

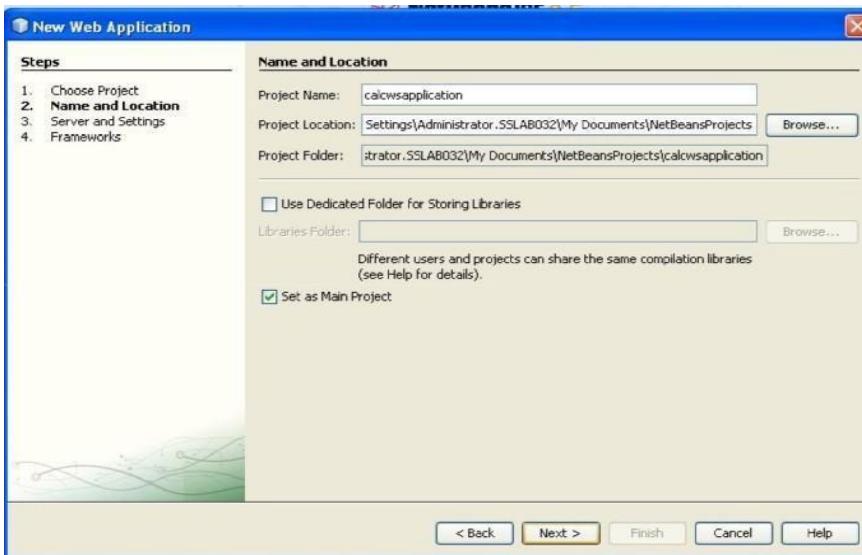
## DEVELOP A NEW WEB SERVICE FOR A CALCULATOR

EX.NO 1

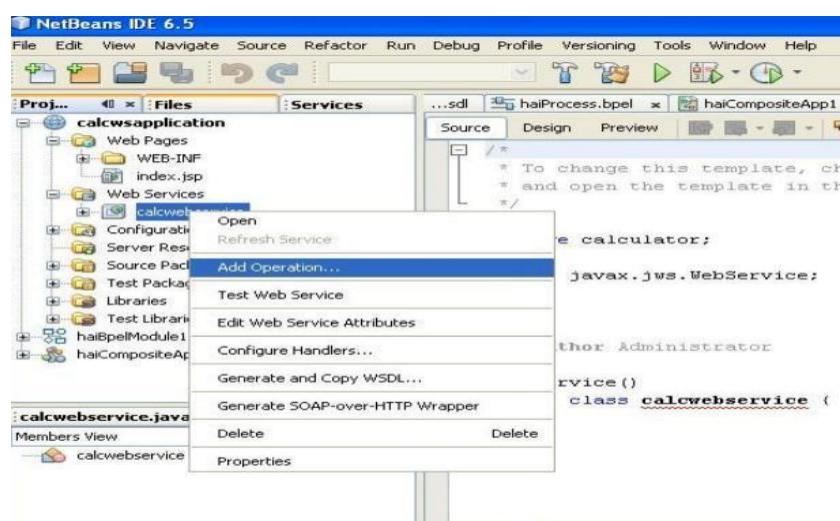
**AIM:** To develop a new Web Service for Calculator using SOAP Protocol

### PROCEDURE:

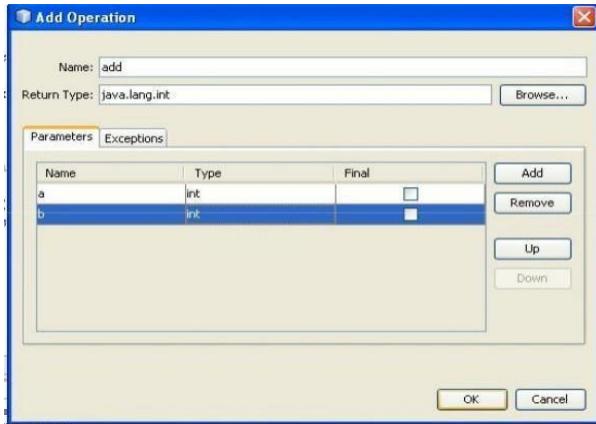
1. Open NetBeans IDE 8.1
2. Click File -> New Project
3. Give project name as calcwsapplication and click next.
4. In new web application dialog box, ensure that glassfish v2 server and Java EE 5 are selected and click next and then finish



5. Right click calcwsapplication and select New -> web service. Give web service name as calwebservice and package name as calculator and click Finish
6. Expand web service folder. Right click calwebservice and click Add Operation. Give operation name as add and return type as int
7. Click add button and give parameter as a and data type as int. Again Click add button and give parameter name as b and its data type as int and Click OK



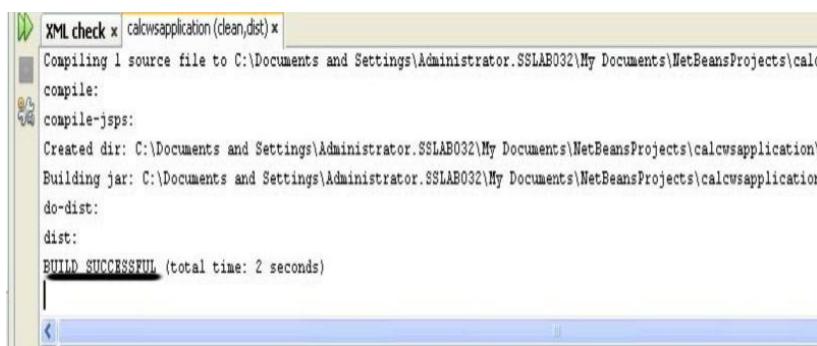
## Step 6 and 7:



8. Instead of return 0, change it as return a+b

```
@WebService()  
public class calcwebservice {  
  
    /**  
     * Web service operation  
     */  
    @WebMethod(operationName = "add")  
    public int add(@WebParam(name = "a")  
    int a, @WebParam(name = "b")  
    int b) {  
        //TODO write your implementation code here  
        return a+b;  
    }  
}
```

9. Similarly, add operations for subtraction(sub), multiplication(mul),division(div)
10. Right Click calwsapplication and click clean and build. It will show BUILD SUCCESSFUL.
11. Again right Click calwsapplication and click deploy. It will show BUILD SUCCESSFUL.



12. Select calwsapplication -> web services -> calculatorws. Right click and select Test WebService
13. Give input values and click add button to check output

Go to back and click WSDL to open it. Now, Server is running...

### Web Service tester page:

## Output:

The screenshot shows a web browser window with the URL `localhost:8080/calcwsapplication/calculatorService?wsdl`. The page title is "add Method invocation".  
**Method parameter(s)**  
A table with two rows:

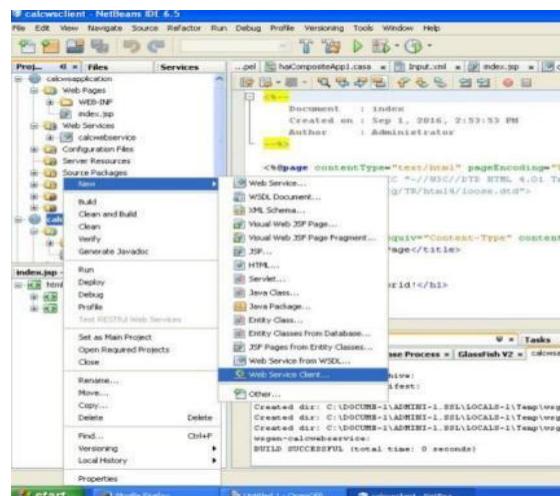
Type	Value
int	5
int	2

  
**Method returned**  
The value is "7".  
**SOAP Request**  

```
<?xml version="1.0" encoding="UTF-8"?>
<S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Header/>
  <S:Body>
```

## Invoking Web Service Client

1. Click File -> New Project. Select web application from java web category
2. Give file name as calcwsclient.click next and then finish.
3. Right Click calcwsclient and Select New -> web service client



4. Select Project and click browse. Browse the web service that we did in the previous step. Ensure that client style is JAX- WS style.



5. Click Finish. Code will appear and it will show some error

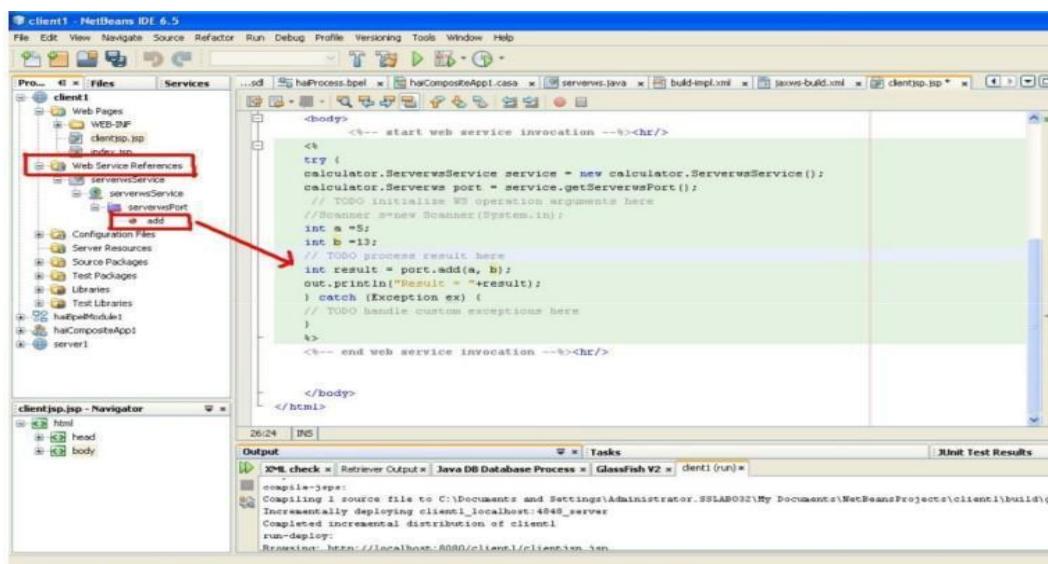
- Click on error. At end of line add: `xendorsed="true"` and save it.

 A screenshot of the NetBeans IDE interface. The main window shows a Java code editor with the following code snippet:

```
//localhost:8080/calcwsapplication/calcwsService?wsdl" xnocompile="true" xendorsed="true"!>
```

A red rectangular box highlights the entire line of code.

- Right Click calcwsclient -> web pages and select new -> JSP
- Give file name as client and click finish.
- In client.jsp page, inside the body tag, remove h1 tag and drag and drop the add operation from web\_service\_references from calcwsclient



- In the code appeared, change the values.(For instance, a=5,b=13)
- Right Click calcwsclient and click Clean and build
- Again Right click calcwsclient and click deploy. It will show BUILD SUCCESSFUL.
- Right Client Client.jsp and click Run file
- It will show the output as follows:



- ## Result = 18
- Similarly create jsp files for subtraction, multiplication and division.

### RESULT:

Thus, calculator is implemented as a web service using SOAP protocol.

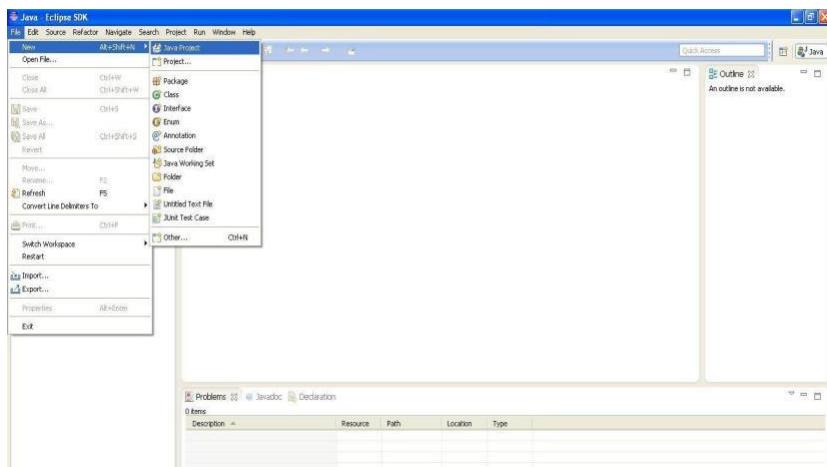
## DEVELOP A CLOUD ENVIRONMENT USING CLOUDSIM SIMULATOR

EX.NO : 2

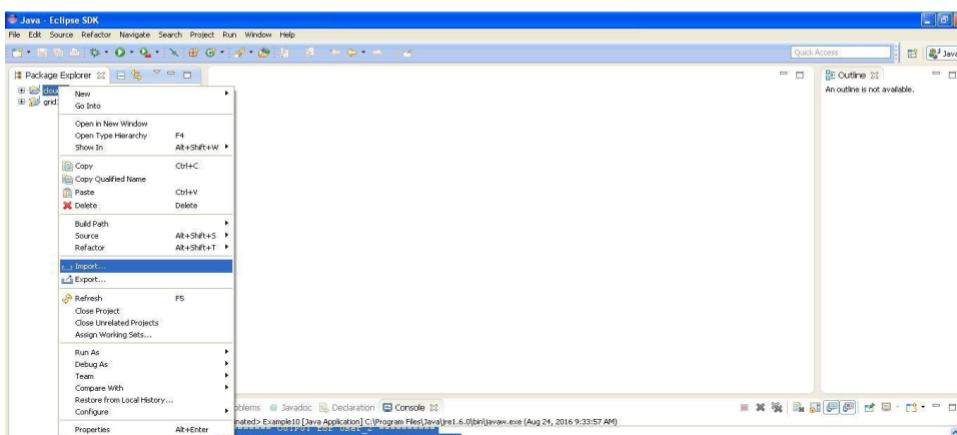
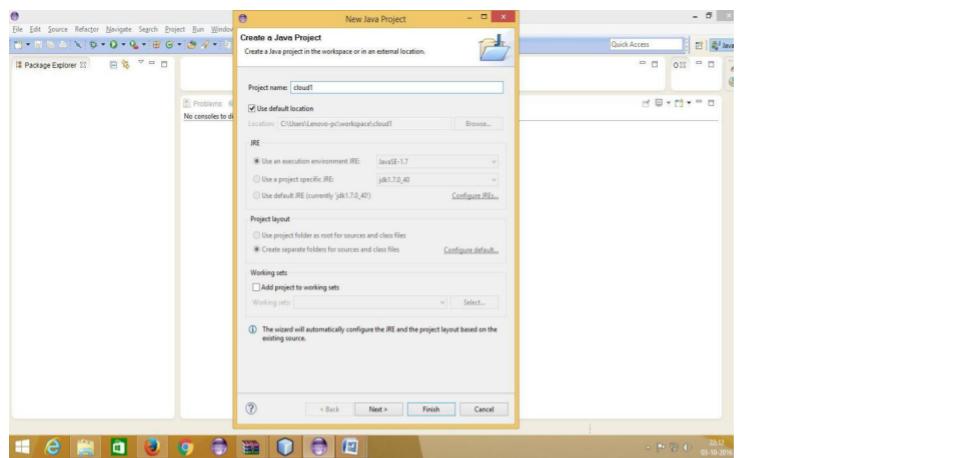
**AIM:** To install CloudSim and to implement the java code to create cloudlets and to execute the cloudlets in data centers.

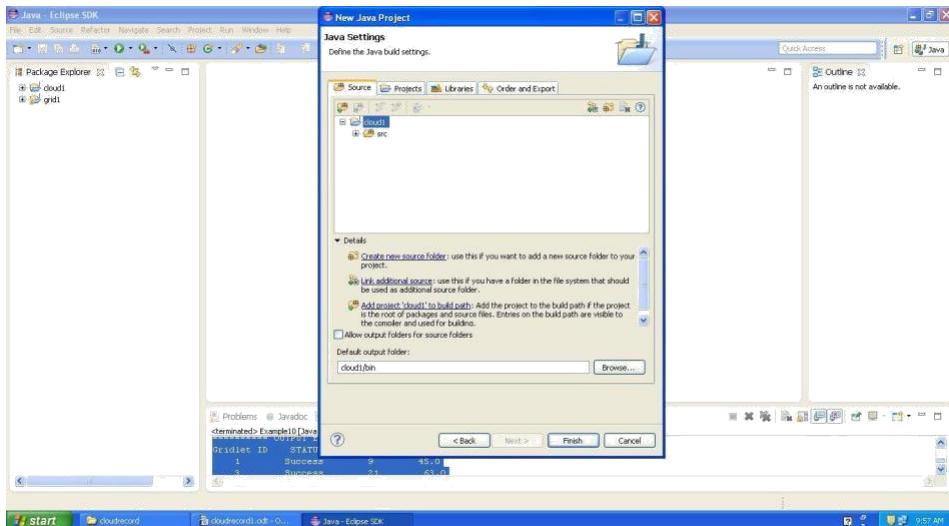
### PROCEDURE:

1. Open the eclipse tool using the path **E:\cloud grid\eclipse-SDK-4.2.2-win32x86\_64\eclipse\eclipse.exe**
2. Click on File Menu → New → Java Project

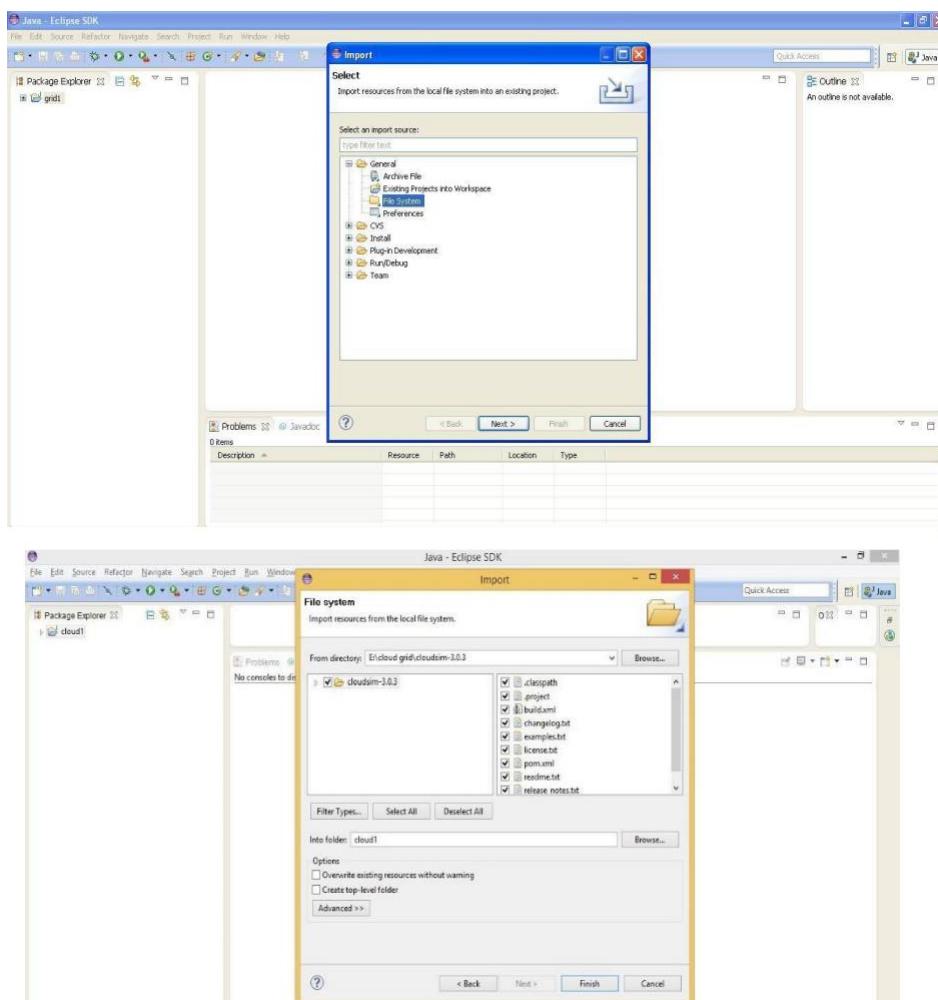


3. Give name to the project (for instance, cloud1) and click on **Next** Button

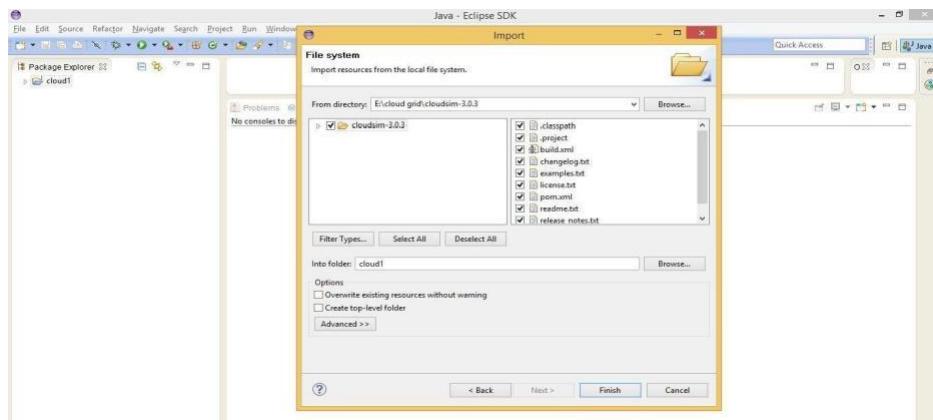




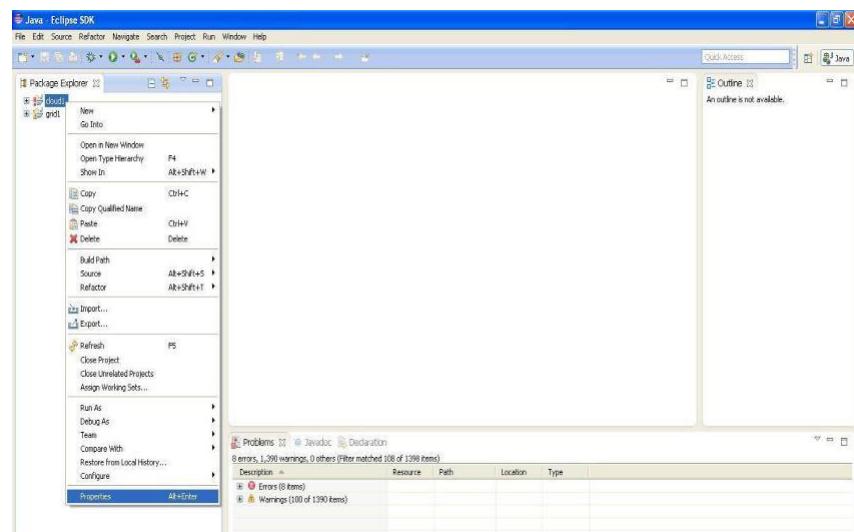
1. Click **Finish** Button
2. Right Click on the project in project explorer and click **Import**
3. Select General → File System and click Next
4. Click **Browse** and browse the CloudSim-3.0.3 folder and Select the folder.



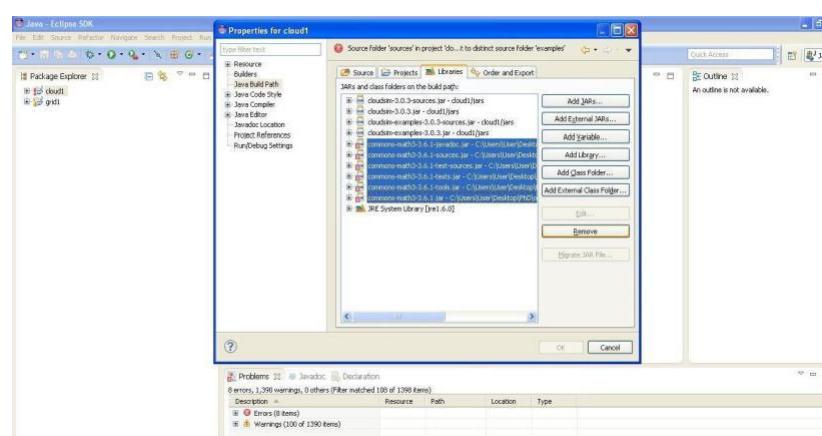
- Click OK
- Then Select the CloudSim folder



- Click Finish Button

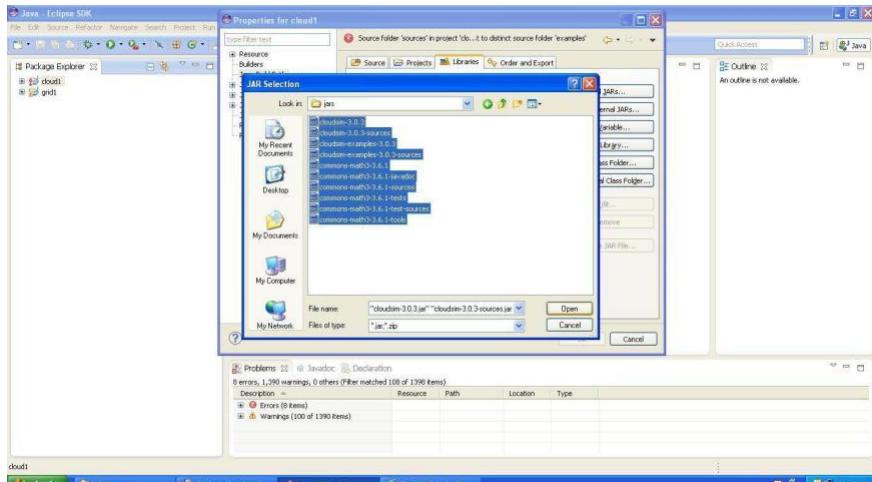


- Click **yes to All** to import
- Right Click the project in project explorer and click **properties**
- Click on **Java Build Path** and then **libraries** tab
- Remove Error showing Jar files

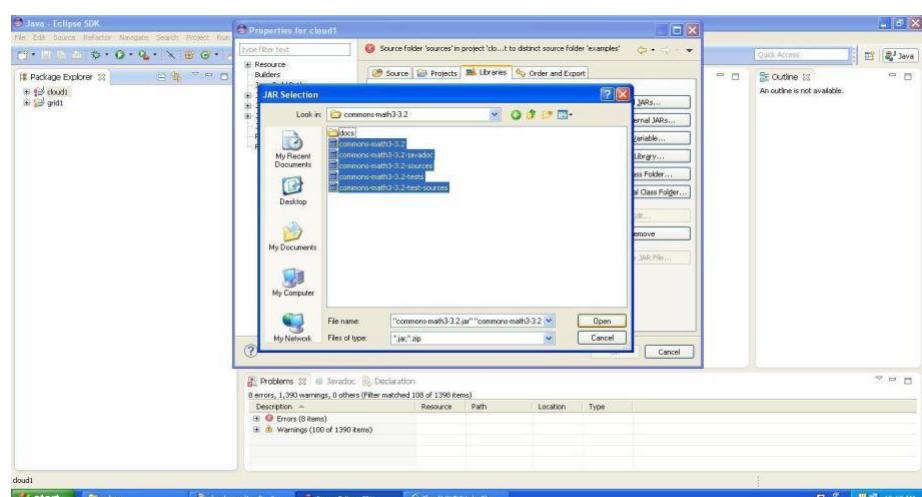


- Click on **Add External Jars**

13. Browse and Select all the jar files within CloudSim folder → jars



14. Again Click on Add External Jars to include common math jars



15. It will show Error. Click on Source tab and followed by **Browse** button  
16. Click on **Create New Folder**  
17. Give folder name (for instance, output)  
18. Click OK and again click OK  
19. Expand the project and Navigate into cloud1 → examples → org.cloudbus.cloudSim.examples → CloudSimExample1.java  
20. Open the source code by double clicking the CloudSim Example

Starting CloudSimExample3... Initialising...  
Starting CloudSim version 3.0 Datacenter\_0 is starting...  
Broker is starting...  
Entities started.  
: Broker: Cloud Resource List received with 1 resource(s)  
: Broker: Trying to Create VM #0 in Datacenter\_0:0: Broker: Trying to Create VM #1 inDatacenter\_0  
: Broker: VM #0 has been created in Datacenter #2, Host #0  
: Broker: VM #1 has been created in Datacenter #2, Host #1  
  
0.1: Broker: Sending cloudlet 0 to VM #0  
  
0.1: Broker: Sending cloudlet 1 to VM #1  
  
80.1: Broker: Cloudlet 1 received  
  
160.1: Broker: Cloudlet 0 received  
  
160.1: Broker: All Cloudlets executed. Finishing... 160.1: Broker: Destroying VM #0  
  
160.1: Broker: Destroying VM #1Broker is shutting down...  
  
Simulation: No more future events  
  
CloudInformationService: Notify all CloudSim entities for shutting down. Datacenter\_0 is shutting down...  
  
Broker is shutting down... Simulation completed.  
  
Simulation completed.  
  
===== OUTPUT ======  
  
Cloudlet IDSTATUS Data center ID  
  
1 SUCCESS 2 1 80  
  
0 SUCCESS 2 0 160 VM ID Time0.1 0.1  
  
Start Time Finish Time 80.1 160.1  
  
CloudSimExample3 finished!

**RESULT:**

Thus, cloud is simulated in CloudSim Environment and the program is execute

## **PROCEDURE TO RUN A VIRTUAL MACHINE WITH DIFFERENT CONFIGURATION AND TO CHECK HOW MANY VIRTUAL MACHINES CAN BE UTILIZED AT A PARTICULAR TIME**

**EX.NO. : 3**

**AIM:** Use Eucalyptus and to demonstrate the following and Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at a particular time.

### **PROCEDURE:**

#### **STEP 1:**

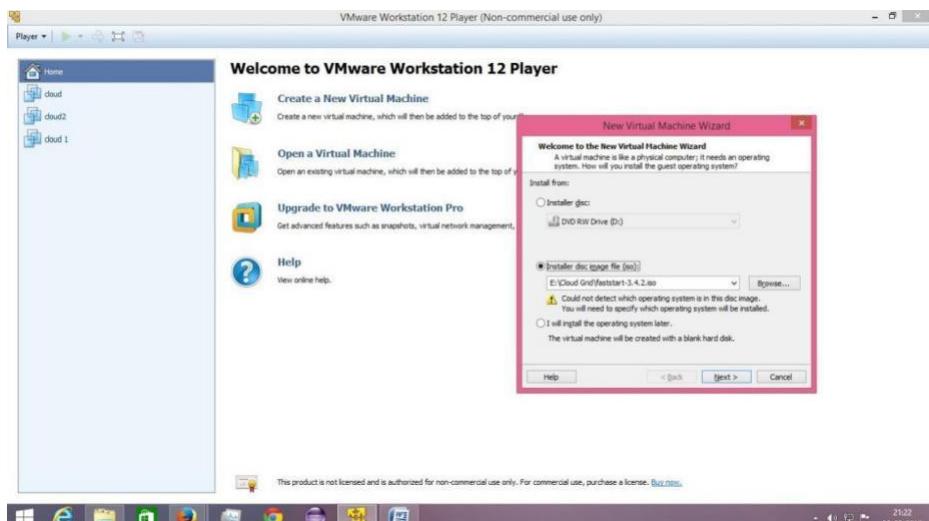
Install the virtual machine (vmware workstation)

12) Click **create new virtual machine.**

New virtual machine wizard dialog box appear, check the installer disk image file (iso).

Browse the faststat1.3.4.2.iso file from the path **E:\Cloud Grid\ faststat1.3.4.2.iso**

Click **next**



#### **STEP 2:**

Select the **LINUX** operating system. Version: **CENTOS 64-bit**

Click **next**

Create a virtual machine name as **cloud**(any name).

Browse the location for the virtual machine **E:\clougrid**

To make the folder,click browse 2.select **E:**



**Click make new folder**

**Give the name for folder**



#### **STEP 4:**

**Set maximum disk size as 40 GB.**

**Select the “Store virtual disk as single file” option. Click next**

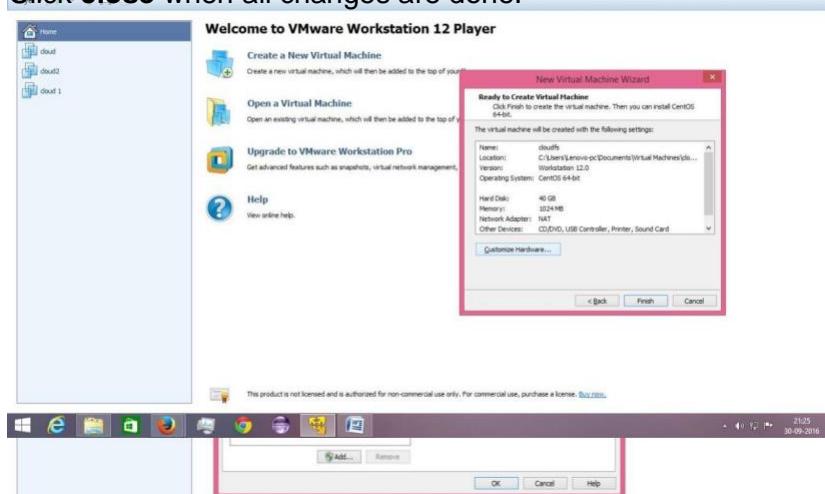


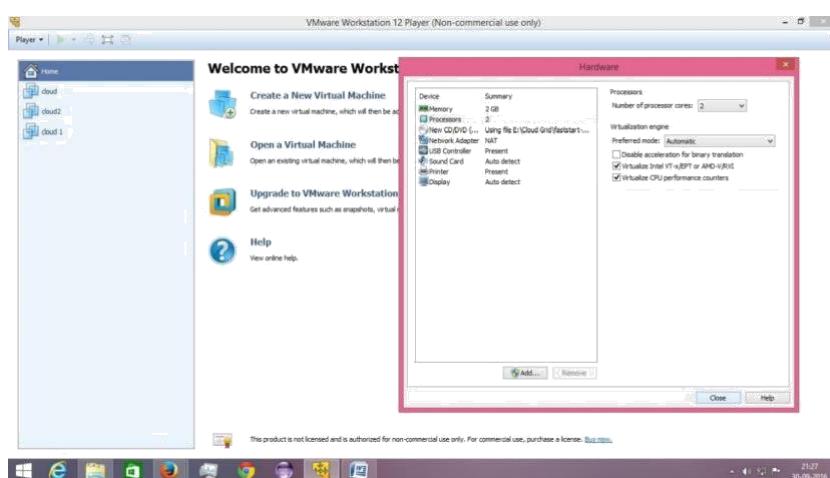
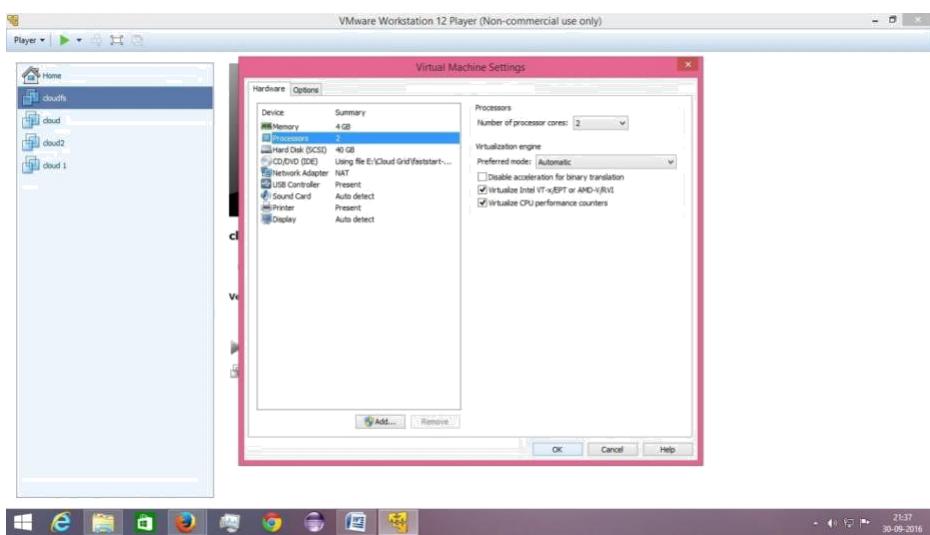
#### **STEP 5:**

**Select the “customize hardware option”. Select Memory as 4GB.**

**Select number of processors as 2 and select the two options "Virtualize Intel" and "Virtualize CPU".**

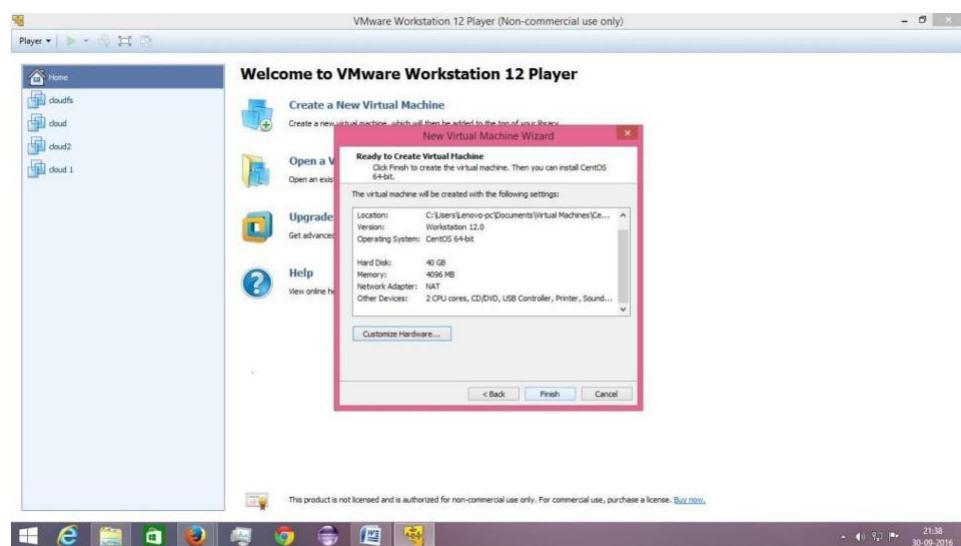
**Click close when all changes are done.**





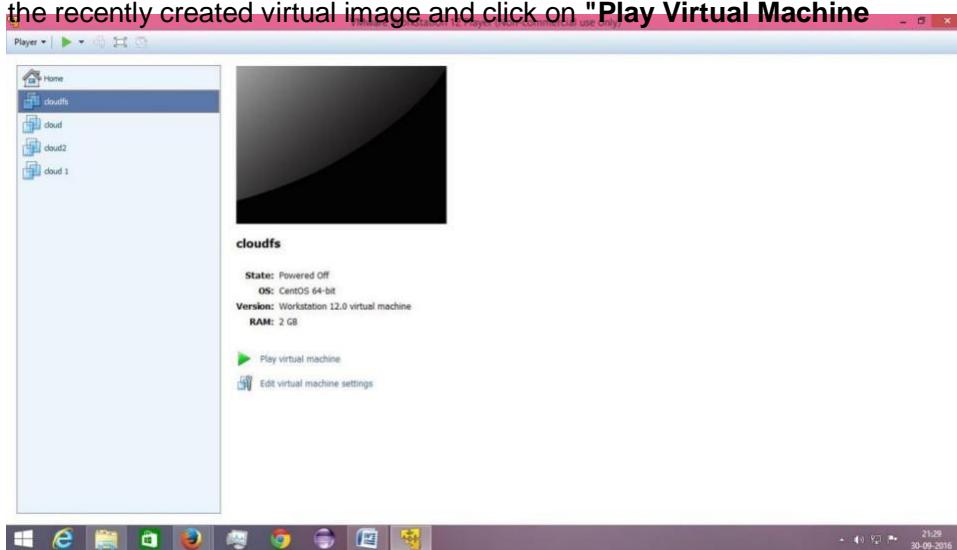
## **STEP 6:**

1. Click "Finish" on the next Screen.



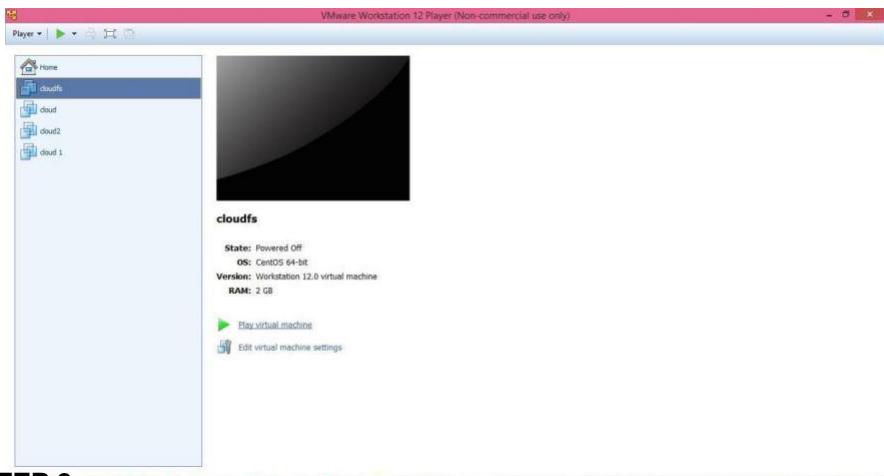
## **STEP 7**

Select the recently created virtual image and click on "Play Virtual Machine"



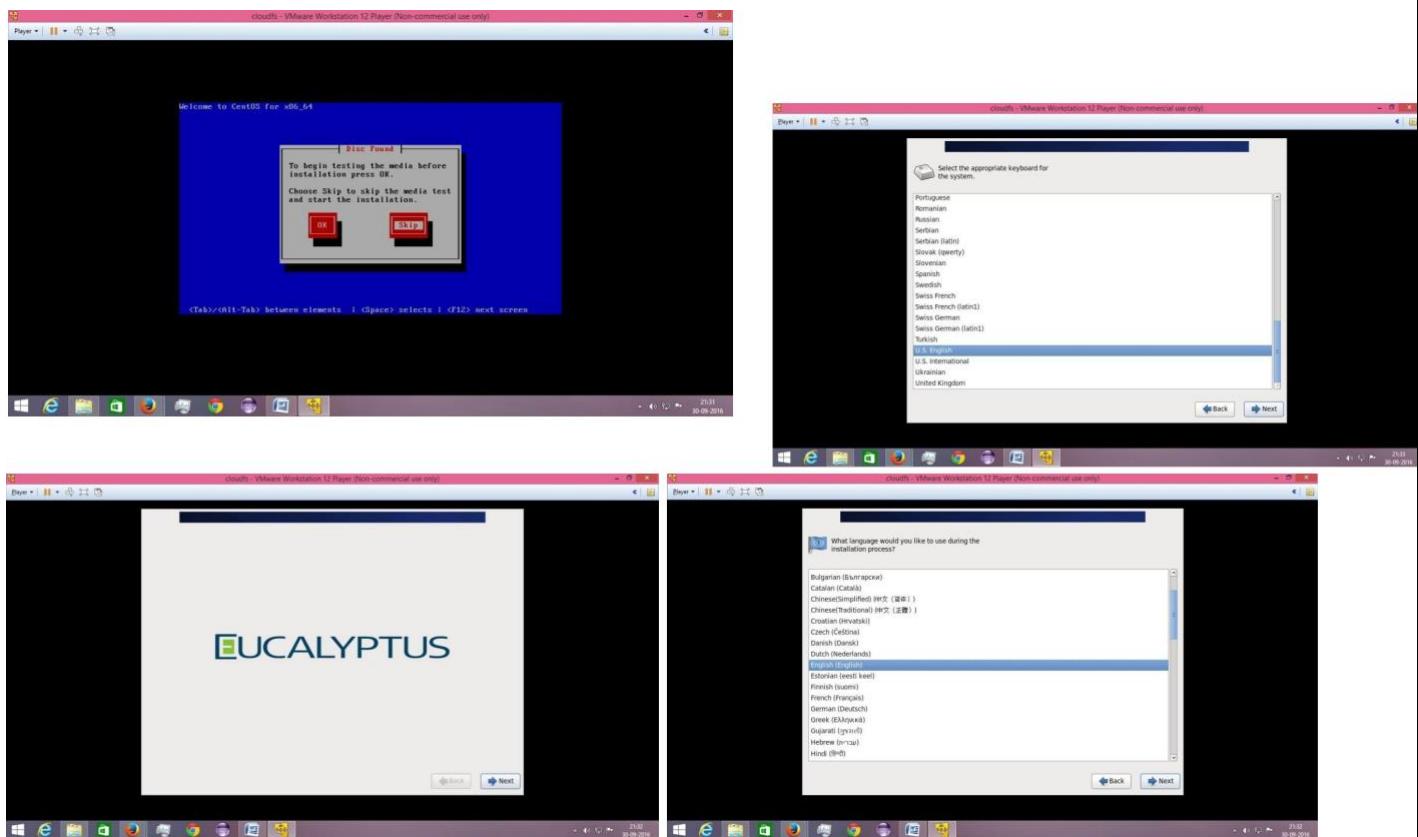
## **STEP 8:**

Click on "Install CentOS 6 with Eucalyptus Cloud-in-a-box".



## **STEP 9:**

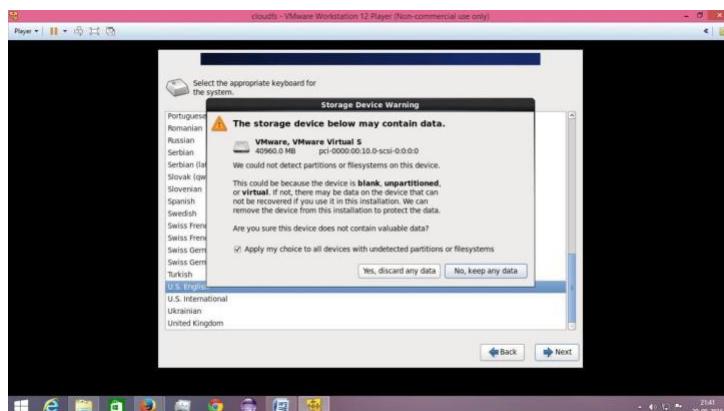
Click on "Skip" in the screen which asks for media test.



## Step 10:

Click On "Next" in the previous screens till you arrive at a **Storage Device**

**Warning.** Click on "Yes, Discard any data".



## STEP 11:

Select hostname as "**root**".

Select Network Interface as "**eth0**" and mode as "**Static**".

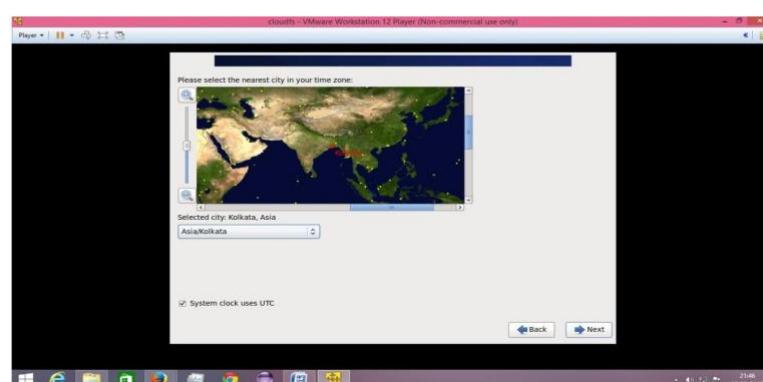
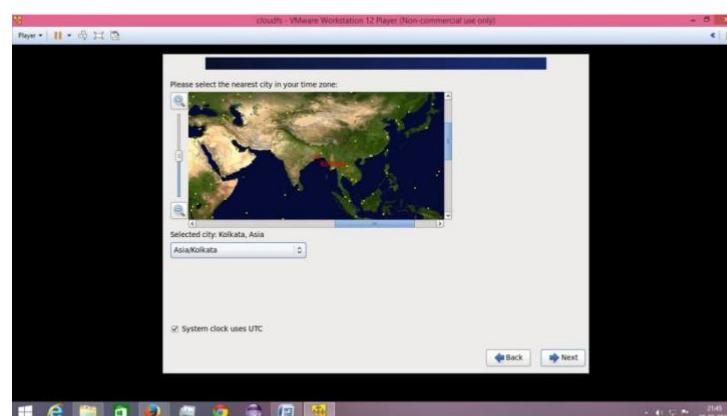
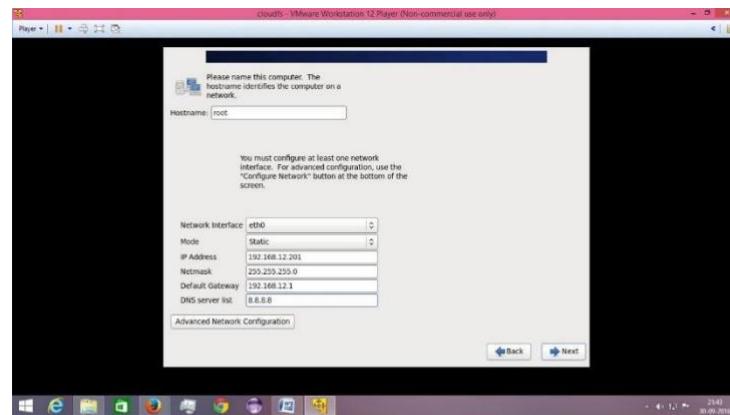
Enter the IP Address as "**192.168.12.201**" and Netmask "**255.255.255.0**".

Enter Default Gateway as "**192.168.12.1**" and DNS as "**8.8.8.8**".

Click **Next**.

Select city as

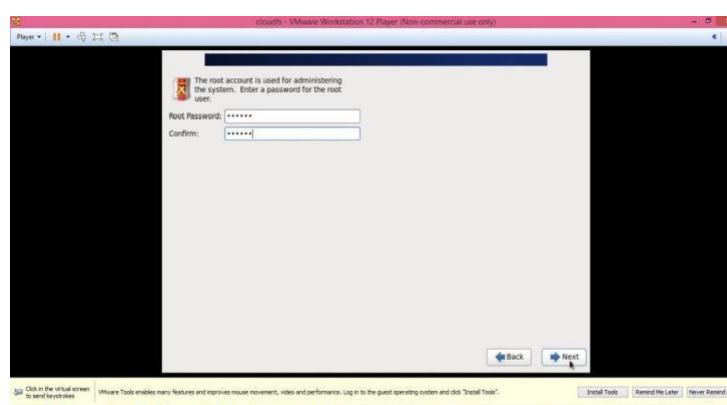
**"Kolkata/Asia"**. Click **Next**.

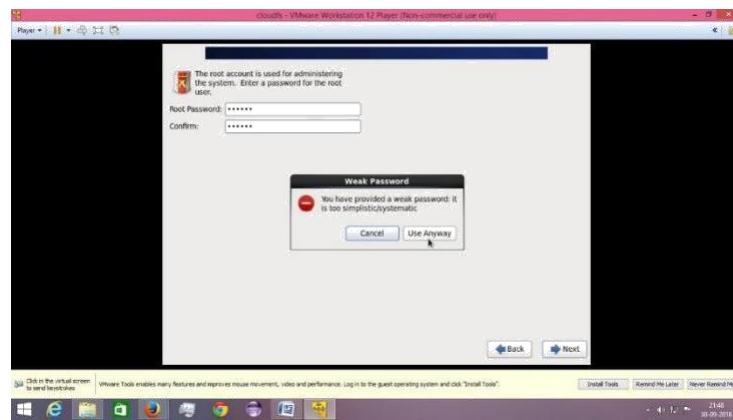


## STEP 12:

Enter your **root password:123456** and click

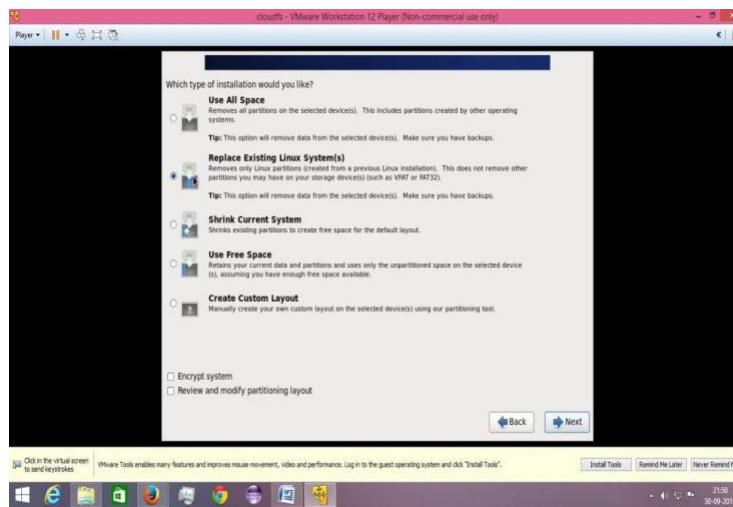
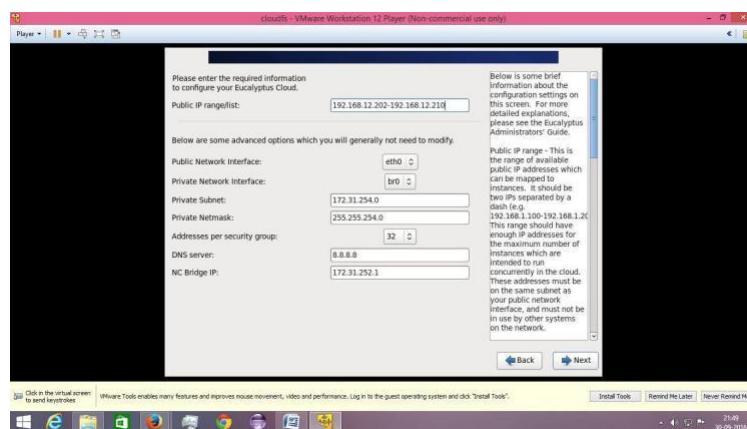
**Next.** Click on "Use Anyway".





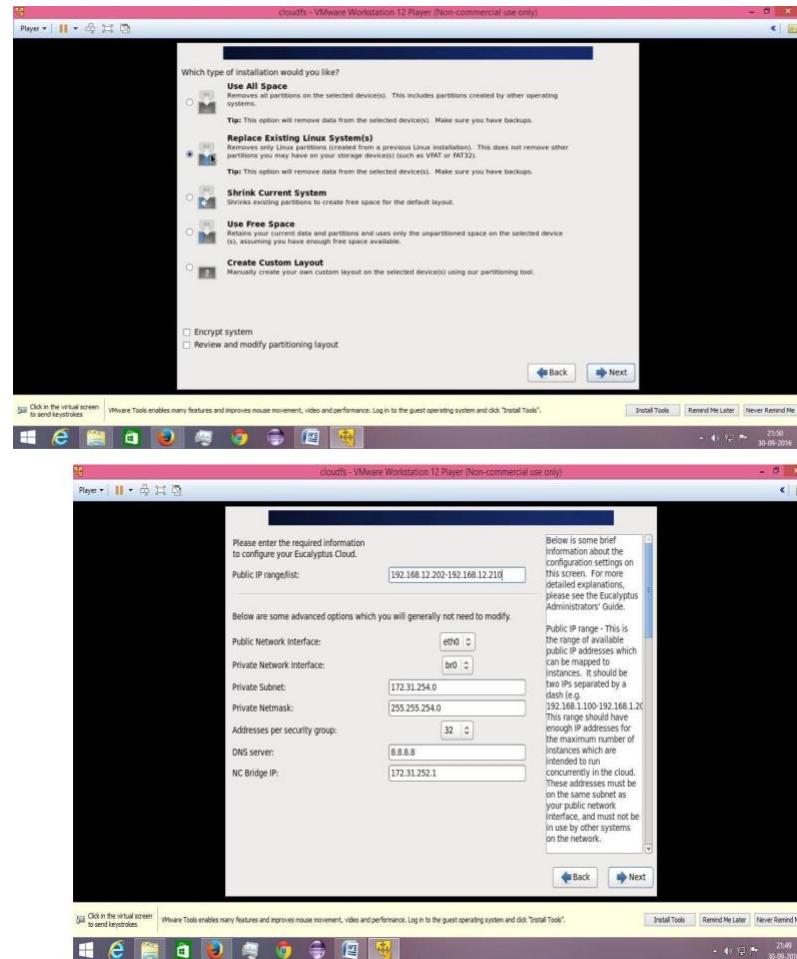
### **STEP 13:**

Enter the Public IP range as "**192.168.12.202-192.168.12.210**". Click on **Next**



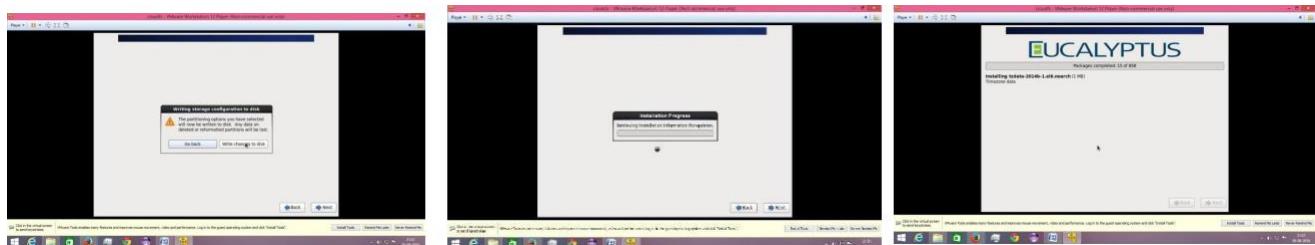
## **STEP 14:**

Select Replace Existing Linux Systems and click on **Next**.



## **STEP 15:**

Click on **Write Changes to Disk**.

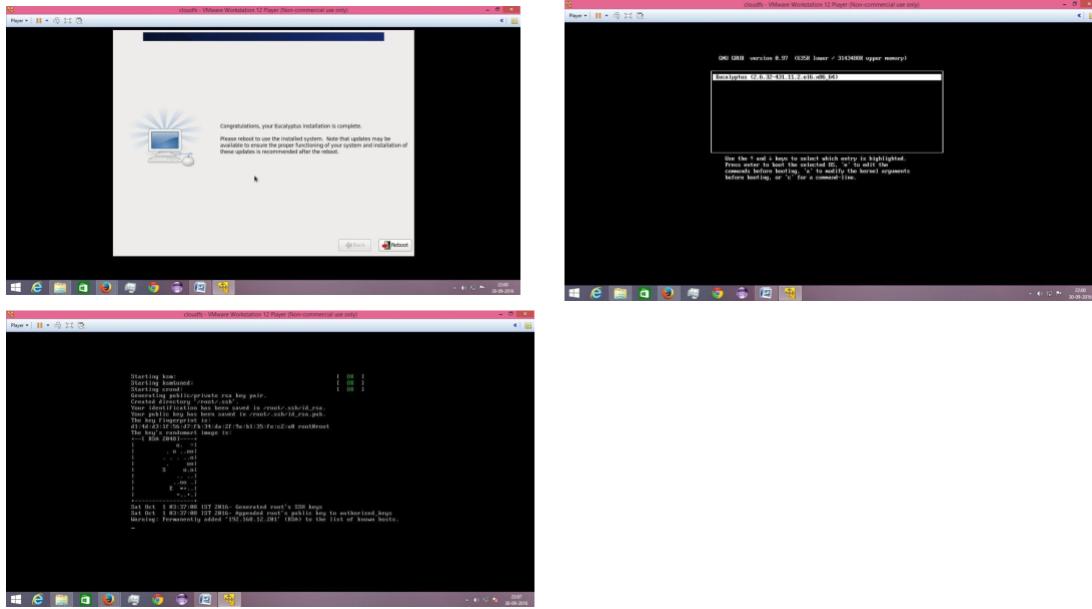


Wait for installation to complete

## **STEP 16:**

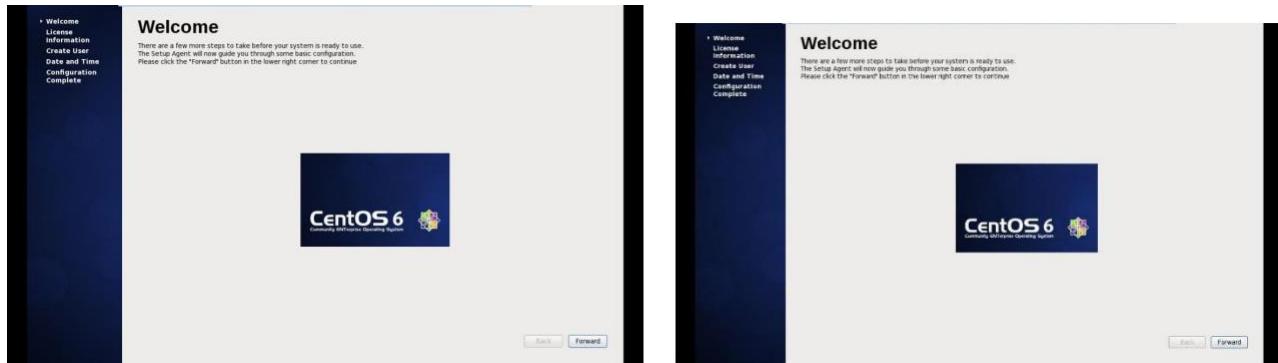
Click on **Reboot**.

Wait for CentOS to boot up.



## **STEP 17:**

Click on **Forward**.



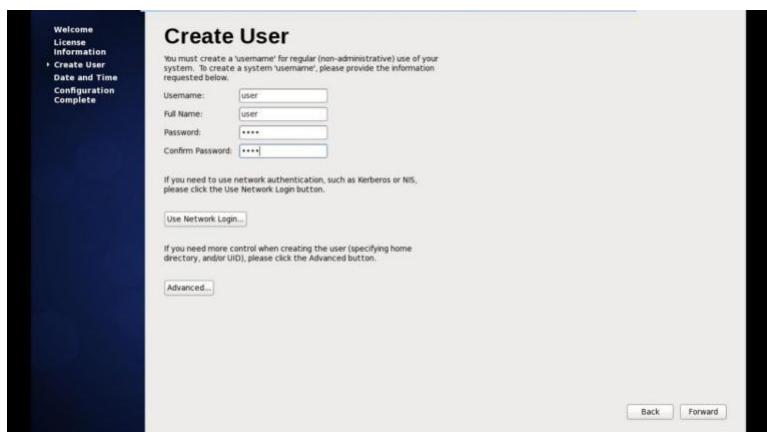
## **STEP 18:**

Type your Username:**user**, FullName:**user**, Password:**user** and Confirm Password:**user**.

Click on **Forward** when you are done.

Select "Yes" if dialog box appears.

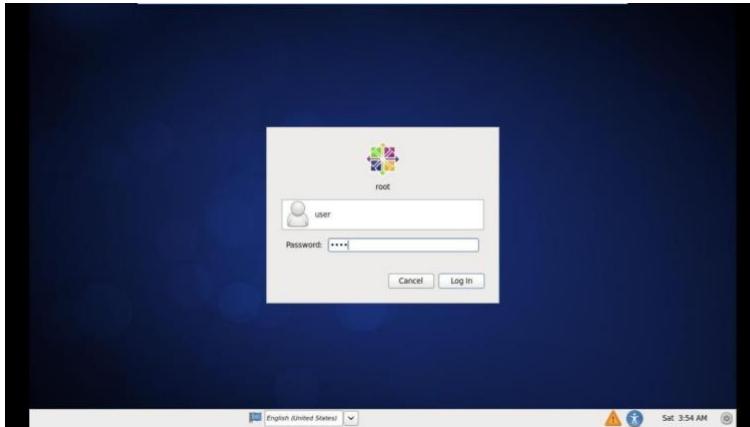
Click **Forward** and **Finish** when Configuration Complete Window appears.



## **STEP 19:**

Enter your password and Login into the system. User name:user

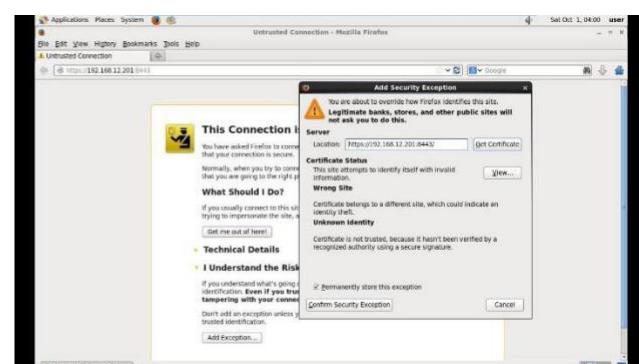
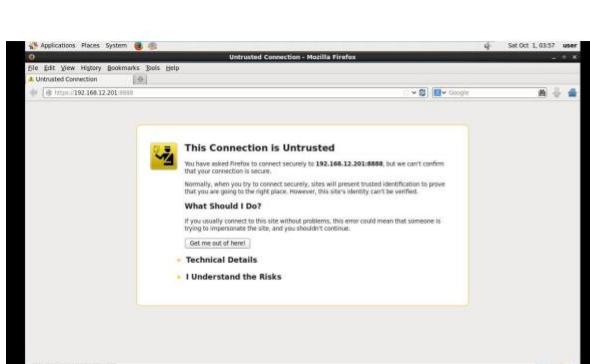
Password:user



## **STEP 20:**

Open Firefox and go to the URL - "**192.168.12.201:8888**" ( Or) click the eucalyptus user console

Click on "**I Understand the Risks**" and then click on "**Add Exception**". Click on "**Confirm Security Exception**".

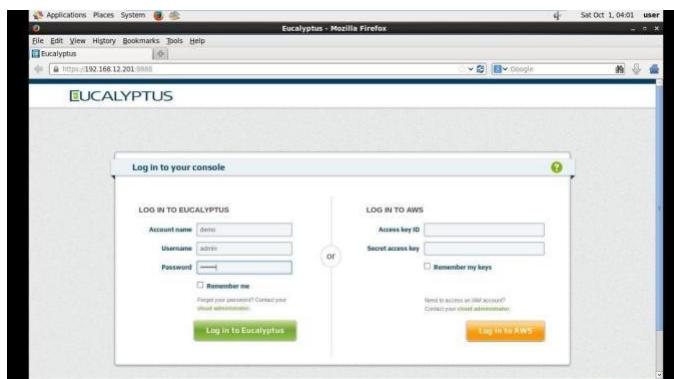


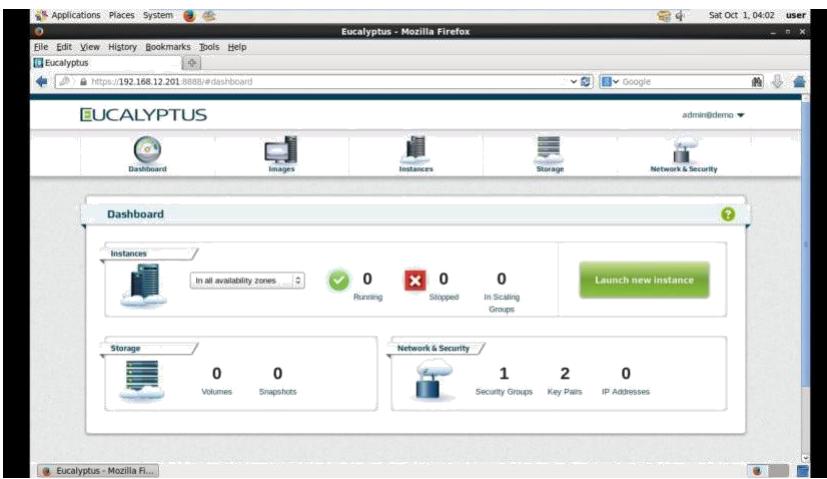
## **STEP 21:**

Log into the Eucalyptus

**Account name:demo, username: admin , password:**

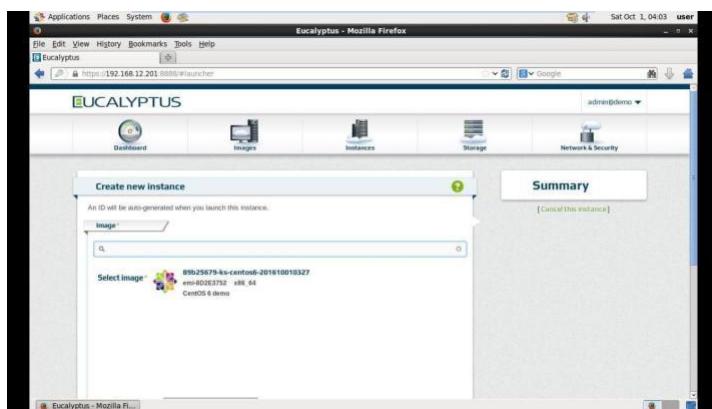
**123456 Click on "Launch new Instance"**





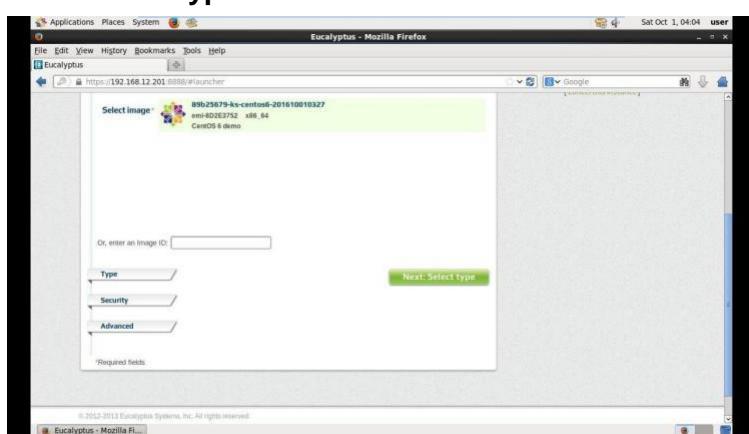
## **STEP 22:**

Select the **Image** to be used.



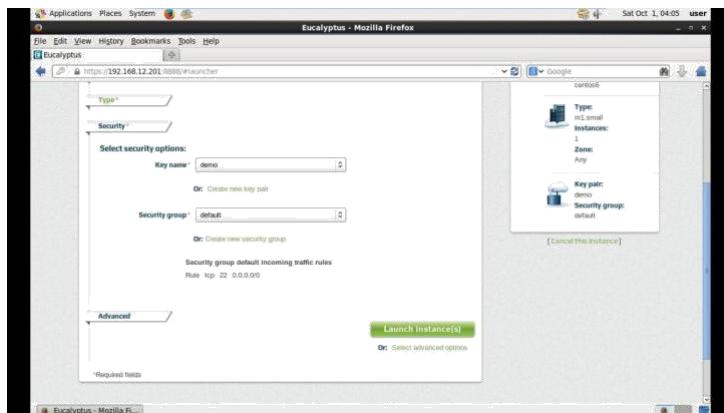
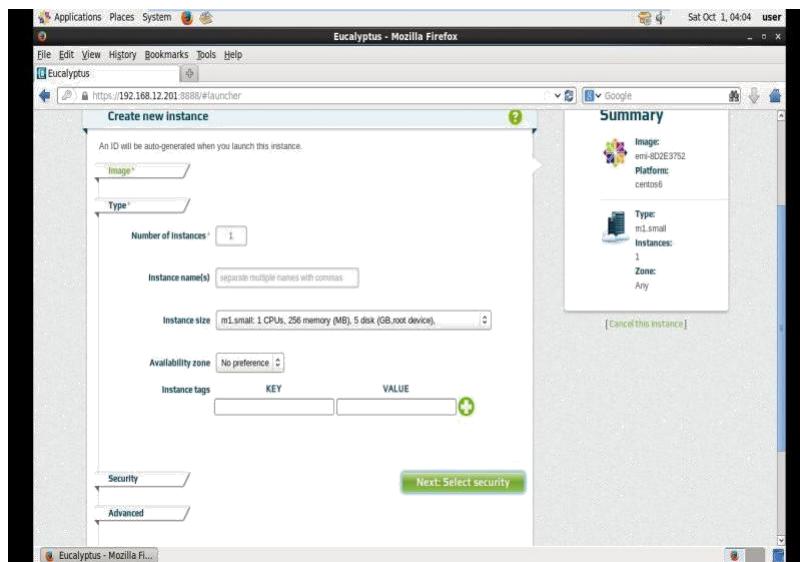
## **STEP 23:**

Select the **"Select Type"**.



## **STEP 24:**

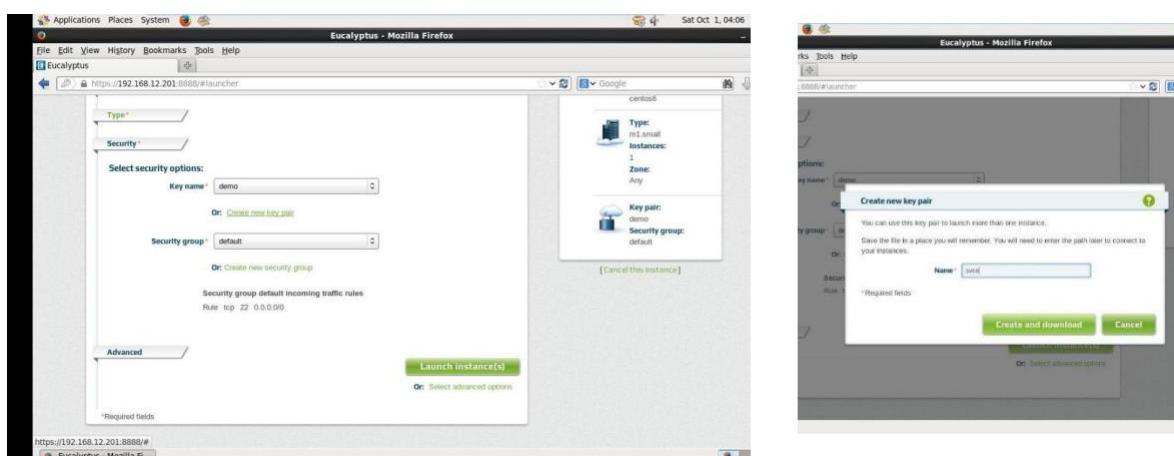
Select the **"Select Security"**.

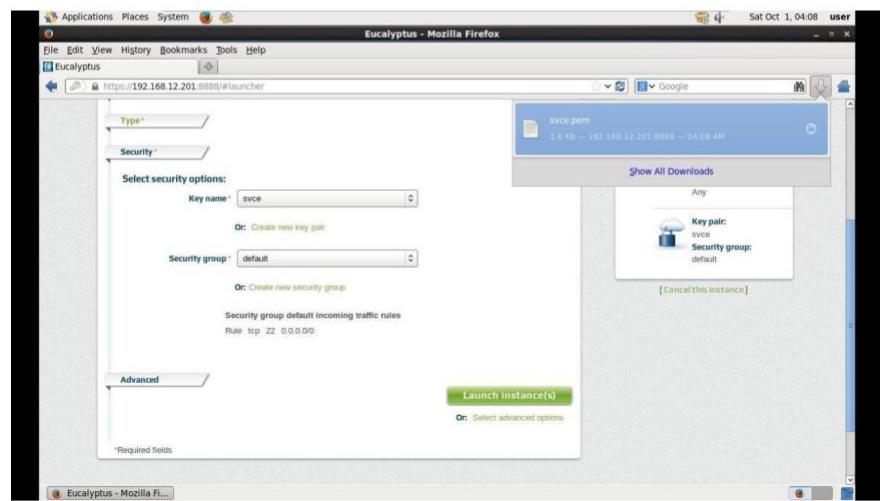
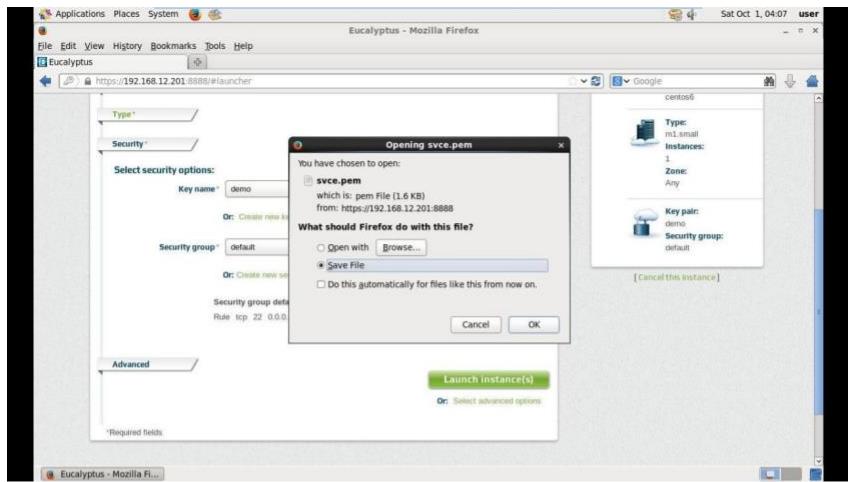


## **STEP 25:**

Select the "Create new key pair".

Give a name for your key pair and click on create and download and then on "**Save .pem File**" on the window that appears.





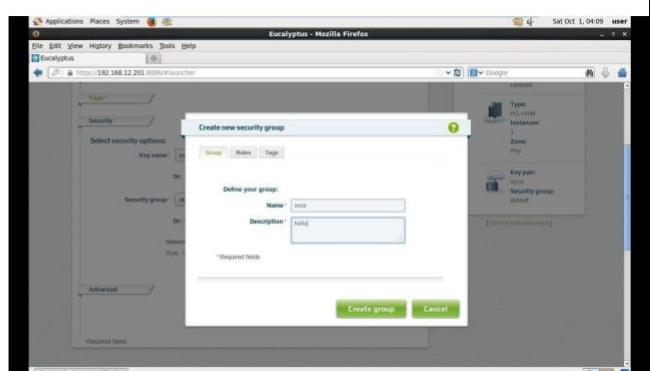
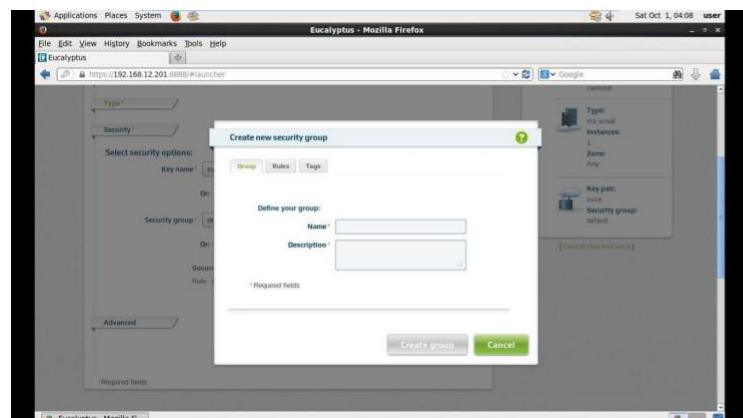
## STEP 26:

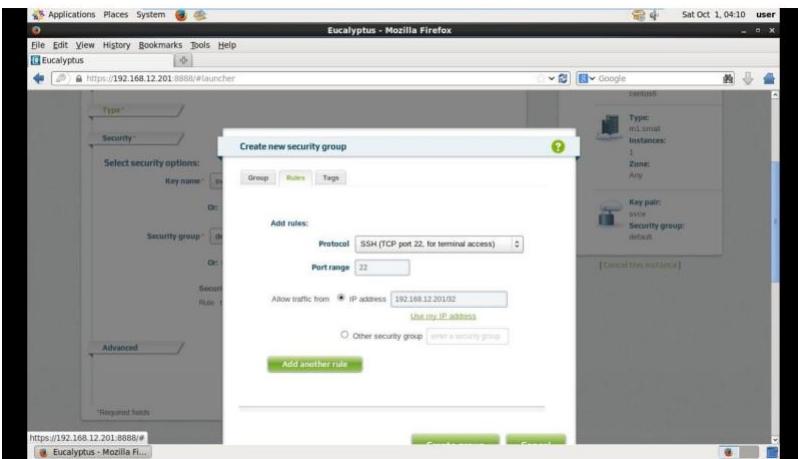
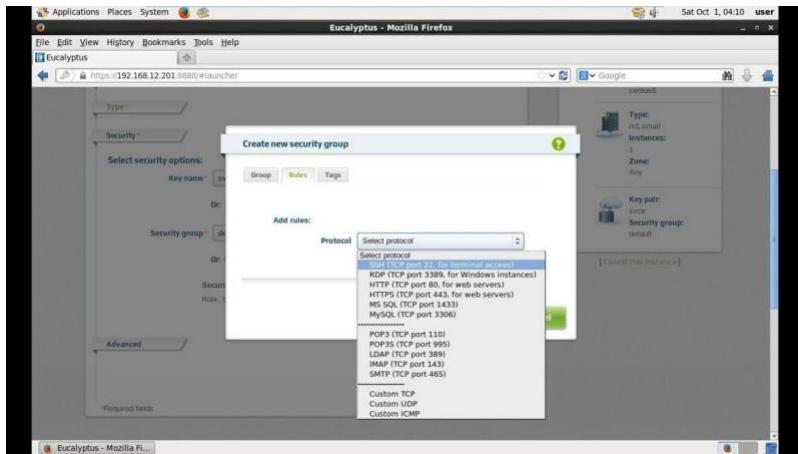
Select the "Create new Security Group".

Enter name as **svce** and description as "**Hello**".

Select Rules Tab and create a rule for the **SSH** protocol

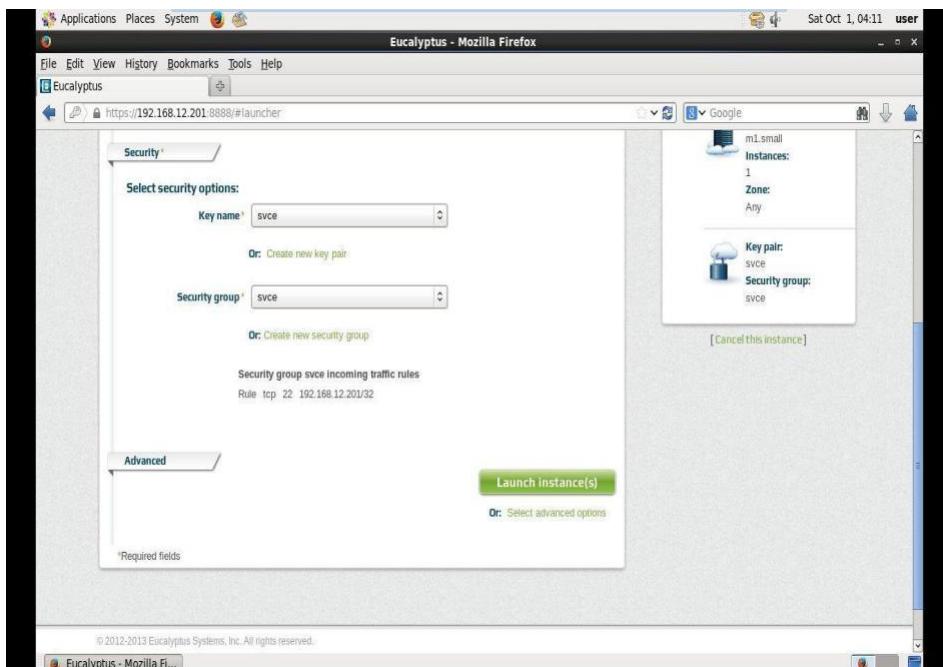
Enter IP address as "**192.168.12.202/32**" (or) click use my ip and click on "Create Group".

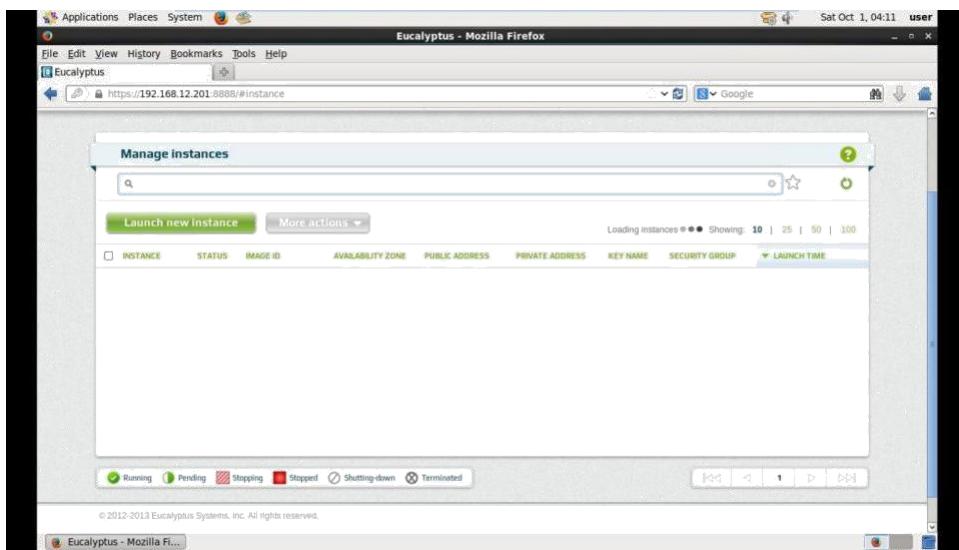




## STEP 27:

Click on **Launch Instance** and wait for the instance for launching.





## STEP 28:

Open a new Terminal.

Type the following

### 1.cd Downloads 2.ls

(This list all the files from the downloads)

3. chmod 400 svce.pem
4. ssh -i svce.pem [cloud-user@192.168.12.202](mailto:cloud-user@192.168.12.202) 5.lsblk

The left screenshot shows the Eucalyptus Management Console's 'Manage Instances' page. It lists one instance named 'emr-ID23752' with the following details:

INSTANCE	STATUS	IMAGE ID	AVAILABILITY ZONE	PUBLIC ADDRESS	PRIVATE ADDRESS	KEY NAME	SECURITY GROUP	LAUNCH TIME
emr-ID23752	Running	emr-ID23752	CLUSTER01	192.168.12.202	172.31.254.146	svce	svr	04:11:52 AM Oct 1st 2018

A status bar at the bottom indicates '© 2012-2013 Eucalyptus Systems, Inc. All rights reserved.' The right screenshot shows a terminal window with the command 'lsblk' executed, displaying disk block information for the instance.

**Result:** Thus the Eucalyptus is installed and used to run the virtual machine of different configuration and instance creation has been executed successfully.

## PROCEDURE TO ATTACH A VIRTUAL BLOCK TO THE VIRTUAL MACHINE AND CHECK WHETHER IT HOLDS DATA EVEN AFTER THE RELEASE OF THE VIRTUAL MACHINE

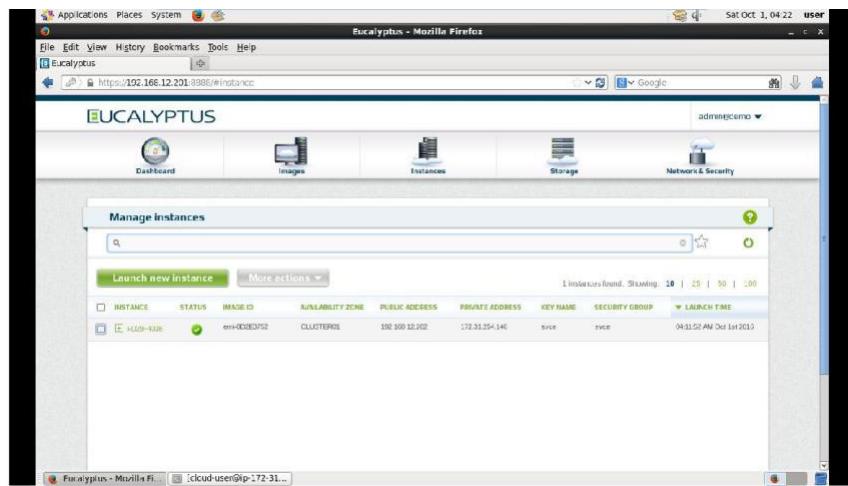
EX.NO. : 4

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

### PROCEDURE:

#### **STEP 1:**

- 1.create the **virtual machine installed** with centos.
- 2.create an **instance**(follow the previous exercise step).



#### **STEP 2:**

1. Click **Storage** and select **volume**.
2. Click **create new volume**.

The first screenshot shows the 'Storage' tab selected in the main menu. Below it, there are two tabs: 'Volumes' and 'Appoints'. The second screenshot shows the 'Create new volume' page, which has a table with columns: VOLUME, STATUS, SIZE (GB), ATTACHED TO INSTANCE, SNAPSHOT, AVAILABILITY ZONE, and CREATION TIME. There is one entry: VOLUME: vol-00003752, STATUS: Pending, SIZE (GB): 10, ATTACHED TO INSTANCE: None, SNAPSHOT: None, AVAILABILITY ZONE: CLUSTER01, CREATION TIME: 04:31:52 AM Oct 1st 2013.

#### **STEP 3:**

1. Create new volume dialog box will appear
2. Click general tab
3. Enter name : any name
4. Create from snapshot : none
5. Volume size : 1GB
6. Availability zone :cluster 01
7. Click create volume

The top window shows the 'Create new volume' dialog box with the following details:

- Name: vol1
- Create from snapshot: None
- Volume size (GB): 1
- Availability zone: CLUSTER01

The bottom window shows the 'Manage volumes' page with the following table:

VOLUME	STATUS	SIZE (GB)	ATTACHED TO INSTANCE	SAPSHOT	AVAILABILITY ZONE	CREATION TIME
vol 35A43BE3 [volume1]	available	1			CLUSTER01	09:24:45 AM 06 Oct 2018

#### **STEP 4:**

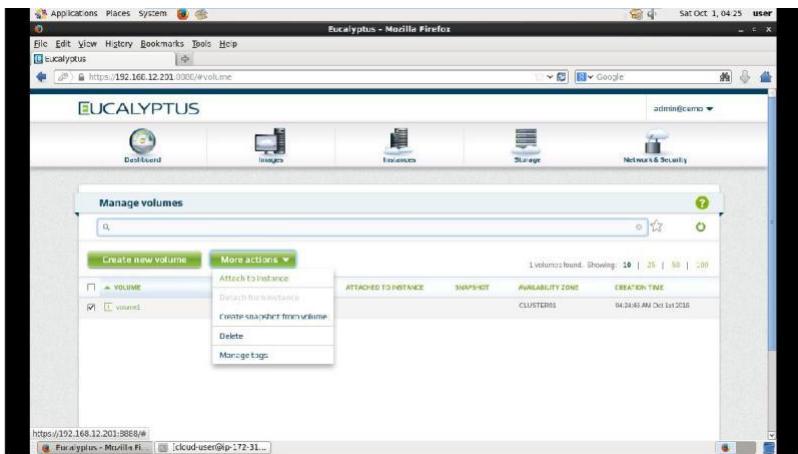
1. After volume is created successfully click more actions button
2. Select attach to instance from drop down menu.
3. Attach volume to instance dialog box will appear

The dialog box for 'Attach volume to instance' has the following fields:

- Volume: vol 35A43BE3 [volume1]
- Instance: i-029c4333
- Attach as device: /dev/sda

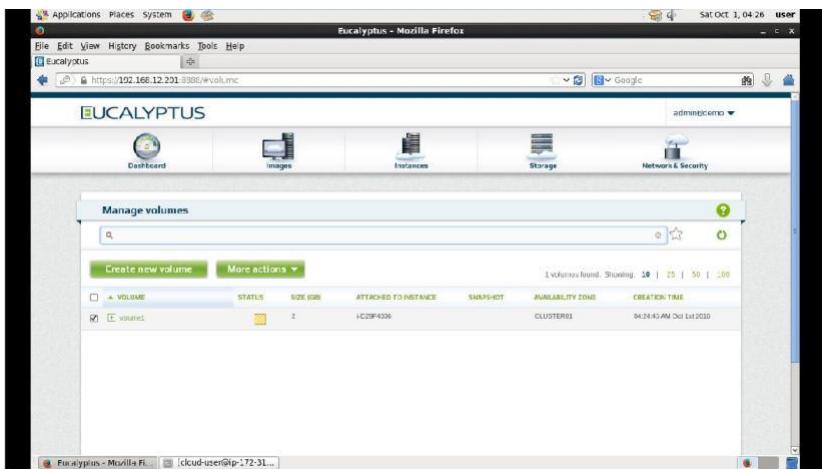
4. Ensure value is Entered for volume name, Instance(select from dropdown the instance which was created),attach as volume (/dev/sda).

5. Click attach.



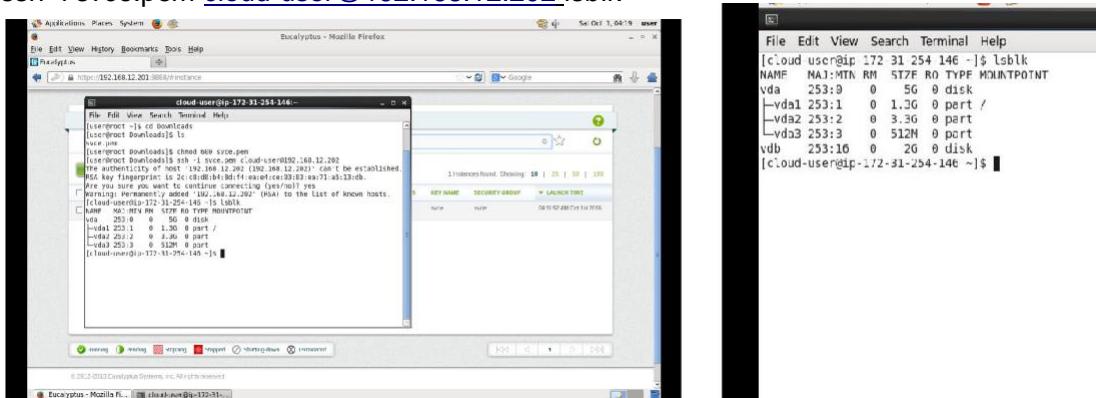
## STEP 5:

1. Ensure the status is in “in use”.



## STEP 6:

1. open terminal 2. Type the following  
cd Downloads ls chmod 400 svce.pem  
ssh -i svce.pem [cloud-user@192.168.12.202](https://cloud-user@192.168.12.202) lsblk



**RESULT:** Thus the volume has been successfully attached to the instance created and verified whether it holds the data even after the release of the virtual machine.

## USE EUCALYPTUS AND CREATE AN IMAGE AND EXECUTE THE INSTANCE WITH A STORAGE CONTROLLER AND INTERACT WITH IT

**EX.NO. : 5**

**AIM:** To create a virtual image execute the instance with a storage controller and interact with it.

### **PROCEDURE:**

#### **STEP 1:**

- Open new terminal
- Type the following

#### **Creating the kernel image:**

```
source credentials/admin/eucarc
```

```
euca-bundle-image -i ~/Desktop/Eucaimage/ vmlinuz-2.6.32-642.3.1.el6.x86_64 -r x86_64 - -kernel  
true
```

After this step the following will be created /var/tmp/bundle-hfWXvk/ vmlinuz-2.6.32-  
642.3.1.el6.x86\_64.manifest.xml

```
euca-upload-bundle -b kerimg -m /var/tmp/bundle-hfWXvk/ vmlinuz- 2.6.32-  
642.3.1.el6.x86_64.manifest.xml
```

(Note: kerimg is the user defined name/var/tmp/bundle-  
hfWXvk/ vmlinuz-2.6.32-642.3.1.el6.x86\_64.manifest.xml  
which is created under the bundle step (i.e)2)

After this step the following wil be created/vmlinuz-2.6.32- 642.3.1.el6.x86\_64.manifest.xml)

#### **2. euca-register kerimg/vmlinuz-2.6.32-642.3.1.el6.x86\_64.manifest.xml - a x86\_64 -n gcckernel**

**(Note:** /vmlinuz-2.6.32-642.3.1.el6.x86\_64.manifest.xml which is created under upload step (i.e)

3. Gcckernel is also user defined name.The two user defined names should not be same)

#### **3. EKI image will be created eki-6SD039D3(refer the screen shot) Screenshot for creating kernel image(eki image)**

The screenshot shows a terminal window titled "user@root:~". The terminal displays the following command sequence and its output:

```
[user@root ~]$ source credentials/admin/eucarc
[user@root ~]$ euca-bundle-image -i ~/Desktop/Eucaimage/vmlinuz-2.6.32-642.3.1.el6.x86_64 -r x86_64 - -kernel true
100% [=====] 4.07 MB 20.63 MB/s Time: 0:00:00
Wrote manifest /var/tmp/bundle-hfWXvk/vmlinuz-2.6.32-642.3.1.el6.x86_64.manifest.xml
[user@root ~]$ euca-upload-bundle -b kerimg -m /var/tmp/bundle-hfWXvk/vmlinuz-2.6.32-642.3.1.el6.x86_64.manifest.xml
vmlinuz-2.6.32-642.3.1.el6.x86_64.part.0 100% [=====] 4.02 MB 5.22 MB/s Time: 0:00:00
vmlinuz-2.6.32-642.3.1.el6.x86_64.manifest.xml 100% [=====] 3.42 kB 14.30 kB/s Time: 0:00:00
Uploaded kerimg/vmlinuz-2.6.32-642.3.1.el6.x86_64.manifest.xml
[user@root ~]$ euca-register kerimg/vmlinuz-2.6.32-642.3.1.el6.x86_64.manifest.xml -a x86_64 -n imagekernel
euca-register: error (InvalidAMINName.Duplicate): AMI name imagekernel is already in use by EMI eki-4D9A3831
[user@root ~]$ euca-register kerimg/vmlinuz-2.6.32-642.3.1.el6.x86_64.manifest.xml -a x86_64 -n gcckernel
IMAGE eki-6SD039D3
```

#### **STEP 2:**

#### **Creating the RAM image:**

Type the following in the same terminal

5. **euca-bundle-image -i ~/Desktop/Eucaimage/initramfs-2.6.32-642.3.1.el6.x86\_64.img -r x86\_64 -- ramdisk true**

After this step the following will be created /var/tmp/bundle-PnF6Y4/initramfs-2.6.32-642.3.1.el6.x86\_64.img.manifest.xml

6. **euca-upload-bundle -b ramimg/var/tmp/bundle-PnF6Y4/initramfs-2.6.32-642.3.1.el6.x86\_64.img.manifest.xml**

(Note: ramimg is the user defined name

/var/tmp/bundle-PnF6Y4/initramfs-2.6.32-642.3.1.el6.x86\_64.img.manifest.xml which is created under the bundle step (i.e)1)

After this step the following wil be createdramimg/initramfs- 2.6.32- 42.3.1.el6.x86\_64.img.manifest.xml)

7. **euca-register ramimg/initramfs-2.6.32-642.3.1.el6.x86\_64.img.manifest.xml -n gccram -a x86\_64**

(Note: /initramfs-2.6.32-642.3.1.el6.x86\_64.img.manifest.xml which is created under upload step (i.e) 2.gccram is also user defined name. The two user defined names should not be same)

8. ERI image will be created **eri-67F9346B3(refer the screen shot)**

**Screenshot for creating RAM image(eri image)**

```
[user@root ~]$ euca-bundle-image -i ~/Desktop/Eucaimage/initramfs-2.6.32-642.3.1.el6.x86_64.img -r x86_64 --ramdisk true
100% [=====] 26.71 MB 25.54 MB/s Time: 0:00:01
Wrote manifest /var/tmp/bundle-PnF6Y4/initramfs-2.6.32-642.3.1.el6.x86_64.img.manifest.xml
[user@root ~]$ euca-upload-bundle -b ramimg -m /var/tmp/bundle-PnF6Y4/initramfs-2.6.32-642.3.1.el6.x86_64.img.manifest.xml
initramfs-2.6.32-642.3.1.el6.x86_64.img.part.0 (1/3) 100% ===== 10.00 MB 56.94 MB/s Time: 0:00:00
initramfs-2.6.32-642.3.1.el6.x86_64.img.part.1 (2/3) 100% ===== 10.00 MB 70.76 MB/s Time: 0:00:00
initramfs-2.6.32-642.3.1.el6.x86_64.img.part.2 (3/3) 100% ===== 6.57 MB 50.94 MB/s Time: 0:00:00
initramfs-2.6.32-642.3.1.el6.x86_64.img.manifest.xml 100% ===== 3.70 KB 39.77 kB/s Time: 0:00:00
Uploaded ramimg/initramfs-2.6.32-642.3.1.el6.x86_64.img.manifest.xml
[user@root ~]$ euca-register ramimg/initramfs-2.6.32-642.3.1.el6.x86_64.img.manifest.xml -n gccram -a x86_64
IMAGE eri-67F9346B
```

**STEP 3:**

**Creating the MANIFEST image:**

**euca-bundle-image-i ~/Desktop/Eucaimage/root1.img -r x86\_64 - - kernel eki- 6SD039D3 - - ramdisk eri-67F9346B3**

After this step the following will be created /var/tmp/bundle Z61gwm/root1.img.manifest.xml

euca-upload-bundle-b rootimg -m /var/tmp/bundle-Z61gwm /root1.img.manifest.xml

(Note: rootimg is the user defined name /var/tmp/bundle-Z61gwm /root1.img.manifest.xml which is created under the bundle step (i.e)1) After this step the following wil be created rootimg/root1.img.manifest.xml)

**euca-register rootimg/root1.img.manifest.xml -n gccroot -a x86\_64 (Note:**

rootimg/root1.img.manifest.xml which is created under upload step (i.e) 2. gccroot is also user defined name.

The two user defined names should not be same)

EMI image will be created **emi-3E633FB3**(refer the screen shot) Screenshot for creating  
**MANIFEST image(emi image)**

```
[user@root ~]$ euca-bundle-image -i ~/Desktop/Eucaimage/root1.img -r x86_64 --kernel eki-65D039D3 --ra
ndisk eri-67F9346B
100% |=====| 2.00 GB 24.74 MB/s Time: 0:01:26
Wrote manifest /var/tmp/bundle-Z61gwm/root1.img.manifest.xml
[user@root ~]$ euca-upload-bundle -b rootimg -m /var/tmp/bundle-Z61gwm/root1.img.manifest.xml
root1.img.part.0 ( 1/59) 100% |=====| 10.00 MB 53.19 MB/s Time: 0:00:00
root1.img.part.1 ( 2/59) 100% |=====| 10.00 MB 56.14 MB/s Time: 0:00:00
root1.img.part.2 ( 3/59) 100% |=====| 10.00 MB 59.06 MB/s Time: 0:00:00
root1.img.part.3 ( 4/59) 100% |=====| 10.00 MB 52.35 MB/s Time: 0:00:00
root1.img.part.4 ( 5/59) 100% |=====| 10.00 MB 52.79 MB/s Time: 0:00:00
root1.img.part.5 ( 6/59) 100% |=====| 10.00 MB 50.33 MB/s Time: 0:00:00
root1.img.part.6 ( 7/59) 100% |=====| 10.00 MB 52.43 MB/s Time: 0:00:00
root1.img.part.7 ( 8/59) 100% |=====| 10.00 MB 49.16 MB/s Time: 0:00:00
root1.img.part.8 ( 9/59) 100% |=====| 10.00 MB 40.36 MB/s Time: 0:00:00
root1.img.part.9 (10/59) 100% |=====| 10.00 MB 51.04 MB/s Time: 0:00:00
root1.img.part.10 (11/59) 100% |=====| 10.00 MB 46.51 MB/s Time: 0:00:00
root1.img.part.11 (12/59) 100% |=====| 10.00 MB 50.90 MB/s Time: 0:00:00
root1.img.part.12 (13/59) 100% |=====| 10.00 MB 51.25 MB/s Time: 0:00:00
root1.img.part.13 (14/59) 100% |=====| 10.00 MB 38.22 MB/s Time: 0:00:00
root1.img.part.14 (15/59) 100% |=====| 10.00 MB 49.68 MB/s Time: 0:00:00
root1.img.part.15 (16/59) 100% |=====| 10.00 MB 35.49 MB/s Time: 0:00:00
root1.img.part.16 (17/59) 100% |=====| 10.00 MB 45.73 MB/s Time: 0:00:00
root1.img.part.17 (18/59) 100% |=====| 10.00 MB 54.09 MB/s Time: 0:00:00
root1.img.part.18 (19/59) 100% |=====| 10.00 MB 51.23 MB/s Time: 0:00:00
root1.img.part.19 (20/59) 100% |=====| 10.00 MB 47.56 MB/s Time: 0:00:00
root1.img.part.20 (21/59) 100% |=====| 10.00 MB 52.41 MB/s Time: 0:00:00
```

#### **STEP 4:**

This EMI image can be accessed only by the ADMIN.

This access privilege can be extended to all user by the following steps.

```
euca-modify-image-attribute -l -a all emi- 3E633FB3 (launch permission will be given to all groups)
```

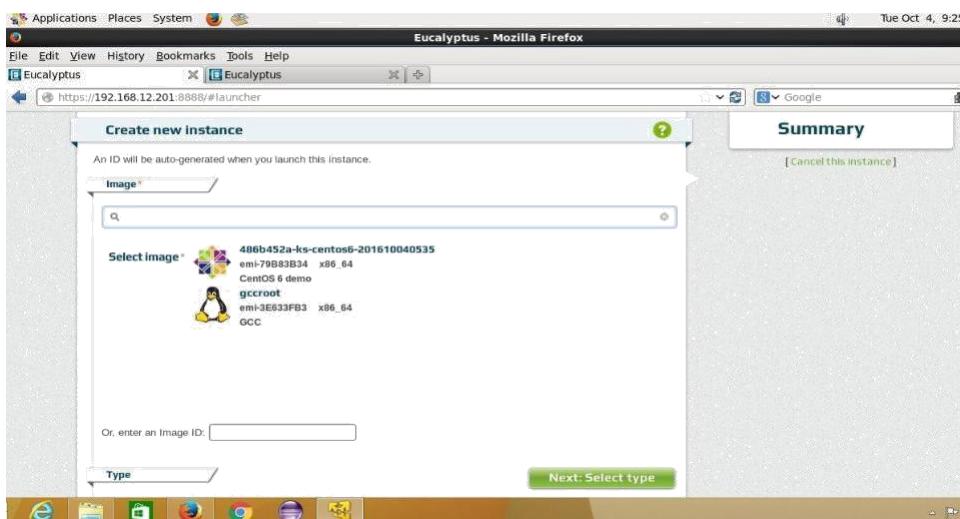
```
euca-modify-image-attribute - -description GCC emi-3E633FB3 (description name is assigned to emi
image. GCC is user defined name Refer the screenshot)
```

#### **Screenshot for launch permission**

```
[user@root ~]$ euca-modify-image-attribute -l -a all emi-3E633FB3
  launchPermission emi-3E633FB3 ADD Group all
#[user@root ~]$ euca-modify-image-attribute --description GCC emi-3E633FB3
  description emi-3E633FB3           GCC
[user@root ~]$
[user@root ~]$ █
```

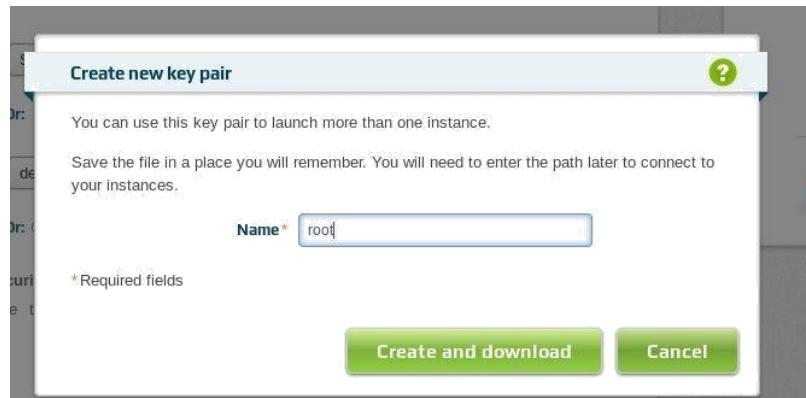
#### **STEP 5:**

- 1 Open browser and type: <https://192.168.12.201:8888> (or) click the eucalyptus user console directly.
- 2 Click Create new instance
- 3 You will find two image  
centos6 demo(already existed image) 2.gccroot( created image)
- 4 For creating an instance follow the procedure of eucalyptus instance creation,instead of selecting centos 6 demo **select gccroot**



## **STEP 6:**

- 5 Give instance name, instance size.
- 6 Next select security type where you will click.
6. create new pair(create and download it)
- 6.1 create new security group(create group and assign rules to it)
- 7 Click launch instance.
- 8 Instance will be created.



Eucalyptus - Mozilla Firefox

File Edit View Bookmarks Tools Help

Eucalyptus https://192.168.12.201:8988/instance Google

Manage instances

Launch new instance More actions ▾

1 instances found. Showing: 10 | 25 | 50 | 100

INSTANCE	STATUS	IMAGE ID	AVAILABILITY ZONE	PUBLIC ADDRESS	PRIVATE ADDRESS	KEY NAME	SECURITY GROUP	LAUNCH TIME
newimg	Running	emi-3E63F53	CLUSTER01	192.168.12.202	172.31.254.26	root	newroot	09:31:07 AM Oct 4th 2018

Group Rules Tags

Add rules:

Protocol SSH (TCP port 22, for terminal access)

Port range 22

Allow traffic from  IP address 192.168.12.201/32

Use my IP address

Other security group enter a security group

Add another rule

Create group Cancel

## **STEP 7:**

Open terminal

Type the following

### **1.Ping 192.168.12.202**

(check whether public address is establish connection)

**chmod 400 root.pem (changing the permission of pem file which is created when instance launched)  
ssh -i root.pem**

**centos@192.168.12.202 Su -**

**Password: centos**

(It changes from user to root)

```
root@ip-172-31-255-85:~ - □
File Edit View Search Terminal Help
[user@root ~]$ ping 192.168.12.202
PING 192.168.12.202 (192.168.12.202) 56(84) bytes of data.
64 bytes from 192.168.12.202: icmp_seq=1 ttl=64 time=0.177 ms
64 bytes from 192.168.12.202: icmp_seq=2 ttl=64 time=0.332 ms
64 bytes from 192.168.12.202: icmp_seq=3 ttl=64 time=0.311 ms
^Z
[1]+  Stopped                  ping 192.168.12.202
[user@root ~]$ ls
credentials  Documents  Music    Public    Videos
Desktop      Downloads   Pictures  Templates
[user@root ~]$ cd Downloads
[user@root Downloads]$ ls
kumara.pem  root.pem
[user@root Downloads]$ chmod 400 root.pem
[user@root Downloads]$ ssh -i root.pem centos@192.168.12.202
[centos@ip-172-31-255-85 ~]$ su -
Password:
[root@ip-172-31-255-85 ~]#
```

**RESULT : Thus an image is created and the instance is executed with a storage controller and interact with it**

## **INSTALL A C COMPILER IN THE VIRTUAL MACHINE AND EXECUTE A SAMPLE PROGRAM EX.NO. : 6**

## **AIM: To install a C compiler in the virtual machine and execute a sample program**

## **PROCEDURE:**

## **Step 1: Installation of GCC compiler**

## 1.Yum install gcc

(GCC will be installed from the local repository. After completion of gcc compiler, ready to run the C program)

To run the C program

## Open the terminal

## Execute the c program

- \* vi programname.c (for opening the program)
  - \* Press esc:wq (saving the program

```
[root@ip-172-31-255-85 ~]# yum install gcc
Loaded plugins: fastestmirror, presto
Setting up Install Process
Determining Fastest mirrors
GCC | 2.9 kB 00:00 ...
Resolving Dependencies
--> Running transaction check
--> Package gcc.x86_64 0:4.4.7-17.el6 will be installed
--> Processing Dependency: libgomp = 4.4.7-17.el6 for package: gcc-4.4.7-17.el6.x86_64
--> Processing Dependency: cpp = 4.4.7-17.el6 for package: gcc-4.4.7-17.el6.x86_64
--> Processing Dependency: glibc-devel >= 2.2.90-12 for package: gcc-4.4.7-17.el6.x86_64
--> Processing Dependency: cloog-ppl >= 0.15 for package: gcc-4.4.7-17.el6.x86_64
--> Processing Dependency: libgomp.so.1()(64bit) for package: gcc-4.4.7-17.el6.x86_64
--> Running transaction check
--> Package cloog-ppl.x86_64 0:0.15.7-1.2.el6 will be installed
--> Processing Dependency: libppl_c.so.2()(64bit) for package: cloog-ppl-0.15.7-1.2.el6.x86_64
--> Processing Dependency: libppl.so.7()(64bit) for package: cloog-ppl-0.15.7-1.2.el6.x86_64
```

```
[root@ip-172-31-255-85 ~]# yum install -y gcc
File Edit View Search Terminal Help
Dependencies Resolved

=====
Package           Arch      Version       Repository   Size
=====
Installing:
gcc              x86_64    4.4.7-17.el6  GCC          10 M
Installing for dependencies:
cloog-ppl        x86_64    0.15.7-1.2.el6  GCC          93 k
cpp              x86_64    4.4.7-17.el6  GCC          3.7 M
glibc-devel      x86_64    2.12-1.192.el6  GCC          988 k
glibc-headers    x86_64    2.12-1.192.el6  GCC          617 k
kernel-headers   x86_64    2.6.32-642.3.1.el6  GCC          4.4 M
libgomp          x86_64    4.4.7-17.el6  GCC          134 k
ppl              x86_64    0.10.2-11.el6  GCC          1.3 M

Transaction Summary
=====
Install     8 Package(s)

Total download size: 21 M
Installed size: 38 M
Is this ok? [y/N]: y
```

- \* cc programname.c (for compiling the program)  
./a.out (to see the output)

## Result:

Thus the image(gcc) has been created and the C program has been compiled successfully.

## FIND THE PROCEDURE TO SET UP THE ONE NODE HADOOP CLUSTER:

EX.NO. : 7

**AIM:** To find procedure to set up the one node hadoop cluster.

### PROCEDURE:

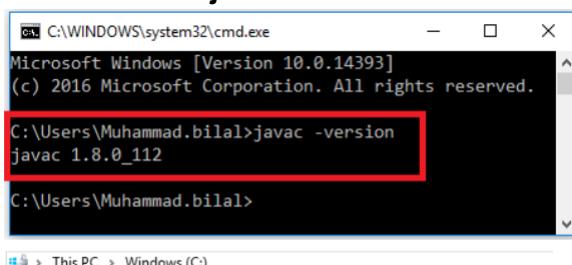
#### STEP 1:

These softwares should be prepared to install Hadoop 2.8.0 on window 10

64bit Download Hadoop 2.8.0 (Link: <http://www-eu.apache.org/dist/hadoop/common/hadoop-2.8.0/hadoop-2.8.0.tar.gz> OR  
<http://archive.apache.org/dist/hadoop/core//hadoop-2.8.0/hadoop-2.8.0.tar.gz>)  
Java JDK 1.8.0.zip (Link:  
<http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html>)

#### STEP 2:

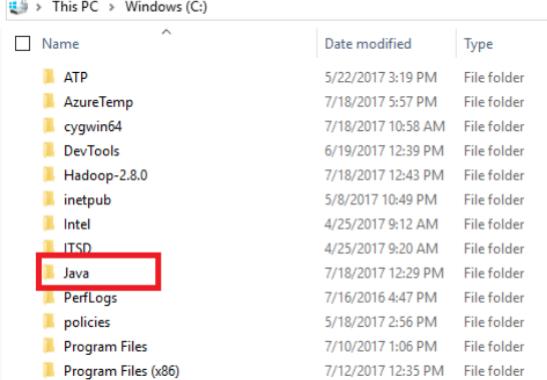
Check either Java 1.8.0 is already installed on your system or not, use "Javac - version" to check. java version



```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.

C:\Users\Muhammad.bilal>javac -version
javac 1.8.0_112

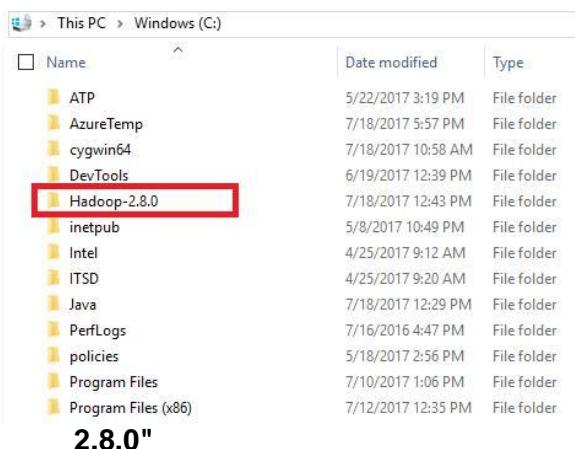
C:\Users\Muhammad.bilal>
```



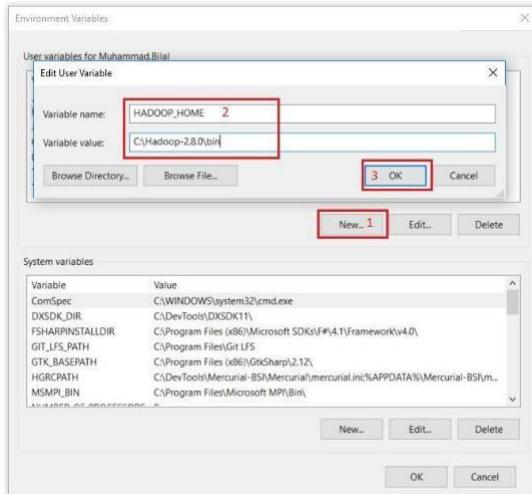
Name	Date modified	Type
ATP	5/22/2017 3:19 PM	File folder
AzureTemp	7/18/2017 5:57 PM	File folder
cygwin64	7/18/2017 10:58 AM	File folder
DevTools	6/19/2017 12:39 PM	File folder
Hadoop-2.8.0	7/18/2017 12:43 PM	File folder
inetpub	5/8/2017 10:49 PM	File folder
Intel	4/25/2017 9:12 AM	File folder
ITSD	4/25/2017 9:20 AM	File folder
Java	7/18/2017 12:29 PM	File folder
PerfLogs	7/16/2016 4:47 PM	File folder
policies	5/18/2017 2:56 PM	File folder
Program Files	7/10/2017 1:06 PM	File folder
Program Files (x86)	7/12/2017 12:35 PM	File folder

If Java is not installed on your system then first install java under "C:\JAVA" Java setup

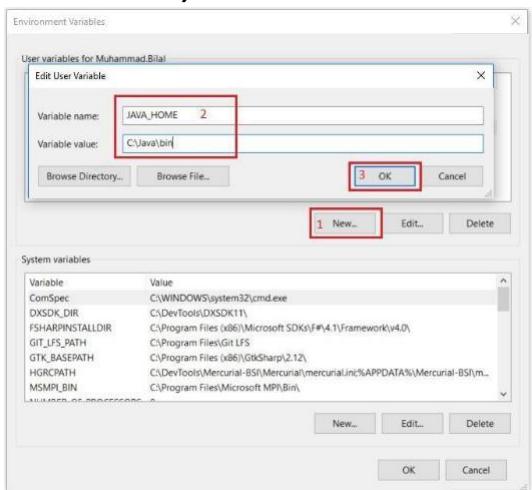
**Extract file Hadoop 2.8.0.tar.gz or Hadoop-2.8.0.zip and place under "C:\Hadoop-2.8.0"**



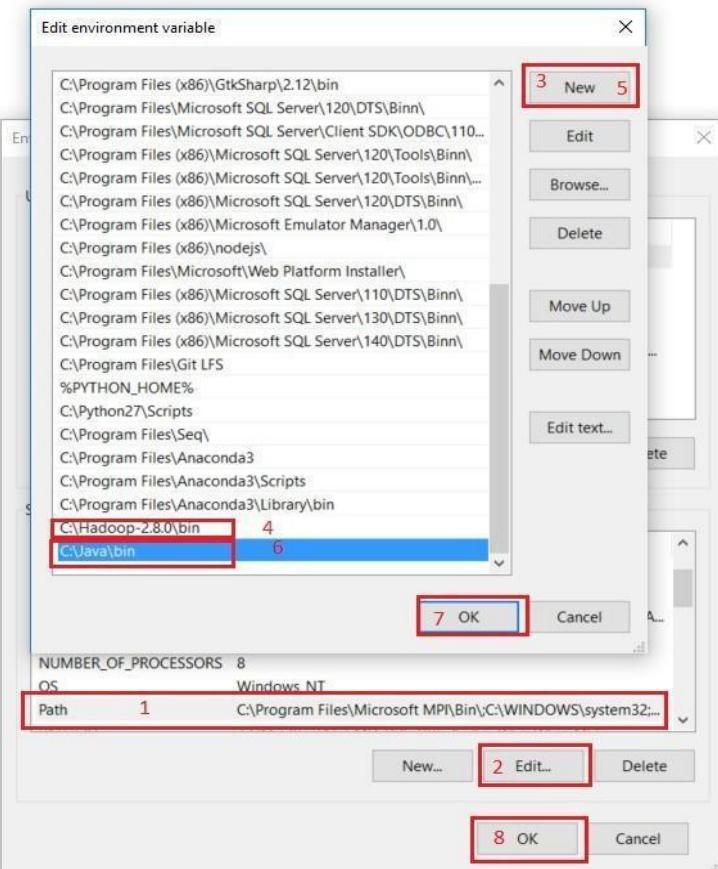
**Set the path HADOOP\_HOME Environment variable on windows 10(see Step 1,2,3 and 4 below).**



**Set the path JAVA\_HOME Environment variable on windows 10(see Step 1,2,3 and 4 below).**



Next we set the Hadoop bin directory path and JAVA bin directory path.



### STEP 3 : Configuration

Edit file **C:/Hadoop-2.8.0/etc/hadoop/core-site.xml**, paste below xml paragraph and save this file.

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

Rename "mapred-site.xml.template" to "mapred-site.xml" and edit this file **C:/Hadoop-**

**2.8.0/etc/hadoop/mapred-site.xml**, paste below xml paragraph and save this file.

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

Create folder "data" under "**C:\Hadoop-2.8.0**"

Create folder "datanode" under "**C:\Hadoop-2.8.0\data**"

Create folder "namenode" under "C:\Hadoop-2.8.0\data"

Name	Date modified	Type	Size
bin	7/20/2017 2:14 PM	File folder	
<input checked="" type="checkbox"/> data	7/20/2017 2:47 PM	File folder	
etc	7/20/2017 2:14 PM	File folder	
include	7/20/2017 2:14 PM	File folder	
lib	7/20/2017 2:14 PM	File folder	
libexec	7/20/2017 2:14 PM	File folder	
sbin	7/20/2017 2:14 PM	File folder	
share	7/20/2017 2:20 PM	File folder	
LICENSE.txt	3/17/2017 10:31 AM	TXT File	97 KB
NOTICE.txt	3/17/2017 10:31 AM	TXT File	16 KB
README.txt	3/17/2017 10:31 AM	TXT File	2 KB

Edit file C:\Hadoop-2.8.0\etc\hadoop\hdfs-site.xml, paste below xml paragraph and save this file.

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

Edit file C:/Hadoop-2.8.0/etc/hadoop/yarn-site.xml, paste below xml paragraph and save this file.

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

Edit file C:/Hadoop-2.8.0/etc/hadoop/hadoop-env.cmd by closing the command line     "JAVA\_HOME=%JAVA\_HOME%"     instead     of     set  
"JAVA\_HOME=C:\Java" (On C:\java this is path to file jdk.18.0)

```
%rem The java implementation to use. Required.
%rem set JAVA_HOME=%JAVA_HOME%
set JAVA_HOME=C:\java|
```

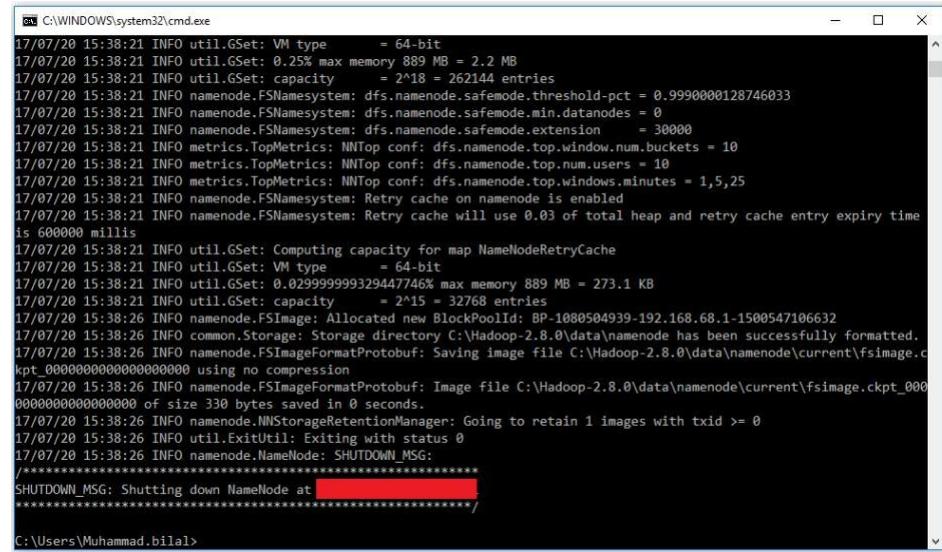
## STEP 4 : Hadoop Configuration

Download file Hadoop Configuration.zip (Link:

<https://github.com/MuhammadBilalYar/HADOOP-INSTALLATION-ON-WINDOW-10/blob/master/Hadoop%20Configuration.zip>

Delete file bin on C:\Hadoop-2.8.0\bin, replaced by file bin on file just download (from Hadoop Configuration.zip).

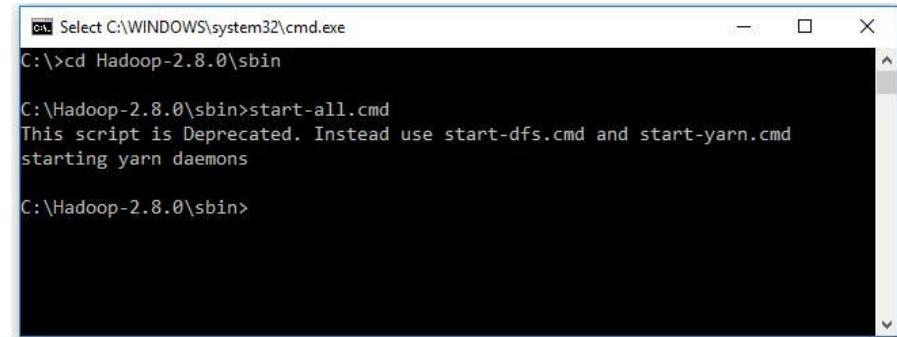
Open cmd and typing command "**hdfs namenode –format**". You will see



```
C:\WINDOWS\system32\cmd.exe
17/07/20 15:38:21 INFO util.GSet: VM type      = 64-bit
17/07/20 15:38:21 INFO util.GSet: 0.25% max memory 889 MB = 2.2 MB
17/07/20 15:38:21 INFO util.GSet: capacity     = 2^18 = 262144 entries
17/07/20 15:38:21 INFO namenode.FSNamesystem: dfs.namenode.safemode.threshold-pct = 0.9990000128746033
17/07/20 15:38:21 INFO namenode.FSNamesystem: dfs.namenode.safemode.min.datanodes = 0
17/07/20 15:38:21 INFO namenode.FSNamesystem: dfs.namenode.safemode.extension   = 30000
17/07/20 15:38:21 INFO metrics.TopMetrics: NNTop conf: dfs.namenode.top.window.num.buckets = 10
17/07/20 15:38:21 INFO metrics.TopMetrics: NNTop conf: dfs.namenode.top.num.users = 10
17/07/20 15:38:21 INFO metrics.TopMetrics: NNTop conf: dfs.namenode.top.windows.minutes = 1,5,25
17/07/20 15:38:21 INFO namenode.FSNamesystem: Retry cache on namenode is enabled
17/07/20 15:38:21 INFO namenode.FSNamesystem: Retry cache will use 0.03 of total heap and retry cache entry expiry time
is 600000 millis
17/07/20 15:38:21 INFO util.GSet: Computing capacity for map NameNodeRetryCache
17/07/20 15:38:21 INFO util.GSet: VM type      = 64-bit
17/07/20 15:38:21 INFO util.GSet: 0.02999999329447746% max memory 889 MB = 273.1 KB
17/07/20 15:38:21 INFO util.GSet: capacity     = 2^15 = 32768 entries
17/07/20 15:38:26 INFO namenode.FSImage: Allocated new BlockPoolID: BP-1080504939-192.168.68.1-1500547106632
17/07/20 15:38:26 INFO common.Storage: Storage directory C:/Hadoop-2.8.0\data\namenode has been successfully formatted.
17/07/20 15:38:26 INFO namenode.FSImageFormatProtobuf: Saving image file C:/Hadoop-2.8.0\data\namenode\current\fimage.c
kpt_0000000000000000 using no compression
17/07/20 15:38:26 INFO namenode.FSImageFormatProtobuf: Image file C:/Hadoop-2.8.0\data\namenode\current\fimage.ckpt_000
00000000000000 of size 330 bytes saved in 0 seconds.
17/07/20 15:38:26 INFO namenode.NNStorageRetentionManager: Going to retain 1 images with txid >= 0
17/07/20 15:38:26 INFO util.ExitUtil: Exiting with status 0
17/07/20 15:38:26 INFO namenode.NameNode: SHUTDOWN_MSG:
*****Shutdown MSG: Shutting down NameNode at *****/*****
SHUTDOWN MSG: Shutting down NameNode at *****/*****
*****/*****
C:\Users\Muhammad.bilal>
```

## STEP 5 : Testing

Open cmd and change directory to "C:\Hadoop-2.8.0\sbin" and type "**start- all.cmd**" to start apache.



```
Select C:\WINDOWS\system32\cmd.exe
C:\>cd Hadoop-2.8.0\sbin
C:\Hadoop-2.8.0\sbin>start-all.cmd
This script is Deprecated. Instead use start-dfs.cmd and start-yarn.cmd
starting yarn daemons
C:\Hadoop-2.8.0\sbin>
```

Make sure these apps are running

2. Hadoop Namenode
3. Hadoop datanode
4. YARN Resource Manager
5. YARN Node Manager



```
Apache Hadoop Distribution [Hadoop_namenode]
Apache Hadoop Distribution [Hadoop_datanode]
Apache Hadoop Distribution [YARN_ResourceManager]
Apache Hadoop Distribution [YARN_Nodemanager]
for /D %i in (%*) do tasklist /FI "IMAGENAME eq %i" /NH & echo %i
17/07/17 15:50:09 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17 15:50:12 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17 15:50:15 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17 15:50:18 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17 15:50:21 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17 15:50:24 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17 15:50:27 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17 15:50:30 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17 15:50:33 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17 15:50:36 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
d-85403017/07/20 15:50:39 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
09fc17/IN17/07/20 15:50:42 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17/07/20 15:50:46 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17/07/20 15:50:49 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
0_0f-17/07/20 15:50:52 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17/07/20 15:50:55 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17/07/20 15:50:58 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17/07/20 15:51:01 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17/07/20 15:51:04 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17/07/20 15:51:07 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
F-7sec 17/07/20 15:51:10 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
075/17/07/20 15:51:13 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
5085f(17/07/20 15:51:15 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
p Rtt/07/20 15:51:17 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/17/07/20 15:51:20 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/20 15:51:25 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
C<17/07/20 15:51:29 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/20 15:51:32 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
17/07/20 15:51:35 WARN util.SysInfoWindows: Expected split length of sysInfo to be 11. Got 7
```

Open: <http://localhost:8088>

The screenshot shows the 'All Applications' section of the Hadoop cluster metrics. It includes tables for Cluster Metrics, Cluster Nodes Metrics, Scheduler Metrics, and a detailed table for Applications. The Applications table has columns for ID, User, Name, Application Type, Queue, Application Priority, Start Time, Finish Time, State, Final Status, Running Containers, Allocated CPU Vcores, Allocated Memory MB, % of Queue, % of Cluster, Progress, Tracking UI, and Blacklisted Nodes. A search bar and pagination controls are also present.

Open: <http://localhost:50070>

The screenshot shows the 'Overview' tab of the HDFS health page. It displays basic cluster information: Started (Thu Jul 20 15:44:11 +0500 2017), Version (2.8.0, r91f2b7a13d1e97b...), Compiled (Fri Mar 17 09:12:00 +0500 2017 by jdu from branch-2.8.0), Cluster ID (CID-098b09fc-fc...), and Block Pool ID (BP-10805049-47106632).

## Overview 'localhost:9000' (active)

Started:	Thu Jul 20 15:44:11 +0500 2017
Version:	2.8.0, r91f2b7a13d1e97b...7cc29ac0009
Compiled:	Fri Mar 17 09:12:00 +0500 2017 by jdu from branch-2.8.0
Cluster ID:	CID-098b09fc-fc...df7b674
Block Pool ID:	BP-10805049-47106632

## Summary

Security is off.

Safemode is off.

1 files and directories, 0 blocks = 1 total filesystem object(s).

Heap Memory used 36.53 MB of 311 MB Heap Memory. Max Heap Memory is 889 MB.

Non Heap Memory used 40.68 MB of 41.53 MB Committed Non Heap Memory. Max Non Heap Memory is <unbounded>.

Configured Capacity:	475.24 GB
DFS Used:	321 B (0%)
Non DFS Used:	261.08 GB

## RESULT:

Thus, the one node hadoop cluster has been set up successfully.

**WRITE A PROGRAM TO USE THE APIs OF HADOOP TO INTERACT WITH IT**

EX.NO. : 8

**AIM:** To write a program to use the API's of hadoop to interact with it

## **PROCEDURE:**

## **STEP 1.**

## Prepare

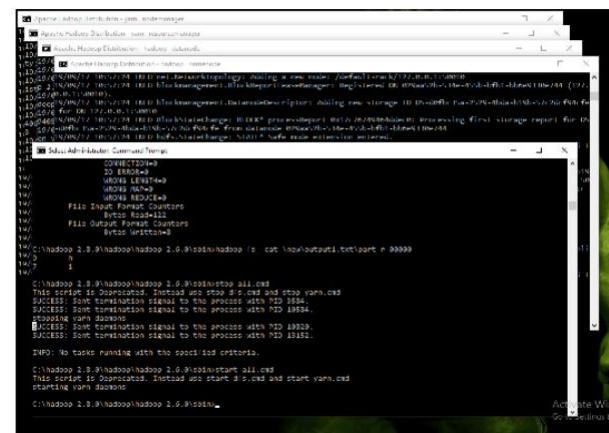
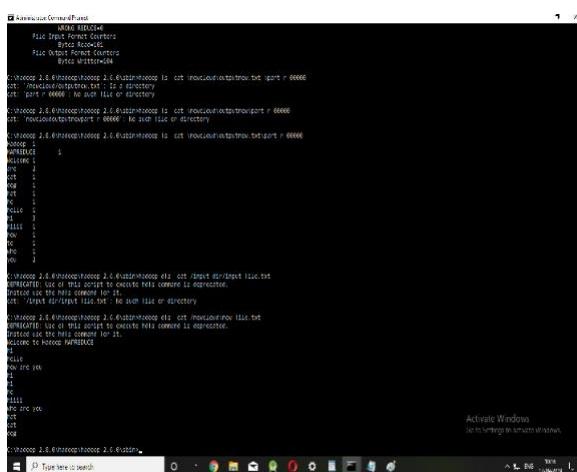
Download Input\_file.txt (Link: [https://github.com/MuhammadBilalYar/HADOOP-INSTALLATION-ON-WINDOW-10/blob/master/input\\_file.txt](https://github.com/MuhammadBilalYar/HADOOP-INSTALLATION-ON-WINDOW-10/blob/master/input_file.txt))

Place both files in "C:/"

## **STEP 2-**

Hadoop Operation

1. Open cmd in Administrative mode and move to "C:/Hadoop-2.8.0/sbin" and start cluster Start-all.cmd



2. Create an input directory in HDFS. hadoop fs -mkdir /input\_dir
  3. Copy the input text file named input\_file.txt in the input directory (input\_dir) of HDFS. hadoop fs -put C:/input\_file.txt /input\_dir
  4. Verify input\_file.txt available in HDFS input directory (input\_dir). hadoop fs -ls /input\_dir/
  5. Verify content of the copied file.  
hadoop dfs -cat /input\_dir/input\_file.txt

**RESULT:** Thus the program to use the apis of hadoop to interact with it are executed successfully

**WRITE A WORDCOUNT PROGRAM TO DEMONSTRATE THE USE OF MAP AND REDUCE**

## **TASKS EX.NO. :9**

## **AIM:**

To write a program to use the API's of hadoop to interact with it and write a wordcount program to demonstrate the use of map and reduce task.

## **PROCEDURE:**

## **STEP 1.**

## Prepare

Download MapReduceClient.jar (Link:  
<https://github.com/MuhammadBilalYar/HADOOP-INSTALLATION-ON-WINDOWS>

Download Input\_file.txt (Link: <https://github.com/MuhammadBilalYar/HADOOP-INSTALLATION-ON-WINDOWS-10-11>)

Place both files in "C:/"

## **STEP 8-**

## **STEP 2: Hadoop Operation**

Open cmd in Administrative mode and move to "C:/Hadoop-2.8.0/sbin" and start cluster Start-all.cmd

- a. Create an input directory in HDFS. `hadoop fs -mkdir /input_dir`
  - b. Copy the input text file named `input_file.txt` in the input directory (`/input_dir`) of HDFS. `hadoop fs -put C:/input_file.txt /input_dir`
    - i. Verify `input_file.txt` available in HDFS input directory (`/input_dir`). `hadoop s -ls /input_dir/`
    - ii. Verify content of the copied file.  
`hadoop dfs -cat /input_dir/input_file.txt`

Run MapReduceClient.jar and also provide input and out directories.

```
hadoop jar C:/MapReduceClient.jar  
wordcount /input_dir /output_dir
```

Verify content for generated output file. `hadoop dfs -cat /output_dir/*`

**RESULT:** Thus the map and reduce tasks to implement word count in hadoop is executed successfully.

## **WRITE A GREP PROGRAM TO DEMONSTRATE THE USE OF MAP AND REDUCE TASKS**

EX.NO. : 10

**AIM:** To write a program to use the API's of hadoop to interact with it and write a grep program to demonstrate the use of map and reduce task

## **PROCEDURE:**

## **STEP 1.**

**Prepare**  
Download MapReduceClient.jar (Link: <https://github.com/MuhammadBilalYar/HADOOP-INSTALLATION-ON-WINDOW-10/blob/master/MapReduceClient.jar>)

Download Input\_file.txt (Link: [https://github.com/MuhammadBilalYar/HADOOP-INSTALLATION-ON-WINDOW-10/blob/master/input\\_file.txt](https://github.com/MuhammadBilalYar/HADOOP-INSTALLATION-ON-WINDOW-10/blob/master/input_file.txt))

Place both files in "C:/"

## **STEP 2:**

## Hadoop Operation

Open cmd in Administrative mode and move to "C:/Hadoop-2.8.0/sbin" and start cluster Start-all.cmd Create an input directory in HDFS. hadoop fs

-mkdir /input\_dir

Copy the input text file named `input_file.txt` in the input directory (`input_dir`) of HDFS. `hadoop fs -put C:/input_file.txt /input_dir`

Verify input file.txt available in HDFS input directory (input dir).

```
hadoop fs -ls /input_dir/
```

Verify content of the copied file.

```
hadoop dfs -cat /input_dir/input_file.txt
```

Run MapReduceClient.jar and also provide input and out directories. hadoop jar "C:/MapReduceClient.jar" grep /input\_dir /output1\_dir "hi"

Verify content for generated output file hadoop dfs -cat /output1\_dir/\*

```
Administrator:Command Prompt
C:\Windows\system32\cmd.exe | grep -i log4j root operations=0
    HDFS: Number of HDFS operations=2
Job Counter
  Launched map tasks=1
  Launched reduce tasks=1
  Total map input bytes by all map tasks in occurred siests (ms)=3400
  Total map input bytes by all mreduces in occurred siests (ms)=881
  Total map output bytes by all map tasks in occurred siests (ms)=1000
  Total map output bytes by all reduce tasks in occurred siests (ms)=2811
  Total map output bytes by all mreduces in occurred siests (ms)=1000
  Total work milliseconds taken by all map tasks=37708
  Total work milliseconds taken by all reduce tasks=2811
  Total work milliseconds taken by all mreduces=1000
Map Reduce Framework
  Map input records=2
  Map output records=2
  Map output bytes=4
  Map output blocks=2
  Input split bytes=35
  Compressed input bytes=35
  Compressed output records=2
  Reduce input bytes=2811
  Reducer input bytes=2811
  Reducer input records=2
  Reduce input records=2
  Reduce output records=2
  Spill 0 Records=4
  Spill 1 Records=4
  Spill 2 Records=4
  Spill 3 Records=4
  Failed 0 Shuffles=2
  Merged Map output=4
  (0) Failed 0 Map output=0
  CPU time spent (ms)=372
  Framework memory usage (bytes)=47062400
  Virtual memory (bytes) snapshot=88068444
  Total committed heap usage (bytes)=880684268
Shuffled bytes=0
  BAD IP=0
  BAD IP=0
  IO ERRORS=0
  WRONG LENGTH=0
  WRONG RECORDS=0
  WRONG REKEYS=0
  File Input bytes=0
  Bytes Read=122
  File Output Format Counters
    Bytes Written=0

C:\binhadoop 2.6.0\bin\hadoop fs -cat /root/test1.txt>port = 6666
I
I

C:\binhadoop 2.6.0\bin\hadoop fs -cat /root/test1.txt>port = 6666
I
I

Activate Windows
(6 to 9999) in the Windows shutdown screen.
```

**RESULT:** Thus the map and reduce tasks to implement grep in hadoop is executed successfully

