DMI COLLEGE OF ENGINEERING

PALANCHUR CHENNAI – 600 123

DEPARTMENT OF INFORMATION TECHNOLOGY

LABORATORY MANUAL

SUB CODE : CCS372

SUBJECT TITLE : VIRTUALIZATION LABORATORY

SEMESTER : VI

YEAR : III

DEPARTMENT : IT

Ex.1:
Date:

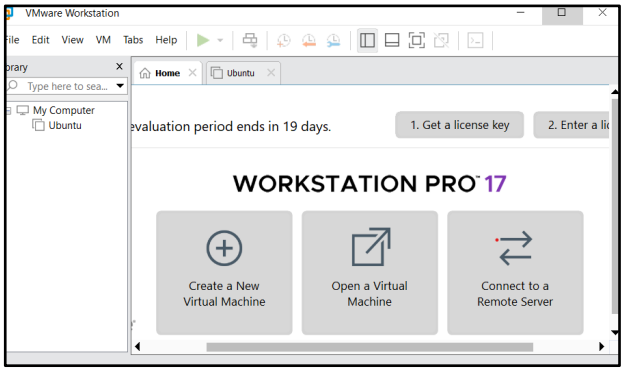
Create type 2 virtualization in VMWARE or any equivalent Open Source Tool. Allocate memory and storage space as per requirement. Install Guest OS on that VMWARE

Aim:

To find the procedure to run VM of different configuration and Allocate memory and storage space as per requirement .

Procedure:

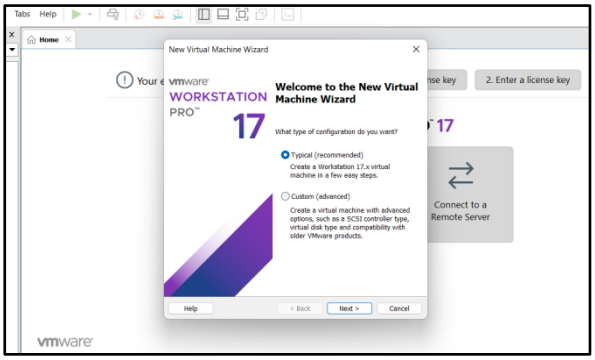
Step 1: Download and Install VMware Workstation Player



Step 2: Create a New Virtual Machine

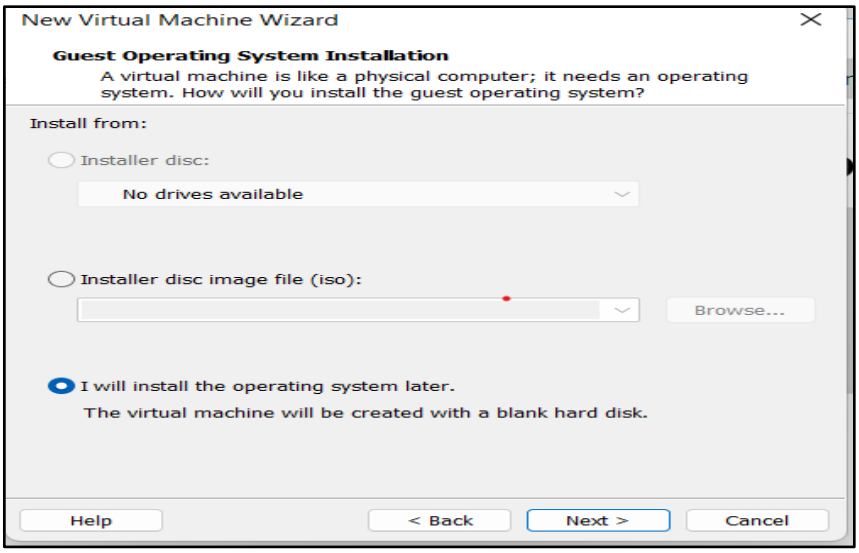
Open VMware Workstation Player

Click on "Create a New Virtual Machine" or go to File > New Virtual Machine



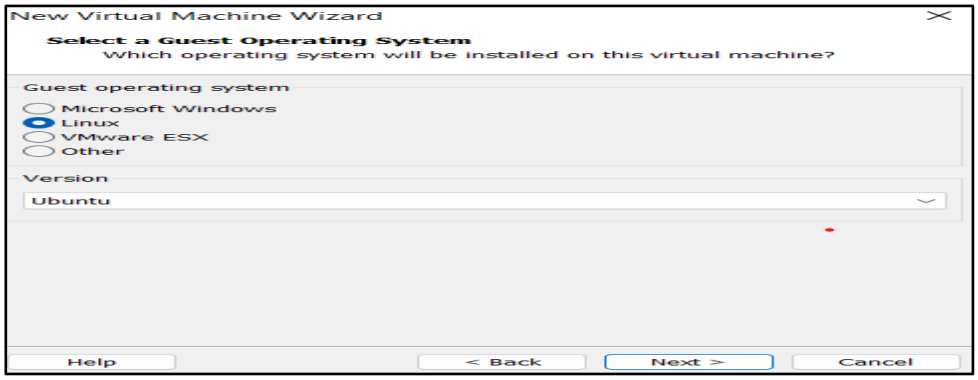
Step 3: Virtual Machine Configuration Wizard

The Virtual machine configuration Wizard will appear. Choose “Typical” configuration and click “Next”.



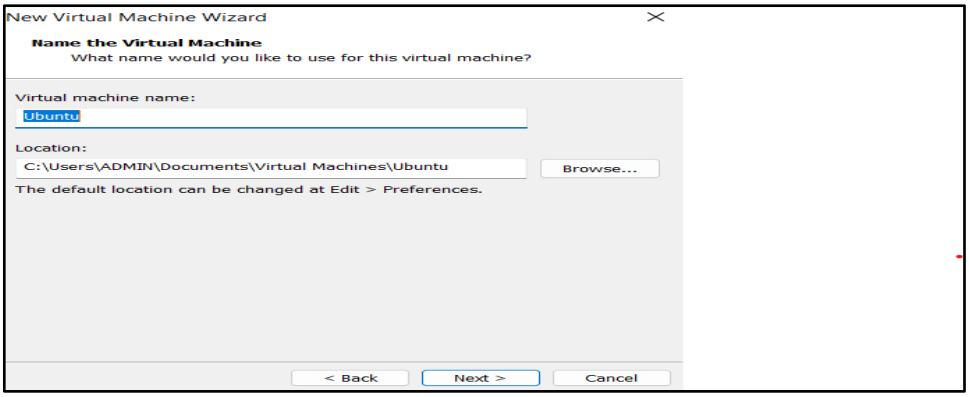
Step 4: Install Guest Operating System

- Choose the installation method for the guest OS. You can either install from a disc or image file (ISO) or choose to install later. If you have the ISO file for your guest OS, select it during this step
- Click “Next”



Step 5: Enter Guest OS Details

- Enter the name of your virtual machine and choose the location where you want to save it.
- Select the appropriate guest operating system and version. For example, if you are installing Windows 10, choose "Windows" as the guest OS and "Windows 10 x64" as the version.
- Click "Next."



Step 6: Configure Virtual Machine Hardware

- Allocate memory: Choose how much RAM you want to allocate to the virtual machine. Make sure to leave enough memory for your host OS to run smoothly as well.
- Allocate storage: Choose whether to store the virtual disk as a single file or split into multiple files. Specify the disk size, and you can also choose to allocate all disk space now or let it grow as needed.
- Click "Next."

Step 7: Customize Hardware (Optional)

- If needed, you can customize the virtual machine's hardware settings like CPU cores, network adapters, graphics memory, etc. Otherwise, you can leave them as default.
- Click "Finish" once you are satisfied with the settings.

Step 8: Install Guest OS

- Start the virtual machine you just created. The virtual machine will boot from the ISO or installation media you provided earlier.
- Follow the standard installation process for your guest OS.

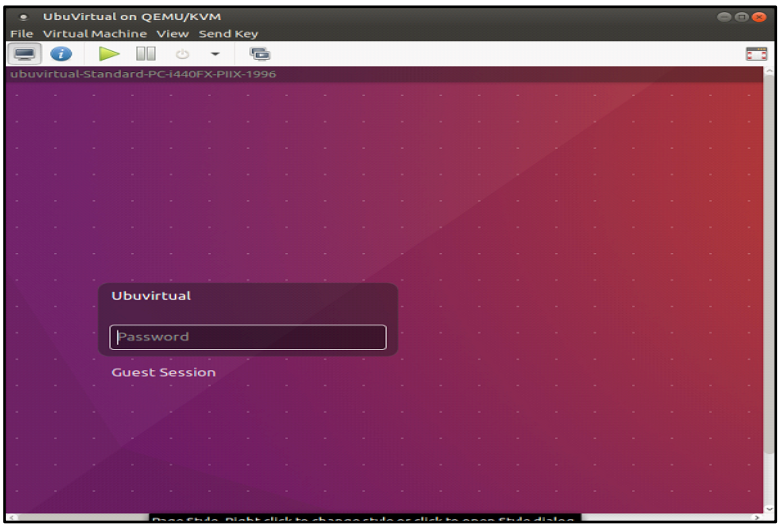
Step 9: Install VMware Tools (Optional but Recommended)

- After installin/ g the guest OS, it is advisable to install VMware Tools within the guest OS. VMware Tools provides better integration between the host and guest OS, enabling features like shared folders, improved graphics, and more.

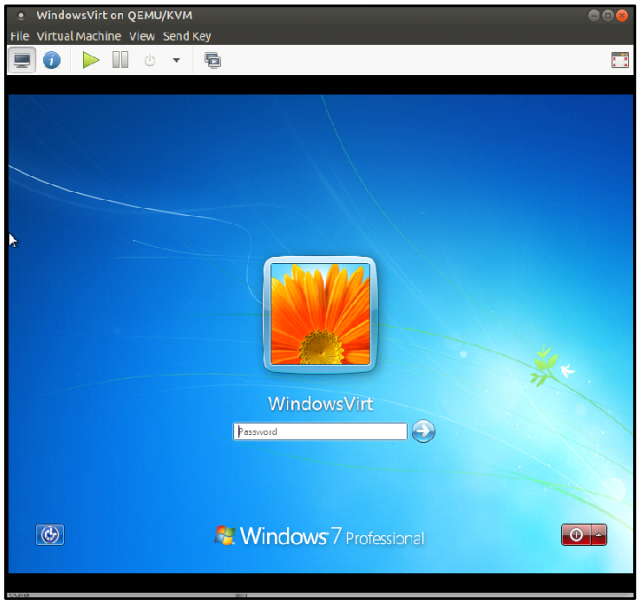
In the same way, we can install windows OS also. The output screens for the virtual machines of different configurations.

OUTPUT:

(i)Ubuntu Operating System in Virtual Machine



(ii)Windows7 Operating System in Virtual Machine



RESULT:

Thus, various configurations of Virtual machines has been created and run.

Ex no: 2(a)
Date:

Shrink and Extend Virtual Disk

Aim:

To find the procedure of Shrink a virtual disk involves reducing its size to reclaim unused space and extend a virtual disk allows you to increase its size to accommodate more data.

Procedure:

Shrink a Virtual Disk:

Step1: Inside the virtual machine, delete unnecessary files and empty the recycle bin/trash to free up space.

Step 2: Defragment the virtual machine's disk to move all the data to the beginning of the disk.

Step 3: Shutdown the virtual machine.

Step 4: On the host system, open the virtualization software

Step 5: Navigate to the virtual machine's settings or configuration.

Step 6: Select the virtual disk you want to shrink.

Step 7: Look for an option to shrink or compact the disk and follow the prompts.

Step 8: The process might take some time, and it's essential to back up your virtual machine before proceeding,
as data loss can occur in some cases.

Extend Virtual Disk:

Step 1: Shutdown the virtual machine.

Step 2: On the host system, open the virtualization software (e.g., VMware, VirtualBox).

Step 3: Navigate to the virtual machine's settings or configuration.

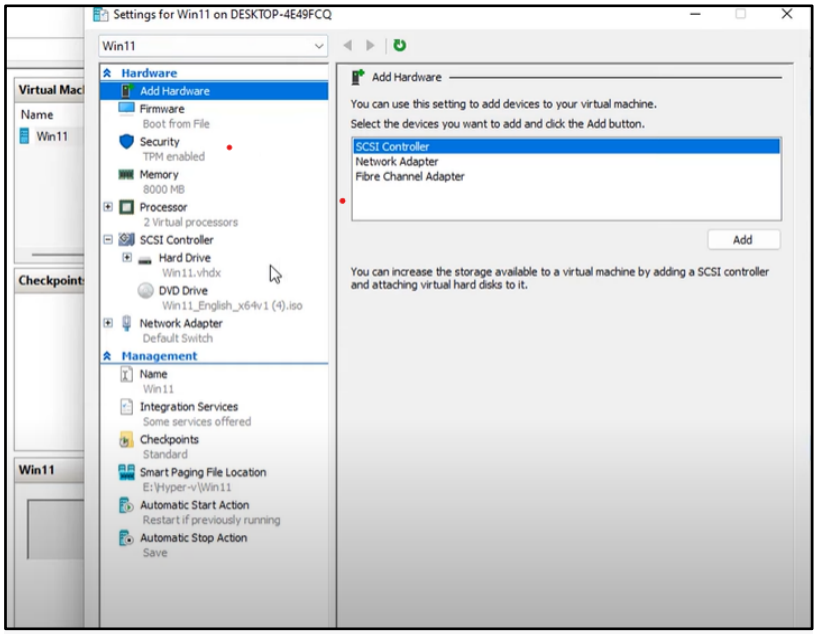
Step 4: Select the virtual disk you want to extend.

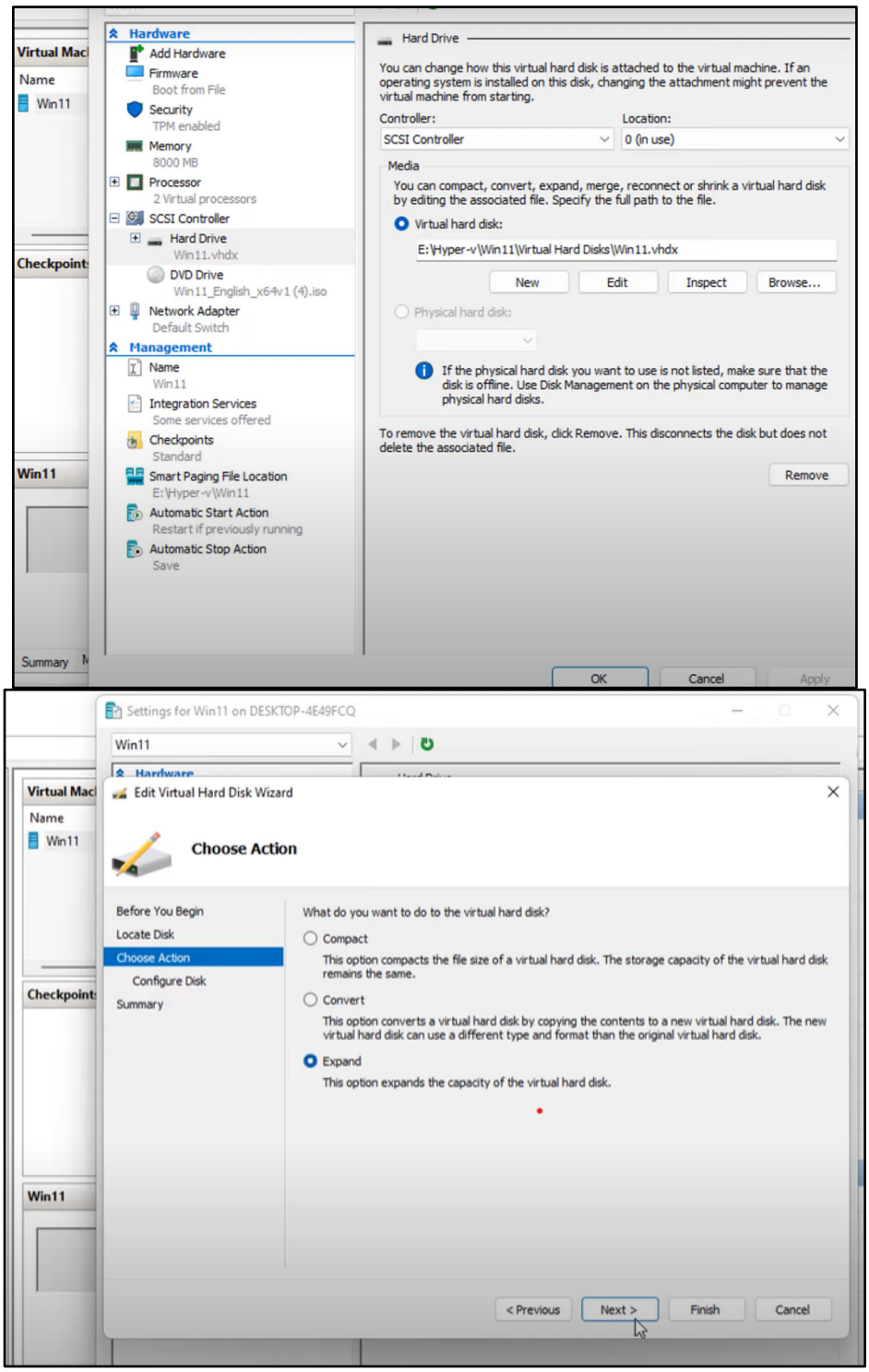
Step 5: Look for an option to increase or extend the disk and follow the prompts.

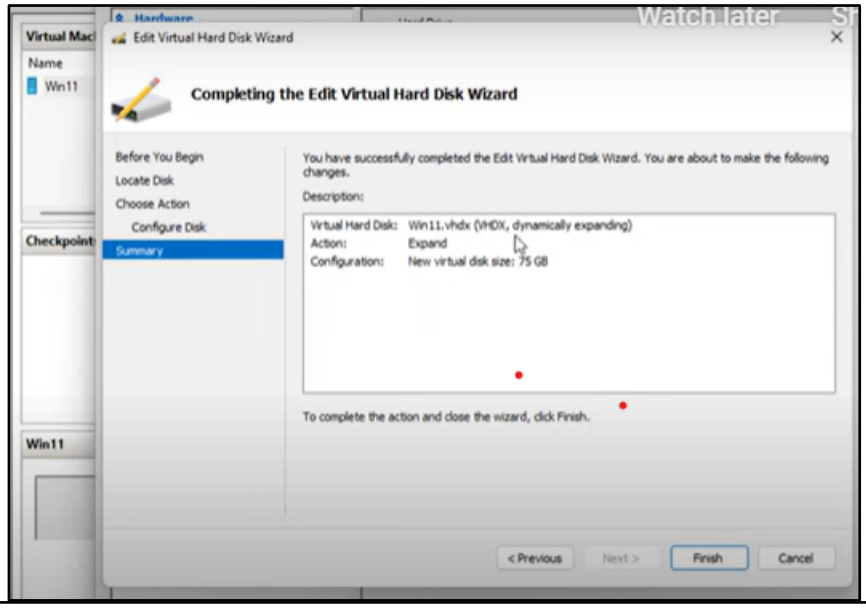
Step 6: Specify the new size for the virtual disk (make sure to allocate enough space for your needs).

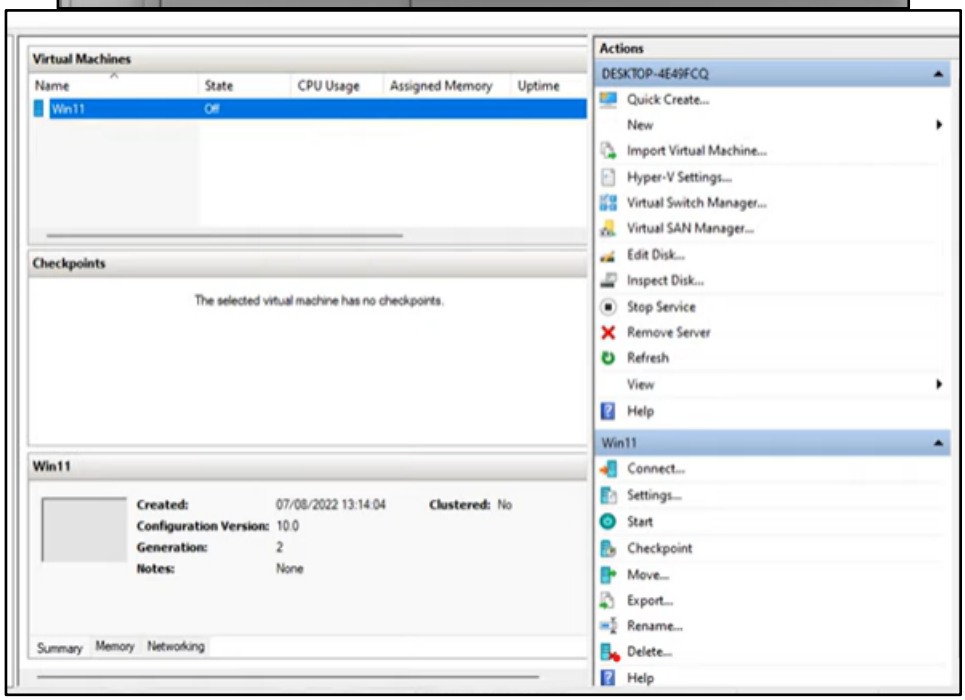
Step 7: The process might take some time, and it's crucial to back up your virtual machine before proceeding, as extending the disk involves modifying the underlying file system.

Output:




Hardware
Add Hardware
Firmware
Boot from File
Security
TPM enabled
Memory
8000 MB
Processor
2 Virtual processors
SCSI Controller
Hard Drive
Win11.vhdx
DVD Drive
Win11_English_x64v1 (4).iso
Network Adapter
Default Switch
Management
Name
Win11
Integration Services
Some services offered
Checkpoints
Standard
Smart Paging File Location
E:\Hyper-v\Win11
Automatic Start Action
Restart if previously running
Automatic Stop Action
Save
Hard Drive
You can change how this virtual hard disk is attached to the virtual machine. If an operating system is installed on this disk, changing the attachment might prevent the virtual machine from starting.
Controller:
SCSI Controller
Location:
0 (in use)
Media
You can compact, convert, expand, merge, reconnect or shrink a virtual hard disk by editing the associated file. Specify the full path to the file.
Virtual hard disk:
E:\Hyper-v\Win11\Virtual Hard Disks\Win11.vhdx
New
Edit
Inspect
Browse...
Physical hard disk:
If the physical hard disk you want to use is not listed, make sure that the disk is offline. Use Disk Management on the physical computer to manage physical hard disks.
To remove the virtual hard disk, click Remove. This disconnects the disk but does not delete the associated file.
Remove
OK
Cancel
Apply
Settings for Win11 on DESKTOP-4E49FCQ
Win11
Edit Virtual Hard Disk Wizard
Choose Action
Before You Begin
Locate Disk
Choose Action
Configure Disk
Summary
What do you want to do to the virtual hard disk?
Compact
This option compacts the file size of a virtual hard disk. The storage capacity of the virtual hard disk remains the same.
Convert
This option converts a virtual hard disk by copying the contents to a new virtual hard disk. The new virtual hard disk can use a different type and format than the original virtual hard disk.
Expand
This option expands the capacity of the virtual hard disk.
< Previous
Next >
Finish
Cancel





Result:

Thus the shrink and extend of virtual disk has been created and run successfully.

Ex No:2(b)
Date:

Create, Manage, Configure and schedule snapshots

Aim:

To find the procedure of Creating, managing, configuring, and scheduling snapshots is a fundamental part of virtual machine management.

Procedure:

Step 1: Creating a Snapshot: To create a snapshot, follow these steps:

a. Select the virtual machine in the management interface (e.g., vSphere Client).

b. Right-click on the virtual machine and choose "Snapshot" or "Take Snapshot."

c. Provide a name and description for the snapshot.

d. Optionally, select the memory state to capture the virtual machine's running state (requires the virtual machine to be powered off).

e. Click "OK" to create the snapshot.

Step 2: Managing Snapshots: Managing snapshots involves tasks such as viewing, reverting, deleting, and consolidating snapshots.

a. Viewing Snapshots: To see the list of snapshots for a virtual machine, navigate to the "Snapshots" tab in the virtual machine's details.

b. Reverting to a Snapshot: To revert a virtual machine to a specific snapshot, right-click on the snapshot and choose "Revert to Snapshot." This action will roll back the virtual machine to the state captured in the selected snapshot.

c. Deleting Snapshots: To delete a snapshot, right-click on the snapshot and choose "Delete Snapshot." You can choose to delete the snapshot only or delete the snapshot and consolidate its changes into the base virtual machine disk.

d. Consolidating Snapshots: If you have multiple snapshots, you can perform a "Snapshot Consolidation" to merge all snapshots into the base disk. This helps to reduce storage requirements and improves performance.

Step 3: Configuring Snapshot Settings: The snapshot settings allow you to define how snapshots are managed and stored.

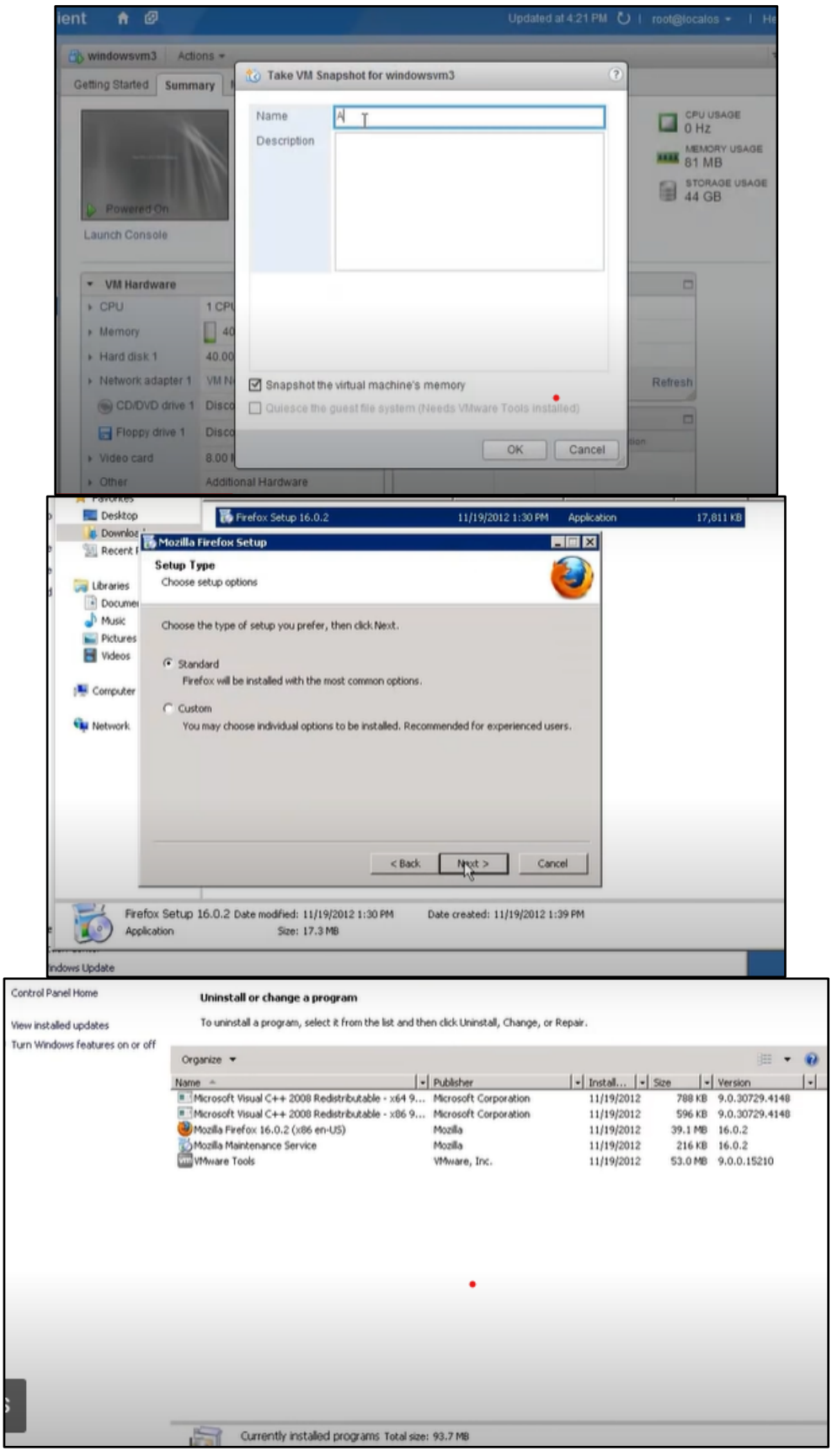
a. Snapshot Location: Configure the location where snapshot files are stored, which can be on the same data store as the virtual machine or on a different storage location.

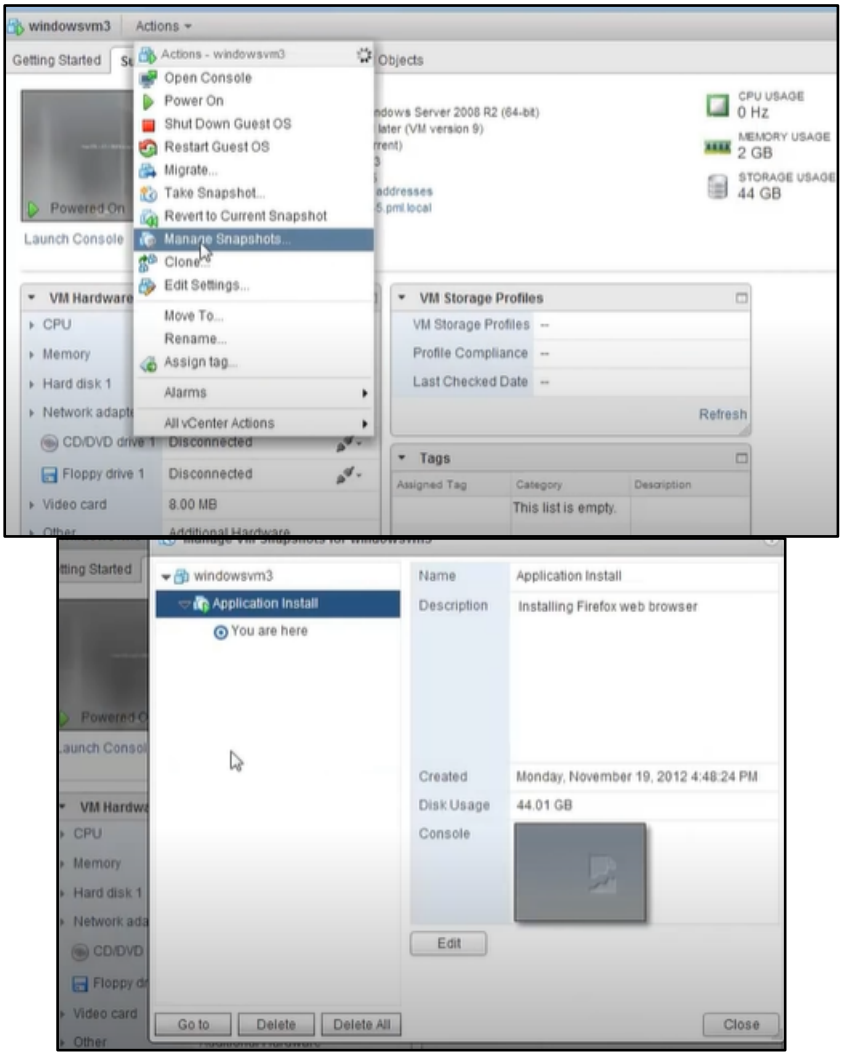
b. Snapshot Quiescent: Enable or disable the use of VMware Tools to quiesce the file system inside the virtual machine before taking a snapshot. This helps ensure application consistency during the snapshot.

Step 4: Scheduling Snapshots: Some virtualization platforms allow you to schedule snapshots to be taken automatically at specific intervals.

a. Scheduled Snapshots: Navigate to the virtual machine's settings, find the "Snapshot Schedule" option, and configure the frequency and retention policy for automatic snapshots.

Output:


Updated at 4:21 PM
root@localos
windowsvm3
Actions
Getting Started
Summary
Take VM Snapshot for windowsvm3
Name
Description
Snapshot the virtual machine's memory
Quiesce the guest file system (Needs VMware Tools installed)
OK
Cancel
CPU USAGE
0 Hz
MEMORY USAGE
81 MB
STORAGE USAGE
44 GB
Powered On
Launch Console
VM Hardware
CPU
Memory
Hard disk 1
Network adapter 1
CD/DVD drive 1
Floppy drive 1
Video card
Other
Additional Hardware
Refresh
Desktop
Libraries
Music
Pictures
Videos
Computer
Network
Firefox Setup 16.0.2
11/19/2012 1:30 PM
Application
17,811 KB
Mozilla Firefox Setup
Setup Type
Choose setup options
Choose the type of setup you prefer, then click Next.
Standard
Firefox will be installed with the most common options.
Custom
You may choose individual options to be installed. Recommended for experienced users.
< Back
Next >
Cancel
Firefox Setup 16.0.2 Date modified: 11/19/2012 1:30 PM
Application
Size: 17.3 MB
Date created: 11/19/2012 1:39 PM
Control Panel Home
View installed updates
Turn Windows features on or off
Uninstall or change a program
To uninstall a program, select it from the list and then click Uninstall, Change, or Repair.
Organize
Name
Publisher
Install...
Size
Version
Microsoft Visual C++ 2008 Redistributable - x64 9...
Microsoft Corporation
11/19/2012
788 KB
9.0.30729.4148
Microsoft Visual C++ 2008 Redistributable - x86 9...
Microsoft Corporation
11/19/2012
596 KB
9.0.30729.4148
Mozilla Firefox 16.0.2 (x86 en-US)
Mozilla
11/19/2012
39.1 MB
16.0.2
Mozilla Maintenance Service
Mozilla
11/19/2012
216 KB
16.0.2
VMware Tools
VMware, Inc.
11/19/2012
53.0 MB
9.0.0.15210
Currently installed programs Total size: 93.7 MB



Result:

Thus the procedure of Creating, managing, configuring, and scheduling snapshots is a fundamental part of virtual machine management is executed successfully

Ex.No:2(c)
Date:

Create Spanned, Mirrored and Striped volume

Aim:

To find the procedure of Creating Desktop Virtualization using VNC(Virtual Network Computing).

Procedure :

Step 1: How to create a spanned volume:

a. Right-click on "This PC" or "My Computer" and select "Manage."

b. In the Computer Management window, click on "Disk Management" under "Storage" in the left pane.

c. Identify the disks you want to use in the spanned volume. They should be unallocated or have empty space available.

d. Right-click on the first disk and choose "New Spanned Volume."

e. Follow the on-screen instructions to select additional disks and allocate space for the spanned volume.

f. Assign a drive letter or mount point to the new volume and format it with a file system.

Step 2: How to create a mirrored volume:

a. Follow steps a to c from the spanned volume creation process to open Disk Management.

b. Right-click on one of the disks you want to use in the mirror and choose "New Mirrored Volume."

c. Select the additional disk(s) to mirror the first disk, and then allocate space for the mirrored volume.

d. Assign a drive letter or mount point to the new volume and format it with a file system. e. Windows will start the synchronization process, where data is copied from the source disk to the mirror disk(s).

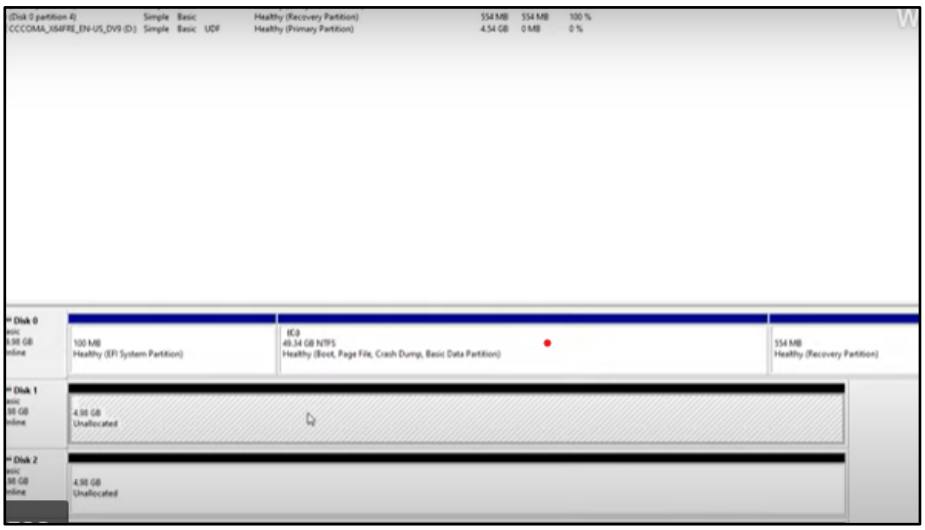
Step 3: How to create a striped volume:

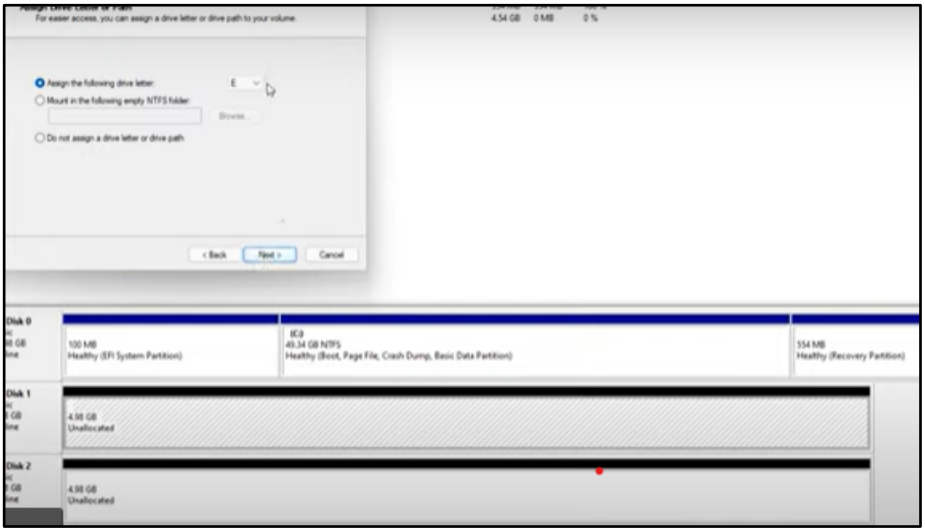
a. Follow steps a to c from the spanned volume creation process to open Disk Management.

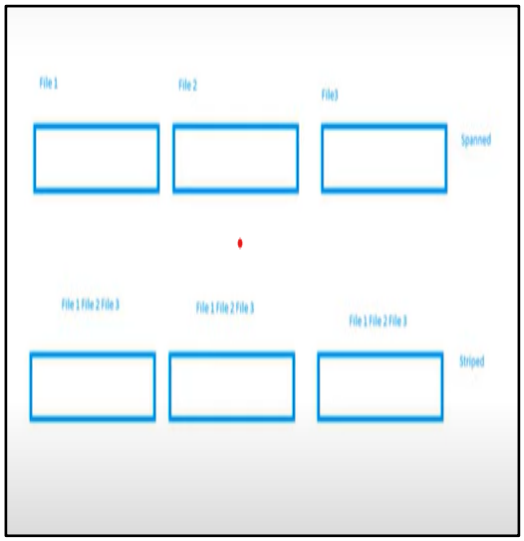
b. Right-click on one of the disks you want to use in the stripe and choose "New Striped Volume."

c. Select the additional disk(s) to include in the stripe, and then allocate space for the striped volume. d. Assign a drive letter or mount point to the new volume and format it with a file system.

Output:







Result:

Thus the procedure of Creating Desktop Virtualization using VNC(Virtual Network Computing) is created successfully

Ex.No:2(d)
Date:

Create RAID 5 Volume

Aim:

To find the procedure to install remote desktop in chrome for desktop virtualization.

Procedure:

Step 1: Backup Data: Before creating the RAID 5 volume, back up all your critical data to ensure it is safe in case of any unforeseen issues.

Step 2: Initialize and Convert Disks to Dynamic: If your disks are currently basic disks, you need to convert them to dynamic disks to create a RAID 5 volume. Follow these steps:

a. Right-click on "This PC" or "My Computer" and select "Manage."

b. In the Computer Management window, click on "Disk Management" under "Storage" in the left pane.

c. Identify the disks you want to use in the RAID 5 array. They should be unallocated or have empty space available.

d. Right-click on each disk and select "Convert to Dynamic Disk." Repeat this for all the disks you want to include in the RAID 5 array.

Step 3: Create the RAID 5 Volume: Once you have converted the disks to dynamic, you can proceed to create the RAID 5 volume:

a. Right-click on one of the disks you want to use in the RAID 5 array.

b. Select "New Spanned Volume."

c. Follow the on-screen instructions to select the other disks you want to include in the RAID 5 array. There should be at least three disks in total.

d. Allocate the desired amount of space for the RAID 5 volume. RAID 5 requires a minimum of three disks, and the volume size will be the total capacity of all disks minus one disk's worth of space. For example, if you have three 1TB disks, the RAID 5 volume will have a total capacity of 2TB.

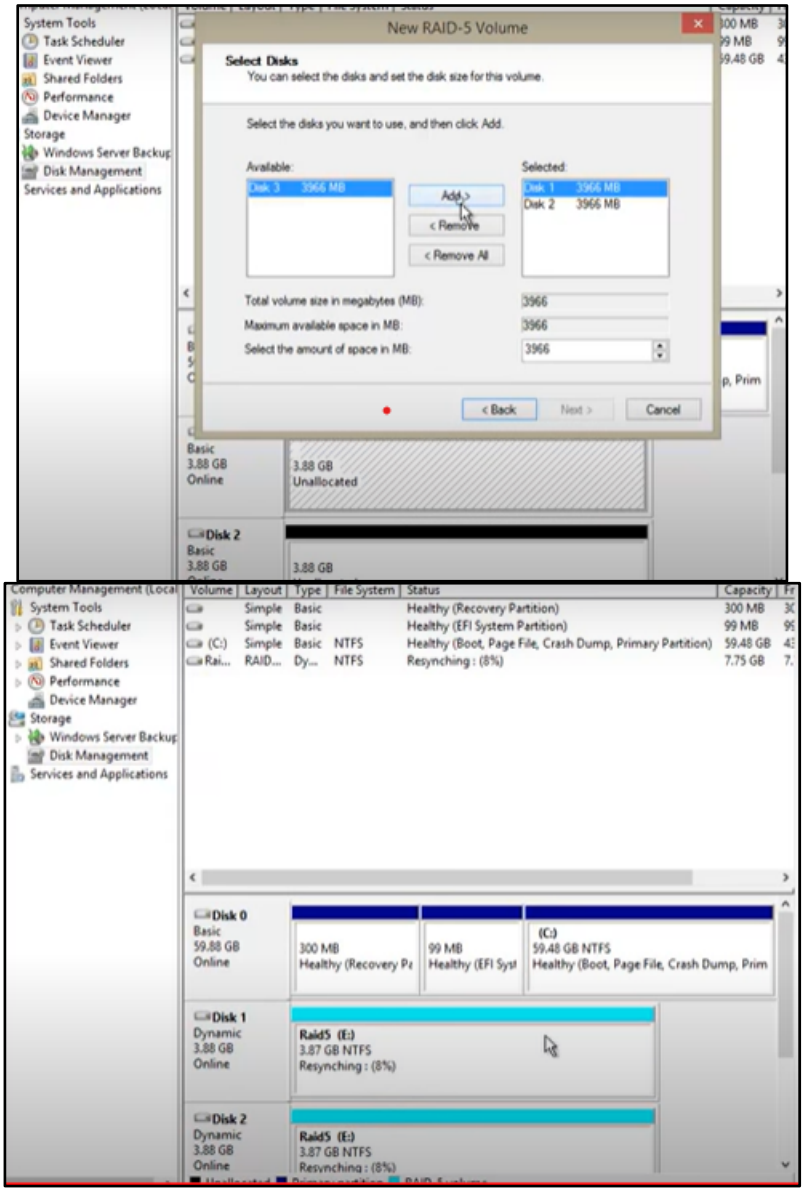
e. Assign a drive letter or mount point to the new RAID 5 volume and format it with a file system.

Step 4: Initialize and Format the RAID 5 Volume: After creating the RAID 5 volume, you need to initialize and format it:

a. When prompted, initialize the disks using the default partition style (usually GPT).

b. Format the RAID 5 volume with your desired file system (e.g., NTFS) and assign a drive letter or mount point.

Output:



Result:

Thus the procedure to install remote desktop in chrome for desktop virtualization is executed successfully

Ex.No:3(a)
Date:

Desktop Virtualization using VNC

Aim:

To find the procedure for Creating Desktop Virtualization using VNC

Procedure:

Step 1: Install VNC Server.

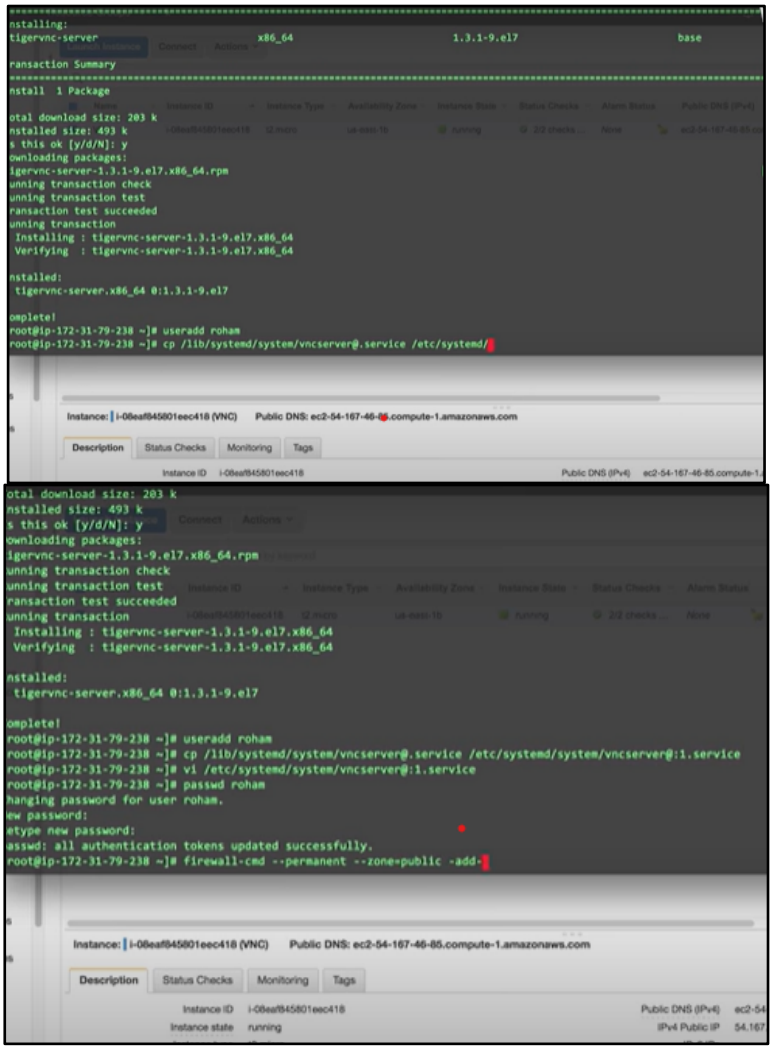
Step 2: Configure VNC Server: After installing the VNC server, you'll need to configure it by setting a password or access control options to secure the remote access. Ensure that the VNC server is running and ready to accept incoming connections.

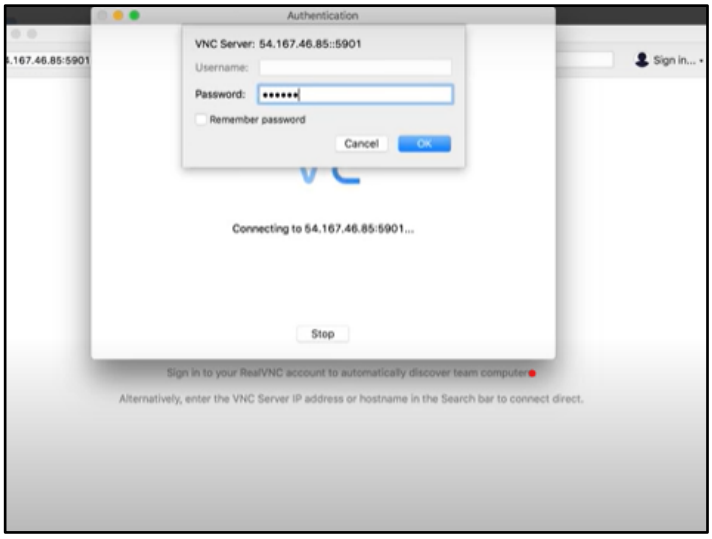
Step 3: Install VNC Viewer.

Step 4: Connect to the Remote Desktop: Launch the VNC viewer and enter the IP address or host name of the remote computer (the host) you want to connect to. If you have configured a password or access control options on the VNC server, you will be prompted to enter the credentials. Once authenticated, the VNC viewer establishes a connection to the remote desktop.

Step 5: Control the Remote Desktop: After the connection is established, you will see the remote desktop environment displayed in the VNC viewer. You can now interact with the remote desktop as if you were physically sitting in front of it. You can run applications, access files, and perform any tasks on the remote computer just as if you were using it directly.

Output:





Result:

Thus the procedure for Creating Desktop Virtualization using VNC is executed successfully

Ex.No:3(b)
Date:

Desktop Virtualization using Chrome Remote Desktop

Aim:

To find the procedure for Creating Desktop Desktop Virtualization using Chrome Remote Desktop

Procedure:

Step 1: Install Chrome Remote Desktop Extension: Make sure you have the Google Chrome web browser installed on both the computer you want to access remotely (the host) and the computer or device you want to use for remote access (the client). Install the "Chrome Remote Desktop" extension from the Chrome Web Store on both devices.

Step 2: Set Up Host Computer (Computer to be Accessed):

a. Open Google Chrome on the host computer.

b. In the address bar, type "chrome://apps" and press Enter.

c. Click on the "Chrome Remote Desktop" icon to open the application.

d. Follow the on-screen instructions to grant necessary permissions and set up remote access for the host computer.

e. Create a secure PIN to use for remote access authentication.

Step 3: Access Host Computer (Client Device):

a. Open Google Chrome on the client device (the computer or device from which you want to access the host computer remotely).

b. In the address bar, type "remotedesktop.google.com/access" and press Enter.

c. Click on the "Access" button under the "Remote Access" section.

d. Sign in with your Google Account (the same account used on the host computer).

Step 4: Choose the Host Computer:

a. After signing in, you should see a list of available computers set up for remote access. Choose the host computer you want to access.

Step 5: Authenticate and Connect:

a. If you have set up a PIN for the host computer, you will be prompted to enter it to authenticate the remote access.

b. Once authenticated, the remote connection will be established, and you will see the host computer's desktop in the Chrome browser window.

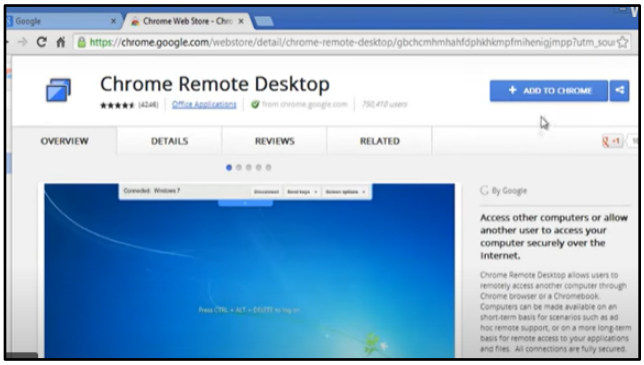
Step 6: Control the Host Computer:

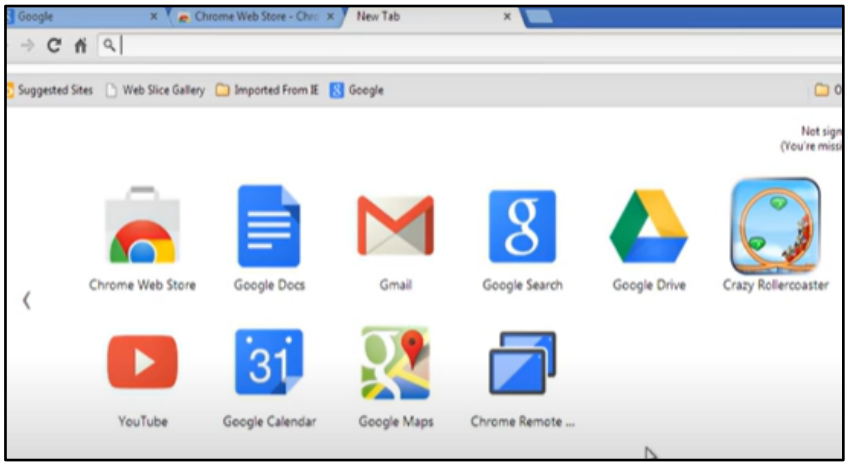
a. You can now interact with the host computer's desktop through the Chrome browser on your client device. Use your mouse and keyboard to control the remote desktop.

b. To switch between full-screen and windowed mode, click the "Toggle full screen" button on the top right corner of the remote desktop window.

Step 7: End the Remote Session: To end the remote session, click the "Stop Sharing" button at the bottom of the remote desktop window.

Output:





Result:

Thus the procedure for Creating Desktop Virtualization using Chrome Remote Desktop is executed successfully

Ex.No:4
Date:

Create type 2 virtualization on ESXI 6.5 server

Aim:

To find the procedure for Create the type 2 virtualization on ESXI 6.5 server

Procedure:

Step 1: Install ESXi 6.5: First, you need to install VMware ESXi 6.5 on your server.

Step 2: Access ESXi Web Client: Once ESXi is installed and running, access the ESXi Web Client through a web browser on a separate computer. Enter the IP address or hostname of your ESXi server to log in to the management interface.

Step 3: Create a Virtual Machine: To create a virtual machine within ESXi, follow these steps:

a. In the ESXi Web Client, navigate to the "Hosts and Clusters" view.

b. Select your ESXi server from the list of hosts.

c. Click on the "Create/Register VM" button or right-click on the host and choose "New Virtual Machine."

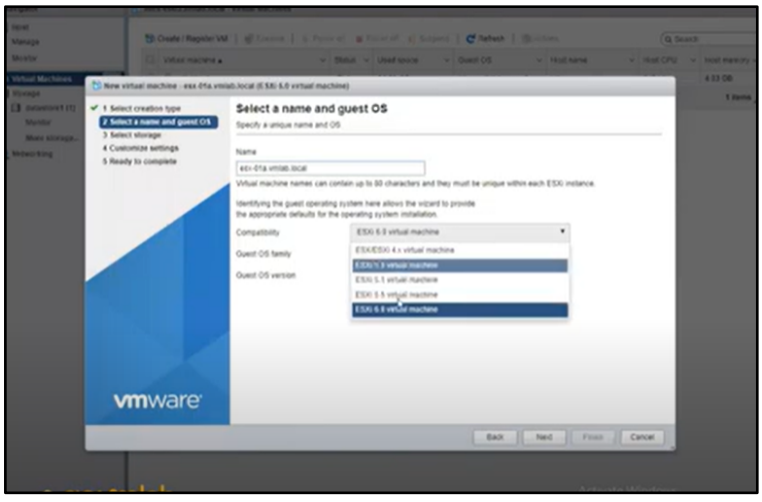
d. The "Create New Virtual Machine" wizard will appear. Follow the steps in the wizard to configure the virtual machine, including providing a name, selecting the guest operating system, setting the desired resources (CPU, memory, disk space, etc.), and selecting a storage location for the virtual machine files.

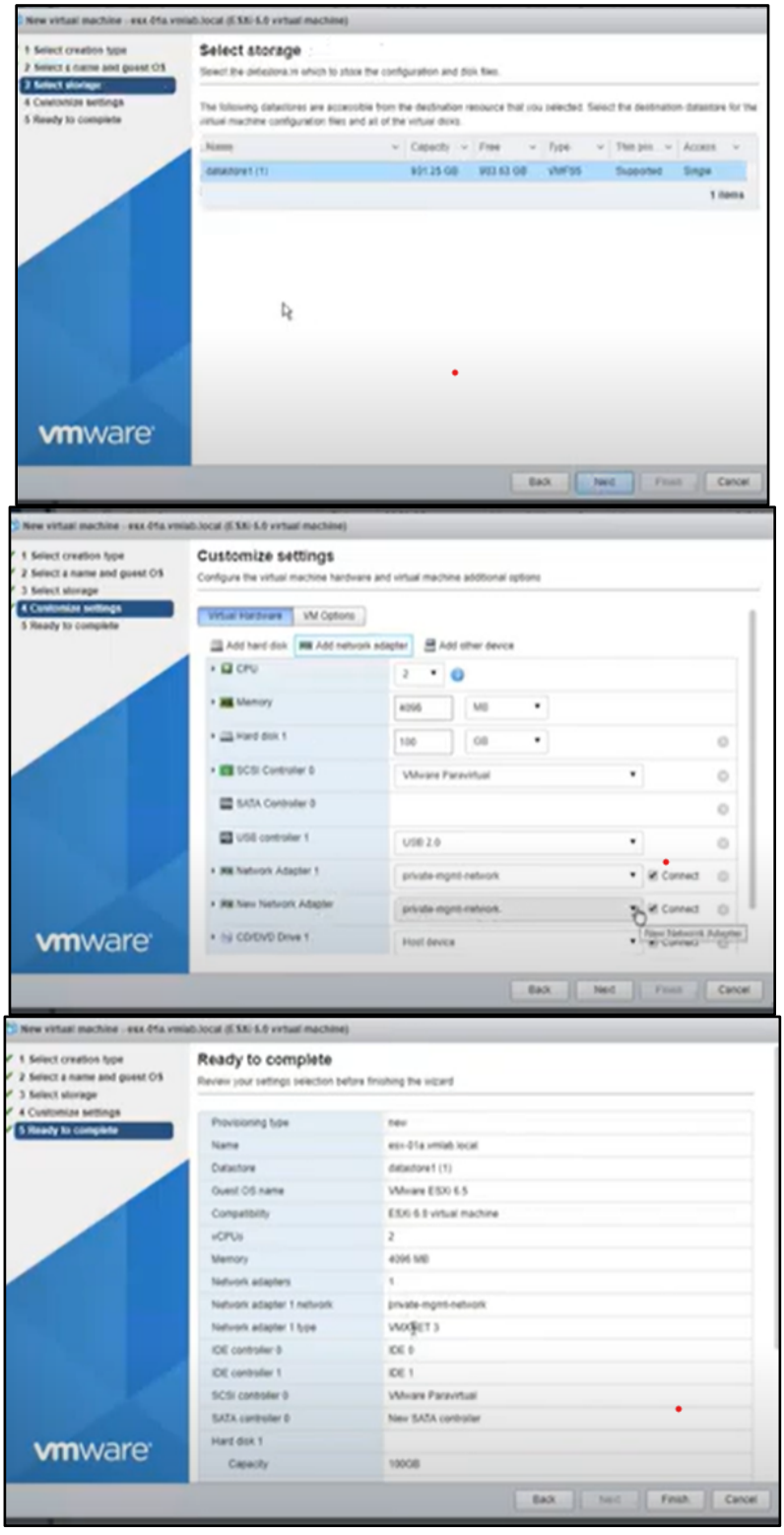
e. Finish the wizard, and the virtual machine will be created.

Step 4: Install Guest Operating System: Once the virtual machine is created, you can power it on and install the guest operating system of your choice (e.g., Windows, Linux, etc.) using an ISO image or CD/DVD.

Step 5: Access and Manage the Virtual Machine: After the guest operating system is installed, you can access the virtual machine through the VMware Remote Console (VMRC) or use remote access tools like VNC or RDP to interact with the guest operating system.

OUTPUT:





Result:

Thus the procedure for Create the type 2 virtualization on ESXI 6.5 server is executed successfully

Ex.No:5
Date:

Create a VLAN in CISCO packet tracer

Aim:

To find the procedure for Create a VLAN in CISCO packet tracer

Procedure:

Step 1: Launch Cisco Packet Tracer: Start Cisco Packet Tracer and open a new or existing project.

Step 2: Add Switches: Drag and drop switches from the "Switches" section of the "Devices" pane onto the workspace. You can use any Cisco switch model available in Packet Tracer.

Step 3: Connect Switches: Connect the switches using Ethernet cables. Click on the Ethernet interfaces of the switches and then click on the other switch's Ethernet interfaces to create connections.

Step 4: Access the CLI: Double-click on the first switch to access its CLI (Command Line Interface). The CLI window will open.

Step 5: Configure VLANs: Enter the configuration mode by typing the following command:

enable
configure terminal

Step 6: Create VLANs: To create VLANs, use the **vlan** command followed by the VLAN number. For example, to create VLAN 10 and VLAN 20, you would do:

vlan 10
vlan 20

Step 7: Assign Ports to VLANs: To assign ports to VLANs, use the

interface command followed by the port number and then the **switchport access vlan** command. For example, to assign port 1 to VLAN 10 and port 2 to VLAN 20, you would do:

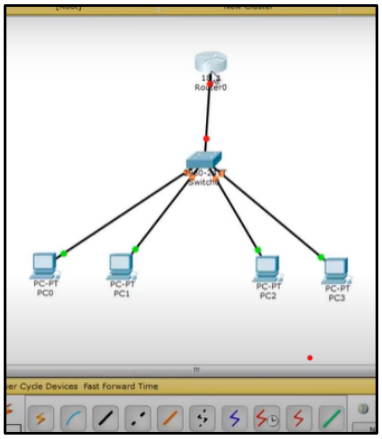
```
interface FastEthernet0/1
switchport mode access
switchport access vlan 10
interface FastEthernet0/2
switchport mode access
switchport access vlan 20
```

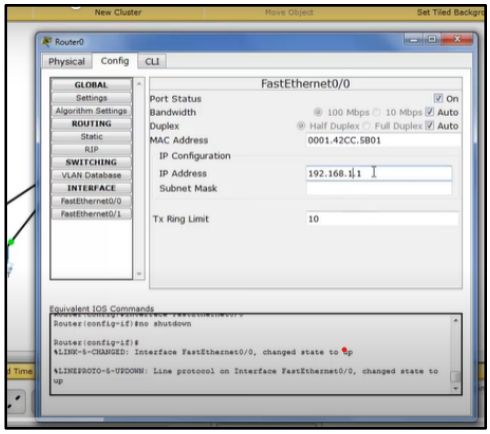
Step 8: Exit Configuration Mode: After assigning VLANs to the desired ports, exit the configuration mode by typing **exit**.

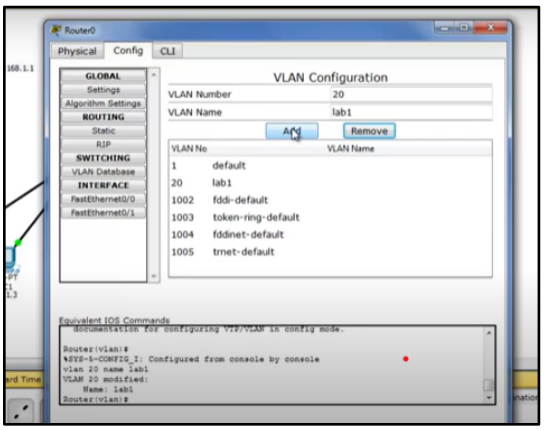
Step 9: Save Configuration: Save the configuration by typing **write** or **copy running-config startup-config** to make sure the changes are saved.

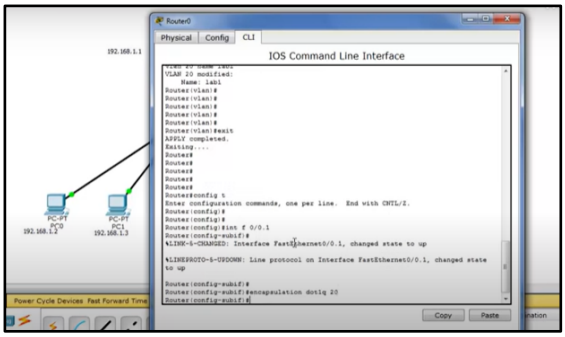
Step 10: Test VLANs: Now that you have created VLANs and assigned ports, you can test the connectivity between devices connected to the switches. Devices in the same VLAN should be able to communicate with each other, while devices in different VLANs should not have direct communication unless you configure inter-VLAN routing.

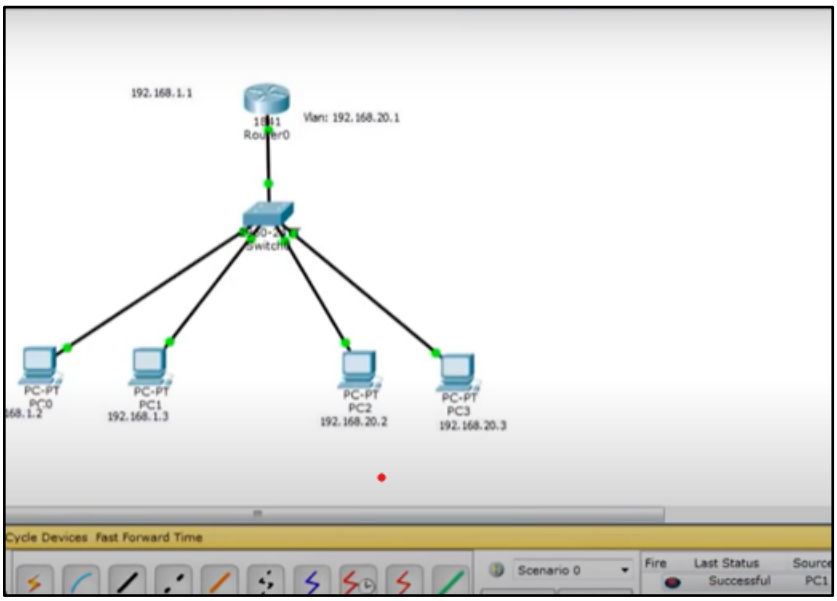
Output:











Result:

Thus the procedure for Create a VLAN in CISCO packet tracer is executed successfully

Ex.No:6
Date:

Install KVM in Linux

Aim:

To find the procedure for Install KVM in Linux

Procedure:

Step 1: Check Hardware Support: Before installing KVM, ensure that your system's CPU supports hardware virtualization extensions (Intel VT-x or AMD-V). You can check this by running the following command:

egrep -c '(vmx|svm)' /proc/cpuinfo

If the output is greater than zero (1 or more), it means your CPU supports hardware virtualization.

Step 2: Install KVM Packages: The package names may vary depending on your Linux distribution. Here are the package names for some popular distributions:

For Ubuntu/Debian:

sudo apt update

sudo apt install qemu-kvm libvirt-daemon-system libvirt-clients bridge-utils virt-manager

For CentOS/RHEL:

sudo yum install qemu-kvm libvirt virt-install bridge-utils

sudo systemctl enable libvirtd

sudo systemctl start libvirtd

For Fedora:

sudo dnf install @virtualization

sudo systemctl enable libvirtd

sudo systemctl start libvirtd

Step 3: Verify Installation: After installing the required packages, check if KVM kernel modules are loaded correctly:

lsmod | grep kvm

The output should show **kvm** and **kvm_intel** or **kvm_amd** modules loaded, depending on your CPU.

Step 4: Configure Permissions: For non-root users to manage virtual machines using KVM, add them to the **libvirt** group:

sudo usermod -aG libvirt <username>

Remember to log out and log back in for the changes to take effect.

Step 5: Enable Nested Virtualization (Optional): If you plan to run virtual machines with nested virtualization (e.g., running KVM inside a KVM guest), you may need to enable nested virtualization on the host. This step is only required if you intend to run virtual machines with KVM as guests.

For Intel CPUs:

echo "options kvm-intel nested=1" | sudo tee /etc/modprobe.d/kvm-intel.conf

sudo modprobe -r kvm_intel

sudo modprobe kvm_intel

For AMD CPUs:

echo "options kvm-amd nested=1" | sudo tee /etc/modprobe.d/kvm-amd.conf

sudo modprobe -r kvm_amd

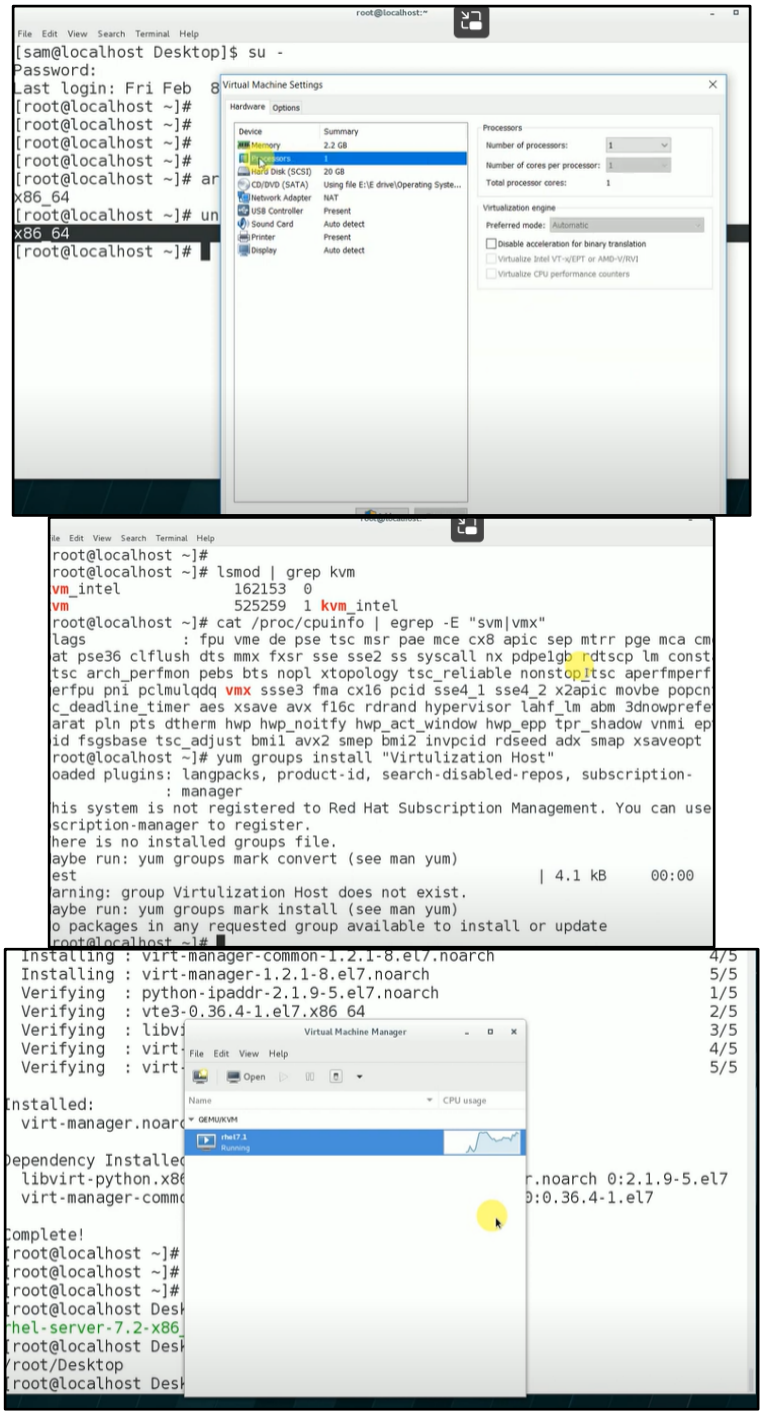
sudo modprobe kvm_amd

Step 6: Install and Configure Virt-Manager (Optional): Virt-Manager is a graphical user interface tool to manage virtual machines using KVM. If you prefer a GUI interface, you can install Virt-Manager:

For Ubuntu/Debian:

sudo apt install virt-manager
For CentOS/RHEL:
sudo yum install virt-manager

For Fedora:
sudo dnf install virt-manager
Once the installation is complete, you can start creating and managing virtual machines using KVM. You can use command-line tools like **virsh** or a graphical interface like Virt-Manager to interact with KVM.
Output:



Result:

Thus the procedure for Install KVM in Linux was installed successfully

Ex.No:7
Date:

Create Nested Virtual Machine(VM under another VM)

Aim:

To find a procedure for Create Nested Virtual Machine(VM under another VM)

Procedure:

Step 1: Enable Nested Virtualization: Before creating a nested VM, ensure nested virtualization is enabled on the host VM (the VM that will run other VMs).

For VirtualBox:

Open VirtualBox and select the host VM from the list. Go to "Settings" > "System" > "Processor" and check the "Enable Nested VT-x/AMD-V" option.

Step 2: Install an Operating System in the Host VM: Ensure you have an operating system installed in the host VM. This will be the environment in which you'll run the nested VMs.

Step 3: Install VirtualBox within the Host VM: Inside the host VM, download and install VirtualBox (or any other virtualization software you prefer) as if you were installing it on a physical machine.

Step 4: Create the Nested VM: Now that you have VirtualBox installed within the host VM, you can create a new VM inside it.

a. Open VirtualBox within the host VM.

b. Click on "New" to create a new VM.

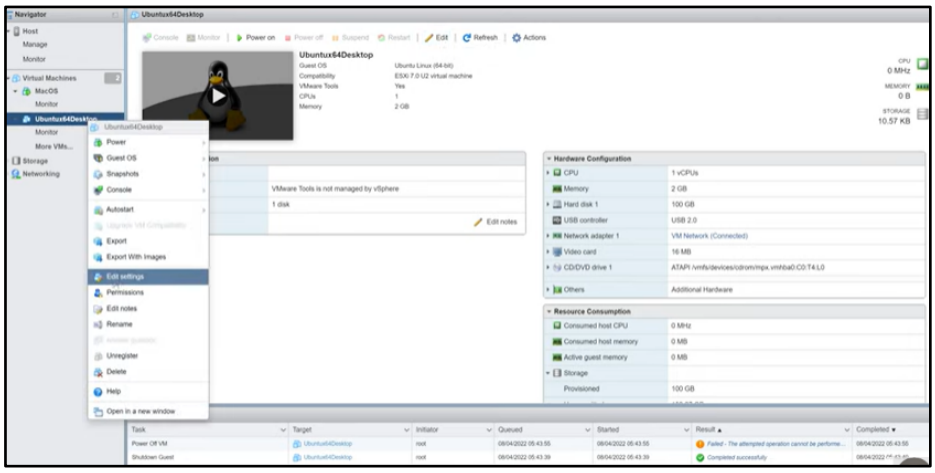
c. Follow the VM creation wizard to set up the nested VM, including selecting the guest operating system, allocating memory, creating a virtual hard disk, etc.

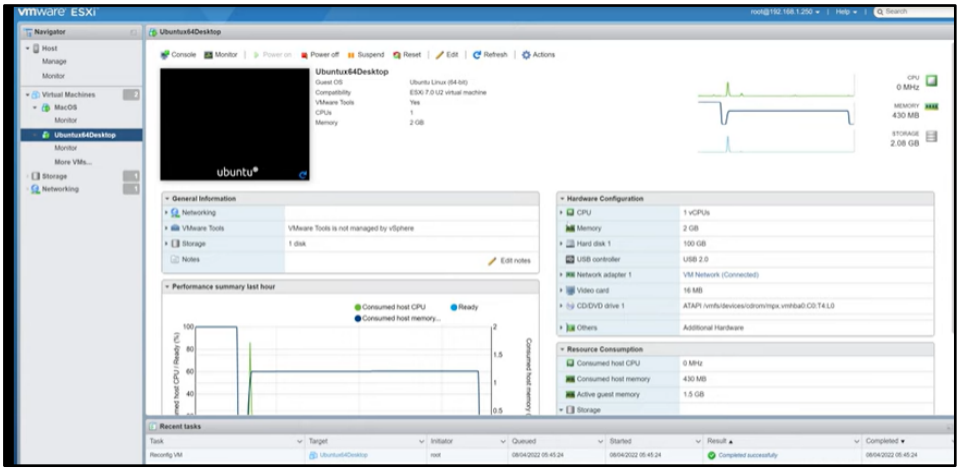
Step 4: Install the Guest Operating System in the Nested VM: With the nested VM created, start it and install the guest operating system, just as you would with any regular VM installation.

Step 5; Configure Networking (Optional): Depending on your requirements, you may need to configure the networking of the nested VM to allow communication with other VMs or external networks.

Step 6: Use the Nested VM: Once the nested VM is set up and the guest operating system is installed, you can use it just like any other VM. Install applications, run tests, or perform any tasks within the nested VM.

Output:





Result:

Thus the procedure for Create Nested Virtual Machine(VM under another VM) was executed successfully

CONTENT BEYONG THE SYLLABUS

Ex no : 1

Find a procedure to launch virtual machine using try stack (Online Open stack Demo Version)

Aim:

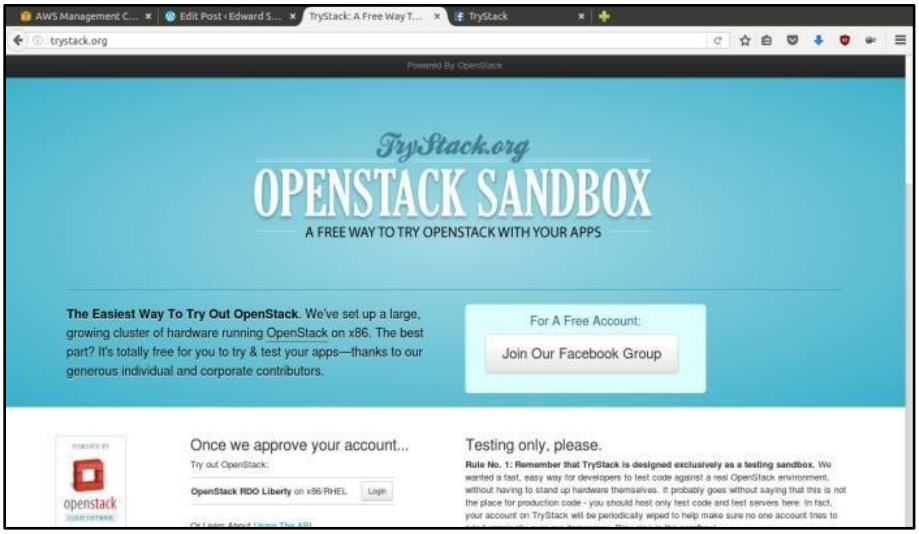
To Find a procedure to launch virtual machine using trystack.

Steps:

OpenStack is an open-source software cloud computing platform.

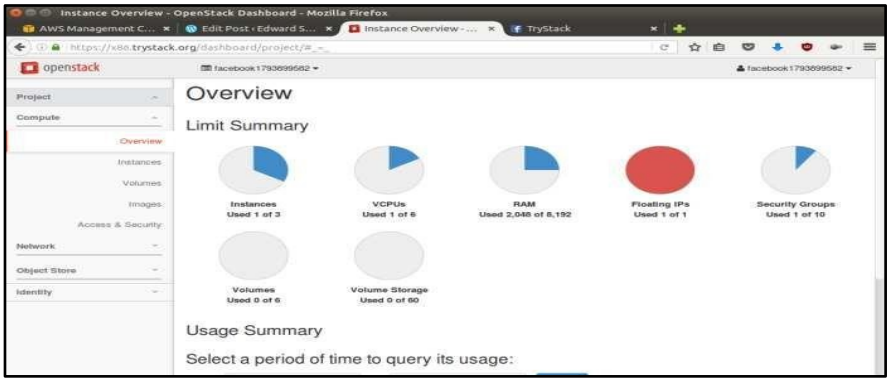
OpenStack is primarily used for deploying an infrastructure as a service (IaaS) solution like Amazon Web Service (AWS). In other words, you can *make your own AWS* by using OpenStack. If you want to try out OpenStack, **TryStack** is the easiest and free way to do it.

In order to try OpenStack in TryStack, you must register yourself by joining TryStack Facebook Group. The acceptance of group needs a couple days because it's approved manually. After you have been accepted in the TryStack Group, you can log in TryStack.



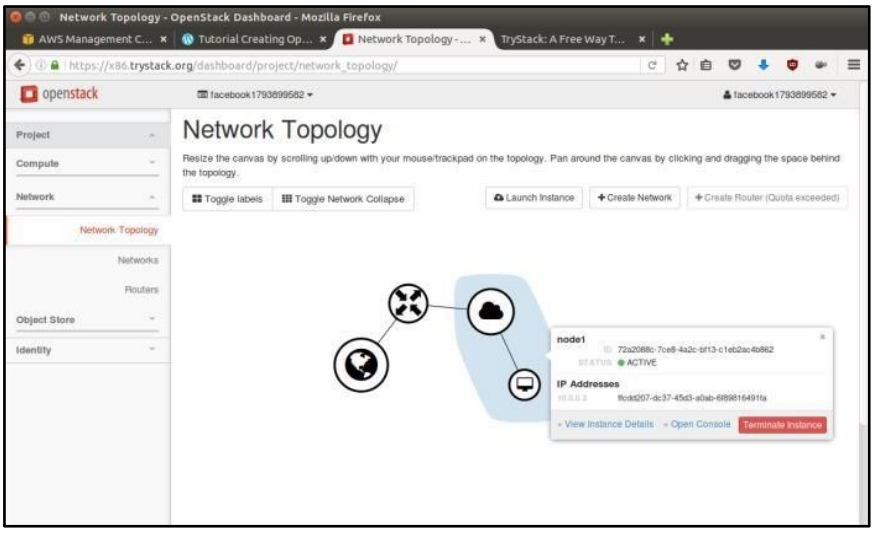
TryStack.org Homepage

I assume that you already join to the Facebook Group and login to the dashboard. After you log in to te TryStack, you will see the Compute Dashboard like:



Open Stack Compute Dashboard

Overview: What we will do?



In this post, I will show you how to run an OpenStack instance. The instance will be accessible through the internet (have a public IP address). The final topology will like

Network topology

As you see from the image above, the instance will be connected to a local network and the local network will be connected to internet.

Step 1: Create Network

Network? Yes, the network in here is our own local network. So, your instances will be not mixed up with the others. You can imagine this as your own LAN (Local Area Network) in the cloud.

1. Go to **Network > Networks** and then click **Create Network**.
2. In **Network** tab, fill **Network Name** for example internal and then click **Next**.
3. In **Subnet** tab,
    1. Fill **Network Address** with appropriate CIDR, for example 192.168.1.0/24.
    Use private network CIDR block as the best practice.
    2. Select **IP Version** with appropriate IP version, in this case IPv4.
    3. Click **Next**.
4. In **Subnet Details** tab, fill **DNS Name Servers** with 8.8.8.8 (Google DNS) and then click **Create**.

Step 2: Create Instance

Now, we will create an instance. The instance is a virtual machine in the cloud, like AWS EC2. You need the instance to connect to the network that we just created in the previous step.

1. Go to **Compute > Instances** and then click **Launch Instance**.
2. In **Details** tab,
    1. Fill **Instance Name**, for example Ubuntu
    2. Select **Flavor**, for example m1.medium.
    3. Fill **Instance Count** with 1.

4. Select **Instance Boot Source** with **Boot from Image**.
5. Select **Image Name** with **Ubuntu 14.04 amd64 (243.7 MB)** if you want install Ubuntu 14.04 in your virtual machine.

3. In **Access & Security** tab,
    1. Click [**+**] button of **Key Pair** to import key pair. This key pair is a public and private key that we will use to connect to the instance from our machine.
2. In **Import Key Pair** dialog,
    1. Fill **Key Pair Name** with your machine name (for example Edward-Key).
    2. Fill **Public Key** with your **SSH public key** (usually is in ~/.ssh/id_rsa.pub). See description in Import Key Pair dialog box for more information. If you are using Windows, you can use **Puttygen** to generate key pair.
    3. Click **Import key pair**.
3. In **Security Groups**, mark/check **default**.

4. In **Networking** tab,
    1. In **Selected Networks**, select network that have been created in Step 1, for example internal.
5. Click **Launch**.
6. If you want to create multiple instances, you can repeat step 1-5. I created one more instance with instance name Ubuntu 2.

Step 3: Create Router

I guess you already know what router is. In the step 1, we created our network, but it is isolated. It doesn't connect to the internet. To make our network has an internet connection, we need a router that running as the gateway to the internet.

1. Go to **Network > Routers** and then click **Create Router**.
2. Fill **Router Name** for example router1 and then click **Create router**.
3. Click on your **router name link**, for example router1, **Router Details** page.
4. Click **Set Gateway** button in upper right:
    1. Select **External networks** with **external**.
    2. Then **OK**.
5. Click **Add Interface** button.
    1. Select **Subnet** with the network that you have been created in Step 1.
    2. Click **Add interface**.
6. Go to **Network > Network Topology**. You will see the network topology. In the example, there are two network, i.e. external and internal, those are bridged by a router. There are instances those are joined to internal network.

Step 4: Configure Floating IP Address

Floating IP address is public IP address. It makes your instance is accessible from the internet. When you launch your instance, the instance will have a private network IP, but no public IP. In OpenStack, the public Ips is collected in a pool and managed by admin (in our case is TryStack). You need to request a public (floating) IP address to be assigned to your instance.

1. Go to **Compute > Instance**.
2. In one of your instances, click **More > Associate Floating IP**.
3. In **IP Address**, click Plus [**+**].
4. Select **Pool** to **external** and then click **Allocate IP**.

5. Click **Associate**.
6. Now you will get a public IP, e.g. 8.21.28.120, for your instance.

Step 5: Configure Access & Security

OpenStack has a feature like a firewall. It can whitelist/blacklist your in/out connection. It is called *Security Group*.

1. Go to **Compute > Access & Security** and then open **Security Groups** tab.
2. In **default** row, click **Manage Rules**.
3. Click **Add Rule**, choose **ALL ICMP** rule to enable ping into your instance, and then click **Add**.
4. Click **Add Rule**, choose **HTTP** rule to open HTTP port (port 80), and then click **Add**.
5. Click **Add Rule**, choose **SSH** rule to open SSH port (port 22), and then click **Add**.
6. You can open other ports by creating new rules.

Step 6: SSH to Your Instance

Now, you can SSH your instances to the floating IP address that you got in the step 4. If you are using Ubuntu image, the SSH user will be ubuntu.

Result:

Thus the openstack demo worked successfully.

EX NO : 2. Install Hadoop single nodeclusterandrun simple applications like word count.

Aim:

To Install Hadoop single node cluster and run simple applications like wordcount.

Steps:

Install Hadoop

Step 1: Click here to download the Java 8 Package. Save this file in your home directory.

Step 2: Extract the Java Tar File.

Command: tar -xvf jdk-8u101-linux-i586.tar.gz

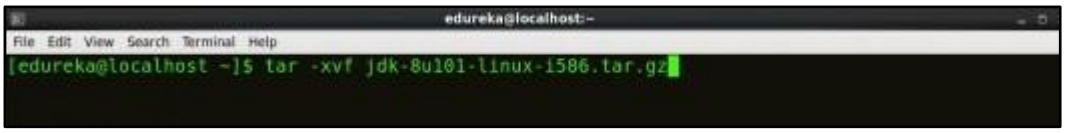
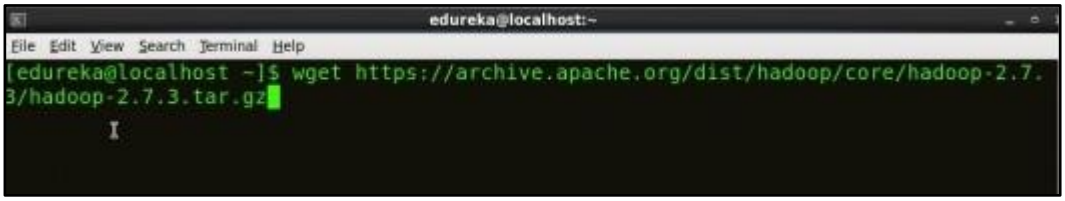


Fig: Hadoop Installation – Extracting Java Files

Step 3: **Download the Hadoop 2.7.3 Package.**

Command: wget https://archive.apache.org/dist/hadoop/core/hadoop-2.7.3/hadoop-



2.7.3.tar.gz

Fig: Hadoop Installation – Downloading Hadoop

Step 4: Extract the Hadoop tar File.

Command: tar -xvf hadoop-2.7.3.tar.gz

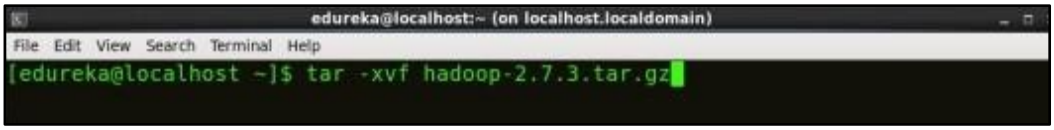
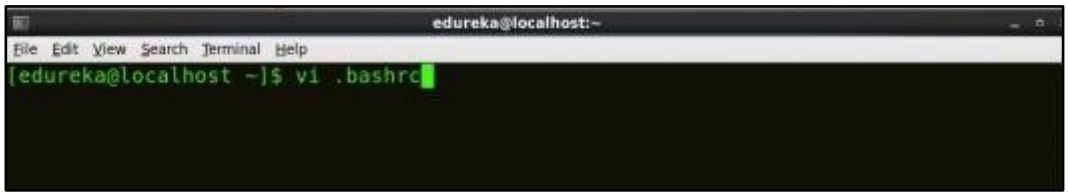


Fig: Hadoop Installation – Extracting Hadoop Files

Step 5: Add the Hadoop and Java paths in the bash file (.bashrc).

Open. **bashrc** file. Now, add Hadoop and Java Path as shown below.

Command: vi .bashrc



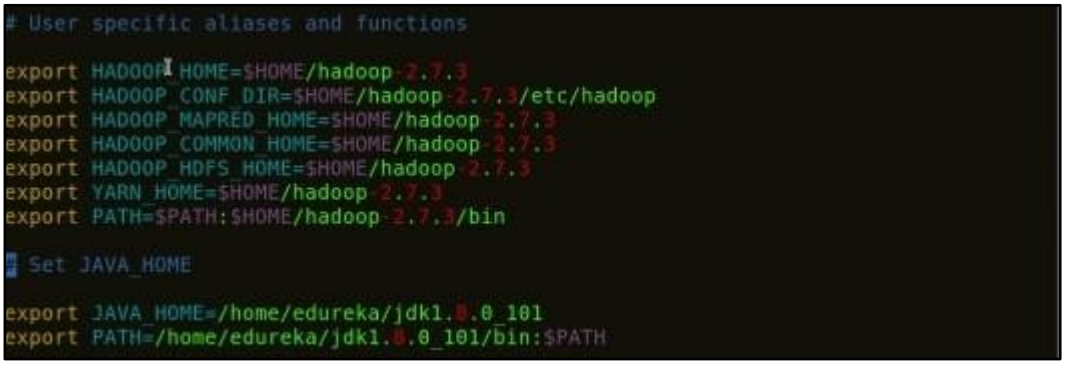


Fig: Hadoop Installation – Setting Environment Variable

Then, save the bash file and close it.

For applying all these changes to the current Terminal, execute the source command.

Command: source .bashrc

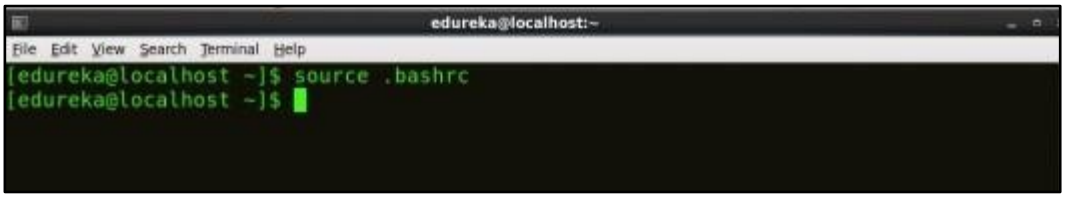
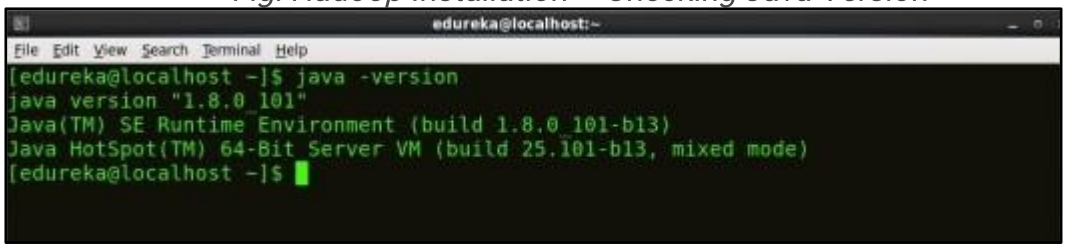


Fig: Hadoop Installation – Refreshing environment variables

To make sure that Java and Hadoop have been properly installed on your system and can be accessed through the Terminal, execute the java -version and hadoop version commands.

Command: java -version

Fig: Hadoop Installation – Checking Java Version



```
edureka@localhost:~
File  Edit  View  Search  Terminal  Help
[edureka@localhost ~]$ hadoop version
Hadoop 2.7.3
Subversion https://git-wip-us.apache.org/repos/asf/hadoop.git -r baa91f7c6bc9cb92be
5982de4719c1c8af91ccff
Compiled by root on 2016-08-18T01:41Z
Compiled with protoc 2.5.0
From source with checksum 2e4ce5f957ea4db193bce3734ff29ff4
This command was run using /home/edureka/hadoop-2.7.3/share/hadoop/common/hadoop-co
mmon-2.7.3.jar
[edureka@localhost ~]$
```

Command: hadoop version

Fig: Hadoop Installation – Checking Hadoop Version

Step 6: Edit the **Hadoop Configuration files**.

Command: cd hadoop-2.7.3/etc/hadoop/

Command: ls
All the Hadoop configuration files are located in **hadoop-2.7.3/etc/hadoop** directory as you can see in the snapshot below:

```
edureka@localhost:~/hadoop-2.7.3/etc/hadoop
File  Edit  View  Search  Terminal  Help
[edureka@localhost ~]$ cd hadoop-2.7.3/etc/hadoop/
[edureka@localhost hadoop]$ ls
capacity-scheduler.xml      httpfs-env.sh            mapred-env.sh
configuration.xsl           httpfs-log4j.properties  mapred-queues.xml.template
container-executor.cfg      httpfs-signature.secret  mapred-site.xml.template
core-site.xml               httpfs-site.xml          slaves
hadoop-env.cmd              kms-acls.xml             ssl-client.xml.example
hadoop-env.sh               kms-env.sh               ssl-server.xml.example
hadoop-metrics2.properties  kms-log4j.properties     yarn-env.cmd
hadoop-metrics.properties   kms-site.xml             yarn-env.sh
hadoop-policy.xml           log4j.properties         yarn-site.xml
hdfs-site.xml               mapred-env.cmd
[edureka@localhost hadoop]$
```

Fig: Hadoop Installation – Hadoop Configuration Files

Step 7: Open *core-site.xml* and edit the property mentioned below inside configuration tag:

core-site.xml informs Hadoop daemon where NameNode runs in the cluster. It contains configuration settings of Hadoop core such as I/O settings that are common to HDFS & MapReduce.
Command: vi core-site.xml

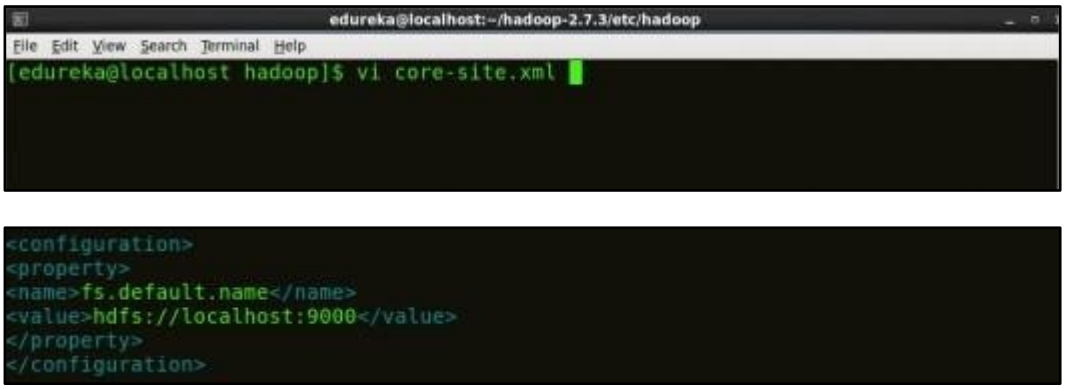


Fig: Hadoop Installation – Configuring core-site.xml

```
1
2
3
4
5
6
7
```

```
<?xmlversion="1.0"encoding="UTF-8"?>
<?xml-stylesheettype="text/xsl"href="configuration.xsl"?>
<configuration>
<property>
<name>fs.default.name</name>
<value>hdfs://localhost:9000</value>
</property>
</configuration>
```

Step 8: Edit *hdfs-site.xml* and edit the property mentioned below inside configuration tag:

hdfs-site.xml contains configuration settings of HDFS daemons (i.e. NameNode, DataNode, Secondary NameNode). It also includes the replication factor and block size of HDFS.
Command: vi hdfs-site.xml

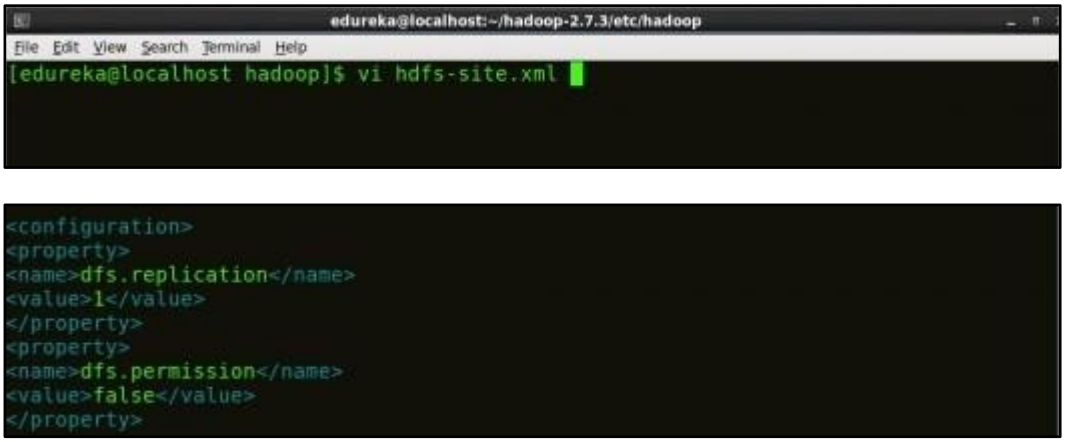


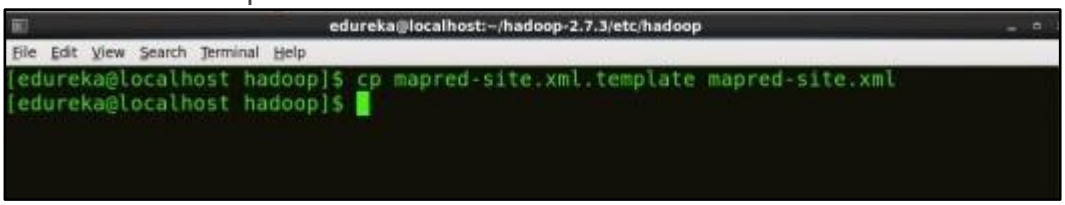
Fig: Hadoop Installation – Configuring hdfs-site.xml

```
1
2                    <?xmlversion="1.0"encoding="UTF-8"?>
3          <?xml-stylesheettype="text/xsl"href="configuration.xsl"?>
4                              <configuration>
5                                 <property>
                          <name>dfs.replication</name>
6                                 <value>1</value>
7                                 </property>
8                                 <property>
                          <name>dfs.permission</name>
9                                 <value>false</value>
10                                </property>
11                                </configuration>
```

Step 9: Edit the *mapred-site.xml* file and edit the property mentioned below

inside configuration tag:

mapred-site.xml contains configuration settings of MapReduce application like number of JVM that can run in parallel, the size of the mapper and the reducer process, CPU cores available for a process, etc.
In some cases, mapred-site.xml file is not available. So, we have to create the mapred- site.xml file using mapred-site.xml template.
Command: cp mapred-site.xml.template mapred-site.xml
Command: vi mapred-site.xml.



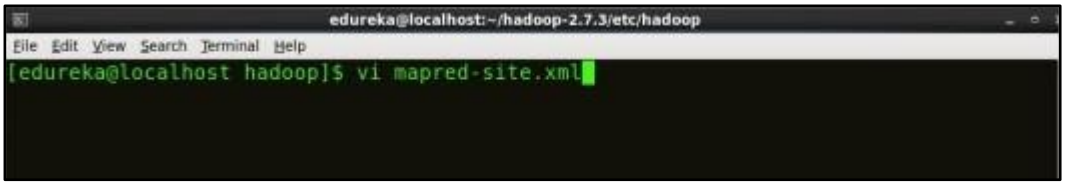


Fig: Hadoop Installation – Configuring mapred-site.xml

```
<?xmlversion="1.0"encoding="UTF-8"?>
<?xml-stylesheettype="text/xsl"href="configuration.xsl"?>
<configuration>
<property>
<name>mapreduce.framework.name</name>
<value>yarn</value>
</property>
</configuration>
```

Step 10: Edit *yarn-site.xml* and edit the property mentioned below inside configuration tag:

yarn-site.xml contains configuration settings of ResourceManager and NodeManager like application memory management size, the operation needed on program & algorithm, etc.
Command: vi yarn-site.xml

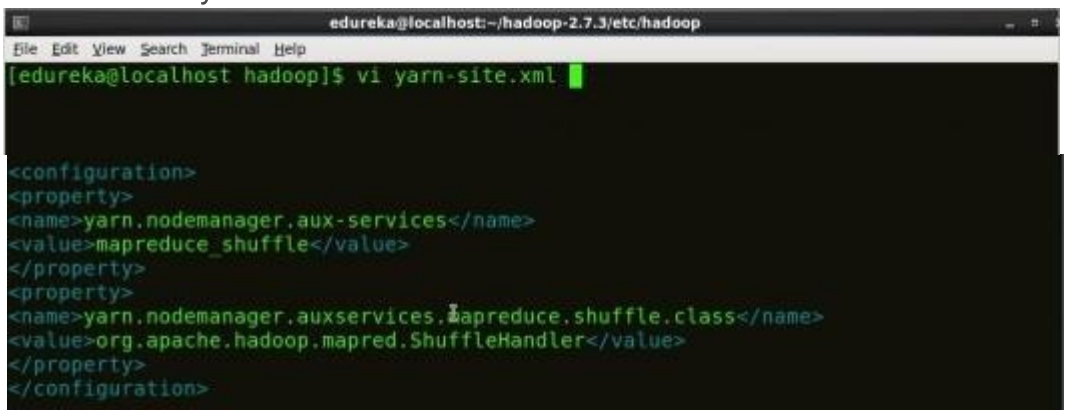


Fig: Hadoop Installation – Configuring yarn-site.xml

Step 11: Edit *hadoop-env.sh* and add the Java Path as mentioned below:

```
<?xmlversion="1.0">
<configuration>
<property>
<name>yarn.nodemanager.aux-services</name>
<value>mapreduce_shuffle</value>
</property>
<property>
<name>yarn.nodemanager.auxservices.mapreduce.shuffle.class</ name>
<value>org.apache.hadoop.mapred.ShuffleHandler</value>
</property>
```

hadoop-env.sh contains the environment variables that are used in the script to run Hadoop like Java home path, etc.

Command: vi hadoop–env.sh

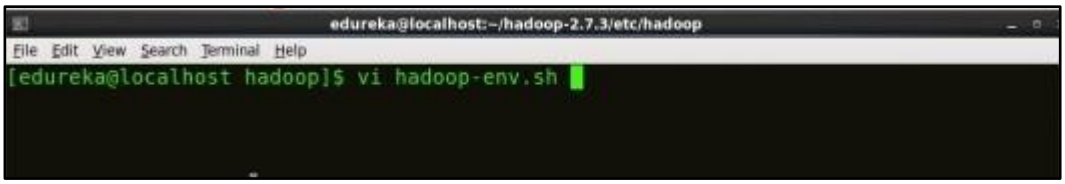


Fig: Hadoop Installation – Configuring hadoop-env.sh

Step 12: Go to Hadoop home directory and format the NameNode.

Command: cd

Command: cd hadoop-2.7.3

Command: bin/hadoop namenode -format

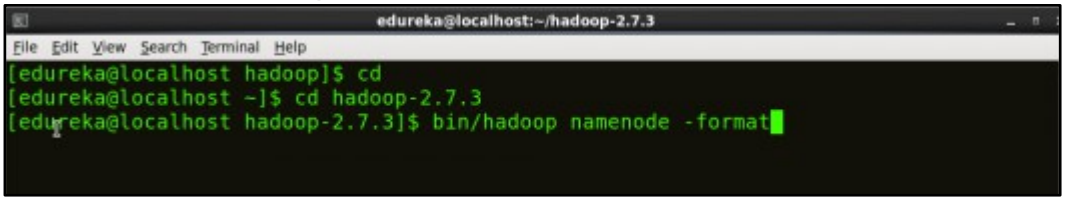


Fig: Hadoop Installation – Formatting NameNode

This formats the HDFS via NameNode. This command is only executed for the first time. Formatting the file system means initializing the directory specified by the dfs.name.dir variable.

Never format, up and running Hadoop filesystem. You will lose all your data stored in the HDFS.

Step 13: **Once the NameNode is formatted, go to hadoop-2.7.3/sbin directory and start all the daemons.**

Command: cd hadoop-2.7.3/sbin

Either you can start all daemons with a single command or do it individually.

Command: ./start-all.sh

The above command is a combination of ***start-dfs.sh, start-yarn.sh*** & ***mr-jobhistory- daemon.sh***

Or you can run all the services individually as below:

Start NameNode:

The NameNode is the centerpiece of an HDFS file system. It keeps the directory tree of all files stored in the HDFS and tracks all the file stored across the cluster.
Command: ./hadoop-daemon.sh start namenode

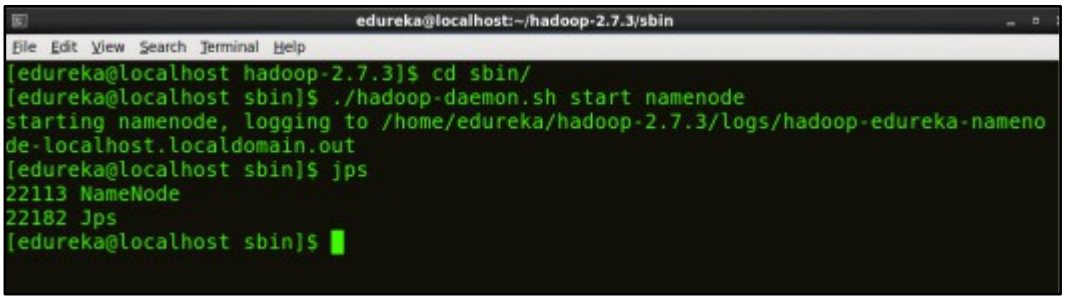


Fig: Hadoop Installation – Starting NameNode

Start DataNode:

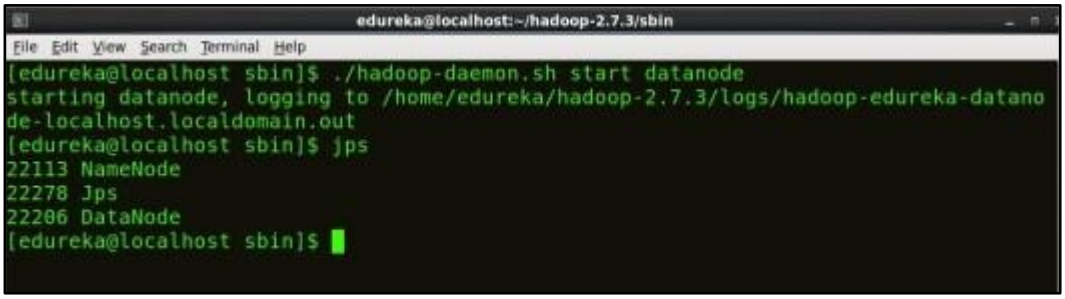


Fig: Hadoop Installation – Starting DataNode

Start ResourceManager:

ResourceManager is the master that arbitrates all the available cluster resources and thus helps in managing the distributed applications running on the YARN system. Its work is to manage each NodeManagers and the each application's ApplicationMaster.
Command: ./yarn-daemon.sh start resourcemanager

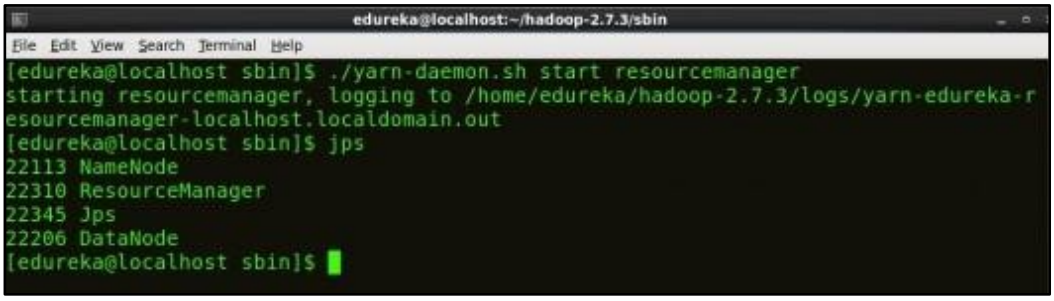
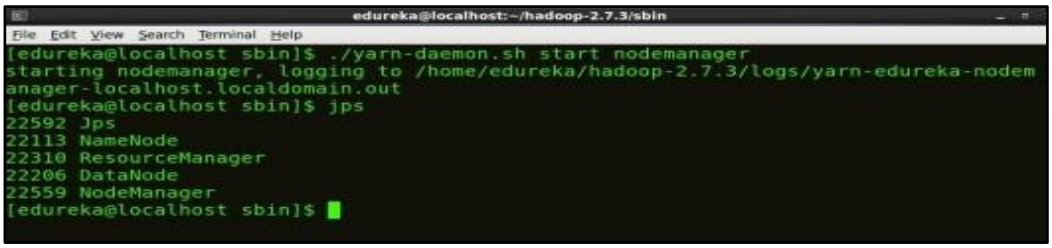
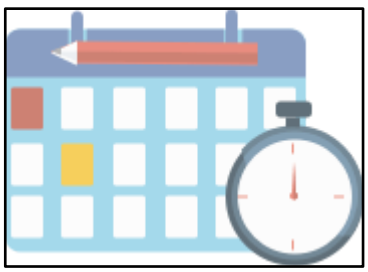


Fig: Hadoop Installation – Starting ResourceManager

Start NodeManager:

The NodeManager in each machine framework is the agent which is responsible for managing containers, monitoring their resource usage and reporting the same to the ResourceManager.
Command: ./yarn-daemon.sh start nodemanager





Start JobHistoryServer:

JobHistoryServer is responsible for servicing all job history related requests from client.

Command: ./mr-jobhistory-daemon.sh start historyserver

Step 14: **To check that all the Hadoop services are up and running, run the below command.**

Command: jps

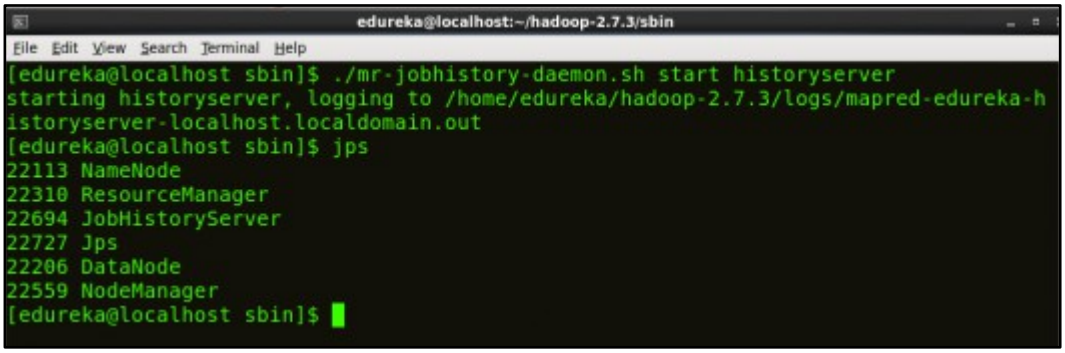


Fig: Hadoop Installation – Checking Daemons

Step 15: Now open the Mozilla browser and go to **localhost:50070/dfshealth.html** to check the

NameNode interface

.

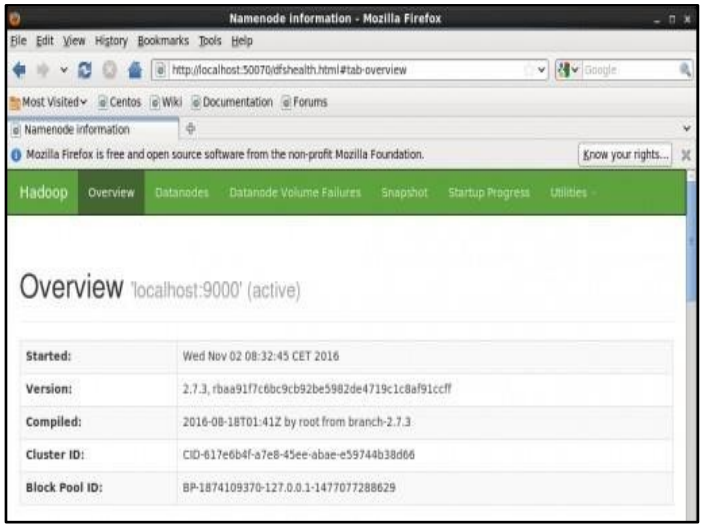


Fig: Hadoop Installation – Starting WebUI

Congratulations, you have successfully installed a single node Hadoop cluster

Result:

Thus the Hadoop one cluster was installed and simple applications executed successfully

EX.NO:3

Find a procedure to transfer the files from one virtual machine to another virtual machine.

Aim:

To Find a procedure to transfer the files from one virtual machine to another virtual machine.

Steps:

1. You can copy few (or more) lines with *copy & paste* mechanism.

   For this you need to share clipboard between host OS and guest OS, installing Guest Addition on both the virtual machines (probably setting *bidirectional* and restarting them). You *copy* from *guest OS* in the clipboard that is shared with the *host OS*.
   Then you *paste* from the *host OS* to the second *guest OS*.
2. You can enable drag and drop too with the same method (Click on the machine, settings, general, advanced, drag and drop: set to *bidirectional*)
3. You can have common *Shared Folders* on both virtual machines and use one of the directory shared as buffer to copy.
   Installing Guest Additions you have the possibility to set Shared Folders too. As you put a file in a shared folder from *host OS* or from *guest OS*, is immediately visible to the other. (Keep in mind that can arise some problems for date/time of the files when there are different clock settings on the different virtual machines).
   If you use the same folder shared on more machines you can exchange files directly copying them in this folder.
4. You can use usual method to copy files between 2 different computer with client-server application. (e.g. scp with sshd active for linux, winscp... you can get some info about SSH servers e.g. here)
   You need an active server (sshd) on the receiving machine and a client on the sending machine. Of course you need to have the authorization setted (via password or, better, via an automatic authentication method).
   Note: many Linux/Ubuntu distribution install sshd by default: you can see if it is running with pgrep sshd from a shell. You can install with sudo apt-get install openssh-server.
5. You can mount part of the file system of a virtual machine via NFS or SSHFS on the other, or you can share file and directory with Samba.
   You may find interesting the article Sharing files between guest and host without VirtualBox shared folders with detailed step by step instructions.

You should remember that you are dialling with a little network of machines with different operative systems, and in particular:

- Each virtual machine has its own operative system running on and acts as a physical machine.
- Each virtual machine is an instance of a program *owned* by an *user* in the hosting operative system and should undergo the restrictions of the *user* in the *hosting OS*.
  E.g Let we say that Hastur and Meow are users of the hosting machine, but they did not allow each other to see their directories (no read/write/execute authorization). When each of them run a virtual machine, for the hosting OS those virtual machine are two normal programs owned by Hastur and Meow and cannot see the private directory of the other user. This is a restriction due to the *hosting OS*. It's easy to overcame it: it's enough to give authorization to read/write/execute to a directory or to chose a different directory in which both users can read/write/execute.
- Windows likes mouse and Linux fingers. :-)
  I mean I suggest you to enable *Drag & drop* to be cosy with the Windows machines and the *Shared folders* or to be cosy with Linux.
  When you will need to be fast with Linux you will feel the need of ssh-keygen and

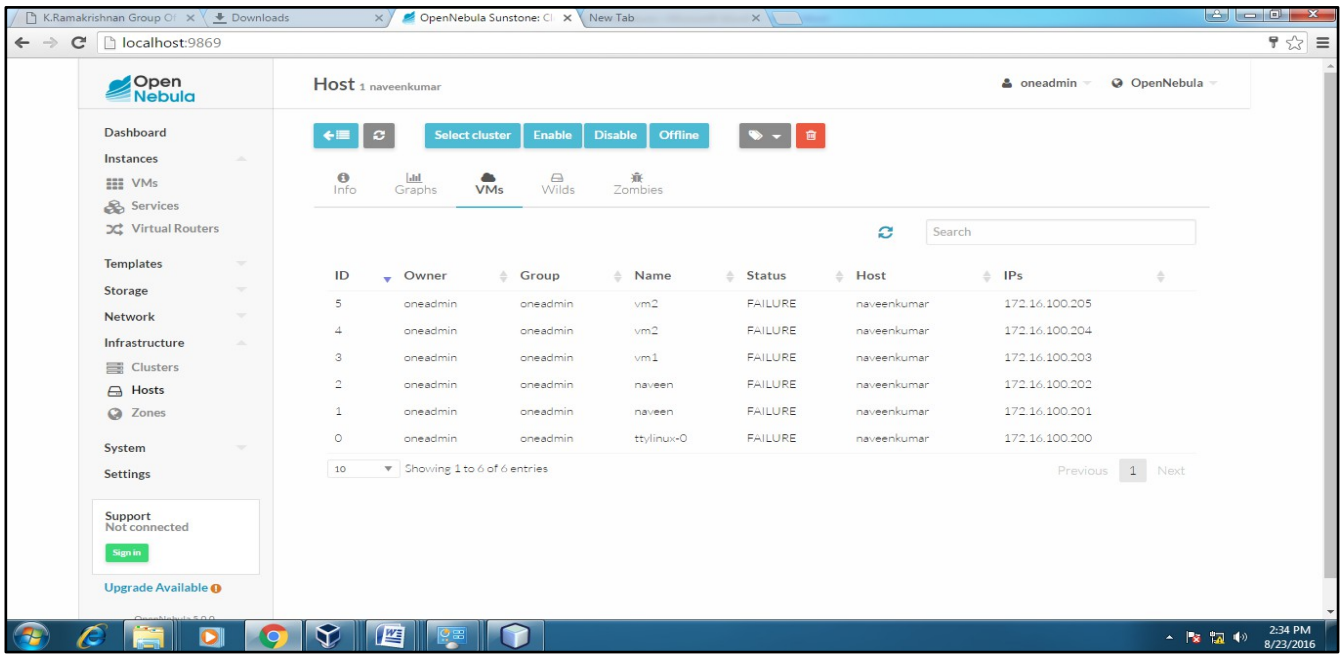
  to Generate once SSH Keys to copy files on/from a remote machine without writing password anymore. In this way it functions bash auto-completion remotely too!

PROCEDURE:

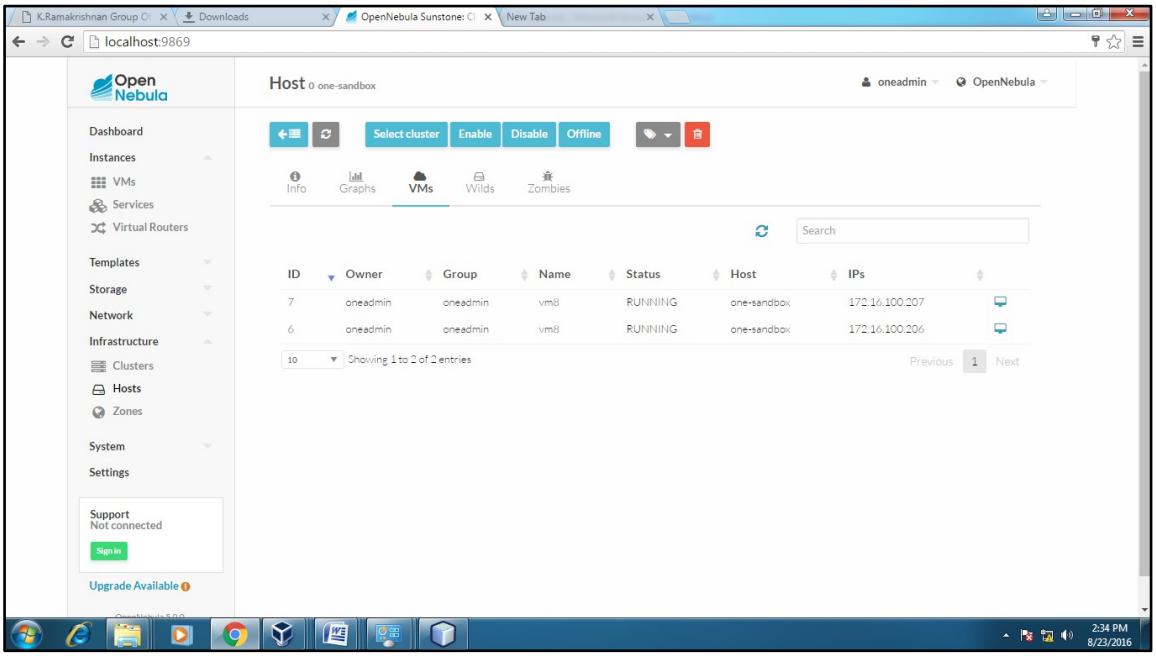
Steps:

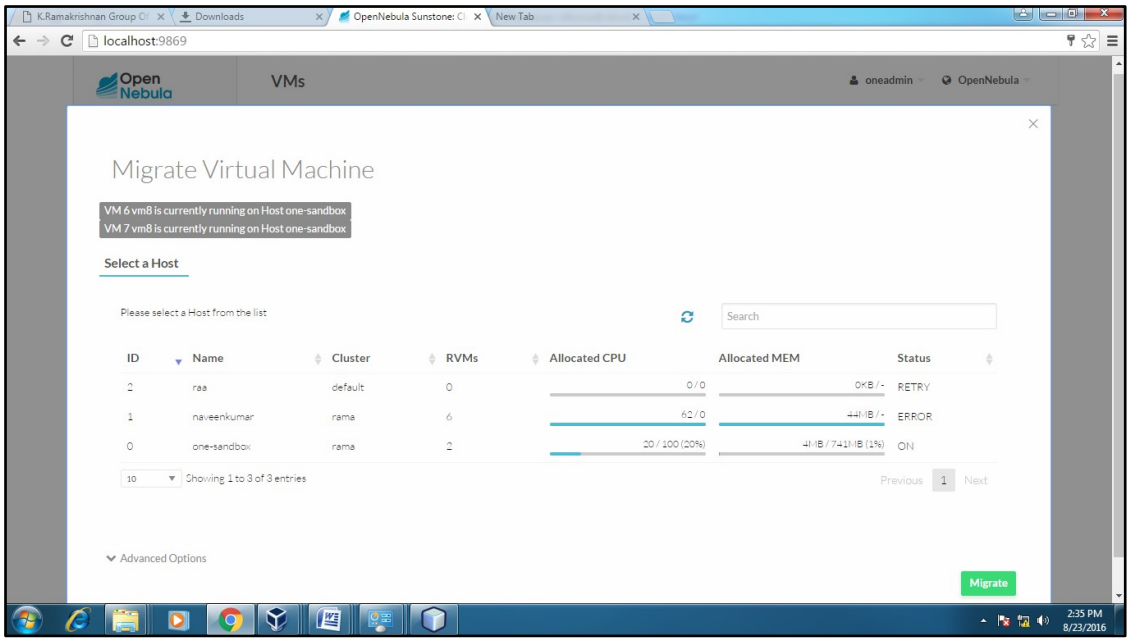
1. Open Browser, type localhost:9869
2. Login using username: oneadmin, password: opennebula
3. Then follow the steps to migrate VMs
   a. Click on infrastructure
   b. Select clusters and enter the cluster name
   c. Then select host tab, and select all host
   d. Then select Vnets tab, and select all vnet
   e. Then select datastores tab, and select all datastores
   f. And then choose host under infrastructure tab
   g. Click on + symbol to add new host, name the host then click on create.
4. on instances, select VMs to migrate then follow the stpes
   a. Click on 8th icon ,the drop down list display
   b. Select migrate on that ,the popup window display
   c. On that select the target host to migrate then click on migrate.

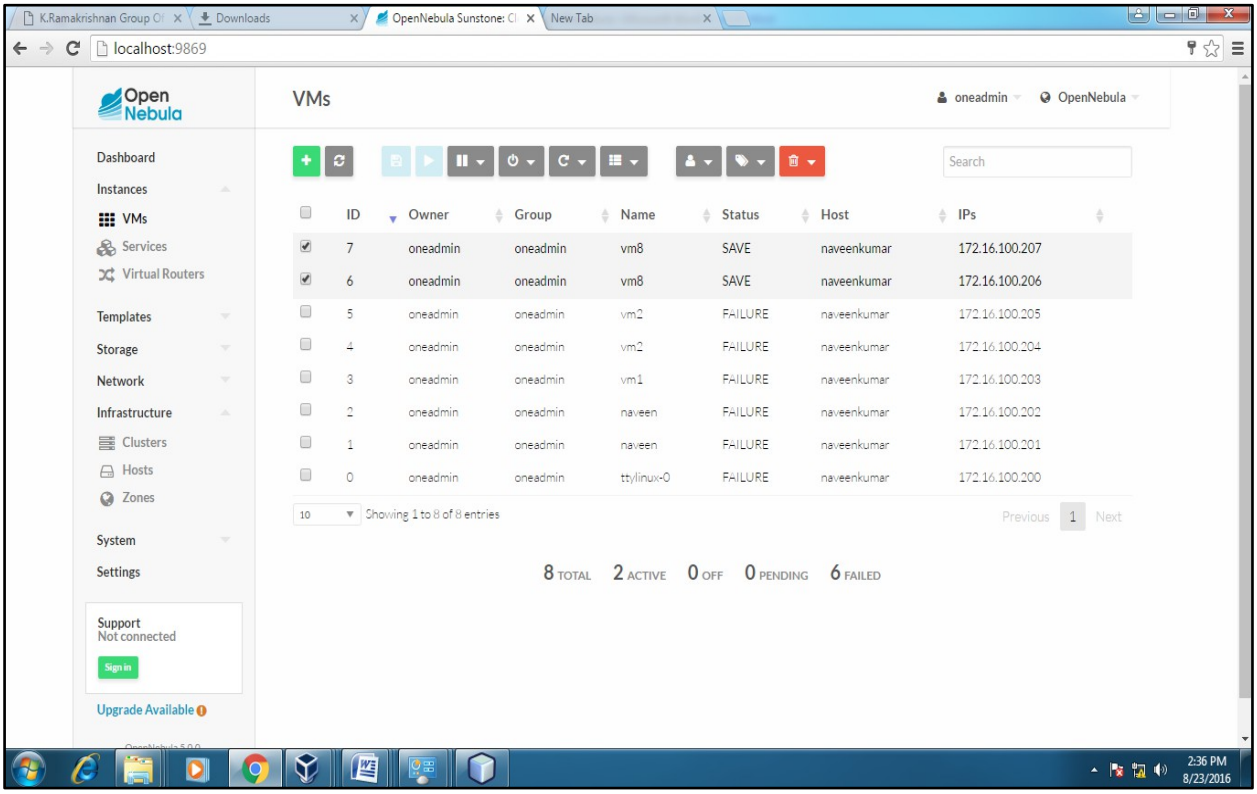
Before
migration
Host:SACET



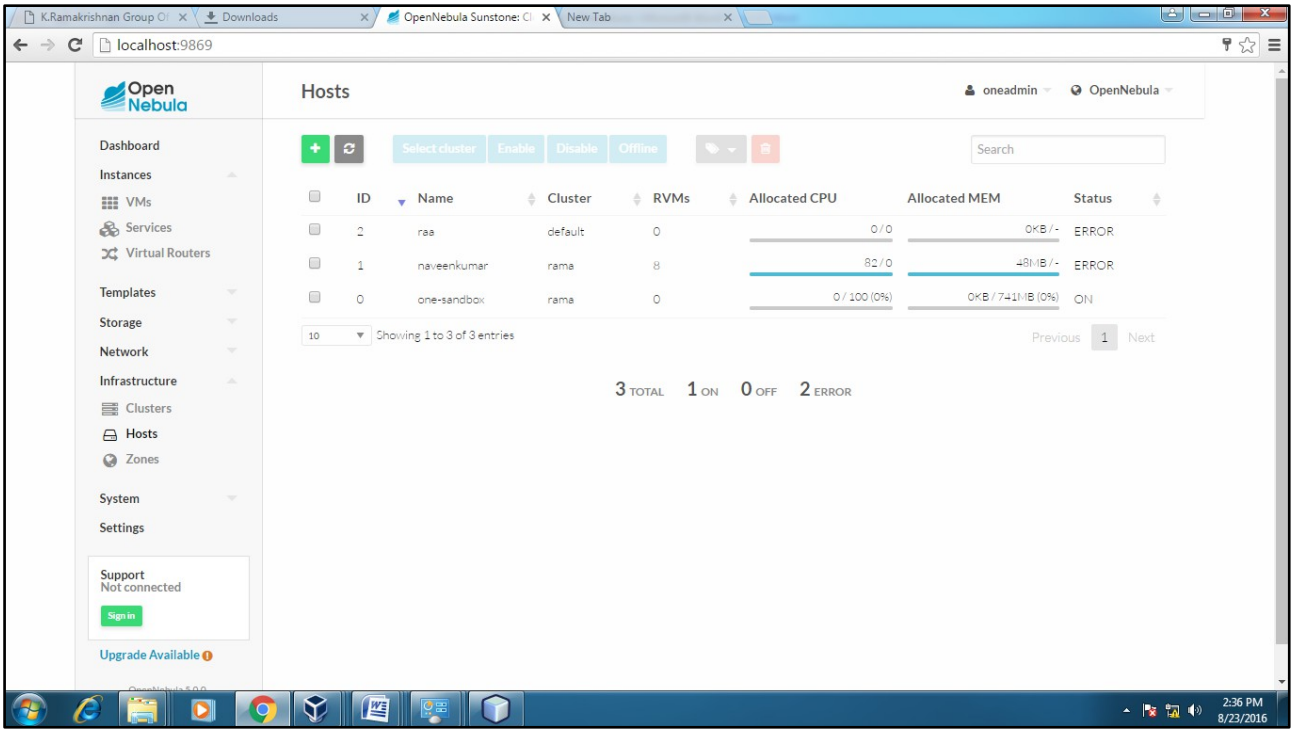
Host:one-sandbox



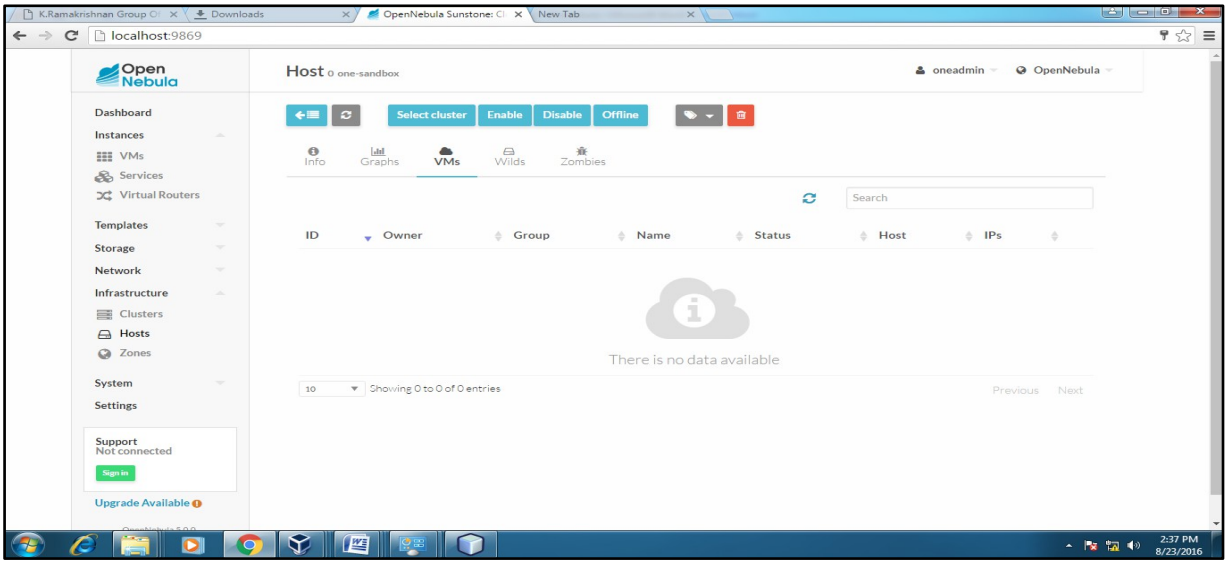

localhost:9869
Open Nebula
VMs
oneadmin
OpenNebula
Migrate Virtual Machine
VM 6 vm8 is currently running on Host one-sandbox
VM 7 vm8 is currently running on Host one-sandbox
Select a Host
Please select a Host from the list
Search
ID
Name
Cluster
RVMs
Allocated CPU
Allocated MEM
Status
2 raa default 0 0 / 0 0KB / - RETRY
1 naveenkumar rama 6 62 / 0 4MB / - ERROR
0 one-sandbox rama 2 20 / 100 (20%) 4MB / 741MB (1%) ON
10
Showing 1 to 3 of 3 entries
Previous
1
Next
Advanced Options
Migrate
2:35 PM
8/23/2016


localhost:9869
Open Nebula
VMs
oneadmin
OpenNebula
Dashboard
Instances
VMs
Services
Virtual Routers
Templates
Storage
Network
Infrastructure
Clusters
Hosts
Zones
System
Settings
Support
Not connected
Sign in
Upgrade Available
Search
ID Owner Group Name Status Host IPs
7 oneadmin oneadmin vm8 SAVE naveenkumar 172.16.100.207
6 oneadmin oneadmin vm8 SAVE naveenkumar 172.16.100.206
5 oneadmin oneadmin vm2 FAILURE naveenkumar 172.16.100.205
4 oneadmin oneadmin vm2 FAILURE naveenkumar 172.16.100.204
3 oneadmin oneadmin vm1 FAILURE naveenkumar 172.16.100.203
2 oneadmin oneadmin naveen FAILURE naveenkumar 172.16.100.202
1 oneadmin oneadmin naveen FAILURE naveenkumar 172.16.100.201
0 oneadmin oneadmin ttylinux-0 FAILURE naveenkumar 172.16.100.200
10
Showing 1 to 8 of 8 entries
Previous
1
Next
8 TOTAL 2 ACTIVE 0 OFF 0 PENDING 6 FAILED
2:36 PM
8/23/2016

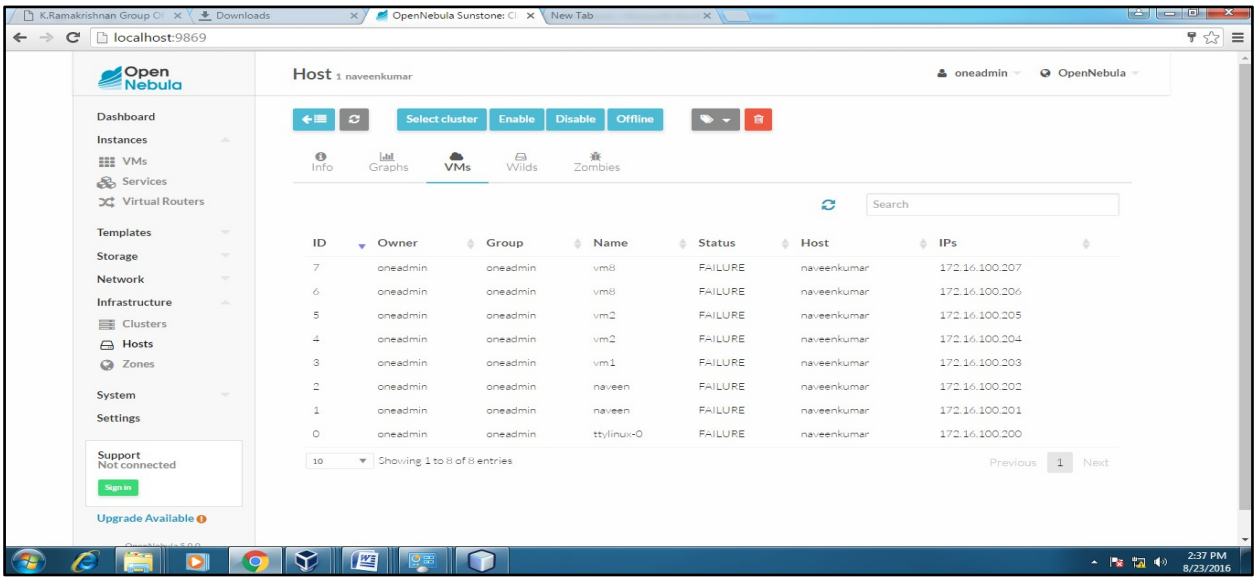
After Migration:



Host:one-sandbox



Host:SACET



APPLICATIONS:

Easily migrate your virtual machine from one pc to another.

Result:

Thus the file transfer between VM was successfully completed.....