त्रिभवनु ववश्ववद्यालय

Tribhuvan University

Patan Multiple Campus

Bachelor in Information Technology (BIT)

PRACTICAL FILE

Subject : Cloud Computing

Course No: BIT407

Semester: 7thd Semester

Submitted To:

Sachita Nanda Mishra

BIT, Patan Multiple Campus

Submitted By:

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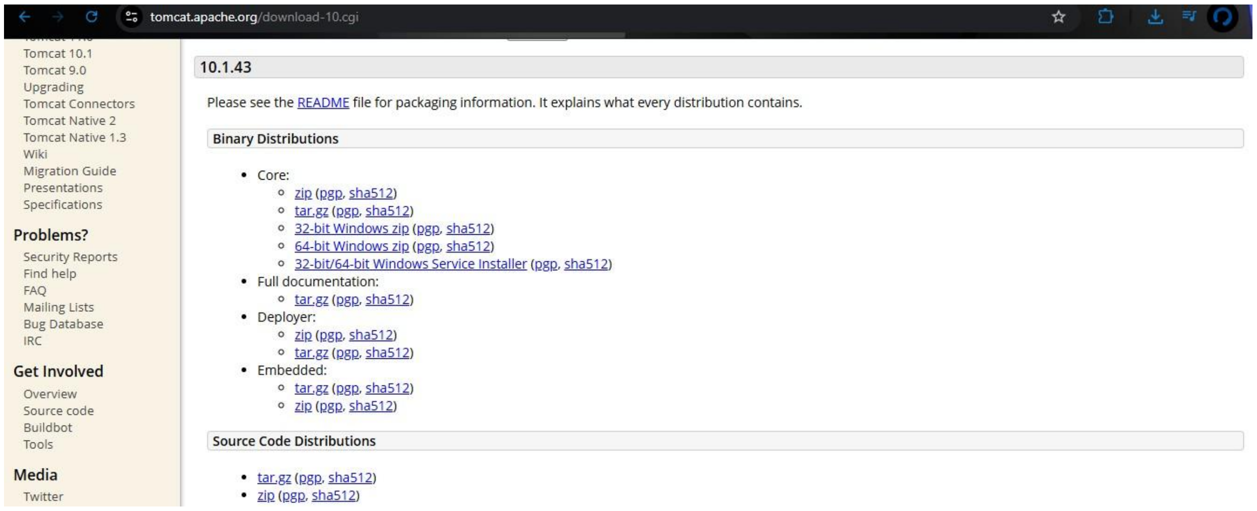
Roll No: 594/078

S.N.	**Title**	**Date**	**Signature**
1	Installation and Testing of tomcat Server on Java IDE		
2	SOAP Web Service in Java (JAX-WS)		
3	Consuming SOAP Web services in java		
4	Implement Windows Hyper V virtualization		
5	Implement Virtualization using VirtualBox		
6	Simulate a cloud scenario using CloudSim		
7	Installation and testing of Hadoop single node cluster on windows		
8	Map reduce word count program using java		
9	Develop and application for Google App Engine		

Lab-1 Installation and testing of Apache Tomcat in Java IDE

Step 1: Download Tomcat from https://tomcat.apache.org/download-10.cgi



10.1.43

Please see the README file for packaging information. It explains what every distribution contains.

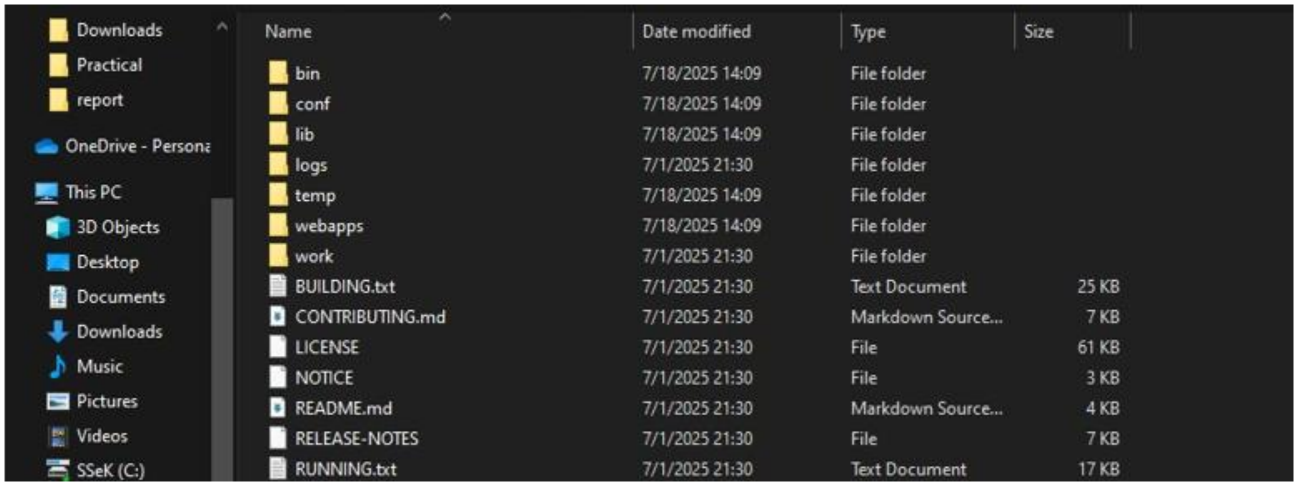
Binary Distributions

- Core:
  - zip (pgp, sha512)
  - tar.gz (pgp, sha512)
  - 32-bit Windows zip (pgp, sha512)
  - 64-bit Windows zip (pgp, sha512)
  - 32-bit/64-bit Windows Service Installer (pgp, sha512)
- Full documentation:
  - tar.gz (pgp, sha512)
- Deployer:
  - zip (pgp, sha512)
  - tar.gz (pgp, sha512)
- Embedded:
  - tar.gz (pgp, sha512)
  - zip (pgp, sha512)

Source Code Distributions

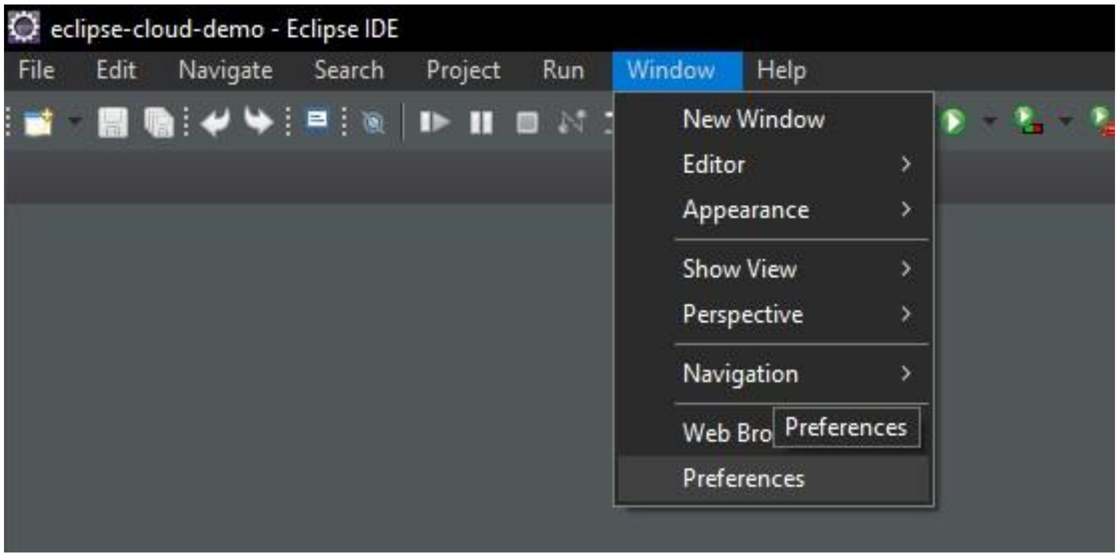
- tar.gz (pgp, sha512)
- zip (pgp, sha512)

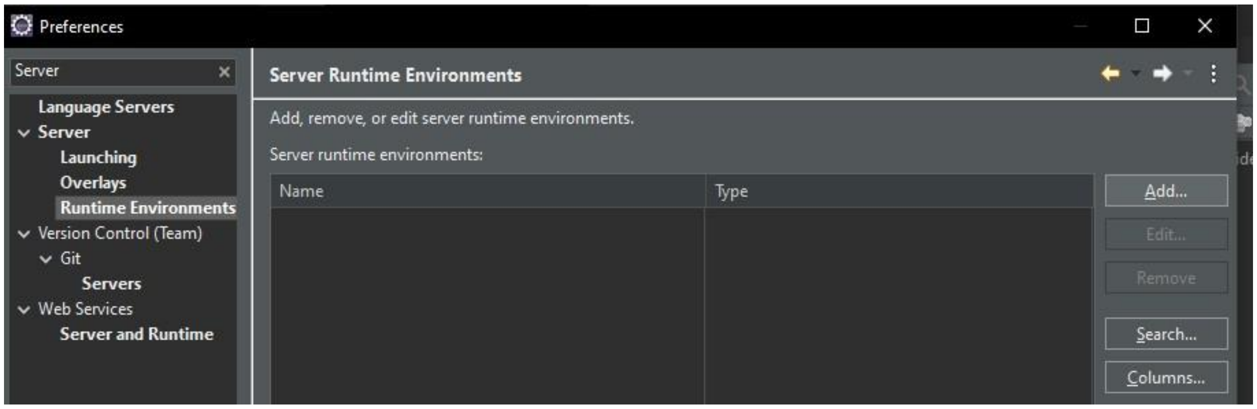
Step 2: Extract/Install



Name	Date modified	Type	Size
bin	7/18/2025 14:09	File folder	
conf	7/18/2025 14:09	File folder	
lib	7/18/2025 14:09	File folder	
logs	7/1/2025 21:30	File folder	
temp	7/18/2025 14:09	File folder	
webapps	7/18/2025 14:09	File folder	
work	7/1/2025 21:30	File folder	
BUILDING.txt	7/1/2025 21:30	Text Document	25 KB
CONTRIBUTING.md	7/1/2025 21:30	Markdown Source...	7 KB
LICENSE	7/1/2025 21:30	File	61 KB
NOTICE	7/1/2025 21:30	File	3 KB
README.md	7/1/2025 21:30	Markdown Source...	4 KB
RELEASE-NOTES	7/1/2025 21:30	File	7 KB
RUNNING.txt	7/1/2025 21:30	Text Document	17 KB

Step 3: Add Tomcat to IDE

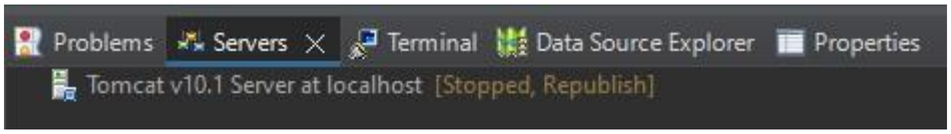




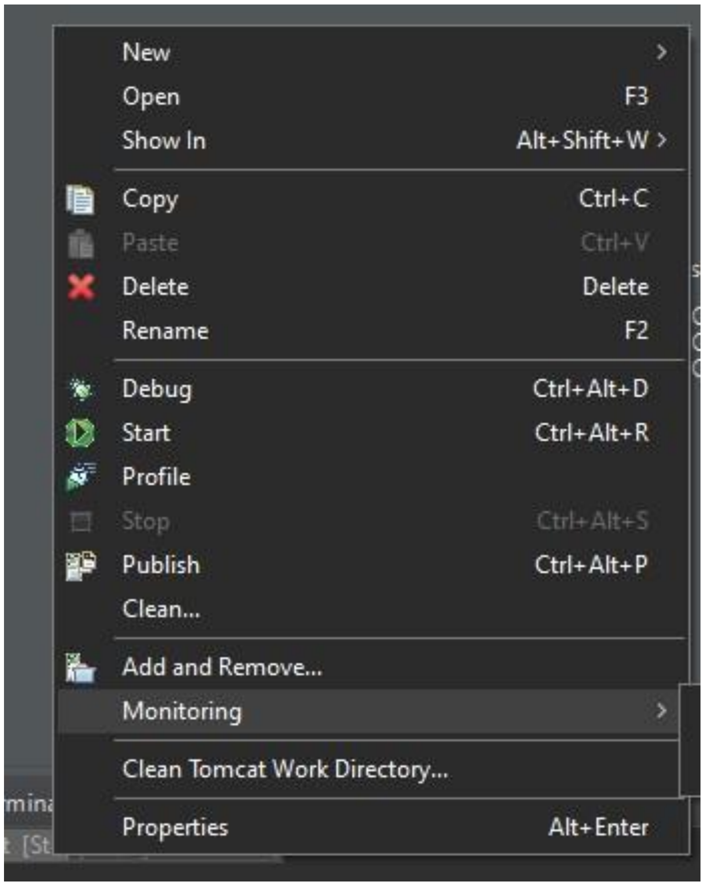
Add, remove, or edit server runtime environments.

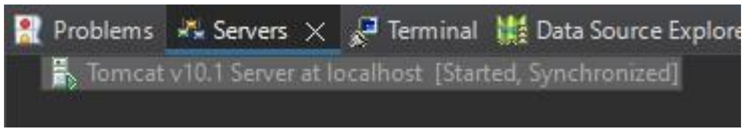
Server runtime environments:

Step 4: Attempt to run

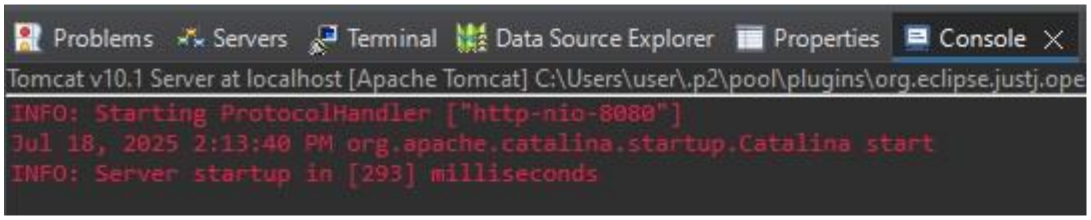


Tomcat v10.1 Server at localhost [Stopped, Republish]





Tomcat v10.1 Server at localhost [Started, Synchronized]

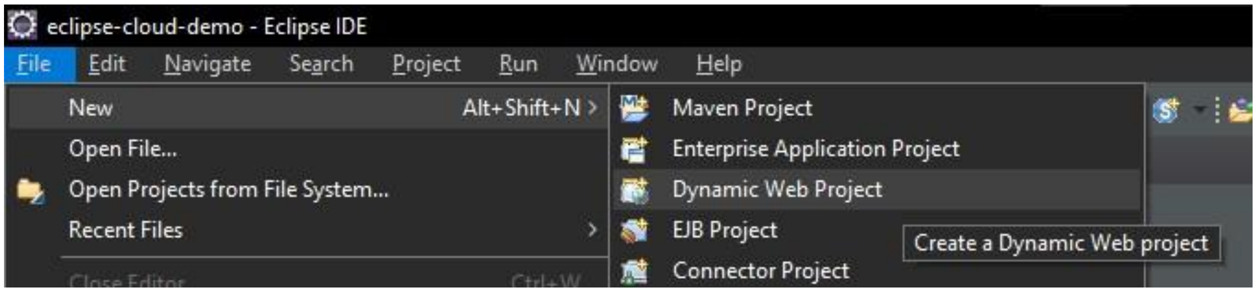


```
Tomcat v10.1 Server at localhost [Apache Tomcat] C:\Users\user\.p2\pool\plugins\org.eclipse.justj.ope
INFO: Starting ProtocolHandler ["http-nio-8080"]
Jul 18, 2025 2:13:40 PM org.apache.catalina.startup.Catalina start
INFO: Server startup in [293] milliseconds
```

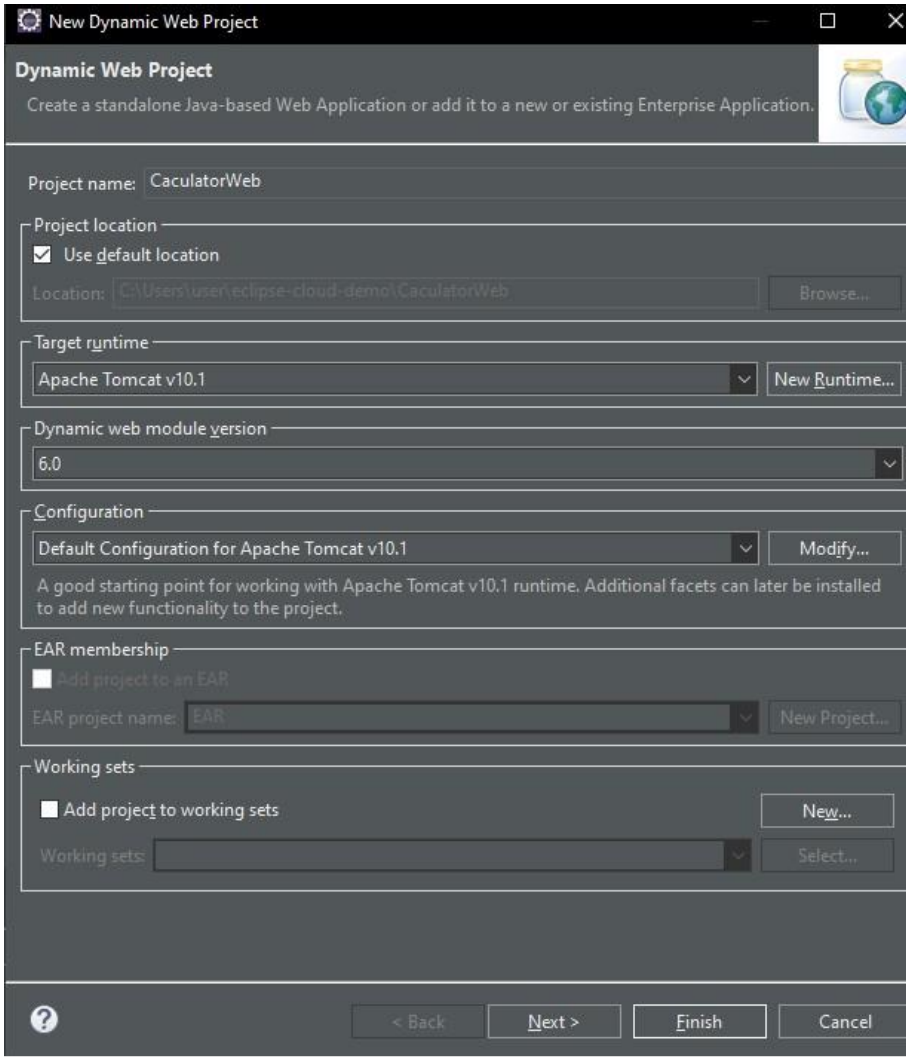
Lab-2 SOAP Web Service in Java (JAX-WS)

Develop a simple SOAP based Web Service in Java using JAX-WS, called as "CalculatorService".

Step 1: Create a new Java Web application project



Enter name and select finish



Create a standalone Java-based Web Application or add it to a new or existing Enterprise Application.

Project name: CaculatorWeb

Project location

Use default location [✓]

Location: C:\Users\user\eclipse-cloud-demo\CaculatorWeb

Target runtime: Apache Tomcat v10.1

Dynamic web module version: 6.0

Configuration: Default Configuration for Apache Tomcat v10.1

A good starting point for working with Apache Tomcat v10.1 runtime. Additional facets can later be installed to add new functionality to the project.

EAR membership

Add project to an EAR

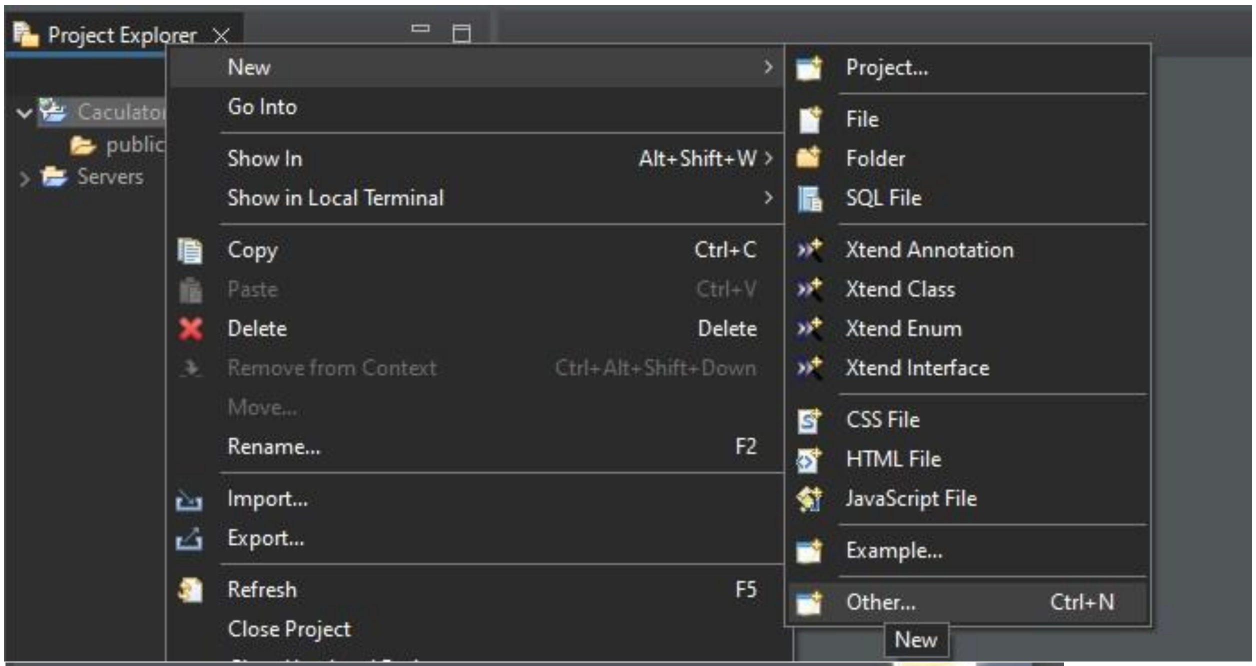
EAR project name: EAR

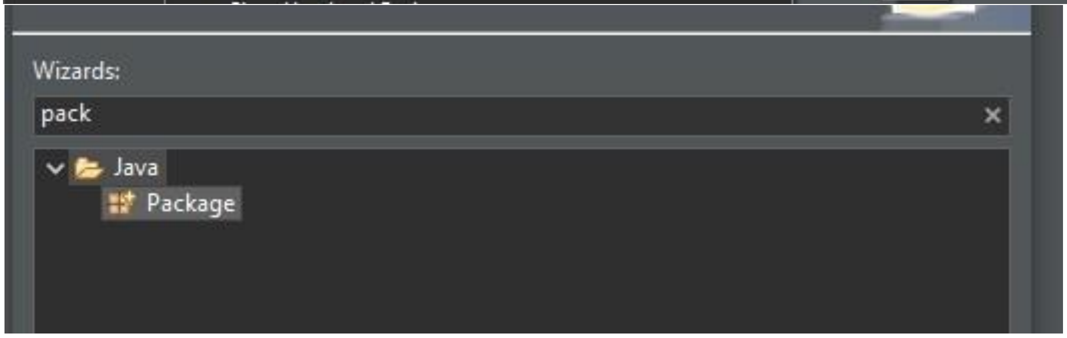
Working sets

Add project to working sets

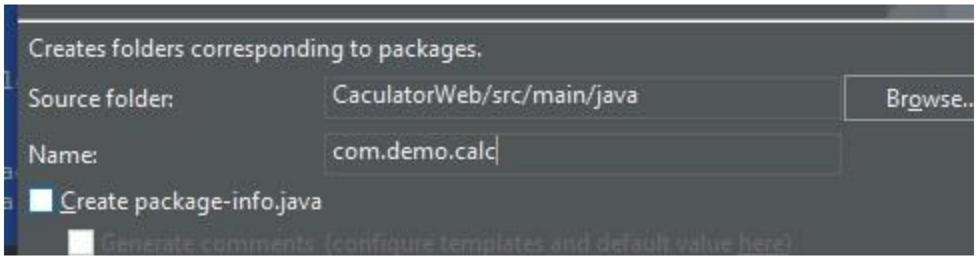
Working sets:

Step 2: Add a web service




Wizards:

pack


Creates folders corresponding to packages.

Source folder: CaculatorWeb/src/main/java

Name: com.demo.calc

Create package-info.java

Browse...
Generate comments (configure templates and default value here)

Create a CalculatorService.java class with

```
package com.demo.calc;  import
javax.xml.ws.Endpoint;  public class
CalculatorPublisher {      public static
void main(String[] args) {
        String url = "http://localhost:8080/CalculatorService";
        Endpoint.publish(url, new CalculatorService());
        System.out.println("Service published at: " + url + "?wsdl");
    }
}
```

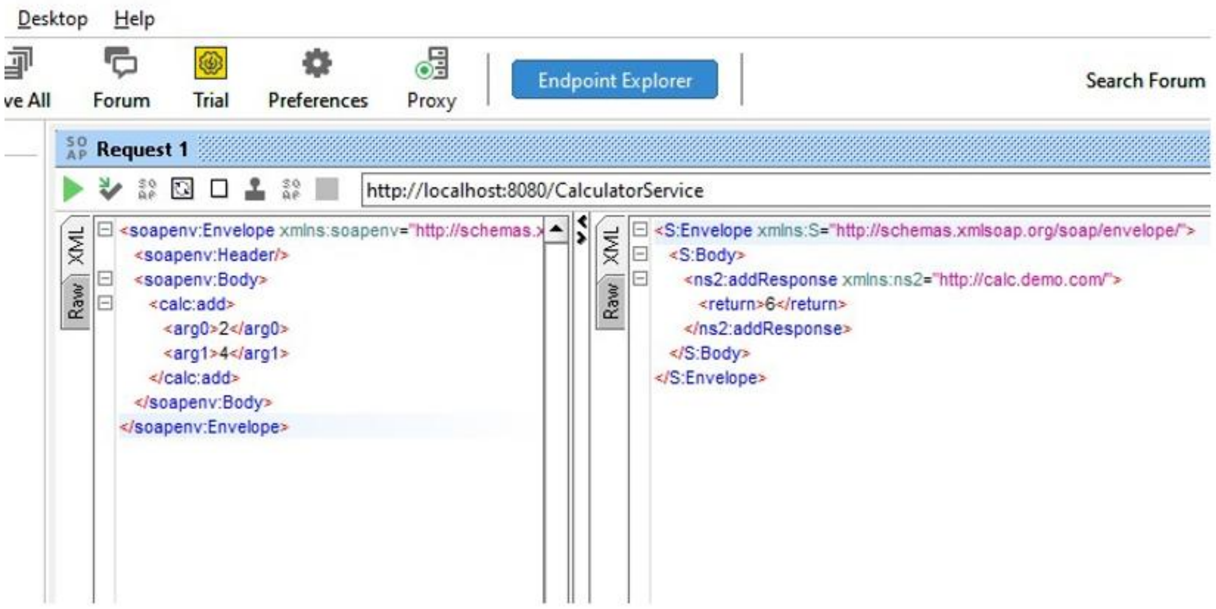
Create CaclulatorPublisher.java class with

```
package com.demo.calc; import
javax.xml.ws.Endpoint; public class
CalculatorPublisher {    public static void
main(String[] args) {
     String url = "http://localhost:8080/CalculatorService";
     Endpoint.publish(url, new CalculatorService());
     System.out.println("Service published at: " + url + "?wsdl");
   }
}
```

Running the CaclulatorPublisher we get the output

```
Service published at: http://localhost:8080/CalculatorService?wsdl
```

Using SOAP UI to test this file we get



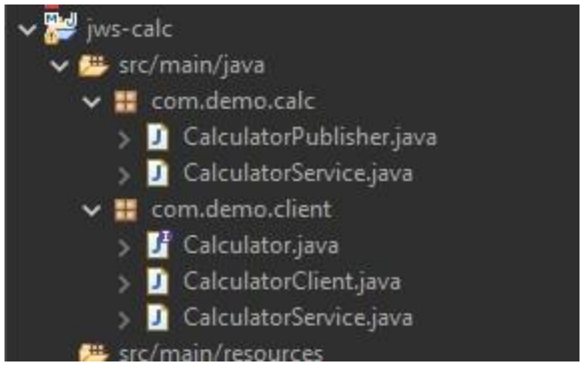
```
<soapenv:Envelope xmlns:soapenv="http://schemas.x
   <soapenv:Header/>
   <soapenv:Body>
      <calc:add>
         <arg0>2</arg0>
         <arg1>4</arg1>
      </calc:add>
   </soapenv:Body>
</soapenv:Envelope>
```

```
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
   <S:Body>
      <ns2:addResponse xmlns:ns2="http://calc.demo.com/">
         <return>6</return>
      </ns2:addResponse>
   </S:Body>
</S:Envelope>
```

Lab-3 Consuming Soap Web Services in java

Client to make user of web services add method

Step 1: create a new package named client and create following interfaces and classes



With the code as follows

```
package com.demo.client;
public class CalculatorClient {
  public static void main(String[] args) {
    CalculatorService service = new CalculatorService(null);
    Calculator port = service.getCalculatorPort();

    int result = port.add(7, 5);
    System.out.println("Result from CalculatorService: " + result);
  }
}
```

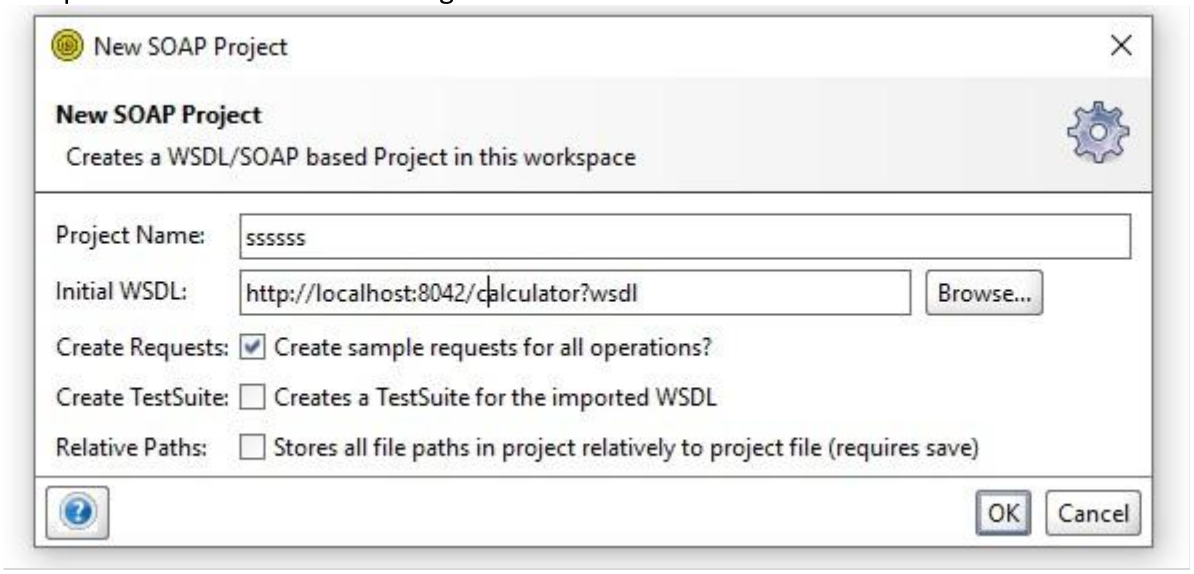
Create Calculator interface with

```
package com.demo.client; import
javax.jws.WebMethod; import
javax.jws.WebService; import
javax.jws.soap.SOAPBinding;
@WebService(targetNamespace = "http://calc.demo.com/")
@SOAPBinding(style = SOAPBinding.Style.DOCUMENT, use = SOAPBinding.Use.LITERAL)
public interface Calculator {
  @WebMethod
  int add(int a, int b);}
```

and finally create a calculatorservice class extending service as such

```
package com.demo.client; import
javax.xml.namespace.QName; import javax.xml.ws.Service; import
java.net.URL; public class CalculatorService extends Service {
  private static final QName SERVICE_NAME = new QName("http://calc.demo.com/",
"CalculatorService");
   public CalculatorService(URL wsdlDocumentLocation) {
super(wsdlDocumentLocation, SERVICE_NAME);
   }
   public Calculator getCalculatorPort() {
      return super.getPort(new QName("http://calc.demo.com/", "CalculatorServicePort"),
Calculator.class);
   }
}
```

Compile the client and test it using SOAP UI



New SOAP Project

Creates a WSDL/SOAP based Project in this workspace

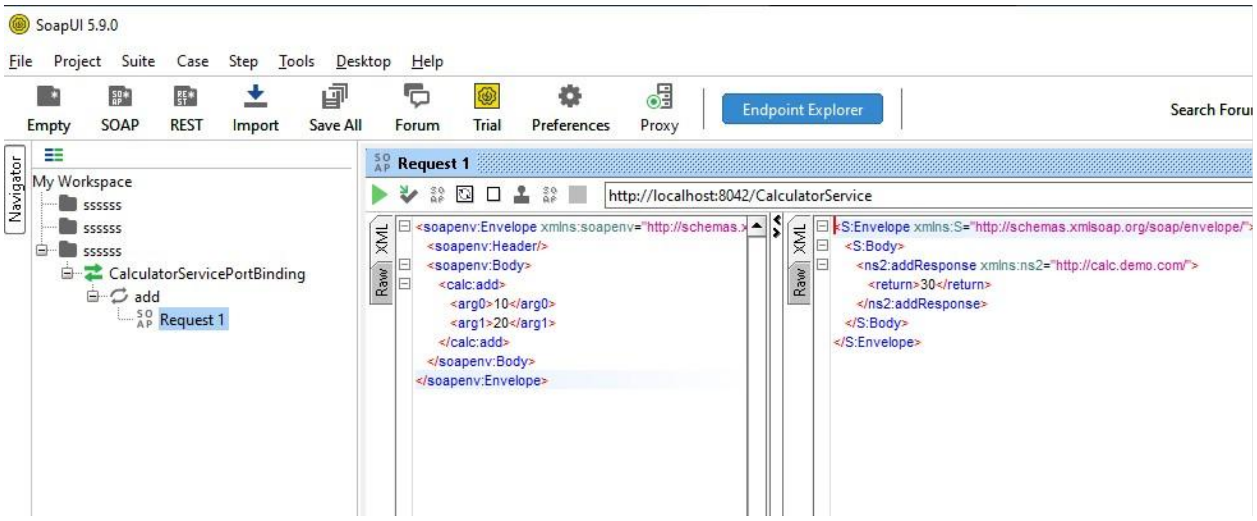
Project Name: ssssss

Initial WSDL: http://localhost:8042/calculator?wsdl

Create Requests: [✓] Create sample requests for all operations?

Create TestSuite: [ ] Creates a TestSuite for the imported WSDL

Relative Paths: [ ] Stores all file paths in project relatively to project file (requires save)



SoapUI 5.9.0
File Project Suite Case Step Tools Desktop Help
Empty SOAP REST Import Save All Forum Trial Preferences Proxy
Endpoint Explorer
Search Forum
Navigator
My Workspace
ssssss
ssssss
ssssss
CalculatorServicePortBinding
add
Request 1
XML
Raw

Request 1

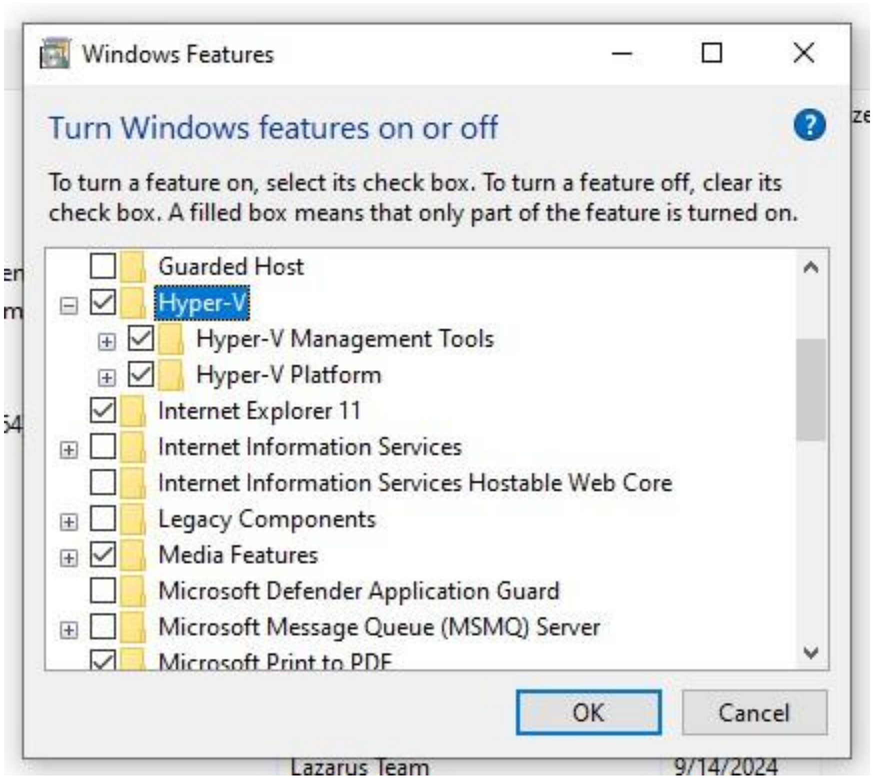
http://localhost:8042/CalculatorService

```
<soapenv:Envelope xmlns:soapenv="http://schemas.x
   <soapenv:Header/>
   <soapenv:Body>
      <calc:add>
         <arg0>10</arg0>
         <arg1>20</arg1>
      </calc:add>
   </soapenv:Body>
</soapenv:Envelope>
```

```
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
   <S:Body>
      <ns2:addResponse xmlns:ns2="http://calc.demo.com/">
         <return>30</return>
      </ns2:addResponse>
   </S:Body>
</S:Envelope>
```

Lab-4 Implement Windows Hyper V virtualization

Step 1: Enable Hyper-V

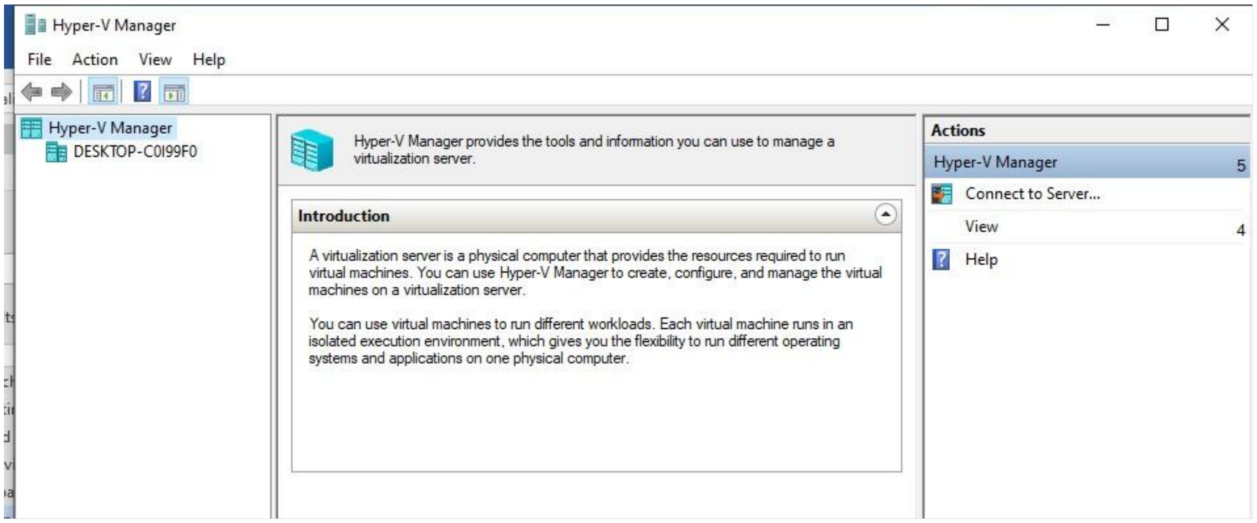

Windows Features

Turn Windows features on or off

To turn a feature on, select its check box. To turn a feature off, clear its check box. A filled box means that only part of the feature is turned on.

- [ ] Guarded Host
- [x] Hyper-V
  - [x] Hyper-V Management Tools
  - [x] Hyper-V Platform
- [x] Internet Explorer 11
- [ ] Internet Information Services
- [ ] Internet Information Services Hostable Web Core
- [ ] Legacy Components
- [x] Media Features
- [ ] Microsoft Defender Application Guard
- [ ] Microsoft Message Queue (MSMQ) Server
- [x] Microsoft Print to PDF

After system restart launch hyper v managers



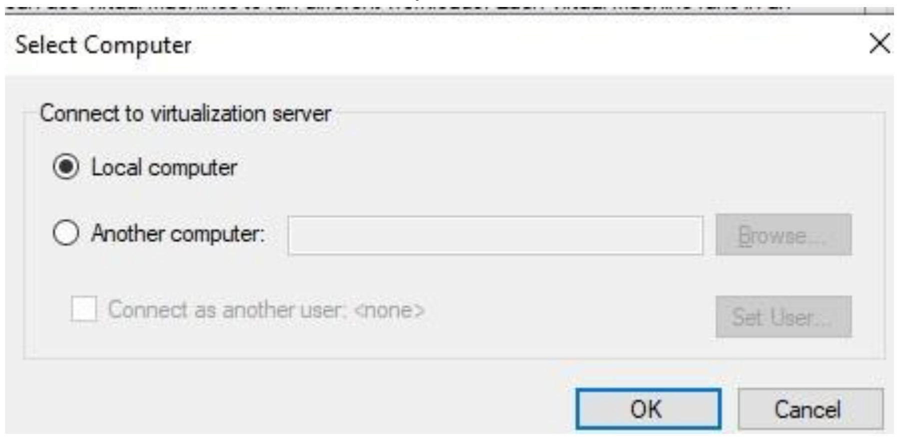
Hyper-V Manager provides the tools and information you can use to manage a virtualization server.

Introduction

A virtualization server is a physical computer that provides the resources required to run virtual machines. You can use Hyper-V Manager to create, configure, and manage the virtual machines on a virtualization server.

You can use virtual machines to run different workloads. Each virtual machine runs in an isolated execution environment, which gives you the flexibility to run different operating systems and applications on one physical computer.

Connect to server as a local computer

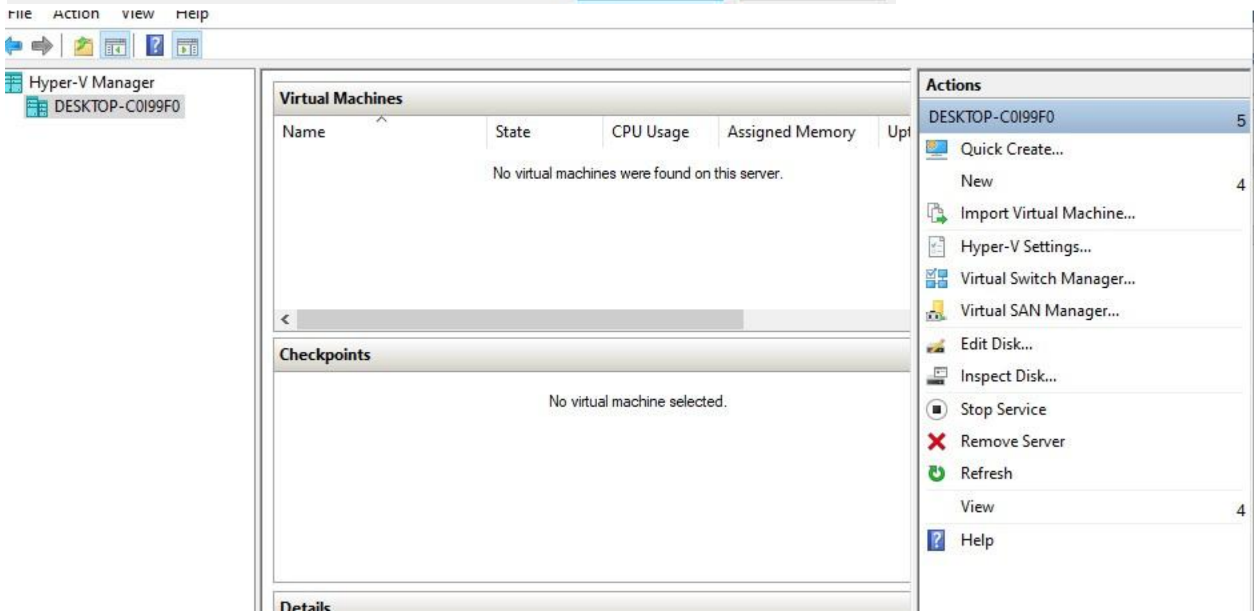

Select Computer

Connect to virtualization server

[✓ Local computer]

Another computer:

Connect as another user: <none>



Virtual Machines

Name	State	CPU Usage	Assigned Memory	Upt

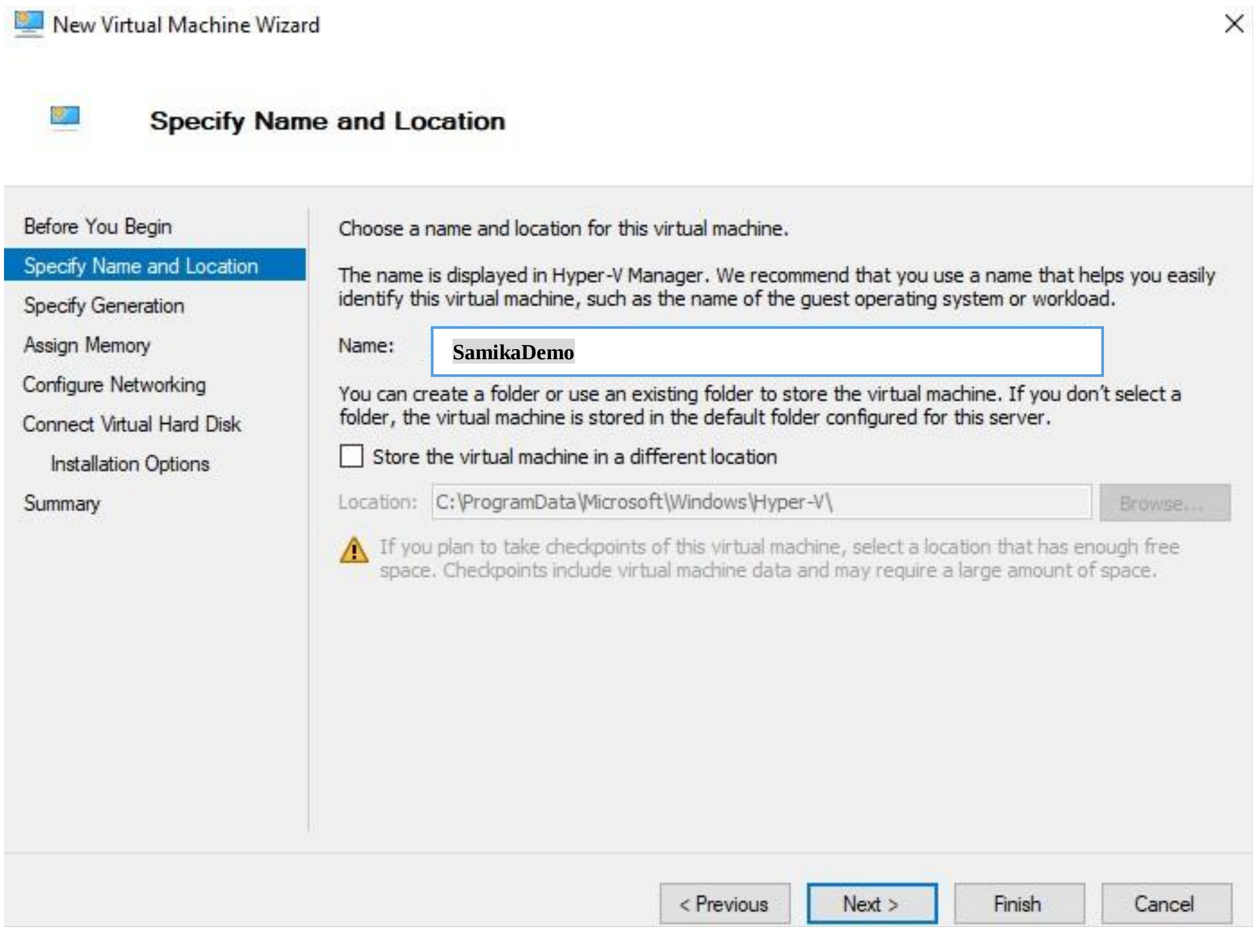
No virtual machines were found on this server.

Checkpoints

No virtual machine selected.

Details

Create a new Virtual Machine



New Virtual Machine Wizard

Specify Name and Location

- Before You Begin
- Specify Name and Location
- Specify Generation
- Assign Memory
- Configure Networking
- Connect Virtual Hard Disk
  - Installation Options
- Summary

Choose a name and location for this virtual machine.

The name is displayed in Hyper-V Manager. We recommend that you use a name that helps you easily identify this virtual machine, such as the name of the guest operating system or workload.

Name: SamikaDemo

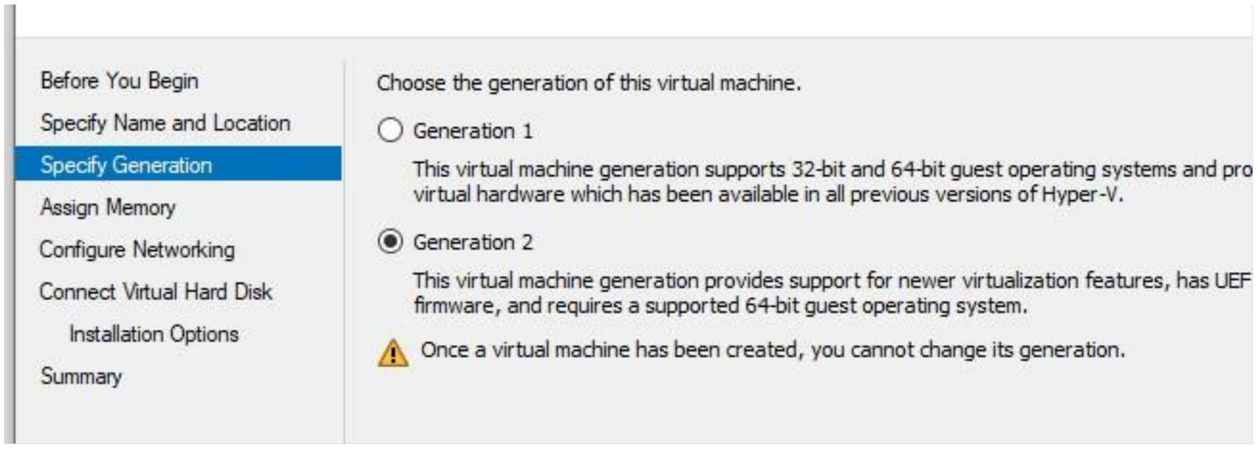
You can create a folder or use an existing folder to store the virtual machine. If you don't select a folder, the virtual machine is stored in the default folder configured for this server.

☐ Store the virtual machine in a different location

Location: C:\ProgramData\Microsoft\Windows\Hyper-V\

If you plan to take checkpoints of this virtual machine, select a location that has enough free space. Checkpoints include virtual machine data and may require a large amount of space.

Select generation



- Before You Begin
- Specify Name and Location
- Specify Generation
- Assign Memory
- Configure Networking
- Connect Virtual Hard Disk
  - Installation Options
- Summary

Choose the generation of this virtual machine.

○ Generation 1

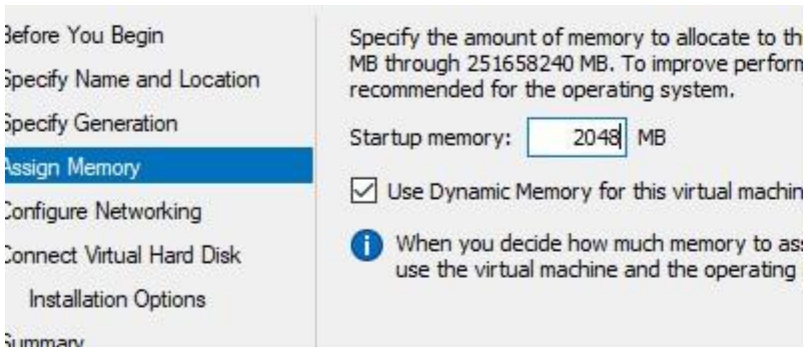
This virtual machine generation supports 32-bit and 64-bit guest operating systems and pro
virtual hardware which has been available in all previous versions of Hyper-V.

● Generation 2

This virtual machine generation provides support for newer virtualization features, has UEF
firmware, and requires a supported 64-bit guest operating system.

Once a virtual machine has been created, you cannot change its generation.

Assign memory


Before You Begin
Specify Name and Location
Specify Generation
Assign Memory
Configure Networking
Connect Virtual Hard Disk
Installation Options
Summary

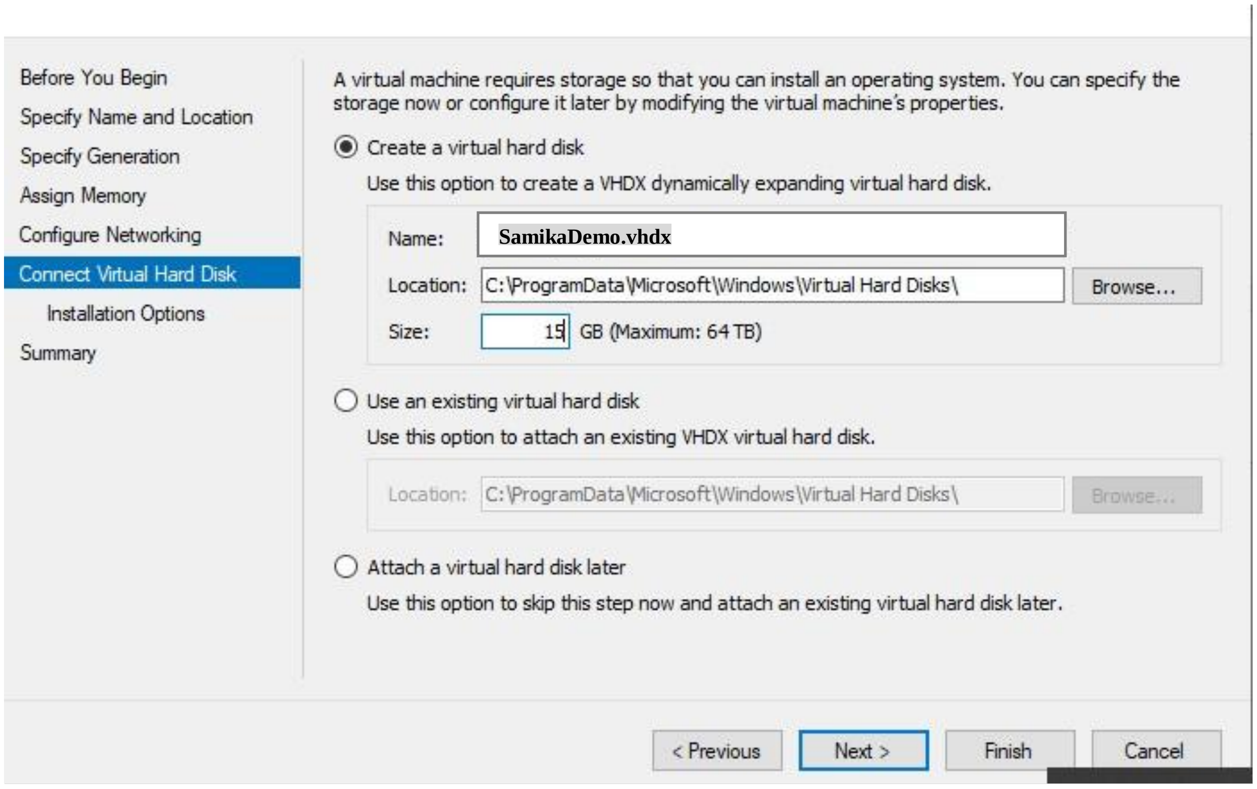
Specify the amount of memory to allocate to th
MB through 251658240 MB. To improve perforn
recommended for the operating system.

Startup memory: 2048 MB

[✓] Use Dynamic Memory for this virtual machin

When you decide how much memory to as
use the virtual machine and the operating

Set up harddisk


Before You Begin
Specify Name and Location
Specify Generation
Assign Memory
Configure Networking
Connect Virtual Hard Disk
Installation Options
Summary

A virtual machine requires storage so that you can install an operating system. You can specify the storage now or configure it later by modifying the virtual machine's properties.

[● Create a virtual hard disk]
Use this option to create a VHDX dynamically expanding virtual hard disk.

Name: SamikaDemo.vhdx
Location: C:\ProgramData\Microsoft\Windows\Virtual Hard Disks\ Browse...
Size: 15 GB (Maximum: 64 TB)

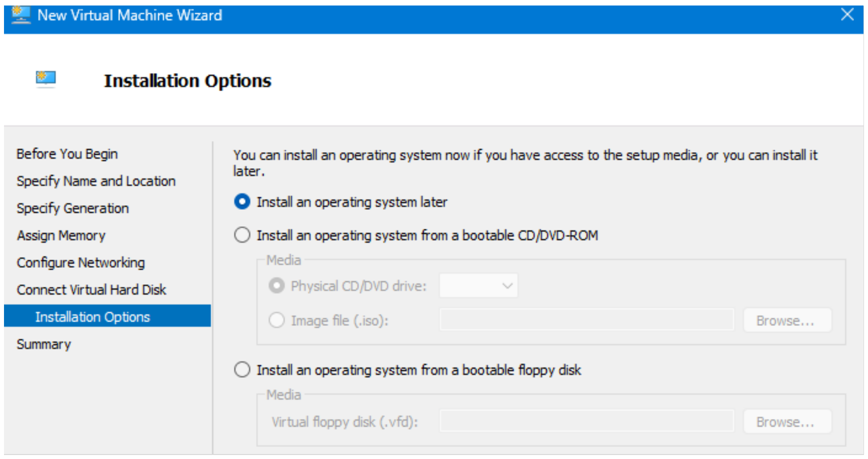
○ Use an existing virtual hard disk
Use this option to attach an existing VHDX virtual hard disk.

Location: C:\ProgramData\Microsoft\Windows\Virtual Hard Disks\ Browse...

○ Attach a virtual hard disk later
Use this option to skip this step now and attach an existing virtual hard disk later.

< Previous | Next > | Finish | Cancel

Install os later then finish


New Virtual Machine Wizard

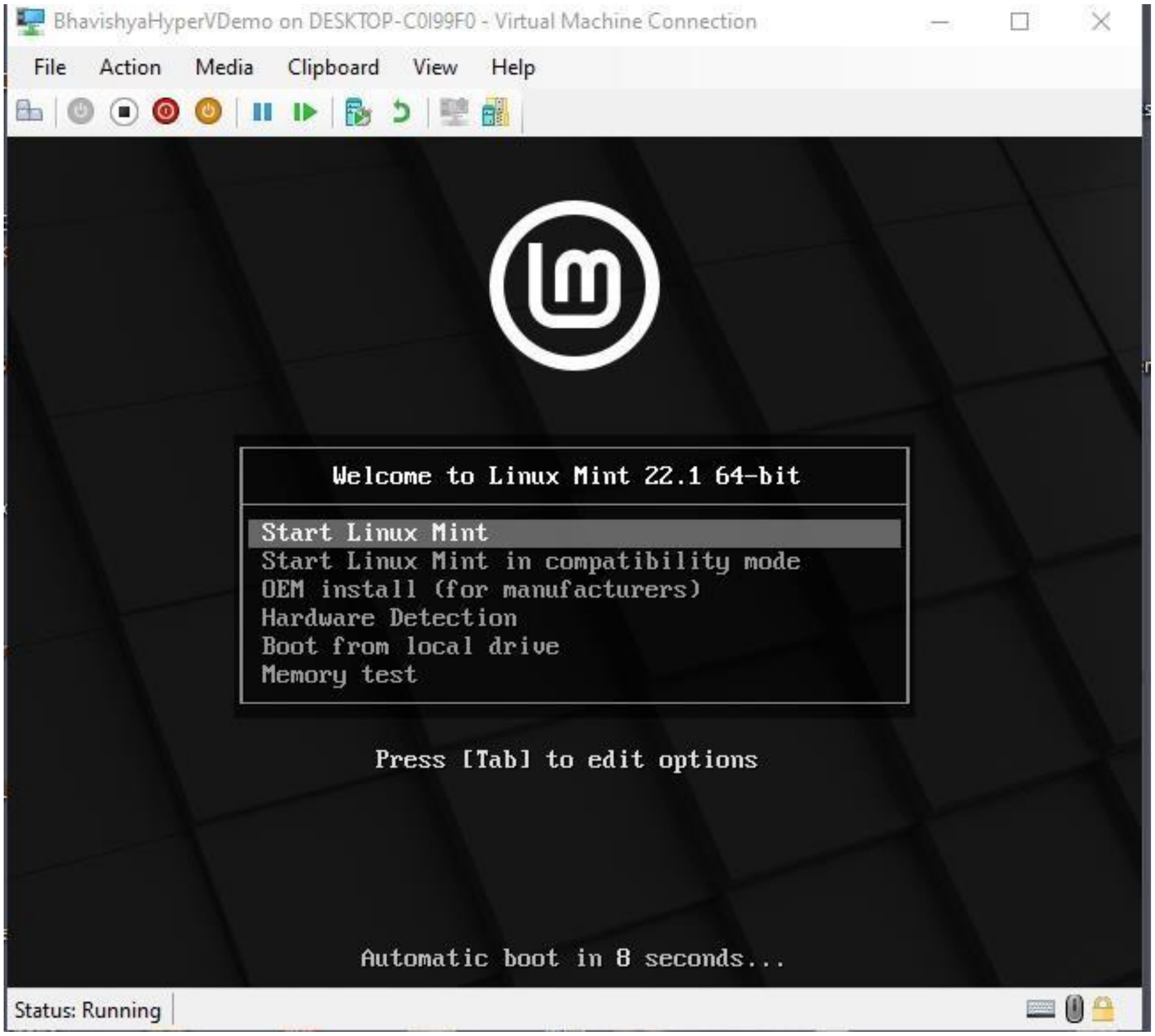
Installation Options

Before You Begin
Specify Name and Location
Specify Generation
Assign Memory
Configure Networking
Connect Virtual Hard Disk
Installation Options
Summary

You can install an operating system now if you have access to the setup media, or you can install it later.

[● Install an operating system later]
○ Install an operating system from a bootable CD/DVD-ROM
Media
○ Physical CD/DVD drive:
○ Image file (.iso): Browse...
○ Install an operating system from a bootable floppy disk
Media
Virtual floppy disk (.vfd): Browse...

Connect to the machine

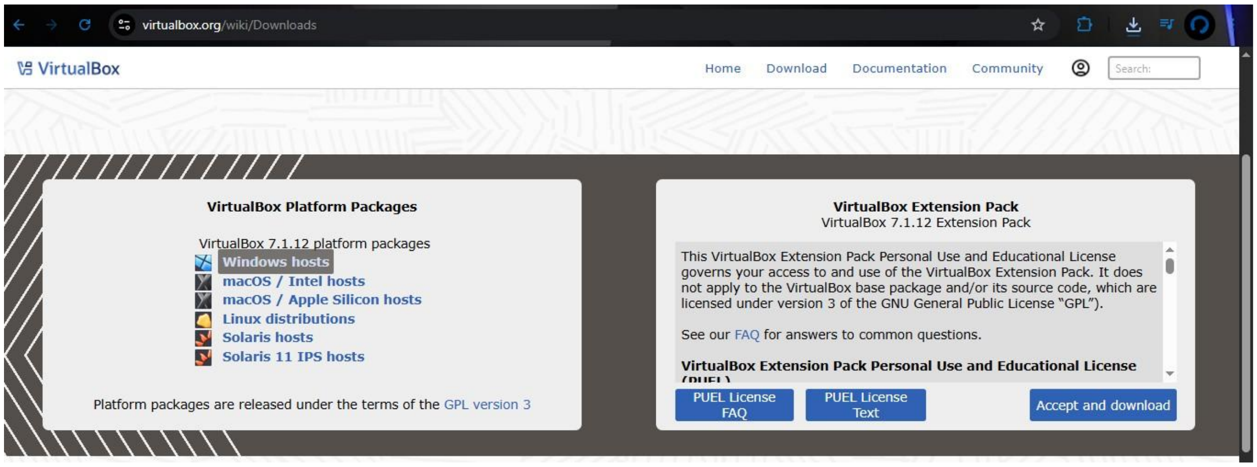

BhavishyaHyperVDemo on DESKTOP-C0I99F0 - Virtual Machine Connection

```
Welcome to Linux Mint 22.1 64-bit

Start Linux Mint
Start Linux Mint in compatibility mode
OEM install (for manufacturers)
Hardware Detection
Boot from local drive
Memory test

Press [Tab] to edit options

Automatic boot in 8 seconds...
```

Status: Running

Lab-5 Implement Virtualization using VirtualBox

Download Virtualbox exe from https://www.virtualbox.org/wiki/Downloads



VirtualBox Platform Packages

VirtualBox 7.1.12 platform packages
- Windows hosts
- macOS / Intel hosts
- macOS / Apple Silicon hosts
- Linux distributions
- Solaris hosts
- Solaris 11 IPS hosts

Platform packages are released under the terms of the GPL version 3

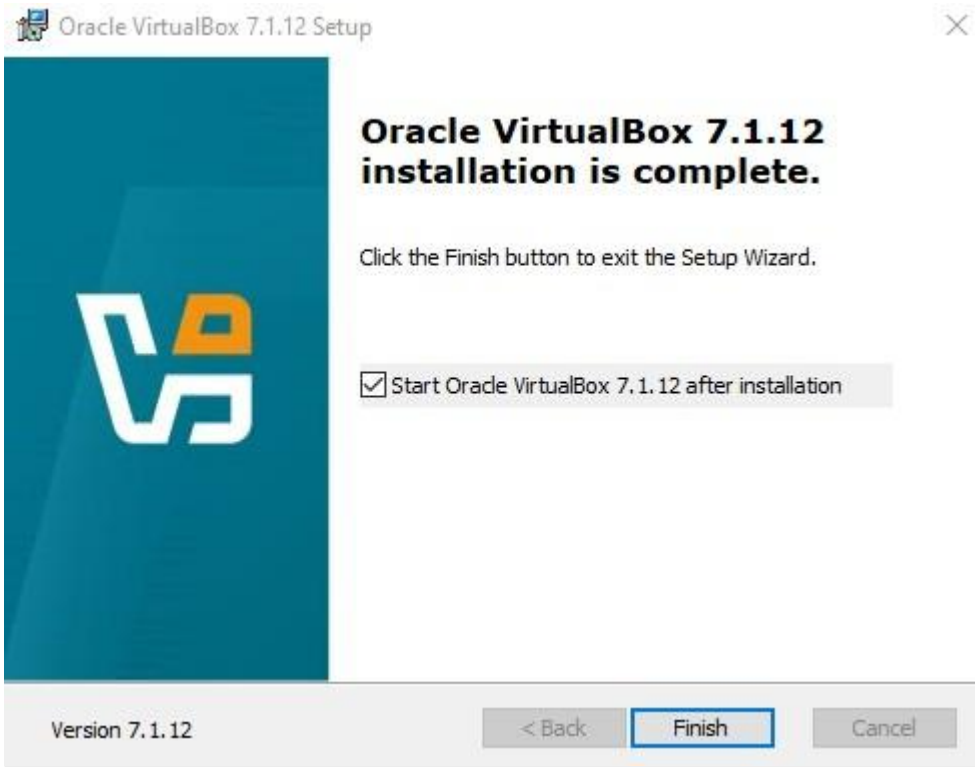
VirtualBox Extension Pack
VirtualBox 7.1.12 Extension Pack

This VirtualBox Extension Pack Personal Use and Educational License governs your access to and use of the VirtualBox Extension Pack. It does not apply to the VirtualBox base package and/or its source code, which are licensed under version 3 of the GNU General Public License "GPL").

See our FAQ for answers to common questions.

VirtualBox Extension Pack Personal Use and Educational License (PUEL)

Install the application



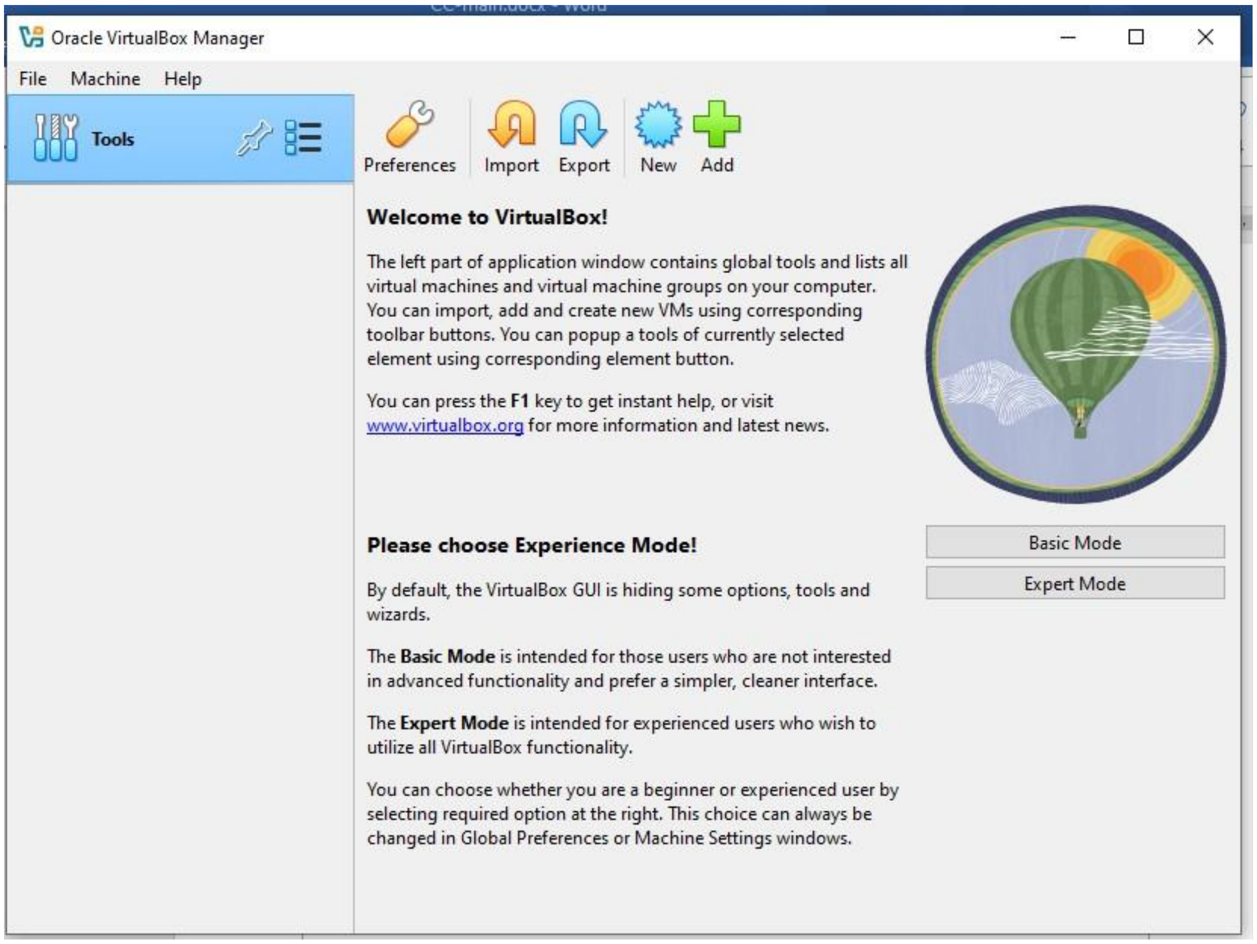
Oracle VirtualBox 7.1.12 installation is complete.

Click the Finish button to exit the Setup Wizard.

☑ Start Oracle VirtualBox 7.1.12 after installation

Version 7.1.12

Launch



Welcome to VirtualBox!

The left part of application window contains global tools and lists all virtual machines and virtual machine groups on your computer. You can import, add and create new VMs using corresponding toolbar buttons. You can popup a tools of currently selected element using corresponding element button.

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

Please choose Experience Mode!

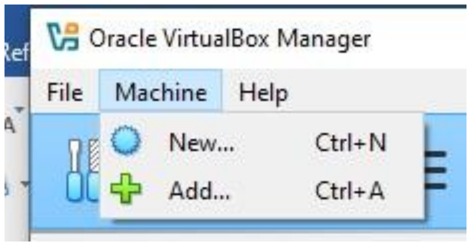
By default, the VirtualBox GUI is hiding some options, tools and wizards.

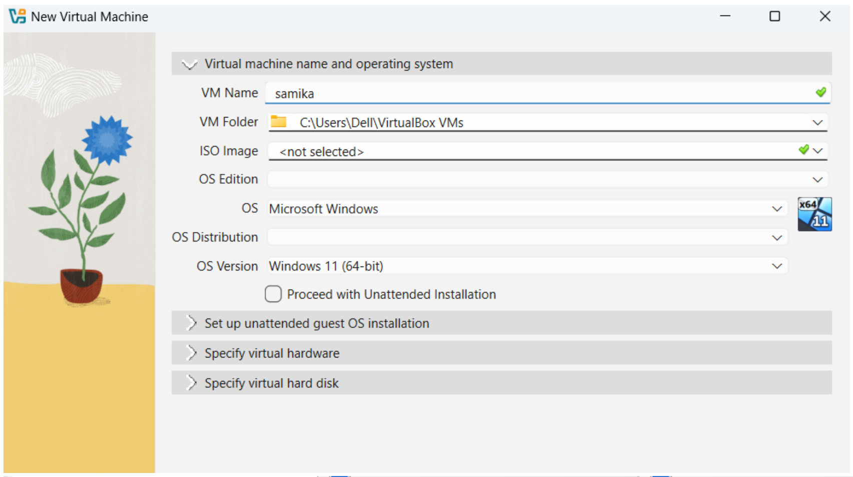
The **Basic Mode** is intended for those users who are not interested in advanced functionality and prefer a simpler, cleaner interface.

The **Expert Mode** is intended for experienced users who wish to utilize all VirtualBox functionality.

You can choose whether you are a beginner or experienced user by selecting required option at the right. This choice can always be changed in Global Preferences or Machine Settings windows.

Create new machine

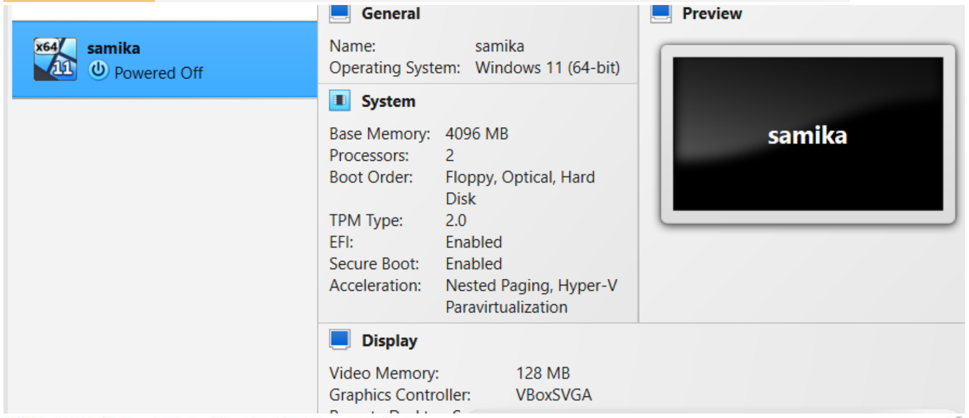



New Virtual Machine

Virtual machine name and operating system

VM Name: samika
VM Folder: C:\Users\Dell\VirtualBox VMs
ISO Image: <not selected>
OS Edition:
OS: Microsoft Windows
OS Distribution:
OS Version: Windows 11 (64-bit)
Proceed with Unattended Installation

Set up unattended guest OS installation
Specify virtual hardware
Specify virtual hard disk


samika
Powered Off

General

Name: samika
Operating System: Windows 11 (64-bit)

System

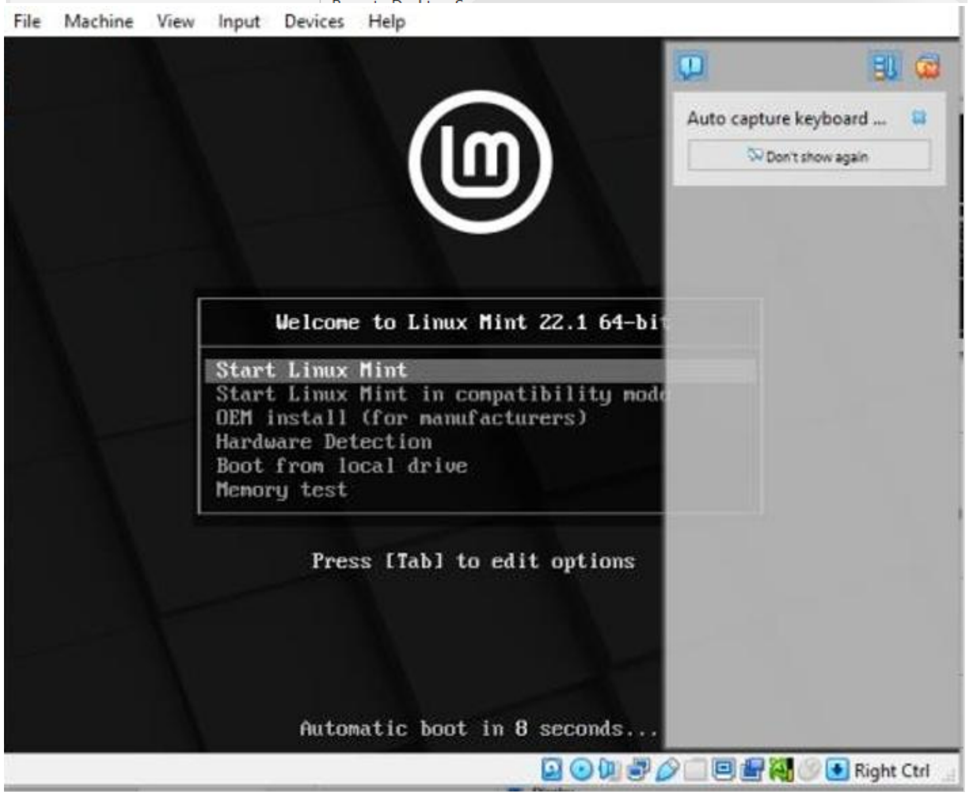
Base Memory: 4096 MB
Processors: 2
Boot Order: Floppy, Optical, Hard Disk
TPM Type: 2.0
EFI: Enabled
Secure Boot: Enabled
Acceleration: Nested Paging, Hyper-V Paravirtualization

Display

Video Memory: 128 MB
Graphics Controller: VBoxSVGA

Preview

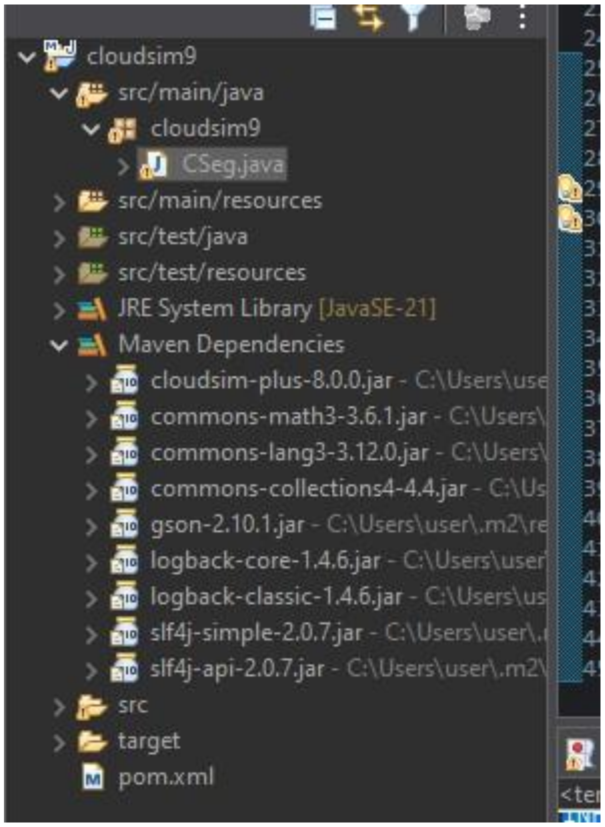
samika



```
Welcome to Linux Mint 22.1 64-bi

Start Linux Mint
Start Linux Mint in compatibility mod
OEM install (for manufacturers)
Hardware Detection
Boot from local drive
Memory test

Press [Tab] to edit options

Automatic boot in 8 seconds...
```

Lab-6 Simulate a cloud scenario using CloudSim

Import cloudsim plus dependencies



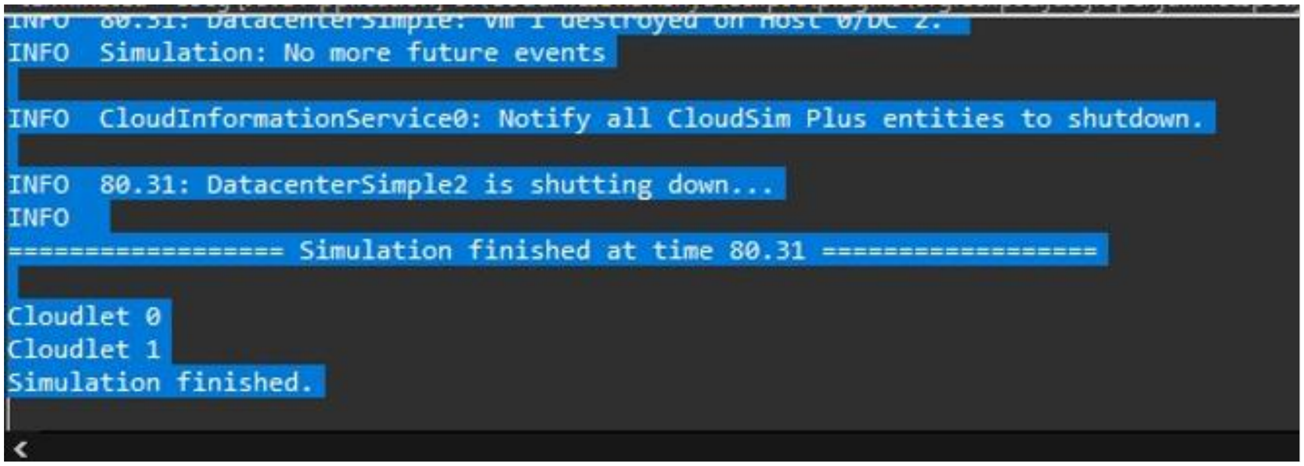
```
cloudsim9
  src/main/java
    cloudsim9
      CSeg.java
  src/main/resources
  src/test/java
  src/test/resources
  JRE System Library [JavaSE-21]
  Maven Dependencies
    cloudsim-plus-8.0.0.jar - C:\Users\use
    commons-math3-3.6.1.jar - C:\Users\
    commons-lang3-3.12.0.jar - C:\Users\
    commons-collections4-4.4.jar - C:\Us
    gson-2.10.1.jar - C:\Users\user\.m2\re
    logback-core-1.4.6.jar - C:\Users\user\
    logback-classic-1.4.6.jar - C:\Users\us
    slf4j-simple-2.0.7.jar - C:\Users\user\.
    slf4j-api-2.0.7.jar - C:\Users\user\.m2\
  src
  target
  pom.xml
```

And execute the following code in CSeg.java

```
package cloudsim9; import
org.cloudsimplus.brokers.DatacenterBrokerSimple; import
org.cloudsimplus.cloudlets.Cloudlet; import
org.cloudsimplus.cloudlets.CloudletSimple; import
org.cloudsimplus.core.CloudSimEntity; import
org.cloudsimplus.core.CloudSimPlus; import
org.cloudsimplus.core.Simulation; import
org.cloudsimplus.datacenters.Datacenter; import
org.cloudsimplus.datacenters.DatacenterSimple; import
org.cloudsimplus.hosts.Host; import org.cloudsimplus.hosts.HostSimple;
import org.cloudsimplus.resources.Pe; import
org.cloudsimplus.resources.PeSimple; import
org.cloudsimplus.schedulers.cloudlet.CloudletSchedulerTimeShared;
import org.cloudsimplus.schedulers.vm.VmSchedulerSpaceShared; import
org.cloudsimplus.vms.Vm;
import org.cloudsimplus.vms.VmSimple; import
org.cloudsimplus.utilizationmodels.UtilizationModelDynamic;
```

```
import java.util.ArrayList; import
java.util.List;

public class CSeg {    public static void
main(String[] args) {

        CloudSimPlus simulation = new CloudSimPlus();

        Datacenter dc1 = createDatacenter(simulation);
        Datacenter dc2 = createDatacenter(simulation);

        DatacenterBrokerSimple broker = new DatacenterBrokerSimple(simulation);

        List<Vm> vmList = createVms();
        List<Cloudlet> cloudletList = createCloudlets();

        broker.submitVmList(vmList);
broker.submitCloudletList(cloudletList);

        simulation.start();

        broker.getCloudletFinishedList().forEach(System.out::println);

        System.out.println("Simulation finished.");
    }

    private static Datacenter createDatacenter(Simulation simulation) {
        List<Pe> peList = List.of(new PeSimple(1000)); // 1 core with 1000 MIPS

        Host host = new HostSimple(2048, 10000, 1000000, peList); // RAM, BW, Storage
host.setVmScheduler(new VmSchedulerSpaceShared());

        List<Host> hostList = new ArrayList<>();
hostList.add(host);

        return new DatacenterSimple(simulation, hostList);
    }
    private static List<Vm> createVms() {        List<Vm>
list = new ArrayList<>();        list.add(new
VmSimple(0, 1000, 1) // id, MIPS, PE
                .setRam(512).setBw(1000).setSize(10000)
                .setCloudletScheduler(new CloudletSchedulerTimeShared()));
list.add(new VmSimple(1, 1000, 1)
                .setRam(512).setBw(1000).setSize(10000)
                .setCloudletScheduler(new CloudletSchedulerTimeShared()));
return list;
    }

    private static List<Cloudlet> createCloudlets() {
        List<Cloudlet> list = new ArrayList<>();
        UtilizationModelDynamic utilization = new UtilizationModelDynamic(0.5);

        list.add(new CloudletSimple(40000, 1, utilization)
.setFileSize(300).setOutputSize(300));
list.add(new CloudletSimple(40000, 1, utilization)
.setFileSize(300).setOutputSize(300));        return list;
    }
}
```

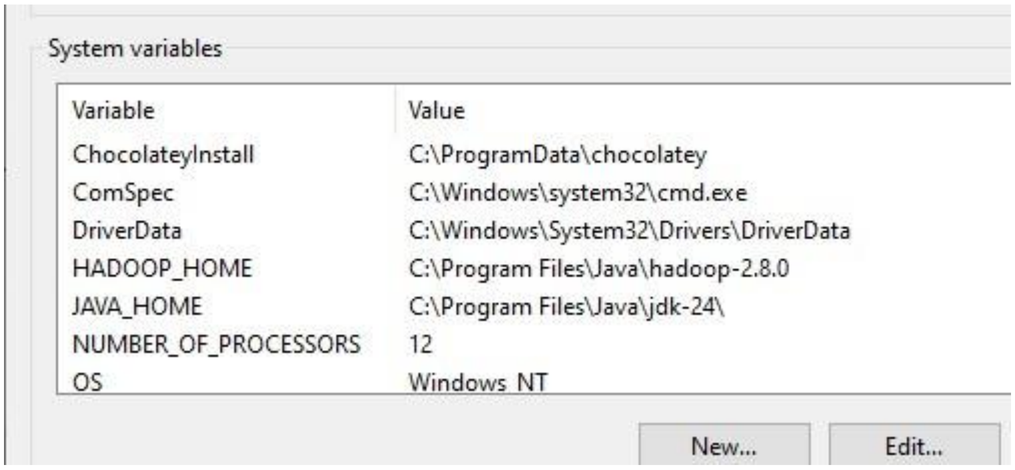
Output:



```
INFO  80.31: DatacenterSimple: Vm 1 destroyed on Host 0/DC 2.
INFO  Simulation: No more future events

INFO  CloudInformationService0: Notify all CloudSim Plus entities to shutdown.

INFO  80.31: DatacenterSimple2 is shutting down...
INFO
================== Simulation finished at time 80.31 ==================

Cloudlet 0
Cloudlet 1
Simulation finished.
```

Lab-7 Installation and testing of Hadoop single node cluster on windows

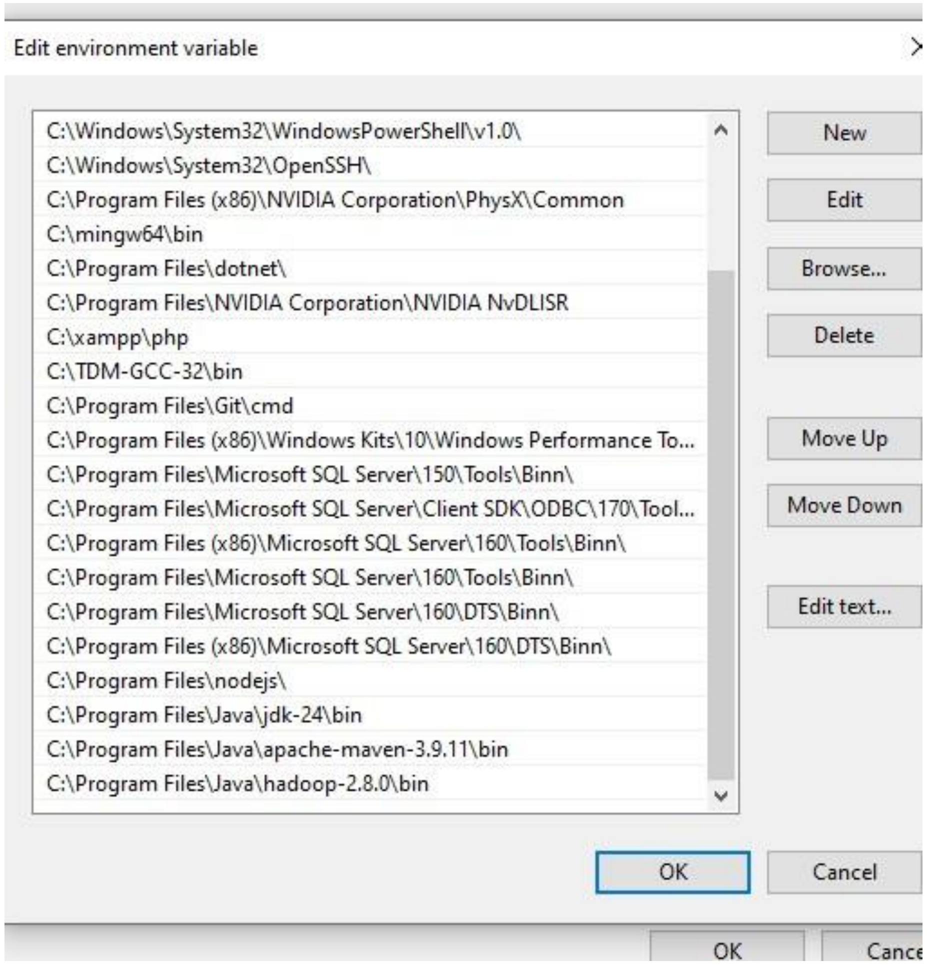
Download Hadoop from http://archive.apache.org/dist/hadoop/core//hadoop-2.8.0/hadoop-2.8.0.tar.gz install
and setup JDK and Hadoop set
up system variables for both



System variables

Variable	Value
ChocolateyInstall	C:\ProgramData\chocolatey
ComSpec	C:\Windows\system32\cmd.exe
DriverData	C:\Windows\System32\Drivers\DriverData
HADOOP_HOME	C:\Program Files\Java\hadoop-2.8.0
JAVA_HOME	C:\Program Files\Java\jdk-24\
NUMBER_OF_PROCESSORS	12
OS	Windows_NT

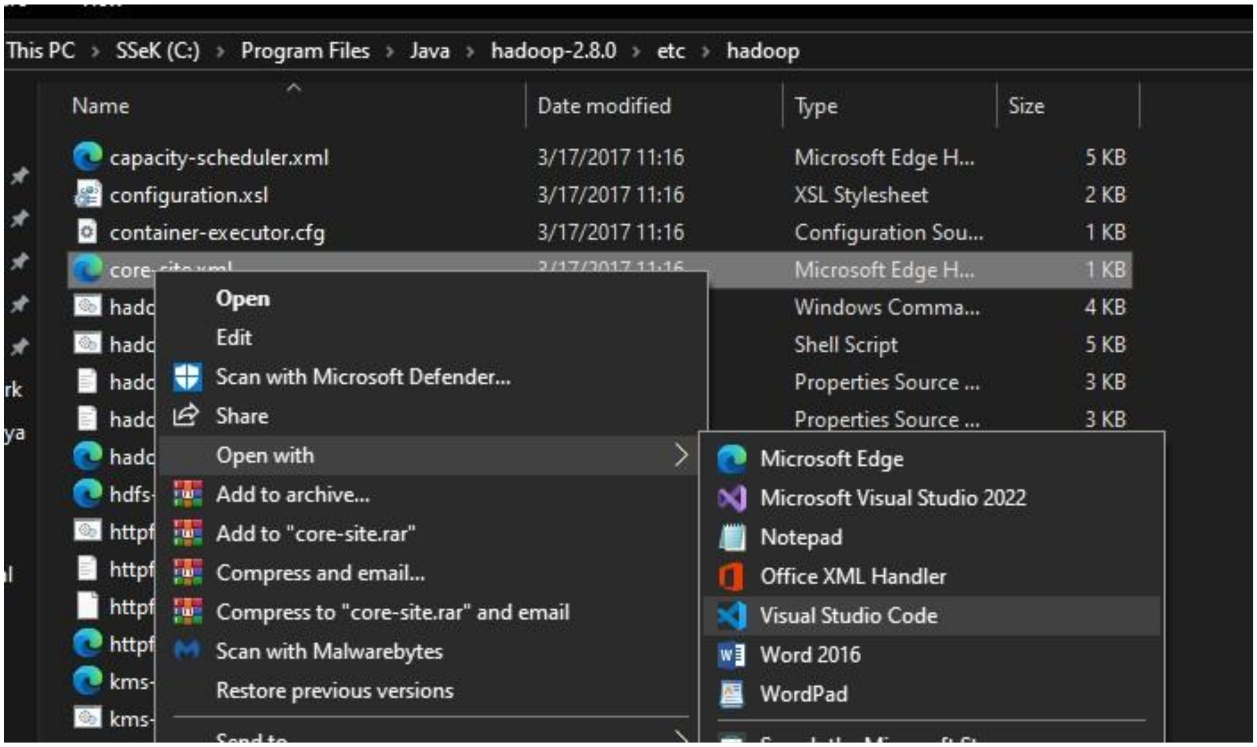
Add them to the paths as well



Edit environment variable

```
C:\Windows\System32\WindowsPowerShell\v1.0\
C:\Windows\System32\OpenSSH\
C:\Program Files (x86)\NVIDIA Corporation\PhysX\Common
C:\mingw64\bin
C:\Program Files\dotnet\
C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR
C:\xampp\php
C:\TDM-GCC-32\bin
C:\Program Files\Git\cmd
C:\Program Files (x86)\Windows Kits\10\Windows Performance To...
C:\Program Files\Microsoft SQL Server\150\Tools\Binn\
C:\Program Files\Microsoft SQL Server\Client SDK\ODBC\170\Tool...
C:\Program Files (x86)\Microsoft SQL Server\160\Tools\Binn\
C:\Program Files\Microsoft SQL Server\160\Tools\Binn\
C:\Program Files\Microsoft SQL Server\160\DTS\Binn\
C:\Program Files (x86)\Microsoft SQL Server\160\DTS\Binn\
C:\Program Files\nodejs\
C:\Program Files\Java\jdk-24\bin
C:\Program Files\Java\apache-maven-3.9.11\bin
C:\Program Files\Java\hadoop-2.8.0\bin
```

Go to Hadoop folder hadoop-2.8.0\etc\hadoop edit core-site.xml with a rich text editor, eg Visual Studio Code


This PC › SSeK (C:) › Program Files › Java › hadoop-2.8.0 › etc › hadoop
Name
Date modified
Type
Size
capacity-scheduler.xml 3/17/2017 11:16 Microsoft Edge H... 5 KB
configuration.xsl 3/17/2017 11:16 XSL Stylesheet 2 KB
container-executor.cfg 3/17/2017 11:16 Configuration Sou... 1 KB
core-site.xml Microsoft Edge H... 1 KB
Open
Edit
Scan with Microsoft Defender...
Share
Open with
Add to archive...
Add to "core-site.rar"
Compress and email...
Compress to "core-site.rar" and email
Scan with Malwarebytes
Restore previous versions
Microsoft Edge
Microsoft Visual Studio 2022
Notepad
Office XML Handler
Visual Studio Code
Word 2016
WordPad

Modify

```
<configuration>
</configuration>
```

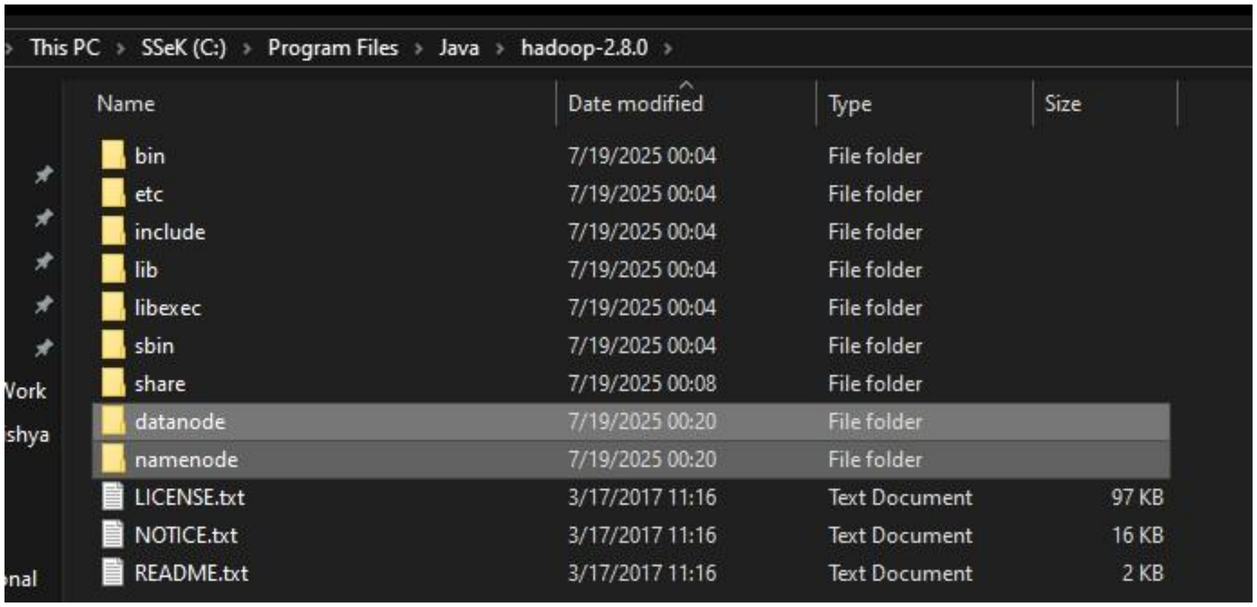
To

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

Find mapred-site.xml.template and modify it to mapred-site.xml and add

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

To the configuration tags
Create the following highlighted folders



This PC › SSeK (C:) › Program Files › Java › hadoop-2.8.0 ›

Name	Date modified	Type	Size
bin	7/19/2025 00:04	File folder	
etc	7/19/2025 00:04	File folder	
include	7/19/2025 00:04	File folder	
lib	7/19/2025 00:04	File folder	
libexec	7/19/2025 00:04	File folder	
sbin	7/19/2025 00:04	File folder	
share	7/19/2025 00:08	File folder	
datanode	7/19/2025 00:20	File folder	
namenode	7/19/2025 00:20	File folder	
LICENSE.txt	3/17/2017 11:16	Text Document	97 KB
NOTICE.txt	3/17/2017 11:16	Text Document	16 KB
README.txt	3/17/2017 11:16	Text Document	2 KB

Edit Hadoop-2.8.0\etc\hadoop/hdfs-site.xml with

```
  <property>
  <name>dfs.replication</name>
  <value>1</value>
  </property>
  <property>
  <name>dfs.namenode.name.dir</name>
  <value>C:\hadoop-2.8.0\data\namenode</value>
  </property>
  <property>
  <name>dfs.datanode.data.dir</name>
  <value>C:\hadoop-2.8.0\data\datanode</value>
  </property>
```

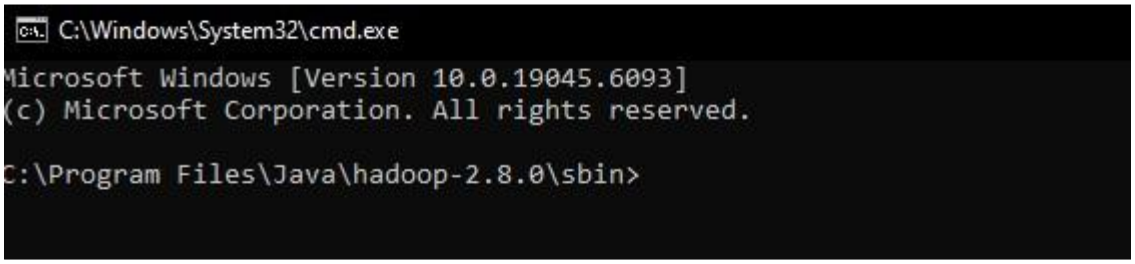
And Hadoop-2.8.0\etc\hadoop\yarn-site.xml with

```
 <property>
<name>yarn.nodemanager.aux-services</name>
<value>mapreduce_shuffle</value>
  </property>
  <property>
<name>yarn.nodemanager.auxservices.mapreduce.shuffle.class</name>
<value>org.apache.hadoop.mapred.ShuffleHandler</value>
  </property>
```

Edit the file Hadoop-2.8.0\etc/hadoop\hadoop-env.cmd and write @rem in front of "set JAVA_HOME=%JAVA_HOME%". Write set JAVA_HOME={JDK directory} at the next row. This is C:\Program Files\Java\jdk-24 for me

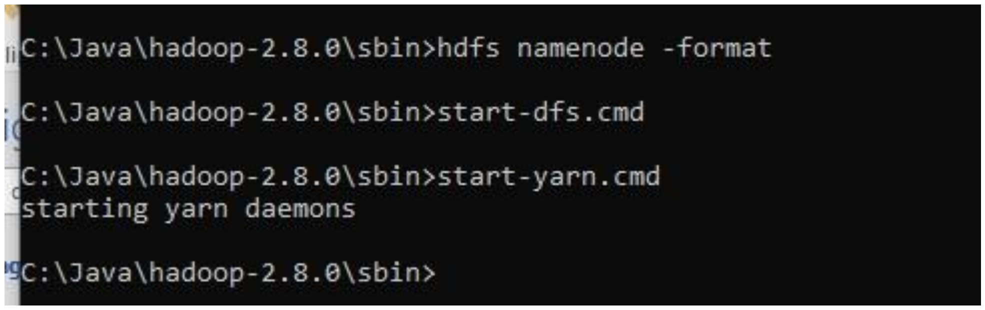
Download Hadoop Configuration.zip from
https://github.com/MuhammadBilalYar/HADOOP-INSTALLATION-ON-WINDOW10/blob/master/Hadoop%20Configuration.zip
And replace the bin from Hadoop-2.8.0 with bin from configuration

Run cmd at this directory



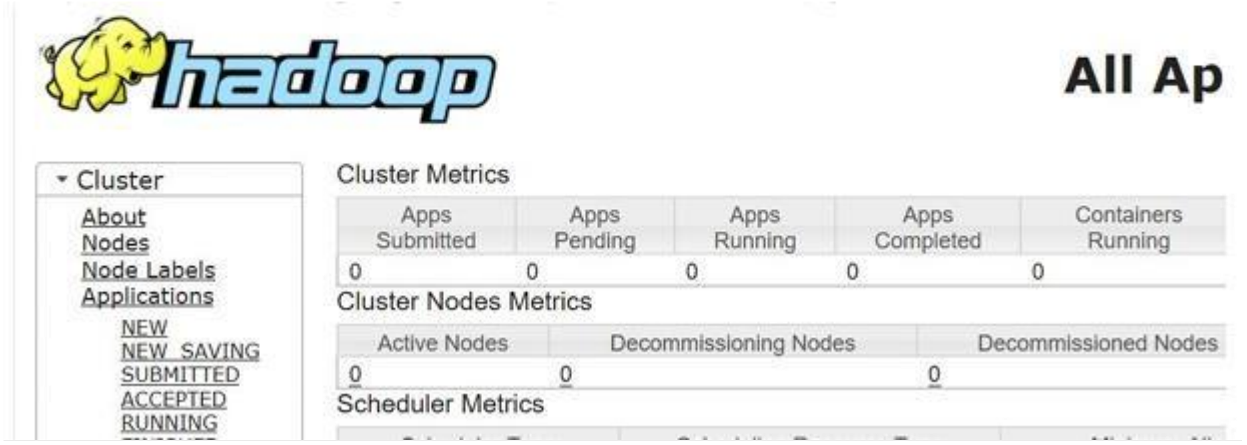
```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.19045.6093]
(c) Microsoft Corporation. All rights reserved.

C:\Program Files\Java\hadoop-2.8.0\sbin>
```

Runn the following commands



```
C:\Java\hadoop-2.8.0\sbin>hdfs namenode -format

C:\Java\hadoop-2.8.0\sbin>start-dfs.cmd

C:\Java\hadoop-2.8.0\sbin>start-yarn.cmd
starting yarn daemons

C:\Java\hadoop-2.8.0\sbin>
```

In browser go to localhost:8088



All Ap

- Cluster
  - About
  - Nodes
  - Node Labels
  - Applications
    - NEW
    - NEW_SAVING
    - SUBMITTED
    - ACCEPTED
    - RUNNING

Cluster Metrics

Apps Submitted	Apps Pending	Apps Running	Apps Completed	Containers Running
0	0	0	0	0

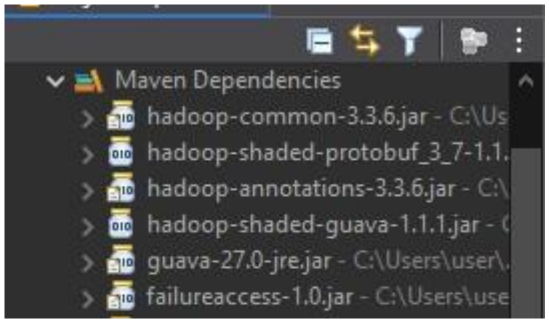
Cluster Nodes Metrics

Active Nodes	Decommissioning Nodes	Decommissioned Nodes
0	0	0

Scheduler Metrics

Lab-8 Mapreduce wordcount program using java

Import apache Hadoop 3.3.6

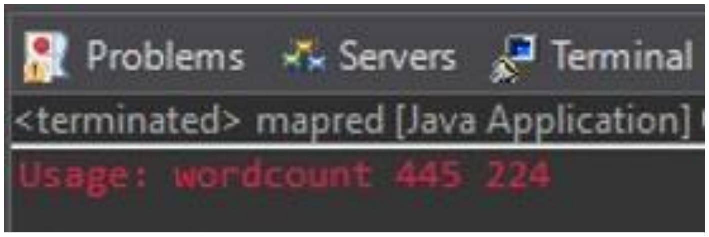

Maven Dependencies
hadoop-common-3.3.6.jar - C:\Us
hadoop-shaded-protobuf_3_7-1.1.
hadoop-annotations-3.3.6.jar - C:\
hadoop-shaded-guava-1.1.1.jar - C
guava-27.0-jre.jar - C:\Users\user\.
failureaccess-1.0.jar - C:\Users\use

Create a word count reducer class with following code package mapred;

```
import java.io.IOException;  import
java.util.StringTokenizer;

import org.apache.hadoop.conf.Configuration;  import
org.apache.hadoop.fs.Path;  import
org.apache.hadoop.io.IntWritable;  import
org.apache.hadoop.io.Text;  import
org.apache.hadoop.mapreduce.Job;  import
org.apache.hadoop.mapreduce.Mapper;  import
org.apache.hadoop.mapreduce.Reducer;  import
org.apache.hadoop.mapreduce.lib.input.FileInputFormat;  import
org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;

import com.ctc.wstx.util.WordSet;

public class mapred {

 public static class TokenizerMapper
      extends Mapper<Object, Text, Text, IntWritable>{

   private final static IntWritable one = new IntWritable(1);
private Text word = new Text();

   public void map(Object key, Text value, Context context
) throws IOException, InterruptedException {
     StringTokenizer itr = new StringTokenizer(value.toString());
```

```
      while (itr.hasMoreTokens()) {
word.set(itr.nextToken());
context.write(word, one);
      }
    }
  }
   public class SumReducer extends Reducer<Text, IntWritable, Text, IntWritable> {
    @Override     protected void reduce(Text key, Iterable<IntWritable> values,
Context context)             throws IOException, InterruptedException {         int sum
= 0;         for (IntWritable val : values) {             sum += val.get();
        }
        context.write(key, new IntWritable(sum));
    }
 }
   public static void main(String[] args) throws Exception {
    Configuration conf = new Configuration();
Job job = Job.getInstance(conf, "word count");
job.setJarByClass(WordSet.class);
job.setMapperClass(TokenizerMapper.class);
job.setOutputKeyClass(Text.class);
job.setOutputValueClass(IntWritable.class);
    FileInputFormat.addInputPath(job, new Path(args[0]));
    FileOutputFormat.setOutputPath(job, new Path(args[1]));
    System.exit(job.waitForCompletion(true) ? 0 : 1);
  }
}
```

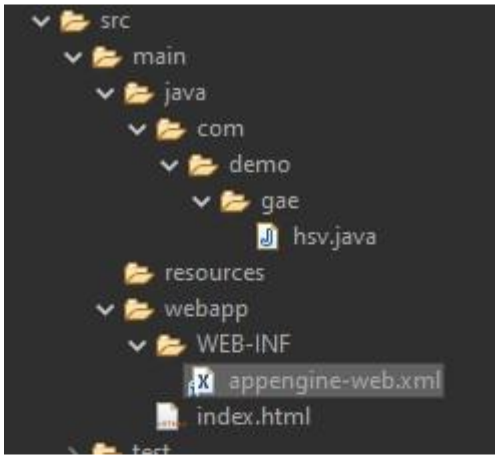
Output



```
<terminated> mapred [Java Application]
Usage: wordcount 445 224
```

Lab-9 Develop and application for Google App Engine

Create a new maven project with following structure



With each containing the following
code Hsv.java package com.demo.gae;

```
import java.io.IOException; import
jakarta.servlet.http.*;

@SuppressWarnings("serial") public
class hsv extends HttpServlet {
   @Override    public void doGet(HttpServletRequest req,
HttpServletResponse resp)       throws IOException {
resp.setContentType("text/plain");       resp.getWriter().println("Hello,
world from Java 17!");
   }
}
```

Appengine-web.xml

```
<appengine-web-app xmlns="http://appengine.google.com/ns/1.0">
 <runtime>java17</runtime>
 <threadsafe>true</threadsafe>
</appengine-web-app>
```

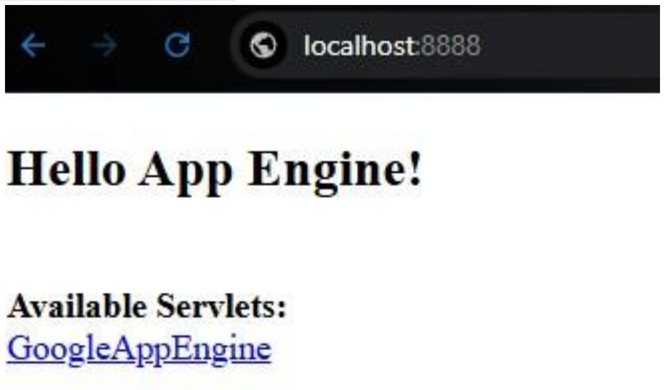
Index.html

```
<!DOCTYPE html>
<html>
 <head>
   <title>Hello GAE</title>
 </head>
 <body>
   <h1>Hello from Java 17 on App Engine!</h1>
   <p><a href="/hello">Go to Servlet</a></p>
```

```
  </body>
</html>
```

Run the application by

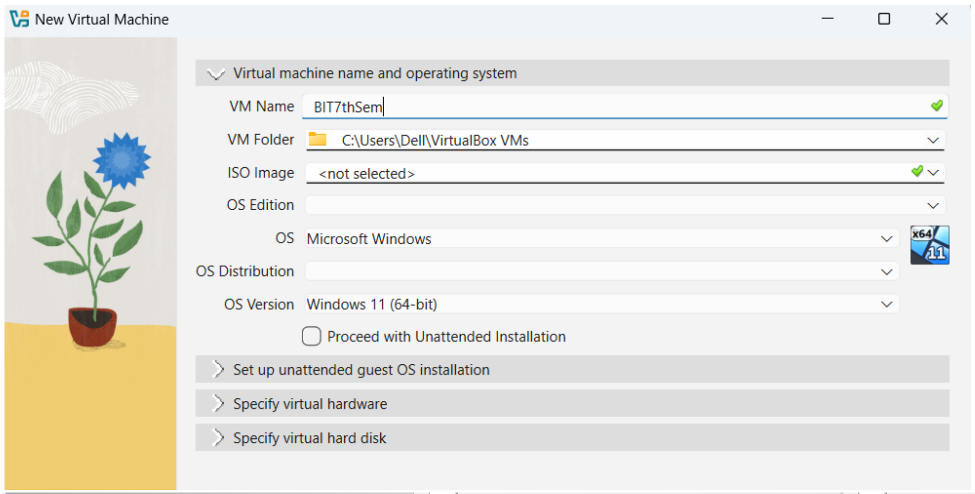
```
mvn appengine:run
gcloud app deploy
```



localhost:8888

Hello App Engine!

Available Servlets:
GoogleAppEngine



New Virtual Machine

Virtual machine name and operating system

VM Name: BIT7thSem

VM Folder: C:\Users\Dell\VirtualBox VMs

ISO Image: <not selected>

OS Edition:

OS: Microsoft Windows

OS Distribution:

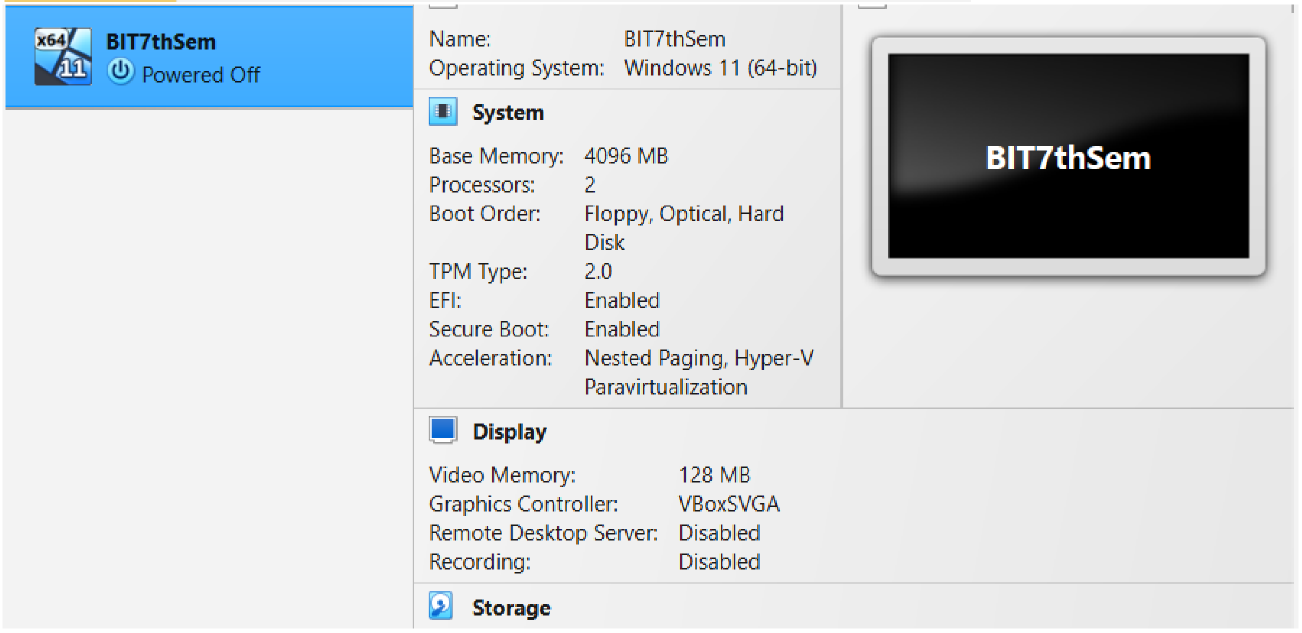
OS Version: Windows 11 (64-bit)

Proceed with Unattended Installation

Set up unattended guest OS installation

Specify virtual hardware

Specify virtual hard disk



BIT7thSem
Powered Off

Name: BIT7thSem
Operating System: Windows 11 (64-bit)

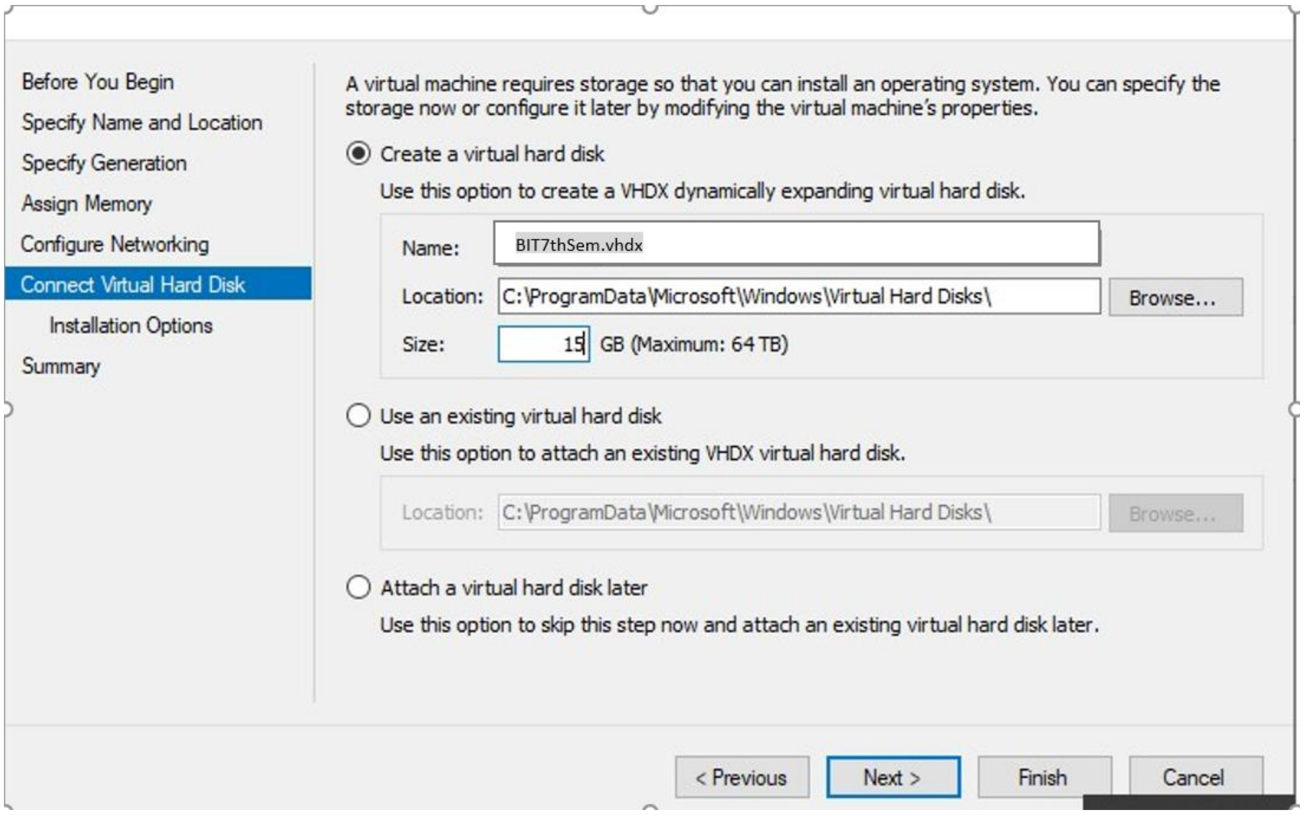
System

Base Memory: 4096 MB
Processors: 2
Boot Order: Floppy, Optical, Hard Disk
TPM Type: 2.0
EFI: Enabled
Secure Boot: Enabled
Acceleration: Nested Paging, Hyper-V Paravirtualization

Display

Video Memory: 128 MB
Graphics Controller: VBoxSVGA
Remote Desktop Server: Disabled
Recording: Disabled

Storage



Before You Begin
Specify Name and Location
Specify Generation
Assign Memory
Configure Networking
Connect Virtual Hard Disk
Installation Options
Summary

A virtual machine requires storage so that you can install an operating system. You can specify the storage now or configure it later by modifying the virtual machine's properties.

(●) Create a virtual hard disk

Use this option to create a VHDX dynamically expanding virtual hard disk.

Name: BIT7thSem.vhdx
Location: C:\ProgramData\Microsoft\Windows\Virtual Hard Disks\ [Browse...]
Size: 15 GB (Maximum: 64 TB)

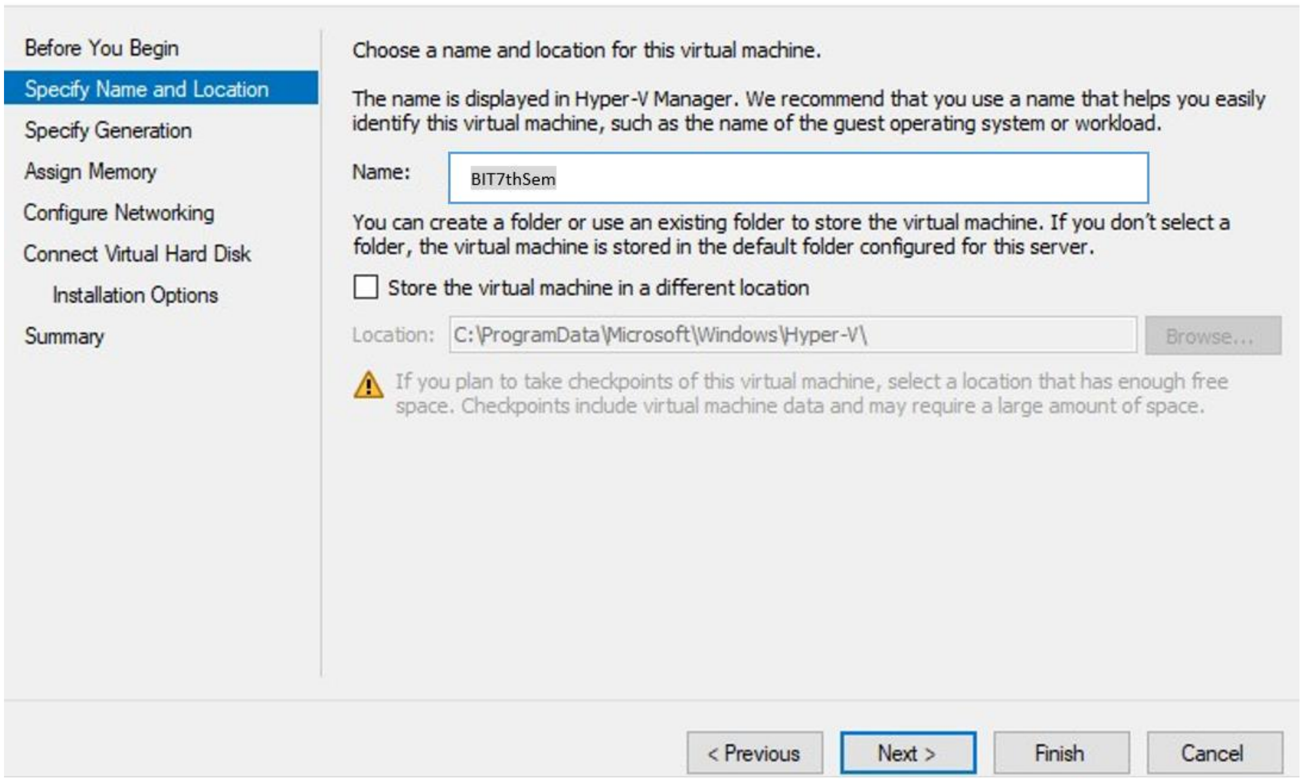
( ) Use an existing virtual hard disk

Use this option to attach an existing VHDX virtual hard disk.

Location: C:\ProgramData\Microsoft\Windows\Virtual Hard Disks\ [Browse...]

( ) Attach a virtual hard disk later

Use this option to skip this step now and attach an existing virtual hard disk later.



Before You Begin
Specify Name and Location
Specify Generation
Assign Memory
Configure Networking
Connect Virtual Hard Disk
Installation Options
Summary

Choose a name and location for this virtual machine.

The name is displayed in Hyper-V Manager. We recommend that you use a name that helps you easily identify this virtual machine, such as the name of the guest operating system or workload.

Name: BIT7thSem

You can create a folder or use an existing folder to store the virtual machine. If you don't select a folder, the virtual machine is stored in the default folder configured for this server.

☐ Store the virtual machine in a different location

Location: C:\ProgramData\Microsoft\Windows\Hyper-V\ [Browse...]

If you plan to take checkpoints of this virtual machine, select a location that has enough free space. Checkpoints include virtual machine data and may require a large amount of space.