Ex. No. 1	INSTALLING VIRUALBOX IN WINDOWS MACHINE

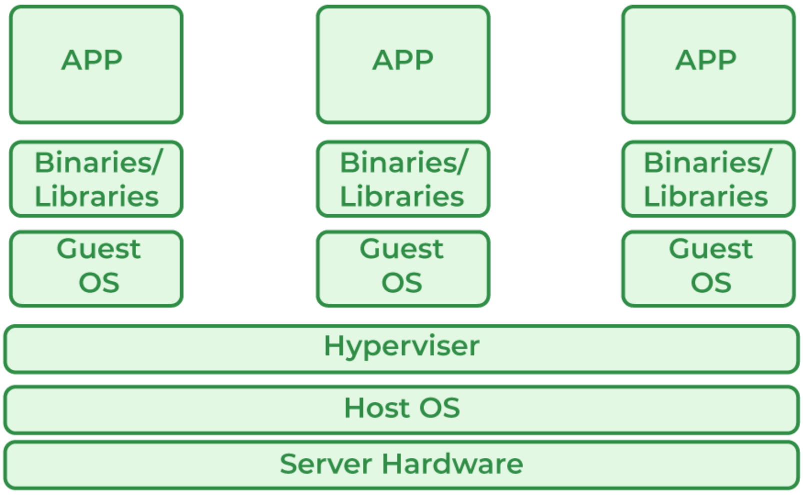
AIM:

To install Oracle VirtualBox in Windows Machine.

BASIC OF VIRTUALIZATION:

Virtualization is a technique how to separate a service from the underlying physical delivery of that service. It is the process of creating a virtual version of something like computer hardware. It was initially developed during the mainframe era. It involves using specialized software to create a virtual or software-created version of a computing resource rather than the actual version of the same resource. With the help of Virtualization, multiple operating systems and applications can run on the same machine and its same hardware at the same time, increasing the utilization and flexibility of hardware.

In other words, one of the main cost-effective, hardware-reducing, and energy-saving techniques used by cloud providers is Virtualization. Virtualization allows sharing of a single physical instance of a resource or an application among multiple customers and organizations at one time. It does this by assigning a logical name to physical storage and providing a pointer to that physical resource on demand. The term virtualization is often synonymous with hardware virtualization, which plays a fundamental role in efficiently delivering Infrastructure-as-a-Service (IaaS) solutions for cloud computing. Moreover, virtualization technologies provide a virtual environment for not only executing applications but also for storage, memory, and networking.



Virtualization

- Host Machine: The machine on which the virtual machine is going to be built is known as Host Machine.
- Guest Machine: The virtual machine is referred to as a Guest Machine.

CHARACTERISTICS OF VIRTUALIZATION:

- Increased Security: The ability to control the execution of a guest program in a completely transparent manner opens new possibilities for delivering a secure, controlled execution environment. All the operations of the guest programs are generally performed against the virtual machine, which then translates and applies them to the host programs.
- Managed Execution: In particular, sharing, aggregation, emulation, and isolation are the most relevant features.
- Sharing: Virtualization allows the creation of a separate computing environment within the same host.
- Aggregation: It is possible to share physical resources among several guests, but virtualization also allows aggregation, which is the opposite process.

BENEFITS OF VIRTUALIZATION:

- More flexible and efficient allocation of resources.
- Enhance development productivity.
- It lowers the cost of IT infrastructure.
- Remote access and rapid scalability.
- High availability and disaster recovery.
- Pay peruse of the IT infrastructure on demand.
- Enables running multiple operating systems.

TYPES OF VIRTUALIZATION:

1. Application Virtualization
2. Network Virtualization
3. Desktop Virtualization
4. Storage Virtualization
5. Server Virtualization
6. Data virtualization

USES OF VIRTUALIZATION:

- Data-integration
- Business-integration
- Service-oriented architecture data-services
- Searching organizational data

HYPERVISORS

- Virtualization requires the use of a hypervisor, which was originally called a virtual machine monitor or VMM. A hypervisor abstracts operating systems and applications from their underlying hardware. The physical hardware that a hypervisor runs on is typically referred to as a host machine, whereas the VMs the hypervisor creates and supports are collectively called guest machines.
- A hypervisor enables the host hardware to operate multiple VMs independent of each other and share abstracted resources among those VMs. Virtualization with a hypervisor increases a data center's efficiency compared to physical workload hosting.

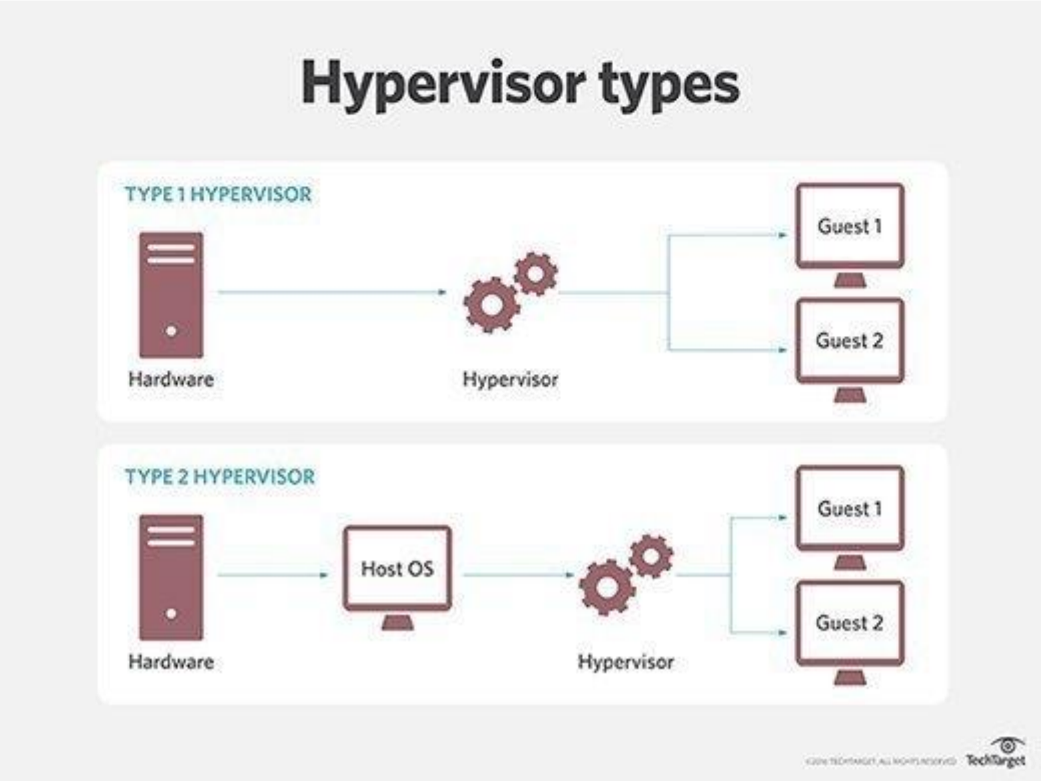
TYPE 1 HYPERVISORS

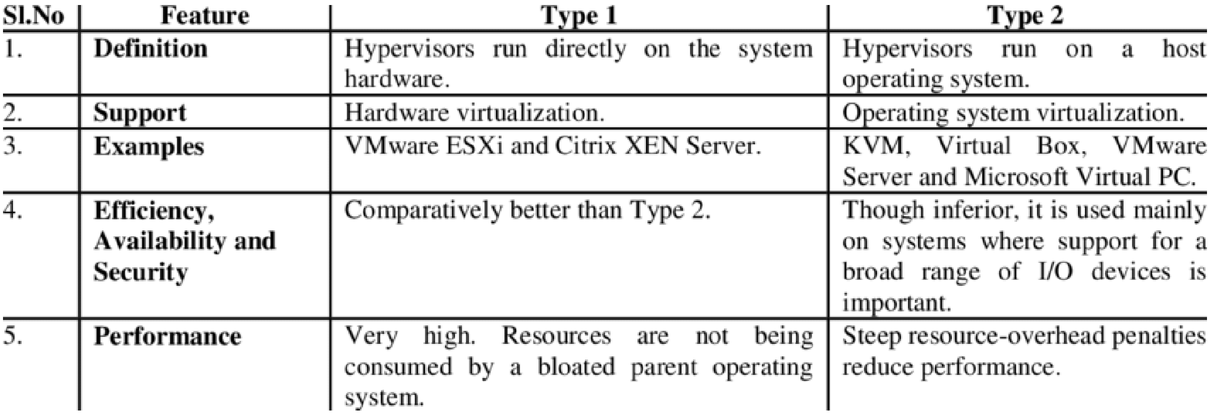
- A Type 1 hypervisor runs directly on the host machine's physical hardware, and it's referred to as a bare-metal hypervisor.
- The Type 1 hypervisor doesn't have to load an underlying OS.
- With direct access to the underlying hardware and no other software -- such as OSes and device drivers -- to contend with for virtualization, Type 1 hypervisors are regarded as the most efficient and best-performing hypervisors available for enterprise computing.

TYPE 2 HYPERVISORS

- A Type 2 hypervisor is typically installed on top of an existing OS. It is sometimes called a hosted hypervisor because it relies on the host machine's preexisting OS to manage calls to CPU, memory, storage and network resources.
- Type 2 hypervisors trace their roots back to the early days of x86 virtualization when the hypervisor was added above the existing systems' OSes.
- Although the purpose and goals of Type 1 and Type 2 hypervisors are identical, the presence of an underlying OS with Type 2 hypervisors introduces unavoidable latency

- All of the hypervisor's activities and the work of every VM has to pass through the host OS.
- Also, any security flaws or vulnerabilities in the host OS could potentially compromise all of the VMs running above it.

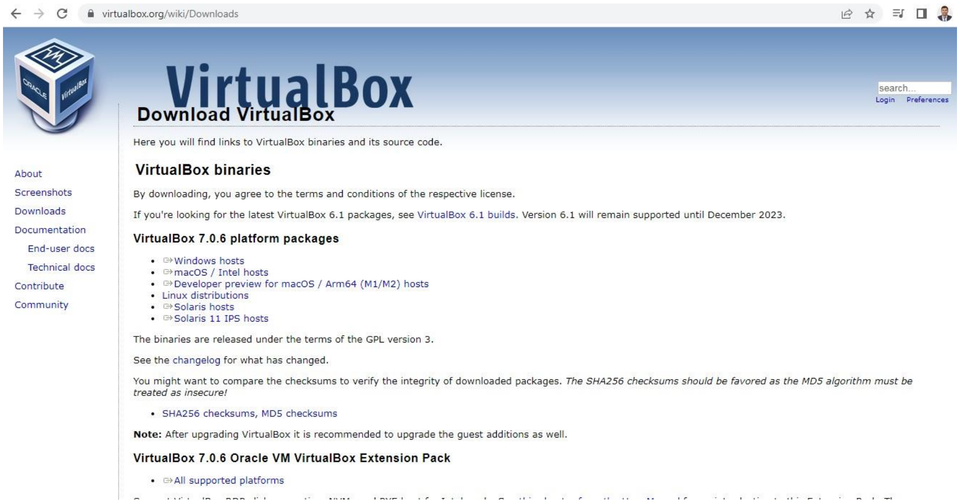




Sl.No	Feature	Type 1	Type 2
1.	**Definition**	Hypervisors run directly on the system hardware.	Hypervisors run on a host operating system.
2.	**Support**	Hardware virtualization.	Operating system virtualization.
3.	**Examples**	VMware ESXi and Citrix XEN Server.	KVM, Virtual Box, VMware Server and Microsoft Virtual PC.
4.	**Efficiency, Availability and Security**	Comparatively better than Type 2.	Though inferior, it is used mainly on systems where support for a broad range of I/O devices is important.
5.	**Performance**	Very high. Resources are not being consumed by a bloated parent operating system.	Steep resource-overhead penalties reduce performance.

PROCEDURE:

1. Go to the VirtualBox download page at https://www.virtualbox.org/wiki/Downloads and download the appropriate version of VirtualBox for your Windows machine.



Download VirtualBox

Here you will find links to VirtualBox binaries and its source code.

VirtualBox binaries

By downloading, you agree to the terms and conditions of the respective license.

If you're looking for the latest VirtualBox 6.1 packages, see VirtualBox 6.1 builds. Version 6.1 will remain supported until December 2023.

VirtualBox 7.0.6 platform packages

- Windows hosts
- macOS / Intel hosts
- Developer preview for macOS / Arm64 (M1/M2) hosts
- Linux distributions
- Solaris hosts
- Solaris 11 IPS hosts

The binaries are released under the terms of the GPL version 3.

See the changelog for what has changed.

You might want to compare the checksums to verify the integrity of downloaded packages. *The SHA256 checksums should be favored as the MD5 algorithm must be treated as insecure!*

- SHA256 checksums, MD5 checksums

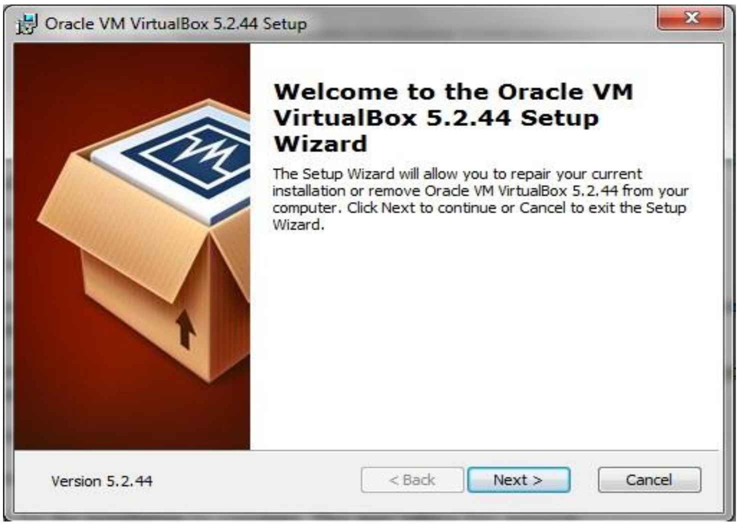
Note: After upgrading VirtualBox it is recommended to upgrade the guest additions as well.

VirtualBox 7.0.6 Oracle VM VirtualBox Extension Pack

- All supported platforms

2. Once the download is complete, double-click on the downloaded file to begin the installation process.

3. In the VirtualBox Setup wizard, click "Next" to begin the installation.

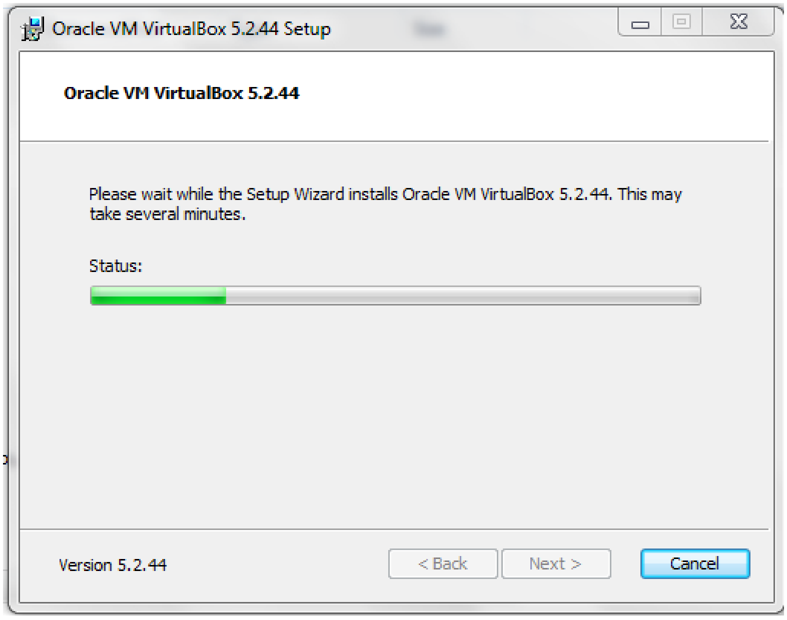


Welcome to the Oracle VM VirtualBox 5.2.44 Setup Wizard

The Setup Wizard will allow you to repair your current installation or remove Oracle VM VirtualBox 5.2.44 from your computer. Click Next to continue or Cancel to exit the Setup Wizard.

4. Choose the installation location or keep the default location, then click "Next".
5. Choose the components you want to install or keep the default components, then click "Next".

6. Choose whether to create shortcuts on the desktop and/or the Start menu, then click "Next".
7. Review the installation options and click "Install" to begin the installation process.
8. If prompted by Windows, allow the installation to make changes to your device.
9. Wait for the installation to complete. This may take a few minutes.



Oracle VM VirtualBox 5.2.44 Setup

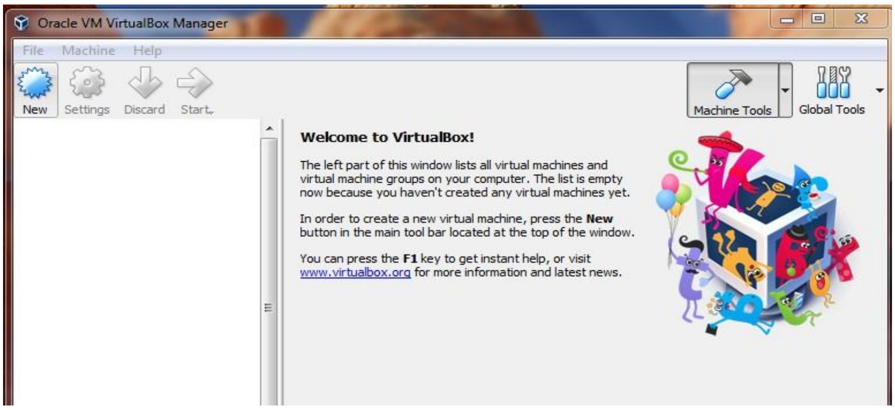
Oracle VM VirtualBox 5.2.44

Please wait while the Setup Wizard installs Oracle VM VirtualBox 5.2.44. This may take several minutes.

Status:

Version 5.2.44

10. When the installation is complete, click "Finish" to exit the setup wizard and run the VirtualBox.



Oracle VM VirtualBox Manager

Welcome to VirtualBox!

The left part of this window lists all virtual machines and virtual machine groups on your computer. The list is empty now because you haven't created any virtual machines yet.

In order to create a new virtual machine, press the **New** button in the main tool bar located at the top of the window.

You can press the **F1** key to get instant help, or visit www.virtualbox.org for more information and latest news.

RESULT:

Thus, the Oracle VirtualBox was installed successfully in Windows Machine.

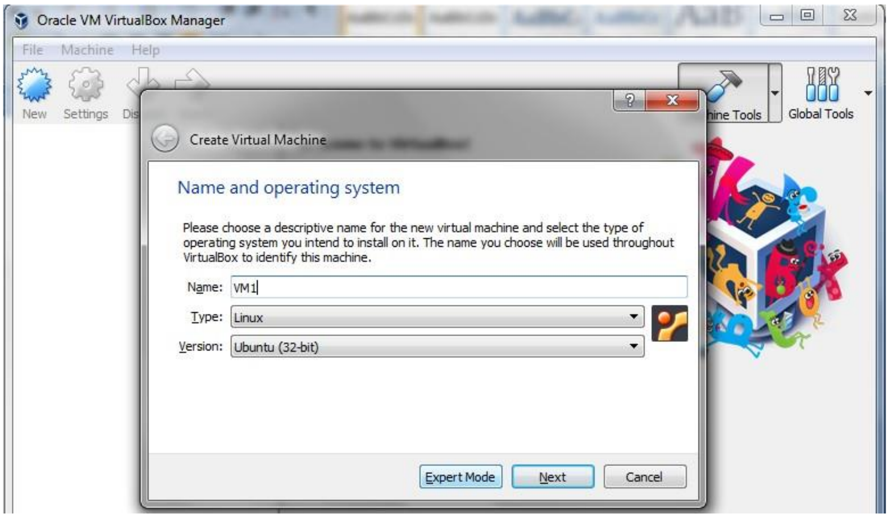
Ex. No. 2	CREATING VIRTUAL MACHINE IN VIRTUALBOX

AIM:

To create Ubuntu Virtual Machine in Windows Host Machine.

PROCEDURE:

1. Open VirtualBox and click on the "New" button in the toolbar.
2. In the "Name and Operating System" screen, give your VM a name and select the type of operating system you want to install. Then click "Next".



Name and operating system

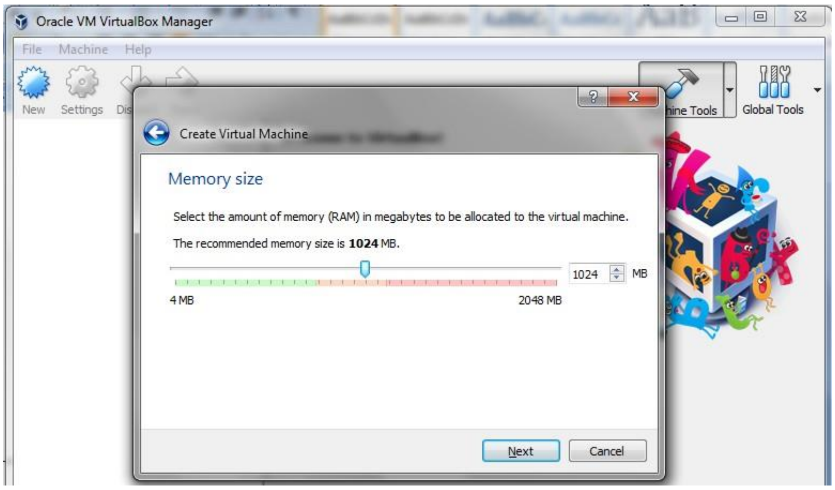
Please choose a descriptive name for the new virtual machine and select the type of operating system you intend to install on it. The name you choose will be used throughout VirtualBox to identify this machine.

Name: VM1

Type: Linux

Version: Ubuntu (32-bit)

3. In the "Memory Size" screen, choose the amount of memory (RAM) you want to allocate to the VM. Then click "Next".



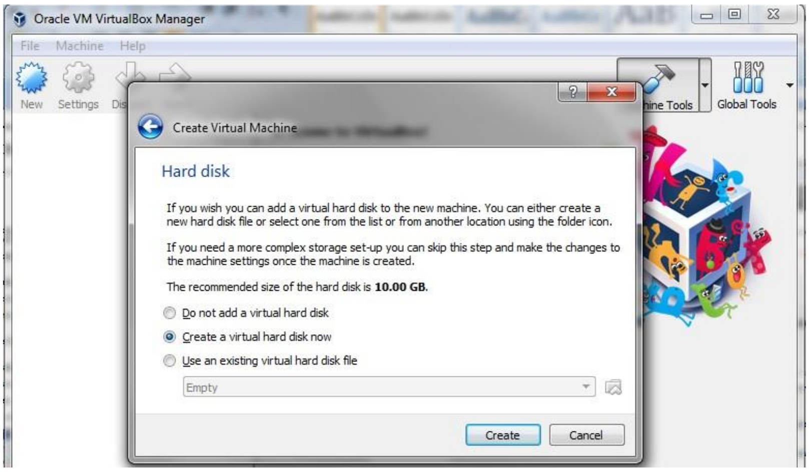
Memory size

Select the amount of memory (RAM) in megabytes to be allocated to the virtual machine.

The recommended memory size is **1024** MB.

1024 MB

4. In the "Hard Disk" screen, choose "Create a virtual hard disk now" and click "Create".



Oracle VM VirtualBox Manager

Create Virtual Machine

Hard disk

If you wish you can add a virtual hard disk to the new machine. You can either create a new hard disk file or select one from the list or from another location using the folder icon.

If you need a more complex storage set-up you can skip this step and make the changes to the machine settings once the machine is created.

The recommended size of the hard disk is **10.00 GB.**

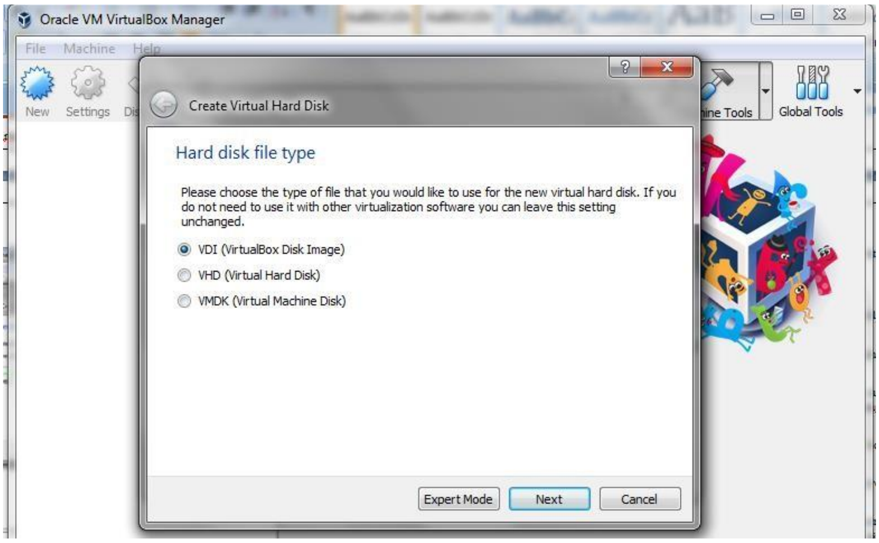
○ Do not add a virtual hard disk

● Create a virtual hard disk now

○ Use an existing virtual hard disk file

Empty

5. In the "Hard Disk File Type" screen, choose the file type you want to use for the virtual hard disk and click "Next".



Oracle VM VirtualBox Manager

Create Virtual Hard Disk

Hard disk file type

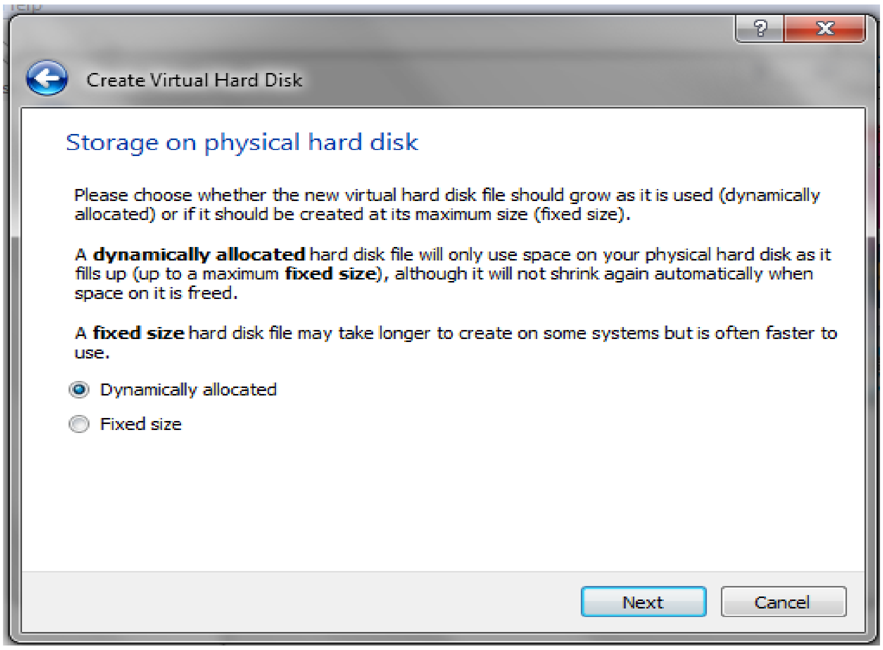
Please choose the type of file that you would like to use for the new virtual hard disk. If you do not need to use it with other virtualization software you can leave this setting unchanged.

● VDI (VirtualBox Disk Image)

○ VHD (Virtual Hard Disk)

○ VMDK (Virtual Machine Disk)

6. In the "Storage on Physical Hard Disk" screen, choose "Dynamically allocated" and click "Next".



Create Virtual Hard Disk

Storage on physical hard disk

Please choose whether the new virtual hard disk file should grow as it is used (dynamically allocated) or if it should be created at its maximum size (fixed size).

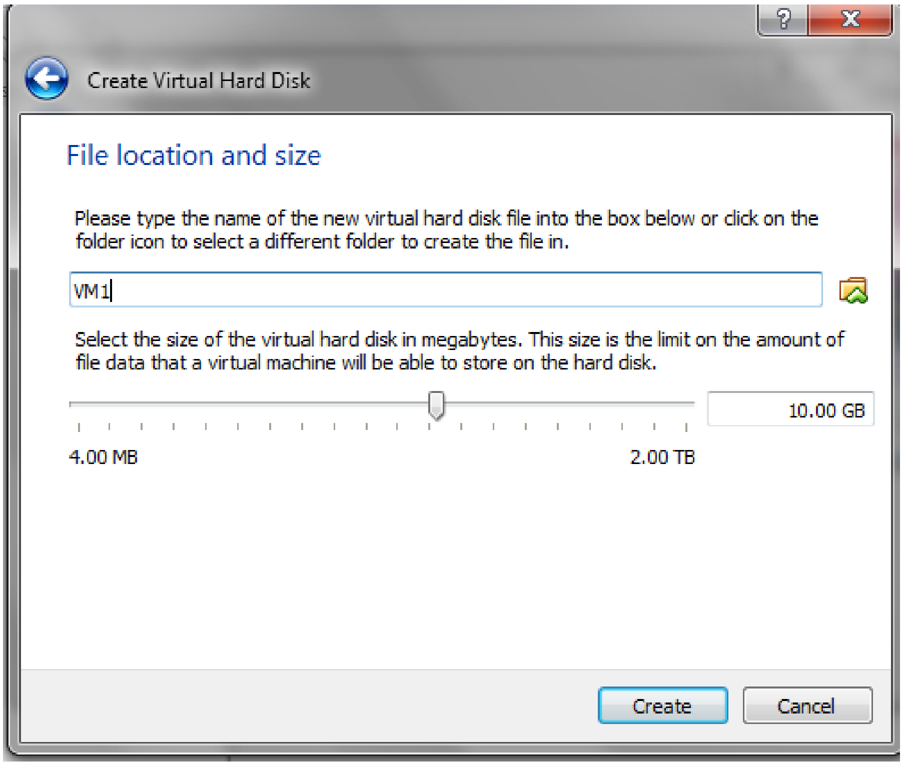
A **dynamically allocated** hard disk file will only use space on your physical hard disk as it fills up (up to a maximum **fixed size**), although it will not shrink again automatically when space on it is freed.

A **fixed size** hard disk file may take longer to create on some systems but is often faster to use.

● Dynamically allocated

○ Fixed size

7. In the "File Location and Size" screen, choose the location and size of the virtual hard disk file. Then click "Create".



Create Virtual Hard Disk

File location and size

Please type the name of the new virtual hard disk file into the box below or click on the folder icon to select a different folder to create the file in.

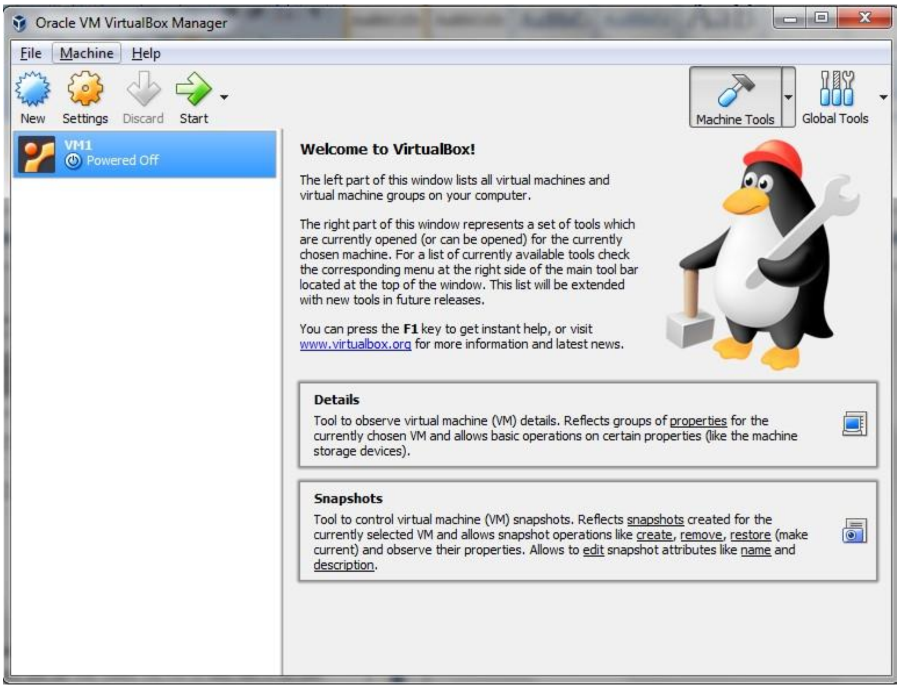
VM1

Select the size of the virtual hard disk in megabytes. This size is the limit on the amount of file data that a virtual machine will be able to store on the hard disk.

10.00 GB

8. Once the virtual hard disk has been created, you will be taken back to the main VirtualBox window. Click on your newly created VM and then click on the "Settings" button in the toolbar.

9. In the VM settings, you can configure various options such as the amount of video memory, network settings, etc. Make any necessary changes and then click "OK".
10. You are now ready to install the operating system on your VM. To do this, select your VM and click on the "Start" button in the toolbar.
11. Follow the on-screen instructions to install the operating system on your VM. You may need to insert the installation media (e.g. a DVD or ISO file) into the virtual optical drive.



Welcome to VirtualBox!

The left part of this window lists all virtual machines and virtual machine groups on your computer.

The right part of this window represents a set of tools which are currently opened (or can be opened) for the currently chosen machine. For a list of currently available tools check the corresponding menu at the right side of the main tool bar located at the top of the window. This list will be extended with new tools in future releases.

You can press the **F1** key to get instant help, or visit www.virtualbox.org for more information and latest news.

Details

Tool to observe virtual machine (VM) details. Reflects groups of properties for the currently chosen VM and allows basic operations on certain properties (like the machine storage devices).

Snapshots

Tool to control virtual machine (VM) snapshots. Reflects snapshots created for the currently selected VM and allows snapshot operations like create, remove, restore (make current) and observe their properties. Allows to edit snapshot attributes like name and description.

RESULT:

Thus, the Virtual Machine was installed successfully in the Host Machine.

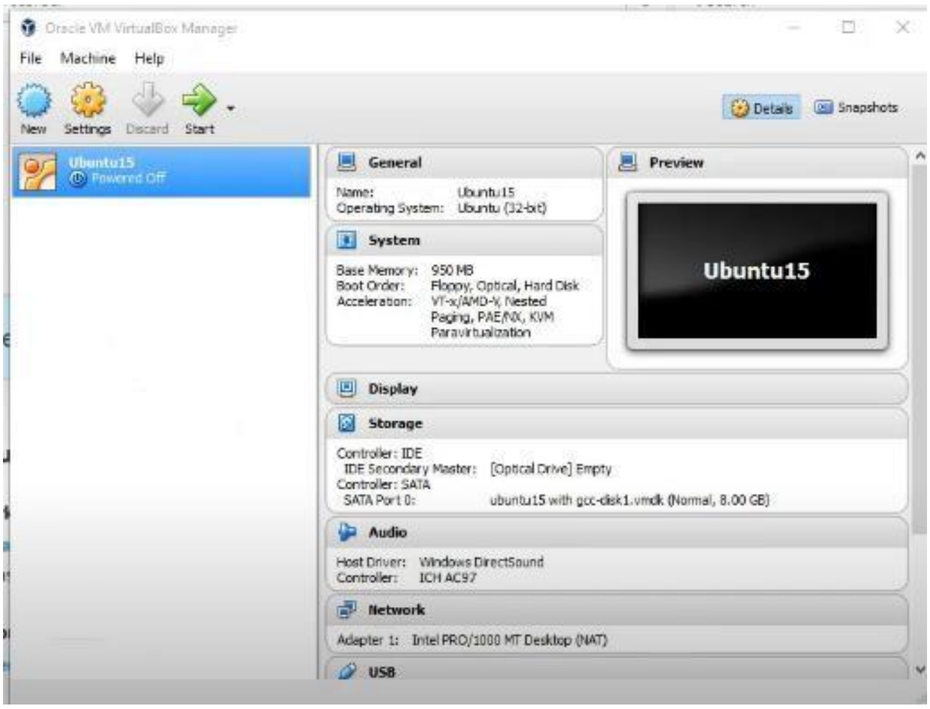
Ex. No. 3	**VIRTUAL MACHINES MIGRATION**

AIM:

To migrate Virtual machine from one host to another using Oracle VirtualBox.

PROCEDURE:

1. Open the VirtualBox Manager.
2. Select the Virtual Machine already created.



Name: Ubuntu15
Operating System: Ubuntu (32-bit)

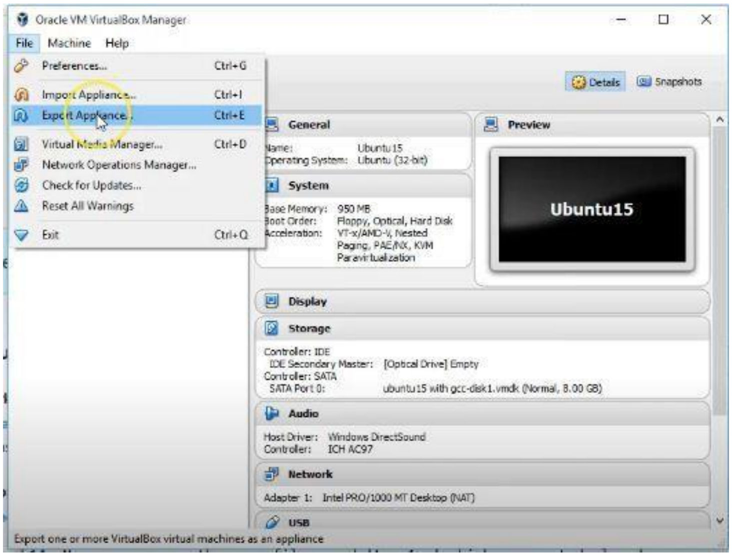
Base Memory: 950 MB
Boot Order: Floppy, Optical, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging, PAE/NX, KVM Paravirtualization

Controller: IDE
IDE Secondary Master: [Optical Drive] Empty
Controller: SATA
SATA Port 0: ubuntu15 with gcc-disk1.vmdk (Normal, 8.00 GB)

Host Driver: Windows DirectSound
Controller: ICH AC97

Adapter 1: Intel PRO/1000 MT Desktop (NAT)

3. Select the option File ->Export Appliance



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Base Memory: 950 MB
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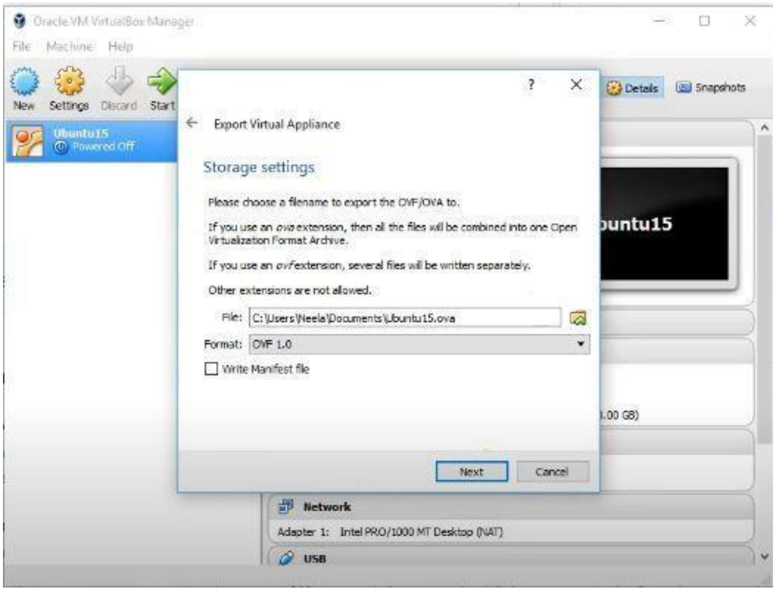
Controller: IDE
IDE Secondary Master: [Optical Drive] Empty
Controller: SATA
SATA Port 0: ubuntu15 with gcc-disk1.vmdk (Normal, 8.00 GB)

Host Driver: Windows DirectSound
Controller: ICH AC97

Adapter 1: Intel PRO/1000 MT Desktop (NAT)

Export one or more VirtualBox virtual machines as an appliance

4. Select folder icon, then select the destination folder to store the virtual machine image. Give a name for the virtual machine.



Export Virtual Appliance

Storage settings

Please choose a filename to export the OVF/OVA to.

If you use an *ova* extension, then all the files will be combined into one Open Virtualization Format Archive.

If you use an *ovf* extension, several files will be written separately.

Other extensions are not allowed.

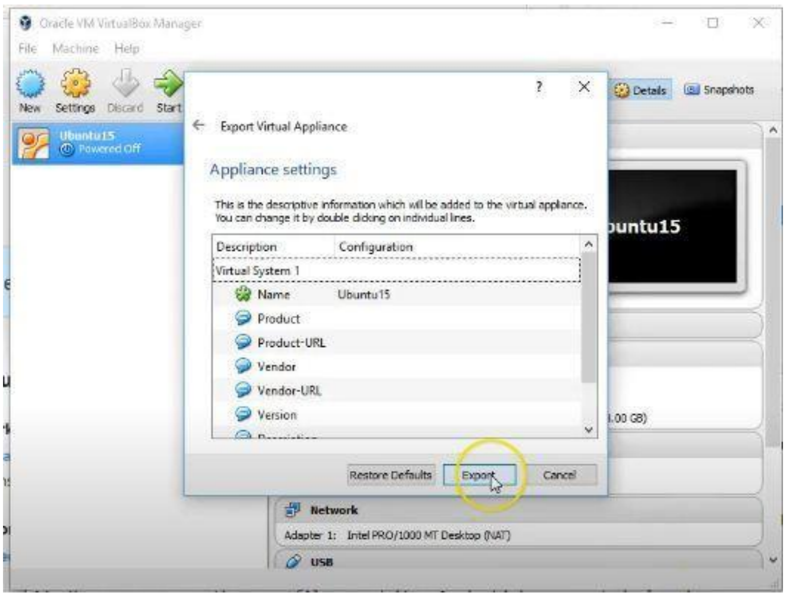
File: C:\Users\Neela\Documents\Ubuntu15.ova

Format: OVF 1.0

□ Write Manifest file

Adapter 1: Intel PRO/1000 MT Desktop (NAT)

5. Select the Import Button on the next window.



Export Virtual Appliance

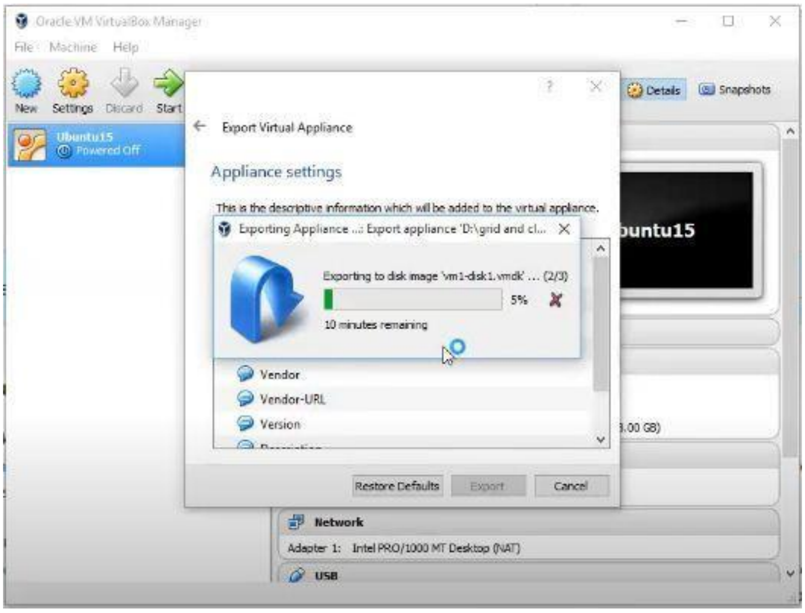
Appliance settings

This is the descriptive information which will be added to the virtual appliance. You can change it by double clicking on individual lines.

Description	Configuration
Virtual System 1	
Name	Ubuntu15
Product	
Product-URL	
Vendor	
Vendor-URL	
Version	

Adapter 1: Intel PRO/1000 MT Desktop (NAT)

6. The Virtual machine will be imported in the desired location.



This is the descriptive information which will be added to the virtual appliance.

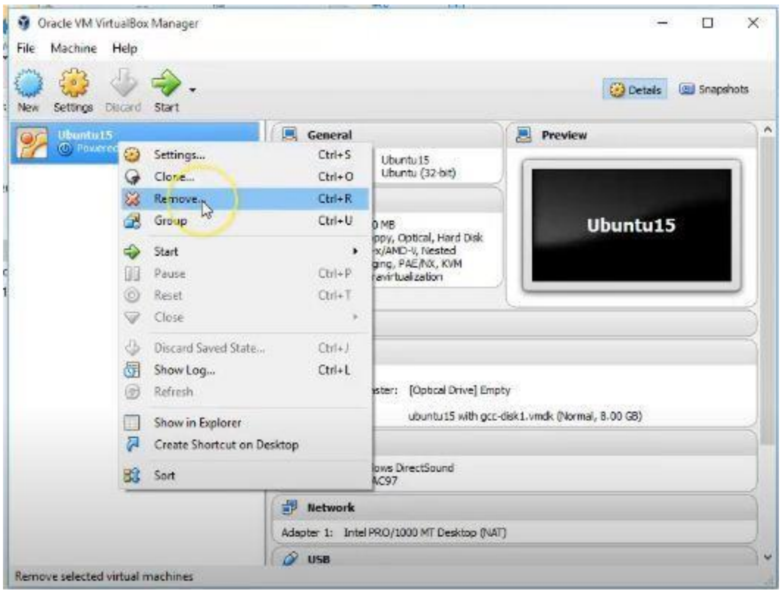
Exporting to disk image 'vm1-disk1.vmdk' ... (2/3)

5%

10 minutes remaining

Adapter 1: Intel PRO/1000 MT Desktop (NAT)

7. Then delete the virtual machine by right click and select Remove option and then click ‘Delete all files’ button in the next window.



Ubuntu15
Ubuntu (32-bit)

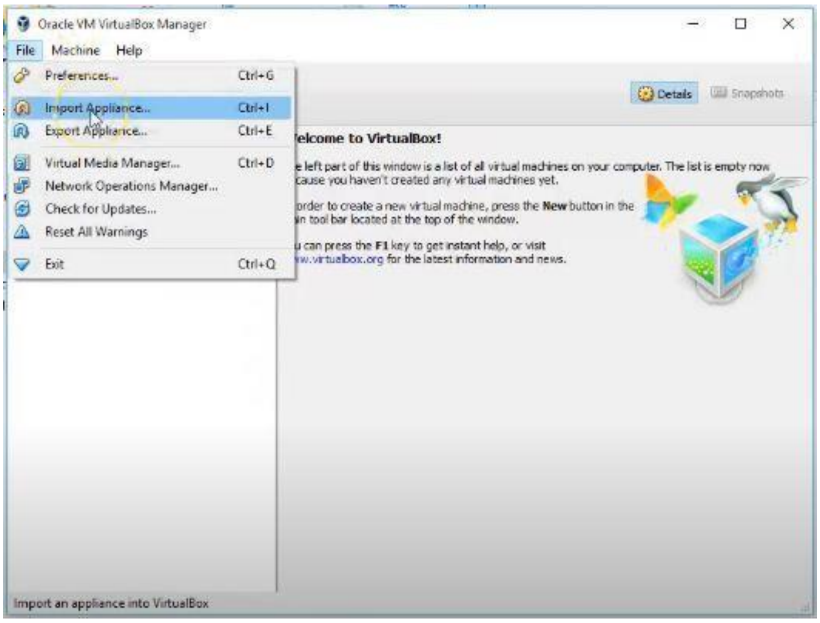
[Optical Drive] Empty

ubuntu15 with gcc-disk1.vmdk (Normal, 8.00 GB)

Adapter 1: Intel PRO/1000 MT Desktop (NAT)

Remove selected virtual machines

8. Select File -> Import Appliance option.


Oracle VM VirtualBox Manager
File
Machine
Help
Preferences... Ctrl+G
Import Appliance... Ctrl+I
Export Appliance... Ctrl+E
Virtual Media Manager... Ctrl+D
Network Operations Manager...
Check for Updates...
Reset All Warnings
Exit Ctrl+Q
Details
Snapshots
Import an appliance into VirtualBox

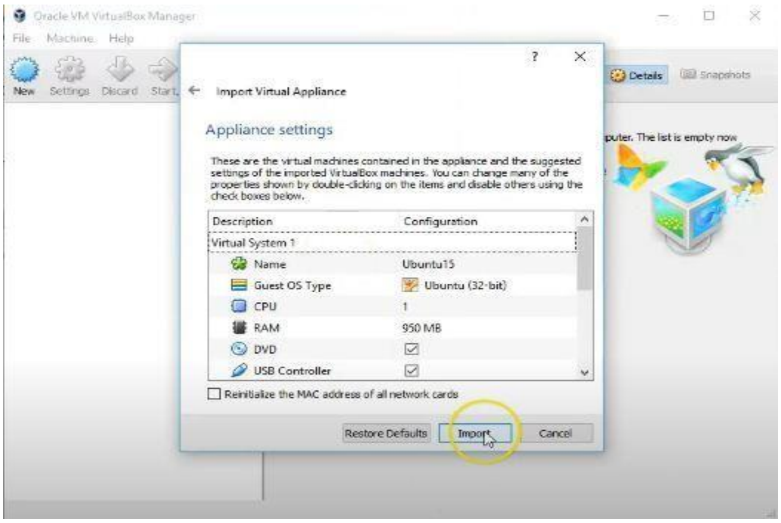
elcome to VirtualBox!

e left part of this window is a list of all virtual machines on your computer. The list is empty now cause you haven't created any virtual machines yet.

order to create a new virtual machine, press the **New** button in the in tool bar located at the top of the window.

u can press the **F1** key to get instant help, or visit ww.virtualbox.org for the latest information and news.

9. Select the folder icon and locate the saved virtual machine image file and click import button.



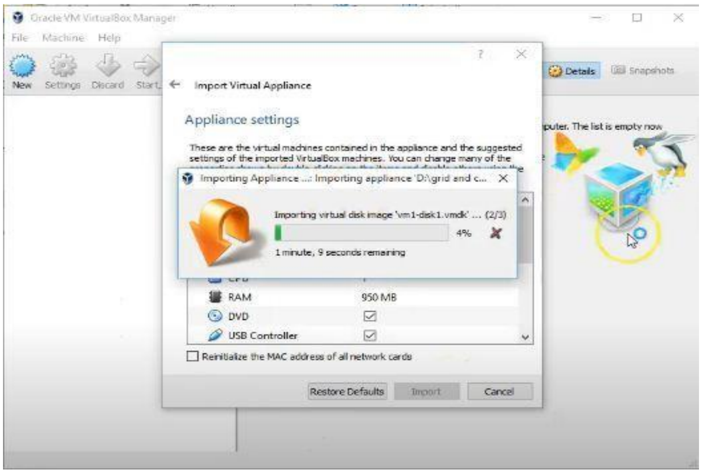
Appliance settings

These are the virtual machines contained in the appliance and the suggested settings of the imported VirtualBox machines. You can change many of the properties shown by double-clicking on the items and disable others using the check boxes below.

Description	Configuration
Virtual System 1	
Name	Ubuntu15
Guest OS Type	Ubuntu (32-bit)
CPU	1
RAM	950 MB
DVD	☑
USB Controller	☑

□ Reinitialize the MAC address of all network cards

puter. The list is empty now



Appliance settings

These are the virtual machines contained in the appliance and the suggested settings of the imported VirtualBox machines. You can change many of the

Importing Appliance ...: Importing appliance 'D:\grid and c...

Importing virtual disk image 'vm1-disk1.vmdk' ... (2/3)

4%

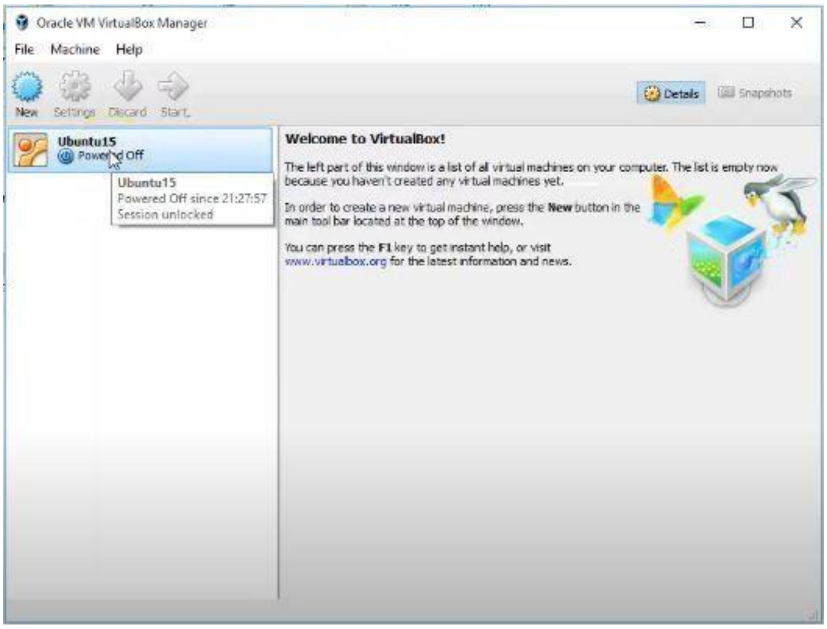
1 minute, 9 seconds remaining

RAM	950 MB
DVD	☑
USB Controller	☑

□ Reinitialize the MAC address of all network cards

puter. The list is empty now

10. Now the virtual machine of the same OS will be displayed with the same user account already created.



Ubuntu15
Powered Off

Ubuntu15
Powered Off since 21:27:57
Session unlocked

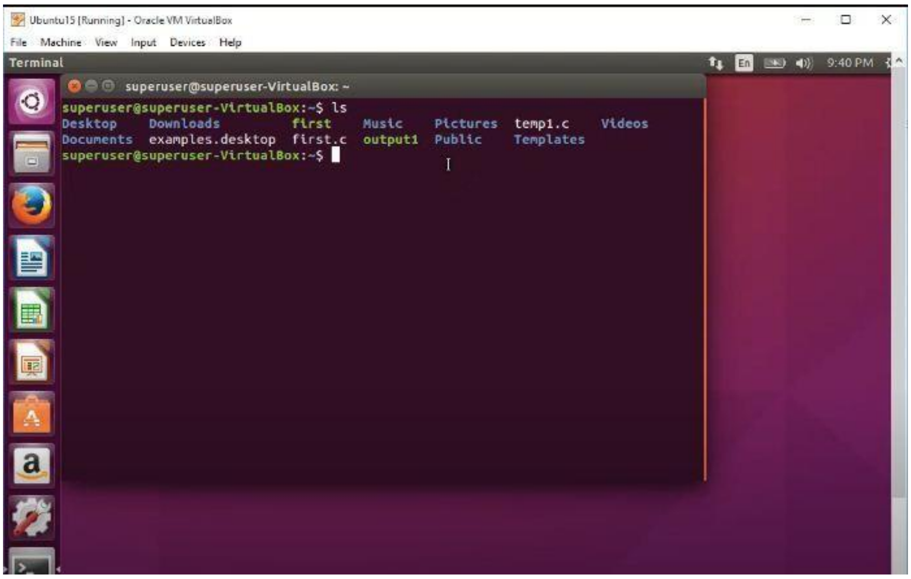
Welcome to VirtualBox!

The left part of this window is a list of all virtual machines on your computer. The list is empty now because you haven't created any virtual machines yet.

In order to create a new virtual machine, press the **New** button in the main tool bar located at the top of the window.

You can press the **F1** key to get instant help, or visit www.virtualbox.org for the latest information and news.

11. Now open the terminal window and type the command 'ls' to check the files which are already created.



Ubuntu15 [Running] - Oracle VM VirtualBox
File
Machine
View
Input
Devices
Help
Terminal
En
9:40 PM
superuser@superuser-VirtualBox: ~

```
superuser@superuser-VirtualBox:~$ ls
Desktop    Downloads         first    Music    Pictures  temp1.c    Videos
Documents  examples.desktop  first.c  output1  Public    Templates
superuser@superuser-VirtualBox:~$ 
```

12. From this, it is verified that the virtual machine is migrated properly in the system.

RESULT:

Thus, the Virtual Machine migration process is completed and verified successfully.

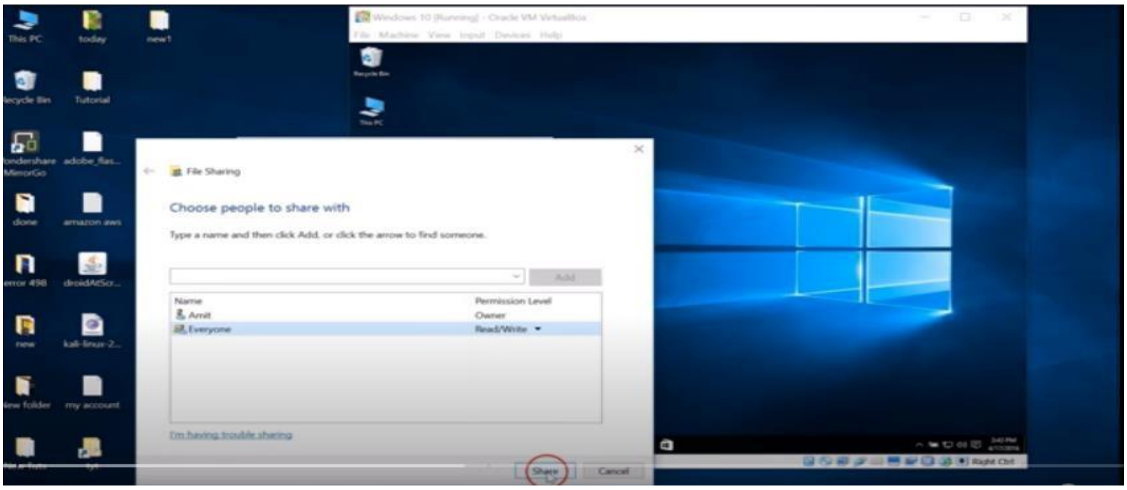
Ex. No. 4	FILE TRANSFERING FROM VIRTUAL MACHINE TO HOST

AIM:

To transfer file from virtual machine to host using Oracle virtual box.

PROCEDURE:

1. Create a Folder in a host machine.
2. Right click on the folder and select the property menu and select the Sharing tab.
3. Click the share button, select everyone in the choose people to share with option and share the folder.



File Sharing

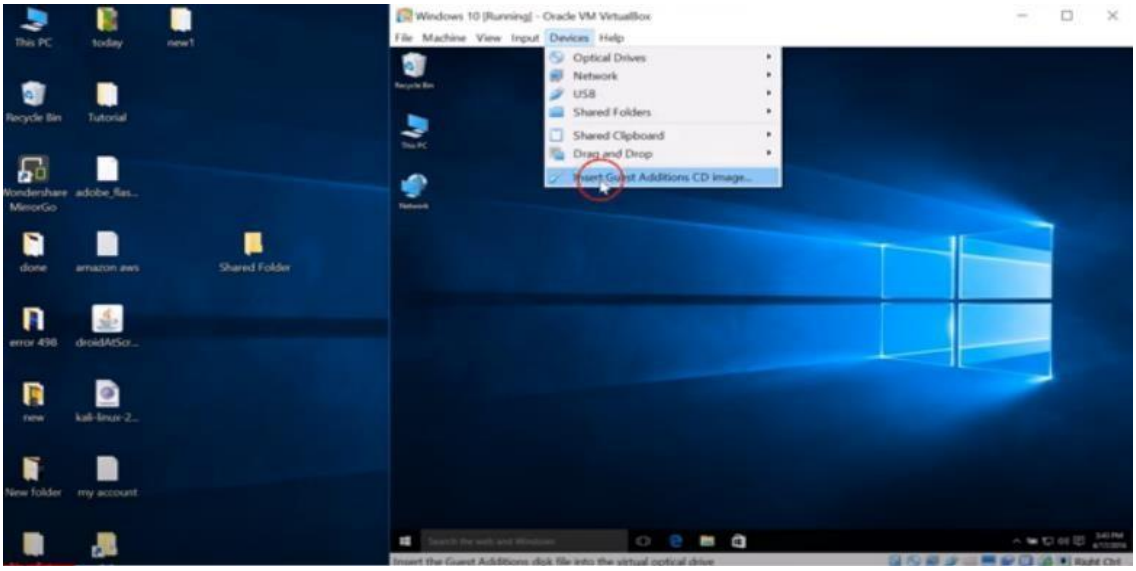
Choose people to share with

Type a name and then click Add, or click the arrow to find someone.

Name	Permission Level
Amit	Owner
Everyone	Read/Write

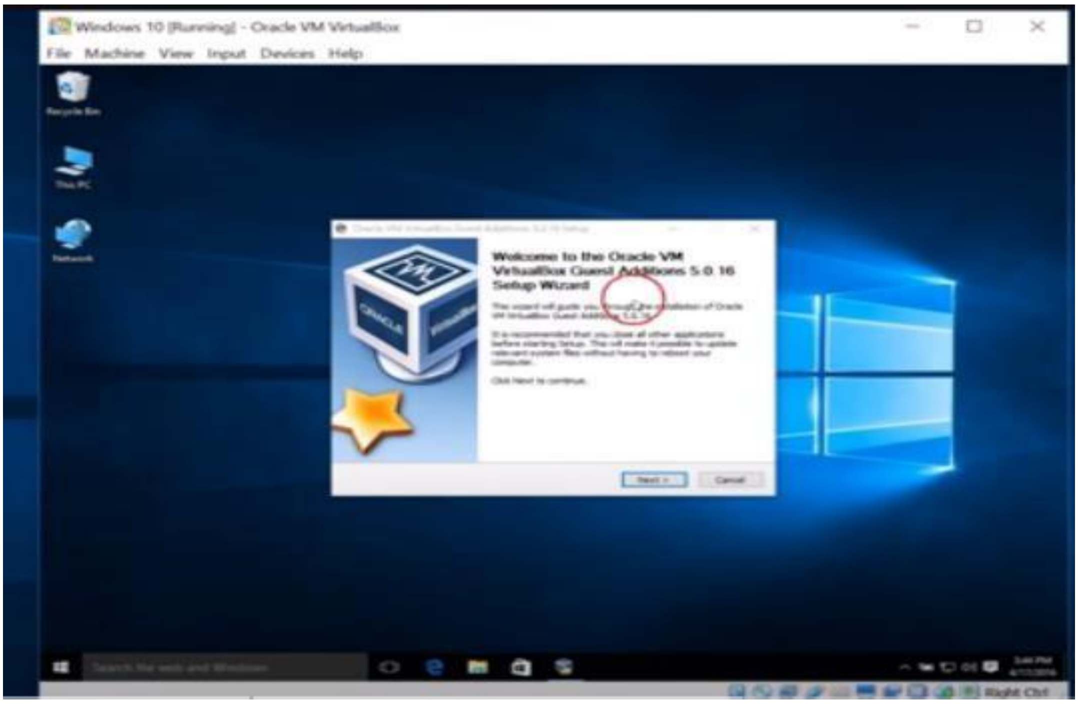
I'm having trouble sharing

4. Start the virtual machine, select the device tab and click on "Insert Guest Addition CD image" option.



Insert the Guest Additions disk file into the virtual optical drive

5. Run VMVBox Windows Additional setup wizard,



Windows 10 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Recycle Bin
This PC
Network
Next >
Cancel
Right Ctrl

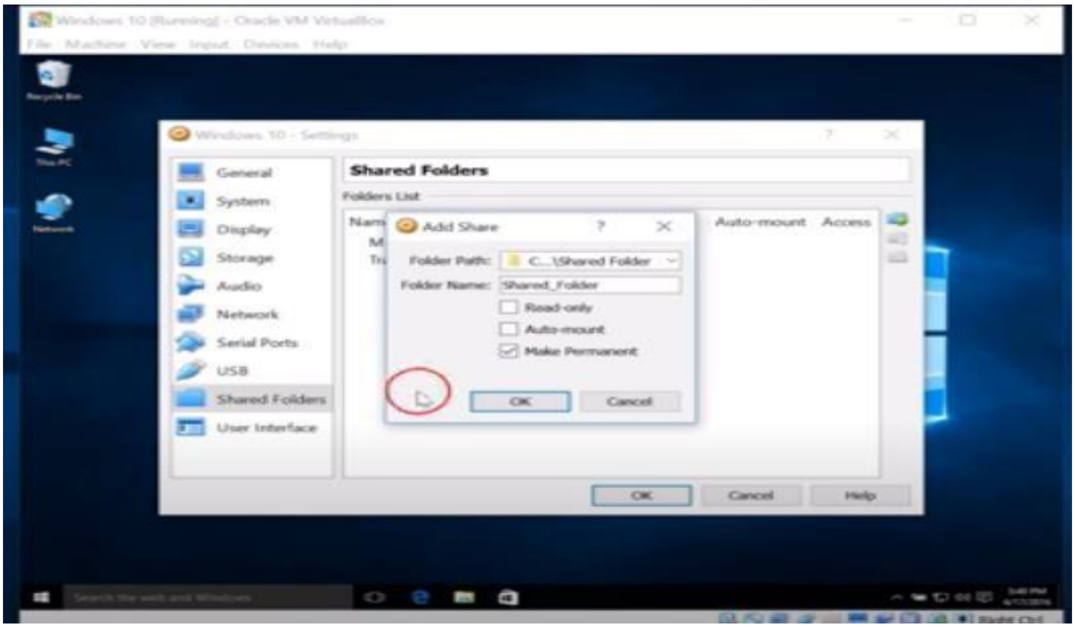
Welcome to the Oracle VM VirtualBox Guest Additions 5.0.16 Setup Wizard

The wizard will guide you through the installation of Oracle VM VirtualBox Guest Additions 5.0.16.

It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.

Click Next to continue.

6. Click Finish button and Restart the host machine.
7. In virtual machine settings, select shared folder option in Devices tab.



Folder Path: C:...\Shared Folder

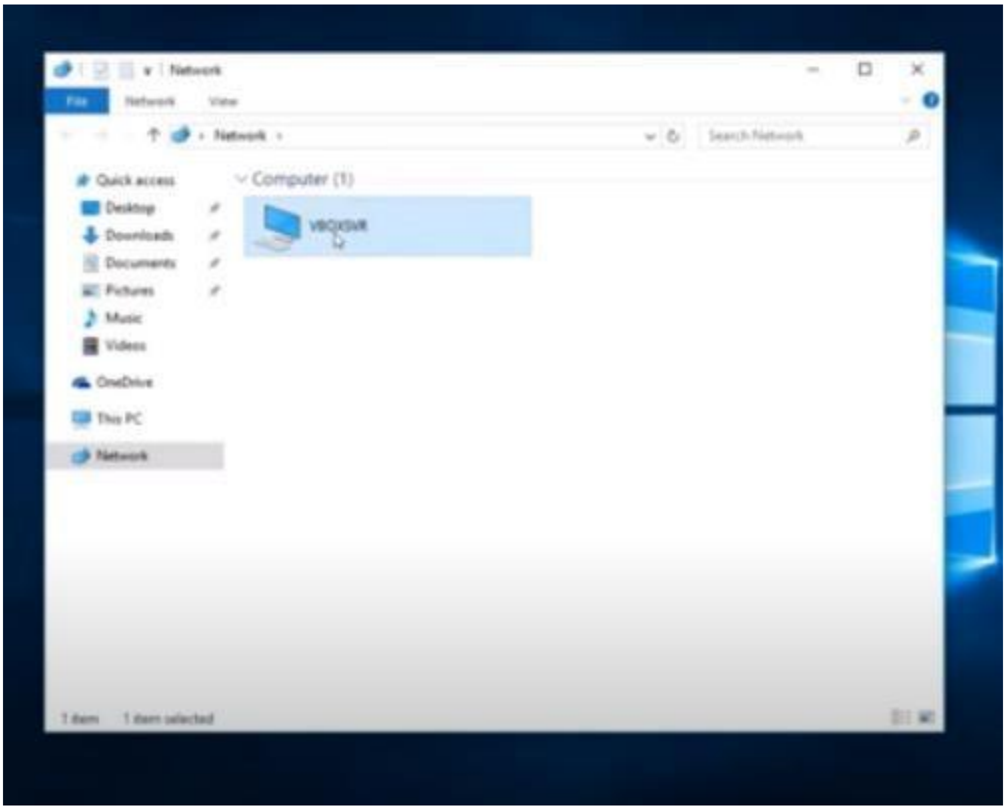
Folder Name: Shared_Folder

☐ Read-only

☐ Auto-mount

☑ Make Permanent

8. In shared Folder menu select the Machine Folders option and add the host shared folder path and select the make permanent option.
9. Now in Folder Explorer of virtual machine, Select the Networks option and turn on the "Network discovery and file sharing" option and refresh to find VBOXSVR.



10. Open the VBOXSVR and find the shared folder of host machine, now the files created in the virtual machine are visible in the host machine and Vice Versa.

RESULT:

Thus, the File transferring from host to virtual machine was executed successfully.

Ex. No. 5	STUDY ON AWS CLOUD

AIM:

To Study about the AWS Cloud.

INTRODUCTION TO AWS CLOUD:

Amazon Web Services (AWS) is a cloud computing platform that provides a wide range of infrastructure and services to individuals, organizations, and governments. AWS offers a broad set of global cloud-based products, including storage, databases, analytics, networking, mobile, development tools, enterprise applications, security, and Internet of Things (IoT).

AWS provides a scalable, secure, and reliable infrastructure to help organizations and individuals deploy their applications and data in the cloud. AWS infrastructure is spread across multiple geographic locations and is designed to provide high availability and resilience to ensure that applications and data are always available.

AWS is a pay-as-you-go service, which means that users only pay for what they use, with no up-front costs or long-term commitments required. AWS offers a range of pricing options, including hourly, monthly, and yearly plans, as well as discounts for reserved instances and savings plans.

AWS SIGN-IN

- Sign in to the AWS Management Console as the root user: When you first create an AWS account, you begin with one sign-in identity that has complete access to all AWS services and resources in the account. This identity is called the AWS account root user and is accessed by signing in with the email address and password that you used to create the account.
- Sign in to the AWS Management Console as an IAM user: An IAM user is an identity created within an AWS account that has permission to interact with AWS resources. IAM users sign-in using their account ID or alias, their user name, and a password. IAM user names are configured by your administrator. IAM user names can be either friendly names, such as Zhang, or email addresses such as zhang@example.com.

CONFIGURING AWS CLOUD:

1. Create an AWS account: If you don't already have one, go to the AWS website and sign up for an AWS account.
2. Choose a region: Choose the region where you want to host your resources. Each region is a separate geographic area with its own data centers.
3. Choose your services: Choose the AWS services you want to use. For example, if you want to host a website, you'll need to set up an EC2 instance and an Elastic Load Balancer.
4. Launch your resources: Once you've chosen your services, you can launch your resources. This typically involves creating an instance or setting up a database.
5. Configure your resources: After you've launched your resources, you'll need to configure them. This might involve setting up security groups, assigning IP addresses, or configuring storage.
6. Test and deploy: Once your resources are set up and configured, you'll want to test your application or website to ensure it's working properly.
7. Monitor and optimize: As you use your AWS resources, you'll want to monitor them to ensure they're performing optimally. You can use AWS monitoring tools like CloudWatch to track your resources and receive alerts when issues arise.

USES OF AWS CLOUD:

There are numerous uses of AWS cloud, as it provides a wide range of cloud computing services and infrastructure that can be used to support many different types of applications and workloads. Here are some common uses of AWS cloud:

1. Hosting websites and web applications: AWS can be used to host websites and web applications, with services like Amazon EC2 and Amazon S3 providing compute and storage resources.
2. Developing and deploying mobile applications: AWS provides a range of services that can be used to develop, test, and deploy mobile applications, including AWS Mobile Hub and AWS Device Farm.
3. Running big data and analytics workloads: AWS provides services like Amazon EMR, Amazon Redshift, and Amazon Kinesis for running big data and analytics workloads, allowing users to process and analyze large amounts of data quickly and efficiently.

4. Deploying and managing containers: AWS provides services like Amazon Elastic Container Service (ECS) and Amazon Elastic Kubernetes Service (EKS) for deploying and managing containerized applications.
5. Running machine learning models: AWS provides services like Amazon SageMaker and Amazon Rekognition for building, training, and deploying machine learning models in the cloud.
6. Disaster recovery and backup: AWS can be used to set up disaster recovery and backup solutions, with services like Amazon Glacier and AWS Backup providing secure and durable storage for data backups.
7. Internet of Things (IoT) applications: AWS provides a range of services for building and managing IoT applications, including Amazon IoT Core and AWS IoT Analytics.

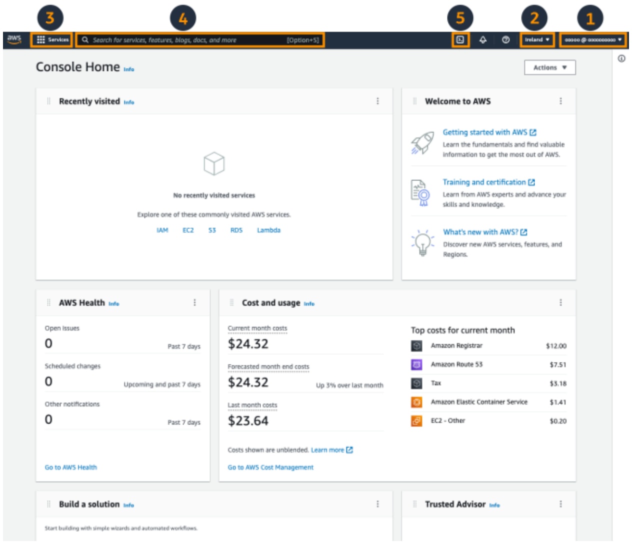
These are just a few examples of the many uses of AWS cloud. With its wide range of services and infrastructure, AWS can be used for many different types of applications and workloads, providing a flexible and scalable platform for businesses and organizations of all sizes.

AWS MANAGEMENT CONSOLE:

After signing up for a new AWS account and logging in, you will see the console dashboard. This is the starting point for interacting with the various AWS services and other important console components. The dashboard consists of a navigation bar at the top and a number of widgets in the main body of the page, which you can configure and rearrange. AWS is developing more widgets so you can further customize your console experience.

We will start by taking a look at the navigation bar at the top. In the image to the right, we have highlighted five controls within the navigation bar:

1. Account information
2. Region selector
3. Service selector
4. Search box
5. AWS CloudShell



No recently visited services

Explore one of these commonly visited AWS services.

Learn the fundamentals and find valuable information to get the most out of AWS.

Learn from AWS experts and advance your skills and knowledge.

Discover new AWS services, features, and Regions.

Open issues
0 Past 7 days

Scheduled changes
0 Upcoming and past 7 days

Other notifications
0 Past 7 days

Current month costs
$24.32

Forecasted month end costs
$24.32 Up 3% over last month

Last month costs
$23.64

Top costs for current month

Amazon Registrar	$12.00
Amazon Route 53	$7.51
Tax	$3.18
Amazon Elastic Container Service	$1.41
EC2 - Other	$0.20

Costs shown are unblended. Learn more

Start building with simple wizards and automated workflows.

AWS COMMAND LINE INTERFACE:

The AWS Command Line Interface (AWS CLI) is a unified tool to manage your AWS services. With just one tool to download and configure, you can control multiple AWS services from the command line and automate them through scripts.

The AWS CLI v2 offers several new features including improved installers, new configuration options such as AWS IAM Identity Center (successor to AWS SSO), and various interactive features. The AWS CLI enables you to start running commands that implement functionality equivalent to that provided by the browser-based AWS Management Console from the command prompt in your terminal program:

- **Linux shells** – Use common shell programs such as bash, zsh, and tcsh to run commands in Linux or macOS.
- **Windows command line** – On Windows, run commands at the Windows command prompt or in PowerShell.
- **Remotely** – Run commands on Amazon Elastic Compute Cloud (Amazon EC2) instances through a remote terminal program such as PuTTY or SSH, or with AWS Systems Manager.

All IaaS (infrastructure as a service) AWS administration, management, and access functions in the AWS Management Console are available in the AWS API and AWS CLI. New AWS IaaS features and services provide full AWS Management Console functionality through the API and CLI at launch or within 180 days of launch.

The AWS CLI provides direct access to the public APIs of AWS services. You can explore a service's capabilities with the AWS CLI, and develop shell scripts to manage your resources. In addition to the low-level, API-equivalent commands, several AWS services provide customizations for the AWS CLI. Customizations can include higher-level commands that simplify using a service with a complex API.

RESULT:

Thus, the study about AWS cloud is made successfully.

Ex. No. 6	INSTALLATION OF CLOUDSTACK

AIM:

To install Apache Cloudstack in Server.

PROCEDURE:

1. Install the CloudStack management server dependencies:
   sudo yum install -y java-1.8.0-openjdk python-setuptools mysql-connector-java maven tomcat
2. Install MySQL server and client:
   sudo yum install -y mariadb mariadb-server
3. Start the MySQL service and enable it to start on boot:
   sudo systemctl start mariadb
   sudo systemctl enable mariadb
4. Run the MySQL secure installation script and follow the prompts to set the root password and other security options:
   sudo mysql_secure_installation
5. Download the CloudStack source code:
   git clone https://github.com/apache/cloudstack.git
6. Navigate to the CloudStack directory:
   cd cloudstack
7. Build the CloudStack management server:
   mvn -P developer -Dsimulator -DskipTests clean install
8. Deploy the CloudStack management server to Tomcat:
   sudo mv ./client/target/cloud-client-ui-4.15.0.0-SNAPSHOT.war
   /var/lib/tomcat/webapps/client.war
   sudo mv ./server/target/cloudstack-management-4.15.0.0-SNAPSHOT.war
   /var/lib/tomcat/webapps/client.war
9. Configure the CloudStack database:
   cd /usr/share/cloudstack-management/setup/db/
   sudo ./create-schema.sh
   sudo ./cloudstack-awsapi.sql
   sudo ./cloudstack-setup-databases cloud:password@localhost --deploy-as=root

10. Configure the CloudStack management server:

    ```
    cd /etc/cloudstack/management/
    sudo cp -p db.properties.template db.properties
    ```

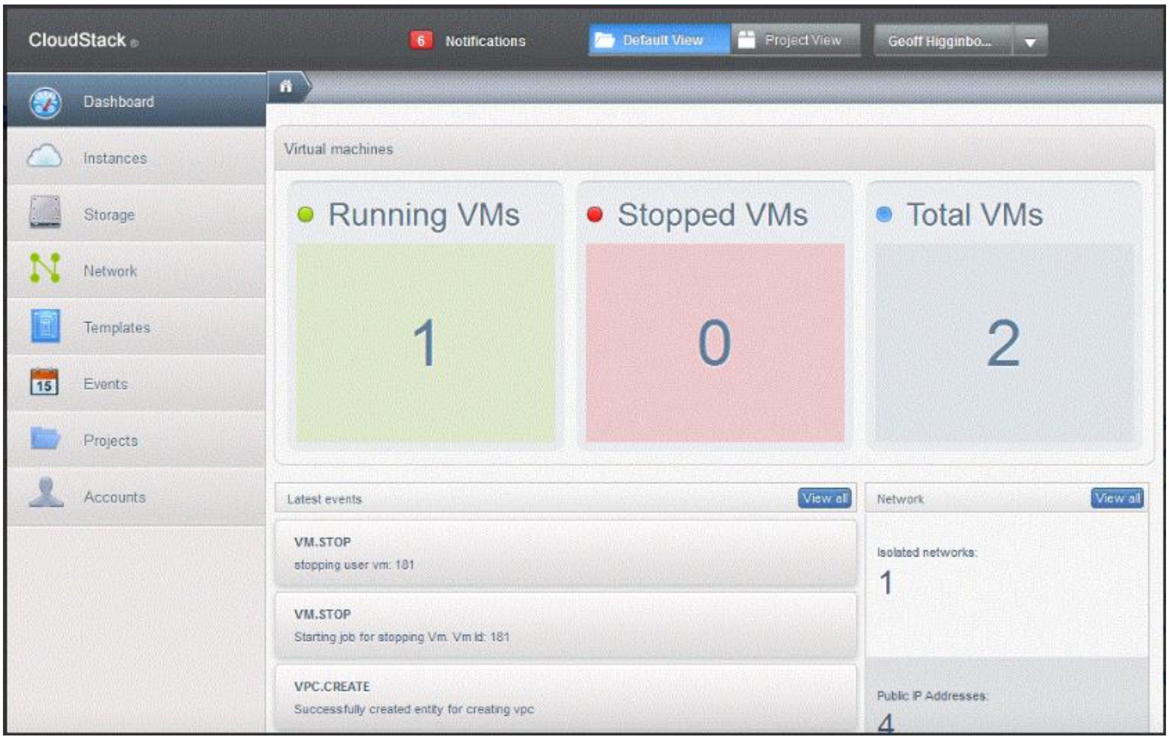
11. Edit the db.properties file to match your MySQL configuration:

    ```
    sudo vi db.properties
    ```

12. Restart Tomcat to apply the changes:

    ```
    sudo systemctl restart tomcat
    ```

13. Access the CloudStack web interface by navigating to http://your-server-ip/client in your web browser.



VM.STOP
stopping user vm: 181

VM.STOP
Starting job for stopping Vm. Vm id: 181

VPC.CREATE
Successfully created entity for creating vpc

RESULT:

Thus, the Apache CloudStack was successfully installed in the Server.

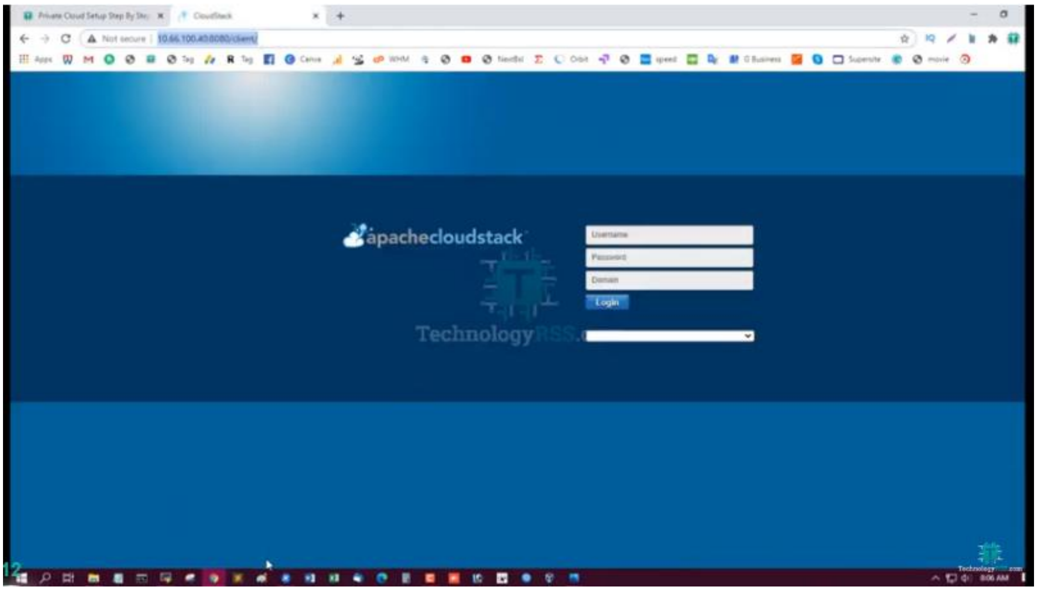
Ex. No. 7	PRIVATE CLOUD DEPLOYMENT USING CLOUDSTACK

AIM:

To deploy private cloud using CloudStack.

PROCEDURE:

1. Log in to the CloudStack web interface as an administrator.



2. Navigate to the "Infrastructure" tab and click "Zones".
3. Click "Add Zone" and fill in the following information:

   Zone Name: The name of your zone

   Zone Type: Choose "Advanced" for more control over your network configuration

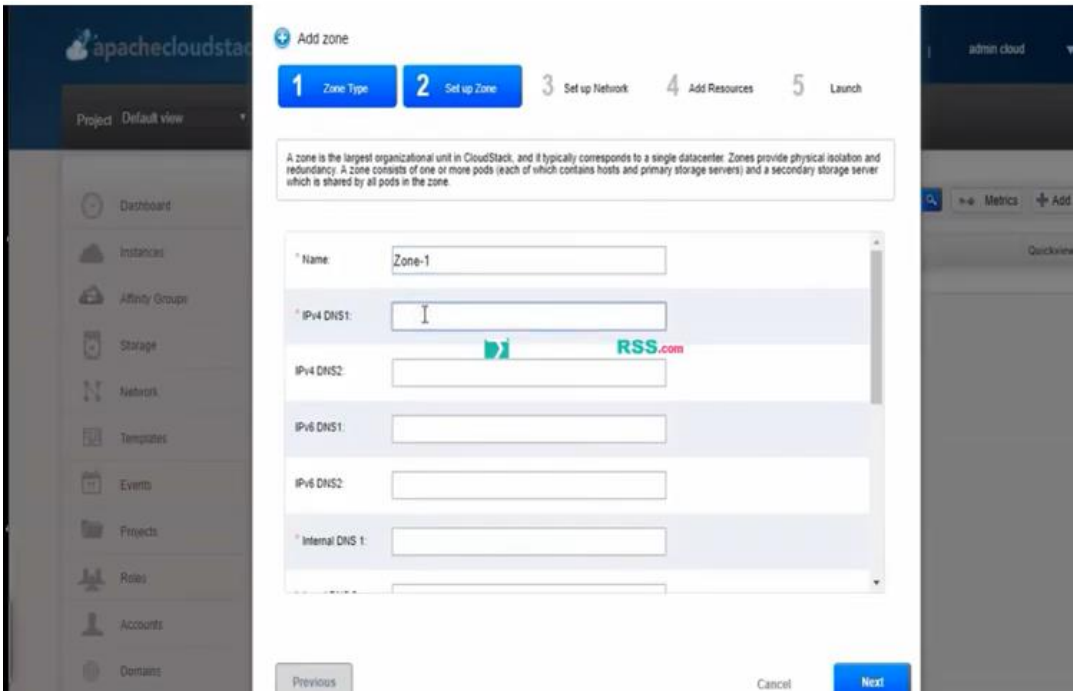
   DNS Type: Choose "Virtual" if you want CloudStack to manage DNS for your virtual machines

   Guest CIDR: The CIDR block for your guest network (e.g. 10.1.1.0/24)

   VLAN: Choose "No" if you don't want to use VLANs, or "Yes" if you do

   Network Offerings: Choose the network offerings that you want to make available in this zone

   Primary Storage: Choose the primary storage provider that you want to use (e.g. NFS)



A zone is the largest organizational unit in CloudStack, and it typically corresponds to a single datacenter. Zones provide physical isolation and redundancy. A zone consists of one or more pods (each of which contains hosts and primary storage servers) and a secondary storage server which is shared by all pods in the zone.

* Name: Zone-1

* IPv4 DNS1:

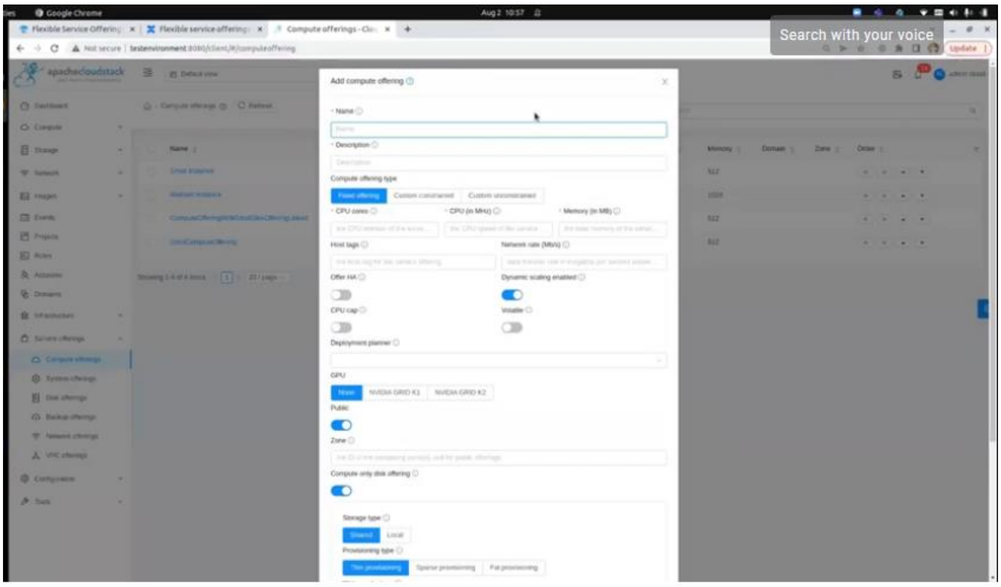
IPv4 DNS2:

IPv6 DNS1:

IPv6 DNS2:

* Internal DNS 1:

4. Click "Next" and fill in the following information:
   Hypervisor: Choose the hypervisor that you want to use (e.g. KVM)
   Hosts: Add the hosts that you want to use in this zone
5. Click "Next" and fill in the following information:
   Storage: Choose the storage provider that you want to use for secondary storage (e.g. NFS)
   System VMs: Choose the system VM template that you want to use (e.g. CentOS 7)
6. Click "Next" and review your settings. Click "Finish" to create the zone.
7. Navigate to the "Compute" tab and click "Service Offerings".
8. Click "Add Service Offering" and fill in the following information:
   Name: The name of your service offering
   CPU: The number of CPU cores to allocate
   Memory: The amount of memory to allocate (in MB)
   Network Rate: The network rate for your virtual machines (in Mbps)



Add compute offering

* Name

* Description

Compute offering type: [✓ Fixed offering] Custom constrained Custom unconstrained

* CPU cores

* CPU (in MHz)

* Memory (in MB)

Host tags

Network rate (Mb/s)

Offer HA: ○

Dynamic scaling enabled: ●

CPU cap: ○

Volatile: ○

Deployment planner

GPU: [✓ None] NVIDIA GRID K1 NVIDIA GRID K2

Public: ●

Zone

Compute only disk offering: ●

Storage type: [✓ Shared] Local

Provisioning type: [✓ Thin provisioning] Sparse provisioning Fat provisioning

9. Click "Next" and review your settings. Click "Finish" to create the service offering.
10. Navigate to the "Compute" tab and click "Templates".
11. Click "Add Template" and fill in the following information:

    Name: The name of your template

    URL: The URL for your template (e.g. http://mirror.centos.org/centos/7/os/x86_64/)

    Format: The format of your template (e.g. QCOW2)

    Zone: Choose the zone where you want to register the template

    OS Type: The type of operating system that your template is based on (e.g. Linux)

    Password Enabled: Choose "Yes" if you want to set a default password for your virtual machines
12. Click "Next" and review your settings. Click "Finish" to register the template.
13. Navigate to the "Compute" tab and click "Instance Groups".
14. Click "Add Instance Group" and fill in the following information:

    Name: The name of your instance group

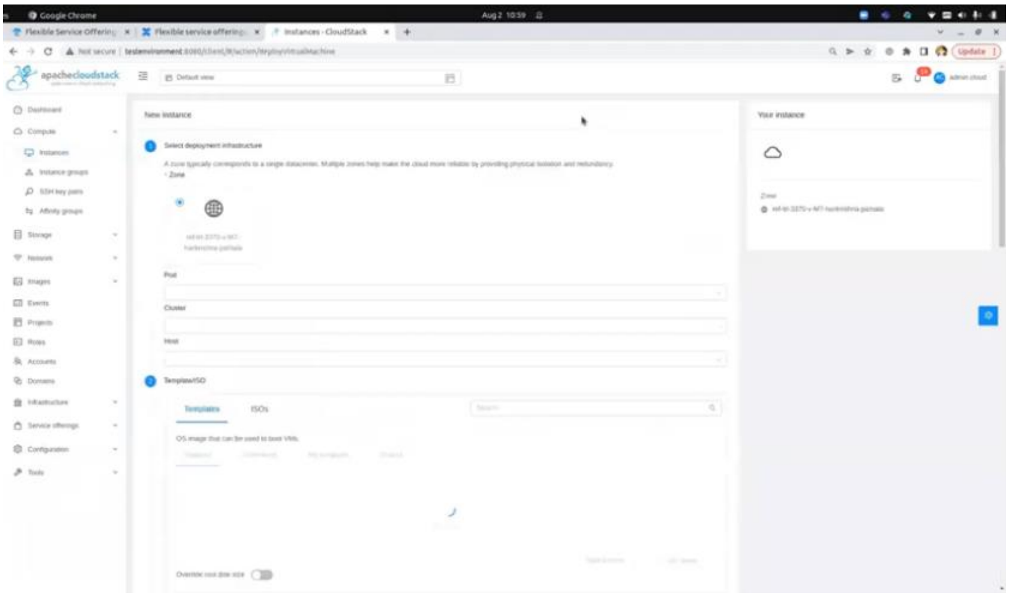
    Description: A brief description of your instance group

    Zone: The zone where you want to create the instance group

    Network: The network that you want to use for your virtual machines

    Service Offering: The service offering that you want to use for your virtual machines

    Template: The template that you want to use for your virtual machines



New instance

1 Select deployment infrastructure

A zone typically corresponds to a single datacenter. Multiple zones help make the cloud more reliable by providing physical isolation and redundancy.

- Zone

Pod

Cluster

Host

2 Template/ISO

OS image that can be used to boot VMs.

Override root disk size

15. Click "Next" and review

RESULT:

Thus, the private cloud environment is deployed using Apache cloudstack management.

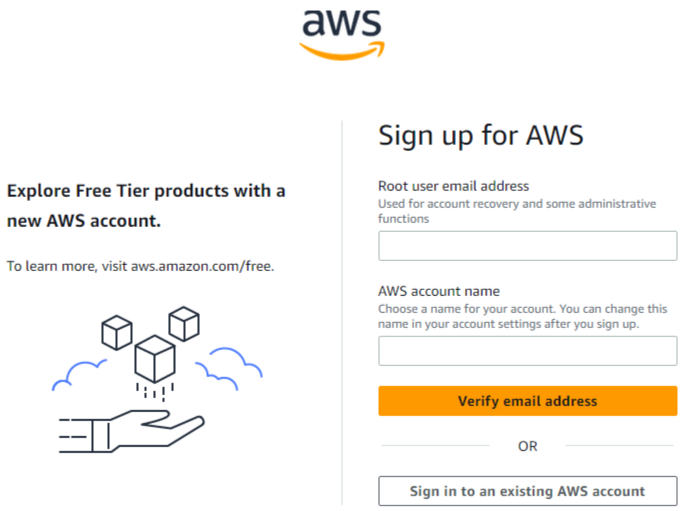
Ex. No. 8	**IMPLEMENTATION OF AMAZON EC2 SERVICE**

AIM:

To Implement Amazon EC2 service in the server.

PROCEDURE:

1. Sign up for an AWS account: If you don't already have one, create an account at aws.amazon.com.



Explore Free Tier products with a new AWS account.

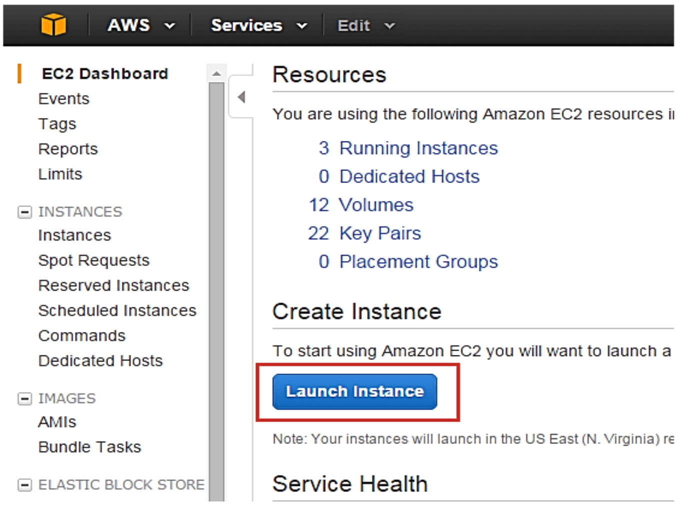
To learn more, visit aws.amazon.com/free.

Sign up for AWS

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.

2. Create a new EC2 instance: Once you are signed in to your AWS account, navigate to the EC2 dashboard. From there, you can launch a new EC2 instance. You'll need to select the operating system and instance type that you want to use.



Resources

You are using the following Amazon EC2 resources i

3 Running Instances
0 Dedicated Hosts
12 Volumes
22 Key Pairs
0 Placement Groups

Create Instance

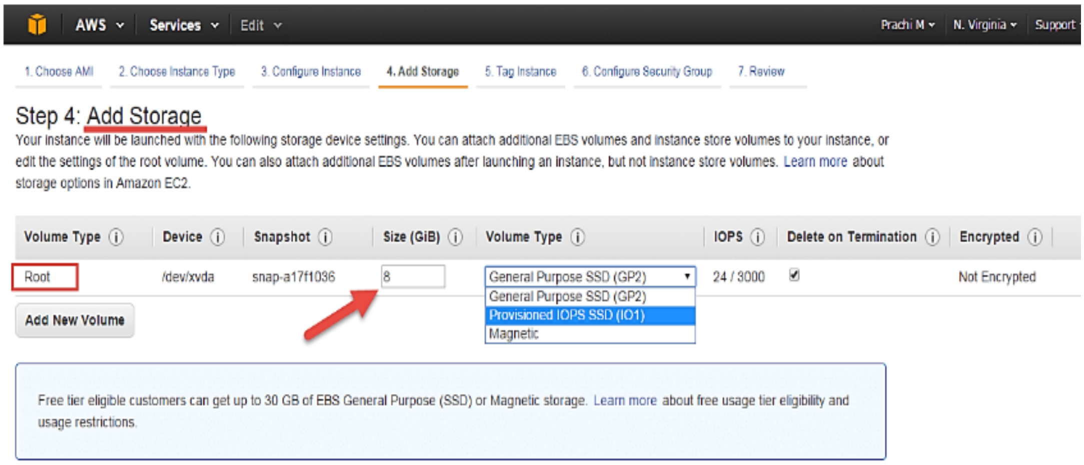
To start using Amazon EC2 you will want to launch a

Note: Your instances will launch in the US East (N. Virginia) re

Service Health

3. Configure security settings: When you create a new EC2 instance, you'll also need to set up security settings. You can configure firewall rules to control incoming and outgoing traffic to your instance.

4. Connect to your instance: Once your instance is up and running, you can connect to it using SSH or Remote Desktop, depending on your operating system.
5. Install software: Once you have connected to your instance, you can install any software you need. This could include web servers, databases, or other applications.
6. Set up storage: You'll also need to set up storage for your EC2 instance. This could include using Amazon EBS to attach additional disks, or using Amazon S3 for object storage.



Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. Learn more about storage options in Amazon EC2.

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Delete on Termination	Encrypted
Root	/dev/xvda	snap-a17f1036	8	General Purpose SSD (GP2)	24 / 3000	☑	Not Encrypted

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. Learn more about free usage tier eligibility and usage restrictions.

7. Monitor your instance: Finally, it's important to monitor your EC2 instance to make sure it is running smoothly. You can use Amazon CloudWatch to monitor resource usage and set up alerts for when certain thresholds are reached.

RESULT:

Thus the Amazon EC2 service is installed successfully.

Ex. No. 9

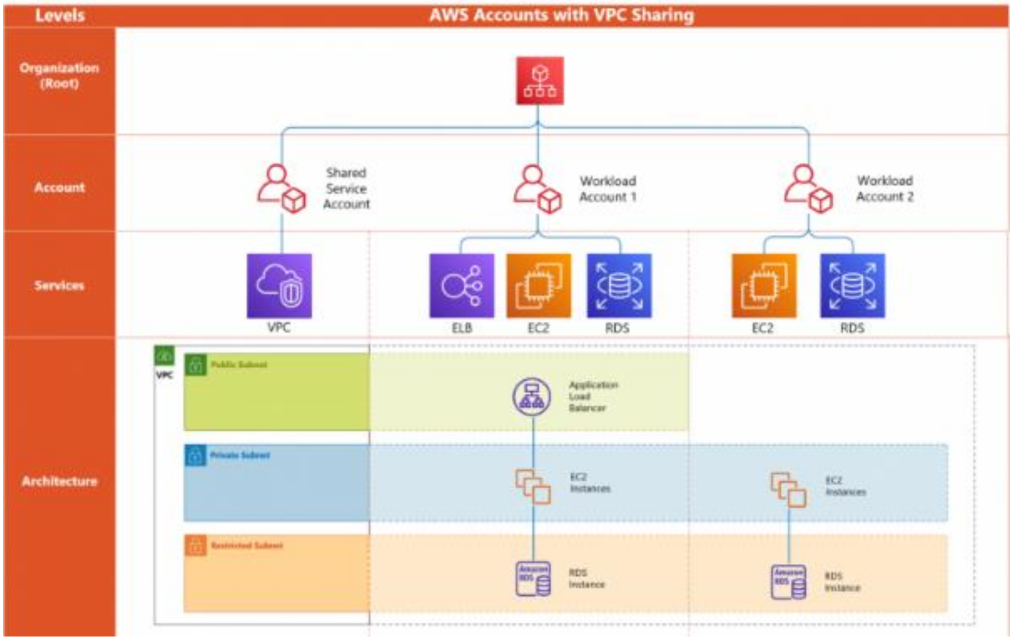
PRIVATE CLOUD IMPLEMENTATION IN AMAZON EC2 SERVICE

AIM:

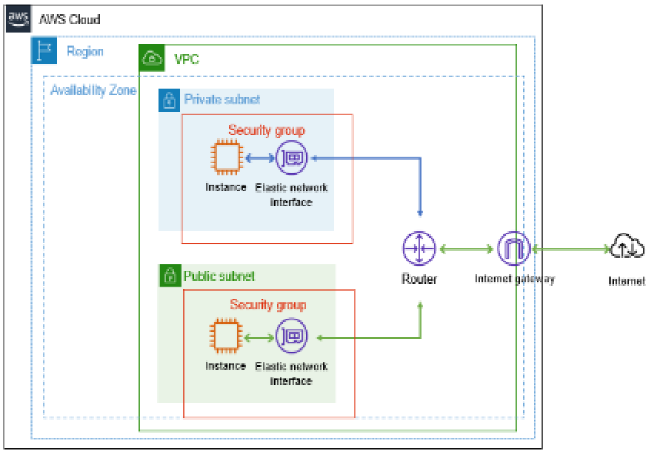
To implement Private Cloud Environment in Amazon EC2 Service.

PROCEDURE:

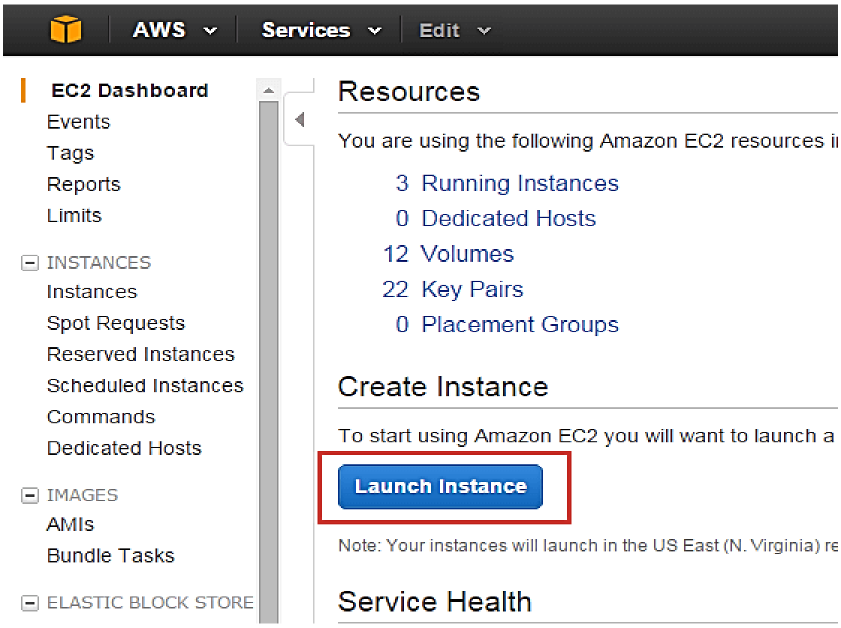
1. Create a Virtual Private Cloud (VPC): A VPC is a virtual network that you can configure in EC2 to isolate your resources from other AWS customers. You can create a VPC through the AWS Management Console or the AWS Command Line Interface (CLI).



2. Create subnets: Within your VPC, you can create subnets that define different portions of your network. For example, you might create one subnet for your web servers and another for your database servers. This helps to improve security and performance.



3. Configure security groups: Security groups are like firewalls that control incoming and outgoing traffic to your instances. You can configure security groups to allow or deny specific types of traffic to your instances.
4. Launch EC2 instances: EC2 instances are virtual machines that you can launch in your VPC. You can choose from a variety of instance types and operating systems to meet your needs.



Resources

You are using the following Amazon EC2 resources i

3 Running Instances
0 Dedicated Hosts
12 Volumes
22 Key Pairs
0 Placement Groups

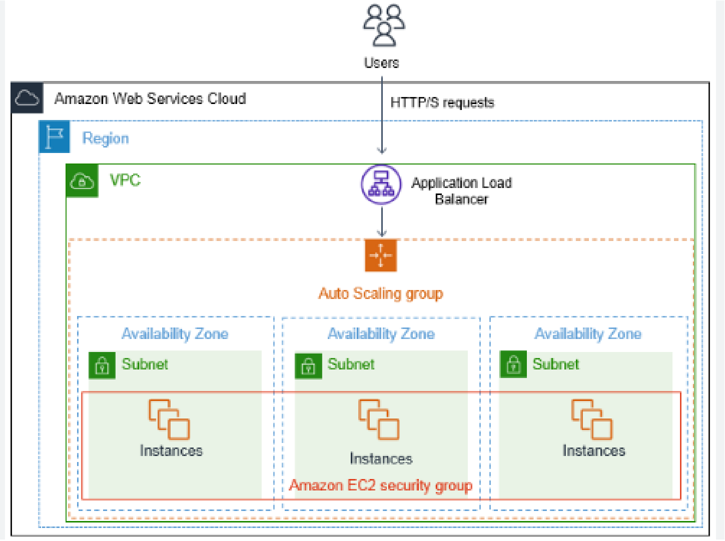
Create Instance

To start using Amazon EC2 you will want to launch a

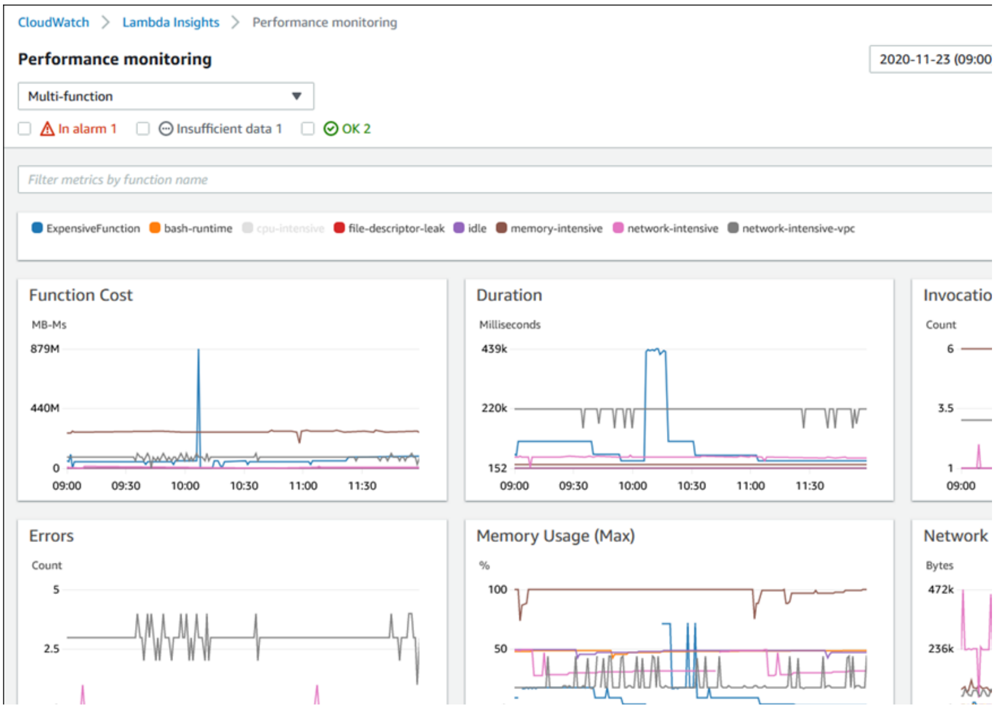
Note: Your instances will launch in the US East (N. Virginia) re

Service Health

5. Configure instances: Once you have launched your instances, you can configure them with the necessary software and settings. For example, you might install a web server, a database server, or other applications.
6. Set up load balancing and autoscaling: To improve performance and availability, you can set up load balancing and autoscaling. Load balancing distributes traffic across multiple instances, while autoscaling automatically adds or removes instances based on demand.



7. Back up data: To ensure data is protected, it is recommended to regularly back up data using AWS services such as Amazon S3, Amazon EBS snapshots or third-party solutions.
8. Monitor and optimize performance: To ensure optimal performance, you can monitor your instances using AWS CloudWatch and other tools. You can also optimize performance by adjusting instance types, network configurations, and other settings.



RESULT:

Thus, the private cloud implementation using Amazon EC2 service was made successfully.

Ex. No. 10	STUDY OF AWS FOUNDATIONAL SECURITY

AIM:

To Study about AWS Foundational security in detail.

AWS FOUNDATIONAL SECURITY:

- The AWS Foundational Security Best Practices standard is a set of controls that detect when your deployed accounts and resources deviate from security best practices.
- You can use this standard to continually evaluate all of your AWS accounts and workloads and quickly identify areas of deviation from best practices.
- The standard provides actionable and prescriptive guidance on how to improve and maintain your organization’s security posture.
- The controls include best practices from across multiple AWS services.
- Each control is assigned a category that reflects the security function that it applies to.
- For more information, see Control categories in the AWS Security Hub User Guide.

USING THIS FRAMEWORK TO SUPPORT YOUR AUDIT PREPARATION:

- You can use the AWS Foundational Security Best Practices framework to help you prepare for audits.
- This framework includes a prebuilt collection of controls with descriptions and testing procedures.
- These controls are grouped into control sets according to AWS Foundational Security Best Practices requirements.
- You can also customize this framework and its controls to support internal audits with specific requirements.
- Using the framework as a starting point, you can create an Audit Manager assessment and start collecting evidence that’s relevant for your audit.
- After you create an assessment, Audit Manager starts to assess resources in your AWS accounts and services.
- It does this based on the controls that are defined in the AWS Foundational Security Best Practices framework.
- When it's time for an audit, you—or a delegate of your choice—can review the evidence that Audit Manager collected. Either, you can browse the evidence folders in your

assessment and choose which evidence you want to include in your assessment report. Or, if you enabled evidence finder, you can search for specific evidence and export it in CSV format, or create an assessment report from your search results.

- Either way, you can use this assessment report to show that your controls are working as intended.
- The AWS Foundational Security Best Practices framework details are as follows

Framework name in AWS Audit Manager	**Number of automated controls**	**Number of manual controls**	**Number of control sets**	**AWS services in scope**
AWS Foundational Security Best Practices	154	0	29	AWS Security Hub

- The controls in this AWS Audit Manager framework aren't intended to verify if your systems are compliant with AWS Foundational Security Best Practices.
- Moreover, they can't guarantee that you'll pass an AWS Foundational Security Best Practices audit.
- You can find this framework under the Standard frameworks tab of the Framework library in Audit Manager.

CONTROL CATEGORIES:

- Each control is assigned a category. The category for a control reflects the security function that the control applies to.
- The category value contains the category, the subcategory within the category, and, optionally, a classifier within the subcategory. For example:

  Identify > Inventory

  Protect > Data protection > Encryption of data in transit
- Identify: Develop the organizational understanding to manage cybersecurity risk to systems, assets, data, and capabilities.
- Protect: Develop and implement the appropriate safeguards to ensure delivery of critical infrastructure services and secure coding practices.
- Detect: Develop and implement the appropriate activities to identify the occurrence of a cybersecurity event.

- Respond: Develop and implement the appropriate activities to take action regarding a detected cybersecurity event.
- Recover: Develop and implement the appropriate activities to maintain plans for resilience and to restore any capabilities or services that were impaired due to a cybersecurity event.

Key advantages of AWS Foundational Security:

1. Best practice guidance: AWS Foundational Security provides customers with a comprehensive set of best practices for securing their cloud infrastructure. These best practices are based on industry standards and recommendations, and are regularly updated to reflect the latest threats and security trends.
2. Simplified security management: By following the best practices outlined in AWS Foundational Security, customers can simplify their security management processes. This includes automating the deployment and management of security controls, as well as streamlining identity and access management policies.
3. Compliance and risk management: AWS Foundational Security provides a framework for achieving and maintaining compliance with various regulatory requirements such as PCI DSS, HIPAA, and SOC 2. This helps customers reduce their risk exposure to security breaches and data loss.
4. Improved incident response: AWS Foundational Security provides guidance on how to prepare for and respond to security incidents in the cloud. This includes best practices for detecting and investigating security incidents, as well as guidelines for recovering from data loss or system disruptions.
5. Security monitoring and logging: AWS Foundational Security provides guidance on how to implement effective security monitoring and logging in the cloud. This includes best practices for collecting and analyzing security logs, as well as guidelines for implementing intrusion detection and prevention systems.

RESULT:

Thus, the study about Amazon AWS Foundational security was made successfully.

CONTENT BEYOND SYLLABUS

Ex. No. 11	**STUDY OF GI CLOUD (MEGHRAJ)**

AIM:

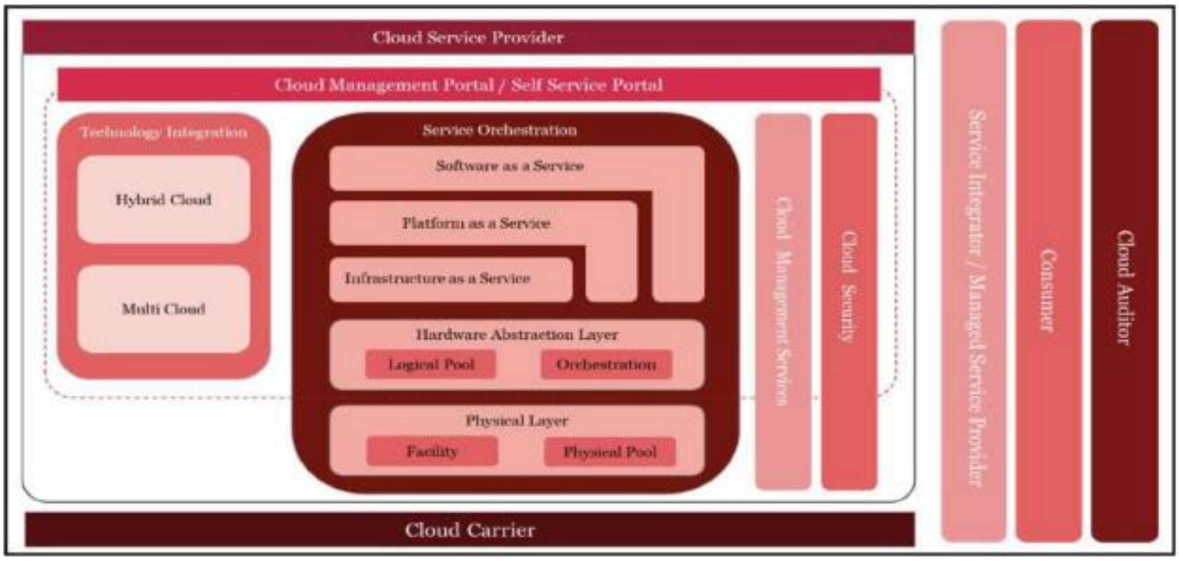
To study and understand the features of GI Cloud (Meghraj).

INTRODUCTION:

Government of India has referenced the Conceptual Reference Model of National Institute of Standards and Technology's (NIST). A requirement to design a GI Cloud Reference Architecture arose to standardize on the nomenclature of terms, various actors and their roles & responsibilities in the GI cloud ecosystem. This document has been prepared to address the requirement of GI Cloud Reference architecture.

The GI Cloud Reference Architecture has been designed to assist the Government Departments to build their Cloud deployment architecture with components, activities and actors as relevant in the GI Cloud ecosystem. The Reference architecture proposed in the document is a vendor neutral architecture and has been designed by adopting widely used and recognized cloud reference architecture and their components.

GI CLOUD REFERENCE ARCHITECTURE



The figure above details the various building block which make up the GI Cloud Reference Architecture. This Reference architecture may be leveraged as a framework to build/design Cloud deployments/environment. GI CRA comprises of the following essential components/entities:

- Consumer
- Cloud Service Provider
- Service Orchestration
- Cloud Management/Self-service Portal
- Cloud Services Management
- Cloud Security and privacy
- Cloud Carrier
- Managed Service Provider/Service Integrator
- Cloud Auditor

In order to utilize and harness the benefits of Cloud Computing, Government of India embarked upon an ambitious initiative – “GI Cloud” which has been coined as ‘Meghraj’. The focus of this initiative is to accelerate delivery of e-services in the country while optimizing ICT spending of the Government. MeitY has embarked upon several initiatives in order to proliferate the Cloud adoption across the various departments and agencies and streamline the processes involved. The various initiatives are summarized as below:

1. Procurement of cloud services through gem
2. Empanelment of cloud service offerings of csp
3. Audit status of cloud service providers
4. Details of audited cloud service providers
5. Cloud guidelines

RESULT:

Thus, the study about GI cloud(MEGHRAJ) was made successfully.