

EX.NO: 1.(a) Virtualization

DATE:

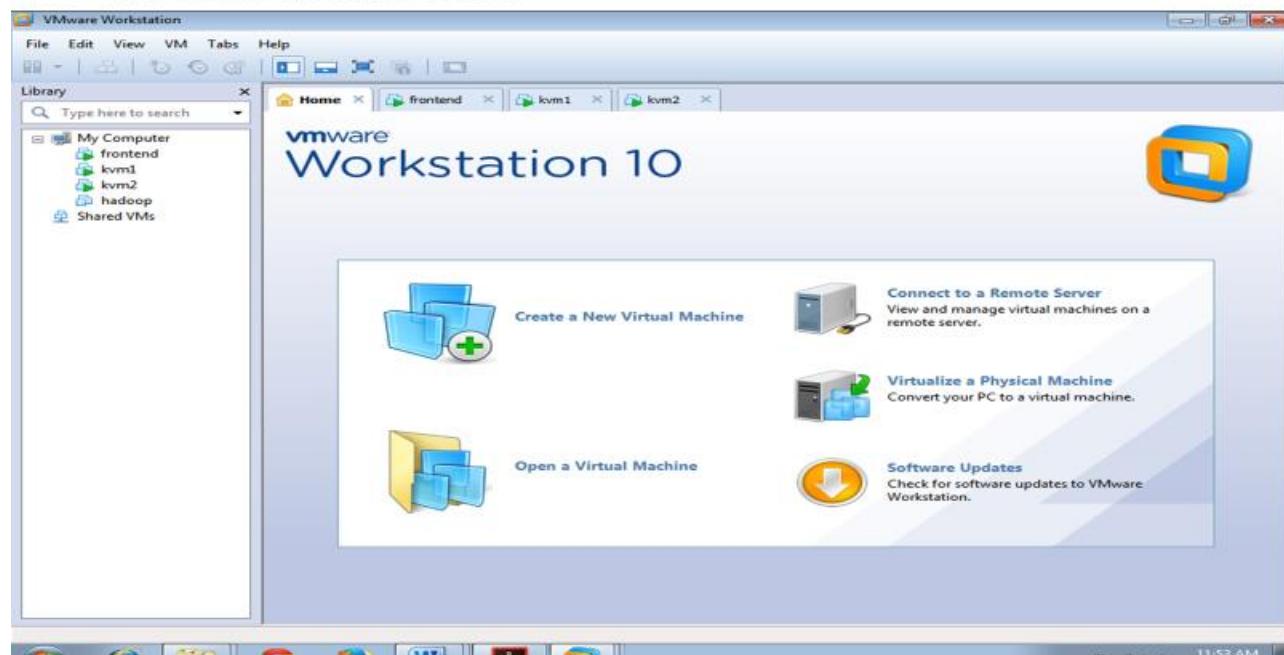
a. Find procedure to run the virtual machine of different configuration using virt-manager.

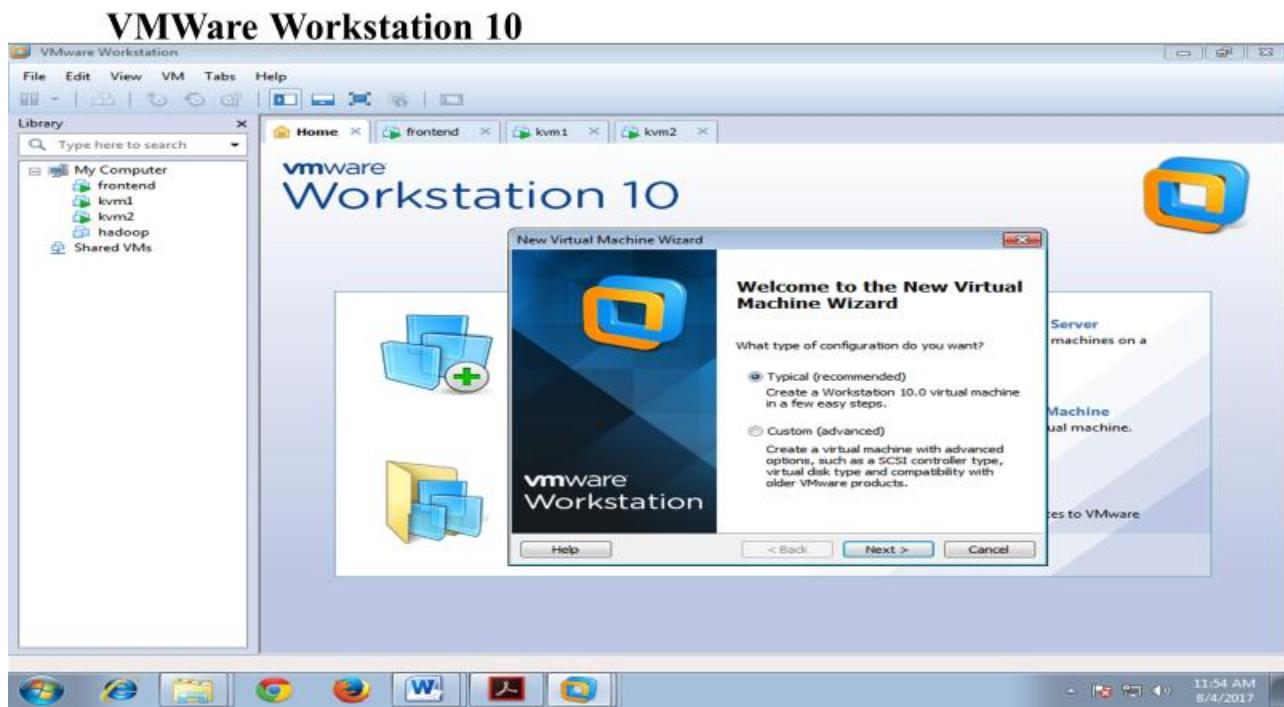
AIM:

To Install VMware workstation with different flavors of linux on top of windows

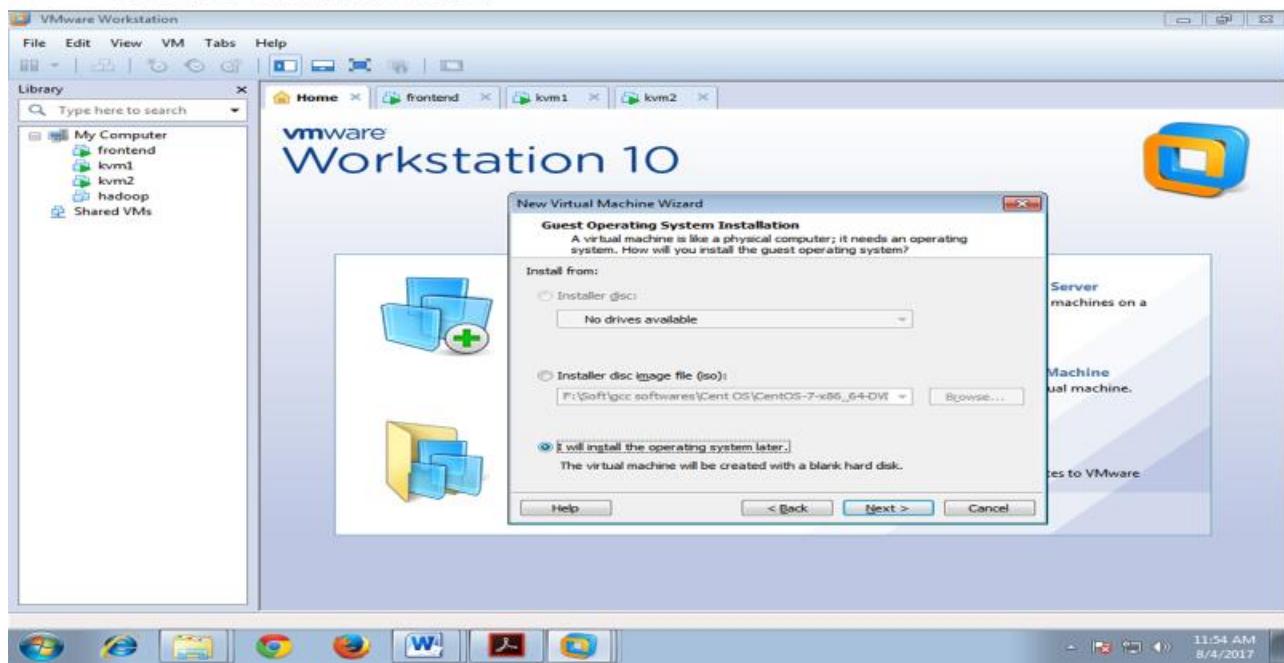
PROCEDURE:

VMWare Workstation 10

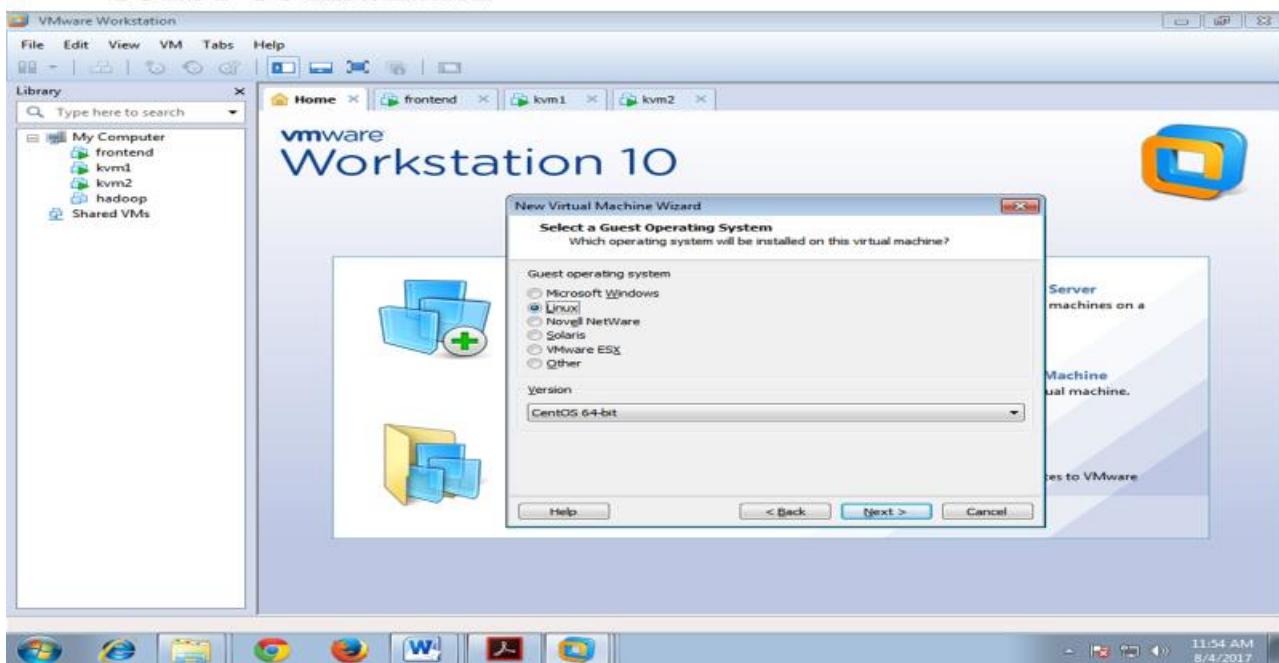




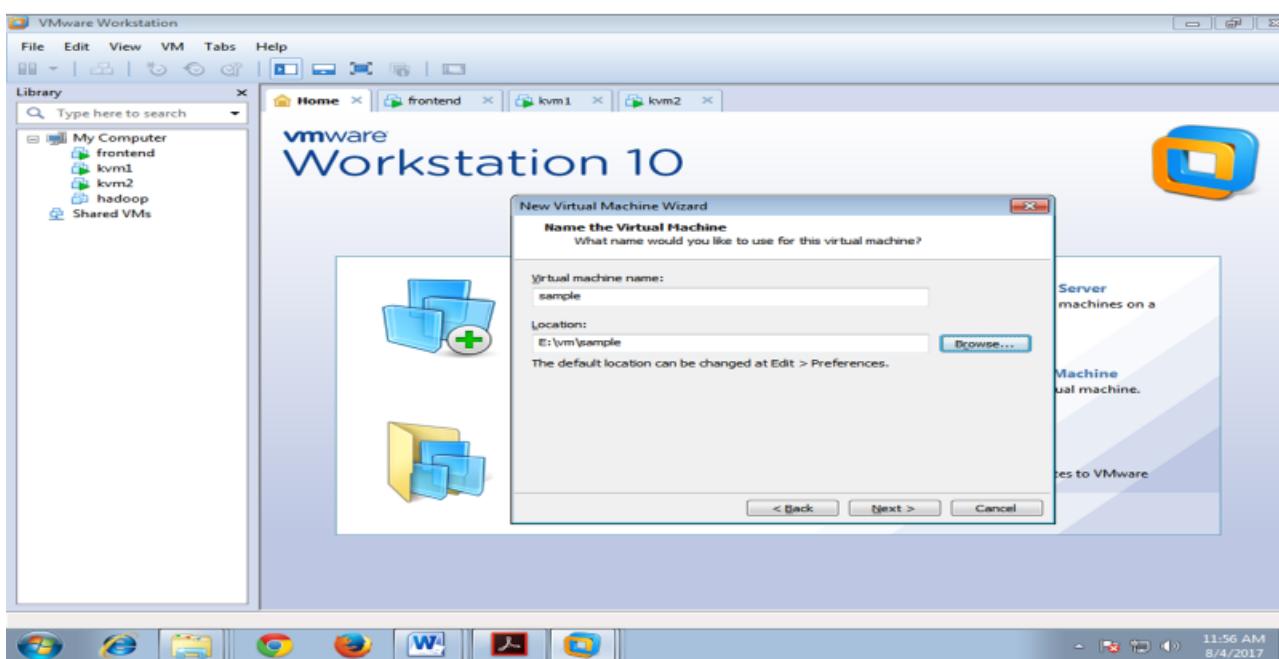
GUEST OS Installation



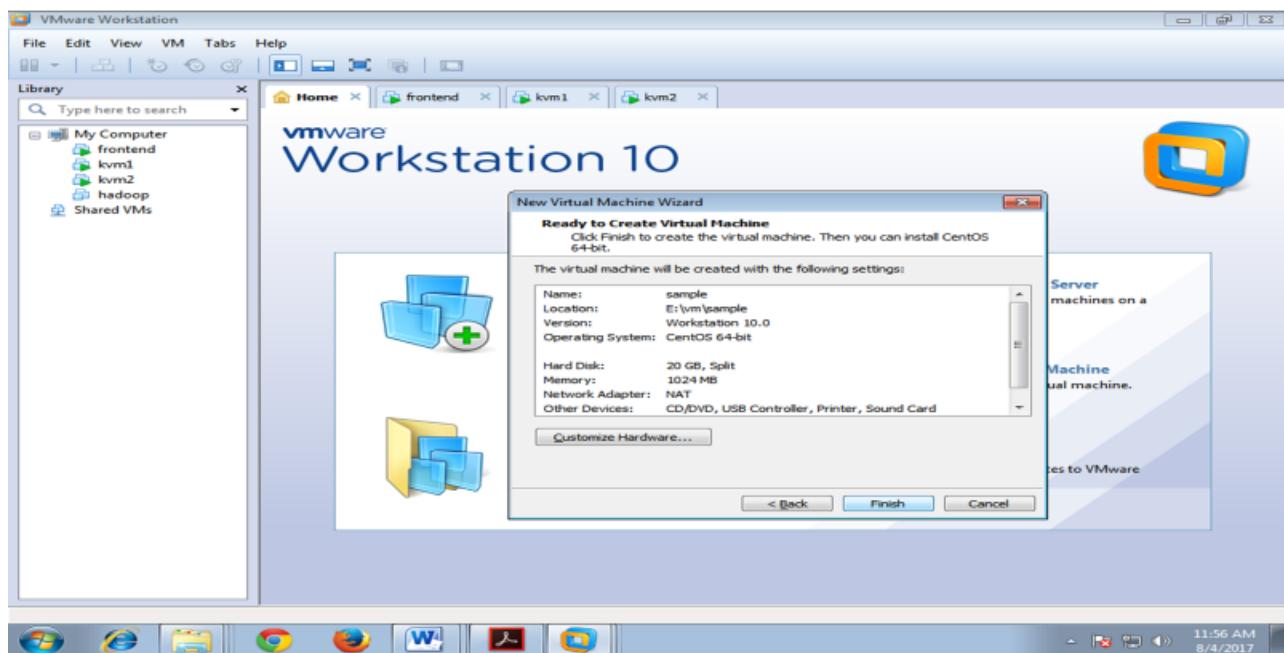
GUEST OS Installation



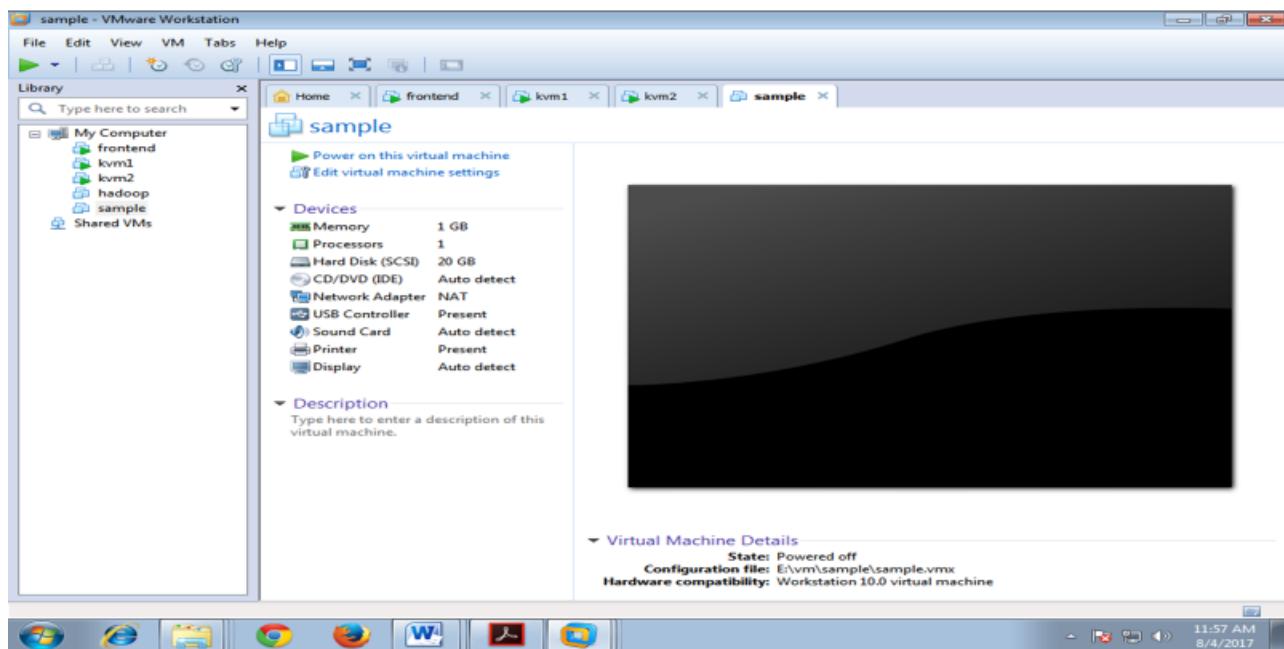
VM Creation



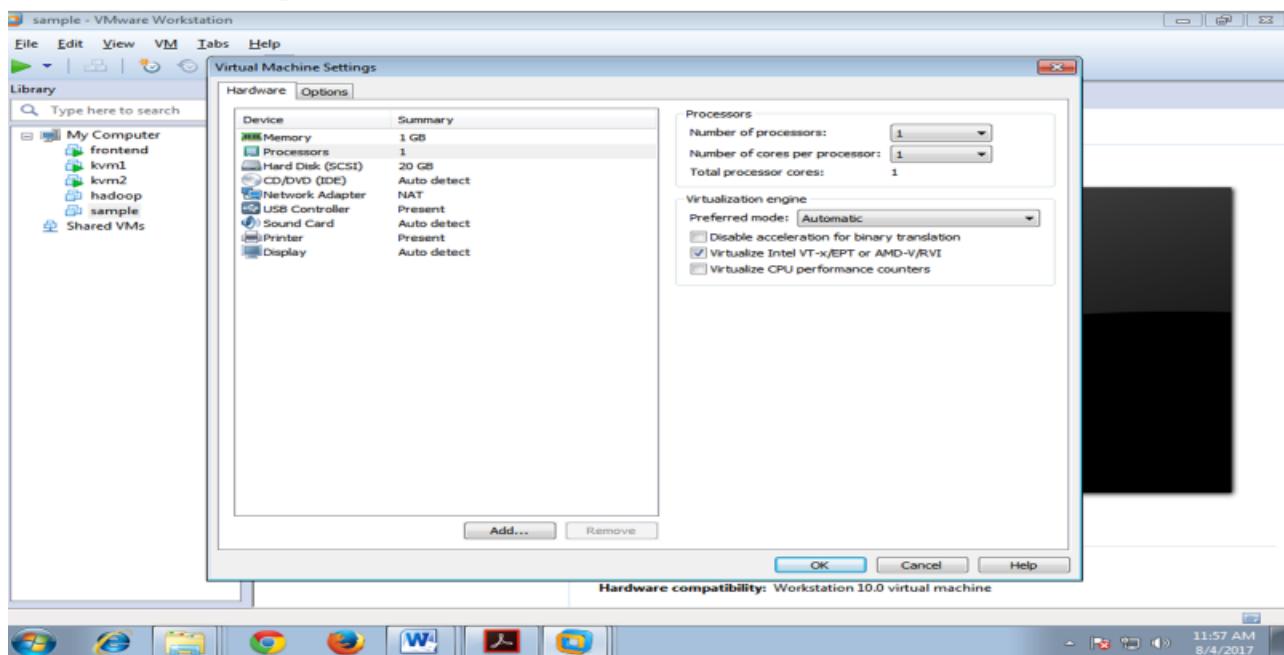
VM Creation



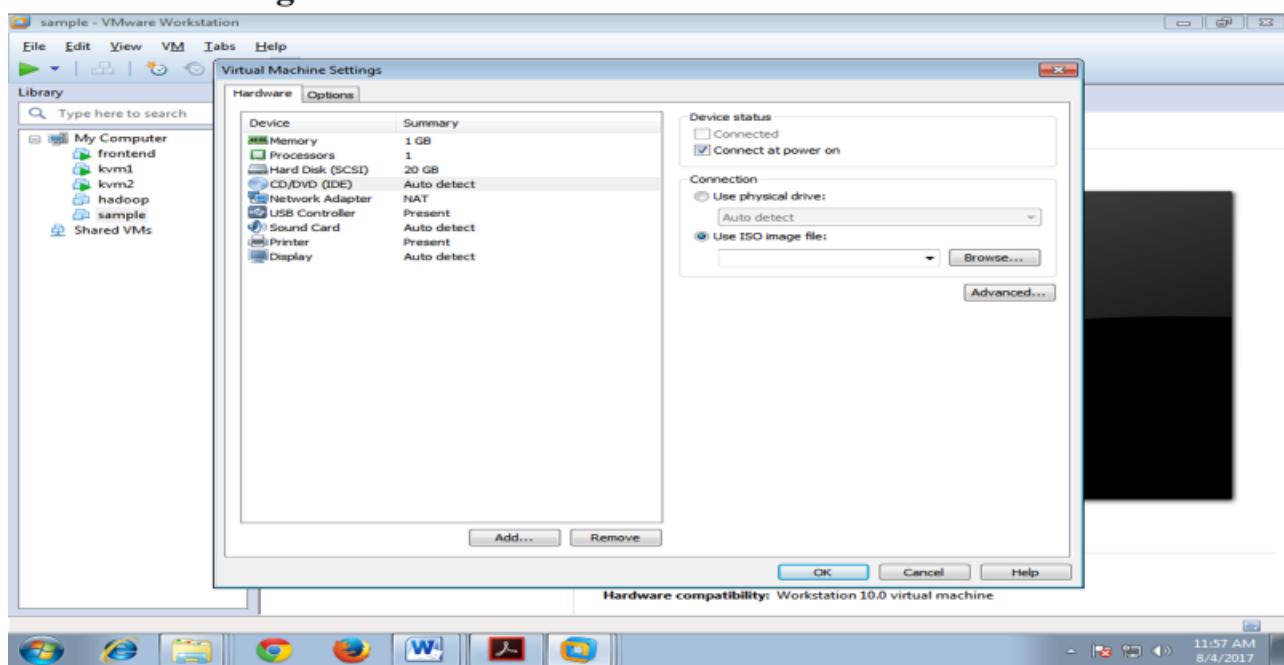
VM Creation



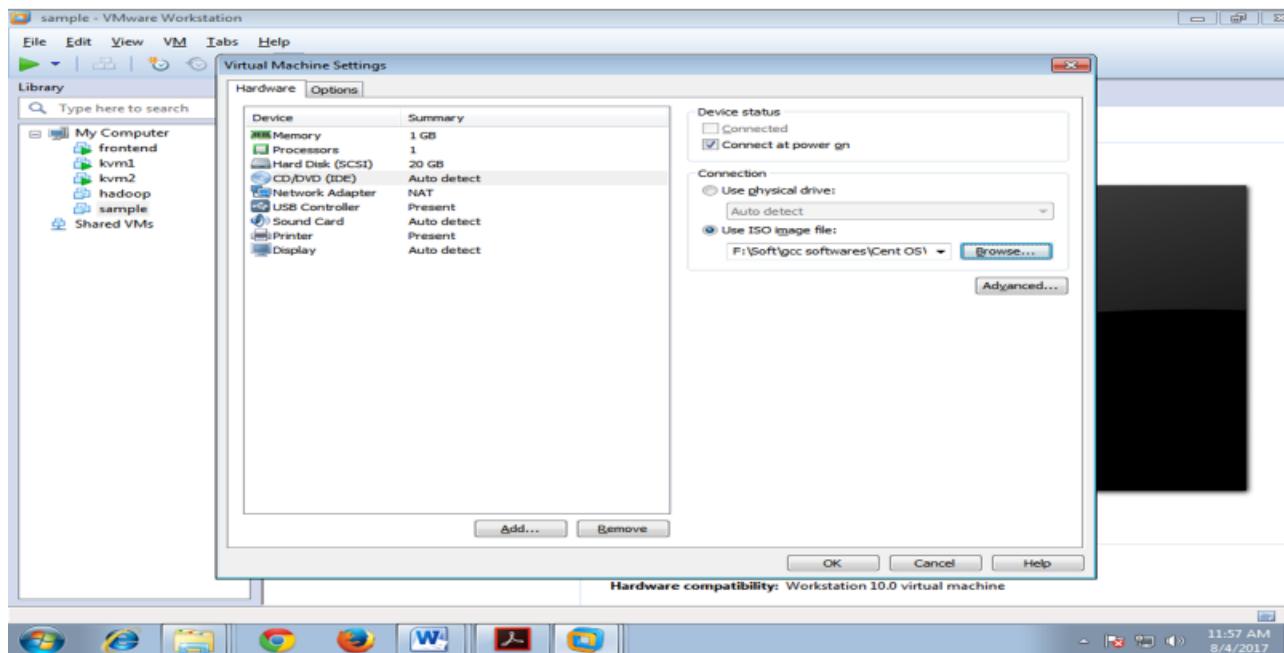
VM Settings



VM Settings



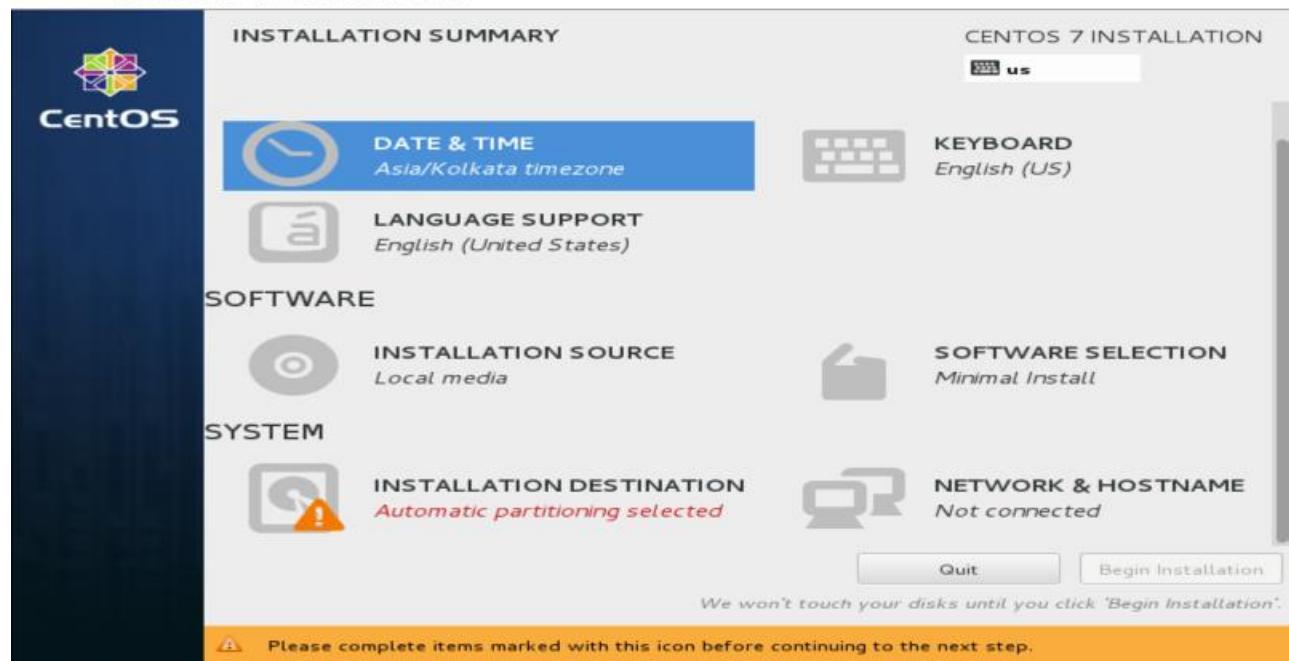
VM Settings



CentOS 7 Installation



CentOS 7 Installation



CentOS 7 Installation



CentOS 7 Installation

INSTALLATION DESTINATION

CENTOS 7 INSTALLATION

Device Selection

Select the device(s) you'd like to install to. They will be left untouched until you click on the main menu's "Begin Installation" button.

Local Standard Disks

25 GiB
 VMware, VMware Virtual S
sda / 992.5 KiB free

Disks left unselected here will not be touched.

Specialized & Network Disks

Add a disk...

Disks left unselected here will not be touched.

Other Storage Options

Partitioning

Automatically configure partitioning. I will configure partitioning.

[Full disk summary and boot loader...](#)

1 disk selected; 25 GiB capacity; 992.5 KiB free

CentOS 7 Installation

INSTALLATION SUMMARY

CENTOS 7 INSTALLATION

LOCALIZATION

 DATE & TIME
Asia/Kolkata timezone

 LANGUAGE SUPPORT
English (United States)

KEYBOARD
English (US)

SOFTWARE

 INSTALLATION SOURCE
Local media

 SOFTWARE SELECTION
Minimal Install

SYSTEM

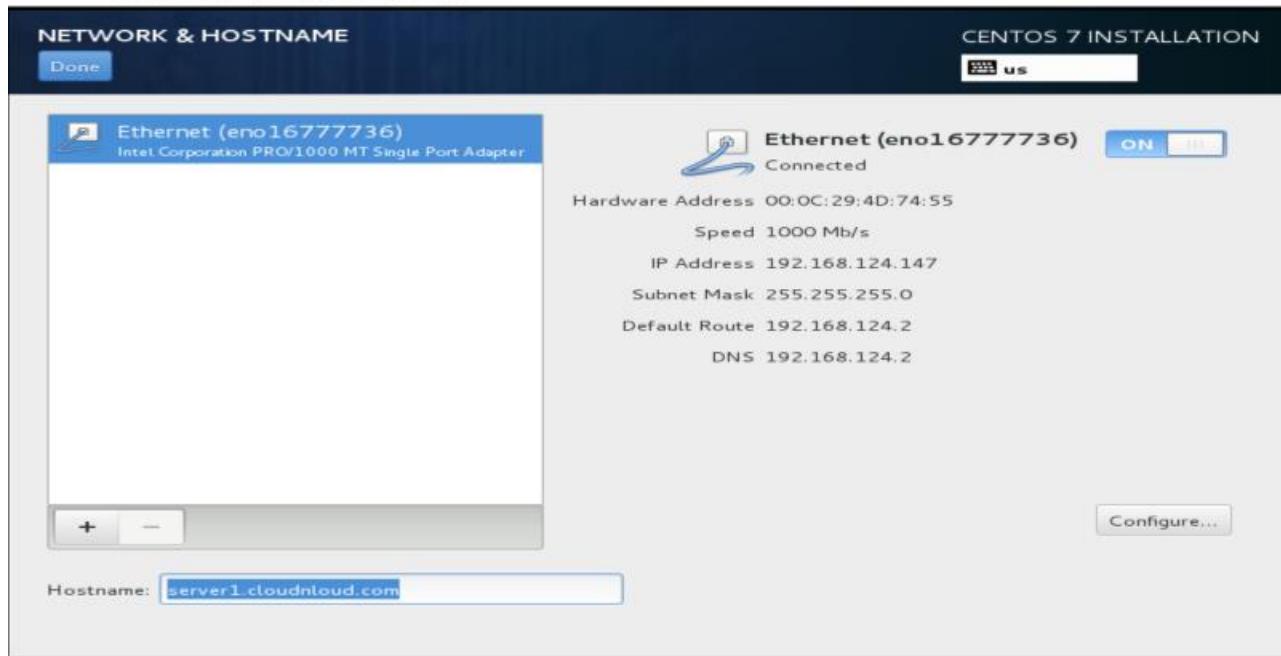
 INSTALLATION DESTINATION
Custom partitioning selected

 NETWORK & HOSTNAME
Not connected

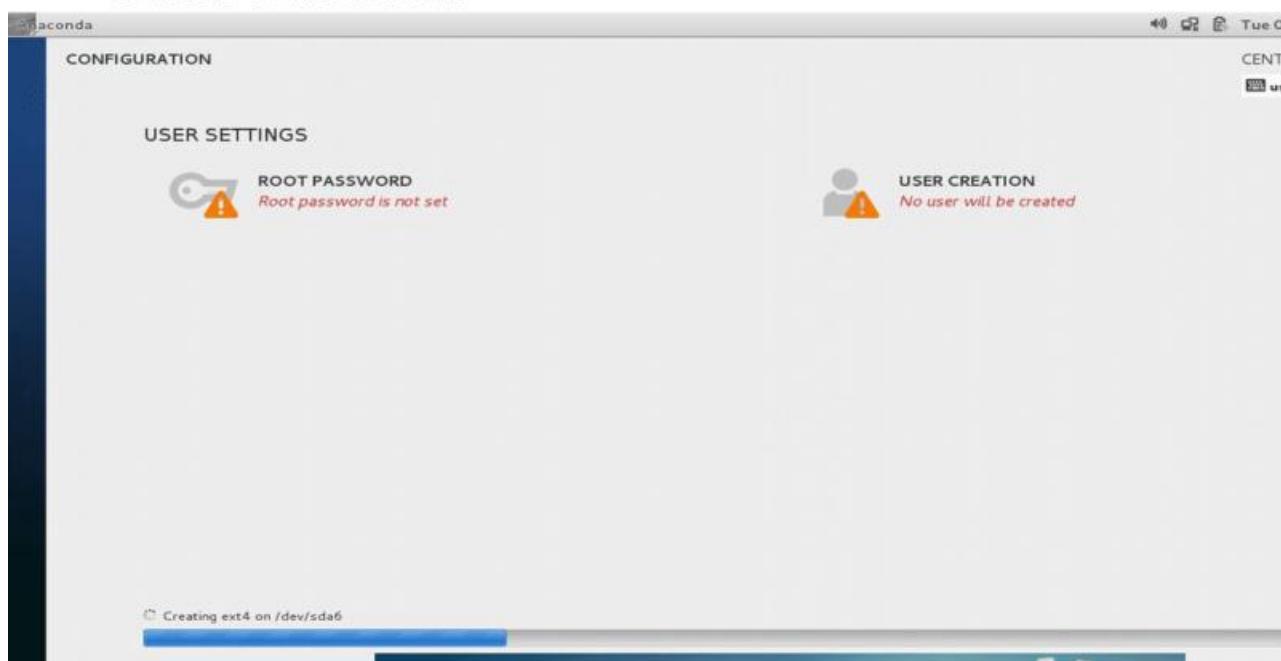
QUIT **BEGIN INSTALLATION**

We won't touch your disks until you click 'Begin Installation'.

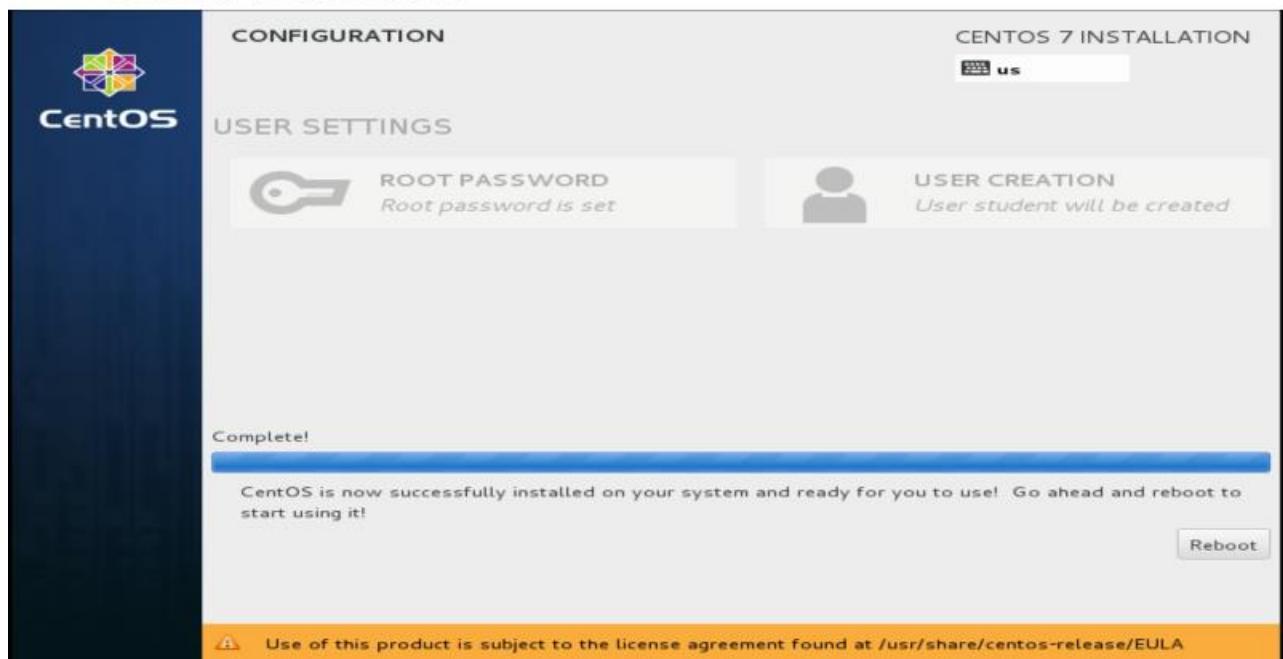
CentOS 7 Installation



CentOS 7 Installation



CentOS 7 Installation



RESULT:

Thus Virtualbox with different flavours of linux on top of windows was successfully installed.

EX.NO:1,(b) 1. Virtualization

DATE:

b. Virtualize a machine and check how many virtual machine can be utilized at a particular time.

AIM:

To execute the procedure for how many virtual machine can be utilized at a particular time.

CREATION OF VIRTUAL MACHINES

• PROCEDURE:

- **Open Frontend, kvm1, kvm2 (Pwd: Redhat)**
- **Goto FrontEnd ->Right Click-> Open In Terminal**
- [frontend@frontend Desktop]\$ **su**
- Password: **redhat**
- [root@frontend Desktop]# **su – oneadmin**

CREATION OF VIRTUAL MACHINES

OUTPUT:

Last login: Wed Aug 21 09:27:42 IST 2019 on pts/0

[oneadmin@frontend ~]\$ **onehost list**

OUTPUT:

ID	NAME	CLUSTER	RVM	ALLOCATED_CPU	ALLOCATED_MEM	STAT
0	kvm1.saec.com	-	0	0 / 100 (0%)	0K / 986.7M (0%)	on
1	kvm2.saec.com	-	0	0 / 100 (0%)	0K / 986.7M (0%)	on

Goto Run -> type cmd -> ipconif

Check the IP ADDRESS of your system.

Goto FrontEnd,

[oneadmin@frontend ~]\$ **vi /var/tmp/mynetwork.one**

CREATION OF VIRTUAL MACHINES

Press **i** for Inserting Mode in the Editor

Copy the Following Code:

```
NAME = "private"
BRIDGE = br0
AR = [
    TYPE = IP4,
    IP = 192.168.35.150,
    SIZE = 10
]
```

```
NAME = "private"
BRIDGE = br0
AR = [
    TYPE = IP4,
    IP = 192.168.35.150,
    SIZE = 10
]
```

Press **ESC**, and then **Shift+ : + w + q** (altogether)

```
[oneadmin@frontend ~]$ onevnet create /var/tmp/mynetwork.one
```

ID: 1

```
[oneadmin@frontend ~]$ onevnet list
```

OUTPUT:

ID	USER	GROUP	NAME	CLUSTER	BRIDGE	LEASES
1	oneadmin	oneadmin	private	-	br0	0

CREATION OF VIRTUAL MACHINES

In Frontend, goto Application -> Mozilla Firefox

url: <http://frontend:9869>

Go to Virtual Resources -> Images -> Click Add + Symbol

Name : **TTYLinux_1.0**

Type: Select “**DATABLOCK**”

Image Location : Select “**Empty Datablock**”

Size: **512**

FS: **qcow2**

CLICK “CREATE”

CREATION OF VIRTUAL MACHINES

In Frontend, goto Application -> Mozilla Firefox

url: <http://frontend:9869>

Go to Virtual Resources -> Images -> Click Add + Symbol

Name : **TTYLinux_1.0**

Type: Select “**DATABLOCK**”

Image Location : Select “**Empty Datablock**”

Size: **512**Goto Terminal,

[oneadmin@frontend ~]\$ onetemplate list

OUTPUT:

ID	USER	GROUP	NAME	REGTIME
2	oneadmin	oneadmin	TTYLinux_1.0	08/21 12:38:42

Goto Virtual Resources -> Templates -> click the file

CREATION OF VIRTUAL MACHINES

Goto Terminal,

[oneadmin@frontend ~]\$ **oneimage list**

ID	USER	GROUP	NAME	DATASTORE	SIZE	TYPE	PER	STAT	RVMS
2	oneadmin	oneadmin	TTYLinux_1.0	default	512M	DB	No	rdy	0

Go to Virtual Resources -> Templates -> Click Add + Symbol

Name : **TTYLinux_1.0**

VCPU: **1**

CLICK “CREATE”

CREATION OF VIRTUAL MACHINES

Goto Terminal,

```
[oneadmin@frontend ~]$ onetemplate list
```

OUTPUT:

ID	USER	GROUP	NAME	REGTIME
2	oneadmin	oneadmin	TTYLinux_1.o	08/21 12:38:42

Goto Virtual Resources -> Templates -> click the file

Now click Instantiate ->

VM NAME : kvm1

Click -> Instantiate

Now click Instantiate ->

VM NAME : kvm2

Click -> Instantiate

Goto Terminal,

```
[oneadmin@frontend ~]$ onevm list
```

OUTPUT:

ID	USER	GROUP	NAME	STATU	CPU	UMEM	HOST	TIME
3	oneadmin	oneadmin	kvm1	runn	2	512M	kvm2.saec.com	0d 00h01
2	oneadmin	oneadmin	kvm2	runn	2	512M	kvm1.saec.com	0d 00h02

Goto Browser , Virtual Resources-> Virtual Machine ->

Click -> oneadmin -> Migrate [live]

Select host -> click “Migrate”

```
[oneadmin@frontend1 ~]$ onevm migrate --live TTYLinux_1-2 kvm1.cn1.com
```

```
[oneadmin@frontend1 ~]$ onevm list
```

ID	USER	GROUP	NAME	STAT	UCPU	UMEM	HOST	TIME
2	oneadmin	oneadmin	TTYLinux_1-2	runn	24	256M	kvm1.cn1.c	0d 00h13
ID	USER	GROUP	NAME	STAT	UCPU	UMEM	HOST	TIME
2	oneadmin	oneadmin	TTYLinux_1-2	runn	24	256M	kvm1.cn1.c	0d 00h13

RESULT:

In this above application is how many virtual machine can be utilized at a particular time executed

Successfully

EX.NO:1,C

DATE:

1. Virtualization

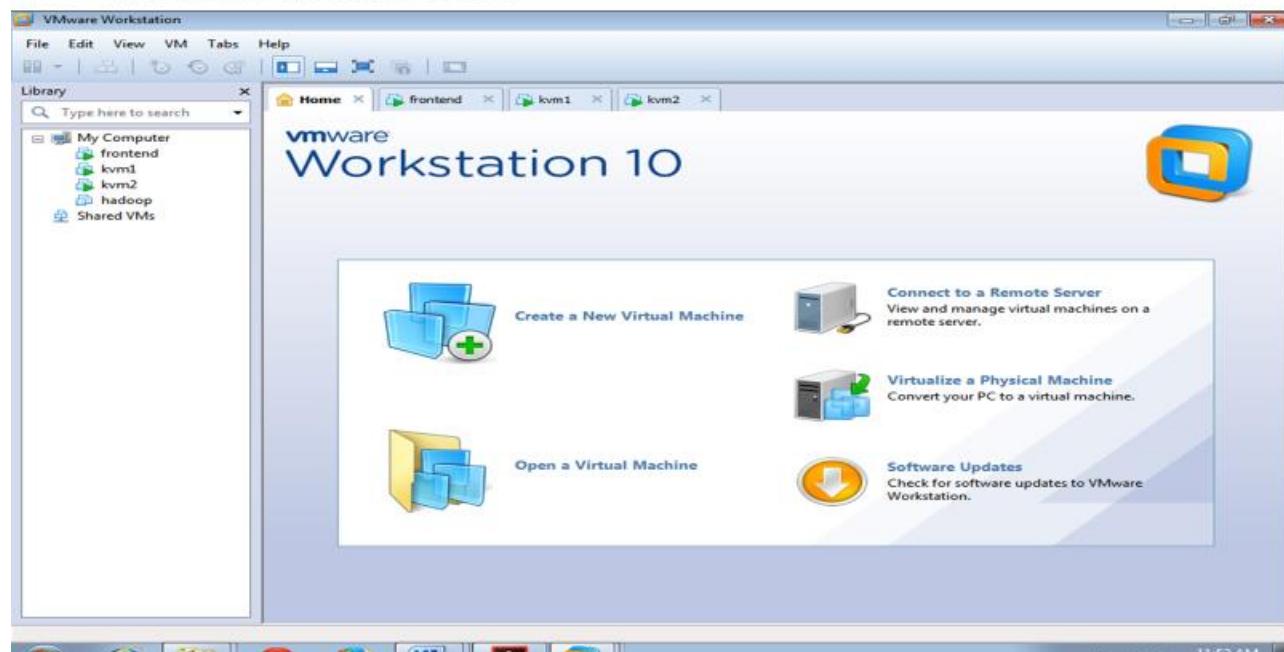
c. Create a VM clone and attach virtual block to the cloned virtual machine and check whether it holds the data even after the release of the virtual machine.

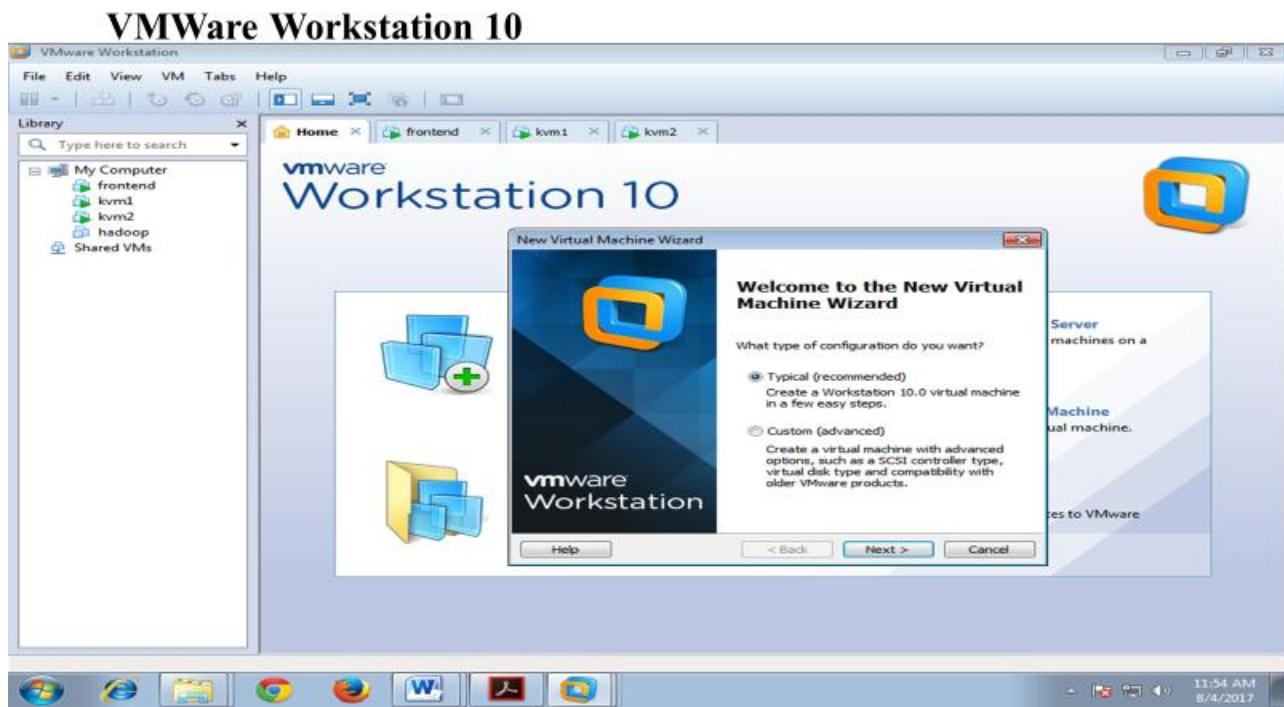
AIM:

To Install VMware workstation ,VM clone and attach virtual block to the cloned virtual machine and check whether it holds the data even after the release of the virtual machine.

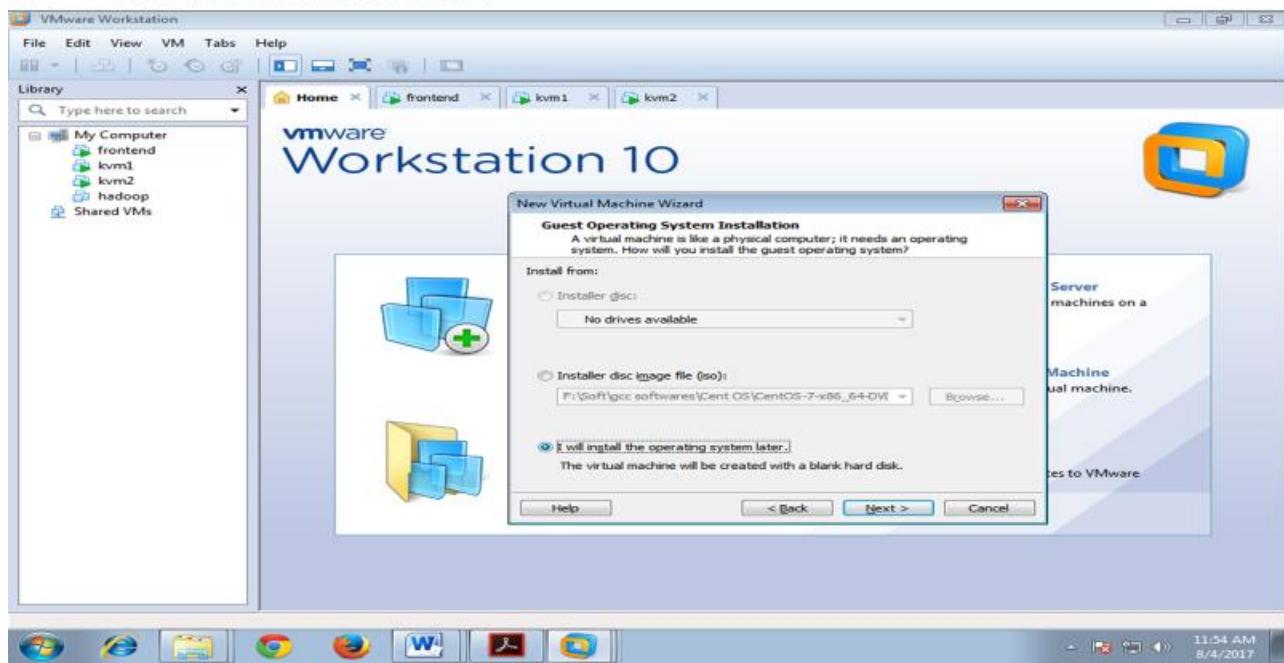
PROCEDURE:

VMWare Workstation 10

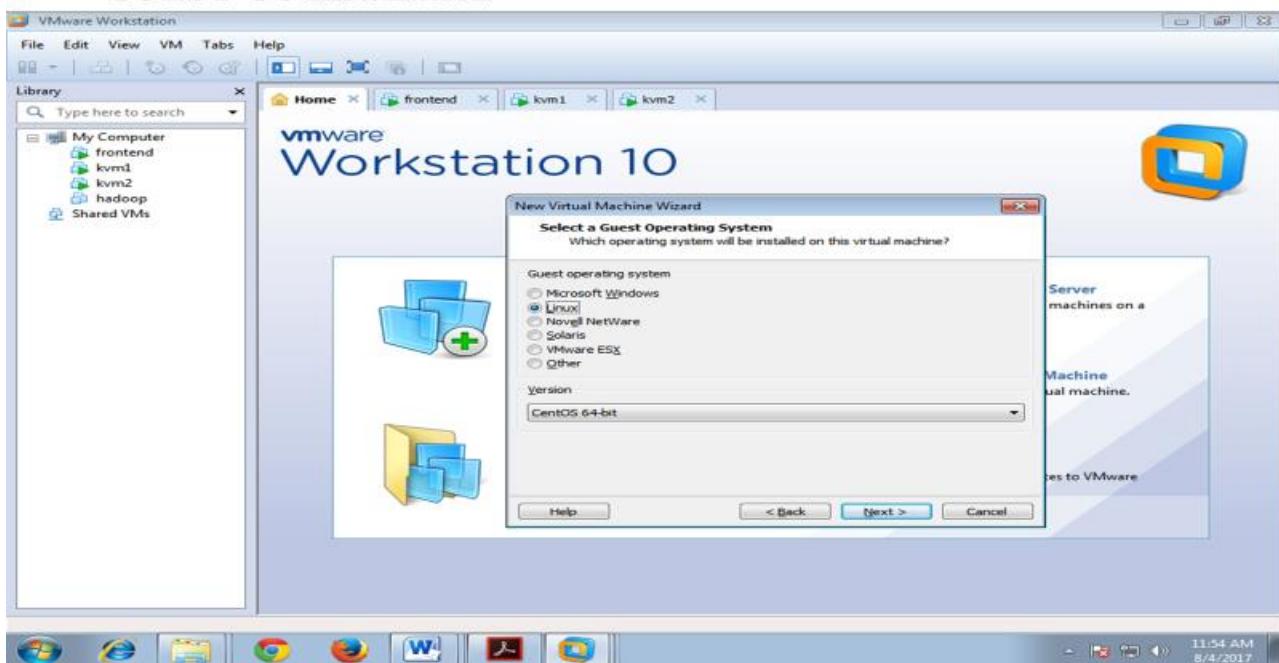




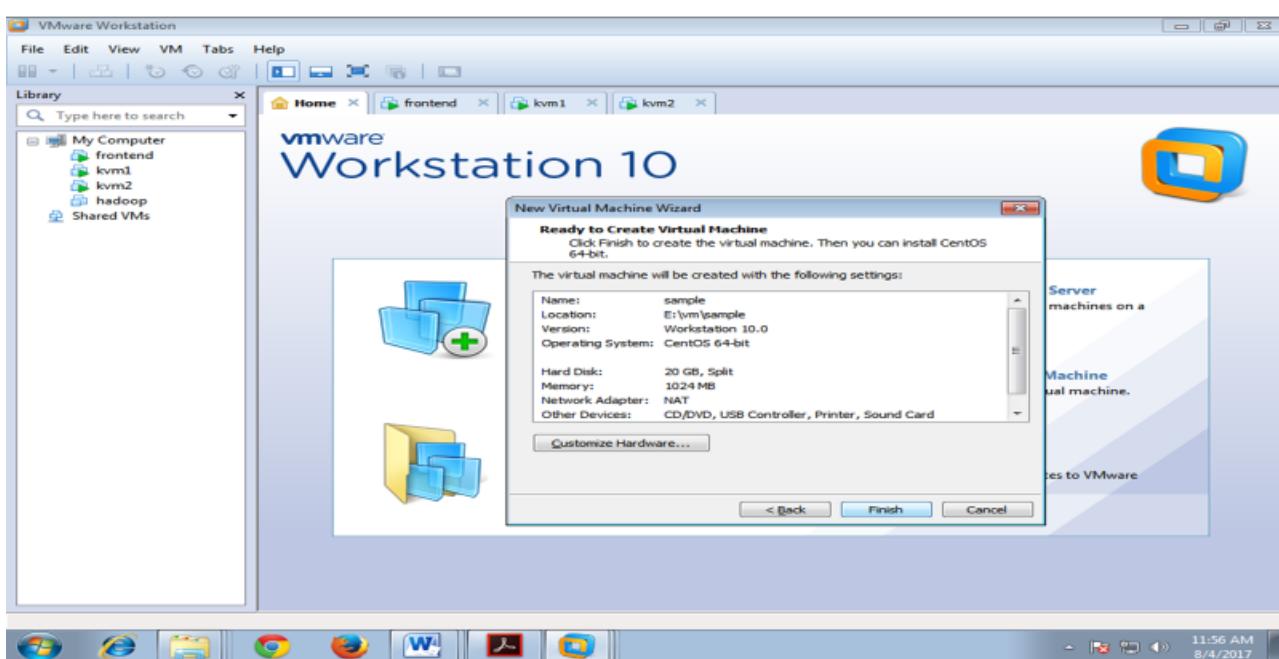
GUEST OS Installation



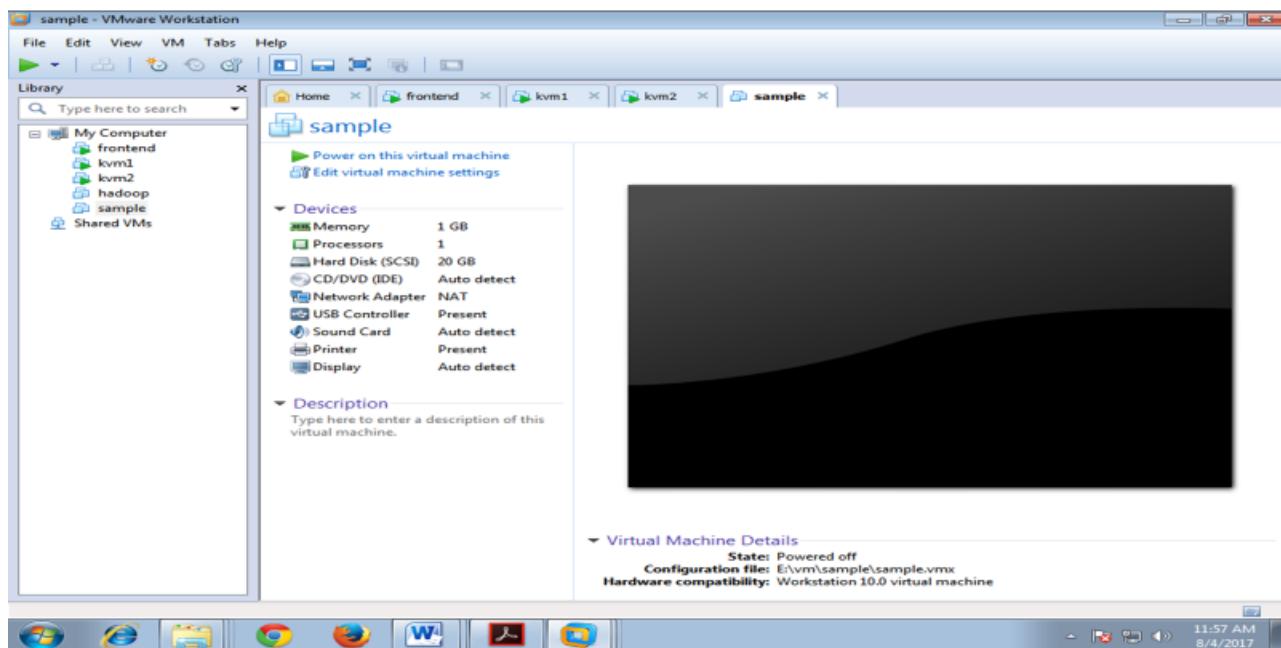
GUEST OS Installation



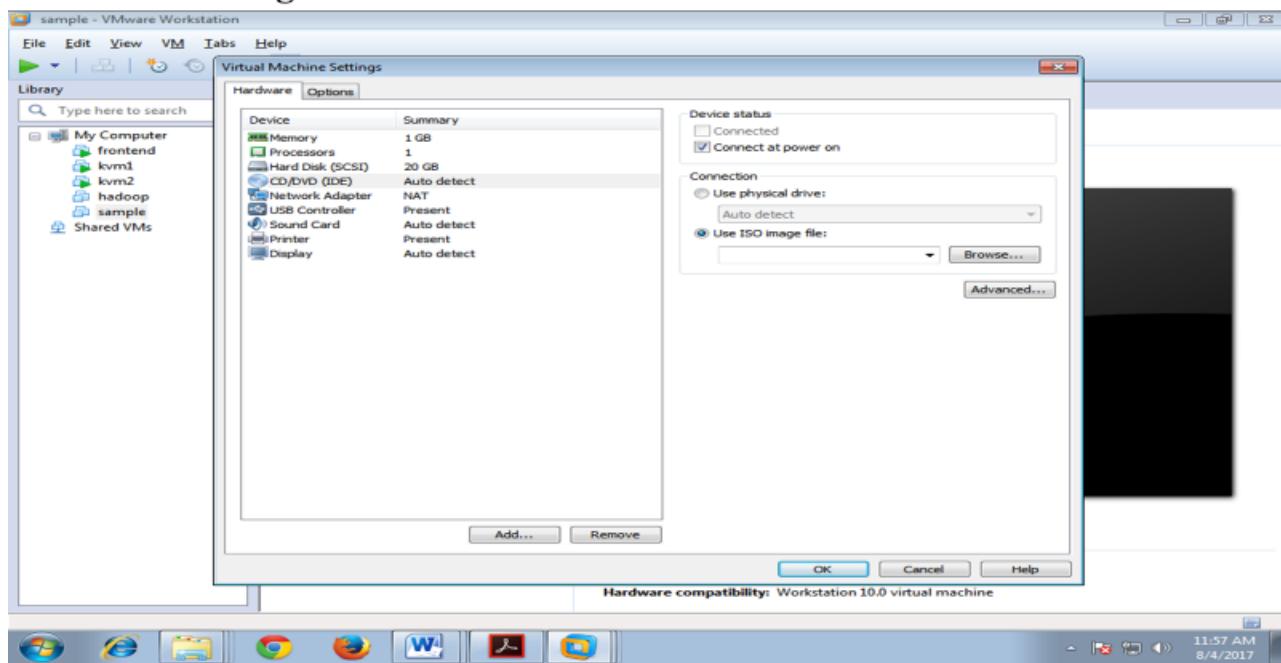
VM Creation



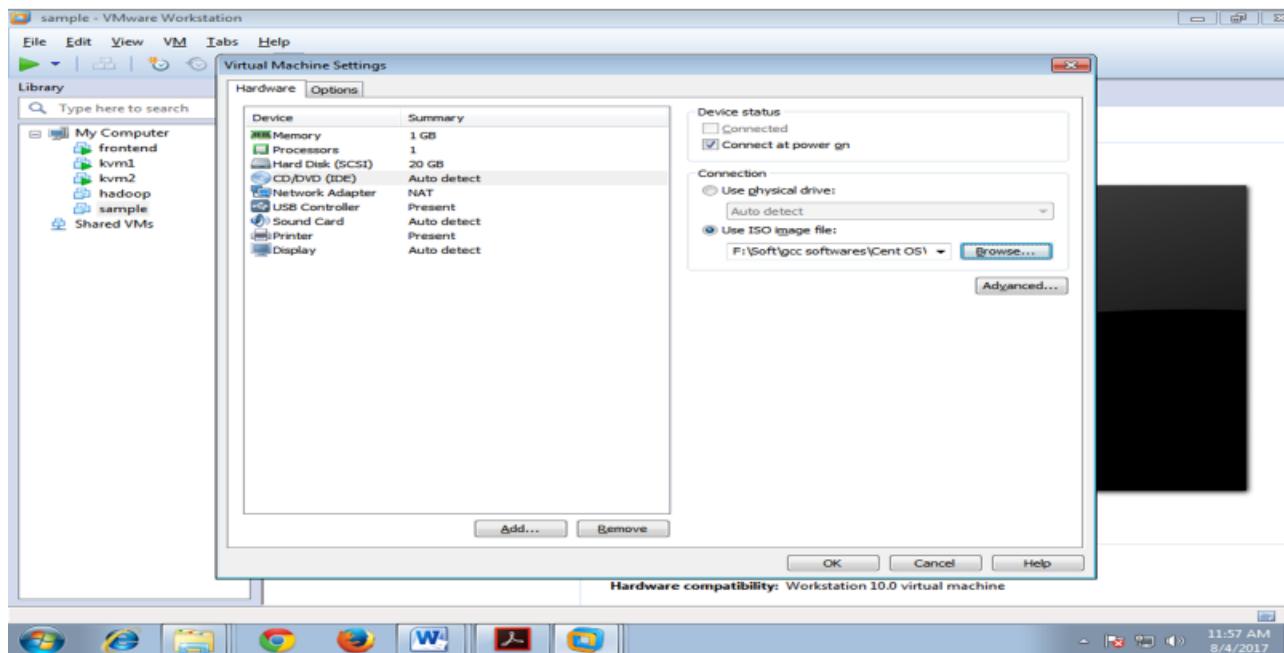
VM Creation



VM Settings

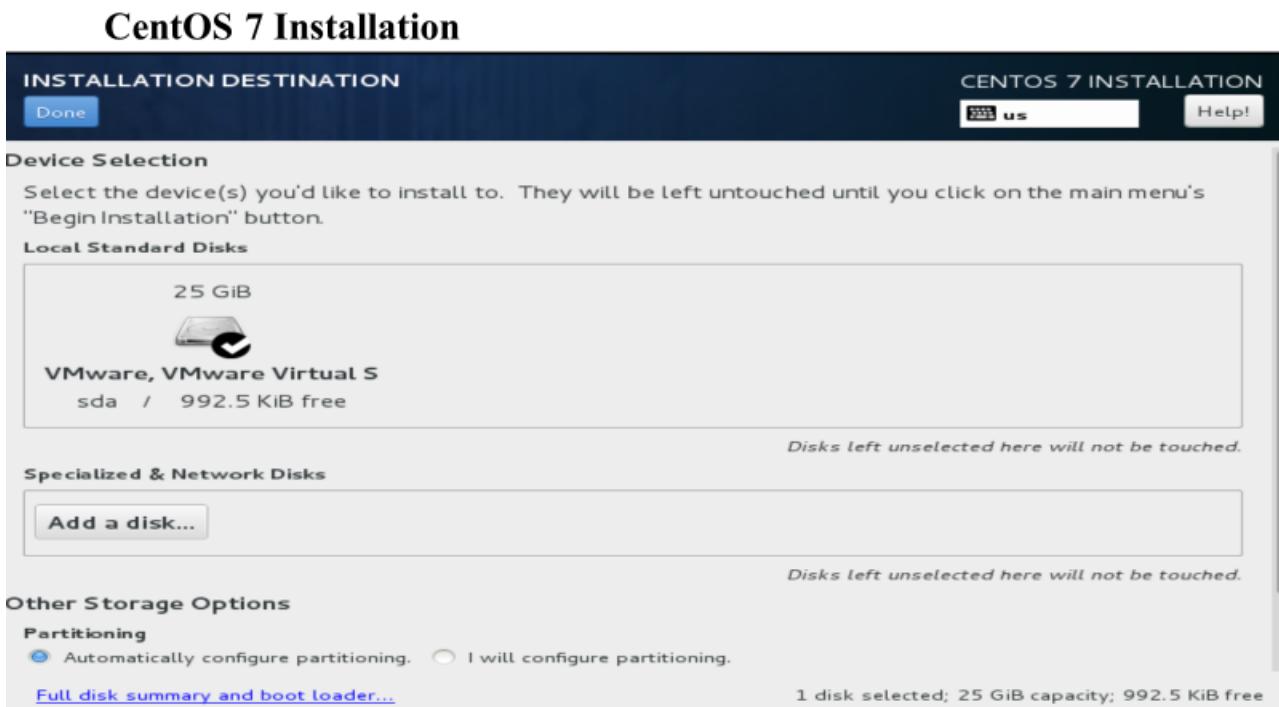


VM Settings

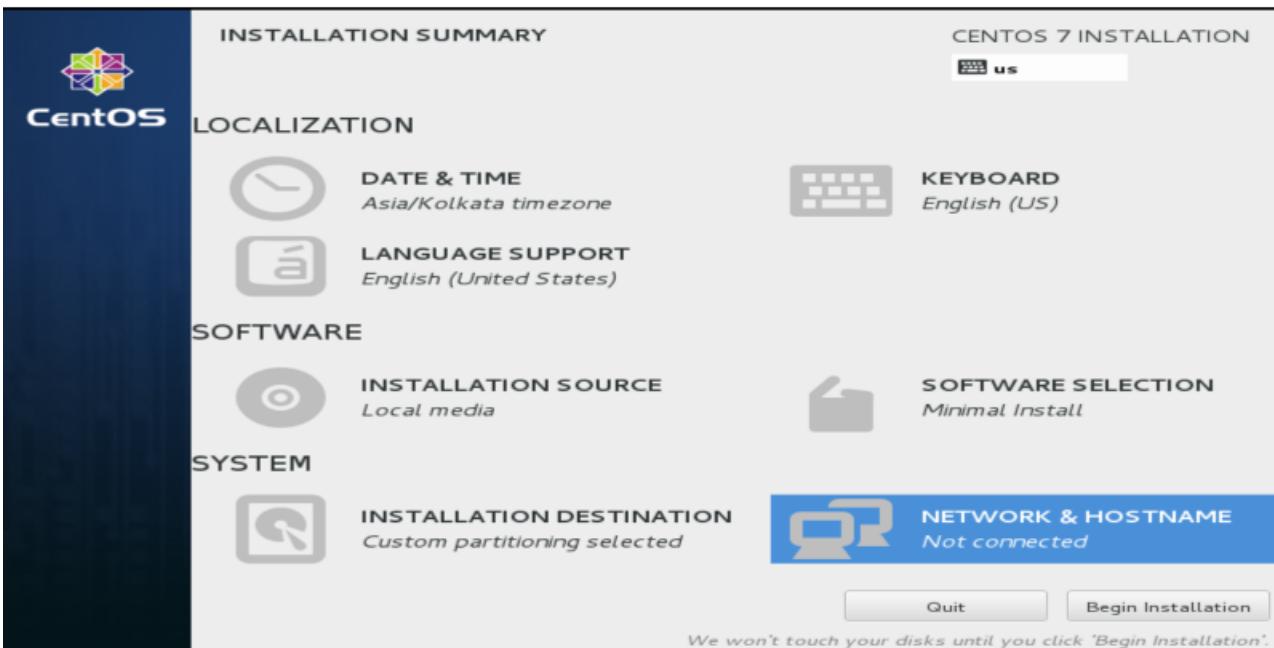


CentOS 7 Installation

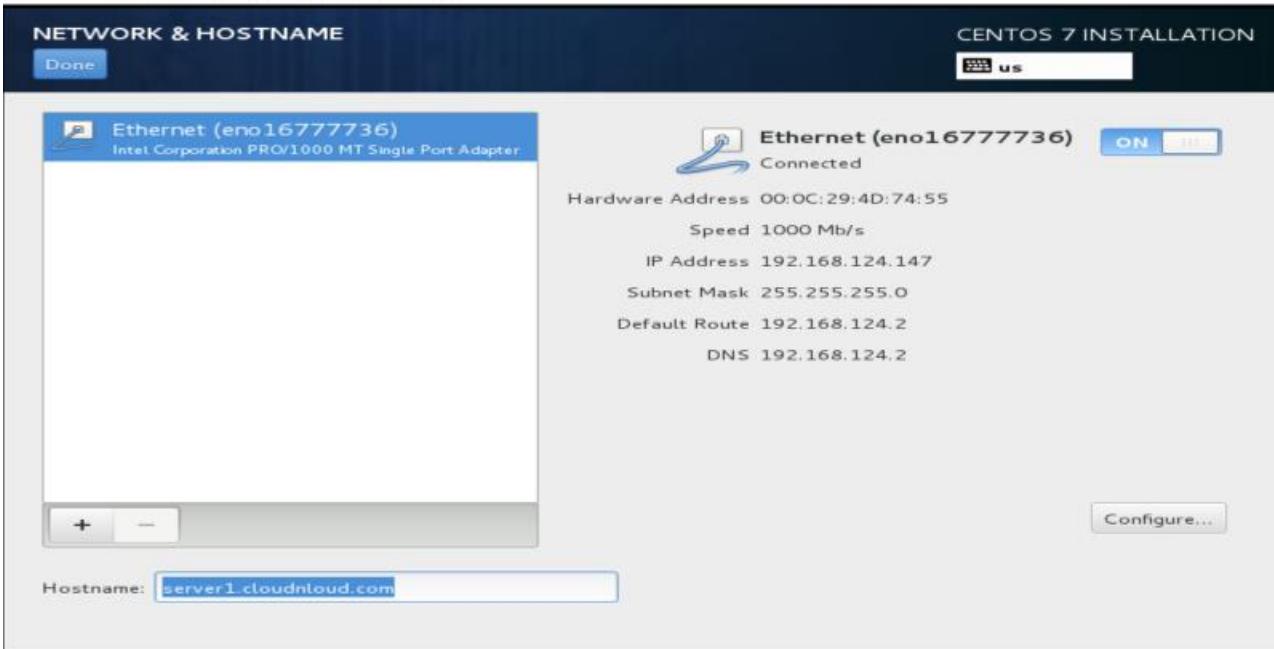




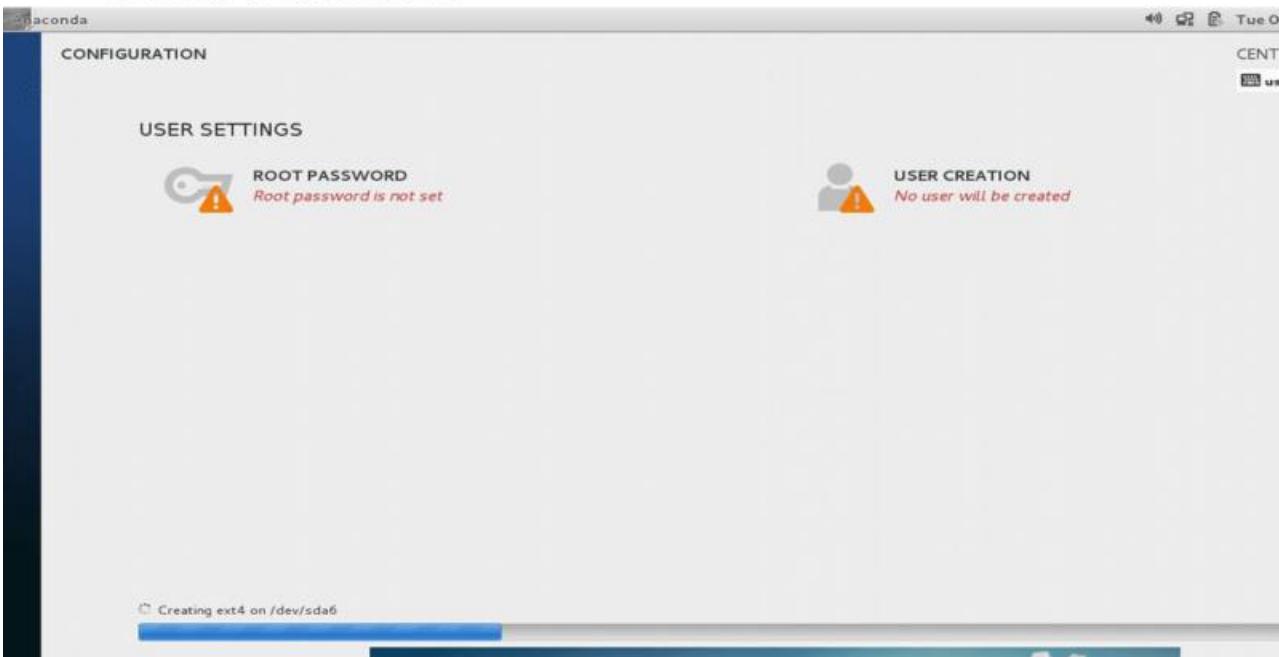
CentOS 7 Installation



CentOS 7 Installation



CentOS 7 Installation



1.1 Host file Entry in centos 7

***** Add following entry in /etc/hosts file on kvm1 kvm2 frontend *****

```
#vi /etc/hosts
```

```
192.168.35.135 frontend1.cnl.com frontend1
```

```
192.168.35.136 kvm2.cnl.com kvm2
```

```
192.168.35.137 kvm1.cnl.com kvm1
```

A screenshot of a terminal window titled 'root@kvm2:~'. The window displays the contents of the /etc/hosts file. The output is as follows:

```
127.0.0.1 localhost localhost.localdomain localhost4 localhost4.localdomain4
::1 localhost localhost.localdomain localhost6 localhost6.localdomain6

##Opennebula servers
192.168.35.135 frontend1.cnl.com frontend1
192.168.35.136 kvm2.cnl.com kvm2
192.168.35.137 kvm1.cnl.com kvm1
```

1.2 Check system is enabled VT or Not in both servers

```
# grep -E 'svm|vmx' /proc/cpuinfo
```

```
Using username "root".
root@192.168.35.135's password:
Last login: Sun Jul  3 22:22:57 2016
[root@frontend1 ~]# grep -E 'svm|vmx' /proc/cpuinfo
flags          : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts mmx fxsr sse sse2 ss syscall nx pdpe1gb rdtscp lm constant
_tsc arch_perfmon pebs bts nopl xtopology tsc_reliable nonstop_tsc aperfmpf ea
esferpu dni pclmulqdq vmx ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe popcnt a
es xsave avx f16c rdrand hypervisor lahf_lm arat epb xsaveopt pln pts dtherm tpr
_shadow vnmi ept vpid fsgsbase smep
[root@frontend1 ~]#
```

1.3 System must be enabled with KVM mode on both servers

```
# lsmod | grep -i kvm
```

```
Using username "root".
root@192.168.35.135's password:
Last login: Sun Jul  3 22:43:36 2016 from 192.168.35.1
[root@frontend1 ~]# lsmod | grep -i kvm
kvm_intel           148081  0
kvm                 461126  1 kvm_intel
[root@frontend1 ~]#
```

1.4 Modify selinux mode on both servers

```
#vi /etc/selinux/config SELINUX=permissive
```

```
#vi /etc/sysconfig/selinux SELINUX=permissive
```

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

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

1.5 Enable nfs home directory usage in selinux on both servers

```
#getsebool -a | grep use_nfs_home_dirs
```

```
#setsebool -P use_nfs_home_dirs 1
```

```
[root@frontend1 ~]# getsebool -a | grep use_nfs_home_dirs
use_nfs_home_dirs --> off
[root@frontend1 ~]# setsebool -P use_nfs_home_dirs 1
[root@frontend1 ~]#
```

1.6 Disable firewalld in both servers

```
# systemctl disable firewalld  
# systemctl stop firewalld  
# systemctl status firewalld  
[root@frontend1 ~]# setsebool -P use_nfs_home_dirs 1  
[root@frontend1 ~]# systemctl disable firewalld  
[root@frontend1 ~]# systemctl stop firewalld  
[root@frontend1 ~]# systemctl status firewalld  
firewalld.service - firewalld - dynamic firewall daemon  
  Loaded: loaded (/usr/lib/systemd/system/firewalld.service; disabled)  
  Active: inactive (dead)  
  
Jul 03 23:26:23 frontend1.cnl.com systemd[1]: Stopped firewalld - dynamic firewall daemon.  
[root@frontend1 ~]#
```

1.7 Reboot all 3 servers

```
# shutdown -r now
```

1.8 Check nfs SE Boolean settings only in kvm1 and kvm2 servers

```
# systemctl status firewalld|grep -i active  
****Active: inactive (dead)****  
# getsebool -a | grep use_nfs_home_dirs
```

1.9 Install EPEL repo on all the servers

```
# yum install epel-release
```

Add the OpenNebula repository in all three machines:

```
# cat<< EOT > /etc/yum.repos.d/opennebula.repo  
[opennebula]  
name=opennebula  
baseurl=http://downloads.opennebula.org/repo/4.8/CentOS/7/x86_64  
enabled=1  
gpgcheck=0  
EOT /
```

```
[opennebula]  
name=opennebula  
baseurl=http://downloads.opennebula.org/repo/4.8/CentOS/7/x86_64/  
enabled=1  
gpgcheck=0
```

1.10 Install the required packages in frontend1 server

```
# yum -y install opennebula-server opennebula-sunstone
```

1.11 Install the required packages in kvm1 and kvm2 servers

```
# yum -y install opennebula-node-kvm
```

1.12 Install the gems package and dependencies in frontend1 servers

On frontend1, now run install_gems to install all the gem dependencies (Select Cent-OS/Redhat)

```
# /usr/share/one/install_gems
```

****lsb_release command not found. If you are using a RedHat based distribution install redhat-lsb****

****Select your distribution or press enter to continue without installing dependencies****

0. Ubuntu/Debian

1. CentOS/RedHat

2. SUSE

****PRESS 1 AND ENTER (because we are using Centos 7)****

****Press Enter wherever asked, and Y when asked to install via yum (will be asked multiple times)****

1.13 On Frontend1 server, configure and start the services

There are two main processes that must be started, the main OpenNebula daemon: oned, and the graphical interface: sunstone.

Sunstone listens only in the loopback interface by default for security reasons. To change it
/etc/one/sunstone-server.conf and change :host: 127.0.0.1 to :host: 0.0.0.0****on 31th line

Now we can start the services

```
:one_xmlrpc: http://localhost:2633/RPC2
#
# Server Configuration
#
:host: 0.0.0.0
:port: 9869
```

```
# serviceopennebula-sunstone start
```

Check to see service is enabled for different runlevels to start on reboot;

```
# chkconfig --list 2>/dev/null|grep -i open
```

opennebula 0:off 1:off 2:on 3:on 4:on 5:on 6:off

opennebula-sunstone 0:off 1:off 2:on 3:on 4:on 5:on 6:off

1.14 On Frontend1 server, configure NFS service

Export /var/lib/one/ from the frontend to the worker nodes. To do so add the following to the /etc/exports file in the frontend:

```

#vi /etc(exports
/var/lib/one/ *(rw,sync,no_subtree_check,no_root_squash,insecure)
# exportfs -ra On KVM1 and KVM2 servers ,check NFS
# showmount -e frontend1
****Refresh the NFS exports by doing on FRONT end 1****
#systemctl status nfs.service
#systemctl start nfs.service
#systemctl enable nfs-server.service
****On kvm1 and kvm2****
#systemctl status nfs-client.target
#systemctl start nfs-client.target
#systemctl enable nfs-client.target

```

1.15 On frontend1 server ,check NFS

```
#systemctl| grep -i nfs
```

```
[root@frontend1 ~]# systemctl |grep -i nfs
proc-fs-nfsd.mount
var-lib-nfs-rpc_pipefs.mount
nfs-config.service
nfs-idmapd.service
nfs-mountd.service
nfs-server.service
rpc-statd.service
loaded active mounted   NFS configuration filesystem
loaded active mounted   RPC Pipe File System
loaded active exited    Preprocess NFS configuration
loaded active running   NFSv4 ID-name mapping service
loaded active running   NFS Mount Daemon
loaded active exited    NFS server and services
loaded active running   NFS status monitor for NFSv2/3 locking.
```

1.16 On KVM1 and KVM2 servers ,check NFS

```
#systemctl | grep -i nfs
```

```
[root@kvm1 ~]# systemctl |grep -i nfs
proc-fs-nfsd.mount
var-lib-nfs-rpc_pipefs.mount
nfs-config.service
rpc-statd.service
nfs-client.target
[root@kvm1 ~]#
loaded active mounted   NFS configuration filesystem
loaded active mounted   RPC Pipe File System
loaded active exited    Preprocess NFS configuration
loaded active running   NFS status monitor for NFSv2/3 locking.
loaded active active    NFS client services
```

1.17 On KVM1 and KVM2 servers , mount /var/lib/one from frontend1

**** opennebulaoneadminhomedir****

```
#vi /etc/fstab
```

```
frontend1.cnl.com:/var/lib/one/ /var/lib/one/ nfssoft,intr,rsize=8192,wszie=8192 0 0
```

```

#
# /etc/fstab
# Created by anaconda on Sun Jul  3 21:54:08 2016
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=034285d9-806c-4e88-9079-f70dfee763c6 /          xfs    defaults    0 0
UUID=0e568dde-99b1-4e64-982c-c12dbf9201f8 /boot      xfs    defaults    0 0
UUID=249f4d92-37e0-45e7-b7a5-4425a4cb0619 swap       swap   defaults    0 0

# New DataStore
/dev/sdb1           /var/lib/one/datastores/3        xfs    defaults    0 0
~
~
~
```

mount -a -t nfs

df -h /var/lib/one (check to see if it is mounted)

Reboot kvm1 and kvm2 to see if homedirs are mounted on reboot

df -h /var/lib/one (check to see if it is mounted)

1.18.On frontend1 server configure ssh public key

OpenNebula will need to SSH passwordlessly from any node (including the frontend) to any other node.

Add the following snippet to `~/.ssh/config` as `oneadmin` so it doesn't prompt to add the keys to the `known_hosts` file:

su - oneadmin

\$ cat<< EOT > ~/.ssh/config

Host *

StrictHostKeyChecking no

UserKnownHostsFile /dev/null

EOT

```

Host *
  StrictHostKeyChecking no
  UserKnownHostsFile /dev/null
```

On KVM1 and KVM2 servers ,start the services:

systemctl status messagebus.service

systemctl status libvirtd.service

systemctl start messagebus.service

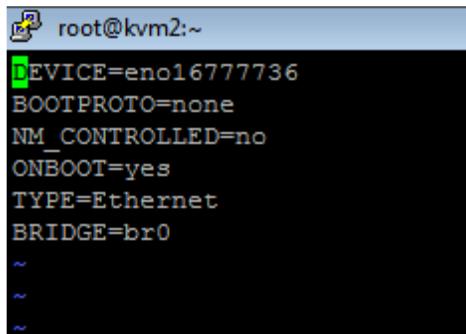
systemctl start libvirtd.service

On KVM1 and KVM2 servers ,configure the bridging for instances:

You will need to have your main interface connected to a bridge. We will do the following example with `ens3` but the name of the interface may vary. An OpenNebula requirements is that the name of the bridge should be the same in all nodes.

#vi /etc/sysconfig/network-scripts/ifcfg-eno16777736

```
DEVICE=eno16777736
BOOTPROTO=none
NM_CONTROLLED=no
ONBOOT=yes
TYPE=Ethernet
```

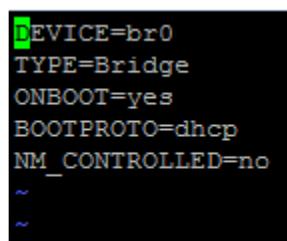


A screenshot of a terminal window titled "root@kvm2:~". The window displays the following configuration file content:

```
DEVICE=eno16777736
BOOTPROTO=none
NM_CONTROLLED=no
ONBOOT=yes
TYPE=Ethernet
BRIDGE=br0
~
```

****BRIDGE=br0****

```
#vi /etc/sysconfig/network-scripts/ifcfg-br0
DEVICE=br0
TYPE=Bridge
ONBOOT=yes
BOOTPROTO=dhcp
NM_CONTROLLED=no
```



A screenshot of a terminal window displaying the configuration for interface br0:

```
DEVICE=br0
TYPE=Bridge
ONBOOT=yes
BOOTPROTO=dhcp
NM_CONTROLLED=no
~
```

****Reboot kvm1 and kvm2 to see if devices are configured****

```
# ip route show | grep -i " br0"
```

****Using browser, open <http://frontend1:9869>****

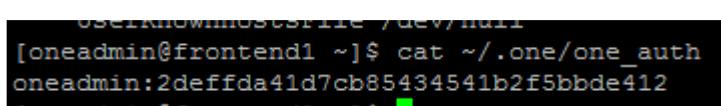


****Password is here****

****On frontend1****

```
#su - oneadmin
```

```
#cat ~/.one/one_auth
```



A screenshot of a terminal window showing the contents of the file ~/.one/one_auth:

```
[oneadmin@frontend1 ~]$ cat ~/.one/one_auth
oneadmin:2deffd41d7cb85434541b2f5bbde412
```

****Copy that key into your browser password field****

Open Frontend, kvm1, kvm2 (Pwd: Redhat)

Goto FrontEnd ->Right Click-> Open In Terminal

```
[frontend@frontend Desktop]$ su
```

Password: **redhat**

```
[root@frontend Desktop]# su – oneadmin
```

OUTPUT:

Last login: Wed Aug 21 09:27:42 IST 2019 on pts/0

```
[oneadmin@frontend ~]$ onehost list
```

OUTPUT:

ID	NAME	CLUSTER	RVM	ALLOCATED_CPU	ALLOCATED_MEM	STAT
----	------	---------	-----	---------------	---------------	------

0	kvm1.saec.com	-	0	0 / 100 (0%)	0K / 986.7M (0%)	on
---	---------------	---	---	--------------	------------------	----

1	kvm2.saec.com	-	0	0 / 100 (0%)	0K / 986.7M (0%)	on
---	---------------	---	---	--------------	------------------	----

```
+++++++++++++++++++++
```

RESULT:

Thus procedure to launch VM clone and attach virtual block to the cloned virtual machine and check whether it holds the data even after the release of the virtual machine was done successfully.

Ex No:2,A

Date:

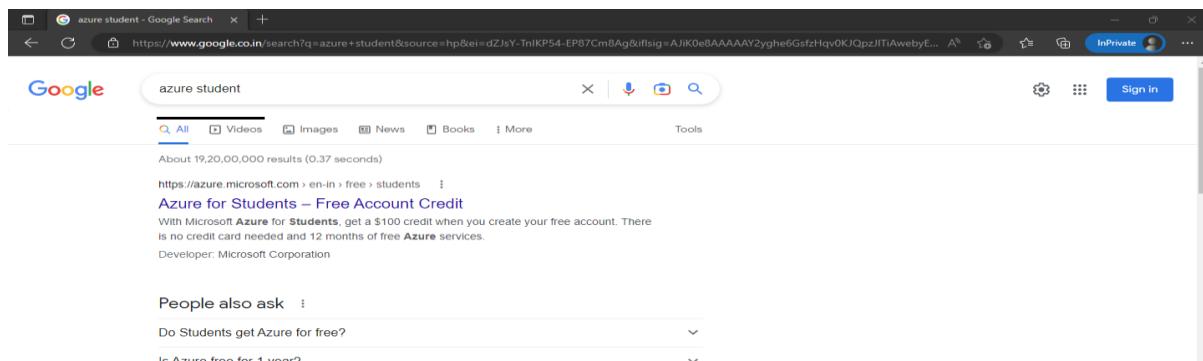
2. Public Cloud

- a. Develop a simple application to understand the concept of PAAS using GAE/Amazon Elastic Beanstalk/IBM Blue Mix/GCC and launch it.

Aim:

To create a Microsoft Azure/Amazion account, initialize a virtual machine and connecting remote desktop protocol (RDP) to the VM to understand the concept of PAAS.

1. Open Browser → Type azure student → Click First Link.



azure student - Google Search

https://www.google.co.in/search?q=azure+student&source=hp&ei=dZJsY-TnIKP54-EP87Cm8Ag&iflsig=AjIK0e8AAAAAY2yghe6GsfzHqvOKJQpzJITiAwebyE... A

InPrivate

Google

azure student

All Videos Images News Books More Tools

About 19,20,00,000 results (0.37 seconds)

<https://azure.microsoft.com/en-in/free/students/>

Azure for Students – Free Account Credit

With Microsoft Azure for Students, get a \$100 credit when you create your free account. There is no credit card needed and 12 months of free Azure services.

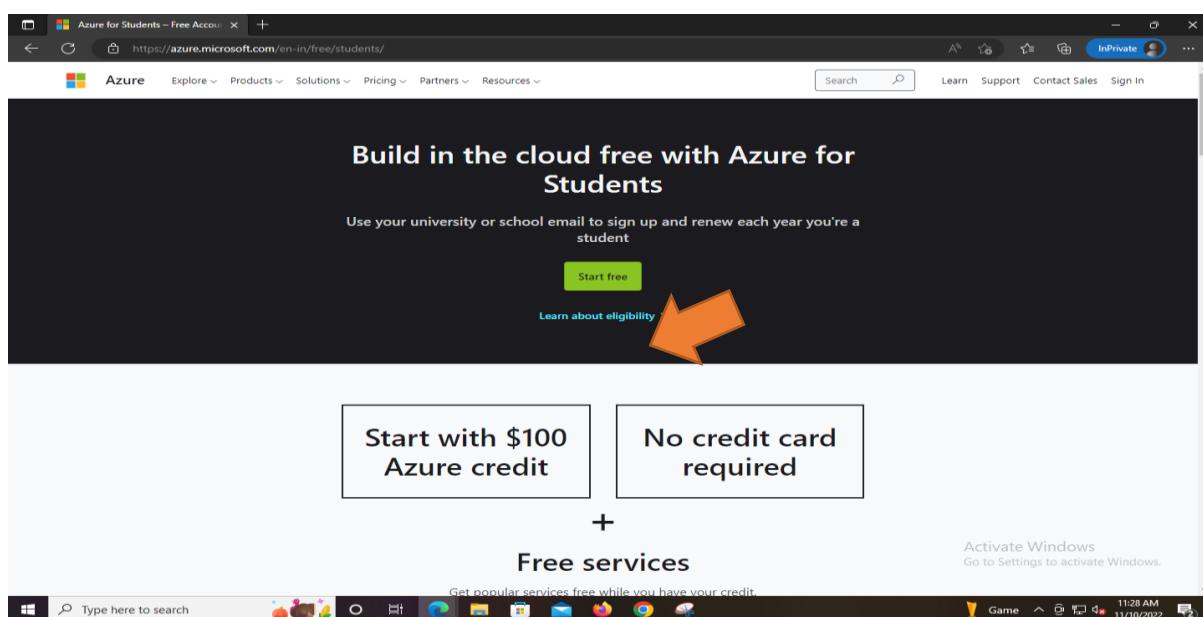
Developer: Microsoft Corporation

People also ask

Do Students get Azure for free?

Is Azure free for 1 year?

2. Click Start Free Button.



Azure for Students – Free Accou

https://azure.microsoft.com/en-in/free/students/

Azure

Explore Products Solutions Pricing Partners Resources

Search

InPrivate

Build in the cloud free with Azure for Students

Use your university or school email to sign up and renew each year you're a student

Start free

Learn about eligibility

Start with \$100 Azure credit

No credit card required

+

Free services

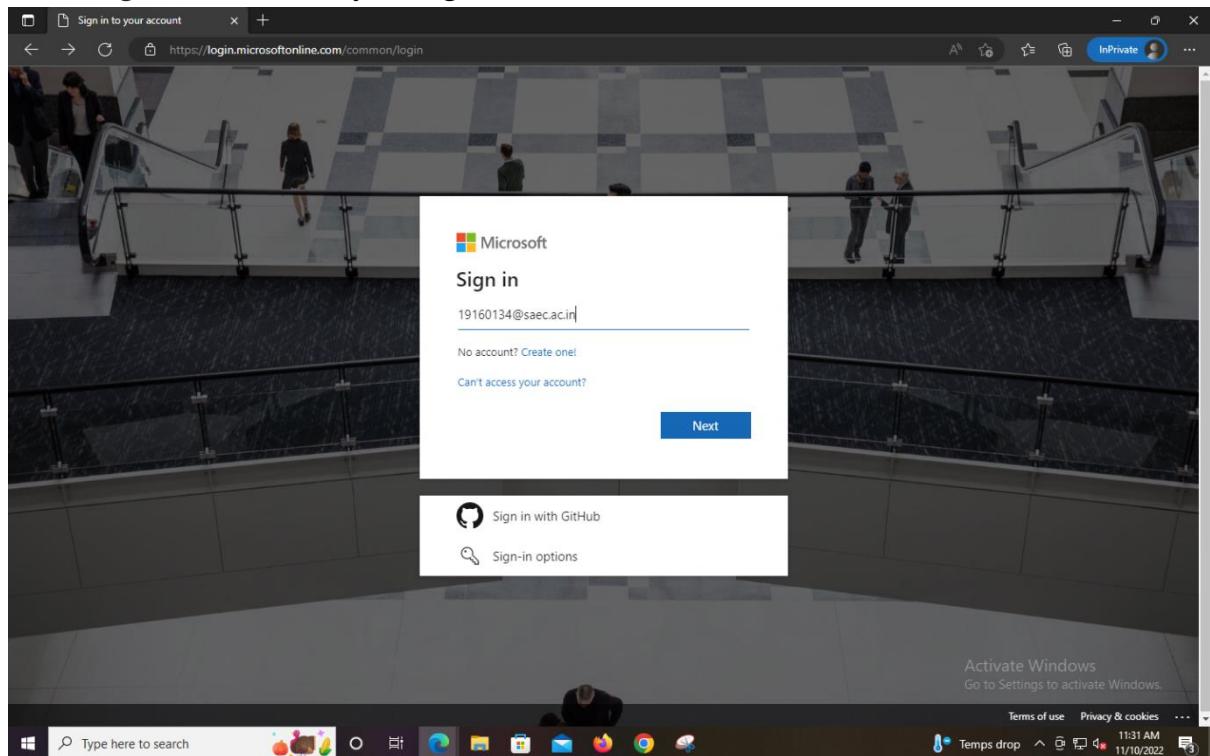
Get popular services free while you have your credit.

Activate Windows Go to Settings to activate Windows.

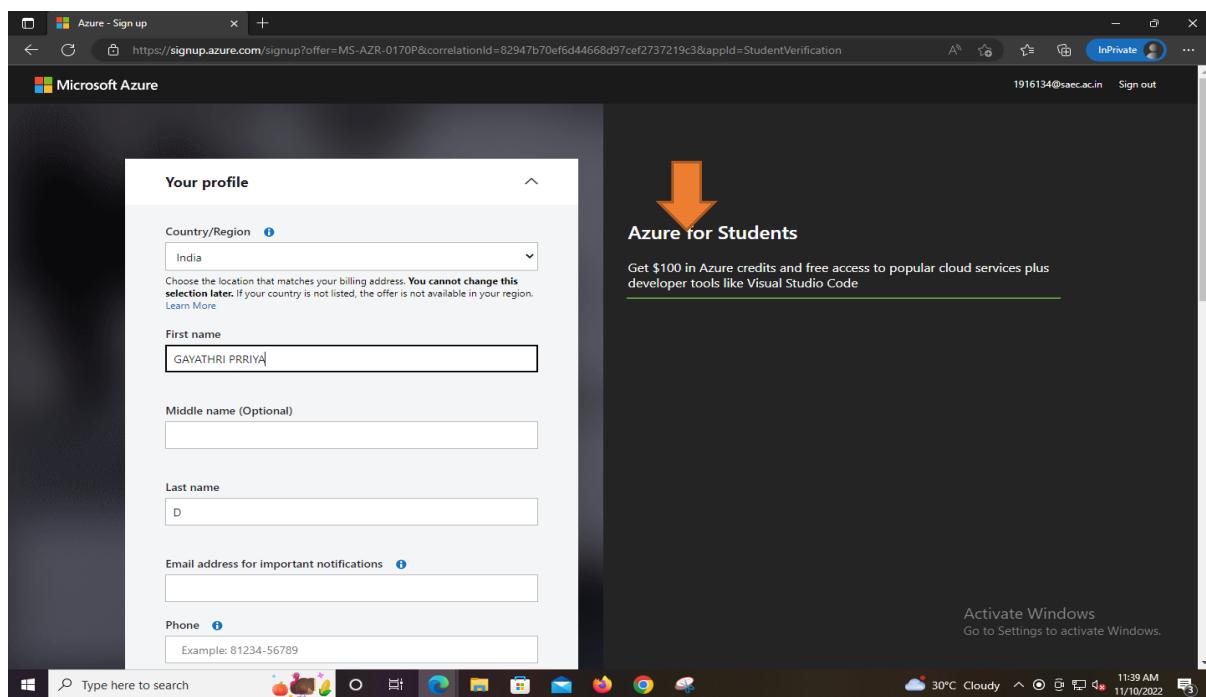
Type here to search

11:28 AM 11/10/2022

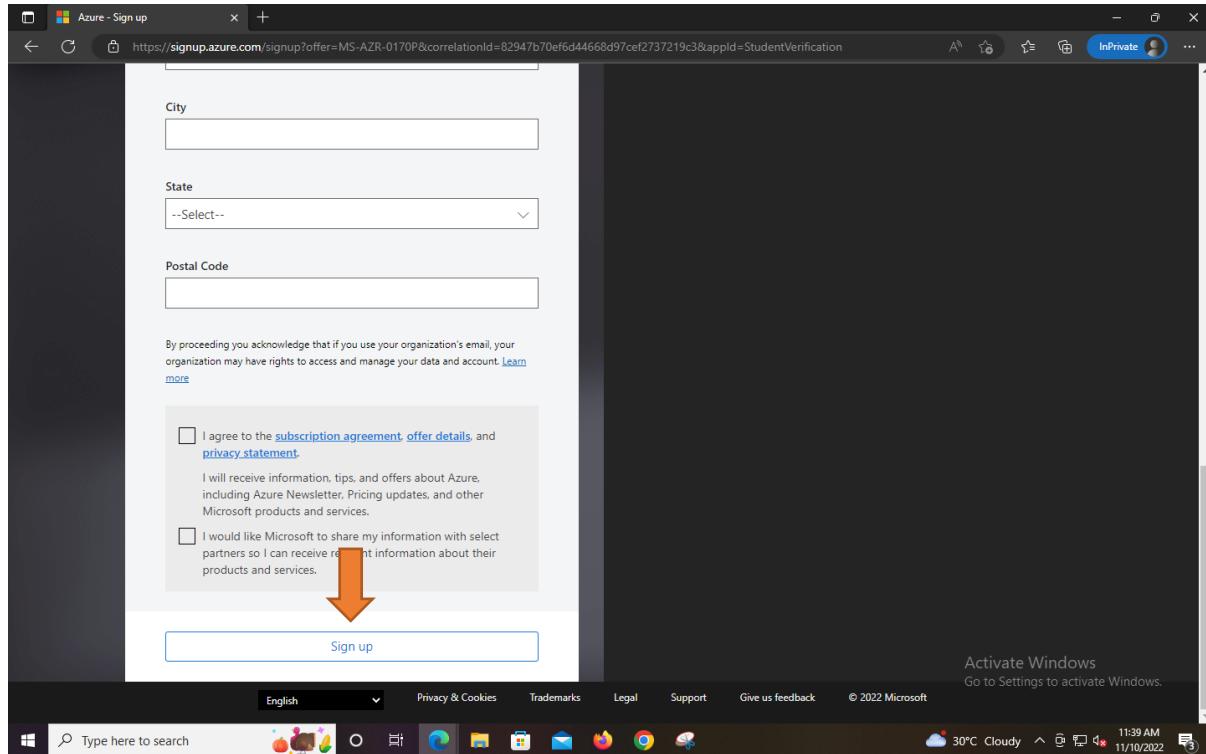
3. Creating an Account By using Education Mail Id → Click Next



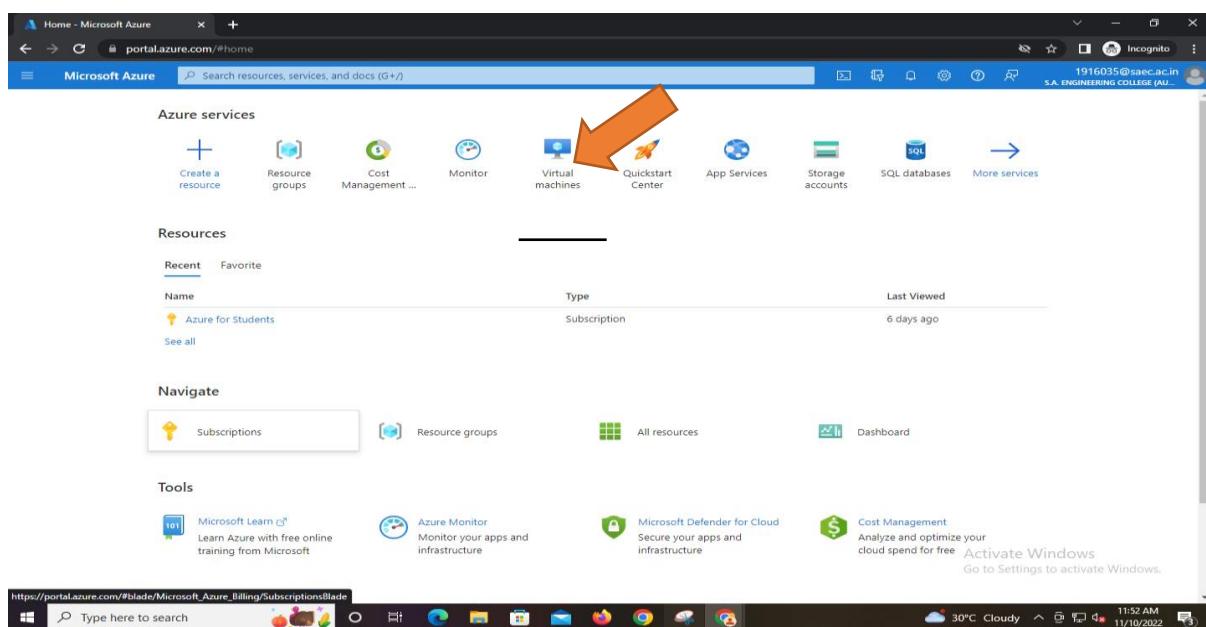
4. Type All The Details Given profile.



5. Kindly Read All The Agreement And click “Check Box “ if you agree with the conditions.
6. Click “Signup” Button.



7. Click on Virtual machine on screen.



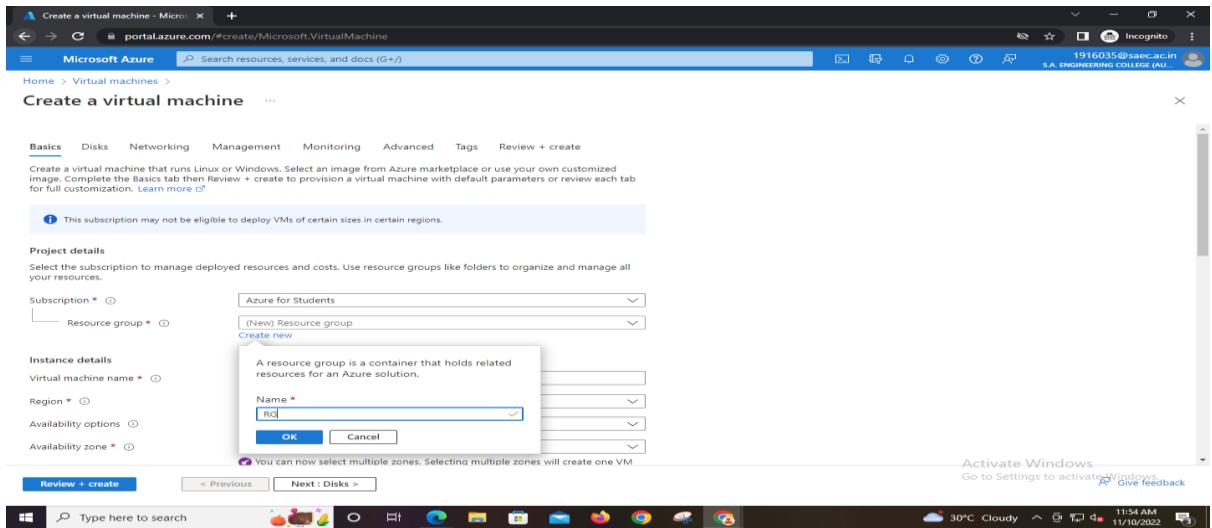
10. Click on the “Create Button”.

A screenshot of the Microsoft Azure portal showing the 'Virtual machines' blade. The page displays a message: 'No virtual machines to display. Create a virtual machine that runs Linux or Windows. Select an image from the marketplace or use your own customized image.' Below this message is a 'Create' button. A large orange arrow points to the 'Create' button.

11. Select “Azure virtual machine” option popup.

A screenshot of the Microsoft Azure portal showing the 'Virtual machines' blade. The page displays a message: 'No virtual machines to display. Create a virtual machine that runs Linux or Windows. Select an image from the marketplace or use your own customized image.' Below this message is a 'Create' button. A dropdown menu is open, listing several options under the heading 'Create a virtual machine hosted by Azure': 'Azure virtual machine', 'Azure virtual machine with preset configuration', 'Azure Arc virtual machine', and 'Azure VMware Solution virtual machine'. The 'Azure virtual machine' option is highlighted. A large orange arrow points to the 'Create' button in the dropdown.

12. Enter the name for the resource group → Click “OK” Button.



Create a virtual machine - Microsoft Azure

portal.azure.com/#create/Microsoft.VirtualMachine

Microsoft Azure

Home > Virtual machines >

Create a virtual machine

your resources.

Subscription: Azure for Students

Resource group: (New) RG

Instance details

Virtual machine name: CC-VM

Region: (Asia Pacific) Central India

Availability options: Availability zone

Availability zone: Zones 1

You can now select multiple zones. Selecting multiple zones will create one VM per zone. Learn more

Security type: Standard

Image: Windows 10 Pro, version 21H2 - Gen2

VM architecture: x64

Arm64 is not supported with the selected image.

Run with Azure Spot discount:

Size: Standard_B1s - 1 vCPU, 1 GiB memory (₹589.04/month)

Administrator account

Username: tamilarasan0427

Password: ****

Confirm password: ****

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports: Allow selected ports

Select inbound ports: HTTP (80), HTTPS (443), SSH (22), RDP (3389)

This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

Licensing

I confirm I have an eligible Windows 10/11 license with multi-tenant hosting rights.

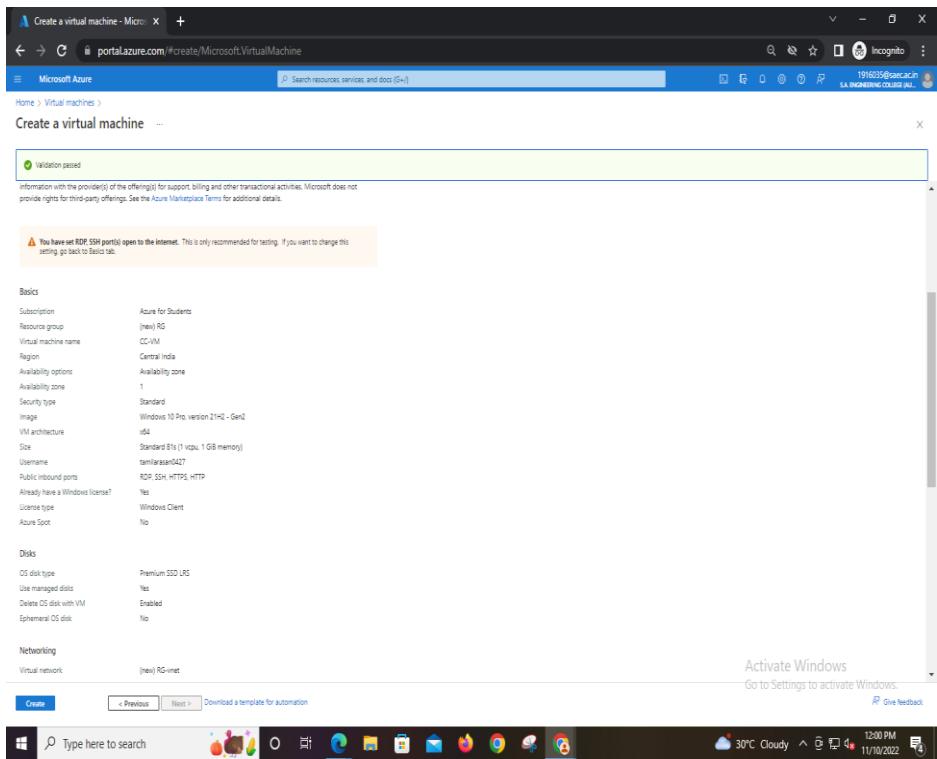
Review multi-tenant hosting rights for Windows 10/11 compliance if:

Review + create < Previous Next : Disks >

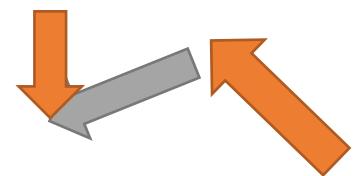


13. Click on Review + Create.

14. Click on “create button” .



15. Click on “Go to resource”



Activate Windows
Go to Settings to activate Windows.



16. Click on connect button → RDP

CC-VM - Microsoft Azure

portal.azure.com/#@saec.ac.in/resource/subscriptions/aa844dd0-3386-4da7-a185-d2bd400be0da/resourcegroups/RG/providers/Microsoft.Compute/virtualMachin...

Microsoft Azure

Home > CreateVm-MicrosoftWindowsDesktop.Windows-10-win10-20221110115532 | Overview >

CC-VM Virtual machine

RDP status is not ready. Troubleshoot the issue →

SSH

Bastion

Resource group (move) : RG

Status : Running

Location : Central India (Zone 1)

Subscription (move) : Azure for Students

Subscription ID : aa844dd0-3386-4da7-a185-d2bd400be0da

Availability zone : 1

Tags (edit) : Click here to add tags

Properties Monitoring Capabilities (7) Recommendations Tutorials

Virtual machine

Computer name	CC-VM
Health state	-
Operating system	Windows
Publisher	Microsoft Windows Desktop
Offer	Windows-10
Plan	win10-21h2-pro-g2
VM generation	V2
VM architecture	x64
Agent status	Not Ready
Agent version	Unknown
Host group	None
Host	-
Proximity placement group	-
Colocation status	N/A
Capacity reservation group	-

Networking

Public IP address	20.197.16.151
Public IP address (IPv6)	-
Private IP address	10.0.0.4
Private IP address (IPv6)	-
Virtual network/subnet	RG-vnet/default
DNS name	Configure

Size

Size	Standard B1s
vCPUs	1
RAM	1 GiB

Disk

OS disk	CC-VM_OSDisk_1_5f3aae92304ae0bdd63cf7802a2b39
Encryption at host	Disabled
Azure disk encryption	Not enabled
Ephemeral OS disk	N/A
Data disks	0

Activate Windows
Go to Settings to activate Windows.

Type here to search

12:06 PM 30°C Cloudy 11/10/2022

CC-VM - Microsoft Azure

portal.azure.com/#@saec.ac.in/resource/subscriptions/aa844dd0-3386-4da7-a185-d2bd400be0da/resourcegroups/RG/providers/Microsoft.Compute/virtualMachin...

Microsoft Azure

Home > CreateVm-MicrosoftWindowsDesktop.Windows-10-win10-20221110115532 | Overview > CC-VM

CC-VM | Connect

RDP SSH Bastion

Suggested method for connecting

To connect to your virtual machine via RDP, select an IP address, optionally change the port number, and download the RDP file.

IP address * Public IP address (20.197.16.151)

Port number * 3389

Download RDP File

Can't connect? Test your connection Troubleshoot RDP connectivity issues

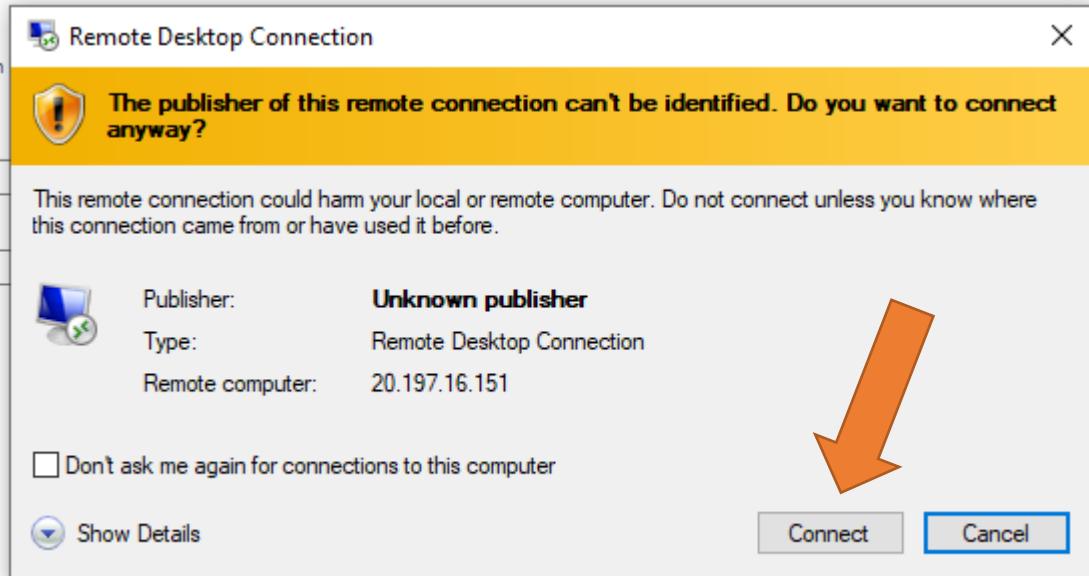
Provide feedback Tell us about your RDP experience

Activate Windows
Go to Settings to activate Windows.

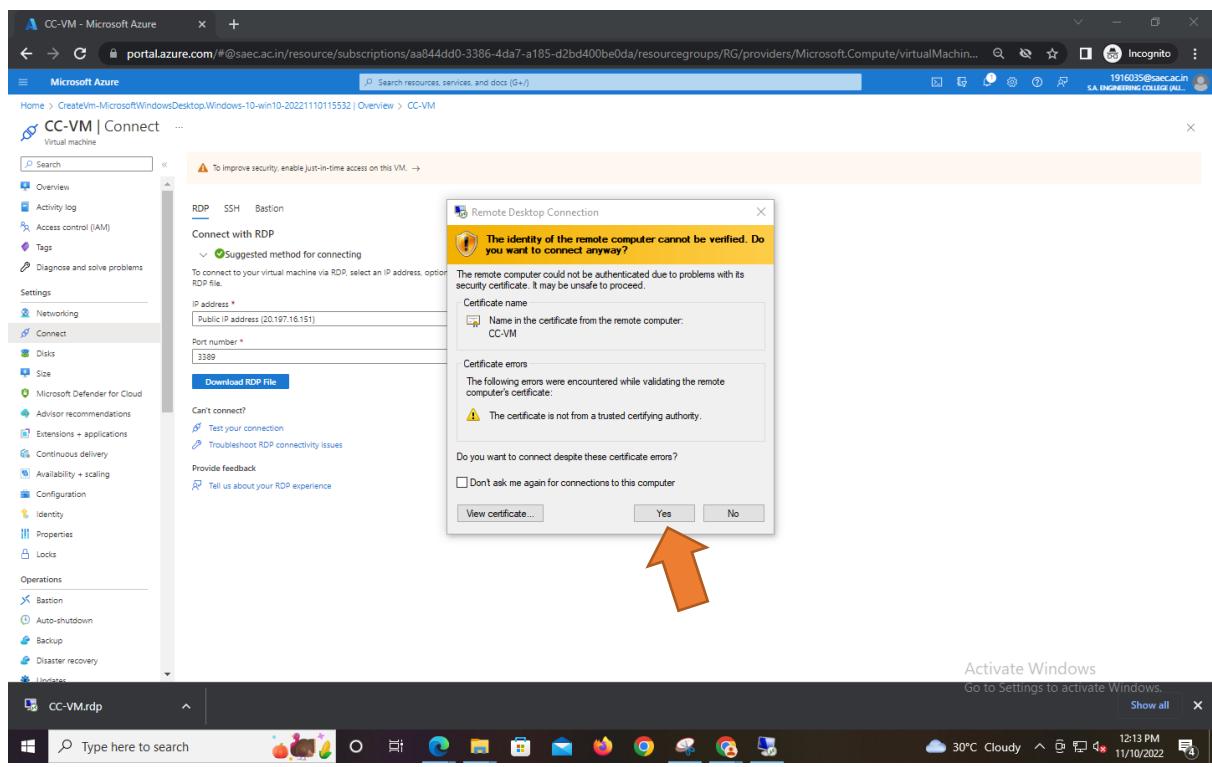
Type here to search

12:07 PM 30°C Cloudy 11/10/2022

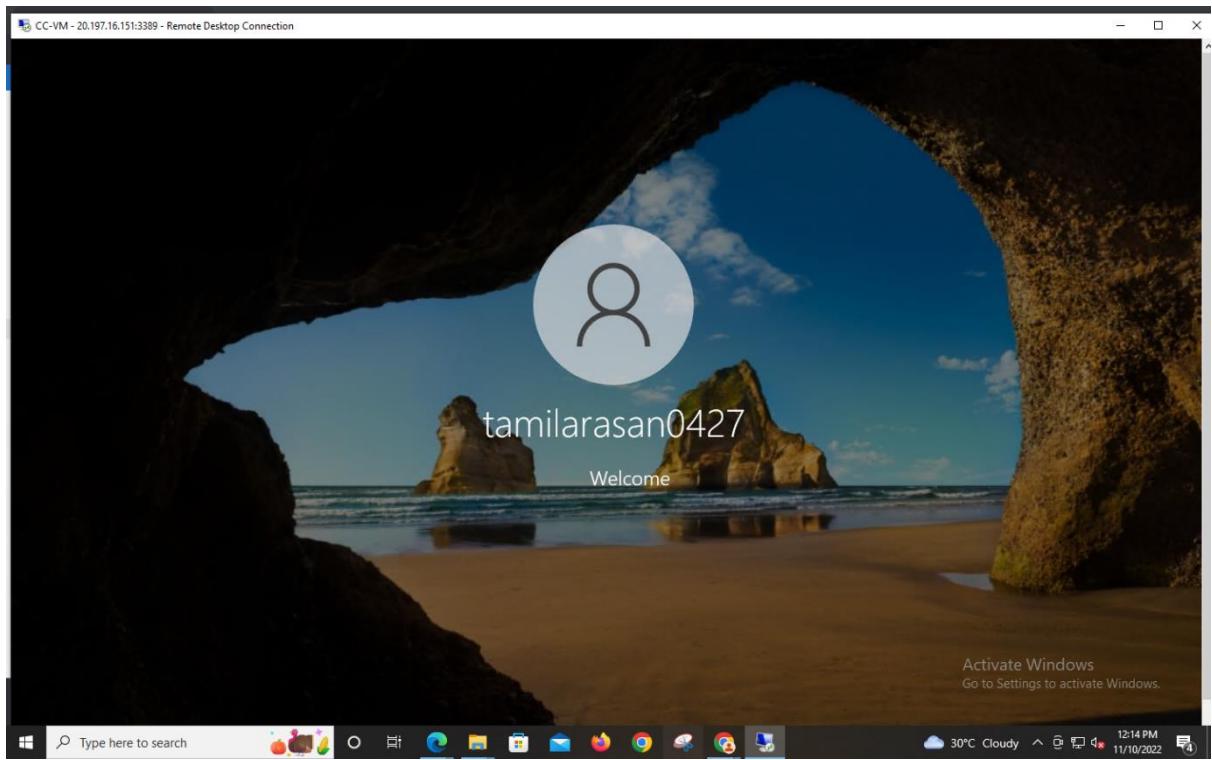
17. Click on “Connect Button”.



18. Click on “Yes” Button.



19. The process is over virtual machine will boot.



Result:

In this above application Microsoft Azure/Amazon account, initialize a virtual machine and connecting remote desktop protocol (RDP) to the VM in PaaS.

EX NO:2,b

Date:

2. Public Cloud

b. Test how a SaaS applications scales in response to demand.

Aim:

To create a Microsoft Azure/Amazon account, initialize a virtual machine and connecting remote desktop protocol (RDP) to the VM SaaS applications scales in response to demand.

Deploy a website with virtual machines using EX NO:2(a) and follow this step

Create asp.net project and add this html for login using visual studio 2022

```
<html>
<head>
<title>LeeZon Login</title>
<link href="css/Bootstrap/css/bootstrap.min.css" rel="stylesheet">
<link href="css/style.css" rel="stylesheet">
<meta name='viewport' content='width=device-width, initial-scale=1'>
<link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/6.1.1/css/all.min.css">

</head>
<body class="body">

<div>
    <form class="center" action="/home/index">
<div class="shadow-lg p-5 bg-white rounded">
    <label class="py-2" style="font-weight:500;font-size:xx-large;">Sign in</label>
<div class="form-group">
<label>UserName</label>
<br>
<input class="form-control" type="text" id="uname" placeholder="Enter username"/>
<br>
<label>Password</label>
<br>
<input class="form-control" type="password" id="pass" placeholder="Enter password"/>
<br>
<input type="submit" value="Sign in" onclick="login();" class="btn btn-primary mb-4" style="width:100%"/>
</div>

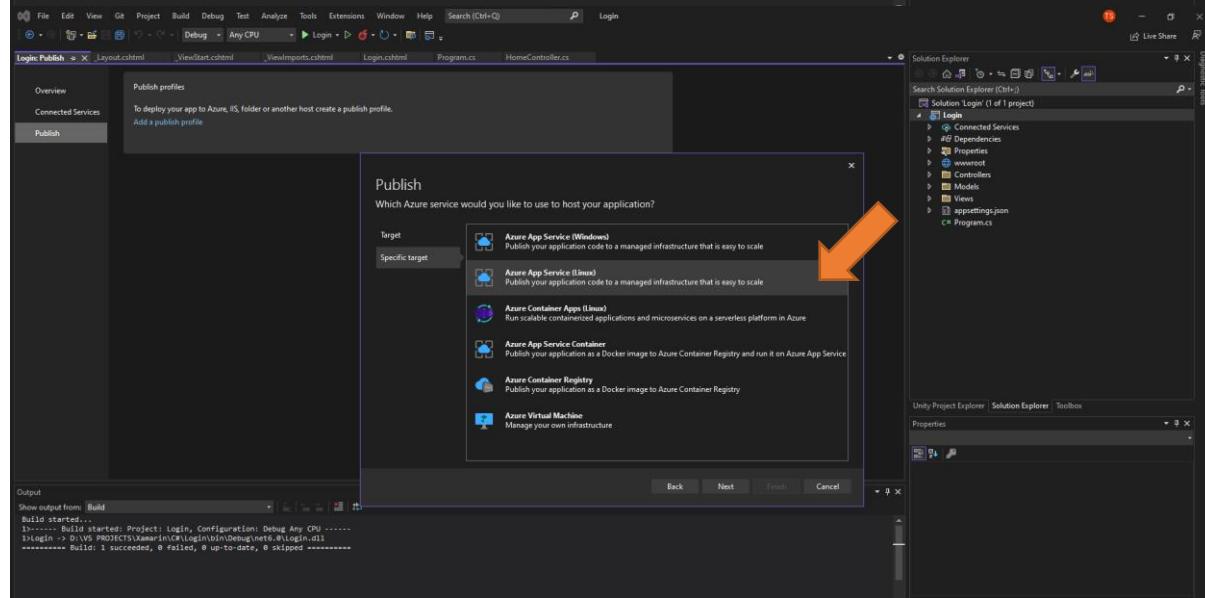
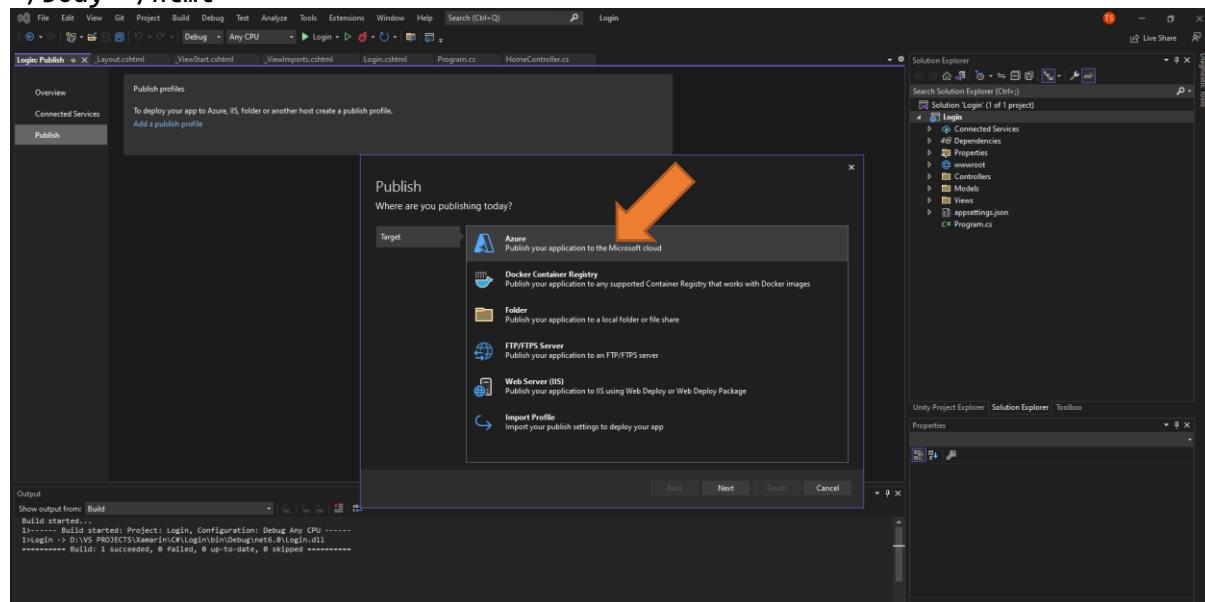
</form>
</div>
<script>
    function login()
    {
        var uname = document.getElementById("uname").value;
        var pass = document.getElementById("pass").value;
        if(uname == "admin" && pass == "admin")
    {
```

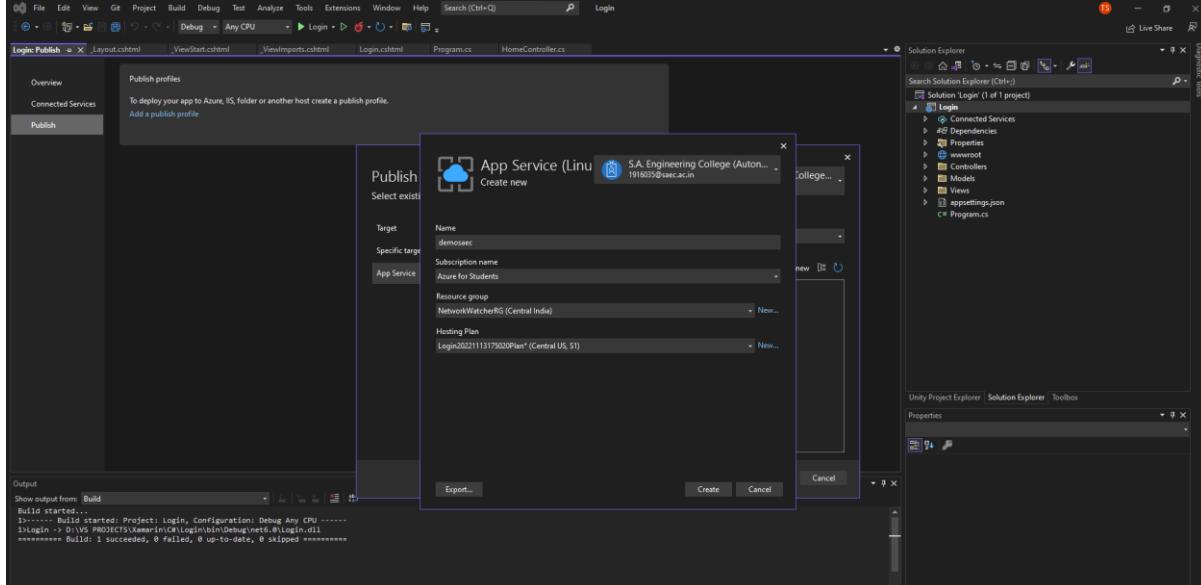
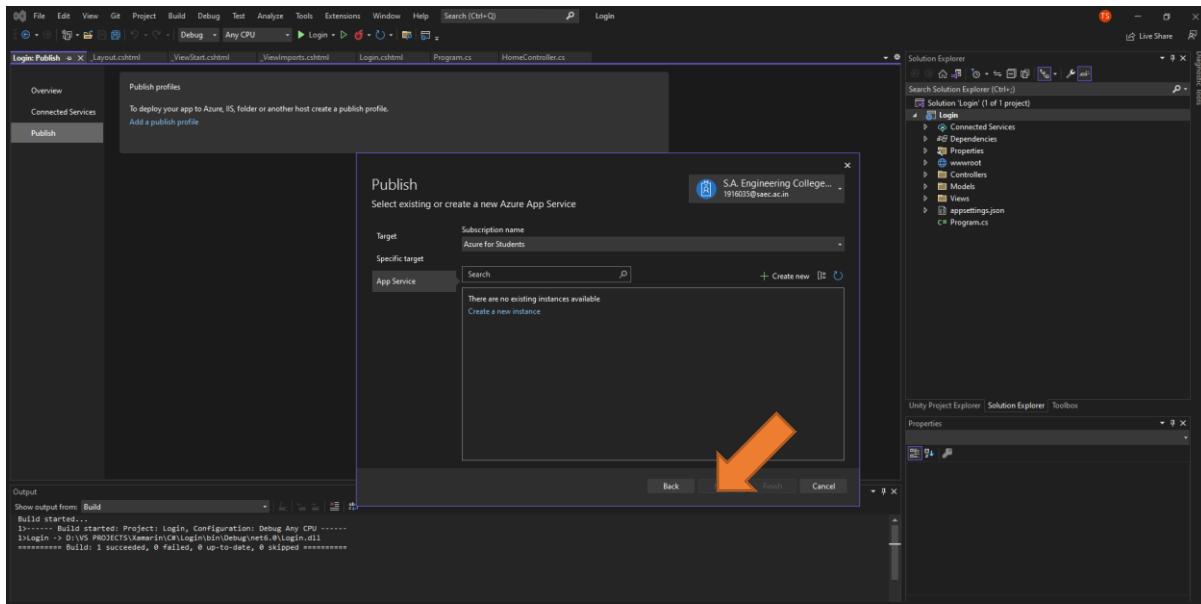
```

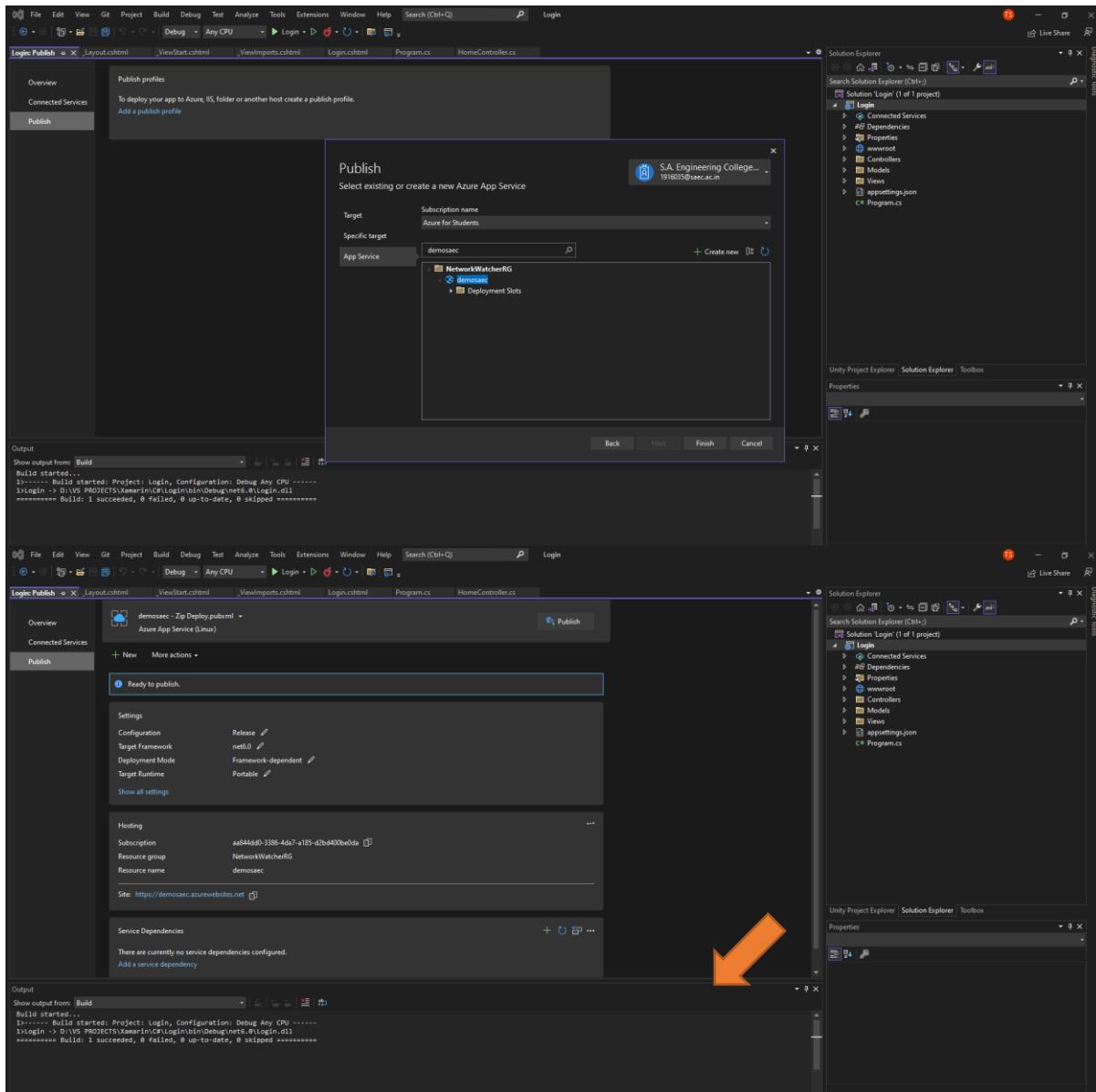
        alert("Success");
    }
    else
    {
        alert("invalid username and password");
    }

}
</script>
</body></html>

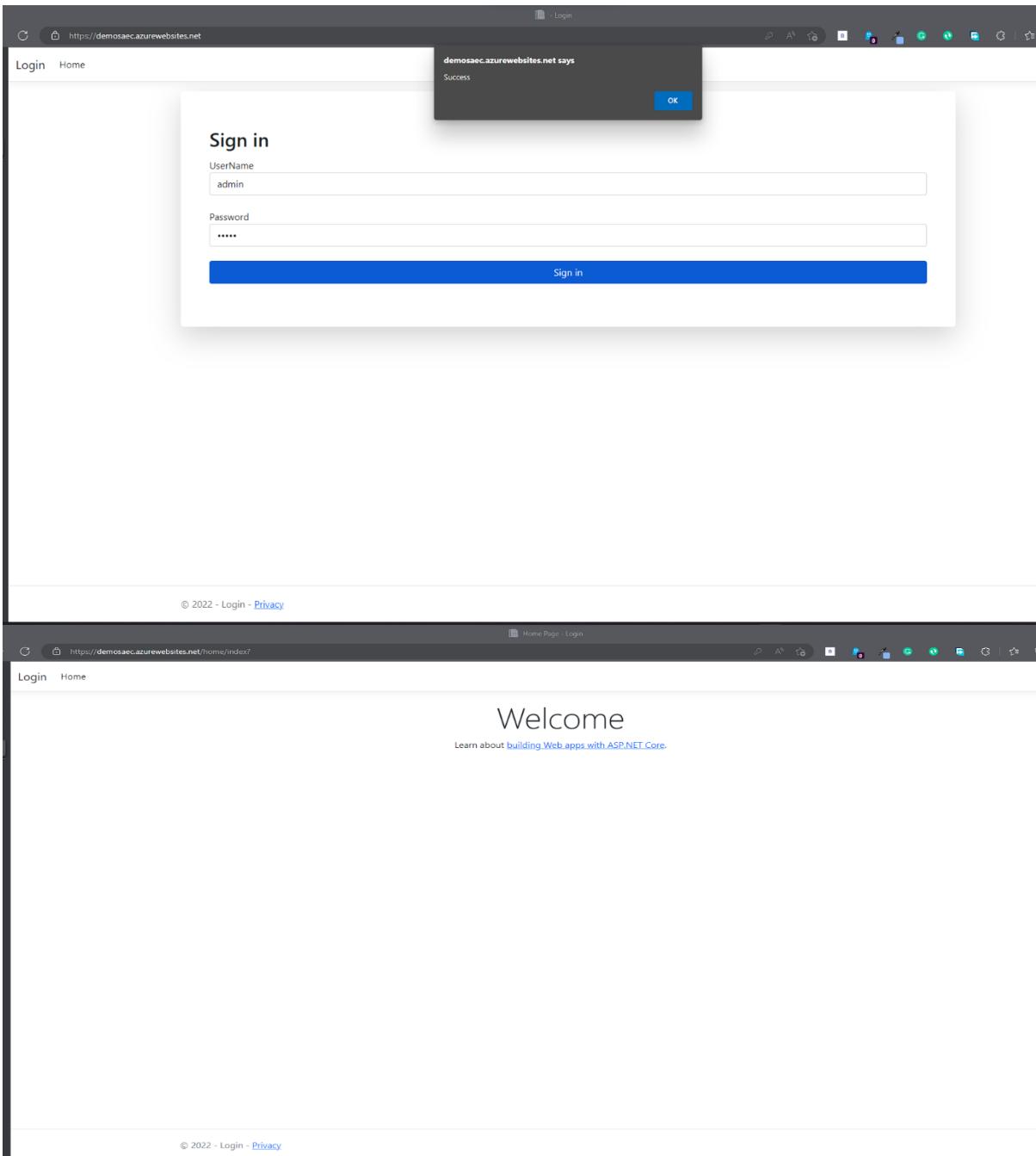
```







Open chrome and enter the web address <https://demosaec.azurewebsites.net/>



RESULT:

Thus live cloud deployment using RDP in Azure/AmZion with VM SaaS applications Successfully executed.

Ex No:2,c

Date:

c. Find the procedure to launch a Cloud instance using a Public IaaS cloud like AWS/GCP.

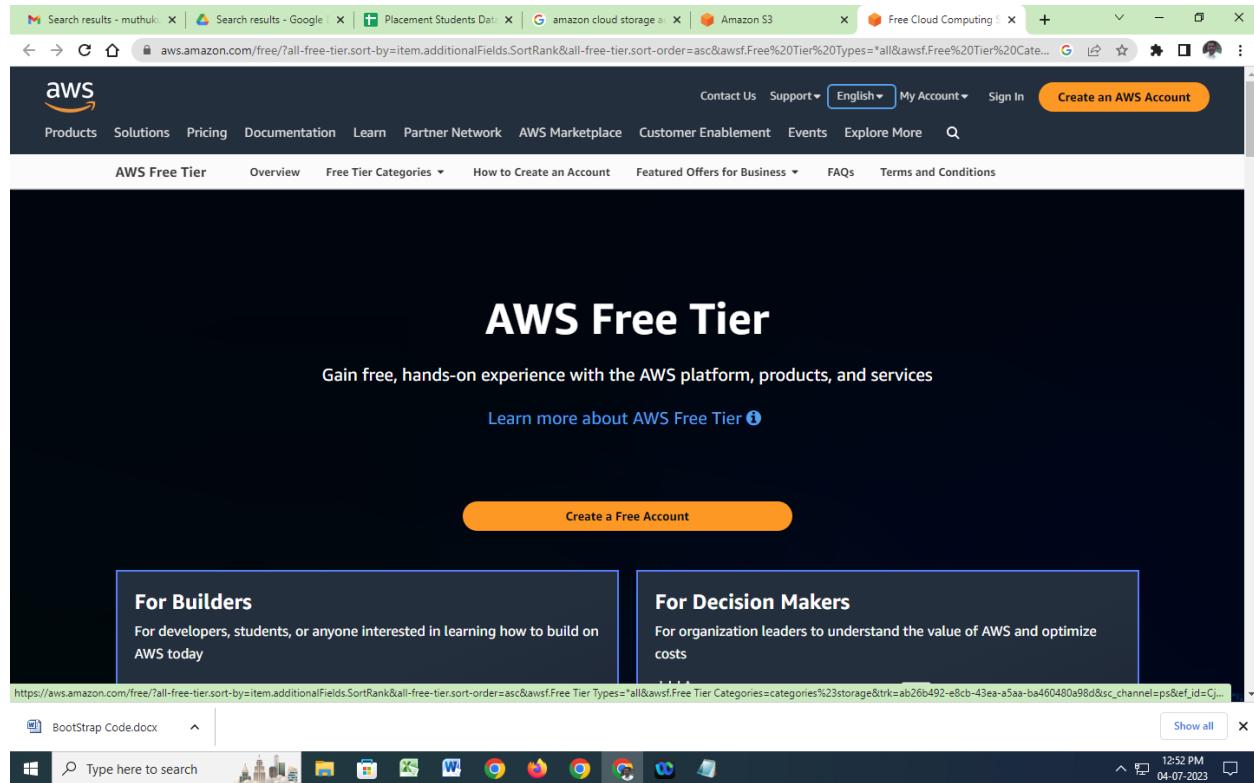
Aim:

To launch a Cloud instance using a Public IaaS cloud like AWS/GCP.

How do I create a S3 account

User Guide

1. Setting up.
2. Step 1: Create a bucket.
3. Step 2: Upload an object.
4. Step 3: Download an object.
5. Step 4: Copy an object.
6. Step 5: Delete the objects and bucket.
7. Next steps.
8. Access control.



The screenshot shows the AWS Free Tier landing page. At the top, there's a navigation bar with links for Contact Us, Support, English, My Account, Sign In, and Create an AWS Account. Below the navigation, there are links for Products, Solutions, Pricing, Documentation, Learn, Partner Network, AWS Marketplace, Customer Enablement, Events, Explore More, and a search bar. The main title is "AWS Free Tier" in large white font. Below it, a sub-headline reads "Gain free, hands-on experience with the AWS platform, products, and services". A blue button says "Learn more about AWS Free Tier". Another blue button at the bottom says "Create a Free Account". There are two sections: "For Builders" (for developers, students, or anyone interested in learning how to build on AWS today) and "For Decision Makers" (for organization leaders to understand the value of AWS and optimize costs). The URL in the browser address bar is https://aws.amazon.com/free/?all-free-tier.sort-by=item.additionalFields.SortRank&all-free-tier.sort-order=asc&awsf.Free%20Tier%20Types=*all&awsf.Free%20Tier%20Category=storage&trk=ab26b492-e8cb-43ea-a5aa-ba460480a98d&sc_channel=ps&ef_id=Cj.... The taskbar at the bottom shows several open windows, including "BootStrap Code.docx" and "Type here to search".

Search results - mutu... | Search results - Google | Placement Students Data | amazon cloud storage | Amazon S3 | AWS Console - Signup | portal.aws.amazon.com/billing/signup?nc2=h_ct&src=header_signup&refid=ab26b492-e0cb-43ea-a5aa-ba460480a98d&redirect_url=https%3A%2F%2Faws.amazon...

English ▾

aws

Sign up for AWS

Explore Free Tier products with a new AWS account.

To learn more, visit aws.amazon.com/free.



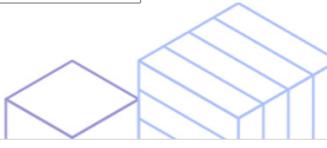
Root user email address
Used for account recovery and some administrative functions

AWS account name
Choose a name for your account. You can change this name in your account settings after you sign up.

Verify email address

OR

Sign in to an existing AWS account



Show all x

Type here to search 12:53 PM 04-07-2023

Search results - mutu... | Search results - Google | Placement Students Data | amazon cloud storage | Amazon S3 | AWS Management Cons... | ap-northeast-1.console.aws.amazon.com/console/home?nc2=h_ct®ion=ap-northeast-1&src=header-signin#

12:53 PM 04-07-2023

AWS Services Search [Alt+S] Tokyo MKS

Console Home Info

Recently visited Info



No recently visited services

Explore one of these commonly visited AWS services.

IAM EC2 S3 RDS Lambda

[View all services](#)

Reset to default layout + Add widgets

Welcome to AWS

Getting started with AWS Info
Learn the fundamentals and find valuable information to get the most out of AWS.

Training and certification Info
Learn from AWS experts and advance your skills and knowledge.

What's new with AWS? Info
Discover new AWS services, features, and Regions.

AWS Health Info Cost and usage Info

Open issues

CloudShell Feedback Language

© 2023, Amazon Web Services India Private Limited or its affiliates. Privacy Terms Cookie preferences

Show all x

Type here to search 12:55 PM 04-07-2023

The screenshot shows the AWS Management Console with the Services dashboard open. The left sidebar lists various service categories like Analytics, Application Integration, AWS Cost Management, Blockchain, Business Applications, Compute, Containers, Customer Enablement, Database, Developer Tools, End User Computing, Front-end Web & Mobile, Game Development, and Internet of Things. The main content area displays several services: AWS App Runner, Batch, EC2, EC2 Image Builder, Elastic Beanstalk, Lambda, Lightsail, AWS Outposts, and Serverless Application Repository. A right-hand sidebar titled 'Welcome to AWS' includes sections for 'Getting started with AWS', 'Training and certification', and 'What's new with AWS?'. The bottom navigation bar includes CloudShell, Feedback, Language, and cookie preferences.

The screenshot shows the AWS Management Console with the Storage dashboard open. The left sidebar lists various service categories under Storage, including Database, Developer Tools, End User Computing, Front-end Web & Mobile, Game Development, Internet of Things, Machine Learning, Management & Governance, Media Services, Migration & Transfer, Networking & Content Delivery, Quantum Technologies, Robotics, Satellite, Security, Identity, & Compliance, and Storage. The main content area displays services: AWS Backup, EFS, AWS Elastic Disaster Recovery, FSx, S3, S3 Glacier, and Storage Gateway. A right-hand sidebar titled 'Welcome to AWS' includes sections for 'Getting started with AWS', 'Training and certification', and 'What's new with AWS?'. The bottom navigation bar includes CloudShell, Language, and cookie preferences.

Result:

The above application Cloud instance using a Public IaaS cloud like AWS/GCP created and executed Successfully.

3. Private Cloud

- a. Setup a Private Cloud by performing the procedure using a Single node Openstack/Opennebula implementation.

AIM:

To execute the procedure to launch virtual machine using Openstack

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.



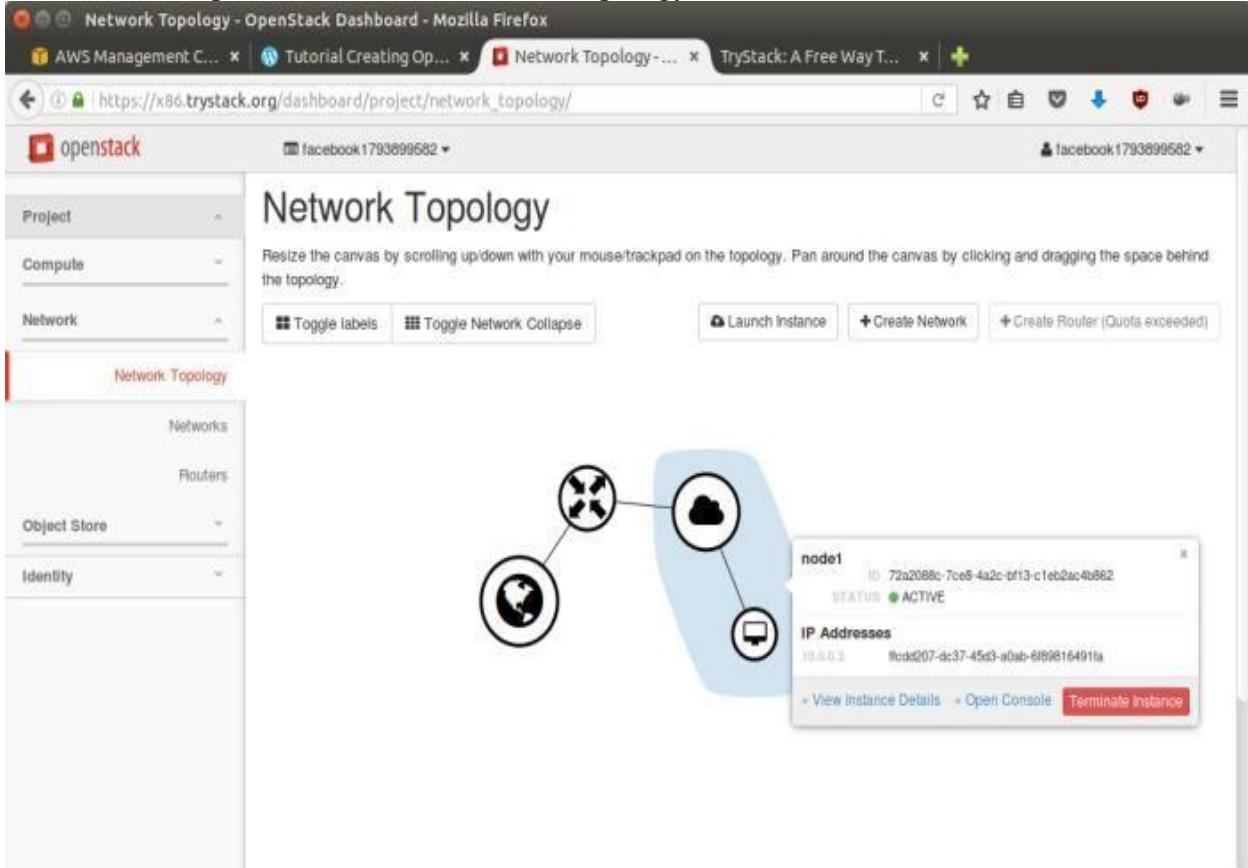
TryStack.org Homepage

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

OpenStack 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 be 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 **CreateNetwork**.
2. In **Network** tab, fill **Network Name** for example internal and then click **Next**.
3. In **Subnettab**,
 1. Fill **Network Address** with appropriate CIDR, for example 192.168.1.0/24. Use **private network CIDR block** as the bestpractice.
 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 **LaunchInstance**.
2. In **Detailstab**,
 1. Fill **Instance Name**, for example **Ubuntu1**.
 2. Select **Flavor**, for example **m1.medium**.
 3. Fill **Instance Count** with **1**.
 4. Select **Instance Boot Source** with **Boot fromImage**.
 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 & Securitytab**,
 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 keypair.
 3. Click **Import keypair**.
 3. In **Security Groups**, mark/check **default**.
4. In **Networkingtab**,
 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 **Ubuntu2**.

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 runs as the gateway to the internet.

1. Go to **Network > Routers** and then click **CreateRouter**.
2. Fill **Router Name** for example router1 and then click **CreateRouter**.
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 networks, 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 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 are 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 > Instances**.
2. In one of your instances, click **More > Associate FloatingIP**.
3. In **IP Address**, click Plus[+].
4. Select **Pool to external** and then click **AllocateIP**.
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

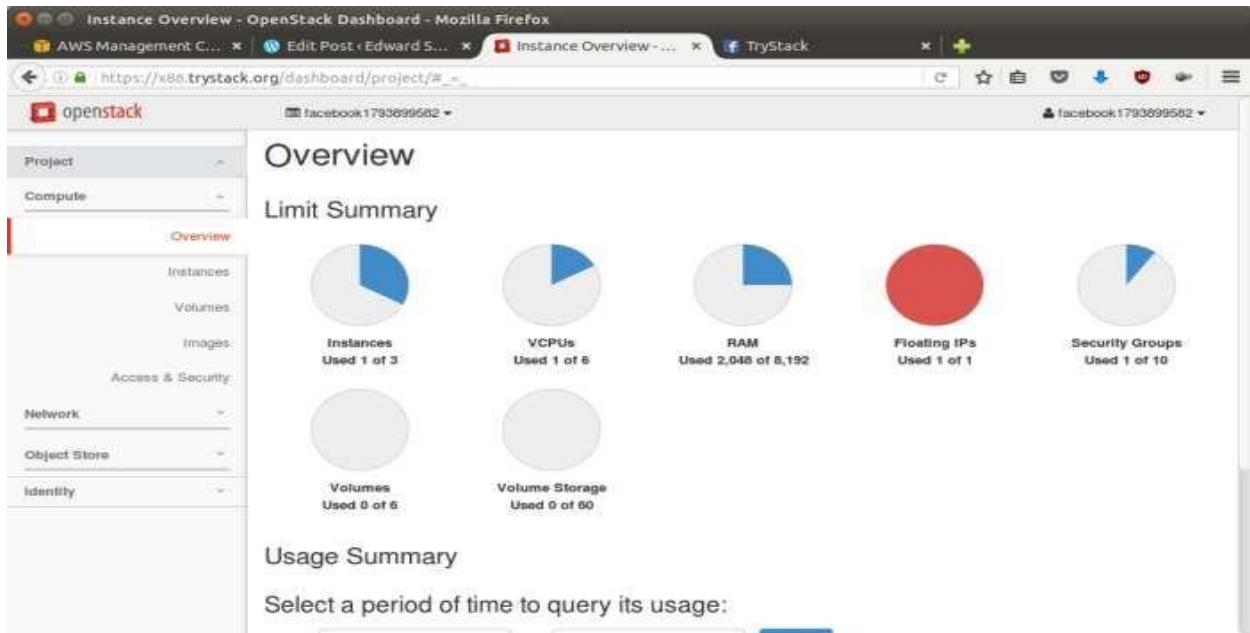
OpenStack has a feature like a firewall. It can whitelist/blacklist your in/out connection. It is called **Security Group**.

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**.

Output:



Result:

Thus the above open stack Application created and Executed successfully.

3. Private Cloud

b. Perform Creation, Management and Termination of a CentOS instance in Openstack/Opennebula.

Aim:

To Create a Cloud application in Openstack/Opennebula Instance using in centOS.

three machines

```
"vi /etc/hosts"
```

```
192.168.163.132 frontend.saec.com frontend
```

```
192.168.163.134 kvm2.saec.com kvm2
```

```
192.168.163.133 kvm1.saec.com kvm1
```

```
#####VT check#####
```

On kvm1 kvm2 frontend

```
# "grep -E 'svm|vmx' /proc/cpuinfo"
```

```
flags      : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts
mmx fxsr sse sse2 ss syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts nopl xtopology
tsc_reliable nonstop_tsc aperfmpf eagerfpu pni pclmulqdq vmx ssse3 fma cx16 pcid sse4_1 sse4_2
x2apic movbe popcnt aes xsave avx f16c rdrand hypervisor lahf_lm arat epb xsaveopt pln pts dtherm
tpr_shadow vnmi ept vpid fsgsbase smep
```

```
# "lsmod | grep -i kvm"
```

```
kvm_intel      148081  0
```

```
kvm          461126  1 kvm_intel
```

```
#####
```

all three

```
"vi /etc/selinux/config --> SELINUX=permissive"  
"vi /etc/sysconfig/selinux --> SELINUX=permissive"
```

```
"getsebool -a | grep use_nfs_home_dirs"  
"setsebool -P use_nfs_home_dirs 1"
```

all three

```
systemctl disable firewalld  
systemctl stop firewalld  
systemctl status firewalld
```

```
#####
```

reboot kvm1 kvm2 frontend To Restart "shutdown -r now"

```
#####
```

kvm1 and kvm2

```
# "systemctl status firewalld |grep -i active"  
Active: inactive (dead)  
# "getsebool -a | grep use_nfs_home_dirs"  
use_nfs_home_dirs --> on
```

```
#####
```

kvm1 kvm2 and frontend

```
# "yum install epel-release"
```

```
# "cat << EOT > /etc/yum.repos.d/opennebula.repo"
```

```
[opennebula]
```

```
name=opennebula
```

```
baseurl=http://downloads.opennebula.org/repo/4.8/CentOS/7/x86_64/
```

```
enabled=1
```

```
gpgcheck=0
```

```
EOT
```

```
#####
```

On frontend

```
# yum -y install opennebula-server opennebula-sunstone
```

kvm1 and kvm2

```
# yum -y install opennebula-node-kvm
```

```
#####
```

On frontend

```
# "/usr/share/one/install_gems"  
lsb_release command not found. If you are using a RedHat based  
distribution install redhat-lsb
```

Select your distribution or press enter to continue without
installing dependencies.

0. Ubuntu/Debian

1. CentOS/RedHat

2. SUSE

give 1 and then press enter

```
#####  
gem install --no doc sinatra thin azure  
error not install ruby rack not installed  
#####
```

```
# gem uninstall sinatra
```

```
# gem install sinatra --version '1.4.4'  
installed
```

```
"/usr/share/one/install_gems"
```

```
#####
```

On frontend,

```
"vi /etc/one/sunstone-server.conf "
```

and change :host: 127.0.0.1 to :host: 0.0.0.0.

```
# service opennebula start
```

```
# service opennebula-sunstone start
```

on status if not displayed reboot

```
# "chkconfig --list 2>/dev/null|grep -i open"
```

```
opennebula    0:off  1:off  2:on   3:on   4:on   5:on   6:off
```

```
opennebula-sunstone  0:off  1:off  2:on   3:on   4:on   5:on   6:off
```

```
#####
```

On frontend

```
vi /etc/exports
```

```
/var/lib/one/ *(rw,sync,no_subtree_check,no_root_squash,insecure)----> paste in that
```

```
# exportfs -ra
```

```
systemctl status nfs.service
```

```
systemctl start nfs.service
```

```
systemctl enable nfs-server.service
```

```
#####
```

Check from kvm1 and kvm2

```
# showmount -e frontend
```

On kvm1 and kvm2

```
systemctl status nfs-client.target
```

```
systemctl start nfs-client.target
```

```
systemctl enable nfs-client.target
#####

```

On frontend

```
systemctl |grep -i nfs
```

proc-fs-nfsd.mount configuration filesystem	loaded active mounted NFSD
var-lib-nfs-rpc_pipefs.mount System	loaded active mounted RPC Pipe File
nfs-config.service configuration	loaded active exited Preprocess NFS
nfs-idmapd.service mapping service	loaded active running NFSv4 ID-name
nfs-mountd.service Daemon	loaded active running NFS Mount
nfs-server.service services	loaded active exited NFS server and
rpc-statd.service for NFSv2/3 locking.	loaded active running NFS status monitor

```
#####

```

if failed, type "service nfs-idmapd start"

```
#####

```

On kvm1 and kvm2

systemctl grep -i nfs	
proc-fs-nfsd.mount configuration filesystem	loaded active mounted NFSD
var-lib-nfs-rpc_pipefs.mount System	loaded active mounted RPC Pipe File
nfs-config.service configuration	loaded active exited Preprocess NFS
nfs-client.target	loaded active active NFS client services

On kvm1 and kvm2, mount /var/lib/one from frontend

```
# vi /etc/fstab
```

```
frontend.saec.com:/var/lib/one/ /var/lib/one/ nfs soft,intr,rsize=8192,wszie=8192 0 0-----  
-> paste
```

```
# mount -a -t nfs
```

```
# "df -h /var/lib/one" (check to see if it is mounted)
```

To check the status of frontend.saec.com

Reboot kvm1 and kvm2

```
# df -h /var/lib/one (check to see if it is mounted)
```

```
#####
```

On frontend

```
# su - oneadmin
```

```
$ cat << EOT > ~/.ssh/config
```

```
Host *
```

```
StrictHostKeyChecking no
```

```
UserKnownHostsFile /dev/null
```

```
EOT
```

```
$ chmod 600 ~/.ssh/config
```

```
#####
```

On kvm1 and kvm2

```
# systemctl status messagebus.service
```

```
# systemctl status libvirtd.service
```

```
# systemctl start messagebus.service
```

```
# systemctl start libvirtd.service
```

```
#####
```

On kvm1 and kvm2

```
vi /etc/sysconfig/network-scripts/ifcfg-eno16777736
```

```
DEVICE=eno16777736
```

```
BOOTPROTO=none
```

```
NM_CONTROLLED=no
```

```
ONBOOT=yes
```

```
TYPE=Ethernet
```

```
BRIDGE=br0
```

```
vi /etc/sysconfig/network-scripts/ifcfg-br0
```

```
DEVICE=br0
```

```
TYPE=Bridge
```

```
ONBOOT=yes
```

```
BOOTPROTO=dhcp
```

```
NM_CONTROLLED=no
```

Reboot kvm1 and kvm2 to see if devices are configured

network disabled

```
#####
```

```
vi /etc/NetworkManager/NetworkManager.conf
```

```
[main]
```

```
plugins=ifupdown,keyfile
```

```
[ifupdown]
```

```
managed=true
```

```
#####
```

```
Reboot
```

```
#####
```

```
# ip route show | grep -i " br0"
```

```
#####
```

```
To Delete the onehost ID
```

```
"onehost delete 0"
```

```
#####
```

```
Using browser, open http://frontend:9869
```

```
Password is here;
```

```
On frontend
```

```
su - oneadmin
```

```
cat ~/.one/one_auth
```

```
#####
#
```

If ERROR DISPLAY NO ROUTE

We have to check HOST IP

```
#####
#
```

On frontend, all activities to be performed as oneadmin

Add both hypervisors;

```
$ onehost create kvm1.saec.com -i kvm -v kvm -n dummy
```

```
$ onehost create kvm2.saec.com -i kvm -v kvm -n dummy
```

Check log to see if all is well

```
"tail -f /var/log/one/oned.log"
```

Check to see both hypervisors are properly added;

```
$ onehost list
```

ID	NAME	CLUSTER	RVM	ALLOCATED_CPU	ALLOCATED_MEM	STAT
0	kvm1.saec.com	-	0	0 / 100 (0%)	0K / 1.8G (0%)	on
1	kvm2.saec.com	-	0	0 / 100 (0%)	0K / 1.8G (0%)	on

Once it's working you need to create a network, an image and a virtual machine template.

To create networks, we need to create first a network template file mynetwork.one that contains:

```
vi /var/tmp/mynetwork.one
```

```
NAME = "private"
```

```
BRIDGE = br0
```

```
AR = [
```

```
    TYPE = IP4,
```

```
    IP = 192.168.35.150,
```

```
    SIZE = 10
```

```
]
```

**** For IP, make sure the network you are working on is used

**** For Size, make sure there are enough IPs to be used

Create the virtual network:

```
$ onevnet create /var/tmp/mynetwork.one
```

Check to see if vnet has been created;

```
$ onevnet list
```

ID	USER	GROUP	NAME	CLUSTER	BRIDGE	LEASES
0	oneadmin	oneadmin	private	-	br0	0

Create the image (we are using ttylinux due to size and speed)

```
$ oneimage create --name "TTYLinux_1.0" \
--path http://marketplace.c12g.com/appliance/4fc76a938fb81d3517000003/download \
--driver raw \
-d default
```

Check to see if the image has been created;

```
$ oneimage list
```

ID	USER	GROUP	NAME	DATASTORE	SIZE	TYPE	PER	STAT	RVMS
0	oneadmin	oneadmin	TTYLinux_1.0	default	40M	OS	No	lock	0

** STAT says locked, wait for a few minutes for it to say rdy

```
$ oneimage list
```

ID	USER	GROUP	NAME	DATASTORE	SIZE	TYPE	PER	STAT	RVMS
0	oneadmin	oneadmin	TTYLinux_1.0	default	40M	OS	No	rdy	0

Create the template (need to refer the image created in previous step)

```
$ onetemplate create --name "TTYLinux_1" \
--cpu 1 --vcpu 1 --memory 256 --arch x86_64 \
--disk "TTYLinux_1.0" \
--nic "private" \
--vnc --ssh --net_context
```

Check to see if the template has been created;

```
$ onetemplate list
```

ID	USER	GROUP	NAME	REGTIME
0	oneadmin	oneadmin	TTYLinux_1	07/03 18:27:50

Instantiate the template and it will run a VM;

```
$ onetemplate instantiate TTYLinux_1
```

Check to see if the VM is running;

```
$ onevm list
```

ID	USER	GROUP	NAME	STAT	UCPU	UMEM	HOST	TIME
0	oneadmin	oneadmin	TTYLinux_1-0	runn	99	256M	kvm2.cnl.c	0d 00h02

Connect to the VM (can be done from anywhere within the network);

```
$ onevm list -x| grep ETH0
```

```
<ETH0_IP><![CDATA[192.168.35.150]]></ETH0_IP>
<ETH0_MAC><![CDATA[02:00:c0:a8:23:96]]></ETH0_MAC>
```

```
$ ssh root@192.168.35.150 "uname -a"
```

Warning: Permanently added '192.168.35.150' (RSA) to the list of known hosts.

root@192.168.35.150's password:

```
Linux ttylinux_host 2.6.20 #1 PREEMPT Mon Aug 17 20:32:57 MST 2009 i686 GNU/Linux
```

\$

Migrate the instance from one hypervisor to another;

**** --live will ensure the VM is running

Check current hypervisor;

\$ onevm list

ID	USER	GROUP	NAME	STAT	UCPU	UMEM	HOST	TIME
0	oneadmin	oneadmin	TTYLinux_1-0	runn	99	256M	kvm2.cnl.c	0d 00h02

Migrate the instance;

\$ onevm migrate --live TTYLinux_1-0 kvm1.cnl.com

Check current hypervisor;

\$ onevm list

ID	USER	GROUP	NAME	STAT	UCPU	UMEM	HOST	TIME
0	oneadmin	oneadmin	TTYLinux_1-0	runn	27	256M	kvm1.cnl.c	0d 00h07

Check instance uptime;

\$ ssh root@192.168.35.150 "uptime"

Warning: Permanently added '192.168.35.150' (RSA) to the list of known hosts.

root@192.168.35.150's password:

13:08:55 up 5 min, load average: 0.00, 0.00, 0.00

No reboot!! Enjoy!!

#####

Addition of DataStore

On frontend1, rescan scsi new disk added

```
echo "---" > /sys/class/scsi_host/host#/scan  
fdisk -l
```

*** - for new scsi controller, please check under the directory for the host number.

Check to see new disks added

```
tail -f /var/log/messages (we see /dev/sdb added (example))
```

Create new partition

```
fdisk /dev/sdb (follow normal process, and then run partprobe)
```

Create new filesystem

```
mkfs.xfs /dev/sdb1
```

Create mountpoint and set entry in /etc/fstab to mount;

```
mkdir -pm 750 /var/lib/one/datastores/3
```

```
vi /etc/fstab
```

```
# New DataStore
```

```
/dev/sdb1      /var/lib/one/datastores/3      xfs  defaults    0 0
```

Mount /var/lib/one/datastores/3 and check to see if mounted;

```
mount /var/lib/one/datastores/3
```

```
df -h /var/lib/one/datastores/3
```

Using frontend1 GUI, add new datastore (called as DS_System_3), type System

```
#####
```

Addition of new disk to instances (virtual block)

Using frontend1 GUI, add new disk;

- Volatile
- Size 50MB
- Target Param should be sd

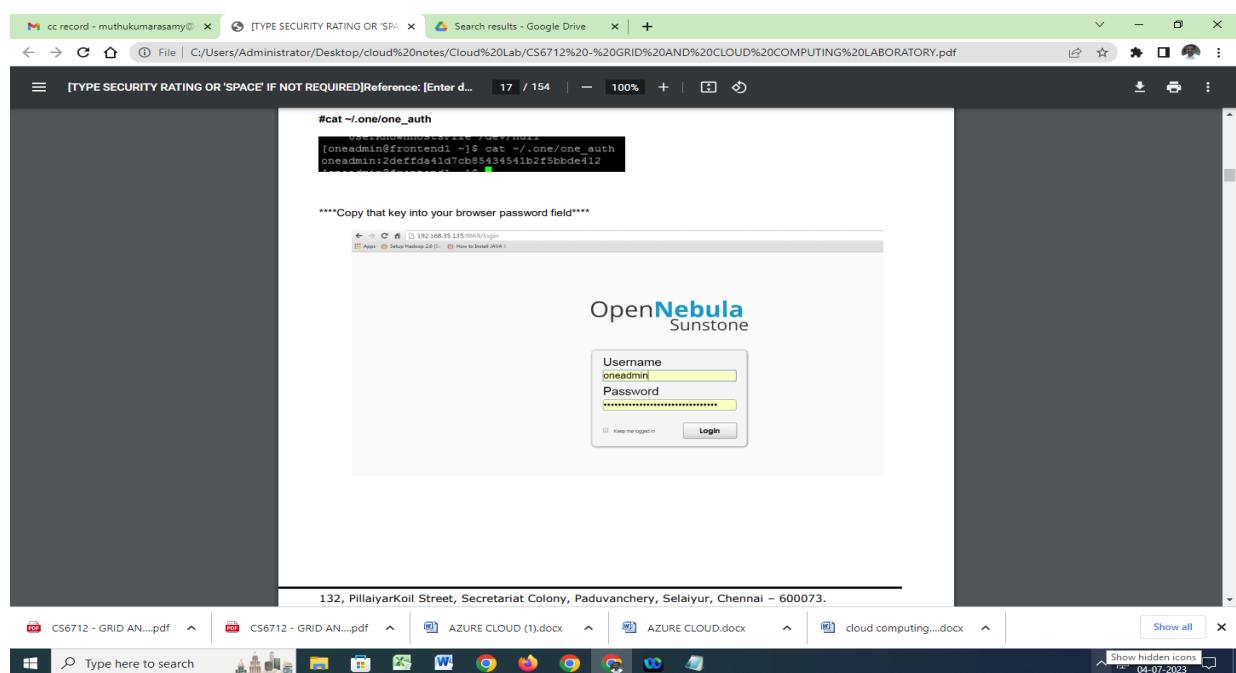
Check logs to see disk added;

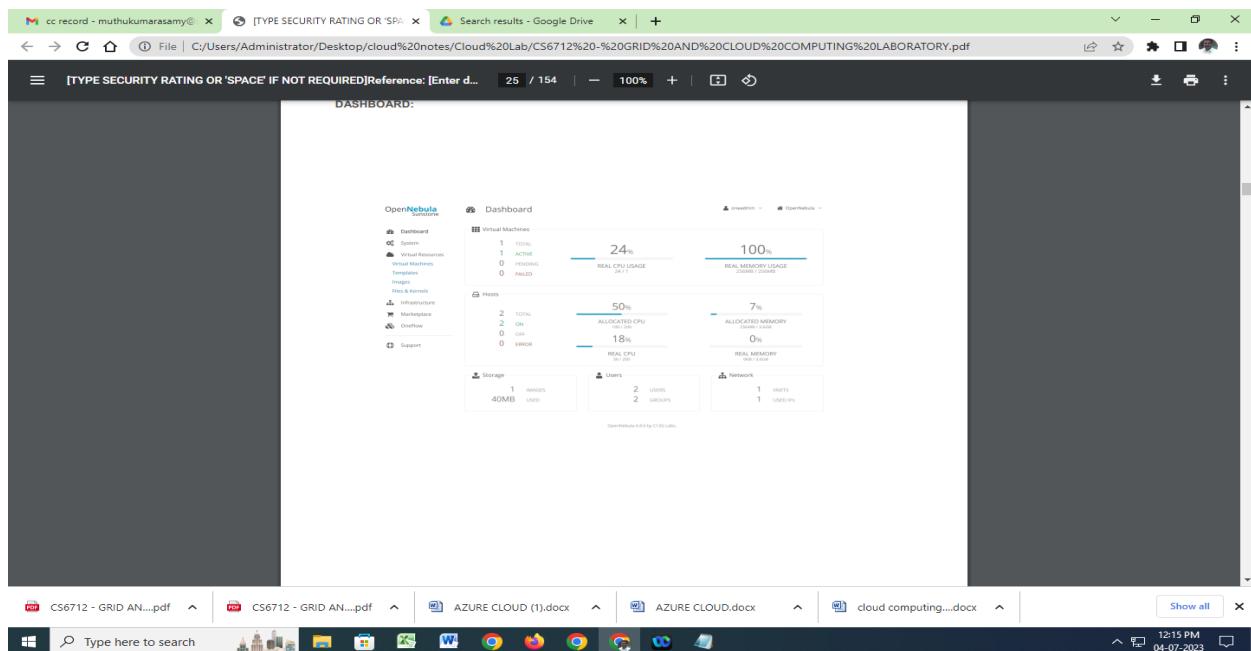
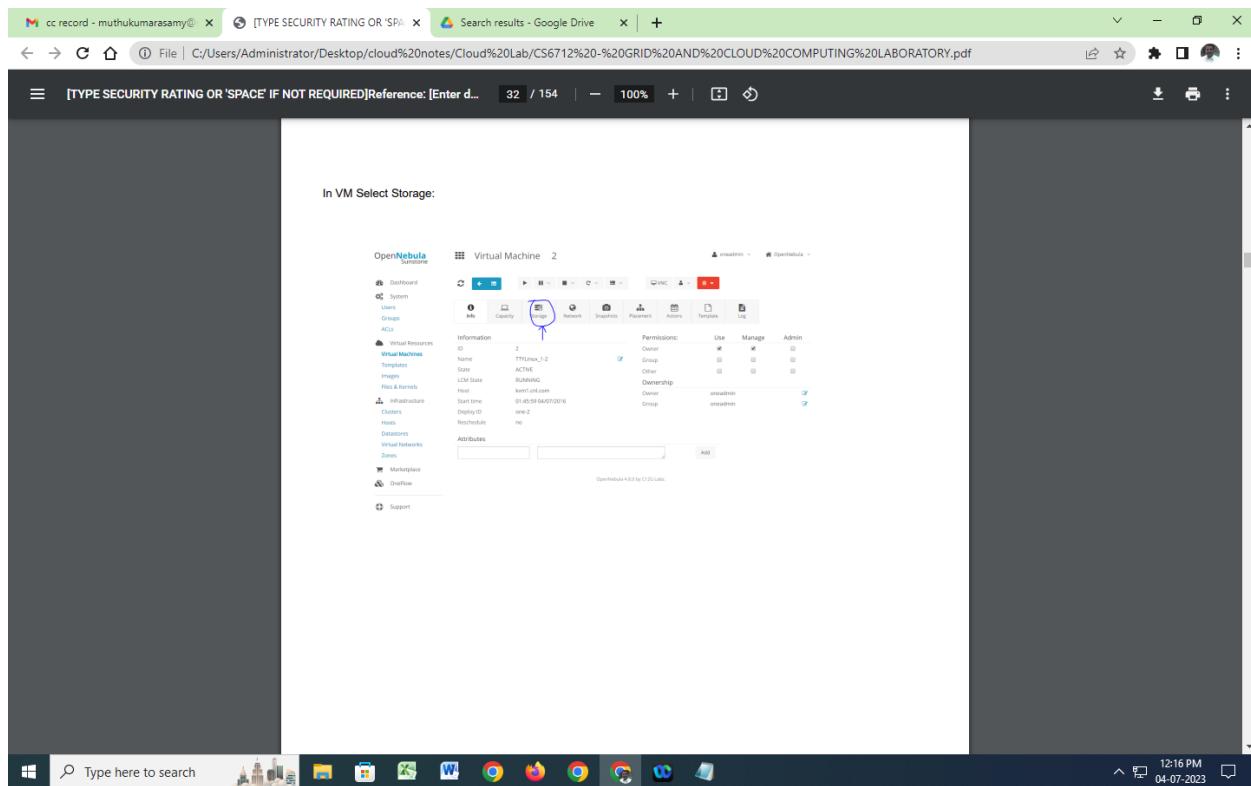
Sun Jul 3 19:14:48 2016 [Z0][VMM][I]: Successfully execute transfer manager driver operation: tm_attach.

Sun Jul 3 19:14:48 2016 [Z0][VMM][I]: ExitCode: 0

Sun Jul 3 19:14:48 2016 [Z0][VMM][I]: Successfully execute virtualization driver operation: attach_disk.

Sun Jul 3 19:14:48 2016 [Z0][VMM][I]: VM Disk successfully attached.





Result:

The above Cloud application in Openstack/Opennebula Instance using in centOS Created and executed Sucessfully.

3. Private Cloud

c. Show the virtual machine migration based on certain conditions from one node to the other.

AIM:

To execute the procedure for transfer the file from one virtual machine to another virtual machine.

CREATION OF VIRTUAL MACHINES

• PROCEDURE:

- **Open Frontend, kvm1, kvm2 (Pwd: Redhat)**
- **Goto FrontEnd ->Right Click-> Open In Terminal**
- [frontend@frontend Desktop]\$ **su**
- Password: **redhat**
- [root@frontend Desktop]# **su – oneadmin**

CREATION OF VIRTUAL MACHINES

OUTPUT:

Last login: Wed Aug 21 09:27:42 IST 2019 on pts/0

[oneadmin@frontend ~]\$ **onehost list**

OUTPUT:

ID	NAME	CLUSTER	RVM	ALLOCATED_CPU	ALLOCATED_MEM	STAT
0	kvm1.saec.com	-	0	0 / 100 (0%)	0K / 986.7M (0%)	on
1	kvm2.saec.com	-	0	0 / 100 (0%)	0K / 986.7M (0%)	on

Goto Run -> type cmd -> ipconif

Check the IP ADDRESS of your system.

Goto FrontEnd,

[oneadmin@frontend ~]\$ **vi /var/tmp/mynetwork.one**

CREATION OF VIRTUAL MACHINES

Press **i** for Inserting Mode in the Editor

Copy the Following Code:

```
NAME = "private"
BRIDGE = br0
AR = [
    TYPE = IP4,
    IP = 192.168.35.150,
    SIZE = 10
]
```

```
NAME = "private"
BRIDGE = br0
AR = [
    TYPE = IP4,
    IP = 192.168.35.150,
    SIZE = 10
]
```

Press **ESC**, and then **Shift+ : + w + q** (altogether)

[oneadmin@frontend ~]\$ **onevnet create /var/tmp/mynetwork.one**

ID: 1

[oneadmin@frontend ~]\$ **onevnet list**

OUTPUT:

ID	USER	GROUP	NAME	CLUSTER	BRIDGE	LEASES
1	oneadmin	oneadmin	private	-	br0	0

CREATION OF VIRTUAL MACHINES

In Frontend, goto Application -> Mozilla Firefox

url: <http://frontend:9869>

Go to Virtual Resources -> Images -> Click Add + Symbol

Name : **TTYLinux_1.0**

Type: Select “**DATABLOCK**”

Image Location : Select “**Empty Datablock**”

Size: **512**

FS: **qcow2**

CLICK “CREATE”

CREATION OF VIRTUAL MACHINES

In Frontend, goto Application -> Mozilla Firefox

url: <http://frontend:9869>

Go to Virtual Resources -> Images -> Click Add + Symbol

Name : **TTYLinux_1.0**

Type: Select “**DATABLOCK**“

Image Location : Select “**Empty Datablock**”

Size: **512**Goto Terminal,

[oneadmin@frontend ~]\$ **onetemplate list**

OUTPUT:

ID	USER	GROUP	NAME	REGTIME
2	oneadmin	oneadmin	TTYLinux_1.0	08/21 12:38:42

Goto Virtual Resources -> Templates -> click the file

CREATION OF VIRTUAL MACHINES

Goto Terminal,

[oneadmin@frontend ~]\$ **oneimage list**

ID	USER	GROUP	NAME	DATASTORE	SIZE	TYPE	PER	STAT	RVMS
2	oneadmin	oneadmin	TTYLinux_1.0	default	512M	DB	No	rdy	0

Go to Virtual Resources -> Templates -> Click Add + Symbol

Name : **TTYLinux_1.0**

VCPU: **1**

CLICK “CREATE”

CREATION OF VIRTUAL MACHINES

Goto Terminal,

```
[oneadmin@frontend ~]$ onetemplate list
```

OUTPUT:

ID	USER	GROUP	NAME	REGTIME
2	oneadmin	oneadmin	TTYLinux_1.0	08/21 12:38:42

Goto Virtual Resources -> Templates -> click the file

Now click Instantiate ->

VM NAME : kvm1

Click -> Instantiate

Now click Instantiate ->

VM NAME : kvm2

Click -> Instantiate

Goto Terminal,

```
[oneadmin@frontend ~]$ onevm list
```

OUTPUT:

ID	USER	GROUP	NAME	STATU	CPU	UMEM	HOST	TIME
3	oneadmin	oneadmin	kvm1	runn	2	512M	kvm2.saec.com	0d 00h01
2	oneadmin	oneadmin	kvm2	runn	2	512M	kvm1.saec.com	0d 00h02

Goto Browser , Virtual Resources-> Virtual Machine ->

Click -> oneadmin -> Migrate [live]

Select host -> click “Migrate”

```
[oneadmin@frontend1 ~]$ onevm migrate --live TTYLinux_1-2 kvm1.cn1.com
[oneadmin@frontend1 ~]$ onevm list
  ID USER      GROUP      NAME      STAT UCPU      UMEM HOST      TIME
  2 oneadmin  oneadmin  TTYLinux_1-2  runn    24    256M kvm1.cn1.c  0d 00h13
[oneadmin@frontend1 ~]$ onevm list
  ID USER      GROUP      NAME      STAT UCPU      UMEM HOST      TIME
  2 oneadmin  oneadmin  TTYLinux_1-2  runn    24    256M kvm1.cn1.c  0d 00h13
[oneadmin@frontend1 ~]$
```

[TYPE SECURITY RATING OR 'SPACE' IF NOT REQUIRED]Reference: [Enter d...]

23 / 154 | - 100% +

The sum of equals 246

4.3 Show the virtual machine migration based on the certain condition from one node to the other.

****Migrate the instance from one hypervisor to another****

**** --live will ensure the VM is running****

****Check current hypervisor****

```
$ onevm list
```

ID	USER	GROUP	NAME	STAT	UCPU	UMEM	HOST	TIME
2	oneadmin	oneadmin	TTYLinux_1-2	runn	24	256M	kvm2.cn1.c	0d 00h11

****Migrate the instance****

```
$ onevm migrate --live TTYLinux_1-0 kvm1.cn1.com
```

Check current hypervisor;

```
$ onevm list
```

ID	USER	GROUP	NAME	STAT	UCPU	UMEM	HOST	TIME
2	oneadmin	oneadmin	TTYLinux_1-2	runn	24	256M	kvm1.cn1.c	0d 00h13

ID	USER	GROUP	NAME	STAT	UCPU	UMEM	HOST	TIME
2	oneadmin	oneadmin	TTYLinux_1-2	runn	24	256M	kvm1.cn1.c	0d 00h13

```
[oneadmin@frontend1 ~]$
```

Check instance uptime:

```
$ ssh root@192.168.35.150 "uptime"
```

Warning: Permanently added '192.168.35.150' (RSA) to the list of known hosts.

132, PillaiyarKoil Street, Secretariat Colony, Paduvanchery, Selaiyur, Chennai – 600073.

+91-44-22292796 | +91-9884561188 | www.cloudncloud.com | training@cloudncloud.com

12:21 PM
04-07-2023

RESULT:

The above program migration using transferring the files from one virtual machine to another machine was executed successfully

Content beyond syllabus

EX.NO: Install Hadoop single node cluster applications wordcount

DATE:

AIM:

To install Hadoop single node cluster and run simple applications like wordcount

PROCEDURE:

Step 1:Log on to your Cent OS machine by root

User name->root

Password->redhat

Step2:Disable your firewall & set the selinux mode □ Permissive

#systemctl disable firewalld

systemctl stop firewalld

systemctl status firewalld

```
root@frontend1 ~]# setsebool -P use_nfs_home_dirs 1
root@frontend1 ~]# systemctl disable firewalld
root@frontend1 ~]# systemctl stop firewalld
root@frontend1 ~]# systemctl status firewalld
firewalld.service - firewalld - dynamic firewall daemon
   Loaded: loaded (/usr/lib/systemd/system/firewalld.service; disabled)
     Active: inactive (dead)

Jul 03 23:26:23 frontend1.cnl.com systemd[1]: Stopped firewalld - dynamic firewall daemon.
[root@frontend1 ~]#
```

#setenforce 0

#getenforce

```
[root@hadoop12 ~]# setenforce 0
[root@hadoop12 ~]# getenforce
Permissive
[root@hadoop12 ~]#
```

Uninstall your previous java version:

#yum erase java*

Install epel release:

#yum install epel-release

Install new java version (java 1.8.0_91)

#yum install java 1.8.0*

Adding hadoop user:

#useraddhadoop

#hadooppasswd

Enter your password here: _____

Retype your pass word: _____

Switch to hadoop user:

#su – hadoop

Key generation:

#key-gen **(on root)**

#ssh-copy-id hadoop@hadoop12

\$key-gen (on hadoop)

\$ ssh-copy-id root@hadoop12

```
[hadoop@hdp1 ~]$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/hadoop/.ssh/id_rsa):
/home/hadoop/.ssh/id_rsa already exists.
Overwrite (y/n)?
[hadoop@hdp1 ~]$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/hadoop/.ssh/id_rsa):
/home/hadoop/.ssh/id_rsa already exists.
Overwrite (y/n)? y
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/hadoop/.ssh/id_rsa.
Your public key has been saved in /home/hadoop/.ssh/id_rsa.pub.
The key fingerprint is:
c0:8d:7f:2d:de:6d:b2:f2:8f:29:24:de:c5:47:21:cd hadoop@hdp1.cn1.com
The key's randomart image is:
---[ RSA 2048]---+
|   o   |
| . o . E |
| + . . . |
| o . . . |
| S o... |
| .o.o... |
| .+..o.o |
| . + *   |
| +=..   |
+-----+
```

Now install hadoop utility by follow link:

\$ cd ~

\$ wget http://apache.claz.org/hadoop/common/hadoop-2.6.1/hadoop-2.6.1.tar.gz

Un patch the tar file:

\$ tar xzf hadoop-2.6.1.tar.gz

Move unpatched file into hadoop directory:

\$ mv hadoop-2.6.1 hadoop

Setup Environment Variables

First we need to set environment variable uses by hadoop. Edit `~/.bashrc` file and append following values at end of file.

\$vi ~/.bashrc

```

export HADOOP_HOME=/home/hadoop/hadoop
export HADOOP_INSTALL=$HADOOP_HOME
export HADOOP_MAPRED_HOME=$HADOOP_HOME
export HADOOP_COMMON_HOME=$HADOOP_HOME
export HADOOP_HDFS_HOME=$HADOOP_HOME
export YARN_HOME=$HADOOP_HOME
export HADOOP_COMMON_LIB_NATIVE_DIR=$HADOOP_HOME/lib/native
export PATH=$PATH:$HADOOP_HOME/sbin:$HADOOP_HOME/bin

```

```

# .bashrc

# Source global definitions
if [ -f /etc/bashrc ]; then
    . /etc/bashrc
fi

# Uncomment the following line if you don't like systemctl's auto-paging feature:
# export SYSTEMD_PAGER=

# User specific aliases and functions
export HADOOP_HOME=/home/hadoop/hadoop
export HADOOP_INSTALL=$HADOOP_HOME
export HADOOP_MAPRED_HOME=$HADOOP_HOME
export HADOOP_COMMON_HOME=$HADOOP_HOME
export HADOOP_HDFS_HOME=$HADOOP_HOME
export YARN_HOME=$HADOOP_HOME
export HADOOP_COMMON_LIB_NATIVE_DIR=$HADOOP_HOME/lib/native
export PATH=$PATH:$HADOOP_HOME/sbin:$HADOOP_HOME/bin
~#
~#
~#
"~/./.bashrc" 19L, 563C
19,1
All

```

Now apply the changes in current running environment

```
$ source ~/.bashrc
```

Now edit \$HADOOP_HOME/etc/hadoop/hadoop-env.sh file and set JAVA_HOME environment variable. Change the JAVA path as per install on your system.

```
$vi $HADOOP_HOME/etc/hadoop/hadoop-env.sh
```

Delete previous path

Add this path export JAVA_HOME=/usr/lib/jvm/java-1.8.0-openjdk-1.8.0.91-1.b14.el7_2.x86_64

```

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# limitations under the License.

# Set Hadoop-specific environment variables here.

# The only required environment variable is JAVA_HOME. All others are
# optional. When running a distributed configuration it is best to
# set JAVA_HOME in this file, so that it is correctly defined on
# remote nodes.

# The java implementation to use.
#export JAVA_HOME=/usr/lib/jvm/java-1.8.0-openjdk-1.8.0.91
export JAVA_HOME=/usr/lib/jvm/java-1.8.0-openjdk-1.8.0.91-1.b14.e17_2.x86_64

```

"~/hadoop/etc/hadoop/hadoop-env.sh" 99L, 4330C 27,0-1 5%

Now apply the changes in current running environment

cd \$HADOOP_HOME/etc/hadoop

Edit core-site.xml

```

<configuration>
<property>
<name>fs.default.name</name>
<value>hdfs://localhost:9000</value>
</property>
</configuration>

```

```

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limitations under the License. See accompanying LICENSE file.
-->

<!-- Put site-specific property overrides in this file. -->

<configuration>
<configuration>
<property>
  <name>fs.default.name</name>
  <value>hdfs://localhost:9000</value>
</property>
</configuration>

```

"core-site.xml" 26L, 902C 25,1 66%

Edit hdfs-site.xml

```

<configuration>
<property>
<name>dfs.replication</name>
<value>1</value>
</property>
<property>
<name>dfs.name.dir</name>
<value>file:///home/hadoop/hadoopdata/hdfs/namenode</value>
</property>
<property>
<name>dfs.data.dir</name>
<value>file:///home/hadoop/hadoopdata/hdfs/datanode</value>
</property>
</configuration>

```

```

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-->

<!-- Put site-specific property overrides in this file. --&gt;

&lt;configuration&gt;
&lt;property&gt;
&lt;name&gt;dfs.replication&lt;/name&gt;
&lt;value&gt;1&lt;/value&gt;
&lt;property&gt;
&lt;name&gt;dfs.name.dir&lt;/name&gt;
&lt;value&gt;file:///home/hadoop/hadoopdata/hdfs/namenode&lt;/value&gt;
&lt;/property&gt;
&lt;property&gt;
&lt;name&gt;dfs.data.dir&lt;/name&gt;
&lt;value&gt;file:///home/hadoop/hadoopdata/hdfs/datanode&lt;/value&gt;
&lt;/property&gt;
</pre>


"hdfs-site.xml" 33L, 1076C


```

31,1

80%

Edit mapred-site.xml

```

<configuration>
<property>
<name>mapreduce.framework.name</name>
<value>yarn</value>
</property>

```

```
</configuration>
```

```
<?xml version="1.0"?>
<?xml-stylesheet type="text/xsl" href="configuration.xsl"?>
<!--
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-->

<!-- Put site-specific property overrides in this file. -->

<configuration>
<property>
    <name>mapreduce.framework.name</name>
    <value>yarn</value>
</property>
"mapred-site.xml.template" 24L, 844C
```

23,2

Top

Edit yarn-site.xml

```
<configuration>
<property>
<name>yarn.nodemanager.aux-services</name>
<value>mapreduce_shuffle</value>
</property>
</configuration>
```

```
<?xml version="1.0"?>
<!--
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-->
<configuration>
<property>
    <name>yarn.nodemanager.aux-services</name>
    <value>mapreduce_shuffle</value>
</property>
</configuration>
~
~
~
"yarn-site.xml" 20L, 741C
```

19,2

All

Format Namenode

Now format the namenode using following command, make sure that Storage directory is

\$ hdfsnamenode –format

```
15/02/04 09:58:43 INFO namenode.NameNode: STARTUP_MSG:  
*****  
STARTUP_MSG: Starting NameNode  
STARTUP_MSG: host = svr1.tecadmin.net/192.168.1.133  
STARTUP_MSG: args = [-format]  
STARTUP_MSG: version = 2.6.0  
...  
...  
15/02/04 09:58:57 INFO common.Storage: Storage directory /home/hadoop/hadoopdata/hdfs/nar  
15/02/04 09:58:57 INFO namenode.NNStorageRetentionManager: Going to retain 1 images with  
15/02/04 09:58:57 INFO util.ExitUtil: Exiting with status 0  
15/02/04 09:58:57 INFO namenode.NameNode: SHUTDOWN_MSG:  
*****  
SHUTDOWN_MSG: Shutting down NameNode at svr1.tecadmin.net/192.168.1.133  
*****
```

Now run start-dfs.sh script.

\$ start-dfs.sh

```
15/02/04 10:00:34 WARN util.NativeCodeLoader: Unable to load native-hadoop library for yo  
Starting namenodes on [localhost]  
localhost: starting namenode, logging to /home/hadoop/hadoop/logs/hadoop-hadoop-namenode-  
localhost: starting datanode, logging to /home/hadoop/hadoop/logs/hadoop-hadoop-datanode-  
Starting secondary namenodes [0.0.0.0]  
The authenticity of host '0.0.0.0 (0.0.0.0)' can't be established.  
RSA key fingerprint is 3c:c4:f6:f1:72:d9:84:f9:71:73:4a:0d:55:2c:f9:43.  
Are you sure you want to continue connecting (yes/no)? yes  
0.0.0.0: Warning: Permanently added '0.0.0.0' (RSA) to the list of known hosts.  
0.0.0.0: starting secondarynamenode, logging to /home/hadoop/hadoop/logs/hadoop-hadoop-se  
15/02/04 10:01:15 WARN util.NativeCodeLoader: Unable to load native-hadoop library for yo
```

Now run start-yarn.sh script:

\$ start-yarn.sh

```
starting yarn daemons  
starting resourcemanager, logging to /home/hadoop/hadoop/logs/yarn-hadoop-resourcem  
localhost: starting nodemanager, logging to /home/hadoop/hadoop/logs/yarn-hadoop-no
```

Access Hadoop Services in Browser

HadoopNameNode started on port 50070 default. Access your server on port 50070 in your favorite web browser.

<http://IP ADDRESS:50070>

Overview 'localhost:9000' (active)

Started:	Tue Jul 05 02:16:23 IST 2016
Version:	2.6.0, re3496499ecb8d220fba99dc5ed4c99c8f9e33bb1
Compiled:	2014-11-13T21:10Z by jenkins from (detached from e349649)
Cluster ID:	CID-06b4f983-d75c-499c-895a-a571b17d2859
Block Pool ID:	BP-1992003736-192.168.35.150-1467665144497

Summary

Security is off.
Safemode is off.
8 files and directories, 1 blocks = 9 total filesystem object(s).
Heap Memory used 44.66 MB of 63.55 MB Heap Memory. Max Heap Memory is 966.69 MB.
Non Heap Memory used 50.41 MB of 51.44 MB Committed Non Heap Memory. Max Non Heap Memory is -1 B.

Configured Capacity:	14.99 GB
DFS Used:	28 KB
Non DFS Used:	5.28 GB

Then check datanodes :

In Datanode the single node was added

Datanode Information

In operation

Node	Last contact	Admin State	Capacity	Used	Non DFS Used	Remaining	Blocks	Block pool used	Failed Volumes	Version
hdp1.cni.com (127.0.0.1:50010)	1	In Service	14.99 GB	28 KB	5.28 GB	9.71 GB	1	28 KB (0%)	0	2.6.0

Decommissioning

Node	Last contact	Under replicated blocks	Blocks with no live replicas	Under Replicated Blocks In files under construction
Hadoop, 2014				

Legacy UI

open hadoop

[desktop@hadoop]\$ su

Password: redhat

[root@hadoop]\$ ifconfig

[root@hadoop]\$ vi /etc/hosts

system ip hadoop.saec.com hadoop

Esc Shift + :wq

[root@hadoop]\$ java -version

[root@hadoop]\$ su - hadoop

[hadoop@hadoop]\$ hadoop version

[hadoop@hadoop]\$ cd \$HADOOP_HOME/etc/hadoop

[hadoop@hadoop]\$ vi core-site.xml

[hadoop@hadoop]\$ vi hdfs-site.xml

[hadoop@hadoop]\$ vi mapred-site.xml

[hadoop@hadoop]\$ vi yarn-site.xml

[hadoop@hadoop]\$ hdfs namenode -format

[hadoop@hadoop]\$ cd \$HADOOP_HOME/sbin/

[hadoop@hadoop]\$ start-all.sh

[hadoop@hadoop]\$ jps

in browser localhost:50070

green page configured capacity-17.5GB

in browser localhost:50075->datanode

in browser localhost:50090->secondary name node

in browser localhost:8088->cluster

Permission	Owner	Group	Size	Replication	Block Size	Name
-rw-r--r--	hadoop	supergroup	0 B	0	0 B	-K
-rw-r--r--	hadoop	supergroup	10.06 KB	1	128 MB	boot.log
-rw-r--r--	hadoop	supergroup	0 B	0	0 B	dir
-rw-r--r--	hadoop	supergroup	13.31 MB	1	128 MB	hadoop-0.20.2.tar.gz
-rw-r--r--	hadoop	supergroup	186.21 MB	1	128 MB	hadoop-2.6.0.tar.gz

Hadoop, 2014.

Accessing port 8088:

Node Labels	Rack	State	Node Address	Node HTTP Address	Last health-update	Health-report	Containers	Mem Used	Mem Avail	Vcores Used	Vcores Reserved	Active Nodes	Decommissioned Nodes	Lost Nodes	Unhealthy Nodes	Rebooted Nodes
default-rack		RUNNING	hdp1.cnl.com:48502	hdp1.cnl.com:6042	5-Jul-2016 05:33:33		0	0 B	8 GB	0	1	1	0	0	0	2.6.0

Accessing 50090 port:

The screenshot shows the Hadoop NameNode Overview page. At the top, there's a green header bar with the tabs "Hadoop" and "Overview". Below the header, the title "Overview" is centered. A table provides detailed information about the NameNode:

Version	2.6.0
Compiled	2014-11-13T21:10Z by jenkins from (detached from e349649)
NameNode Address	localhost:9000
Started	7/5/2016, 2:16.41 AM
Last Checkpoint	1/1/1970, 9:30:29 AM
Checkpoint Period	3600 seconds
Checkpoint Transactions	1000000

Below the table, there are two sections with URIs:

- Checkpoint Image URI**: file:///tmp/hadoop-hadoop/dfs/namesecondary
- Checkpoint Editlog URI**: file:///tmp/hadoop-hadoop/dfs/namesecondary

Accessing 500075 Port:

The screenshot shows the Hadoop DataNode page for the IP address 192.168.35.150:50075. At the top, there's a green header bar with the tabs "Hadoop" and "Overview". Below the header, the title "DataNode on 192.168.35.150:50075" is displayed. A note at the bottom states "Hadoop, 2014."

Type the following code:

```
[root@hadoop]$ vi wrdcnt.java
```

Press i for insert mode.

**Type the following program

```
public class wrdcnt
{
    Static int i,str1,c=0,res;
    static intwordcount(String s)
    {
        Char ch[] = new char[s.length()];
        for(i=0;i<s.length();i++)
        {
            ch[i]= s.charAt(i);
            if( ((i>0)&&(ch[i]!=' ')&&(ch[i-1]==' ')) || ((ch[0]!=' ')&&(i==0)) )
            c++;
        }
    }
}
```

```

}
return c;
}

public static void main (String args[])
{
    String str1="The hadoop is a opensource frame work here we use hadoop 2.6.0 ";
    res=wrdcnt.wordcount(str1);
    System.out.println("The number of words in the String are : "+res);
    System.out.println("the word is:"+str1);
}
}

```

save it by **esc shift:wq**

```

public class wrdcnt
{
    static int i,str1,c=0,res;
    static int wordcount(String s)
    {
        char ch[]= new char[s.length()];
        for(i=0;i<s.length();i++)
        {
            ch[i]= s.charAt(i);
            if( ((i>0) && (ch[i] != ' ') && (ch[i-1]== ' ')) || ((ch[0] != ' ') && (i==0)) )
                c++;
        }
        return c;
    }

    public static void main (String args[])
    {
        String str1="The hadoop is a opensource frame work here we use hadoop 2.6.0 ";
        res=wrdcnt.wordcount(str1);
        System.out.println("The number of words in the String are : "+res);
        System.out.println("the word is:"+str1);
    }
}

```

Then compile the java file using below command

[root@hadoop]\$javac wrdcnt.java

Run the java file

\$java wrdcnt

OUTPUT:

```

[hadoop@hdpi ~]$ javac wrdcnt.java
[hadoop@hdpi ~]$ java wrdcnt
The number of words in the String are : 12
the word is:The hadoop is a opensource frame work here we use hadoop 2.6.0
[hadoop@hdpi ~]$ 

```

RESULT:

Thus installation of Hadoop single node cluster and running of simple applications like wordcount was executed successfully.