ST.ANNE'S

COLLEGE OF ENGINEERING & TECHNOLOGY

ANGUCHETTYPALYAM, PANRUTI – 607110.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CS6712 GRID AND CLOUD COMPUTING LABORATORY

PREPARED BY

S.MANAVALAN,AP/CSE

LIST OF EXPERIMENTS:

GRID COMPUTING LAB

Use Globus Toolkit or equivalent and do the following:

1. Develop a new Web Service for Calculator.

2. Develop new OGSA-compliant Web Service.

3. Using Apache Axis develop a Grid Service.

4. Develop applications using Java or C/C++ Grid APIs

5. Develop secured applications using basic security mechanisms available in Globus Toolkit.

6. Develop a Grid portal, where user can submit a job and get the result. Implement it with and without GRAM concept.

CLOUD COMPUTING LAB

Use Eucalyptus or Open Nebula or equivalent to set up the cloud and demonstrate.

1. Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.

2. Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.

3. Install a C compiler in the virtual machine and execute a sample program.

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

5. Find procedure to install storage controller and interact with it.

6. Find procedure to set up the one node Hadoop cluster.

7. Mount the one node Hadoop cluster using FUSE.

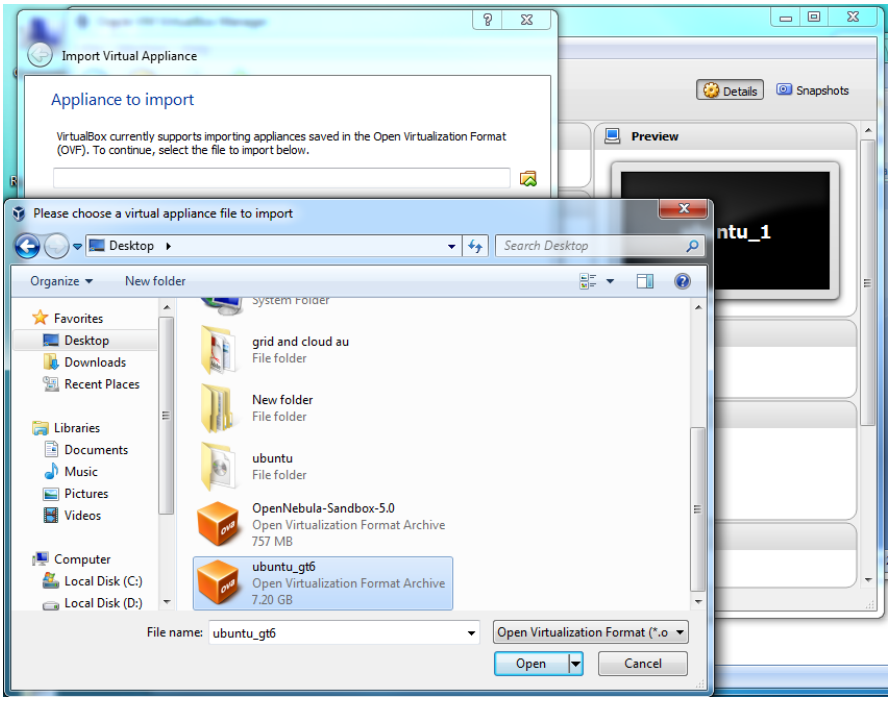
8. Write a program to use the API's of Hadoop to interact with it.

9. Write a wordcount program to demonstrate the use of Map and ReducetasksInstall

GRID COMPUTING LAB

UBUNTU_GT6 INSTALLATION:

1. Open Virtual box
2. File →import Appliance
3. Browse ubuntu_gt6.ova file
4. Then go to setting, select Usb and choose USB 1.1
5. Then Start the ubuntu_gt6
6. Login using username: dinesh, password:99425.



EX.NO:1 Develop a new Web Service for Calculator.
DATE:

OBJECTIVE:

To build a new web service for calculator.

PROCEDURE:

Steps:

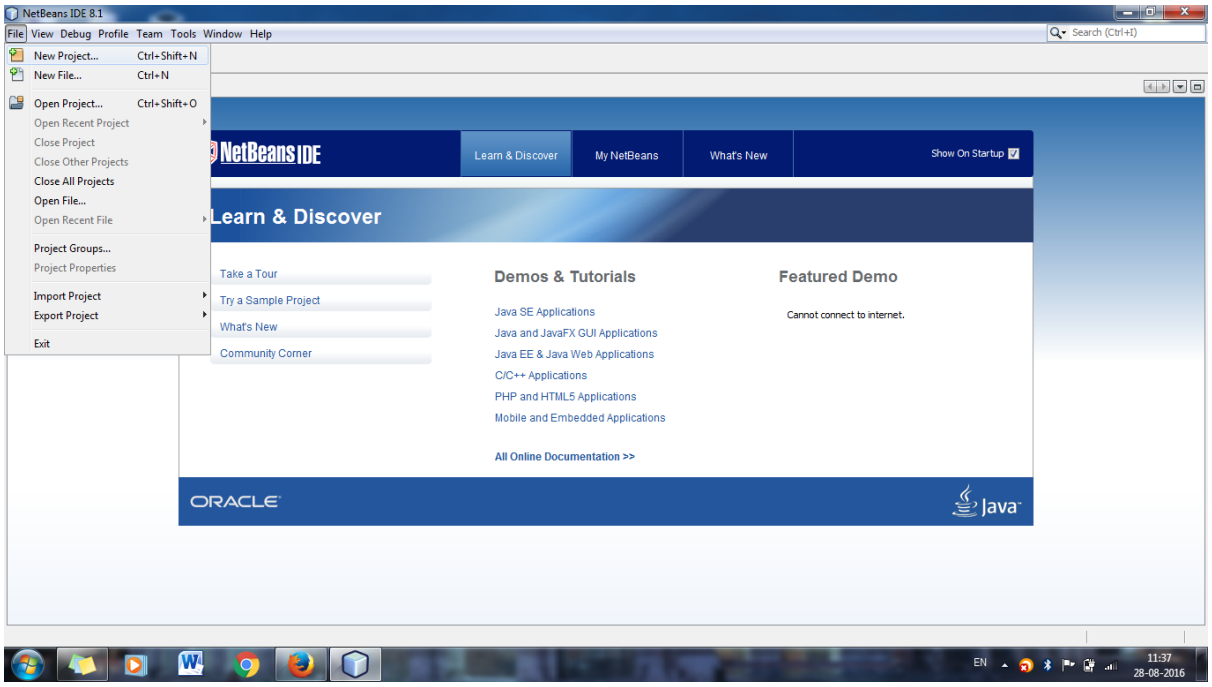
1. Open Netbeans IDE 8.1.
2. Click File →New Project, then select Maven in the categories then select web application in the projects.
3. Enter the name of the project. For example Calculator
4. Then Click next and choose Glassfish as server then click on finish.
5. Next Right click on project name then select New→web service, enter the name of the web service and choose the packages from list or enter com.mycompany.calculator/me.org.calculator then click on finish.
6. Then Right click on created web service and select Add Operation
7. Now Pop window will display on that enter operation name as Addition then return type as int and Add parameters ‘a’ and ‘b’ as int.
8. Now goto the coding file . On that coding file delete hello operation coding.

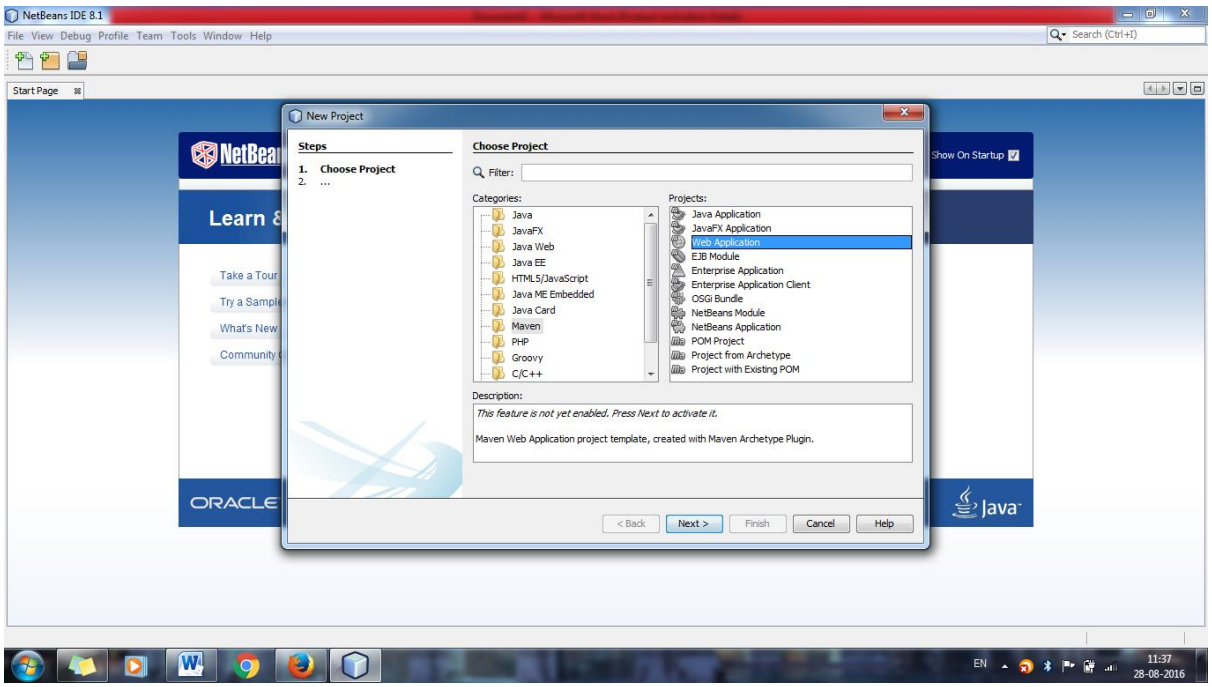
   And Add the following code

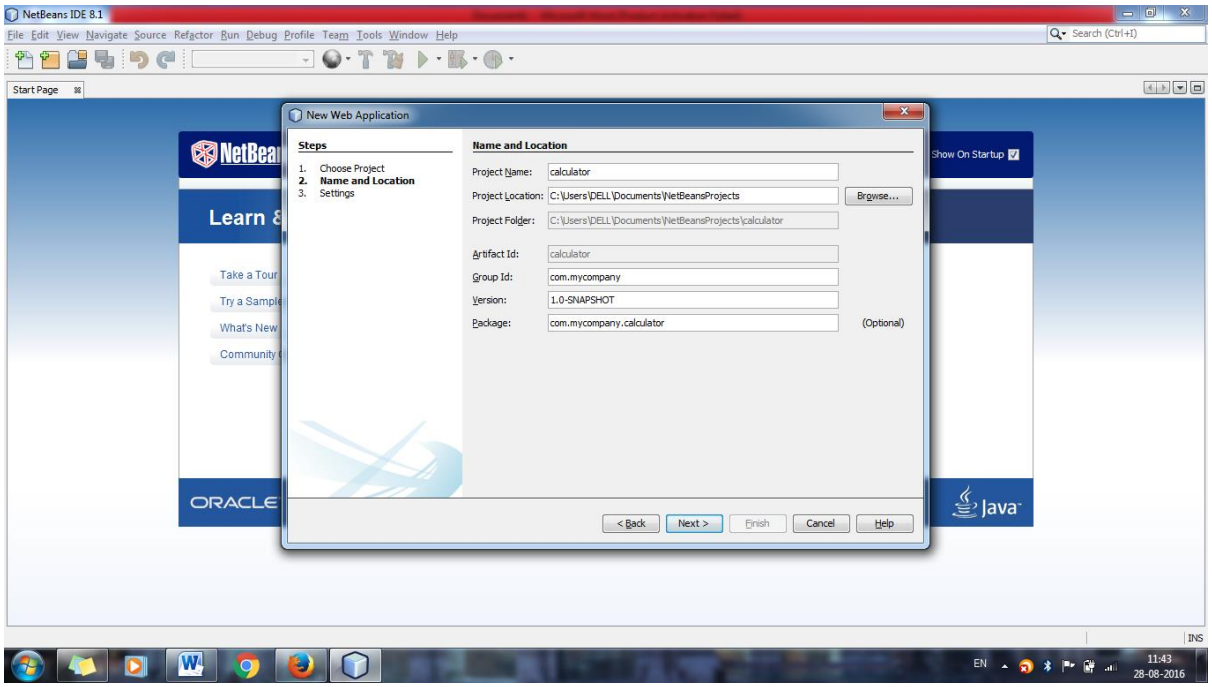
```
@WebMethod(operationName = "add")

publicint add(@WebParam(name = "a") int a, @WebParam(name = "b") int b) {

int c=a+b;

return c;    }
```

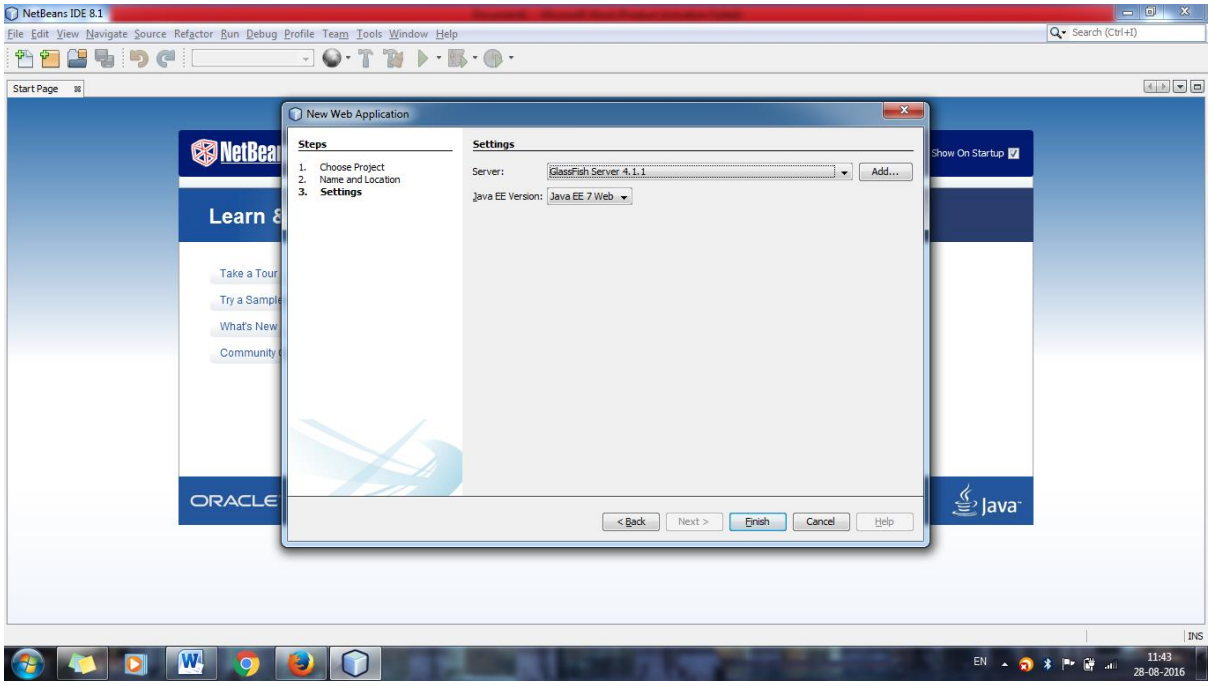
9. And repeat the steps 6,7,8 for operation Subtraction, Multiplication and Division then save the coding file.
10. Next Run the project. After successfully Running of project select the web service and Right click on that and select test web service.

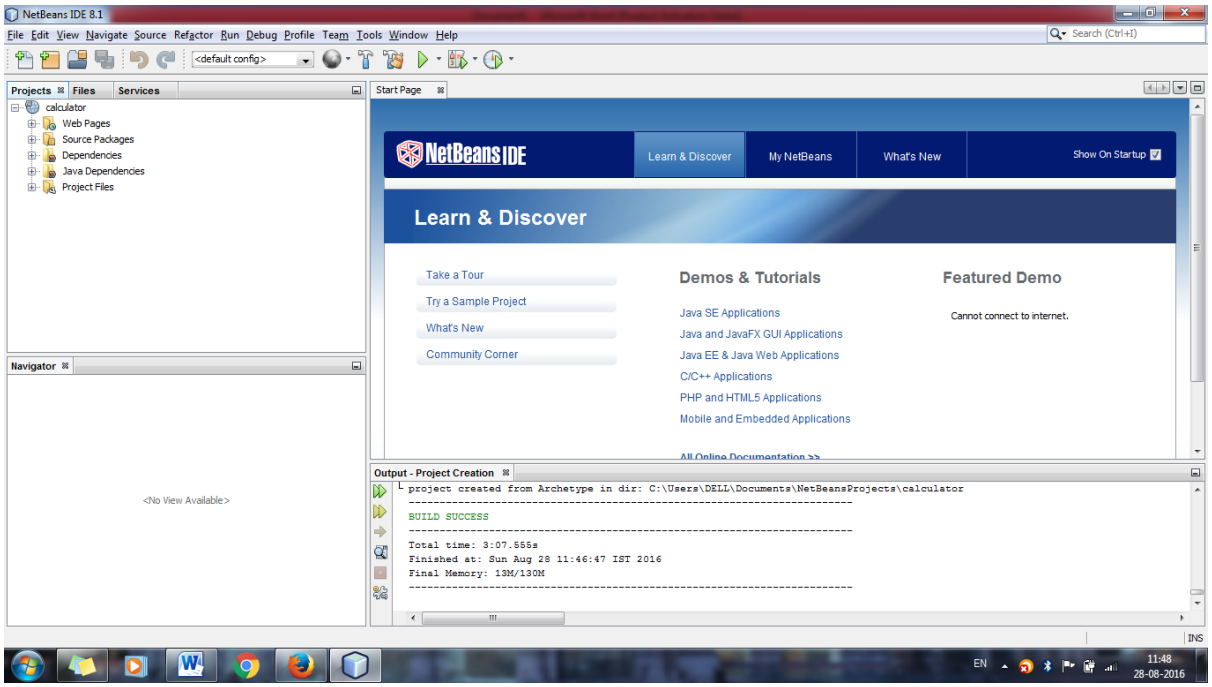
OUTPUT:

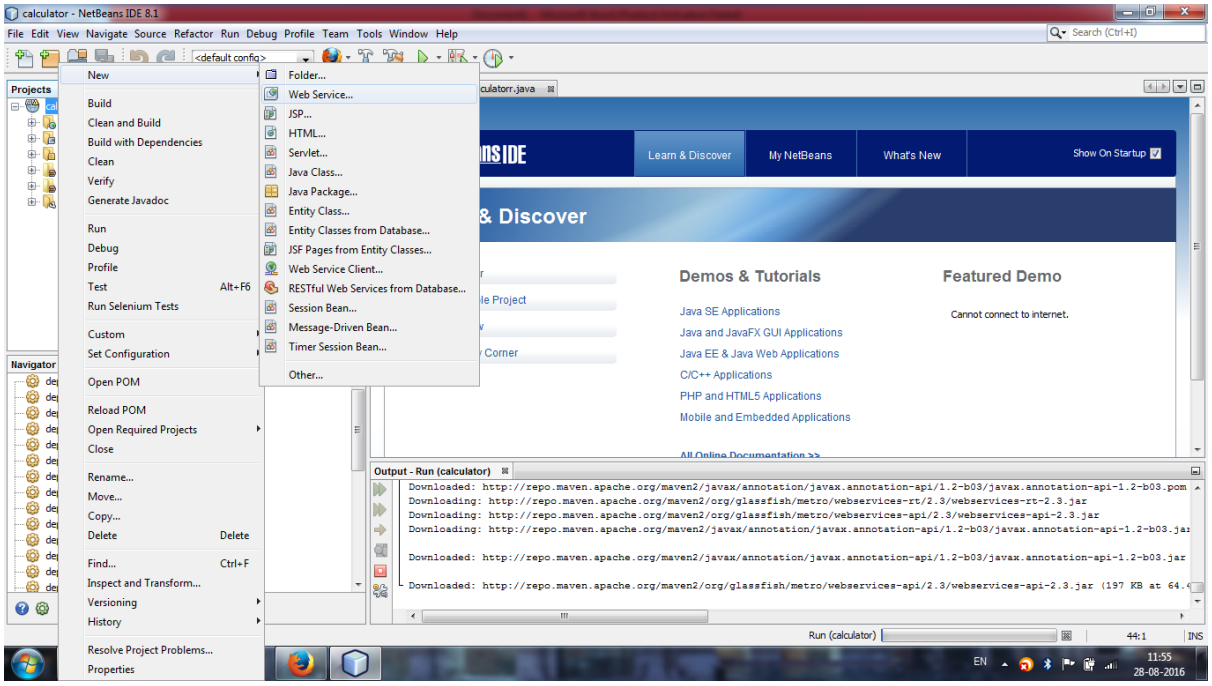

NetBeans IDE 8.1
File View Debug Profile Team Tools Window Help
New Project... Ctrl+Shift+N
New File... Ctrl+N
Open Project... Ctrl+Shift+O
Open Recent Project
Close Project
Close Other Projects
Close All Projects
Open File...
Open Recent File
Project Groups...
Project Properties
Import Project
Export Project
Exit
NetBeans IDE
Learn & Discover
My NetBeans
What's New
Show On Startup
Learn & Discover
Take a Tour
Try a Sample Project
What's New
Community Corner
Demos & Tutorials
Java SE Applications
Java and JavaFX GUI Applications
Java EE & Java Web Applications
C/C++ Applications
PHP and HTML5 Applications
Mobile and Embedded Applications
All Online Documentation >>
Featured Demo
Cannot connect to internet.
ORACLE
Java
EN
11:37
28-08-2016

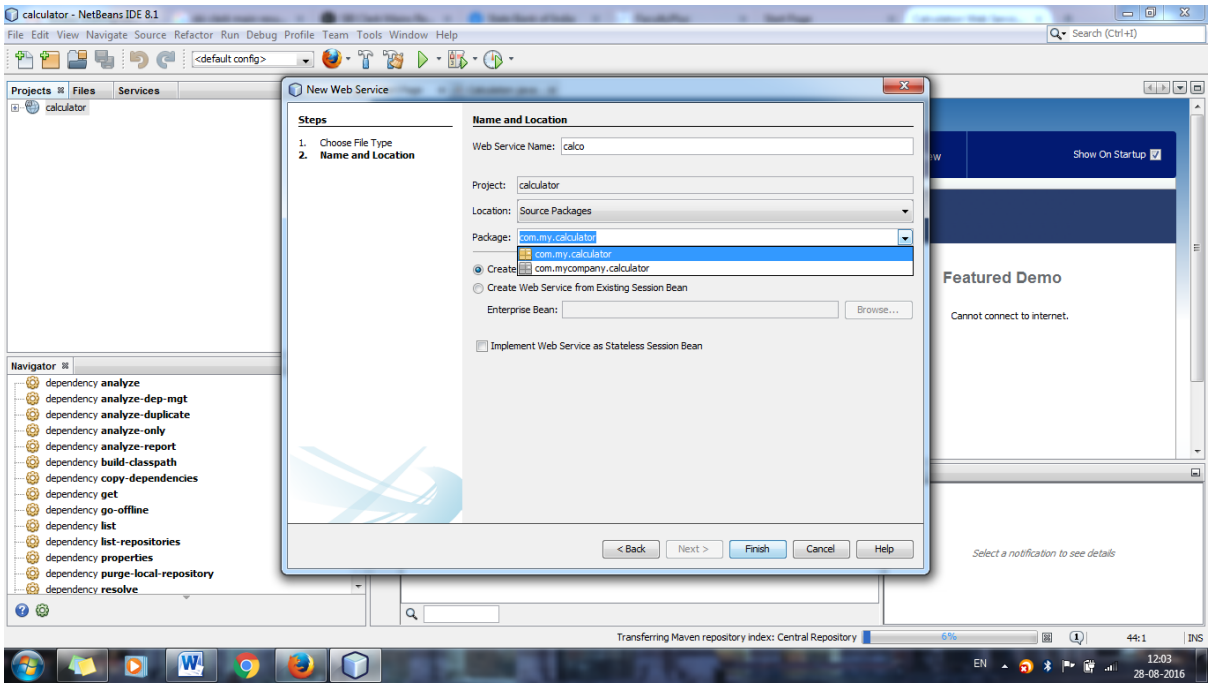

NetBeans IDE 8.1
File View Debug Profile Team Tools Window Help
Start Page
New Project
Steps
1. Choose Project
2. ...
Choose Project
Filter:
Categories:
Java
JavaFX
Java Web
Java EE
HTML5/JavaScript
Java ME Embedded
Java Card
Maven
PHP
Groovy
C/C++
Projects:
Java Application
JavaFX Application
Web Application
EJB Module
Enterprise Application
Enterprise Application Client
OSGi Bundle
NetBeans Module
NetBeans Application
POM Project
Project from Archetype
Project with Existing POM
Description:
This feature is not yet enabled. Press Next to activate it.
Maven Web Application project template, created with Maven Archetype Plugin.
< Back
Next >
Finish
Cancel
Help
Show On Startup
Learn &
Take a Tour
Try a Sample
What's New
Community
ORACLE
Java
EN
11:37
28-08-2016

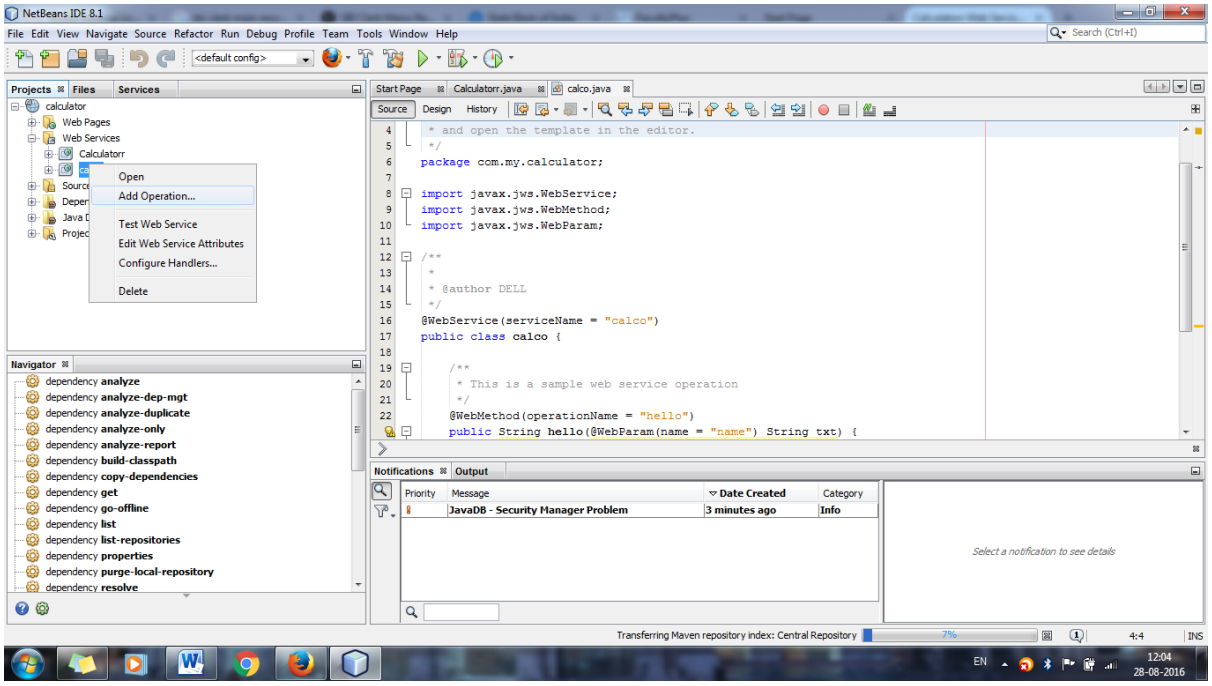

NetBeans IDE 8.1
File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
Search (Ctrl+I)
Start Page
New Web Application
Steps
1. Choose Project
2. Name and Location
3. Settings
Name and Location
Project Name: calculator
Project Location: C:\Users\DELL\Documents\NetBeansProjects
Browse...
Project Folder: C:\Users\DELL\Documents\NetBeansProjects\calculator
Artifact Id: calculator
Group Id: com.mycompany
Version: 1.0-SNAPSHOT
Package: com.mycompany.calculator
(Optional)
< Back
Next >
Finish
Cancel
Help
Show On Startup
Learn &
Take a Tour
Try a Sample
What's New
Community
ORACLE
Java
INS
EN
11:43
28-08-2016

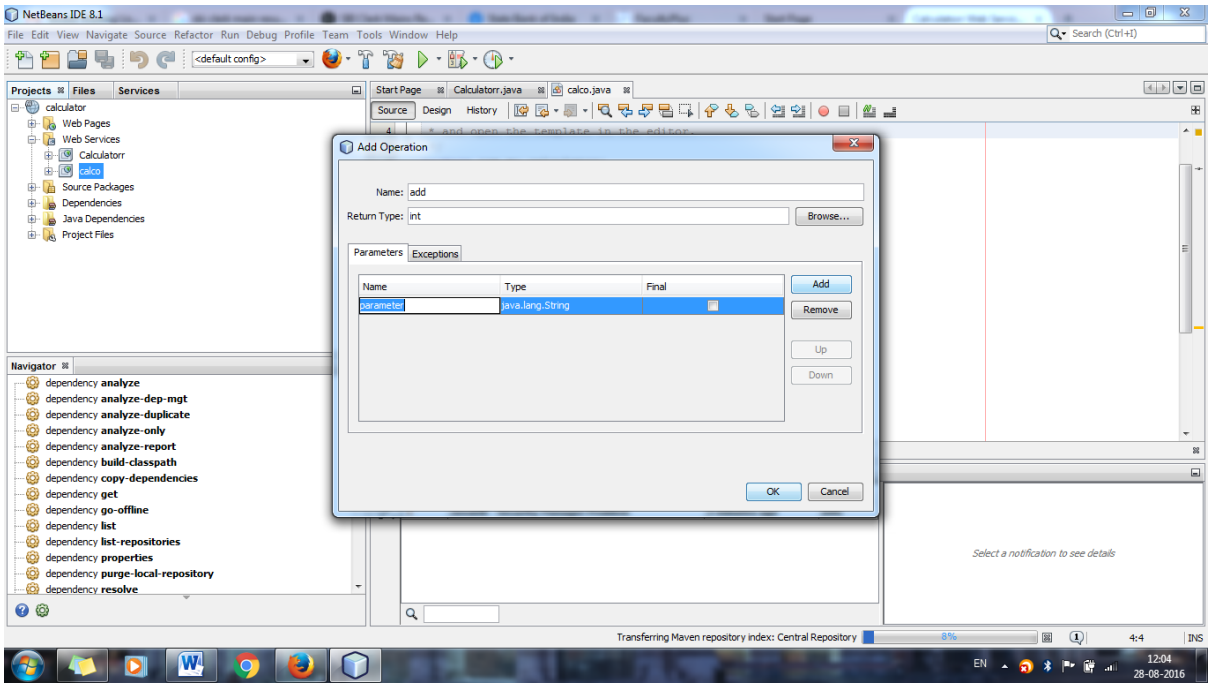

NetBeans IDE 8.1
File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
Search (Ctrl+I)
Start Page
New Web Application
Steps
1. Choose Project
2. Name and Location
3. Settings
Settings
Server: GlassFish Server 4.1.1
Add...
Java EE Version: Java EE 7 Web
< Back
Next >
Finish
Cancel
Help
Show On Startup
Learn &
Take a Tour
Try a Sample
What's New
Community
ORACLE
Java
INS
EN
11:43
28-08-2016

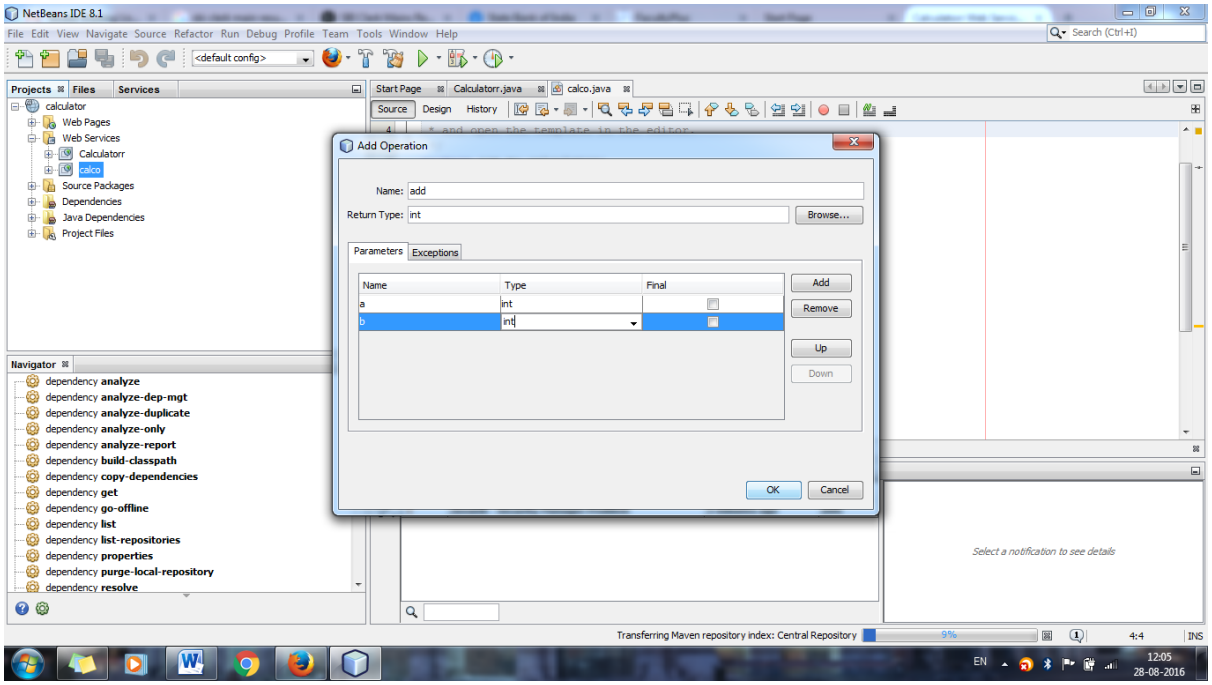

NetBeans IDE 8.1
File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
Projects Files Services
calculator
Web Pages
Source Packages
Dependencies
Java Dependencies
Project Files
Navigator
<No View Available>
Start Page
NetBeans IDE
Learn & Discover
My NetBeans
What's New
Show On Startup
Learn & Discover
Take a Tour
Try a Sample Project
What's New
Community Corner
Demos & Tutorials
Java SE Applications
Java and JavaFX GUI Applications
Java EE & Java Web Applications
C/C++ Applications
PHP and HTML5 Applications
Mobile and Embedded Applications
Featured Demo
Cannot connect to internet.
Output - Project Creation
project created from Archetype in dir: C:\Users\DELL\Documents\NetBeansProjects\calculator
BUILD SUCCESS
Total time: 3:07.555s
Finished at: Sun Aug 28 11:46:47 IST 2016
Final Memory: 13M/130M
11:48
28-08-2016

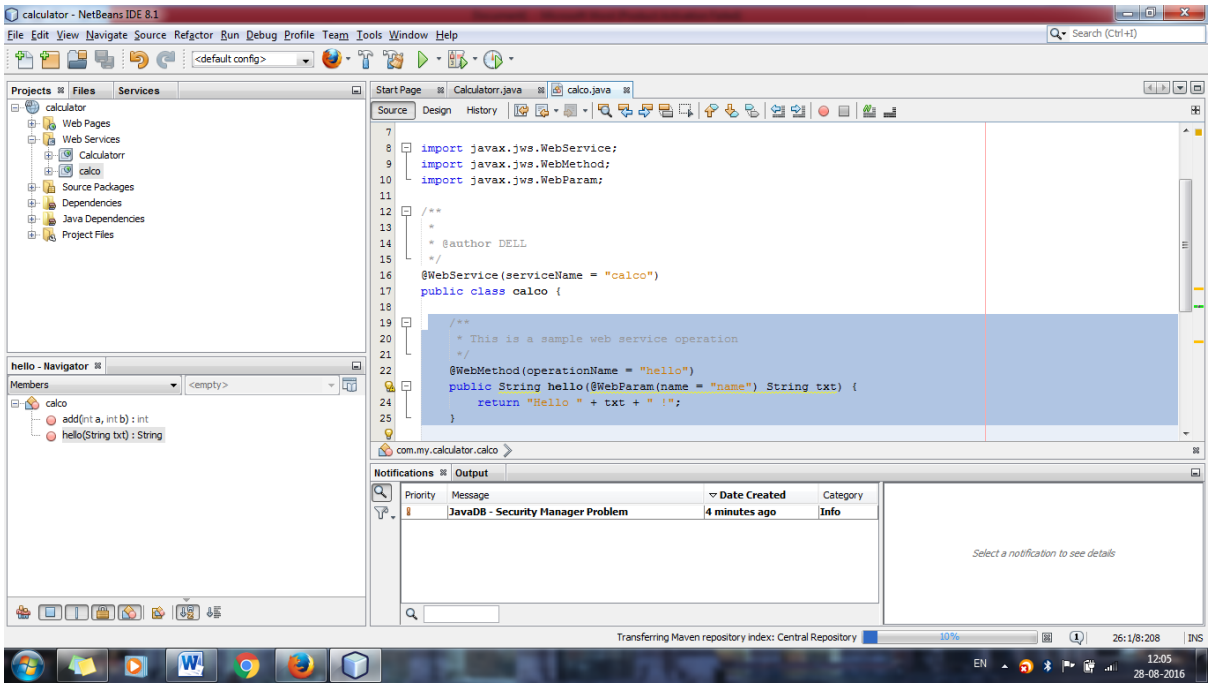

calculator - NetBeans IDE 8.1
File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
New
Folder...
Web Service...
JSP...
HTML...
Servlet...
Java Class...
Java Package...
Entity Class...
Entity Classes from Database...
JSF Pages from Entity Classes...
Web Service Client...
RESTful Web Services from Database...
Session Bean...
Message-Driven Bean...
Timer Session Bean...
Other...
Build
Clean and Build
Build with Dependencies
Clean
Verify
Generate Javadoc
Run
Debug
Profile
Test Alt+F6
Run Selenium Tests
Custom
Set Configuration
Open POM
Reload POM
Open Required Projects
Close
Rename...
Move...
Copy...
Delete Delete
Find... Ctrl+F
Inspect and Transform...
Versioning
History
Resolve Project Problems...
Properties
Output - Run (calculator)
Downloaded: http://repo.maven.apache.org/maven2/javax/annotation/javax.annotation-api/1.2-b03/javax.annotation-api-1.2-b03.pom
Downloading: http://repo.maven.apache.org/maven2/org/glassfish/metro/webservices-rt/2.3/webservices-rt-2.3.jar
Downloading: http://repo.maven.apache.org/maven2/org/glassfish/metro/webservices-api/2.3/webservices-api-2.3.jar
Downloaded: http://repo.maven.apache.org/maven2/javax/annotation/javax.annotation-api/1.2-b03/javax.annotation-api-1.2-b03.jar
Run (calculator)
44:1
11:55
28-08-2016


calculator - NetBeans IDE 8.1
New Web Service
Steps
1. Choose File Type
2. Name and Location
Name and Location
Web Service Name: calco
Project: calculator
Location: Source Packages
Package: com.my.calculator
com.my.calculator
com.mycompany.calculator
Create
Create Web Service from Existing Session Bean
Enterprise Bean:
Browse...
Implement Web Service as Stateless Session Bean
< Back
Next >
Finish
Cancel
Help
Featured Demo
Cannot connect to internet.
Select a notification to see details

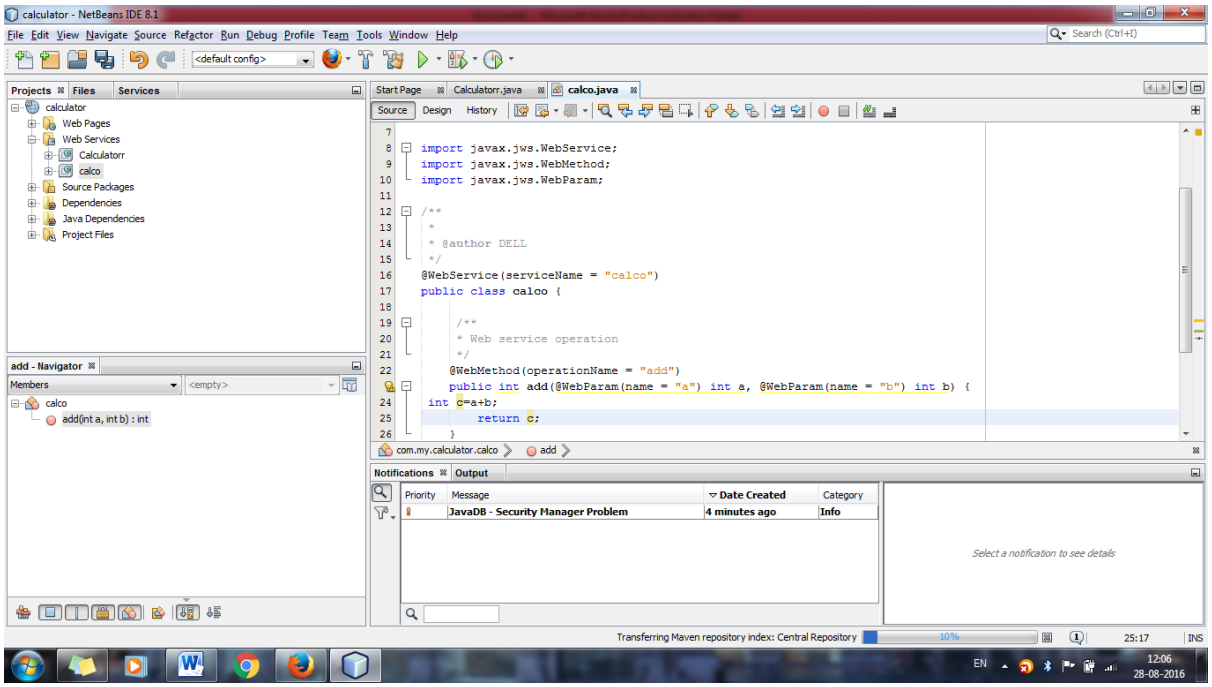

NetBeans IDE 8.1
Open
Add Operation...
Test Web Service
Edit Web Service Attributes
Configure Handlers...
Delete
package com.my.calculator;
import javax.jws.WebService;
import javax.jws.WebMethod;
import javax.jws.WebParam;
@WebService(serviceName = "calco")
public class calco {
@WebMethod(operationName = "hello")
public String hello(@WebParam(name = "name") String txt) {
JavaDB - Security Manager Problem
3 minutes ago
Info
Select a notification to see details

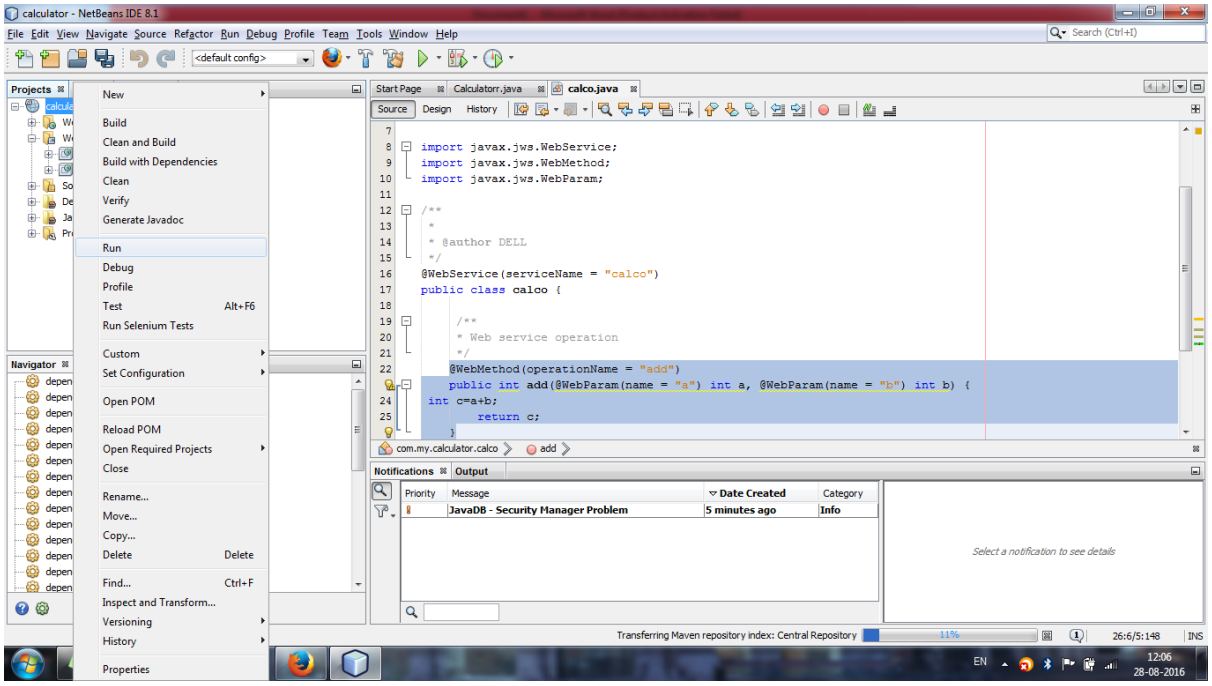

NetBeans IDE 8.1
Add Operation
Name: add
Return Type: int
Browse...
Parameters
Exceptions
Name
Type
Final
parameter
java.lang.String
Add
Remove
Up
Down
OK
Cancel
Select a notification to see details
Transferring Maven repository index: Central Repository
8%
4:4
INS
12:04
28-08-2016

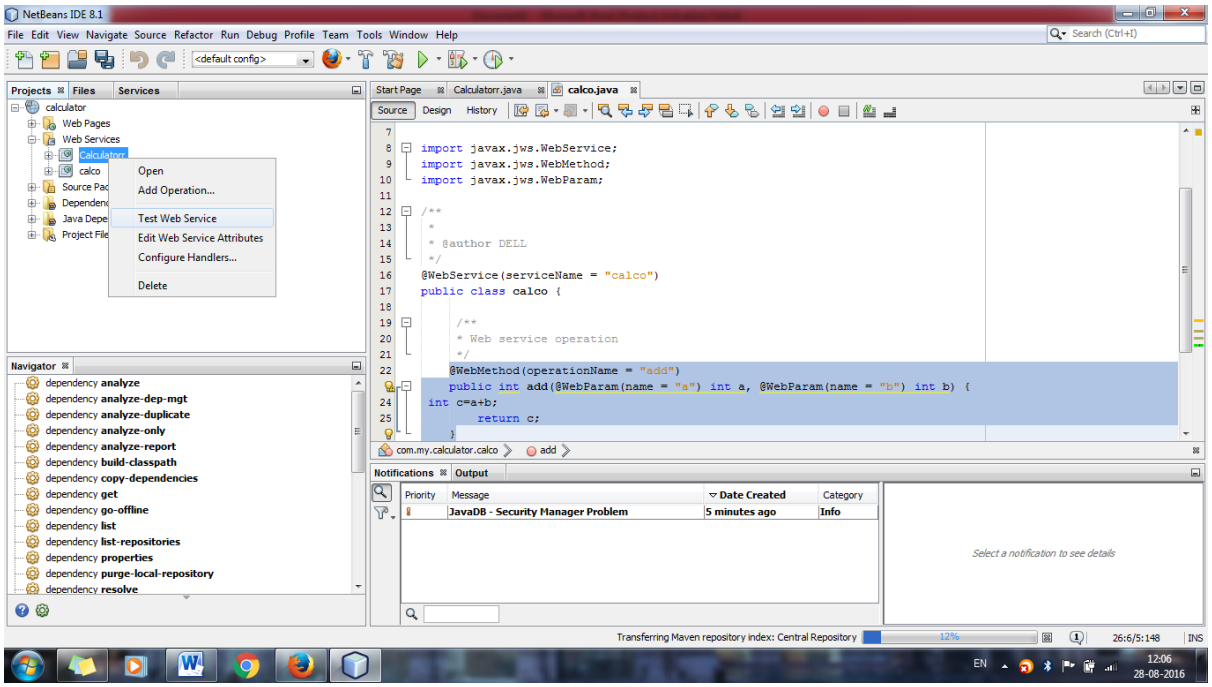

NetBeans IDE 8.1
Add Operation
Name: add
Return Type: int
Browse...
Parameters
Exceptions
Name
Type
Final
a
int
b
int
Add
Remove
Up
Down
OK
Cancel
Select a notification to see details
Transferring Maven repository index: Central Repository
9%
4:4
INS
12:05
28-08-2016

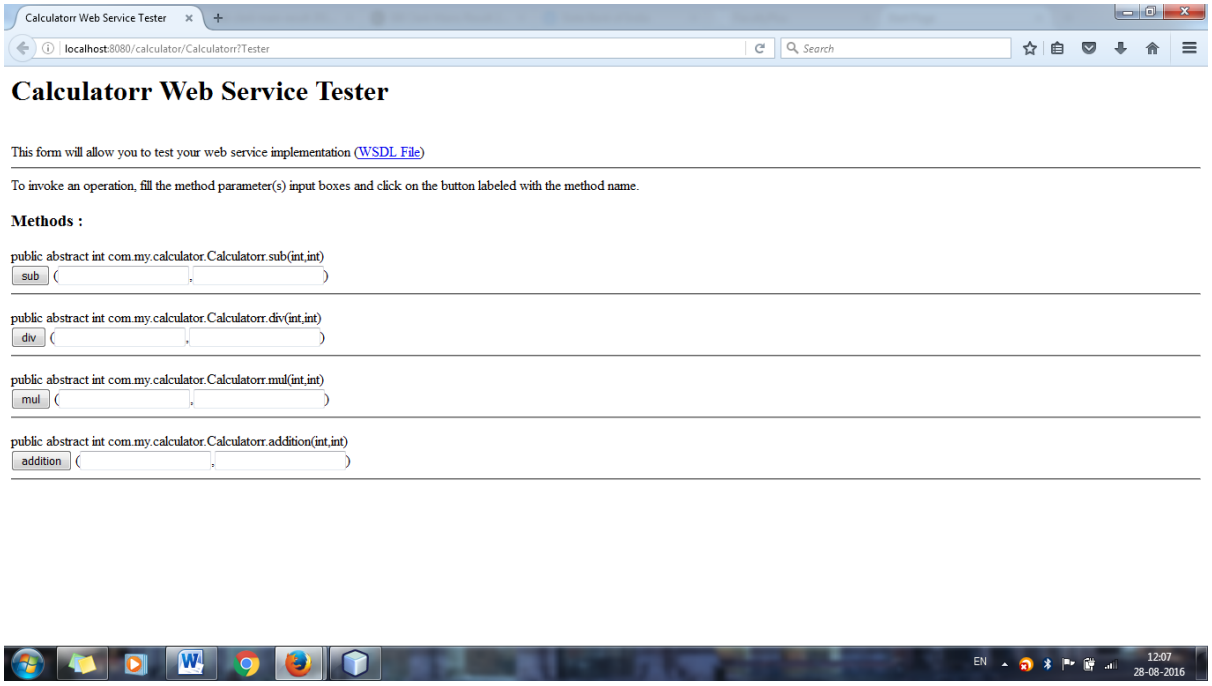


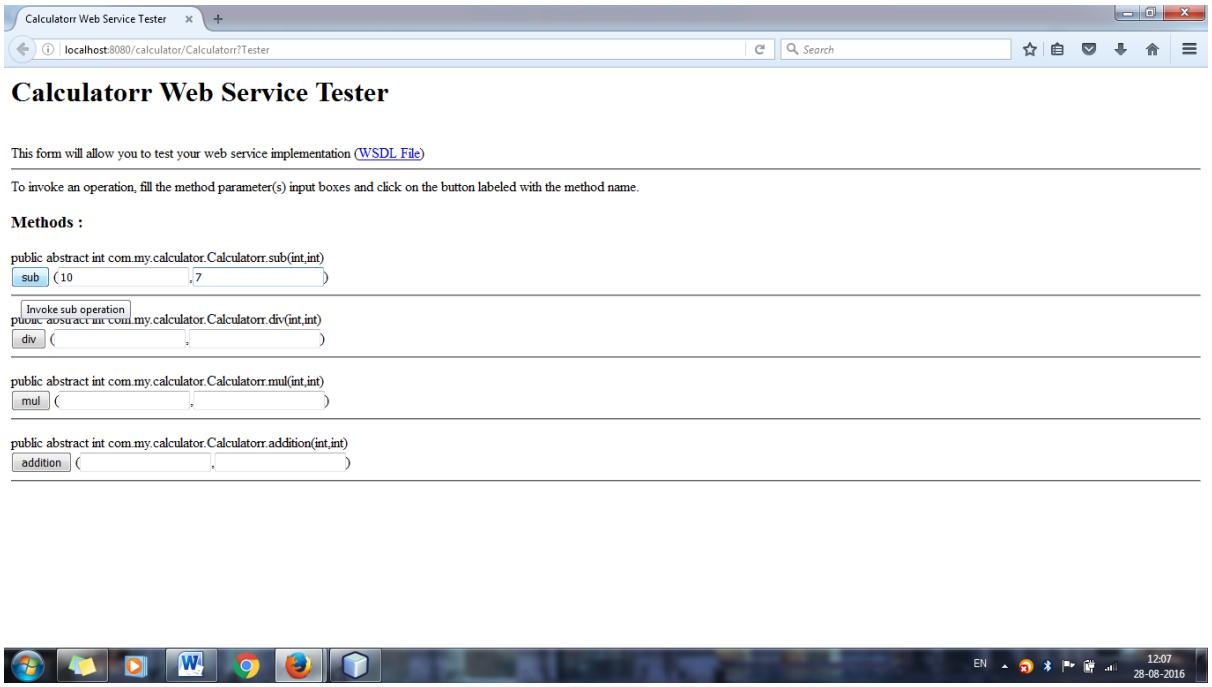

```
@WebMethod(operationName = "add")

publicint add(@WebParam(name = "a") int a, @WebParam(name = "b") int b) {

int c=a+b;

return c;

   }
```


calculator - NetBeans IDE 8.1
File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
Projects Files Services
calculator
Web Pages
Web Services
Calculatorr
calco
Source Packages
Dependencies
Java Dependencies
Project Files
Start Page Calculatorr.java calco.java
Source Design History
import javax.jws.WebService;
import javax.jws.WebMethod;
import javax.jws.WebParam;
/**
* @author DELL
*/
@WebService(serviceName = "calco")
public class calco {
/**
* Web service operation
*/
@WebMethod(operationName = "add")
public int add(@WebParam(name = "a") int a, @WebParam(name = "b") int b) {
int c=a+b;
return c;
}
add - Navigator
Members
calco
add(int a, int b) : int
com.my.calculator.calco add
Notifications Output
Priority Message Date Created Category
JavaDB - Security Manager Problem 4 minutes ago Info
Select a notification to see details
Transferring Maven repository index: Central Repository
25:17 INS
12:06
28-08-2016


calculator - NetBeans IDE 8.1
File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
Projects
New
Build
Clean and Build
Build with Dependencies
Clean
Verify
Generate Javadoc
Run
Debug
Profile
Test Alt+F6
Run Selenium Tests
Custom
Set Configuration
Open POM
Reload POM
Open Required Projects
Close
Rename...
Move...
Copy...
Delete Delete
Find... Ctrl+F
Inspect and Transform...
Versioning
History
Properties
Navigator
Start Page Calculatorr.java calco.java
Source Design History
import javax.jws.WebService;
import javax.jws.WebMethod;
import javax.jws.WebParam;
/**
* @author DELL
*/
@WebService(serviceName = "calco")
public class calco {
/**
* Web service operation
*/
@WebMethod(operationName = "add")
public int add(@WebParam(name = "a") int a, @WebParam(name = "b") int b) {
int c=a+b;
return c;
}
com.my.calculator.calco add
Notifications Output
Priority Message Date Created Category
JavaDB - Security Manager Problem 5 minutes ago Info
Select a notification to see details
Transferring Maven repository index: Central Repository
26:6/5:148 INS
12:06
28-08-2016


NetBeans IDE 8.1
File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
Projects Files Services
calculator
Web Pages
Web Services
Calculatorr
calco
Open
Add Operation...
Test Web Service
Edit Web Service Attributes
Configure Handlers...
Delete
Navigator
dependency analyze
dependency analyze-dep-mgt
dependency analyze-duplicate
dependency analyze-only
dependency analyze-report
dependency build-classpath
dependency copy-dependencies
dependency get
dependency go-offline
dependency list
dependency list-repositories
dependency properties
dependency purge-local-repository
dependency resolve
Start Page
Calculatorr.java
calco.java
Source Design History
import javax.jws.WebService;
import javax.jws.WebMethod;
import javax.jws.WebParam;
/**
*
* @author DELL
*/
@WebService(serviceName = "calco")
public class calco {
/**
* Web service operation
*/
@WebMethod(operationName = "add")
public int add(@WebParam(name = "a") int a, @WebParam(name = "b") int b) {
int c=a+b;
return c;
}
com.my.calculator.calco
add
Notifications
Output
Priority
Message
Date Created
Category
JavaDB - Security Manager Problem
5 minutes ago
Info
Select a notification to see details
Transferring Maven repository index: Central Repository
12%
26:6/5:148
INS
12:06
28-08-2016


Calculatorr Web Service Tester
localhost:8080/calculator/Calculatorr?Tester
Search
Calculatorr 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 com.my.calculator.Calculatorr.sub(int,int)
sub (,)
public abstract int com.my.calculator.Calculatorr.div(int,int)
div (,)
public abstract int com.my.calculator.Calculatorr.mul(int,int)
mul (,)
public abstract int com.my.calculator.Calculatorr.addition(int,int)
addition (,)
EN
12:07
28-08-2016


Calculatorr Web Service Tester
localhost:8080/calculator/Calculatorr?Tester
Search
Calculatorr 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 com.my.calculator.Calculatorr.sub(int,int)
sub (10 , 7)
Invoke sub operation
public abstract int com.my.calculator.Calculatorr.div(int,int)
div (,)
public abstract int com.my.calculator.Calculatorr.mul(int,int)
mul (,)
public abstract int com.my.calculator.Calculatorr.addition(int,int)
addition (,)
EN
12:07
28-08-2016


Method invocation trace
localhost:8080/calculator/Calculatorr?Tester
Search
sub Method invocation
Method parameter(s)
Type
Value
int
10
int
7
Method returned
int : "3"
SOAP Request
<?xml version="1.0" encoding="UTF-8"?><S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
<SOAP-ENV:Header/>
<S:Body>
<ns2:sub xmlns:ns2="http://calculator.my.com/">
<a>10
7
</ns2:sub>
</S:Body>
</S:Envelope>
SOAP Response
<?xml version="1.0" encoding="UTF-8"?><S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
<SOAP-ENV:Header/>
<S:Body>
<ns2:subResponse xmlns:ns2="http://calculator.my.com/">
<return>3</return>
</ns2:subResponse>
</S:Body>
</S:Envelope>
EN
12:08
28-08-2016

APPLICATIONS:

Using calculator for mathematical operations.

RESULT:

Thus build a new web service calculator is successfully executed.

EX.NO.2 Develop new OGSA-compliant Web Service.
DATE:

OBJECTIVE:

To build a newOGSA- Compliant web service.

PROCEDURE:

Steps:

1. Setup the Development Environment for PATH,JAVA_HOME,TOMCAT_HOME.(My computer→Properties→ Advanced System Setting→Environment variables)
2. Open the Eclipse then select windows→preferences→webservice
3. Then select Axis2 preferences and choose Axis2 runtime tab.
4. Then browse the Axis2 path.
5. File→New→ Dynamic web project
6. Name the project name eg.Myfirstwebservice ,select the Target run time environment as Apache Tomcat v6.0
7. Then choose custom on configuration and click on Modify button
8. Then project facets window will popup .
9. On that check-in the Axis2 Web Services,clickoK then Next
10. Right Click on MyFirstWebService in Project Explorer and select New –-> Class and give suitable package name and class name. I have given com.sencide as package name and FirstWebService as class name.
11. Type the following code on class file

```
packagecom.sencide;
public class FirstWebService {
 public int addTwoNumbers(int firstNumber, int secondNumber){
  return firstNumber + secondNumber;
 }
}
```

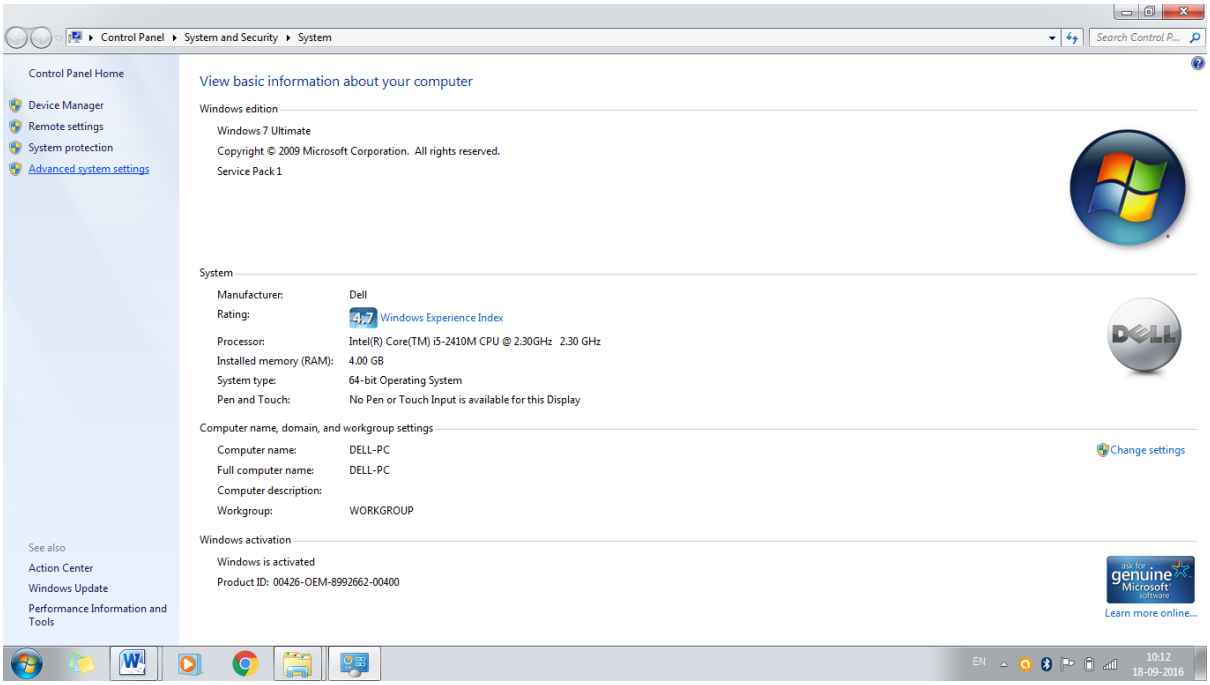
12. Then, select File --> New –-> Other and choose Web Service
13. Select the FirstWebService class as service implementation and to make sure that the Configuration is setup correctly click on Server runtime.
14. There set the Web Service runtime as Axis2 (Default one is Axis) and click Ok.
15. Click Next and make sure Generate a default service.xml file is selected.
16. Click Next and Start the Server and after server is started you can Finish if you do not want to publish the Web service to a test UDDI repository
17. You can go to http://localhost:8080/MyFirstWebService/services/listServices to see your running service which is deployed by Axis2. You can see the WSDL by clicking the link FirstWebService.
18. Select File --> New --> Other… and choose Web Service Client

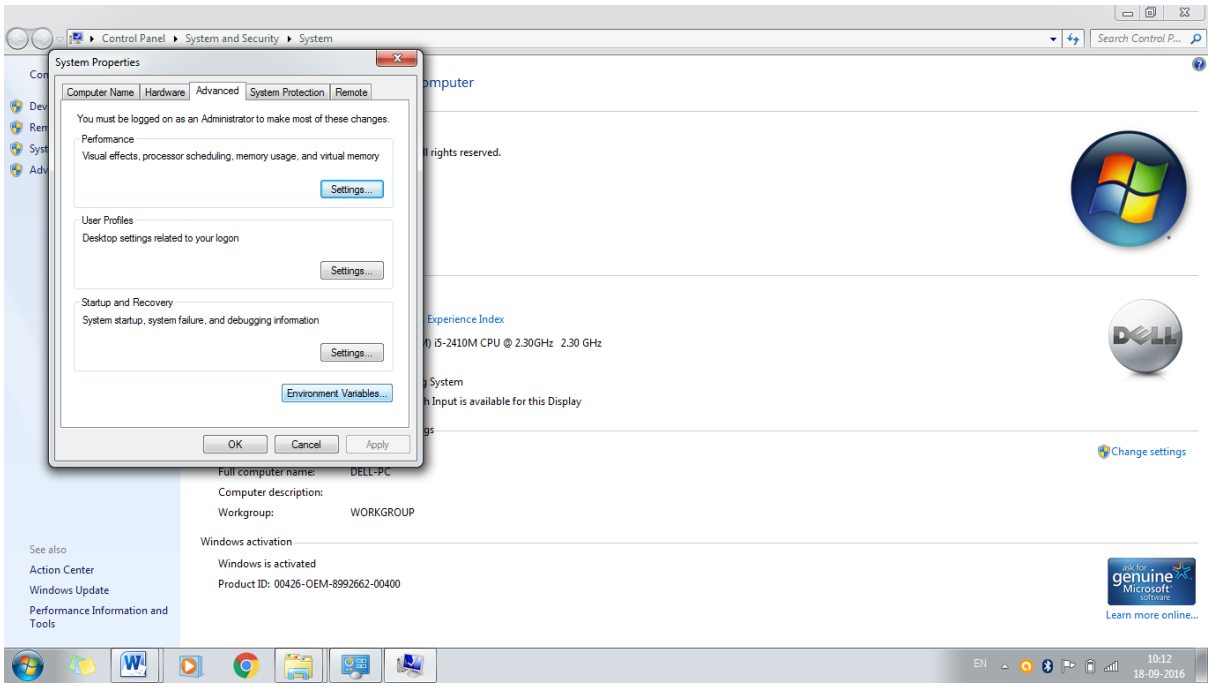
19. Set he newly created Axis2 Web service (http://localhost:8080/axis2/services/FirstWebService?wsdl) as the Service definition. Then configure the Server runtime as previously and click finish.
20. This will generate two new classes called FirstWebServiceStub.java and FirstWebServiceCallbackHandler.java. Now we can create test class for client and use our web service. Create new class called TestClient.java and paste following code.

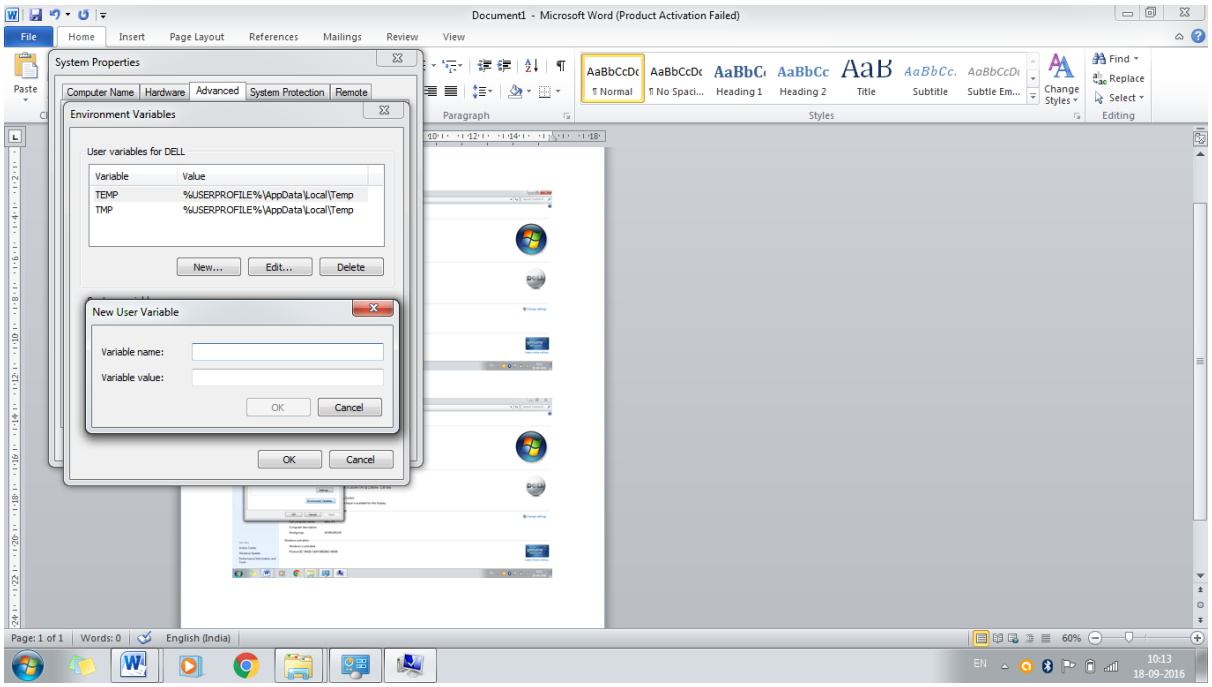
```
packagecom.sencide;

importjava.rmi.RemoteException;
importcom.sencide.FirstWebServiceStub.AddTwoNumbers;
importcom.sencide.FirstWebServiceStub.AddTwoNumbersResponse;

publicclassTestClient {

 publicstaticvoidmain(String[] args) throwsRemoteException {

  FirstWebServiceStub stub = newFirstWebServiceStub();
  AddTwoNumbersatn = newAddTwoNumbers();
  atn.setFirstNumber(5);
  atn.setSecondNumber(7);
  AddTwoNumbersResponse res = stub.addTwoNumbers(atn);
  System.out.println(res.get_return());

 }
}
```

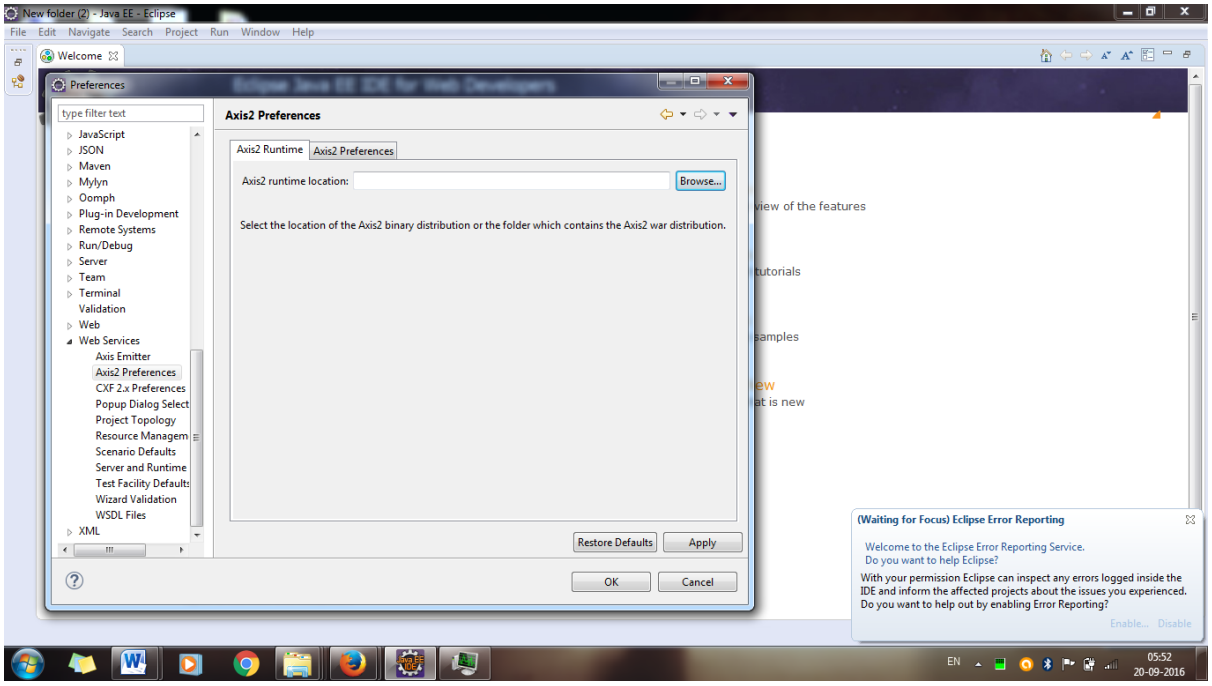
21. Now you can run the above code as java application and you will get the output as 12 since we are adding 7 and 5.

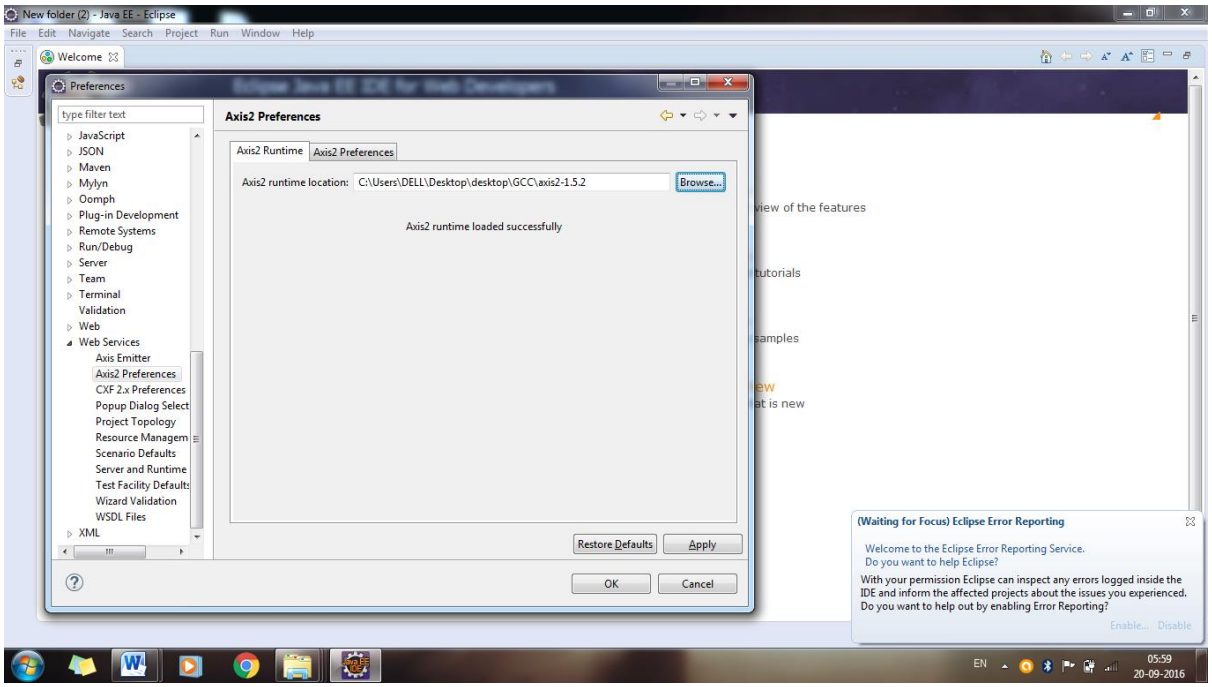
OUTPUT:

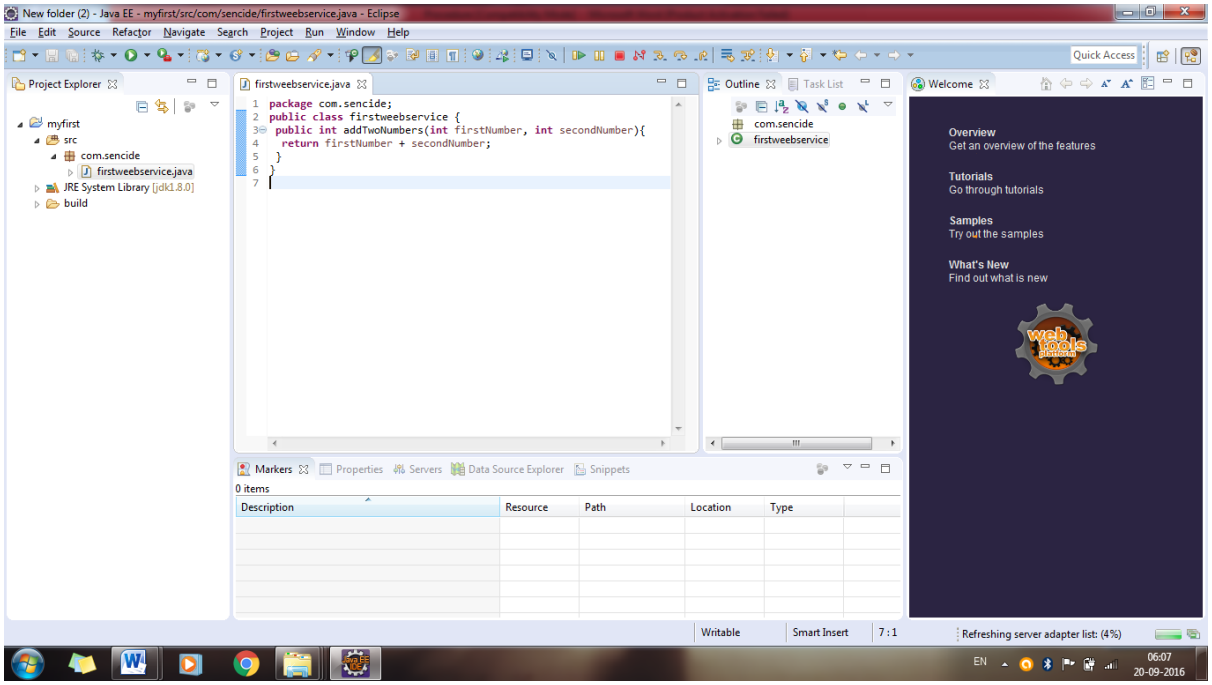

Control Panel ▸ System and Security ▸ System
Search Control P...
Control Panel Home
Device Manager
Remote settings
System protection
Advanced system settings
View basic information about your computer
Windows edition
Windows 7 Ultimate
Copyright © 2009 Microsoft Corporation. All rights reserved.
Service Pack 1
System
Manufacturer: Dell
Rating: 4.7 Windows Experience Index
Processor: Intel(R) Core(TM) i5-2410M CPU @ 2.30GHz 2.30 GHz
Installed memory (RAM): 4.00 GB
System type: 64-bit Operating System
Pen and Touch: No Pen or Touch Input is available for this Display
Computer name, domain, and workgroup settings
Computer name: DELL-PC
Full computer name: DELL-PC
Computer description:
Workgroup: WORKGROUP
Change settings
Windows activation
Windows is activated
Product ID: 00426-OEM-8992662-00400
Learn more online...
See also
Action Center
Windows Update
Performance Information and Tools
10:12
18-09-2016

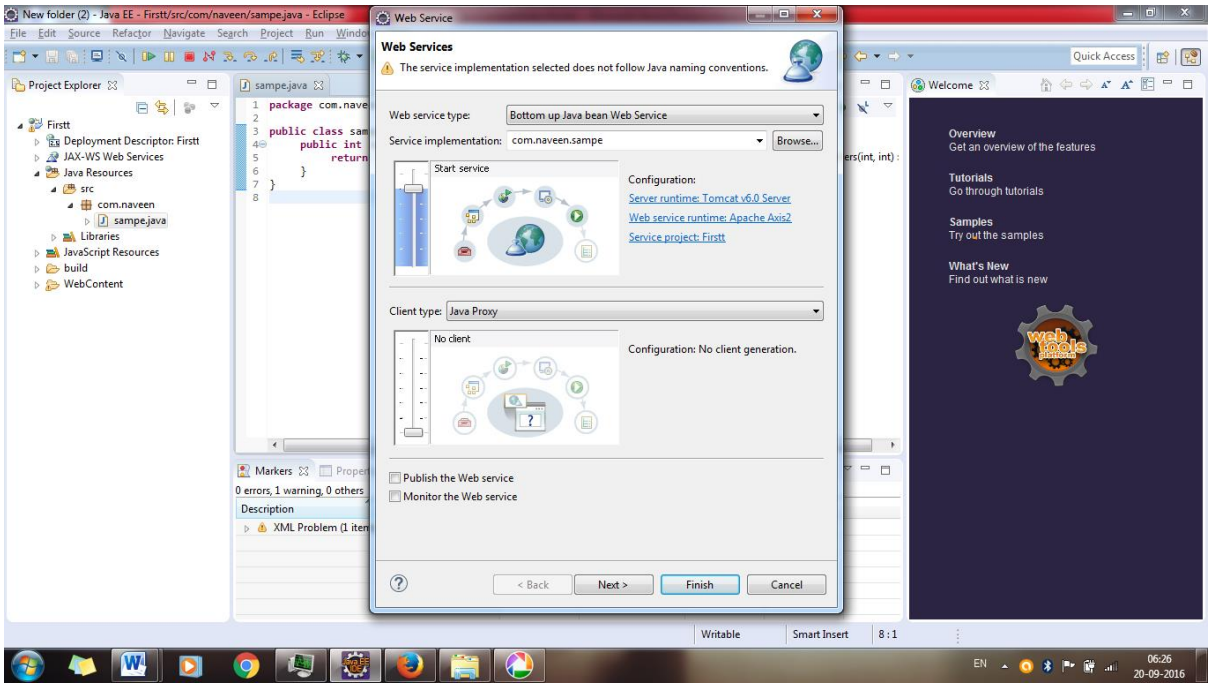

System Properties
Computer Name
Hardware
Advanced
System Protection
Remote
You must be logged on as an Administrator to make most of these changes.
Performance
Visual effects, processor scheduling, memory usage, and virtual memory
Settings...
User Profiles
Desktop settings related to your logon
Settings...
Startup and Recovery
System startup, system failure, and debugging information
Settings...
Environment Variables...
OK
Cancel
Apply
Control Panel ▸ System and Security ▸ System
Search Control P...
Windows is activated
Product ID: 00426-OEM-8992662-00400
Learn more online...
10:12
18-09-2016

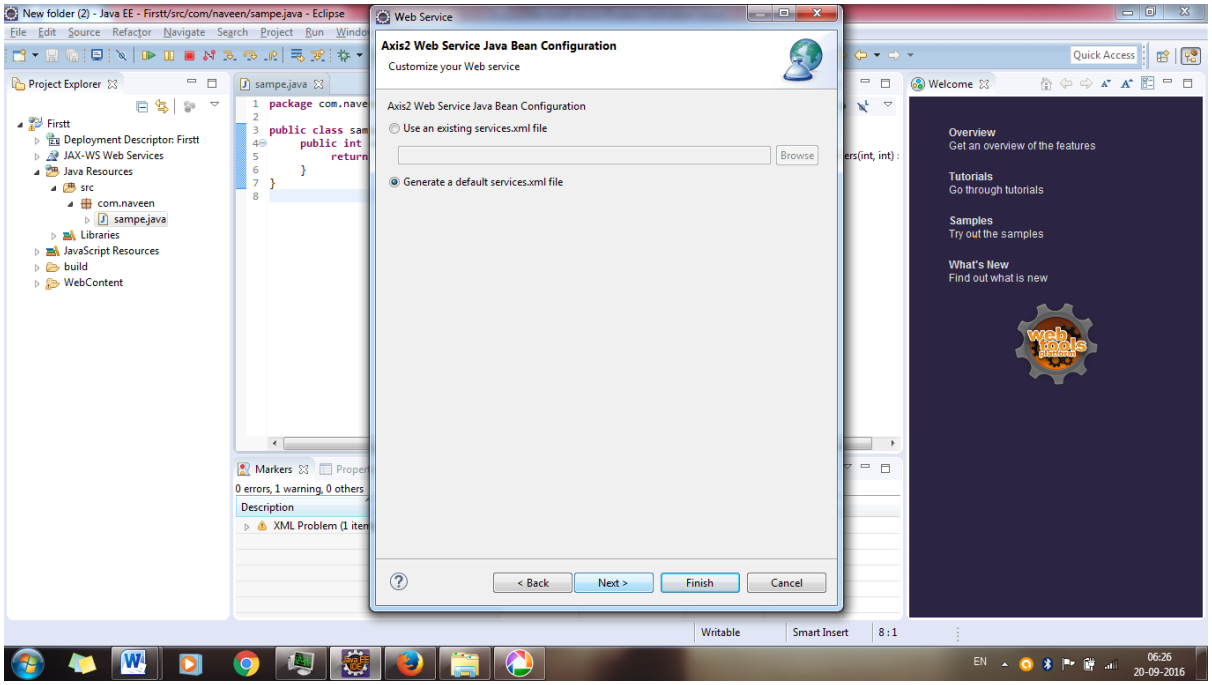

Document1 - Microsoft Word (Product Activation Failed)
System Properties
Environment Variables
User variables for DELL
Variable
Value
TEMP
%USERPROFILE%\AppData\Local\Temp
TMP
%USERPROFILE%\AppData\Local\Temp
New...
Edit...
Delete
New User Variable
Variable name:
Variable value:
OK
Cancel

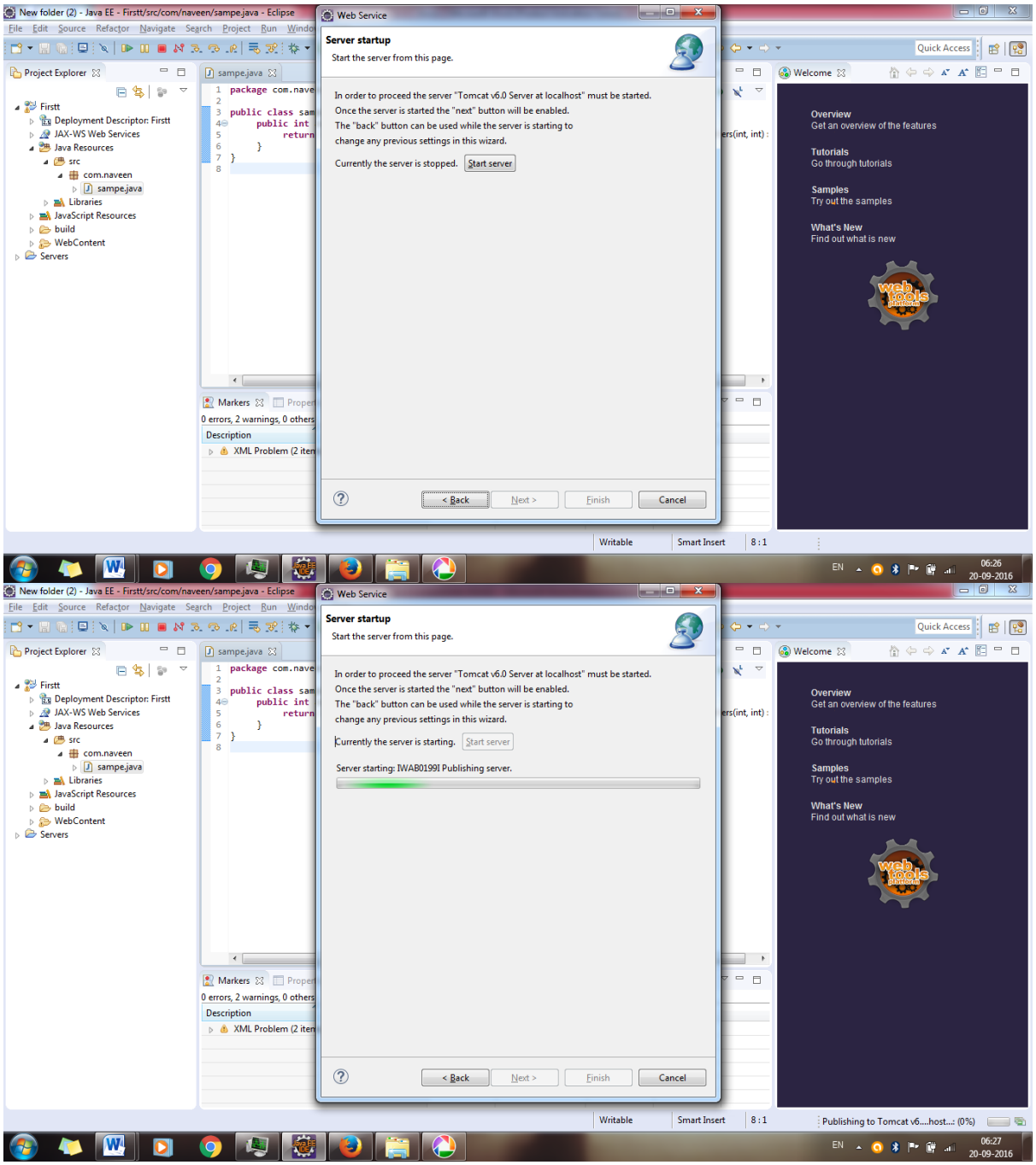

New folder (2) - Java EE - Eclipse
Welcome
Preferences
Axis2 Preferences
Axis2 Runtime
Axis2 Preferences
Axis2 runtime location:
Browse...
Select the location of the Axis2 binary distribution or the folder which contains the Axis2 war distribution.
Restore Defaults
Apply
OK
Cancel
(Waiting for Focus) Eclipse Error Reporting
Welcome to the Eclipse Error Reporting Service.
Do you want to help Eclipse?
With your permission Eclipse can inspect any errors logged inside the IDE and inform the affected projects about the issues you experienced.
Do you want to help out by enabling Error Reporting?

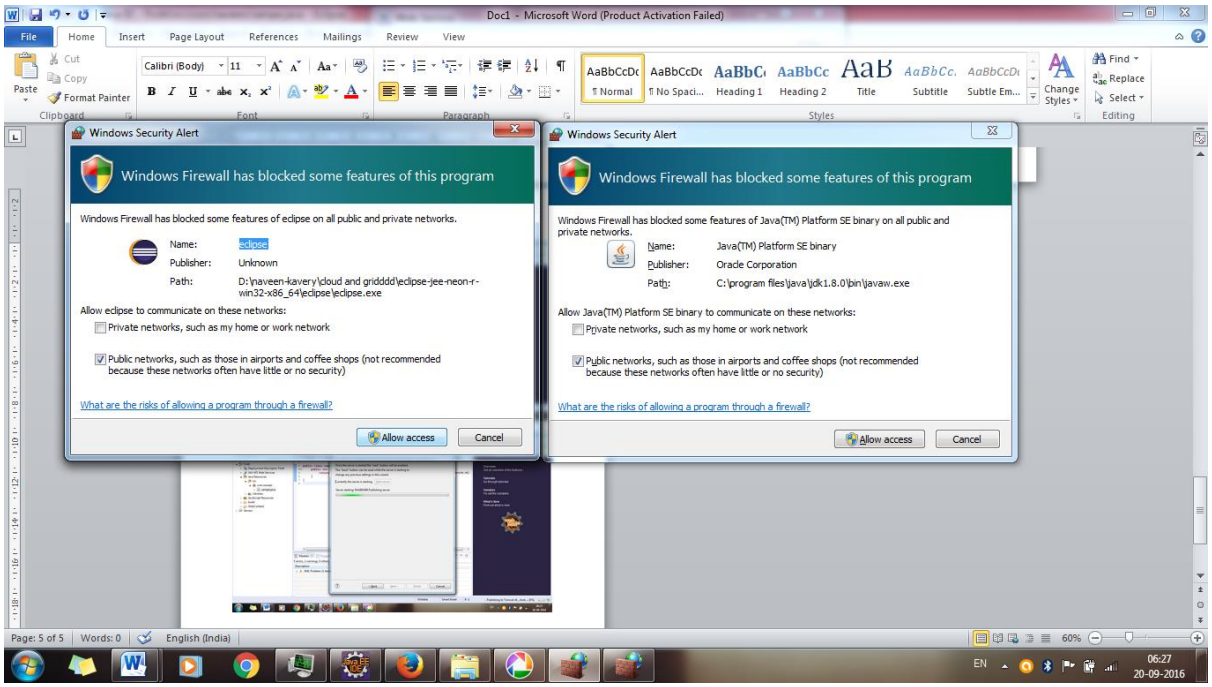

New folder (2) - Java EE - Eclipse
File Edit Navigate Search Project Run Window Help
Welcome
Preferences
type filter text
JavaScript
JSON
Maven
Mylyn
Oomph
Plug-in Development
Remote Systems
Run/Debug
Server
Team
Terminal
Validation
Web
Web Services
Axis Emitter
Axis2 Preferences
CXF 2.x Preferences
Popup Dialog Select
Project Topology
Resource Managem
Scenario Defaults
Server and Runtime
Test Facility Defaults
Wizard Validation
WSDL Files
XML
Axis2 Preferences
Axis2 Runtime
Axis2 Preferences
Axis2 runtime location:
C:\Users\DELL\Desktop\desktop\GCC\axis2-1.5.2
Browse...
Axis2 runtime loaded successfully
Restore Defaults
Apply
OK
Cancel
(Waiting for Focus) Eclipse Error Reporting
Welcome to the Eclipse Error Reporting Service.
Do you want to help Eclipse?
With your permission Eclipse can inspect any errors logged inside the IDE and inform the affected projects about the issues you experienced.
Do you want to help out by enabling Error Reporting?
Enable... Disable
EN
05:59
20-09-2016

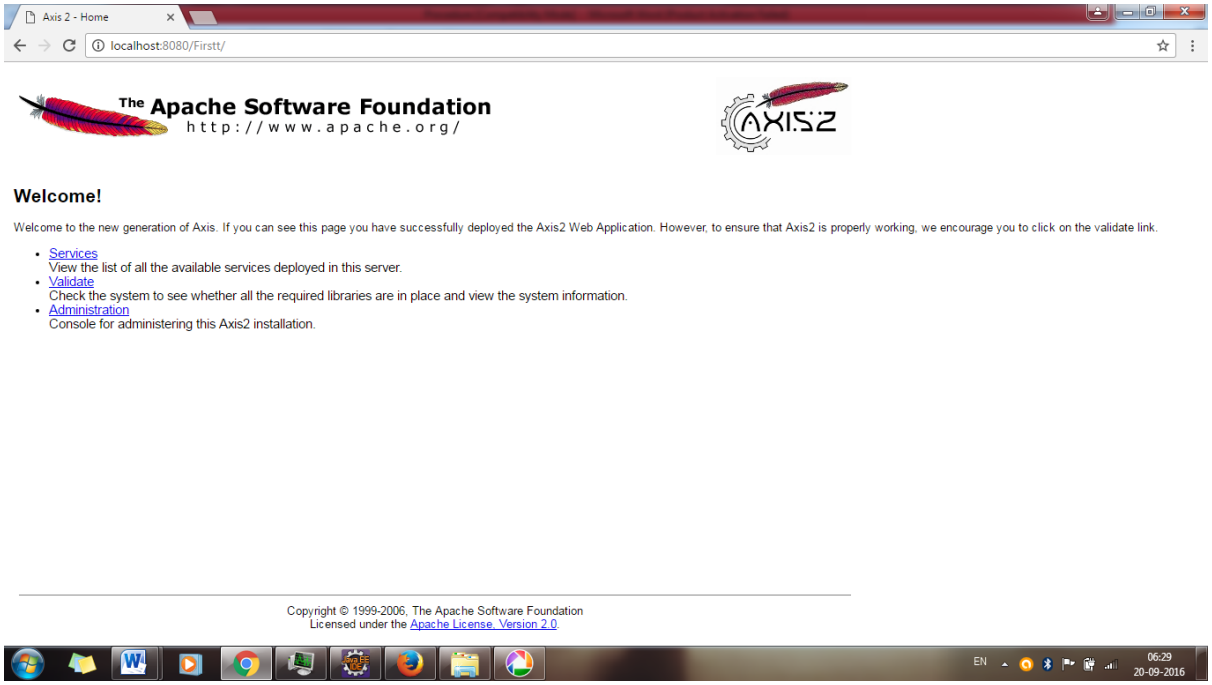

New folder (2) - Java EE - myfirst/src/com/sencide/firstweebservice.java - Eclipse
File Edit Source Refactor Navigate Search Project Run Window Help
Quick Access
Project Explorer
myfirst
src
com.sencide
firstweebservice.java
JRE System Library [jdk1.8.0]
build
firstweebservice.java
1 package com.sencide;
2 public class firstweebservice {
3 public int addTwoNumbers(int firstNumber, int secondNumber){
4 return firstNumber + secondNumber;
5 }
6 }
7
Outline
Task List
com.sencide
firstweebservice
Welcome
Overview
Get an overview of the features
Tutorials
Go through tutorials
Samples
Try out the samples
What's New
Find out what is new
Markers
Properties
Servers
Data Source Explorer
Snippets
0 items
Description
Resource
Path
Location
Type
Writable
Smart Insert
7 : 1
Refreshing server adapter list: (4%)
EN
06:07
20-09-2016

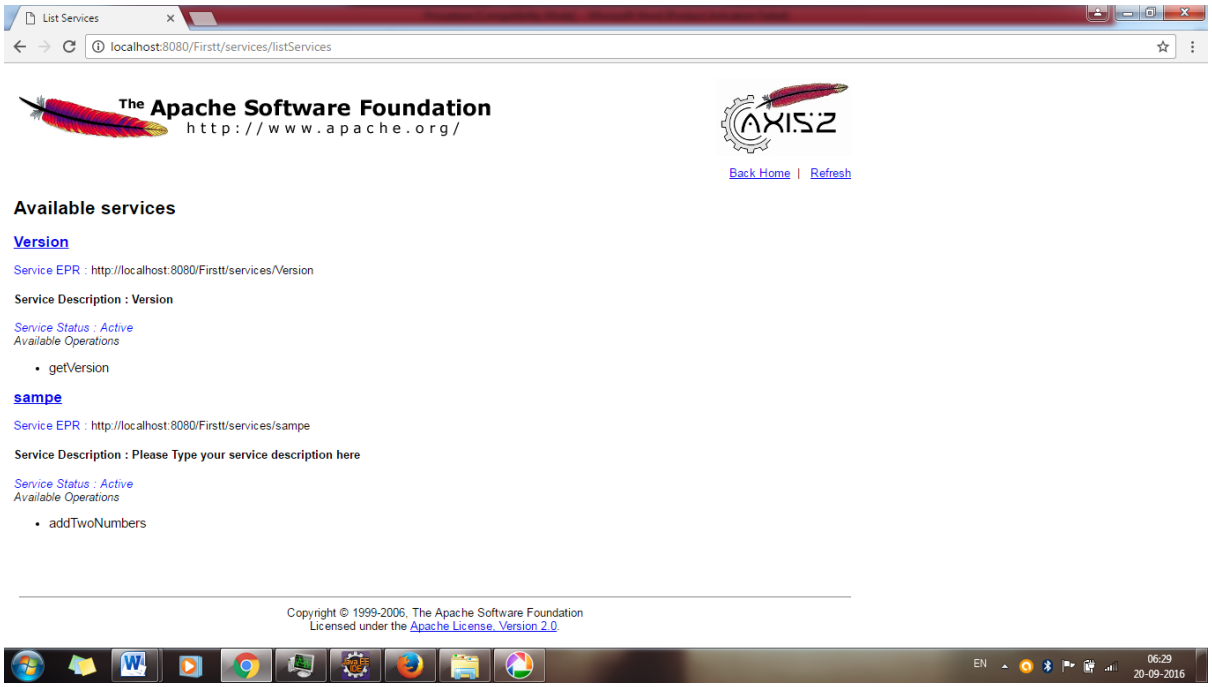

Web Service
Web Services
The service implementation selected does not follow Java naming conventions.
Web service type:
Bottom up Java bean Web Service
Service implementation:
com.naveen.sampe
Browse...
Start service
Configuration:
Server runtime: Tomcat v6.0 Server
Web service runtime: Apache Axis2
Service project: Firstt
Client type:
Java Proxy
No client
Configuration: No client generation.
Publish the Web service
Monitor the Web service
< Back
Next >
Finish
Cancel

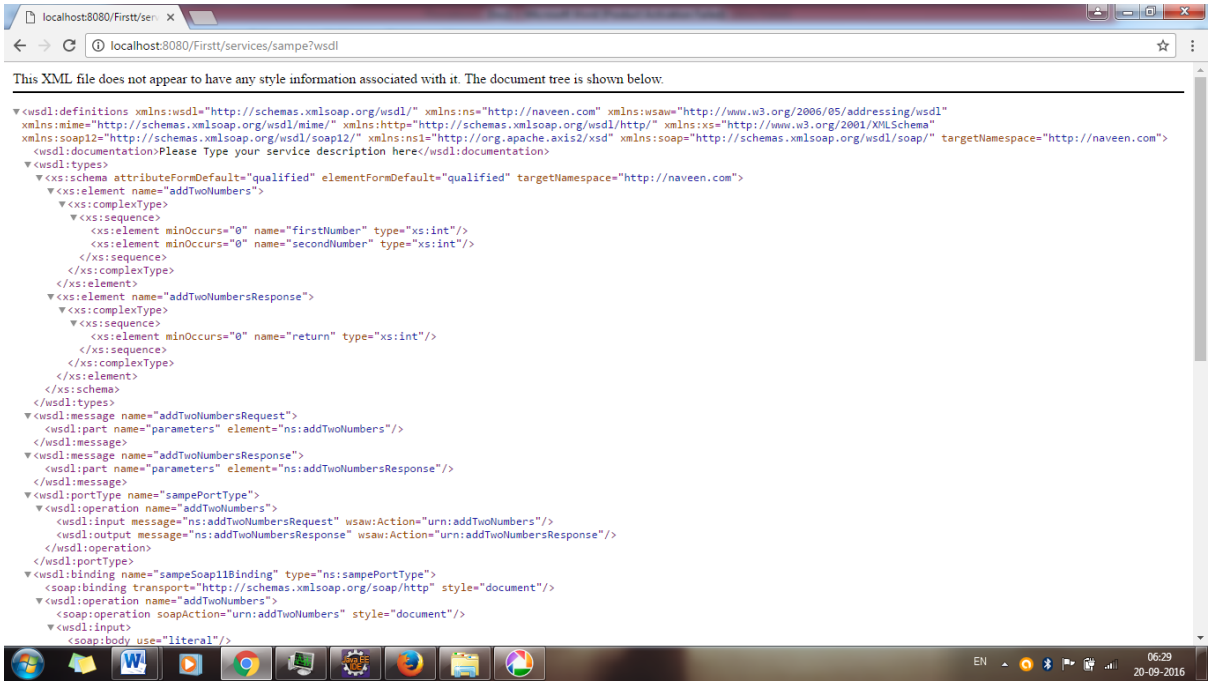

Web Service
Axis2 Web Service Java Bean Configuration
Customize your Web service
Axis2 Web Service Java Bean Configuration
Use an existing services.xml file
Browse
Generate a default services.xml file
< Back
Next >
Finish
Cancel

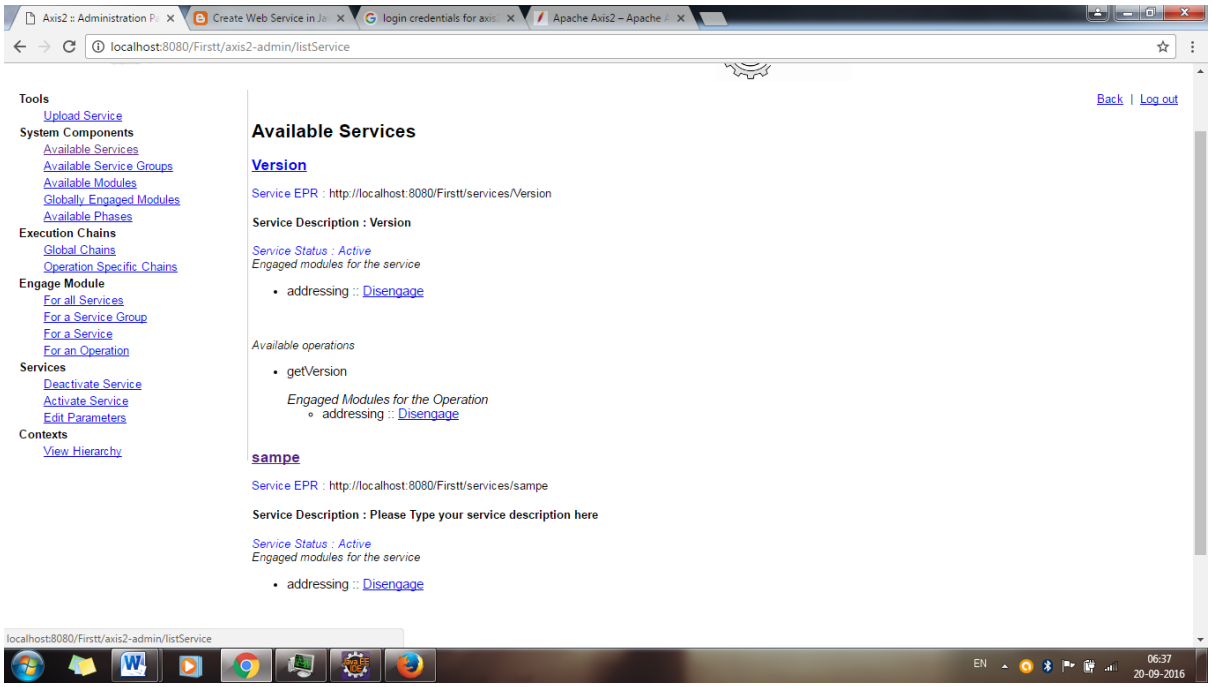

New folder (2) - Java EE - Firstt/src/com/naveen/sampe.java - Eclipse
Web Service
Server startup
Start the server from this page.
In order to proceed the server "Tomcat v6.0 Server at localhost" must be started.
Once the server is started the "next" button will be enabled.
The "back" button can be used while the server is starting to
change any previous settings in this wizard.
Currently the server is stopped.
Start server
< Back
Next >
Finish
Cancel
Currently the server is starting.
Server starting: IWAB0199I Publishing server.
Overview
Get an overview of the features
Tutorials
Go through tutorials
Samples
Try out the samples
What's New
Find out what is new
Writable
Smart Insert
8 : 1
Publishing to Tomcat v6....host... (0%)

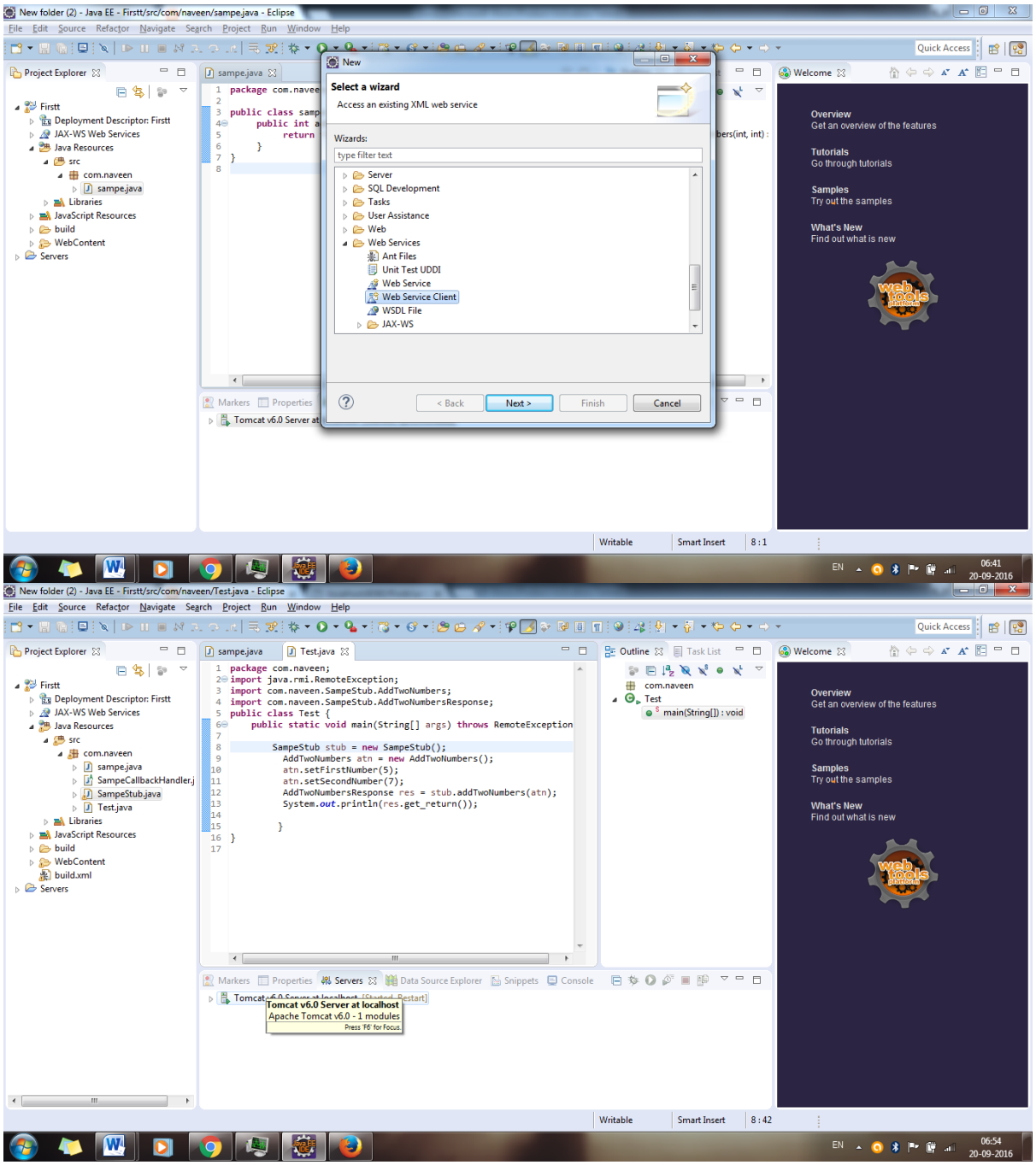

Doc1 - Microsoft Word (Product Activation Failed)
Windows Security Alert
Windows Firewall has blocked some features of this program
Windows Firewall has blocked some features of eclipse on all public and private networks.
Name: eclipse
Publisher: Unknown
Path: D:\naveen-kavery\cloud and griddd\eclipse-jee-neon-r-win32-x86_64\eclipse\eclipse.exe
Allow eclipse to communicate on these networks:
Private networks, such as my home or work network
Public networks, such as those in airports and coffee shops (not recommended because these networks often have little or no security)
What are the risks of allowing a program through a firewall?
Allow access
Cancel
Windows Security Alert
Windows Firewall has blocked some features of this program
Windows Firewall has blocked some features of Java(TM) Platform SE binary on all public and private networks.
Name: Java(TM) Platform SE binary
Publisher: Oracle Corporation
Path: C:\program files\java\jdk1.8.0\bin\javaw.exe
Allow Java(TM) Platform SE binary to communicate on these networks:
Private networks, such as my home or work network
Public networks, such as those in airports and coffee shops (not recommended because these networks often have little or no security)
What are the risks of allowing a program through a firewall?
Allow access
Cancel


Axis 2 - Home
localhost:8080/Firstt/
The Apache Software Foundation
http://www.apache.org/
Welcome!
Welcome to the new generation of Axis. If you can see this page you have successfully deployed the Axis2 Web Application. However, to ensure that Axis2 is properly working, we encourage you to click on the validate link.
Services
View the list of all the available services deployed in this server.
Validate
Check the system to see whether all the required libraries are in place and view the system information.
Administration
Console for administering this Axis2 installation.
Copyright © 1999-2006, The Apache Software Foundation
Licensed under the Apache License, Version 2.0.

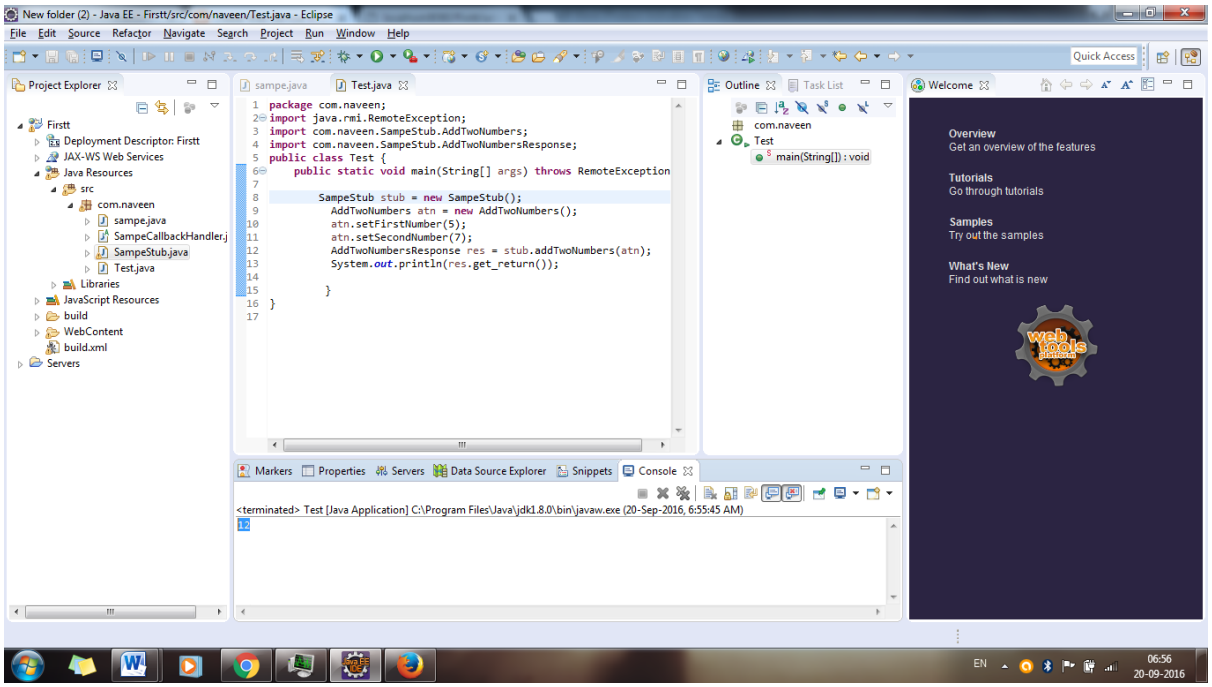

List Services
localhost:8080/Firstt/services/listServices
The Apache Software Foundation
http://www.apache.org/
AXIS2
Back Home | Refresh
Available services
Version
Service EPR : http://localhost:8080/Firstt/services/Version
Service Description : Version
Service Status : Active
Available Operations
getVersion
sampe
Service EPR : http://localhost:8080/Firstt/services/sampe
Service Description : Please Type your service description here
Service Status : Active
Available Operations
addTwoNumbers
Copyright © 1999-2006, The Apache Software Foundation
Licensed under the Apache License, Version 2.0.
EN
06:29
20-09-2016


localhost:8080/Firstt/ser
localhost:8080/Firstt/services/sampe?wsdl
This XML file does not appear to have any style information associated with it. The document tree is shown below.
<wsdl:definitions xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/" xmlns:ns="http://naveen.com" xmlns:wsaw="http://www.w3.org/2006/05/addressing/wsdl"
xmlns:mime="http://schemas.xmlsoap.org/wsdl/mime/" xmlns:http="http://schemas.xmlsoap.org/wsdl/http/" xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:soap12="http://schemas.xmlsoap.org/wsdl/soap12/" xmlns:ns1="http://org.apache.axis2/xsd" xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/" targetNamespace="http://naveen.com">
<wsdl:documentation>Please Type your service description here</wsdl:documentation>
<wsdl:types>
<xs:schema attributeFormDefault="qualified" elementFormDefault="qualified" targetNamespace="http://naveen.com">
<xs:element name="addTwoNumbers">
<xs:complexType>
<xs:sequence>
<xs:element minOccurs="0" name="firstNumber" type="xs:int"/>
<xs:element minOccurs="0" name="secondNumber" type="xs:int"/>
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="addTwoNumbersResponse">
<xs:complexType>
<xs:sequence>
<xs:element minOccurs="0" name="return" type="xs:int"/>
</xs:sequence>
</xs:complexType>
</xs:element>
</xs:schema>
</wsdl:types>
<wsdl:message name="addTwoNumbersRequest">
<wsdl:part name="parameters" element="ns:addTwoNumbers"/>
</wsdl:message>
<wsdl:message name="addTwoNumbersResponse">
<wsdl:part name="parameters" element="ns:addTwoNumbersResponse"/>
</wsdl:message>
<wsdl:portType name="sampePortType">
<wsdl:operation name="addTwoNumbers">
<wsdl:input message="ns:addTwoNumbersRequest" wsaw:Action="urn:addTwoNumbers"/>
<wsdl:output message="ns:addTwoNumbersResponse" wsaw:Action="urn:addTwoNumbersResponse"/>
</wsdl:operation>
</wsdl:portType>
<wsdl:binding name="sampeSoap11Binding" type="ns:sampePortType">
<soap:binding transport="http://schemas.xmlsoap.org/soap/http" style="document"/>
<wsdl:operation name="addTwoNumbers">
<soap:operation soapAction="urn:addTwoNumbers" style="document"/>
<wsdl:input>
<soap:body use="literal"/>
EN
06:29
20-09-2016


Axis2 :: Administration P
Create Web Service in Ja
login credentials for axis
Apache Axis2 – Apache
localhost:8080/Firstt/axis2-admin/listService
Tools
Upload Service
System Components
Available Services
Available Service Groups
Available Modules
Globally Engaged Modules
Available Phases
Execution Chains
Global Chains
Operation Specific Chains
Engage Module
For all Services
For a Service Group
For a Service
For an Operation
Services
Deactivate Service
Activate Service
Edit Parameters
Contexts
View Hierarchy
Back | Log out
Available Services
Version
Service EPR : http://localhost:8080/Firstt/services/Version
Service Description : Version
Service Status : Active
Engaged modules for the service
addressing :: Disengage
Available operations
getVersion
Engaged Modules for the Operation
addressing :: Disengage
sampe
Service EPR : http://localhost:8080/Firstt/services/sampe
Service Description : Please Type your service description here
Service Status : Active
Engaged modules for the service
addressing :: Disengage
localhost:8080/Firstt/axis2-admin/listService
EN
06:37
20-09-2016




```
package com.naveen;
import java.rmi.RemoteException;
import com.naveen.SampeStub.AddTwoNumbers;
import com.naveen.SampeStub.AddTwoNumbersResponse;
public class Test {
    public static void main(String[] args) throws RemoteException
    {

        SampeStub stub = new SampeStub();
          AddTwoNumbers atn = new AddTwoNumbers();
          atn.setFirstNumber(5);
          atn.setSecondNumber(7);
          AddTwoNumbersResponse res = stub.addTwoNumbers(atn);
          System.out.println(res.get_return());

         }
}
```



APPLICATIONS:

OGSA has contributed to projects and organisations around the world, in sectors including medical research, geographical information systems, meteorology, transport, computer-aided design, engineering and astronomy.

RESULT:

Thus build a new OGSA- Compliant web service is successfully executed.

EX.NO.3 Using Apache Axis develop a Grid Service.
DATE:

OBJECTIVE:

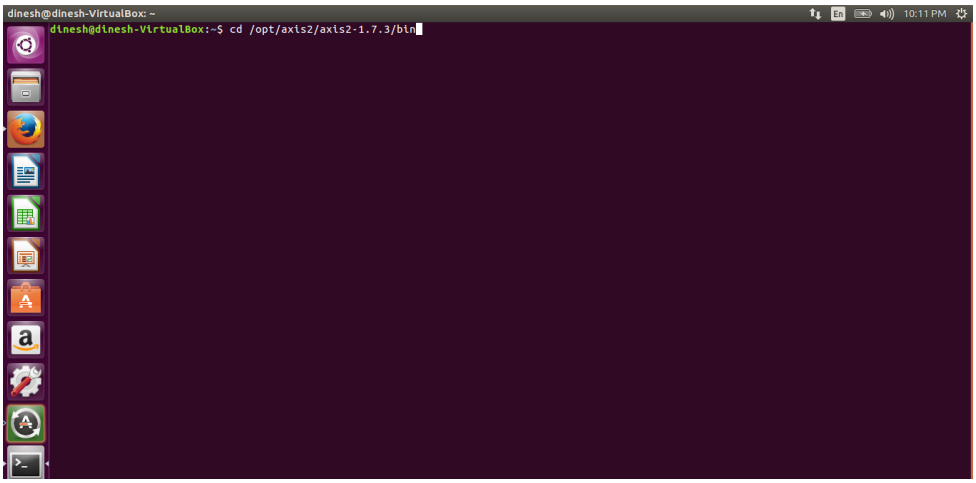
To develop a Grid service using Apache Axis.

PROCEDURE:

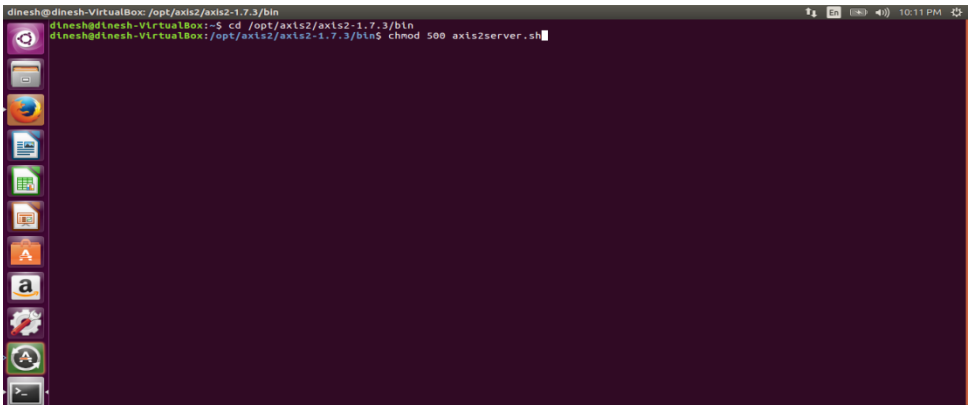
Steps:

1. Open the terminal
2. Type cd /opt/axis2/axis2-1.7.3/bin then press enter
3. Type chmod 500 axis2server.sh
4. Type ./axis2server.sh
5. Then open browser on ubuntu type the URL as localhost:8080/axis2/services

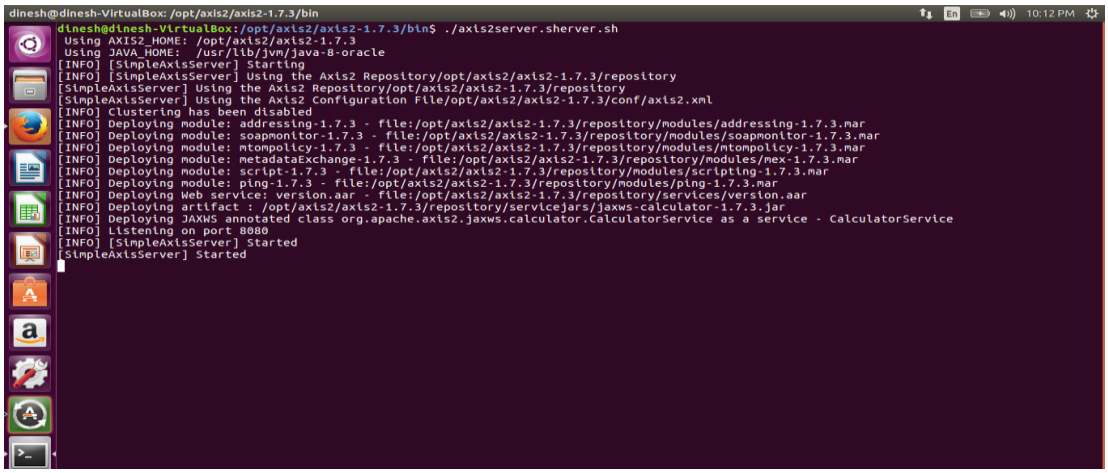
1. Type cd /opt/axis2/axis2-1.7.3/bin then press enter



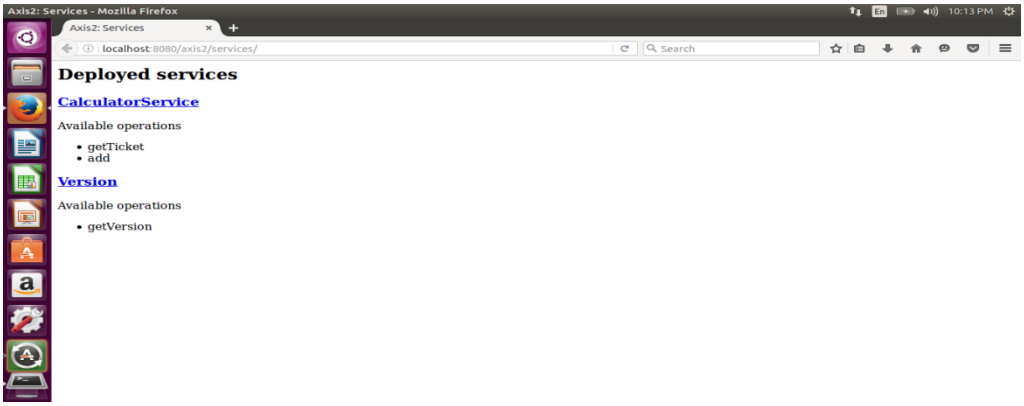
2. Type chmod 500 axis2server.sh & Type ./axis2server.sh



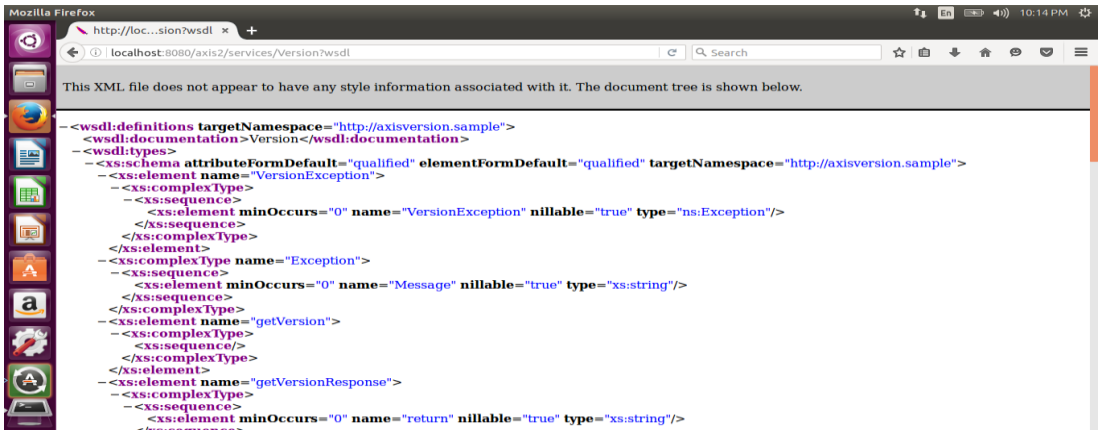
3. Axis2 server running



4. Then open browser on ubuntu type the URL as localhost:8080/axis2/services



5. Click on version to check



APPLICATIONS:

It contributed to projects and organisations around the world, in sectors including medical research, geographical information systems, meteorology, transport, computer-aided design, engineering and astronomy.

RESULT:

Thus develop a Grid service using Apache Axis is successfully executed.

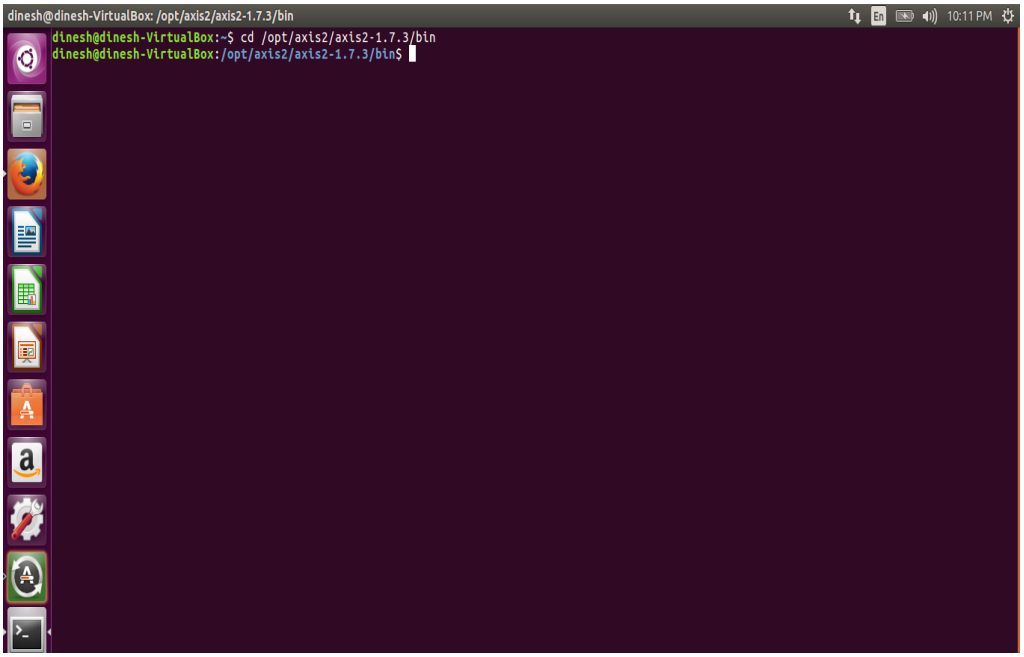
EX`NO.4 **Develop applications using Java or C/C++ Grid APIs**
DATE:

OBJECTIVE:
To develop applications using Java or C/C++ Grid APIs

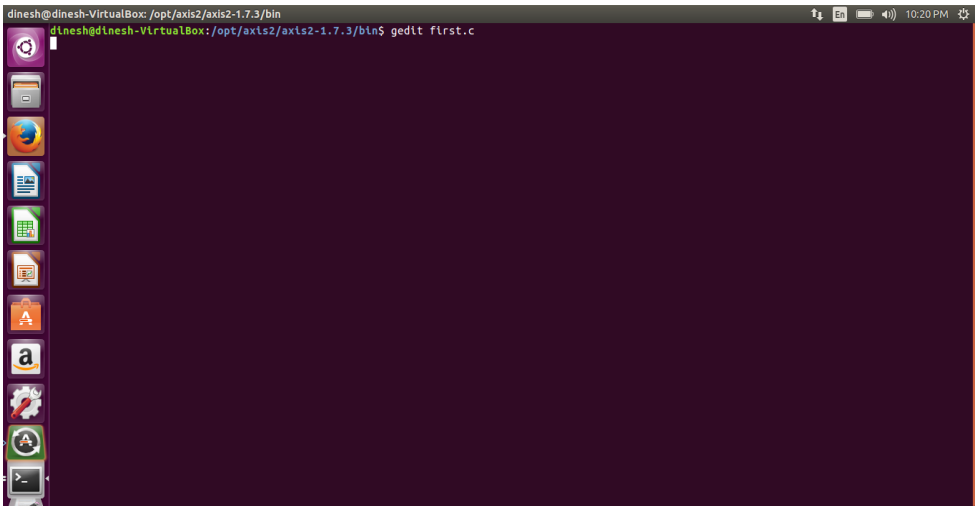
PROCEDURE:
Steps:

1. Open the terminal
2. Type cd /opt/axis2/axis2-1.7.3/bin then press enter
3. gedit thello.c
4. gcc hello.c
5. ./a.out

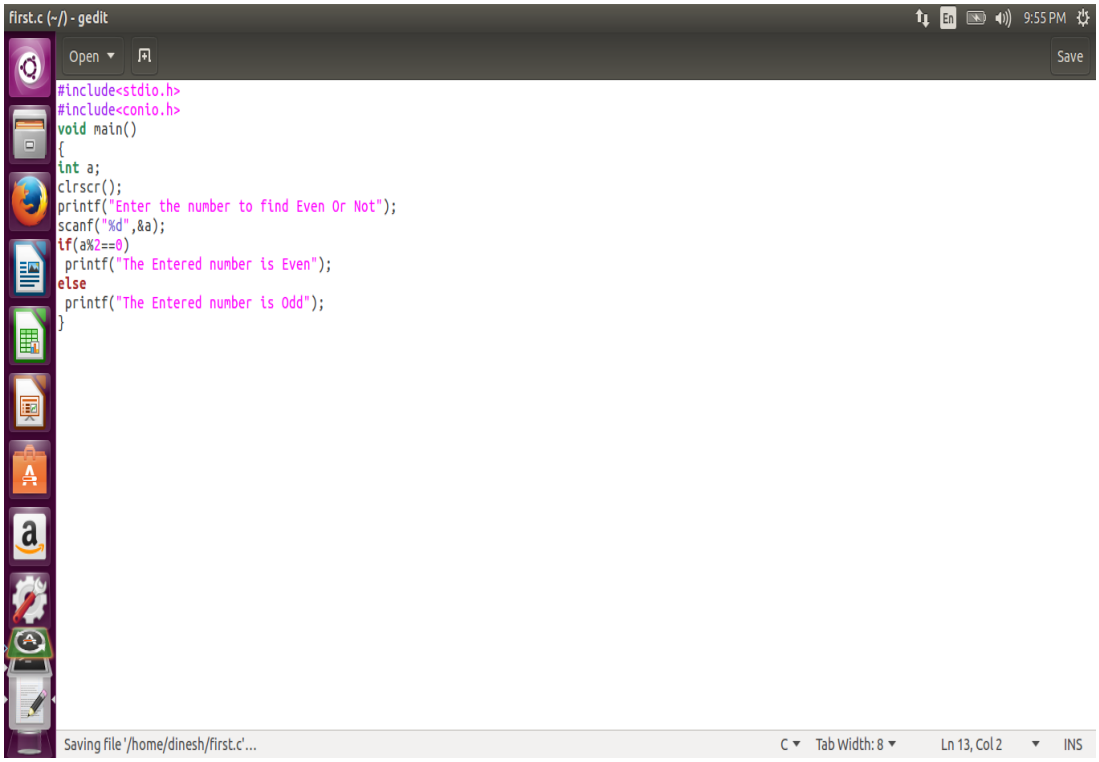
1. **Type cd /opt/axis2/axis2-1.7.3/bin then press enter**



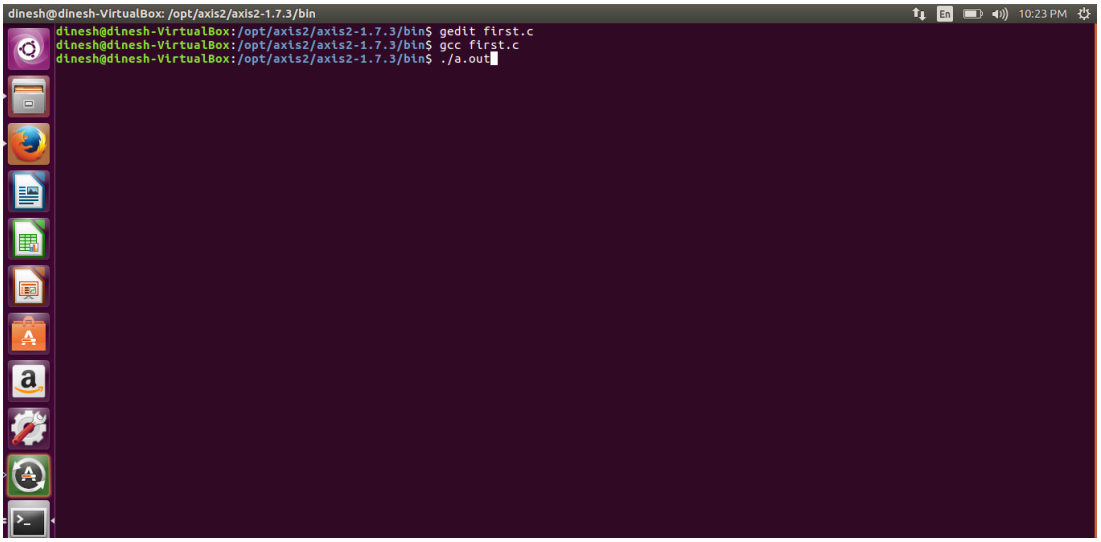
2. **Type geditfirst.c**



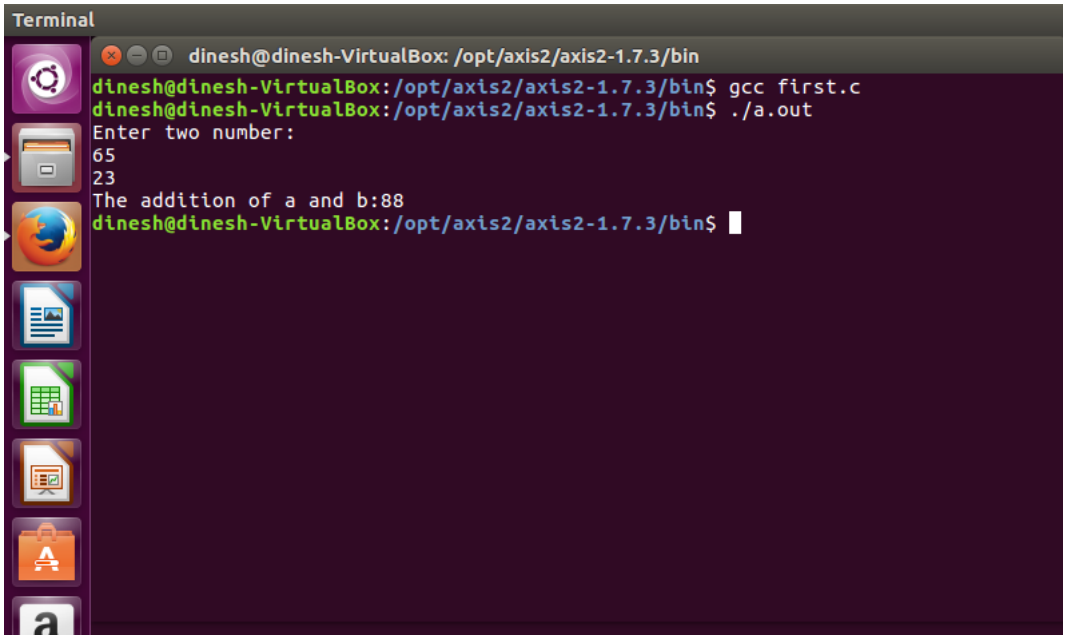
3. **Type the c program**



4. Running the C program



5. Display the output:



APPLICATIONS:

Simply running all programs in grid environment.

RESULT:
Thus develop applications using Java or C/C++ Grid APIs is successfully executed.

EX.NO.5 Develop secured applications using basic security mechanisms available in
DATE: Globus
Toolkit.

OBJECTIVE:

To develop secured applications using basic security mechanisms available in Globus Toolkit.

PROCEDURE:

Steps:

1. **Follow these command to install basic security**

Installing GRID Essential

wget http://www.globus.org/ftppub/gt6/installers/repo/globus-toolkit-repo_latest_all.deb

sudodpkg -i globus-toolkit-repo_latest_all.deb

sudo apt-get update

sudo apt-get install globus-data-management-client

sudo apt-get install globus-gridftp

sudo apt-get install globus-gram5

sudo apt-get install globus-gsi

sudo apt-get install globus-data-management-server

sudo apt-get install globus-data-management-client

sudo apt-get install globus-data-management-sdk

sudo apt-get install globus-resource-management-server

sudo apt-get install globus-resource-management-client

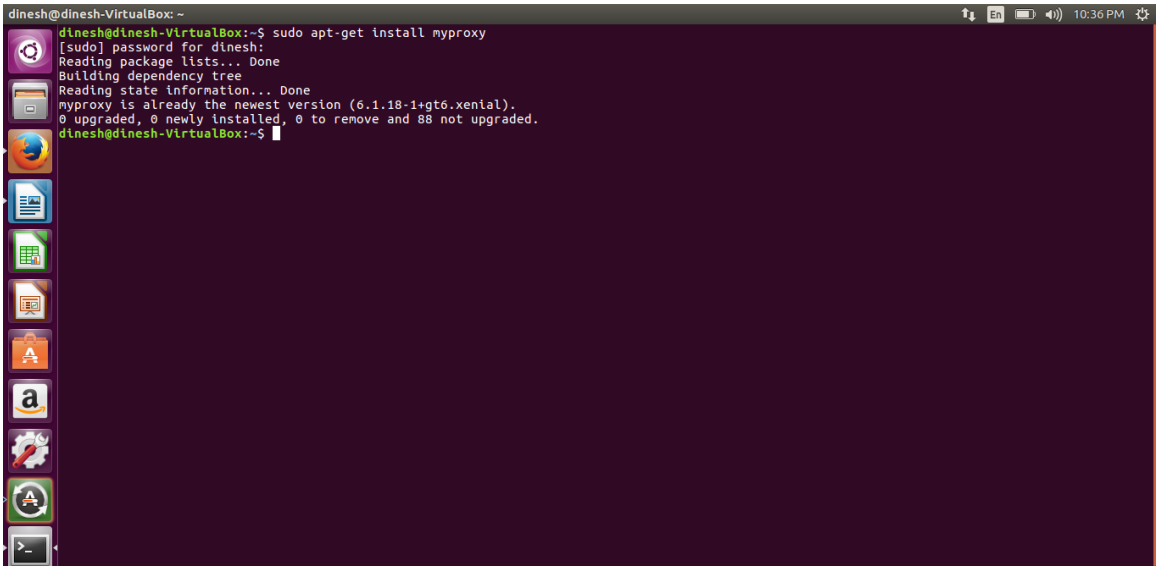
sudo apt-get install globus-resource-management-sdk

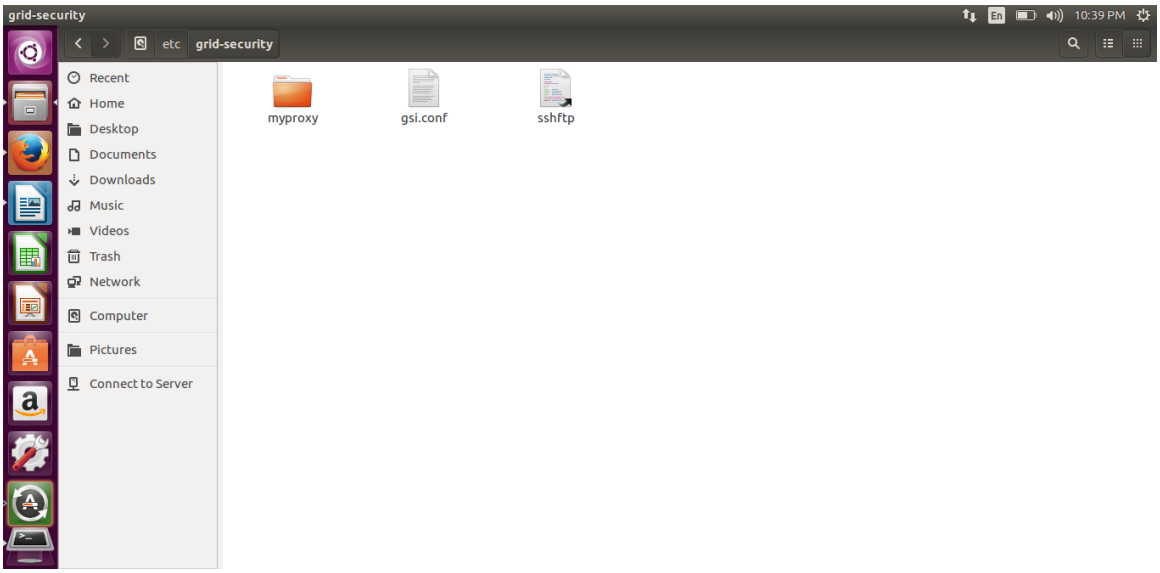
sudo apt-get install myproxy

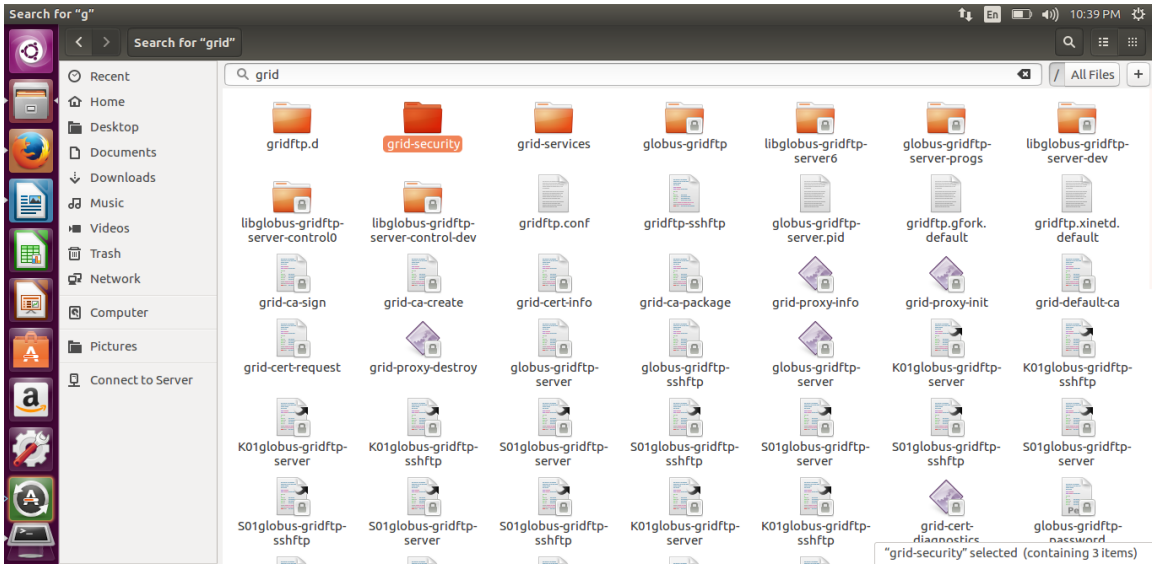
sudo apt-get install gsi-openssh

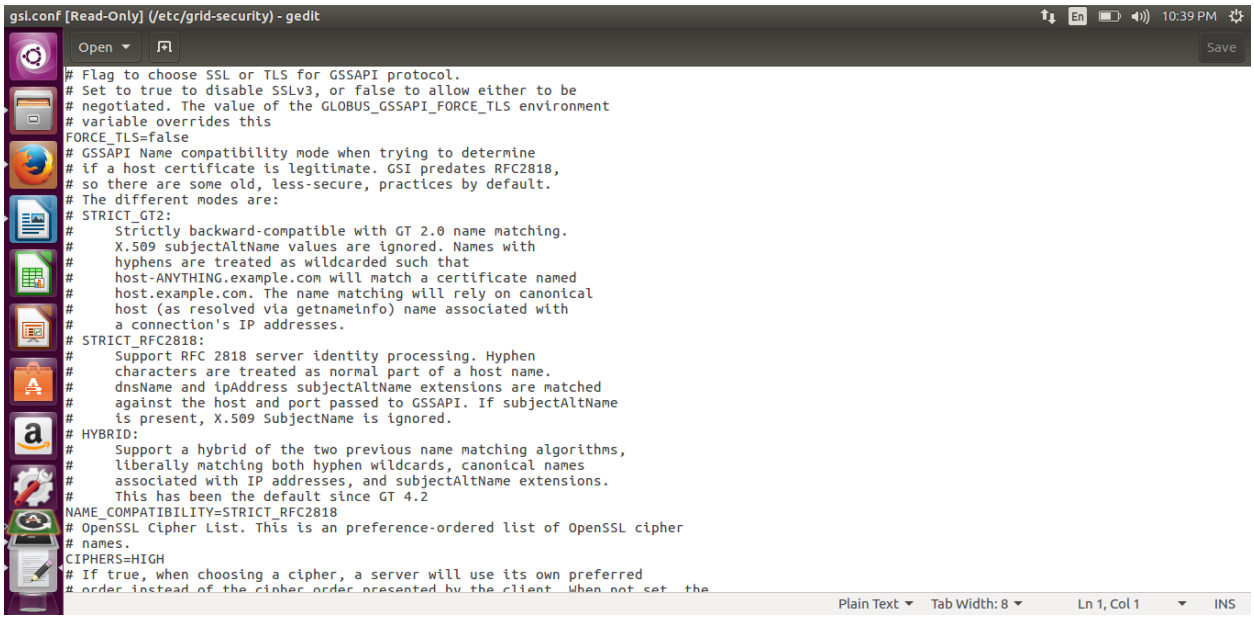
sudo apt-get install globus-gridftp globus-gram5 globus-gsimyproxymyproxy-server myproxy-admin

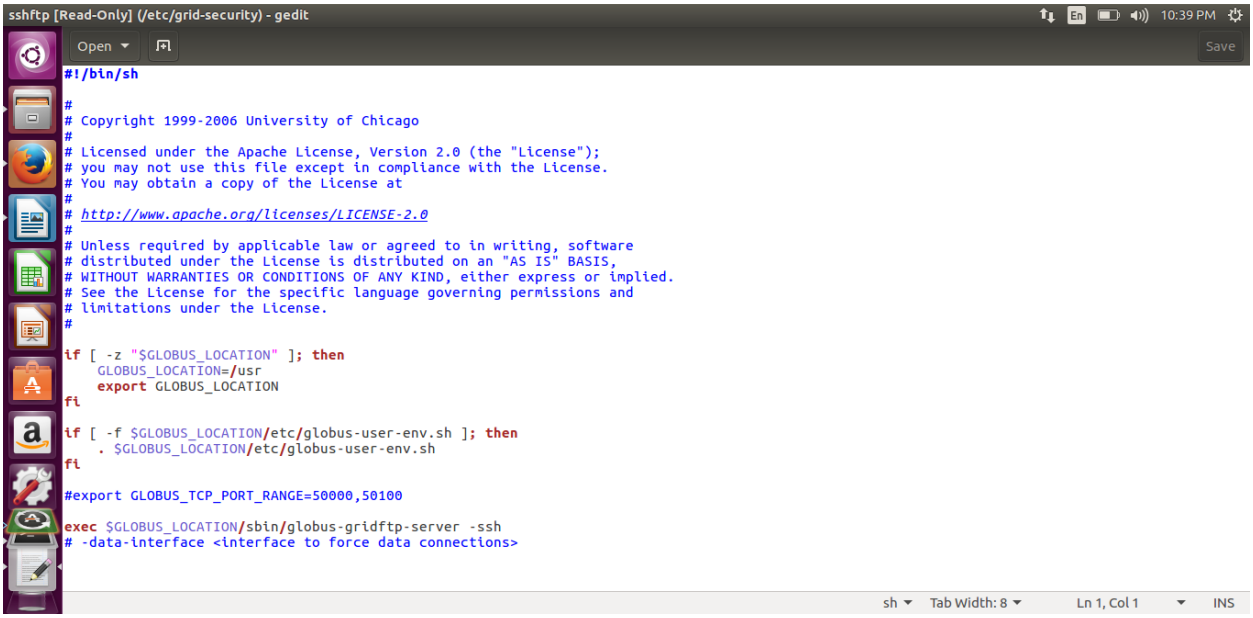
2. After installing like myproxy,gsi-openssh and Globus GRAM file
    a. Click the file→computer
    b. Then Search Grid security folder
    c. Then see the gsi.conf, sshftp.(This indicate the basic security mechanisms are configured)






Search for "g"
10:39 PM
Search for "grid"
grid
All Files
Recent
Home
Desktop
Documents
Downloads
Music
Videos
Trash
Network
Computer
Pictures
Connect to Server
gridftp.d
grid-security
grid-services
globus-gridftp
libglobus-gridftp-server6
globus-gridftp-server-progs
libglobus-gridftp-server-dev
libglobus-gridftp-server-control0
libglobus-gridftp-server-control-dev
gridftp.conf
gridftp-sshftp
globus-gridftp-server.pid
gridftp.gfork.default
gridftp.xinetd.default
grid-ca-sign
grid-ca-create
grid-cert-info
grid-ca-package
grid-proxy-info
grid-proxy-init
grid-default-ca
grid-cert-request
grid-proxy-destroy
globus-gridftp-server
globus-gridftp-sshftp
K01globus-gridftp-server
K01globus-gridftp-sshftp
S01globus-gridftp-server
S01globus-gridftp-sshftp
"grid-security" selected (containing 3 items)


gsi.conf [Read-Only] (/etc/grid-security) - gedit
10:39 PM
Open
Save
# Flag to choose SSL or TLS for GSSAPI protocol.
# Set to true to disable SSLv3, or false to allow either to be
# negotiated. The value of the GLOBUS_GSSAPI_FORCE_TLS environment
# variable overrides this
FORCE_TLS=false
# GSSAPI Name compatibility mode when trying to determine
# if a host certificate is legitimate. GSI predates RFC2818,
# so there are some old, less-secure, practices by default.
# The different modes are:
# STRICT_GT2:
#   Strictly backward-compatible with GT 2.0 name matching.
#   X.509 subjectAltName values are ignored. Names with
#   hyphens are treated as wildcarded such that
#   host-ANYTHING.example.com will match a certificate named
#   host.example.com. The name matching will rely on canonical
#   host (as resolved via getnameinfo) name associated with
#   a connection's IP addresses.
# STRICT_RFC2818:
#   Support RFC 2818 server identity processing. Hyphen
#   characters are treated as normal part of a host name.
#   dnsName and ipAddress subjectAltName extensions are matched
#   against the host and port passed to GSSAPI. If subjectAltName
#   is present, X.509 SubjectName is ignored.
# HYBRID:
#   Support a hybrid of the two previous name matching algorithms,
#   liberally matching both hyphen wildcards, canonical names
#   associated with IP addresses, and subjectAltName extensions.
#   This has been the default since GT 4.2
NAME_COMPATIBILITY=STRICT_RFC2818
# OpenSSL Cipher List. This is an preference-ordered list of OpenSSL cipher
# names.
CIPHERS=HIGH
# If true, when choosing a cipher, a server will use its own preferred
Plain Text
Tab Width: 8
Ln 1, Col 1
INS



APPLICATIONS:

Using authentications and authorization purpose for grid user.

RESULT:

Thus develop secured applications using basic security mechanisms available in Globus Toolkit is successfully executed.

Ex.No.6 Develop a Grid portal, where user can submit a job and get the result.
DATE: Implement it with and without GRAM concept

OBJECTIVE:

To develop a Grid portal, where user can submit a job and get the result and to implement it with and without GRAM concept.

PROCEDURE:

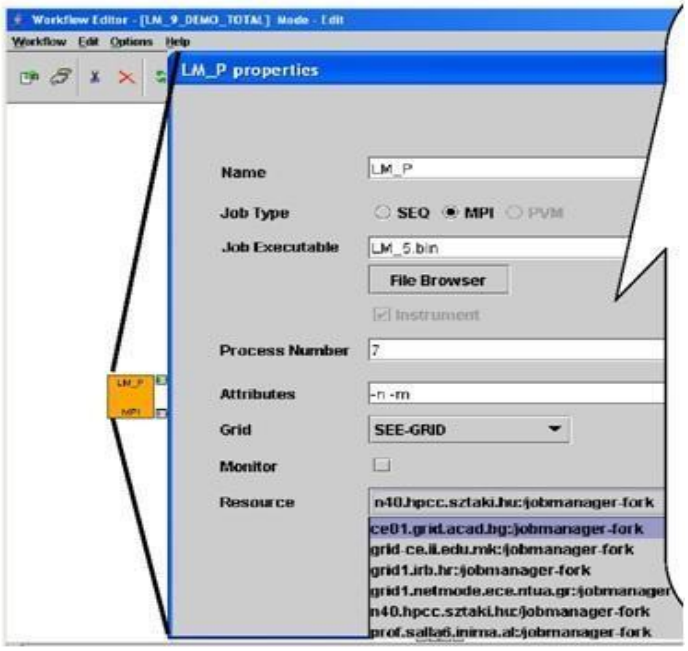
1. Opening the workflow editor

The editor is a Java Webstart application download and installation is only a click.

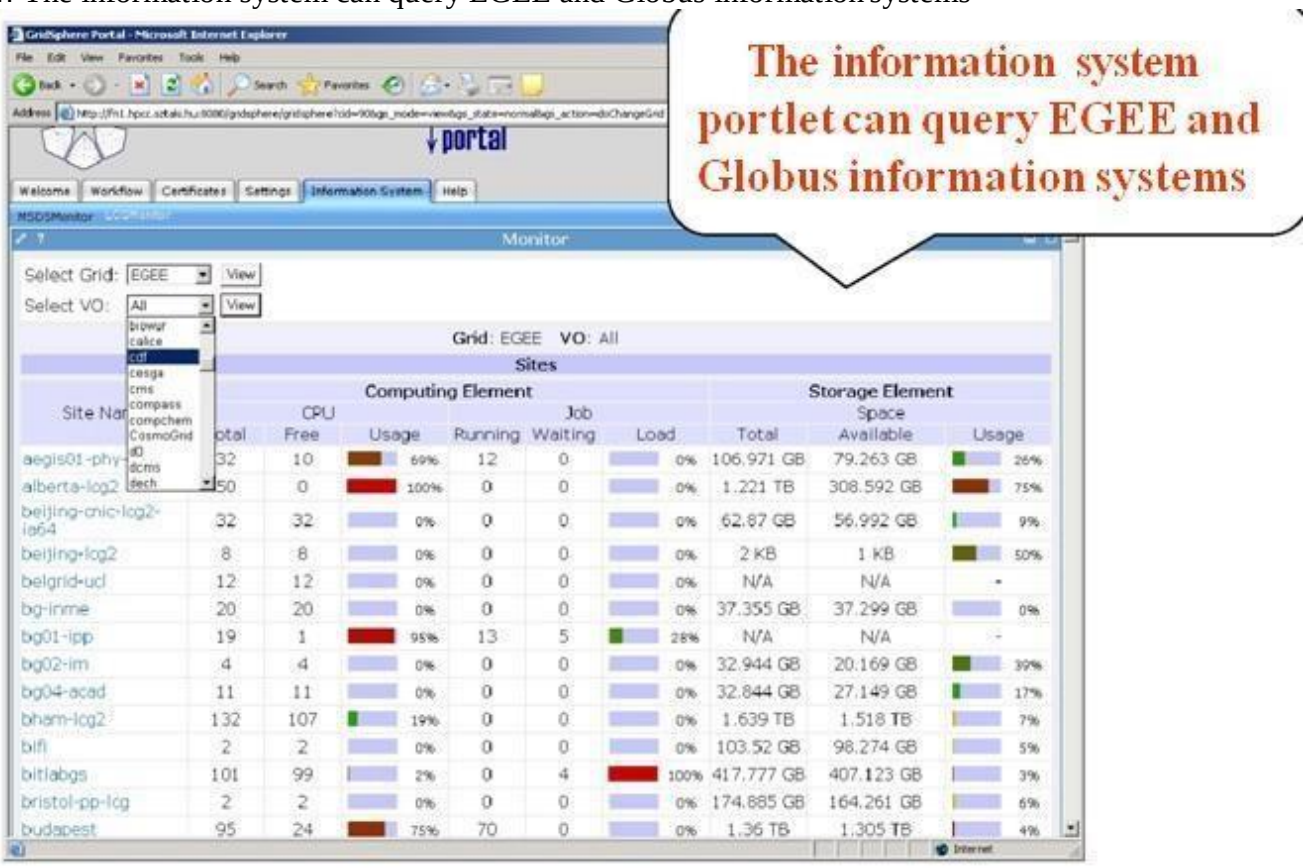
2. Java Webstart application

Download and install

3. Job property window:

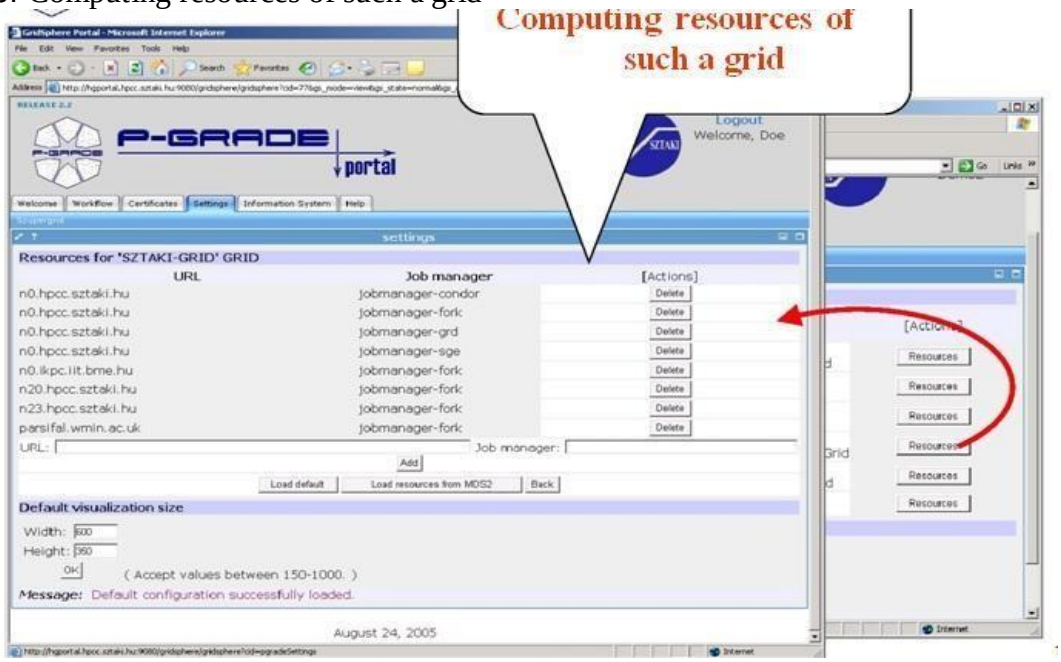


4. The information system can query EGEE and Globus information systems



5. List of available grids

6. Computing resources of such a grid

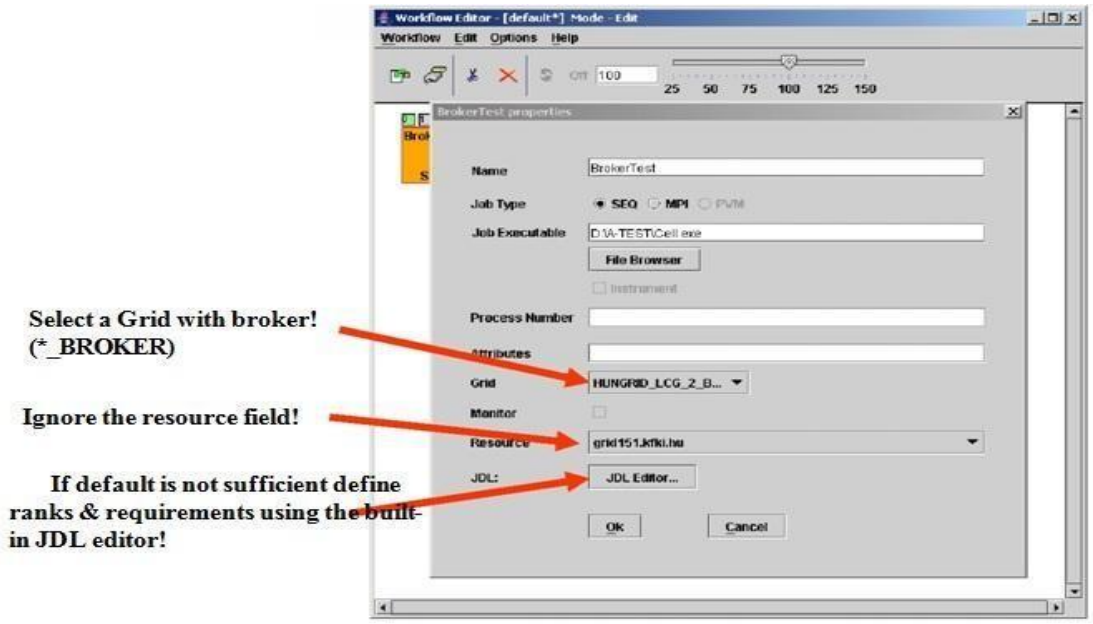


7. Broker resource selection

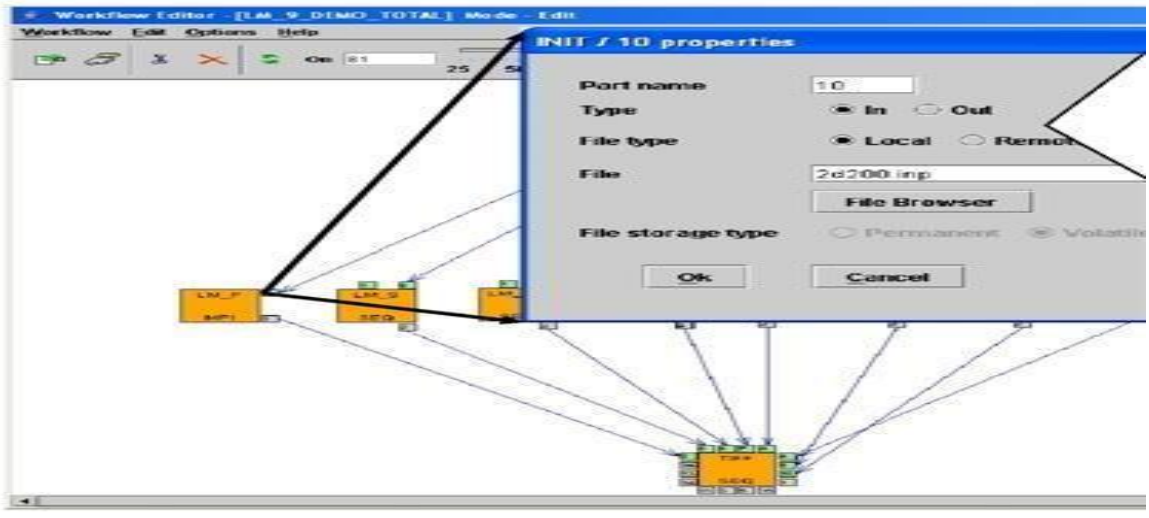
-> Select a Broker Grid for the job

-> Specify extra ranks and requirements for the job in Job description language.

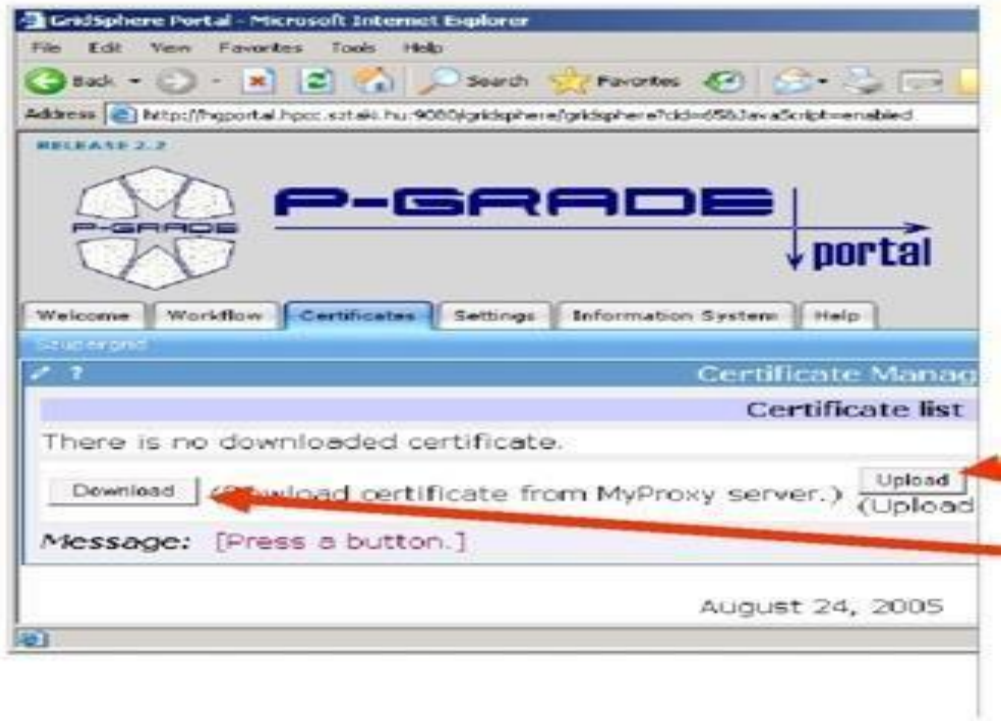
-> The broker will find the best resource for your job.



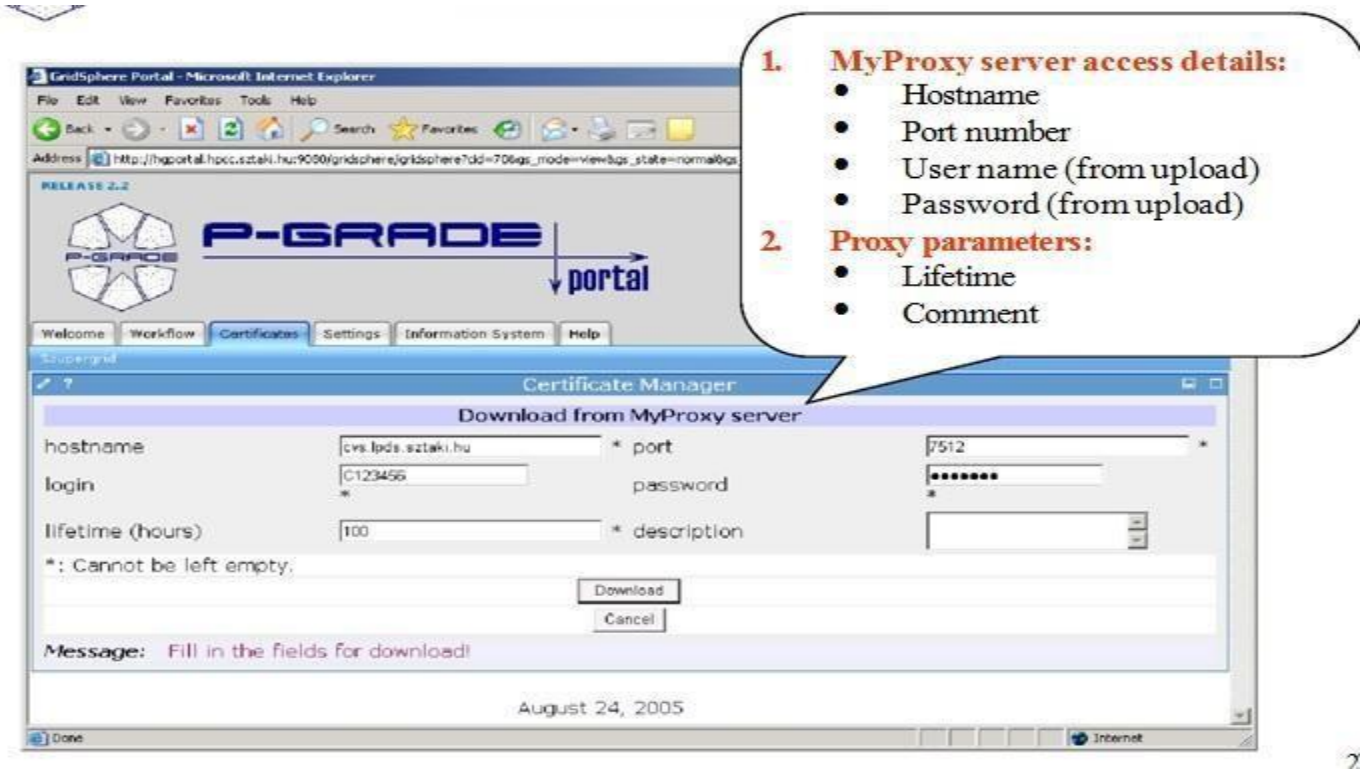
8. Defining input/output data for jobs File type
Input: required by the job Output:
produced by the job File location:
local: my desktop
remote: grid storage resource File name:
Unique name of the file File
storage type:
Permanent: final result of WF
Volatile: only used for inter-job data transfer



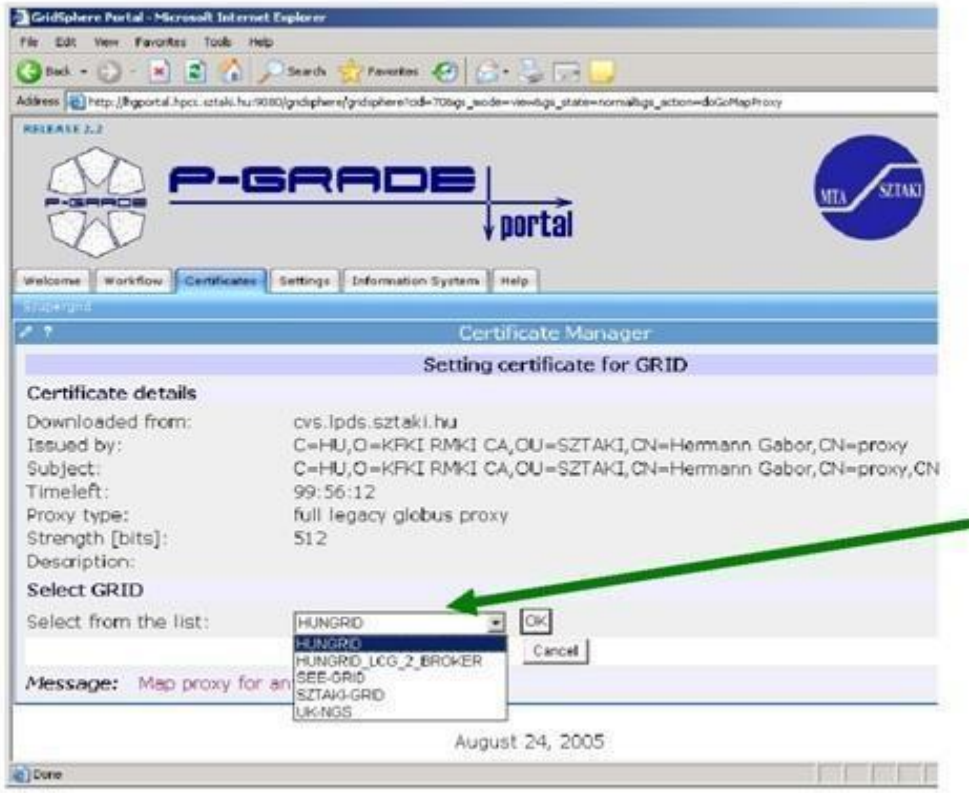
9. Executing workflows with the P-Grade portal Download proxies



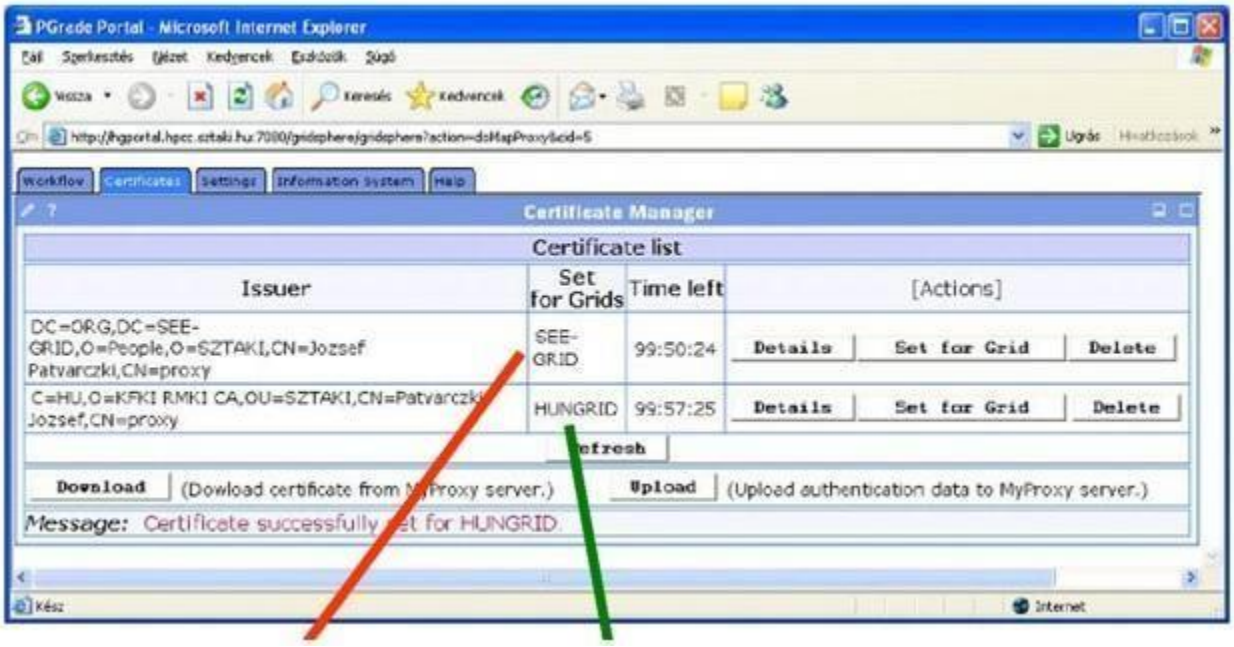
10. Downloading a proxy



11. Associating the proxy with a grid

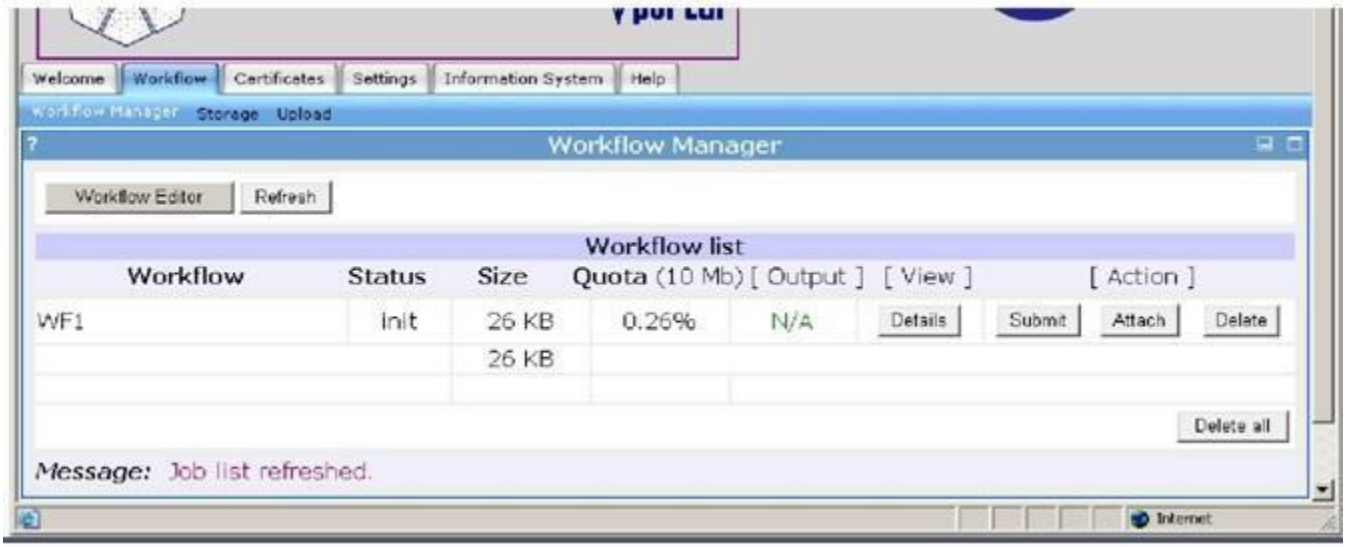


12. Browsing Proxies

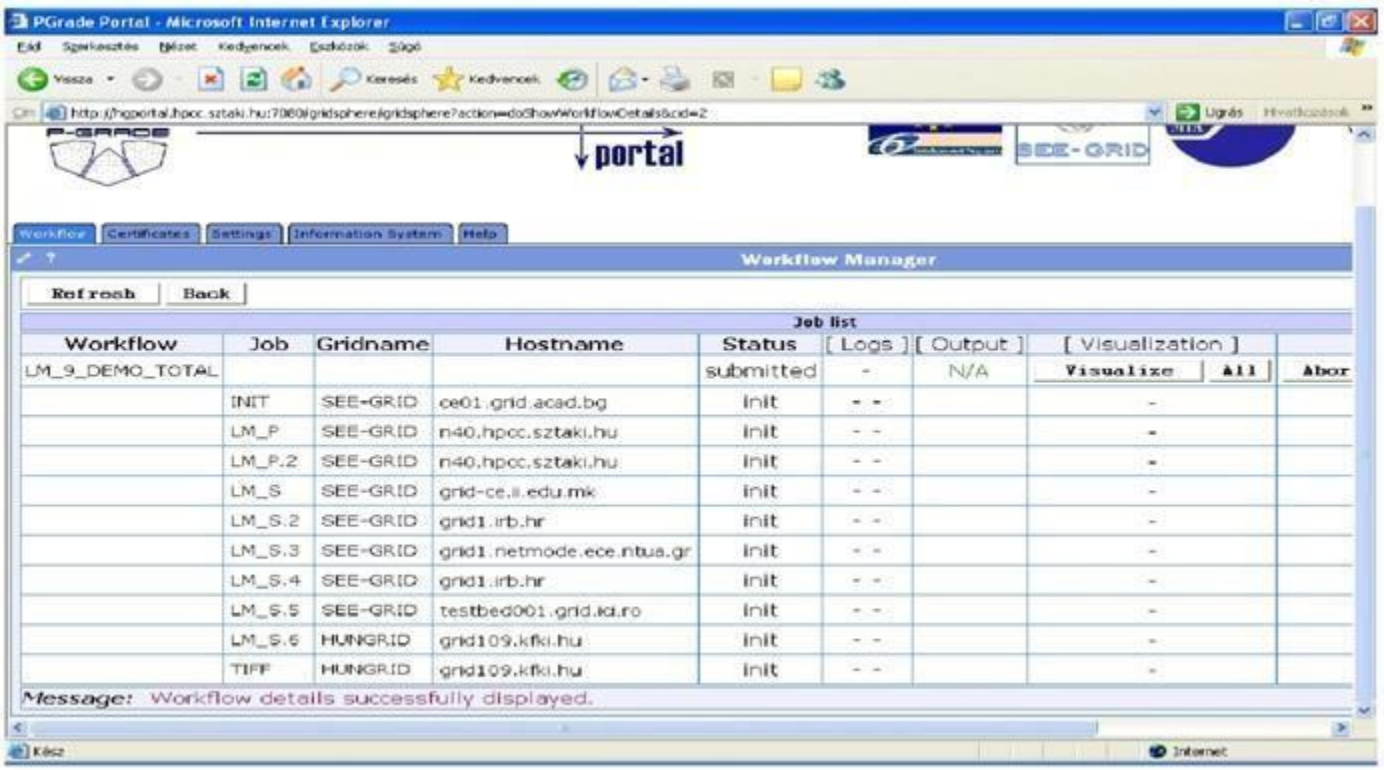


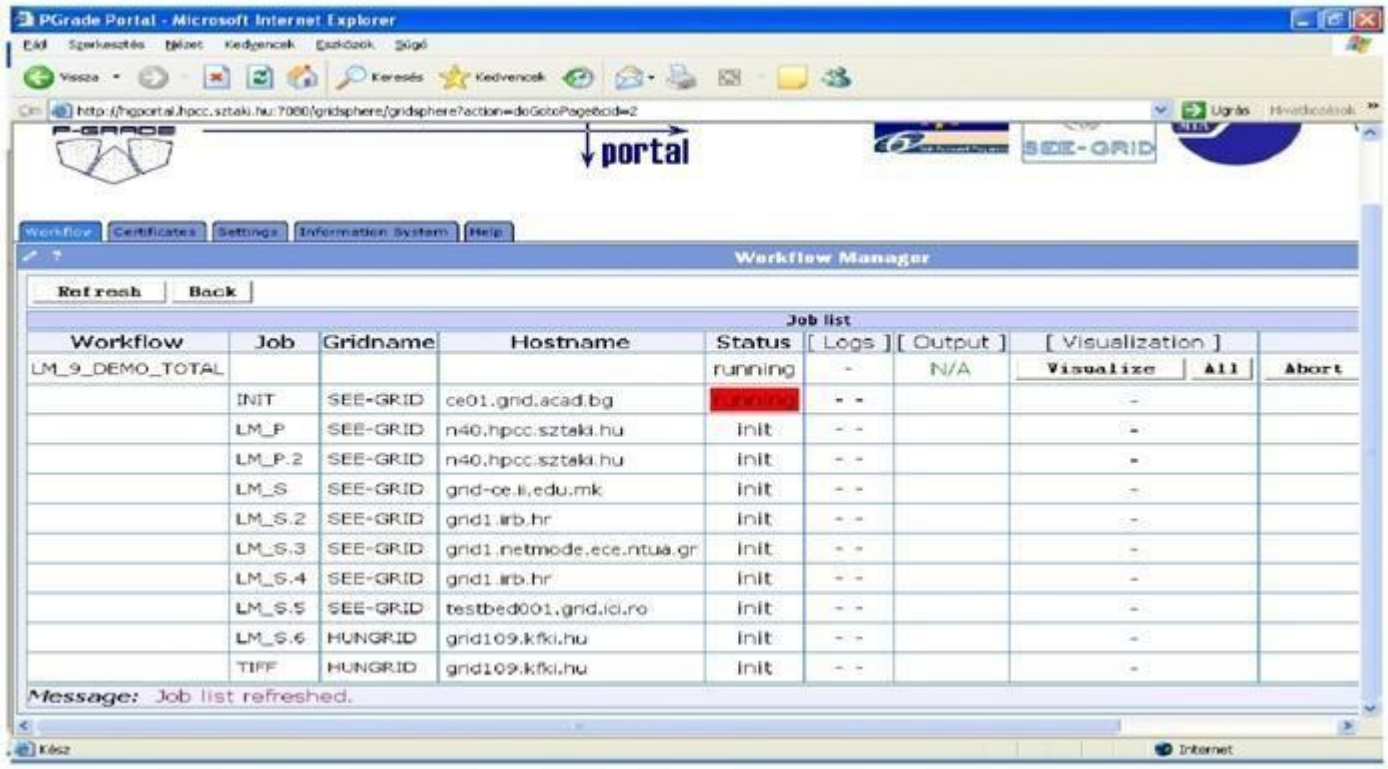
13. Workflow execution

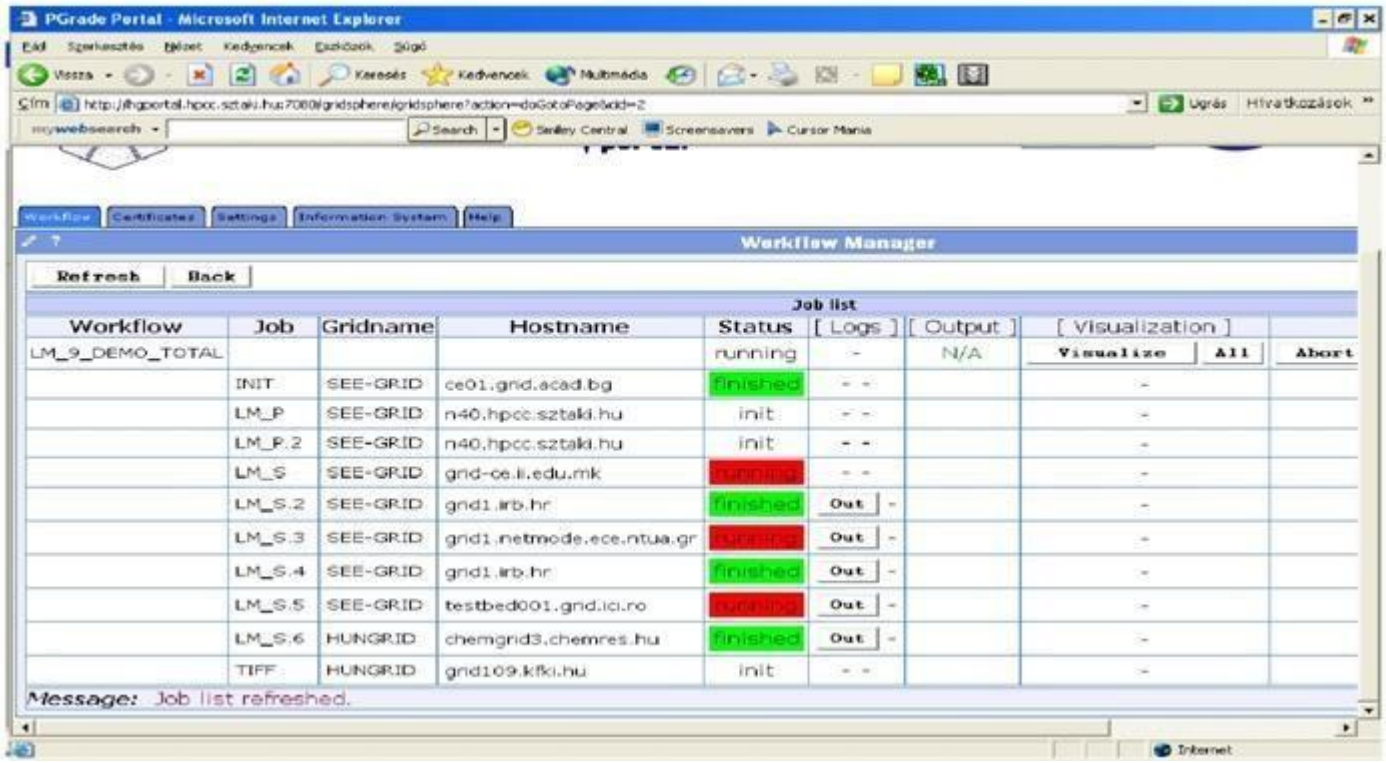
Workflow portlet

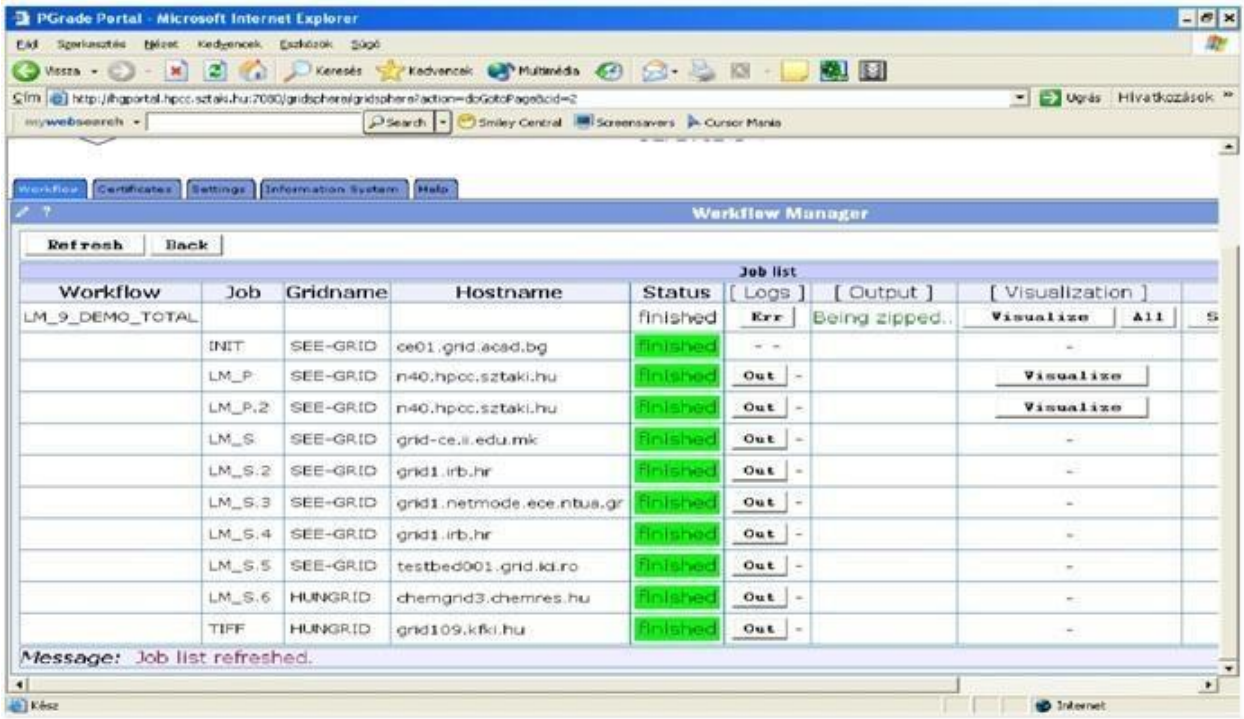


14. Observation by the workflow portlet


PGrade Portal - Microsoft Internet Explorer
portal
SEE-GRID
Workflow
Certificates
Settings
Information System
Help
Workflow Manager
Refresh
Back
Job list
Workflow | Job | Gridname | Hostname | Status | [Logs] | [Output] | [Visualization]
LM_9_DEMO_TOTAL | submitted | - | N/A | Visualize | All | Abor
INIT | SEE-GRID | ce01.grid.acad.bg | init
LM_P | SEE-GRID | n40.hpcc.sztaki.hu | init
LM_P.2 | SEE-GRID | n40.hpcc.sztaki.hu | init
LM_S | SEE-GRID | grid-ce.ii.edu.mk | init
LM_S.2 | SEE-GRID | grid1.irb.hr | init
LM_S.3 | SEE-GRID | grid1.netmode.ece.ntua.gr | init
LM_S.4 | SEE-GRID | grid1.irb.hr | init
LM_S.5 | SEE-GRID | testbed001.grid.ici.ro | init
LM_S.6 | HUNGRID | grid109.kfki.hu | init
TIFF | HUNGRID | grid109.kfki.hu | init
Message: Workflow details successfully displayed.


PGrade Portal - Microsoft Internet Explorer
portal
SEE-GRID
Workflow
Certificates
Settings
Information System
Help
Workflow Manager
Refresh
Back
Job list
Workflow | Job | Gridname | Hostname | Status | [Logs] | [Output] | [Visualization]
LM_9_DEMO_TOTAL | running | - | N/A | Visualize | All | Abort
INIT | SEE-GRID | ce01.grid.acad.bg | running
LM_P | SEE-GRID | n40.hpcc.sztaki.hu | init
LM_P.2 | SEE-GRID | n40.hpcc.sztaki.hu | init
LM_S | SEE-GRID | grid-ce.ii.edu.mk | init
LM_S.2 | SEE-GRID | grid1.irb.hr | init
LM_S.3 | SEE-GRID | grid1.netmode.ece.ntua.gr | init
LM_S.4 | SEE-GRID | grid1.irb.hr | init
LM_S.5 | SEE-GRID | testbed001.grid.ici.ro | init
LM_S.6 | HUNGRID | grid109.kfki.hu | init
TIFF | HUNGRID | grid109.kfki.hu | init
Message: Job list refreshed.


PGrade Portal - Microsoft Internet Explorer
Workflow Manager
Refresh
Back
Job list
Workflow | Job | Gridname | Hostname | Status | [Logs] | [Output] | [Visualization]
LM_9_DEMO_TOTAL | running | N/A | Visualize | All | Abort
INIT | SEE-GRID | ce01.grid.acad.bg | finished
LM_P | SEE-GRID | n40.hpcc.sztaki.hu | init
LM_P.2 | SEE-GRID | n40.hpcc.sztaki.hu | init
LM_S | SEE-GRID | grid-ce.ii.edu.mk
LM_S.2 | SEE-GRID | grid1.irb.hr | finished | Out
LM_S.3 | SEE-GRID | grid1.netmode.ece.ntua.gr | Out
LM_S.4 | SEE-GRID | grid1.irb.hr | finished | Out
LM_S.5 | SEE-GRID | testbed001.grid.ici.ro | Out
LM_S.6 | HUNGRID | chemgrid3.chemres.hu | finished | Out
TIFF | HUNGRID | grid109.kfki.hu | init
Message: Job list refreshed.


PGrade Portal - Microsoft Internet Explorer
Workflow Manager
Refresh
Back
Job list
Workflow | Job | Gridname | Hostname | Status | [Logs] | [Output] | [Visualization]
LM_9_DEMO_TOTAL | finished | Err | Being zipped.. | Visualize | All
INIT | SEE-GRID | ce01.grid.acad.bg | finished
LM_P | SEE-GRID | n40.hpcc.sztaki.hu | finished | Out | Visualize
LM_P.2 | SEE-GRID | n40.hpcc.sztaki.hu | finished | Out | Visualize
LM_S | SEE-GRID | grid-ce.ii.edu.mk | finished | Out
LM_S.2 | SEE-GRID | grid1.irb.hr | finished | Out
LM_S.3 | SEE-GRID | grid1.netmode.ece.ntua.gr | finished | Out
LM_S.4 | SEE-GRID | grid1.irb.hr | finished | Out
LM_S.5 | SEE-GRID | testbed001.grid.ici.ro | finished | Out
LM_S.6 | HUNGRID | chemgrid3.chemres.hu | finished | Out
TIFF | HUNGRID | grid109.kfki.hu | finished | Out
Message: Job list refreshed.

15. Downloading the results

APPLICATIONS:

Using the portal to access the grid resources and jobs.

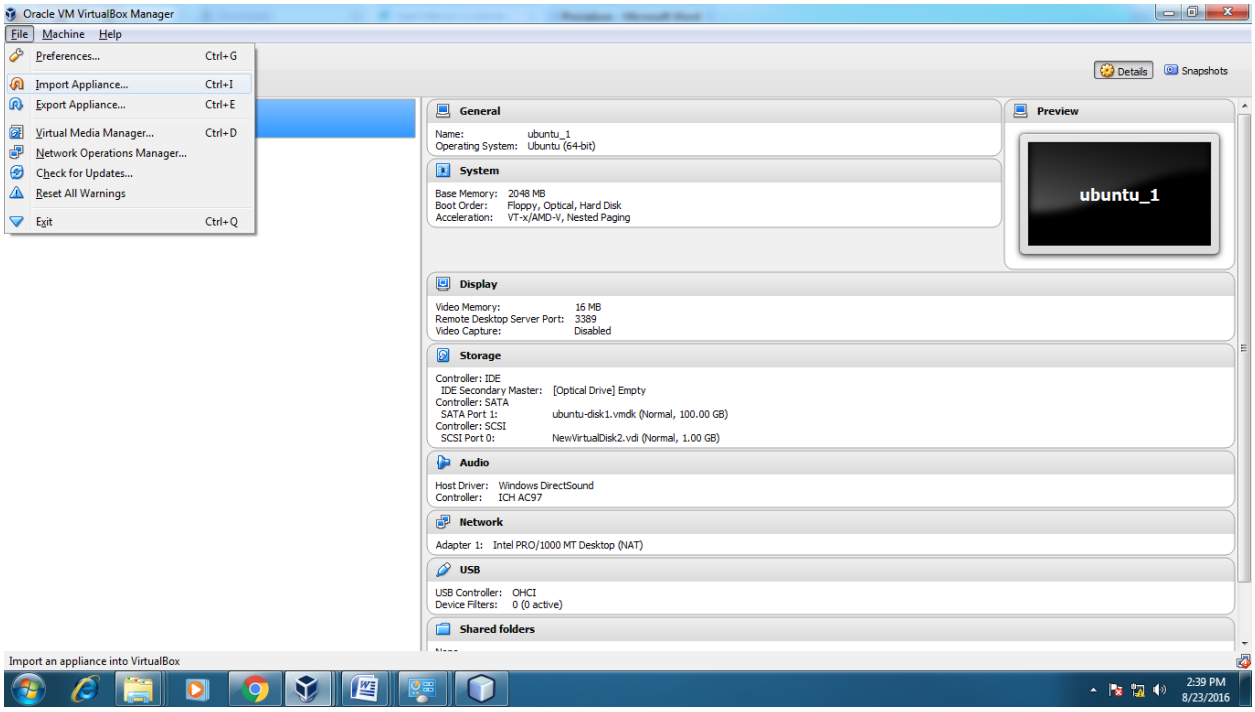
RESULT:

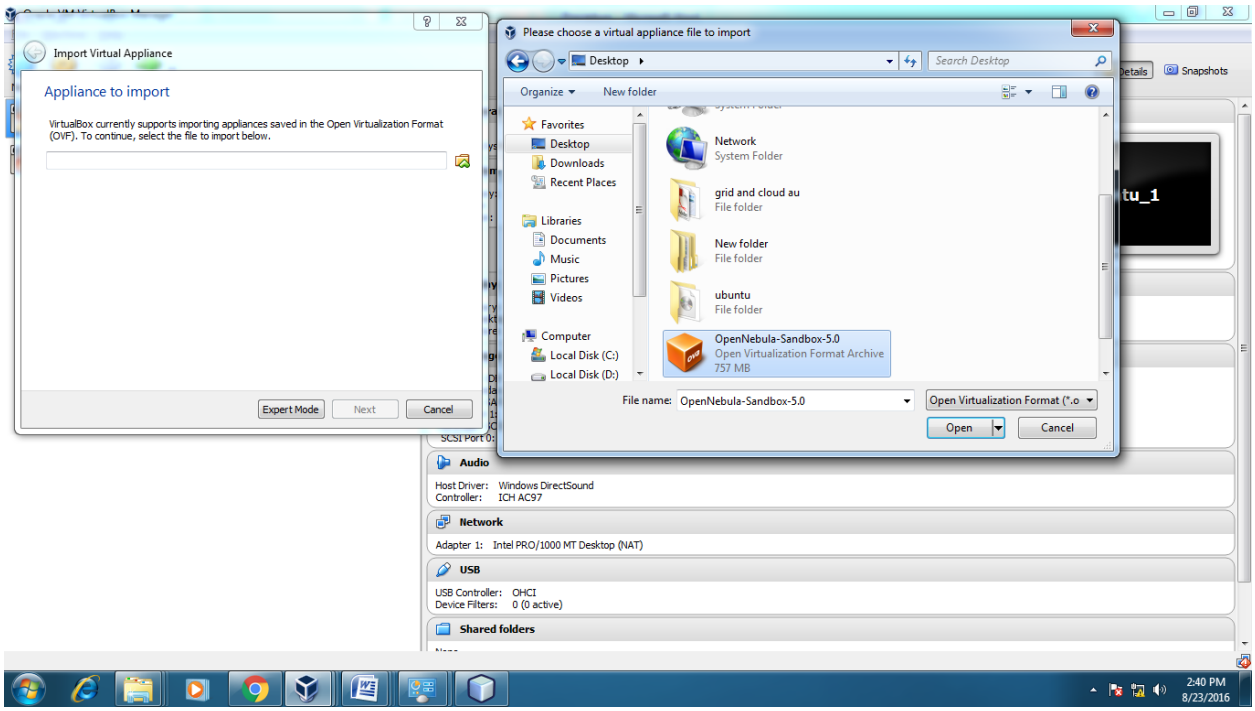
Thus the development of a Grid portal, where user can submit a job and get the result and to implement it with and without GRAM is executed successfully.

CLOUD COMPUTING LAB

Open nebula sandbox:

1. Open Virtual box
2. File →import Appliance
3. Browse OpenNebula-Sandbox-5.0.ova file
4. Then go to setting, select Usb and choose USB 1.1
5. Then Start the Open Nebula
6. Login using username: root, password:opennebula




Import Virtual Appliance
Appliance to import
VirtualBox currently supports importing appliances saved in the Open Virtualization Format (OVF). To continue, select the file to import below.
Expert Mode
Next
Cancel
Please choose a virtual appliance file to import
Desktop
Search Desktop
Organize
New folder
Favorites
Desktop
Downloads
Recent Places
Libraries
Documents
Music
Pictures
Videos
Computer
Local Disk (C:)
Local Disk (D:)
Network
System Folder
grid and cloud au
File folder
New folder
File folder
ubuntu
File folder
OpenNebula-Sandbox-5.0
Open Virtualization Format Archive
757 MB
File name: OpenNebula-Sandbox-5.0
Open Virtualization Format (*.o
Open
Cancel
Audio
Host Driver: Windows DirectSound
Controller: ICH AC97
Network
Adapter 1: Intel PRO/1000 MT Desktop (NAT)
USB
USB Controller: OHCI
Device Filters: 0 (0 active)
Shared folders
Details
Snapshots
tu_1
2:40 PM
8/23/2016

EX.NO.1 **Find procedure to run the virtual machine of different configuration.**
DATE: **Check how many virtual machines can be utilized at particular time.**

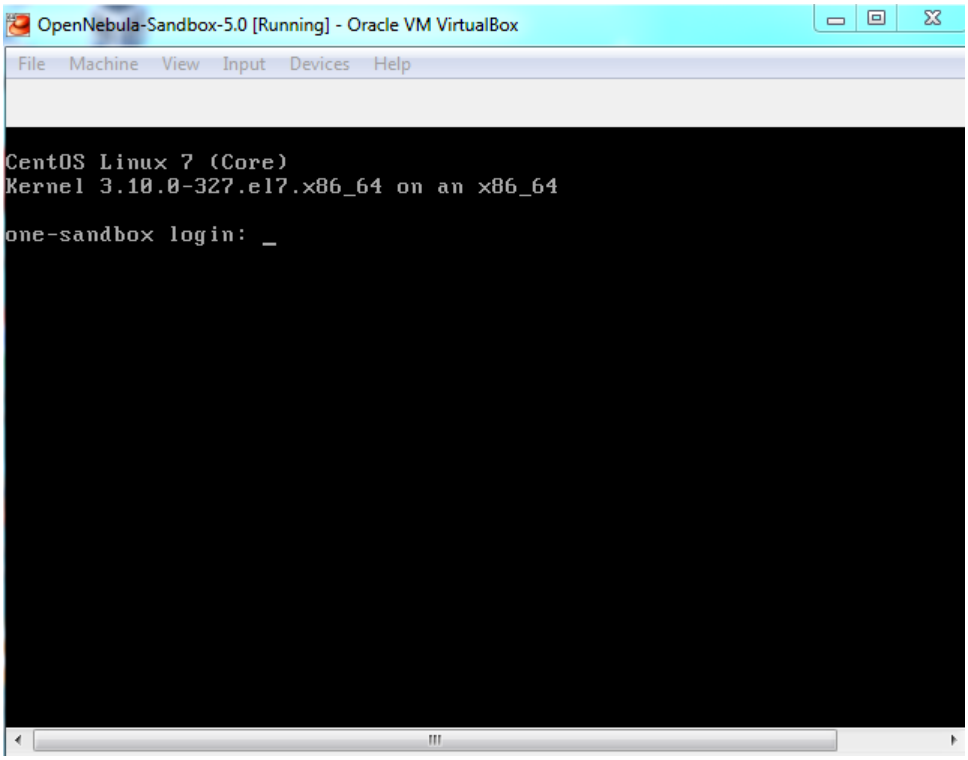
OBJECTIVE:

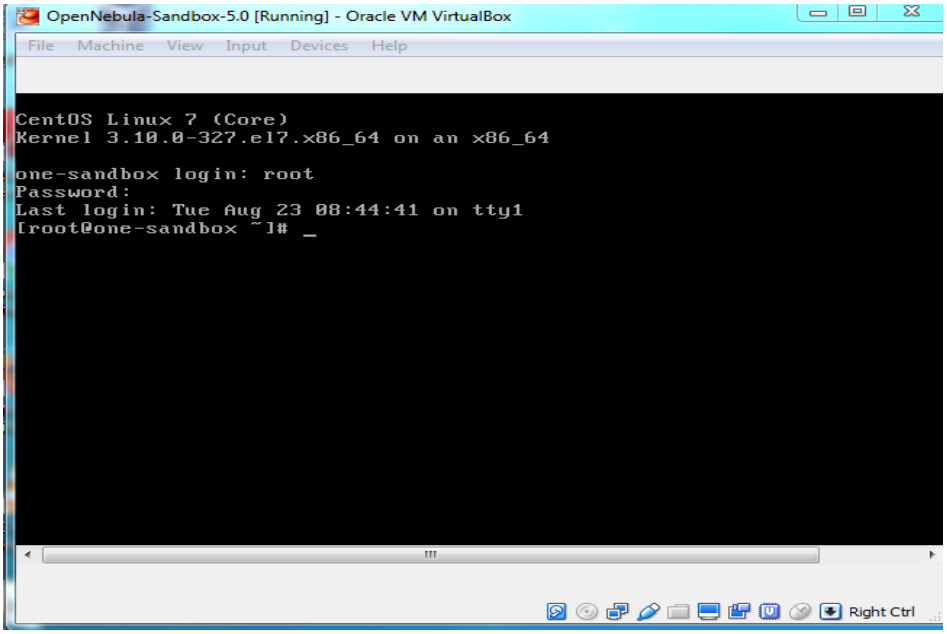
To run the virtual machine of different configuration. Check how manyvirtual machines can be utilized at particular time.

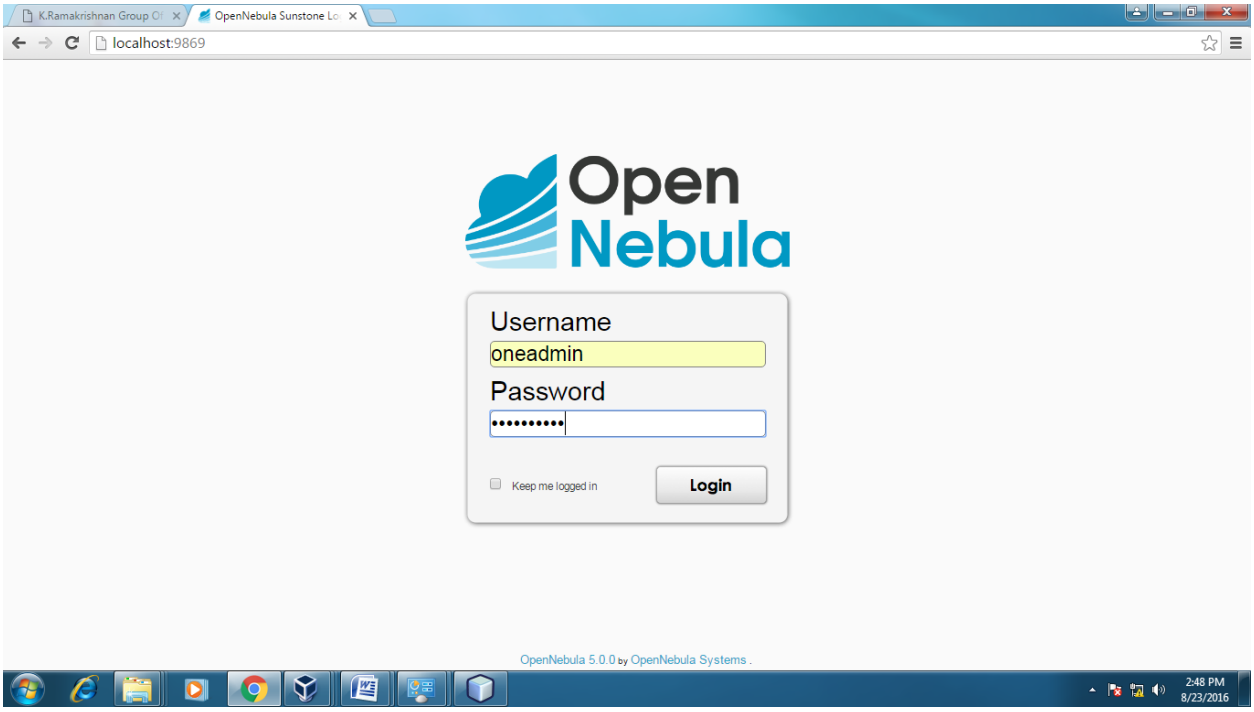
PROCEDURE:

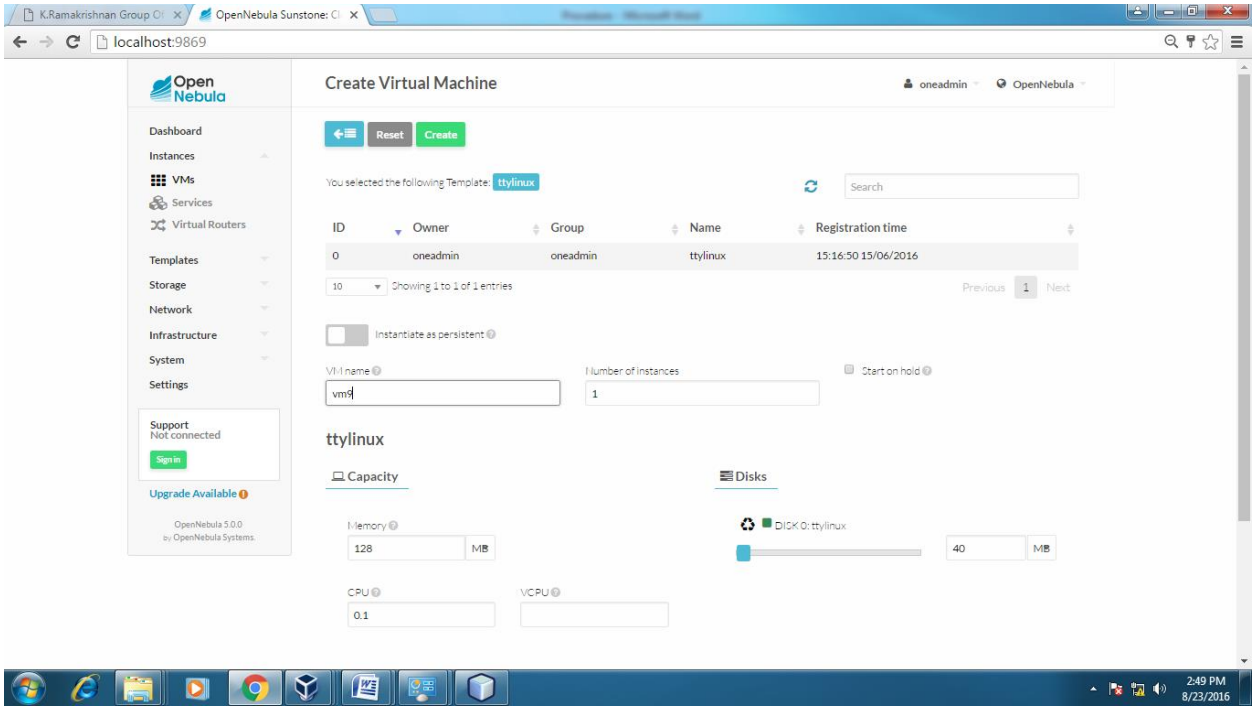
Steps

1. Open Browser, type localhost:9869
2. Login using username: oneadmin, password: opennebula
3. Click on instances, select VMs then follow the steps to create Virtaul machine
    a. Expand the + symbol
    b. Select user oneadmin
    c. Then enter the VM name,no.of instance, cpu.
    d. Then click on create button.
    e. Repeat the steps the C,D for creating more than one VMs.




OpenNebula-Sandbox-5.0 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
CentOS Linux 7 (Core)
Kernel 3.10.0-327.el7.x86_64 on an x86_64
one-sandbox login: root
Password:
Last login: Tue Aug 23 08:44:41 on tty1
[root@one-sandbox ~]# _
Right Ctrl


localhost:9869
Open Nebula
Username
oneadmin
Password
Keep me logged in
Login
OpenNebula 5.0.0 by OpenNebula Systems .
2:48 PM
8/23/2016



APPLICATIONS:

There are various applications of cloud computing in today's network world. Many search engines and social websites are using the concept of cloud computing like www.amazon.com, hotmail.com, facebook.com, linkedln.com etc. the advantages of cloud computing in context to scalability is like reduced risk , low cost testing ,ability to segment the customer base and auto-scaling based on application load.

RESULT:

Thus the procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time is successfully executed.

EX.NO.2 Find procedure to attach virtual block to the virtual machine and check
DATE: whether it holds the data even after the release of the virtual machine.

OBJECTIVE:

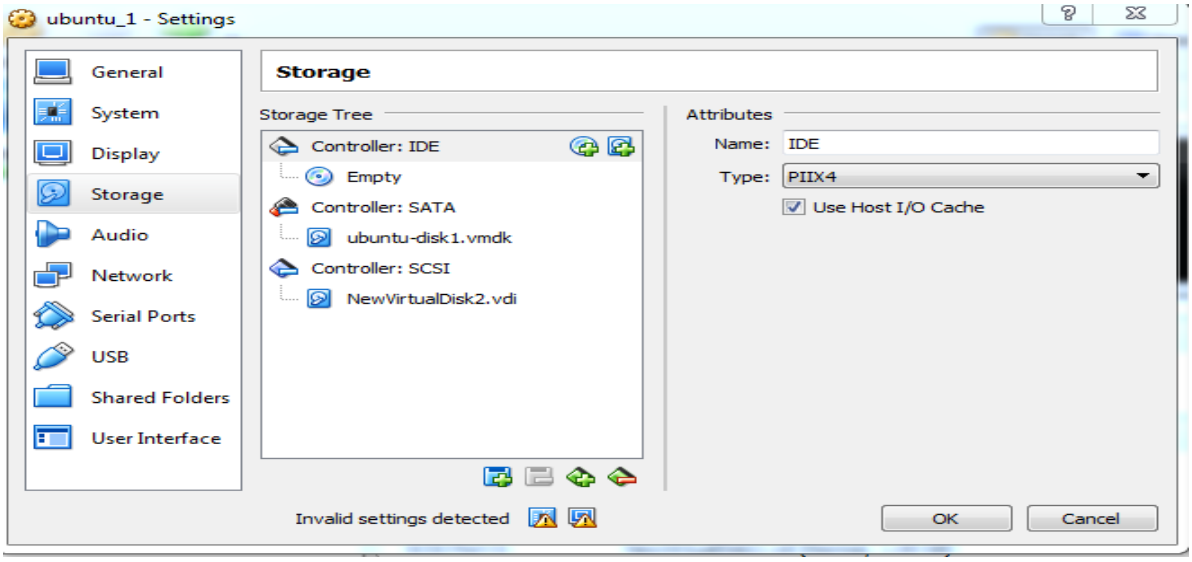
To attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.

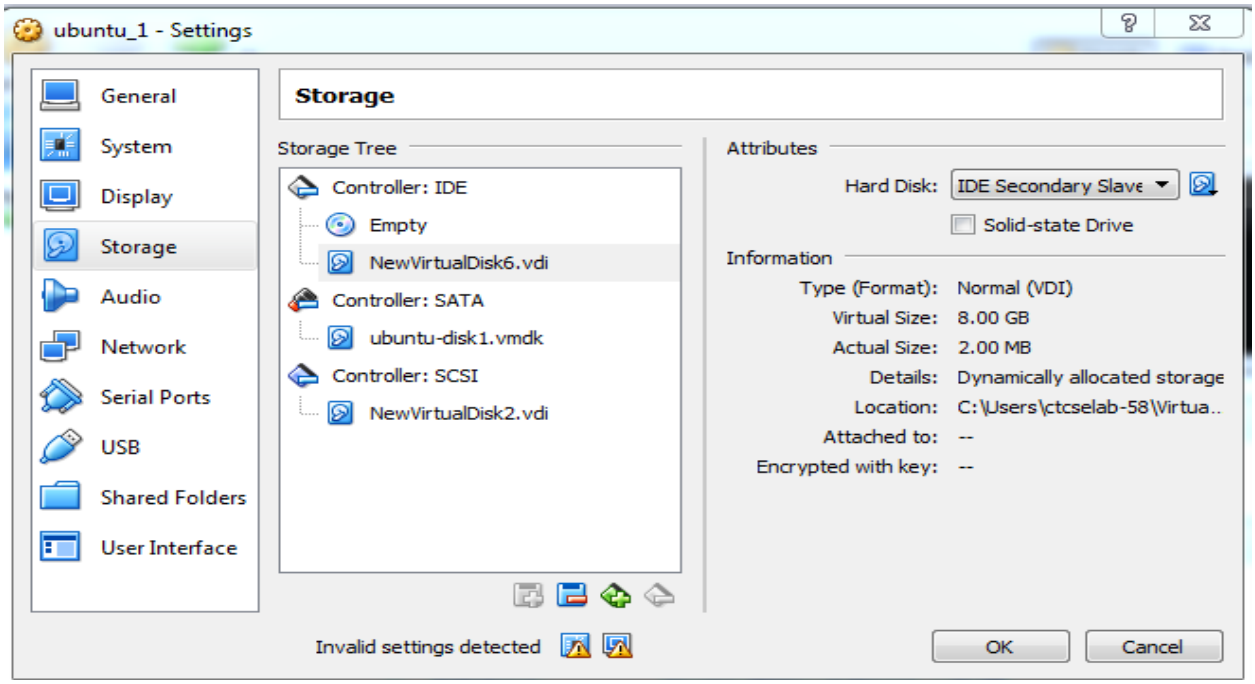
PROCEDURE:

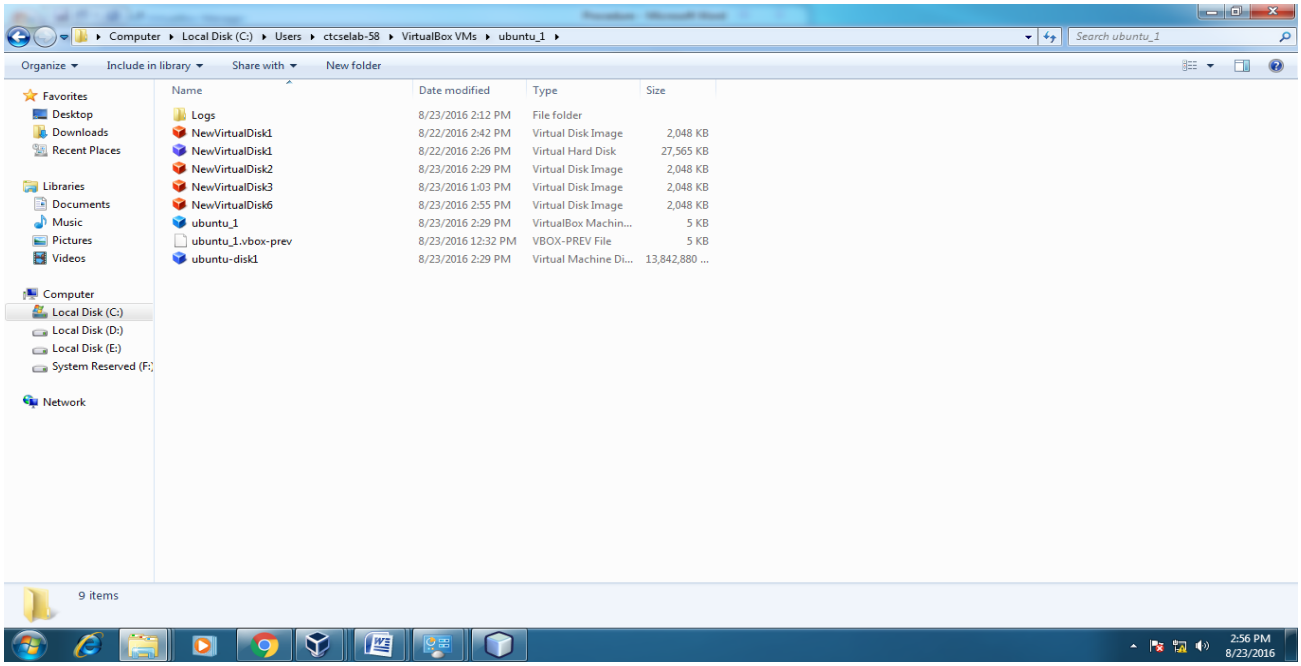
Steps:

Method 1:

1. Open the virtual box
2. Power off the VM which you want to add virtual box
3. Then right click on that VM,select setting
4. Then click on storage,find controller IDE .
5. In the top right find add hard disk icon, the pop up window display
6. On that window select create new disk, and then click next and next then finish.
7. Then find attributes icon ,hard disk as IDE secondary slave.

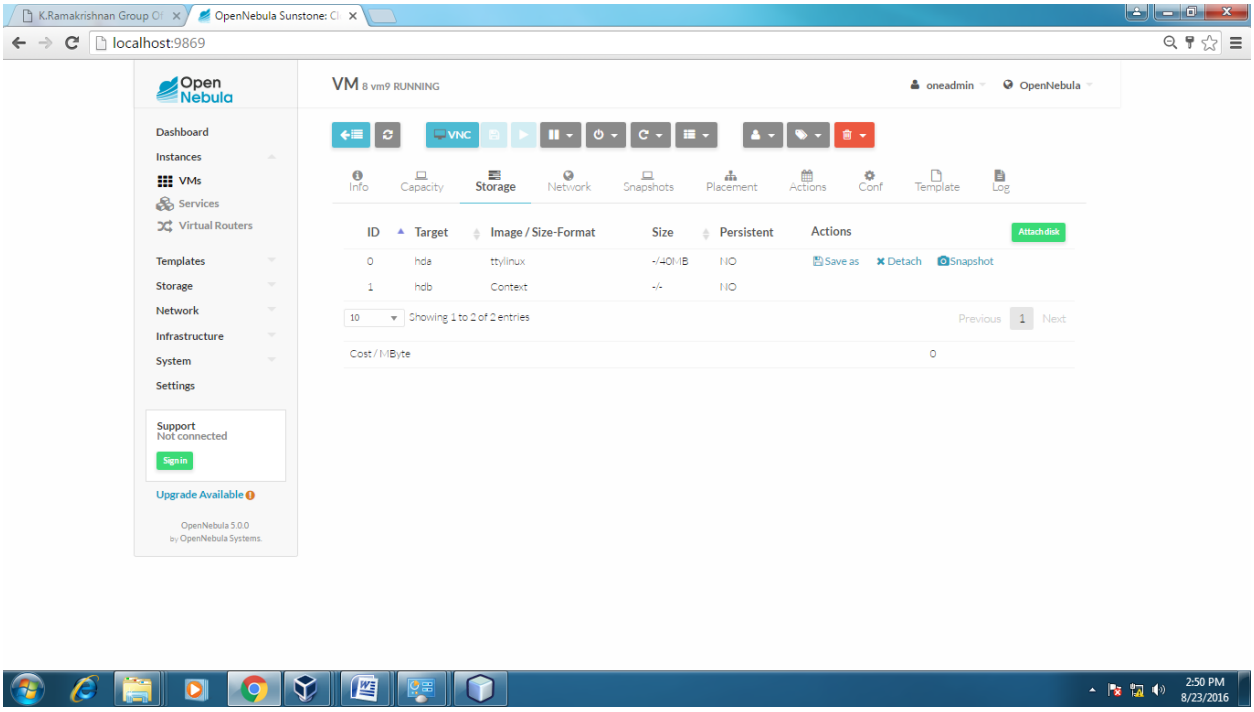


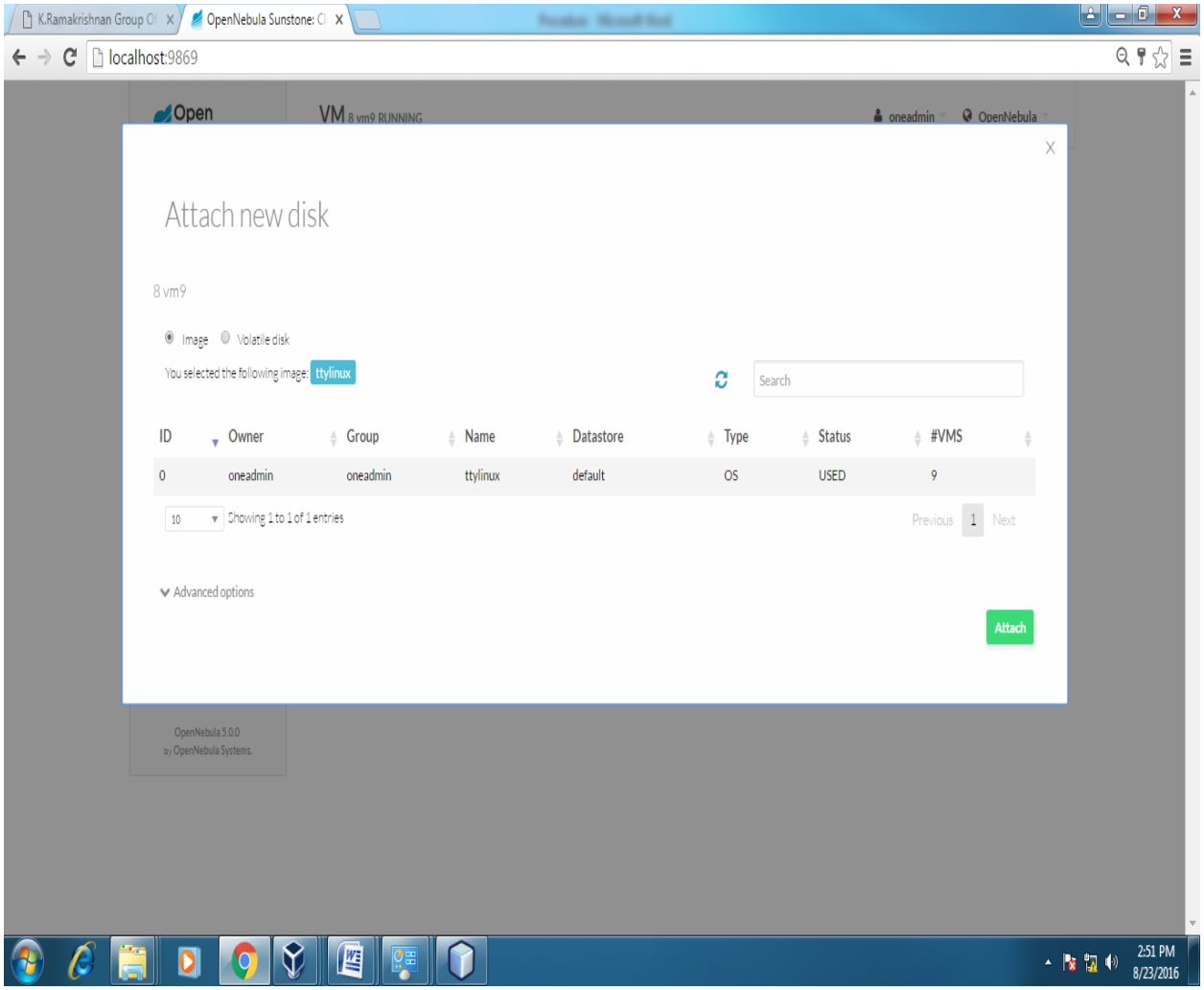

ubuntu_1 - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
Storage
Storage Tree
Controller: IDE
Empty
NewVirtualDisk6.vdi
Controller: SATA
ubuntu-disk1.vmdk
Controller: SCSI
NewVirtualDisk2.vdi
Attributes
Hard Disk:
IDE Secondary Slave
Solid-state Drive
Information
Type (Format): Normal (VDI)
Virtual Size: 8.00 GB
Actual Size: 2.00 MB
Details: Dynamically allocated storage
Location: C:\Users\ctcselab-58\Virtua..
Attached to: --
Encrypted with key: --
Invalid settings detected
OK
Cancel


Computer ▸ Local Disk (C:) ▸ Users ▸ ctcselab-58 ▸ VirtualBox VMs ▸ ubuntu_1 ▸
Search ubuntu_1
Organize
Include in library
Share with
New folder
Favorites
Desktop
Downloads
Recent Places
Libraries
Documents
Music
Pictures
Videos
Computer
Local Disk (C:)
Local Disk (D:)
Local Disk (E:)
System Reserved (F:)
Network
Name
Date modified
Type
Size
Logs 8/23/2016 2:12 PM File folder
NewVirtualDisk1 8/22/2016 2:42 PM Virtual Disk Image 2,048 KB
NewVirtualDisk1 8/22/2016 2:26 PM Virtual Hard Disk 27,565 KB
NewVirtualDisk2 8/23/2016 2:29 PM Virtual Disk Image 2,048 KB
NewVirtualDisk3 8/23/2016 1:03 PM Virtual Disk Image 2,048 KB
NewVirtualDisk6 8/23/2016 2:55 PM Virtual Disk Image 2,048 KB
ubuntu_1 8/23/2016 2:29 PM VirtualBox Machin... 5 KB
ubuntu_1.vbox-prev 8/23/2016 12:32 PM VBOX-PREV File 5 KB
ubuntu-disk1 8/23/2016 2:29 PM Virtual Machine Di... 13,842,880 ...
9 items
2:56 PM
8/23/2016

Method 2:

1. Open Browser, type localhost:9869
2. Login using username: oneadmin, password: opennebula
3. Click on instances, select VMs then follow the steps to add virtual block
    a. Select any one VM from the list and power off the VM
    b. Then click on that VM ,find the storage tab then click on that
    c. Then find the attach disk button
    d. Click on that button ,the new pop window display
    e. On that window select either image or volatile disk
    f. Click on attach button.





APPLICATIONS:

There are various applications of cloud computing in today's network world. Many search engines and social websites are using the concept of cloud computing like www.amazon.com, hotmail.com, facebook.com, linkedln.com etc. the advantages of cloud computing in context to scalability is like reduced risk , low cost testing ,ability to segment the customer base and auto-scaling based on application load.

RESULT:

Thus the procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine is successfully executed.

EX.NO.3 Install a C compiler in the virtual machine and execute a sample program.
DATE: (Working on ubuntu-gt6)

OBJECTIVE:

Install a C compiler in the virtual machine and execute a sample program.

PROCEDURE:

Steps:

1. Install the virtual box on windows platform.
2. Now Run a virtual box and create new virtual machine by selecting New and give the virtual machine name then choose Ubuntu16.04.ISO file.
3. Now start the virtual machine Ubuntu16.04 then open a Terminal by press Ctrl+Alt+t
4. To Install Gcc Or G++ Compiler, Type the following command in the terminal
   sudo apt-get install build-essential

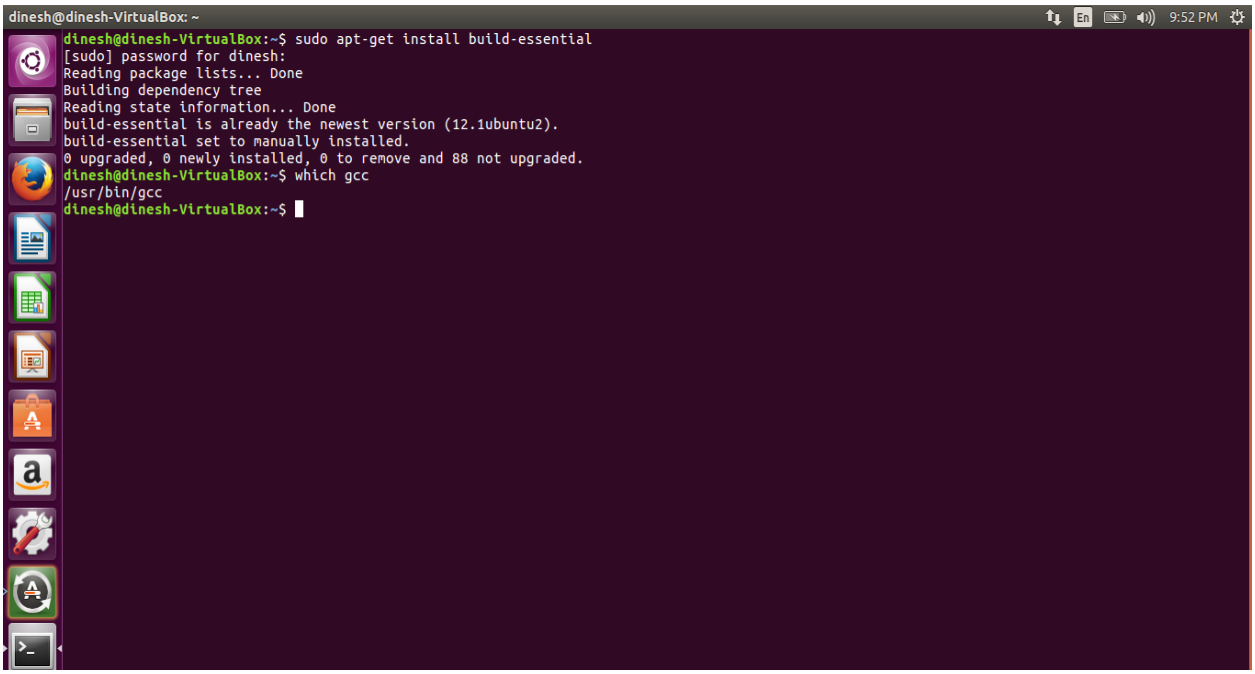
5. heck the information about your compiler that where it is installed, type the following command in the terminal

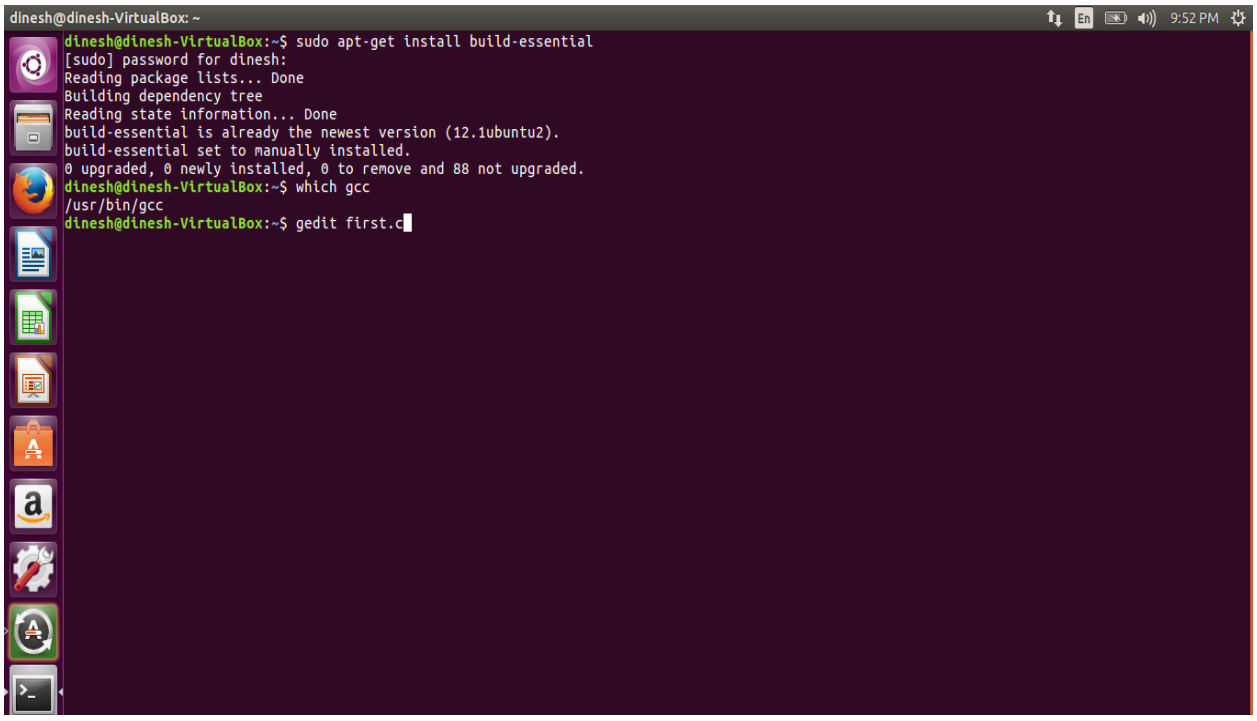
   whichgccor**whereisgcc**

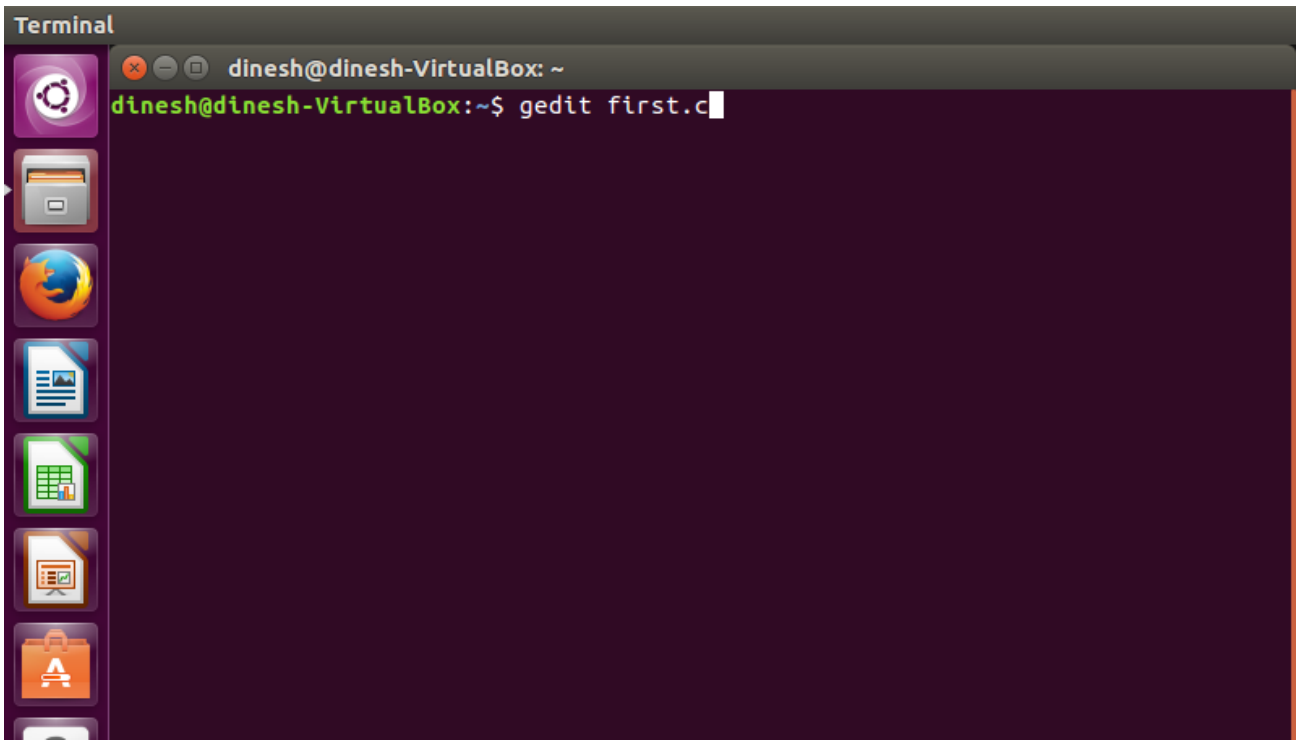
6. Then open the terminal and type gedithello.c
7. Type the C program and to Run the program type the following command in terminal

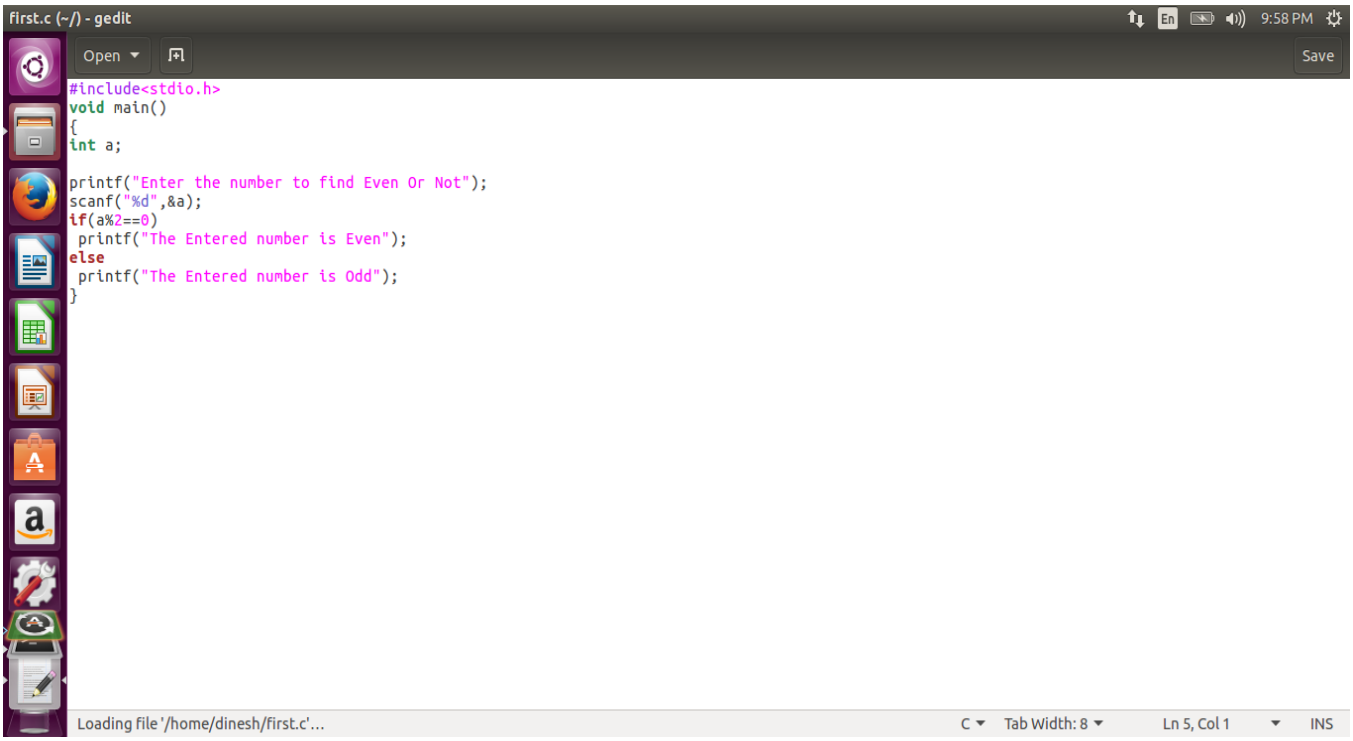
   gcchello.c

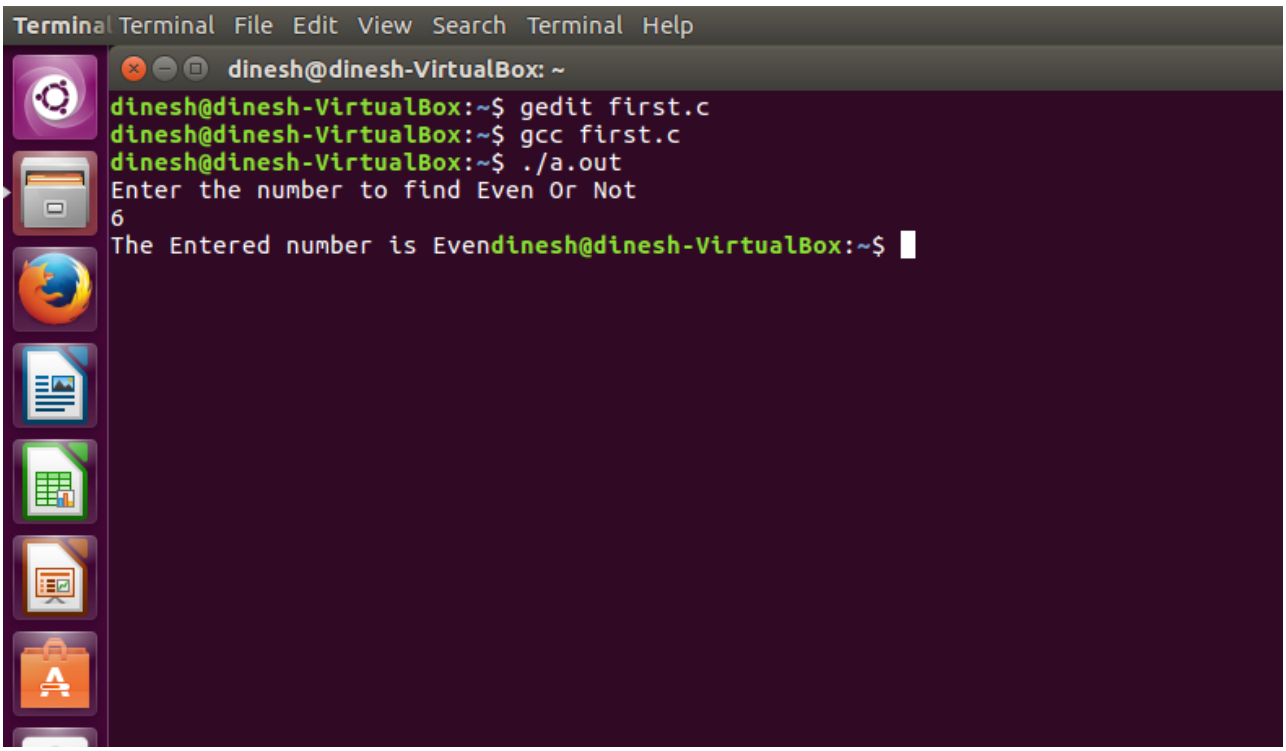
   ./a.out


dinesh@dinesh-VirtualBox: ~
9:52 PM
dinesh@dinesh-VirtualBox:~$ sudo apt-get install build-essential
[sudo] password for dinesh:
Reading package lists... Done
Building dependency tree
Reading state information... Done
build-essential is already the newest version (12.1ubuntu2).
build-essential set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 88 not upgraded.
dinesh@dinesh-VirtualBox:~$ which gcc
/usr/bin/gcc
dinesh@dinesh-VirtualBox:~$


dinesh@dinesh-VirtualBox: ~
9:52 PM
dinesh@dinesh-VirtualBox:~$ sudo apt-get install build-essential
[sudo] password for dinesh:
Reading package lists... Done
Building dependency tree
Reading state information... Done
build-essential is already the newest version (12.1ubuntu2).
build-essential set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 88 not upgraded.
dinesh@dinesh-VirtualBox:~$ which gcc
/usr/bin/gcc
dinesh@dinesh-VirtualBox:~$ gedit first.c


Terminal
dinesh@dinesh-VirtualBox: ~
dinesh@dinesh-VirtualBox:~$ gedit first.c


first.c (~/) - gedit
9:58 PM
Open
Save
#include<stdio.h>
void main()
{
int a;
printf("Enter the number to find Even Or Not");
scanf("%d",&a);
if(a%2==0)
printf("The Entered number is Even");
else
printf("The Entered number is Odd");
}
Loading file '/home/dinesh/first.c'...
C
Tab Width: 8
Ln 5, Col 1
INS



APPLICATIONS:

Easily run the C programs in virtual machine.

RESULT:

Thus the procedure to Install a C compiler in the virtual machine and execute a sample program is successfully executed.

EX.NO.4 **Show the virtual machine migration based on the certain condition**
DATE: **from one node to the other.**

OBJECTIVE:

To how the virtual machine migration based on the certain condition from one node to the other.

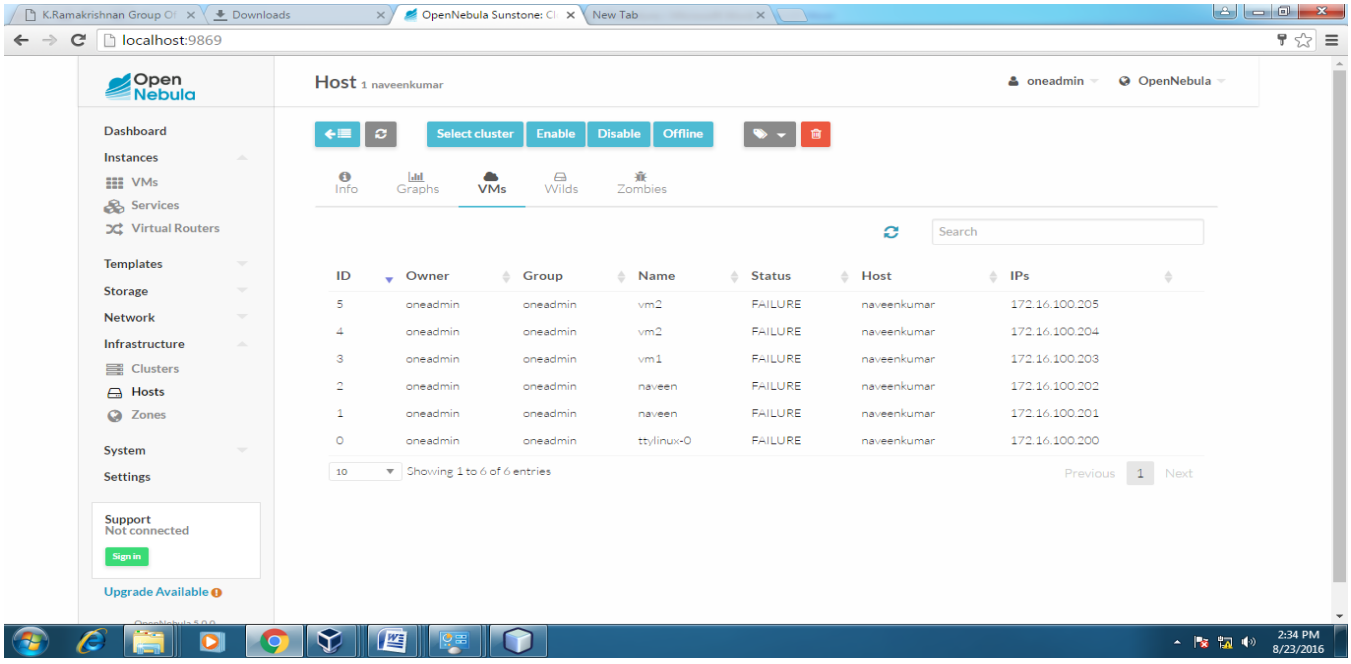
PROCEDURE:

Steps:

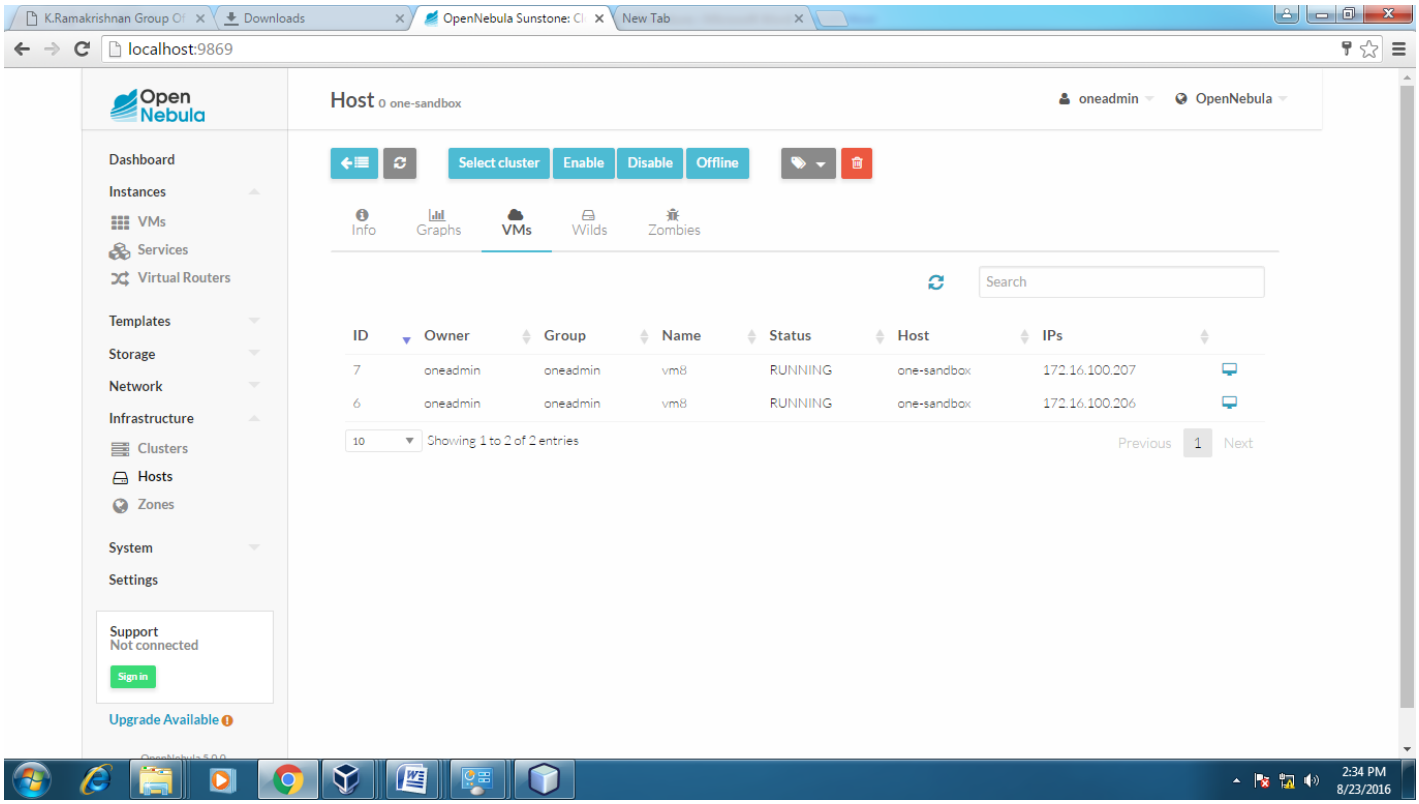
1. Open Browser, type localhost:9869
2. Login using username: oneadmin, password: opennebula
3. Then follow the steps to migrate VMs
    a. Click on infrastructure
    b. Select clusters and enter the cluster name
    c. Then select host tab, and select all host
    d. Then select Vnets tab, and select all vnet
    e. Then select datastores tab, and select all datastores
    f. And then choose host under infrastructure tab
    g. Click on + symbol to add new host, name the host then click on create.
4. on instances, select VMs to migrate then follow the stpes
    a. Click on 8th icon ,the drop down list display
    b. Select migrate on that ,the popup window display
    c. On that select the target host to migrate then click on migrate.

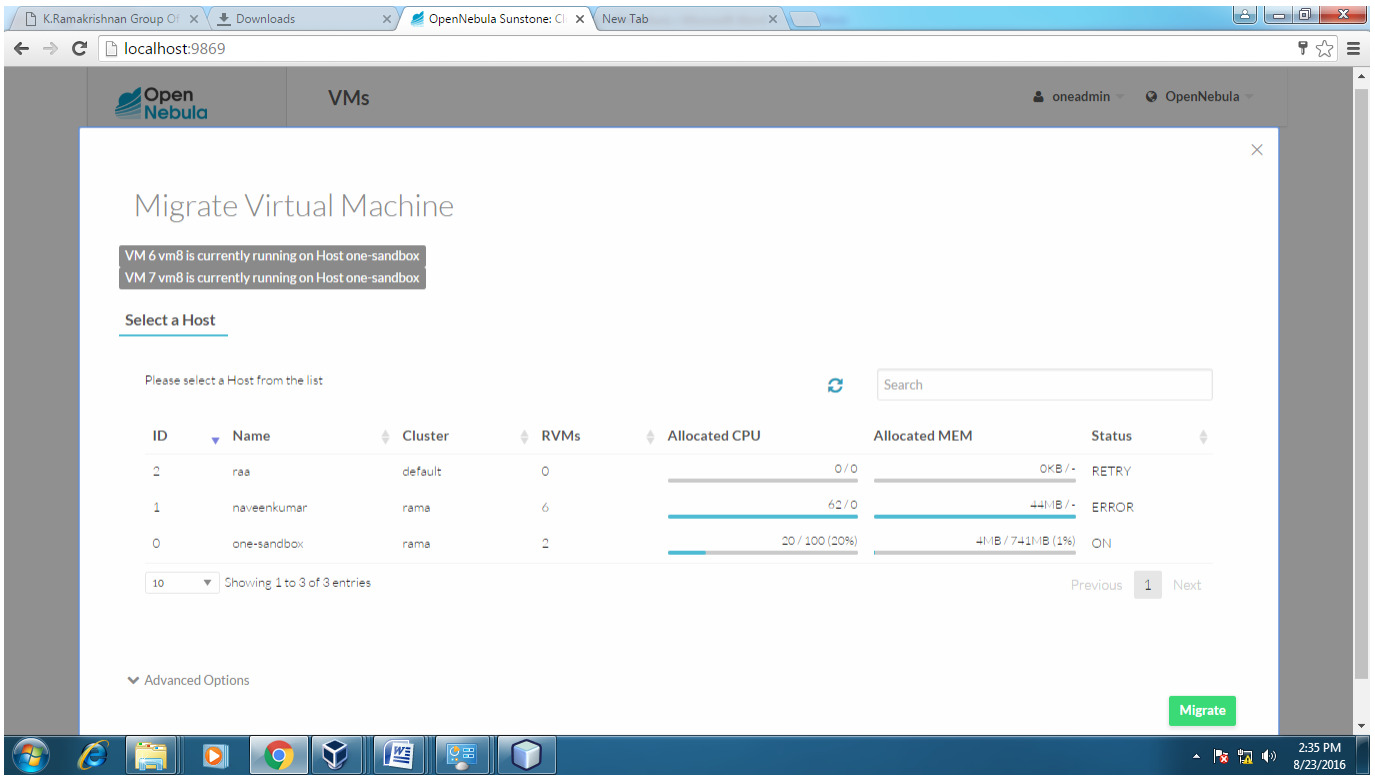
Before migration

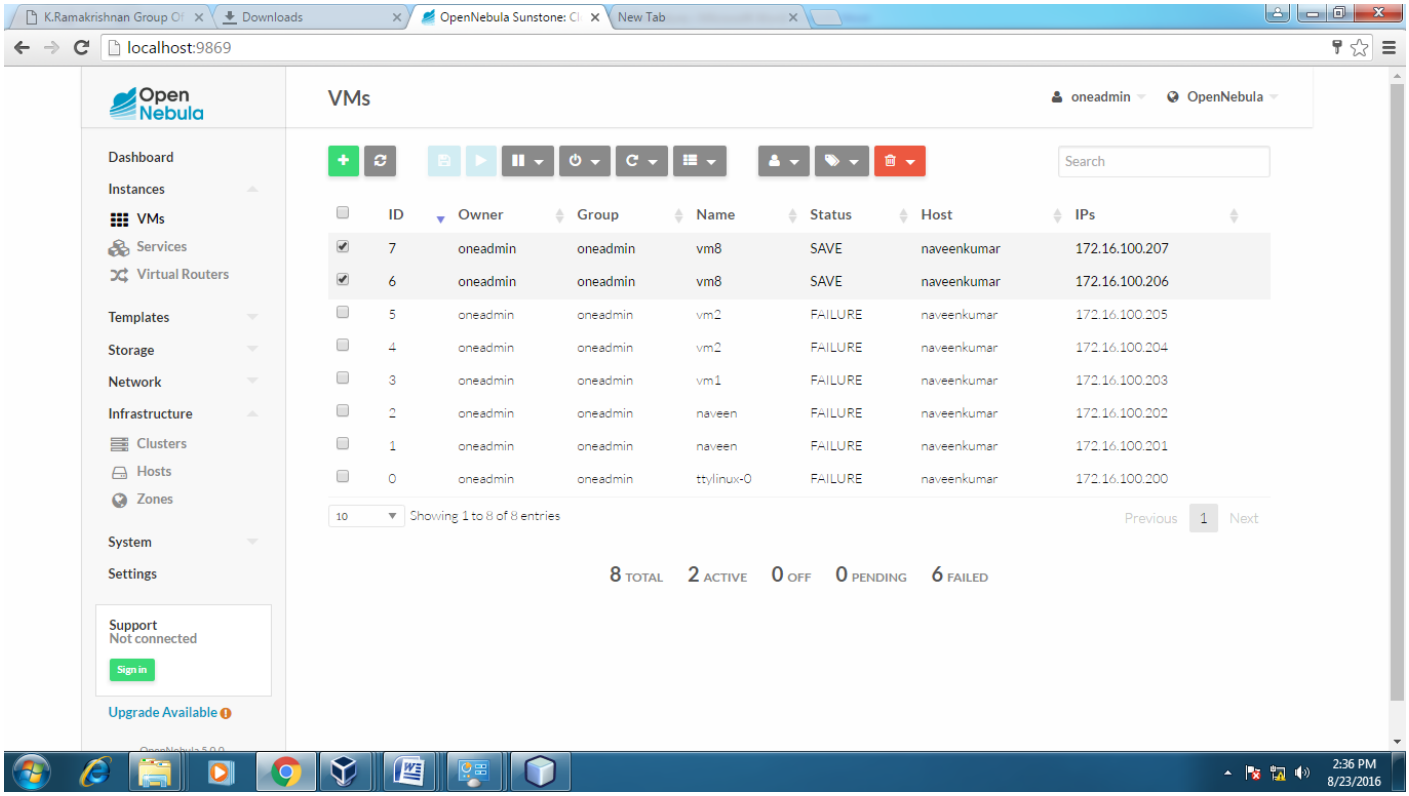
Host:SACET



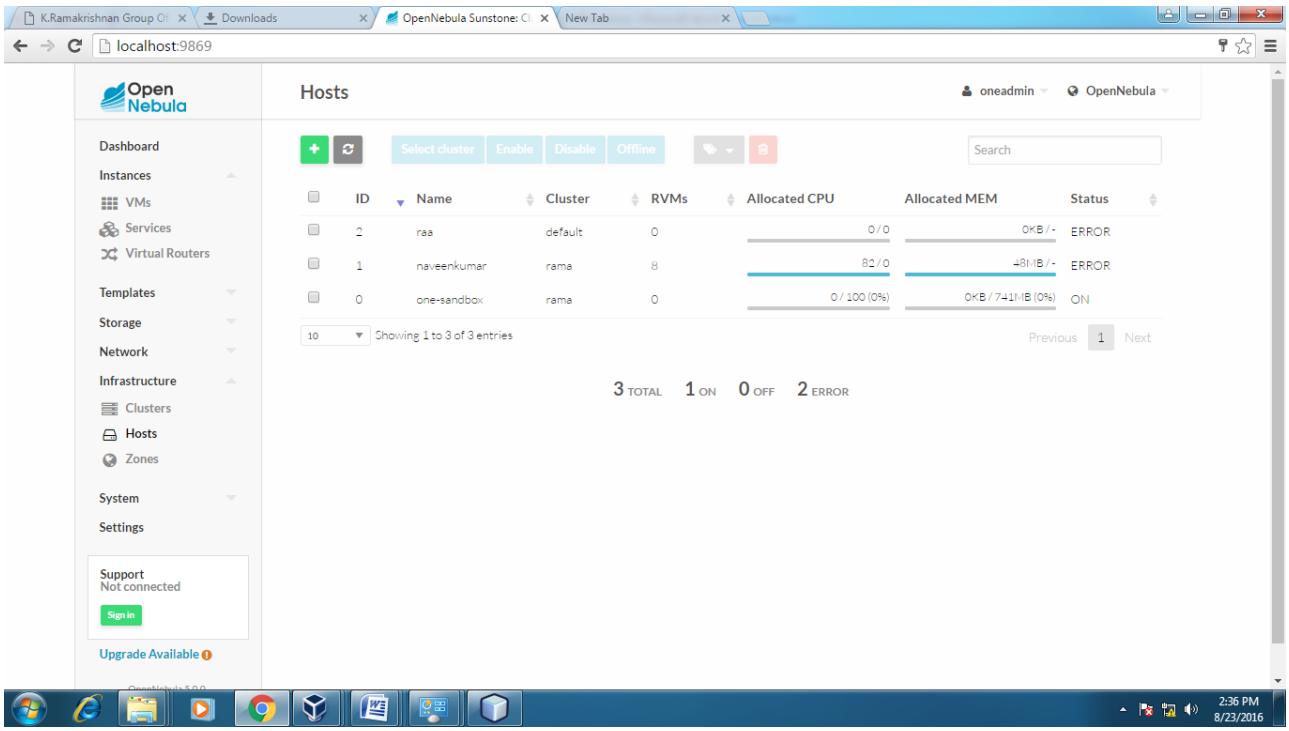
Host:one-sandbox



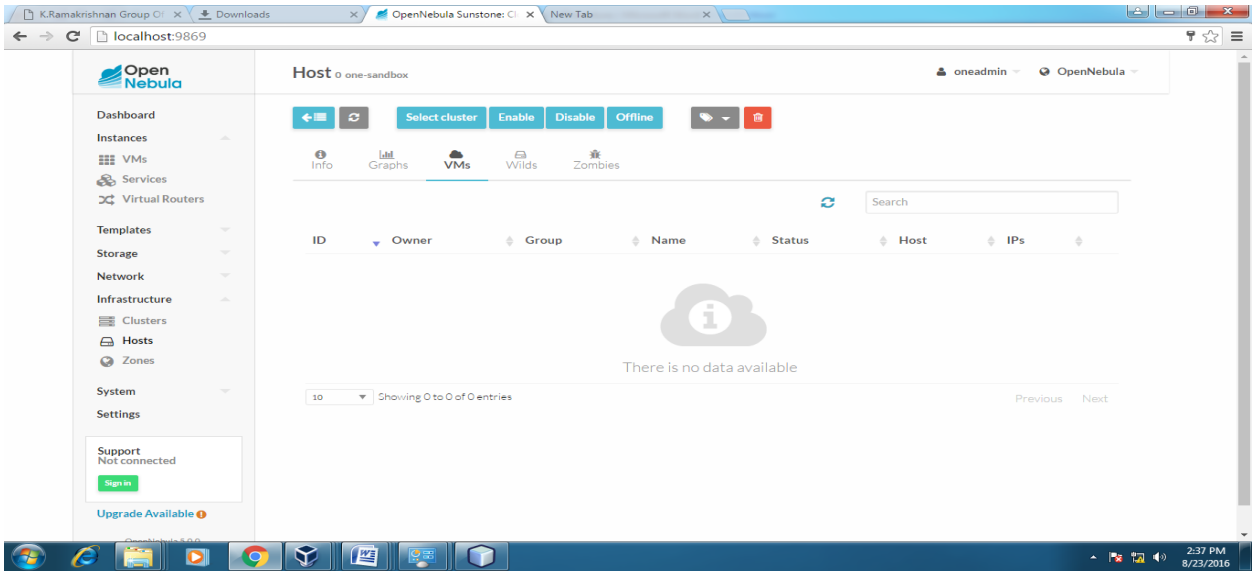




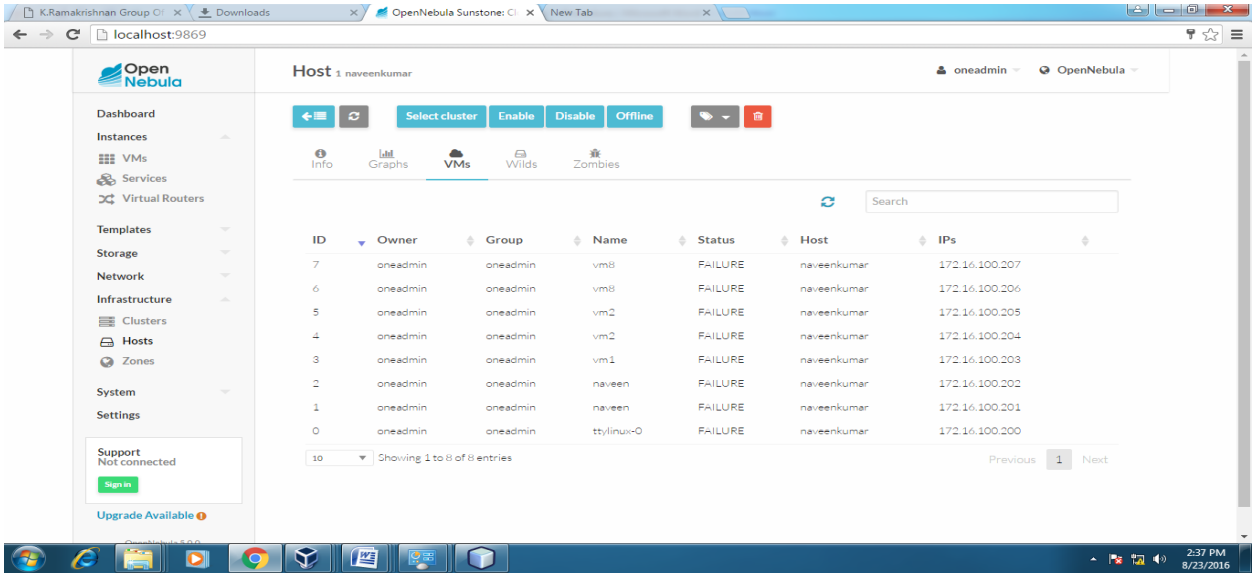
After Migration:



Host:one-sandbox



Host:SACET



APPLICATIONS:

Easily migrate your virtual machine from one pc to another.

RESULT:

Thus the procedure to Show the virtual machine migration based on the certain condition from one node to the other is successfully executed.

EX.NO.5 Find procedure to install storage controller and interact with it`

DATE: (Working on ubuntu-gt6)

OBJECTIVE:

To Find procedure to install storage controller and interact with it.

PROCEDURE:

Steps:

1. After login plug-in the USB drive
2. Right Click on the USB icon at bottom right corner(4th Icon)
3. Select your device name like jetflash,sandisketc
4. Explorer window open.
5. Then do read, write operations on the USB.

APPLICATIONS:

Attach your memory controller like pendrive,cd,dvd and etc,. to virtual machine.

RESULT:

Thus the procedure to to install storage controller and interact with it is successfully executed.

EX.NO.6 Find procedure to set up the one node hadoop cluster.

DATE:

OBJECTIVE:

Set up the one node Hadoop cluster.

PROCEDURE:

1) Installing Java

Hadoop is a framework written in Java for running applications on large clusters of commodity hardware. Hadoop needs Java 6 or above to work.

Step 1: Download tar and extract

Download Jdk tar.gz file for linux-64 bit, extract it into "/usr/local"

cd /opt

sudo tar xvpzf /home/itadmin/Downloads/jdk-8u5-linux-x64.tar.gz

cd /opt/jdk1.8.0_05

Step 2: Set Environments

- Open the "/etc/profile" file and Add the following line as per the version
- Set a environment for Java
- Use the root user to save the /etc/proflie or use gedit instead of vi .
- The 'profile' file contains commands that ought to be run for login shells

sudo vi /etc/profile

#--insert JAVA_HOME

JAVA_HOME=/opt/jdk1.8.0_05

#--in PATH variable just append at the end of the line

PATH=$PATH:$JAVA_HOME/bin

#--Append JAVA_HOME at end of the export statement

export PATH JAVA_HOME

save the file using by pressing “Esc” key followed by :wq!

Step 3: Source the /etc/profile

source /etc/profile

Step 4: Update the java alternatives

1. By default OS will have a open jdk. Check by “java -version”. You will be prompt

“openJDK”

2. If you also have openjdk installed then you'll need to update the java alternatives:

3. If your system has more than one version of Java, configure which one your system

causes by entering the following command in a terminal window

4. By default OS will have a open jdk. Check by “java -version”. You will be prompt

“JavaHotSpot(TM) 64-Bit Server”

update-alternatives --install "/usr/bin/java" java "/opt/jdk1.8.0_05/bin/java" 1

update-alternatives --config java

--type selection number:

java -version

2) configuressh

•Hadoop requires SSH access to manage its nodes, i.e. remote machines plus your localmachine if you want to use Hadoop on it (which is what we want to do in this exercise).For our single-node setup of Hadoop, we therefore need to configure SSH access to localhostThe need to create a Password-less SSH Key generation based authentication is so thatthe master node can then login to slave nodes (and the secondary node) to start/stopthem easily without any delays for authentication

•If you skip this step, then have to provide passwordGenerate an SSH key for the user. Then Enable password-less SSH access to you **sudo apt-get install openssh-server**

--You will be asked to enter password,

root@abc []#sshlocalhost

root@abc[]# ssh-keygen

root@abc[]# ssh-copy-id -i localhost

--After above 2 steps, You will be connected without password,

root@abc[]# sshlocalhost

root@abc[]# exit

3) Hadoop installation

•Now Download Hadoop from the official Apache, preferably a stable release version ofHadoop 2.7.x and extract the contents of the Hadoop package to a location of yourchoice.

•For example, choose location as "/opt/"

Step 1: Download the tar.gz file of latest version Hadoop (hadoop-2.7.x) from the official site .

Step 2: Extract (untar) the downloaded file from this commands to /opt/bigdata

root@abc[]# cd /opt

root@abc[/opt]# sudo tar xvpzf /home/itadmin/Downloads/hadoop-2.7.0.tar.gz

root@abc[/opt]# cd hadoop-2.7.0/

Like java, update Hadop environment variable in /etc/profile

sudo vi /etc/profile

#--insert HADOOP_PREFIX

HADOOP_PREFIX=/opt/hadoop-2.7.0

#--in PATH variable just append at the end of the line

PATH=$PATH:$HADOOP_PREFIX/bin

#--Append HADOOP_PREFIX at end of the export statement

export PATH JAVA_HOME HADOOP_PREFIX

save the file using by pressing "Esc" key followed by :wq!

Step 3: Source the /etc/profile

source /etc/profile

Verify Hadoop installation

cd $HADOOP_PREFIX

bin/hadoop version

3.1) Modify the Hadoop Configuration Files

• In this section, we will configure the directory where Hadoop will store its configuration files, the network ports it listens to, etc. Our setup will use Hadoop Distributed File System,(HDFS), even though we are using only a single local machine.

• Add the following properties in the various hadoop configuration files which is available under $HADOOP_PREFIX/etc/hadoop/

• core-site.xml, hdfs-site.xml, mapred-site.xml & yarn-site.xml

Update Java, hadoop path to the Hadoop environment file

cd $HADOOP_PREFIX/etc/hadoop

vi hadoop-env.sh

Paste following line at beginning of the file

export JAVA_HOME=/usr/local/jdk1.8.0_05

export HADOOP_PREFIX=/opt/hadoop-2.7.0

Modify the core-site.xml

cd $HADOOP_PREFIX/etc/hadoop

vi core-site.xml

Paste following between <configuration> tags

<configuration>

<property>

<name>fs.defaultFS</name>

<value>hdfs://localhost:9000</value>

</property>

< /configuration>

Modify the hdfs-site.xml

vi hdfs-site.xml

Paste following between <configuration> tags

<configuration>

<property>

<name>dfs.replication</name>

<value>1</value>

</property>

</configuration>

YARN configuration - Single Node

modify the mapred-site.xml

cpmapred-site.xml.template mapred-site.xml

vi mapred-site.xml

Paste following between <configuration> tags

<configuration>

<property>

<name>mapreduce.framework.name</name>

<value>yarn</value>

</property>

</configuration>

Modiy yarn-site.xml

vi yarn-site.xml

Paste following between <configuration> tags

<configuration>

<property>

<name>yarn.nodemanager.aux-services</name>

<value>mapreduce_shuffle</value>

</property>

</configuration>

Formatting the HDFS file-system via the NameNode

• The first step to starting up your Hadoop installation is formatting the Hadoop files system which is implemented on top of the local file system of our "cluster" which includes only our local machine. We need to do this the first time you set up a Hadoop cluster.

• Do not format a running Hadoop file system as you will lose all the data currently in the cluster (in HDFS)

root@abc[]# cd $HADOOP_PREFIX

root@abc[]# bin/hadoopnamenode -format

Start NameNode daemon and DataNode daemon: (port 50070)

root@abc[]# sbin/start-dfs.sh

To know the running daemons jut type jps or /usr/local/jdk1.8.0_05/bin/jps

Start ResourceManager daemon and NodeManager daemon: (port 8088)

root@abc[]# sbin/start-yarn.sh

To stop the running process

root@abc[]# sbin/stop-dfs.sh

To know the running daemons jut type jps or /usr/local/jdk1.8.0_05/bin/jps

Start ResourceManager daemon and NodeManager daemon: (port 8088)

root@abc[]# sbin/stop-yarn.sh

Make the HDFS directories required to execute MapReduce jobs:

$ bin/hdfsdfs -mkdir /user

$ bin/hdfsdfs -mkdir /user/mit

• Copy the input files into the distributed filesystem:

$ bin/hdfsdfs -put <input-path>/* /input

•□Run some of the examples provided:

$ bin/hadoop jar share/hadoop/mapreduce/hadoop-mapreduce-examples-2.5.1.jar

grep /input /output '(CSE)'

•□Examine the output files:

Copy the output files from the distributed filesystem to the local filesystem and examine them:

$ bin/hdfsdfs -get output output

$ cat output/* or

•□View the output files on the distributed filesystem:

$ bin/hdfsdfs -cat /output/*

Applications:

- Who use Hadoop?
    - Amazon/A9
    - AOL
    - Facebook
    - Fox interactive media
    - Google
    - IBM
    - New York Times
    - PowerSet (now Microsoft)
    - Quantcast
    - Rackspace/Mailtrust
    - Veoh
    - Yahoo!

RESULT:

Thus setting up of one node Hadoop cluster is successfully executed

EX.NO.7. Mount the one node hadoop cluster using fuse.

DATE:

OBJECTIVE:

To mount the one node Hadoop cluster using FUSE

PROCEDURE:

Hadoop Distributed File System (HDFS) is a distributed, scalable file system developed as the back-end storage for data-intensive Hadoop applications. As such, HDFS is designed to handle very large files with "write-once-read-many" access model. As HDFS is not a full-fledged POSIX

compliant file system, it cannot be directly mounted by the operating system, and file access with HDFS is done via HDFS shell commands.

However, one can leverage FUSE to write a userland application that exposes HDFS via a traditional file system interface. fuse-dfs is one such FUSE-based application which allows you to mount HDFS as if it were a traditional Linux file system. If you would like to mount HDFS on Linux, you can install fuse-dfs, along with FUSE as follows.

Now, install fuse-dfs and all necessary dependencies as follows.

To install fuse-dfs on Ubuntu 12.04 and higher:

$ wget http://archive.cloudera.com/one-click-install/maverick/cdh3-repository_1.0_all.deb

$ sudodpkg -i cdh3-repository_1.0_all.deb

$ sudo apt-get update

$ sudo apt-get install hadoop-0.20-fuse

Once fuse-dfs is installed, go ahead and mount HDFS using FUSE as follows.

$ sudohadoop-fuse-dfs dfs://<name_node_hostname>:<namenode_port><mount_point>

Once HDFS has been mounted at <mount_point>, you can use most of the traditional filesystem operations (e.g., cp, rm, cat, mv, mkdir, rmdir, more, scp). However, random write operations such as rsync, and permission related operations such as chmod, chown are not supported in

FUSE-mounted HDFS.

APPLICATIONS:

- Who use Hadoop?
    - Amazon/A9
    - AOL
    - Facebook
    - Fox interactive media
    - Google
    - IBM
    - New York Times
    - PowerSet (now Microsoft)
    - Quantcast
    - Rackspace/Mailtrust
    - Veoh
    - Yahoo!

RESULT:

Thus mounting the one node Hadoop cluster using FUSE is successfully executed.

EX.NO.8 Write a program to use the API's of hadoop to interact with it.

DATE:

OBJECTIVE:

Program to use Hadoop's File system API'

PROCEDURE:

Reading data from and writing data to Hadoop Distributed File System (HDFS) can be done in a lot of ways. Now let us start by using the FileSystem API to create and write to a file in HDFS, followed by an application to read a file from HDFS and write it back to the local file system.

Step 1: Once you have downloaded a test dataset, we can write an application to read a

file from the local file system and write the contents to Hadoop Distributed File System.

```
packagecom.hadoop.hdfs.writer;

importorg.apache.hadoop.conf.Configured;

importorg.apache.hadoop.util.Tool;

importjava.io.BufferedInputStream;

importjava.io.FileInputStream;

importjava.io.InputStream;

importjava.io.OutputStream;

importorg.apache.hadoop.conf.Configuration;

importorg.apache.hadoop.fs.FileSystem;

importorg.apache.hadoop.fs.Path;

importorg.apache.hadoop.io.IOUtils;

importorg.apache.hadoop.util.ToolRunner;

public class HdfsWriter extends Configured implements Tool {

public static final String FS_PARAM_NAME = "fs.defaultFS";
```

```
publicint run(String[] args) throws Exception {
if (args.length< 2) {
System.err.println("HdfsWriter [local input path] [hdfs output path]");
return 1;
}
String localInputPath = args[0];
Path outputPath = new Path(args[1]);
Configuration conf = getConf();
System.out.println("configured filesystem = " + conf.get(FS_PARAM_NAME));
FileSystemfs = FileSystem.get(conf);
if (fs.exists(outputPath)) {
System.err.println("output path exists");
return 1;
}
OutputStreamos = fs.create(outputPath);
InputStream is = new BufferedInputStream(new FileInputStream(localInputPath));
IOUtils.copyBytes(is, os, conf);
return 0;
}
public static void main( String[] args ) throws Exception {
intreturnCode = ToolRunner.run(new HdfsWriter(), args);
System.exit(returnCode);
}
}
```

Step 2: Export the Jar file and run the code from terminal to write a sample file to HDFS.

```
[training@localhost ~]$ hadoop jar HdfsWriter.jar com.hadoop.hdfs.writer.HdfsWriter
```

sample.txt /user/training/HdfsWriter_sample.txt

Step 3: Verify whether the file is written into HDFS and check the contents of the file.

[training@localhost ~]$ hadoopfs -cat /user/training/HdfsWriter_sample.txt

Step 4: Next, we write an application to read the file we just created in Hadoop Distributed File System and write its contents back to the local file system.

```
packagecom.hadoop.hdfs.reader;
importjava.io.BufferedOutputStream;
importjava.io.FileOutputStream;
importjava.io.InputStream;
importjava.io.OutputStream;
importorg.apache.hadoop.conf.Configuration;
importorg.apache.hadoop.conf.Configured;
importorg.apache.hadoop.fs.FileSystem;
importorg.apache.hadoop.fs.Path;
importorg.apache.hadoop.io.IOUtils;
importorg.apache.hadoop.util.Tool;
importorg.apache.hadoop.util.ToolRunner;
public class HdfsReader extends Configured implements Tool {
public static final String FS_PARAM_NAME = "fs.defaultFS";
publicint run(String[ ] args) throws Exception {
if (args.length< 2) {

System.err.println("HdfsReader [hdfs input path] [local output path]");
return 1;
}
Path inputPath = new Path(args[0]);
```

```
String localOutputPath = args[1];
Configuration conf = getConf();
System.out.println("configured filesystem = " + conf.get(FS_PARAM_NAME));
FileSystemfs = FileSystem.get(conf);
InputStream is = fs.open(inputPath);
OutputStreamos = new BufferedOutputStream(new FileOutputStream(localOutputPath));
IOUtils.copyBytes(is, os, conf);
return 0;
}
public static void main( String[] args ) throws Exception {
intreturnCode = ToolRunner.run(new HdfsReader(), args);
System.exit(returnCode);
}
}
```

Step 5: Export the Jar file and run the code from terminal to write a sample file to HDFS.

```
[training@localhost ~]$ hadoop jar HdfsReader.jar com.hadoop.hdfs.reader.HdfsReader
/user/training/HdfsWriter_sample.txt /home/training/HdfsReader_sample.txt
```

Step 6: Verify whether the file is written back into local file system.

```
[training@localhost ~]$ hadoopfs -cat /user/training/HdfsWriter_sample.txt
```

FileSystem is an abstract class that represents a generic file system. Most Hadoop file system implementations can be accessed and updated through the FileSystem object. To create an instance of the HDFS, you call the method FileSystem.get(). The FileSystem.get() method will look at the URI assigned to the fs.defaultFS parameter of the Hadoop configuration files on your classpath and choose the correct implementation of the FileSystem class to instantiate. Thefs.defaultFS parameter of HDFS has the value hdfs://.

Once an instance of the FileSystem class has been created, the HdfsWriter class calls

the create() method to create a file in HDFS. The create() method return

anOutputStream object, which can be manipulated using normal Java I/O methods.

Similarly HdfsReader calls the method open() to open a file in HDFS, which returns

anInputStream object that can be used to read the contents of the file.

The FileSystem API is extensive. To demonstrate some of the other methods available in the API,

we can add some error checking to the HdfsWriter and HdfsReader classes we created.

To check whether the file exists before we call create(), use:

boolean exists = fs.exists(inputPath);

To check whether the path is a file, use:

booleanisFile = fs.isFile(inputPath);

To rename a file that already exits, use:

boolean renamed = fs.rename(inputPath, new Path("old_file.txt"));

APPLICATIONS:

- Who use Hadoop?
    - Amazon/A9
    - AOL
    - Facebook
    - Fox interactive media
    - Google
    - IBM
    - New York Times
    - PowerSet (now Microsoft)
    - Quantcast
    - Rackspace/Mailtrust
    - Veoh
    - Yahoo!

RESULT:

Thus the program to use the Hadoop File System API to interact with it is successfully

executed.

EX.NO.9 Write A Wordcount Program To Demonstrate The Use Of Map And

DATE: ReduceTasks

OBJECTIVE:

Word count program to demonstrate the use of Map and Reduce tasks

PROCEDURE:

STEPS:

1. Analyze the input file content

2. Develop the code

a. Writing a map function

b. Writing a reduce function

c. Writing the Driver class

3. Compiling the source

4. Building the JAR file

5. Starting the DFS

6. Creating Input path in HDFS and moving the data into Input path

7. Executing the program

Sample Program:

```
importjava.io.IOException;
importjava.util.StringTokenizer;
importorg.apache.hadoop.conf.Configuration;
importorg.apache.hadoop.fs.Path;
importorg.apache.hadoop.io.IntWritable;
importorg.apache.hadoop.io.Text;
importorg.apache.hadoop.mapreduce.Job;
importorg.apache.hadoop.mapreduce.Mapper;
importorg.apache.hadoop.mapreduce.Reducer;
importorg.apache.hadoop.mapreduce.lib.input.FileInputFormat;
importorg.apache.hadoop.mapreduce.lib.output.FileOutputFormat;
importorg.apache.hadoop.util.GenericOptionsParser;
public class WordCount
{
//Step a
public static class TokenizerMapper extends Mapper < Object , Text, Text, IntWritable>
{
//hadoop supported data types
private final static IntWritable one = new IntWritable(1);
private Text word = new Text();
//map method that performs the tokenizer job and framing the initial key value pairs
public void map( Object key, Text value, Context context) throws IOException ,
InterruptedException
{
//taking one line at a time and tokenizing the same
```

```
StringTokenizeritr = new StringTokenizer (value.toString());
//iterating through all the words available in that line and forming the key value pair
while (itr.hasMoreTokens())
{
word.set(itr.nextToken());
//sending to the context which inturn passes the same to reducer
context.write(word, one);
}
}
}
//Step b
public static class IntSumReducer extends Reducer < Text, IntWritable, Text, IntWritable>
{
privateIntWritable result = new IntWritable();
// Reduce method accepts the Key Value pairs from mappers, do the aggregation based on keys
// and produce the final output
public void reduce(Text key, Iterable<IntWritable> values, Context context) throws
IOException ,InterruptedException }

int sum = 0;
/*iterates through all the values available with a key and
add them together and give the final result as the key and sum of its values*/
for (IntWritableval: values)
{
sum += val.get();
}
```

```
result.set(sum);
context.write(key, result);
}
}
//Step c
public static void main( String [] args) throws Exception
{
//creating conf instance for Job Configuration
Configuration conf = new Configuration();
//Parsing the command line arguments
String [] otherArgs = new GenericOptionsParser(conf,args).getRemainingArgs();
if (otherArgs.length< 2)
{
System .err.println("Usage: wordcount<in> [<in>...]<out>" );
System .exit(2);
}
//Create a new Job creating a job object and assigning a job name for identification
//purposes
Job job = new Job(conf, "word count" );
job.setJarByClass(WordCount.class);
// Specify various job specific parameters
job.setMapperClass(TokenizerMapper.class);
job.setCombinerClass(IntSumReducer.class);
job.setReducerClass(IntSumReducer.class);
//Setting job object with the Data Type of output Key
job.setOutputKeyClass(Text.class);
```

```
//Setting job object with the Data Type of output value
job.setOutputValueClass(IntWritable.class);
//the hdfs input and output directory to be fetched from the command line
for ( int i = 0; i <otherArgs.length 1; ++i)
{
FileInputFormat.addInputPath(job, new Path(otherArgs[i]));
}
FileOutputFormat.setOutputPath(job, new Path(otherArgs[otherArgs.length 1]));
System .exit(job.waitForCompletion( true ) ? 0 : 1);
}
}
```

Compiling the source:

```
bigdata@localhost:$ cd /home/bigdata/Downloads/mrcode/src
bigdata@localhost:/home/bigdata/Downloads/mrcode/src$ javacclasspath
../lib/hadoopcommon2.5.0.jar:../lib/hadoopmapreduceclientcore2.5.0.jar:../lib/commonscli1.2.j
ar d../build/ bigdata/WordCount.java
```

Building the JAR File:

```
bigdata@localhost:/home/bigdata/Downloads/mrcode/src$ cd ../build/
bigdata@localhost:/home/bigdata/Downloads/mrcode/build$ jar cvfwc.jar .
```

Starting the DFS (if not running already)

```
bigdata@localhost:/home/bigdata/Downloads/hadoop2.5.1$sbin/startdfs.sh
```

Creating Input path in HDFS and moving the data into Input path

```
bigdata@localhost:/home/bigdata/Downloads/hadoop2.5.1$bin/hadoopfsmkdir/mrin
bigdata@localhost:/home/bigdata/Downloads/hadoop2.5.1$bin/hadoopfs -copyFromLocal
/home/bigdata/Downloads/mrcode/mrsampledata/* hdfs://localhost:9000/mrin
```

Executing the program

bigdata@localhost:/home/bigdata/Downloads/hadoop2.5.1$bin/hadoop jar

/home/bigdata/Downloads/mrcode/build/wc.jar bigdata.WordCount /mrin /mrout1

APPLICATIONS:

Use this program to easily count the number of words in your program through map reduce techniques.

RESULT:

Thus the Word count program to use Map and reduce tasks is demonstrated successfully.

VIVA QUESTIONS AND ANSWERS

1.Define Cloud Computing with example.

Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

2.What is the working principle of Cloud Computing?

The cloud is a collection of computers and servers that are publicly accessible via the Internet. This hardware is typically owned and operated by a third party on a consolidated basis in one or more data center locations. The machines can run any combination of operating systems.

3.What are the advantages and disadvantages of Cloud Computing?

Advantages

Lower-Cost Computers for Users
Improved Performance
Lower IT Infrastructure Costs
Fewer Maintenance Issues
Lower Software Costs
Instant Software Updates
Increased Computing Power
Unlimited Storage Capacity
Increased Data Safety
Improved Compatibility Between Operating Systems
Improved Document Format Compatibility
Easier Group Collaboration
Universal Access to Documents
Latest Version Availability
Removes the Tether to Specific Devices

Disadvantages

Requires a Constant Internet Connection
Doesn't Work Well with Low-Speed Connections
Can Be Slow
Features Might Be Limited
Stored Data Might Not Be Secure
If the Cloud Loses Your Data, You're Screwed

4.What is distributed system?

A *distributed system* is a software system in which components located on networked computers communicate and coordinate their actions by passing messages. The components interact with each other in order to achieve a common goal.

Three significant characteristics of distributed systems are:

- ✓ Concurrency of components
- ✓ Lack of a global clock
- ✓ Independent failure of components
- ✓ **What is cluster?**
- ✓ A computing cluster consists of interconnected stand-alone computers which work cooperatively as a single integrated computing resource. In the past,

clustered computer systems have demonstrated

5.What is grid computing? (Apr 11)(Nov 10)

Grid Computing enables virtuals organizations to share geographically distributed resources as they pursue common goals, assuming the absence of central location, central control, omniscience, and an existing trust relationship.

(or)

- ✓ Grid technology demands new distributed computing models, software/middleware support, network protocols, and hardware infrastructures.
- ✓ National grid projects are followed by industrial grid plat-form development by IBM, Microsoft, Sun, HP, Dell, Cisco, EMC, Platform Computing, and others. New grid service providers (GSPs) and new grid applications have emerged rapidly, similar to the growth of Internet and web services in the past two decades.
- ✓ grid systems are classified in essentially two categories: computational or data grids and P2P grids.

Computing or data grids are built primarily at the national level

6.What are the business areas needs in Grid computing?

- ✓ Life Sciences
- ✓ Financial services
- ✓ Higher Education
- ✓ Engineering Services
- ✓ Government
- ✓ Collaborative games

7.List out the Grid Applications:

- ✓ Application partitioning that involves breaking the problem into discrete pieces
- ✓ Discovery and scheduling of tasks and workflow
- ✓ Data communications distributing the problem data where and when it is required
- ✓ Provisioning and distributing application codes to specific system nodes
- ✓ Autonomic features such as self-configuration, self-optimization, self-recovery and self-management

8.List some grid computing toolkits and frameworks?

- ✓ Globus Toolkit Globus Resource Allocation Manager(GRAM)
- ✓ Grid Security Infrastructure(GSI)
- ✓ Information Services
- ✓ Legion, Condor and Condor-G
- ✓ NIMROD, UNICORE, NMI.

9.What are Desktop Grids? (Apr 11)

- ✓ These are grids that leverage the compute resources of desktop computers. Because of the true (but unfortunate) ubiquity of Microsoft® Windows® operating system in corporations, desktop grids are assumed to apply to the Windows environment. The Mac OS™ environment is supported by a limited number of vendors.

10.What are Server Grids?

- ✓ Some corporations, while adopting Grid Computing , keep it limited to server resources that are within the purview of the IT department.
- ✓ Special servers, in some cases, are bought solely for the purpose of creating an internal "utility grid" with resources made available to various departments.
- ✓ No desktops are included in server grids. These usually run some flavor of the Unix/Linux operating system.

OpenNebula is an open source management tool that helps virtualized data centers oversee private clouds, public clouds and hybrid clouds. ... **OpenNebula** is vendor neutral, as well as platform- and API-agnostic. It can use KVM, Xen or VMware hypervisors.

Eclipse is an integrated development environment (IDE) used in computer programming, and is the most widely used Java IDE. It contains a base workspace and an extensible plug-in system for customizing the environment.

NetBeans is an open-source integrated development environment (IDE) for developing with Java, PHP, C++, and other programming languages. **NetBeans** is also referred to as a platform of modular components used for developing Java desktop applications.

Apache Tomcat (or Jakarta **Tomcat** or simply **Tomcat**) is an open source servlet container developed by the **Apache** Software Foundation (ASF). **Tomcat** implements the Java Servlet and the JavaServer Pages (JSP) specifications from Sun Microsystems, and provides a "pure Java" HTTP web **server** environment for Java code to run."

Apache Axis (**Apache** eXtensible Interaction System) is an open-source, XML based Web service framework. It consists of a Java and a C++ implementation of the SOAP server, and various utilities and APIs for generating and deploying Web service applications.

11.What is private cloud?

The *private cloud* is built within the domain of an intranet owned by a single organization. Therefore, they are client owned and managed. Their access is limited to the owning clients and their partners. Their deployment was not meant to sell capacity over the Internet through publicly accessible interfaces. Private clouds give local users a flexible and agile private infrastructure to run service workloads within their administrative domains.

12.What is public cloud?

A *public cloud* is built over the Internet, which can be accessed by any user who has paid for the service. Public clouds are owned by service providers. They are accessed by subscription. Many companies have built public clouds, namely Google App Engine, Amazon AWS, Microsoft Azure, IBM Blue Cloud, and Salesforce Force.com. These are commercial providers that offer a publicly accessible remote interface for creating and managing VM instances within their proprietary infrastructure.

13. What is hybrid cloud?

A *hybrid cloud* is built with both public and private clouds, Private clouds can also support a *hybrid cloud* model by supplementing local infrastructure with computing capacity from an external public cloud. For example, the *research compute cloud* (RC2) is a private cloud built by IBM.

14.What is a Community Cloud ?

A **community cloud** in computing is a collaborative effort in which infrastructure is shared between several organizations from a specific community with common concerns (security, compliance, jurisdiction, etc.), whether managed internally or by a third-party and hosted internally or externally. This is controlled and used by a group of organizations that have shared interest. The costs are spread over fewer users than a public cloud (but more than a private cloud

15.Define IaaS?

The IaaS layer offers storage and infrastructure resources that is needed to deliver the Cloud services. It only comprises of the infrastructure or physical resource. Top IaaS Cloud Computing Companies: Amazon (EC2), Rackspace, GoGrid, Microsoft, Terremark and Google.

16.Define PaaS?

PaaS provides the combination of both, infrastructure and application. Hence, organisations using PaaS don't have to worry for infrastructure nor for services. Top PaaS Cloud Computing Companies: Salesforce.com, Google, Concur Technologies, Ariba, Unisys and Cisco..

17.Define SaaS?

In the SaaS layer, the Cloud service provider hosts the software upon their servers. It can be defined as a in model in which applications and softwares are hosted upon the server and made available to customers over a network. Top SaaS Cloud Computing Companies: Amazon Web Services, AppScale, CA Technologies, Engine Yard, Salesforce and Windows Azure.

18.What is meant by virtualization?

Virtualization is a computer architecture technology by which multiple virtual machines (VMs) are multiplexed in the same hardware machine. The idea of VMs can be dated back to the 1960s. The purpose of a VM is to enhance resource sharing by many users and improve computer performance in terms of resource utilization and application flexibility.

19.What are the implementation levels of virtualization?

The virtualization types are following

1. OS-level virtualization
2. ISA level virtualization
3. User-Application Level virtualization
4. hardware level virtualization
5. library level virtualization

20.List the requirements of VMM?

There are three requirements for a VMM.

First, a VMM should provide an environment for programs which is essentially identical to the original machine.

Second, programs run in this environment should show, at worst, only minor decreases in speed.

Third, a VMM should be in complete control of the system resources.

21.Explain Host OS and Guest OS?

A comparison of the differences between a host system, a guest system, and a virtual machine within a virtual infrastructure.

A **host system (host operating system)** would be the primary & first installed operating system. If you are using a bare metal Virtualization platform like Hyper-V or ESX, there really isn't a host operating system besides the Hypervisor. If you are using a Type-2

Hypervisor like VMware Server or Virtual Server, the host operating system is whatever operating system those applications are installed into.

A **guest system (guest operating system)** is a virtual guest or virtual machine (VM) that is installed under the host operating system. The guests are the VMs that you run in your virtualization platform.

22.Write the steps for live VM migration?

The five steps for live VM migration is

Stage 0: *Pre-Migration*
Active VM on Host A
Alternate physical host may be preselected for migration
Block devices mirrored and free resources maintained

Stage 1: *Reservation*
Initialize a container on the target host

Stage 2: *Iterative pre-copy*
Enable shadow paging
Copy dirty pages in successive rounds.

Stage 3: *Stop and copy*
Suspend VM on host A
Generate ARP to redirect traffic to Host B
Synchronize all remaining VM state to Host B

Stage 4: *Commitment*
VM state on Host A is released

Stage 5: *Activation*
VM starts on Host B
Connects to local devices
Resumes normal operation

24.Define Globus Toolkit: Grid Computing Middleware

- ✓ Globus is open source grid software that addresses the most challenging problmes in distributed resources sharing.
- ✓ The Globus Toolkit includes software services and libraries for distributed security, resource management, monitoring and discovery, and data management.

25.Define Blocks in HDFS

- ✓ A disk has a block size, which is the minimum amount of data that it can read or write. Filesystems for a single disk build on this by dealing with data in blocks, which are an integral multiple of the disk block size. Filesystem blocks are typically a few kilobytes in size, while disk blocks are normally 512 bytes. This is generally transparent to the filesystem user who is simply reading or writing a file—of whatever length.

26.Define Namenodes and Datanodes

- ✓ An HDFS cluster has two types of node operating in a master-worker pattern:
  - ➢ a ***namenode*** (the master) and
  - ➢ a number of ***datanodes*** (workers).
- ✓ The namenode manages the filesystem namespace. It maintains the filesystem tree and the metadata for all the files and directories in the tree. This information is stored

persistently on the local disk in the form of two files: the namespace image and the edit log.

- ✓ The namenode also knows the datanodes on which all the blocks for a given file are located, however, it does not store block locations persistently, since this information is reconstructed from datanodes when the system starts.

27.Define HADOOP.

Hadoop is an open source, Java-based programming framework that supports the processing and storage of extremely large data sets in a distributed computing environment. It is part of the Apache project sponsored by the Apache Software Foundation.

28.Define HDFS.

Hadoop Distributed File System (**HDFS**) is a Java-based file system that provides scalable and reliable data storage that is designed to span large clusters of commodity servers. **HDFS**, MapReduce, and YARN form the core of Apache™ Hadoop®.

29.Write about HADOOP.

Hadoop was created by Doug Cutting and Mike Cafarella in **2005**. Cutting, who was working at Yahoo! at the time, named it after his son's toy elephant. It was originally developed to support distribution for the Nutch search engine project.

30.Definition of *Grid Portal*:

A ***Grid Portal*** provides an efficient infrastructure to put Grid-empowered applications on corporate Intranet/Internet.