

## CLOUD COMPUTING ASSIGNMENT #2

Sri Sai Anusha Gandu

16230560

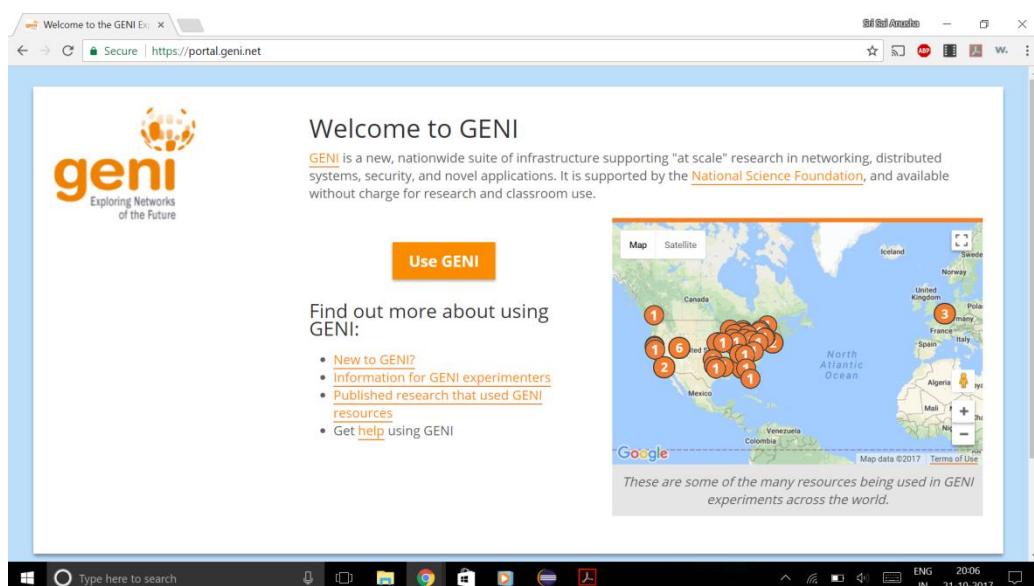
Created a html file with the following text

“Hello World!  
Sri Sai Anusha Gandu”

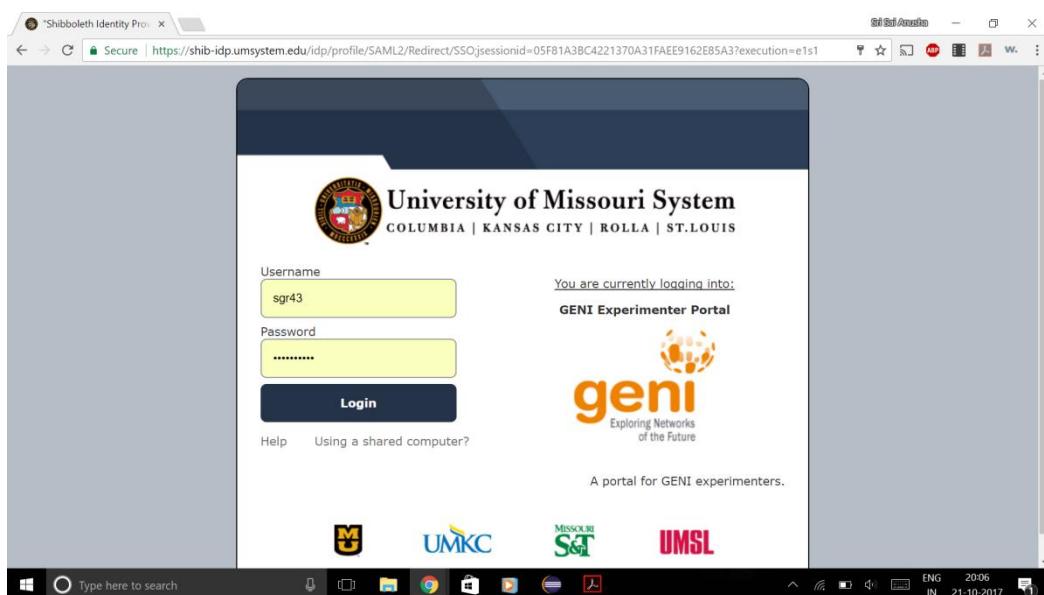
and named it as “index”

**Deploying “index” on GENI:**

1. Go to URL <https://portal.geni.net>



2. Login to the portal using blackboard credentials



### 3. Generate an SSH private key by protecting it with passphrase

The screenshot shows a web browser window for the GENI Portal. The URL is <https://portal.geni.net/secure/generatesshkey.php>. The page title is "Home → Profile → Generate SSH Keypair". The main content is titled "Generate an SSH private key". It instructs the user to supply a new passphrase to protect the SSH private key (minimum 5 characters). There are two input fields: "Passphrase:" and "Confirm Passphrase:". A blue button labeled "Generate SSH private key" is below them. A note says, "If you already have an SSH key pair that you want to use, you can instead [upload an SSH public key](#)". Another note says, "If you're not sure what to do, use this page to generate a new key pair." At the bottom right of the page, there is copyright information: "GENI Portal Version 3.26 Copyright © 2017 Raytheon BBN Technologies All Rights Reserved - NSF Award CNS-0714770".

The screenshot shows the same browser window after generating the SSH key. A green "Notice" box at the top says "Generated SSH keypair - now download the private key". Below it, the "SSH Keys" section lists one entry:

Name	Description	Public Key	Private Key	PuTTY	Edit	Delete
id_geni_ssh_rsa 9d:36:af:22:21:05:68:98:0ca9:5d:e4:3d:51:60	Generated SSH keypair	<a href="#">Download Public Key</a>	<a href="#">Download Private Key</a>	<a href="#">Download PuTTY Key</a>	<a href="#">Edit</a>	<a href="#">Delete</a>

Below the table, instructions for Linux and Mac systems and most Windows SSH clients (not PuTTY) are provided:

- Download your private key.
- On Windows, just point your SSH client (not PuTTY) to the downloaded private key.
- On Linux and Mac, open a terminal.
  - Store your key under `~/.ssh/`:
    - If the directory does not exist, create it:

At the bottom right, the system tray shows the date as 21-10-2017.

### 4. Create a slice in the project joined

The screenshot shows a web browser window for the GENI Portal. The URL is <https://portal.geni.net/secure/dashboard.php#projects>. The page title is "Home". The main content is titled "Projects". It shows a list of projects with the first one highlighted: "Fall17CloudComputing". The project details are: Lead: Choi, Baek-Young, No slices, Project expires in 70 days, and a green checkmark icon. Below the project list, there are buttons for "Join a Project" and "Ask to be a Project Lead". At the bottom right, there is copyright information: "GENI Portal Version 3.26 Copyright © 2017 Raytheon BBN Technologies All Rights Reserved - NSF Award CNS-0714770 GENI is sponsored by the National Science Foundation".

Slices

Filter by: All slices Sort by: Slice name Sort ascending

+ New slice

**SriSaiAnushaGandu** ...

Project: Fall17CloudComputing

Owner: Gandu, Sri Sai Anusha (UMKC-Student)

Slice expires in 6 days

No resources for this slice

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- Add 2 resources in the slice and name them as Server and Client with IP's as 10.1.1.1 and 10.1.1.2 respectively and Netmask as 255.255.255.0 and then reserve the resources

Drag to Add

VM Xen VM EG VM

Raw PC IG Raw PC EG OF OVS

New Site

Site 1

Client

Server

Delete All Tidy View View RSpec

v1.6

Home → Project Fall17CloudComputing → Slice SriSaiAnushaGandu → Add Resources to SriSaiAnushaGandu (Results)

Add Resources to GENI Slice SriSaiAnushaGandu (Results)

Total run time: 24 seconds  
Status: Running

Started at: Sat, 21 Oct 2017 21:24:00 -0400  
Last updated: Sat, 21 Oct 2017 21:24:24 -0400

Results | Detailed Progress | Request RSpec | Manifest RSpec | Send Problem Report | Advanced

Results

Resources requested from RSpec:

Pending... (See 'Detailed Progress' tab for more information.)

Back to All slices  
Back to Slice SriSaiAnushaGandu

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## 6. The colour of the resources turn to green when their status turns ready

**Aggregate Kentucky InstaGENI's Resources:**

**Node #1:**

Status	Client ID	Component ID	Expiration	Type	Hostname
READY	Server	pc3	2017-12-15T23:59:59.000Z	default-vm	Server.SriSaiAnushaGandu.ch-geni-net.lan.sdn.uky.edu
Login		ssh_cholby@pc3.lan.sdn.uky.edu	-p 26603		
		ssh_mmc9d@pc3.lan.sdn.uky.edu	-p 26603		
		ssh_rzc46@pc3.lan.sdn.uky.edu	-p 26603		
		ssh_sgr43@pc3.lan.sdn.uky.edu	-p 26603		

**Node #2:**

Status	Client ID	Component ID	Expiration	Type	Hostname
READY	Client	pc3	2017-12-15T23:59:59.000Z	default-vm	Client.SriSaiAnushaGandu.ch-geni-net.lan.sdn.uky.edu
Login		ssh_cholby@pc3.lan.sdn.uky.edu	-p 26602		
		ssh_mmc9d@pc3.lan.sdn.uky.edu	-p 26602		
		ssh_rzc46@pc3.lan.sdn.uky.edu	-p 26602		
		ssh_sgr43@pc3.lan.sdn.uky.edu	-p 26602		

**Manage Resources**

Resources on Kentucky InstaGENI are ready.

Name: Client

SSH to:

- choiby@pc3.lan.sdn.uky.edu:26602
- mmc9d@pc3.lan.sdn.uky.edu:26602
- rzc46@pc3.lan.sdn.uky.edu:26602
- sgr43@pc3.lan.sdn.uky.edu:26602

Node Type: Other...

Hardware Type: Renew, Renew Date, Delete, SSH, Restart, Snapshot, Details, Add Resources, Expand

**Manage Resources**

Resources on Kentucky InstaGENI are ready.

Name: Server

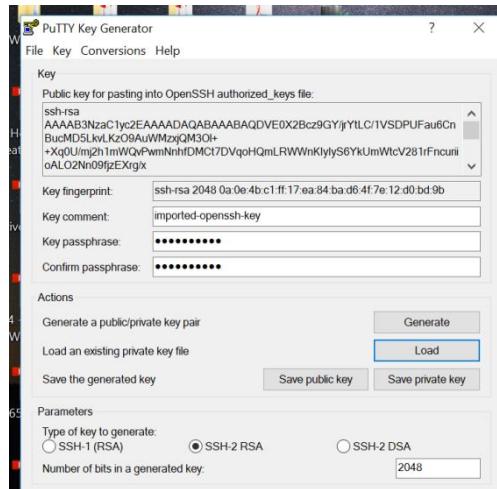
SSH to:

- choiby@pc3.lan.sdn.uky.edu:26603
- mmc9d@pc3.lan.sdn.uky.edu:26603
- rzc46@pc3.lan.sdn.uky.edu:26603
- sgr43@pc3.lan.sdn.uky.edu:26603

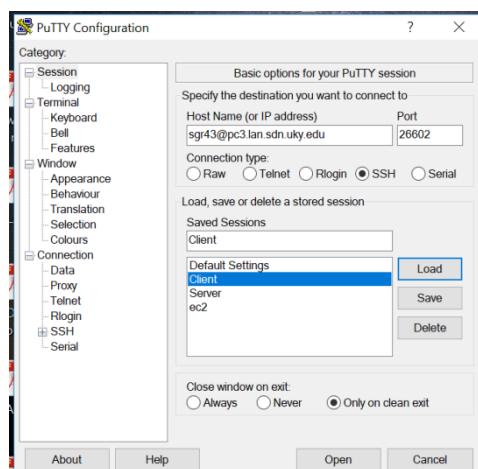
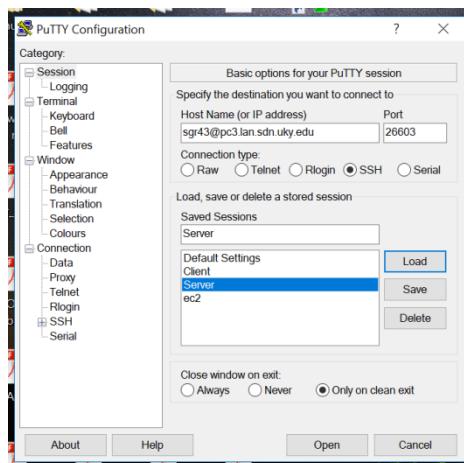
Node Type: Other...

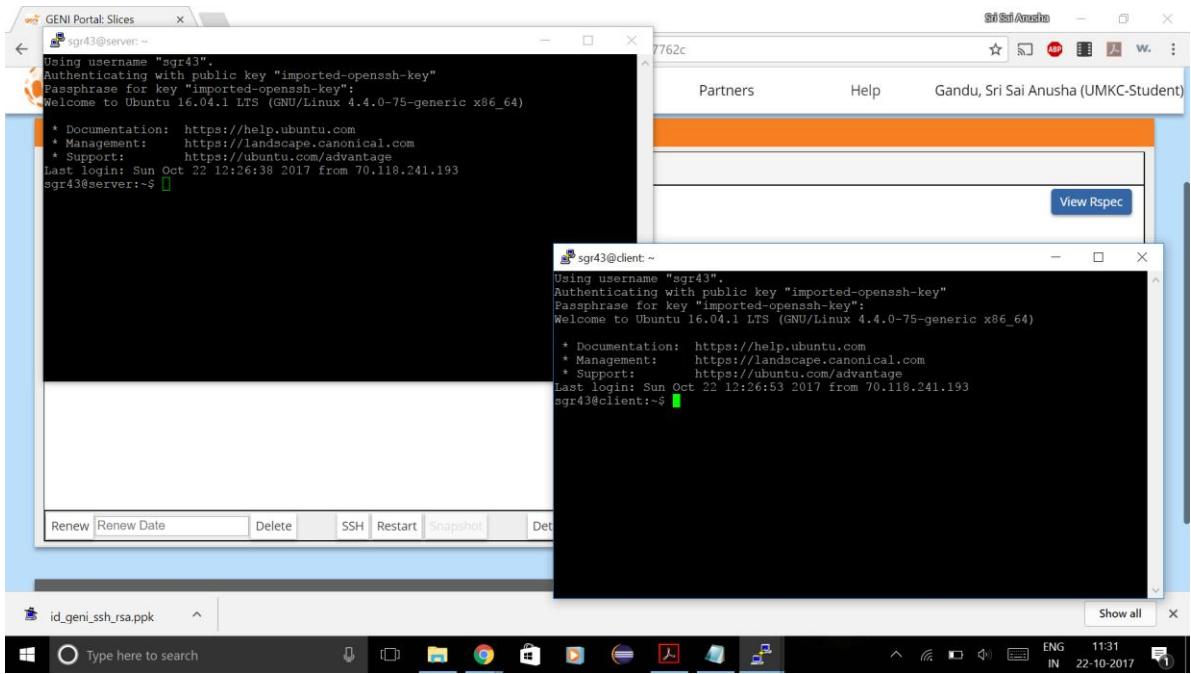
Hardware Type: Renew, Renew Date, Delete, SSH, Restart, Snapshot, Details, Add Resources, Expand

- Download the PuTTY private key from the generated SSH key and by using puttygen and PuTTY private key, generate public and private keys that are compatible with PuTTY

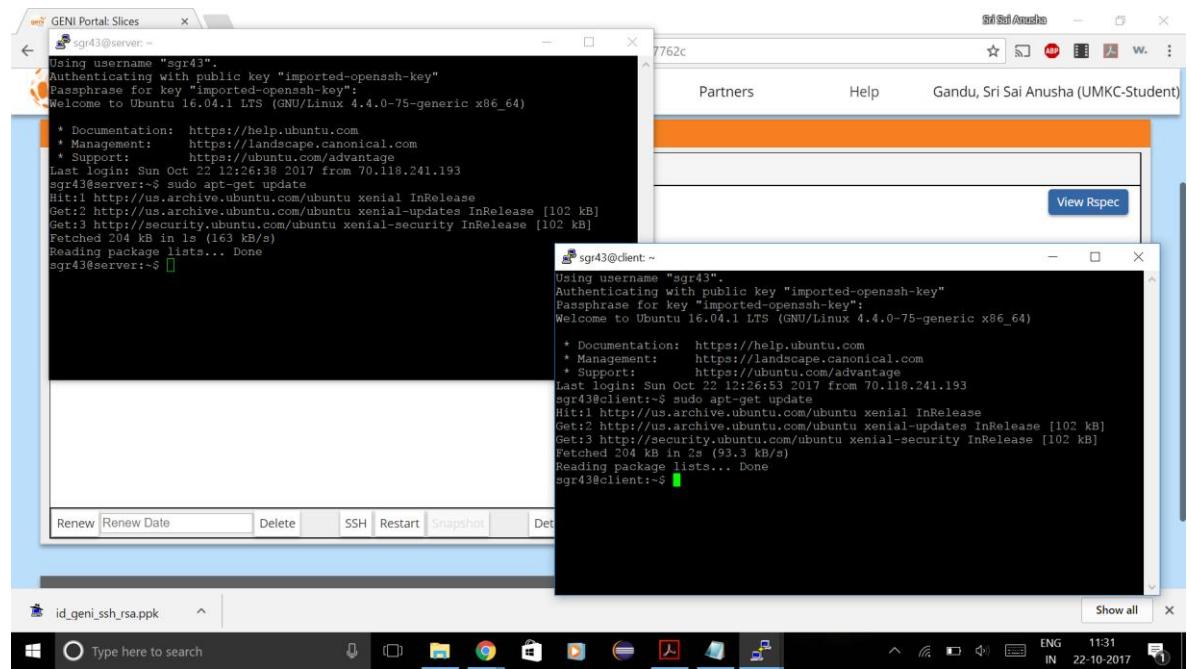


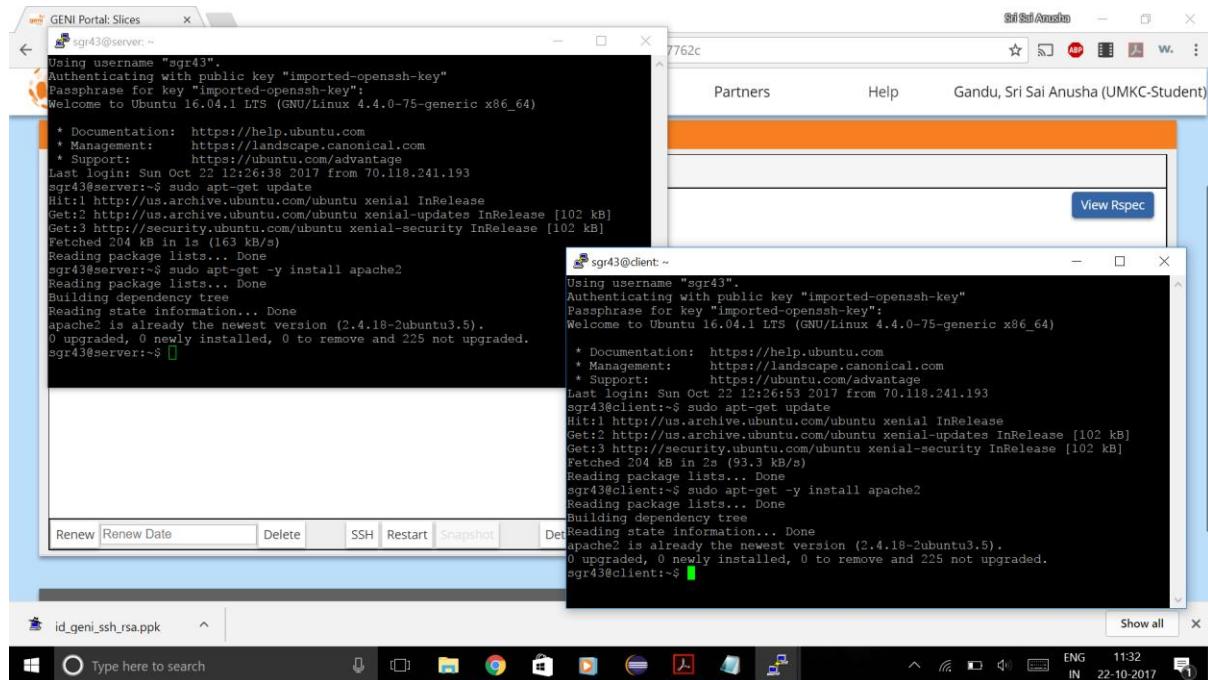
- Enable the Server and Client nodes using PuTTY with SSH authorization of private key generated using puttygen



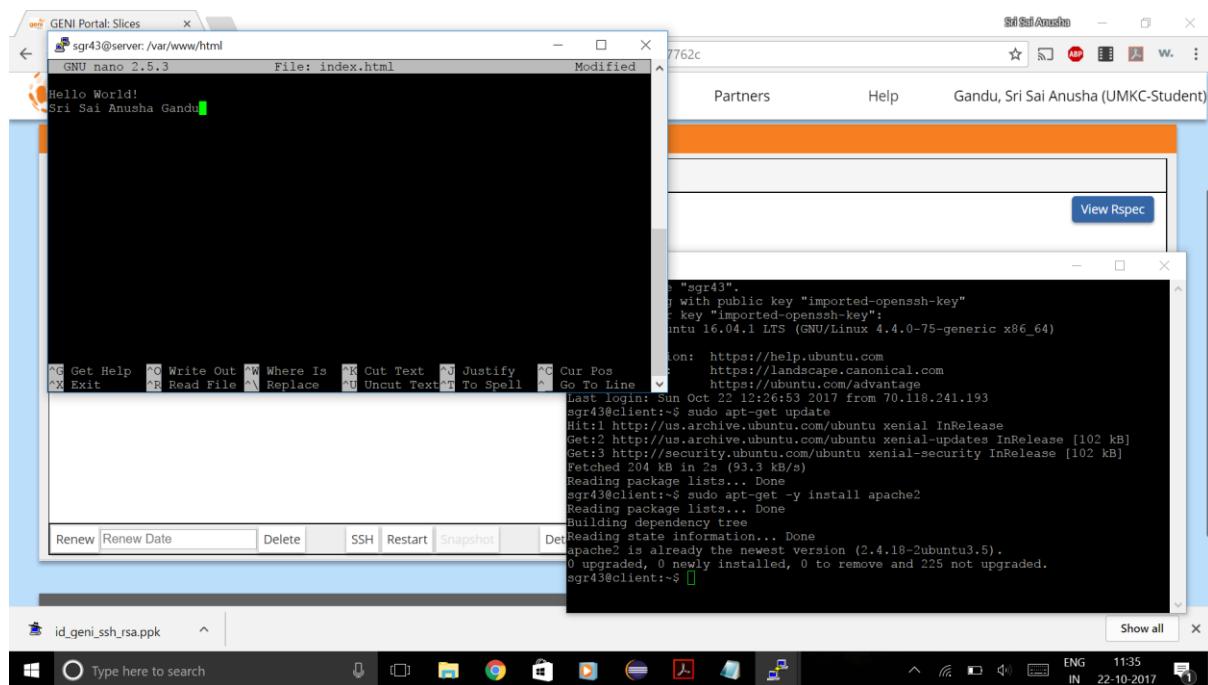


## 9. Run the commands **sudo apt-get update** and **sudo apt-get -y install apache2** in both Server and Client





## 10. Create a html file in the Server node and then connect the Client node to the Server node



```

GENI Portal: Slices
sgr43@server: /var/www/html

Passphrase for key "imported-openssh-key":
Welcome to Ubuntu 16.04.1 LTS (GNU/Linux 4.4.0-75-generic x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/advantage
Last login: Sun Oct 22 12:26:38 2017 from 70.118.241.193
sgr43@server:~$ sudo apt-get update
Hit:1 http://us.archive.ubuntu.com/ubuntu xenial InRelease [102 kB]
Get:2 http://us.archive.ubuntu.com/ubuntu xenial-updates InRelease [102 kB]
Get:3 http://security.ubuntu.com/ubuntu xenial-security InRelease [102 kB]
Fetched 204 kB in 2s (163 kB/s)
Reading package lists... Done
sgr43@server:~$ sudo apt-get -y install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
apache2 is already the newest version (2.4.18-2ubuntu3.5).
0 upgraded, 0 newly installed, 0 to remove and 225 not upgraded.
sgr43@server:~$ cd /var/www/html
sgr43@server:/var/www/html$ sudo rm index.html
rm: cannot remove 'index.html': No such file or directory
sgr43@server:/var/www/html$ sudo nano index.html
sgr43@server:/var/www/html$ 

Renew Renew Date Delete SSH Restart Snapshot Det

sgr43@client: ~

Using username "sgr43".
Authenticating with public key "imported-openssh-key"
Passphrase for key "imported-openssh-key":
Welcome to Ubuntu 16.04.1 LTS (GNU/Linux 4.4.0-75-generic x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/advantage
Last login: Sun Oct 22 12:26:53 2017 from 70.118.241.193
sgr43@client:~$ sudo apt-get update
Hit:1 http://us.archive.ubuntu.com/ubuntu xenial InRelease [102 kB]
Get:2 http://us.archive.ubuntu.com/ubuntu xenial-updates InRelease [102 kB]
Get:3 http://security.ubuntu.com/ubuntu xenial-security InRelease [102 kB]
Fetched 204 kB in 2s (93.3 kB/s)
Reading package lists... Done
sgr43@client:~$ sudo apt-get -y install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
apache2 is already the newest version (2.4.18-2ubuntu3.5).
0 upgraded, 0 newly installed, 0 to remove and 225 not upgraded.
sgr43@client:~$ telnet 10.1.1.1 80

```

## 11. Retrieve the html file from the Client node

```

GENI Portal: Slices
sgr43@server: /var/www/html

Passphrase for key "imported-openssh-key":
Welcome to Ubuntu 16.04.1 LTS (GNU/Linux 4.4.0-75-generic x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/advantage
Last login: Sun Oct 22 12:26:38 2017 from 70.118.241.193
sgr43@server:~$ sudo apt-get update
Hit:1 http://us.archive.ubuntu.com/ubuntu xenial InRelease [102 kB]
Get:2 http://us.archive.ubuntu.com/ubuntu xenial-updates InRelease [102 kB]
Get:3 http://security.ubuntu.com/ubuntu xenial-security InRelease [102 kB]
Fetched 204 kB in 2s (163 kB/s)
Reading package lists... Done
sgr43@server:~$ sudo apt-get -y install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
apache2 is already the newest version (2.4.18-2ubuntu3.5).
0 upgraded, 0 newly installed, 0 to remove and 225 not upgraded.
sgr43@server:~$ cd /var/www/html
sgr43@server:/var/www/html$ sudo rm index.html
rm: cannot remove 'index.html': No such file or directory
sgr43@server:/var/www/html$ sudo nano index.html
sgr43@server:/var/www/html$ 

Renew Renew Date Delete SSH Restart Snapshot Det

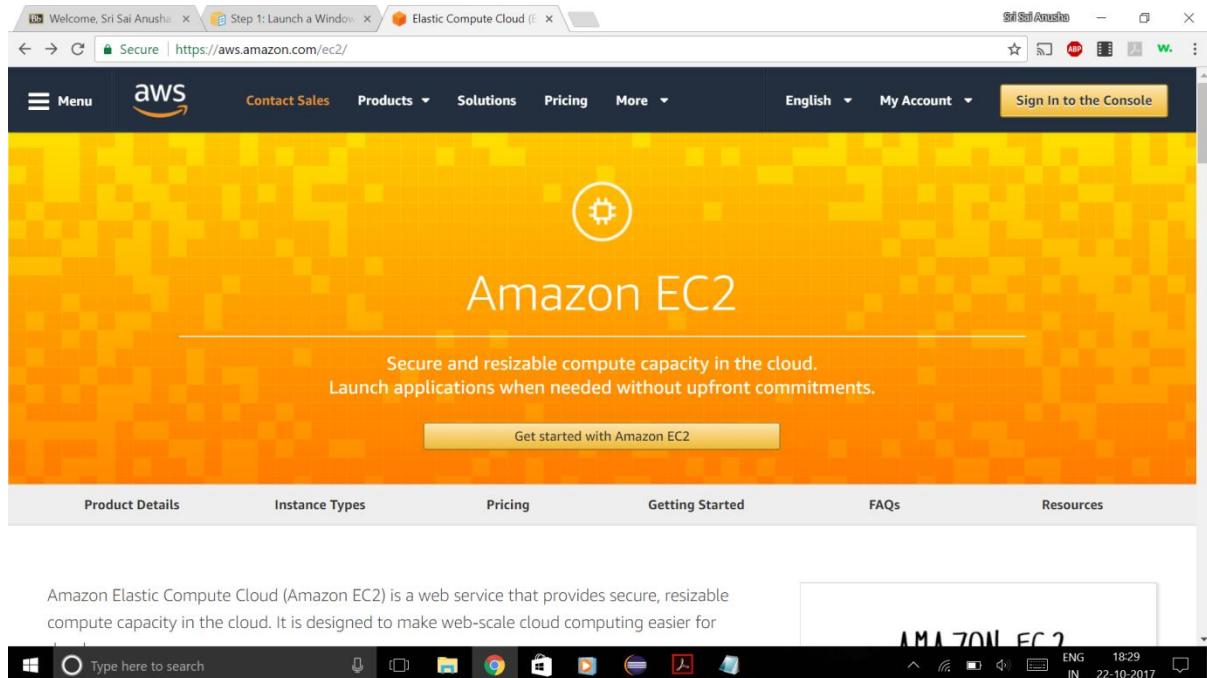
sgr43@client: ~

Management: https://landscape.canonical.com
Support: https://ubuntu.com/advantage
Last login: Sun Oct 22 12:26:53 2017 from 70.118.241.193
sgr43@client:~$ sudo apt-get update
Hit:1 http://us.archive.ubuntu.com/ubuntu xenial InRelease [102 kB]
Get:2 http://us.archive.ubuntu.com/ubuntu xenial-updates InRelease [102 kB]
Get:3 http://security.ubuntu.com/ubuntu xenial-security InRelease [102 kB]
Fetched 204 kB in 2s (93.3 kB/s)
Reading package lists... Done
sgr43@client:~$ sudo apt-get -y install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
apache2 is already the newest version (2.4.18-2ubuntu3.5).
0 upgraded, 0 newly installed, 0 to remove and 225 not upgraded.
sgr43@client:~$ telnet 10.1.1.1...
Connected to 10.1.1.1.
GET /index.html
Hello World!
Sri Sai Anusha Gandu
Connection closed by foreign host.
sgr43@client:~$ 

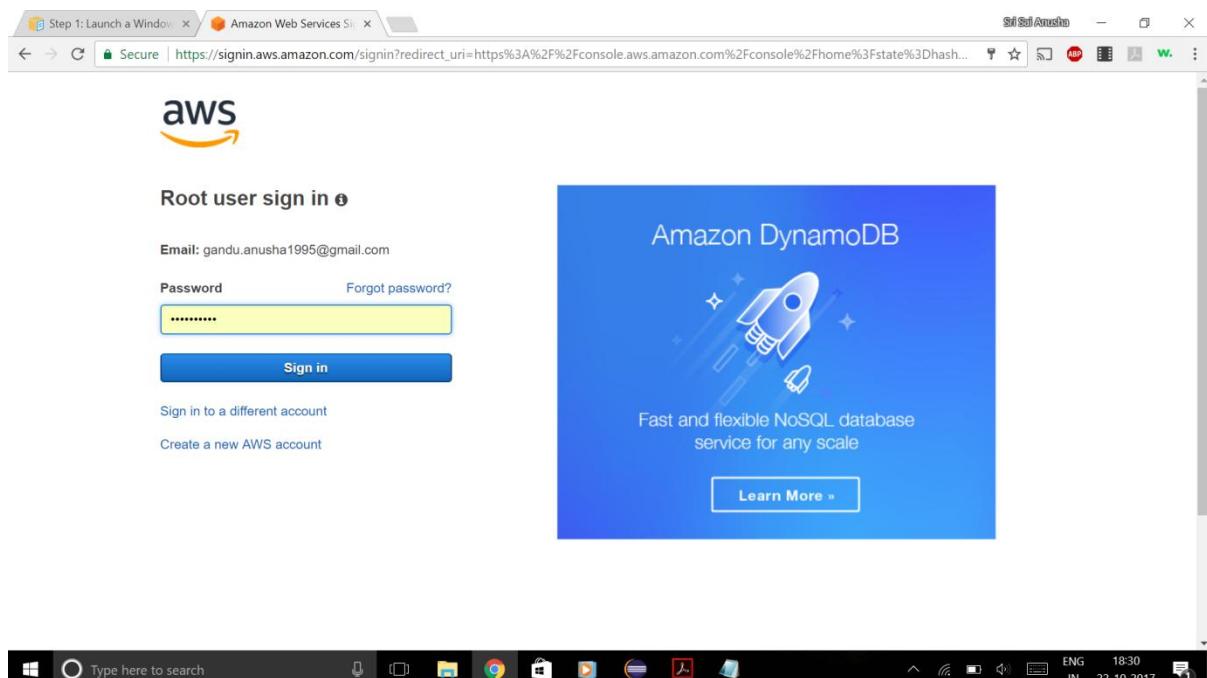

```

## Deploying “index” on Amazon AWS:

1. Go to URL [https://aws.amazon.com/ec2/?nc2=h\\_m1](https://aws.amazon.com/ec2/?nc2=h_m1)



2. Register and login to the portal and select EC2



Sri Sri Anusha — X

Secure | https://us-east-2.console.aws.amazon.com/console/home?region=us-east-2#

aWS Services Resource Groups

Sri Sri Anusha Ohio Support

### AWS services

Find a service by name or feature (for example, EC2, S3 or VM, storage).

Recently visited services

All services

### Build a solution

Get started with simple wizards and automated workflows.

Launch a virtual machine With EC2 or Lightsail ~1-2 minutes

Build a web app With Elastic Beanstalk ~6 minutes

Host a static website With S3, CloudFront, Route 53 ~5 minutes

Connect an IoT device With AWS IoT ~5 minutes

Start a development project With CodeStar ~5 minutes

Register a domain With Route 53 ~3 minutes

See more

### Helpful tips

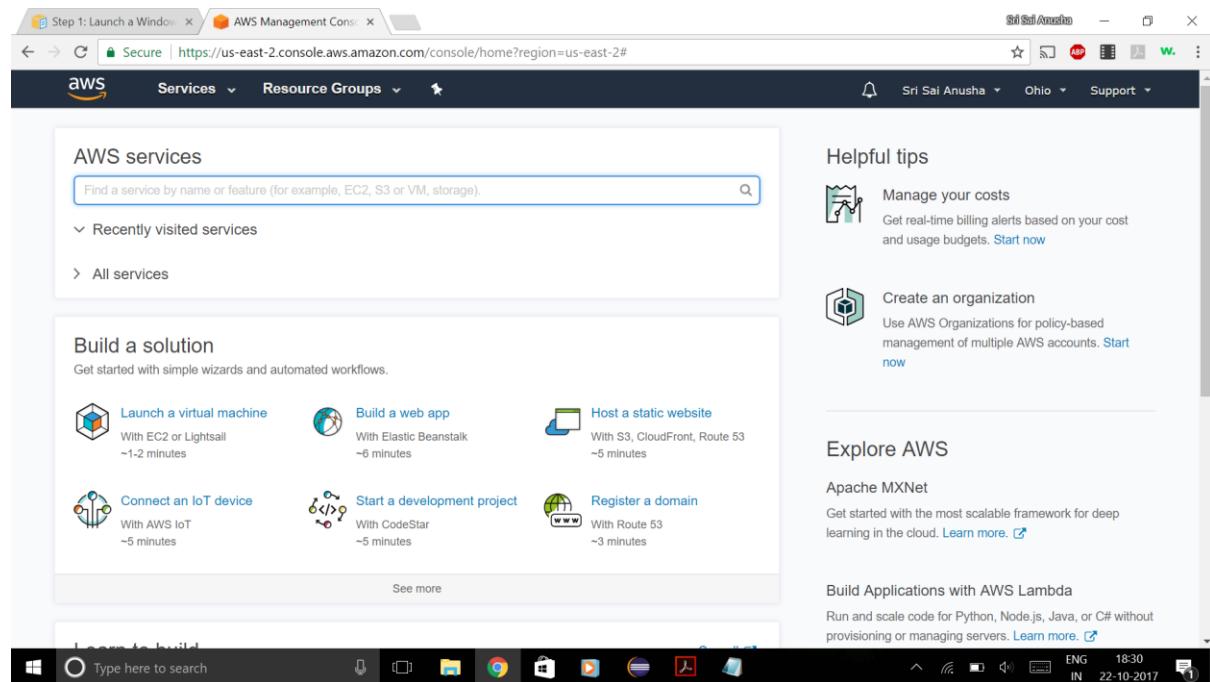
Manage your costs Get real-time billing alerts based on your cost and usage budgets. [Start now](#)

Create an organization Use AWS Organizations for policy-based management of multiple AWS accounts. [Start now](#)

### Explore AWS

Apache MXNet Get started with the most scalable framework for deep learning in the cloud. [Learn more](#)

Build Applications with AWS Lambda Run and scale code for Python, Node.js, Java, or C# without provisioning or managing servers. [Learn more](#)



Sri Sri Anusha — X

Secure | https://us-east-2.console.aws.amazon.com/ec2/v2/home?region=us-east-2#

aWS Services Resource Groups

Sri Sri Anusha Ohio Support

### EC2 Dashboard

- Events
- Tags
- Reports
- Limits

### Instances

- Instances
- Spot Requests
- Reserved Instances
- Dedicated Hosts

### Images

- AMIs
- Bundle Tasks

### Elastic Block Store

- Volumes
- Snapshots

### Network & Security

- Security Groups

### Resources

You are using the following Amazon EC2 resources in the US East (Ohio) region:

0 Running Instances	0 Elastic IPs
0 Dedicated Hosts	0 Snapshots
0 Volumes	0 Load Balancers
0 Key Pairs	1 Security Groups
0 Placement Groups	

Just need a simple virtual private server? Get everything you need to jumpstart your project - compute, storage, and networking – for a low, predictable price. [Try Amazon Lightsail for free](#).

### Create Instance

To start using Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 instance.

[Launch Instance](#)

Note: Your instances will launch in the US East (Ohio) region

### Service Health

Service Status: US East (Ohio):

### Scheduled Events

### Account Attributes

Supported Platforms VPC

Default VPC vpc-b92617d0

Resource ID length management

### Additional Information

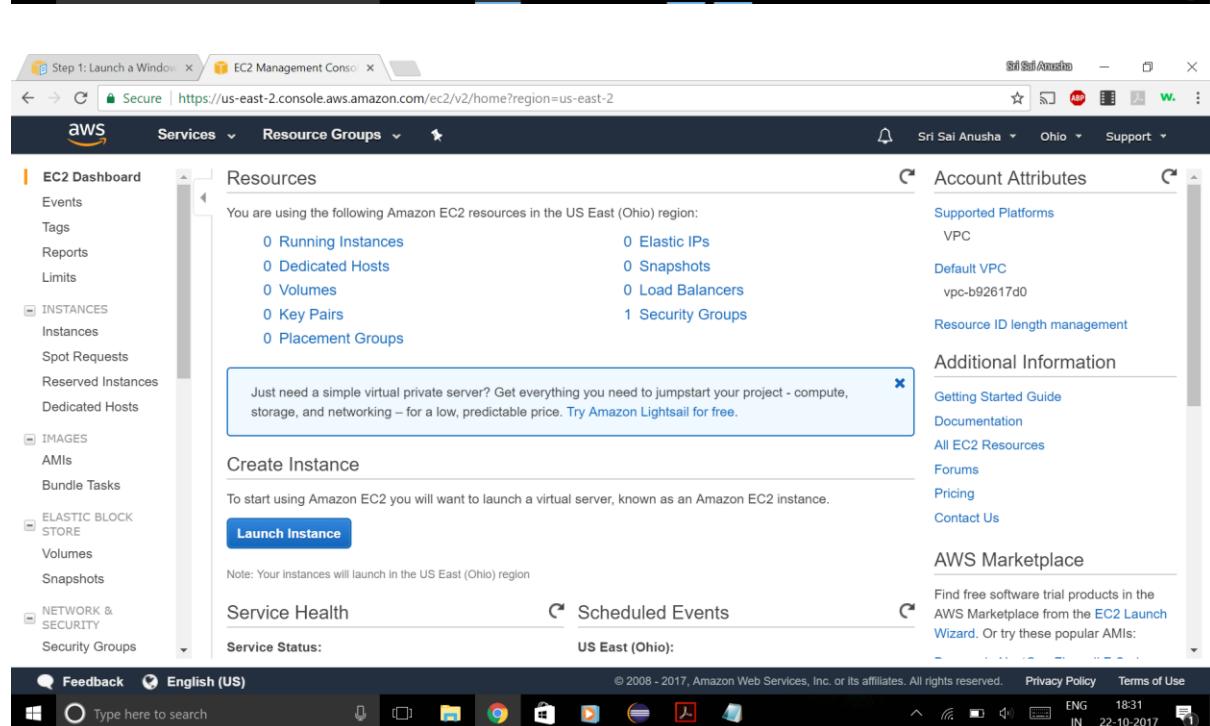
Getting Started Guide Documentation All EC2 Resources Forums Pricing Contact Us

### AWS Marketplace

Find free software trial products in the AWS Marketplace from the [EC2 Launch Wizard](#). Or try these popular AMIs:

Feedback English (US)

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3. Go to instances and launch an instance of **Amazon Linux AMI** and configure the details

**Step 2: Choose an Instance Type**

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. [Learn more](#) about instance types and how they can meet your computing needs.

Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
General purpose	<b>t2.micro</b> <small>Free tier eligible</small>	1	1	EBS only	-	Low to Moderate	Yes
General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Configure Instance Details](#)

**Step 7: Review Instance Launch**

**Instance Type**

Instance Type	ECUs	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance
t2.micro	Variable	1	1	EBS only	-	Low to Moderate

**Security Groups**

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	0.0.0.0/0	
SSH	TCP	22	::/0	

**Instance Details**

[Edit instance details](#) [Cancel](#) [Previous](#) [Launch](#)

**Launch Status**

**Your instances are now launching**  
The following instance launches have been initiated: i-08dba4107179b0b3c [View launch log](#)

**Get notified of estimated charges**  
Create billing alerts to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier).

**How to connect to your instances**

Your instances are launching, and it may take a few minutes until they are in the **running** state, when they will be ready for you to use. Usage hours on your new instances will start immediately and continue to accrue until you stop or terminate your instances.

Click [View Instances](#) to monitor your instances' status. Once your instances are in the **running** state, you can [connect](#) to them from the Instances screen. [Find out](#) how to connect to your instances.

**Here are some helpful resources to get you started:**

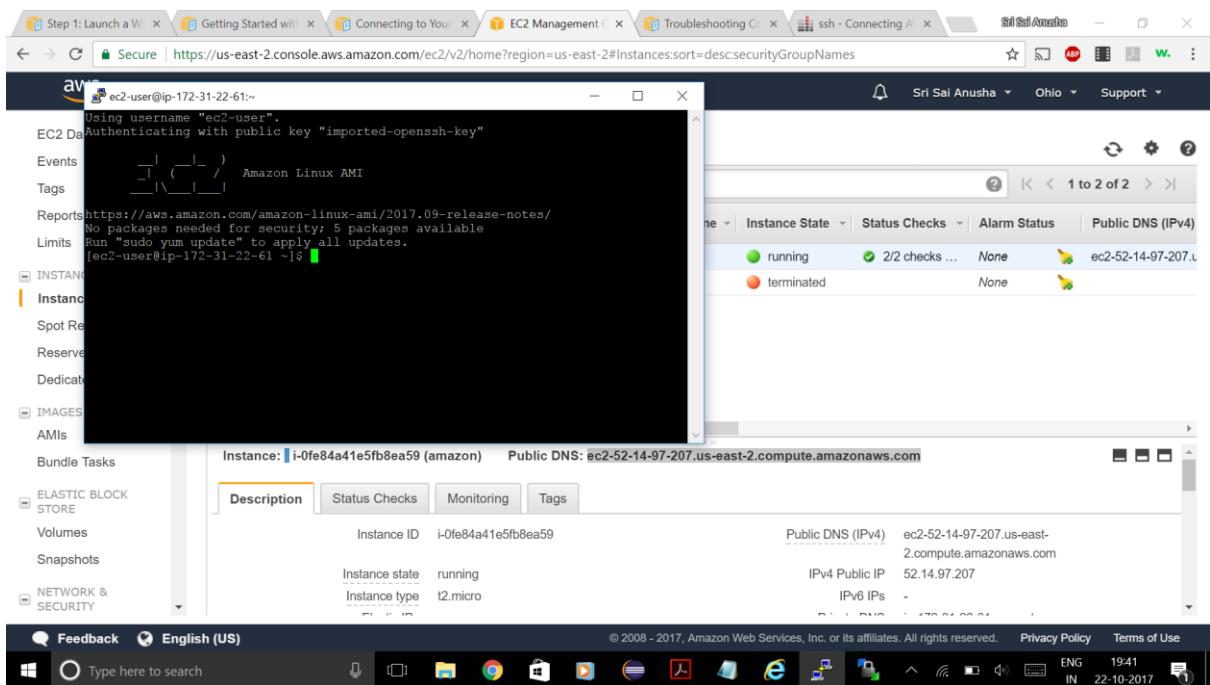
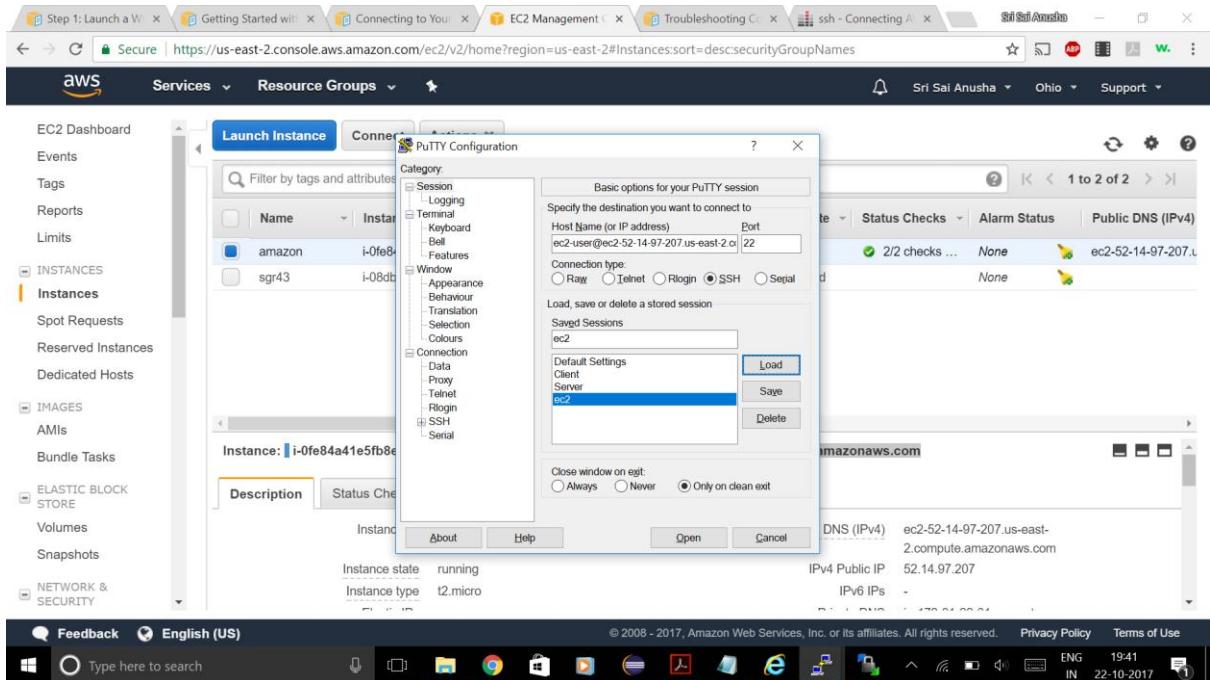
[Feedback](#) [English \(US\)](#) [Privacy Policy](#) [Terms of Use](#) [Show all](#)

The screenshot shows the AWS EC2 Management Console. On the left, the navigation pane includes options like EC2 Dashboard, Events, Tags, Reports, Limits, Instances, Images, AMIs, and Elastic Block Store. The Instances section is currently selected. The main area displays a table of instances. One instance, named 'sgr43' with the ID 'i-08dba4107179b0b3c', is highlighted. A detailed modal window for this instance is open, showing its description: 'Instance: i-08dba4107179b0b3c (sgr43) Public DNS: ec2-13-58-155-208.us-east-2.compute.amazonaws.com'. It also lists its Instance ID, Public DNS (IPv4), and Instance state.

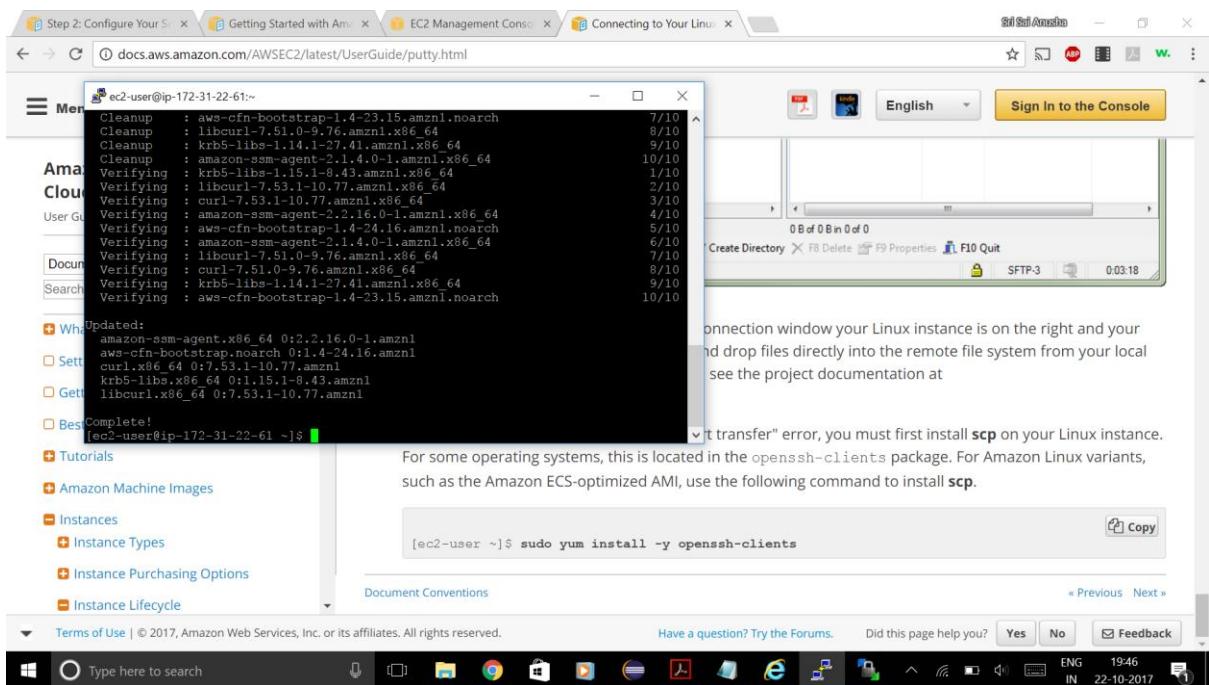
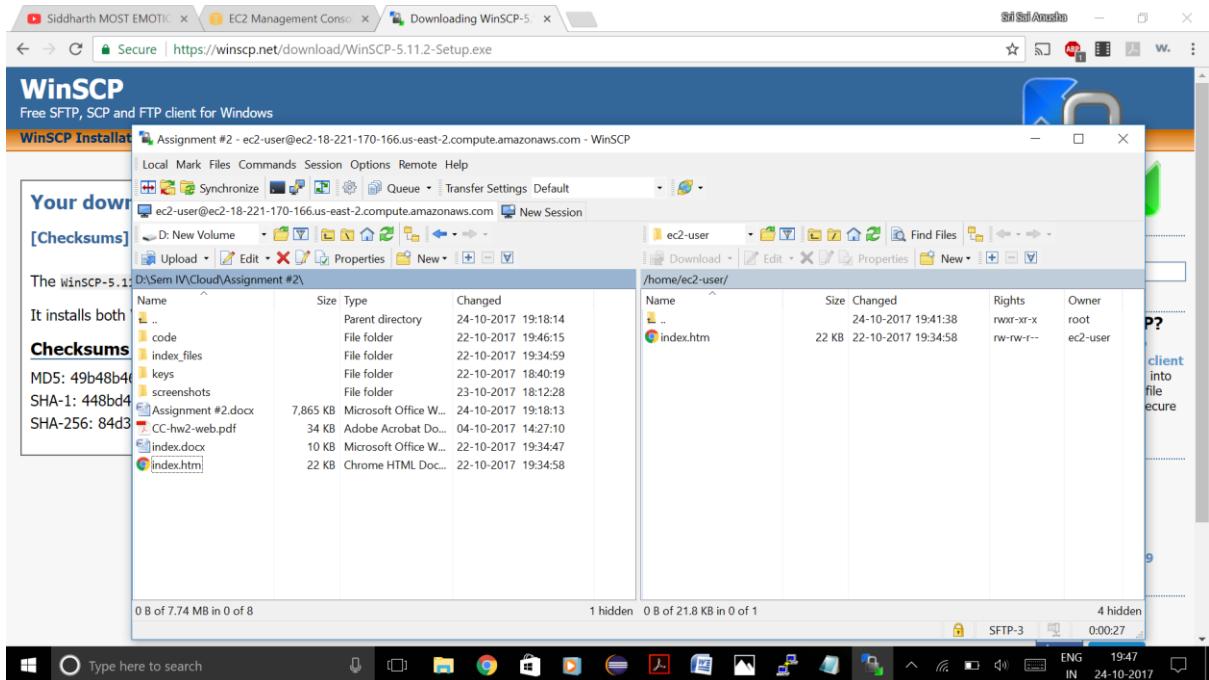
4. Download the key value pair for the instance (.pem file) and generate a PuTTY private key that is compatible with PuTTY

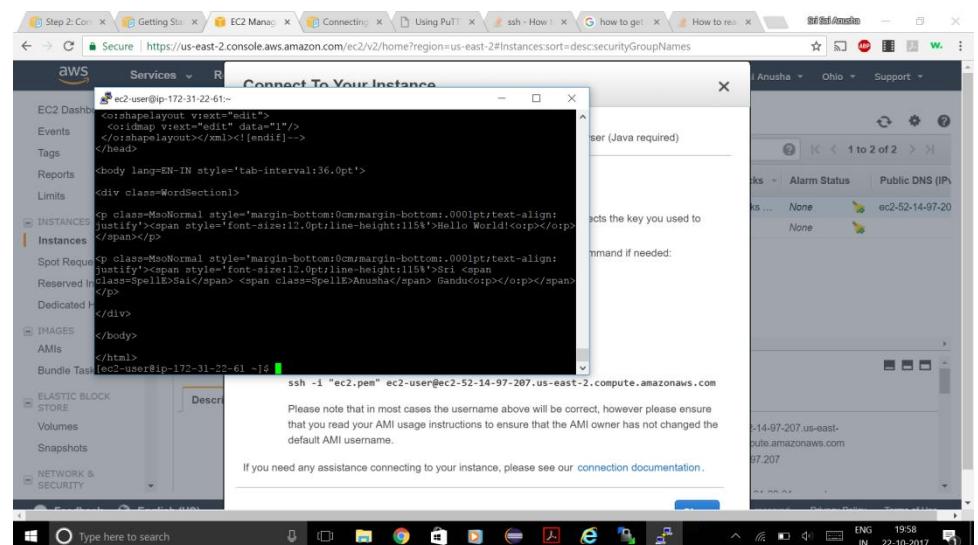
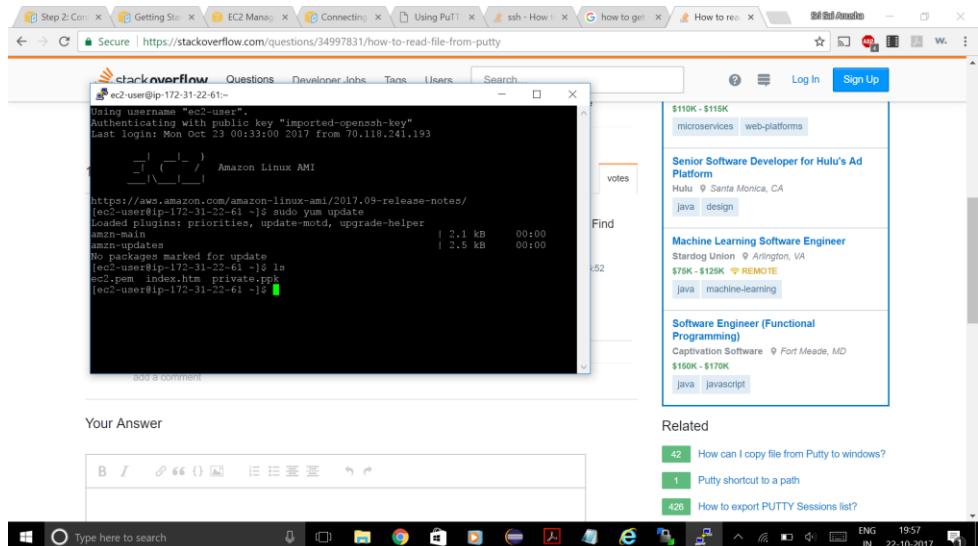
This screenshot shows the same AWS EC2 Management Console interface as above, but with a 'PuTTY Key Generator' dialog box overlaid. The dialog box contains fields for generating a key: 'Key fingerprint' (ssh-rsa 2048 dd:40:09:ef:86:14:e6:70:23:93:b5:d1:41:05:55), 'Key comment' (imported-openssh-key), and 'Actions' (Generate, Load, Save public key, Save private key). Below these are parameters for generating the key: 'Type of key to generate' (SSH-2 RSA selected), 'Number of bits in a generated key' (2048).

5. With the username as **ec2-user**, hostname as **Public DNS** and using generated private key, instantiate a PuTTY node

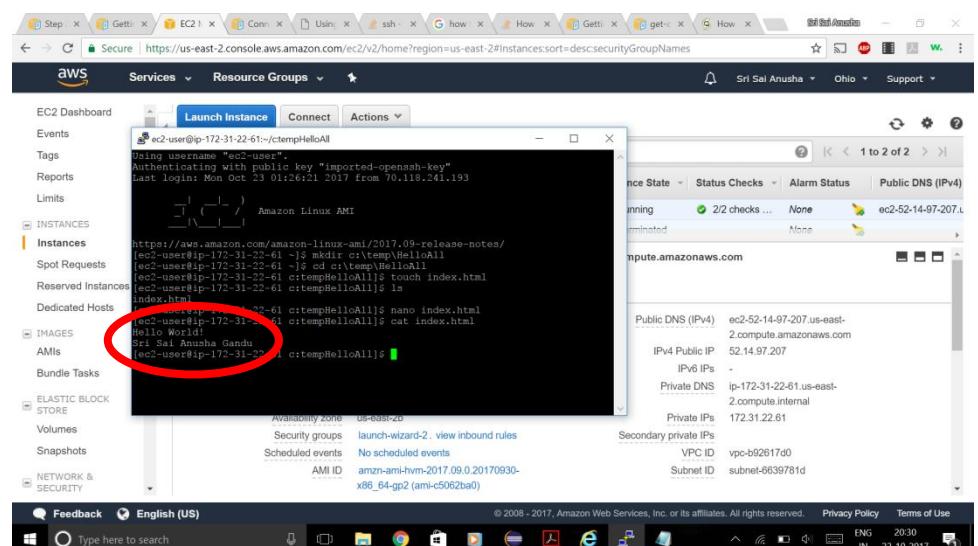


6. Run the command **sudo yum update** and copy the index file to remote machine through WinSCP



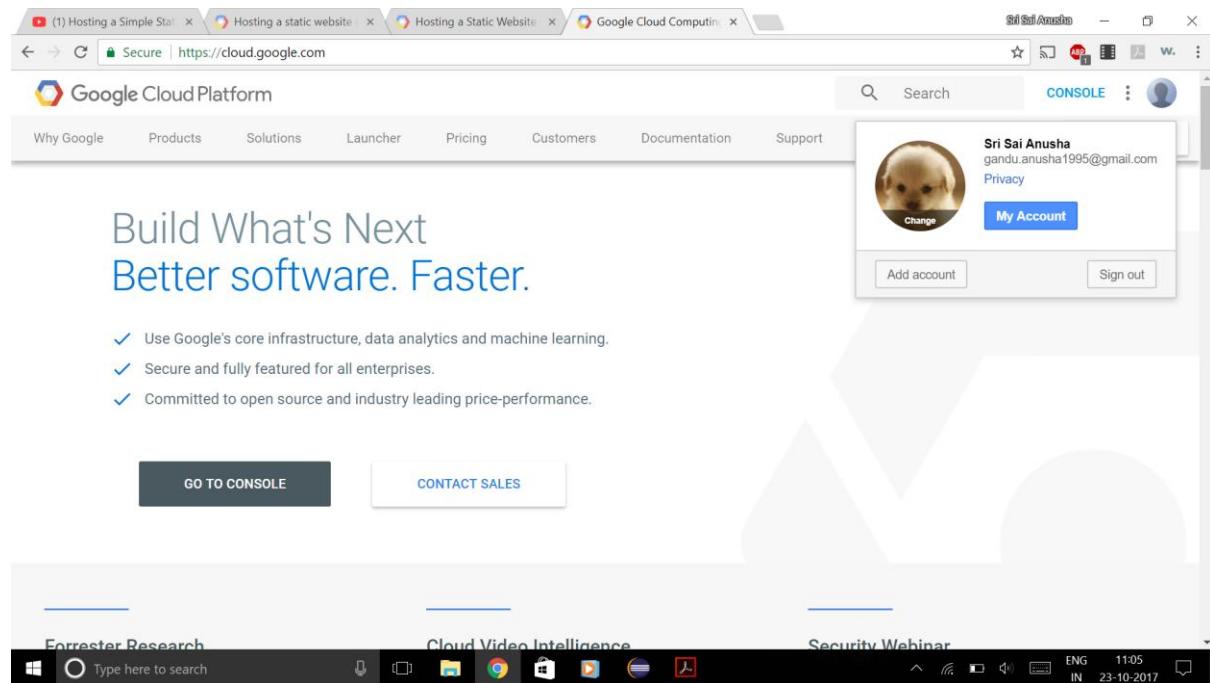


## 7. Retrieve the file using cat index.htm command

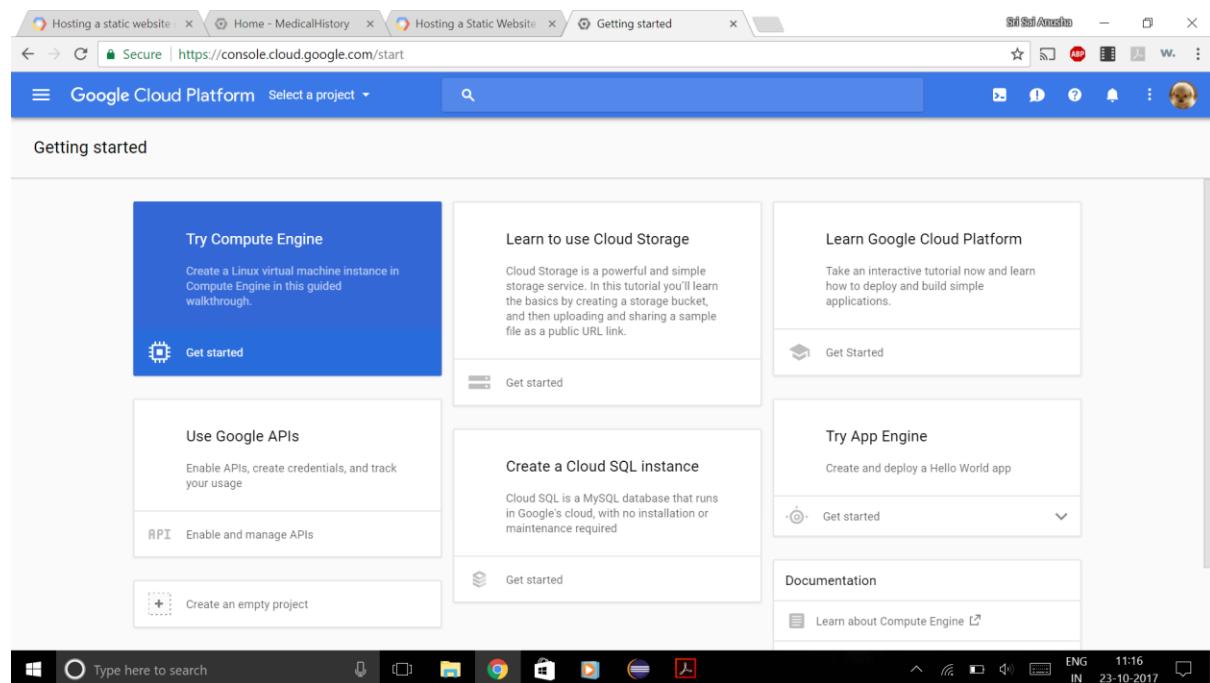


## Deploying “index” on Google Cloud Platform:

1. Go to URL <https://cloud.google.com/>



2. Login with your Google credentials



### 3. Create a new project in the cloud

The screenshot shows the 'New Project' page in the Google Cloud Platform console. At the top, there is a message: 'You have 11 projects remaining in your quota. Learn more.' Below it, a 'Project name' field contains 'Cloud 24352'. A note below the field says, 'Your project ID will be cloud-24352'. At the bottom are two buttons: 'Create' (highlighted in blue) and 'Cancel'.



The screenshot shows the 'DASHBOARD' view for the project 'Cloud 24352'. On the left, the 'Project info' sidebar lists the project name, ID, and number. The main area features several cards: 'Compute Engine' (CPU %), 'Google Cloud Platform status' (All services normal), 'Billing' (Estimated charges \$0.00), and 'Error Reporting' (No sign of any errors). At the bottom, there is a 'CUSTOMIZE' button.

The screenshot shows the 'Billing' overview page for the project 'CS5525 Cloud Computing'. The left sidebar has an 'Overview' tab selected, showing a billing account ID of '01FD7B-F0FE2C-5E9700'. The main area displays 'Credits' (\$50.00 remaining, 302 days until end), 'Projects linked to this billing account' (Cloud 24352), and a 'PERMISSIONS' section where a member named 'Billing Account Administrator' (1 member) is listed with the role 'Authorized to see and manage all aspects of billing accounts'.

#### 4. Create a new bucket under the storage section

The screenshot shows the Google Cloud Platform Storage browser interface. On the left, a sidebar menu has 'Storage' selected. The main area displays a large circular 'Drop files here' placeholder with a file icon. Below it, the text 'or use the upload button' is visible. At the top of the main area, there are buttons for 'UPLOAD FILES', 'UPLOAD FOLDER', 'CREATE FOLDER', 'REFRESH', 'SHARE PUBLICLY', and 'DELETE'. A search bar at the top says 'Filter by prefix...'. The URL in the address bar is <https://console.cloud.google.com/storage/browser/sgr43?project=cloud-24352>. The taskbar at the bottom shows various application icons.

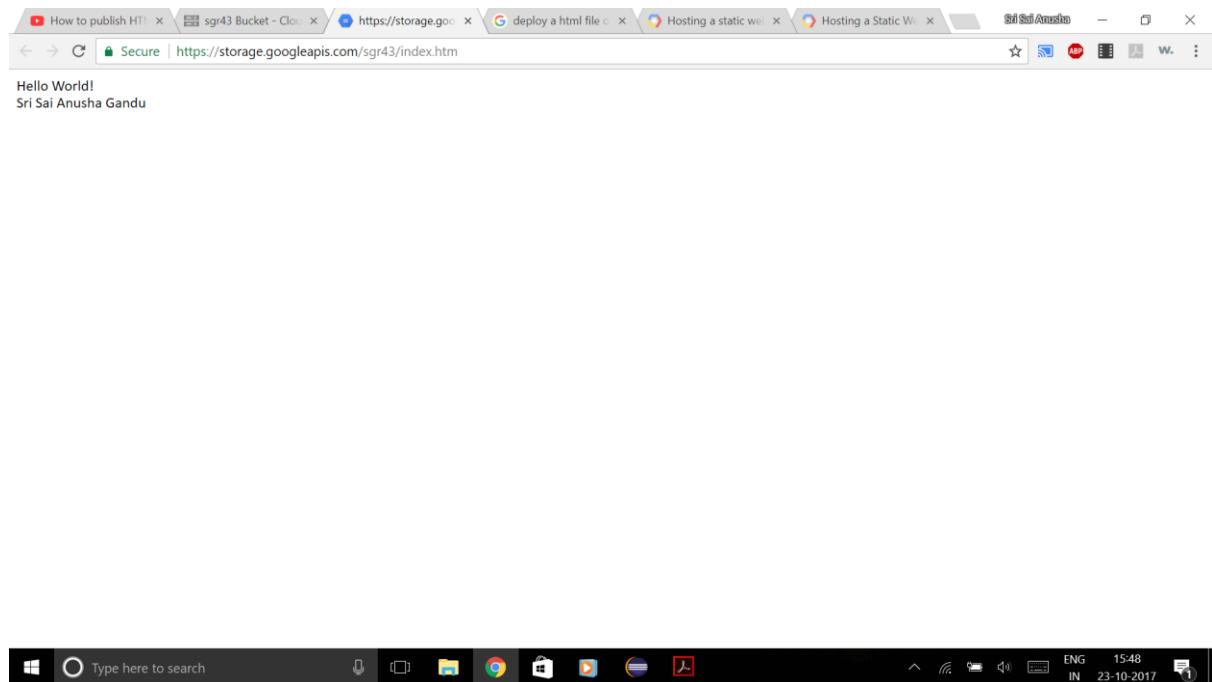
#### 5. Upload the html file into the bucket

The screenshot shows the Google Cloud Platform Storage browser interface after a file has been uploaded. The main area now lists a single file: 'index.htm'. The table below shows the file details:

Name	Size	Type	Storage class	Last modified	Share publicly
index.htm	21.81 KB	text/html	Multi-Regional	10/23/17, 3:47 PM	<input checked="" type="checkbox"/> Public link

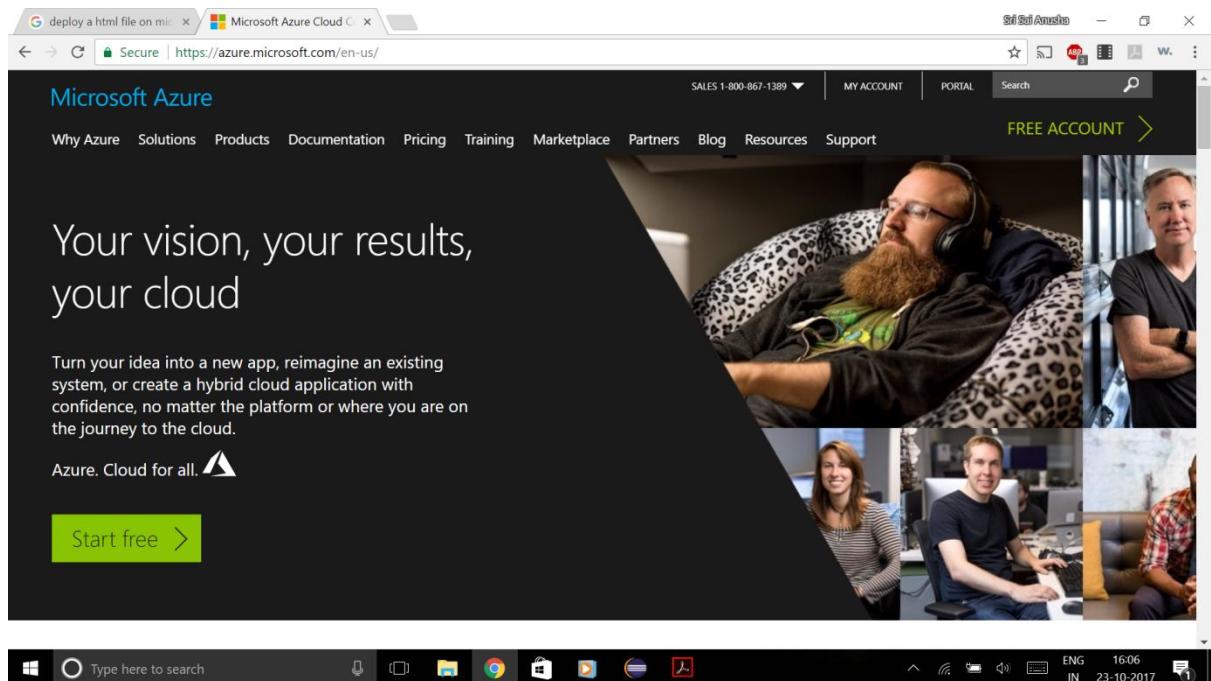
A modal window titled 'Upload 1 of 1 complete' is open, showing the status 'index.htm' and 'Finished'. The taskbar at the bottom shows various application icons.

6. This creates a public link for the html file and gives the required output

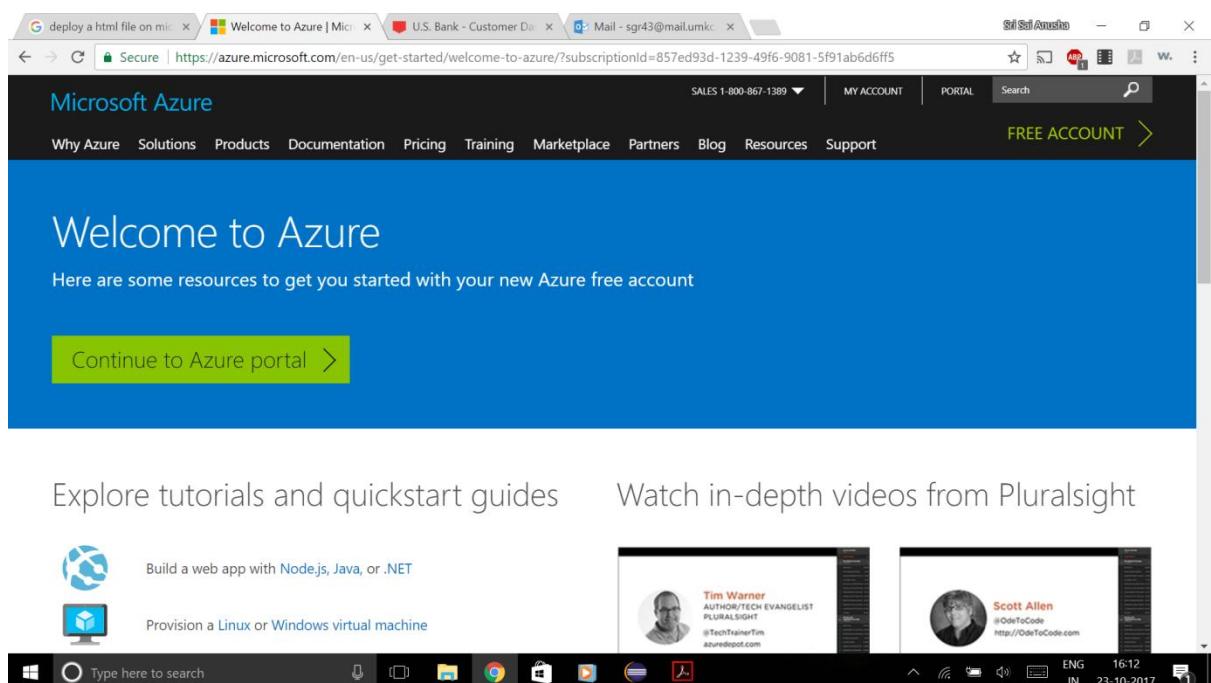


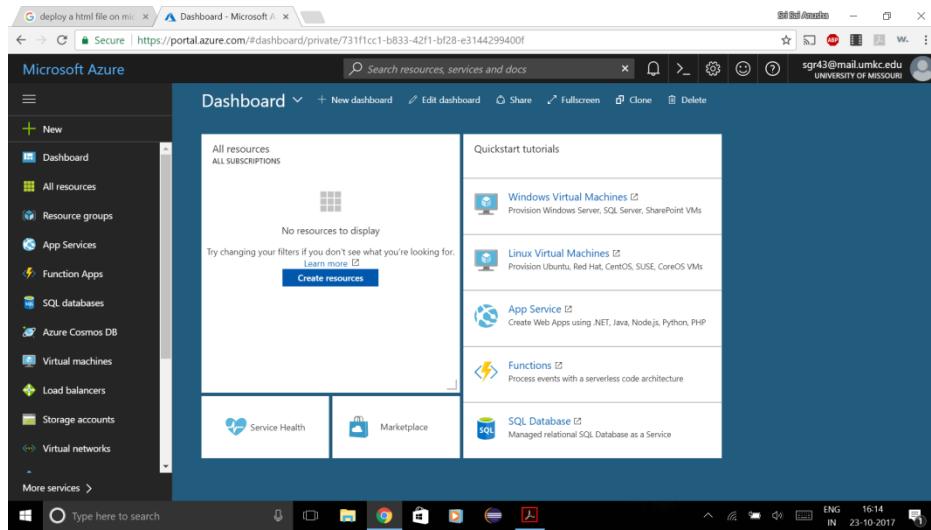
## Deploying “index” on Microsoft Azure:

1. Go to URL <https://azure.microsoft.com/en-us/?cdn=disable>

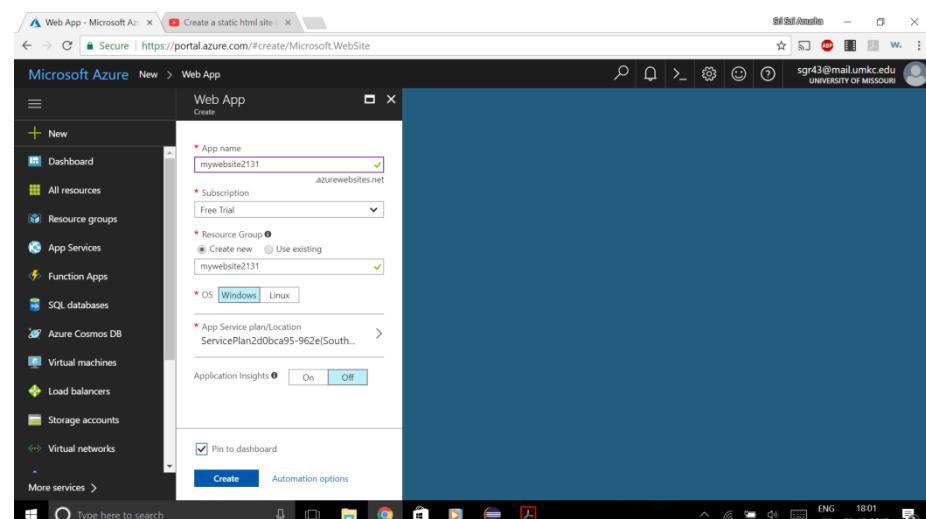
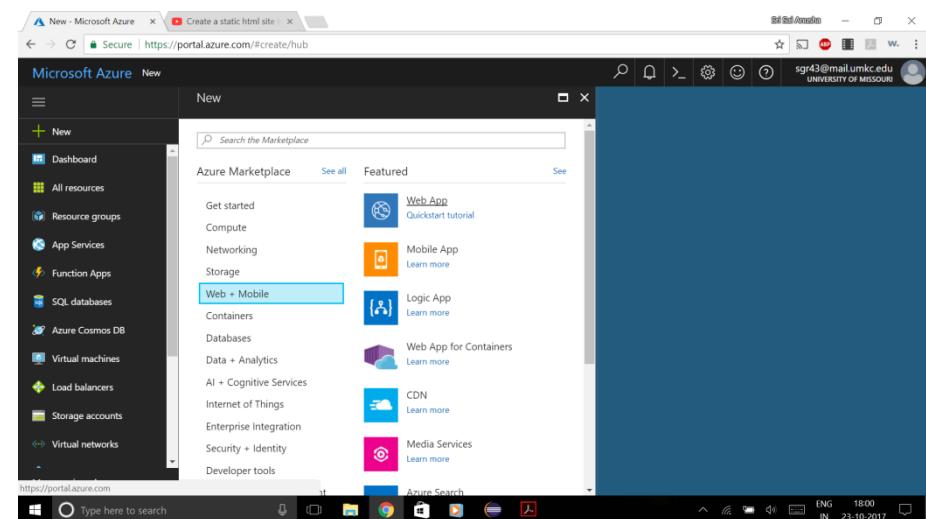


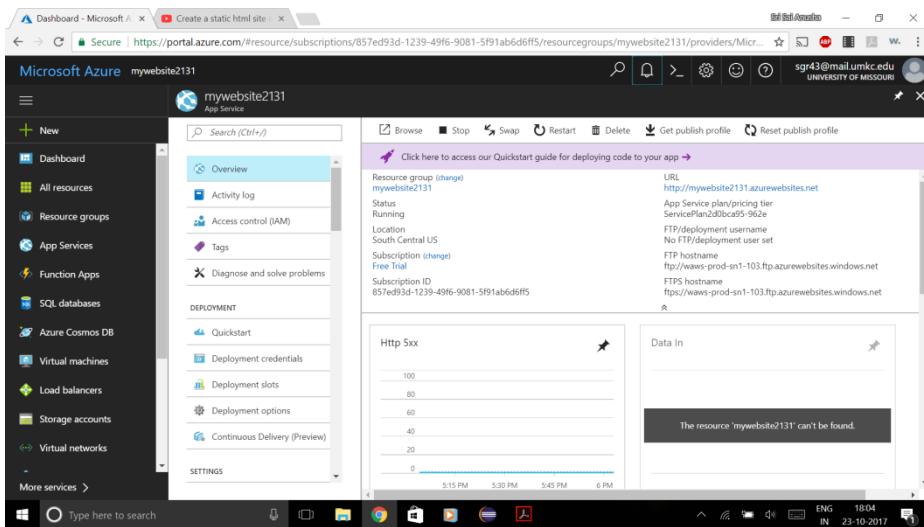
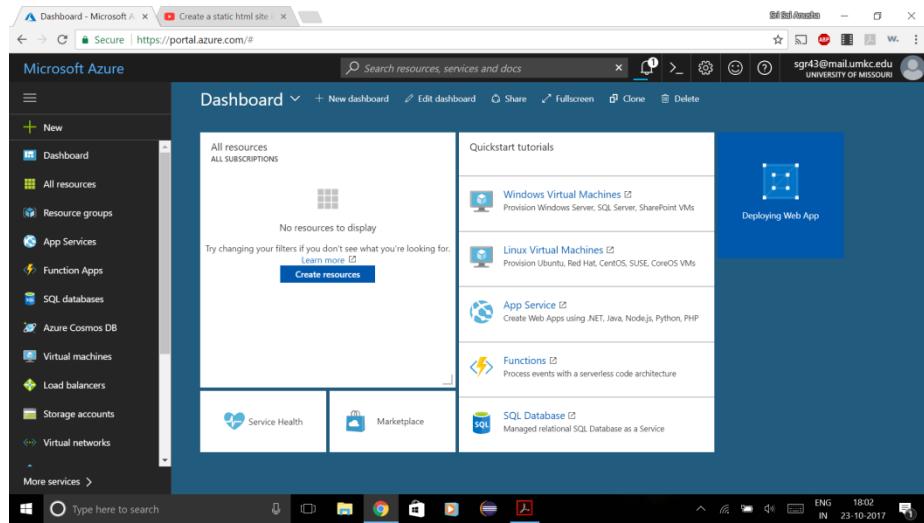
2. Login with your Microsoft credentials



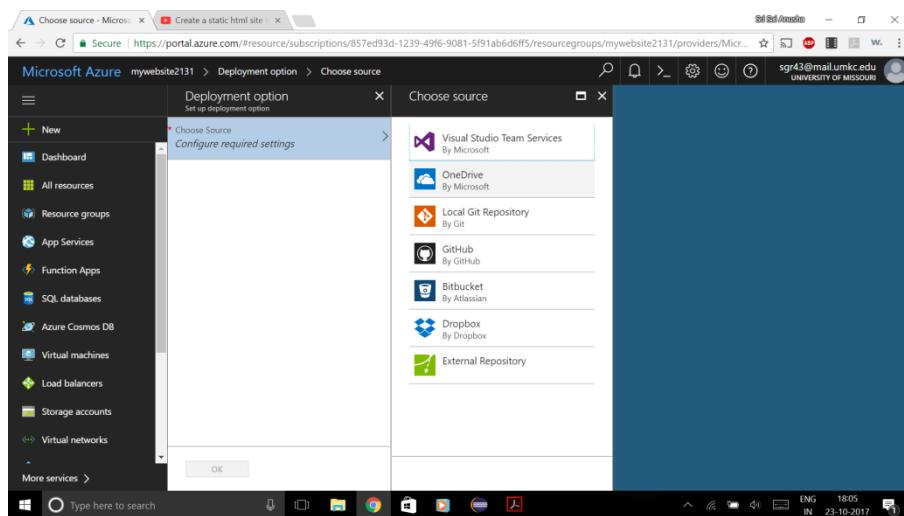


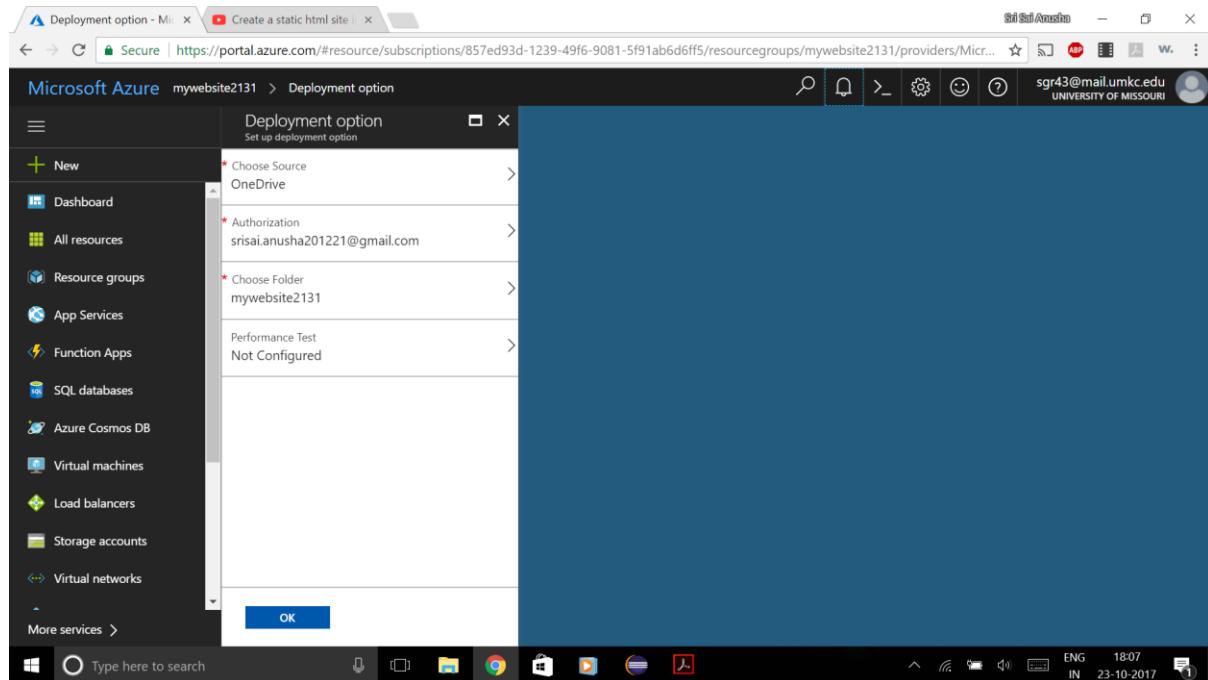
### 3. Under New section, select Web+Mobile and then create a new Web App



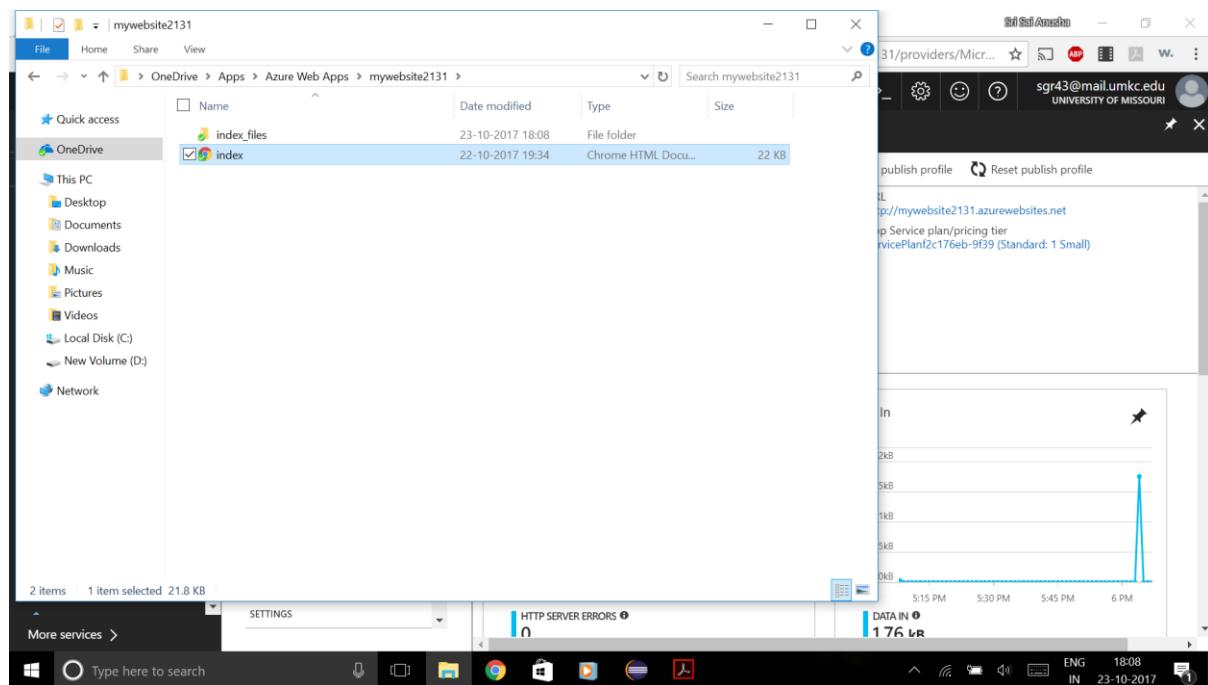


#### 4. Under deployment options, choose OneDrive





5. A new folder with the app name is created in OneDrive folder on your PC. Copy the index file into the web app folder and synchronize the web app



The screenshot shows the Microsoft Azure portal interface. The left sidebar lists various services: New, Dashboard, All resources, Resource groups, App Services (selected), Function Apps, SQL databases, Azure Cosmos DB, Virtual machines, Load balancers, Storage accounts, Virtual networks, and More services. The main content area is titled "mywebsite2131 - Deployment options" under "App Service". It includes tabs for Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Quickstart, Deployment credentials, Deployment slots, Deployment options (which is selected and highlighted in blue), and Continuous Delivery (Preview). A "Sync" button is visible at the top right. Below it, a message states "Synchronized 1 change(s) from OneDrive." followed by "OneDrive Active 6:07 PM". The bottom navigation bar shows standard Windows icons like Start, Task View, File Explorer, and Edge, along with system status indicators.

6. This creates a public URL for the app and by browsing, we get the required output

The screenshot shows a web browser window with the address bar containing "mywebsite2131.azurewebsites.net". The page content displays the text "Hello World!" followed by "Sri Sai Anusha Gandu". The bottom navigation bar shows standard Windows icons like Start, Task View, File Explorer, and Edge, along with system status indicators.

## EPILOGUE

- 1) I got to know and exposed to various cloud platforms which is a whole new concept to me
- 2) The fun part of the assignment is the opportunity to learn the new concepts which is now boom in the current software industry and there is no such thing as difficult. The assignment went with such an ease that it is challenging passing through each step
- 3) GENI: Used already, got along very easily
- 4) Amazon AWS: Professional
- 5) Google Cloud Platform: Used to Google, so got along
- 6) Microsoft Azure: User friendly UI
- 7) I enjoyed working with Microsoft Azure the most