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Configuring the BIOS

We now need to configure the BIOS of the server motherboard.

You can do this via a keyboard and monitor attached to the server or through IPMI as outlined in a previous section.

The settings and screen shots are all taken from a Supermicro X10SRH-CLN4F, but most are applicable to most server motherboards (I would imagine).

Getting Into Your BIOS

In order to gain access to the motherboard's BIOS the user is required to press a certain key at a certain point in time (usually as the POST messages are displayed).

Consult your motherboard documentation to find out how to gain access to your motherboard's BIOS.

On Fester's motherboard it is done by pressing the "DEL" key at a specific point.

Incidentally, motherboards usually display a screen at some point during the POST process that tells you what key to press, something like this.



When you have access to the BIOS it's time to configure it.

Most BIOS settings are navigated using the " $\leftrightarrow \rightarrow \uparrow \downarrow$ " keys.

BIOS Settings

Quiet Boot

This setting is entirely optional.

It determines if POST messages are displayed on screen or a graphic logo (so the POST messages are hidden from view) when you first turn on the server. Fester likes to see the POST messages so I disabled this function.

Navigate to the "Advanced" page.



Select the submenu "Boot Feature".



Now go to "Quiet Boot" and select "Disabled".



Watch Dog Function

Remain in the "Advanced \rightarrow Boot Feature" page and select "Watch Dog Function".

The watch dog function serves to reboot the server if it experiences an error it cannot recover from (and so hangs) for more than 5 minutes. It works by starting a 5 minute count-down timer when the server hangs. When this timer reaches zero the system is forced to reboot.

When I first tried this in FreeNAS it caused my system to spontaneously reboot every 5 minutes even though the system was not hanging, so I disabled it.



AES-NI Encryption

If you intend to encrypt the information on your storage drives then you need to enable this in the BIOS.

This can be useful as it allows a failing HDD in a vdev to be discarded without worrying about wiping the information before disposal.

Go to the "Advanced" page.

🛓 Java iKVM Viewer v1.69.25 [192.168.0.2] TestServer - Resolution 800 X 600 - FPS 29		
Virtual Media Record Macro	Options User List Capture Power Control Exit	
Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc. Main Advanced Event Logs IPMI Security Boot Save & Exit		
System Date System Time		Set the Date. Use Tab to switch between Date elements.
Supermicro X10SRH-CLN4F BIOS Version Build Date	1.0c 09/14/2015	
Memory Information Total Memory	16384 MB	<pre> ++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values</pre>
Memory Speed	1867 MT/s	F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version :	2.17.1245. Copyright (C) 2015 American Meg	atrends, Inc.

Now navigate to "CPU Configurtion".



Then scroll down (it is towards the bottom) to "AES-NI" and select "Enable".

🛃 Java iKVM Viewer v1.69.25 [192.168.0.2] TestServer - Resolution 800 X 600 - FPS 28		
Virtual Media Record Macro Options	User List Capture Power Control Exit	
Aptio Setup Uti. Advanced	lity – Copyright (C) 2015 American N	Megatrends, Inc.
Processor Frequency Processor Max Ratio Processor Min Ratio Microcode Revision L1 Cache RAM L2 Cache RAM L3 Cache RAM CPU1 Version	2.400GHz 18H 0CH 00000036 384KB 1536KB 15360KB Intel(R) Xeon(R) CPU E 5-2620 v3 @ 2.40GHz	 Enable/Disable Processor Advanced Encryption Standard (AES) feature
Clock Spread Spectrum Hyper-Threading (ALL) Cores Enabled Execute Disable Bit PPIN Control Hardware Prefetcher Adjacent Cache Prefetch	[Disabled] [Enable] 0 [Enable] [Unlock/Enable] [Enable] [Enable]	→+: Select Screen
DCU Streamer Prefetcher DCU IP Prefetcher Direct Cache Access (DCA) X2APIC AES-NI Intel Virtualization Technolog ► Advanced Power Management Corr	[Enable] [Enable] [Auto] [Disable] [Enable] gy [Enable] figuration	<pre>f↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults ▼ F4: Save & Exit ESC: Exit</pre>
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.		

AHCI SATA Configuration

There are certain advantages to putting the SATA controller in AHCI mode. By enabling this option any SATA devices connected to the SATA ports on the motherboard will operate in AHCI mode.

Go to the "Advanced" page.



Now select "SATA Configuration" from the submenu.

差 Java iKVM Viewer v1.69.25 [192.168.0.2] TestServer - Resolution 800 X 600 - FPS 30		
Virtual Media Record Macro Options User List Capture Power Co	ntrol Exit	
Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc. Main Advanced Event Logs IPMI Security Boot Save & Exit		
 Boot Feature Boot Feature Boot Feature Configuration Chipset Configuration SATA Configuration Server ME Configuration Super ID Configuration Super ID Configuration Settings #: Select Screen 14: Select Screen 14: Select Item Enter: Select -/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit		
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.		

Now navigate to "Configure SATA as" and select "AHCI" from the options.

Virtual Media Record Macro Options User List Capture Power Control Exit Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc. Advanced Advanced SATA Configuration This will configure SATA as SATA Configure SATA as SATA Controller Configure SATA as SATA Controller Configure SATA as SATA Port 0 Samsung SSD 85 - 256.0 Port 0 Spin Up Device [Disabled] Port 0 SATA Device Type [Solid State Drive] SATA Port 1 [Not Installed] Port 1 SATA Device Type [Hard Disk Drive] Port 2 Spin Up Device [Disabled] Port 2 SATA Device Type [Hard Disk Drive] Port 3 SATA Device Type [Hard Disk Drive]	🍰 Java iKVM Viewer v1.69.25 [192.168.0.2] TestServer - Resolution 800 X 600 - FPS 30		
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc. Advanced SATA Configuration	Virtual Media Record Macro Options User List	Capture Power Control Exit	
SATA ConfigurationThis will configure SATA asSATA Controller[Enabled]Configure SATA as[AHCI]Support Aggressive Link Power Mgmt[Enabled]SATA Port 0Samsung SSD 85 - 256.0Port 0 Hot Plug[Enabled]Port 0 Spin Up Device[Disabled]Port 0 SATA Device Type[Solid State Drive]SATA Port 1[Not Installed]Port 1 SATA Device Type[Disabled]Port 1 SATA Device Type[Hard Disk Drive]SATA Port 2[Not Installed]Port 2 Short Pupe[Hard Disk Drive]SATA Port 3[Not Installed]Port 3 SATA Device Type[Hard Disk Drive]Port 3 ATA Port 4[Not Installed]F2: Previous Values	Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc. Advanced		
Port 4 Hot Plug[Enabled]F3: Optimized DefaultsPort 4 Spin Up Device[Disabled]▼ F4: Save & Exit	SATA Configuration SATA Controller Configure SATA as Support Aggressive Link Power Mgmt SATA Port 0 Port 0 Hot Plug Port 0 Spin Up Device Port 0 SATA Device Type SATA Port 1 Port 1 Hot Plug Port 1 Spin Up Device Port 2 SATA Device Type SATA Port 2 Port 2 Hot Plug Port 2 Spin Up Device Port 2 SATA Device Type SATA Port 3 Port 3 Hot Plug Port 3 Spin Up Device Port 3 SATA Device Type SATA Port 4 Port 4 Hot Plug Port 4 Hot Plug Port 4 Spin Up Device	[Enabled] [Enabled] Samsung SSD 85 - 256.0 [Enabled] [Disabled] [Solid State Drive] [Not Installed] [Enabled] [Hard Disk Drive] [Not Installed] [Enabled] [Disabled] [Hard Disk Drive] [Not Installed] [Enabled] [Disabled] [Hard Disk Drive] [Not Installed] [Enabled] [Disabled] [Hard Disk Drive] [Not Installed] [Enabled] [Disabled] [Hard Disk Drive] [Not Installed] [Enabled] [Enabled] [Disabled] [Enabled] [Disabled]	 This will configure SATA as IDE, RAID or AHCI. **: Select Screen **: Select Item Enter: Select */-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit

IPMI Configuration

You do not have to configure the IPMI of the server through the BIOS. You can use the IPMI web GUI which I will cover in a later section. However, if you decide to do this through the BIOS the following should help.

Go to the IPMI page.



Now select "BMC Network Configuration" (BMC=Board Management Controller and is the hardware through which IPMI is managed and implemented on the motherboard).

🛓 Java iKVM Viewer v1.69.25 [192.168.0.2] TestServer - Resolution 800 X 600 - FPS 21			
Virtual Media Record Macro Op	ptions User List Capture Power Control Exit		
Aptio Setup Main Advanced Event Log	Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc. Main Advanced Event Logs <mark>IPMI</mark> Security Boot Save & Exit		
BMC Firmware Revision IPMI STATUS ▶ Sustow Event Log ▶ BMC Network Configuration	3.20 Working	Configure BMC network parameters	
		<pre> ++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>	
Version 2.	17.1245. Copyright (C) 2015 American Megat	rends, Inc.	

Navigate to the "Update IPMI Lan Configuration" and select "Yes" (1). At this point the greyed out text below should become active (it may go from grey to blue) allowing you to input your own values.

In "Configuration Address Source" select "Static" (2).

In the "Station IP Address" text box (3) type in an IP address of your choosing. Make sure you give it an IP address that is outside the range of the DHCP server in the router (Fester used 192.168.0.2).

Now put in the subnet mask of the private network which you obtained earlier in the "Subnet Mask" text box (4) (Fester's was 255.255.255.0).

Now place the Default Gateway IP address in the "Gateway IP Address" text box (5) if it is not already there.



You have now assigned a static IP address to the IPMI web GUI. We will now always know where to find the IPMI GUI and it will not change even when the router gets rebooted.

Boot Order Configuration

p { margin-bottom: 0.1in; direction: ltr; color: rgb(0, 0, 0); line-height: 120%; }p.western { font-family: "Times New Roman",serif; font-size: 12pt; }p.cjk { font-family: "Times New Roman",serif; font-size: 12pt; }p.ctl { font-family: "Times New Roman",serif; font-size: 12pt; }a:visited { color: rgb(128, 0, 128); }a.western:visited { }a.cjk:visited { }a.ctl:visited { }a:link { color: rgb(0, 0, 255); }

FreeNAS can be installed in a number of ways. It can be installed from a bootable CD/DVD, a bootable USB stick or even across a network using PXE.

When you boot the server and watch the various pages of information come and go as the server goes through its POST, you may have noticed that a certain key press at the correct time will allow you to boot from an attached storage device of your choice temporarily (i.e. just that one time).

This is fine, but if you install FreeNAS from one particular type of storage device regularly then it might be more convenient to change the boot order of the server.

The boot order is the order in which the motherboard's BIOS will look for an OS or something it can boot from, on the various storage devices connected to it. This change is persistent (i.e. it applies each time the server is booted).

The regular method by which you install FreeNAS will determine the boot order, if that's how you want to do things.

Fester favours a USB stick so "USB Key" must be the first device selected in the boot order list. Why? If we had the HDD/SDD (with the installed FreeNAS OS on it) listed before the USB key (with the bootable FreeNAS installation program on it) then if we want to reinstall the FreeNAS OS again, a problem would occur. The BIOS will encounter the installed FreeNAS OS on the HDD/SDD before it encounters the bootable FreeNAS installation program on the USB key and reinstallation will not take place (unless you temporarily alter the order through the key press at POST boot up method).

So if you would like to alter the boot order (it's completely optional) this is how you do it.

Select the "Boot" page.



Navigate to "Dual Boot Order #1" ("Boot Mode Select" should be set to "Dual" or this part will look different) and select "USB Key" (1), in Fester's case this is where the bootable FreeNAS intallation program will reside.

Notice how the storage device that contains the actual FreeNAS OS appears further down the list, in Fester's case it's the Samsung SSD (2).

Last update: 2016/06/10 17:34

🛓 Java iKVM Viewer v1.69.25 [192.168.0.2] TestServer - Resolution 800 X 600 - FPS 20		
Virtual Media Record Macro Option	ns User List Capture Power Control Exit	
Aptio Setup Ut Main Advanced Event Logs	ility – Copyright (C) 2015 American IPMI Security <mark>Boot</mark> Save & Exit	Megatrends, Inc.
Boot Configuration Setup Prompt Timeout	1	▲ Sets the system boot order
Boot Mode Select	[DUAL]	
 FIXED BOOT ORDER Priorities Dual Boot Order #1 Dual Boot Order #2 Dual Boot Order #3 Dual Boot Order #4 Dual Boot Order #4 Dual Boot Order #5 Dual Boot Order #6 Dual Boot Order #7 Dual Boot Order #7 Dual Boot Order #8 Dual Boot Order #9 Dual Boot Order #10 Dual Boot Order #11 Dual Boot Order #12 Dual Boot Order #13 Dual Boot Order #14 Dual Boot Order #14 Dual Boot Order #15 Delete Boot Option 	 USB Key] USB Hard Disk] [CD/DVD] [USB CD/DVD] UBB CD/DVD] UHard Disk: Samsun [Network.ibH GE S1 [UEFI Network] [UEFI Network] [UEFI AP:UEFI: Bui [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] 	<pre></pre>
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There doesn't seem to be a lot of information on the configuration of a server BIOS for a FreeNAS installation. I suspect there are other essential settings that need to be made (e.g. power management, etc), but this is all I could find. If I have missed any please let me know and I will try to include them in the guide or you could replace this or any section with your own?

