

Lab: Create a Load Balanced web server

Step 1: Create a EC2 Instance with Security Group name websg

Step 2: Create a EBS volume

Step 3: Attach EBS Volume to an Instance

Step 4: Configure Volume in the Instance

Step 5: Install Apache Web Server on the Instance

Step 6: Put Website data in to the EBS Volume

Step 7: Start the Web Server

Step 8: Test the Web Server

Step 9: Take a Snapshot of the Volume

Step 10: Create an Instance with

Volume created from the Snapshot

Startup Script to configure and start Apache and Volume

Security Group Websg

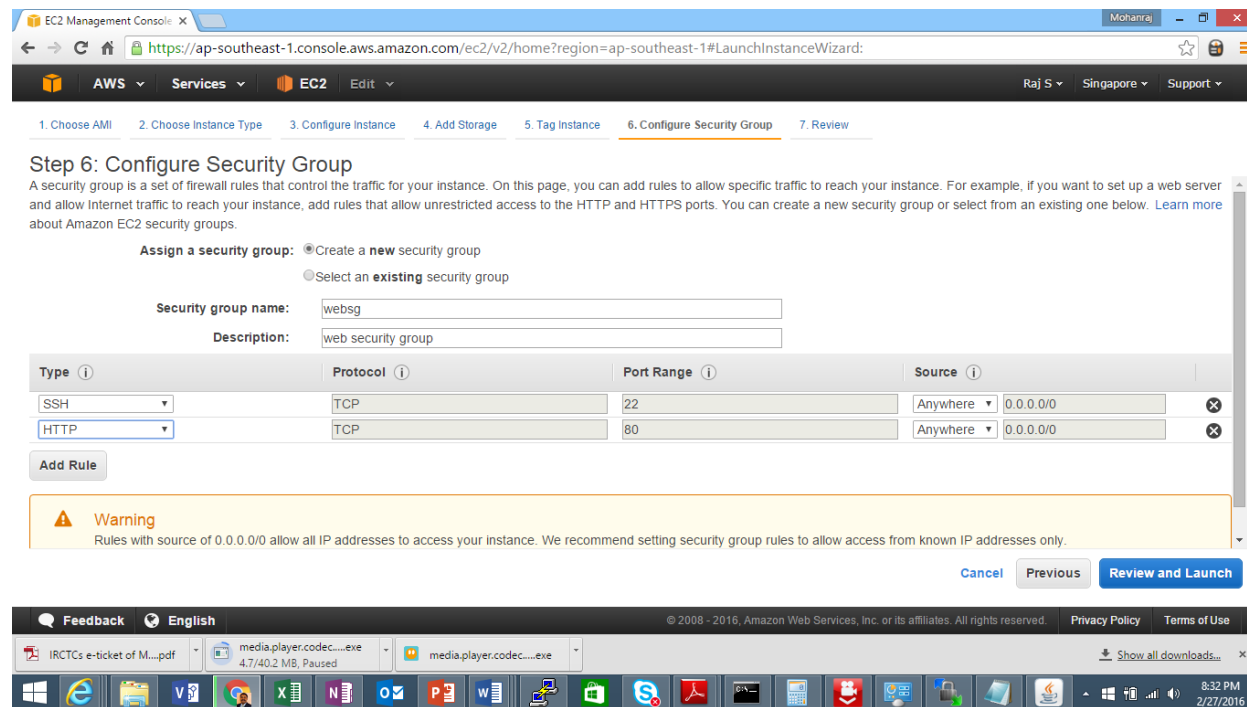
Step 11: Create a Load balancer with

two instance under a load balancer

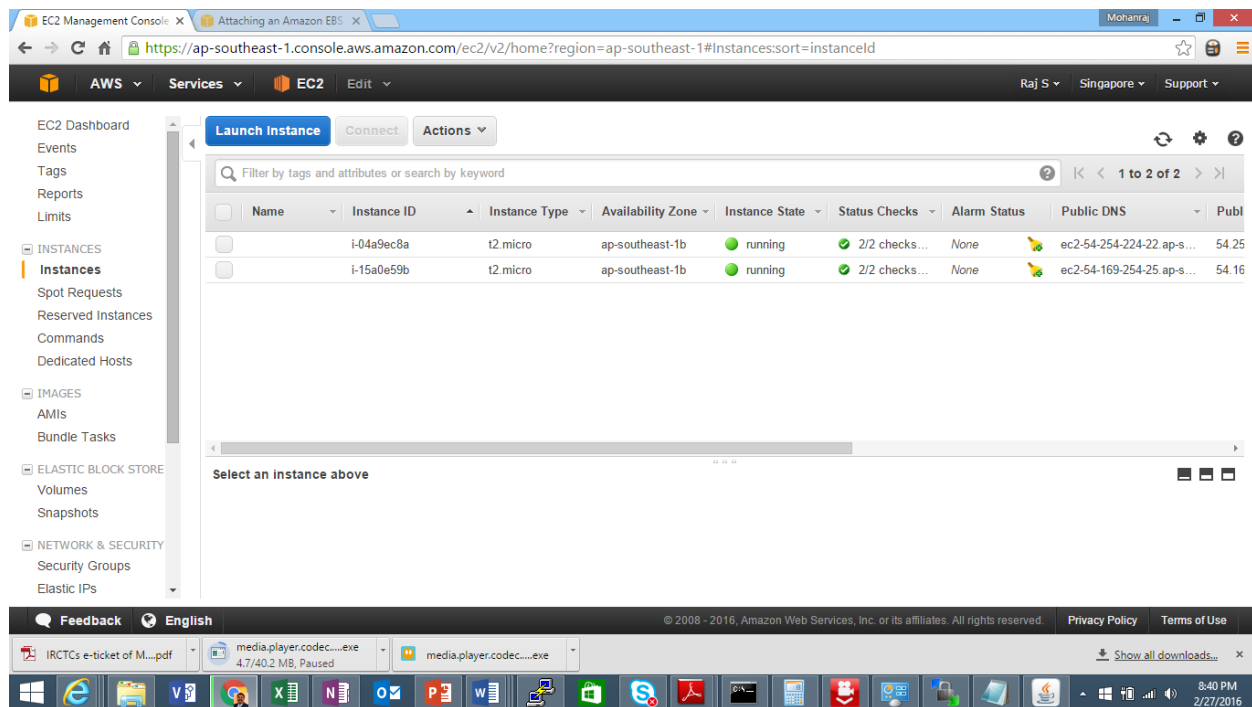
Step 12: Validate the Configuration

To launch an instance

1. Open the Amazon EC2 console at <https://console.aws.amazon.com/ec2/>.
2. From the console dashboard, choose **Launch Instance**.
3. The **Choose an Amazon Machine Image (AMI)**
4. On the **Choose an Instance Type** page, Select the `t2.micro` type, which is selected by default.
5. Choose **Configure Instance Details** to let the wizard complete the other configuration settings for you.
6. On the **Review Instance Launch** page, under **Security Groups**
 - a. Choose **Edit security groups**.
 - b. On the **Configure Security Group** page create websg Security group



- c. then choose **Review and Launch**.
7. On the **Review Instance Launch** page, choose **Launch**.
8. When prompted for a key pair, Select **Create a new key pair**, enter a name for the key pair, and then choose **Download Key Pair**.
9. When you are ready, select the acknowledgement check box, and then choose **Launch Instances**.
10. A confirmation page lets you know that your instance is launching. Choose **View Instances** to close the confirmation page and return to the console.
11. On the **Instances** screen, you can view the status of the launch. It takes a short time for an instance to launch. When you launch an instance, its initial state is `pending`. After the instance starts, its state changes to `running` and it receives a public DNS name. (If the **Public DNS** column is hidden, choose the Show/Hide icon in the top right corner of the page and then select **Public DNS**.)
12. It can take a few minutes for the instance to be ready so that you can connect to it. Check that your instance has passed its status checks; you can view this information in the **Status Checks** column.
13. Get the Instance ID and Availability Zone of the machine in Second and Fourth column



Step 2: Create a EBS volume

1. Click **Volumes** in the navigation pane.
2. Above the upper pane, click **Create Volume**.
3. In the **Create Volume** dialog box, in the **Volume Type** list, select **General Purpose SSD**
4. In the **Size** box, enter the size of the volume, in 20 GiB.
5. In the **Availability Zone** list, select the Availability Zone same as EC2 Instance
6. Click **Yes, Create**.

Step 3: Attach EBS Volume to an Instance

1. Click **Volumes** in the navigation pane.
2. Select a volume and then click **Attach Volume**.
3. In the **Attach Volume** dialog box, Type the EC2 **Instance ID** created
4. Change the Device name /dev/sdf
5. Click **Attach**.

Step 4: Configure Volume in the Instance

1. In the Amazon EC2 console, click **Instances** in the navigation pane.
2. Select the instance, and then click **Connect**.

3. Click **A Java SSH client directly from my browser (Java required)**.
4. Amazon EC2 automatically detects the public DNS name of your instance and the name of the populates **Public DNS** for you. It also detects name of the key pair that you specified when you launched the instance. Complete the following,
 1. In **User name**, enter the user name to log in to your instance.
 2. In **Private key path**, enter the fully-qualified path to your private key (.pem) file, including the key pair name; for example:

`C:\KeyPairs\my-key-pair.pem`

3. Click **Store in browser cache** to store the location of the private key in your browser cache.
4. and then click **Launch SSH Client**.
5. click **Yes** to trust the certificate, and click **Run** to run the MindTerm client.
6. If this is your first time running MindTerm, a series of dialog boxes asks you to accept the license agreement, to confirm setup for your home directory, and to confirm setup of the known hosts directory. Confirm these settings.
7. A dialog prompts you to add the host to your set of known hosts. If you do not want to store the host key information on your local computer, click **No**.
8. A window opens and you are connected to your instance.
9. Once Connected

```
[ec2-user@ip-172-31-18-45 ~]$ sudo bash
[root@ip-172-31-18-45 ec2-user]# fdisk /dev/xvdf
```

Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Select (default p):

Using default response p

Partition number (1-4, default 1):

First sector (2048-41943039, default 2048):

Using default value 2048

Last sector, +sectors or +size{K,M,G} (2048-41943039, default 41943039):

Using default value 41943039

Partition 1 of type Linux and of size 20 GiB is set

Command (m for help): w

Command (m for help): q

```
[root@ip-172-31-18-45 ec2-user]# partprobe
```

```
[root@ip-172-31-18-45 ec2-user]# mkfs.ext4 /dev/xvdf1
```

```
[root@ip-172-31-18-45 ec2-user]# vi /etc/fstab
```

```
#  
LABEL=/ / ext4 defaults,noatime 1 1  
tmpfs /dev/shm tmpfs defaults 0 0  
devpts /dev/pts devpts gid=5,mode=620 0 0  
sysfs /sys sysfs defaults 0 0  
proc /proc proc defaults 0 0  
/dev/xvdf1 /var/www/html ext4 defaults 1 1
```

```
[root@ip-172-31-18-45 ec2-user]# mount -a
```

Step 5: Install Apache Web Server on the Instance

```
[root@ip-172-31-18-45 ec2-user]# yum -y install httpd
```

Transfer the web site data using Winscp

Step 6: Put Website data in to the EBS Volume

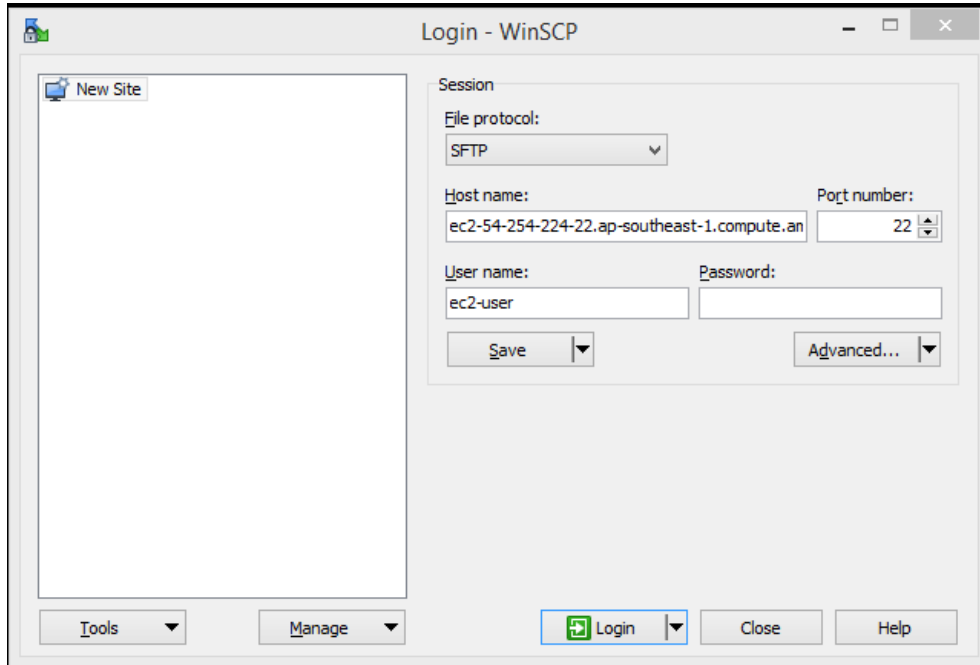
Download Winscp below

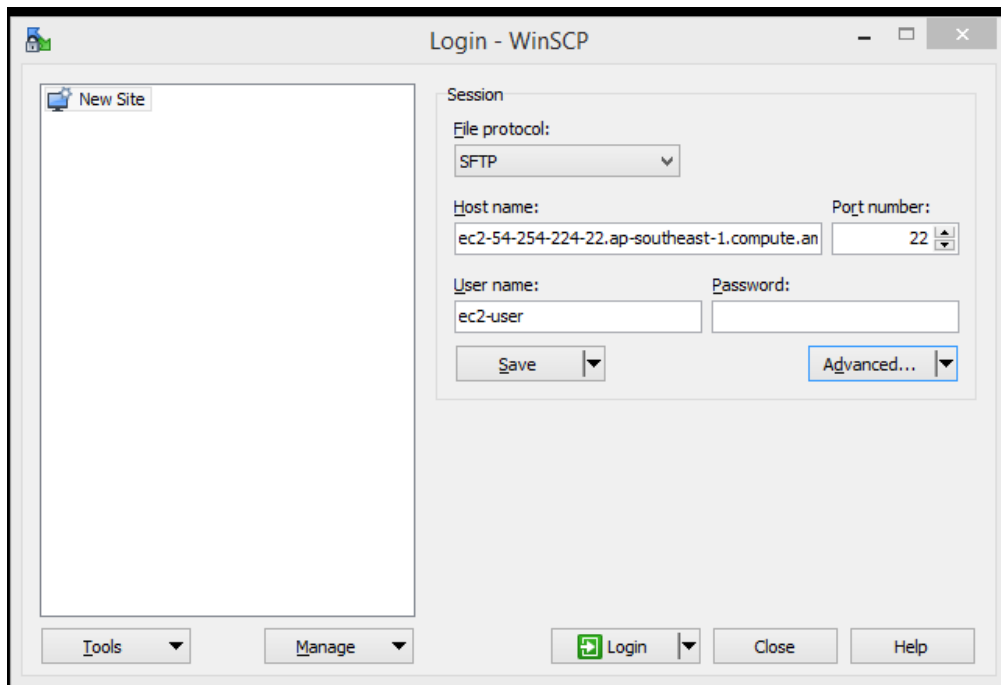
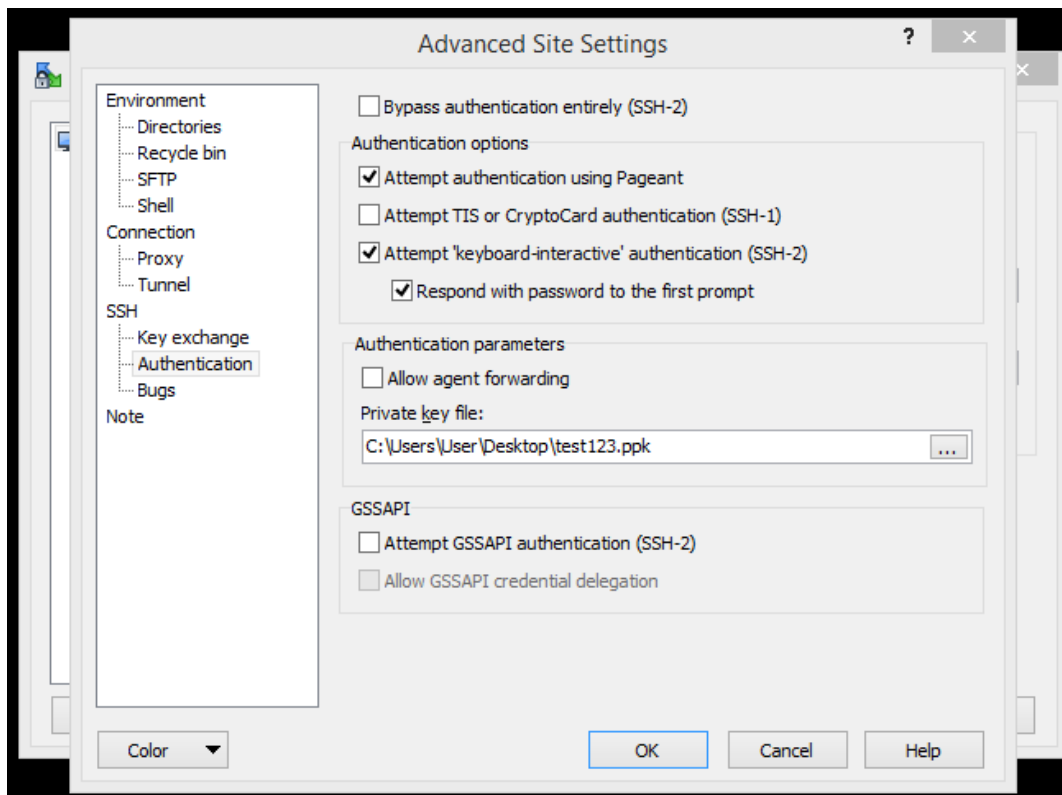
<https://winscp.net/eng/download.php>

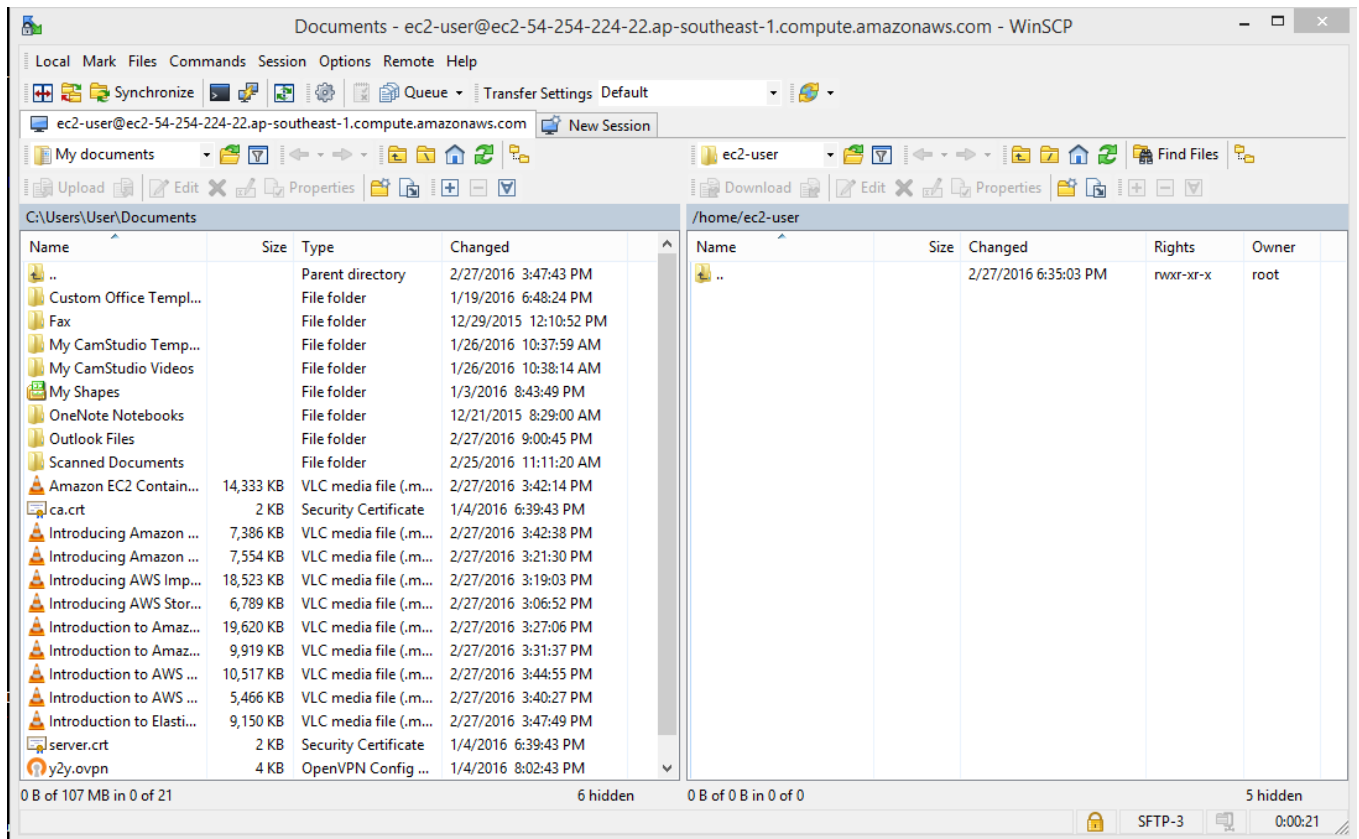
Open Winscp enter DNS name of the instace and user name as ec2-user and

Advanced → Authentication -> Upload .PPK file

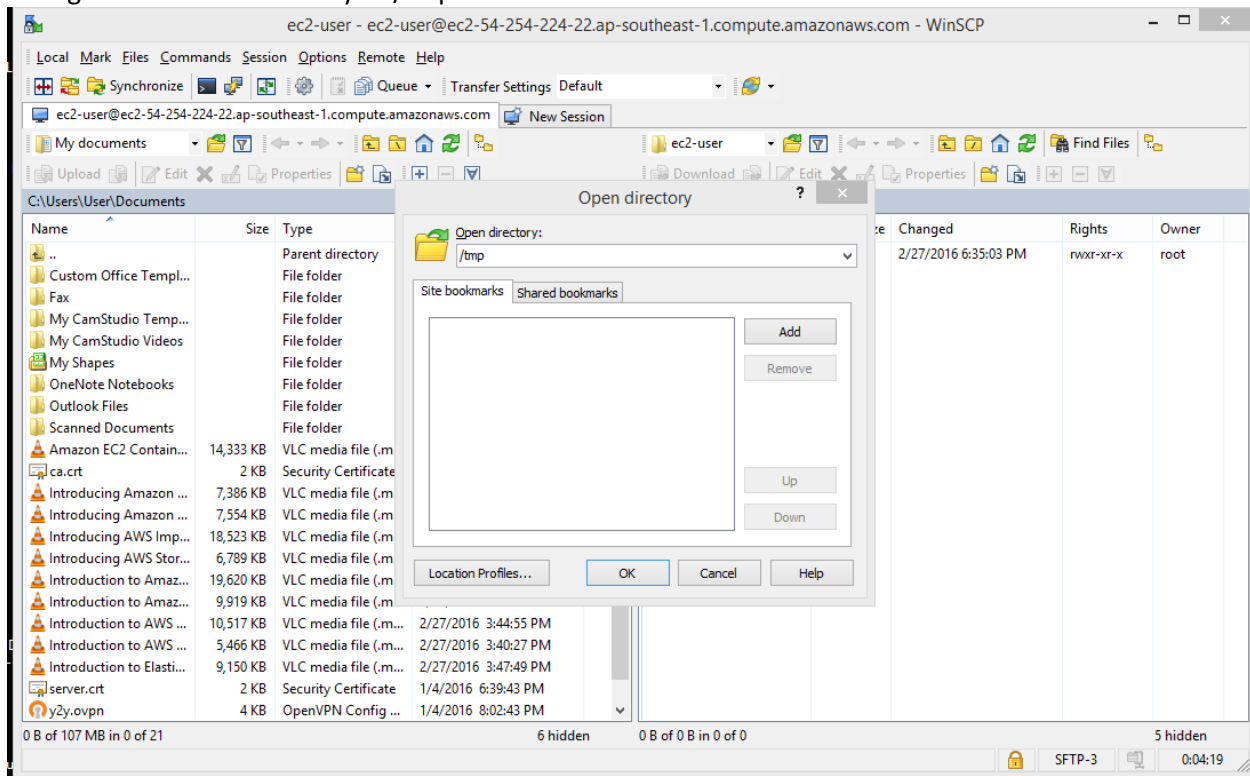
Convert .pem file to .ppk file using puttygen







Change Destination directory to /tmp



Copy the Web code by drag and drop

Step 7: Start the Web Server

Go back to Terminal

```
[root@ip-172-31-18-45 ec2-user]# cp -R /tmp/web/* /var/
```

```
[root@ip-172-31-18-45 ec2-user]# groupadd www
```

```
[root@ip-172-31-18-45 ec2-user]# usermod -a -G www ec2-user
```

```
[root@ip-172-31-18-45 ec2-user]# chown -R root:www /var/www
```

```
[root@ip-172-31-18-45 ec2-user]# chmod 2775 /var/www
```

```
[root@ip-172-31-18-45 ec2-user]# service httpd start
```

```
[root@ip-172-31-18-45 ec2-user]# chkconfig httpd on
```

Step 8: Test the Web Server

Open browser and type and validate <http://<domain>> name of instance>

Step 9: Take a Snapshot of the Volume

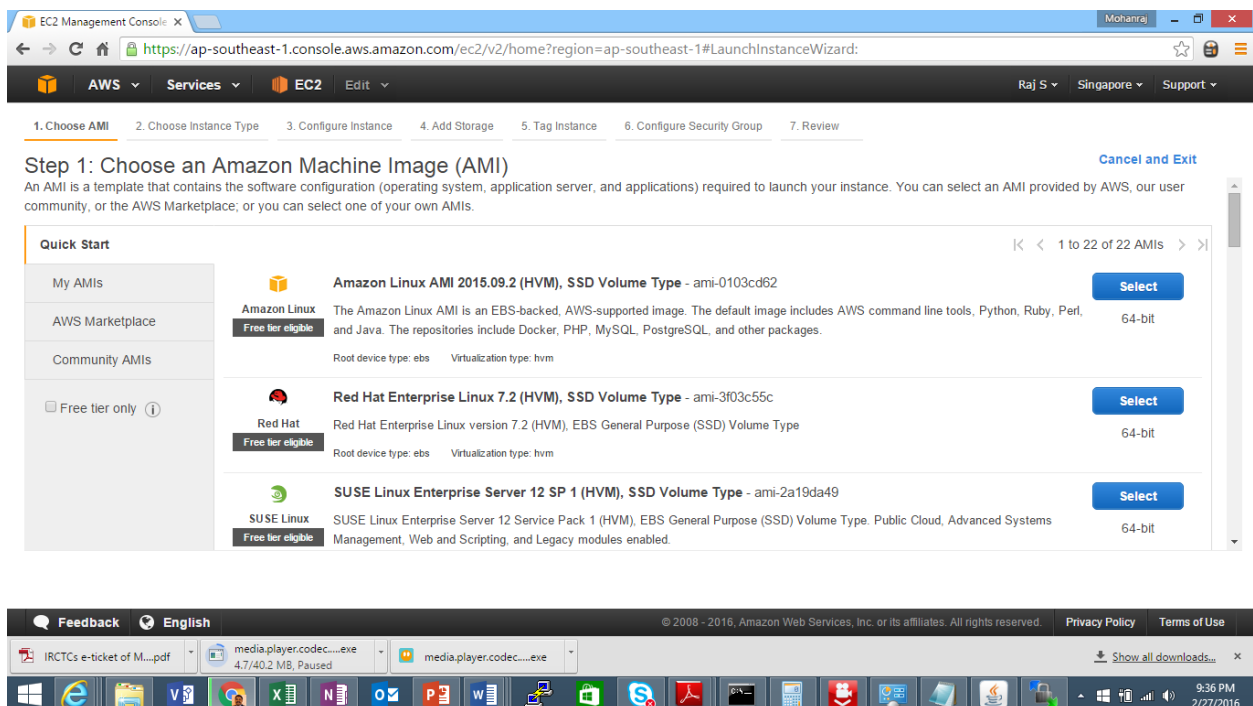
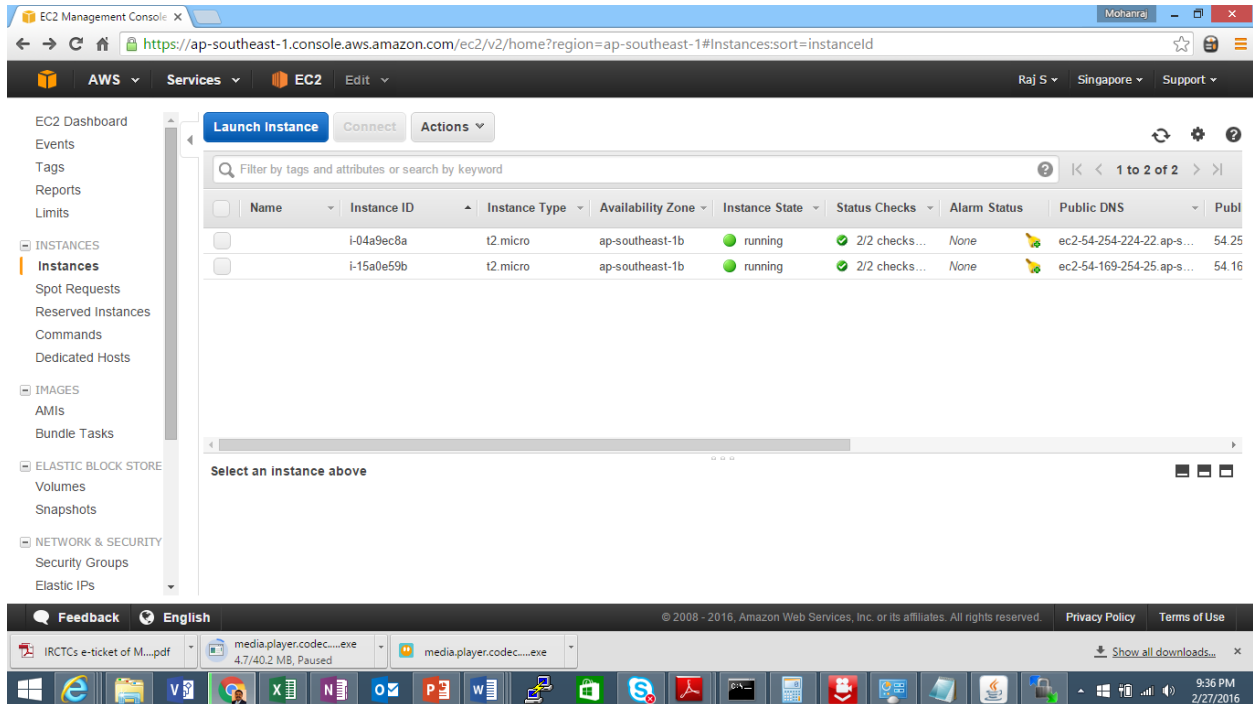
1. Choose **Snapshots** in the navigation pane.
2. Choose **Create Snapshot**.
3. In the **Create Snapshot** dialog box, select the volume created in step 4
4. then choose **Create**.

Step 10: Create an Instance with

Volume created from the Snapshot as /dev/sdf

Startup Script to configure and start Apache and Volume

Security Group Websg



EC2 Management Console

https://ap-southeast-1.console.aws.amazon.com/ec2/v2/home?region=ap-southeast-1#LaunchInstanceWizard:

AWS Services EC2 Edit

Raj S Singapore Support

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Tag Instance 6. Configure Security Group 7. Review

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.

Filter by: All instance types Current generation Show/Hide Columns

Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GiB)	EBS-Optimized Available	Network Performance
<input type="checkbox"/>	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate
<input checked="" type="checkbox"/>	General purpose	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate
<input type="checkbox"/>	General purpose	t2.small	1	2	EBS only	-	Low to Moderate
<input type="checkbox"/>	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate
<input type="checkbox"/>	General purpose	t2.large	2	8	EBS only	-	Low to Moderate

Cancel Previous Review and Launch Next: Configure Instance Details

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EC2 Management Console

https://ap-southeast-1.console.aws.amazon.com/ec2/v2/home?region=ap-southeast-1#LaunchInstanceWizard:

AWS Services EC2 Edit

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1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Tag Instance 6. Configure Security Group 7. Review

Step 3: Configure Instance Details

IAM role: None Create new IAM role

Shutdown behavior: Stop

Enable termination protection: ☐ Protect against accidental termination

Monitoring: ☐ Enable CloudWatch detailed monitoring Additional charges apply.

Tenancy: Shared - Run a shared hardware instance Additional charges will apply for dedicated tenancy.

Advanced Details

User data: ☒ As text ☐ As file ☐ Input is already base64 encoded

```
#!/bin/bash
yum update -y
yum install -y httpd24
mount /dev/xvdf1 /var/www/html
echo "/dev/xvdf1 /var/www/html ext4 defaults 1 1" >> /etc/fstab
```

Cancel Previous Review and Launch Next: Add Storage

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EC2 Management Console

https://ap-southeast-1.console.aws.amazon.com/ec2/v2/home?region=ap-southeast-1#LaunchInstanceWizard:

AWS Services EC2 Edit

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1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Tag Instance 6. Configure Security Group 7. Review

Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. [Learn more](#) about storage options in Amazon EC2.

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Delete on Termination	Encrypted
Root	/dev/xvda	snap-90f2d371	8	General Purpose SSD (GP2)	24 / 3000	<input checked="" type="checkbox"/>	Not Encrypted

[Add New Volume](#)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. [Learn more](#) about free usage tier eligibility and usage restrictions.

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

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media.player.codec.exe 4.7/40.2 MB, Paused

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EC2 Management Console

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Reports Limits

INSTANCES

- Instances
- Spot Requests
- Reserved Instances
- Commands
- Dedicated Hosts

IMAGES

- AMIs
- Bundle Tasks

ELASTIC BLOCK STORE

- Volumes
- Snapshots**

NETWORK & SECURITY

- Security Groups
- Elastic IPs
- Placement Groups
- Key Pairs
- Network Interfaces

Create Snapshot Actions

Owned By Me Filter by tags and attributes or search by keyword

Name	Snapshot ID	Size	Description	Status	Started
web_landed	snap-f99aade7	20 GiB		completed	February 27, 2016 at 5:56:2

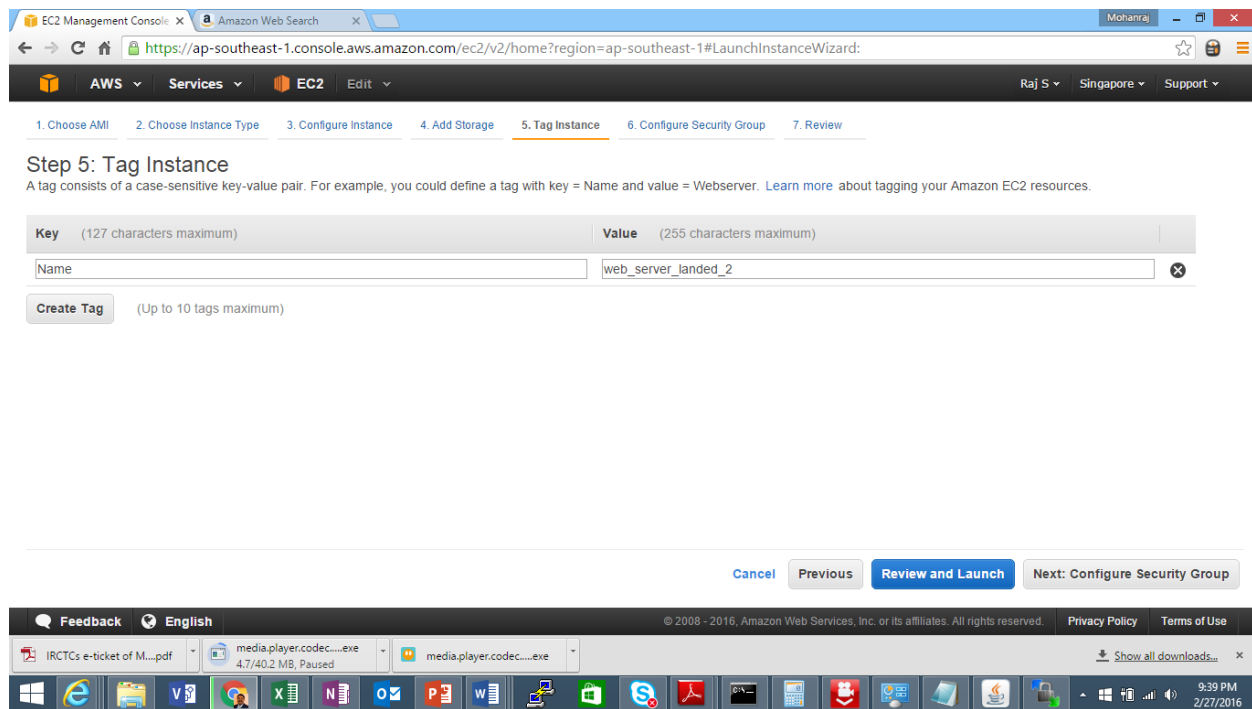
Snapshot: snap-f99aade7 (web_landed)

Description Permissions Tags

Snapshot ID	snap-f99aade7	Progress	100%
Status	completed	Capacity	20 GiB
Volume	vol-365dabf0	Encrypted	Not Encrypted

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Choose websg security Group

Review and launch

Launch choose the existing Key created

And Launch

Once create login using the Same as Step 4

Validate script run using

```
[root@ip-172-31-18-45 ec2-user]# more /var/log/cloud-init-output.log
```

Test the Web Server

Open browser and type and validate <http://<domain name of instance>>

Step 1: Define Your Load Balancer

1. From the navigation bar, select a region for your load balancers. Be sure to select the same region that you selected for your EC2 instances.
2. In the navigation pane, under **LOAD BALANCING**, click **Load Balancers**.
3. Click **Create Load Balancer**.
4. In **Load Balancer name**, enter a name for your load balancer.

The name of your load balancer must be unique within your set of load balancers for the region, can have a maximum of 32 characters, and can contain only alphanumeric characters and hyphens.

5. From **Create LB inside**, select the same network that you selected for your instances
6. Leave the default listener configuration.

Load Balancer name:

Create LB Inside:

Create an internal load balancer: ☐ [\(what's this?\)](#)

Enable advanced VPC configuration: ☐

Listener Configuration:

Load Balancer Protocol	Load Balancer Port	Instance Protocol	Instance Port
<input type="text" value="HTTP"/>	<input type="text" value="80"/>	<input type="text" value="HTTP"/>	<input type="text" value="80"/>

7. Click **Next: Assign Security Groups**.

Step 2: Assign Security Groups to Your Load Balancer in a VPC

1. On the **Assign Security Groups** page, select **Create a new security group**.
2. Enter a name and description for your security group, or leave the default name and description. This new security group contains a rule that allows traffic to the port that you configured your load balancer to use.

Assign a security group: ☒ Create a **new** security group
☐ Select an **existing** security group

Security group name:

Description:

Type <small>i</small>	Protocol <small>i</small>	Port Range <small>i</small>	Source <small>i</small>
<input type="text" value="HTTP"/>	<input type="text" value="TCP"/>	<input type="text" value="80"/>	<input type="text" value="Anywhere"/> <input type="text" value="0.0.0.0/0"/>

Step 3: Configure Security Settings

Click **Next**

Step 4: Configure Health Checks for Your EC2 Instances

On the **Configure Health Check** page, do the following:

- a. Leave **Ping Protocol** set to its default value, **HTTP**.
- b. Leave **Ping Port** set to its default value, **80**.

- c. In the **Ping Path** field, replace the default value with a single forward slash ("/"). This tells Elastic Load Balancing to send health check queries to the default home page for your web server, such as `index.html` or `default.html`.

Ping Protocol	<input type="text" value="HTTP"/>
Ping Port	<input type="text" value="80"/>
Ping Path	<input type="text" value="/"/>

- d. Leave the other fields set to their default values.
- b) Click **Next: Add EC2 Instances**.

Step 5: Register EC2 Instances with Your Load Balancer

On the **Add EC2 Instances** page, select the instances to register with your load balancer.

Click **Next: Add Tags**.

Step 6: Tag Your Load Balancer

- On the **Add Tags** page, specify a key and a value for the tag.
- To add another tag, click **Create Tag** and specify a key and a value for the tag.
- After you are finished adding tags, click **Review and Create**.

Step 7: Create and Verify Your Load Balancer

On the **Review** page, check your settings. If you need to make changes, click the corresponding link to edit the settings.

Click **Create** to create your load balancer.

After you are notified that your load balancer was created, click **Close**.

Select your new load balancer.

In the bottom pane, on the **Description** tab, check the **Status** row. If it indicates that some of your instances are not in service, its probably because they are still in the registration process.

Step 12: Validate the Configuration

After you've verified that at least one of your EC2 instances is `InService`, you can test your load balancer. Copy the string from the **DNS Name** field and paste it into the address field of an Internet-connected web browser. (For example, `my-load-balancer-1234567890.us-west-2.elb.amazonaws.com`.) If your] load balancer is working, you see the default page of your HTTP server

Step 13: Change `Index.html` in one of the Server to know it is serving from both the servers

Cleanup:

- Delete load balancer
- Delete Instances