



Operating System & Virtualized Environment Installation Guide

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About this Guide

The purpose of this guide is to present general guidelines for successfully installing Operating Systems or virtualized software environments on SeaMicro devices. It is by no means a comprehensive or exhaustive guide that includes all of the steps in installing Operating Systems, as most of those procedures are available online through the respective OS websites. For example, the most current information on Windows is available on the Microsoft website. Similarly, Linux, Citrix, VMWare, and KVM information are available online, and wherever possible, links are included to their respective websites.

This guide is designed for administrators who are responsible for ensuring Windows, Linux, Citrix Xen, VMWare ESXi, or KVM installation on SeaMicro servers. It includes:

- References to Third Party Vendor OS installation instructions to use as needed.
- Guidelines to be used within the context of a SeaMicro SM10K or SM15K installation.

This guide provides:

- Information on the following OS environments:
 - Windows
 - Linux
- Information on the following virtualized software environments:
 - Citrix XenServer
 - VMWare ESXi
- Best Practices for the following:
 - CentOS/RHEL kernel below 2.6, 2.6, and above.
 - Ubuntu kernel below 2.6, 2.6, and above.

Note:

- No SeaMicro-specific configuration is required for KVM hypervisor. For information on KVM installation, refer to http://www.linux-kvm.org/page/Main_Page.
- Intermittently, ACPI shutdown is not honored on Xen OS running on internal servers.

Related Documentation

- *Hardware Guide*
- *Application Guide*
- *Command Line Reference*
- *Sliding Rack Mount Guide*
- *Server Network and Configuration Guide*
- *Quick Start Guide*
- *Release Notes*

Technical Support

For support, log in to the SeaMicro Support page at: <http://www.seamicro.com/support>. If you do not have a SeaMicro Support account, you can request one at: <http://www.seamicro.com/supportform>. Support login credentials gives you access to hardware installation and software configuration documentation, Generally Available code, release notes, Frequently Asked Questions, and Technical Tips. You can also open, track, and administer SeaMicro Support cases.

To contact SeaMicro Support directly by E-mail or by phone:

- **E-mail:** support@seamicro.com
- **Phone:** International: 1-408-701-5077
US: 1-888-522-8760

Operating System - Windows

This section provides information on booting and deploying Windows on SeaMicro devices. Currently, SeaMicro supports Windows Server 2008 R2. Starting with Release 3.2, SeaMicro also supports Windows Server 2012.

The preferred Windows installation method is through the Windows Deployment Service (WDS). Included here are guidelines in an environment that has WDS installed and running, and in an environment where the administrator is required to install and run WDS before installing the Windows Operating System.

Existing Windows Deployment Service (WDS)

After installation of the SeaMicro chassis, make sure that WDS is up and running. In order to take full advantage of SeaMicro's administration benefits, you must enable serial console re-direction by turning on Emergency Management Services (EMS). If it is not already set up, then begin with setting up WDS before you turn on EMS, and then install the Windows Automated Installation Kit.

Note: By default, the Windows 2008 R2 server does not output to a serial console.

If EMS is not enabled, the command “`server console connect <server_#>`” will complete the connection successfully, but will not output to a serial console.

However, If EMS is enabled, the Windows server will output to a serial console, and an administrator will be able to use CLI commands to access the server. See sample output below.

```
tac-sm3# server console connect 58
Using local telnet client for loopback connection to server: 58.
Standard telnet commands apply.
Trying 127.0.0.1...
Connected to 127.0.0.1.
Escape character is '^]'.
Connecting to server 58... Success!
```

Enabling EMS with WDS

If WDS is up and running, before you PXE boot the server, enable EMS as outlined below:

Step	Task	<input checked="" type="checkbox"/>
1	Check the existing BCD settings for the Windows Boot Loader.	<input type="checkbox"/>
2	Create EMS settings option.	<input type="checkbox"/>
3	Set the connection type, baud rate, and port.	<input type="checkbox"/>
4	Review changes to the Windows Boot Loader.	<input type="checkbox"/>
5	Enable EMS for the specified image.	<input type="checkbox"/>
6	Enable inheritance of EMS settings from default.bcd.	<input type="checkbox"/>
7	Restart WDS.	<input type="checkbox"/>
8	Deploy Windows to a SeaMicro node using a WDS access console.	<input type="checkbox"/>

Step 1: Check the existing BCD settings for the Windows Boot Loader.

Note down the identifier, as you will need it in Step 4 and Step 5. This number will be unique at each customer site.

```
c:\RemoteInstall\Boot\x64\Images>bcdedit -store
"c:\RemoteInstall\Boot\x64\Images\boot.wim.bcd" /enum all
Windows Boot Loader
-----
identifier                {4c11407c-812e-4f93-b466-92c6f5896ae7}
device                    ramdisk=[boot]\Boot\x64\Images\boot.wim,{0ea0431e-5391-
4
9ab-ac80-d99174c1e68d}
description                Microsoft Windows Setup (x64)
osdevice                  ramdisk=[boot]\Boot\x64\Images\boot.wim,{68d9e51c-a129-
4ee1-9725-2ab00a957daf}
systemroot                \WINDOWS
detecthal                 Yes
winpe                     Yes

Device options
-----
identifier                {0ea0431e-5391-49ab-ac80-d99174c1e68d}
inherit                   {68d9e51c-a129-4ee1-9725-2ab00a957daf}
```

```
ramdiskmccenabled          No
ramdiskmctftpfallback      Yes
```

Step 2: Create EMS Settings option.

```
c:\RemoteInstall\Boot\x64\Images>bcdedit -store
"c:\RemoteInstall\Boot\x64\Images\boot.wim.bcd" /create {emssettings} /d "EMS
Settings"
The entry {emssettings} was successfully created.
```

Step 3: Set the connection type, baud rate, and port.

- Set the following:
 - o Connection Type: **Serial**
 - o Baud Rate: **9600**
 - o Port: **1**

```
c:\RemoteInstall\Boot\x64\Images>bcdedit -store
"c:\RemoteInstall\Boot\x64\Images\boot.wim.bcd" /set {emssettings} debugtype
Serial
The operation completed successfully.
```

```
c:\RemoteInstall\Boot\x64\Images>bcdedit -store
"c:\RemoteInstall\Boot\x64\Images\boot.wim.bcd" /set {emssettings} baudrate
9600
The operation completed successfully.
```

```
c:\RemoteInstall\Boot\x64\Images>bcdedit -store
"c:\RemoteInstall\Boot\x64\Images\boot.wim.bcd" /set {emssettings} debugport 1
The operation completed successfully.
```

Step 4: Review changes to the Windows Boot Loader.

```
c:\RemoteInstall\Boot\x64\Images>bcdedit -store
"c:\RemoteInstall\Boot\x64\Images\boot.wim.bcd" /enum all
```

Windows Boot Loader

```
-----
identifier          {4c11407c-812e-4f93-b466-92c6f5896ae7}
device              ramdisk=[boot]\Boot\x64\Images\boot.wim,{0ea0431e-5391-
49ab-ac80-d99174c1e68d}
description         Microsoft Windows Setup (x64)
osdevice            ramdisk=[boot]\Boot\x64\Images\boot.wim,{68d9e51c-a129-
4ee1-9725-2ab00a957daf}
systemroot          \WINDOWS
detecthal           Yes
```

```
winpe                Yes
```

EMS Settings

```
-----  
identifier           {emssettings}  
description          EMS Settings  
debugtype           Serial  
debugport           1  
baudrate            9600
```

Device options

```
-----  
identifier           {0ea0431e-5391-49ab-ac80-d99174c1e68d}  
inherit              {68d9e51c-a129-4ee1-9725-2ab00a957daf}  
ramdiskmccenabled   No  
ramdiskmctftpfallback Yes
```

Step 5: Enable EMS for the specified image.

```
c:\RemoteInstall\Boot\x64\Images>bcdedit -store  
"c:\RemoteInstall\Boot\x64\Images\boot.wim.bcd" /set {4c11407c-812e-4f93-b466-  
92c6f5896ae7} ems on  
The operation completed successfully.
```

Step 6: Enable inheritance of EMS settings from default.bcd.

```
c:\RemoteInstall\Boot\x64\Images>bcdedit -store  
"c:\RemoteInstall\Boot\x64\Images\boot.wim.bcd" /set {4c11407c-812e-4f93-b466-  
92c6f5896ae7} inherit {emssettings}  
The operation completed successfully.
```

Step 7: Check the 'ramdiskftpwindowssize' configuration file.

```
C:\RemoteInstall\Boot\x64\Images>bcdedit /enum all /store  
c:\RemoteInstall\Boot\x86x64\default.bcd
```

Sample Output:

```
Windows Boot Manager  
-----  
identifier           {bootmgr}  
fontpath             \boot\fonts  
inherit              {dbgsettings}  
timeout              30  
  
Debugger Settings  
-----  
identifier           {dbgsettings}
```



```

debugtype          Serial
debugport          1
baudrate           115200

Device options
-----
identifier          {68d9e51c-a129-4ee1-9725-2ab00a957daf}
ramdiskdevice      boot
ramdiskpath        \Boot\Boot.SDI

```

Step 8. Copy the identifier from the above output, and change the ‘**ramdisktftpwindowsize**’ as shown below:

```

C:\RemoteInstall\Boot\x64\Images>bcdedit /store
c:\RemoteInstall\Boot\x86x64\default.bcd /set {68d9e51c-a129-4ee1-9725-
2ab00a957daf} ramdisktftpwindowsize 1

```

Step 9. Verify the changes.

```

C:\RemoteInstall\Boot\x64\Images>bcdedit /enum all /store
c:\RemoteInstall\Boot\x86x64\default.bcd

```

Sample Output:

```

Windows Boot Manager
-----
identifier          {bootmgr}
fontpath            \boot\fonts
inherit             {dbgsettings}
timeout             30

Debugger Settings
-----
identifier          {dbgsettings}
debugtype           Serial
debugport           1
baudrate            115200

Device options
-----
identifier          {68d9e51c-a129-4ee1-9725-2ab00a957daf}
ramdiskdevice       boot
ramdiskpath         \Boot\Boot.SDI
ramdisktftpwindowsize 1

```

Step 10: Restart WDS.

```

c:\RemoteInstall\Boot\x64\Images>sc control wdsserver 129

```

```
SERVICE_NAME: wdsserver
      TYPE                : 20  WIN32_SHARE_PROCESS
      STATE                : 4   RUNNING
                          (STOPPABLE, NOT_PAUSABLE, ACCEPTS_SHUTDOWN)
      WIN32_EXIT_CODE      : 0   (0x0)
      SERVICE_EXIT_CODE   : 0   (0x0)
      CHECKPOINT          : 0x0
      WAIT_HINT           : 0x0
```

```
c:\RemoteInstall\Boot\x64\Images>
```

Step 11: Deploy Windows to a SeaMicro node using a WDS access console.

From the SeaMicro console:

1. Restart the server to be imaged with the “using-pxe” flag set to PXE boot the server for the next boot. For example: “reset server 3 using-pxe”
2. Connect to the server console, and watch the output as installation begins. For example:

```
tac-sm3# server console connect 58
Using local telnet client for loopback connection to server: 58.
Standard telnet commands apply.
Trying 127.0.0.1...
Connected to 127.0.0.1.
Escape character is '^]'.
Connecting to server 58... Success!
```

Note:

- This process covers the x64 installation only.
- Location of the boot.wim.bcd for the x64 image is at:
C:\RemoteInstall\Boot\x64\Images\boot.wim.bcd folder.
- If installed in a different location, substitute with the correct location.

New Windows Deployment Service (WDS)

As mentioned before, if WDS is not set up, you must first install it before you can install the Windows Operating System.

Step	Task	<input checked="" type="checkbox"/>
1	Install WDS.	<input type="checkbox"/>
2	Download and Install the Windows Automated Installation Kit.	<input type="checkbox"/>
3	Build an Unattend Install file using the Windows System Manager.	<input type="checkbox"/>
4	Enable EMS.	<input type="checkbox"/>
5	Configure SeaMicro internal servers to PXE boot.	<input type="checkbox"/>

1. To install WDS, click on the link below for the latest instructions on the Microsoft website:

<http://technet.microsoft.com/en-us/library/cc766320%28v=ws.10%29.aspx>

2. To download and install the Windows Automated Installation Kit from the Microsoft website, refer to:

<http://www.microsoft.com/en-us/download/details.aspx?id=5753>

3. Build an Unattend Install file using the Windows System Manager. This file will help you answer all questions during the installation of Windows, such as language, install location, user names, etc.
4. Enable EMS.
5. Configure SeaMicro internal servers to PXE boot. By default, servers are not set up to PXE boot. However, before a PXE boot, ensure that all NICs for a C-card are in the same VLAN. Note that NIC device enumeration is different than the NIC numbering shown on the CLI. For example, NIC 0 on the CLI may correspond to a different NIC number for Windows OS during a PXE boot.
6. Restart servers using the PXE flag, or PXE boot the servers using the following CLI command:

```
reset server server # using PXE
```

7. To monitor and confirm progress of the installation, run the command:

```
server console connect server
```

Sample Output:

```
tac-sm3# server console connect 58
Using local telnet client for loopback connection to server: 58.
Standard telnet commands apply.
Trying 127.0.0.1...
Connected to 127.0.0.1.
Escape character is '^]'.
Connecting to server 58... Success!
```

Congratulations! You have now successfully installed Windows on your SeaMicro device. From here on out, subsequent PXE installations of Windows will take 6-10 minutes only.

Sample Unattended Install Files for Windows 2008 R2

```
<?xml version="1.0" encoding="utf-8"?>

<unattend xmlns="urn:schemas-microsoft-com:unattend">

<servicing></servicing>

<settings pass="specialize">

<component name="Microsoft-Windows-Shell-Setup" processorArchitecture="amd64"
publicKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMICConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<AutoLogon>

<Password>

<Value>password</Value> <!-- Specify password here -->

<PlainText>>false</PlainText>

</Password>

<Enabled>>true</Enabled>

<LogonCount>5</LogonCount>

<Username>administrator</Username> <!-- Specify account here -->

</AutoLogon>

<TimeZone>pacific</TimeZone>

</component>
<component name="Microsoft-Windows-International-Core" processorArchitec-
ture="amd64" publicKeyToken="31bf3856ad364e35" language="neutral" version-
Scope="nonSxS" xmlns:wcm="http://schemas.microsoft.com/WMICConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<InputLocale>en-US</InputLocale>

<UILanguage>en-US</UILanguage>

<UserLocale>en-US</UserLocale>

<SystemLocale>en-US</SystemLocale>

<UILanguageFallback>en-US</UILanguageFallback>

</component>
<component name="Networking-MPSSVC-Svc" processorArchitecture="amd64" publicK-
eyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMICConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
```

```

</component>
<component name="Microsoft-Windows-TerminalServices-RDP-WinStationExtensions"
processorArchitecture="amd64" publicKeyToken="31bf3856ad364e35" language="neu-
tral" versionScope="nonSxS" xmlns:wcm="http://schemas.microsoft.com/WMICConfig/
2002/State" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<SecurityLayer>0</SecurityLayer>

<UserAuthentication>0</UserAuthentication>

</component>

</settings>

<settings pass="windowsPE">

<component name="Microsoft-Windows-International-Core-WinPE" processorArchi-
tecture="amd64" publicKeyToken="31bf3856ad364e35" language="neutral" version-
Scope="nonSxS" xmlns:wcm="http://schemas.microsoft.com/WMICConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<SetupUILanguage>

<UILanguage>en-US</UILanguage>

</SetupUILanguage>

<UILanguage>en-US</UILanguage>

<InputLocale>en-US </InputLocale>

<SystemLocale>en-US</SystemLocale>

<UserLocale>en-US</UserLocale>

</component>

<component name="Microsoft-Windows-Setup" processorArchitecture="amd64" pub-
licKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMICConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<DiskConfiguration>

<Disk wcm:action="add">

<CreatePartitions>

<CreatePartition wcm:action="add">

<Type>Primary</Type>

<Order>1</Order>

<Extend>>true</Extend>

</CreatePartition>

```

```
</CreatePartitions>

<ModifyPartitions>

<ModifyPartition wcm:action="add">

<Active>true</Active>

<Extend>>false</Extend>

<Format>NTFS</Format>

<Label>OS</Label>

<Letter>C</Letter>

<Order>1</Order>

<PartitionID>1</PartitionID>

</ModifyPartition>

</ModifyPartitions>

<WillWipeDisk>true</WillWipeDisk>

<DiskID>0</DiskID>

</Disk>

<WillShowUI>OnError</WillShowUI>

</DiskConfiguration>

<UserData>

<ProductKey>

<WillShowUI>OnError</WillShowUI>

</ProductKey>

<AcceptEula>true</AcceptEula>

</UserData>

<WindowsDeploymentServices>

<Login>

<Credentials>

<Domain></Domain>
```

```
<Password></Password>

<Username></Username>

</Credentials>

</Login>

<ImageSelection>

<InstallImage>

<ImageGroup>Name_Of_Image_Group</ImageGroup><!-- Name your Image Group here -->

<Filename>install.wim</Filename>
<ImageName>Windows Server 2008 R2 SERVERSTANDARD</ImageName> <!-- Use exact
name of desired Windows Edition here -->
</InstallImage>

<InstallTo>

<DiskID>0</DiskID>

<PartitionID>1</PartitionID>

</InstallTo>

</ImageSelection>

</WindowsDeploymentServices>

<ImageInstall>

<OSImage>

<InstallFrom>

<Credentials>

<Domain>domain</Domain> <!-- Your domain name here -->

<Password>password</Password> <!-- Your password name here -->

<Username>administrator</Username> <!-- Your account name here -->

</Credentials>

<Path>C:\RemoteInstall\Images\ImageGroup1\install.wim</Path> <!-- Location of
Windows image here -->
</InstallFrom>

<InstallTo>
```



```

<DiskID>0</DiskID>

<PartitionID>1</PartitionID>

</InstallTo>

</OSImage>

</ImageInstall>

</component>

<component name="Microsoft-Windows-Setup" processorArchitecture="x86" publicKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS" xmlns:wcm="http://schemas.microsoft.com/WMIConfig/2002/State" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<DiskConfiguration>

<WillShowUI>OnError</WillShowUI>

</DiskConfiguration>

<UserData>

<ProductKey>

<WillShowUI>OnError</WillShowUI>

</ProductKey>

</UserData>

<WindowsDeploymentServices>

<Login>

<Credentials>

<Domain>domain</Domain> <!-- Your domain name here -->

<Password>password</Password> <!-- Your password name here -->

<Username>administrator</Username> <!-- Your account name here -->

</Credentials>

</Login>

<ImageSelection>

<InstallImage>

<Filename>install.wim</Filename>

```

```

<ImageGroup>ImageGroup1</ImageGroup> <!-- Name your Image Group here -->
<ImageName>Windows Server 2008 R2 SERVERSTANDARD</ImageName> <!-- Use exact
name of desired Windows Edition here -->
</InstallImage>

<InstallTo>

<DiskID>0</DiskID>

<PartitionID>1</PartitionID>

</InstallTo>

</ImageSelection>

</WindowsDeploymentServices>

</component>

</settings>

<settings pass="oobeSystem">
<component name="Microsoft-Windows-Shell-Setup" processorArchitecture="amd64"
publicKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMICConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<UserAccounts>

<AdministratorPassword>

<Value>password</Value> <!-- Your password name here -->

<PlainText>true</PlainText>

</AdministratorPassword>

</UserAccounts>

<TimeZone>pacific</TimeZone>

</component>
<component name="Microsoft-Windows-International-Core" processorArchitec-
ture="amd64" publicKeyToken="31bf3856ad364e35" language="neutral" version-
Scope="nonSxS" xmlns:wcm="http://schemas.microsoft.com/WMICConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

<InputLocale>en-us</InputLocale>

<SystemLocale>en-us</SystemLocale>

<UILanguage>en-us</UILanguage>

<UILanguageFallback>en-us</UILanguageFallback>

```

```
<UserLocale>en-us</UserLocale>
```

```
</component>
```

```
</settings>
```

```
<csi:offlineImage csi:source="wim:c:/win2k8r2-x64/sources/install.wim#Windows  
Server 2008 R2 SERVERSTANDARD" xmlns:csi="urn:schemas-microsoft-com:csi" />
```

```
</unattend>
```

Sample Unattended Install Files for Windows 2012

```
<?xml version="1.0" encoding="utf-8"?>
<unattend xmlns="urn:schemas-microsoft-com:unattend">

  <settings pass="windowsPE">
    <component name="Microsoft-Windows-International-Core-WinPE" processorArchitecture="amd64"
      publicKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
      xmlns:wcm="http://schemas.microsoft.com/WMICConfig/2002/State"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
      <SetupUILanguage>
        <UILanguage>en-US</UILanguage>
      </SetupUILanguage>
      <InputLocale>0409:00000409</InputLocale>
      <UserLocale>en-US</UserLocale>
      <UILanguage>en-US</UILanguage>
        <SystemLocale>en-US</SystemLocale>
    </component>
    <component name="Microsoft-Windows-Setup" processorArchitecture="amd64"
      publicKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
      xmlns:wcm="http://schemas.microsoft.com/WMICConfig/2002/State"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

      <DiskConfiguration>
        <WillShowUI>Never</WillShowUI>
        <Disk wcm:action="add">
          <DiskID>0</DiskID>
          <WillWipeDisk>true</WillWipeDisk>
          <CreatePartitions>
            <CreatePartition wcm:action="add">
              <Order>1</Order>
              <Size>25000</Size>
              <Type>Primary</Type>
              <Extend>>false</Extend>
            </CreatePartition>
          </CreatePartitions>
          <ModifyPartitions>
            <ModifyPartition wcm:action="add">
              <Order>1</Order>
              <PartitionID>1</PartitionID>
              <Label>SYSTEM</Label>
              <Format>NTFS</Format>
            </ModifyPartition>
          </ModifyPartitions>
        </Disk>
      </DiskConfiguration>

      <ImageInstall>
        <OSImage>
          <InstallFrom>
            <MetaData wcm:action="add">
              <Key>/IMAGE/INDEX</Key>
            <!-- SERVER CORE
```

```

<Value>1</Value>
-->
<!-- FULL DESKTOP -->
<Value>2</Value>
</MetaData>
<Path>install.wim</Path>
</InstallFrom>

<InstallTo>
<DiskID>0</DiskID>
<PartitionID>1</PartitionID>
</InstallTo>

<WillShowUI>Never</WillShowUI>
<InstallToAvailablePartition>>false</InstallToAvailablePartition>
</OSImage>
</ImageInstall>

<UserData>
<AcceptEula>>true</AcceptEula>
<ProductKey>
<WillShowUI>OnError</WillShowUI>
    <!-- Server 2012 Beta/Release Candidate Key -->
<Key>XC9B7-NBPP2-83J2H-RHMBY-92BT4</Key>
</ProductKey>
</UserData>
</component>
</settings>

<settings pass="oobeSystem">
<component name="Microsoft-Windows-Shell-Setup"
processorArchitecture="amd64" publicKeyToken="31bf3856ad364e35"
language="neutral" versionScope="NonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIconfig/2002/State"
xmlns:xsi="http://z33.w3.org/2001/XMLSchema-instance">
    <UserAccounts>
        <AdministratorPassword>
            <Value>rootforyou</Value>
            <PlainText>>true</PlainText>
        </AdministratorPassword>
    </UserAccounts>
    <AutoLogon>
        <Password>
            <Value>rootforyou</Value>
        </Password>
        <Enabled>>true</Enabled>
        <LogonCount>1</LogonCount>
        <Username>Administrator</Username>
    </AutoLogon>
    <FirstLogonCommands>
        <SynchronousCommand wcm:action="add">
            <CommandLine>%WINDIR%\System32\cmd /c sc config tlntsvr start= auto</Com-
mandLine>
            <Description>enable telnet</Description>

```

```

    <Order>1</Order>
  </SynchronousCommand>
  <SynchronousCommand wcm:action="add">
    <CommandLine>%WINDIR%\System32\cmd /c net start telnet</CommandLine>
    <Description>start telnet</Description>
    <Order>2</Order>
  </SynchronousCommand>
  <SynchronousCommand wcm:action="add">
    <CommandLine>%WINDIR%\System32\cmd /c powercfg.exe -setactive 8c5e7fda-
e8bf-4a96-9a85-a6e23a8c635c</CommandLine>
    <Description>modify power setting</Description>
    <Order>13</Order>
  </SynchronousCommand>
  <SynchronousCommand wcm:action="add">
    <CommandLine>%WINDIR%\System32\cmd /c powercfg.exe -setacindexvalue
8c5e7fda-e8bf-4a96-9a85-a6e23a8c635c 4f971e89-eebd-4455-a8de-9e59040e7347
7648efa3-dd9c-4e3e-b566-50f929386280 3</CommandLine>
    <Description>modify power button setting</Description>
    <Order>14</Order>
  </SynchronousCommand>
</FirstLogonCommands>
</component>
</settings>

```

```
<settings pass="offlineServicing">
```

```

<component name="Microsoft-Windows-TerminalServices-LocalSessionManager"
processorArchitecture="amd64" publicKeyToken="31bf3856ad364e35"
language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIconfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<fDenyTSConnections>>false</fDenyTSConnections>
</component>

```

```

<component name="Microsoft-Windows-IE-ESC"
processorArchitecture="amd64" publicKeyToken="31bf3856ad364e35"
language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIconfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<IEHardenAdmin>>false</IEHardenAdmin>
</component>

```

```

<component name="Microsoft-ServerManager-SvrMgrNc"
processorArchitecture="amd64" publicKeyToken="31bf3856ad364e35"
language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIconfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<DoNotOpenServerManagerAtLogon>>true</DoNotOpenServerManagerAtLogon>
</component>

```

```

<component name="Microsoft-Windows-TerminalServices-RDP-WinStationExtensions"
processorArchitecture="amd64" publicKeyToken="31bf3856ad364e35"
language="neutral" versionScope="nonSxS"

```

```

xmlns:wcm="http://schemas.microsoft.com/WMICConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <SecurityLayer>0</SecurityLayer>
  <UserAuthentication>2</UserAuthentication>
</component>

<component name="Networking-MPSSVC-Svc" processorArchitecture="amd64"
publicKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMICConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <DomainProfile_EnableFirewall>>false</DomainProfile_EnableFirewall>
  <PrivateProfile_EnableFirewall>>false</PrivateProfile_EnableFirewall>
  <PublicProfile_EnableFirewall>>false</PublicProfile_EnableFirewall>
</component>

</settings>

<servicing>
  <package action="install">
    <assemblyIdentity name="Microsoft-Windows-Foundation-Package" ver-
sion="6.2.8400" processorArchitecture="amd64" publicKeyTo-
ken="31bf3856ad364e35" language="" />
    <selection name="TelnetServer" state="true" />
    <selection name="TelnetClient" state="true" />
    <selection name="IIS-WebServerRole" state="true"/>
    <selection name="IIS-WebServer" state="true"/>
    <selection name="IIS-CommonHttpFeatures" state="true"/>
    <selection name="IIS-StaticContent" state="true"/>
    <selection name="IIS-DefaultDocument" state="true"/>
    <selection name="IIS-DirectoryBrowsing" state="true"/>
    <selection name="IIS-HttpErrors" state="true"/>
    <selection name="IIS-HttpRedirect" state="true"/>
    <selection name="IIS-ApplicationDevelopment" state="true"/>
    <selection name="IIS-ASPNET" state="true"/>
    <selection name="IIS-NetFxExtensibility" state="true"/>
    <selection name="IIS-ASP" state="true"/>
    <selection name="IIS-CGI" state="true"/>
    <selection name="IIS-ISAPIExtensions" state="true"/>
    <selection name="IIS-ISAPIFilter" state="true"/>
    <selection name="IIS-ServerSideIncludes" state="true"/>
    <selection name="IIS-HealthAndDiagnostics" state="true"/>
    <selection name="IIS-HttpLogging" state="true"/>
    <selection name="IIS-LoggingLibraries" state="true"/>
    <selection name="IIS-RequestMonitor" state="true"/>
    <selection name="IIS-HttpTracing" state="true"/>
    <selection name="IIS-CustomLogging" state="true"/>
    <selection name="IIS-ODBCLogging" state="true"/>
    <selection name="IIS-Security" state="true"/>
    <selection name="IIS-BasicAuthentication" state="true"/>
    <selection name="IIS-URLAuthorization" state="true"/>
    <selection name="IIS-RequestFiltering" state="true"/>
    <selection name="IIS-IPSecurity" state="true"/>
    <selection name="IIS-Performance" state="true"/>
    <selection name="IIS-HttpCompressionStatic" state="true"/>
  </package>
</servicing>

```

```
<selection name="IIS-HttpCompressionDynamic" state="true"/>
<selection name="IIS-WebServerManagementTools" state="true"/>
<selection name="IIS-ManagementConsole" state="true"/>
<selection name="IIS-ManagementScriptingTools" state="true"/>
<selection name="IIS-ManagementService" state="true"/>
<selection name="IIS-IIS6ManagementCompatibility" state="true"/>
<selection name="IIS-Metabase" state="true"/>
<selection name="IIS-WMICompatibility" state="true"/>
<selection name="IIS-LegacyScripts" state="true"/>
<selection name="IIS-LegacySnapIn" state="true"/>
<selection name="WAS-WindowsActivationService" state="true"/>
<selection name="WAS-ProcessModel" state="true"/>
<selection name="WAS-NetFxEnvironment" state="true"/>
<selection name="WAS-ConfigurationAPI" state="true"/>
</package>
</servicing>

</unattend>
```


Operating Systems – Linux

SeaMicro recommends using PXE as the server OS installation method. PXE enables internal servers to install an OS off of its network interface, and enables the automation of OS installation and configuration.

Consult your OS documentation for proper network setup and prerequisites for a PXE install. The procedure for preparing the SeaMicro system for a PXE install is shown in the table below. Prepare the internal servers to install an OS via PXE. Also, in the Kickstart file, make sure the root partition is no larger than 1 TB.

Note: When multiple NICs are present on an internal server, PXE can only be done by using eth0 on the first NIC.

Step	Task	<input checked="" type="checkbox"/>
1	Include PXE in the server BIOS boot order.	<input type="checkbox"/>
2	Edit the boot loader configuration file.	<input type="checkbox"/>
2a	Set the serial console name to <i>ttyS0</i> .	<input type="checkbox"/>
2b	Set the BAUD must be <i>9600n8</i> .	<input type="checkbox"/>
2c	Exclude the VGA parameters.	<input type="checkbox"/>
3	Create an answer file for unattended installation.	<input type="checkbox"/>

BIOS: Boot Order

By default, each server will attempt to boot from the following locations, in the following order: vdisk 0, vdisk 1, vdisk 2, vdisk 3.

If the OS is not found in the first location, vdisk 0, the server, will attempt to boot from the next location, vdisk 1. You can change the order of the list, and also include PXE in the list.

When you specify PXE in the boot order, PXE is enabled. To disable PXE, remove it from the list. Also, PXE is supported only on the first NIC of the two NICs on each N570 internal server.

In Release 3.2, hd0 can boot from any vDisk on an AHCI device. (This includes vDisk0,8,16,24.) This is the same as with hd1, hd2, and so on.

Setting a Boot Order for Xeon

For Xeon boards, setting a boot order is not supported. You must select only one boot target at any given time. This is an exception.

Examples for Xeon and Opeteron

```
seamicro(config)# server id 0/0  
seamicro(config-id-0/0)# b
```

Possible Completions:

```
  bios  boot-at-system-startup  
seamicro(config-id-0/0)# bios boot-order ?
```

Possible Completions:

```
  comma-separated list of boot devices: hd[0-3],pxe  
seamicro(config-id-0/0)# bios boot-order hd0,pxe  
seamicro(config-id-0/0)#  
seamicro# show server bios ?
```

Possible completions:

```
  server number: e.g. single server ("0/0"), server ranges ("0/0-5/1"), multi-  
  ple servers/range  
  s ("0/1,3/2,5/1-7/5"), all  
  |  
  <cr>
```

```
seamicro# show server bios 0/0  
Server  hyperthreading  c-states  cpufreq-scaling  hide-topmem  boot-order  
-----  
0/0      ON                OFF      ON                -            hd0 pxe
```

Step	Task	Command
1	Enter the internal server CLI context.	Command: server id server-number CLI Level: Configuration
	Change the order of the locations in which servers look for the OS during bootup.	bios boot-order {hd0, hd1, hd2, hd3, pxe,}
	Note:	
	<ul style="list-style-type: none"> When configuring the boot order, to enter more than one location, you must enter comma-separated (no spaces) locations. 	
2	For example, bios boot-order hd0,hd2,pxe.	
	<ul style="list-style-type: none"> If you do not enter all of the available devices in some order, the system will implicitly complete the boot order list with the remaining parameters. For example if you explicitly configure, bios boot-order hd2, the resulting configuration will be bios boot-order hd2,pxe,hd0,hd1,hd3. 	
	<pre>seamicro(config)# server id 0 (config-id-0)# bios ? Possible completions: boot-order Set BootOrder for server, default:hd0,hd1,hd2,hd3 c-states Enable C-states for server hyperthreading Configure HyperThreading for server, default:enabled seamicro(config-id-0)# bios boot-order ? Possible completions: comma seperated list of boot devices: hd0,hd1,hd2,hd3,pxe seamicro(config-id-0)# bios boot-order hd0,hd2,hd1,hd3 seamicro(config-id-0)# show config server id 0 bios boot-order hd0,hd2,hd1,hd3 ! seamicro(config-id-0)#</pre>	

Boot Loader Configuration File

PXE uses DHCP and TFTP to locate and download two pre-boot files: a boot loader program and a boot loader configuration file. The SeaMicro system requires specific values for some boot loader configuration parameters:

- The serial console name must be *ttyS0*.
- The BAUD must be *9600n8*.

Example Boot Loader Configuration Files

Below are example boot loader configuration (menu) files for PXELINUX and GRUB, customized for each of the supported operating systems.

PXELINUX “default” Menu File	GRUB menu.lst Menu File
PXELINUX: 32-bit RedHat Enterprise	GRUB: 32-bit CentOS/RedHat Enterprise
PXELINUX: 64-bit RedHat Enterprise	initrd /initrd-2.6.18-164.el5.img
32-bit Debian	GRUB: 32-bit Debian

PXELINUX: 32-bit CentOS

```
#pxelinux.cfg/default
#=====
SERIAL 0 9600
default text
prompt 1
timeout 15
label text
    kernel Centos-5.4/images/pxeboot/vmlinuz
    append initrd=Centos-5.4/images/pxeboot/initrd.img text
        console=ttyS0,9600n8 ks=http://10.14.0.10/ks.cfg
```

PXELINUX: 64-bit CentOS

```
#pxelinux.cfg/default
#=====
SERIAL 0 9600
default text
prompt 1
timeout 15
label text
    kernel Centos-5.4/images/pxeboot/vmlinuz
    append initrd=Centos-5.4/images/pxeboot/initrd.img text
        console=ttyS0,9600n8 ks=http://10.14.0.10/ks.cfg
```

PXELINUX: 32-bit RedHat Enterprise

```
#pxelinux.cfg/default
#=====
SERIAL 0 9600
default text
prompt 1
timeout 5
label text
    kernel redhat/images/pxeboot/vmlinuz
    append initrd=redhat/images/pxeboot/initrd.img text
        console=ttyS0,9600n8 ks=http://10.24.1.1/ks.cfg
```

PXELINUX: 64-bit RedHat Enterprise

```
#pxelinux.cfg/default
#=====
SERIAL 0 9600
default text
prompt 1
timeout 5
label text
    kernel redhat54/images/pxeboot/vmlinuz
    append initrd=redhat54/images/pxeboot/initrd.img text
        console=ttyS0,9600n8 ks=http://10.52.0.10/minRedhat54.cfg
        ksdevice=eth0
```

PXELINUX: 32-bit Debian

```
#default file for debian
#=====
SERIAL 0 9600 0
DEFAULT install
LABEL DEBIAN
    kernel /i386/linux
    append auto=true text initrd=/i386/initrd.gz -- console=ttyS0,9600n8
        debian-installer/allow_unauthenticated=true url=http://10.14.0.10//
        DEBIAN_DEFAULT.cfg netcfg/get_nameservers= mirror/http/
        hostname=10.14.0.10 priority=critical
```

PXELINUX: 64-bit Debian

```
#default file for debian
#=====
SERIAL 0 9600 0
DEFAULT install
LABEL DEBIAN
    kernel /amd64/linux
    append auto=true text initrd=/amd64/initrd.gz -- console=ttyS0,9600n8
        url=http://10.52.0.10/DEBIAN64.cfg netcfg/get_nameservers= mirror/
        http/hostname=10.52.0.10 priority=critical netcfg/
        choose_interface=eth0 debian-installer/allow_unauthenticated=true
```

GRUB: 32-bit CentOS/RedHat Enterprise

```
default=0
timeout=5
serial --unit=0 --speed=9600
terminal --timeout=5 serial console
title CentOS (2.6.18-164.el5)
root (hd0,0)
    kernel /vmlinuz-2.6.18-164.el5 ro root=/dev/VolGroup00/LogVol100
        console=ttyS0,9600n8
    initrd /initrd-2.6.18-164.el5.img
```

GRUB: 64-bit CentOS/RedHat Enterprise

```
default=0
timeout=5
serial --unit=0 --speed=9600
terminal --timeout=5 serial console
title CentOS (2.6.18-164.el5)
root (hd0,0)
    kernel /vmlinuz-2.6.18-164.el5 ro root=/dev/VolGroup00/LogVol100
        console=ttyS0,9600n8
    initrd /initrd-2.6.18-164.el5.imgGRUB: 32-bit Debian
''' ''' serial --unit=0 --speed=9600 --word=8 --parity=no --stop=1
title Debian GNU/Linux, kernel 2.6.26-2-686
root (hd0,0)
    kernel /boot/vmlinuz-2.6.26-2-686 root=/dev/sda1 ro console=ttyS0,9600n8
    initrd /boot/initrd.img-2.6.26-2-686
```

GRUB: 64-bit Debian

```
''' ''' serial --unit=0 --speed=9600 --word=8 --parity=no --stop=1
title Debian GNU/Linux, kernel 2.6.26-2-686
root (hd0,0)
    kernel /boot/vmlinuz-2.6.26-2-686 root=/dev/sda1 ro console=ttyS0,9600n8
    initrd /boot/initrd.img-2.6.26-2-686
```

Unattended OS Installation

The OS installation itself is an interactive process. The required responses may be defined in a separate file so you can leave the system unattended. The file location is provided to the client in the boot loader configuration file.

The answer file is called *Kickstart* for CentOS and RedHat Enterprise. For Debian, the answer file is called *Preseed*. The SeaMicro console parameters may be specified in the answer file and the boot loader configuration file, but note that they must be specified in at least one location. If they are to be added to the answer file, add the appropriate SeaMicro-specific configuration lines.

SeaMicro-specific configuration lines for answer files
32-bit CentOS/RedHat Enterprise: bootloader --append="console=ttyS0,9600n8" --location=mbr
64-bit CentOS/RedHat Enterprise: bootloader --append="console=ttyS0,9600n8" --location=mbr
32/64-bit Debian: No changes are required if serial console parameters were added to the bootloader menu file.

Sample Kickstart for CentOS/RHEL

```
#-----  
#platform=x86, AMD64, or Intel EM64T  
# System authorization information  
auth --useshadow --enablemd5  
# System bootloader configuration  
bootloader --append="serial console=ttyS0,9600n8 --location=mbr"  
# Clear the Master Boot Record  
zerombr  
# Partition clearing information  
clearpart --all --initlabel  
autopart  
# Use text mode install  
text  
# Firewall configuration  
firewall --disabled  
# Run the Setup Agent on first boot  
firstboot --disable  
# System keyboard  
keyboard us  
# System language  
lang en_US  
# Installation logging level  
logging --level=info  
# Use network installation  
url --url=http://<pxe-server-ip>/<OS-image-filename>
```

```

# Network information
network --bootproto=dhcp --device=eth0 --onboot=on
# Reboot after installation
reboot
#Root password
rootpw --iscrypted $1$iGgDdKAB$/wOFkmJ23p1linmT30Lt41
# SELinux configuration
selinux --disabled
# System timezone
timezone America/Los_Angeles
# Install OS instead of upgrade
install
# X Window System configuration information
#xconfig --defaultdesktop=GNOME --depth=24 --resolution=1280x1024
# Do not configure the X Window System
skipx
%packages
@development-tools
@base
@web-server
@network-server
@emacs
@graphical-internet
@legacy-network-server
@text-internet
@editors
#-----

```

DHCP Options for PXE

On the external DHCP server, do the following:

- Specify the server on which clients can obtain the boot loader program using the command: **next-server** *ip-address*.
- Specify the file path and name for the boot loader program using the command: **bootfile** *filepath/filename*.

Note: The ‘**next-server**’ can be an internal or external server. For more information, refer to Advanced Internal Server Features in the *Server and Network Configuration Guide*.

This section includes information on the following:

- [Installing the Citrix XenServer](#)
- [Using XenServer via CLI](#)
- [Using XenServer via Citrix XenCenter](#)
- [Installing VMWare ESXi 5.0](#)

Note: No SeaMicro-specific configuration is required for the KVM hypervisor. For information on KVM installation, refer to http://www.linux-kvm.org/page/Main_Page.

Installing the Citrix XenServer

This section describes the steps involved in installing the Citrix XenServer, using the XenServer via CLI, and using the XenServer via Citrix XenCenter.

IMPORTANT: There is a known issue with XenServer default boot loader syslinux 4.02 that can cause servers to occasionally hang during boot. The default boot loader is a part of all known versions of XenServer to date. To eliminate any boot issues, SeaMicro recommends that you use syslinux 4.06. For more information on downloading or creating the extlinux binary, refer to [Installing Syslinux 4.06 on page 33](#).

To install Citrix XenServer, follow the procedures below:

1. Get Citrix Xen for PXE. You will need a Citrix account for obtaining the ISO for mounting. Get the ISO for 5.6 or 6.0 from the Citrix website, and mount it on the PXE server.
2. Set up the answerfile. Citrix Xenserver needs an “answerfile” as an analog to a Kickstart file.
3. Sample answer file:

The pattern is as follows:

```
<?xml version="1.0"?>
<installation>
<primary-disk>sda</primary-disk>
<keymap>us</keymap>
<root-password>seamicro</root-password> //Set up the root password
<source type="url">http://10.18.0.100/xen/packages.main</source>
```

```

// Point it to packages.main.
<admin-interface name="eth0" proto="dhcp" />
<timezone>Pacific/Los_Angeles</timezone>
<bootloader>grub</bootloader>
<post-install-script type="url">
http://10.18.0.100/xenserver-postinstall-script
// Change IP to PXE servers
</post-install-script>

</installation>

```

4. Label for the XenServer in the pxe server cfg file:

1. Sample Label for XenServer 5.6.

```

kernel xenserver/mboot.c32

append xenserver/xen.gz dom0_mem=752M com1=9600,8n1 console=com1 -
-- xenserver/vmlinuz xencons=ttyS0 console=com1 answerfile=http://
172.16.16.50/xen-answerfile.ch26 answerfile_device=eth0 install --
- xenserver/install.img

```

2. Sample Label for XenServer 6.

```

kernel xenserver-6.0/mboot.c32

append xenserver-6.0/boot/xen.gz dom0_mem=752M com1=9600,8n1
console=com1 --- xenserver-6.0/boot/vmlinuz xencons=ttyS0
console=ttyS0,9600,n8 output=ttyS0 answerfile=http://172.16.16.50/
xenserver6-answerfile.ch26 answerfile_device=eth0 install ---
xenserver-6.0/install.img

```

Congratulations! You have now successfully installed Xenserver on your PXE server.

Notes:

- The mboot.c32 file used for Xenserver 6 is the same as the one used for Xenserver 5.6.
- For help on various commands, enter “xe help”.
- Use SSH to connect to the internal server. Most Linux commands will work on it. Its file system and usage is very similar to CentOS.
- If you follow the default installation method, you will get an eth0 IP by DHCP. This is intentional. However, to add another interface, use the following command:

```

root@localhost ~]# xe pif-reconfigure-ip uuid=ba029a29-cda0-
c977-7c7c-a5a937b3d319 mode=dhcp
where uuid is uuid of eth1
[root@localhost ~]# xe pif-list
uuid ( RO) : ba029a29-cda0-c977-7c7c-a5a937b3d319

```

```
device ( RO): eth1
currently-attached ( RO): true
VLAN ( RO): -1
network-uuid ( RO): a25802e4-09f6-3626-afd7-60f6f623a720
```

Installing Syslinux 4.06

Open source Xen, Citrix XenServer 6.x and previous versions come pre-loaded with syslinux 4.02. In some instances, when all servers are reset at the same time, some of the servers will not boot up properly. To correct this issue, install syslinux 4.06 in one of two ways:

- Download the `extlinux` binary, and follow the instructions listed below.
- Or, recompile `syslinux 4.06`, and create the `extlinux` binary on your own.

Download extlinux Binary

Contact SeaMicro Support for a version of `extlinux` binary. Download the `extlinux` binary, and follow the instructions below:

1. Install XenServer, and wait for the login prompt.
2. Login as root.
3. Copy the `extlinux` binary to `/root`.
4. Change file permissions to make it executable.

```
# chmod +x ./extlinux
```

5. Execute the binary.

```
# ./extlinux -i /boot
```

6. Verify if the new version is `syslinux 4.06` with the following command. You should see 4.06 in the output.

```
# hexdump /boot/ldlinux.sys | head -1
```

7. Synchronize and reboot gracefully.

```
# sync  
# reboot
```

Recompile syslinux 4.06

If you want to recompile `syslinux 4.06` and create the `extlinux` binary on your own, proceed as follows:

1. Get syslinux 4.06 source file.

<http://www.kernel.org/pub/linux/utils/boot/syslinux/4.xx/syslinux-4.06.tar.bz2>

2. Get fedora 13 installed on a server.

- A complete installation is recommended to load all development tools and libraries.
- If you use 670-ts as PXE server, the fedora 13 entry is already modified to install all development tools and libraries.
- Build binary package as follows:
- `# yum install glibc-static`
- Install `nasm-2.10.07-1.i386.rpm`. It is available at `ch670-ts:/tftpboot/pxe-server/`.

3. Once the development box is ready, untar the file.

4. From `syslinux 4.06` directory, change directory (`cd`) to `extlinux` directory.

5. Open the makefile, and modify the `LD_FLAGS` entry to `LD_FLAGS = -static`.

6. Save the makefile, and run '**make**' from the `syslinux` directory.

A statically linked binary of `extlinux` will be created inside the `extlinux` directory.

7. Run this binary on all the servers.

Using XenServer via CLI

1. Setting up VM's PXE:

Set up the `pvArgs` and install the repository. This will be needed in step 2.

For the install repository, use the “method=” entry in your PXE file.

For example, in CentOS55-64, it is as follows:

```
http://<ip>/CentOS-55-64
```

For the `pvargs`, you will need the text option, the Kickstart (`ks`) file, and the `ksdevice`.

For example, in CentOS55-64, it is as follows:

```
text quiet ks=http://<ip>/autoinstall/CENTOS64-55-XENSERVEN.cfg
ksdevice=eth0
```

Note the “`XENSERVEN.cfg` file” changes the disk to an *xvda* format.

2. Getting storage repository UUID:

By default, unless there is a configured server pool, the local repository will always be used. You don't need to specify the local repository specifically, but if someone has made your server a part of a pool, you might get some unexpected results. SeaMicro recommends specifying the local repository.

At the prompt, enter as follows:

- Type `xe sr-list name-label="Local storage"` and note the SR UUID obtained.
- Type `xe network-list bridge=xenbr0 --minimal` and note the NW UUID obtained.
- Type `xe vm-install template=<tab>` to get a list of all the labels available. You will have to match the labels to the install procedures in Step 1 and 2. For our purposes here, we will use CentOS 5 (64 bit). Note that the XenServer is extremely sensitive to spellings, spaces, and cases.
- Type `xe vm-install template="CentOS 5 (64 bit)" new-name-label=<$name> sr-UUID=<SR UUID obtained earlier>`
- This step will return a UUID for VM. Let's call it VMUUID.
- Type `xe vif-create vm-UUID=<VMUUID> network-UUID=<NWUUID obtained earlier> mac=random device=0`

· Set memory limits as follows:

```
xe vm-memory-limits-set static-min=<size> dynamic-min=<size>
dynamic-max=<size> static-max=<size> UUID=<VMUUID>.
```

Note that all sizes have to be specified in actual bytes. For example, 512MB is specified as $512 * 2^{10} * 2^{10} = 536870912$

Xenserver will prevent you from making max-size less than min-size. Make all sizes equal in order to have a static limited size. Minimum memory requirements are 512 MB.

- Type `xe vm-param-set UUID=<VMUUID> other-config:install-repository=<install repository>` as mentioned in step 1.

```
PV-args= < pv args mentioned in step1. >
```

For example, the command for Centos 5.5 is:

```
xe vm-param-set UUID=<VMUUID> other-config:install-repository=
PV-args= "text quiet ks=http://<ip>/autoinstall/CENTOS64-55-
XENSERVEN.cfg ksdevice=eth0"
```

The `pv-args` line will set up the `/smttools/` folder and other useful packages for you.

- Type `xe vm-start UUID=<VMUUID>`

Note that PXE booting happens in the background. You will need to switch consoles to see it executed in the foreground. Using console access from a testserver, type:

```
vncviewer -via root@<ip of xenserver> localhost:<id of vm beginning from
1>
```

You may now watch it complete PXE booting, and at this point, all VMs can be used as a normal internal servers, and have access to all the tools of the internal servers.

- VMs may be powered on using XE commands:

```
xe vm-start name-label=<name given in step 2. >
```

- VMs may be destroyed using XE commands:

§ First, shutdown the VM.

§ Strip disks out for reuse with the following command:

```
xe vm-disk-remove name-label=<name_of_label>
```

§ Destroy the vm with the following command:

```
xe vm-destroy name-label=<name_of_vm>
```

- You may use a `.smt` script with minimal changes on most systems.
- You may use other relevant XE commands as listed on the next page:

XE Command	Description
xe vm-pause name-label=<name_of_vm>	Saves the state of a VM, and halts it.
xe vm-resume name-label=<name_of_vm>	Resumes the paused VM.
xe vm-reboot name-label=<name_of_vm>	Resets the VM.
xe vm-shutdown name label=<name_of_vm>	Powers-off the VM.

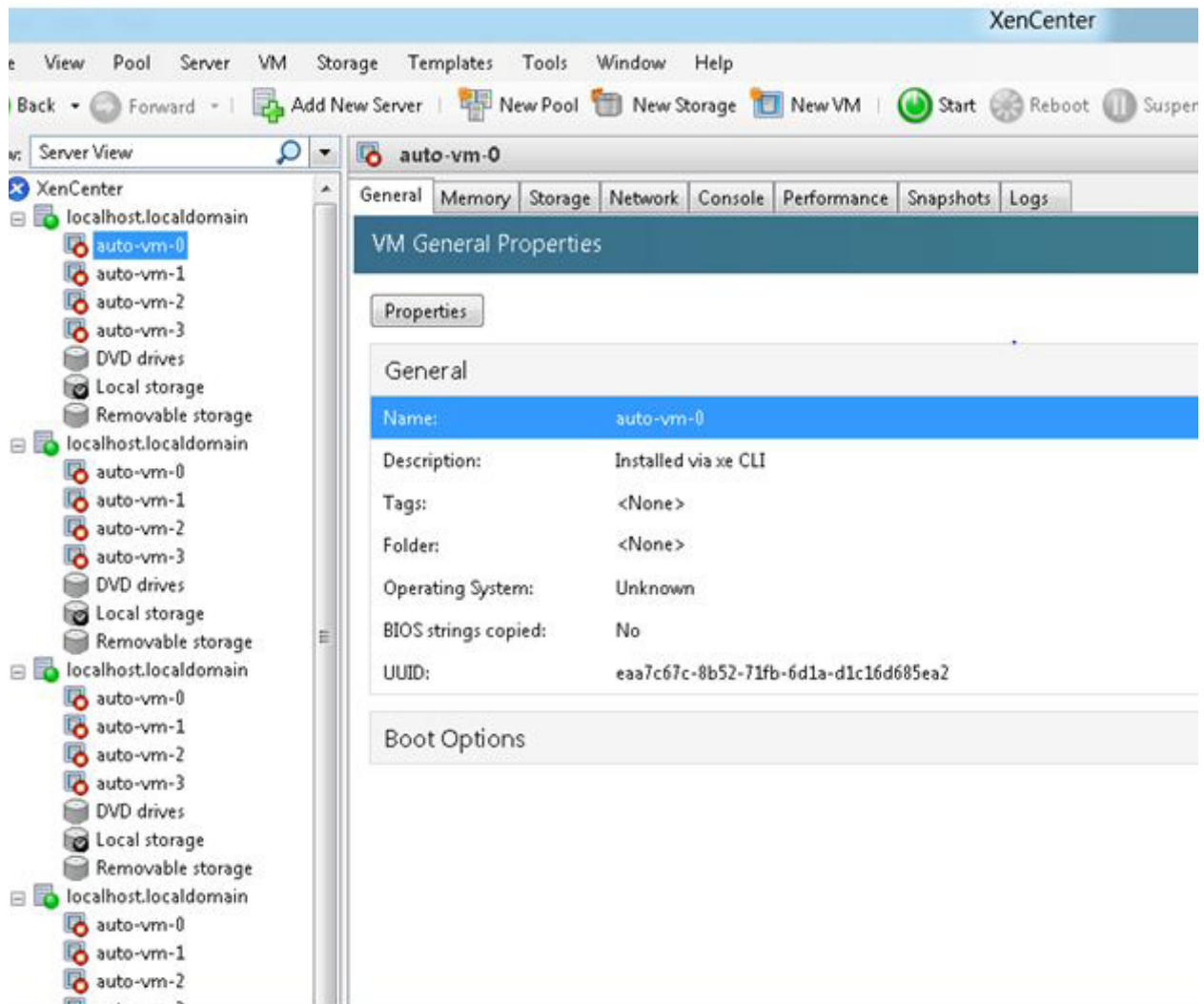
Using XenServer via Citrix XenCenter

1. Get XenCenter from the Citrix website.
2. Next, install XenCenter. Note that this installation will only work after XenServer installation is complete on host machines.
3. Ensure that the XenCenter version matches your XenServer version.



4. As shown in the screen above, press the “**LEARN**” button to walk you through XenCenter.
5. Use “**ADD a server**” button to add a host machine.
6. Specify user/password to get you to the XenServer host console, which is a simulated console over ssh.
7. You may now use XE commands to launch VMs.

8. The added machine will show up in the left hand side of the graphical user interface (GUI).



9. Highlight it and press **New VM**.

10. You will get a Settings page where you can enter all the information similar to what you entered in the CLI context. You may switch consoles simply by clicking on the name of the VMs.

Installing VMWare ESXi 5.0

When installing VMWare ESXi 5.0, follow the steps below:

1. Add the following line to the bootloader configuration file:

```
kernelopt=runweasel text nofb gdbPort=none logPort=com1  
tty2Port=com1 tty1Port=com1 com1_baud=9600 debugui
```

2. Add the following lines to the PXE configuration file:

```
label ESXi5  
kernel VMware-Installer-5.0.0/mboot.c32  
append -c bootloader_config_file.cfg ks=http://10.69.0.100/  
kickstart_file.cfg
```

Note:

- The boot.cfg file for ESX 5.0.0 and ESX 5.0.0 update1 are not identical. There are modules in 5.0 update 1, which do not exist in 5.0.
- The text in red will be different on each customer's end.

boot.cfg for ESXi 5.0

Below are boot instructions for ESX5.0.0:

```
bootstate=0
title>Loading ESXi installer
kernel=/VMware-Installer-5.0.0/tboot.b00
kernelopt=runweasel text nofb gdbPort=none logPort=com1 tty2Port=com1
tty1Port=com1 com1_baud=9600 debugui
modules=/VMware-Installer-5.0.0/b.b00 --- /VMware-Installer-5.0.0/useropts.gz
--- /VMware-Installer-5.0.0/k.b00 --- /VMware-Installer-5.0.0/a.b00 --- /
VMware-Installer-5.0.0/ata-pata.v00 --- /VMware-Installer-5.0.0/ata-pata.v01 -
-- /VMware-Installer-5.0.0/ata-pata.v02 --- /VMware-Installer-5.0.0/ata-
pata.v03 --- /VMware-Installer-5.0.0/ata-pata.v04 --- /VMware-Installer-5.0.0/
ata-pata.v05 --- /VMware-Installer-5.0.0/ata-pata.v06 --- /VMware-Installer-
5.0.0/ata-pata.v07 --- /VMware-Installer-5.0.0/block-cc.v00 --- /VMware-
Installer-5.0.0/ehci-ehc.v00 --- /VMware-Installer-5.0.0/s.v00 --- /VMware-
Installer-5.0.0/weaselin.i00 --- /VMware-Installer-5.0.0/ima-qla4.v00 --- /
VMware-Installer-5.0.0/ipmi-ipm.v00 --- /VMware-Installer-5.0.0/ipmi-ipm.v01 -
-- /VMware-Installer-5.0.0/ipmi-ipm.v02 --- /VMware-Installer-5.0.0/misc-
cni.v00 --- /VMware-Installer-5.0.0/misc-dri.v00 --- /VMware-Installer-5.0.0/
net-be2n.v00 --- /VMware-Installer-5.0.0/net-bnx2.v00 --- /VMware-Installer-
5.0.0/net-bnx2.v01 --- /VMware-Installer-5.0.0/net-cnic.v00 --- /VMware-
Installer-5.0.0/net-e100.v00 --- /VMware-Installer-5.0.0/net-e100.v01 --- /
VMware-Installer-5.0.0/net-enic.v00 --- /VMware-Installer-5.0.0/net-forc.v00 -
-- /VMware-Installer-5.0.0/net-igb.v00 --- /VMware-Installer-5.0.0/net-
ixgb.v00 --- /VMware-Installer-5.0.0/net-nx-n.v00 --- /VMware-Installer-5.0.0/
net-r816.v00 --- /VMware-Installer-5.0.0/net-r816.v01 --- /VMware-Installer-
5.0.0/net-s2io.v00 --- /VMware-Installer-5.0.0/net-sky2.v00 --- /VMware-
Installer-5.0.0/net-tg3.v00 --- /VMware-Installer-5.0.0/ohci-usb.v00 --- /
VMware-Installer-5.0.0/sata-ahc.v00 --- /VMware-Installer-5.0.0/sata-ata.v00 -
-- /VMware-Installer-5.0.0/sata-sat.v00 --- /VMware-Installer-5.0.0/sata-
sat.v01 --- /VMware-Installer-5.0.0/sata-sat.v02 --- /VMware-Installer-5.0.0/
sata-sat.v03 --- /VMware-Installer-5.0.0/scsi-aac.v00 --- /VMware-Installer-
5.0.0/scsi-adp.v00 --- /VMware-Installer-5.0.0/scsi-aic.v00 --- /VMware-
Installer-5.0.0/scsi-bnx.v00 --- /VMware-Installer-5.0.0/scsi-fni.v00 --- /
VMware-Installer-5.0.0/scsi-hps.v00 --- /VMware-Installer-5.0.0/scsi-ips.v00 -
-- /VMware-Installer-5.0.0/scsi-lpf.v00 --- /VMware-Installer-5.0.0/scsi-
meg.v00 --- /VMware-Installer-5.0.0/scsi-meg.v01 --- /VMware-Installer-5.0.0/
scsi-meg.v02 --- /VMware-Installer-5.0.0/scsi-mpt.v00 --- /VMware-Installer-
5.0.0/scsi-mpt.v01 --- /VMware-Installer-5.0.0/scsi-mpt.v02 --- /VMware-
Installer-5.0.0/scsi-qla.v00 --- /VMware-Installer-5.0.0/scsi-qla.v01 --- /
VMware-Installer-5.0.0/uhci-usb.v00 --- /VMware-Installer-5.0.0/tools.t00 ---
/VMware-Installer-5.0.0/imgdb.tgz --- /VMware-Installer-5.0.0/imgpayld.tgz
build=
updated=0
```

boot.cfg for 5.0 update1

Below are boot instructions for ESX 5.0 Update 1. You will most likely have to rename the /VMware-VMvisor-Installer-5.0.0.u1 path with the actual path to the ESXi 5.0 update 1 install sources on the host TFTP server.

```
bootstate=0
title>Loading ESXi installer 5.0 update 1
kernel=/VMware-VMvisor-Installer-5.0.0.u1/tboot.b00
kernelopt=runweasel debugui ks=http://172.16.21.1/VMware-ESXi-5-boot-ks.cfg
text nofb gdbPort=none logPort=com1 tty2Port=com1 tty1Port=com1 com1_baud=9600
modules=/VMware-VMvisor-Installer-5.0.0.u1/b.b00 --- /VMware-VMvisor-
Installer-5.0.0.u1/useropts.gz --- /VMware-VMvisor-Installer-5.0.0.u1/k.b00 --
- /VMware-VMvisor-Installer-5.0.0.u1/a.b00 --- /VMware-VMvisor-Installer-
5.0.0.u1/ata-pata.v00 --- /VMware-VMvisor-Installer-5.0.0.u1/ata-pata.v01 ---
/VMware-VMvisor-Installer-5.0.0.u1/ata-pata.v02 --- /VMware-VMvisor-Installer-
5.0.0.u1/ata-pata.v03 --- /VMware-VMvisor-Installer-5.0.0.u1/ata-pata.v04 ---
/VMware-VMvisor-Installer-5.0.0.u1/ata-pata.v05 --- /VMware-VMvisor-Installer-
5.0.0.u1/ata-pata.v06 --- /VMware-VMvisor-Installer-5.0.0.u1/ata-pata.v07 ---
/VMware-VMvisor-Installer-5.0.0.u1/block-cc.v00 --- /VMware-VMvisor-Installer-
5.0.0.u1/ehci-ehc.v00 --- /VMware-VMvisor-Installer-5.0.0.u1/s.v00 --- /
VMware-VMvisor-Installer-5.0.0.u1/weaselin.i00 --- /VMware-VMvisor-Installer-
5.0.0.u1/ima-qla4.v00 --- /VMware-VMvisor-Installer-5.0.0.u1/ipmi-ipm.v00 ---
/VMware-VMvisor-Installer-5.0.0.u1/ipmi-ipm.v01 --- /VMware-VMvisor-Installer-
5.0.0.u1/ipmi-ipm.v02 --- /VMware-VMvisor-Installer-5.0.0.u1/misc-cni.v00 ---
/VMware-VMvisor-Installer-5.0.0.u1/misc-dri.v00 --- /VMware-VMvisor-Installer-
5.0.0.u1/net-be2n.v00 --- /VMware-VMvisor-Installer-5.0.0.u1/net-bnx2.v00 ---
/VMware-VMvisor-Installer-5.0.0.u1/net-bnx2.v01 --- /VMware-VMvisor-Installer-
5.0.0.u1/net-cnic.v00 --- /VMware-VMvisor-Installer-5.0.0.u1/net-e100.v00 ---
/VMware-VMvisor-Installer-5.0.0.u1/net-e100.v01 --- /VMware-VMvisor-Installer-
5.0.0.u1/net-enic.v00 --- /VMware-VMvisor-Installer-5.0.0.u1/net-forc.v00 ---
/VMware-VMvisor-Installer-5.0.0.u1/net-igb.v00 --- /VMware-VMvisor-Installer-
5.0.0.u1/net-ixgb.v00 --- /VMware-VMvisor-Installer-5.0.0.u1/net-nx-n.v00 ---
/VMware-VMvisor-Installer-5.0.0.u1/net-r816.v00 --- /VMware-VMvisor-Installer-
5.0.0.u1/net-r816.v01 --- /VMware-VMvisor-Installer-5.0.0.u1/net-s2io.v00 ---
/VMware-VMvisor-Installer-5.0.0.u1/net-sky2.v00 --- /VMware-VMvisor-Installer-
5.0.0.u1/net-tg3.v00 --- /VMware-VMvisor-Installer-5.0.0.u1/ohci-usb.v00 --- /
VMware-VMvisor-Installer-5.0.0.u1/sata-ahc.v00 --- /VMware-VMvisor-Installer-
5.0.0.u1/sata-ata.v00 --- /VMware-VMvisor-Installer-5.0.0.u1/sata-sat.v00 ---
/VMware-VMvisor-Installer-5.0.0.u1/sata-sat.v01 --- /VMware-VMvisor-Installer-
5.0.0.u1/sata-sat.v02 --- /VMware-VMvisor-Installer-5.0.0.u1/sata-sat.v03 ---
/VMware-VMvisor-Installer-5.0.0.u1/scsi-aac.v00 --- /VMware-VMvisor-Installer-
5.0.0.u1/scsi-adp.v00 --- /VMware-VMvisor-Installer-5.0.0.u1/scsi-aic.v00 ---
/VMware-VMvisor-Installer-5.0.0.u1/scsi-bnx.v00 --- /VMware-VMvisor-Installer-
5.0.0.u1/scsi-fni.v00 --- /VMware-VMvisor-Installer-5.0.0.u1/scsi-hps.v00 ---
/VMware-VMvisor-Installer-5.0.0.u1/scsi-ips.v00 --- /VMware-VMvisor-Installer-
5.0.0.u1/scsi-lpf.v00 --- /VMware-VMvisor-Installer-5.0.0.u1/scsi-meg.v00 ---
```

```
/VMware-VMvisor-Installer-5.0.0.u1/scsi-meg.v01 --- /VMware-VMvisor-Installer-5.0.0.u1/scsi-meg.v02 --- /VMware-VMvisor-Installer-5.0.0.u1/scsi-mpt.v00 --- /VMware-VMvisor-Installer-5.0.0.u1/scsi-mpt.v01 --- /VMware-VMvisor-Installer-5.0.0.u1/scsi-mpt.v02 --- /VMware-VMvisor-Installer-5.0.0.u1/scsi-qla.v00 --- /VMware-VMvisor-Installer-5.0.0.u1/scsi-qla.v01 --- /VMware-VMvisor-Installer-5.0.0.u1/scsi-rst.v00 --- /VMware-VMvisor-Installer-5.0.0.u1/uhci-usb.v00 --- /VMware-VMvisor-Installer-5.0.0.u1/tools.t00 --- /VMware-VMvisor-Installer-5.0.0.u1/imgdb.tgz --- /VMware-VMvisor-Installer-5.0.0.u1/imgpayld.tgz
```

This section includes information on the following:

- [Best Practice for CentOS/RHEL](#)
- [Best Practice for Ubuntu](#)

Best Practice for CentOS/RHEL

This section includes best practices for CentOS/RHEL kernel below 2.6, 2.6, and above.

Best Practice for CentOS/RHEL 2.6 and Below

For best performance when running applications that are network intensive, use the latest e1000 driver (version 8.0.35-NAPI). The following section discusses how to upgrade to 8.0.35-NAPI.

Upgrade to 8.0.35-NAPI

Go through the following steps to upgrade to 8.0.35-NAPI:

1. Before you begin upgrading, create a backup copy of your current driver module so that you can revert to it if and when you run into errors during installation:

```
cp /lib/modules/<KERNEL VERSION>/kernel/drivers/net/e1000/e1000.[k]o  
/lib/modules/<KERNEL VERSION>/kernel/drivers/net/e1000/e1000.[k]o.bk
```

2. Make sure the latest kernel development tools and compiler is present on the OS.

```
(yum update/install kernel-devel, yum update/install gcc)
```

3. Untar and unzip the archive:

```
tar xzf e1000-x.x.x.tar.gz
```

4. Change your directory to the source (`src`) directory of the driver:

```
cd e1000-x.x.x/src/
```

5. Compile the driver module:

```
make install
```

The binary will be installed in the following location and file:

```
/lib/modules/<KERNEL VERSION>/kernel/drivers/net/e1000/e1000.[k]o
```

Note: Install locations listed above are all default locations.

6. Load the module using either the `modprobe` or `insmod` command:

```
modprobe e1000 or insmod e1000
```

Note: For 2.6 kernels, remember to specify the full path of the driver module when using the `insmod` command. For example:

```
insmod /lib/modules/<KERNEL VERSION>/kernel/drivers/net/e1000/  
e1000.ko
```

Best Practice for CentOS/RHEL Kernel Above 2.6

In case the kernel used is greater than 2.6 and/or the performance is below the expected throughput, attempt the following tuning to get the best performance.

1. Increase RX/TX descriptors for every NIC e1000 driver, if large packet loss is observed. By default, the driver allocates 256 RX/TX buffers for every NIC.

Increasing this value to 1024 or 2048 (max of 4096), allows the driver to buffer more packets leading to higher throughput and lower packet loss. The following commands show how to adjust Rx/Tx descriptors for 2 different e1000 drivers.

8.0.35-NAPI driver	7.3.21-k8-NAPI driver
<code>ethtool -G eth0 [rx tx]<1024 2048 3072></code>	<code>modprobe e1000 [R T]xDescriptors <1024 2048 3072></code>

2. Adjust the `InterruptThrottle` rate for every NIC to reduce the interrupt load on the CPU, which can get bottlenecked during network intensive applications when there is no interrupt coalescing.

The range of 2000 to 3000 interrupts per second works on a majority of systems is a good starting point, but the optimal value will be platform-specific.

8.0.35-NAPI driver

7.3.21-k8-NAPI driver

```
ethtool -C eth0 rx-usecs <0|1|2|3|100-10000>
```

```
modprobe e1000  
InterruptThrottleRate=2000,2000,2000,2000,2000,2000,2000,2000
```

Note: The above command will set the throttle rate to 2000 for all 8 NICs.

Best Practice for Ubuntu

On Ubuntu 12.04 LTS, network interrupts are not distributed across all CPU cores by default. If your application is network intensive, to achieve better throughput, spread the network interrupts across CPU cores. Based on the type of network application being deployed, perform due diligence using optimum settings.

Apply the following settings on the server.

```
echo 02 > /proc/irq/16/smp_affinity
```

```
echo 04 > /proc/irq/17/smp_affinity
```

```
echo 80 > /proc/irq/18/smp_affinity
```

```
echo 20 > /proc/irq/19/smp_affinity
```

Note: The settings mentioned above were qualified for performance tests using standard network tools such as *netperf* and *iperf*.

This section includes best practices for Ubuntu kernel below 2.6, 2.6, and above.

Best Practice for Ubuntu Kernel 2.6 or Below

1. On Ubuntu, network interrupts are not distributed across all CPU cores by default. If your application is network intensive, to achieve better throughput, spread the network interrupts across CPU cores. Based on the type of network application being deployed, perform due diligence by using optimum settings.

Stop service irqbalance using: `service irqbalance stop`

Run commands:

```
echo 01 > /proc/irq/16/smp_affinity (CPU core 1)
```

```
echo 04 > /proc/irq/17/smp_affinity (CPU core 2)
```

```
echo 10 > /proc/irq/18/smp_affinity (CPU core 3)
```

```
echo 40 > /proc/irq/19/smp_affinity (CPU core 4)
```

2. For best performance when running applications that are network intensive, use the latest e1000 driver (version 8.0.35-NAPI). To Upgrade to 8.0.35-NAPI:

- Before you begin upgrading, create a backup copy of your current driver module so that you can revert to it if you run into errors during installation:

```
cp /lib/modules/<KERNEL VERSION>/kernel/drivers/net/e1000/e1000.[k]o
/lib/modules/<KERNEL VERSION>/kernel/drivers/net/e1000/e1000.[k]o.bk
```

- Make sure the latest kernel development tools and compiler is present on the OS. (yum update/install kernel-devel, yum update/install gcc)
- Untar and unzip the archive: tar xzf e1000-x.x.x.tar.gz
- Change your directory to the source (src) directory of the driver: cd e1000-x.x.x/src/

3. Compile the driver module with `make install`

The binary will be installed in the following location and file:

```
/lib/modules/<KERNEL VERSION>/kernel/drivers/net/e1000/e1000.[k]o
```

Note: Install locations listed above are all default locations.

4. Load the module using either the `modprobe` or `insmod` command:

```
modprobe e1000 or insmod e1000.
```

Note: For 2.6 kernels, remember to specify the full path of the driver module when using the `insmod` command. For example:

```
insmod /lib/modules/<KERNEL VERSION>/kernel/drivers/net/e1000/
e1000.ko
```

Best Practice for any Ubuntu Kernel Above 2.6

In case the kernel used is greater than 2.6 and/or the performance is below the expected throughput these are some of the tunings that can be tried to get the best performance.

1. On Ubuntu, network interrupts are not distributed across all CPU cores by default. If your application is network intensive, to achieve better throughput, spread the network interrupts across CPU cores. Based on the type of network application being deployed, perform due diligence using optimum settings.

Stop service irqbalance using the command: `service irqbalance stop`

Run commands:

```

echo 01 > /proc/irq/16/smp_affinity (CPU core 1)
echo 04 > /proc/irq/17/smp_affinity (CPU core 2)
echo 10 > /proc/irq/18/smp_affinity (CPU core 3)
echo 40 > /proc/irq/19/smp_affinity (CPU core 4)

```

2. Increase RX/TX descriptors for every NIC e1000 driver, if large packet loss is observed. By default, the driver allocates 256 RX/TX buffers for every NIC.

Increasing this value to 1024 or 2048 (max of 4096), allows the driver to buffer more packets leading to higher throughput and lower packet loss.

8.0.35-NAPI driver	7.3.21-k8-NAPI driver
<code>ethtool -G eth0 [rx tx] <1024 2048 3072></code>	<code>modprobe e1000 [R T]xDescriptors <1024 2048 3072></code>

3. Adjust the InterruptThrottle rate for every NIC to reduce the interrupt load on the CPU, which can get bottlenecked for network intensive applications when there is no interrupt coalescing.

The range of 2000 to 3000 interrupts per second works on a majority of systems and is a good starting point, but the optimal value will be platform-specific.

8.0.35-NAPI driver	7.3.21-k8-NAPI driver
<code>ethtool -C eth0 rx-usecs <0 1 2 3 100-10000></code>	<code>modprobe e1000 InterruptThrottleRate=2000,2000,2000,2000,2000,2000,2000,2000</code>

Note: The above command will set the throttle rate to 2000 for all 8 NICs.