# Capstone Project: Deploying Cart Management Application to Cloud

## DESCRIPTION

You work for an E-commerce company and as a Cloud Architect you are asked to deploy the Cart Management Application on cloud.

**Background of the problem statement:**

The company has created a new website for the organization where the user can add and delete products from the cart. The company wants to use a public cloud for the internet facing website of the organization. Once the website was deployed, users started complaining that all the products are not loading fast enough. You realized that the website gets global traffic and the static assets like pages and products are served from a single server. You need to make sure that the traffic coming to the application from different parts of the world is load balanced at the DNS level. Also, internal employees within your organization told that they are facing difficulty in accessing common files of the website, as they need to get it from each other when accessing them from Virtual Machine.

You can use either Azure or AWS platforms to design the solution using IaaS OR PaaS.

**You must use the following tools:**

- AWS: Route 53, S3 Bucket, CloudFront, EC2
- Azure: Azure App Service, CDN, DNS, Azure VM, Azure Traffic Manager

**Following requirements should be met:**

1. Suggest an appropriate solution so that your company can make use of cloud while keeping the requirements mentioned above for your company in mind
2. Provide an approach to:
    a. Govern all the resources being used for development, testing, and production of the company's website.
    b. Keep a separate track of the billing life cycle and cost management of all the services being used for hosting the company's website on Cloud
3. Upload all static content of your website to cloud
4. Create a CDN endpoint and configure it to serve the static files you have uploaded
5. Use storage service and upload files for your teammates to share
6. Connect Windows or Linux VM to the Storage service

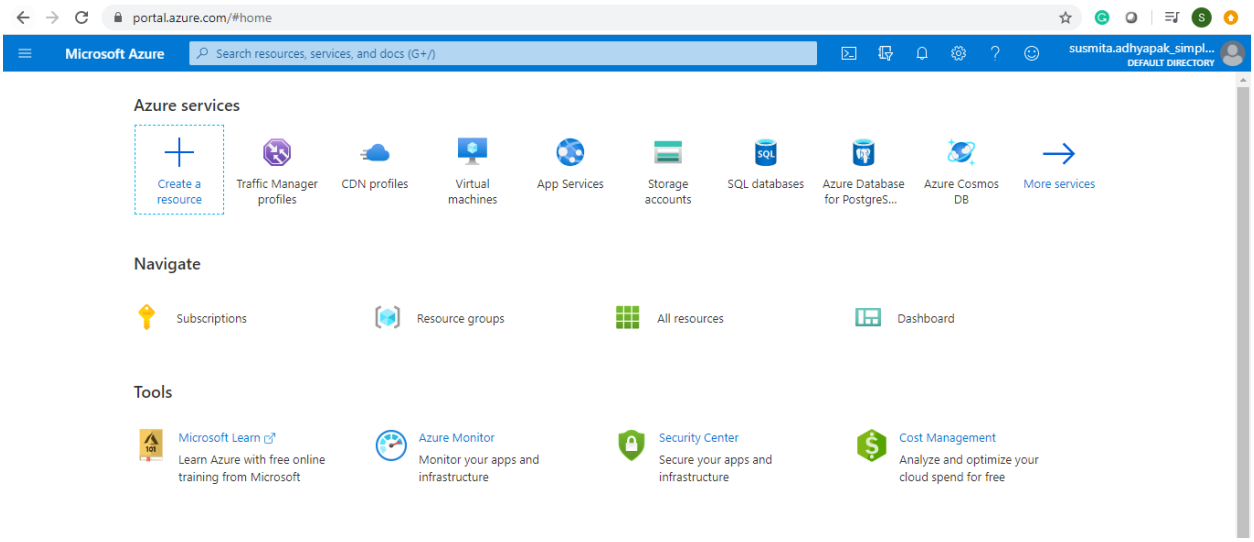
This section will guide you to deploy an application on:

- Azure
- AWS

**Azure:**

Approach 1:

**Step 1:** Log into the Azure portal

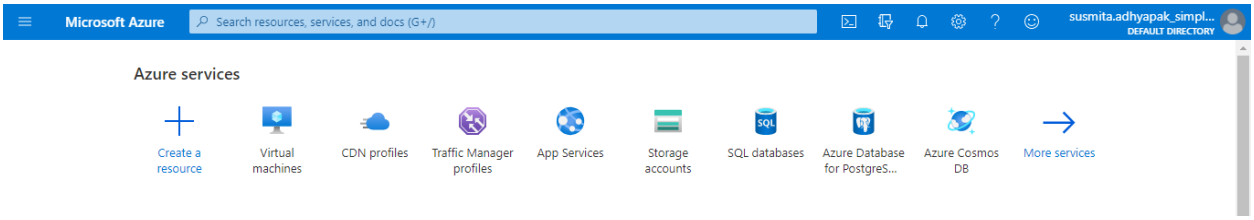



**Step 2:** Before creating the resources, make sure you apply tags to the resources so that you can keep a track of billing later on

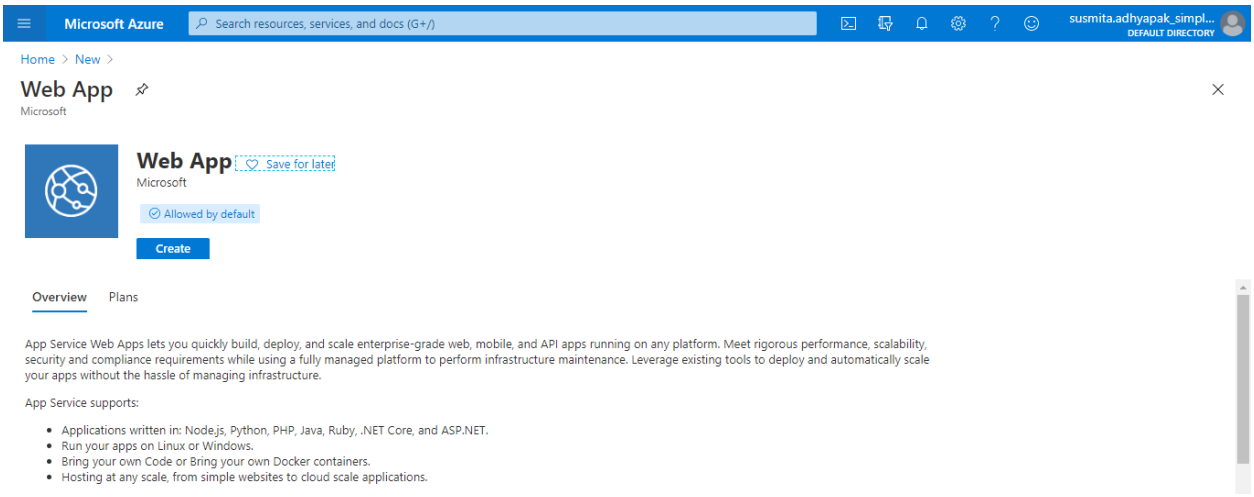
**Step 3:** To begin, create an Azure App service plan in the standard tier.

**Step 4:** Create an App Service (Web App) using the App Service Plan that you created in the previous step

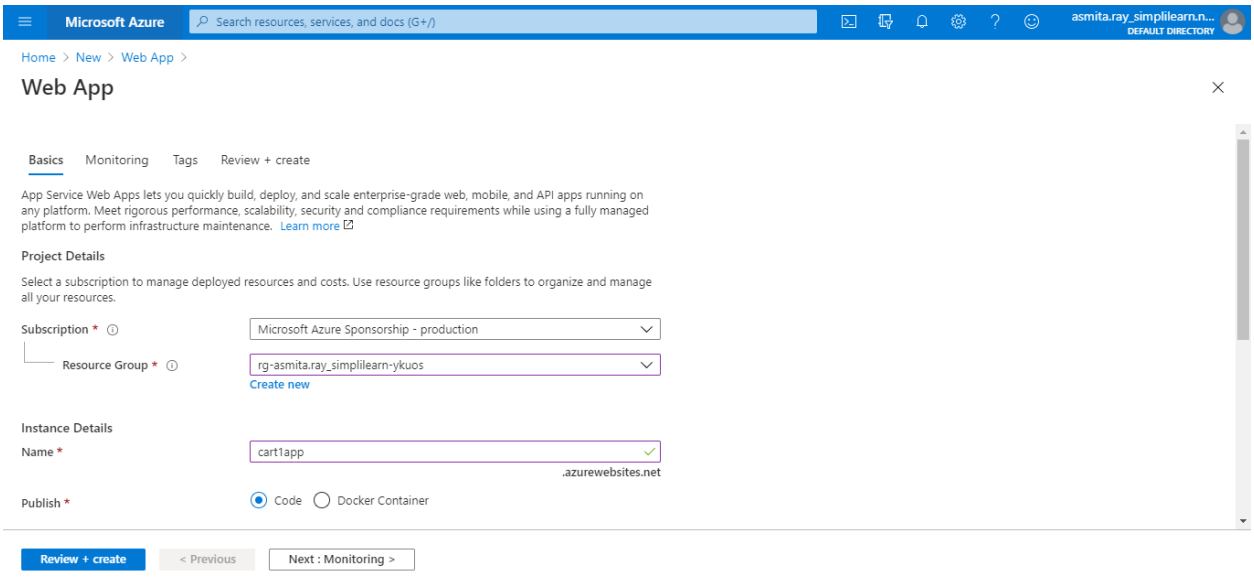
Step 4.1: Click on the **Create a resource** tab

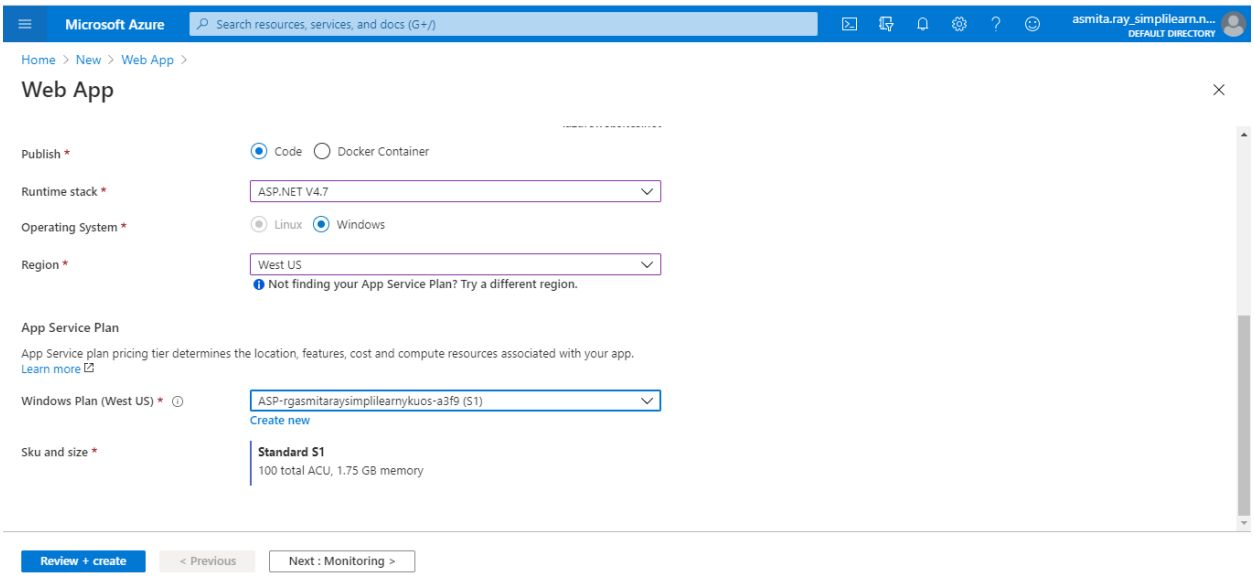



Step 4.2: Search for Web App and click on the **Create** tab



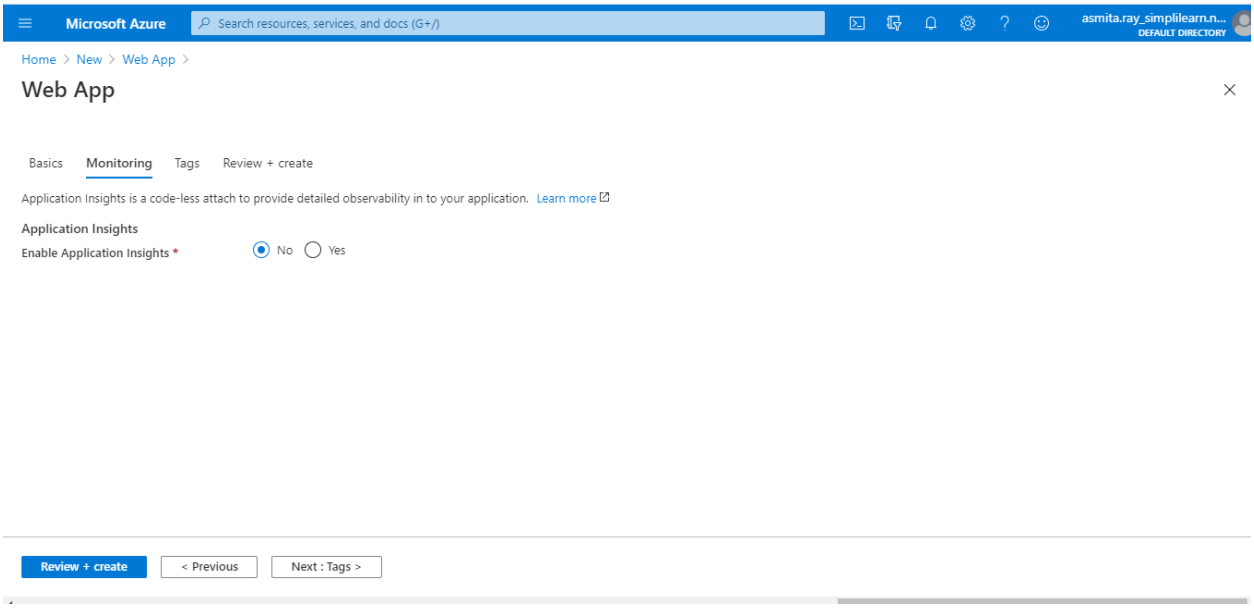

Step 4.3: Provide basic information in the application



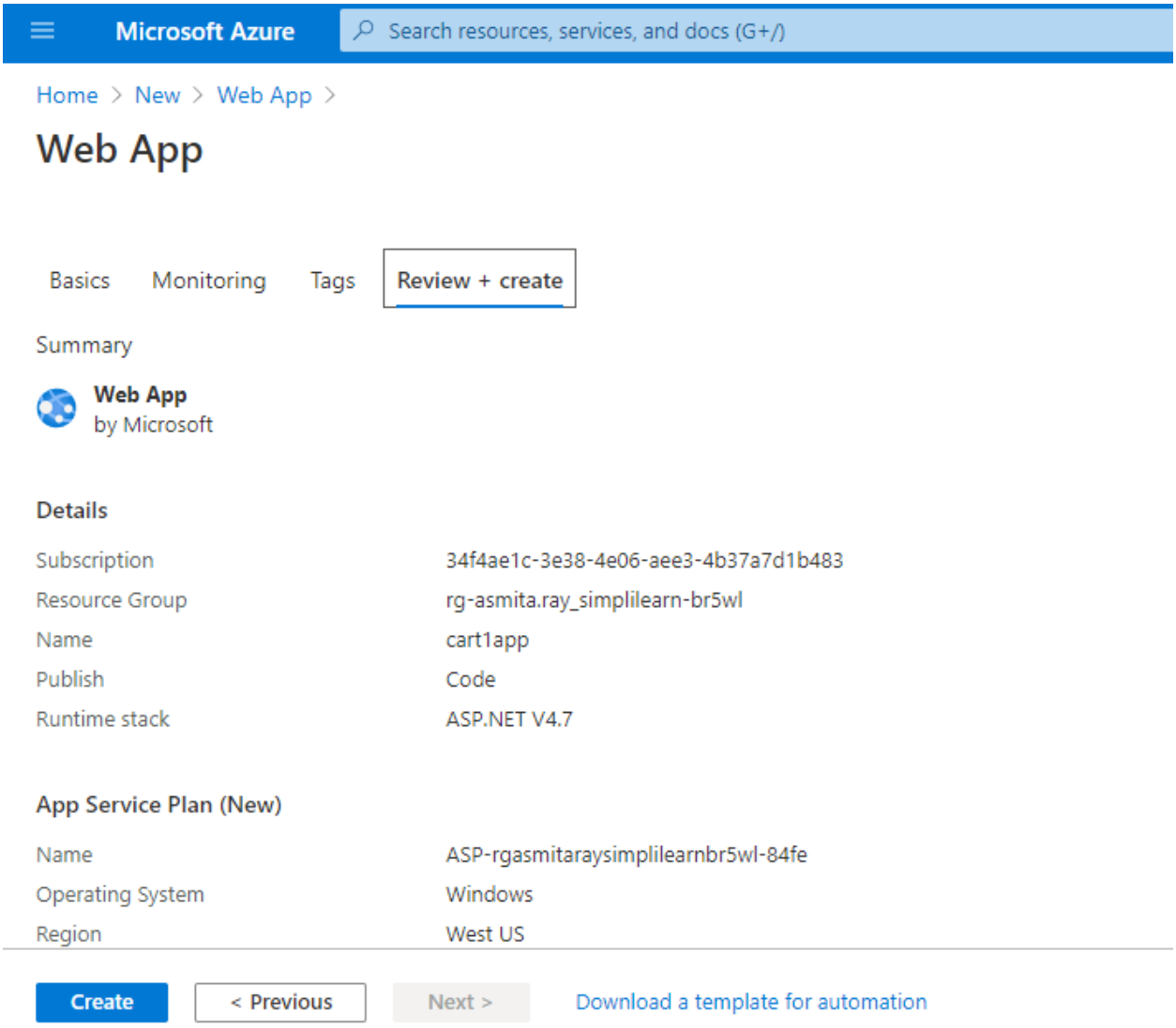

**Note:** Choose the runtime stack as ASP.NET V4.7 and choose the region as West US or West US 2

Step 4.4: In the monitoring section, select **No** for **Enable Application Insights**

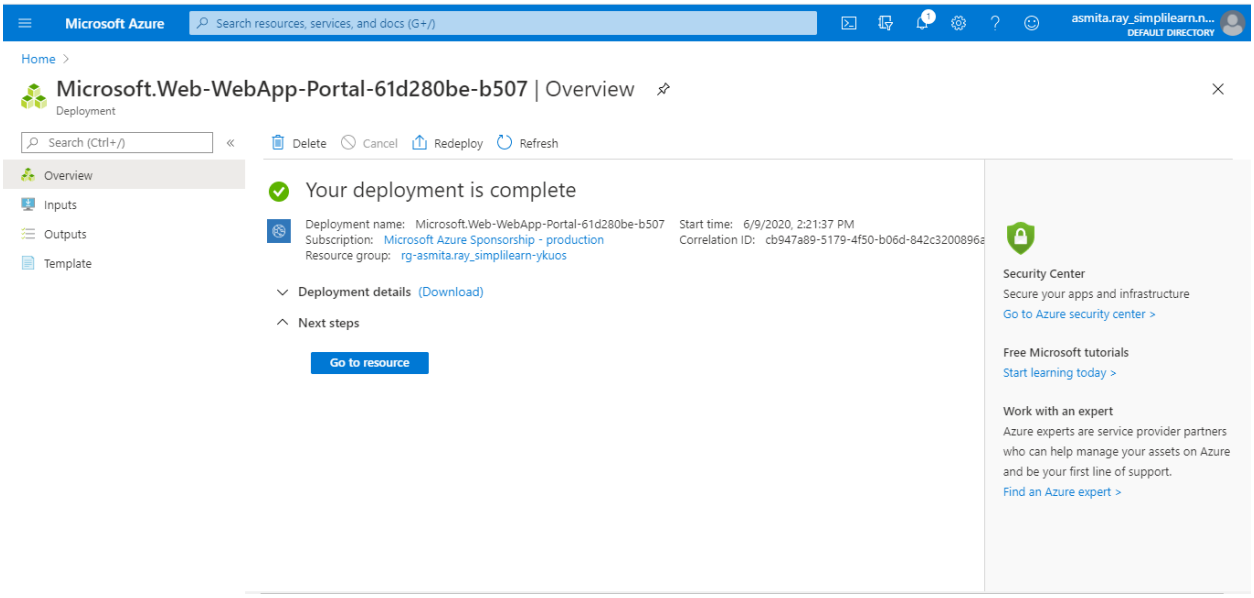


Step 4.5: Click on **Review and Create**

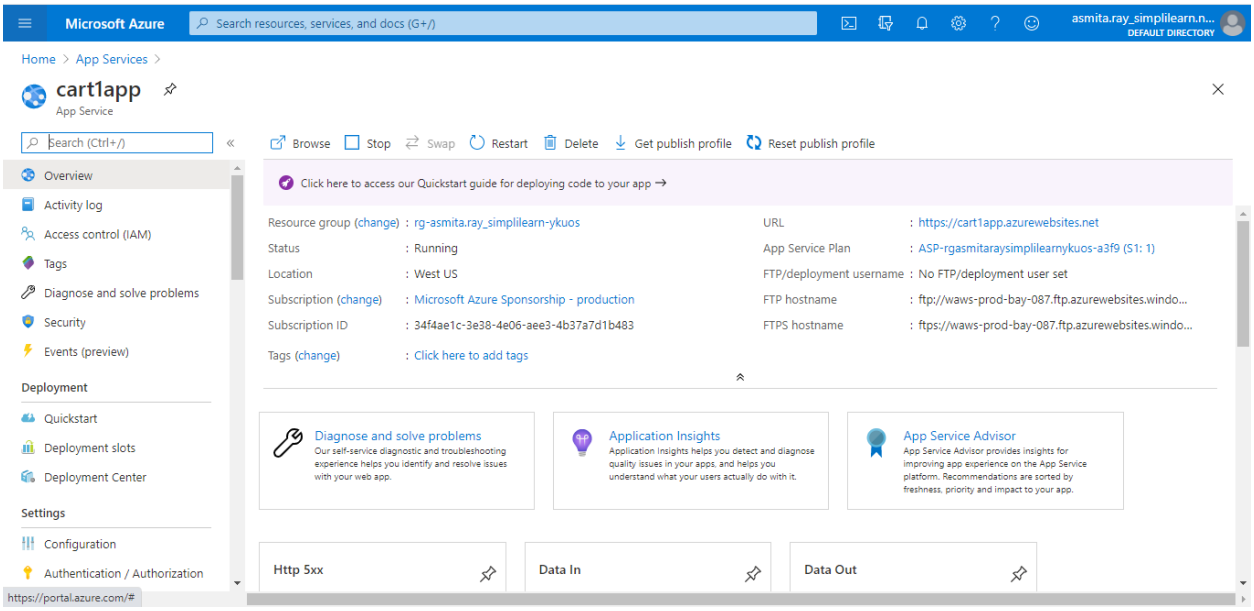
Step 4.6: Click on **Create**



This will create the Web App on Azure.



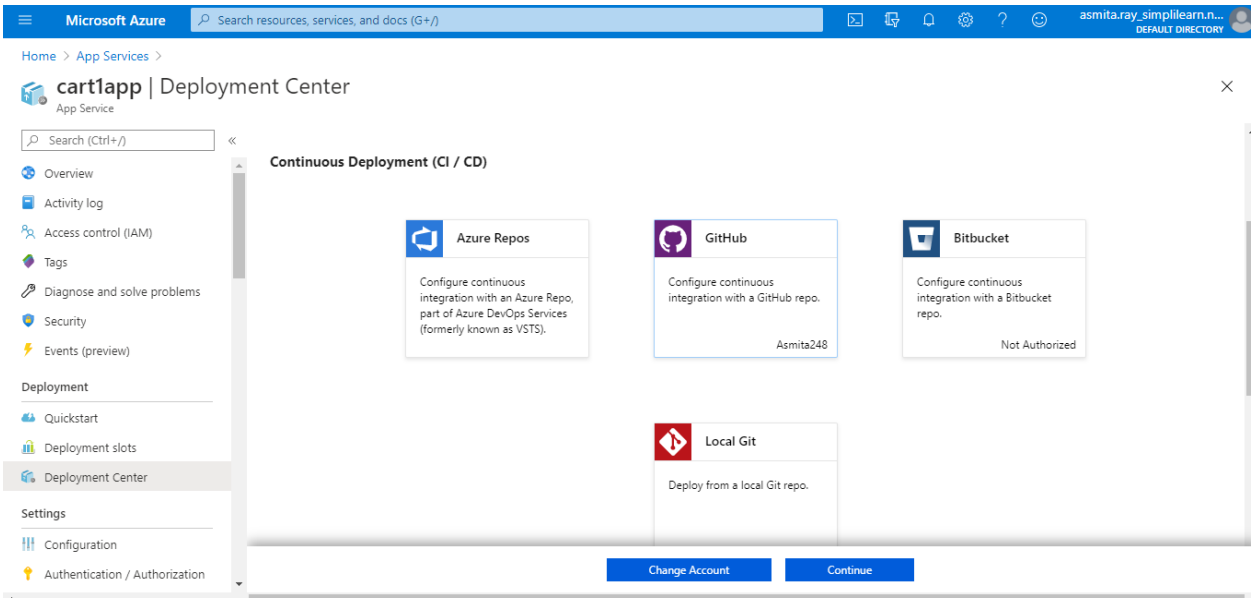

Step 4.7: Click on **Go to resource** to get the overview of the created web app




**Step 5:** Deploy your static web app to Azure App Service (web app) using a method of

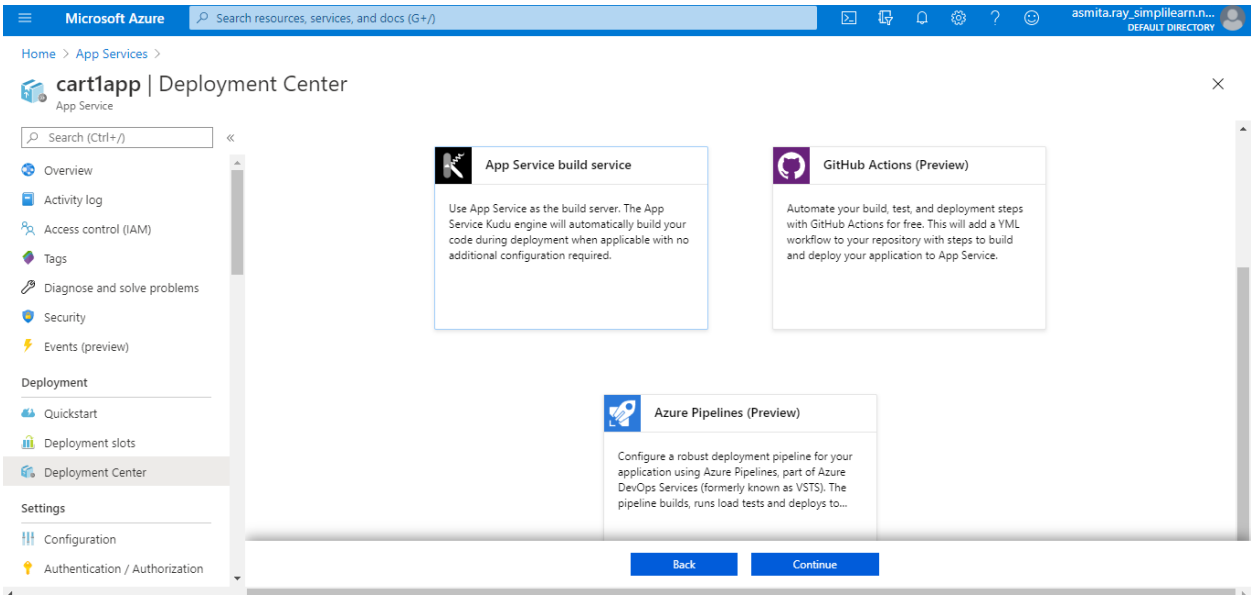
your choice such as Visual Studio Code or GitHub or FTP

Step 5.1: Go to the **Deployment Center**

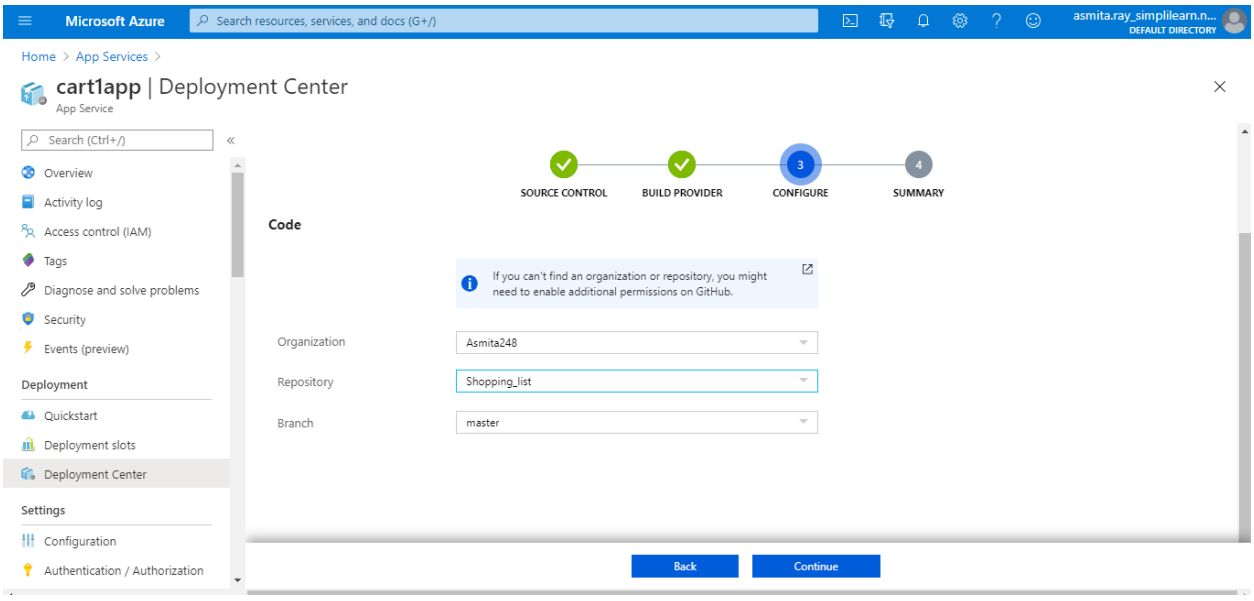



Step 5.2: Select GitHub

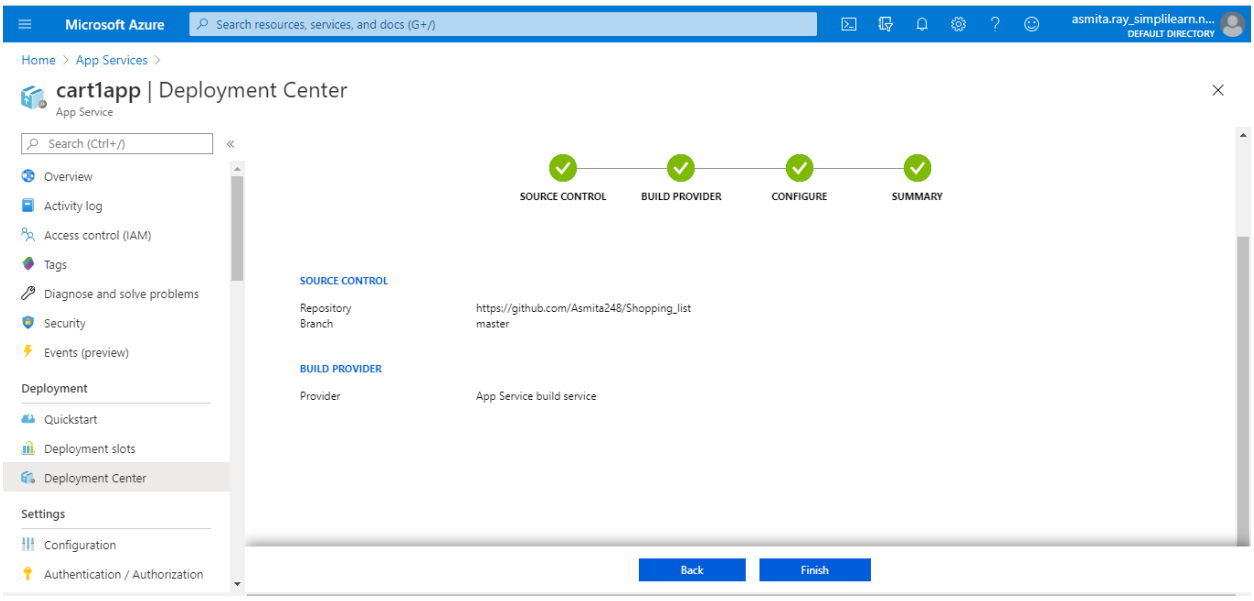
Step 5.3: Authorize your account



## Step 5.4: Select the application files uploaded on GitHub and click on **Continue**

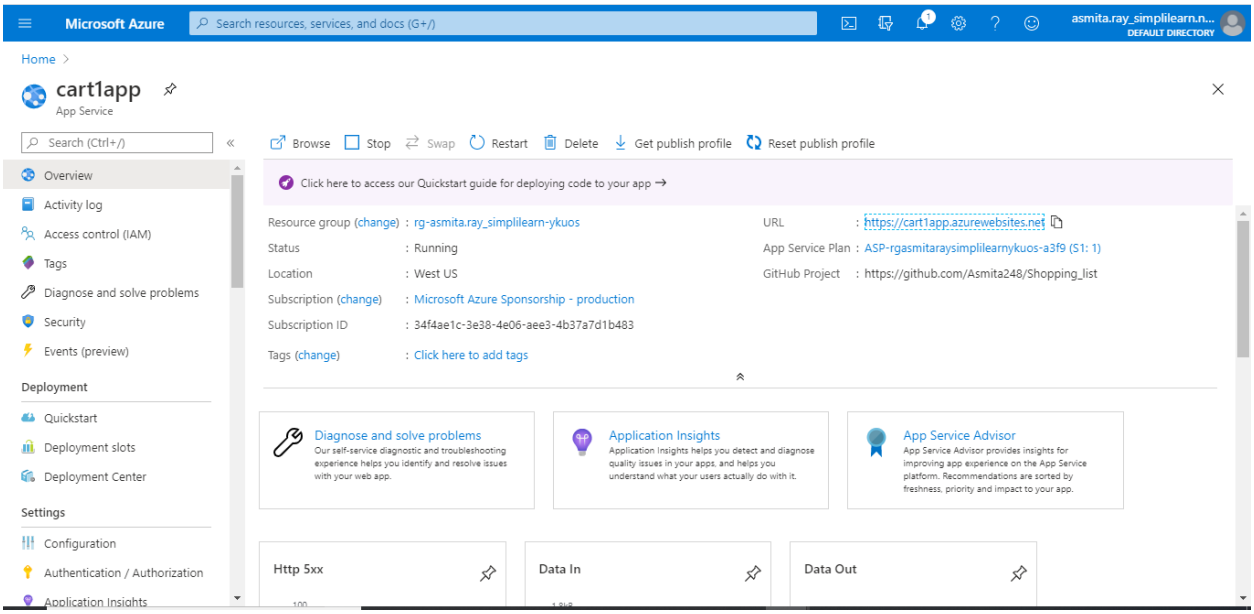



## Step 5.5: Click on **Finish**

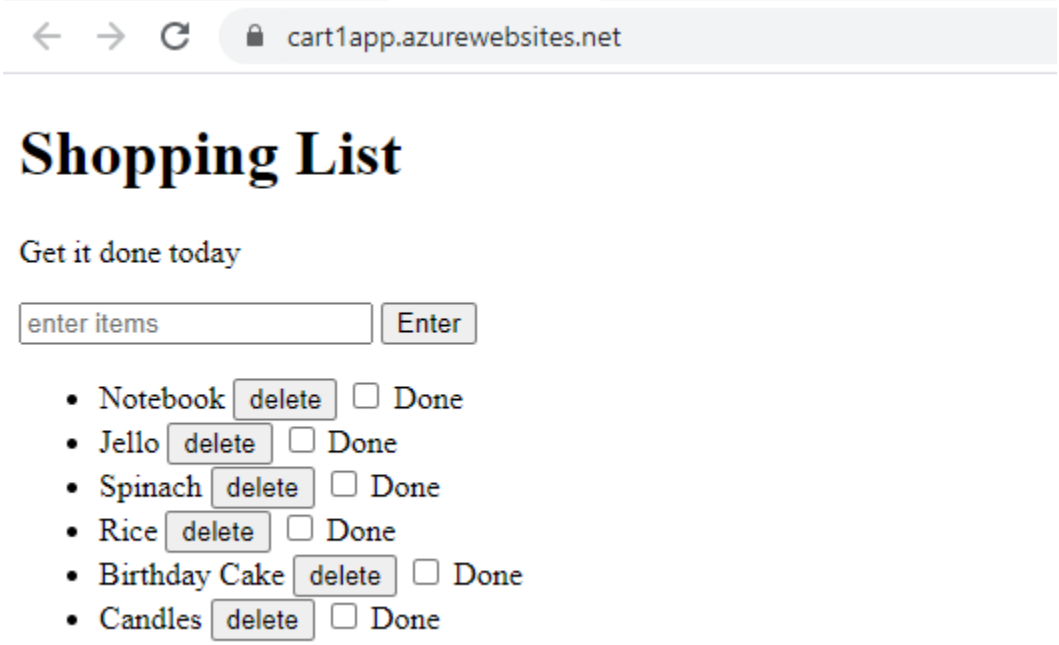


**Step 6:** Hit the web app endpoint to check if the application is online

Step 6.1: Click on Overview of the web app



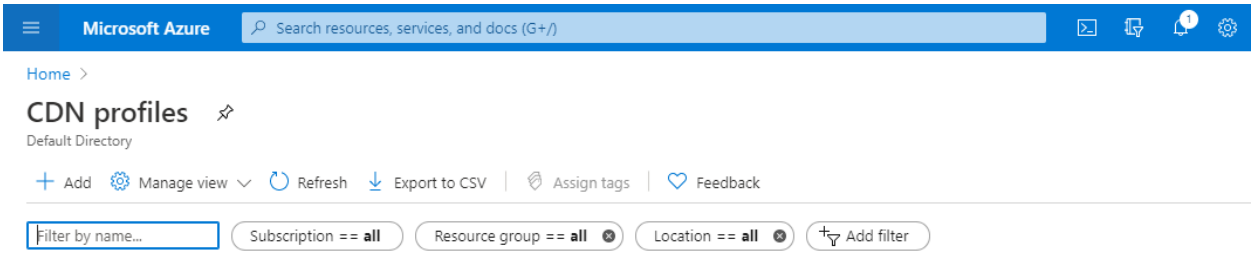

Step 6.2: Click on the URL and you will get the application running



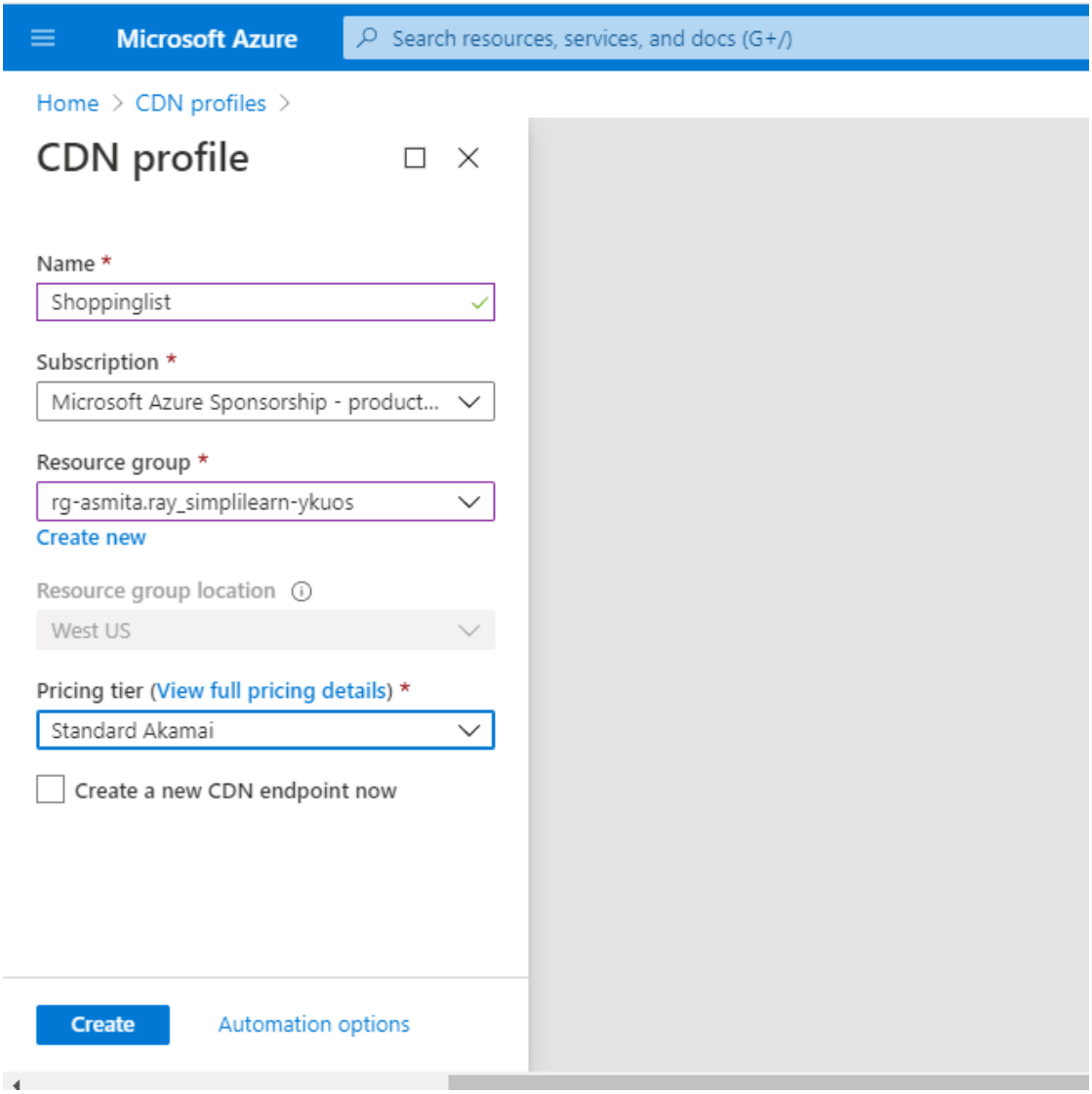
**Step 7:** Now create a CDN profile

Step 7.1: In the search window, search for CDN profiles

Step 7.2: Click on **Add**




Step 7.3: Provide the information to create the CDN and click on **Create**

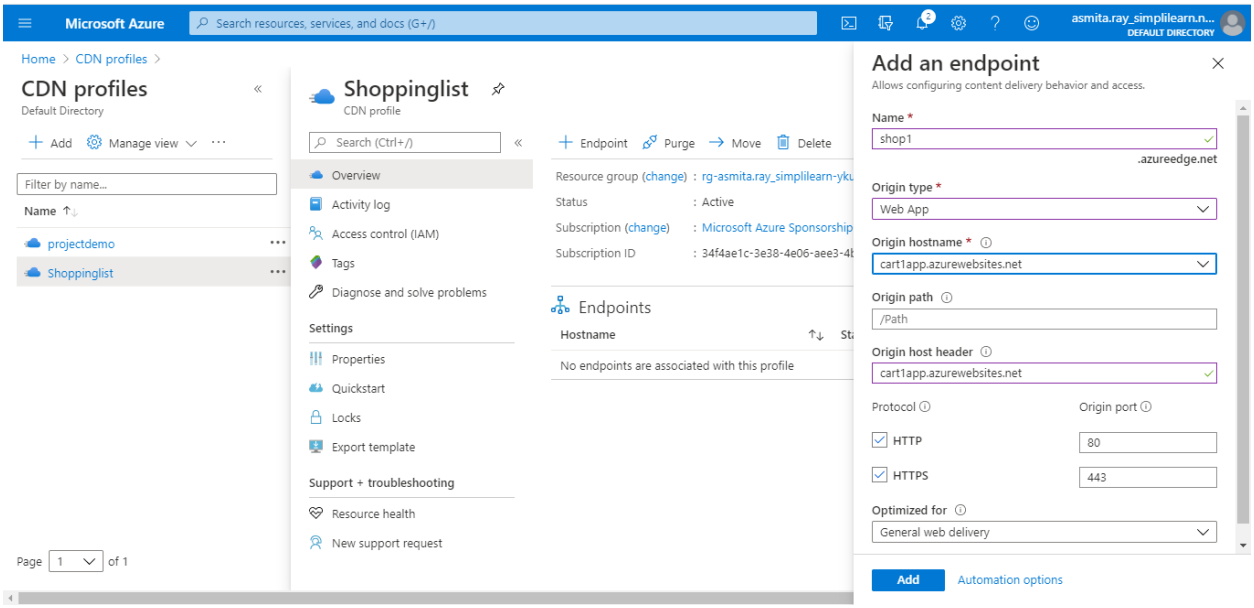


**Step 8:** Use CDN profile to create an endpoint.

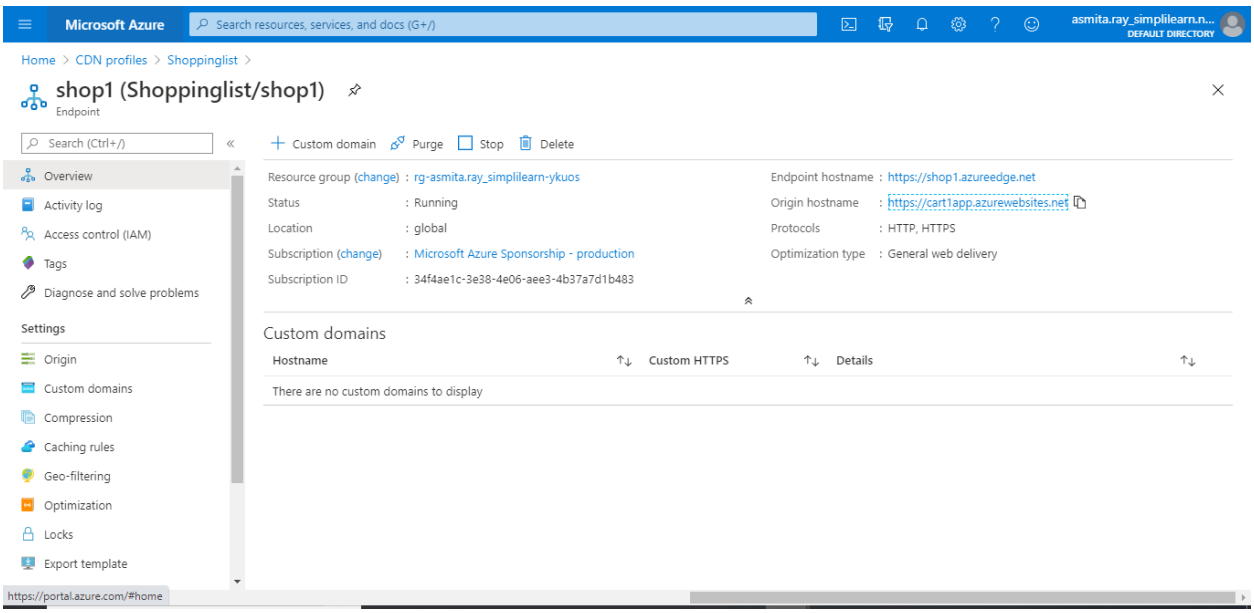
Step 8.1: Go to the created CDN

Step 8.2: Click on **Endpoint**

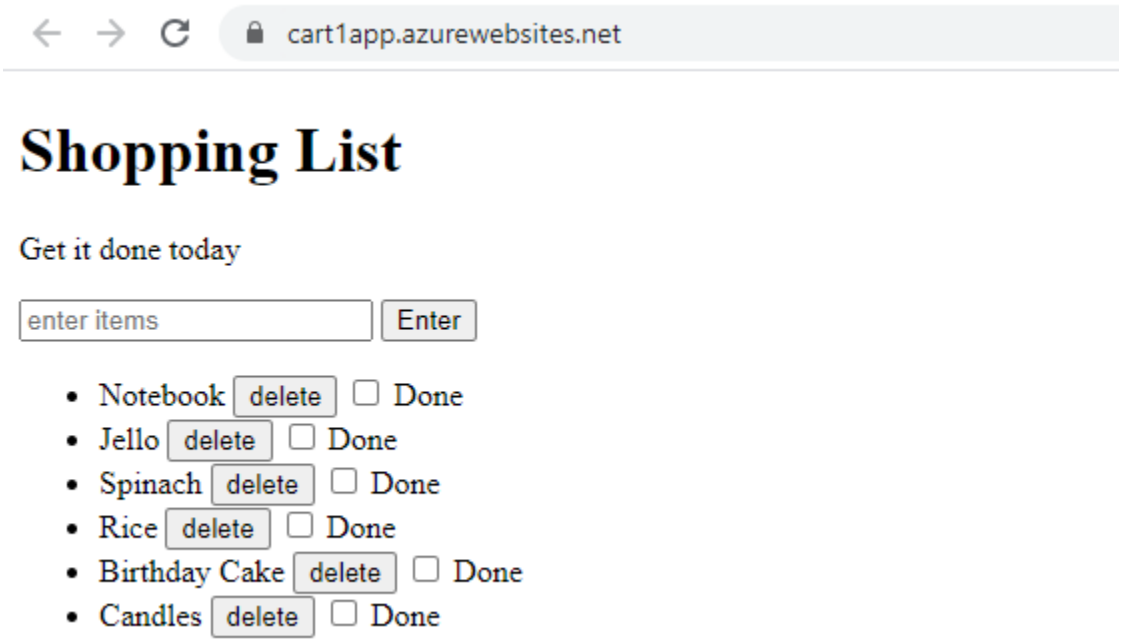
Step 8.3: Provide the basic information about the endpoint and click on **Add**




Step 8.4: Go to the created CDN endpoint and click on **Origin hostname**



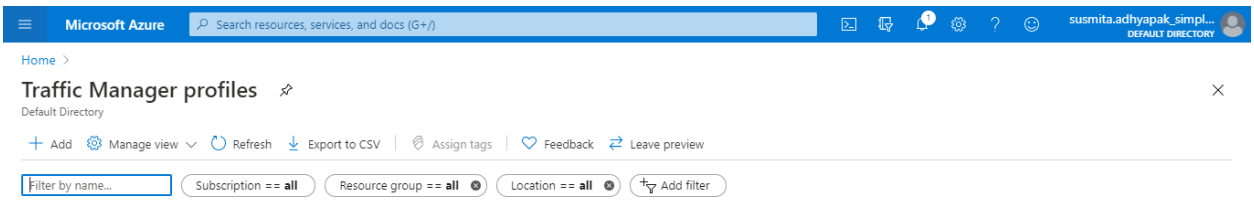
Step 8.5 Your application is running



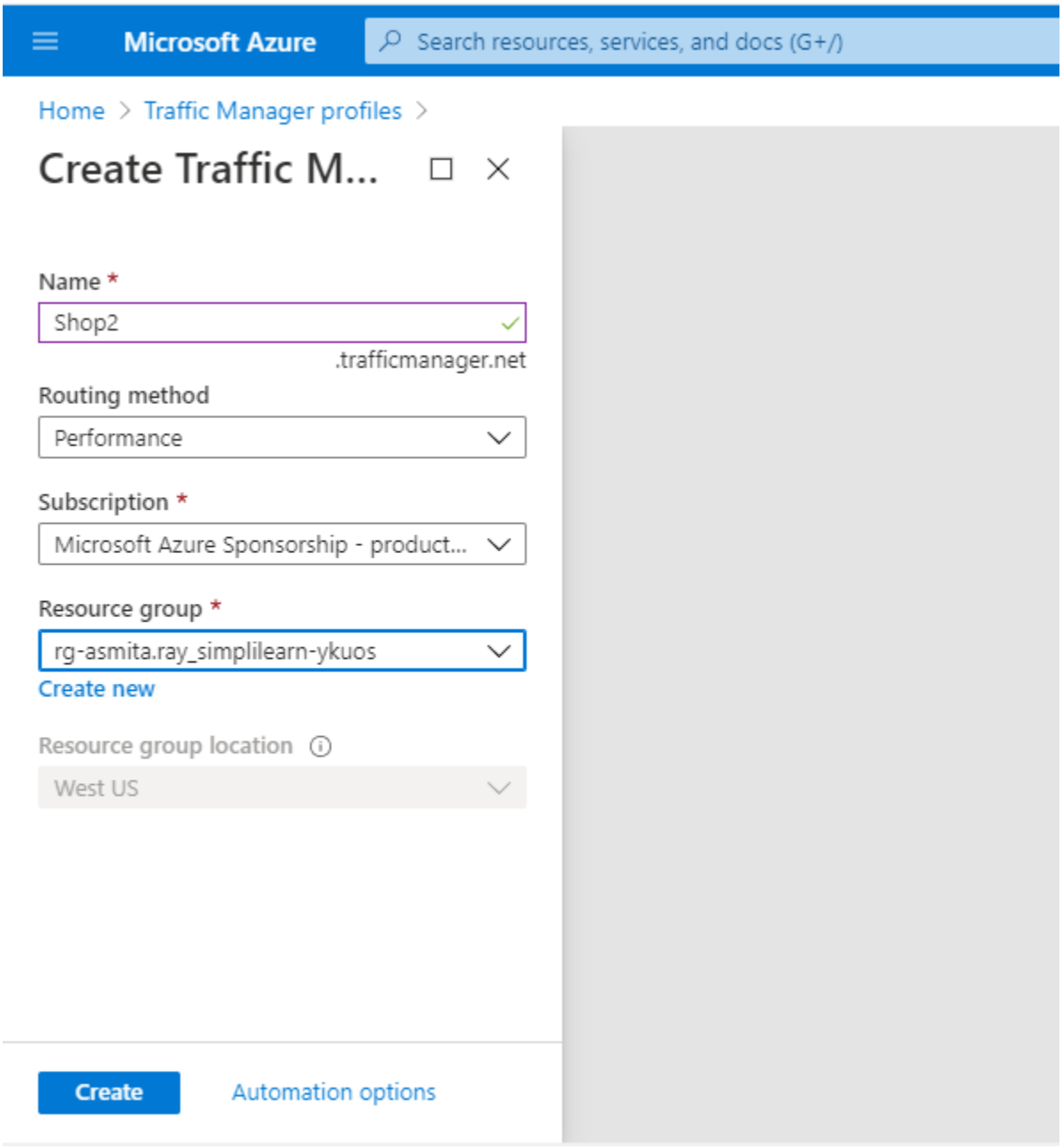

**Step 9:** Repeat steps 2 to 7 to create multiple deployments of your application in different regions so that you can meet the global traffic demand.

**Step 10:** To make sure that traffic coming from different parts of the world is load balanced at DNS level, create a Traffic Manager Profile

Step 10.1: In the search window, search for Traffic Manager Profile and click on **Add** to create a new traffic manager profile



Step 10.2: Provide the required information and click on **Create** to create the Traffic Manager Profile

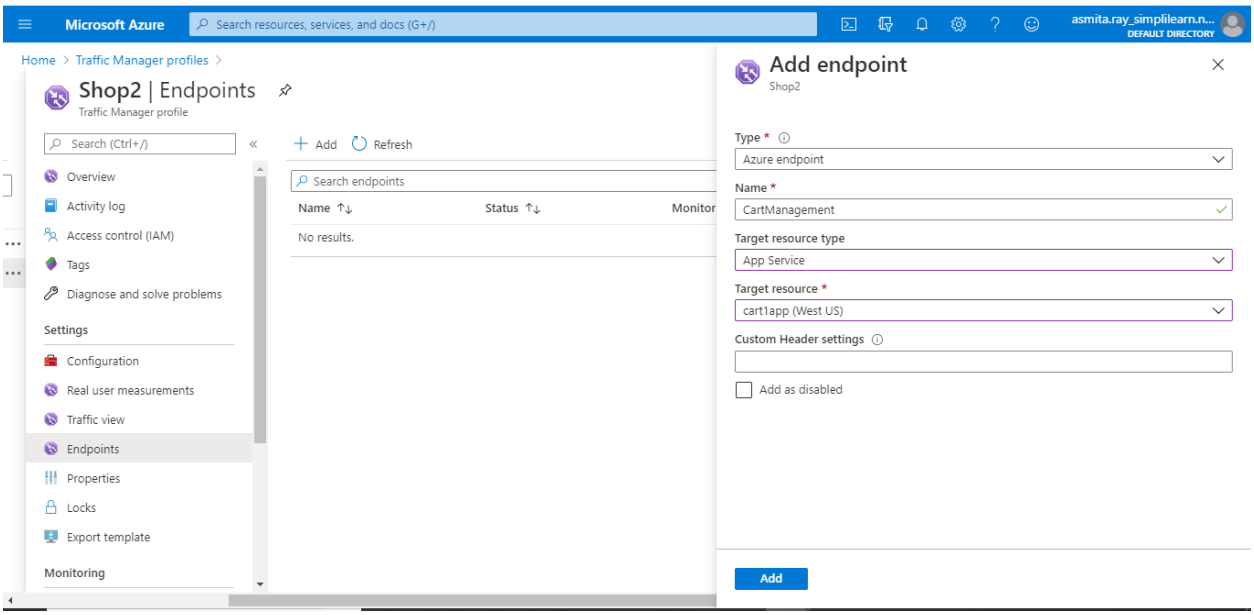


**Step 11:** Create endpoints in the traffic manager corresponding to each CDN endpoint that you have created

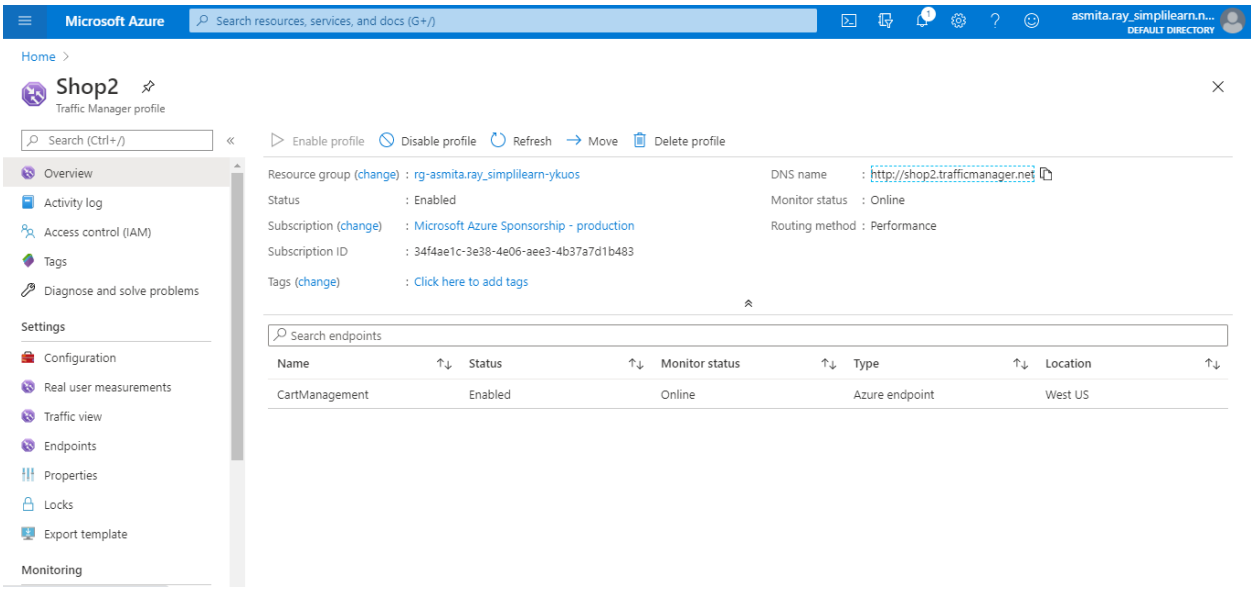
Step 11.1: Go to the created Traffic Manager Profile

Step 11.2: Click on **Endpoints** and click on **Add** to add new endpoints

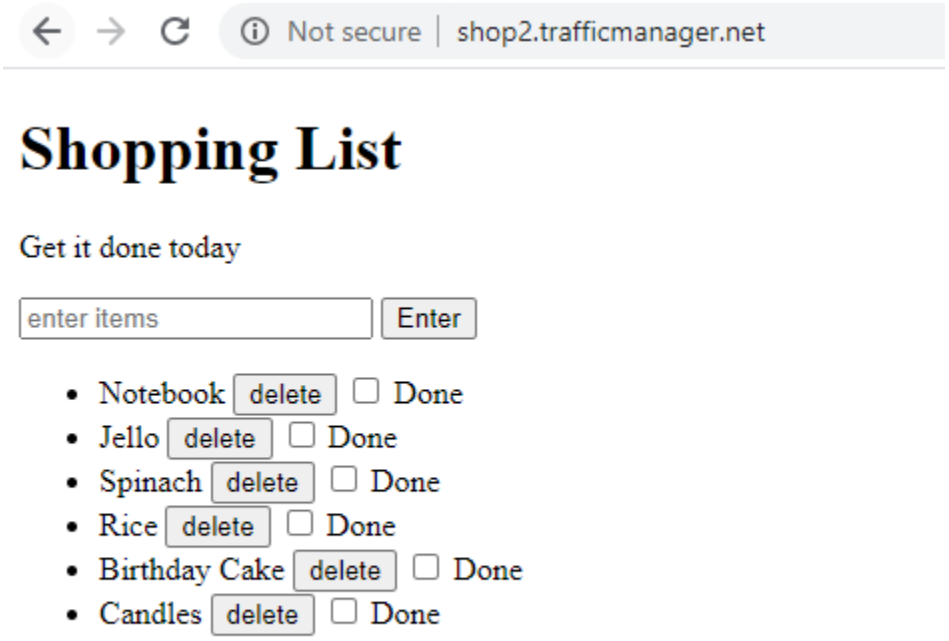
Step 11.3: Provide the required information and click on **Add**




Step 11.4: Once the monitor status is online, copy the link of the DNS name and check whether the application is online




Your application is running.




**Step 12:** Optionally, if you want to add the application in your own domain, you can configure the traffic manager to point to a custom domain.

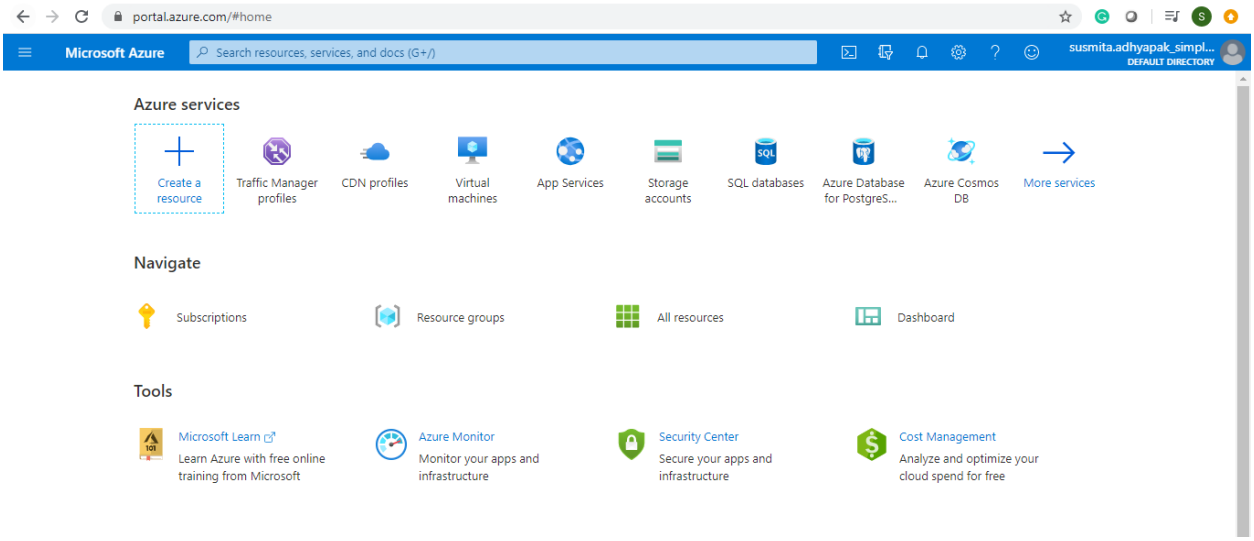
**Step 13:** As good practice, follow the principle of least privilege so that you only give

access to the services that need to be accessed within the Azure portal.

**Azure:**

Approach 2:

**Step 1:** Login to Azure Portal

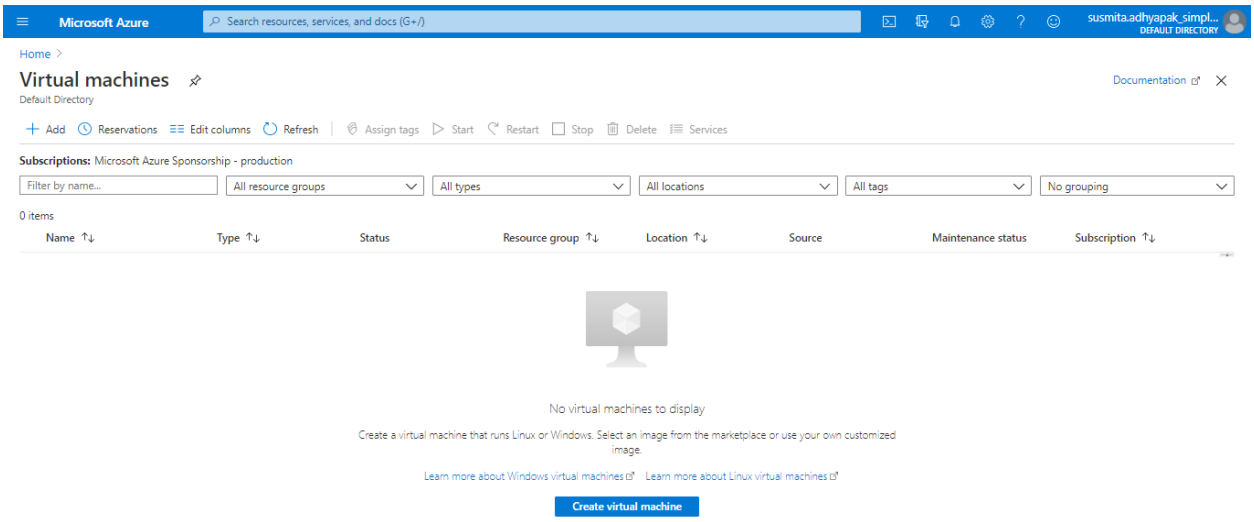



**Step 2:** Before creating the resources, make sure that you apply tags to resources so

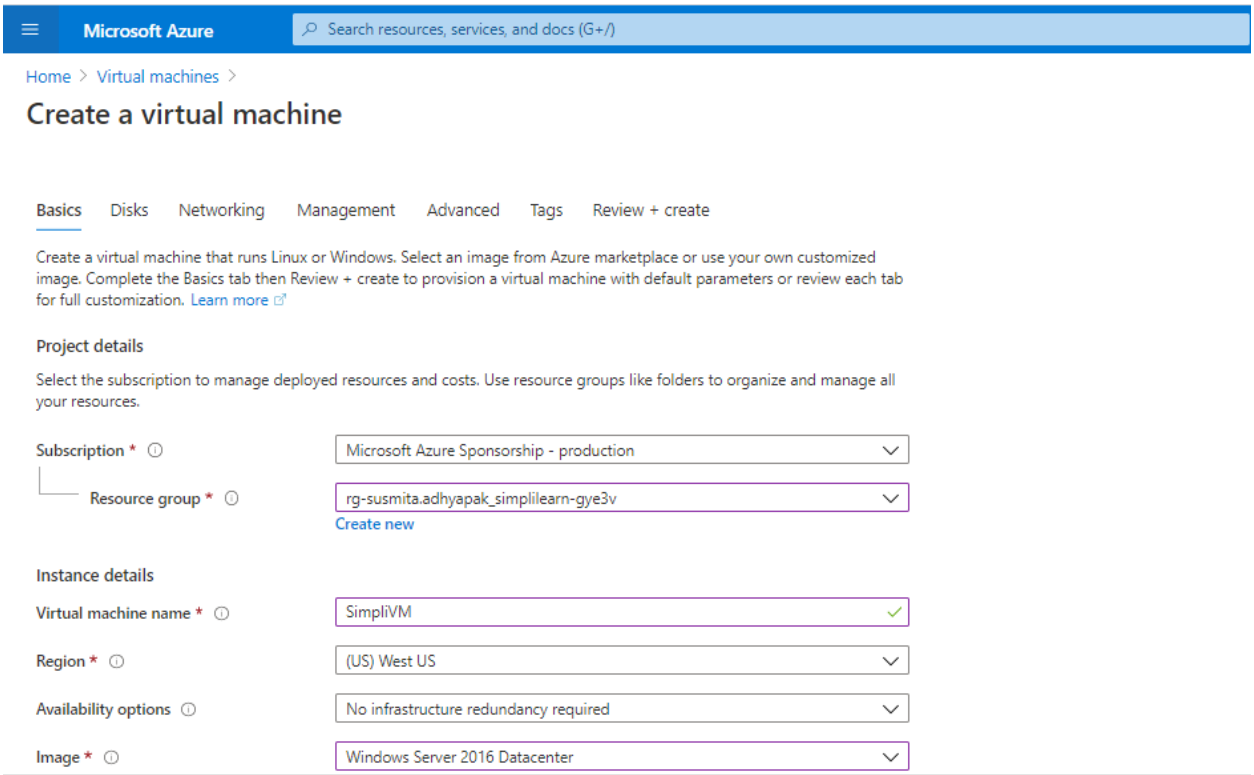
that you can keep a track of billing later on.

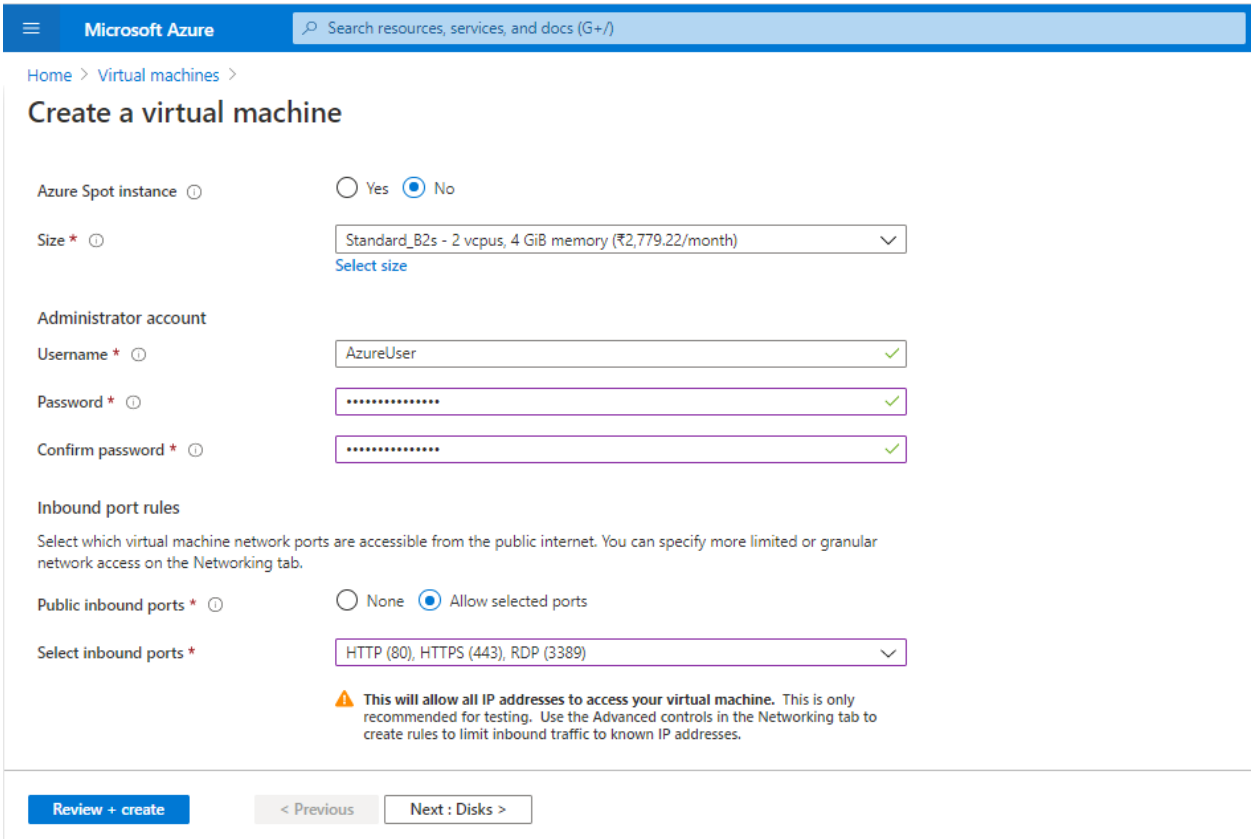
**Step 3:** To begin , create an Azure VM

Step 3.1: Search for Virtual Machines and click on **Add**

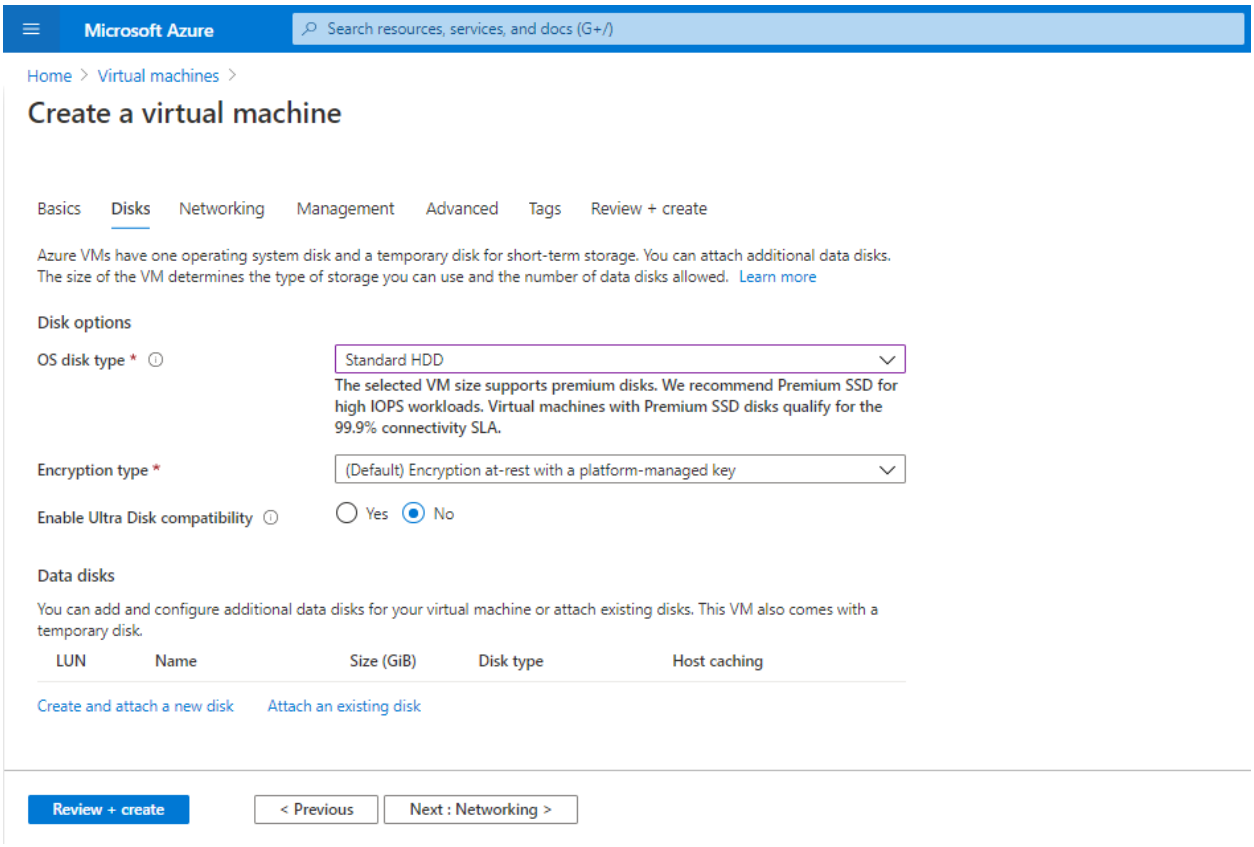



Step 3.2: Provide basic information about VM

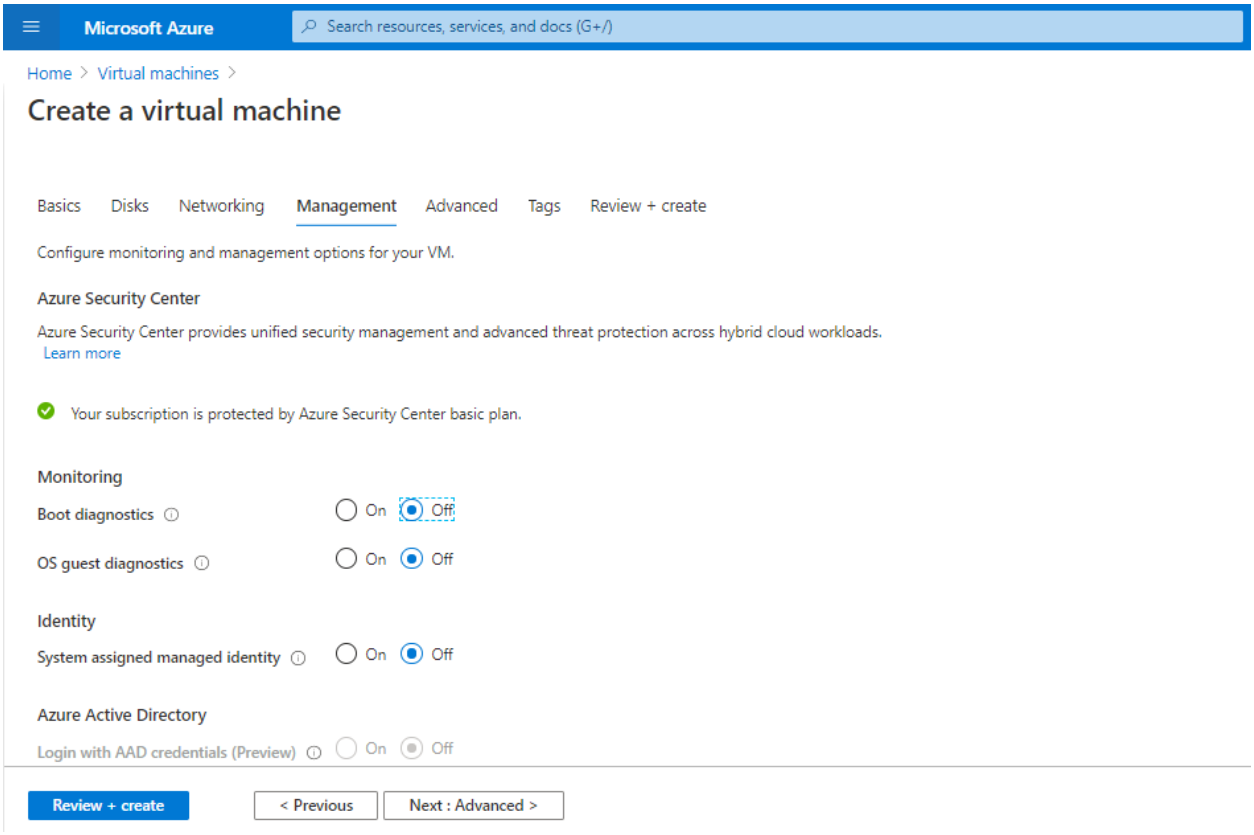

Microsoft Azure
Search resources, services, and docs (G+/)
Home > Virtual machines >
Create a virtual machine
Basics Disks Networking Management Advanced Tags Review + create
Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. Learn more
Project details
Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.
Subscription * Microsoft Azure Sponsorship - production
Resource group * rg-susmita.adhyapak_simplilearn-gye3v
Create new
Instance details
Virtual machine name * SimpliVM
Region * (US) West US
Availability options No infrastructure redundancy required
Image * Windows Server 2016 Datacenter
Review + create
< Previous
Next : Disks >


Microsoft Azure
Search resources, services, and docs (G+/)
Home > Virtual machines >
Create a virtual machine
Azure Spot instance Yes No
Size * Standard_B2s - 2 vcpus, 4 GiB memory (₹2,779.22/month)
Select size
Administrator account
Username * AzureUser
Password *
Confirm password *
Inbound port rules
Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.
Public inbound ports * None Allow selected ports
Select inbound ports * HTTP (80), HTTPS (443), RDP (3389)
This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.
Review + create
< Previous
Next : Disks >

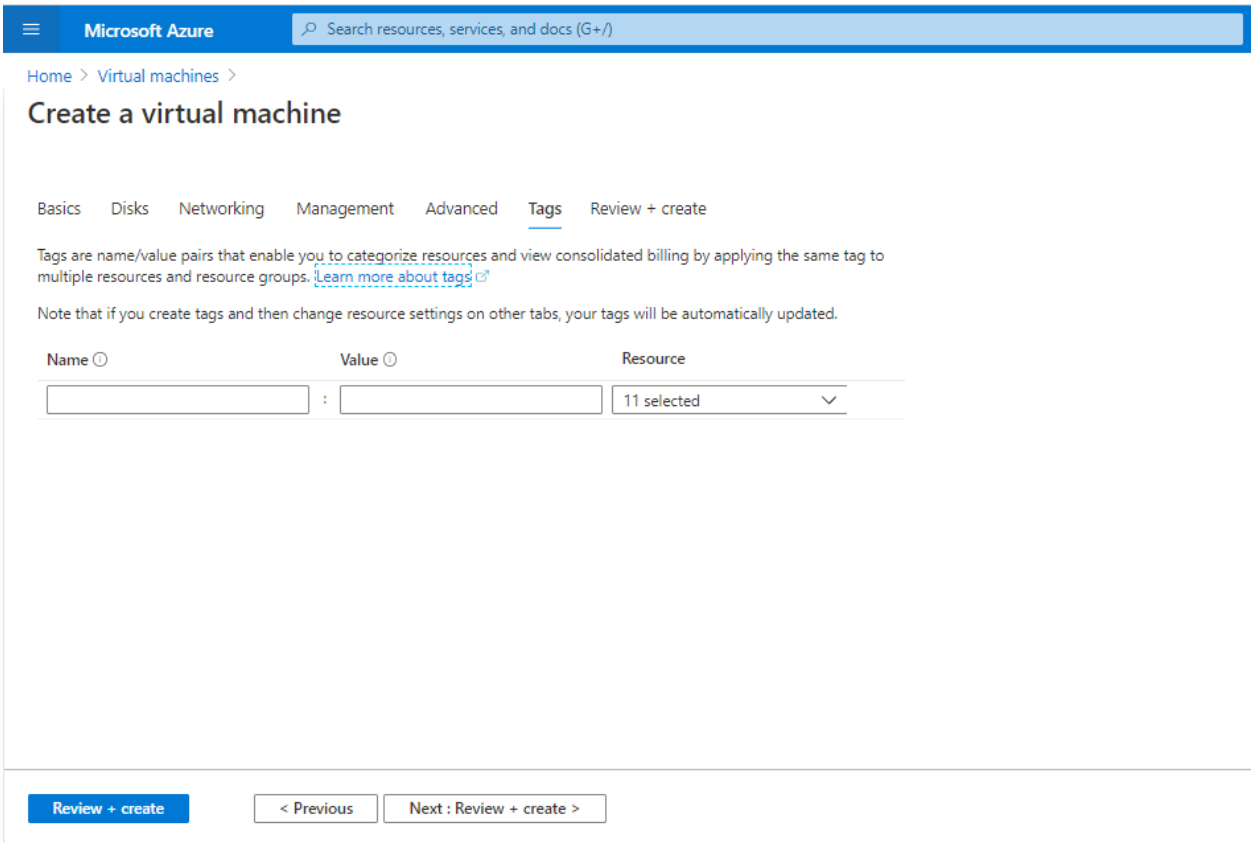
Step 3.3: In the Disks section, provide the required information



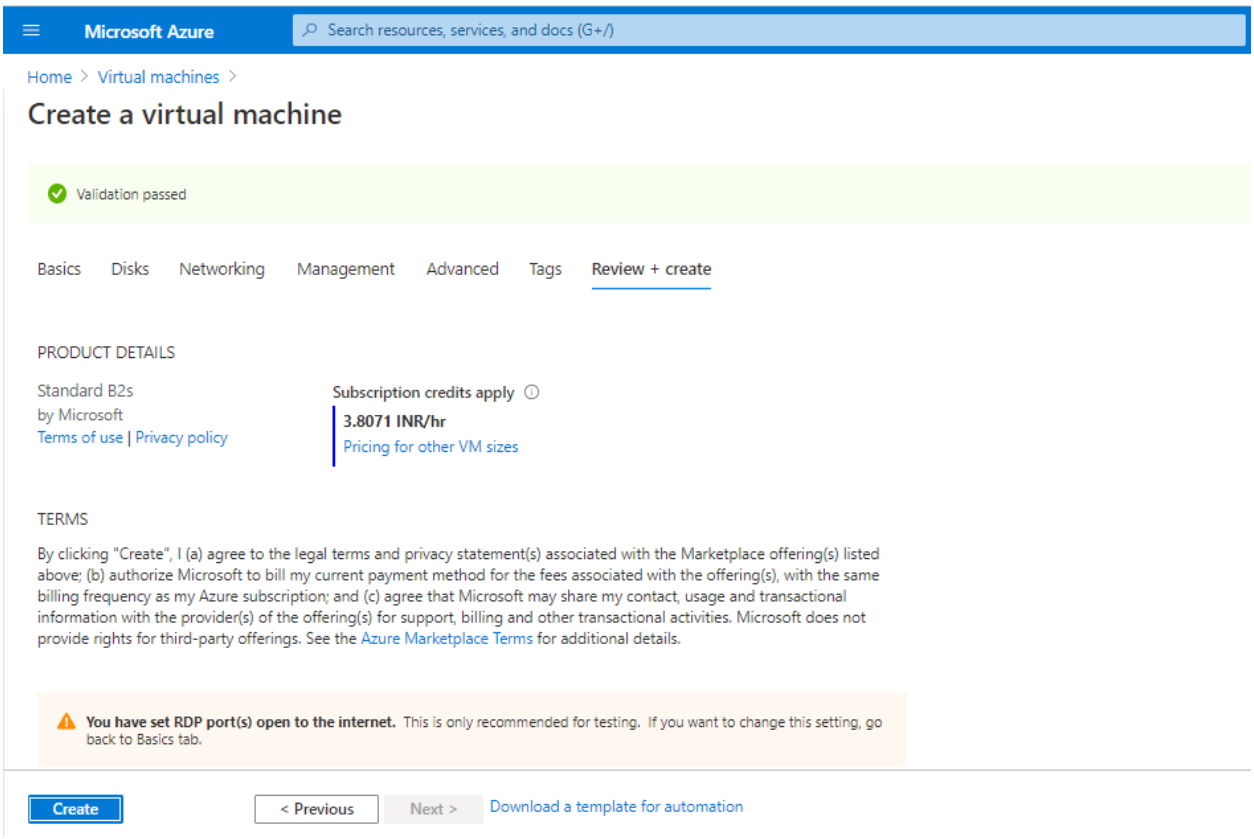

Step 3.4: In the Management section, turn off the Boot diagnostics



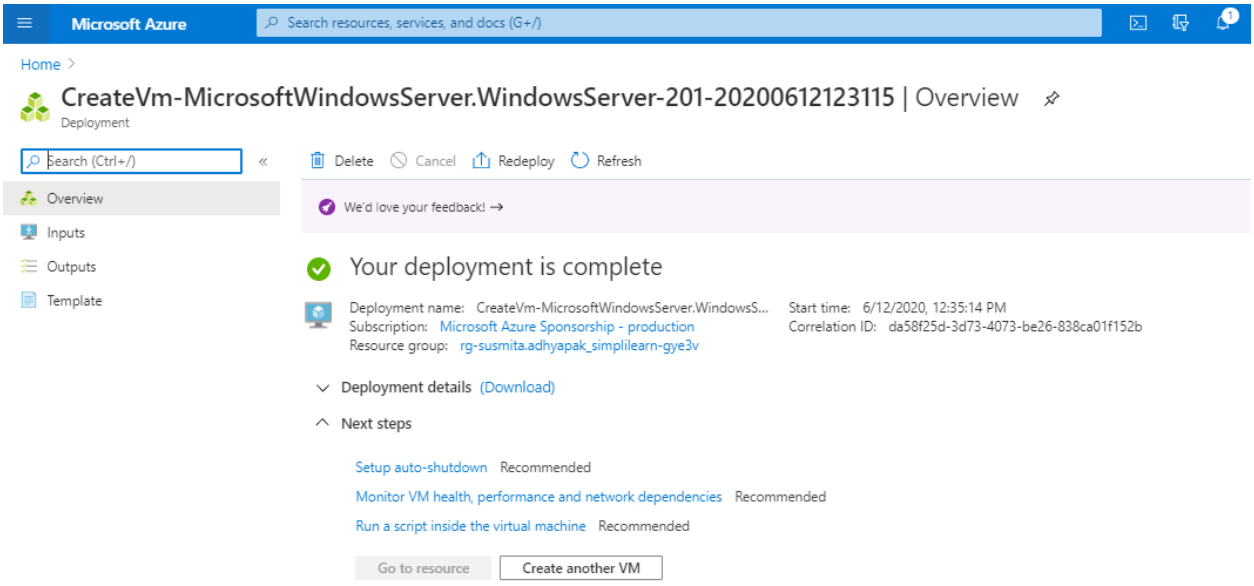

Step 3.4: Click on **Review and Create**




Step 3.5: Click on **Create**




## Step 3.6: Your VM will get deployed

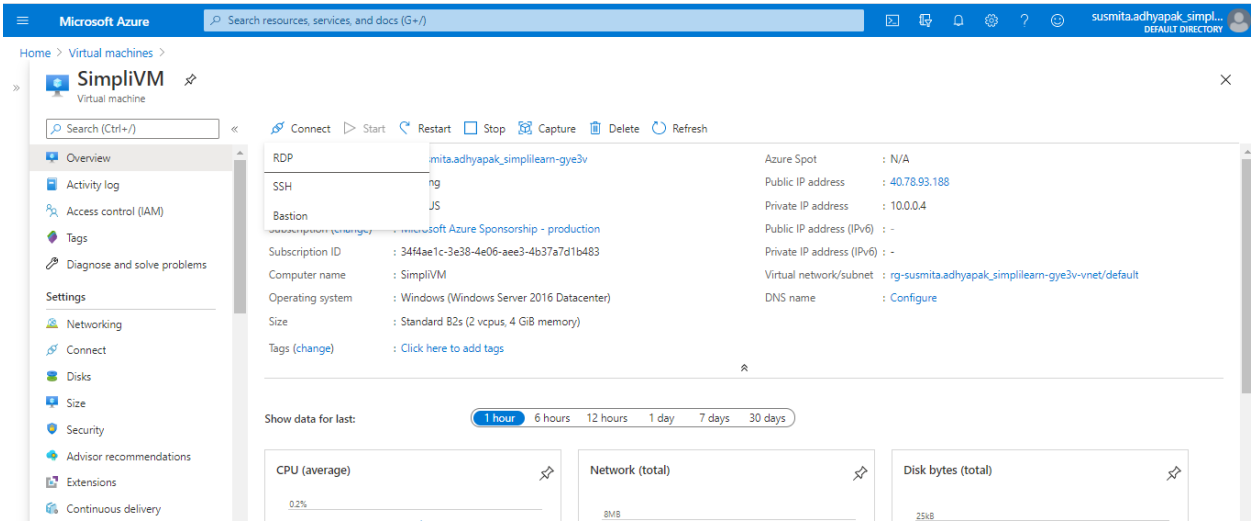


**Step 4:** Make sure you have inbound traffic on port 80 and port 443 open.

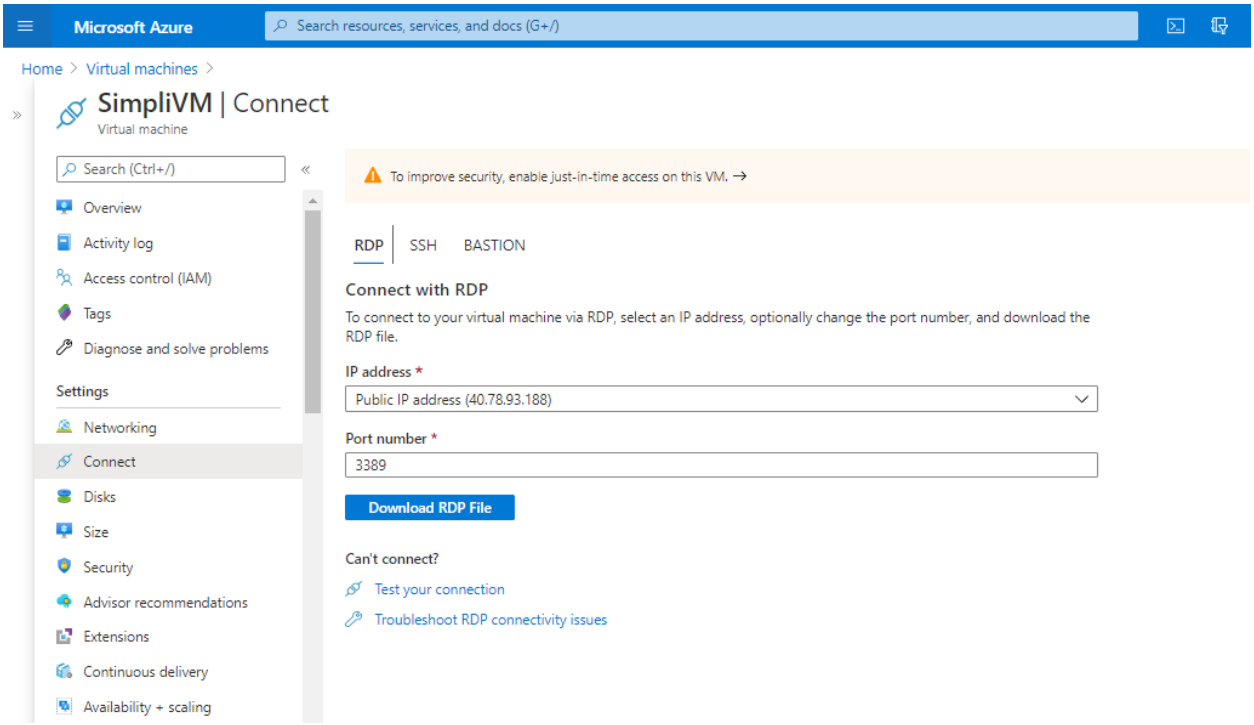
**Step 5:** Make sure port 445 is opened on your VMs so that teammates can use common file share to access and share files if needed.

**Step 6:** Login to Azure VM and spin up a web server of your choice on port 80

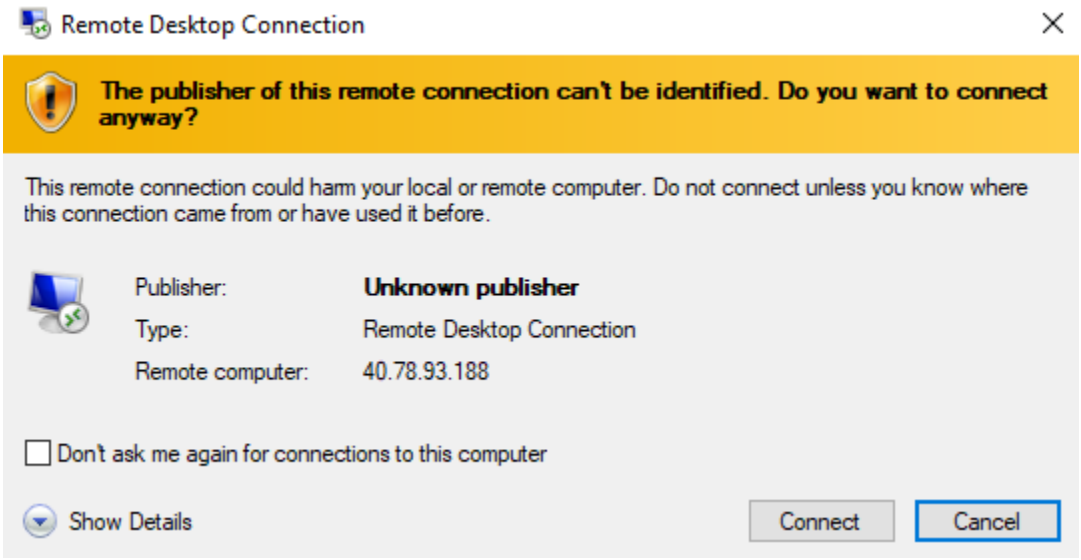
Step 6.1: Click on Connect and select RDP



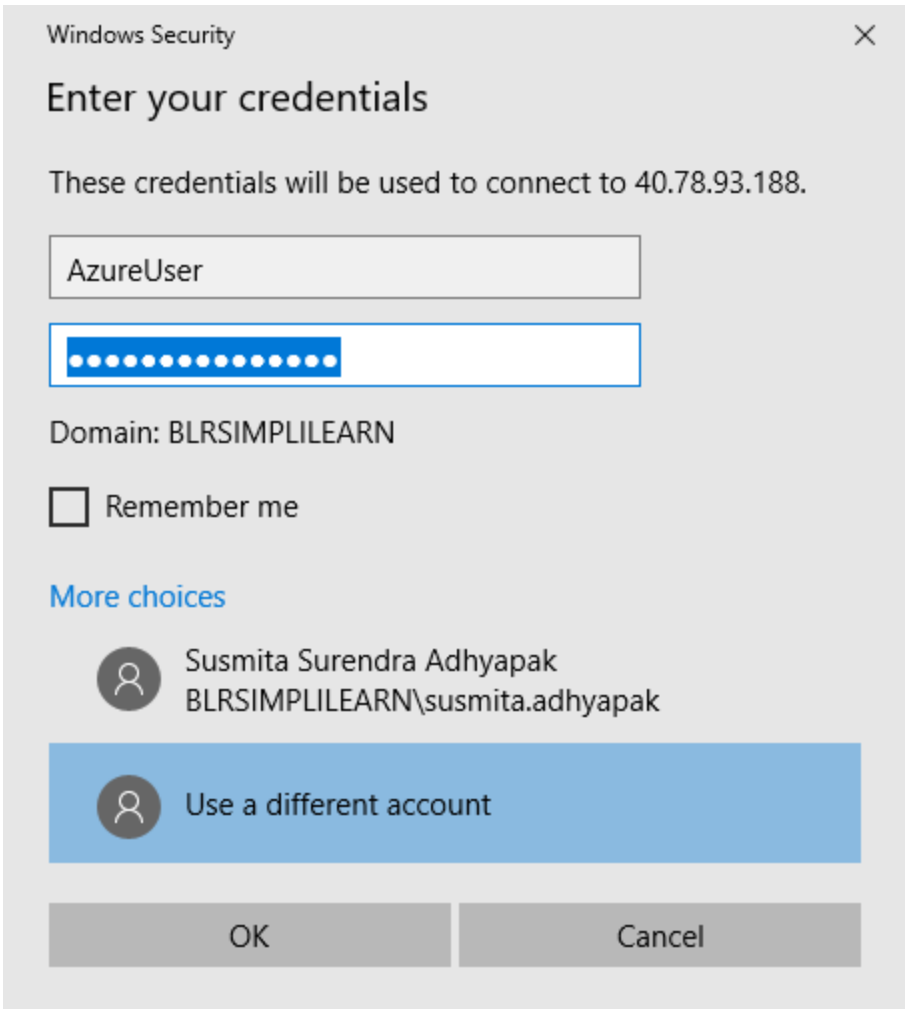

Step 6.2: Click on **Download RDP file.** It will download the created VM in your system.



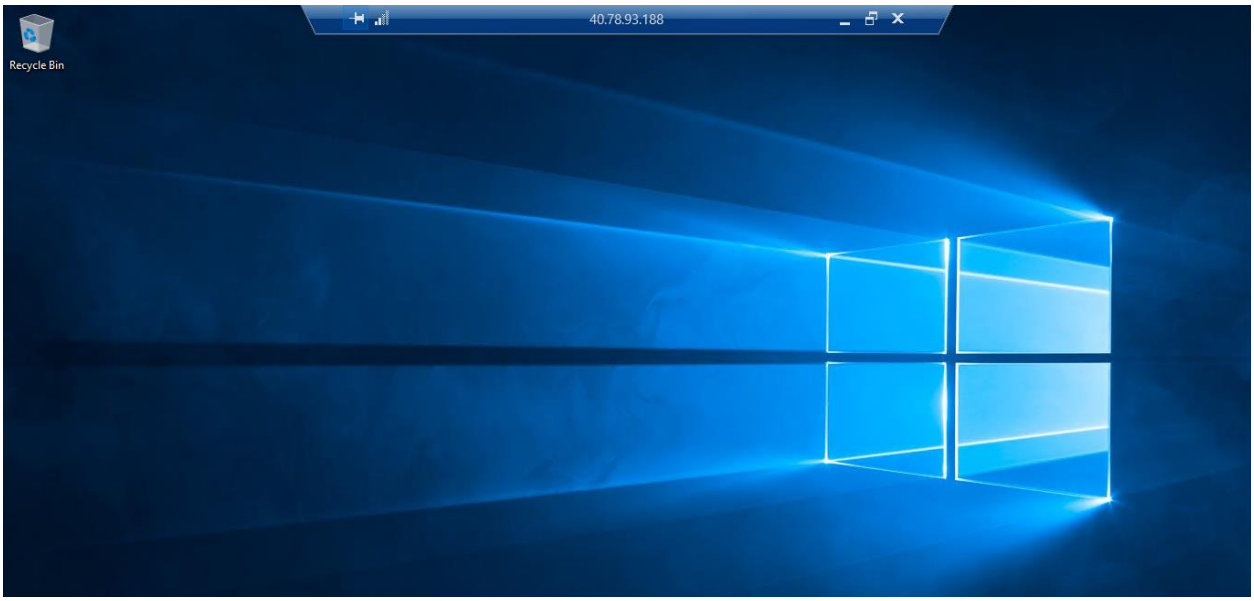

Step 6.3: Open the downloaded VM. Click on **Connect**




Step 6.4: Enter the credentials to login into VM and click on **OK**

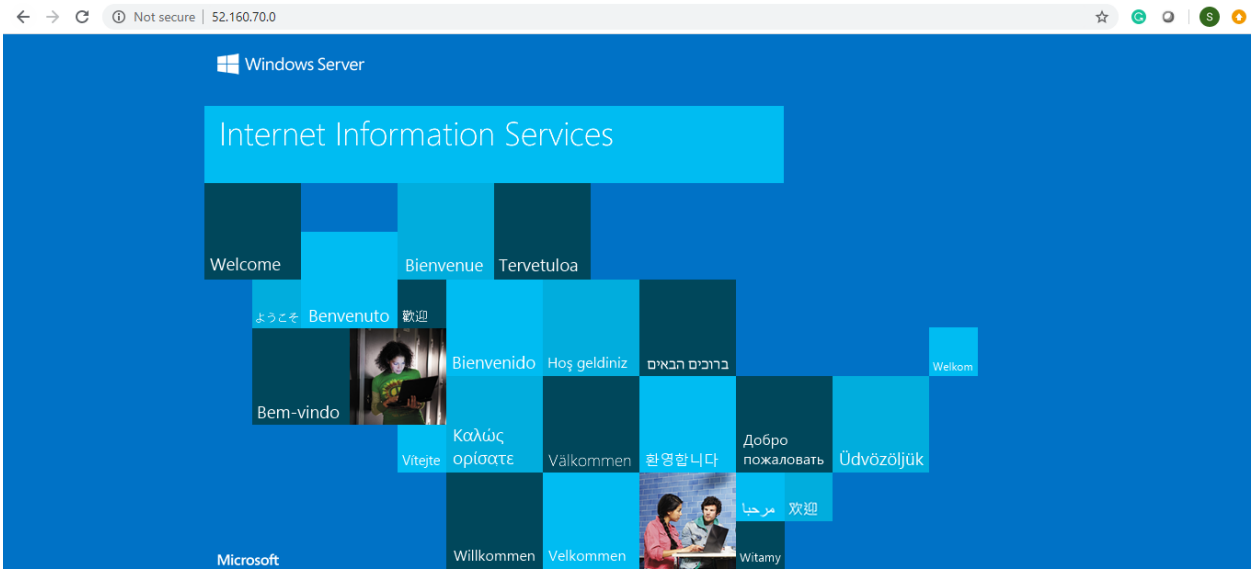



Step 6.5: This will open the VM in your system



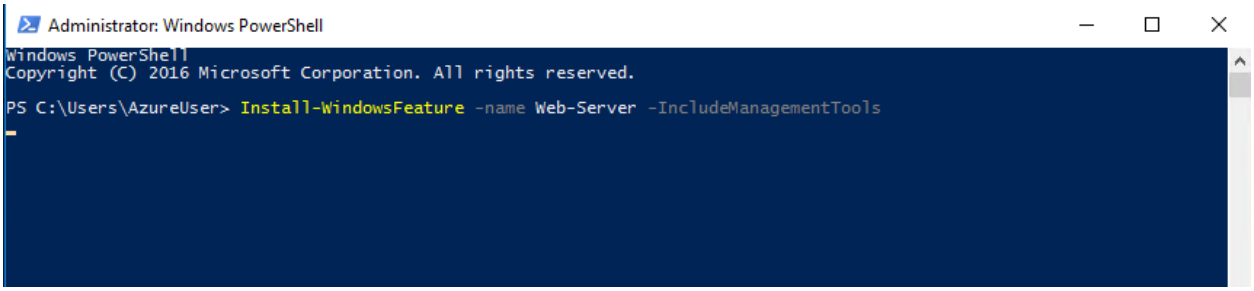

**Step 7:** Deploy your application on the web server that you have created within the virtual machine

Step 7.1: In the portal, select the VM and in the overview of the VM, use the Click to copy button to the right of the IP address to copy it and paste it into a browser tab. The default IIS welcome page will open, and should look like this:

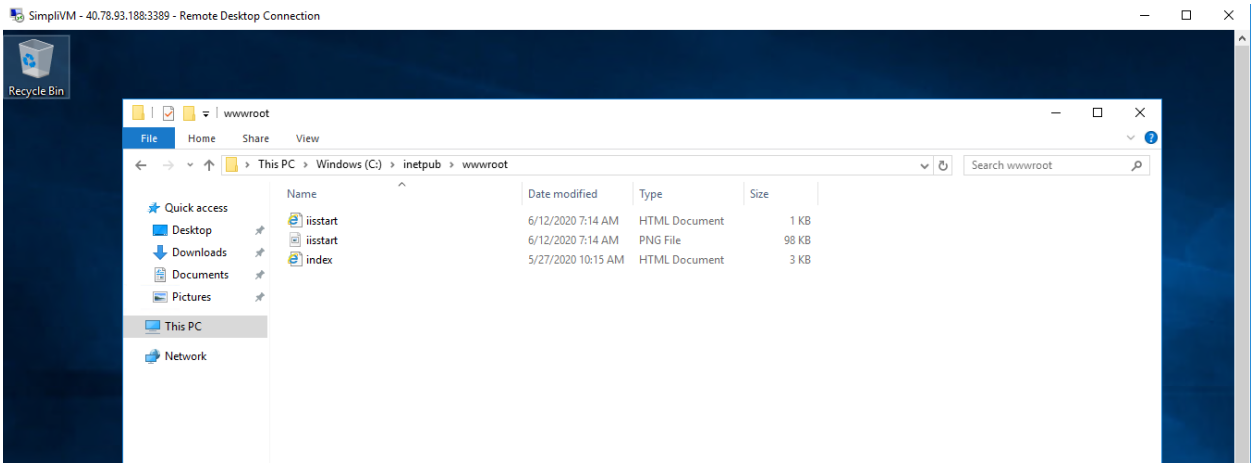



Step 7.2: Open powershell and type the following command

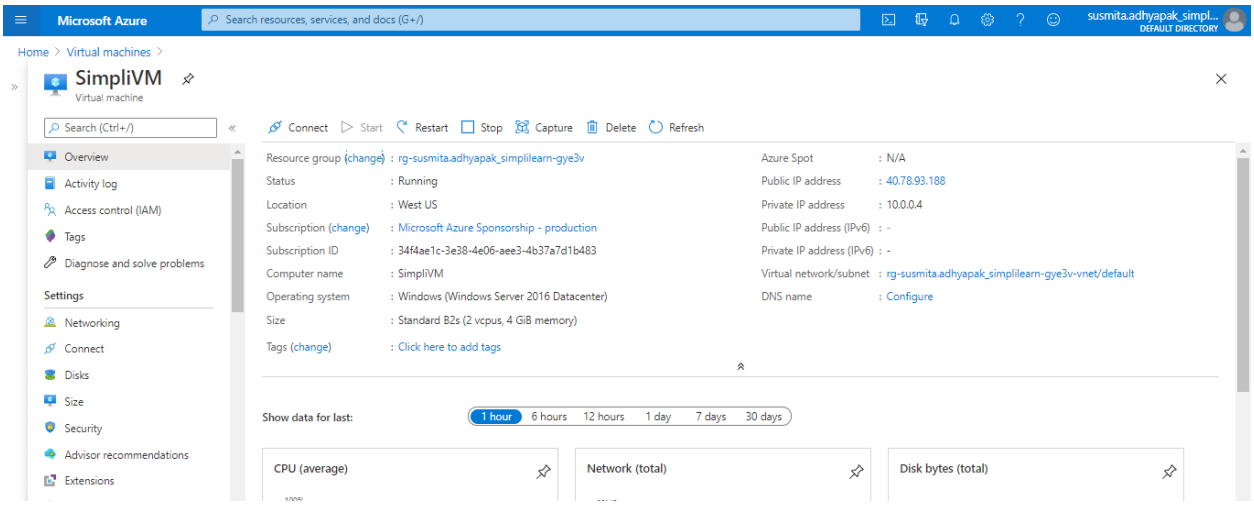
*Install-WindowsFeature -name Web-Server -IncludeManagementTools*

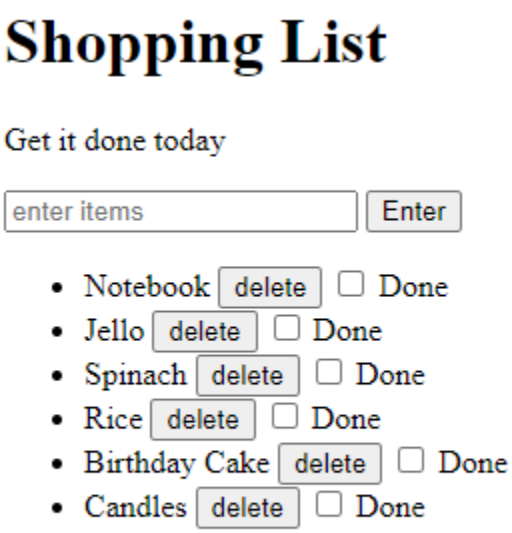



Step 7.3: The above command will create an inetpub folder in your C drive. Go to C:\inetpub\wwwroot and copy-paste the index.html file of your application which you want to deploy here




Step 7.4: Copy and paste the public IP address of the created VM in the browser and you will get the output



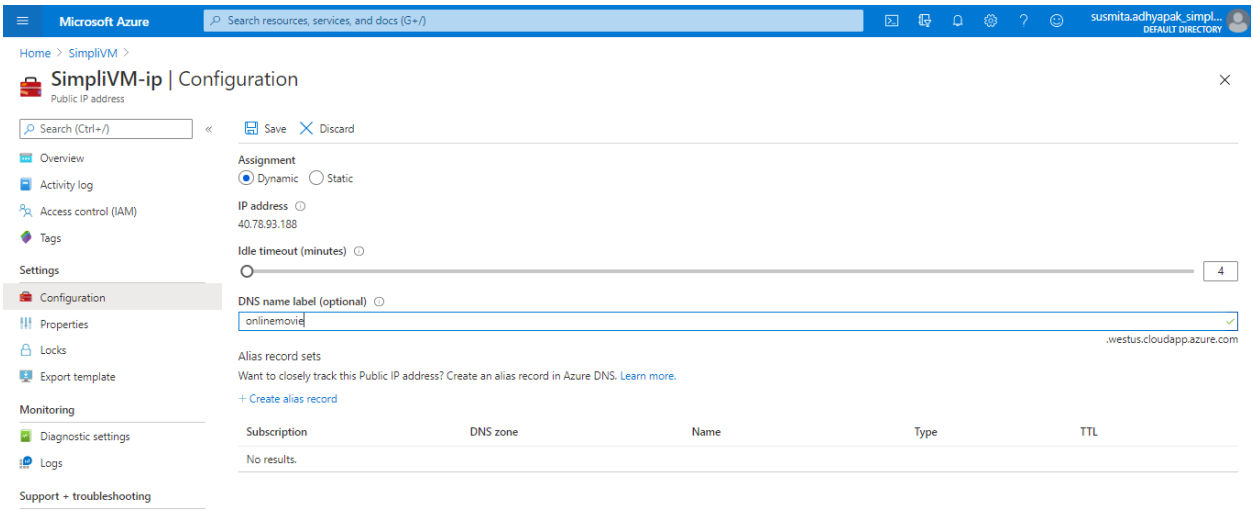




**Step 8:** Repeat steps 2 to 6 to create multiple deployments of your application in different regions so that you can meet the global traffic demand.

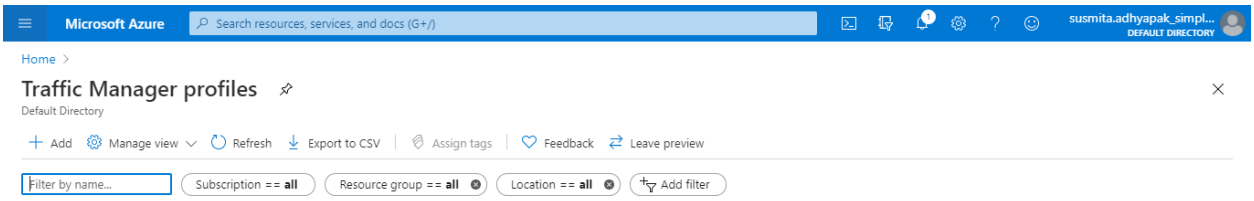
**Step 9:** To make sure that traffic coming from different parts of the world is load balanced at DNS level, create a Traffic Manager Profile

Step 9.1: Click on the Public IP address of the created VM

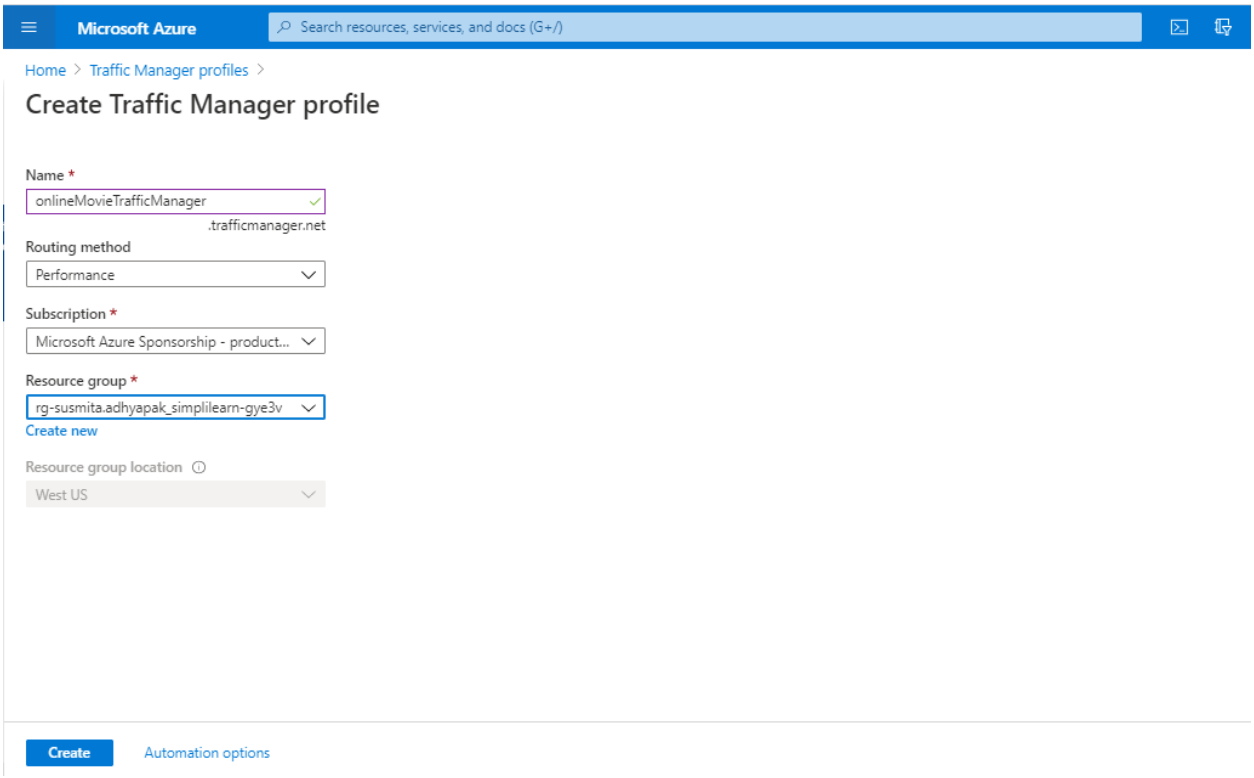
Step 9.2: Enter the DNS name and click on Save




Step 9.3: In the search window, search for Traffic Manager Profile. Click on **Add** to create a new traffic manager profile

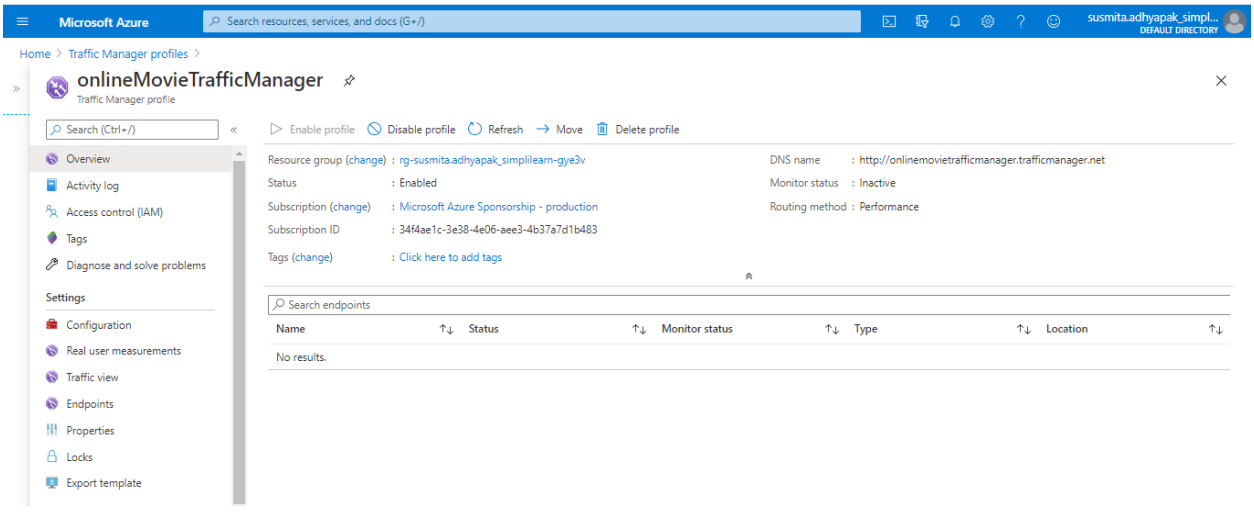



Step 10.2: Provide the required information and click on **Create** to create the Traffic Manager Profile

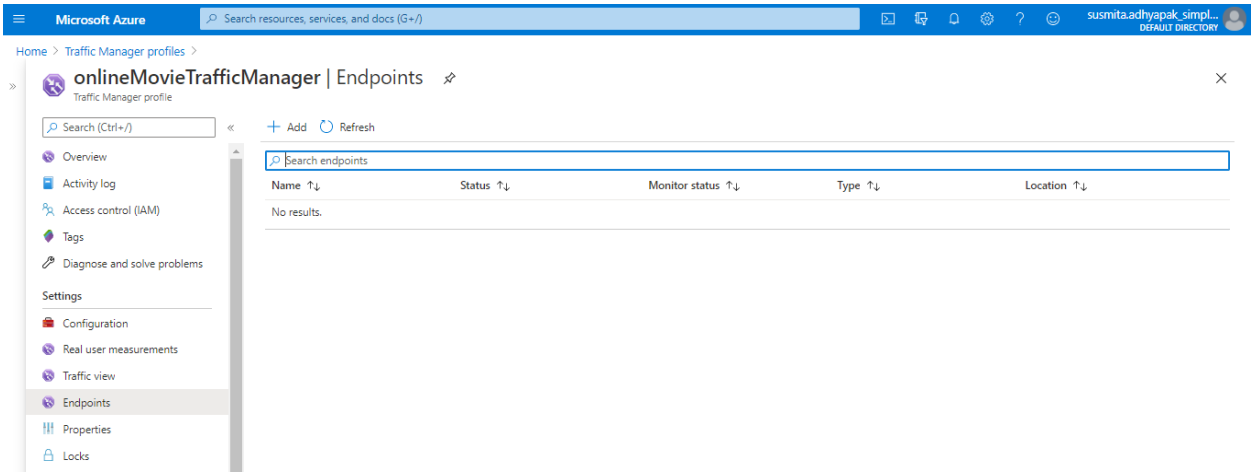



**Step 10:** Create endpoints in the traffic manager corresponding to public IP of each virtual machine that you have created.

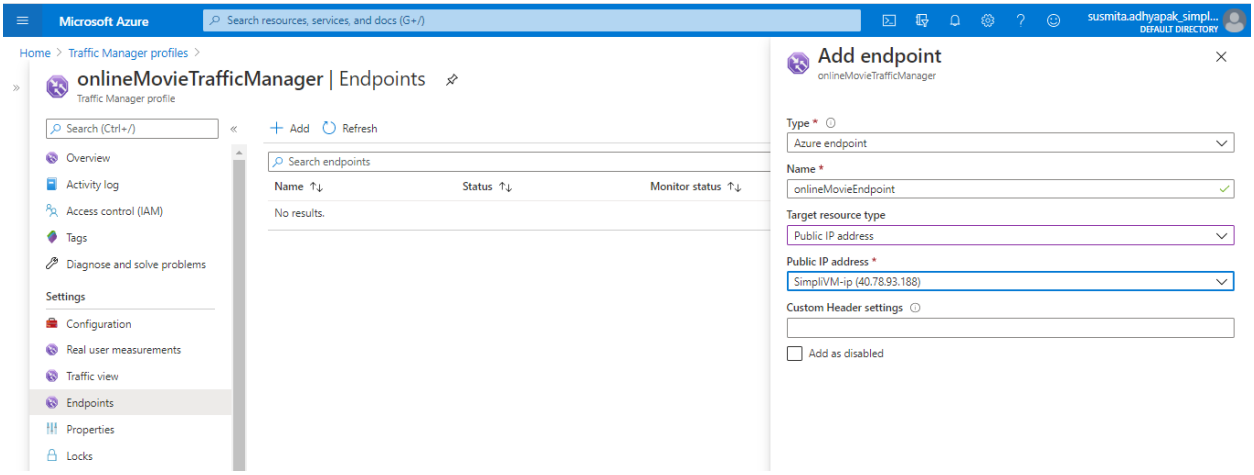
Step 10.1: Go to the created Traffic Manager Profile



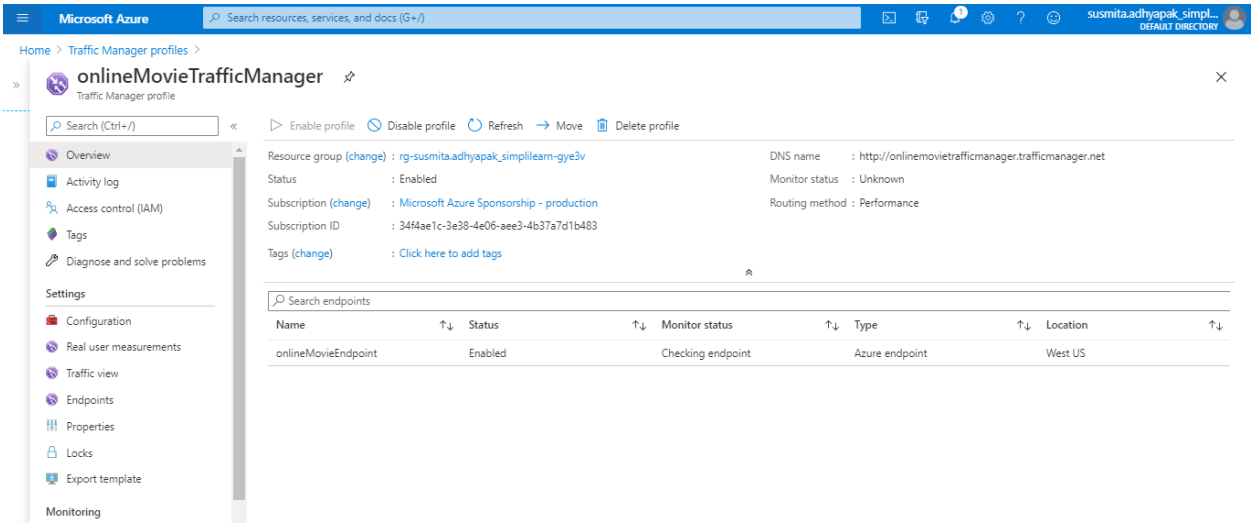

Step 10.2: Click on **Endpoints**. Click on **Add** to add new endpoints

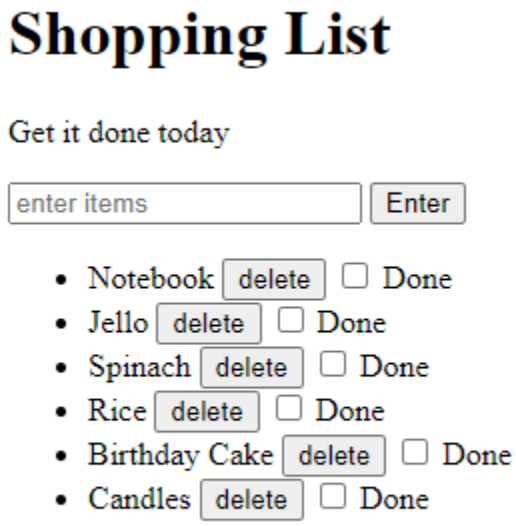



Step 10.3: Provide the required information and click on **Add**




Step 10.4: Copy-paste the DNS name link in the web browser and you'll get the output



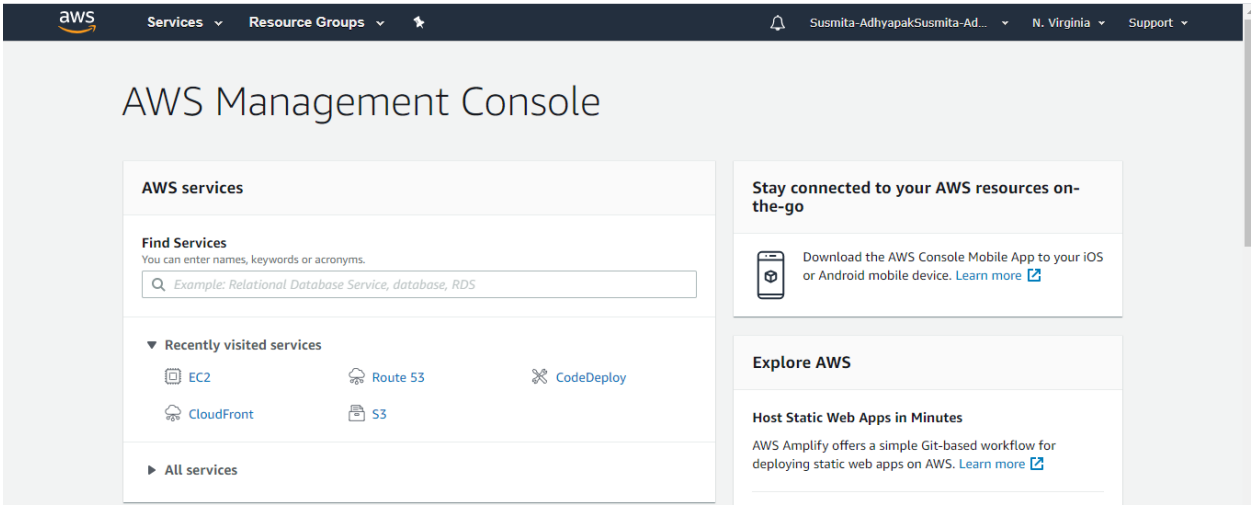

**Step 11:** Optionally, if you want to add in your own domain, you can configure the traffic manager to point to a custom domain.

**Step 12:** As good practice, follow the principle of least privilege so that you only give access to the services that need to be accessed within the Azure portal.

**AWS:**

Approach 1:

**Step 1:** Log into the AWS console.

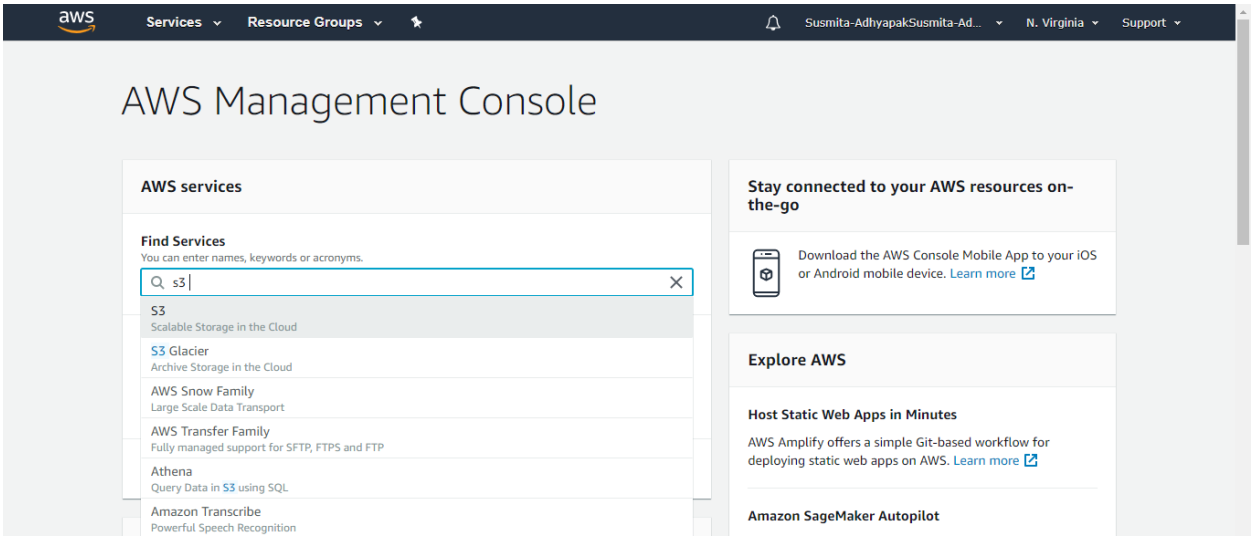



**Step 2:** Before creating the resources, make sure you apply cost allocation tags to resources so that you can keep a track of billing later on.

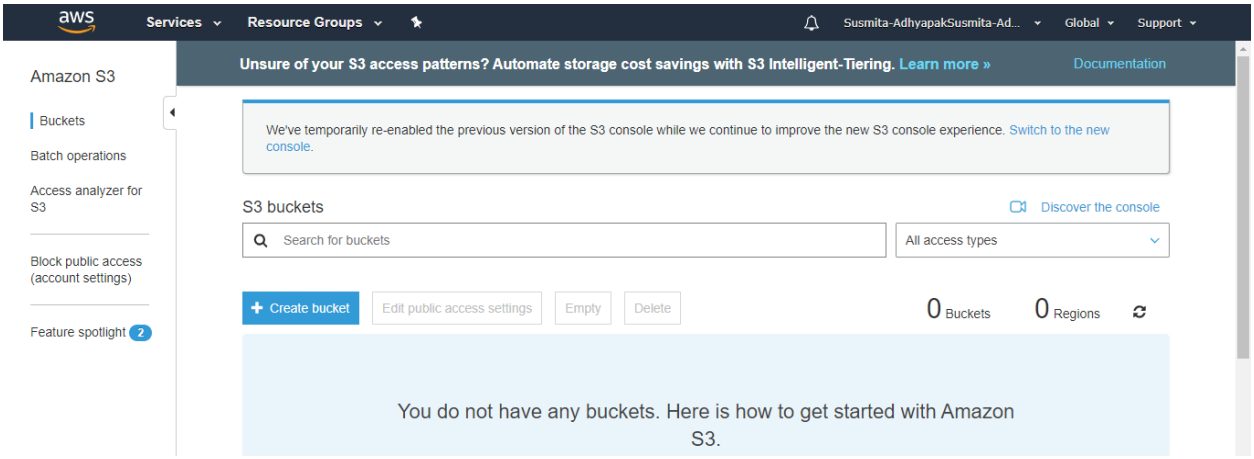
**Step 3:** To begin with, create Route 53 and add a hosted zone if you have your own domain. This is an optional step to configure a custom domain for your web app.

**Step 4:** Create an S3 bucket.

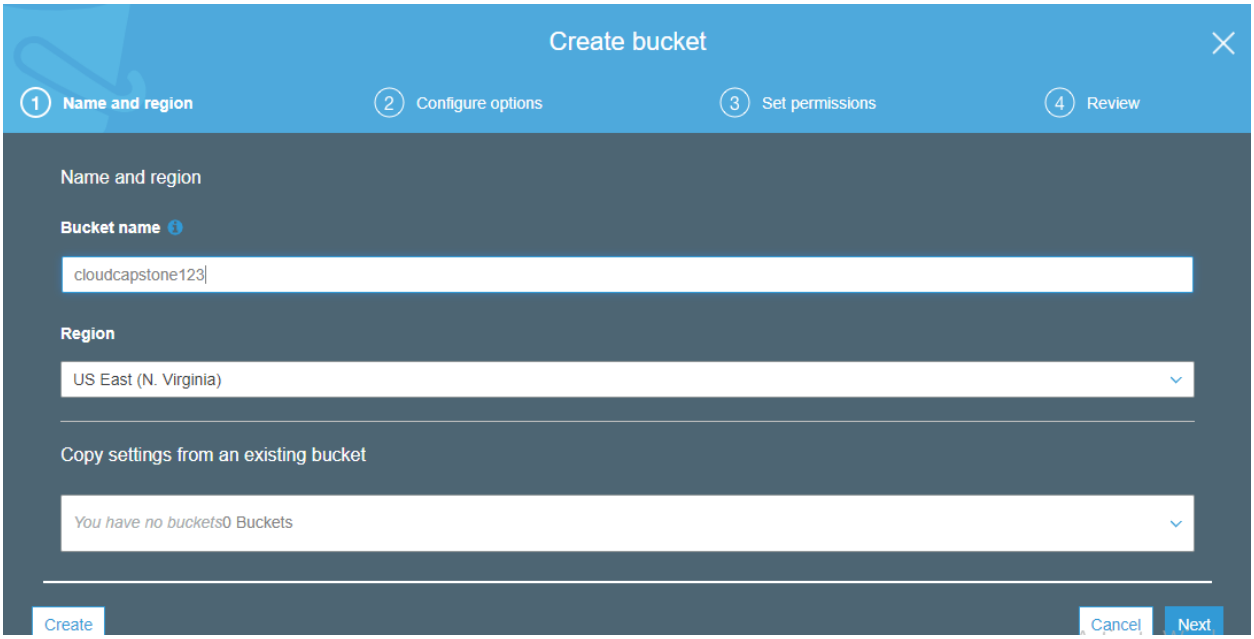
Step 4.1: In the search window, search for S3 service



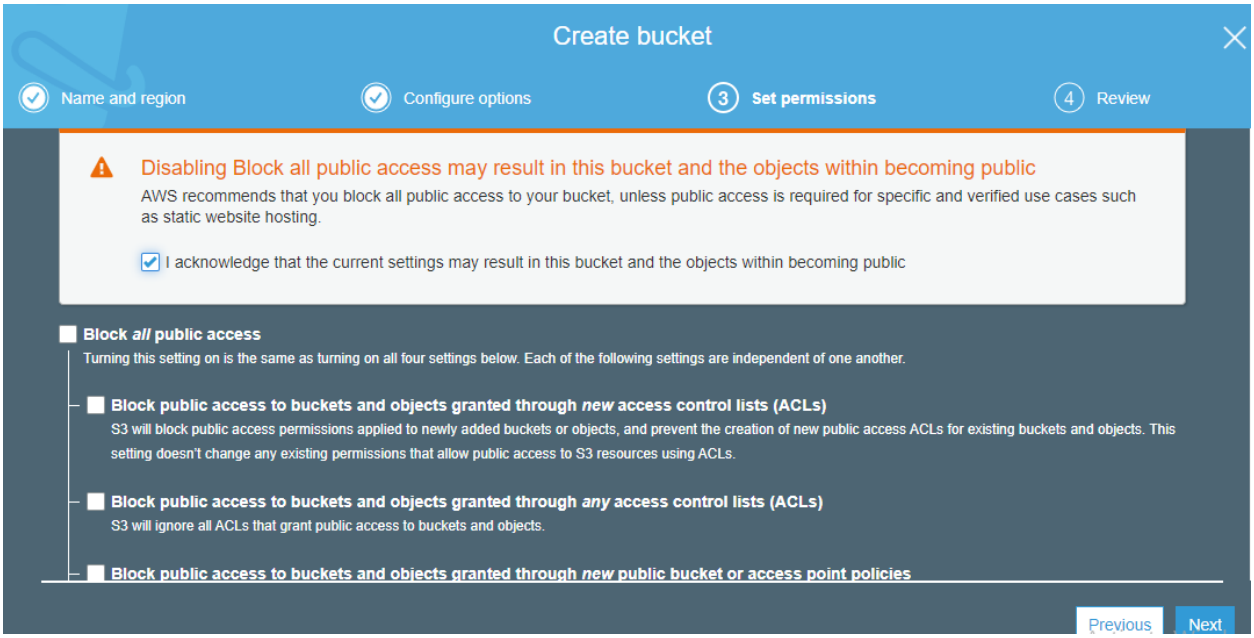

Step 4.2: Click on **Create bucket**




Step 4.3: Provide the bucket name, select the region, and click on **Next**

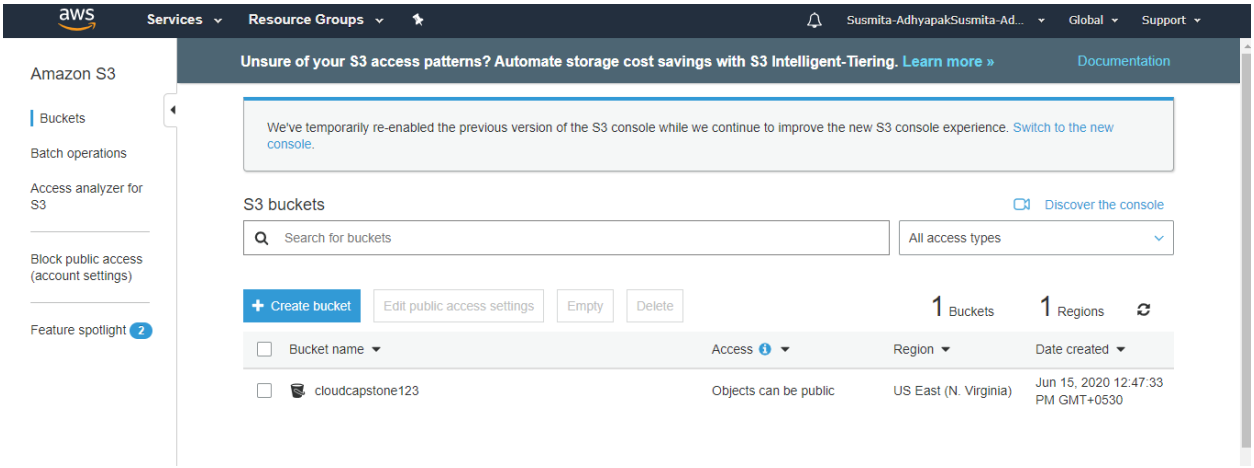



Step 4.4: In the Set permissions section, uncheck the box of Block all public access and acknowledge the terms and click on **Next**




Step 4.5: Click on **Create bucket**

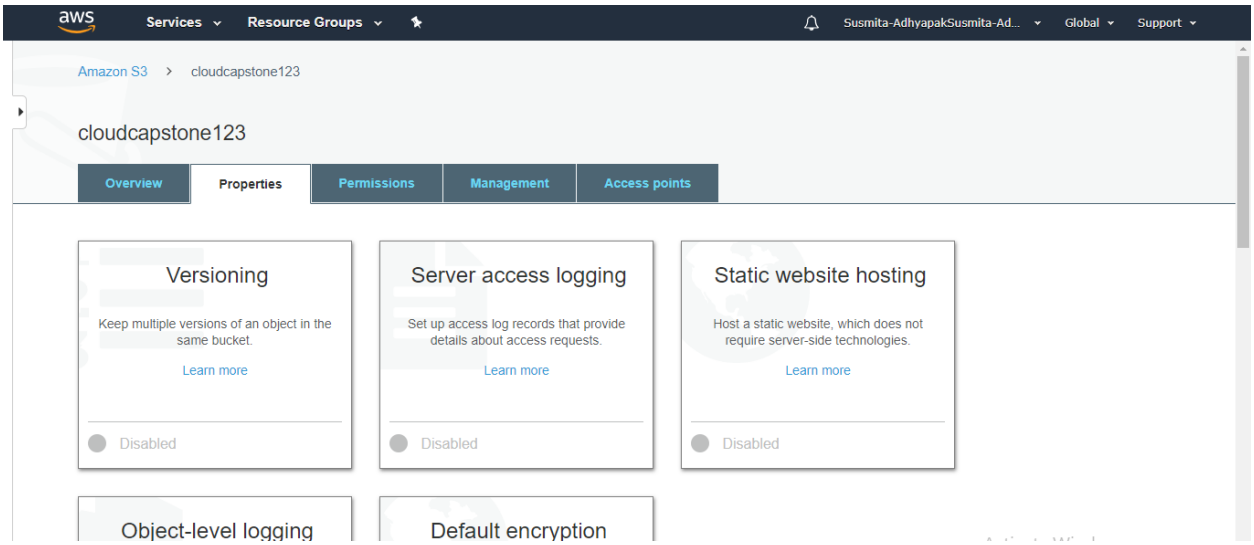

Step 4.6: The created bucket will be visible in the portal




**Step 5:** In the properties of S3 bucket, configure the S3 bucket to enable Static website hosting.

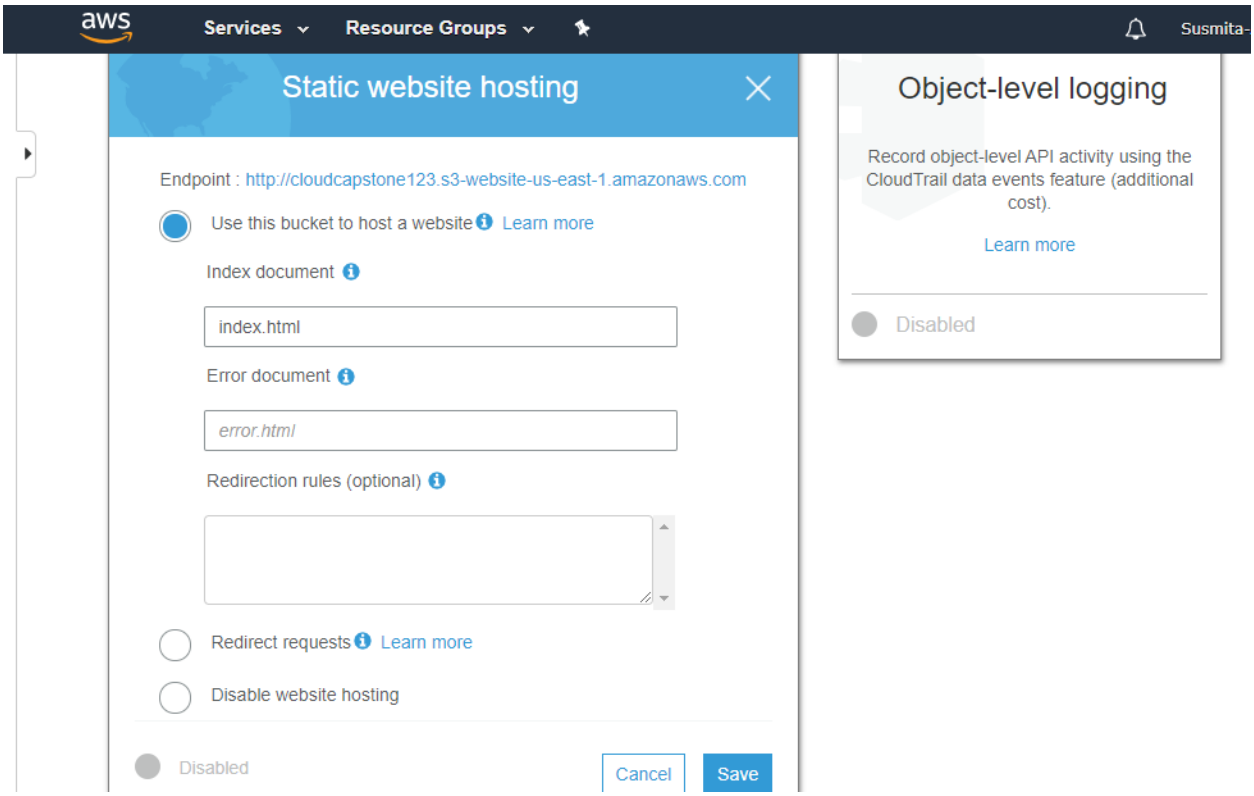
Step 5.1: Click on the created bucket

Step 5.2: Go to **Properties**



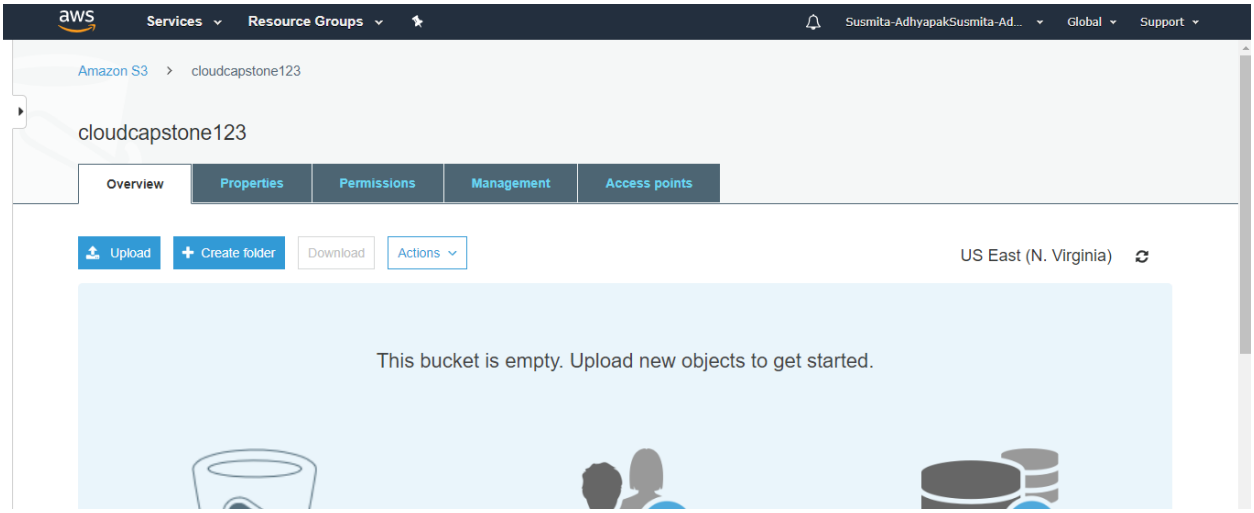

Step 5.3: Select Static web hosting

Step 5.4: Select **Use this bucket to host a website**, provide the required information and click on **Save**

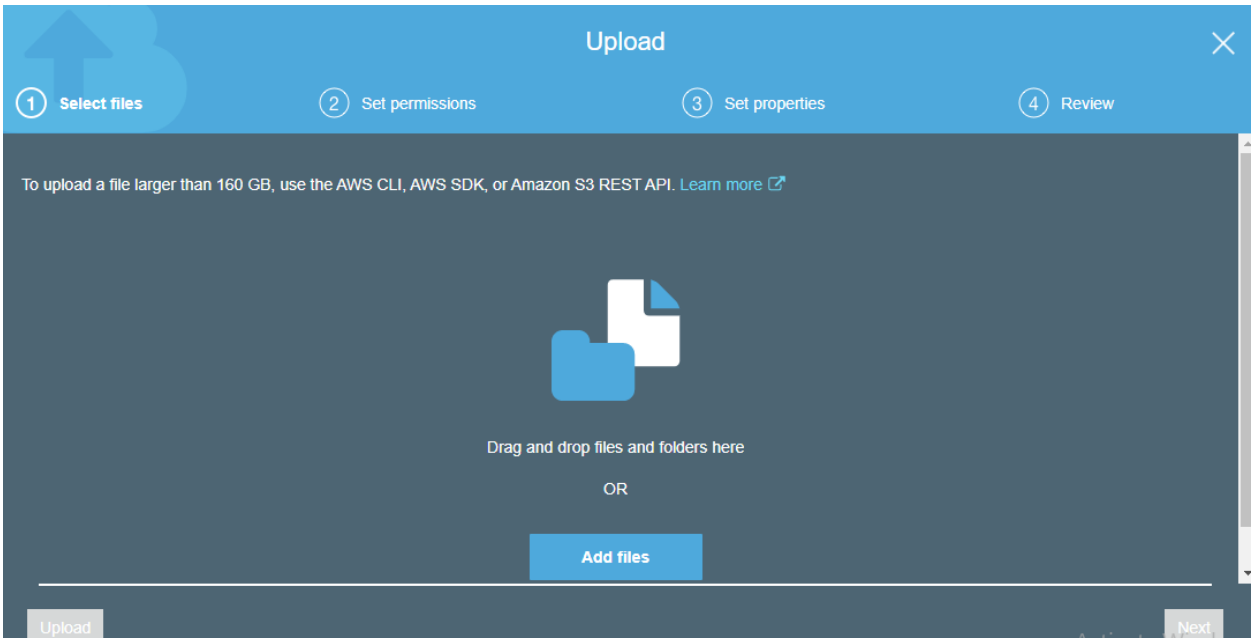



**Step 6:** Upload your static content (web app files) to the S3 bucket.

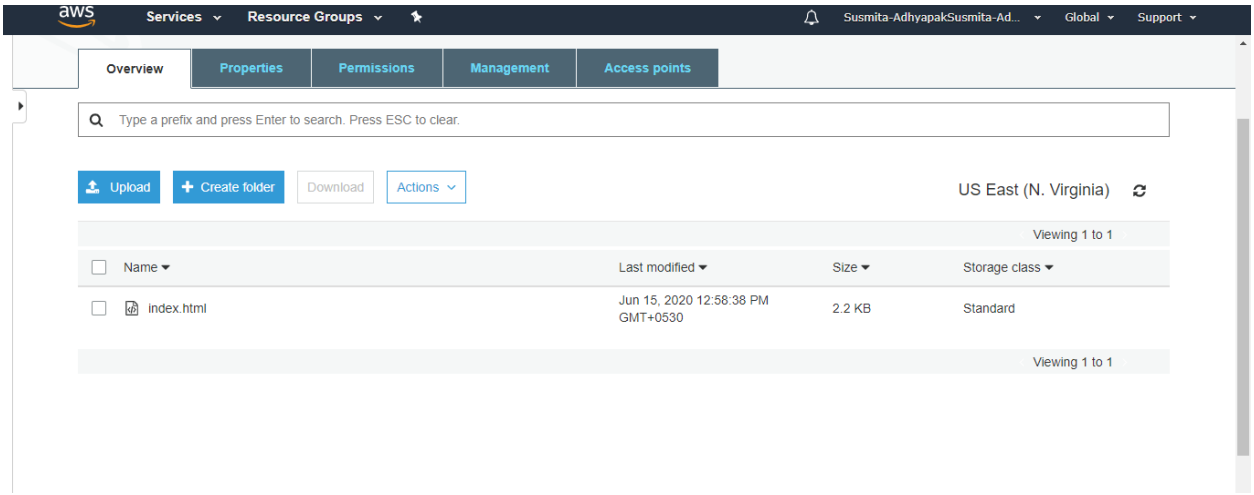
Step 6.1: Go to Overview tab of the created bucket and click on **Upload**




Step 6.2: Select the files of your application which you want to deploy and click on **Next** and click on **Upload**




Step 6.3: This will add the files of your application in the S3 bucket

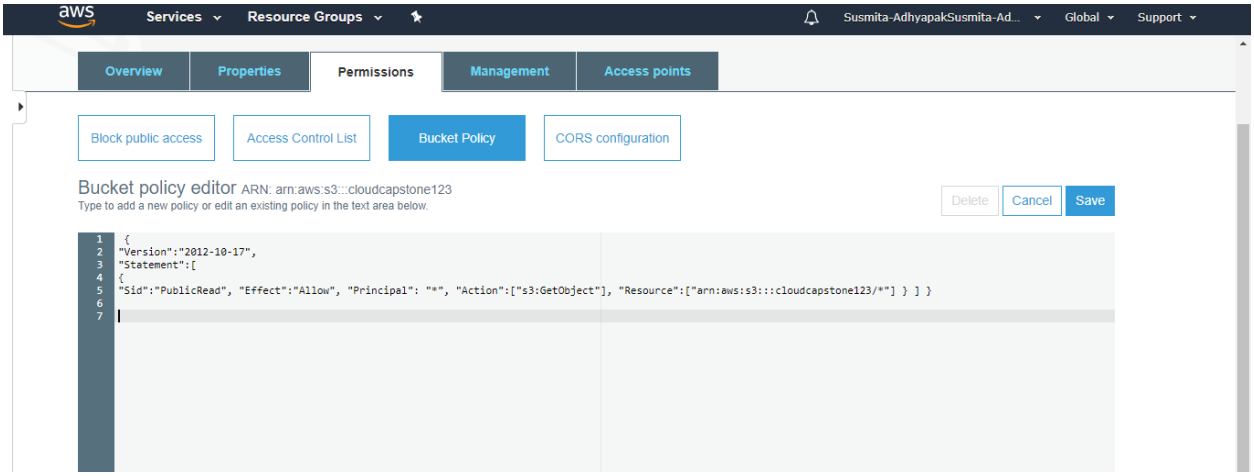



**Step 7:** Configure permissions in S3 and add below bucket policy to give read only access to the static web app endpoint.

Step 7.1: Go to the **Permissions**, click on **Bucket policy**, add the following code there and click on **Save**

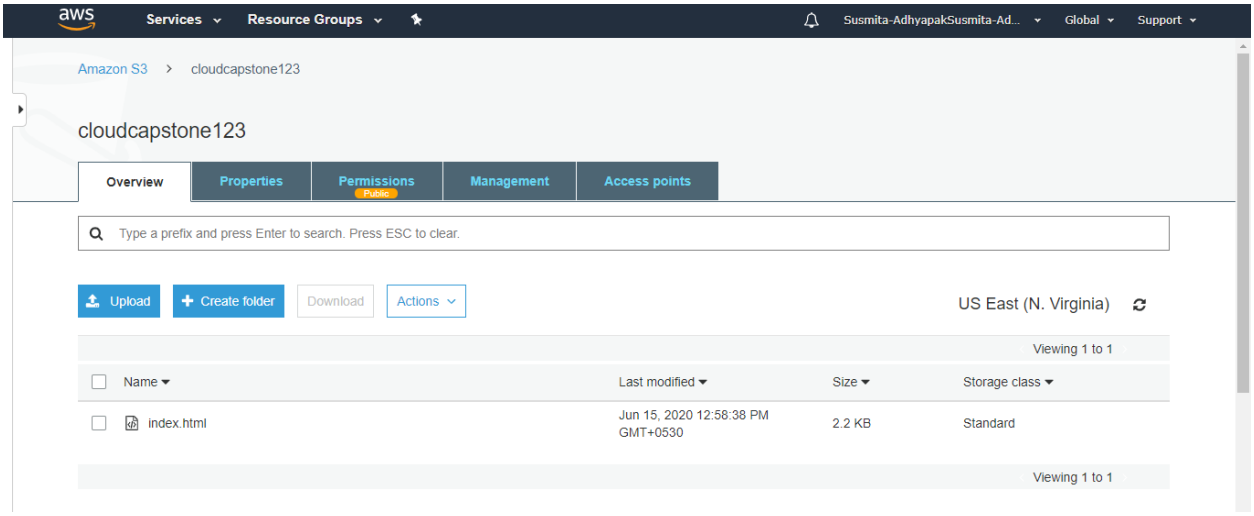
```
{

    "Version":"2012-10-17",
        "Statement":[
            {
"Sid":"PublicRead", "Effect":"Allow", "Principal": "*",
"Action":["s3:GetObject"],
"Resource":["arn:aws:s3:::cloudcapstone123/*"] } ] }
```

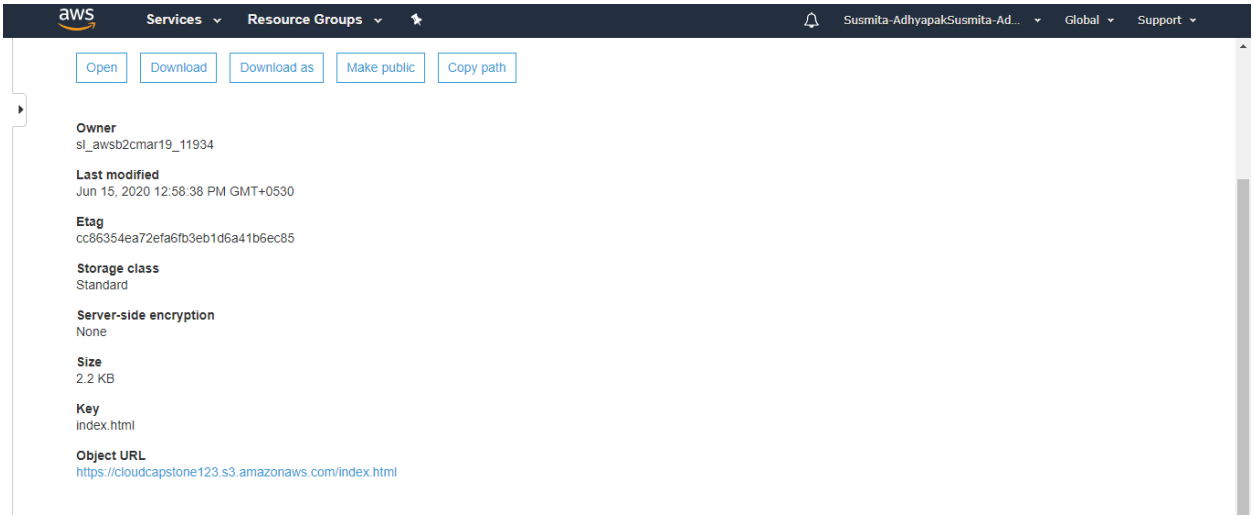



**Step 8:** Hit the web app endpoint to check if the application is online.

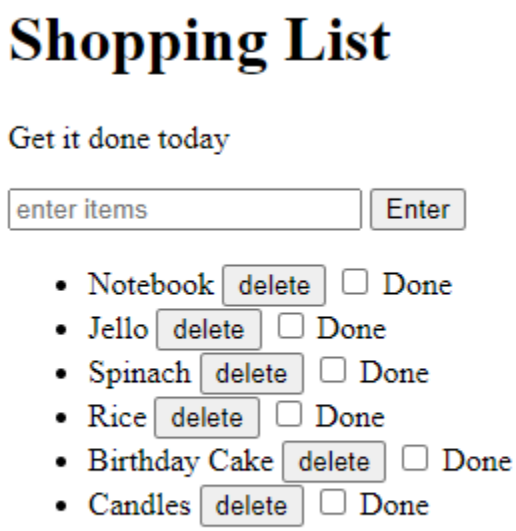
Step 8.1: Click on the Overview tab of the created bucket and click on the uploaded file




Step 8.2: Click on the **Object URL**

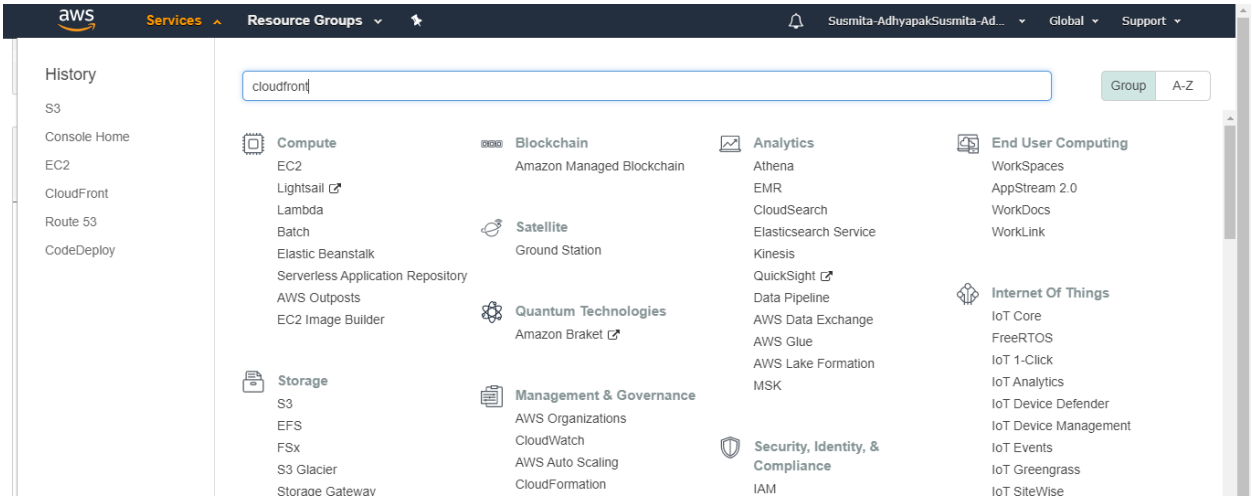



Step 8.3: Your application will start running

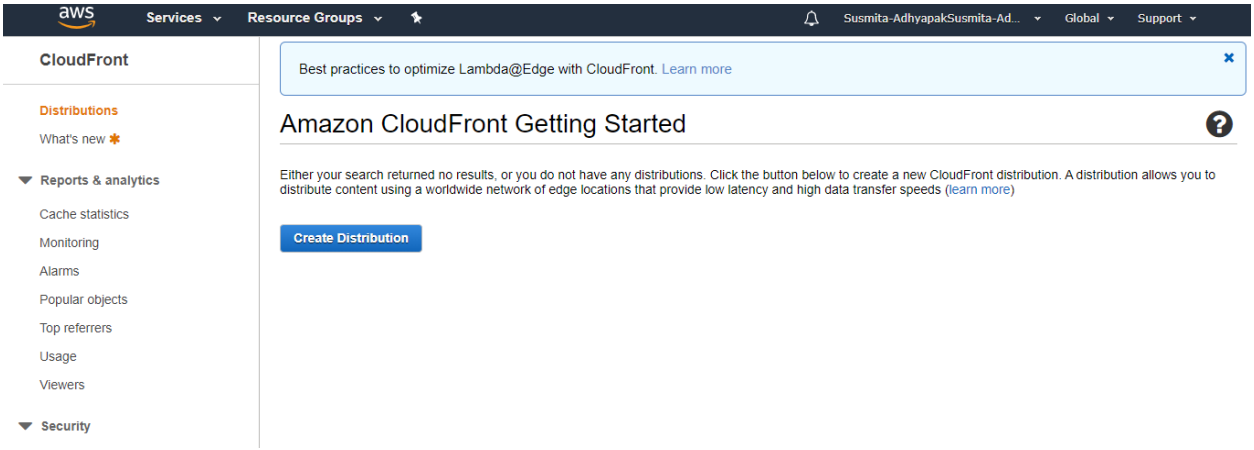



**Step 9:** Now create a CloudFront distribution corresponding to the static web app endpoint.

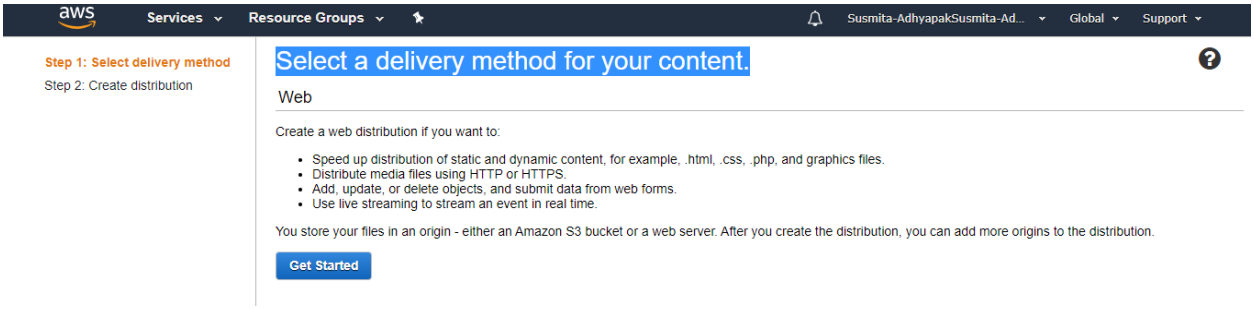
Step 9.1: Go to services and search for CloudFront



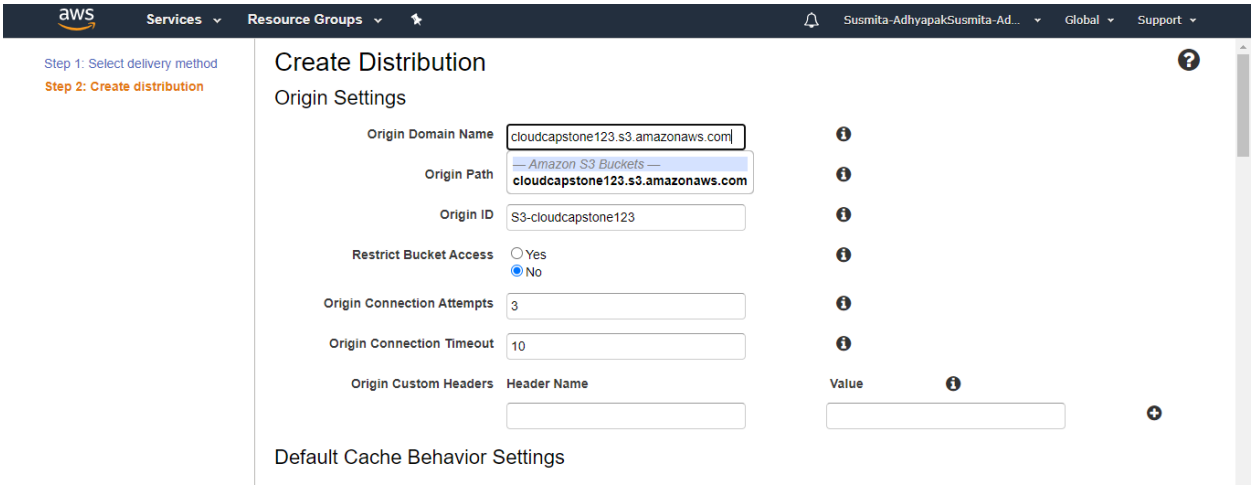

## Step 9.2: Click on **Create Distribution**



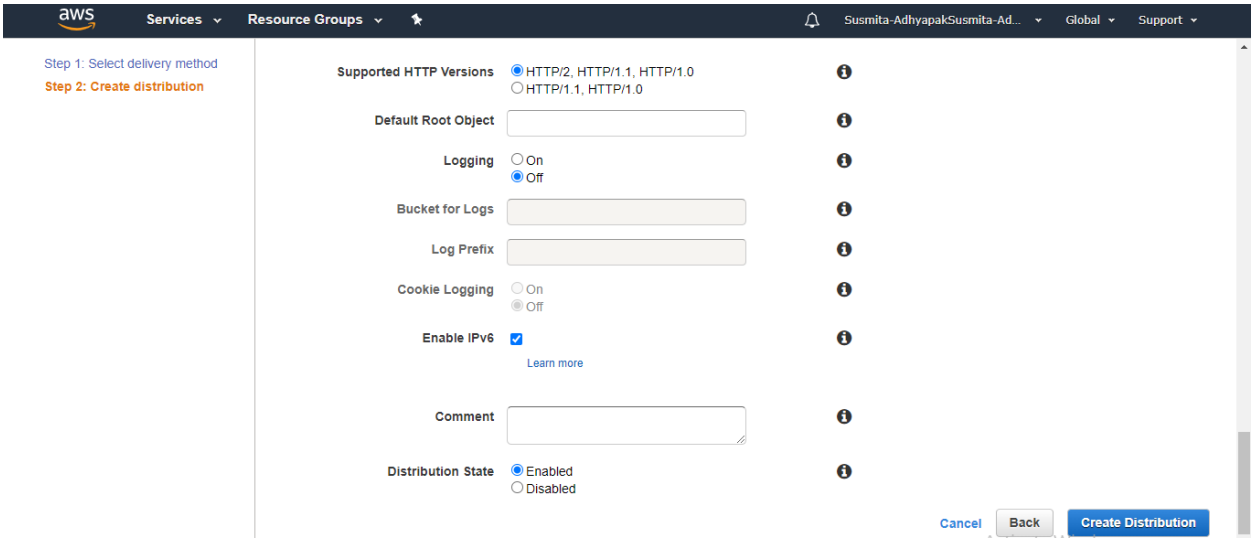

## Step 9.3: Select a delivery method for your content as Web and click on Get Started



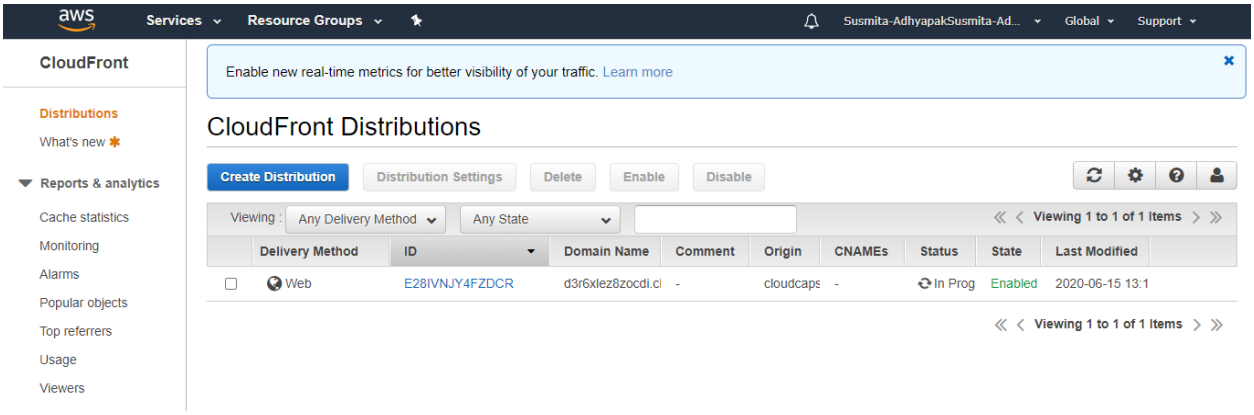
## Step 9.4: Provide the Origin Domain Name and Origin ID




## Step 9.5: Keep all the values as default and click on **Create Distribution**




## Step 9.6: These steps will create your CloudFront distribution

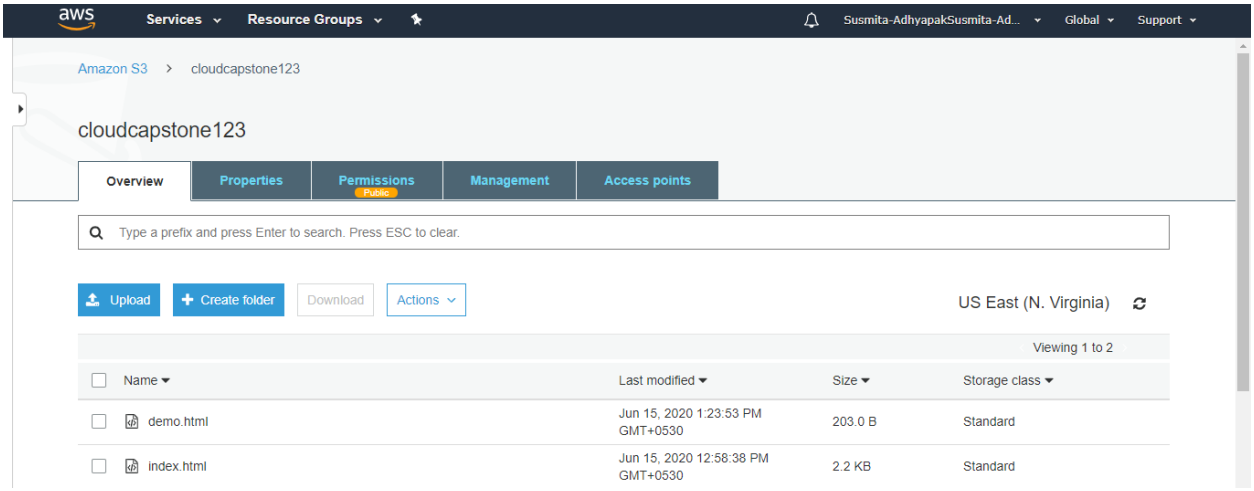



**Step 10:** Configure the CloudFront distribution to point to your domain by editing the configuration and adding the domain name in Alternate Domain Name field.

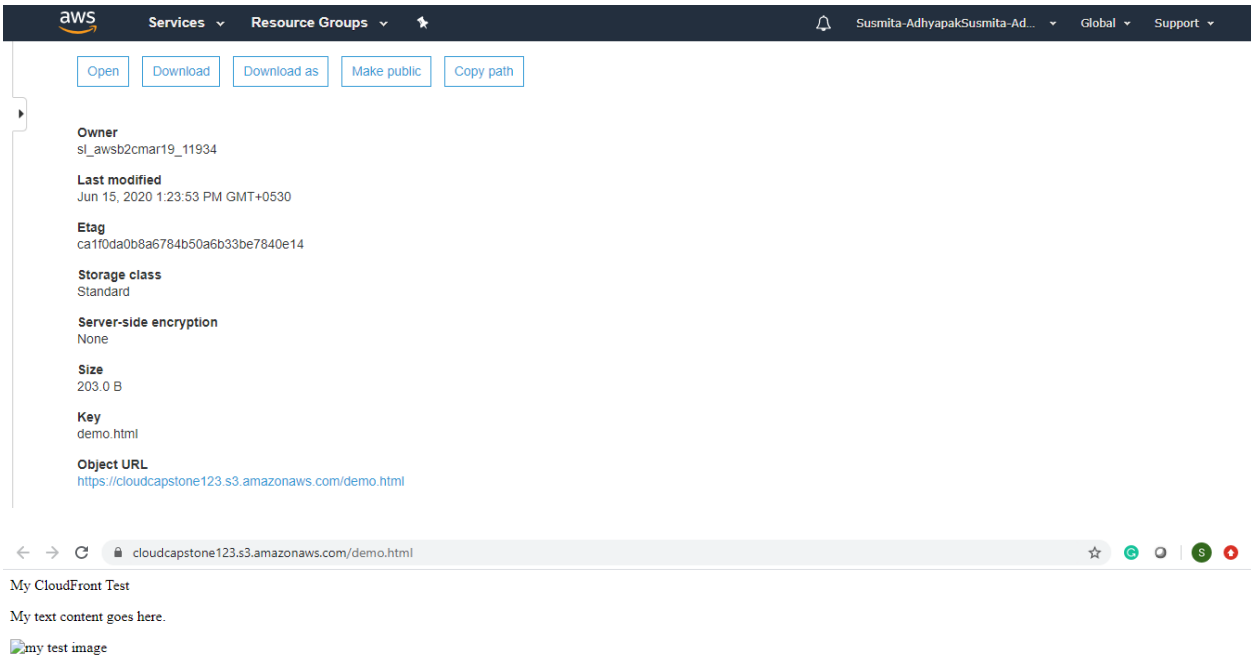
Step 10.1: Once the CloudFront service get deployed, create a new file of .html extension in your system and copy the following content in it

```
<html>
    <head>My CloudFront Test</head>
    <body>
    <p>My text content goes here.</p>
    <p><img src=https://d111111abcdef8.cloudfront.net/.html
alt="my test image"/>
    </body>
    </html>
```

Step 10.2: Upload the same file in the created S3 bucket




Step 10.3: Click on the newly uploaded file, and go to the Object URL




**Step 11:** Repeat Steps 5 to 11 to create multiple deployments of your application in different regions so that you can meet the global traffic demand.

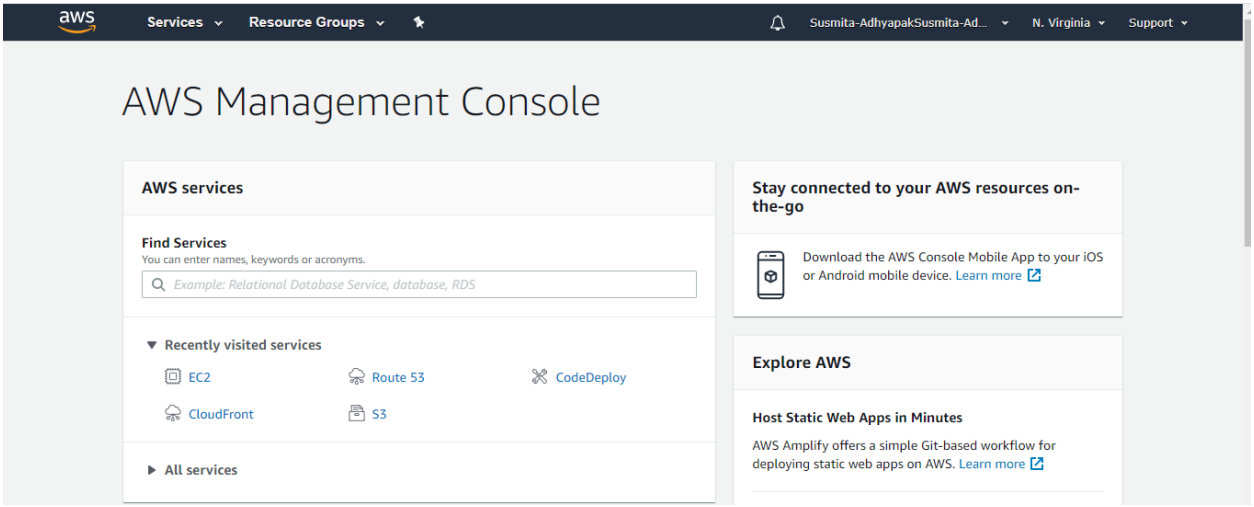
**Step 12:** Use the traffic flow editor to create traffic policy to route traffic to different endpoints across the globe.

**Step 13:** As a best practice, follow the principle of least privilege so that you give access to the services that need to be accessed within the AWS console.

**AWS:**

Approach 2:

**Step 1:** Log into the AWS console

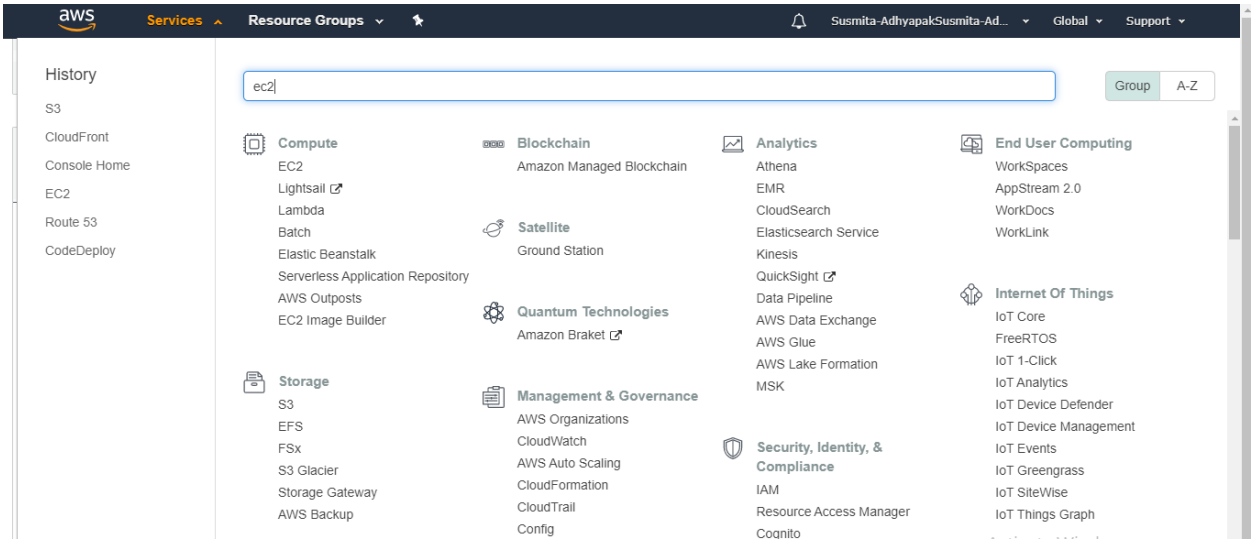



**Step 2:** Before creating the resources, make sure you apply cost allocation tags to resources so that you can keep a track of billing later on

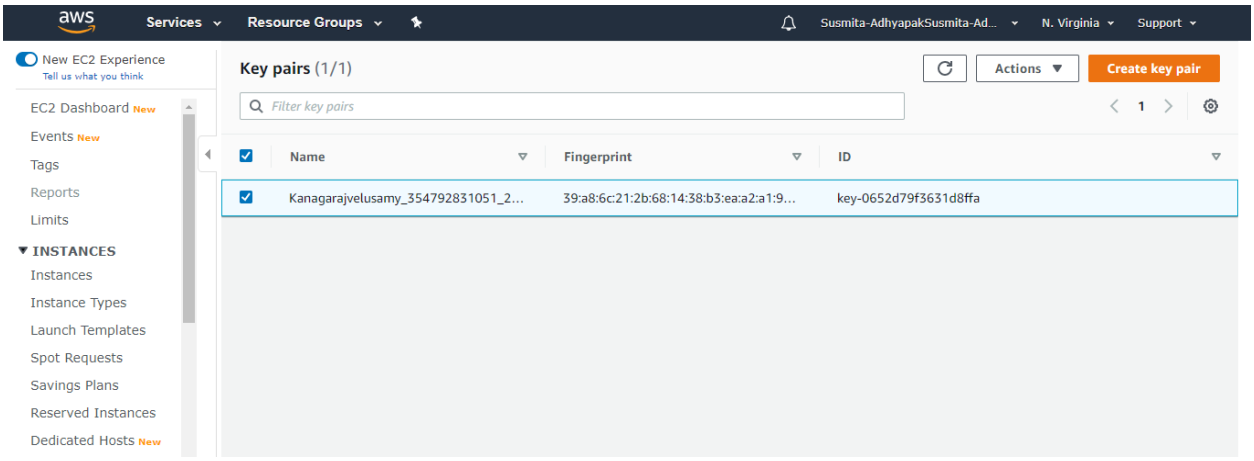
**Step 3:** To begin, create Route 53 and add a hosted zone if you have your own domain, this is an optional step to configure a custom domain for your web app

**Step 4:** Create an EC2 instance

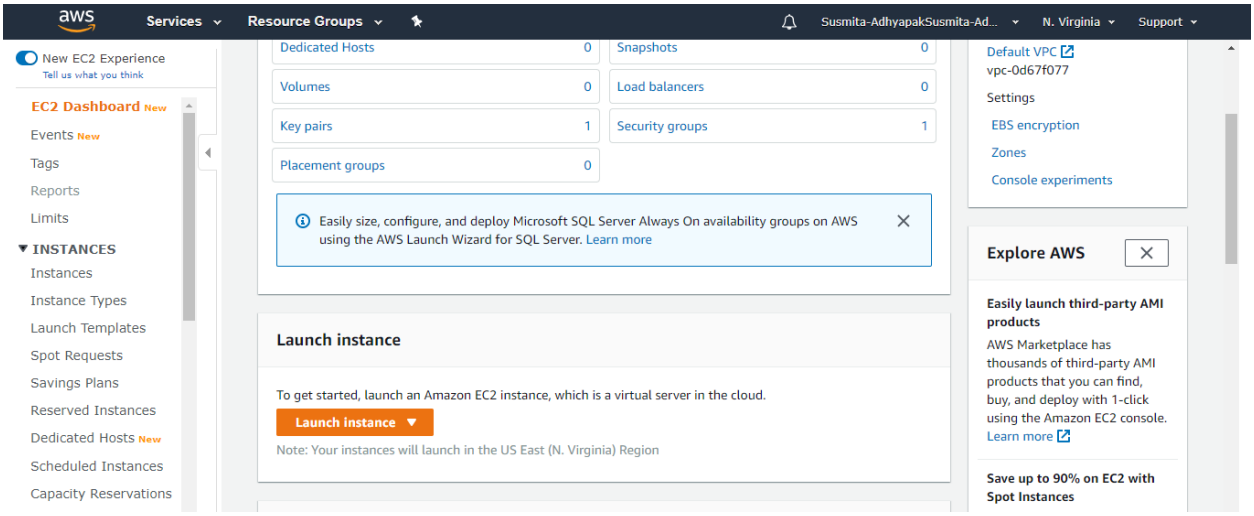
Step 4.1: In the search window, search for EC2



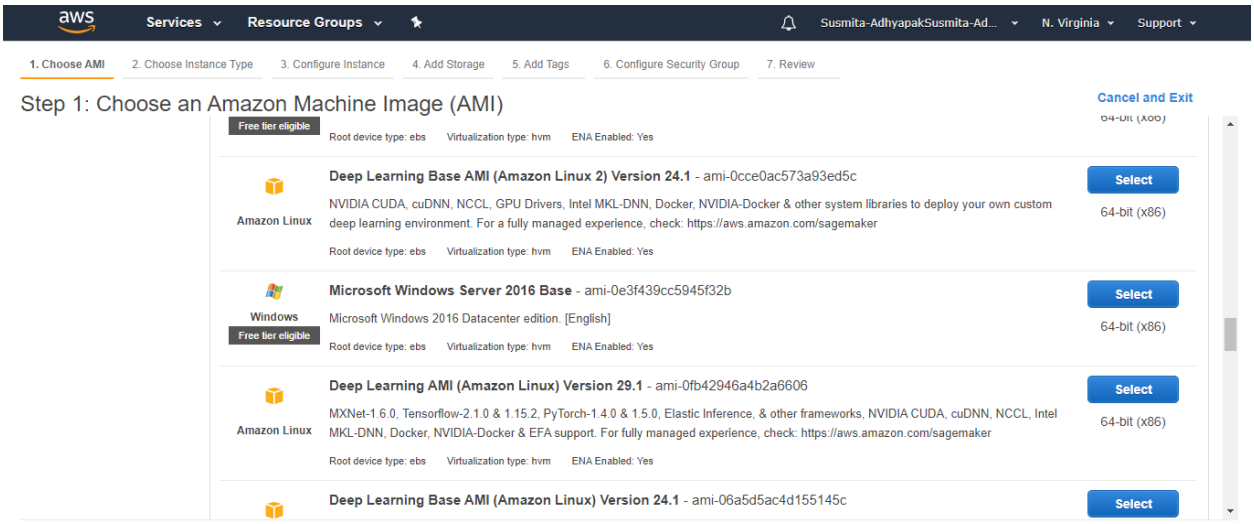

Step 4.2: In the EC2 instance, check whether a key-value pair is created or not. If not then create one



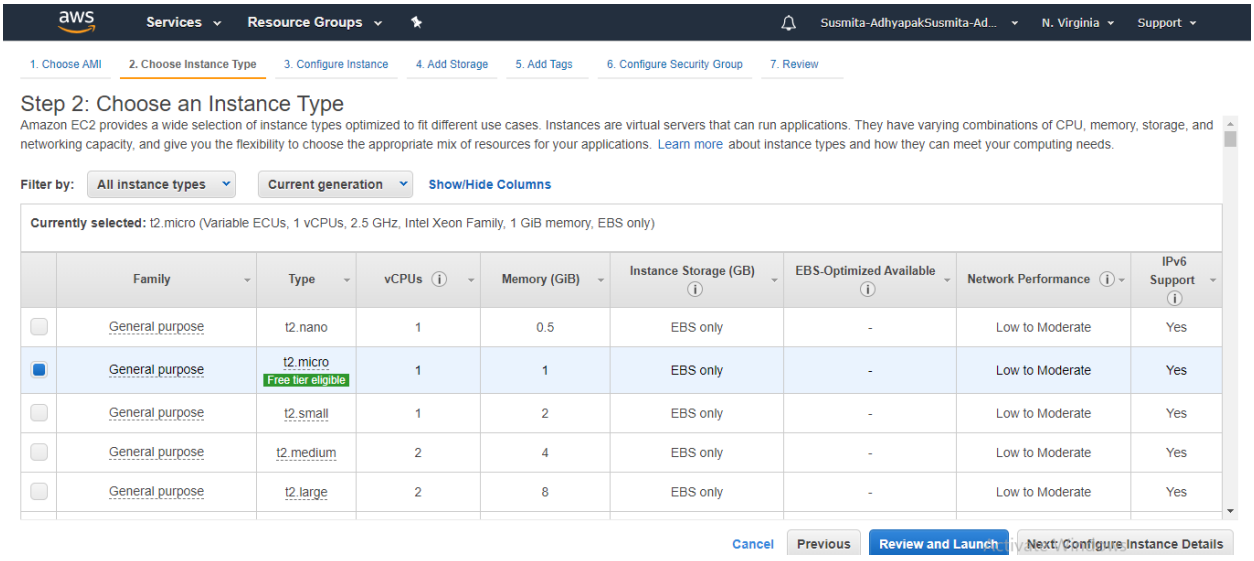

Step 4.3: Click on Launch instance



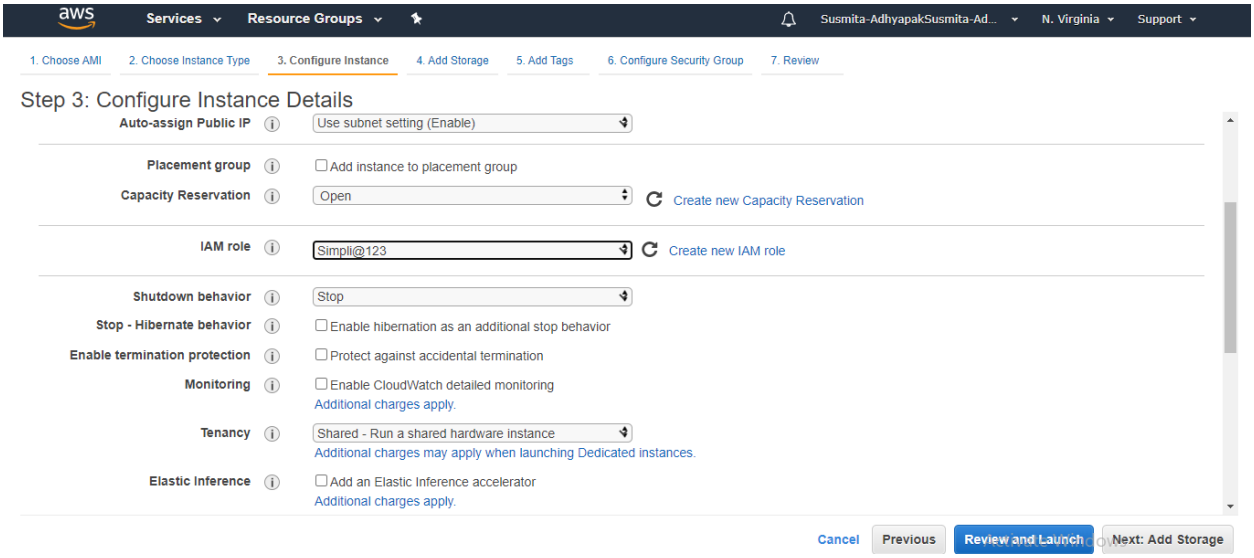

Step 4.4: Choose an Amazon Machine Image (AMI) (Free tier only) and click on **Select**



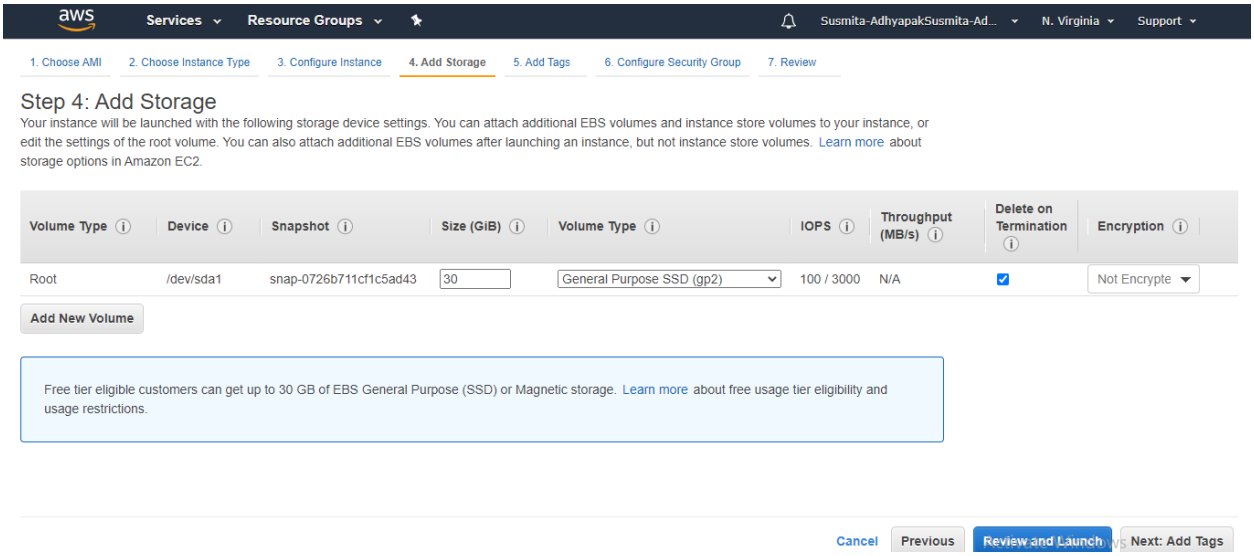

Step 4.5: Select a proper instance type (Select t2 micro) and anc click on **Next: Configure Instance Details**



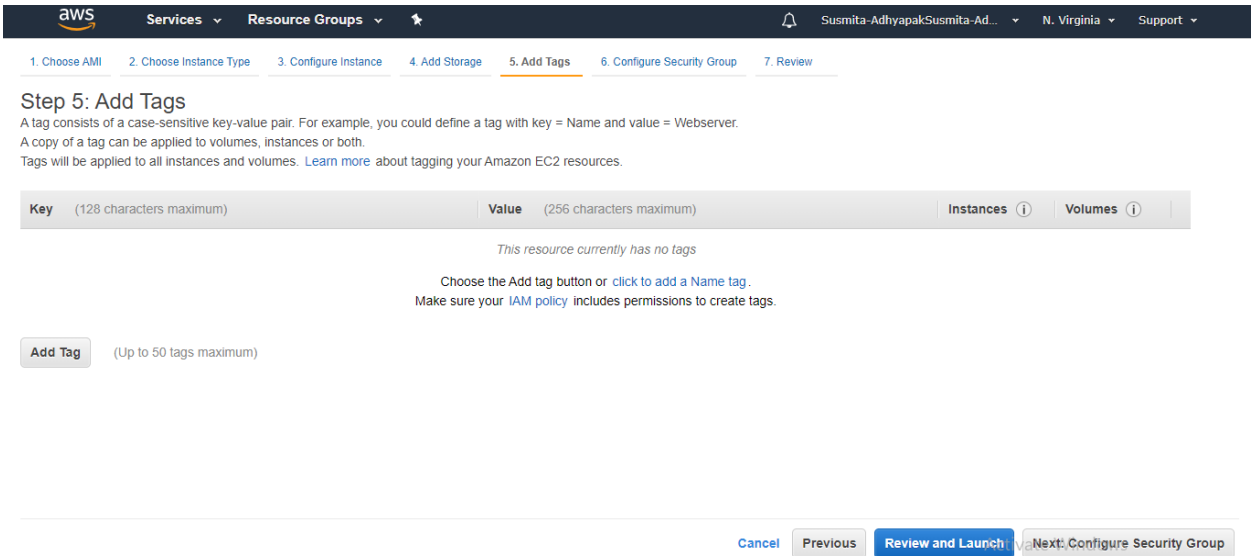

## Step 4.6: In the EC2 dashboard, click on **Next: Add Storage**



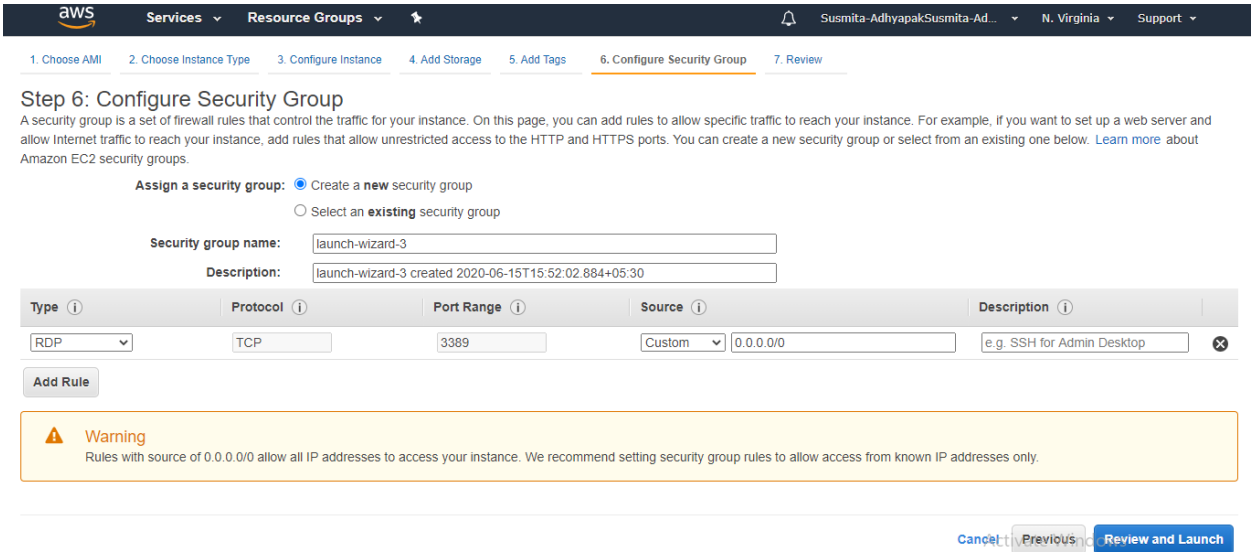

## Step 4.7: Click on **Next: Add Tags**



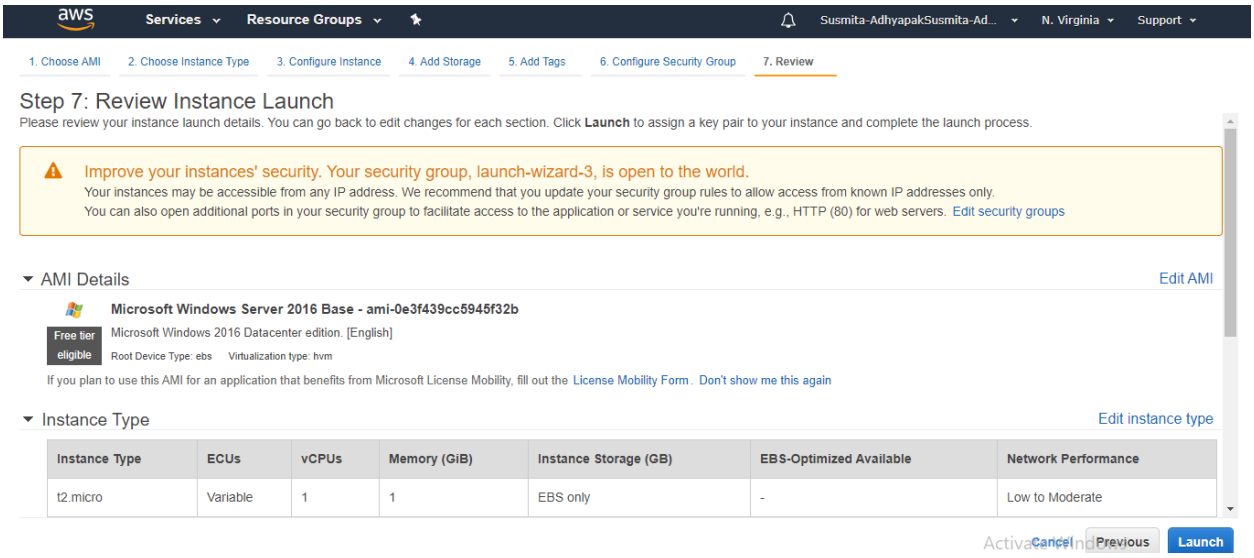

## Step 4.8: Click on **Next: Configure Security Groups**



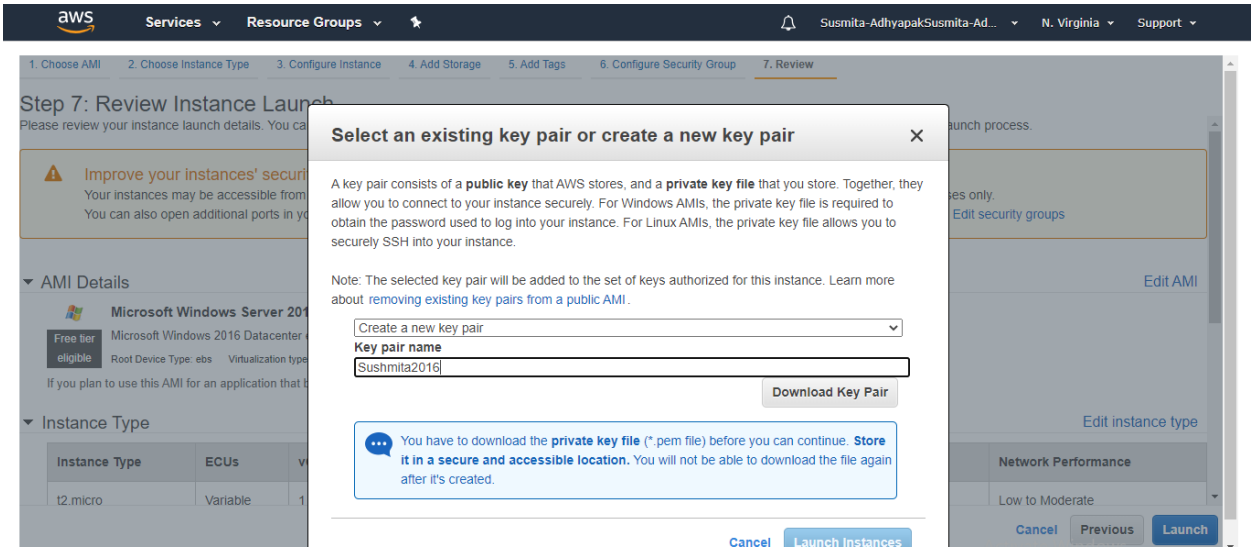

## Step 4.9: Click on **Review and Launch**



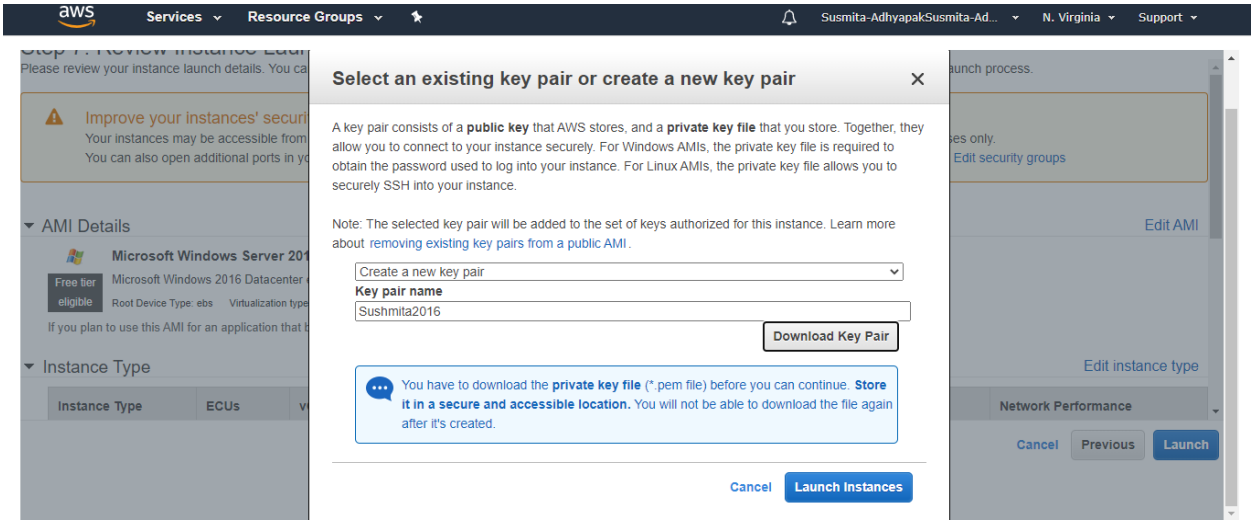

## Step 4.10: Click on **Launch**



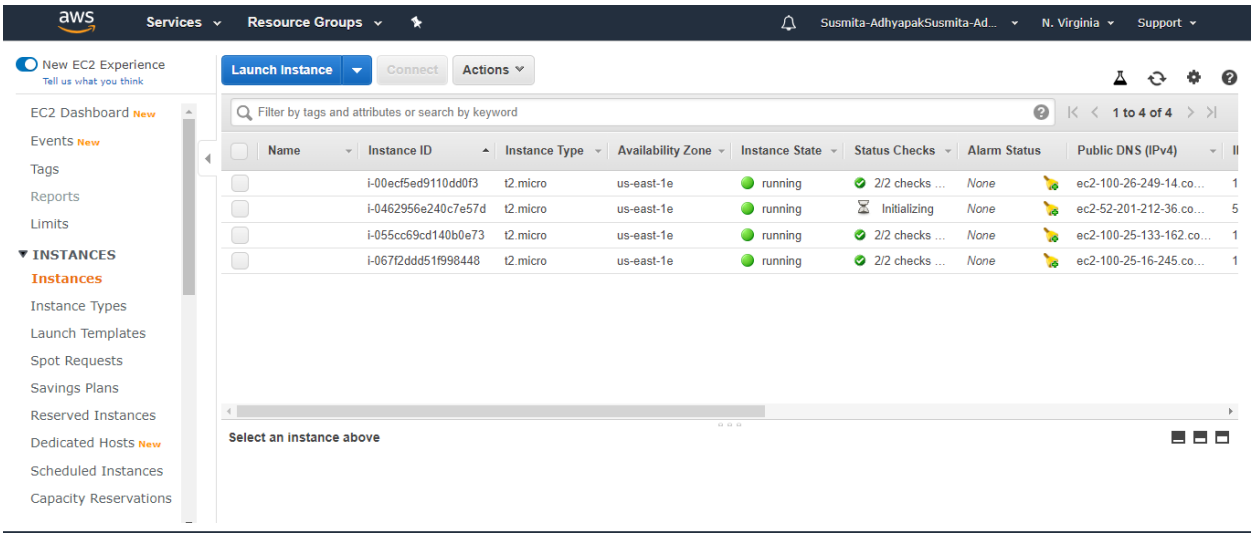

## Step 4.11: Create a new key-pair, provide the name of the file and click on **Download Key Pair**



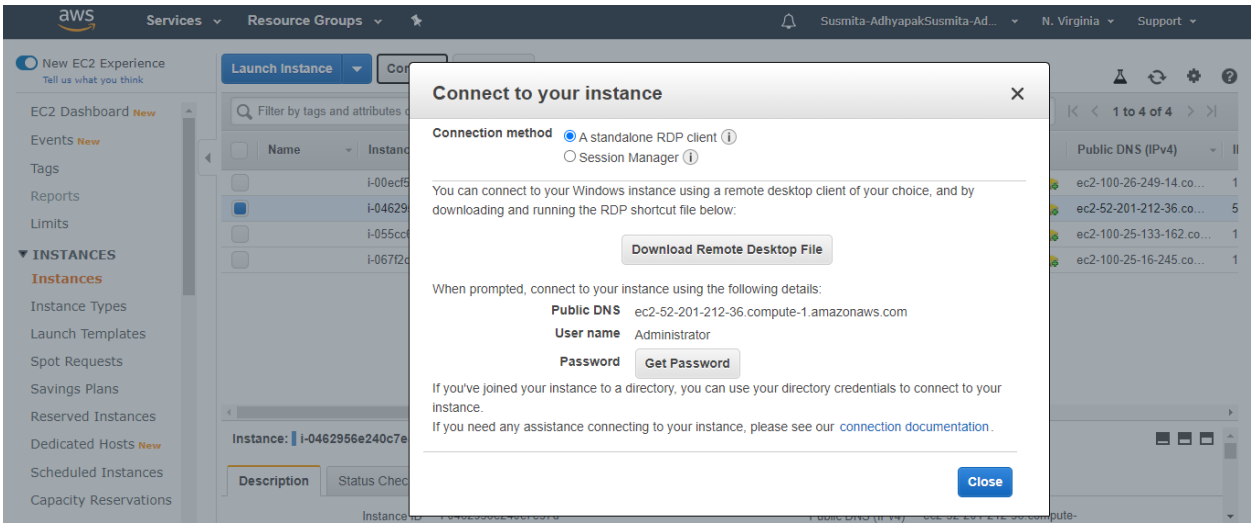

Step 4.12: Click on **Launch Instances**




Step 4.13: Go to the EC2 dashboard, select the created EC2 instance and click on **Connect**

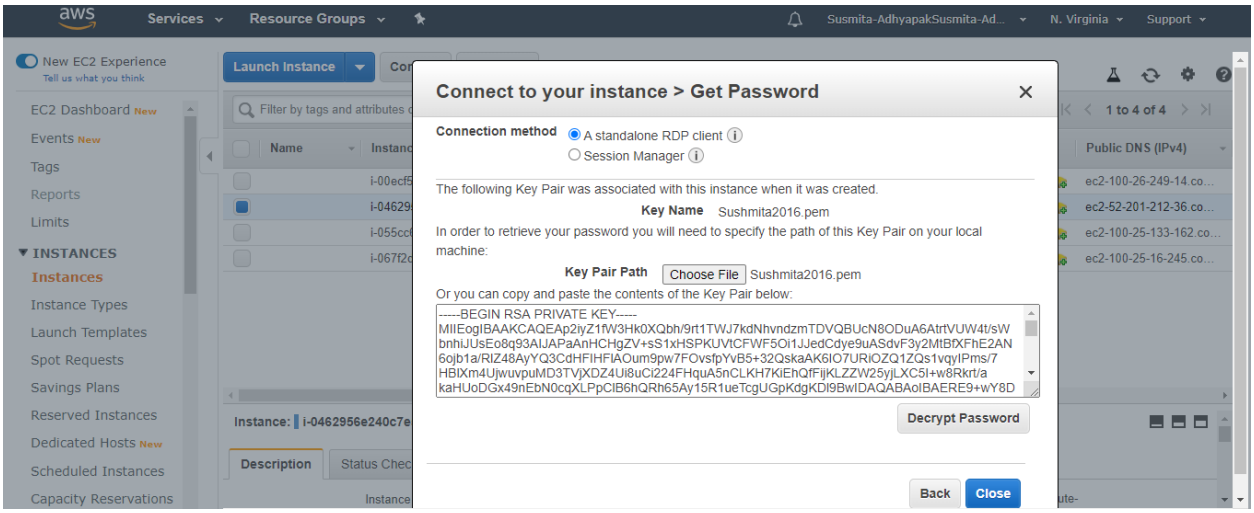



Step 4.14: Click on **Download Remote Desktop File**

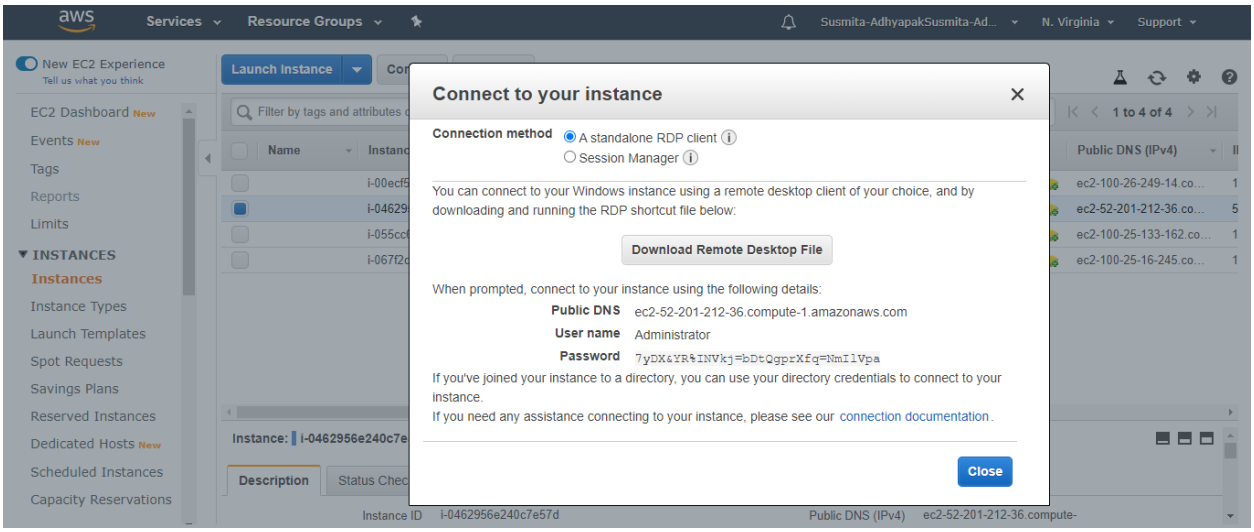



Step 4.15: Click on **Get Password**

Step 4.16: Browse to the Key Pair File you have downloaded using **Choose File** option




Step 4.17: Click on **Decrypt Password**




Step 4.18: Copy the decrypted password

**Step 5:** Make sure you have inbound traffic on port 80 and port 443 open

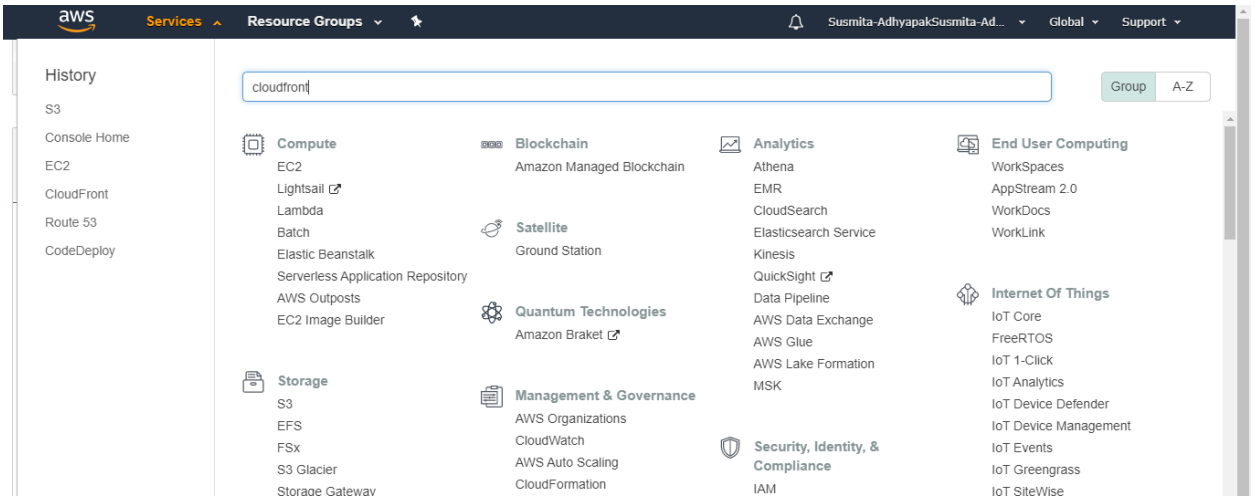
**Step 6:** Log into EC2 instance and spin up a web server of your choice on port 80

**Step 7:** Deploy your application on the web server that you have created within the virtual machine

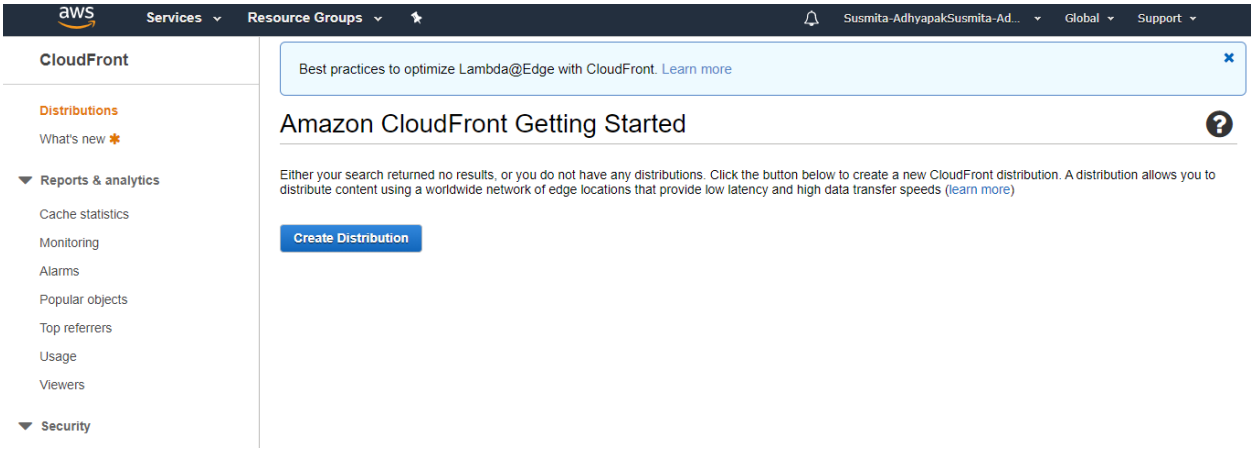
**Step 8:** Hit the Public IP of EC2 instance (web app endpoint) to check if the application is online

**Step 9:** Now create a CloudFront distribution corresponding to the static web app endpoint.

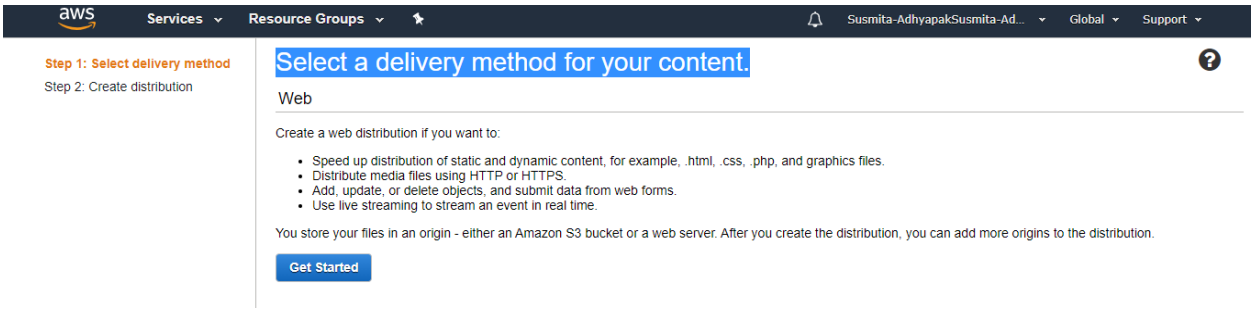
Step 9.1: Go to services and search for CloudFront



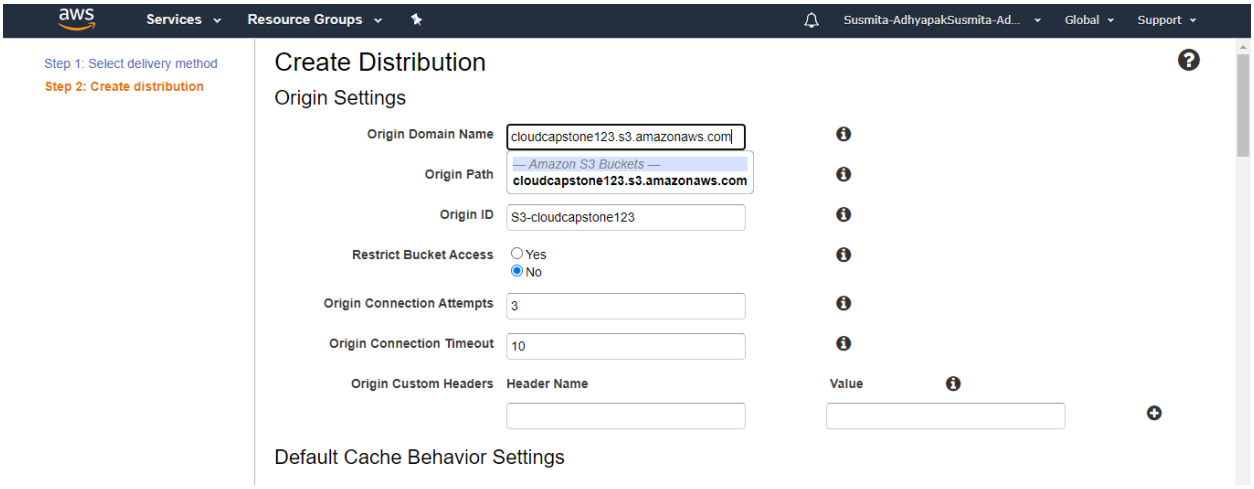

Step 9.2: Click on **Create Distribution**



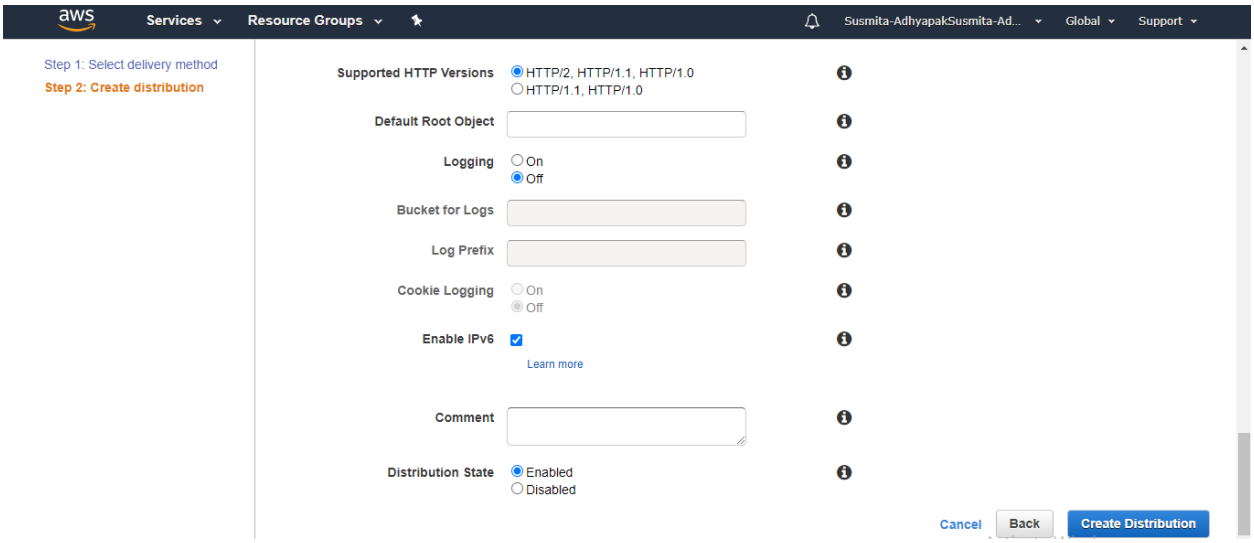

## Step 9.3: Select a delivery method for your content as Web and click on Get Started



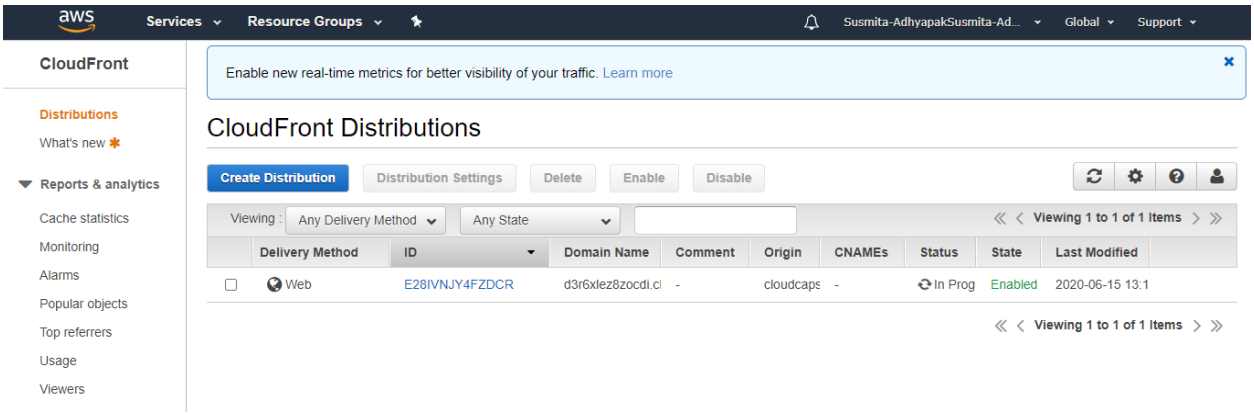

## Step 9.4: Provide the Origin Domain Name (DNS name of the3 created EC2 instance) and Origin ID



Step 9.5: Keep all the values as default and click on **Create Distribution**




Step 9.6: These steps will create your CloudFront distribution.




**Step 10:** Configure the CloudFront distribution to point to your domain by editing the configuration and adding the domain name in Alternate Domain Name field

**Step 11:** Repeat steps 4 to 10 to create multiple deployments of your application in

different regions so that you can meet the global traffic demand

**Step 12:** Use the traffic flow editor to create traffic policy to route traffic to different endpoints across the globe

**Step 13:** As good practice, follow the principle of least privilege so that you give access to the services that need to be accessed within the AWS console