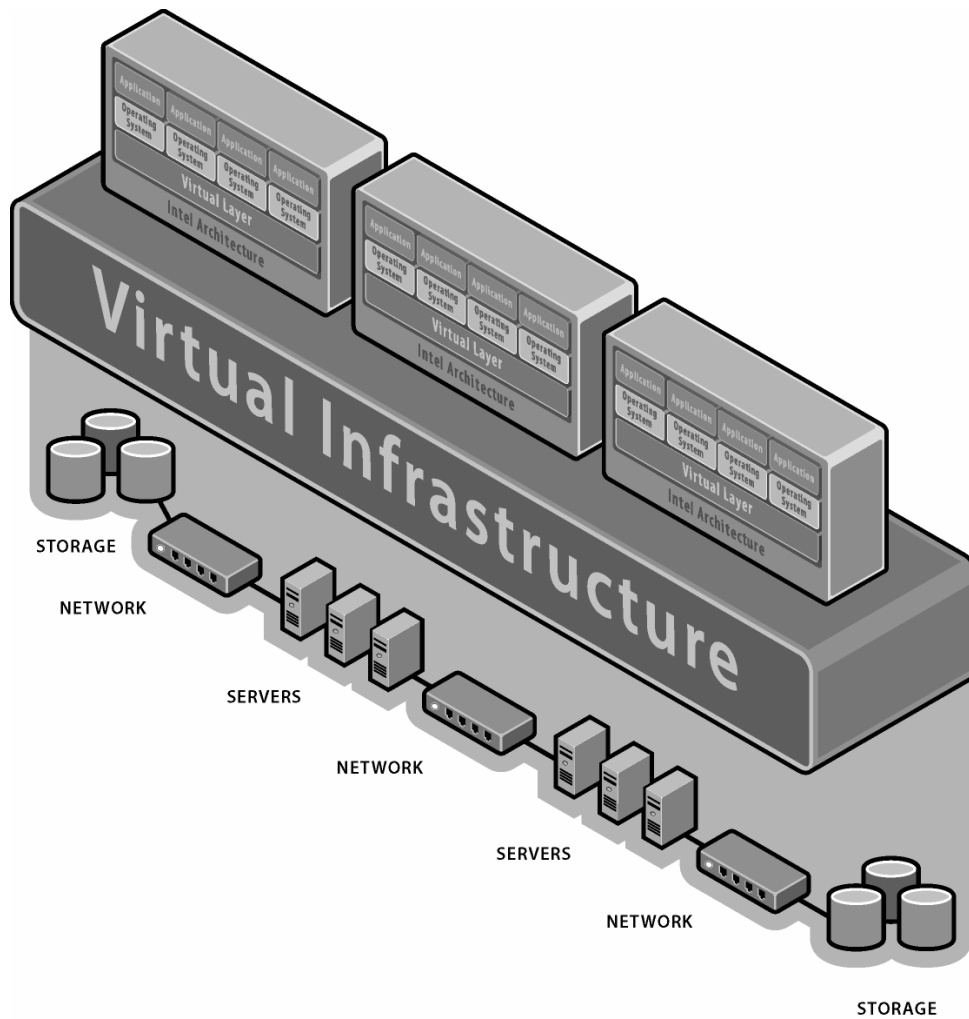# VMware VirtualCenter Lab

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Lab Setup:

Station 1 – IP Range 10.10.10.1 – 10.10.10.10
        VM Name – Student 1 VMx, where x = the number of VMs
Station 2 – IP Range 10.10.10.11 – 10.10.10.20
        VM Name – Student 2 VMx, where x = the number of VMs
Station 3 – IP Range 10.10.10.21 – 10.10.10.30
        VM Name – Student 3 VMx, where x = the number of VMs
Station 4 – IP Range 10.10.10.31 – 10.10.10.40
        VM Name – Student 4 VMx, where x = the number of VMs
Station 5 – IP Range 10.10.10.41 – 10.10.10.50
        VM Name – Student 5 VMx, where x = the number of VMs
Station 6 – IP Range 10.10.10.51 – 10.10.10.60
        VM Name – Student 6 VMx, where x = the number of VMs
Station 7 – IP Range 10.10.10.61 – 10.10.10.70
        VM Name – Student 7 VMx, where x = the number of VMs
Station 8 – IP Range 10.10.10.71 – 10.10.10.80
        VM Name – Student 8 VMx, where x = the number of VMs
Station 9 – IP Range 10.10.10.81 – 10.10.10.90
        VM Name – Student 9 VMx, where x = the number of VMs
Station 10 – IP Range 10.10.10.91 – 10.10.10.100
        VM Name – Student 10 VMx, where x = the number of VMs

Subnet Mask will be 255.255.255.0

All passwords should be password (all small latters)

In this lab, you will install ESX 2.1 over the network using a scripted installation. Then, using ESX tools and VirtualCenter, you will create several VMs in different ways. You will explore the different functions of VirtualCenter, including the monitoring and deployment tools.

Part 1 Installing ESX Server over the Network
In this part you will do a scripted install of ESX Server over the network

1. Insert the floppy labeled Station x into the server and power it on.

    Note: If you receive warnings about the partition table on your drives select **yes** to initialize the drives.

2. When prompted remove the floppy and hit enter to reboot

3. After reboot hit the _alt & F2 _keys to enter a terminal session

4. Log in as _root_ password = _password_

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5. Type *vmkpcidivy –i* at the prompt, enter the following:
    - Name of this configuration – hit enter to accept the default (esx)
    - Amount of memory to allocate – hit enter to accept the default (272)
    - Enable hyperthreading - hit enter to accept the default (y)
    - Ethernet controller 1 - hit enter to accept the default (c)
    - Ethernet controller 2 – enter (v) to allocate to VMs, hit enter
    - SCSI Controller – enter (s) to share between Console OS and VMs, hit enter
    - Current configuration is not the default configuration. Use this configuration as default – enter (y), hit enter
    - Commit Changes – enter (y), hit enter
    - Type in *reboot* at the command prompt

6. On the management server log into the ESX Server through the MUI by launching IE and enter the ESX Server IP address.

7. Go to the options tab and click on **Storage Management**

8. Go to the free space on the first disk and click on **Create Volume**

9. In the Volume Creation method screen select **typical**

10. In the core dump partition screen select **yes**

11. Enter **VMFS1** when prompted for a vmfs volume label

12. Go to the free space on the second disk and click **Create Volume**

13. In the Volume Creation method screen select **typical**

14. Enter **VMFS2** when prompted for a vmfs volume label

15. Close the storage management window

16. Go to the status monitor tab

17. Click on **reconfigure** for the No swap space configured warning

18. Click on **create** in the swap configuration screen

19. Create the swap file on VMFS1 partition, except all other fields defaults and click on **OK**

20. Click on **activate** in the swap configuration screen

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21. Click on **reconfigure** for the No virtual Ethernet switches found warning

22. Click on **click here** to create a virtual Ethernet switch link

23. Change the network label to **public**, Select the outbound **adapter 0** under Bind Network Adapter, Click on **Create Switch**

24. Close the Virtual Switches screen

25. Click on **log out** in the MUI and close IE

Part 2: Importing a Cloned Image

In this section, you will import a VM from a Windows file server to use as a master file from which you can make copies. Follow these steps:

1. Log on to the local console

2. Now, mount the Windows file share
   * First, create a directory where you can mount the share by going to the root directory displayed as / and typing "mkdir /winshare"
   * Now, mount the shared directory by typing "mount –t smbfs –o username=root,password=password //10.10.10.201/labfiles /winshare"

3. Change to the share directory by typing "cd /winshare" and hitting return then type "ls" and hit return to make sure the command worked successfully. If the command worked you will see files in this directory.

4. Now, import the .dsk file by typing "vmkfstools –i w2k03.dsk vmfs2:VCVM1.dsk"
   IMPORTANT NOTE: This step will take from 10 to 15 minutes to complete. Since we will be using this VM to install Virtual Center you must complete this step before going forward.

5. Start the import of another VM naming it StudentxVMx.dsk .

   Note: You do not need to wait for this to complete before continuing. This VM will be required for **Lab 10**

6. Using the first .dsk file you imported, named VCVN1.dsk, create a new VM by following these steps.
   * On management sever log into the ESX Server through the MUI
   * Select **Add Virtual Machine**
   * Select **Windows Server 2003** as the Guest Operating System
   * Enter **VirtualCenter Server** for the display name

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- Change the path under location to read /root/vmware/winNetStandard/vmvm1/winNetStandard.vmx
- Click on **Next**
- Accept the defaults on this screen by selecting **Next**
- On the Virtual Disk screen select **Existing**
- Point to the .dsk file named VCVM1.dsk located on vmfs2
- Launch the Remote Console clicking on the icon located on the left of the screen
- Power on your VM and complete installation
    - The IP address will be 10.10.10.2
    - Subnet Mask 255.255.255.0
    - License Key JKMDT-JTCH2-J8TMY-R9J46-M4XVM
- After set up is complete let your VM reboot and leave it powered on

Part 3: Install VirtualCenter

In this part you will install VirtualCenter

1. Launch the VirtualCenter Installation located on the desktop of your VM.

2. Select *Next* in the VMware VirtualCenter installation wizard.

3. Accept the License Agreement.

4. Accept the defaults in the Customer Information screen by selecting *Next*.

5. Choose Custom Setup in the Setup Type screen and select *Next*.

6. Deselect the VirtualCenter Web Service in the Custom Setup screen and select *Next*.

7. Accept the default (Use Access Database) in the Database Setup screen and select *Next*.

8. Select *Install* in the Ready to Install the Program screen.

9. Select *Finsh* when installation is complete.

10. The VirtualCenter client and server have been installed. You can determine this by checking the following:
    - VMware VirtualCenter icon appears on the desktop.
    - In the Services MMC plug-in, you should see the VMware VirtualCenter Server service.

Part 4: Add Licenses to VirtualCenter

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In this section, you will add licenses to VirtualCenter.

1. Start the VMware VirtualCenter client by double-clicking on the VMware VirtualCenter icon.

2. Log into the VirtualCenter client interface using the following information:

   - Server: localhost
   - Username: <admin_id>
   - Password: <admin_password>

3. Since you are entering the VirtualCenter client for the first time, the Licensing screen is displayed. Add licenses by doing the following:
   - Click **Add Licenses…**
   - Open the file located on your VM desktop named *vclicense.txt*
   Note: Do not edit this file.

4. Verify that you have an appropriate number of licenses for your management server.

5. Close the Licensing screen when done.

Part 5: Add a Farm, Add a Host and Verify the Virtual Center Agent is Enabled on the ESX Server

In this section, you will create a farm in VirtualCenter.

1. At this point, you should be in the Inventory panel of the client interface. Create a new farm under the Server Farms level:
   - Right-click over Server Farms.
   - Select **New Farm** from the drop-down menu.
   - Name your farm Studentx Farm.

2. Now you will add an ESX server to be managed by VirtualCenter to your farm. To do this:
   - Right-click on your farm name.
   - Select **Add Host…** from the drop down menu.

3. The **Add Host Wizard** appears. Enter the following information when prompted by the wizard:
   - Hostname – EXS Server IP address
   - Password – root password
   - Enable VMotion – No

4. Verify that your ESX Server host has been added to your farm

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5. The VirtualCenter agent was enabled on your ESX Server when you added it to the management server. Verify that this was done by logging in as root either remotely or locally to the ESX Server:

6. Verify that the VirtualCenter agent, `vmware-ccagent` is indeed running:

```
ps –ef | grep vmware
```

Part 6: Identify Information About Your ESX Server

In this section, you will explore the informational views in VirtualCenter.

Verify your ESX Server configuration

1. In the VirtualCenter client interface, select your ESX Server hostname in the Inventory panel.

2. In the **Summary** tab, locate the following:
   * Datastores section. You should see your server's VMFSes.
   * Total memory
   * Type and number of processors
   * Number of NICs
   * CPU utilization
   * Available Resources
   * Memory Utilization

3. On the Virtual Machines tab, locate the VM you created earlier. This is the VM you are using for your VirtualCenter Server. As a result of adding your host, VirtualCenter discovered at least one virtual machine on your host. Answer the following questions:

4. Under what VM group is the virtual machine(s) placed?
   _____

5. What is the name of each VM that was discovered?
   _____

6. What operating system is running in each discovered VM (click on VM, then look at Summary tab to find out)?
   _____

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Part 7: Add VM Group to Farm

In this section, you will create a new VM Group, and then move your VM into this new group.

Create a VM group under your farm named "*Studentx* VMs".

1. Right-click on your farm.

2. Select **New Virtual Machine Group** from the drop-down menu.

    Type the name of your new VM group (as mentioned above, name it "*Your Name's* VMs")

3. Using the drag-and-drop method, move your VM to the VM group you just created.

Part 8: Create another Virtual Machine

In this section, you will create a new VM using VirtualCenter and not the MUI.

For this lab, you will create a new virtual machine using the second .dsk file you imported.

The name of your Windows virtual disk is `StudentxVM2.dsk`:

1. In the Inventory panel, right-click your <u>ESX Server host</u>.

2. Select **New Virtual Machine…** from the drop-down menu.

3. The **New Virtual Machine Wizard** appears. Enter the following information when prompted by the wizard:

    - Virtual Machine Configuration Type – Custom
    - VM Group – Studentx VMs
    - Guest Operating System – Windows Server 2003 Standard
    - Virtual Machine Name – Studentx VM1
    - Datastores – Select yours VMFS partition
    - Memory – 384
    - Network Type – Select Public Network
    - Adapter Type – vlance
    - Device Status – Connect at Power On
    - I/O Adapter Type – LSI
    - Select a Disk – Use an existing virtual disk
    - Select an Existing Disk – Choose `StudentxVM2.dsk`

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4. Click Finish. Verify that your VM is created and placed in your VM group.

5. Power on your new VM:

    - Right-click your VM.
    - Select **Power On** from the drop-down menu.

6. Launch a VM console to your VM:

    - Select your VM.
    - Click the **Open Console** link in the Summary tab.

7. Power on the VM, and then finish the installation.

8. Your VM is ready to be used. Keep it powered on, and close its VM console for now.

9. Look at your Inventory panel. Is there a red alert icon next to the VM you just created? If so, why do you think you are getting this red alert? (Feel free to look at the other tabs to determine the reason.)

        _____
        _____
        _____

Part 9: Understand Role Assignment

In this part, you will explore giving VirtualCenter permissions to different user IDs, and how the different roles affect what a user can do.

1. Log into VirtualCenter as an administrator

2. Verify that you do indeed have the role of VirtualCenter Administrator at your team farm level by selecting the Farm and Permissions Tab

3. For this part, you will need a user account, a user account called user exist on your VirtualCenter VM . Give `user` the role of Virtual Machine User at *Studentx VMs* group level. To do this:

    - Right-click *Your Name's VMs* group.
    - Select **Add Permission…** from the drop-down menu.
    - From the user name list, select your `user` account and add it.
    - Set the permissions of this user to Virtual Machine User.
    - Verify that your user assignment appears in the Permissions tab associated with your VM group.

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4. Verify that the permission is set correctly by doing the following:

    *   Start a second VirtualCenter client and login as `user`.
    *   Test your permissions by powering off one of the VMs in your VM group. You should be able to do this successfully.
    *   Test your permissions by trying to delete one of the powered off VMs in your VM group. You should not be able to do this. What role do you need in order to delete a VM?

        _____

5. Log into VirtualCenter as an administrator (or if you have an existing session open for this user, then return to it.)

6. Create a new VM group in your team farm named "*Studentx* Read Only VMs"
7. Give your `user` account the role of Read Only User at this VM group level.

    At this point, user has the role of VM User at *Studentx* VMs group level, and user has the role of Read Only User at *Studentx* Read Only VMs group level.

8. Drag and drop the Studentx VM2 VM from *Studentx* VMs group to *Studentx* Read Only VMs group.

9. Log out of your `administrator` account and log back into VirtualCenter as `user`.

10. Verify `user`'s permissions are set properly at *Studentx* Read Only VMs group.

    *   You should not be able to perform any power operations on VMs in this group.
    *   You should not be able to open a VM console to any of the VMs in this group.

11. Log out of your `user` account when done testing your permissions.

Part 10: Create Template from Virtual Machine
In this section, you will create a template from an existing VM.

1.   Log into VirtualCenter as the administrator.

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2. Verify that the VM you will use to create your template is powered off. This should be the Studentx VM2 VM. If it is not, shutdown the guest OS at this time.

3. Click the **Templates** panel.

4. The **Templates** tab is displayed. Right-click anywhere in the displayed area.

5. Select **New Template…** from the drop-down menu.

6. The **New Template Wizard** appears. Enter the following information when prompted by the wizard:

- Source Virtual machine – A virtual machine in the VMware VitualCenter Inventory
- Virtual Machine – Select the powered off VM
- Template Name – W2K03 Standard Template
- Location of Template Files – On a Datastore
- Specify the Template Location – Choose your VMFS partition with the most space available
- Select Finish to complete the wizard

8. Monitor the template creation progress in the Tasks panel.

9. While the task is running, return to the Inventory panel, what is the State and the Active Tasks for the VM from which you are creating the template?

    o State: _____

    o Active Tasks: _____

    o Can you power it on? _____

10. Remain in the Inventory panel and select your host. How many active tasks are running on your host? _____

11. Verify that the template creates without any errors.

Part 11: Deploy Virtual Machine from Template
In this section, you will create a new VM from a template, and modify the template on the fly to have unique information.

Your management server needs to be set up for you to customize your Windows guest OSes. To do that, you must install the Microsoft W2K Sysprep tool. To do that, run

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Q257813_w2k_spl_x86_en.exe located on your desktop and install it in the
C:\[VirtualCenter_installation_directory]\resources\windows\sysprep\1.1 directory

1. Display the **Templates** panel.

2. Right-click over the template that you just created.

3. Select Deploy **Virtual Machine** from this Template… in the drop-down
   menu.

4. The **Deployment Wizard** appears. Enter the following information when
   prompted by the wizard:

   - Virtual Machine Name – Student x VMx
   - Virtual Machine Destination – Select your VM Group
   - Destination Host – Select your ESX Server Host
   - Specify Virtual Machine Location – Choose the VMFS with the most
     space available
   - NIC Configuration – Choose Public Network
   - Assign Resources – Memory 384MB, Resource Priority – Normal
   - Start the Guest Customization Wizard
   - Name – ATS
   - Organization – IBM
   - Computer Name – StudentXVMX
   - Product ID – JKMDT-JTCH2-J8TMY-R9J46-M4XVM
   - Server License Mode – Per seat
   - Password – password
   - Time Zone – Central
   - Run Once – Leave Blank
   - Network Interface Settings – Typical settings
   - Workgroup or Domain – Workgroup
   - Operating System Options – Generate New Security ID (SID)
   - Save Customization Settings – Select Save my customization settings,
     Browse to folder c:\XMLfiles, Name your file studentx.xml

5. To deploy the virtual machine, click **Finish** in the Deployment Wizard.

6. Monitor the progress of the Deploy task in the Tasks panel. Two tasks will
   happen:

   - Virtual machine is deployed
   - Guest OS is customized using the Virtual Image Editor

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While your virtual machine is being deployed, proceed to the next part to schedule deployment of another virtual machine.

Part 12: Schedule Deployment of a Virtual Machine

Before scheduling your VM deployment, edit the customization settings file to reflect a new computer name for your VM:

1. Locate the customization settings file (.xml) that you saved in the folder C:\XMLfiles.

2. Make a copy of this file. Name it anything you want.

3. Using Notepad, edit this copied file:

   - Search for the attribute called <ComputerName>.
   - Change the value to StudentxVMx.
   - Save your changes and exit Notepad.

You are now ready to schedule your VM deployment.

4. Display the **Tasks** panel.

5. Right-click in the Scheduled Tasks area anywhere below the current list of tasks.

6. Select **New Scheduled Task…** from the drop-down menu.

7. The **New Task Wizard** starts. Enter the following information when prompted by the wizard:

   - Select a Task – Deploy a virtual machine from a template
   - Virtual Machine Template – Select the template you created
   - Virtual Machine Destination – Select your virtual machine group
   - Destination Host – Select your ESX Server
   - Virtual Machine Name – StudentxVMx
   - Specify the Virtual Machine Location – Select the VMFS with the most available space, Select – Automatically Power On
   - NIC Configuration – Public Network
   - Assign Resources – Memory – 384MB, Resource Priority – Normal
   - Guest Operating System Customization – Select Import Customizations from an XML file, Browse to the file you just customized
   - Schedule the task – Frequency – Once, Start Time – Later (5 minutes from now)

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- Select Finish to complete

8. Verify that the task is scheduled to run at the time you specified

9. Verify that your first deployment finished successfully.

Part 13: Monitor System Activity

In this section, you will create activity within a VM, and monitor the hardware utilization within VirtualCenter. Use the additional VMs you have created for the remaining labs, do not use your Virtual Center VM.

1. Log into VirtualCenter with an administrator account.

2. The host's Summary tab contains information about the host's status and configuration. View the appropriate displays in the VirtualCenter client and answer the following questions:

   a. Who are you logged in as? _____

   b. Does your host have any active tasks? _____

   c. How full are your host's datastores?
      _____
      _____

3. What specific display(s) would help you determine if a VM has hung or bluescreen'ed?
   _____
   _____
   _____

4. Make sure your VMs are powered on, and then look at your host and view the resource usage of its VMs:

   a. What VM is using the most CPU? _____

   b. What VM is using the most Memory? _____

   c. Are their any VMs that are saturating their CPU or Memory allocations?
      _____

   d. What VM is using the most disk bandwidth? _____

   e. What VM is using the most network bandwidth? _____

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5. Based on your utilization findings, what VM(s), if any, would you migrate to other hosts in your farm? Why?

6. Go to *programs*, *Auremo Demo Apps* in your VMs, set them to use resources, and then monitor them using VirtualCenter. Repeat the questions in step 5.

Part 14: Configure Alarm at the Virtual Machine Level

In this section, you will configure an alarm, set it off, and see the results inside VirtualCenter.

1. Log into VirtualCenter as an administrator
2. Select any one of your Windows VMs.
3. Create an alarm for one of your Windows VMs with the following settings:

   - Name it "*VM_Name* CPU Usage"
   - Trigger a Yellow alert when the VM's CPU Usage is above 60% and a Red alert when the VM's CPU is above 80%.
   - Create an action to send an SNMP trap notification when status changes from Green to Yellow.
   - Create a second action to power off the VM when status changes from Yellow to Red.
   - Create a third action to send an SNMP trap notification when status changes from Yellow to Green.

4. Verify that your alarm is working properly. To do this launch the CPU Consumer app you installed inside the VM.