

Virtualization Assignment

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Lecturer: Tom Brett

12/20/2013

Assignment Outline: A user's manual documenting the steps you used to complete each tasks outlined in the brief. For each of the tasks, all technical issues with regard to hardware and software requirements which must be met should be detailed.

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Task A.1

Document the process of connecting to and installing a vSphere client by accessing the ESXi Host.

Scott Lowe defines ESXi as, “the core of the vSphere product suite is the hypervisor, which is the virtualization layer that serves as the foundation for the rest of the product line. In vSphere 5, the hypervisor comes in the form of VMware ESXi”¹.

The vSphere Client is a Windows-based application that allows you to manage ESXi hosts, either directly or through an instance of vCenter Server. The vSphere Client can be installed by browsing to the URL of an ESXi host or vCenter Server and selecting the appropriate installation link. The vSphere Client provides a rich graphical user interface for all day-to-day management tasks and for the advanced configuration of a virtual infrastructure².

Step 1:

Go to VMware.com and download vSphere ESXi and vSphere Client.

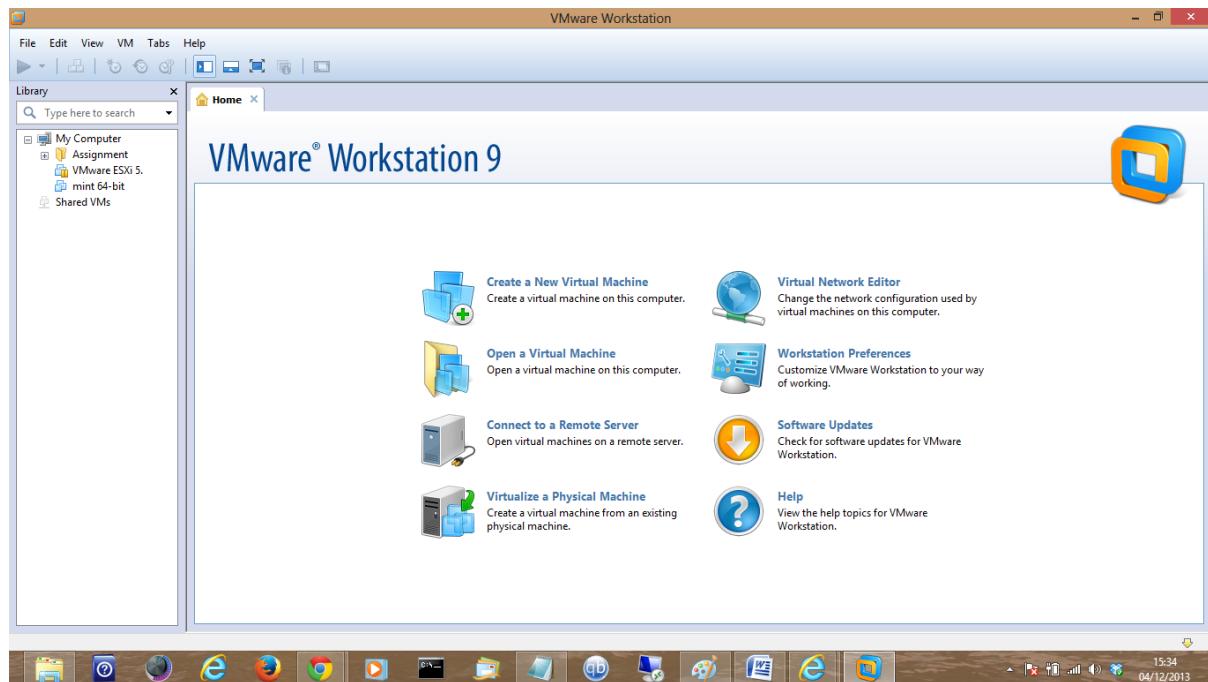
The screenshot shows the VMware website at https://my.vmware.com/web/vmware/info/slug/datacenter_cloud_infrastructure/vmware_vsphere_hypervisor_esxi/5_5. The page title is "Download VMware vSphere Hypervisor (ESXi)". A sidebar on the left has a "SHARE" button with social media icons. The main content area includes a "Select Version" dropdown set to "5.5", a description of the product, and a "Read More" link. Below this are tabs for "Product Downloads", "Drivers & Tools", "Open Source", and "Custom ISOs". A table lists the product details: "VMware vSphere Hypervisor 5.5" under "Product", "2013-09-22" under "Release Date", and a "Download" link. To the right, there's a "Product Resources" sidebar with links for "View My Download History" and "Get Free Trial".

Step 2:

Once ESXi and the vSphere client have been downloaded, open VMware Workstation.

¹ Lowe, S. (2011). Mastering VMware vSphere 5. Indiana: John Wiley & Sons.

² Ibid.



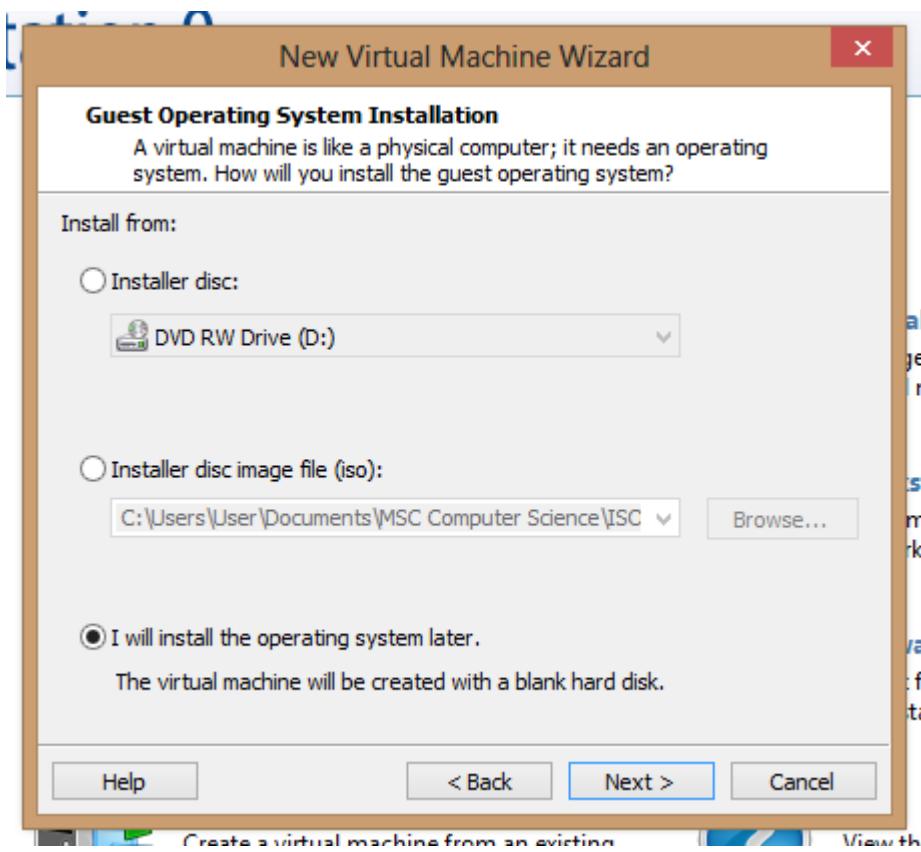
Step 3:

Create a new virtual machine using the “typical” method.



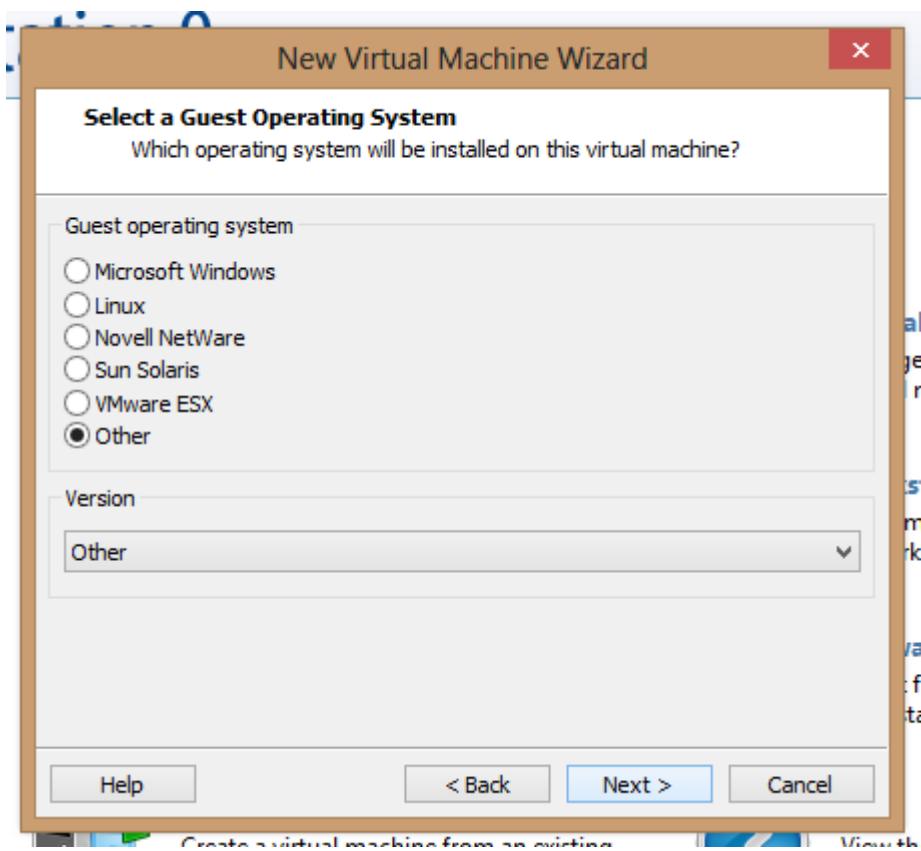
Step 4:

Select to install the operating system later.



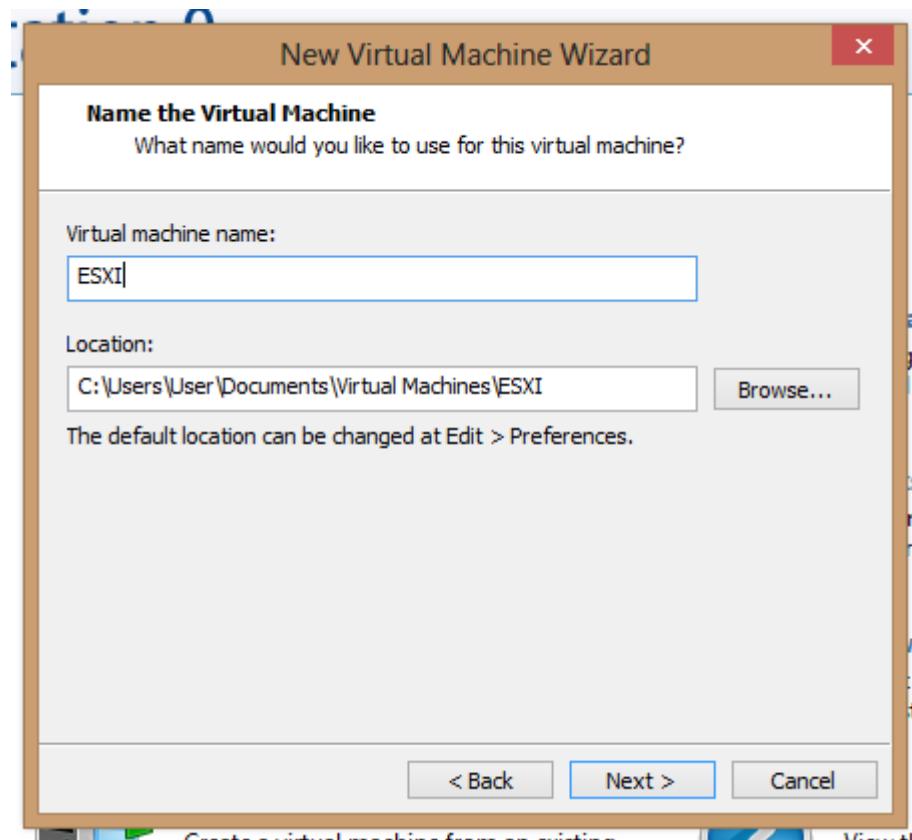
Step 5:

Select “other” as the guest operating system. Then click next.



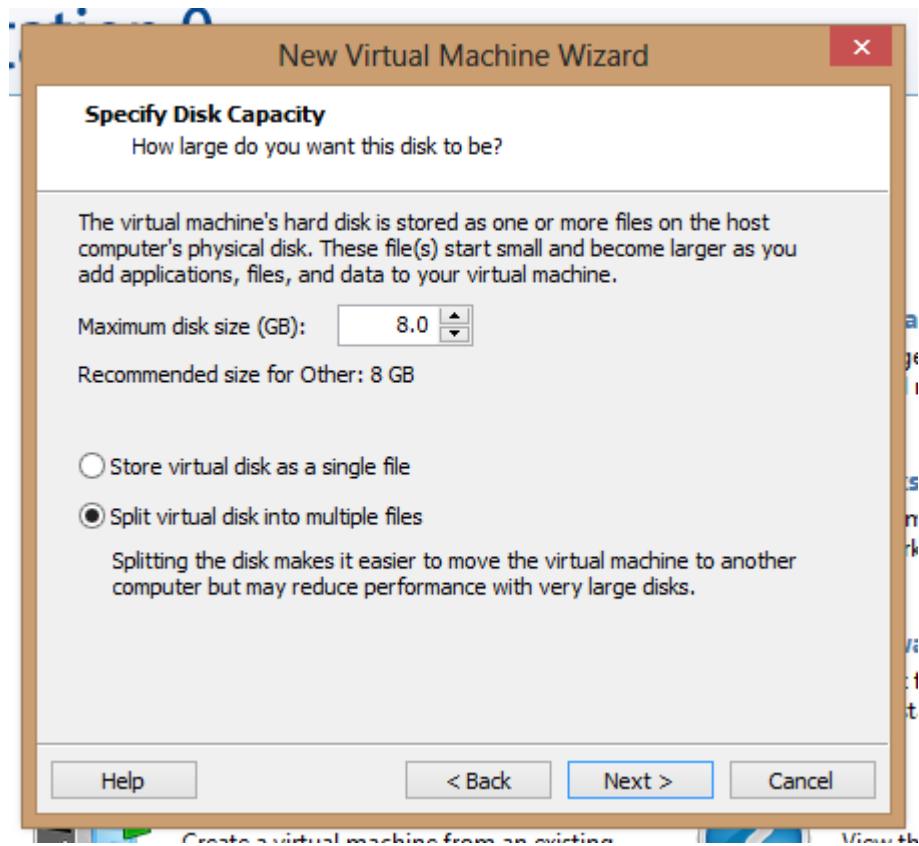
Step 6:

Choose a name for the ESXI server, but it should be memorable and unique.



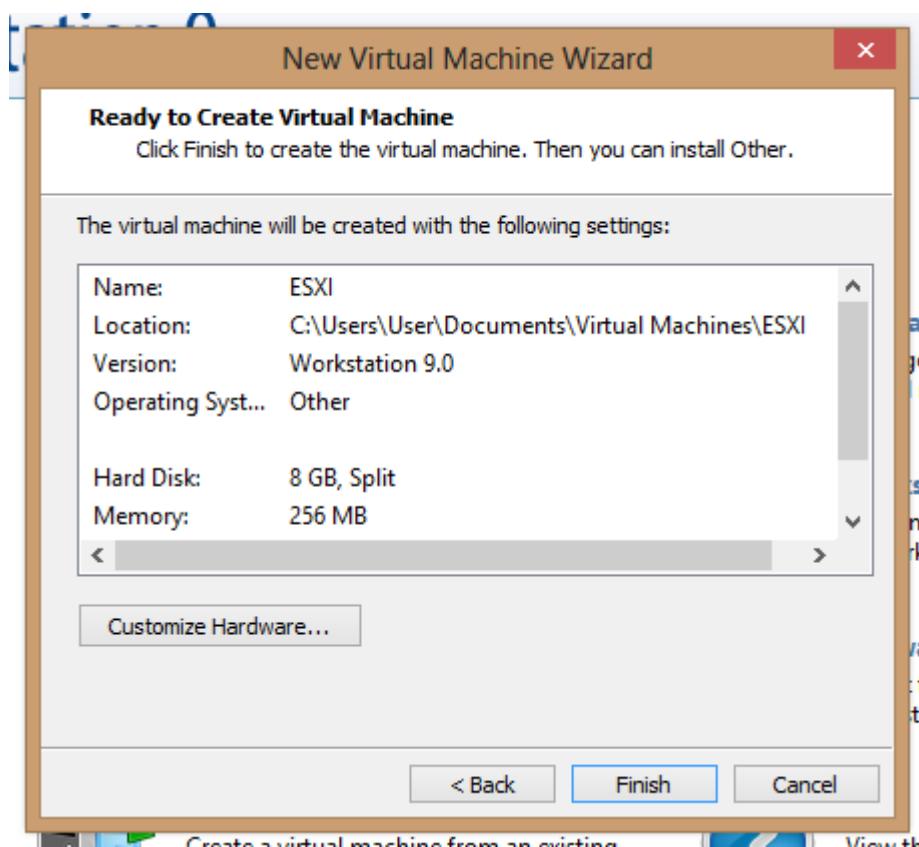
Step 7:

Choose the size of the hard-disk, it should be around 250GB preferably to hold the datacenter and virtual machines. Select “split virtual disk into multiple files”, then click next.



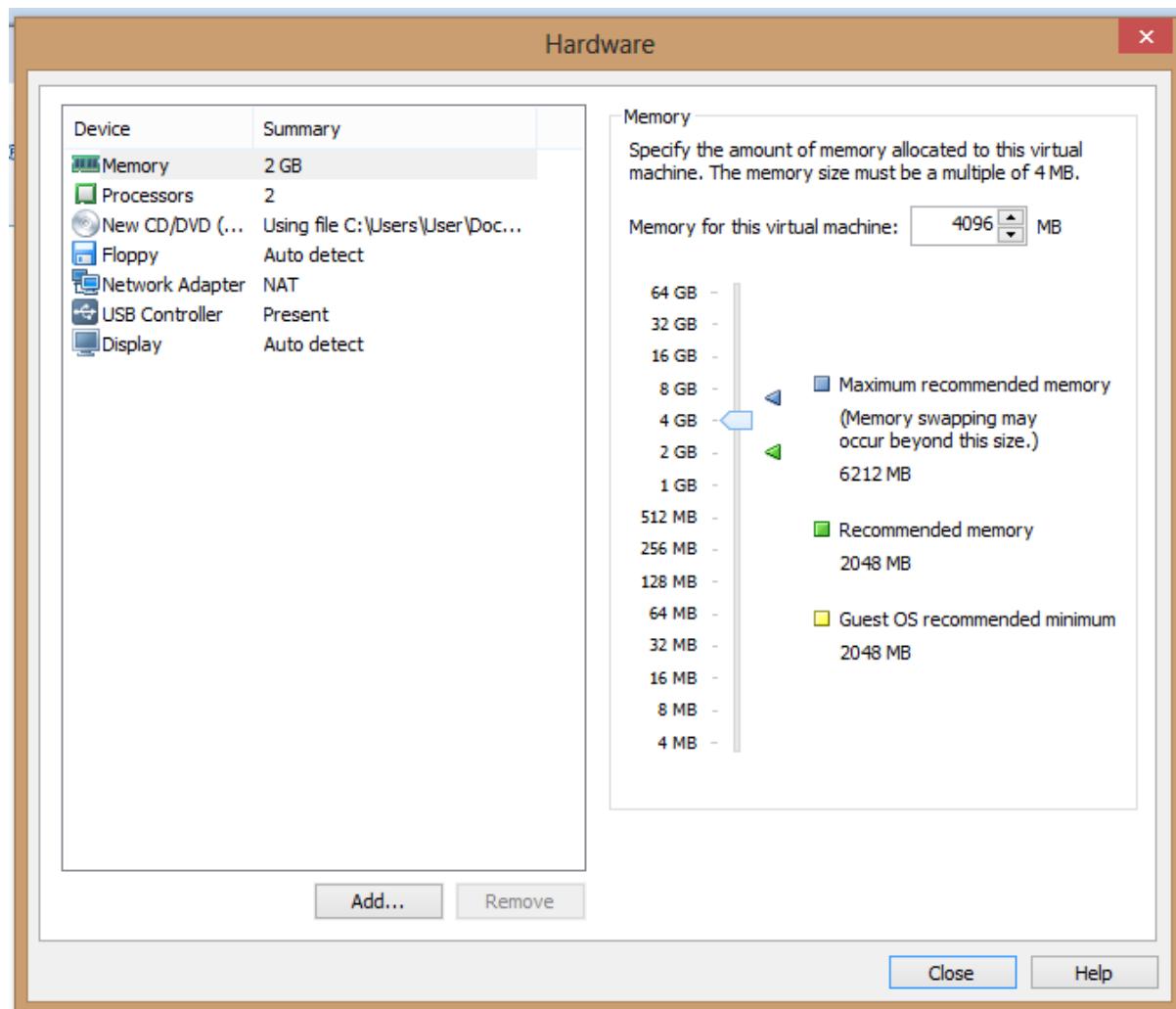
Step 8:

The Ram must be at 4GB for the ESXI server to install. Click, customize hardware.



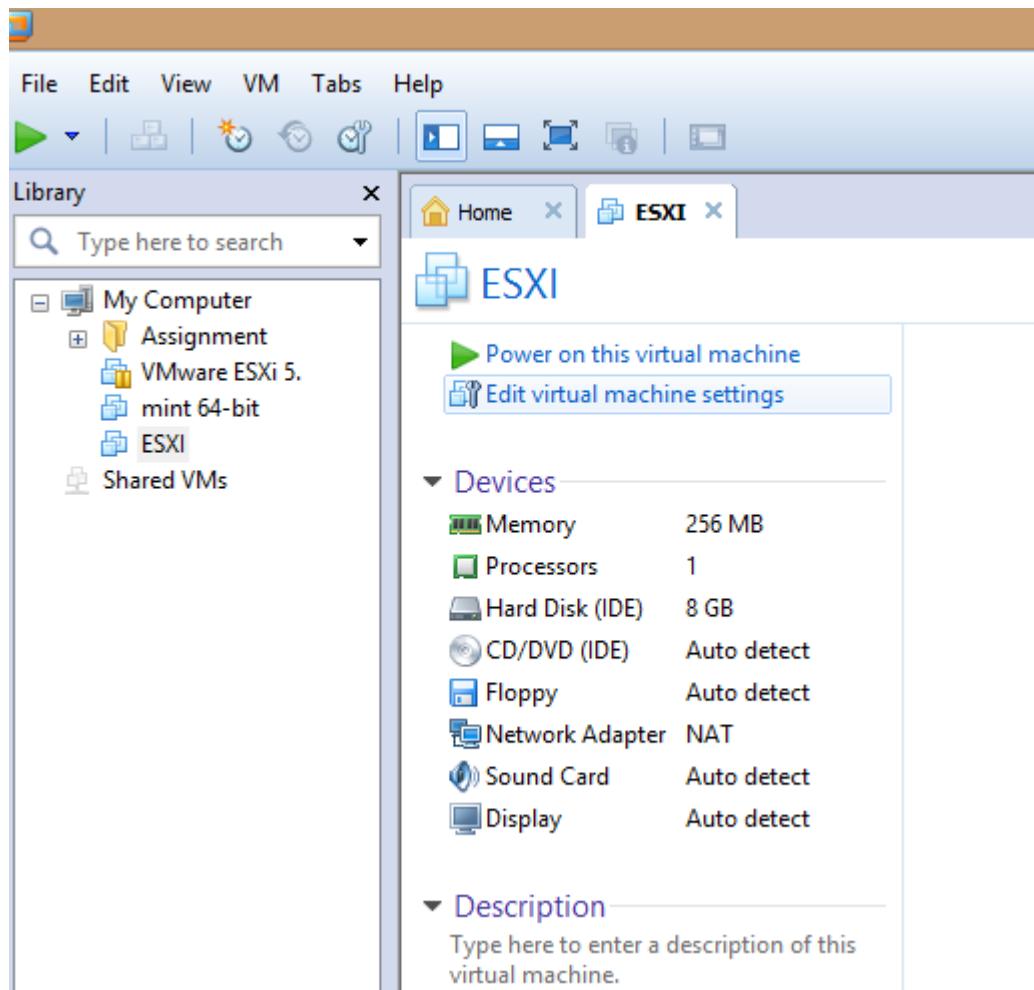
Step 9:

Slide the icon to 4GB, then click close. The RAM must be changed to 4GB to allow the ESXI to run. It is the minimum amount of RAM that the ESXI server can operate on. Then, click finish.



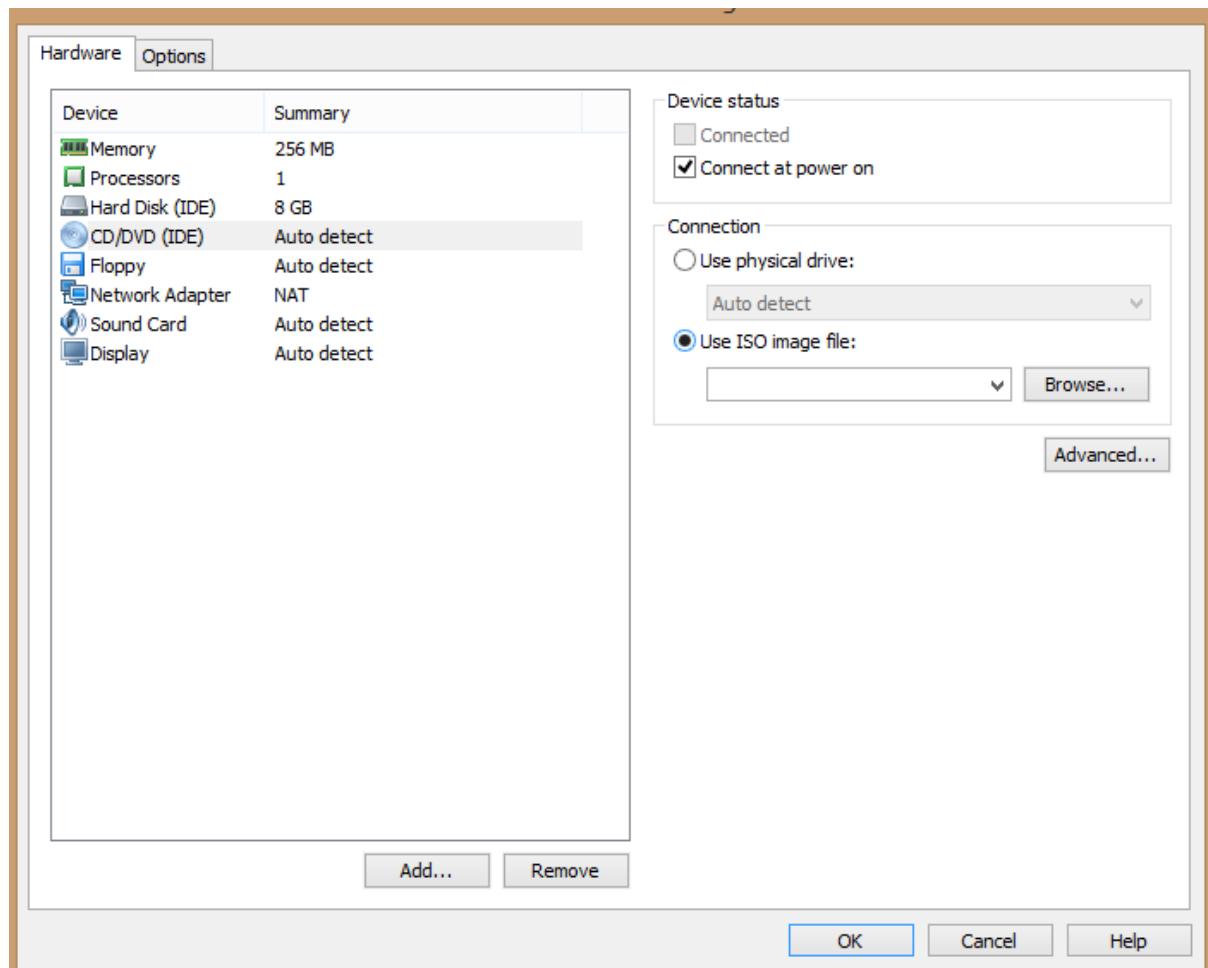
Step 10:

Click Edit virtual machine settings.



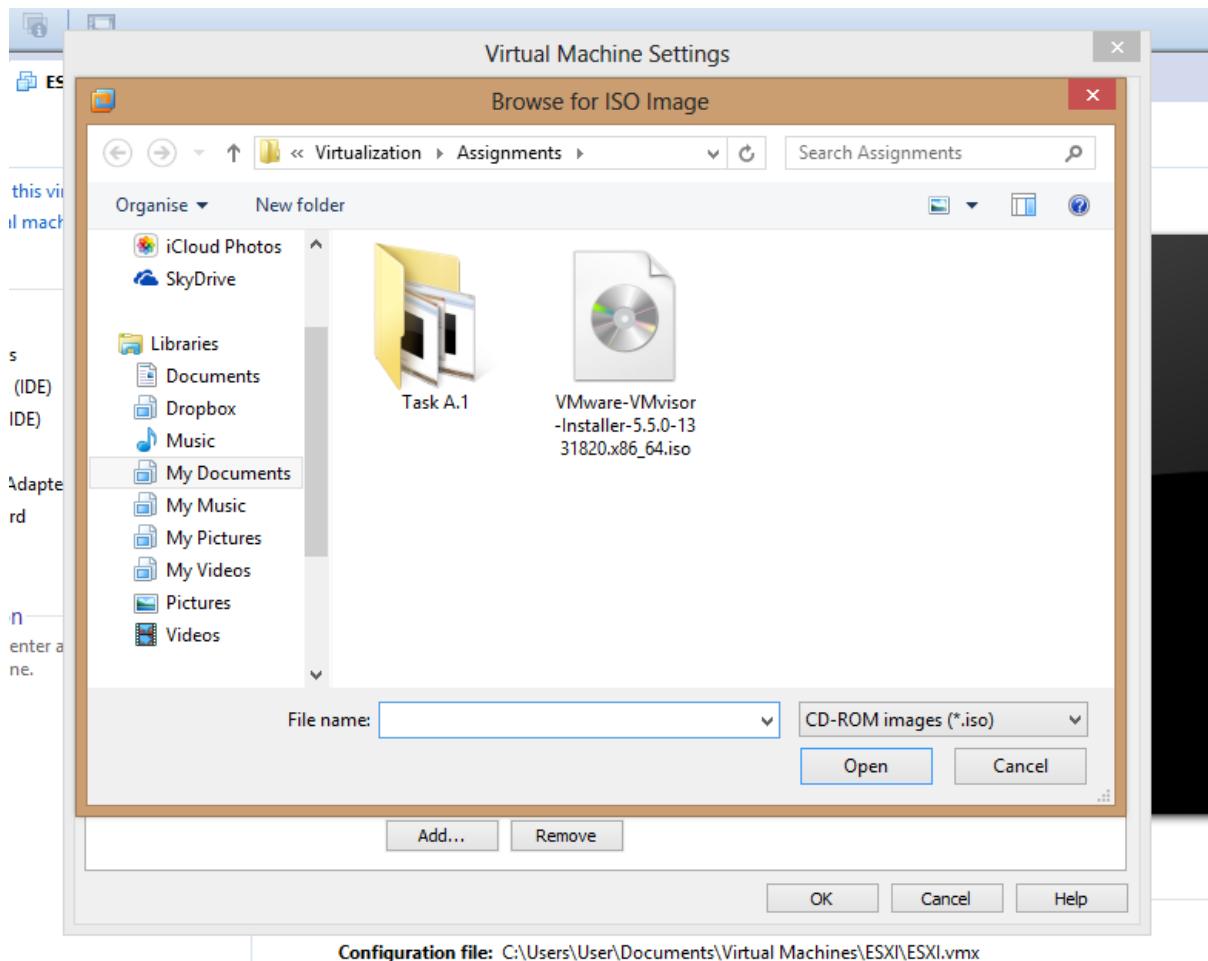
Step 11:

Click CD/DVD (IDE), then select, use ISO image file, then click browse. Make sure that “ connect at power on” is selected, if not, when the virtual machine is powered on, the operating system will not be found. Then click ok.



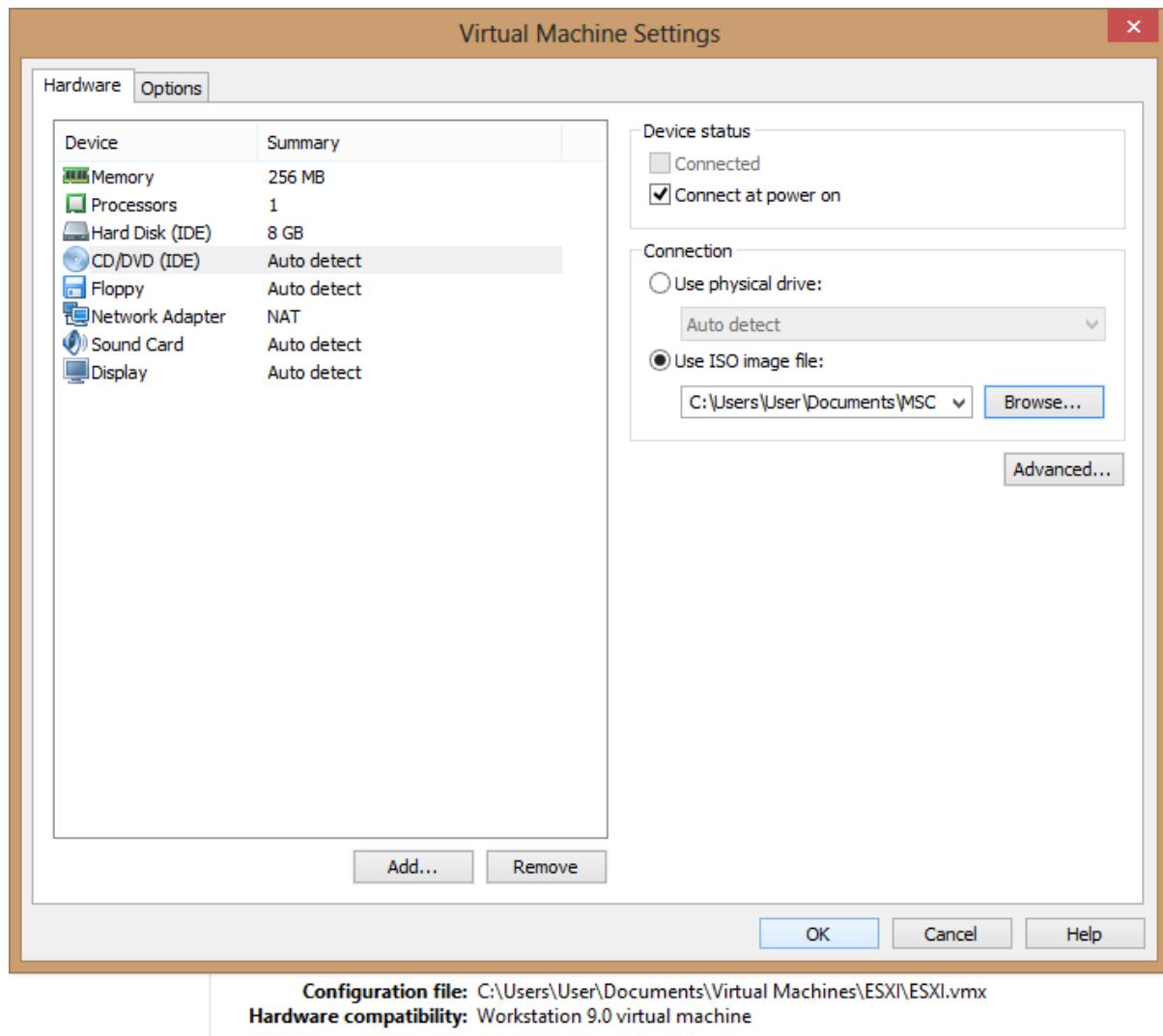
Step 12:

Find where the disk image is located, select the image, then, click open.



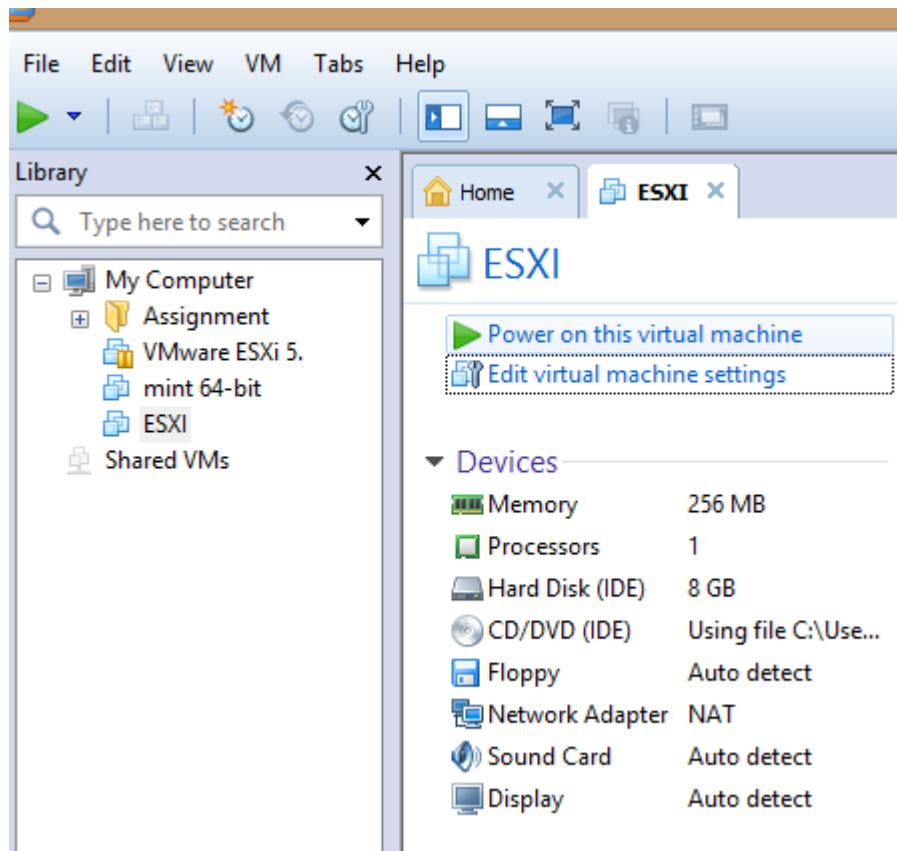
Step 13:

Once the disk image has been selected, click open, then click ok.



Step 14:

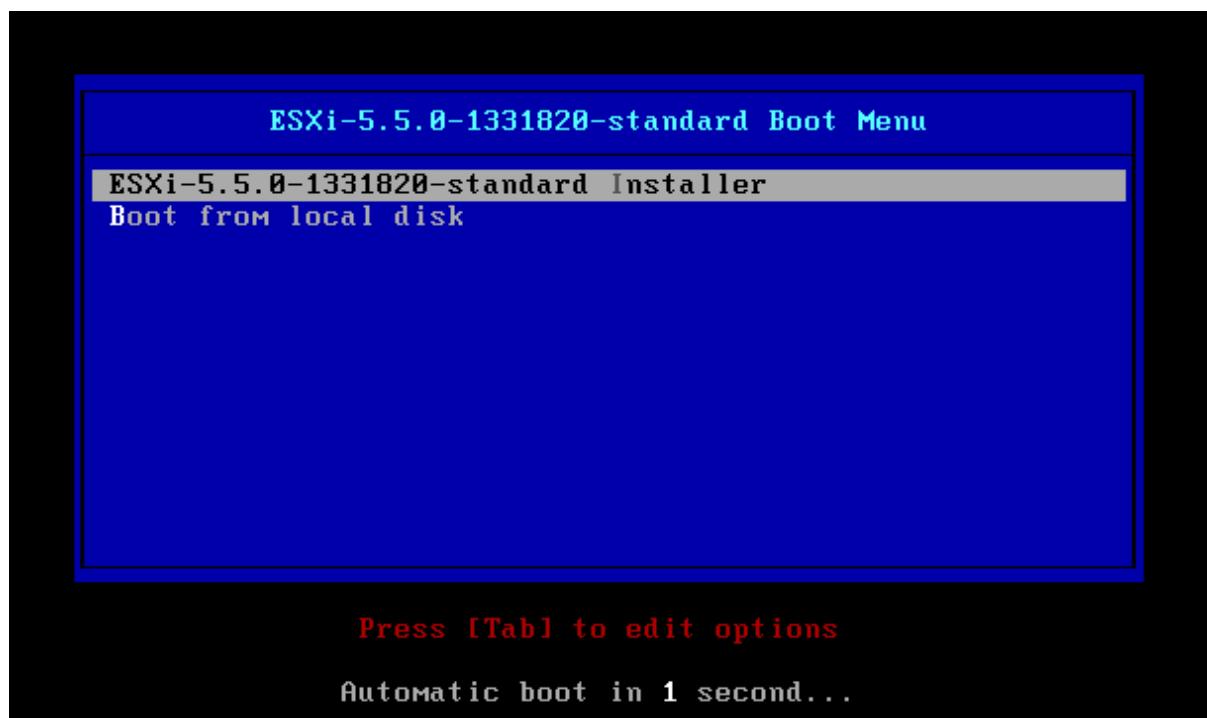
When the previous steps have been carried out correctly, click power on this virtual machine.



Devices	
Memory	256 MB
Processors	1
Hard Disk (IDE)	8 GB
CD/DVD (IDE)	Using file C:\Use...
Floppy	Auto detect
Network Adapter	NAT
Sound Card	Auto detect
Display	Auto detect

Step 15:

Select the ESXi standard installer by pressing enter from the keyboard.



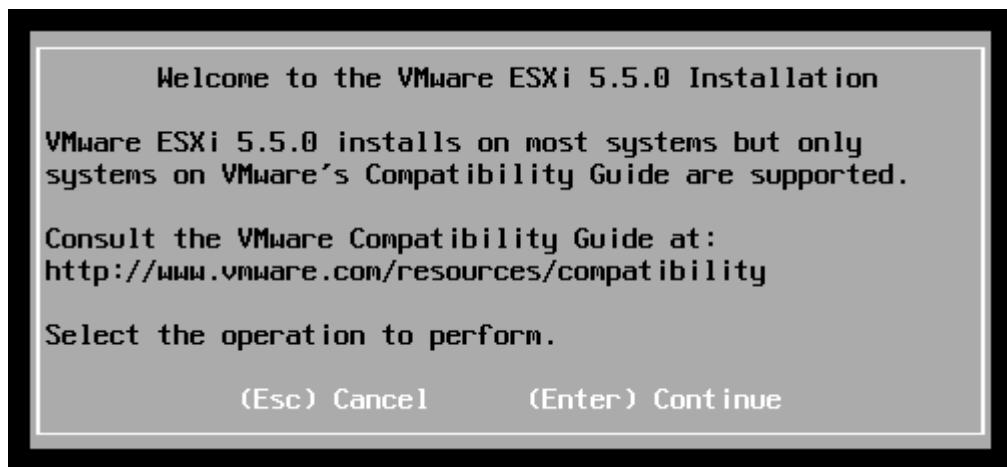
Step 16:

This screen will follow after step 15.



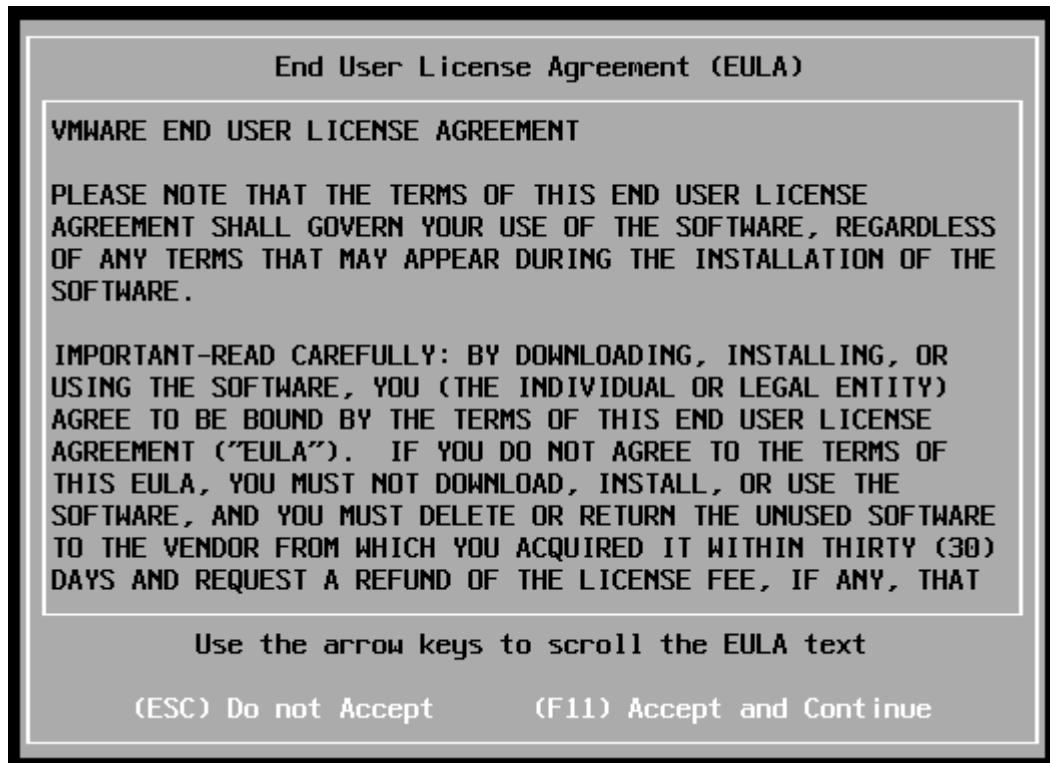
Step 17:

When the installer begins and when prompted hit “Enter” to continue.



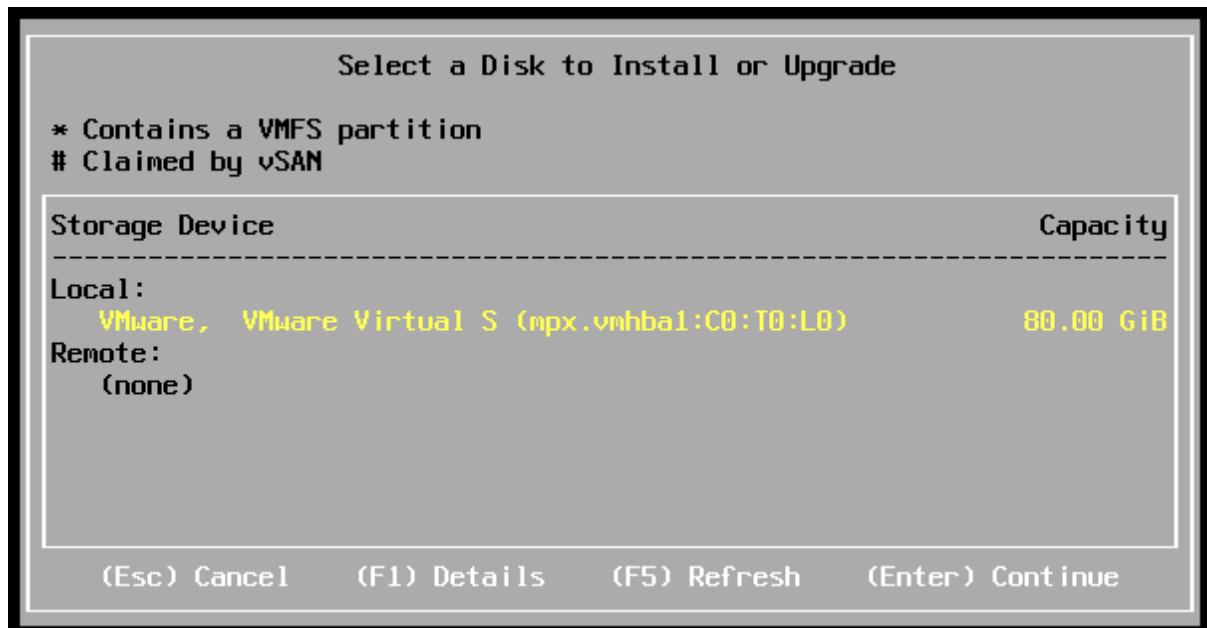
Step 18:

Accept the license agreement by pressing F11.



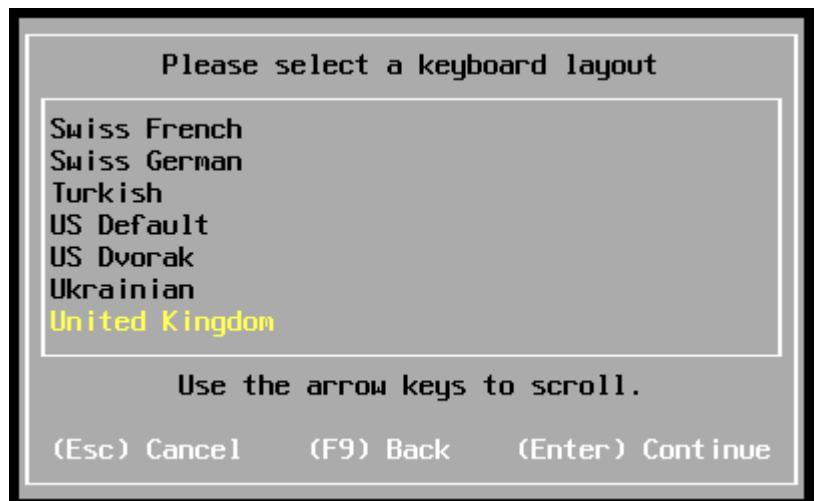
Step 19:

Press Enter to select to install the ESXI server on the harddrive.



Step 20:

Select the keyboard language, then press Enter to continue.



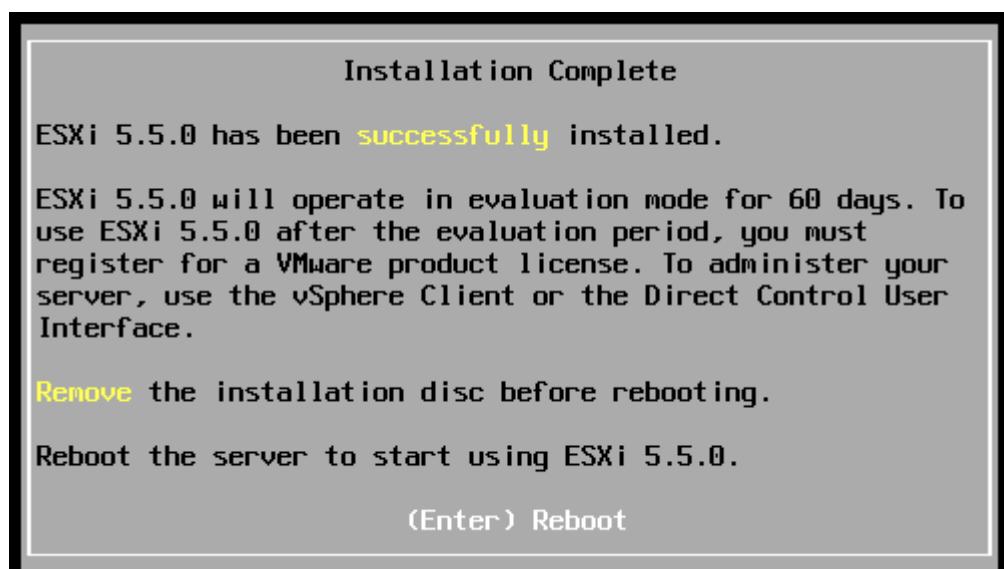
Step 21:

Select a password for the root user. For the purposes of demonstration the password used was Pa\$\$w0rd.



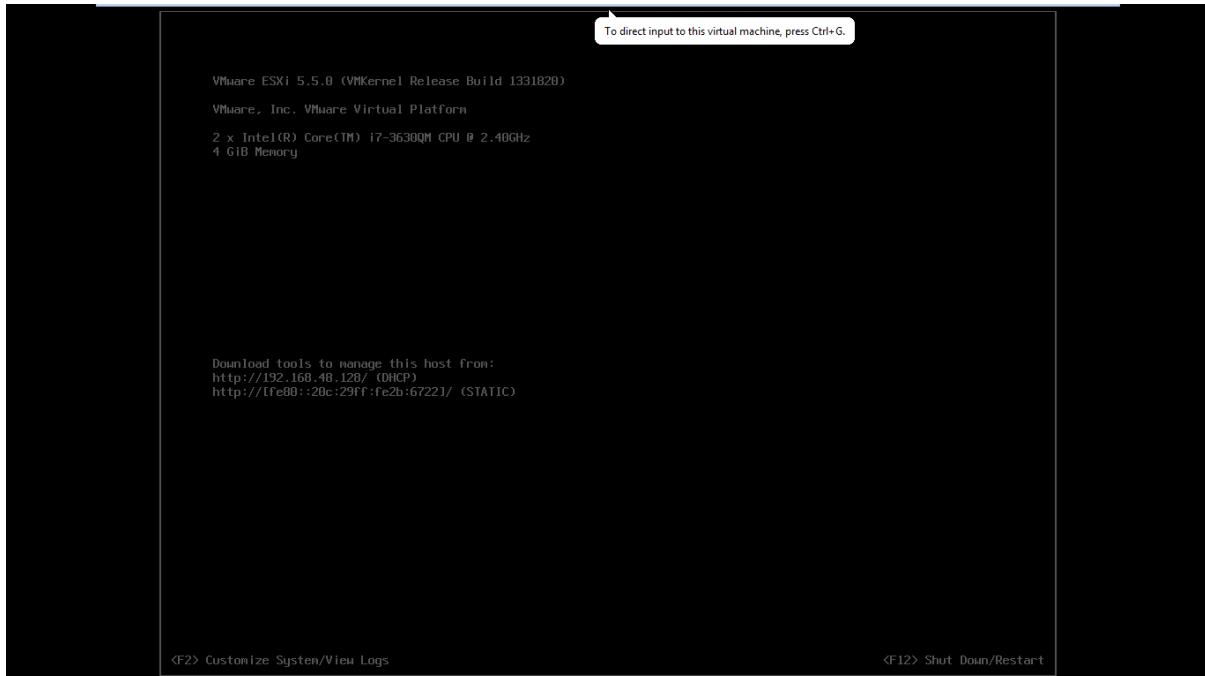
Step 22:

After this warning, vCenter ESXi has successfully been installed.



Step 23:

This is the home screen of the ESXi server which will be seen after installation.



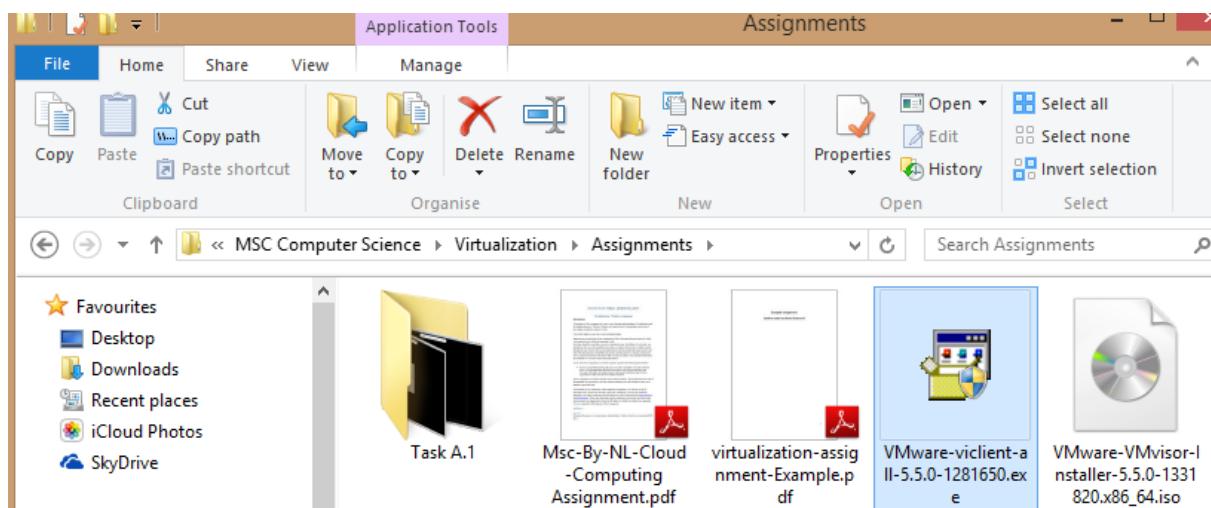
Step 24:

Download vSphere client from vmware's website.

A screenshot of a web browser showing the "Download Packages" page for VMware vSphere Hypervisor 5.5 - Binaries. The URL in the address bar is https://my.vmware.com/group/vmware/evalcenter?p=free-esxi5&lp=default. The page lists three download options: 1. "ESXi ISO image (Includes VMware Tools)" dated 2013-09-22, size 5.5.0 | 326M | .iso. It includes MD5SUM and SHA1SUM checksums, and links to "Start Download Manager" and "Manually Download". 2. "VMware vSphere Client" dated 2013-09-22, size 5.5.0 | 349M | .exe. It includes MD5SUM and SHA1SUM checksums, and links to "Start Download Manager" and "Manually Download". 3. "VMware Tools CD image for Linux Guest Oses" dated 2013-09-22, size 19.4 0 | 61M | .iso. It includes MD5SUM and SHA1SUM checksums, and links to "Start Download Manager" and "Manually Download".

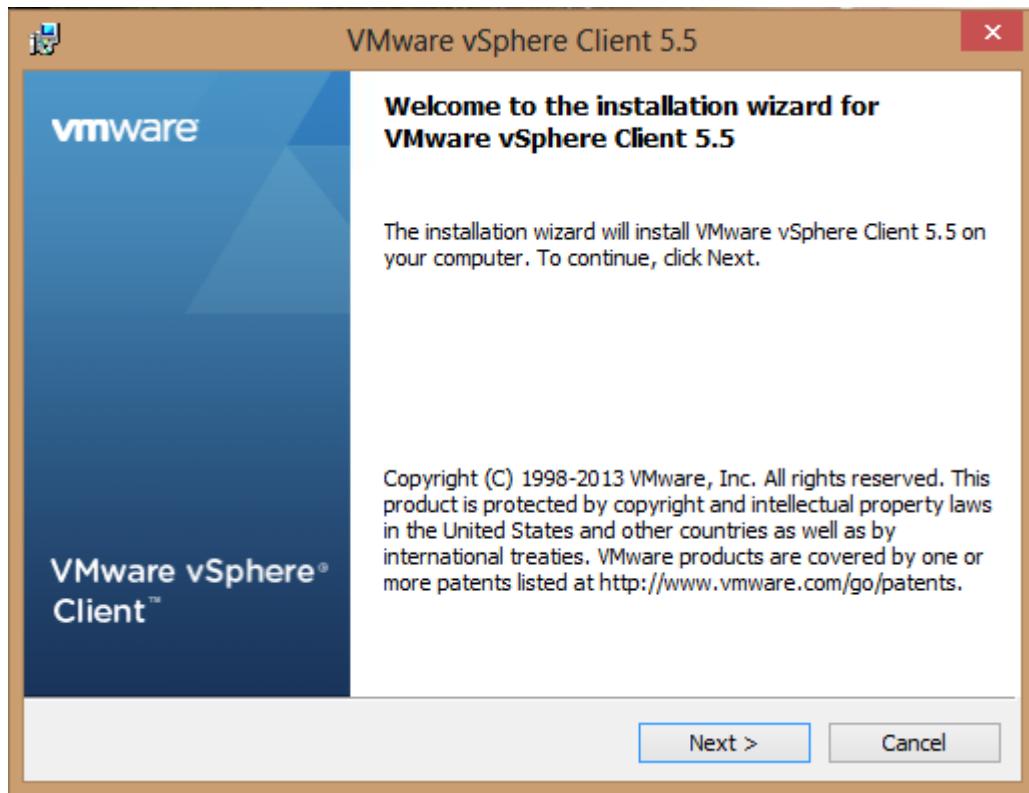
Step 25:

Find where the download is stored and double click the file, to run the install wizard.



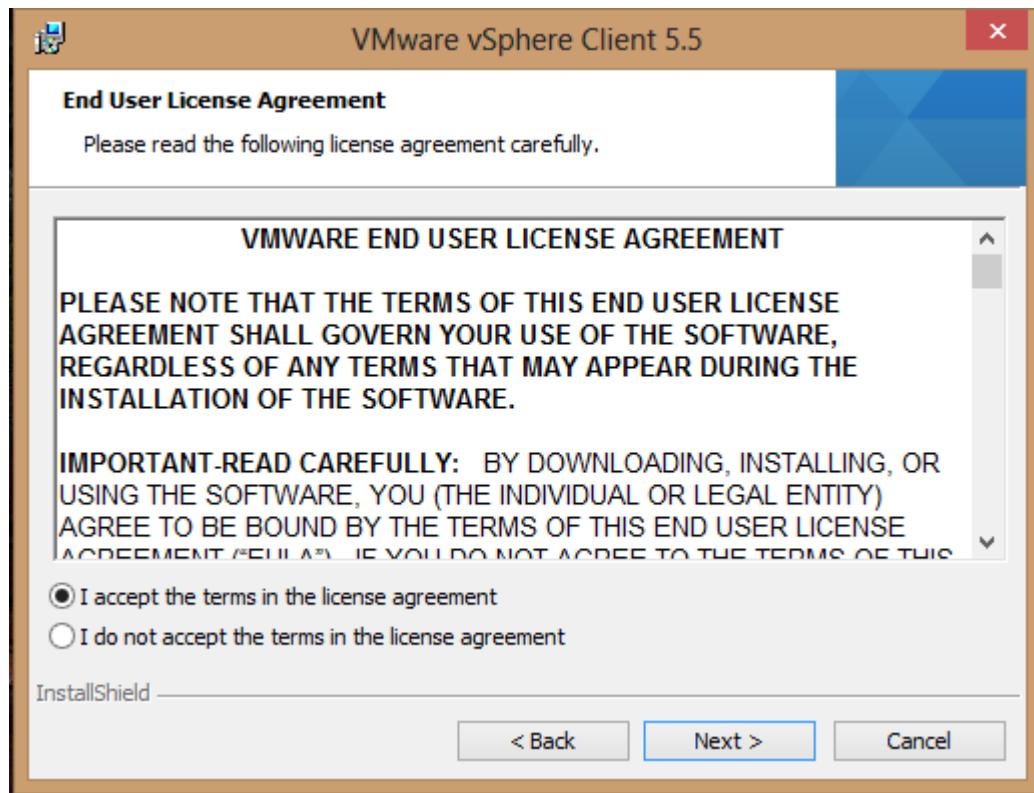
Step 26:

When the installation wizard opens, click next.



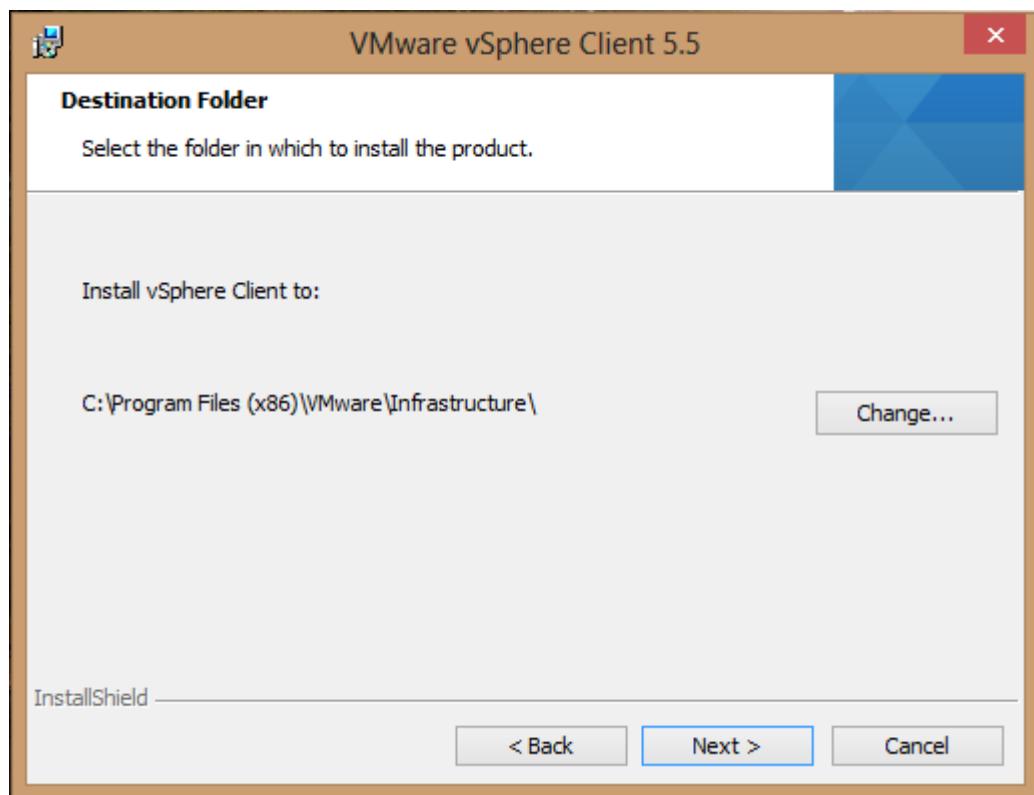
Step 27:

Agree to the license terms and then click next.



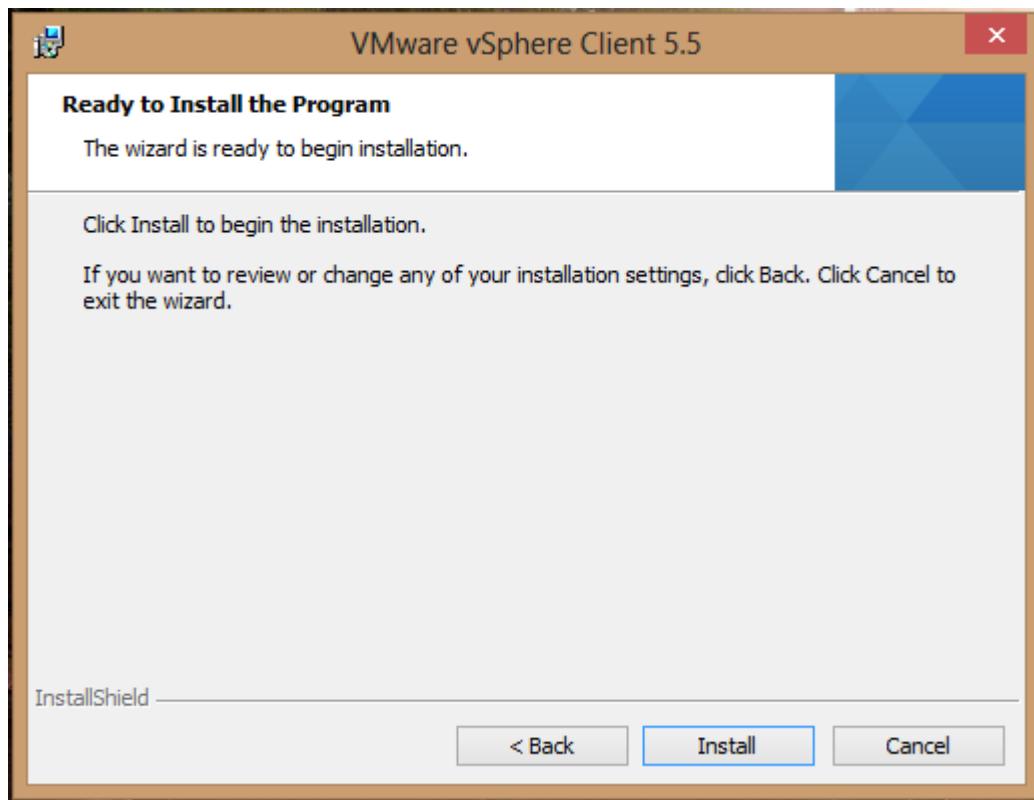
Step 28:

In this step you can choose where you wish to install the vSphere client. Once you are satisfied with the location, click next.



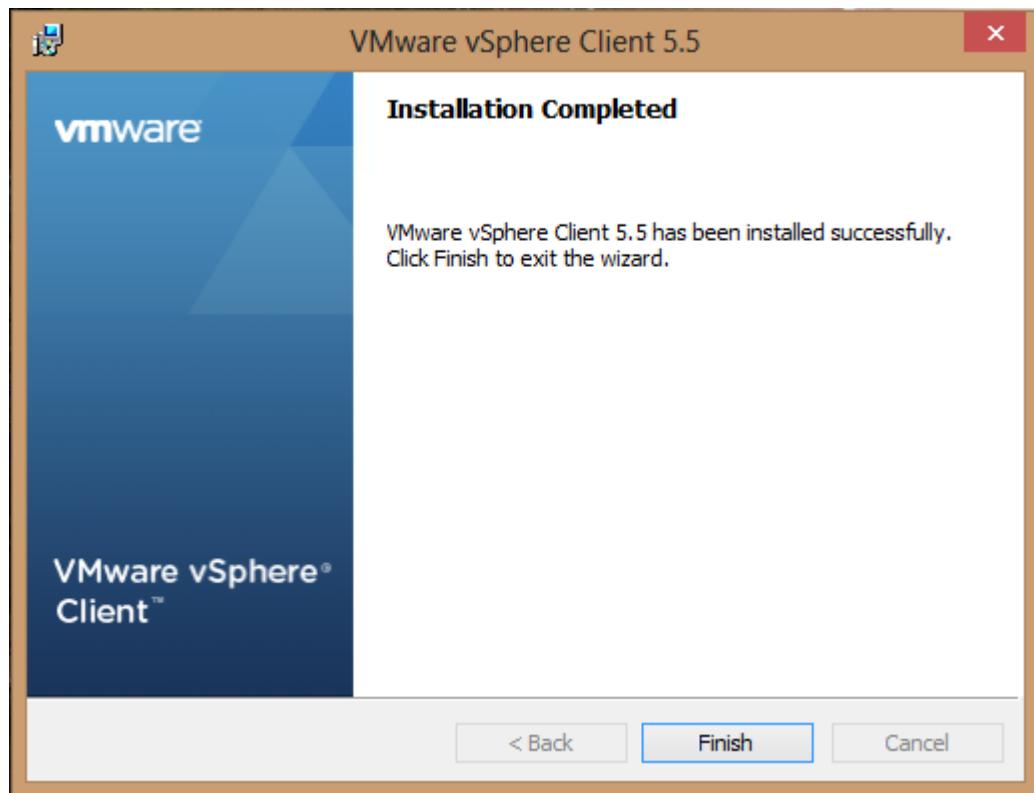
Step 29:

In the next window, click install.



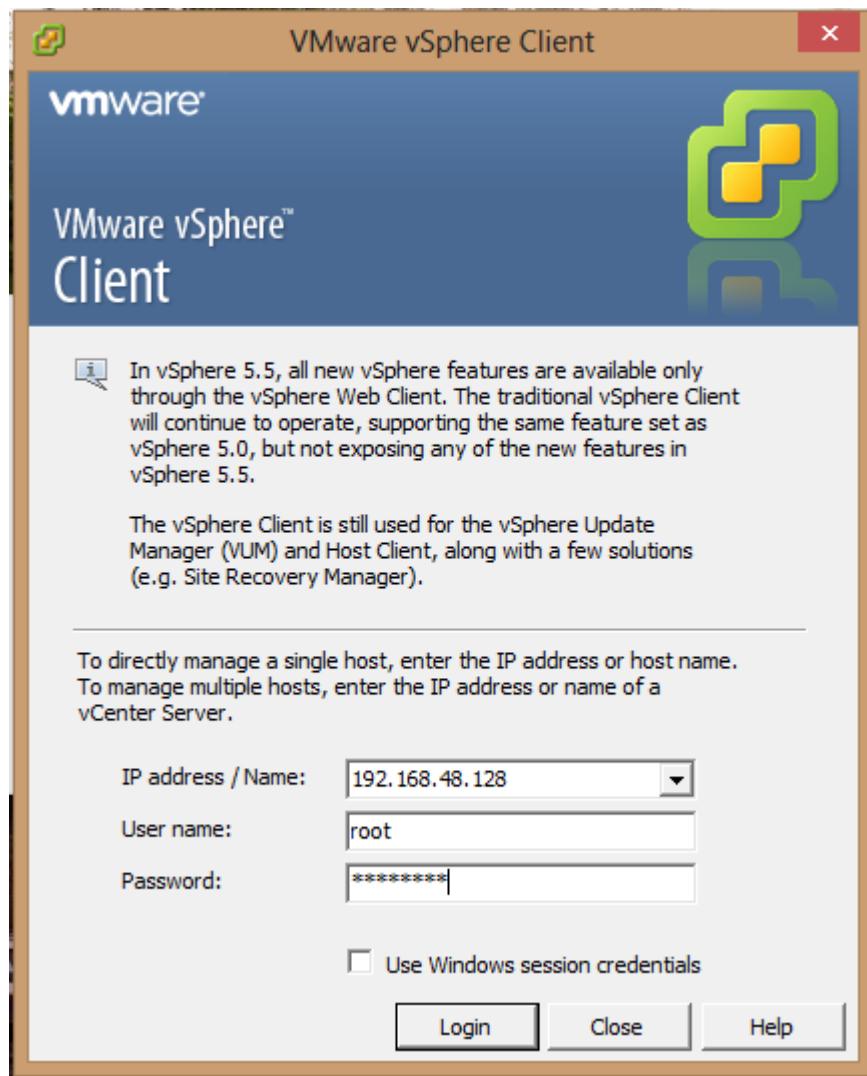
Step 30:

After the installation has finished, the menu will be displayed as below;



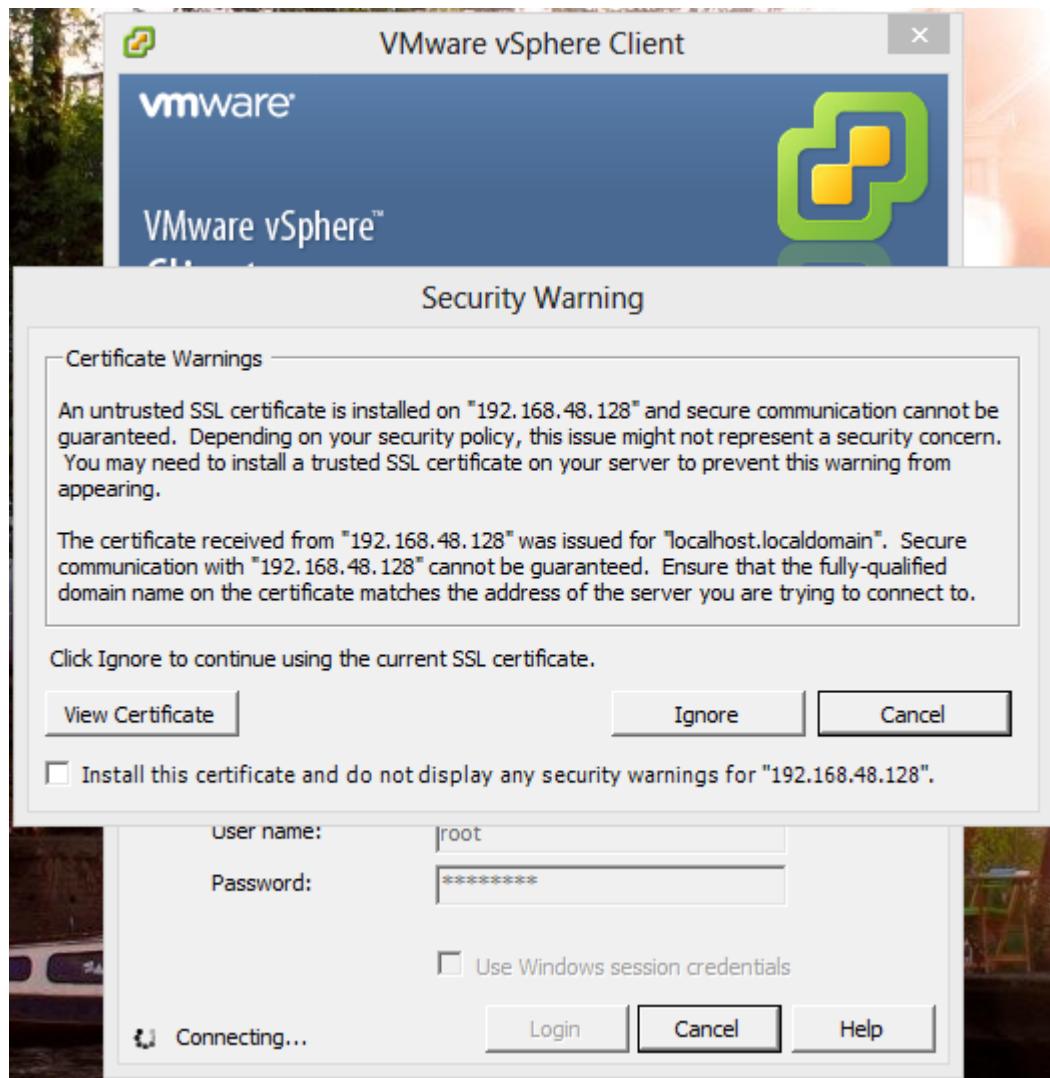
Step 31:

Open the vsphere client. When the window opens enter the IP address of the ESXI server, then enter the username and password entered during the installation of the ESXI server. The default username is root. The password used for this assignment was Pas\$\$w0rd.



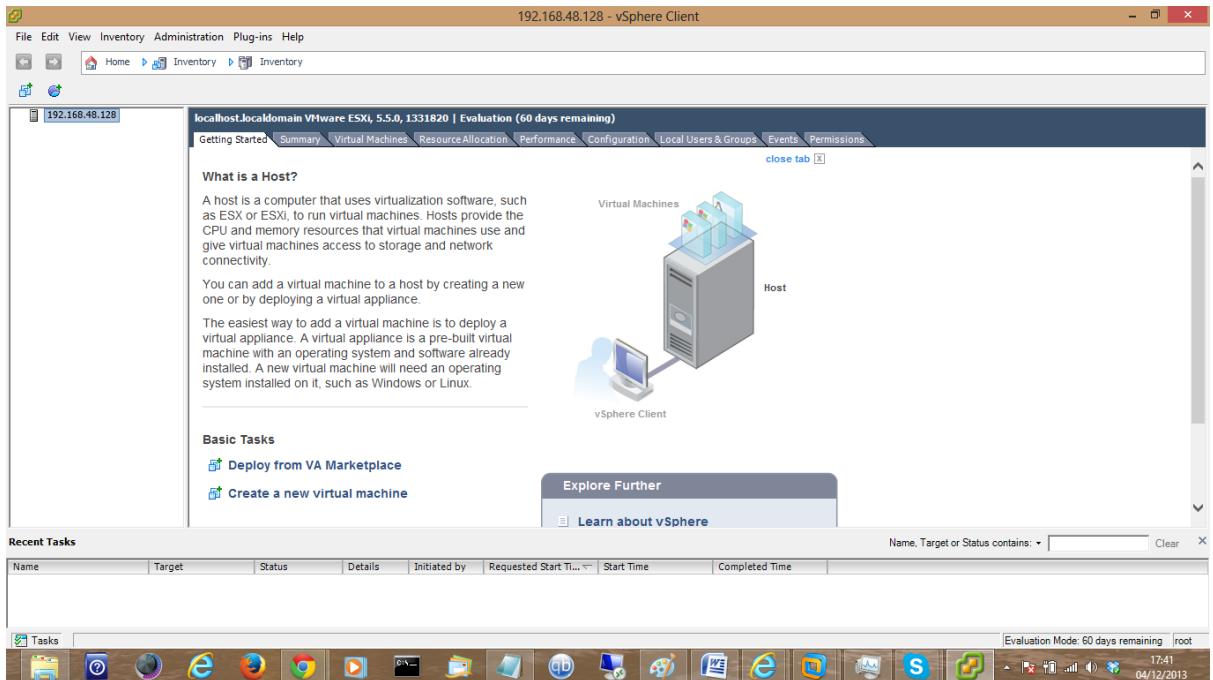
Step 32:

Select Ignore to ignore the certificate.



Step 33:

When the connection is created to the ESXi server below is the window that opens.



Task A.2

Using VMware ESXi and a vSphere client, create and document the process of creating two virtual machines, each with the relevant requirements met to install a host OS capable of running the relevant environments.

Outline the differences between vCenter Server and the use of vCenter Server Virtual Appliance.

vCenter Server

VMware vCenter Server, is the centralized management tool for the vSphere suite. VMware vCenter Server allows for the management of multiple ESX servers and virtual machines from different ESX servers through a single console application. vCenter Server performs the following three key functions³:

Visibility: vCenter Server allows you to configure ESX servers and virtual machiness, as well as monitor performance throughout the entire infrastructure, using events and alerts. The objects in the virtual infrastructure can be securely managed with roles and permissions⁴.

Scalability: The visibility found in vCenter Server is scalable across hundreds of ESX servers and thousands of VMs. Using Linked Mode, you can also manage multiple vCenter servers within the same vSphere client⁵.

Automation: vCenter Server alerts can trigger actions. The Orchestrator feature in vCenter Server Standard allows you to automate hundreds of actions⁶.

vCenter Server Virtual Appliance

The VMware vCenter Server Virtual Appliance provides an alternative option for organizations that chose not to use the Windows vCenter Server but still require centralised management of VMware vSphere deployments in the enterprise. It provides exactly the same functionality as the traditional Windows vCenter Server but packaged in a Linux distribution⁷.

Differences of vCenter Server and vCenter Server Virtual Appliance

The differences of vCenter Server and vCenter Server Virtual Appliance are outlined by Scott Lowe⁸, they are as follows:

- The Linux-based virtual appliance comes preloaded with additional services like Auto Deploy, Dynamic Host Configuration Protocol, Trivial File Transfer Protocol, and Syslog. If you need these services on your network, you can provide these services with a single

³ Davis, D (March 10th 2013). What is VMware vCenter Server?. TechTarget. Retrieved December 19th, 2013, from <http://searchvmware.techtarget.com/What-is-VMware-vCenter-Server>

⁴ Ibid.

⁵ Ibid.

⁶ Ibid.

⁷ Phan, H (July 17th 2011). VMware vCenter Server Virtual Appliance Features and Benefits. Vmwire. Retrieved December 19th, 2013, from <http://vmwire.com/2011/07/17/vmware-vcenter-server-virtual-appliance-vcsa-features-and-benefits/>

⁸ Lowe, S (2011). Loc.cit.

deployment of the vCenter virtual appliance. With the Windows Server-based version, these services are separate installations or possibly even separate VMs (or, worse yet, separate physical servers!).

- If your experience is primarily with Windows Server, the Linux underpinnings of the vCenter virtual appliance are something with which you may not be familiar. This introduces a learning curve that you should consider.
- Conversely, if your experience is primarily with Linux, then deploying a Windows Server-based application will require some learning and acclimation for you and/or your staff.
- If you need support for Microsoft SQL Server, the Linux-based vCenter virtual appliance won't work; you'll need to deploy the Windows Server-based version of vCenter Server. However, if you are using Oracle or DB2, or if you are a small installation without a separate database server, the vCenter Server virtual appliance will work just fine (it has its own embedded database if you don't have or don't need a separate database server).
- If you need to use linked mode, you must deploy the Windows Server-based version of vCenter Server. The vCenter Server virtual appliance does not support linked mode.
- If you need support for IPv6, the vCenter Server virtual appliance does not provide that support; you must deploy the Windows Server-based version.
- Because the vCenter Server virtual appliance naturally runs only as a VM, you are constrained to that particular design decision. If you want or need to run vCenter Server on a physical system, you cannot use the vCenter Server virtual appliance.
- If you want to use vCenter Heartbeat to protect vCenter Server from downtime, you'll need to use the Windows Server-based version of vCenter Server.

Machine 1

The first machine is to be set up for Microsoft Windows 2008 Server running vCenter Server and all its dependant software.

Step 1:

When the vSphere Client opens, click on the IP address of the host in the top left of the window. Then click summary, the click the datastore1 under the title storage.

localhost.localdomain VMware ESXi, 5.5.0, 1331820 | Evaluation (57 days remaining)

General

Manufacturer:	VMware, Inc.
Model:	VMware Virtual Platform
CPU Cores:	2 CPUs x 2.394 GHz
Processor Type:	Intel(R) Core(TM) i7-3630QM CPU @ 2.40GHz
License:	Evaluation Mode -
Processor Sockets:	2
Cores per Socket:	1
Logical Processors:	2
Hyperthreading:	Inactive
Number of NICs:	1
State:	Connected
Virtual Machines and Templates:	2
vMotion Enabled:	N/A
VMware EVC Mode:	Disabled
vSphere HA State	② N/A
Host Configured for FT:	N/A
Active Tasks:	
Host Profile:	N/A
Image Profile:	ESXi-5.5.0-1331820-standard

Resources

CPU usage: 849 MHz	Capacity 2 x 2.394 GHz
Memory usage: 3802.00 MB	Capacity 4095.49 MB
Storage	Drive Type Capacity
datastore1	Non-SSD 242.50 GB
Network	Type
VM Network	Standard port group

Fault Tolerance

Fault Tolerance Version:	5.0.0-5.0.0-5.0.0
Total Primary VMs:	0
Powered On Primary VMs:	0
Total Secondary VMs:	0
Powered On Secondary VMs:	0

Step 2:

Right click on datastore1.

localhost.localdomain VMware ESXi, 5.5.0, 1331820 | Evaluation (57 days remaining)

General

Manufacturer:	VMware, Inc.
Model:	VMware Virtual Platform
CPU Cores:	2 CPUs x 2.394 GHz
Processor Type:	Intel(R) Core(TM) i7-3630QM CPU @ 2.40GHz
License:	Evaluation Mode -
Processor Sockets:	2
Cores per Socket:	1
Logical Processors:	2
Hyperthreading:	Inactive
Number of NICs:	1
State:	Connected
Virtual Machines and Templates:	2
vMotion Enabled:	N/A
VMware EVC Mode:	Disabled
vSphere HA State	② N/A
Host Configured for FT:	N/A
Active Tasks:	

Resources

CPU usage: 1111 MHz	Capacity 2 x 2.394 GHz
Memory usage: 3799.00 MB	Capacity 4095.49 MB
Storage	Drive Type Capacity
datastore1	Non-SSD 242.50 GB
Network	Type
VM Network	Standard port group

Fault Tolerance

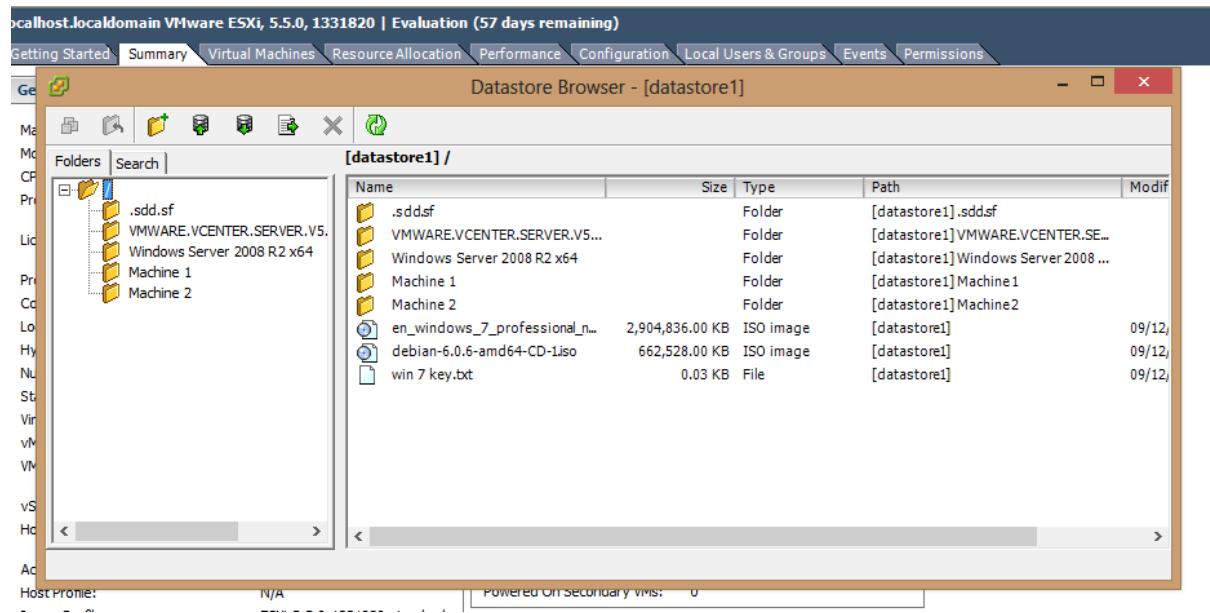
Fault Tolerance Version:	5.0.0-5.0.0-5.0.0
Total Primary VMs:	0
Powered On Primary VMs:	0
Total Secondary VMs:	0

Context Menu (over datastore1):

- Browse Datastore...
- Rename
- Unmount
- Delete
- Refresh
- Properties...
- Copy to Clipboard Ctrl+C

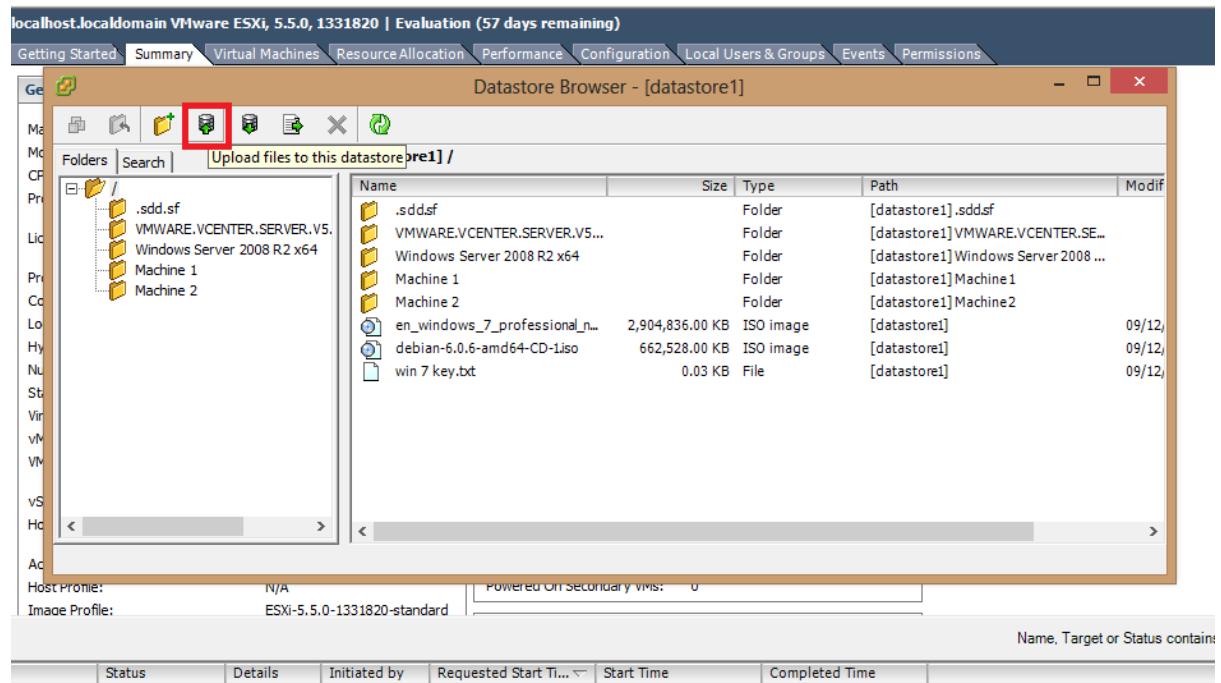
Step 3:

When the datastore browser opens, select upload.



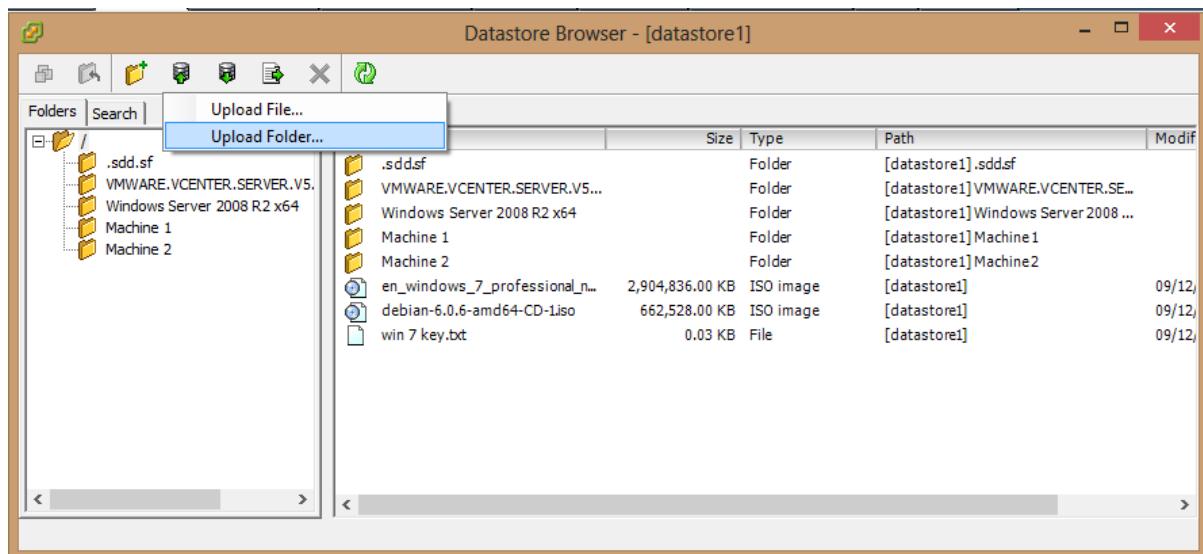
Step 4:

The upload icon is located inside the red square.



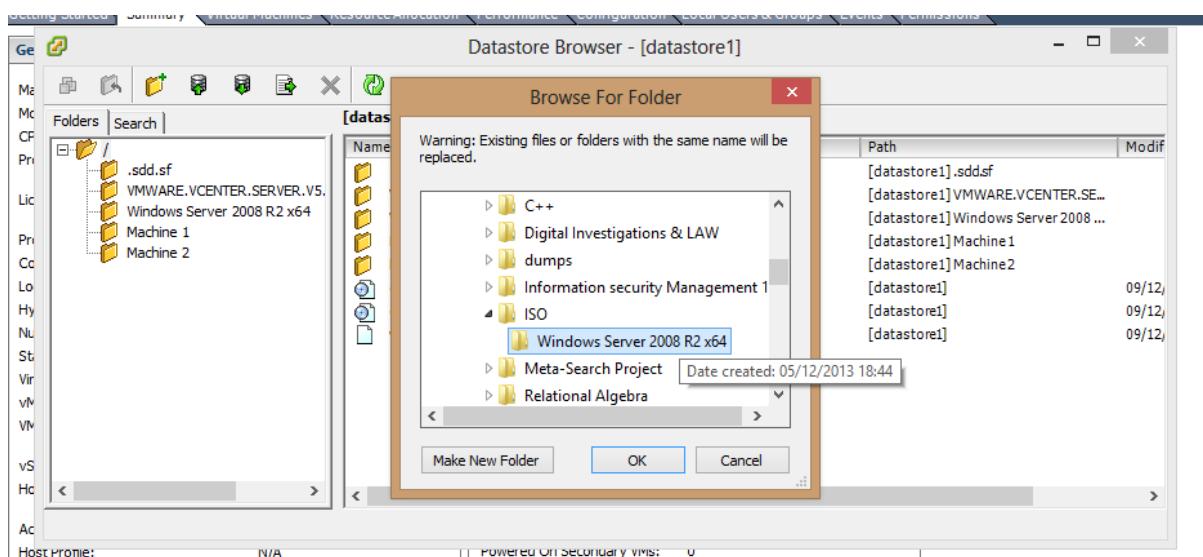
Step 5:

After clicking upload, click upload folder.



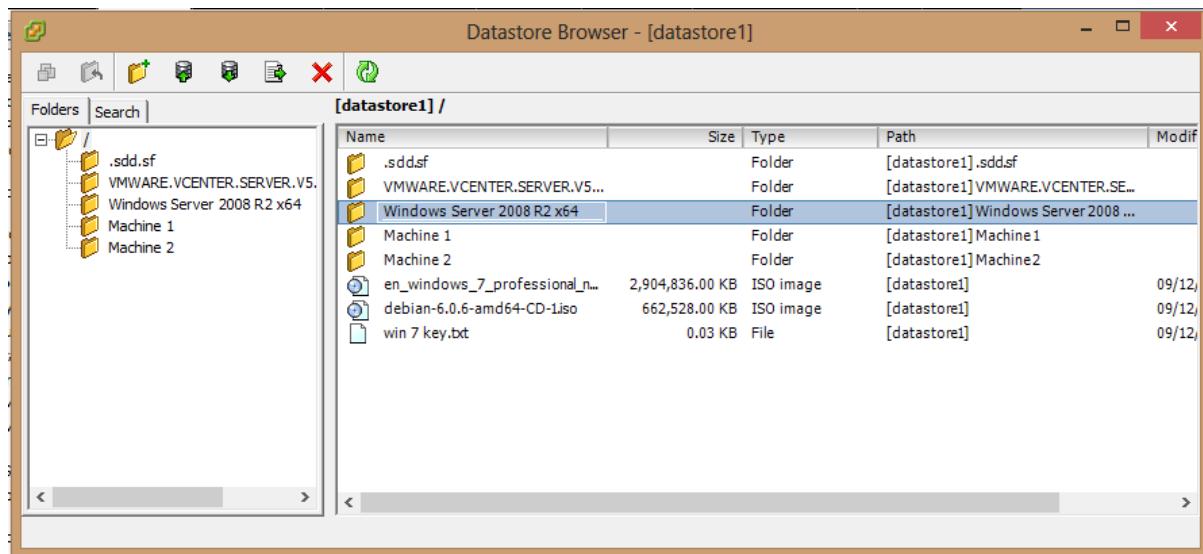
Step 6:

Find where the Windows Server 2008 R2 is located, then click ok.



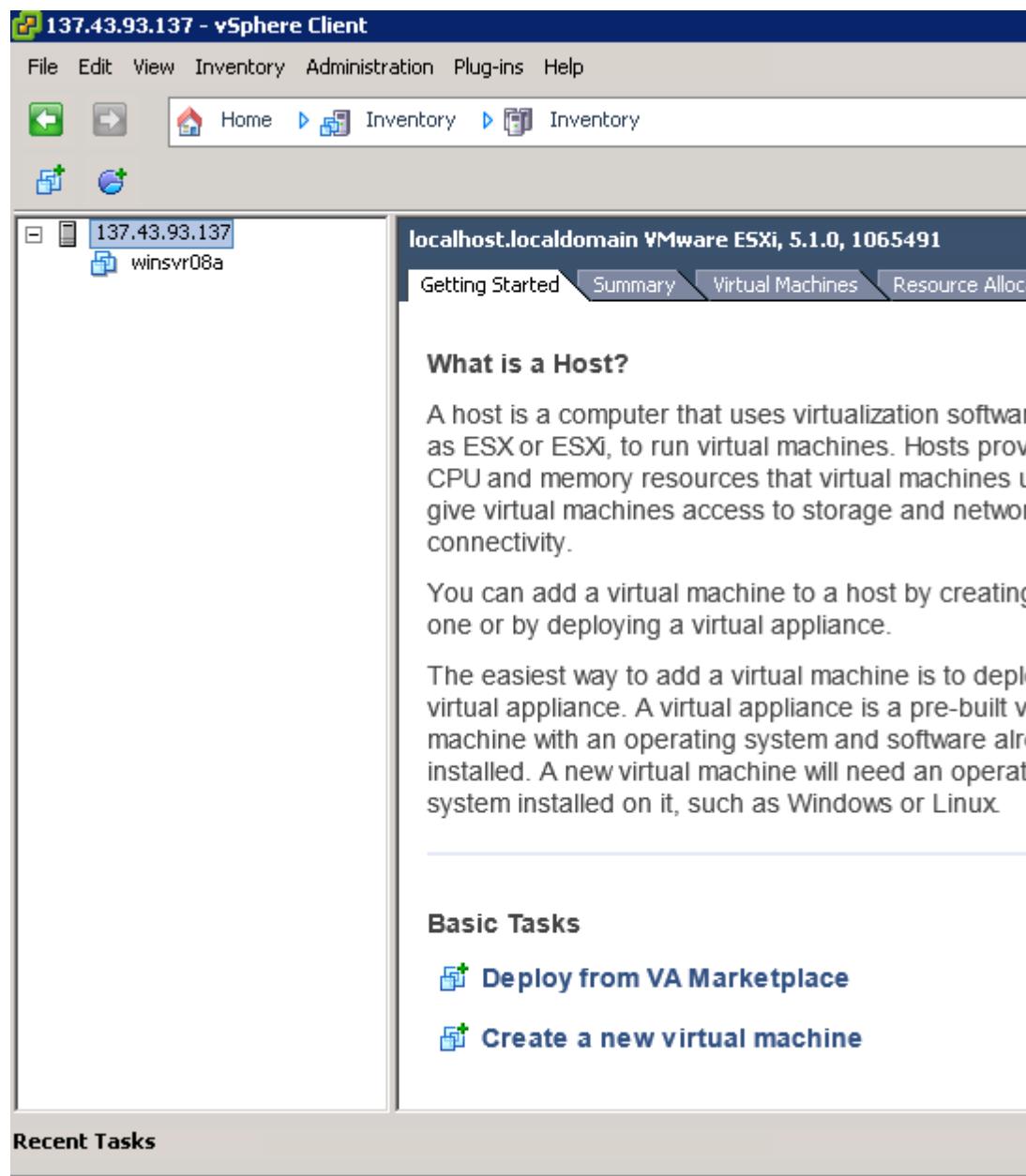
Step 7:

After the upload is completed it is displayed as below;



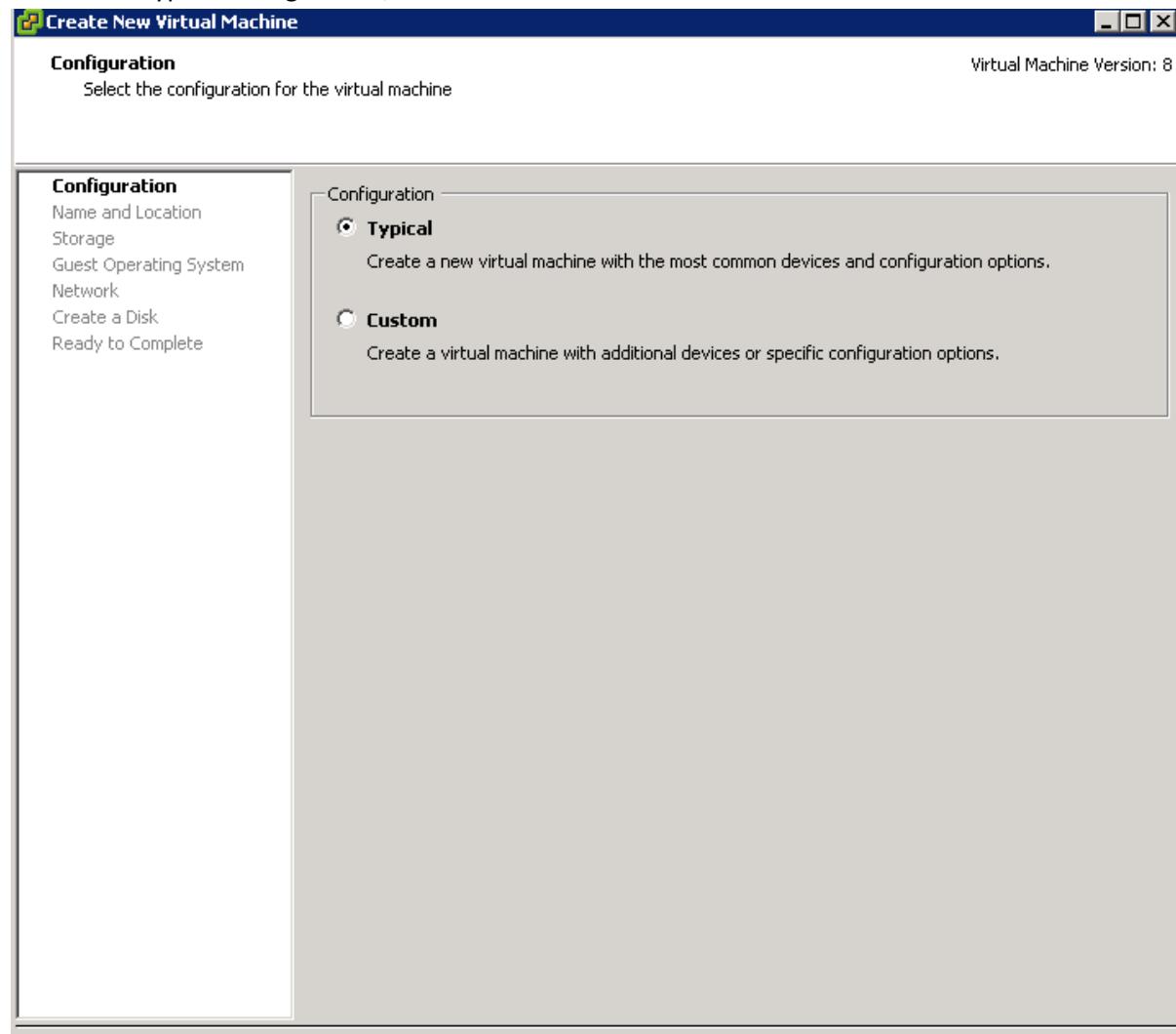
Step 8:

Once the software has uploaded to the datastore, again, click the ip address in the top left corner then click “Create a new virtual machine”.



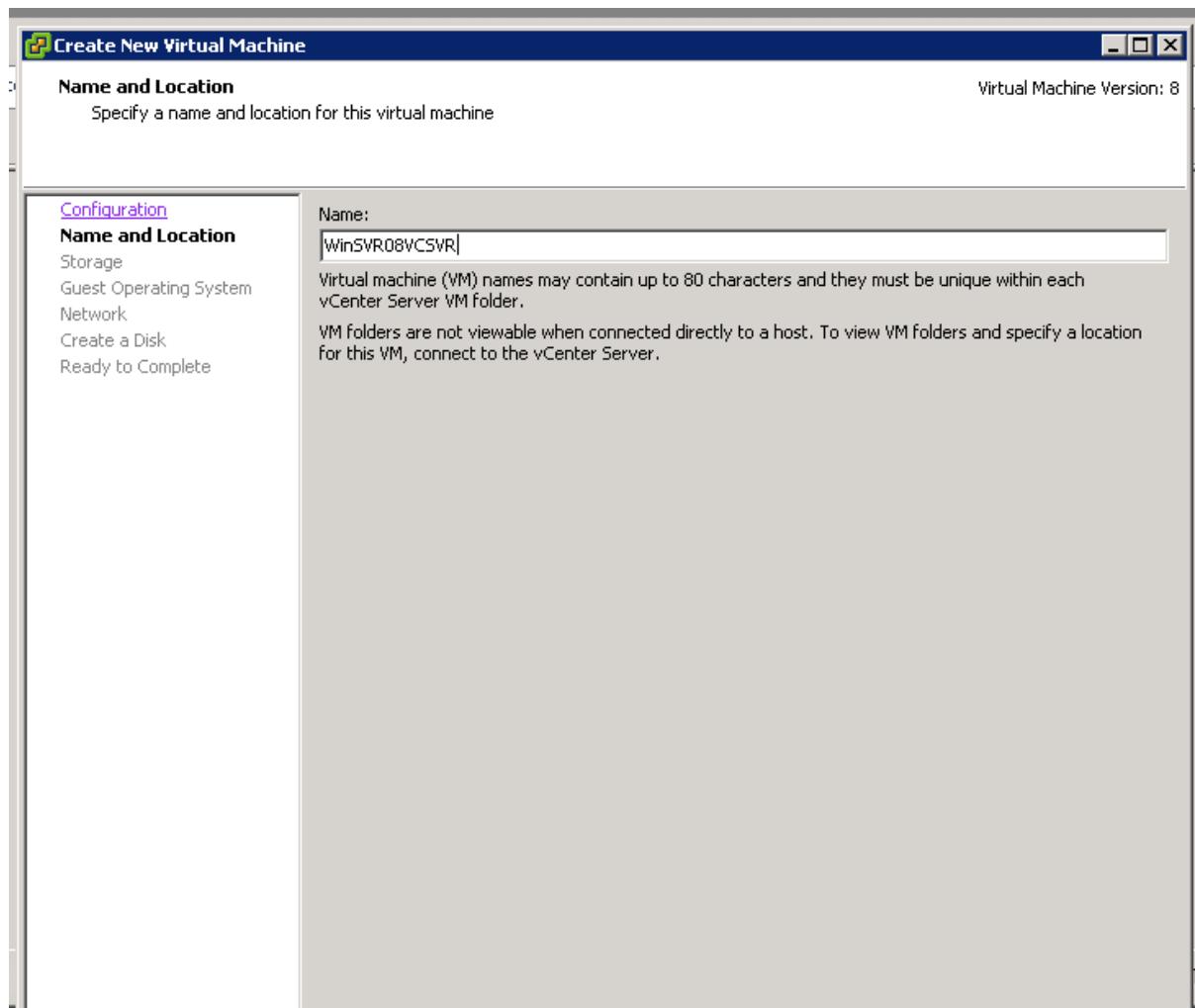
Step 9:

Choose the typical configuration, then click next.



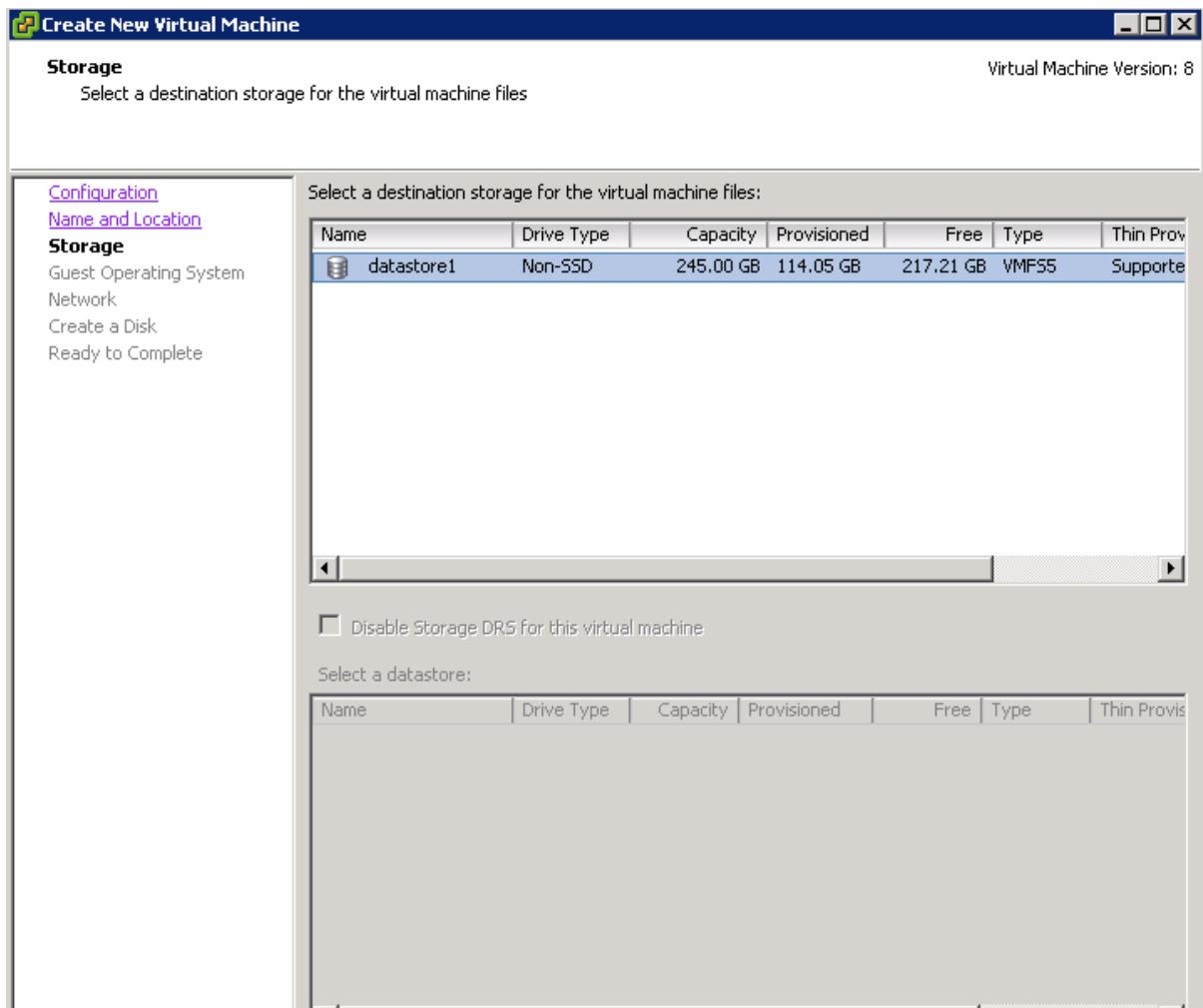
Step 10:

Choose a name for the virtual machine, then click next.



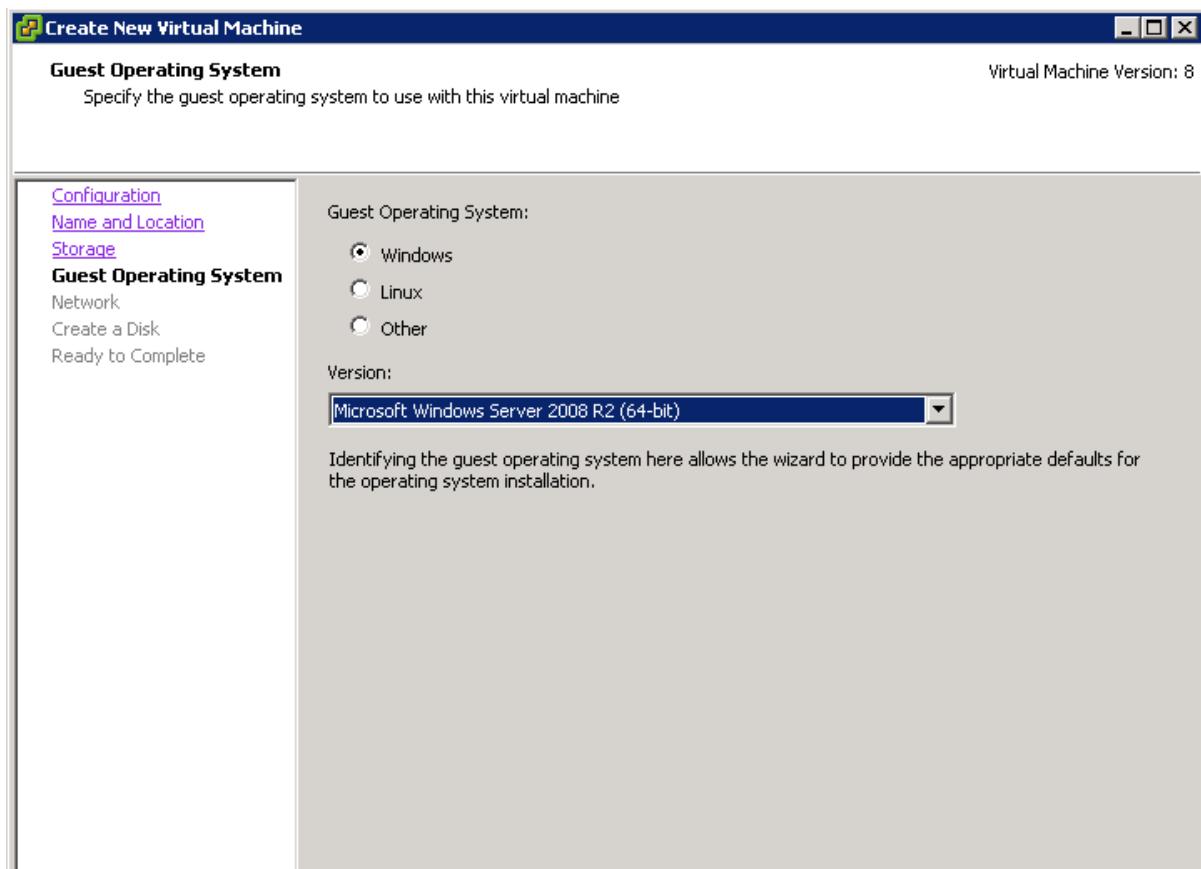
Step 11:

Choose the correct datastore, then click next.



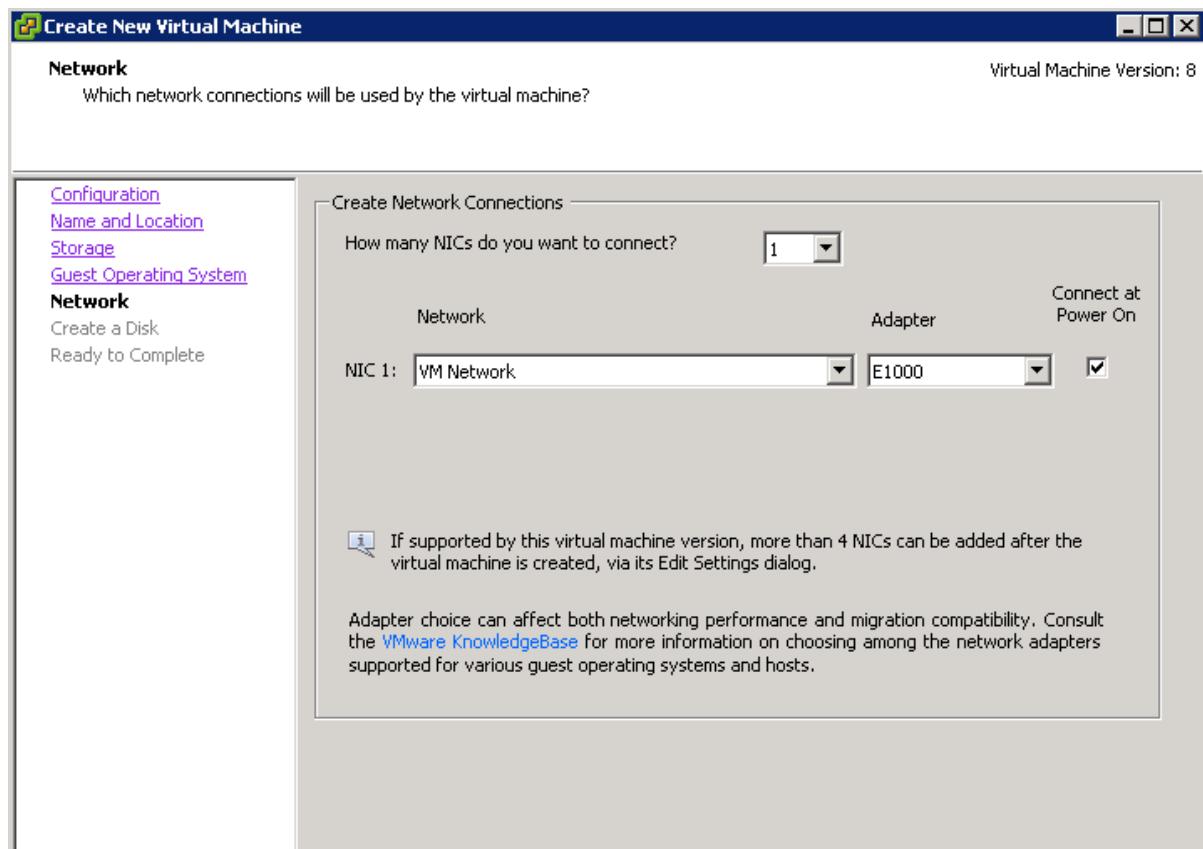
Step 12:

Choose the correct guest operating system, then click next.



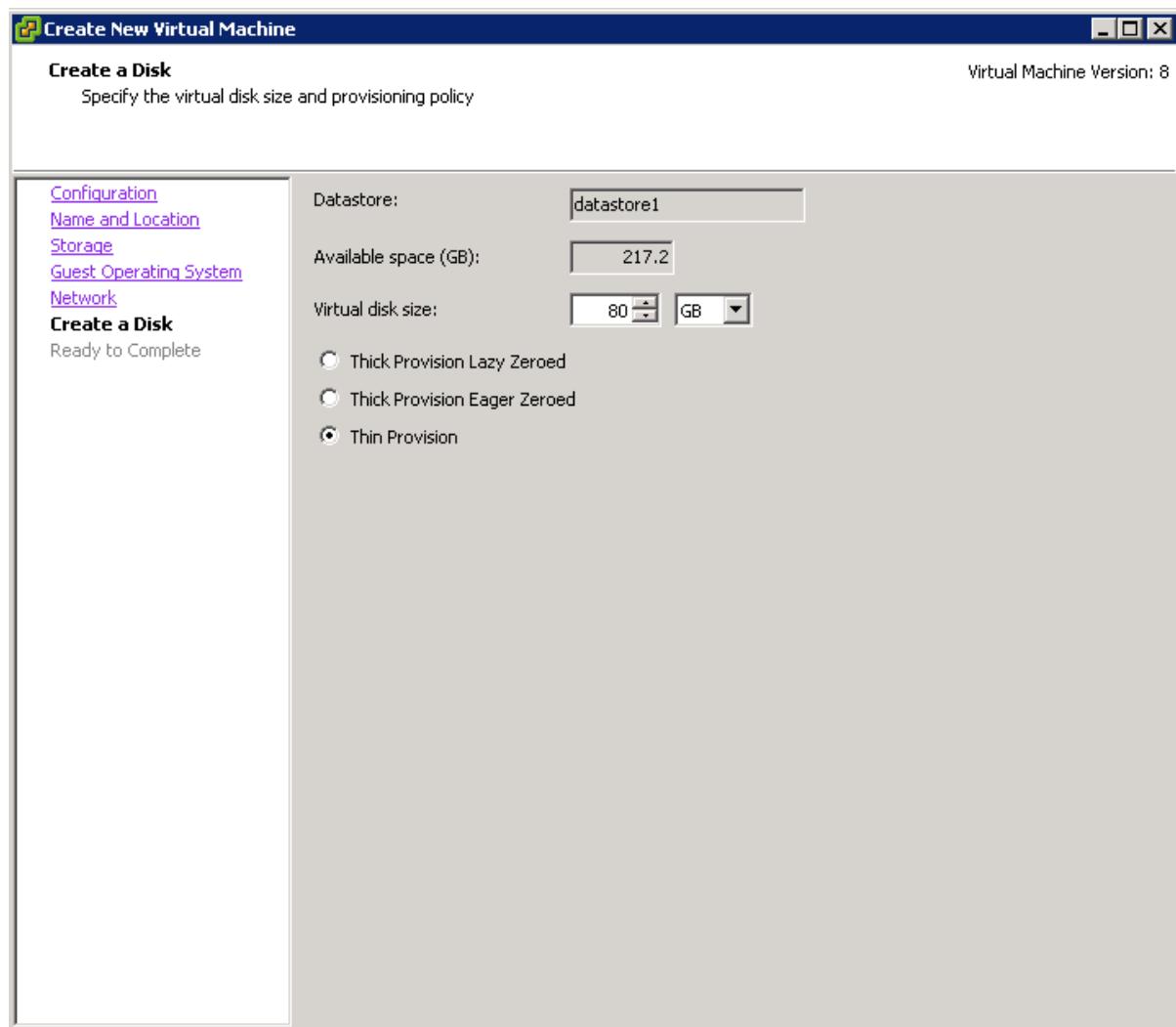
Step 13:

Leave the network settings as default, then click next.



Step 14:

Choose between 150GB and 200GB for the windows server. Choose thin provision as the disk storage method. Then click next.



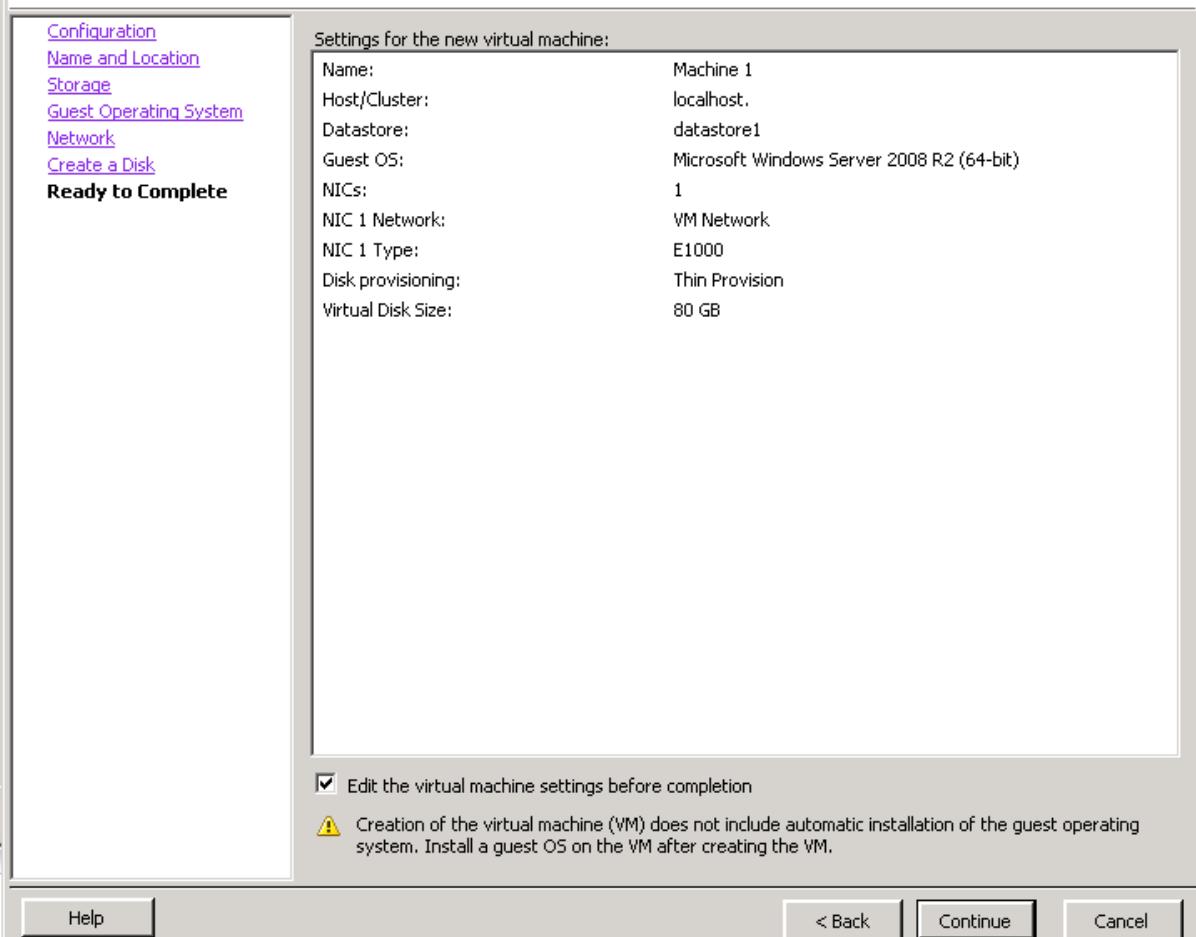
Step 15:

Tick, "Edit virtual machine settings before completion" then click finish.

Ready to Complete

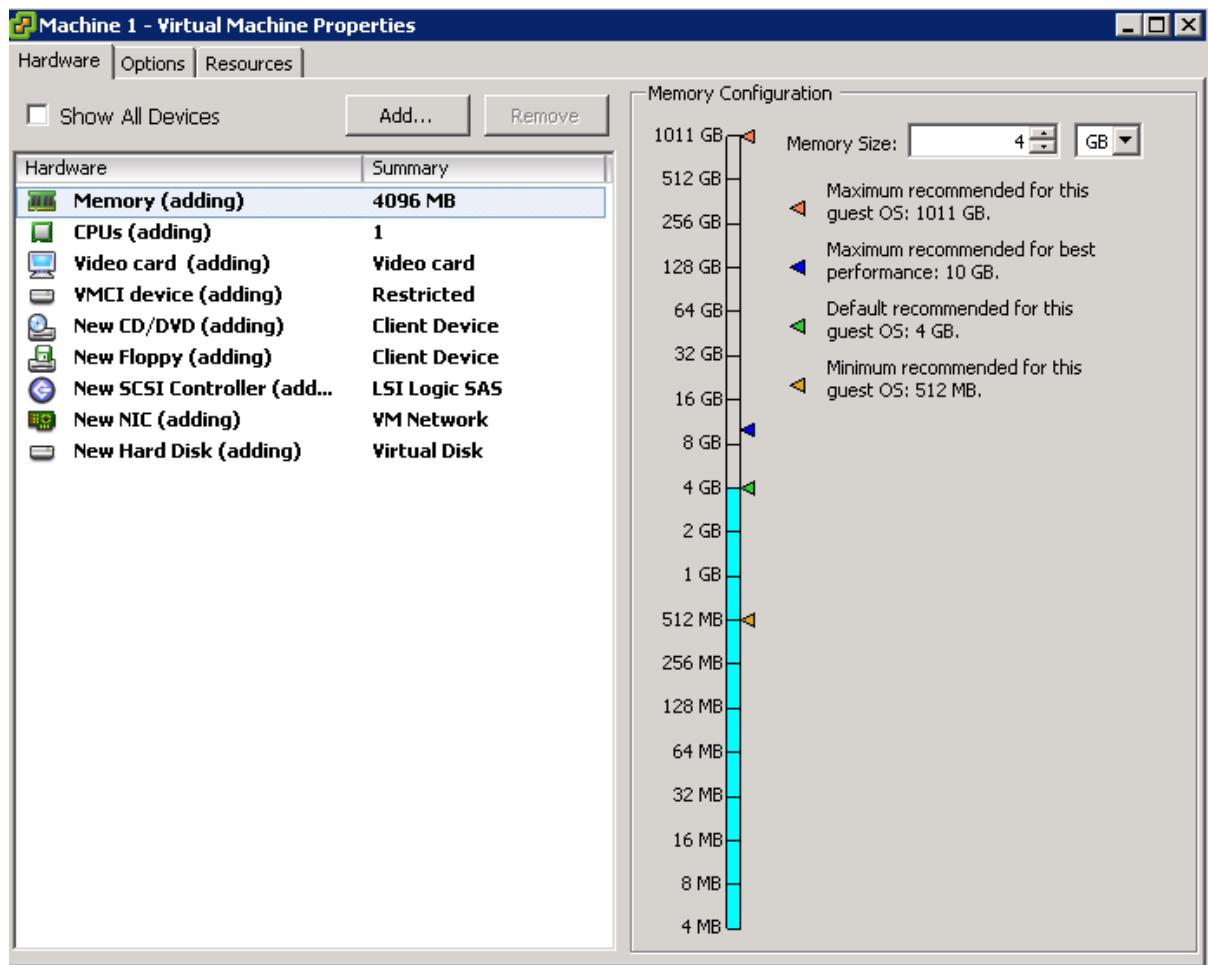
Click Finish to start a task that will create the new virtual machine

Virtual Machine Version: 8



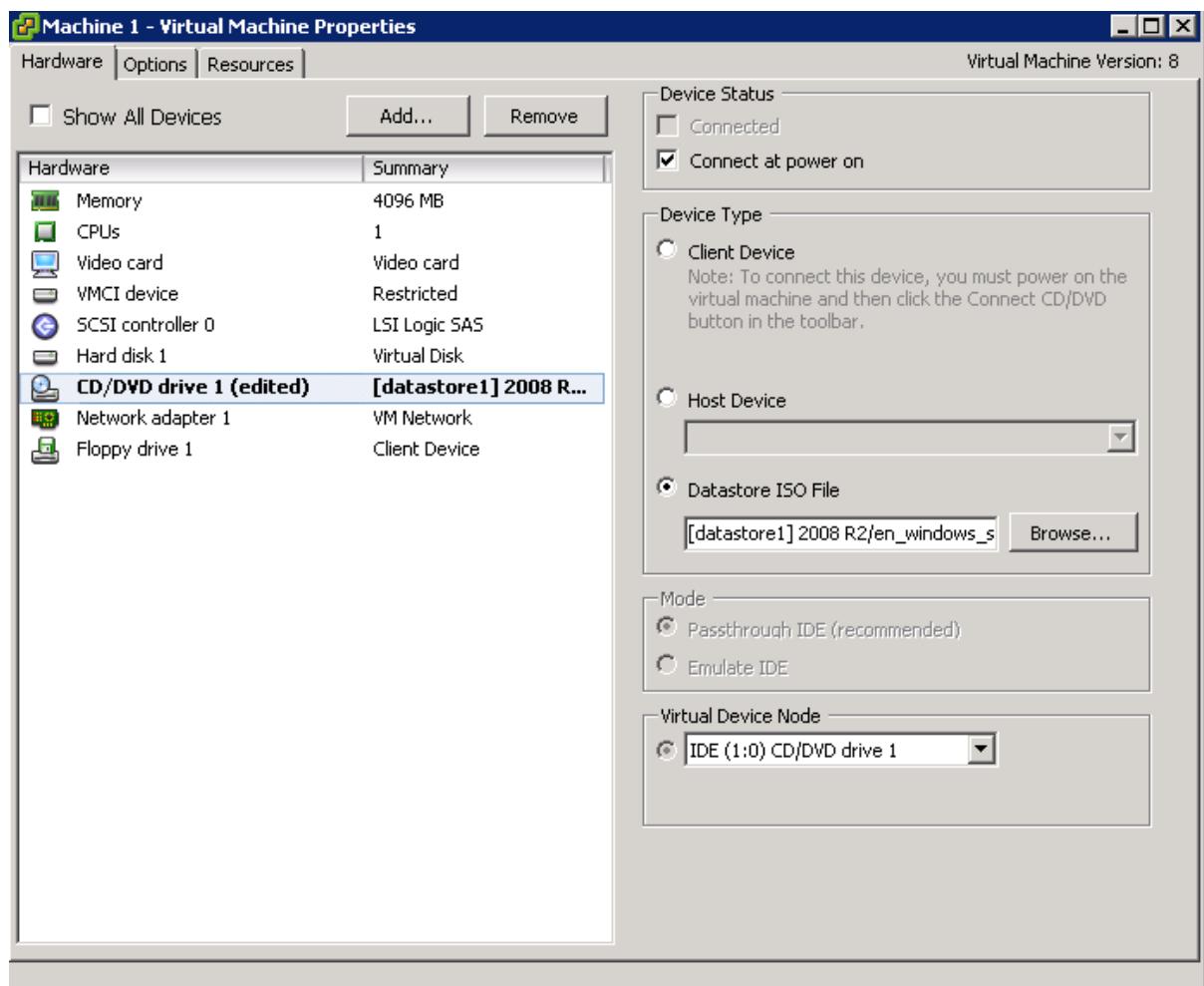
Step 16:

Set the ram to 4GB.



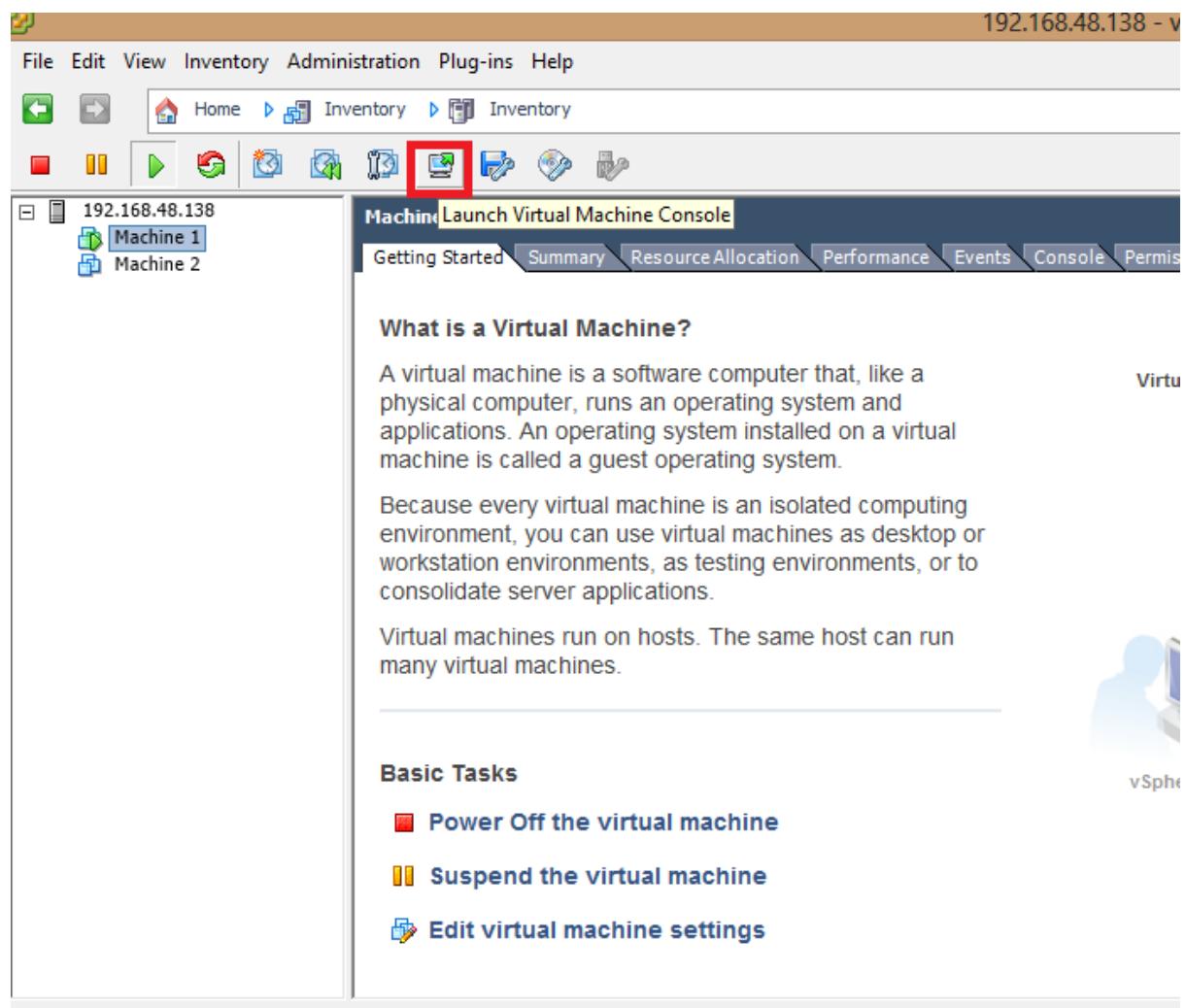
Step 17:

Click CD/DVD drive 1 (edited) then click Datastore ISO file then click Browse. Then find where the Windows 2008 R2 server iso is stored. Also, make sure that connect at power on is selected before powering on.



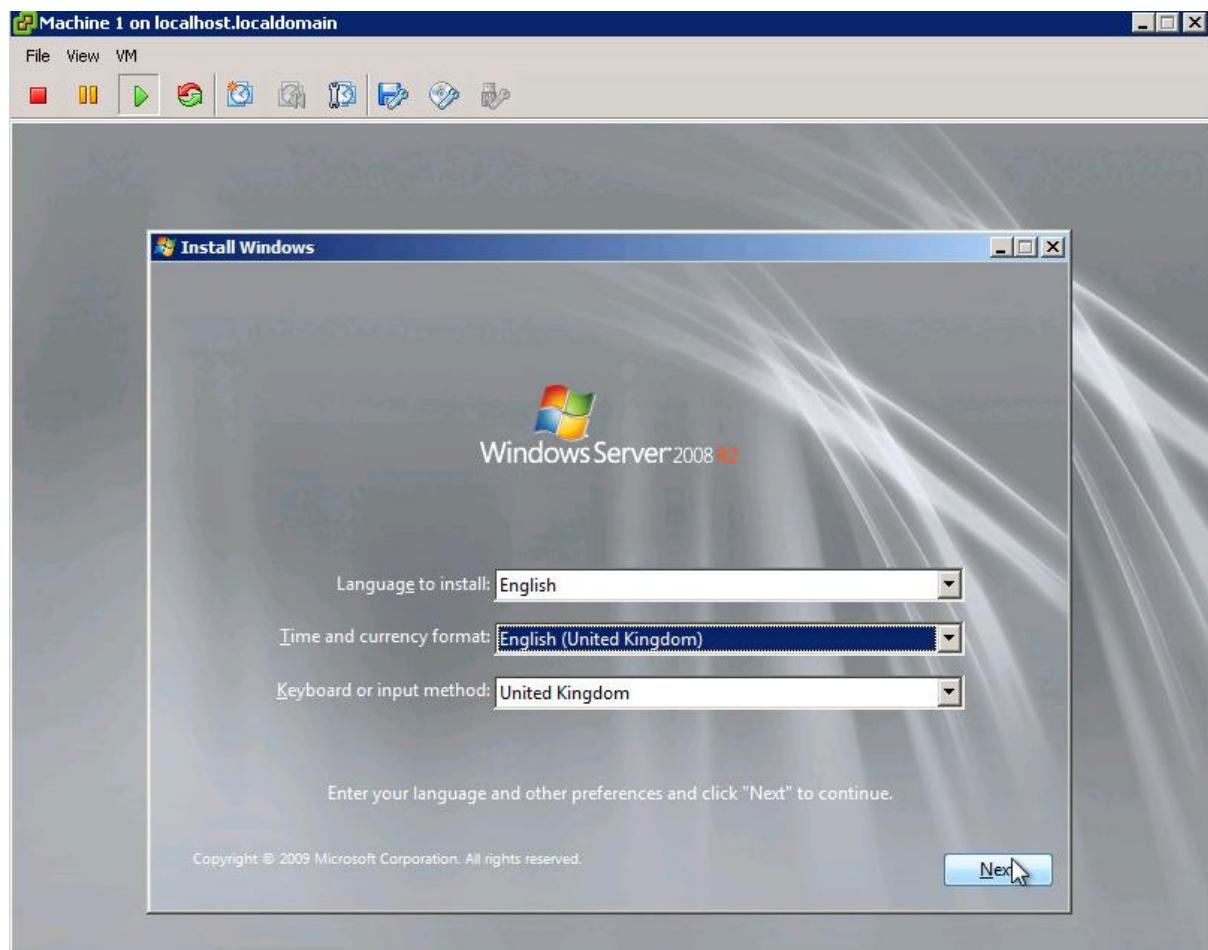
Step 18:

Power on the virtual machine, then click, Launch virtual machine console.



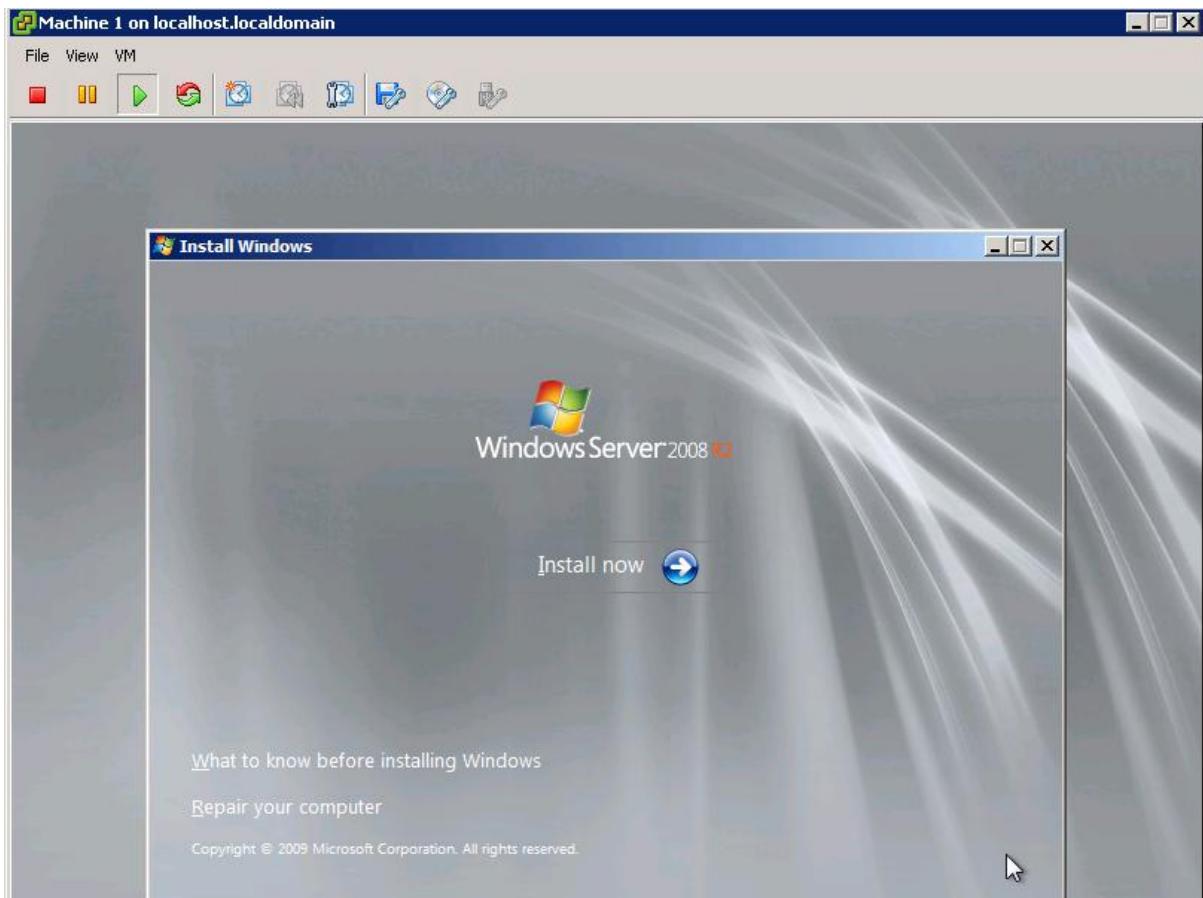
Step 19:

Select the correct time and currency format, then, click next.



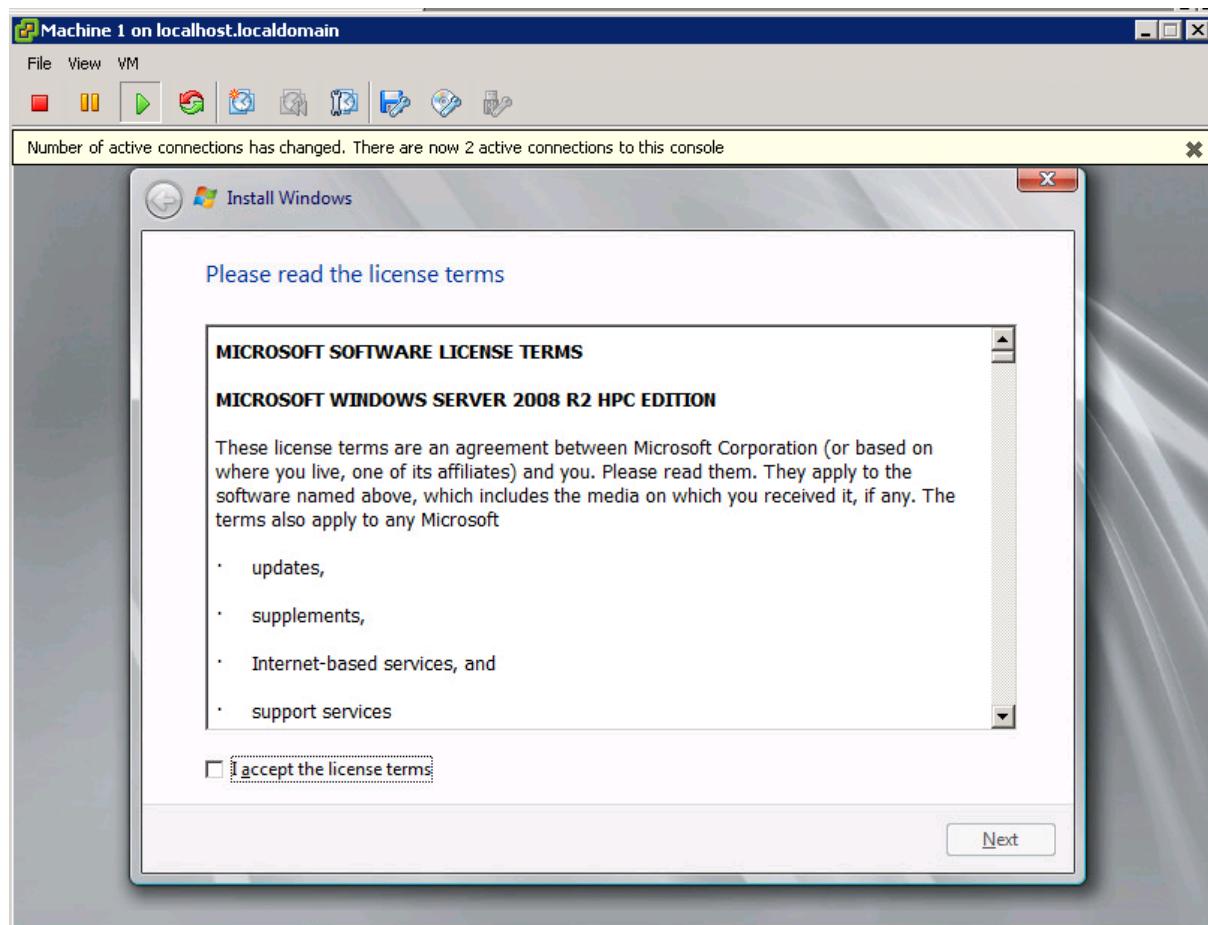
Step 20:

Click Install Now to begin the installation.



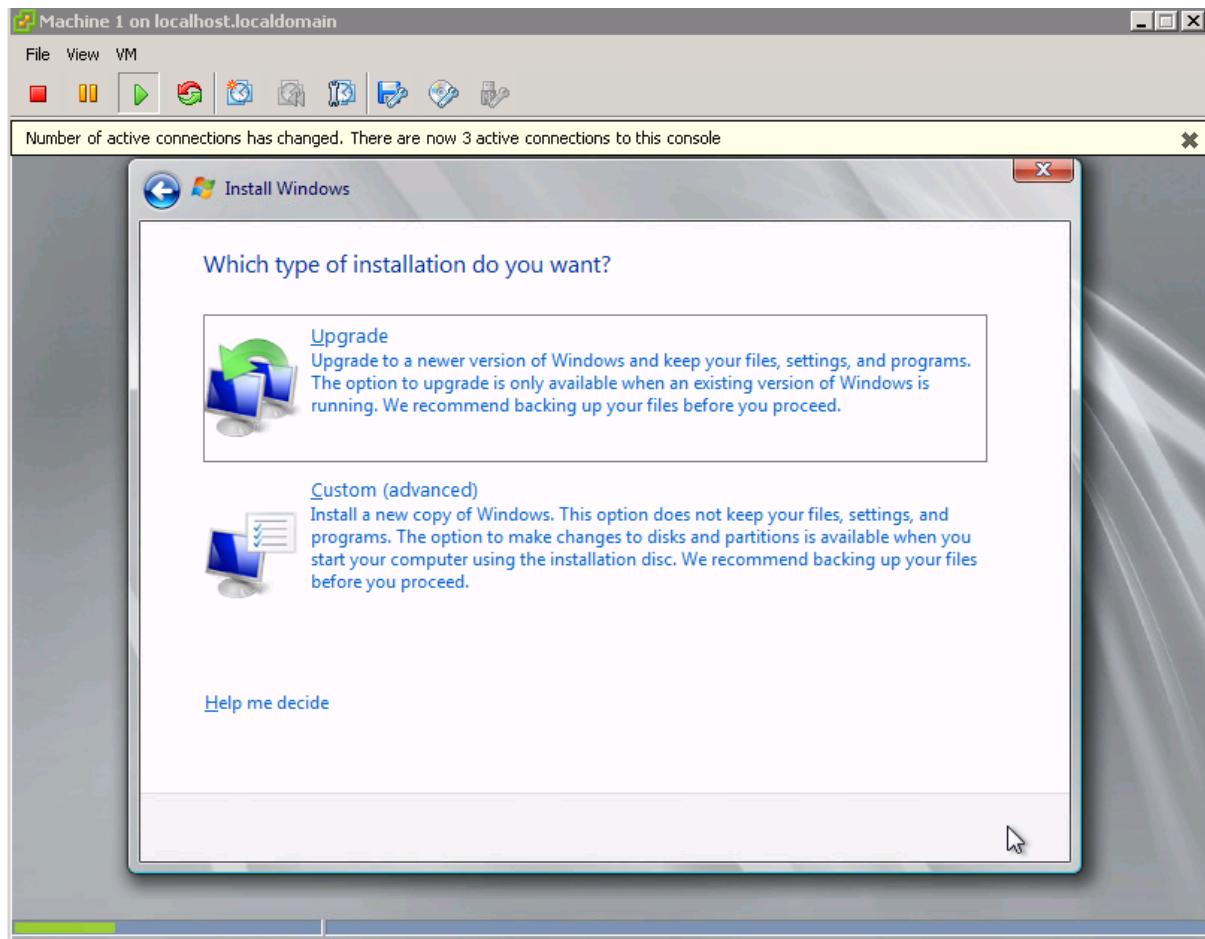
Step 21:

Accept the license terms, then, click next.



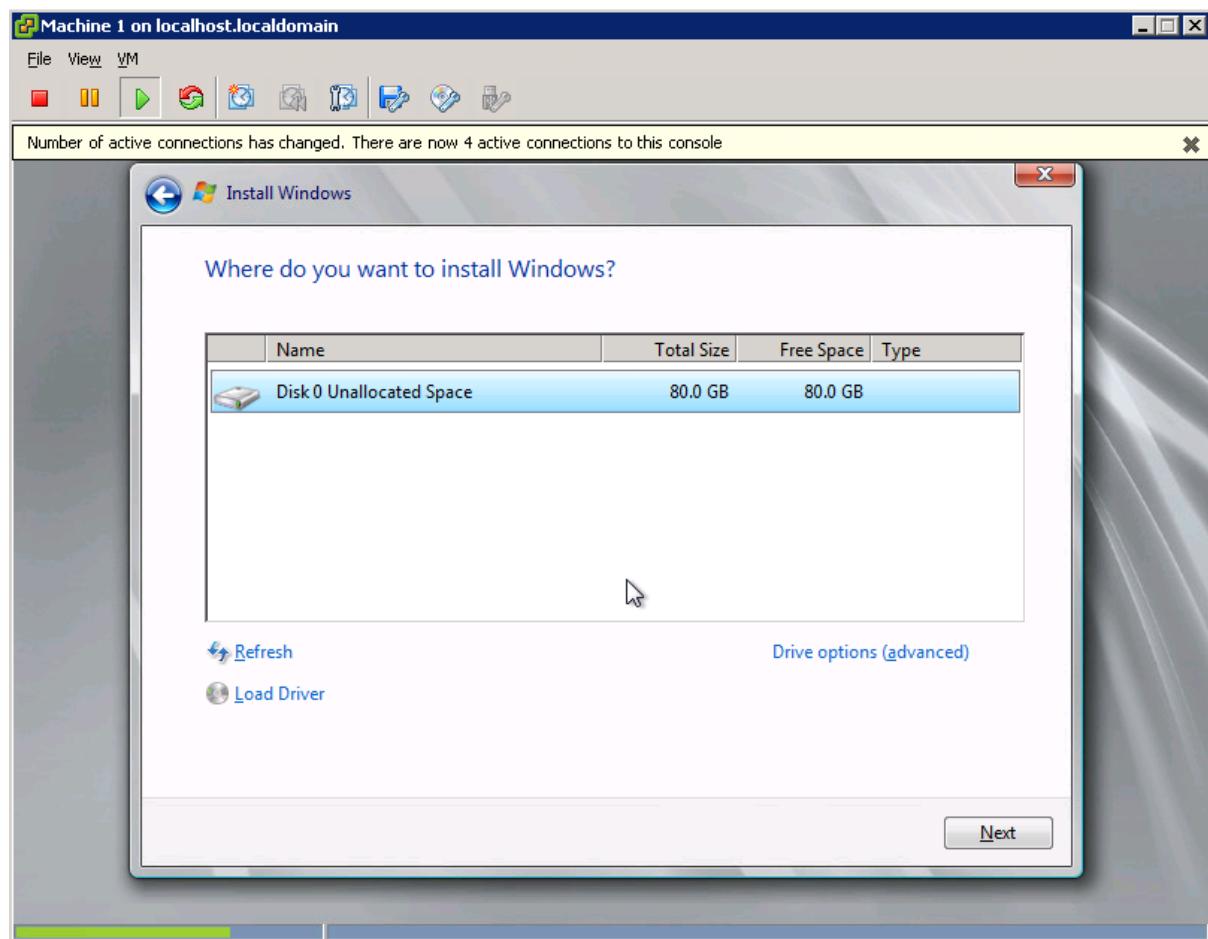
Step 22:

Click custom(advanced) installation.



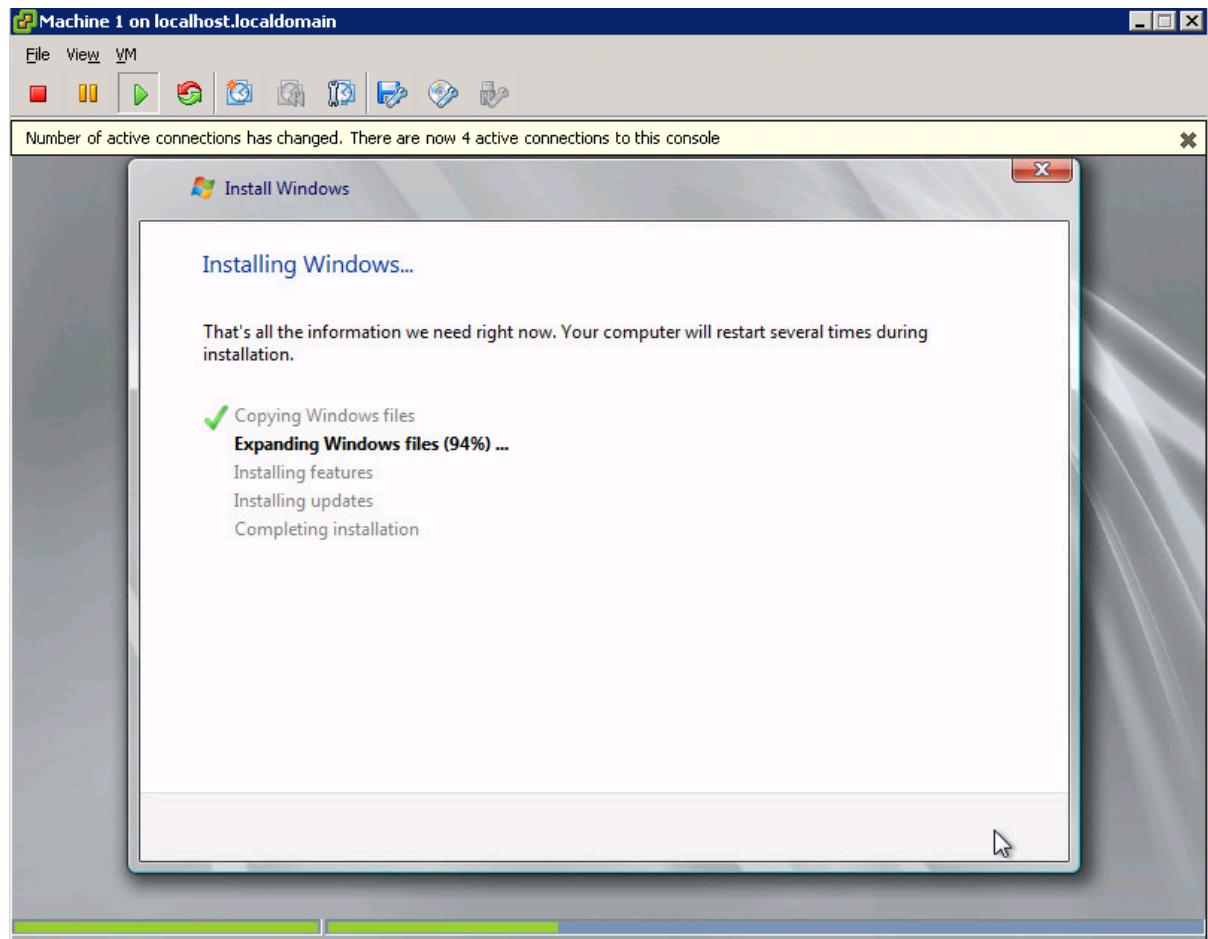
Step 23:

Select the hard drive, then click next.



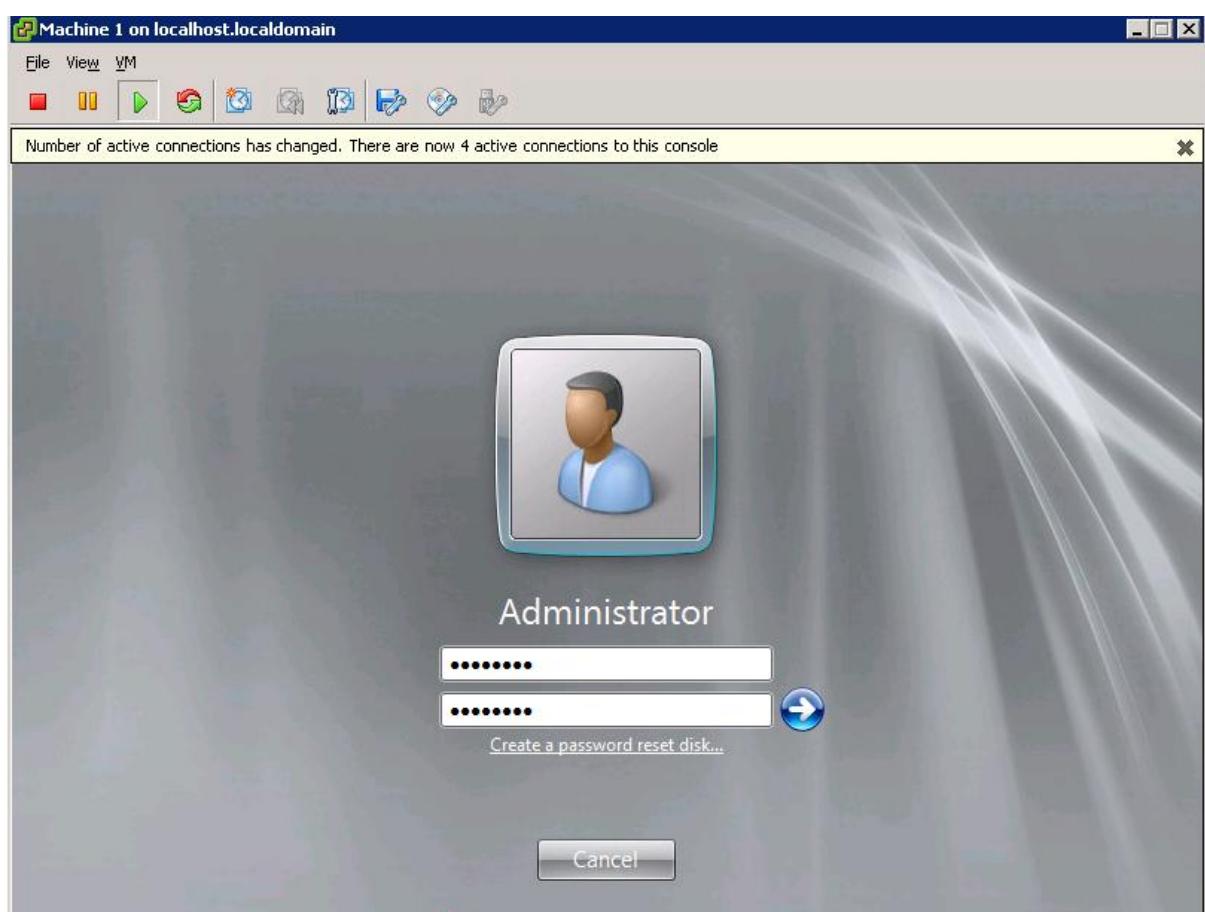
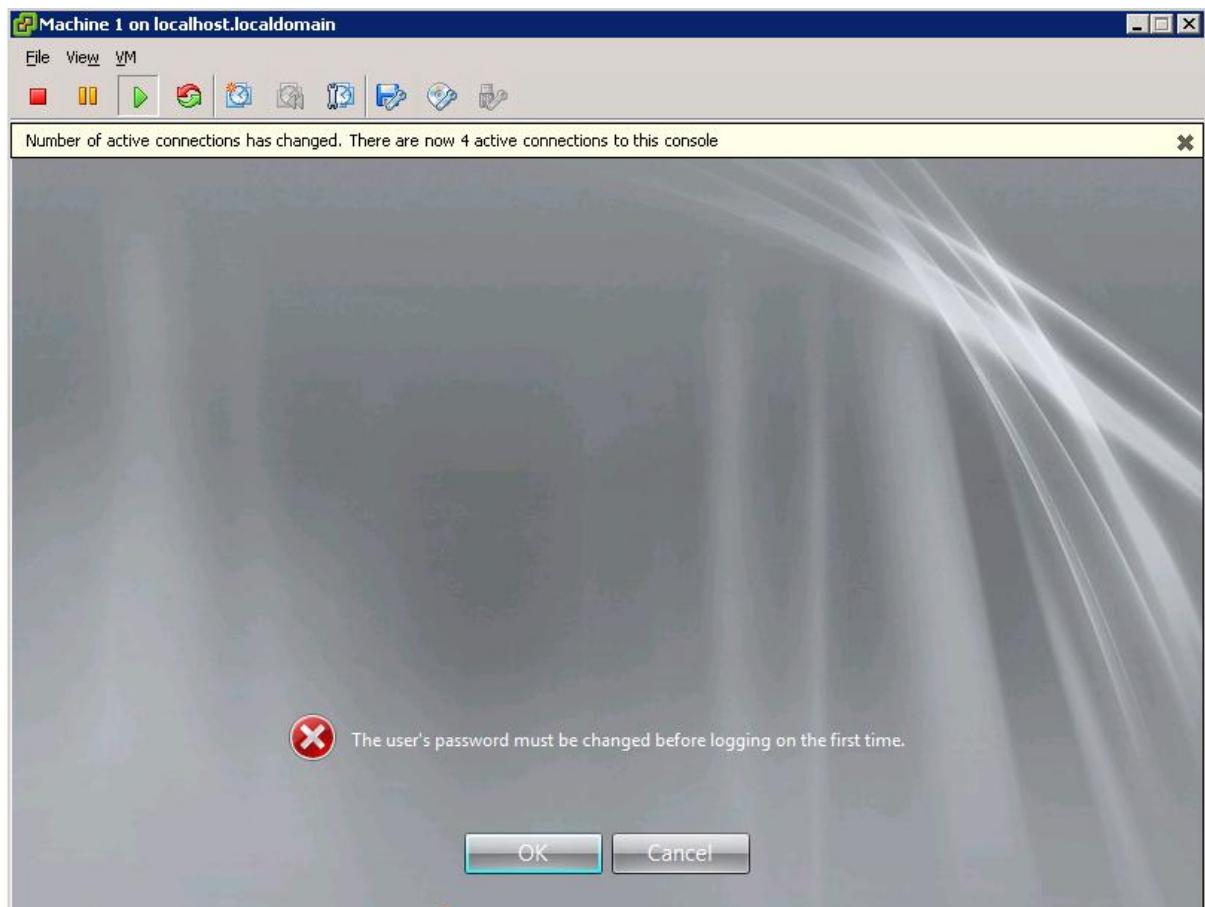
Step 24:

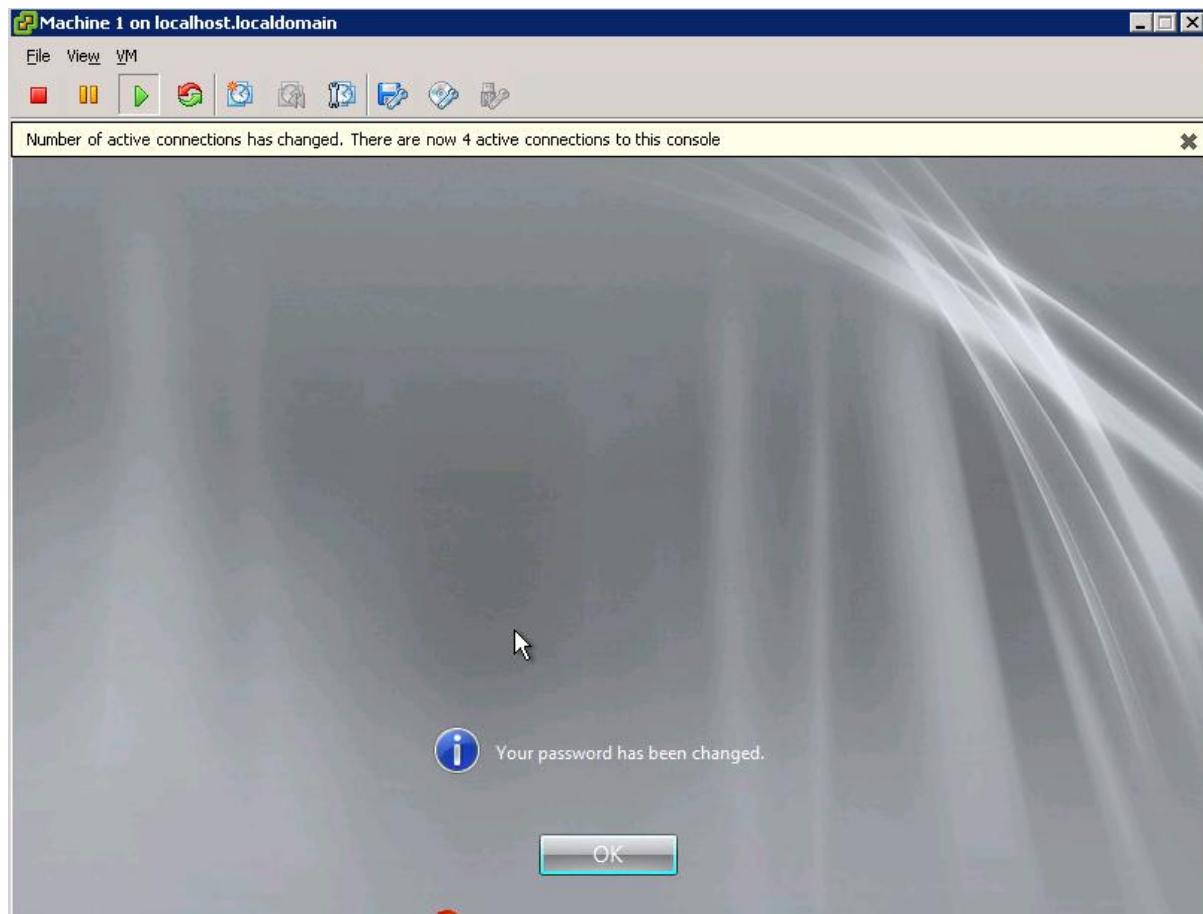
After clicking next in the previous step, the installation will begin.



Step 25:

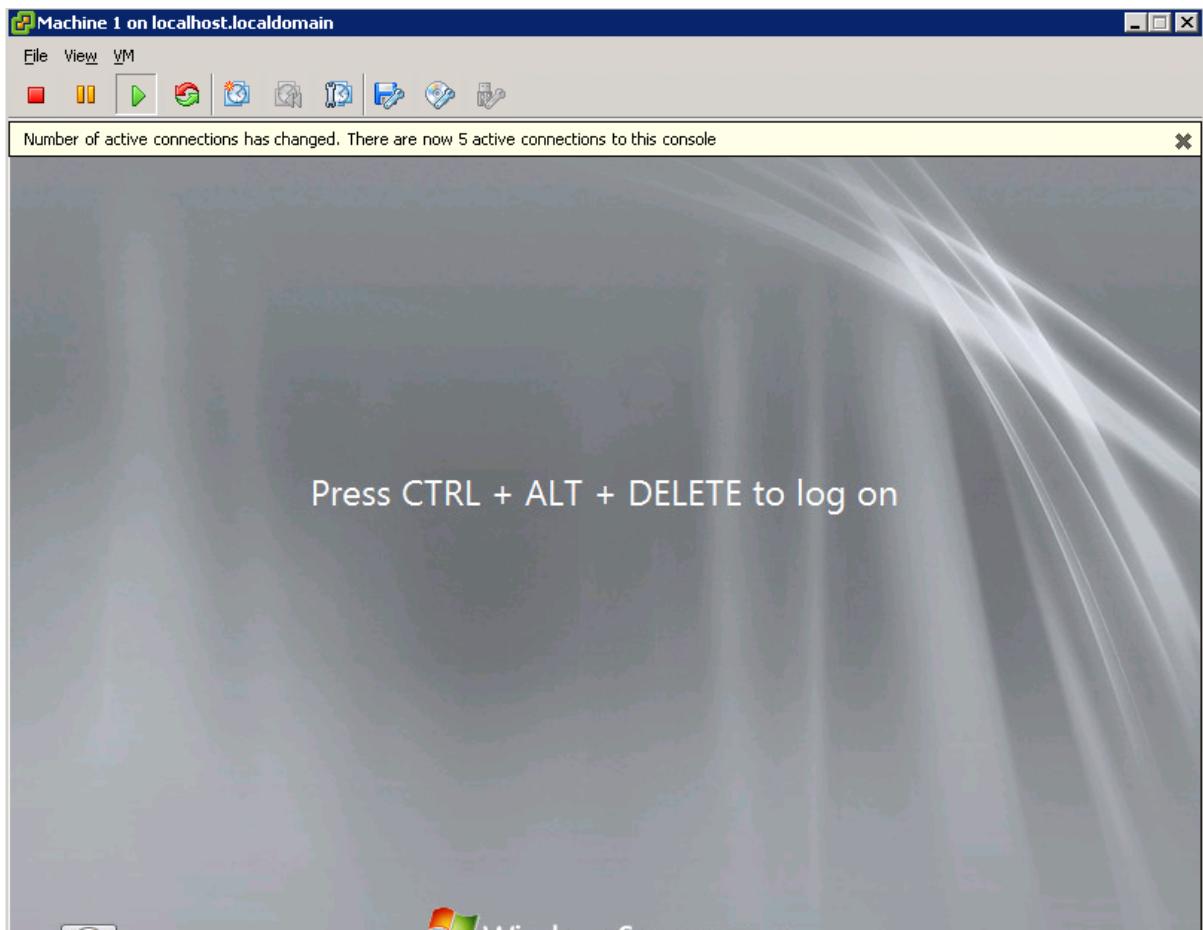
When the installation has finished, change the administrators password, for demonstration this is Pa\$\$w0rd.





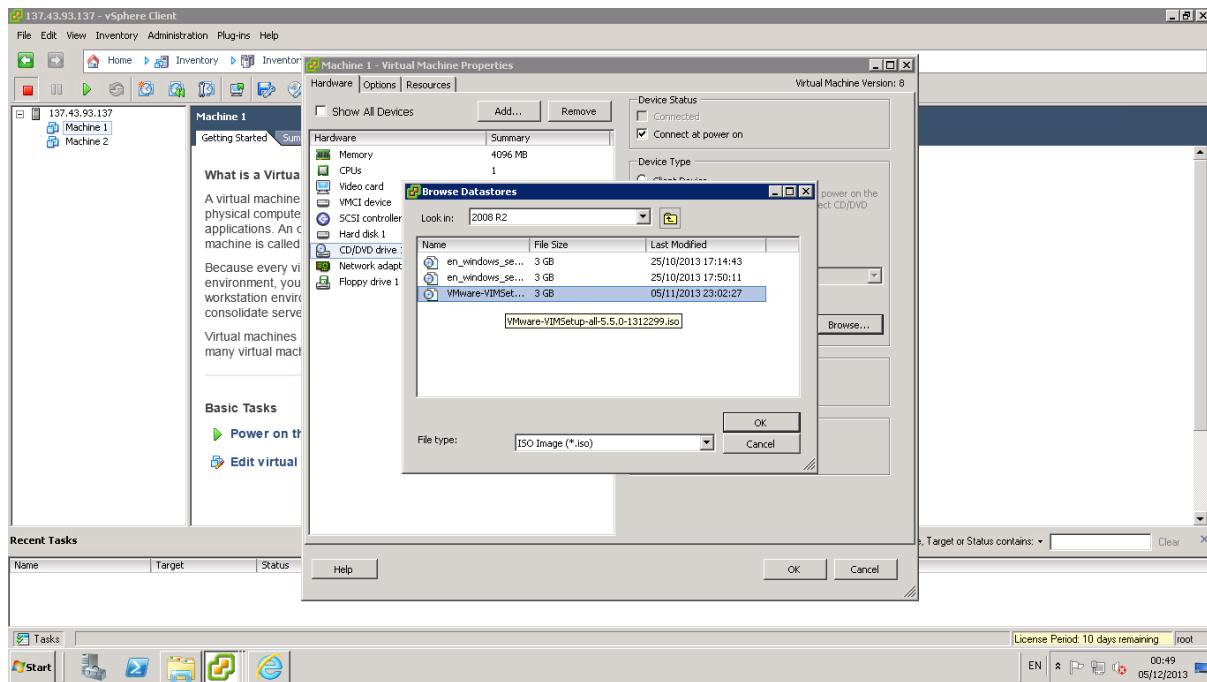
Step 26:

Press control+Alt+Delete at the same time to begin the login process.



Step 27:

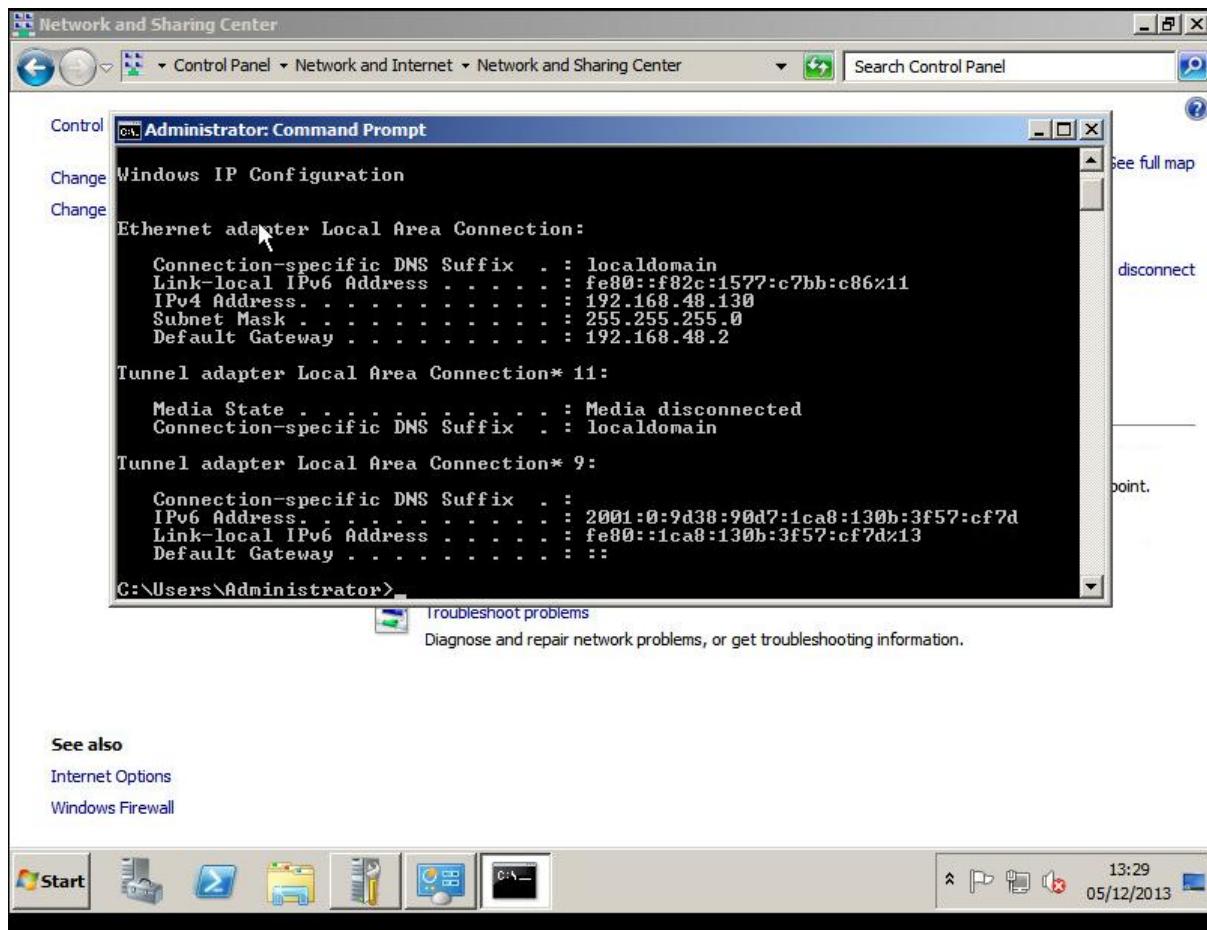
When the server has been fully loaded, it must be shut down. This is so that the ISO can be changed to the vCenter Server ISO for it to be installed. When the virtual machine has shut down, click edit virtual machine settings. Select CD/DVD then click Browse. Now browse to where the vCenter Server ISO has been uploaded, select the vCenter Server ISO then click ok. Now, power on the virtual machine again, then open the console view again.



Step 28:

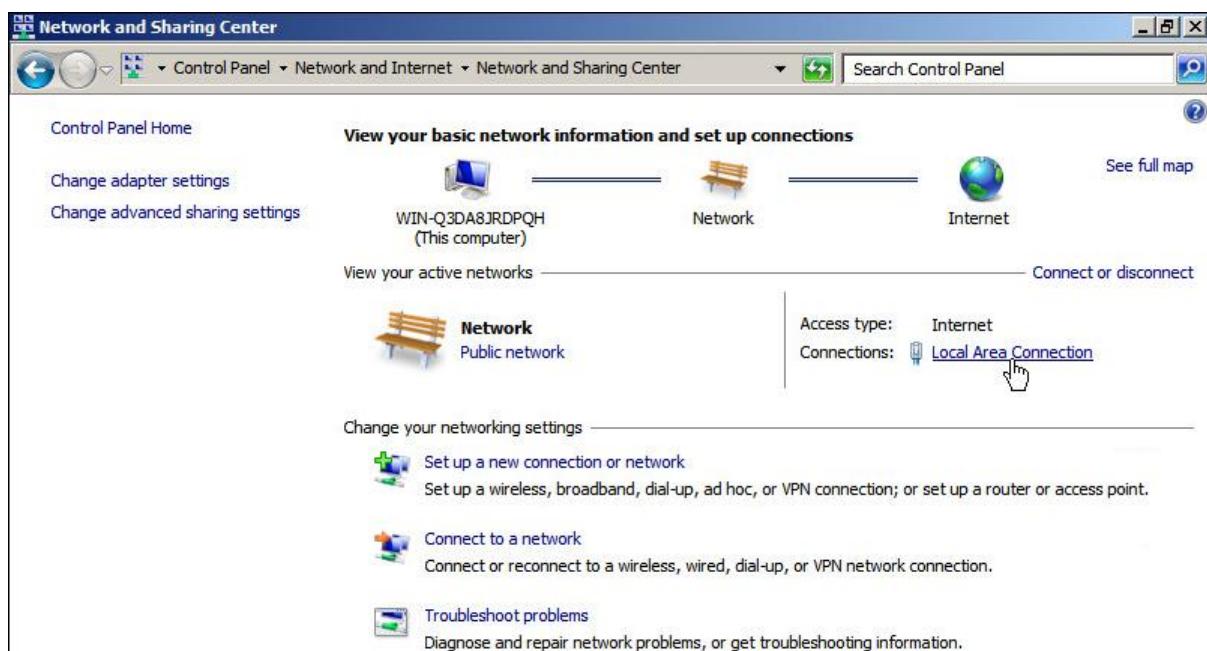
When the machine has powered on, first, assign a static ip address to the windows server. First click start, then in the search box enter "cmd" then press enter to run.

When the command prompt opens, enter "ipconfig". The IPv4 address is the IP address which it should be statically assigned to.



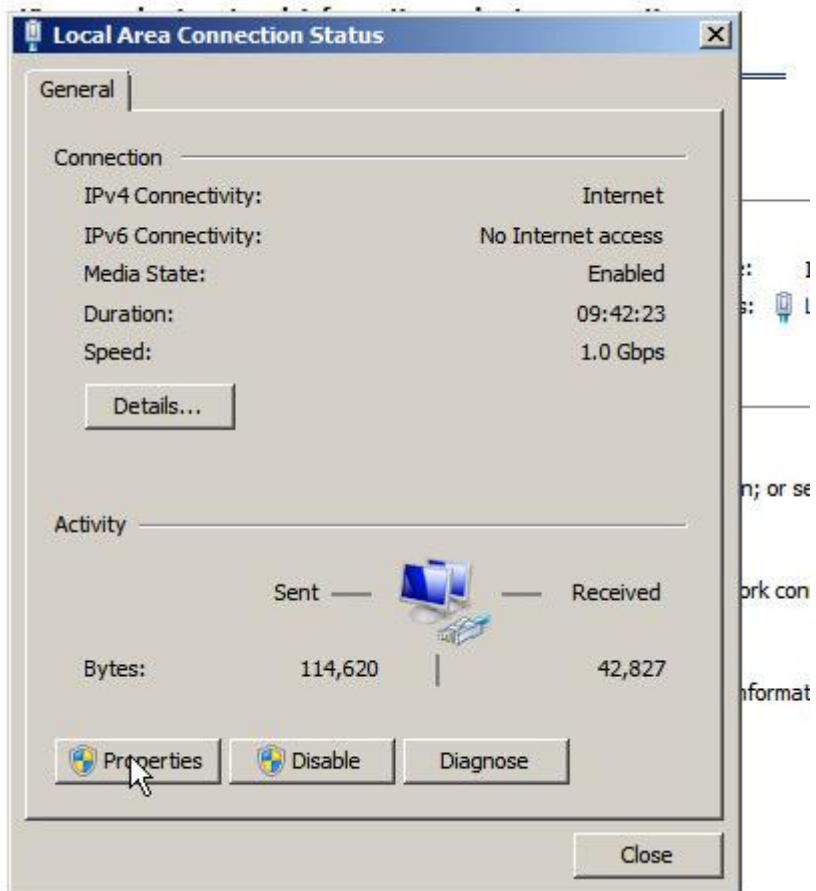
Step 29:

Open the network and sharing center, then click "Local Area Connection".



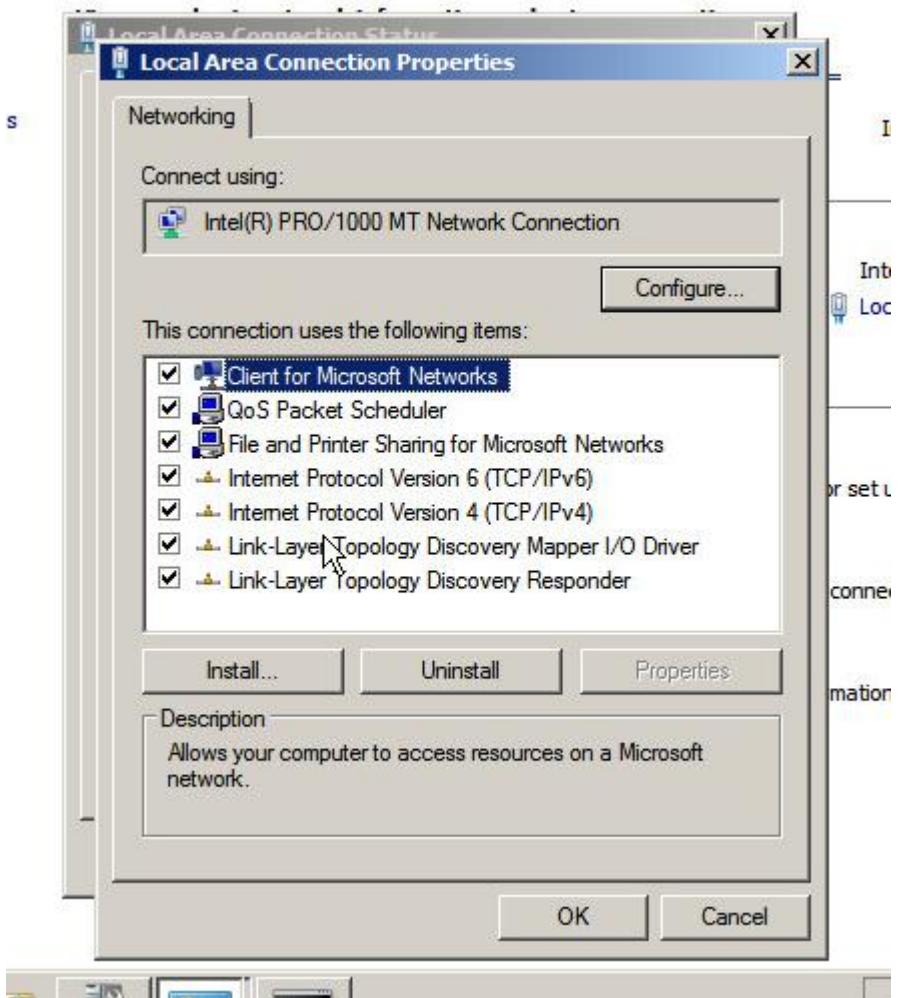
Step 30:

Click properties from the new window.



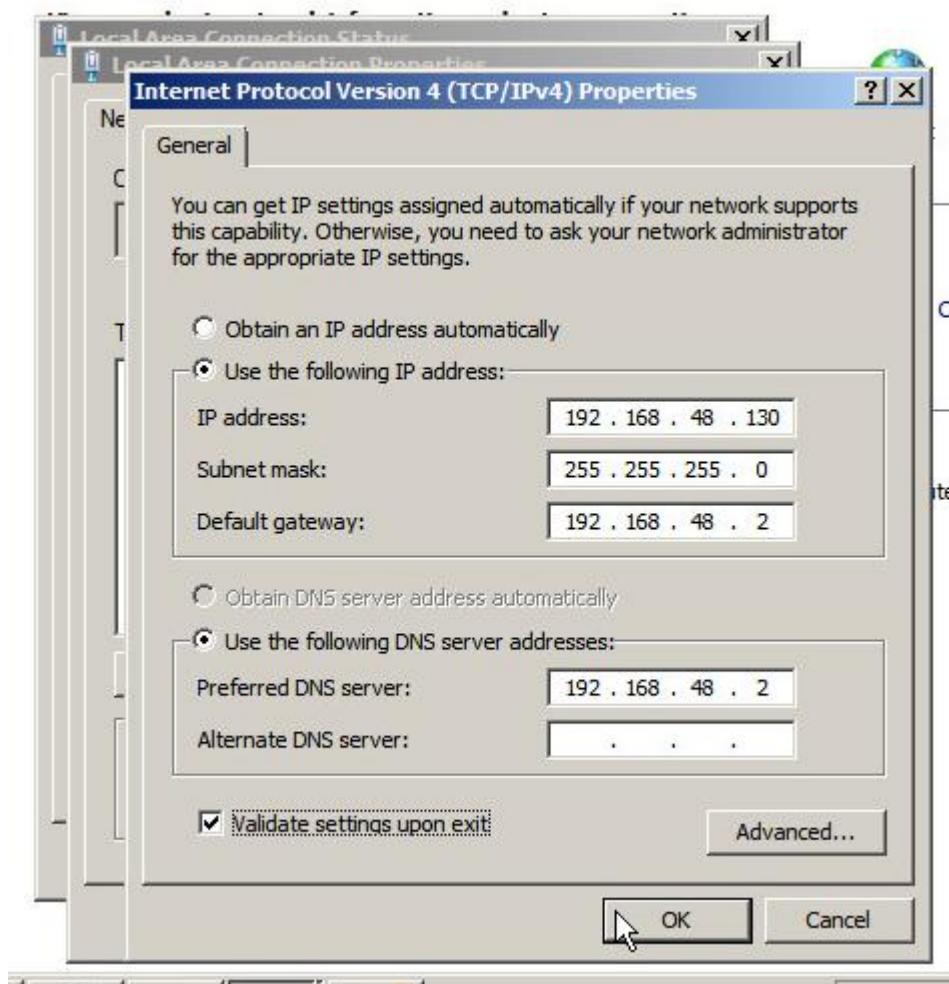
Step 31:

Double Click "Internet Protocol Version 4 (TCP/IPv4).



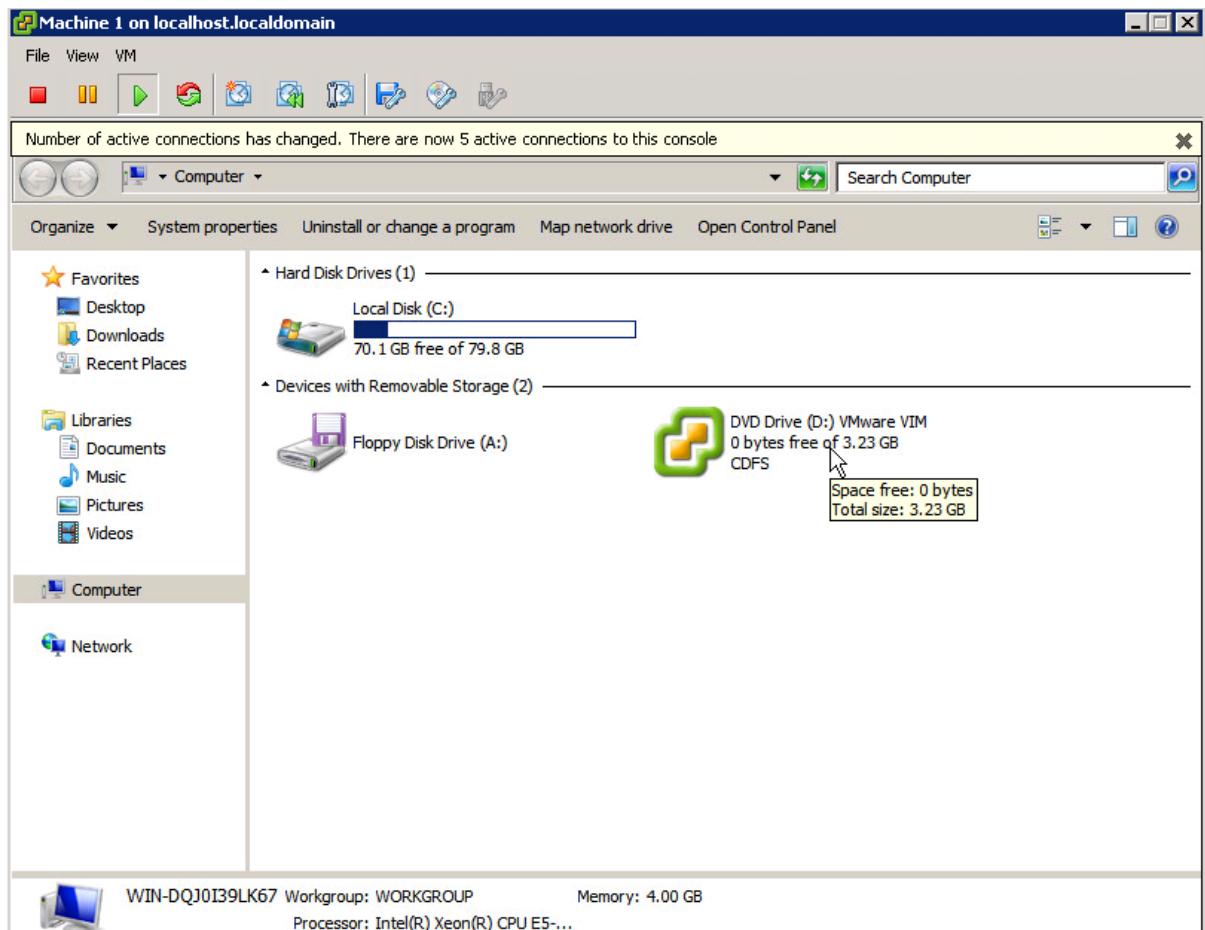
Step 32:

Enter the details that were in the CMD results from when ipconfig was run. Then click ok.



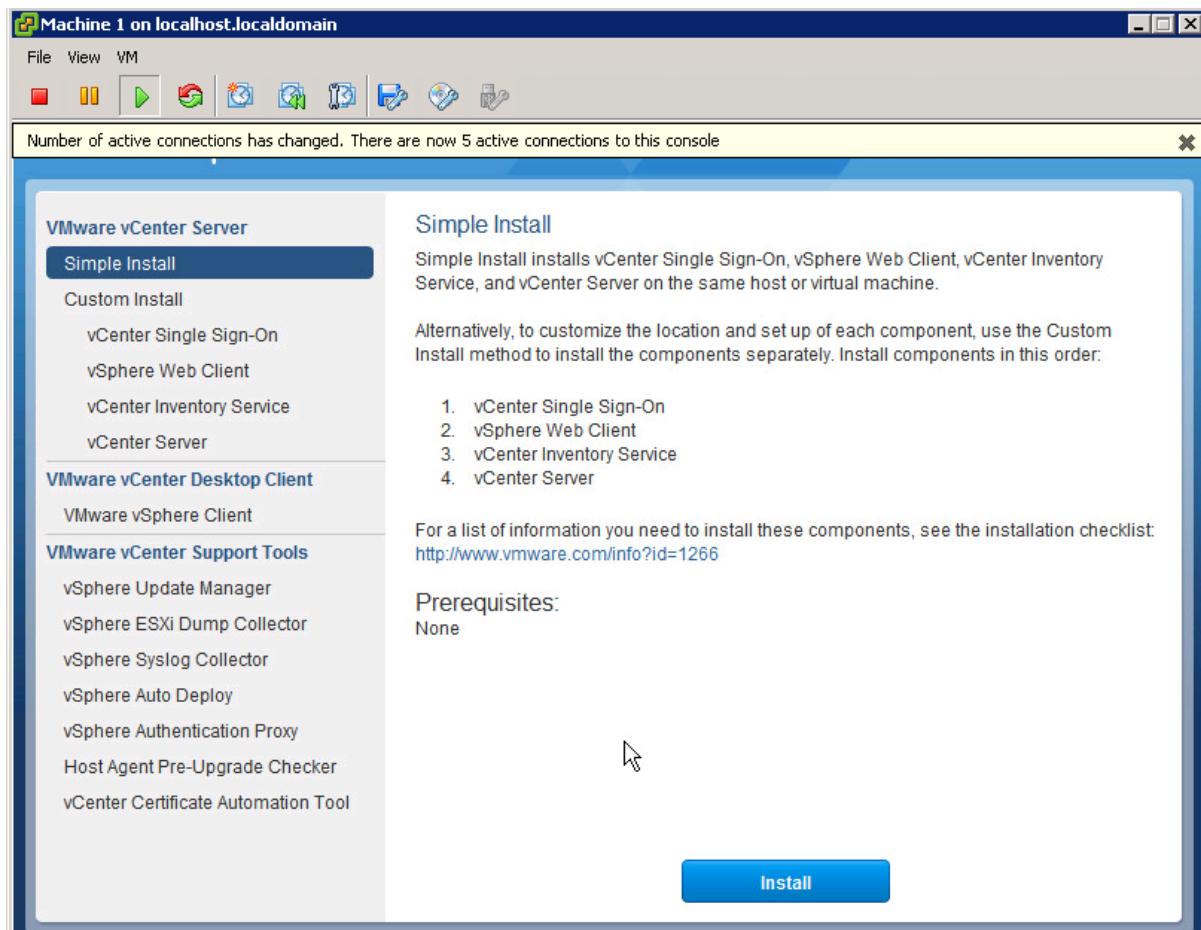
Step 33:

Click ok. Then power on the virtual machine again. When it is powered on fully, click start, then click My Computer, there you will now see the drive has been changed to VMware VIM ISO.



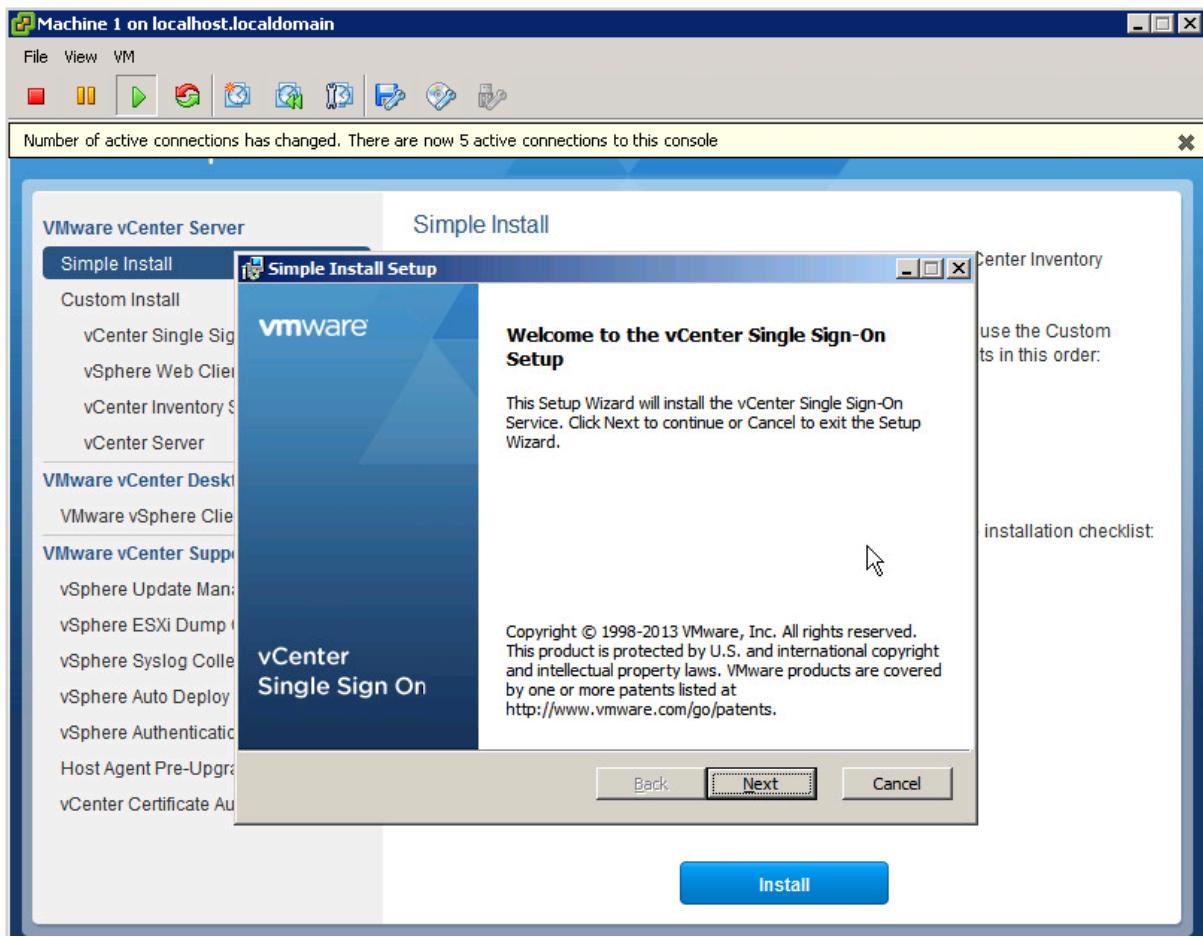
Step 34:

Double click on the disc, then wait for the installation disc to start. Click simple install, then click install.



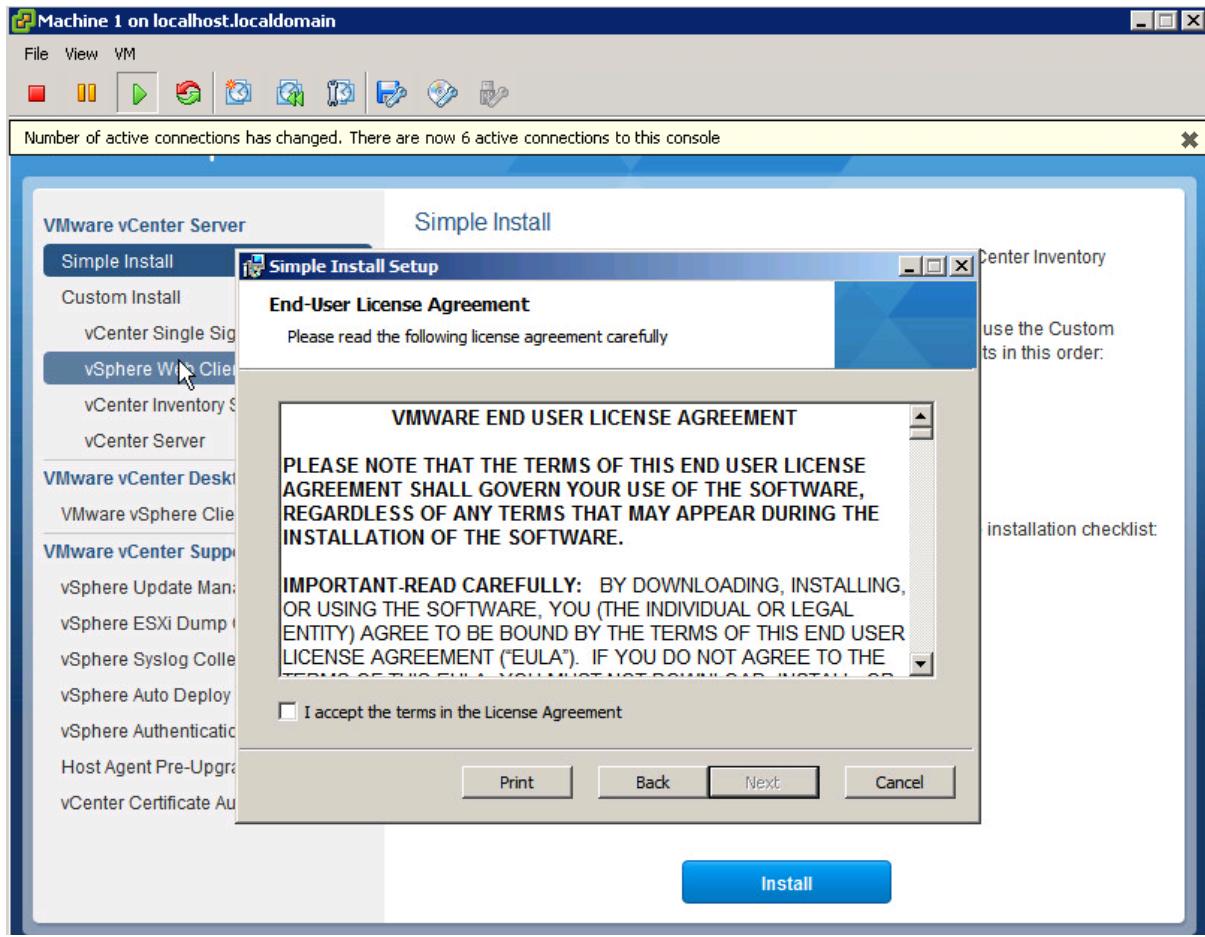
Step 35:

Click next to move onto the next step of the install wizard.



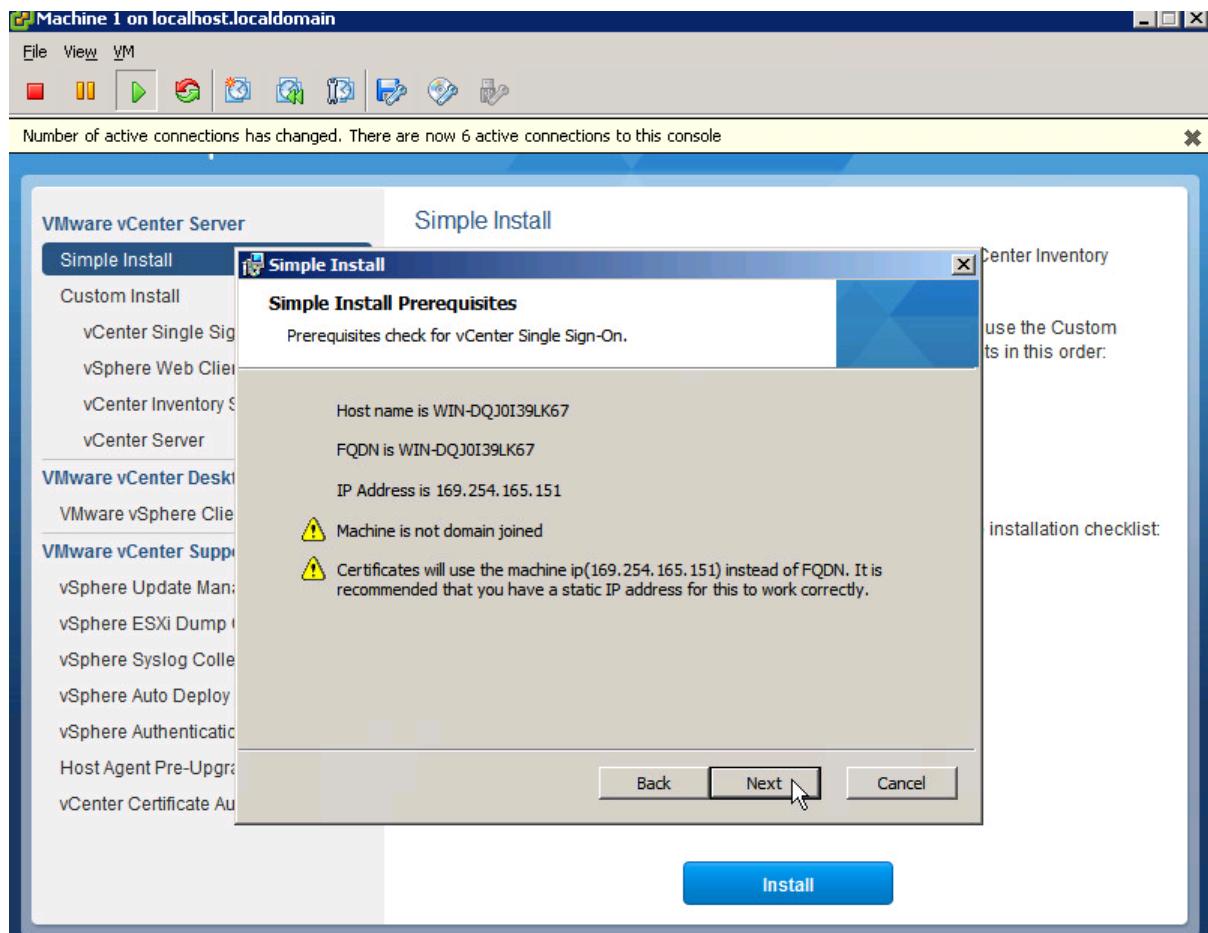
Step 36:

Accept the license agreement, then click next.



Step 37:

Take note of the Host Name and IP address which vCenter Sever is going to be installed on.

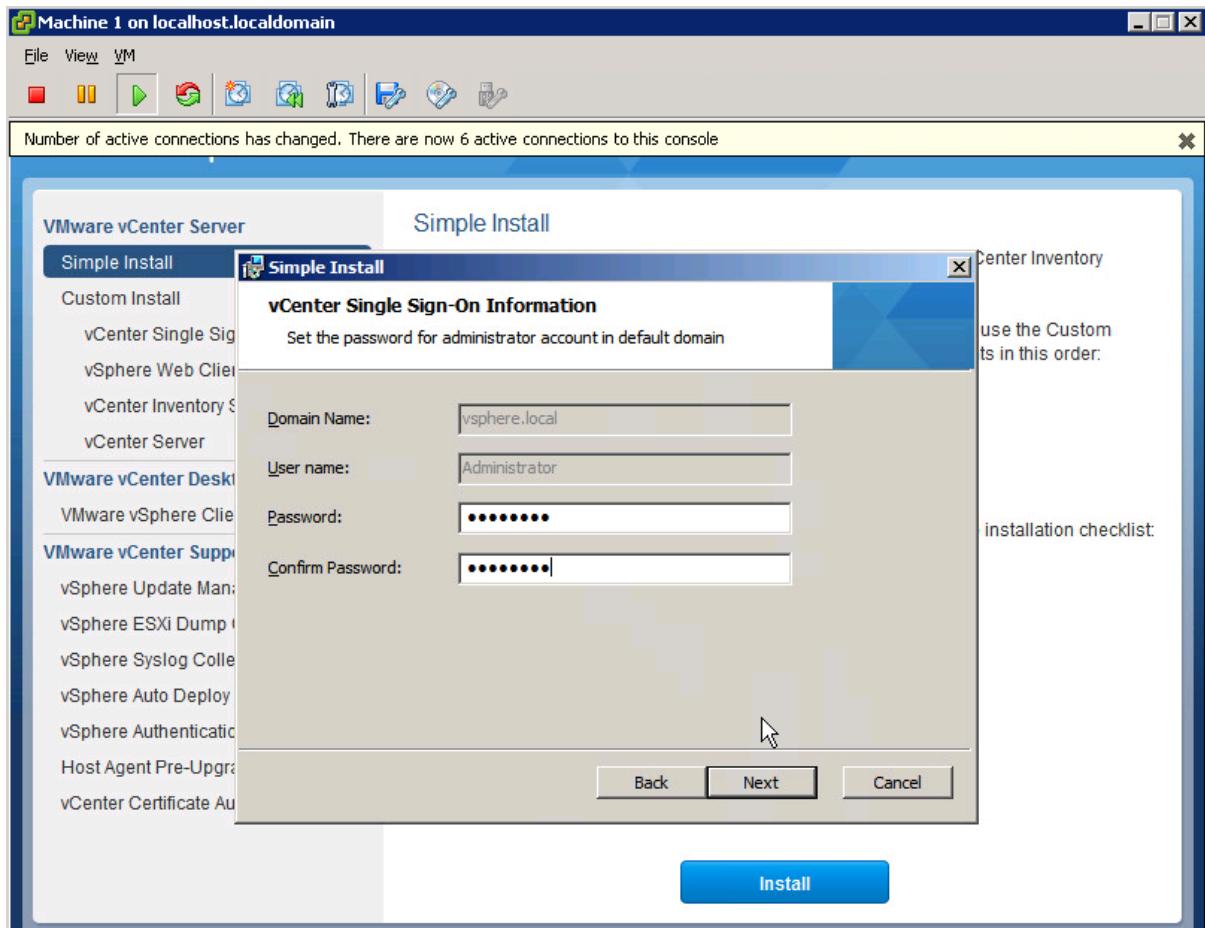


Step 38:

Create a password for the vCenter single sign-on server. The password used for the purposes of the assignment is; “Passw0rd.”. The single-sign on can cause errors if these special characters have been used in the password⁹:

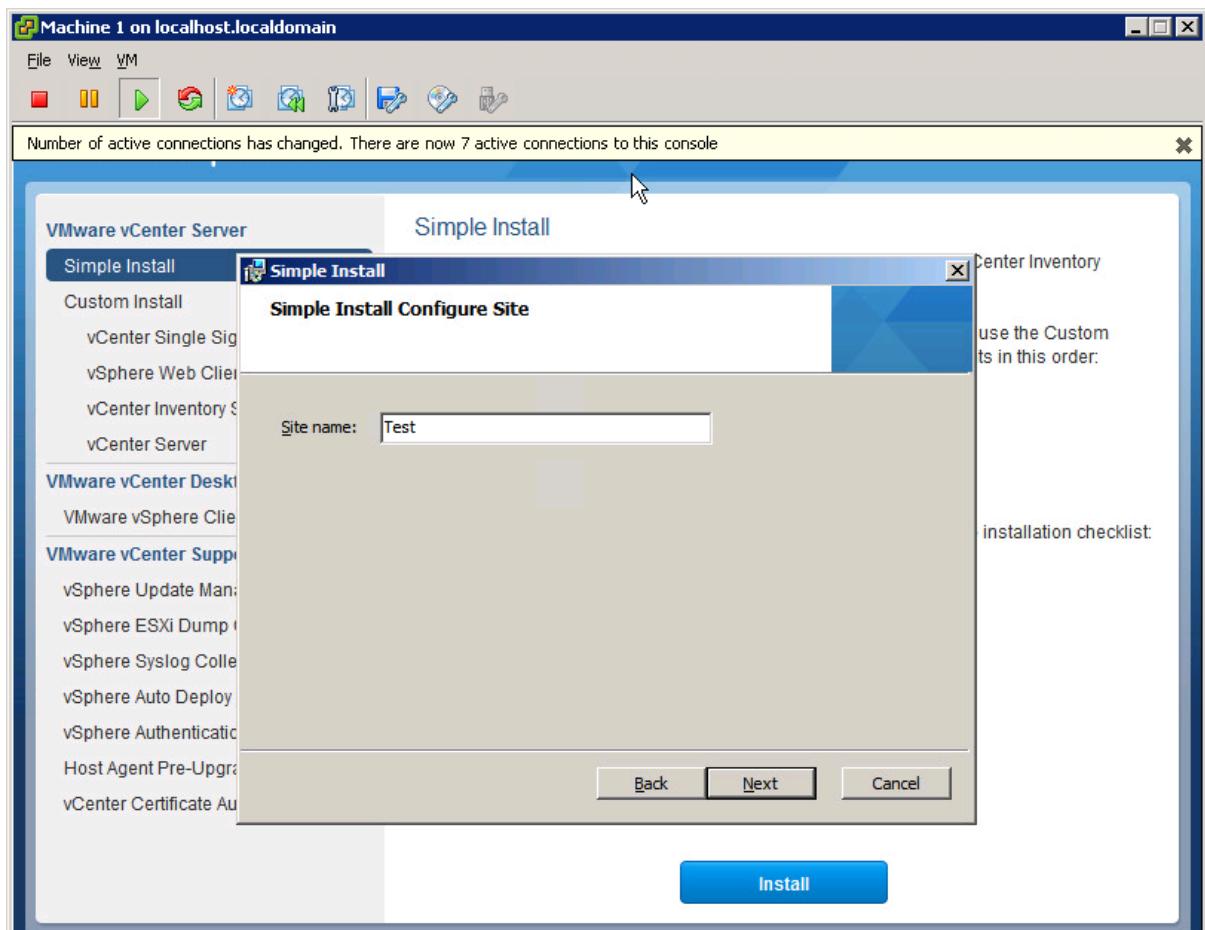
- Non-ASCII characters
- Ampersand (&)
- Semicolon (;)
- Double quotation mark (")
- Single quotation mark (')
- Circumflex (^)
- Backslash (\)
- Space ()
- Exclamation mark (!)

⁹ VMware (2013). Installing vCenter Single Sign-On 5.5 fails if the password for administrator@vsphere.local contains certain special character (2060746). VMware. Retrieved December 20th, 2013, from http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=2060746



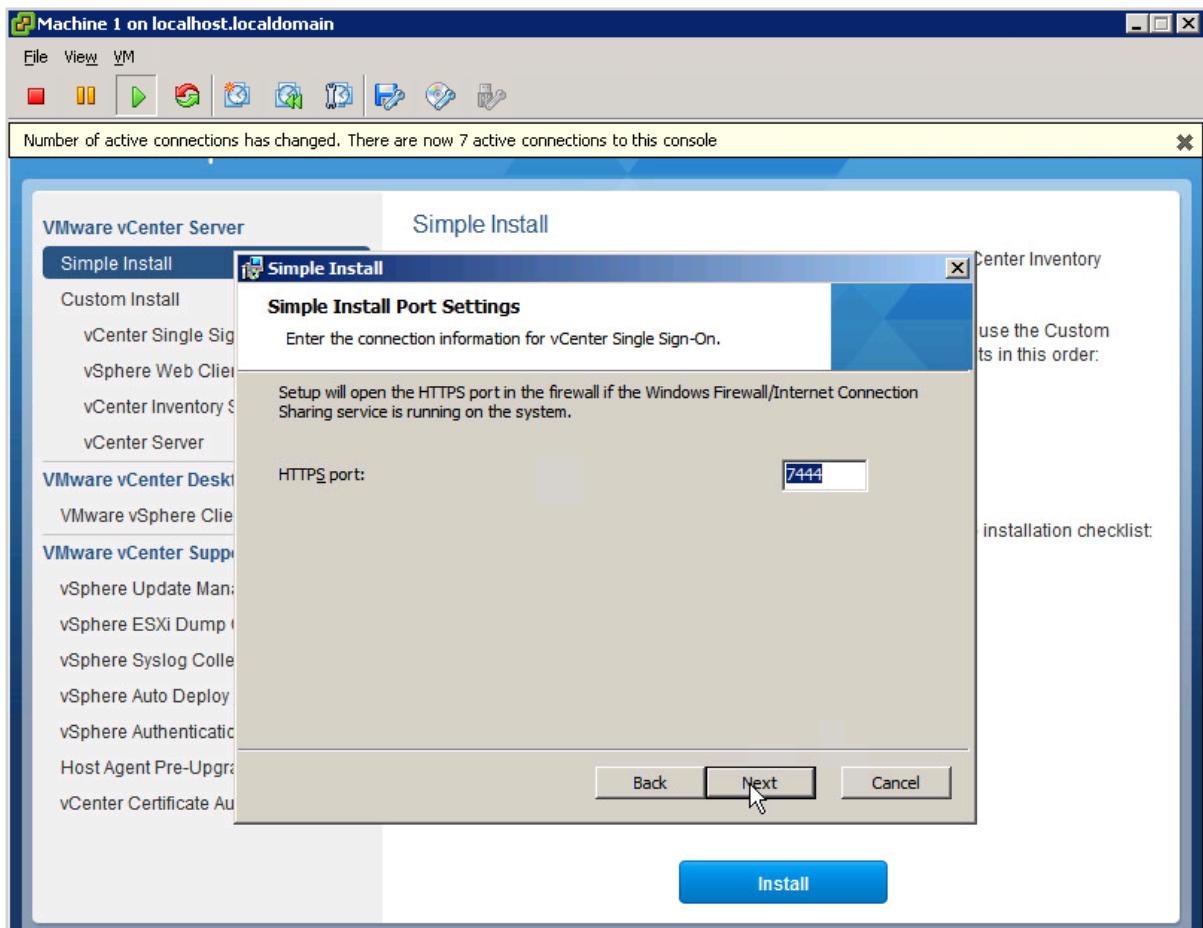
Step 39:

Choose a name for the site. Then click next.



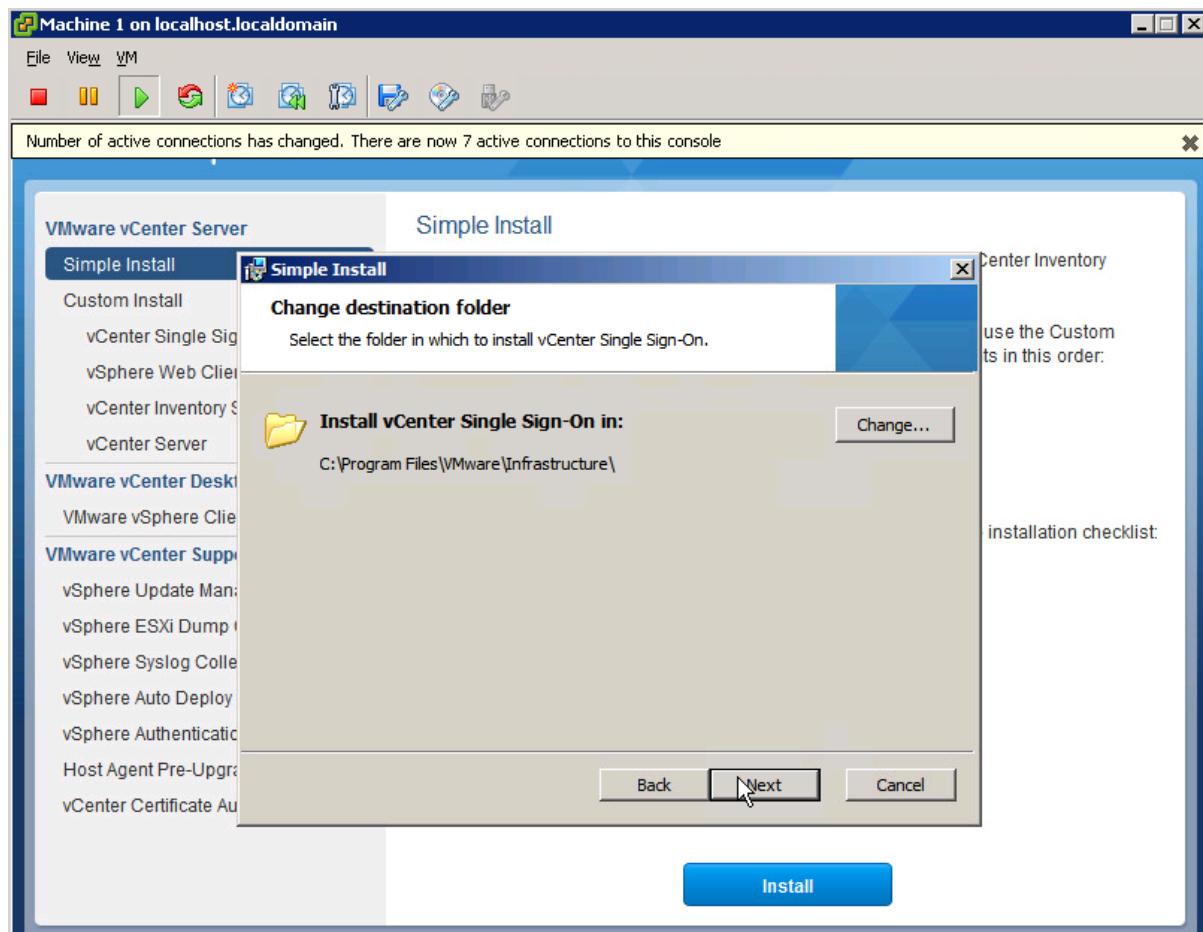
Step 40:

Choose the HTTPS port number, then click next.



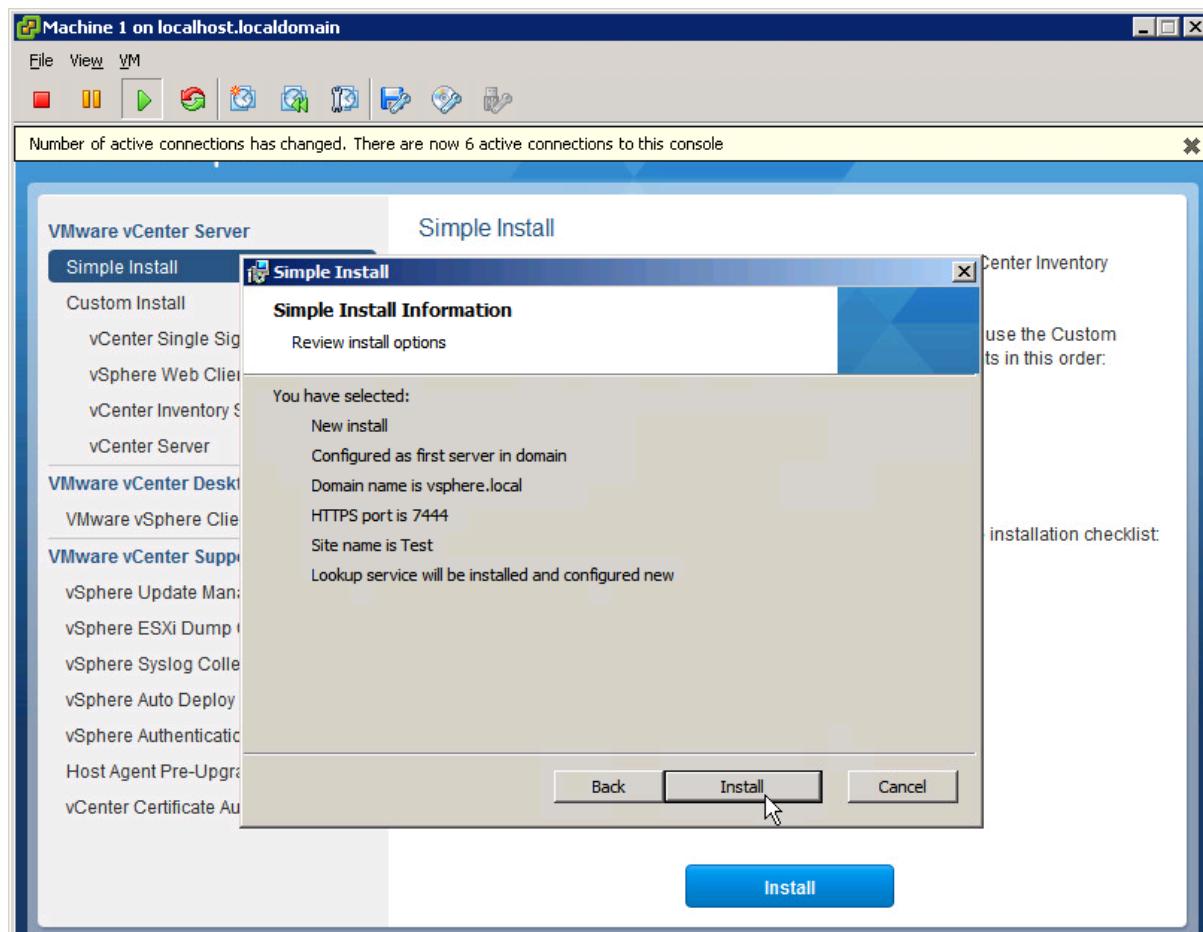
Step 41:

Choose where you would like to install vCenter server, then click next.

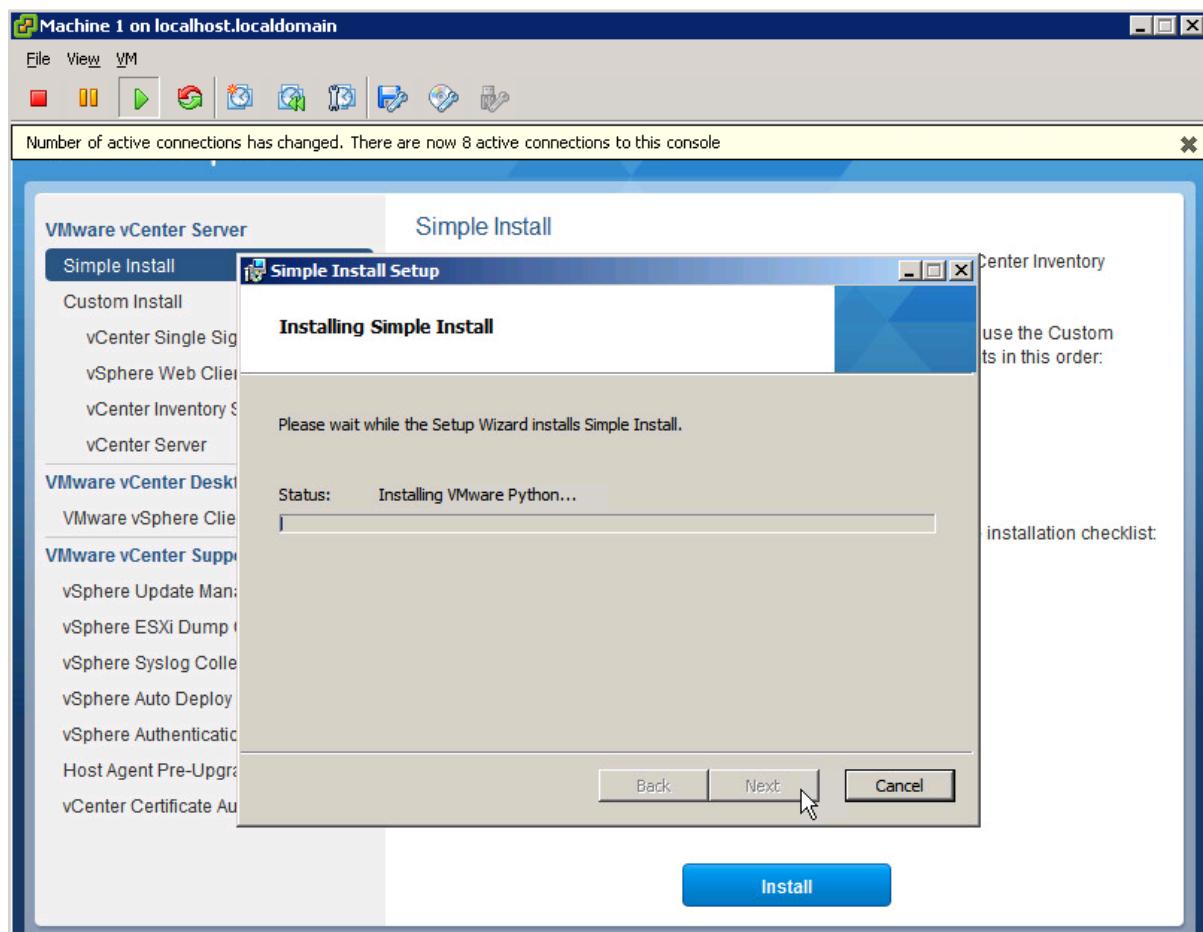


Step 42:

Once you are satisfied with the settings, click **Install**.

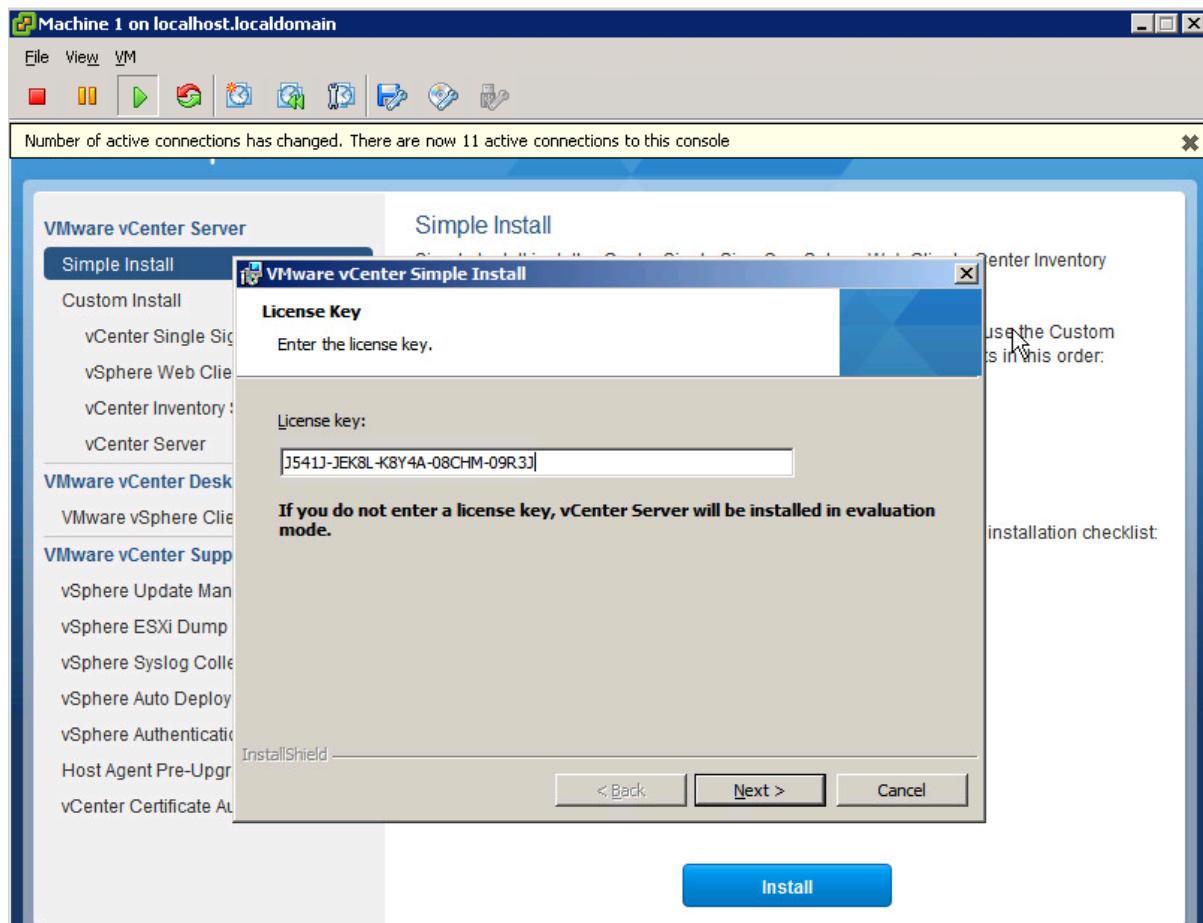


This window will appear when it is installing.



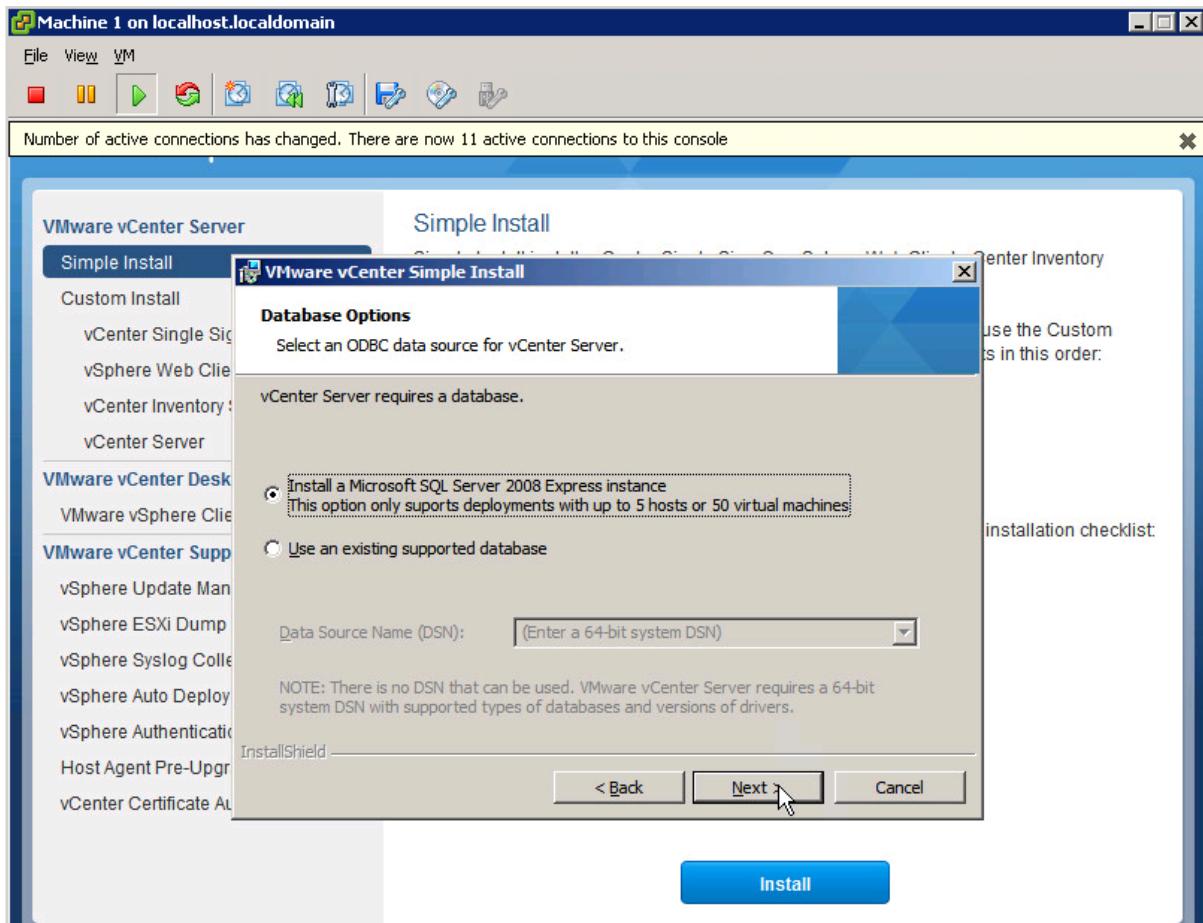
Step 43:

Enter a license key for the vCenter Server, then click next.



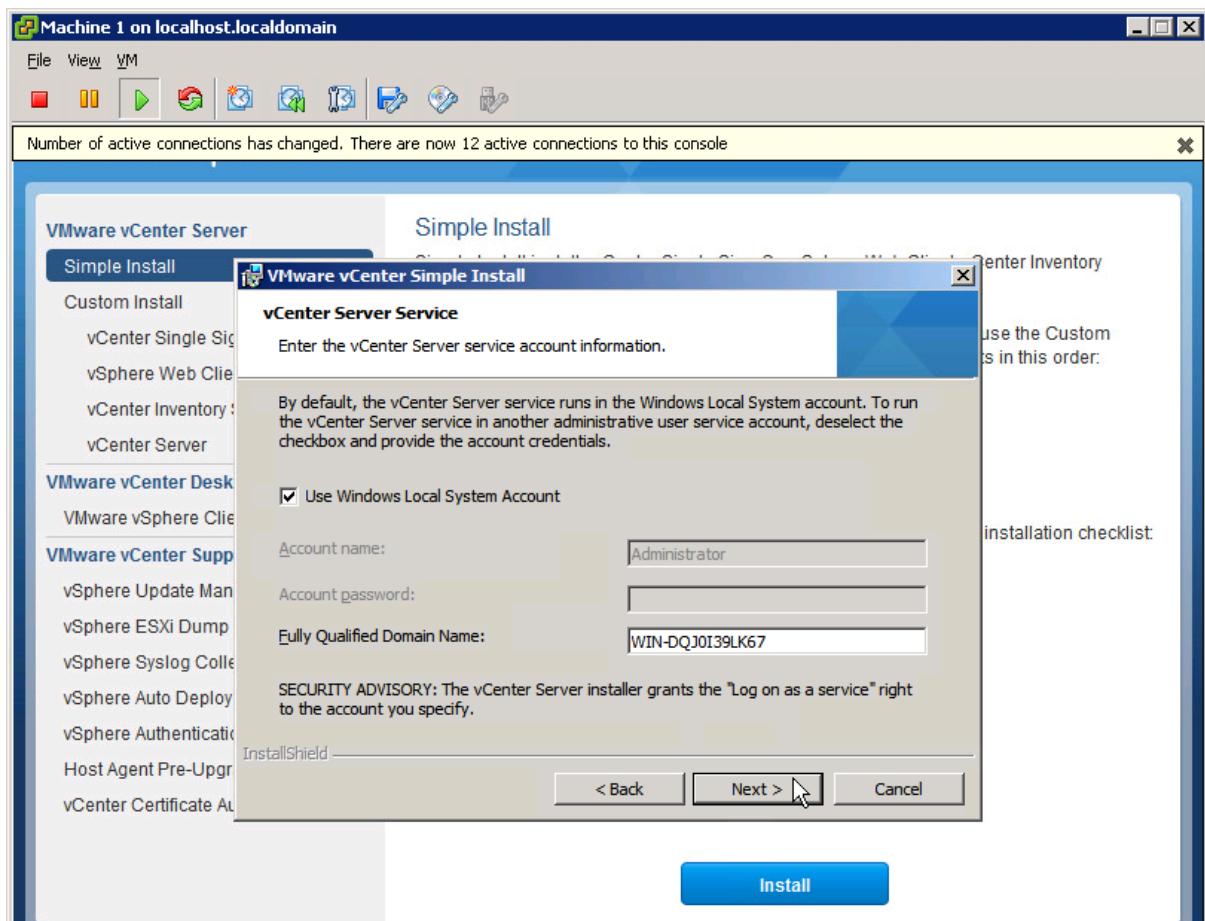
Step 44:

As this is being installed on the fresh windows 2008 r2, there is no SQL database on the server. A new SQL database needs to be installed. Select "Install a Microsoft SQL Server 2008 Express instance", then, click Next.



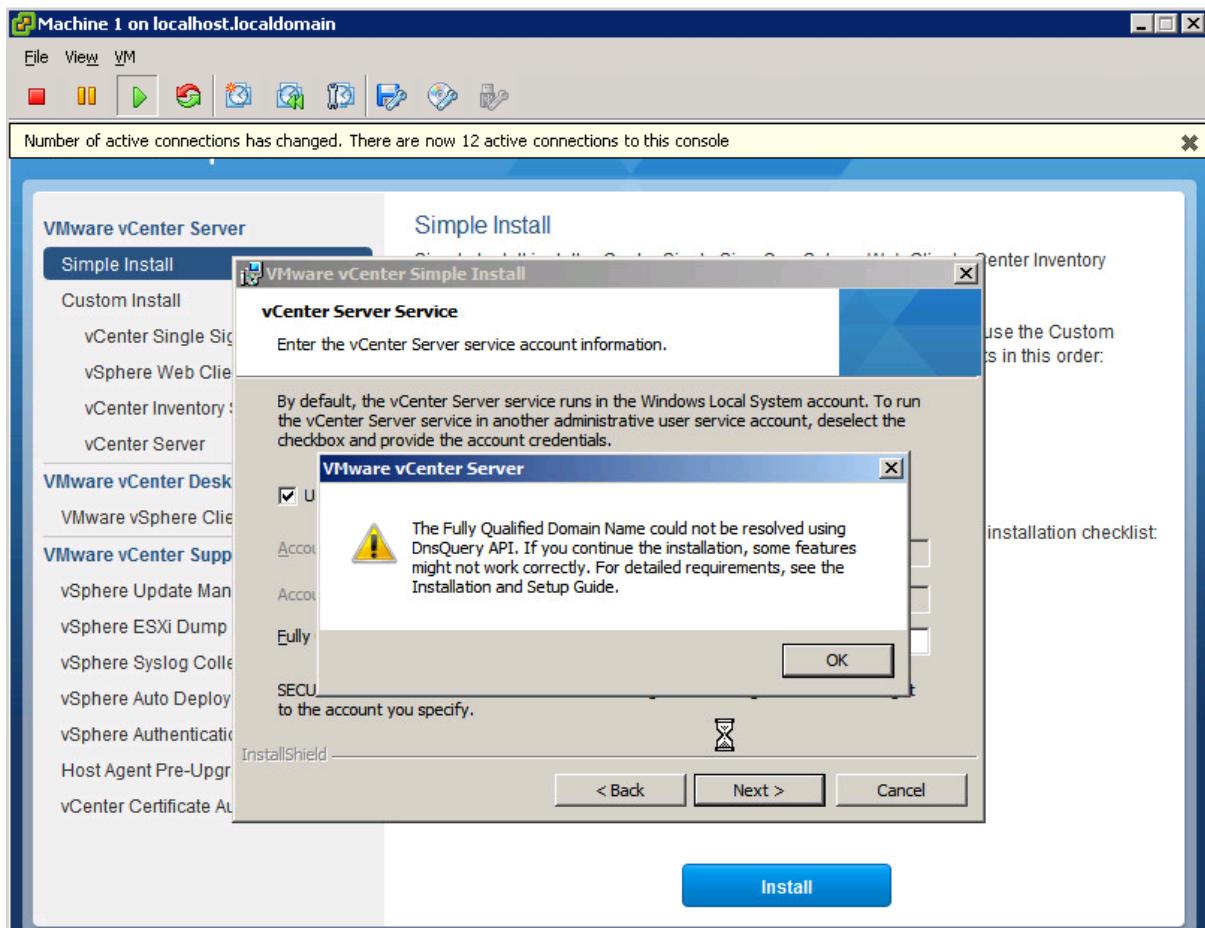
Step 45:

Choose the Fully Qualified Domain Name, then click Next.



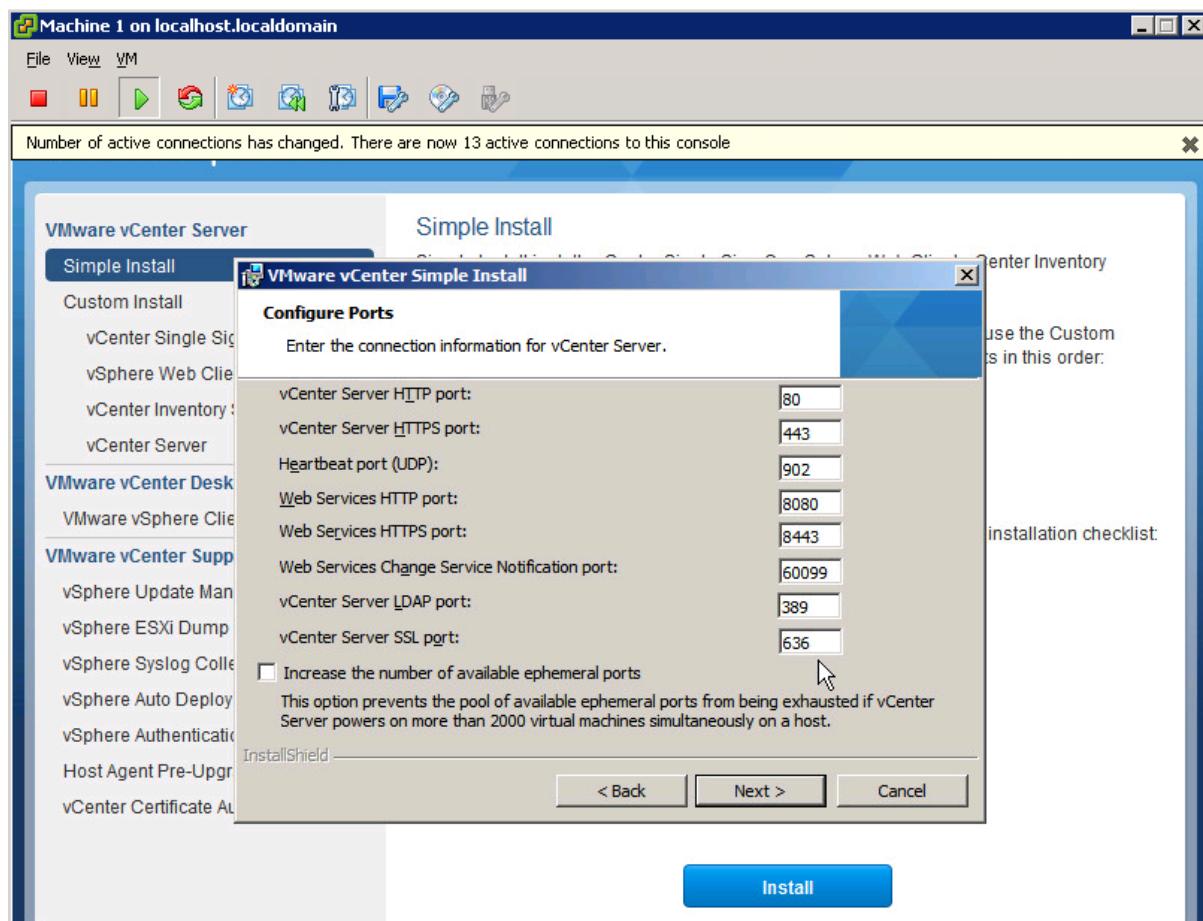
Step 46:

Click ok from the warning box to continue the installation.



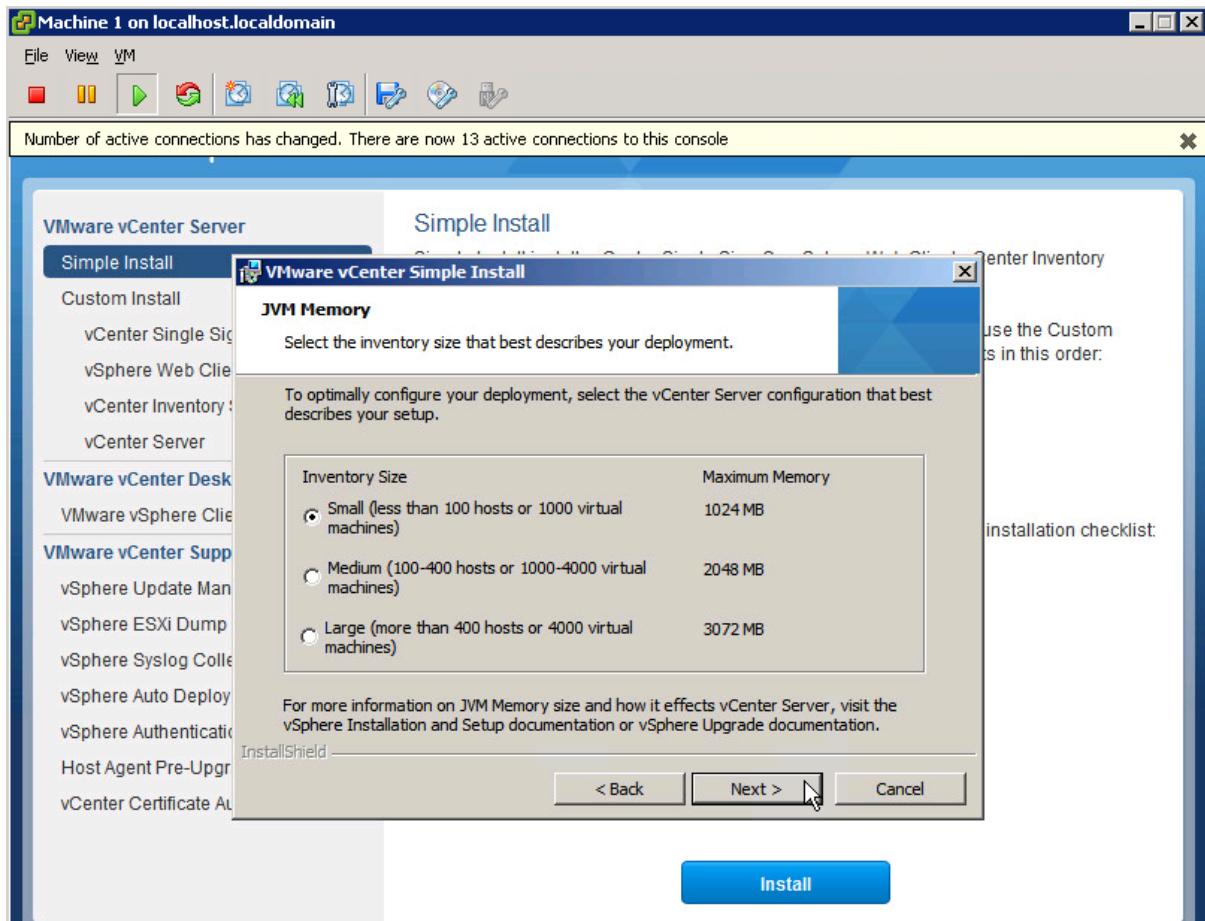
Step 49:

Take note of the configured ports, then click Next.



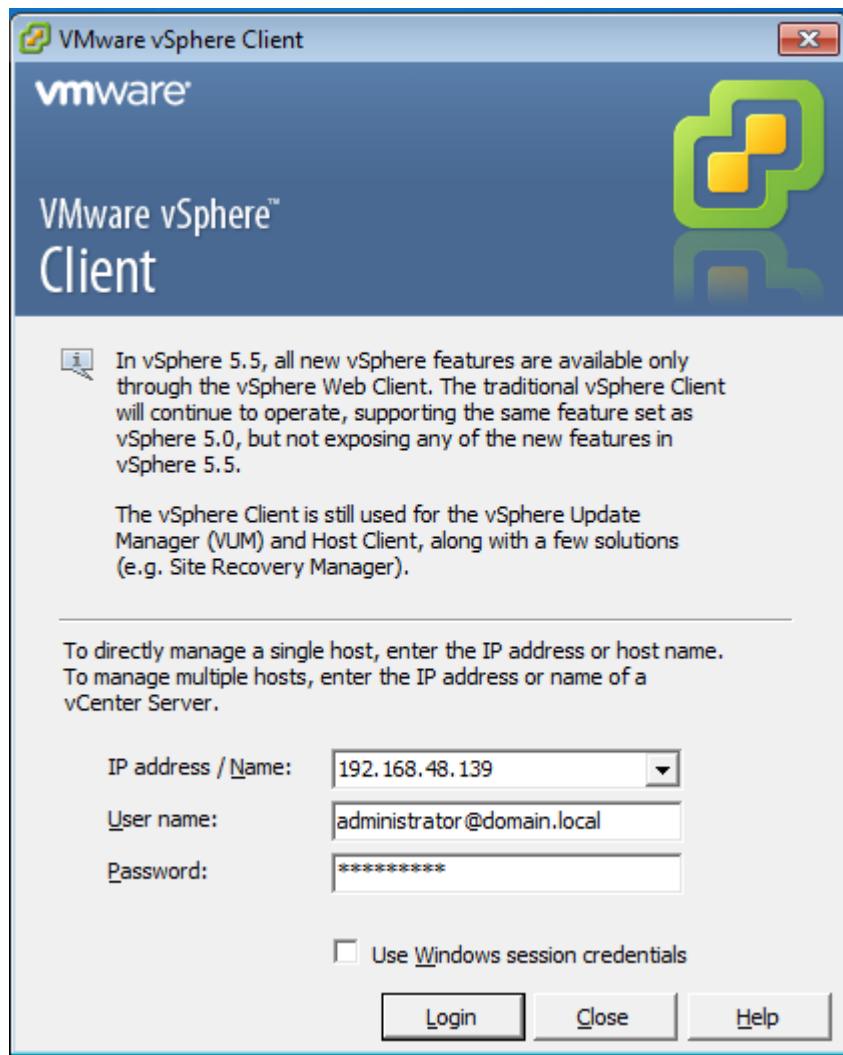
Step 50:

Select a small inventory size, then click Next.



Step 51:

After the vCenter server has been installed, go to the windows 7 client (machine 2) and connect to the vCenter Server using the vSphere client. The IP address is the address of the vCenter Server, the default username is, administrator@vsphere.local, the password is the password entered during the single-sign on installation, for the purposes of this assignment is “Passw0rd.”.



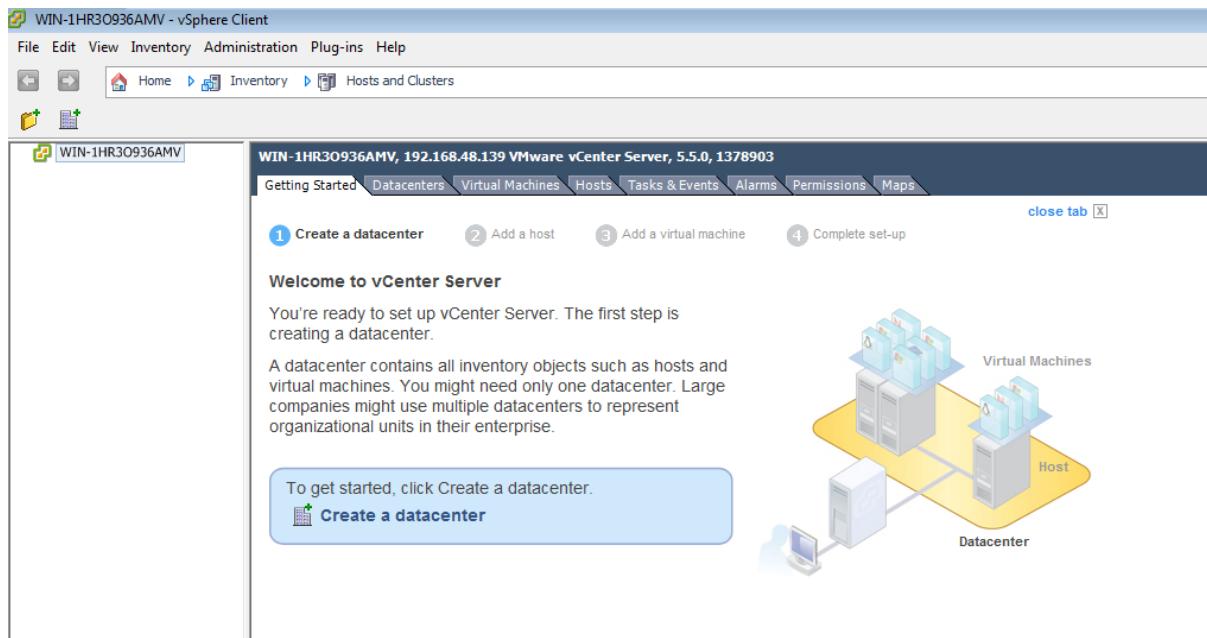
Step 52:

After clicking login, then click ignore the certificate.



Step 53:

After connecting to the vCenter Server, this screen will appear. Here, you can manage such things as, organisation environments, datacenters and hosts.

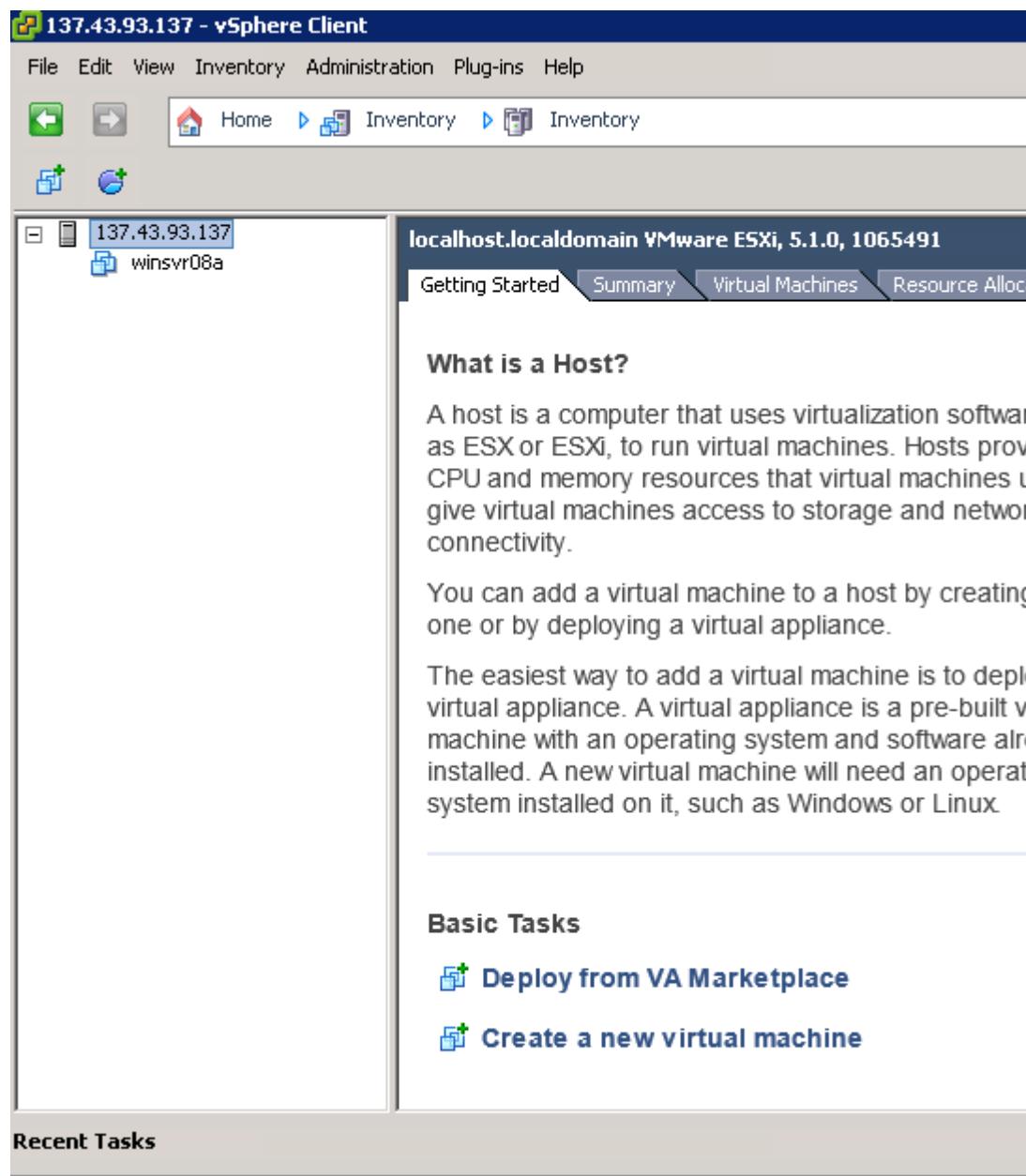


Machine 2

This machine is to be set up using Microsoft Windows 7 for use as a vSphere Client, please note that this is purely for documentation purposes for connection purposes, continue to use the remote desktop connection to the VM which you have been assigned.

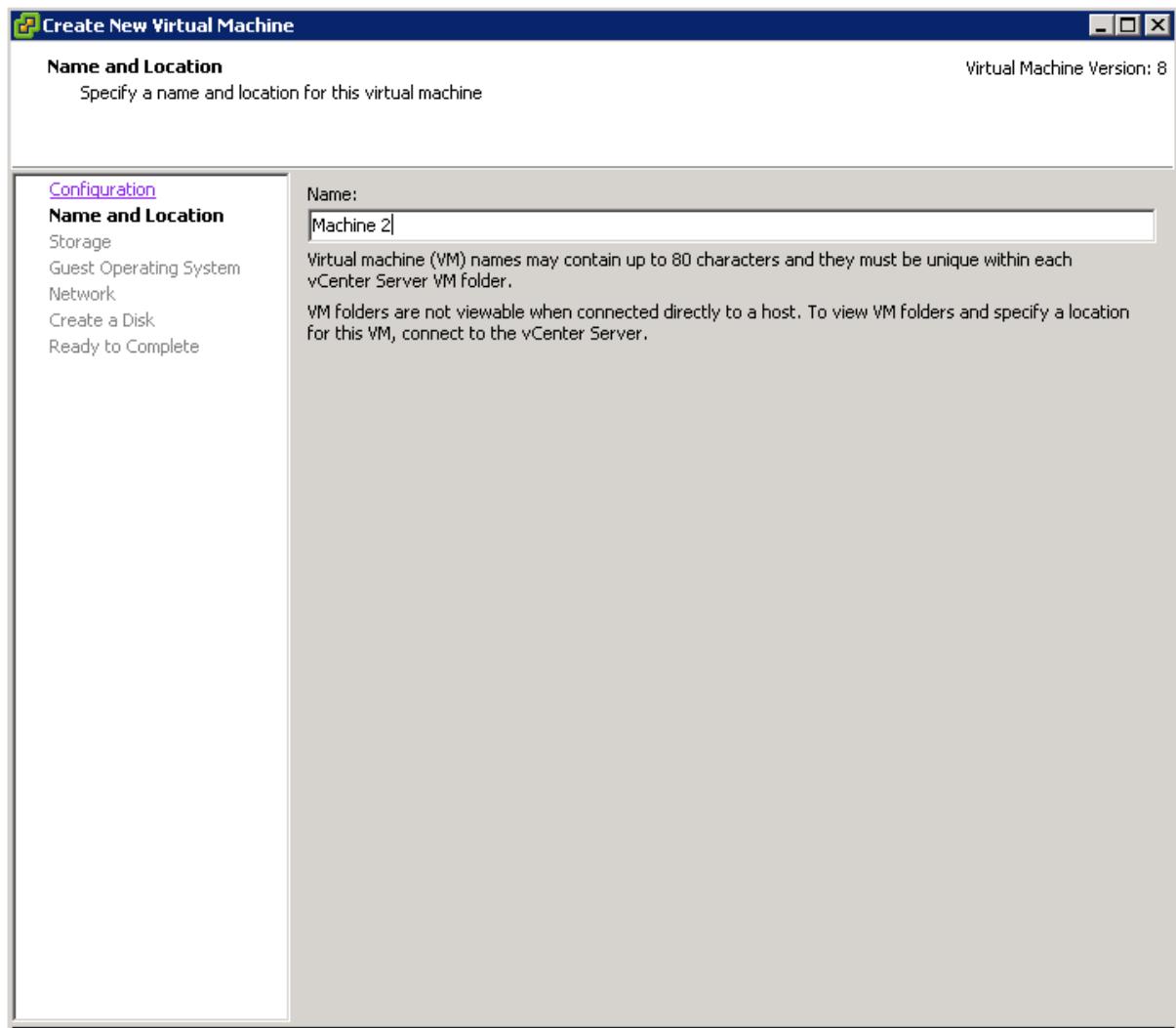
Step 1:

Open up the vSphere client connection to the ESXI host. Select the IP address of the host, then click “Create a New Virtual Machine”. Then choose the Typical configuration and click Next.



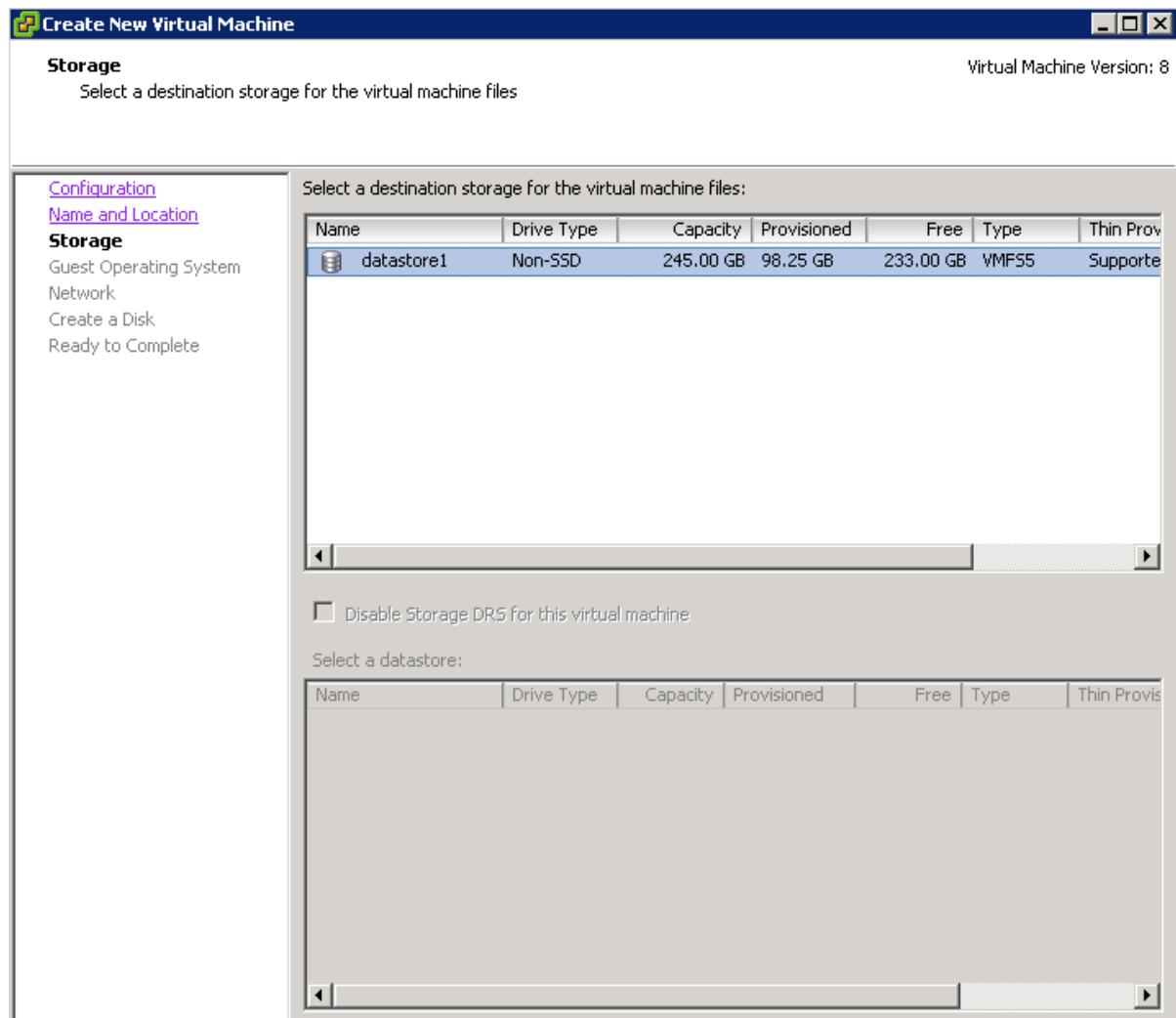
Step 2:

Create a name for the virtual machine, for the purpose of the assignment it is to be called “Machine 2”. Then click Next.



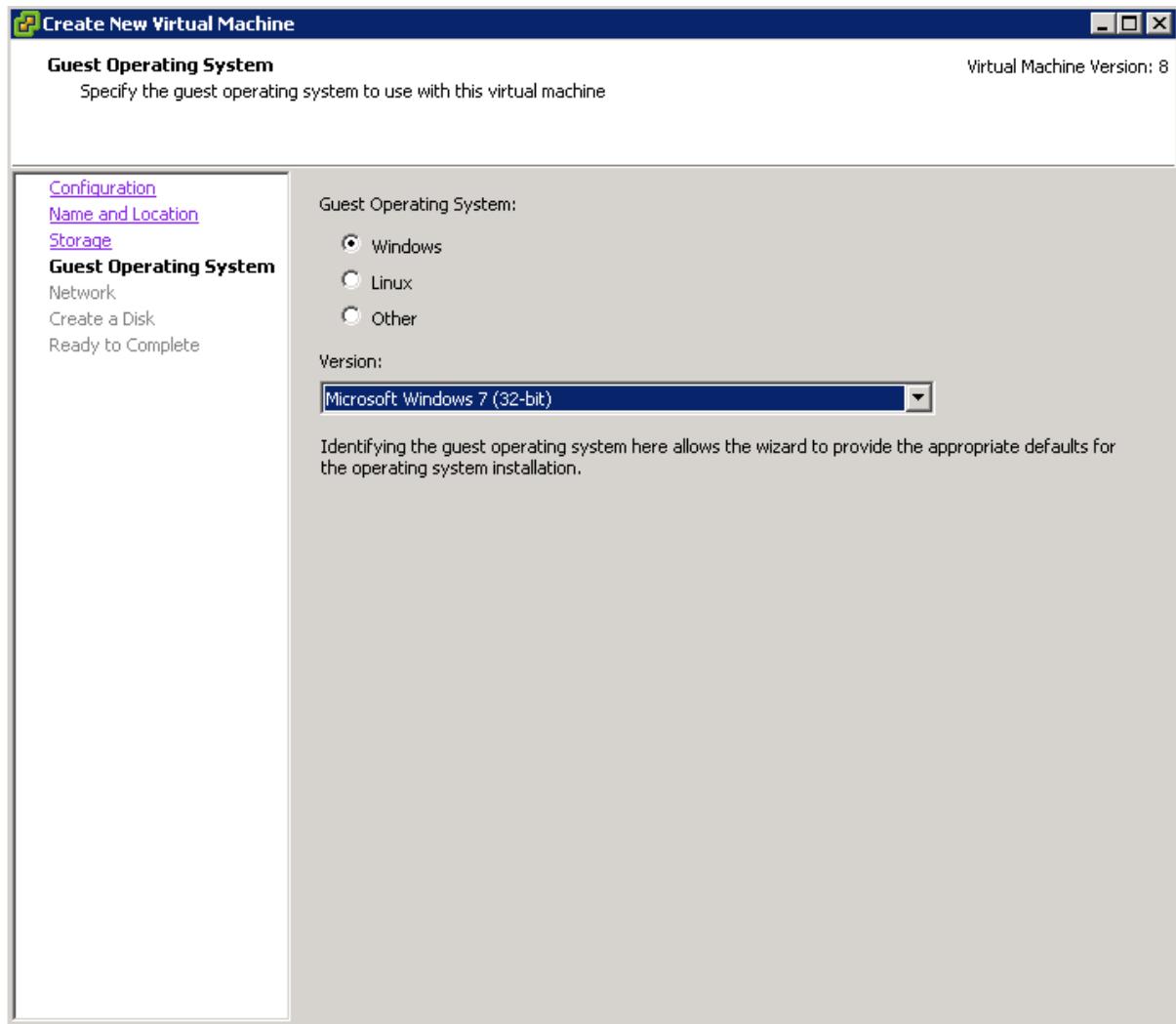
Step 3:

Choose the datastore you want to install the virtual machine on, then click Next.



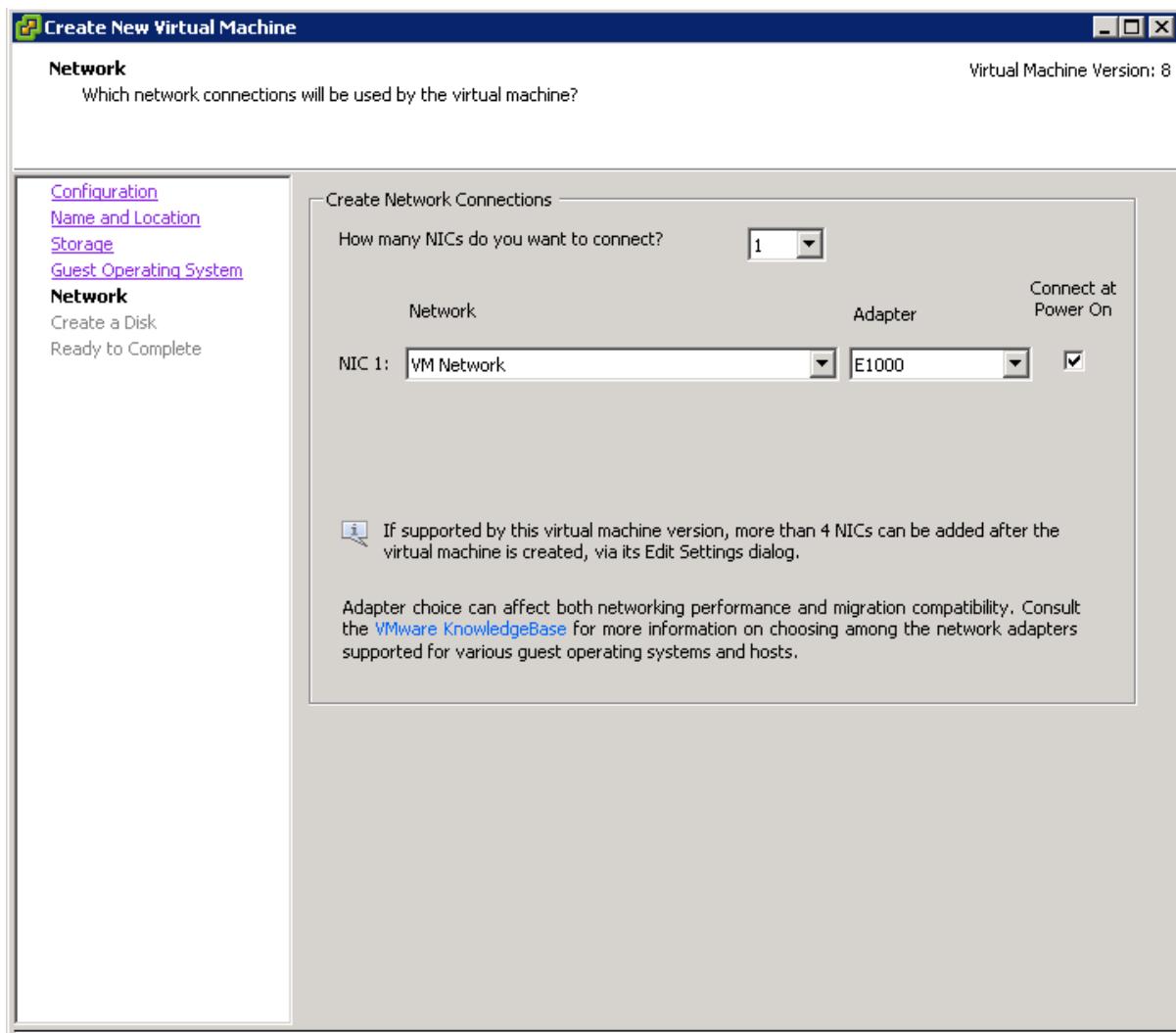
Step 4:

Choose the Guest Operating system settings, then click Next.



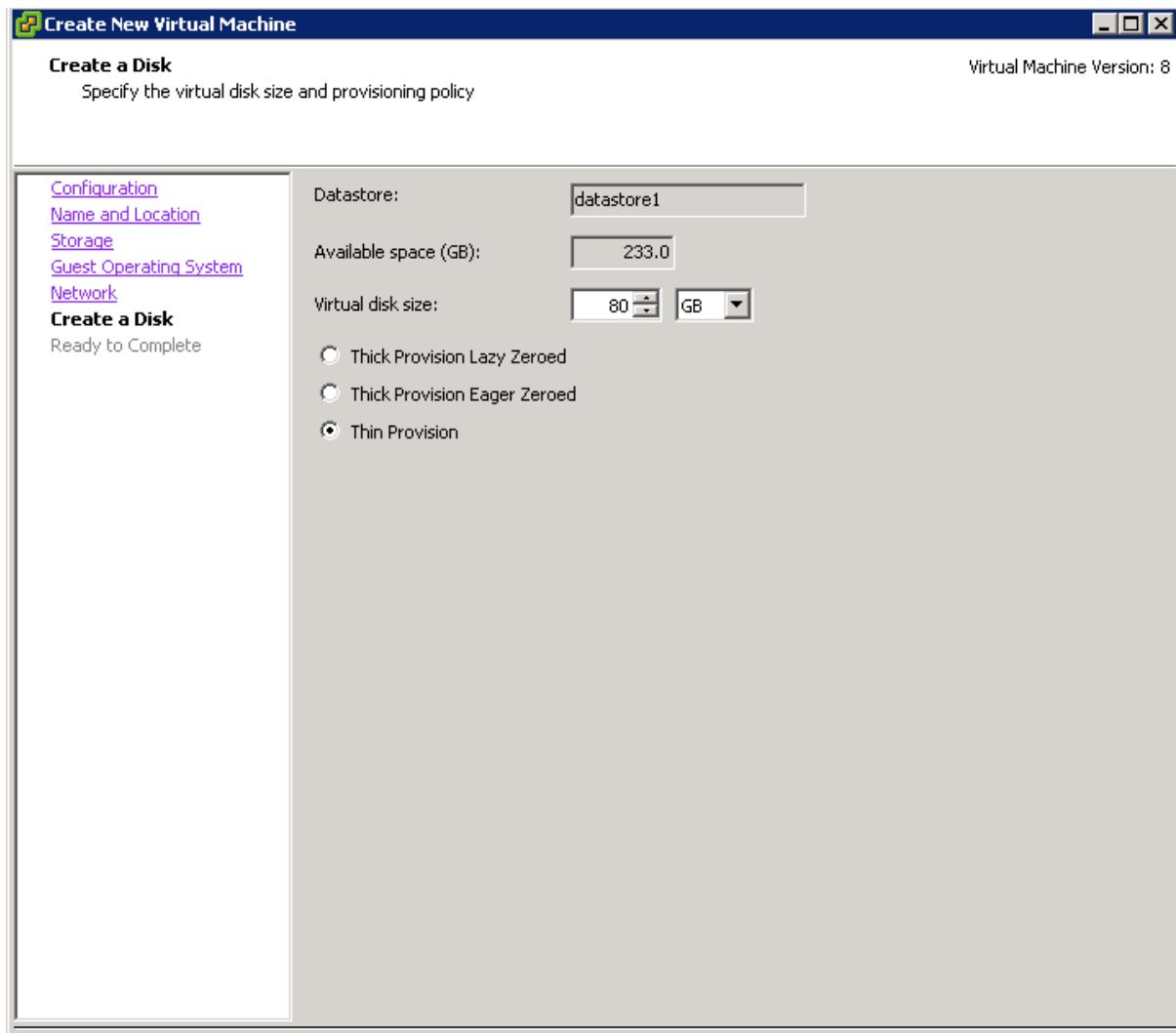
Step 5:

Leave the network setting as default, then click Next.



Step 6:

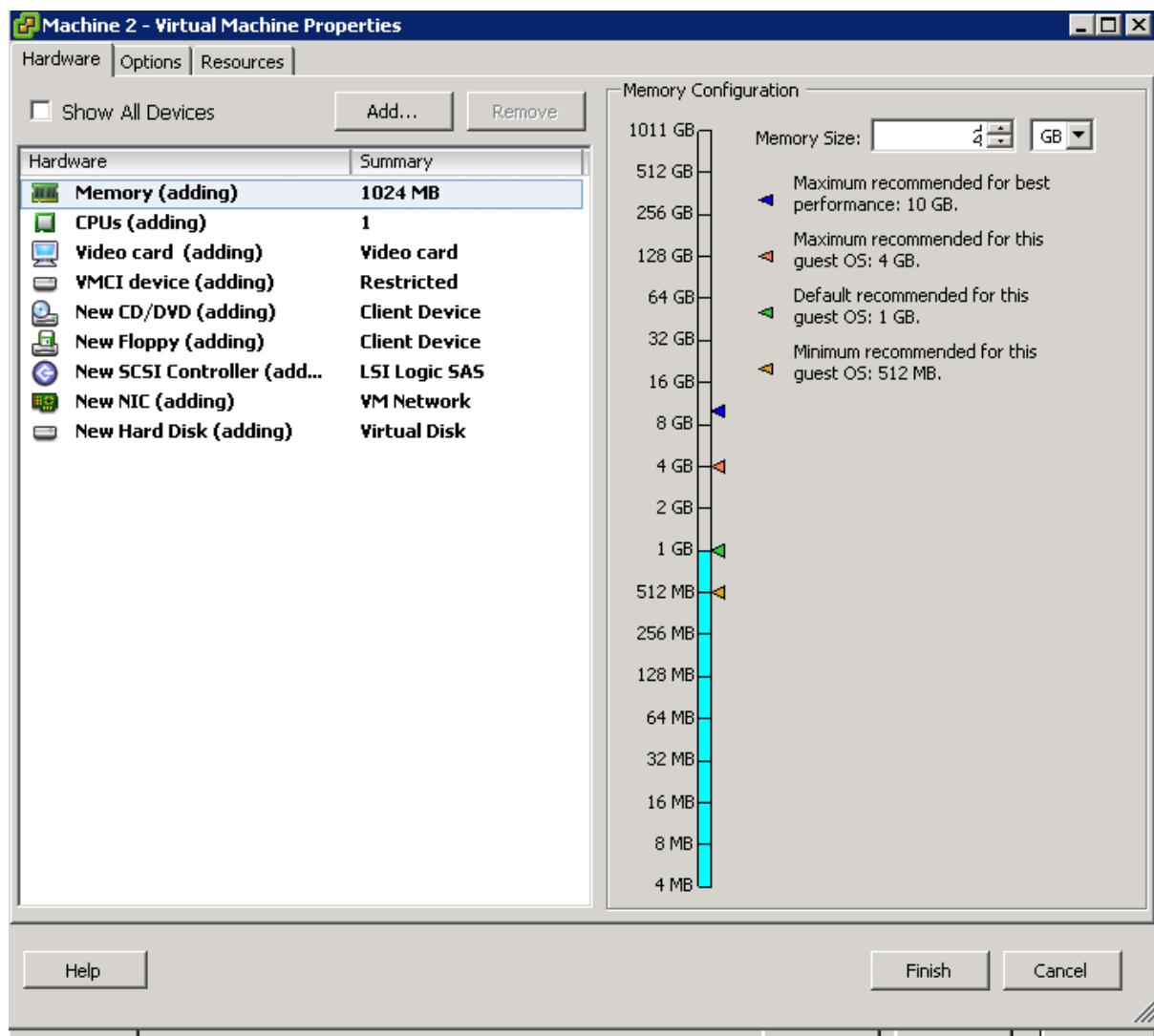
Select the size of the Hard Disk, then select thin provision. Then click Next.



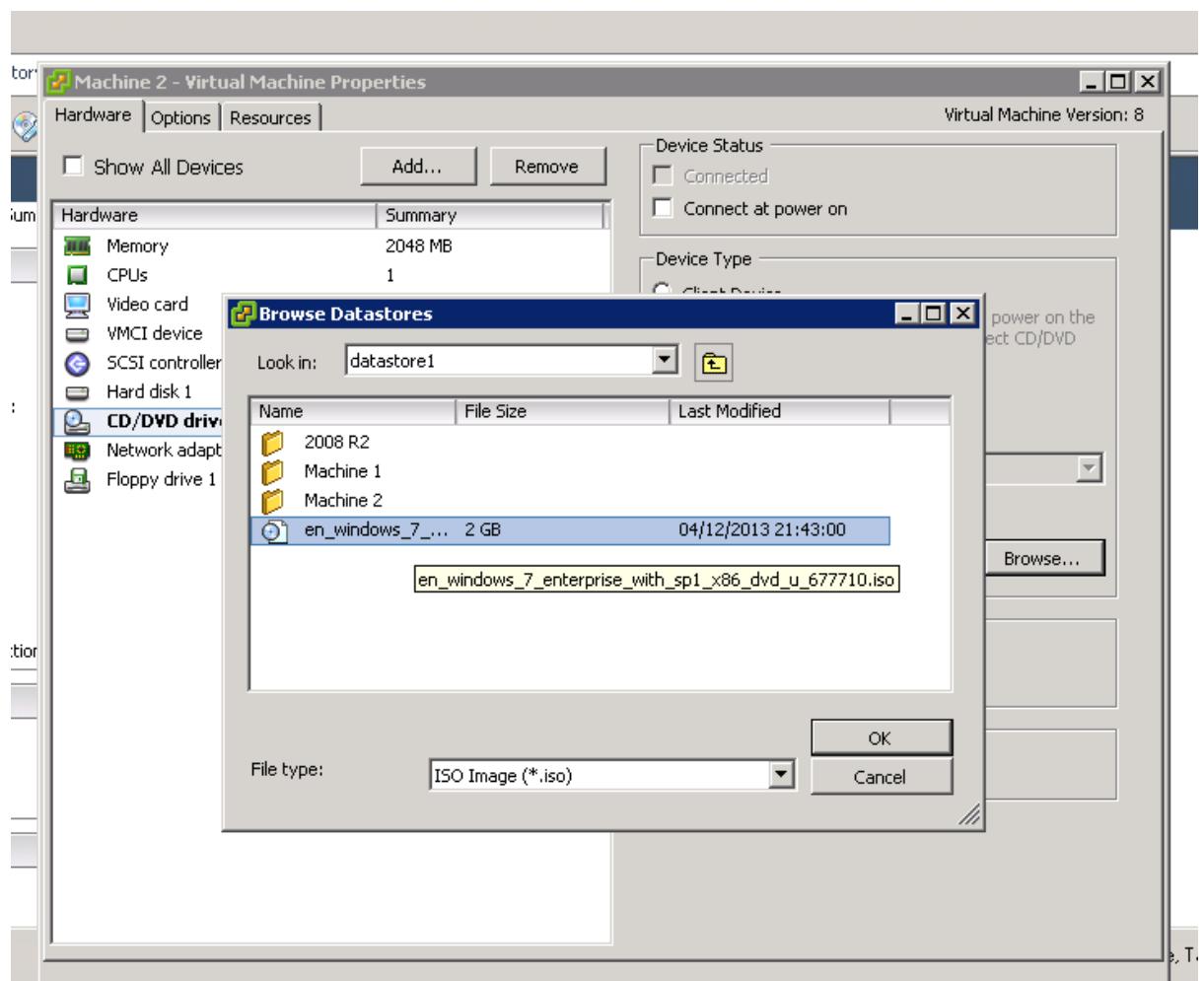
Step 7:

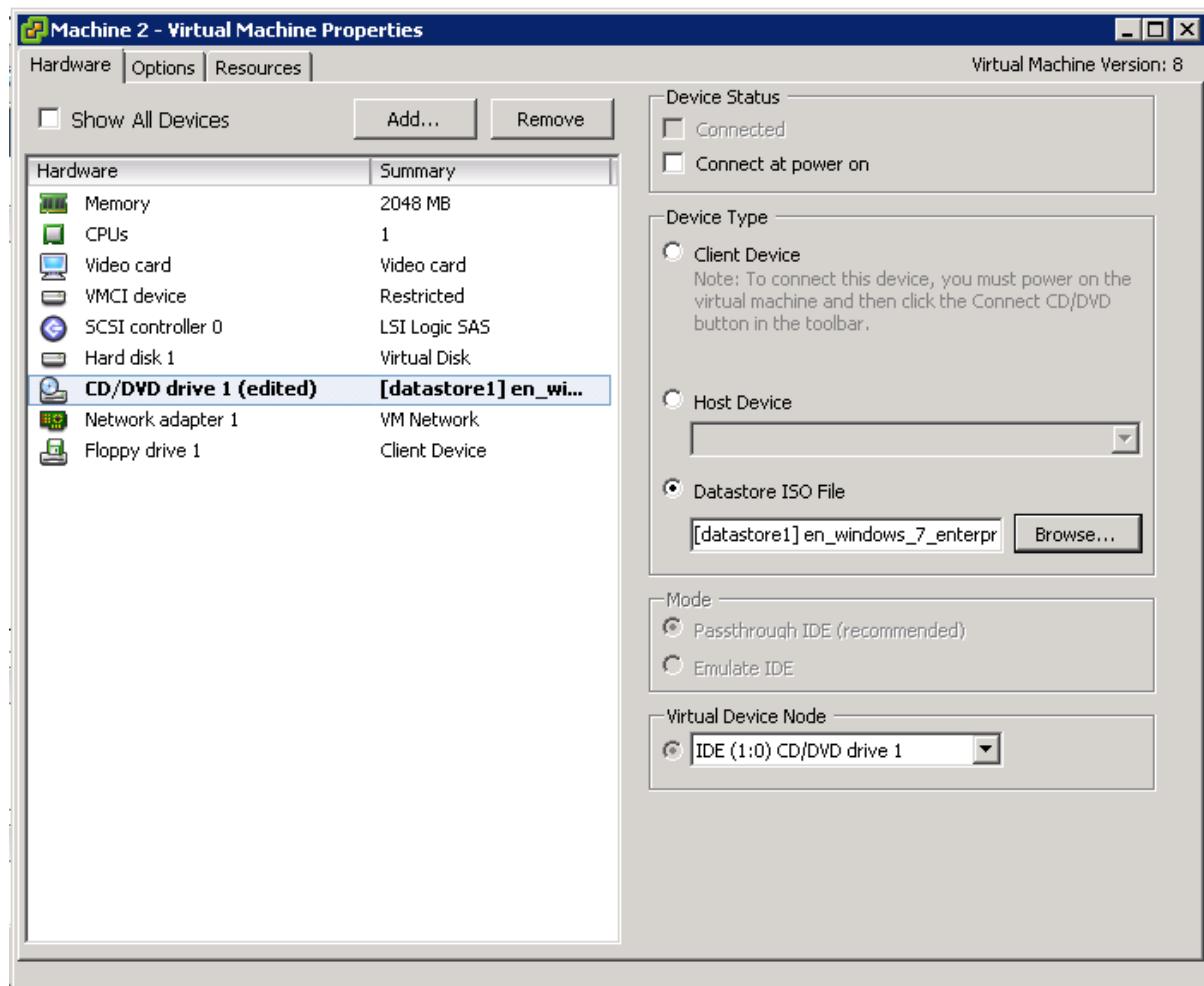
Choose “Edit the virtual machine settings before completion” then click Finish.

Change the size of the RAM to 4GB.



Then choose CD/DVD drive and browse for the ISO of Windows 7.

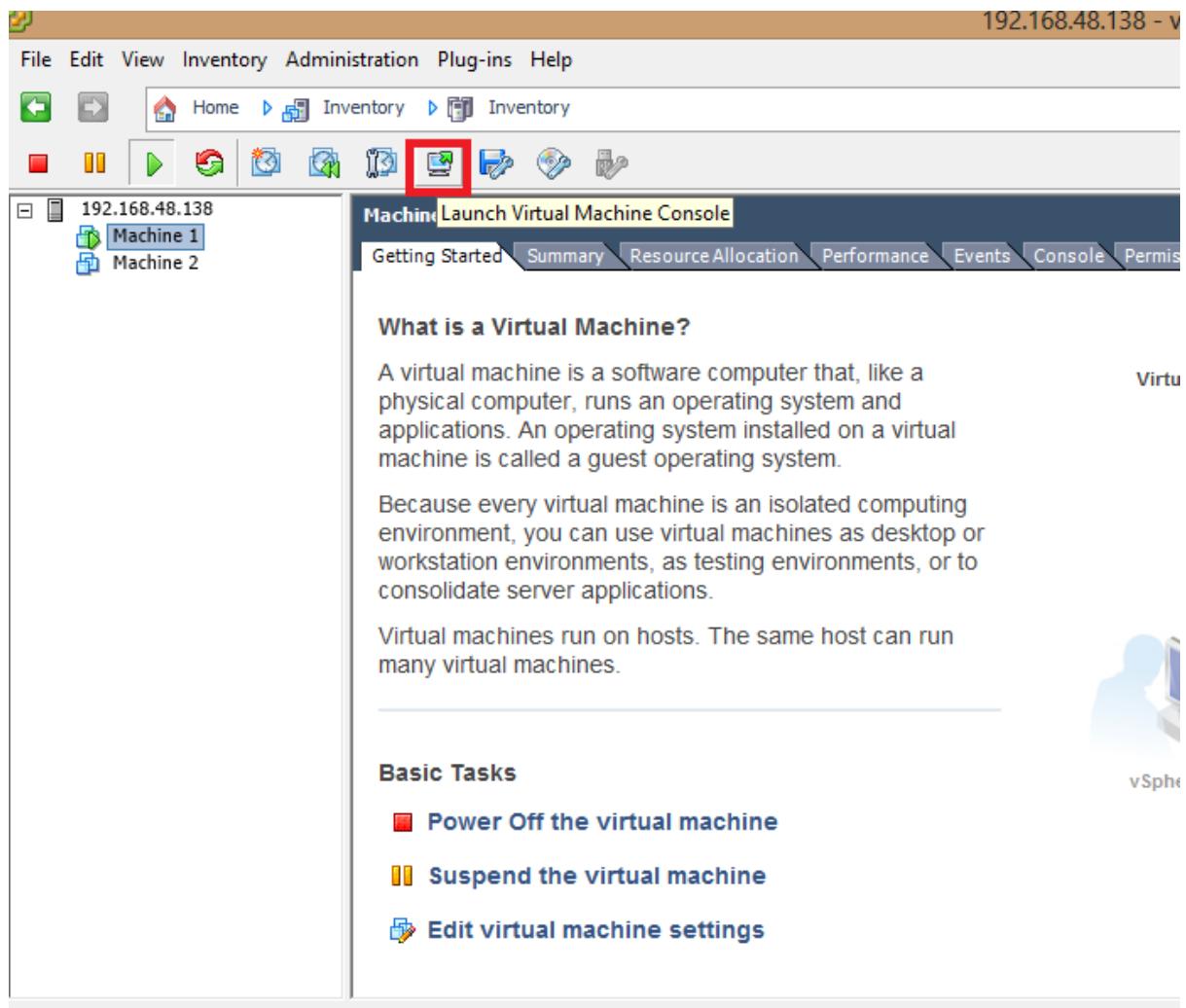




Then click ok to finish the Virtual Machine wizard, then click, Power on the virtual machine.

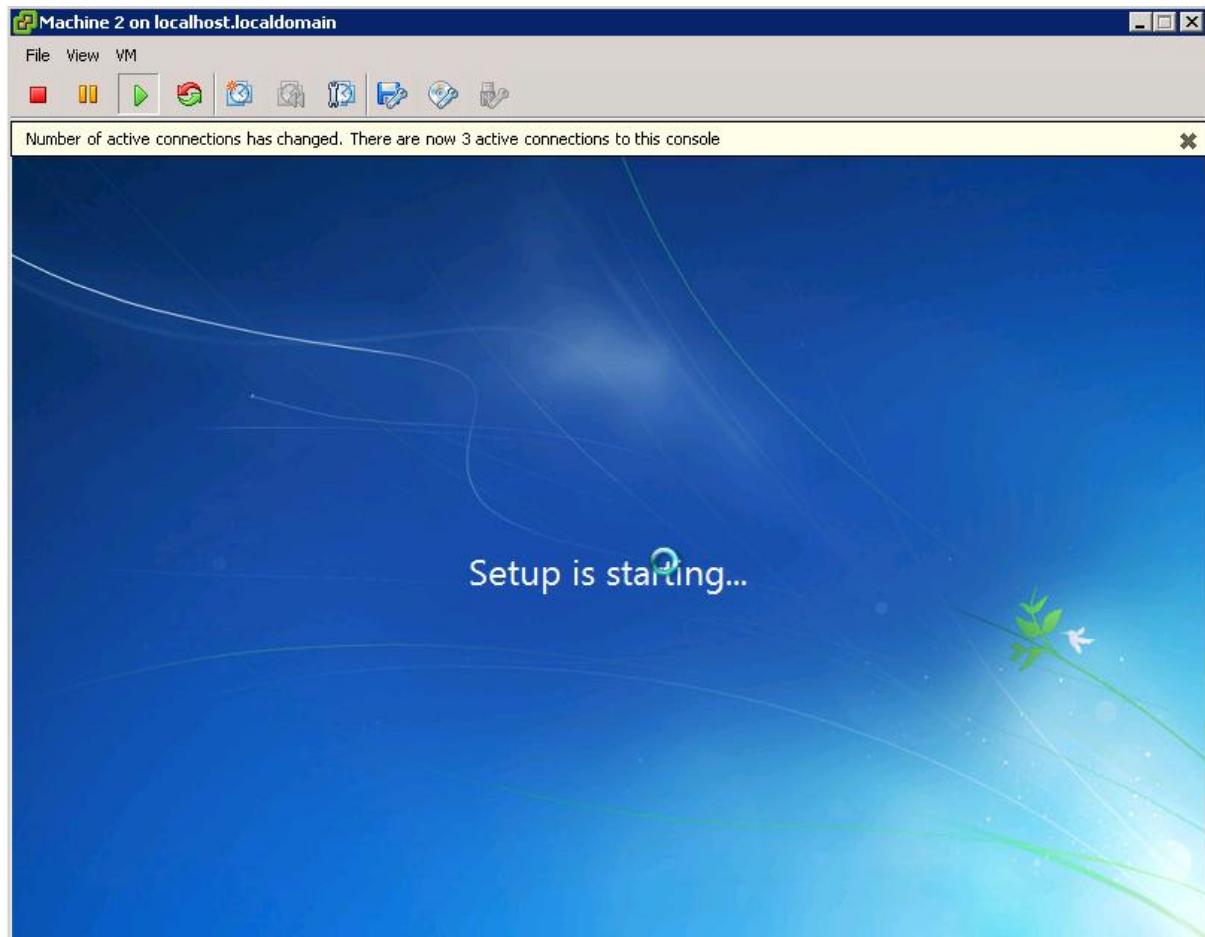
Step 8:

After the virtual machine is powered on, Click “Launch virtual machine console”.



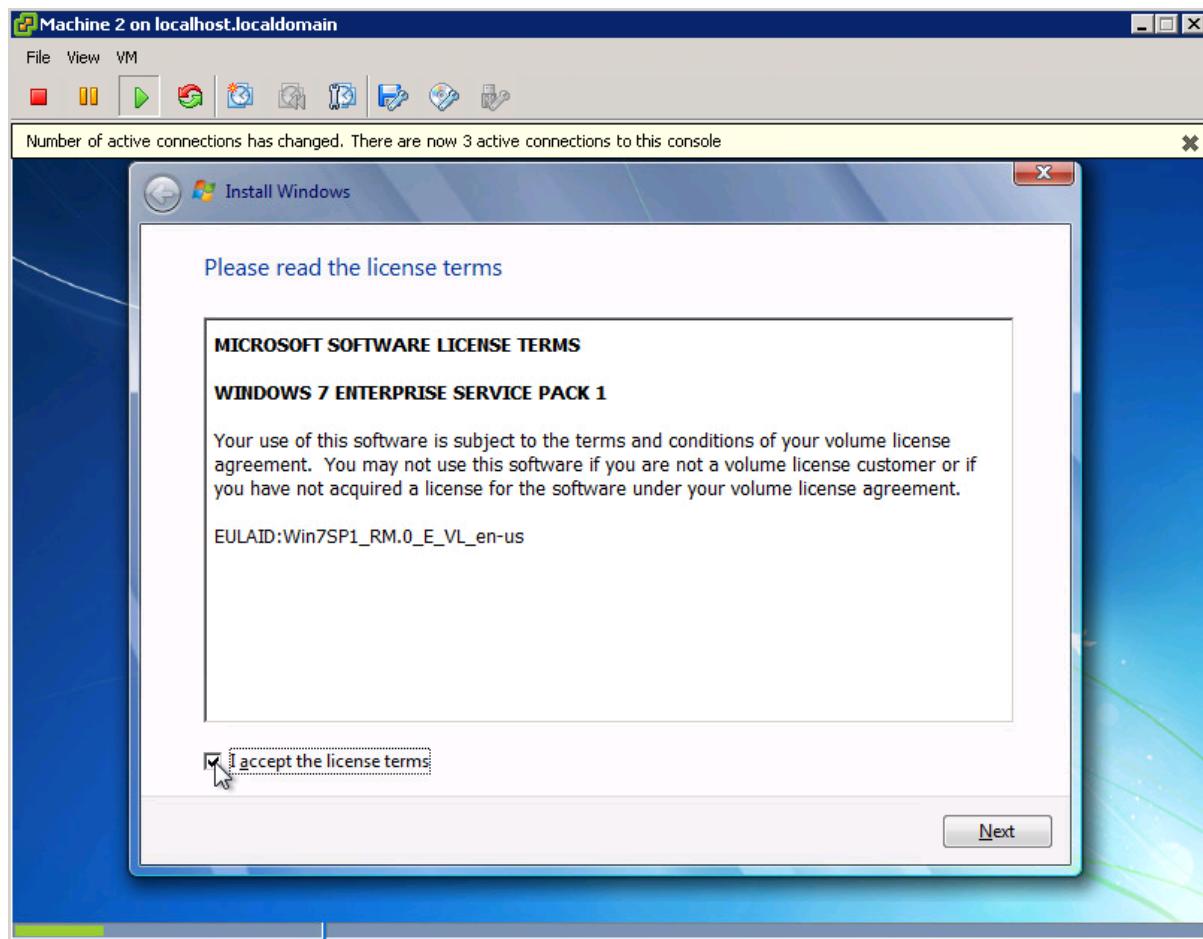
Step 9:

Follow the installation prompts as the installation loads.



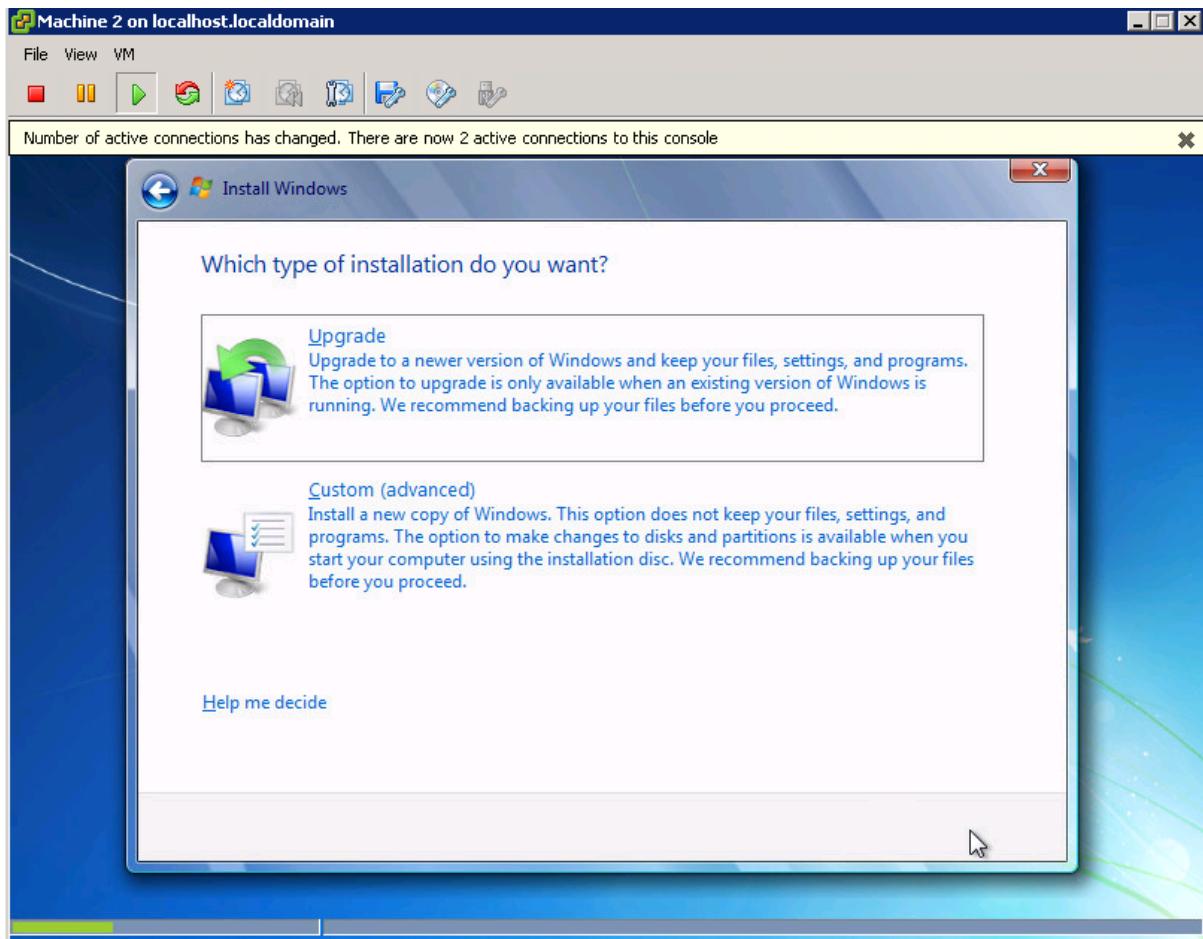
Step 10:

Accept the license terms then click Next.



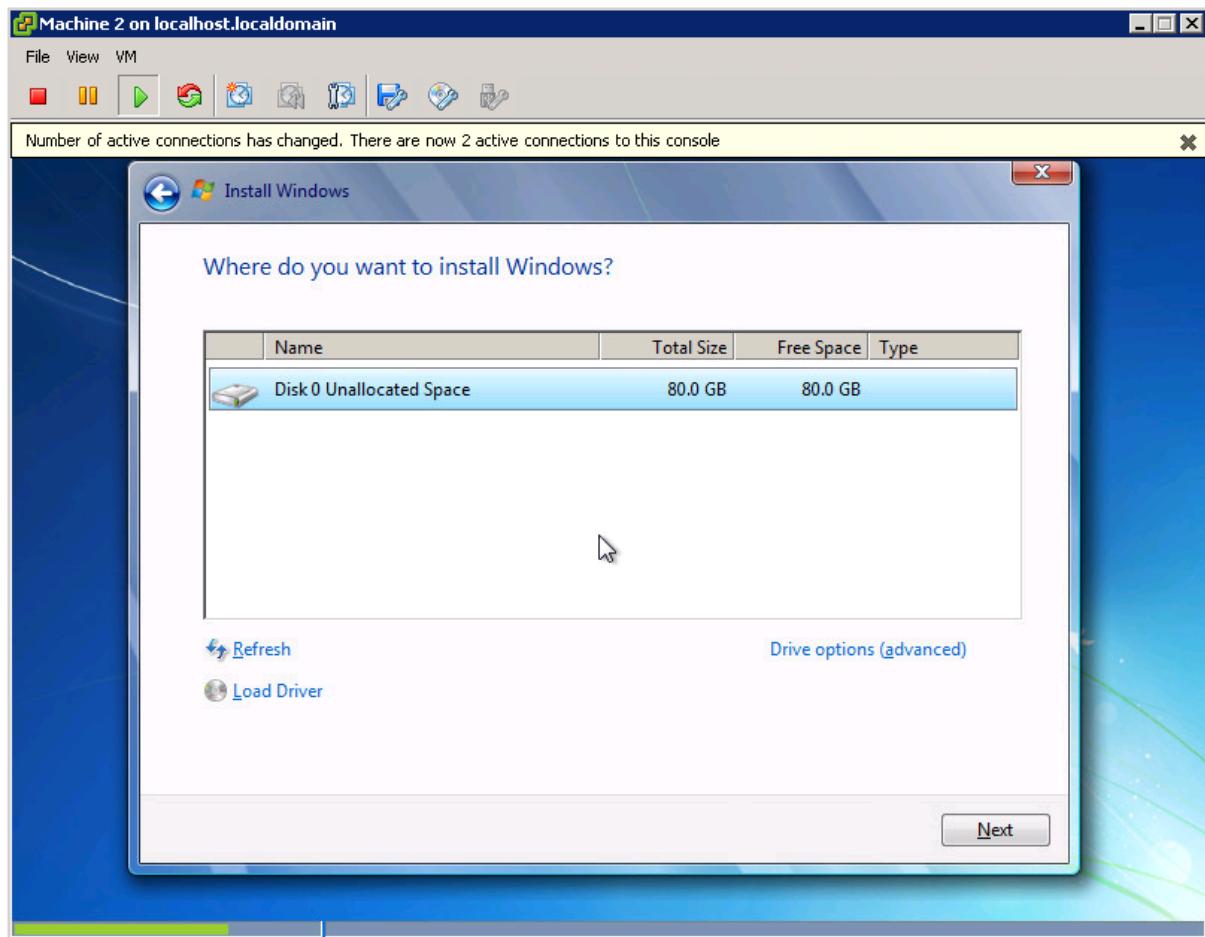
Step 11:

Click custom installation.



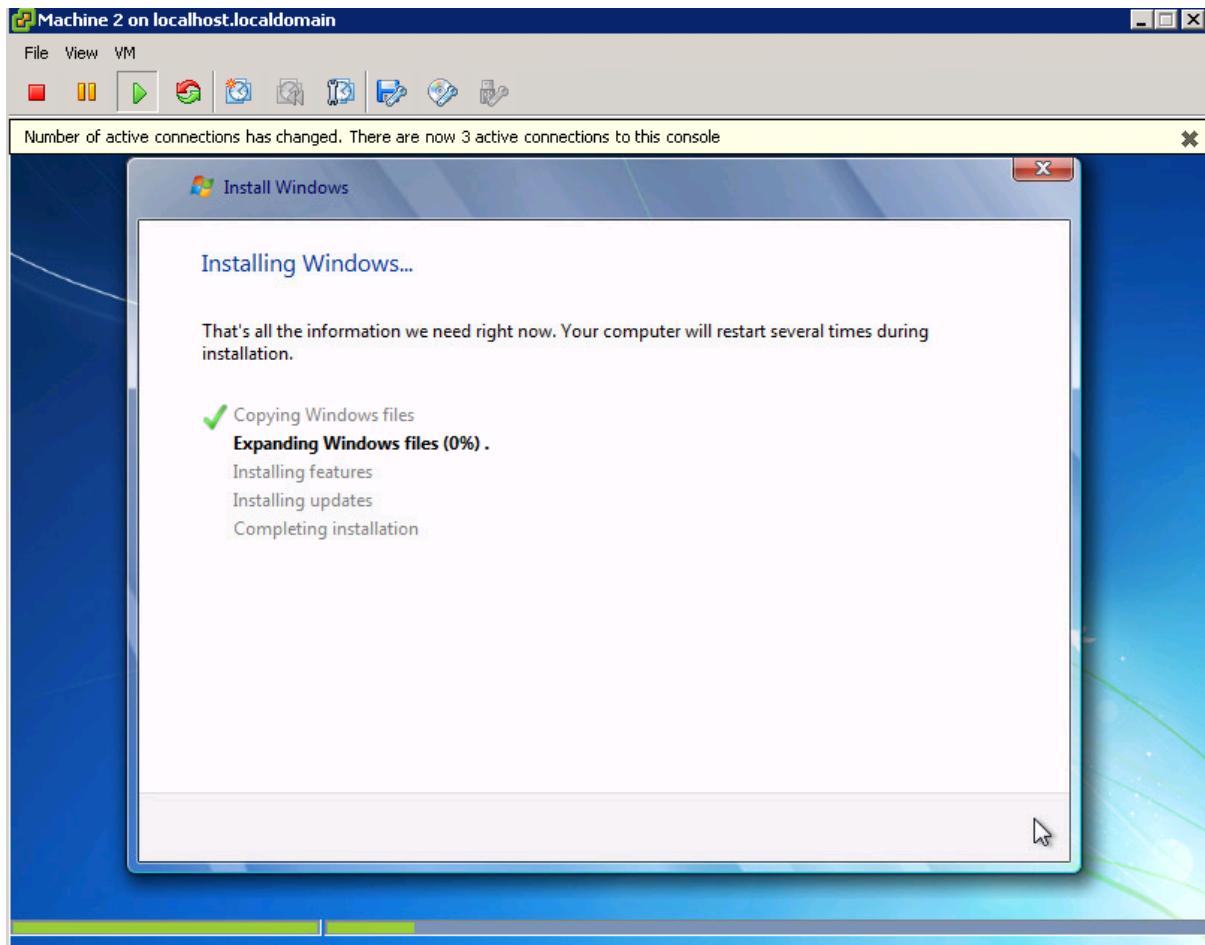
Step 12:

Choose the harddrive to install windows 7, then click Next.



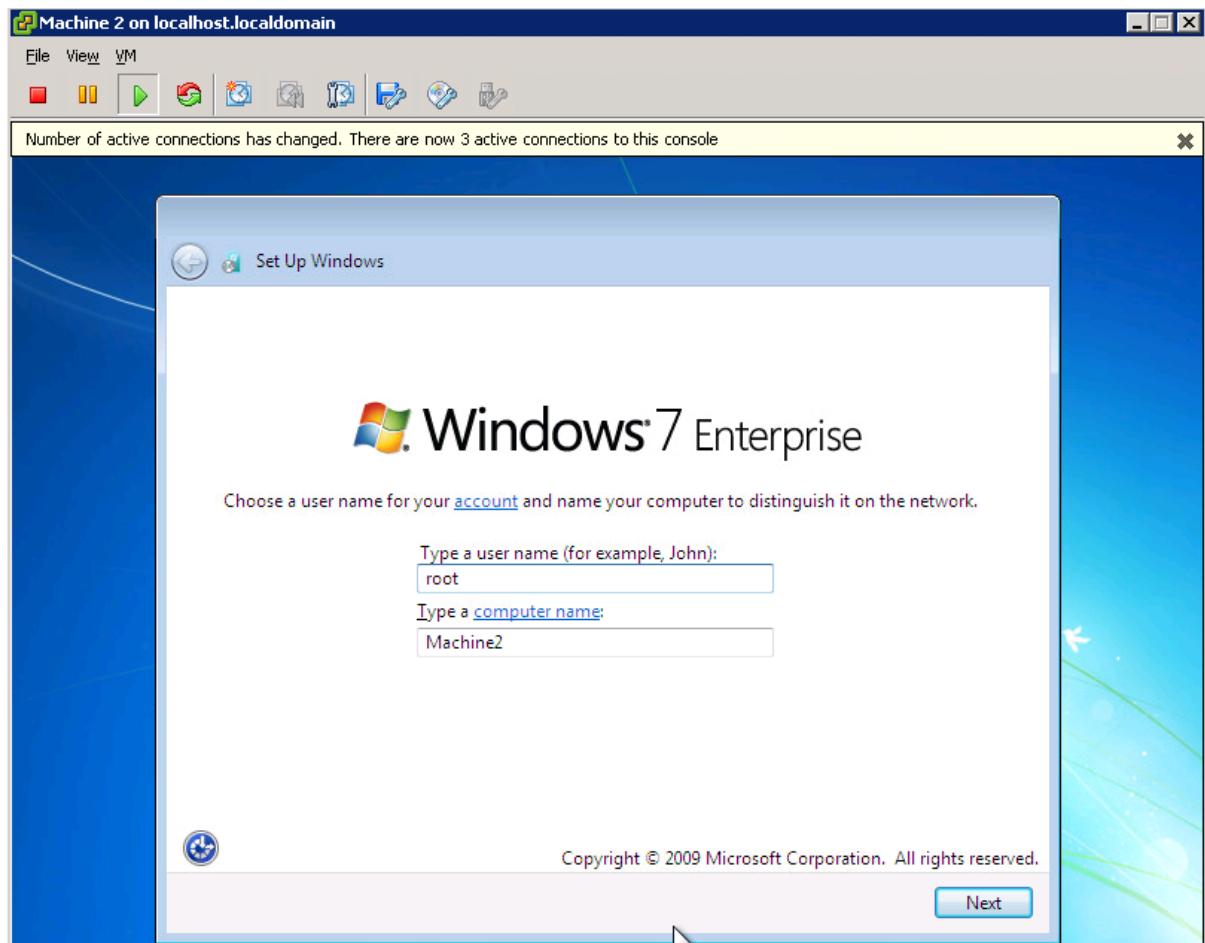
Step 13:

After step 12, windows will begin installing.



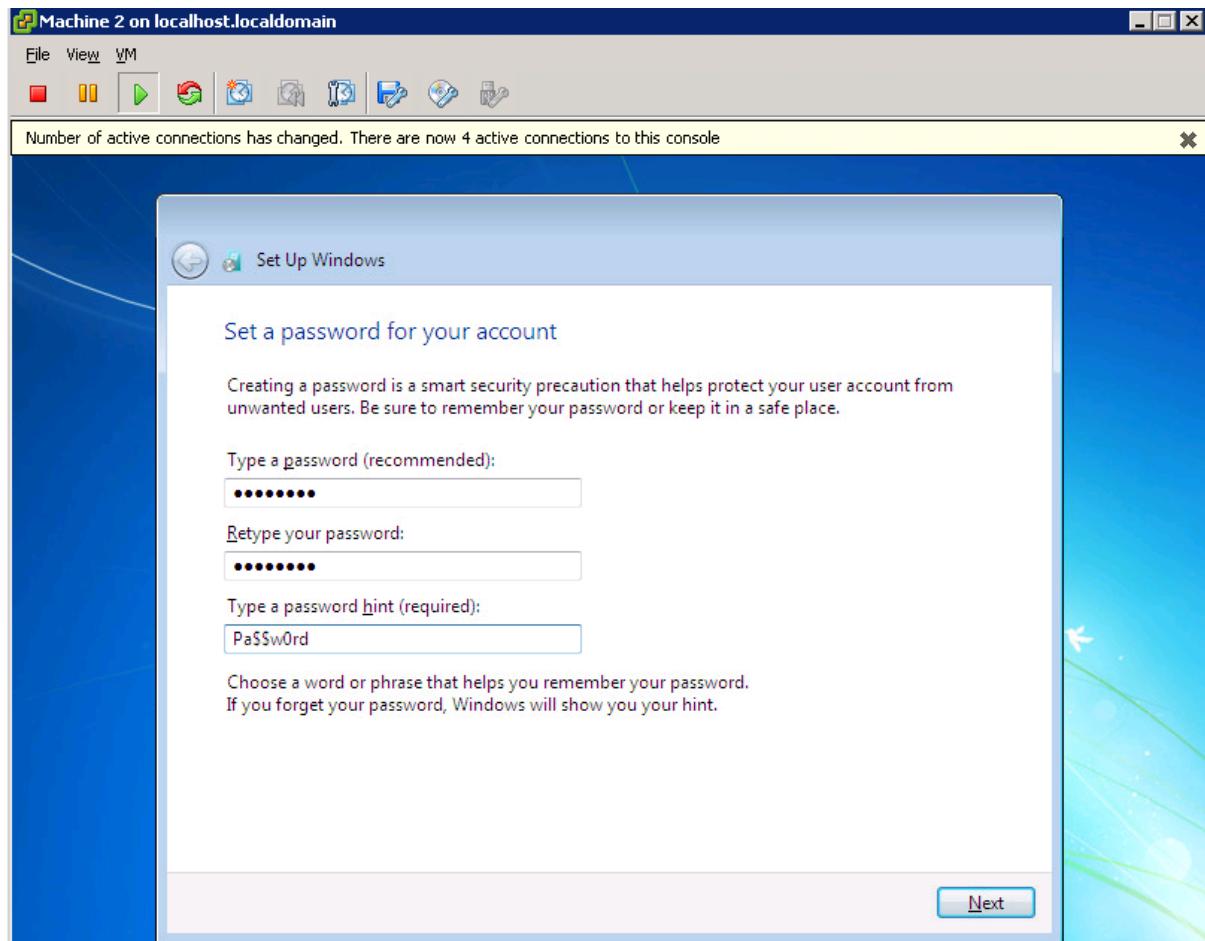
Step 14:

Choose a username and computer name for the install, then click Next. For the purposes of the assignment, the username is “root” and the machine name is “Machine 2”. Then click Next.



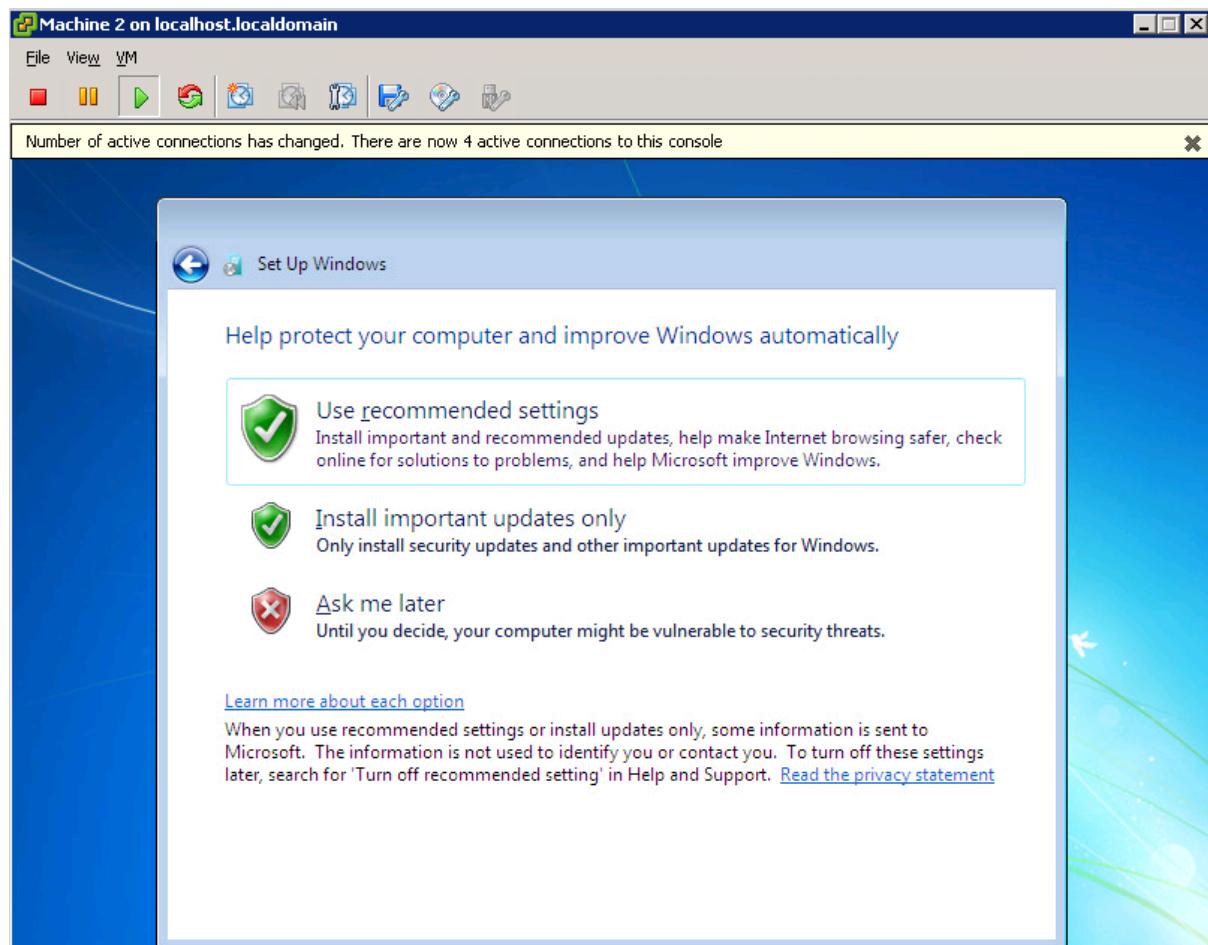
Step 15:

Choose a password for the root user created in step 14.



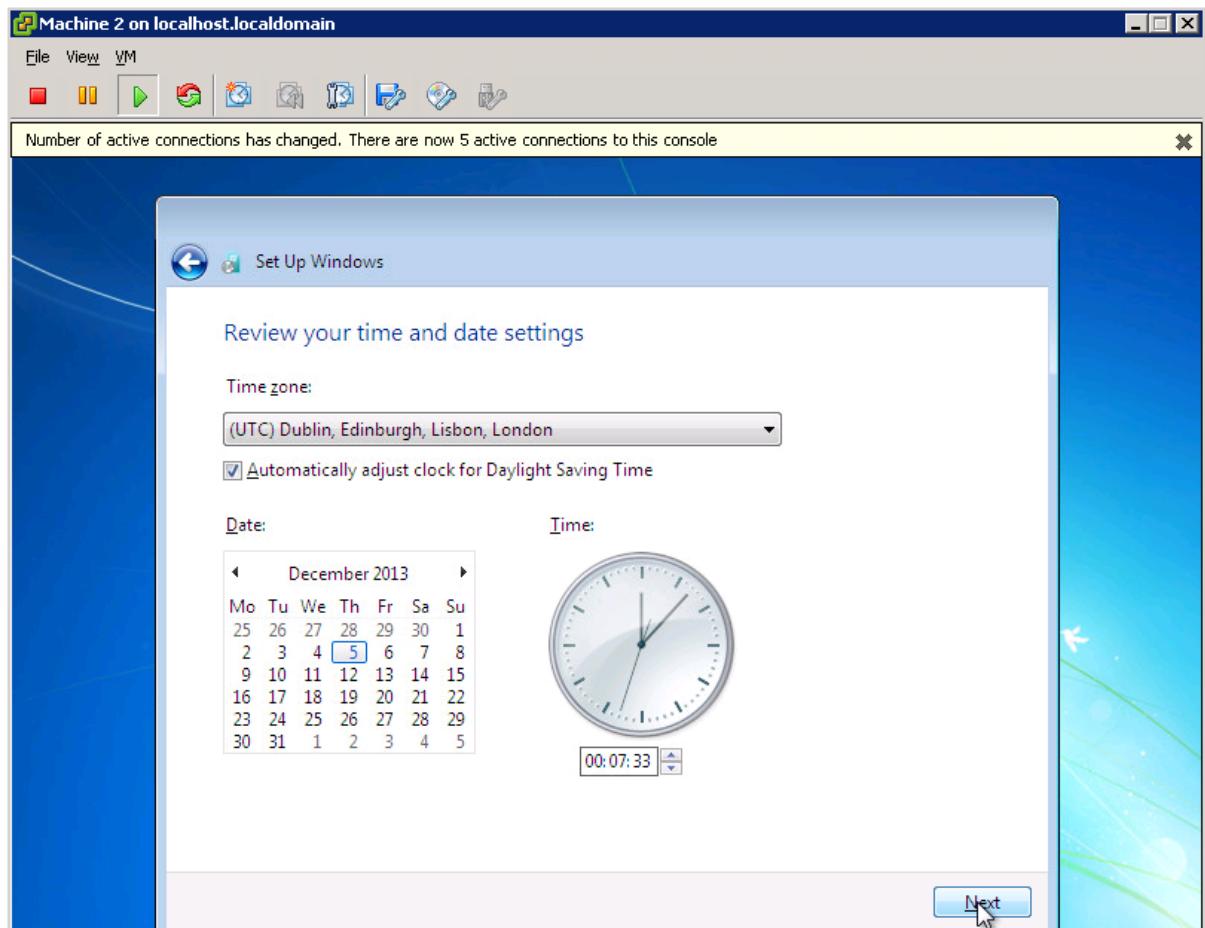
Step 16:

Choose “Use recommended settings” then click next.



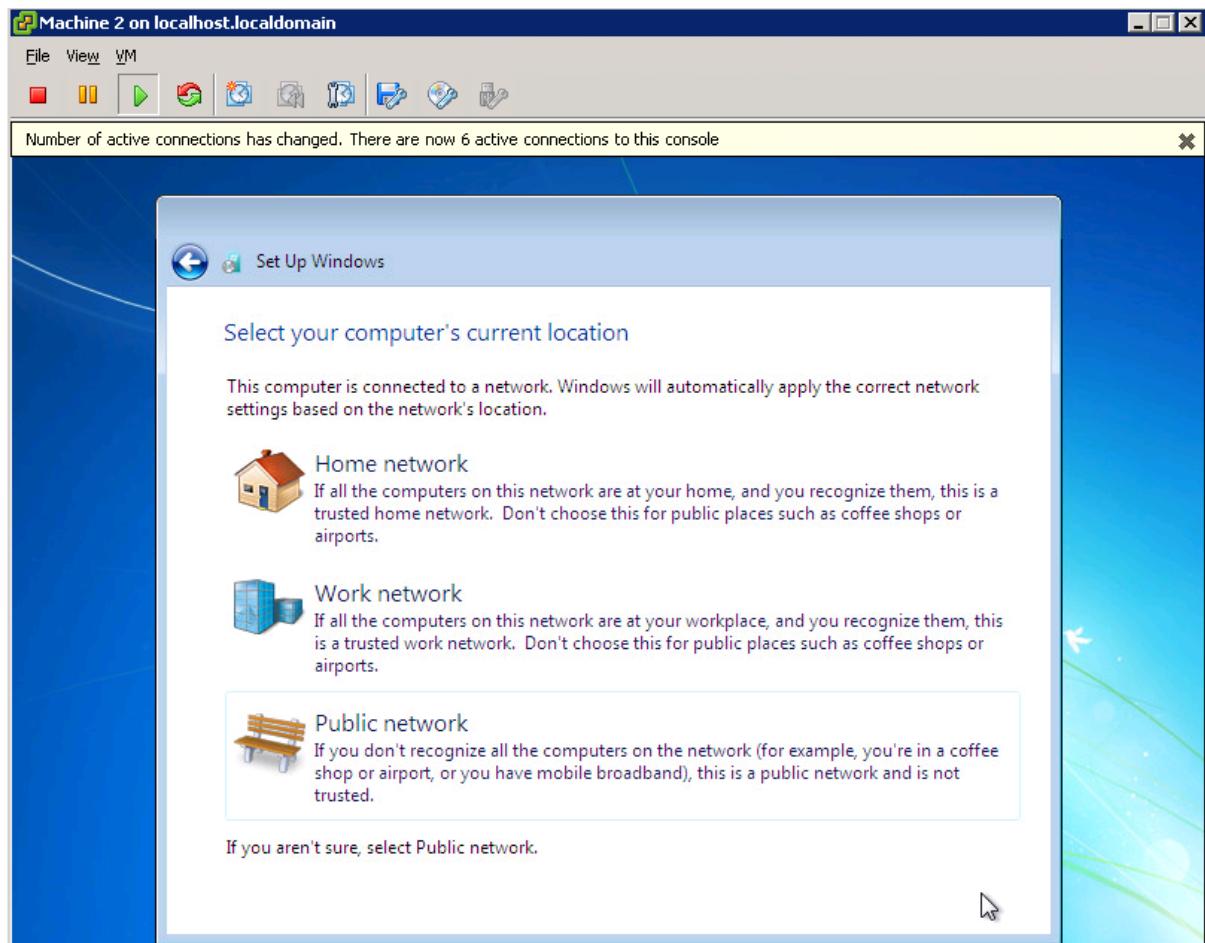
Step 17:

Choose the correct time and date settings, then click next.



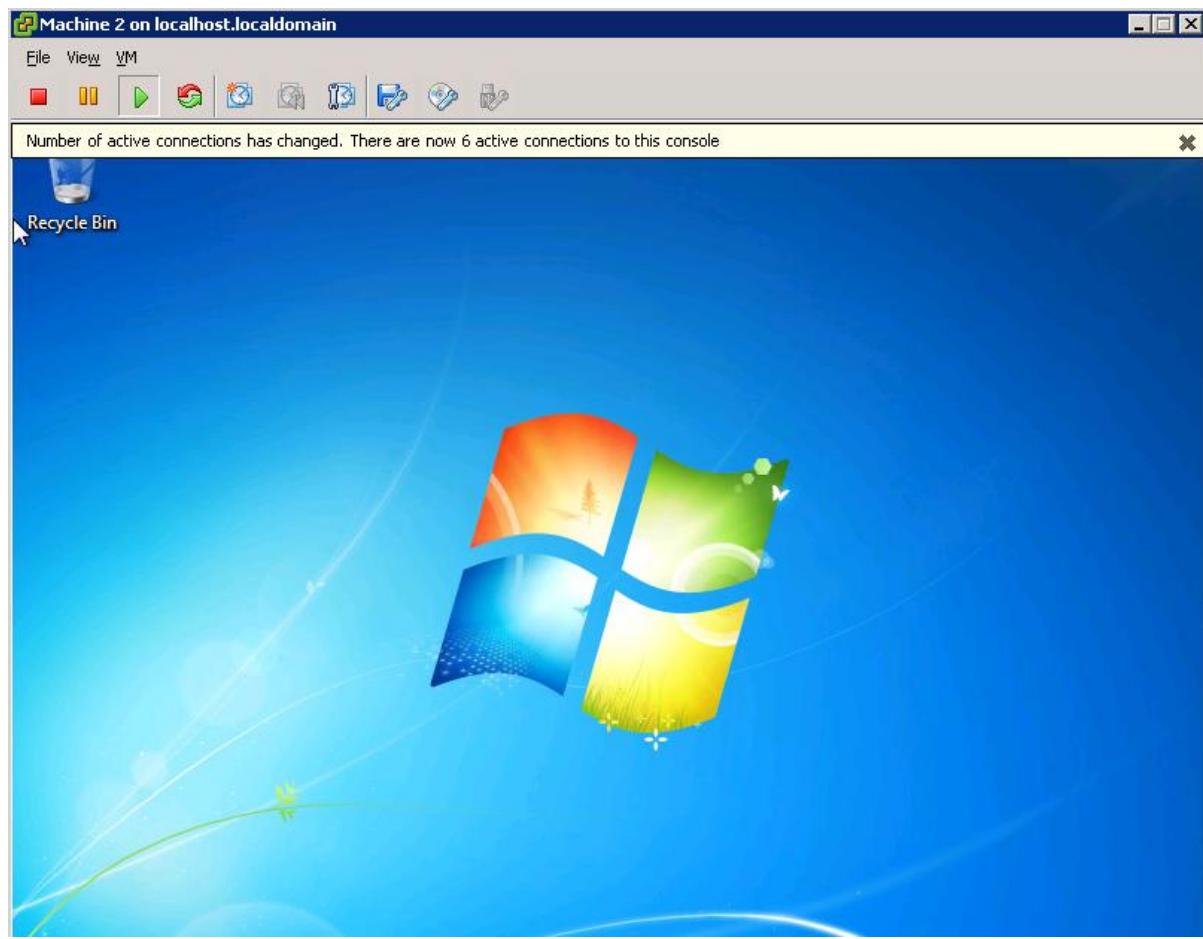
Step 18:

Choose the correct network status, for the assignment, Home Network was chosen.



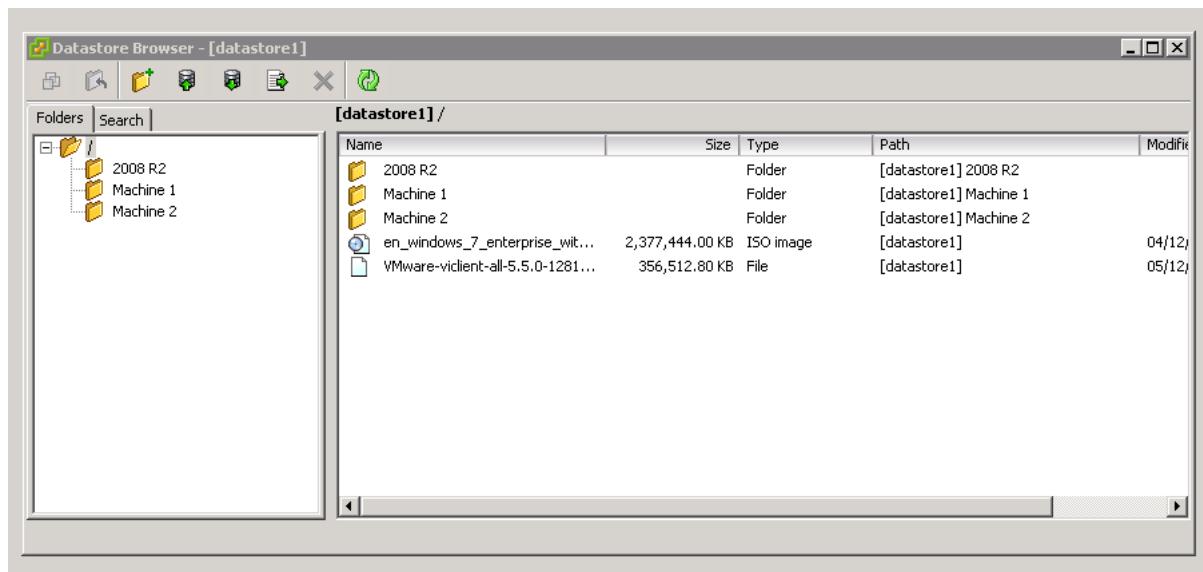
Step 19:

After step 18, windows has now finished installing.



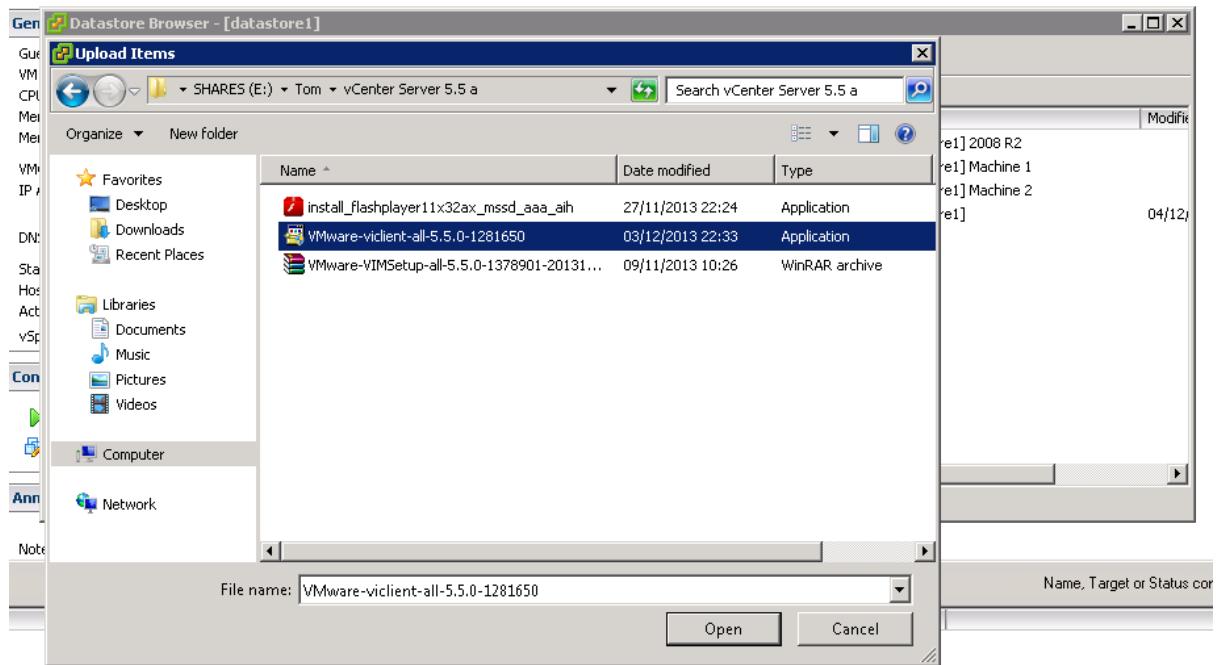
Step 20:

Shut down the virtual machine, then click summary, then right click datastore1. Click upload file.



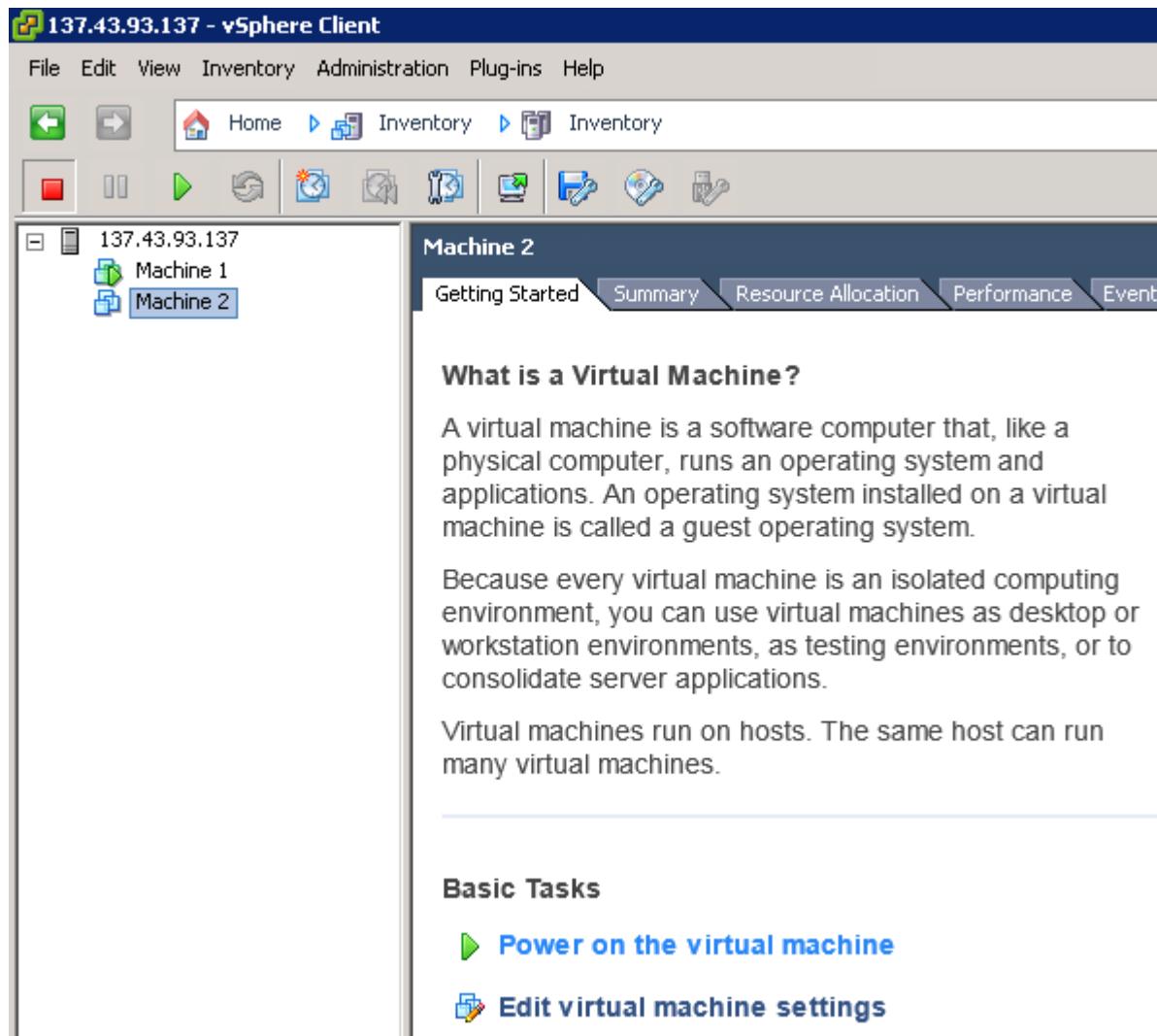
Step 21:

Browse to where the file is located, then click open.



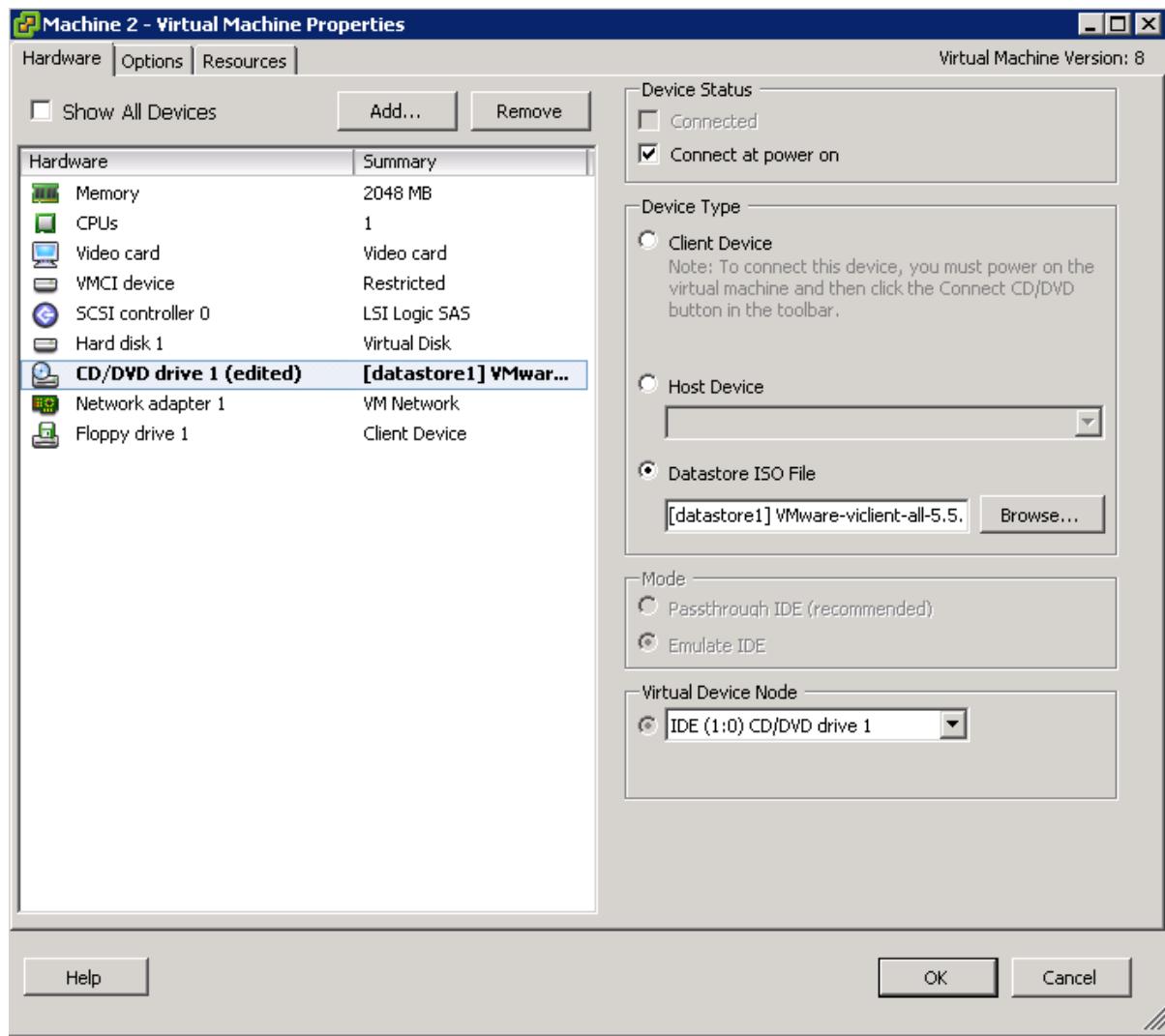
Step 22:

After the VMware vSphere client has uploaded to the datastore, click “edit virtual machine settings”.



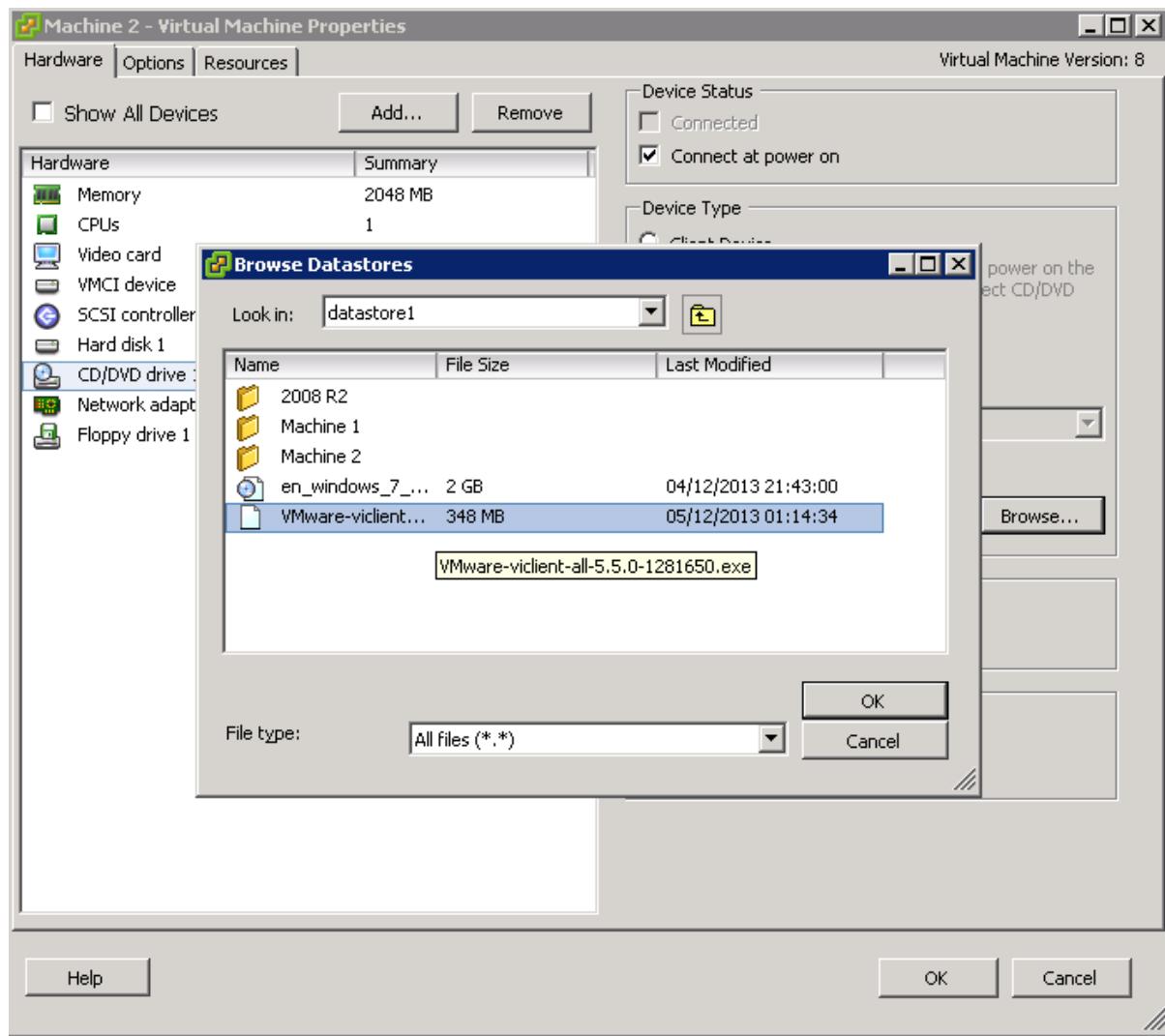
Step 23:

Click CD/DVD drive, then select “connect at power on”, then click Browse.



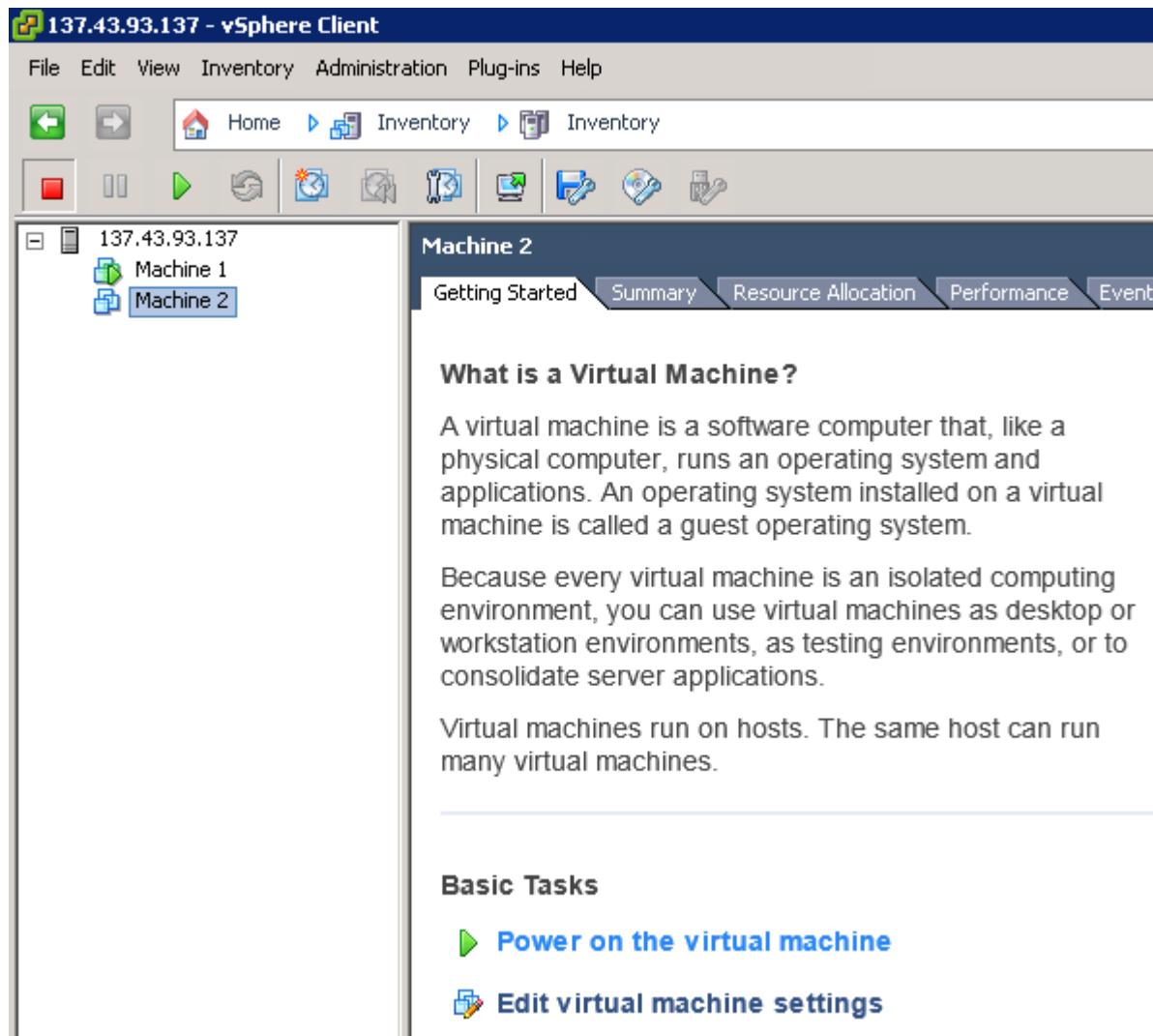
Step 24:

Find where the VMware vsphere client ISO is located, then select it and click ok.



Step 25:

Now click "Power on the Virtual Machine".



Step 26:

Open “My Computer”, then double click on the ISO in the CD/DVD drive. The installation will begin.

Select the language, then click ok.



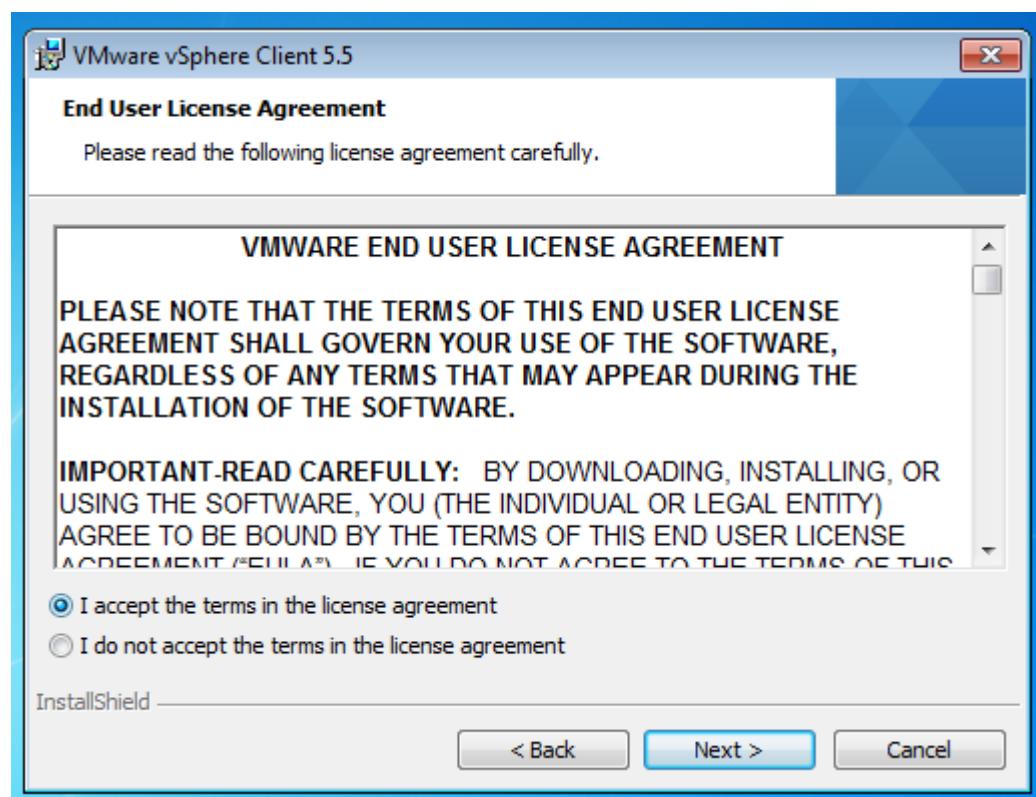
Step 27:

Follow the installation wizard by clicking Next.



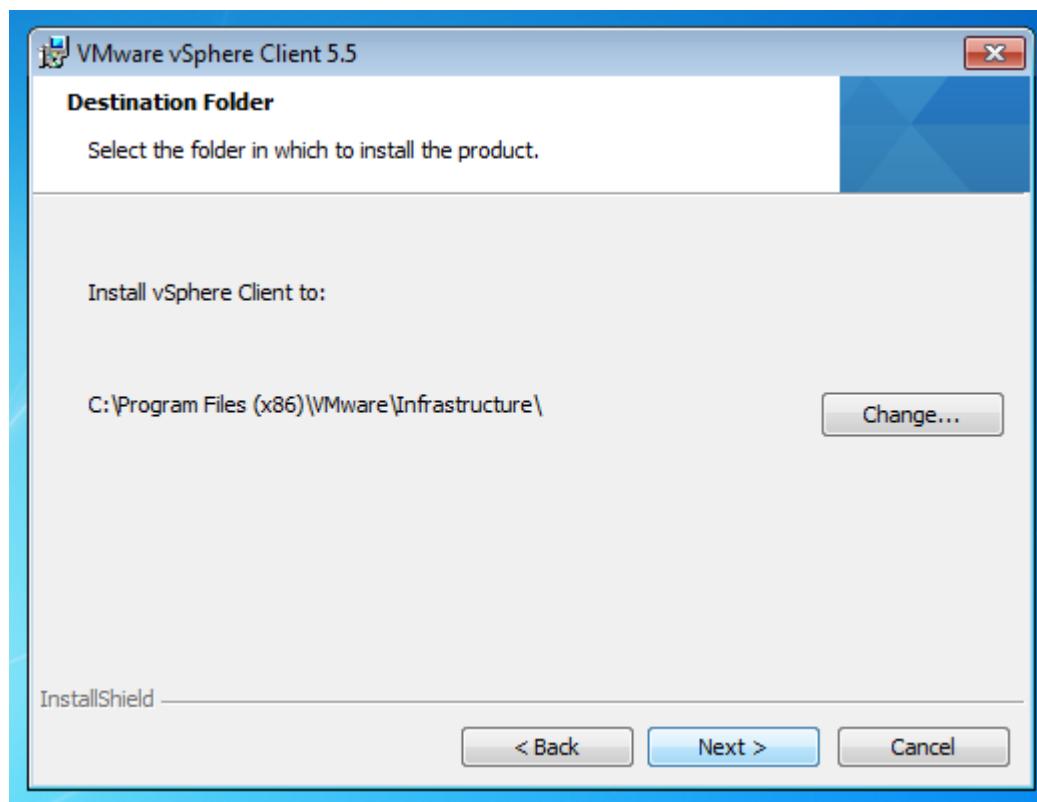
Step 28:

Accept the license agreement, then click Next.



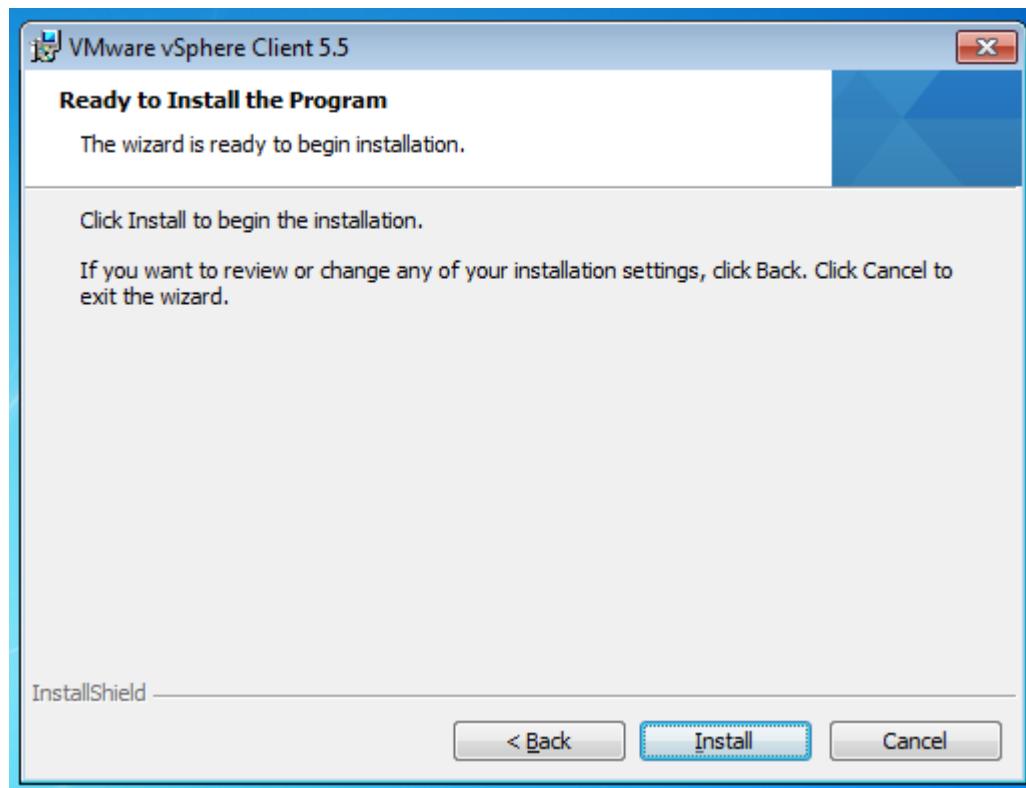
Step 29:

Choose the file location where you would like the vSphere client to be installed. For the assignment purposes it was left as default.



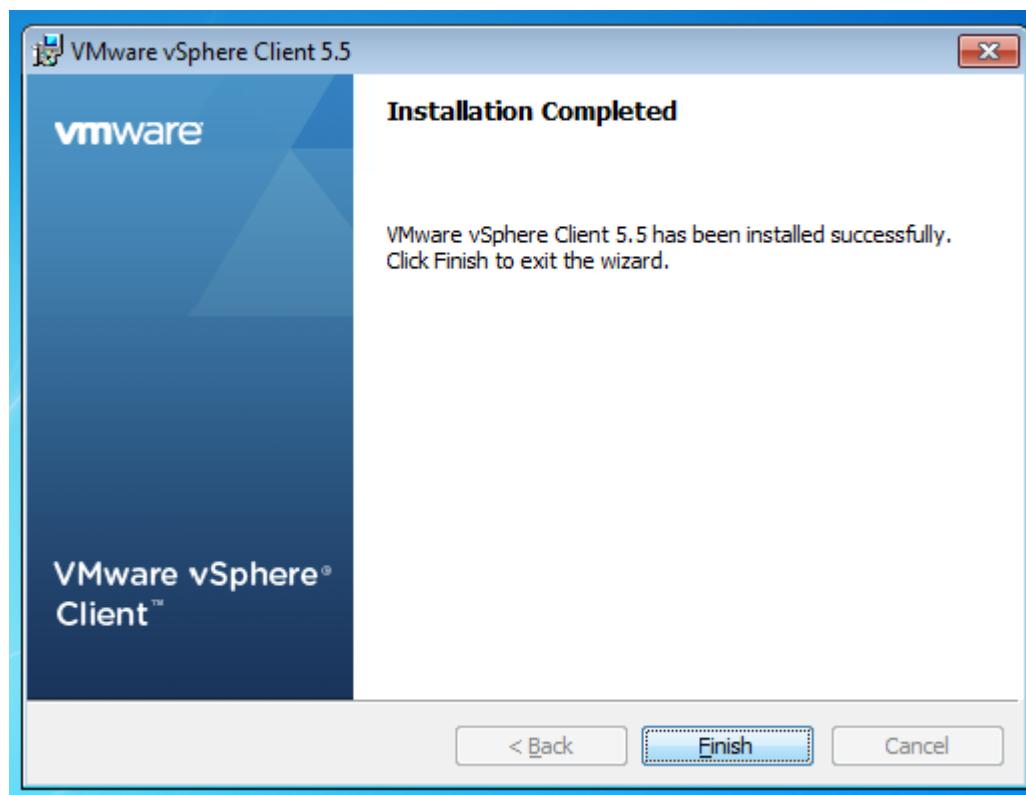
Step 30:

Click Install, to install vSphere client.



Step 31:

The installation has now completed when the window below appears.

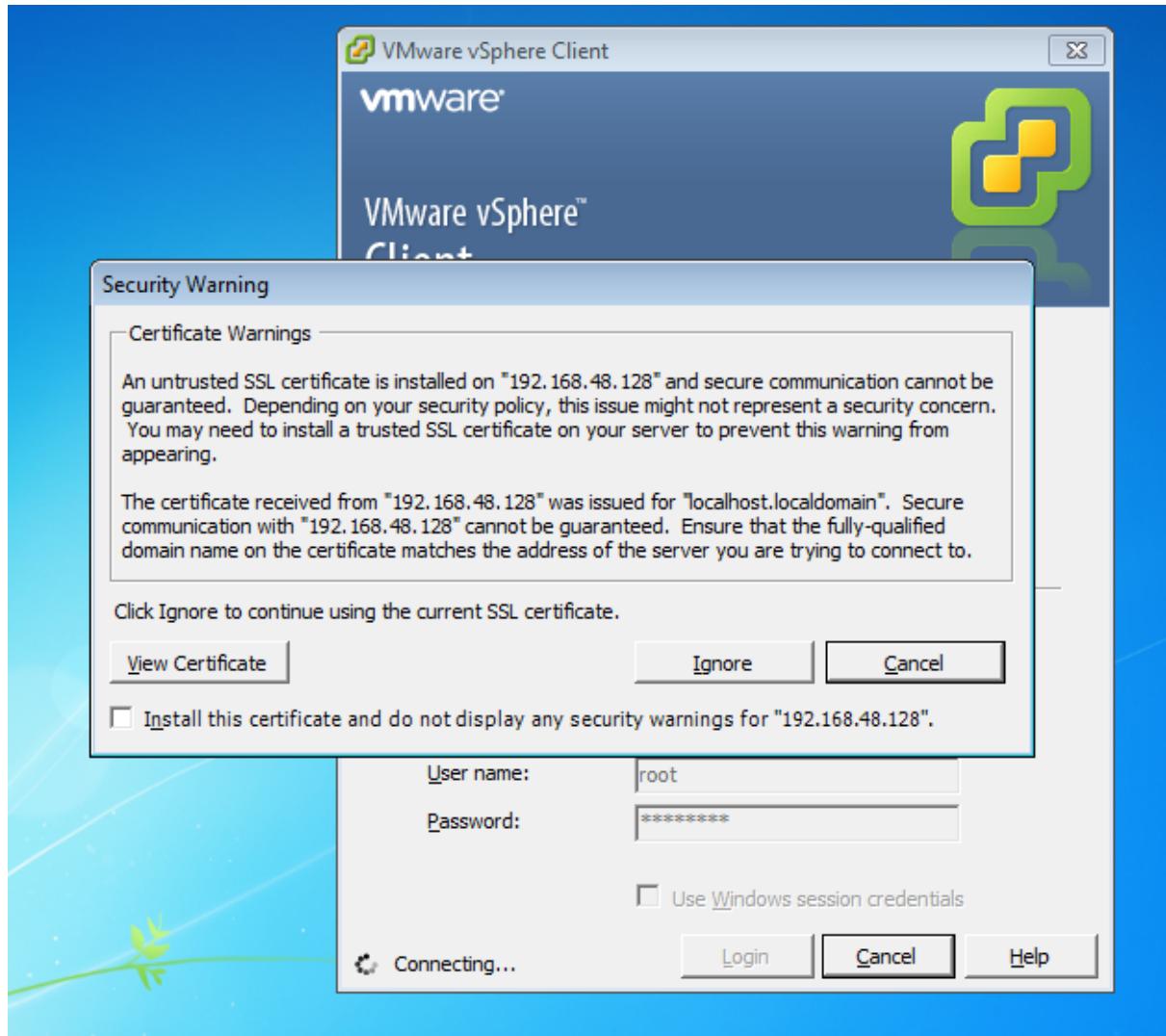


Step 32:

Double click on the shortcut of the vSphere Client. When it opens, enter the IP address of the host, username and the password of the host. For the purpose of the assignment the host address is: 192.168.48.128, username: root, and password: Pa\$\$w0rd.

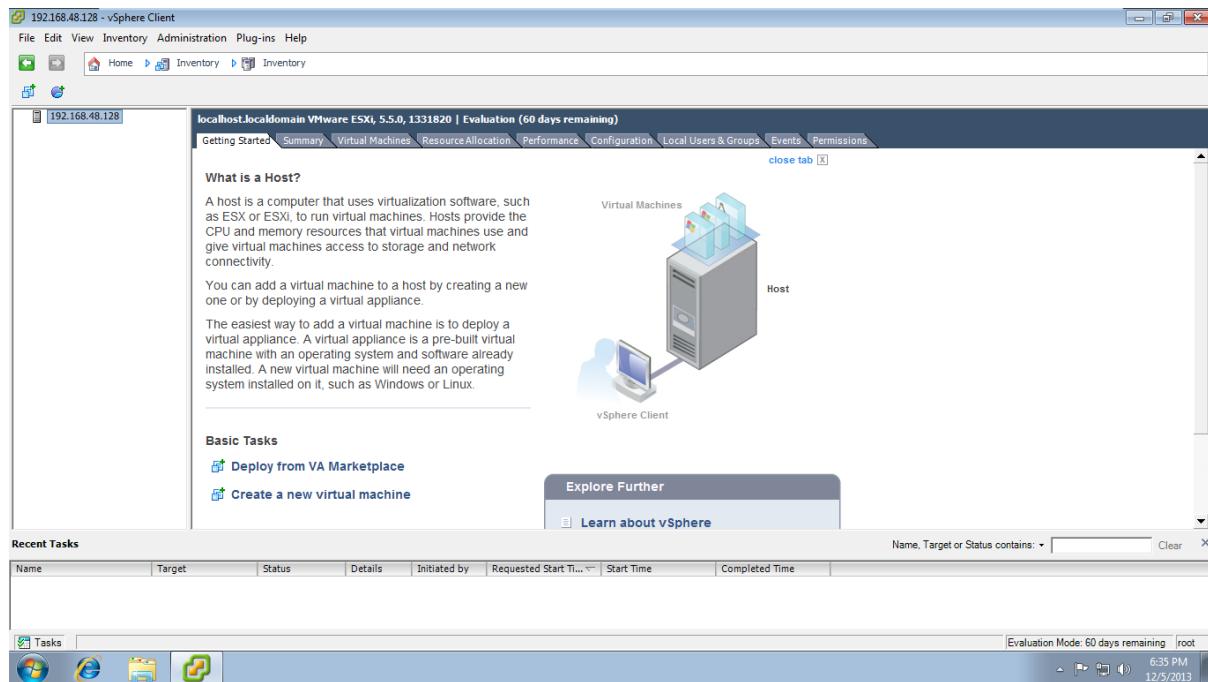
Step 33:

Choose to Ignore the certificate.



Step 34:

Windows 7 client is now completely installed running VMware's vSphere client. It is possible to completely manage the host from this windows 7 client virtual machine.



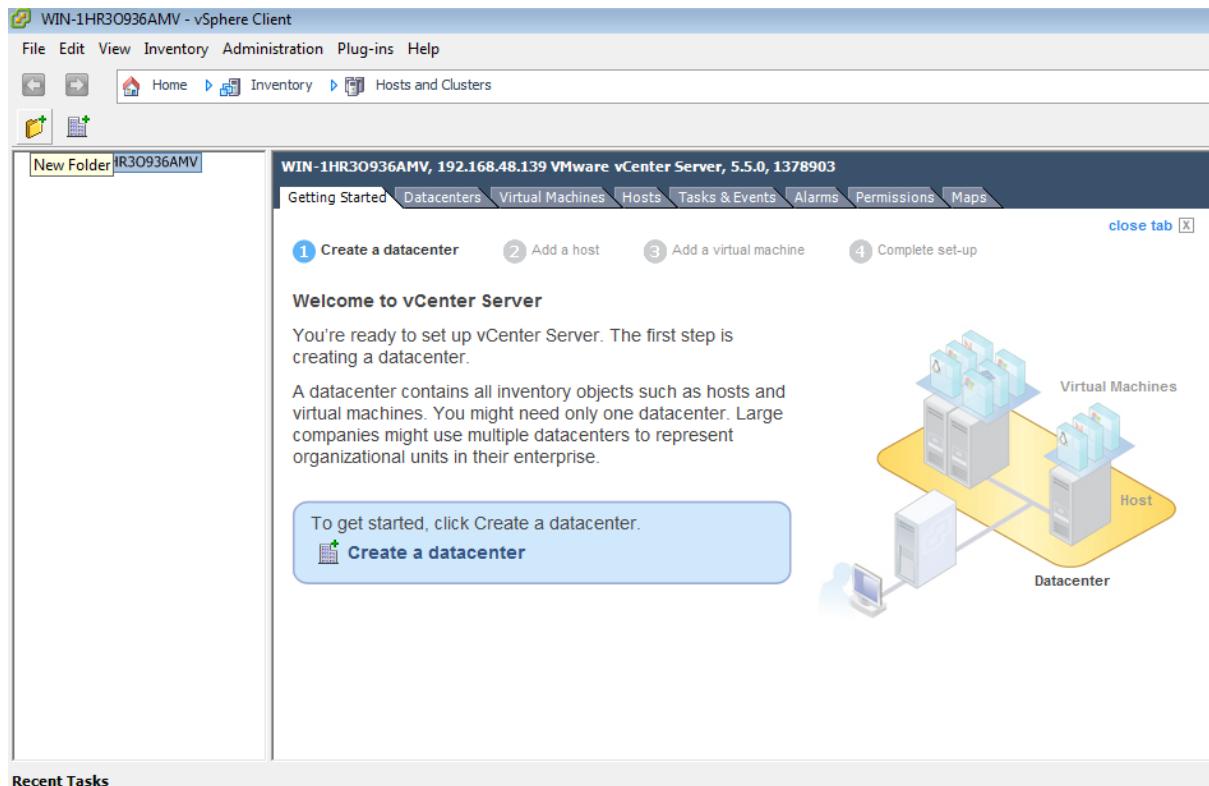
Task A.3

Using 'Machine 1' created in Task A.2

Create an Environment within vCenter Server to mimic a chosen organisation and add the ESXI host which you have been assigned to this environment.

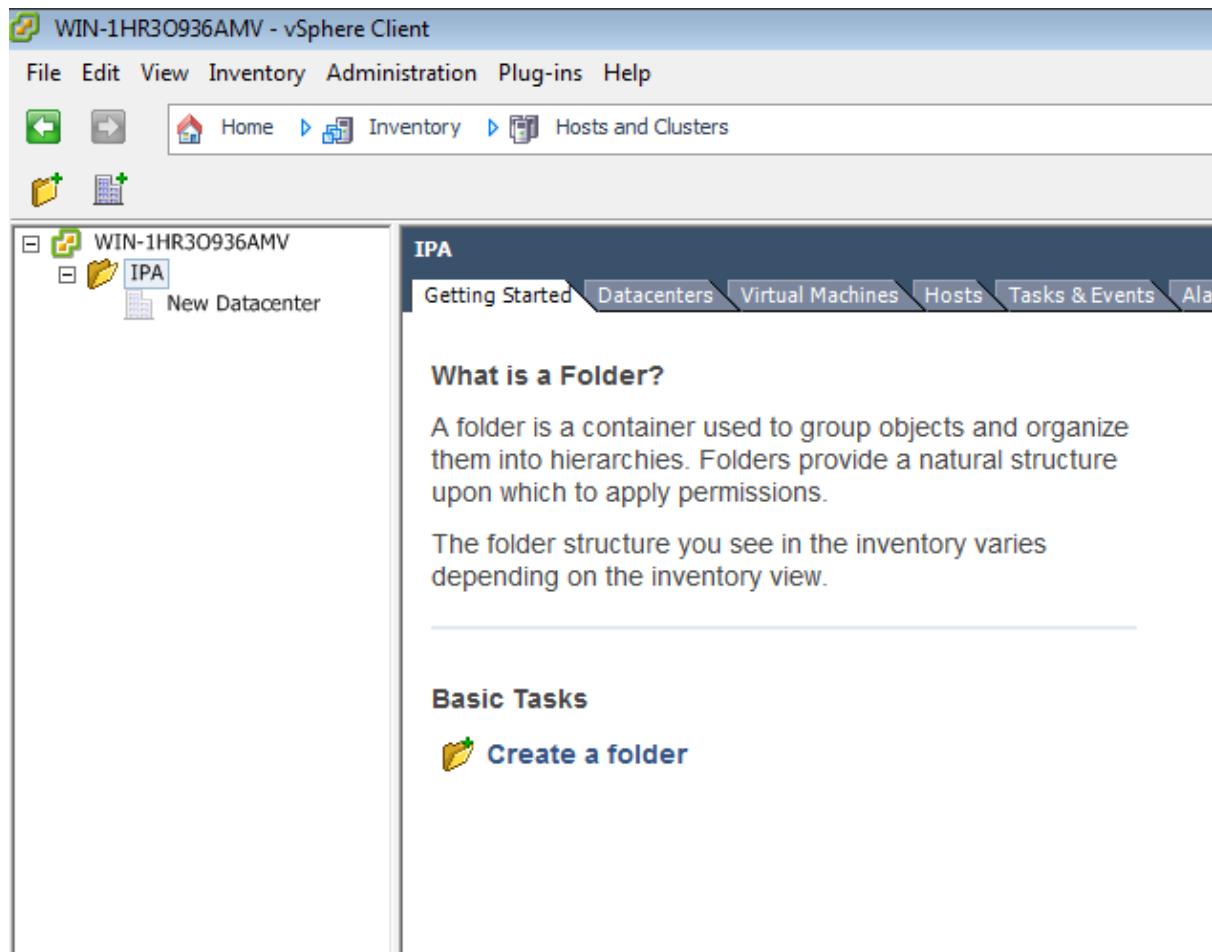
Step 1:

Connect to the vCenter server. Click New Folder.



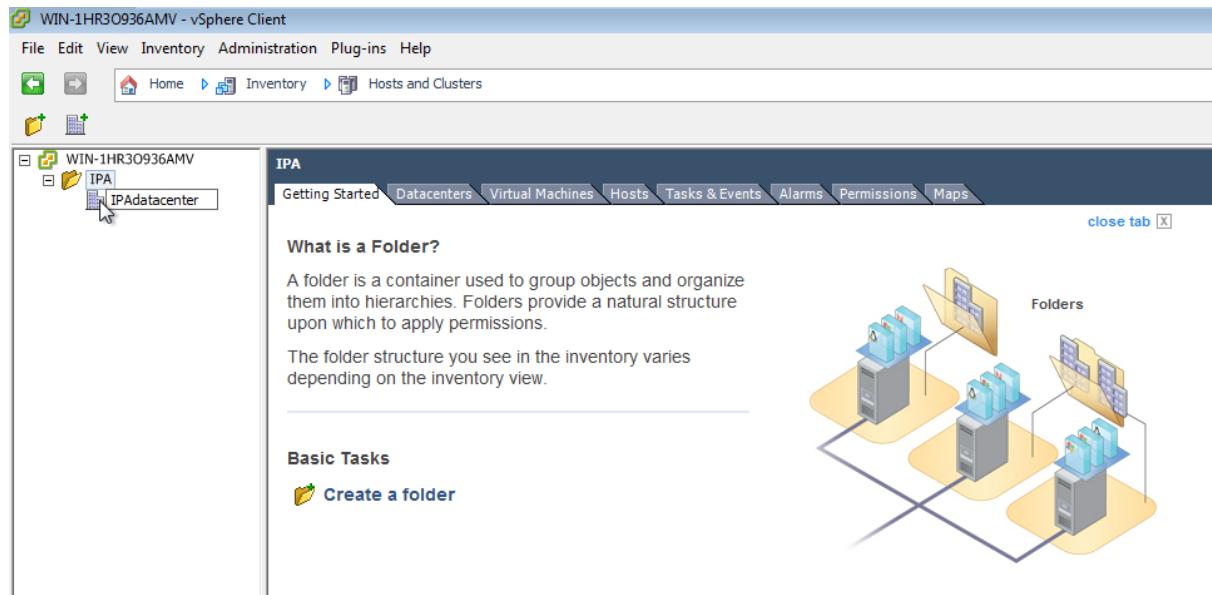
Step 2:

After the new folder has been created, rename it to the organisation. For the assignment example, the IPA organization was used.



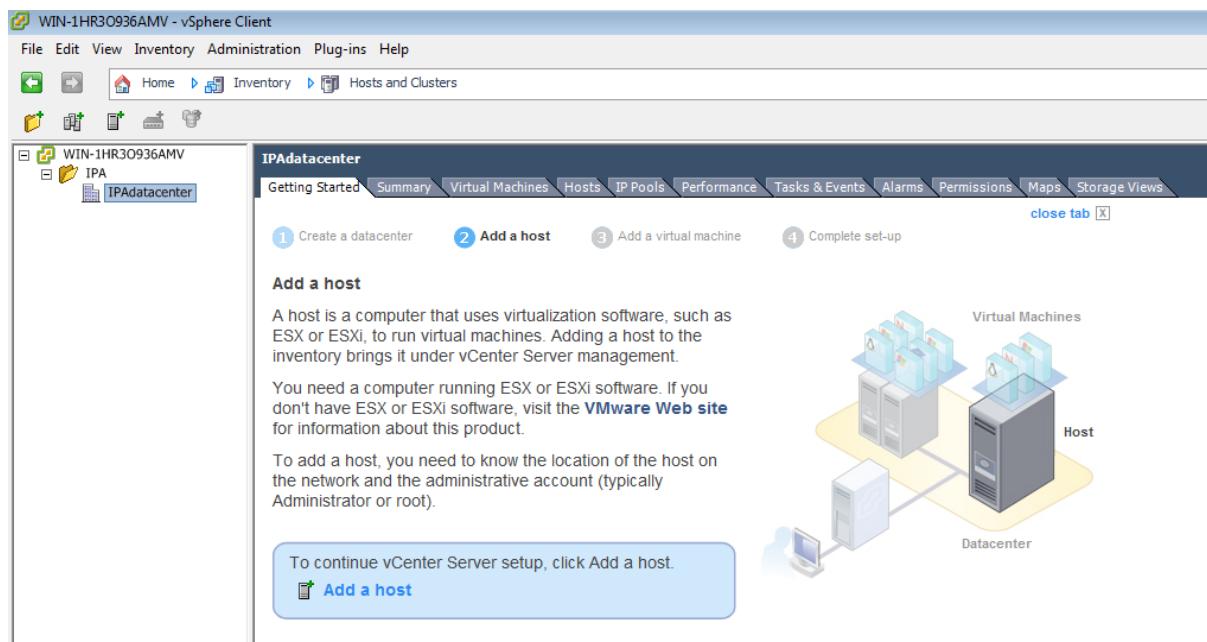
Step 3:

Click new datacenter, then rename the new datacenter, for the assignment the name "Ipadatacenter" was chosen.



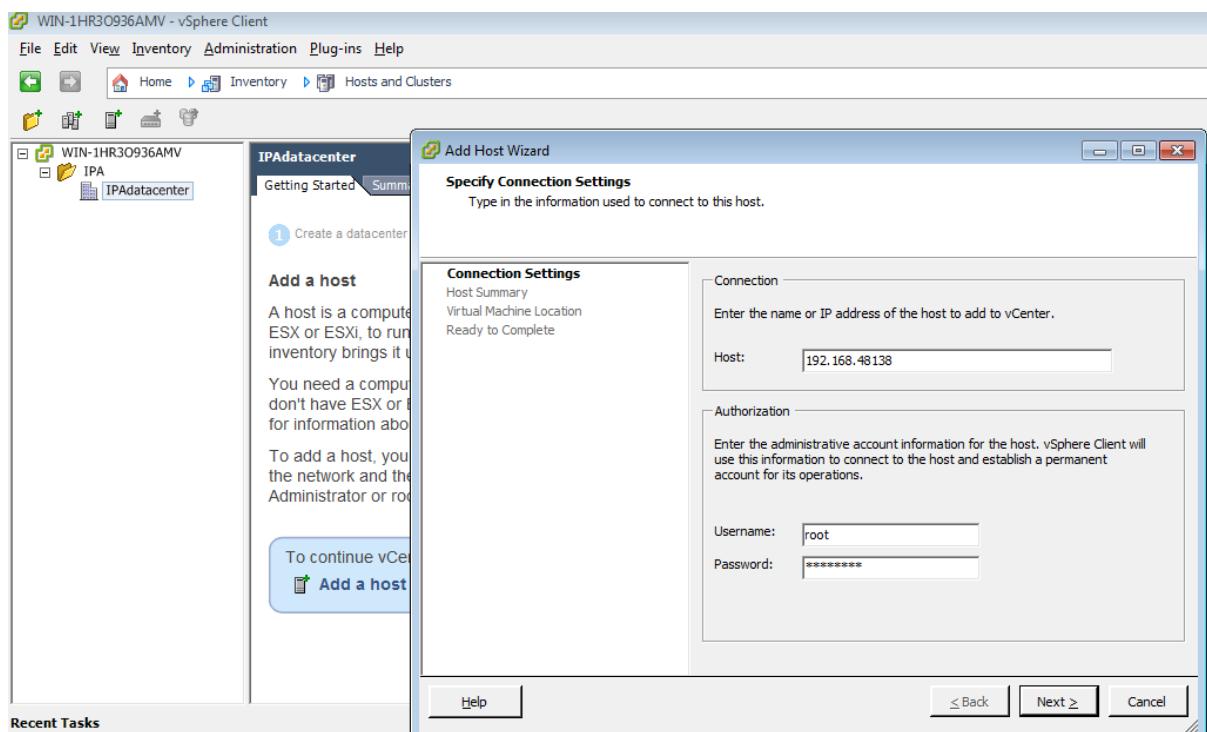
Step 4:

When the datacenter has been created, click, "add a host".



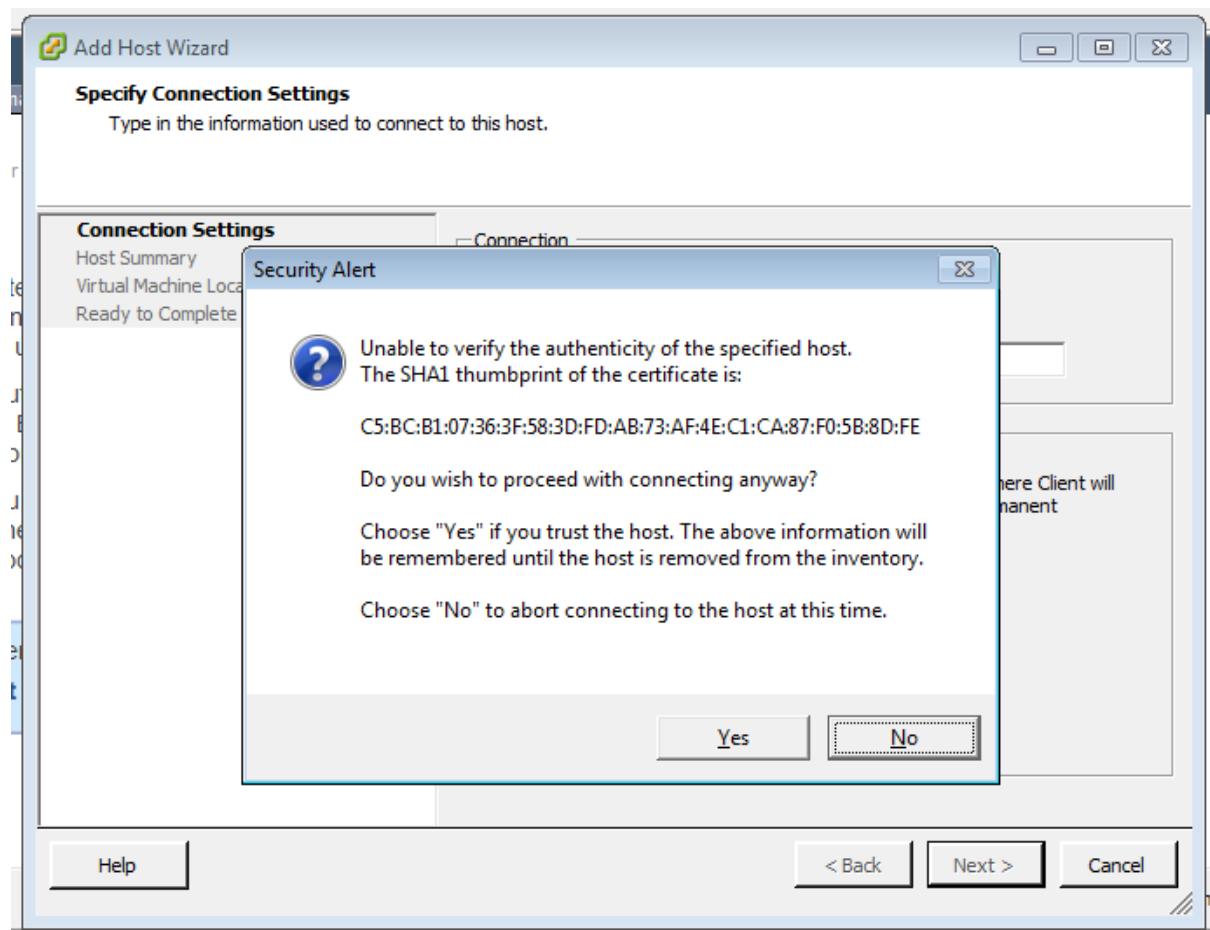
Step 5:

When the Add a host wizard opens, enter the Host address, username and password. Then click Next.



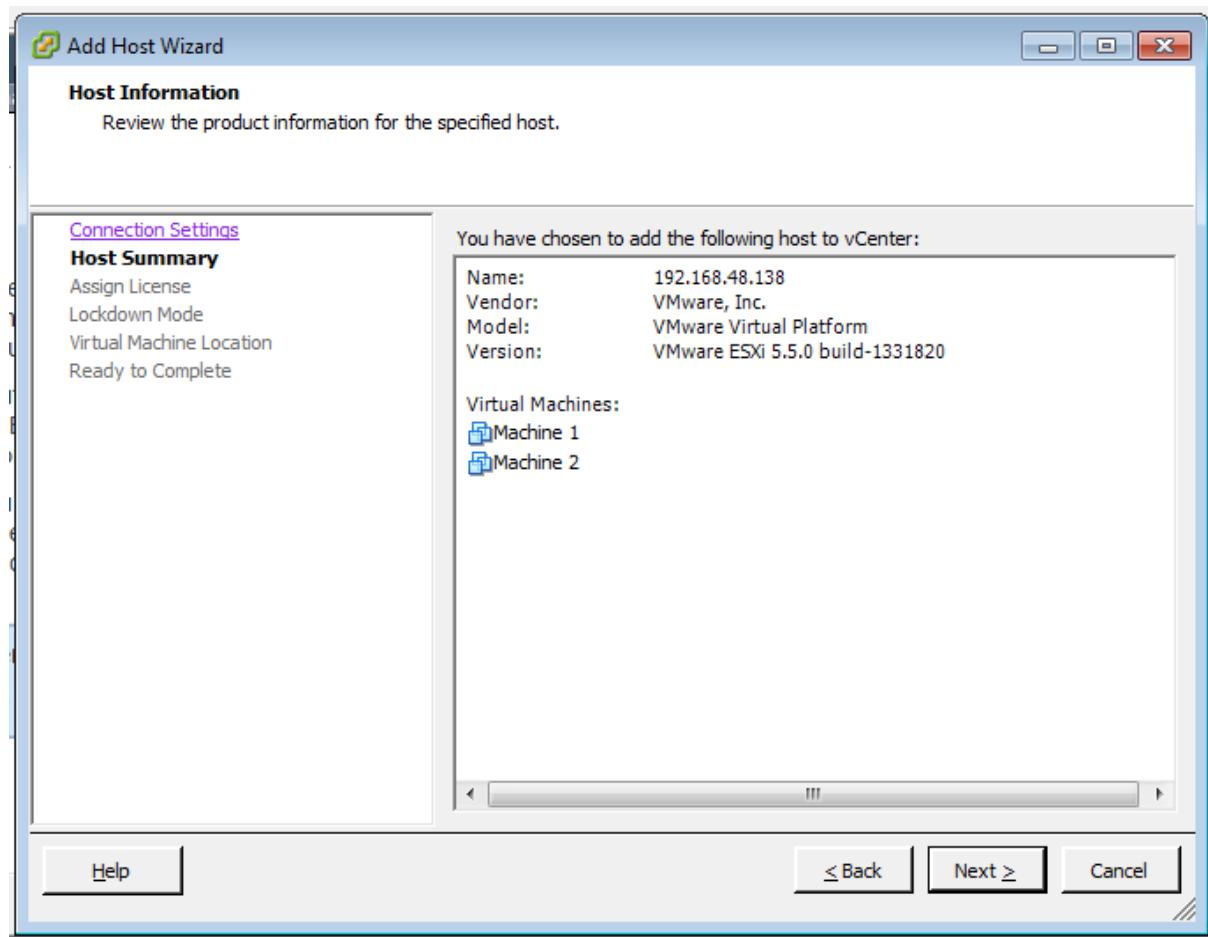
Step 6:

Select yes that the host is trusted.



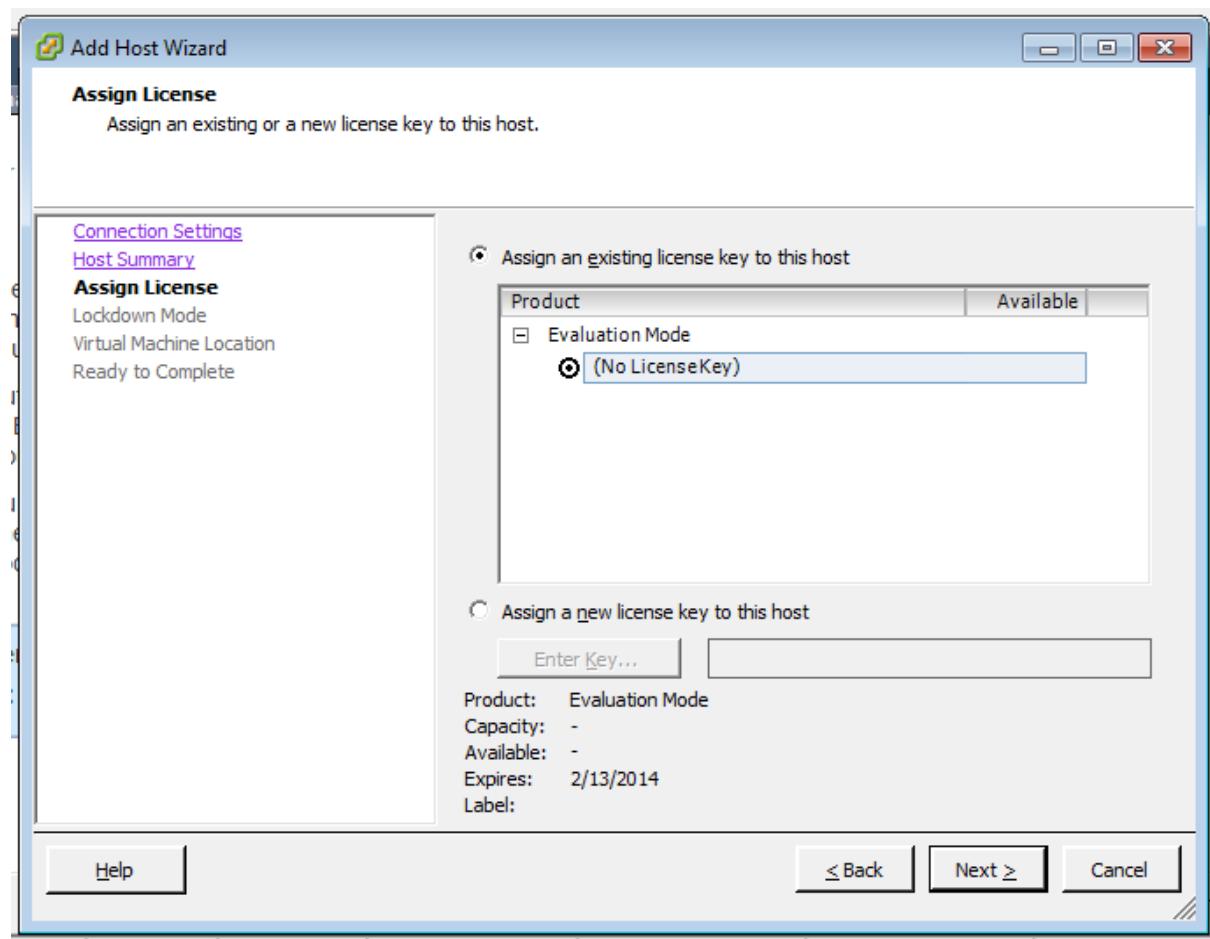
Step 7:

The next window will give a summary of the host.



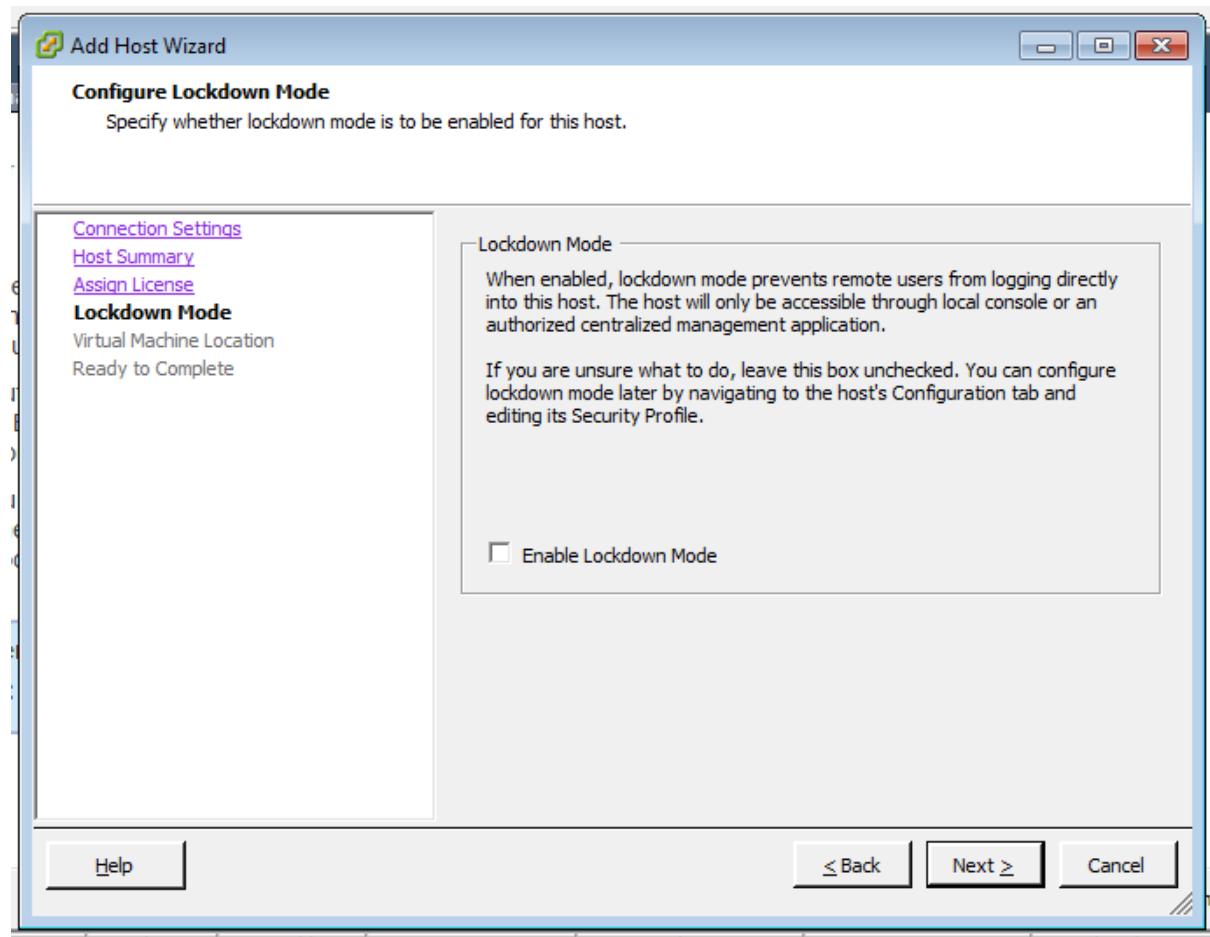
Step 8:

Enter an existing license key for the host, then click Next.



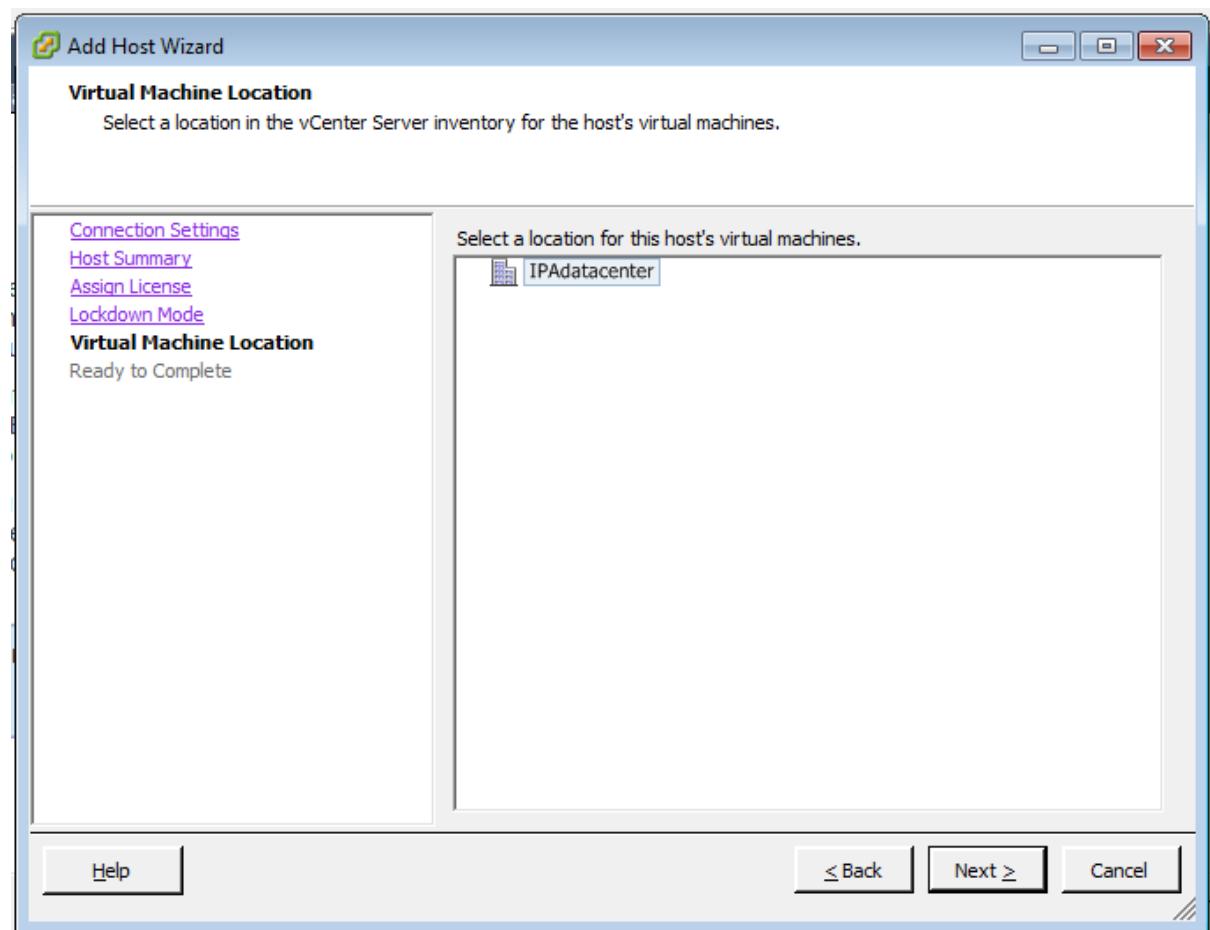
Step 9:

Do not enable Lockdown mode, then click Next.



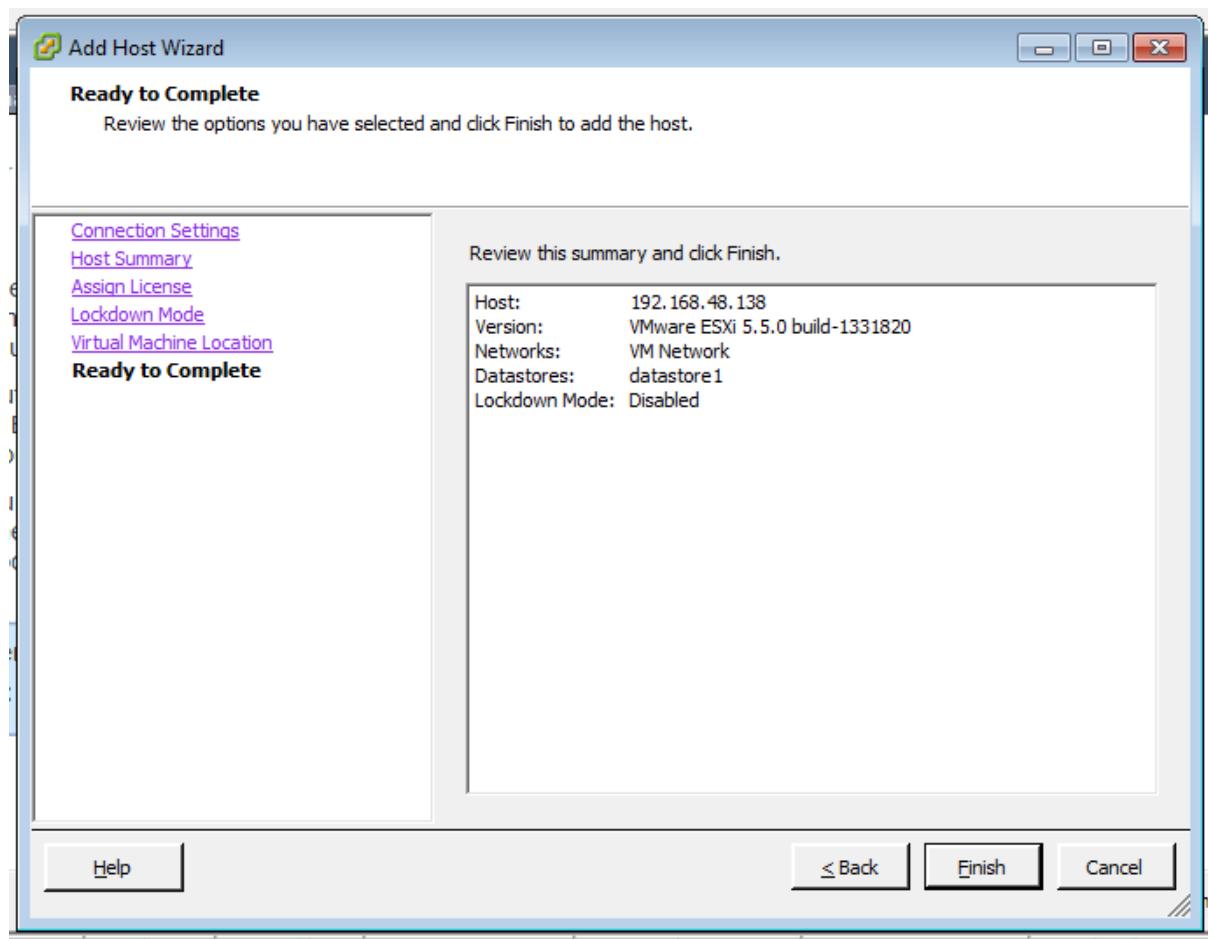
Step 10:

Select a location for the hosts virtual machines, then click Next.



Step 11:

Once you are satisfied with the settings, click Finish.



Step 12:

The host is now in the process of being added.

Name	Target	Status	Details	Initiated by	vCenter Server	Requested Start Time	Start Time	Completed Time
Add standalone host	IPAdatcenter	In Progress		VMware vSphere	WIN-1HR3O936AMV	12/18/2013 11:40:55	12/18/2013 11:40:55	

Step 13:

When the host has finished adding, the virtual machines associated with the host will be able to be managed. A summary will be displayed as below of the hosts and associated virtual machines.

The screenshot shows the vSphere Client interface with the following details:

- Top Bar:** File, Edit, View, Inventory, Administration, Plug-ins, Help.
- Breadcrumb:** Home > Inventory > Hosts and Clusters.
- Left Sidebar:** Shows a tree view of inventory objects under "WIN-1HR3O936AMV".
 - WIN-1HR3O936AMV
 - IPA
 - IPDatacenter
 - 192.168.48.138
 - Machine 1
 - Machine 2
 - 192.168.48.140
 - winsvr08
- IPDatacenter Tab:** Getting Started, Summary, Virtual Machines, Hosts, IP Pools, Performance, Tasks & Events, Alarms, Permissions, Maps, Storage Views, close tab.
- Content Area:**
 - What is a Datacenter?** A datacenter is the primary container of inventory objects such as hosts and virtual machines. From the datacenter, you can add and organize inventory objects. Typically, you add hosts, folders, and clusters to a datacenter.
 - vCenter Server can contain multiple datacenters. Large companies might use multiple datacenters to represent organizational units in their enterprise.
 - Inventory objects can interact within datacenters, but interaction across datacenters is limited. For example, you can move a virtual machine with vMotion technology across hosts within a datacenter but not to a host in another datacenter.
- Basic Tasks:**
 - Add a host
 - Create a cluster
 - Create a folder
- Explore Further:** Learn more about datacenters.

Task A.4

Using 'Machine 2' created in Task A.2 or another remotely connected machine outline the process of creating, managing and reverting to a snapshot. Provide an example of why a user may use snapshots and outline the benefits they would serve in this purpose.

Snapshot

VMware state that, the snapshot feature is most useful when you want to preserve the state of the virtual machine so you can return to the same state repeatedly. To simply save the current state of your virtual machine, then pick up work later with the virtual machine in the same state it was when you stopped. You can take a snapshot of a virtual machine at any time and revert to that snapshot at any time. You can take a snapshot while a virtual machine is powered on, powered off or suspended. A snapshot preserves the virtual machine just as it was when you took the snapshot the state of the data on all the virtual machine's disks and whether the virtual machine was powered on, powered off or suspended¹⁰.

One precaution of using a snapshot is; when deleting multiple snapshots, there must be ample disk space on the virtual machine file storage; best practices recommend at least 25% of the VM's total disk size. This is because all of the snapshots grow in succession before they are deleted. When snapshots are deleted, they are first merged into the previous snapshot and then into the original disk file before they are actually deleted. If the extra disk space is not available to delete snapshots in the usual manner, an option is to delete snapshots one by one. But this method can be tedious¹¹.

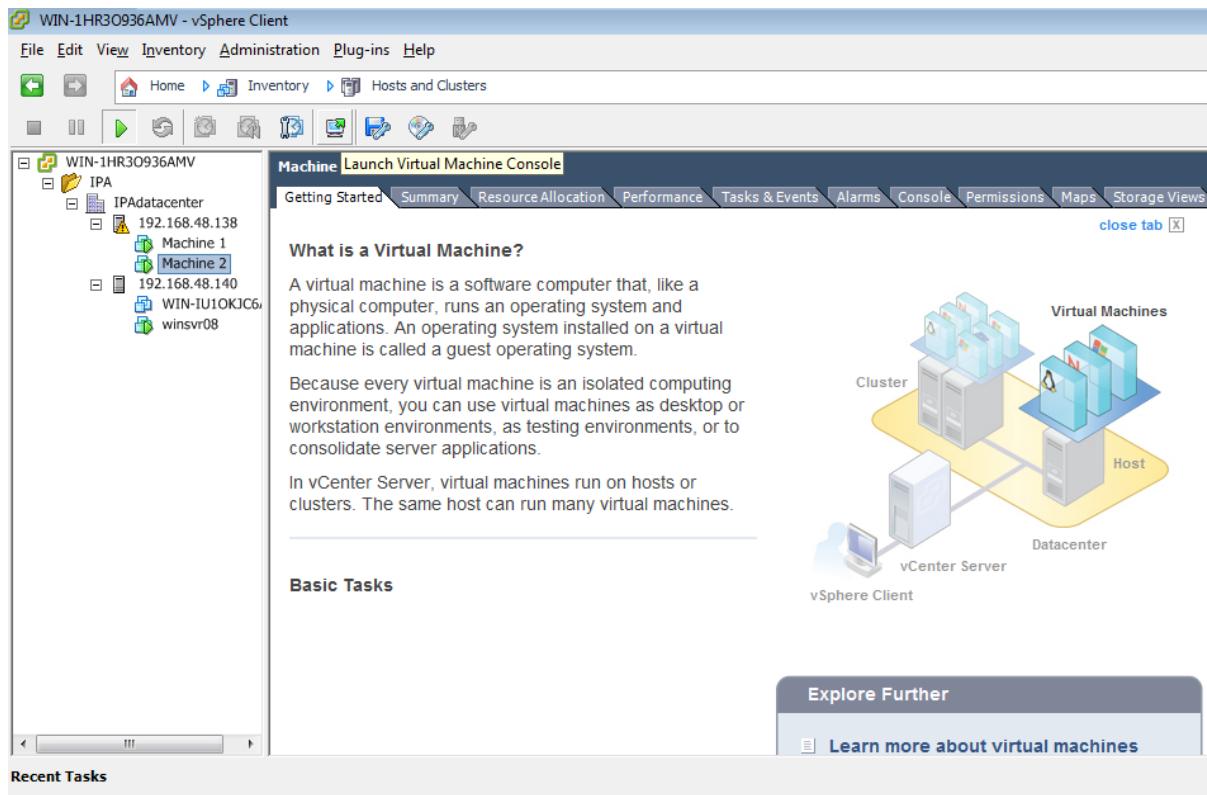
An example of the use of a snapshot is, when an operating system is just installed, create a snapshot of the fresh install so that when installing other software which may cause the machine to crash or freeze, you have a roll back point to go back to and start again, instead of reinstalling the operating system.

Step 1:

Power on Machine 2. Then, launch virtual machine console.

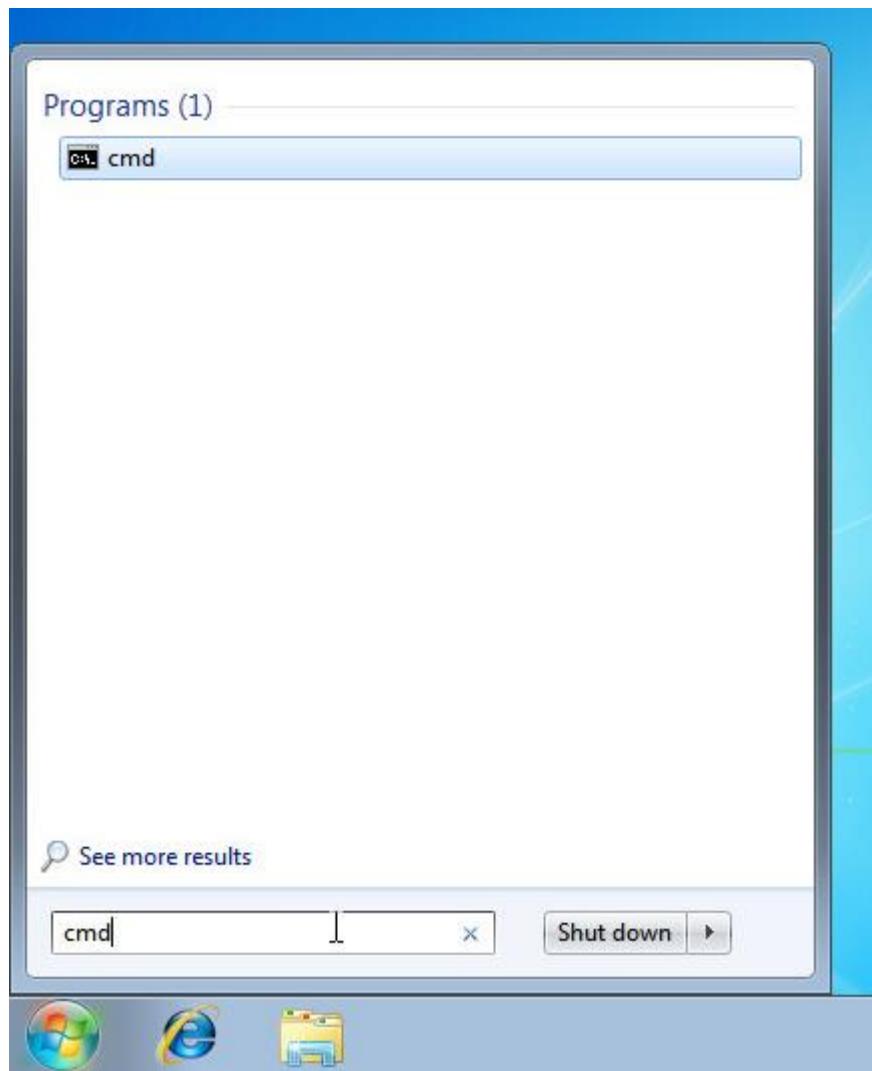
¹⁰ VMware (2013). VMware Workstation 4. VMware. Retrieved December 20th, 2013, from https://www.vmware.com/support/ws4/doc/preserve_snapshot_ws.html

¹¹ Drake, H (2008). Virtual Machine and VMware Snapshot Guide. TechTarget. Retrieved December 20th, 2013, from <http://searchservervirtualization.techtarget.com/tip/Virtual-machine-and-VMware-snapshot-guide>



Step 2:

Click start, then type “CMD” in the search box then press enter on the keyboard.



Step 3:

When the command prompt opens, type “ipconfig” then press enter. This is command to retrieve the current network addresses of the machine.

```
C:\Windows\system32\cmd.exe
C:\Users\dfoy>ipconfig
Windows IP Configuration

Ethernet adapter Local Area Connection:

  Connection-specific DNS Suffix . : localdomain
  Link-local IPv6 Address . . . . . : fe80::d59a:e0cc:f5e1:4c4a%11
  IPv4 Address . . . . . : 192.168.48.141
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 192.168.48.2

Tunnel adapter isatap.localdomain:

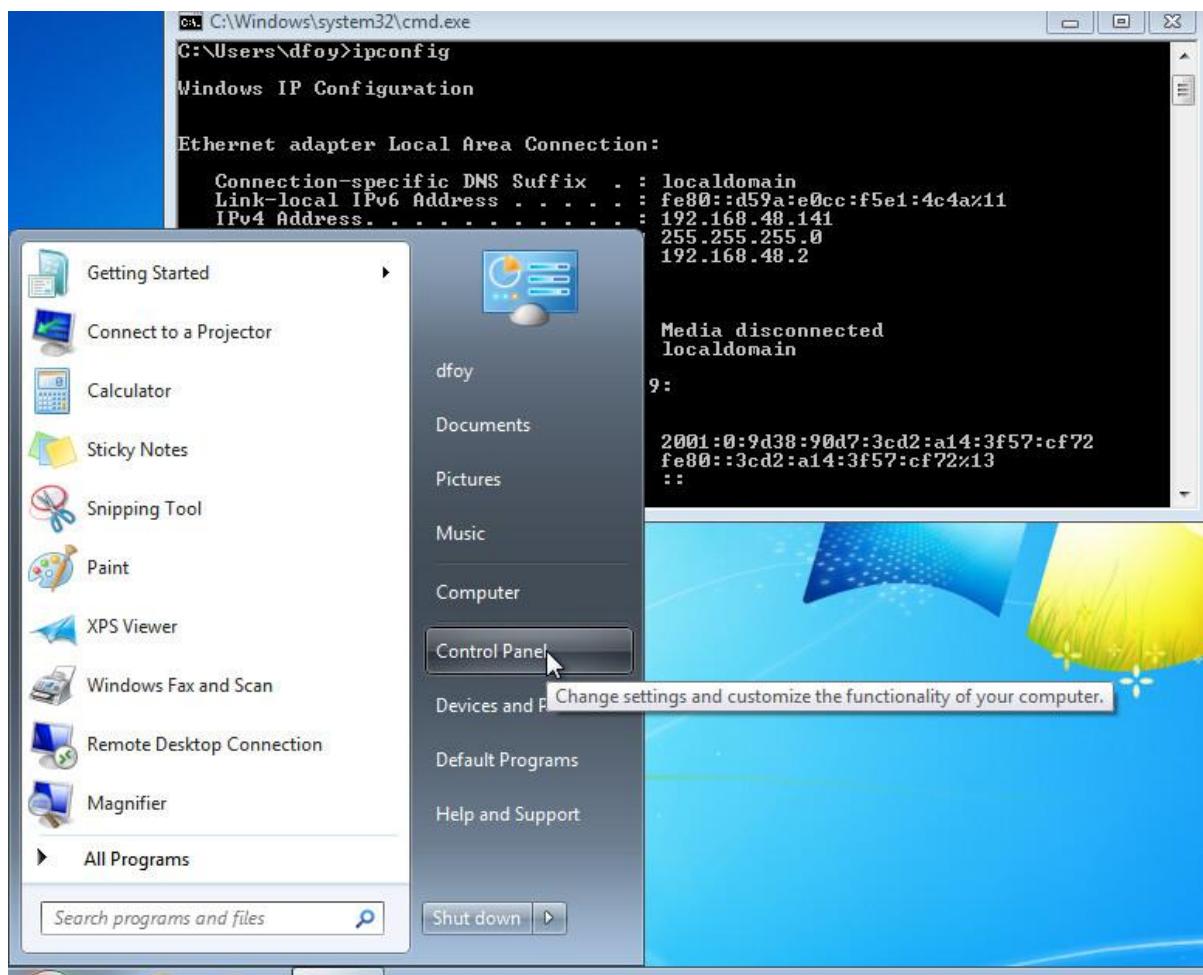
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . : localdomain

Tunnel adapter Local Area Connection* 9:

  Connection-specific DNS Suffix . . .
  IPv6 Address . . . . . : 2001:0:9d38:90d7:3cd2:a14:3f57:cf72
  Link-local IPv6 Address . . . . . : fe80::3cd2:a14:3f57:cf72%13
  Default Gateway . . . . . :
```

Step 4:

After step 3 has successfully been carried out, click start, then click control panel.



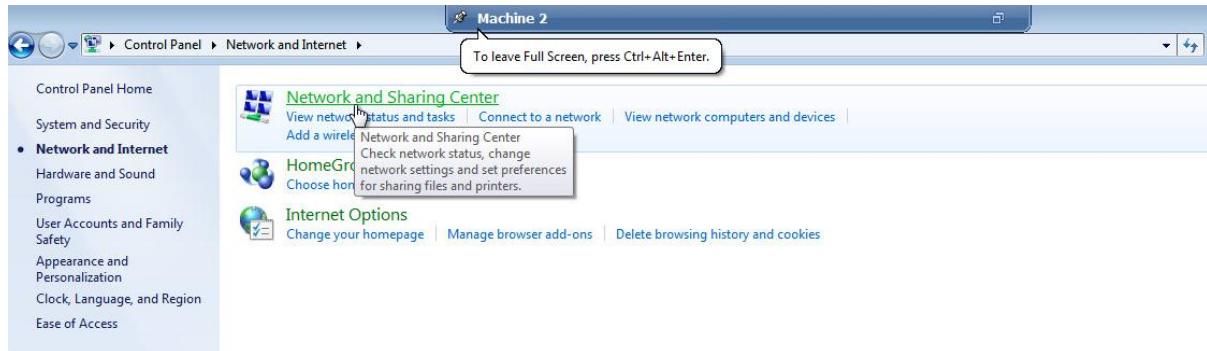
Step 5:

When the control panel has opened, click network and internet.



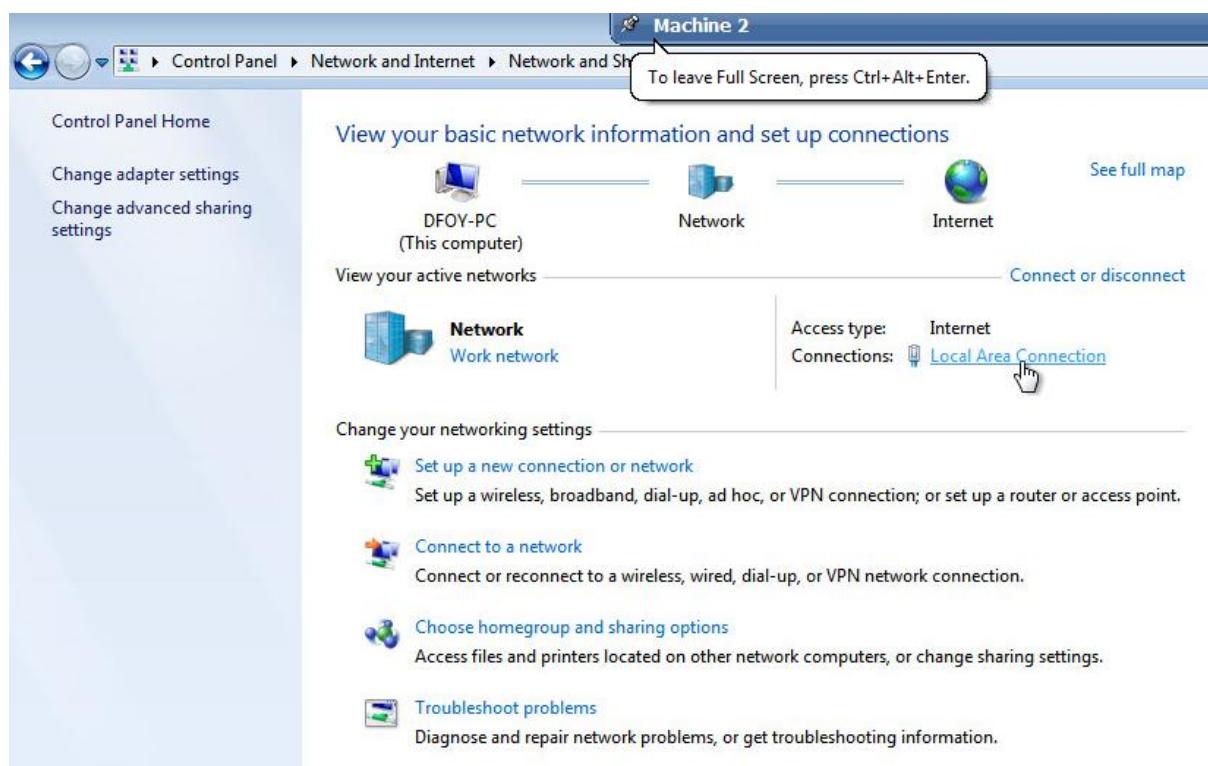
Step 6:

When the Network and Internet window has opened, click "Network and Sharing Center".



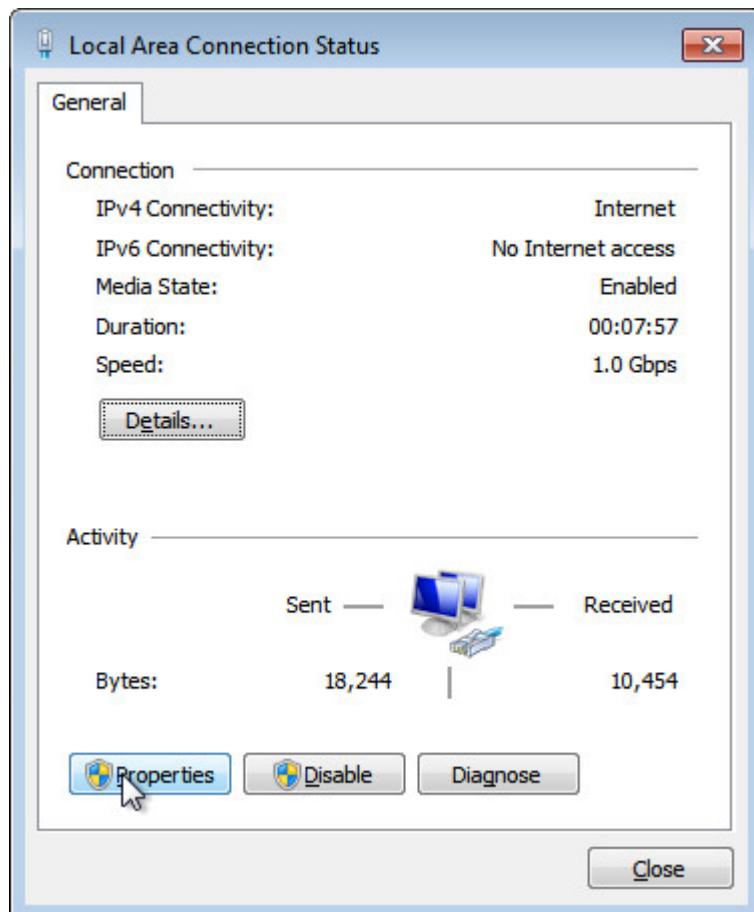
Step 7:

Click Local Area Connection.



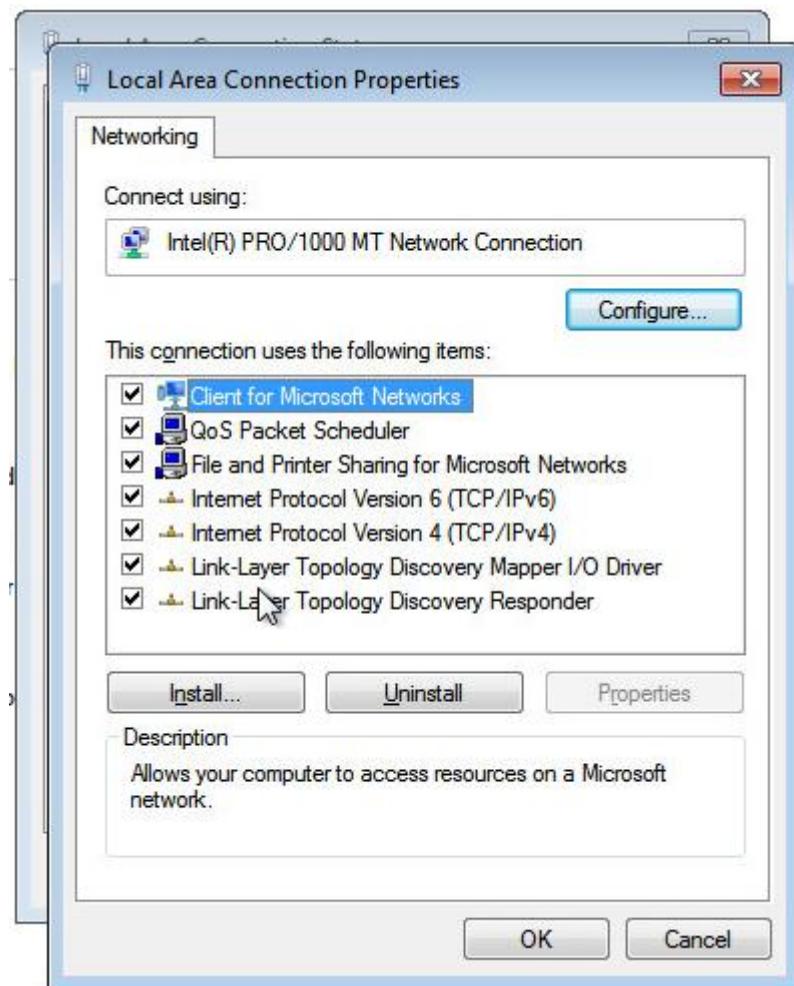
Step 8:

From the Local Area Connection Status, click Properties.



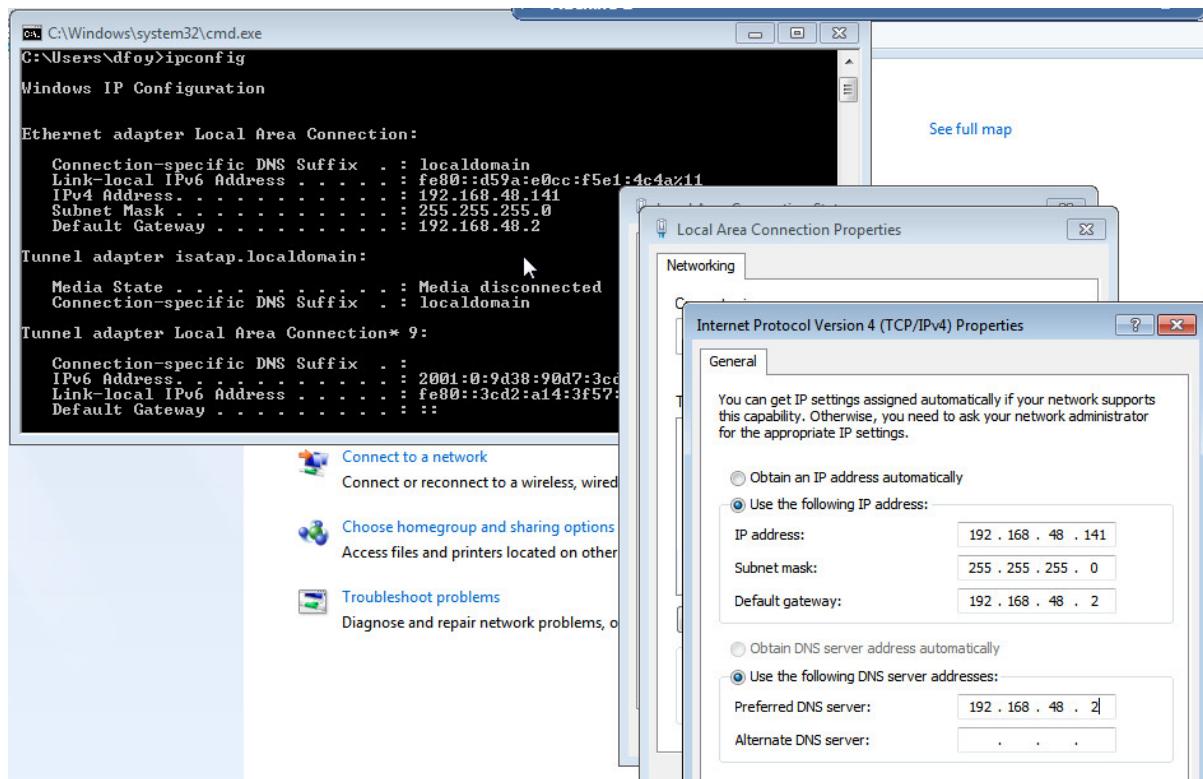
Step 9:

Double-click “Internet Protocol Version 4 (TCP/IPv4)”.



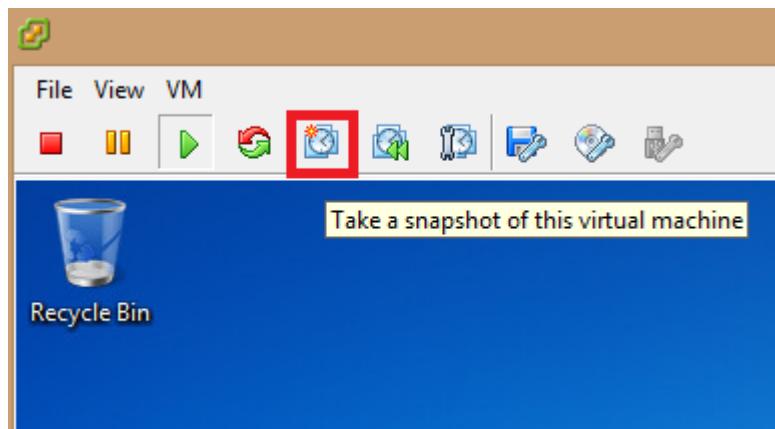
Step 10:

Select “use the following IP address”. Then enter the details which was found in step 3 of the command prompt. Then click ok.



Step 11:

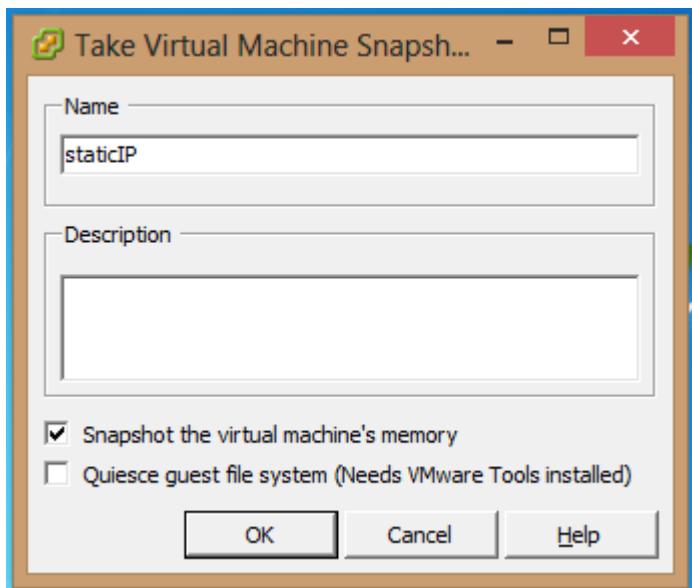
Click the button outlined in red to create a new snapshot of the virtual machine.



Step 12:

Enter a memorable name and description to identify the snapshot.

The name chosen for this step as an example was "staticIP". Then click ok.



Step 13:

The status of the creation of the snapshot is displayed near the bottom of the vSphere client.

Recent Tasks							
Name	Target	Status	Details	Initiated by	Requested Start Ti...	Start Time	Completed Time
Create virtual machine snapshot	Machine 2	14%	<div style="width: 14%;"></div>	root	18/12/2013 23:52:39	18/12/2013 23:52:39	

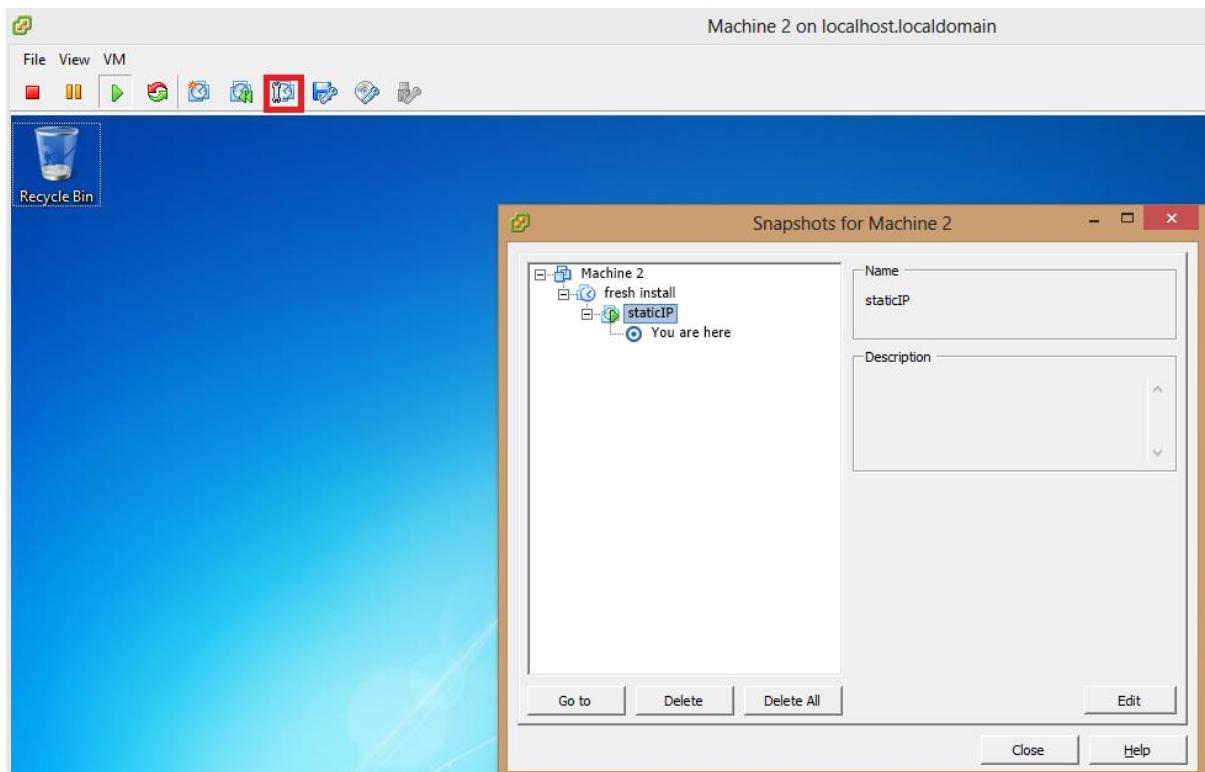
Step 14:

When the snapshot has been successfully completed it will be displayed as below:

Recent Tasks							
Name	Target	Status	Details	Initiated by	Requested Start Ti...	Start Time	Completed Time
Create virtual machine snapshot	Machine 2	Completed	<div style="width: 100%;"></div>	root	18/12/2013 23:52:39	18/12/2013 23:52:39	19/12/2013 00:01:57

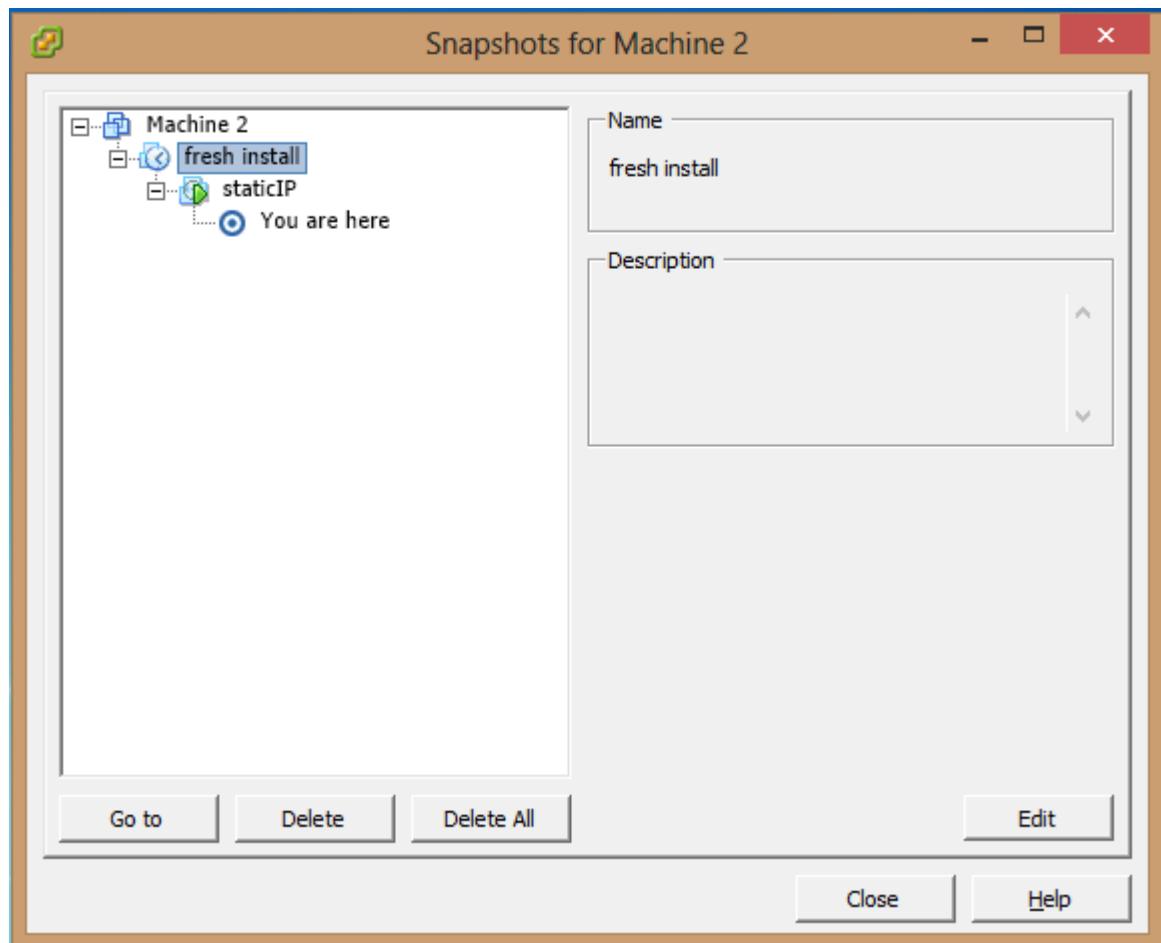
Step 15:

Click the button outlined in red, then open the snapshot manager.



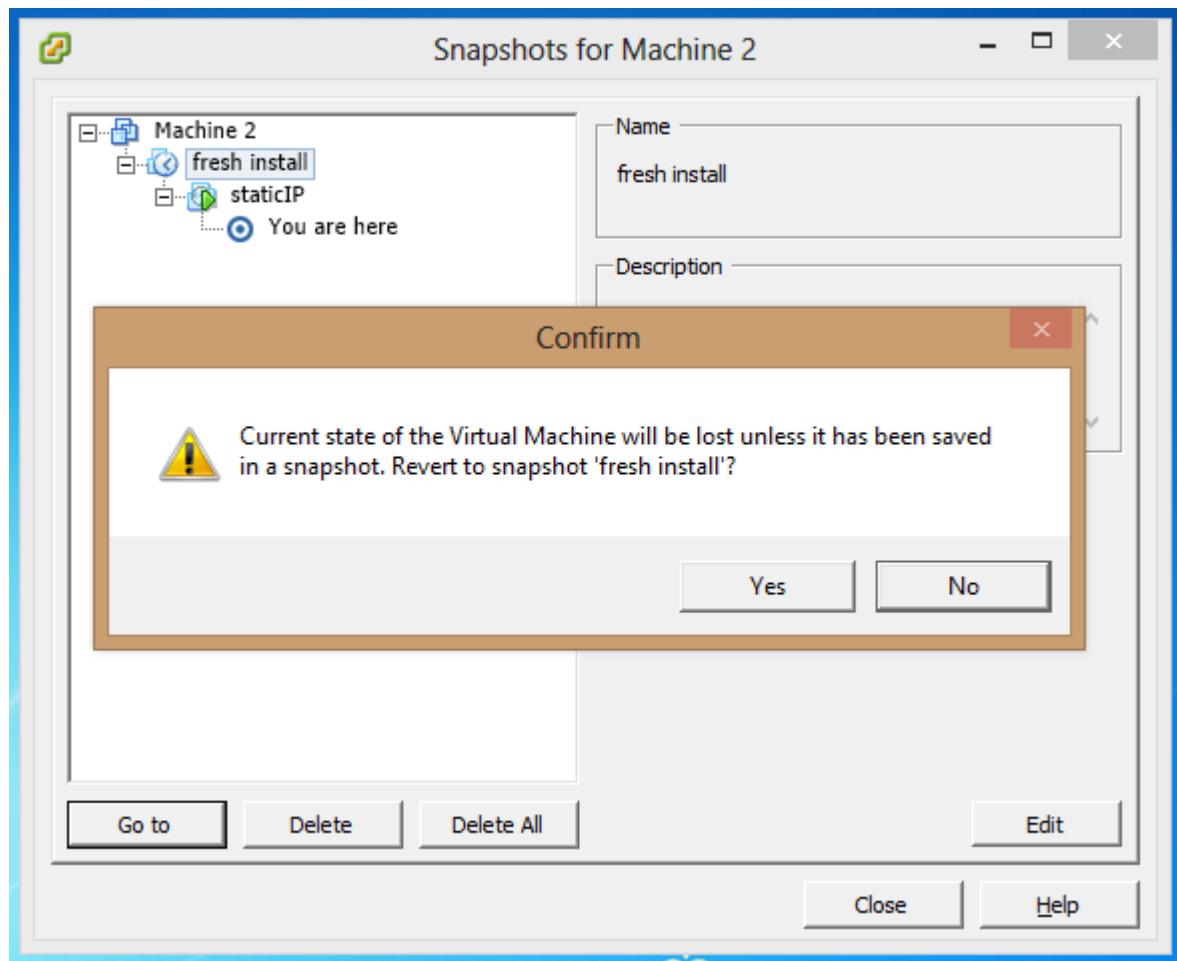
Step 16:

Select the snapshot called “fresh install”, this was a snapshot which was made using the same process, when windows was first installed. Then click Go To.



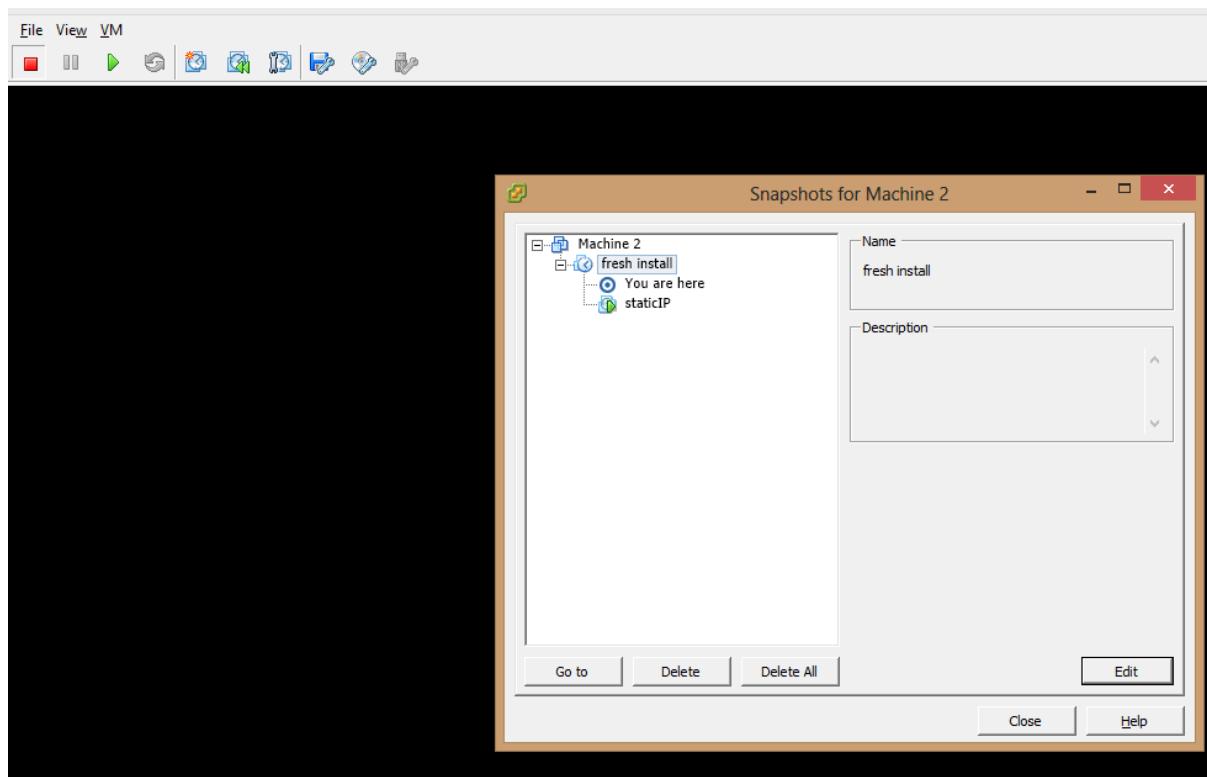
Step 17:

A warning pops up stating that "current state of the virtual machine will be lost unless it has been saved in a snapshot. Revert to snapshot 'fresh install'?". Click yes in this window.



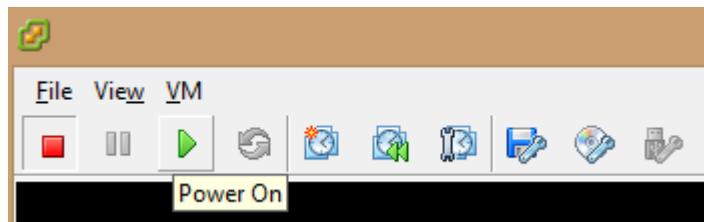
Step 18:

The virtual machine has now powered off, click to close the snapshot manager.



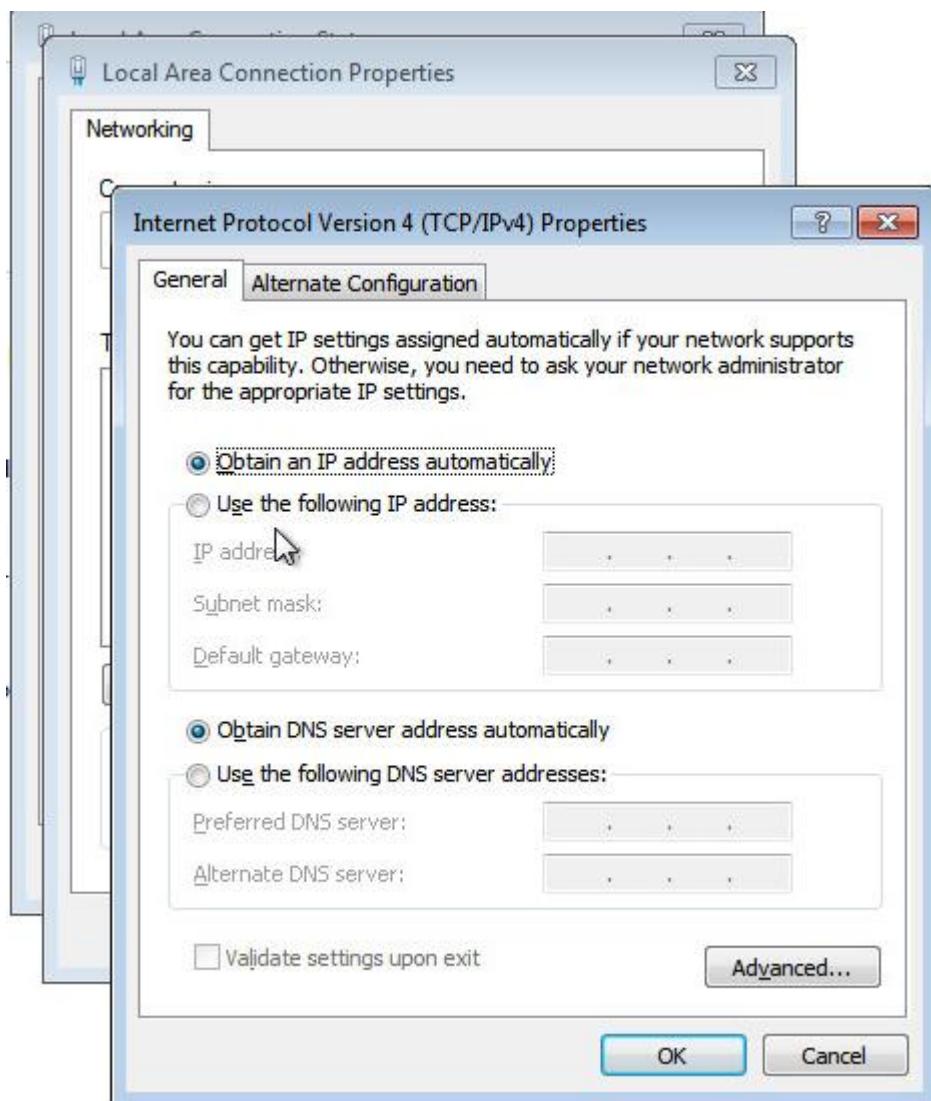
Step 19:

Now, power on the virtual machine.



Step 20:

When the machine has fully powered on, open the IPv4 settings for the Local Area Connection, repeating steps 4 to 10. You will now see after reverting to the old snapshot, the settings have been returned to the previous original setting after the fresh install.



Task A.5

You are required to outline the benefits of creating a Gold Image. Create a new Virtual Machine with Windows 2008 installed to include service packs and bug fixes. Create and outline the process of creating a Template of the virtual machine.

Gold Image

A golden image is a template for a virtual machine, virtual desktop, server or hard disk drive. A golden image may also be referred to as a clone image, master image or base image. To create a golden image, an administrator first sets up the computing environment exactly the way it is needed and then saves the disk image as a pattern for making more copies. The use of golden images can save time and ensure consistency by eliminating the need for repetitive configuration changes and performance tweaks¹².

Template

A template is defined as, a perfect, model copy of a virtual machine from which an administrator can clone, convert or deploy more virtual machines¹³.

A VMware template includes the virtual machine's virtual disks and settings from its .vmx configuration file, managed with permissions. Templates save time and avoid errors when configuring settings and other choices to create new Windows or Linux server virtual machines. They can also be used as long-term in-place backups of virtual machines, and to ensure consistent virtual machines are created and deployed across a company. A VMware template cannot be operated without reverting it to a virtual machine¹⁴.

Step 1:

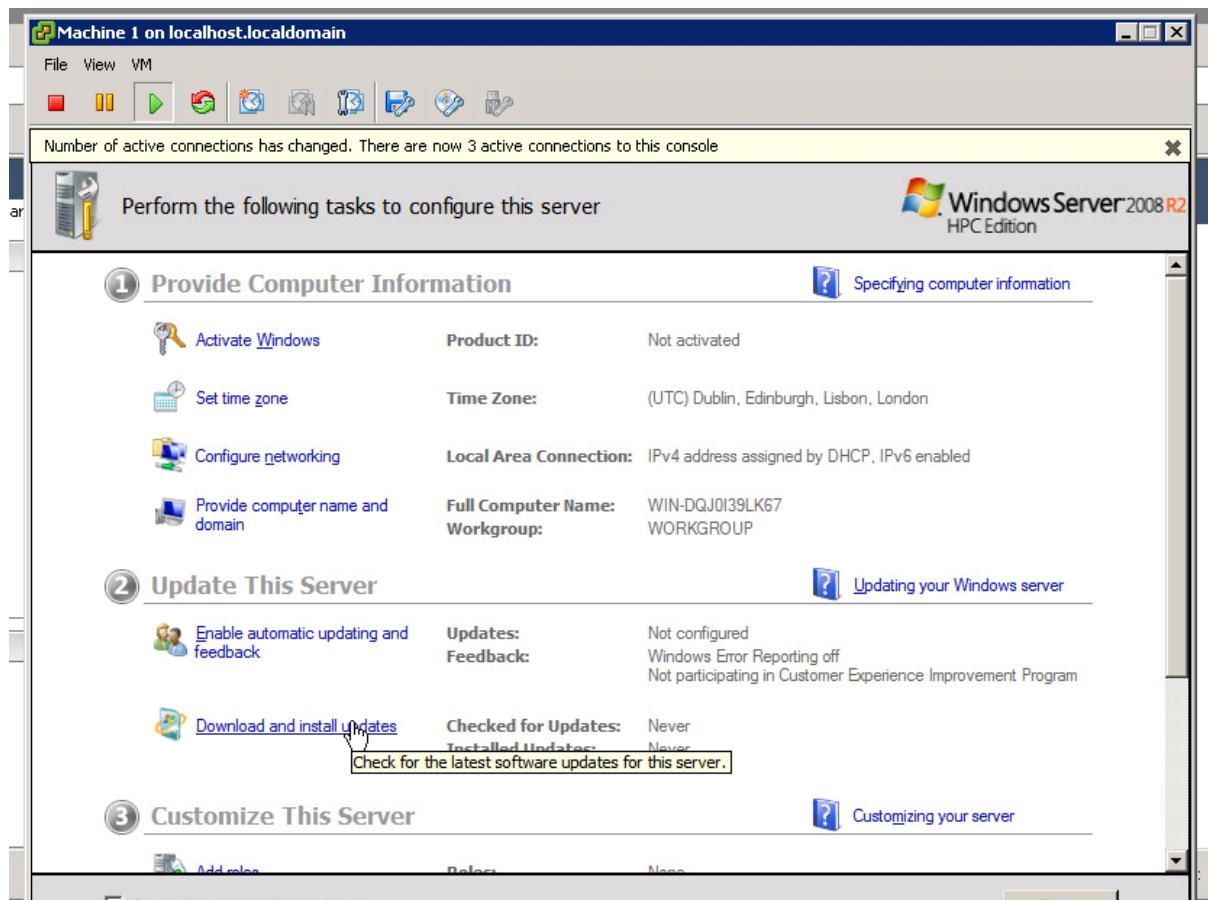
Using slides 1 to 26 in task 2 machine 1, create a new Windows Server R2 virtual Machine.

When the machine has successfully installed and booted up, click “Download and Install Updates” from the “perform the following tasks to configure this server” menu as displayed below:

¹² Martin, N (2012). Golden Image. TechTarget. Retrieved December 20th, 2013, from <http://searchservervirtualization.techtarget.com/definition/golden-image>.

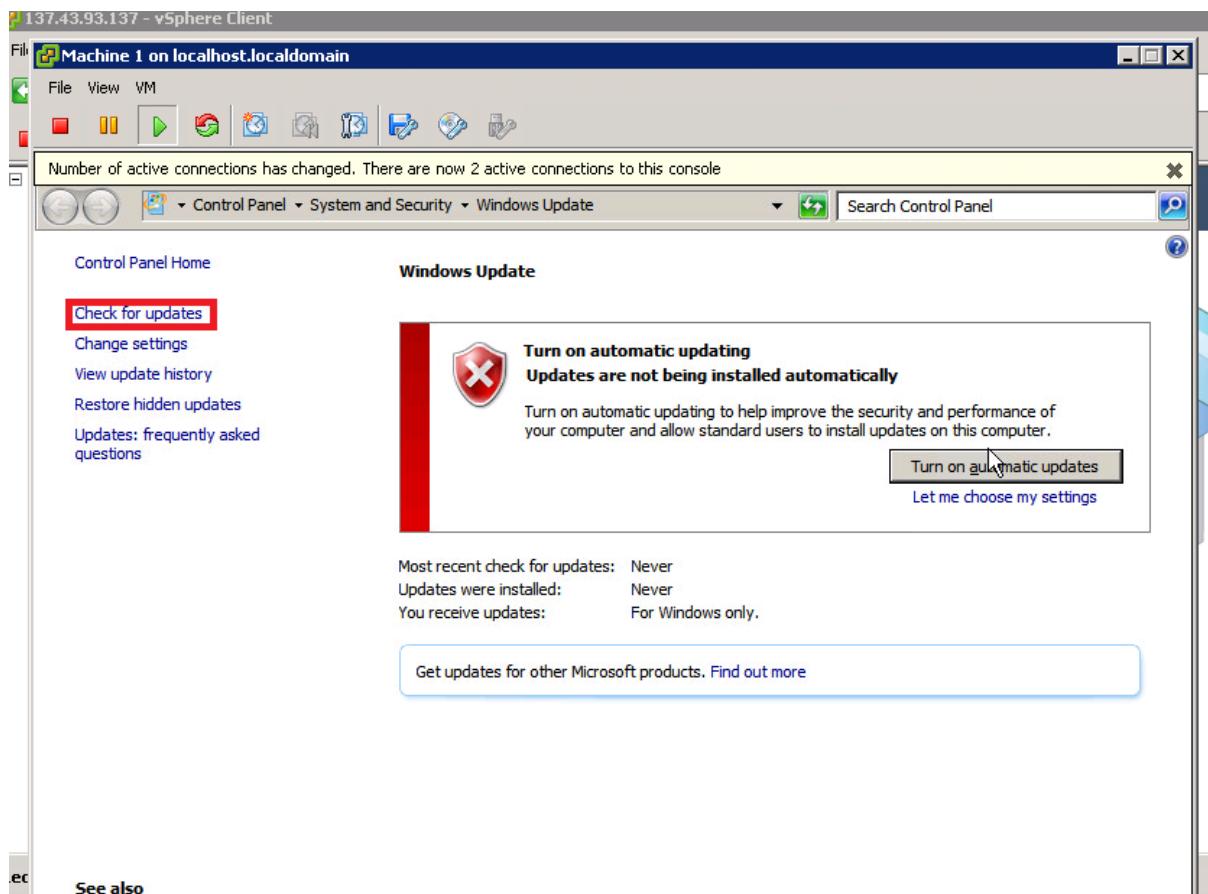
¹³ Rouse, M (2013). VMware Template. TechTarget. Retrieved Decemebr 20th, 2013, from <http://searchvmware.techtarget.com/definition/VMware-template>

¹⁴ Ibid.



Step 2:

Click "check for updates" outlined in the red box displayed below:



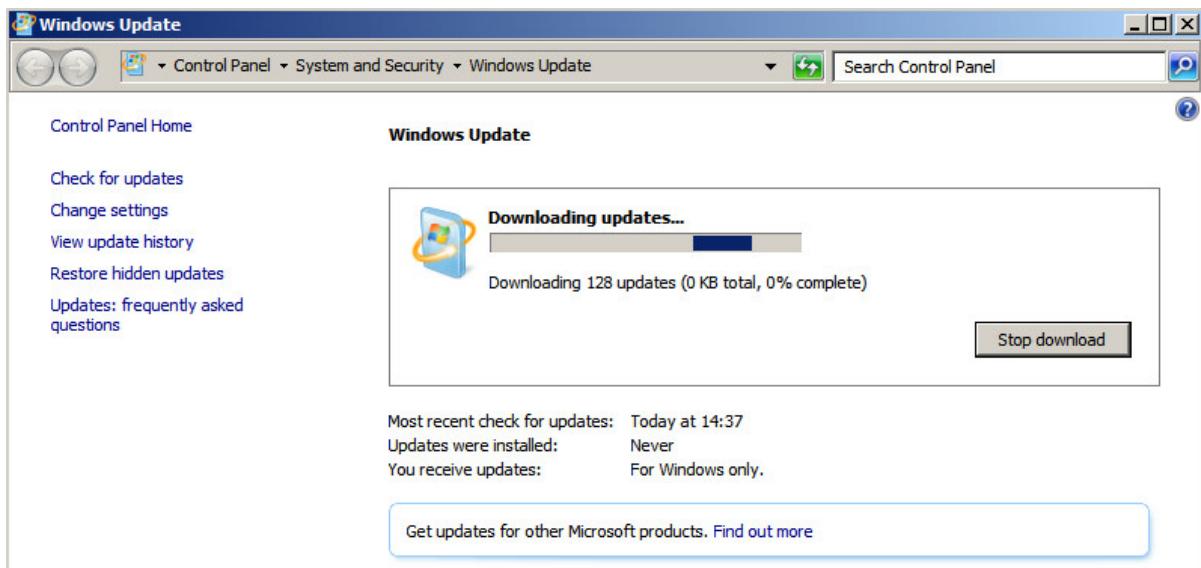
Step 3:

When windows update completes checking for updates, click install updates. These updates will include the latest bug fixes and service packs.



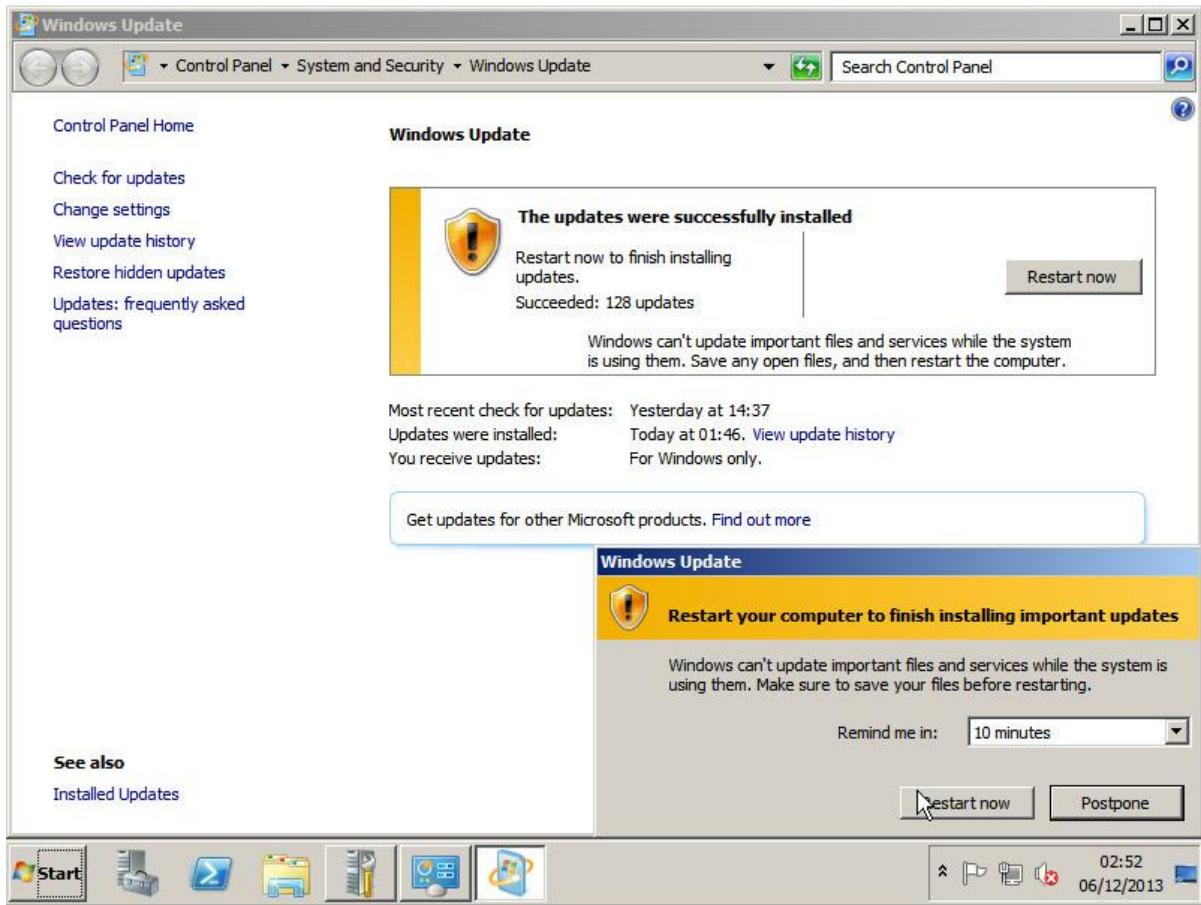
Step 4:

After clicking Install Updates, the updates will now begin downloading.



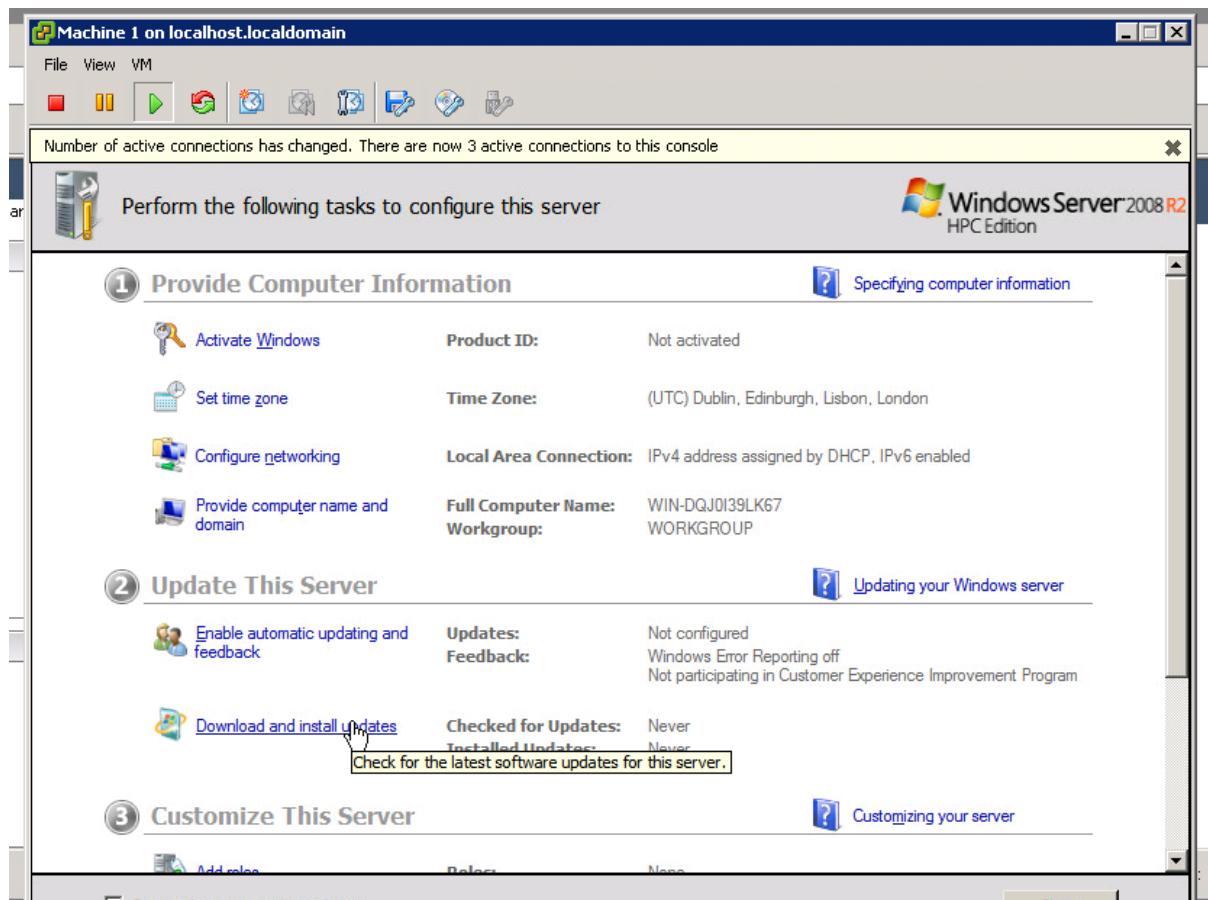
Step 5:

After the updates have finished downloading, click “restart now” to install the updates and service packs.



Step 6:

After the server restarts and loads click “Activate Windows” from the “perform the following tasks to configure this server” menu as displayed below:



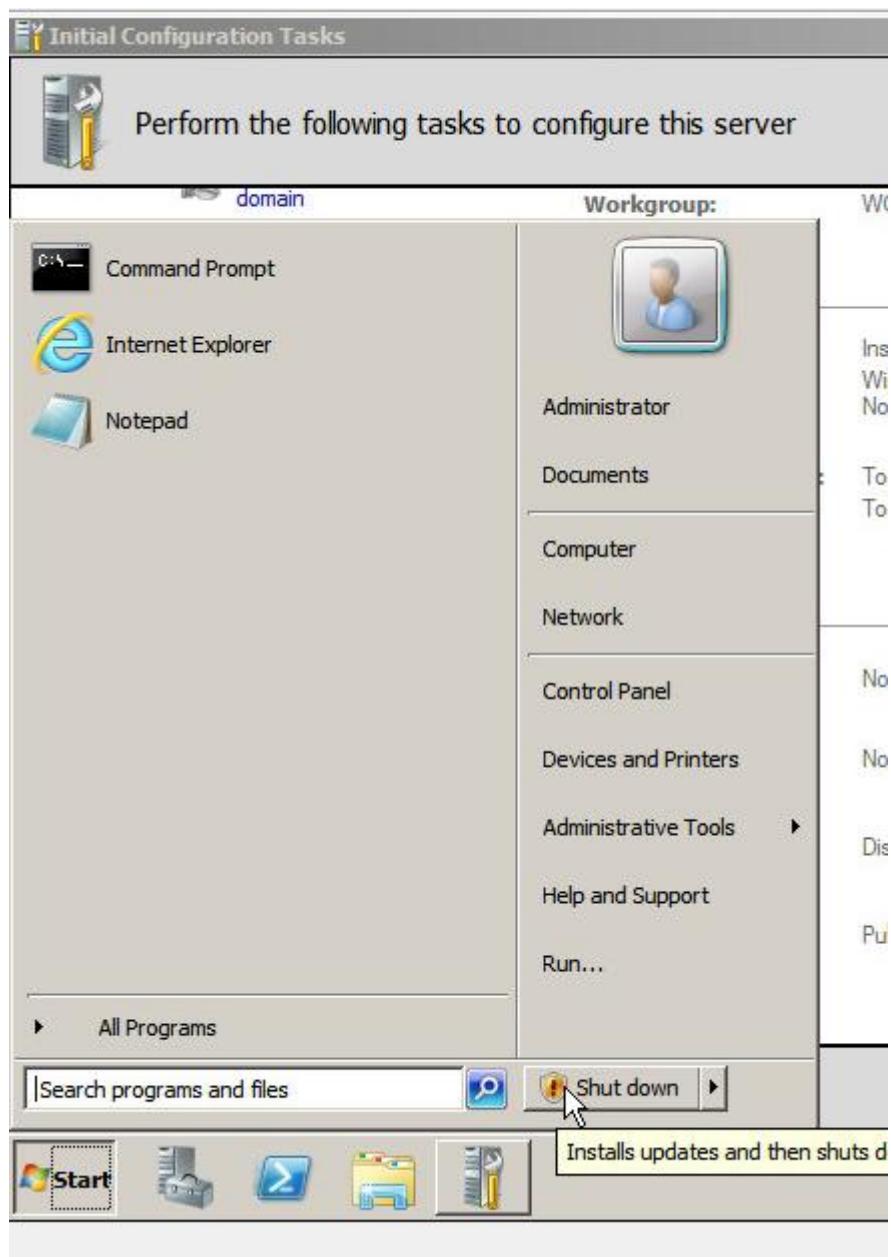
Step 7:

When the pop up window appears enter a valid product key, the product key used for this assignment is "D37BX-GVFBP-8DK89-FYYDG-G4FMW".



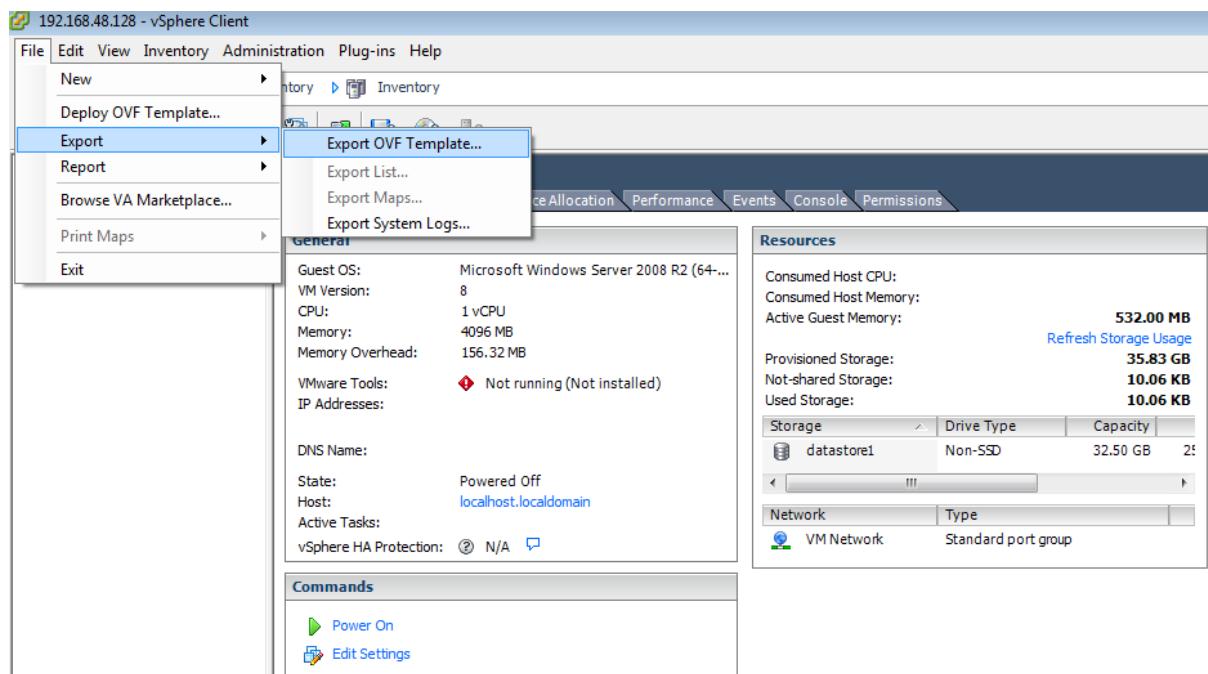
Step 8:

Shut down the server, a template cannot be created if the machine is running.



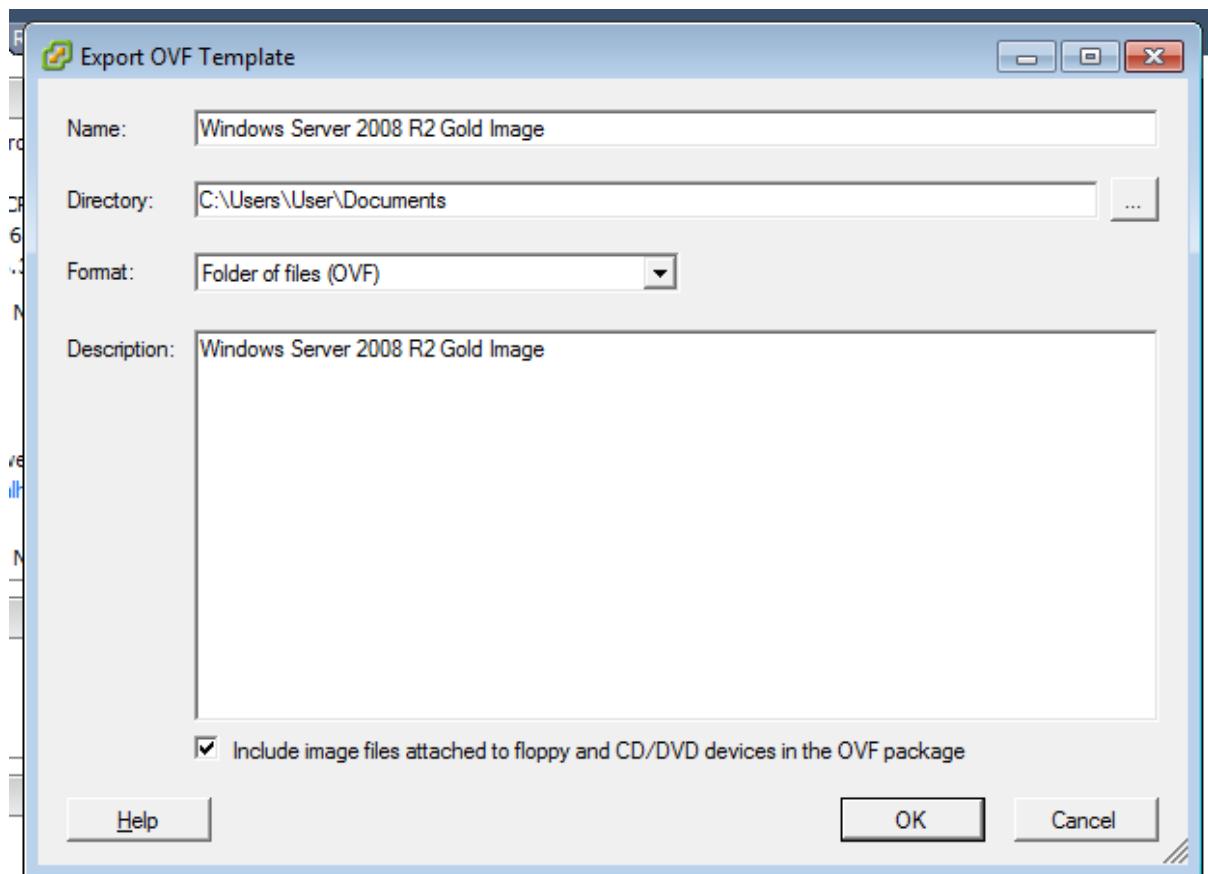
Step 9:

In the vSphere client, click, File > Export > Export OVF template.



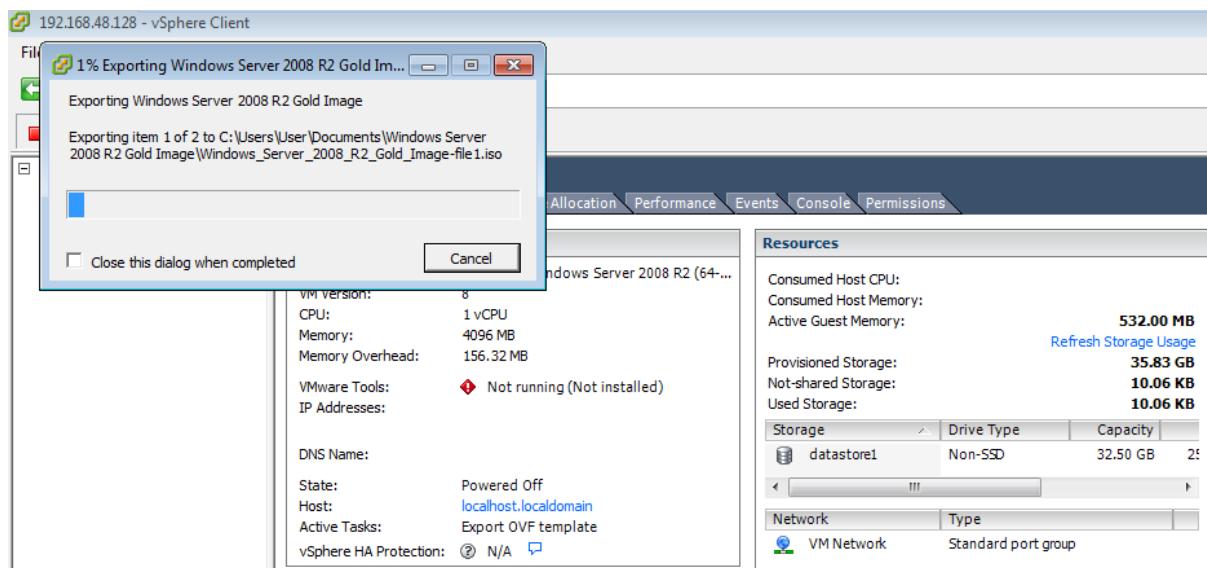
Step 10:

Name the virtual machine template, again keep it memorable and easily recognised. Also choose the location of the template and the format of the template. Then click ok.



Step 11:

The template of the virtual machine has now been created and will begin exporting after step 10.



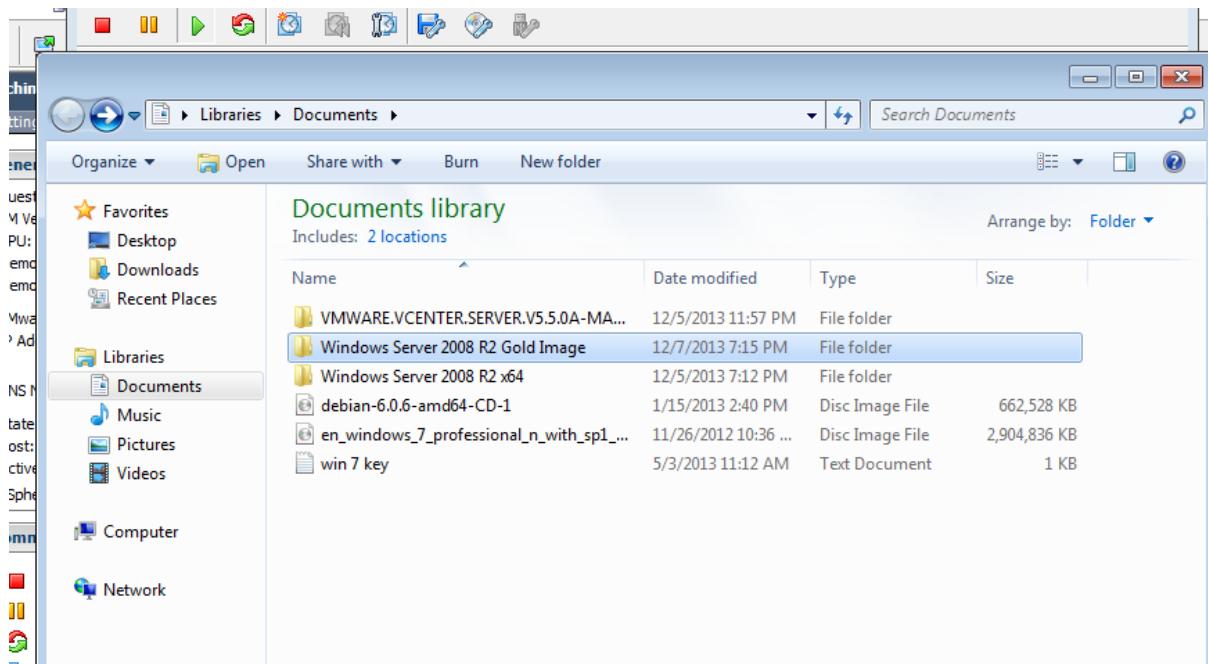
Step 12:

The export is complete when the below window appears.

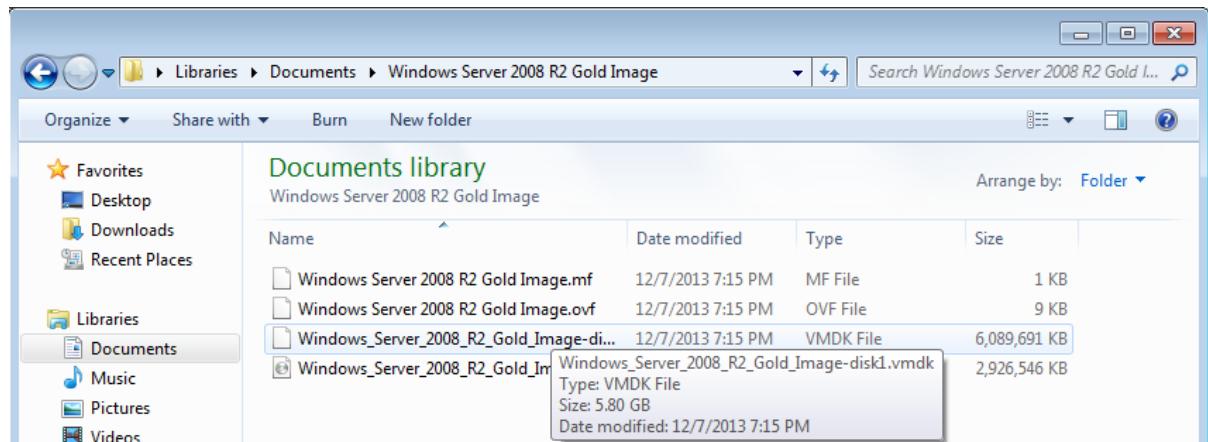


Step 13:

Open the location where the template was saved to.



Double click on the template folder to view the associated files.



To create a template in vSphere vCenter Server:

Once the gold image has been created, the template is very easy to create in vCenter Server.

Step 1:

Select the correct Virtual machine on which you created a gold image.

Then click "convert to a template". The wizard will then begin creating a template.

The screenshot shows the vCenter Server interface. The left pane displays a tree view of virtual machines under the root node 'WIN-1HR3O936AMV'. One node, 'WINSVRTEMP1', is highlighted with a red box. The right pane shows the details for 'WINSVRTEMP1' under the 'Summary' tab. The title bar says 'WINSVRTEMP1'. Below it, there are tabs for 'Getting Started', 'Summary' (which is selected), 'Resource Allocation', and 'Performance'. A section titled 'What is a Virtual Machine?' contains the following text:

A virtual machine is a software computer that, physical computer, runs an operating system applications. An operating system installed on machine is called a guest operating system.

Because every virtual machine is an isolated environment, you can use virtual machines as workstation environments, as testing environments, or consolidate server applications.

In vCenter Server, virtual machines run on host clusters. The same host can run many virtual

Basic Tasks

- ▶ [Power on the virtual machine](#)
- ▶ [Edit virtual machine settings](#)
- ▶ [Convert to a template](#)

Step 2:

When the template is created it is displayed as below (outlined in the red box):

WIN-1HR3O936AMV - vSphere Client

File Edit View Inventory Administration Plug-ins Help

Home Inventory VMs and Templates

IPA

IPAdatcenter

Machine 1

Machine 2

Machine 3

WIN-TU1OK1C6A96

winsvr08

Getting Started Summary Resource Allocation Tasks

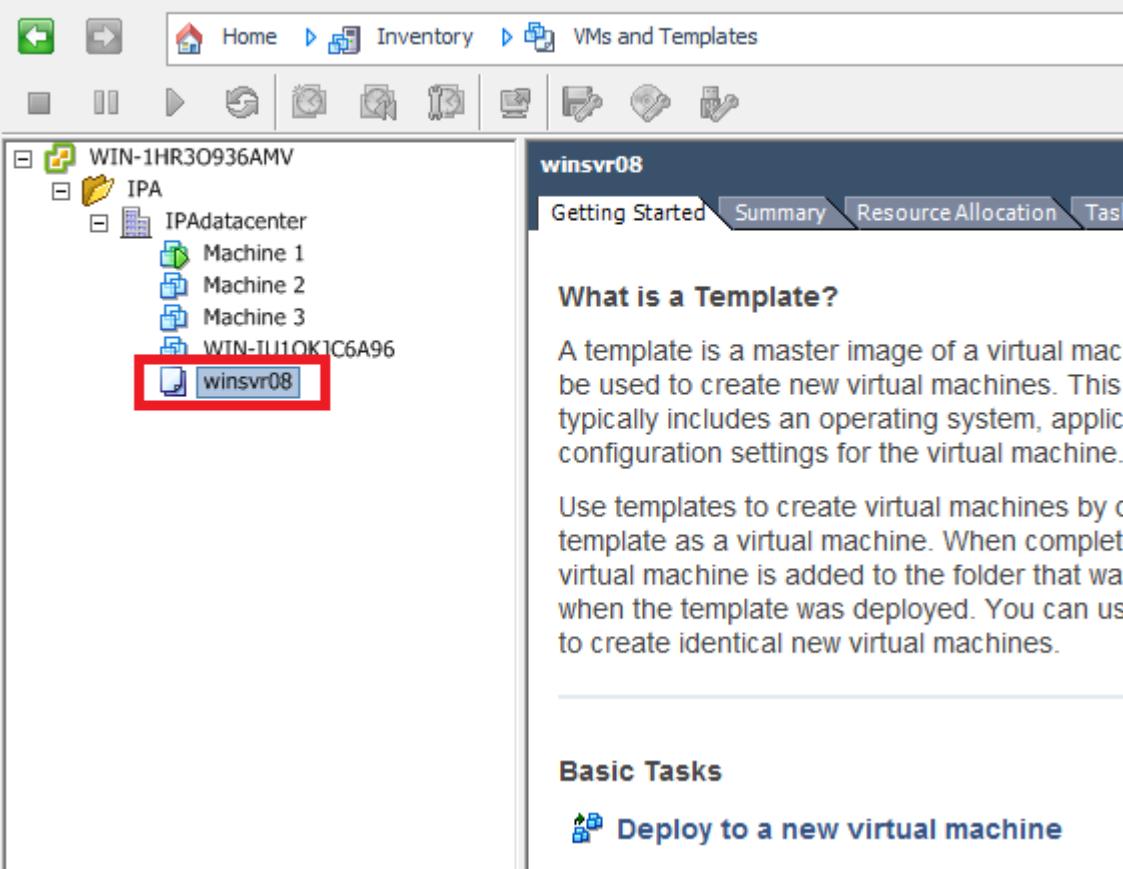
What is a Template?

A template is a master image of a virtual machine that can be used to create new virtual machines. This typically includes an operating system, application configuration settings for the virtual machine.

Use templates to create virtual machines by cloning the template as a virtual machine. When completed, the virtual machine is added to the folder that was specified when the template was deployed. You can use this template to create identical new virtual machines.

Basic Tasks

 [Deploy to a new virtual machine](#)



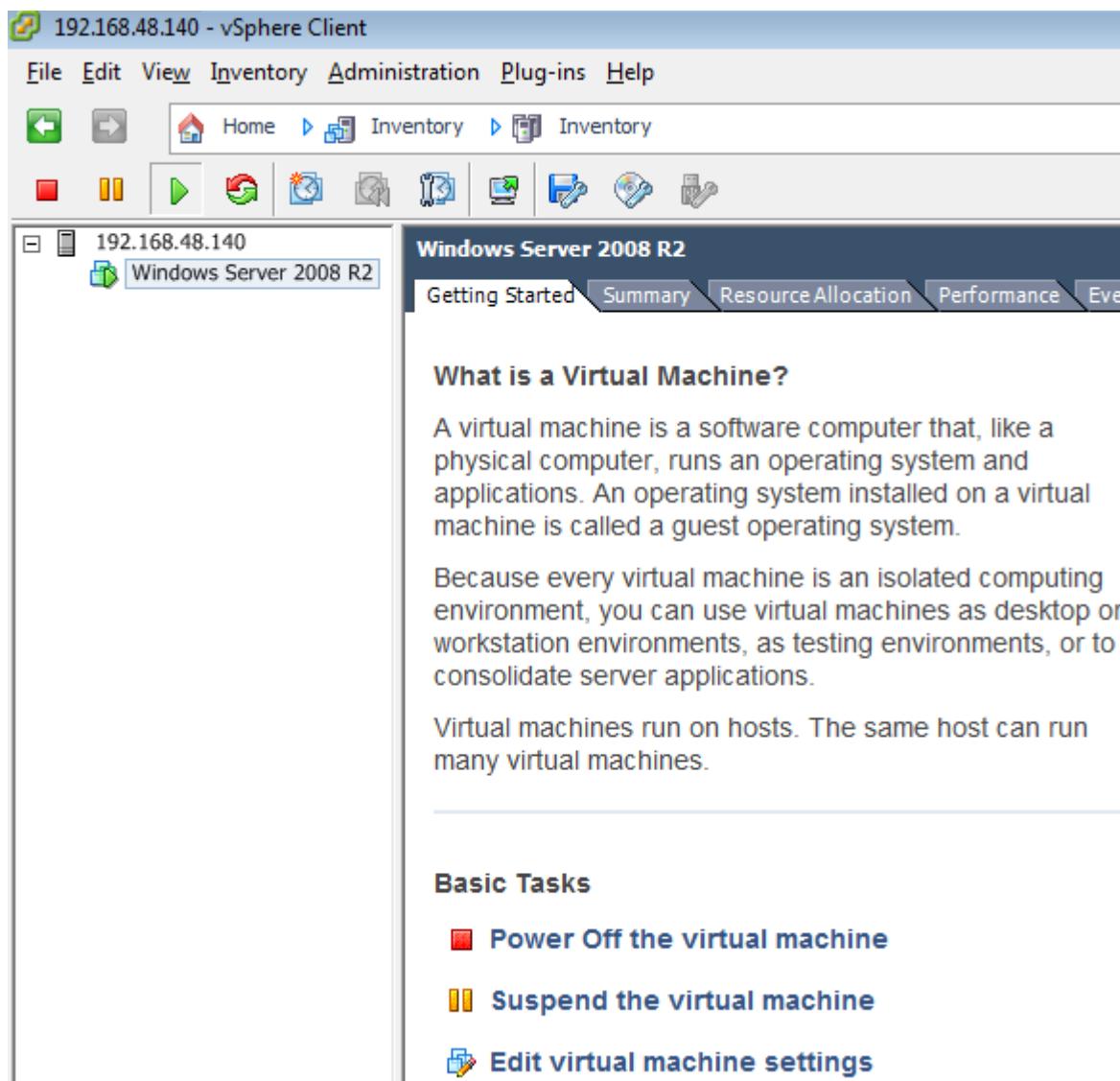
Task A.6

Using the template created in task A.5, deploy a VM from this template, during the task, outline what unique information with regard to the virtual machine operating system should be changed and demonstrate how this procedure would be carried out.

To Deploy a template on vSphere ESXi:

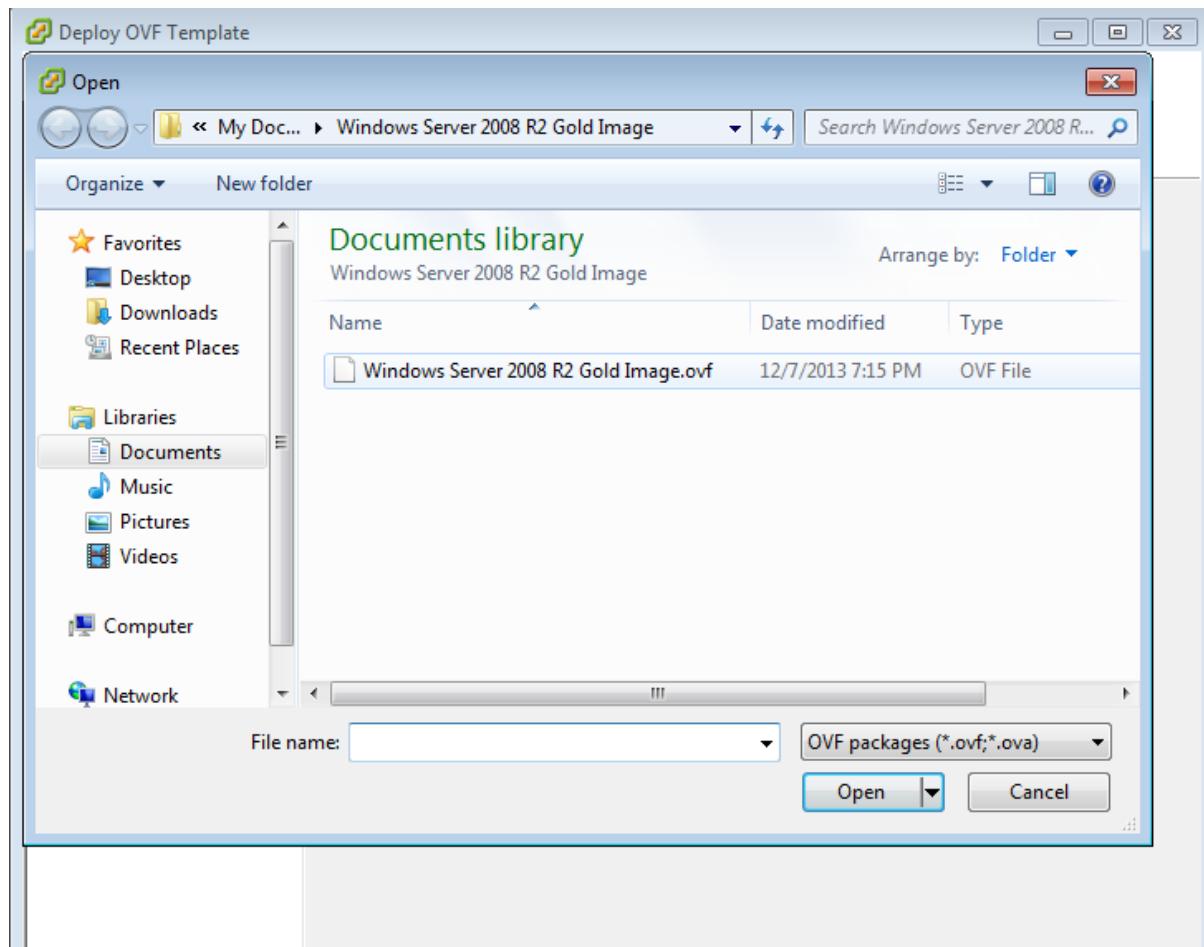
Step 1:

Click File > Deploy OVF Template...



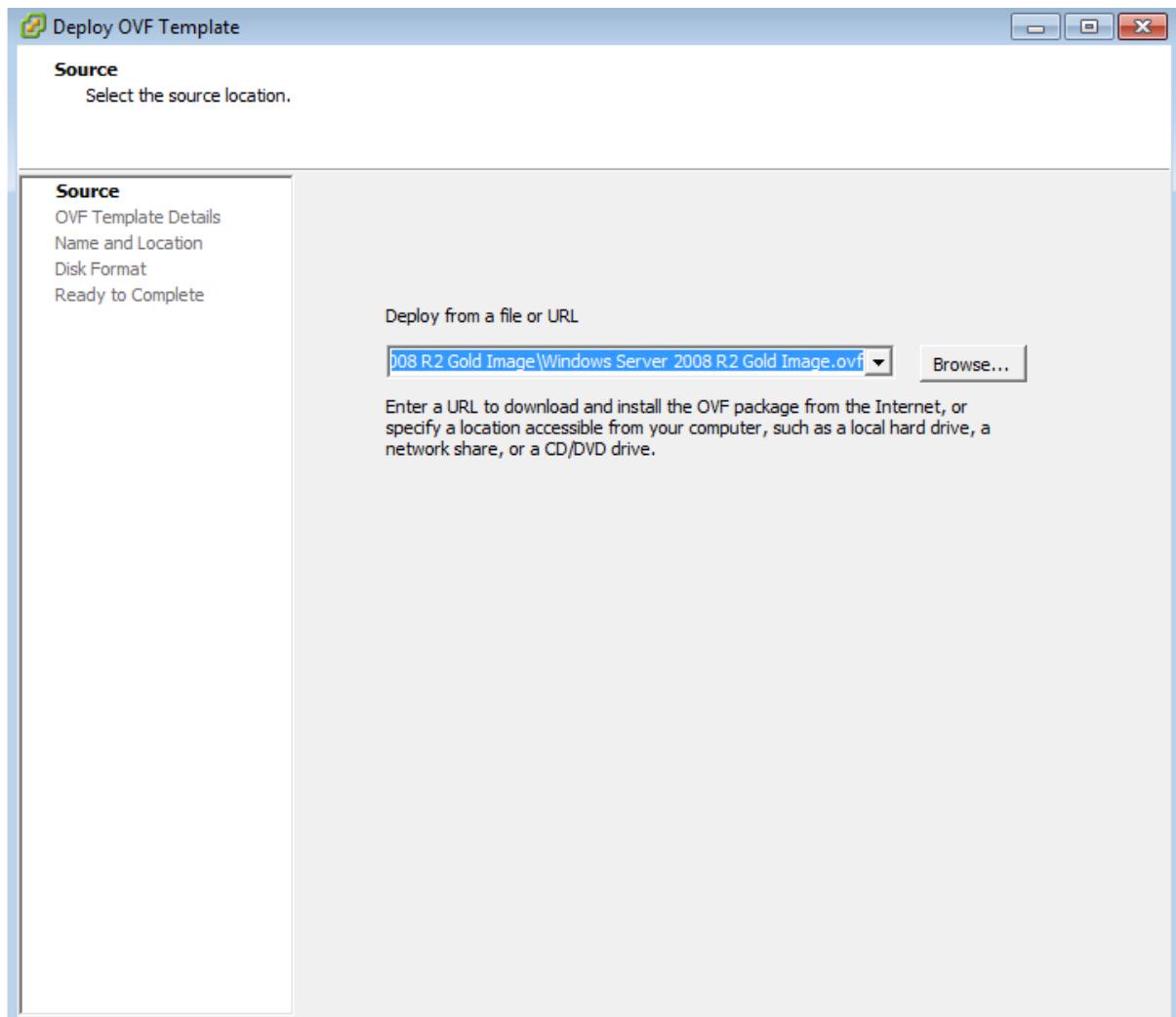
Step 2:

Click Browse, then find the location of the templates ovf file. Then select the ovf file and click ok.



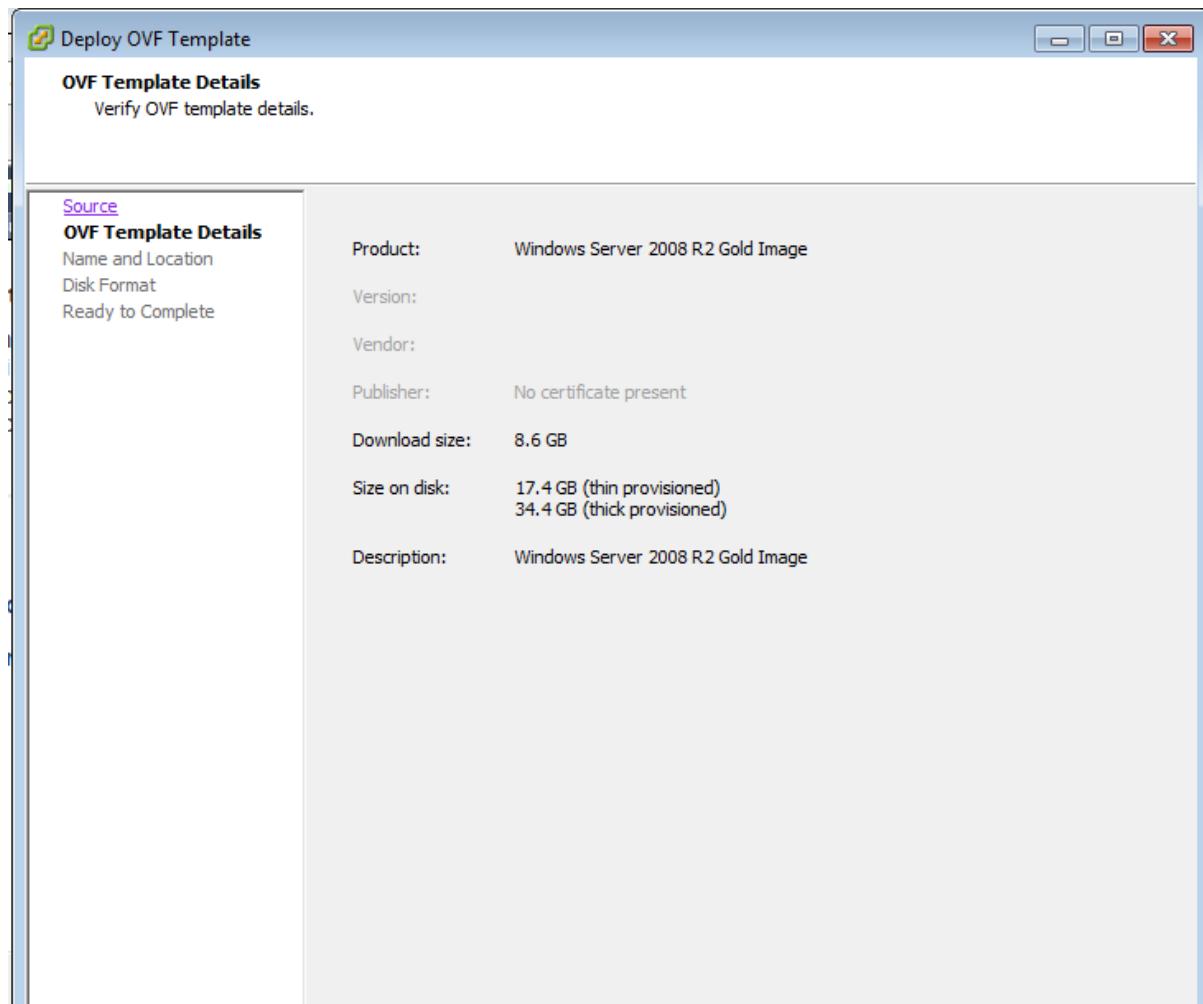
Step 3:

When the file has been selected, click Next to move onto the next step.



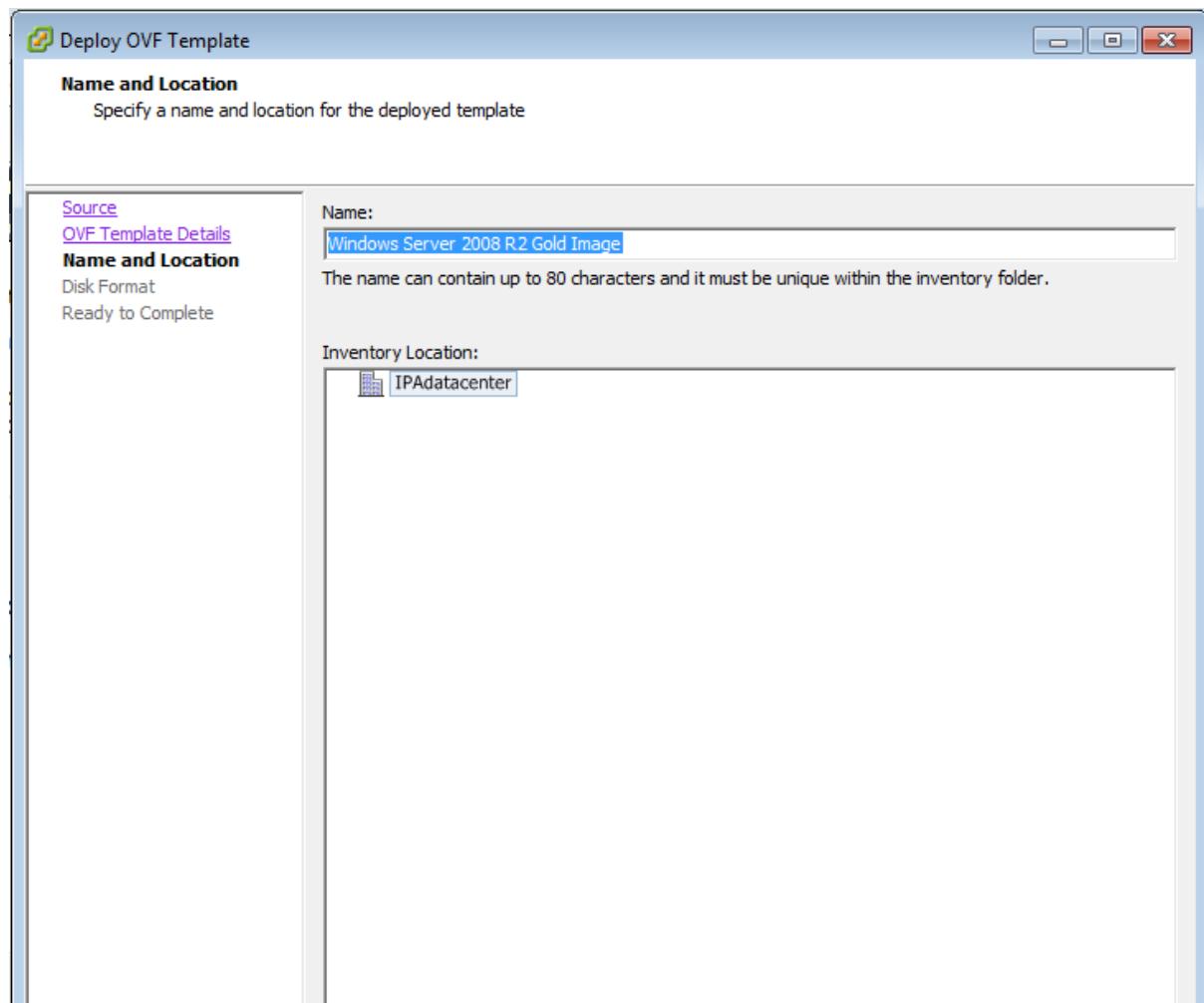
Step 4:

View the details of the source ovf template then click Next.



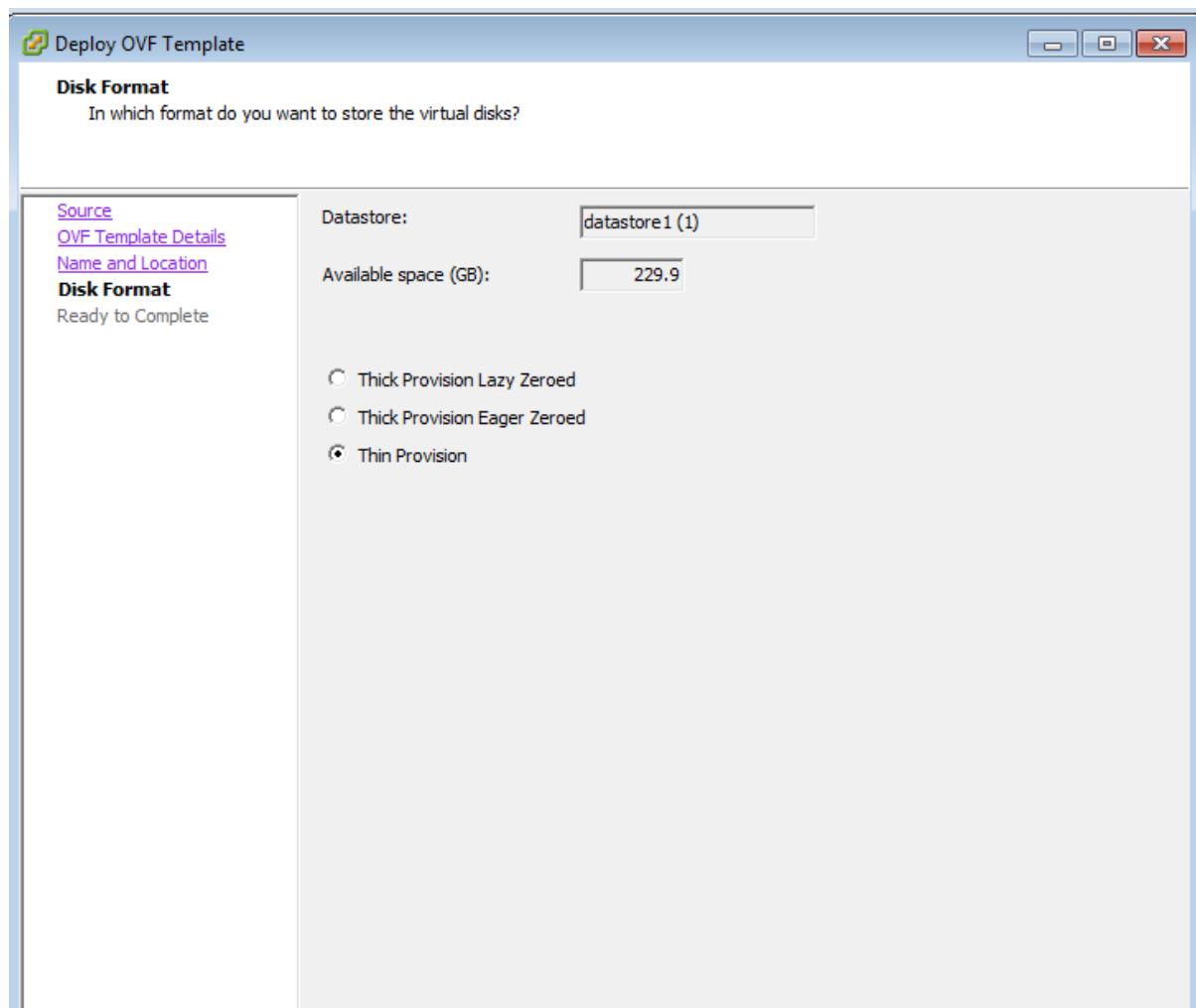
Step 5:

Choose a name and Inventory Location for the virtual machine, then click Next.



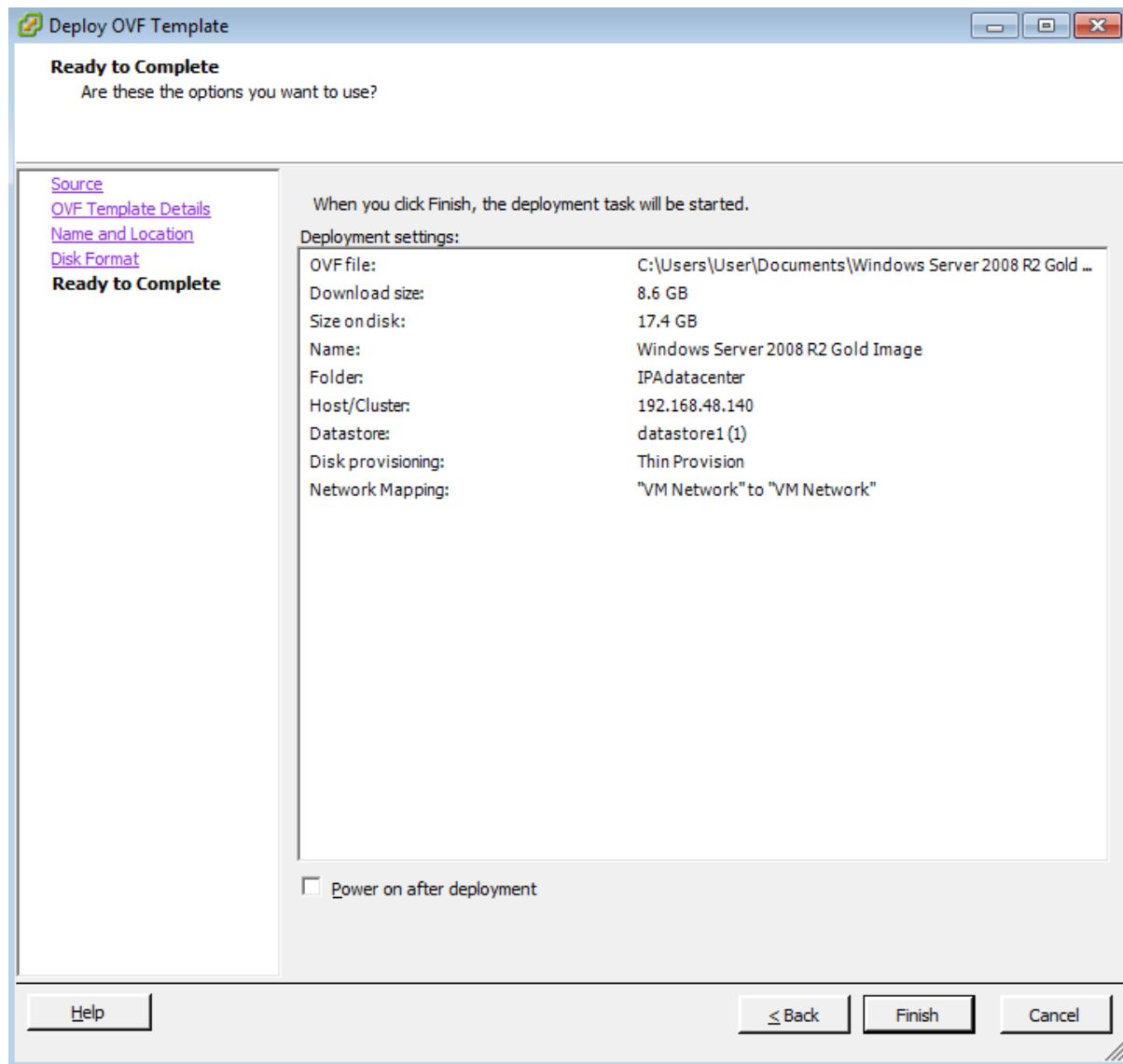
Step 6:

Choose Thin Provisioning as the Disk Format, then click Next.



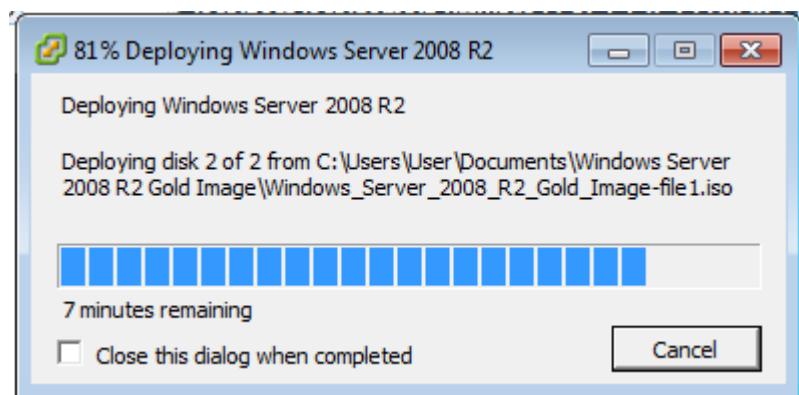
Step 7:

When you are satisfied with the deployment settings, click Finish to begin the Deployment.



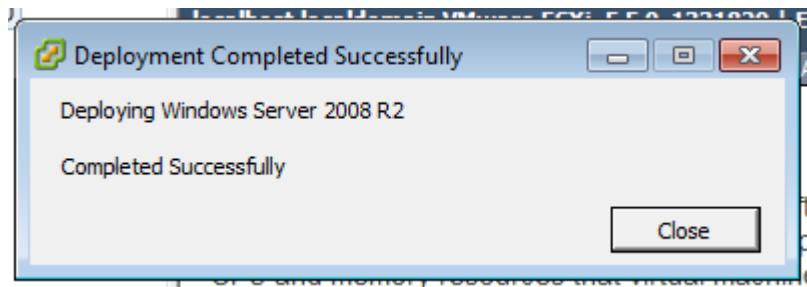
Step 11:

This window will appear when the deployment is executing:



Step 12:

This window will appear when the deployment has been carried out successfully.

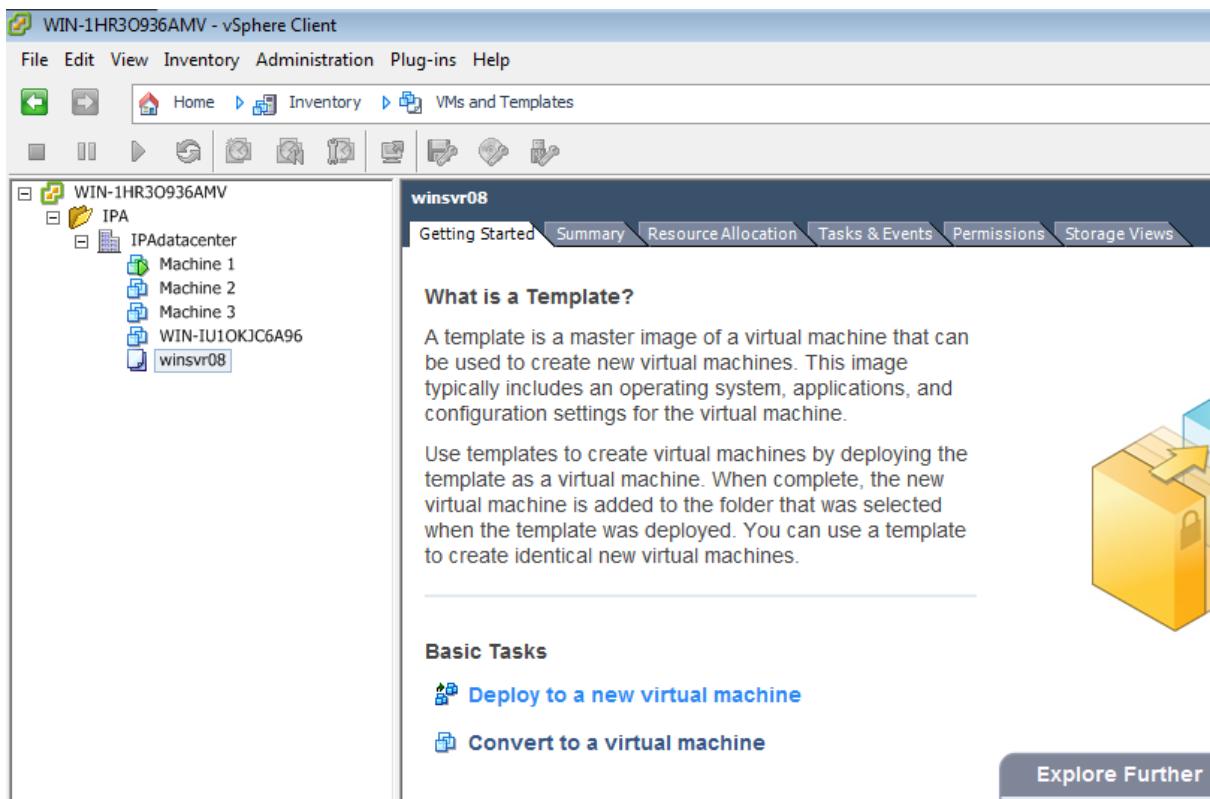


To deploy a Template on vSphere vCenter Server:

The following information can be changed using vCenter Server deployment wizard, SID's, IP address (static or Automatically assigned), computers name, user name and user password. These should all be changed during the deployment of any template so no contradictions or confusion occur on the network.

Step 1:

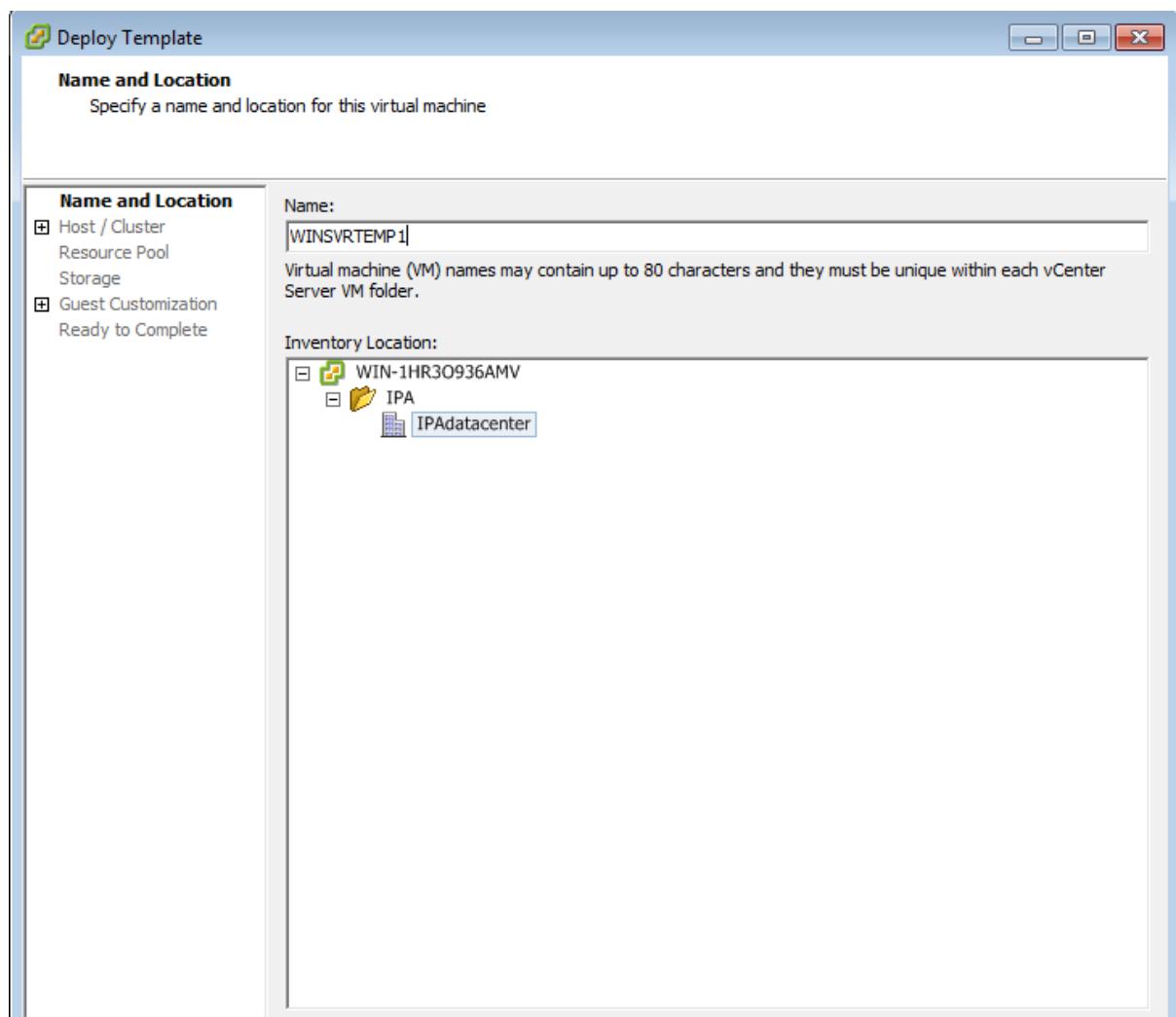
Select the template, then click “deploy to a new virtual machine”.



A screenshot of the vSphere Client interface. The left sidebar shows a tree view with "WIN-1HR30936AMV" expanded, revealing "IPA" and "IPDatacenter". "IPDatacenter" is expanded to show "Machine 1", "Machine 2", "Machine 3", "WIN-IU1OKJC6A96", and "winsvr08". The main pane is titled "winsvr08" and has tabs for "Getting Started", "Summary", "Resource Allocation", "Tasks & Events", "Permissions", and "Storage Views". The "Getting Started" tab is selected. It contains a section titled "What is a Template?" with the following text: "A template is a master image of a virtual machine that can be used to create new virtual machines. This image typically includes an operating system, applications, and configuration settings for the virtual machine." Below this, another section says: "Use templates to create virtual machines by deploying the template as a virtual machine. When complete, the new virtual machine is added to the folder that was selected when the template was deployed. You can use a template to create identical new virtual machines." To the right of this text is a yellow 3D cube icon with a lock symbol. At the bottom right of the main pane is a "Explore Further" button.

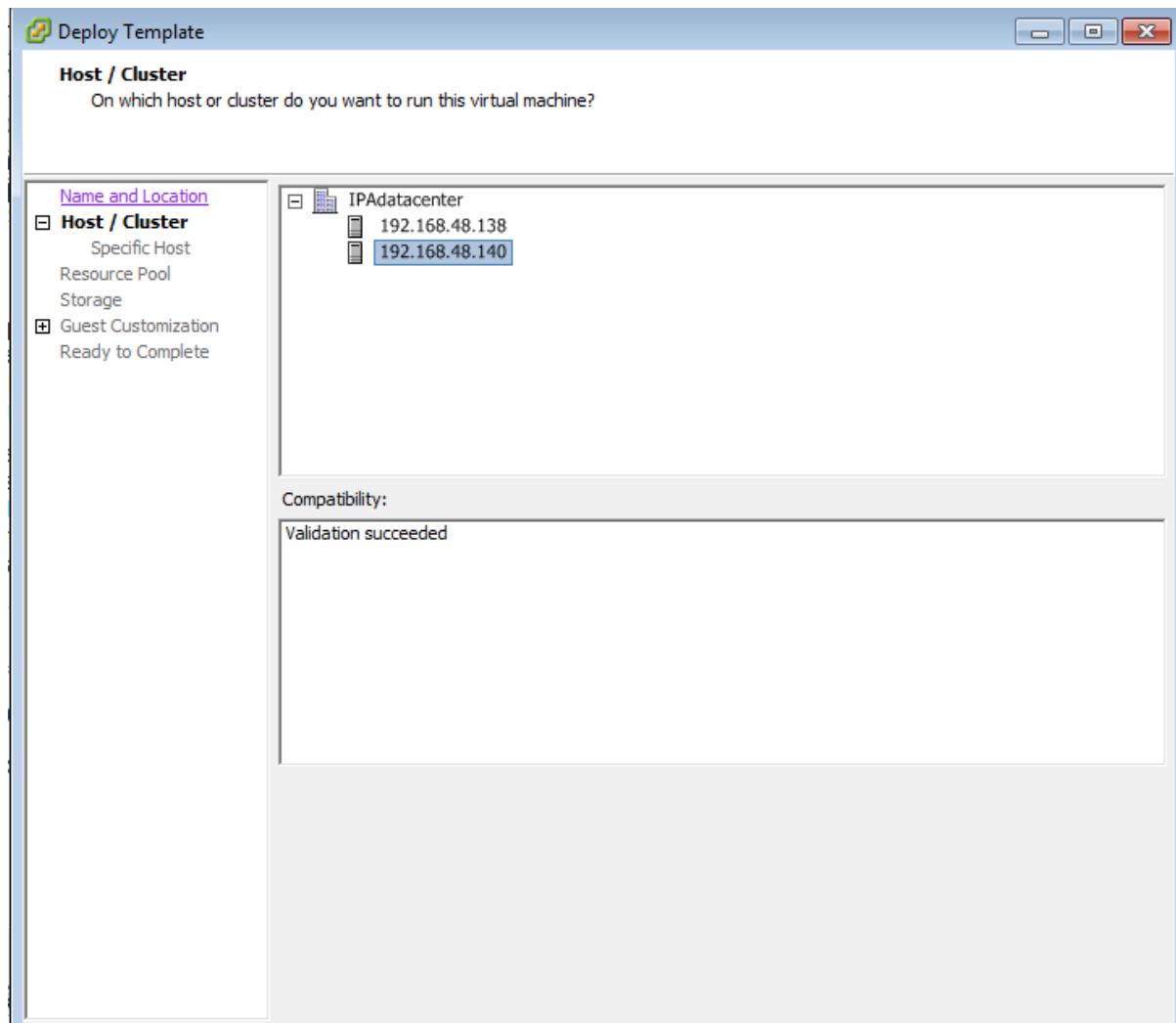
Step 2:

Choose a name and select the datacenter then click next.



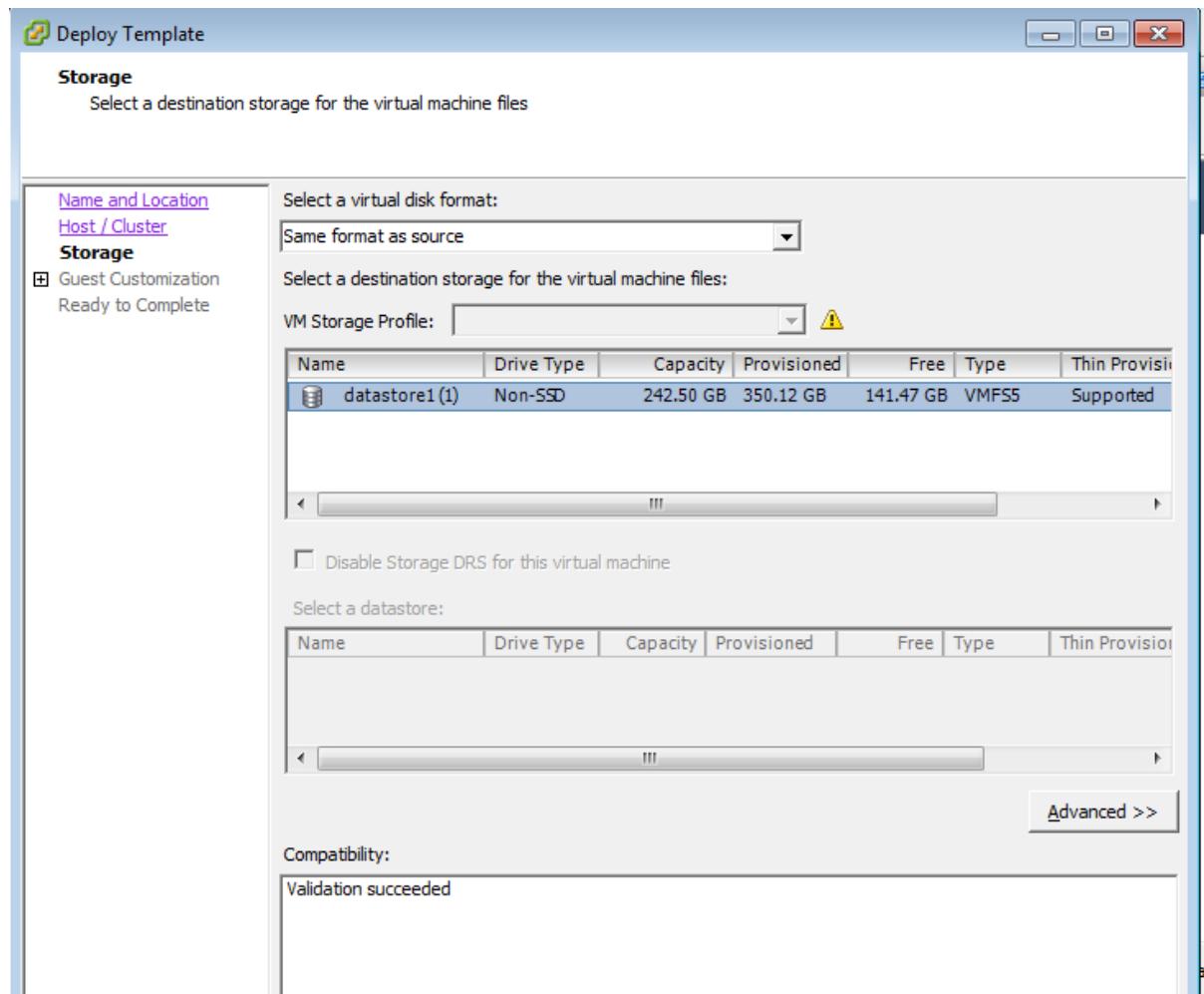
Step 3:

Choose the host in the datacenter you would like to deploy the template to. Then click Next.



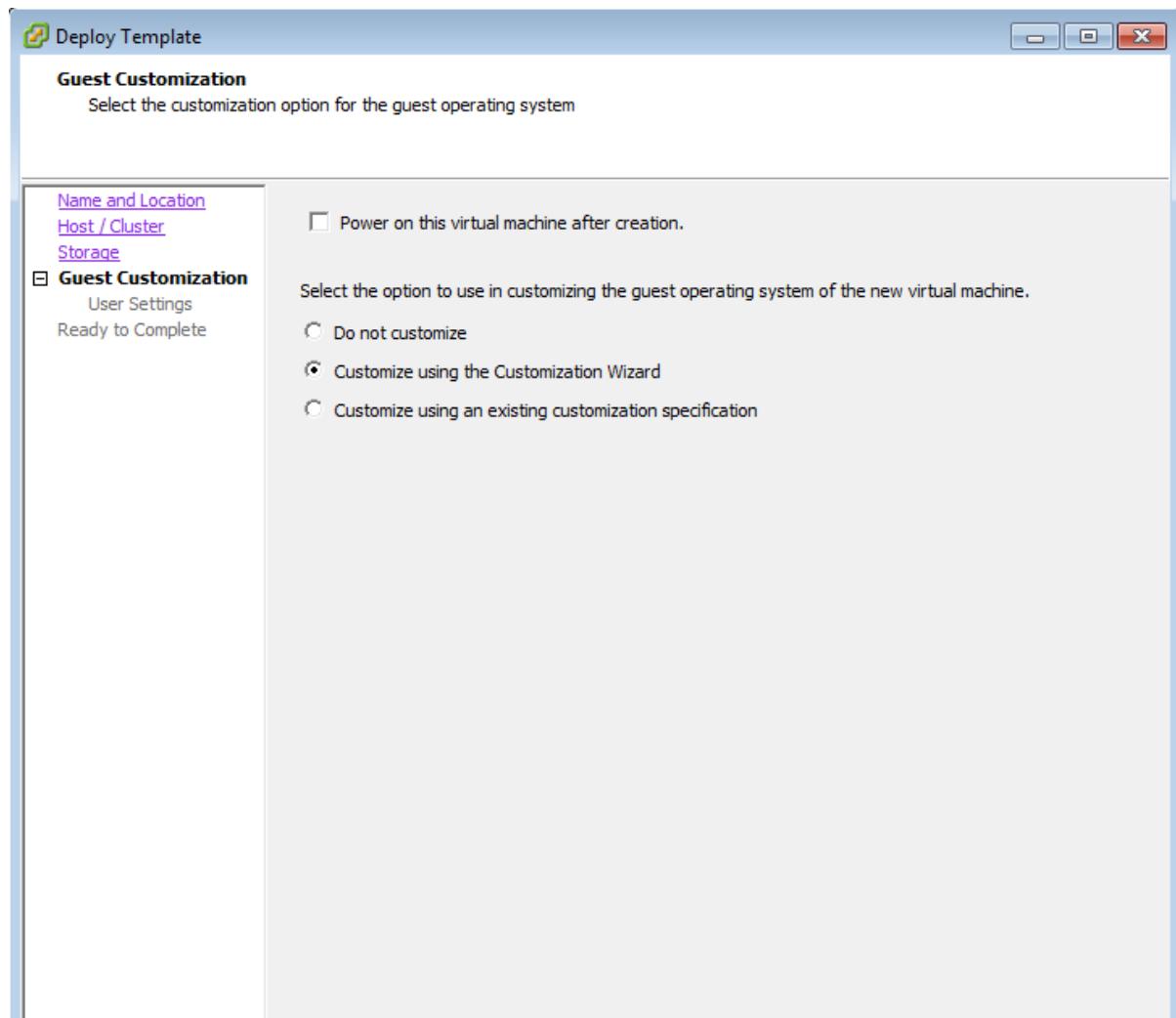
Step 4:

Choose the datastore which you would like to store the machines files on, the disk format was thin provisioning so leave as default, then click Next.



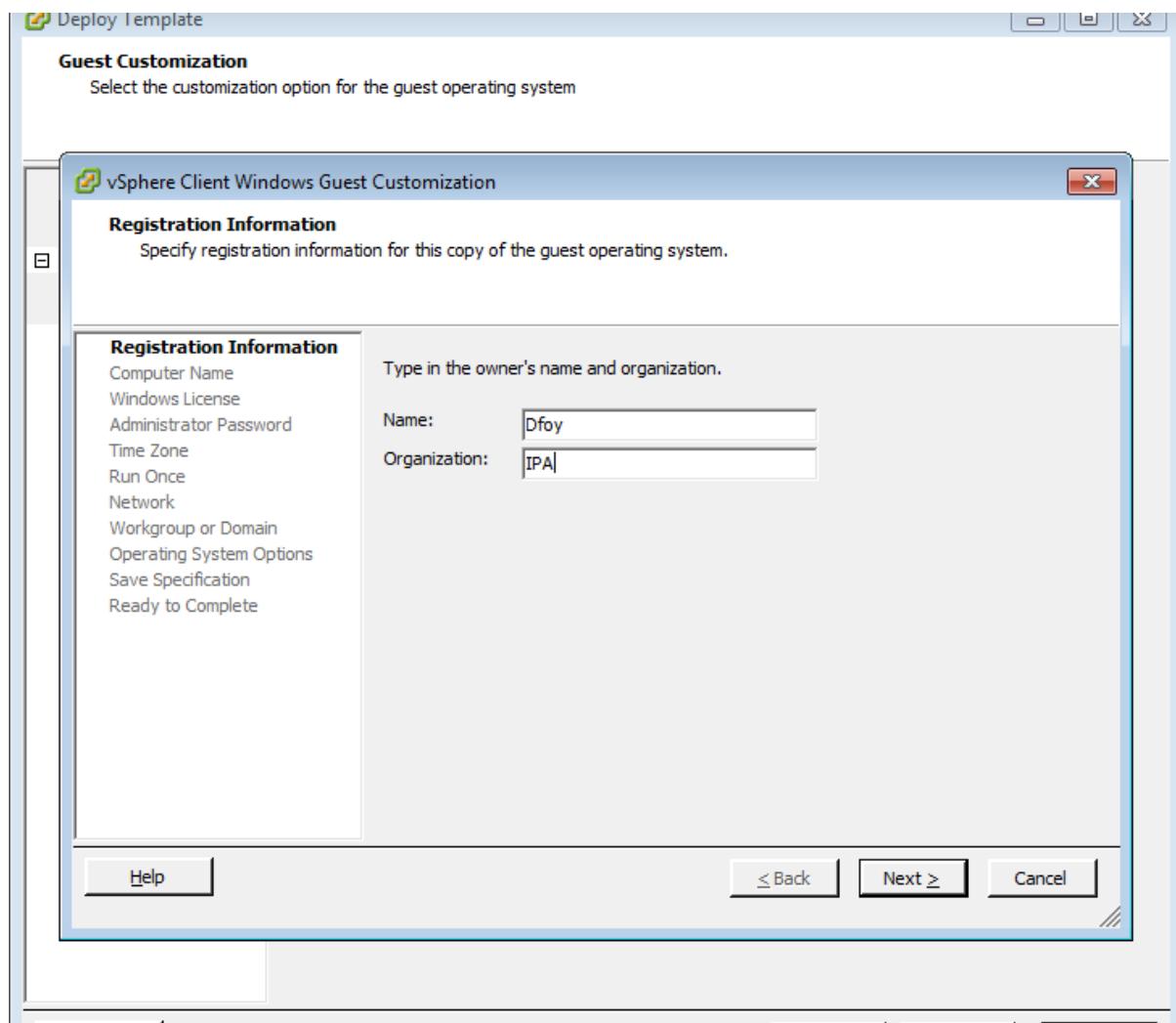
Step 5:

Choose "Customize using the customization wizard", then click Next.



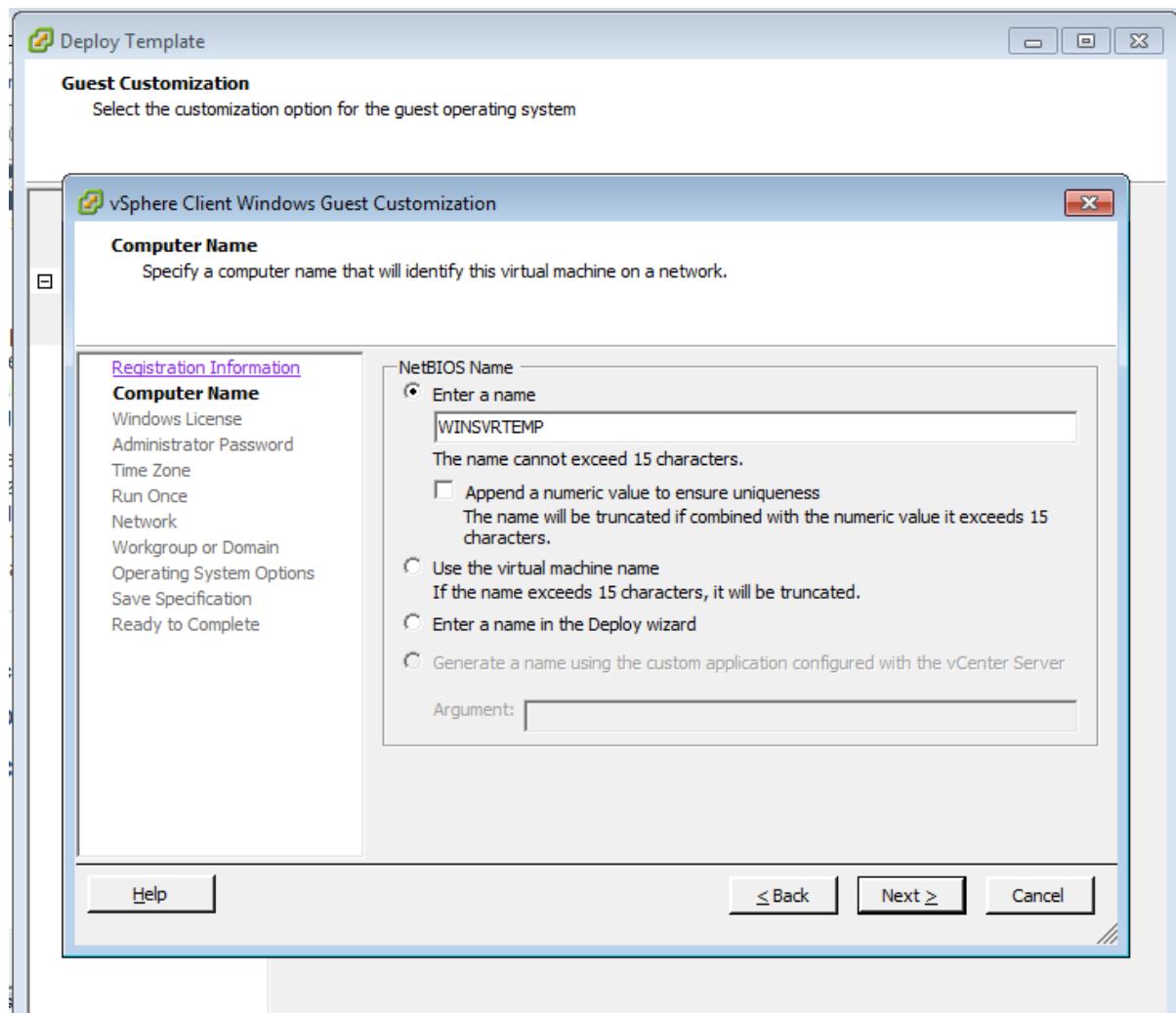
Step 6:

Choose the owner's name and the organisations name, then click Next.



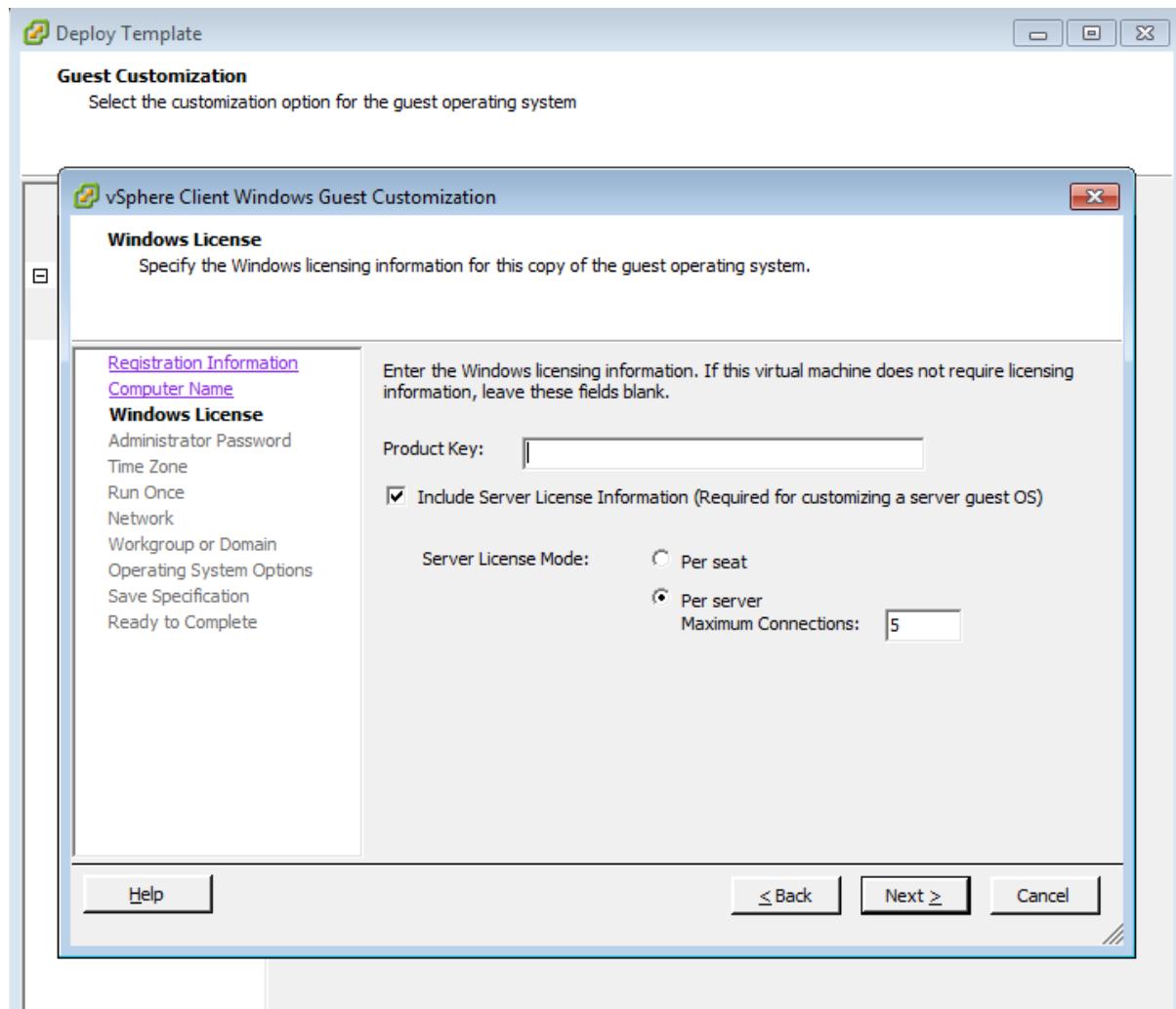
Step 7:

Choose a new NetBIOS name, then click Next.



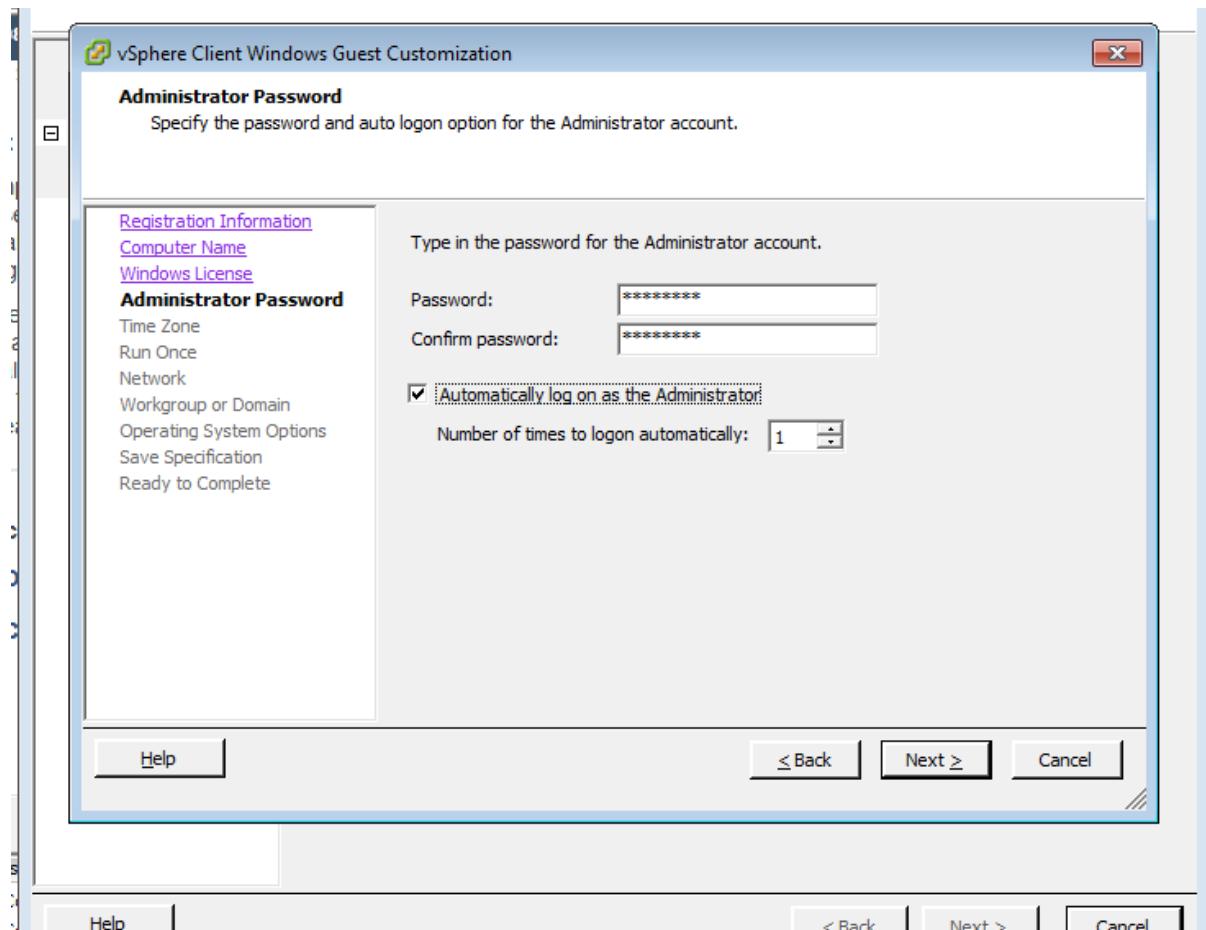
Step 8:

Enter a product key then click Next. The product key used for demonstration purposes is: "D37BX-GVFBP-8DK89-FYYDG-G4FMW".



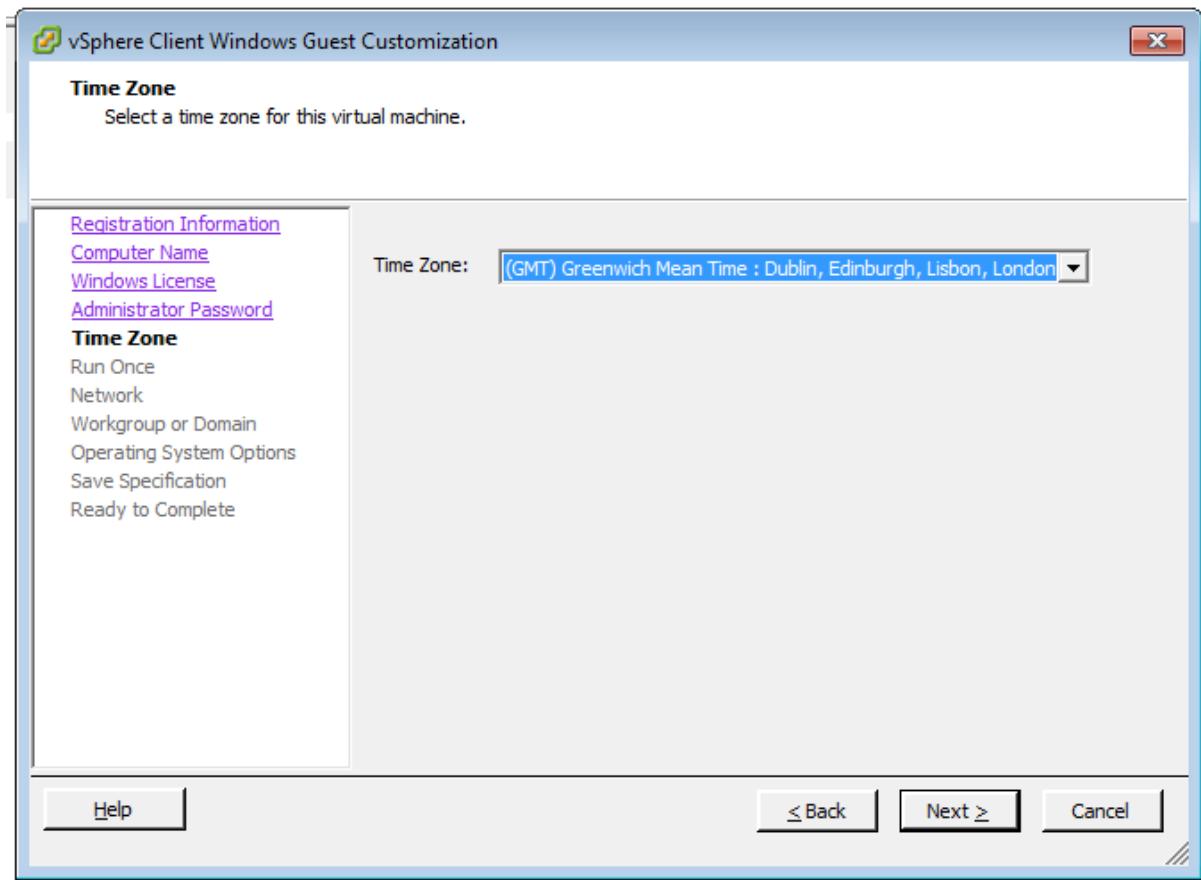
Step 9:

Choose an administrator password, then click Next.



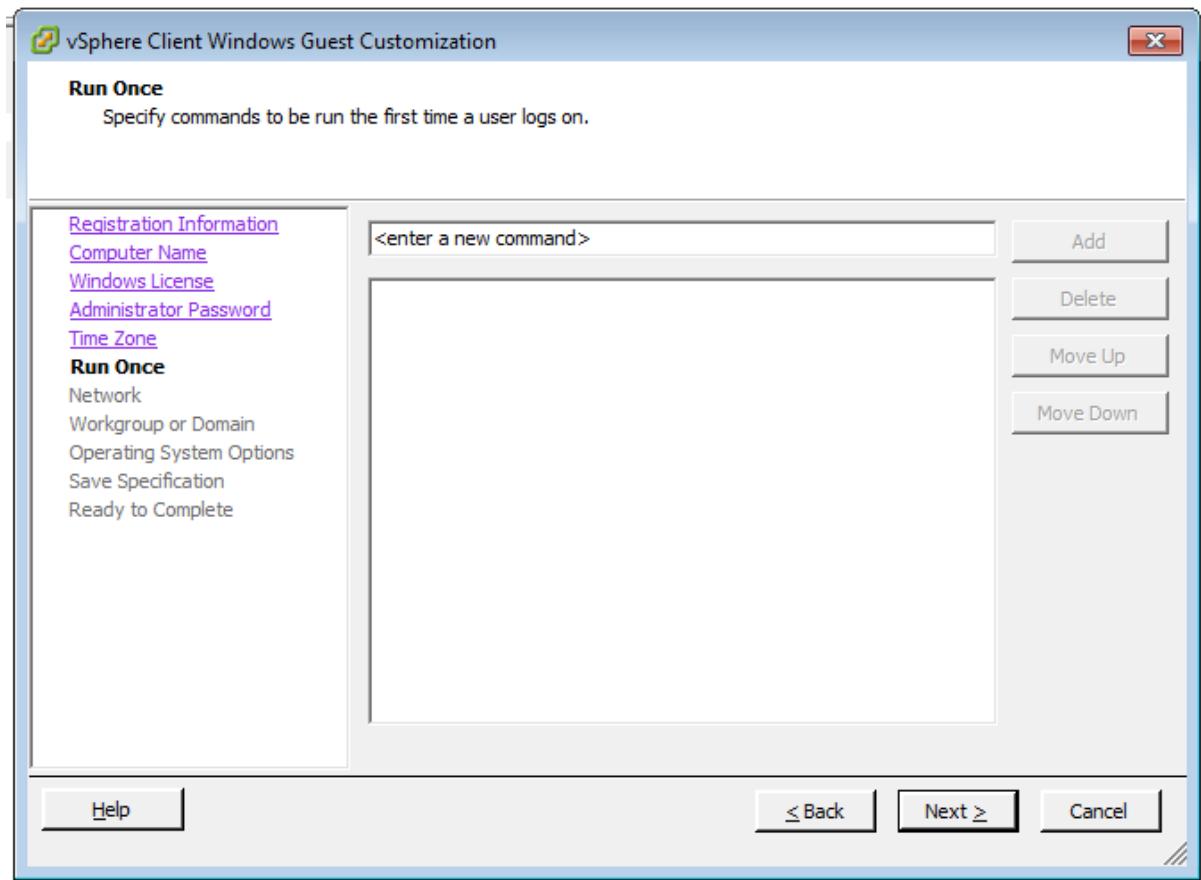
Step 10:

Choose the correct timezone relevant to your country, then click Next.



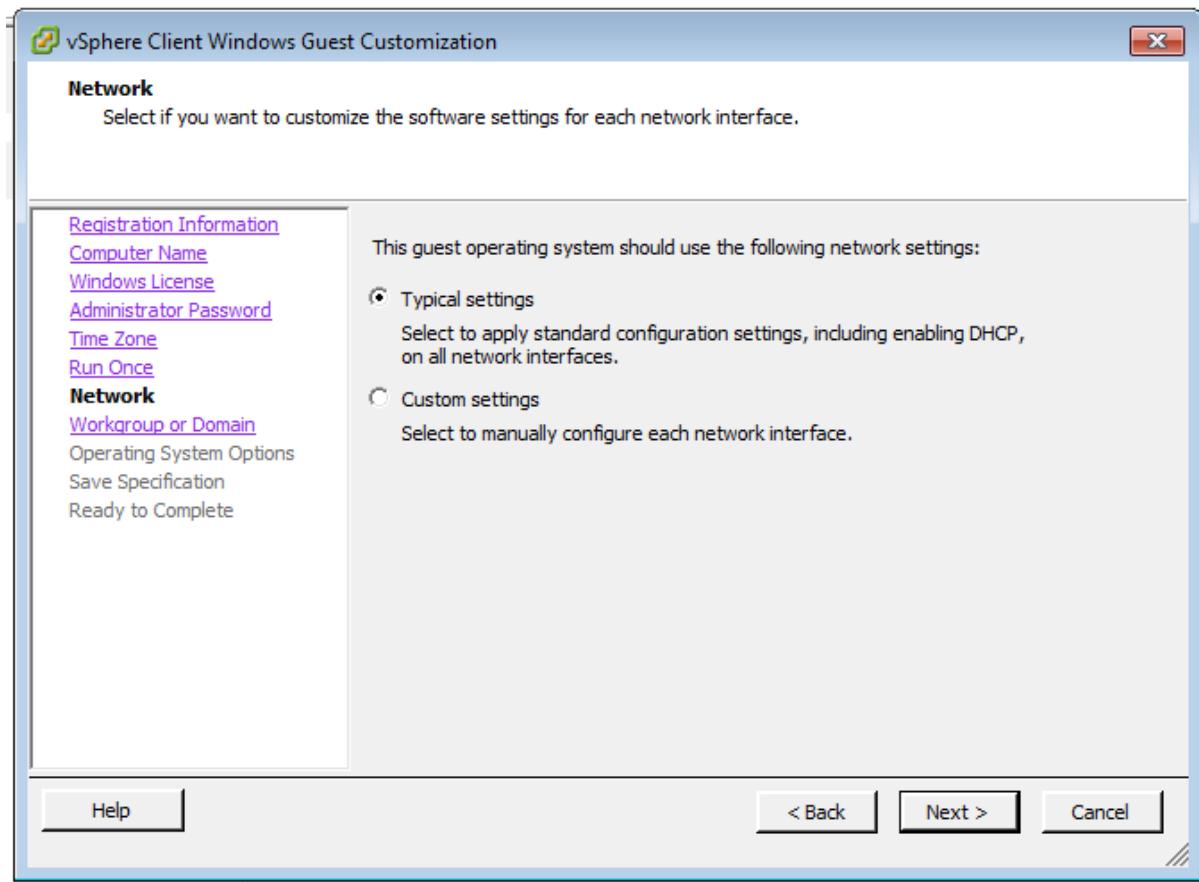
Step 11:

Choose any commands you wish to run upon the first user log on. Then click Next.



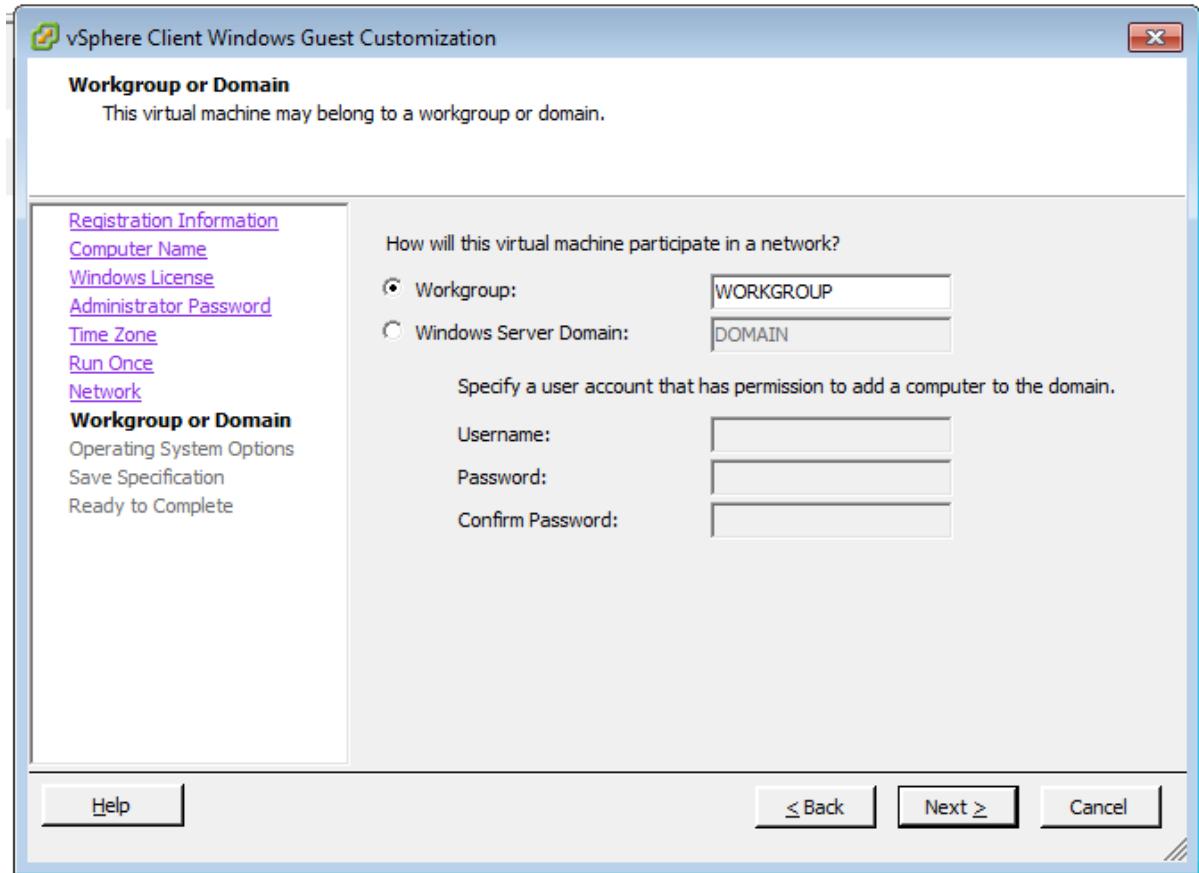
Step 12:

Choose typical network settings, then click Next.



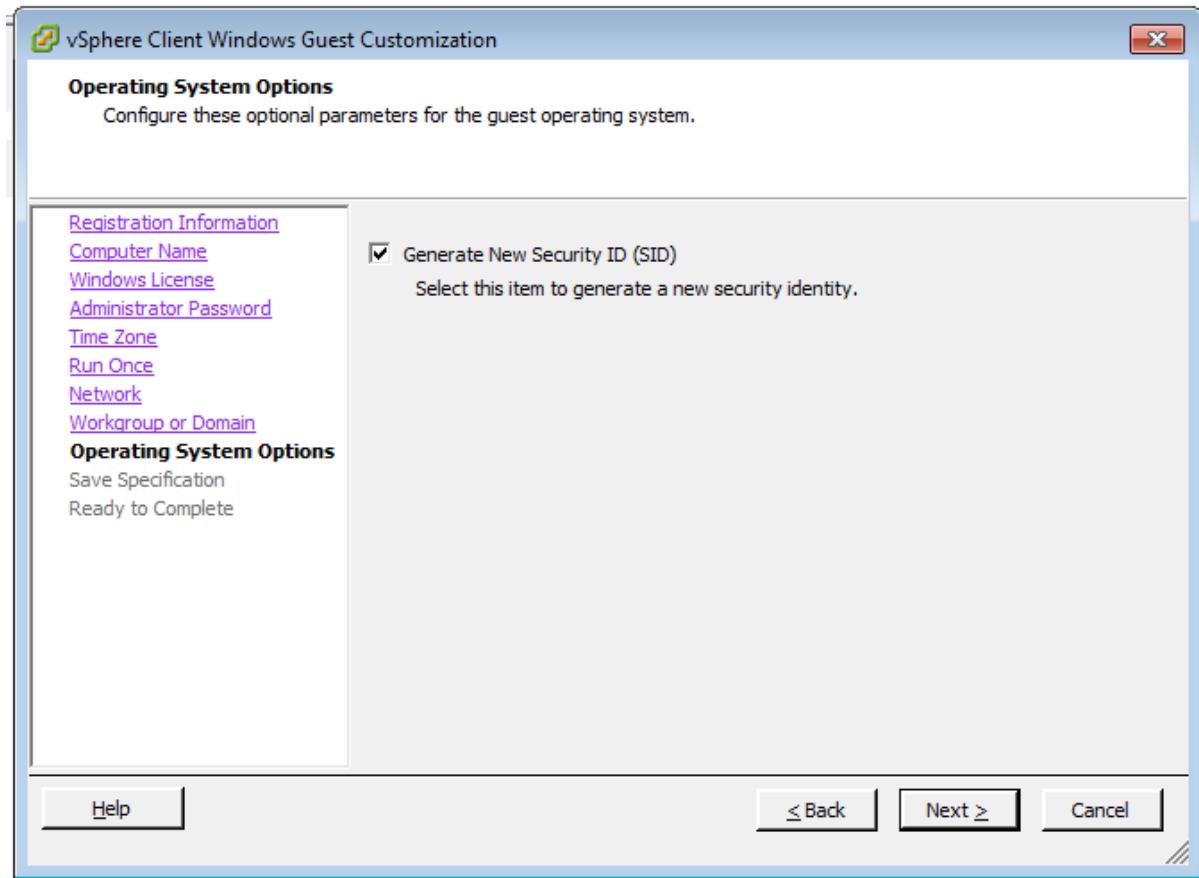
Step 13:

Choose the Domain or Workgroup settings for the new template, then click next.



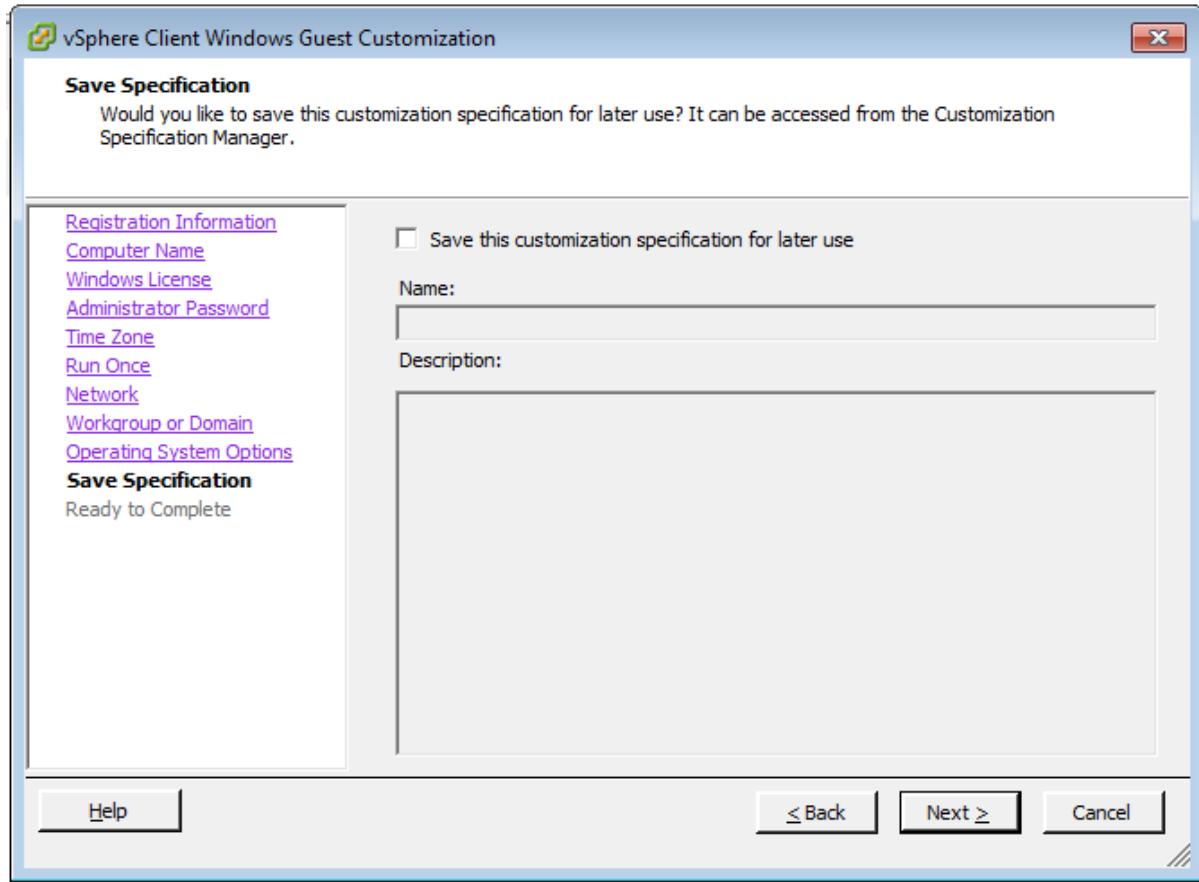
Step 14:

Choose to generate new SID(Security Identity). Then click Next.



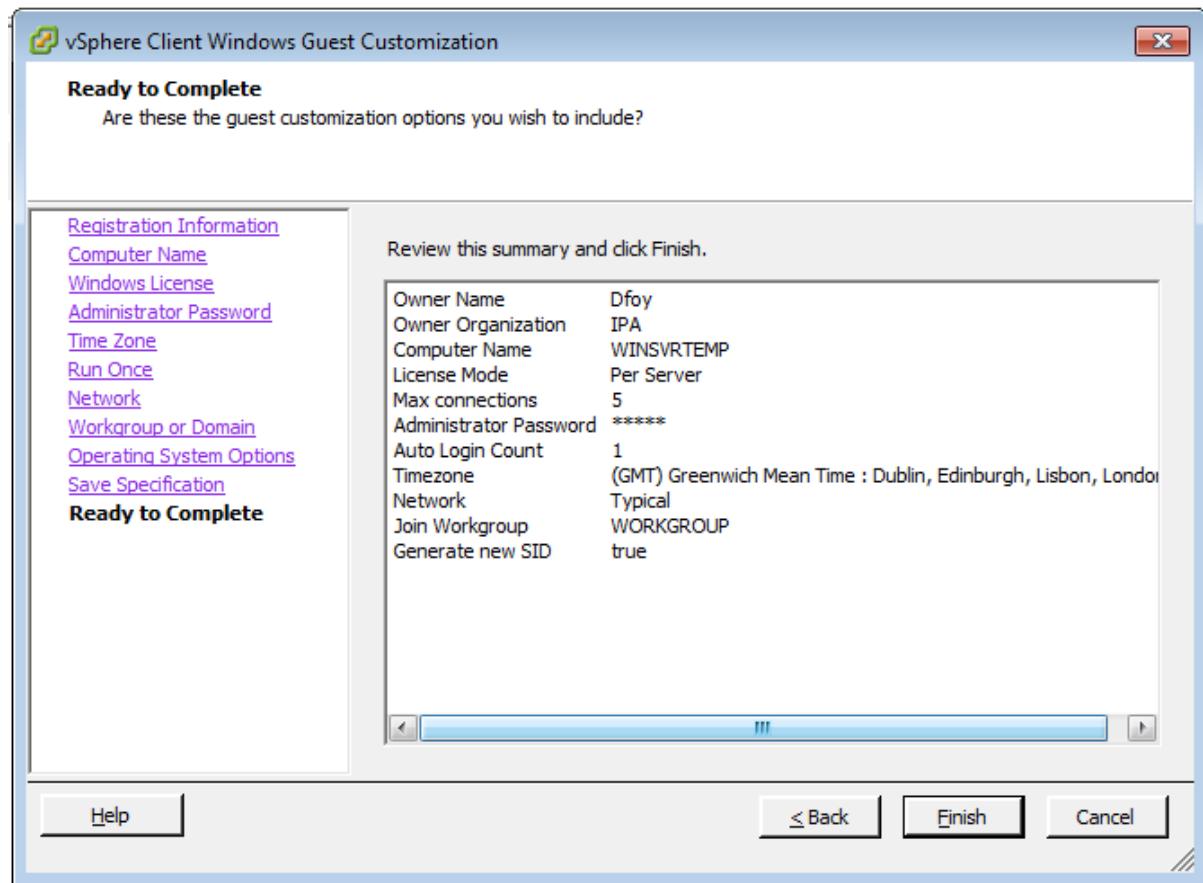
Step 15:

In this step of the wizard, you can save the specification of the deployment for re-use. If you wish to do so, select “save this customization specification for later use”, enter a name and description for the configuration. Then when you have chosen and entered the correct data, click Next.



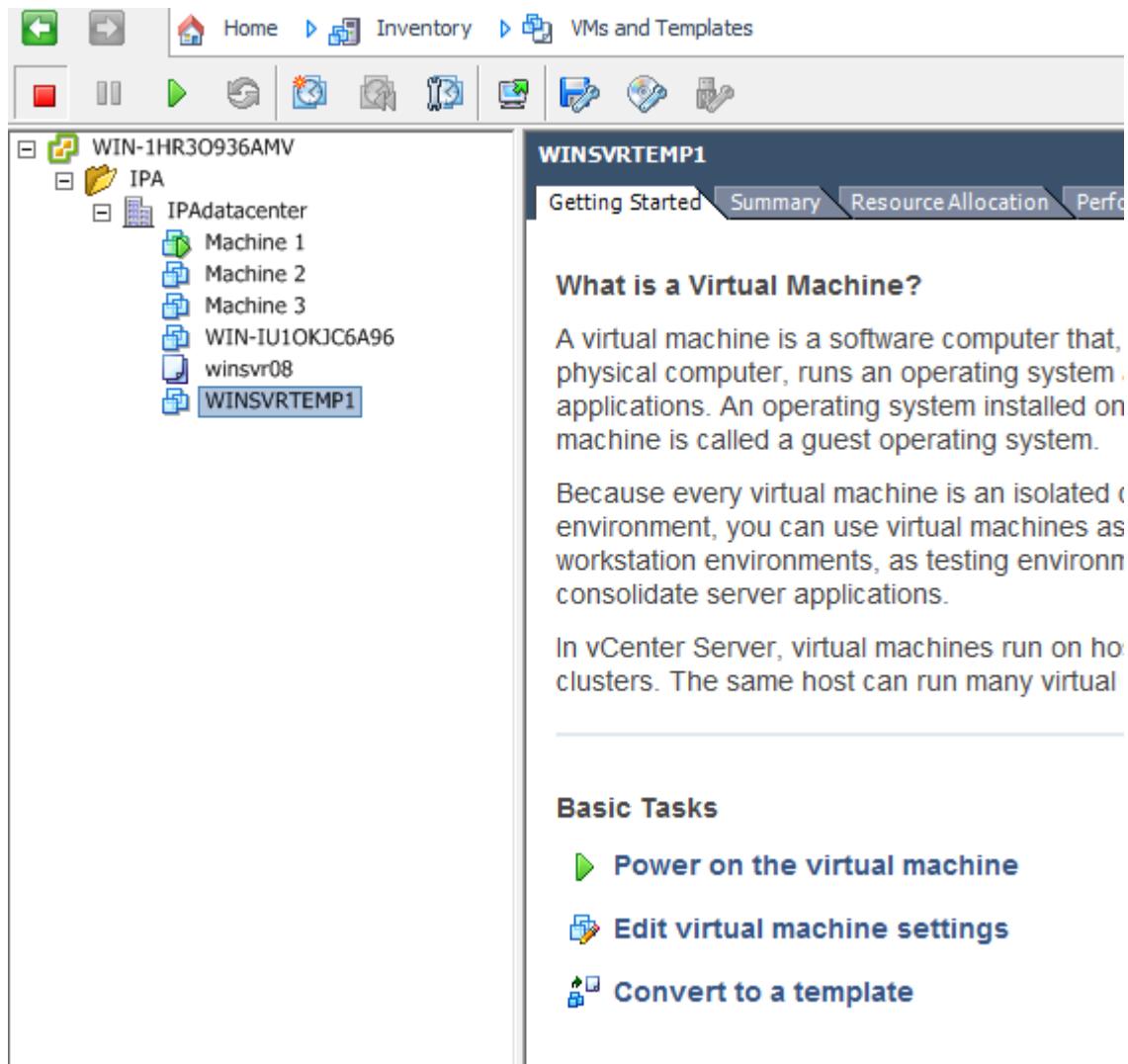
Step 16:

Review the deployment settings, once you are satisfied, then click Finish.



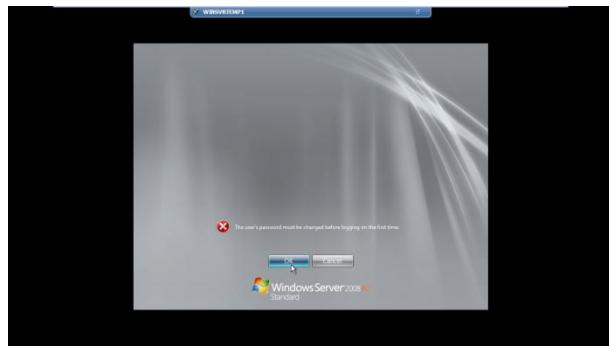
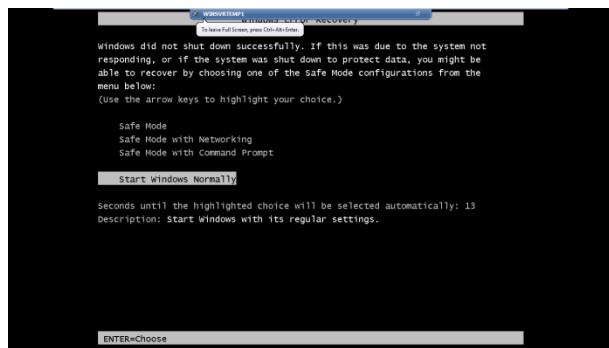
Step 17:

When the new virtual machine has been created, click “Power on the virtual machine” as normal.



Step 18:

As you can see, the new virtual machine, deployed from the template behaves as normal like any other new virtual machine, when viewed in the console.

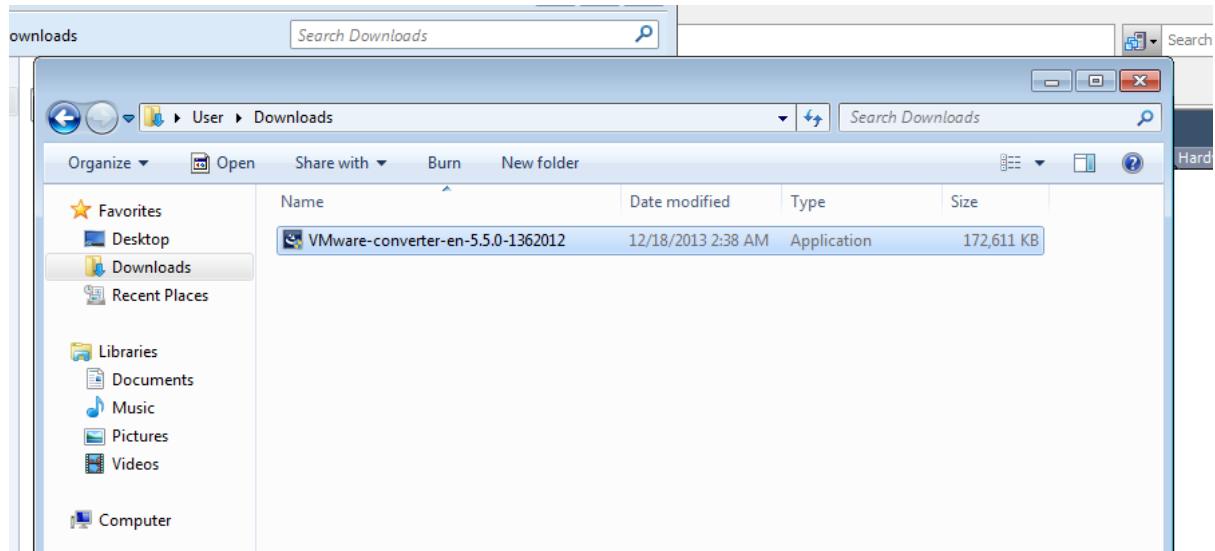


Task A.7

Using any compatible product, convert and outline the process of converting a physical computer to a virtual computer.

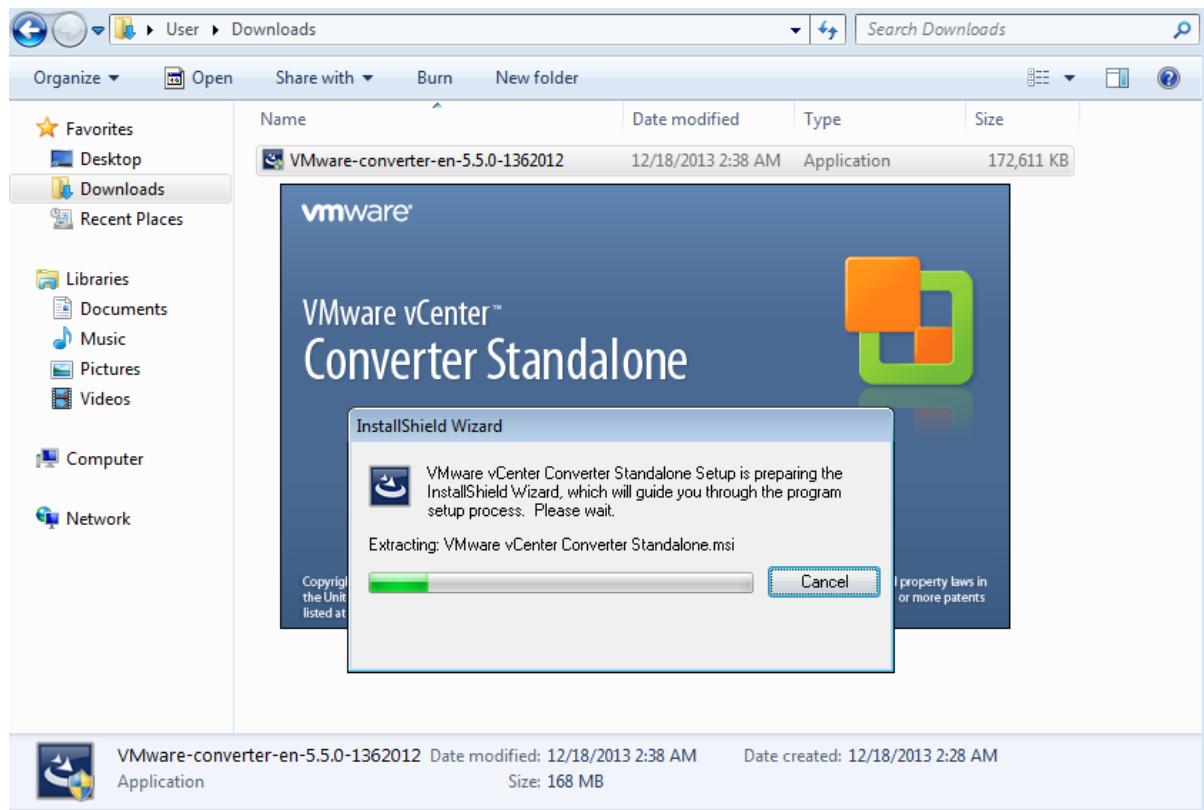
Step 1:

Download VMware Convertor from the VMware website. Locate the file when downloaded, then double click the file to begin the installation.



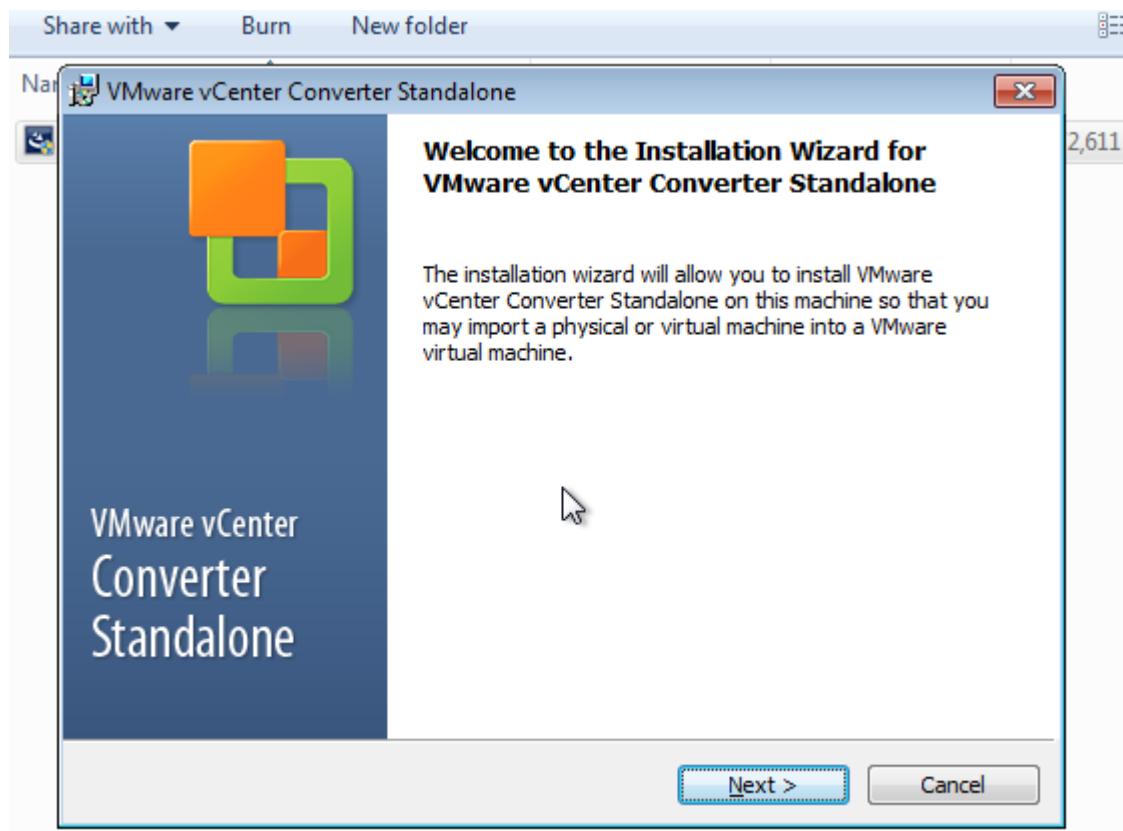
Step 2:

The Installshield Wizard will now begin.



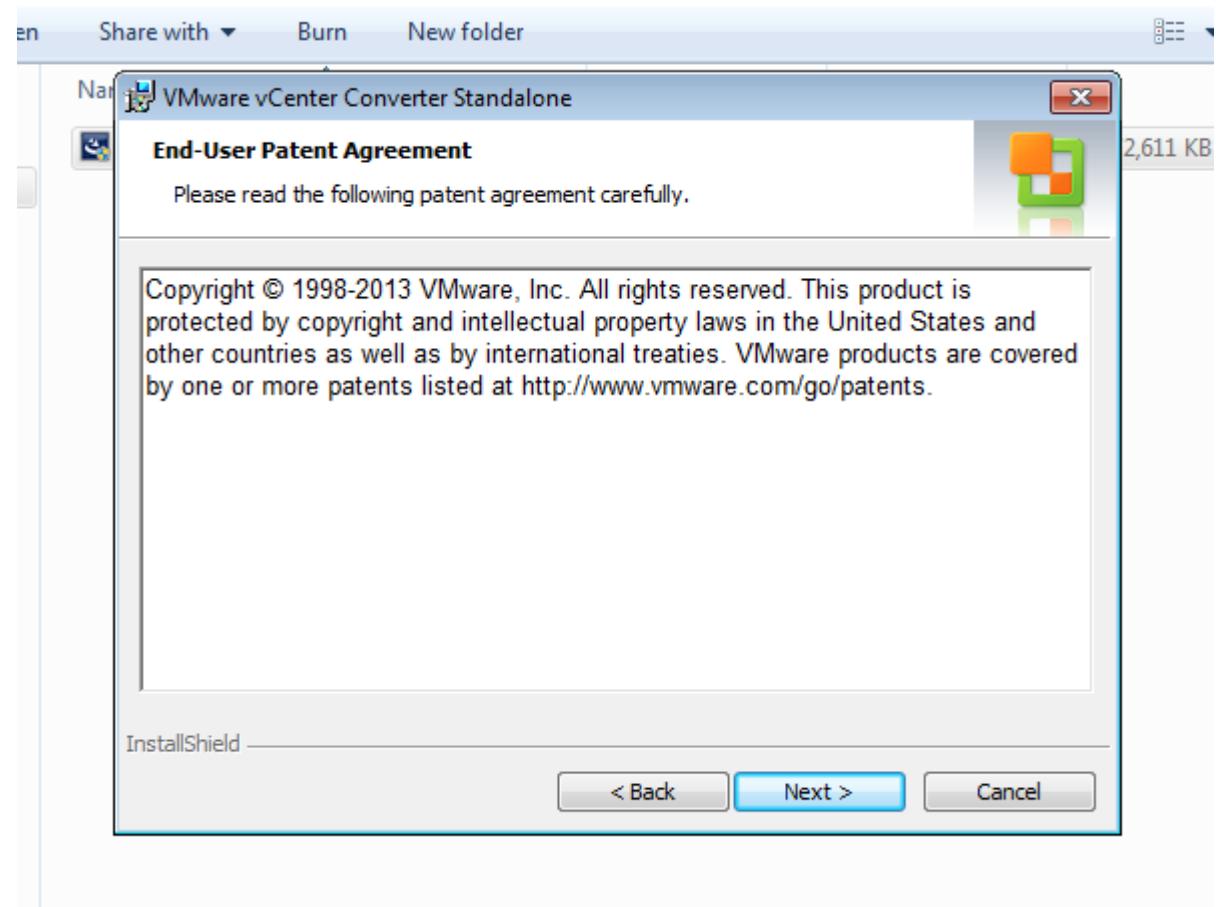
Step 3:

When the installation window prompts you in the window displayed below, click Next.



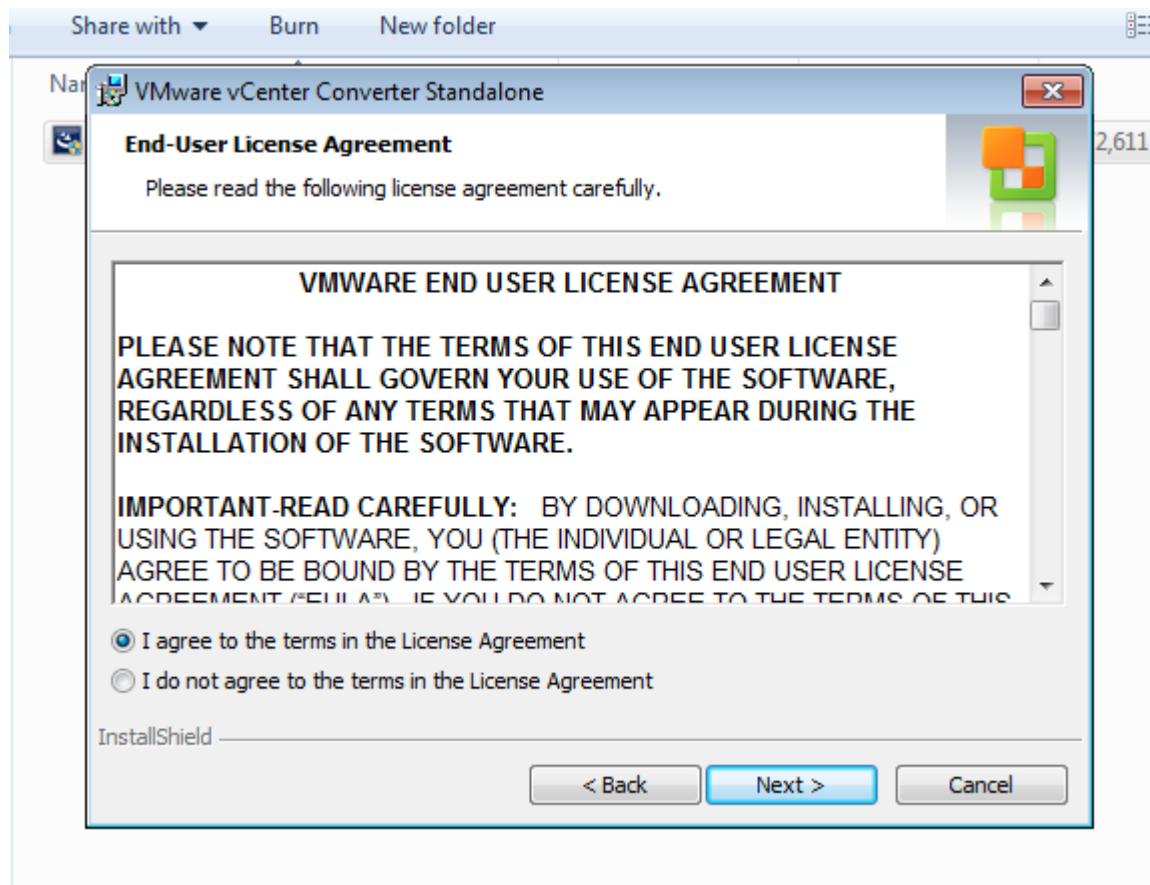
Step 4:

Agree with the licensing terms by clicking Next.



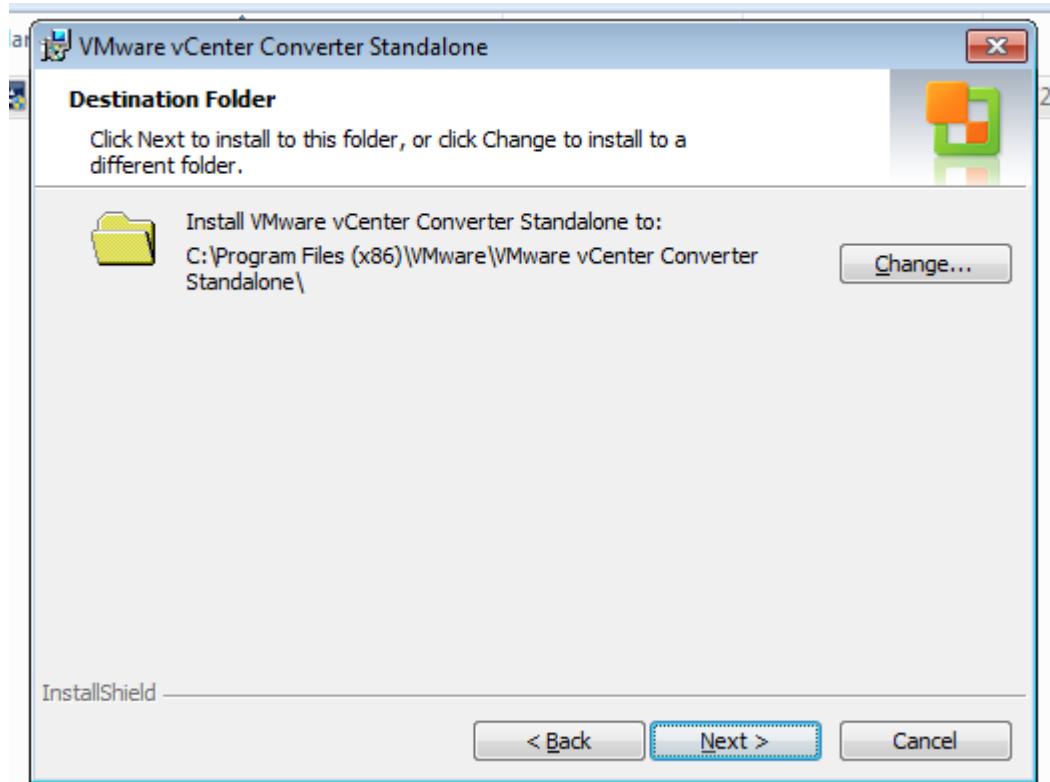
Step 5:

Select "I agree to the terms in the License Agreement", then click Next.



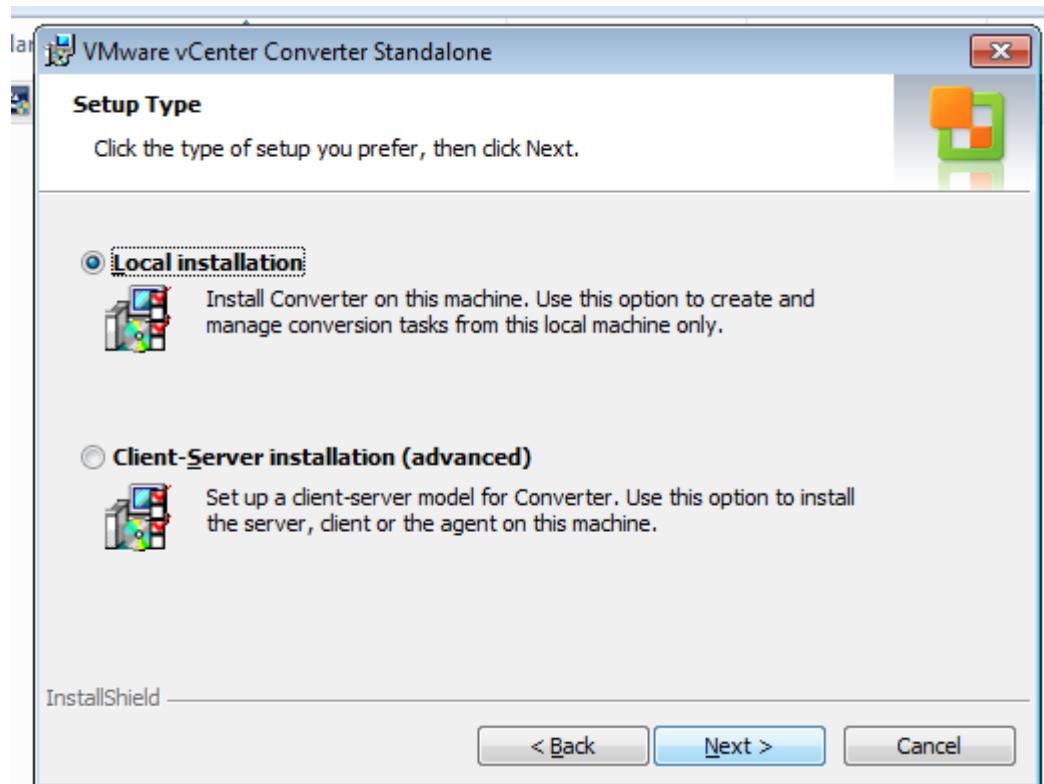
Step 6:

Choose the location you wish to install VMware's convertor. Then click Next.



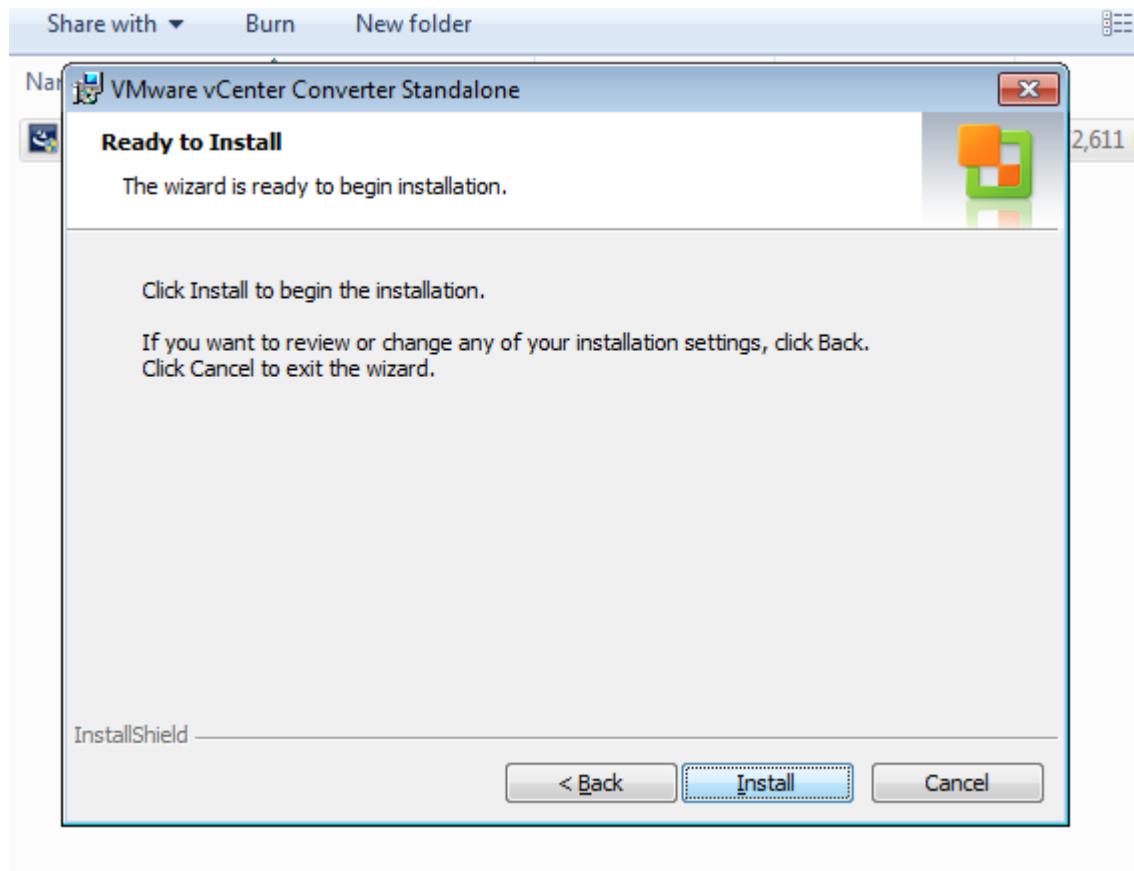
Step 7:

Choose “Local Installation” to install it on the local client machine, then click Next.



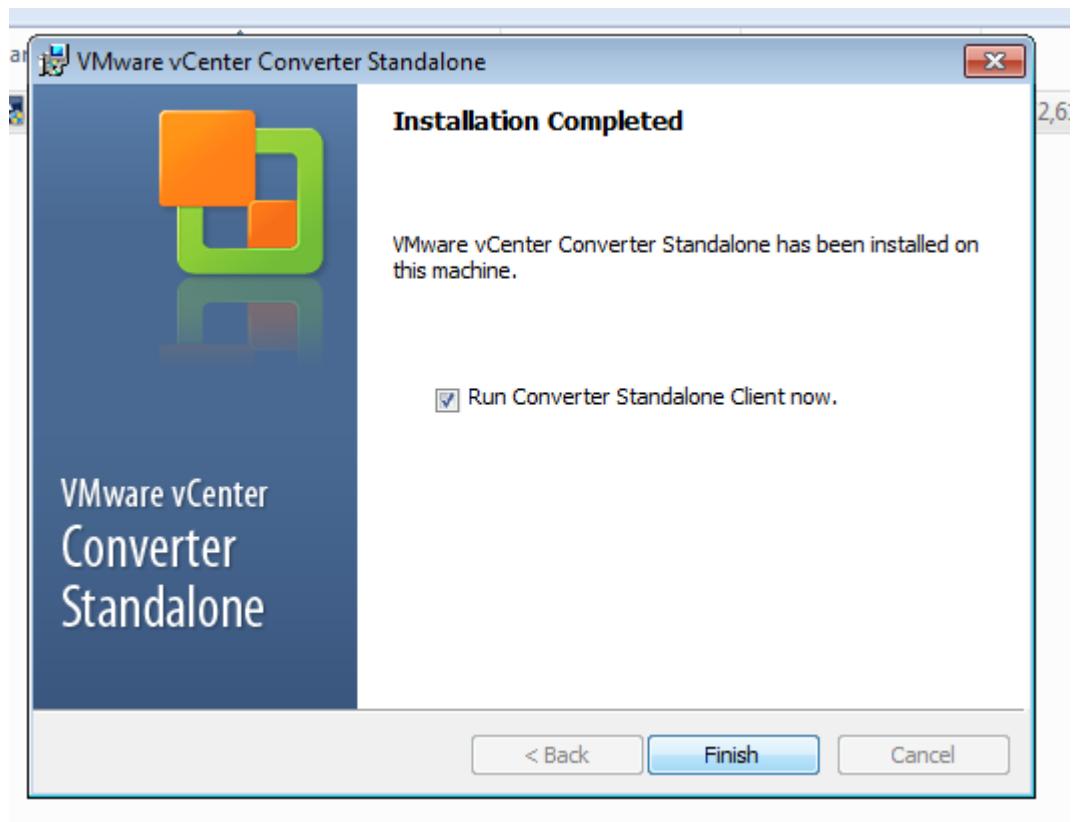
Step 8:

Click Install.



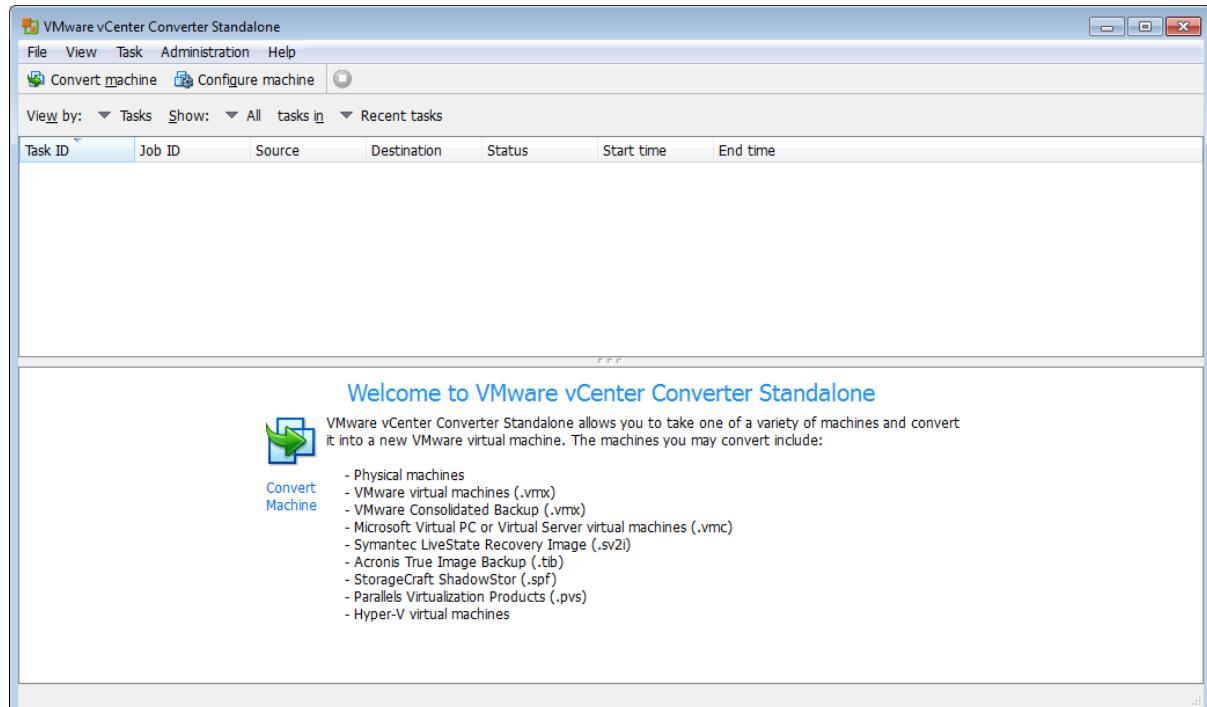
Step 9:

When the Installation wizard has completed, click Finish.



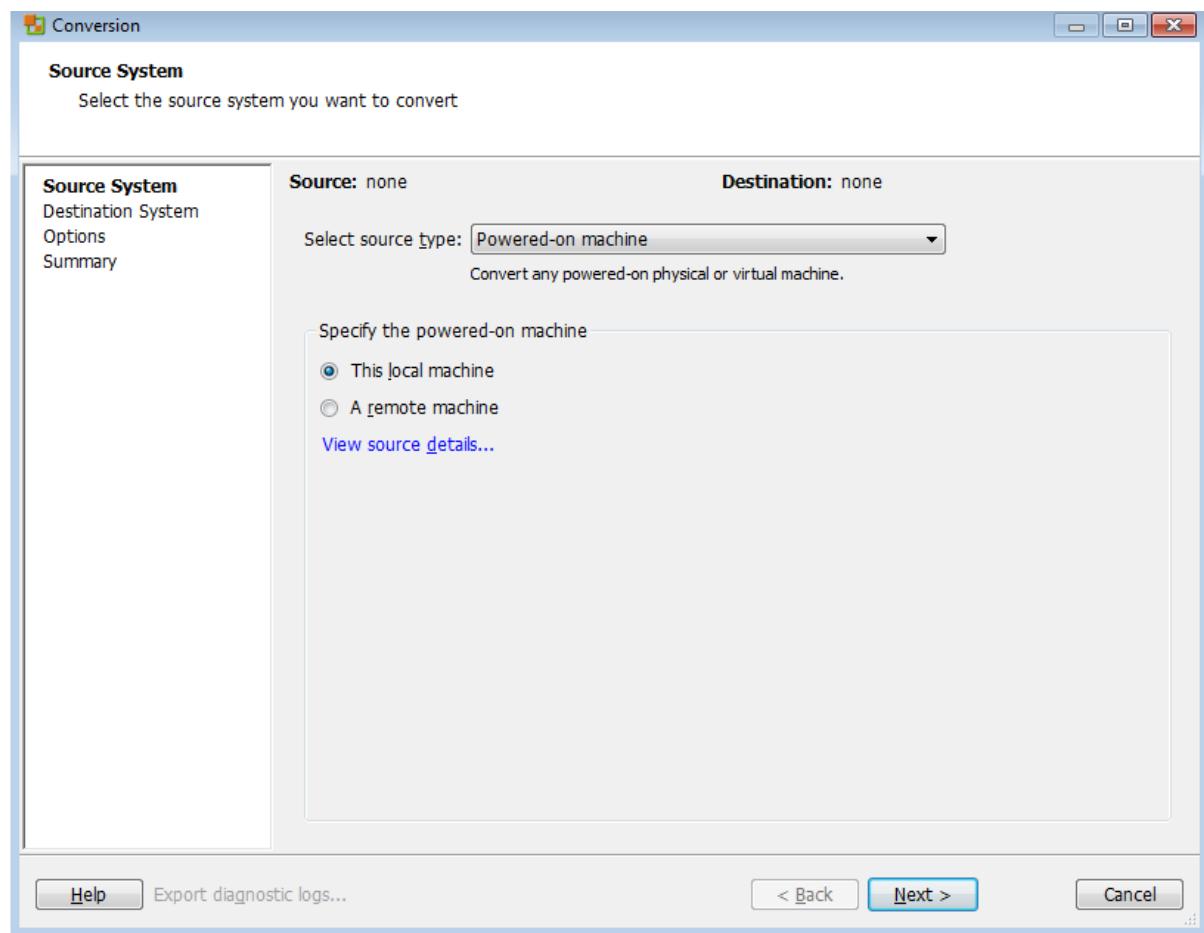
Step 10:

When vCenter Converter starts click convert machine.



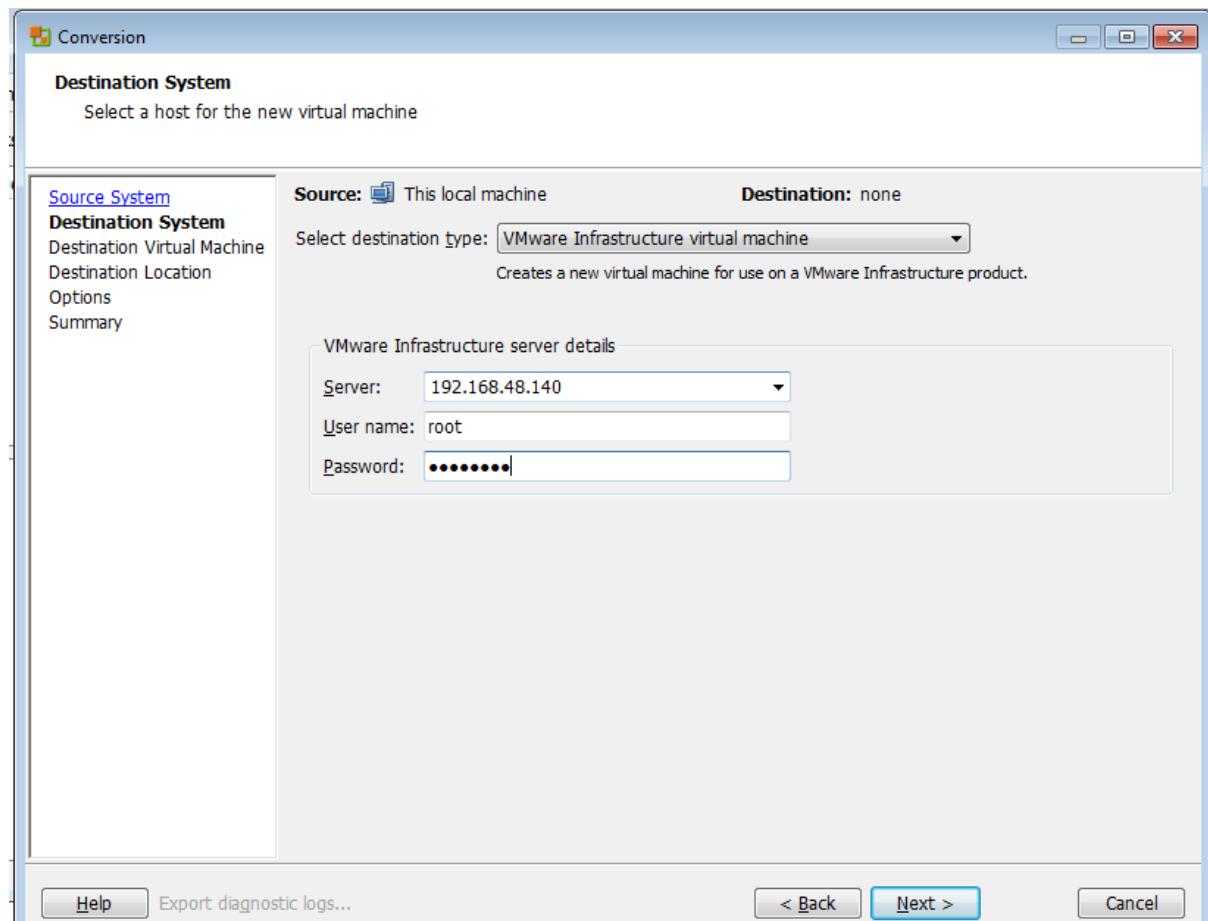
Step 11:

Select the source type and specify the state of the machine. Then click next.



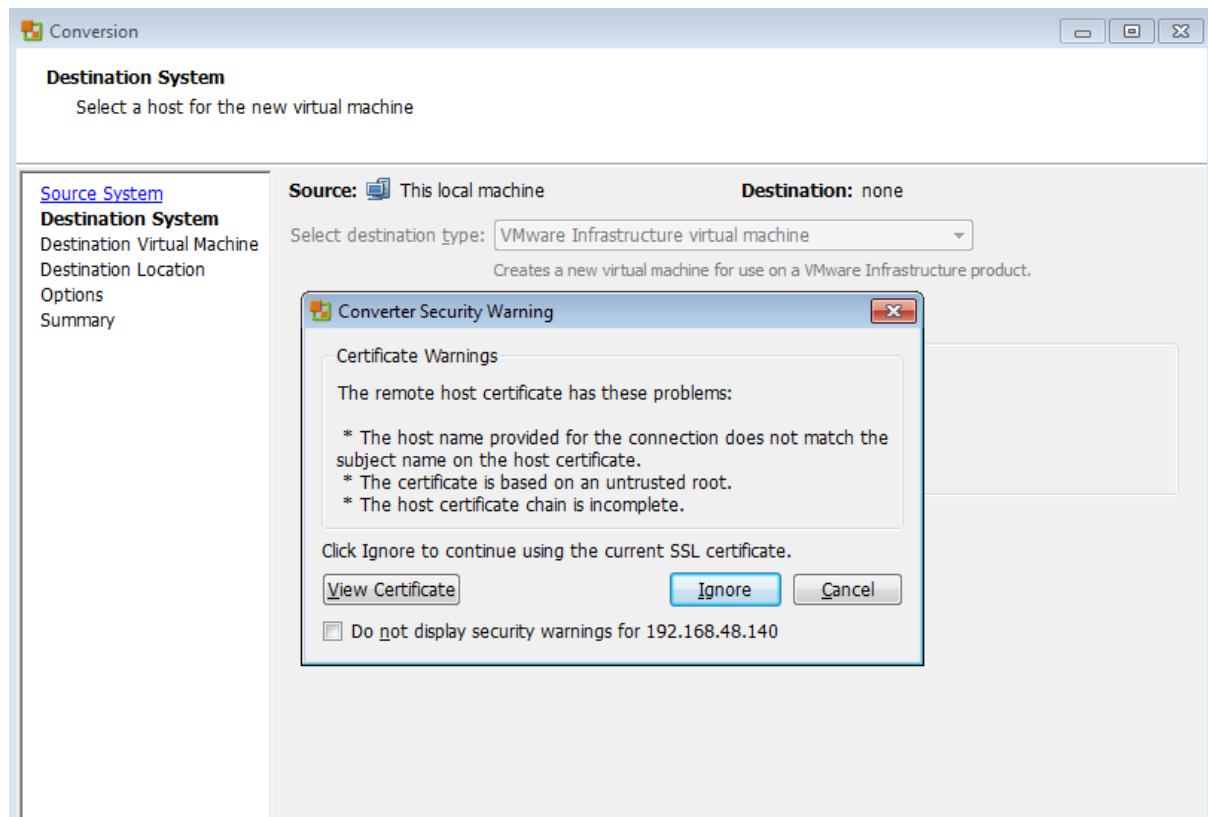
Step 12:

Enter the destination IP address, username and password, then click Next.



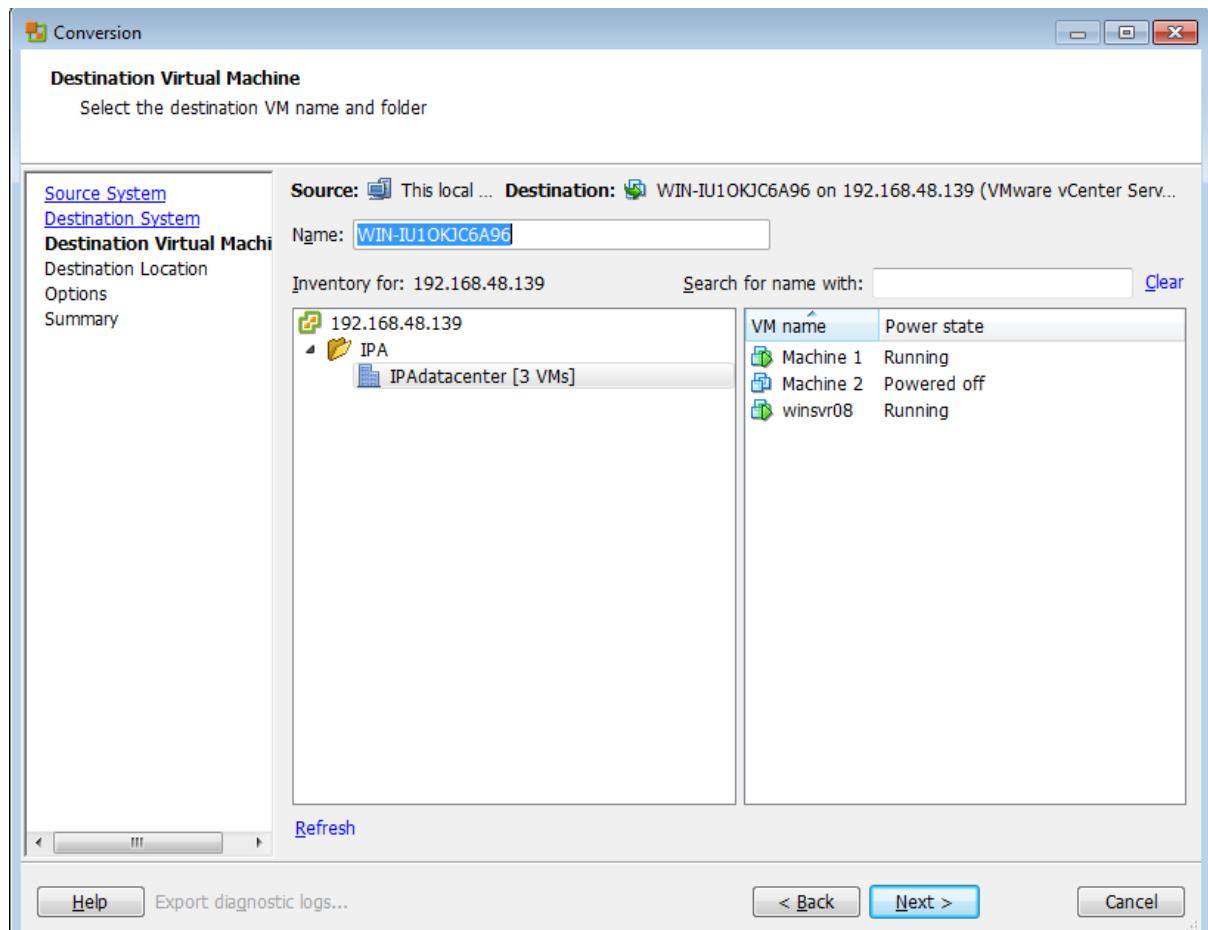
Step 13:

Click ignore to continue using the current SSL certificate and continue the conversion.



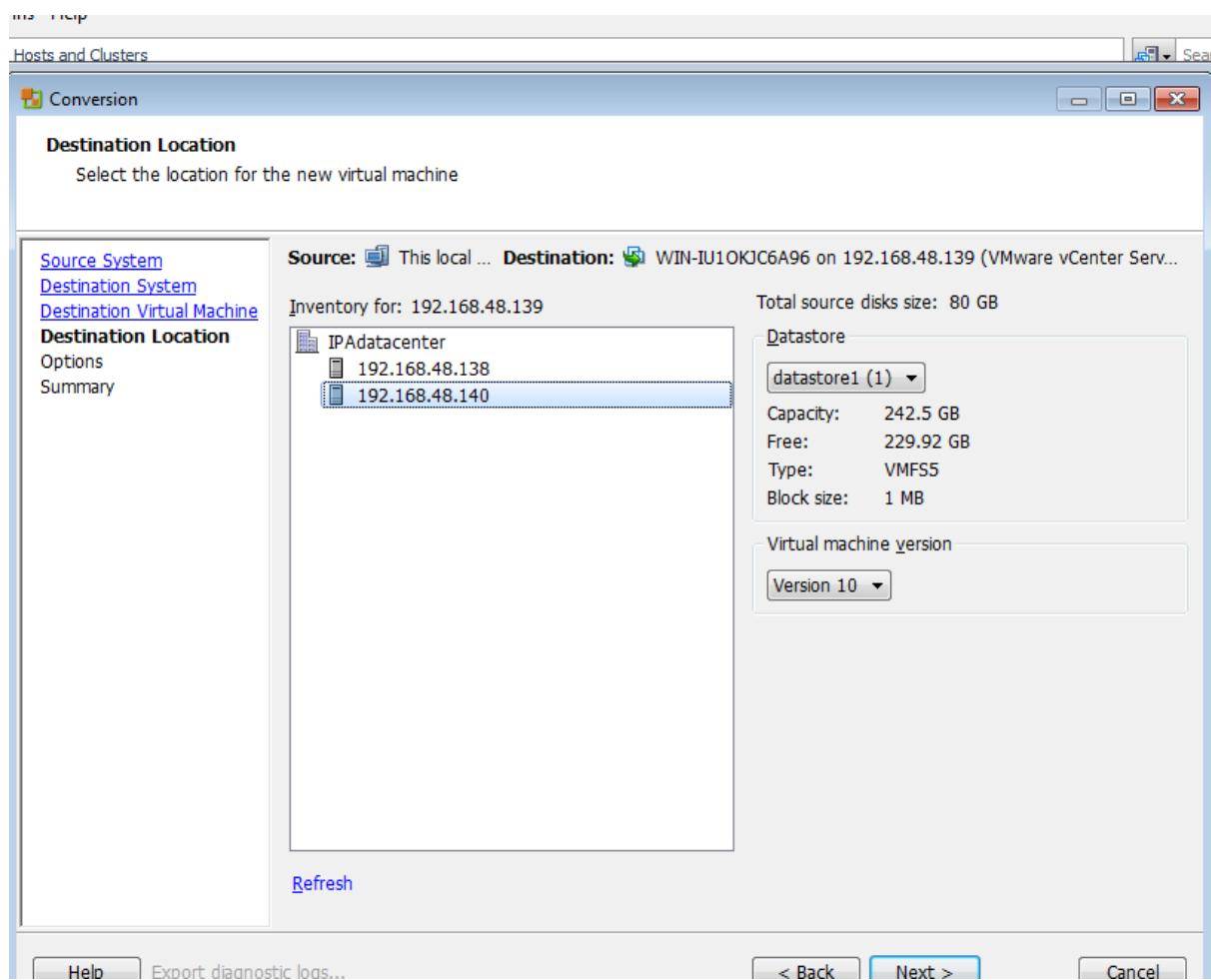
Step 14:

Select a name for the destination virtual machine and the inventory location. Then click next.



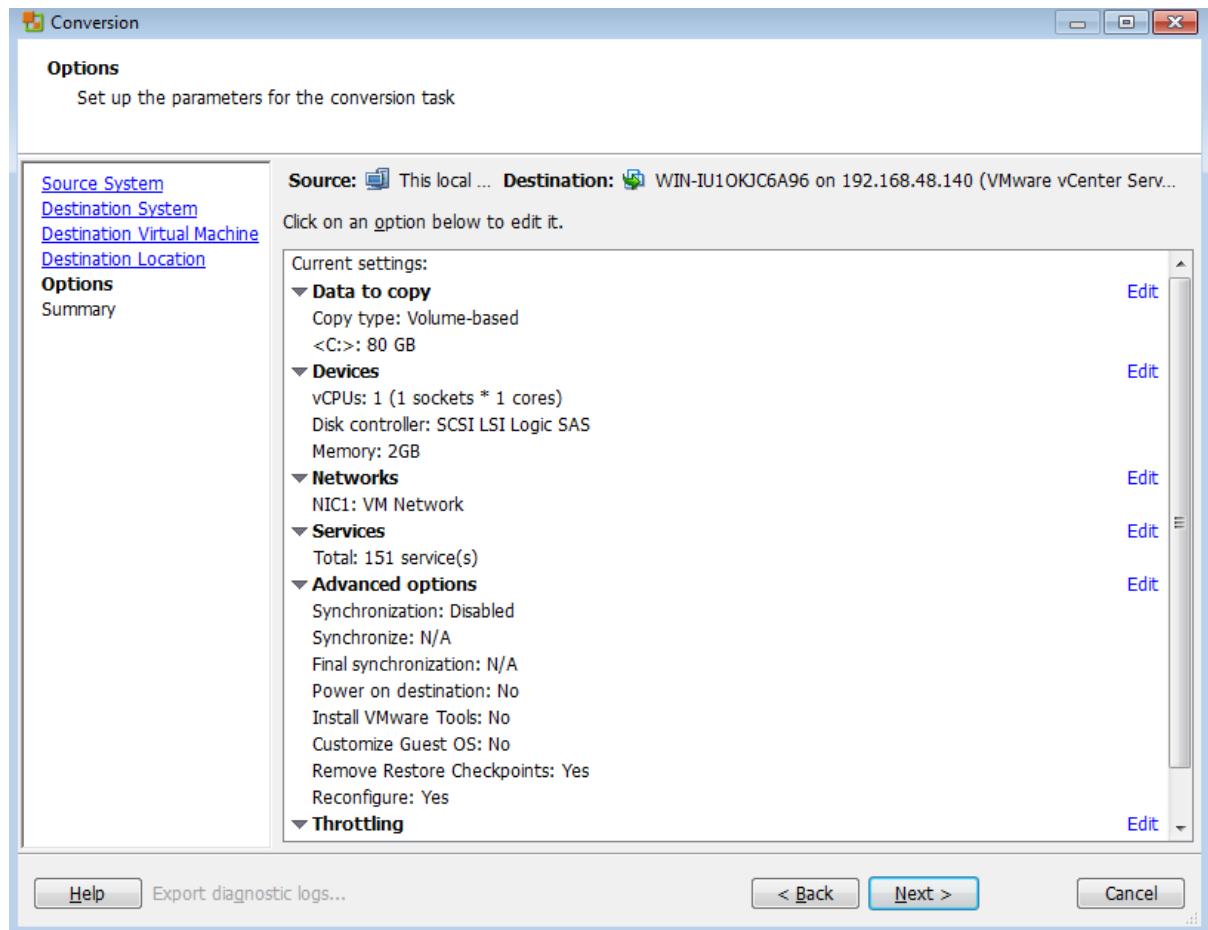
Step 15:

Choose the destination Host from the data center, then click Next.



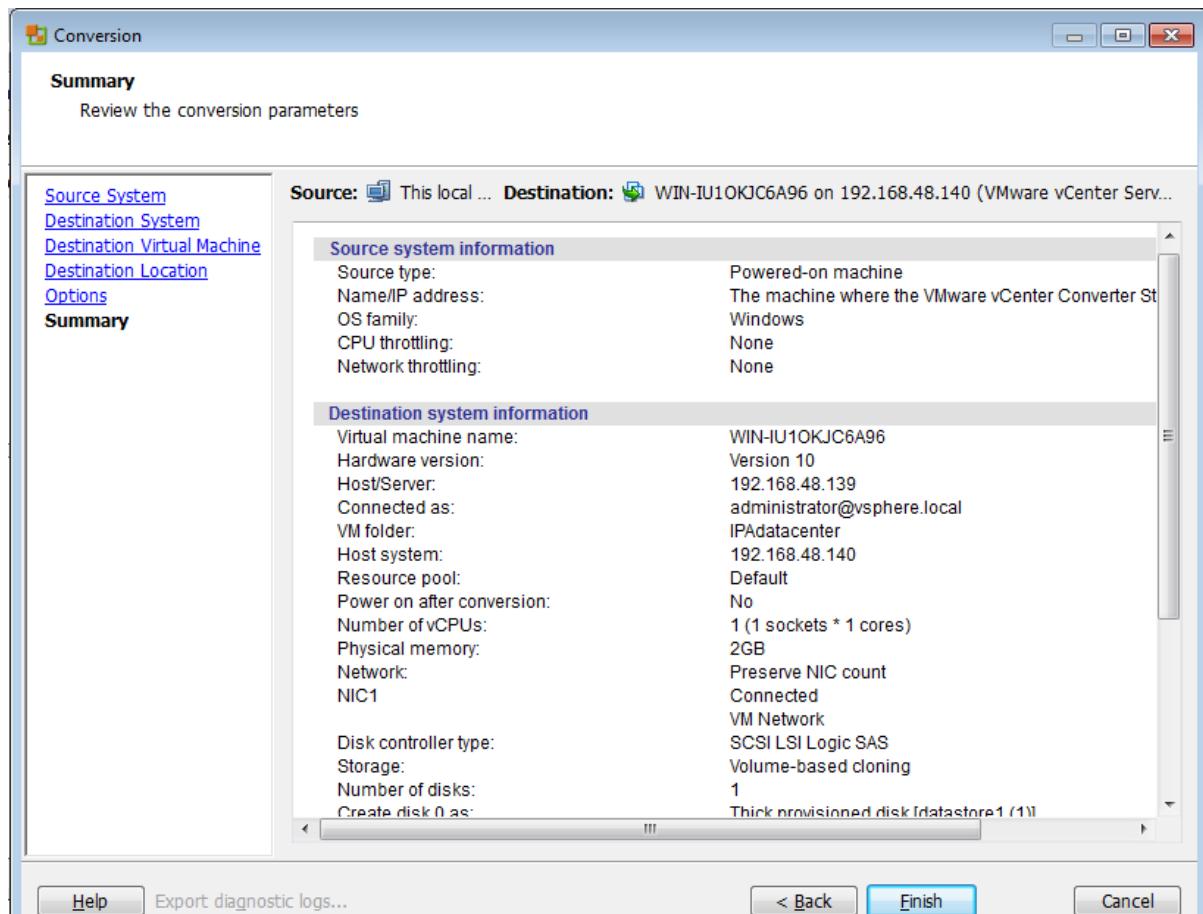
Step 16:

Once you are satisfied with the conversion options, click Next.



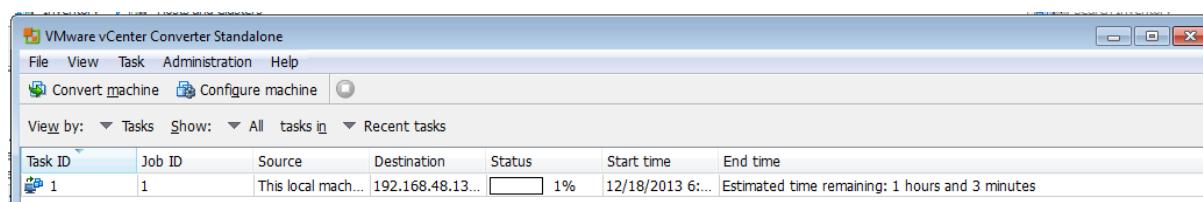
Step 17:

Once you are satisfied with the machine's conversion summary click Finish.



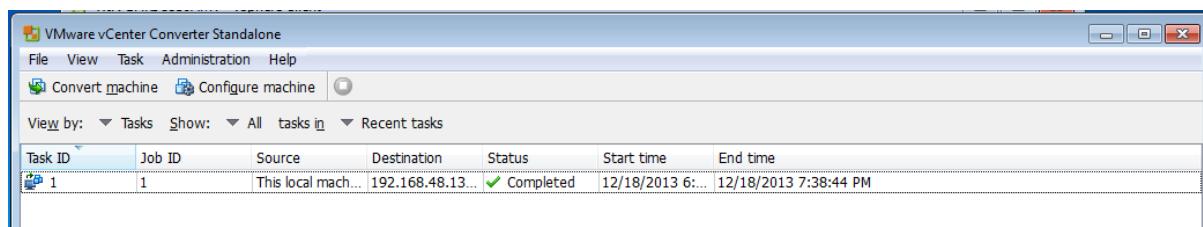
Step 18:

When the conversion is being carried out, it will be displayed as below.



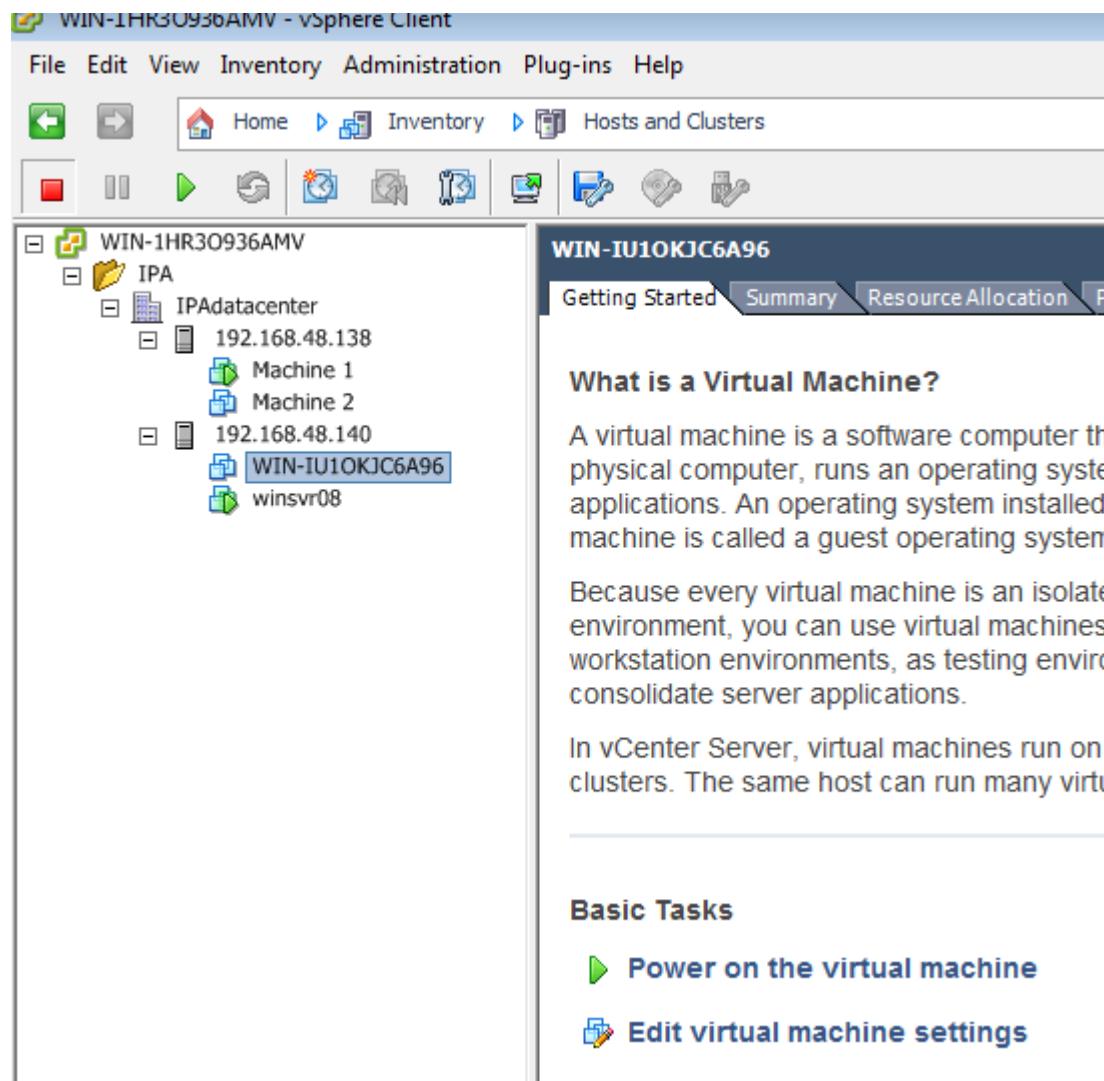
Step 19:

The status will show as "completed" when the conversion has finished.



Step 20:

Connect to the vCenter Server, then you will see the physical to virtual machine located on the host. Then click Power On to power on the virtual machine.



Step 21:

After the converted virtual machine has started, view the log on screen, notice that the username is different. The password however will be the same.



Step 22:

Notice the desktop is same as the original physical machine.



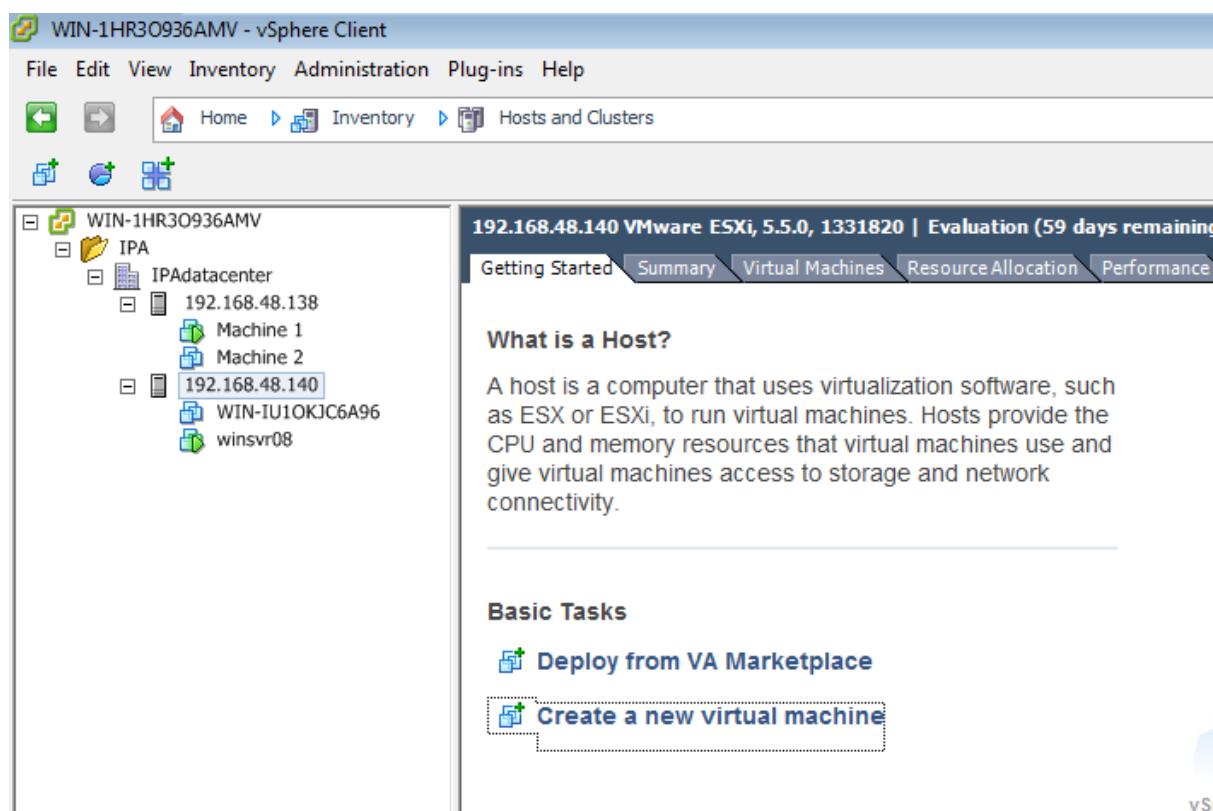
Task A.8

Using a desktop virtualization product of your choice, create a third virtual machine ‘Machine 3’ on this machine perform a default installation of Debian Linux.

Step 1:

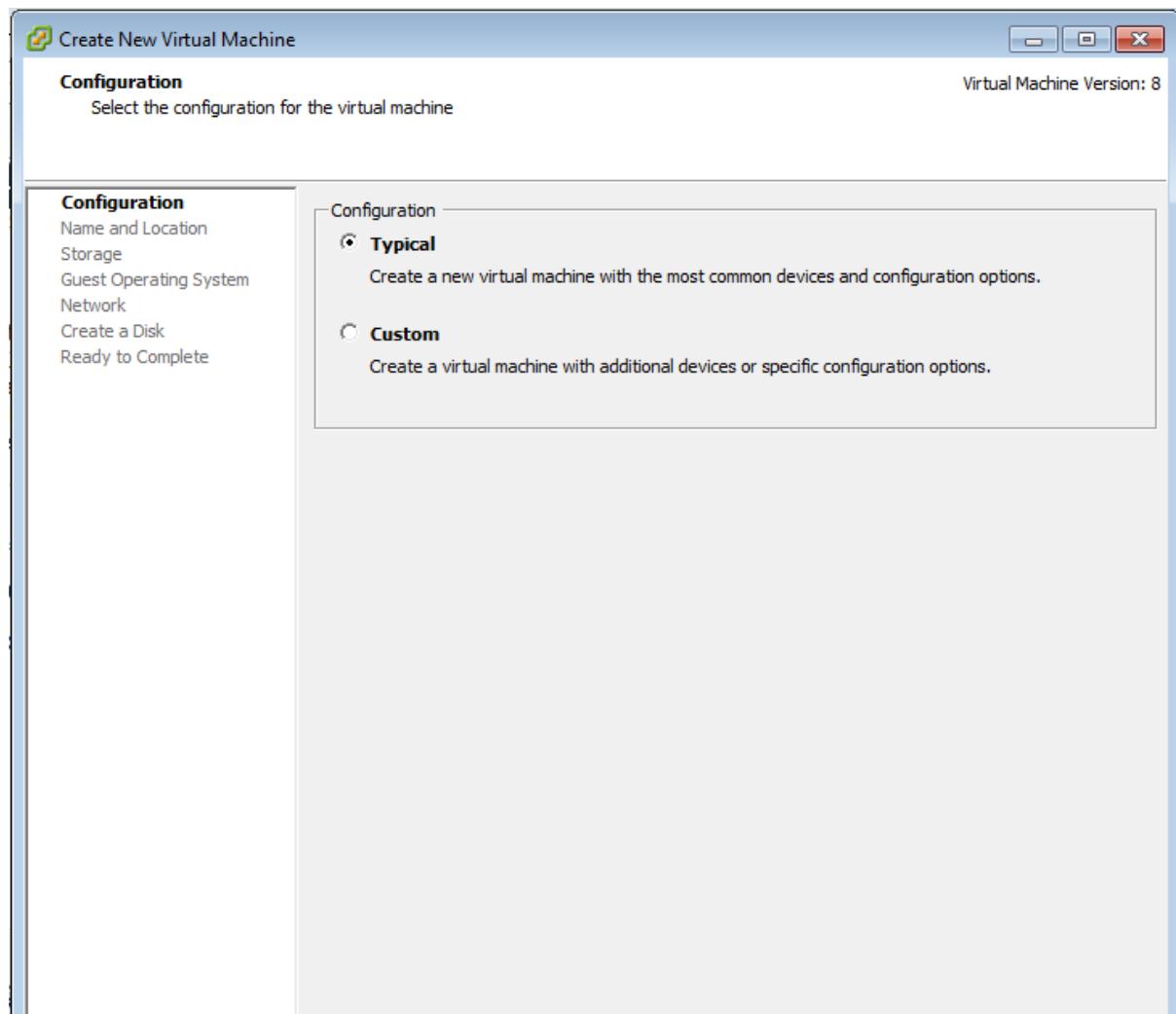
Download linux Debian, then upload the ISO to the datastore using the same slides as Task 2, Machine 2 steps 1 to 8.

Select the IP address of the host from the vSphere client vCenter Server menu, then click “Create New Virtual Machine”.



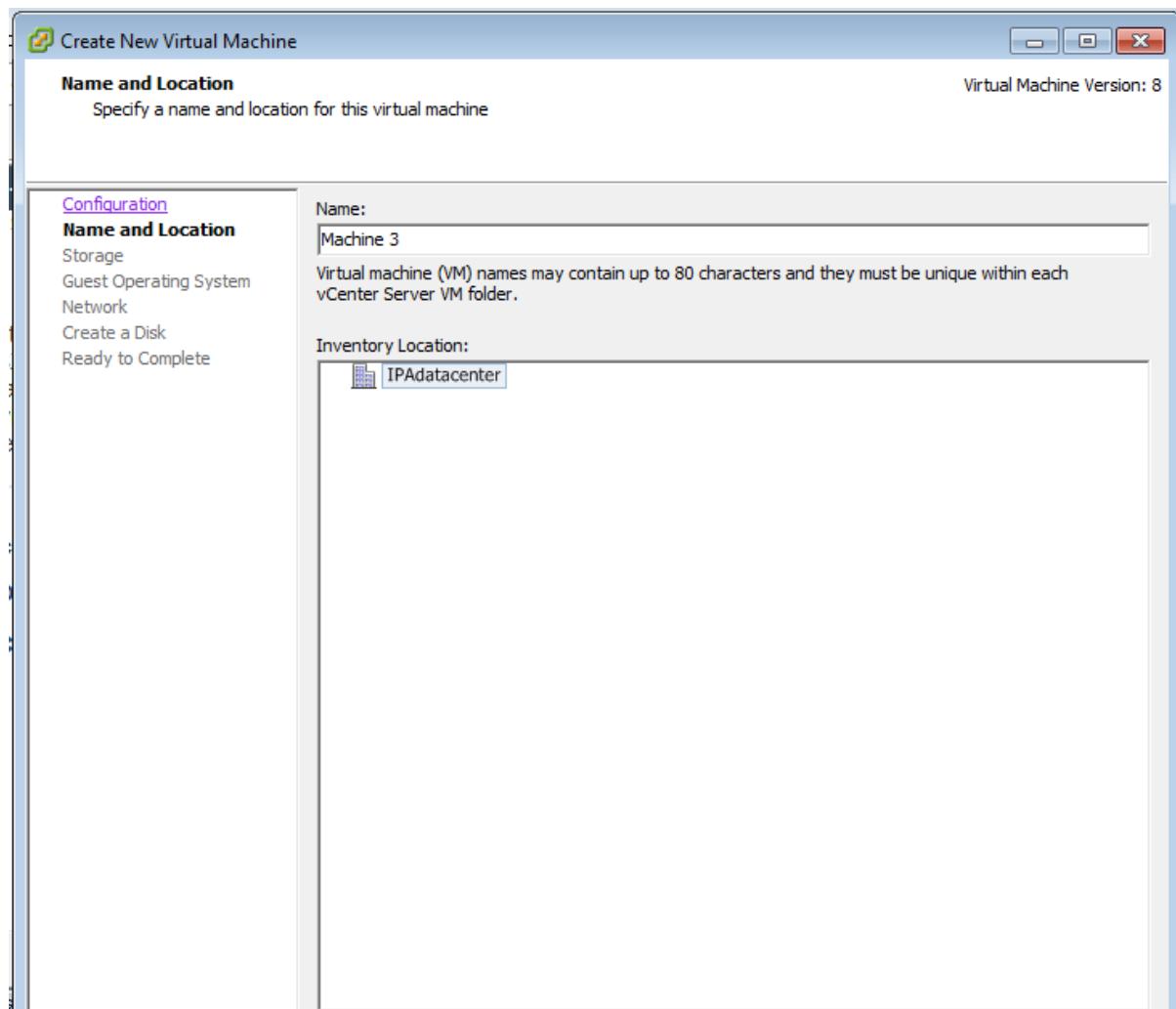
Step 2:

Choose Typical configuration then click Next.



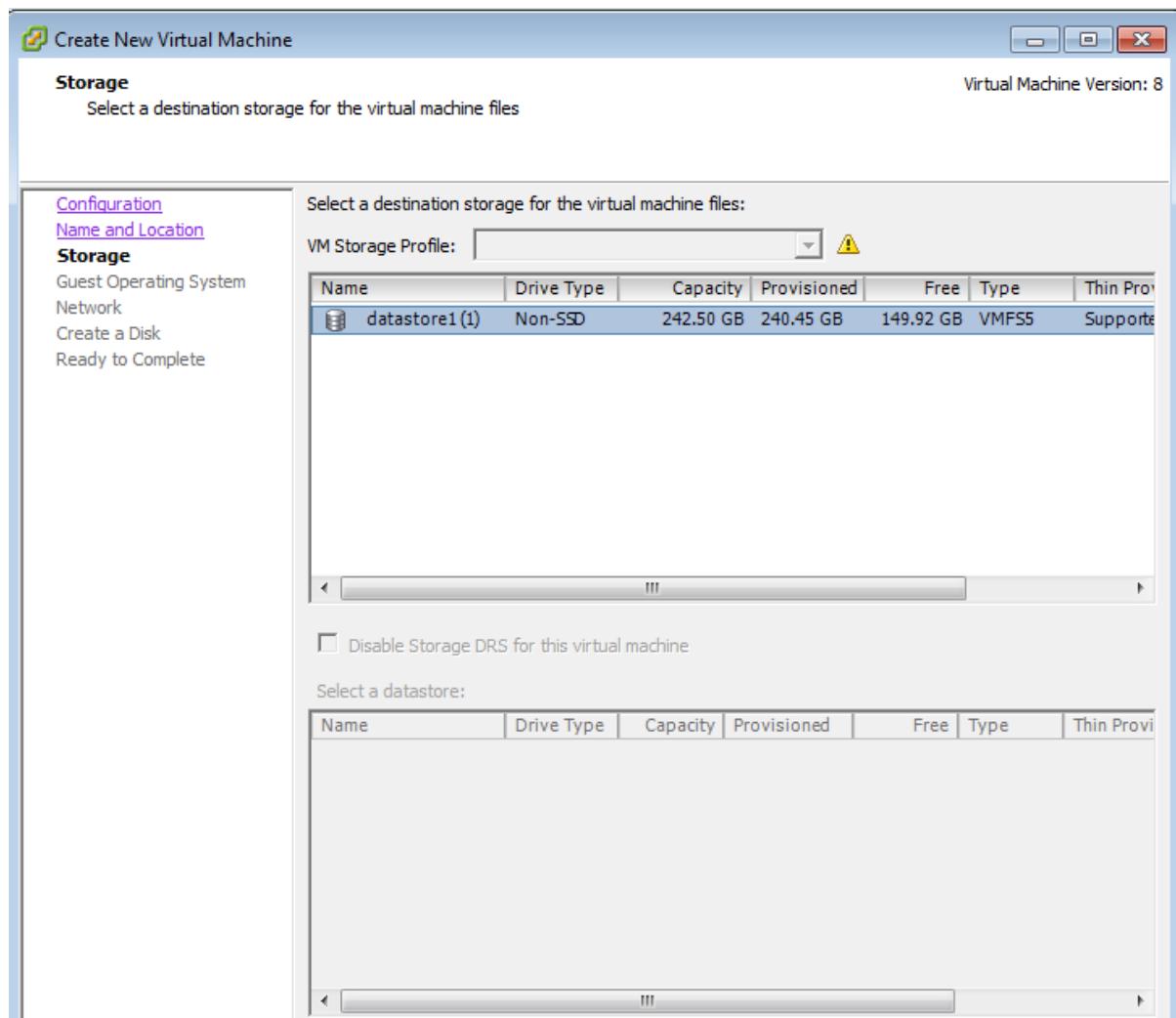
Step 3:

Choose a name for the debian machine, then click Next. For the purpose of the assignment, the name of the virtual machine is “Machine 3”.



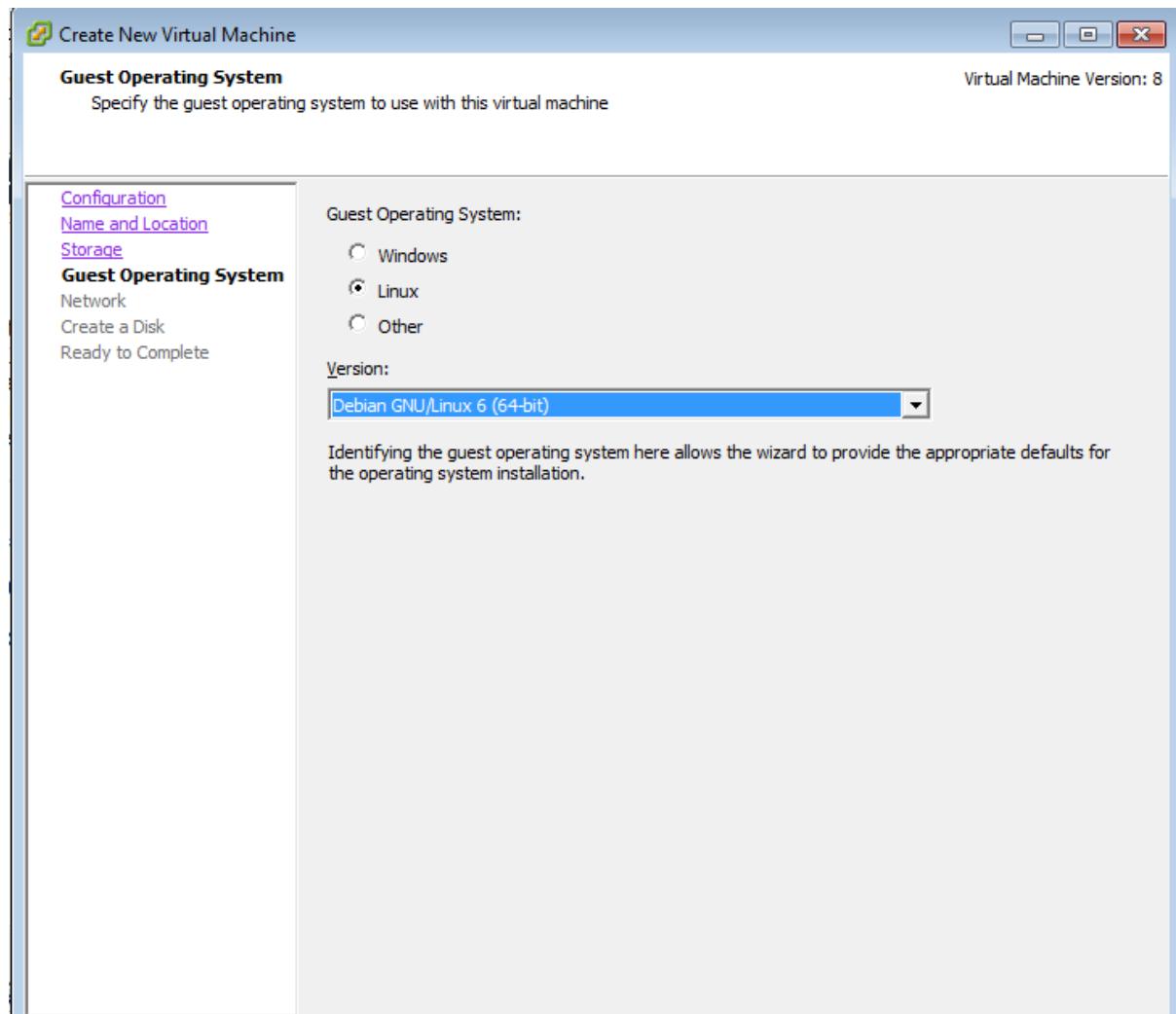
Step 4:

Select the storage area for the machine, then click Next.



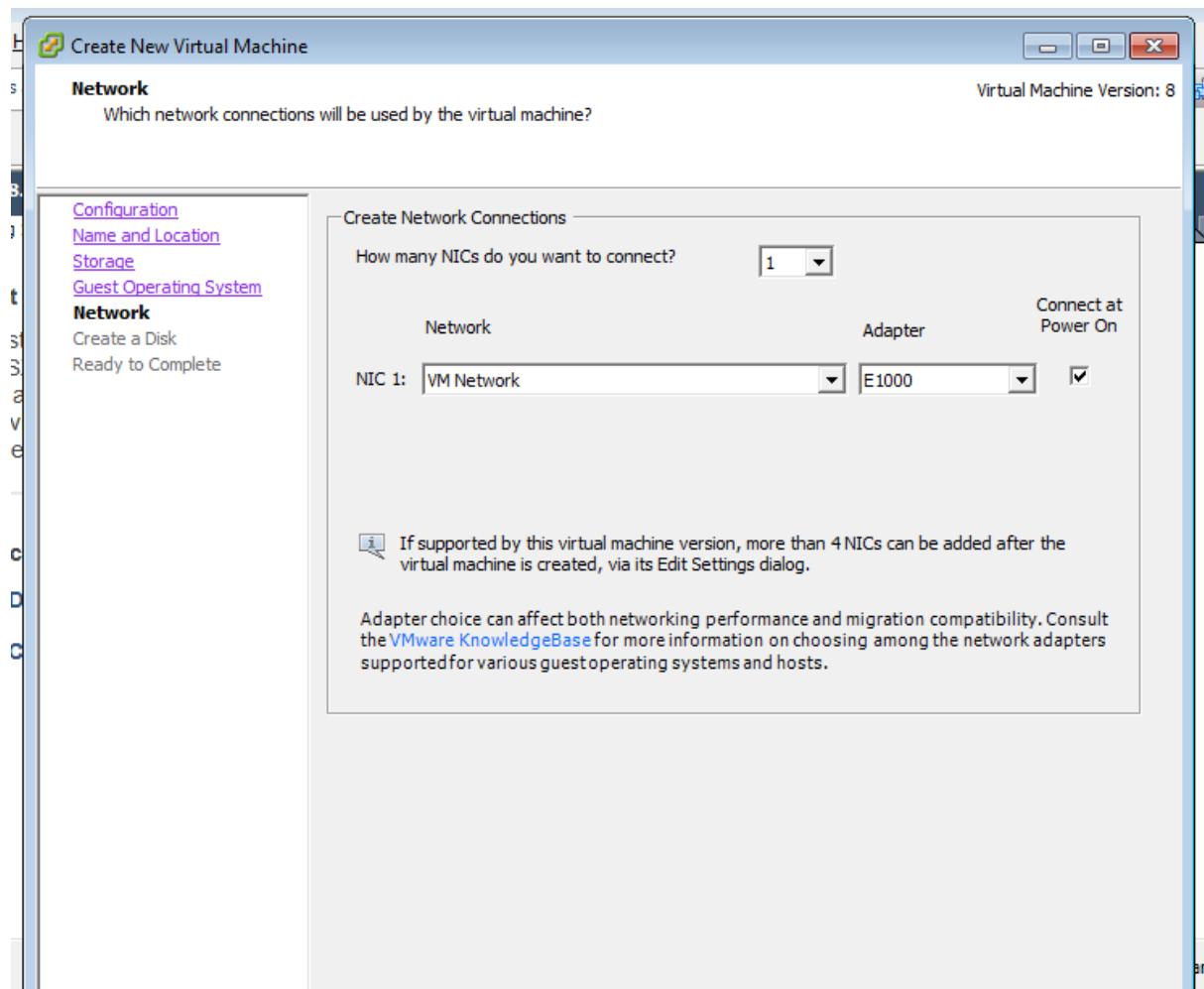
Step 5:

Choose the correct setting the guest operating system. The settings should be configured as below, then click Next.



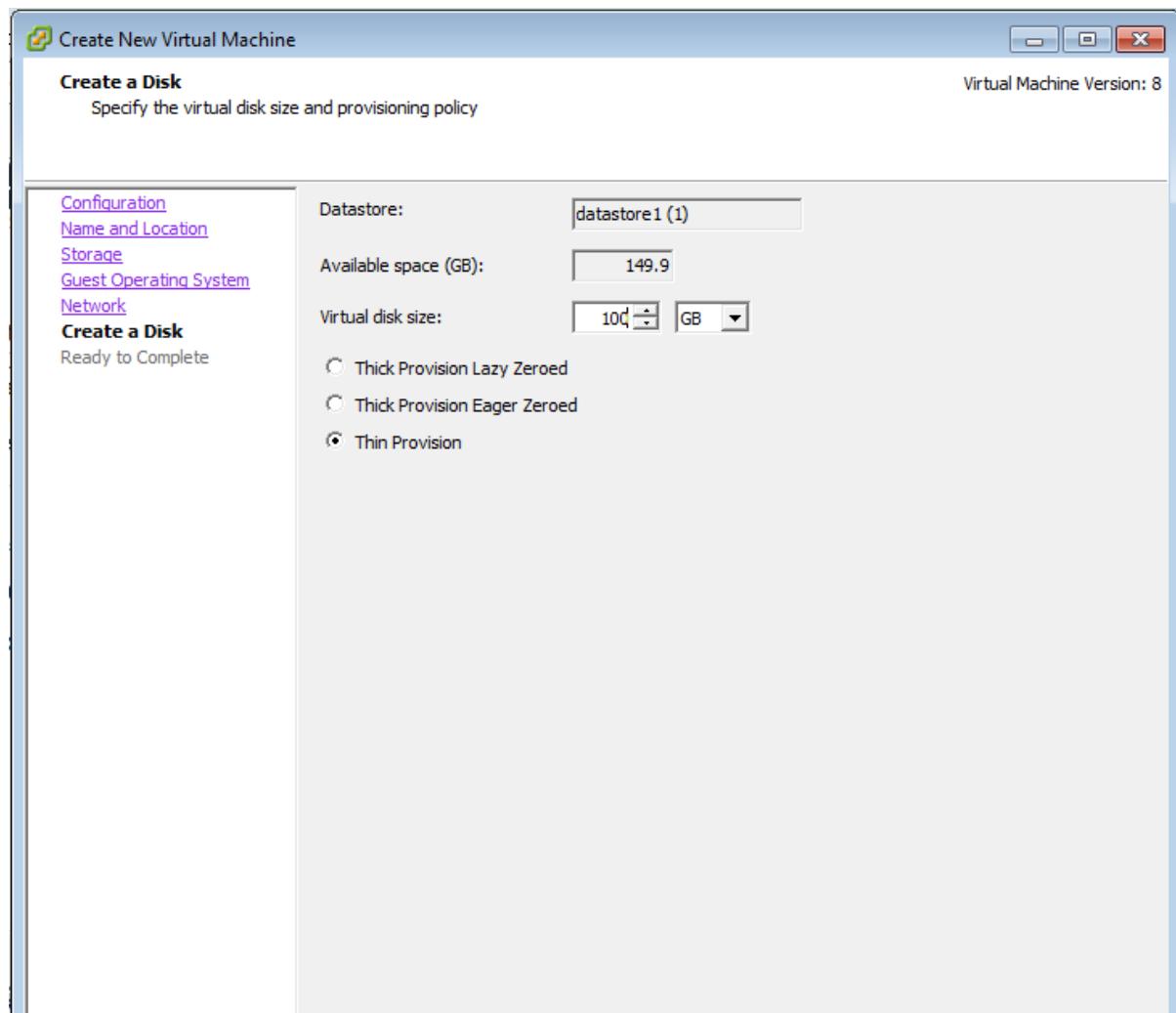
Step 6:

Leave the network settings as default, then click Next.



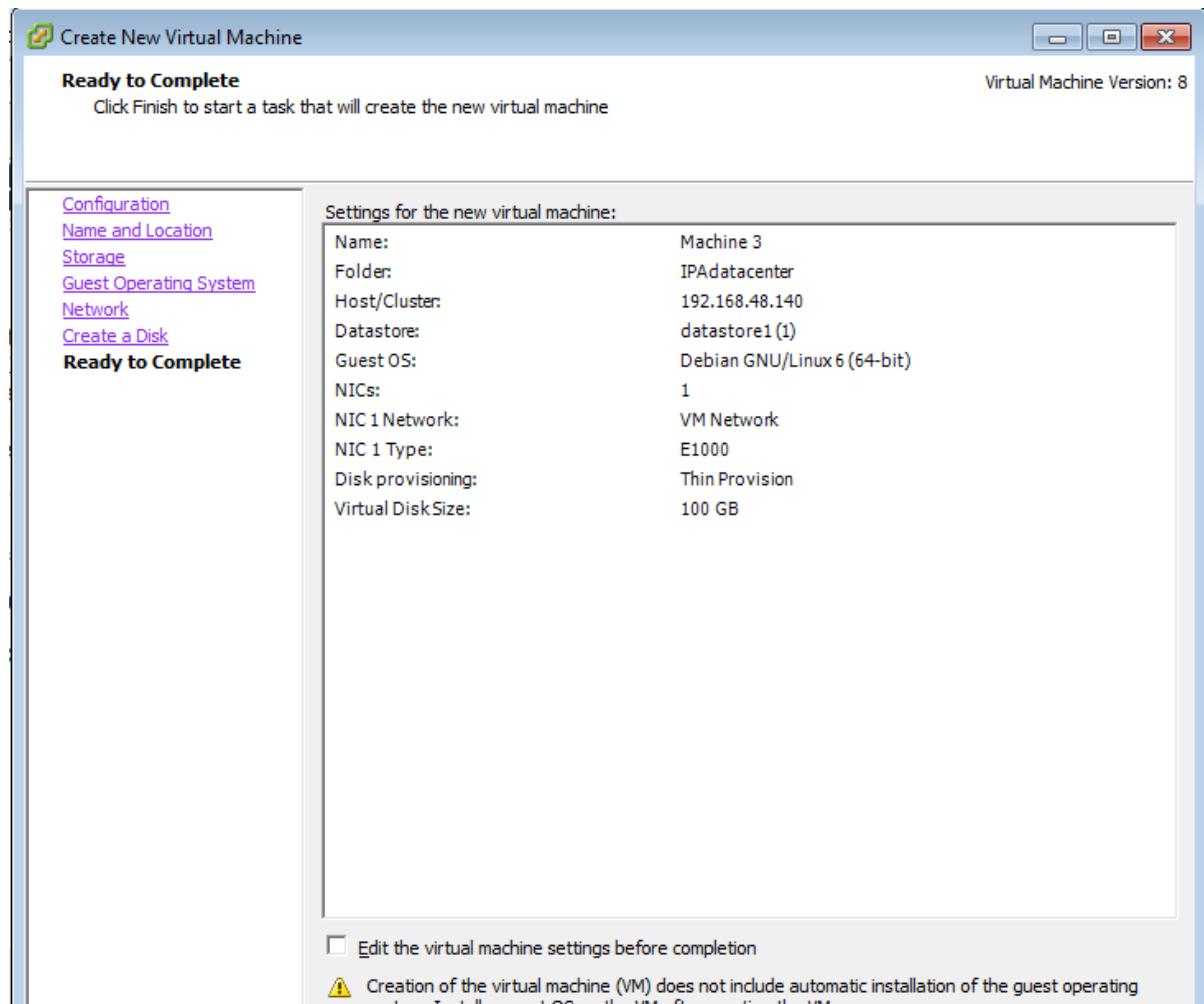
Step 7:

Set the hard drive size to 100GB then select Thin Provisioning, then click Next.



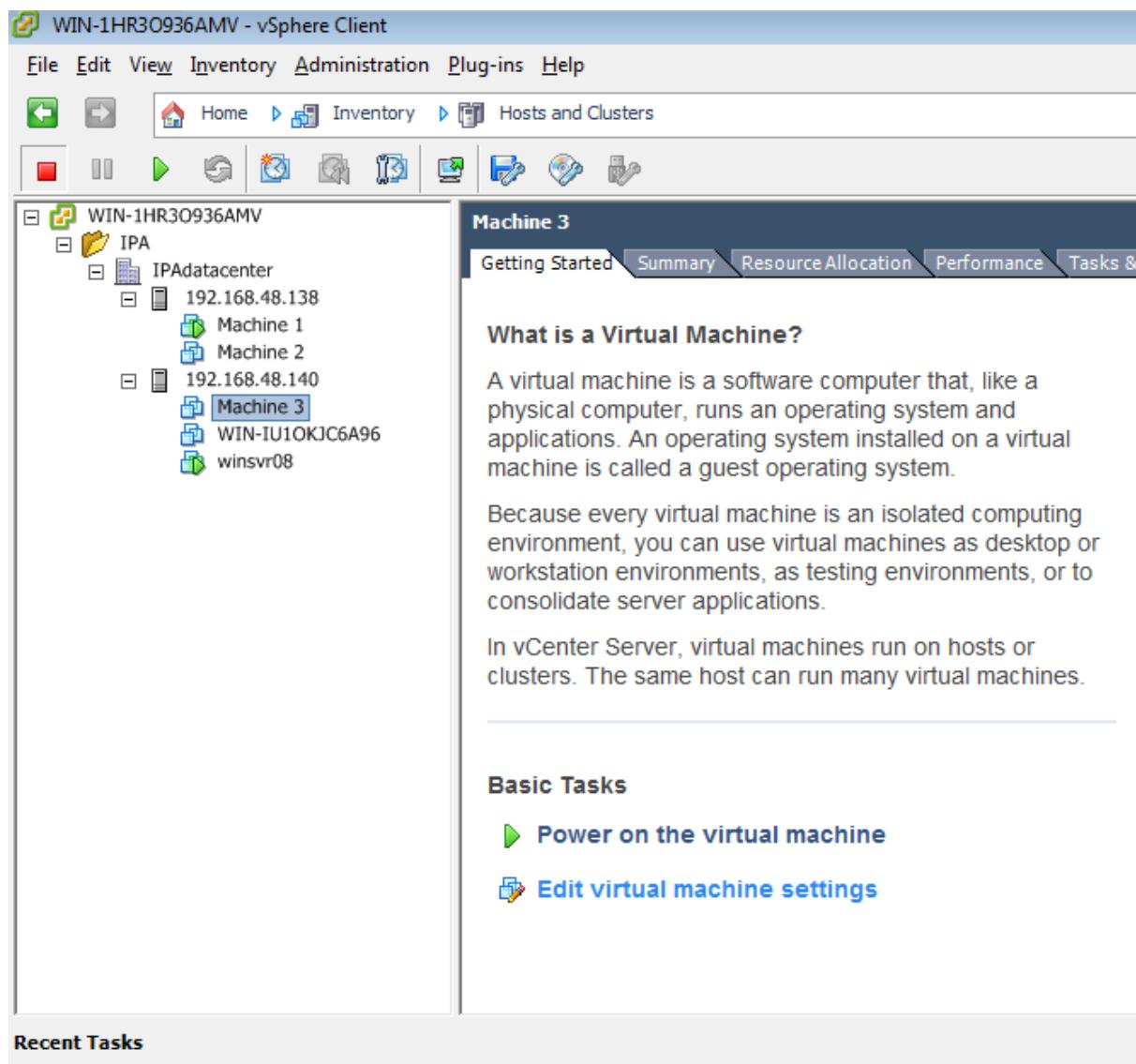
Step 8:

Once you are happy with the summary, click Finish.



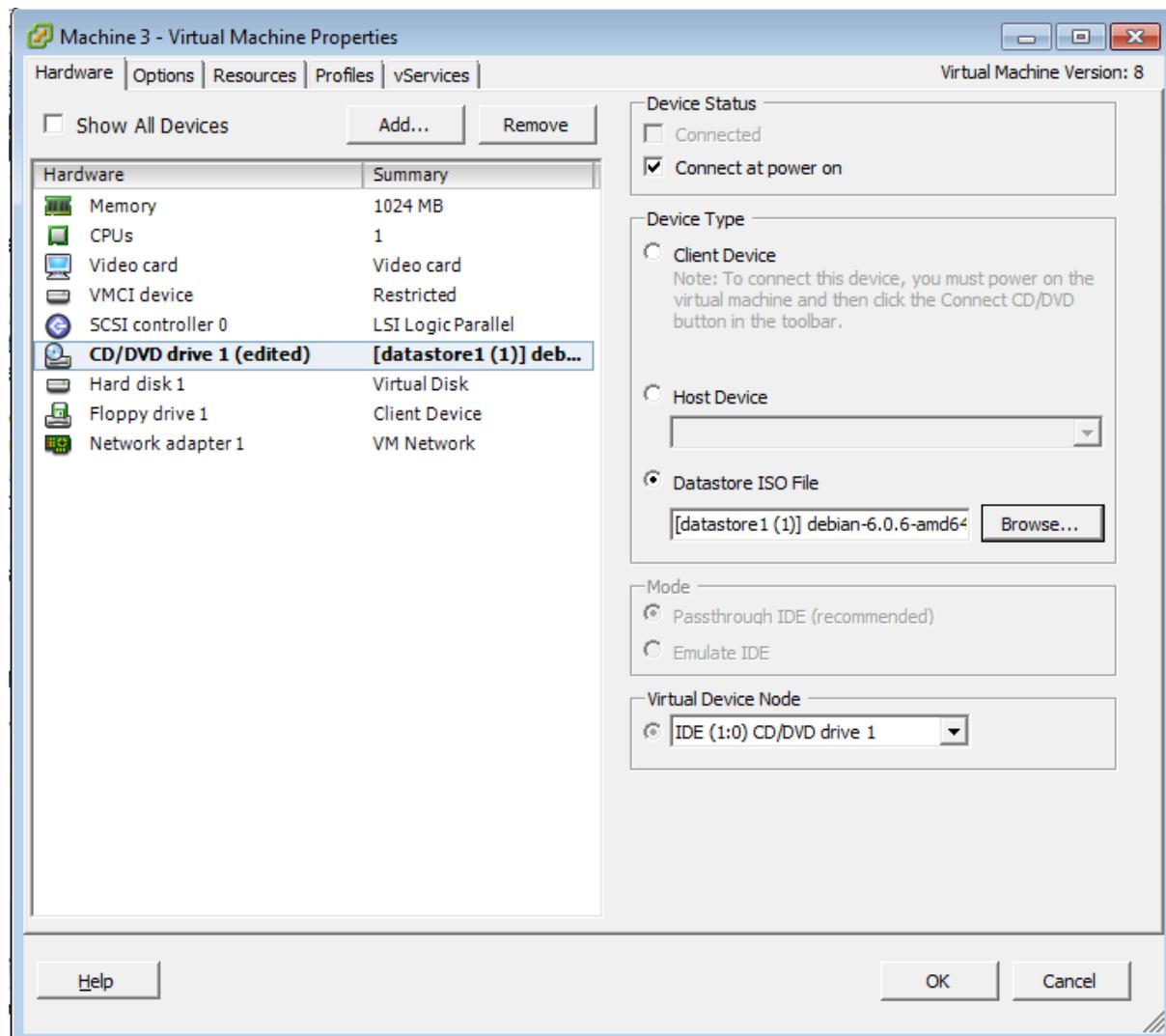
Step 9:

Select Machine 3, then click “Edit Virtual Machine Settings”.



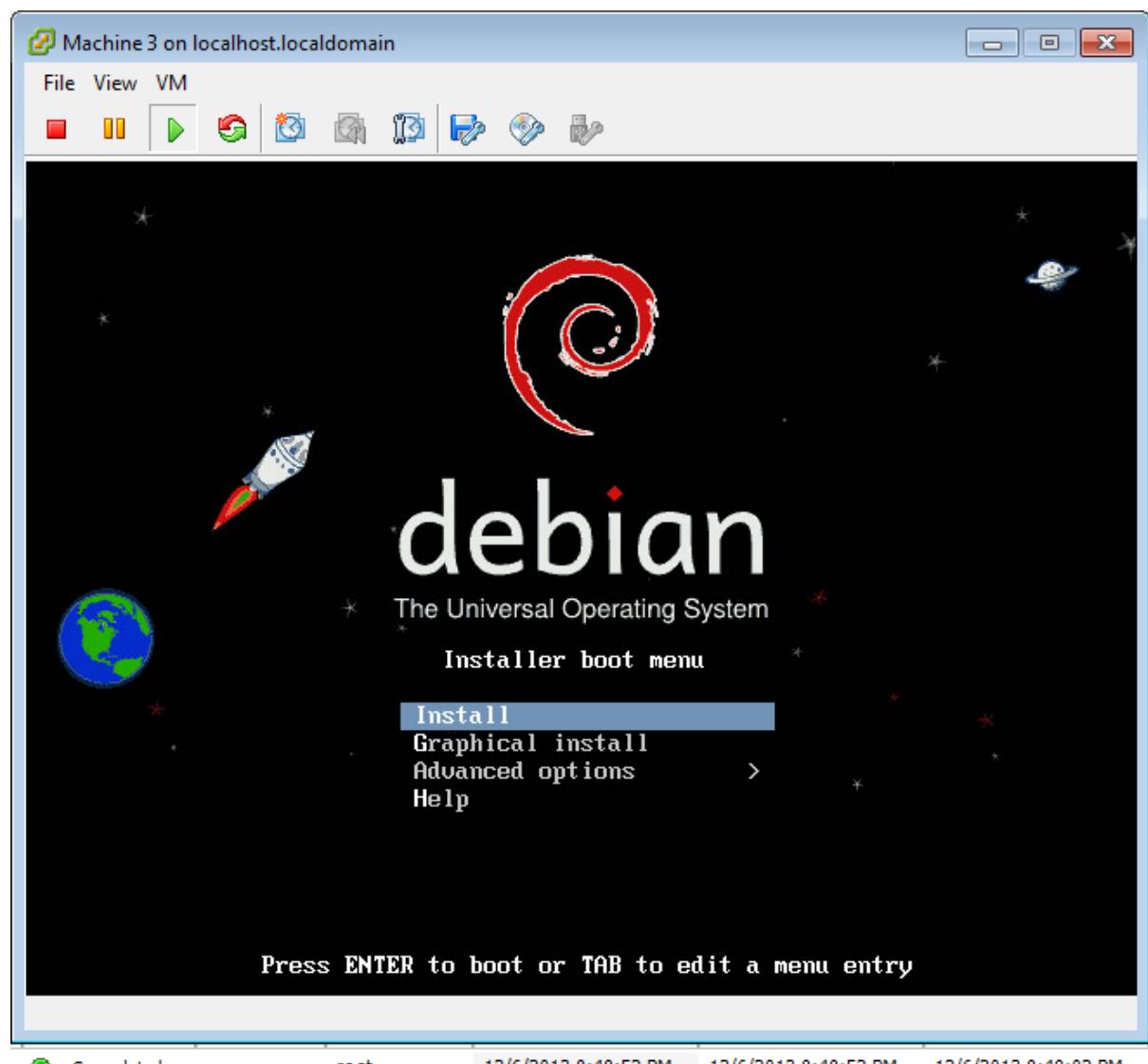
Step 10:

Click CD/DVD, then click “connect at power on”, then browse for the location of the Debian ISO, then click Open. Then click ok and power on the virtual machine.



Step 11:

Select Graphic Install, then press Enter using the keyboard.



Step 12:

Select the relevant language for your country then click continue.



The Universal Operating System

Select a language

Choose the language to be used for the installation process. The selected language will also be the default language for the installed system.

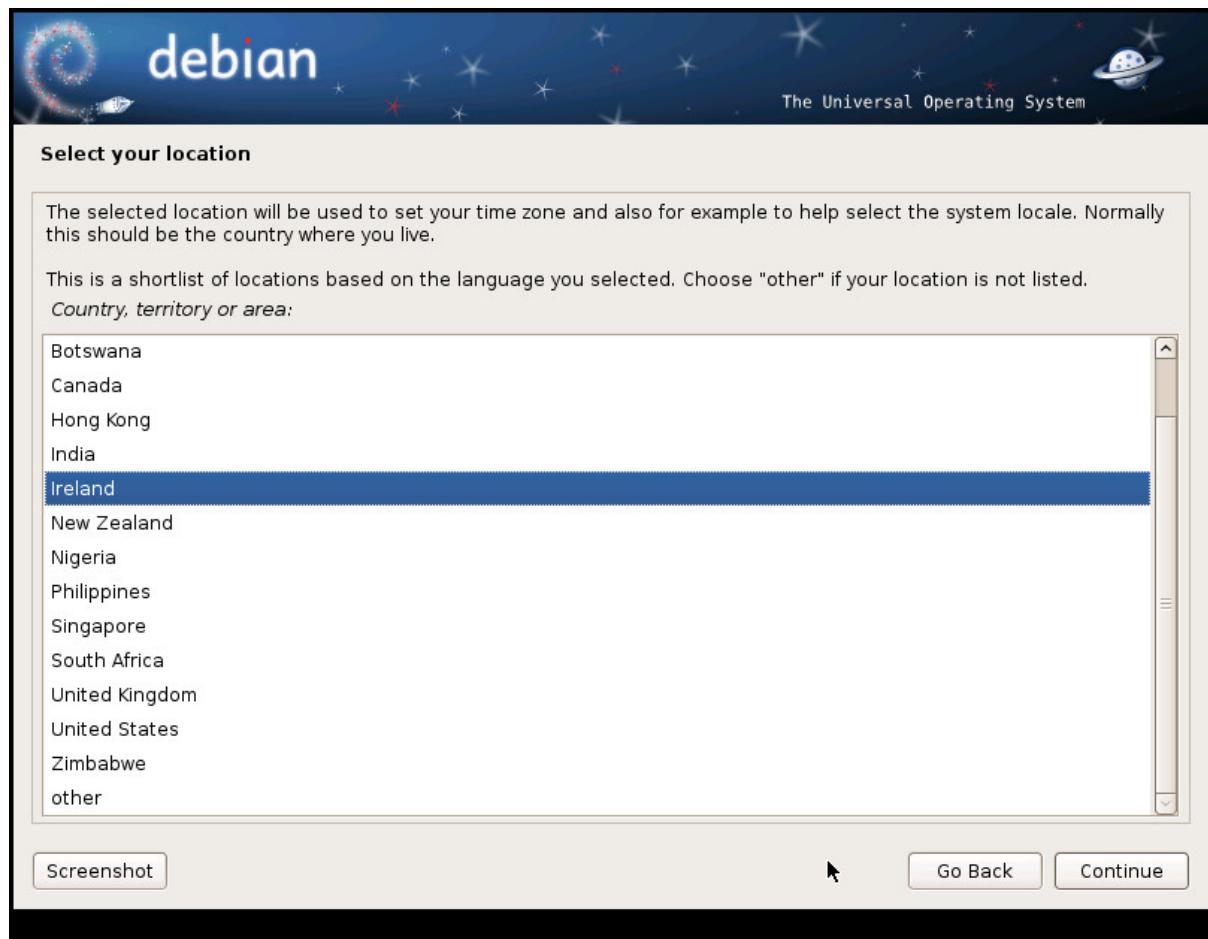
Language:

Chinese (Simplified)	- 中文(简体)
Chinese (Traditional)	- 中文(繁體)
Croatian	- Hrvatski
Czech	- Čeština
Danish	- Dansk
Dutch	- Nederlands
Dzongkha	- ཇོང་ཁ
English	- English
Esperanto	- Esperanto
Estonian	- Eesti
Finnish	- Suomi
French	- Français
Galician	- Galego
Georgian	- ქართული
German	- Deutsch

Screenshot Go Back Continue

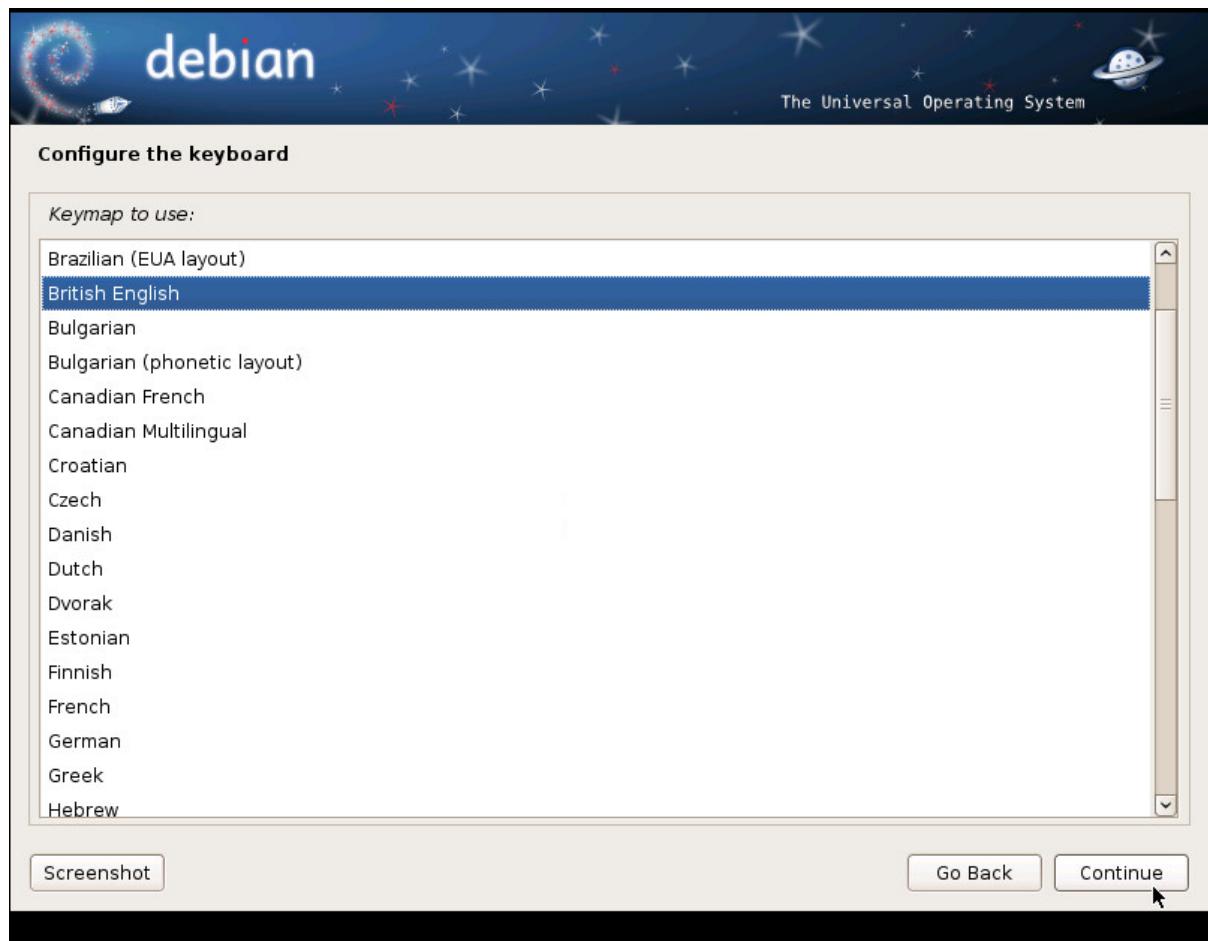
Step 13:

Select your location then click continue.



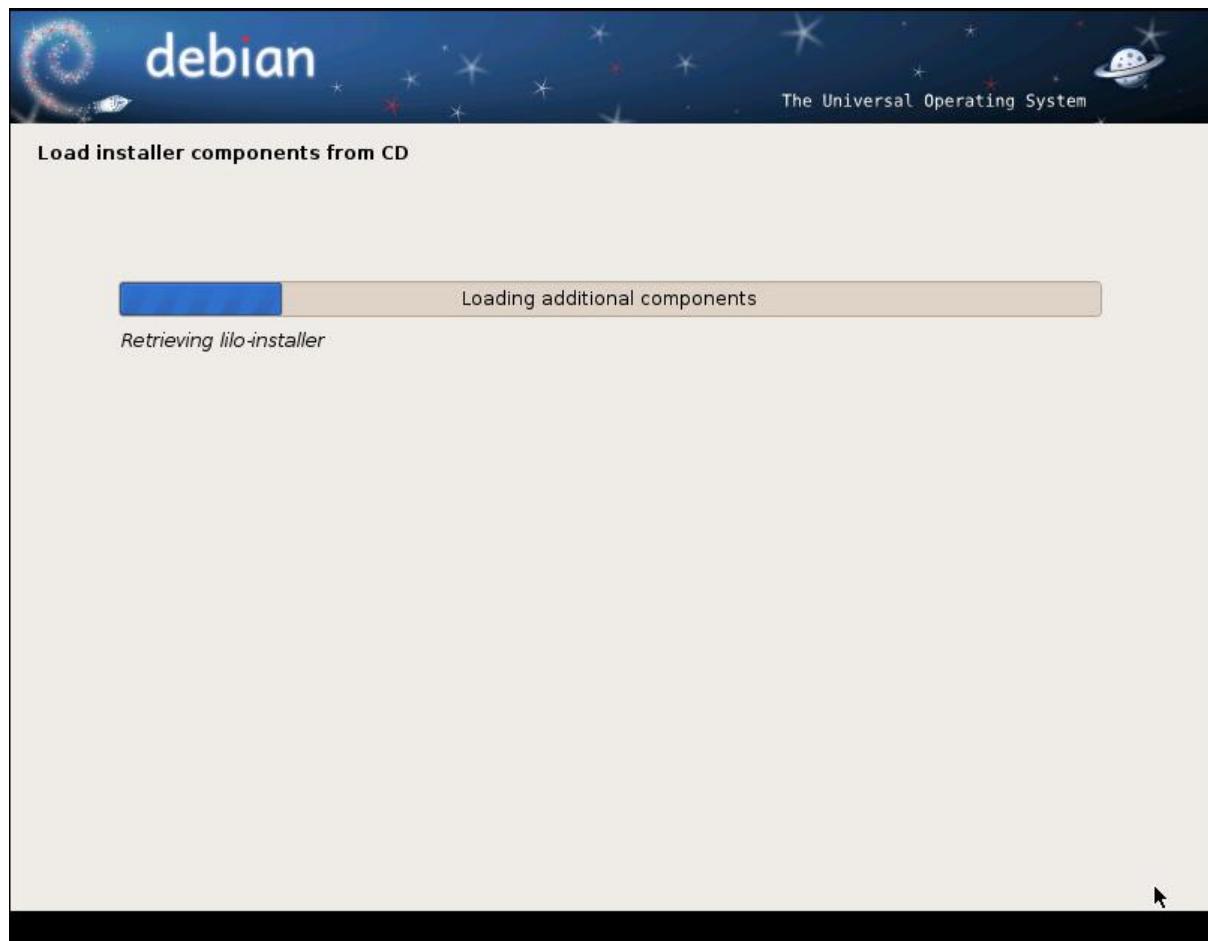
Step 14:

Configure the keyboard setting relevant for your country.



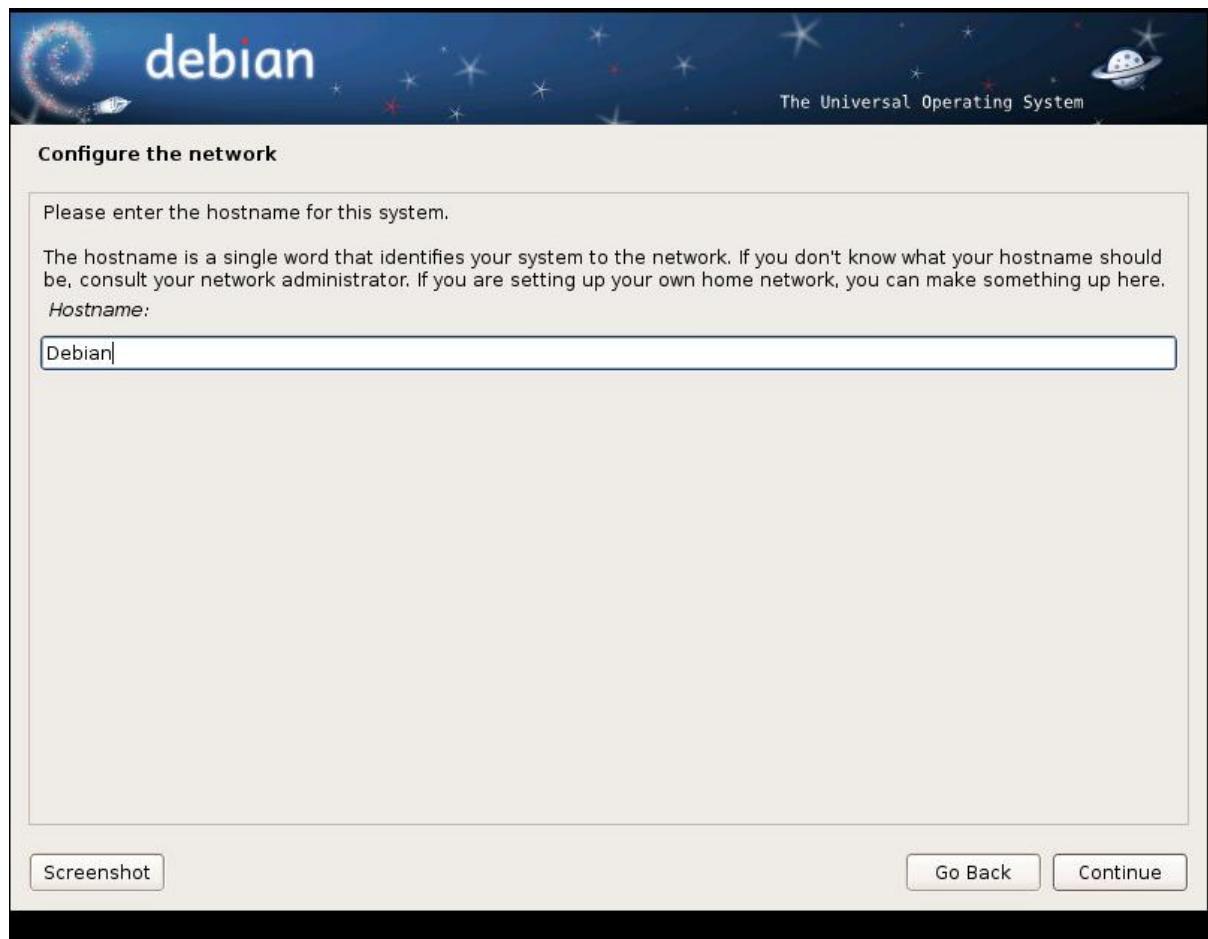
Step 15:

The installation is now running.



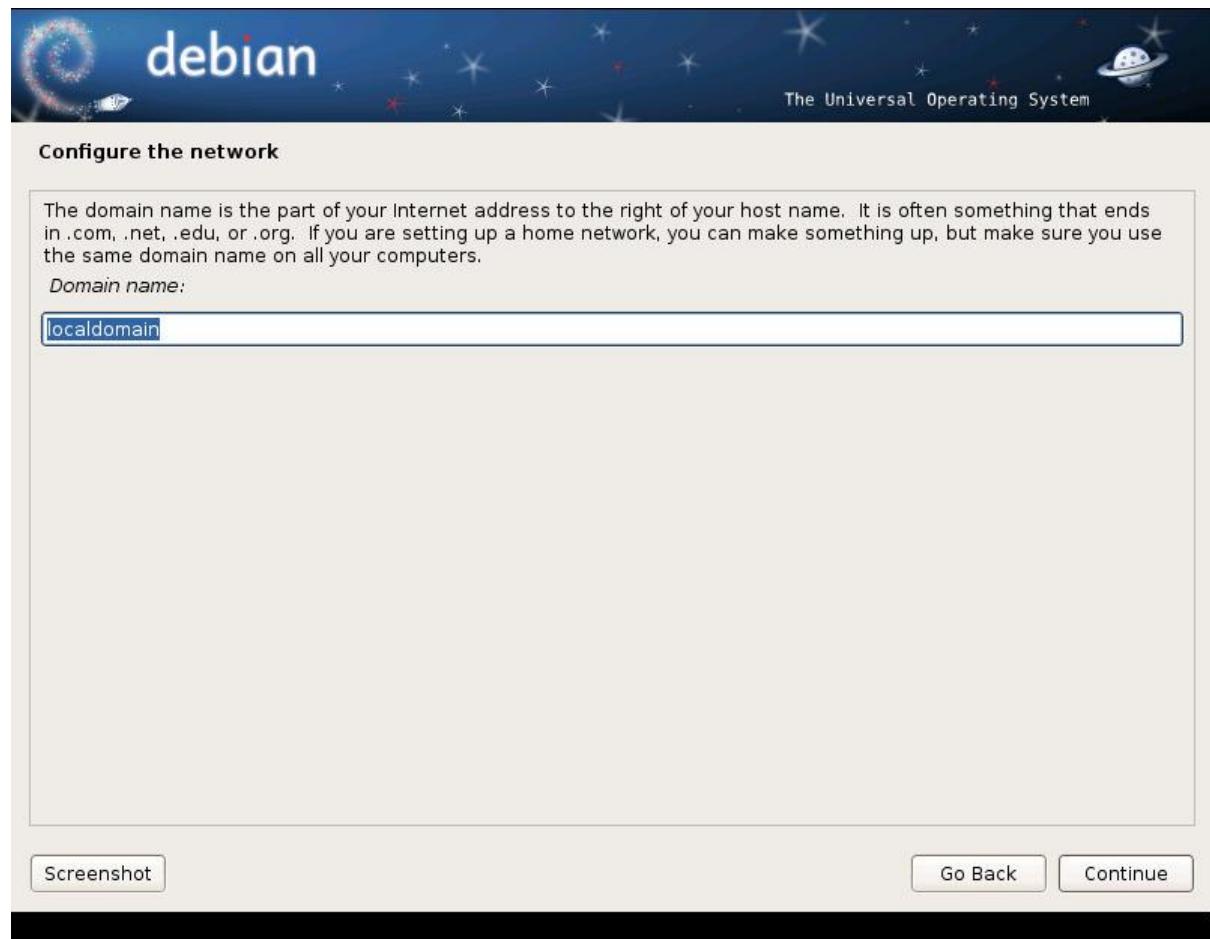
Step 16:

Choose a hostname for the network then click continue.



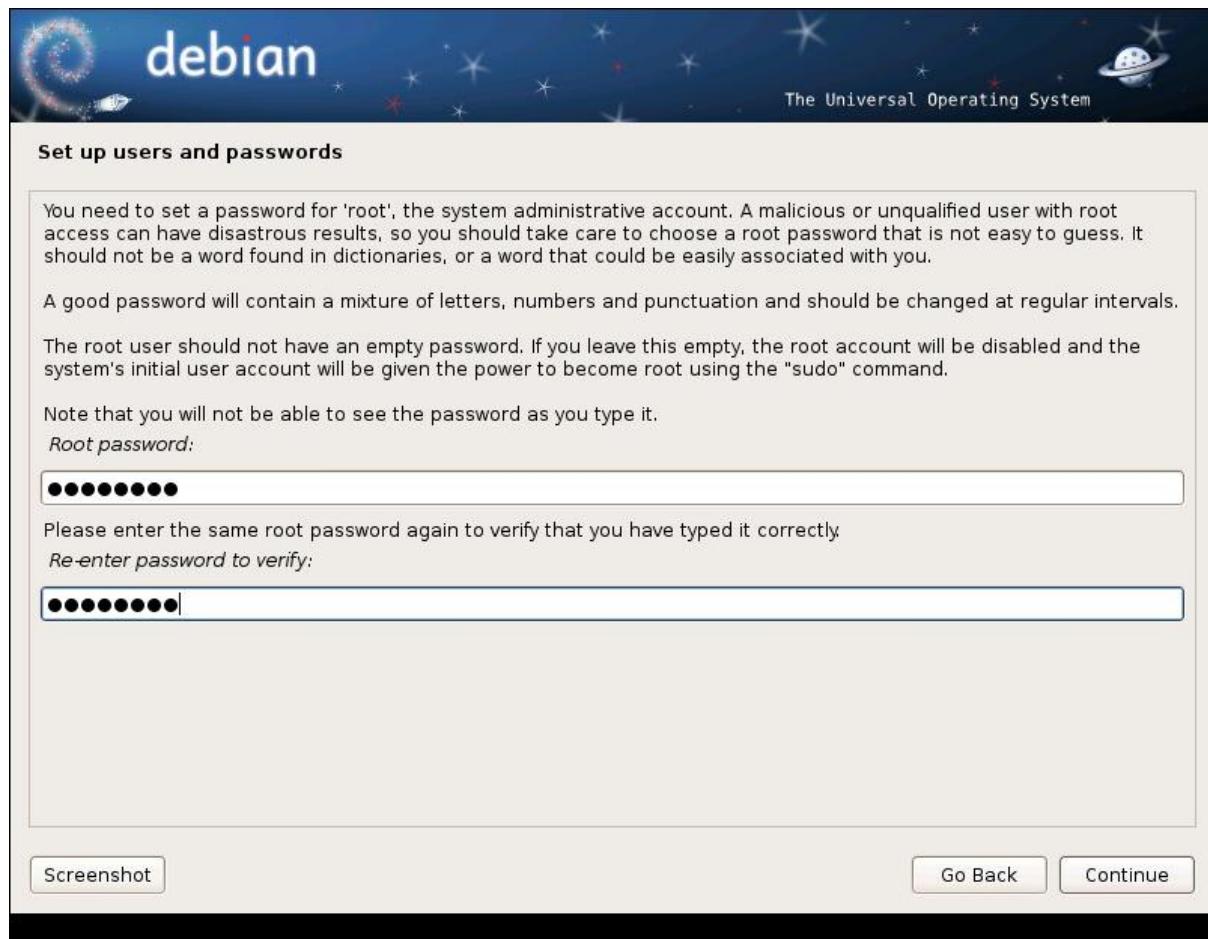
Step 17:

Choose the domain name then click continue.



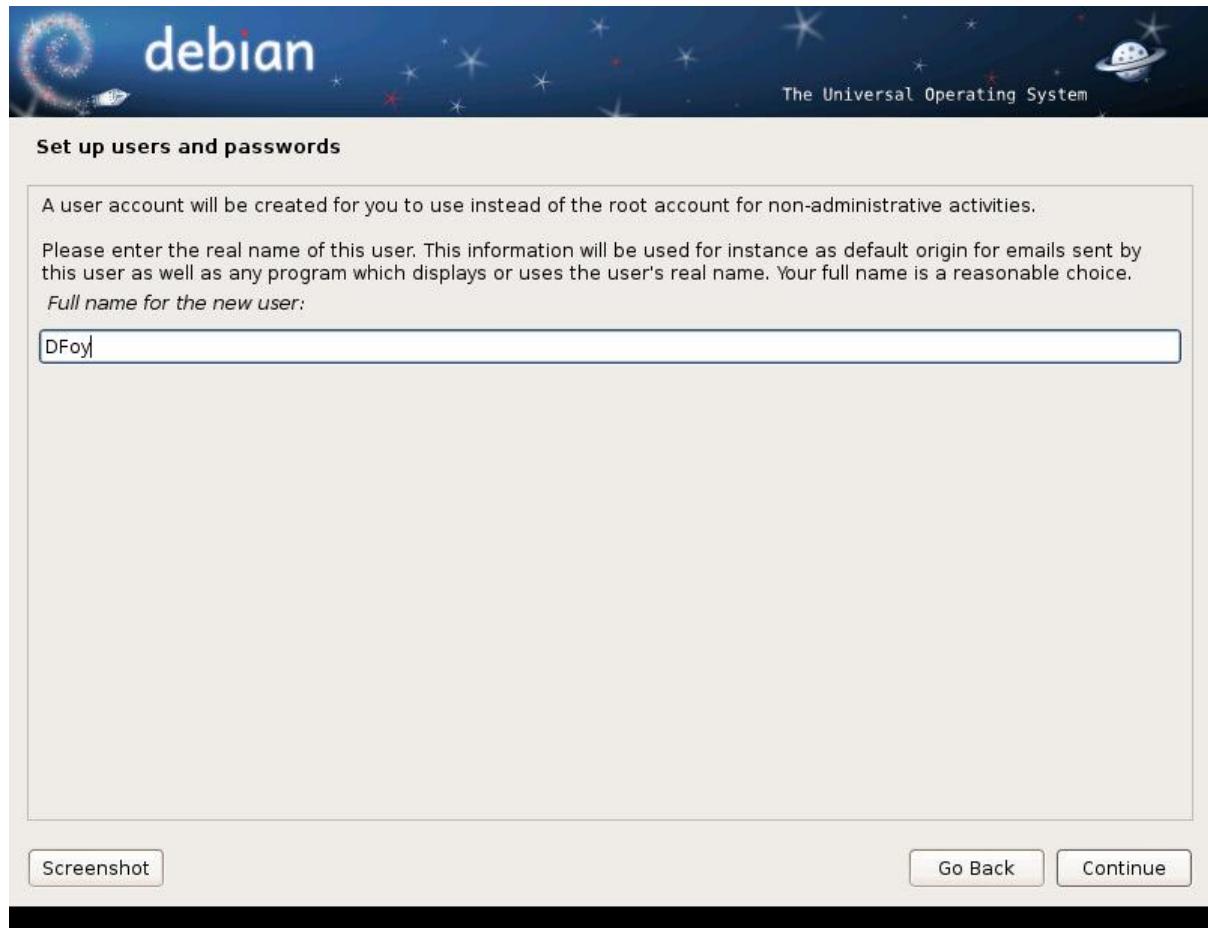
Step 18:

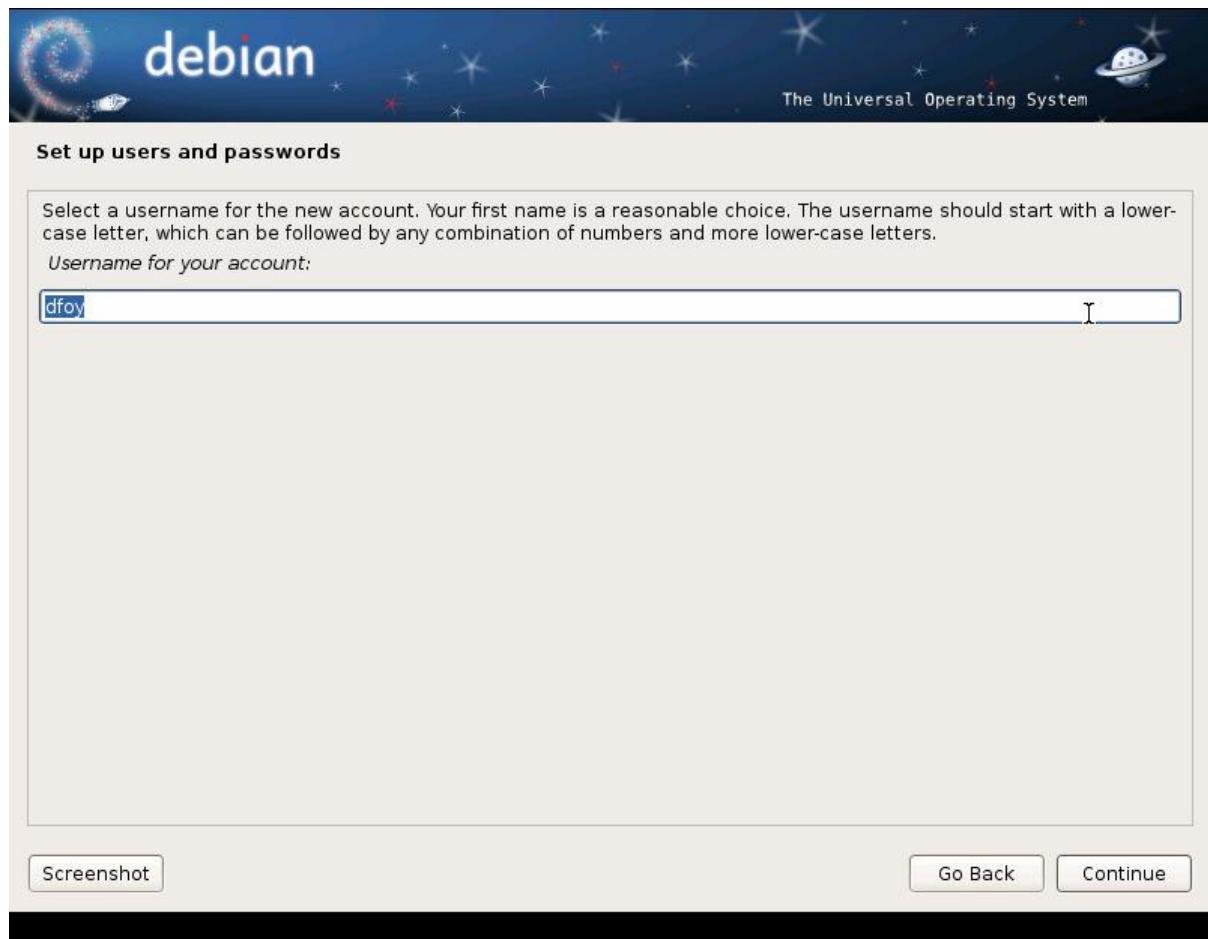
Choose a root user password for the installation. For the assignment purposes the password used is "Pa\$\$w0rd".



Step 19:

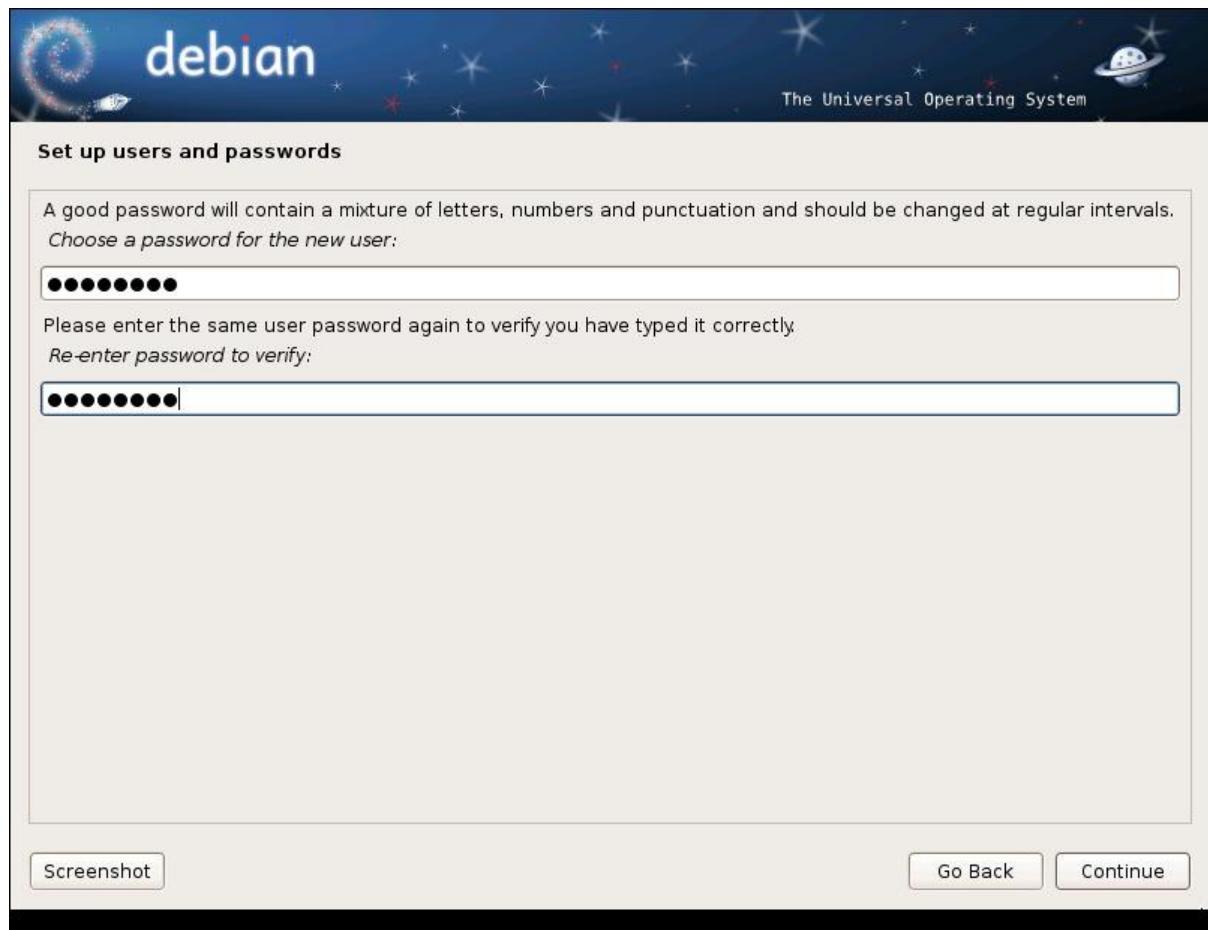
Choose a username for a non root user and non administrative account.





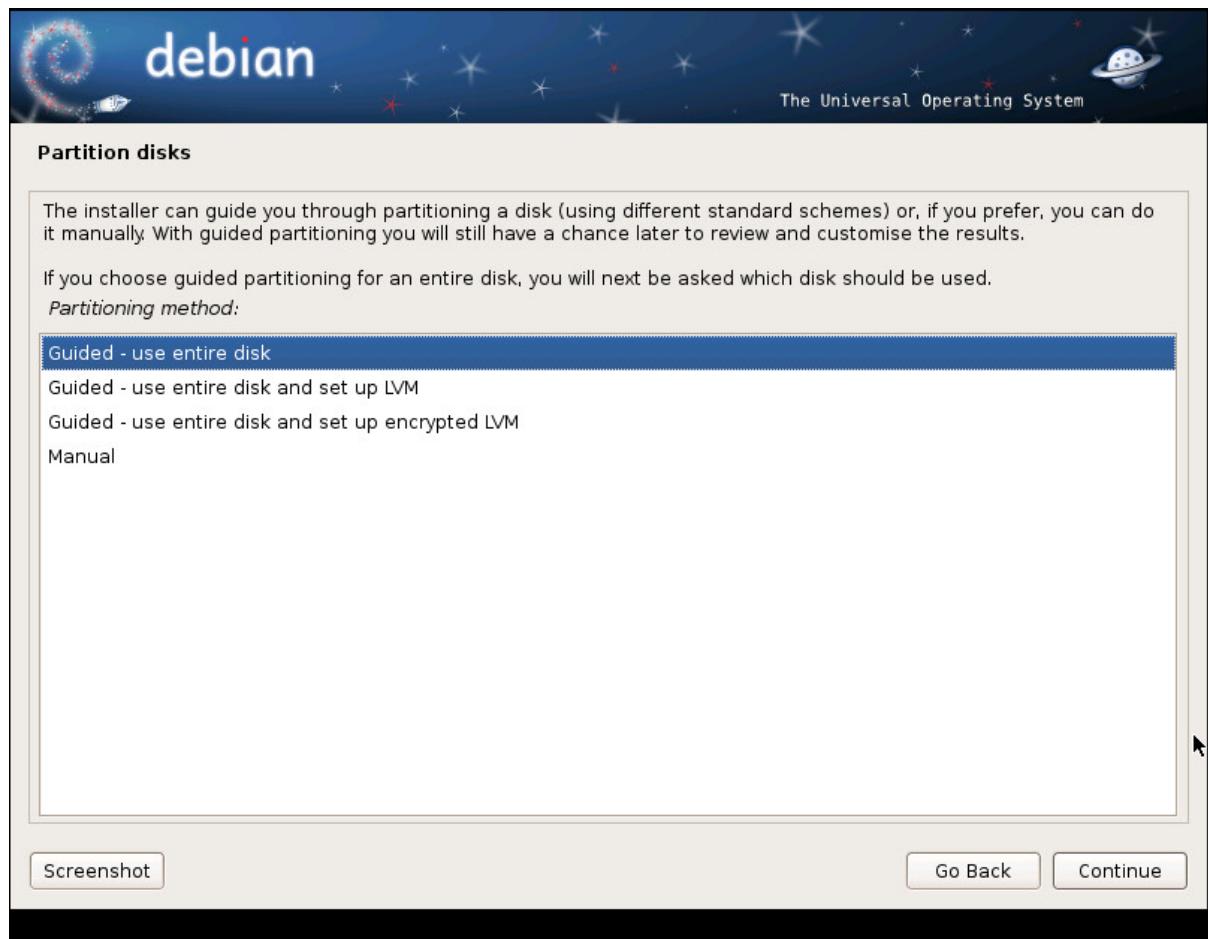
Step 20:

Enter a password for the non administrative user. Again the same password is used for the purpose of the assignment, "Pas\$\$w0rd".



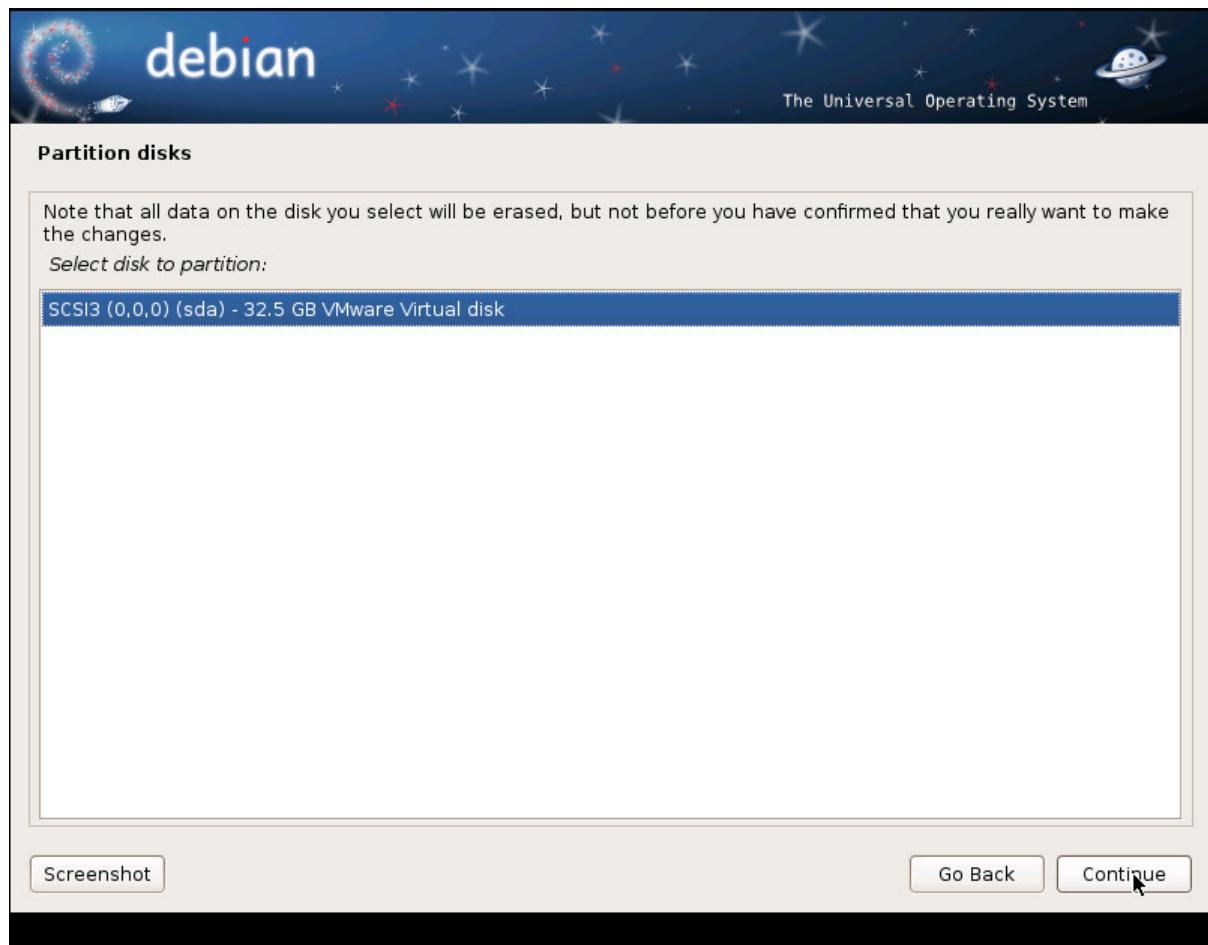
Step 21:

Select guided-use entire disk, then click continue.



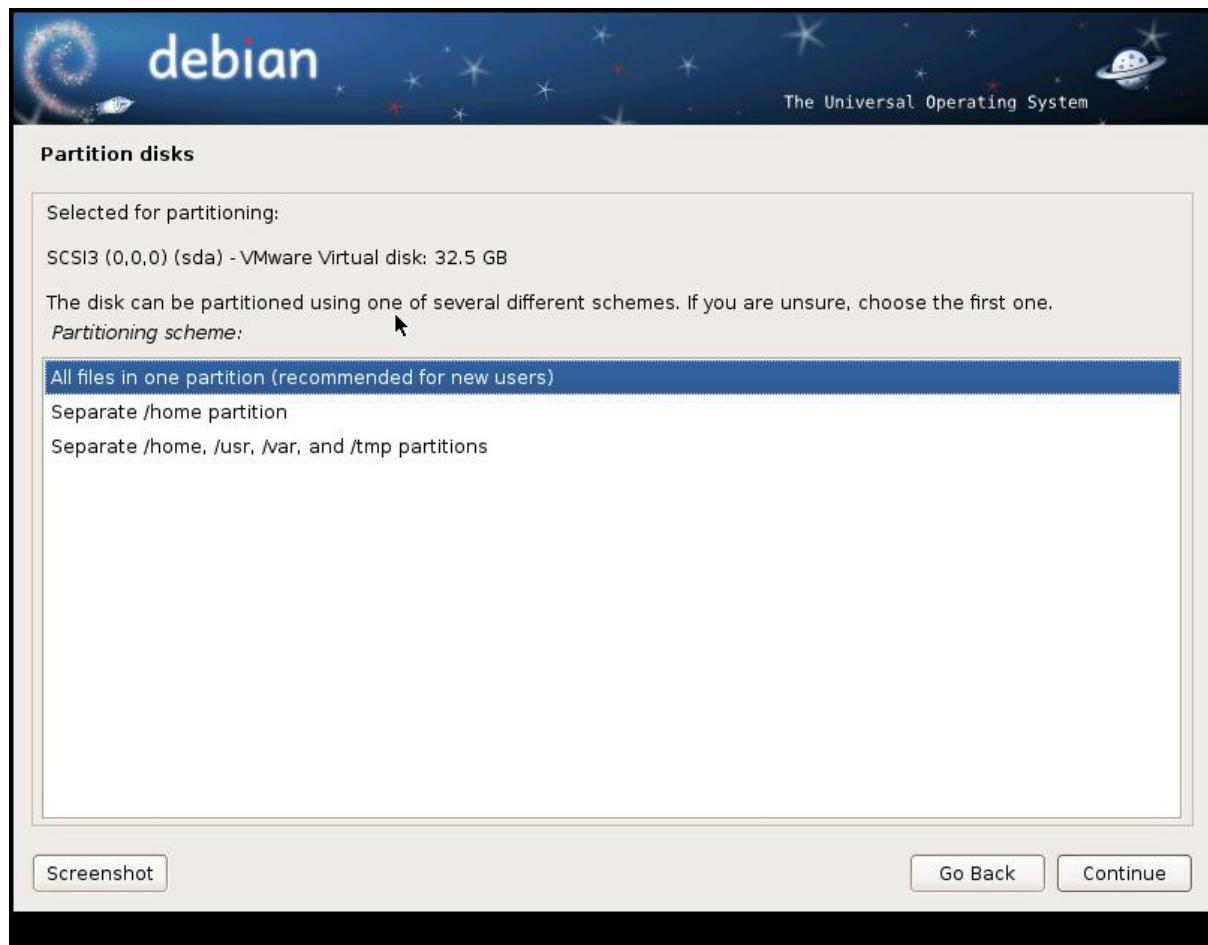
Step 22:

Choose the hard disk to partition, then click continue.



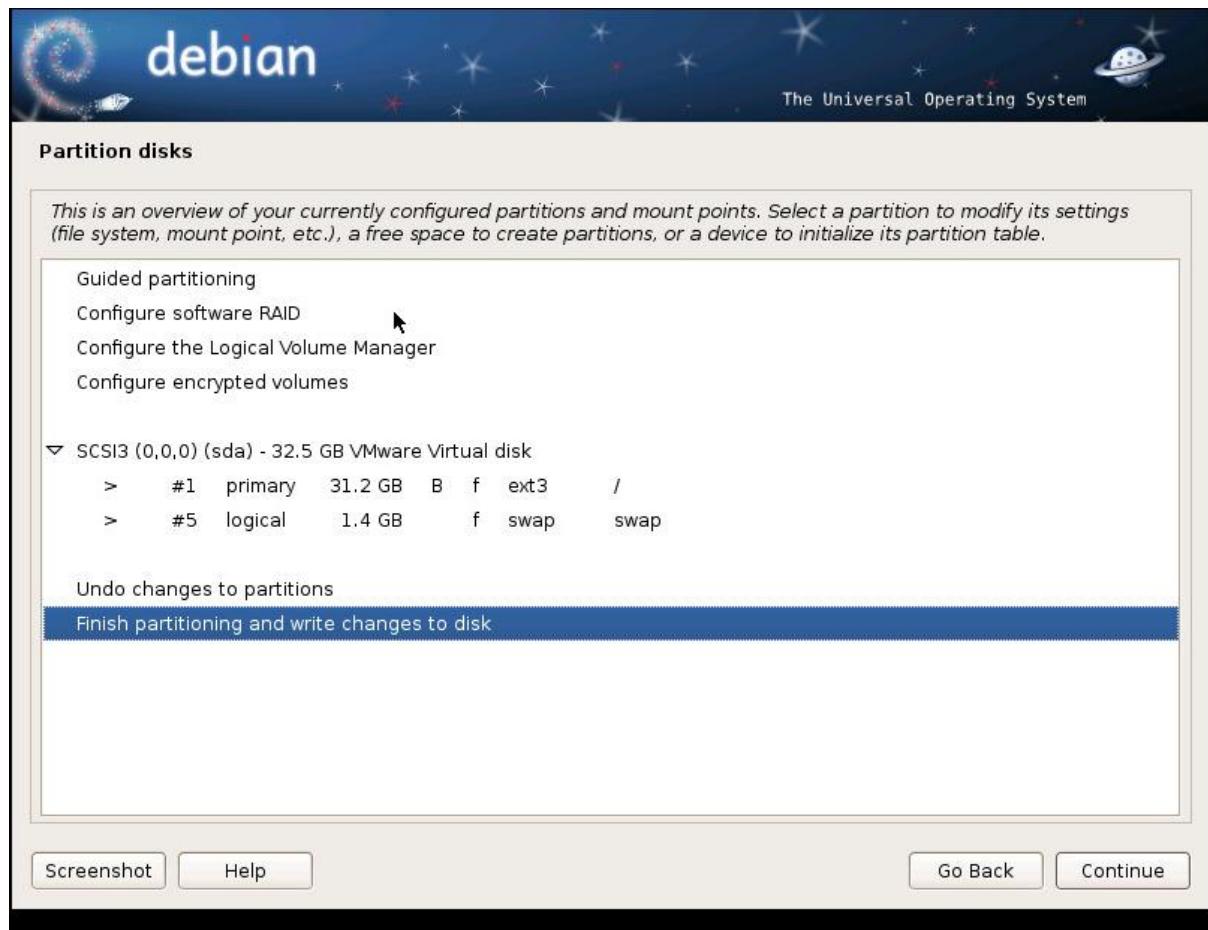
Step 23:

Select “All files in one partition (recommended for new users)”, then click continue.



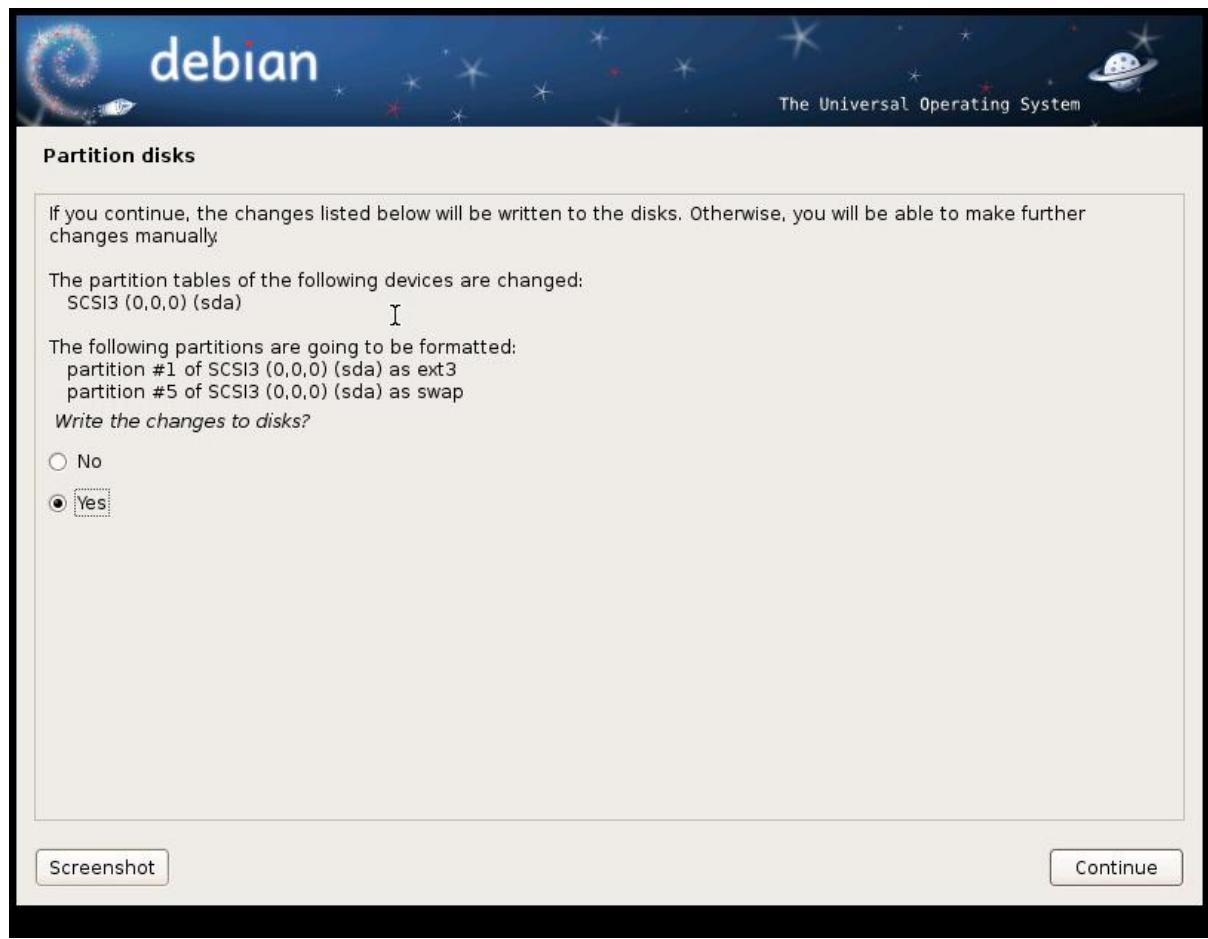
Step 24:

Choose “Finish partitioning and write changes to disk”, then click continue.



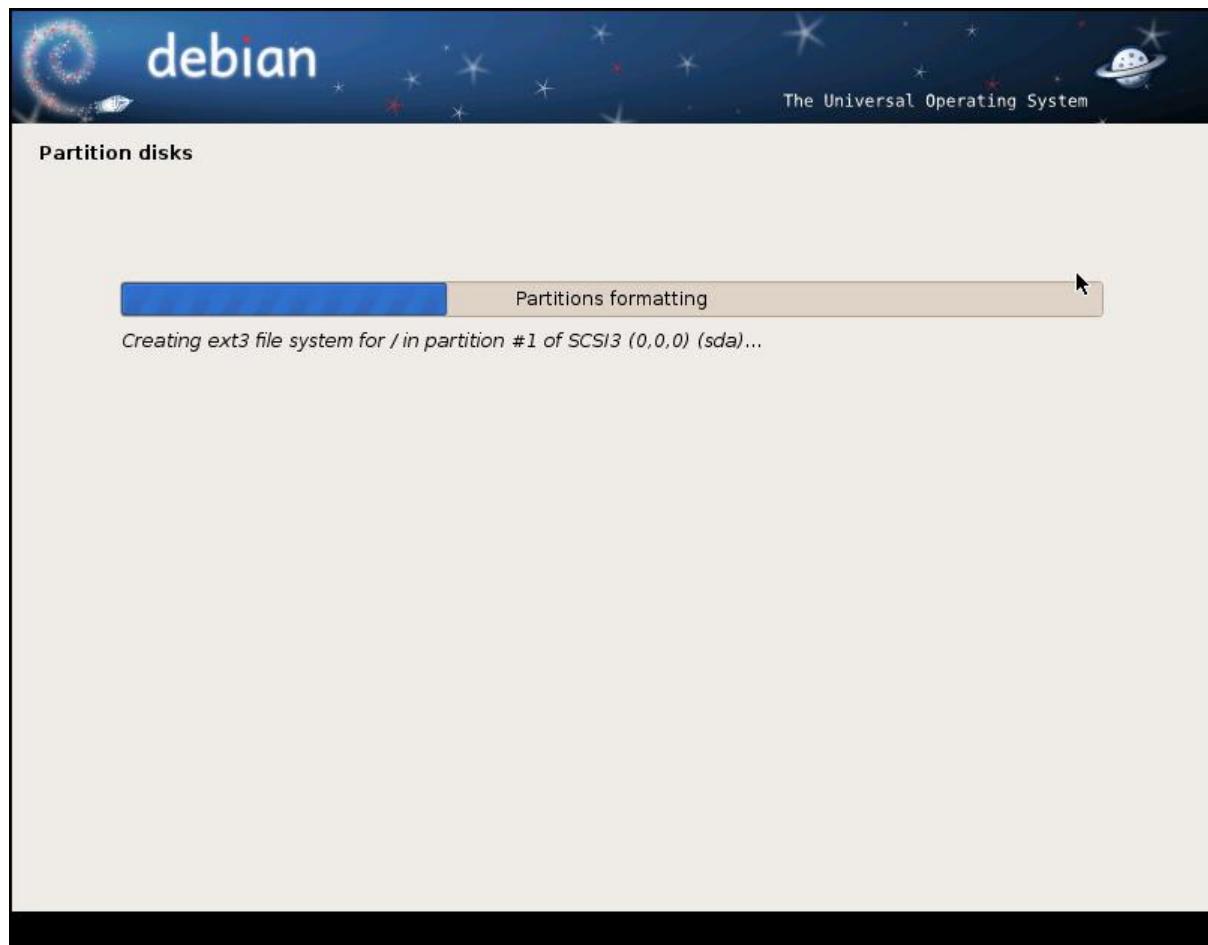
Step 25:

Select yes to “write the changes to disk”, then click continue.



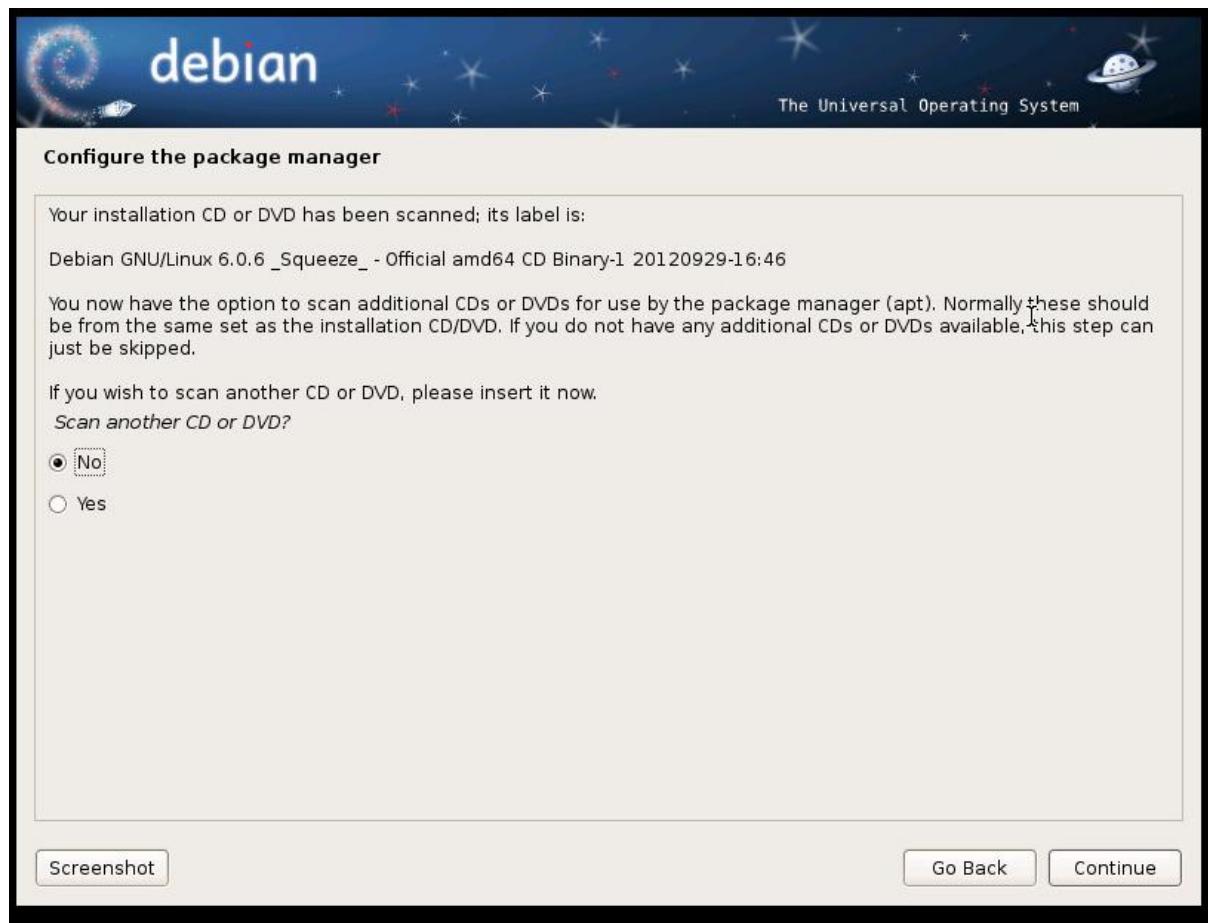
Step 26:

The partitioning disks wizard is now running.



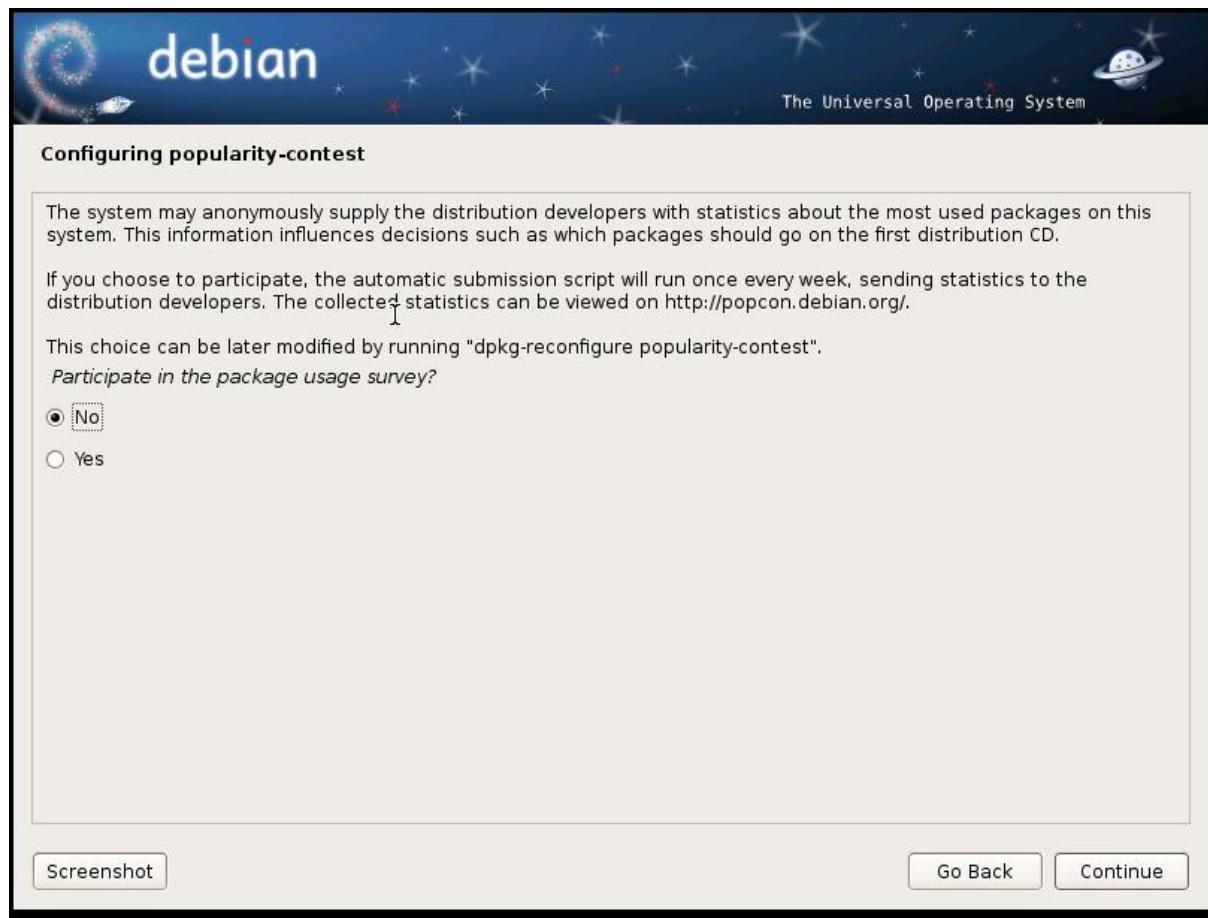
Step 27:

Select no to configuring the package manager, the click next.



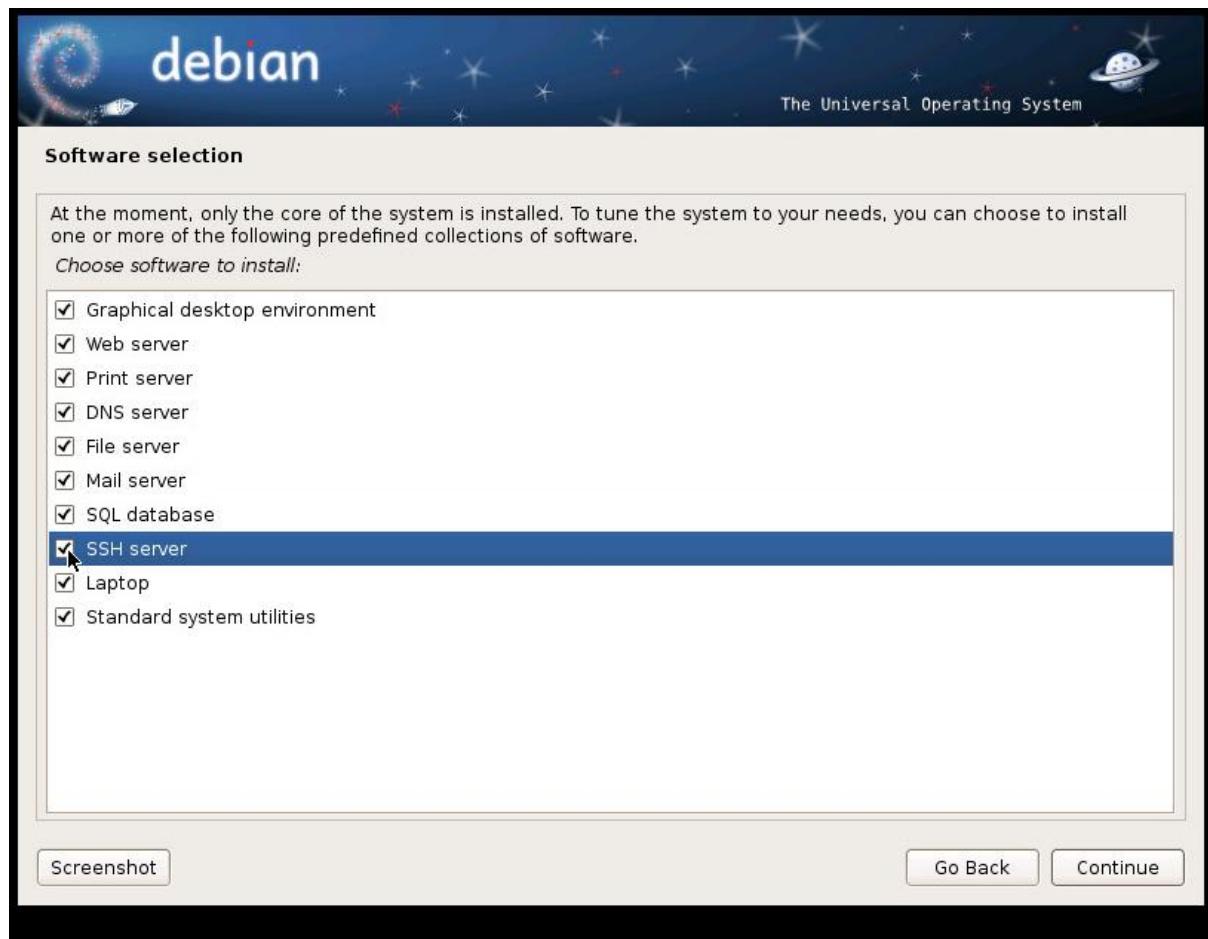
Step 28:

Select no to “configuring popularity-contest” then click continue.



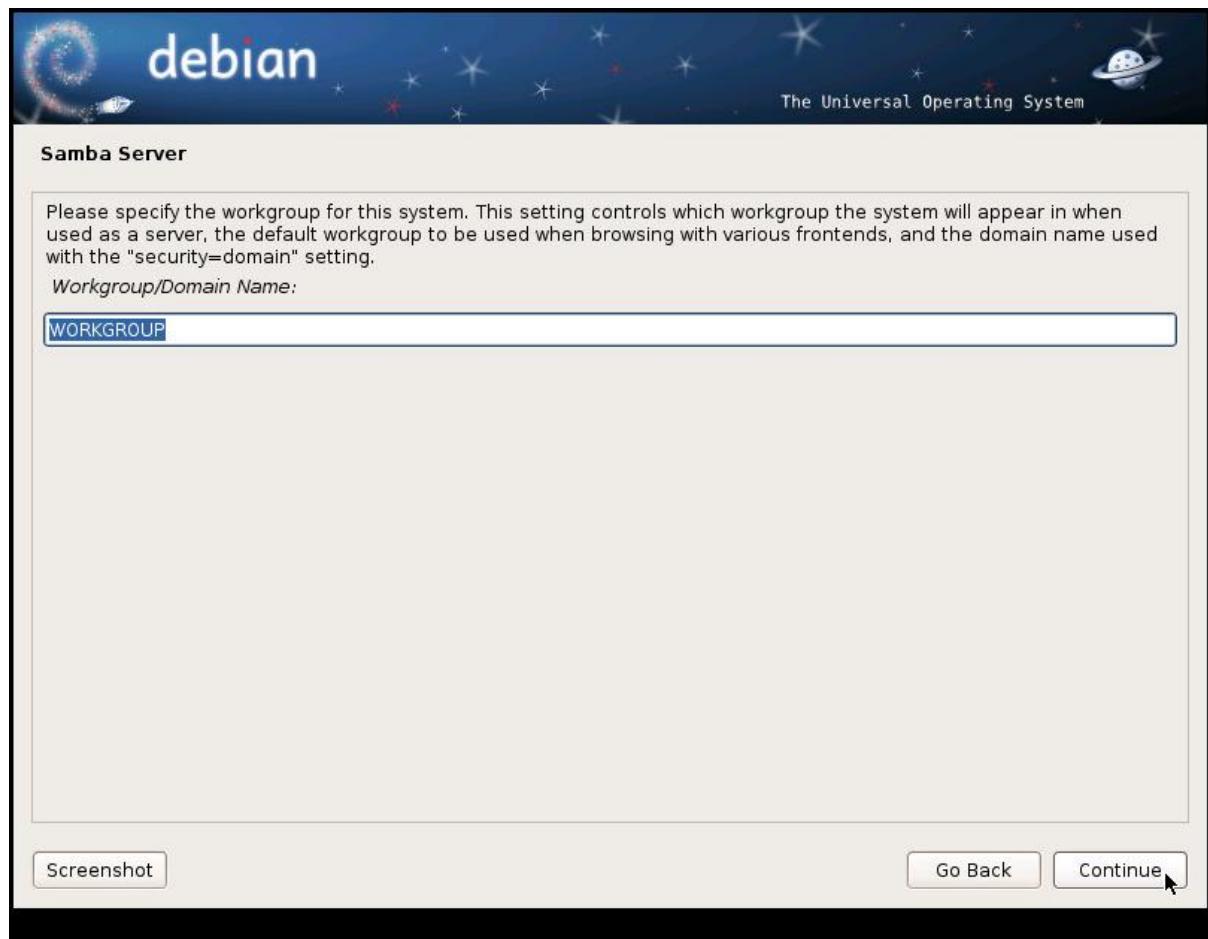
Step 29:

Select which software you wish to install then click continue.



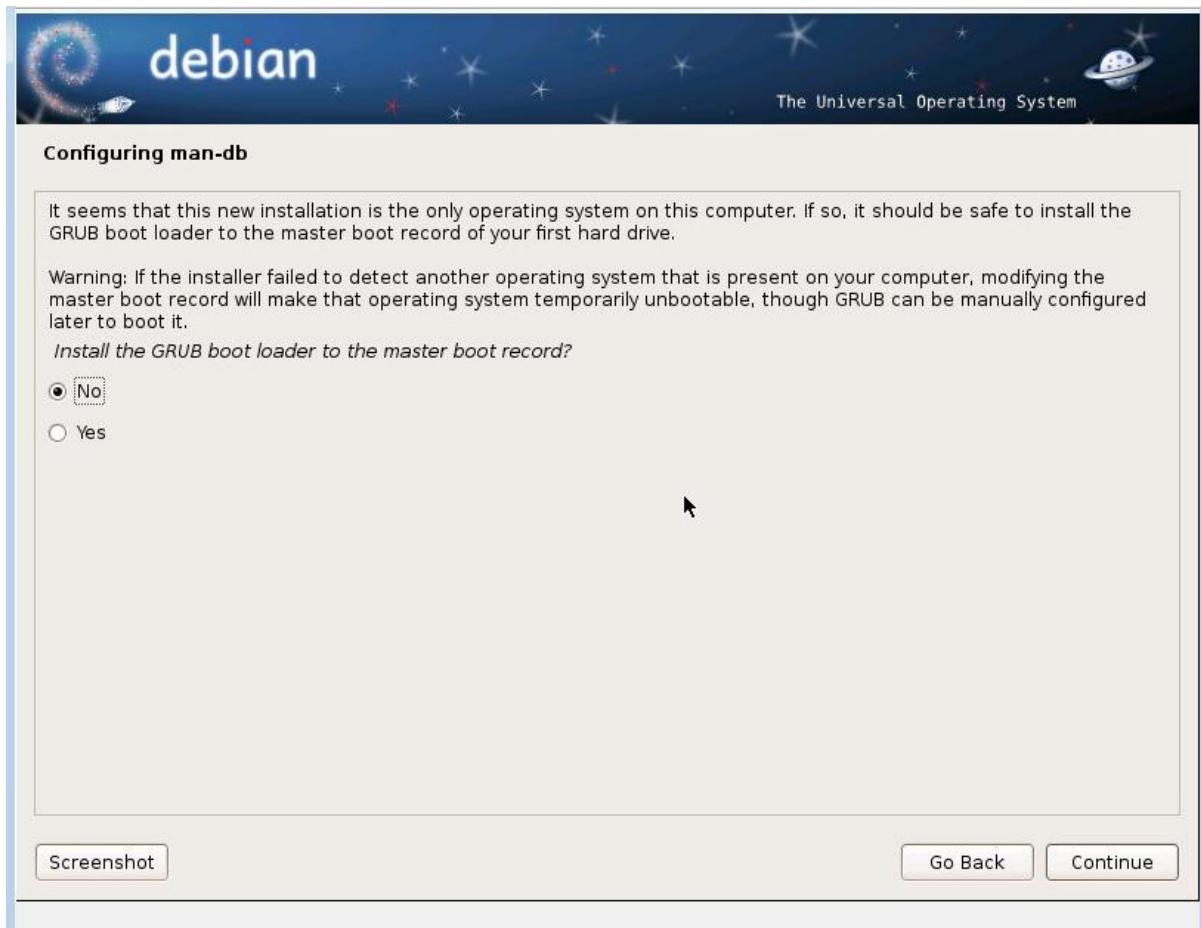
Step 30:

Choose a domain name for the samba server, then click continue.



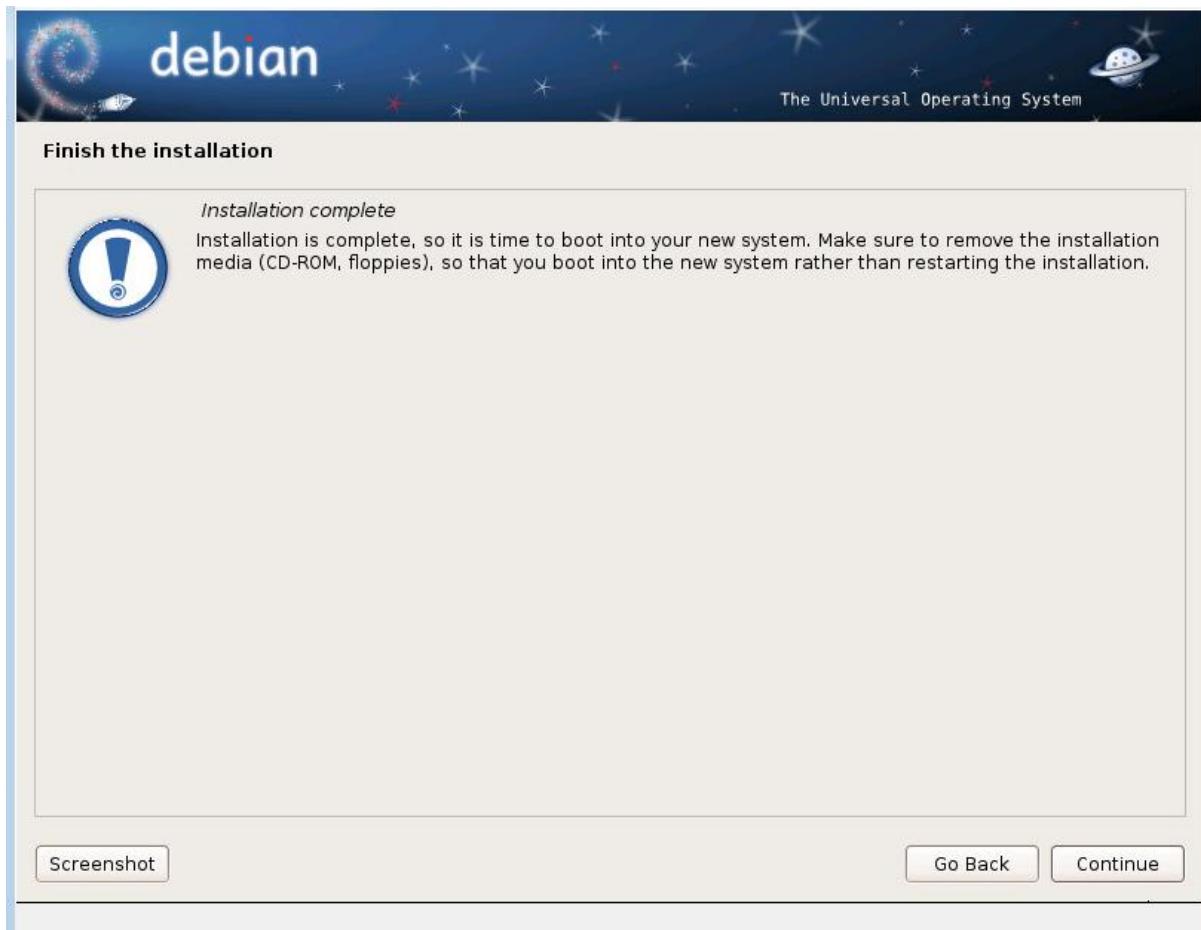
Step 31:

Select no to installing the GRUB boot loader to the master boot record, then click continue.



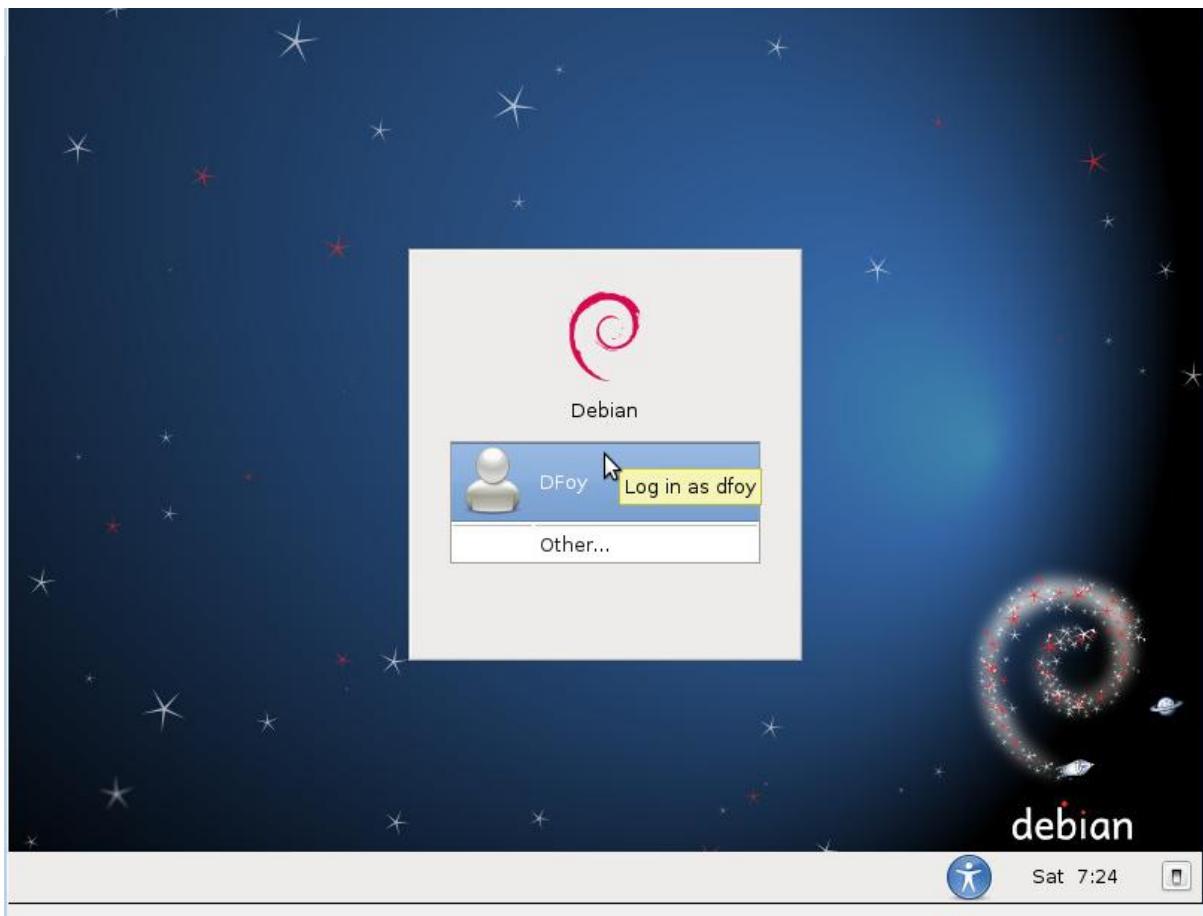
Step 32:

The installation is now complete, then click continue.



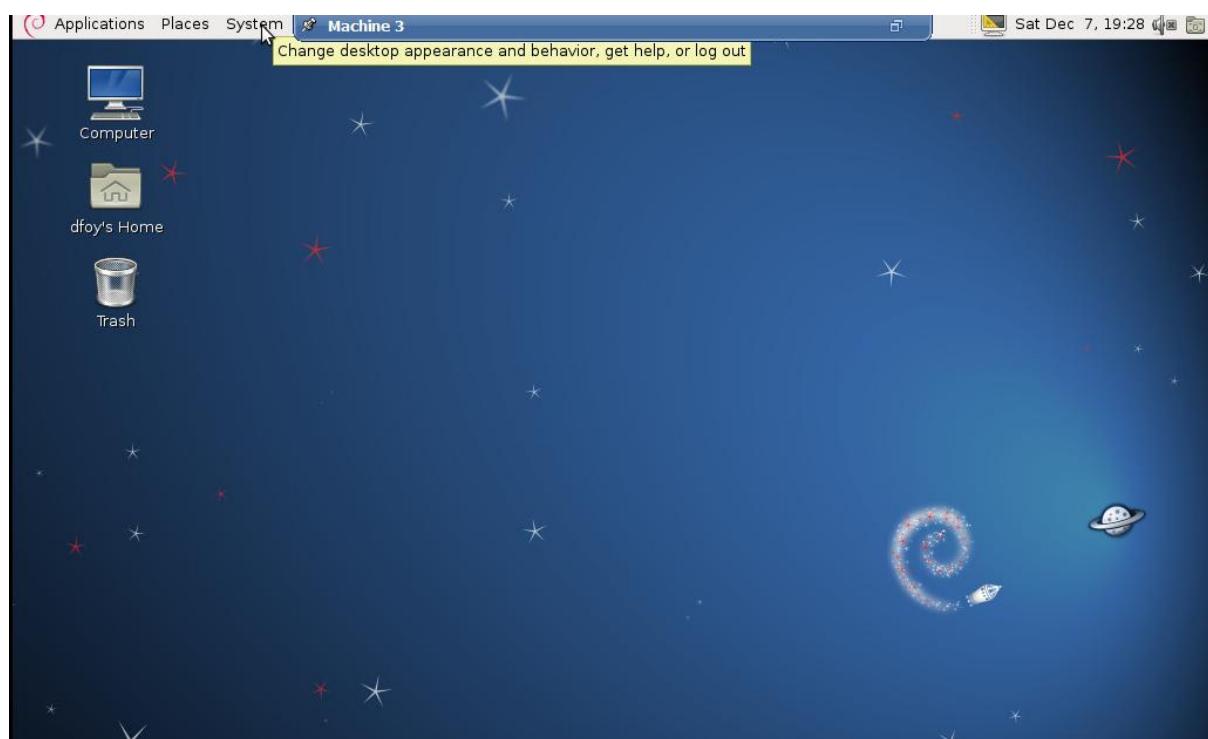
Step 33:

When the debian server reboots the non-administrative user and password that was specified during the installation should be used.



Step 34:

Linux Debian Server is now installed and fully functional as displayed below.



Task A.9

You are required to write an introductory section in relation to virtualization, outlining its benefits and disadvantages, this section should be no less than 1000 words, include references in APA format.

Virtualization is defined by IBM as, “a software technology that allows multiple operating systems to run on the same processor at the same time”¹⁵.

The name for the virtualization software is Hypervisor. The hypervisor is arguably the most important piece in the virtualization puzzle. It is this software that makes it possible for a single physical machine to run multiple operating systems, all the while managing the resources of the host hardware so everything goes smoothly in each virtual container¹⁶.

Two of the main types of virtualisation are desktop virtualization and server virtualization. Desktop virtualization has two different models, client-hosted desktop and virtual desktop infrastructure.

Client-hosted desktop

A hosted desktop is a virtualization technique that provides a local desktop instance remotely from a server through the Internet. A hosted desktop is a virtual machine that hosts the operating system, applications, data and other system configurations of a physical desktop. A hosted desktop provides similar functionality and capabilities as a physical desktop. It can be accessed through a client-end browser or in some cases, a thin client utility. A hosted desktop is also known as a virtual desktop. The process is known as desktop virtualization¹⁷.

Virtual Desktop Infrastructure

Virtual desktop infrastructure is defined as the practice of hosting a desktop operating system within a virtual machine running on a centralized server. Virtual Desktop Infrastructure is a variation on the client/server computing model, sometimes referred to as server-based computing. The term was created by VMware Inc¹⁸.

Virtual desktop infrastructure utilizes server hardware to run desktop operating systems and application software inside a virtual machine. Users access these virtual desktops using their existing

¹⁵ IBM (N.D). Virtualization Basics. IBM. Retrieved December 20th, 2012, from http://pic.dhe.ibm.com/infocenter/tivihelp/v28r1/index.jsp?topic=%2Fcom.ibm.tivoli.tpm.scenario.doc%2Fvirtual%2Fccom_basics.html

¹⁶ Bradford, C. (2013). Virtualization Wars: VMware vs. Hyper V: Which is Right For Your Virtual Environment. Storage Tech. Retrieved October 11th, 2013, from <http://www.storagecraft.com/blog/virtualization-wars-vmware-vs-hyper-v-which-is-right-for-your-virtual-environment/>

¹⁷ Janssen, C. (N.D.). Hosted Desktop. Techopedia. Retrieved October 8th, 2013, from <http://www.techopedia.com/definition/26634/hosted-desktop>.

¹⁸ Rouse, M. (2007). Virtual Desktop Infrastructure. Tech Target. Retrieved October 9th, 2013, from <http://searchservervirtualization.techtarget.com/definition/virtual-desktop-infrastructure-VDI>

PCs. This not only eliminates the need for workstation hardware upgrades, but also enables the user to switch between operating environments, such as Windows XP and Windows 7. What's more, VDI renders administrative and management tasks much easier, because every attached workstation can use the same image. Install OS and application software updates and patches to the one image, and every desktop system using that image is automatically updated and patched¹⁹.

Virtual Desktop Infrastructure, is not limited to simply delivering a desktop operating system. The OS is just one layer of the Hosted Virtual Desktop model. This model includes the infrastructure layer (storage, network and hypervisor), interface layer (base operating system, locally installed applications and virtual applications), workspace management layer (user data and profiles), delivery layer (remote access and connection brokering) and the client device layer²⁰.

Server virtualization is done using virtual desktop infrastructure using such software as VMware's ESXi or Microsoft's HyperV.

VMware ESXi

Vsphere is a monolithic hypervisor. A monolithic hypervisor manages hardware access for each virtual machine. It contains the device drivers for all components those virtual machines must access, including input, network and storage devices. This configuration requires the drivers to be physically installed at the hypervisor layer, in addition to a special driver that controls access to those hardware components²¹.

Hyper V

Hyper V is microkernelized hypervisor. A microkernelised hypervisor has no device drivers at the hypervisor layer. Instead, those drivers are located in the partitions of the individual operating systems, where they run independently for each individual virtual environment. As a result of this configuration, Hyper V is able to enjoy some unique advantages over VMware Vsphere²².

Benefits of virtualization

- Desktop Virtualization solutions integrate with corporate directories like Active Directory or Lightweight Domain Access Protocol etc, and User Access Policies can be applied to all users based on their role, location, type of device, etc²³.
- Desktop Virtualization enhances security as the administration is centralized – Antivirus and Firewall policies can be applied and monitored from the data center. The applications that

¹⁹ Harbaugh, L. (2012). The pros and cons of using virtual desktop infrastructure. PC World. Retrieved October 8th, 2013, from

http://www.pcworld.com/article/252314/the_pros_and_cons_of_using_virtual_desktop_infrastructure.html

²⁰ Paul, A. (2011). To VDI or not to VDI. Ecommerce Times. Retrieved October 9th, 2013, from

<http://www.ecommercetimes.com/story/72839.html>

²¹ Bradford, C. Loc.cit.

²² Bradford, C. Loc.cit.

²³ Rajesh, K (March 25th 2011). Understanding Desktop Virtualization – Advantages & Disadvantages. ExcitingIP. Retrieved December 20th, 2012, from <http://www.excitingip.com/1569/understanding-desktop-virtualization-advantages-disadvantages/>

can be accessed and run by the users can be restricted and even tracked using such tools as VMware vCenter Server²⁴.

- Faster, reliable and easier backup and recovery of all the user data is possible due to centralized hosting and administration²⁵.
- For applications that require heavy CPU processing, the performance with Desktop Virtualization might be better, as the applications are now being processed by the heavy-duty server processors, than the desktop processors²⁶.
- Desktop Virtualization software generally has settings to allow administrators to allocate or limit server resources that can be used per user, so that an individual user doesn't over-consume resources²⁷.

Disadvantages of virtualization

- Desktop Virtualization is expensive. One needs to buy the Desktop Virtualization Software/Licenses, Servers, Centralized Storage infrastructure, Upgrade Network infrastructure to support more bandwidth, etc in addition to buying computers/ thin-clients for each user²⁸.
- There is no reduction in the number of end-user client machines (computers) that are needed in the network²⁹.
- The licenses for Operating Systems, applications etc, still needs to be bought for each user (mostly) and there is no reduction of costs there³⁰.
- The network needs to handle all that extra bandwidth that Desktop Virtualization is going to introduce. Otherwise, it has to be upgraded. The WAN links need to have sufficient bandwidth to handle all those remote virtual desktop users, as well³¹.
- If the bandwidth on the remote end is not sufficient/ if there is congestion in LAN, the display quality may not be as good (when images are streamed from server) as processing and viewing applications right from a desktop³².
- Some vendor Desktop Virtualization solutions work only with their Server Virtualization counterparts, hence limiting the choices for the customers³³.
- There is a limit to the number of Operating Systems that can be supported by Desktop Virtualization products³⁴.

²⁴ Ibid.

²⁵ Ibid.

²⁶ Ibid

²⁷ Ibid.

²⁸ Ibid.

²⁹ Ibid.

³⁰ Ibid.

³¹ Ibid.

³² Ibid.

³³ Ibid.

³⁴ Ibid