



***RAMNIRANJAN JHUNJHUNWALA COLLEGE  
GHATKOPAR (W), MUMBAI - 400 086***

***DEPARTMENT OF INFORMATION TECHNOLOGY 2021 -  
2022***

***M.Sc. (I.T.) SEM I  
Cloud Computing***

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***Roll No.: 30***



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**CERTIFICATE**

*This is to certify that Mr. Kedar Sitaram Jadhav with Seat No. 30 has successfully completed the necessary course of experiments in the subject of Cloud Computing during the academic year 2021 – 2022 complying with the requirements of RAMNIRANJAN JHUNJHUNWALA COLLEGE OF ARTS, SCIENCE AND COMMERCE, for the course of M.Sc. (IT) Semester -I.*

*27th November 2021*

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*Internal Examiner*

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*Date*

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*Head Of Department*

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*College Seal*

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*External Examiner*

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<i>Sr. No.</i>	<i>Practical</i>	<i>Date</i>
1.	<i>Implement Client Server communication model using TCP</i>	02/09/21
2.	<i>Implement Client Server communication model using UDP</i>	02/09/21
3.	<i>Implementation of web services</i>	13/09/21
4.	<i>Develop application for Google App Engine</i>	19/09/21
5.	<i>Implement virtualization using VMWare ESXi Server and managing with vSphere Client</i>	21/09/21
6.	<i>Implement virtualization using Hyper-V</i>	12/10/21
7.	<i>Develop a cloud application for Microsoft Azure</i>	16/10/21

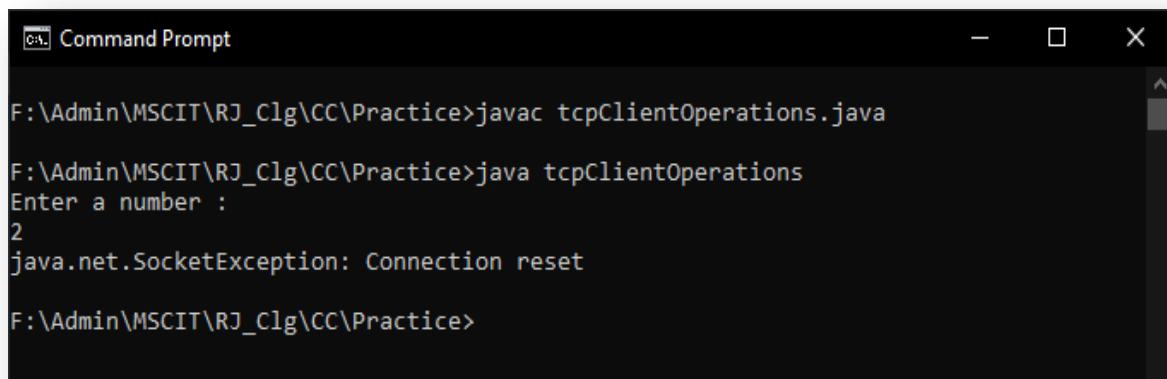
## Practical No. 1

Write a client program to enter the number and server program to calculate the square, square root, cube and cube root of the entered number using TCP Communication

### *tcpClientOperations.java*

```
1 import java.net.*;
2 import java.io.*;
3
4 class tcpClientOperations
5 {
6     public static void main(String args[])
7     {
8         try
9         {
10             Socket sc = new Socket("LocalHost",8001);
11             BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
12
13             System.out.println("Enter a number : ");
14             int a = Integer.parseInt(br.readLine());
15
16             DataOutputStream out = new DataOutputStream(sc.getOutputStream());
17             out.writeInt(a);
18
19             DataInputStream in = new DataInputStream(sc.getInputStream());
20             System.out.println(in.readUTF());
21
22             sc.close();
23         }
24
25         catch(Exception e)
26         {
27             System.out.println(e.toString());
28         }
29     }
30 }
31 }
```

*Output:*



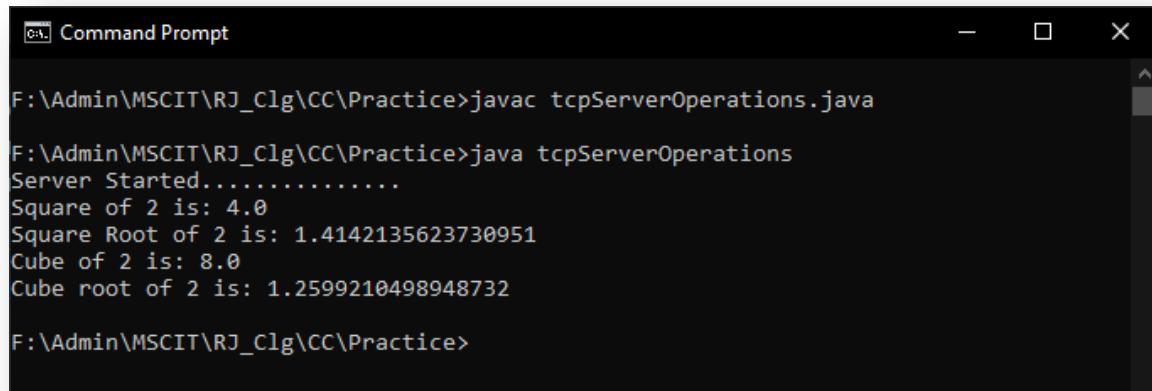
The screenshot shows a Windows Command Prompt window titled "Command Prompt". The command F:\Admin\MSCIT\RJ\_Clg\CC\Practice>javac tcpClientOperations.java is run, followed by F:\Admin\MSCIT\RJ\_Clg\CC\Practice>java tcpClientOperations. The user is prompted to "Enter a number : " and enters "2". A "java.net.SocketException: Connection reset" error is displayed, indicating a communication issue between the client and server.

```
F:\Admin\MSCIT\RJ_Clg\CC\Practice>javac tcpClientOperations.java
F:\Admin\MSCIT\RJ_Clg\CC\Practice>java tcpClientOperations
Enter a number :
2
java.net.SocketException: Connection reset
F:\Admin\MSCIT\RJ_Clg\CC\Practice>
```

## *tcpServerOperations.java*

```
1 import java.net.*;
2 import java.io.*;
3 import java.util.*;
4 class tcpServerOperation
5 {
6     public static void main(String args[])
7     {
8         try
9         {
10             ServerSocket ss = new ServerSocket(8001); System.out.println("Server Started.....");
11
12             Socket s = ss.accept(); DataInputStream in = new DataInputStream(s.getInputStream());
13
14             int x= in.readInt(); DataOutputStream otc = new DataOutputStream(s.getOutputStream());
15
16             //Square
17             System.out.println("Square of " + x + " is: " + Math.pow(x, 2));
18
19             //Square Root
20             System.out.println("Square Root of " + x + " is: " + Math.sqrt(x));
21
22             //Cube
23             System.out.println("Cube of " + x + " is: " + Math.pow(x, 3));
24
25             //Cube root
26             System.out.println("Cube root of "+ x +" is: "+Math.cbrt(x));
27         }
28         catch(Exception e)
29         {
30             System.out.println(e.toString());
31         }
32     }
33 }
34 }
```

*Output:*



The screenshot shows a Windows Command Prompt window titled "Command Prompt". The command F:\Admin\MSCIT\RJ\_Clg\CC\Practice>javac tcpServerOperations.java is entered, followed by F:\Admin\MSCIT\RJ\_Clg\CC\Practice>java tcpServerOperations. The output shows the server starting at port 8001, and then it prints the square and square root of the number 2, followed by its cube and cube root.

```
F:\Admin\MSCIT\RJ_Clg\CC\Practice>javac tcpServerOperations.java
F:\Admin\MSCIT\RJ_Clg\CC\Practice>java tcpServerOperations
Server Started.....
Square of 2 is: 4.0
Square Root of 2 is: 1.4142135623730951
Cube of 2 is: 8.0
Cube root of 2 is: 1.2599210498948732
F:\Admin\MSCIT\RJ_Clg\CC\Practice>
```

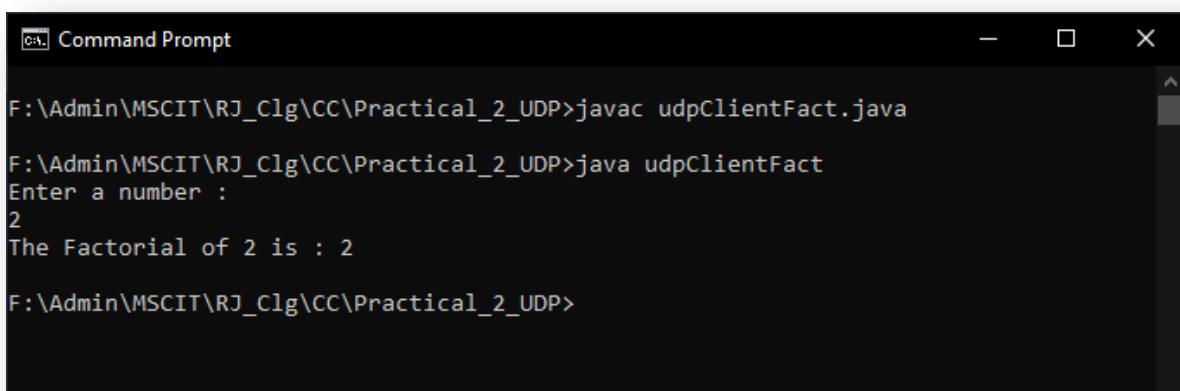
## Practical No. 2

*Write a client server-based program using UDP to find the factorial of the entered number*

*udpClientFact.java*

```
1 import java.net.*;
2 import java.io.*;
3 class udpClientFact
4 {
5     public static void main(String args[])
6     {
7         try
8         {
9             DatagramSocket ds = new DatagramSocket(1000);
10            BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
11
12            System.out.println("Enter a number : ");
13            String num = br.readLine();
14
15            byte b[] = new byte[1024];
16            b = num.getBytes();
17
18            DatagramPacket dp = new DatagramPacket(b,b.length,InetAddress.getLocalHost(),2000);
19            ds.send(dp);
20
21            byte b1[] = new byte[1024];
22
23            DatagramPacket dp1 = new DatagramPacket(b1,b1.length);
24            ds.receive(dp1);
25
26            String str = new String(dp1.getData(),0,dp1.getLength());
27            System.out.println(str);
28        }
29        catch(Exception e)
30        {
31            e.printStackTrace();
32        }
33    }
34 }
35 }
36 }
```

*Output:*



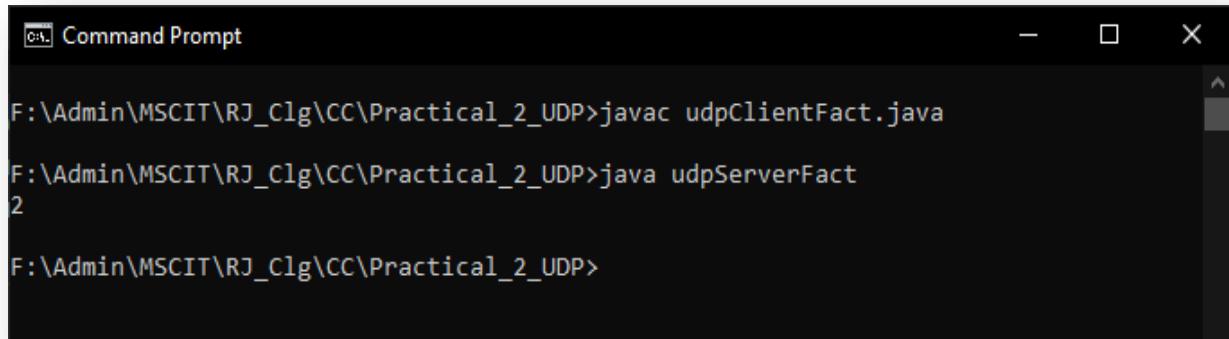
The screenshot shows a Windows Command Prompt window titled "Command Prompt". The user has navigated to the directory "F:\Admin\MSCIT\RJ\_Clg\CC\Practical\_2\_UDP". They first run the command "javac udpClientFact.java" to compile the Java source code. After compilation, they run the command "java udpClientFact" to execute the program. The program prompts the user to enter a number, which they type "2". The program then outputs "The Factorial of 2 is : 2", indicating that it has calculated the factorial of the input number.

```
F:\Admin\MSCIT\RJ_Clg\CC\Practical_2_UDP>javac udpClientFact.java
F:\Admin\MSCIT\RJ_Clg\CC\Practical_2_UDP>java udpClientFact
Enter a number :
2
The Factorial of 2 is : 2
F:\Admin\MSCIT\RJ_Clg\CC\Practical_2_UDP>
```

### *udpServerFact.java*

```
1 import java.net.*;
2 import java.io.*;
3 public class udpServerFact
4 {
5     public static void main(String args[])
6     {
7         try
8         {
9             DatagramSocket ds = new DatagramSocket(2000);
10            byte b[] = new byte[1024];
11            DatagramPacket dp = new DatagramPacket(b,b.length);
12            ds.receive(dp);
13
14            String str = new String(dp.getData(),0,dp.getLength());
15            System.out.println(str);
16
17            int a= Integer.parseInt(str);
18            int f = 1, i;
19
20            String s= new String();
21            for(i=1;i<=a;i++)
22            {
23                f=f*i;
24            }
25            s=Integer.toString(f);
26
27            String strResult = "The Factorial of " + str + " is : " + f;
28
29            byte b1[] = new byte[1024]; b1 = strResult.getBytes();
30            DatagramPacket dp1 = new DatagramPacket(b1,b1.length,InetAddress.getLocalHost(),1000); ds.send(dp1);
31        }
32        catch(Exception e)
33        {
34            e.printStackTrace();
35        }
36    }
37 }
```

### *Output:*



The screenshot shows a Windows Command Prompt window titled "Command Prompt". The command F:\Admin\MSCIT\RJ\_Clg\CC\Practical\_2\_UDP>javac udpClientFact.java is run, followed by F:\Admin\MSCIT\RJ\_Clg\CC\Practical\_2\_UDP>java udpServerFact. The output shows the factorial of 2 being calculated and printed.

```
F:\Admin\MSCIT\RJ_Clg\CC\Practical_2_UDP>javac udpClientFact.java
F:\Admin\MSCIT\RJ_Clg\CC\Practical_2_UDP>java udpServerFact
2
F:\Admin\MSCIT\RJ_Clg\CC\Practical_2_UDP>
```

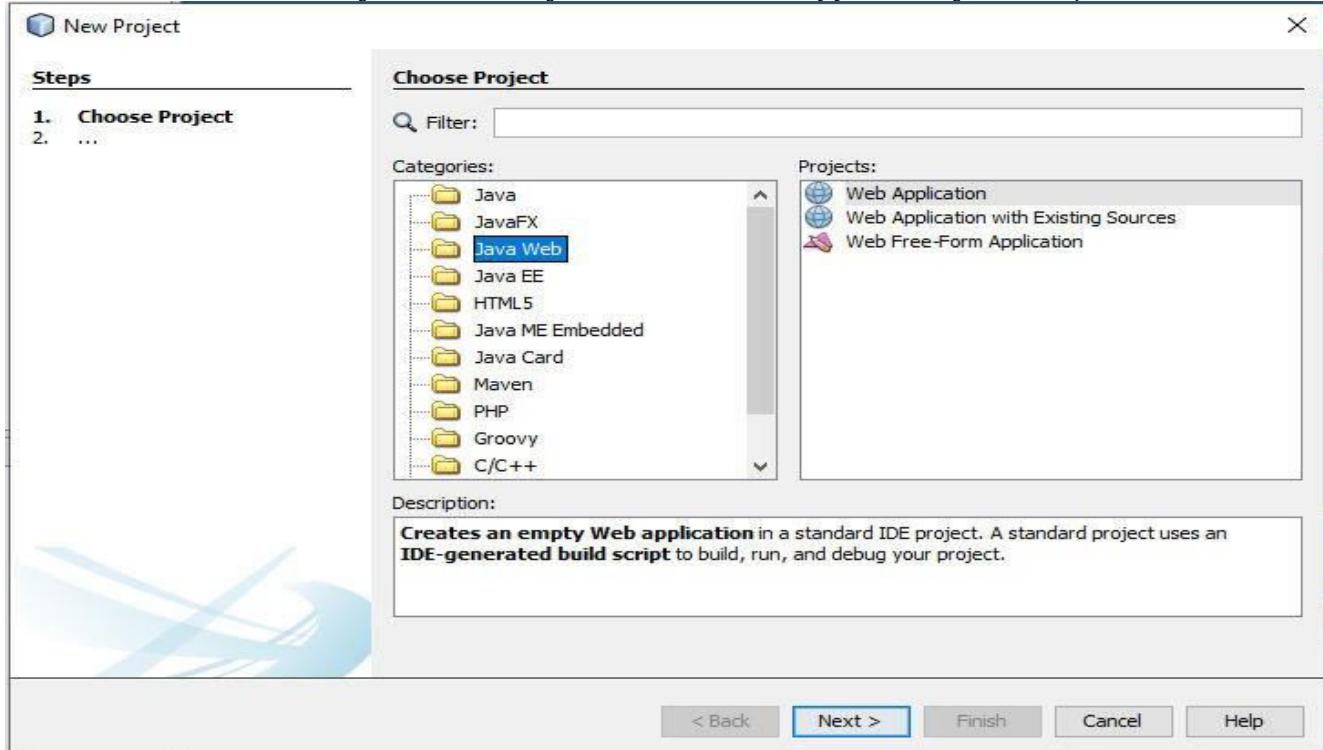
## Practical No. 3

Create A Webservice to do add and subtract operation and consume webservice.

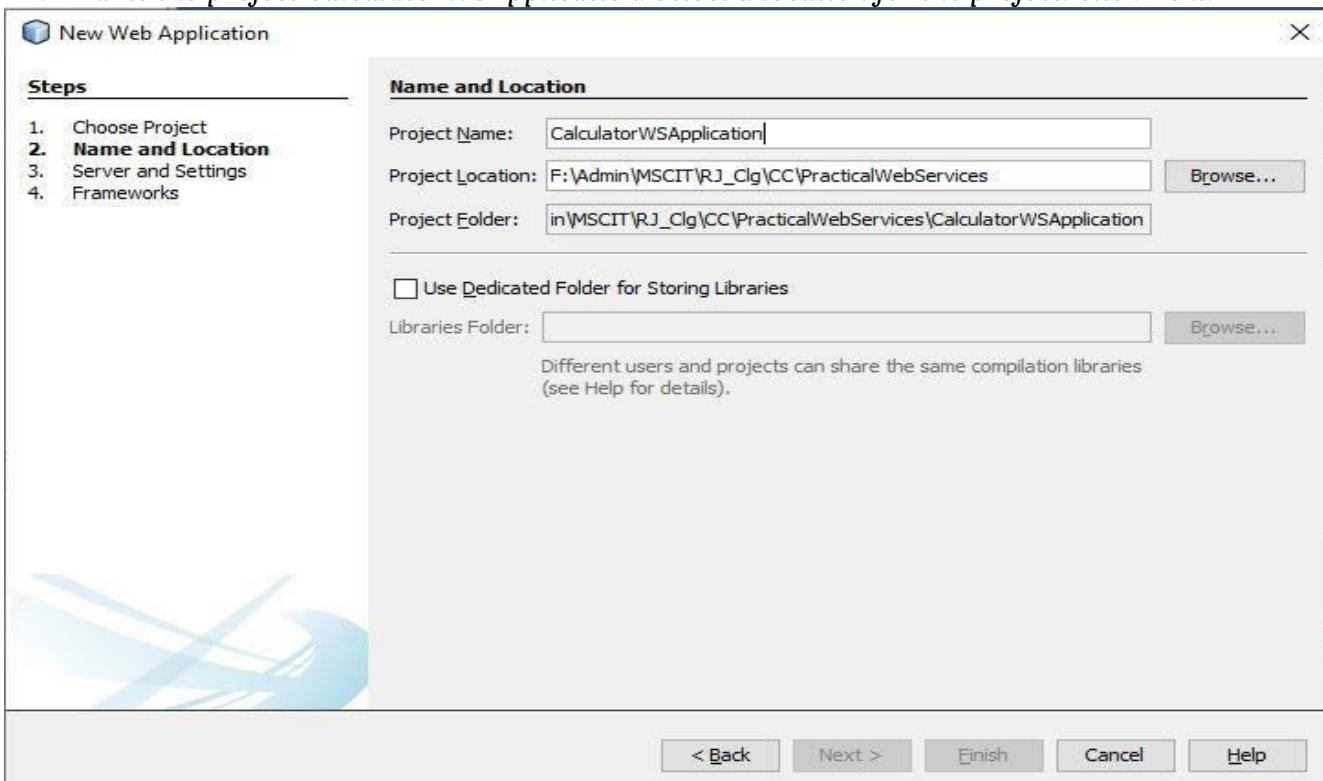
### 1) Creating a Web Service –

#### A. Choosing a Container

1. Choose File > New Project (Ctrl + Shift + N). Select Web Application from the Java Web.



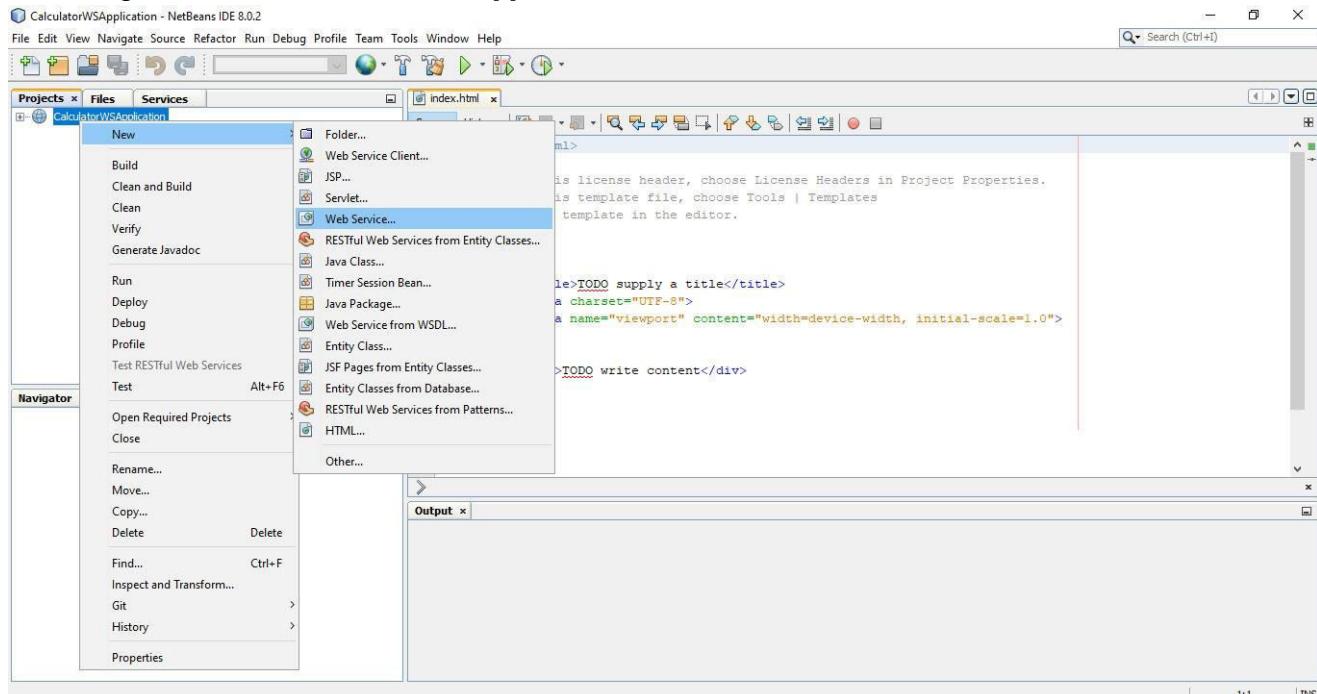
2. Name the project CalculatorWSApplication. Select a location for the project. Click Next.



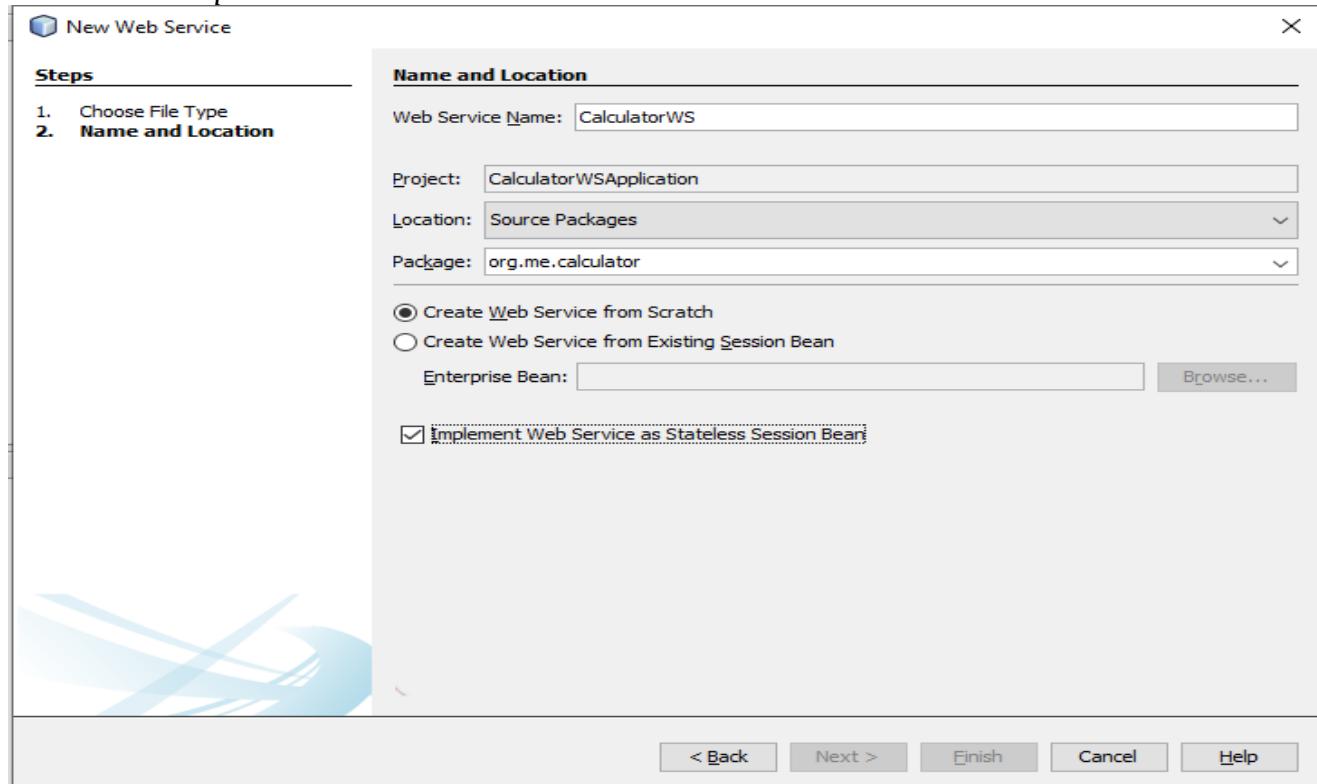
3. Select your server and Java EE version and click Finish

## B. Creating a Web Service from a Java Class

1. Right-click the *CalculatorWSApplication* node and choose *New > Web Service*



2. Name the web service *CalculatorWS* and type *org.me.calculator* in Package.
3. Leave Create Web Service from Scratch selected. If you are creating a Java EE 6 project on GlassFish,
4. Select Implement Web Service as a Stateless Session Bean.



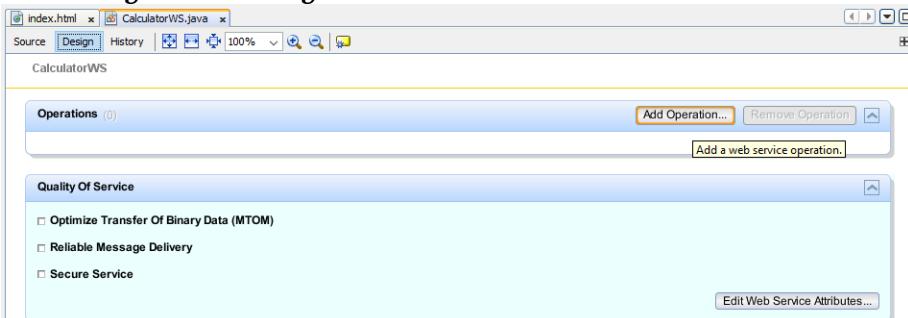
5. Click *Finish*. The *Projects* window displays the structure of the new web service and the source code is shown in the editor area.

## 2) Adding an Operation to the Web Service

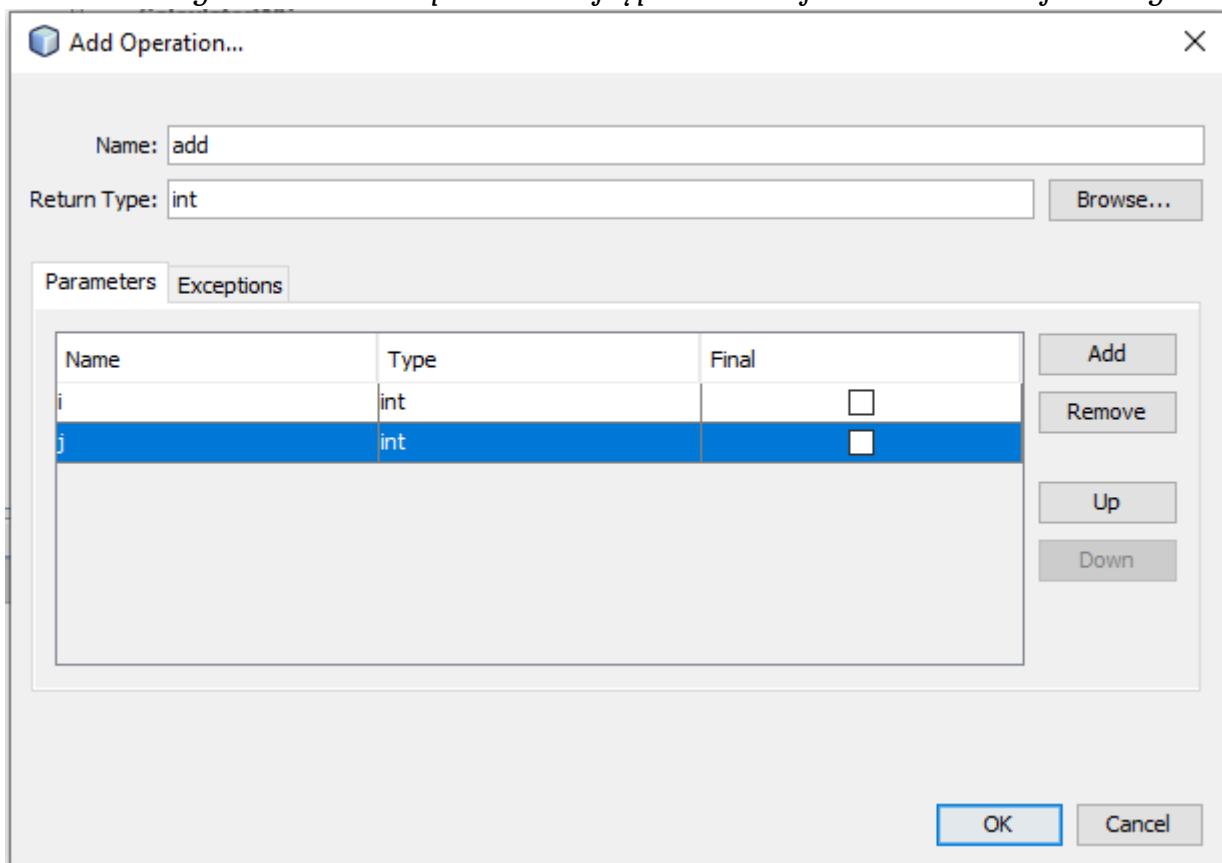
The goal of this exercise is to add to the web service an operation that adds two numbers received from a client. The NetBeans IDE provides a dialog for adding an operation to a web service. You can open this dialog either in the web service visual designer or in the web service context menu.

### A. To add an operation to the web service:

#### 1. Change to the Design view in the editor.

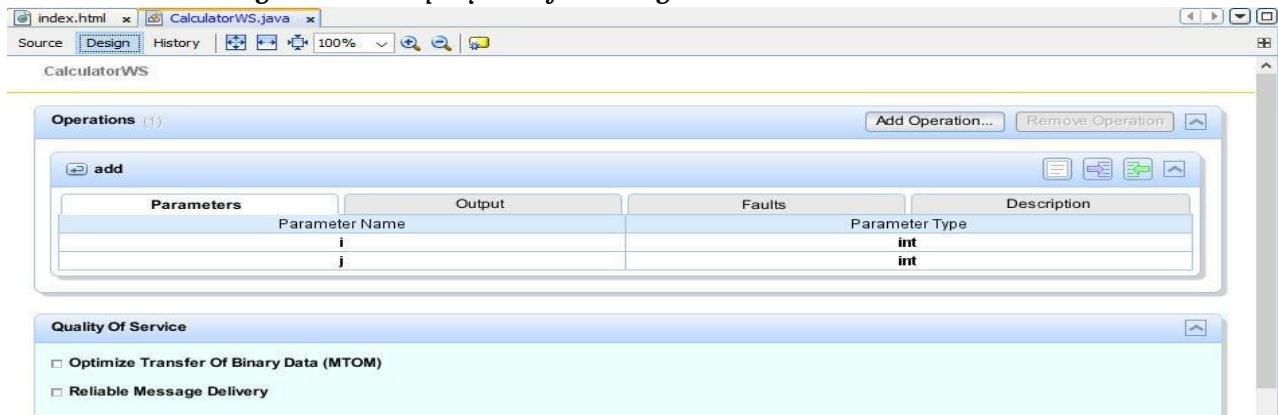


2. Click Add Operation in either the visual designer or the context menu. The Add Operation dialog opens.
3. In the upper part of the Add Operation dialog box, type add in Name and type int in the Return Type drop-down list.
4. In the lower part of the Add Operation dialog box, click Add and create a parameter of type int named i.
5. Click Add again and create a parameter of type int called j. You now see the following:



6. Click OK at the bottom of the Add Operation dialog box. You return to the editor.

7. The visual designer now displays the following

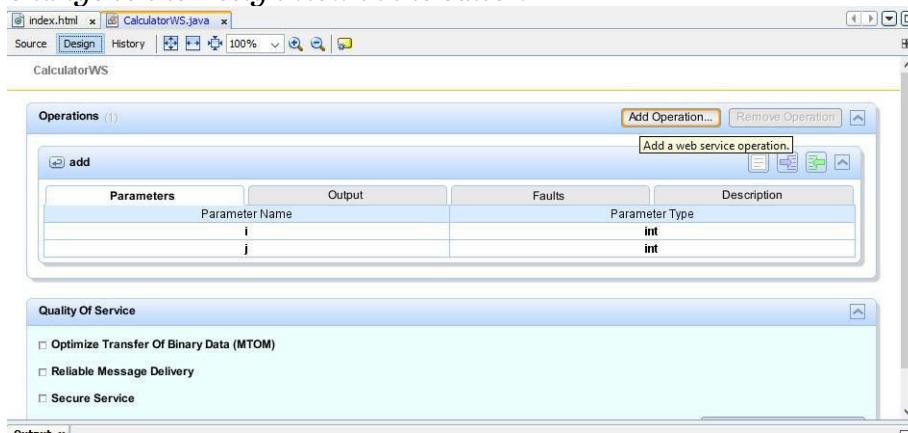


8. Click Source. And code the following.

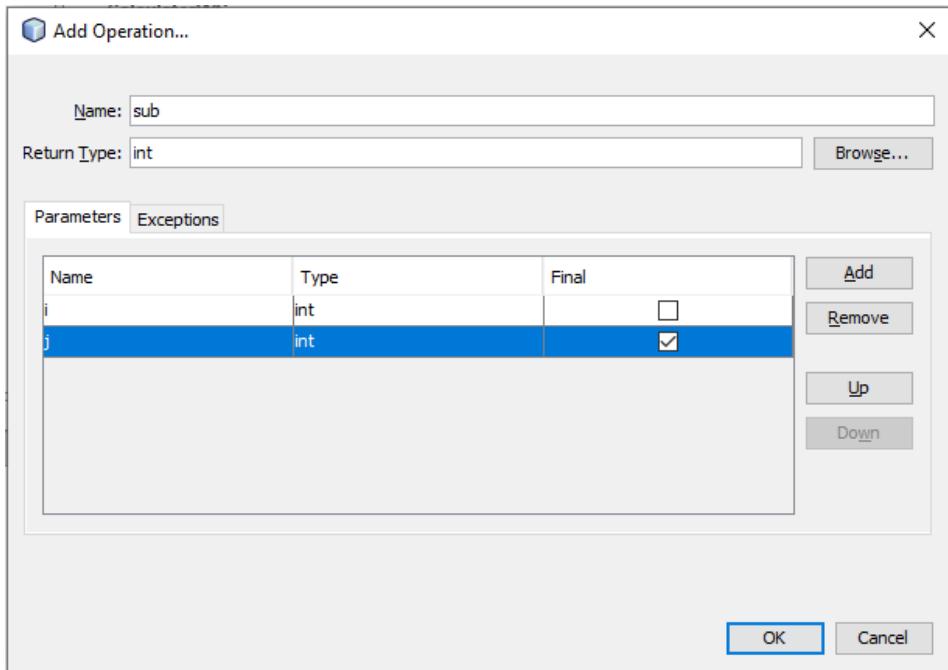
```
1  /**
2  * Web service operation
3  */
4  @WebMethod(operationName = "add")
5  public int add(@WebParam(name = "i") int i, @WebParam(name = "j") int j) { int k = i + j;
6  return
```

B. To Sub an operation to the web service:

1. Change to the Design view in the editor.



2. Click Add Operation in either the visual designer or the context menu. The Add Operation dialog opens.
3. In the upper part of the Add Operation dialog box, type sub in Name and type int in the Return Type drop-down list.
4. In the lower part of the Add Operation dialog box, click Add and create a parameter of type int named i.
5. Click Add again and create a parameter of type int called j. You now see the following:



6. Click OK at the bottom of the Add Operation dialog box. You return to the editor.
7. The visual designer now displays the following:

8. Click Source. And code the following.

```

1  /**
2  * Web service operation
3  */
4  @WebMethod(operationName = "sub")
5  public int sub(@WebParam(name = "i") int i, @WebParam(name = "j") final int j) { int k = i - j
6  return k;
7 }

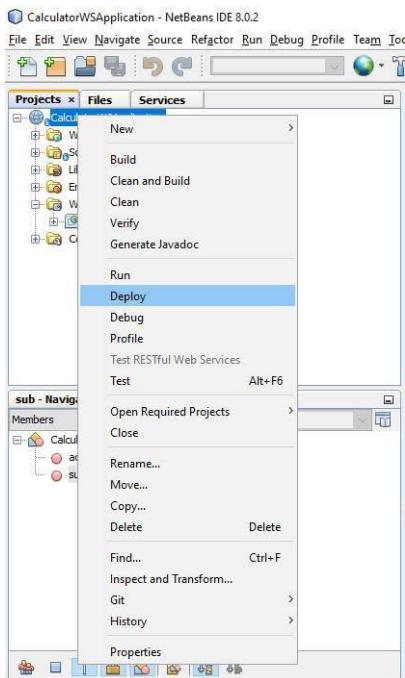
```

### 3) Deploying and Testing the Web Service

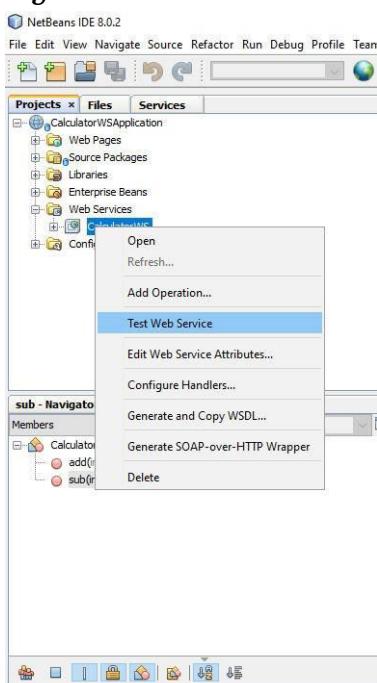
After you deploy a web service to a server, you can use the IDE to open the server's test client, if the server has a test client. The GlassFish servers provide test clients.

A. To test successful deployment to a GlassFish server:

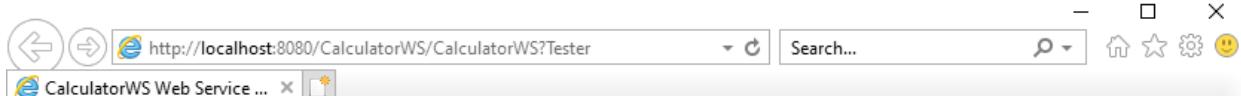
1. Right-click the project and choose Deploy. The IDE starts the application server, builds the application, and deploys the application to the server.



2. In the IDE's Projects tab, expand the Web Services node of the CalculatorWSApplication project. Right-click the CalculatorWS node, and choose Test Web Service



3. The IDE opens the tester page in your browser, if you deployed a web application to the GlassFish server.
4. If you deployed to the GlassFish server, type two numbers in the tester page, as shown below:



## CalculatorWS Web Service Tester

This form will allow you to test your web service implementation ([WSDL File](#))

To invoke an operation, fill the method parameter(s) input boxes and click on the button labeled with the method name.

### Methods :

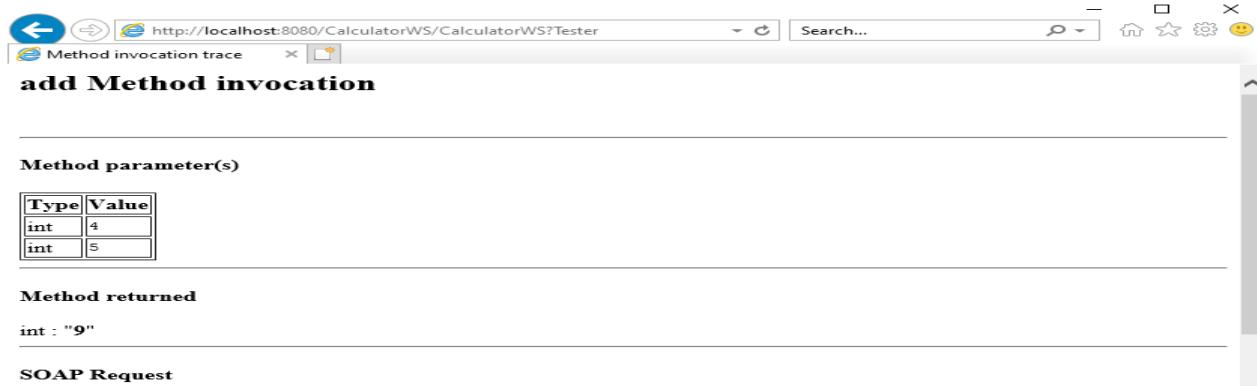
```
public abstract int org.me.calculator.CalculatorWS.add(int,int)
```

```
add (4 ,5 x)
```

```
public abstract int org.me.calculator.CalculatorWS.sub(int,int)
```

```
sub ( , )
```

5. The Sum of the 2 numbers is displayed.

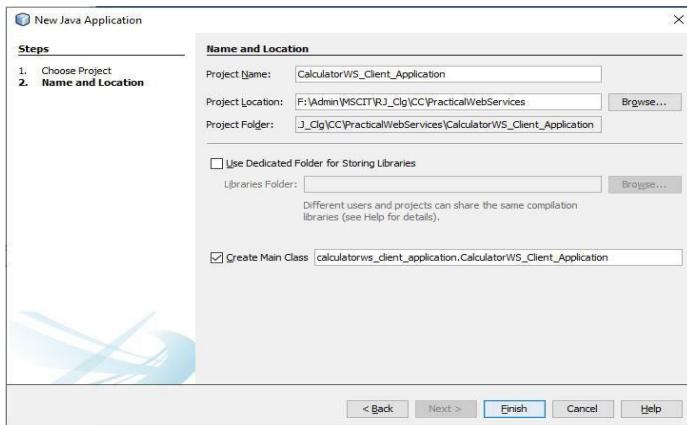
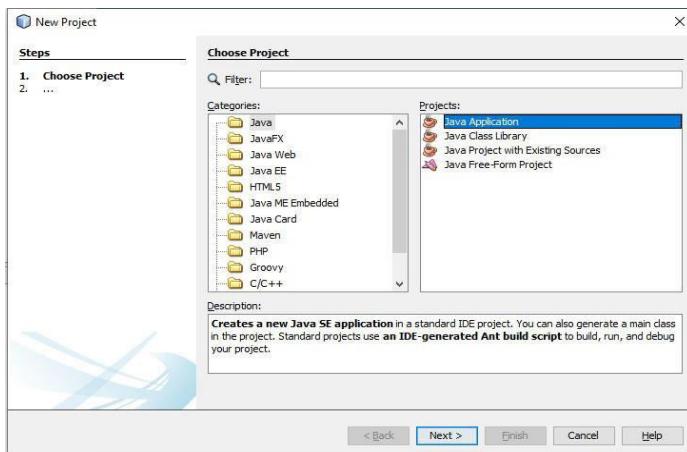


6. The Same process for Subtraction operation is follow.

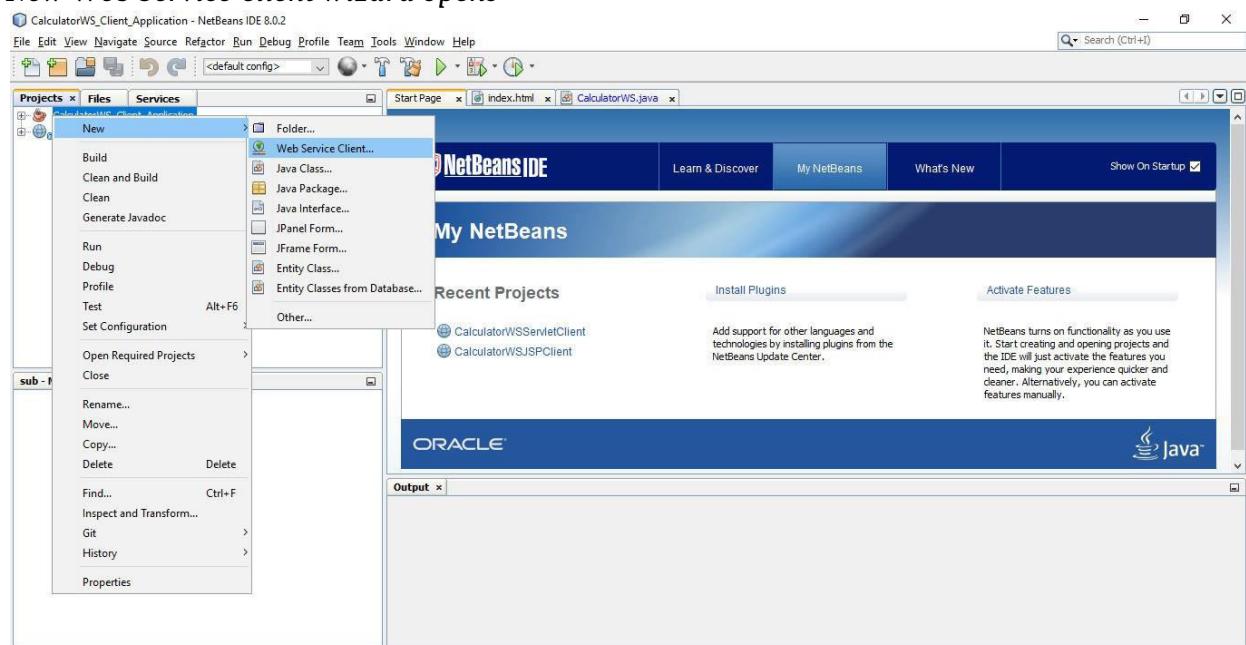
## Consuming the Web Service

Now that you have deployed the web service, you need to create a client to make use of the web service's add method and sub method.

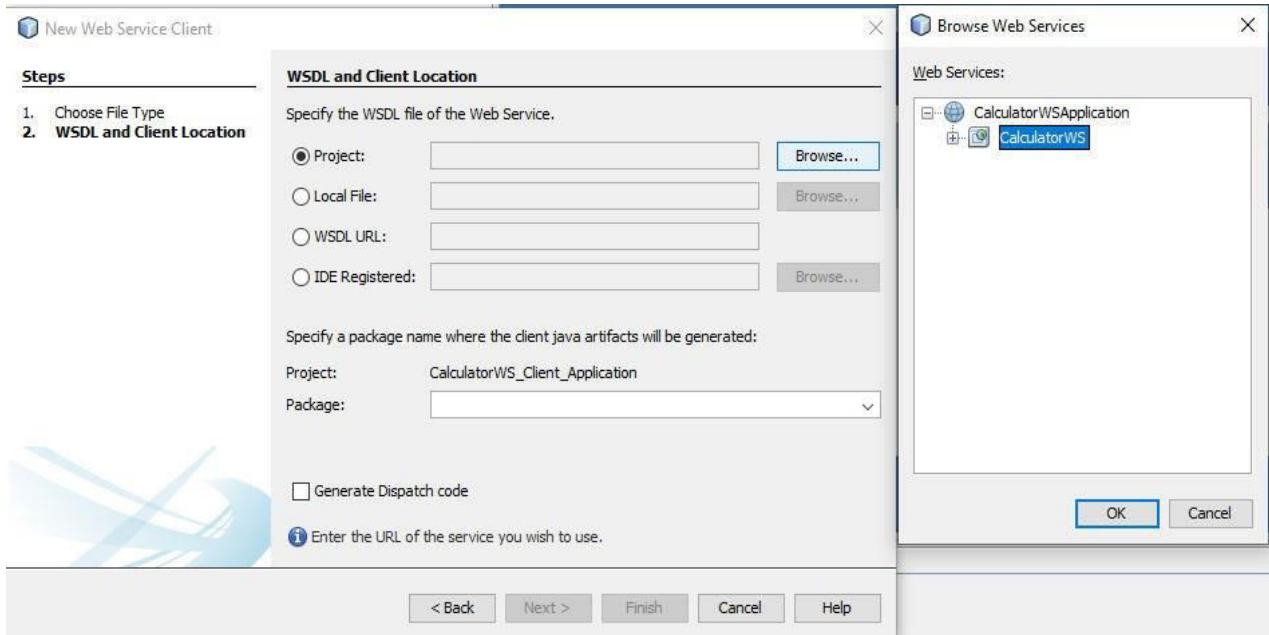
1. Client-1: Java Class in Java SE Application
  1. Choose File > New Project. Select Java Application from the Java category.
  2. Name the project CalculatorWS\_Client\_Application.
  3. Leave Create Main Class selected and accept all other default settings. Click Finish.



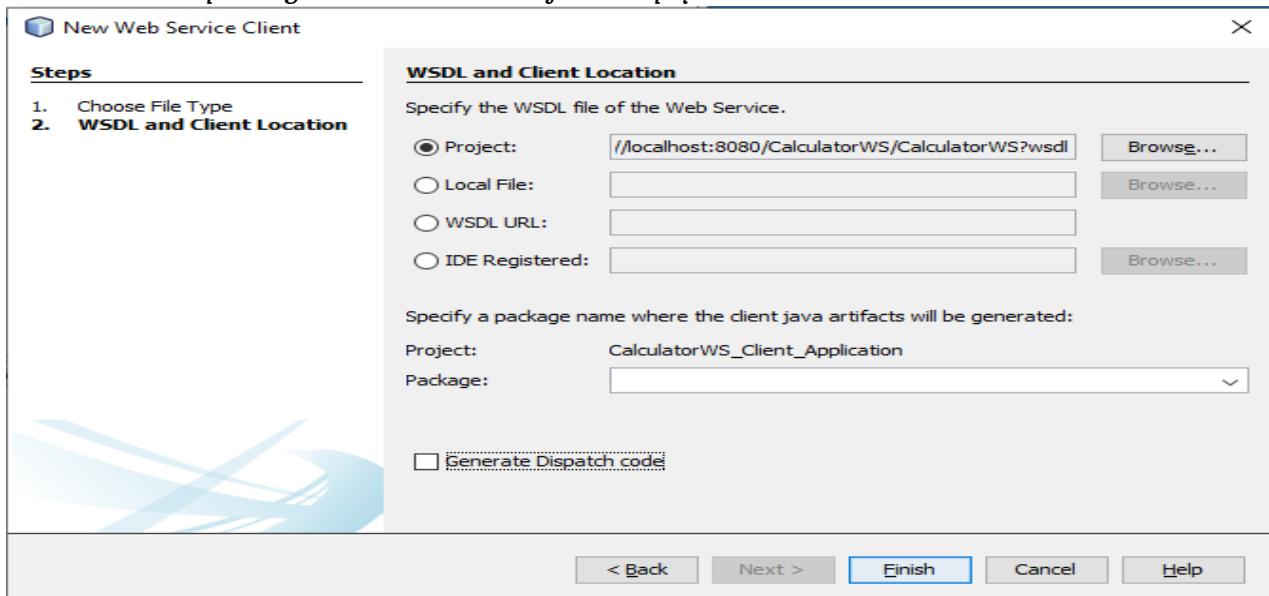
- Right-click the *CalculatorWS\_Client\_Application* node and choose *New > Web Service Client*. The *New Web Service Client* wizard opens



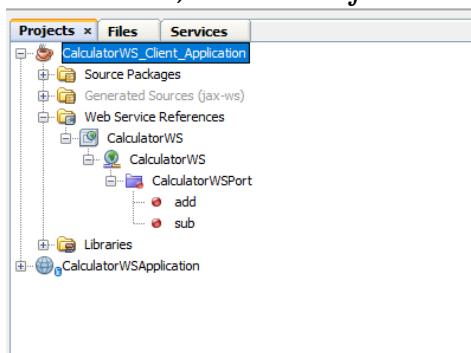
- Select *Project* as the WSDL source. Click *Browse*. Browse to the *CalculatorWS* web service in the *CalculatorWSApplication* project. When you have selected the web service, click *OK*.



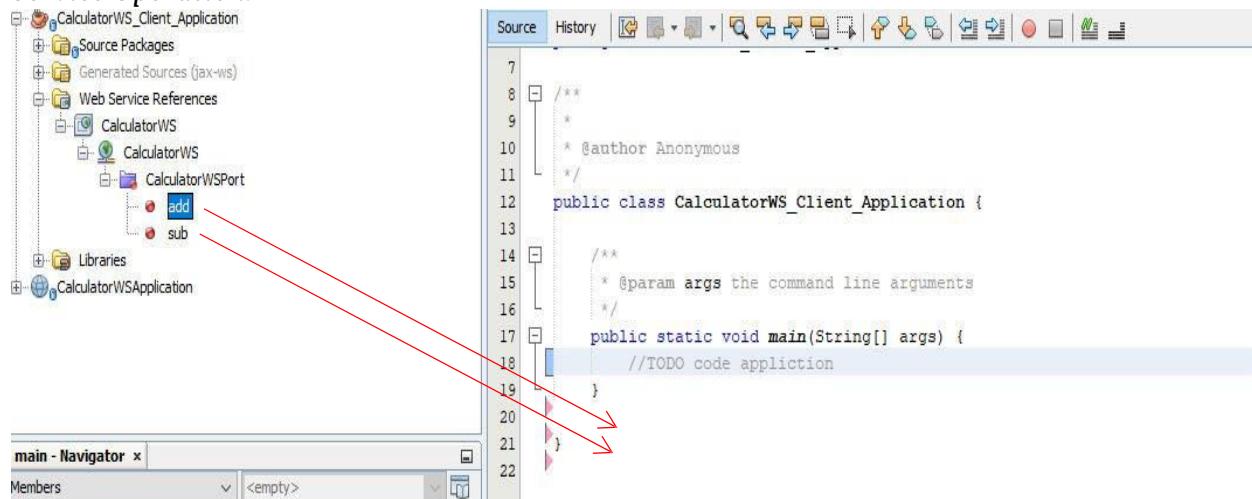
4. Do not select a package name. Leave this field empty.



5. Leave the other settings at default and click Finish. The Projects window displays the new web service client, with a node for the add method that you created:



6. Double-click your main class so that it opens in the Source Editor. Drag the add node below the main() method (or ) you can right-click in the editor and then choose Insert Code > Call Web Service Operation.



You now see the following code getting added on dragging:

```

1  /**
2  * @param args the command line arguments
3  */
4  public static void main(String[] args) {
5  //TODO code application
6  }
7
8  private static int add(int i, int j) {
9  org.me.calculator.CalculatorWS_Service service = new org.me.calculator.Calculatorws_Service();
10 org.me.calculator.CalculatorWS port = service.getCalculatorWSPort(); return port.add(i, j);
11 }
12
13 private static int sub(int i, int j) {
14 org.me.calculator.CalculatorWS_Service service = new org.me.calculator.Calculatorws_Service();
15 org.me.calculator.CalculatorWS port = service.getCalculatorWSPort(); return port.sub(i, j);
16 }
```

7. In the main () method body, replace the TODO comment with code that initializes values for i and j, calls add () and sub (), and prints the result.

```

1  public static void main(String[] args)
2  {
3      try
4      {
5          // Addition int a1 = 3; int a2 = 4;
6          int addResult = add(a1, a2);
7          System.out.println("Addition of " + a1 + " and " + a2 + " is " + addResult);
8
9          // Subtraction int s1 = 5; int s2 = 4;
10         int subResult = sub(s1, s2);
11         System.out.println("Subtraction of " + s1 + " and " + s2 + " is " + subResult);
12     }
13     catch(Exception ex)
14     {
15         System.out.println("Exception: " + ex);
16     }
17 }
```

8. Right-click the project node and choose Run. The Output window now shows the sum:

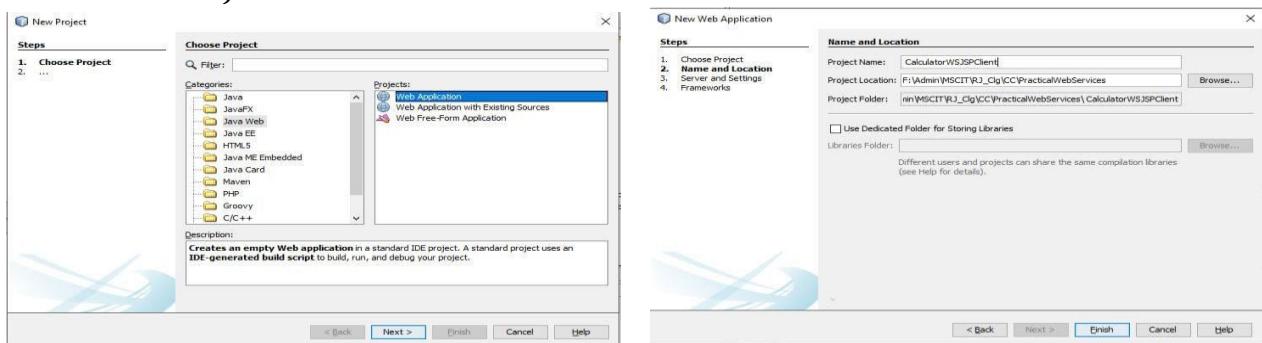
```

Output x
Java DB Database Process x GlassFish Server 4.1 x CalculatorWS_Client_Application (run) x
wsimport-client-generate:
compile:
run:
Addition of 3 and 4 is 7
Subtraction of 5 and 4 is 1
BUILD SUCCESSFUL (total time: 1 second)

```

## 1. Client-2: JSP Page in Web Application

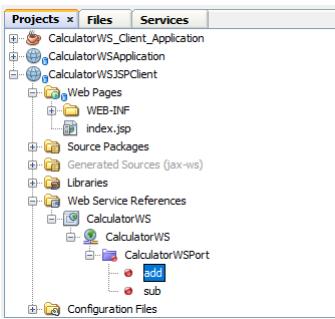
1. Choose File > New Project.
2. Select Web Application from the Java Web category. Name the project CalculatorWSJSPClient. Click Next and then click Finish.



3. Expand the Web Pages node under the project node and delete index.html .
4. Right-click the Web Pages node and choose New > JSP in the popup menu.
5. Note: If JSP is not available in the popup menu, choose New > Other and select JSP in the Web category of the New File wizard.
6. Type index for the name of the JSP file in the New File wizard. Click Finish.
7. Right-click the CalculatorWSJSPClient node and choose New > Web Service Client.
8. Select Project as the WSDL source.
9. Click Browse. Browse to the CalculatorWS web service in the CalculatorWSApplication project. When you have selected the web service, click OK.

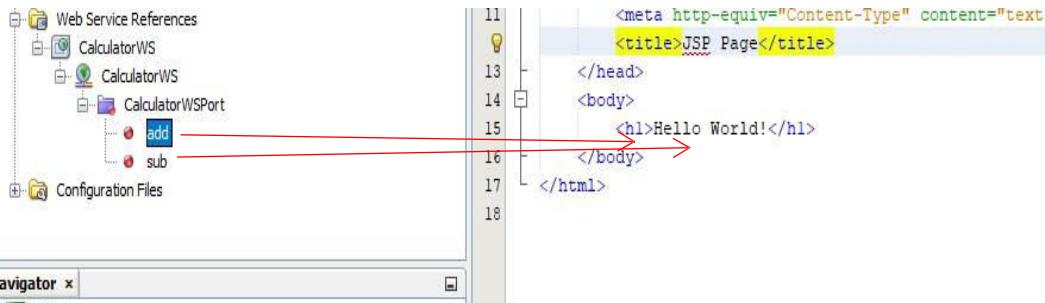


10. Do not select a package name. Leave this field empty.
11. Leave the other settings at default and click Finish.
12. The Projects window displays the new web service client, as shown below:



13. In the Web Service References node, expand the node that represents the web service. The add operation, which you will invoke from the client, is now exposed.

14. Drag the add operation to the client's index.jsp page, and drop it below the H1 tags.



15. The code for invoking the service's operation is now generated in the index.jsp page, as you can see here:

```

1  <%-- start web service invocation --%><hr/>
2  <%
3  try
4  {
5      org.me.calculator.CalculatorWS_Service service = new org.me.calculator.CalculatorWS_Service();
6      org.me.calculator.CalculatorWS port = service.getCalculatorWSPort();
7      // TODO initialize WS operation arguments here int i = 0;
8      int j = 0;
9      // TODO process result here int result = port.add(i, j);
10     out.println("Result = "+result);
11 }
12 catch (Exception ex)
13 {
14     // TODO handle custom exceptions here
15 }
16 %>
17 <%-- end web service invocation --%><hr/>
18 <%-- start web service invocation --%><hr/>
19 <%
20 try
21 {
22     org.me.calculator.CalculatorWS_Service service = new org.me.calculator.CalculatorWS_Service();
23     org.me.calculator.CalculatorWS port = service.getCalculatorWSPort();
24     // TODO initialize WS operation arguments here int i = 0;
25     int j = 0;
26     // TODO process result here int result = port.sub(i, j);
27     out.println("Result = "+result);
28 }
29 catch (Exception ex)
30 {
31     // TODO handle custom exceptions here
32 }
33 %>
34 <%-- end web service invocation --%><hr/>
```

Make the Change the value for i and j from 0 to other integers, such as 3 and 4. Replace the commented out TODO line in the catch block with out.println("exception" + ex);

```

1 <%-- start web service invocation --%><hr/>
2 <%
3 try
4 {
5     org.me.calculator.CalculatorWS_Service service = new org.me.calculator.CalculatorWS_Service();
6     org.me.calculator.CalculatorWS port = service.getCalculatorWSPort();
7     // TODO initialize WS operation arguments here
8     int i = 3;
9     int j = 4;
10    int result = port.add(i, j);    // TODO process result here
11    out.println("Addition Result = "+result);
12 }
13 catch (Exception ex)
14 {
15     // TODO handle custom exceptions here
16 }
17 %>
18 <%-- end web service invocation --%><hr/>
19
20 <%-- start web service invocation --%><hr/>
21 <%
22 try
23 {
24     org.me.calculator.CalculatorWS_Service service = new org.me.calculator.CalculatorWS_Service();
25     org.me.calculator.CalculatorWS port = service.getCalculatorWSPort();
26     // TODO initialize WS operation arguments here
27     int i = 5;
28     int j = 4;
29     int result = port.sub(i, j);    // TODO process result here
30     out.println("Subtraction Result = "+result);
31 }
32 catch (Exception ex)
33 {
34     // TODO handle custom exceptions here
35 }
36 %>
37 <%-- end web service invocation --%><hr/>
```

## 16. Right-click the project node and choose Run.

The server starts, if it wasn't running already. The application is built and deployed, and the browser opens, displaying the calculation result:



# Hello JSP!

---

Addition Result = 7

---



---

Subtraction Result = 1

---

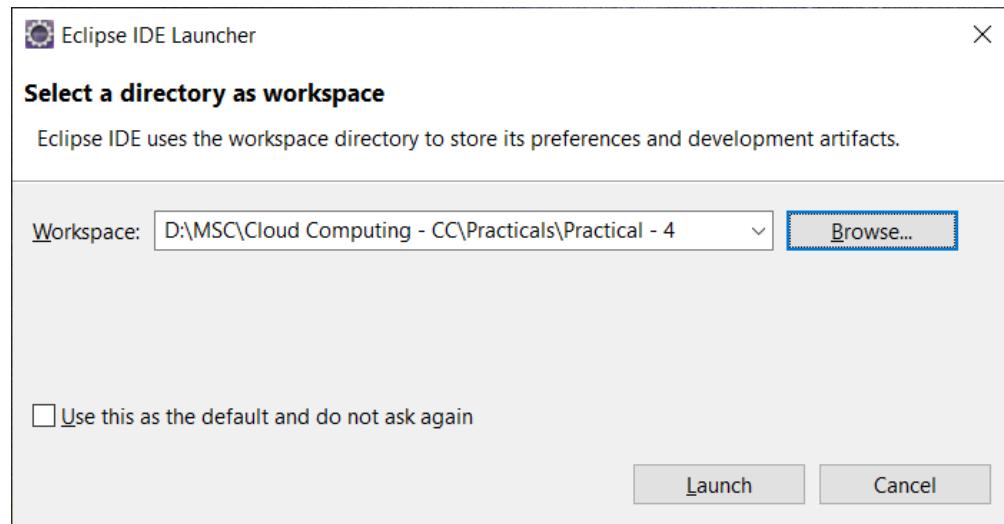
## Practical No. 4

### *Implement Application with Google App Engine (GAE)*

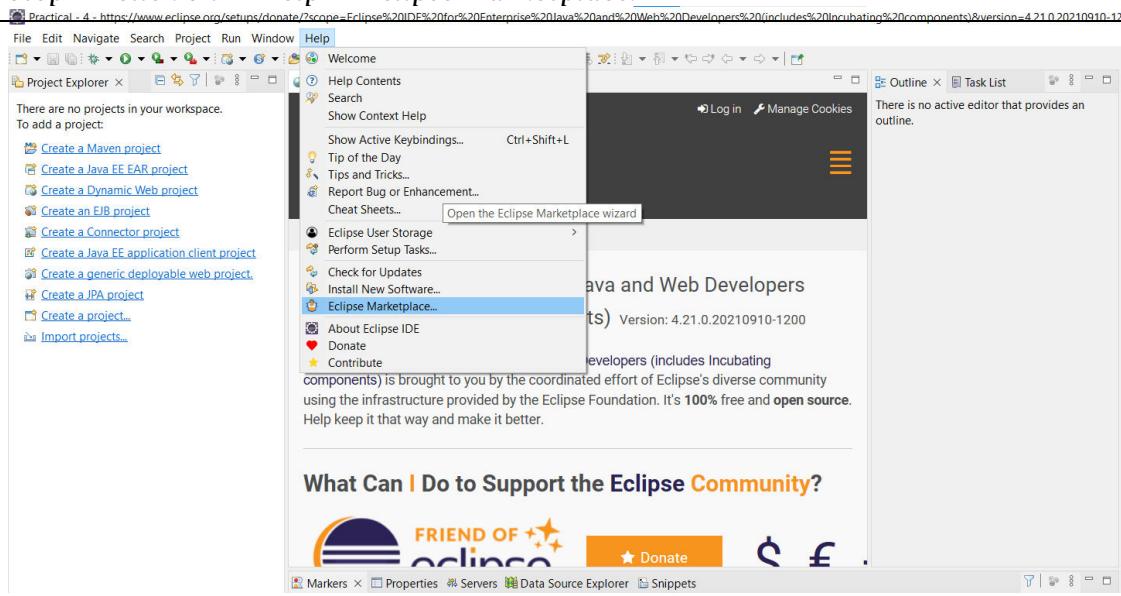
**Steps involved how to implement application with Google App Engine (GAE) below in the following order-**

*Step 1 - Install Eclipse IDE for Java EE Developers, version 4.8 or later. Install JDK 8 or JDK 11. Earlier and later versions of Java are not supported.*

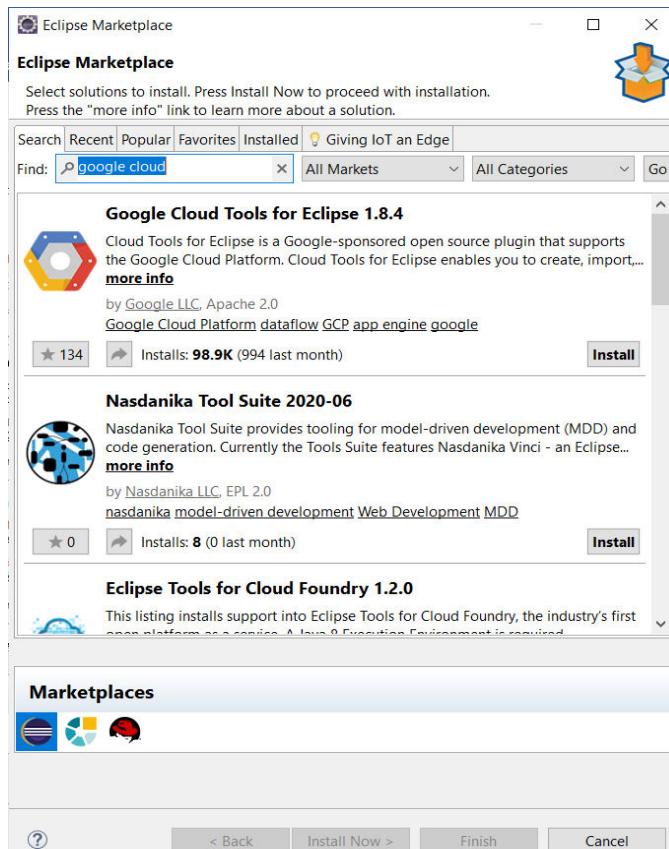
<https://www.eclipse.org/downloads/packages/>



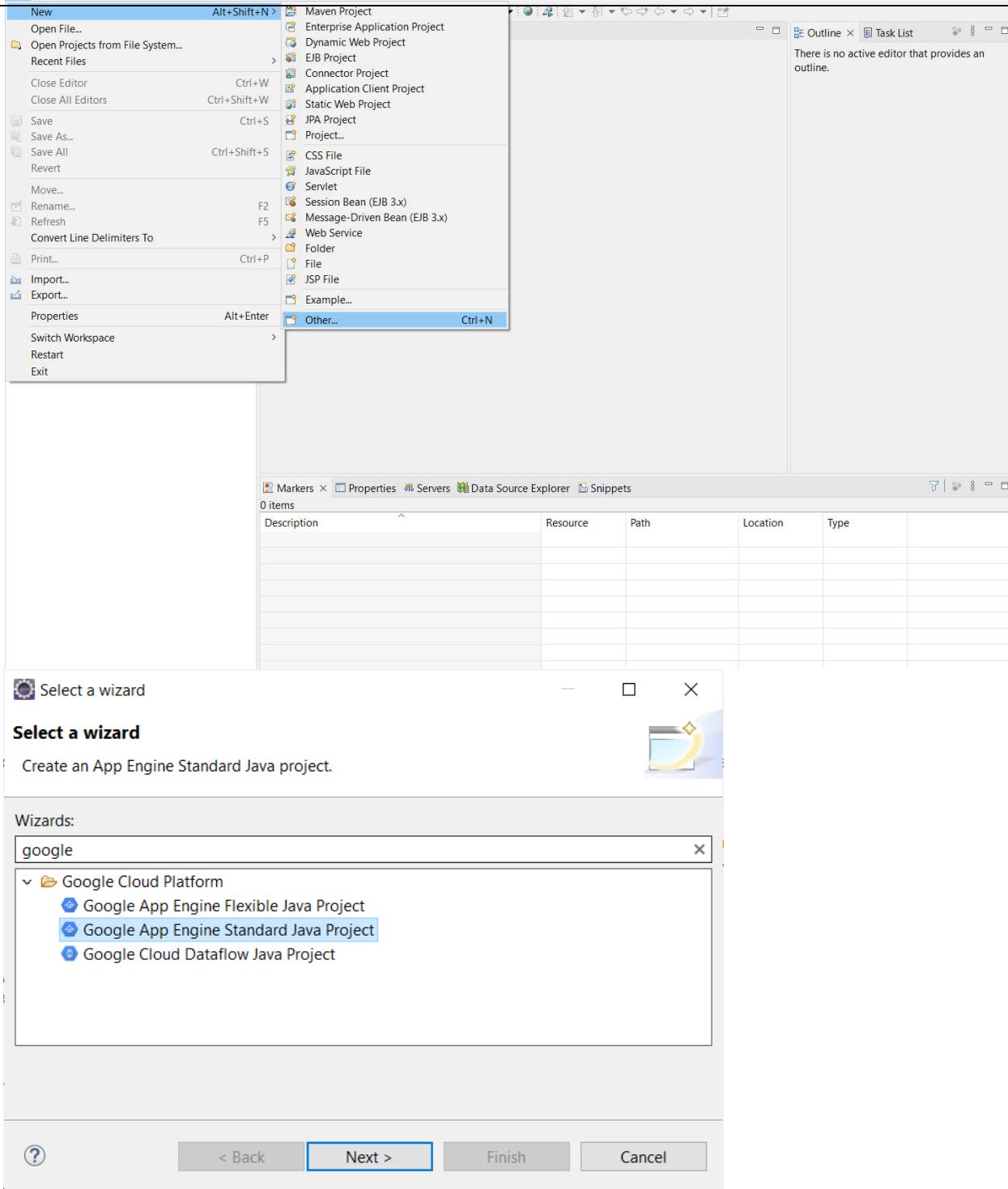
## Step 2 - Click on -> Help -> Eclipse Marketplace.



Step 3 - In Find Search Box: Search for “Google cloud tools for eclipse” and click on Install button. After complete installation of the plugin restart the Eclipse.



Step 4 - Click on 'File' menu and select -> New -> Other and search with “Google” keyword and select Google App Engine Standard Java Project under Google Cloud Platform and click on Next.



**Step 5 - Enter Project Name “FirstGAEProject” and Package Name “com.GAE” and then Click on -> Next -> Finish.**

**App Engine Standard Project**

Create a new Eclipse project for App Engine standard environment development.



Project name: FirstGAEProject

 Use default location

Location: D:\MSC\Cloud Computing - CC\Practicals\Practical - 4\FirstGAEProj

[Browse...](#)

Java version:

Java 8, Servlet 3.1

Java package:

com.GAE

App Engine service:

default

 Create as Maven project**Maven project coordinates**

Group ID:

Artifact ID:

Version:

0.1.0-SNAPSHOT



&lt; Back

Next &gt;

[Finish](#)

Cancel

Practical\_4 - Eclipse IDE

File Edit Navigate Search Project Run Window Help

Project Explorer

&gt; FirstGAEProject [CC master]

New App Engine Standard Project

Google Cloud Platform Libraries

Additional jars for applications using Google Cloud Platform



## App Engine Standard Libraries

- App Engine API
- Google Cloud Endpoints
- Objectify

## Cloud Client Libraries for Java

- BigQuery API
- BigQuery Data Transfer API
- Cloud Asset API
- Cloud Auto ML API
- Cloud Container Analysis API
- Cloud Data Loss Prevention
- Cloud Datstore
- Cloud DNS
- Cloud Firestore
- Cloud KMS
- Cloud Natural Language
- Cloud OS Login
- Cloud Pub/Sub
- Cloud Redis
- Cloud Resource Manager
- Cloud Scheduler
- Cloud Security Scanner
- Cloud Spanner
- Cloud Speech
- Cloud Storage
- Cloud Talent Solution
- Cloud Tasks
- Cloud Translation
- Cloud Video Intelligence

Outline Task List

There is no active editor that provides an outline.

FirstGAEProject

**Step 6 - Open project hierarchy. (FirstGAEProject> main> webapp> WEB-INF> index.html) Edit the file as required (Unedited file too can be used. Here the editing is done to “what should be displayed” on the browser). Save the file. HelloAppEngine.java**

The screenshot shows the Eclipse IDE interface. The Project Explorer view on the left displays the project structure: FirstGAEProject > src > main > java > com > GAE > HelloAppEngine.java. The code editor in the center shows the Java code for HelloAppEngine.java:

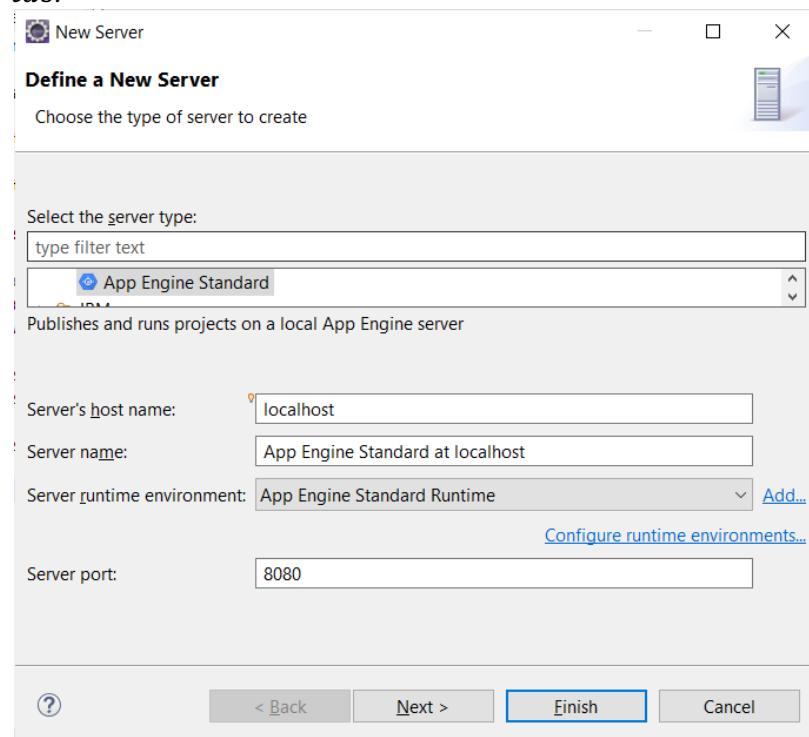
```

1 package com.GAE;
2
3 import java.io.IOException;
4
5 @WebServlet(
6     name = "HelloAppEngine",
7     urlPatterns = {"/*"})
8
9 public class HelloAppEngine extends HttpServlet {
10
11     @Override
12     public void doGet(HttpServletRequest request, HttpServletResponse response)
13         throws IOException {
14
15         response.setContentType("text/plain");
16         response.setCharacterEncoding("UTF-8");
17
18         response.getWriter().print("Hello App Engine!\r\n");
19     }
20
21 }

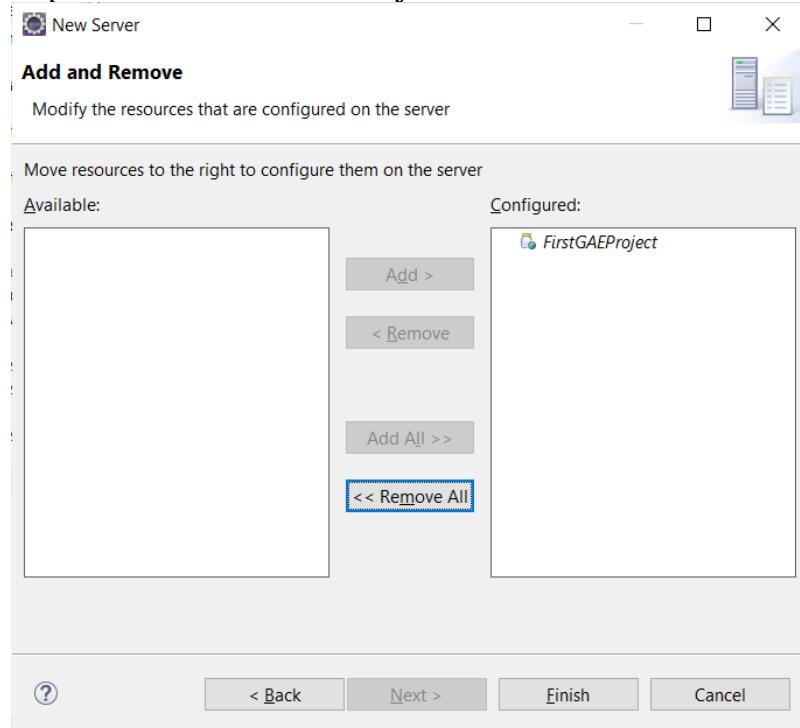
```

The Outline view on the right shows the class definition. The Problems view at the bottom indicates 0 errors, 2 warnings, and 0 others.

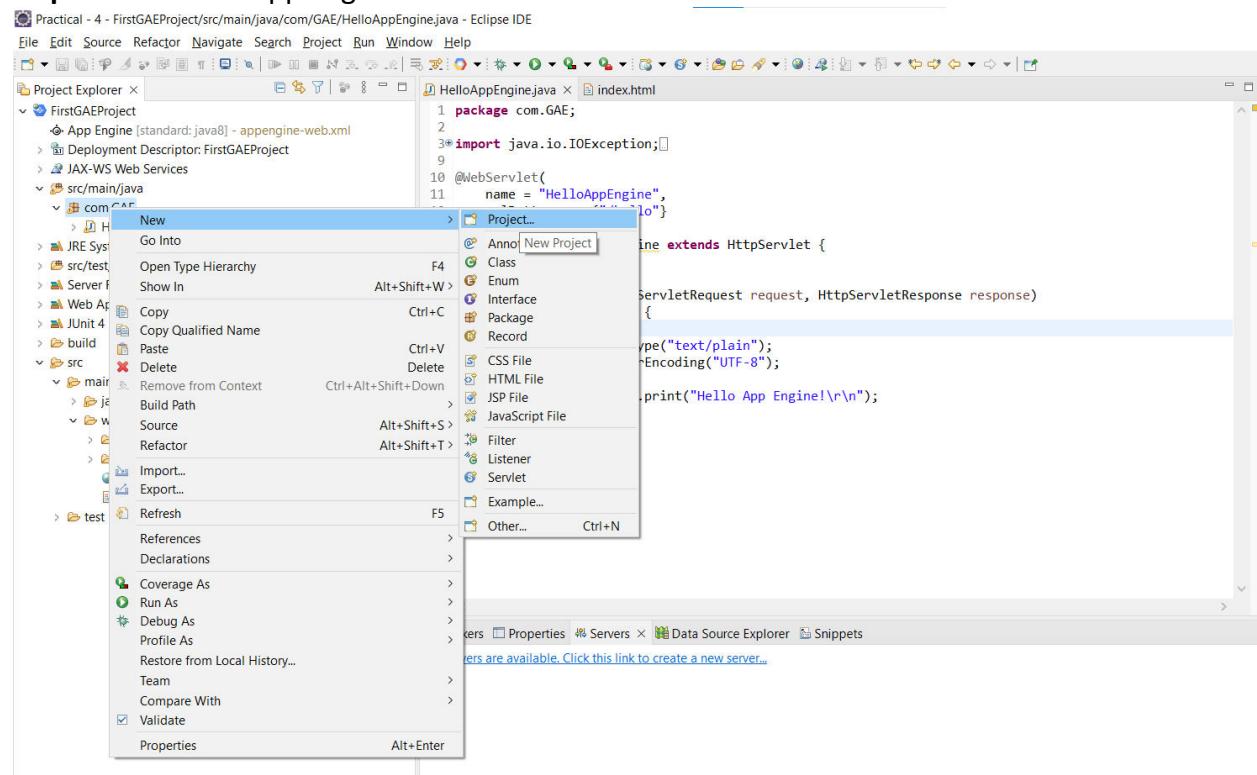
**Step 7 - Configuring “App Engine Standard” Server. Click on the link to create a new server under Server tab.**

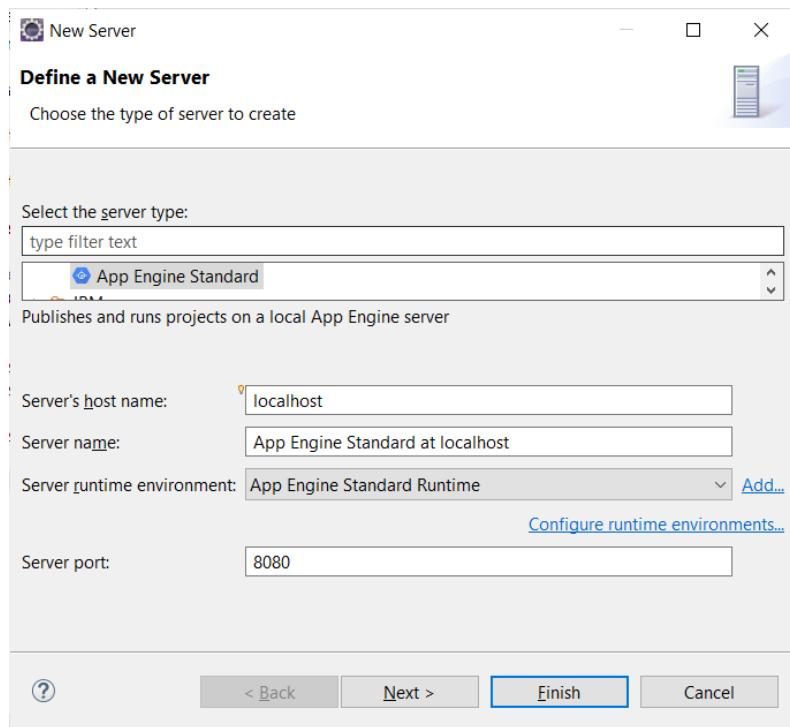


### Step 8 - Add the “FirstGAEProject” and click on “Finish”.

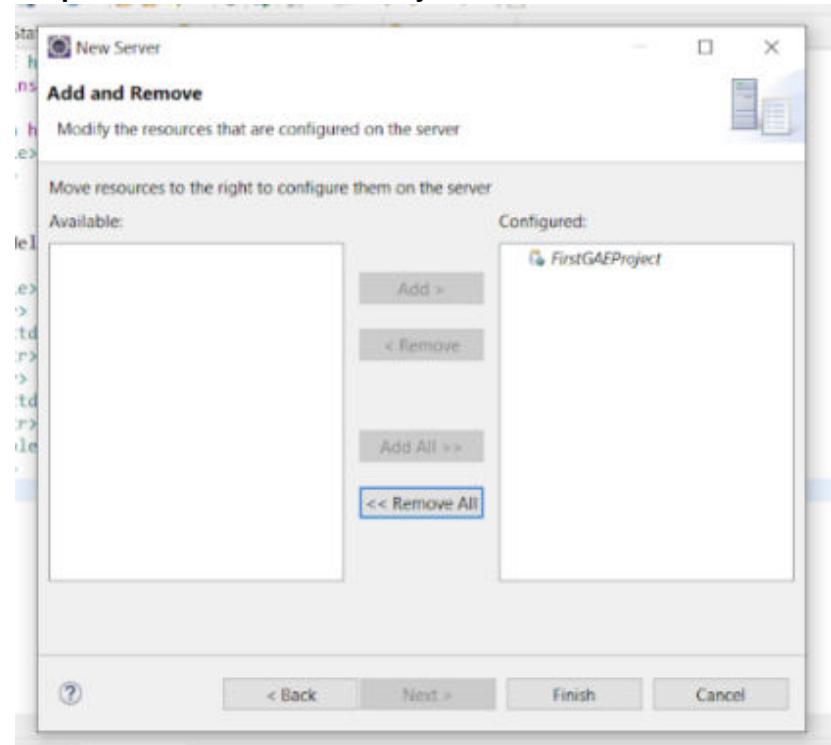


### Step 9 - Start the “App Engine Standard” server.

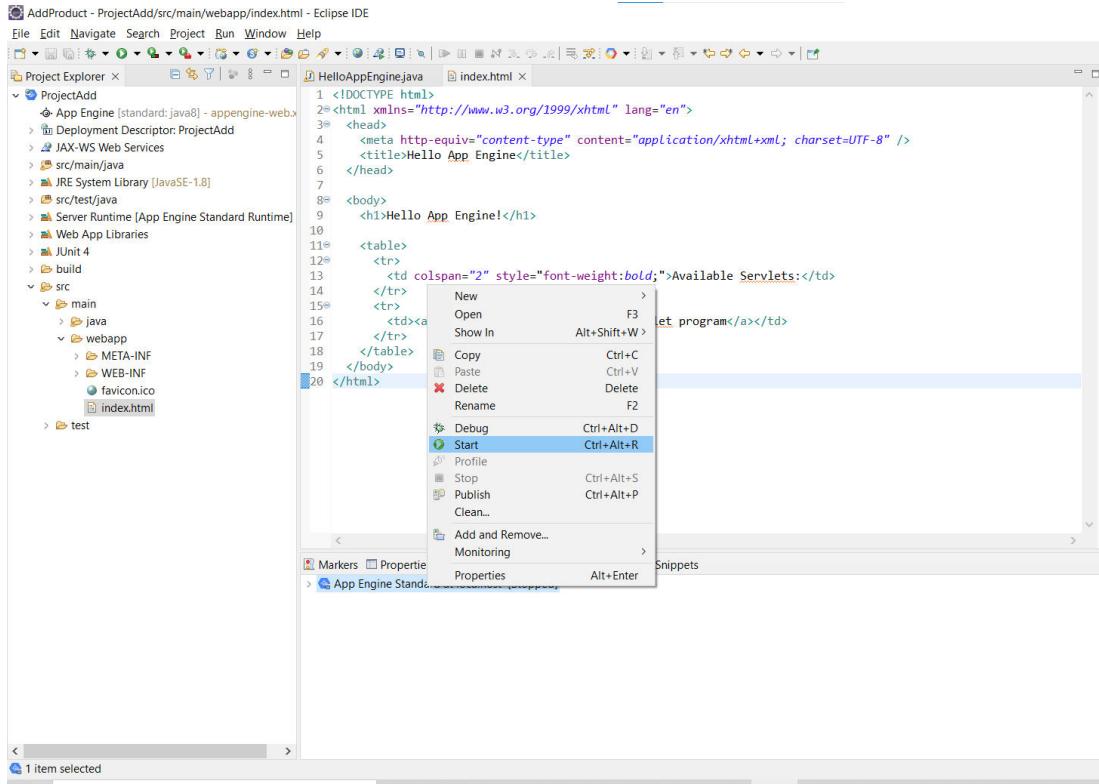




**Step10 - Add the “FirstGAEProject” and click on “Finish”.**



## **Step11 - Start the “App Engine Standard” server.**



**Step12 - In the browser (Here, Google Chrome) type the address as “localhost:8080” which is “Default” for http protocol.**



**Hello App Engine!**

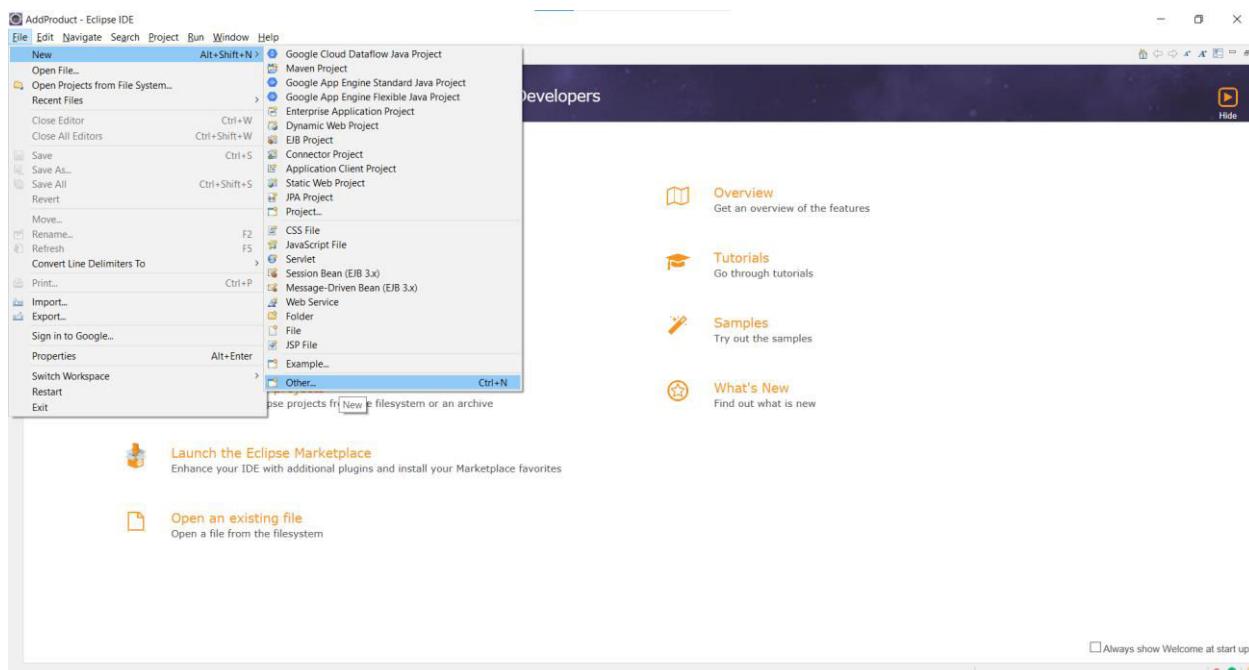
Available Servlets:  
[Google App Engine](#)

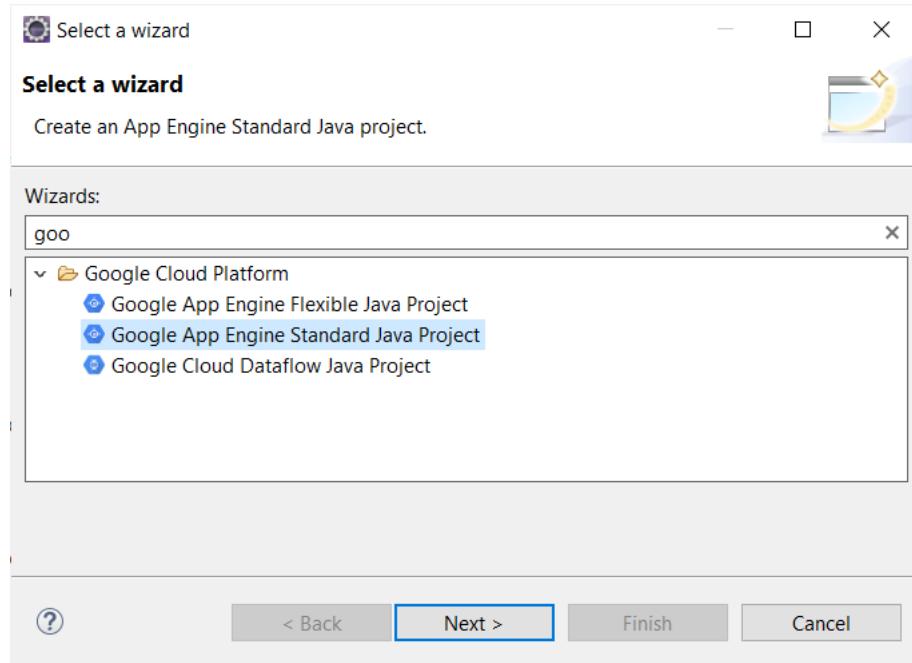
**Step13 - Click on this link “Google App Engine”. It will redirect with the address “localhost:8080/hello”.**



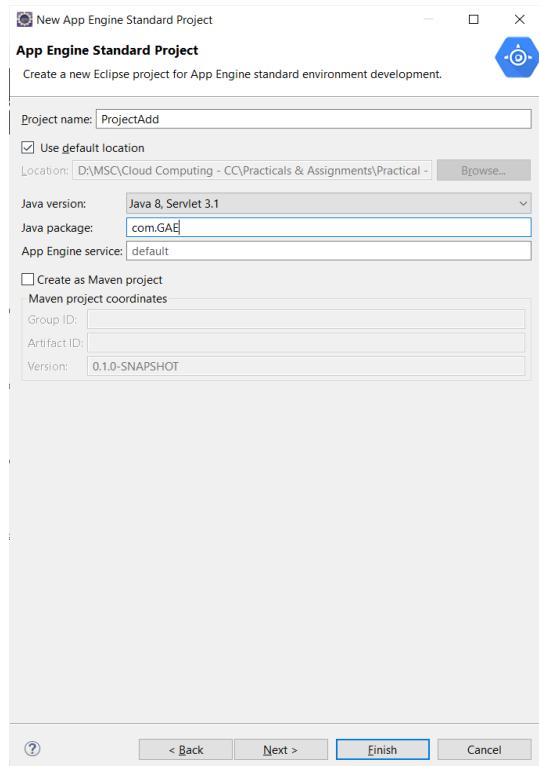
## Design and implement Google app search engine to Add and to find product of two Numbers –

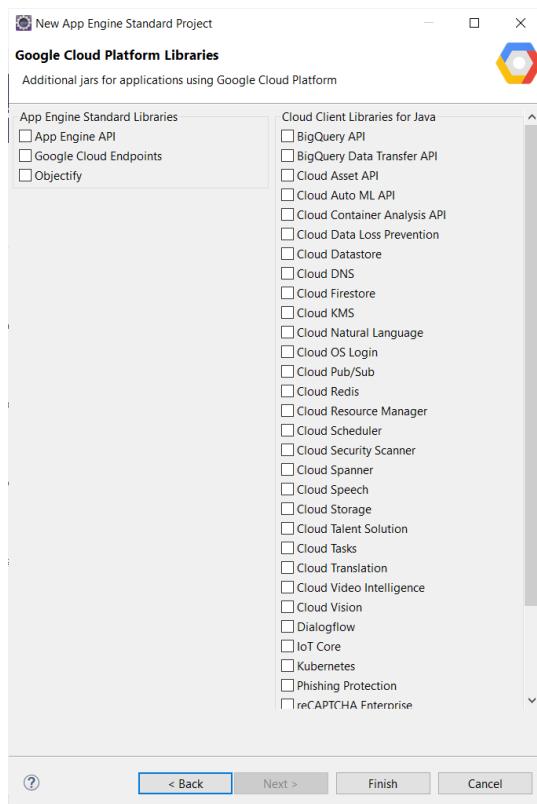
### Step1 - Create a new project. File-> New-> Other...





**Step 2 - Enter Project Name “ProjectAdd” and Package Name “com.GAE” and then Click on -> Next -> Finish.**





## HelloAppEngine.java

AddProduct - ProjectAdd/src/main/java/com/GAE/HelloAppEngine.java - Eclipse IDE

```

File Edit Source Refactor Navigate Search Project Run Window Help
Project Explorer X Deployment Descriptor: ProjectAdd
  App Engine [standard: java8] - appengine-web.xml
  Deployment Descriptor: ProjectAdd
  JAX-WS Web Services
  src/main/java
  src/main/java/JRE System Library [JavaSE-1.8]
  src/test/java
  src/test/java
  Server Runtime [App Engine Standard Runtime]
  Web App Libraries
  JUnit 4
  build
  src
    main
      java
      webapp
        META-INF
          MANIFEST.MF
        WEB-INF
          lib
            appengine-web.xml
            logging.properties
            web.xml
            favicon.ico
          index.html
    test
HelloAppEngine.java X index.html X web.xml X App Engine Standard at localhost
Outline Task List
com.GAE
HelloAppEngine
doGet(HttpServletRequest, HttpServletResponse) : void

HelloAppEngine.java
1 package com.GAE;
2
3 import java.io.IOException;
4 import java.io.PrintWriter;
5
6 import javax.servlet.annotation.WebServlet;
7 import javax.servlet.http.HttpServlet;
8 import javax.servlet.http.HttpServletRequest;
9 import javax.servlet.http.HttpServletResponse;
10
11 @WebServlet(
12     name = "HelloAppEngine",
13     urlPatterns = {"/*Hello"})
14 )
15 public class HelloAppEngine extends HttpServlet {
16
17     @Override
18     public void doGet(HttpServletRequest request, HttpServletResponse response)
19         throws IOException {
20
21         response.setContentType("text/plain");
22         response.setCharacterEncoding("UTF-8");
23
24         response.getWriter().println("Add and Product App\r\n");
25         int num1 = Integer.parseInt(request.getParameter("num1"));
26         int num2 = Integer.parseInt(request.getParameter("num2"));
27         int sum = num1 + num2;
28         PrintWriter output = response.getWriter();
29         output.println("The Addition Result : "+sum +"\n The Product :"+product);
30
31     }
32 }
```

## Index.html

The screenshot shows the Eclipse IDE interface with the 'index.html' file open in the editor. The code is as follows:

```

<!DOCTYPE html>
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
<meta http-equiv="content-type" content="application/xhtml+xml; charset=UTF-8" />
<title>Hello App Engine</title>
</head>
<body>
<h1>Hello App Engine!</h1>
<table>
<tr>
<td colspan="2" style="font-weight:bold;">Available Servlets:</td>
</tr>
<tr>
<td><a href='/hello'>This is a new servlet program</a></td>
</tr>
</table>
<form action="add_me">
<label>First Number <input type="text" name="num1"/><br /><br />
<label>Second Number <input type="text" name="num2"/><br /><br />
<button type="submit" name="calculate">Product and Sum</button><br />
</form>
</body>
</html>

```

## Web.xml

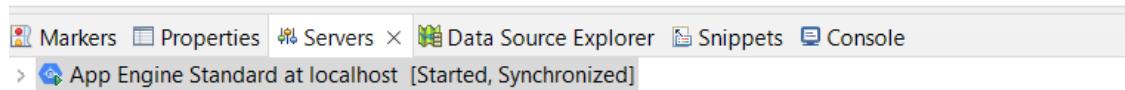
The screenshot shows the Eclipse IDE interface with the 'web.xml' file open in the editor. The code is as follows:

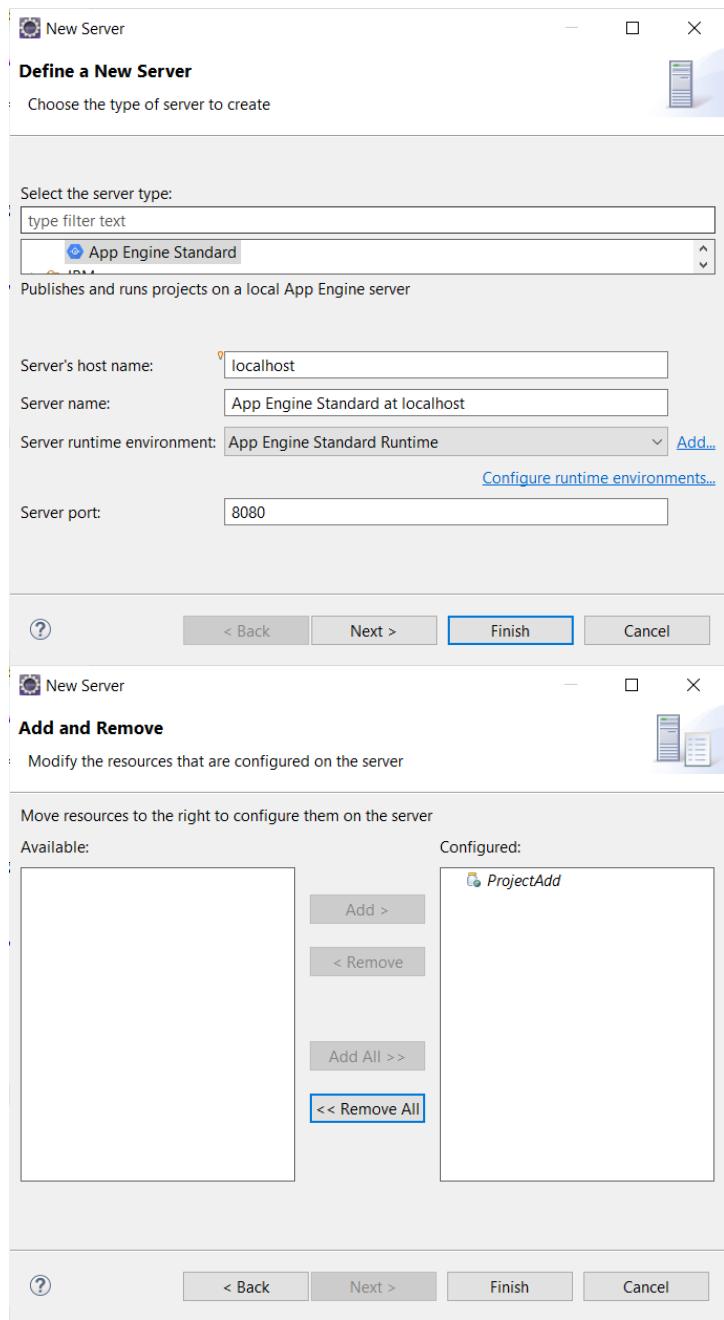
```

<?xml version="1.0" encoding="utf-8"?>
<web-app xmlns="http://xmlns.jcp.org/xml/ns/javaee"
         xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
         xsi:schemaLocation="http://xmlns.jcp.org/xml/ns/javaee http://xmlns.jcp.org/xml/ns/javaee/web-app_3_1.xsd"
         version="3.1">
    <welcome-file-list>
        <welcome-file>index.html</welcome-file>
        <welcome-file>index.jsp</welcome-file>
    </welcome-file-list>
    <servlet>
        <servlet-name>Add</servlet-name>
        <servlet-class>com.GAE.HelloAppEngine</servlet-class>
    </servlet>
    <servlet-mapping>
        <servlet-name>Add</servlet-name>
        <url-pattern>/add_me</url-pattern>
    </servlet-mapping>
</web-app>

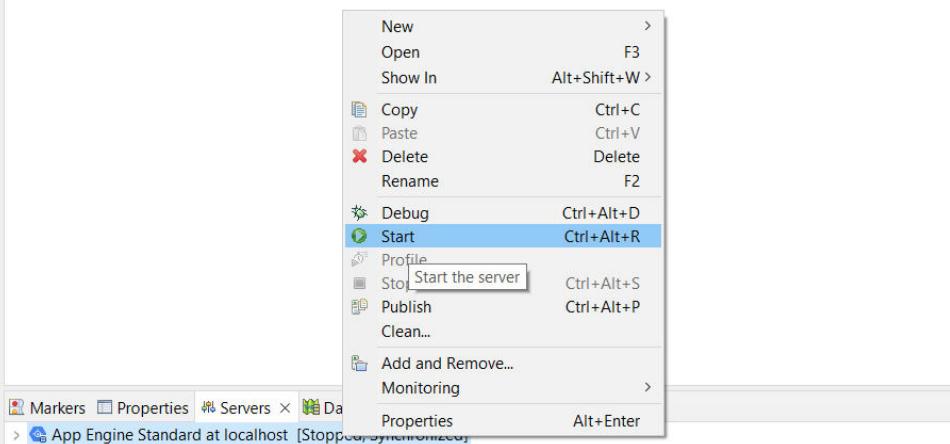
```

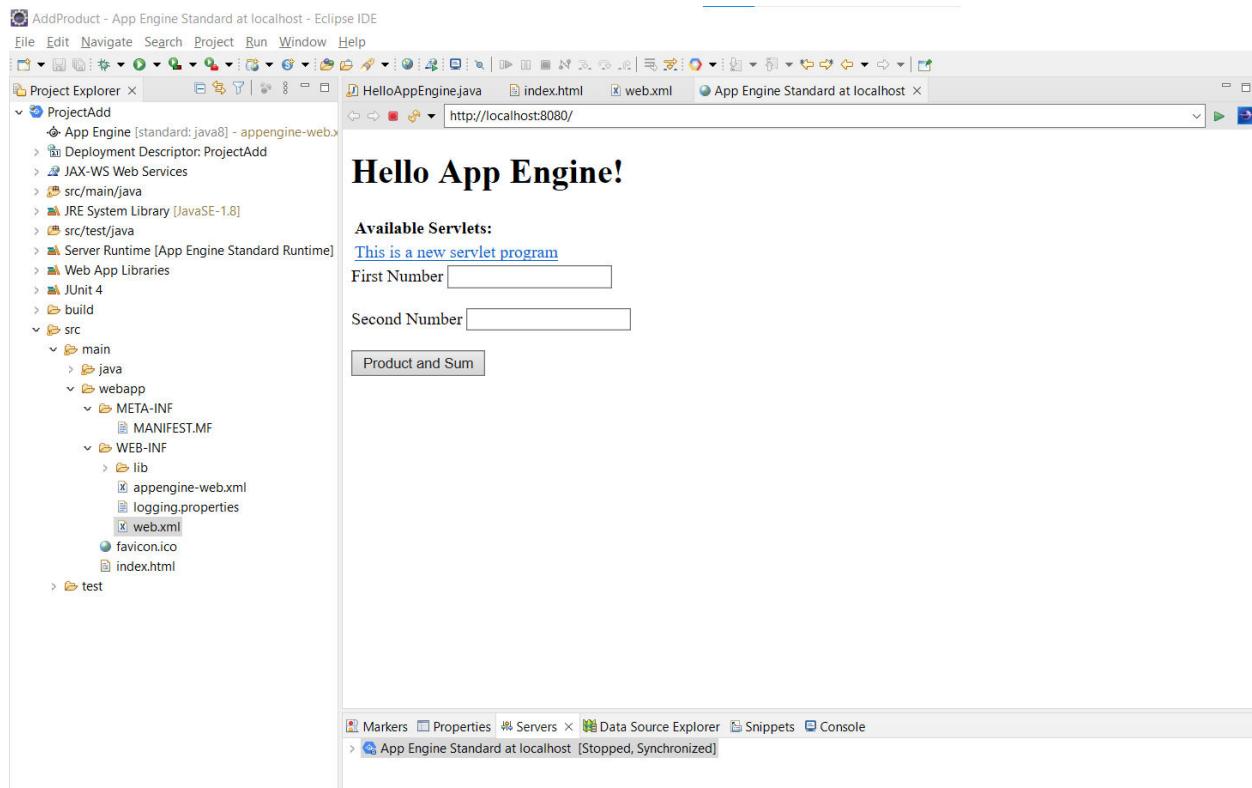
**Step 3 - Configuring “App Engine Standard” Server. Click on the link to create a new server under Server tab.**



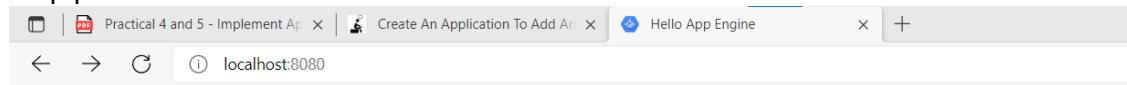


### Step 3 - Start the “App Engine Standard” server





**Step 4** - In the browser (Here, Google Chrome) type the address as "localhost:8080" which is "Default" for http protocol



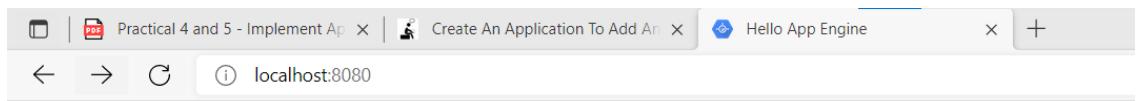
## Hello App Engine!

### Available Servlets:

[This is a new servlet program](#)

First Number

Second Number



## Hello App Engine!

### Available Servlets:

[This is a new servlet program](#)

First Number

Second Number



Add and Product App

The Addition Result : 30

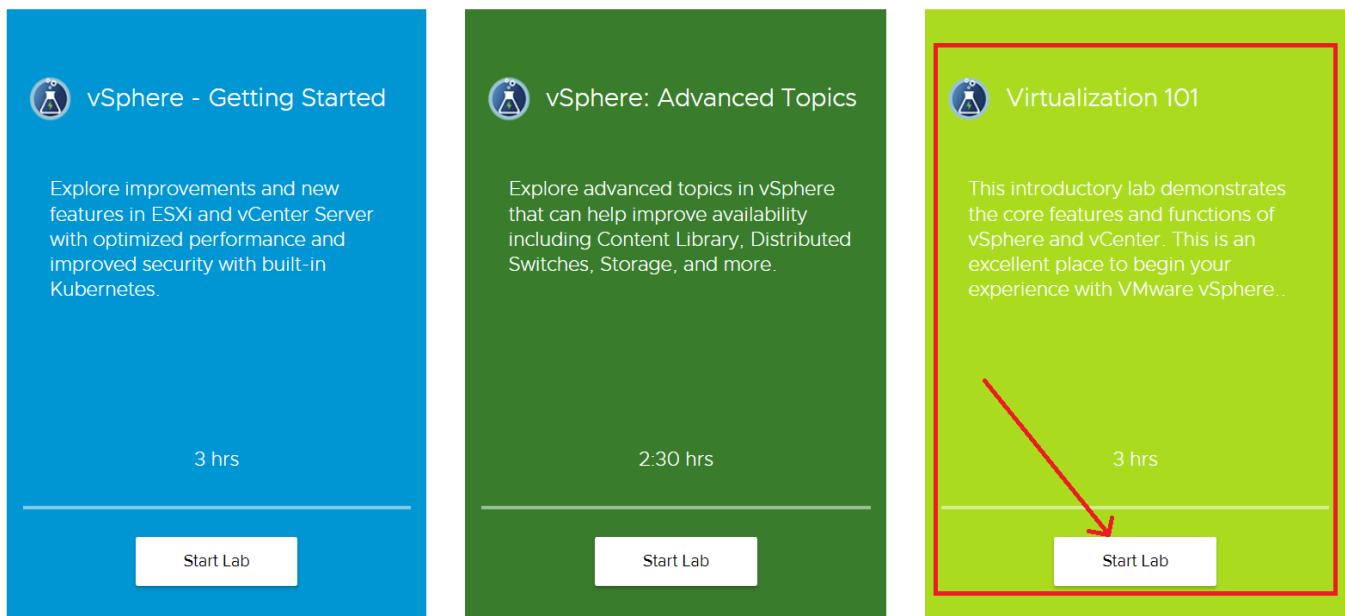
The Product :200

## Practical No. 5

*Implement Virtualization using VMWare ESXi Server and managing with vSphere Client*

**1. Use the below link to select lab for Virtualization.**

<https://www.vmware.com/try-vmware/try-hands-on-labs.html>



**2. Create an account using below link.**

<https://customerconnect.vmware.com/en/web/vmware/evalcenter?p=virtualization-hol-gen-21>

The screenshot shows the VMware customerconnect website with the following details:

- Header:** vmware, Apps & Cloud, Networking, Workspace, Security, By Industry, Resources.
- Breadcrumbs:** Home/Evaluate VMware Products / VMware Virtualization 101 Hands-on Lab
- Title:** VMware Virtualization 101 Hands-on Lab
- Text:** Hands-on Labs are the fastest and easiest way to test-drive the full technical capabilities of VMware products. These evaluations are free, up and running on your browser in minutes, and require no installation.  
Make sure you allow pop-up windows in order to access the lab.
- Form (Visible on the right):**
  - I Have an Account** (selected) and **Create an Account** buttons.
  - First name \*: Kedar
  - Last name \*: Jadhav
  - Email address \*: kedarjadhav0194@gmail.com
  - Are you a VMware Partner?  
 Yes    No
  - Continue** button.

### 3. Login with credentials.

Home/Evaluate VMware Products / VMware Virtualization 101 Hands-on Lab

## VMware Virtualization 101 Hands-on Lab

Hands-on Labs are the fastest and easiest way to test-drive the full technical capabilities of VMware products. These evaluations are free, up and running on your browser in minutes, and require no installation.

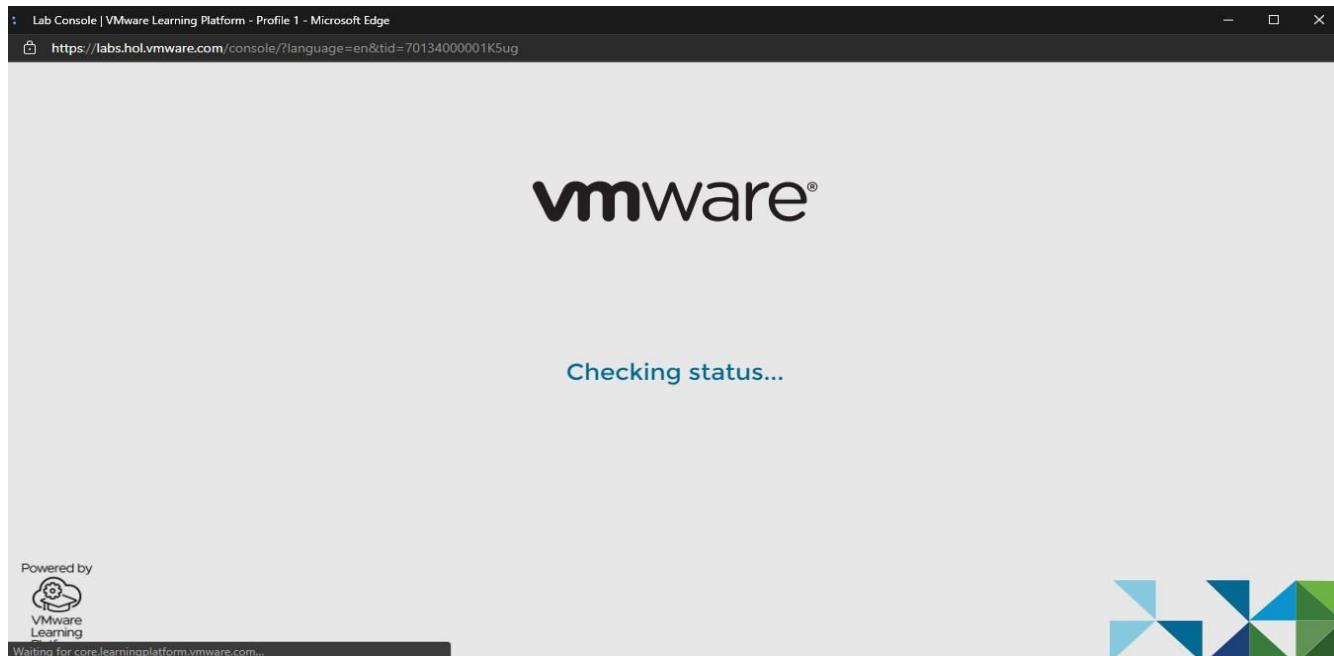
Make sure you allow pop-up windows in order to access the lab.

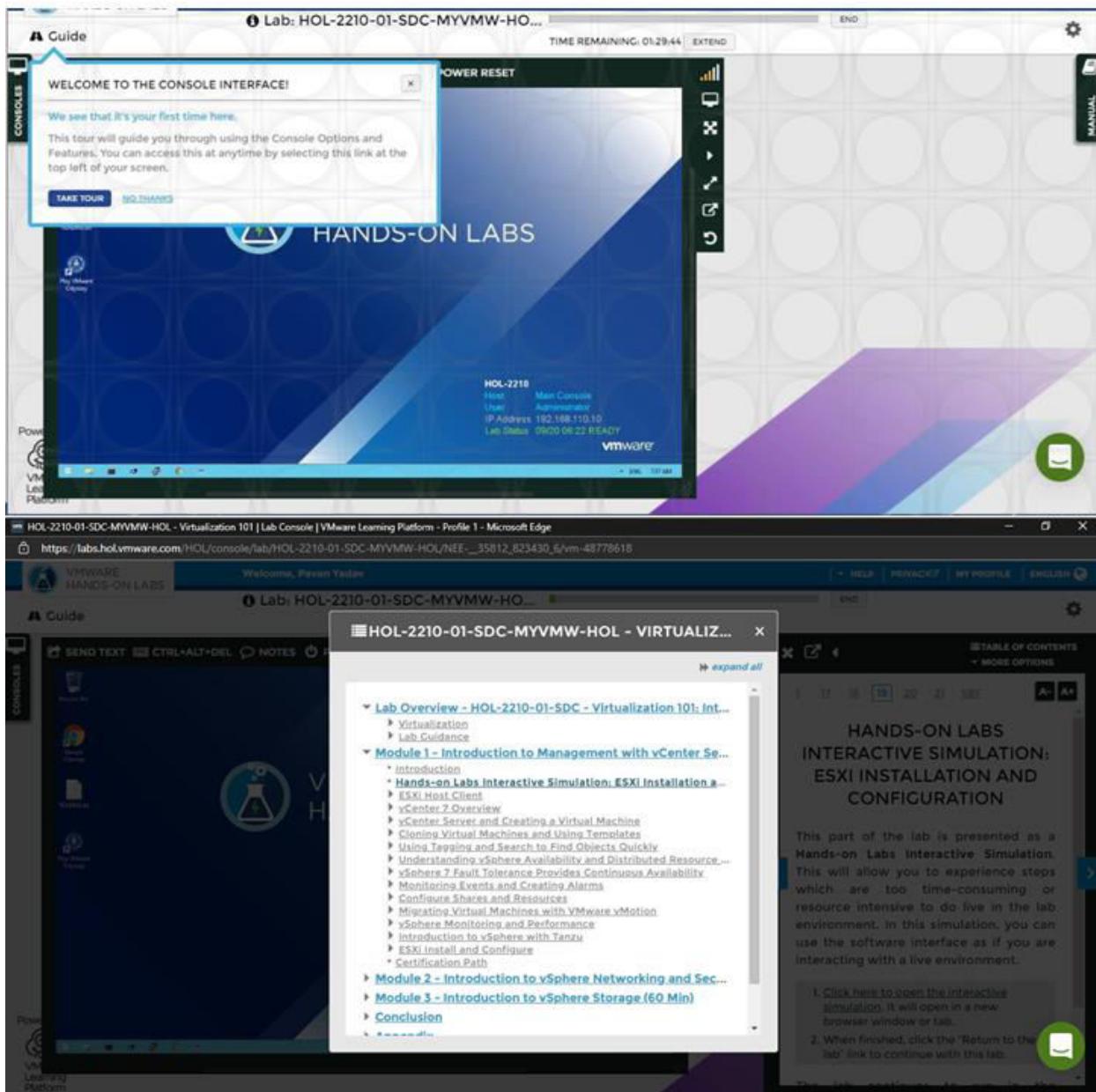
I Have an Account [Create an Account](#)

Email Address or Customer Number:

Password  
 \*

[Log in](#) [Forgot your password?](#)





The screenshot displays two windows from the VMware Learning Platform.

**Top Window:** A VMware vSphere Client interface titled "Lab: HOL-2210-01-SDC-MYVMW-HOL...". It shows a "WELCOME TO THE CONSOLE INTERFACE!" dialog box with a "TAKE TOUR" button. The main screen shows a blue background with the "HANDS-ON LABS" logo and system information: Host: Main Console, User: Administrator, IP Address: 192.168.10.10, Lab Status: 09/20 08:22 READY.

**Bottom Window:** A browser window titled "HOL-2210-01-SDC-MYVMW-HOL - VIRTUALIZ...". It shows a navigation bar with "SEND TEXT", "CTRL+ALT+DEL", and "NOTES". The main content area displays a table of contents for a lab overview:

- Lab Overview - HOL-2210-01-SDC - Virtualization 101: Introduction
- Module 1 - Introduction to Management with vCenter Server
- Module 2 - Introduction to vSphere Networking and Security
- Module 3 - Introduction to vSphere Storage (60 Min)
- Conclusion

To the right of the table of contents, there is an "INTERACTIVE SIMULATION: ESXI INSTALLATION AND CONFIGURATION" section. It includes a brief description: "This part of the lab is presented as a Hands-on Lab Interactive Simulation. This will allow you to experience steps which are too time-consuming or resource intensive to do live in the lab environment. In this simulation, you can use the software interface as if you are interacting with a live environment." Below this, there are two numbered steps:

- Click here to open the interactive simulation. It will open in a new browser window or tab.
- When finished, click the "Return to the lab" link to continue with this lab.

The screenshot shows the VMware Hands-on Labs interface. On the left, there's a 'CONSOLES' sidebar with icons for 'Recycle Bin', 'Google Chrome', 'RADCLIet', and 'Play VMware Gallery'. The main window displays a blue desktop environment with the 'VMWARE HANDS-ON LABS' logo. At the top, it says 'Lab: HOL-2210-01-SDC-MYVMW-HO...' and 'TIME REMAINING: 01:13:16'. A 'Guide' tab is selected. On the right, a 'CONFIGURATION' panel is open, showing a table of contents with items 1 through 21. Item 19 is highlighted in blue. The panel contains instructions for interacting with the lab:

1. Click here to open the interactive simulation. It will open in a new browser window or tab.
2. When finished, click the "Return to the lab" link to continue with this lab.

The panel also notes that the lab continues to run in the background and can be resumed if it goes into standby mode.

The screenshot shows the VMware Hands-on Labs interface. On the left, there's a 'CONSOLES' sidebar with icons for 'Recycle Bin', 'Google Chrome', 'RADCLIet', and 'Play VMware Gallery'. The main window displays a dark desktop environment with the 'VMWARE HANDS-ON LABS' logo. At the top, it says 'Welcome, Pavan Yadav' and 'Lab: HOL-2210-01-SDC-MYVMW-HO...'. A 'Guide' tab is selected. In the center, a 'HOL-2210-01-SDC-MYVMW-HOL - VIRTUALIZ...' pop-up window is open, showing a 'Lab Overview' section with a list of steps:

- Introduction
- Hands-on Labs Interactive Simulation: ESXi Installation a...
- ESXi Host Client
- vCenter 7 Overview
- vCenter Server and Creating a Virtual Machine
  - Login to vCenter
  - Go to step 40
  - Login to vCenter Client
  - Login to vCenter
  - vCenter Inventory
  - Child objects, Data Centers, and Hosts
  - Virtual Machine Summary
  - Edit the settings of a virtual machine
  - Add a second network adapter
  - Configure the Second Network Card
  - Recent Tasks List
  - Recent Tasks List
  - Create a Virtual Machine
  - Select and Expand Datacenter
  - Start the New Virtual Machine Wizard
  - Virtual Machine wizard
  - Name the Virtual Machine

The right side of the screen shows a 'CONFIGURATION' panel with a table of contents and instructions for interacting with the lab, similar to the first screenshot.

VMWARE HANDS-ON LABS

Lab: HOL-2210-01-SDC-MYVMW-HO...

TIME REMAINING: 01:10:46 EXTEND

CONSOLES

Guide

SEND TEXT CTRL+ALT+DEL NOTES POWER DOWN POWER RESET

VMware vSphere

administrator@corp.local

Use Windows session authentication

Login - Google Chrome

Power VM Learning Platform

LAUNCH CHROME

Recycle Bin

Google Chrome

README.txt

If you are not already in Chrome, double click on Google Chrome on your desktop. If you are already in Google Chrome,

This screenshot shows the VMware vSphere login interface on the left, where the user is prompted to enter their credentials. On the right, there is a 'LAUNCH CHROME' guide. It displays a desktop environment with a blue background. A red box highlights the 'Google Chrome' icon on the desktop. Below the desktop image, a green callout bubble provides instructions: 'If you are not already in Chrome, double click on Google Chrome on your desktop. If you are already in Google Chrome,' followed by a green smiley face icon.

VMWARE HANDS-ON LABS

Lab: HOL-2210-01-SDC-MYVMW-HO...

TIME REMAINING: 01:00:16 EXTEND

CONSOLES

Guide

SEND TEXT CTRL+ALT+DEL NOTES POWER DOWN POWER RESET

VMware vSphere

administrator@corp.local

Use Windows session authentication

LOGIN

Power VM Learning Platform

LAUNCH CHROME

Recycle Bin

Google Chrome

README.txt

If you are not already in Chrome, double click on Google Chrome on your desktop. If you are already in Google Chrome,

This screenshot is similar to the one above, showing the vSphere login screen on the left and a 'LAUNCH CHROME' guide on the right. The desktop environment shows the 'Google Chrome' icon highlighted with a red box. The accompanying text in the guide is identical to the previous screenshot, instructing users to double-click the icon if they are not already in Google Chrome.

VMWARE HANDS-ON LABS

Lab: HOL-2210-01-SDC-MYVMW-HO...

TIME REMAINING: 01:58:49 EXTEND

CONSOLES

Guide

SEND TEXT CTRL+ALT+DEL NOTES POWER DOWN POWER RESET

vSphere Client

Administrator@CORP.LOCAL

VMware vSphere

Inventory and Clusters

VMs and Templates

Storage

Networking

Content Library

Workload Management

Global Inventory Lists

Hosts and Profiles

Auto Deploy

Hybrid Cloud Services

Developer Center

Advanced search

Folders

Events

Tags & Custom Attributes

Lifecycle Manager

Compute Operations

Recent Tasks

Power VM Learning Platform

Vcenter Inventory

Inventory and Clusters

VMs and Templates

Storage

Networking

Content Library

Workload Management

Global Inventory Lists

Hosts and Profiles

Auto Deploy

Hybrid Cloud Services

Developer Center

Advanced search

Folders

Events

Tags & Custom Attributes

Lifecycle Manager

vCloud Availability

Click to enlarge

By default, you are brought to a view

This screenshot shows the vSphere Client interface on the left, displaying the 'Inventory' section with various management options like 'Inventory and Clusters', 'VMs and Templates', etc. On the right, there is a 'Vcenter Inventory' guide. It shows a desktop environment with a blue background. A red box highlights the 'Global Inventory Lists' icon in the inventory tree. Below the desktop image, a green callout bubble provides instructions: 'By default, you are brought to a view' followed by a green smiley face icon.

VMWARE  
HANDS-ON LABS

Lab: HOL-2210-01-SDC-MYVMW-HO... TIME REMAINING: 01:56:22 EXTEND

CONSOLES Guide

SEND TEXT CTRL+ALT+DEL NOTES POWER DOWN POWER RESET

vSphere Client vCenter Home

vCenter Home

Global Inventory Lists

- Virtual Machines
- VM Templates
- Resources
- Clusters
- Databases
- Networks
- Distributed Port Groups
- Distributed Indexes
- Namewpaces

Recent Tasks

Power VMs Less Platform

MANUAL TABLE OF CONTENTS MORE OPTIONS

CHILD OBJECTS, DATA CENTERS, AND HOSTS

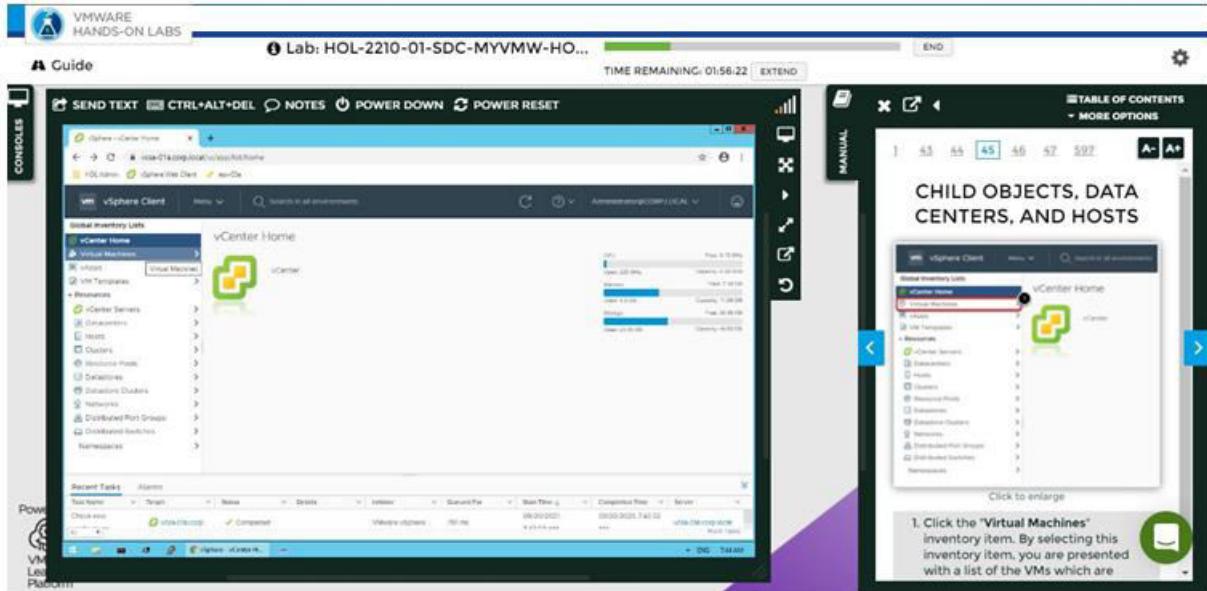
vSphere Client vCenter Home

Global Inventory Lists

- Virtual Machines
- VM Templates
- Resources
- Clusters
- Databases
- Networks
- Distributed Port Groups
- Distributed Indexes
- Namewpaces

Click to enlarge

1. Click the "Virtual Machines" inventory item. By selecting this inventory item, you are presented with a list of the VMs which are



VMWARE  
HANDS-ON LABS

Lab: HOL-2210-01-SDC-MYVMW-HO... TIME REMAINING: 01:55:51 EXTEND

CONSOLES Guide

SEND TEXT CTRL+ALT+DEL NOTES POWER DOWN POWER RESET

vSphere Client vCenter Home

vCenter Home

Global Inventory Lists

- Virtual Machines
- VM Templates
- Resources
- Clusters
- Databases
- Networks
- Distributed Port Groups
- Distributed Indexes
- Namewpaces

Recent Tasks

Power VMs Less Platform

MANUAL TABLE OF CONTENTS MORE OPTIONS

CHILD OBJECTS, DATA CENTERS, AND HOSTS

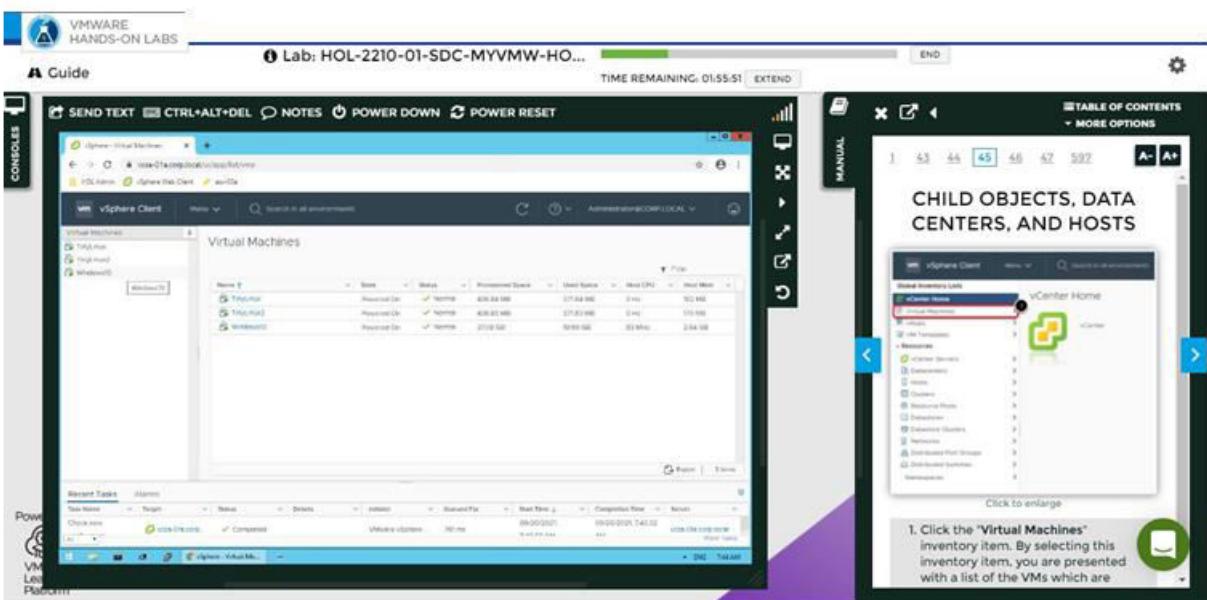
vSphere Client vCenter Home

Global Inventory Lists

- Virtual Machines
- VM Templates
- Resources
- Clusters
- Databases
- Networks
- Distributed Port Groups
- Distributed Indexes
- Namewpaces

Click to enlarge

1. Click the "Virtual Machines" inventory item. By selecting this inventory item, you are presented with a list of the VMs which are



**VMWARE HANDS-ON LABS**

Lab: HOL-2210-01-SDC-MYVMW-HO... TIME REMAINING: 01:54:38 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**vSphere Client** Summary Configuration Permissions Databases Networks Snapshots Utilities

**VMware Web Client** Launch Web Console Launch Remote Console

**VMware** Power Options Recent Tasks Alarms Test Alerts Click here to check for updates.

**VMware** Help Platform

**MANUAL**

**EDIT THE SETTINGS OF A VIRTUAL MACHINE.**

1. Review the VM Hardware for the windows10 virtual machine. Note that there is currently only one network adapter.  
2. Use the scroll bar to move to the bottom of the VM Hardware section.  
3. Click 'Edit Settings' so a second network adapter can be added to the virtual machine.

**VMWARE HANDS-ON LABS**

Lab: HOL-2210-01-SDC-MYVMW-HO... TIME REMAINING: 01:55:40 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**vSphere Client** Summary Configuration Permissions Databases Networks Snapshots Utilities

**VMware** Help Platform

**MANUAL**

**EDIT THE SETTINGS OF A VIRTUAL MACHINE.**

1. Review the VM Hardware for the windows10 virtual machine. Note that there is currently only one network adapter.  
2. Use the scroll bar to move to the bottom of the VM Hardware section.  
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**VMWARE HANDS-ON LABS**

Lab: HOL-2210-01-SDC-MYVMW-HO... TIME REMAINING: 01:52:55 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**vSphere Client** Summary Configuration Permissions Databases Networks Snapshots Utilities

**VMware** Help Platform

**MANUAL**

**ADD A SECOND NETWORK ADAPTER**

Add another network adapter to the windows10 machine.

1. In the Edit Settings window, click the 'Add New Device' button.

**VMWARE HANDS-ON LABS**

Lab: HOL-2210-01-SDC-MYVMW-HO... TIME REMAINING: 01:46:12 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**vSphere Client**

**Virtual Machines**: Home, Monitors, Windows, Tiny-1, Tiny-2, Tiny-3, VMs and Templates, Storage, Networking, Content Libraries, Workload Management, Global Inventory Lists, Policies and Profiles, Auto Deploy, Hybrid Cloud Services, Datacenter Center, Administration, Tasks, Events, Tag & Custom Attributes, UPerf & Manager, vCloud Availability, vSphere Operations.

**Power**: Power On, Power Off, Power Cycle, Power Reset, Power Off Delay, Power On Delay, Power Off Now, Power On Now, Power Off Later, Power On Later, Power Off Always, Power On Always, Power Off Never, Power On Never.

**VM**: Lock, Unlock, Power Off, Power On, Power Cycle, Power Reset, Power Off Delay, Power On Delay, Power Off Now, Power On Now, Power Off Later, Power On Later, Power Off Always, Power On Always, Power Off Never, Power On Never.

**Lev**: Power Off, Power On, Power Cycle, Power Reset, Power Off Delay, Power On Delay, Power Off Now, Power On Now, Power Off Later, Power On Later, Power Off Always, Power On Always, Power Off Never, Power On Never.

**Platfrom**: Power Off, Power On, Power Cycle, Power Reset, Power Off Delay, Power On Delay, Power Off Now, Power On Now, Power Off Later, Power On Later, Power Off Always, Power On Always, Power Off Never, Power On Never.

**MANUAL**

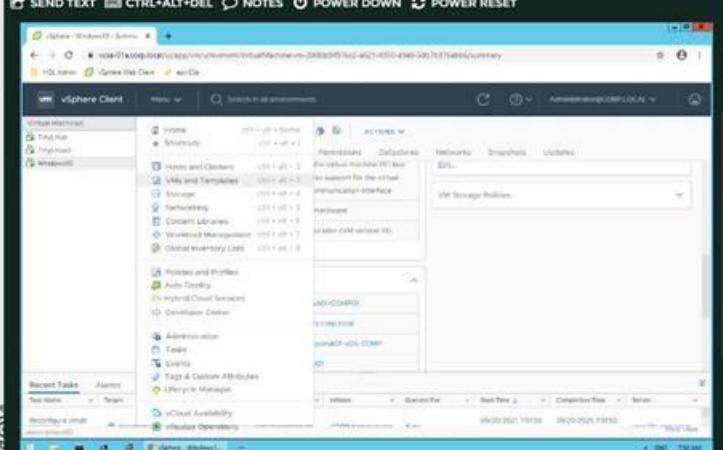
**CREATE A VIRTUAL MACHINE**

**vSphere Client**: Home, Monitors, VMs and Templates, Storage, Networking, Content Libraries, Workload Management, Global Inventory Lists, Policies and Profiles, Auto Deploy.

**Click to enlarge**

In the next steps, we will create a virtual machine and then, install an operating system.

1. To return to the VMs and Templates view, click on Menu.



**VMWARE HANDS-ON LABS**

Lab: HOL-2210-01-SDC-MYVMW-HO... TIME REMAINING: 01:47:20 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**vSphere Client**

**RegionA01**: Summary, Monitor, Configure, Permissions, Hosts & Clusters, VMs, Datastores, Networks, Updates.

**Power**: Power On, Power Off, Power Cycle, Power Reset, Power Off Delay, Power On Delay, Power Off Now, Power On Now, Power Off Later, Power On Later, Power Off Always, Power On Always, Power Off Never, Power On Never.

**VM**: Lock, Unlock, Power Off, Power On, Power Cycle, Power Reset, Power Off Delay, Power On Delay, Power Off Now, Power On Now, Power Off Later, Power On Later, Power Off Always, Power On Always, Power Off Never, Power On Never.

**Lev**: Power Off, Power On, Power Cycle, Power Reset, Power Off Delay, Power On Delay, Power Off Now, Power On Now, Power Off Later, Power On Later, Power Off Always, Power On Always, Power Off Never, Power On Never.

**Platfrom**: Power Off, Power On, Power Cycle, Power Reset, Power Off Delay, Power On Delay, Power Off Now, Power On Now, Power Off Later, Power On Later, Power Off Always, Power On Always, Power Off Never, Power On Never.

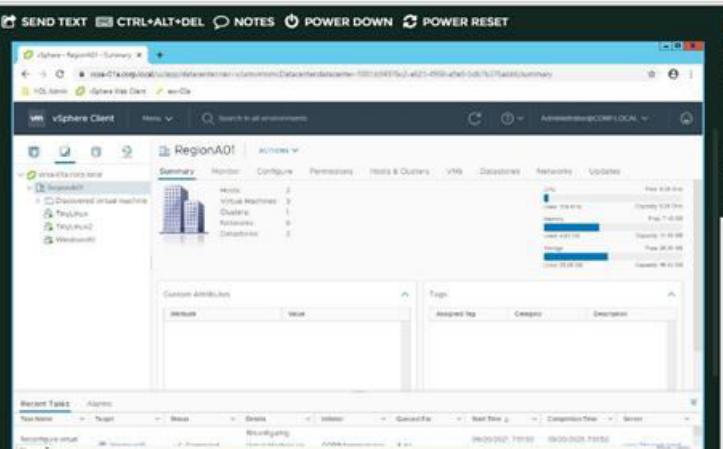
**MANUAL**

**SELECT AND EXPAND DATACENTER**

**vSphere Client**: RegionA01, Summary, Monitor, Configure, Permissions, Hosts & Clusters, VMs, Datastores, Networks, Updates.

**Click to enlarge**

1. Click on RegionA01 Datacenter.  
2. Expand RegionA01 Datacenter so the virtual machines under it can be seen.



**VMWARE HANDS-ON LABS**

Lab: HOL-2210-01-SDC-MYVMW-HO... TIME REMAINING: 01:47:20 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**vSphere Client**

**RegionA01**: Summary, Monitor, Configure, Permissions, Hosts & Clusters, VMs, Datastores, Networks, Updates.

**Power**: Power On, Power Off, Power Cycle, Power Reset, Power Off Delay, Power On Delay, Power Off Now, Power On Now, Power Off Later, Power On Later, Power Off Always, Power On Always, Power Off Never, Power On Never.

**VM**: Lock, Unlock, Power Off, Power On, Power Cycle, Power Reset, Power Off Delay, Power On Delay, Power Off Now, Power On Now, Power Off Later, Power On Later, Power Off Always, Power On Always, Power Off Never, Power On Never.

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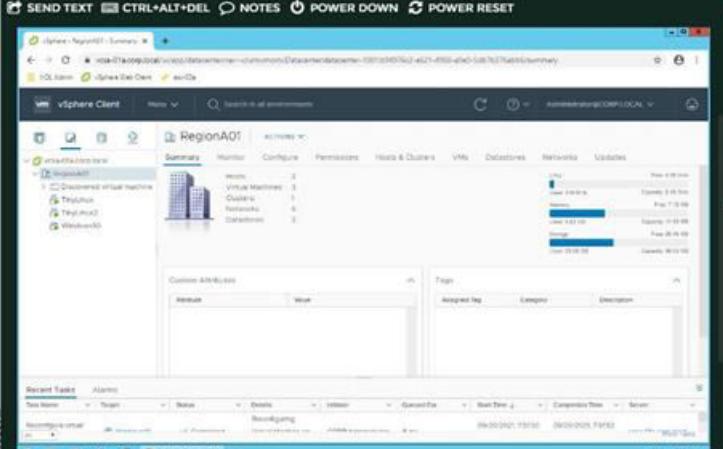
**MANUAL**

**SELECT AND EXPAND DATACENTER**

**vSphere Client**: RegionA01, Summary, Monitor, Configure, Permissions, Hosts & Clusters, VMs, Datastores, Networks, Updates.

**Click to enlarge**

1. Click on RegionA01 Datacenter.  
2. Expand RegionA01 Datacenter so the virtual machines under it can be seen.



**VMWARE HANDS-ON LABS**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

TIME REMAINING: 01:46:17 EXTEND

**CONSOLES**

**Guide**

The screenshot shows the vSphere Client interface. On the left, there's a tree view of a datacenter named 'RegionA01'. In the center, a context menu is open over a selected item, with 'New Virtual Machine' highlighted. To the right, a callout box provides instructions: '1. Right-click on RegionA01 Datacenter. 2. Click New Virtual Machine to start the new virtual machine wizard.' Below the callout, it says, 'This wizard is used to create a new Virtual Machine and place it in the vSphere inventory.'

**VMWARE HANDS-ON LABS**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

TIME REMAINING: 01:45:35 EXTEND

**CONSOLES**

**Guide**

The screenshot shows the 'Create a new virtual machine' wizard. Step 1, 'Select a creation type', is displayed. The 'Create a new virtual machine' option is highlighted. A callout box says, '1. Since the Create a new virtual machine wizard is highlighted, just click Next.'

**VMWARE HANDS-ON LABS**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

TIME REMAINING: 01:43:55 EXTEND

**CONSOLES**

**Guide**

The screenshot shows the 'NAME THE VIRTUAL MACHINE' wizard. Step 2, 'Select a name and folder', is displayed. The 'Virtual machine name' field contains 'web-serv01'. A callout box says, '1. Enter web-serv01 for the name of the new virtual machine. 2. Click Next.'

**VMWARE HANDS-ON LABS**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

TIME REMAINING: 01:43:01 EXTEND

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**CONSOLES**

**PLACEMENT**

Select a compute resource  
Select the合适的compute resource for this operation.

1 Select a creation type  
2 Select a name and folder  
3 Select a compute resource  
4 Select storage  
5 Select compatibility  
6 Select a power O/S  
7 Customize hardware  
8 Ready to complete

esx-01.corp.local  
esx-02.corp.local

Because Distributed Resource Scheduler (DRS) is not enabled, you just have to select a host to use for the VM. More details on DRS will be covered later in this module.

1. Click esx-01.corp.local.  
2. Click Next.

**VMWARE HANDS-ON LABS**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

TIME REMAINING: 01:42:17 EXTEND

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**CONSOLES**

**SELECT STORAGE**

Select storage  
Select the usage for the configuration and click Next.

1 Select a creation type  
2 Select a name and folder  
3 Select a compute resource  
4 Select storage  
5 Select compatibility  
6 Select a power O/S  
7 Customize hardware  
8 Ready to complete

ds-iscsi01  
ds-vmfs01

1. Ensure the ds-iscsi01 datastore is selected.  
2. Click Next.

**VMWARE HANDS-ON LABS**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

TIME REMAINING: 01:41:34 EXTEND

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**CONSOLES**

**COMPATIBILITY**

Select compatibility  
Select compatibility for this virtual machine depending on the hosts in your environment.

The host or cluster supports more than one VMware virtual machine version. Select a compatibility for the virtual machine.

Compatible with: **ESXi 7.0 and later**

Select compatibility: **ESXi 7.0 and later**

1 Select a creation type  
2 Select a name and folder  
3 Select a compute resource  
4 Select storage  
5 Select compatibility  
6 Select a power O/S  
7 Customize hardware  
8 Ready to complete

**VMWARE HANDS-ON LABS**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**TIME REMAINING: 01:40:19** **END** **Settings**

**CONSOLES**

**vSphere - Region01 - Summary**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

**1 Select a creation type.** **Select a guest OS.**

**2 Select a name and folder.** **Choose the guest OS that will be installed on the virtual machine.**

**3 Select a compute resource.**

**4 Select storage.**

**5 Select compatibility.**

**6 Select a guest OS.** **Guest OS Family: Linux** **Guest OS Version: VMware Photon OS (64-bit)**

**7 Continue hardware.** **8 Ready to complete.**

**Compatibility: ESXi 7.0 and later (VM version 15)**

**Power** **VM** **Logs** **Platform**

**Click to enlarge**

**TABLE OF CONTENTS** **MORE OPTIONS**

In this step, we will be selecting what operating system we will be installing. When we select the operating system, the supported virtual hardware and recommended configuration is used to create the virtual machine. Keep in mind this does not create a virtual machine with the operating system installed, but rather creates a virtual machine that is tuned appropriately for the operating system you have selected.

1. For the **Guest OS Family**, select **Linux** from the drop-down menu.
2. For the **Guest OS Version**, select **VMware Photon OS (64-bit)**.
3. Click **Next** to continue.

**VMWARE HANDS-ON LABS**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**TIME REMAINING: 01:59:38** **END** **Settings**

**CONSOLES**

**vSphere - Region01 - Summary**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

**1 Select a creation type.** **2 Select a name and folder.** **3 Select a compute resource.** **4 Select storage.** **5 Select compatibility.** **6 Select a guest OS.** **7 Continue hardware.** **8 Ready to complete.**

**Virtual Hardware** **VM Options**

**CPU:** 1 **Memory:** 2 GB **Processor:** 2 **Processor Cores:** 1

**New Hard Disk:** 10 GB **VMware Paravirtual**

**New SCSI Controller:** VM Network **Connect:** Yes

**New Network:** VM Network

**New CD/DVD Drive:** Client Device

**Video Card:** Intel GMA X4300

**Security Device:** Not Configured

**VM Options:** **New SATA Controller:** New SATA Controller

**Other:** Additional Hardware

**Compatibility: ESXi 7.0 and later (VM version 15)**

**Power** **VM** **Logs** **Platform**

**Click to enlarge**

**TABLE OF CONTENTS** **MORE OPTIONS**

**CHANGE VIRTUAL DISK SIZE.**

The recommended virtual hardware settings are shown as the default. These can be modified if needed.

1. Leave the default settings and click **Next**.

**VMWARE HANDS-ON LABS**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**TIME REMAINING: 01:38:56** **END** **Settings**

**CONSOLES**

**vSphere - Region01 - Summary**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

**1 Select a creation type.** **2 Select a name and folder.** **3 Select a compute resource.** **4 Select storage.** **5 Select compatibility.** **6 Select a guest OS.** **7 Continue hardware.** **8 Ready to complete.**

**Ready to complete.**

**Virtual machine name:** web-server01 **Power on at boot:** Yes

**Host:** esxi-01 **Compute Resource:** esxi-01

**Network:** dh-inet02 **Network Adapter:** VMware NIC

**Storage:** VMware Photon OS (10.0 GB)

**Processor:** 1 **Memory:** 2 GB

**Processor Cores:** 1 **Processor Threads:** 1

**IDE Controller:** VMFibrePATA-2 **IDE Controller:** VMFibrePATA

**CD/DVD Controller:** None **CD/DVD Drive:** None

**Capacity:** 10 GB **File:** /var/vmfs/volumes/0/VMFS5/VMFS5/VMFS5.vmdk

**Resource:** esxi-01

**Power** **VM** **Logs** **Platform**

**Click to enlarge**

**TABLE OF CONTENTS** **MORE OPTIONS**

**READY TO COMPLETE**

The settings for the virtual machine can be verified prior to it being created.

1. Click **Finish** to create the virtual machine.

**VMWARE HANDS-ON LABS**

**Guide**

**CONSOLES**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

**TIME REMAINING: 01:38:05** **END** **Settings**

**MANUAL**

**NEWLY CREATED VIRTUAL MACHINE**

Congratulations on creating your first virtual machine **web-serv01**!

In the next steps, Photon OS will be installed on the virtual machine.

**Click to enlarge**

**VMWARE HANDS-ON LABS**

**Guide**

**CONSOLES**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

**TIME REMAINING: 01:37:00** **END** **Settings**

**MANUAL**

**ATTACHING AN ISO TO A VIRTUAL MACHINE**

To make it easier to install operating systems on virtual machines, ISO images can be used. These can be

**Click to enlarge**

**VMWARE HANDS-ON LABS**

**Guide**

**CONSOLES**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

**TIME REMAINING: 01:35:27** **END** **Settings**

**MANUAL**

**CONTENT LIBRARY ISO FILE**

1. From the **CD/DVD drive 1** drop-down menu, select **Content Library ISO File**.

This will open a file explorer to select that file.

**Click to enlarge**

**VMWARE HANDS-ON LABS**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

TIME REMAINING: 01:34:51 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**SELECT PHOTON**

Choose an ISO image to mount

1. Click the radio button next to photon-2.0-304b817.  
2. Click OK.

**VMWARE HANDS-ON LABS**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

TIME REMAINING: 01:34:08 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**CONNECT THE DRIVE**

Finally, we want to attach or connect the ISO image to the virtual machine.

1. Click the Connected check box next to CD/DVD drive 1.  
2. Click OK.

**VMWARE HANDS-ON LABS**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

TIME REMAINING: 01:32:58 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**POWER ON WEB-SERV01**

1. Click the green play button to power on the virtual machine and start the installation.

**VMWARE HANDS-ON LABS**

Lab: HOL-2210-01-SDC-MYVMW-HO... TIME REMAINING: 01:31:24 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**vSphere Client** Summary Monitor Configure Permissions Datasources Networks Snapshots Utilities

**VMware Photon OS** **Windows**

**Launch Web Console** **Launch Remote Console**

**VM Hosted** CPU: 100% Memory: 49% Storage: 4%

**Recent Tasks** **Home**

**Power** **VM** **Leave** **Logout**

**CONSOLES**

**Send Text** **Ctrl+Alt+Del** **Notes** **Power Down** **Power Reset**

**vSphere Client** **Summary** **Monitor** **Configure** **Permissions** **Datasources** **Networks** **Snapshots** **Utilities**

**VMware Photon OS** **Windows**

**Launch Web Console** **Launch Remote Console**

**VM Hosted** **CPU Usage** 0 Hz **Memory Usage** 0 B **Storage Usage** 10.08 GB

**Recent Tasks** **Home**

**Power** **VM** **Leave** **Logout**

**CONSOLES**

**TABLE OF CONTENTS** **MORE OPTIONS**

**LAUNCH CONSOLE**

**Summary** **Monitor** **Configure** **Permissions** **Datasources** **Networks**

**VMware Photon OS** **Windows**

**Launch Web Console** **Launch Remote Console**

**VM Hosted**

**Click to enlarge**

1. To launch the console window, click anywhere in the console window screen.

**MANUAL**

**VMWARE HANDS-ON LABS**

Lab: HOL-2210-01-SDC-MYVMW-HO... TIME REMAINING: 01:30:56 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**vSphere Client** **Summary** **Monitor** **Configure** **Permissions** **Datasources** **Networks** **Snapshots** **Utilities**

**VMware Photon OS** **Windows**

**Launch Console**

**Web Console** **VMware Remote Console (VMRC)** **Remember my choice**

**VM Hosted** **CPU Usage** 0 Hz **Memory Usage** 0 B **Storage Usage** 10.08 GB

**Recent Tasks** **Home**

**Power** **VM** **Leave** **Logout**

**CONSOLES**

**TABLE OF CONTENTS** **MORE OPTIONS**

**WEB CONSOLE**

**Launch Console**

**Web Console** **VMware Remote Console (VMRC)** **Remember my choice**

**VM Hosted**

**Click to enlarge**

1. Select the Web Console.  
2. Click OK.

Note you also have the option of using the VMware Remote Console (VMRC). This is console is a separate application that needs to be installed on your local device as opposed to the Web Console which will launch in new browser tab. The VMRC can be useful in certain situations when you

**MANUAL**

**VMWARE HANDS-ON LABS**

Lab: HOL-2210-01-SDC-MYVMW-HO... TIME REMAINING: 01:30:26 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**vSphere Client** **Summary** **Monitor** **Configure** **Permissions** **Datasources** **Networks** **Snapshots** **Utilities**

**VMware Photon OS** **Windows**

**Photon**

**Install**

**Version 2.0**

**PHOTON™**

**Press ENTER to boot or B9 to edit a menu entry.**

**CONSOLES**

**Send Text** **Ctrl+Alt+Del** **Notes** **Power Down** **Power Reset**

**vSphere Client** **Summary** **Monitor** **Configure** **Permissions** **Datasources** **Networks** **Snapshots** **Utilities**

**VMware Photon OS** **Windows**

**Photon**

**Install**

**Version 2.0**

**PHOTON™**

**Press Enter key to start the installation process.**

**MANUAL**

**TABLE OF CONTENTS** **MORE OPTIONS**

**PHOTON BOOT SCREEN**

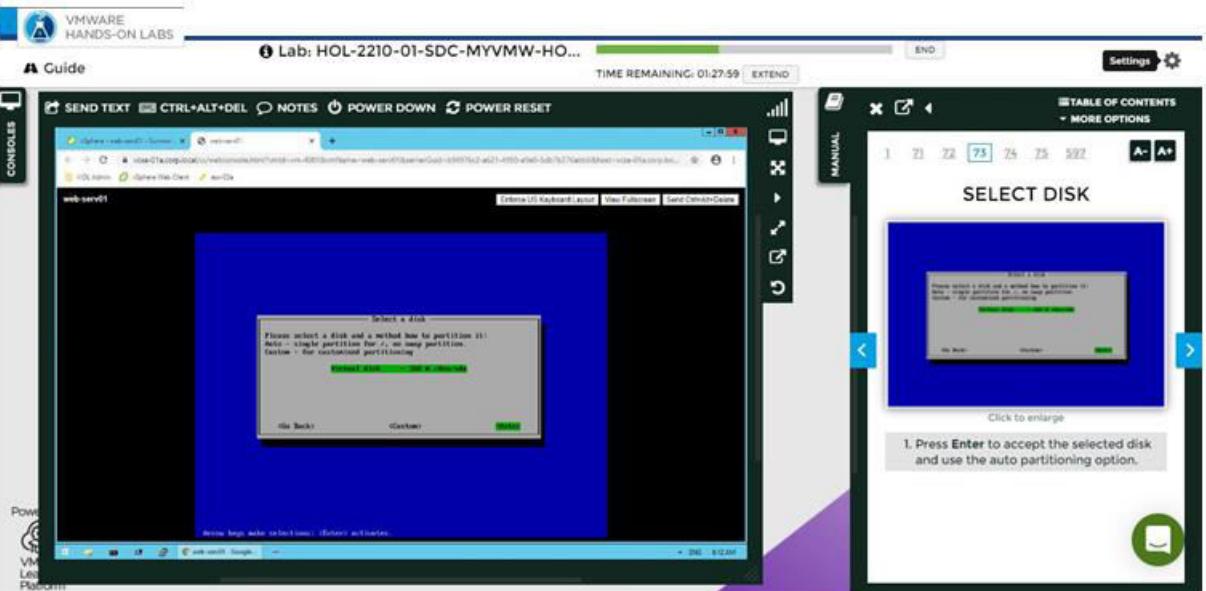
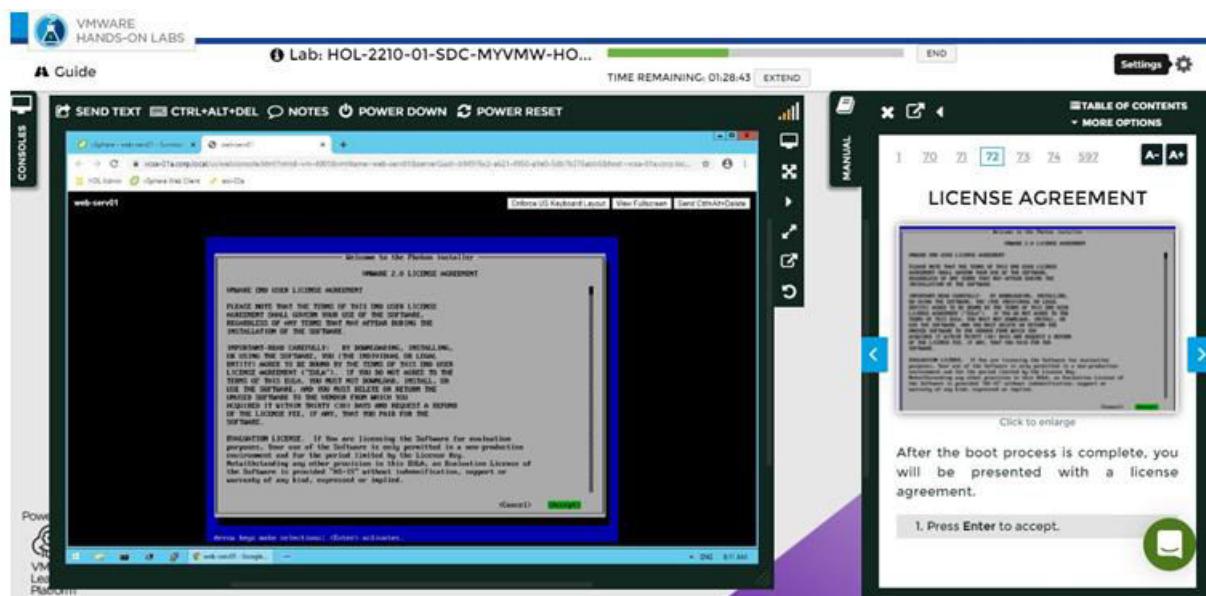
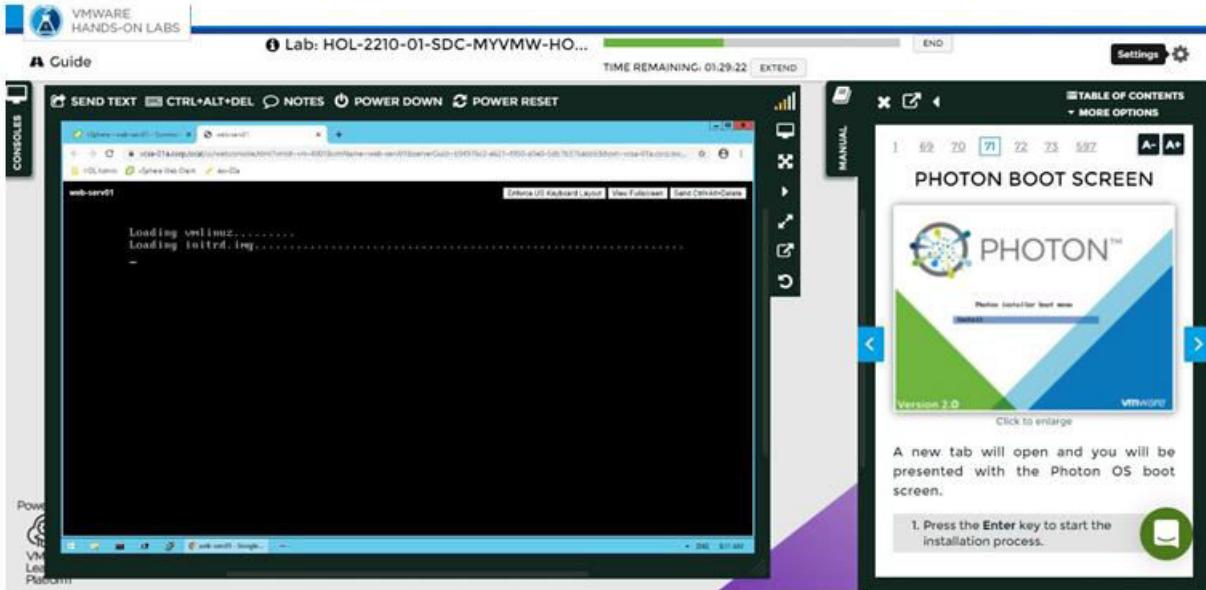
**Version 2.0**

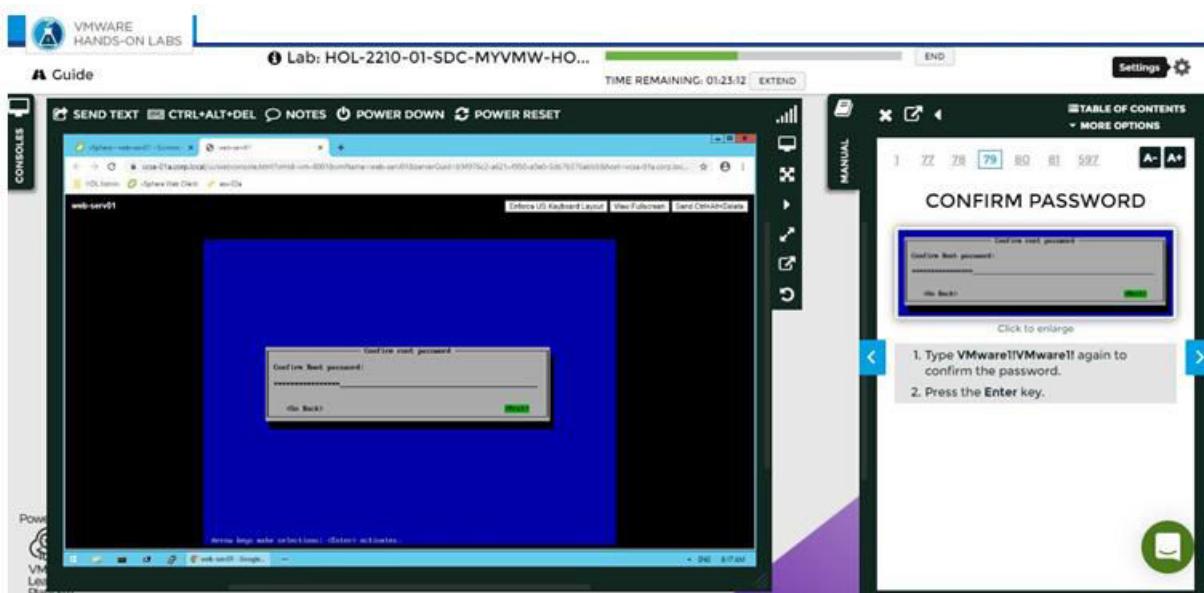
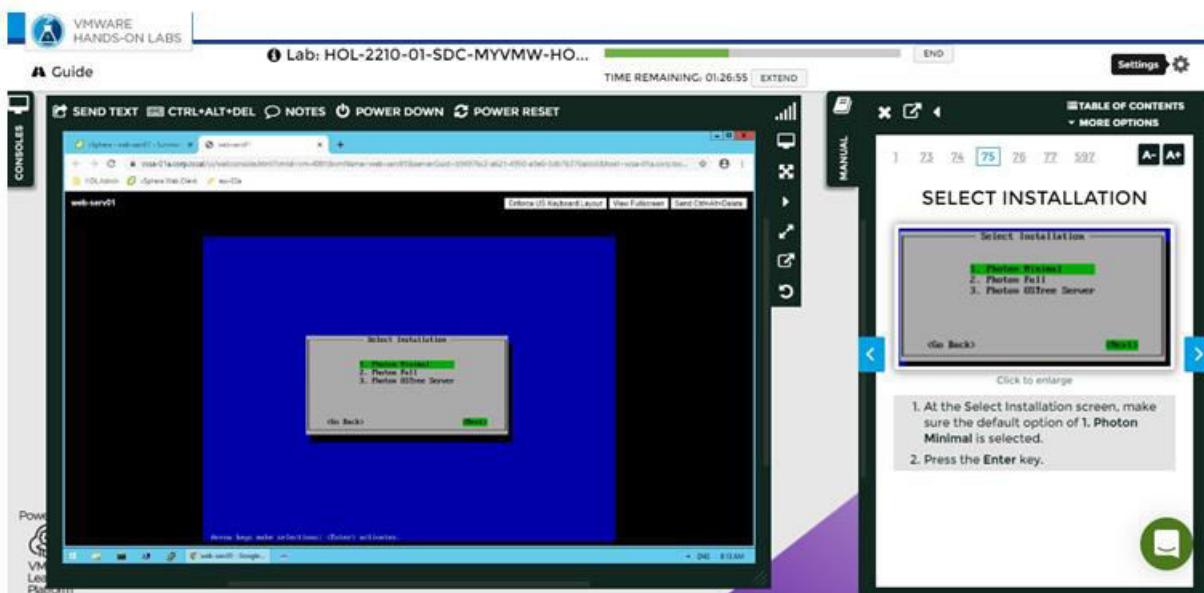
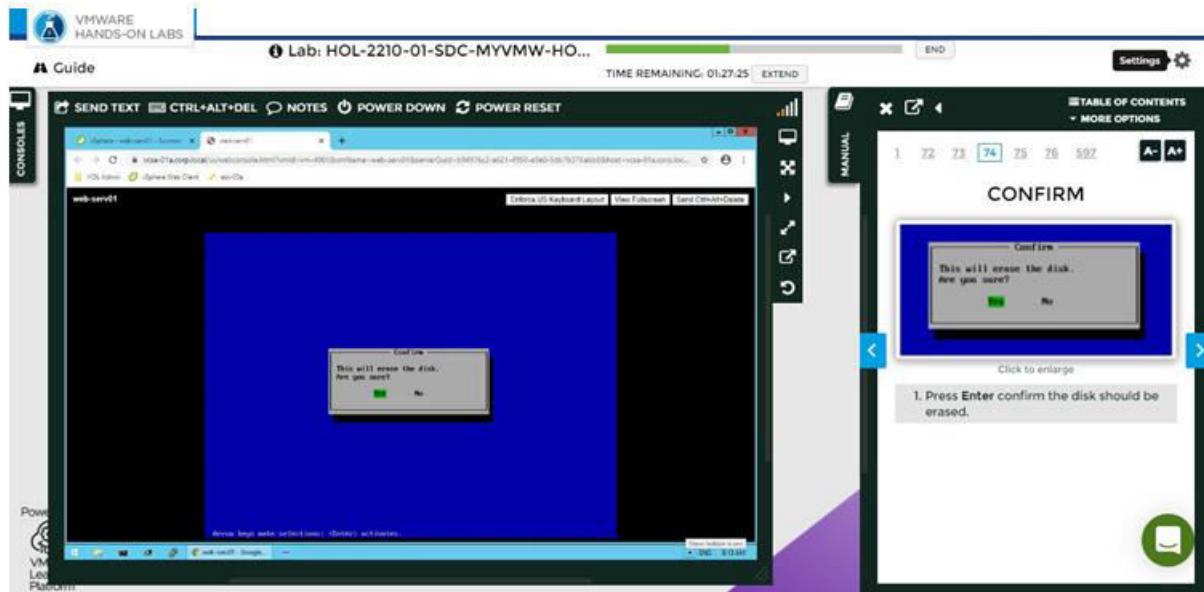
**PHOTON™**

**Press Enter key to start the installation process.**

**Click to enlarge**

1. Press the Enter key to start the installation process.





**L** VMWARE HANDS-ON LABS

Lab: HOL-2210-01-SDC-MYVMW-HO... TIME REMAINING: 01:26:09 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

web-serv01

Select Linux Kernel to install  
The installer has detected that you are installing Photon OS on a VMware hypervisor.  
Which type of Linux Kernel would you like to install?  
1. Hypervisor optimized  
2. Generic  
3. Other  
[Go Back]

Power VM Logon Platform

**MANUAL**

**TABLE OF CONTENTS** **MORE OPTIONS**

## LINUX KERNEL

Select Linux Kernel to install  
The installer has detected that you are installing Photon OS on a VMware hypervisor.  
Which type of Linux Kernel would you like to install?  
1. Hypervisor optimized  
2. Generic  
3. Other  
[Go Back]

Click to enlarge

1. Use the arrow key to select 2. Generic.
2. Press the Enter key.

**NOTE:** If 1. Hypervisor optimized is selected, the virtual machine will not boot. This is due to the unique environment the Hands-on Labs are running in.

**L** VMWARE HANDS-ON LABS

Lab: HOL-2210-01-SDC-MYVMW-HO... TIME REMAINING: 01:25:35 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

web-serv01

Choose the hostname for your system  
Hostname: photon-dc79f6d177  
[Go Back]

Power VM Logon Platform

**MANUAL**

**TABLE OF CONTENTS** **MORE OPTIONS**

## RENAME HOST

Choose the hostname for your system  
Hostname: web-serv01  
[Go Back]

Click to enlarge

1. Use the Backspace key to remove the default hostname.
2. Type web-serv01.
3. Press the Enter key.

**L** VMWARE HANDS-ON LABS

Lab: HOL-2210-01-SDC-MYVMW-HO... TIME REMAINING: 01:24:19 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

web-serv01

Set up root password  
Root password: VMware!VMware!  
[Go Back]

Power VM Logon Platform

**MANUAL**

**TABLE OF CONTENTS** **MORE OPTIONS**

## PASSWORD

Set up root password  
Root password: VMware!VMware!  
[Go Back]

Click to enlarge

1. For the password, use VMware!VMware!

Note that Photon requires a complex, non-dictionary password, which is why the typical password is being repeated.

**VMWARE HANDS-ON LABS**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

TIME REMAINING: 01:22:24 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**MANUAL**

**INSTALLATION COMPLETE**

Click to enlarge

After a minute or two, the installation will be complete.

Press a key to reboot the virtual machine. After a minute or two, the system should boot the login prompt.

**VMWARE HANDS-ON LABS**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

TIME REMAINING: 01:22:02 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**MANUAL**

**INSTALLATION COMPLETE**

Click to enlarge

After a minute or two, the installation will be complete.

Press a key to reboot the virtual machine. After a minute or two, the system should boot the login prompt.

**VMWARE HANDS-ON LABS**

**Lab: HOL-2210-01-SDC-MYVMW-HO...**

TIME REMAINING: 01:18:41 EXTEND

**CONSOLES**

**Guide**

**SEND TEXT** **CTRL+ALT+DEL** **NOTES** **POWER DOWN** **POWER RESET**

**MANUAL**

**INSTALLATION COMPLETE**

Click to enlarge

After a minute or two, the installation will be complete.

Press a key to reboot the virtual machine. After a minute or two, the system should boot the login prompt.

VMWARE HANDS-ON LABS

Lab: HOL-2210-01-SDC

You network connection is degraded.  
Console experience may slow.

CONSOLES

SEND TEXT CTRL+ALT+DEL NOTES POWER DOWN POWER RESET

vSphere Client

Edit Settings | web-serv01

Virtual Hardware VM Options

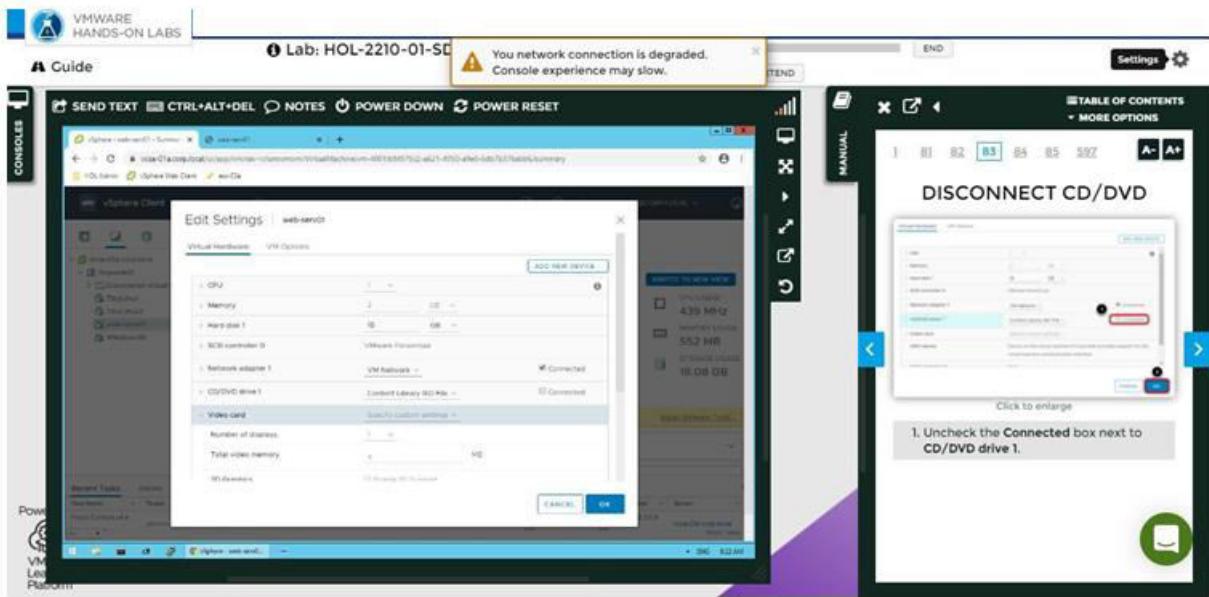
Processor: 2 vCPUs  
Memory: 2 GB  
Hard disk 1: 10 GB  
SCSI controller: VMware Paravirtual  
Network adapter 1: VM Network  
CD/DVD Drive 1: Content Library (224 MB)  
Video card: Intel GMA X4300  
Number of processors: 2  
Total video memory: 16 MB  
Resolution: 1280x800 16.7M colors

OK CANCEL

DISCONNECT CD/DVD

1. Uncheck the **Connected** box next to CD/DVD drive 1.

Click to enlarge



VMWARE HANDS-ON LABS

Lab: HOL-2210-01-SDC-MYVMW-HO...

TIME REMAINING: 01:16:06 EXTEND

CONSOLES

SEND TEXT CTRL+ALT+DEL NOTES POWER DOWN POWER RESET

vSphere Client - Systems

web-serv01

Welcome to Oracle VM VirtualBox - Version 4.5.5-83010 (Build 10111) (64-bit) - Oracle VM VirtualBox

MANUAL

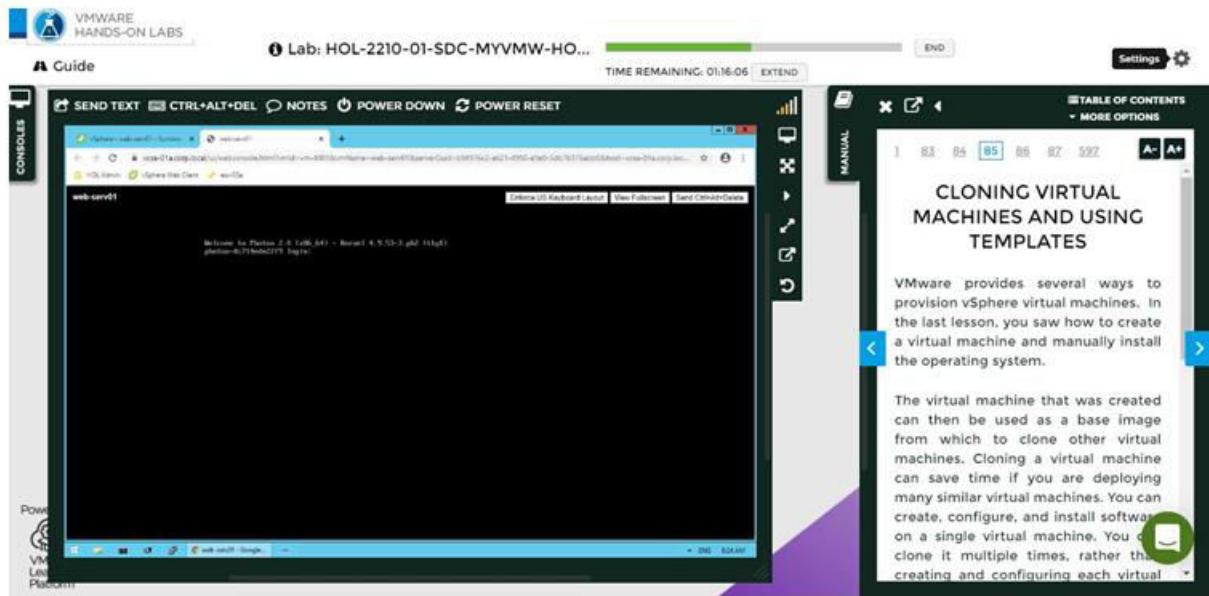
TABLE OF CONTENTS MORE OPTIONS

A A+

## CLONING VIRTUAL MACHINES AND USING TEMPLATES

VMware provides several ways to provision vSphere virtual machines. In the last lesson, you saw how to create a virtual machine and manually install the operating system.

The virtual machine that was created can then be used as a base image from which to clone other virtual machines. Cloning a virtual machine can save time if you are deploying many similar virtual machines. You can create, configure, and install software on a single virtual machine. You can then clone it multiple times, rather than creating and configuring each virtual machine individually.



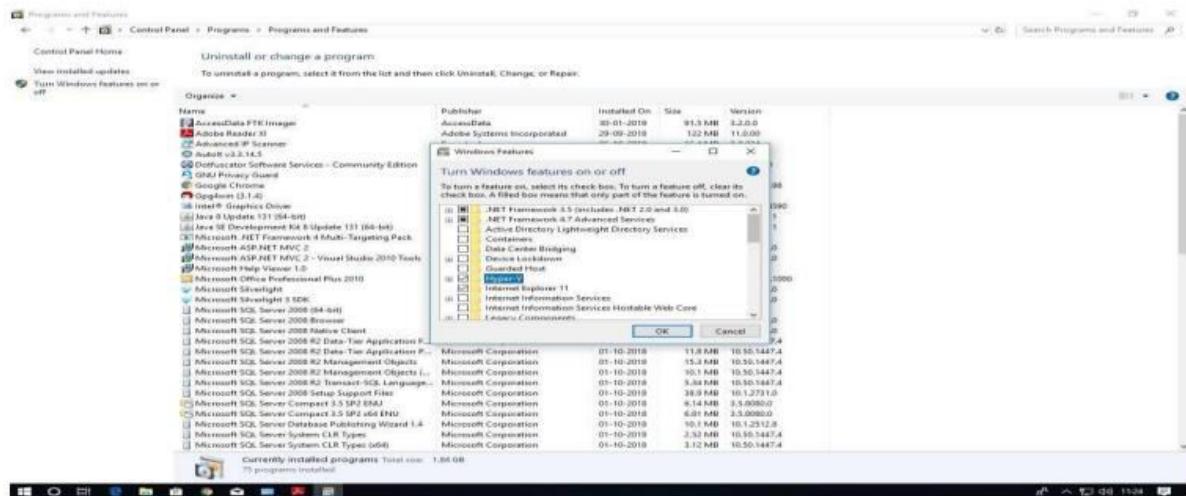
## Practical No. 6

### *Implement Virtualization using Hyper-V*

*Steps involved how to - Implement virtualization Hyper-V below in the following order*

*Step 1 - First we have to uninstall vmware software if already installed on computer because the VMware Workstation installer does not support running on a Hyper-V virtual machine.*

*After uninstalling VMware, we can proceed to next step - go to control panel and click on uninstall a program.*



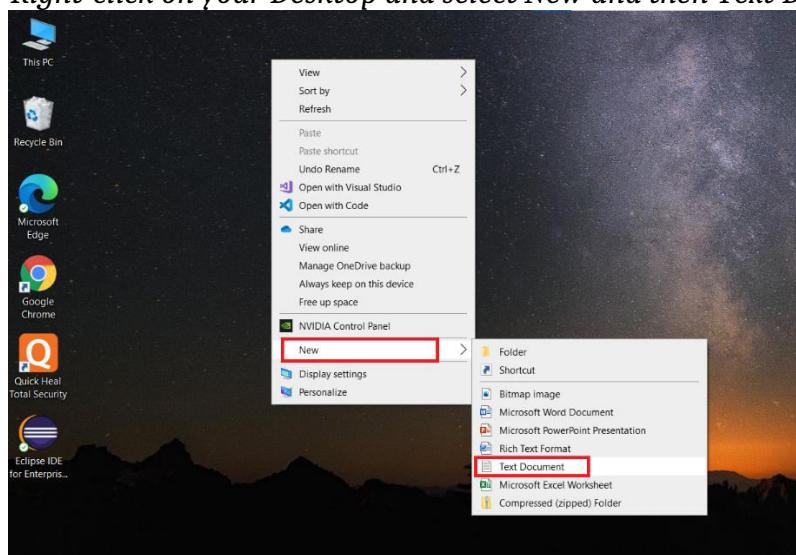
*Step 2 - If Hyper V is not installed and if you couldn't find it then follow the link to do installation.*

<https://www.how2shout.com/how-to/how-to-download-and-install-hyper-v-on-windows-11-home.html>

- *Steps to download & install Hyper-V on Windows 11 Home -*

#### *1. Create a text file -*

*Right-click on your Desktop and select New and then Text Document to create a new empty file.*



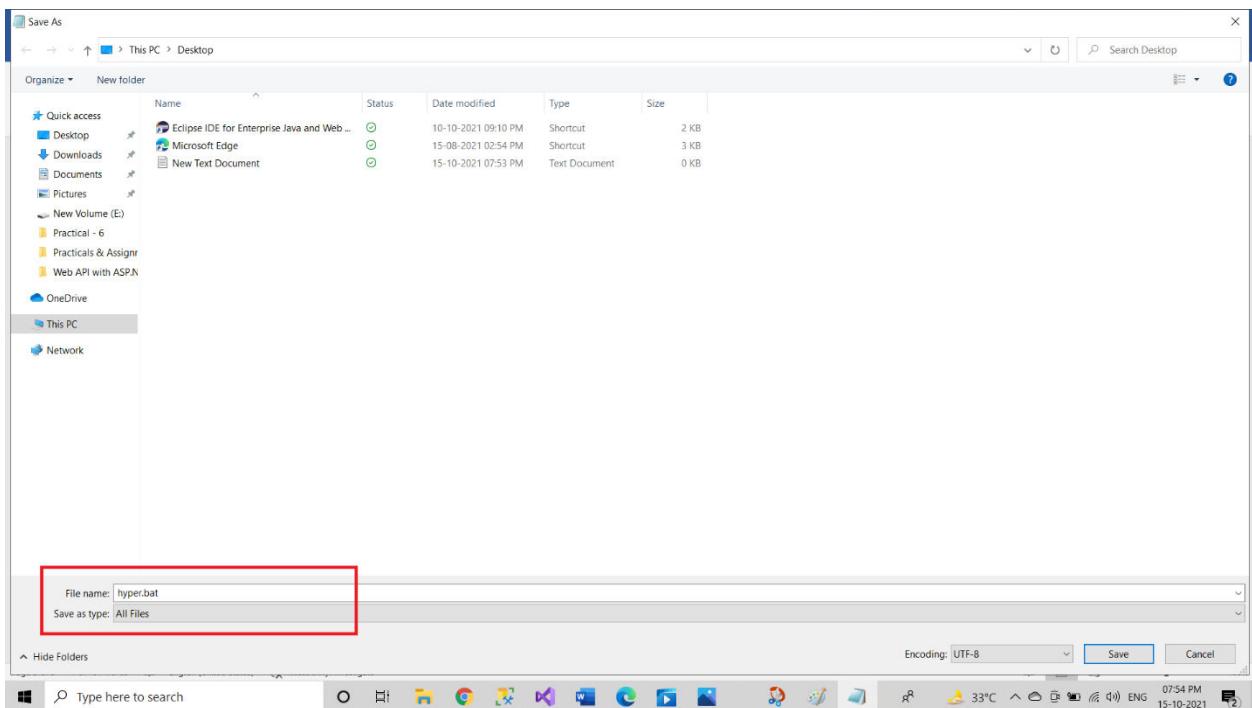
## 2. Bat file code to download Hyper-v for Windows 11 home -

Next, open the newly created file and paste the following given code into it.



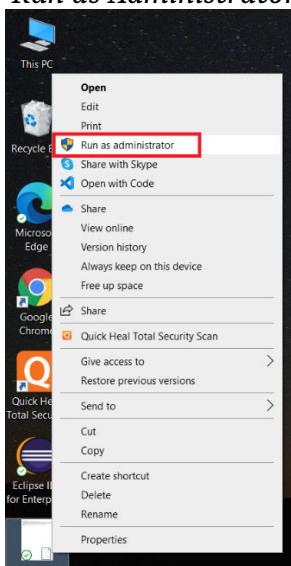
```
File Edit Format View Help
pushd "%~dp0"
dir /b %SystemRoot%\servicing\Packages\*Hyper-V*.mum >hv.txt
for /f %%i in ('findstr /i . hv.txt 2>nul') do dism /online /norestart /add-package:"%SystemRoot%\servicing\Packages\%%i"
del hv.txt
Dism /online /enable-feature /featurename:Microsoft-Hyper-V -All /LimitAccess /ALL
pause
```

After that click on the File option given in the menu and select the “Save As...” option. Before saving assign it a name- **hyper.bat**



## 3. Run script to install Hyper-V -

Once you have the BAT file on your system, right-click on it and select the “Run as Administrator” option.



4. You will see a process will get started on your Command prompt to download the packages for Microsoft Hyper-V Services for Windows 10 home. Wait until that is not get completed, once it is done, press Y and hit the Enter key to restart the system.

**Note:** Now you can delete the created **hyper.bat** file.

```
C:\Windows\System32\cmd.exe
Processing 1 of 1 - Adding package Microsoft-Hyper-V-Services-Package~31bf3856ad364e35~amd64~~10.0.19041.1237
[=====100.0%=====]
The operation completed successfully.

C:\Users\KEDAR\OneDrive\Desktop>dism /online /norestart /add-package:"C:\Windows\servicing\Packages\Microsoft-Hyper-V-Services-Package~31bf3856ad364e35~amd64~~10.0.19041.1288.mum"

Deployment Image Servicing and Management tool
Version: 10.0.19041.844

Image Version: 10.0.19042.1288

Processing 1 of 1 - Adding package Microsoft-Hyper-V-Services-Package~31bf3856ad364e35~amd64~~10.0.19041.1288
[=====100.0%=====]
The operation completed successfully.

C:\Users\KEDAR\OneDrive\Desktop>del hv.txt

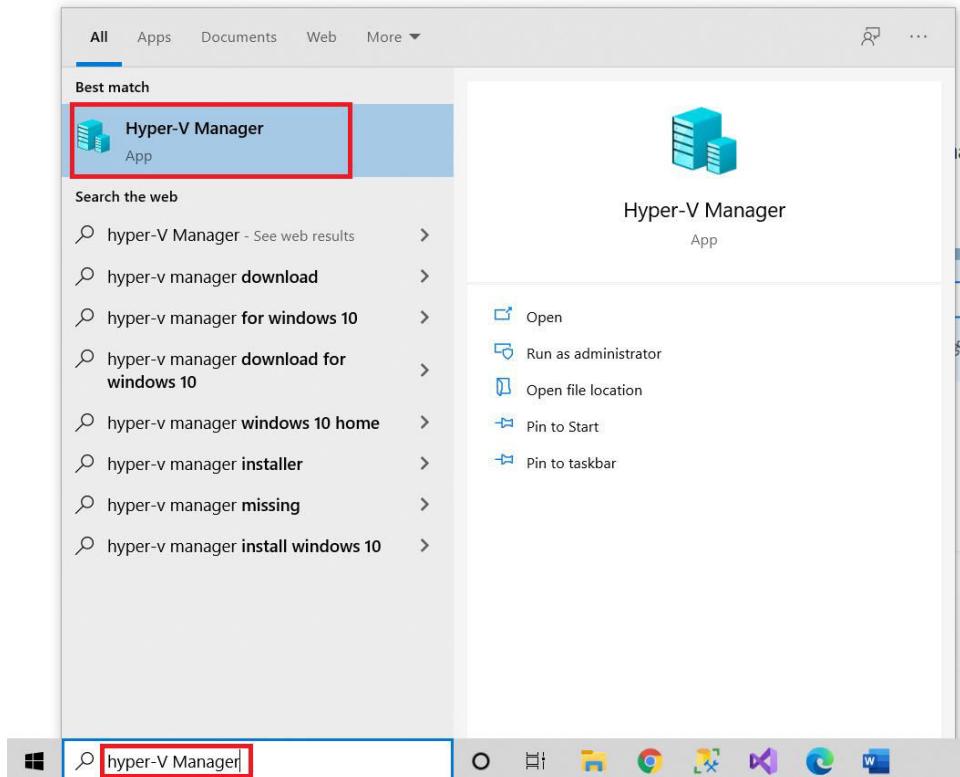
C:\Users\KEDAR\OneDrive\Desktop>Dism /online /enable-feature /featurename:Microsoft-Hyper-V -All /LimitAccess /ALL

Deployment Image Servicing and Management tool
Version: 10.0.19041.844

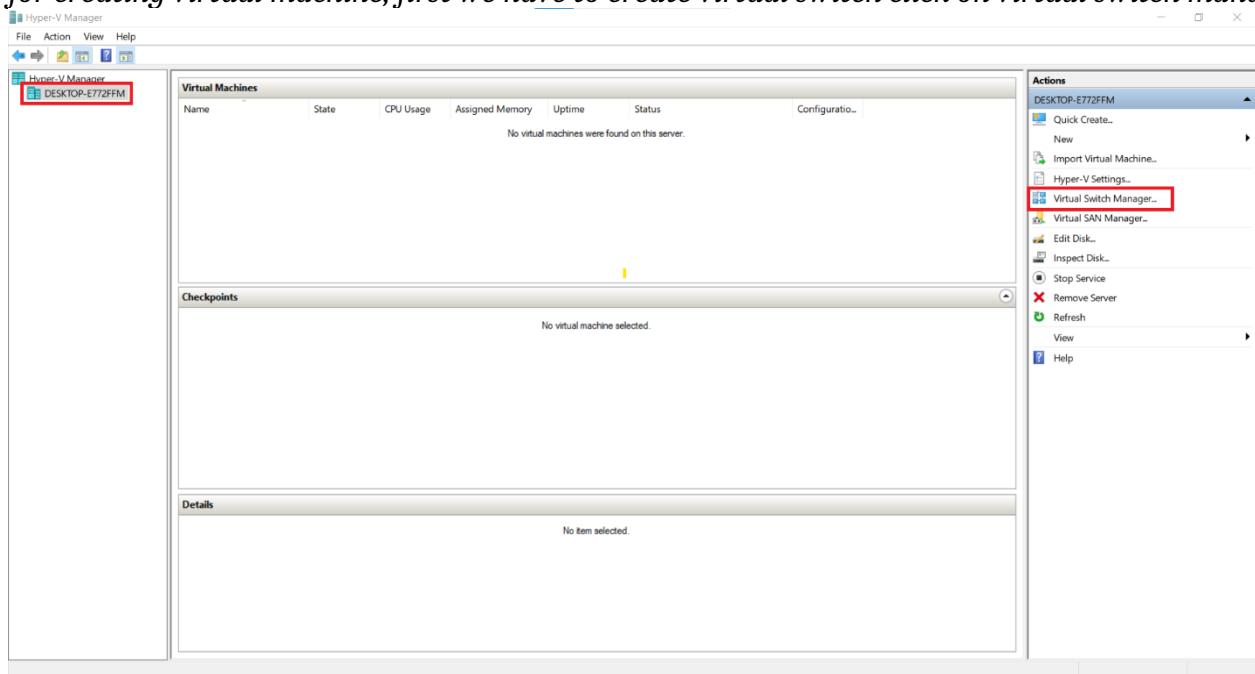
Image Version: 10.0.19042.1288

Enabling feature(s)
[=====100.0%=====]
The operation completed successfully.
Restart Windows to complete this operation.
Do you want to restart the computer now? (Y/N)
```

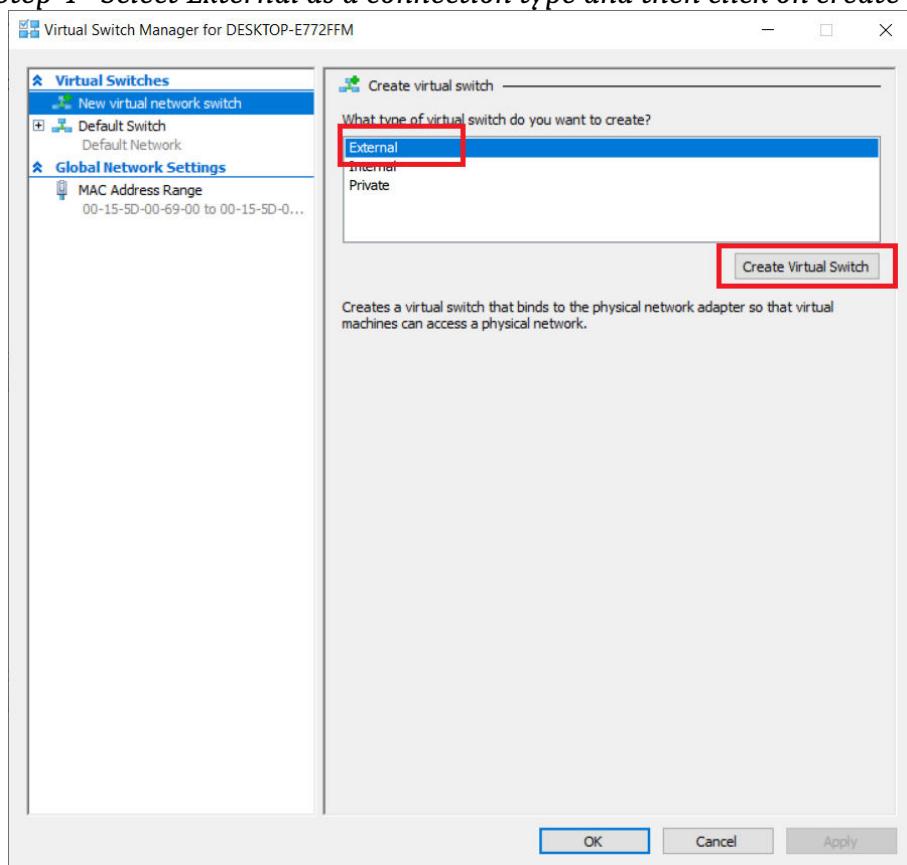
5. Start Win 11 Microsoft Hypervisor platform -  
Click on the Start button and type- **hyper**, soon you will see the “Hyper-V Manager” icon.  
Click it to run the same.



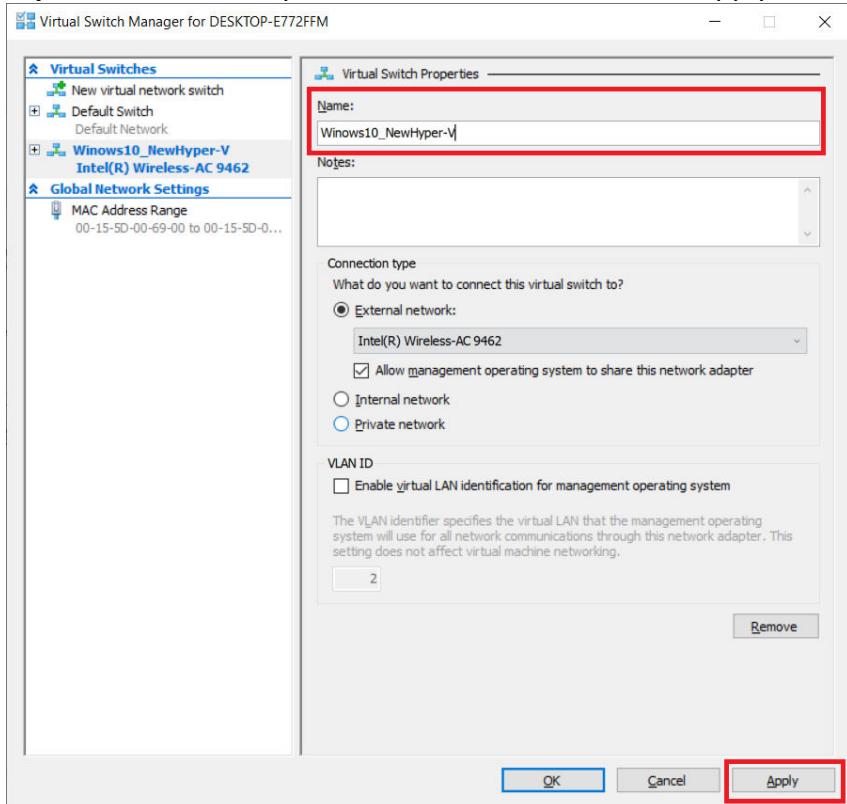
*Step 3 - After Restart Search for hyper-V manager in search box and click on that. for creating virtual machine, first we have to create virtual switch click on virtual switch manager opt*



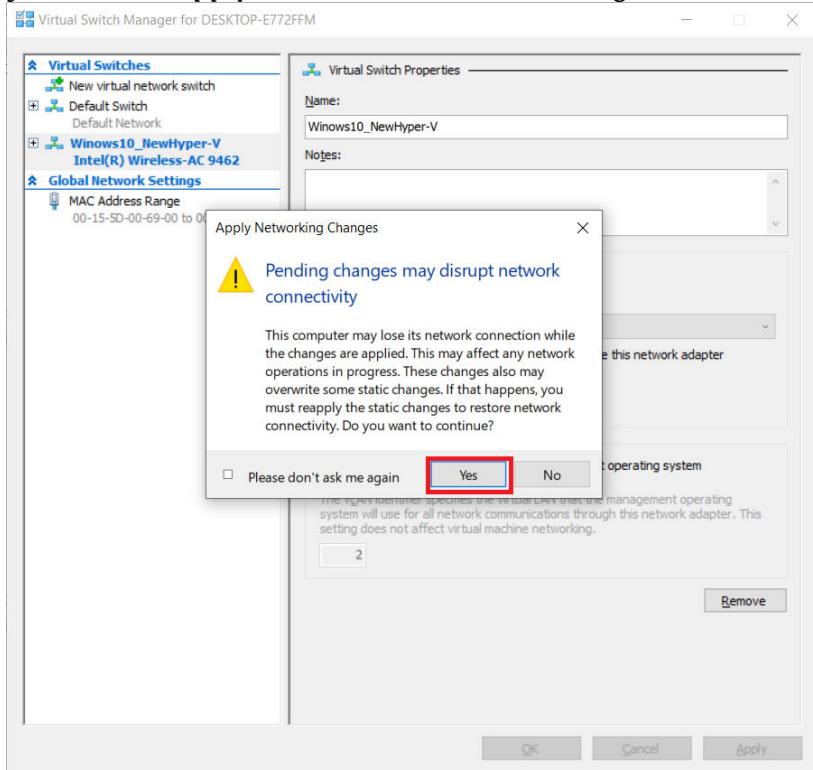
*Step 4 - Select External as a connection type and then click on create virtual switch*



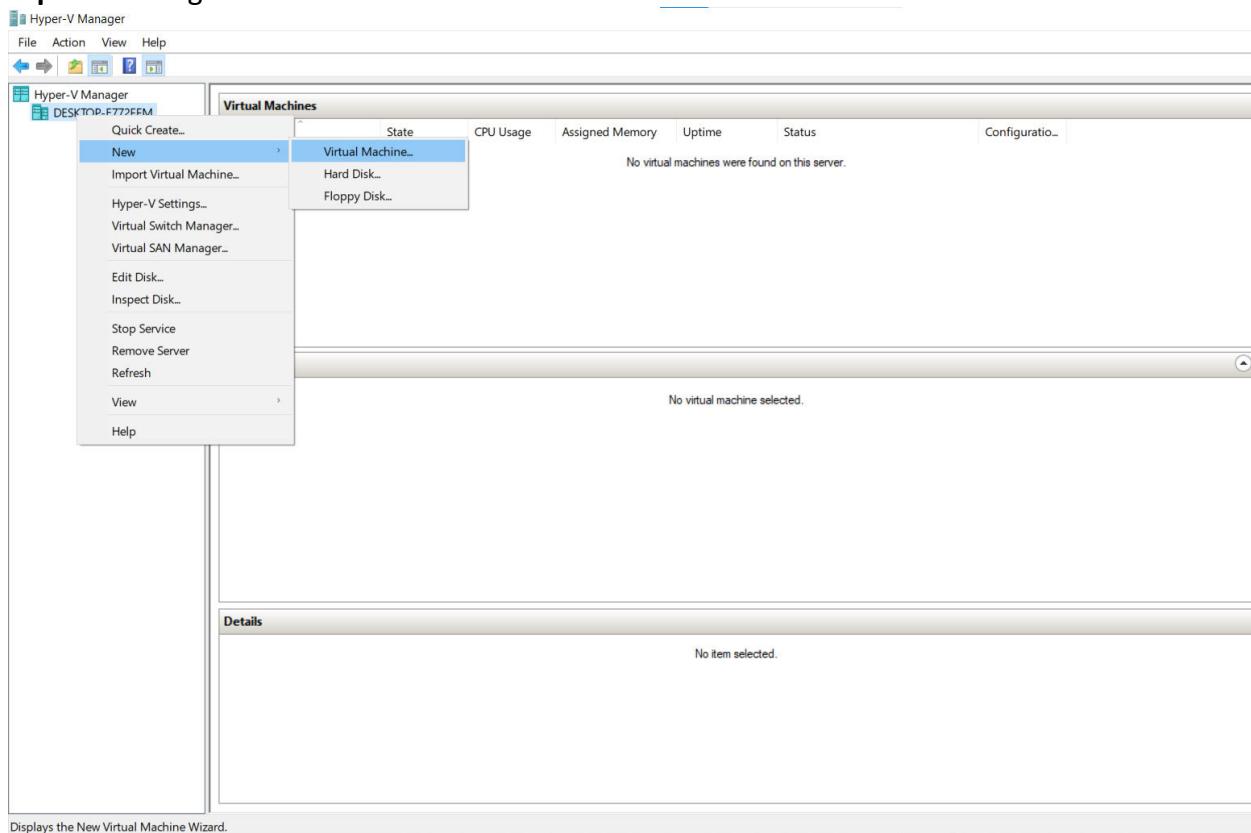
## Step 5 - Give name to your virtual switch then click on apply button



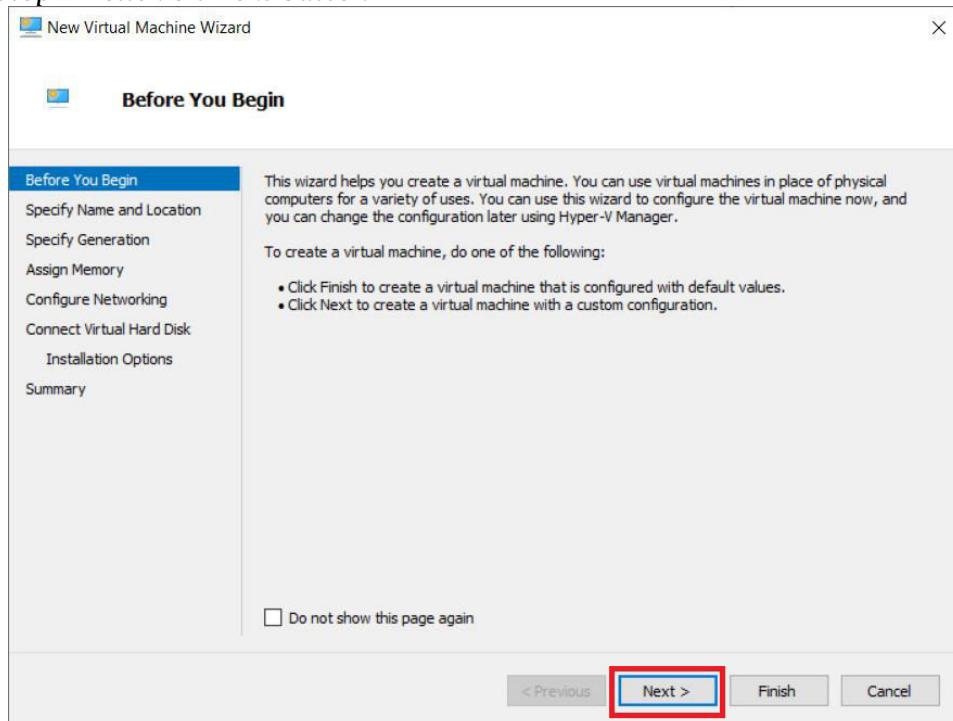
After click on Apply button, it will show warning about our connection click on yes



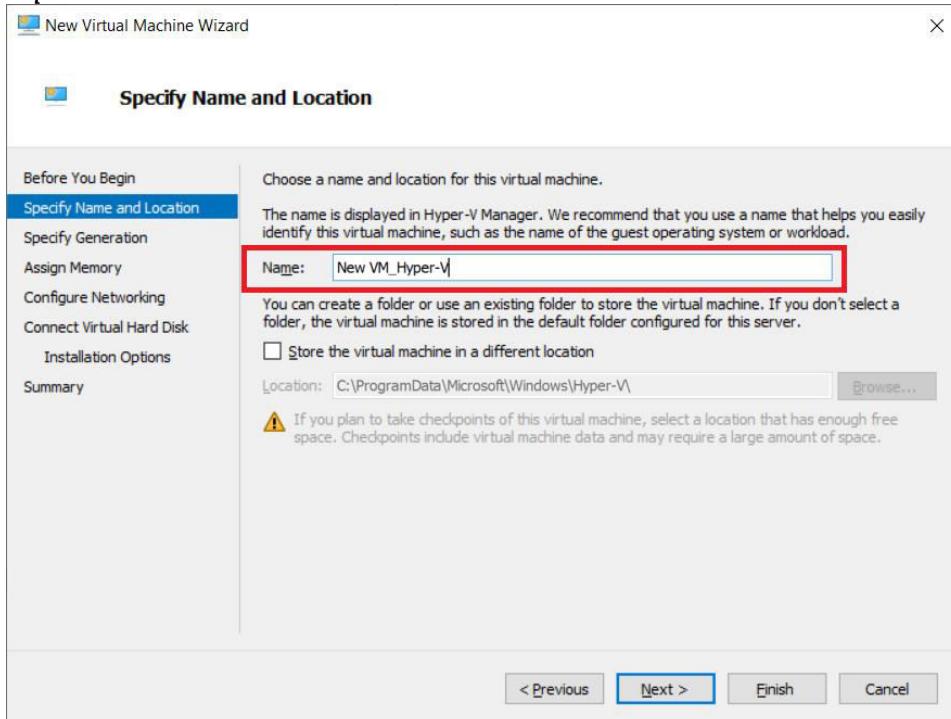
## Step 6 - Now right click on server and select new virtual machine



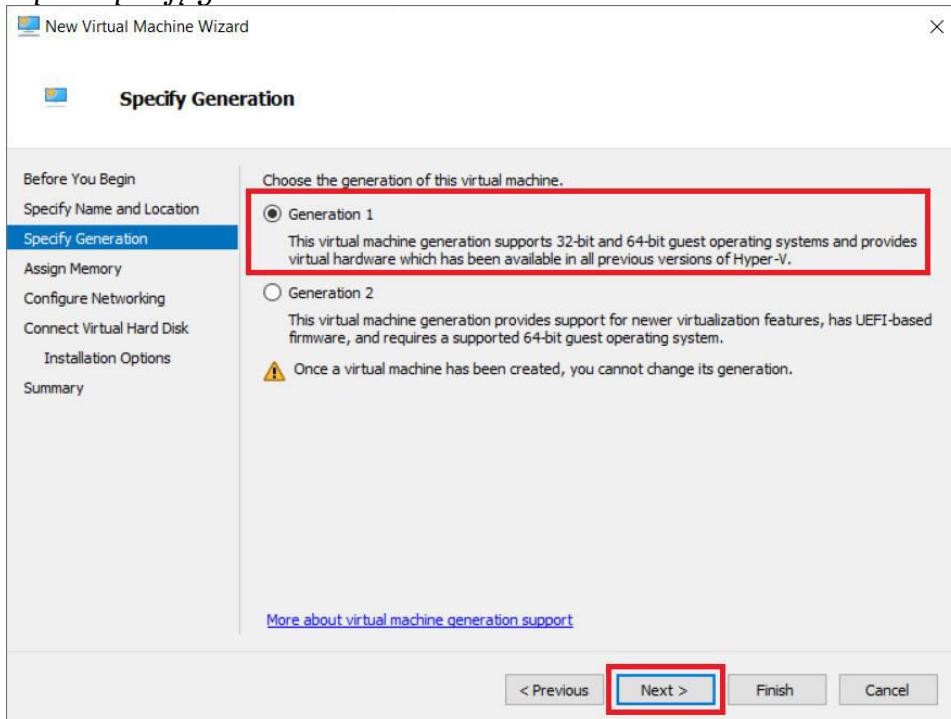
## Step 7 - Click on Next button



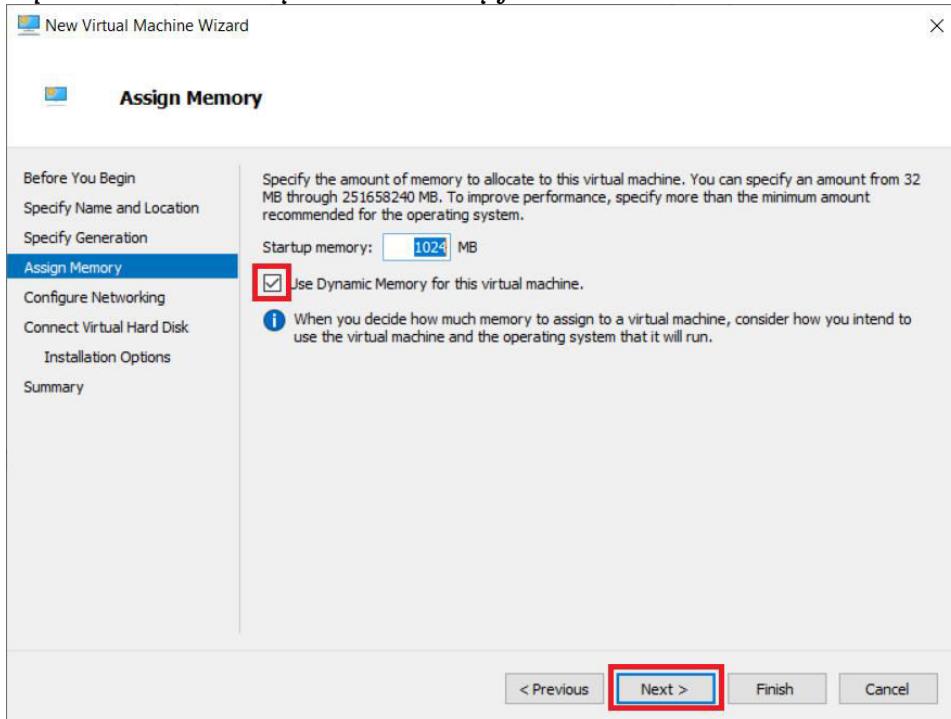
### Step 8 - Provide name to virtual machine then click on Next button



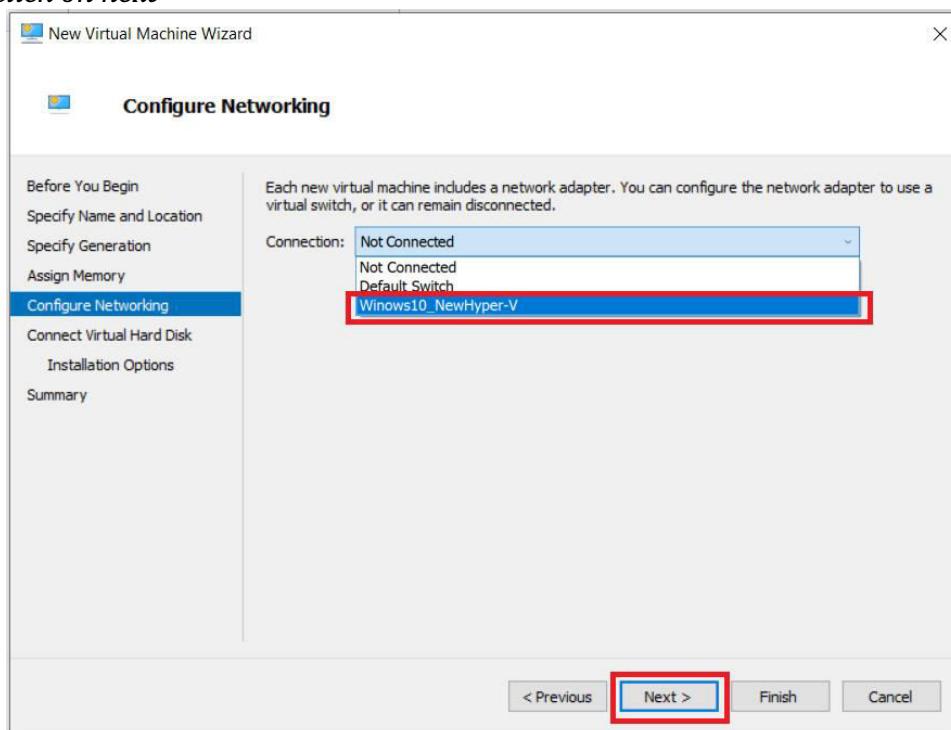
### Step 9 - Specify generation: Generation 1



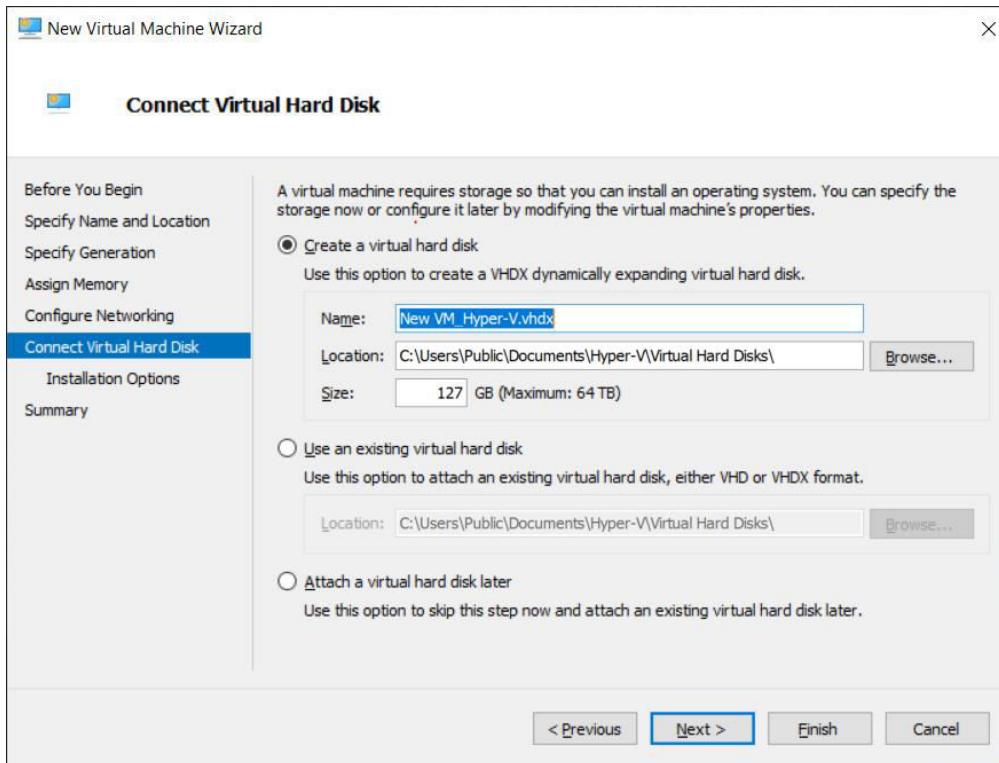
*Step 10 - tick on use dynamic memory for this virtual machine*



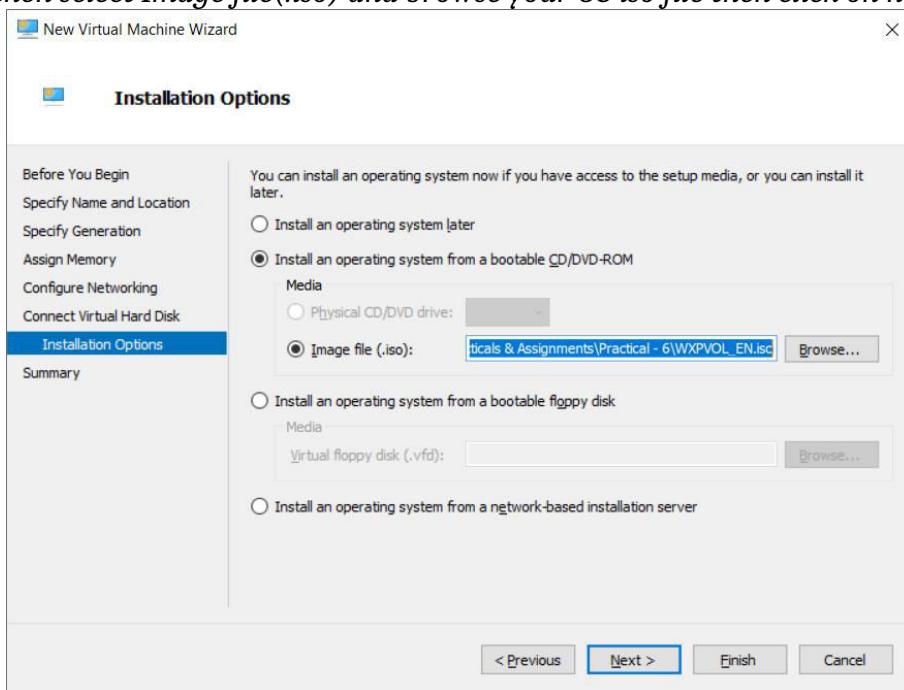
*Step 11 - Select switch which we created earlier for our virtual machine from drop-down list and then click on next*



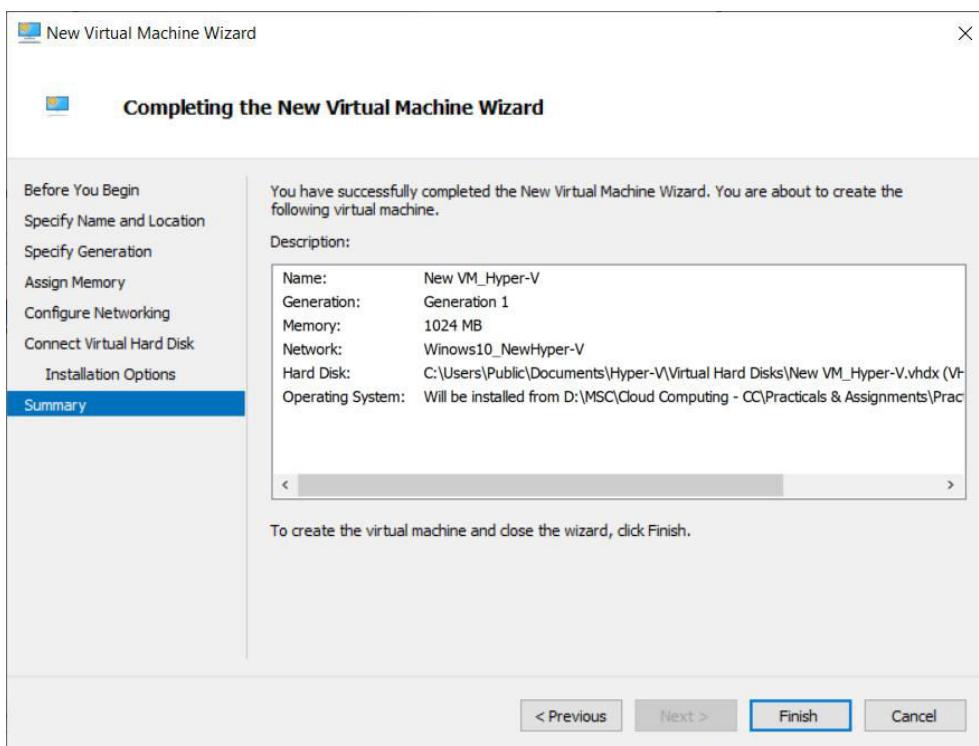
*Step 12 - Description of virtual machine and location where it will store virtual machine related files and size require for this machine click on next*



**Step 13 - New virtual machine wizard panel will appear, where we will choose operating system which we want to install on virtual machine select install an operating system from boot CD/DVD-ROM and then select Image file(.iso) and browse your OS iso file then click on next button**



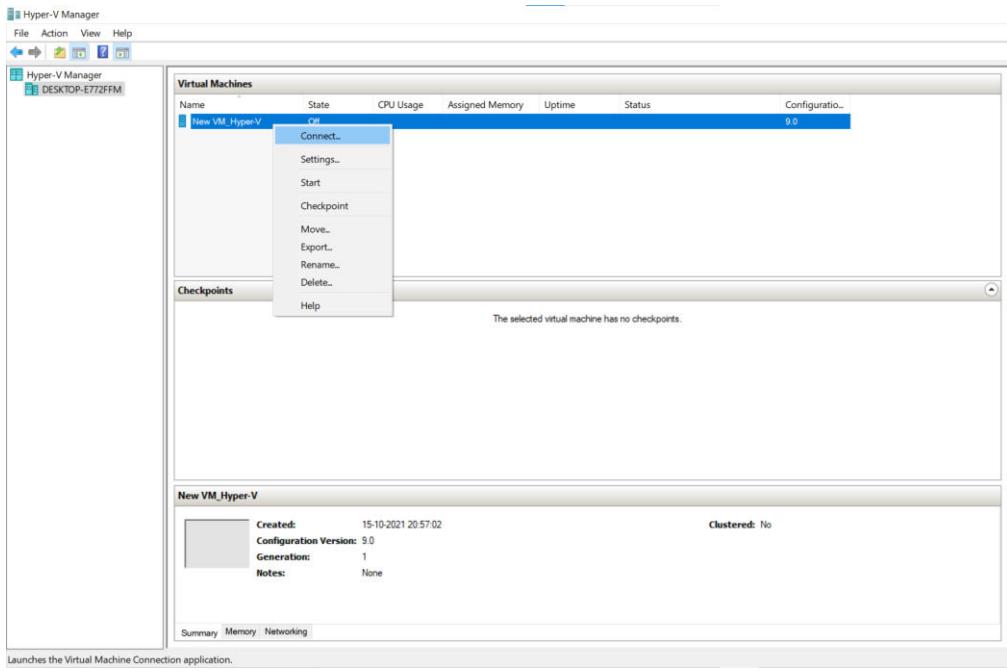
**Step 14 - Summary report will be generated about virtual machine then click on Finish button**



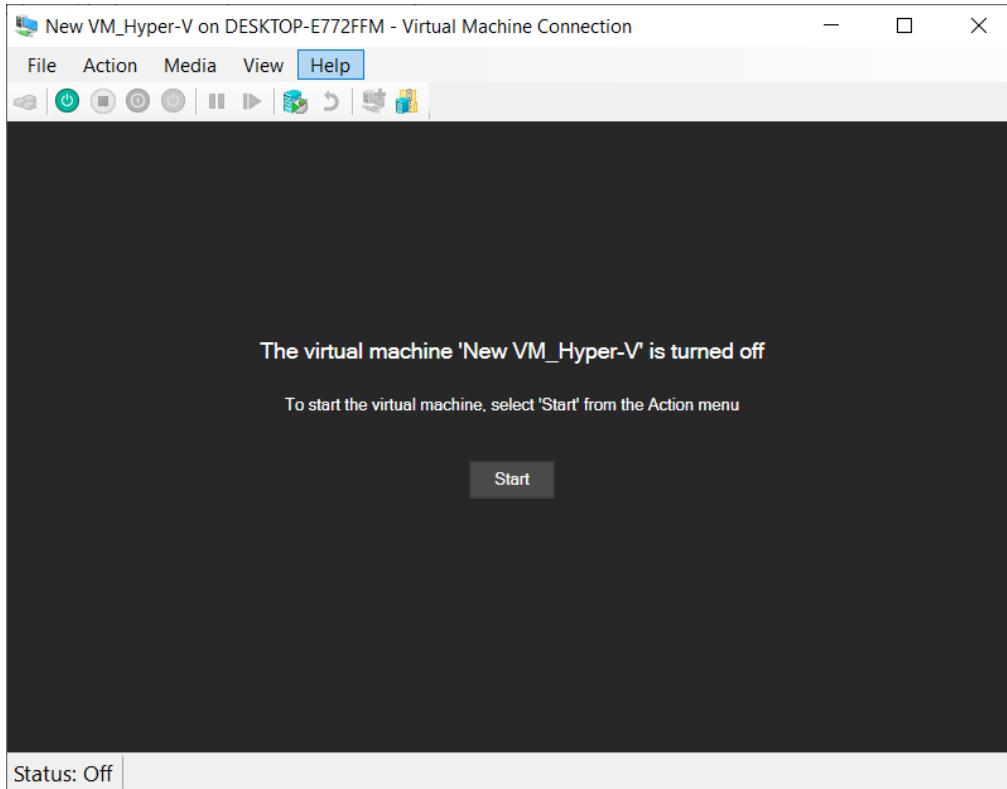
*In virtual machine panel your virtual machine will appear which has off state*

Name	State	CPU Usage	Assigned Memory	Uptime	Status	Configuration
New VM_Hyper-V	Off					9.0

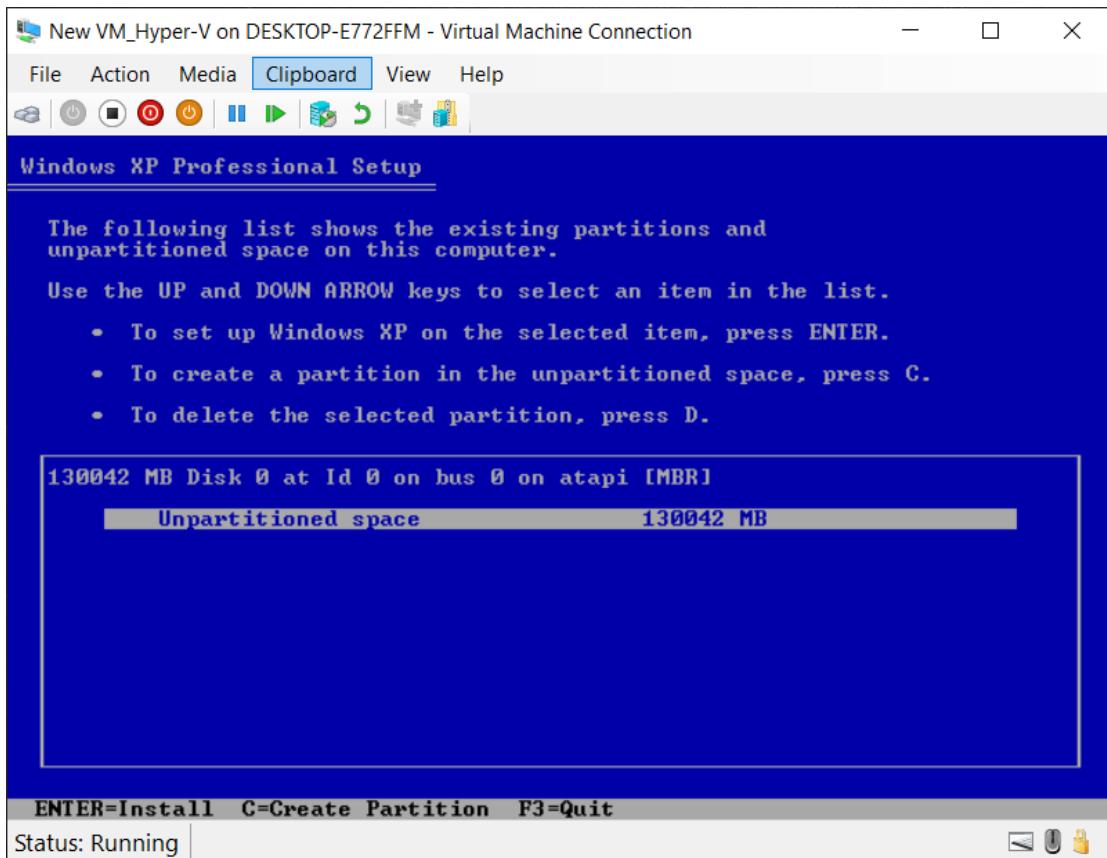
*Step 15 - Right click on virtual machine and click on connect option*



### Step 16 - Now turn on virtual machine



Step 17 - Click Start  
Virtual machine will start with below screen.



## Practical No. 7

### Develop Cloud application Using Microsoft Azure

Before Installation of VM on Azure first to activate sandbox

Activate sandbox

<https://docs.microsoft.com/en-us/learn/modules/create-windows-virtual-machine-in-azure/3-exercise-create-a-vm>



## Exercise - Create a Windows virtual machine

✓ 100 XP

10 minutes

Microsoft Learn needs your permission to create Azure resources.

For more information, please check the [troubleshooting guidance page](#).

[Review permissions](#)

Your company processes video content on Windows VMs. A new city has contracted with your company to process their traffic cameras, but it's a model you haven't worked with before. You need to create a new Windows VM and install some proprietary codecs in order to process and analyze the new video content.

Click on Azure Portal Link.

## Create a new Windows virtual machine

You can create Windows VMs with the Azure portal, Azure CLI, or Azure PowerShell. The best approach is to use the portal because the **Create a virtual machine** wizard collects all the required information and provides hints and validation messages throughout the process.

1. Sign in to the [Azure portal](#) using the same account you used to activate the sandbox.
2. On the Azure portal, under **Azure services**, select **Create a resource**. The **Create a resource** pane appears.
3. In **Search services and marketplace** search box, search for and select **Windows Server**, and press **Enter**. The **Windows Server** pane appears.
4. There are several Windows Server options to choose from to create your VM. In the **Plan** dropdown list, scroll down, and select **[smalldisk] Windows Server 2019 Datacenter**.
5. Select **Create**. The **Create a virtual machine** pane appears.

The screenshot shows the Microsoft Azure homepage. At the top, there's a navigation bar with the Microsoft Azure logo, a search bar, and user account information. Below the header, a "Welcome to Azure!" message is displayed, followed by three promotional cards: "Start with an Azure free trial", "Manage Azure Active Directory", and "Access student benefits". Under the "Azure services" section, there's a grid of icons for various services like Virtual machines, App Services, Storage accounts, etc. A large red arrow points from the text above to the "Create a resource" button in the "Azure services" sidebar.

This screenshot shows the Microsoft Azure homepage again, but with a different focus. The "Virtual machines" service is selected in the "Create a resource" sidebar, which is now expanded. The main content area shows the "Virtual machines" service details, including a brief description, a "Create" button, and a "View" link. The rest of the page layout is similar to the first screenshot, with the "Azure services" grid and other promotional cards visible.

Home >

## Create a virtual machine

Basics Disks Networking Management Advanced Tags Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

**Project details**

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* Concierge Subscription  
Resource group \* (View) Resource group Create new

**Instance details**

Virtual machine name \* PracticeWindowsOS  
Region \* (US) East US

**Review + create** < Previous Next : Disks >



Home >

## Create a virtual machine

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* Concierge Subscription  
Resource group \* (View) learn-a5c1d285-7cbc-4154-be5b-0619ab942988 Create new

**Instance details**

Virtual machine name \* PracticeWindowsOS  
Region \* (US) West US  
Availability options No infrastructure redundancy required  
Image \* Ubuntu Server 20.04 LTS - Gen2 See all images | Configure VM generation  
Azure Spot instance   
Size \* Standard\_D2s\_v3 - 2 vcpus, 8 GiB memory (\$85.41/month)

**Review + create** < Previous Next : Disks >



Home >

## Create a virtual machine

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* Concierge Subscription  
Resource group \* (View) learn-a5c1d285-7cbc-4154-be5b-0619ab942988 Create new

**Instance details**

Virtual machine name \* PracticeWindowsOS  
Region \* (US) West US  
Availability options No infrastructure redundancy required  
Image \* Windows 10 Pro, Version 20H2 - Gen2 See all images | Configure VM generation  
Azure Spot instance   
Size \* Standard\_D2s\_v3 - 2 vcpus, 8 GiB memory (\$85.41/month)

**Review + create** < Previous Next : Disks >



Home >

## Create a virtual machine

Azure Spot instance

**Size \***

**Administrator account**

**Username \***

**Password \***

**Confirm password \***

**Inbound port rules**

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

**Public inbound ports \***  None  Allow selected ports

Select inbound ports \*

**Review + create**

Home >

## Create a virtual machine

Inbound port rules

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

Public inbound ports \*

None

Allow selected ports

Select inbound ports \*

RDP (3389)

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

Licensing

I confirm I have an eligible Windows 10 license with multi-tenant hosting rights.\*

Review multi-tenant hosting rights for Windows 10 compliance

**Review + create**    [« Previous](#)    **Next : Disks >**

Home >

## Create a virtual machine

[Basics](#) **Disks** [Networking](#) [Management](#) [Advanced](#) [Tags](#) [Review + create](#)

Azure VMs have one operating system disk and a temporary disk for short-term storage. You can attach additional data disks. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

**Disk options**

OS disk type \* [Premium SSD \(locally-redundant storage\)](#)

Encryption type \* [\(Default\) Encryption at-rest with a platform-managed key](#)

Enable Ultra Disk compatibility

**Data disks**

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

LUN	Name	Size (GB)	Disk type	Host caching
	<a href="#">Create and attach a new disk</a>			
	<a href="#">Attach an existing disk</a>			

[Review + create](#) [< Previous](#) [Next : Networking >](#)

Home > Create a virtual machine >

### Create a new disk

Create a new disk to store applications and data on your VM. Disk pricing varies based on factors including disk size, storage type, and number of transactions. [Learn more](#)

Name *	<input type="text" value="PracticeWindowsOS_DataDisk_0"/>
Source type *	<input type="text" value="None (empty disk)"/>
Size *	<b>1024 GiB</b> Premium SSD LRS <a href="#">Change size</a>
Encryption type *	<input type="text" value="(Default) Encryption at-rest with a platform-managed key"/>
Enable shared disk	<input type="radio"/> Yes <input checked="" type="radio"/> No

**OK** 

Home >

### Create a virtual machine

Disk options. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

OS disk type *	<input type="text" value="Premium SSD (locally-redundant storage)"/>
Encryption type *	<input type="text" value="(Default) Encryption at-rest with a platform-managed key"/>
Enable Ultra Disk compatibility	<input type="checkbox"/>

Data disks

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

LUN	Name	Size (GiB)	Disk type	Host caching
0	PracticeWindowsOS_0	1024	Premium SSD LRS	<input type="text" value="None"/>  

[Create and attach a new disk](#) [Attach an existing disk](#)

**Review + create**  [< Previous](#) [Next : Networking >](#) 

Home >

### Create a virtual machine

**Networking**  Basics Disks Management Advanced Tags Review + create

Define network connectivity for your virtual machine by configuring network interface card (NIC) settings. You can control ports, inbound and outbound connectivity with security group rules, or place behind an existing load balancing solution. [Learn more](#)

Network interface

When creating a virtual machine, a network interface will be created for you.

Virtual network *	<input type="text" value="(new) learn-a5c1d285-7cbc-4154-be5b-0618ab942988-vnet"/> <a href="#">Create new</a>
Subnet *	<input type="text" value="(new) default (10.0.0.0/24)"/>
Public IP	<input type="text" value="(new) PracticeWindowsOS-ip"/> <a href="#">Create new</a>
NIC network security group	<input type="radio"/> None <input checked="" type="radio"/> Basic <input type="radio"/> Advanced

**Review + create**  [< Previous](#) [Next : Management >](#) 

Home >  
**Create a virtual machine** ...

Basics Disks Networking **Management** Advanced Tags Review + create

Configure monitoring and management options for your VM.

Azure Security Center  
Azure Security Center provides unified security management and advanced threat protection across hybrid cloud workloads. [Learn more](#)

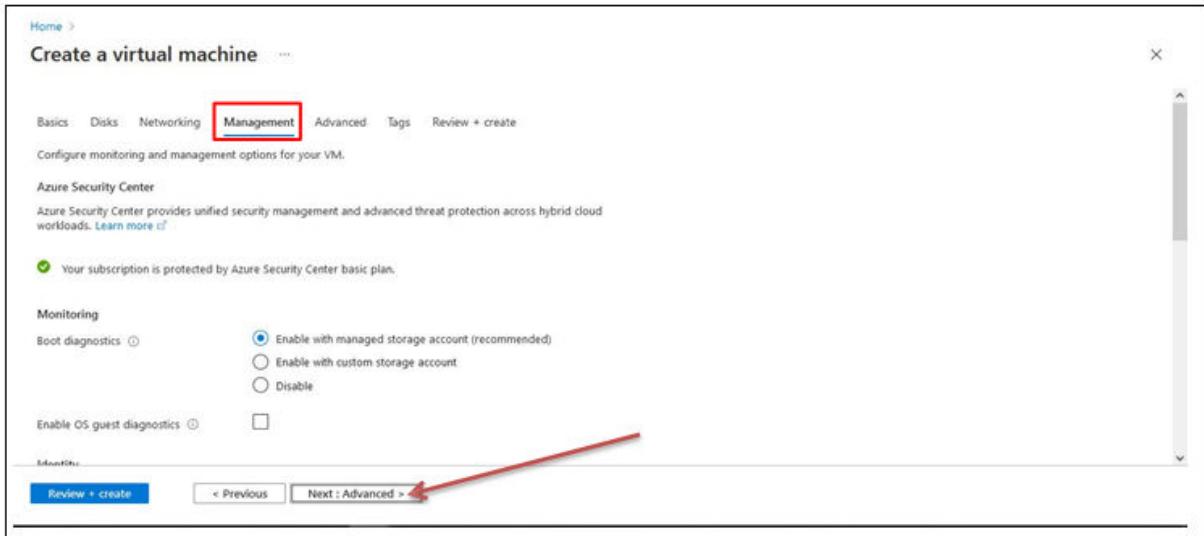
Your subscription is protected by Azure Security Center basic plan.

Monitoring

Boot diagnostics  Enable with managed storage account (recommended)  
 Enable with custom storage account  
 Disable

Enable OS guest diagnostics

[Review + create](#) < Previous **Next : Advanced >**



Home >  
**Create a virtual machine** ...

Basics Disks Networking Management **Advanced** Tags Review + create

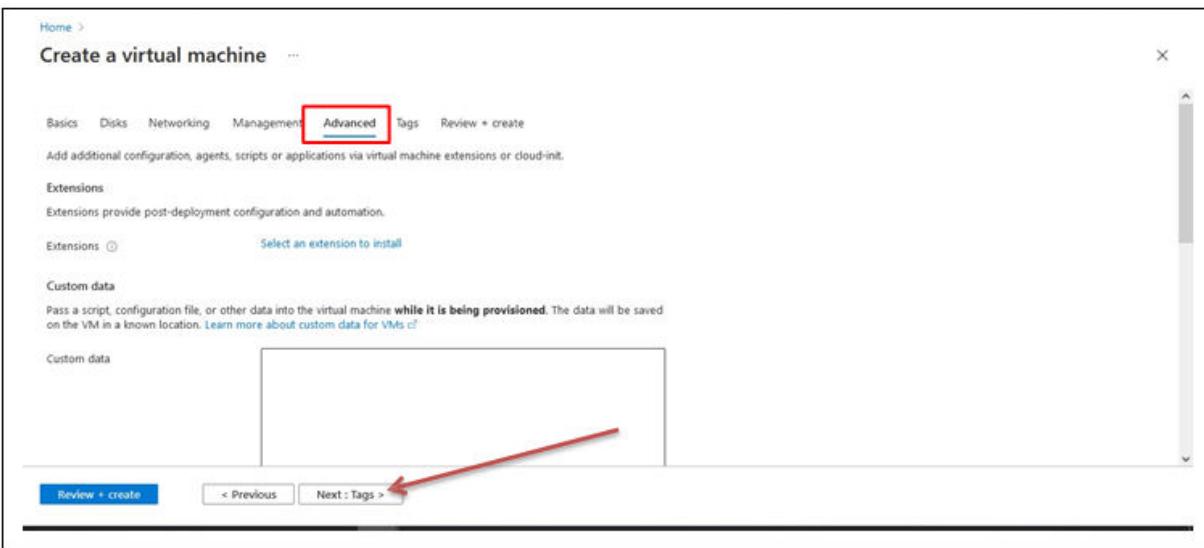
Add additional configuration, agents, scripts or applications via virtual machine extensions or cloud-init.

Extensions  
Extensions provide post-deployment configuration and automation.

Extensions  Select an extension to install

Custom data  
Pass a script, configuration file, or other data into the virtual machine **while it is being provisioned**. The data will be saved on the VM in a known location. [Learn more about custom data for VMs](#)

[Review + create](#) < Previous **Next : Tags >**



Home >  
**Create a virtual machine** ...

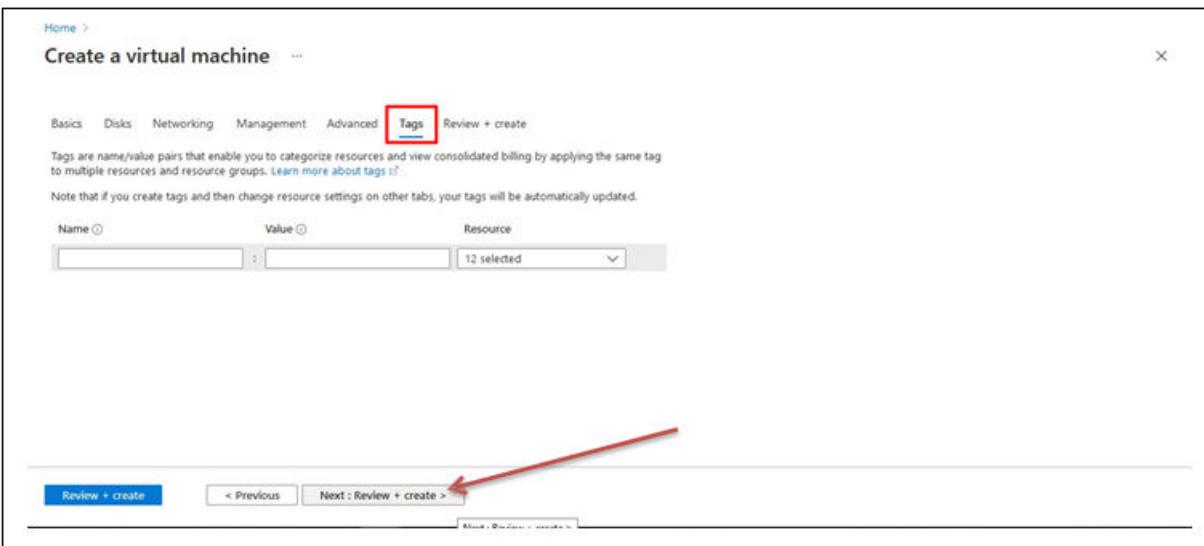
Basics Disks Networking Management Advanced **Tags** Review + create

Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. [Learn more about tags](#)

Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.

Name  Value  Resource

[Review + create](#) < Previous **Next : Review + create >**



Home > Create a virtual machine ...

Running final validation...

Basics Disks Networking Management Advanced Tags Review + create

**⚠ You have set RDP port(s) open to the internet. This is only recommended for testing. If you want to change this setting, go back to Basics tab.**

**Basics**

Subscription Concierge Subscription  
Resource group learn-a5c1d285-7cbc-4154-be5b-0618ab942988  
Virtual machine name PracticeWindowsOS  
Region West US  
Availability options No infrastructure redundancy required  
Image Windows 10 Pro, Version 20H2 - Gen2

Create < Previous Next > Download a template for automation

Home > Create a virtual machine ...

Validation passed

Basics Disks Networking Management Advanced Tags Review + create

**PRODUCT DETAILS**

Standard D2s v3 by Microsoft Subscription credits apply ⓘ  
0.1170 USD/hr Terms of use | Privacy policy Pricing for other VM sizes

**TERMS**

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the Azure Marketplace Terms for additional details.

Create < Previous Next > Download a template for automation

Home > Create a virtual machine ...

Initializing deployment...  
Initializing template deployment to resource group 'learn-a5c1d285-7cbc-4154-be5b-0618ab942988'.

Basics Disks Networking Management Advanced Tags Review + create

**PRODUCT DETAILS**

Standard D2s v3 by Microsoft Subscription credits apply ⓘ  
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**⚠ You have set RDP port(s) open to the internet. This is only recommended for testing. If you want to change this setting, go back to Basics tab.**

Create < Previous Next > Download a template for automation

Home > Create a virtual machine ...

Basics Disks Networking Management Advanced Tags Review + create

**PRODUCT DETAILS**

Standard D2s v3 by Microsoft Subscription credits apply 0.1170 USD/hr Terms of use | Privacy policy Wrong for other VM sizes.

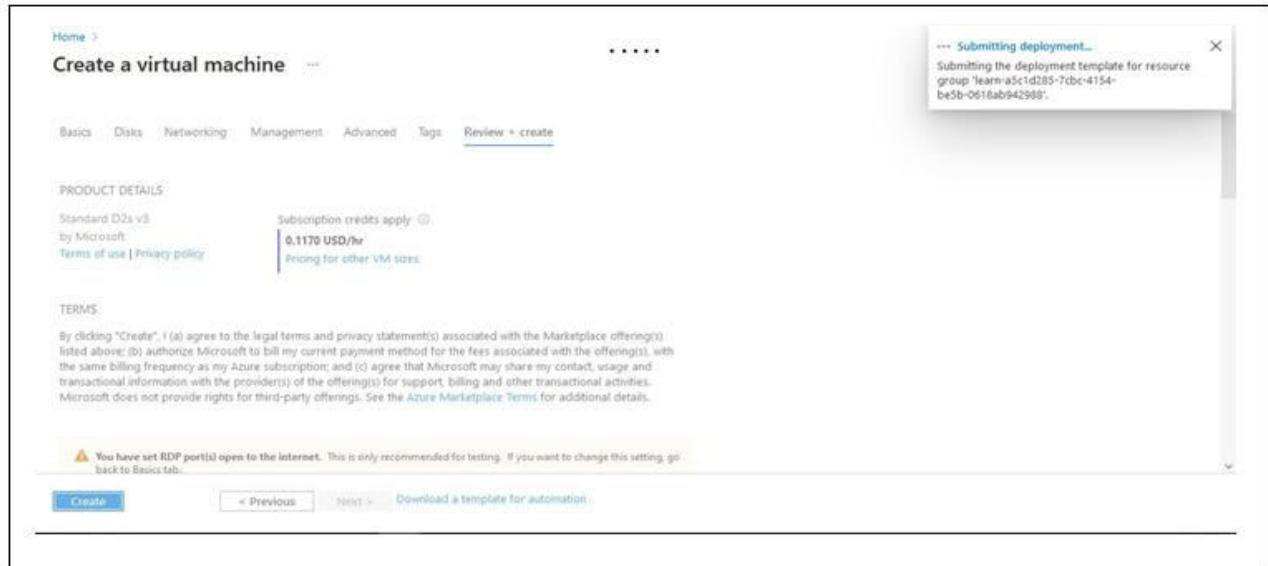
TERMS:

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the Azure Marketplace Terms for additional details.

**Warning:** You have set RDP port(s) open to the internet. This is only recommended for testing. If you want to change this setting, go back to Basics tab.

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... Submitting deployment...  
Submitting the deployment template for resource group 'learn-a5c1d285-7cbc-4154-be5b-0618ab942988'.



Home > CreateVm-MicrosoftWindowsDesktop.Windows-10-20h2--20211016200031 | Overview

Deployment

Search (Ctrl+ /) Delete Cancel Redeploy Refresh

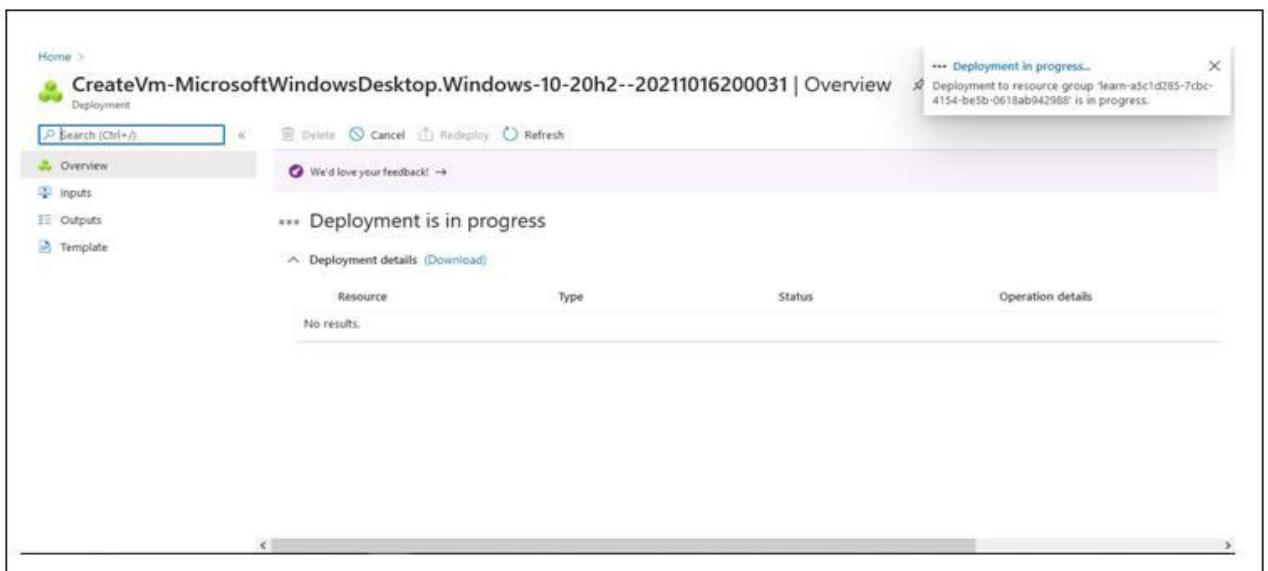
We'd love your feedback! →

\*\*\* Deployment is in progress

Deployment details (Download)

Resource	Type	Status	Operation details
No results.			

... Deployment in progress...  
Deployment to resource group 'learn-a5c1d285-7cbc-4154-be5b-0618ab942988' is in progress.



Home > CreateVm-MicrosoftWindowsDesktop.Windows-10-20h2--20211016200031 | Overview

Deployment

Search (Ctrl+ /) Delete Cancel Redeploy Refresh

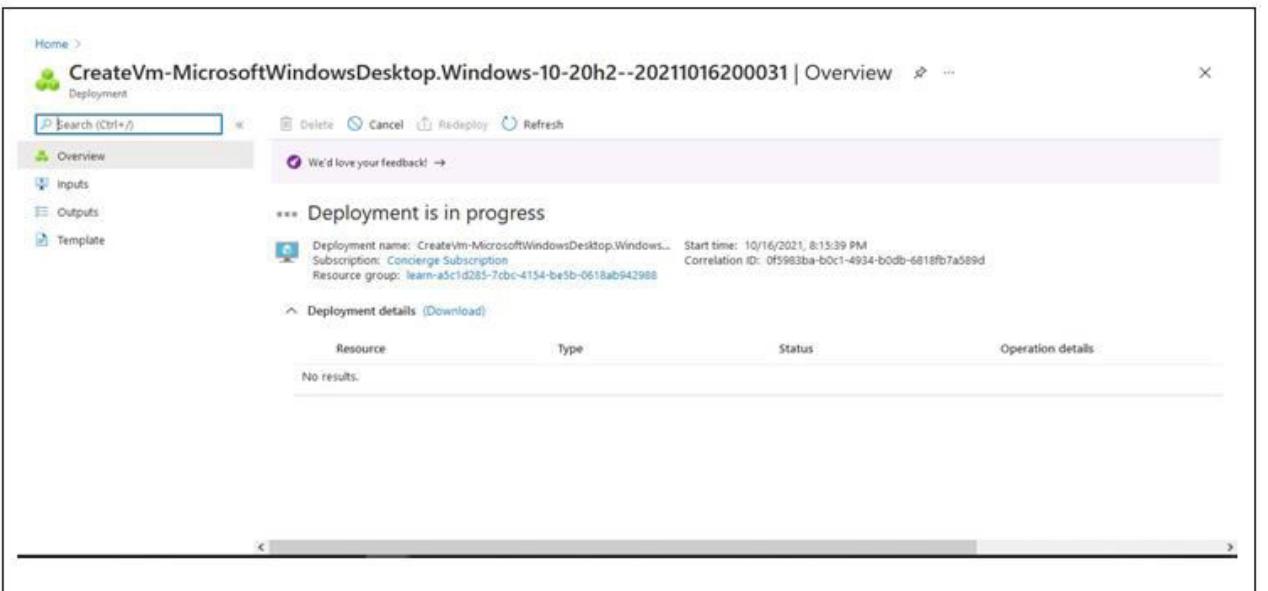
We'd love your feedback! →

\*\*\* Deployment is in progress

Deployment name: CreateVm-MicrosoftWindowsDesktop.Windows-10-20h2--20211016200031 Start time: 10/16/2021, 8:15:39 PM  
Subscription: Concierge Subscription Correlation ID: 0f5983ba-b0c1-4934-b0db-6818fb7a589d  
Resource group: learn-a5c1d285-7cbc-4154-be5b-0618ab942988

Deployment details (Download)

Resource	Type	Status	Operation details
No results.			



Home > CreateVm-MicrosoftWindowsDesktop.Windows-10-20h2--20211016200031 | Overview

Deployment

Search (Ctrl+ /)

Delete Cancel Redeploy Refresh

We'd love your feedback! →

Your deployment is complete

Deployment name: CreateVm-MicrosoftWindowsDesktop.Windows... Start time: 10/16/2021, 8:15:39 PM  
Subscription: Concierge Subscription Correlation ID: 0f5983ba-b0c1-4934-b0db-6818fb7...  
Resource group: learn-a5c1d285-7bc4-4154-be5b-0618ab942988.

Deployment details (Download)

Next steps

Setup auto-shutdown Recommended  
Monitor VM health, performance and network dependencies Recommended  
Run a script inside the virtual machine Recommended

Go to resource Create another VM

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PracticeWindowsOS Virtual machine

Search (Ctrl+ /)

Connect Start Restart Stop Capture Delete Refresh Open in mobile Feedback

PracticeWindowsOS virtual machine agent status is not ready. Troubleshoot the issue →

Essentials

Resource group (change) : learn-a5c1d285-7bc4-4154-be5b-0618ab942988 Operating system : Windows  
Status : Running Size : Standard D2s v3 (2 vcpus, 8 GiB memory)  
Location : West US Public IP address : 13.91.71.100  
Subscription (change) : Concierge Subscription Virtual network/subnet : learn-a5c1d285-7bc4-4154-be5b-0618ab942988-vnet/d...  
Subscription ID : fec12bf7-44d5-422e-806d-6e4e1d535050 DNS name : Not configured  
Tags (change) : Click here to add tags

Properties Monitoring Capabilities (7) Recommendations Tutorials

Virtual machine Networking

Computer name : PracticeWindows Health state : - Public IP address : 13.91.71.100  
Operating system : Windows Private IP address : 10.0.0.4  
Publisher : MicrosoftWindowsDesktop Private IP address (IPv6) : -

Home > CreateVm-MicrosoftWindowsDesktop.Windows-10-20h2--20211016200031 >

PracticeWindowsOS Virtual machine

Search (Ctrl+ /)

Connect Start Restart Stop Capture Delete Refresh Open in mobile Feedback

Machine agent status is not ready. Troubleshoot the issue →

RDP SSH

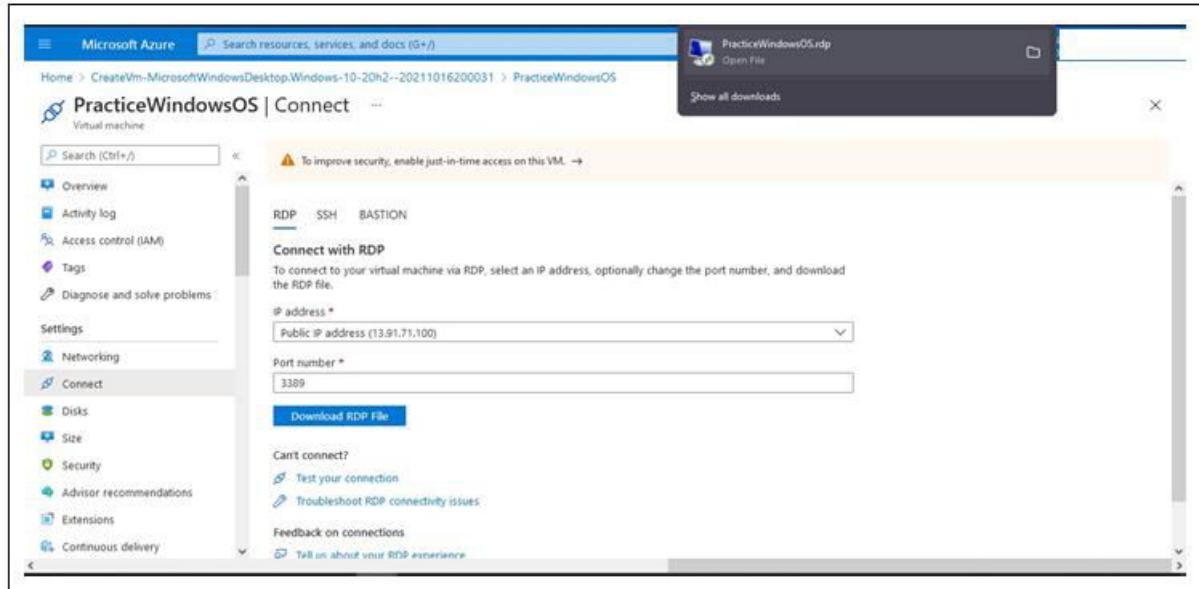
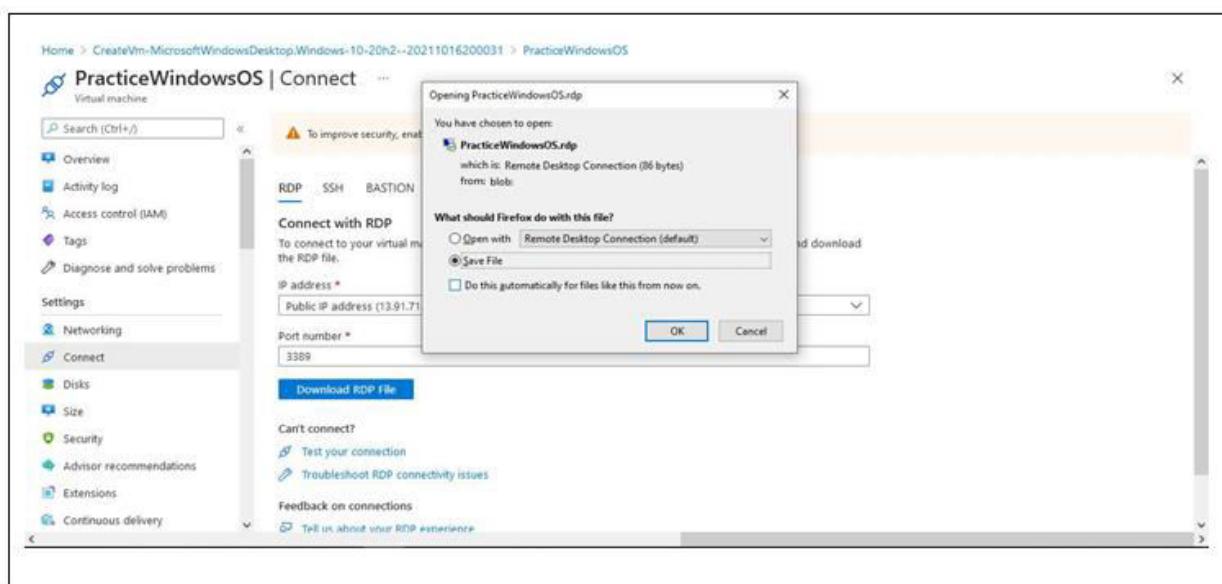
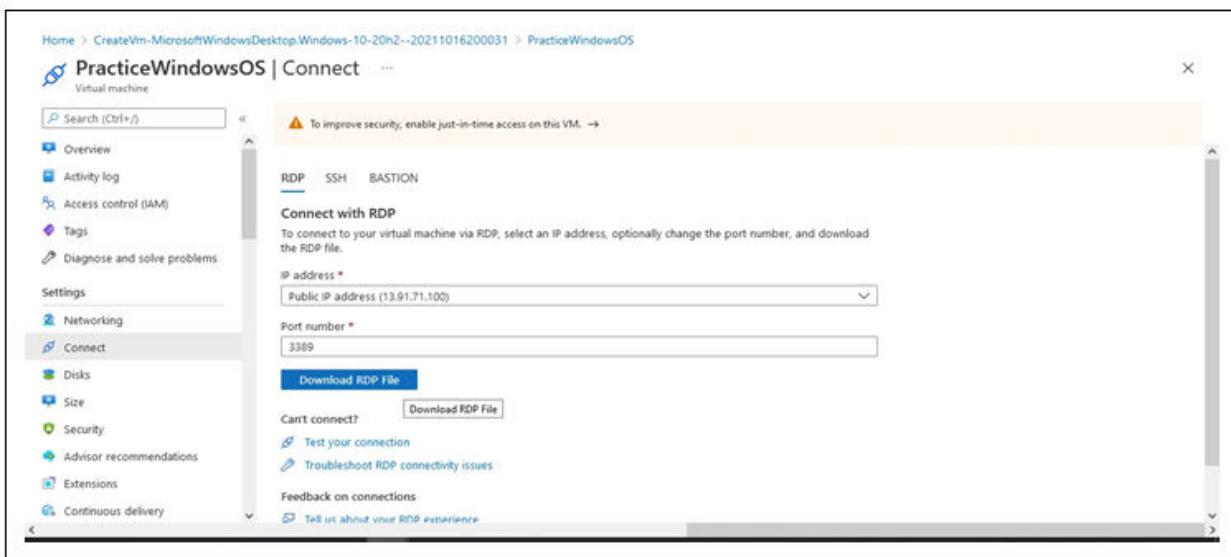
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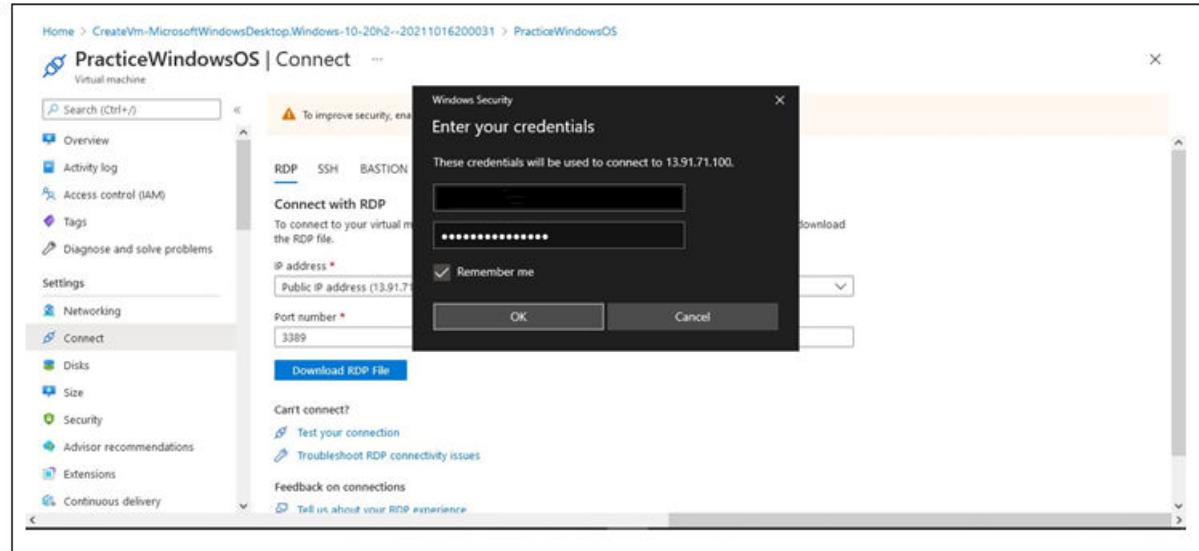
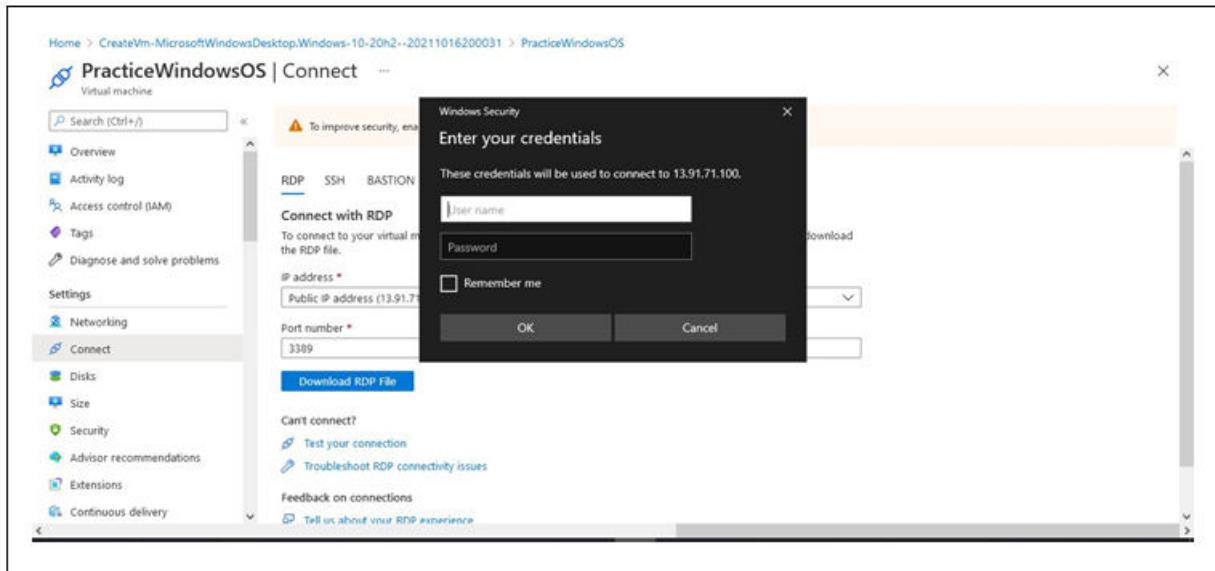
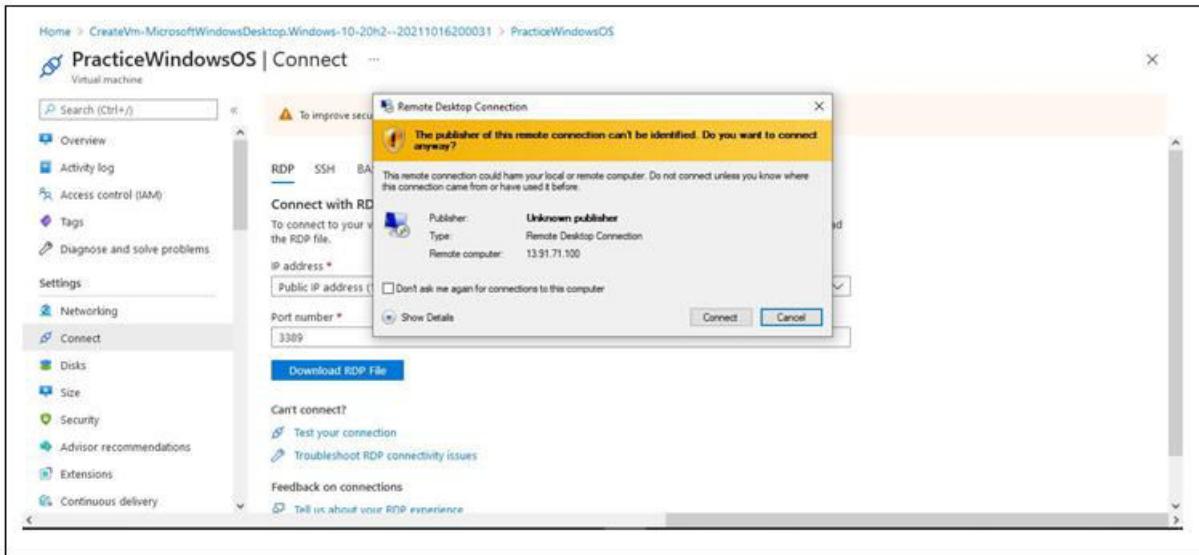
Status : Running Operating system : Windows  
Location : West US Size : Standard D2s v3 (2 vcpus, 8 GiB memory)  
Subscription (change) : Concierge Subscription Public IP address : 13.91.71.100  
Subscription ID : fec12bf7-44d5-422e-806d-6e4e1d535050 Virtual network/subnet : learn-a5c1d285-7bc4-4154-be5b-0618ab942988-vnet/d...  
Tags (change) : Click here to add tags DNS name : Not configured

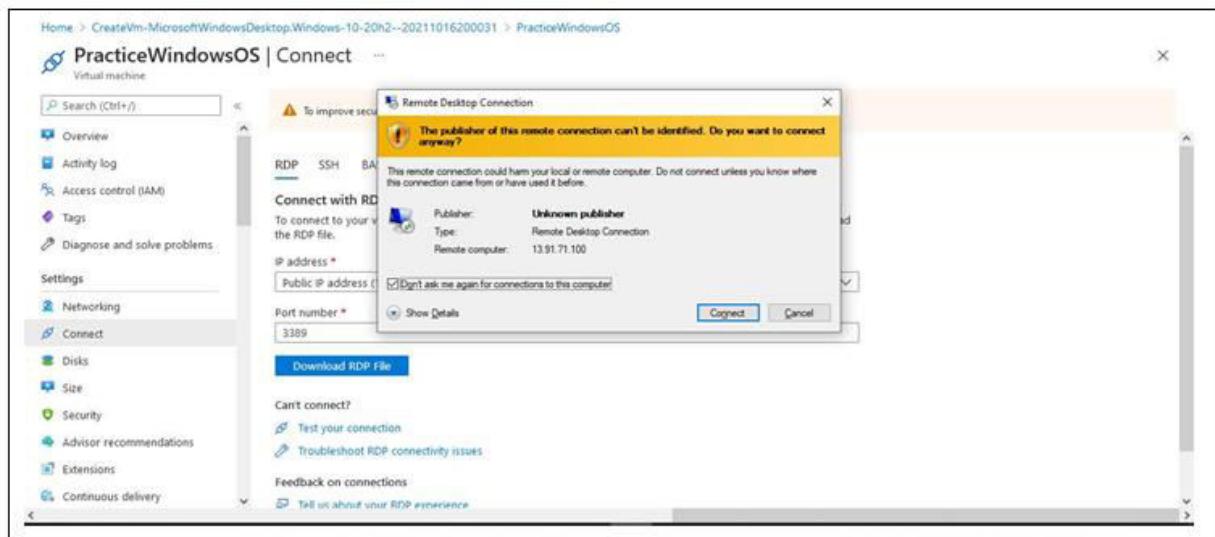
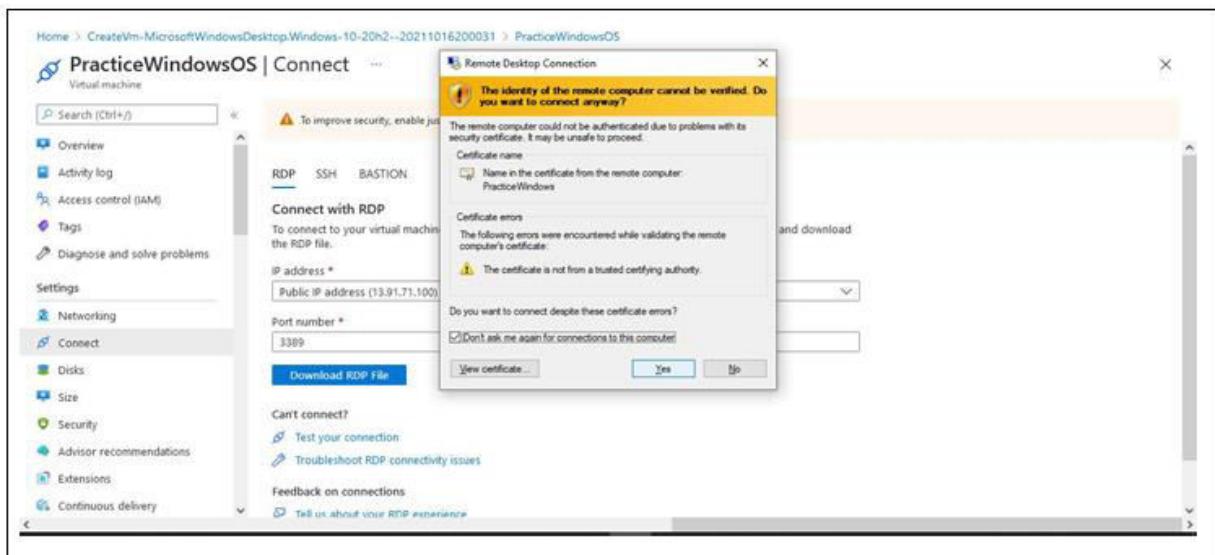
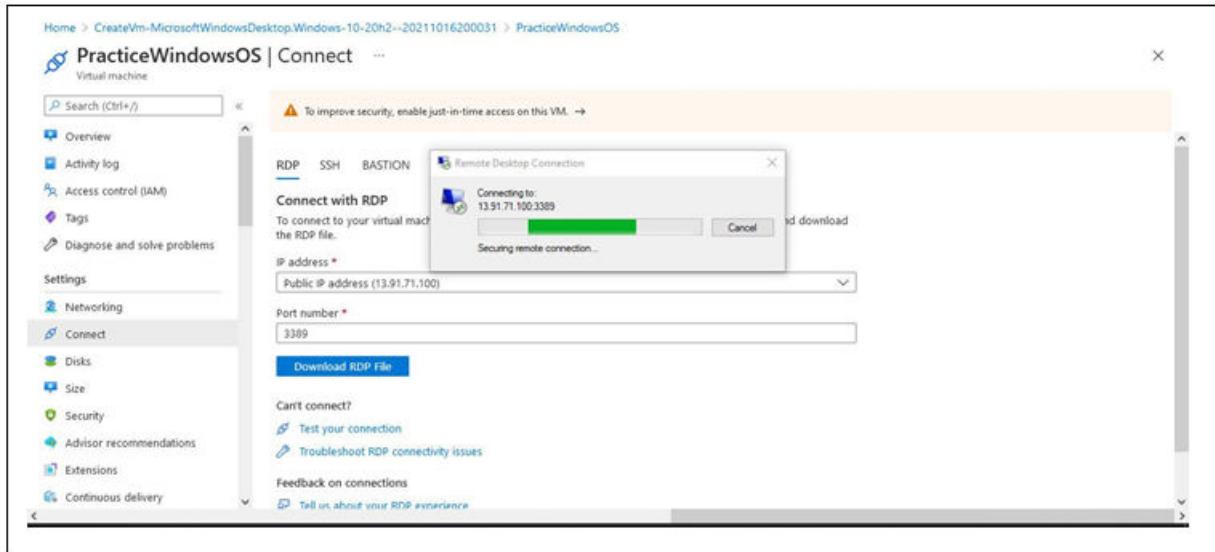
Properties Monitoring Capabilities (7) Recommendations Tutorials

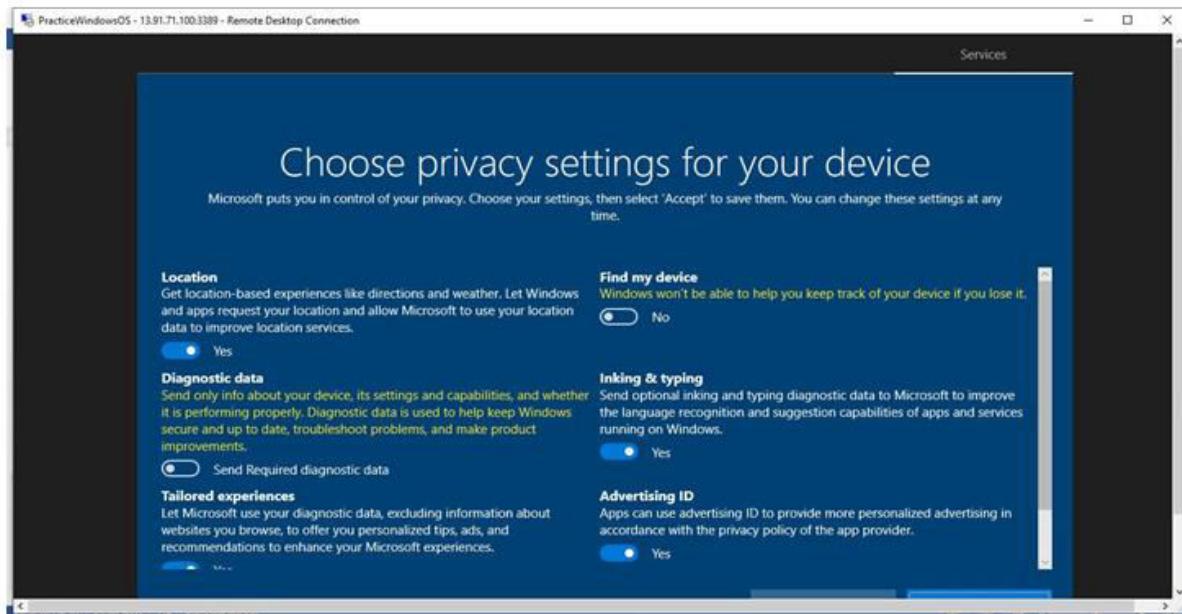
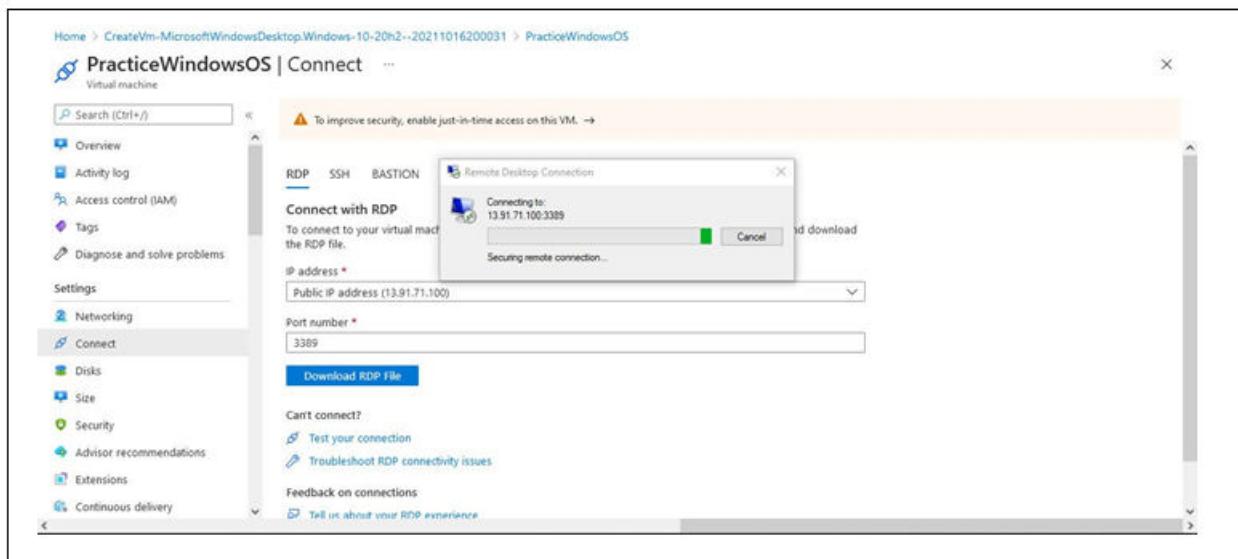
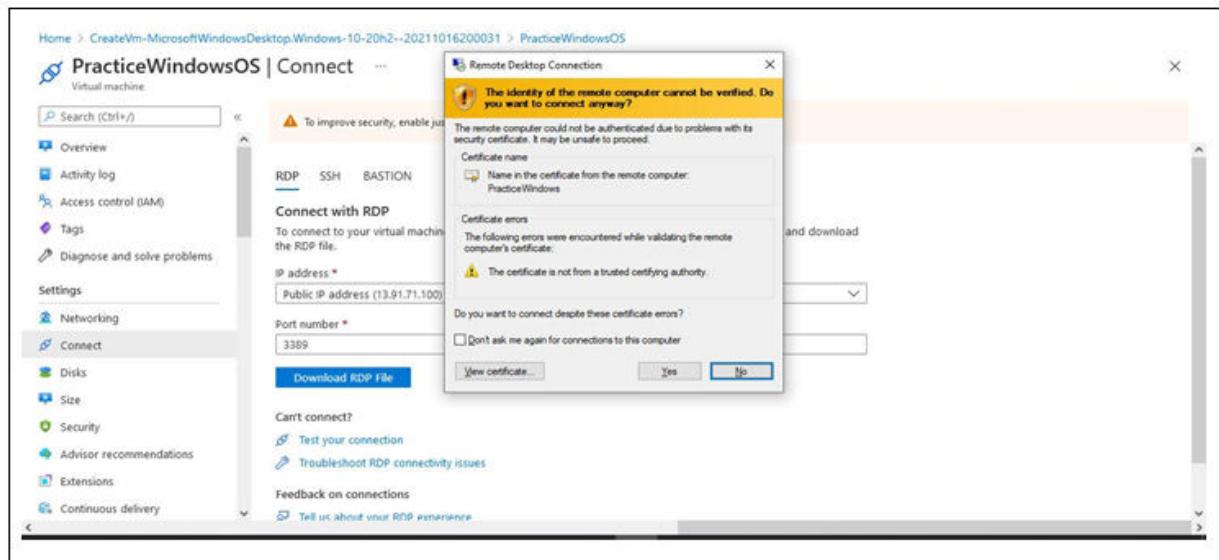
Virtual machine Networking

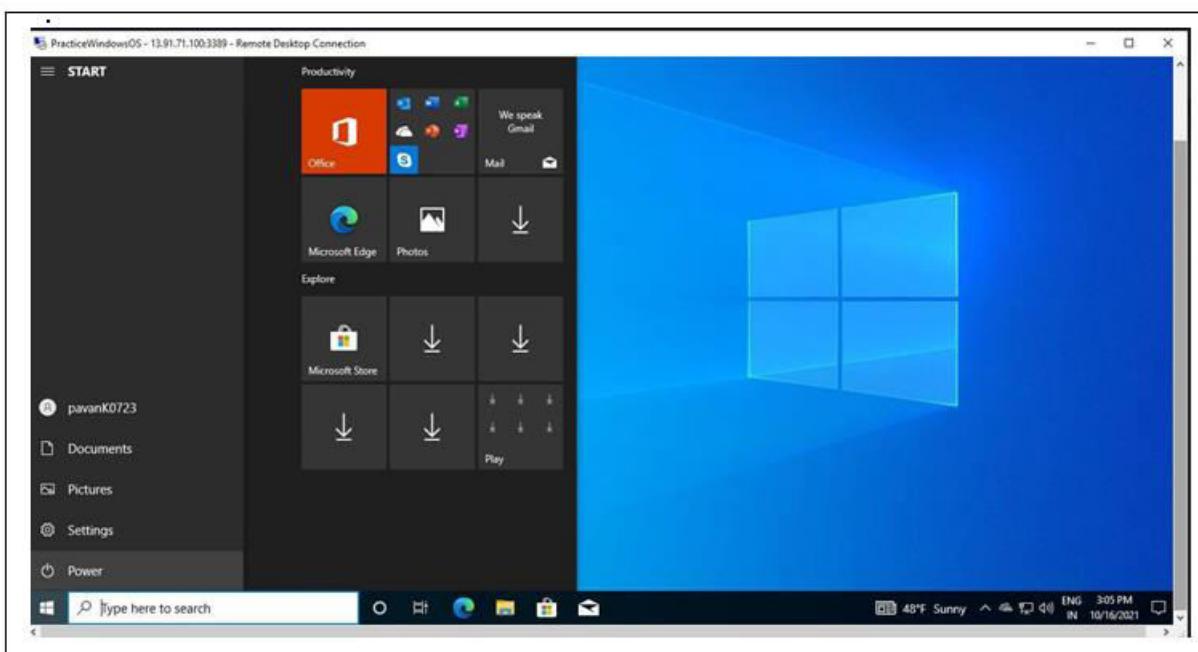
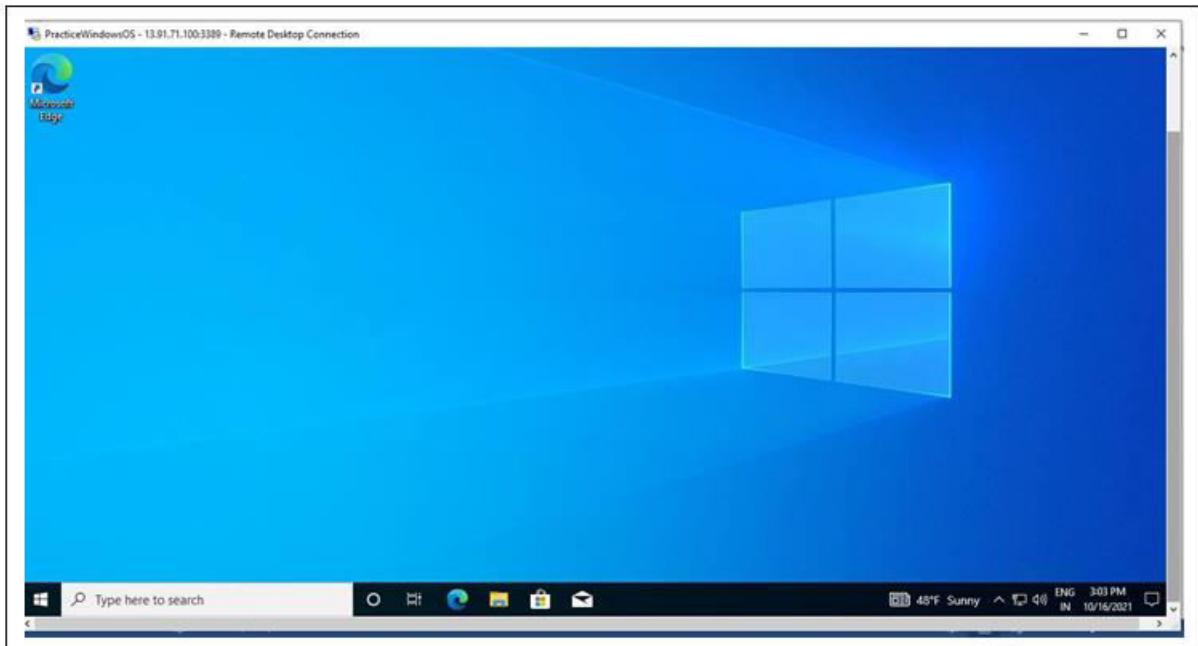
Computer name : PracticeWindows Health state : - Public IP address : 13.91.71.100  
Operating system : Windows Private IP address : 10.0.0.4  
Publisher : MicrosoftWindowsDesktop Private IP address (IPv6) : -

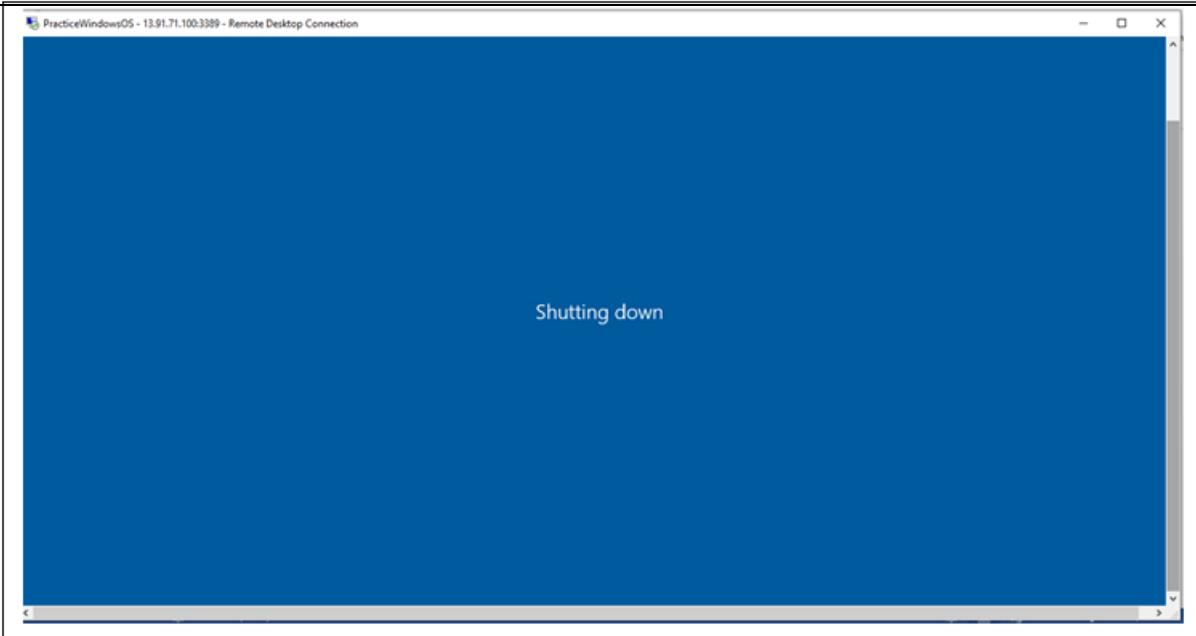












Home >

## PracticeWindowsOS

Virtual machine

Search (Ctrl+)

Connect Start Restart Stop Capture Delete Refresh Open in mobile Feedback

Overview

Activity log Access control (IAM) Tags Diagnose and solve problems

Resource group (change) : learn-a5c1d285-7cbc-4154-be5b-0618ab942988

Status : Starting

Location : West US

Subscription (change) : Concierge Subscription

Subscription ID : fec12bf7-44d5-422e-806d-6e4e1d335050

Tags (change) : Click here to add tags

Operating system : Windows

Size : Standard D2s v3 (2 vcpus, 8 GiB memory)

Public IP address : 13.91.71.100

Virtual network/subnet : learn-a5c1d285-7cbc-4154-be5b-0618ab942988-vnet/default

DNS name : Not configured

Properties Monitoring Capabilities (7) Recommendations Tutorials

Virtual machine

Computer name	PracticeWindows
Health state	-
Operating system	Windows
Publisher	MicrosoftWindowsDesktop
Offer	Windows-10
Plan	20h2-pro-g2
v2 generation	V2

Networking

Public IP address	13.91.71.100
Public IP address (IPv6)	-
Private IP address	10.0.0.4
Private IP address (IPv6)	-
Virtual network/subnet	learn-a5c1d285-7cbc-4154-be5b-0618ab942988-vnet/default
DNS name	Configure

U: 0.00 kbytes D: 0.00 kbytes 20:38 16-10-2021