



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

DEPARTMENT OF INFORMATION TECHNOLOGY

2020 - 2021

M.Sc.(I.T.) SEM I

Cloud Computing

Name: SHREYANS UPADHYAY

Roll No.: 18



Hindi Vidya Prachar Samiti's

**RAMNIRANJAN
JHUNJHUNWALA COLLEGE
(AUTONOMOUS)**

Opposite Ghatkopar Railway Station, Ghatkopar West, Mumbai-400086



CERTIFICATE

This is to certify that Mr. **Upadhyay Shreyans Indresh** with Roll No. **18** has successfully completed the necessary course of experiments in the subject of **Cloud Computing** during the academic year **2020 – 2021** complying with the requirements of **RAMNIRANJAN JHUNJHUNWALA COLLEGE OF ARTS, SCIENCE AND COMMERCE**, for the course of **M.Sc. (IT) semester -I.**

Internal Examiner

External Examiner

Head of Department

College Seal

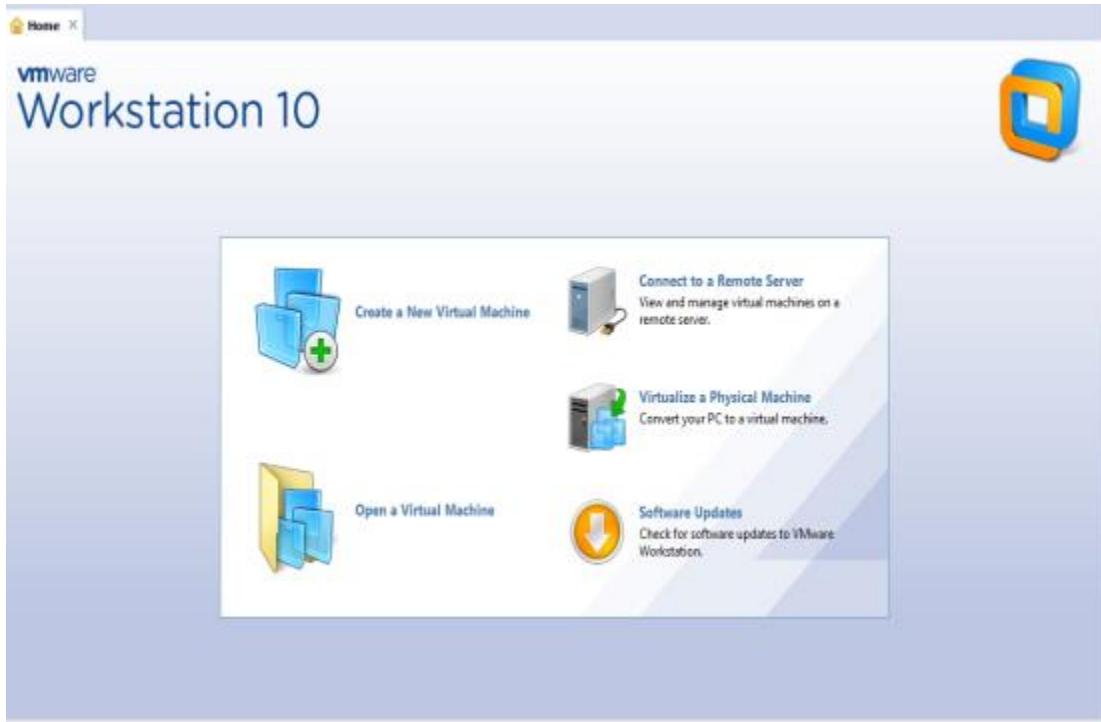
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3.	Implement private cloud with XenServer	
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5.	Implement ESXi Server	
6.	Native Virtualization using HyperV	
7.	Implement Open Nabula	
8.	Implement Web Services	

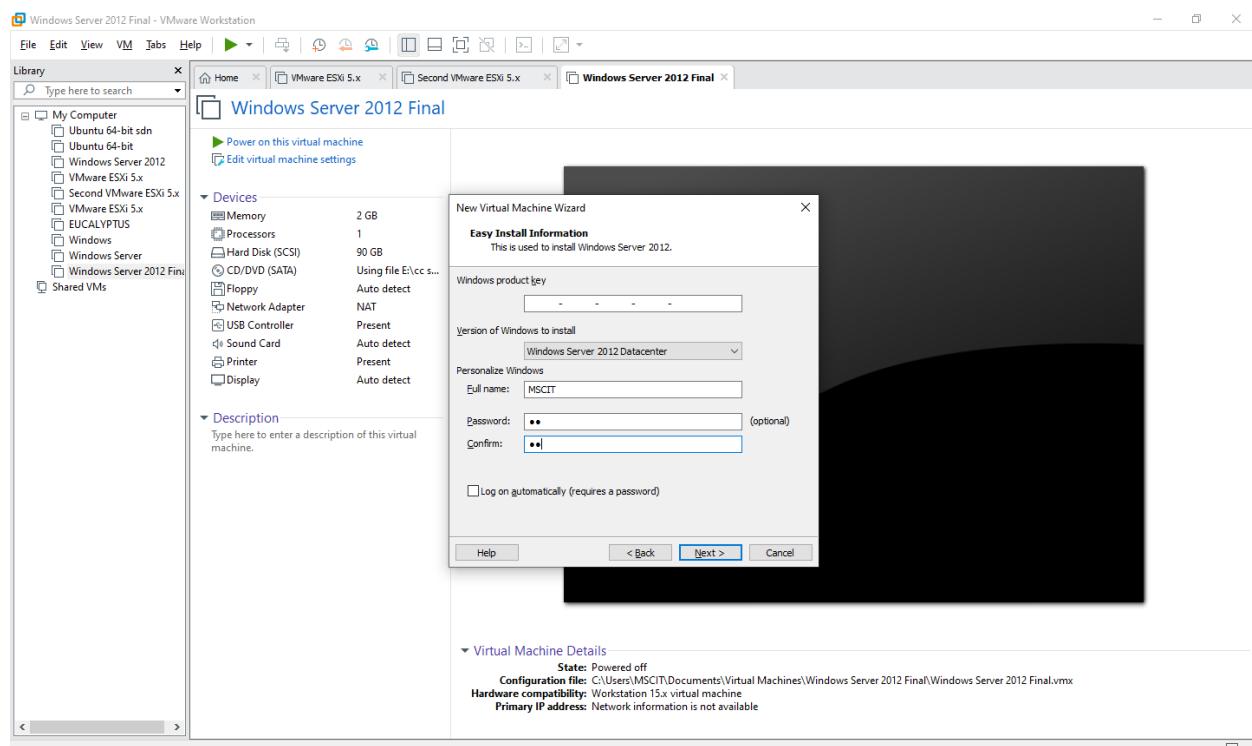
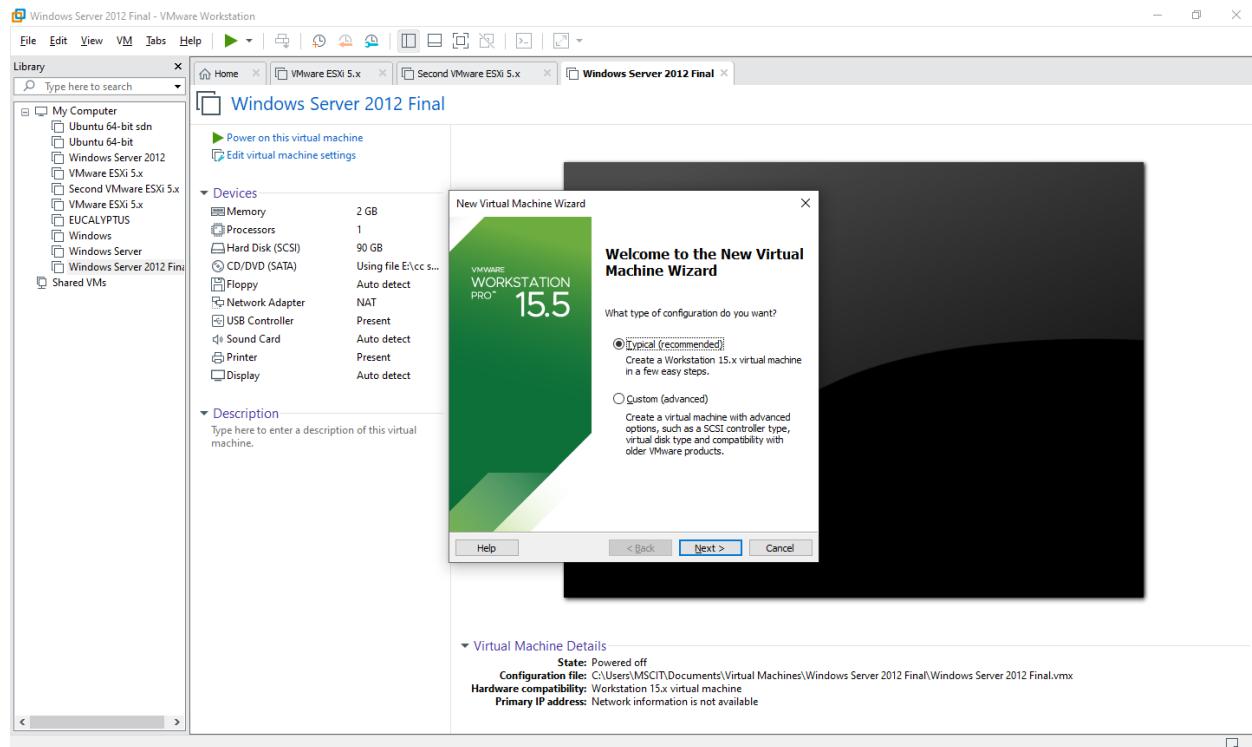
Practical No 1.

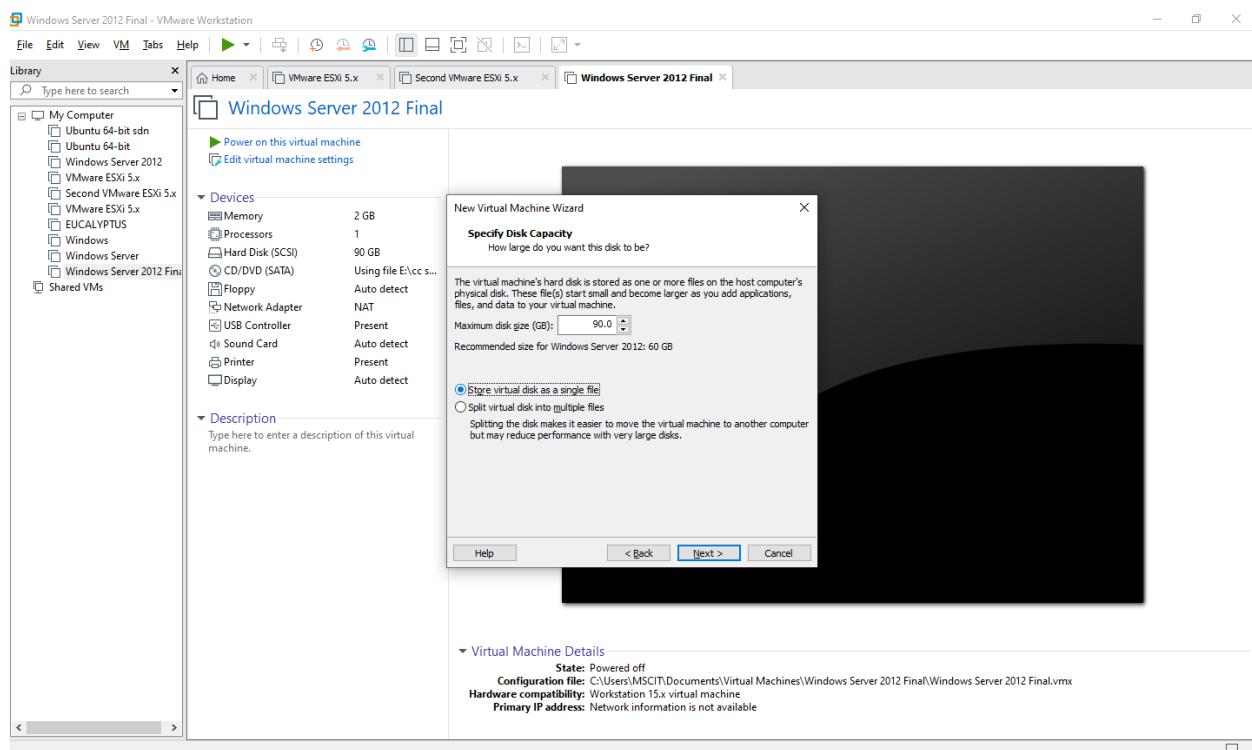
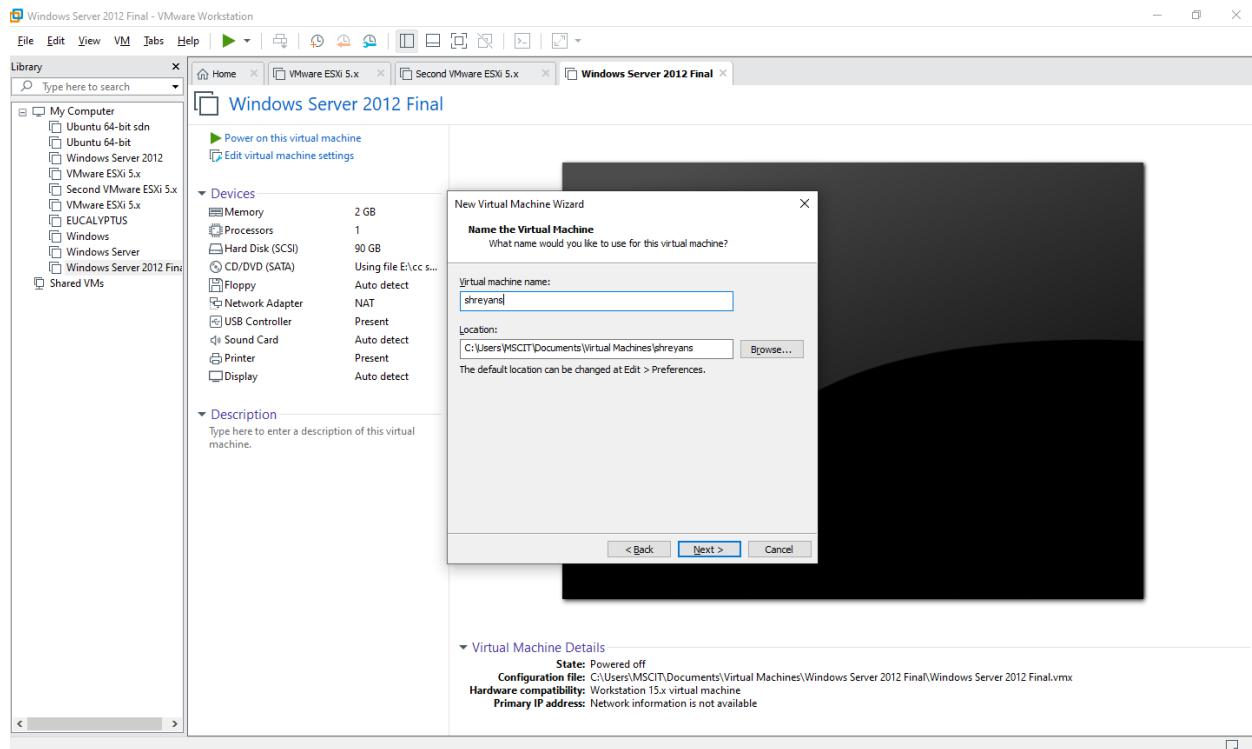
Implement Cluster on Windows

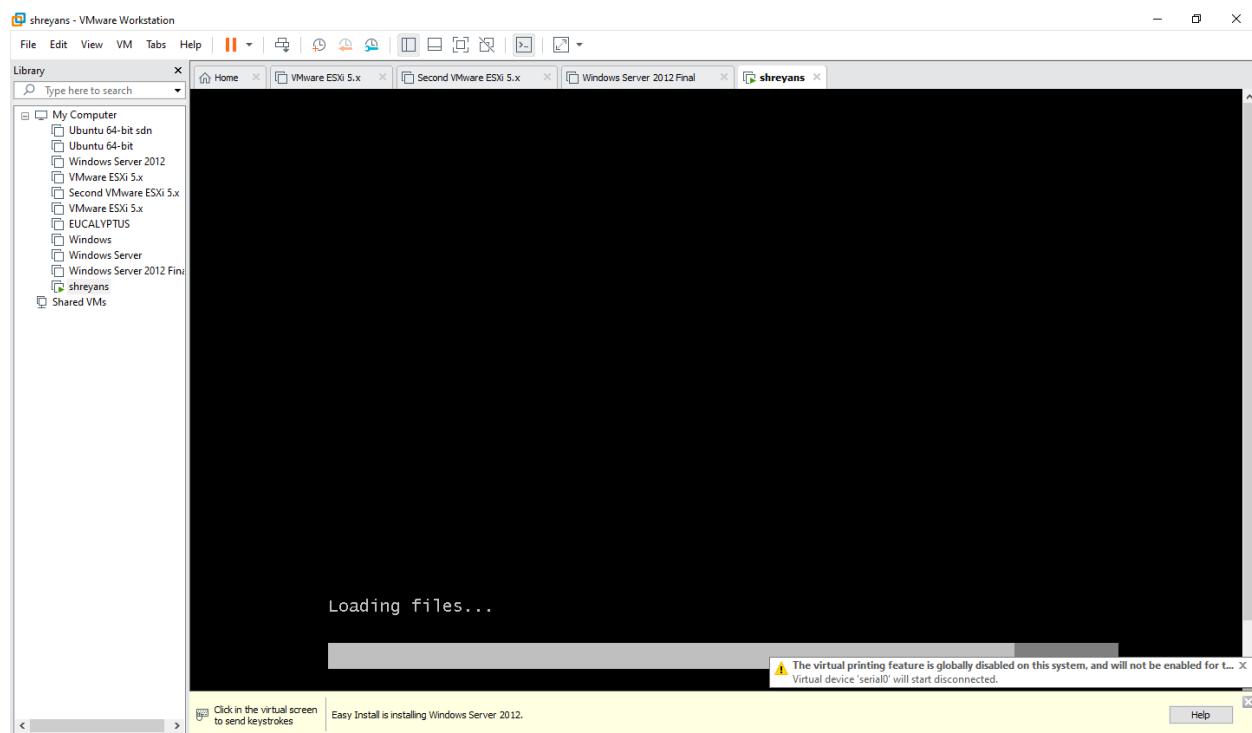
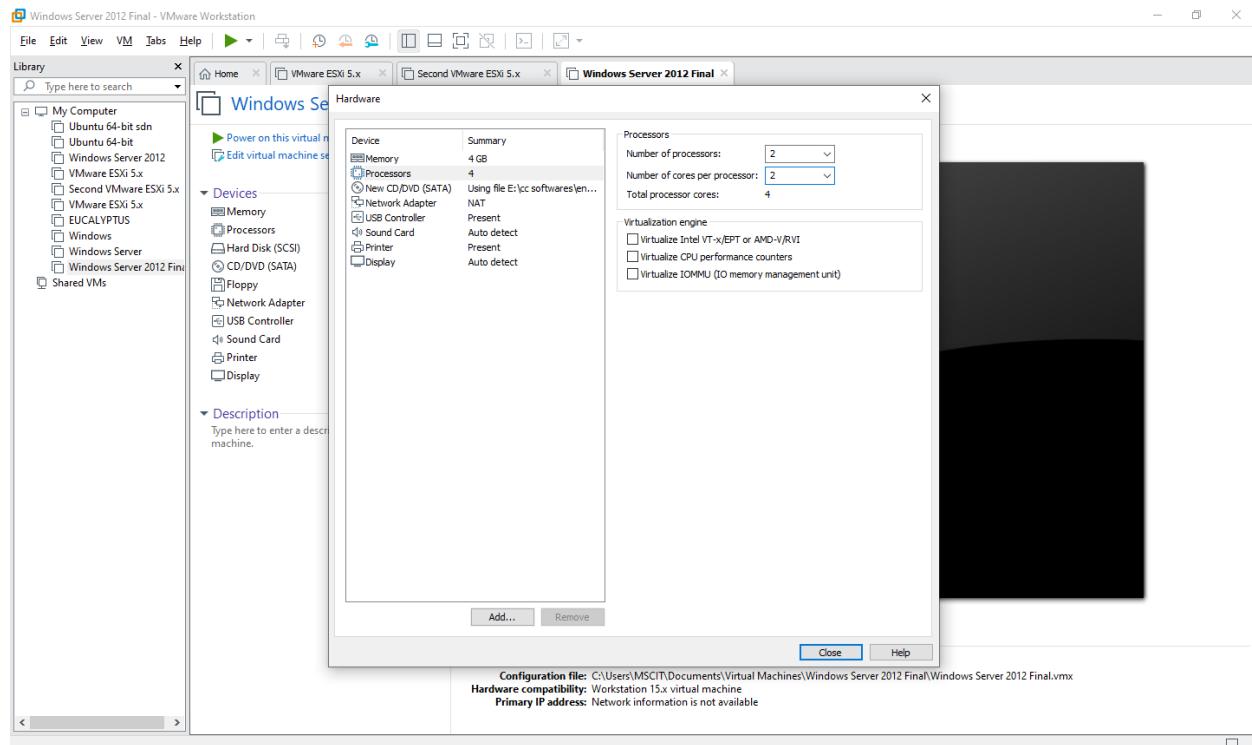
Install the VMWare Workstation. The Home page of VMWare Workstation looks like the picture below. To create a new Virtual Machine click on “Create a New Virtual Machine”.

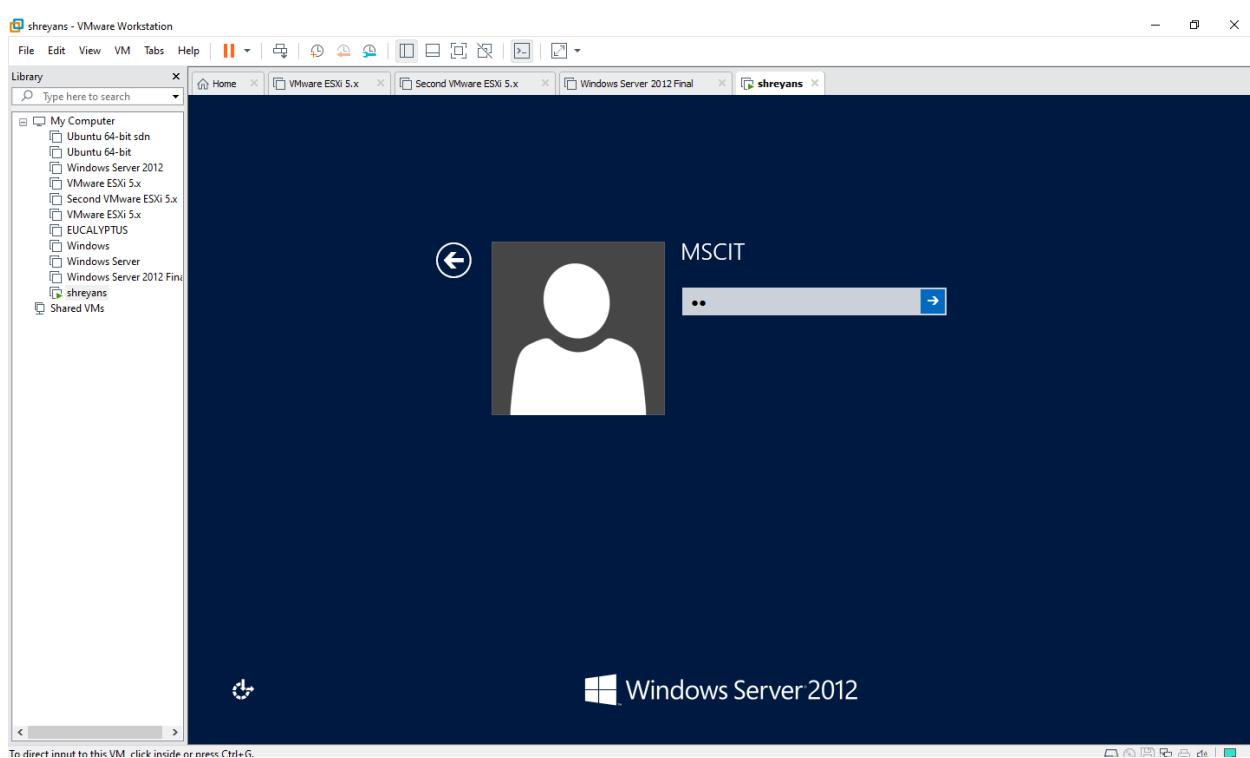
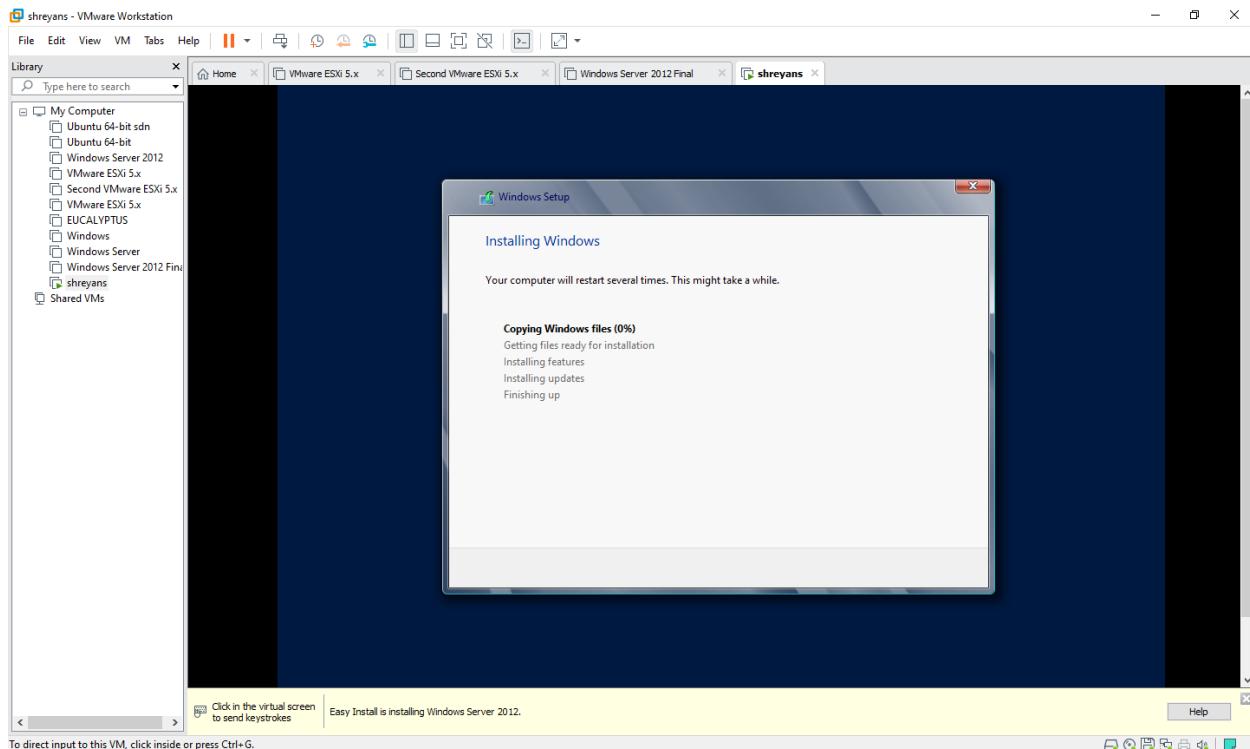


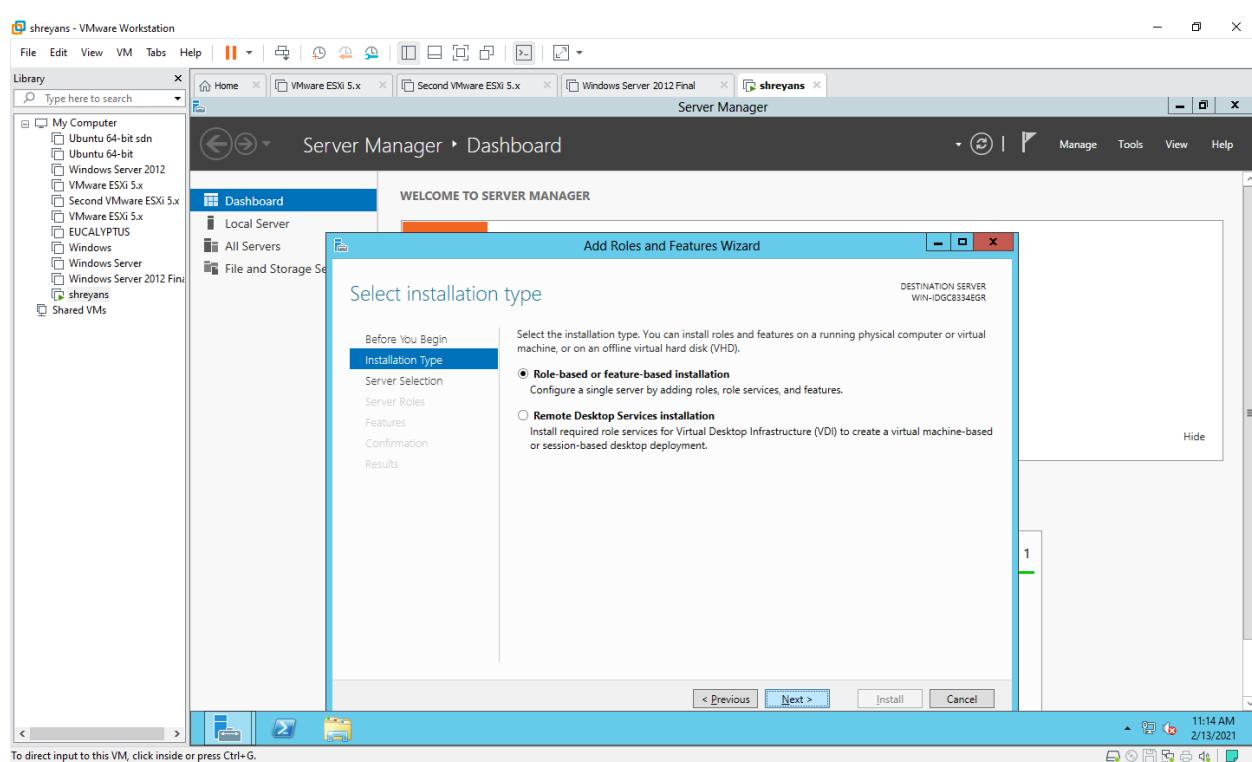
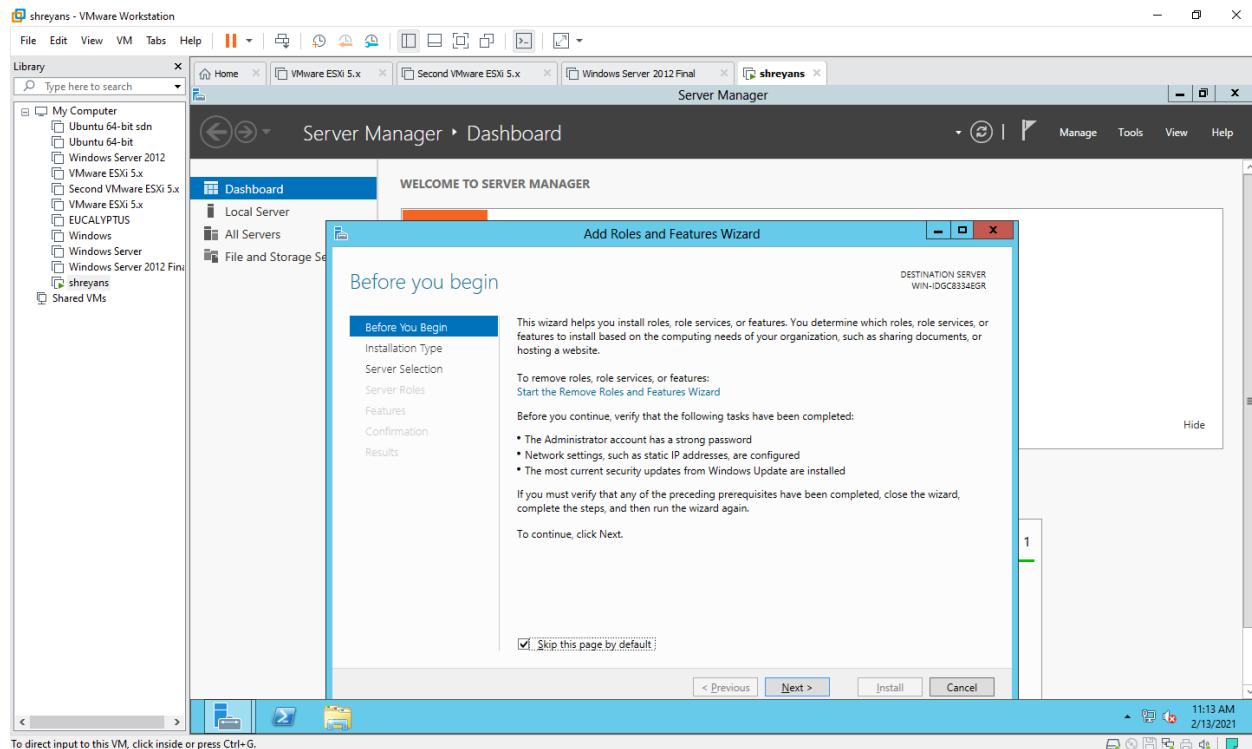
In the “New Virtual Machine Wizard” select the “Typical” option. And click on “Next” button.

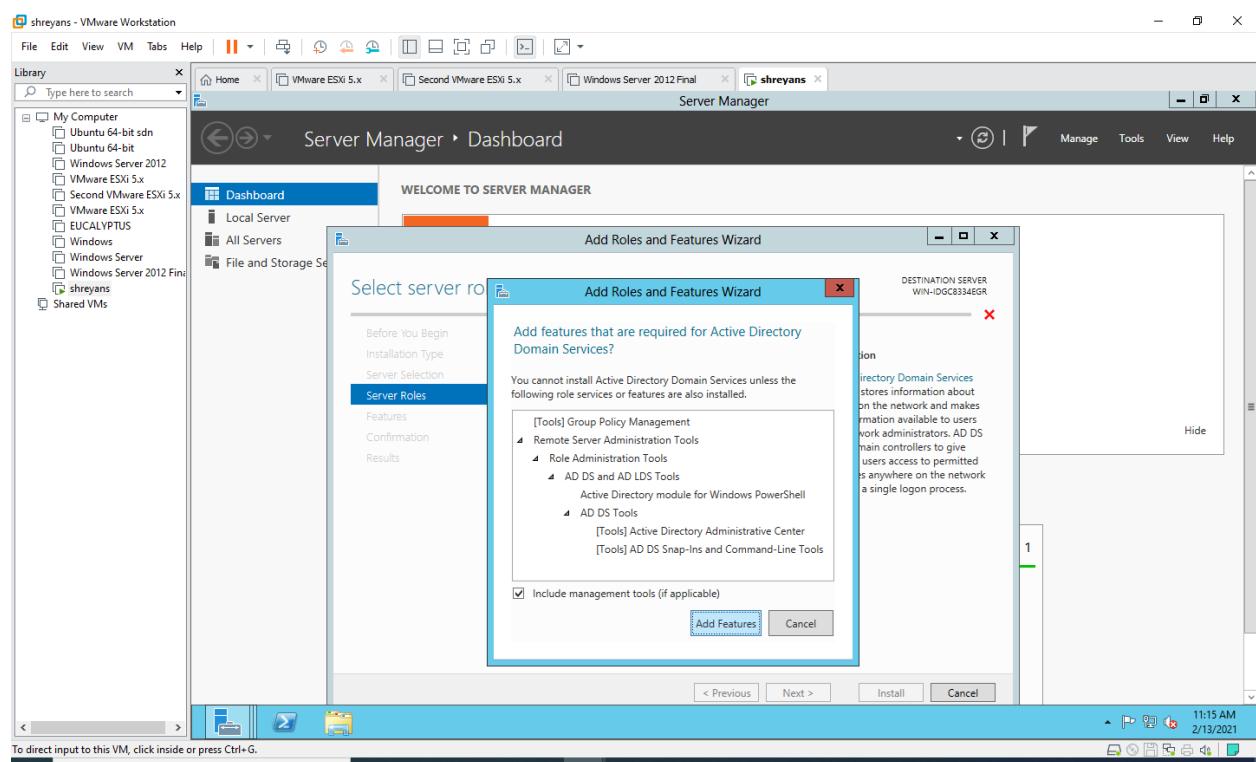
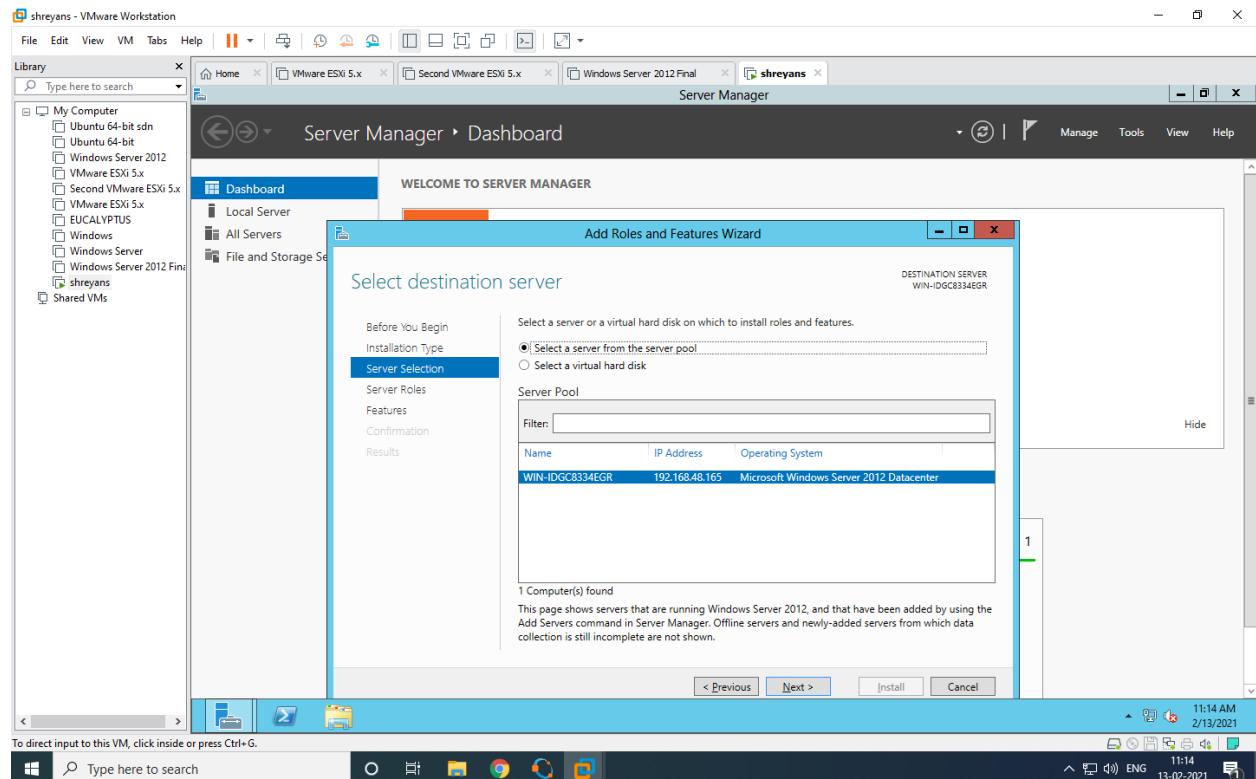


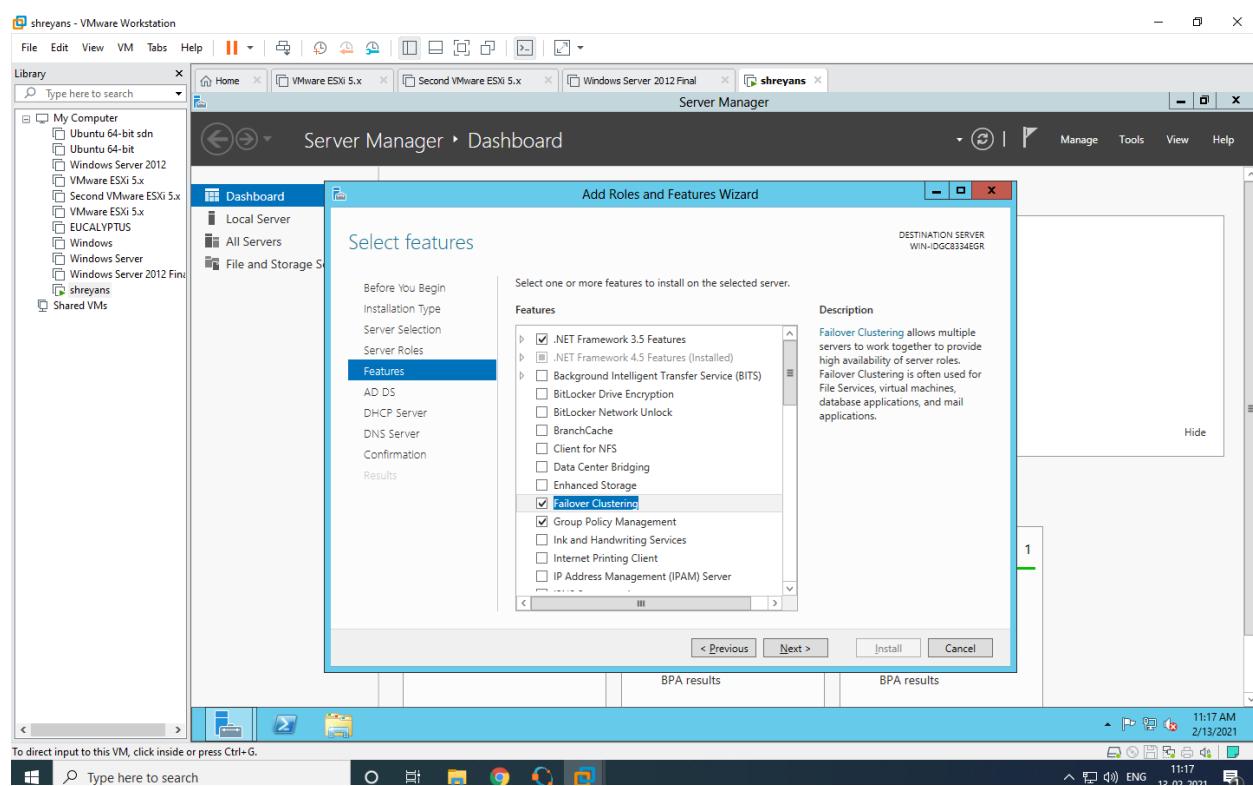
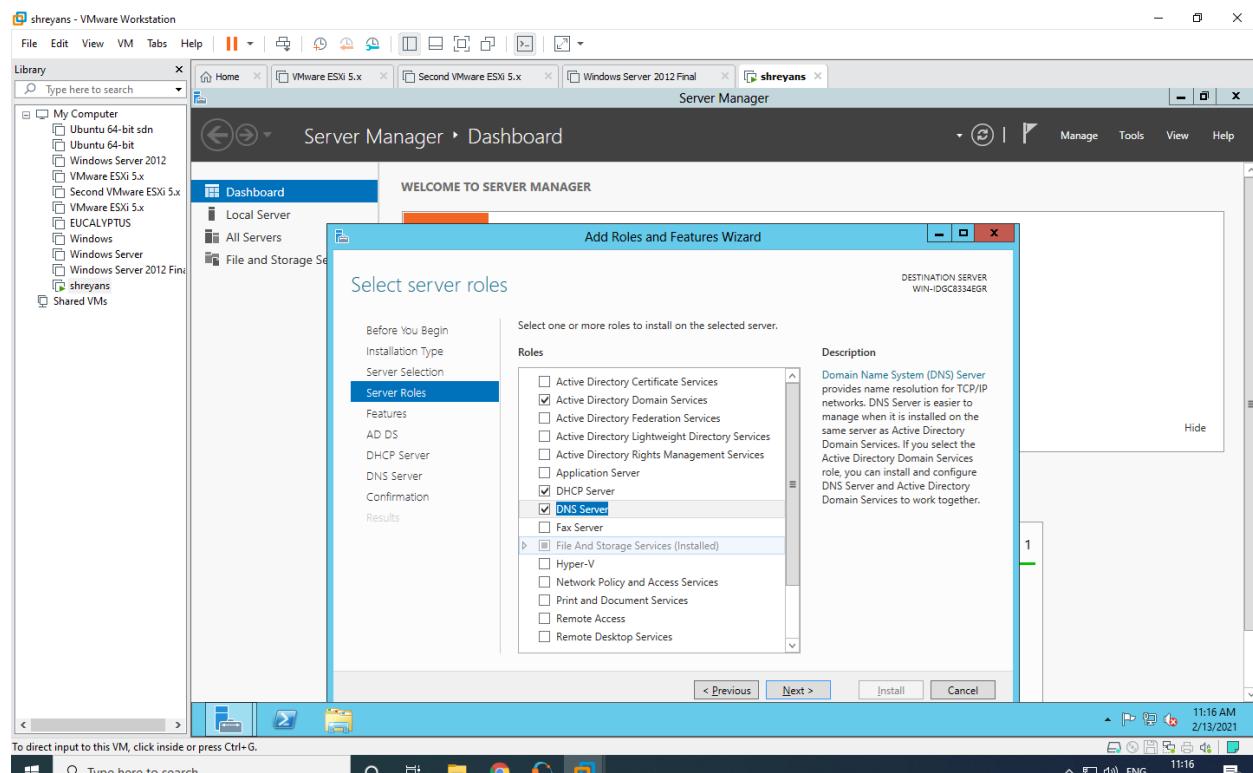


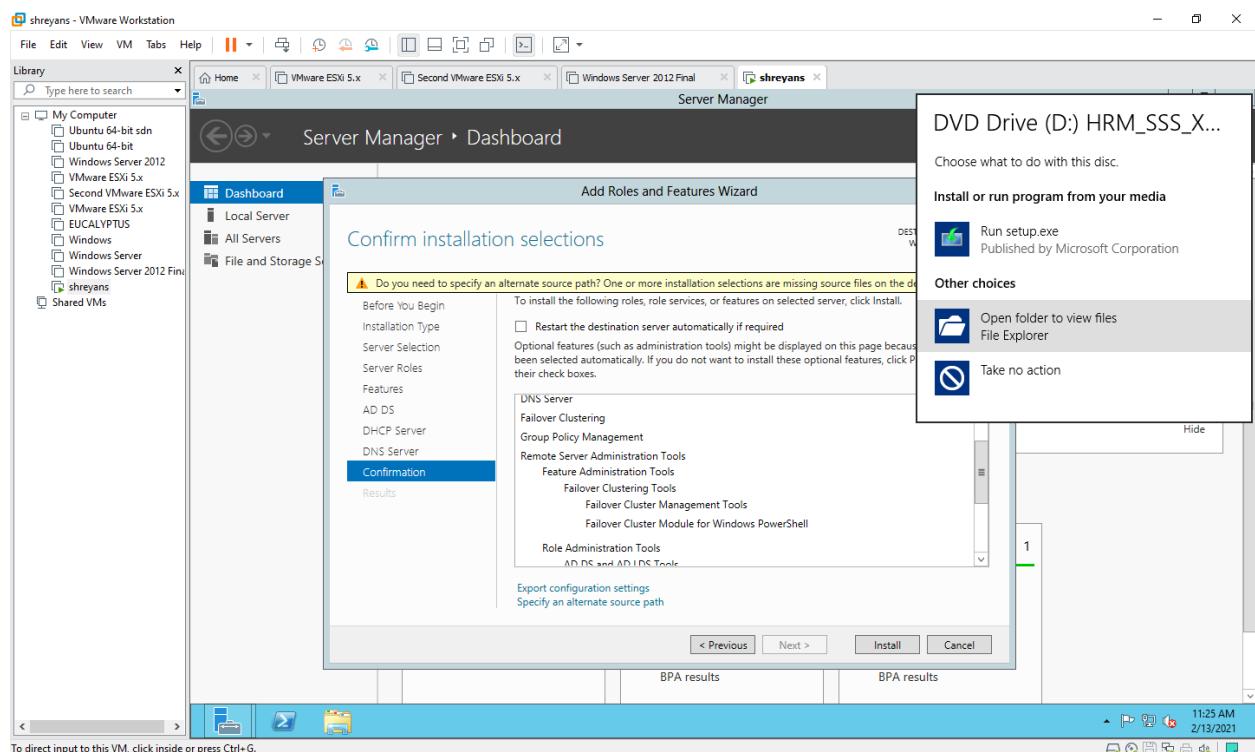
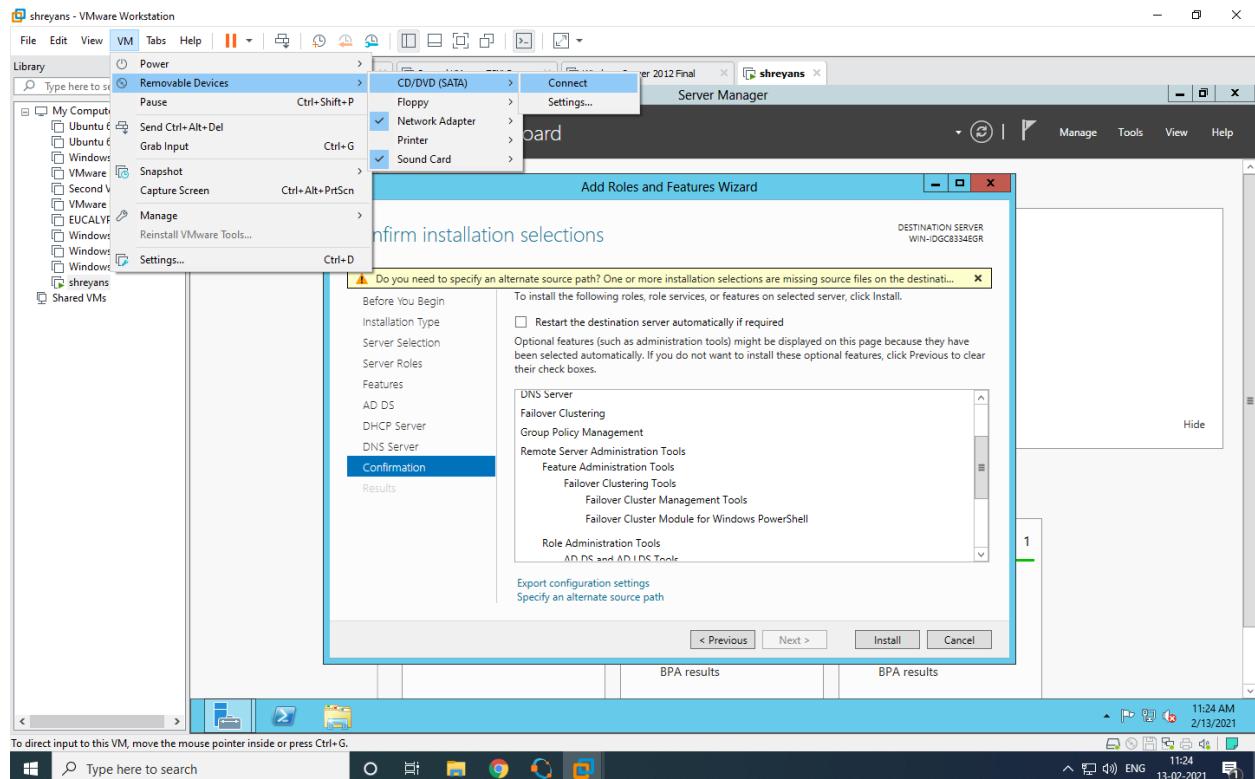


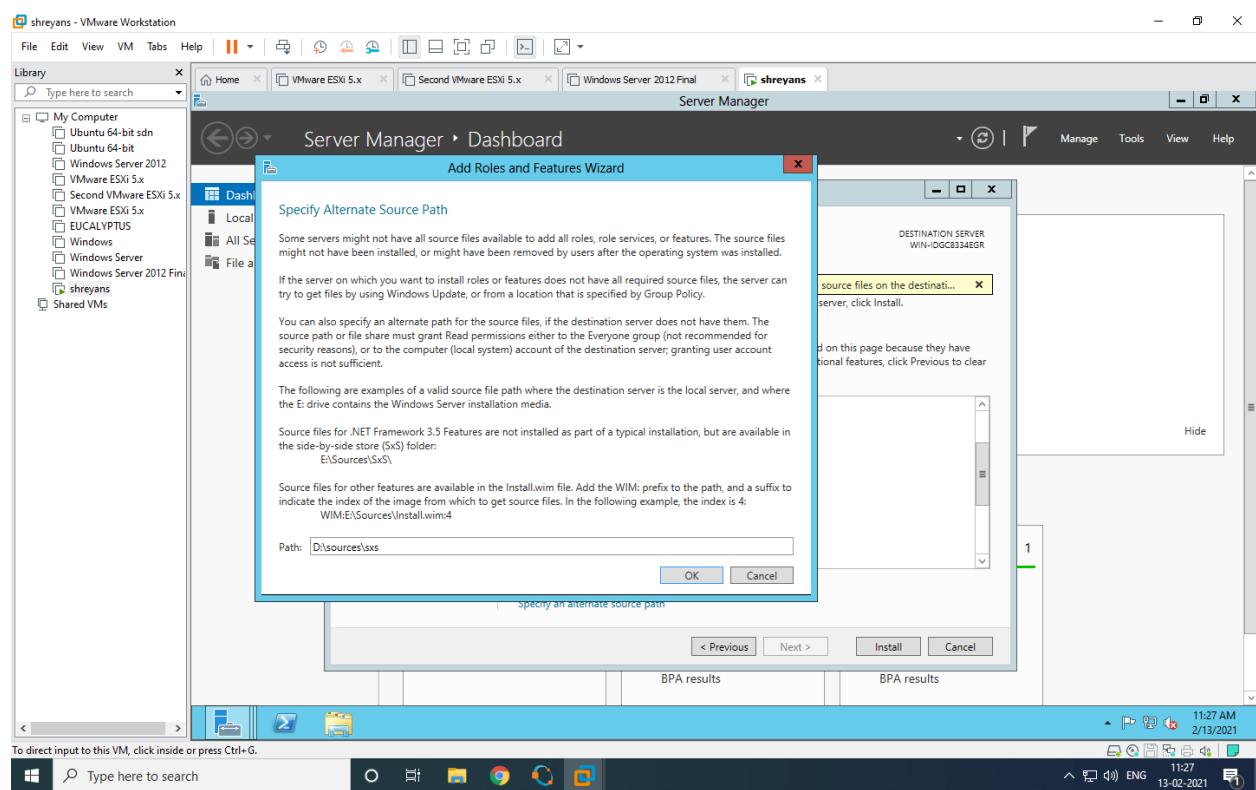
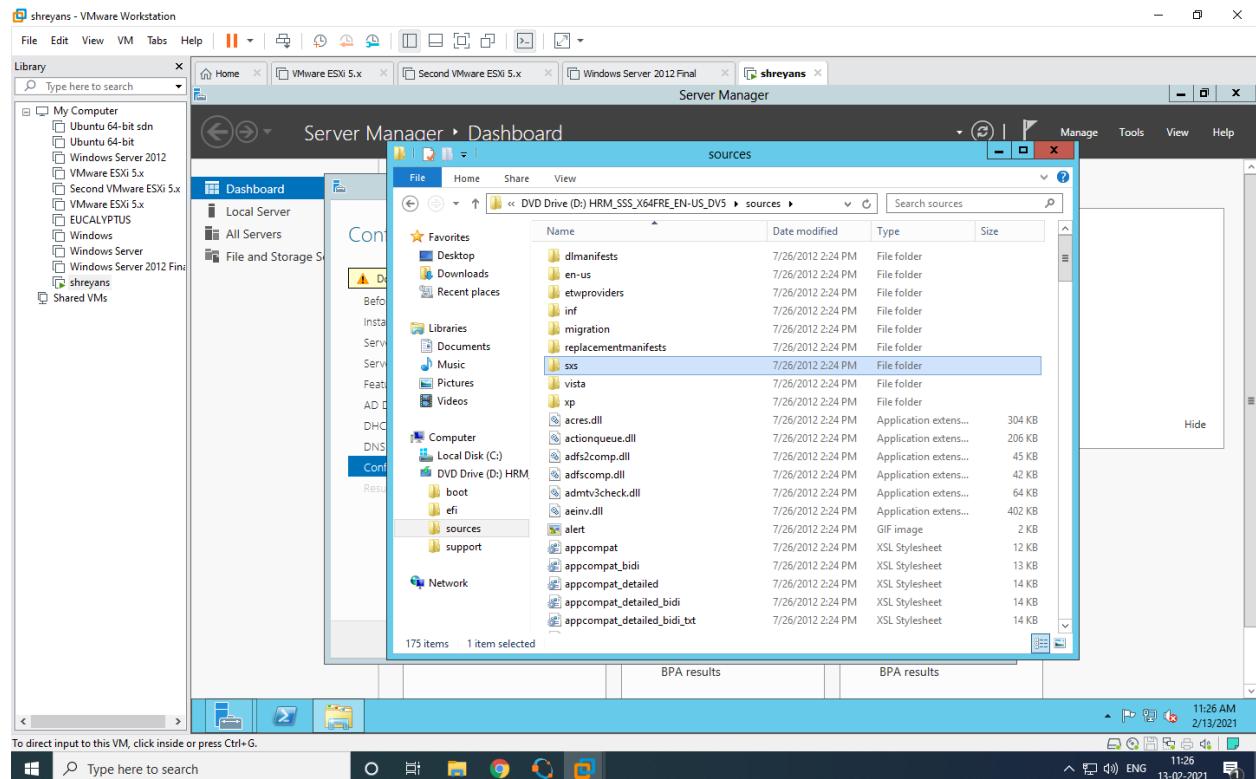


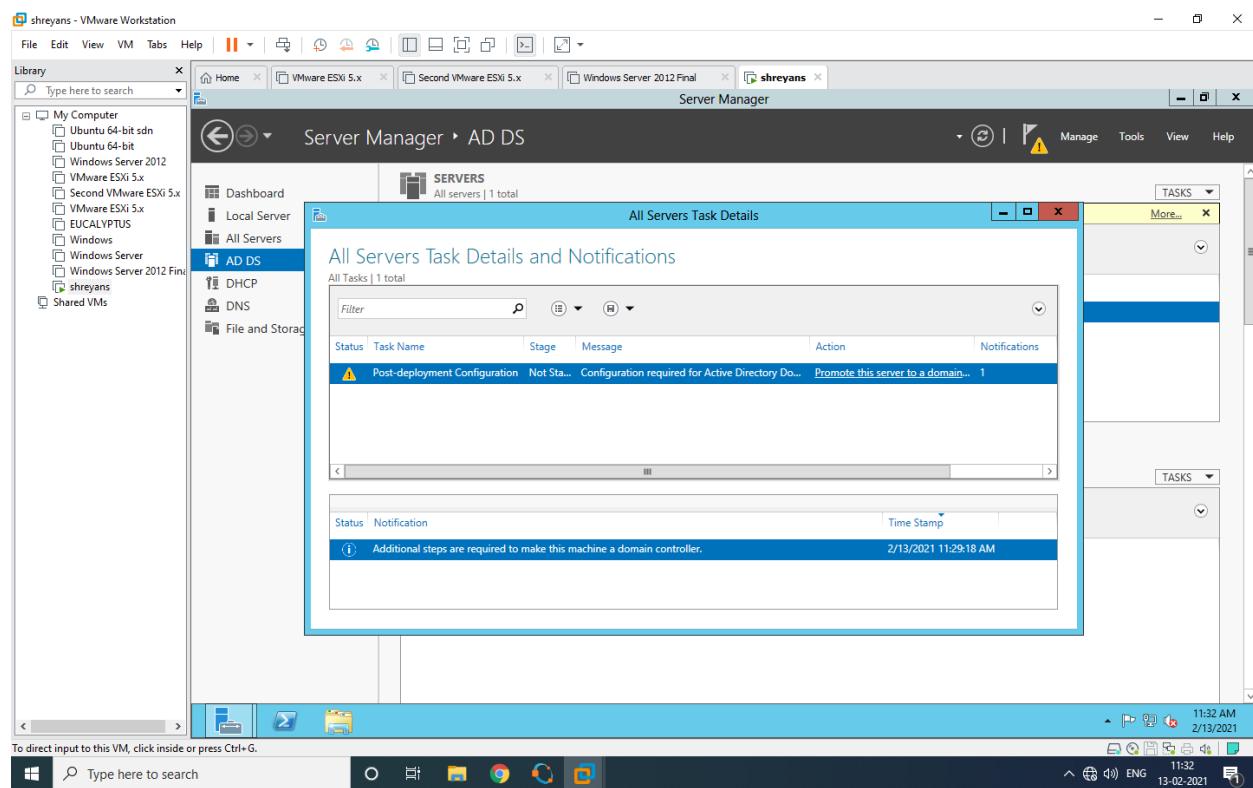
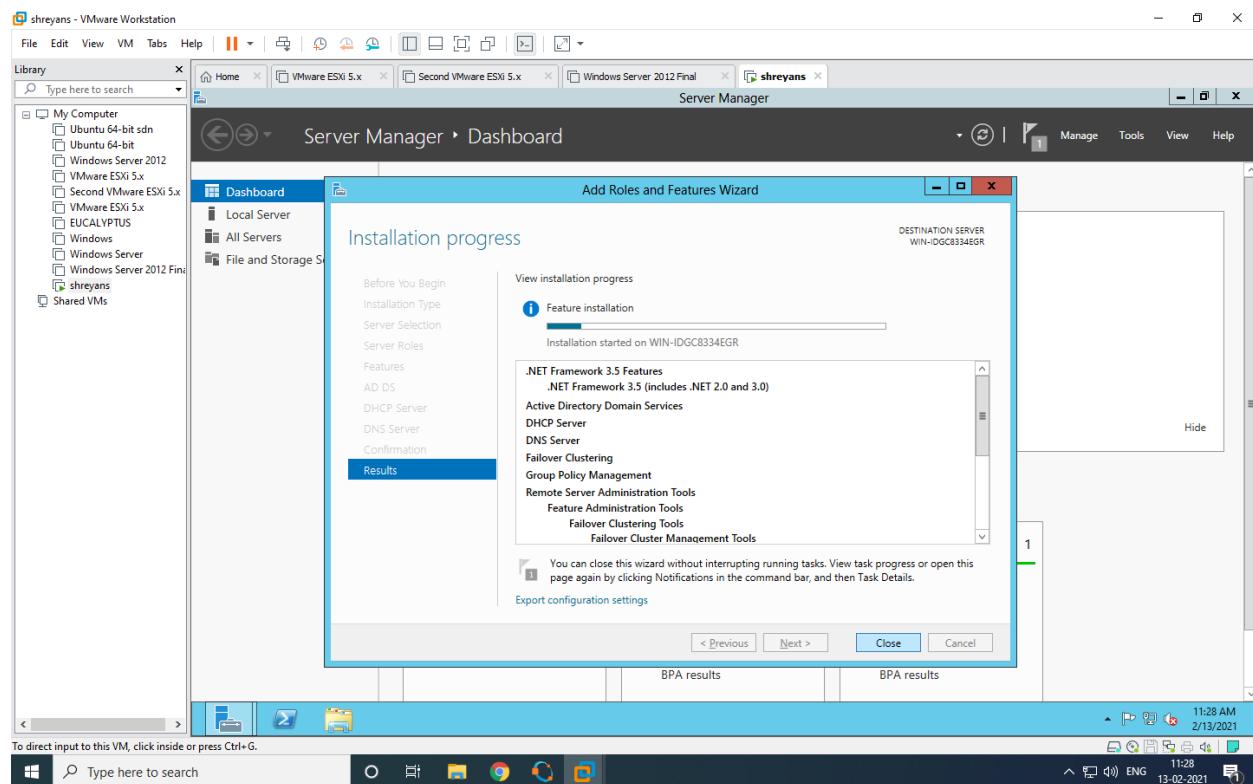


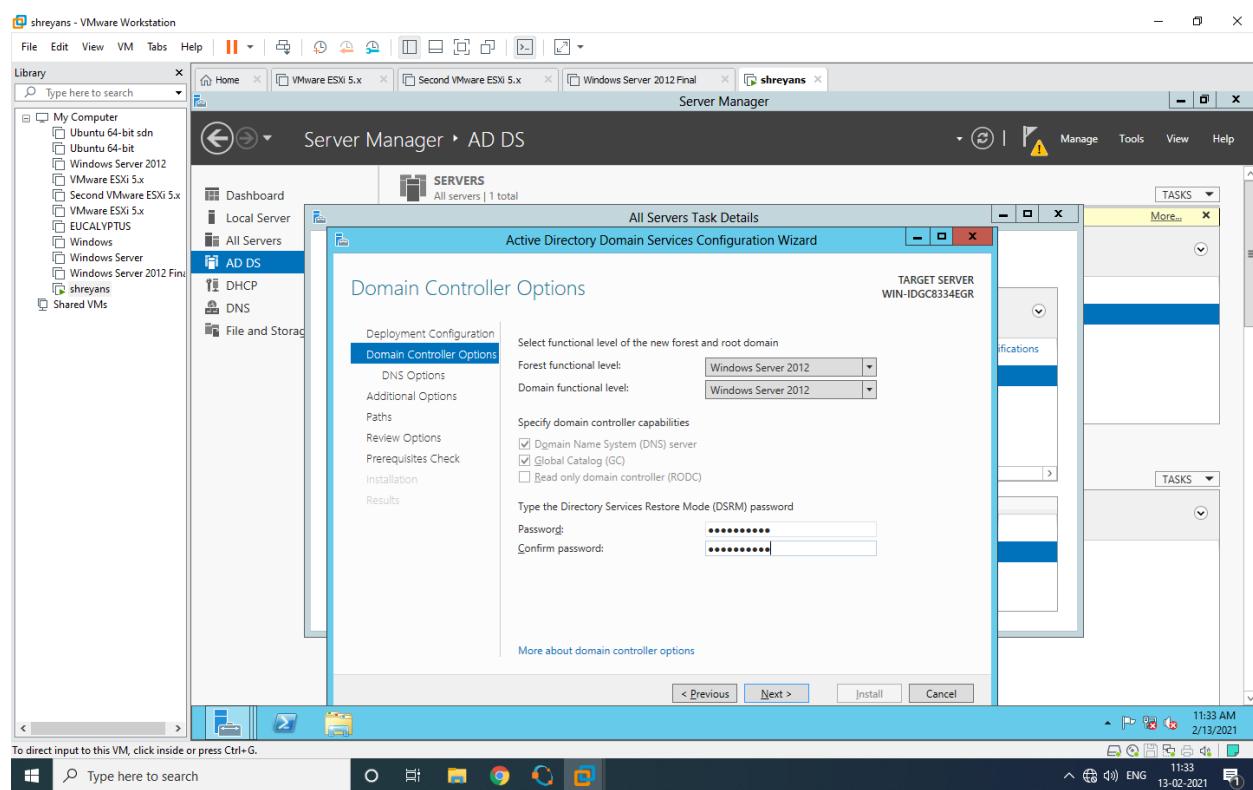
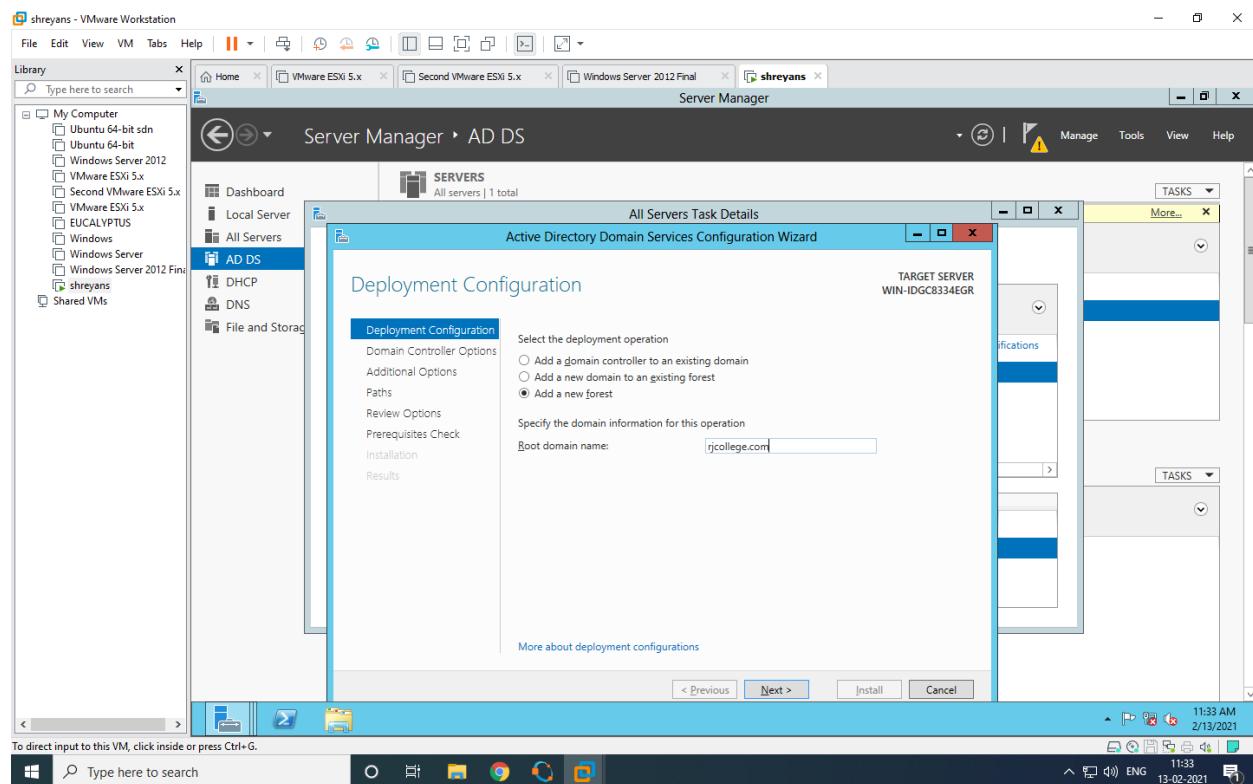


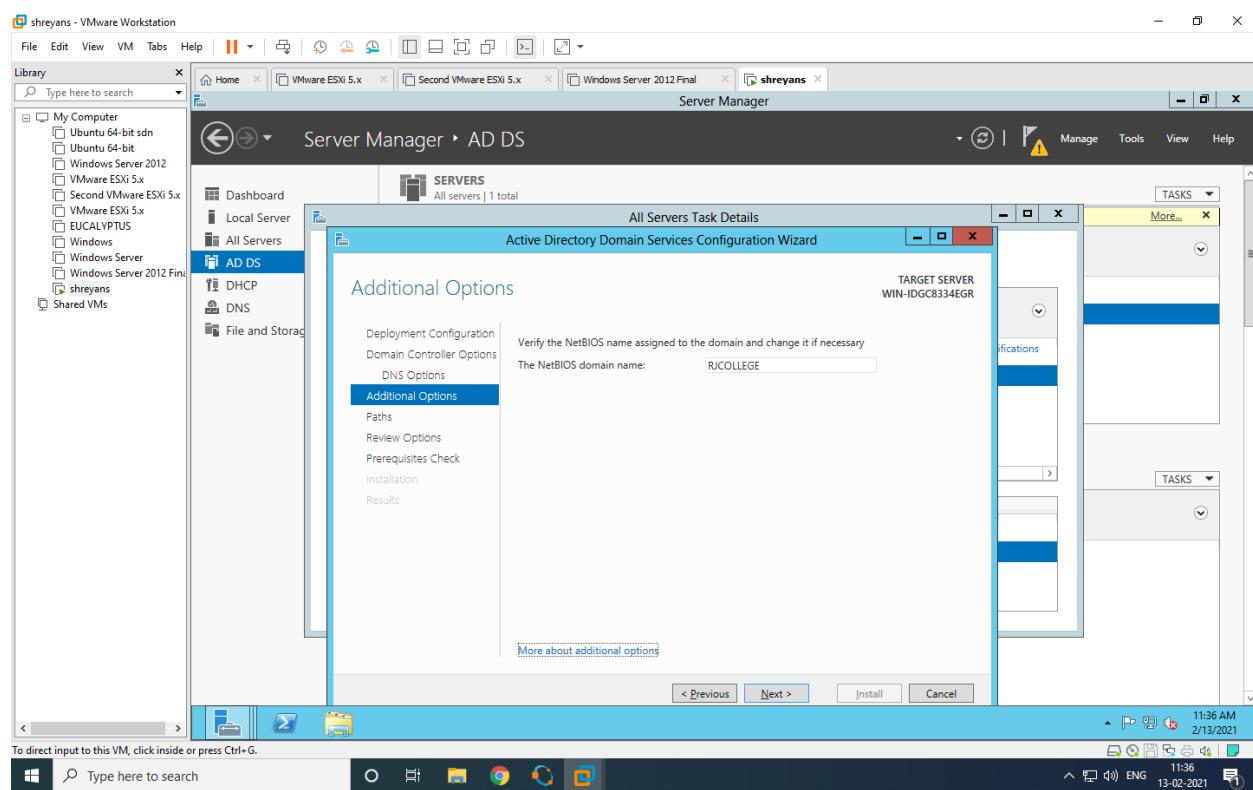
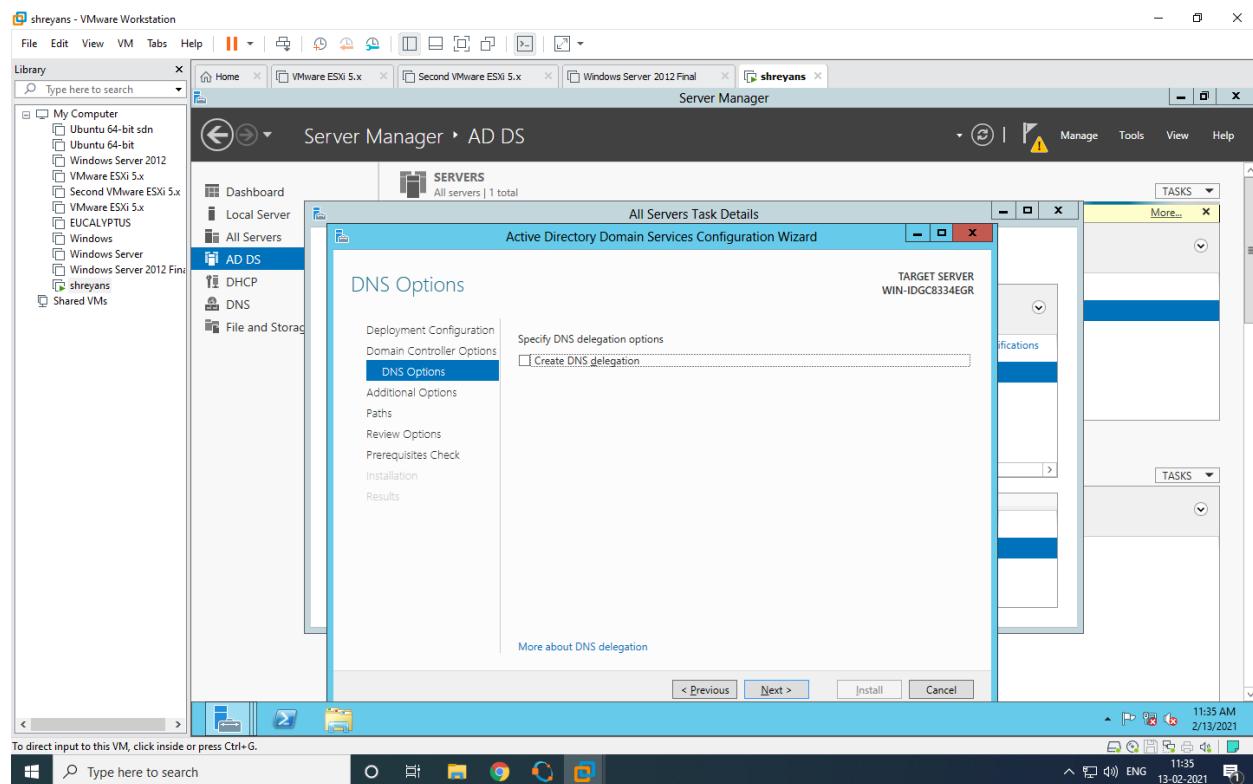


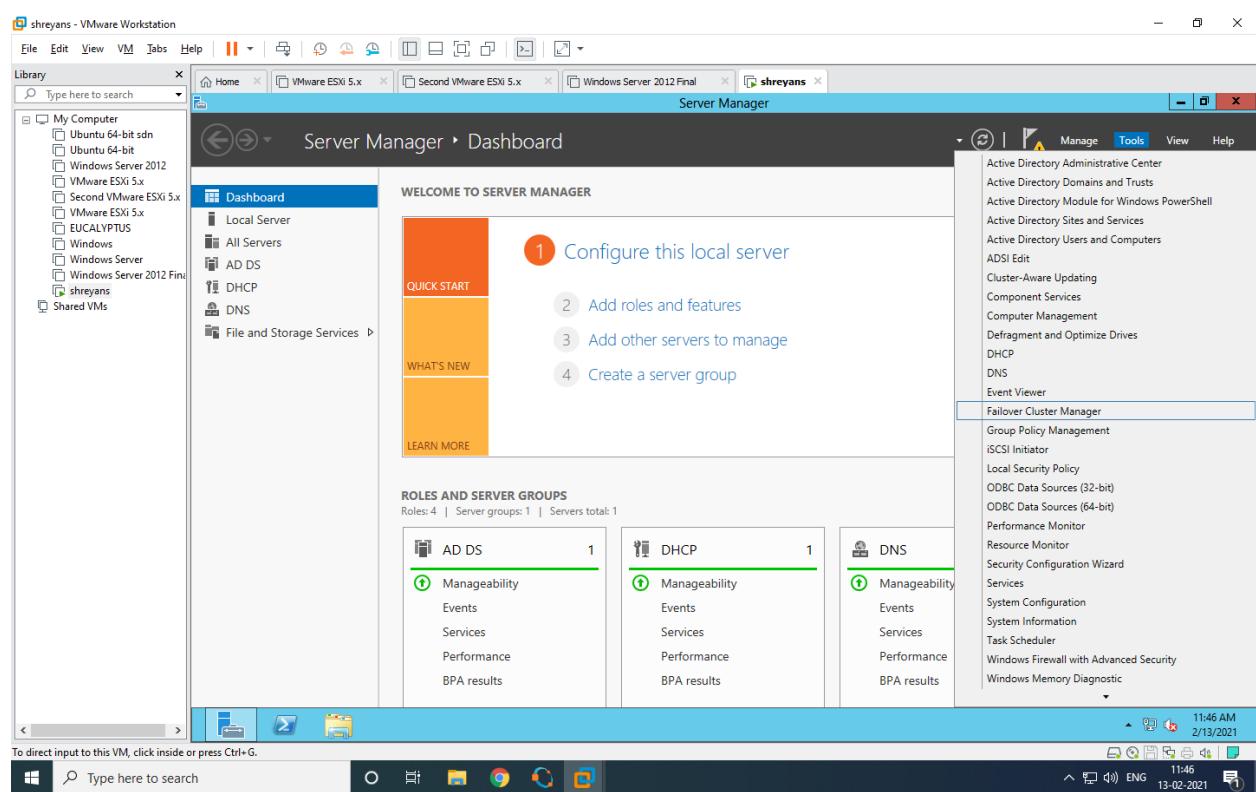
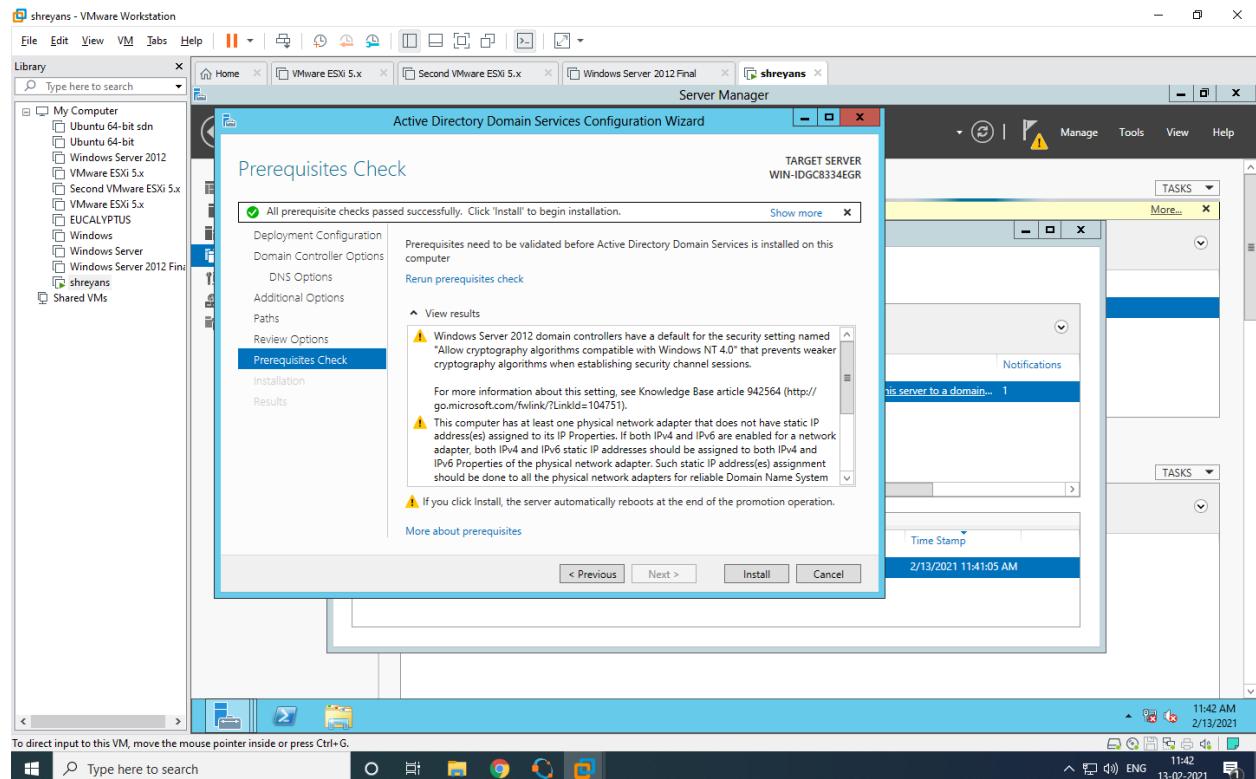


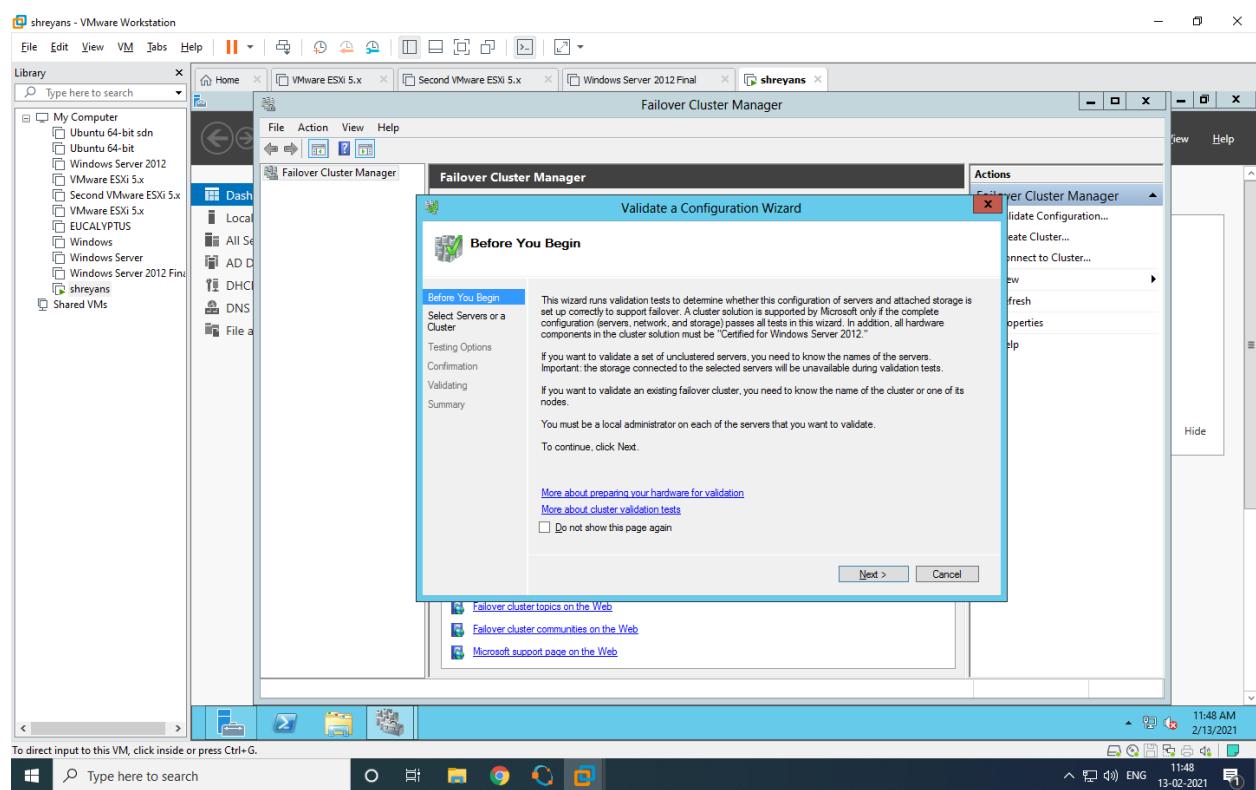
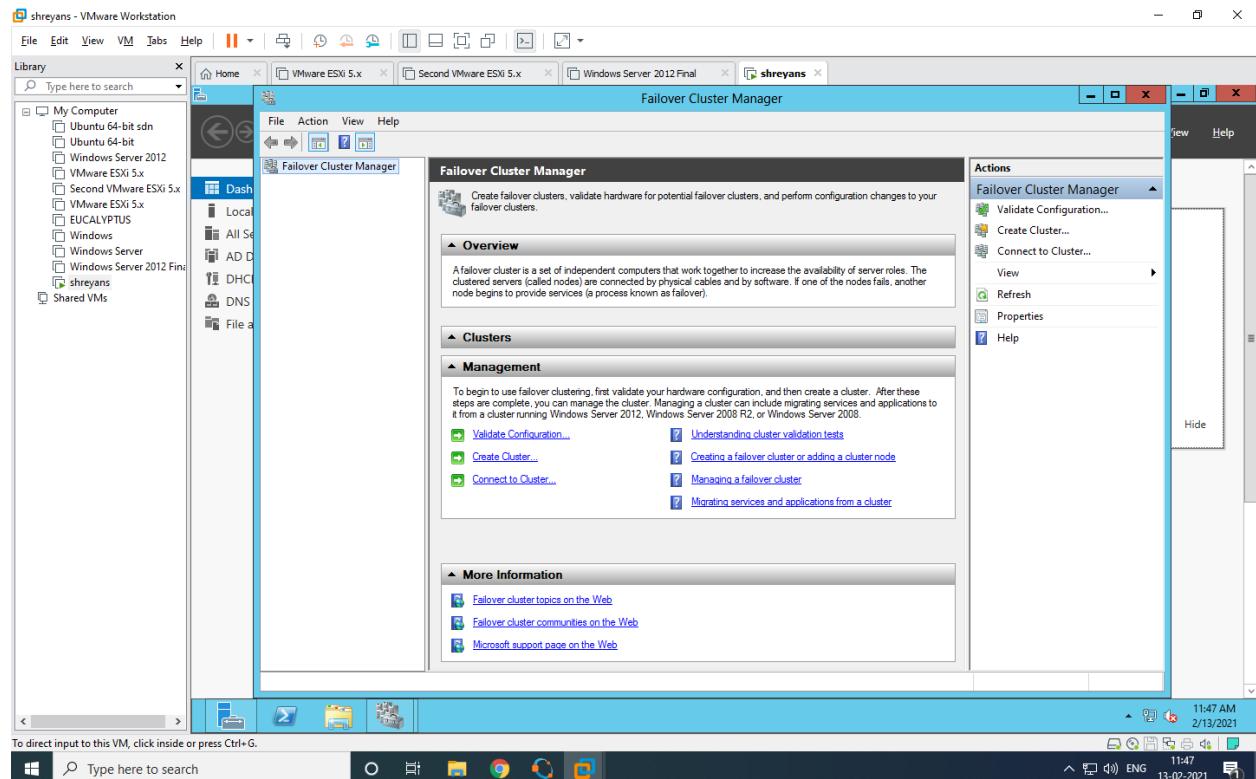


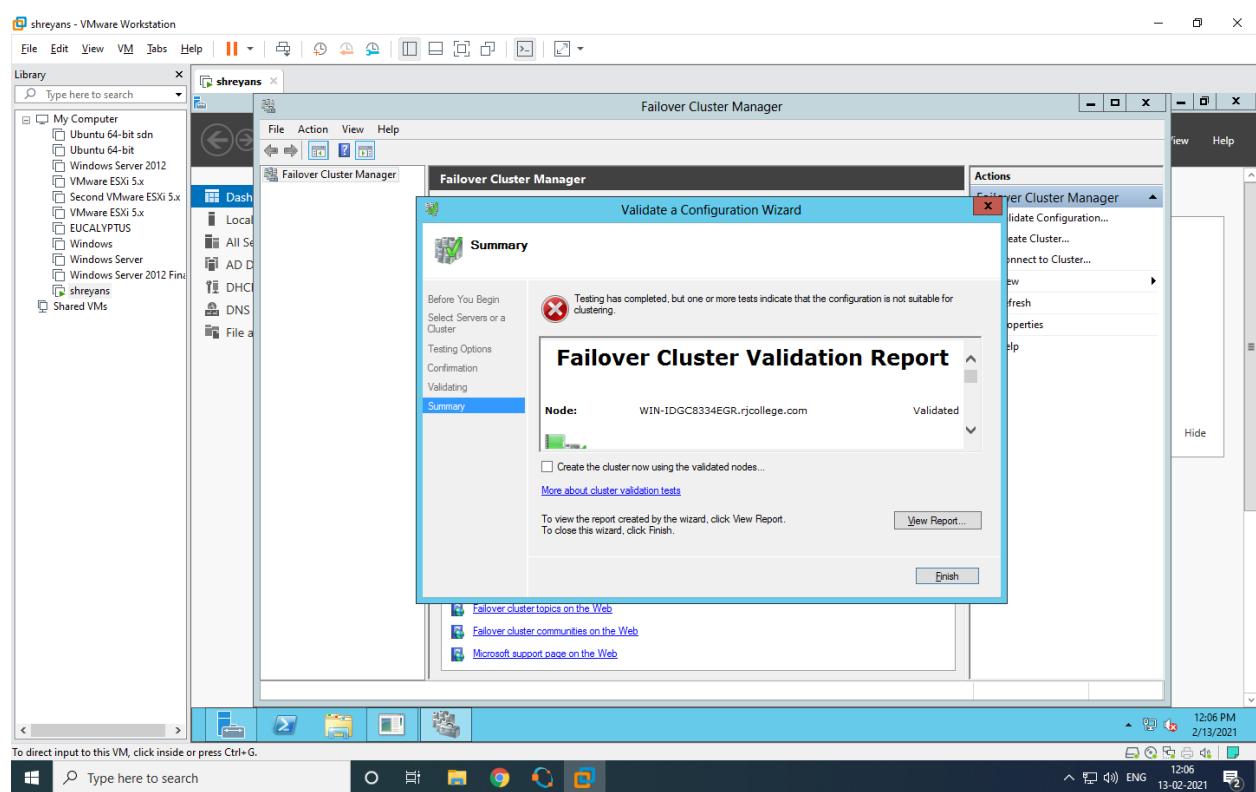
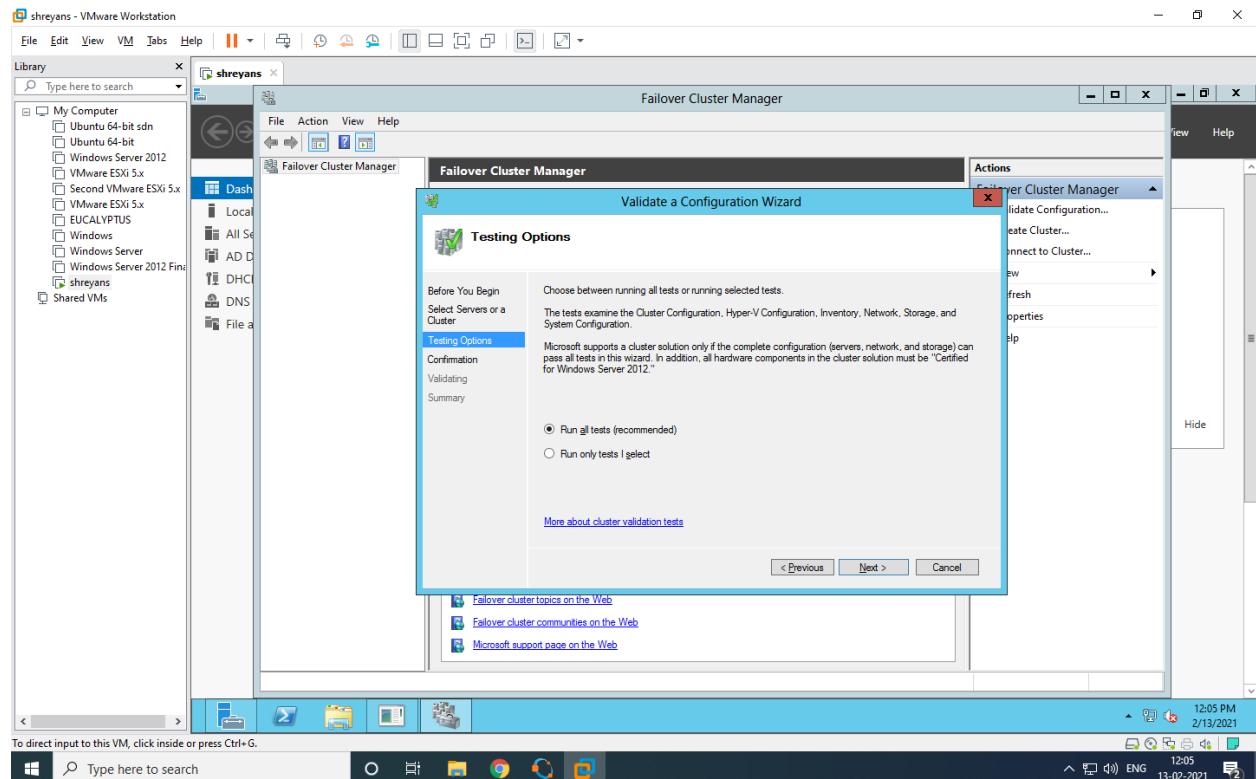


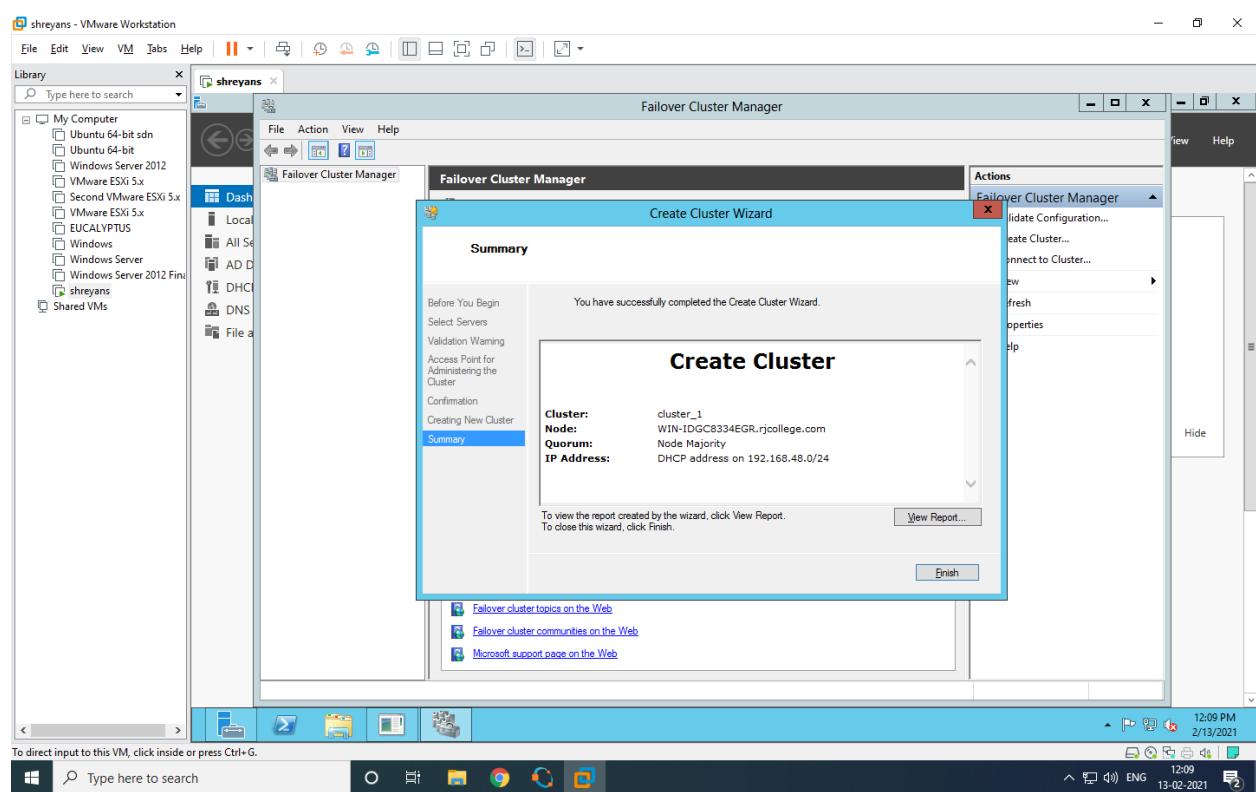
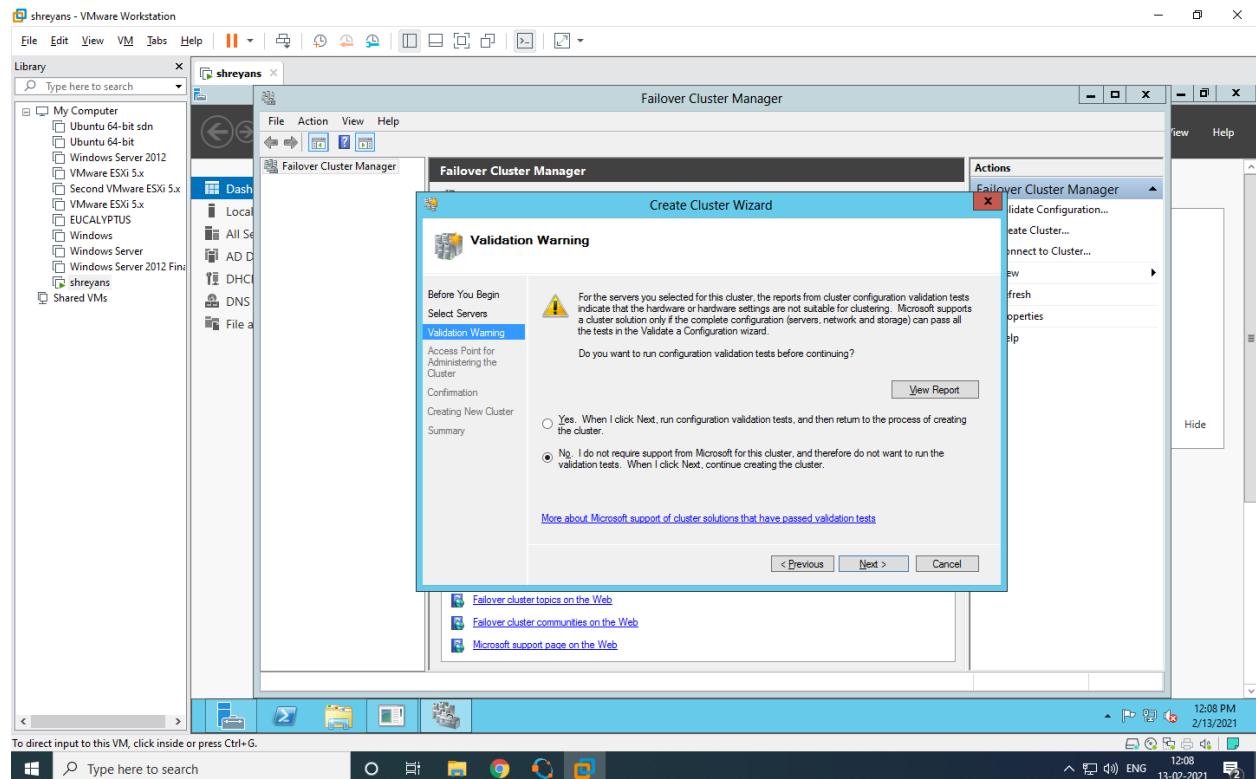








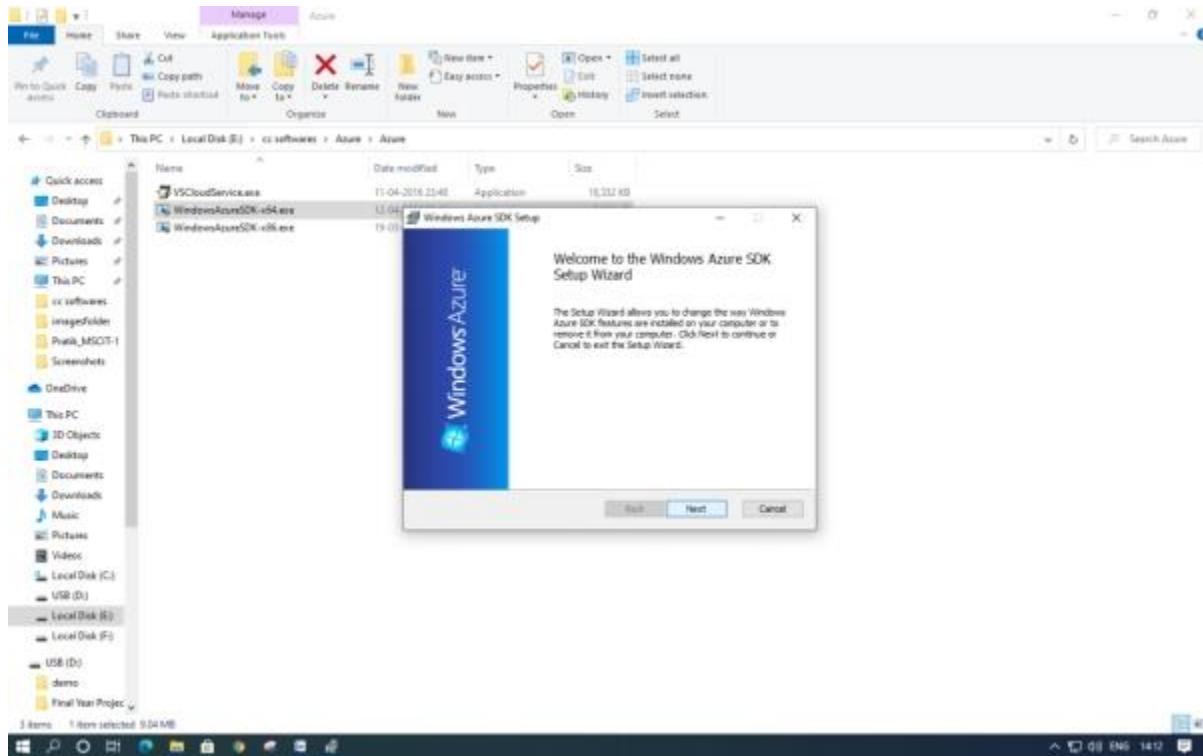


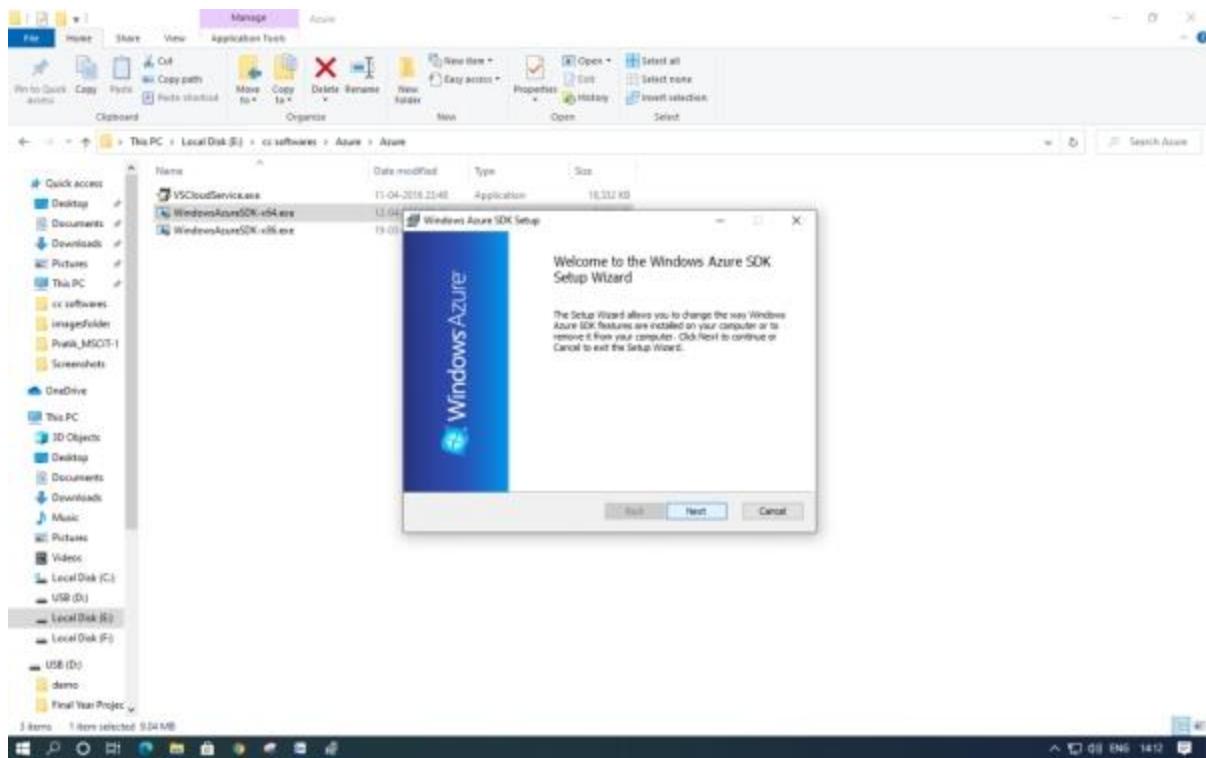


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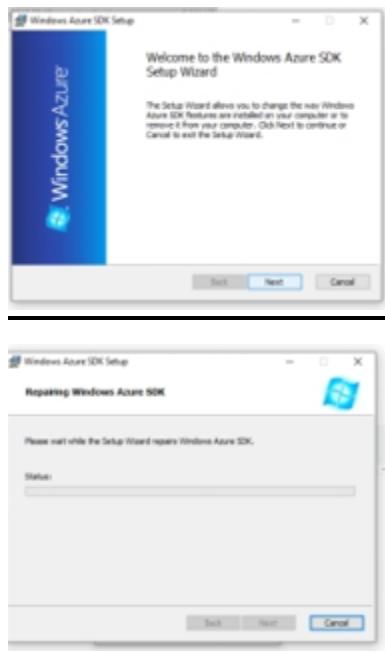
Developing applications for Windows Azure

First install VScloudService.exe and WindowAzureSDK-x64.exe

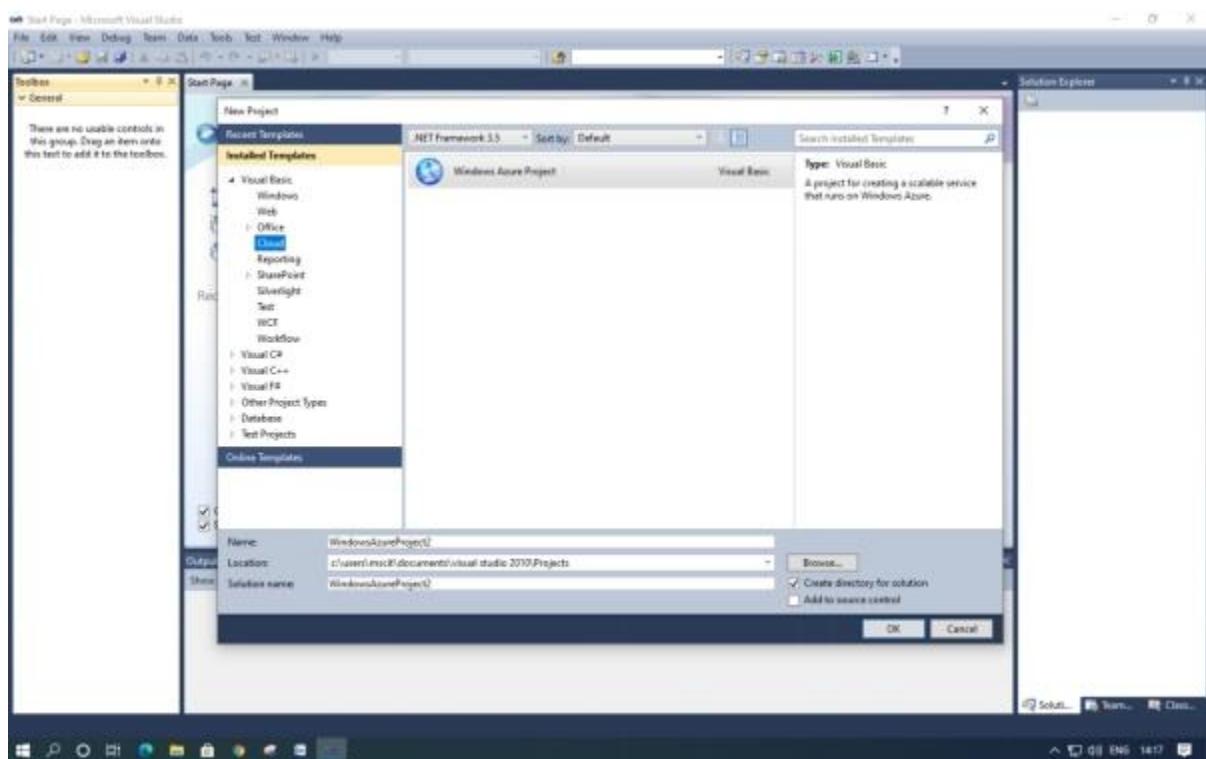
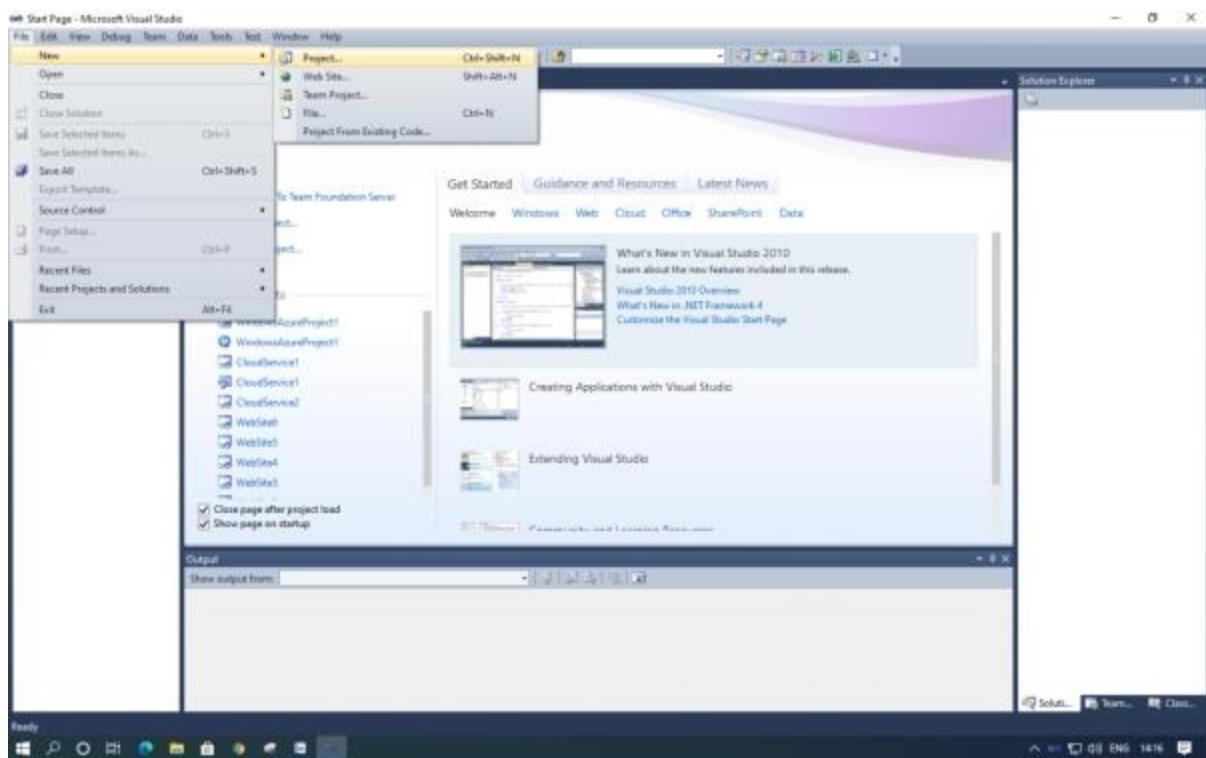


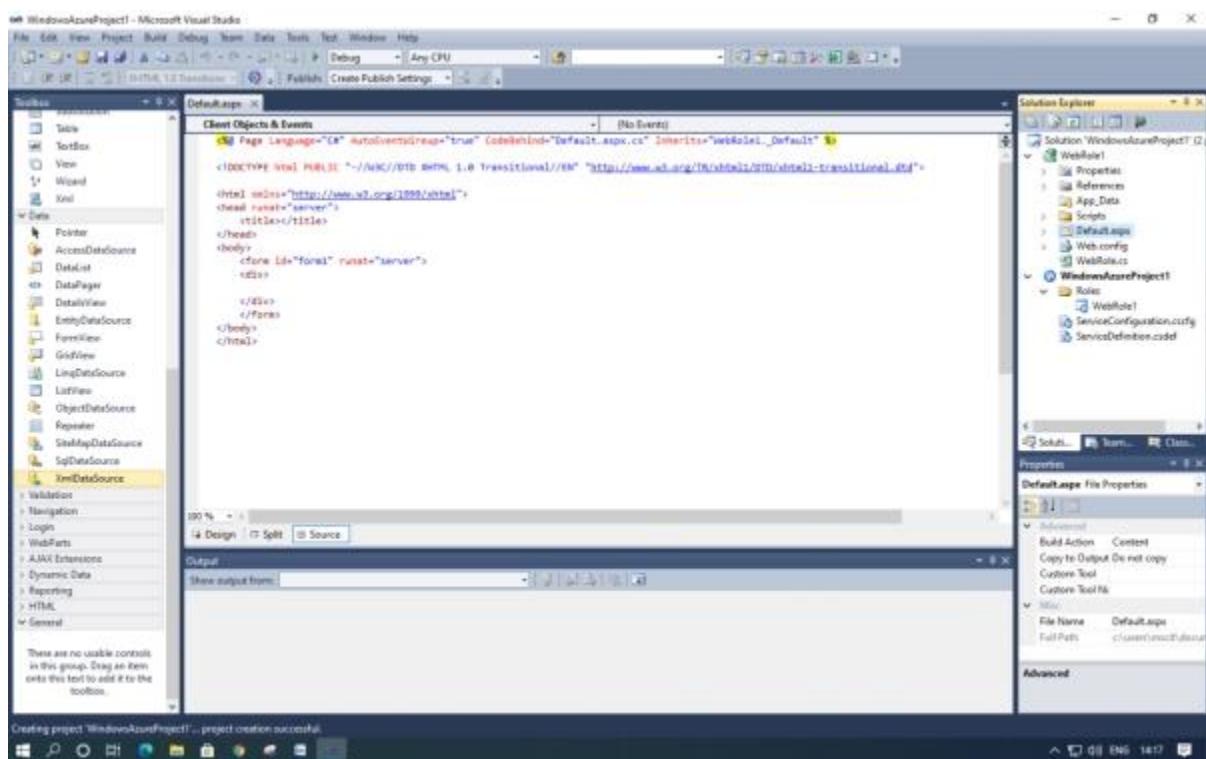
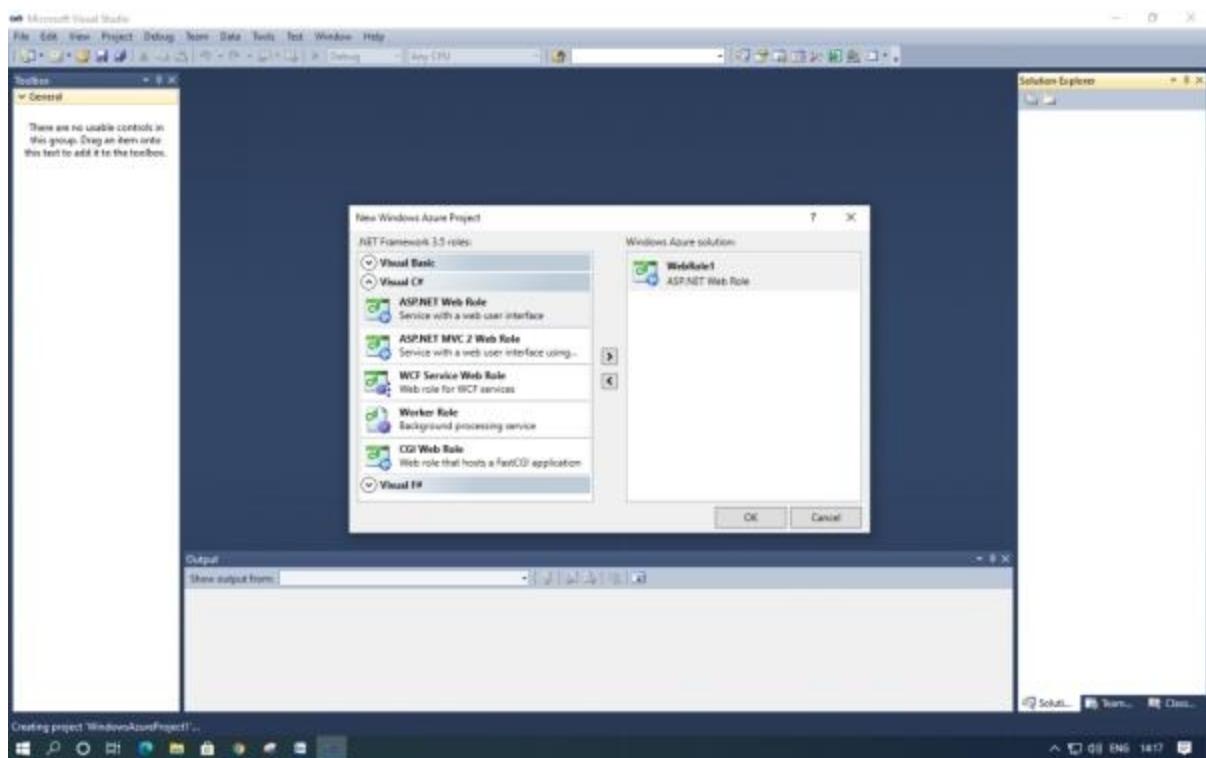


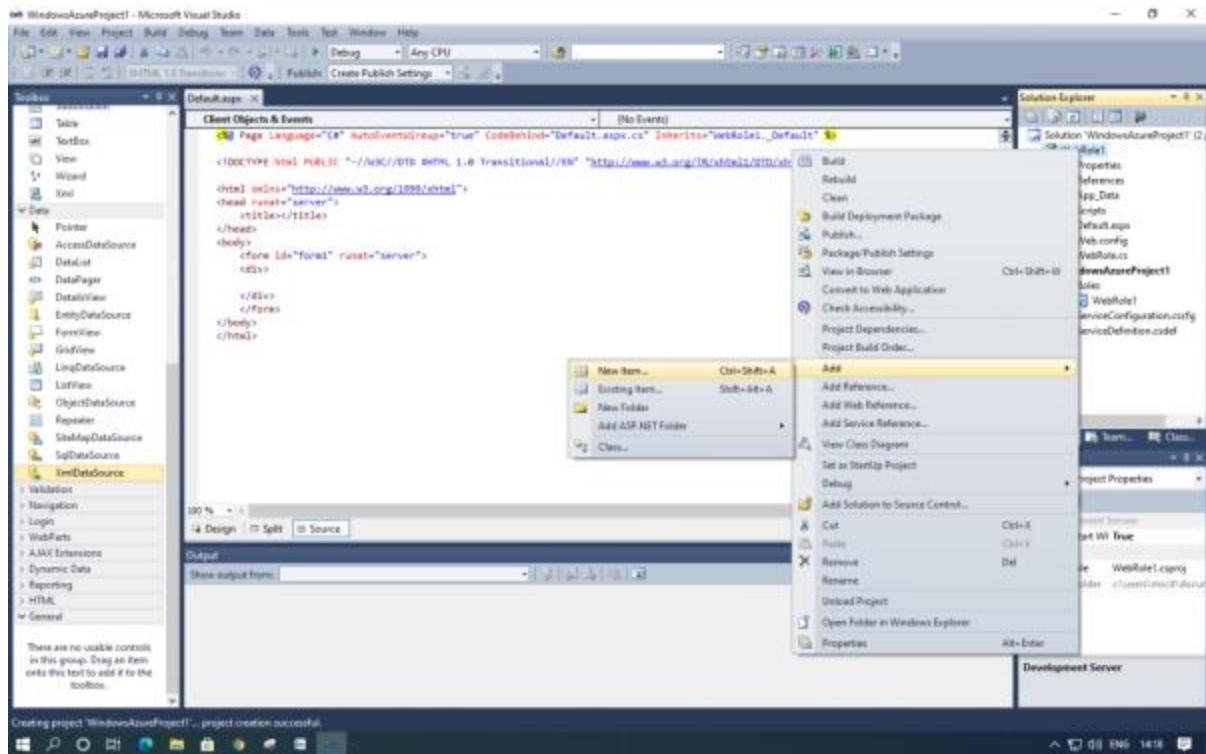
First install VScloudService.exe and WindowAzureSDK-x64.exe



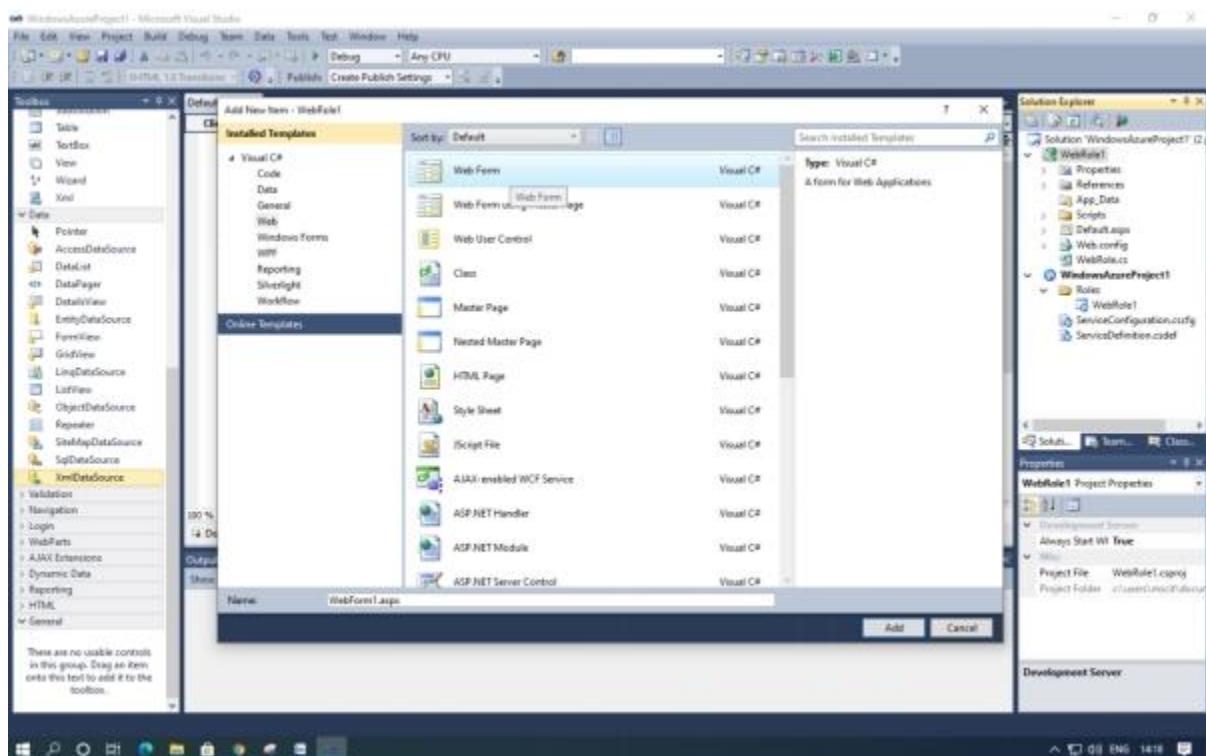
Open Visual Studio 2010

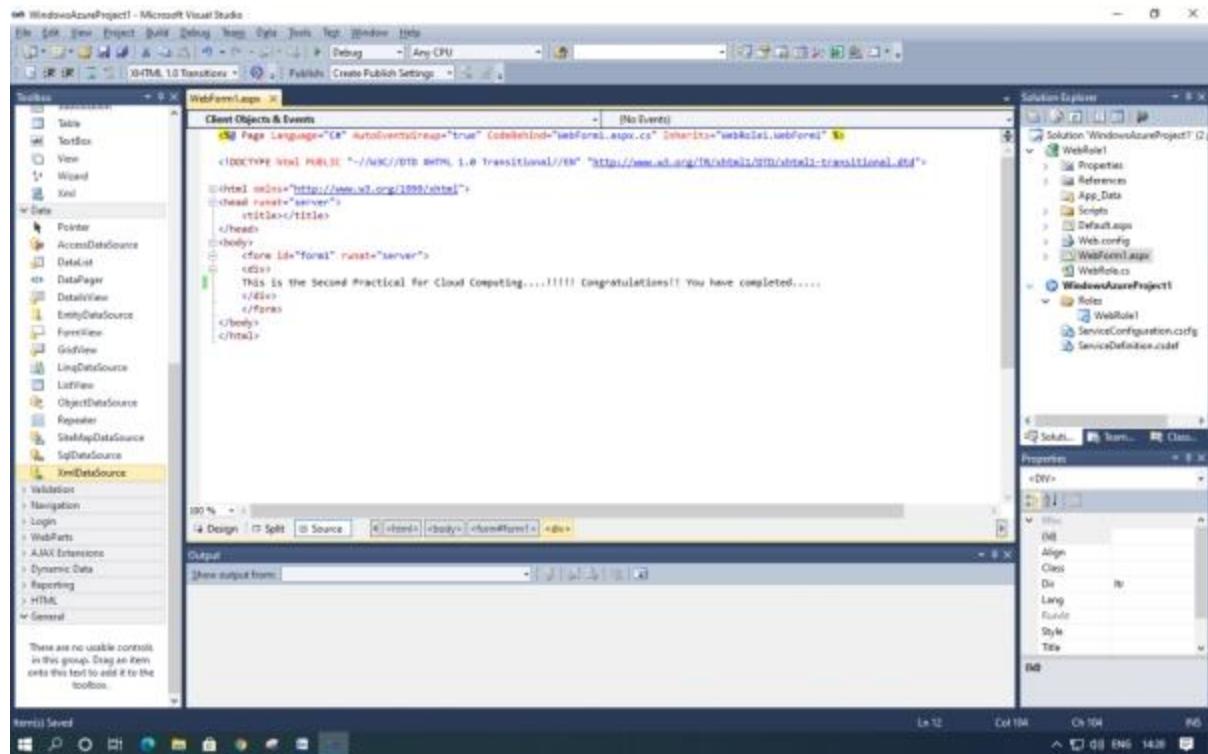




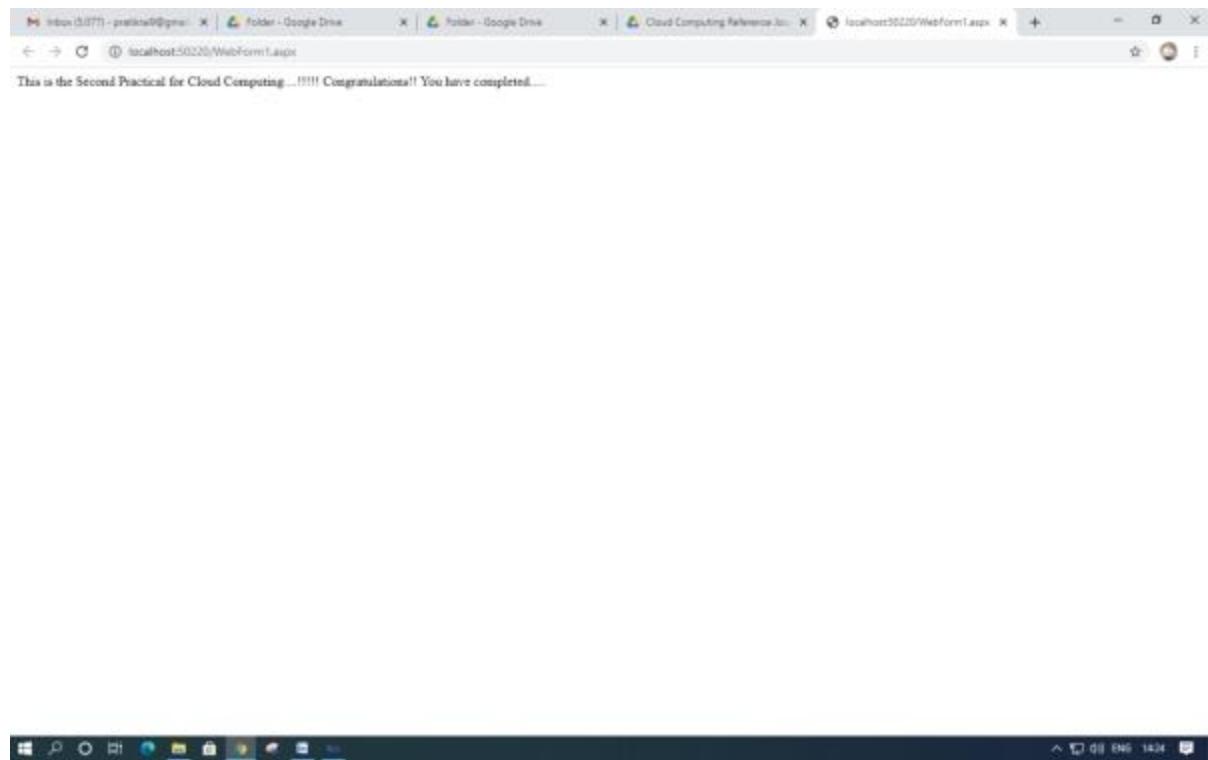


Create a webform



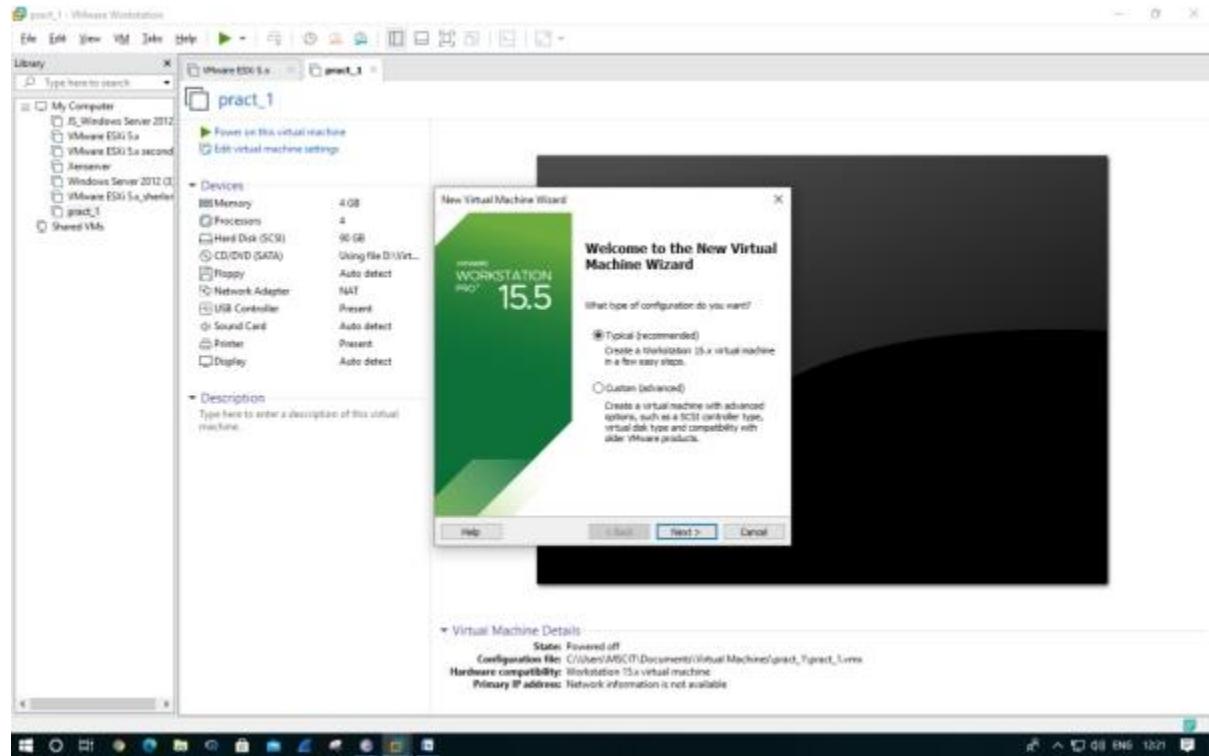


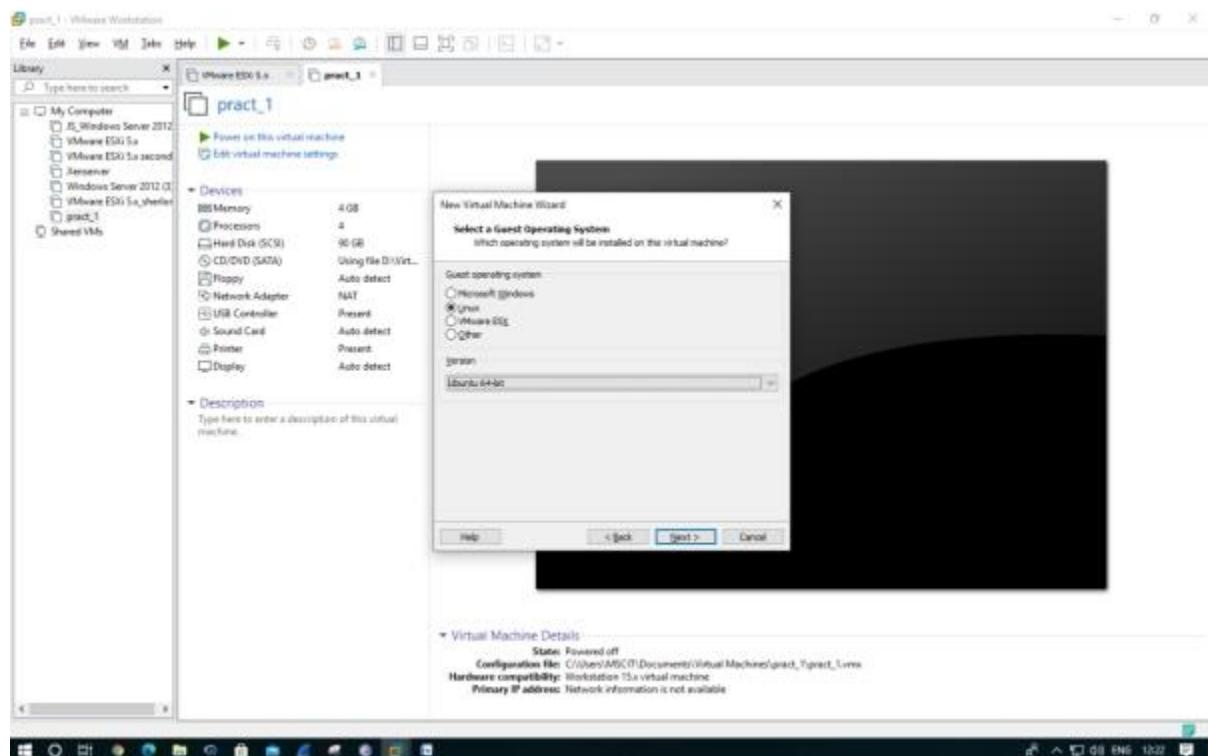
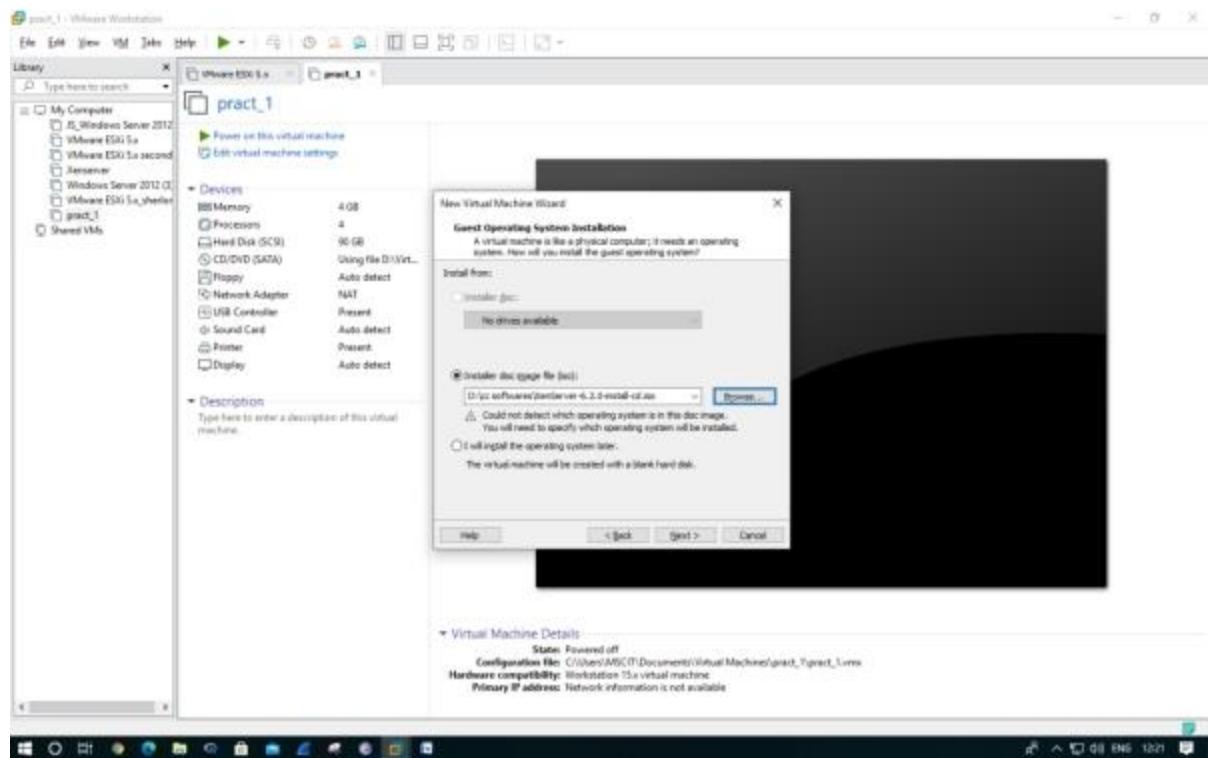
Run the project in administrator also debug 'run it without debug' option.



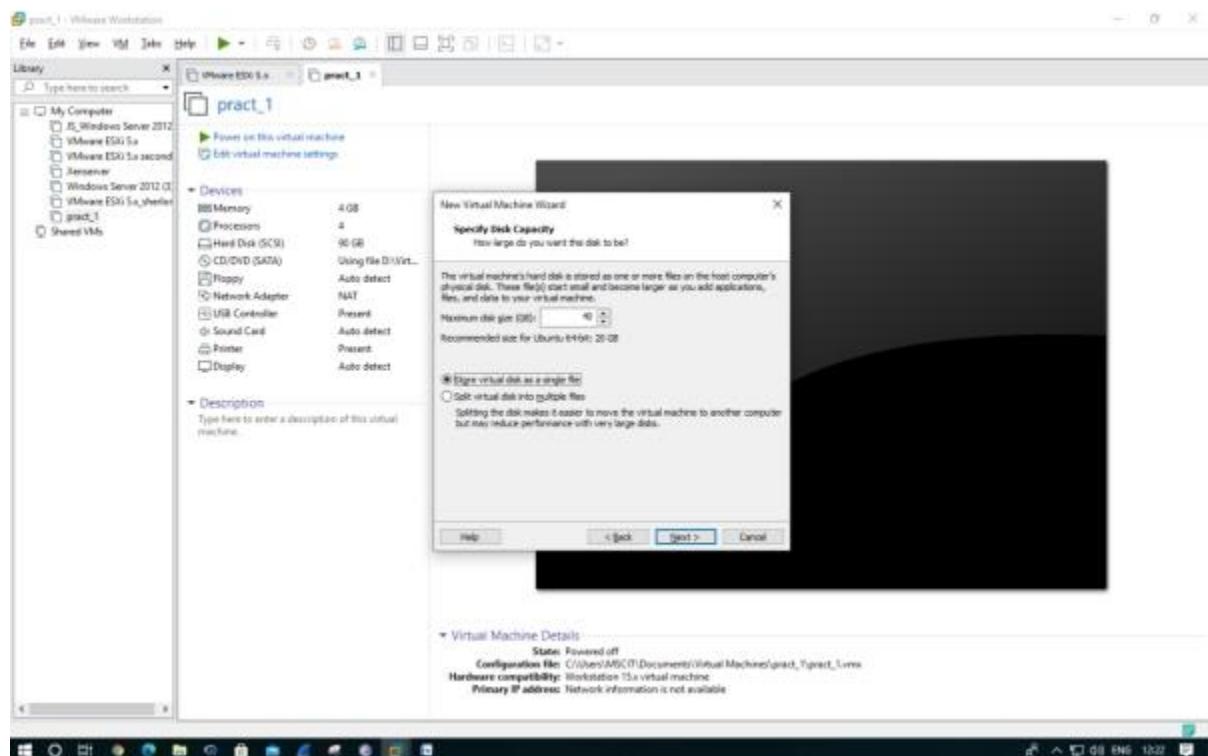
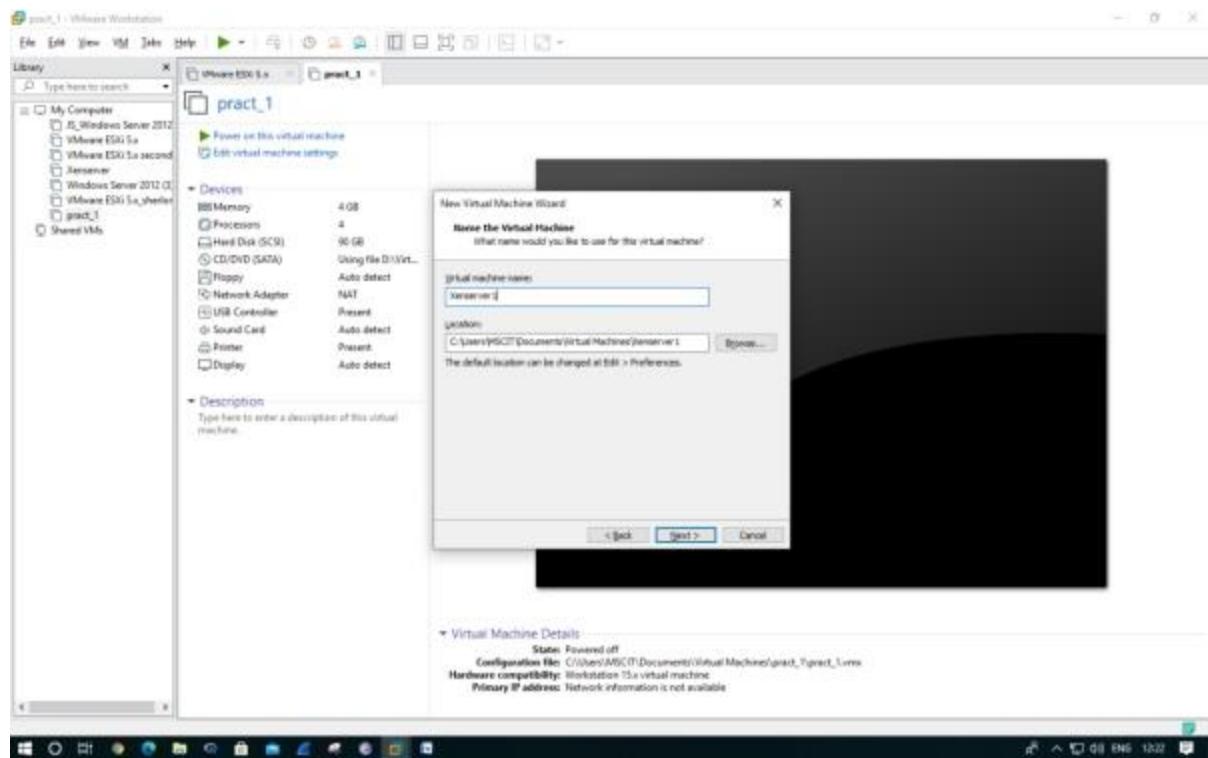
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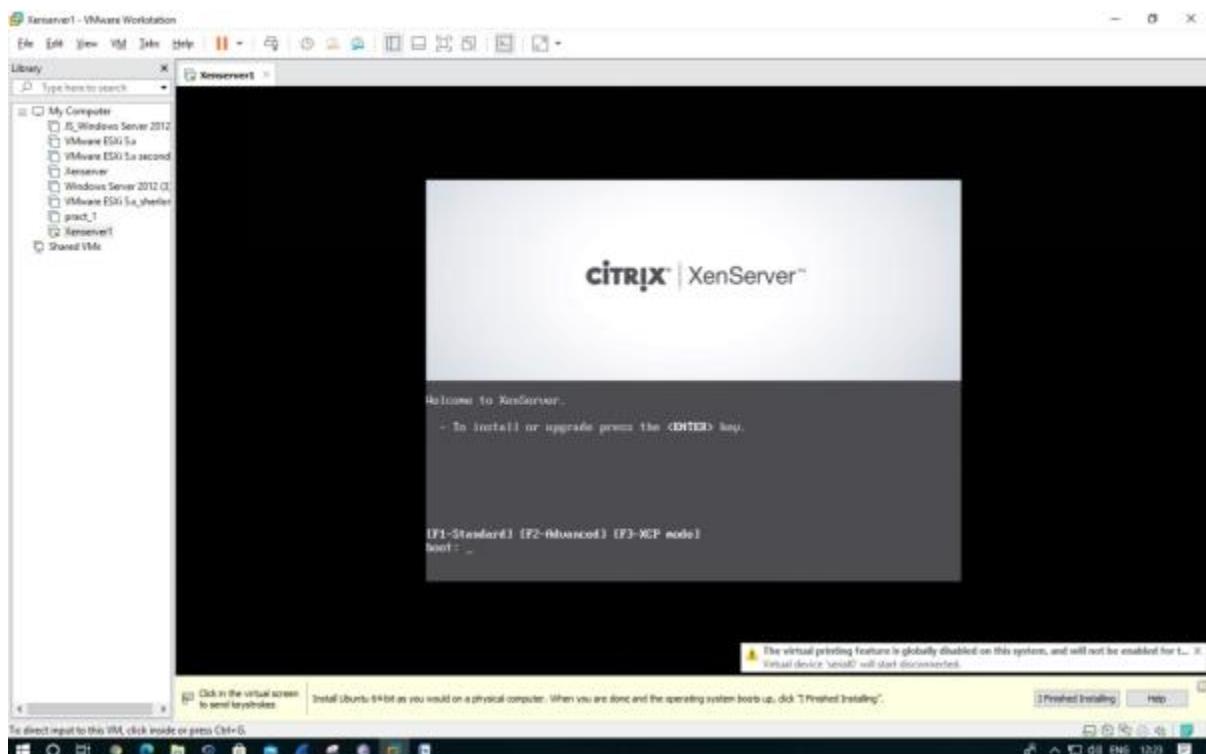
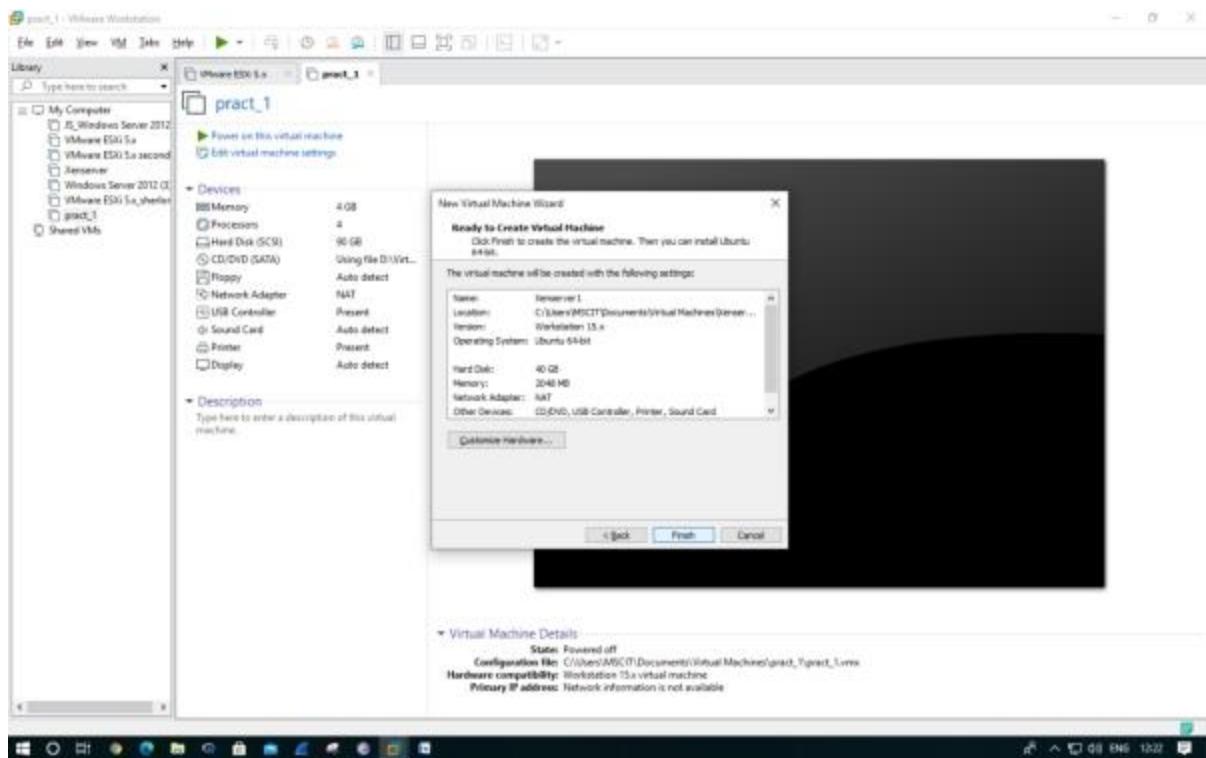
Implementing Private Cloud with Xenserver

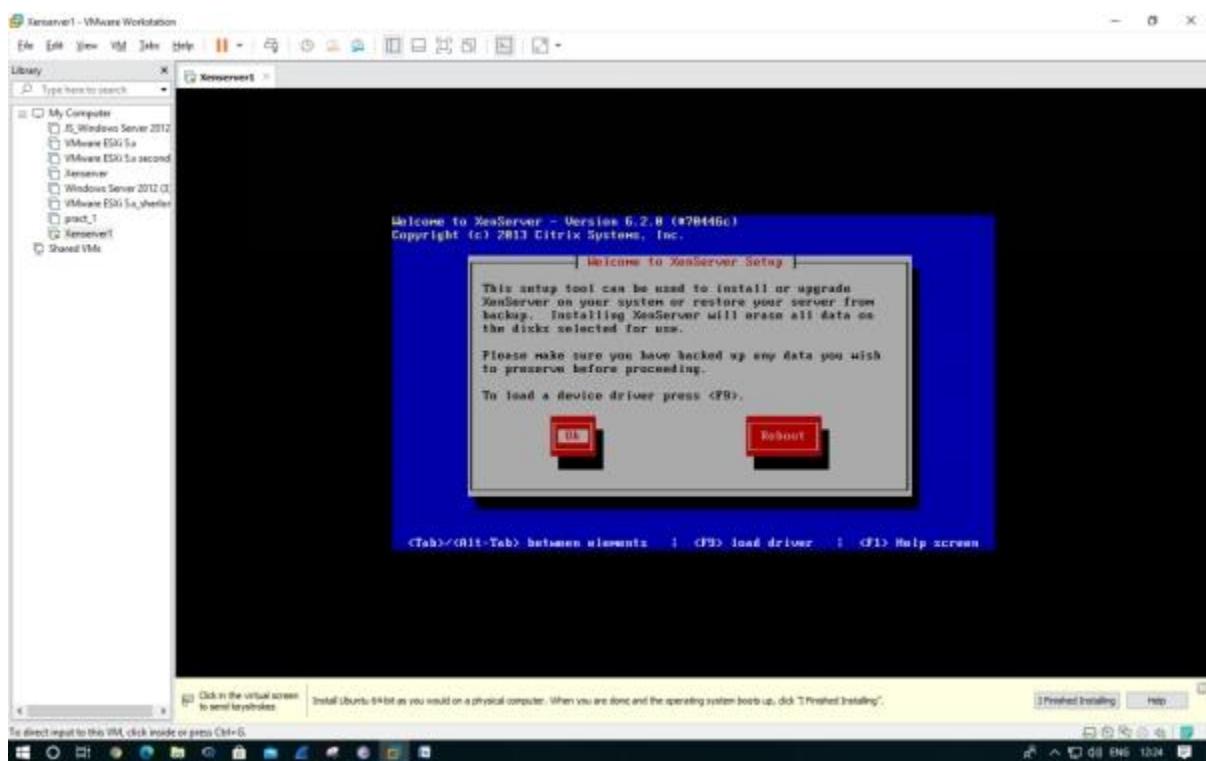
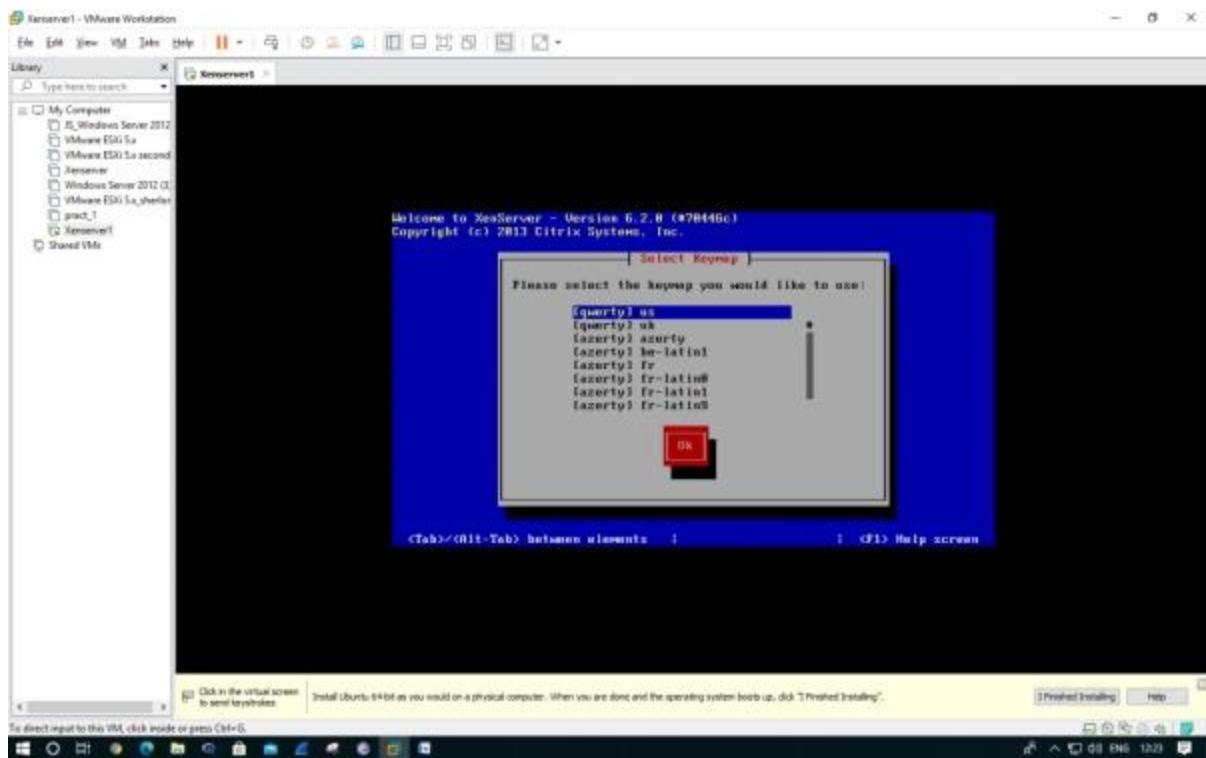


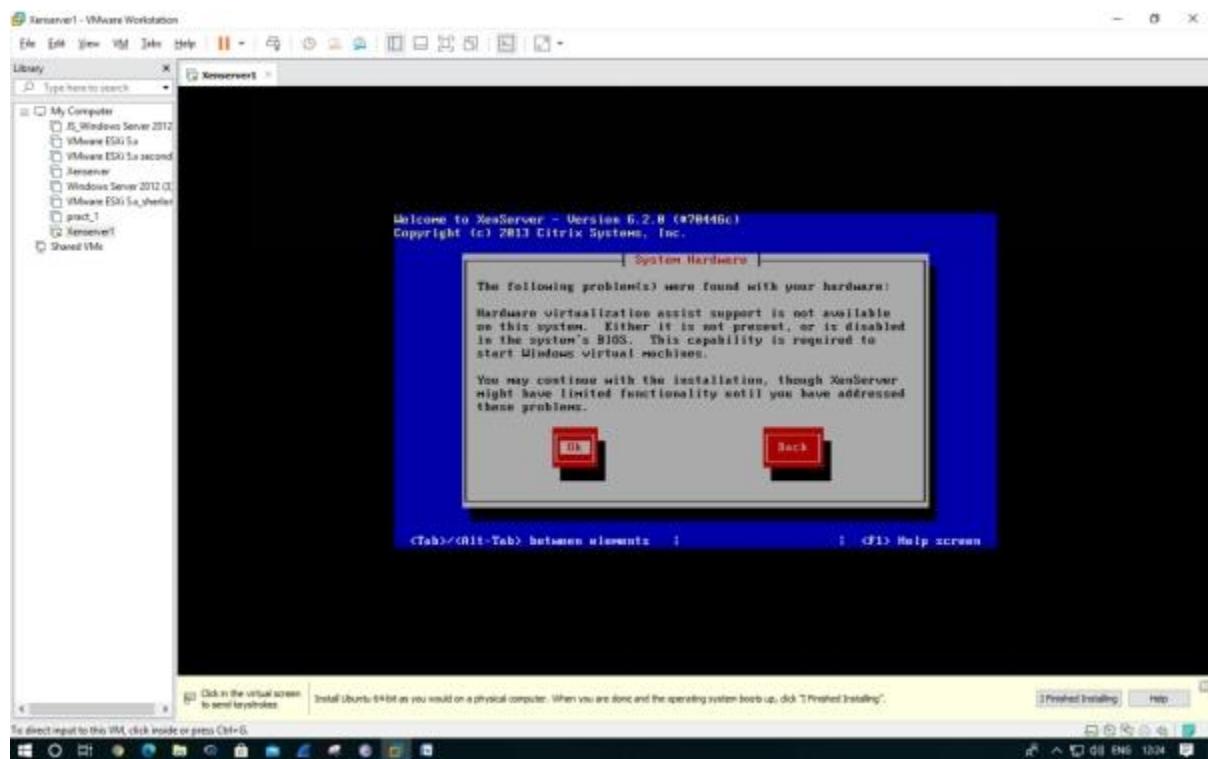
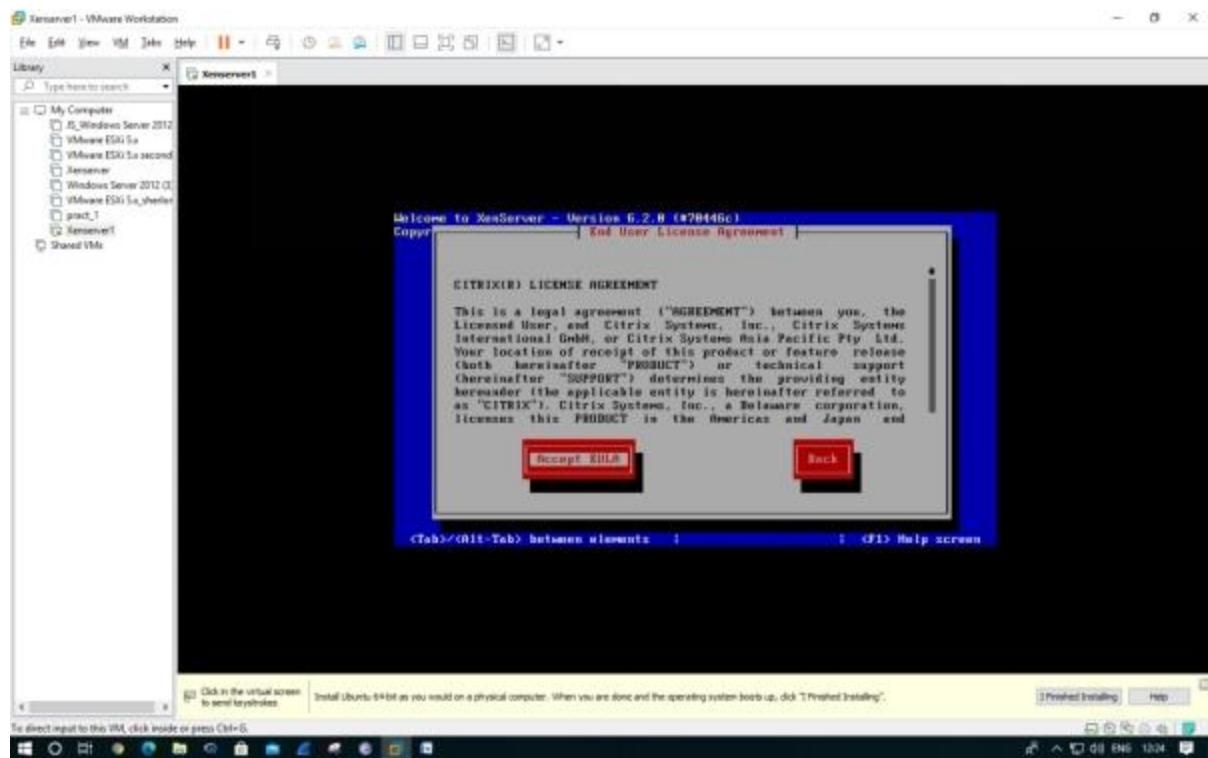


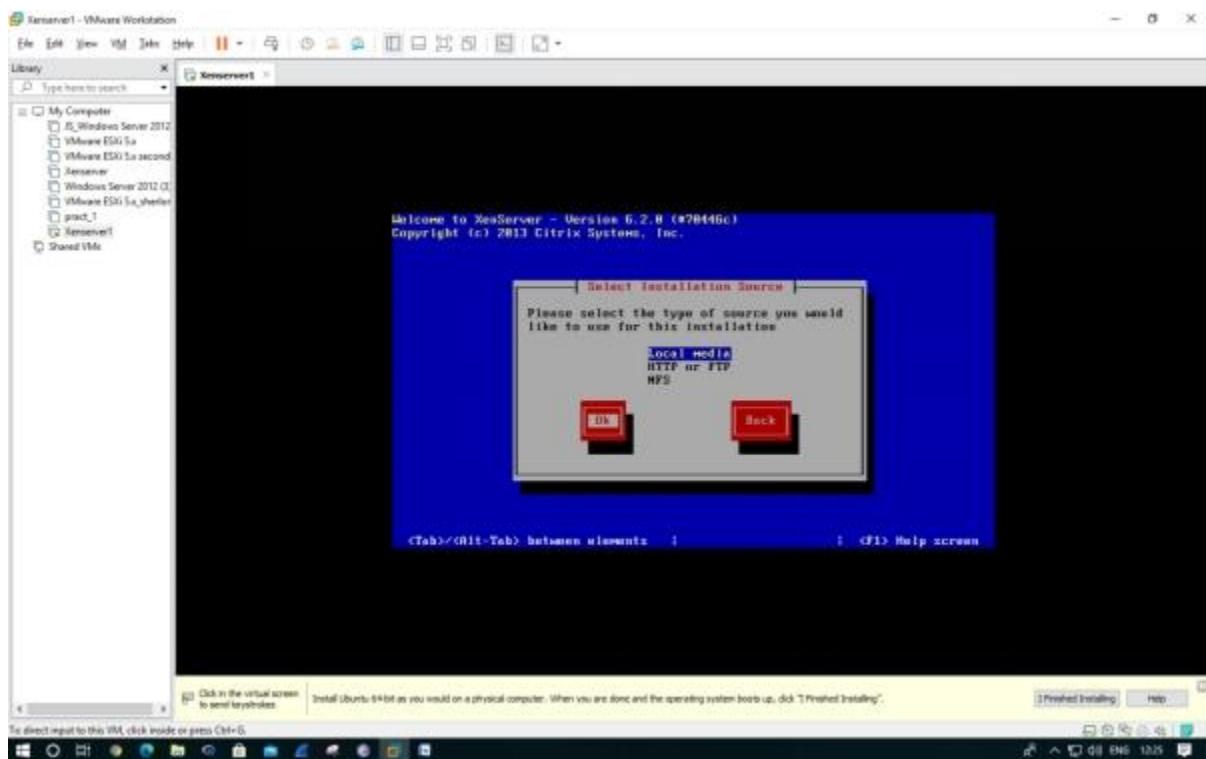
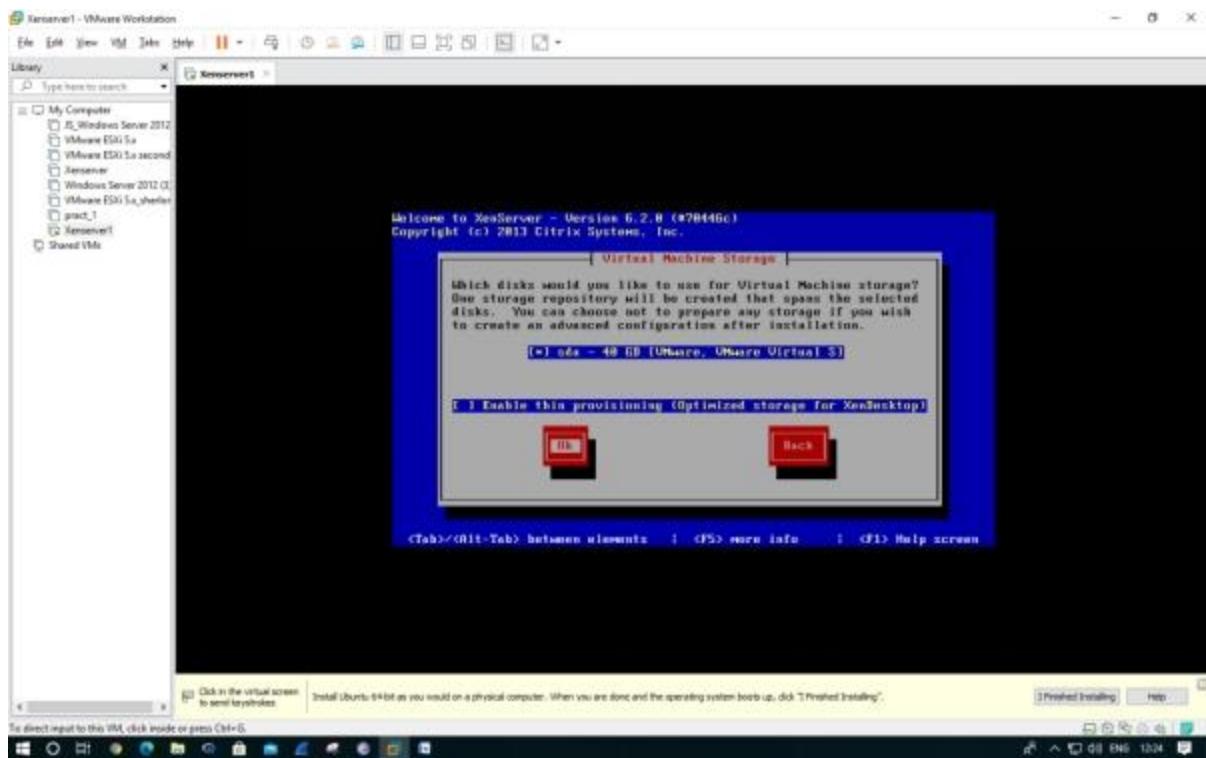
Select Linux Ubuntu version 64 bit

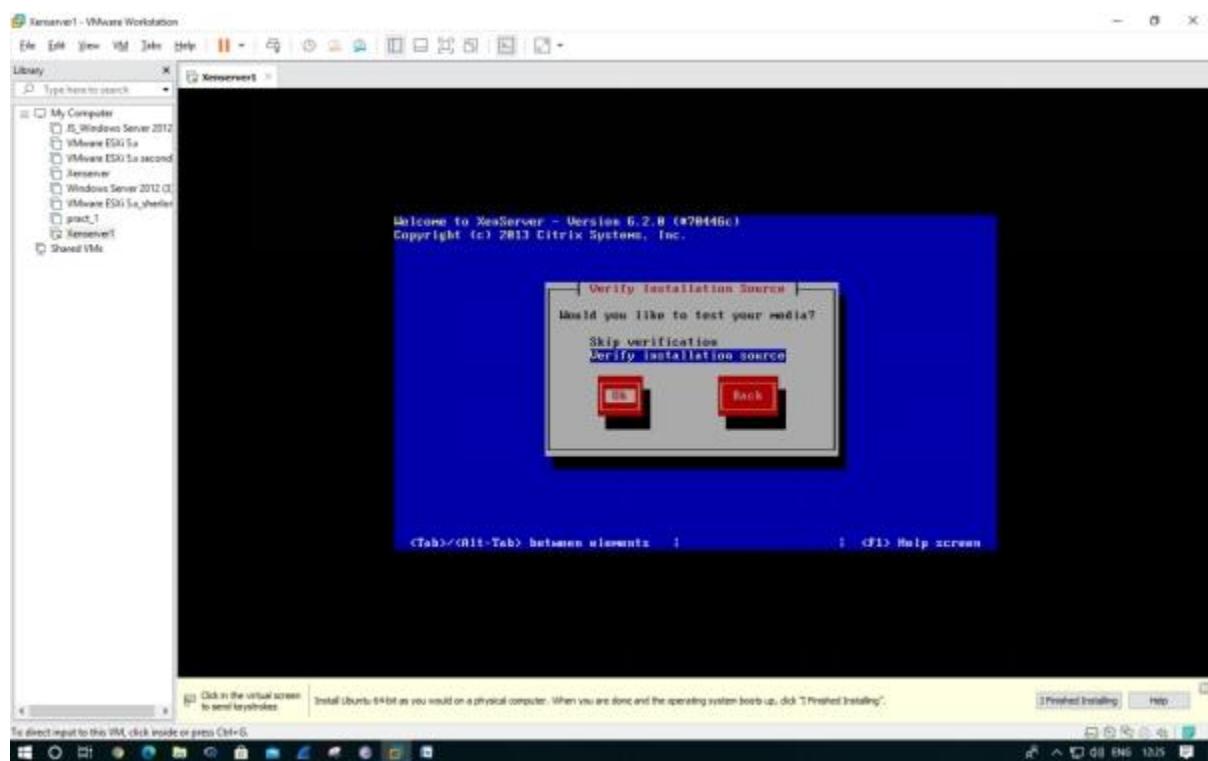
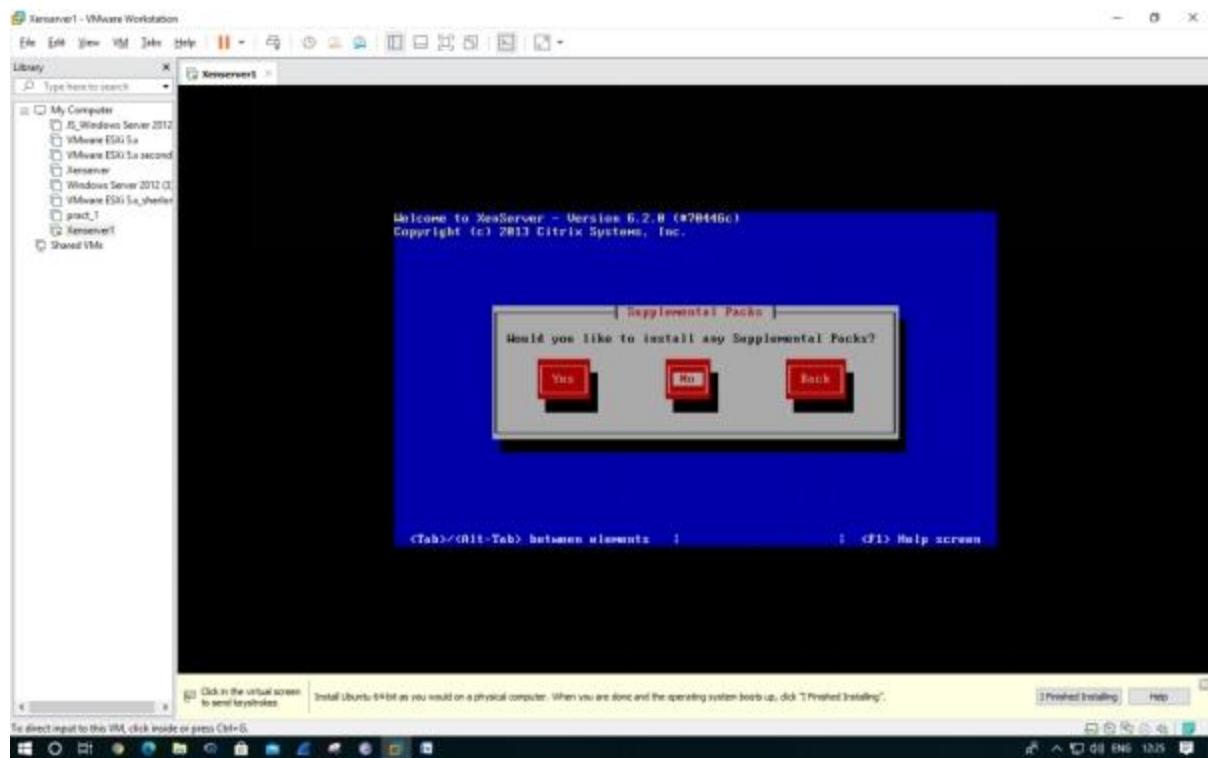


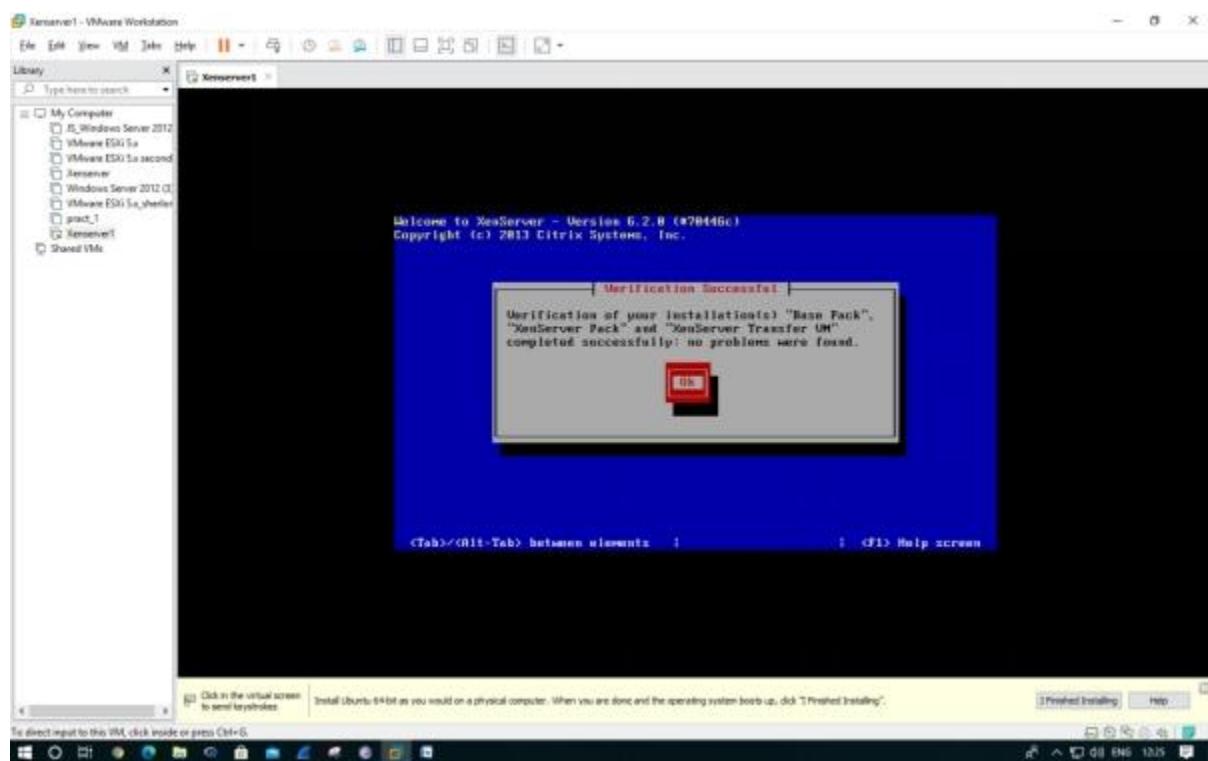
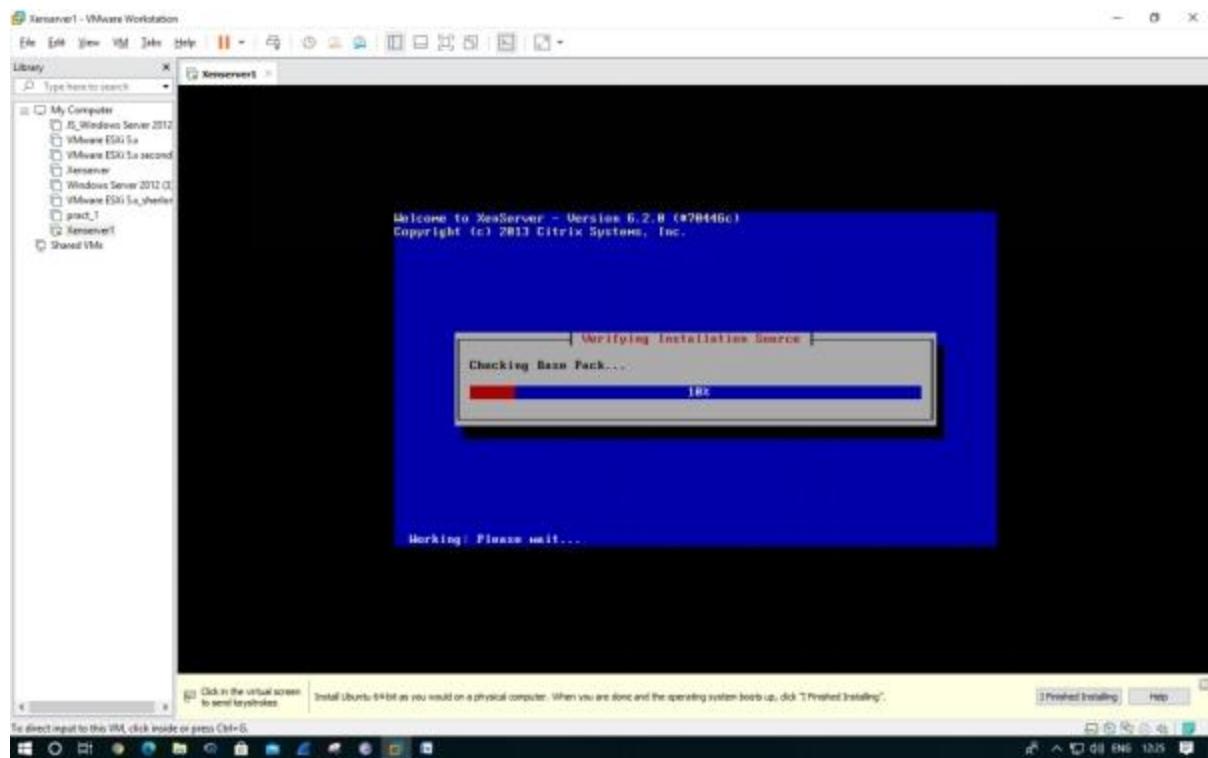


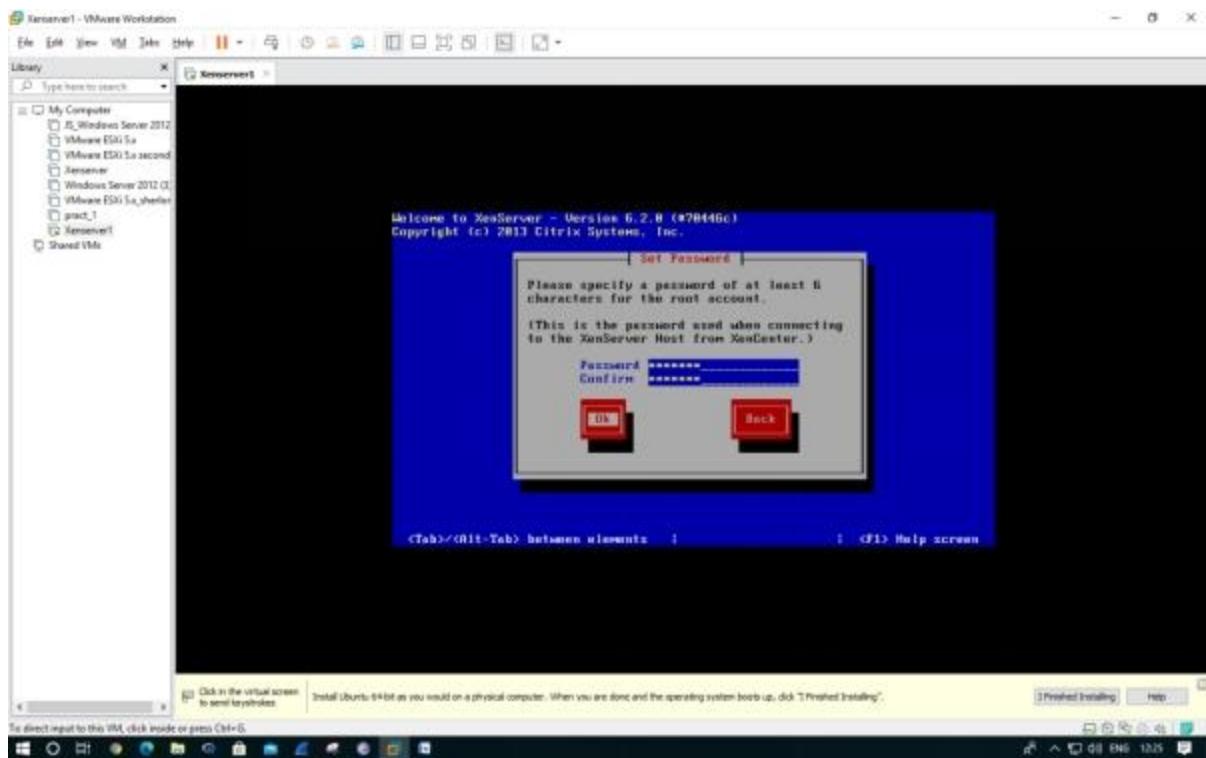




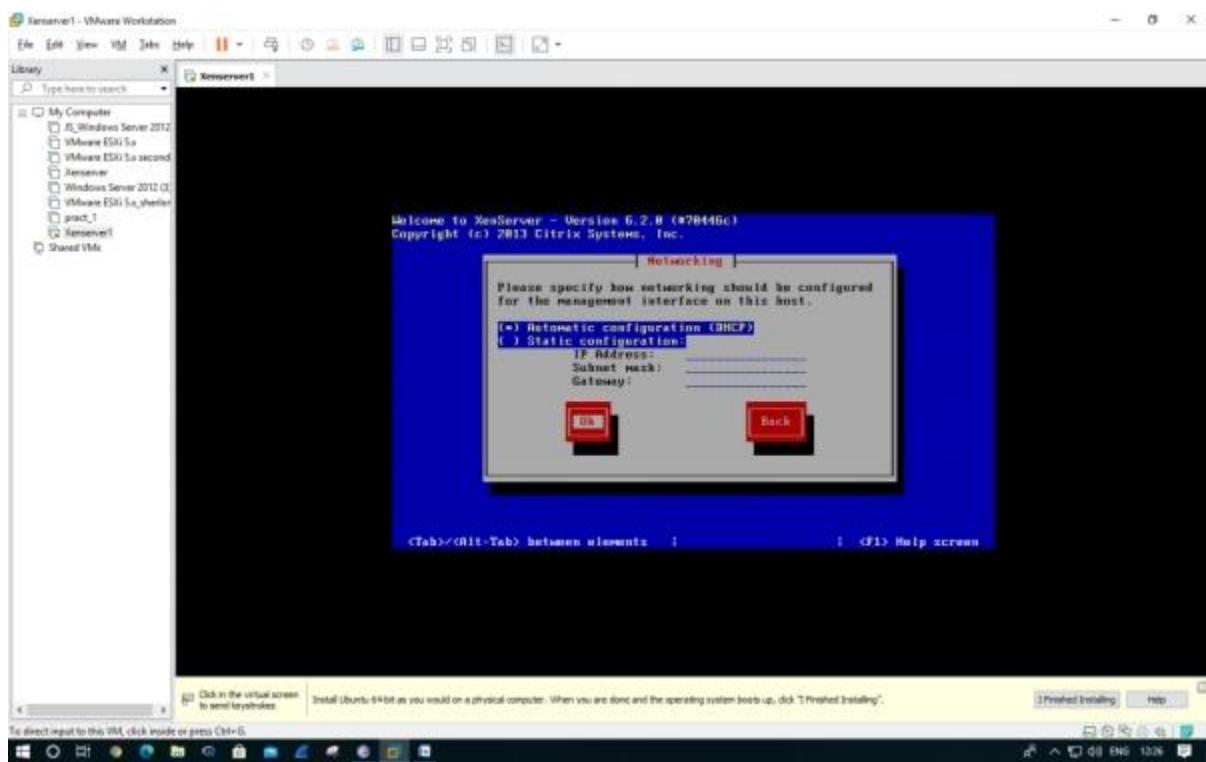


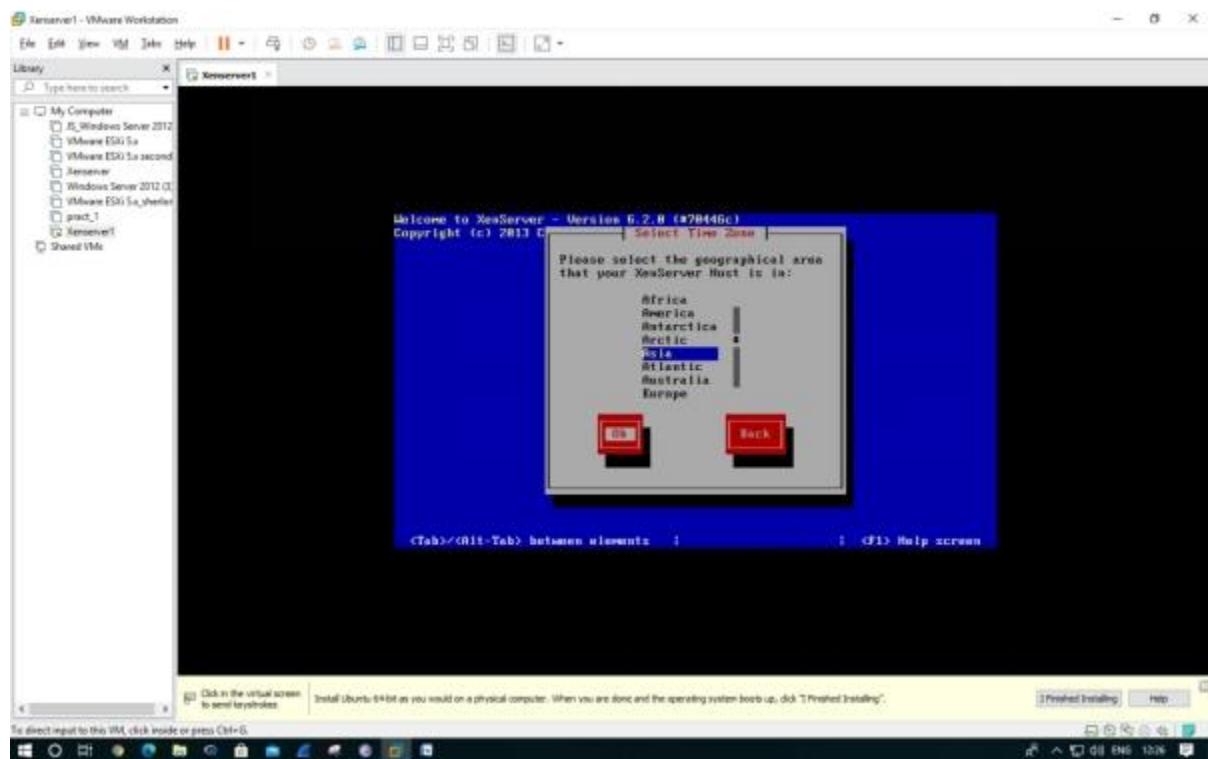
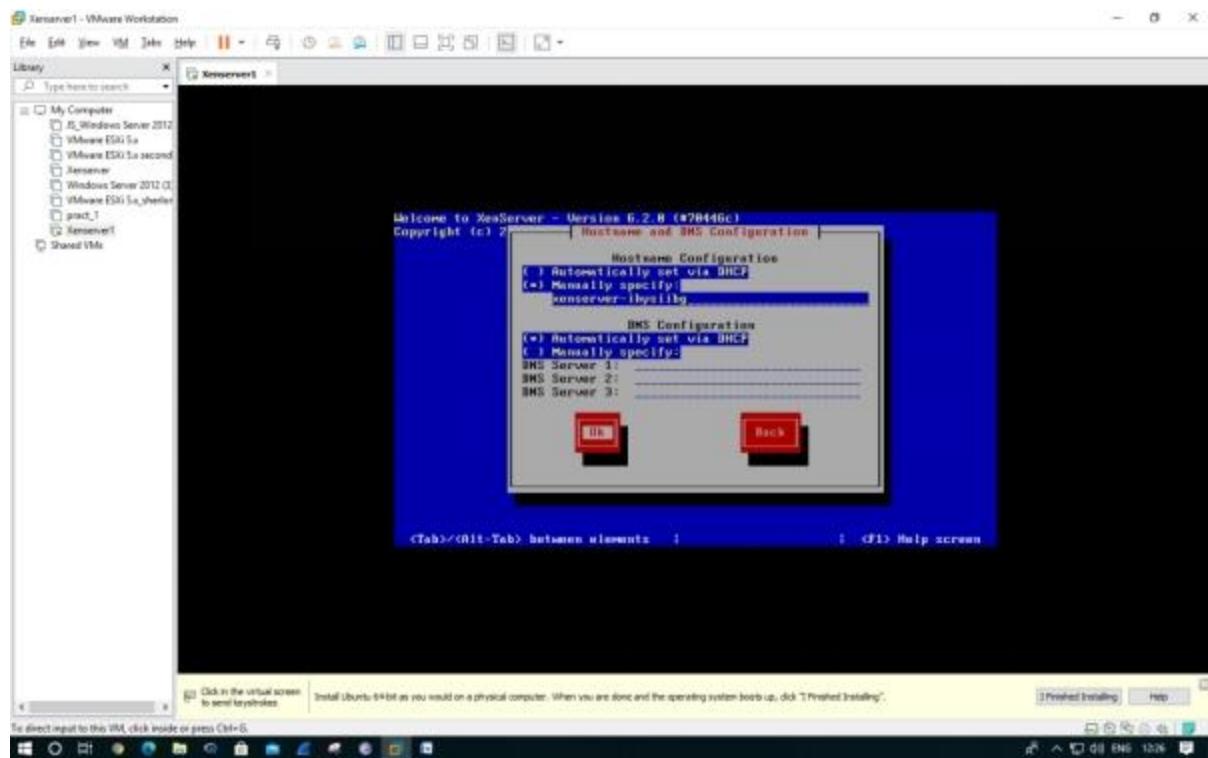


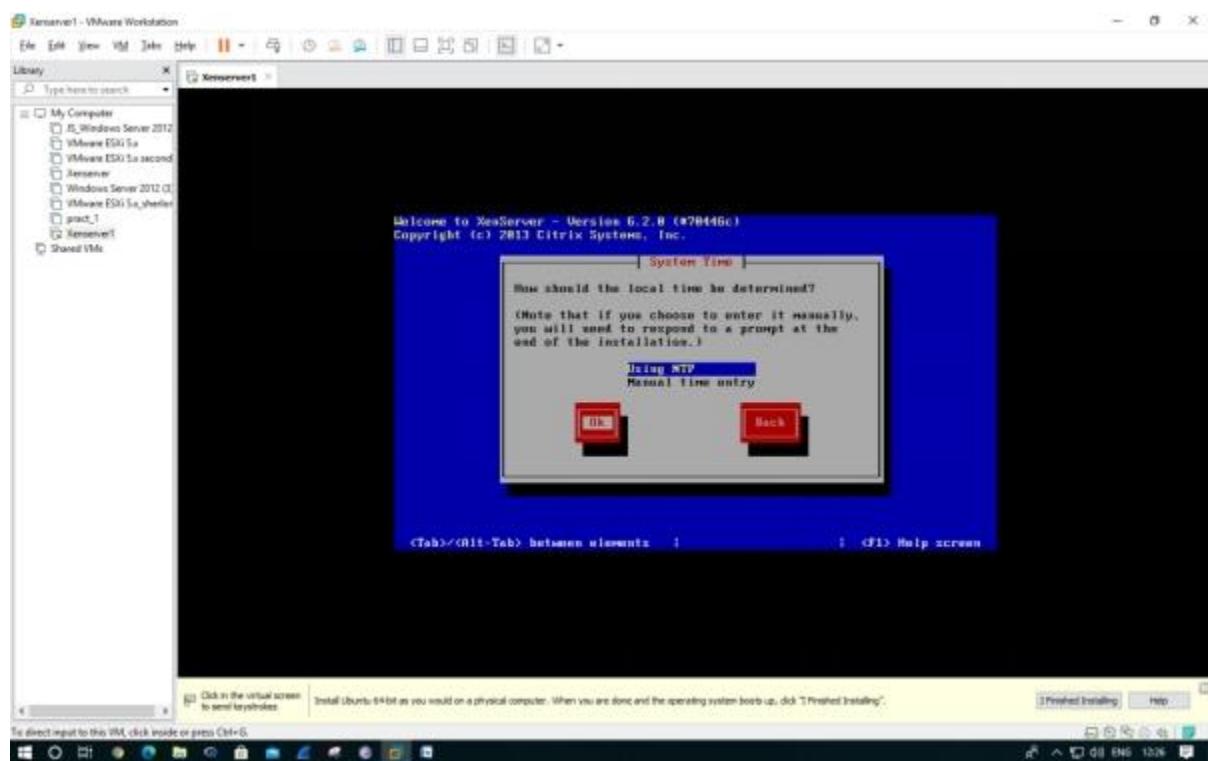
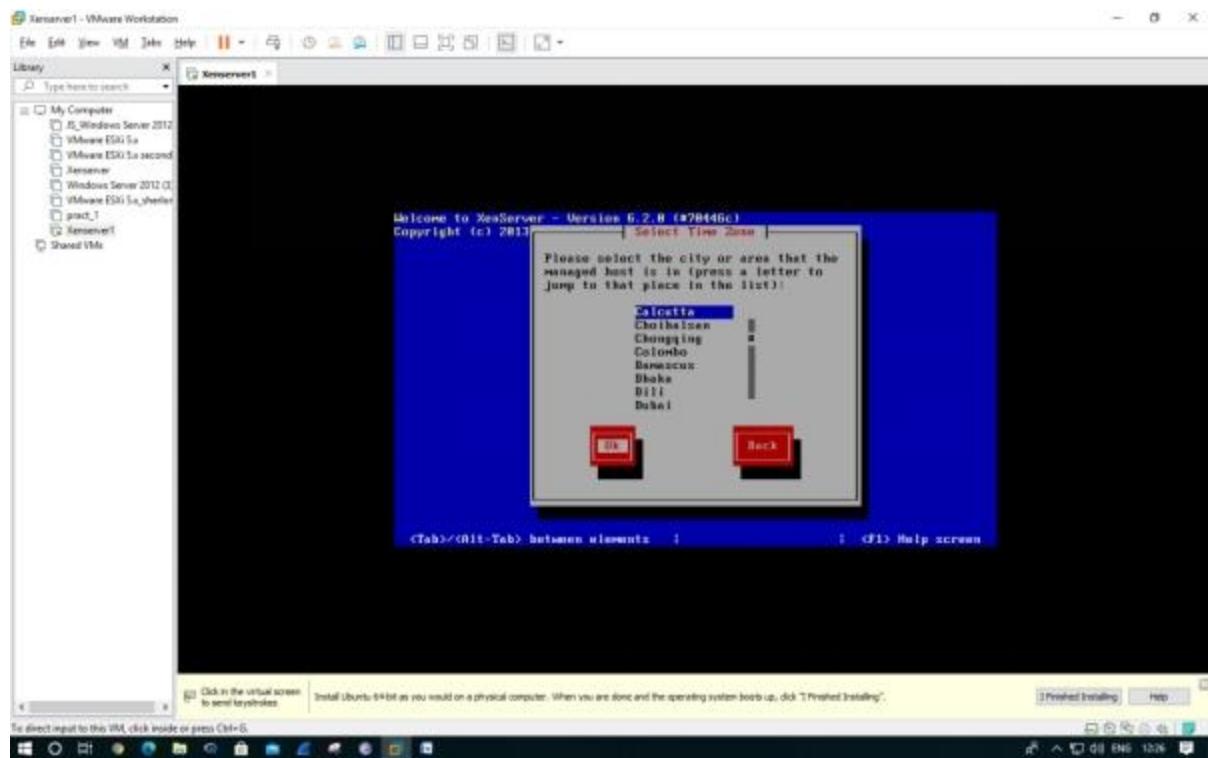


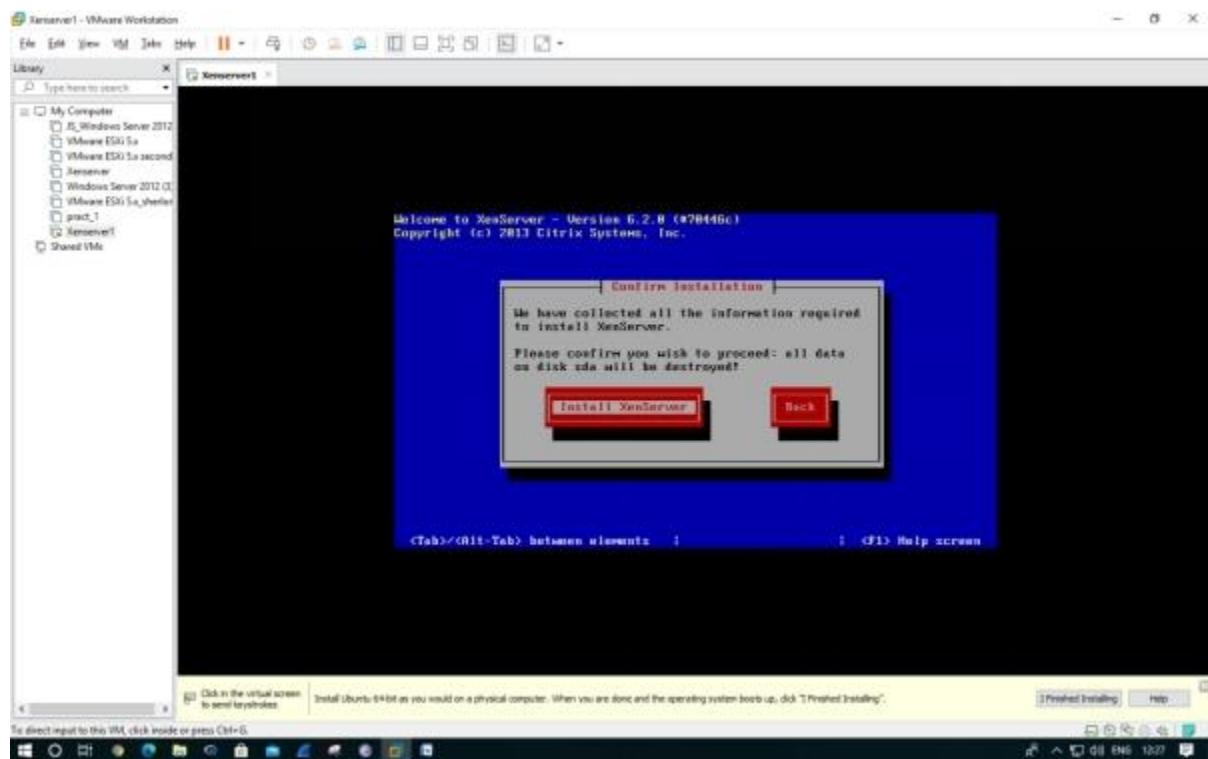
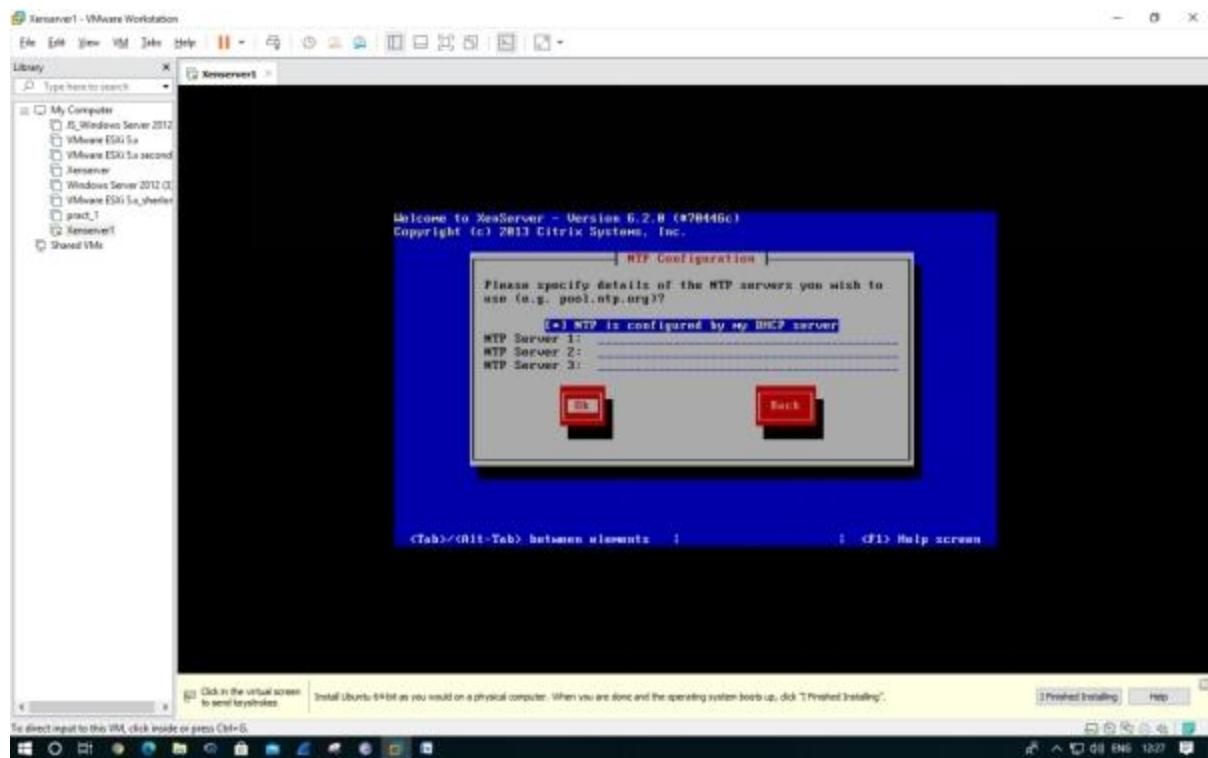


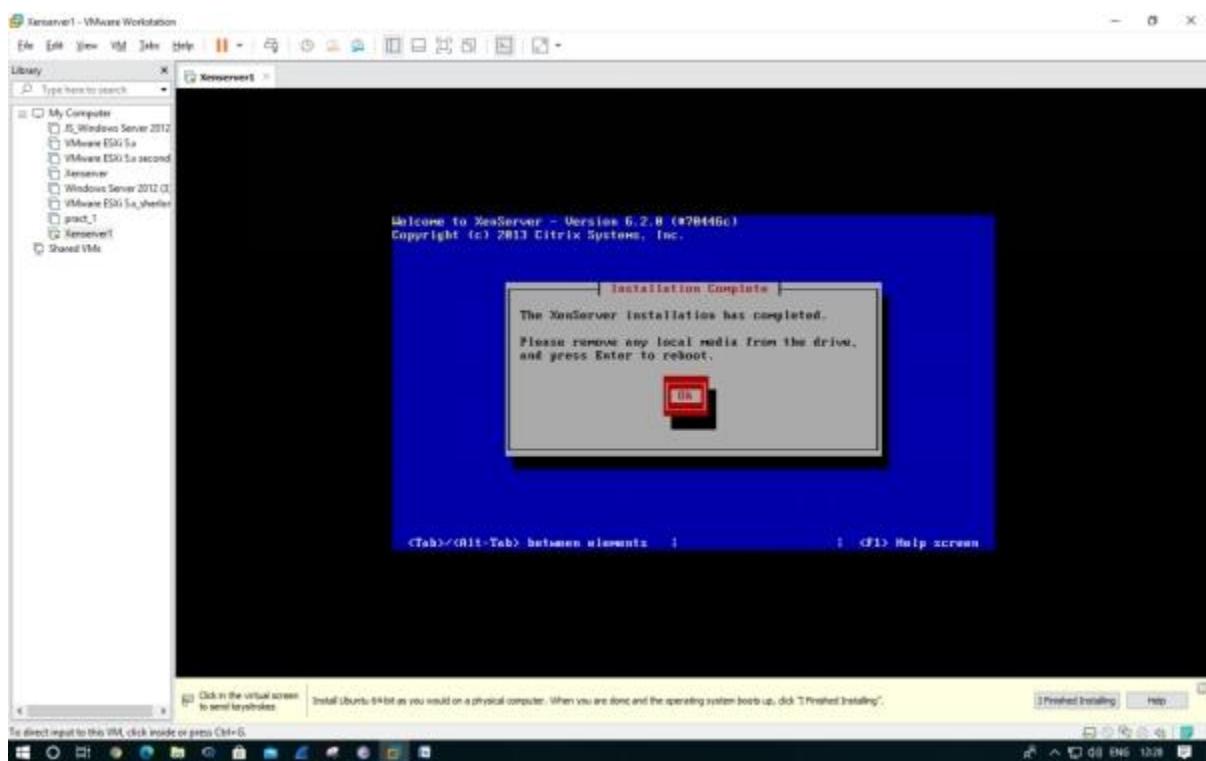
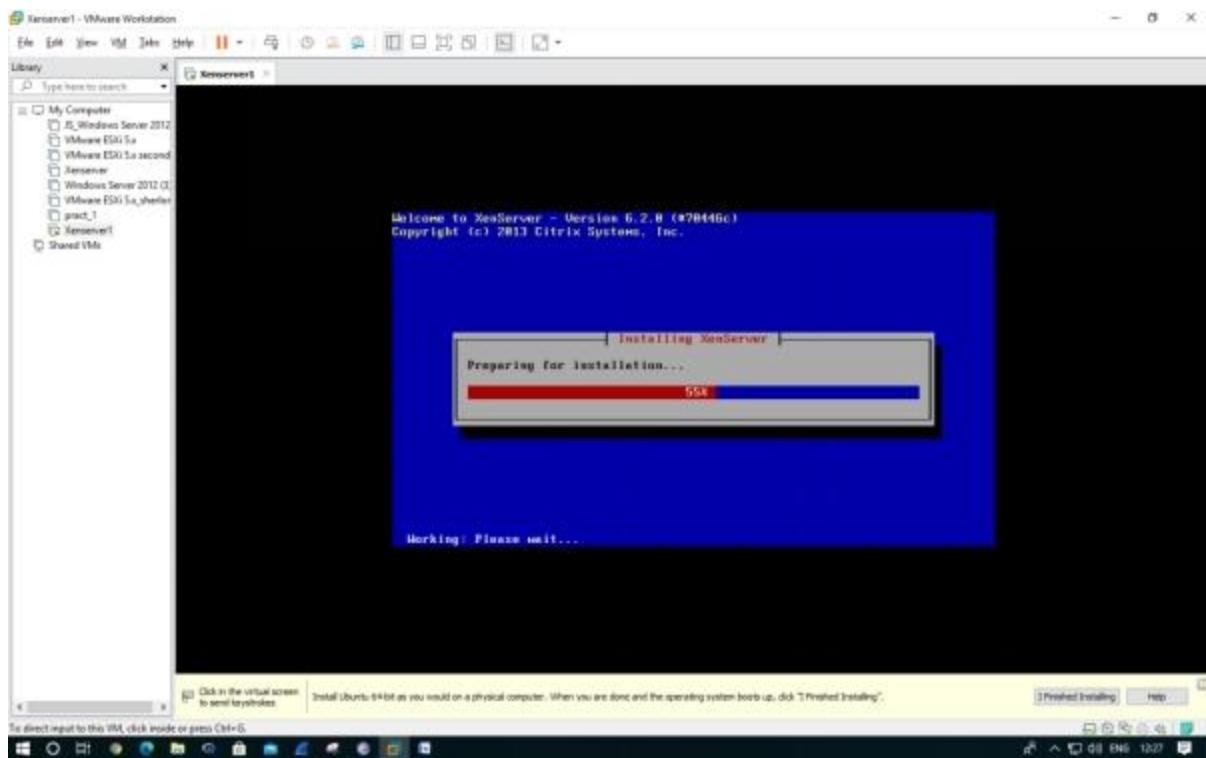
Password root123

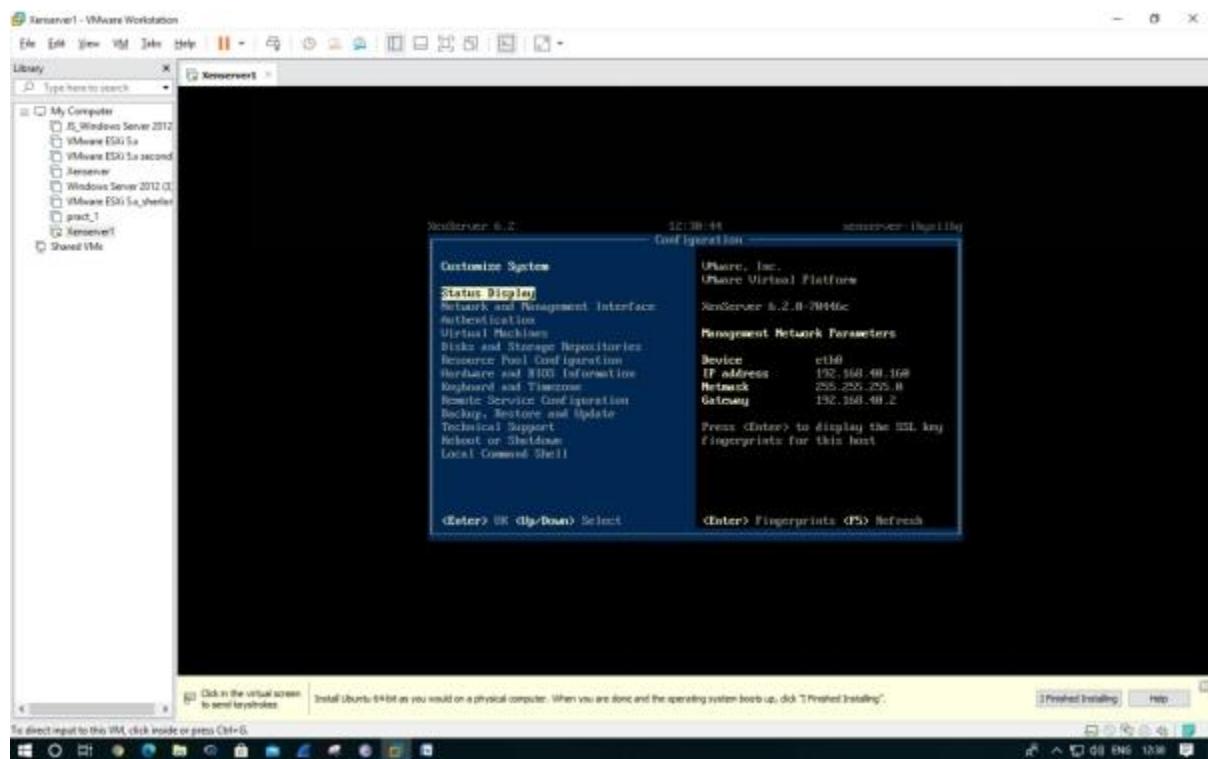
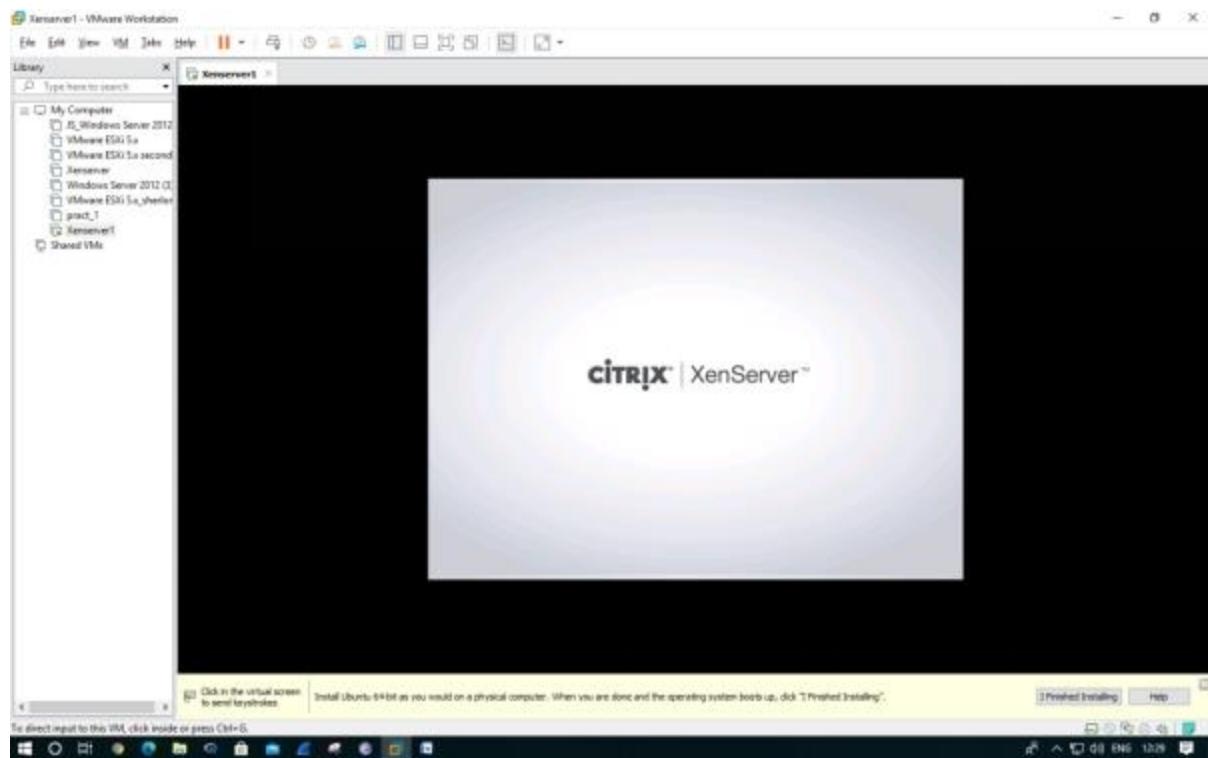


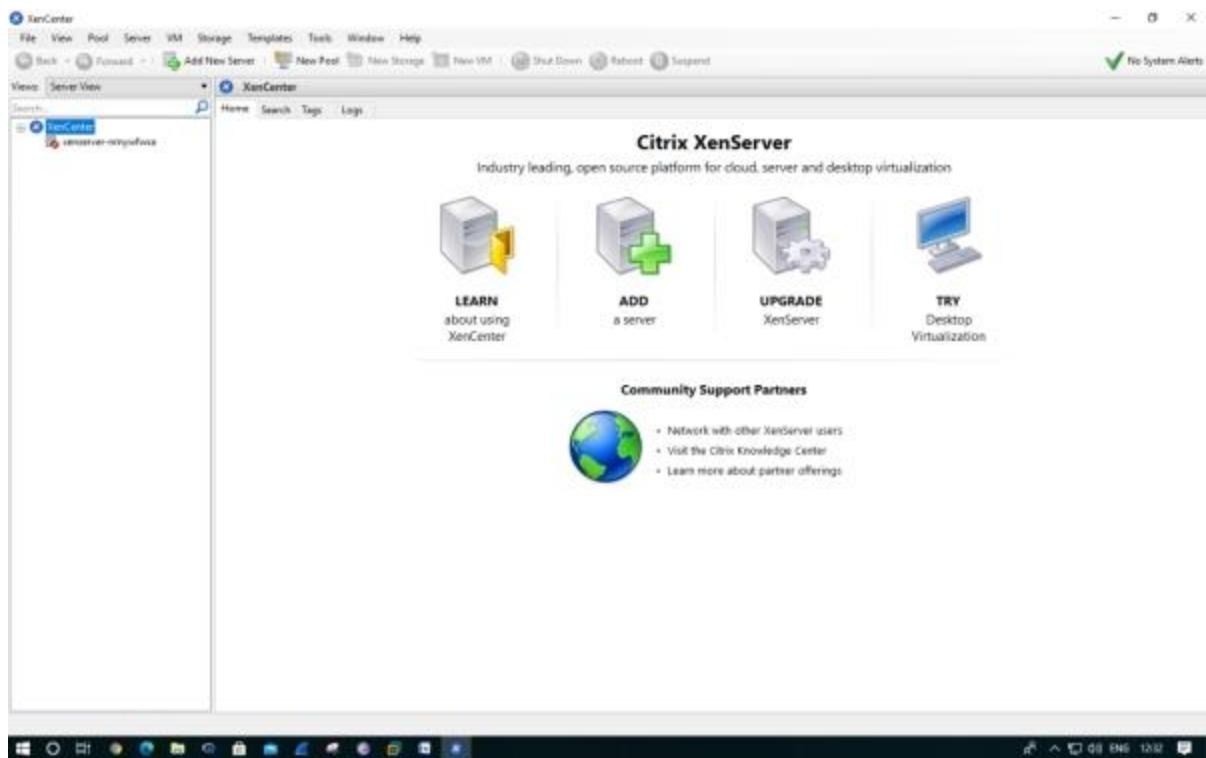




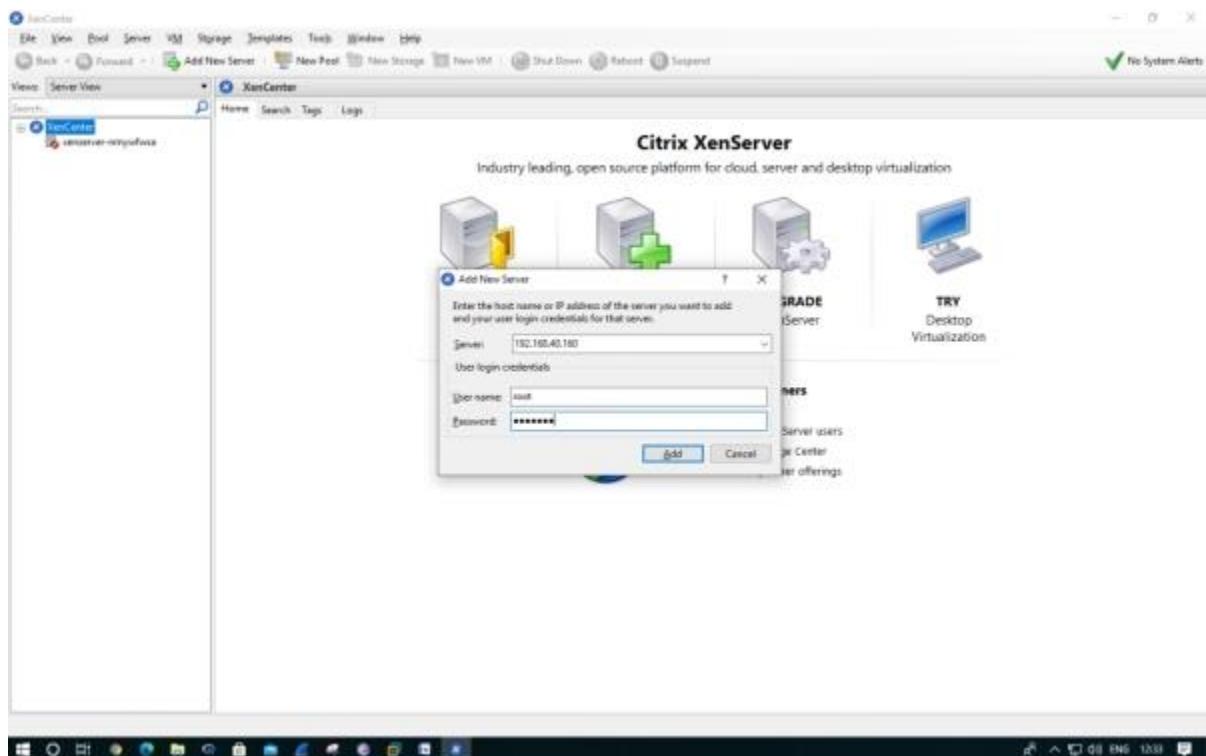




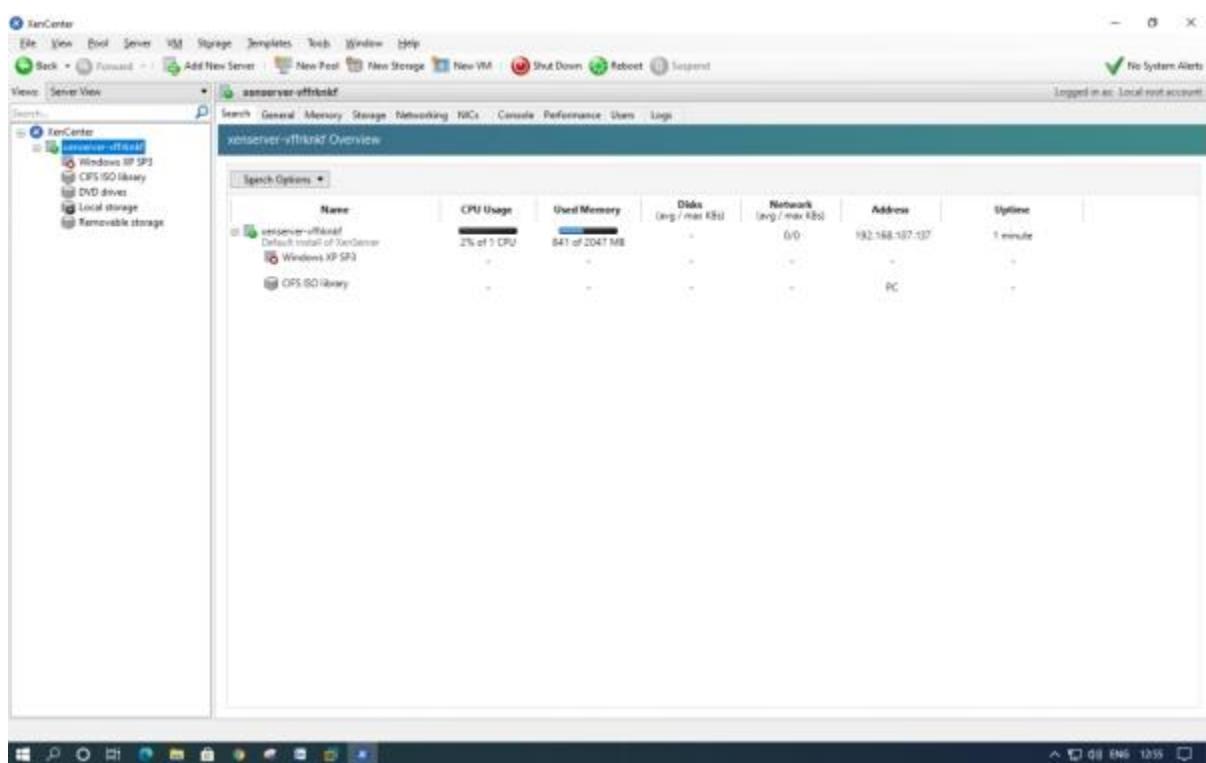
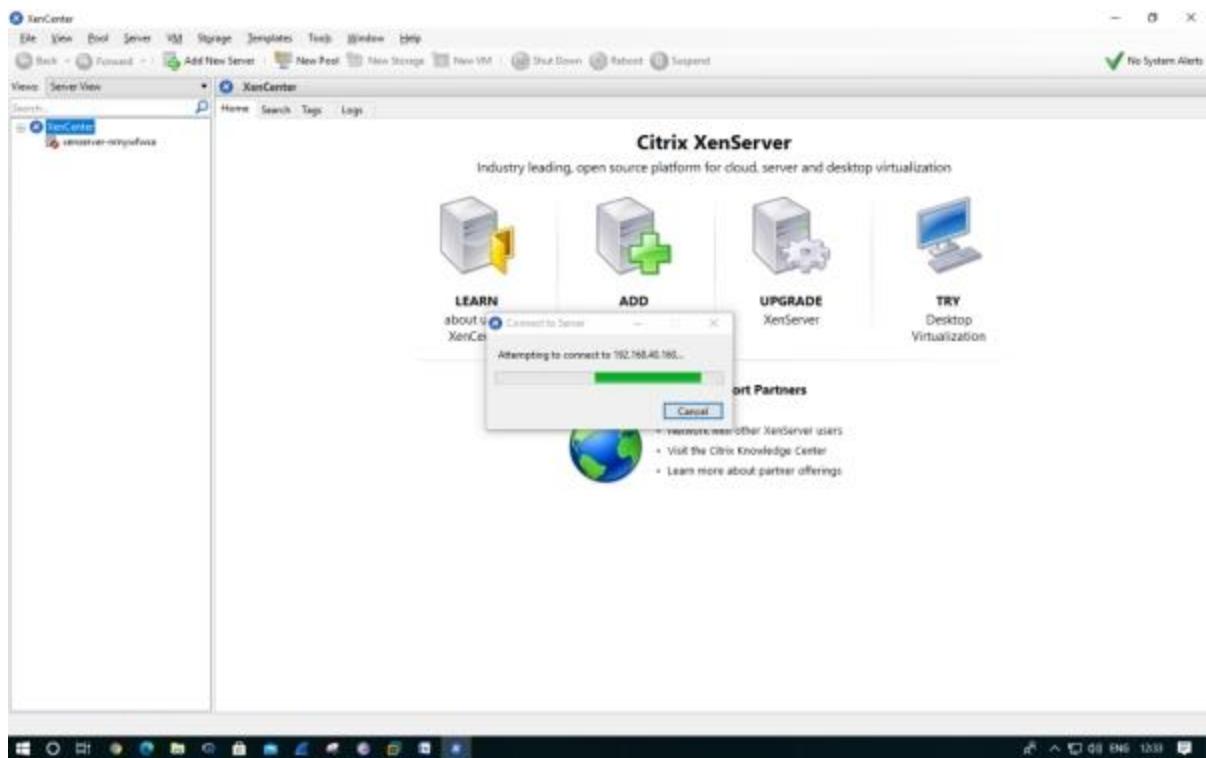


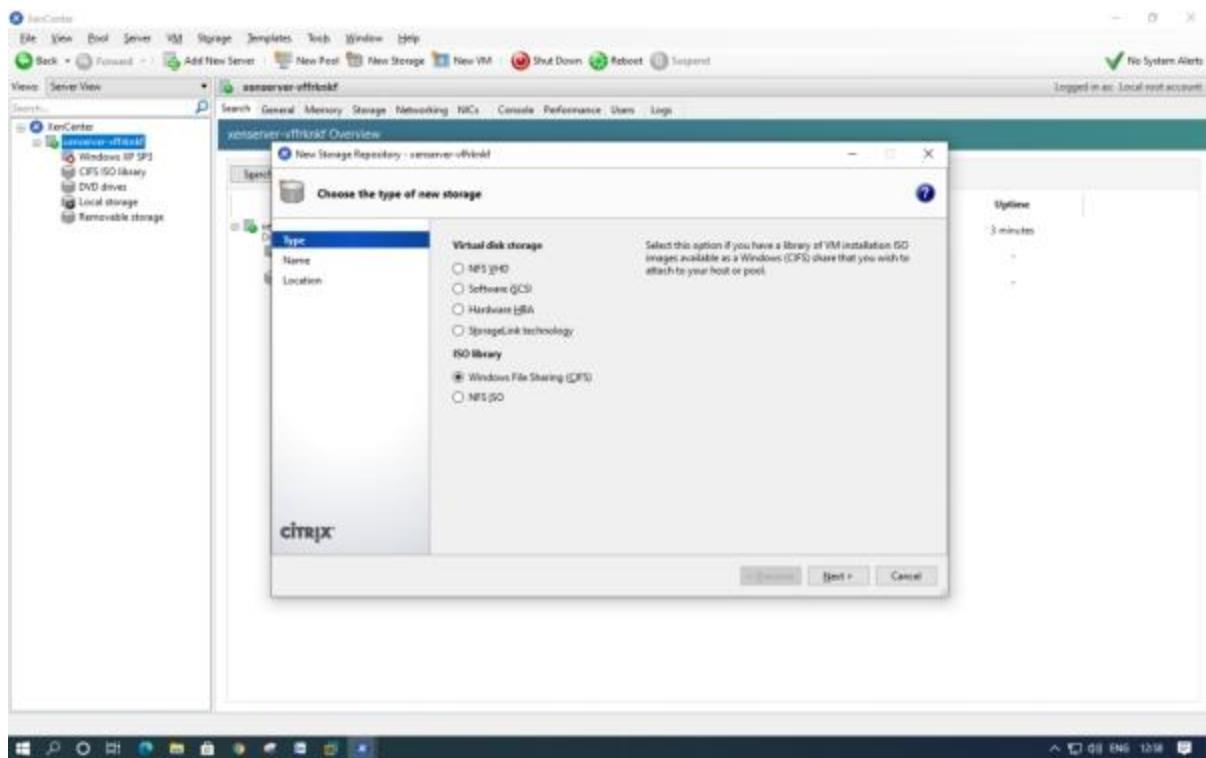


Open Citrix Xenserver

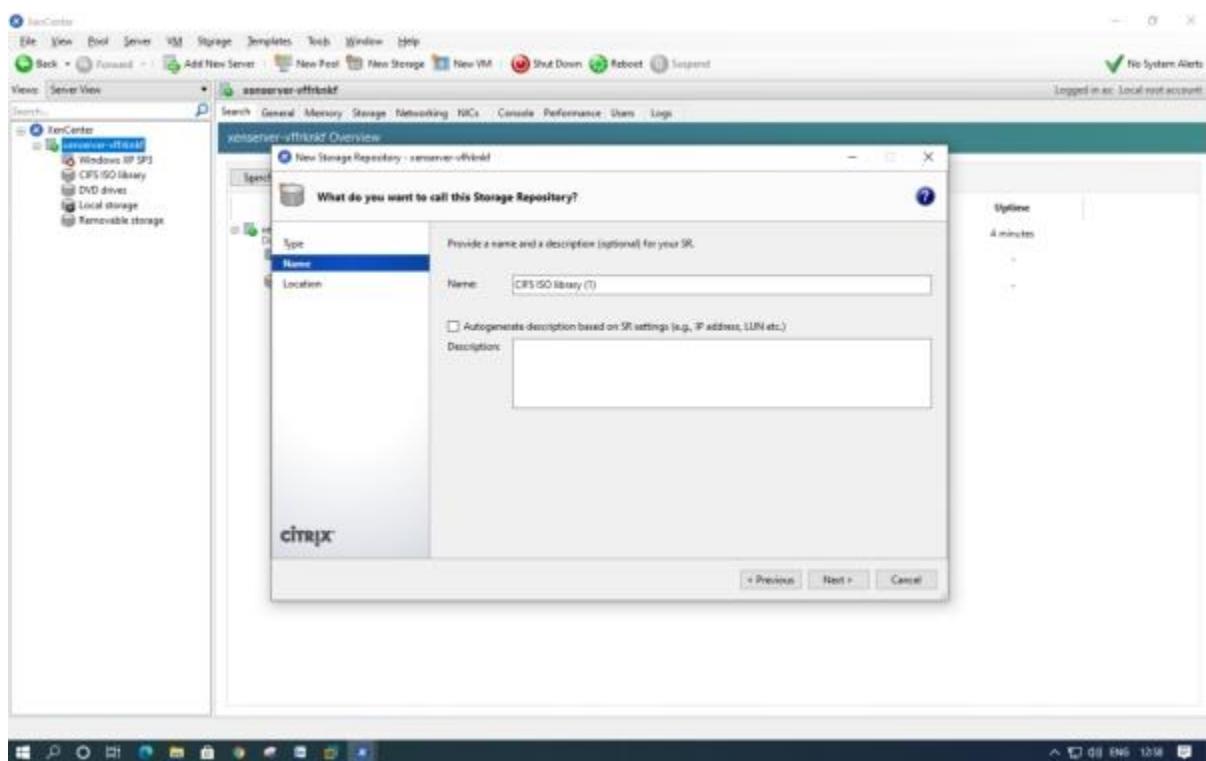


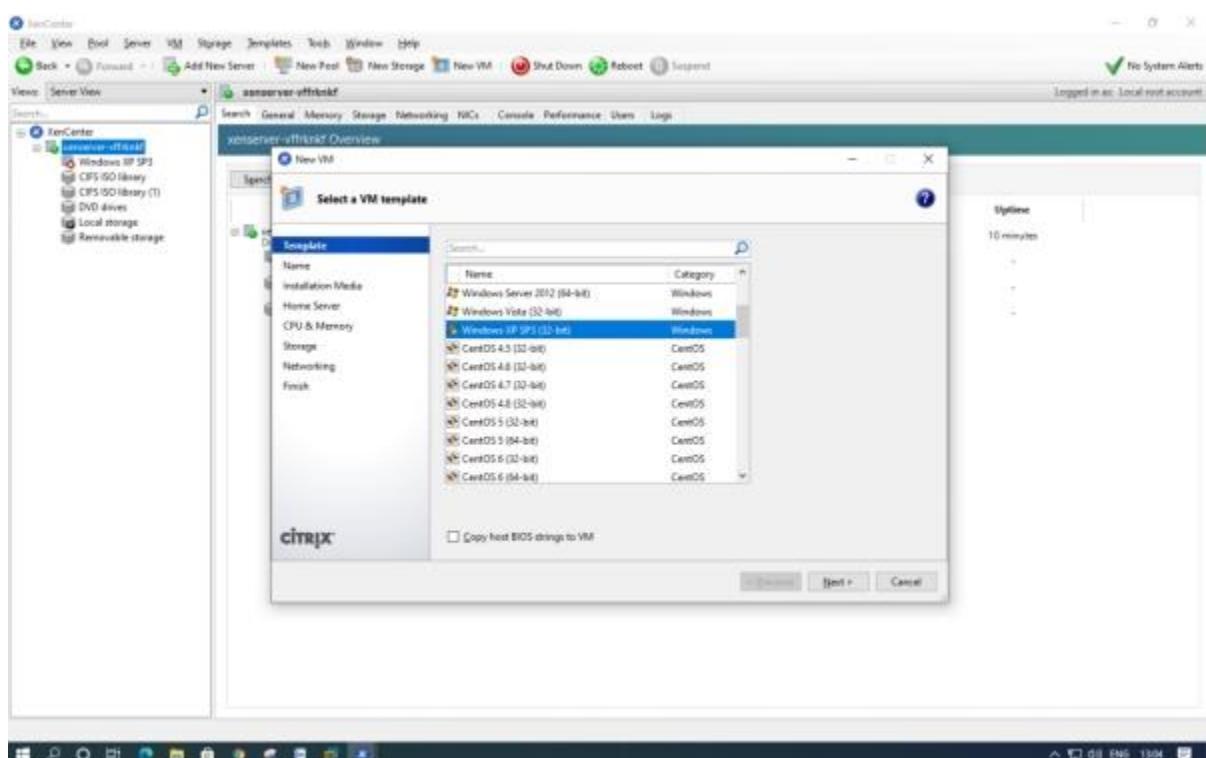
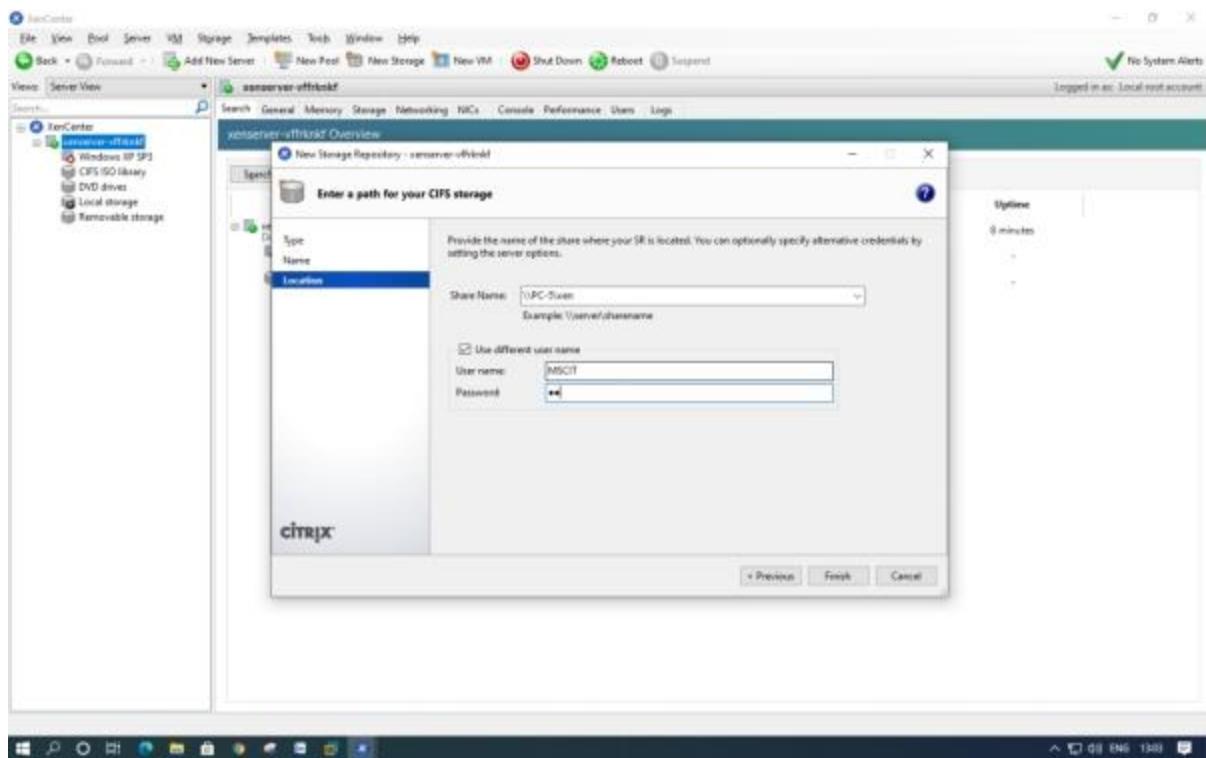
Connect it with the output we got in workstation select server as we got in the output with password as 'root123'.



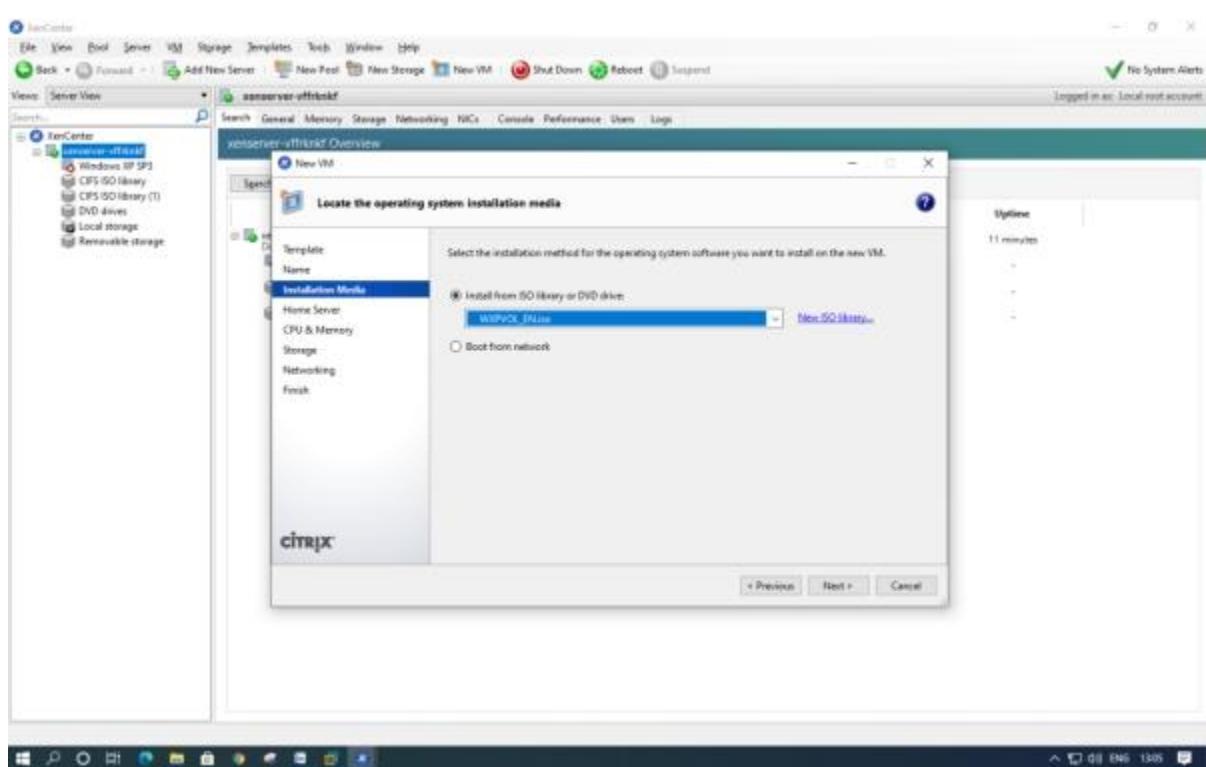
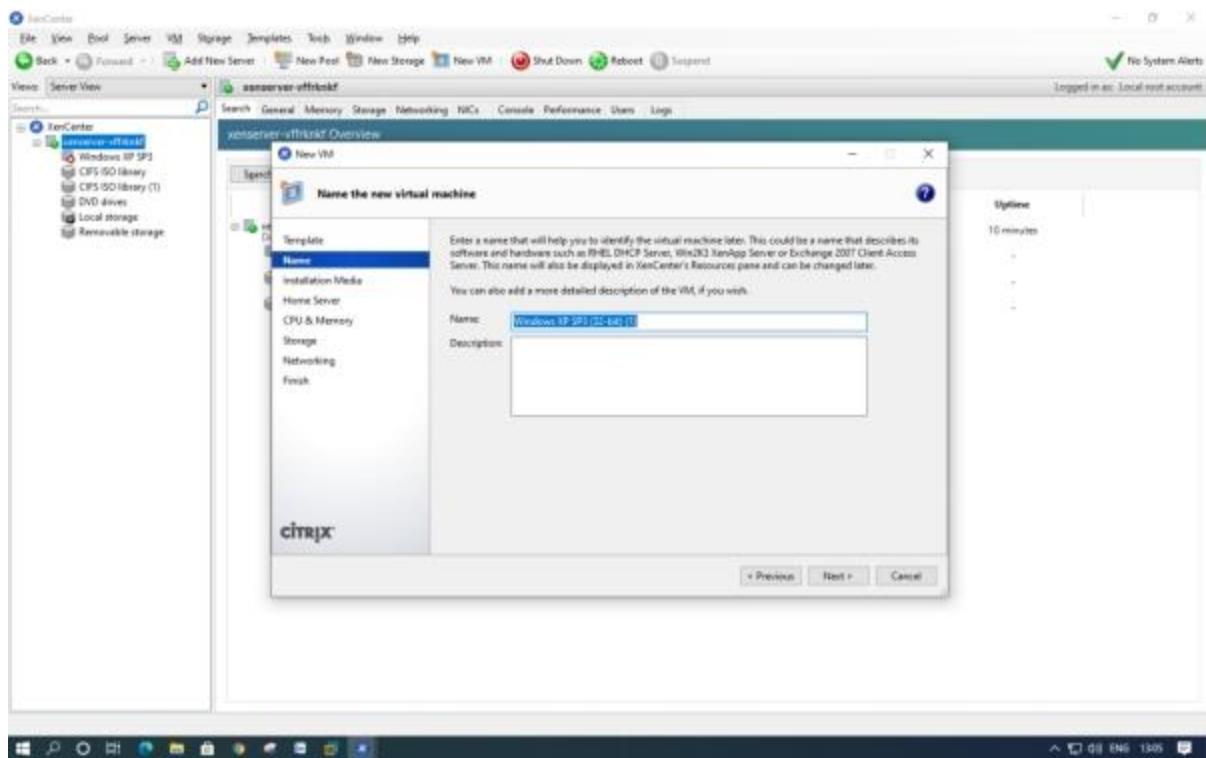


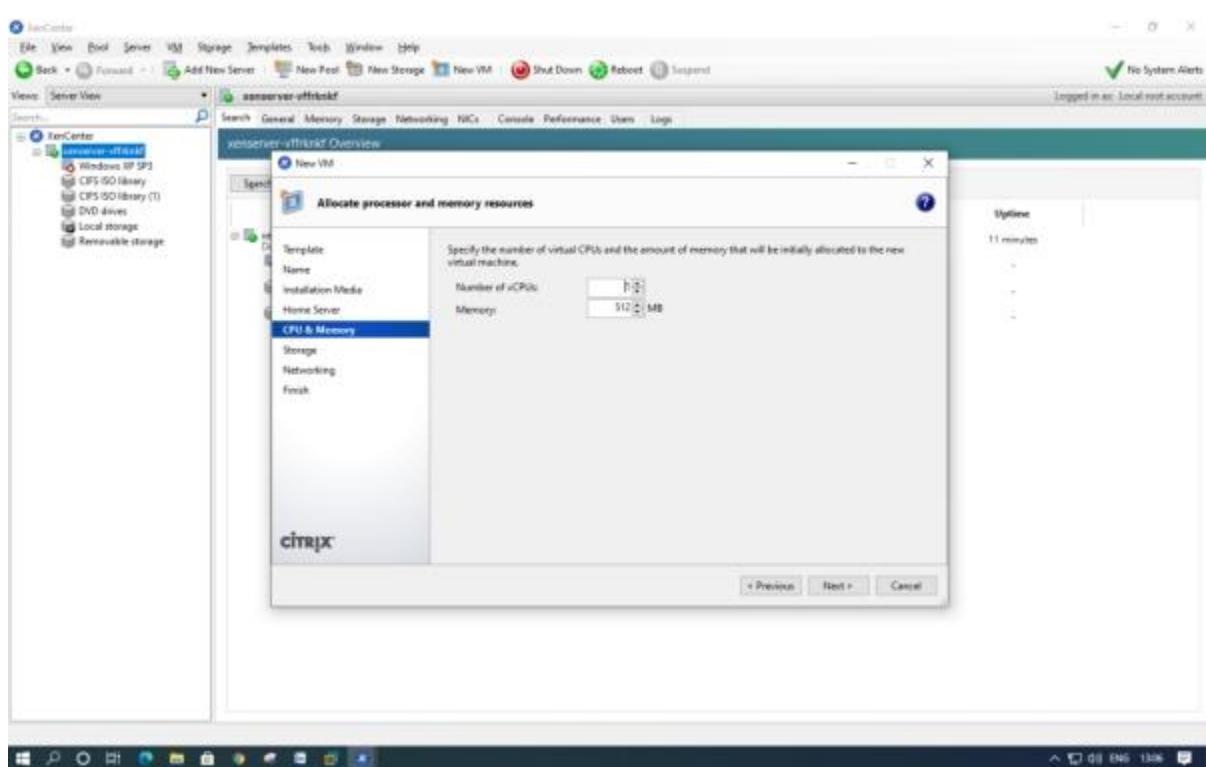
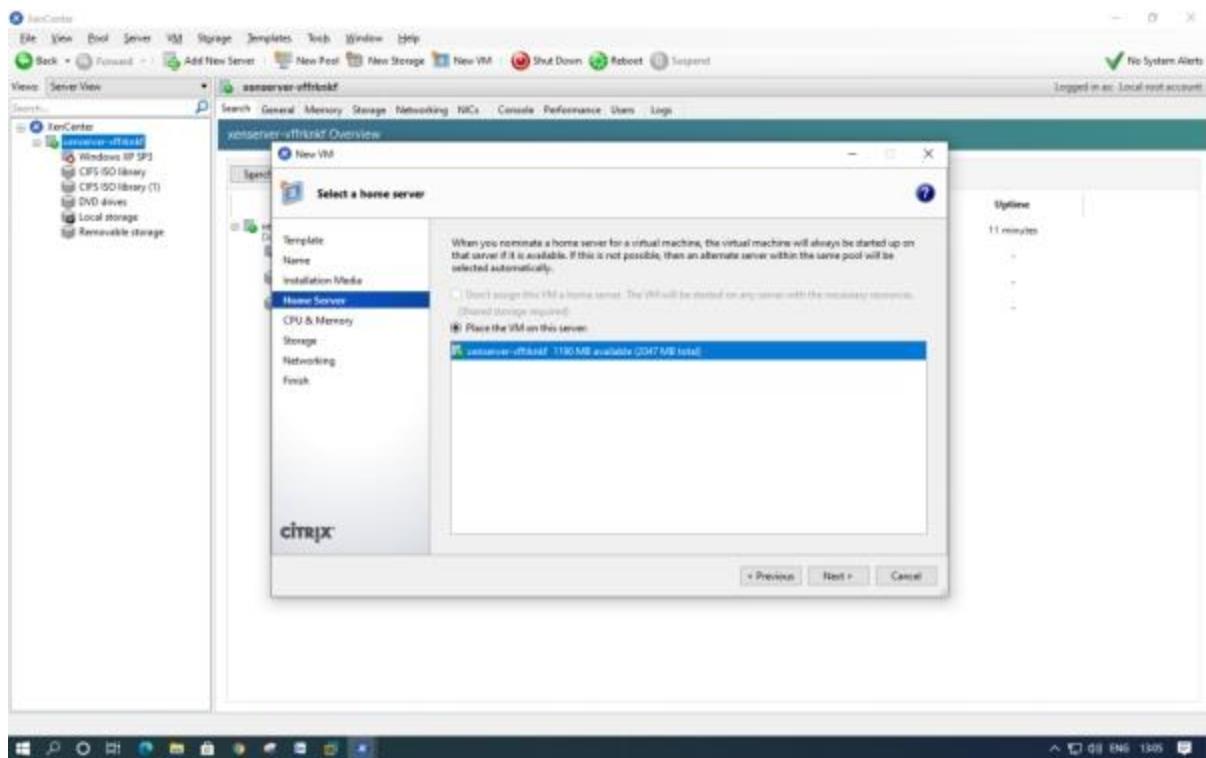
Select iso library option

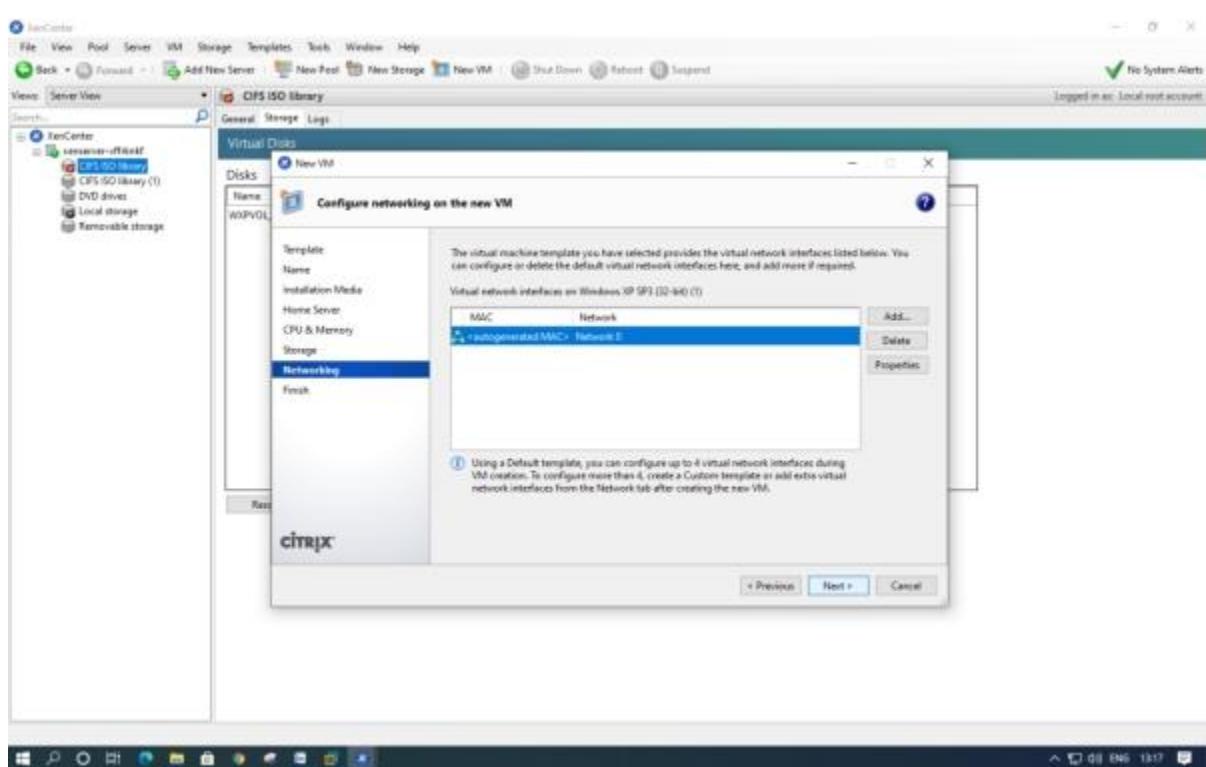
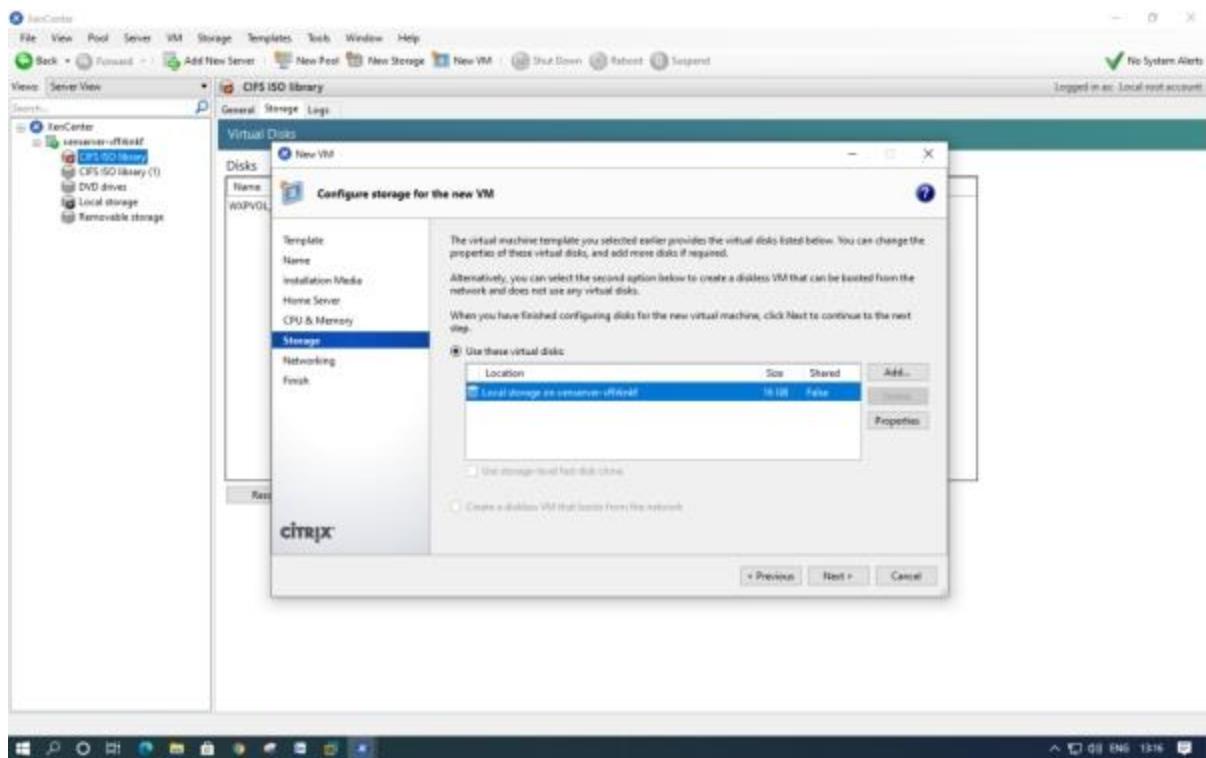


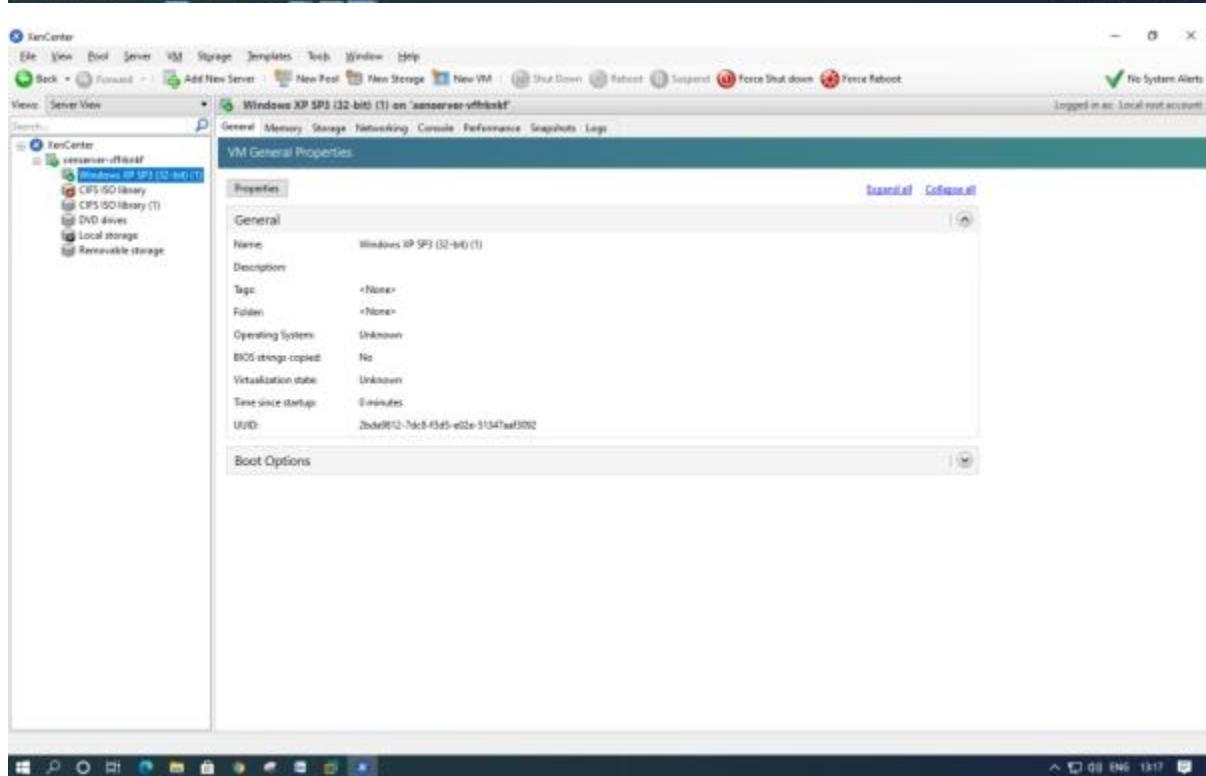
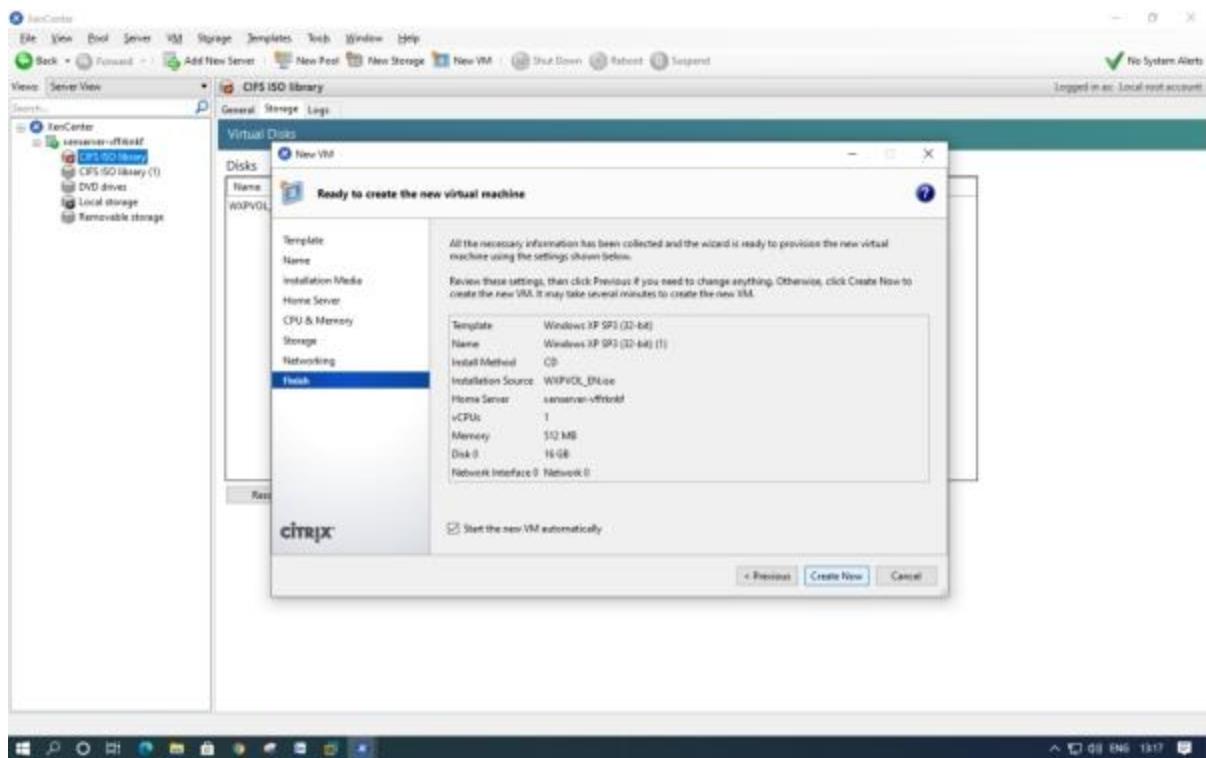


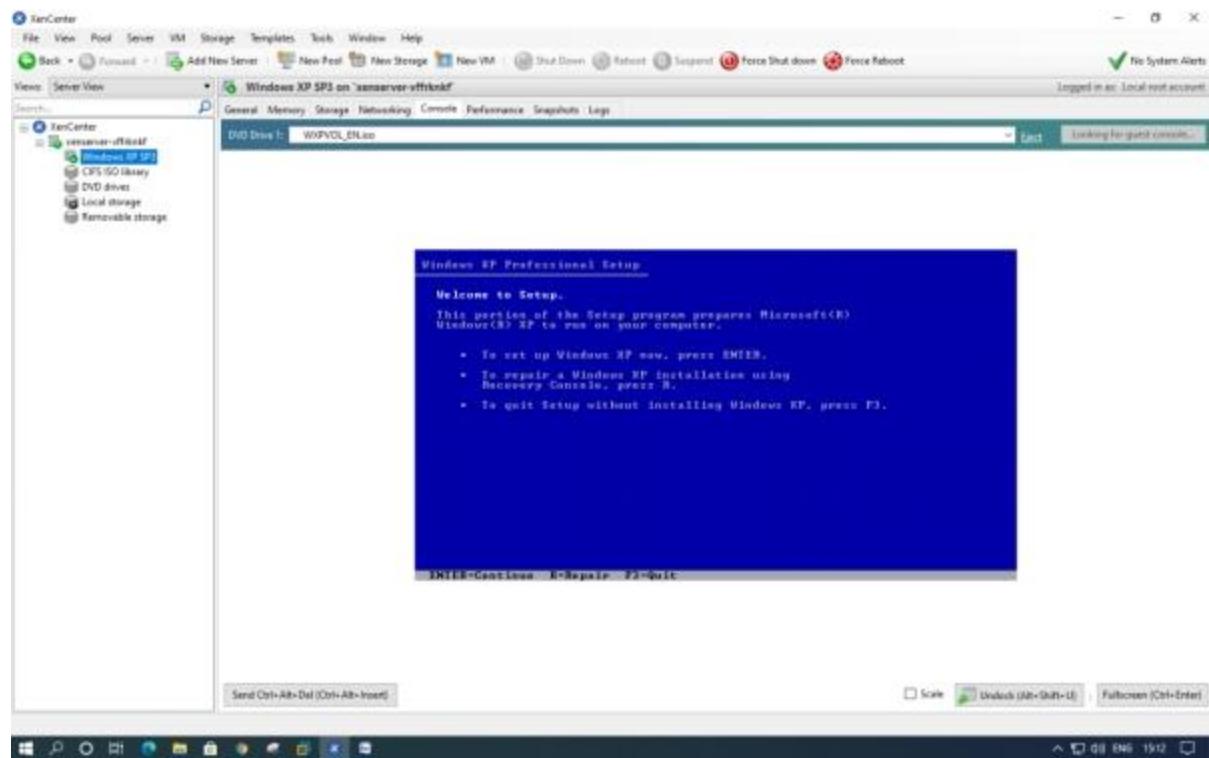
Open new VM option select Windows XP SP3(32-bit) option.







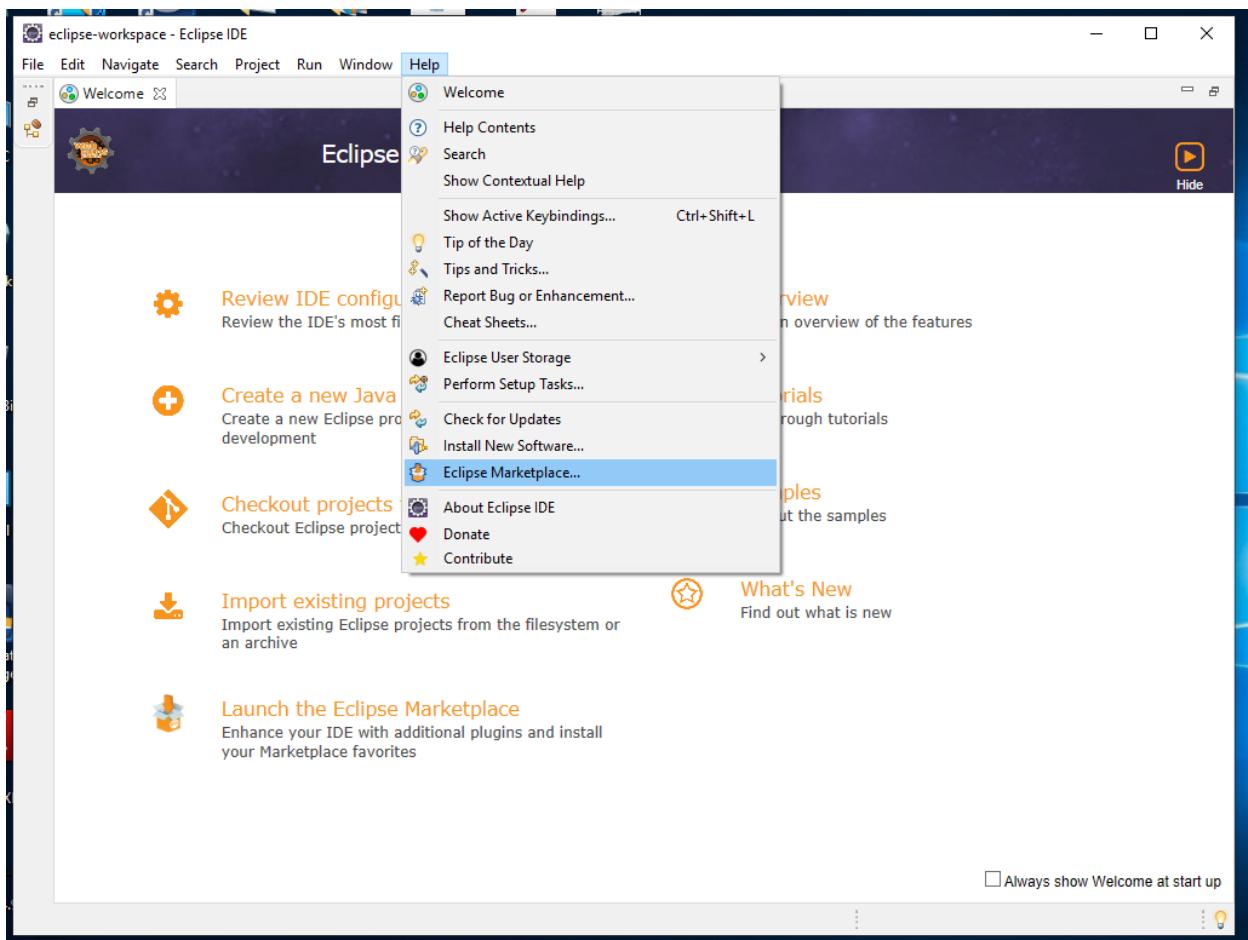




Practical No. 4
Implementing search Engine (Google App Engine)

Open Eclipse IDE 2020-12. Go to Help Menu-> Eclipse Marketplace





Select Google Cloud Tools for Eclipse 1.8.3 and Install

Eclipse Marketplace

Eclipse Marketplace

Select solutions to install. Press Install Now to proceed with installation.
Press the "more info" link to learn more about a solution.

Search Recent Popular Favorites Installed  Giving IoT an Edge

Find: All Markets All Categories Go

Google Cloud Tools for Eclipse 1.8.3

Cloud Tools for Eclipse is a Google-sponsored open source plugin that supports the Google Cloud Platform. Cloud Tools for Eclipse enables you to create, import,... [more info](#)

by Google LLC, Apache 2.0
[Google Cloud Platform](#) [dataflow](#) [GCP](#) [app engine](#) [google](#)

 129  Installs: 90.2K (1,172 last month) 

Eclipse Tools for Cloud Foundry 1.2.0

This listing installs support into Eclipse Tools for Cloud Foundry, the industry's first open platform as a service. A Java 8 Execution Environment is required.... [more info](#)

by Pivotal, IBM, EPL
[spring](#) [Cloud](#) [paas](#) [java](#) [paas](#) [cloudfoundry](#)

 145  Installs: 30.2K (211 last month) 

Oracle Cloud Tools

Tools for developing applications for Oracle Cloud. These features are also part of Oracle Enterprise Pack for Eclipse (OEPE). [more info](#)

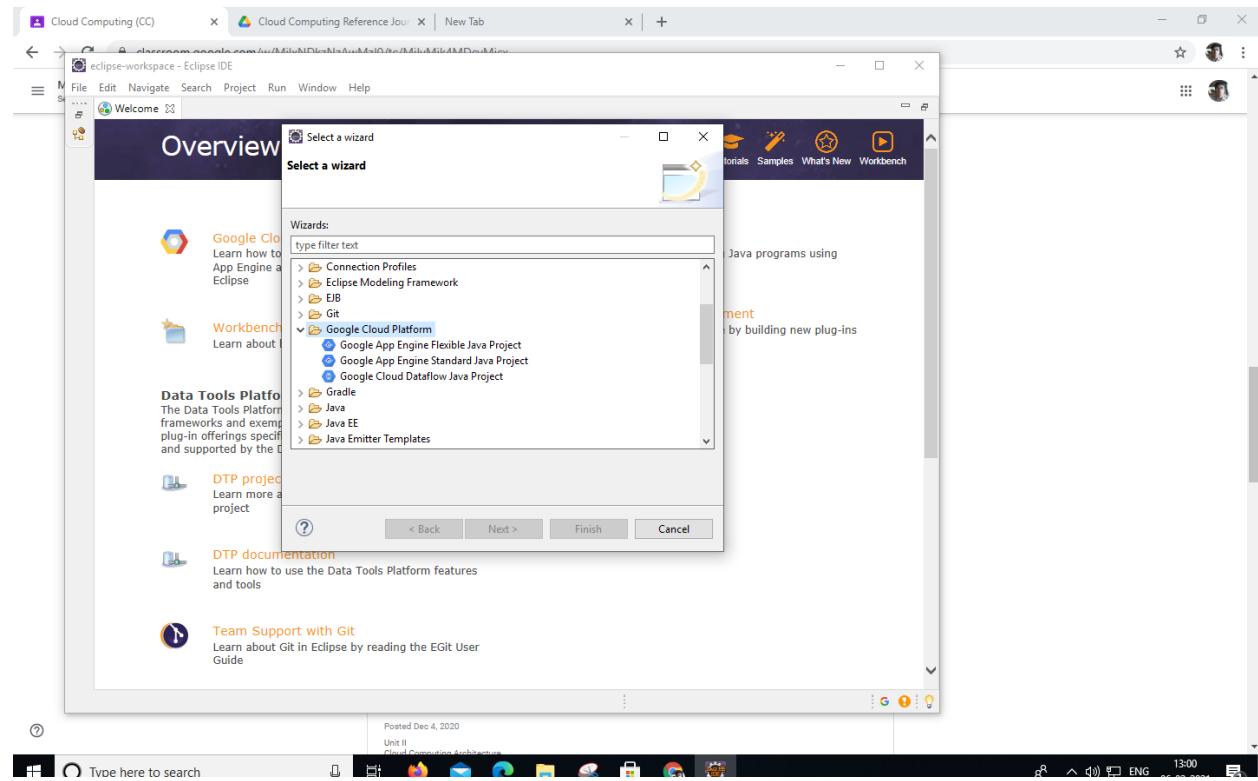
by Oracle, Commercial - Free

Marketplaces

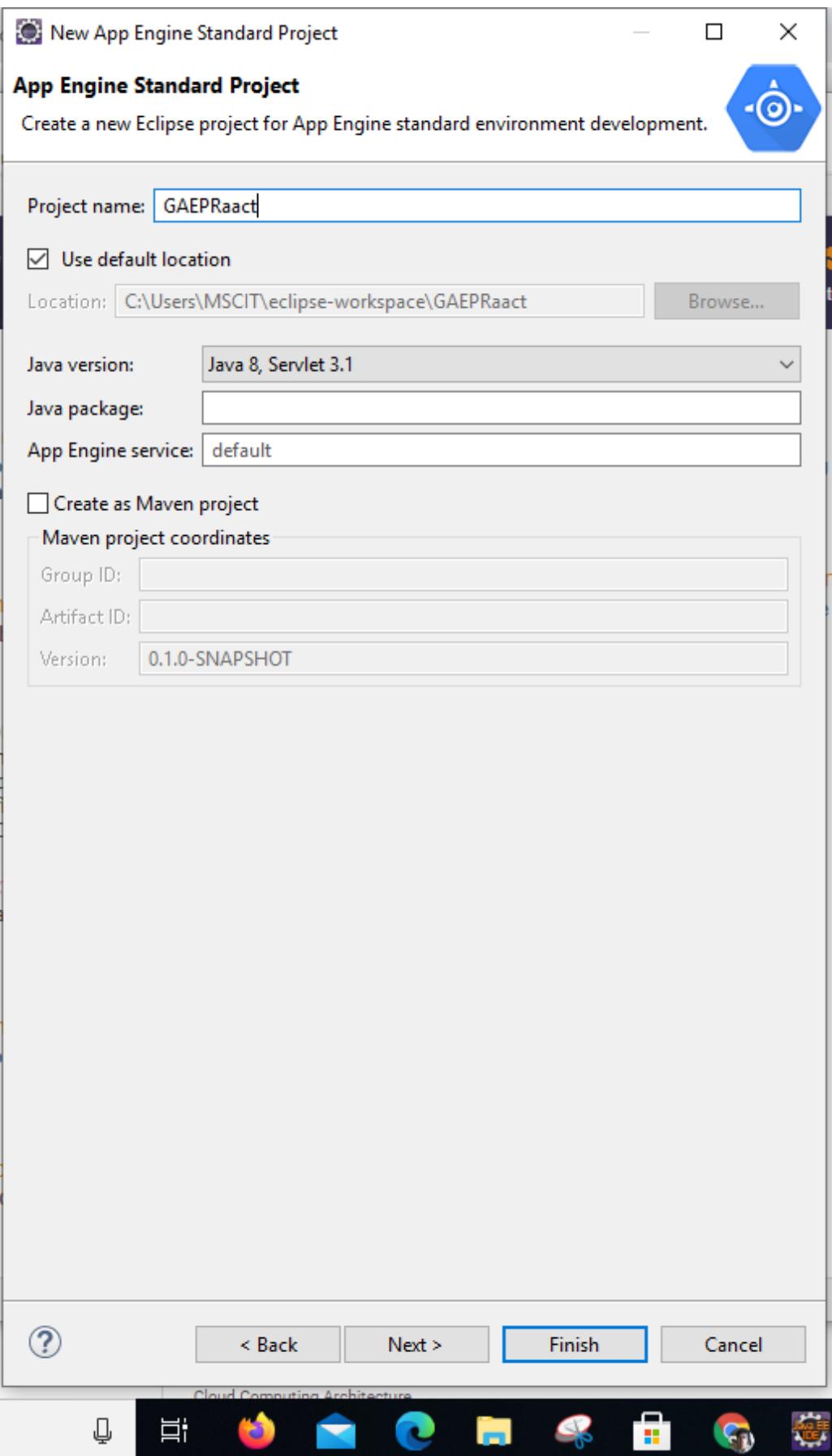
  

 < Back  Install Now >  Cancel

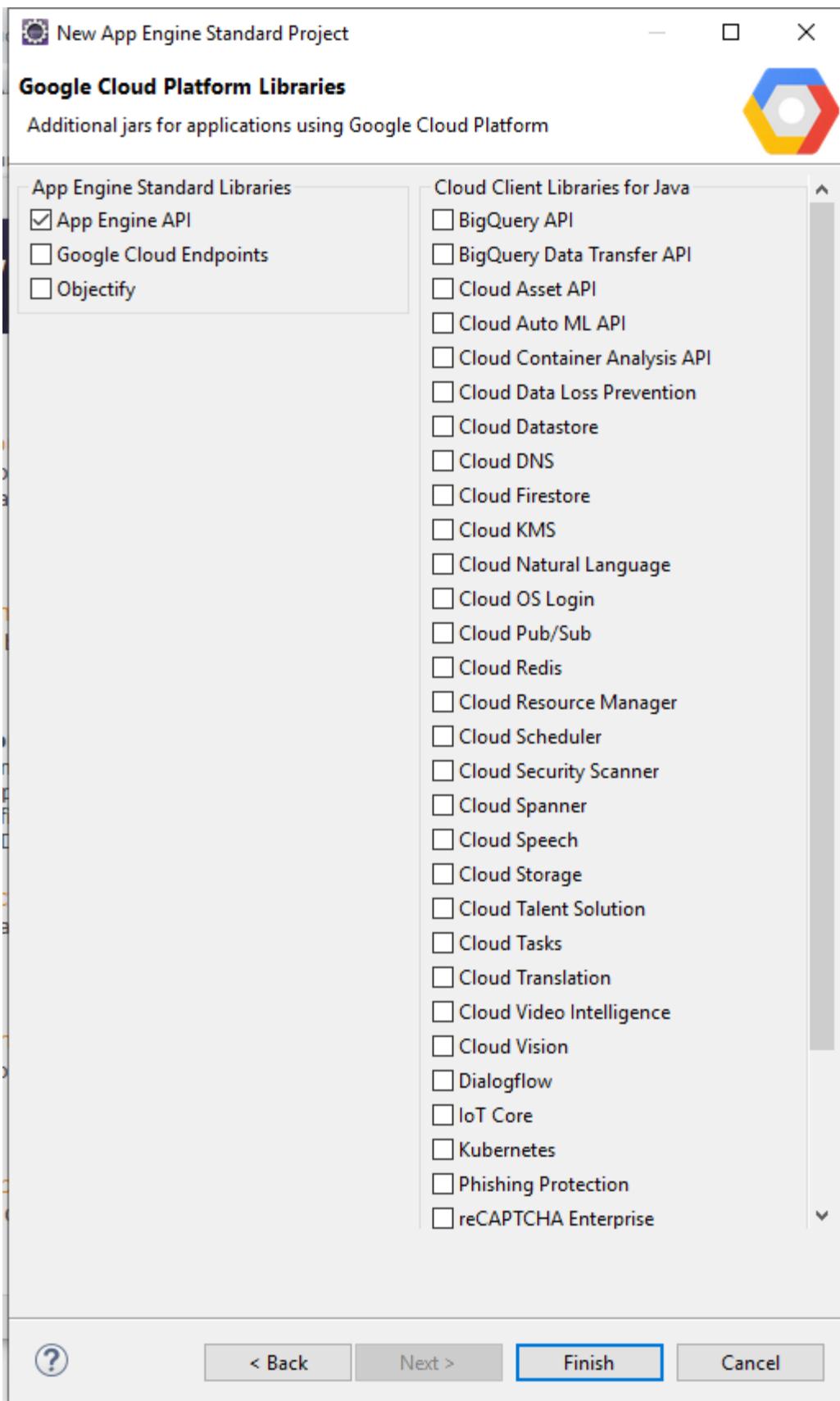
From SELECT A WIZARD, click Google Cloud Platform and select Google App Engine Standard Java Project



In App Engine Standard Project give the project name and click Next



Select App engine Api and click Finish



The screenshot shows the Eclipse IDE interface with the following details:

- Title Bar:** eclipse-workspace - GAEPRact/src/main/java/HelloAppEngine.java - Eclipse IDE
- Project Explorer:** Shows the project "GAEPRact" with one file selected: "HelloAppEngine.java".
- Code Editor:** Displays the Java code for "HelloAppEngine.java". The code defines a servlet named "HelloAppEngine" that handles GET requests and prints "Hello App Engine!\r\n" to the response.
- Outline View:** Shows the class structure and methods.
- Task List:** Empty.
- Problems View:** Shows 1 warning and 2 others. The warnings are:
 - > Java Exception Breakpoints (2 items)
 - > Java Problems (1 item)
- Bottom Bar:** Includes a search bar, taskbar icons, and system status information (Windows logo, battery, date/time).

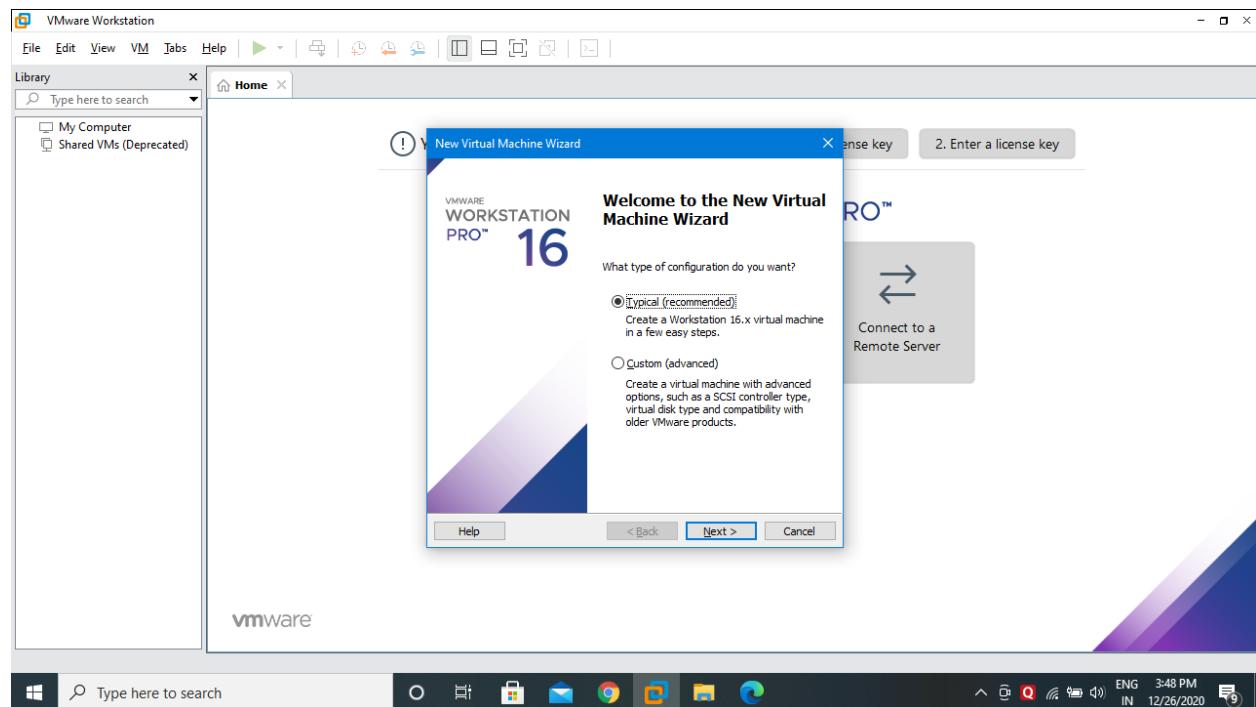
Practical No. 5

Implement ESXi Server

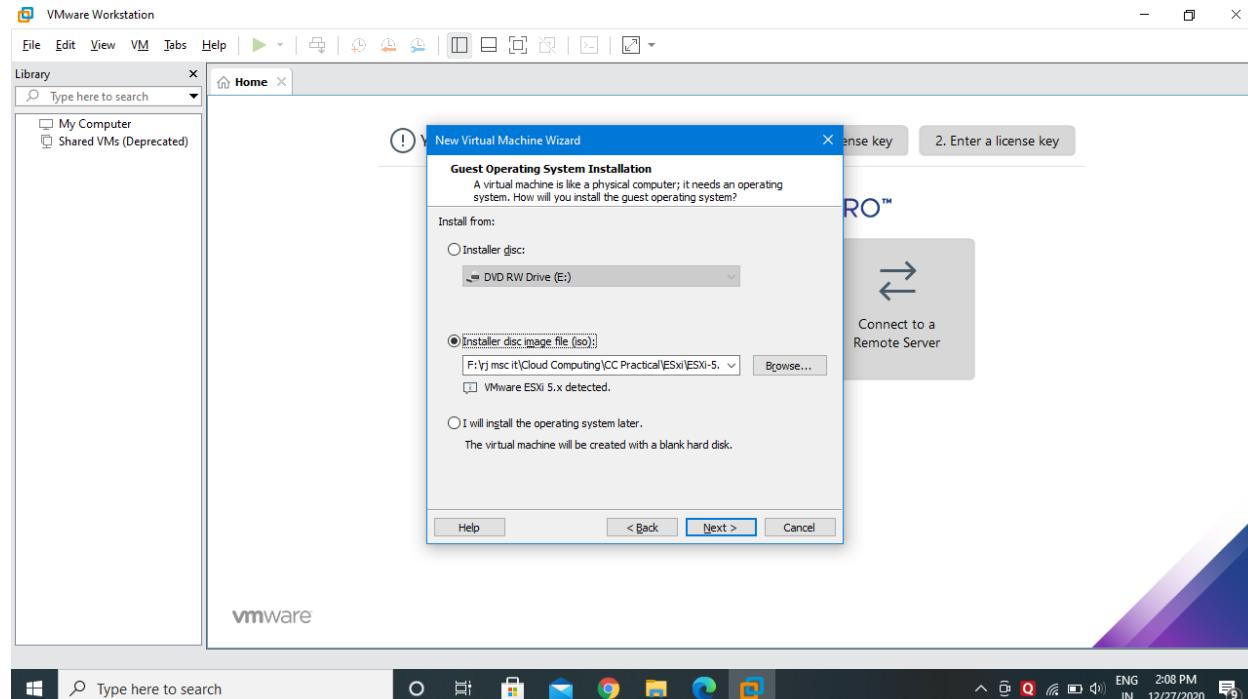
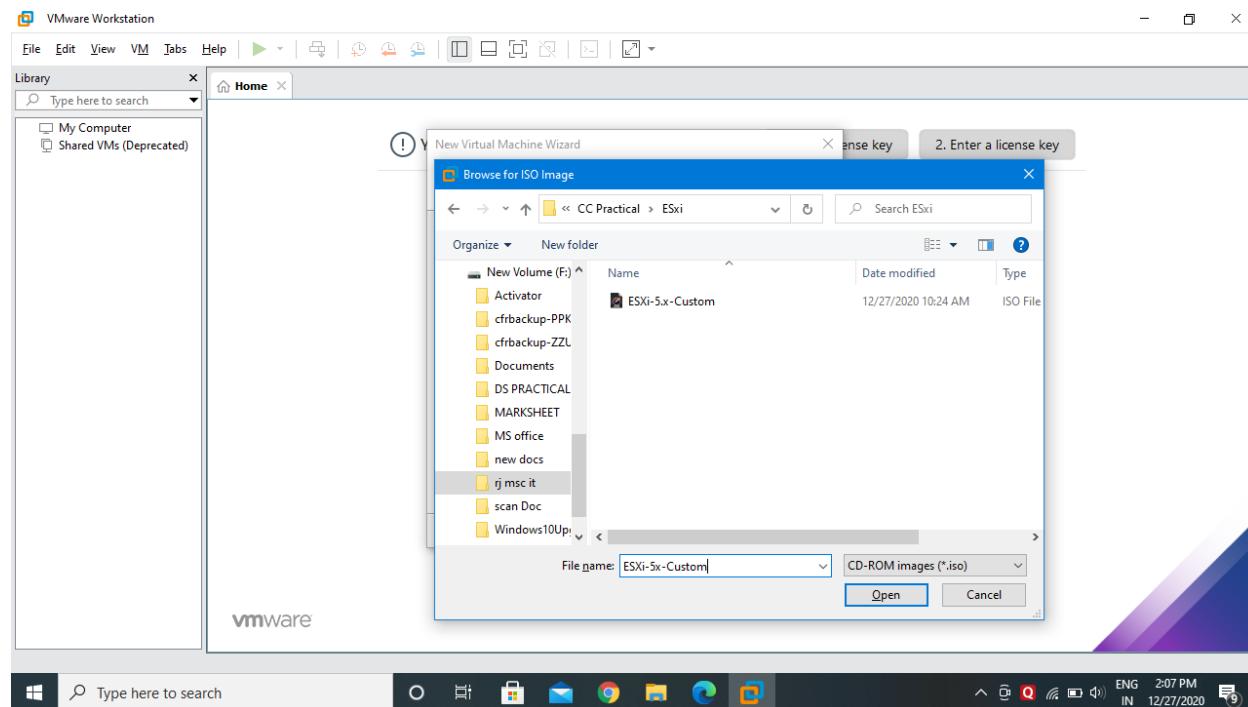
Open VMWare Workstation and select Create new Virtual machine

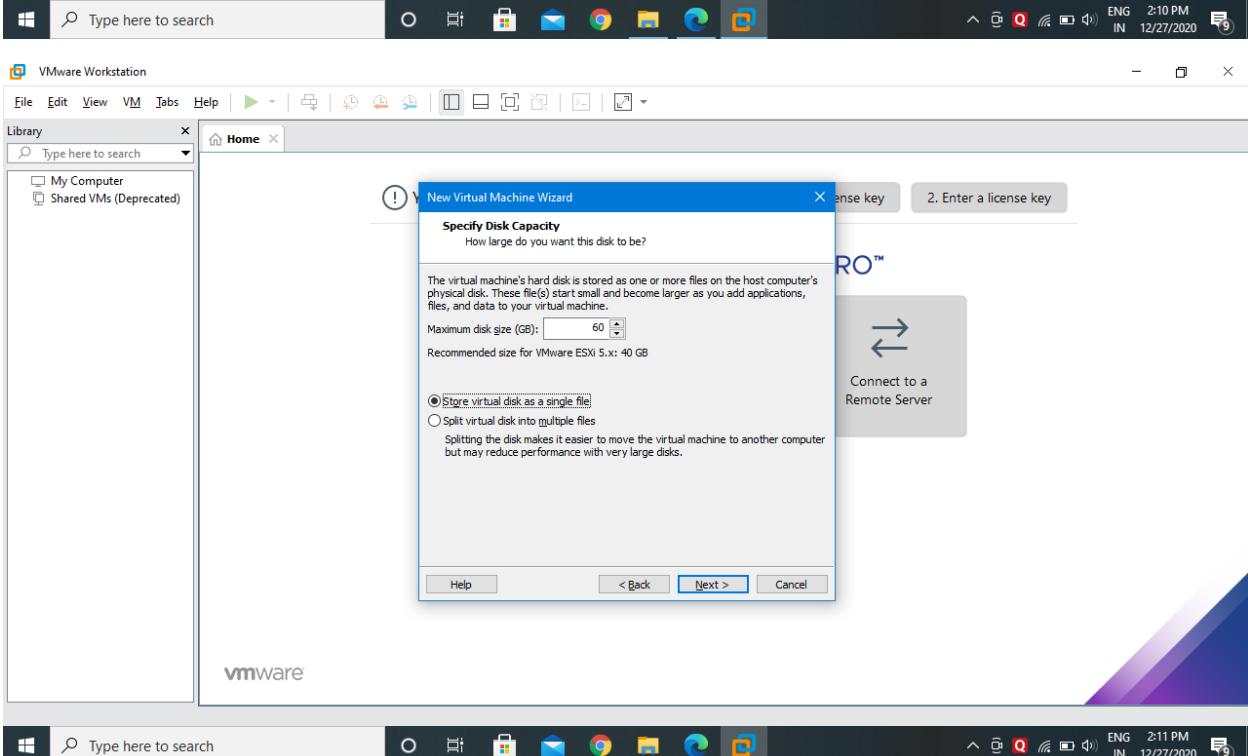
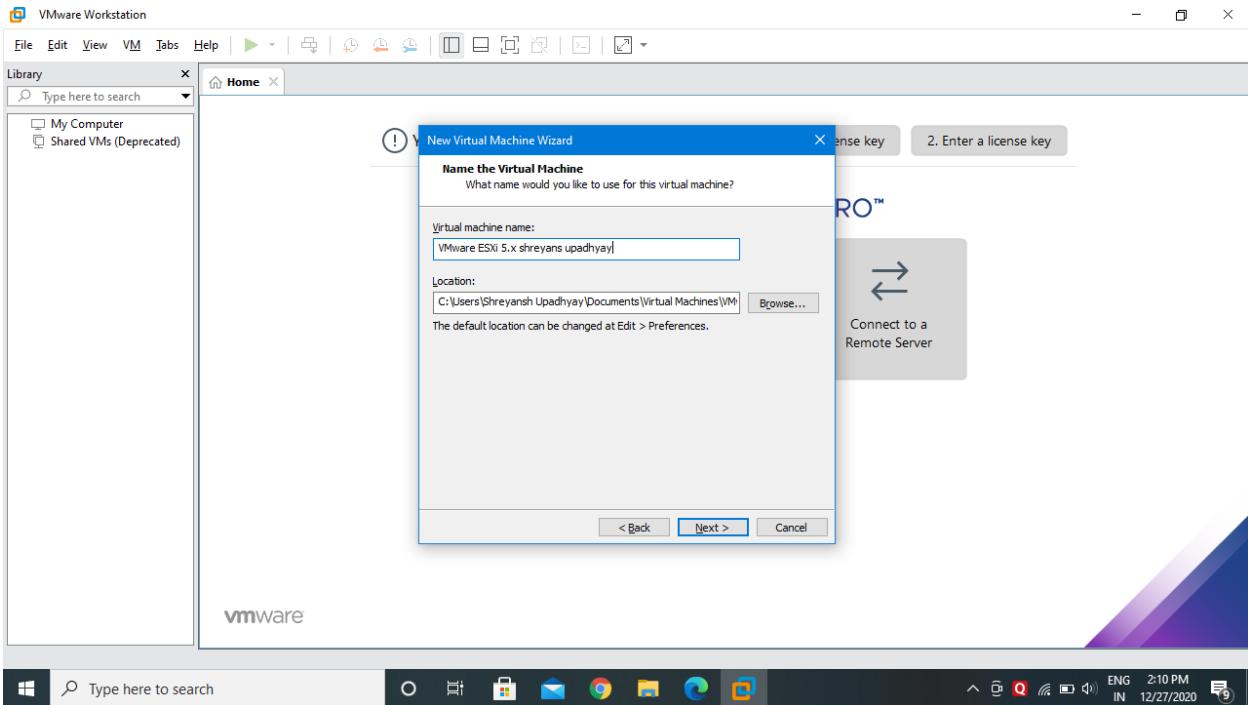


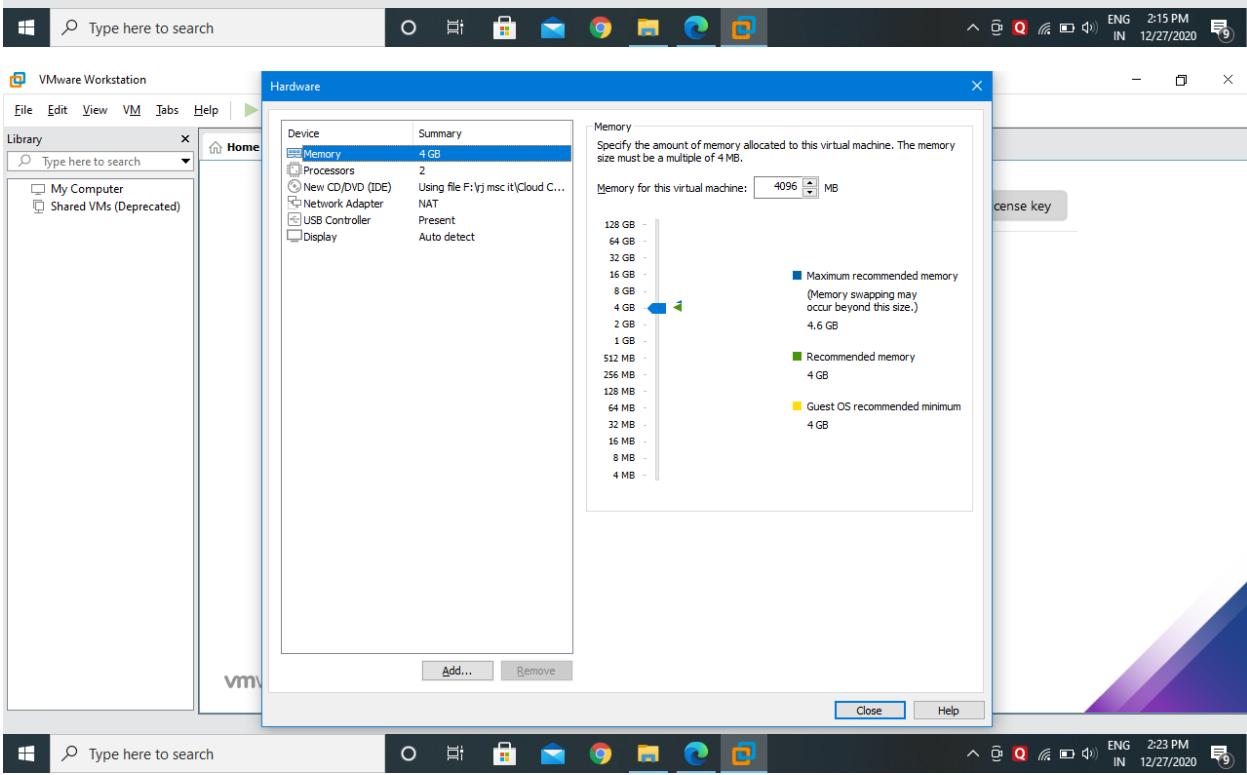
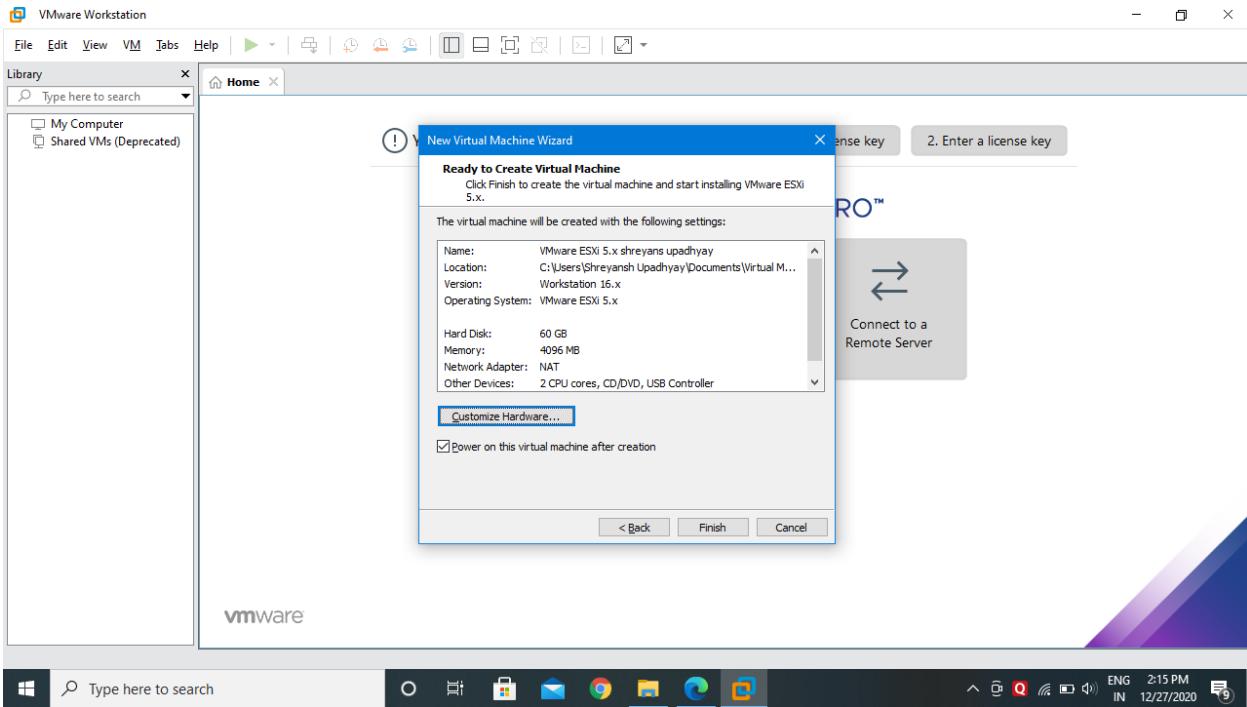
Select Typical and click Next

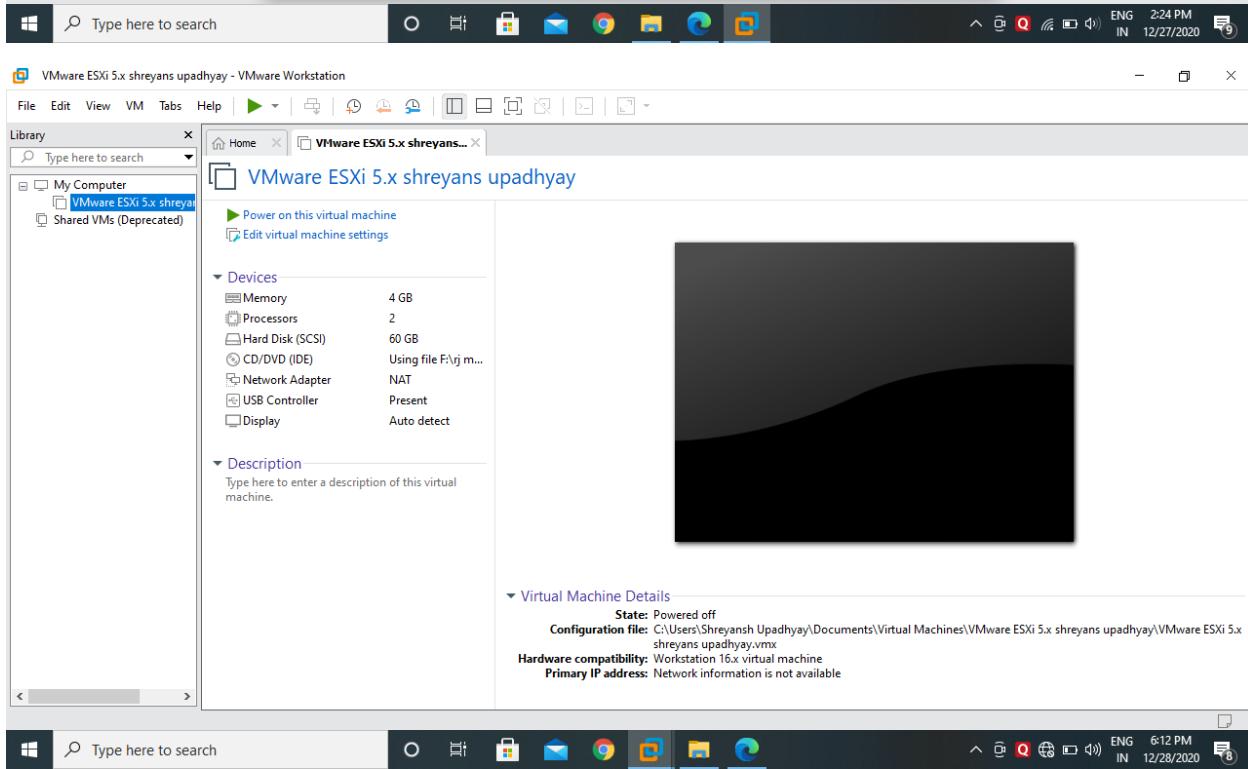
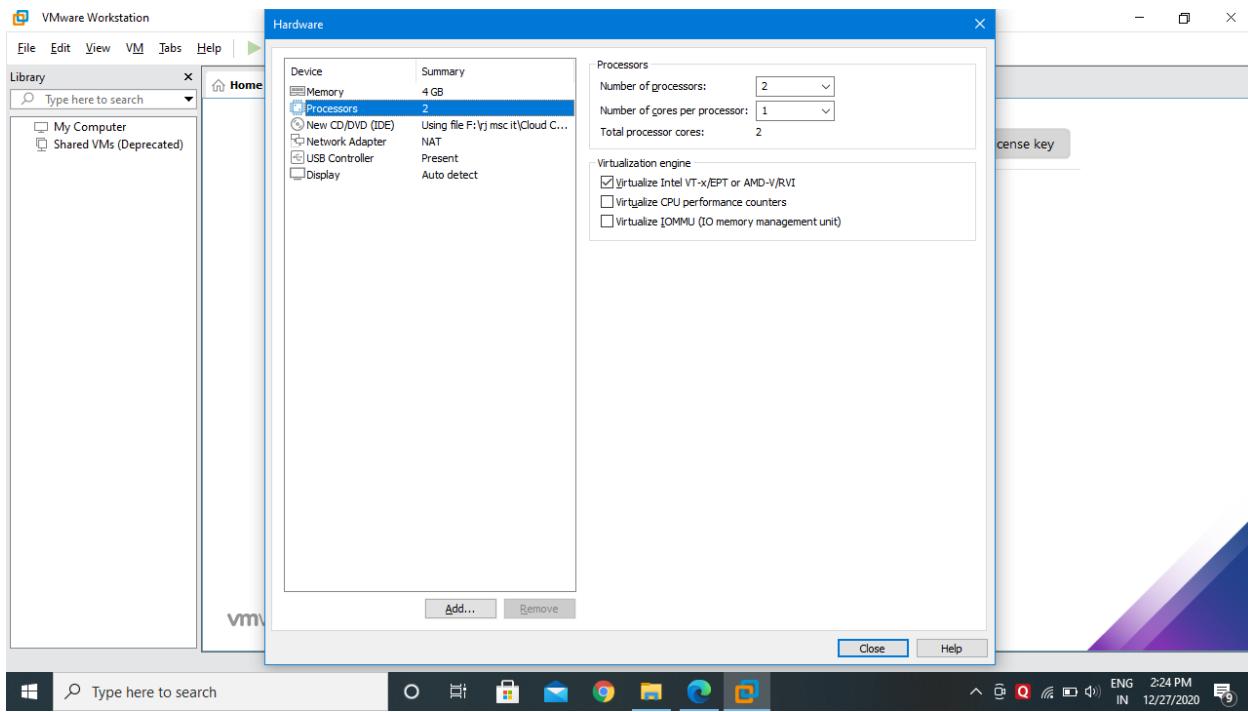


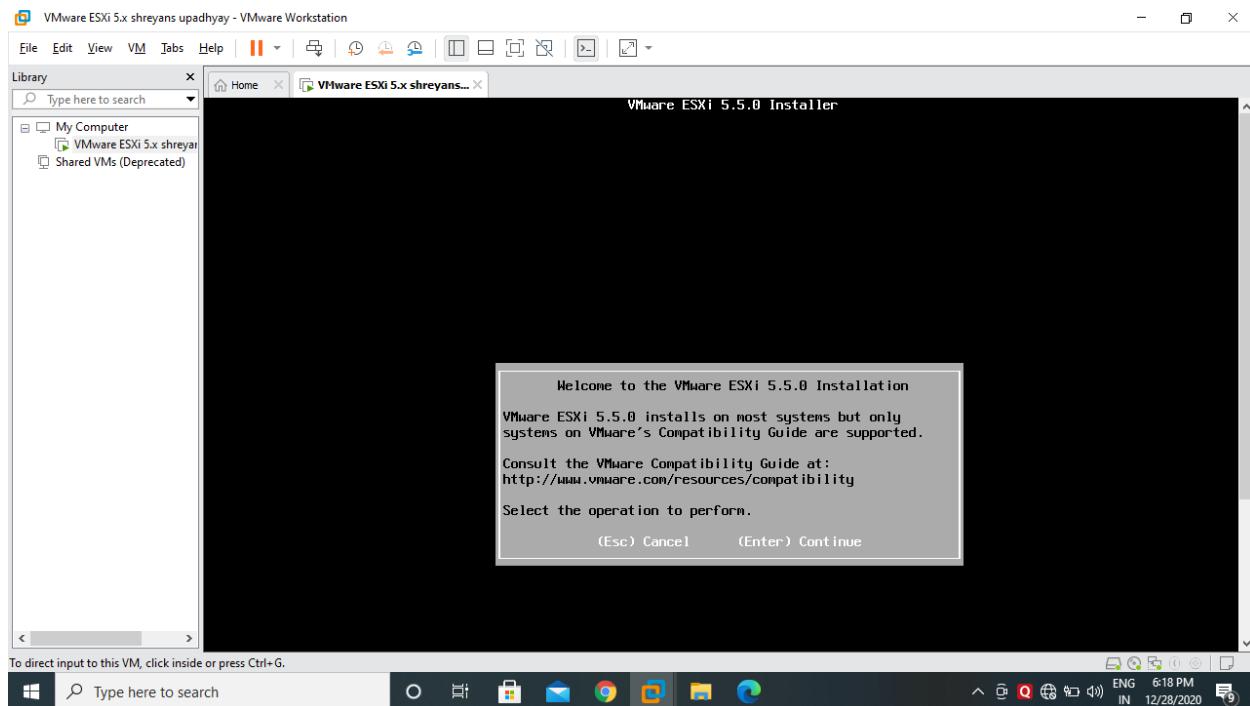
Select Installer disc_image file(ISO). Click Browse -ESXi-5.xCustom.iso Iso



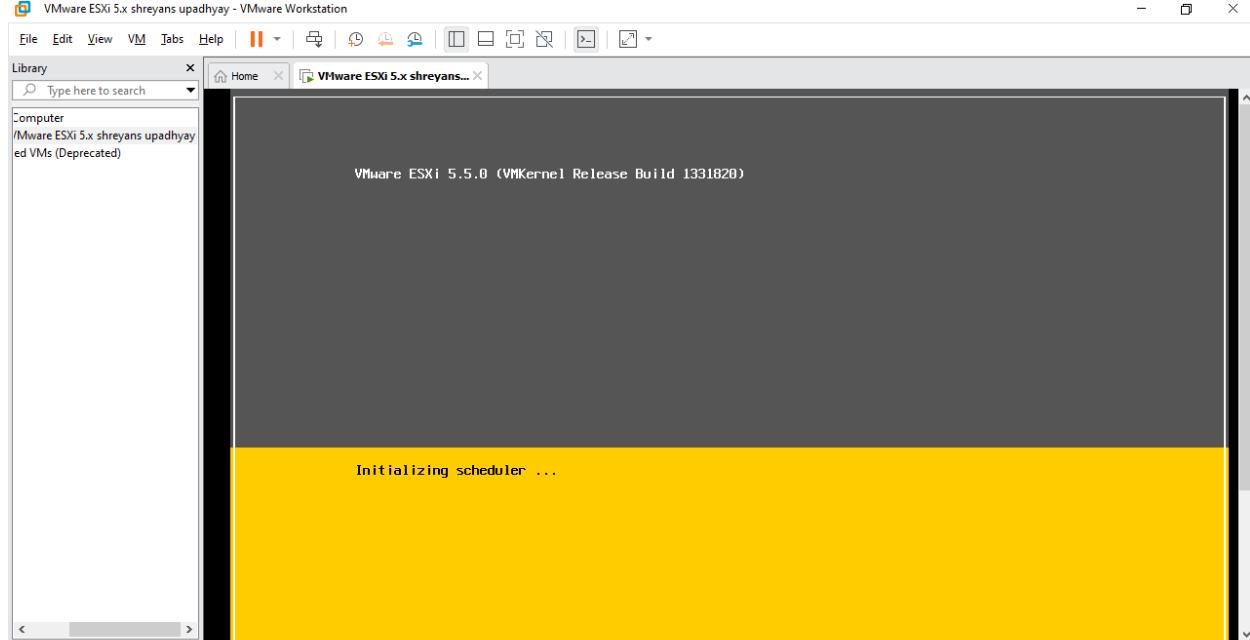
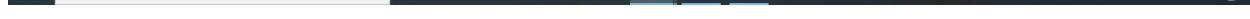


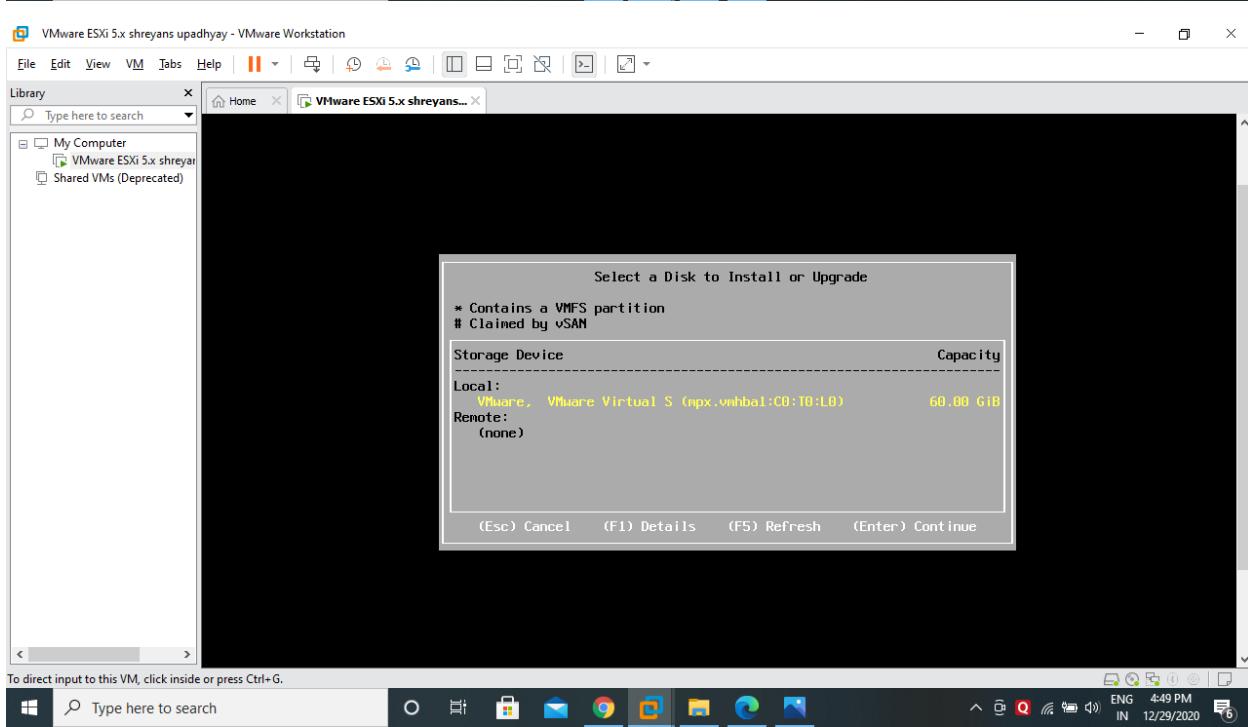
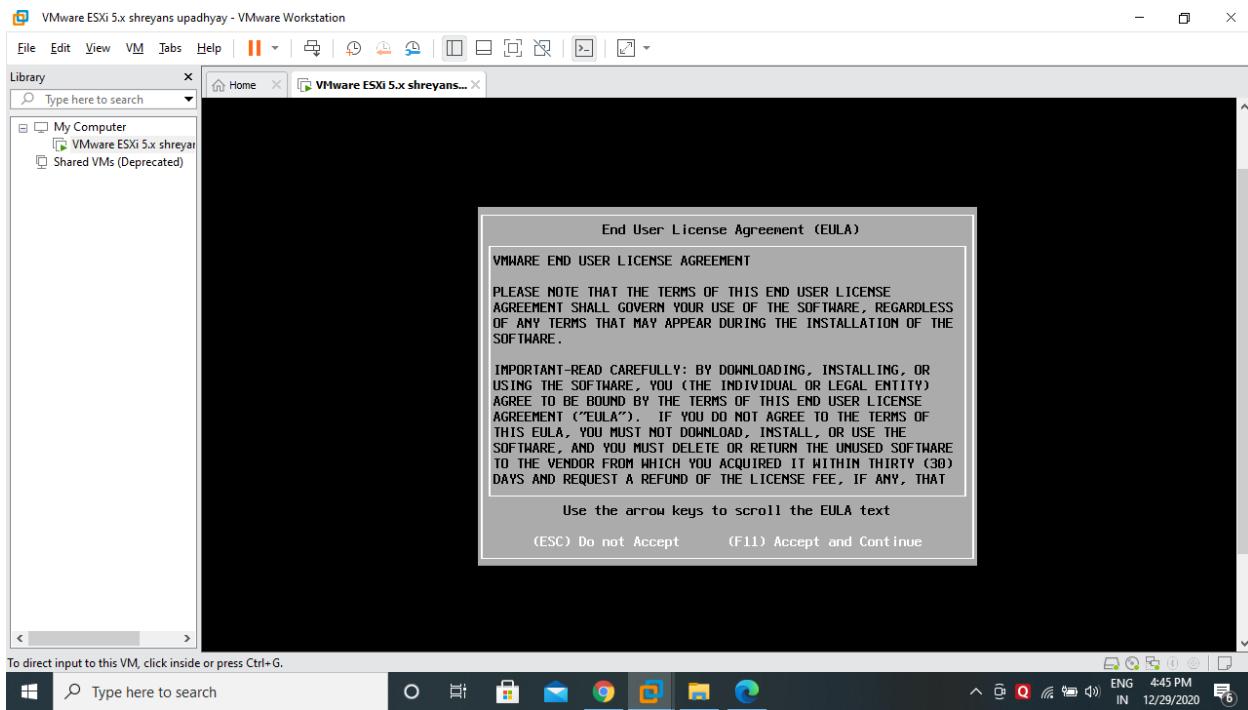


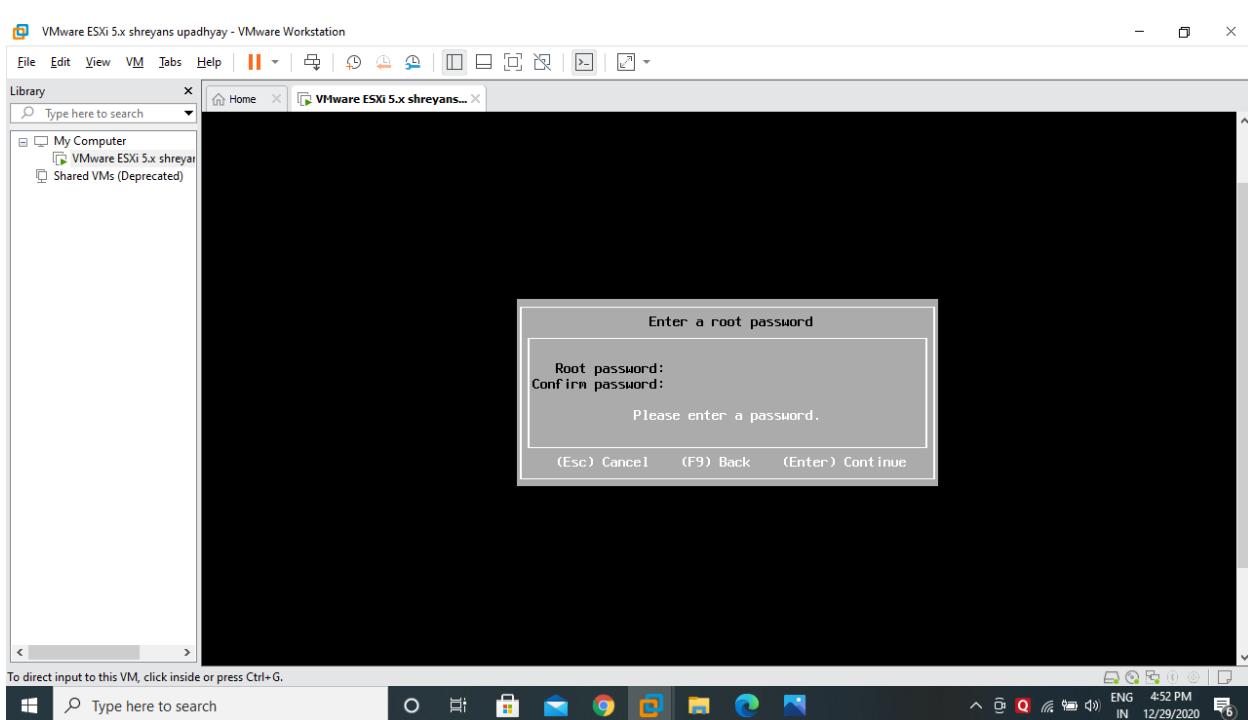
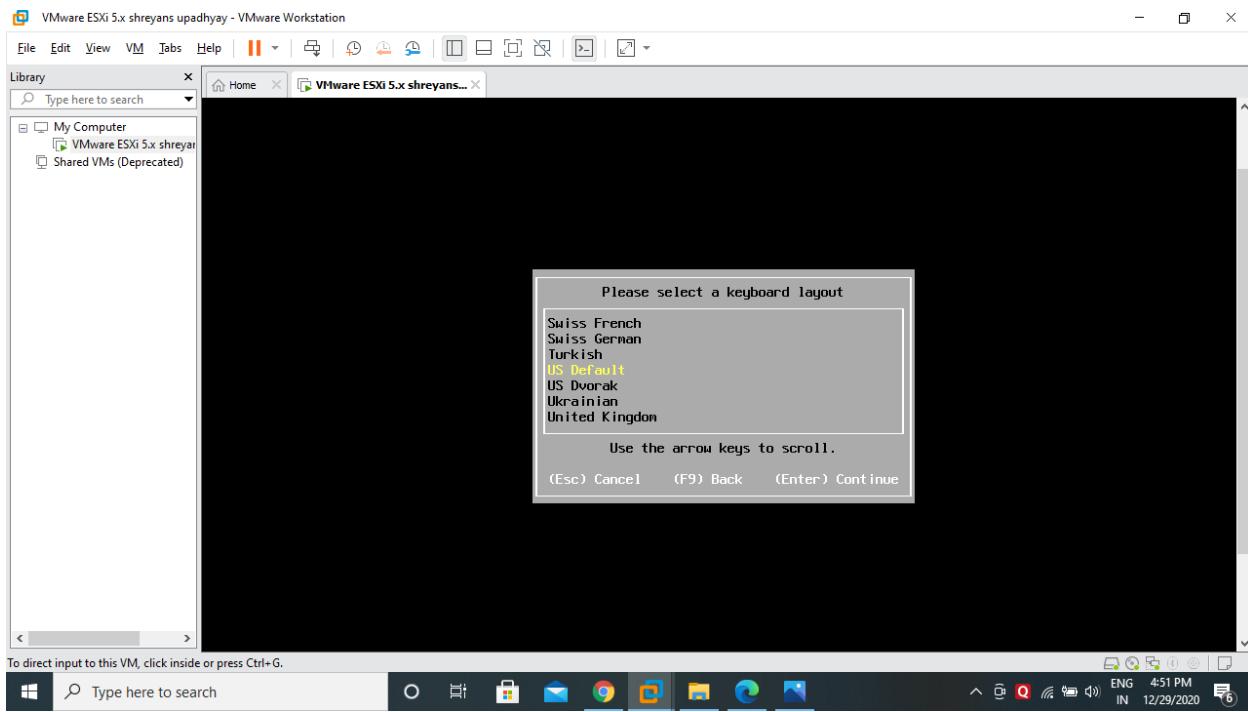




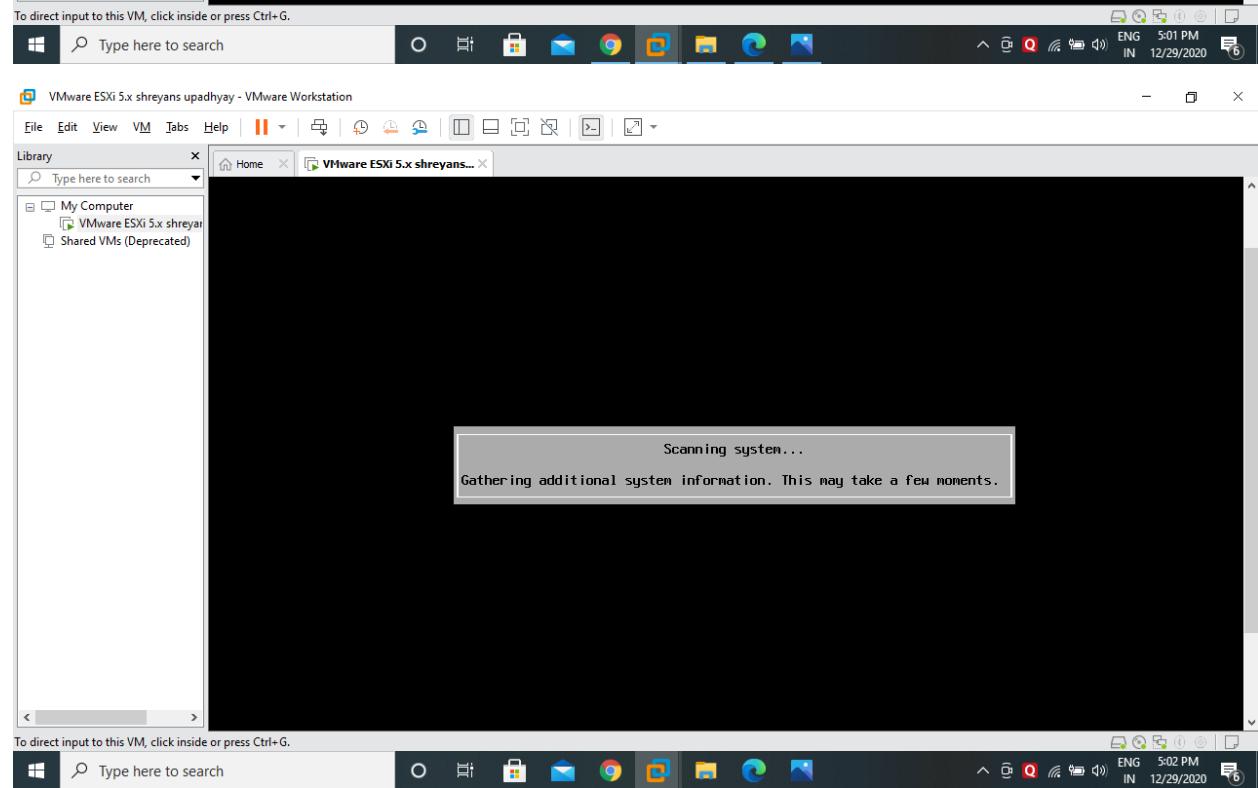
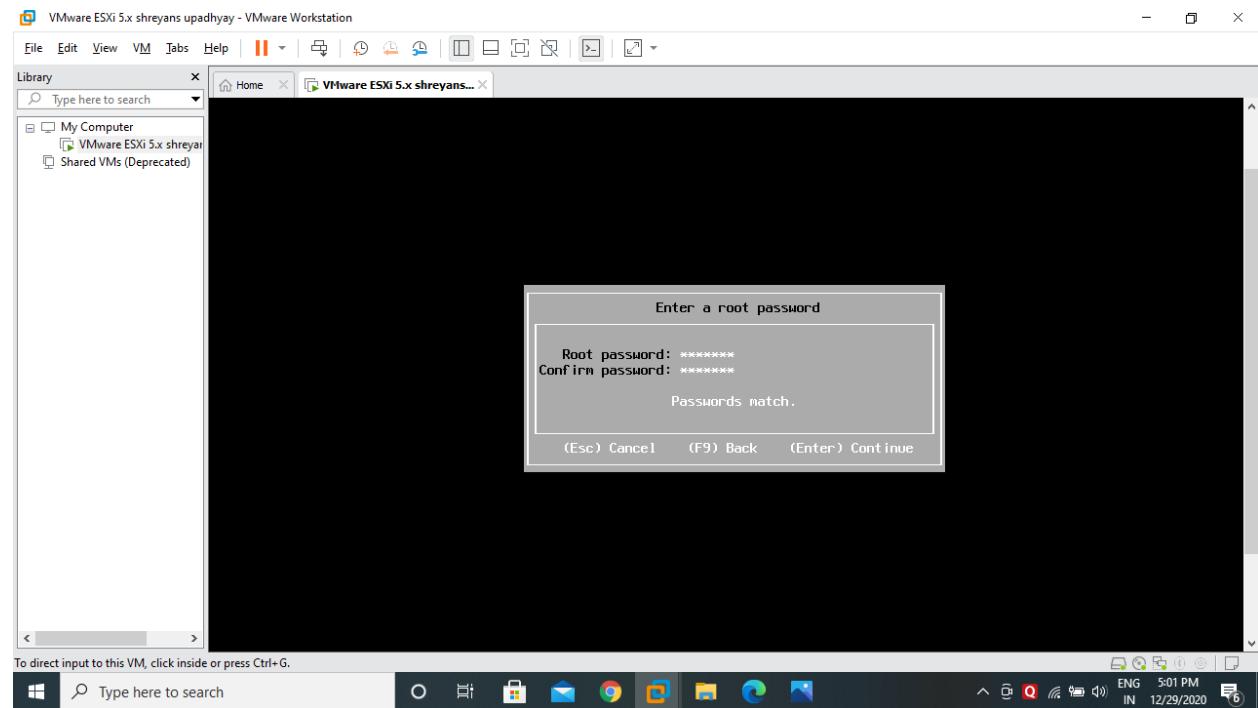
To direct input to this VM, click inside or press Ctrl+G.



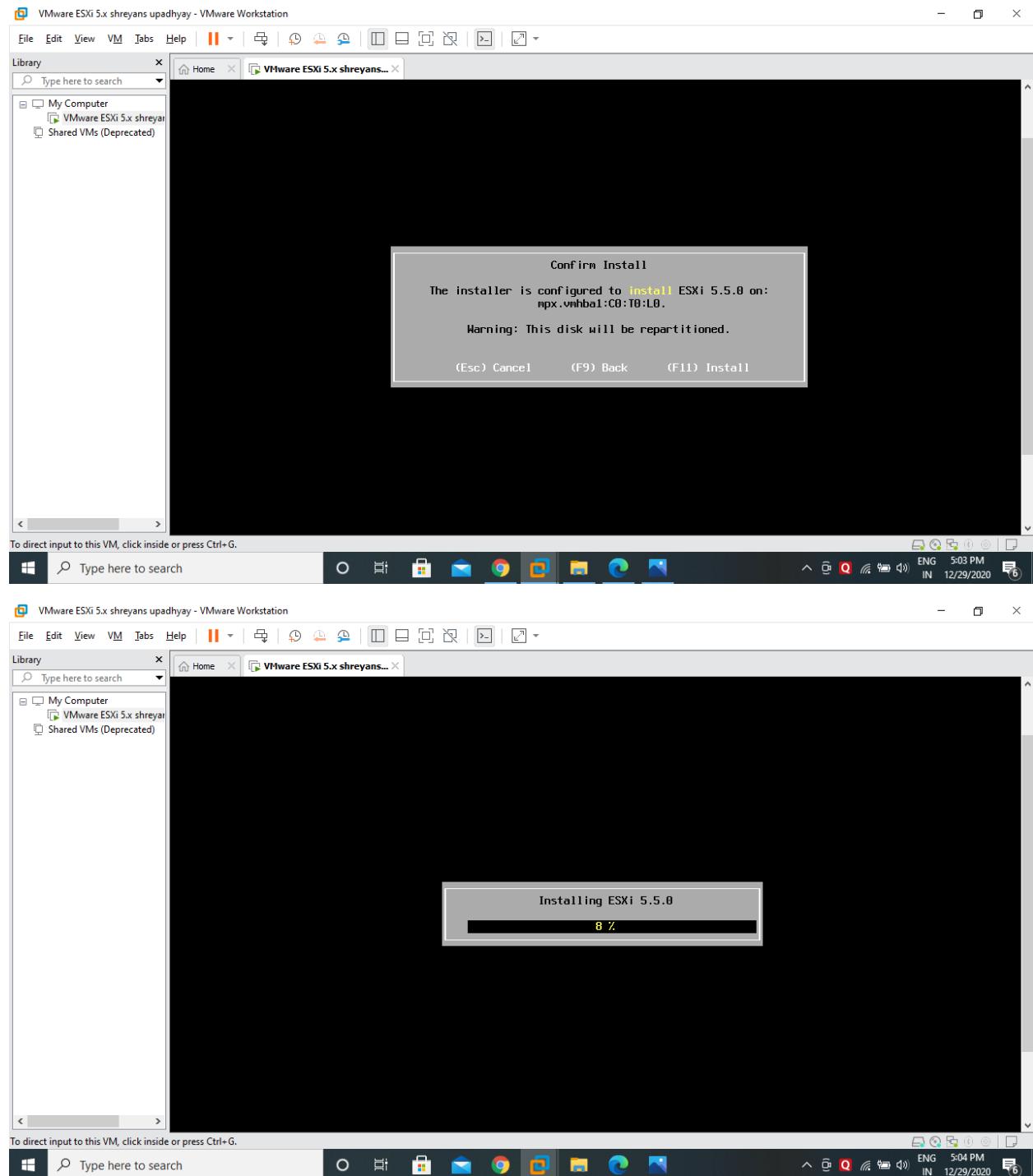


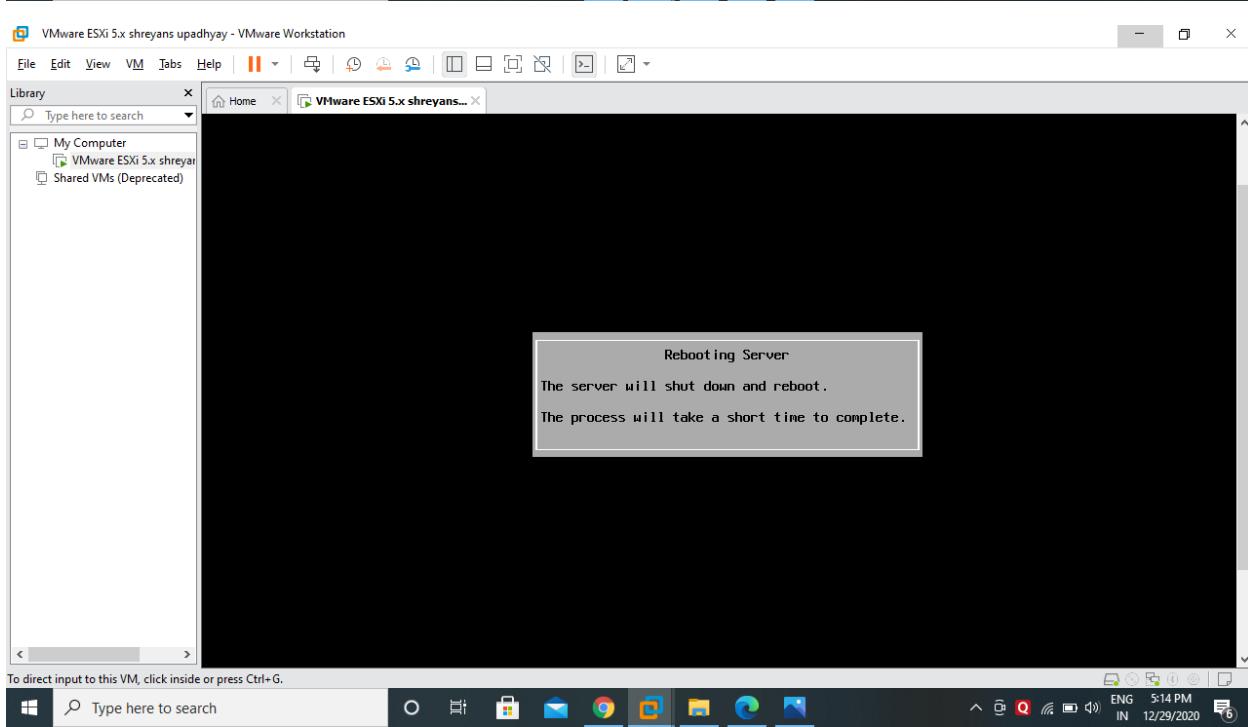
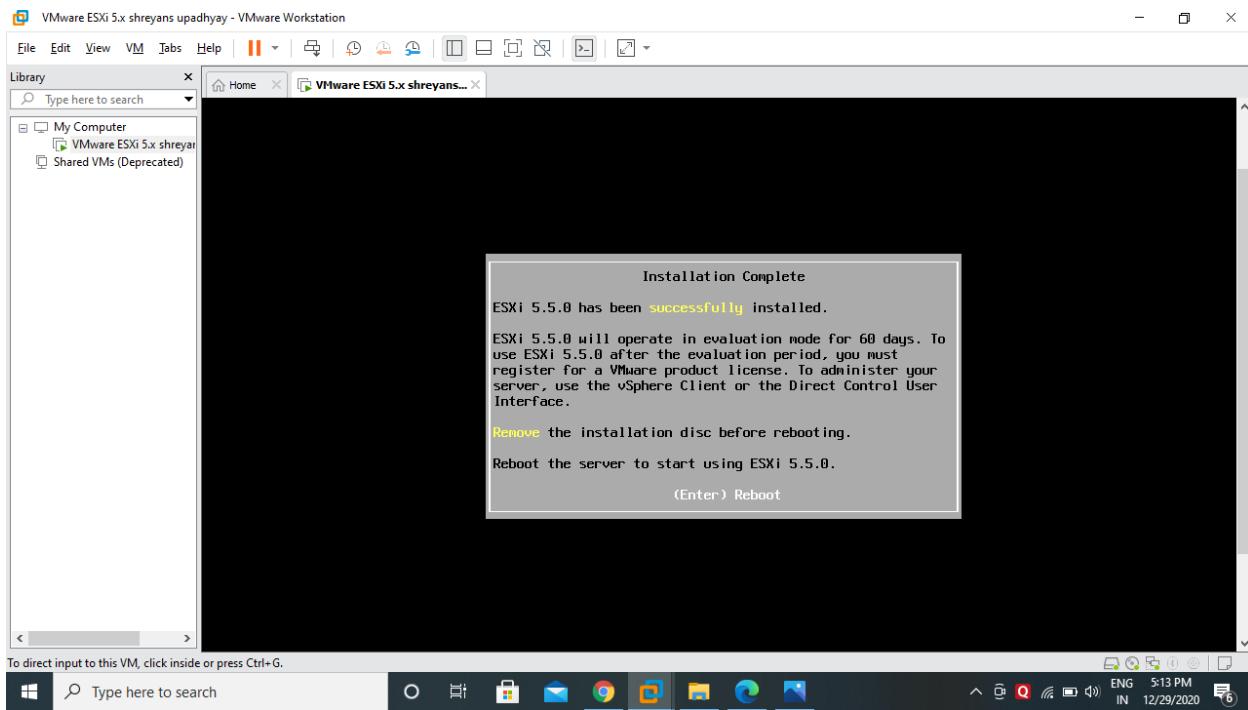


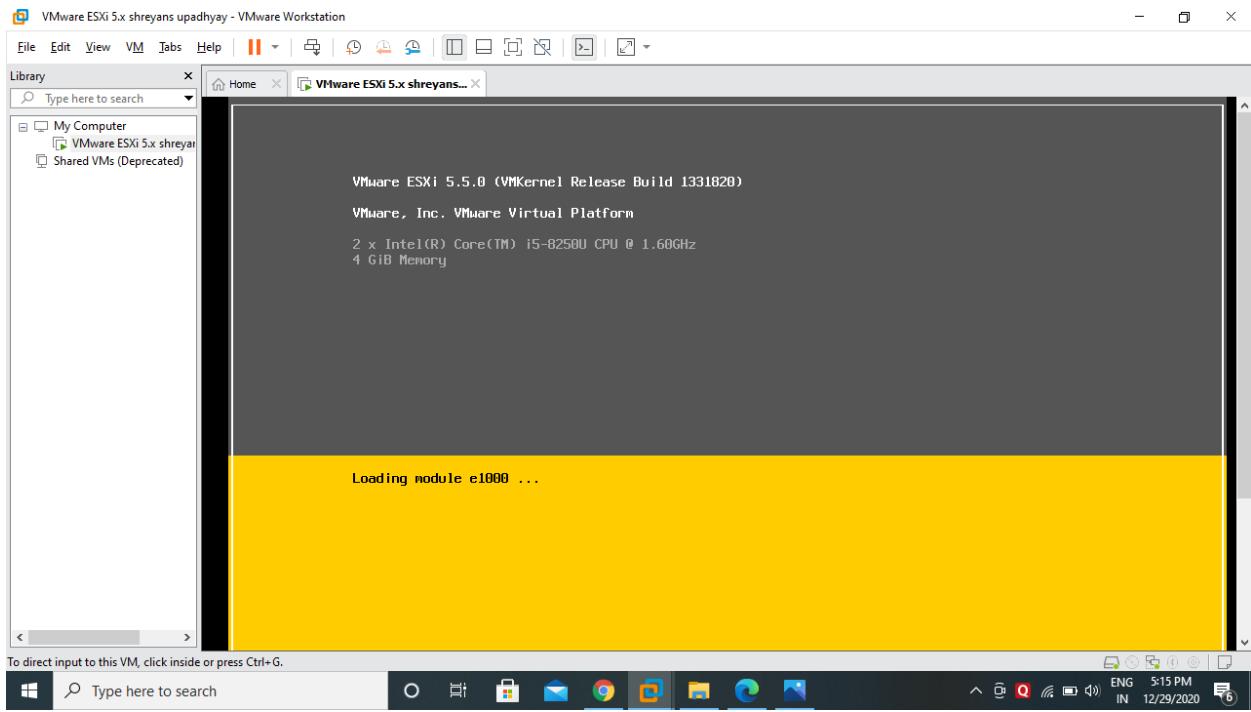
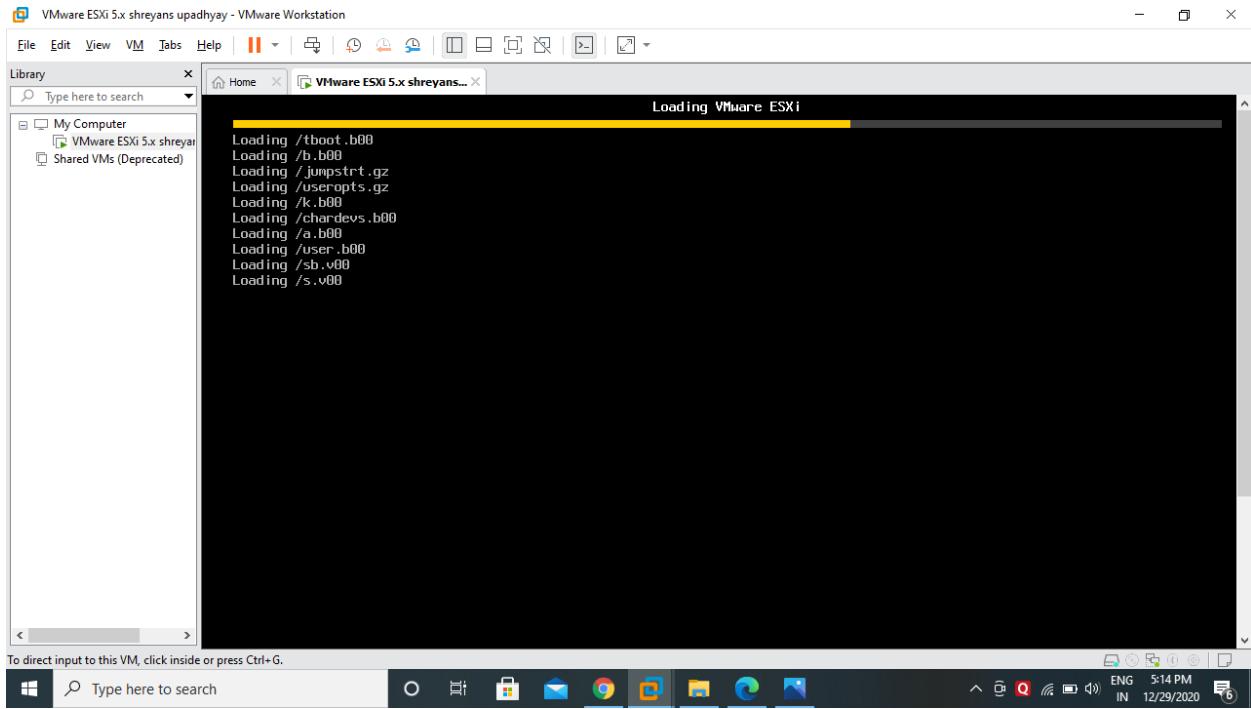
Password rjit123

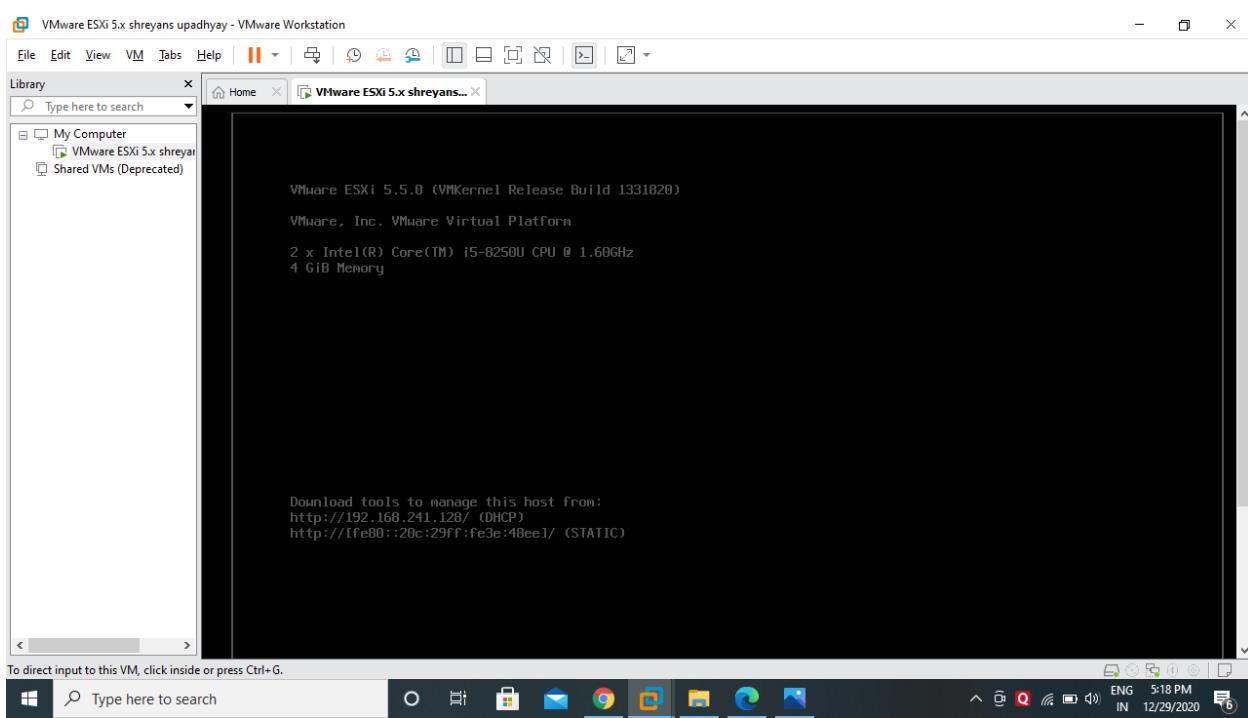
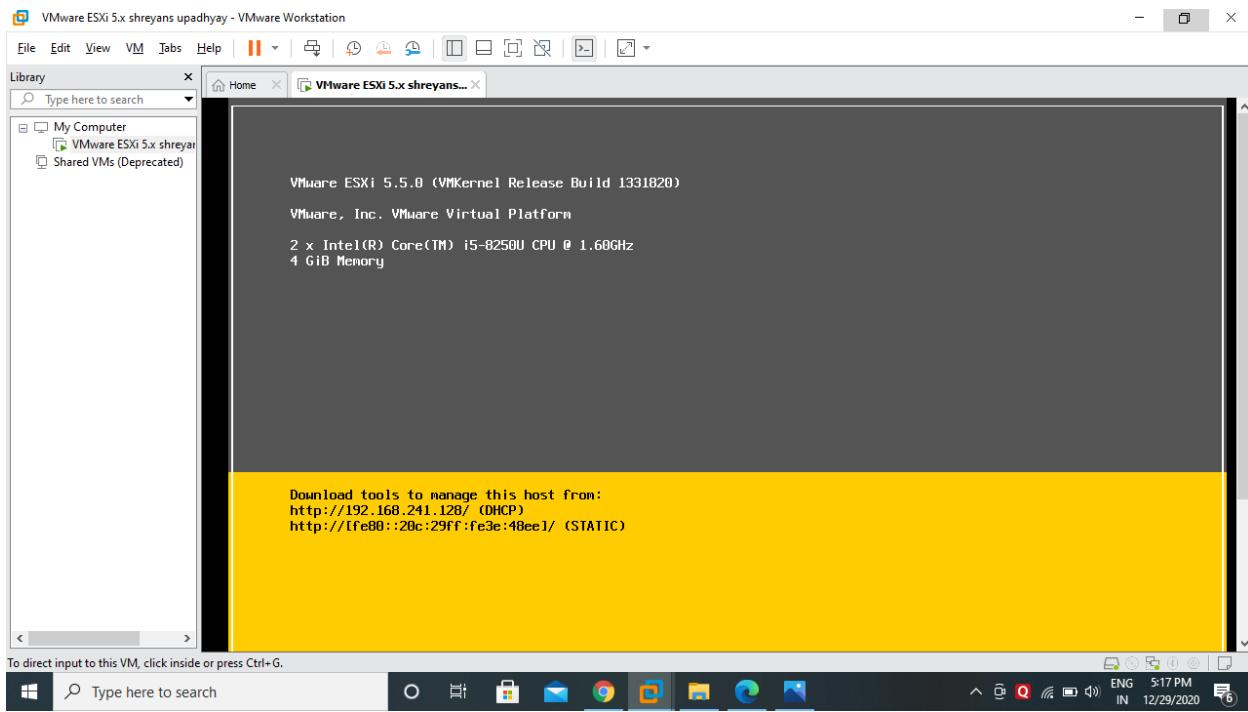


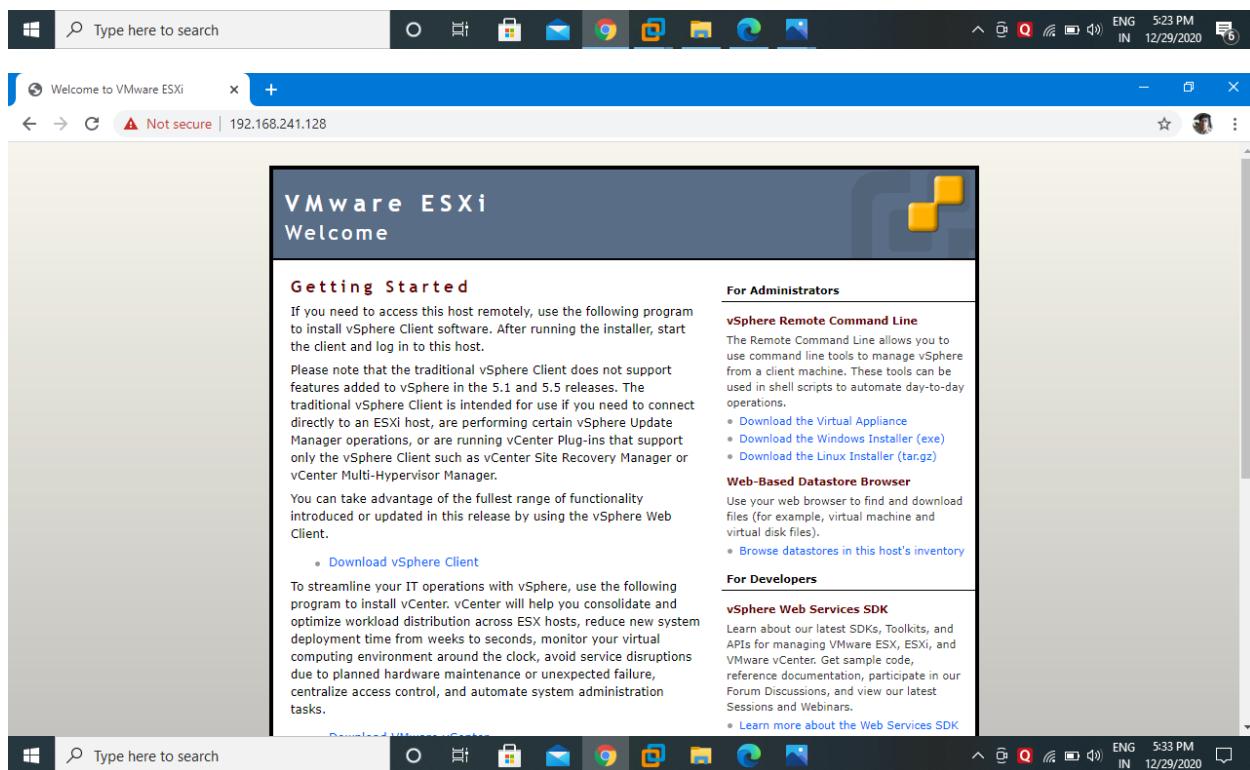
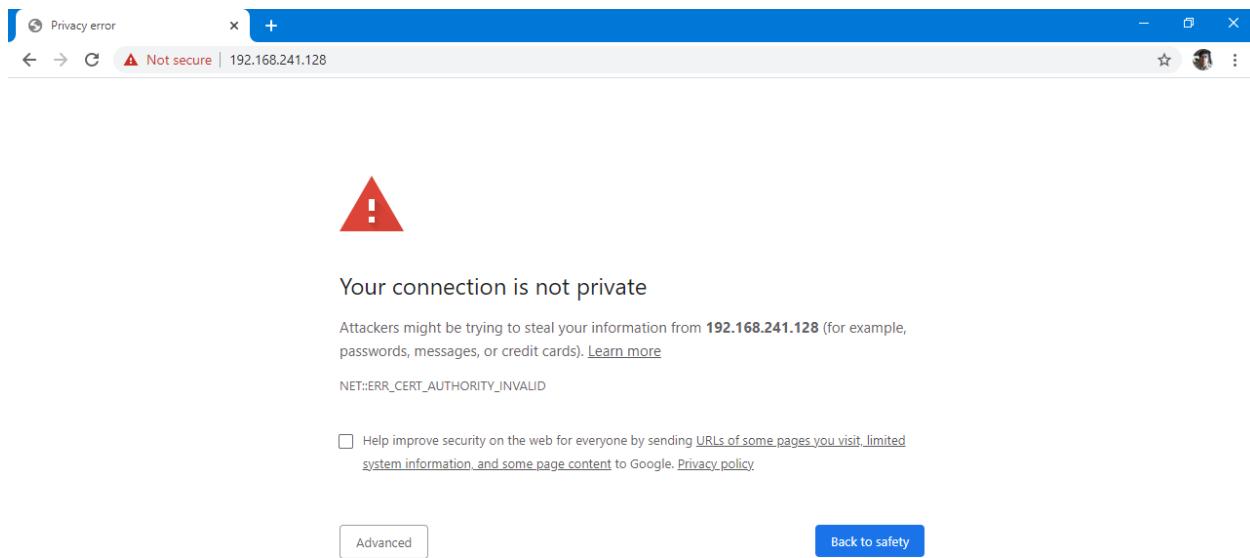
Click Install











Screenshot of a Windows File Explorer window showing a folder structure under "Cloud Computing".

Name	Date modified	Type	Size
CC Practical	12/27/2020 2:48 PM	File folder	
PDF [Kai Hwang, Jack Dongarra, Geoffrey ...	12/2/2020 3:51 PM	Microsoft Edge P...	10,208 KB
PDF 04SandeeprKaduCCJr	12/5/2020 6:01 PM	Microsoft Edge P...	28,903 KB
4_1	12/22/2020 5:09 PM	PNG File	157 KB
4_2	12/22/2020 5:10 PM	PNG File	158 KB
4_3	12/22/2020 5:15 PM	PNG File	125 KB
4_30	12/22/2020 5:16 PM	PNG File	116 KB
PDF 07_shubham_mishra_CC_manual	12/5/2020 6:00 PM	Microsoft Edge P...	24,428 KB
PDF Cloud Syllabus	12/2/2020 3:46 PM	Microsoft Word D...	15 KB
error	12/22/2020 5:19 PM	PNG File	127 KB
PDF grid,clusterand cloud	12/2/2020 3:50 PM	Microsoft Edge P...	566 KB
link	12/26/2020 9:45 AM	Text Document	1 KB
PDF Mastering Cloud computing	12/2/2020 3:51 PM	Microsoft Edge P...	36,071 KB
steps	12/5/2020 9:29 AM	Text Document	1 KB
VMware-viclient-all-5.5.0-1281650	12/27/2020 10:47 AM	Application	356,513 KB

15 items 1 item selected 348 MB

Screenshot of a VMware ESXi welcome screen in a browser window.

VMware ESXi Welcome

Getting Started

If you need to access this host remotely, use the following program to install vSphere Client software. After running the installer, start the client and log in to this host.

Please note that the traditional vSphere Client does not support features added to vSphere in the 5.1 and 5.5 releases. The traditional vSphere Client is intend 92% Extracting directly to an ESXi host, are performed by the vSphere Client Manager operations, or are runnig only the vSphere Client such as vCenter Multi-Hypervisor Manager.

You can take advantage of the full introduced or updated in this release by using the vSphere Web Client.

- Download vSphere Client

To streamline your IT operations with vSphere, use the following program to install vCenter. vCenter will help you consolidate and optimize workload distribution across ESX hosts, reduce new system deployment time from weeks to seconds, monitor your virtual computing environment around the clock, avoid service disruptions due to planned hardware maintenance or unexpected failure, centralize access control, and automate system administration tasks.

- Download VMware vCenter

If you need more help, please refer to our documentation library:

For Administrators

- vSphere Remote Command Line

The Remote Command Line allows you to use command line tools to manage vSphere from a client machine. These tools can be used in shell scripts to automate day-to-day operations.

- Load the Virtual Appliance
- Load the Windows Installer (exe)
- Load the Linux Installer (tar.gz)

Based Datastore Browser

In web browser to find and download files (for example, virtual machine and virtual disk files).

- Browse datastores in this host's inventory

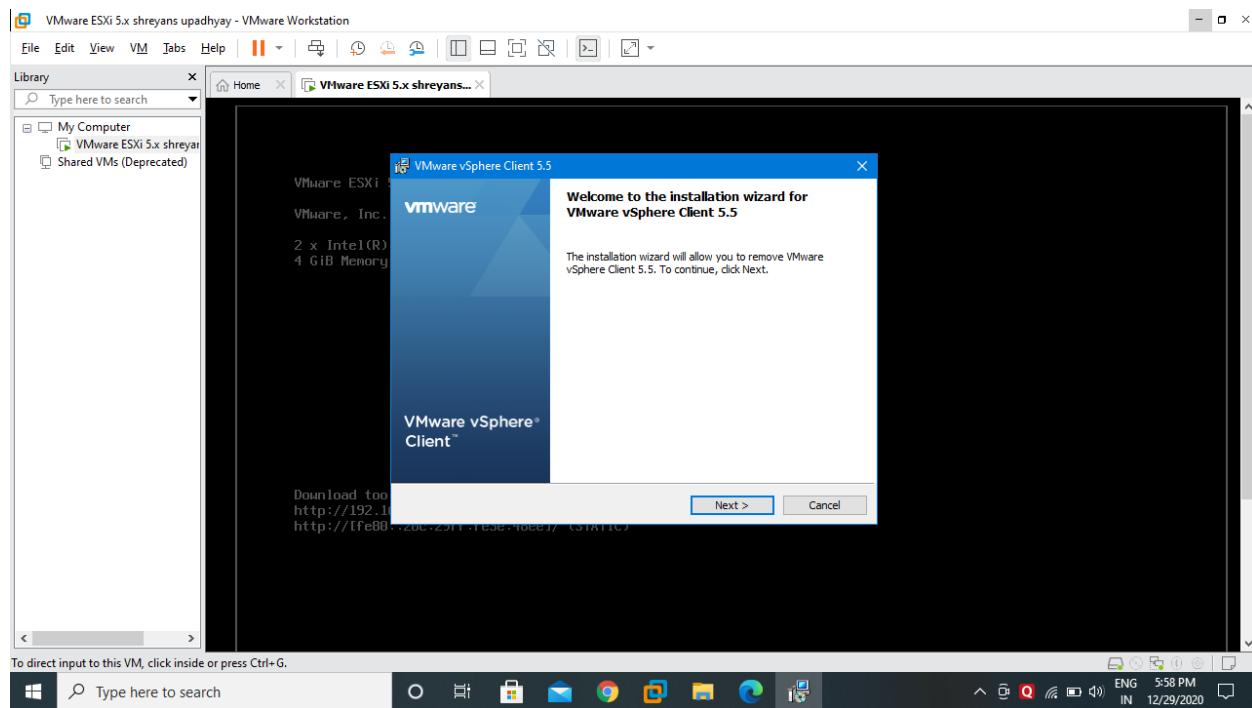
For Developers

- vSphere Web Services SDK

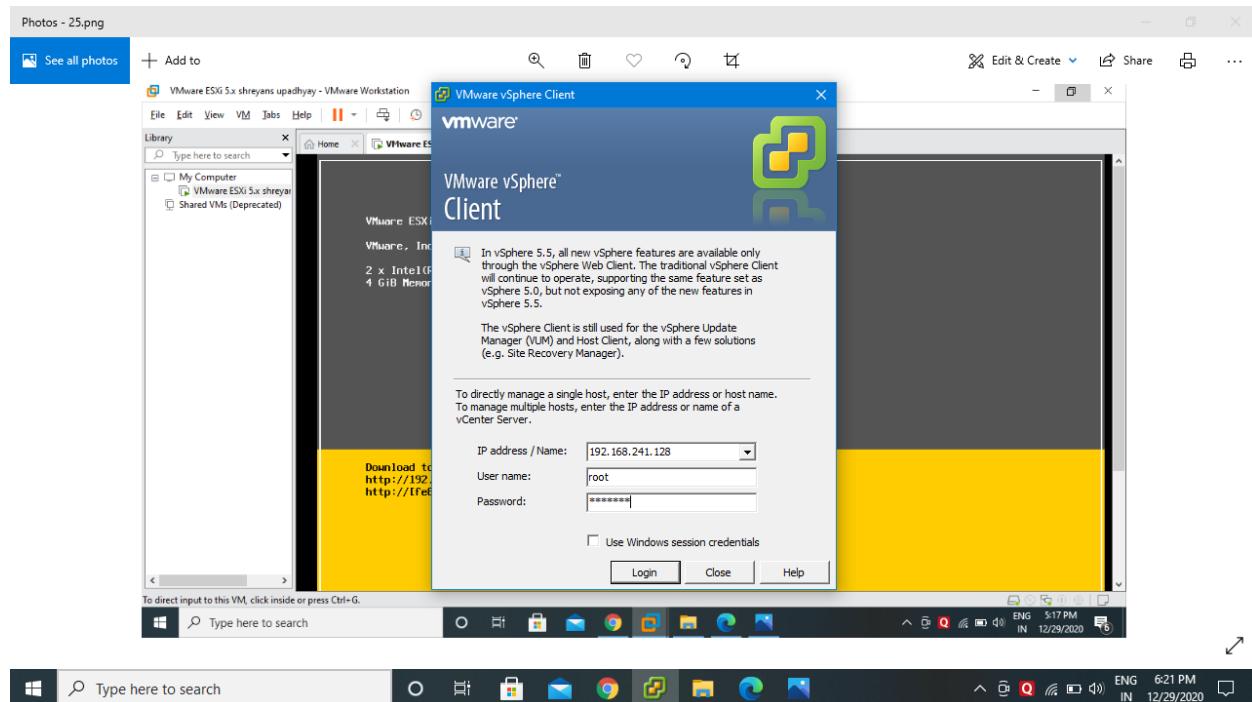
Learn about our latest SDKs, Toolkits, and APIs for managing VMware ESX, ESXi, and VMware vCenter. Get sample code, reference documentation, participate in our Forum Discussions, and view our latest Sessions and Webinars.

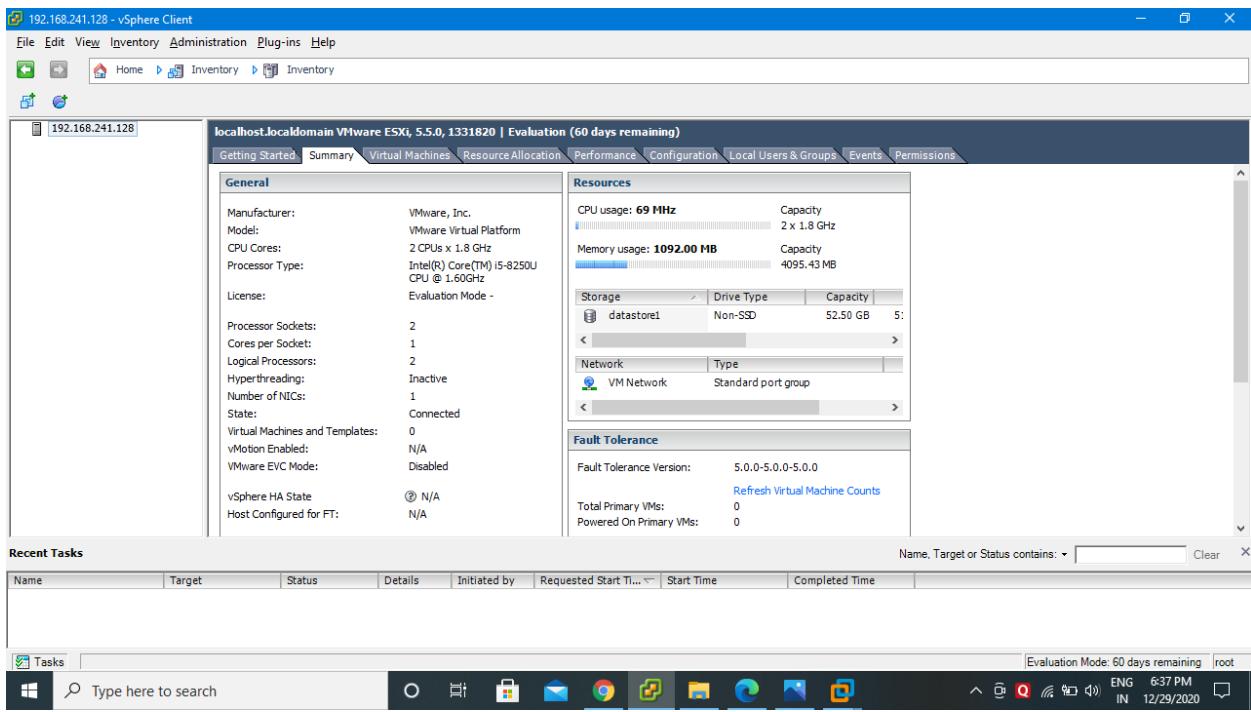
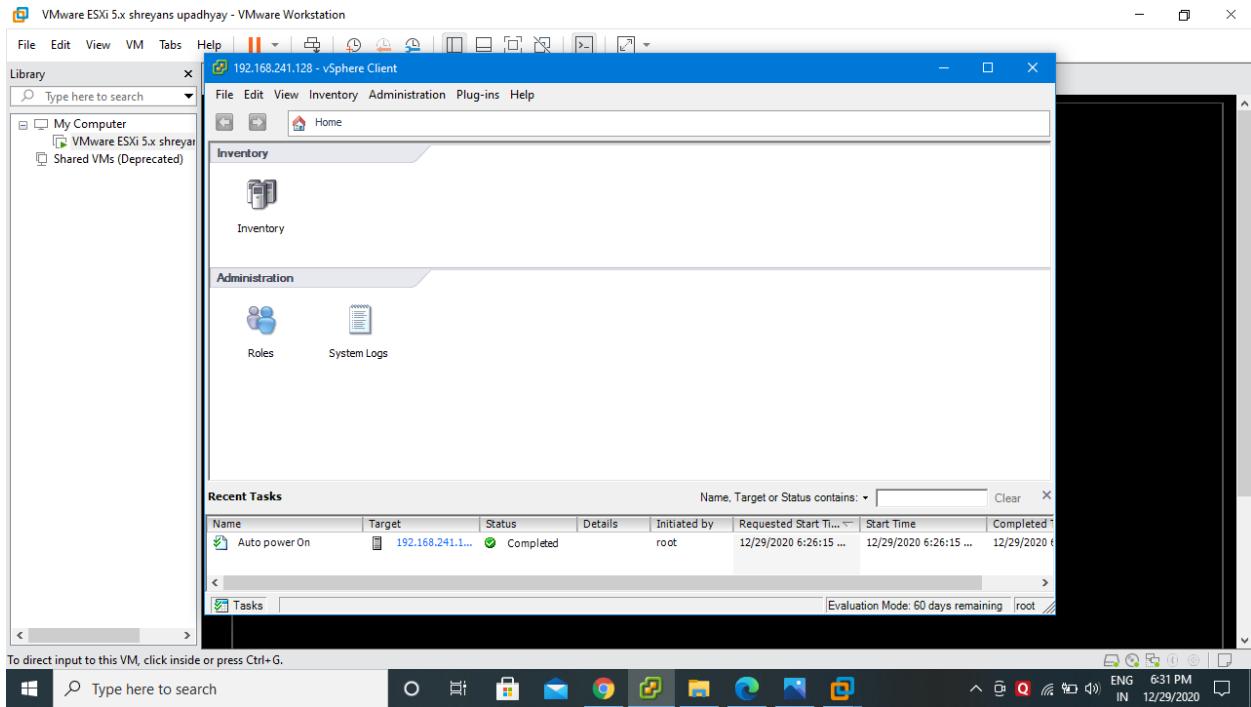
- Learn more about the Web Services SDK
- Browse objects managed by this host

Windows taskbar and system tray are visible at the bottom.



Enter the IP address (which was assigned dynamically) and enter the username and password





192.168.241.128 - vSphere Client

File Edit View Inventory Administration Plug-ins Help

Home Inventory Inventory

localhost.localdomain VMware ESXi, 5.5.0, 1331820 | Evaluation (60 days remaining)

Getting Started Summary Virtual Machines Resource Allocation Performance Configuration Local Users & Groups Events Permissions

General

Manufacturer:	VMware, Inc.
Model:	VMware Virtual Platform
CPU Cores:	2 CPUs x 1.8 GHz
Processor Type:	Intel(R) Core(TM) i5-8250U CPU @ 1.60GHz
License:	Evaluation Mode -
Processor Sockets:	2
Cores per Socket:	1
Logical Processors:	2
Hypertreading:	Inactive
Number of NICs:	1
State:	Connected
Virtual Machines and Templates:	0
vMotion Enabled:	N/A
VMware EVC Mode:	Disabled
vSphere HA State	N/A
Host Configured for FT:	N/A

Resources

CPU usage: 67 MHz	Capacity: 2 x 1.8 GHz
Memory usage: 1096.00 MB	Capacity: 4095.43 MB
Storage	Drive Type Capacity
[datastore1] Non-SSD	Browse Datastore...
Network	Type
VM Network	Standard

Fault Tolerance

Fault Tolerance Version:	5.0.0-
Total Primary VMs:	0
Powered On Primary VMs:	0

Recent Tasks

Name Target Status Details Initiated by Requested Start Ti... Start Time Completed Time

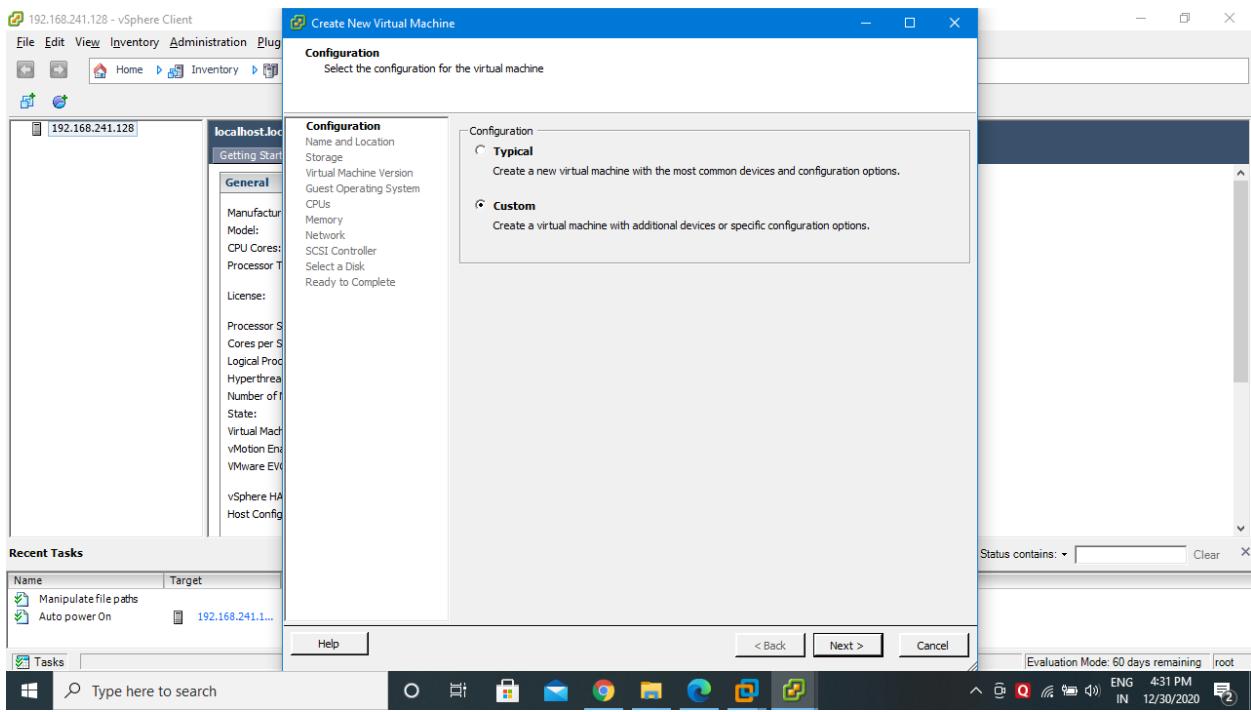
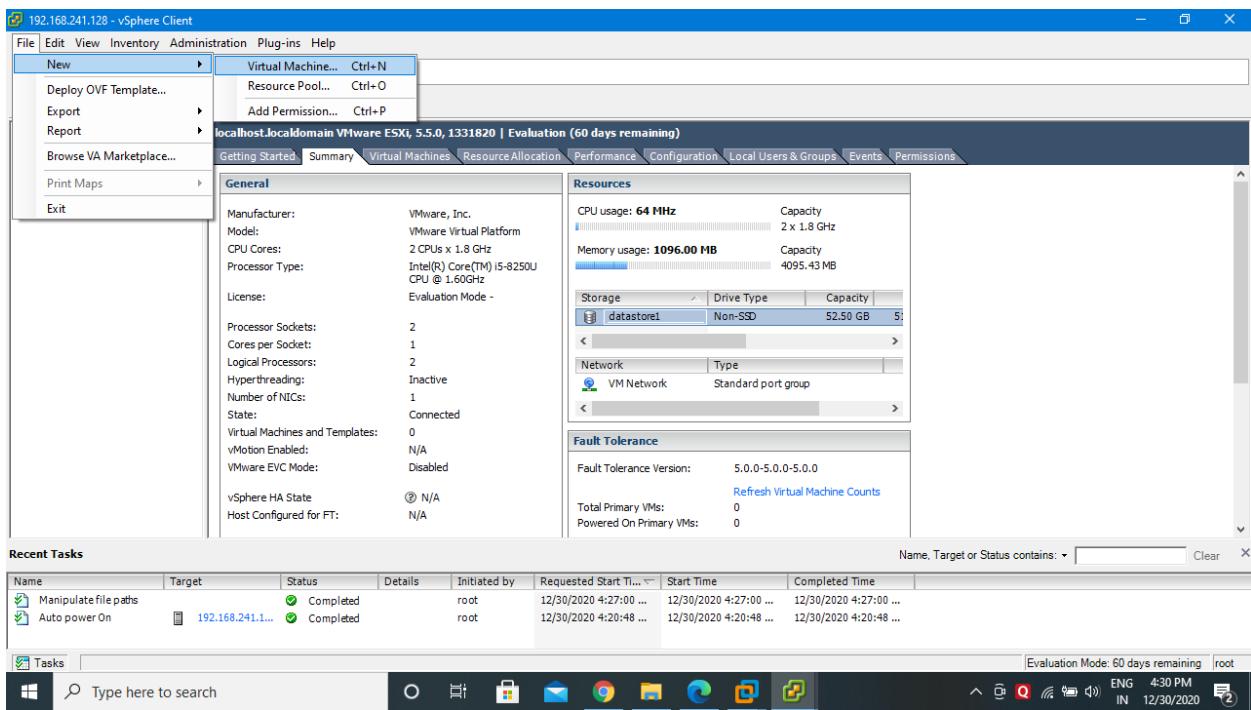
Datastore Browser - [datastore1]

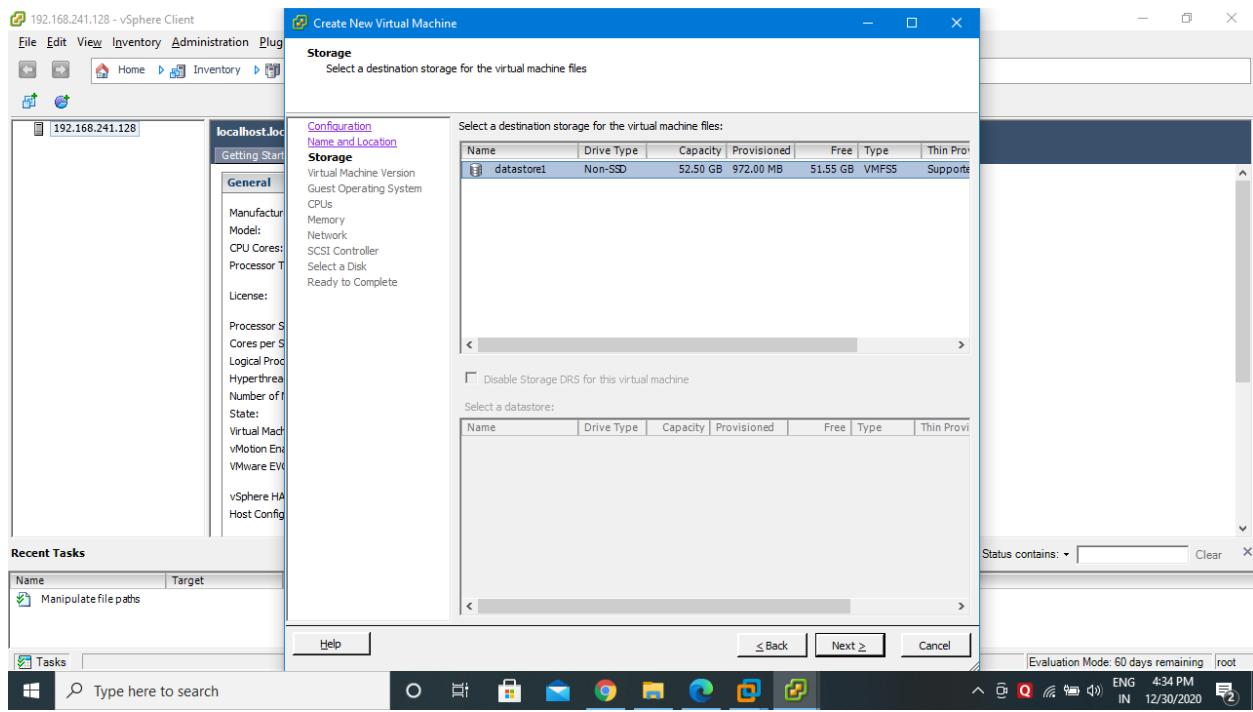
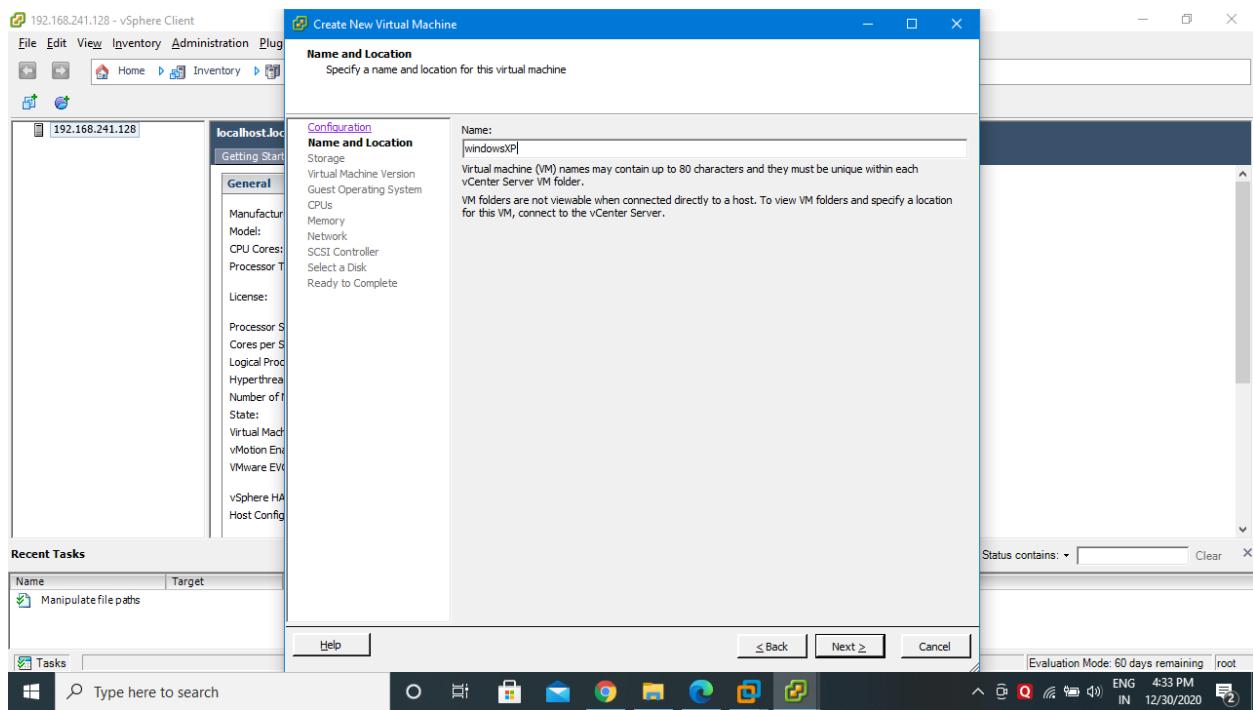
Folders Search

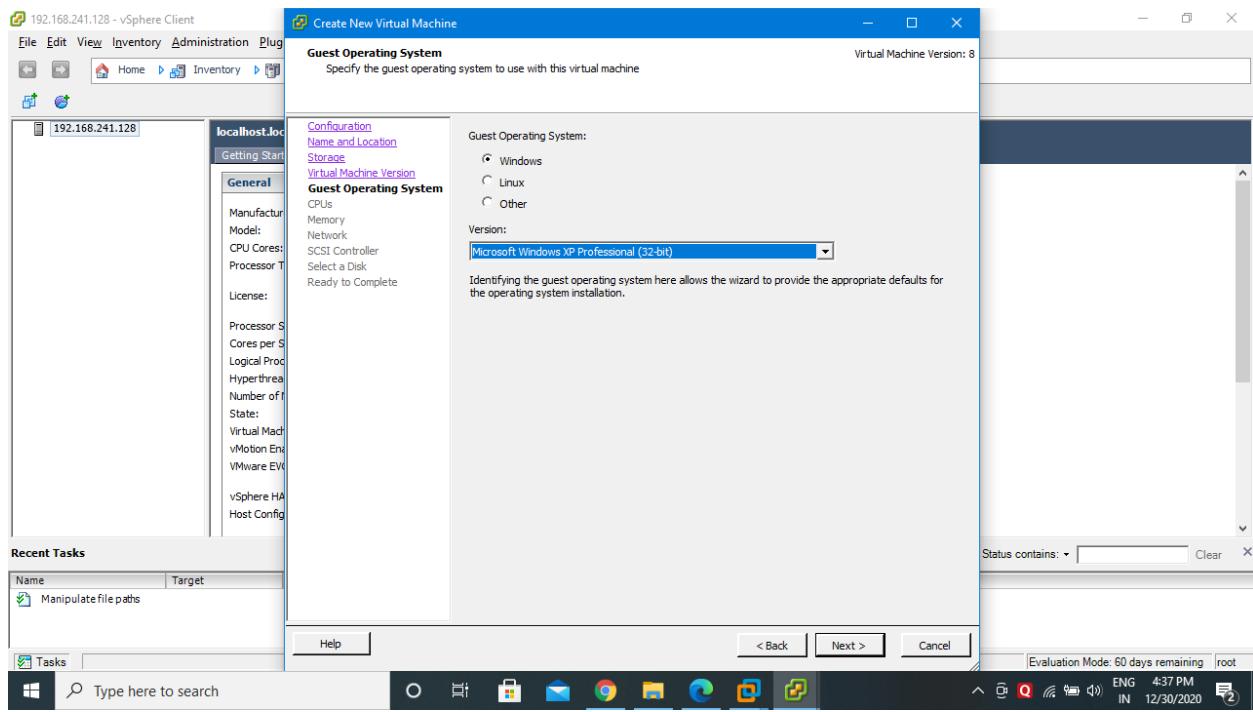
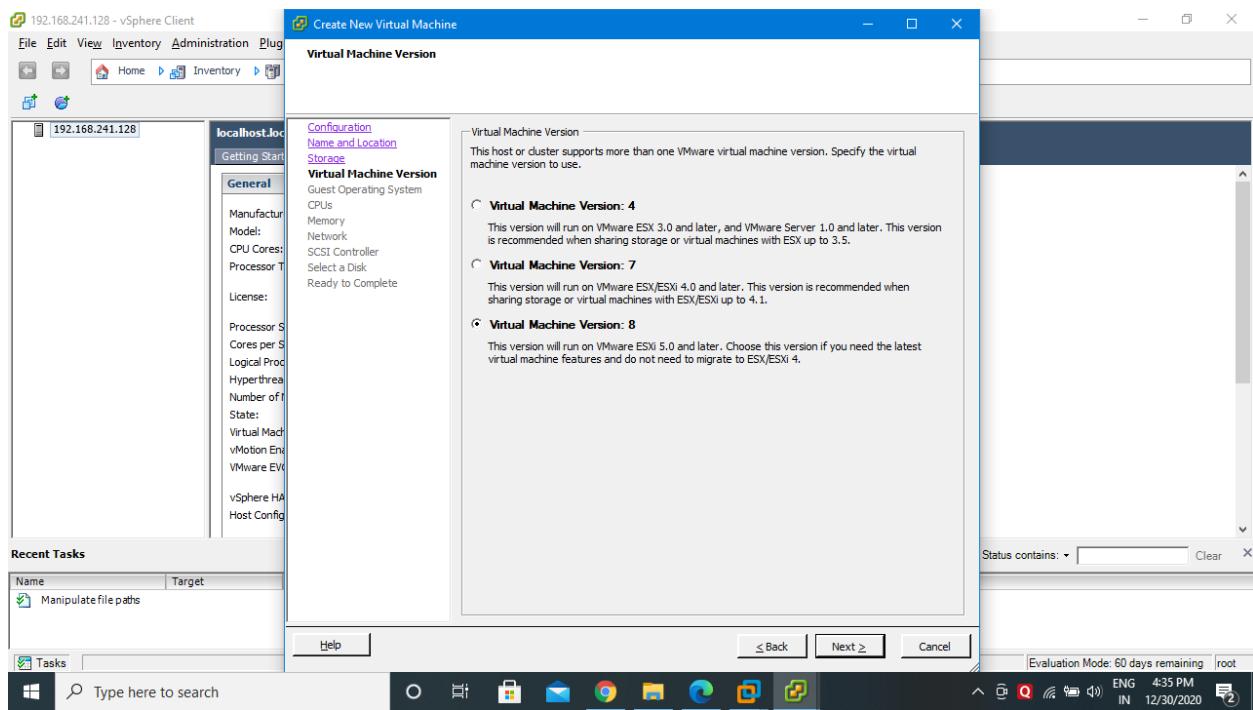
[datastore1] /

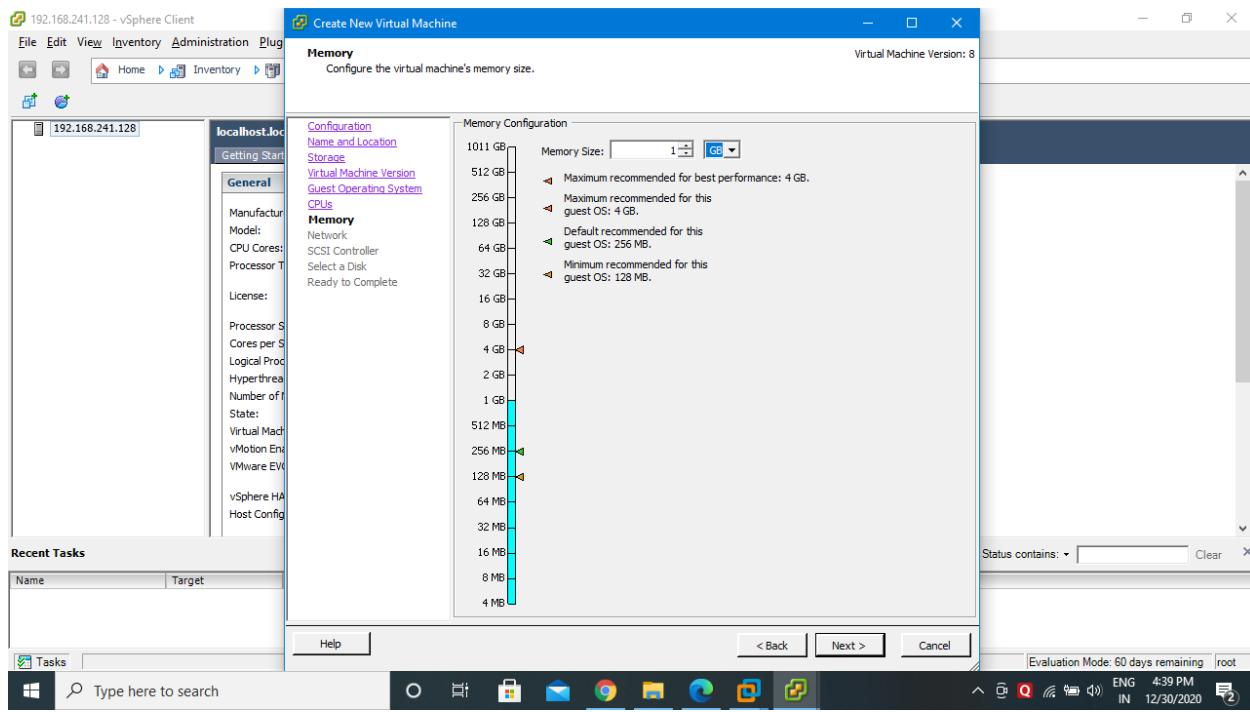
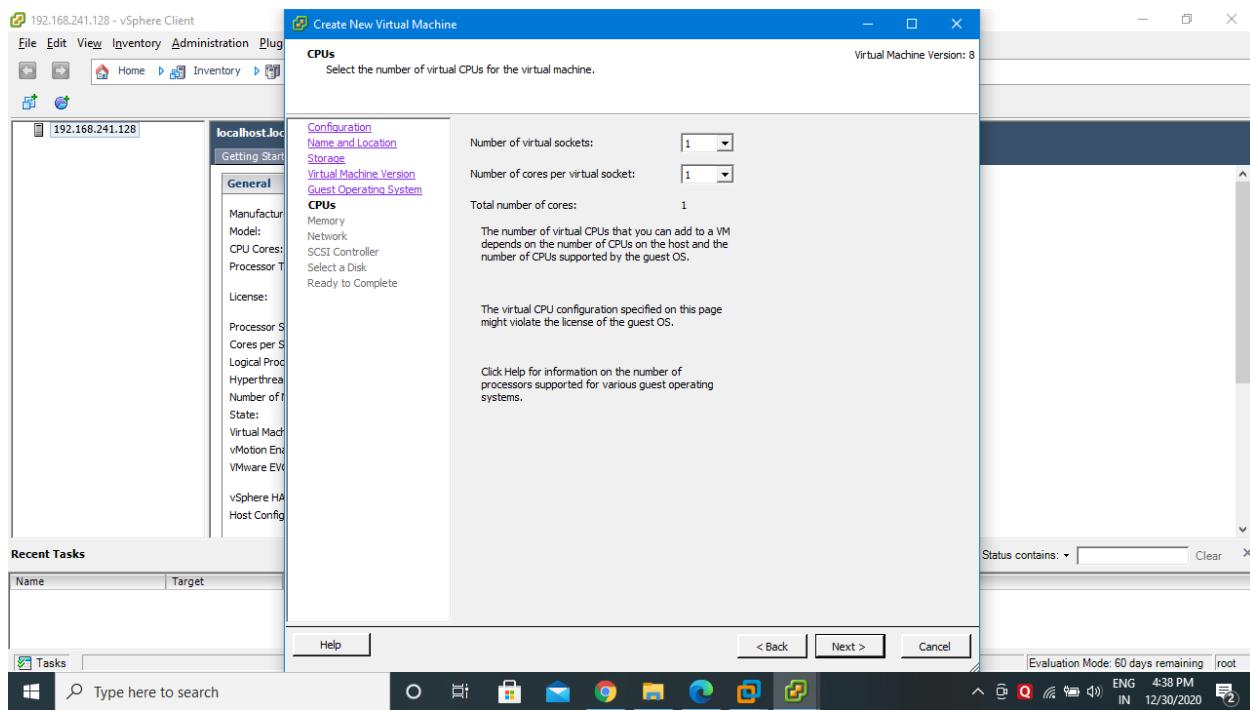
Name	Size	Type	Path	Modified
.sddsf		Folder	[datastore1].sddsf	
WXPVOL_EN.iso	706,862.00 KB	ISO Image	[datastore1]	12/30/2020 4:27:31 PM

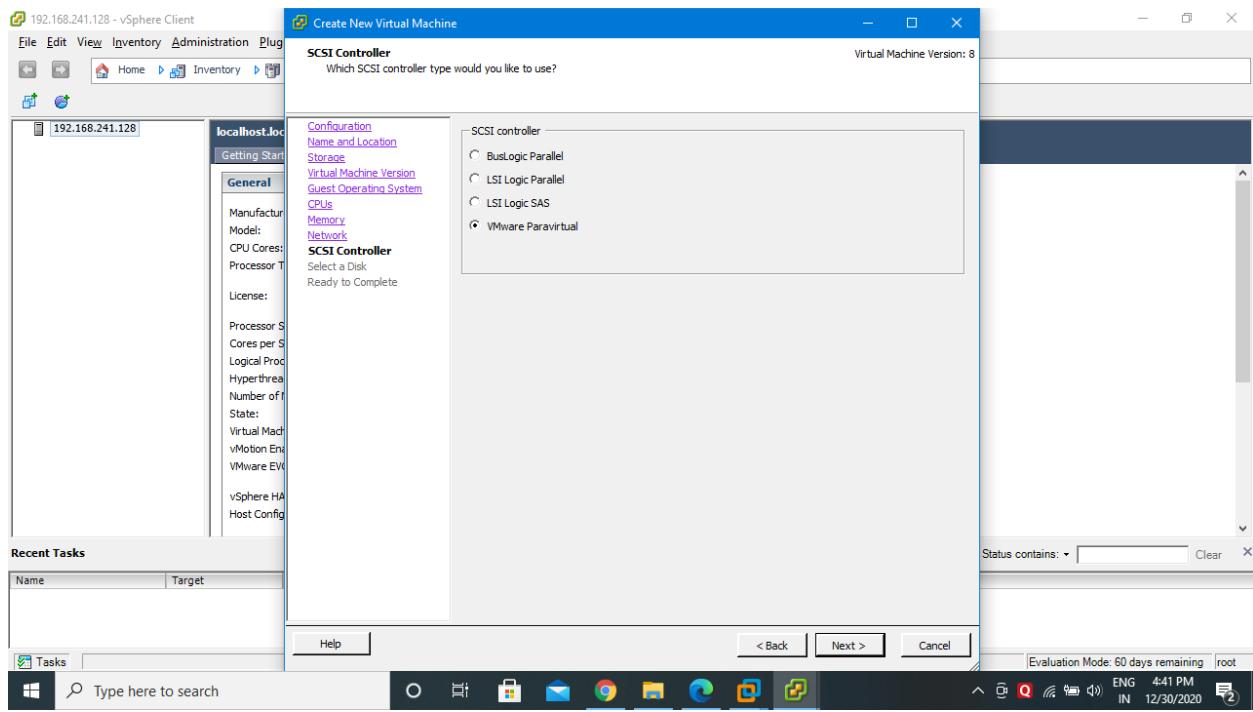
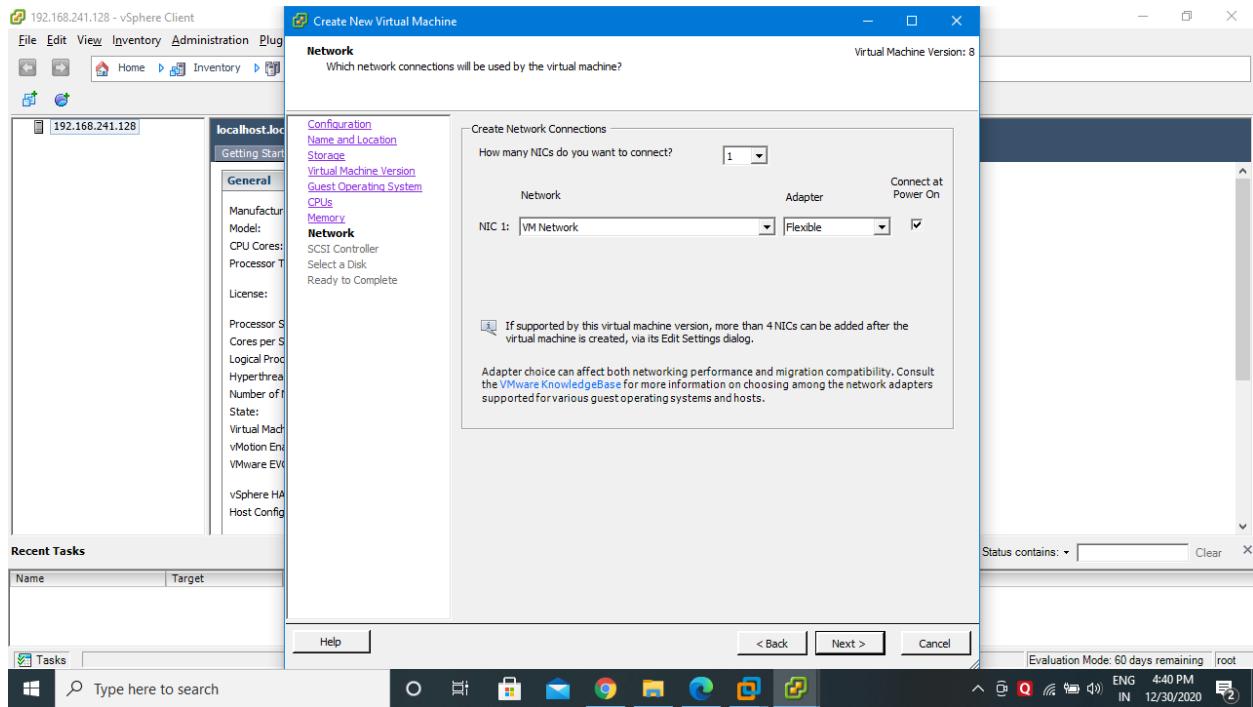
Type here to search

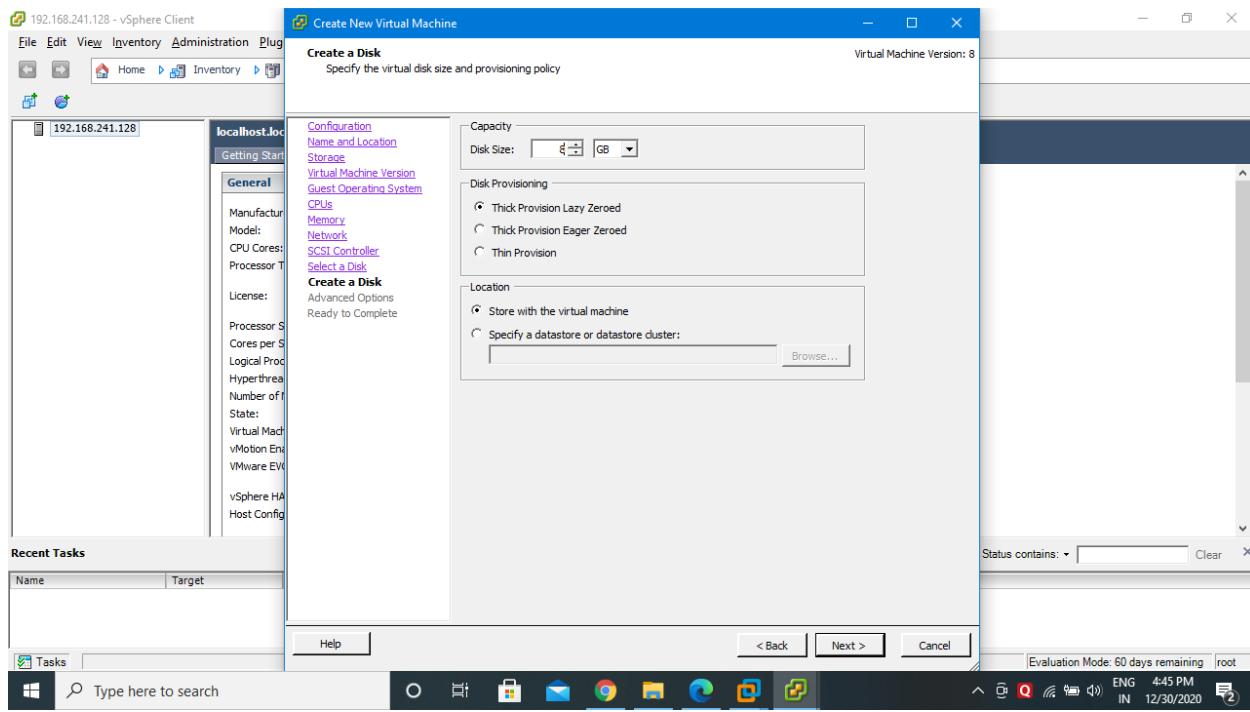
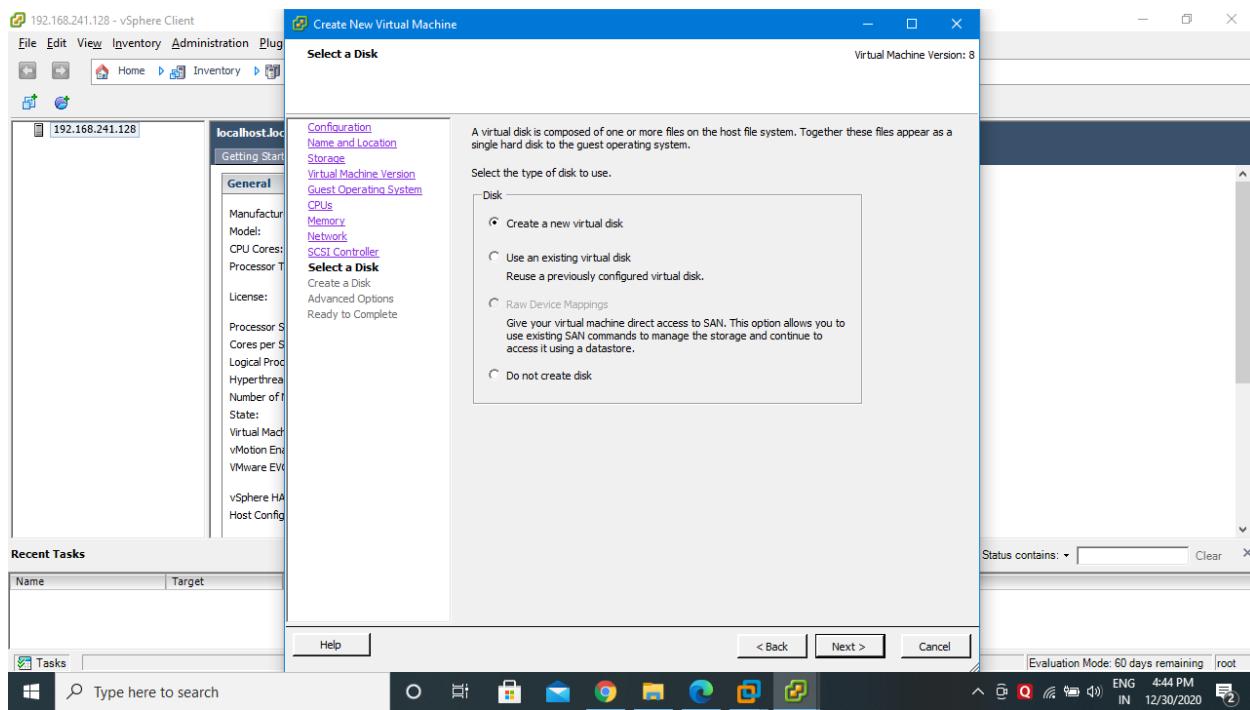


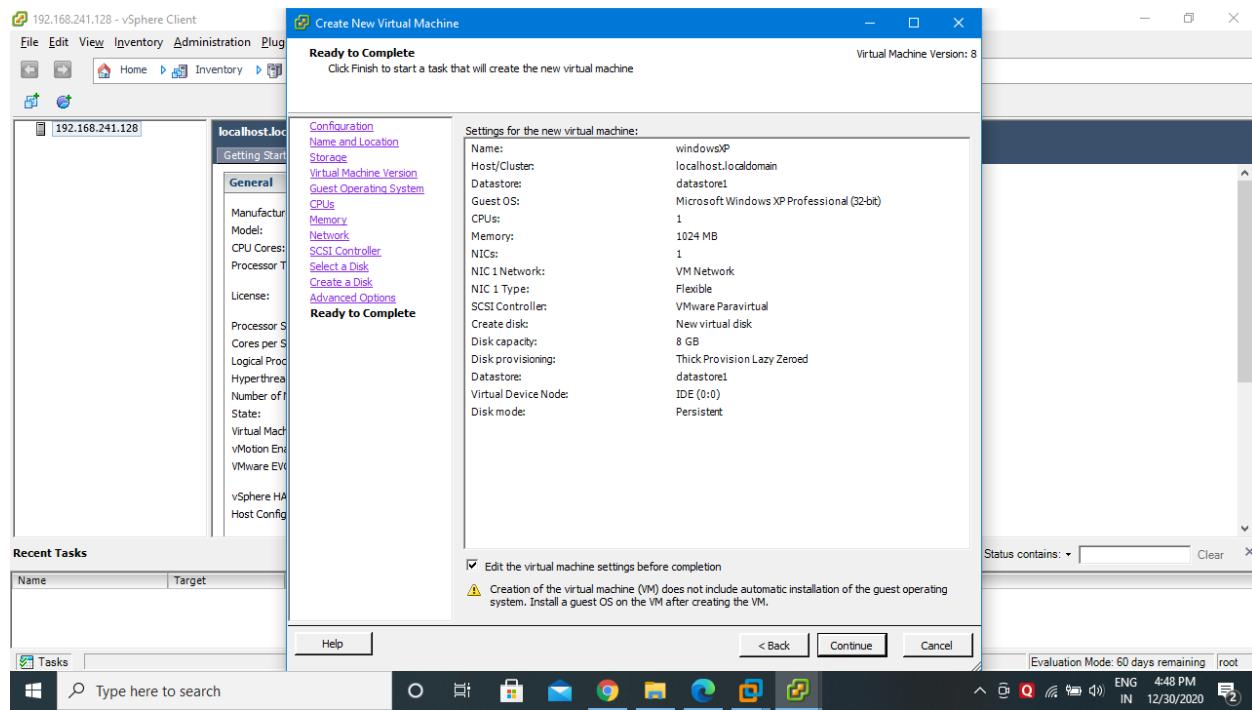
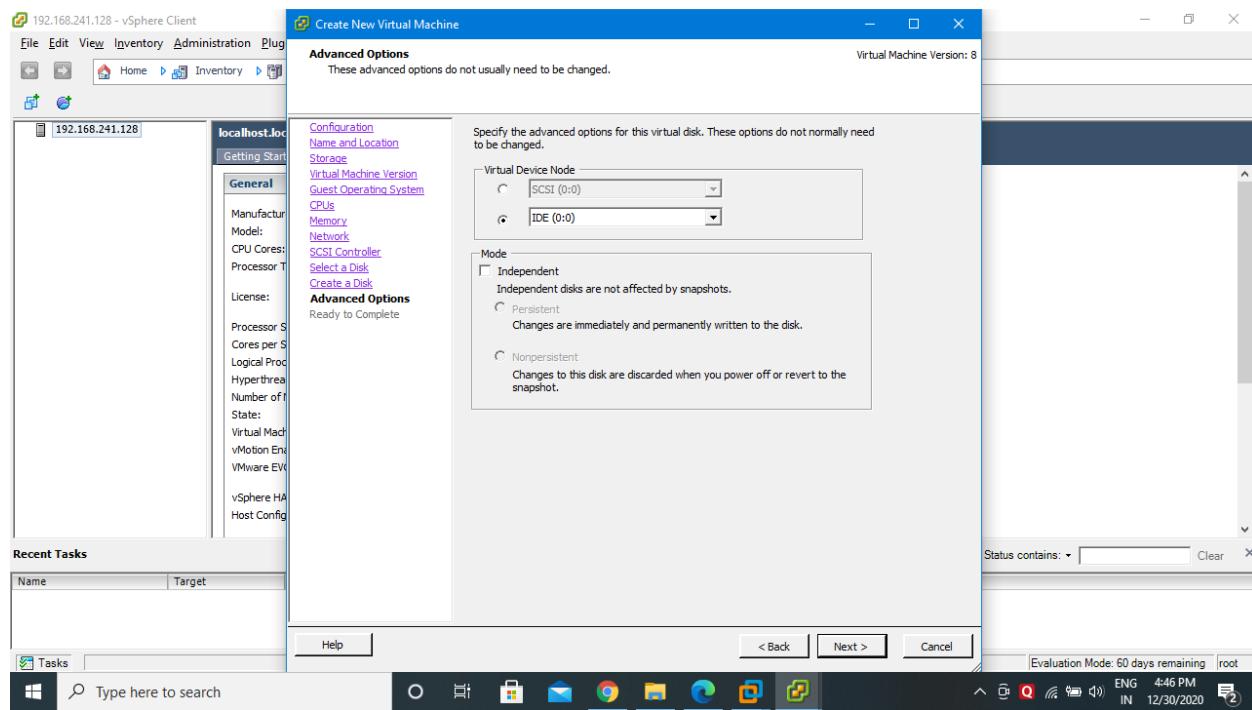


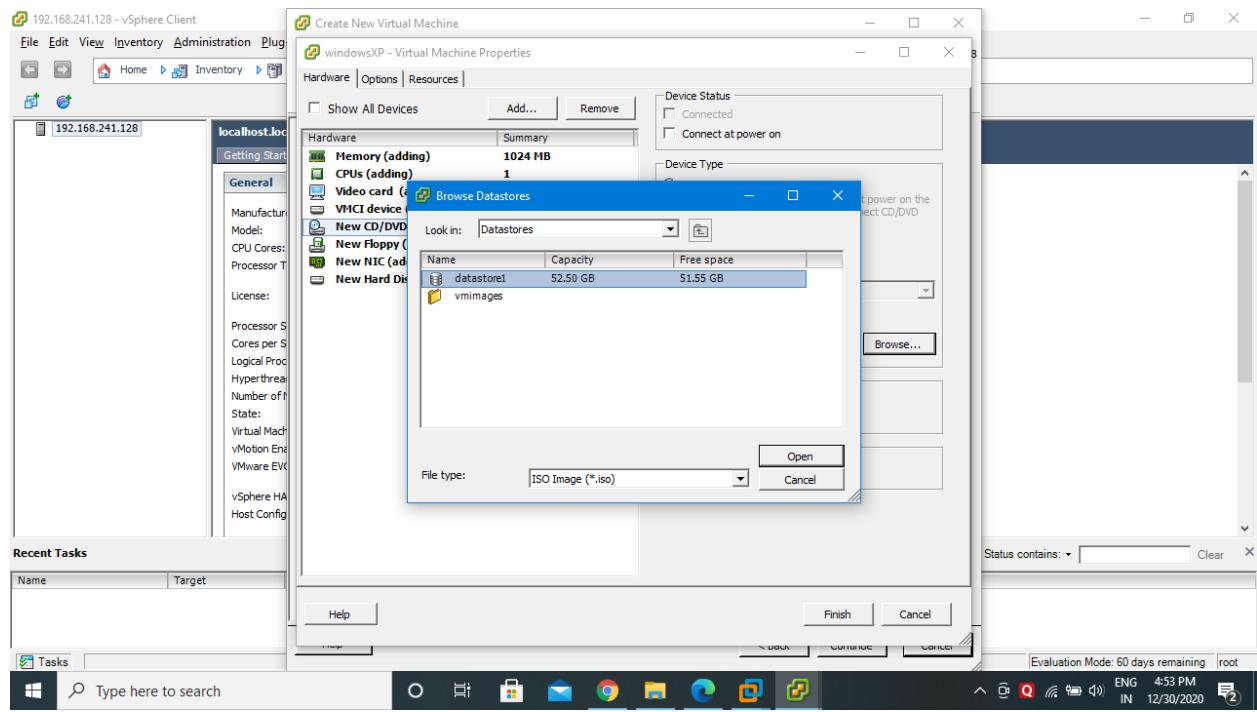
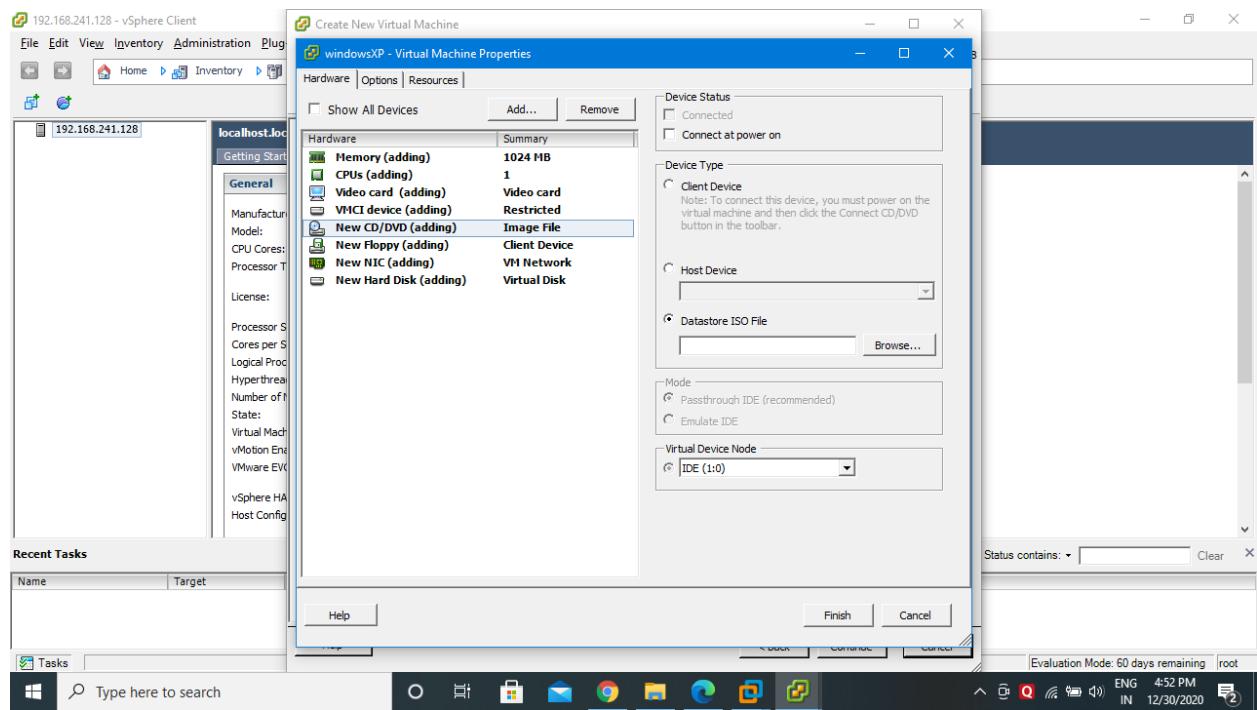


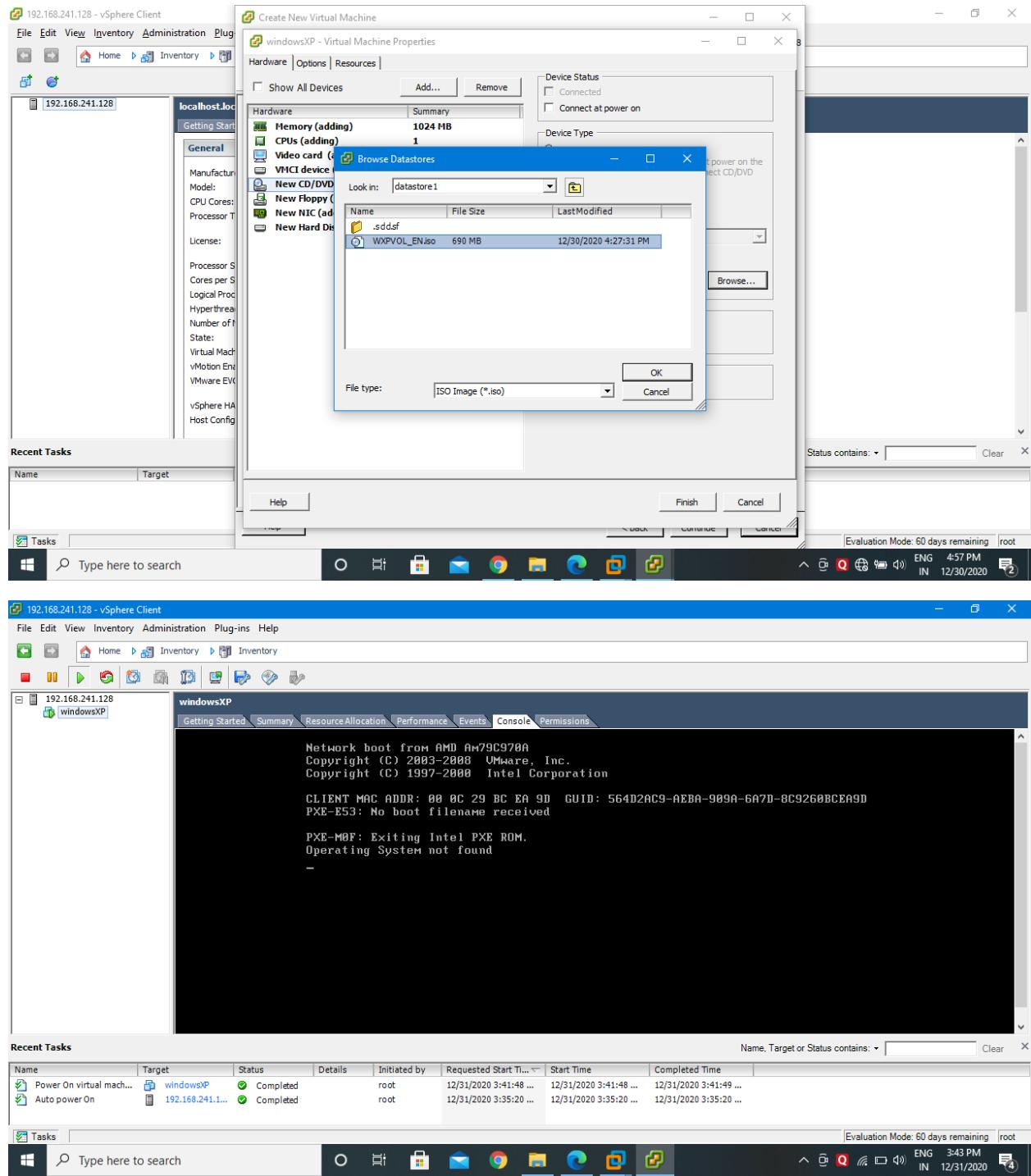


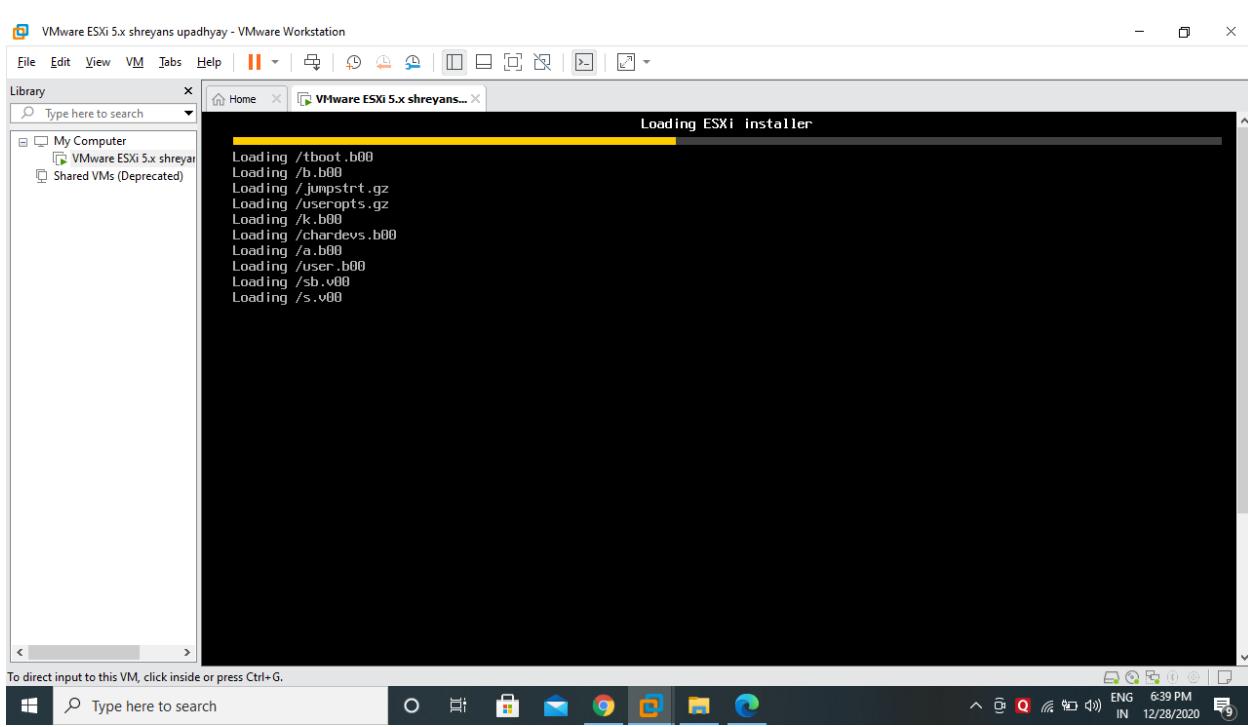
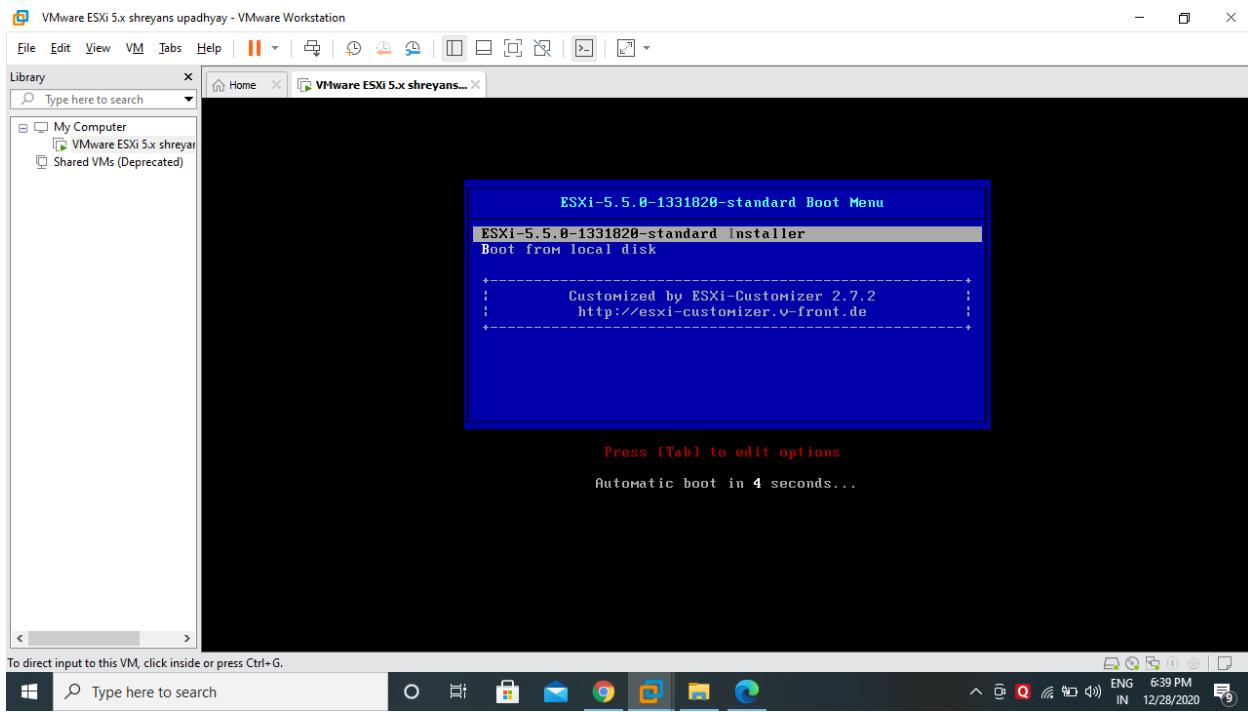


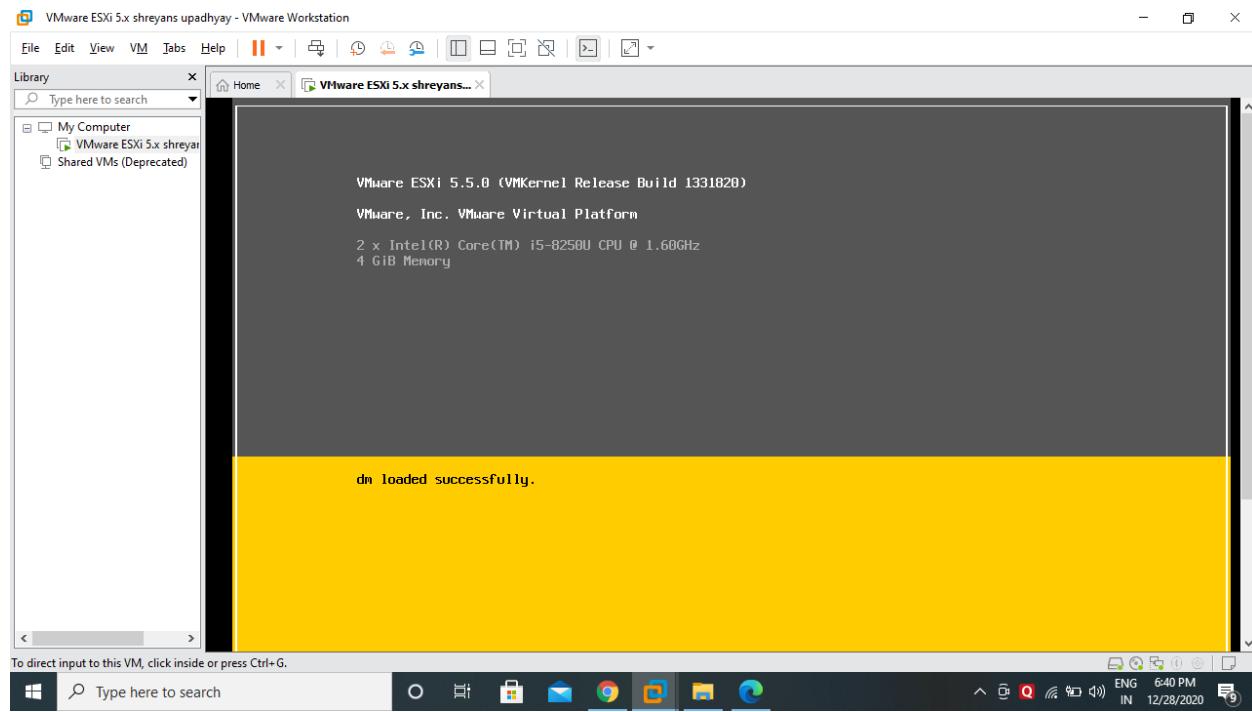








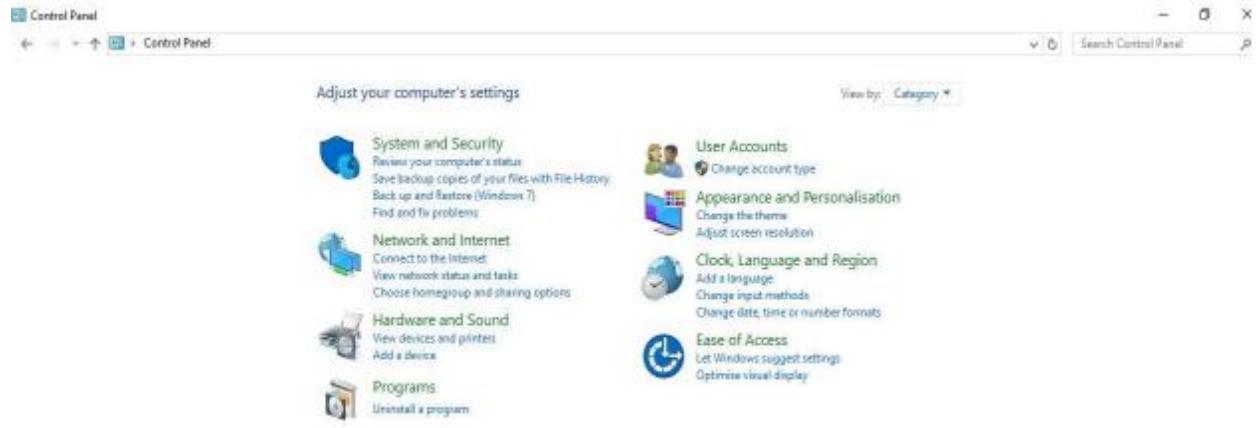




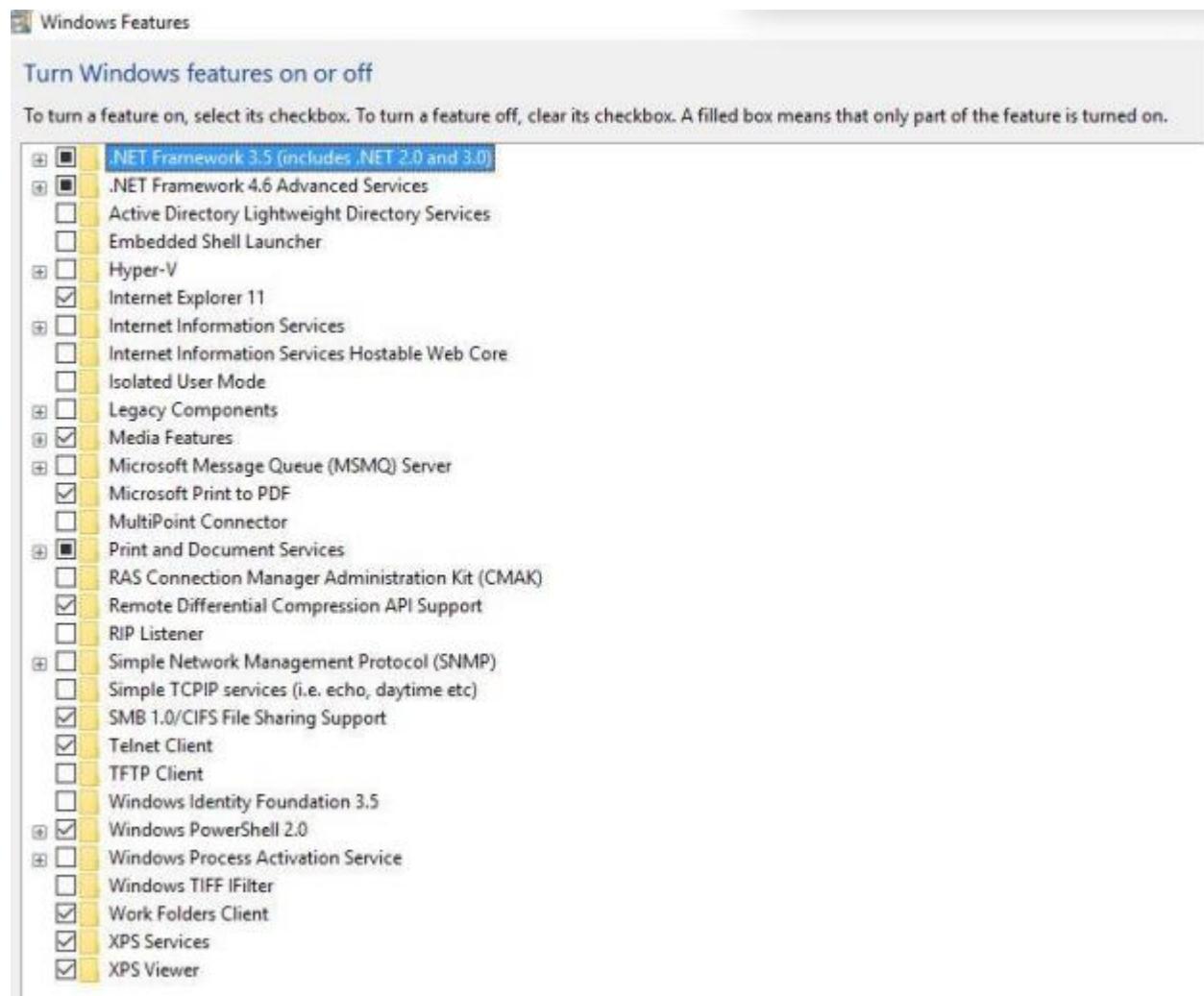
Practical No 6

Native Virtualization using HyperV

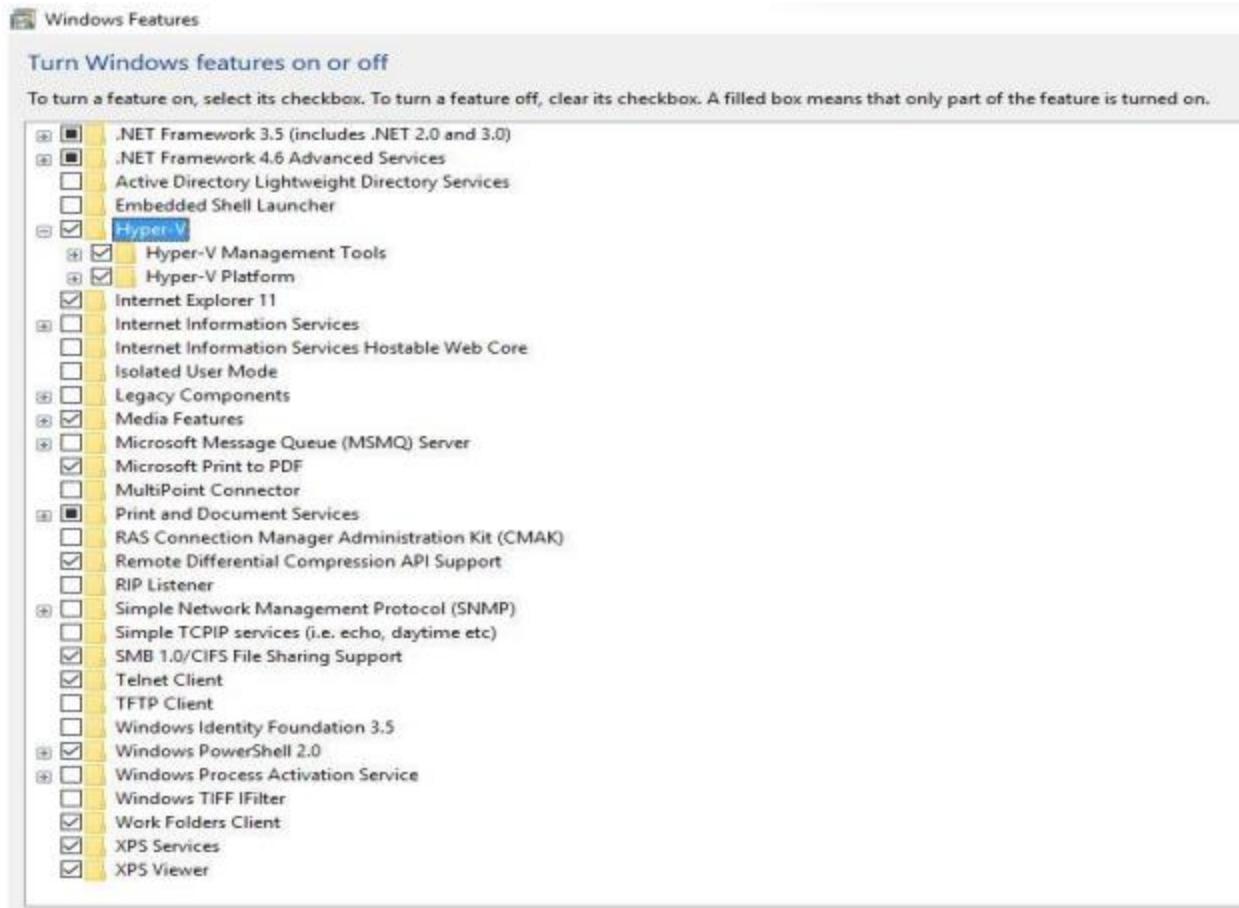
First we have to uninstall vmware software if already installed on computer because the VMware Workstation installer does not support running on a Hyper-V virtual machine. After uninstalling VMware, we can proceed to next step - go to control panel and click on uninstall a program



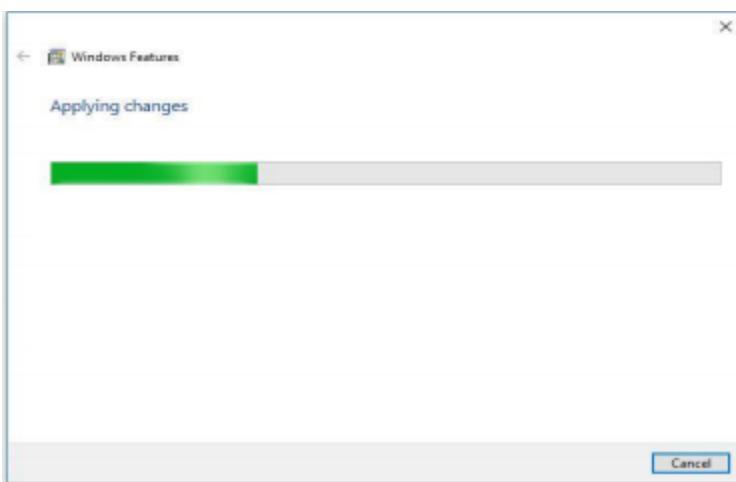
Click on Turn windows features on or off

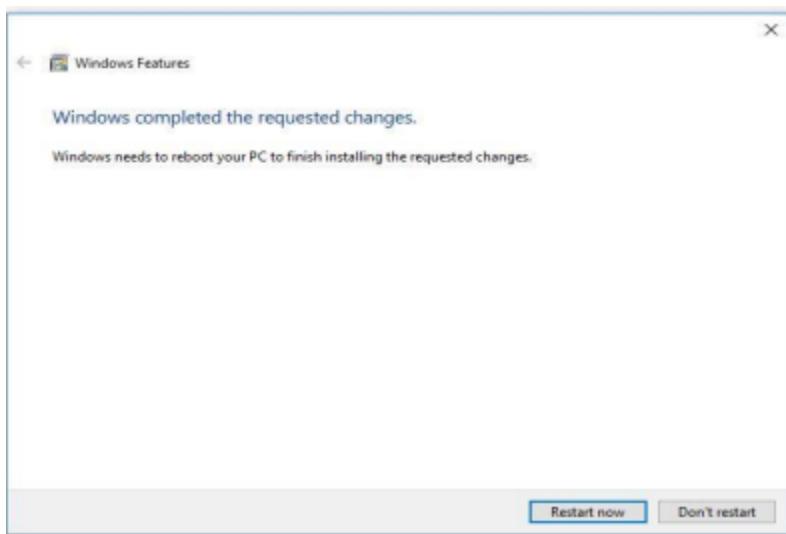


Now in windows features check on Hyper-V option

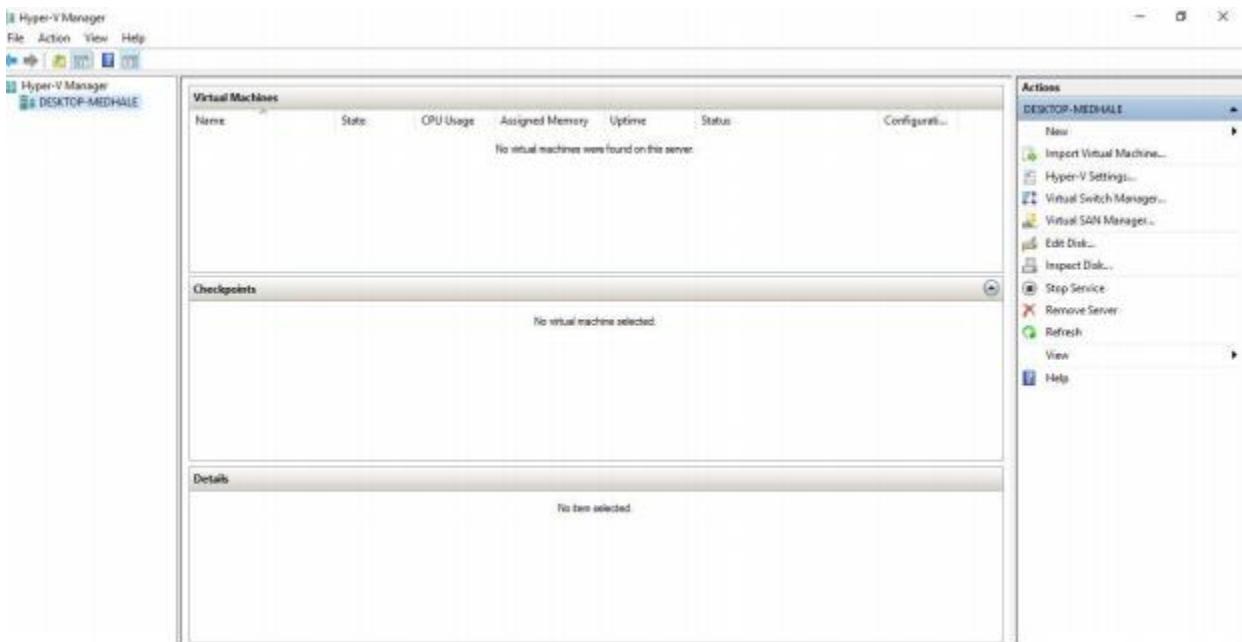


Click on OK button



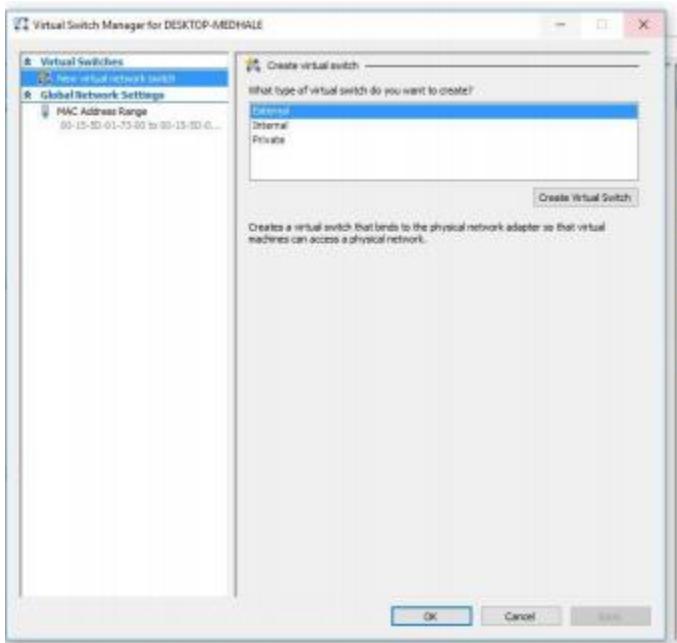


Click on Restart Now, after Retsart search for Hyper-V in search box



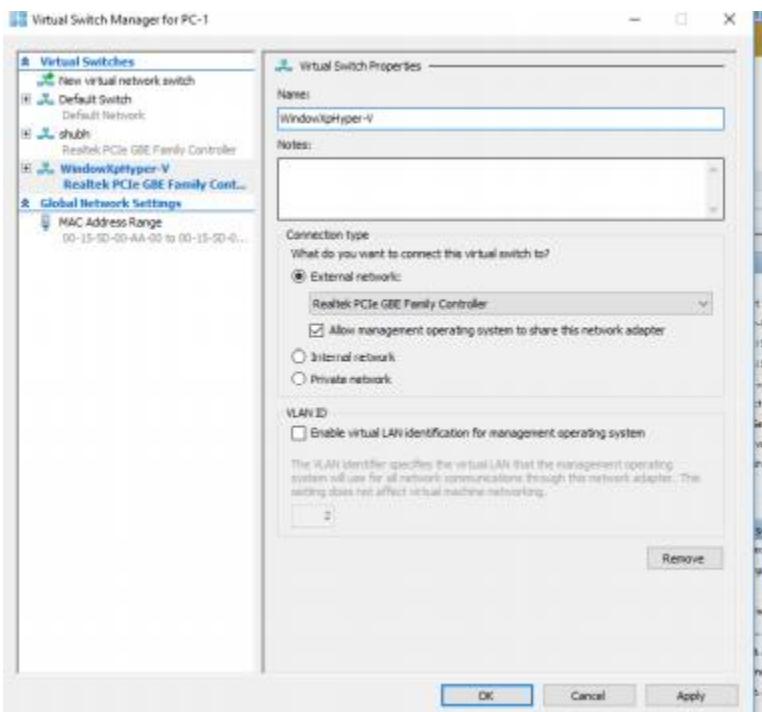
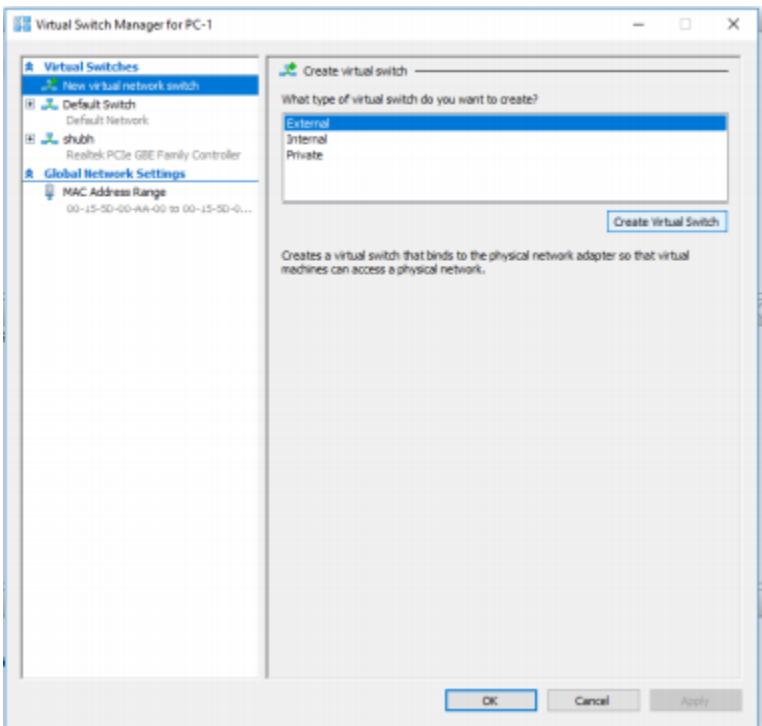
For creating virtual machine, first we have to create virtual switch, click on virtual switch manager option

Select External as connection type and click on create virtual switch



Give name to the virtual switch and click on Apply button

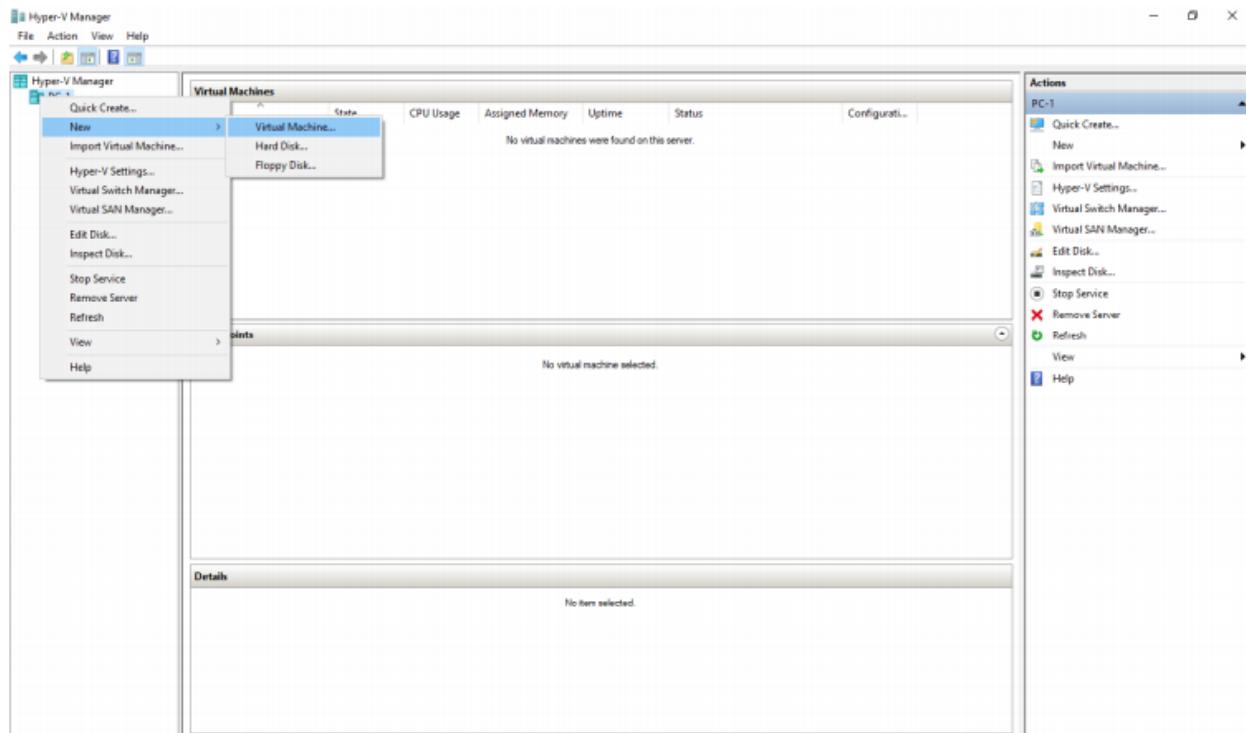
A screenshot of the 'Hyper-V Manager' application. The top menu bar includes 'File', 'Action', 'View', and 'Help'. The left sidebar shows 'Hyper-V Manager' with a single entry 'PC-1'. The main area displays a table titled 'Virtual Machines' with one row: 'Name' (winxp), 'State' (Running), 'CPU Usage' (24%), 'Assigned Memory' (512 MB), 'Uptime' (00:05:16), and 'Status' (8.3). Below this is a 'Checkpoints' section showing 'Automatic Checkpoint - winxp - (26-02-2019 - 11:21:05)'. The bottom section is a detailed view for 'winxp', showing 'Created' (26-02-2019 11:21:05), 'Configuration Version' (8.3), 'Generation' (1), 'Notes' (None), and 'Clustered' (No). The 'Heartbeat' status is listed as 'No Contact'. At the bottom are tabs for 'Summary', 'Memory', and 'Networking'. On the right side, there is a vertical 'Actions' pane for 'PC-1' and a specific 'winxp' pane with options like 'Connect...', 'Settings...', 'Turn Off...', 'Shut Down...', 'Save', 'Pause', 'Reset', 'Checkpoint', 'Revert...', 'Move...', 'Export...', 'Rename...', and 'Help'.



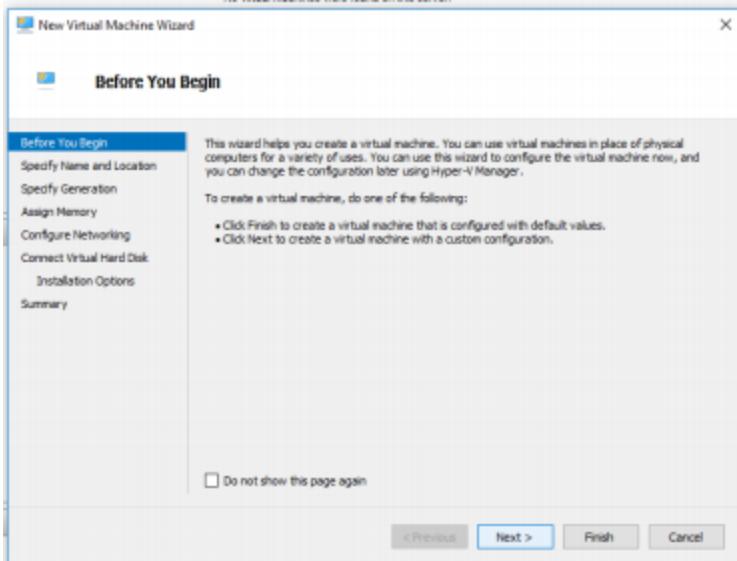
After clicking Apply button, it will show the warning about the connection, click on Yes



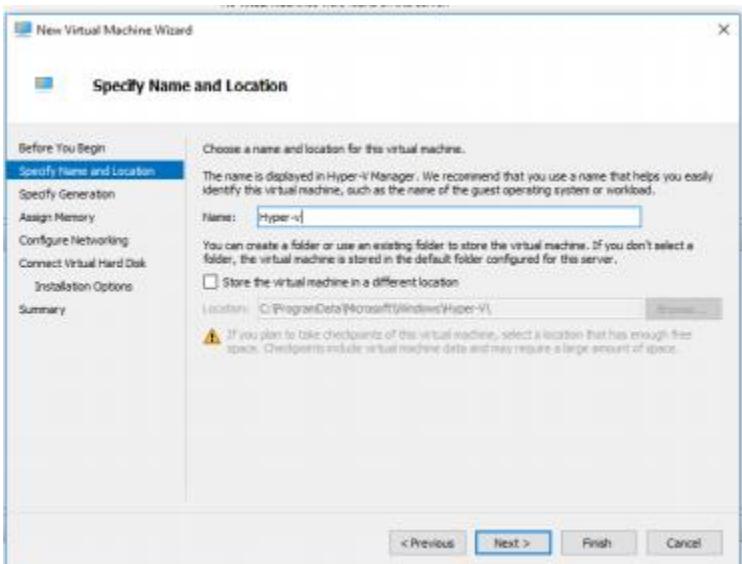
Right click on Server and select New Virtual machine



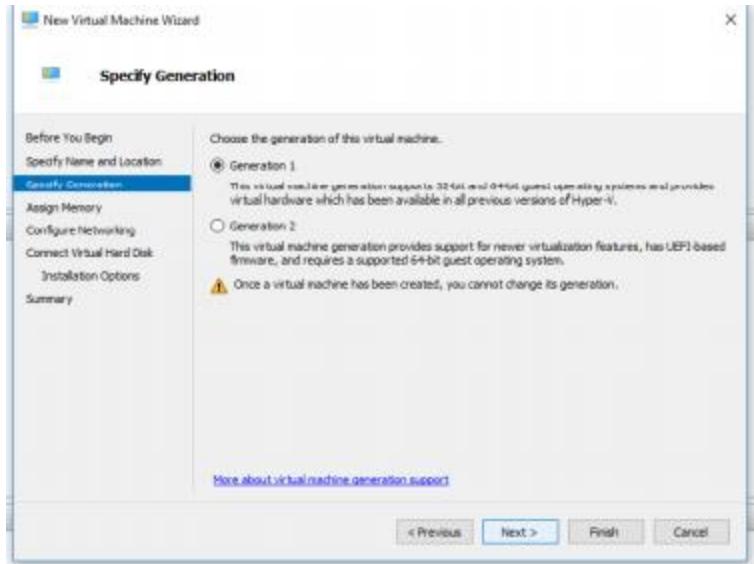
Click on Next button



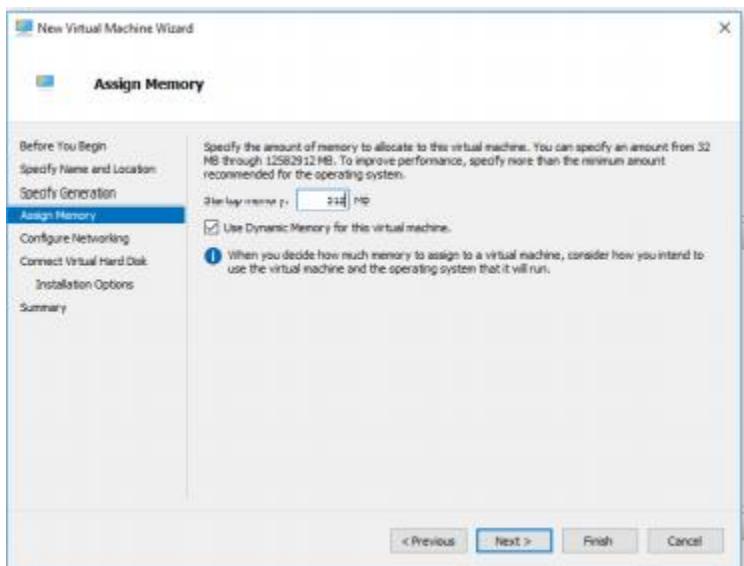
Provide the name to the virtual Machine and click on Next



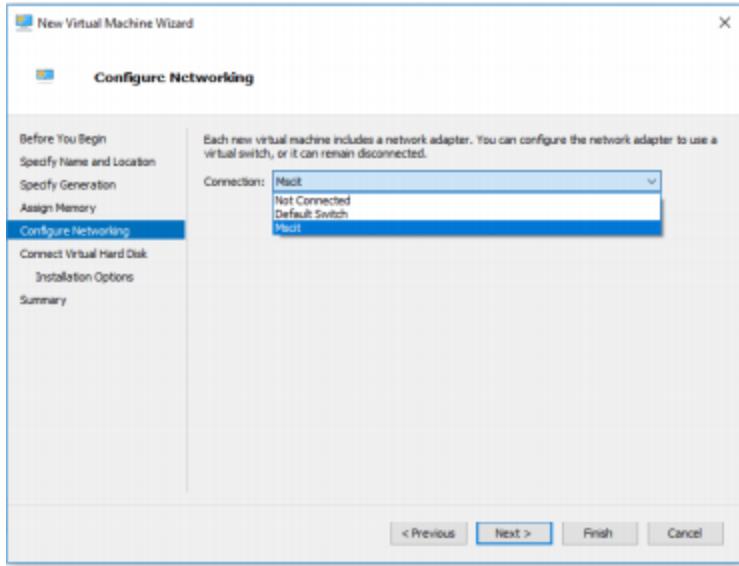
Specify Generation: Generation 1



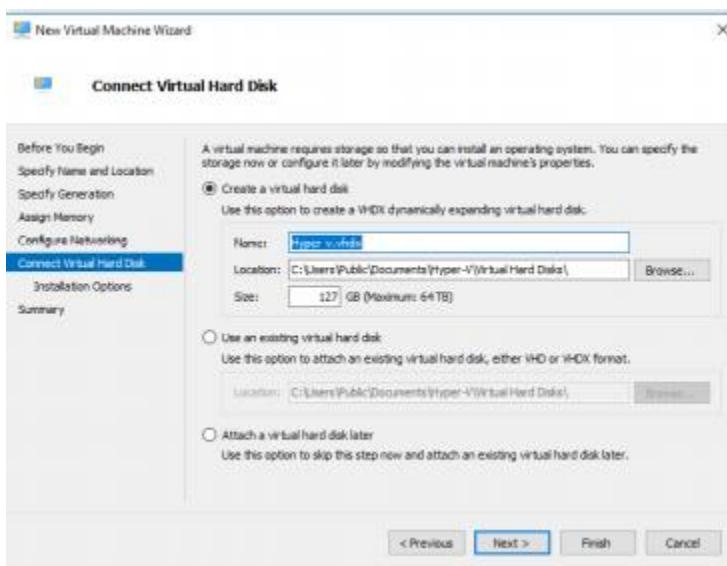
Tick on use Dynamic Memory for this Virtual Machine



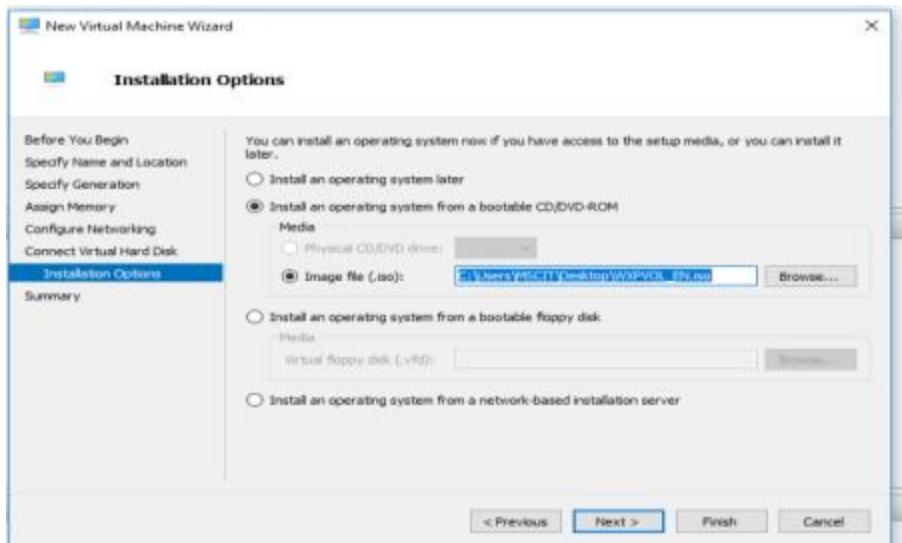
Select the switch which was created earlier from the drop-down list and click NEXT



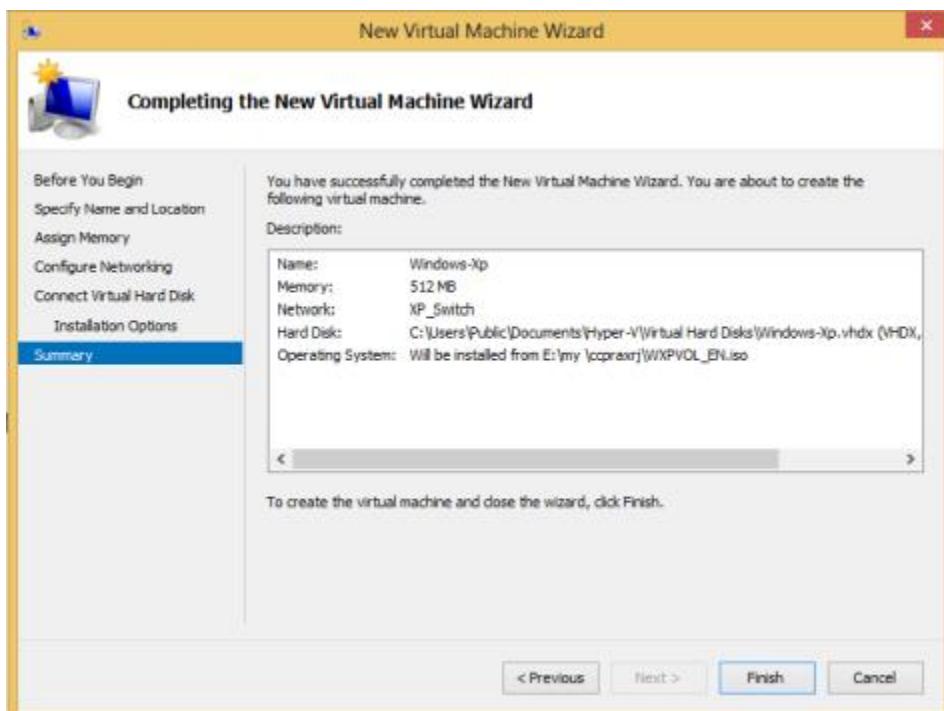
Description of virtual machine and location where it will store virtual machine related files and size require for this machine click on next



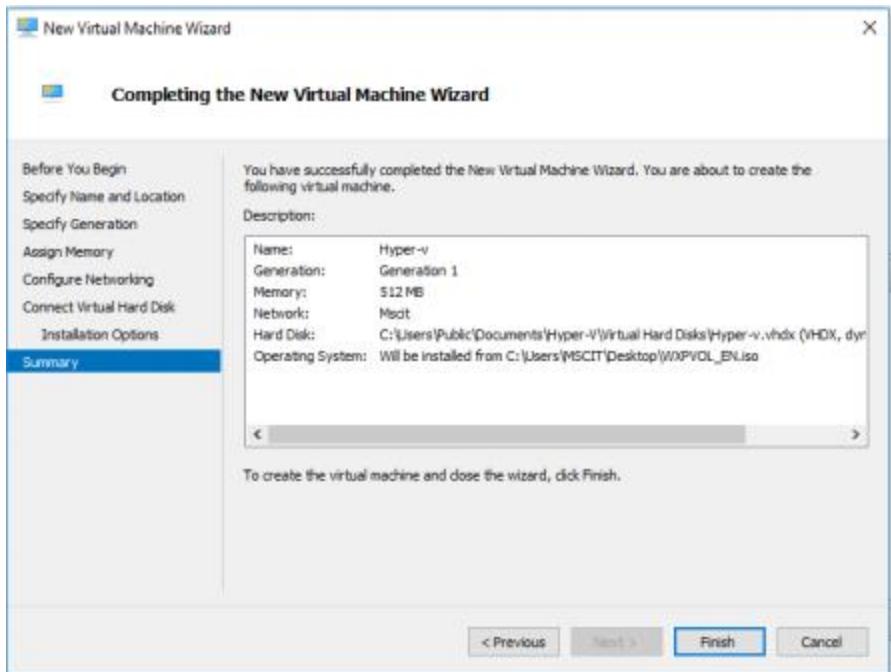
New virtual machine wizard panel will appear, where we will choose operating system which we want to install on virtual machine select install an operating system from boot CD/DVD-ROM and then select Image file(.iso) and browse our OS iso file then click on next button



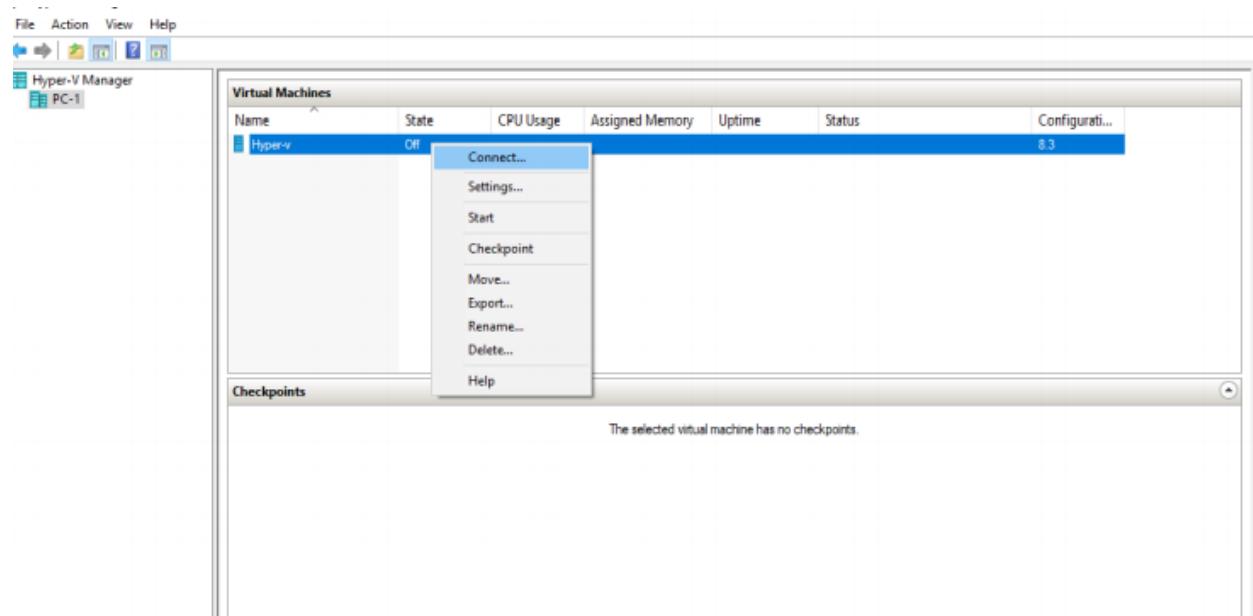
Summary report will be generated about virtual machine then click on Finish button



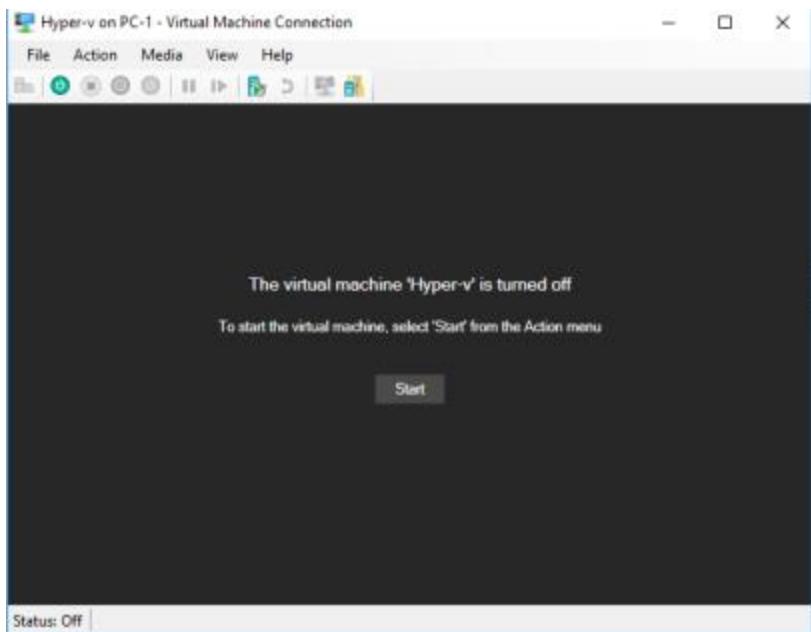
Click Finish



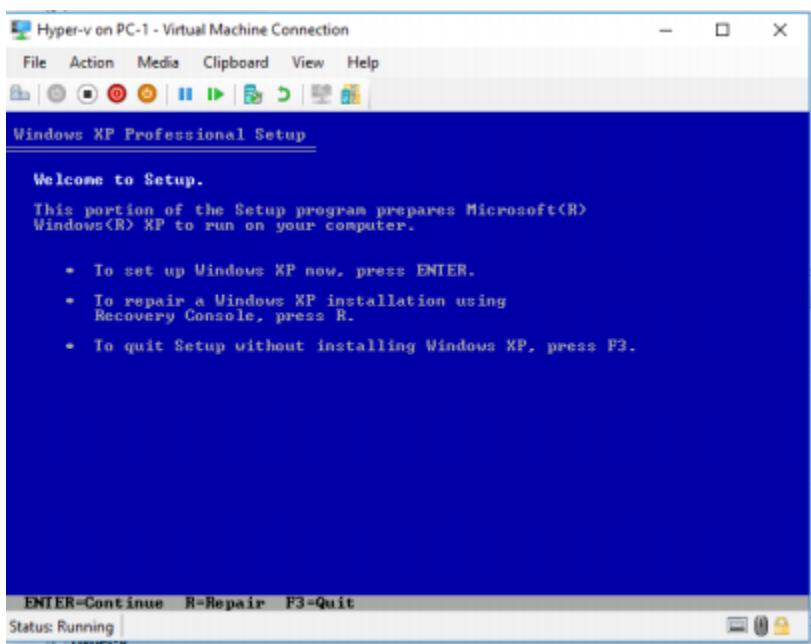
Right click on virtual machine and click on connect option



Turn Virtual Machine ON



VM will Start in below screen



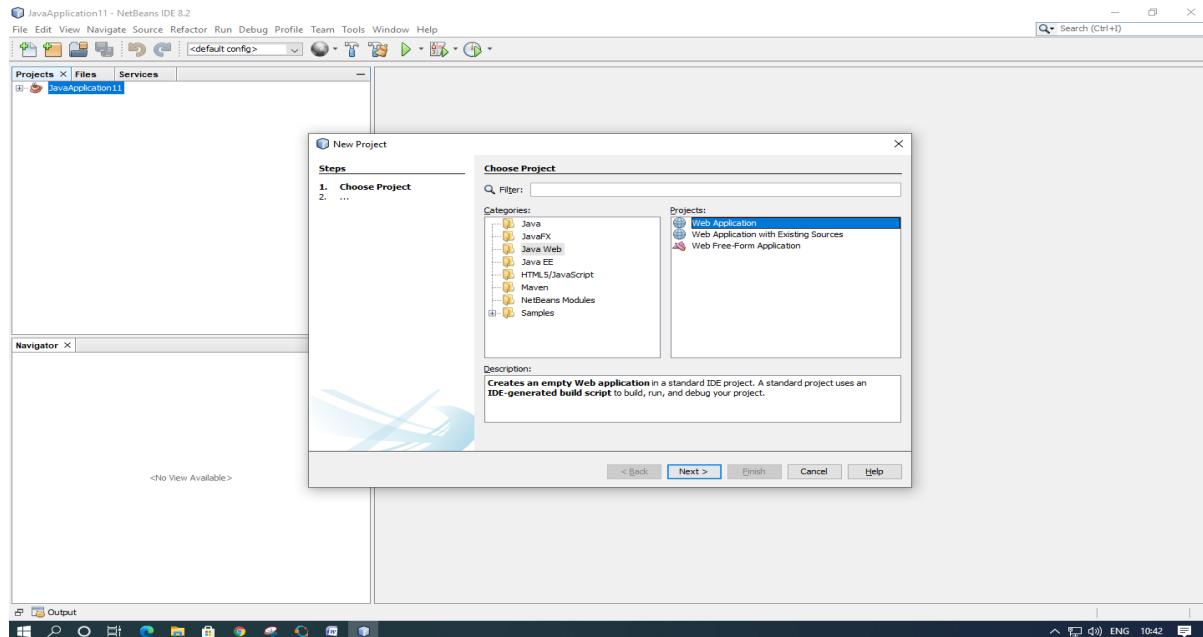
Practical No 8

Implementing “Big” Web Services

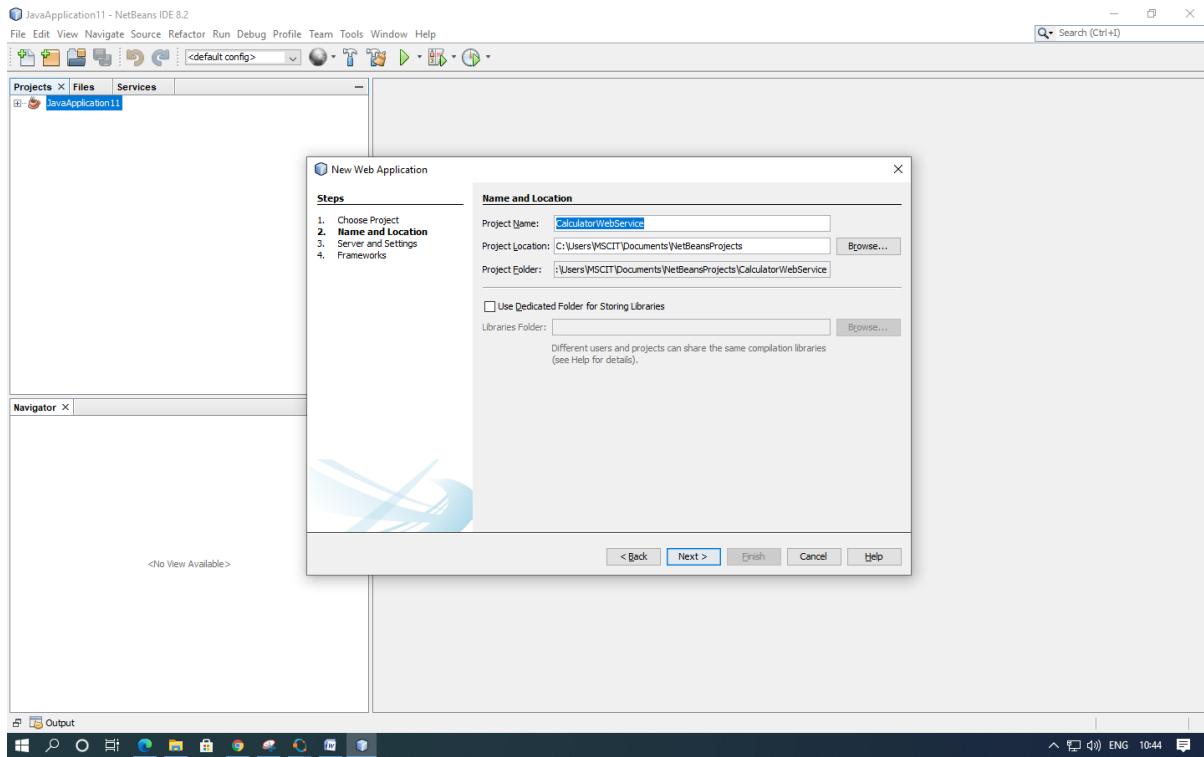
1) Creating a Web Service

A. Choosing a Container: Open NetBeans IDE 8.2

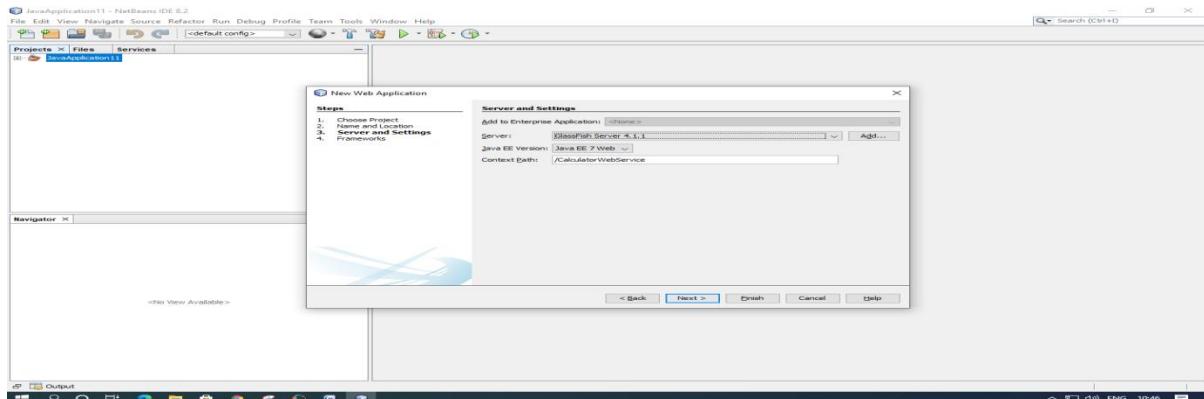
1. Choose File > New Project. Select Web Application from the Java Web.



2. Name the project “CalculatorWebService”. Select a location for the project. Click Next.

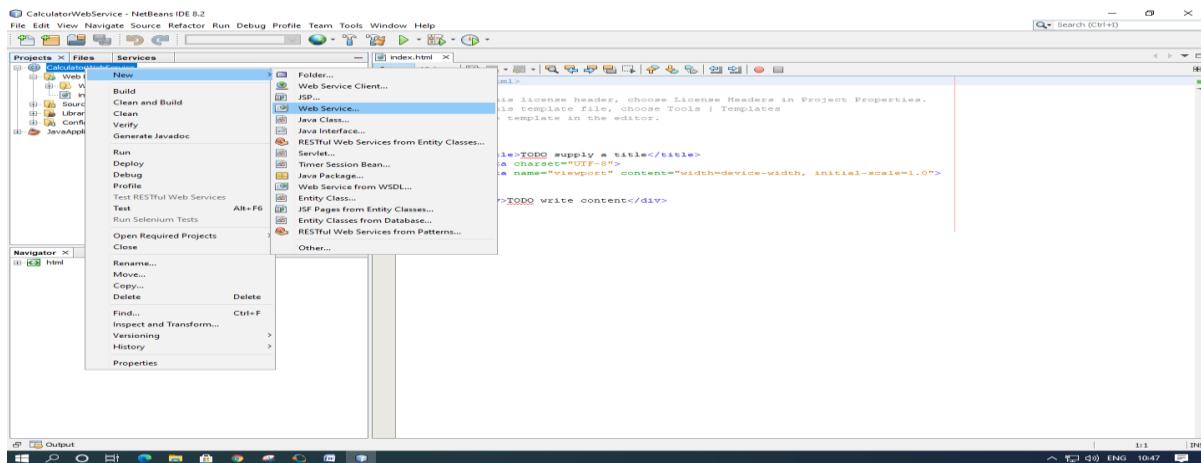


3. Select your server and Java EE version and click Finish. (Do not do anything in Framework)

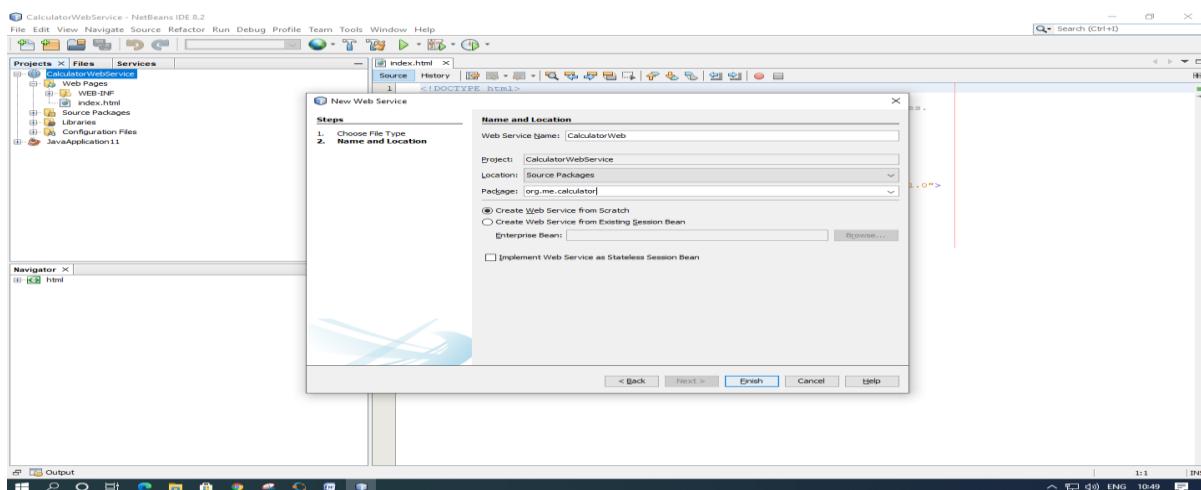


B. Creating a Web Service from a Java Class

1. Right-click the “CalculatorWebService” node and choose New > Web Service.



2. Name the web service “CalculatorWeb” and type org.me.calculator in Package. Leave Create Web Service from Scratch selected.

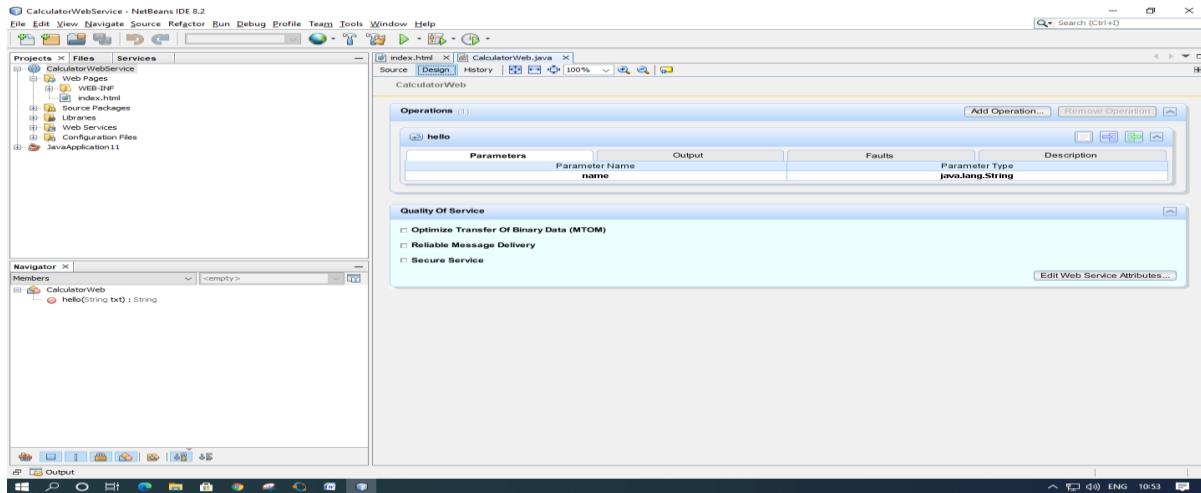


3. Click Finish. The Projects window displays the structure of the new web service and the source code is shown in the editor area.

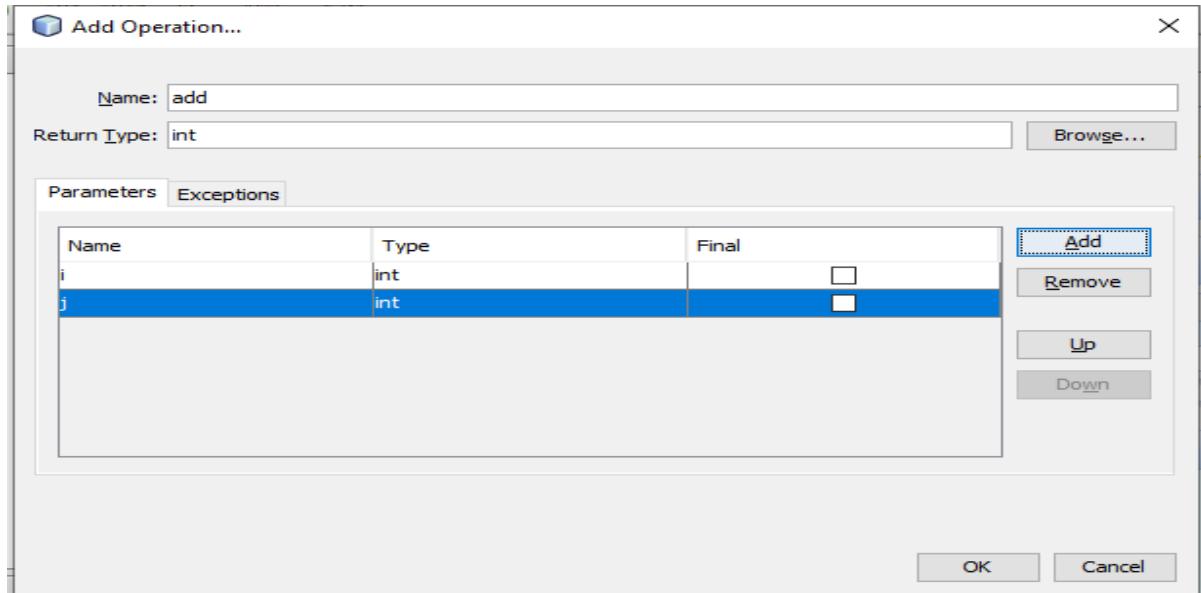
2) Adding an Operation to the Web Service : The goal of this exercise is to add to the web service an operation that adds two numbers received from a client. The NetBeans IDE provides a dialog for adding an operation to a web service. You can open this dialog either in the web service visual designer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

A. To add an operation to the web service:

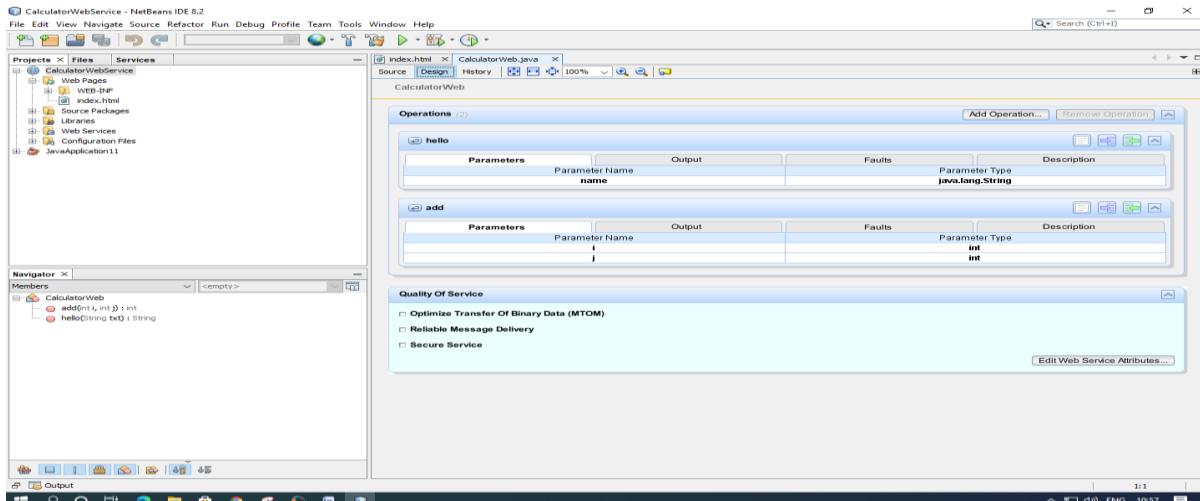
1. Change to the Design view in the editor.



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:

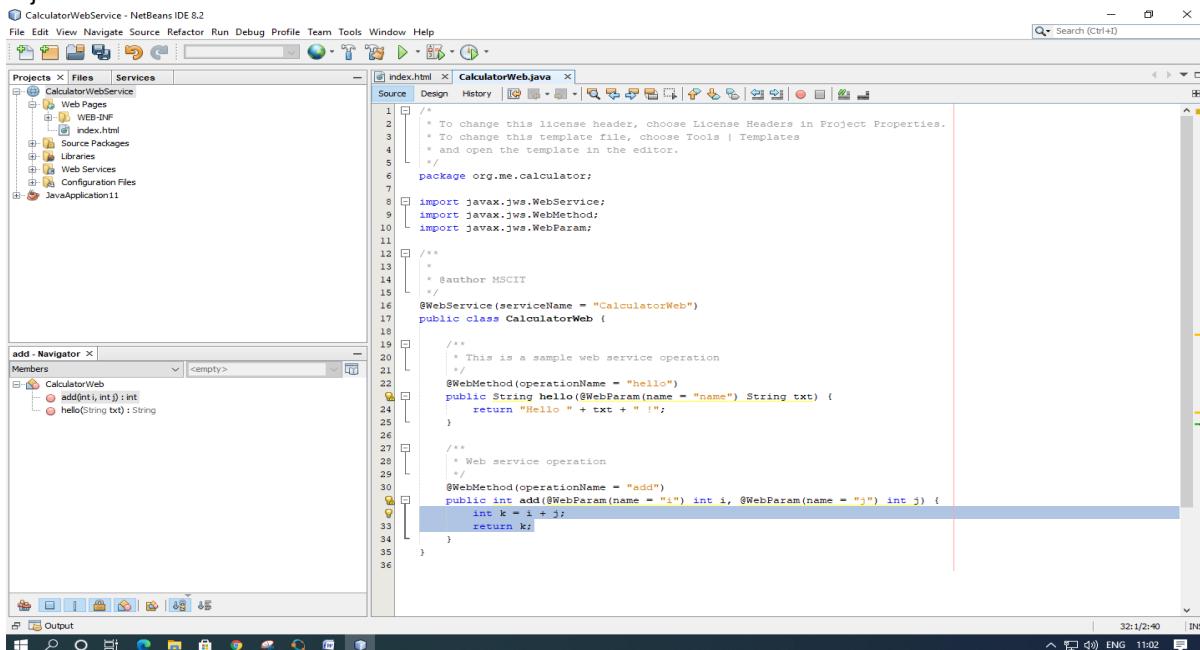


6. Click OK at the bottom of the Add Operation dialog box. You return to the editor.
7. The visual designer now displays the following:



8. Click Source. And code the following.

```
@WebMethod(operationName = "add")
public int add(@WebParam(name = "i") int i, @WebParam(name = "j") int j) {
    int k = i + j;
    return k;
}
```

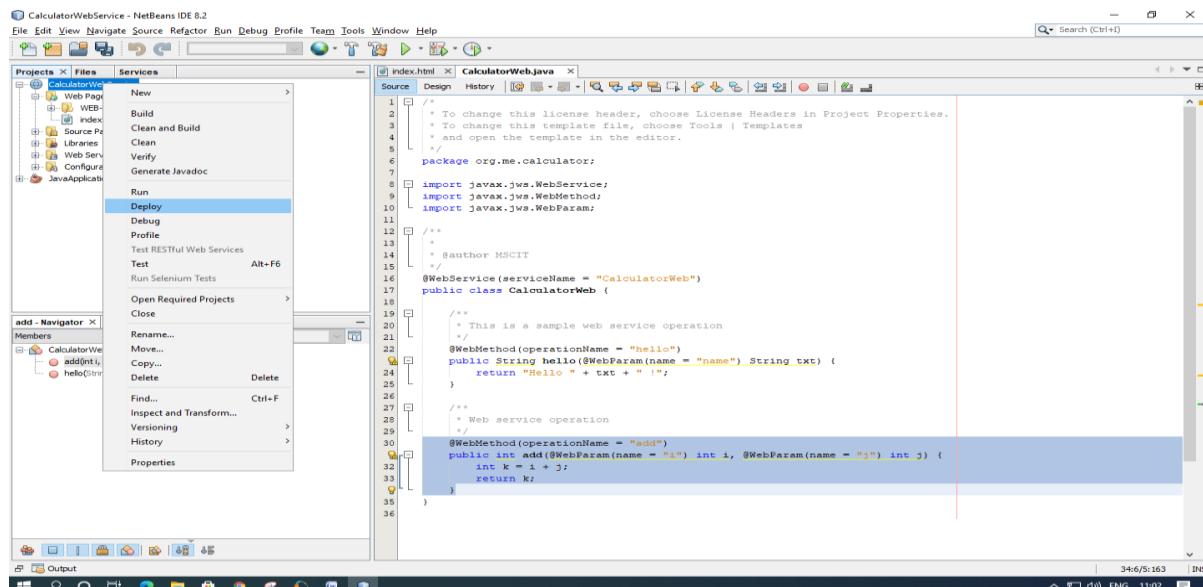


3) Deploying and Testing the Web Service

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 and WebLogic servers provide test clients.

A. To test successful deployment to a GlassFish or WebLogic 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



CalculatorWebService - NetBeans IDE 8.2

File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help

Projects Files Services

New Build Clean and Build Clean Verify Generate Javadoc Run Deploy Debug Profile Test RESTful Web Services Test Run Selenium Tests Open Required Projects Close Rename... Move... Copy... Delete Find... Inspect and Transform... Versioning History Properties

CalculatorWebService

CalculatorWeb

index.html

```

1  /*
2   * To change this license header, choose License Headers in Project Properties.
3   * To change this template file, choose Tools | Templates
4   * and open the template in the editor.
5   */
6  package org.me.calculator;
7
8  import javax.jws.WebService;
9  import javax.jws.WebMethod;
10 import javax.jws.WebParam;
11
12 /**
13  * @author MSCIT
14  */
15 @WebService(serviceName = "CalculatorWeb")
16 public class CalculatorWeb {
17
18
19     /**
20      * This is a sample web service operation
21      */
22     @WebMethod(operationName = "hello")
23     public String hello(@WebParam(name = "name") String txt) {
24         return "Hello " + txt + " !";
25     }
26
27
28     /**
29      * Web service operation
30      */
31     @WebMethod(operationName = "add")
32     public int add(@WebParam(name = "i") int i, @WebParam(name = "j") int j) {
33         int k = i + j;
34         return k;
35     }
36

```

Output

CalculatorWebService - NetBeans IDE 8.2

File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help

Projects Files Services

CalculatorWebService

CalculatorWeb

index.html

```

1  /*
2   * To change this license header, choose License Headers in Project Properties.
3   * To change this template file, choose Tools | Templates
4   * and open the template in the editor.
5   */
6  package org.me.calculator;
7
8  import javax.jws.WebService;
9  import javax.jws.WebMethod;
10 import javax.jws.WebParam;
11
12 /**
13  * @author MSCIT
14  */
15 @WebService(serviceName = "CalculatorWeb")
16

```

Output

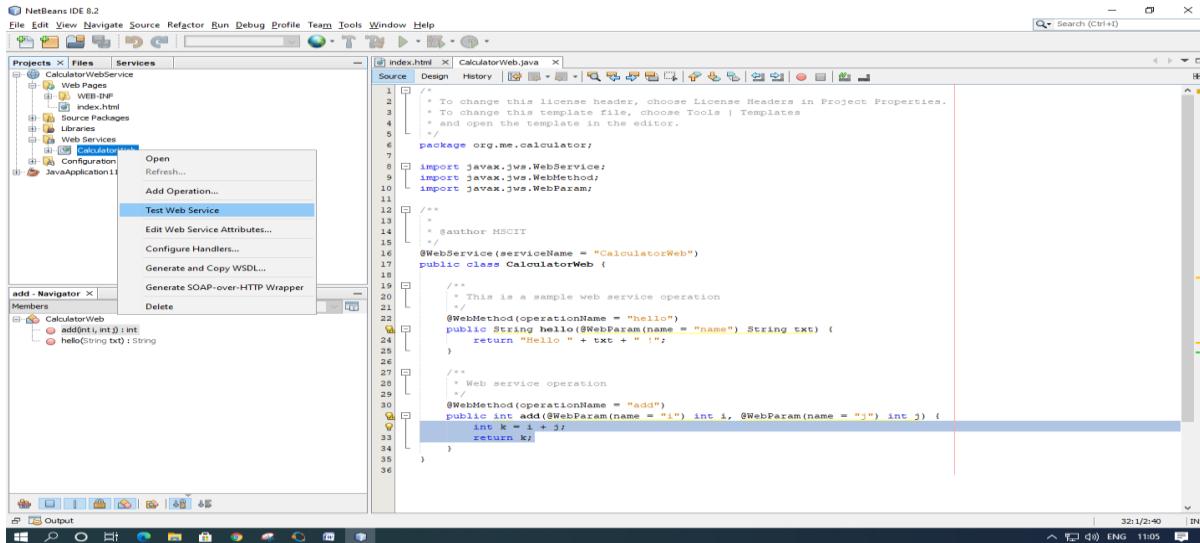
CalculatorWebService (run-deploy) × Java DB Database Process × GlassFish Server 4.1.1 ×

```

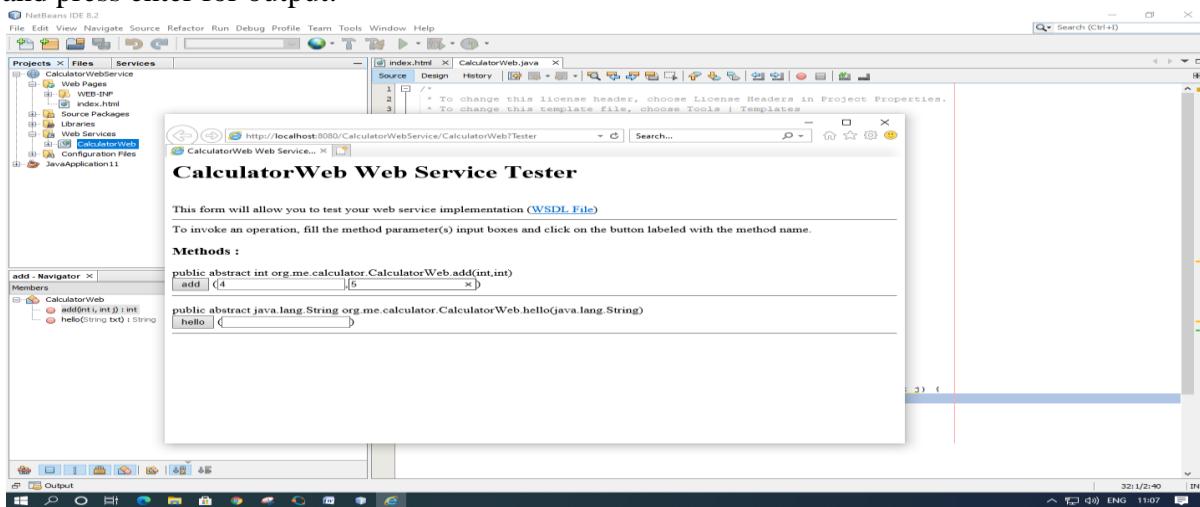
Sat Feb 13 11:08:09 IST 2021 : Security manager installed using the Basic server security policy.
Sat Feb 13 11:09:18 IST 2021 : Apache Derby Network Server - 10.11.1.2 (1e62e631) started and ready to accept connections on port 1527

```

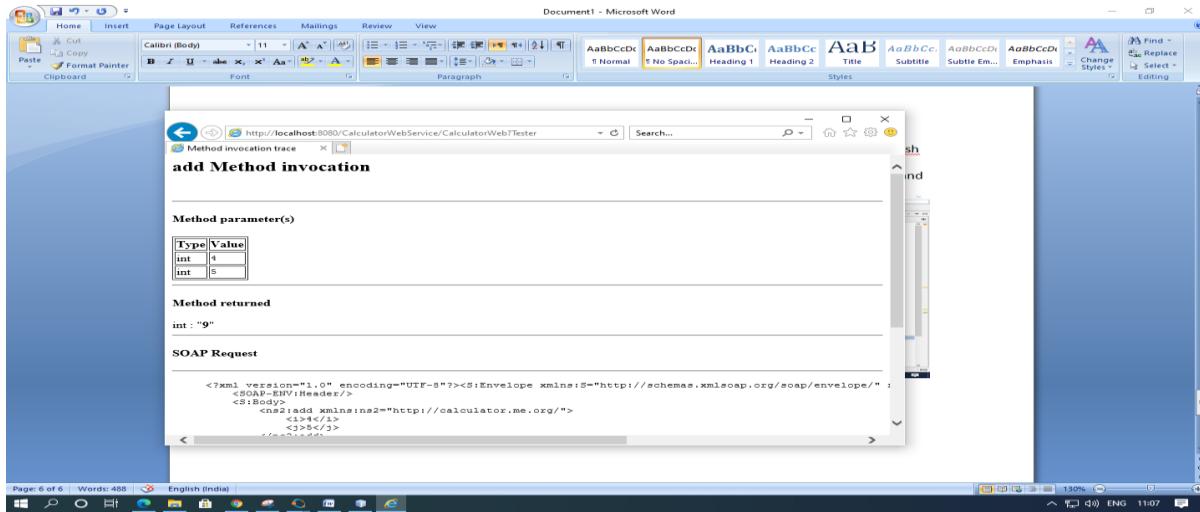
2. In the IDE's Projects tab, expand the Web Services node of the “CalculatorWebService” project. Right-click the “CalculatorWeb” node, and choose Test Web Service.



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 and press enter for output.



5. The sum of the two numbers is displayed:



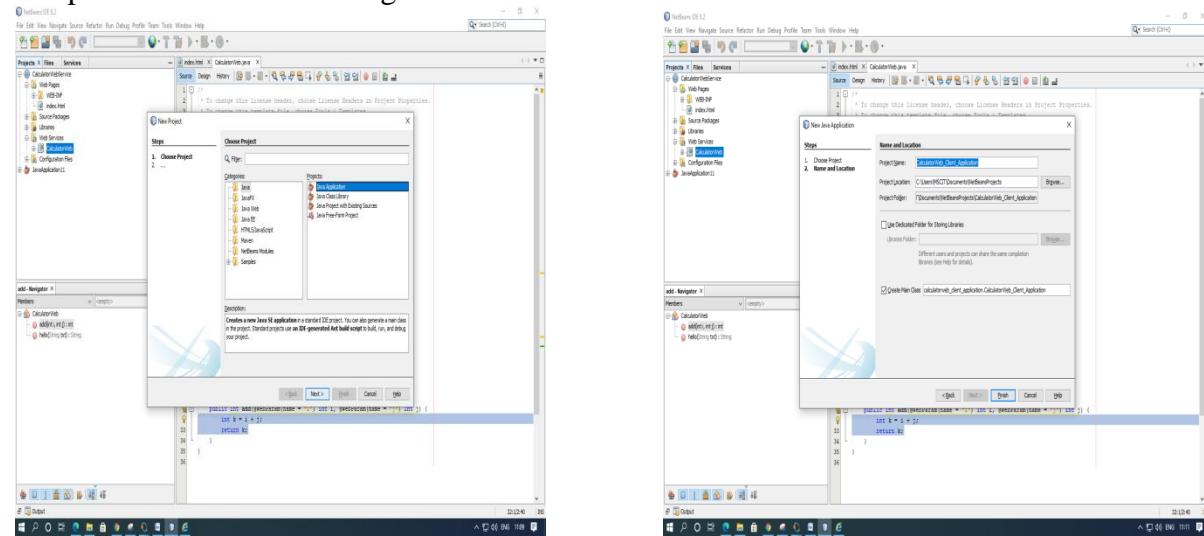
4) Consuming the Web Service

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

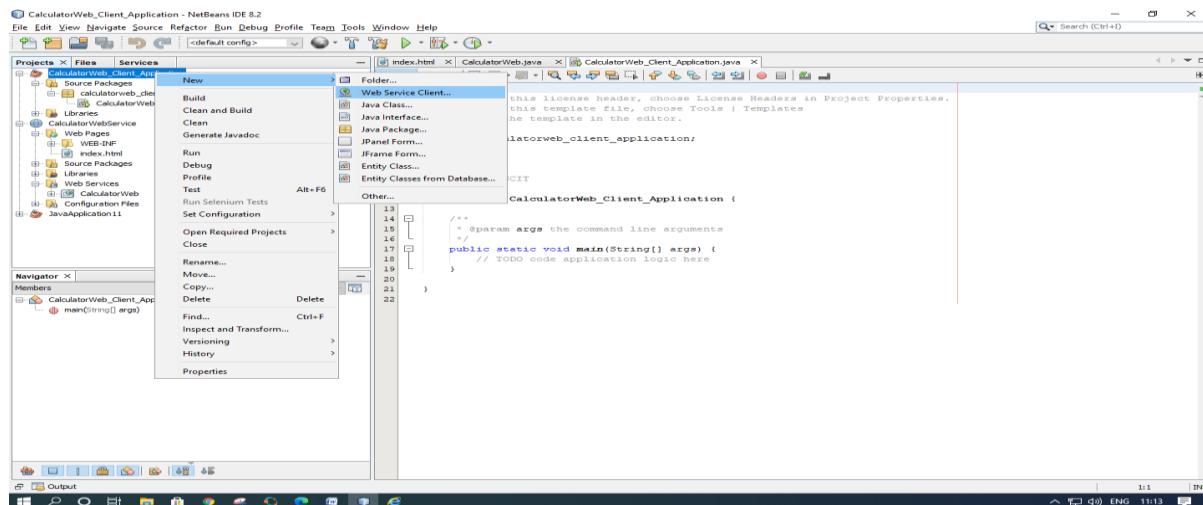
1. Client: Java Class in Java SE Application

1. Choose File > New Project. Select Java Application from the Java category.

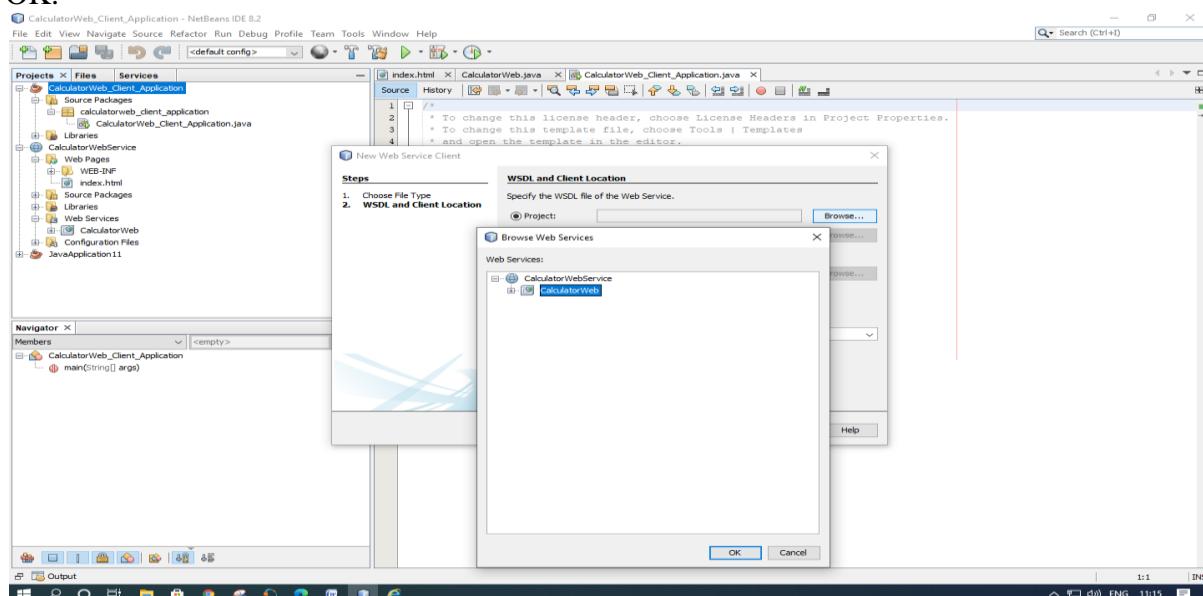
Name the project “CalculatorWeb_Client_Application”. Leave Create Main Class selected and accept all other default settings. Click Finish.



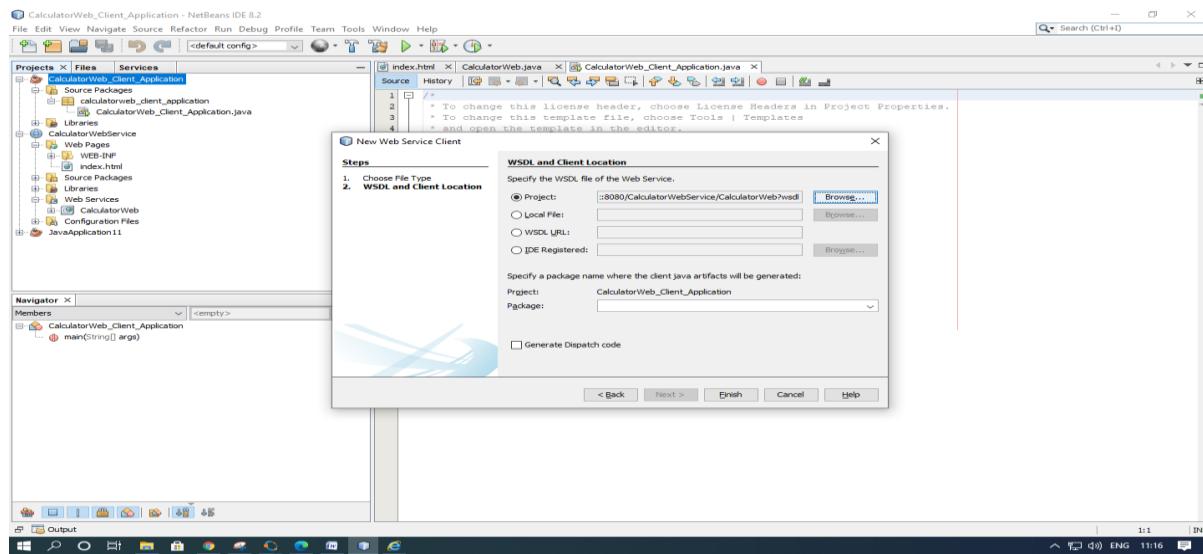
2. Right-click the “CalculatorWeb_Client_Application” node and choose New > Web Service Client. The New Web Service Client wizard opens.



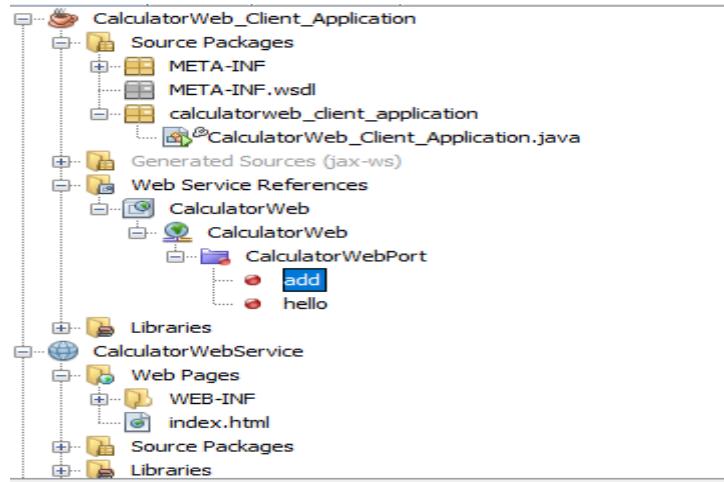
3. Select Project as the WSDL source. Click Browse. Browse to the “CalculatorWeb” web service in the “CalculatorWebService” project. When you have selected the web service, click OK.



4. Do not select a package name. Leave this field empty. Leave the other settings at default and click Finish.



5. 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.

```

CalculatorWeb_Client_Application - NetBeans IDE 8.2
File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
Source Packages Services
CalculatorWeb_Client_Application
  META-INF
    META-INF.wsdl
    calculatorweb_client_application
      calculatorweb_client_Application.java
  Generated Sources (jax-ws)
  Web Service References
    CalculatorWeb
      CalculatorWeb
        CalculatorWebPort
          add
            hello
  Libraries
    CalculatorWebService
    Web Pages
      WEB-INF
        index.html
    Source Packages
    Libraries
CalculatorWeb_Client_Application - Navigator
Members
CalculatorWeb_Client_Application
  <empty>
  add(int i, int j)
  main(String[] args)
CalculatorWeb_Client_Application.java
1 /**
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */
2 package calculatorweb_client_application;
3
4 /**
 * @author MSCIT
 */
5
6 public class CalculatorWeb_Client_Application {
7
8     /**
9      * @param args the command line arguments
10     */
11     public static void main(String[] args) {
12         // TODO code application logic here
13     }
14
15     /**
16      * @param args the command line arguments
17     */
18     private static int add(int i, int j) {
19         org.me.calculator.CalculatorWeb_Service service = new org.me.calculator.CalculatorWeb_Service();
20         org.me.calculator.CalculatorWeb port = service.getCalculatorWebPort();
21         return port.add(i, j);
22     }
23
24 }
25
26
27
28

```

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

```

try
{
    int i = 3;
    int j = 4;
    int result = add(i, j);
    System.out.println("Result = " + result);
}
catch (Exception ex)
{
    System.out.println("Exception: " + ex);
}

```

```

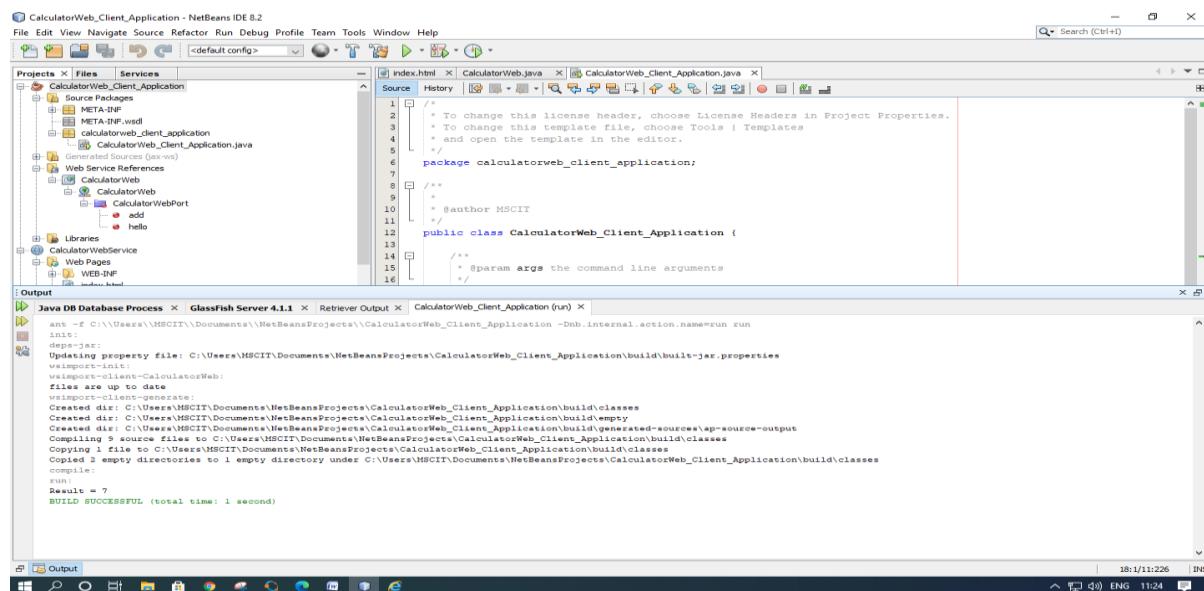
CalculatorWeb_Client_Application - NetBeans IDE 8.2
File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
Source Packages Services
CalculatorWeb_Client_Application
  META-INF
    META-INF.wsdl
    calculatorweb_client_application
      calculatorweb_client_Application.java
  Generated Sources (jax-ws)
  Web Service References
    CalculatorWeb
      CalculatorWeb
        CalculatorWebPort
          add
            hello
  Libraries
    CalculatorWebService
    Web Pages
      WEB-INF
        index.html
    Source Packages
    Libraries
main - Navigator
Members
CalculatorWeb_Client_Application
  <empty>
  add(int i, int j)
  main(String[] args)
CalculatorWeb_Client_Application.java
1 /**
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */
2 package calculatorweb_client_application;
3
4 /**
 * @author MSCIT
 */
5
6 public class CalculatorWeb_Client_Application {
7
8     /**
9      * @param args the command line arguments
10     */
11     public static void main(String[] args) {
12         try {
13             int i = 3;
14             int j = 4;
15             int result = add(i, j);
16             System.out.println("Result = " + result);
17         }
18         catch (Exception ex) {
19             System.out.println("Exception: " + ex);
20         }
21     }
22
23     /**
24      * @param args the command line arguments
25     */
26     private static int add(int i, int j) {
27         org.me.calculator.CalculatorWeb_Service service = new org.me.calculator.CalculatorWeb_Service();
28         org.me.calculator.CalculatorWeb port = service.getCalculatorWebPort();
29         return port.add(i, j);
30     }
31
32 }
33
34
35
36
37
38

```

8. Right-click the project node and choose Run.

The Output window now shows the sum:

compile: run: Result = 7 BUILD SUCCESSFUL (total time: 1 second)



```
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */
package calculatorweb_client_application;

/**
 *
 * @author MSCIT
 */
public class CalculatorWeb_Client_Application {

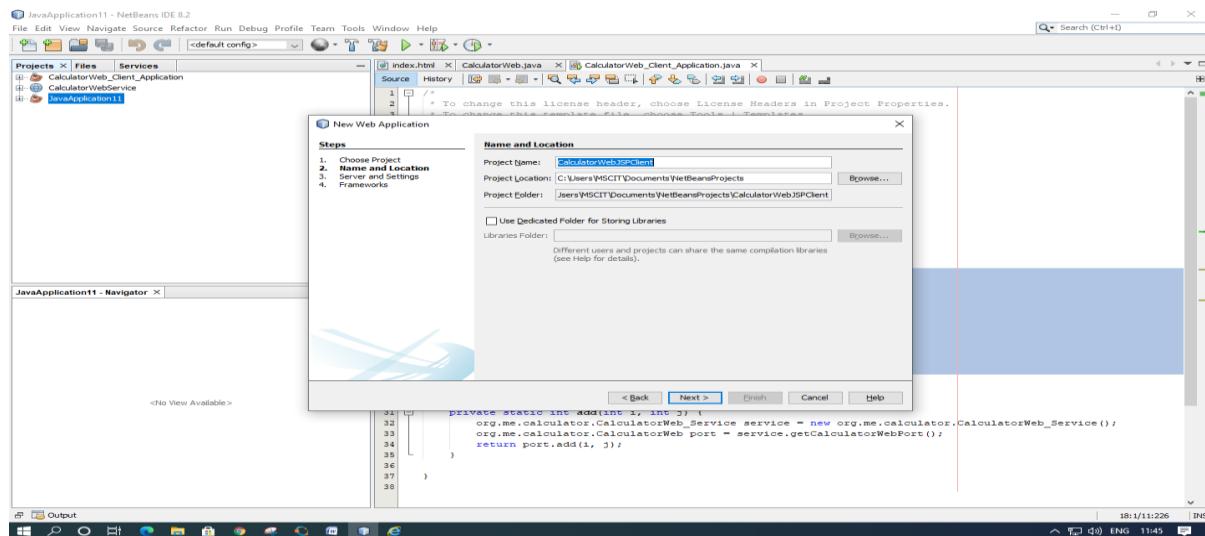
    /**
     * @param args the command line arguments
     */
}
```

```
Java DB Database Process x GlassFish Server 4.1.1 x Retriever Output x CalculatorWeb_Client_Application (run) x
ant -f C:\Users\MSCIT\Documents\NetBeansProjects\CalculatorWeb_Client_Application -Dnb.internal.action.name=run run
deps-jar:
Updating property file: C:\Users\MSCIT\Documents\NetBeansProjects\CalculatorWeb_Client_Application\build\built-jar.properties
wimport-init:
wimport-client-generate:
Created dir: C:\Users\MSCIT\Documents\NetBeansProjects\CalculatorWeb_Client_Application\build\empty
Created dir: C:\Users\MSCIT\Documents\NetBeansProjects\CalculatorWeb_Client_Application\build\generated-sources\ap-source-output
Compiling 9 source files to C:\Users\MSCIT\Documents\NetBeansProjects\CalculatorWeb_Client_Application\build\classes
Copying 1 file to C:\Users\MSCIT\Documents\NetBeansProjects\CalculatorWeb_Client_Application\build\classes
Deleting empty directories to 1 empty directory under C:\Users\MSCIT\Documents\NetBeansProjects\CalculatorWeb_Client_Application\build\classes
compiler:
run:
Result = 7
BUILD SUCCESSFUL (total time: 1 second)
```

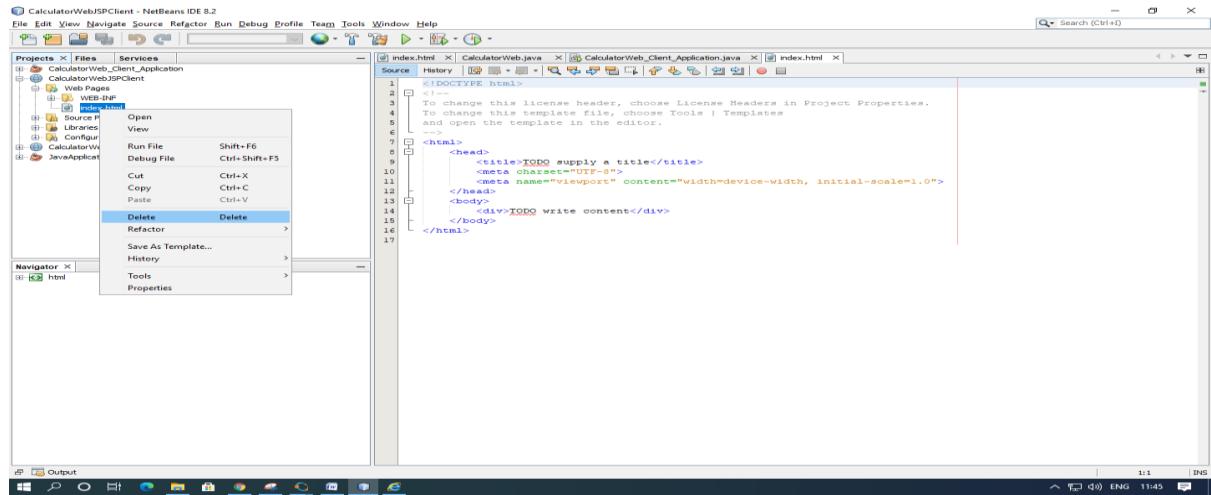
Client : JSP Page in Web Application

In this section, you create a new web application and then consume the web service in the default JSP page that the Web Application wizard creates.

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

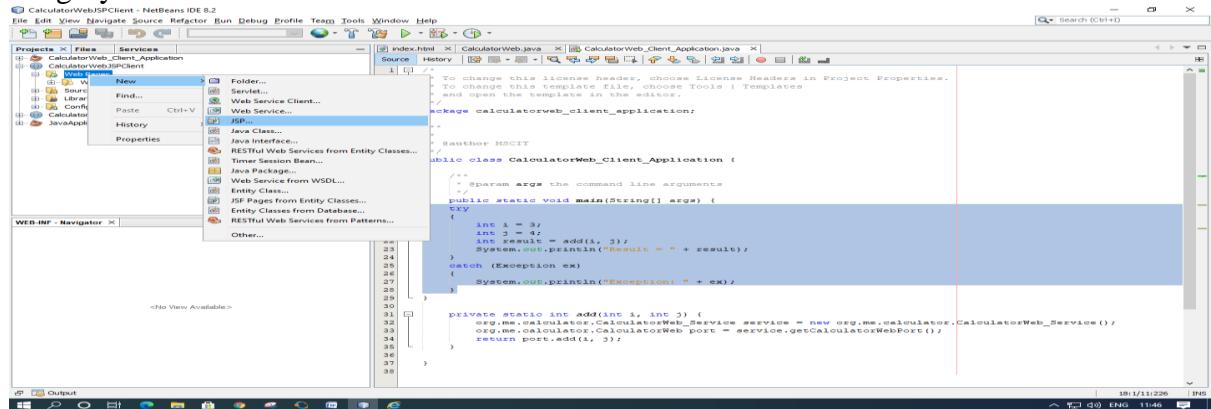


2. Expand the Web Pages node under the project node and delete index.html.

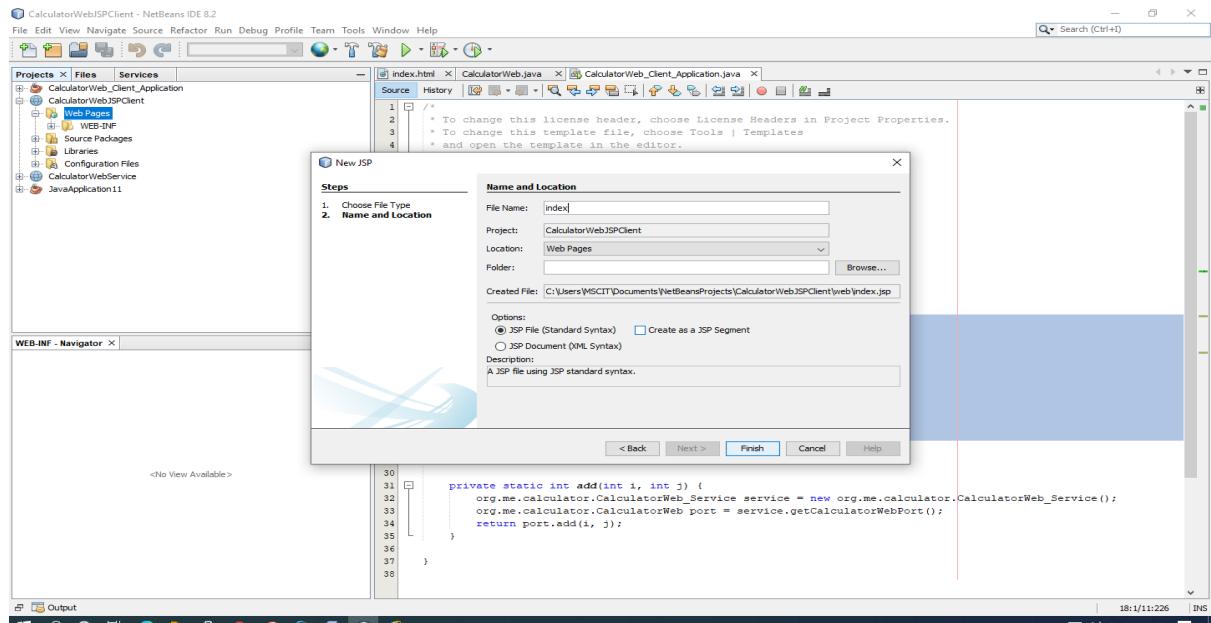


- Right-click the Web Pages node and choose New > JSP in the popup menu.

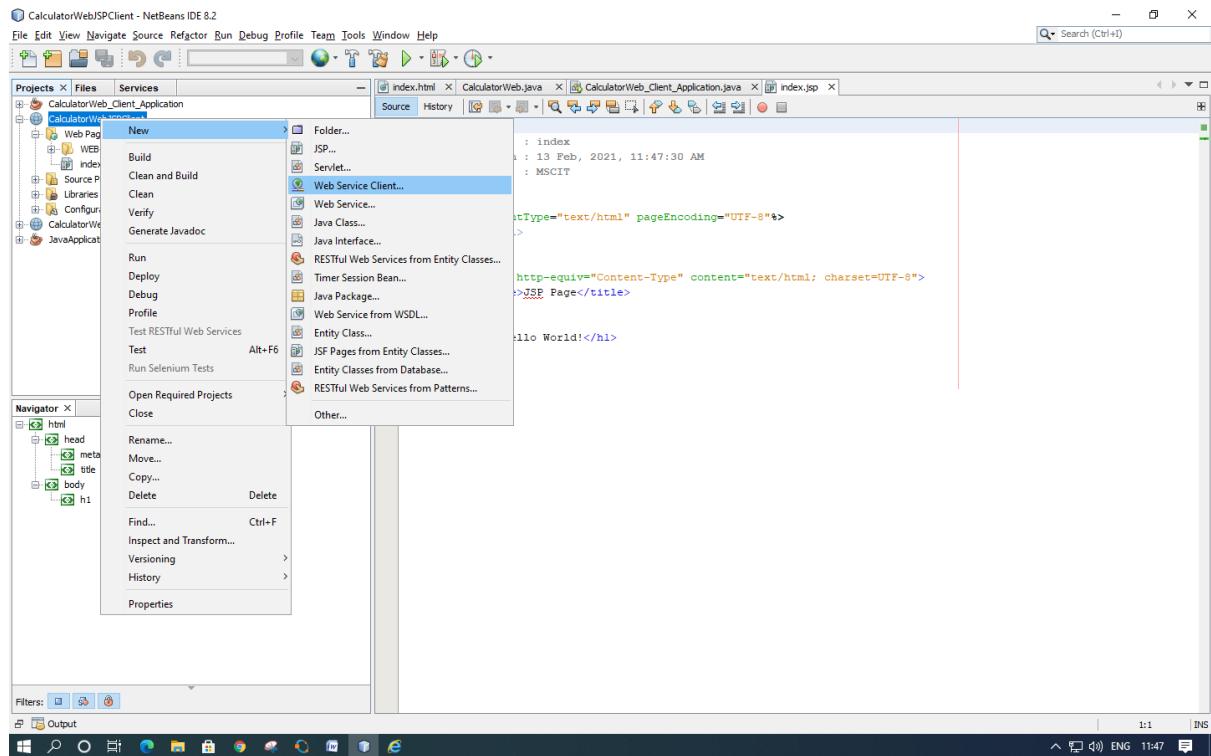
If JSP is not available in the popup menu, choose New > Other and select JSP in the Web category of the New File wizard.



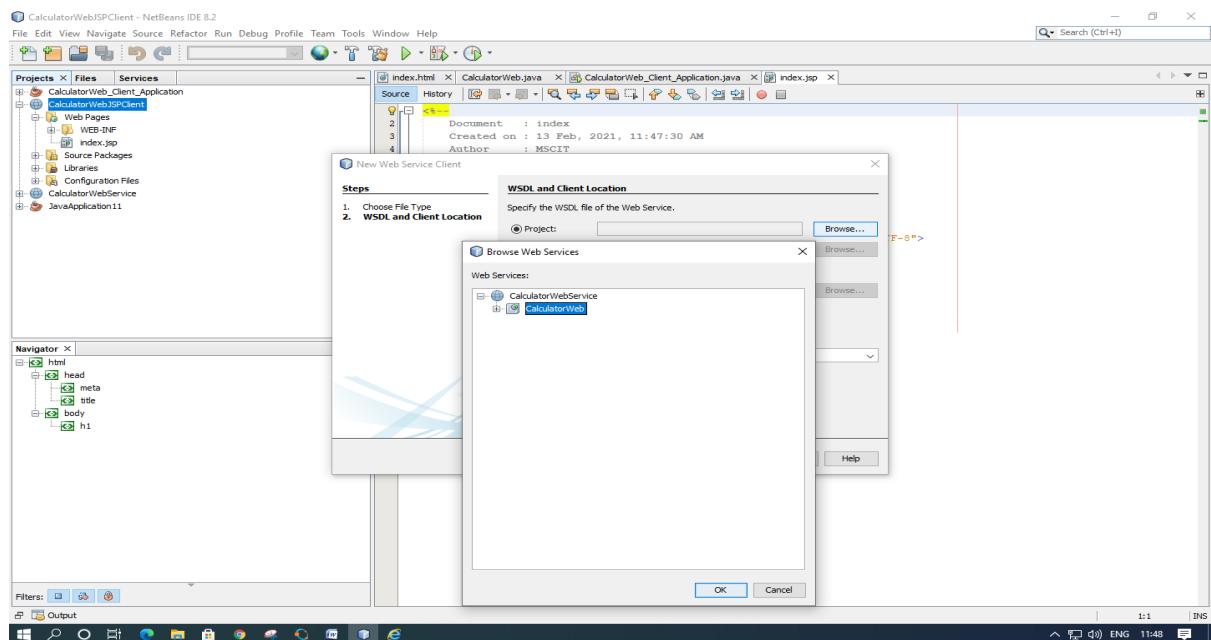
- Type index for the name of the JSP file in the New File wizard. Click Finish.



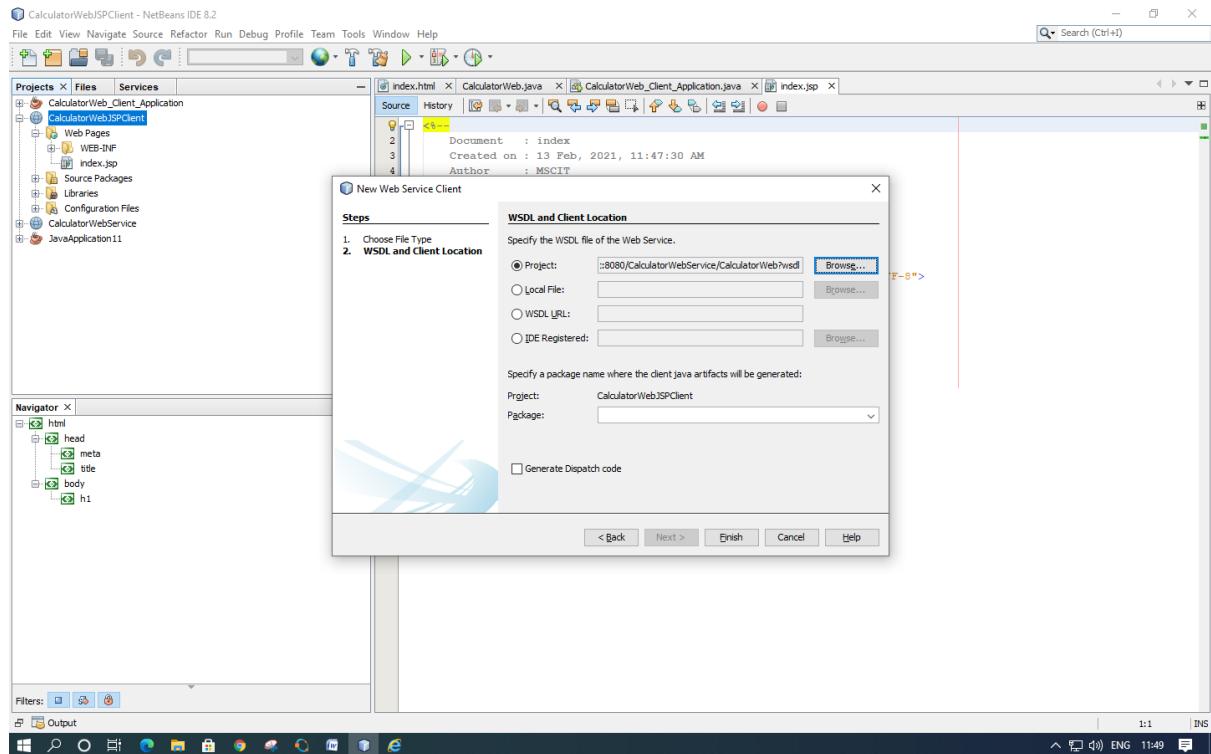
- Right-click the CalculatorWebJSPClient node and choose New > Web Service Client.



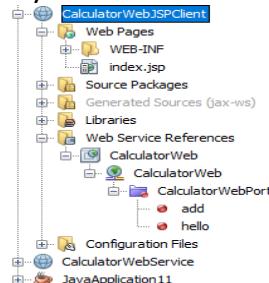
- Select Project as the WSDL source. Click Browse. Browse to the CalculatorWeb web service in the CalculatorWebService project. When you have selected the web service, click OK.



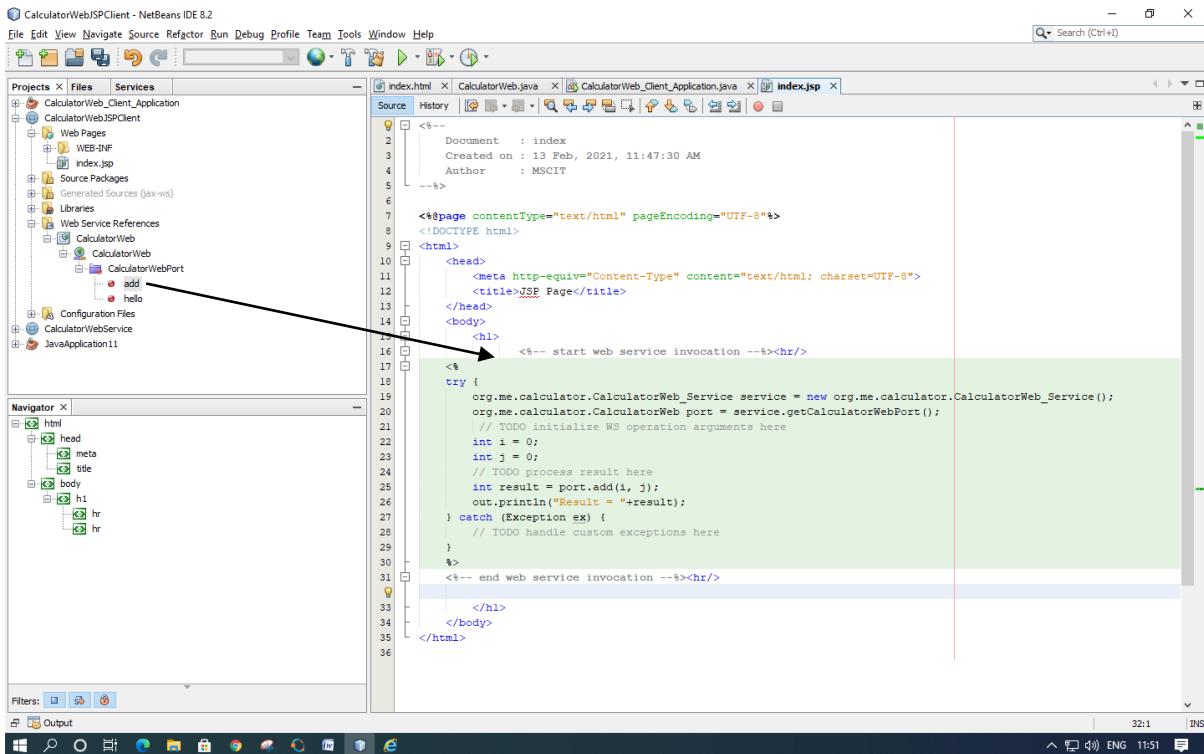
- Do not select a package name. Leave this field empty.
- Leave the other settings at default and click Finish.



The Projects window displays the new web service client, as shown below:



9. 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.
10. Drag the add operation to the client's index.jsp page, and drop it below the H1 tags. The code for invoking the service's operation is now generated in the index.jsp page, as you can see here:



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);

```
<%
try {
    org.me.calculator.CalculatorWeb_Service service = new org.me.calculator.CalculatorWeb_Service();
    org.me.calculator.CalculatorWeb port = service.getCalculatorWebPort();
    // TODO initialize WS operation arguments here
    int i = 3;
    int j = 4;
    // TODO process result here
    int result = port.add(i, j);
    out.println("Result = "+result);
} catch (Exception ex) {
    out.println("exception" + ex);
}
%>
<%-- end web service invocation --%><hr/>
```

11. 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:

