Using Cobbler to Rapidly Deploy ESXi With Zero Touch Configuration

This article will guide the reader through the process of standing up a Cobbler PXE deployment server and configuring Cobbler to rapidly deploy ESXi without having to touch the target server. Hundreds of ESXi servers can be deployed in minutes using this technique.

Introduction

From Cobbler's website:

> Cobbler (http://www.cobblerd.org) is a Linux installation server that allows for rapid setup of network installation environments. It glues together and automates many associated Linux tasks so you do not have to hop between many various commands and applications when deploying new systems, and, in some cases, changing existing ones. Cobbler can help with provisioning, managing DNS and DHCP, package updates, power management, configuration management orchestration, and much more.

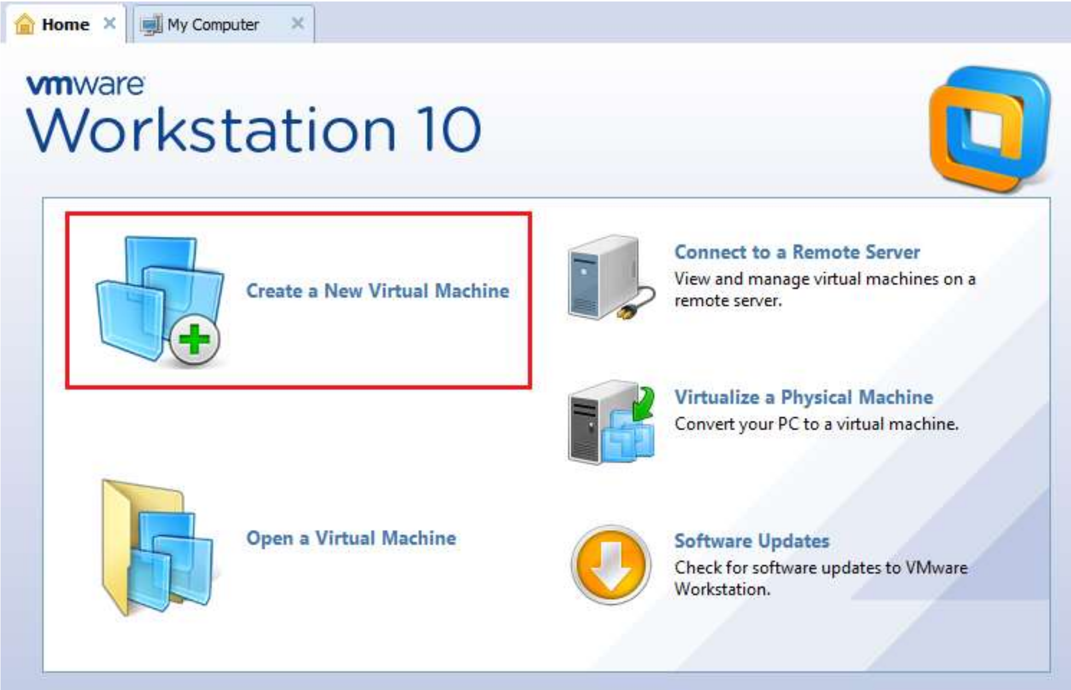
In order to use Cobber to deploy ESXi, or any Linux distribution, the Linux platform that Cobbler resides on needs to be installed and configured. Prerequisite services such as DHCP and EPEL also need to be setup and configured before Cobbler is installed.

Cobbler uses PXE boot services as the method for booting the target system via TFTP in preparation for OS installation. PXE is tightly coupled with DHCP and performs best on a pure layer 2 network without the need for DHCP Helper configuration on network switches. Cobbler should be isolated to either a temporary layer 2 network segment or permanent VLAN in order to prevent production systems from booting from Cobbler by mistake.

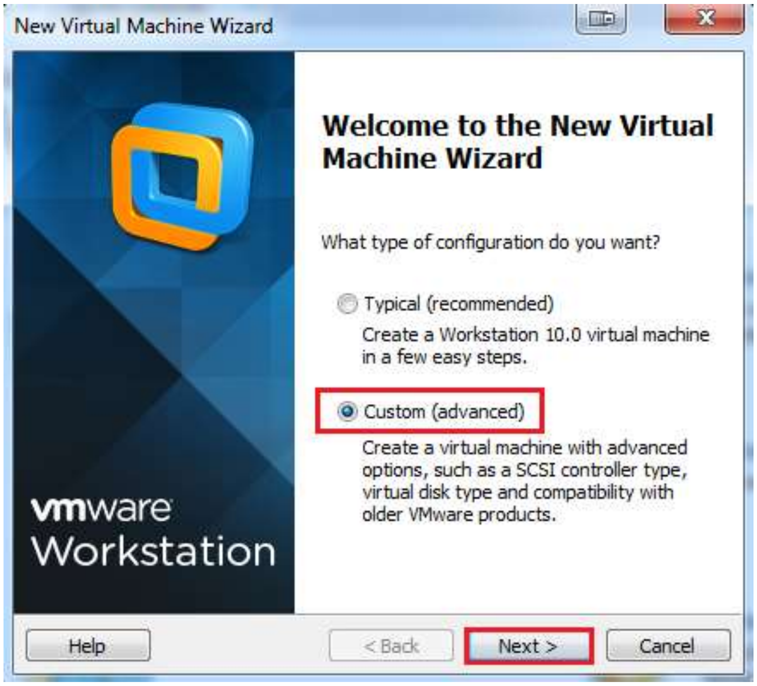
Installing the Base OS

For this example, CentOS 6.5 x64 will be installed as the base OS. Cobbler and all of its prerequisites will be installed on this system. Before that can happen, the base OS needs to be installed along with Cobbler's prerequisite applications like DHCP and EPEL.

VMware Workstation 10 will be used as the environment in which the Cobbler VM will be setup and configured. The following screenshots show how CentOS 6.5 is installed in Workstation 10:


Home
My Computer
vmware
Workstation 10
Create a New Virtual Machine
Connect to a Remote Server
View and manage virtual machines on a remote server.
Virtualize a Physical Machine
Convert your PC to a virtual machine.
Open a Virtual Machine
Software Updates
Check for software updates to VMware Workstation.

Create a new Virtual Machine



Welcome to the New Virtual Machine Wizard

What type of configuration do you want?

○ Typical (recommended)

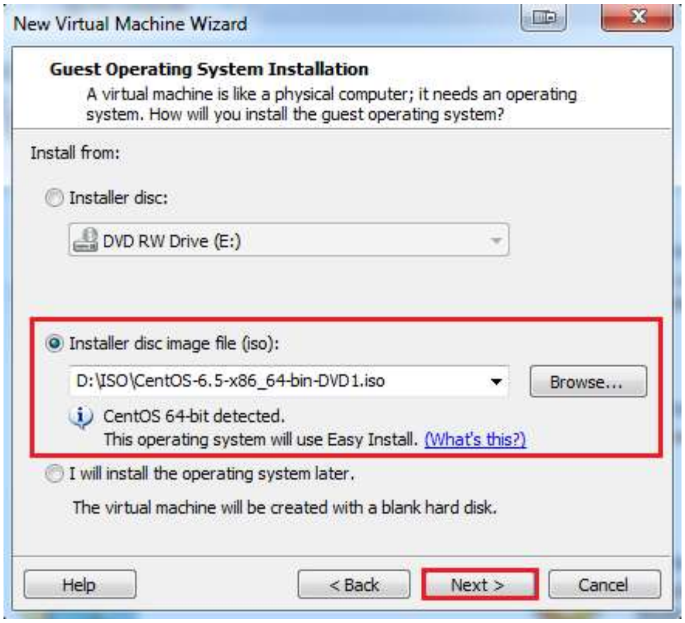
Create a Workstation 10.0 virtual machine in a few easy steps.

● Custom (advanced)

Create a virtual machine with advanced options, such as a SCSI controller type, virtual disk type and compatibility with older VMware products.

Choose Custom, then click next

Click next on the Choose the Virtual Machine Hardware Compatibility screen



Guest Operating System Installation

A virtual machine is like a physical computer; it needs an operating system. How will you install the guest operating system?

Install from:

○ Installer disc:

DVD RW Drive (E:)

● Installer disc image file (iso):

D:\ISO\CentOS-6.5-x86_64-bin-DVD1.iso

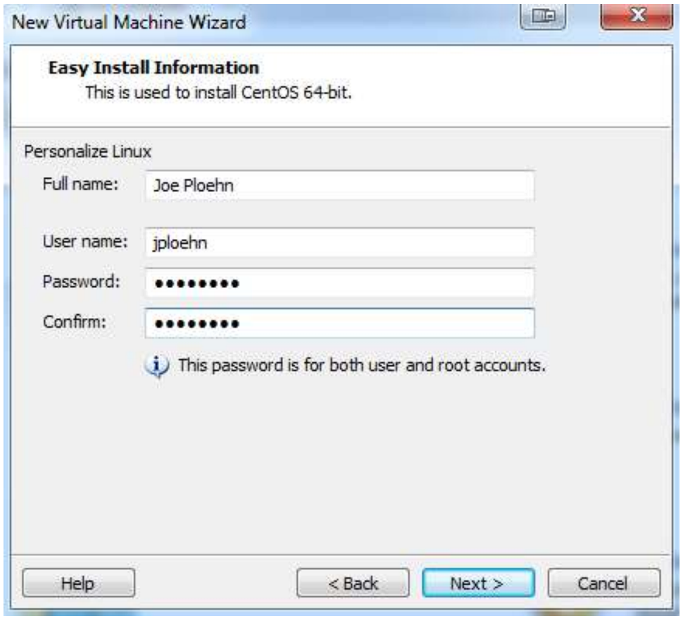
CentOS 64-bit detected.
This operating system will use Easy Install. (What's this?)

○ I will install the operating system later.

The virtual machine will be created with a blank hard disk.

Click Browse and select the CentOS 6.5 distribution ISO. VMware Workstation 10 will use its Easy Install process to automate the installation of CentOS, including the installation of VMware Tools. Click next to continue.

FYI: CentOS 6.5 can be downloaded from: http://www.centos.org/download/



Easy Install Information

This is used to install CentOS 64-bit.

Personalize Linux

Full name: Joe Ploehn

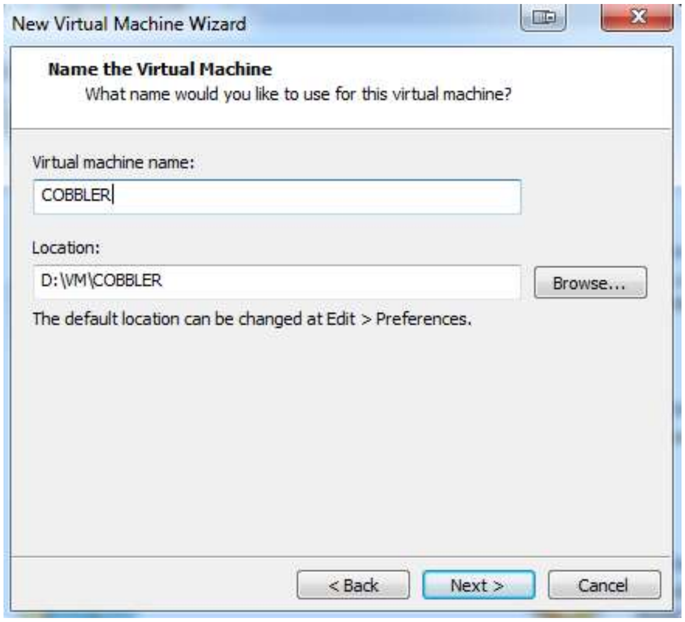
User name: jploehn

Password: ••••••••

Confirm: ••••••••

This password is for both user and root accounts.

Add your personal credential. Note that the password that you select will also be set for the root account. Click next to continue.



New Virtual Machine Wizard

Name the Virtual Machine

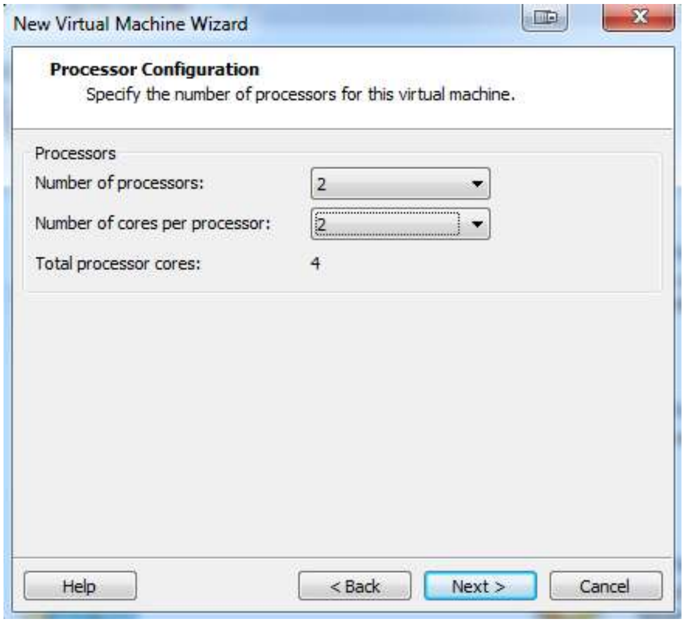
What name would you like to use for this virtual machine?

Virtual machine name: COBBLER

Location: D:\VM\COBBLER

The default location can be changed at Edit > Preferences.

Name the virtual machine. In this case I am using "COBBLER" as my server name. Click Next to continue.



New Virtual Machine Wizard

Processor Configuration

Specify the number of processors for this virtual machine.

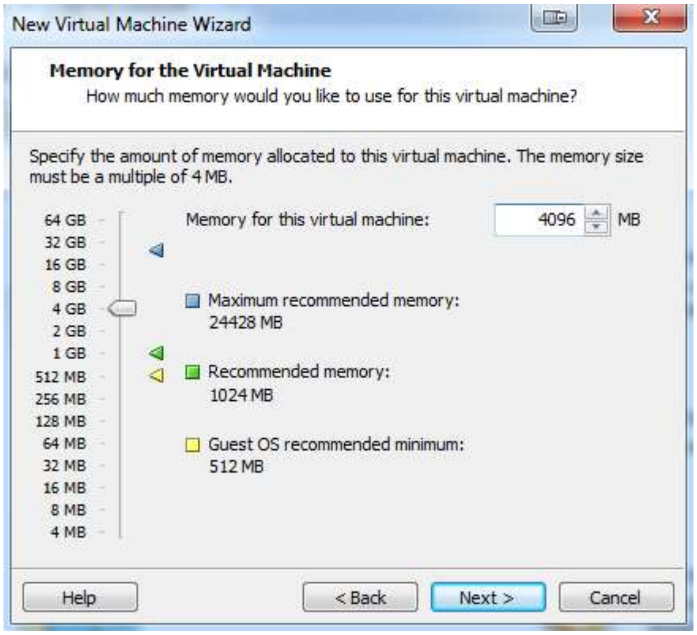
Processors

Number of processors: 2

Number of cores per processor: 2

Total processor cores: 4

Select the number of processors and cores based on how busy you predict the Cobbler server to be. Since this server will be used to load up to 50 ESXi servers simultaneously, this has been set to 4 cores.



New Virtual Machine Wizard

Memory for the Virtual Machine

How much memory would you like to use for this virtual machine?

Specify the amount of memory allocated to this virtual machine. The memory size must be a multiple of 4 MB.

Memory for this virtual machine: 4096 MB

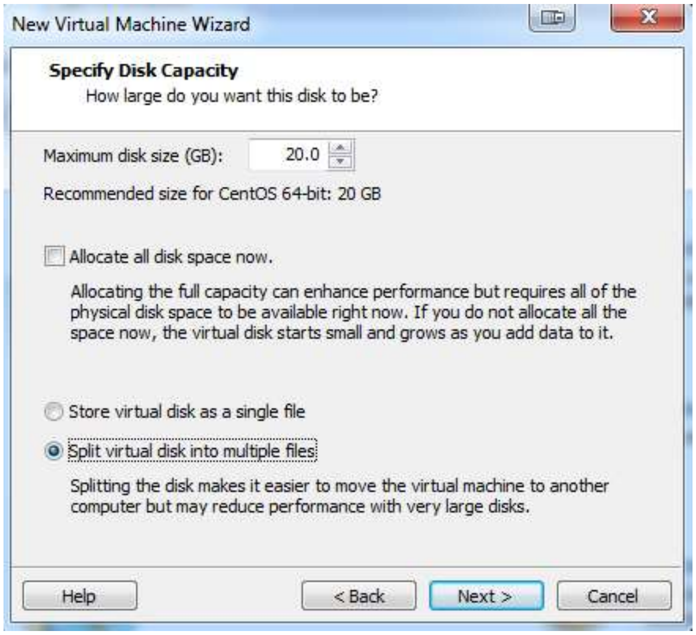
🟦 Maximum recommended memory:
24428 MB

🟩 Recommended memory:
1024 MB

🟨 Guest OS recommended minimum:
512 MB

In a similar fashion, set the amount of RAM for the Cobbler server. In this case this has been set to 4096MB, or 1024MB/core. Click next to continue.

Click next to accept the defaults on the Network Type screen, the I/O Controller Types screen, the Disk Type screen, and Select a Disk screen.



New Virtual Machine Wizard

Specify Disk Capacity

How large do you want this disk to be?

Maximum disk size (GB): 20.0

Recommended size for CentOS 64-bit: 20 GB

□ Allocate all disk space now.

Allocating the full capacity can enhance performance but requires all of the physical disk space to be available right now. If you do not allocate all the space now, the virtual disk starts small and grows as you add data to it.

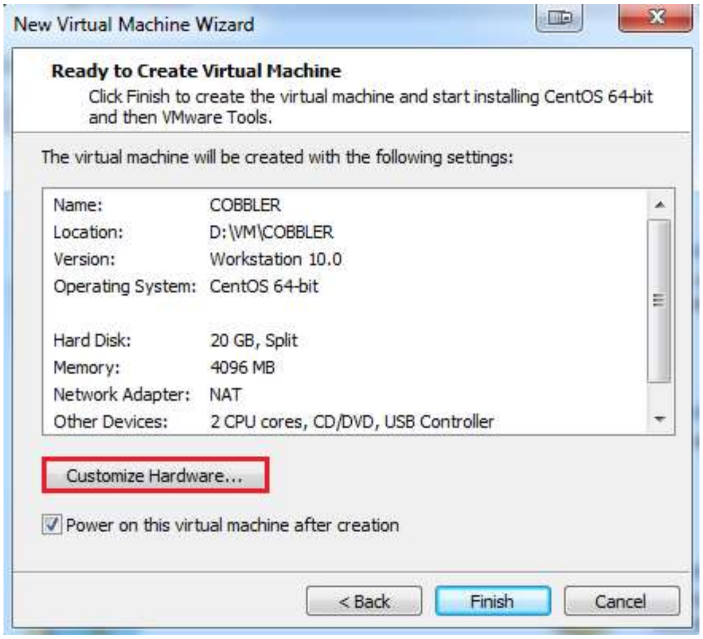
○ Store virtual disk as a single file

● Split virtual disk into multiple files

Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.

Specify the amount of Disk Capacity to carve up for the Cobbler server. Since this Cobbler server will only be used to distribute ESXi, the default 20GB storage capacity is plenty.

Click next on the Specify Disk File screen to accept the default disk file name.


New Virtual Machine Wizard

Ready to Create Virtual Machine

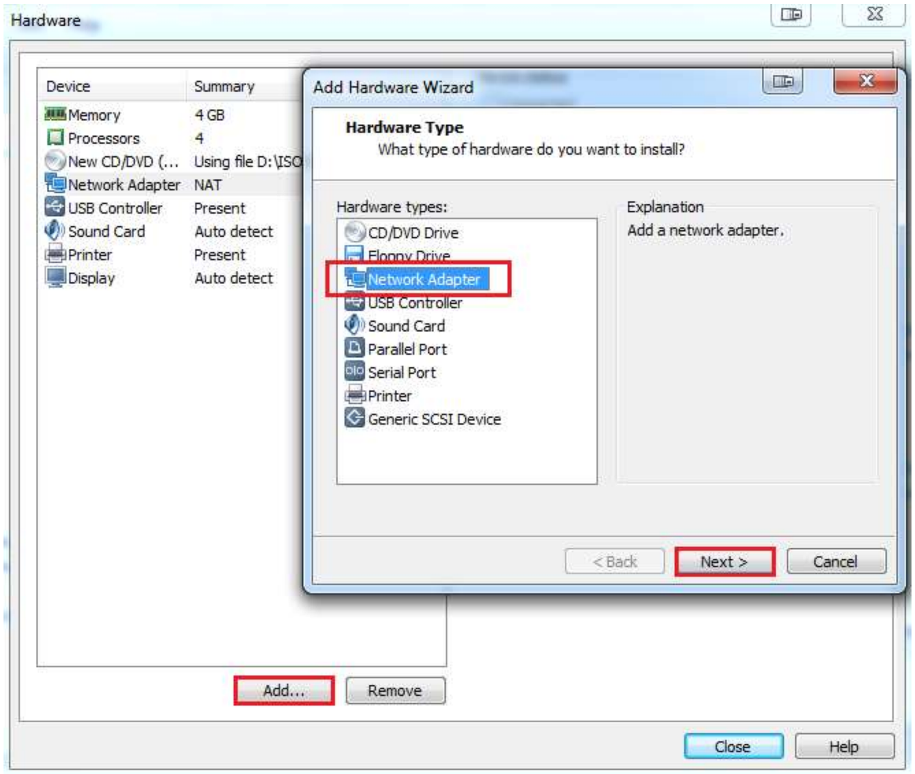
Click Finish to create the virtual machine and start installing CentOS 64-bit and then VMware Tools.

The virtual machine will be created with the following settings:

Name:	COBBLER
Location:	D:\VM\COBBLER
Version:	Workstation 10.0
Operating System:	CentOS 64-bit
Hard Disk:	20 GB, Split
Memory:	4096 MB
Network Adapter:	NAT
Other Devices:	2 CPU cores, CD/DVD, USB Controller

☑ Power on this virtual machine after creation

Click Customize Hardware to change the hardware settings on the VM.


Hardware

Device	Summary
Memory	4 GB
Processors	4
New CD/DVD (...	Using file D:\ISO
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Printer	Present
Display	Auto detect

Add Hardware Wizard

Hardware Type

What type of hardware do you want to install?

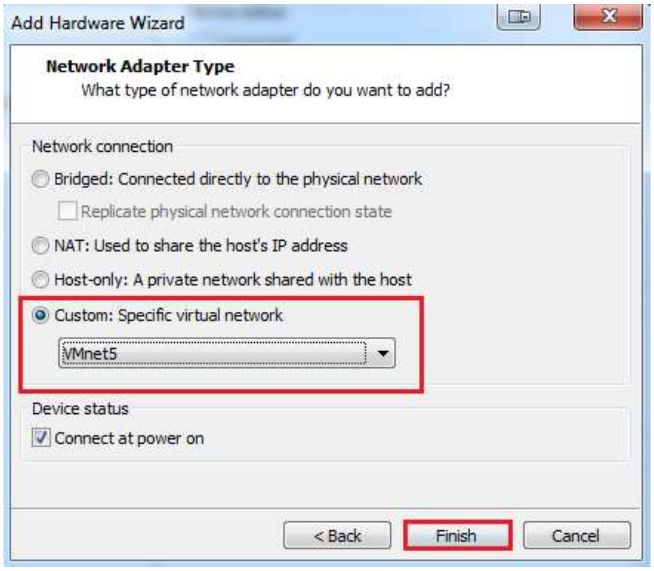
Hardware types:

- CD/DVD Drive
- Floppy Drive
- Network Adapter
- USB Controller
- Sound Card
- Parallel Port
- Serial Port
- Printer
- Generic SCSI Device

Explanation

Add a network adapter.

Click on Add to add an additional Network Adapter, select Network Adapter, and then click next. The first adapter is used for private access to the VM and allows the VM to access the internet through the host's connection.



Add Hardware Wizard

Network Adapter Type

What type of network adapter do you want to add?

Network connection

○ Bridged: Connected directly to the physical network

□ Replicate physical network connection state

○ NAT: Used to share the host's IP address

○ Host-only: A private network shared with the host

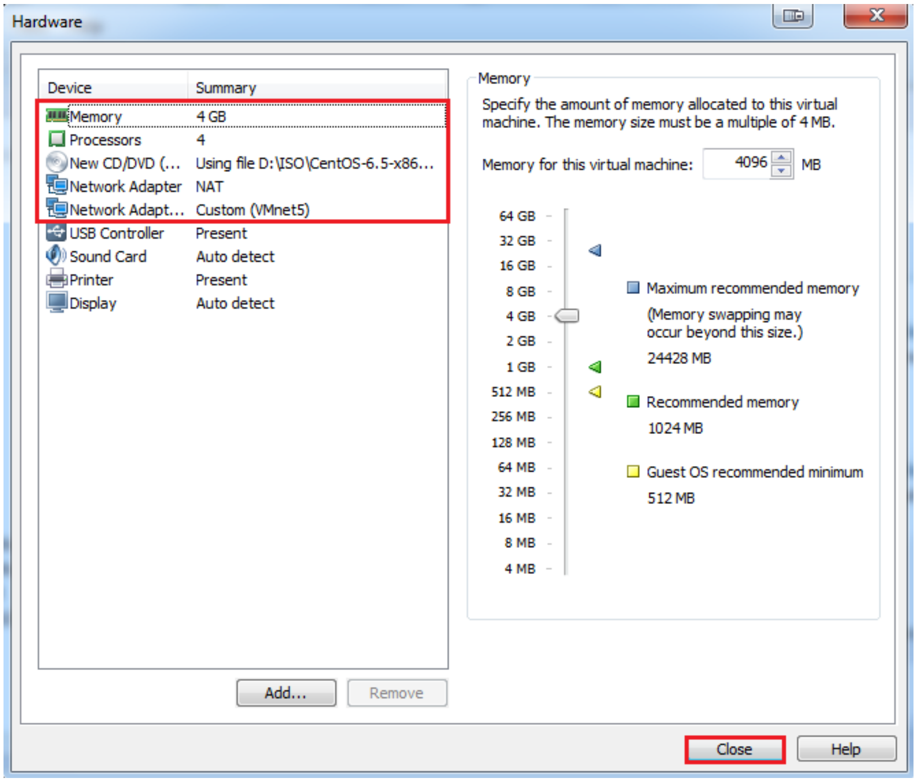
● Custom: Specific virtual network

VMnet5

Device status

☑ Connect at power on

Choose Custom, then pick a custom network that is not being used. In this case, VMnet5 has been selected. That will be our test deployment network where DHCP and PXE services will run. Click Finish to complete the Add Hardware Wizard. You should then see something similar to below:



Hardware

Device	Summary
Memory	4 GB
Processors	4
New CD/DVD (…	Using file D:\ISO\CentOS-6.5-x86…
Network Adapter	NAT
Network Adapt…	Custom (VMnet5)
USB Controller	Present
Sound Card	Auto detect
Printer	Present
Display	Auto detect

Memory

Specify the amount of memory allocated to this virtual machine. The memory size must be a multiple of 4 MB.

Memory for this virtual machine: 4096 MB

🟦 Maximum recommended memory

(Memory swapping may occur beyond this size.)

24428 MB

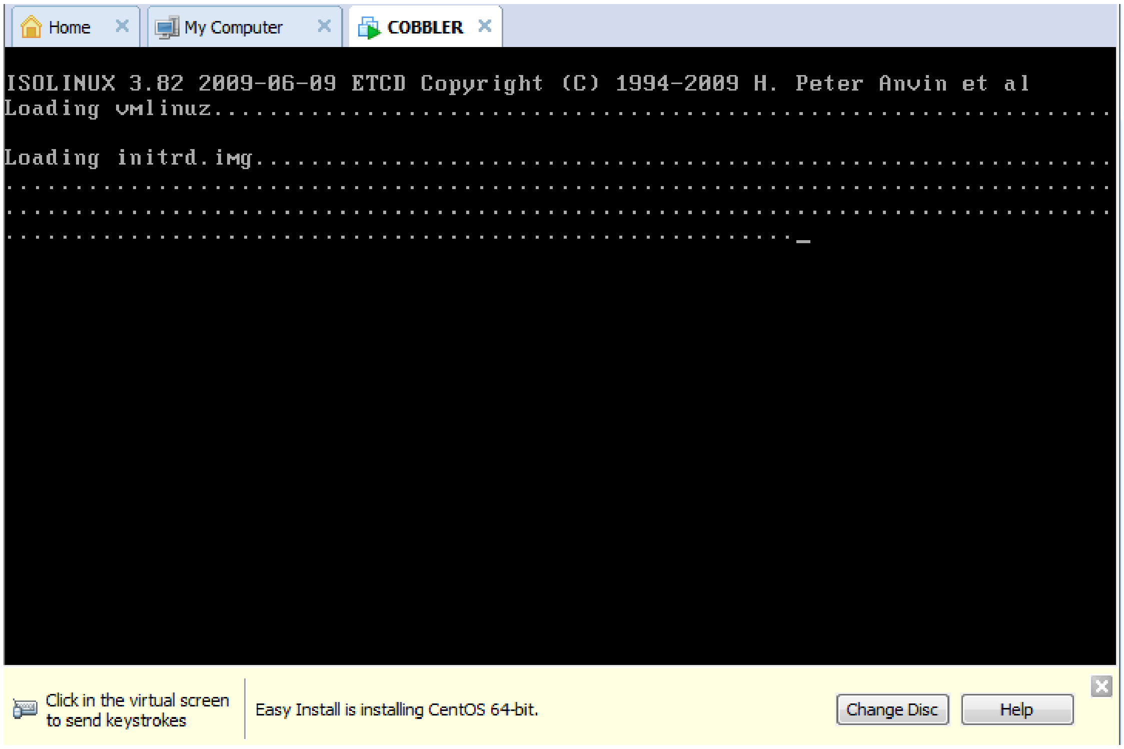
🟩 Recommended memory

1024 MB

🟨 Guest OS recommended minimum

512 MB

Verify that the Cobbler VM's hardware is similar to that shown above and click Close, then click Finish on the New Virtual Machine Wizard to complete the setup of the Cobbler VM.

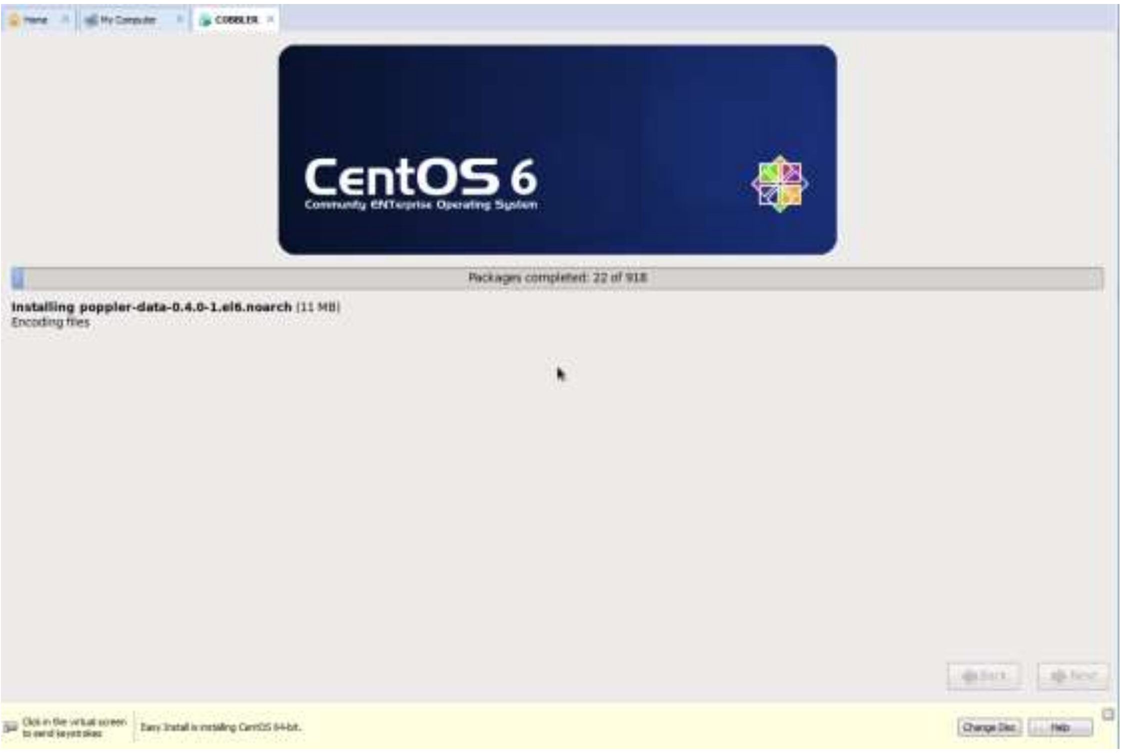


```
ISOLINUX 3.82 2009-06-09 ETCD Copyright (C) 1994-2009 H. Peter Anvin et al
Loading vmlinuz.....................................................................

Loading initrd.img..................................................................
....................................................................................
....................................................................................
............................................................._
```

Click in the virtual screen to send keystrokes

Easy Install is installing CentOS 64-bit.

The Cobbler VM boots and VMware Workstation starts the Easy Install process. CentOS is installed and VMware Tools will be installed near the end of this process as shown below.



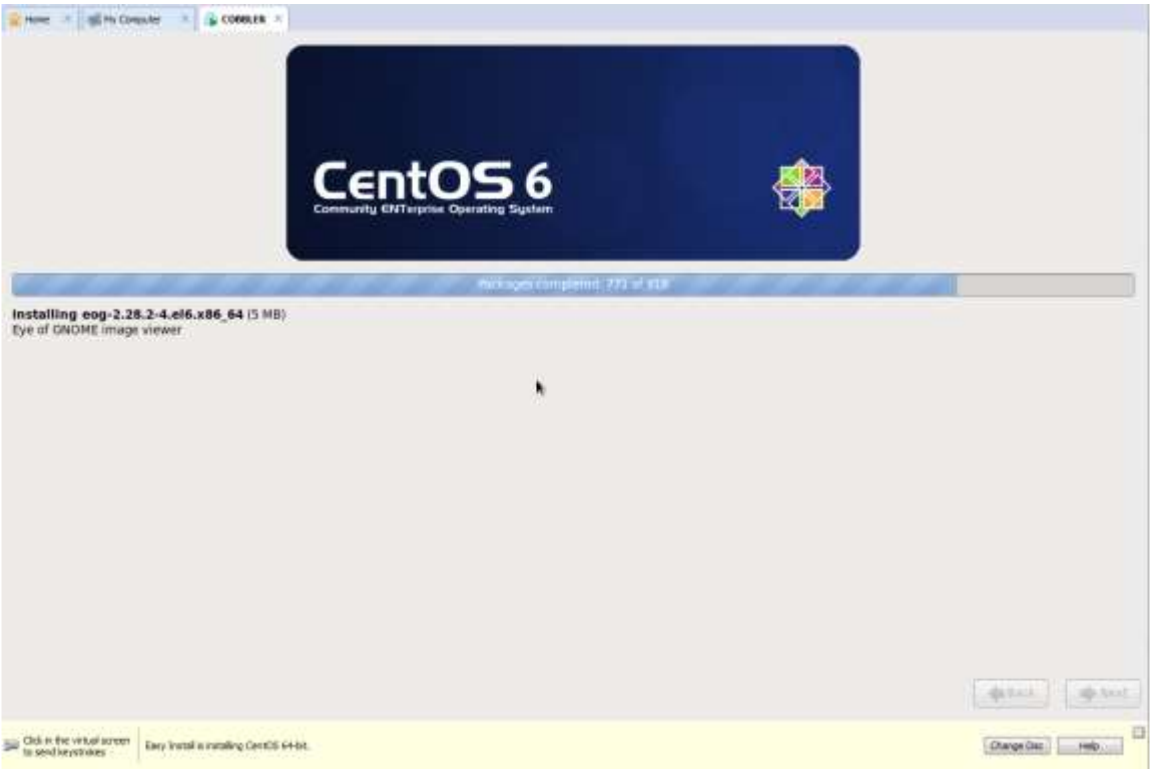
Packages completed: 22 of 918

Installing poppler-data-0.4.0-1.el6.noarch (11 MB)
Encoding files

Click in the virtual screen to send keystrokes

Easy Install is installing CentOS 64-bit.

The installation continues…

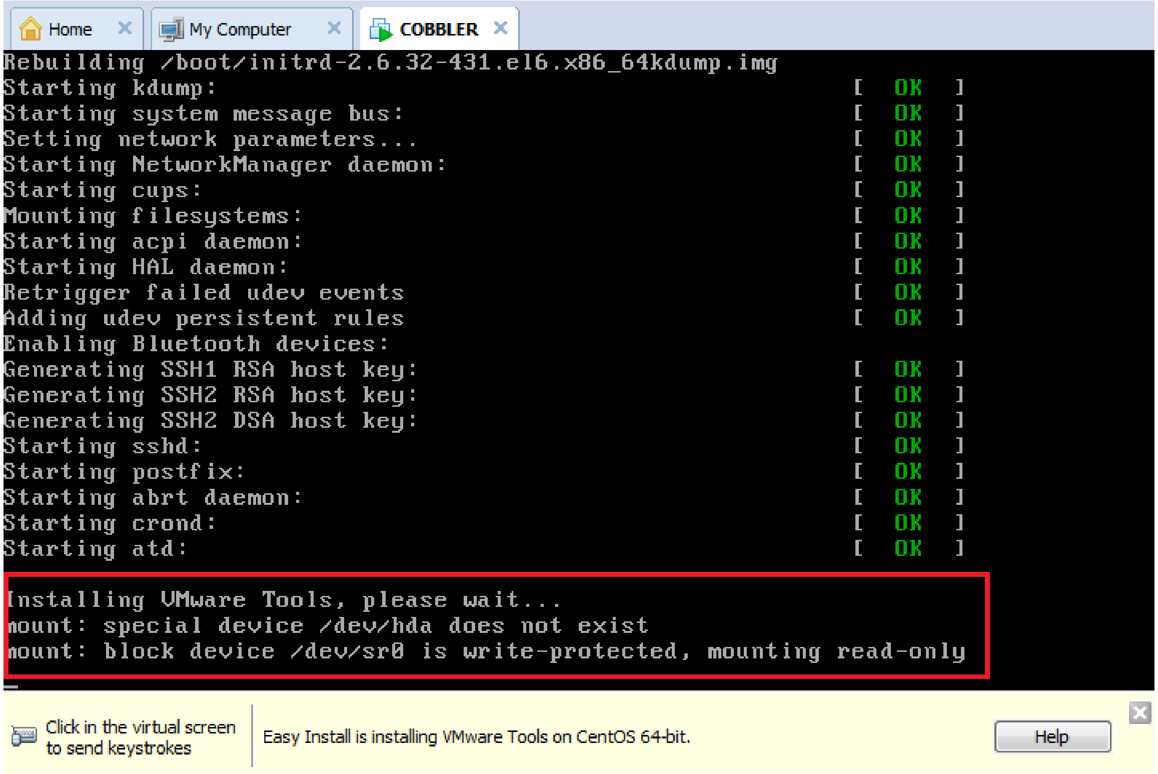


Packages completed: 771 of 919

Installing eog-2.28.2-4.el6.x86_64 (5 MB)
Eye of GNOME image viewer

Click in the virtual screen to send keystrokes

Easy Install is installing CentOS 64-bit.

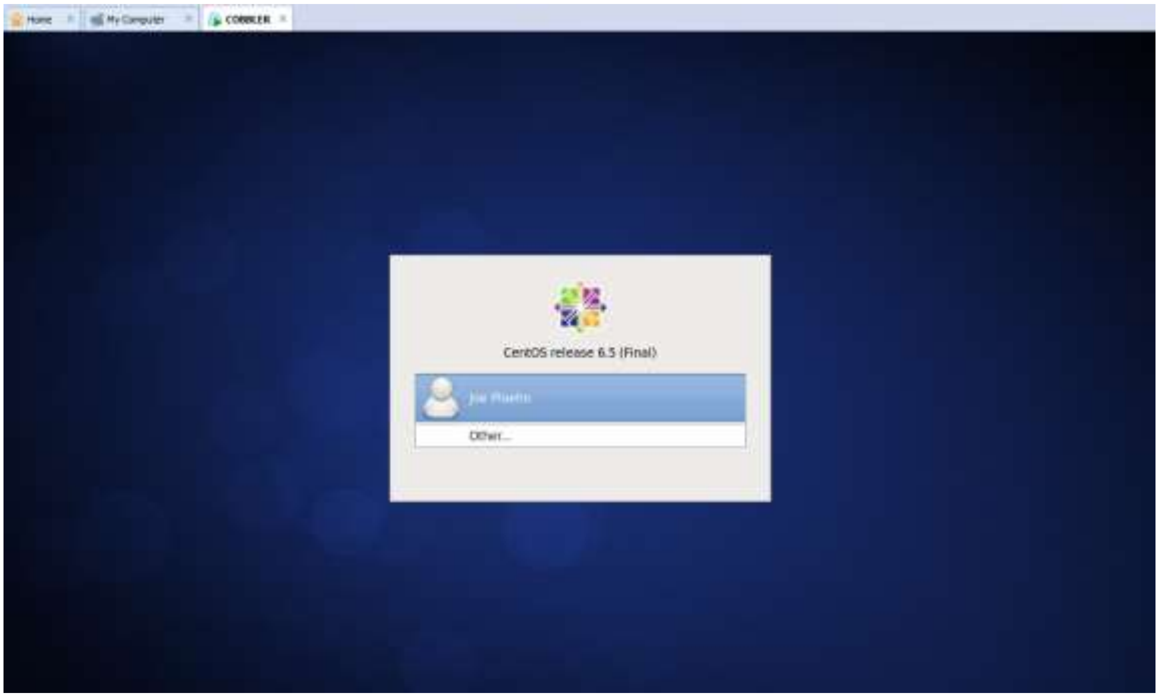


```
Rebuilding /boot/initrd-2.6.32-431.el6.x86_64kdump.img
Starting kdump:                                            [  OK  ]
Starting system message bus:                               [  OK  ]
Setting network parameters...                              [  OK  ]
Starting NetworkManager daemon:                            [  OK  ]
Starting cups:                                             [  OK  ]
Mounting filesystems:                                      [  OK  ]
Starting acpi daemon:                                      [  OK  ]
Starting HAL daemon:                                       [  OK  ]
Retrigger failed udev events                               [  OK  ]
Adding udev persistent rules                               [  OK  ]
Enabling Bluetooth devices:
Generating SSH1 RSA host key:                              [  OK  ]
Generating SSH2 RSA host key:                              [  OK  ]
Generating SSH2 DSA host key:                              [  OK  ]
Starting sshd:                                             [  OK  ]
Starting postfix:                                          [  OK  ]
Starting abrt daemon:                                      [  OK  ]
Starting crond:                                            [  OK  ]
Starting atd:                                              [  OK  ]

Installing VMware Tools, please wait...
mount: special device /dev/hda does not exist
mount: block device /dev/sr0 is write-protected, mounting read-only
_
```

Click in the virtual screen to send keystrokes

Easy Install is installing VMware Tools on CentOS 64-bit.

After the GUI portion of the OS install has been completed, the VM will reboot and Easy Install will automatically install VMware Tools prior to making the OS available for login.



The installation of CentOS has completed successfully. At this point several prerequisite tools need to be installed and configured before Cobbler can be installed. These include the following:

- DHCP Installation and Configuration
- EPEL Repository
- Disable IPtables and SELinux

DHCP Installation and Configuration

To install DHCP, use the yum installer as shown below:

```
[root@cobbler ~]# yum install dhcp
Loaded plugins: fastestmirror, refresh-packagekit, security
Loading mirror speeds from cached hostfile
 * base: centos.sonn.com
 * extras: ftp.usf.edu
 * updates: centos-mirror.jchost.net
Setting up Install Process
Resolving Dependencies
--> Running transaction check
---> Package dhcp.x86_64 12:4.1.1-38.P1.el6.centos will be installed
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================================
 Package               Arch           Version                                Repository         Size
================================================================================================
Installing:
 dhcp                  x86_64         12:4.1.1-38.P1.el6.centos              base               817 k

Transaction Summary
```

```
=================================================================================================
Install       1 Package(s)

Total download size: 817 k
Installed size: 1.9 M
Is this ok [y/N]: y
Downloading Packages:
dhcp-4.1.1-38.P1.el6.centos.x86_64.rpm                                     | 817 kB     00:01
warning: rpmts_HdrFromFdno: Header V3 RSA/SHA1 Signature, key ID c105b9de: NOKEY
Retrieving key from file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-6
Importing GPG key 0xC105B9DE:
 Userid : CentOS-6 Key (CentOS 6 Official Signing Key) <centos-6-key@centos.org>
 Package: centos-release-6-5.el6.centos.11.1.x86_64 (@anaconda-CentOS-201311272149.x86_64/6.5)
 From   : /etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-6
Is this ok [y/N]: y
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
  Installing : 12:dhcp-4.1.1-38.P1.el6.centos.x86_64                                        1/1
  Verifying  : 12:dhcp-4.1.1-38.P1.el6.centos.x86_64                                        1/1

Installed:
  dhcp.x86_64 12:4.1.1-38.P1.el6.centos

Complete!
[root@cobbler ~]#
```

Once DHCP has been installed, the second network adapter needs to be configured and started. This network interface will have a statically assigned IP address and will be the interface that communicates on the layer 2 cobbler network.

```
[root@cobbler ~]# vi /etc/sysconfig/network-scripts/ifcfg-eth1
```

Change the ifcfg-eth1 text file so that it looks similar to the following. Note that the HWADDR and UUID values will be different that shown below:

```
DEVICE=eth1
HWADDR=00:0C:29:0B:9D:E0
TYPE=Ethernet
UUID=f7c890cc-e65f-4679-9bc7-ae8f32b1ea5b
ONBOOT=yes
NM_CONTROLLED=yes
BOOTPROTO=static
IPADDR=172.16.1.1
NETMASK=255.255.255.0
NETWORK=172.16.1.0
```

Change the IP address, subnet mask, and network values according to your requirements. These values are used as a test, using a non-routable IP network. Once the ifcfg-eth1 file is changed, the network service will need to be restarted using the following command:

```
[root@cobbler ~]# service network restart
Shutting down interface eth0:      [  OK  ]
Shutting down interface eth1:      [  OK  ]
Shutting down loopback interface:  [  OK  ]
Bringing up loopback interface:    [  OK  ]
Bringing up interface eth0:        [  OK  ]
Bringing up interface eth1:        [  OK  ]
[root@cobbler /]#
```

Verify that the eth1 interface has been started with the IP address previously specified:

```
[root@cobbler /]# ifconfig eth1
eth1      Link encap:Ethernet  HWaddr 00:0C:29:0B:9D:E0
          inet addr:172.16.1.1  Bcast:172.16.1.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fe0b:9de0/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:3 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 b)  TX bytes:258 (258.0 b)
          Interrupt:16 Base address:0x2024
```

Once the eth1 interface has been configured and started successfully, DHCP needs to be configured, started, and set to automatically start every time the Cobbler VM starts. The DHCP configuration is set in the dhcpd.conf file located in either the /etc or /etc/dhcp directory. Edit the dhcpd.conf file and make the changes shown in red below:

```
[root@cobbler ~]# vi /etc/dhcp/dhcpd.conf

# DHCP Server Configuration file.
#   see /usr/share/doc/dhcp*/dhcpd.conf.sample
#   see 'man 5 dhcpd.conf'
#
ddns-update-style interim;

allow booting;
allow bootp;

ignore client-updates;
set vendorclass = option vendor-class-identifier;

subnet 172.16.1.0 netmask 255.255.255.0 {
        option routers                  172.16.1.1;
        option domain-name-servers      172.16.1.1;
        option subnet-mask              255.255.255.0;
        range                           172.16.1.11 172.16.1.249;
        filename                        "/pxelinux.0";
        default-lease-time              21600;
        max-lease-time                  43200;
        next-server                     172.16.1.1;
}
```

Next, turn DHCP on and configure it to start every time the Cobbler VM starts, then check it as shown below:

```
[root@cobbler /]# service dhcpd start
Starting dhcpd:                                            [  OK  ]

[root@cobbler /]# chkconfig dhcpd on

[root@cobbler /]# chkconfig --list dhcpd
dhcpd           0:off    1:off    2:on     3:on     4:on     5:on     6:off
```

Next, since this environment is running within VMware Workstation, testing to make sure that a VM gets an IP address from the DHCP server is always comforting. Setup a test VM if necessary or use an existing VM and verify that the DHCP server is working properly.

Installing the EPEL Repository

The Cobbler application and associated libraries are packages that are in EPEL, the Extra Packages for Enterprise Linux repository. In order to access the EPEL repository, EPEL needs to be installed.

```
[root@cobbler /]# rpm -ivh http://mirror.sfo12.us.leaseweb.net/epel//6/i386/epel-release-6-
8.noarch.rpm
Retrieving http://mirror.sfo12.us.leaseweb.net/epel//6/i386/epel-release-6-8.noarch.rpm
warning: /var/tmp/rpm-tmp.ntcv4D: Header V3 RSA/SHA256 Signature, key ID 0608b895: NOKEY
Preparing...                ########################################### [100%]
   1:epel-release           ########################################### [100%]
```

Verify that the EPEL repository has been installed successfully:

```
[root@cobbler /]# yum repolist
Loaded plugins: fastestmirror, refresh-packagekit, security
Loading mirror speeds from cached hostfile
epel/metalink                                                                |  14 kB     00:00
 * base: centos.sonn.com
 * epel: mirror.steadfast.net
 * extras: ftp.usf.edu
 * updates: centos-mirror.jchost.net
base                                                                         | 3.7 kB     00:00
epel                                                                         | 4.4 kB     00:00
epel/primary_db                                                              | 6.2 MB     00:08
extras                                                                       | 3.4 kB     00:00
updates                                                                      | 3.4 kB     00:00
repo id                      repo name                                                   status
base                         CentOS-6 - Base                                              6,367
epel                         Extra Packages for Enterprise Linux 6 - x86_64              10,999
extras                       CentOS-6 - Extras                                               14
updates                      CentOS-6 - Updates                                           1,153
repolist: 18,533

[root@cobbler /]#
```

Disable IPtables and SELinux

In order for the PXE boot process to work in an isolated environment, SELinux has to be disabled and the IPtables firewall should be turned off. This will improve the usability of Cobbler in an isolated environment and it will reduce the amount of configuration and troubleshooting that may need to be done in the future to make Cobbler work.

To disable SELinux, use the SED tool. Check and see how the SELinux config file looks before making the change, then check the file after SED runs:

```
[root@cobbler /]# cat /etc/selinux/config

# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#     enforcing - SELinux security policy is enforced.
#     permissive - SELinux prints warnings instead of enforcing.
#     disabled - No SELinux policy is loaded.
SELINUX=enforcing
# SELINUXTYPE= can take one of these two values:
#     targeted - Targeted processes are protected,
#     mls - Multi Level Security protection.
SELINUXTYPE=targeted
```

```
[root@cobbler /]# sed -i 's/SELINUX\=enforcing/SELINUX\=disabled/g' /etc/selinux/config

[root@cobbler /]# cat /etc/selinux/config

# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#     enforcing - SELinux security policy is enforced.
#     permissive - SELinux prints warnings instead of enforcing.
#     disabled - No SELinux policy is loaded.
SELINUX=disabled
# SELINUXTYPE= can take one of these two values:
#     targeted - Targeted processes are protected,
#     mls - Multi Level Security protection.
SELINUXTYPE=targeted
```

The IPtables firewall is not needed in this isolated environment so it should be disabled and removed from the startup boot process:

```
[root@cobbler /]# chkconfig --list iptables
iptables        0:off   1:off   2:on    3:on    4:on    5:on    6:off

[root@cobbler /]# chkconfig iptables off

[root@cobbler /]# chkconfig --list iptables
iptables        0:off   1:off   2:off   3:off   4:off   5:off   6:off
```

Cobbler Installation and Configuration

Once all of the prerequisite configuration adjustments have been made and DHCP has been installed, Cobbler itself can be installed along with some of its associated utilities like the web interface, tftp server, and Python tools.

To install Cobbler and its associated utilities, execute the yum command below:

```
[root@cobbler /]# yum install cobbler cobbler-web httpd xinetd tftp-server mod_python pykickstart wget -y

Loaded plugins: fastestmirror, refresh-packagekit, security
Loading mirror speeds from cached hostfile
 * base: centos.sonn.com
 * epel: mirror.steadfast.net
 * extras: ftp.usf.edu
 * updates: centos-mirror.jchost.net
Setting up Install Process
Resolving Dependencies
--> Running transaction check
---> Package cobbler.noarch 0:2.4.4-1.el6 will be installed
--> Processing Dependency: syslinux for package: cobbler-2.4.4-1.el6.noarch
--> Processing Dependency: python-simplejson for package: cobbler-2.4.4-1.el6.noarch
--> Processing Dependency: python-netaddr for package: cobbler-2.4.4-1.el6.noarch
--> Processing Dependency: python-cheetah for package: cobbler-2.4.4-1.el6.noarch
--> Processing Dependency: mod_wsgi for package: cobbler-2.4.4-1.el6.noarch
--> Processing Dependency: createrepo for package: cobbler-2.4.4-1.el6.noarch
--> Processing Dependency: PyYAML for package: cobbler-2.4.4-1.el6.noarch
---> Package cobbler-web.noarch 0:2.4.4-1.el6 will be installed
--> Processing Dependency: mod_ssl for package: cobbler-web-2.4.4-1.el6.noarch
--> Processing Dependency: Django for package: cobbler-web-2.4.4-1.el6.noarch
---> Package httpd.x86_64 0:2.2.15-29.el6.centos will be updated
---> Package httpd.x86_64 0:2.2.15-30.el6.centos will be an update
--> Processing Dependency: httpd-tools = 2.2.15-30.el6.centos for package: httpd-2.2.15-30.el6.centos.x86_64
---> Package mod_python.x86_64 0:3.3.1-16.el6 will be installed
---> Package tftp-server.x86_64 0:0.49-7.el6 will be installed
---> Package wget.x86_64 0:1.12-1.8.el6 will be updated
---> Package wget.x86_64 0:1.12-1.11.el6_5 will be an update
---> Package xinetd.x86_64 2:2.3.14-39.el6_4 will be installed
--> Running transaction check
```

```
---> Package Django14.noarch 0:1.4.13-1.el6 will be installed
---> Package PyYAML.x86_64 0:3.10-3.el6 will be installed
--> Processing Dependency: libyaml-0.so.2()(64bit) for package: PyYAML-3.10-3.el6.x86_64
---> Package createrepo.noarch 0:0.9.9-18.el6 will be installed
--> Processing Dependency: python-deltarpm for package: createrepo-0.9.9-18.el6.noarch
---> Package httpd-tools.x86_64 0:2.2.15-29.el6.centos will be updated
---> Package httpd-tools.x86_64 0:2.2.15-30.el6.centos will be an update
---> Package mod_ssl.x86_64 1:2.2.15-30.el6.centos will be installed
---> Package mod_wsgi.x86_64 0:3.2-6.el6_5 will be installed
---> Package python-cheetah.x86_64 0:2.4.1-1.el6 will be installed
---> Package pykickstart.noarch 0:1.74.14-1.el6 will be installed
--> Processing Dependency: python-pygments for package: python-cheetah-2.4.1-1.el6.x86_64
--> Processing Dependency: python-markdown for package: python-cheetah-2.4.1-1.el6.x86_64
---> Package python-netaddr.noarch 0:0.7.5-4.el6 will be installed
---> Package python-simplejson.x86_64 0:2.0.9-3.1.el6 will be installed
---> Package syslinux.x86_64 0:4.02-16.el6_5 will be installed
--> Processing Dependency: syslinux-nonlinux for package: syslinux-4.02-16.el6_5.x86_64
--> Running transaction check
---> Package libyaml.x86_64 0:0.1.6-1.el6 will be installed
---> Package python-deltarpm.x86_64 0:3.5-0.5.20090913git.el6 will be installed
--> Processing Dependency: deltarpm = 3.5-0.5.20090913git.el6 for package: python-deltarpm-3.5-
0.5.20090913git.el6.x86_64
---> Package python-markdown.noarch 0:2.0.1-3.1.el6 will be installed
---> Package python-pygments.noarch 0:1.1.1-1.el6 will be installed
--> Processing Dependency: python-setuptools for package: python-pygments-1.1.1-1.el6.noarch
---> Package syslinux-nonlinux.i686 0:4.02-16.el6_5 will be installed
--> Running transaction check
---> Package deltarpm.x86_64 0:3.5-0.5.20090913git.el6 will be installed
---> Package python-setuptools.noarch 0:0.6.10-3.el6 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

=======================================================================================================
 Package                    Arch            Version                             Repository        Size
=======================================================================================================
Installing:
 cobbler                    noarch          2.4.4-1.el6                         epel             666 k
 cobbler-web                noarch          2.4.4-1.el6                         epel             300 k
 mod_python                 x86_64          3.3.1-16.el6                        epel             293 k
 pykickstart                noarch          1.74.14-1.el6                       base             309 k
 tftp-server                x86_64          0.49-7.el6                          base              39 k
 xinetd                     x86_64          2:2.3.14-39.el6_4                   base             121 k
Updating:
 httpd                      x86_64          2.2.15-30.el6.centos                updates          821 k
 wget                       x86_64          1.12-1.11.el6_5                     updates          483 k
Installing for dependencies:
 Django14                   noarch          1.4.13-1.el6                        epel             4.3 M
 PyYAML                     x86_64          3.10-3.el6                          epel             157 k
 createrepo                 noarch          0.9.9-18.el6                        base              94 k
 deltarpm                   x86_64          3.5-0.5.20090913git.el6             base              71 k
 libyaml                    x86_64          0.1.6-1.el6                         epel              52 k
 mod_ssl                    x86_64          1:2.2.15-30.el6.centos              updates           91 k
 mod_wsgi                   x86_64          3.2-6.el6_5                         updates           66 k
 python-cheetah             x86_64          2.4.1-1.el6                         base             365 k
 python-deltarpm            x86_64          3.5-0.5.20090913git.el6             base              27 k
 python-markdown            noarch          2.0.1-3.1.el6                       base             118 k
 python-netaddr             noarch          0.7.5-4.el6                         base             1.0 M
 python-pygments            noarch          1.1.1-1.el6                         base             562 k
 python-setuptools          noarch          0.6.10-3.el6                        base             336 k
 python-simplejson          x86_64          2.0.9-3.1.el6                       base             126 k
 syslinux                   x86_64          4.02-16.el6_5                       updates          331 k
 syslinux-nonlinux          i686            4.02-16.el6_5                       updates          513 k
Updating for dependencies:
 httpd-tools                x86_64          2.2.15-30.el6.centos                updates           73 k

Transaction Summary
=======================================================================================================
Install      21 Package(s)
Upgrade       3 Package(s)

Total download size: 11 M
Downloading Packages:
(1/24): Django14-1.4.13-1.el6.noarch.rpm                                        | 4.3 MB     00:06
(2/24): PyYAML-3.10-3.el6.x86_64.rpm                                            | 157 kB     00:00
(3/24): cobbler-2.4.4-1.el6.noarch.rpm                                          | 666 kB     00:01
(4/24): cobbler-web-2.4.4-1.el6.noarch.rpm                                      | 300 kB     00:00
(5/24): createrepo-0.9.9-18.el6.noarch.rpm                                      |  94 kB     00:00
(6/24): deltarpm-3.5-0.5.20090913git.el6.x86_64.rpm                             |  71 kB     00:00
(7/24): httpd-2.2.15-30.el6.centos.x86_64.rpm                                   | 821 kB     00:00
(8/24): httpd-tools-2.2.15-30.el6.centos.x86_64.rpm                             |  73 kB     00:00
```

```
(9/24): libyaml-0.1.6-1.el6.x86_64.rpm                                           |  52 kB     00:00
(10/24): mod_python-3.3.1-16.el6.x86_64.rpm                                      | 293 kB     00:00
(11/24): mod_ssl-2.2.15-30.el6.centos.x86_64.rpm                                 |  91 kB     00:00
(12/24): mod_wsgi-3.2-6.el6_5.x86_64.rpm                                         |  66 kB     00:00
(13/24): python-cheetah-2.4.1-1.el6.x86_64.rpm                                   | 365 kB     00:00
(14/24): python-deltarpm-3.5-0.5.20090913git.el6.x86_64.rpm                      |  27 kB     00:00
(15/24): python-markdown-2.0.1-3.1.el6.noarch.rpm                                | 118 kB     00:00
(16/24): python-netaddr-0.7.5-4.el6.noarch.rpm                                   | 1.0 MB     00:00
(17/24): python-pygments-1.1.1-1.el6.noarch.rpm                                  | 562 kB     00:00
(18/24): python-setuptools-0.6.10-3.el6.noarch.rpm                               | 336 kB     00:00
(19/24): python-simplejson-2.0.9-3.1.el6.x86_64.rpm                              | 126 kB     00:00
(20/24): syslinux-4.02-16.el6_5.x86_64.rpm                                       | 331 kB     00:00
(21/24): syslinux-nonlinux-4.02-16.el6_5.i686.rpm                                | 513 kB     00:00
(22/24): tftp-server-0.49-7.el6.x86_64.rpm                                       |  39 kB     00:00
(23/24): wget-1.12-1.11.el6_5.x86_64.rpm                                         | 483 kB     00:00
(24/24): xinetd-2.3.14-39.el6_4.x86_64.rpm                                       | 121 kB     00:00
(24/24): pykickstart-1.74.14-1.el6.noarch.rpm                                    | 309 kB     00:00
-------------------------------------------------------------------------------------------------------
Total                                                                   710 kB/s |  11 MB     00:15

warning: rpmts_HdrFromFdno: Header V3 RSA/SHA256 Signature, key ID 0608b895: NOKEY
Retrieving key from file:///etc/pki/rpm-gpg/RPM-GPG-KEY-EPEL-6
Importing GPG key 0x0608B895:
 Userid : EPEL (6) <epel@fedoraproject.org>
 Package: epel-release-6-8.noarch (installed)
 From   : /etc/pki/rpm-gpg/RPM-GPG-KEY-EPEL-6
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
Warning: RPMDB altered outside of yum.
  Installing : syslinux-nonlinux-4.02-16.el6_5.i686                                               1/27
  Installing : syslinux-4.02-16.el6_5.x86_64                                                      2/27
  Installing : python-simplejson-2.0.9-3.1.el6.x86_64                                             3/27
  Installing : Django14-1.4.13-1.el6.noarch                                                       4/27
  Installing : python-setuptools-0.6.10-3.el6.noarch                                              5/27
  Installing : python-pygments-1.1.1-1.el6.noarch                                                 6/27
  Installing : python-markdown-2.0.1-3.1.el6.noarch                                               7/27
  Installing : python-cheetah-2.4.1-1.el6.x86_64                                                  8/27
  Installing : python-netaddr-0.7.5-4.el6.noarch                                                  9/27
  Installing : deltarpm-3.5-0.5.20090913git.el6.x86_64                                           10/27
  Installing : python-deltarpm-3.5-0.5.20090913git.el6.x86_64                                    11/27
  Installing : createrepo-0.9.9-18.el6.noarch                                                    12/27
  Installing : 2:xinetd-2.3.14-39.el6_4.x86_64                                                   13/27
  Installing : tftp-server-0.49-7.el6.x86_64                                                     14/27
  Installing : libyaml-0.1.6-1.el6.x86_64                                                        15/27
  Installing : PyYAML-3.10-3.el6.x86_64                                                          16/27
  Updating   : httpd-tools-2.2.15-30.el6.centos.x86_64                                           17/27
  Updating   : httpd-2.2.15-30.el6.centos.x86_64                                                 18/27
  Installing : mod_wsgi-3.2-6.el6_5.x86_64                                                       19/27
  Installing : cobbler-2.4.4-1.el6.noarch                                                        20/27
  Installing : 1:mod_ssl-2.2.15-30.el6.centos.x86_64                                             21/27
  Installing : cobbler-web-2.4.4-1.el6.noarch                                                    22/27
  Installing : mod_python-3.3.1-16.el6.x86_64                                                    23/27
  Updating   : wget-1.12-1.11.el6_5.x86_64                                                       24/27
  Cleanup    : httpd-2.2.15-29.el6.centos.x86_64                                                 25/27
  Cleanup    : httpd-tools-2.2.15-29.el6.centos.x86_64                                           26/27
  Cleanup    : wget-1.12-1.8.el6.x86_64                                                          27/27
  Verifying  : httpd-2.2.15-30.el6.centos.x86_64                                                  1/27
  Verifying  : httpd-tools-2.2.15-30.el6.centos.x86_64                                            2/27
  Verifying  : cobbler-web-2.4.4-1.el6.noarch                                                     3/27
  Verifying  : mod_wsgi-3.2-6.el6_5.x86_64                                                        4/27
  Verifying  : 1:mod_ssl-2.2.15-30.el6.centos.x86_64                                              5/27
  Verifying  : syslinux-4.02-16.el6_5.x86_64                                                      6/27
  Verifying  : libyaml-0.1.6-1.el6.x86_64                                                         7/27
  Verifying  : mod_python-3.3.1-16.el6.x86_64                                                     8/27
  Verifying  : wget-1.12-1.11.el6_5.x86_64                                                        9/27
  Verifying  : python-simplejson-2.0.9-3.1.el6.x86_64                                            10/27
  Verifying  : 2:xinetd-2.3.14-39.el6_4.x86_64                                                   11/27
  Verifying  : deltarpm-3.5-0.5.20090913git.el6.x86_64                                           12/27
  Verifying  : tftp-server-0.49-7.el6.x86_64                                                     13/27
  Verifying  : python-netaddr-0.7.5-4.el6.noarch                                                 14/27
  Verifying  : python-pygments-1.1.1-1.el6.noarch                                                15/27
  Verifying  : Django14-1.4.13-1.el6.noarch                                                      16/27
  Verifying  : python-cheetah-2.4.1-1.el6.x86_64                                                 17/27
  Verifying  : python-markdown-2.0.1-3.1.el6.noarch                                              18/27
  Verifying  : createrepo-0.9.9-18.el6.noarch                                                    19/27
  Verifying  : python-setuptools-0.6.10-3.el6.noarch                                             20/27
  Verifying  : python-deltarpm-3.5-0.5.20090913git.el6.x86_64                                    21/27
  Verifying  : syslinux-nonlinux-4.02-16.el6_5.i686                                              22/27
  Verifying  : cobbler-2.4.4-1.el6.noarch                                                        23/27
  Verifying  : PyYAML-3.10-3.el6.x86_64                                                   24/27
  Verifying  : httpd-2.2.15-29.el6.centos.x86_64                                          25/27
  Verifying  : wget-1.12-1.8.el6.x86_64                                                   26/27
  Verifying  : httpd-tools-2.2.15-29.el6.centos.x86_64                                    27/27

Installed:
  cobbler.noarch 0:2.4.4-1.el6     cobbler-web.noarch 0:2.4.4-1.el6  mod_python.x86_64 0:3.3.1-16.el6
  tftp-server.x86_64 0:0.49-7.el6  xinetd.x86_64 2:2.3.14-39.el6_4

Dependency Installed:
  Django14.noarch 0:1.4.13-1.el6                        PyYAML.x86_64 0:3.10-3.el6
  createrepo.noarch 0:0.9.9-18.el6                      deltarpm.x86_64 0:3.5-0.5.20090913git.el6
  libyaml.x86_64 0:0.1.6-1.el6                          mod_ssl.x86_64 1:2.2.15-30.el6.centos
  mod_wsgi.x86_64 0:3.2-6.el6_5                         python-cheetah.x86_64 0:2.4.1-1.el6
  python-deltarpm.x86_64 0:3.5-0.5.20090913git.el6      python-markdown.noarch 0:2.0.1-3.1.el6
  python-netaddr.noarch 0:0.7.5-4.el6                   python-pygments.noarch 0:1.1.1-1.el6
  python-setuptools.noarch 0:0.6.10-3.el6               python-simplejson.x86_64 0:2.0.9-3.1.el6
  syslinux.x86_64 0:4.02-16.el6_5                       syslinux-nonlinux.i686 0:4.02-16.el6_5
  pykickstart.noarch 0:1.74.14-1.el6

Updated:
  httpd.x86_64 0:2.2.15-30.el6.centos                   wget.x86_64 0:1.12-1.11.el6_5

Dependency Updated:
  httpd-tools.x86_64 0:2.2.15-30.el6.centos

Complete!
[root@cobbler /]#
```

Before Cobbler can be configured and enabled, dependent utilities such as rsync and tftp need to be enabled and started, and tftp also needs to start every time the Cobbler VM starts. In both the `rsync` and `tftp` files, change **`disable = yes`** to **`disable = no`** as shown below:

```
[root@cobbler /]# vi /etc/xinetd.d/rsync

# default: off
# description: The rsync server is a good addition to an ftp server, as it \
#       allows crc checksumming etc.
service rsync
{
        disable = no
        flags           = IPv6
        socket_type     = stream
        wait            = no
        user            = root
        server          = /usr/bin/rsync
        server_args     = --daemon
        log_on_failure  += USERID
}
```

```
[root@cobbler /]# vi /etc/xinetd.d/tftp

# default: off
# description: The tftp server serves files using the trivial file transfer \
#       protocol.  The tftp protocol is often used to boot diskless \
#       workstations, download configuration files to network-aware printers, \
#       and to start the installation process for some operating systems.
service tftp
{
        socket_type             = dgram
        protocol                = udp
        wait                    = yes
        user                    = root
        server                  = /usr/sbin/in.tftpd
        server_args             = -s /var/lib/tftpboot
        disable                 = no
        per_source              = 11
        cps                     = 100 2
        flags                   = IPv4
}
```

This process controls whether tftp is started when xinetd starts. Now we need to restart the xinetd service using the command below:

```
[root@cobbler /]# service xinetd restart
Stopping xinetd: [FAILED]
Starting xinetd: [  OK  ]
```

The FAILED under xinetd stopping is to be expected. Now we need to check and make sure that xinetd and tftp services start whenever the Cobbler VM starts:

```
[root@cobbler /]# chkconfig --list xinetd
xinetd          0:off   1:off   2:off   3:on    4:on    5:on    6:off
[root@cobbler /]# chkconfig --list tftp
tftp            on
```

Once the prerequisite services are running and configured, the services related to Cobbler itself, namely httpd and cobblerd, can be started and set to autostart whenever the Cobbler VM starts. The following commands take care of this:

```
[root@cobbler /]# service httpd restart
Stopping httpd:     [FAILED]
Starting httpd:     [  OK  ]

[root@cobbler /]# service cobblerd restart
Stopping cobbler daemon: [FAILED]
Starting cobbler daemon: [  OK  ]

[root@cobbler /]# chkconfig httpd on
[root@cobbler /]# chkconfig cobblerd on

[root@cobbler /]# chkconfig --list httpd
httpd           0:off   1:off   2:on    3:on    4:on    5:on    6:off

[root@cobbler /]# chkconfig --list cobblerd
cobblerd        0:off   1:off   2:on    3:on    4:on    5:on    6:off
```

At this point in the process reboot the Cobbler VM to make sure that services start properly and the environment is prepared for Cobbler configuration.

```
[root@cobbler /]# shutdown -r now
Broadcast message from root@cobbler.comcast.com
        (/dev/pts/0) at 11:37 ...

The system is going down for reboot NOW!

<AFTER COBBLER REBOOT>
```

As part of the initial Cobbler configuration, the latest boot loaders need to be downloaded from www.cobblerd.org. This is done using the cobbler get-loaders command.

```
[root@cobbler ~]# cobbler get-loaders
httpd does not appear to be running and proxying cobbler, or SELinux is in the way. Original
traceback:
Traceback (most recent call last):
  File "/usr/lib/python2.6/site-packages/cobbler/cli.py", line 252, in check_setup
    s.ping()
  File "/usr/lib64/python2.6/xmlrpclib.py", line 1199, in __call__
    return self.__send(self.__name, args)
  File "/usr/lib64/python2.6/xmlrpclib.py", line 1489, in __request
    verbose=self.__verbose
  File "/usr/lib64/python2.6/xmlrpclib.py", line 1243, in request
    headers
ProtocolError: <ProtocolError for 127.0.0.1:80/cobbler_api: 502 Proxy Error>
```

Note: Anytime the error above is displayed it generally means that the httpd service needs to be restarted. Restart httpd and execute the cobbler get-loaders command again.

```
[root@cobbler ~]# service httpd restart
Stopping httpd: [  OK  ]
Starting httpd: httpd: Could not reliably determine the server's fully qualified domain name,
using cobbler.comcast.com for ServerName
[  OK  ]

[root@cobbler ~]# cobbler get-loaders
task started: 2014-07-20_113903_get_loaders
task started (id=Download Bootloader Content, time=Sun Jul 20 11:39:03 2014)
downloading http://www.cobblerd.org/loaders/README to /var/lib/cobbler/loaders/README
downloading http://www.cobblerd.org/loaders/COPYING.elilo to /var/lib/cobbler/loaders/COPYING.elilo
downloading http://www.cobblerd.org/loaders/COPYING.yaboot to /var/lib/cobbler/loaders/COPYING.yaboot
downloading http://www.cobblerd.org/loaders/COPYING.syslinux to /var/lib/cobbler/loaders/COPYING.syslinux
downloading http://www.cobblerd.org/loaders/elilo-3.8-ia64.efi to /var/lib/cobbler/loaders/elilo-ia64.efi
downloading http://www.cobblerd.org/loaders/yaboot-1.3.14-12 to /var/lib/cobbler/loaders/yaboot
downloading http://www.cobblerd.org/loaders/pxelinux.0-3.86 to /var/lib/cobbler/loaders/pxelinux.0
downloading http://www.cobblerd.org/loaders/menu.c32-3.86 to /var/lib/cobbler/loaders/menu.c32
downloading http://www.cobblerd.org/loaders/grub-0.97-x86.efi to /var/lib/cobbler/loaders/grub-x86.efi
downloading http://www.cobblerd.org/loaders/grub-0.97-x86_64.efi to /var/lib/cobbler/loaders/grub-x86_64.efi
*** TASK COMPLETE ***
[root@cobbler ~]#
```

The next important step in getting Cobbler configured is to edit the Cobbler settings file located in the /etc/cobbler directory. The following entries need to be changed in order to Cobbler to work properly:

Original Setting	New Setting
next_server: 127.0.0.1	next_server: 172.16.1.1
server: 127.0.0.1	server: 172.16.1.1
default_password_crypted: “$1$mF86/UHC$WvcIcX2t6crBz2onWxyac.”	A password of your choosing that is generated with the openssl command as shown below

Generate a new encrypted default password using the openssl command:

```
[root@cobbler /]# openssl passwd -1 'P@ssw0rd'
$1$HSZ6fep.$OZuwxl1eGQGDlpHxtpQ4p.
```

Edit the /etc/cobbler/settings file and make the appropriate changes

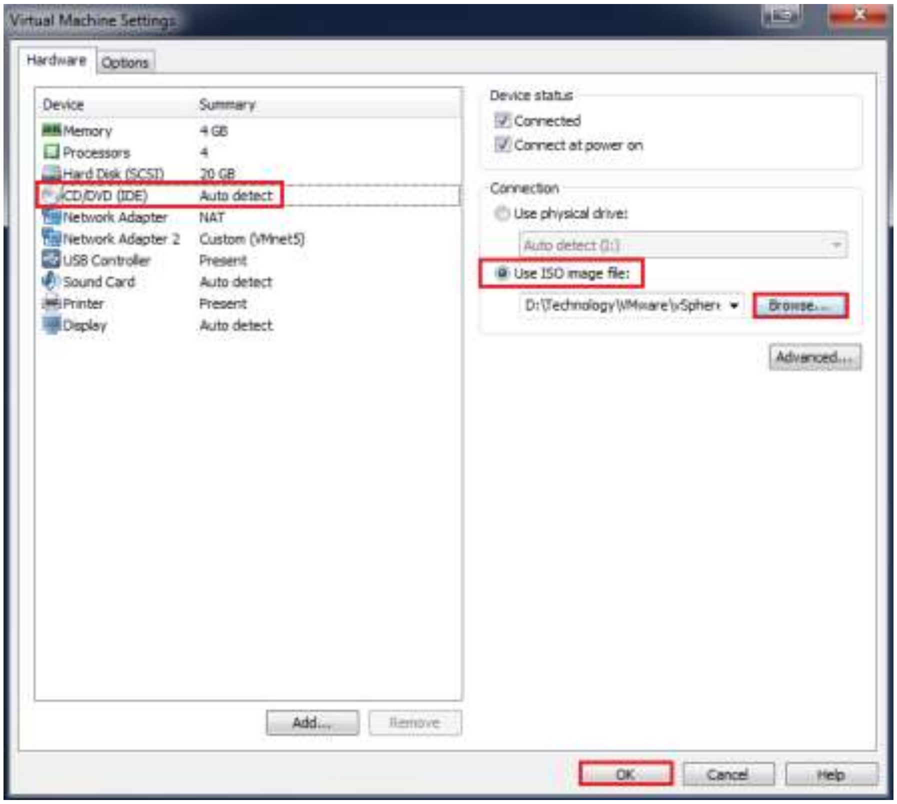
Once the changes identified above have been made to the /etc/cobbler/settings file, restart the cobblerd service for the settings to take effect, then run a cobbler check to verify functionality.

```
[root@cobbler /]# service cobblerd restart
Stopping cobbler daemon: [  OK  ]
Starting cobbler daemon: [  OK  ]

[root@cobbler /]# cobbler check
The following are potential configuration items that you may want to fix:
```

```
1 : debmirror package is not installed, it will be required to manage debian
deployments and repositories
2 : fencing tools were not found, and are required to use the (optional) power
management features. install cman or fence-agents to use them

Restart cobblerd and then run 'cobbler sync' to apply changes.
```

The two items listed above are to be expected and are normal. At this point Cobbler is working normally and is ready to accept Linux and ESXi distributions. The configuration steps listed below show how to import Linux and ESXi distributions, resync Cobbler, edit the PXE boot menu, and successfully use Cobbler to zero touch distribute ESXi automatically.

The first step is to mount the ESXi ISO to the Cobbler VM:



Virtual Machine Settings

Device	Summary
Memory	4 GB
Processors	4
Hard Disk (SCSI)	20 GB
CD/DVD (IDE)	Auto detect
Network Adapter	NAT
Network Adapter 2	Custom (VMnet5)
USB Controller	Present
Sound Card	Auto detect
Printer	Present
Display	Auto detect

Device status
☑ Connected
☑ Connect at power on

Connection
○ Use physical drive:
Auto detect (I:)
● Use ISO image file:
D:\Technology\VMware\vSpher

The location of the ESXi ISO media in the Cobbler VM will depend on what platform Cobbler is being integrated within. Since this example uses CentOS, the ESXi ISO is automatically mounted in the /media directory:

```
[root@cobbler /]# ls /media/ESXI-5.5U1-1623589-ROLLUPISO-STA/
a.b00         esx-dvfi.v00  misc-dri.v00  net-sfc.v00   scsi-adp.v01  scsi-mpt.v03
ata-pata.v00  ima-be2i.v00  mtip32xx.v00  net-tg3.v00   scsi-aic.v00  scsi-qla.v00
ata-pata.v01  ima-qla4.v00  net-be2n.v00  net-vmxn.v00  scsi-be2.v00  scsi-qla.v01
ata-pata.v02  imgdb.tgz     net-bna.v00   ohci-usb.v00  scsi-bnx.v00  s.v00
ata-pata.v03  imgpayld.tgz  net-bnx2.v00  qlnative.v00  scsi-bnx.v01  tboot.b00
ata-pata.v04  ipmi-ipm.v00  net-bnx2.v01  rste.v00      scsi-fni.v00  tools.t00
ata-pata.v05  ipmi-ipm.v01  net-cnic.v00  safeboot.c32  scsi-hfc.v00  uhci-usb.v00
ata-pata.v06  ipmi-ipm.v02  net-e100.v00  sas-vgc.v00   scsi-hps.v00  upgrade
ata-pata.v07  isolinux.bin  net-e100.v01  sata-ahc.v00  scsi-iom.v00  user.b00
b.b00         isolinux.cfg  net-enic.v00  sata-ata.v00  scsi-ips.v00  useropts.gz
block-cc.v00  jumpstrt.gz   net-forc.v00  sata-sat.v00  scsi-lpf.v00  vmware-esx-base-osl.txt
```

```
boot.cat      k.b00         net-igb.v00   sata-sat.v01  scsi-meg.v00  vmware-esx-base-readme
boot.cfg      lpfc.v00      net-ixgb.v00  sata-sat.v02  scsi-meg.v01  weaselin.t00
chardevs.b00  lsi-mr3.v00   net-mlx4.v00  sata-sat.v03  scsi-meg.v02  xlibs.v00
efi           lsi-msgp.v00  net-mlx4.v01  sata-sat.v04  scsi-meg.v03  xorg.v00
efiboot.img   mboot.c32     net-nx-n.v00  sb.v00        scsi-mpt.v00
ehci-ehc.v00  menu.c32      net-qlcn.v00  scsi-aac.v00  scsi-mpt.v01
elxnet.v00    misc-cni.v00  net-qlge.v00  scsi-adp.v00  scsi-mpt.v02
```

Once the ISO is accessible to the Cobbler VM, it can be imported into Cobbler for distribution. This process will take a few minutes to complete as all of the ESXi bits are being copied into Cobbler.

```
[root@cobbler /]# cobbler import --name=ESXI55U1 --path=/media/ESXI-5.5U1-1623589-ROLLUPISO-STA/

task started: 2014-07-21_055825_import
task started (id=Media import, time=Mon Jul 21 05:58:25 2014)
Found a candidate signature: breed=vmware, version=esxi51
running: /usr/bin/file /var/www/cobbler/ks_mirror/ESXI55U1/s.v00
received on stdout: /var/www/cobbler/ks_mirror/ESXI55U1/s.v00: gzip compressed data, was
"vmvisor-sys.tar.vtar", from Unix, last modified: Fri Feb 21 17:45:51 2014

received on stderr:
Found a candidate signature: breed=vmware, version=esxi55
running: /usr/bin/file /var/www/cobbler/ks_mirror/ESXI55U1/s.v00
received on stdout: /var/www/cobbler/ks_mirror/ESXI55U1/s.v00: gzip compressed data, was
"vmvisor-sys.tar.vtar", from Unix, last modified: Fri Feb 21 17:45:51 2014

received on stderr:
Found a matching signature: breed=vmware, version=esxi55
Adding distros from path /var/www/cobbler/ks_mirror/ESXI55U1:
running: /usr/bin/file /var/www/cobbler/ks_mirror/ESXI55U1/tools.t00
received on stdout: /var/www/cobbler/ks_mirror/ESXI55U1/tools.t00: gzip compressed data, from
Unix, last modified: Fri Feb 21 17:44:34 2014

received on stderr:
creating new distro: ESXI55U1-x86_64
trying symlink: /var/www/cobbler/ks_mirror/ESXI55U1 -> /var/www/cobbler/links/ESXI55U1-x86_64
creating new profile: ESXI55U1-x86_64
associating repos
*** TASK COMPLETE ***
```

To verify that Cobbler has successfully imported the ESXi distribution, use the `cobbler profile list` command to list out the Cobbler profiles, then use the `cobbler distro report` command to get the specific distribution report:

```
[root@cobbler /]# cobbler profile list
   ESXI55U1-x86_64

[root@cobbler /]# cobbler distro report --name=ESXI55U1-x86_64
Name                           : ESXI55U1-x86_64
Architecture                   : x86_64
TFTP Boot Files                : {'$local_img_path/*.*':
'/var/www/cobbler/ks_mirror/ESXI55U1/*.*'}
Breed                          : vmware
Comment                        :
Fetchable Files                : {}
Initrd                         : /var/www/cobbler/ks_mirror/ESXI55U1/imgpayld.tgz
Kernel                         : /var/www/cobbler/ks_mirror/ESXI55U1/mboot.c32
Kernel Options                 : {}
Kernel Options (Post Install)  : {}
Kickstart Metadata             : {'tree': 'http://@@http_server@@/cblr/links/ESXI55U1-x86_64'}
Management Classes             : []
OS Version                     : esxi55
Owners                         : ['admin']
Red Hat Management Key         : <<inherit>>
Red Hat Management Server      : <<inherit>>
Template Files                 : {'/etc/cobbler/pxe/bootcfg_esxi55.template':
'$local_img_path/cobbler-boot.cfg'}
```

Next, whenever an OS distribution gets added to Cobbler, a cobbler sync needs to be performed so that the necessary boot files and configuration files are moved into their appropriate locations.

```
[root@cobbler dhcp]# cobbler sync

task started: 2014-07-21_074056_sync
task started (id=Sync, time=Mon Jul 21 07:40:56 2014)
running pre-sync triggers
cleaning trees
removing: /var/www/cobbler/images/ESXI55U1-x86_64
removing: /var/lib/tftpboot/pxelinux.cfg/default
removing: /var/lib/tftpboot/grub/efidefault
removing: /var/lib/tftpboot/grub/images
removing: /var/lib/tftpboot/grub/grub-x86.efi
removing: /var/lib/tftpboot/grub/grub-x86_64.efi
removing: /var/lib/tftpboot/images/ESXI55U1-x86_64
removing: /var/lib/tftpboot/s390x/profile_list
copying bootloaders
trying hardlink /var/lib/cobbler/loaders/grub-x86.efi -> /var/lib/tftpboot/grub/grub-
x86.efi
trying hardlink /var/lib/cobbler/loaders/grub-x86_64.efi ->
/var/lib/tftpboot/grub/grub-x86_64.efi
copying distros to tftpboot
copying files for distro: ESXI55U1-x86_64
trying hardlink /var/www/cobbler/ks_mirror/ESXI55U1/mboot.c32 ->
/var/lib/tftpboot/images/ESXI55U1-x86_64/mboot.c32
trying hardlink /var/www/cobbler/ks_mirror/ESXI55U1/imgpayld.tgz ->
/var/lib/tftpboot/images/ESXI55U1-x86_64/imgpayld.tgz
copying images
generating PXE configuration files
generating PXE menu structure
copying files for distro: ESXI55U1-x86_64
trying hardlink /var/www/cobbler/ks_mirror/ESXI55U1/mboot.c32 ->
/var/www/cobbler/images/ESXI55U1-x86_64/mboot.c32
trying hardlink /var/www/cobbler/ks_mirror/ESXI55U1/imgpayld.tgz ->
/var/www/cobbler/images/ESXI55U1-x86_64/imgpayld.tgz
Writing template files for ESXI55U1-x86_64
generating: /var/lib/tftpboot/images/ESXI55U1-x86_64/cobbler-boot.cfg
rendering TFTPD files
generating /etc/xinetd.d/tftp
processing boot_files for distro: ESXI55U1-x86_64
cleaning link caches
running post-sync triggers
running python triggers from /var/lib/cobbler/triggers/sync/post/*
running python trigger cobbler.modules.sync_post_restart_services
running shell triggers from /var/lib/cobbler/triggers/sync/post/*
running python triggers from /var/lib/cobbler/triggers/change/*
running python trigger cobbler.modules.scm_track
running shell triggers from /var/lib/cobbler/triggers/change/*
*** TASK COMPLETE ***
```

During testing it has been determined that the **cobbler-boot.cfg** file that is generated by Cobbler is incorrect. It should be replaced with the file below. Note that the IP address used is the same one as used in this example. Be sure to change this based on your previous selection.

File Location: **/var/lib/tftpboot/images/ESXI55U1-x86_64/cobbler-boot.cfg**

File Contents:

```
bootstate=0
title=Loading ESXi installer
prefix=/images/ESXI55U1-x86_64/
kernel=tboot.b00
kernelopt=runweasel ks=http://172.16.1.1:80/cblr/svc/op/ks/profile/ESXI55U1-x86_64
modules=b.b00 --- jumpstrt.gz --- useropts.gz --- k.b00 --- chardevs.b00 --- a.b00 --- user.b00 -
-- scsi-aac.v00 --- scsi-adp.v00 --- misc-cni.v00 --- net-bnx2.v00 --- net-bnx2.v01 --- net-
cnic.v00 --- net-tg3.v00 --- scsi-bnx.v00 --- scsi-bnx.v01 --- net-bna.v00 --- net-enic.v00 ---
elxnet.v00 --- ima-be2i.v00 --- lpfc.v00 --- scsi-be2.v00 --- scsi-iom.v00 --- scsi-hps.v00 ---
scsi-hfc.v00 --- net-ixgb.v00 --- scsi-meg.v00 --- scsi-meg.v01 --- scsi-mpt.v00 --- scsi-mpt.v01
--- mtip32xx.v00 --- net-mlx4.v00 --- net-nx-n.v00 --- net-qlcn.v00 --- qlnative.v00 --- net-
sfc.v00 --- ata-pata.v00 --- ata-pata.v01 --- ata-pata.v02 --- ata-pata.v03 --- ata-pata.v04 ---
ata-pata.v05 --- ata-pata.v06 --- ata-pata.v07 --- block-cc.v00 --- ehci-ehc.v00 --- s.v00 ---
sb.v00 --- weaselin.t00 --- esx-dvfi.v00 --- xlibs.v00 --- ima-qla4.v00 --- ipmi-ipm.v00 ---
ipmi-ipm.v01 --- ipmi-ipm.v02 --- lsi-mr3.v00 --- lsi-msgp.v00 --- misc-dri.v00 --- net-be2n.v00
--- net-e100.v00 --- net-e100.v01 --- net-forc.v00 --- net-igb.v00 --- net-mlx4.v01 --- net-
qlge.v00 --- net-vmxn.v00 --- ohci-usb.v00 --- rste.v00 --- sata-ahc.v00 --- sata-ata.v00 ---
sata-sat.v00 --- sata-sat.v01 --- sata-sat.v02 --- sata-sat.v03 --- sata-sat.v04 --- scsi-adp.v01
--- scsi-aic.v00 --- scsi-ips.v00 --- scsi-lpf.v00 --- scsi-meg.v02 --- scsi-meg.v03 --- scsi-
mpt.v02 --- scsi-mpt.v03 --- scsi-qla.v00 --- scsi-qla.v01 --- uhci-usb.v00 --- tools.t00 ---
sas-vgc.v00 --- scsi-fni.v00 --- xorg.v00 --- imgdb.tgz --- imgpayld.tgz
build=
updated=0
```

In addition to this, some files within the **/var/lib/tftpboot/images/ESXI55U1-x86_64/** directory are not accessible during the installation. Use the following **chmod** command to make all files readable by the PXE boot process:

```
[root@cobbler /]# chmod 644 /var/lib/tftpboot/images/ESXI55U1-x86_64/*
```

The last change that needs to be made has to do with how the kickstart file is dynamically created using the Python snippets code that is provided by cobbler. The template for the ESXi 5.x version is shown below:

```
[root@cobbler kickstarts]# pwd
/var/lib/cobbler/kickstarts
[root@cobbler kickstarts]# cat sample_esxi5.ks
#
# Sample scripted installation file
# for ESXi 5+
#

vmaccepteula
reboot --noeject
rootpw --iscrypted $default_password_crypted

install --firstdisk --overwritevmfs
clearpart --firstdisk --overwritevmfs

$SNIPPET('network_config')          < - - - - This produces errors!

%pre --interpreter=busybox

$SNIPPET('kickstart_start')
$SNIPPET('pre_install_network_config')

%post --interpreter=busybox

$SNIPPET('kickstart_done')
```

This generates a dynamic kickstart that looks like this, where the error is shown below in red:

```
# Sample scripted installation file
# for ESXi 5+

vmaccepteula
reboot --noeject
rootpw --iscrypted $1$HSZ6fep.$OZuwxl1eGQGDlpHxtpQ4p.

install --firstdisk --overwritevmfs
clearpart --firstdisk --overwritevmfs

network --bootproto=dhcp --device=eth0 --onboot=on

%pre --interpreter=busybox

wget "http://172.16.1.1/cblr/svc/op/trig/mode/pre/profile/ESXI55U1-x86_64" -O /dev/null

%post --interpreter=busybox

wget "http://172.16.1.1/cblr/svc/op/ks/profile/ESXI55U1-x86_64" -O /var/log/cobbler.ks
wget "http://172.16.1.1/cblr/svc/op/trig/mode/post/profile/ESXI55U1-x86_64" -O /dev/null
```

The network_config snippet needs to be edited to fix this problem for ESXi. Edit the network_config file and change the line as described below:

Backup the original network_config file:

```
[root@cobbler /]# cp /var/lib/cobbler/snippets/network_config /var/lib/cobbler/snippets/network_config.old
```

Edit the network_config file and change this line:

```
network --bootproto=dhcp --device=eth0 --onboot=on
```

To this line:

```
network --bootproto=dhcp --device=vmnic0
```

The last adjustment that needs to be made is to the PXE default menu to enable zero touch deployments. Each time the **`cobbler sync`** command is executed the PXE default menu is regenerated. At this time there is only one version of ESXi that has been assimilated into Cobbler. The PXE default menu will be changed to automatically select ESXi Version 5.5 Update 1 in 10 seconds after the menu is displayed.

Edit the **`/var/lib/tftpboot/pxelinux.cfg/default`** file. The original default file looks like this:

```
DEFAULT menu
PROMPT 0
MENU TITLE Cobbler | http://www.cobblerd.org/
TIMEOUT 200
TOTALTIMEOUT 6000
ONTIMEOUT local

LABEL local
        MENU LABEL (local)
        MENU DEFAULT
        LOCALBOOT -1

LABEL ESXI55U1-x86_64
        kernel /images/ESXI55U1-x86_64/mboot.c32
        MENU LABEL ESXI55U1-x86_64
        ipappend 2
        append -c /images/ESXI55U1-x86_64/cobbler-boot.cfg

MENU end
```

After making a backup copy of the original file, edit it to look like the following:

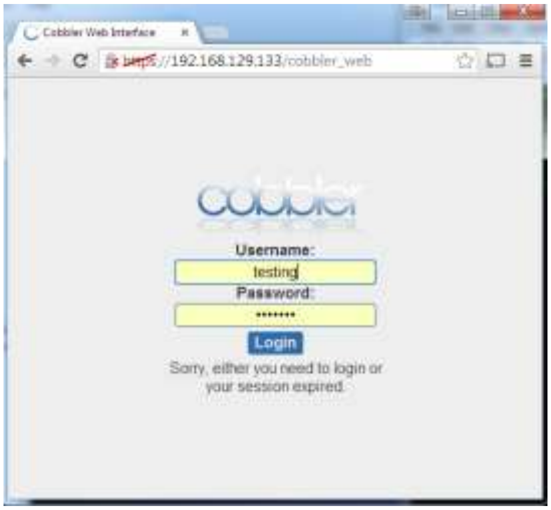
```
PROMPT 0
MENU TITLE Automatic ESXi Installer | Vsphere ESXi Version 5.5 Update 1
TIMEOUT 100
TOTALTIMEOUT 6000
ONTIMEOUT ESXI55U1-x86_64

LABEL local
        MENU LABEL (local)
        LOCALBOOT -1

LABEL ESXI55U1-x86_64
        kernel /images/ESXI55U1-x86_64/mboot.c32
        MENU LABEL ESXi Version 5.5 Update 1
        MENU DEFAULT
        ipappend 2
        append -c /images/ESXI55U1-x86_64/cobbler-boot.cfg

MENU end
```

Once this process has been completed, Cobbler is ready to be tested from within VMware Workstation. The following pages will provide guidance on how to setup the test ESXi VM and boot it so that it loads ESXi off of the Cobbler VM.

Optional: To use the previously installed Cobbler web interface, the web interface needs to be enabled and the cobblerd and httpd services need to be started. The following steps demonstrate this:

```
[root@cobbler /]# sed -i 's/module = authn_denyall/module = authn_testing/g'
/etc/cobbler/modules.conf

[root@cobbler /]# service cobblerd restart
Stopping cobbler daemon: [  OK  ]
Starting cobbler daemon: [  OK  ]

[root@cobbler /]# service httpd restart
Stopping httpd:    [  OK  ]
Starting httpd:    [  OK  ]
```

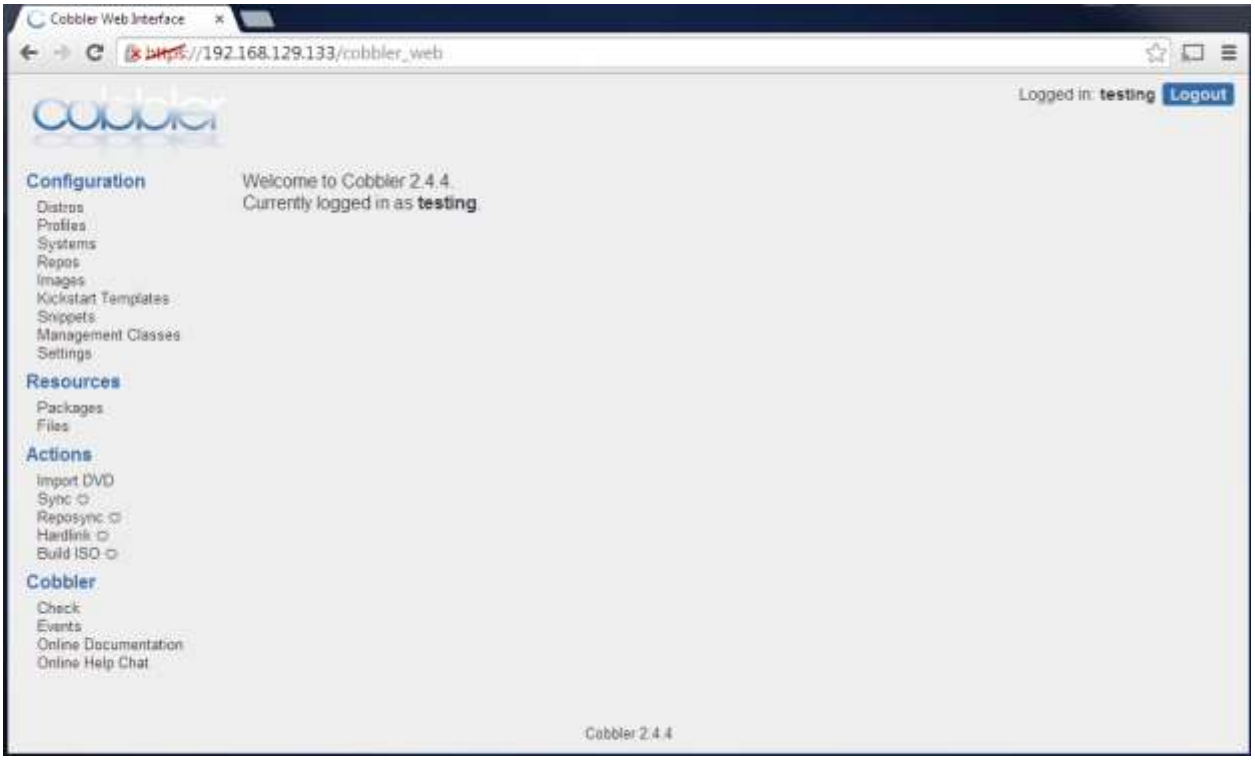
Browse to Cobbler’s management webpage at: https://cobbler_ip_address/cobbler_web
In my example this URL is: https://192.168.129.133/cobbler_web



Username: testing
Password: •••••••

Sorry, either you need to login or your session expired.

Cobbler web page logon screen. Use the userid **`testing`** with a password of **`testing`** to gain access.



Logged in: **testing**

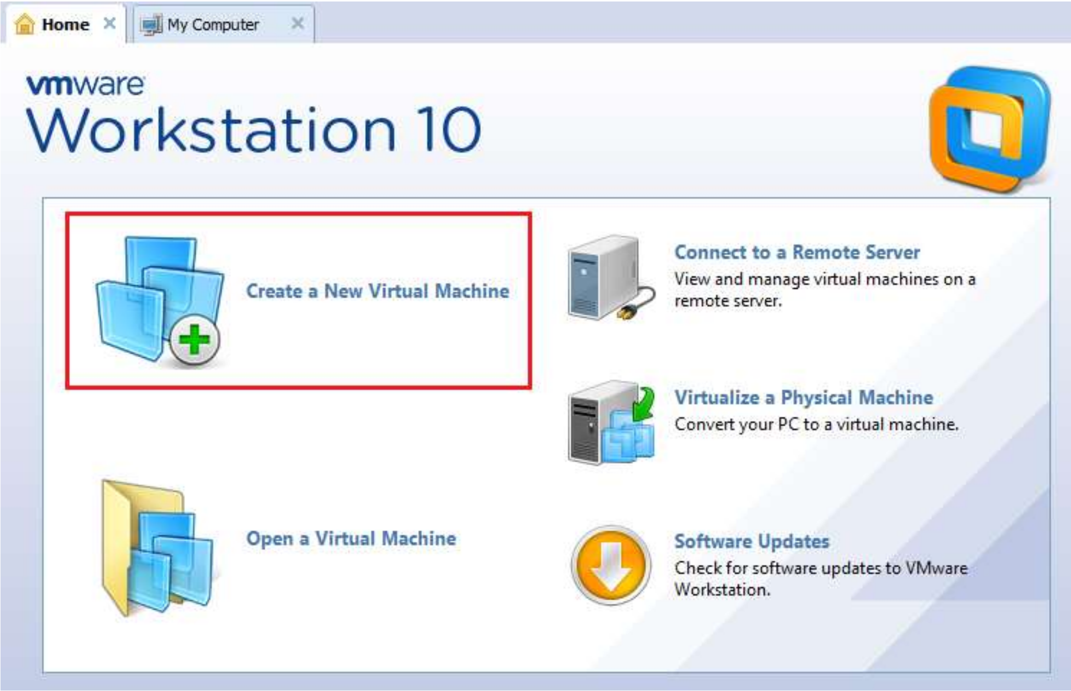
Welcome to Cobbler 2.4.4.
Currently logged in as **testing**.

Cobbler 2.4.4

Cobbler management webpage. Explore the different things that can be done from within this management web interface to see how it can be utilized.

Testing Cobbler on VMware Workstation

Create a test ESXi virtual machine to test the Cobbler PXE boot and installation process:



Create a New Virtual Machine

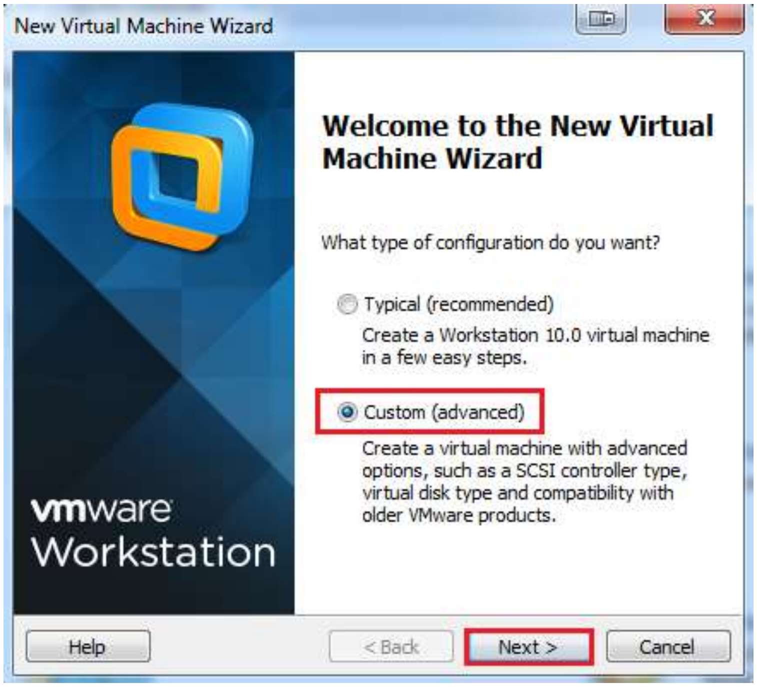
Open a Virtual Machine

Connect to a Remote Server
View and manage virtual machines on a remote server.

Virtualize a Physical Machine
Convert your PC to a virtual machine.

Software Updates
Check for software updates to VMware Workstation.

Create a new Virtual Machine



Welcome to the New Virtual Machine Wizard

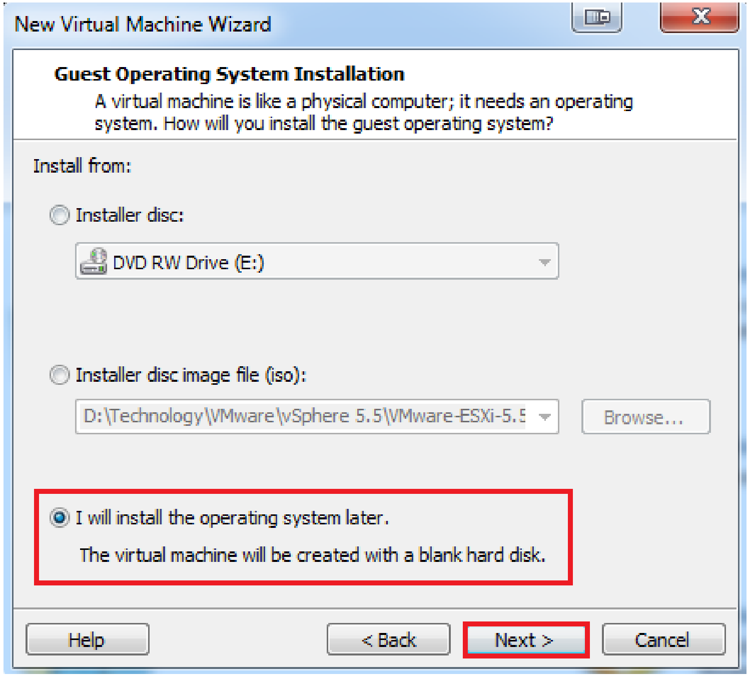
What type of configuration do you want?

○ Typical (recommended)
Create a Workstation 10.0 virtual machine in a few easy steps.

● Custom (advanced)
Create a virtual machine with advanced options, such as a SCSI controller type, virtual disk type and compatibility with older VMware products.

Choose Custom, then click next

Click next on the Choose the Virtual Machine Hardware Compatibility screen



New Virtual Machine Wizard

Guest Operating System Installation

A virtual machine is like a physical computer; it needs an operating system. How will you install the guest operating system?

Install from:

○ Installer disc:

DVD RW Drive (E:)

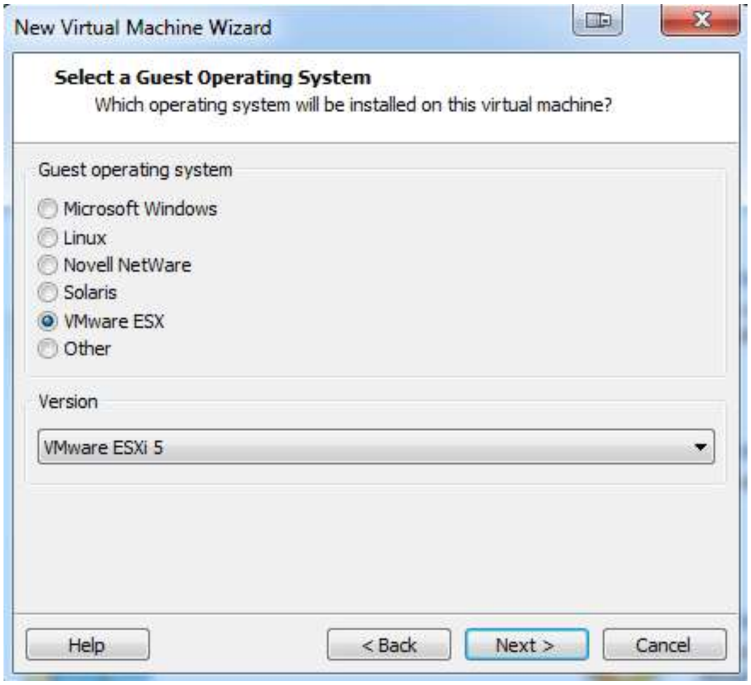
○ Installer disc image file (iso):

D:\Technology\VMware\vSphere 5.5\VMware-ESXi-5.5

● I will install the operating system later.

The virtual machine will be created with a blank hard disk.

Select “I will install the operating system later” radio button and click next.



New Virtual Machine Wizard

Select a Guest Operating System

Which operating system will be installed on this virtual machine?

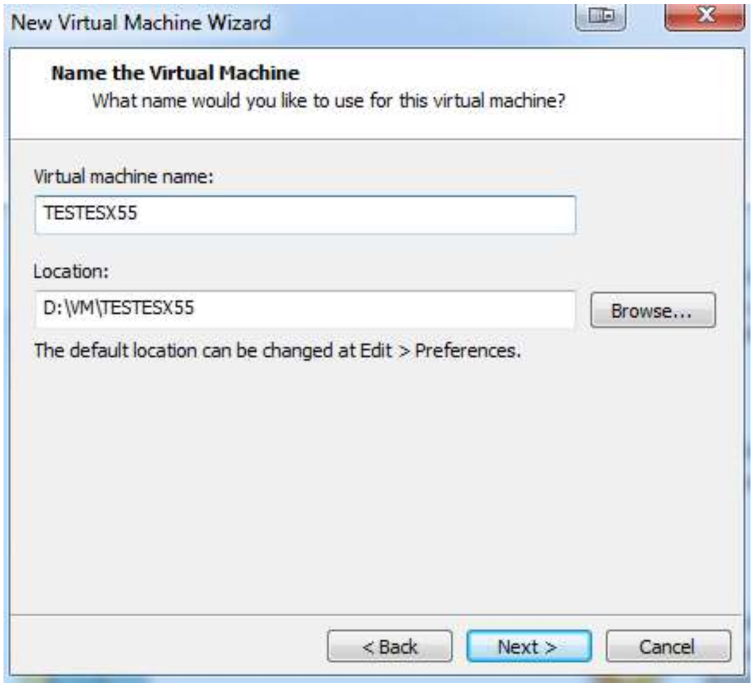
Guest operating system

○ Microsoft Windows
○ Linux
○ Novell NetWare
○ Solaris
● VMware ESX
○ Other

Version

VMware ESXi 5

Choose VMware ESX version 5 and click next.



New Virtual Machine Wizard

Name the Virtual Machine

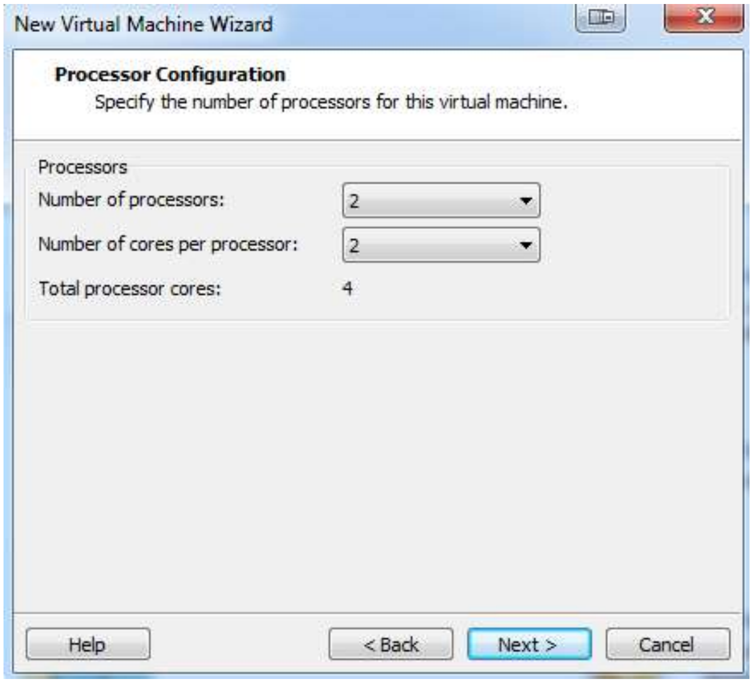
What name would you like to use for this virtual machine?

Virtual machine name: TESTESX55

Location: D:\VM\TESTESX55

The default location can be changed at Edit > Preferences.

Choose a name for the test ESX server and an appropriate location for the VM then click next.



New Virtual Machine Wizard

Processor Configuration

Specify the number of processors for this virtual machine.

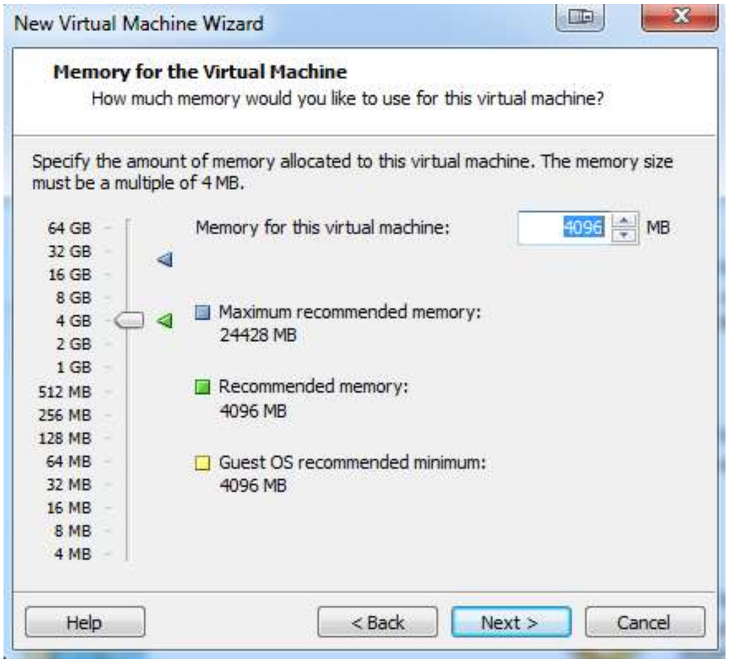
Processors

Number of processors: 2

Number of cores per processor: 2

Total processor cores: 4

Select the appropriate number of processors and cores, then click next.



New Virtual Machine Wizard

Memory for the Virtual Machine

How much memory would you like to use for this virtual machine?

Specify the amount of memory allocated to this virtual machine. The memory size must be a multiple of 4 MB.

Memory for this virtual machine: 4096 MB

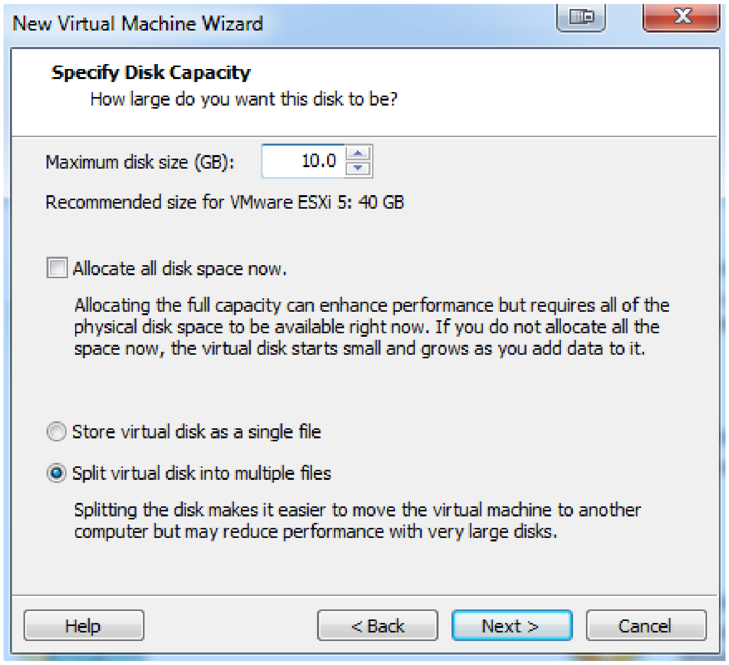
🟦 Maximum recommended memory: 24428 MB

🟩 Recommended memory: 4096 MB

🟨 Guest OS recommended minimum: 4096 MB

Select the amount of memory for the test ESX VM. A minimum of 4GB is needed for ESXi. Click next once the amount of memory has been chosen.

Click next on the “Network Type” screen to choose the default (NAT), then click next on the “Select I/O Controller Types” screen. Click next again on the “Select a Disk Type” screen as well as the “Select a Disk” screen.



New Virtual Machine Wizard

Specify Disk Capacity

How large do you want this disk to be?

Maximum disk size (GB): 10.0

Recommended size for VMware ESXi 5: 40 GB

□ Allocate all disk space now.

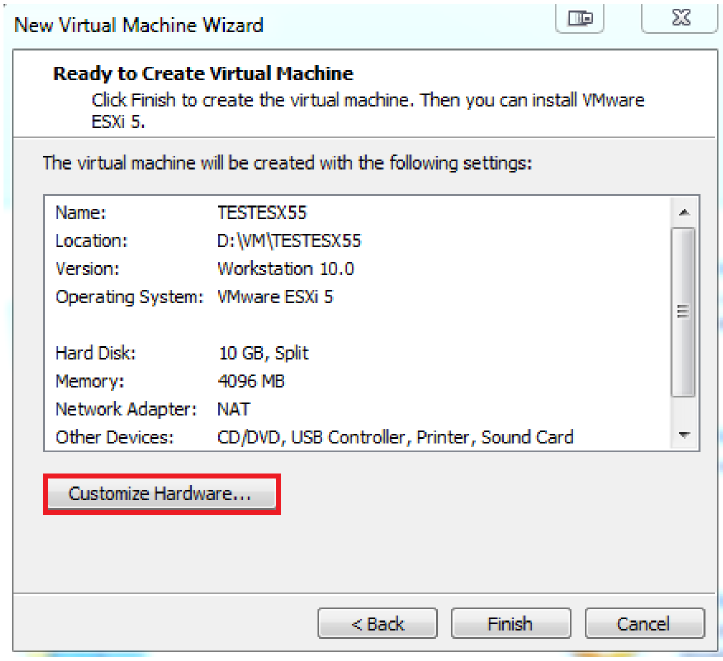
Allocating the full capacity can enhance performance but requires all of the physical disk space to be available right now. If you do not allocate all the space now, the virtual disk starts small and grows as you add data to it.

○ Store virtual disk as a single file

● Split virtual disk into multiple files

Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.

Specify a maximum disk size of 10GB for the test ESX server, then click next. Also click next on the “Specify Disk File” screen.


New Virtual Machine Wizard

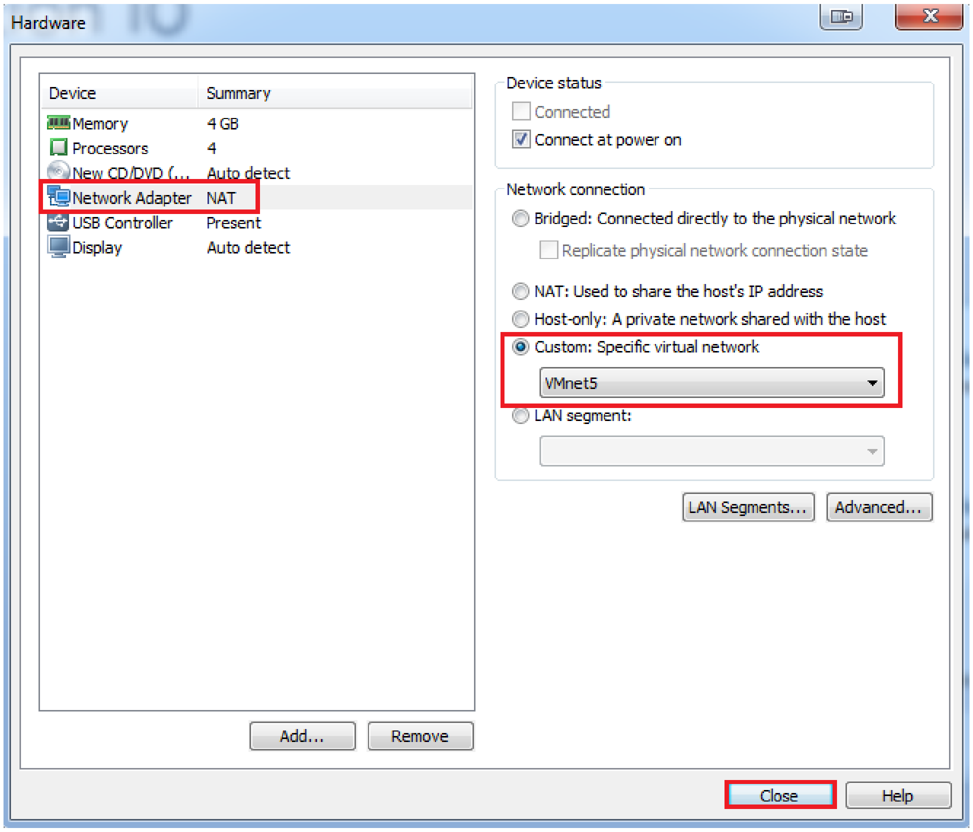
Ready to Create Virtual Machine

Click Finish to create the virtual machine. Then you can install VMware ESXi 5.

The virtual machine will be created with the following settings:

Name:	TESTESX55
Location:	D:\VM\TESTESX55
Version:	Workstation 10.0
Operating System:	VMware ESXi 5
Hard Disk:	10 GB, Split
Memory:	4096 MB
Network Adapter:	NAT
Other Devices:	CD/DVD, USB Controller, Printer, Sound Card

Click “Customize Hardware…” on the “Ready to Create Virtual Machine” screen


Hardware

Device	Summary
Memory	4 GB
Processors	4
New CD/DVD (...	Auto detect
Network Adapter	NAT
USB Controller	Present
Display	Auto detect

Device status

□ Connected

☑ Connect at power on

Network connection

○ Bridged: Connected directly to the physical network

□ Replicate physical network connection state

○ NAT: Used to share the host's IP address

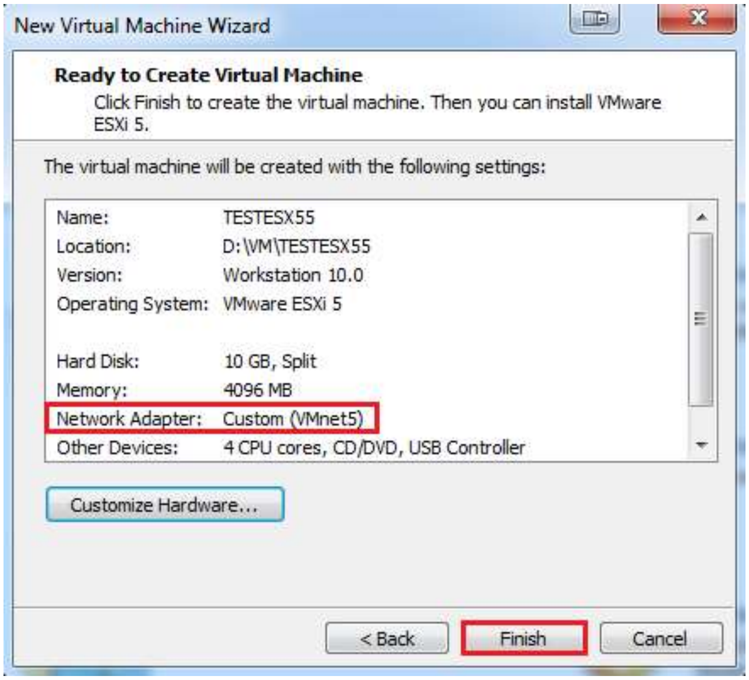
○ Host-only: A private network shared with the host

● Custom: Specific virtual network

VMnet5

○ LAN segment:

Click the Network Adapter, then choose Custom and pick the isolated network that is being used by Cobbler for testing. VMnet5 is being used here so that network is selected. Click Close to continue.



Ready to Create Virtual Machine

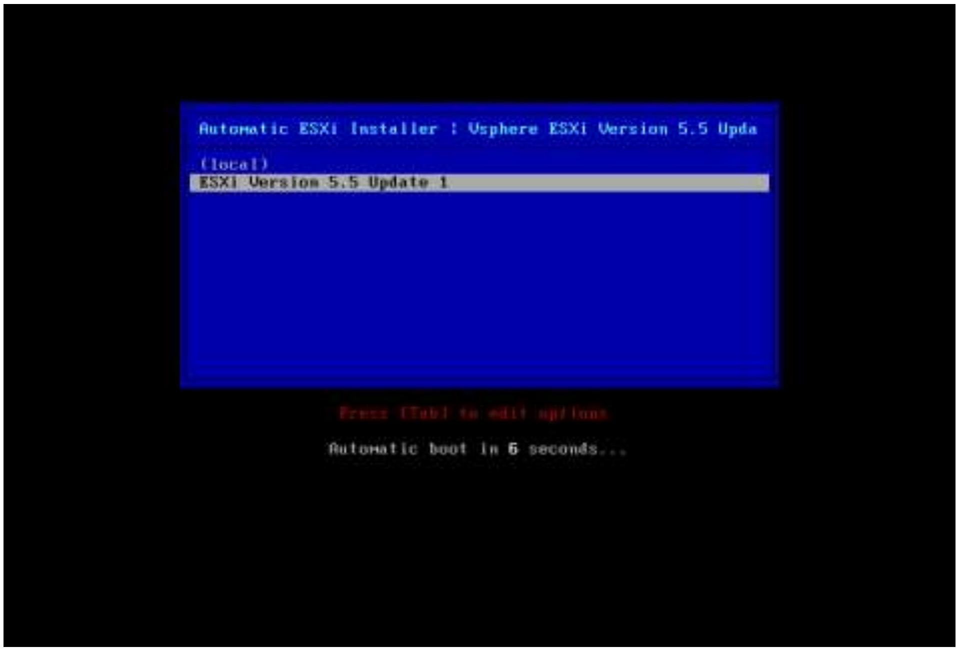
Click Finish to create the virtual machine. Then you can install VMware ESXi 5.

The virtual machine will be created with the following settings:

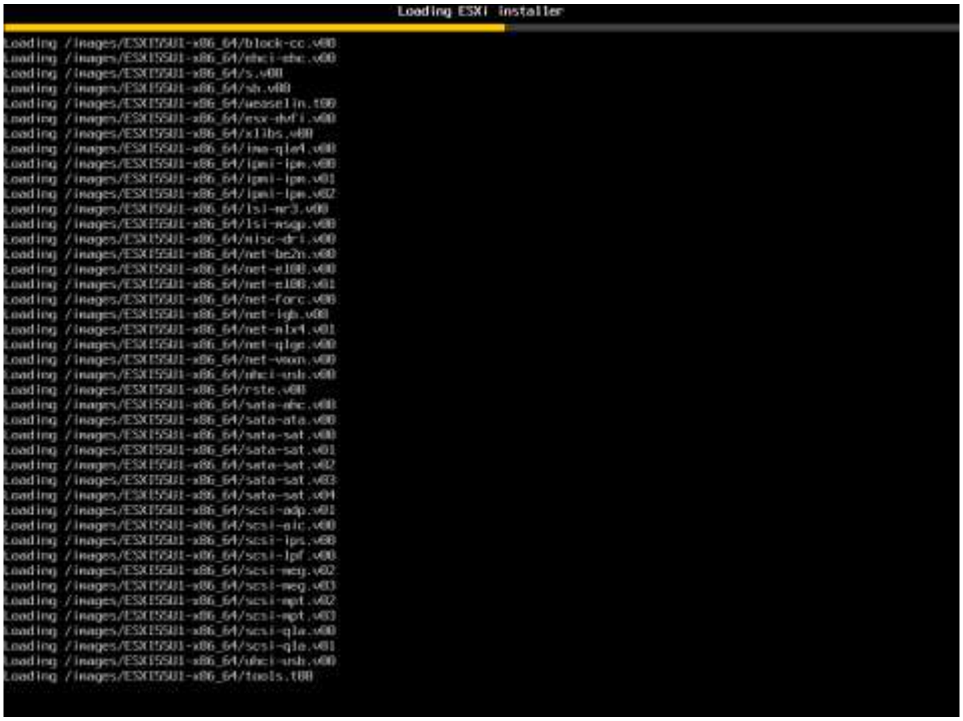
Name:	TESTESX55
Location:	D:\VM\TESTESX55
Version:	Workstation 10.0
Operating System:	VMware ESXi 5
Hard Disk:	10 GB, Split
Memory:	4096 MB
Network Adapter:	Custom (VMnet5)
Other Devices:	4 CPU cores, CD/DVD, USB Controller

Click Finish to complete the setup of the test ESXi VM. This VM will be used to test the installation of ESXi from the Cobbler VM.

Power on the newly created ESXi VM. Notice the customized PXE boot menu shown below.

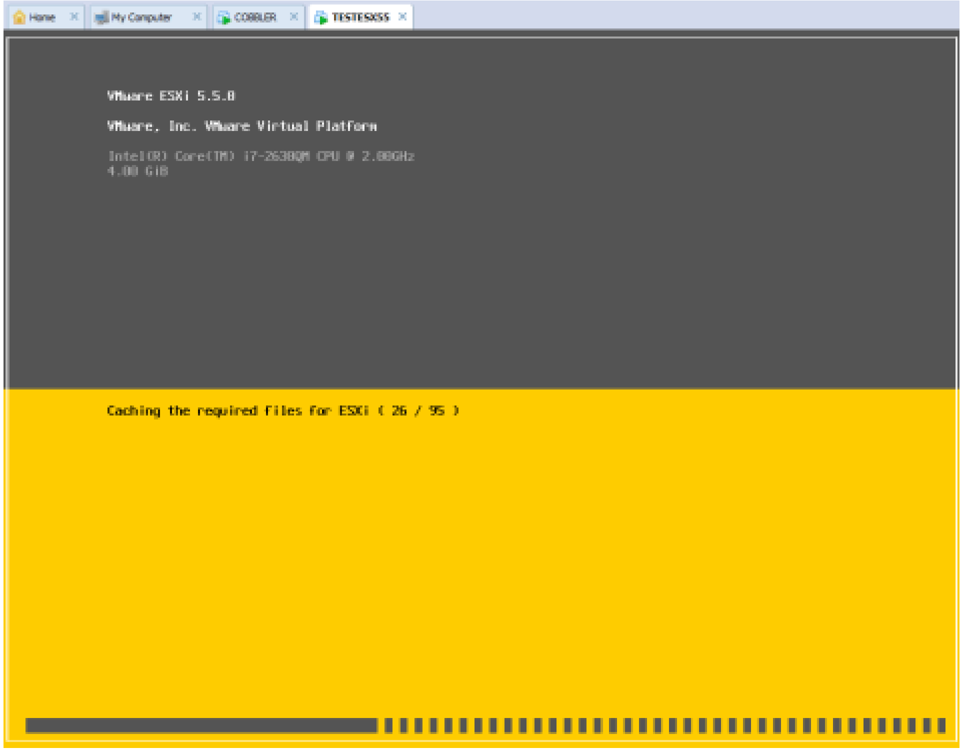


```
Automatic ESXi Installer : Vsphere ESXi Version 5.5 Upda

(local)
ESXi Version 5.5 Update 1

Press [Tab] to edit options

Automatic boot in 6 seconds...
```



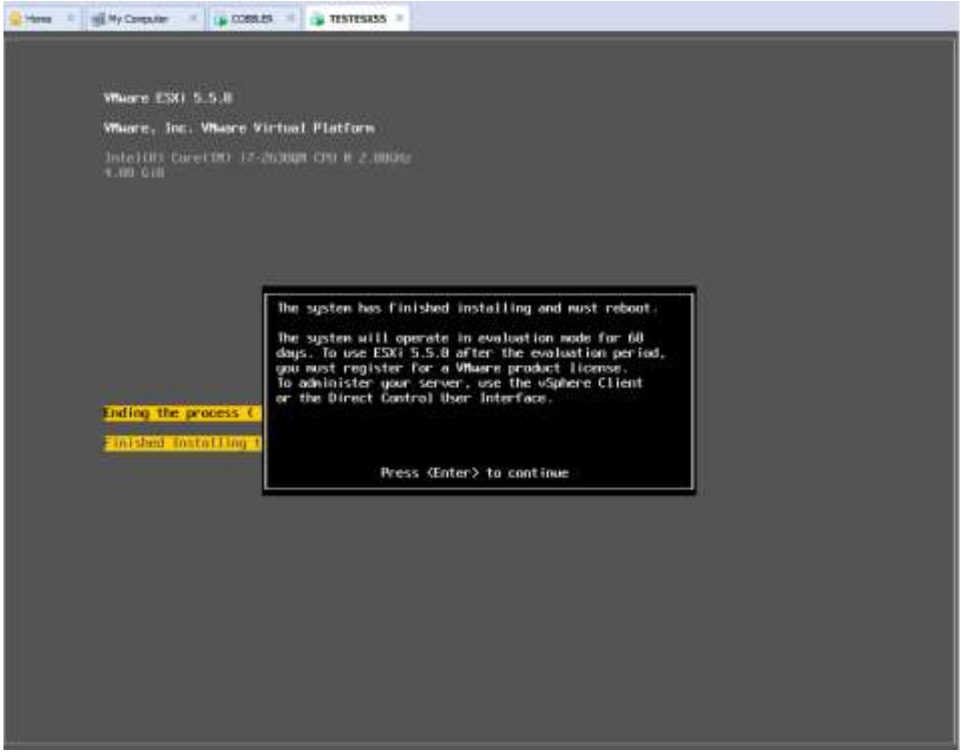
```
                              Loading ESXi installer
Loading /images/ESXI55U1-x86_64/block-cc.v00
Loading /images/ESXI55U1-x86_64/ehci-ehc.v00
Loading /images/ESXI55U1-x86_64/s.v00
Loading /images/ESXI55U1-x86_64/sb.v00
Loading /images/ESXI55U1-x86_64/weaselin.t00
Loading /images/ESXI55U1-x86_64/esx-dvfi.v00
Loading /images/ESXI55U1-x86_64/xlibs.v00
Loading /images/ESXI55U1-x86_64/ima-qla4.v00
Loading /images/ESXI55U1-x86_64/ipmi-ipm.v00
Loading /images/ESXI55U1-x86_64/ipmi-ipm.v01
Loading /images/ESXI55U1-x86_64/ipmi-ipm.v02
Loading /images/ESXI55U1-x86_64/lsi-mr3.v00
Loading /images/ESXI55U1-x86_64/lsi-msgp.v00
Loading /images/ESXI55U1-x86_64/misc-dri.v00
Loading /images/ESXI55U1-x86_64/net-be2n.v00
Loading /images/ESXI55U1-x86_64/net-e100.v00
Loading /images/ESXI55U1-x86_64/net-e100.v01
Loading /images/ESXI55U1-x86_64/net-forc.v00
Loading /images/ESXI55U1-x86_64/net-igb.v00
Loading /images/ESXI55U1-x86_64/net-mlx4.v01
Loading /images/ESXI55U1-x86_64/net-qlge.v00
Loading /images/ESXI55U1-x86_64/net-vmxn.v00
Loading /images/ESXI55U1-x86_64/ohci-usb.v00
Loading /images/ESXI55U1-x86_64/rste.v00
Loading /images/ESXI55U1-x86_64/sata-ahc.v00
Loading /images/ESXI55U1-x86_64/sata-ata.v00
Loading /images/ESXI55U1-x86_64/sata-sat.v00
Loading /images/ESXI55U1-x86_64/sata-sat.v01
Loading /images/ESXI55U1-x86_64/sata-sat.v02
Loading /images/ESXI55U1-x86_64/sata-sat.v03
Loading /images/ESXI55U1-x86_64/sata-sat.v04
Loading /images/ESXI55U1-x86_64/scsi-adp.v01
Loading /images/ESXI55U1-x86_64/scsi-aic.v00
Loading /images/ESXI55U1-x86_64/scsi-ips.v00
Loading /images/ESXI55U1-x86_64/scsi-lpf.v00
Loading /images/ESXI55U1-x86_64/scsi-meg.v02
Loading /images/ESXI55U1-x86_64/scsi-meg.v03
Loading /images/ESXI55U1-x86_64/scsi-mpt.v02
Loading /images/ESXI55U1-x86_64/scsi-mpt.v03
Loading /images/ESXI55U1-x86_64/scsi-qla.v00
Loading /images/ESXI55U1-x86_64/scsi-qla.v01
Loading /images/ESXI55U1-x86_64/uhci-usb.v00
Loading /images/ESXI55U1-x86_64/tools.t00
```

ESXi installation files are being loaded into memory…



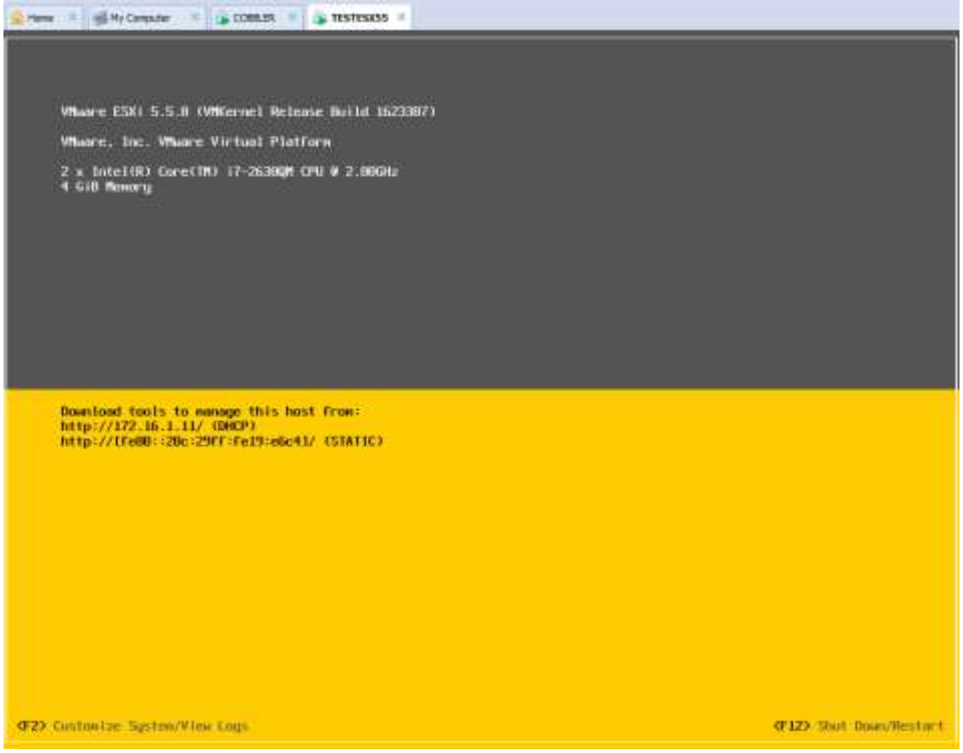
```
VMware ESXi 5.5.0

VMware, Inc. VMware Virtual Platform

Intel(R) Core(TM) i7-2630QM CPU @ 2.00GHz
4.00 GiB


Caching the required files for ESXi ( 26 / 95 )
```

Installation of ESXi onto the 10GB local hard disk continues automatically.



```
VMware ESXi 5.5.0

VMware, Inc. VMware Virtual Platform

Intel(R) Core(TM) i7-2630QM CPU @ 2.00GHz
4.00 GiB

The system has finished installing and must reboot.

The system will operate in evaluation mode for 60
days. To use ESXi 5.5.0 after the evaluation period,
you must register for a VMware product license.
To administer your server, use the vSphere Client
or the Direct Control User Interface.

Ending the process (
Finished Installing t

Press <Enter> to continue
```

The installation of ESXi Version 5.5 Update 1 has completed successfully and will automatically reboot



```
VMware ESXi 5.5.0 (VMKernel Release Build 1623387)

VMware, Inc. VMware Virtual Platform

2 x Intel(R) Core(TM) i7-2630QM CPU @ 2.00GHz
4 GiB Memory

Download tools to manage this host from:
http://172.16.1.11/ (DHCP)
http://[fe80::20c:29ff:fe19:e6c41/ (STATIC)

<F2> Customize System/View Logs                                  <F12> Shut Down/Restart
```

ESXi has booted successfully and is ready to be configured.