Net-Net OS-E

Release 3.6.0

Virtual Machine Information Guide

400-1010-36
Revision 1.40
November 26, 2012

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Preface

About Net-Net OS-E® Documentation

The Net-Net OS-E references in this documentation apply to the Net-Net OS-E operating system software that is used for the following Acme Packet and third-party SBC products.

- Net-Net Application Session Controller (ASC)
- Net-Net OS-E Session Directory (SD) Session Border Controller (SBC)
- Net-Net 2600 Session Directory (SD) Session Border Controller (SBC)
- Third-party products that license and use Net-Net OS-E software on an OEM basis.

Unless otherwise stated, references to the Net-Net OS-E in this document apply to all of the Acme Packet and third-party vendor products that use Net-Net OS-E software.

The following documentation set supports the current release of the OS-E software.

- *Net-Net OS-E – Net-Net 2610/2620 Quick Installation*
- *Net-Net OS-E – Network Interface Card Installation*
- *Net-Net OS-E – USB Creation and Commissioning Instructions*
- *Net-Net OS-E – Slide Rail Kit Installation Instruction*
- *Net-Net OS-E – Virtual Machine Information Guide*
- *Net-Net OS-E – System Installation and Commissioning Guide*
- *Net-Net OS-E – Management Tools*
- *Net-Net OS-E – System Administration Guide*
- *Net-Net OS-E – Session Services Configuration Guide*

- *Net-Net OS-E – Objects and Properties Reference*
- *Net-Net OS-E – System Operations and Troubleshooting*
- *Net-Net ASC — Web Services SOAP/REST API*
- *Net-Net ASC — Web Services Samples Guide*
- *Net-Net OS-E – Release Notes*

About This Manual

The *Net-Net OS-E – Virtual Machine Information Guide* covers information about installing, managing, and administering the OS-E Virtual Machine.

Revision History

This section contains a revision history for this document.

Date	Revision Number	Description
December 14, 2009	Revision 1.00	• Initial Release of OS-E 3.6.0 software.
March 9, 2010	Revision 1.01	• Clarifies directions for installing software on the ESX server. • Removes all references to MX-1 card support.
June 16, 2010	Revision 1.02	• Clarifies the memory sizes supported by the VM.
December 3, 2010	Revision 1.10	• Updates Acme Packet contact information. • Updates Xen installation procedures.
June 24, 2011	Revision 1.20	• Changes references in the software from Net-Net 2600 and NN2600 to Net-Net OS-E and OS-E. • Adds 3.6.0m4 adaptations. • Updates the necessary physical memory under Server-Based Requirements. • Removes Virtual Machine Capabilities and Limitations. • Adds graphic of the email Acme Packet sends for software download.
August 3, 2012	Revision 1.30	• Adds 3.6.0m5 adaptations.
November 26, 2012	Revision 1.40	• Adds Hyper-V machine configuration.

Conventions Used in this Manual

Typographical Conventions

Key Convention	Function	Example
KEY NAME	Identifies the name of a key to press.	Type **abc**, then press [ENTER]
CTRL+*x*	Indicates a control key combination.	Press CTRL+C
brackets [ ]	Indicates an optional argument.	[*portNumber*]
braces { }	Indicates a required argument with a choice of values; choose one.	{enabled | disabled}
vertical bar |	Separates parameter values. Same as "or."	{TCP | TLS}
Monospaced bold	In screen displays, indicates user input.	config> **config vsp**
Monospaced italic	In screen displays, indicates a variable—generic text for which you supply a value.	config servers> **config lcs** *name*
bold	In text, indicates literal names of commands, actions, objects, or properties.	...set as the secondary directory service (with the **unifier** property)...
bold italic	In text, indicates a variable.	...set the **domain** property of the ***directory*** object.

Acronyms

The OS-E manuals contain the following industry-standard and product-specific acronyms:

AAA	Authentication, authorization, and accounting
ALI	Automatic location identifier
ANI	Automatic number identification
ANSI	American National Standards Institute
AOR	Address of record
API	Application programming interface
ARP	Address Resolution Protocol

AVERT	Anti-virus emergency response team
B2BUA	Back-to-back user agent
BOOTP	Bootstrap Protocol
CA	Certificate authority
CAP	Client application protocol
CBC	Cipher block chaining
CBN	Call back number
CCS	Converged Communication Server
CDR	Call detail record
CIDR	Classless interdomain routing
CLI	Command line interface
CMOS	Comparison mean opinion score
CNAME	Canonical name record
CNI	Calling number identification
CODEC	Compressor/decompressor or coder/decoder
CPE	Customer-premise equipment
CRL	Certificate revocation list
CSR	Certificate signing request
CSTA	Computer-supported telecommunications applications
CSV	Comma-separated values
DDDS	Dynamic delegation discovery system
DHCP	Dynamic Host Configuration Protocol
DMZ	Demilitarized zone
DN	Distinguished name
DNIS	Dialed number identification service
DNS	Domain name service
DOS	Denial of service
EIM	Enterprise instant messaging
ESD	Electrostatic discharge
ESGW	Emergency services gateway
ESQK	Emergency services query key
ESRN	Emergency services routing number

FQDN	Fully qualified domain name
GUI	Graphical user interface
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
I2	National Emergency Number Association defined VoIP solution
ICAP	Internet Calendar Access Protocol
ICMP	Internet Control Message Protocol
IM	Instant messaging
IP	Internet Protocol
JDBC	Java database connectivity
JMX	Java management extensions
JRE	Java runtime environment
LATA	Local access and transport area
LCS	Live Communications Server
LCR	Least-cost routing
LDAP	Lightweight Directory Access Protocol
LIS	Location information service
MAC	Media access control
MCS	Multimedia Communications Server
MIB	Management information base
MOS	Mean opinion score
MSAG	Master street address guide
MTU	Maximum transmission unit
NAPTR	Naming authority pointer
NAT	Network address translation
NENA	National Emergency Number Association
NIC	Network interface card
NS	Name server
NSE	Named signaling events
NTLM	NT Lan Manager
NTP	Network Time Protocol
OC	Office Communicator

OCI	Open Client Interface
ODBC	Open database connectivity
OTP	Over temperature protection
OVP	Over voltage protection
PBX	Private branch eXchange
PEM	Privacy-enhanced mail
PERL	Practical Extraction and Reporting Language
PING	Packet internet groper
PKCS#12	Public Key Cryptography Standard #12
PKI	Public Key Infrastructure
PSAP	Public safety answering point
PSCP	PuTTY secure copy
PSTN	Public switched telephone network
QOP	Quality of protection
QOS	Quality of service
RADIUS	Remote Authentication Dial-in User Service
RTC	Real-time collaboration
RTCP	Real-time Control Protocol
RTP	Real-time Transport Protocol
RTT	Round-trip time
SATA	Serial ATA
SCSI	Small computer system interface
SDK	Software development kit
SDP	Session Description Protocol
SFTP	Secure Shell File Transfer Protocol
SIMPLE	SIP Instant Messaging and Presence Leveraging Extension
SIP	Session Initiation Protocol
SIPS	Session Initiation Protocol over TLS
SLB	Server load balancing
SMB	Server message block
SNMP	Simple Network Management Protocol
SOA	Server of authority

SOAP	Simple Object Access Protocol
SQL	Structured Query Language
SRTP	Secure Real-time Transport Protocol
SRV	Server resource
SSH	Secure Shell
SSL	Secure socket layer
SSRC	Synchronization source
STUN	Simple Traversal of UDP over NATs
TCP	Transmission Control Protocol
TDM	Time division multiplexing
TGRP	Trunk group
TLS	Transport Layer Security
TOS	Type of service
TTL	Time to live
UPS	Uninterruptable power supply
US	User agent
UAC	User agent client
UAS	User agent server
UDP	User Datagram Protocol
UID	Unique identifier
URI	Uniform resource identifier
URL	Uniform resource locator
UTC	Universal coordinated time
VoIP	Voice over IP
VLAN	Virtual local area network
VPC	VoIP positioning center
VRRP	Virtual Router Redundancy Protocol
VSP	Virtual system partition
VXID	Virtual router interface ID
WAR	Web application resource
WAV	Waveform audio
WM	Windows Messenger

WSDL	Web Services Description Language
XML	Extensible Markup Language
XSL	Extensible Stylesheet Language

Product Support

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For existing Acme Packet customers, product information, software updates, and documentation are available from the Acme Packet support web site. If you have difficulty logging on to the web site using your existing account, call Acme Packet at 781-756-6920 for assistance.

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Installing and Running the Net-Net OS-E Virtual Machine

This document provides information on downloading, installing, and running the Acme Packet OS-E Virtual Machine (OS-E-VM) software in virtual OS environments. This Acme Packet software is the same software as used for non-virtual OS but has been packaged specifically as OS-E-VM for use in virtual OS environments, such as VMWare® .

The OS-E virtual machine is designed to be used as a evaluation platform so that potential customers can test the OS-E software in an environment that does not require them to install the software on a dedicated piece of hardware. In some cases, the virtual machine can also be used in production environments provided that the customer understands the limitations associated with using the OS-E-VM software in a virtual OS environment.

Server-Based Requirements

Before downloading the virtual machine to an x86-based server, make sure that you have met the following hardware and software requirements:

Hardware

- x86-based Windows or Linux server with Intel 32- or 64-bit dual-core processors

  Note: x86-based servers with AMD processors do not support transcoding
- 2GB minimum (4 GB recommended) physical memory for each VM instance
- Minimum of 40GB hard disk space per VM instance
- One or two Ethernet interfaces; additional interfaces supported, but require editing of the VM configuration file, *net-netos-e.vmx*

Software

- VMware Player®, VMware Workstation®, VMware Server®, VMware ESX®, VMware ESXi®, Hyper-V®, and Citrix XenServer®

Linux Installations

If you are installing the OS-E Virtual Machine on a Linux workstation running VMware, Acme Packet recommends the following technical resources:

For Server 1.0

http://www.vmware.com/support/pubs/server_pubs.html

Player 1.0 and 2.0

http://www.vmware.com/support/pubs/player_pubs.html

Installing the VM

Installing the VMPlayer Image

The OS-E no longer supports a VMPlayer-specific image. Instead, VMPlayer v3.1 allows installation via an ISO disk image, similar to the ESXi installer.

To install the VMPLayer 3.6.0m3 on your PC:

1. Download the OS-E ISO file to your PC. Acme Packet sends you an email from download@acmepacket.com. This email provides an Internet link to the download(s) you requested. The image below displays an example of this email.

   You have received this email in response to a request you submitted to Acme Packet. When you click on the link provided below you will be taken to a download page where you can access the information/trial you requested.

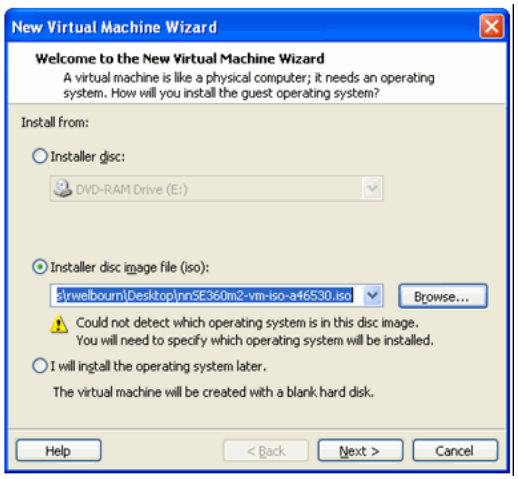
   The download page may contain one or more of the following:

   - ***Boot Media Creator*** - An executable file that will create a bootable USB commissioning stick for the installation of the Acme Packet Net-Net OS-E.
   - ***USB Documentation*** - Documentation describing the steps needed to create a USB stick for installing the Acme Packet Net-Net OS-E software and applying a license.
   - ***Licenses*** - Feature license files or license keys for the Net-Net OS-E software.

   `Sample download of nnSE3.6.0m3`

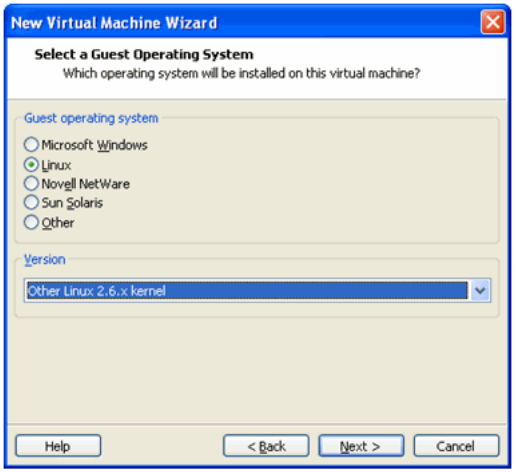
   Download Page Alternative Link(Direct IP)
   The Download Page will expire 24 hours after you select this link.
   You are granted 3 Download Page opportunities, with each opportunity expiring after 24 hours.

2. Click **Download Page**.
3. Run the VMware Player and select **Create a New Virtual Machine**.
4. Browse in the Installer disc image file selection to the ISO image you have previously downloaded. Click **Next**.

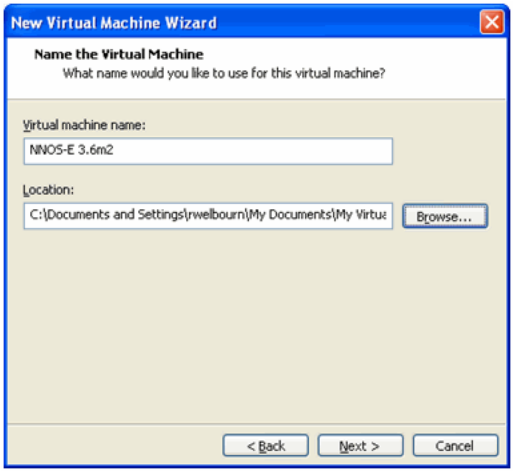


5. Specify **Linux** for the Guest operating system.

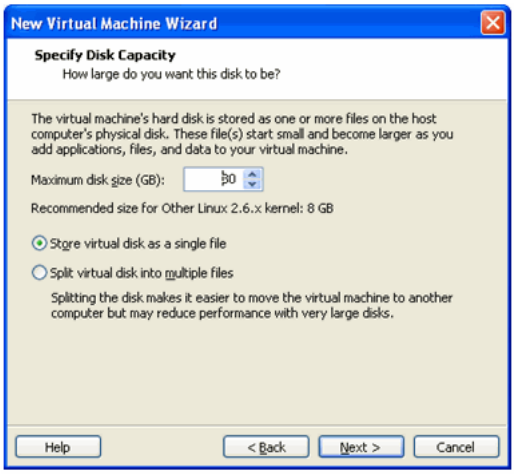
6. Specify **Other Linux 2.6.x kernel** in the Version drop-down box. Click **Next**.



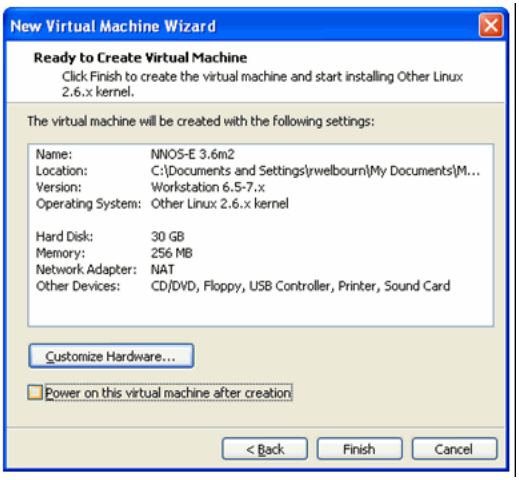
7. Enter the name you want to use for the virtual machine. Click **Next**.



8. Specify Maximum disk size in GB. You must specify a minimum of 30 GB, however Acme Packet suggests you run with a minimum of 80 GB. Click **Next**.



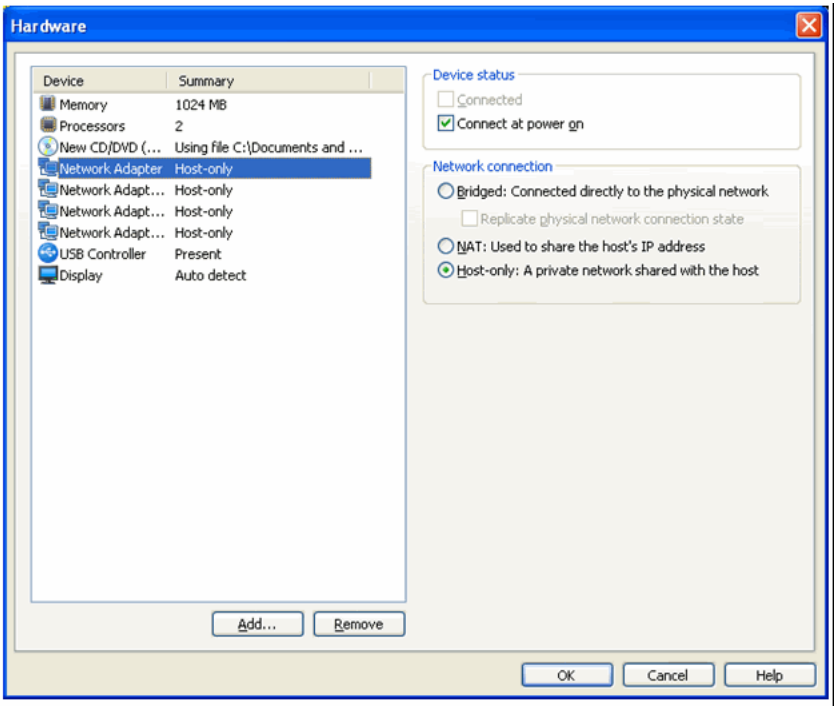
9. Click Customize Hardware...



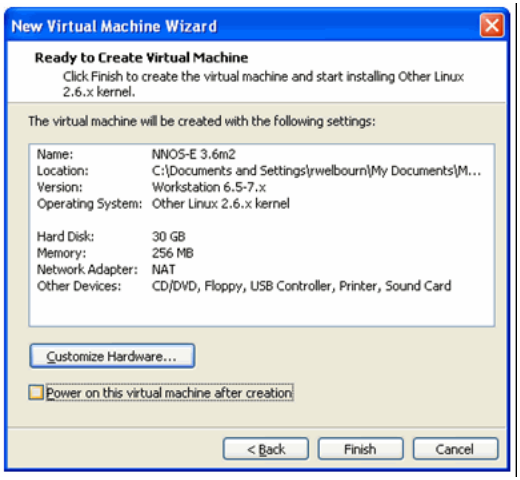
10. Set the Memory to one of the following values:
    - 1024 MB
    - 2048 MB
    - 4096 MB
11. Change the number of Processors to a value greater than one if you have a multi-core system.

12. Remove support for the following devices by selecting them in the left-column and clicking **Remove**:
    - Floppy
    - Sound Card
    - Printer
13. Change the existing Network Adapter to the to the Network Connection type you want to use. Ensure that **Connect at power on** is checked.

    Create as many additional network interfaces as you need by clicking **Add...** and selecting **Network Adapter**. Click **Next**. Set the Network Connection type you want to use and ensure that Connect at power is on is checked. Click **Finish**.
14. Click **OK** when you are finished.



15. Uncheck the **Power on this virtual machine after creation** box. Click Finish.



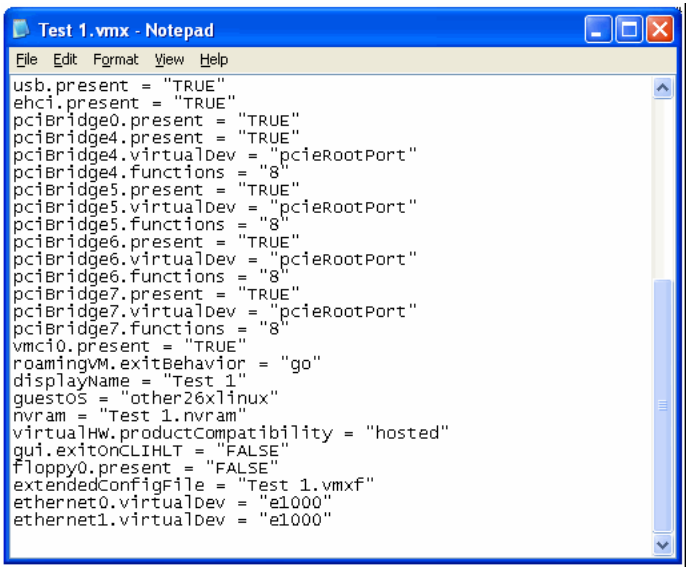
To ensure full support for the OS-E networking options, Acme Packet recommends setting the VM network adapters to e1000 as follows:

1. Find the directory where the VM was created. On a Windows system this defaults to **My Documents/My Virtual Machines/<name-given-to-VM>**. Open the file **<name-given-to-VM>.vmx** with a text editor.
2. Add a line for each Ethernet network adaptor at the end of the file as follows.

   ```
   ethernet<n>.virtualDev = "e1000"
   ```

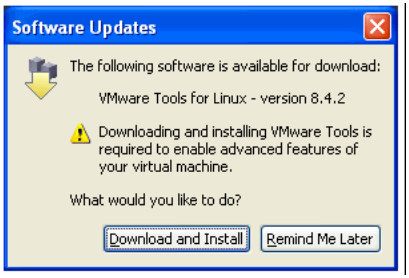
   Where <n> is 0, 1, 2, etc.

3. Save the file and exit the editor.



To complete the installation of the VMPlayer v3.1 onto your PC:

1. On the VMPlayer, select **Play virtual machine**. The VM starts and installation commences.
2. Choose **Remind Me Later** when prompted for Software Updates.



The installer will pause to confirm the installation.

3. Press **y** and **<enter>**. Installation will continue.

Installing Software on the XEN Server

The OS-E supports paravirtualization (PV) for Xen support. This section explains how to install an OS-E disk image on a generic 3.4.2 Xen server running on a Centos 5.4 system.

NOTE: These instructions should be considered a guide and may need to be modified appropriately for a particular environment.

1. Place the disk image on the Centos server with an applicable method such as SCP or FTP.
2. Uncompress the image:

   ```
   gunzip nnSE360m3-xen.img.gz
   ```

3. Ensure there are at least two virtual bridges for connecting to the OS-E. A standard Xen installation should create a bridge based on the primary interface. The example used here is eth0. In the following example, two additional virtual bridges are created and physical interfaces eth1 and eth2 are attached to them:

   ```
   brctl addbr virbr0
   brctl addif virbr0 eth1
   brctl addbr virbr1
   brctl addif virbr1 eth2
   ```

4. Create a Xen configuration file in /etc/xen. Further steps assume the name **NNOSE**. There are two examples below: one for Release 3.6.0m4 and earlier, and one for 3.6.0m5 and later. In each example, the memory is set to 1GB with 4 CPUs. Change the mac addresses to be unique in your network, and ensure that the file in the **disk** line properly references your disk image.

For Release 3.6.0m4 and earlier:

```
name="NNOSE"
memory=1024
vcpus=4
on_poweroff="destroy"
on_reboot="restart"
on_crash="restart"
disk=['file:/vms/360m3.img,xvda,w']
vif=["mac=00:16:4e:00:00:00,bridge=eth0","mac=00:16:4e:00:00:01,
bridge=virbr0",
"mac=00:16:4e:00:00:02,bridge=virbr1"]
kernel="/usr/lib/xen/boot/pv-grub-x86_32.gz"
extra="(hd0,1)/grub/menu.lst"
```

For Release 3.6.0m5 and forward:

```
name=”NNOSE”
memory=1024
vcpus=4
on_poweroff=”destroy”
on_reboot=”restart”
on_crash=”restart”
disk=['file:/vms/360m5.img,sda,w']
vif=[“mac=00:16:4e:00:00:00,bridge=eth0”,”mac=00:16:4e:00:00:01,
bridge=virbr0”,
“mac=00:16:4e:00:00:02,bridge=virbr1”]
kernel=”/usr/lib/xen/boot/pv-grub-x86_32.gz”
extra=”(hd0,1)/grub/menu.lst”
```

5. Launch the VM with the serial console to complete installation. The following is a small sample of the expected output from this step:

```
xm create -c NNOSE
[root@xen-centos vms]# xm create -c NNOSE
Using config file "/etc/xen/NNOSE".
Started domain NNOSE (id=1)

                             Xen Minimal OS!
  start_info: 0xa67000(VA)
    nr_pages: 0x40000
  shared_inf: 0xcfe50000(MA)
     pt_base: 0xa6a000(VA)
nr_pt_frames: 0x9
    mfn_list: 0x967000(VA)
   mod_start: 0x0(VA)
     mod_len: 0
       flags: 0x0
    cmd_line: (hd0,1)/grub/menu.lst
  stack:      0x946780-0x966780
MM: Init
      _text: 0x0(VA)
     _etext: 0x61af5(VA)
   _erodata: 0x76000(VA)
     _edata: 0x7b6d4(VA)
stack start: 0x946780(VA)
       _end: 0x966d34(VA)
  start_pfn: a76
    max_pfn: 3fffd
Mapping memory range 0xc00000 - 0x3fffd000
setting 0x0-0x76000 readonly
skipped 0x1000
```

```
   MM: Initialise page allocator for c70000(c70000)-0(3fffd000)
   MM: done
   Demand map pfns at 3fffe000-bfffe000.
   Heap resides at bffff000-fffff000.
   Initialising timer interface
   Initialising console ... done.
   gnttab_table mapped at 0x3fffe000.
   Initialising scheduler
   Thread "Idle": pointer: 0xbffff008, stack: 0xc90000
   Initialising xenbus
   Thread "xenstore": pointer: 0xbffff478, stack: 0xca0000
   Dummy main: start_info=0x966880
   Thread "main": pointer: 0xbffff8e8, stack: 0xcb0000
   "main" "(hd0,1)/grub/menu.lst"
   vbd 51712 is hd0
   ******************* BLKFRONT for device/vbd/51712 **********


   backend at /local/domain/0/backend/vbd/1/51712
   Failed to read /local/domain/0/backend/vbd/1/51712/feature-barrier.
   Failed to read /local/domain/0/backend/vbd/1/51712/
feature-flush-cache.
   83886080 sectors of 0 bytes
   *************************
   Press `ESC' to enter the menu... 0
     Booting 'Covergence Session Manager on 1st partition'

   root (hd0,2)
    Filesystem type is reiserfs, partition type 0x83
   kernel /boot/vmlinuz-covergence root=/dev/xvda3 rootdelay=10
ramdisk_size=4096
   crashkernel=64M@16M clocksource=acpi_pm

   ...

   Net-Net OS-E
   Copyright (c) 2004-2010  Acme Packet Inc.

   username:
   Net-Net OS-E
   Copyright (c) 2004-2010  Acme Packet Inc.

   username:
```

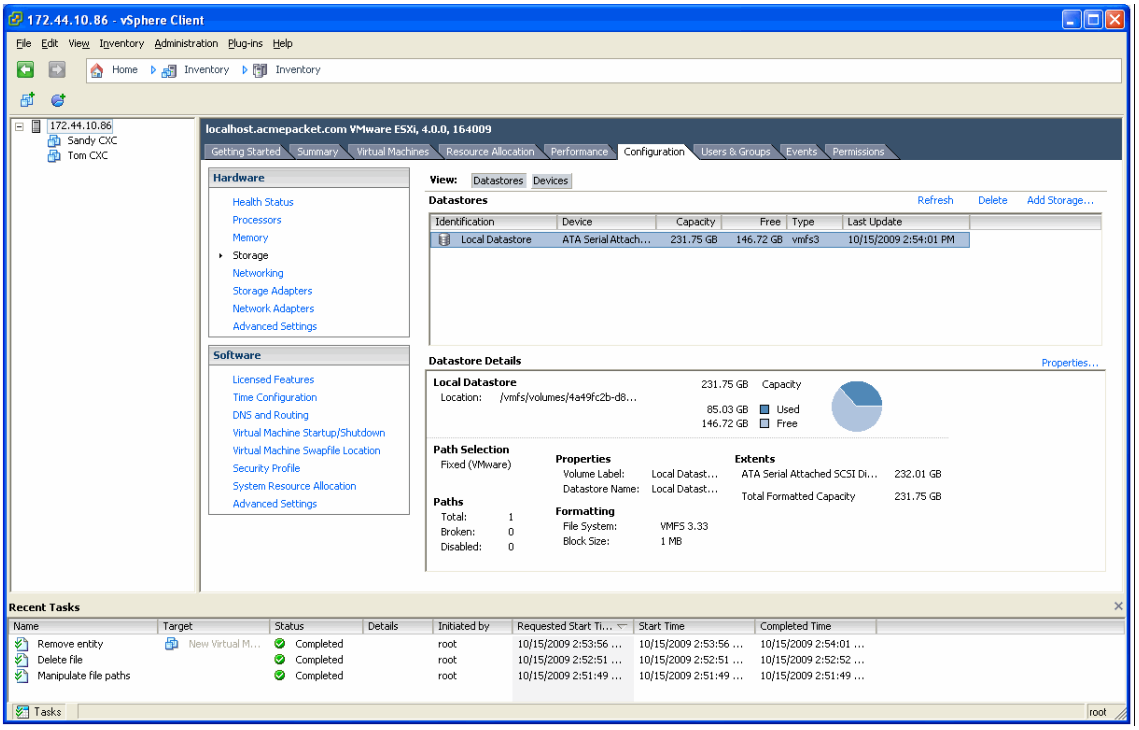
Installing Software on the ESX Server

The OS-E can be installed as an ESX virtual machine.

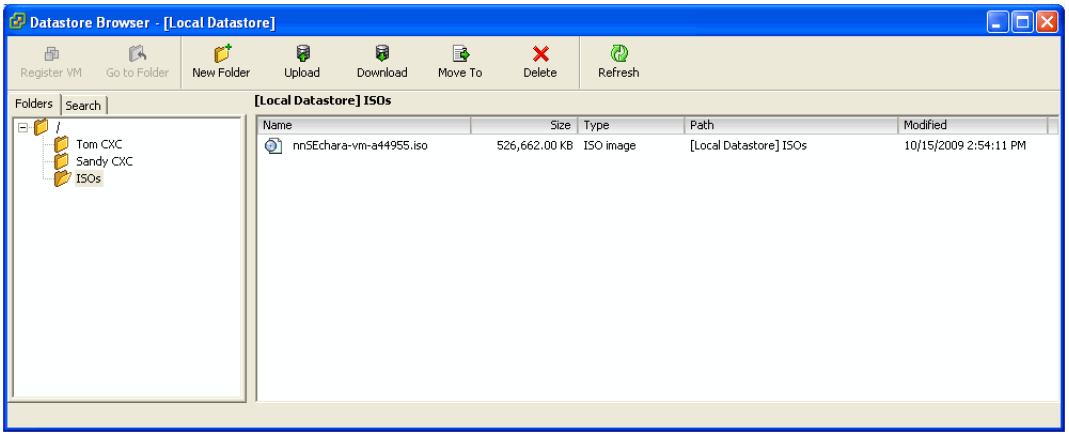
Note: The same image that is used to install the OS-E on a third-party server is used as an ISO for ESX support and you must transfer the license to the ESX host in the same manner used with third-party servers.

This section explains how to install an OS-E ISO image on an ESX server using a Virtual Machine ISO image on your computer desktop. Steps 1-6 only must be done once to discover the ISO.

1. Select the ESX server, then select the **Configuration** tab.
2. Under the Hardware panel select **Storage**.

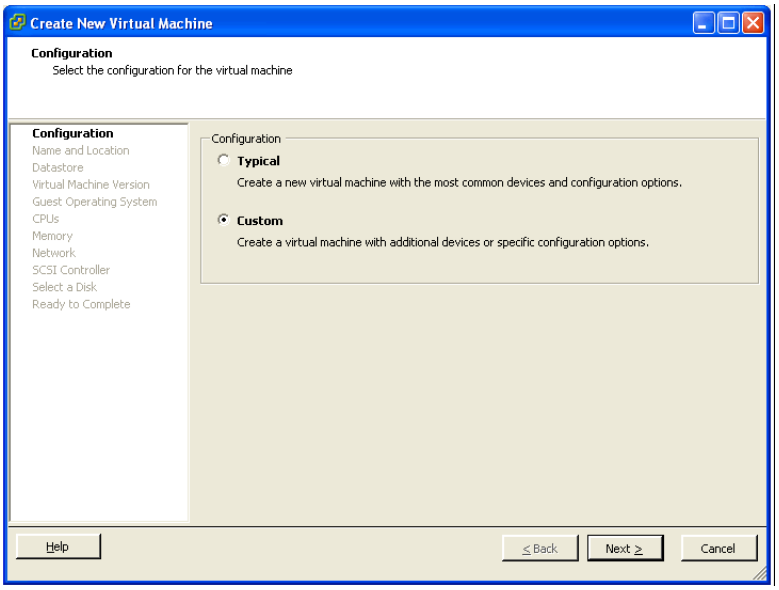


3. Under Datastores right-click the datastore to which you want to update the ISO and select Browse Datastore...



4. In the left panel, select the directory where you want the ISO updated to. If no directory exists, create one.
5. Select the **Upload Files** to this Datastore icon and click **Upload File...**
6. Browse to the OS-E Virtual Machine file and click **Open** to begin the upload.
7. Right-click on the ESX server and select **New Virtual Machine...**

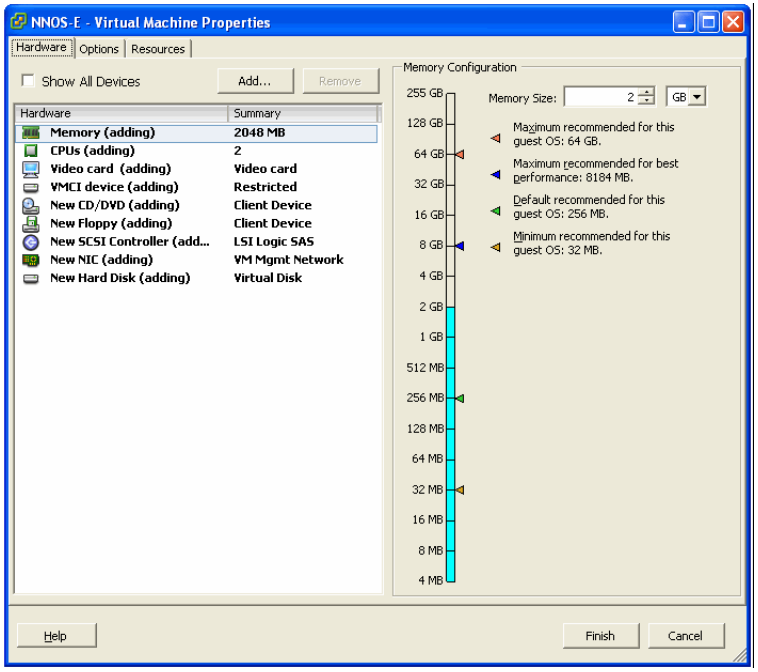
8. Select the **Custom** radio-box and click **Next >**.



9. Enter a name for the virtual machine. Click **Next >**.
10. Select the datastore where the VM is going to reside. Click **Next >**.
11. Select **Virtual Machine Version: 7** under Virtual Machine Version. Click **Next >**.
12. Under Guest Operating System: select **Other**. In the Version Drop-down box select **Other (32-bit)**. Click **Next**.
13. Set the Number of virtual processors. Acme Packet recommends running with a minimum of 2. Click **Next >**.
14. Set the Memory Size to one of the following amounts:
    - 1 GB
    - 2 GB
    - 4 GB (recommended)
    - greater than 4 GB
15. Click **Next >**.
16. Under Create Network Connections indicate how many NICs you want to connect to the VM. Ensure the Adapter field for each configured NIC is set to **E1000**. Select the pre-configured networks each NIC will connect to. Click **Next >**.

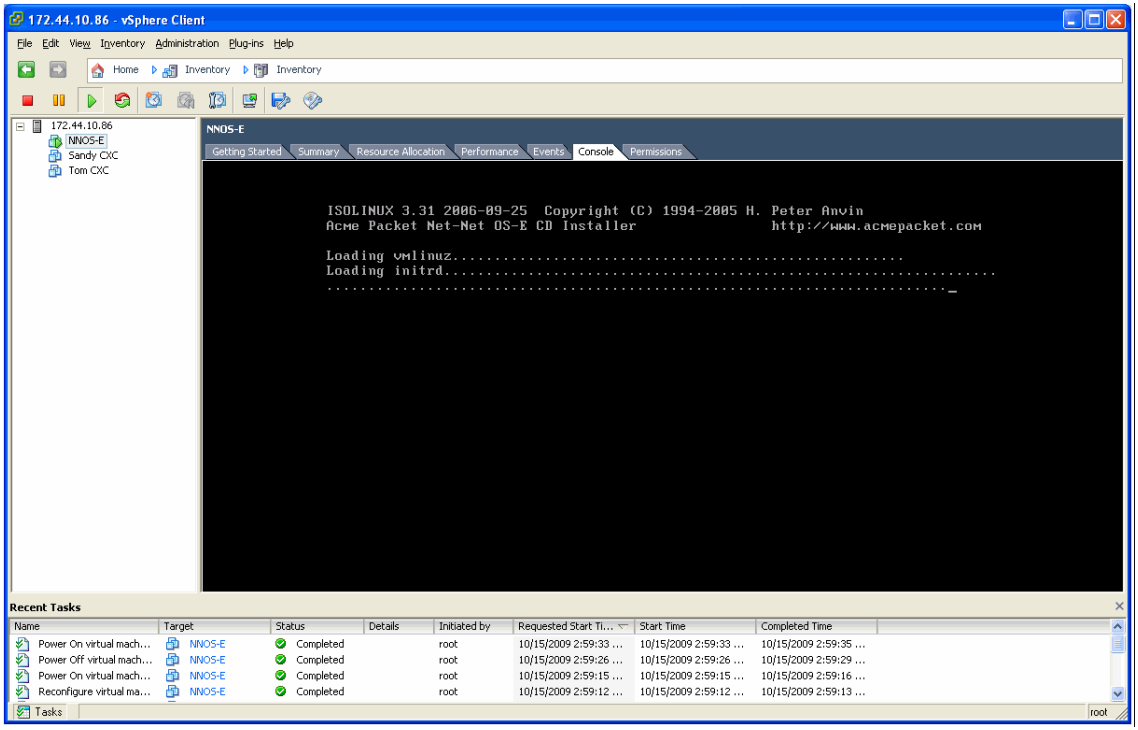
17. Under SCSI controller select **LSI Logic SAS**. Click **Next >**.
18. Under Disk select **Create a new virtual disk**. Click **Next >**.
19. Under Capacity set the Disk Size: You must use a minimum of 40 GB. Acme Packet suggests you run with a minimum of 80 GB. Under Disk Provisioning ensure that no checkboxes are selected. Click **Next >**.
20. Click **Next >**.
21. Select the **Edit the virtual machine settings before compilation** checkbox. Click **Continue**.

    The Virtual Machine Properties dialog is displayed.



22. Under the Hardware tab select **New CD/DVD (adding)** in the left panel.
23. In the right panel select **Datastore ISO File** and use the **Browse...** button to find the appropriate OS-E installation ISO file. Click **Finish**.
24. Select **Connect at power on**.

25. Select the new VM and press the **power-on** button. The VM should boot and automatically install the OS-E software from the ISO image. You can watch the progress from the Console tab.

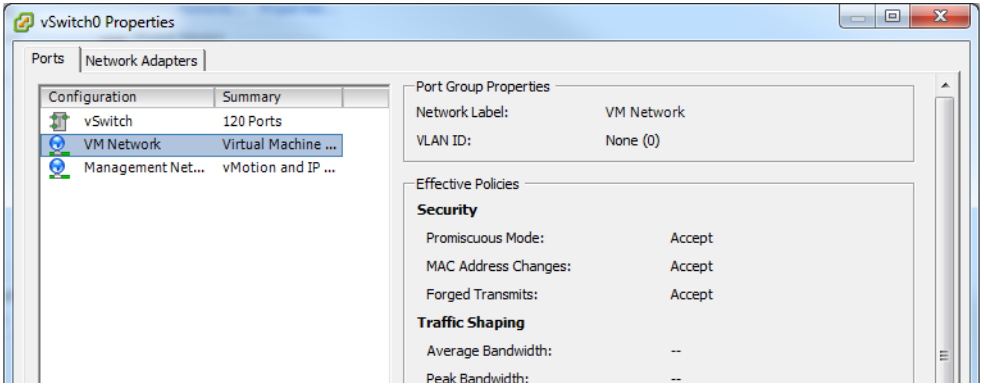


Note also that HA support requires that you set the ESXI NIC to accept packets in promiscuous mode.

26. From the Vshpere client window, highlight your Host machine.
27. Click the Configuration tab.
28. Highlight Networking in the Hardware list.
29. For each Virtual Switch:
    a. Click Properties.
    b. Click Edit.
    c. Open the Security Tab.
    d. Select Accept for Promiscuous Mode.

e. Click OK

30. Close the Properties dialog.



Installing Software on a Hyper-V Virtual Machine

The Net-Net OS-E can be installed as a Hyper-V VM.

Note: The same image that is used to install the OS-E on a third-party server is used as an ISO for Hyper-V support and you must transfer the license to the Hyper-V host in the same manner used with third-party servers.

This section explains how to install an OS-E ISO image on a Hyper-V server using a Virtual Machine ISO image.

This procedure assumes you have Hyper-V operational with adequate resources to run the OS-E VM and Hyper-V Manager v6.1.

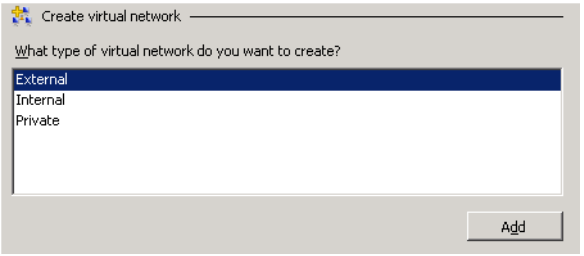
1. Open the Hyper-V Start menu and run the **Hyper-V Manager** application. The Hyper-V Manager application starts.

The commands you need to perform this procedure are either on the right-side panel of the Hyper-V manager window or in the application's **Action** menu.

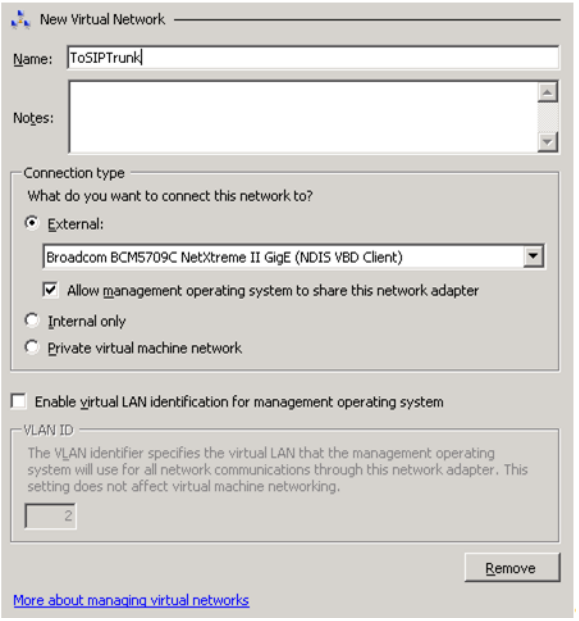
2. Click **Virtual Network Manager** from the **Action** menu.

3. Select **New Virtual Network**. The dialog changes the display of its right-side panel.

4. Select **External** and click the **Add** button.



5. The application adds your new external network and changes the right-side panel to provide controls for configuring the new network.
6. Name the new virtual network and select an external adapter
7. Click the **Apply** button at the bottom of the dialog.



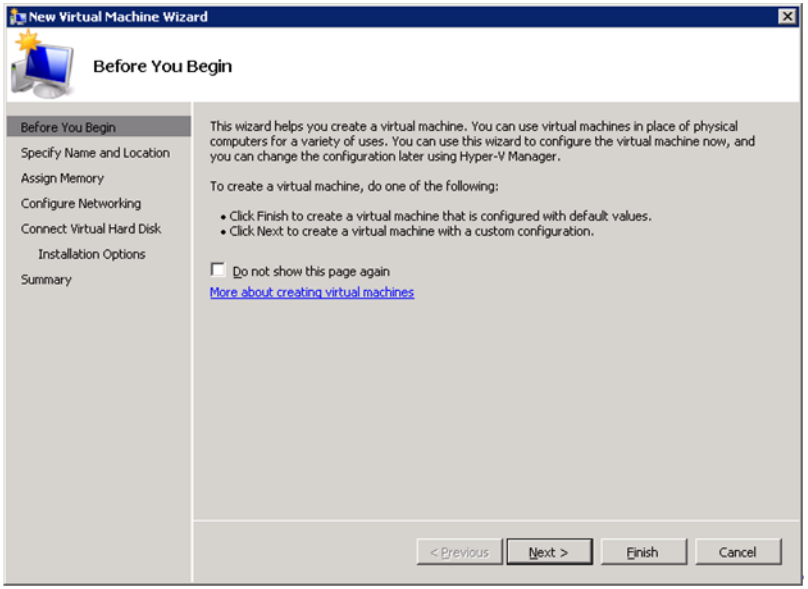
The application creates the virtual network and connects it to the adapter you selected.

8. Repeat steps 4 through 6 three times to create three separate virtual networks. Recommendations for physical interface selection as you create these virtual networks are shown in the table below.

Interface Purpose	Interface Connection
Management	External interface eth1
ToSIPTrunk	External interface eth2
ToPBX	External interface eth3

After creating the virtual networks, the application returns to the main dialog.

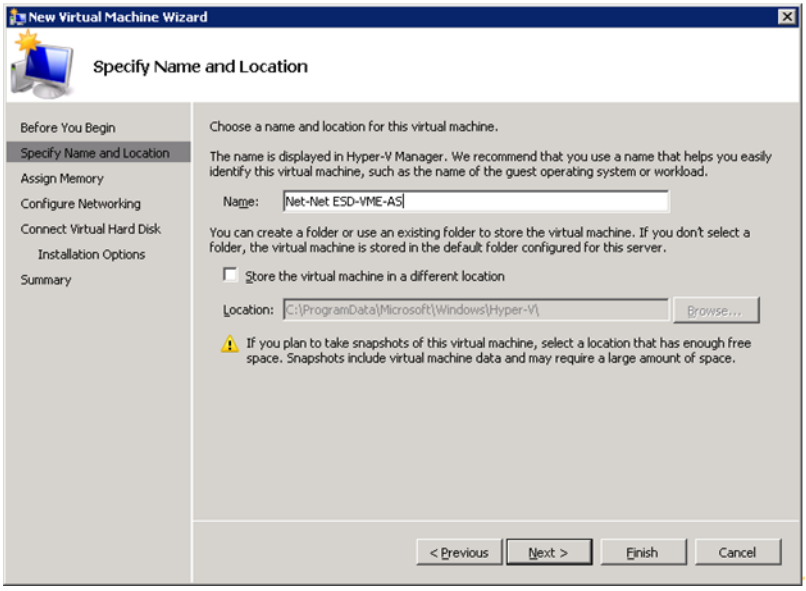
9. Return to the **Actions** menu and select **New Virtual Machine**.



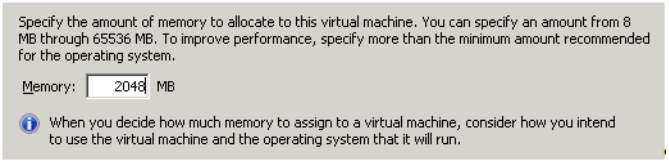
The application displays the first dialog of the New Virtual Machine Wizard.

10. Click **Next** to start the wizard.

11. Name the virtual machine.

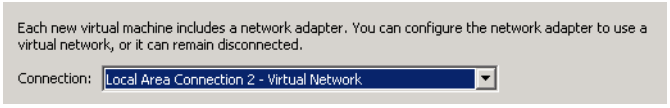


12. Click **Next**. The wizard displays the **Assign Memory** dialog, which allows you to specify the amount of memory used by this machine. Specify 2048MB in the Memory field.
    Note that this is the minimum recommended memory. The maximum is 64G.



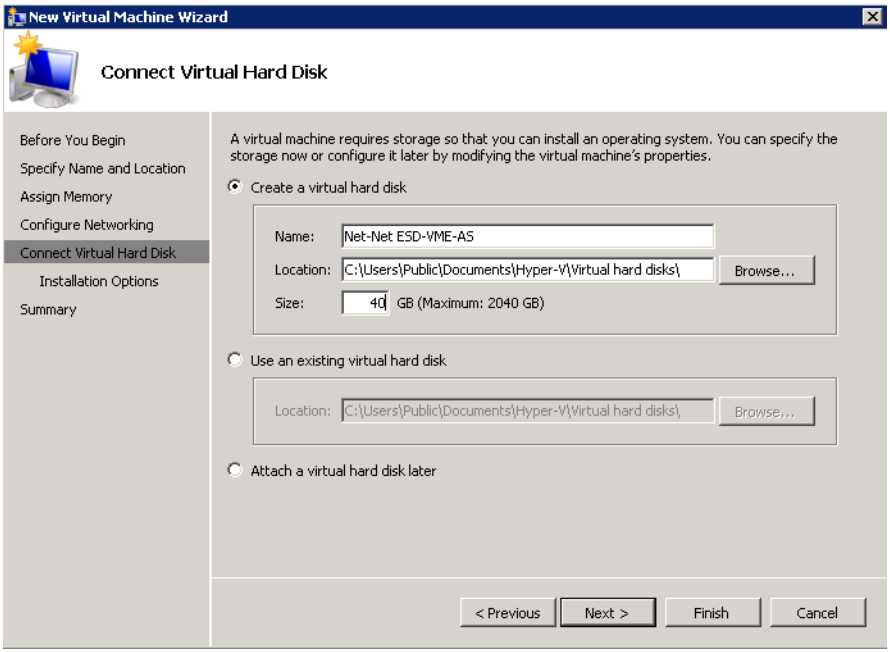
13. Click **Next**. The wizard displays the **Configure Networking** dialog.

14. Select a network adapter for this machine from the drop down list.



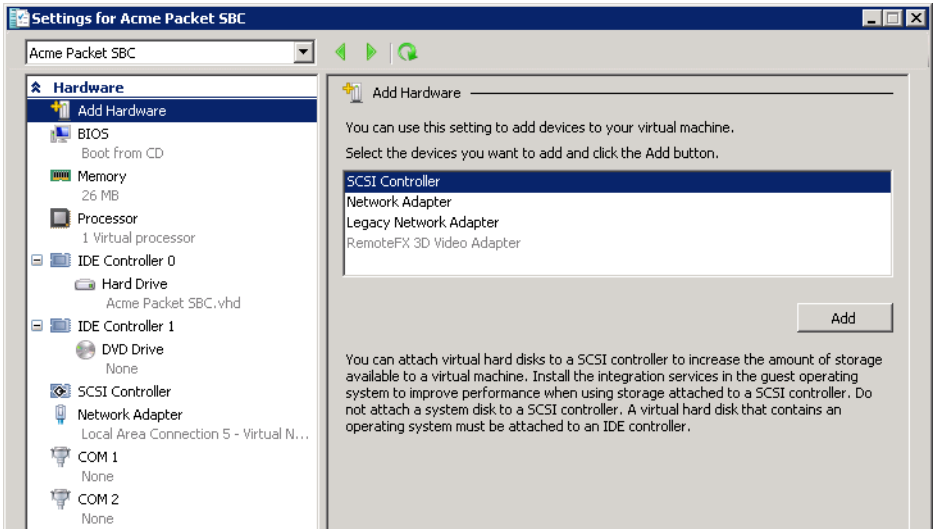
Note: Note that the wizard only allows you to select a single network adapter at this point in the procedure. You configure the Virtual Machine to use additional network adapters later in this procedure.

15. Click **Next**. The wizard displays the **Connect Virtual Hard Disk** dialog.

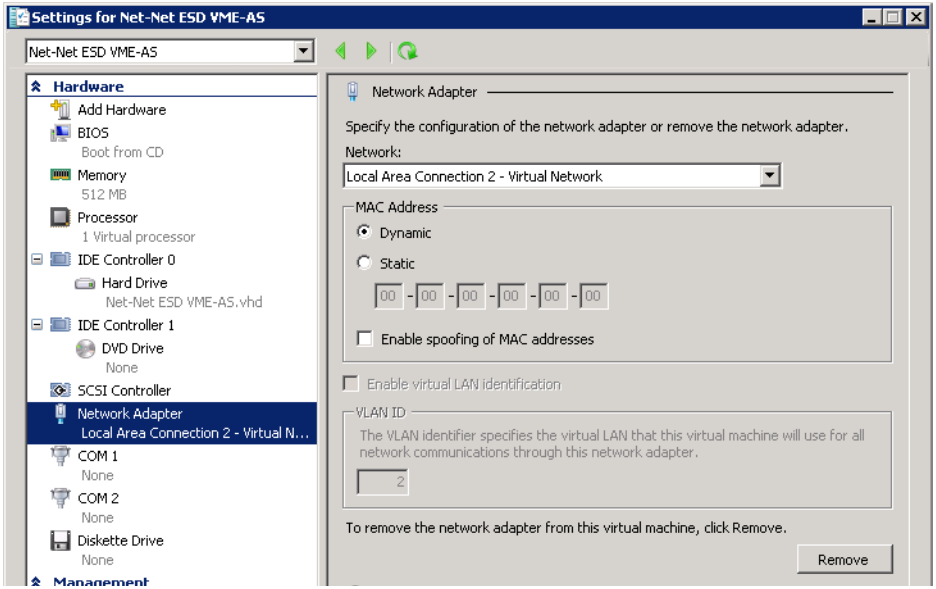


16. Click **Create a virtual hard disk**.
17. Enter a name for this disk.
18. Set the size to 40G. This is the minimum recommended disk size. The maximum is 2 terabytes, which is a Hyper-V maximum.
19. Retain the default location.
20. Click the **Finish** button to complete the new virtual machine. The application returns you to the main Hyper-V Manager dialog.

21. Right-click the newly created machine and click the **Settings** command. The application displays your Virtual Machine's settings dialog.

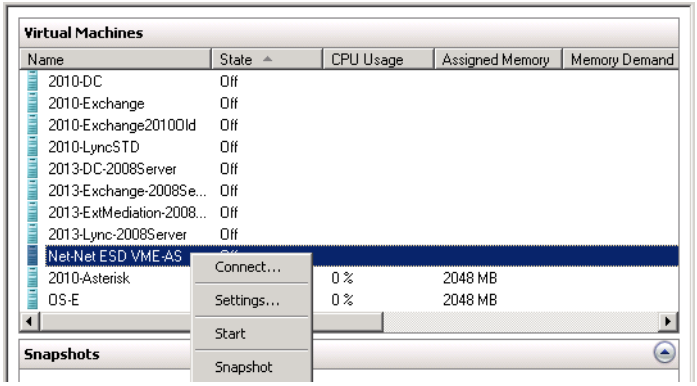


22. Select **Network Adapters** and click **Add**.

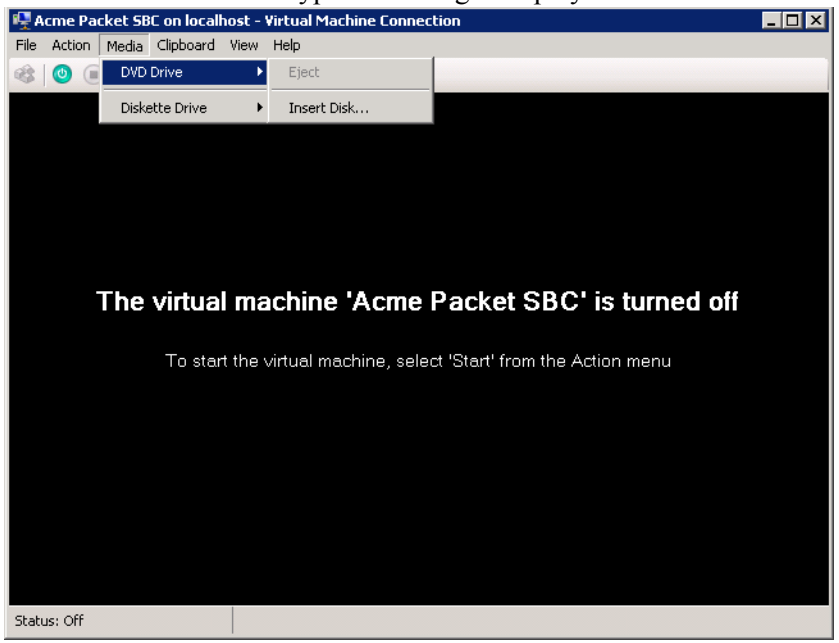


The application displays the Network Adapter settings in the right-side panel of the dialog.

23. Select the next network adapter you created and click **Apply**.
24. Repeat step 22 and 23 for each of the new adapters, then click **OK**. The application returns to the Hyper-V Manager's main dialog.
25. Select and right-click the Virtual Machine within the machine list. The Hyper-V Manager displays the machine-specific menu.



26. Select **Connect**. The Hyper-V Manager displays the Virtual Machine's console.



27. From the Media menu, follow DVD Drive > Insert Disk to point the Virtual Machine to your .ISO. The Hyper-V Manager displays a Windows **File Open** dialog.
28. Browse to your .ISO, select the file and click **Open**. The Hyper-V Manager connects to your .ISO.
29. From the **Action** menu, run the **Start** command.

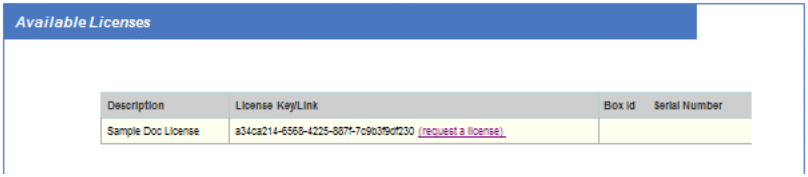
The first time the VM starts, it installs the software using the .ISO. Subsequently, the VM starts the Net-Net OS-E application.

Downloading a License

Perform the following steps:

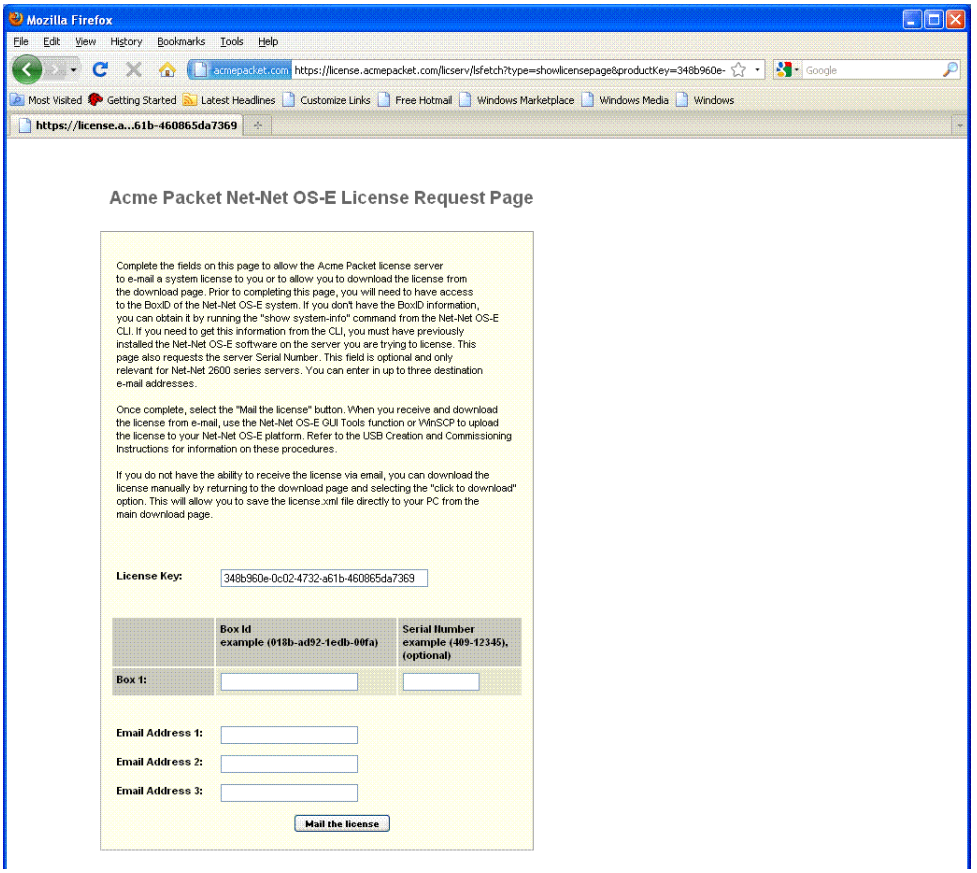
1. Click **Download Page** to display the Download Description, Available Downloads, and Available Licenses page, illustrated in the following image. Use the **Alternate Link (Direct IP)** selection if your network is preventing access to this page.

2. After reviewing the information on this page, click on the **click to download** link from the Available Downloads section of the page. You will have the option to either run or save the download to a specified download location.
3. Proceed to save the file(s) to a location on your PC. A series of standard Window dialog boxes will display the download progress, as this may take a few minutes.
4. The **request a license** function appears in the Available Licenses portion of the screen. Select **request a license** to have Acme Packet send you to the OS-E features license over e-mail rather than over an Internet connection.



From the License Request page, enter the Box Identifier in the supplied field. If unknown, you will need to install the OS-E software (minus the features license), and then use the OS-E **show system-info** command to get the Box Identifier.

Enter up to four box identifiers and three destination e-mail addresses and select **Mail the license**. When you have received the license (named *<productKey>.xml*), use OS-E Management System **Upload License** function or WinSCP to install the license on your OS-E system.



Running the License Fetch Program

You need to get a features license using the **license fetch** command (requiring a connection to the Internet), or Acme Packet will send you the features license via e-mail upon receipt of the box identifier. Use the **show system-info** command to get the box-identifier from the hardware that you are running.

License Fetch Procedures

Before you execute the **license fetch** command, ensure that

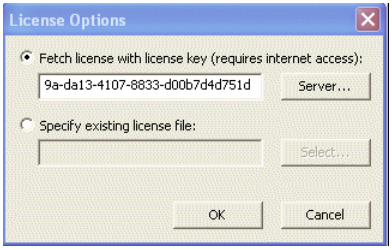
1. You have a connection to the public Internet, and
2. Port 616 is available and not blocked by any firewalls. This allows OS-E connectivity to the license server.

Note: If you do not run the **license fetch** command to successfully unlock your customer-specific features, you will not be able to configure the system with any of the licensed options provided by Acme Packet.

Fetching the Signed License From the BMC

From the BMC Select Options page , check off the **Include License file** box and click **Select**. Then, from the License Options page, select the **Fetch license with license key** option.

Copy and paste the license key provided by Acme Packet into the license key field. The BMC will contact the licensing server, authenticate your unique key, and then install a license on your USB stick. Make sure that the system reports “Success!”



Fetching the Signed License From the CLI

From the OS-E prompt, run the following command:

```
NNOS-E> license fetch <license-key-text> https://216.41.24.54:443
Success!
```

Where **<license-key-text>** is the private key provided to you by Acme Packet. This command will first contact the licensing server to authenticate your unique key before installing a license on your system. Make sure that the system reports "Success!"

Note: If you are unable to fetch an encrypted license using the Acme Packet key and cannot access the licensing server, or if you receive a message other than "Success!", contact Acme Packet Technical Support immediately for assistance.

Fetching the Signed License From the OS-E Management System

If you are using the OS-E Management System, go to the **Actions** tab and select **license->fetch** and paste the key into the key field. Click **Invoke** to install the signed license.

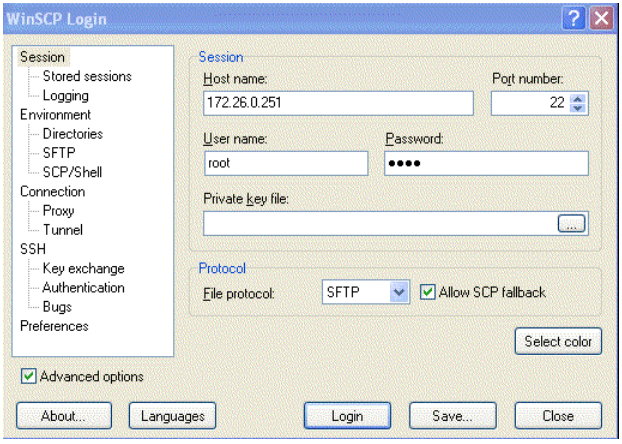
You can also manage licenses using the **Tools** tab by selecting the **Retrieve License** and the **Upload License** functions. **Retrieve License** operates the same as the **license fetch** command by contacting the Acme Packet license server over the Internet.

If for some reason you are unable to access the license server, and if Acme Packet then e-mails the license file to you, place the license on your local PC, then use the **Tools\ Upload License file function** to browse for the file. Select **Apply License**, then click **Upload**.

Using WinSCP to Transfer the License

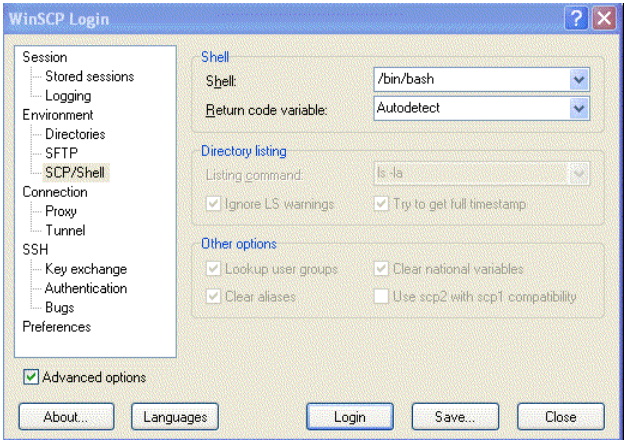
If you do not have access to the OS-E Management System, Acme Packet recommends that you use WinSCP to transfer the license file to the OS-E device. WinSCP is an open source free SFTP client and FTP client for Windows and is available as a free download from the following URL:

http://winscp.net/eng/index.php



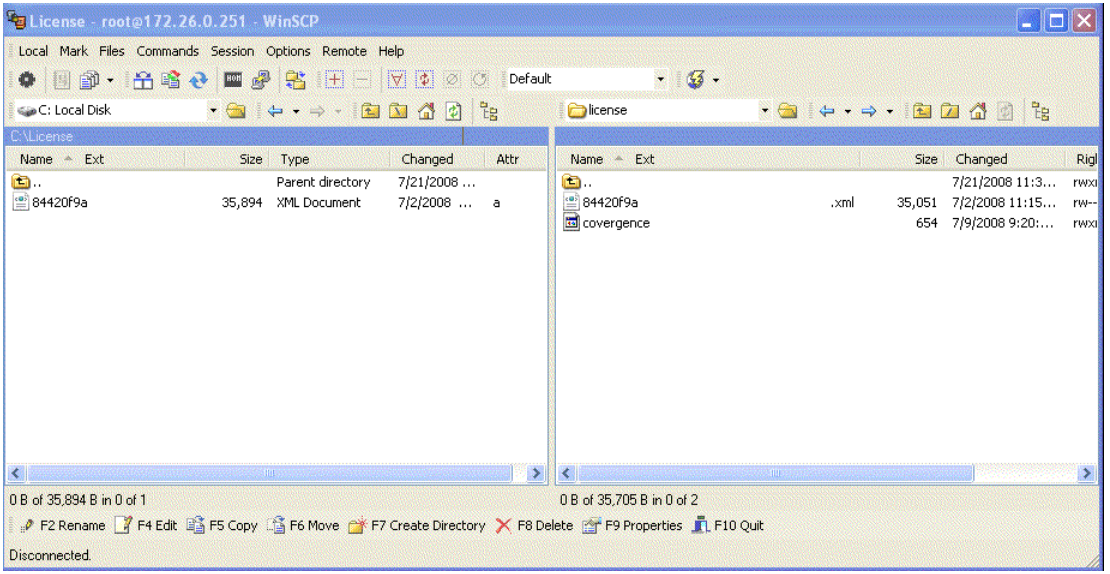
Perform the following steps:

1. At the **Hostname** field, enter the IP address that you assigned to the management interface at the OS-E system. Port **22** is the default port number for SSH sessions.
2. At the **Username** and **Password** fields, type *root* for the username and *sips* for the password.
3. At the Environment menu, select **SCP/Shell** and select **/bin/bash** from the pull-down menu. Leave all other fields at their default settings.



4. Click **Login**. A series of progress message will appear as the connection is established.

5. From the left pane, browse and locate the license file, then drag the license to the *cxc/license* directory. In this example, the file is copied from the **c:\license** directory to the **cxc/license** directory OS-E.



6. Once the license file is present in the *cxc/license* folder, you will need to do one of the follow tasks for the OS-E license to take effect:

- Perform a physical restart of the OS-E system, or
- From a CLI session to the device, execute the **license apply** action, as follows:

```
NNOS-E> license apply /cxc/license/
84420g9a-da13-3007-8853-z00a7a4d771d.xml
Success!

NNOS-E> show licenses

name: LICENSE for Company.com
description: LICENSE for Company.com
        key: 84420g9a-da13-3007-8853-z00a7a4d771d
    expires:
       file: 84420g9a-da13-3007-8853-z00a7a4d771d.xml
```

Configuring the VM

Once the VM is installed and running, you now must configure it to match the SIP application you are supporting. Since the VM does not have a pre-installed base configuration, Acme Packet provides the **config setup** configuration setup script that you can use to create a base configuration.

Using Config Setup

For Acme Packet users who are familiar with OS-E, the *config setup* script enables the configuration on the VM to make it reachable via ICMP (ping), SSH, and HTTPS for further configuration. The script presents a set of questions to help you with the initial system configuration. The information in the script includes the following:

- Local hostname
- IP interface names and addresses
- SSH and Web access
- Default route and any additional static routes per interface for remote management
- User-defined OS-E

Every Acme Packet OS-E system has a minimum of two Ethernet interfaces. Any Ethernet interface on the system can be used for management traffic, however, Acme Packet recommends the use of eth1, as eth0 is reserved for fault-tolerant clustering with other OS-E systems. Management traffic is also supported on any interface that is carrying private or public network traffic. This means that it would be possible to use eth1 to carry SIP traffic and management traffic.

CLI Session

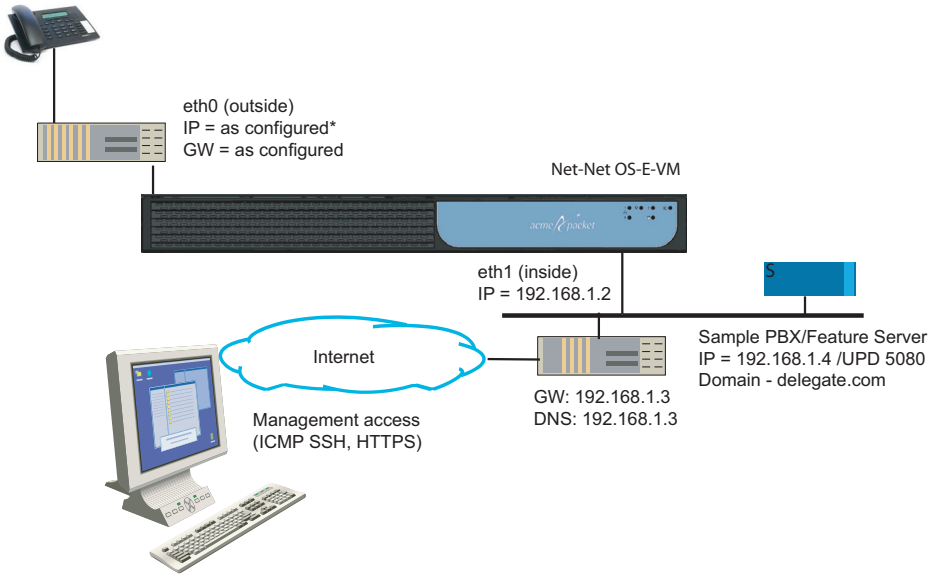
```
NNOS-E-VM> config setup
set box\hostname: <name>
config box\interface: eth1
set box\interface eth1\ip a\ip-address: <ipAddress/mask>
config box\interface eth1\ip a\ssh (y or n)? n
config box\interface eth1\ip a\web (y or n)? y
config box\interface eth1\ip a\routing\route: <routeName>
set box\interface eth1\ip a\routing\route localGateway\gateway:
<ipAddress>
set box\cli\prompt: <newPrompt>
Do you want to commit this setup script (y or n) y

Do you want to update the startup configuration (y or n)? y
```

Sample VM Configuration

The following image illustrates a sample VM network and a base configuration designed to support a standard SBC application where the VM functions with SIP endpoints and a PBX or feature server. The high-level details of this configuration are provided below and additional details are embedded in the configuration file itself at the end of this section.

- Two interfaces: one "outside" and one "inside."
- Management ports for ICMP, SSH, and HTTPS open on both interfaces.
- The IP address associated with a DNS resolver.
- SIP UDP, TCP, and TLS ports open on both interfaces.
- NAT traversal & media anchoring enabled.
- A sample gateway configuration for an attached PBX or feature server.
- A sample registration- and dial-plan for delegation of SIP traffic to the attached PBX or feature server.

- A local registration plan to support registrations and calls locally through the VM (for cases where there is no attached PBX or feature server).



Note: Acme Packet recognizes that the items in the base configuration will not be 100% applicable to all OS-E-VM deployments. However, by including these items in this sample configuration, new VM users can observe the configuration structure and hierarchy. Any necessary changes to this base configuration can be made using the procedures described in the Acme Packet manual set. See, "Using Acme Packet Documentation," for more information.

Below is a copy of the base configuration. Note that any changes to the configuration should be made using the OS-E Management System (see, "Enabling the OS-E Management System").

Note: Acme Packet does not recommend editing the configuration file below directly, and then importing it into the VM. While the VM does support this function, it is possible to introduce syntax errors into the configuration file using this method. Modifying the configuration with the CLI or Net-Net Management System prevents this possibility.

```
#  Copyright (c) 2004-2009 Acme Packet Inc.
#  All Rights Reserved.
#
#  File: /cxc/cxc.cfg
#  Date: 15:00:28 Mon 2009-05-05
```

This section is unique to every VM; you do not need to edit this.

```
config cluster
 set name acmepacket-nnos-e-vm-demo
 config box 1
  set hostname acmepacket-nnos-e-vm-demo
  set name acmepacket-nnos-e-vm-demo
  set identifier 00:0c:29:c9:7a:e2
```

The IP address is configured as part of the configuration script execution.

```
config interface eth0
   config ip outside
    set ip-address static 172.30.3.128/22
    config ssh
    return
    config web
    return
    config sip
     set nat-translation enabled
     set udp-port 5060 "" "" any 0
     set tcp-port 5060 "" "" any 0
     set tls-port 5061 "" "" any 0
     set certificate vsp\tls\certificate sample
    return
    config icmp
    return
    config media-ports
    return
    config routing
     config route default
      set gateway 172.30.0.1
    return
    return
   return
  return
```

The following section of the configuration provides a DNS resolver entry and is configured as part of the configuration script execution. This is not required for operation but can be helpful if you want to use FQDNs in the config instead of IPs)

```
config dns
  config resolver
   set server 192.168.1.3 UDP 53 100 ALL
  return
```

```
 return
return
```

The following IP is disabled; you can enable it once you change the IP to match your local network conditions.

```
config interface eth1
   config ip inside
    set admin disabled
    set ip-address static 192.168.1.2/24
    config ssh
    return
    config web
    return
    config sip
     set udp-port 5060 "" "" any 0
     set tcp-port 5060 "" "" any 0
     set tls-port 5061 "" "" any 0
     set certificate vsp\tls\certificate sample
    return
    config icmp
    return
    config media-ports
    return
```

This routing config is provided as an example; edit it as needed. Change to match your preferred NTP server.

```
config routing
     config route inside-ntwk
      set destination network 192.168.0.0/16
      set gateway 192.168.1.1
   return
    return
   return
  return
  config ntp-client
   set server pool.ntp.org
return
  config cli
   set prompt nnos-e-vm>
  return
 return
return
```

The following section of the configuration contains all of the event log filters and targets.

```
config services
 config event-log
  config file eventlog
```

```
   set filter all error
  return
  config file access-log
   set filter access info
  return
  config file kernelsys
   set filter krnlsys debug
  return
  config file db
   set filter db debug
  return
  config file system
   set filter general info
   set filter system info
  return
  config file access
   set filter access info
  return
  config file dos
   set filter dosSip alert
  return
  config local-database
   set filter all error
  return
 return
return
```

The following section of the config provides some commonly used default system parameters; further information on these parameters is provided in the tech manuals.

```
config master-services
 config database
  set media enabled
 return
return

config vsp
 set admin enabled
 config default-session-config
  config media
   set anchor enabled
   config nat-traversal
    set symmetricRTP true
   return
   set rtp-stats enabled
  return
  config sip-directive
   set directive allow
  return
  config log-alert
  return
```

```
 return
 config tls
  config certificate sample
  return
 return
```

The following section of the configuration provides a sample policy rule to reject calls from a user with a URI that starts with 1000. This sample is provided as a means of introducing a new user to the concept of policy rules)

```
config policies
  config session-policies
   set default-policy vsp\policies\session-policies\policy default
   config policy default
    config rule sample-rule
     set description "sample rule to reject calls"
     config condition-list
      set from-uri-condition user match 1000
     return
     config session-config
      config sip-directive
       set directive refuse 400 "Please Pay Your Bill"
      return
     return
    return
   return
  return
 return
```

The folllowing configuration provides a sample dial-plan that takes a call with a Req URI domain of delegate.com and forwards it to the sample SIP gateway.

```
 config dial-plan
  config route sample-delegate
   set description "delegate to defined server"
   set peer server "vsp\enterprise\servers\sip-gateway sample-gateway"
   set request-uri-match domain-exact delegate.com
  return
 return
```

The following configuration provides a sample registration plan that takes a registration attempt with a domain of *xyz.com* and registers the endpoint locally. This is useful for cases where you want to register an endpoint locally for call testing purposes.

```
config registration-plan
  config route sample-accept-local
   set description "accept registers locally for this domain"
   set action accept
   set peer server "vsp\enterprise\servers\sip-gateway sample-gateway"
```

```
   set to-uri-match domain-exact xyz.com
  return
```

The following configuration provides a sample registration plan that takes a registration attempt with a domain of delegate.com and proxies the registration to the attached PBX or feature server.

```
config route sample-delegate
   set description "delegate to the defined server"
   set peer server "vsp\enterprise\servers\sip-gateway sample-gateway"
   set to-uri-match domain-exact delegate.com
  return
 return
```

The following configuration provides a sample SIP gateway that could be used for an attached PBX or feature server. You will need to edit the IP address to reflect the actual server IP or FQDN.

```
 config enterprise
  config servers
   config sip-gateway sample-gateway
    config server-pool
     config server sample-server
      set host 192.168.1.4
     return
    return
   return
  return
 return

config external-services
return
config preferences
 config cms-preferences
 return
return
```

The following configuration provides two different sample permission sets. These permission sets modified and/or can be used with user accounts that you create.

```
   config access
    config permissions super-user
     set cli advanced
    return
    config permissions view-only
     set cli disabled
     set ftp disabled
     set config view
     set actions disabled
```

```
      set templates disabled
      set web-services disabled
      set debug disabled
     return
    return

config features
return
```

Acme Packet recommends that the storage-device fail-threshold be set to 200 MB.

```
   services
   storage-device
     fail-threshold 200 MB
```

Using Acme Packet Documentation

The documentation folder that you downloaded contains the most recent set of technical publications from Acme Packet. Refer to the *Net-Net OS-E – System Installation and Commissioning Guide,* Chapter 5 for information and examples on how to commission a new OS-E system.

Enabling the OS-E Management System

Once you have configured an Ethernet interface, such as eth1, you can use your Internet Explorer Web browser to point to the configured IP address of this interface to launch the OS-E Management System. The OS-E Management System provides a windows and menu user interface to configuring the OS-E. See the *Net-Net OS-E – Management Tools* for information on using the CMS.

Bridging to Additional Ethernet Ports

Follow the steps in this section if you need to configure VMware Player on a Window platform to use two bridged networks. By default, VMWare Player allows the following functionality:

- One bridged interface (to the first host network interface)
- One NAT interface

- One host-only interface

To create two bridged interfaces, you will need to

1. add an additional VMnet associated with a second interface, and
2. edit the VM configuration file to use the new VMnet.

Adding an Additional VMnet

To add an additional VMnet, perform the following steps:

1. Halt all VMs currently running on this x86-based PC or server.
2. Launch the **vmnetcfg.exe** application from the VMware Player installation directory (c:\Program Files\VMware\VMware Player\vmnetcfg.exe).
3. Select the **Host Virtual Network Mapping** tab.
4. Select a VMnet to use for the second network interface card (NIC), such as VMnet3.
5. From the drop-down men, select the NIC you wish to connect to this VMnet.

If you want to have more control over which VMnet0 which connects to the first NIC perform the following steps:

1. Select the **Automatic Bridging** tab.
2. In the **Automatic Bridging** box, de-select the **Automatically choose and available physical network adapter to bridge to VMnet0**.
3. Select the **Host Virtual Network Mapping** tab.
4. Select a VMnet to use for the first NIC, such as VMnet2.
5. From the drop-down menu, select the NIC you wish to connect to this VMnet.

Note: You can use VMnet0 to assign to a specific NIC. However, avoiding VMnet0 will indicate to a later user of the VMs configuration file that specific NICs were assigned to the VMs virtual interfaces, thus removing any questions about the automatic nature implied with VMnet0 on any particular system.

Editing the VM Configuration File

You will need to edit the VMware configuration file to include the second NIC with the VMware Player. Perform the following steps:

1. Halt all VMs currently running on this x86-based PC or server.
2. Using Windows Explorer, open the Acme Packet OS-E folder.

- Using a text editor such as Notepad, open the file **nnos-e-vm.vmx**.
- At the bottom of the file add the following lines, substituting the desired VMnets for the Ethernet interfaces:
  - **ethernet0.connectionType = "custom"**
  - **ethernet0.vnet = "vmnet0"**
  - **ethernet1.connectionType = "custom"**
  - **ethernet1.vnet = "vmnet3"**
- Ensure that there are no other lines in the file specifying **ethernetX.connectionType = "XXXXX"**.

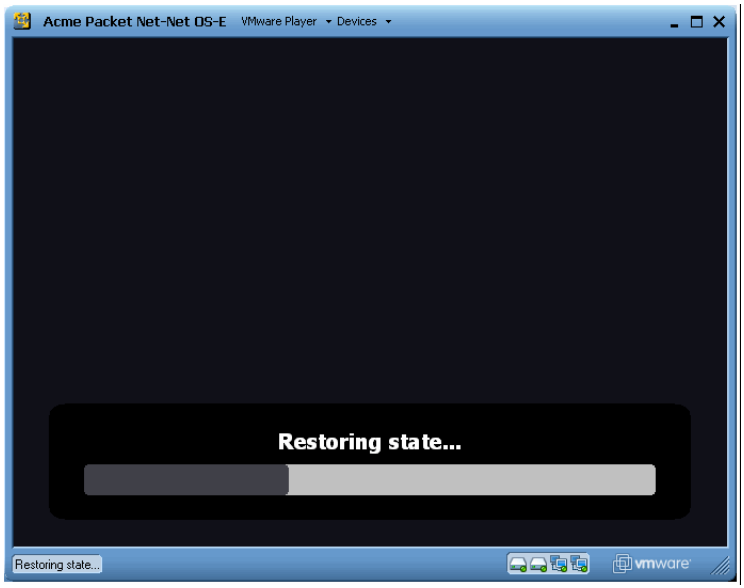
Net-Net OS-E-VM Troubleshooting

Acme Packet makes every effort to test the VM in a variety of customer environments. This section covers recently reported issues directly from OS-E-VM customers. If you discover an issue with the VM that we need to know about, contact Acme Packet Customer Support for assistance.

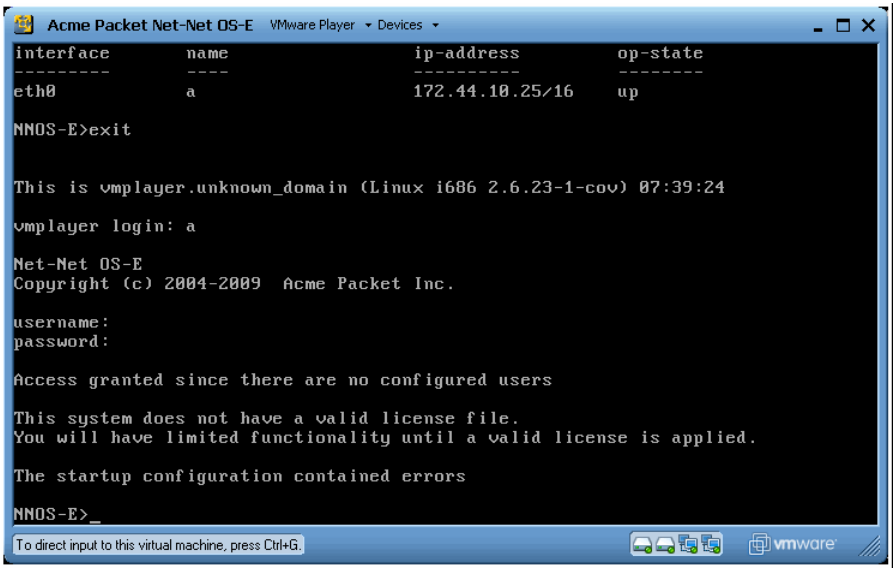
Installing the VM on Slow Systems

There may be cases where you are allowed to log in to the VM before the Acme Packet OS-E application starts up. This is usually caused by a slow system where you installed the VM, and all necessary software processes are requiring more time to complete their startup routines.

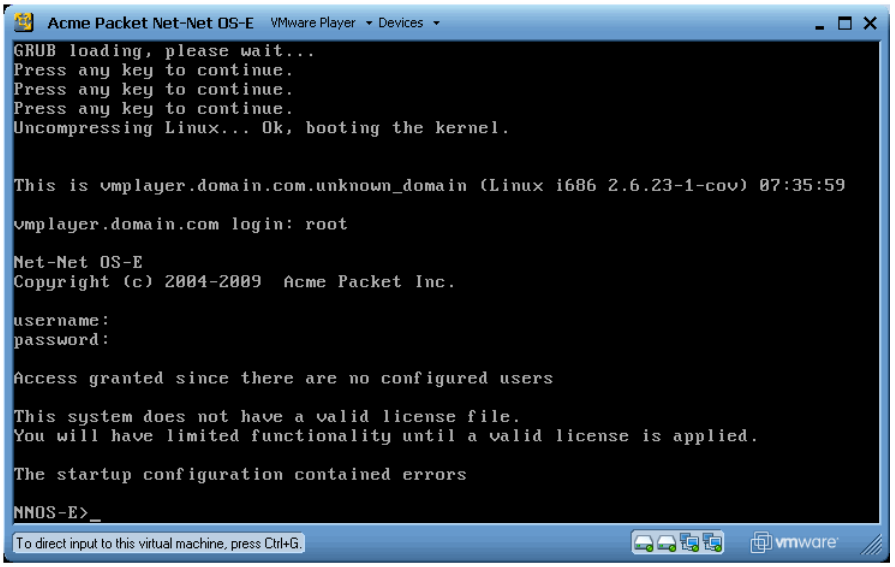
If you shut down the VM, and then start it again later, the VM will return you to the same screen and prompt that was displayed at the time of the shutdown. The VM startup would appear as shown in the following image.



When the VMWare system returns to the state where you previously logged out, and if you restart VMWare, you will see the login: prompt, such as the hostname *mikeo-cva* in the following image. If you did not previously configure a unique *username* and *password*, just press **ENTER** at the username and password prompts.



If the Acme Packet OS-E-VM application has not yet started, your screen appears as shown in the following image. Exit and wait a few minutes for the application to complete all the essential startup processes. You can then log in by pressing ENTER/ ENTER at the username and password prompts, or you can enter the previously-configured username and password.



Other VM Limitations and Considerations

The following limitations and considerations apply:

- Configuring feature options that rely on critical timing are more problematic to VMs. This includes music-on-hold (MoH), announcements, periodic announcements, and transcoding.
- VMs running on AMD systems exhibit more timing issues than on Intel-based systems.
- The type of hardware over which you are running the VM can make a significant difference in VM performance. Improved performance is normal when running the VM over larger and faster running platforms.