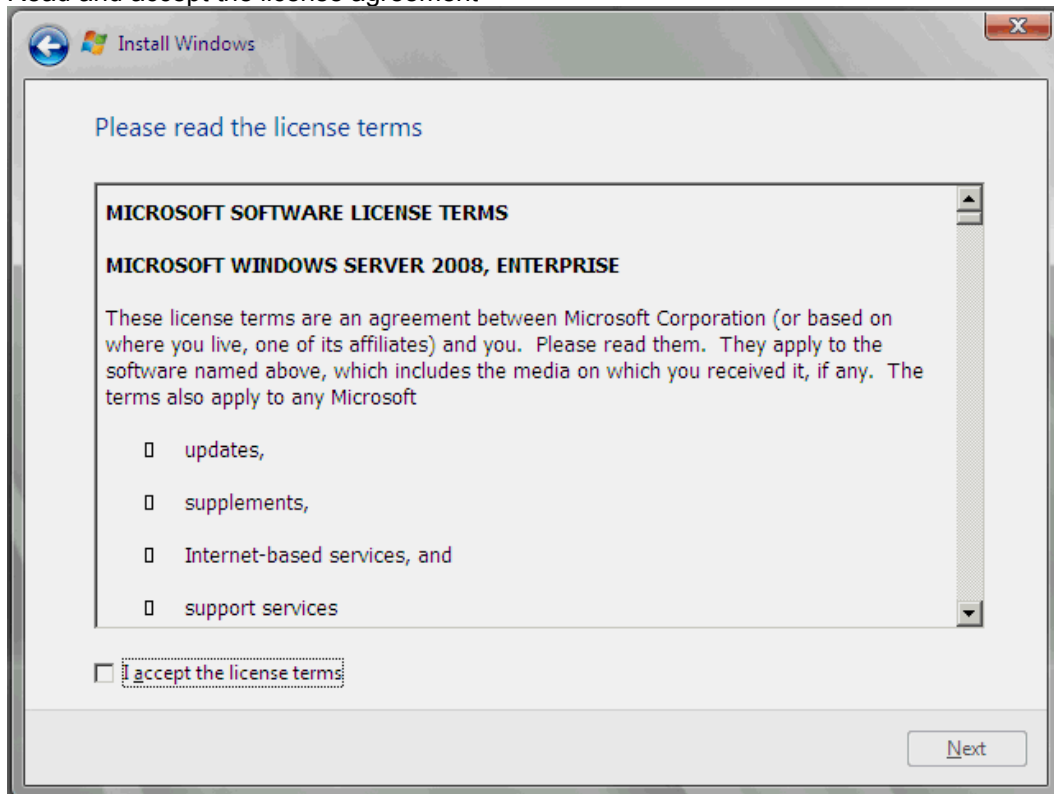
Select Install now



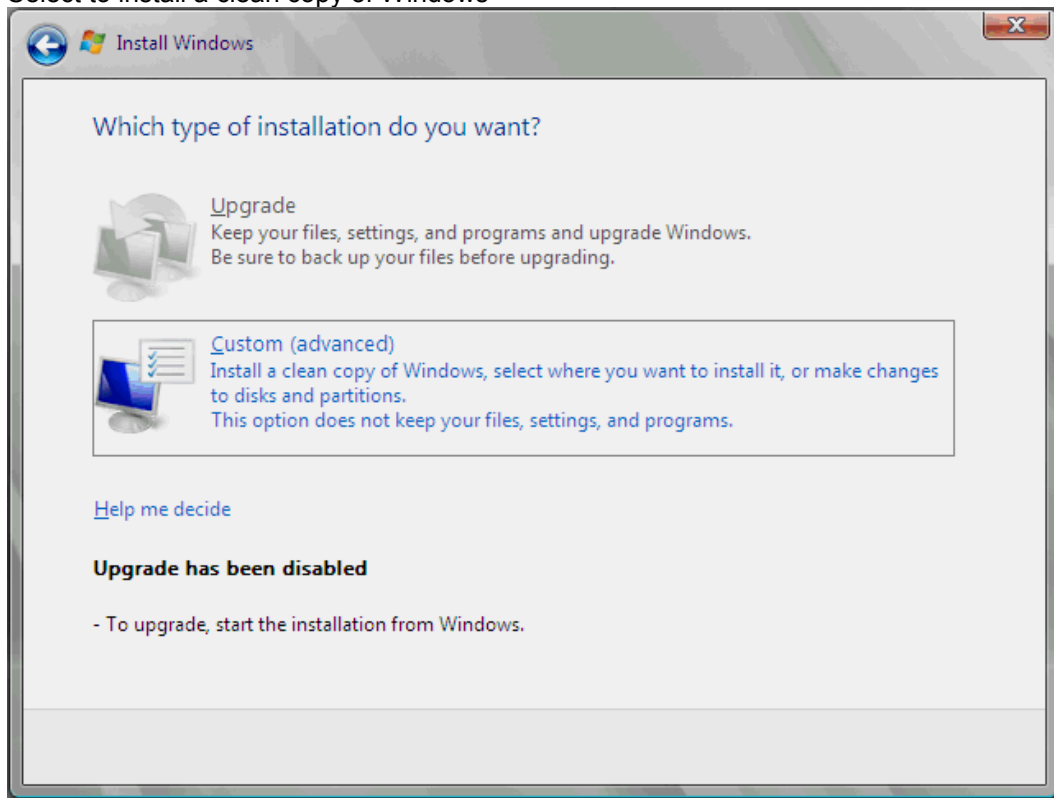
Select your operating system
Click "Next"



Read and accept the license agreement



Select to install a clean copy of Windows



If no disks show here

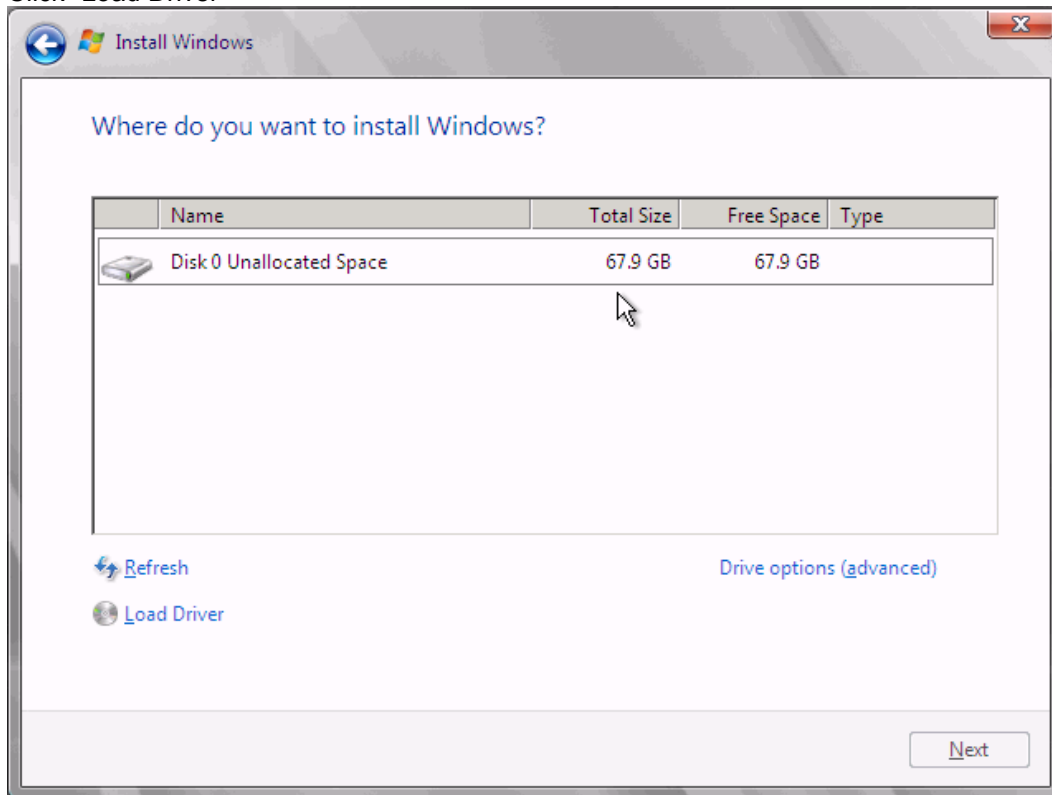
- You need to load a driver for your storage device (QLogic card).
- Possibly the path is not on the preferred path (check with your SAN config)
- Possibly zoning is not correct
- Possibly LUN mapping is not correct.

Here it is strongly recommended to load the latest QLogic driver.

The Windows DVD is pre-packaged with a QLogic driver that will work with 4gb and 8gb QLogic adapters. It may work fine with your setup. However if you experience issues, it is strongly recommended to use the latest QLogic drivers. The updated driver resolves multiple issues. Make sure you use the latest QLogic SAN boot driver. The drivers can be downloaded from here:

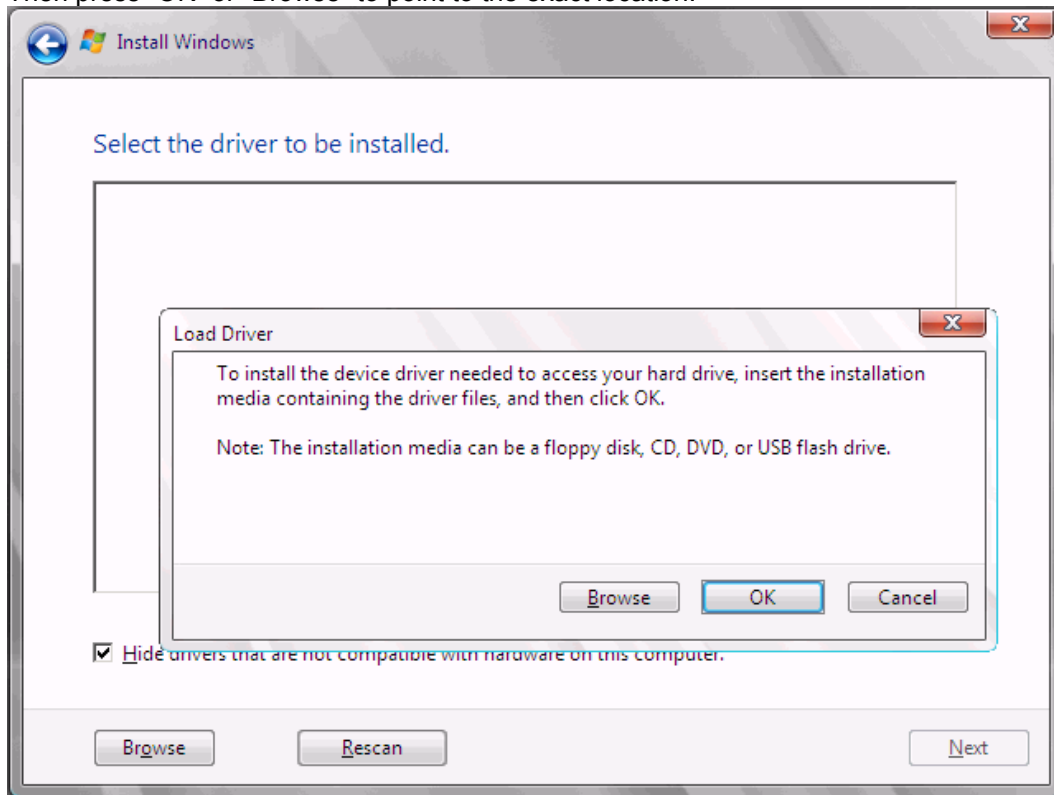
http://driverdownloads.qlogic.com/QLogicDriverDownloads_UI/IBM.aspx?companyid=6
<http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter>

You should see a screen similar to this with your SAN disk.
Click "Load Driver"



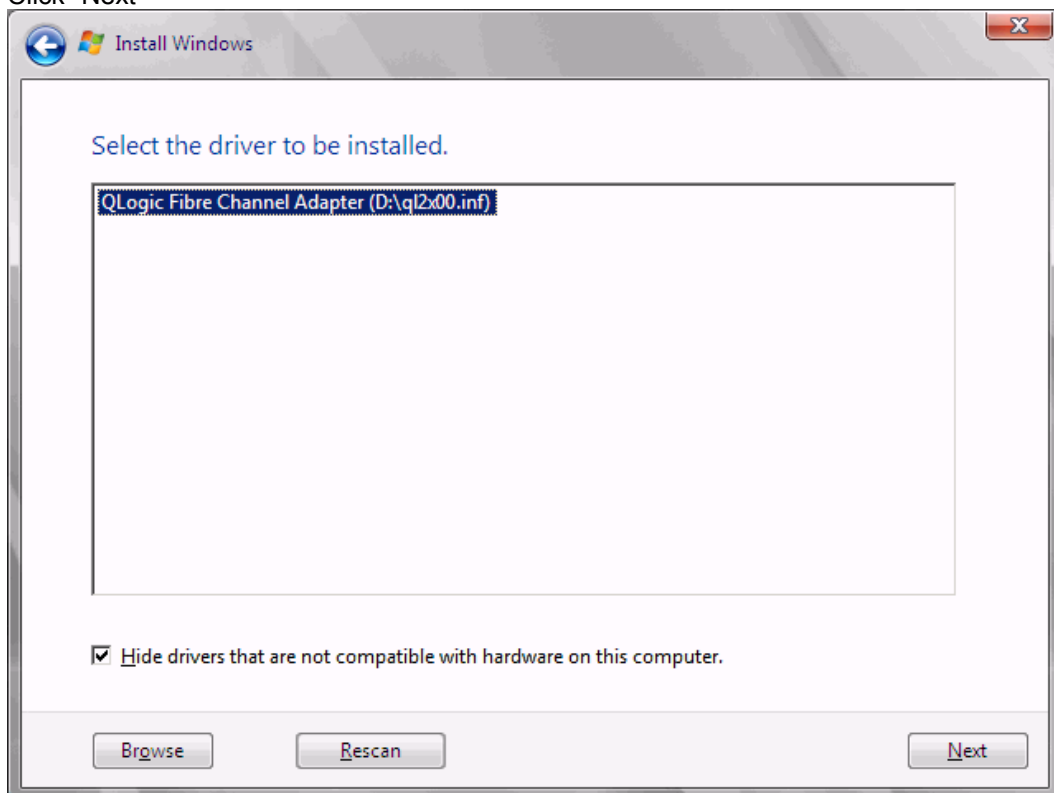
Insert a media containing the latest drivers. Media can be USB key, CD-ROM/DVD-ROM, a remotely mounted ISO.

Then press "OK" or "Browse" to point to the exact location.

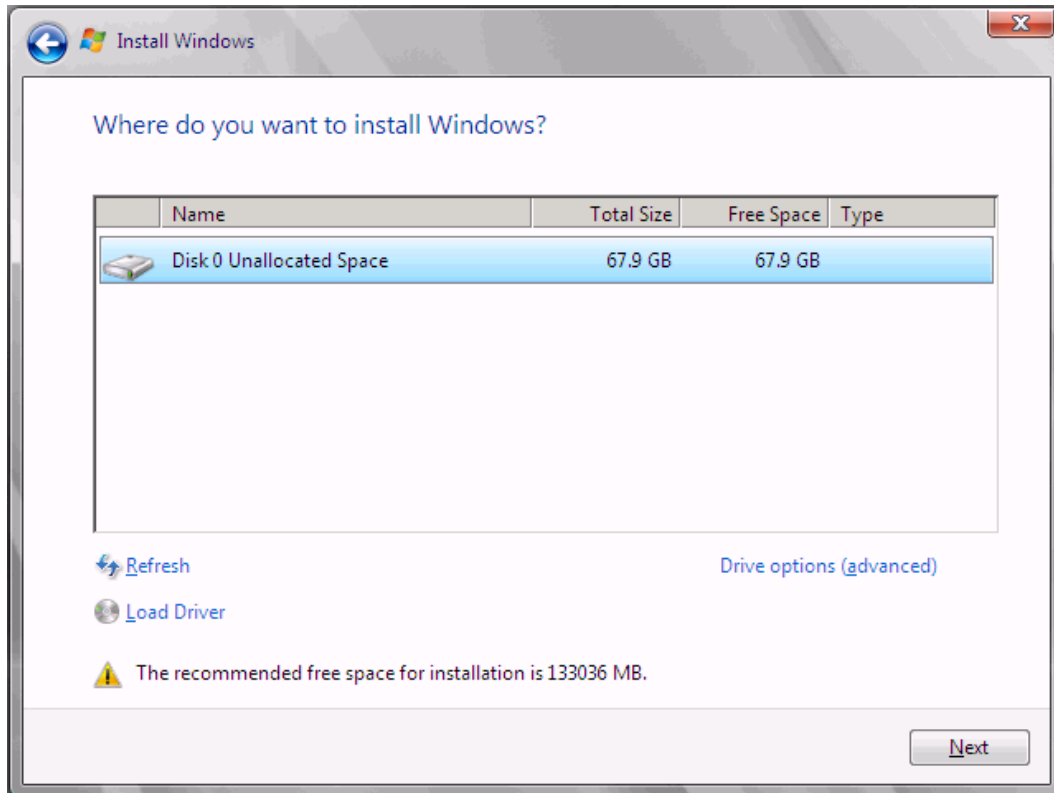


Windows should find an appropriate more up to date driver.

Click "Next"



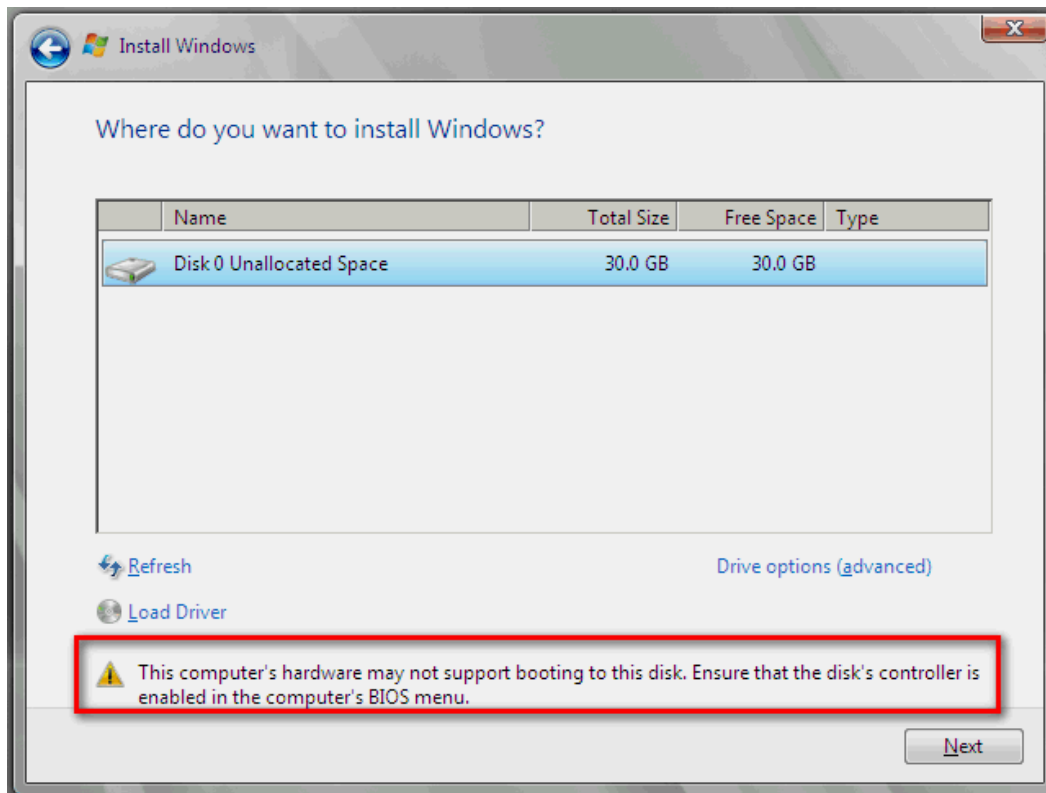
Select the disk you want to install Windows on.
Check for any warnings. See below for more details.
Click "Next".



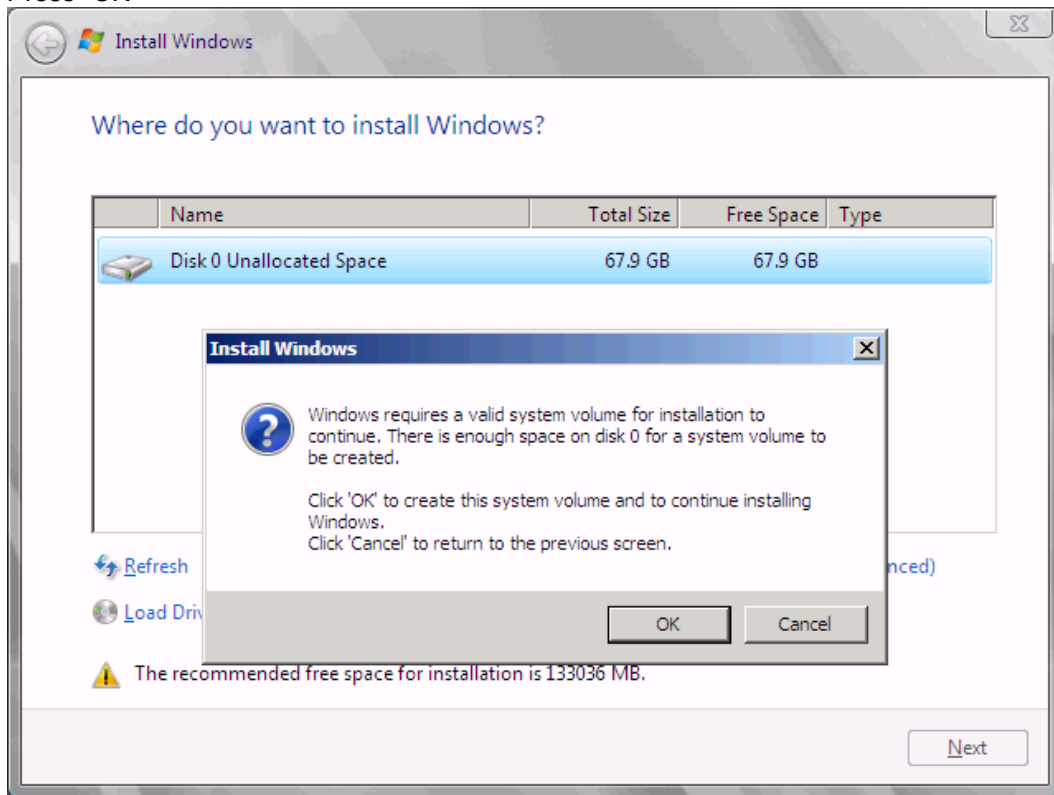
Check for the warning message.

If you see a message that your hardware may not support booting to this disk, something is wrong and the boot from SAN will not work. Go back to the setup instructions and check the following:

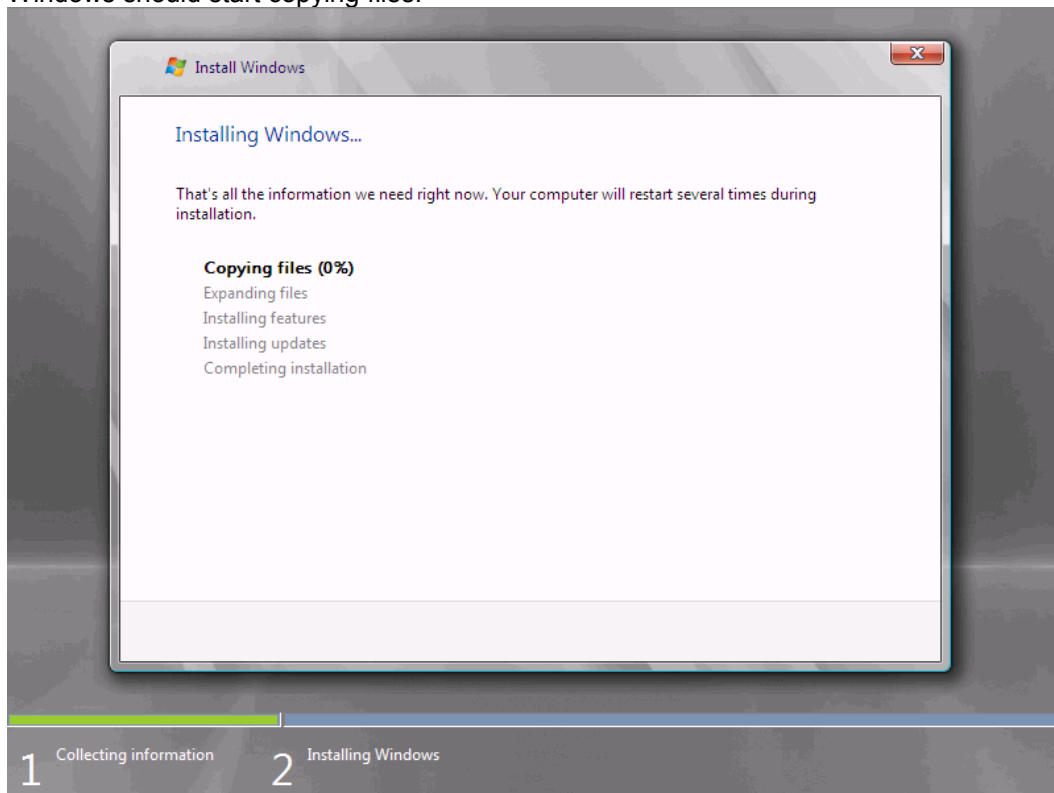
- Possibly the boot device was not added in F1 (go back in F1 and check)
- Possible the BIOS was not enabled on the QLogic port (go back in F1 and check)
- Possibly the HBA you are trying to do boot from is not on the SAN disk preferred path. Check your SAN disk device configuration and reboot the server again on the Windows DVD.
- Possibly your SAN does not support UEFI boot.
 - Make sure your SAN disk is updated to recent firmware.
 - Try to perform a Legacy installation.
- You may see the disk as being offline. Check [Windows KB 2345135](#).
[Setup reports error "Windows cannot be installed to this disk..." booted of DVD in UEFI mode.](#)
You may have to make some modifications to the Windows installation media.
- Use Windows media that are bundled with the latest Service pack.
- If you see a 20 mb disk you most likely mapped the access LUN instead of the actual lun.
- Make sure your LUN is using LUN 0. This is defined in the SAN disk device.



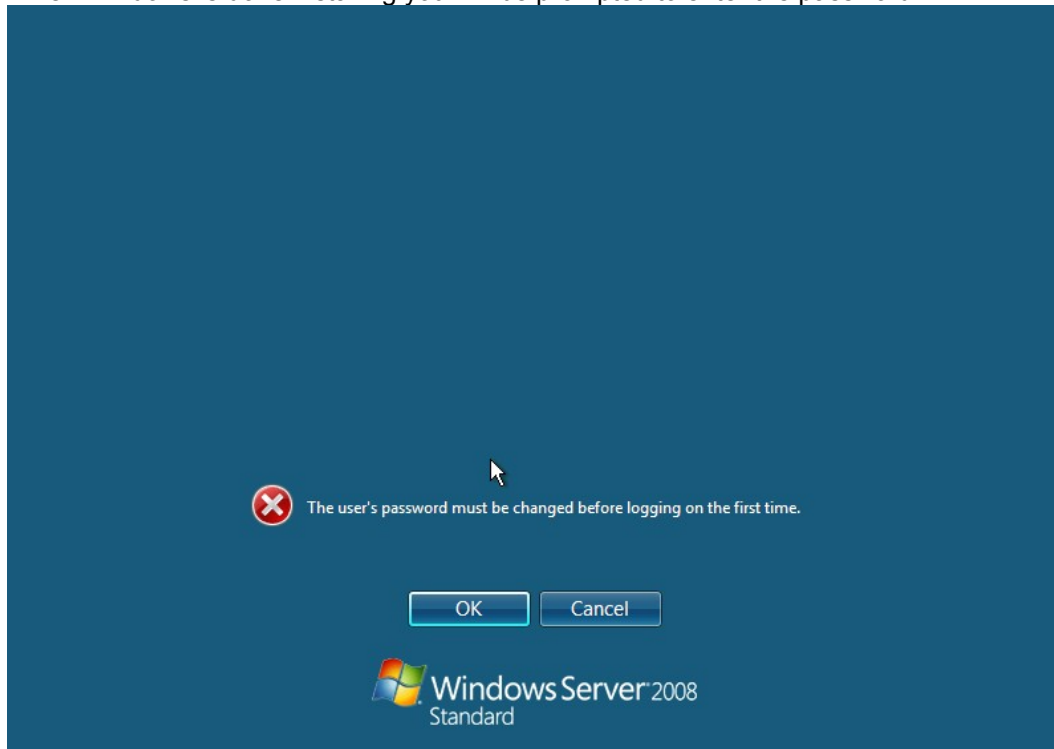
Once you address all errors and click next.
You will get a message that Windows wants to create a volume.
Press "OK"



Windows should start copying files.

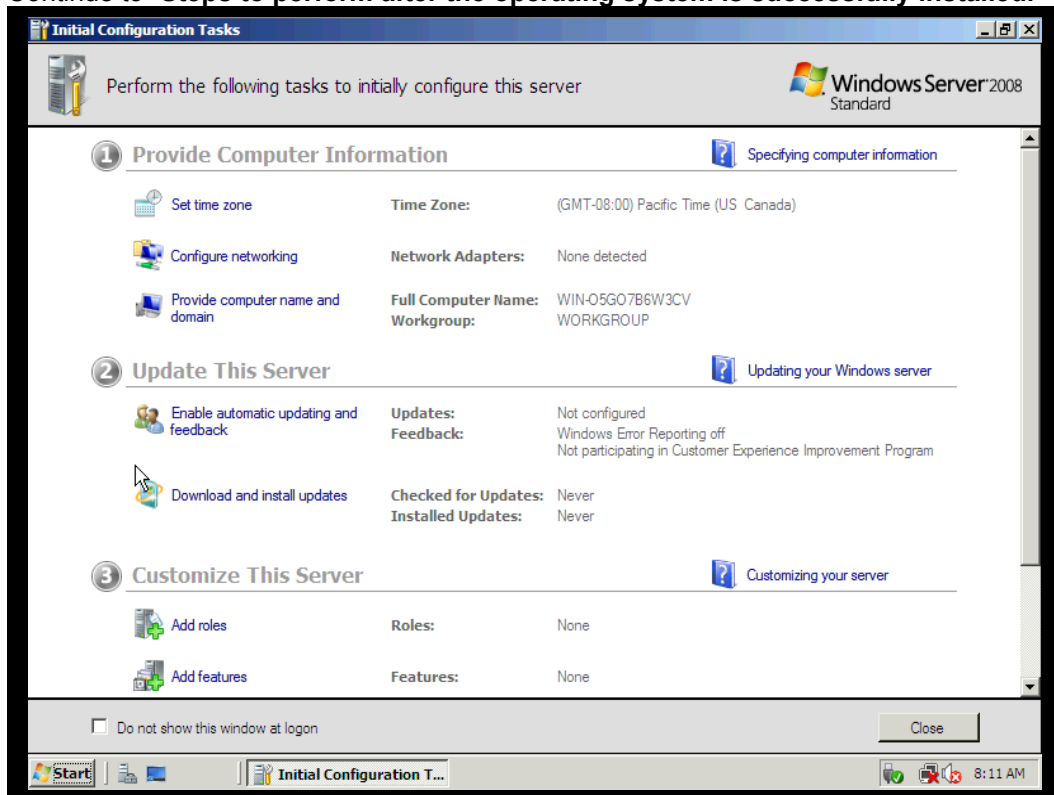


When Windows is done installing you will be prompted to enter the password.



You are now done installing Windows.

Continue to **"Steps to perform after the operating system is successfully installed."**



Installing Windows 2008 x86 in legacy mode

This section will show you how to install Windows 2008 x86 (32 bit).

Whether you are installing Windows, Linux or VMware the main lines are the same.

Boot from the media using the desired method (UEFI or legacy)

(if needed) Input drivers for the storage devices (QLogic in this case).

Select a storage device (disk) to install the operating system.

If your operating system supports UEFI, it may be best to install in UEFI to take advantage of the performance and bigger boot disk size available through GPT.

List of UEFI compliant operating systems at the time this document was written:

Windows 2008 x64, Windows 2008 R2 (x64)

Linux SLES 11 sp1, RHEL 6

Note: The above operating systems can be installed in both UEFI and Legacy mode.

Windows 32 bit versions are legacy only (not UEFI)

For all other non-UEFI compliant OS use this section to install in legacy mode.

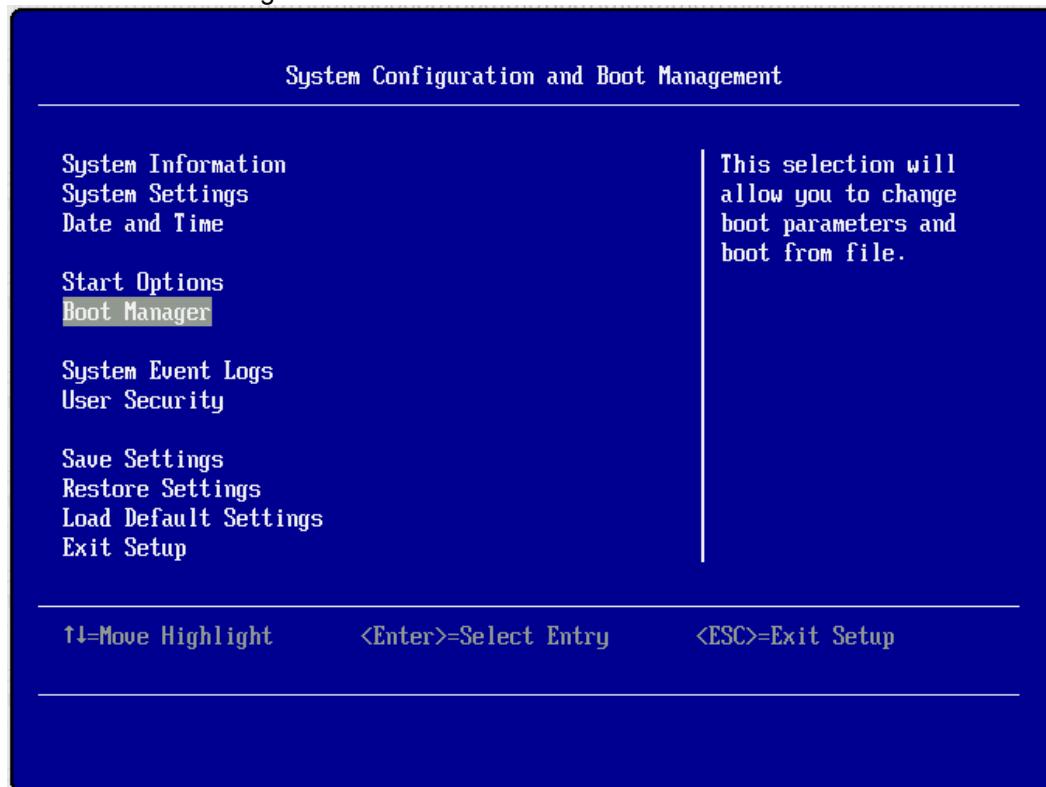
List of legacy compliant operating systems (this list is incomplete, it is only there as reference): Windows 2003 and below, VMware 4 and below, RHEL 5 and below, SLES 10 and below, Novell Netware and more.

Check the operating system specifications to know if your operating system support UEFI or not.

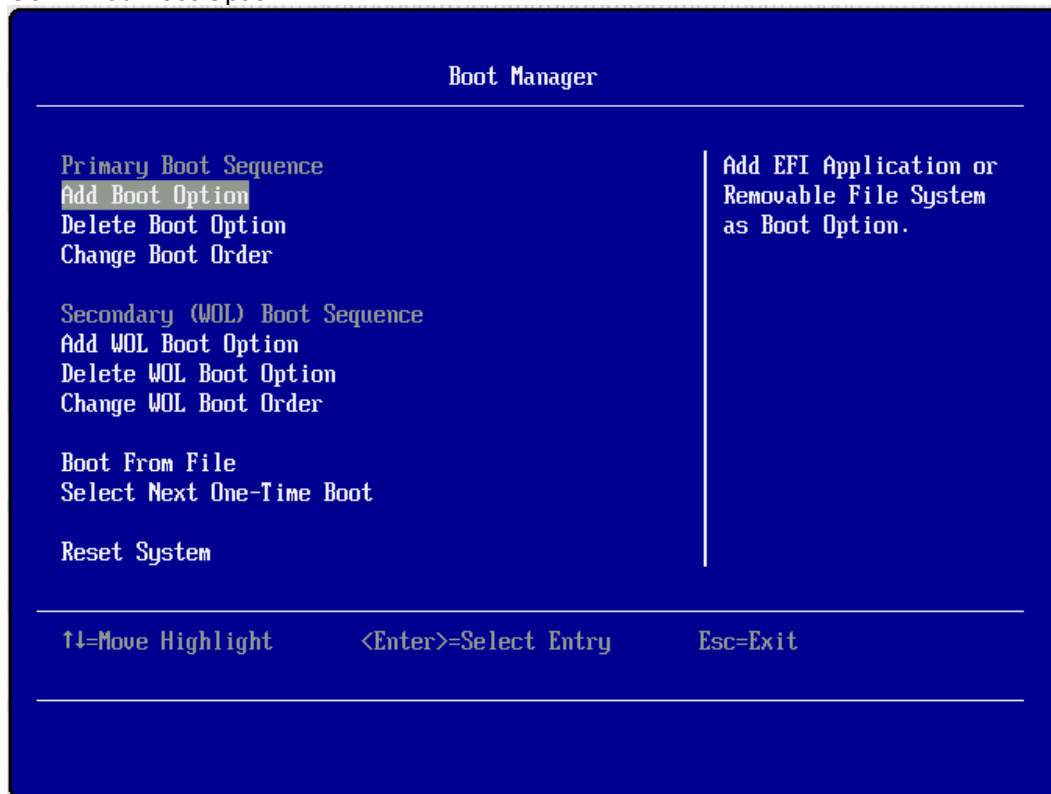
Optimizing the boot for legacy operating systems.

Go in F1 setup

Go in the "Boot Manager"

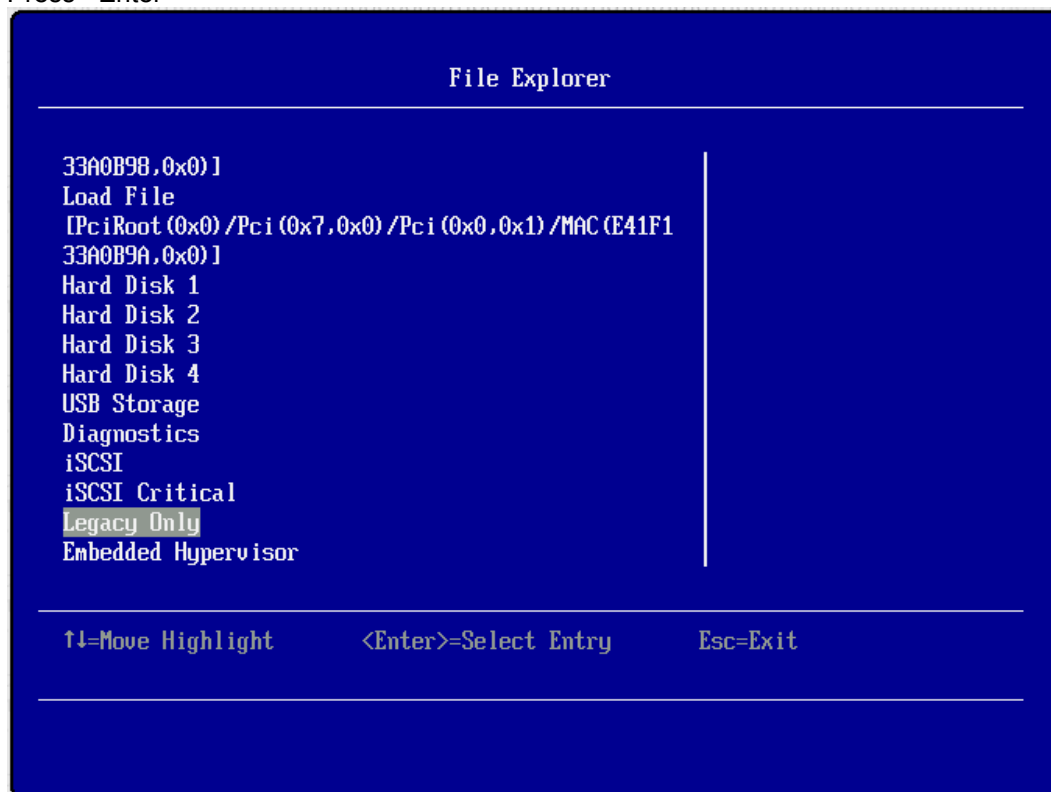


Go in "Add Boot Option"

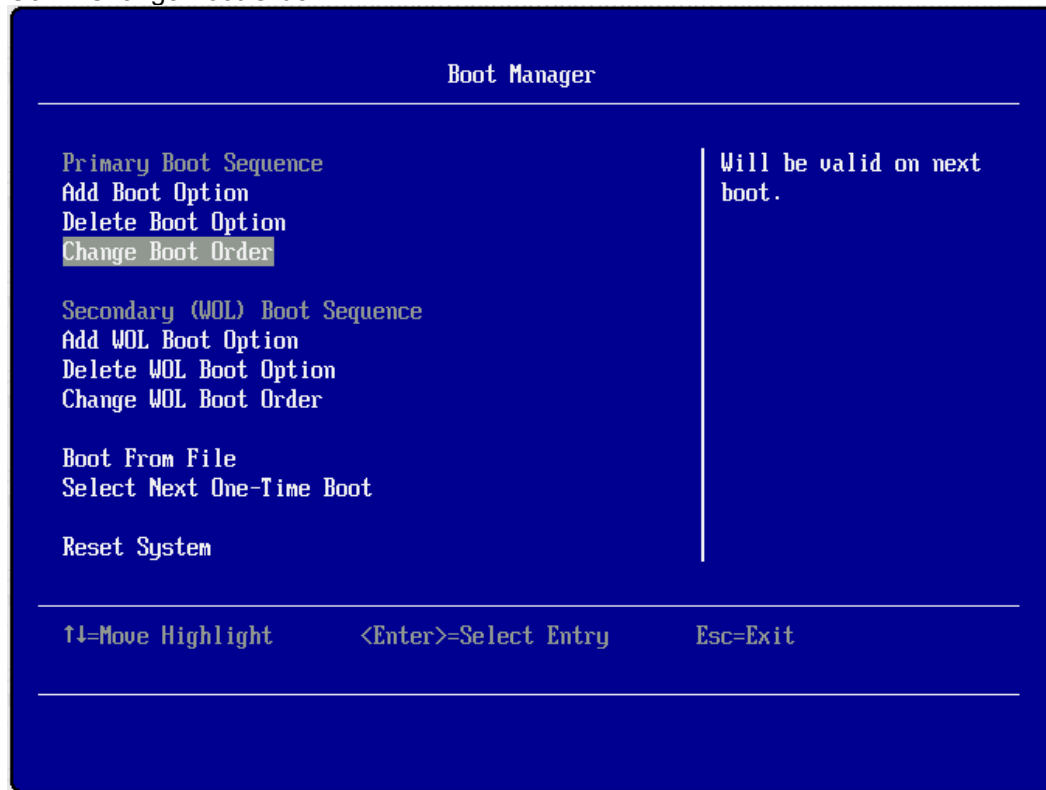


Highlight "Legacy Only"

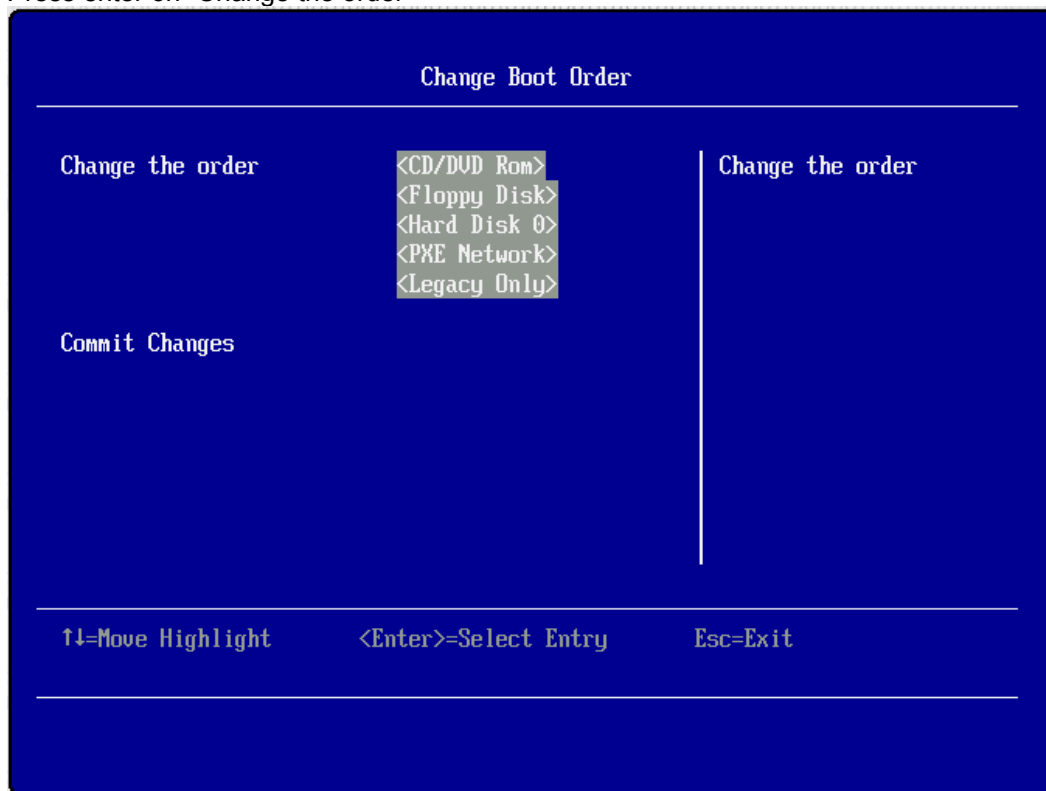
Press <Enter>



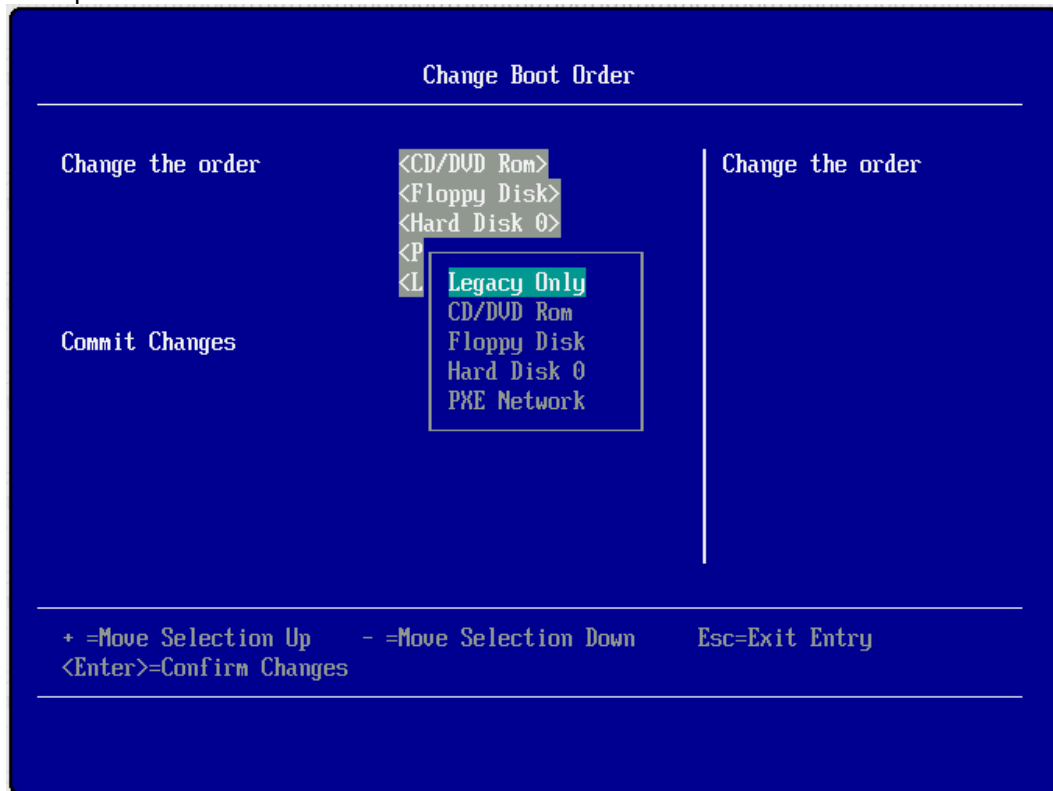
Go in "Change Boot Order"



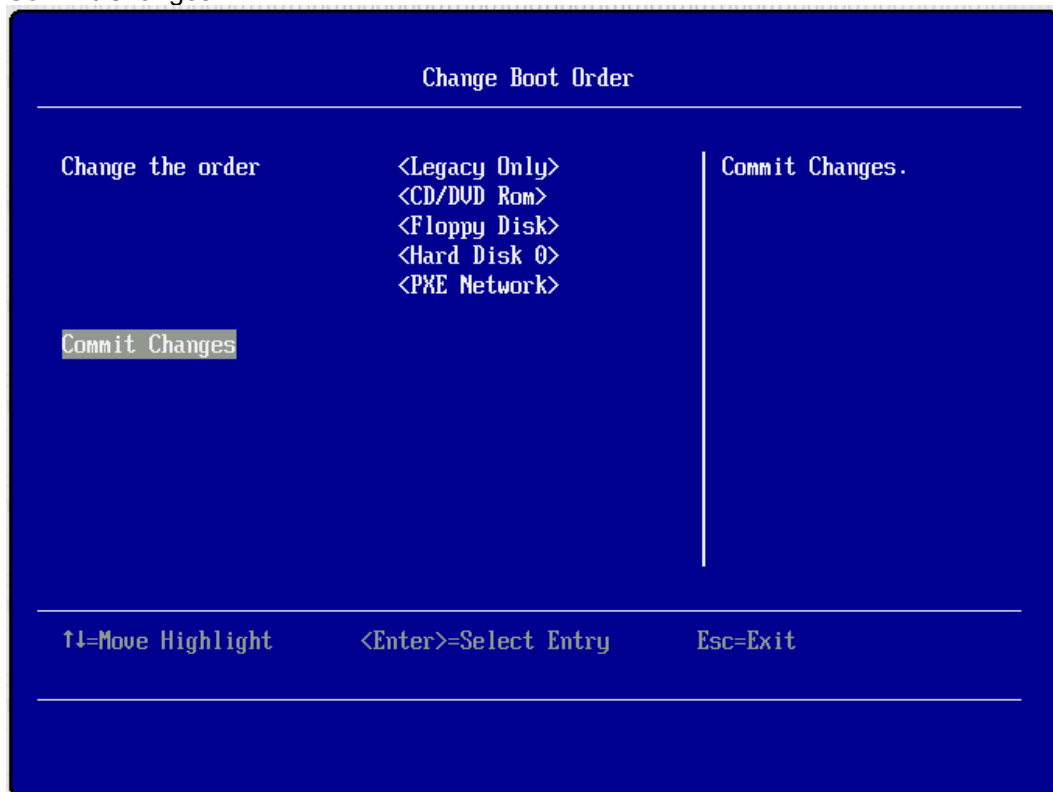
Press enter on "Change the order"



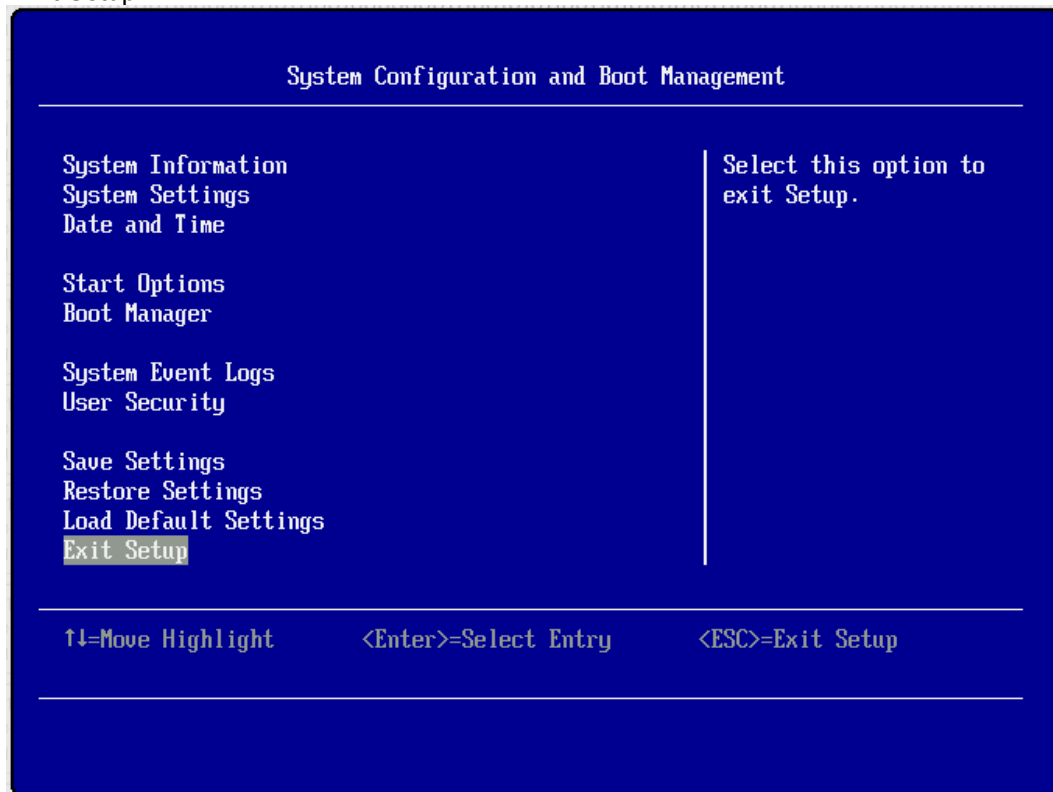
Move "Legacy Only" to the top using + and -
Then press <Enter>



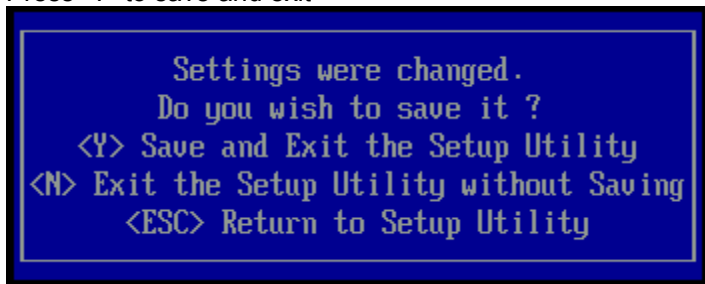
Commit Changes



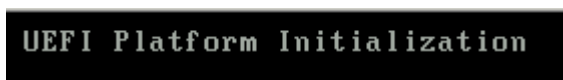
“Exit Setup”



Press “Y” to save and exit



You should see



After a small wait, the system will then start to boot in legacy.
When you see the following, you are now in a legacy BIOS section.
You can go in <Ctrl-Q> to review the settings, but it should not be necessary.

```
Please wait, initializing legacy usb devices...Done

QLogic Corporation
QMI3572 PCI3.0 Fibre Channel ROM BIOS Version 2.09
Copyright (C) QLogic Corporation 1993-2010. All rights reserved.
www.qlogic.com

Press <CTRL-Q> or <ALT-Q> for Fast!UTIL
Firmware Version 5.03.09

BIOS for Adapter 1 is disabled

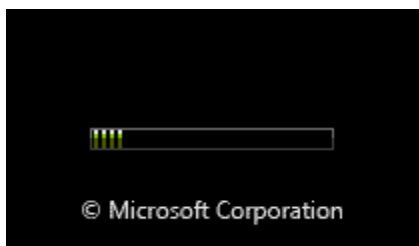

-----
Drive Letter C: is Moved to Drive Letter D:
WWPN 202600A0B8391BEB,LUN 0000 is Installed As Drive C:
-----
Device Number  Device Type  Adapter Number  Port ID  Lun Number  Vendor ID  Product ID  Product Revision
80    Disk        0      660F00  0      IBM      1726-4xx  FASSt      0617
ROM BIOS Installed
```

The DVD starts to load.
If prompted, make sure you press a key so that the DVD will start to boot.
If you do not press a key, you will return to the UEFI setup screen.

```
Press any key to boot from CD or DVD.....
```

Windows starts to load

```
Windows is loading files...
```



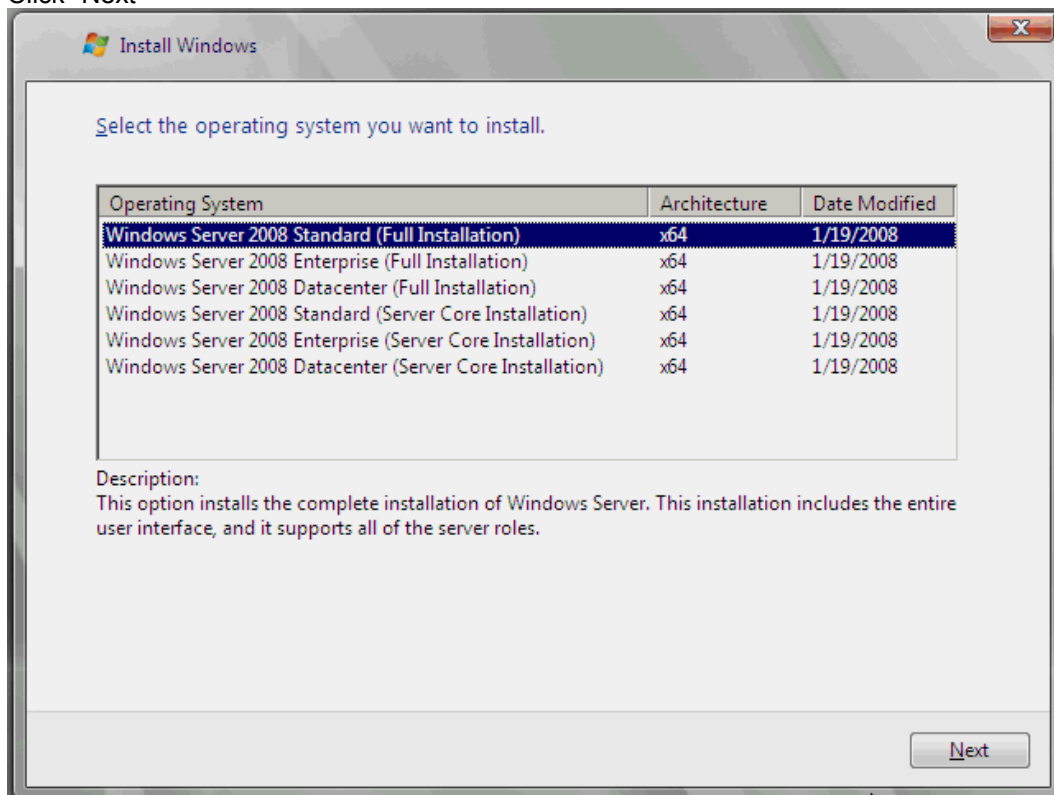
Select your preferences
Click "Next".



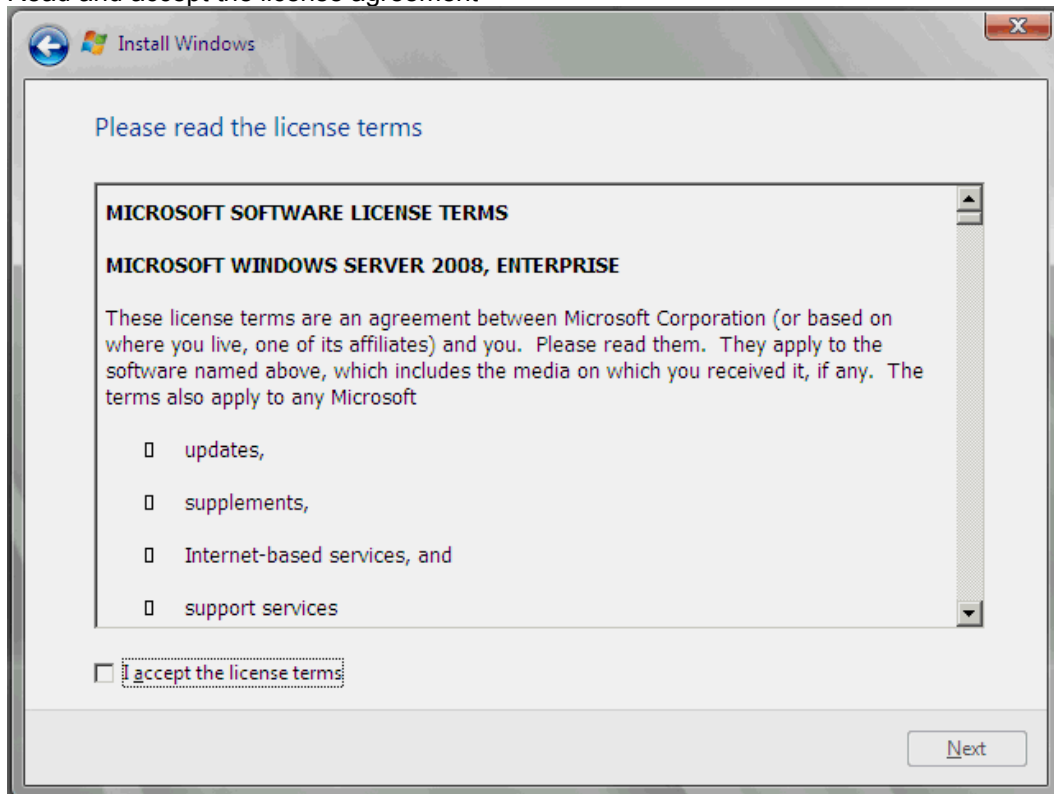
Select Install now



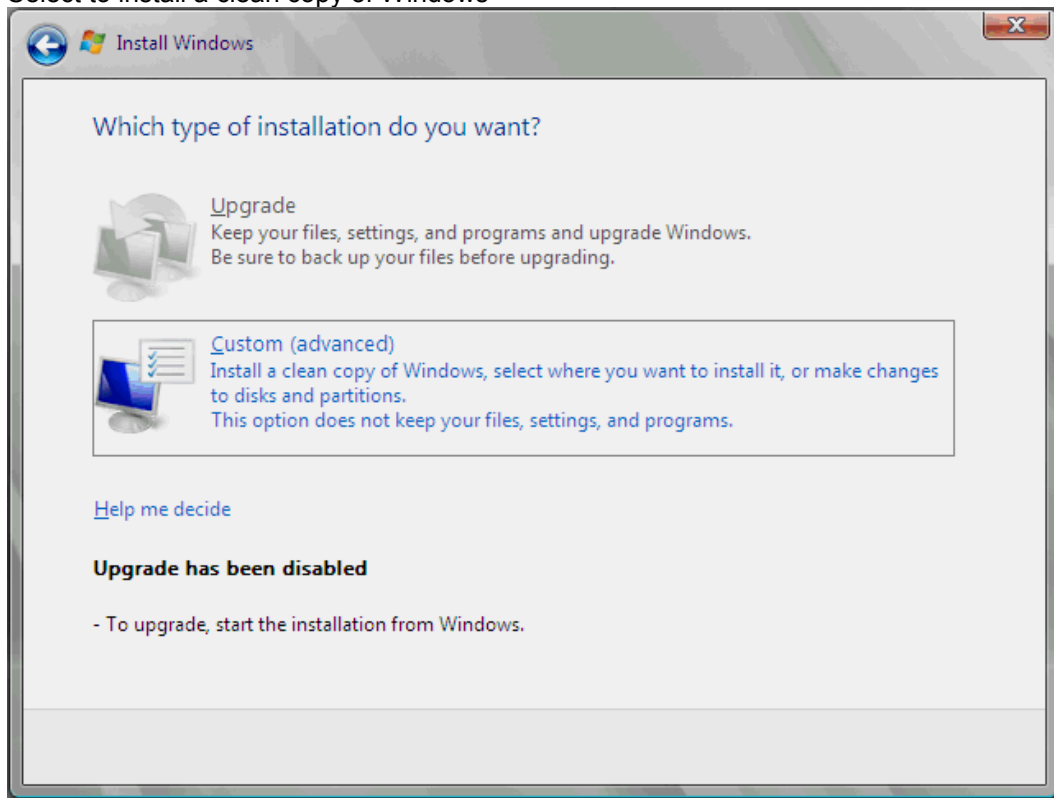
Select your operating system
Click "Next"



Read and accept the license agreement



Select to install a clean copy of Windows



If no disks show here

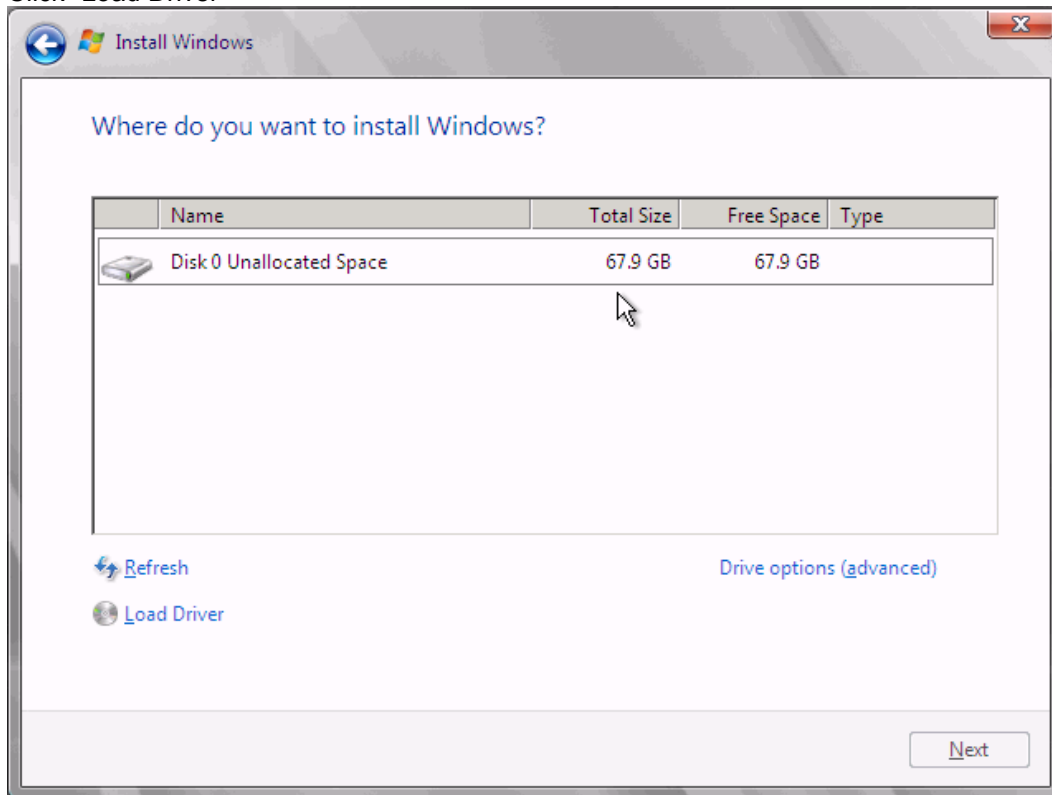
- You need to load a driver for your storage device.
- Possibly the path is not on the preferred path (check with your SAN config)
- Possibly zoning is not correct
- Possibly LUN mapping is not correct.

Here is is strongly recommended to load the latest QLogic driver.

The Windows DVD is pre-packaged with a QLogic driver that will work with 4gb and 8gb QLogic adapters. It may work fine with your setup. However if you experience issues, it is strongly recommended to use the latest QLogic drivers. The updated driver resolves multiple issues. Make sure you use the latest QLogic SAN boot driver. The drivers can be downloaded from here:

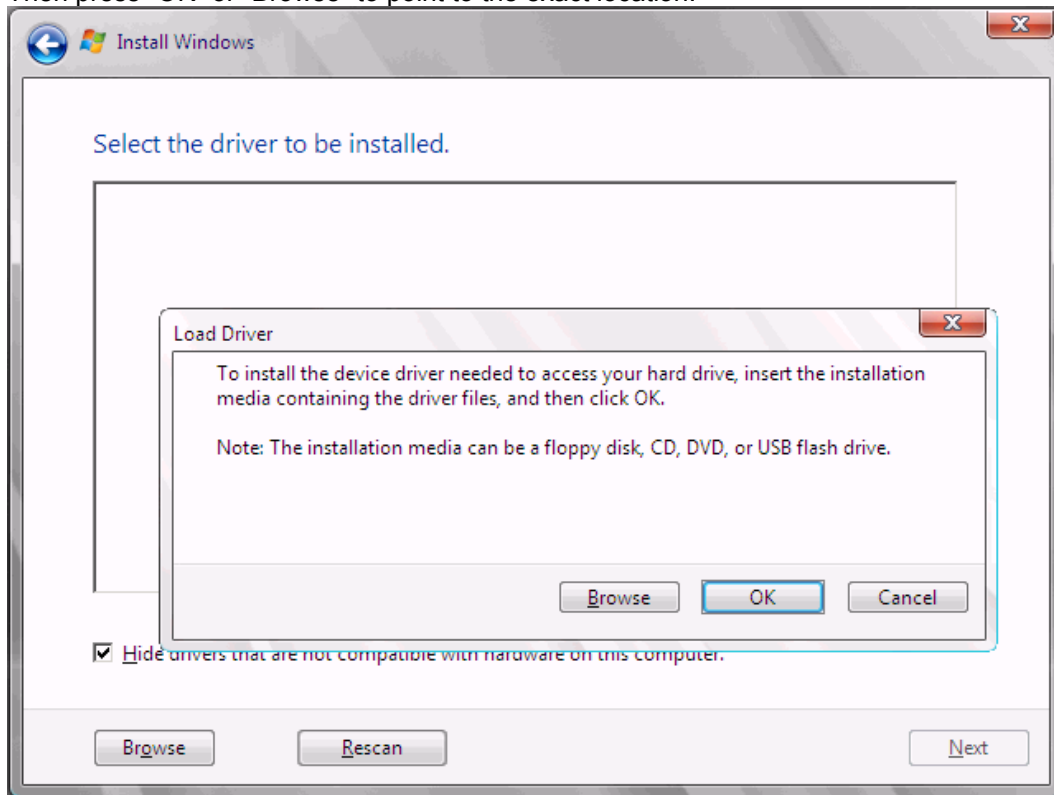
http://driverdownloads.qlogic.com/QLogicDriverDownloads_UI/IBM.aspx?companyid=6
<http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter>

You should see a screen similar to this with your SAN disk.
Click "Load Driver"



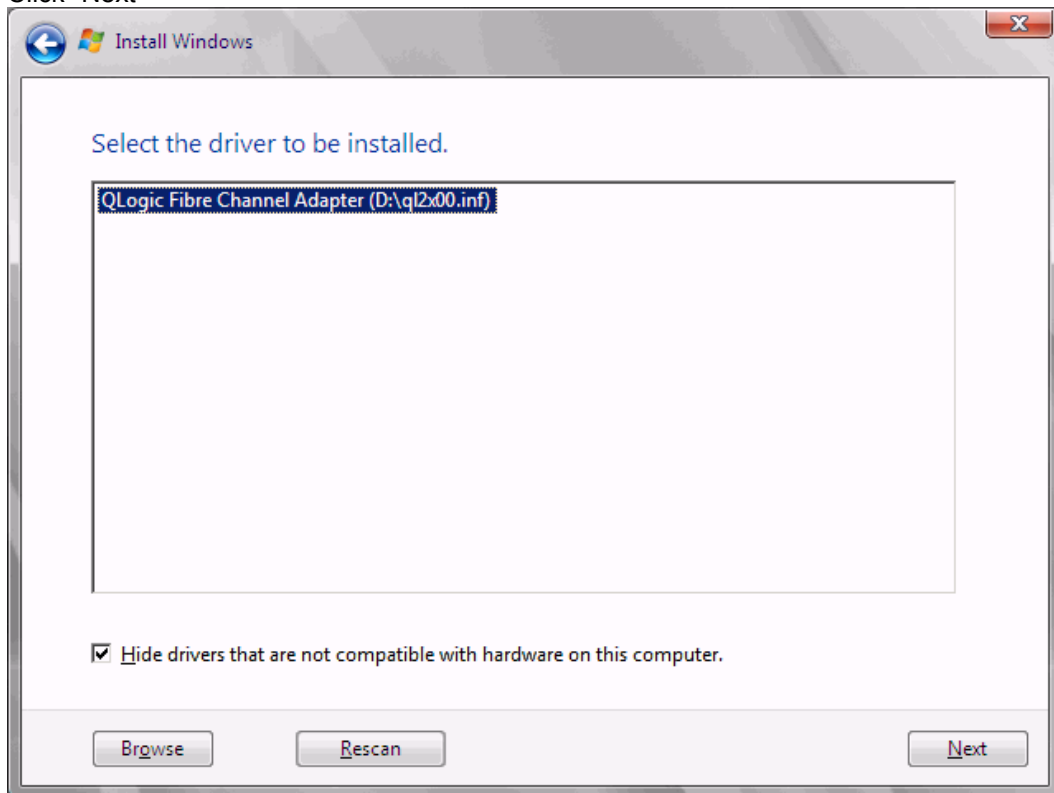
Insert a media containing the latest drivers. Media can be USB key, CD-ROM/DVD-ROM, a remotely mounted ISO.

Then press "OK" or "Browse" to point to the exact location.

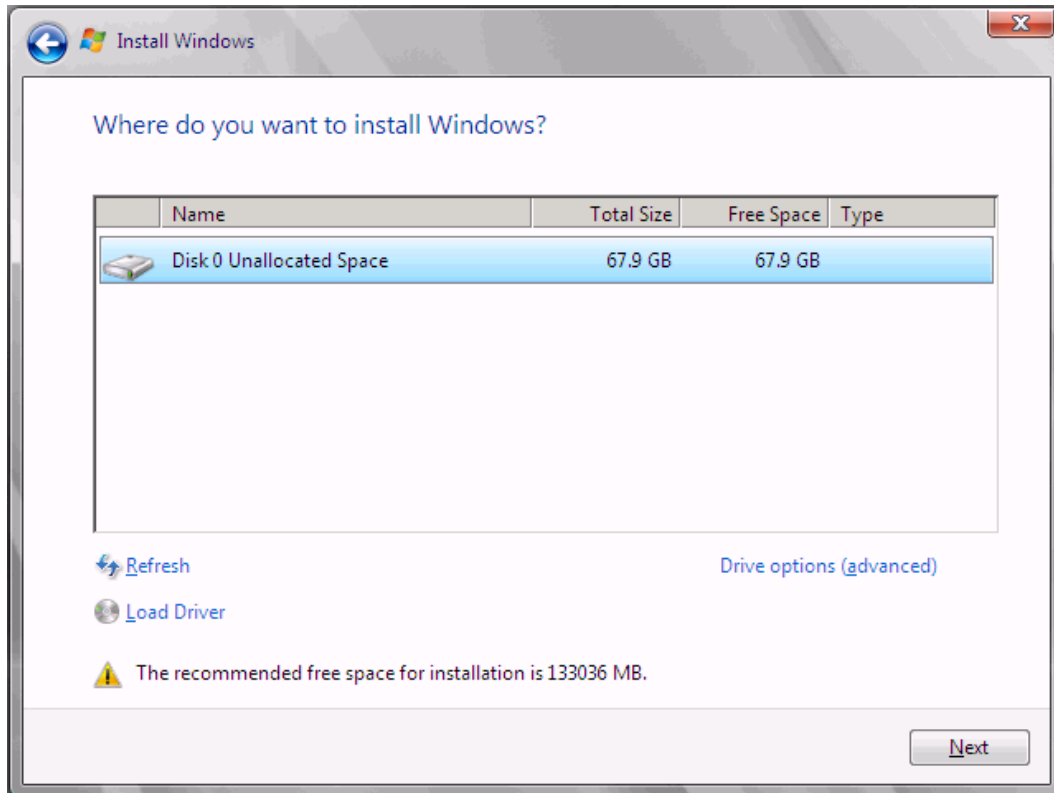


Windows should find an appropriate more up to date driver.

Click "Next"



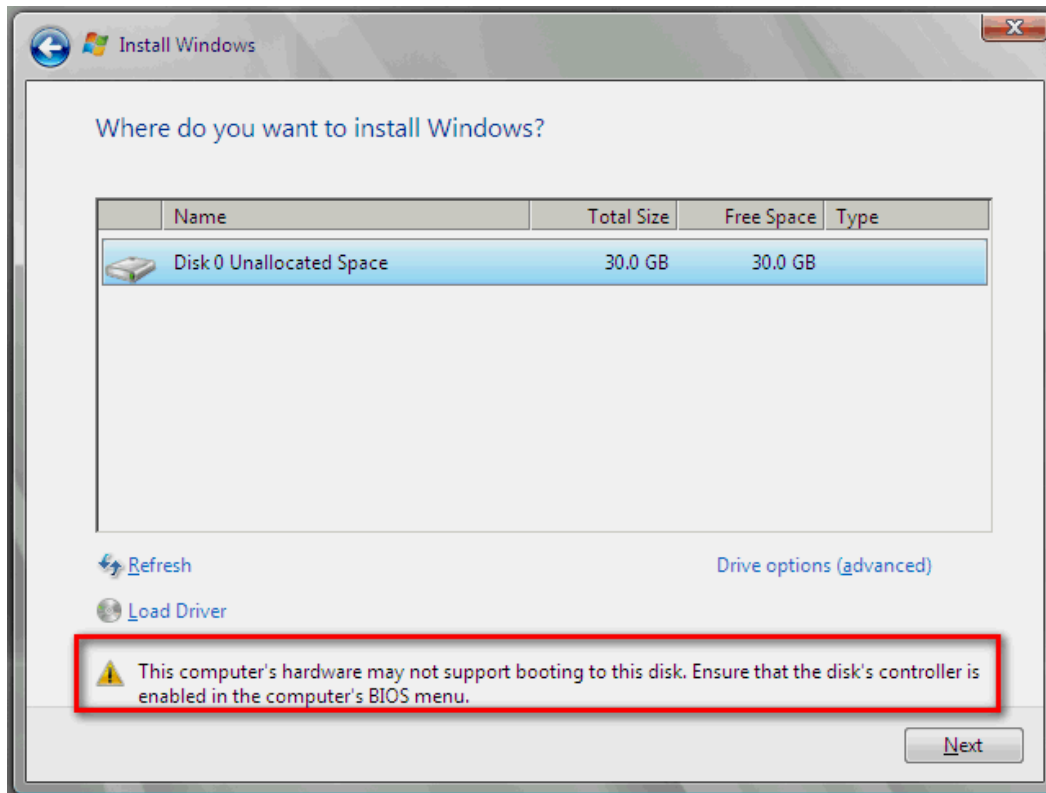
Select the disk you want to install Windows on.
Check for any warnings. See below for more details.
Click "Next".



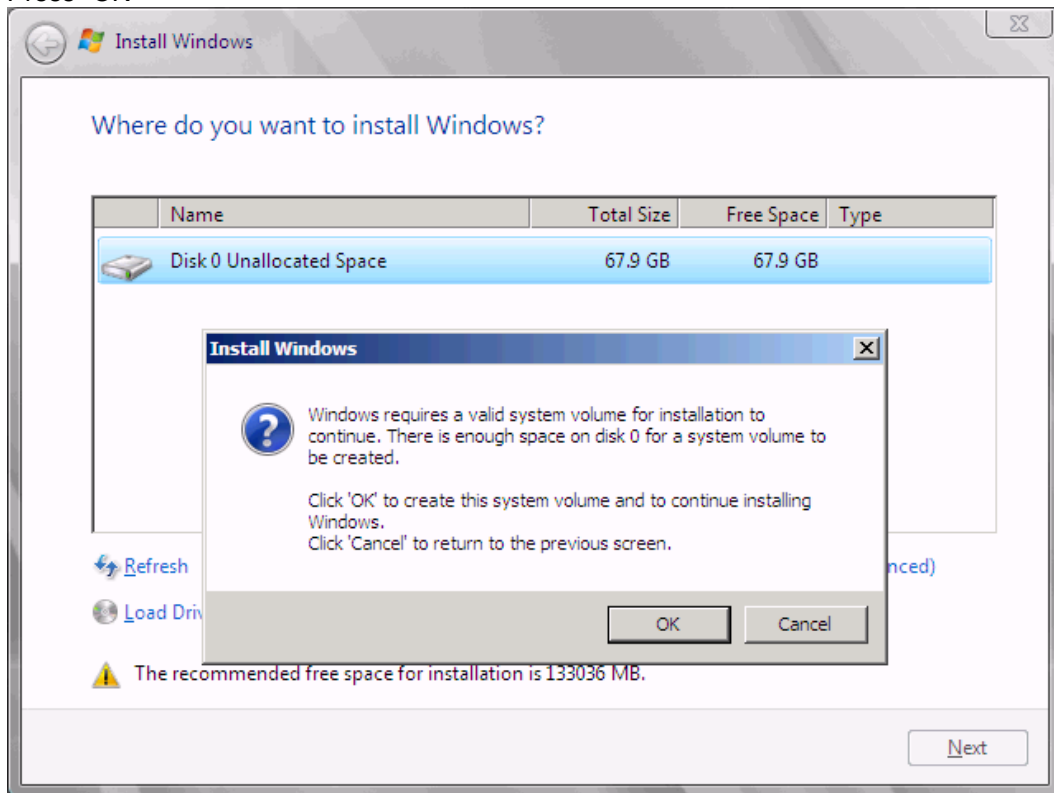
Check for the warning message.

If you see a message that your hardware may not support booting to this disk, something is wrong and the boot from SAN will not work. Go back to the setup instructions and check the following:

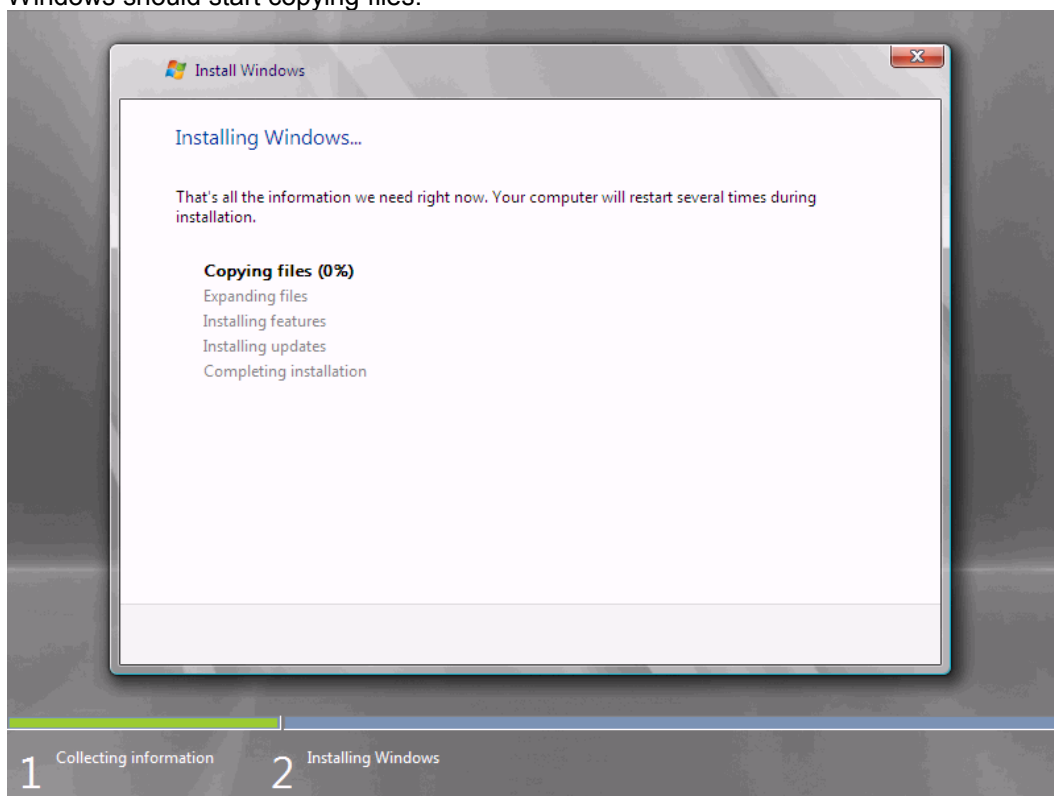
- Possibly the boot device was not added in F1 (go back in F1 and check)
- Possible the BIOS was not enabled on the QLogic port (go back in F1 and check)
- Possibly the HBA you are trying to do boot from is not on the SAN disk preferred path. Check your SAN disk device configuration and reboot the server again on the Windows DVD.
- Possibly your SAN does not support UEFI boot.
 - Make sure your SAN disk is updated to recent firmware.
 - Try to perform a Legacy installation.
- Use Windows media that are bundled with the latest Service pack.
- If you see a 20 mb disk you most likely mapped the access LUN instead of the actual LUN.
- Make sure your LUN is assigned to LUN 0. This is defined in the SAN disk device.



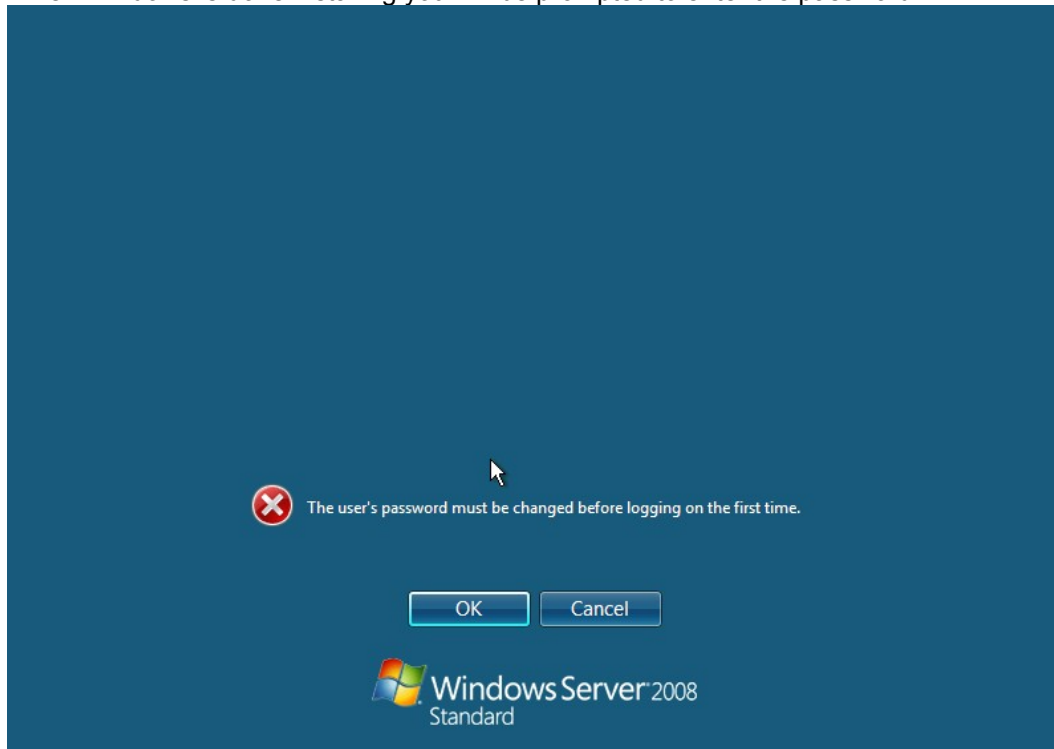
Once you address all errors and click next.
You will get a message that Windows wants to create a volume.
Press "OK"



Windows should start copying files.

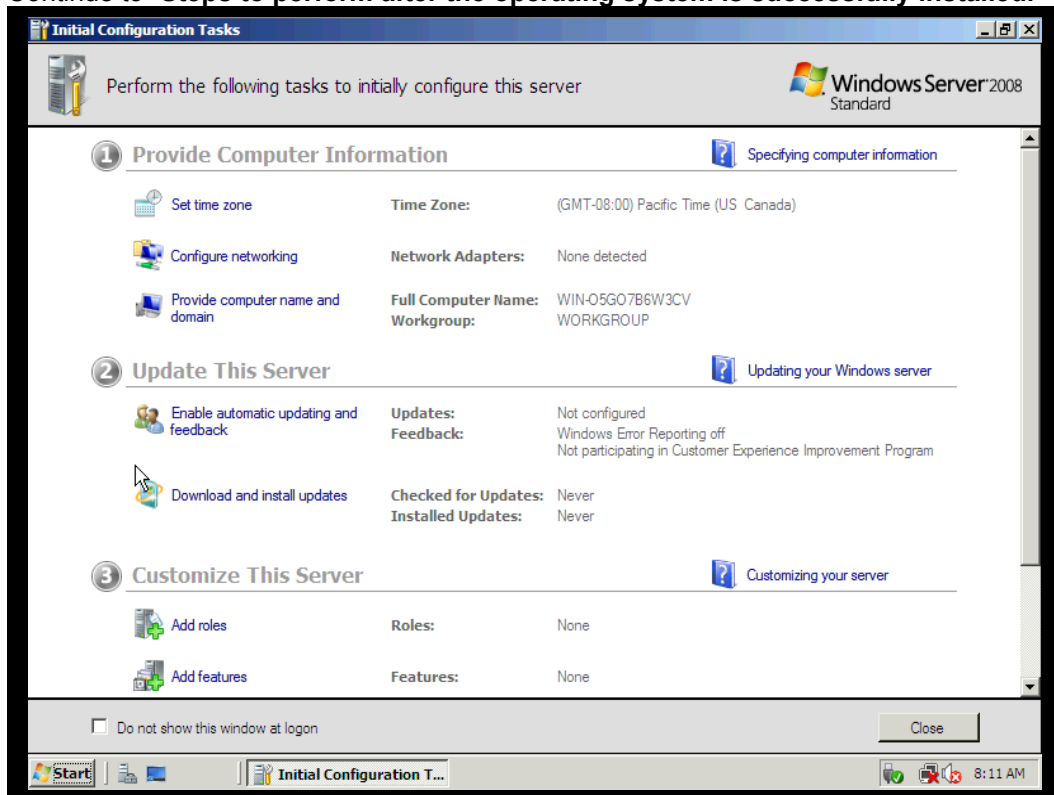


When Windows is done installing you will be prompted to enter the password.



You are now done installing Windows.

Continue to **"Steps to perform after the operating system is successfully installed."**



Steps to Perform after the Operating System is Successfully Installed.

Once your operating system is successfully installed, you should perform the following steps:

- On the blade: Install your disk Storage redundant driver
This is provided by the SAN disk vendor. Please refer to the doc available for your SAN disk.
 - o On IBM this may be:
 - Rdac
 - Mpio
 - SDD
- On the switches: Zone your other HBA ports
Now that the redundant driver has been installed, you can point more than 1 storage
- On the San disk storage: Map your LUN to your other HBA port

Other tips / common symptoms

Verify connectivity with QLogic San surfer to make sure both HBA port are seeing the SAN disks from both HBA ports. San Surfer can be downloaded at the following link

http://driverdownloads.qlogic.com/QLogicDriverDownloads_UI/IBM.aspx?companyid=6

If you see 2 times or more the same disks, it is because your SAN disk redundant driver is not installed.

If you blue screen while installing

- Make sure you only have 1 single path presented while installing
- Make sure you are on the preferred path
 - o Many San disk devices have 1 preferred path active at once.
 - o During the installation, the path may be switched back to its preferred path and this can cause blue screen probably pointing to loss of storage access. This is not a hardware problem.

After rebooting the system does not boot to Windows

- Make sure you are booting the correct HBA port on the correct path.
 - o Try changing the (on the SAN disk) the preferred path to the alternate path.
- If you installed an operating system in Legacy mode, make sure you set Legacy only as the 1st boot device.

If you see a 20 mb disk, this is most likely your access LUN that is mapped. You can manage this from your SAN disk storage device.

Reference material

Redbooks:

- [QLogic Ethernet and 8 Gb Fibre Channel Expansion Card \(CFFh\) for IBM BladeCenter](#)
- [QLogic 4Gb Fibre Channel Expansion Card \(CIOv\) for IBM BladeCenter](#)
- [QLogic 8Gb Fibre Channel Expansion Card \(CIOv\) for IBM BladeCenter](#)
- [QLogic 8Gb FC Single-port and Dual-port HBAs for IBM System x](#)
- [Brocade Enterprise 20-port, 20-port, and 10-port 8Gb SAN Switch Modules](#)
- [Remote Storage Area Network \(SAN\) Boot - IBM BladeCenter HS20 and HS40](#)
- [IBM Midrange System Storage Implementation and Best Practices Guide](#)
- [IBM BladeCenter 4Gb SAN Solution](#)
- [IBM System Storage DS4000 and Storage Manager V10.30](#)
- [IBM System Storage DS3000: Introduction and Implementation Guide](#)

QLogic

- [QLogic SAN boot and UEFI doc](#)
- [Also review the latest versions of EfiUtil.pdf and EfiCfg.pdf packaged with the QLogic firmware package in the \Efi folder.](#)

Microsoft

- [Windows Boot from Fibre Channel SAN – An Executive Overview and Detailed Technical Instructions for the System Administrator](#)
- [Support for booting from a Storage Area Network \(SAN\)](#)

VMware

- [Using Boot from SAN with ESX Server Systems](#)
- [Fibre Channel SAN Configuration Guide - VMware](#)