



END SEMESTER EVALUATION 2024 (II)

IT 246 - CLOUD COMPUTING

SUBMITTED BY

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PALLEKELE

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ABSTRACT

This case study delves into establishing a personal blog using Amazon Web Services (AWS), employing an EC2 instance for hosting and an S3 bucket for storing and delivering static content. It illustrates the setup process, including IAM role creation, EC2 instance launch and setup, and Apache web server installation. Furthermore, it outlines the creation and setup of an S3 bucket for streamlined file storage. This guide equips users with fundamental web development and server management skills to deploy a functional personal blog, capitalizing on AWS's scalability, reliability, and seamless integration capabilities. Ultimately, it offers a robust and economical solution for sharing personal content.

INTRODUCTION

This case study walks you through creating a personal blog on AWS, offering a dependable and scalable method for sharing your ideas and stories online. It covers setting up a blog hosted on an EC2 instance, with images and static files served from an S3 bucket. By following these instructions, you'll configure your AWS environment, install and configure a web server, set up an S3 bucket, and deploy a basic HTML website. Geared towards individuals with basic web development and server management skills, this project provides practical exposure to AWS's robust and effective infrastructure.

SET UP THE AWS ENVIRONMENT

Establishing the AWS environment marks the initial phase in hosting a personal blog on an EC2 instance while serving static files from an S3 bucket. This involves creating an IAM role and launching an EC2 instance.

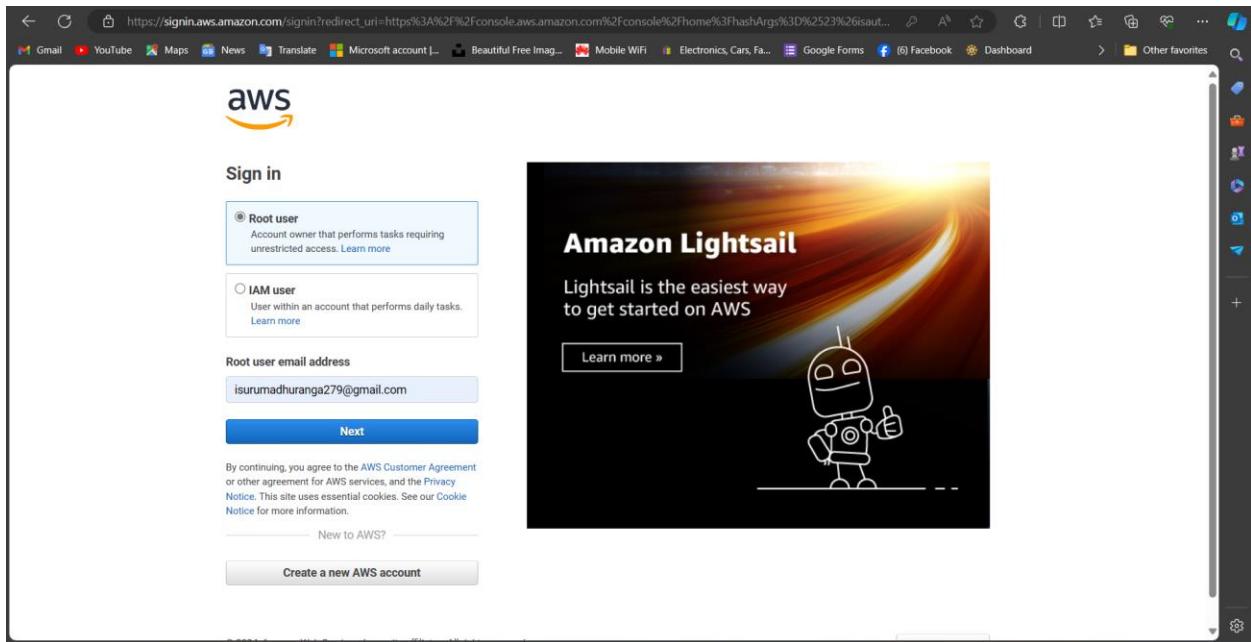
IAM assumes a pivotal role in securely managing access to AWS services and resources. Crafting an IAM role tailored for EC2 instances ensures the instance possesses the requisite permissions to interact with other AWS services, notably S3. This role facilitates EC2 instance access to the S3 bucket housing static files like images.

The launch of an EC2 instance forms the bedrock for hosting the web server responsible for serving the personal blog. Users navigate the AWS Management Console to select the desired Amazon Machine Image (AMI) and instance type, configure security settings, and specify additional details, including IAM role assignments. Configuring security groups is vital to permit inbound traffic on port 80 (HTTP) for web traffic and port 22 (SSH) for remote access.

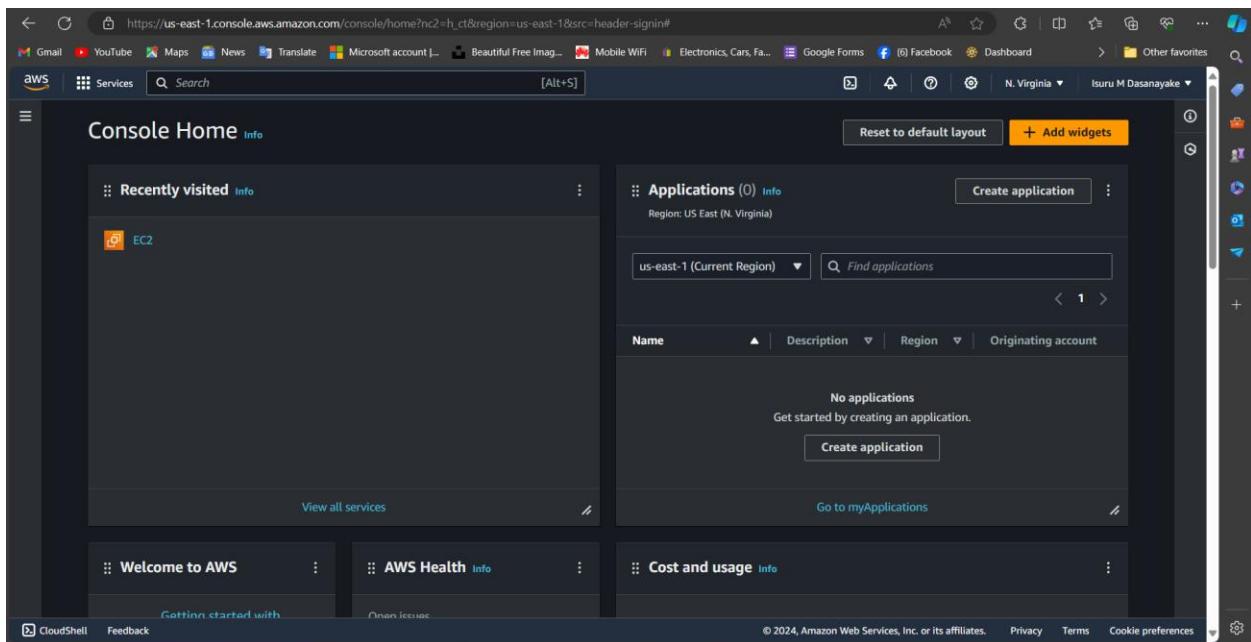
By adeptly setting up the AWS environment, users establish a secure and scalable groundwork for hosting their personal blog, setting the stage for subsequent steps like web server installation, configuration, and S3 bucket setup.

01. SET UP THE AWS ENVIRONMENT

• Create AWS Environment



1.0 Sign In to AWS



1.01 Console Home

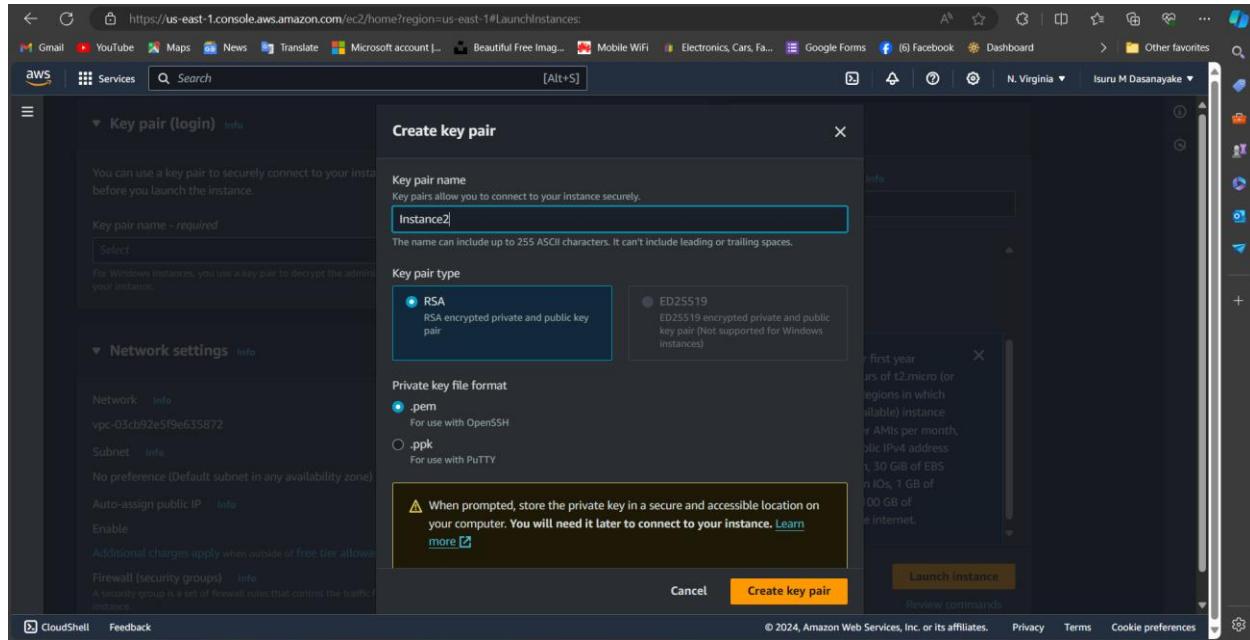
- Launch an EC2 instance

The screenshot shows the AWS EC2 Dashboard. On the left, there's a sidebar with navigation links for EC2 Dashboard, Events, Console-to-Code, Instances, Images, Elastic Block Store, and CloudShell. The main area has a "Resources" section showing counts for Instances (running), Auto Scaling Groups, Dedicated Hosts, Elastic IPs, Instances, Key pairs, Load balancers, Placement groups, Security groups, Snapshots, and Volumes. Below this is a "Launch instance" section with a "Launch instance" button and a "Migrate a server" option. To the right is a "Service health" section for AWS Health Dashboard, showing the US East (N. Virginia) region is operating normally. Further right is an "EC2 Free Tier" section with information about offers and usage, and an "Offer usage (monthly)" section for EBS storage. At the bottom right are links for Privacy, Terms, and Cookie preferences.

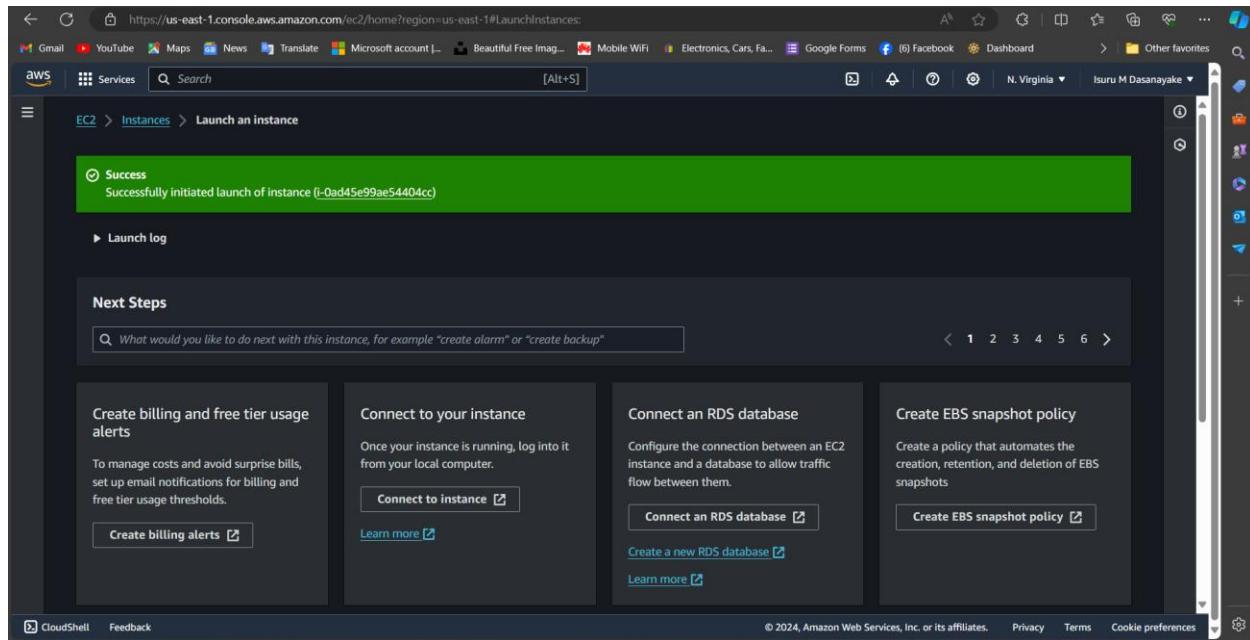
1.02 Figures EC2 Dashboard

The screenshot shows the "Launch an instance" wizard. Step 1: Set instance details. It asks for the number of instances (1), virtual server type (t2.micro), and storage (1 volume(s) - 8 GiB). A tooltip for the t2.micro instance type is open, explaining it includes 750 hours of usage per month. At the bottom are "Cancel", "Launch instance", and "Review commands" buttons.

1.03 Figures launch an instance



1.04 Figures Create Key pair



1.05 Figures Successfully Launch Instance

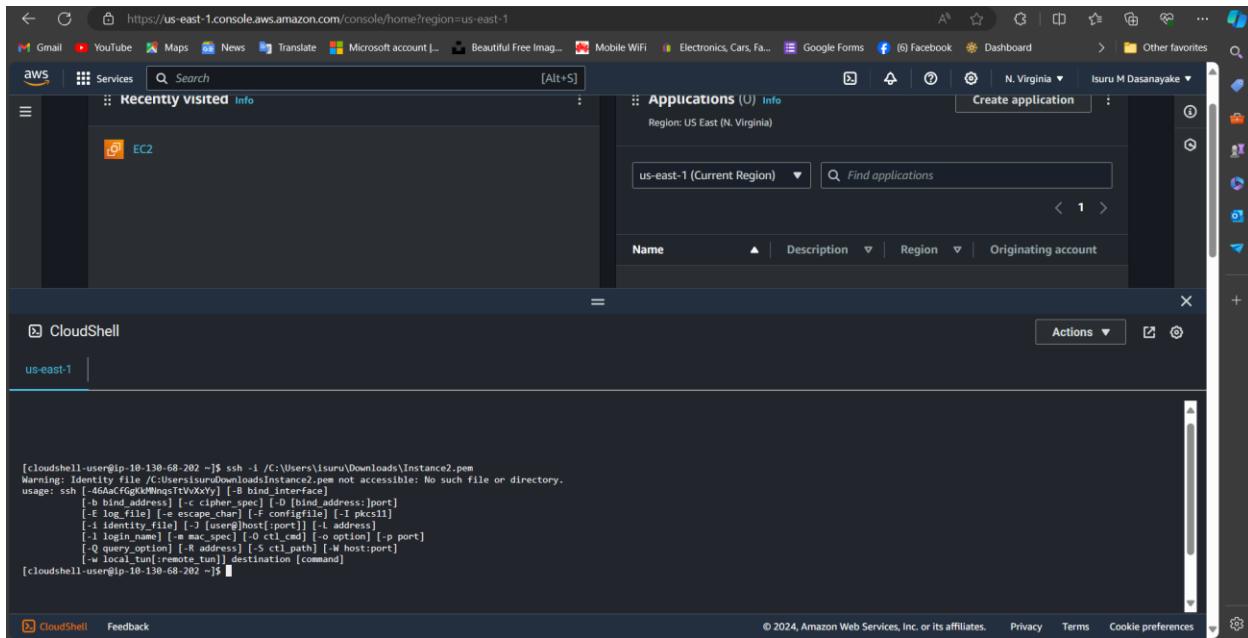
INSTALL A WEB SERVER- APACHE

Installing a web server is a vital stage in configuring your personal blog on an AWS EC2 instance, and for this project, Apache, a widely used and dependable web server, will be employed. Upon launching and connecting to your EC2 instance via SSH, the initial task involves updating the package lists to ensure all software is current, accomplished with the command ‘sudo yum update –y’. Subsequently, installing Apache is a straightforward process with ‘sudo yum install httpd –y’. Once installed, initiating the web server is achieved by starting the Apache service with ‘sudo systemctl start httpd’, enabling it to serve web pages. To ensure Apache automatically starts on boot, ‘sudo systemctl enable httpd’ is executed.

Validating the Apache installation is crucial to confirm the correct setup and operation of the web server. This entails accessing the public IP address of the EC2 instance in a web browser. If Apache is correctly installed and operational, the default Apache test page will be displayed, indicating readiness to host the blog. This stage establishes the core capability of the EC2 instance to deliver web content, paving the way for deploying the HTML website and integrating with the S3 bucket for static file storage.

INSTALL A WEB SERVER- APACHE

- Connect to EC2 instance via SSH

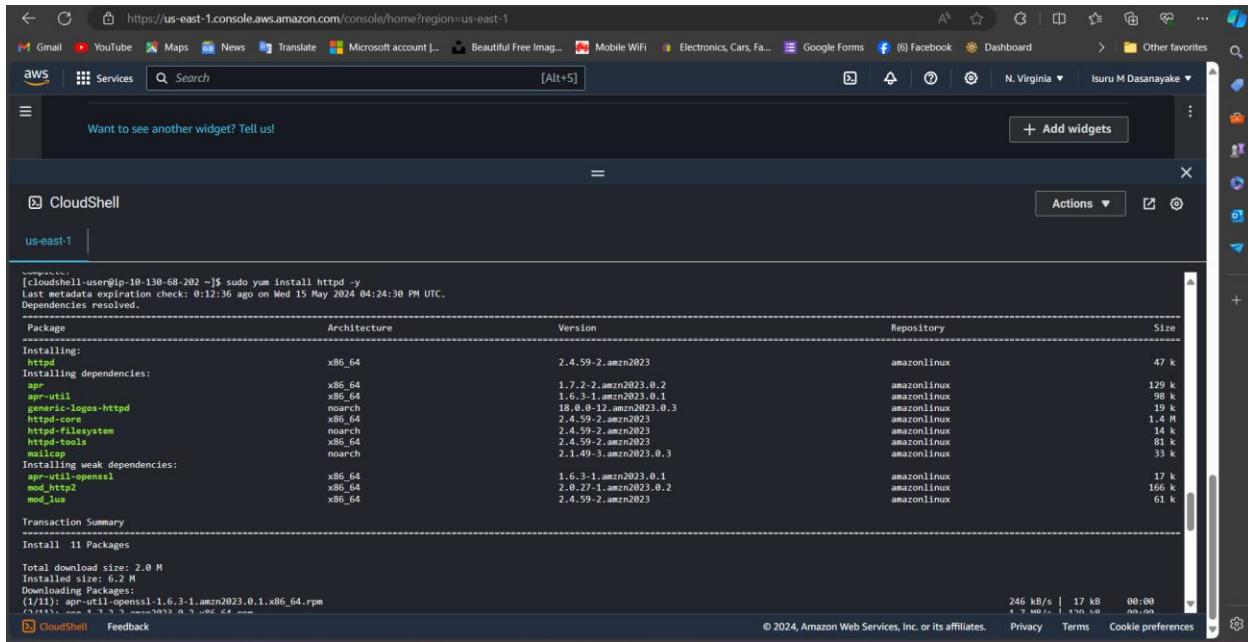


The screenshot shows the AWS CloudShell interface. On the left, there's a sidebar with 'Recently visited' and 'CloudShell' sections. The main area shows an SSH session to an EC2 instance. The terminal window displays the following command and its usage:

```
[cloudshell-user@ip-10-130-68-202 ~]$ ssh -i /C/Users\Isuru\Downloads\Instance2.pem
Warning: Identity file /C/Users\Isuru\Downloads\Instance2.pem not accessible: No such file or directory.
usage: ssh [-i bind_address] [-c cipher_spec] [-D [bind_address:]port]
           [-E log_file] [-e escape_char] [-F configfile] [-I pkcs11]
           [-l identity_file] [-J [user@]host[:port]] [-L address]
           [-l login_name] [-m spec] [-o option] [-R [bind_address]:[port]
           [-Q [bind_address]:[port]] [-S socket] [-s c11_path] [-W host[:port]
           [-w local_tun[:remote_tun]] destination [command]
```

At the bottom of the terminal, it says '[cloudshell-user@ip-10-130-68-202 ~]\$'. The status bar at the bottom right indicates the session is connected to 'us-east-1'.

1.06 Figures CloudShell Amazon Linux



The screenshot shows the AWS CloudShell interface. The terminal window displays the following command:

```
[cloudshell-user@ip-10-130-68-202 ~]$ sudo yum install httpd -y
```

Output from the command:

```
Last metadata expiration check: 0:12:36 ago on Wed 15 May 2024 04:24:30 PM UTC.
Dependencies resolved.
=====
Transaction Summary
=====
Install  11 Packages
```

Table showing package details:

Package	Architecture	Version	Repository	Size
<hr/>				
Installing:	x86_64	2.4.59-2.amzn2023	amazonlinux	47 k
Installing dependencies:	x86_64	1.7.2-2.amzn2023.0.2	amazonlinux	129 k
	x86_64	1.6.3-1.amzn2023.0.1	amazonlinux	98 k
	x86_64	18.1.1-1.amzn2023.0.3	amazonlinux	19 k
httpd-core	x86_64	2.4.59-2.amzn2023.0.3	amazonlinux	3.4 M
httpd-fs	x86_64	2.4.59-2.amzn2023	amazonlinux	14 k
httpd-tools	x86_64	2.4.59-2.amzn2023	amazonlinux	81 k
mailcap	x86_64	2.1.49-3.amzn2023.0.3	amazonlinux	33 k
Installing weak dependencies:	x86_64	1.6.3-1.amzn2023.0.1	amazonlinux	17 k
apr-util-pcre	x86_64	2.0.27-1.amzn2023.0.2	amazonlinux	166 k
mod_dhttp2	x86_64	2.4.59-2.amzn2023	amazonlinux	61 k
mod_lua	x86_64			

Transaction Summary

Total download size: 2.0 M

Installed size: 6.2 M

Downloading Packages:

(1/1) apr-util-pcre-1.6.3-1.amzn2023.0.1.x86_64.rpm

246 kB/s | 17 kB 00:00

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1.07 Figures Transaction Summary

```
https://us-east-1.console.aws.amazon.com/console/home?region=us-east-1
Gmail YouTube Maps News Translate Microsoft account |... Beautiful Free Imag... Mobile WiFi Electronics, Cars, Fa... Google Forms Facebook Dashboard > Other favorites
aws Services Search [Alt+S] N. Virginia Isuru M Dasanayake ...
Want to see another widget? Tell us! + Add widgets :
CloudShell Actions ▾
us-east-1
CloudShell
Last metadata expiration check: 0:12:36 ago on Wed 15 May 2024 04:24:30 PM UTC.
Dependencies resolved.
----  

Package           Architecture      Version          Repository      Size
Installing:
httpd             x86_64           2.4.59-2.amzn2023
Installing dependencies:
apr               x86_64           1.7.2-2.amzn2023.0.2
apr-util          x86_64           1.6.3-1.amzn2023.0.1
generic-logging-httd noarch          18.0.12.amzn2023.0.3
httpd             x86_64           2.4.59-2.amzn2023
httpd-fs-system   noarch          2.4.59-2.amzn2023
httpd-tools       x86_64           2.4.59-2.amzn2023
mailcap           noarch          2.1.49-3.amzn2023.0.3
Installing weak dependencies:
apr-util-openssl x86_64           1.6.3-1.amzn2023.0.1
mod_http2         x86_64           2.0.27-1.amzn2023.0.2
mod_uwsgi        x86_64           2.4.59-2.amzn2023
Transaction Summary
Install 11 Packages

Total download size: 2.0 M
Installed size: 6.2 M
Downloading Packages:
(1/11): apr-util-openssl-1.6.3-1.amzn2023.0.1.x86_64.rpm 246 kB/s | 17 kB 00:00
  100% 0.1 MB/s 0% 0.00
```

1.08 Figures Install httpd

CONFIGURE THE S3 BUCKET

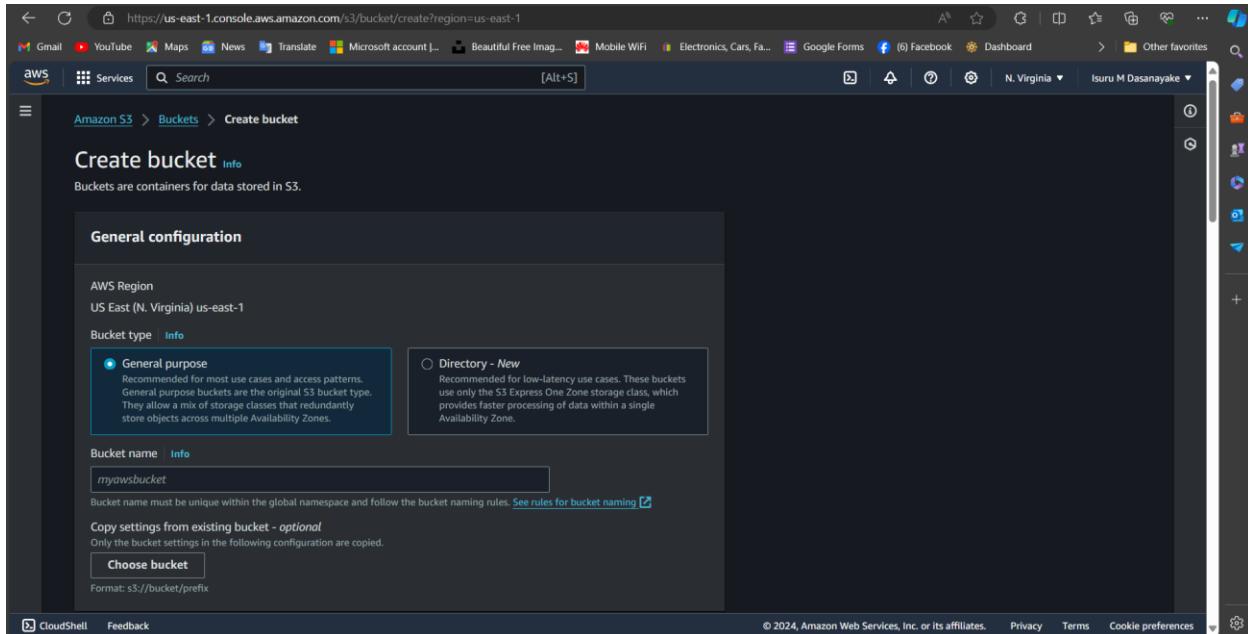
Setting up the S3 bucket is a crucial step in establishing your personal blog, facilitating efficient storage and retrieval of static files like images. Begin by logging into the AWS Management Console and accessing the S3 service. Initiate the creation of a new bucket by clicking the "Create bucket" button, where you'll specify a unique name and select the region that aligns with your requirements. Generally, sticking to default settings is advisable unless specific needs for versioning or logging arise. Upon bucket creation, you'll have a secure and scalable storage solution primed for integration with your EC2 instance.

Once the bucket is established, proceed to upload your static files. Navigate to the newly created bucket, then utilize the "Upload" button to add images and other static content. You can opt to drag and drop files or use the file picker to select them from your local system. Following the upload, each file will possess a unique URL, essential for embedding them in your HTML code. For instance, a file named `profile.jpg` uploaded to the bucket will sport a URL structured as `https://your-bucket-name.s3.amazonaws.com/profile.jpg`, enabling efficient content delivery.

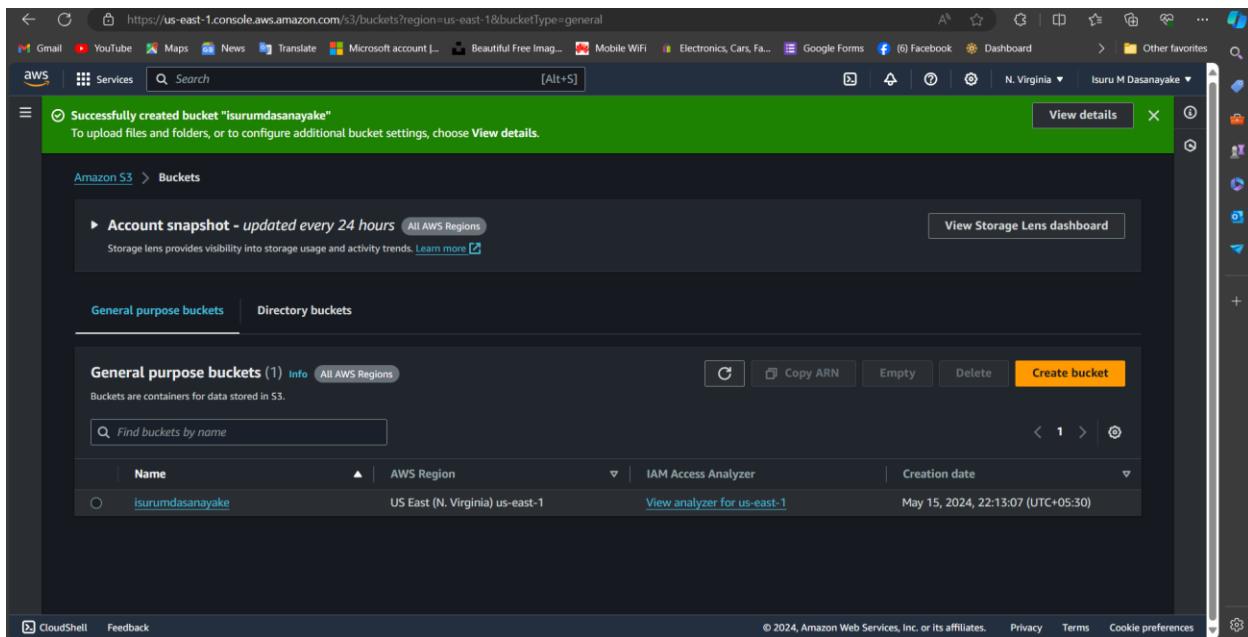
To render your static files publicly accessible, adjust the bucket's permissions. Navigate to the "Permissions" tab of your S3 bucket and configure settings to allow public read access to the files. This can be executed by tweaking the bucket policy or utilizing the S3 console to set appropriate permissions. Exercise caution with these settings to expose only necessary components for your website. Once permissions are configured, your static files will be reachable via their URLs, seamlessly integrating into your HTML website hosted on the EC2 instance. This setup harnesses AWS S3's scalability and cost-effectiveness for static file delivery.

CONFIGURE THE S3 BUCKET

● Create an S3 bucket



1.09 Create S3 Bucket



1.10 Figures General Purpose Bucket

The screenshot shows the AWS S3 console interface. At the top, the URL is https://us-east-1.console.aws.amazon.com/s3/buckets/isurumdasanayake?region=us-east-1&bucketType=general&tab=objects. The page title is 'Amazon S3 > Buckets > isurumdasanayake'. Below the title, there are tabs for Objects, Properties, Permissions, Metrics, Management, and Access Points. The 'Objects' tab is selected. A sub-header 'Objects (0) Info' is shown with a 'Copy S3 URI' button. Below this is a search bar labeled 'Find objects by prefix'. A table header row includes columns for Name, Type, Last modified, Size, and Storage class. A message 'No objects' indicates that the bucket currently contains no files. At the bottom of the table area is a large 'Upload' button.

1.11 Figures Upload file in Bucket

- Upload required image/s

The screenshot shows the AWS S3 upload confirmation page. The URL is https://us-east-1.console.aws.amazon.com/s3/upload/isurumdasanayake?region=us-east-1&bucketType=general. The main message is 'Upload succeeded' with a green circular icon. Below it, a note says 'The information below will no longer be available after you navigate away from this page.' A 'Summary' section shows the destination as s3://isurumdasanayake, with one succeeded file (1 file, 12.7 MB) and zero failed files (0 files, 0 B). The 'Files and folders' tab is selected, showing a table with one entry: 'IMG_9865.c...' (image/jpeg, 12.7 MB, Succeeded). The table has columns for Name, Folder, Type, Size, Status, and Error.

1.12 Figures Upload succeeded in Bucket

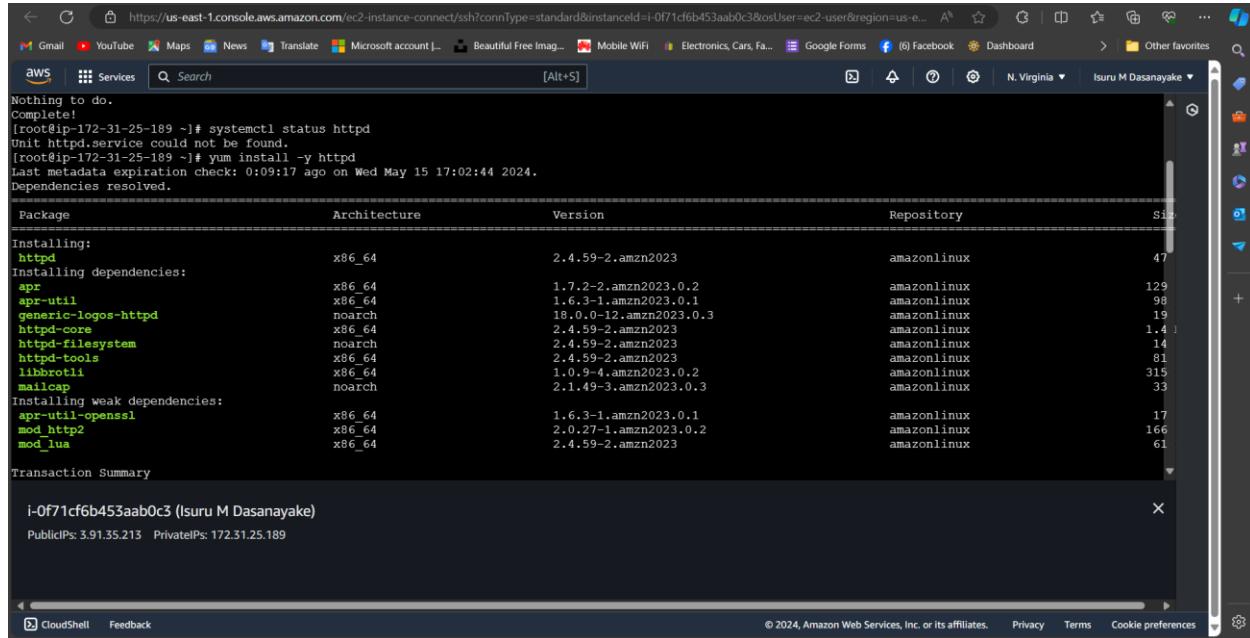
CREATE AND DEPLOY THE WEBSITE

Developing and deploying the website entails crafting HTML content and ensuring it's accurately hosted on the EC2 instance, with static assets linked from the S3 bucket. Begin by establishing an SSH connection to your EC2 instance and navigating to the Apache root directory, typically located at `/var/www/html`. Within this directory, create your primary HTML file, such as `index.html`, employing a text editor like `nano`. Within this HTML file, structure your webpage, incorporating images and other static content using the URLs provided by your S3 bucket. For instance, you may include an image using a tag like `![Profile Picture](https://my-personal-blog-bucket.s3.amazonaws.com/profile.jpg)`.

Once the HTML content is composed, save the file and ensure it's appropriately positioned in the Apache root directory. This placement guarantees that when users visit your EC2 instance's public IP address, the server serves the correct HTML content. To confirm the deployment, launch a web browser and enter the public IP address of your EC2 instance. If everything is configured accurately, your personal blog should load, showcasing the HTML content and images stored in the S3 bucket. This stage concludes the deployment process, rendering your blog publicly accessible and showcasing the seamless integration of AWS services for delivering a dynamic and scalable web application.

CREATE AND DEPLOY THE WEBSITE

- Create the HTML file on the EC2 instance



```
Nothing to do.
Complete!
[root@ip-172-31-25-189 ~]# systemctl status httpd
Unit httpd.service could not be found.
[root@ip-172-31-25-189 ~]# yum install -y httpd
Last metadata expiration check: 0:09:17 ago on Wed May 15 17:02:44 2024.
Dependencies resolved.

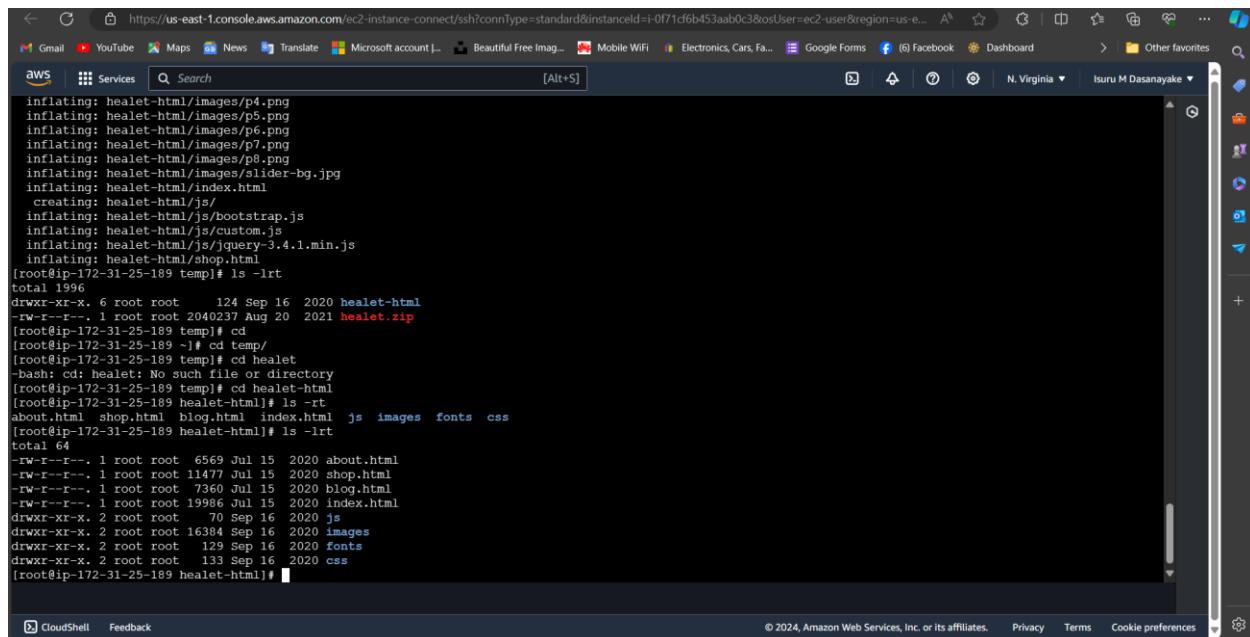
Transaction Summary
i-Of71cf6b453aab0c3 (Isuru M Dasanayake)
Public IPs: 3.91.35.213 Private IPs: 172.31.25.189

Package          Architecture Version      Repository   Size
httpd           x86_64      2.4.59-2.amzn2023 amazonlinux 47
apr             x86_64      1.7.2-2.amzn2023.0.2 amazonlinux 129
apr-util        x86_64      1.6.3-1.amzn2023.0.1 amazonlinux 98
generic-logos-httd noarch      18.0.0-12.amzn2023.0.3 amazonlinux 19
httpd-core      x86_64      2.4.59-2.amzn2023 amazonlinux 14
httpd-filesystem noarch      2.4.59-2.amzn2023 amazonlinux 14
httpd-tools     x86_64      2.4.59-2.amzn2023 amazonlinux 81
libbrotli       x86_64      1.0.9-4.amzn2023.0.2 amazonlinux 315
mailcap         noarch      2.1.49-3.amzn2023.0.3 amazonlinux 33
Installing weak dependencies:
apr-util-openssl x86_64      1.6.3-1.amzn2023.0.1 amazonlinux 17
mod_http2       x86_64      2.0.27-1.amzn2023.0.2 amazonlinux 166
mod_lua          x86_64      2.4.59-2.amzn2023 amazonlinux 61

Transaction Summary
i-Of71cf6b453aab0c3 (Isuru M Dasanayake)
Public IPs: 3.91.35.213 Private IPs: 172.31.25.189

CloudShell Feedback
```

1.13 Figures Yum Update -y



```
inflating: healet-html/images/p4.png
inflating: healet-html/images/p5.png
inflating: healet-html/images/p6.png
inflating: healet-html/images/p7.png
inflating: healet-html/images/p8.png
inflating: healet-html/images/slider-bg.jpg
inflating: healet-html/index.html
creating: healet-html/js/
inflating: healet-html/js/bootstrap.js
inflating: healet-html/js/custom.js
inflating: healet-html/js/jquery-3.4.1.min.js
inflating: healet-html/shop.html
[root@ip-172-31-25-189 temp]# ls -lrt
total 1996
drwxr-xr-x  6 root root  124 Sep 16 2020 healet-html
-rw-r--r--  1 root root 2040237 Aug 20 2021 healet.zip
[root@ip-172-31-25-189 temp]# cd
[root@ip-172-31-25-189 temp]# cd temp/
[root@ip-172-31-25-189 temp]# cd healet
-bash: cd: healet: No such file or directory
[root@ip-172-31-25-189 temp]# cd healet-html
[root@ip-172-31-25-189 healet-html]# ls -lrt
about.html  shop.html  blog.html  index.html  js  images  fonts  css
[root@ip-172-31-25-189 healet-html]# ls -lrt
total 64
-rw-r--r--  1 root root 6569 Jul 15 2020 about.html
-rw-r--r--  1 root root 11477 Jul 15 2020 shop.html
-rw-r--r--  1 root root 7360 Jul 15 2020 blog.html
-rw-r--r--  1 root root 19986 Jul 15 2020 index.html
drwxr-xr-x  2 root root  70 Sep 16 2020 js
drwxr-xr-x  2 root root 16384 Sep 16 2020 images
drwxr-xr-x  2 root root  129 Sep 16 2020 fonts
drwxr-xr-x  2 root root  133 Sep 16 2020 css
[root@ip-172-31-25-189 healet-html]#
```

1.14 Figures Unzip Zip folder

```

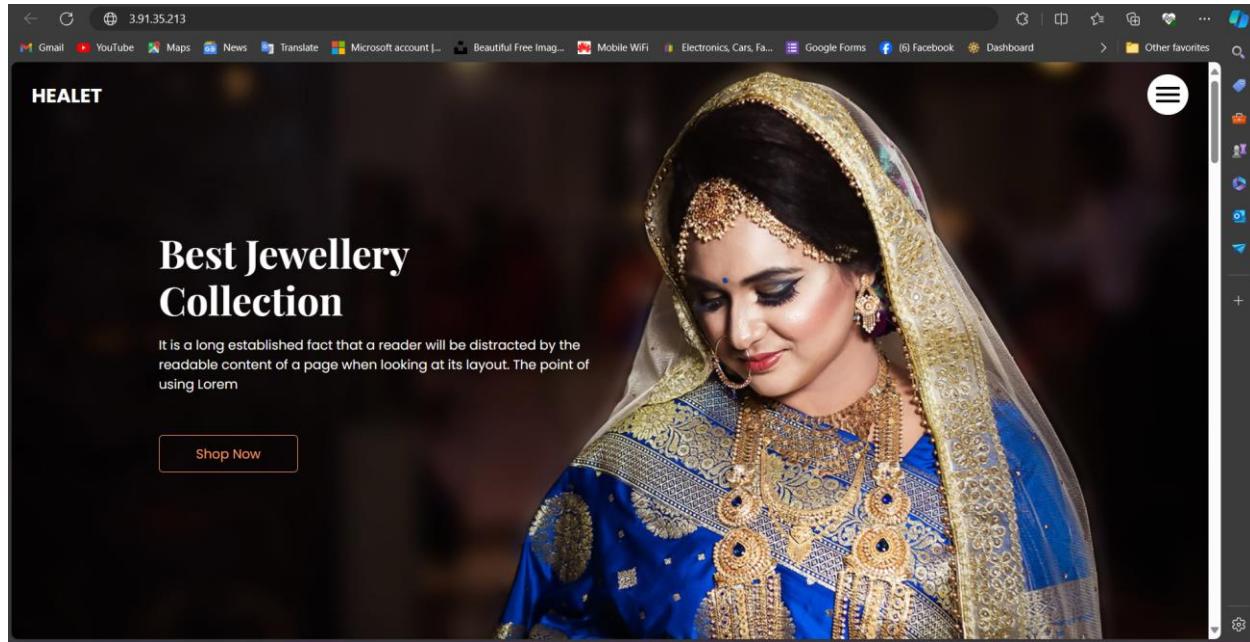
-rw-r--r--. 1 root root 19986 Jul 15 2020 index.html
drwxr-xr-x. 2 root root 70 Sep 16 2020 js
drwxr-xr-x. 2 root root 16384 Sep 16 2020 images
drwxr-xr-x. 2 root root 129 Sep 16 2020 fonts
drwxr-xr-x. 2 root root 133 Sep 16 2020 css
[root@ip-172-31-25-189 html]# systemctl status httpd
● httpd.service - The Apache HTTP Server
    Loaded: loaded (/usr/lib/systemd/system/httpd.service; disabled; preset: disabled)
      Active: inactive (dead)
        Docs: man:httpd.service(8)
[root@ip-172-31-25-189 html]# systemctl enable httpd
Created symlink /etc/systemd/system/multi-user.target.wants/httpd.service → /usr/lib/systemd/system/httpd.service.
[root@ip-172-31-25-189 html]# systemctl start httpd
[root@ip-172-31-25-189 html]# systemctl status httpd
● httpd.service - The Apache HTTP Server
    Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; preset: disabled)
      Active: active (running) since Wed 2024-05-15 17:31:55 UTC; 8s ago
        Docs: man:httpd.service(8)
       Main PID: 26741 (httpd)
          Status: "Started, listening on: port 80"
             Tasks: 177 (limit: 1114)
            Memory: 12.9M
              CPU: 68ms
            CGroup: /system.slice/httpd.service
                    ├─26741 /usr/sbin/httpd -DFOREGROUND
                    ├─26742 /usr/sbin/httpd -DFOREGROUND
                    ├─26743 /usr/sbin/httpd -DFOREGROUND
                    ├─26744 /usr/sbin/httpd -DFOREGROUND
                    └─26745 /usr/sbin/httpd -DFOREGROUND

May 15 17:31:55 ip-172-31-25-189.ec2.internal systemd[1]: Starting httpd.service - The Apache HTTP Server...
May 15 17:31:55 ip-172-31-25-189.ec2.internal systemd[1]: Started httpd.service - The Apache HTTP Server.
May 15 17:31:55 ip-172-31-25-189.ec2.internal httpd[26741]: Server configured, listening on: port 80
[root@ip-172-31-25-189 html]#

```

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1.15 Figures Unzipping Zip folder



1.16 Figures Created Web Site