Project proposal NSSA-712

Deploying an End to End Website on AWS

Group members:

Bashair Algarni - Zaki Bawade

Rochester Institute of Technology

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INTRODUCTION:

"AWS or Amazon Web Services is one of the most reliable and well-known cloud computing platforms in the world. It comprises a wide array of storage, database, computation, content delivery, mobile, and other services. It's a great process to host simple websites in addition to the complex Web or mobile applications in the cloud.

AWS helps you save money, workforce, and time compared to building and maintaining more traditional systems as it is very safe and secure. Amazon Web Services provides numerous advantages for IT firms and developers alike, such as cost-effectiveness as we only have to pay for what we use, as we use it. Besides, it is comprehensive, dependable, resilient, and secure. Flexibility enables us to create applications using any programming model and platform you want or need.

Amazon EC2 is a computing web service of AWS that provides instances which are nothing but virtual machines. It is very reliable, scalable, secure, flexible, and easy to use. It is also integrated with other web services of AWS. It allows you to pay for only the computing capacity you use. You are also able to choose the amount of RAM you require and the quantity of CPU you need[3]".

"Amazon Simple Storage Service (Amazon S3) is a scalable storage service offered by AWS. It stores files in the form of objects, and each object can be of size 5 TB maximum[2]. IAM AWS Identity and Access Management (IAM) helps you manage access for resources and users in your AWS ecosystem. It helps you dynamically give granular access to AWS resources[2].

Amazon RDS is a 'managed' relational database service; i.e., it is a service that can manage relational databases for you. It can do various automated tasks, such as doing security patches, backups, etc." [2].

This project's main objective is to get a better understanding of how to deploy end to end website using AWS "and utilizing different cloud computing services to acquire high performance with less cost. Amazon EC2 is used here since it is very popular in providing good cloud computing services. This report shows step by step the procedure of using the AWS Marketplace to provision and produce a new AWS Cloud server.[3]"

LIT REVIEW:

"Amazon EC2 sets a new perspective and standard for hosting websites. Letting developers scale their numerous machines up or down within minutes presents the capability to innovate distributed and scalable applications that keep running in the cloud. EC2 is secure, reliable, flexible, and most of all, it is cheap. You only pay for the assets you use; you can offer your multi-server application for sale to the public a lot less expensive than at any other time and keep up an incredibly significant value and accessibility level.EC2 is the computing part of the services provided by Amazon. EC2 provides the memory, CPU, transient storage, and operating system. EC2 is the equivalent of a barebones PC. You get the chance to choose from the quantity of CPUs you require (from a string of given options), the quantity of transient storage you require (from a rundown of options), and the measure of RAM you need (from a predefined list of arrangements). You get a choice of different kinds of operating system such as Microsoft Windows, Solaris, or Linux Server. The basis of EC2 is the Amazon Machine Image (AMI). An AMI is a virtual machine with your chosen operating system and applications packaged together. You can make your very own AMIs without any preparation if you need to. Amazon offers several open AMIs with pre-installed applications and many operating systems" [3].

"Amazon S3 (Simple Storage Service) is an online storage service provided by Amazon [2]. The service for storing and retrieving data is available anywhere on the Web, at any

time. The scale continues to grow, and 2 trillion objects have been stored as of April 2013. When using Amazon EC2, S3 can be used for managing virtual machine images, templates, and backups" [4].

"Amazon Route 53 effectively connects user requests to infrastructure running in AWS – such as Amazon EC2 instances, Elastic Load Balancing load balancers, or Amazon S3 buckets – and can also be used to route users to infrastructure outside of AWS. You can use Amazon Route 53 to configure DNS health checks to route traffic to healthy endpoints or independently monitor your application's health and endpoints. Amazon Route 53 also offers Domain Name Registration – you can purchase and manage domain names such as example.com, and Amazon Route 53 will automatically configure DNS settings for your domains.[5]"

"Amazon Relational Database Service (Amazon RDS) makes it easy to set up, operate, and scale a relational database in the cloud. It provides cost-efficient and resizable capacity while automating time-consuming administration tasks such as hardware provisioning, database setup, patching, and backups. It frees you to focus on your applications so you can give them the fast performance, high availability, security, and compatibility they need." [6]

METHODOLOGY:

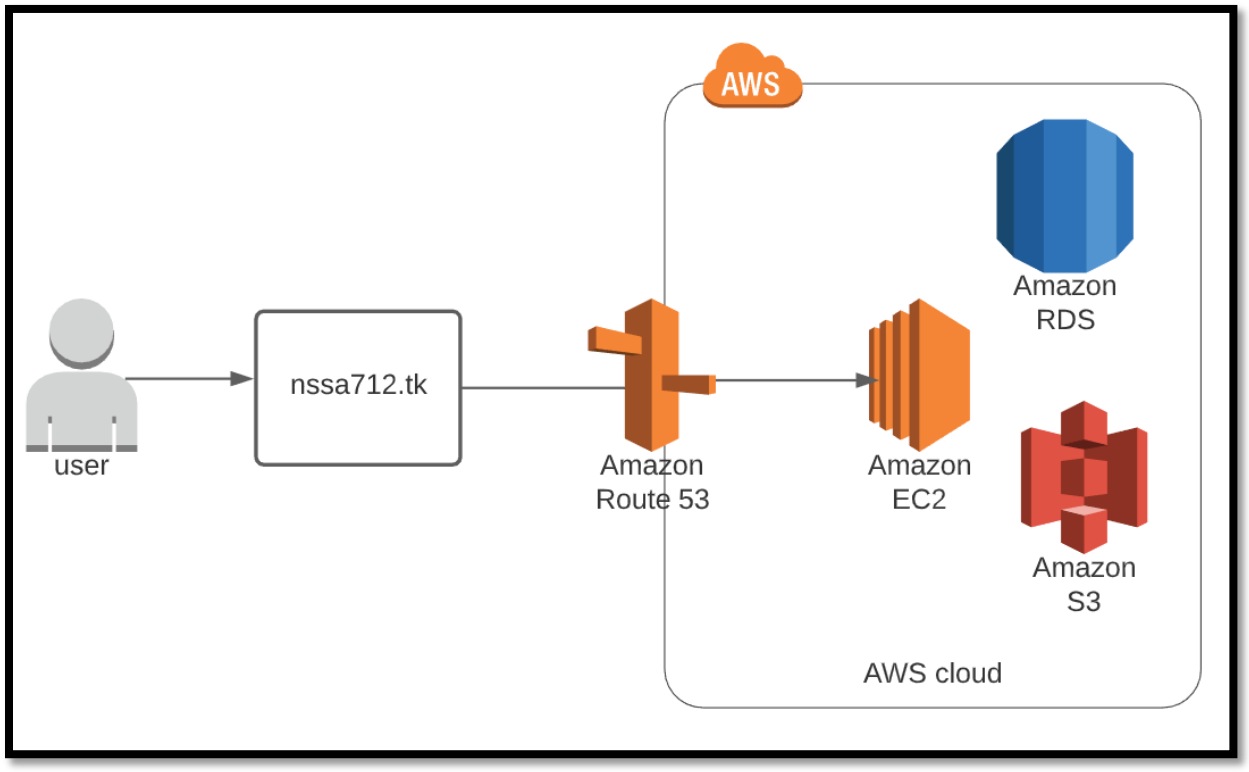
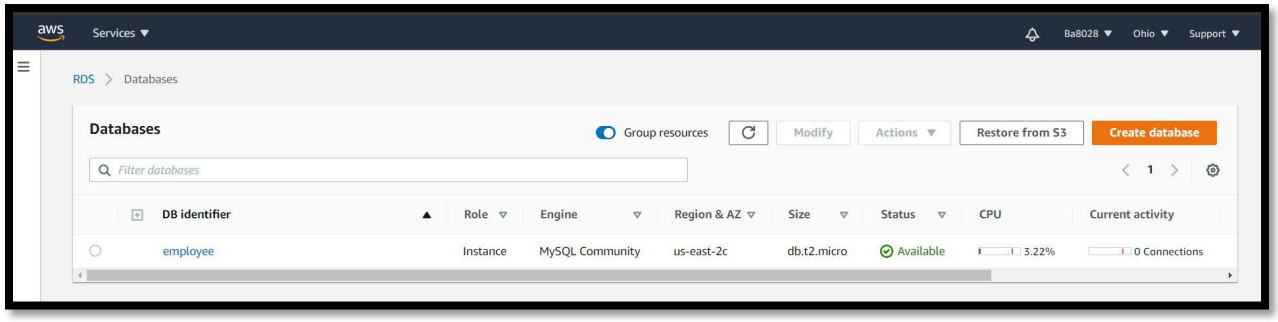


Fig1.The Project Architectures

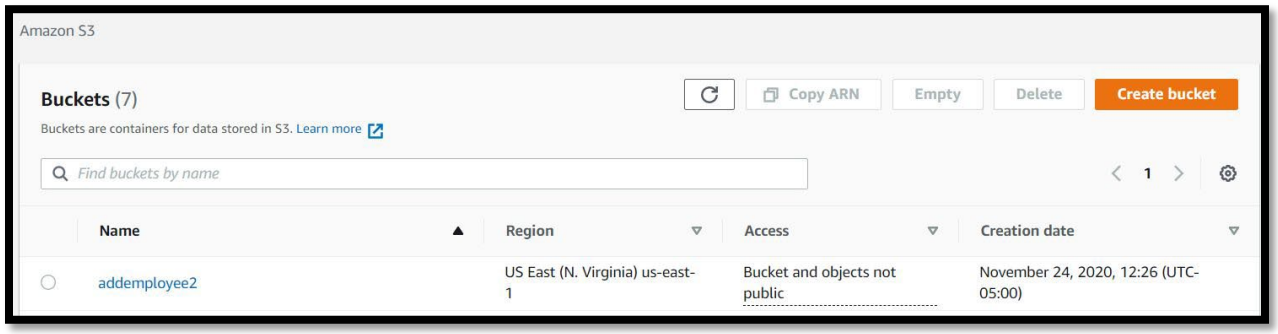
Below we have described the complete deployment of an end-to-end website on AWS using AWS S3, RDS, EC2, and Route 53 DNS service. The complete project uses AWS free tier and a domain naming website. From the above diagram, nssa712.tk is the name of the deployed website. Amazon Route S3 has the necessary zone file and provides reverse and forward lookups. EC2 instance hosts python code based website. Amazon RDS is the MYSQL database, and Amazon S3 is the storage where the files uploaded on the website are stored.

Steps to accomplish this project :

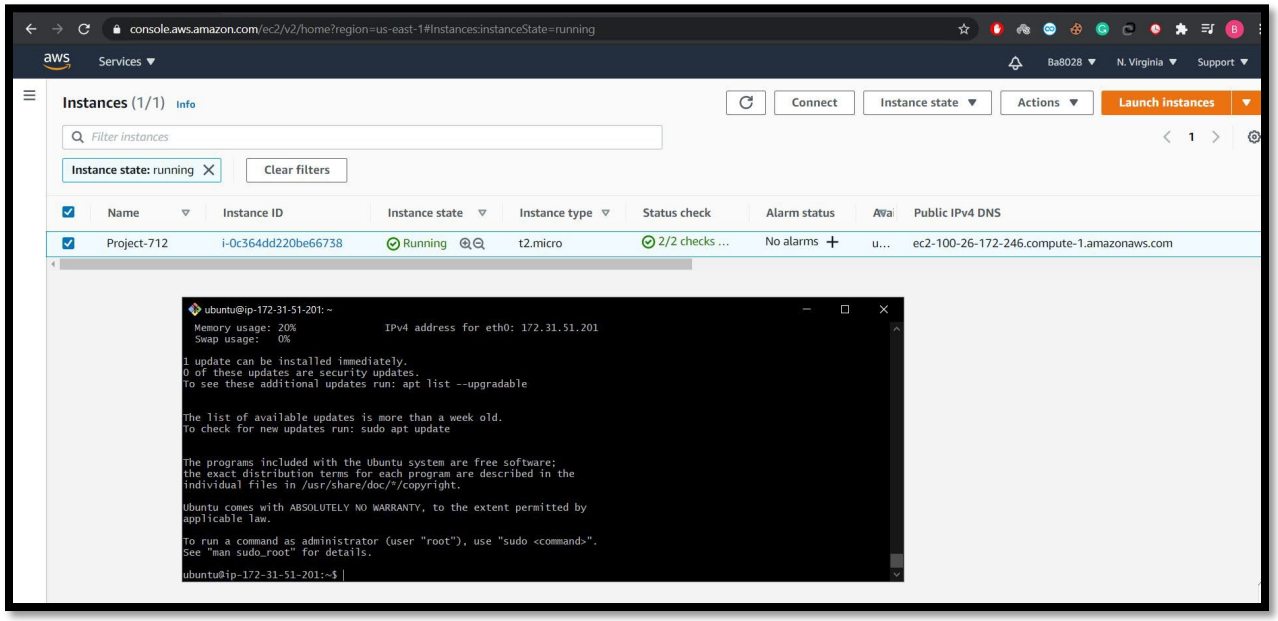
Step1: Deploy MySQL database on AWS using RDS



Step 2:Deploye S3 storage bucket



Step 3:Deploye EC2 instance



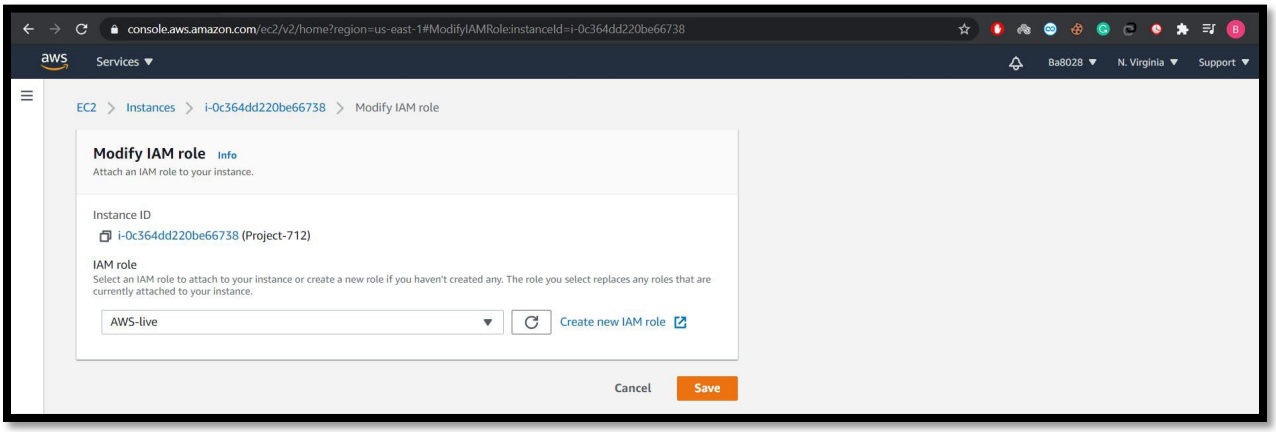
Step 4: Created Database Entries

```
mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| employee           |
| information_schema |
| mysql              |
| performance_schema |
+--------------------+
4 rows in set (0.01 sec)

mysql> create table employee(
    -> empid varchar(20),
    -> fname varchar(20),
    -> lname varchar(20),
    -> pri_skill varchar(20),
    -> location varchar(20));
ERROR 1046 (3D000): No database selected
mysql> create table employee ( empid varchar(20), fname varchar(20), lname varch
ar(20), pri_skill varchar(20), location varchar(20));
ERROR 1046 (3D000): No database selected
mysql> create table employee( empid varchar(20), fname varchar(20), lname varcha
r(20), pri_skill varchar(20), location varchar(20));
ERROR 1046 (3D000): No database selected
mysql> use employee
Database changed
mysql> create table employee( empid varchar(20), fname varchar(20), lname varcha
r(20), pri_skill varchar(20), location varchar(20));
Query OK, 0 rows affected (0.03 sec)

mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| employee           |
| information_schema |
| mysql              |
| performance_schema |
+--------------------+
4 rows in set (0.00 sec)

mysql> show employee;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that
corresponds to your MySQL server version for the right syntax to use near 'emplo
yee' at line 1
mysql> use employee
Database changed
mysql> show tables
    -> ;
+--------------------+
| Tables_in_employee |
+--------------------+
| employee           |
+--------------------+
1 row in set (0.00 sec)
```

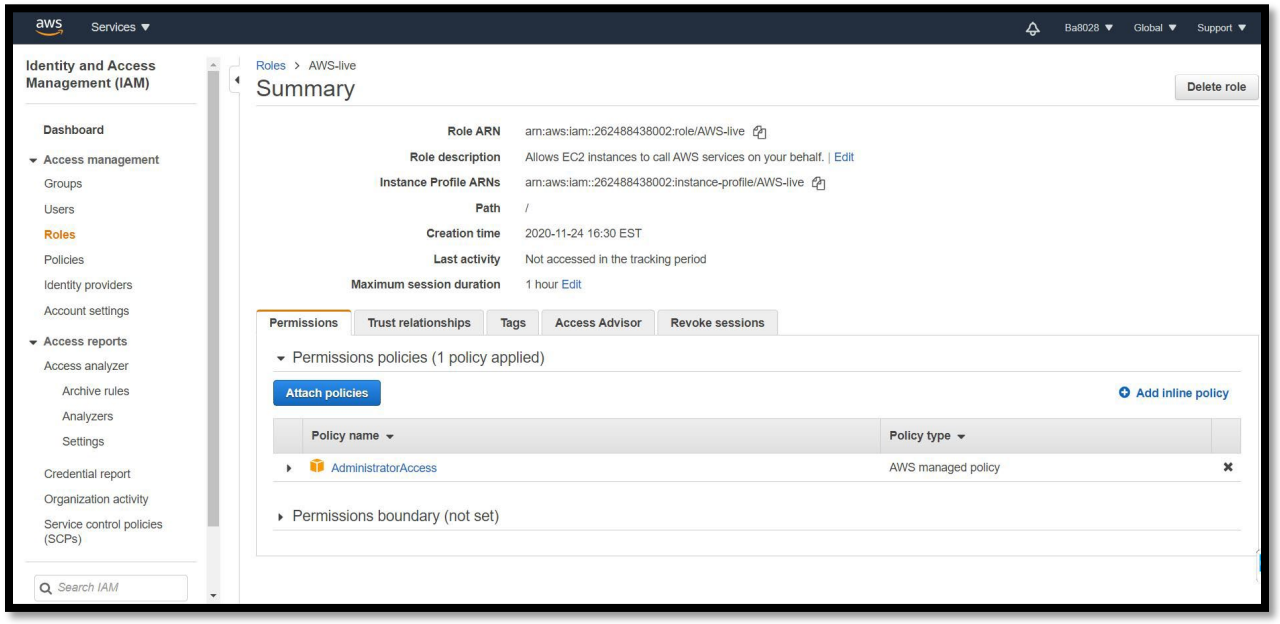
Step 5: Deployed website on EC2 instance

```
ubuntu@ip-172-31-51-201:~/aws-live$ sudo python3 EmpApp.py
 * Serving Flask app "EmpApp" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Running on http://0.0.0.0:80/ (Press CTRL+C to quit)
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 748-116-005
```

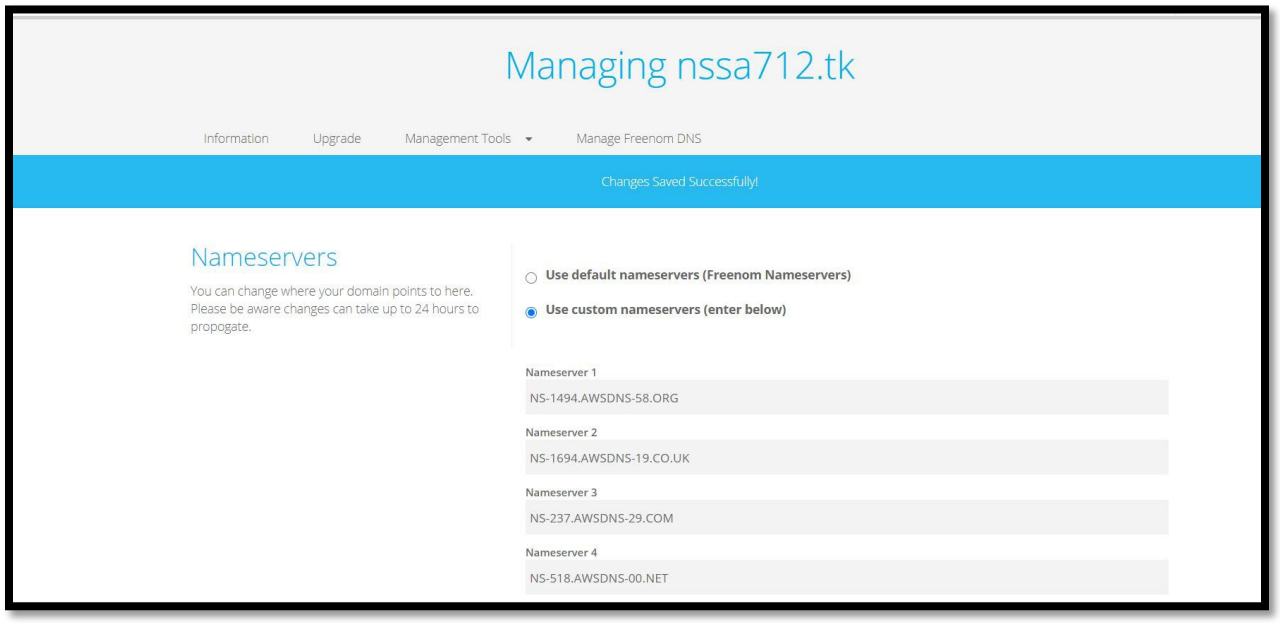
Step 6: Provide an IAM role to the EC2 instance



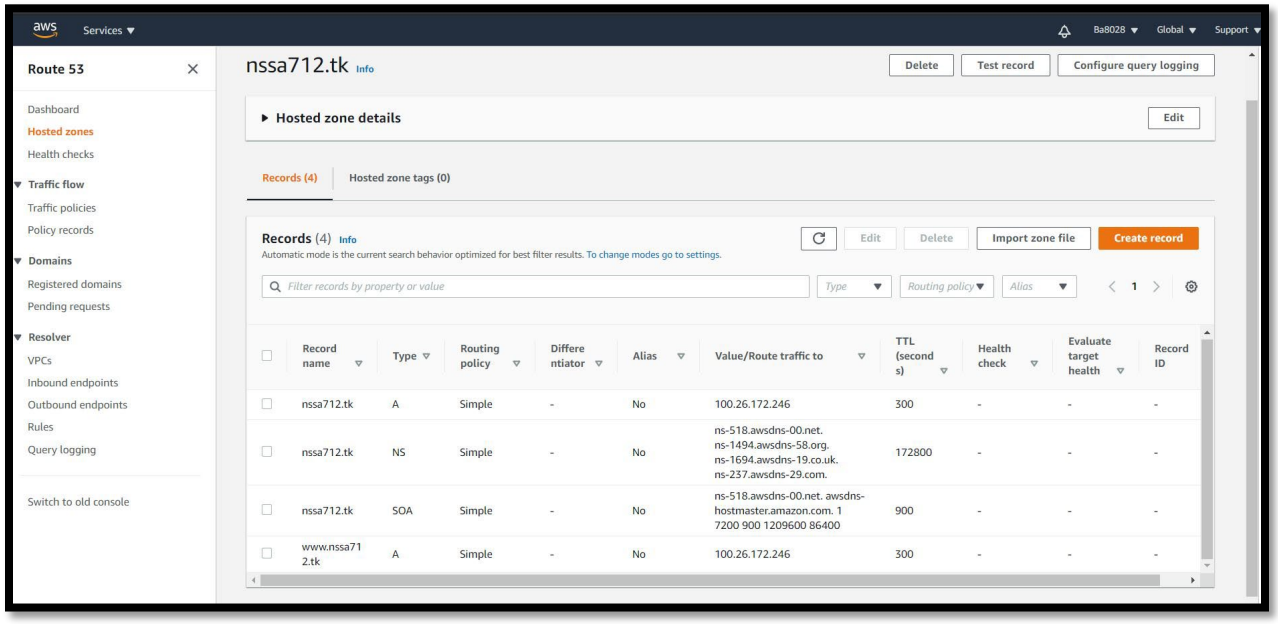
Step 7: Create an IAM role to access S3 from EC2



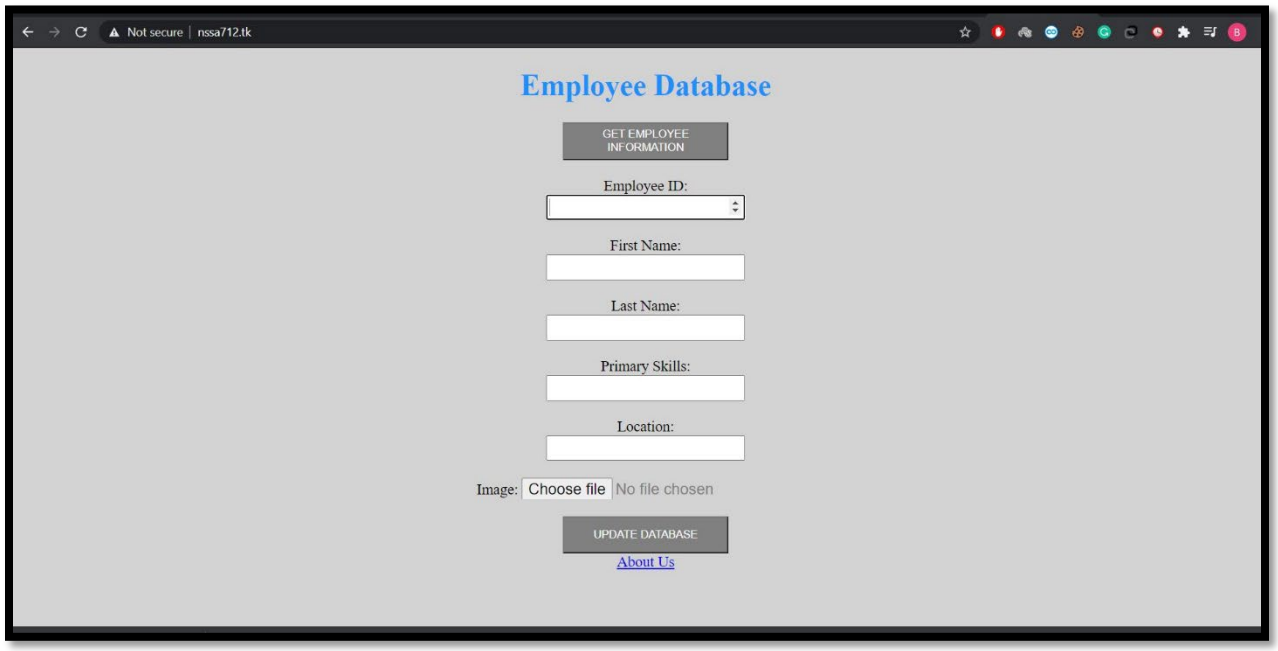
Step 8: Create a Domain Name



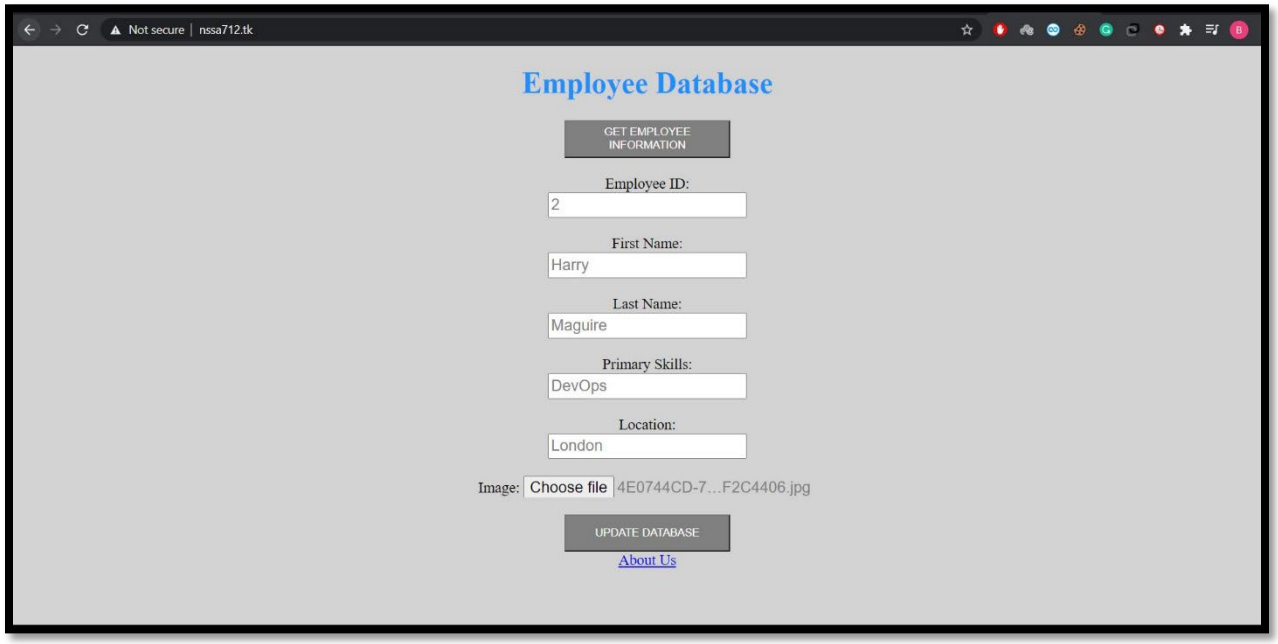
Step 9: Configure Route53



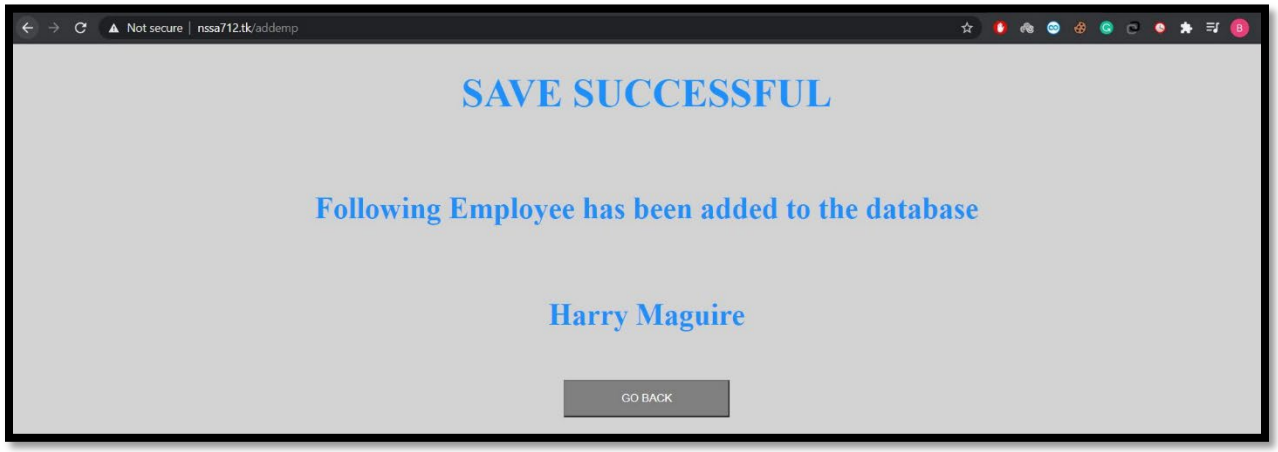
Step 10: Successfully deployed End to End Website on EC2



Step 11: Show the Form Entry :



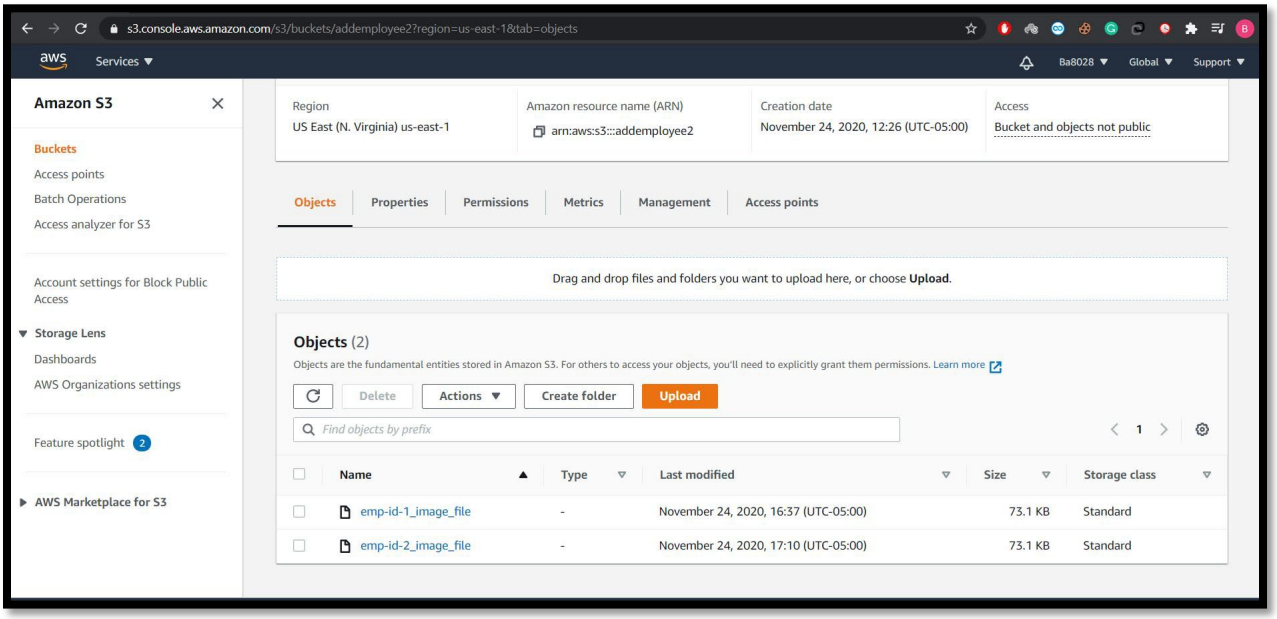
Step 12: Save Successful



Step 13: Check the Database Entries

```
mysql> select * from employee;
+-------+-------+---------+-----------+----------+
| empid | fname | lname   | pri_skill | location |
+-------+-------+---------+-----------+----------+
| 1     | Eric  | Dier    | aws       | London   |
| 2     | Harry | Maguire | DevOps    | London   |
+-------+-------+---------+-----------+----------+
2 rows in set (0.00 sec)
```

Step 14: Check that image files saved in S3 storage



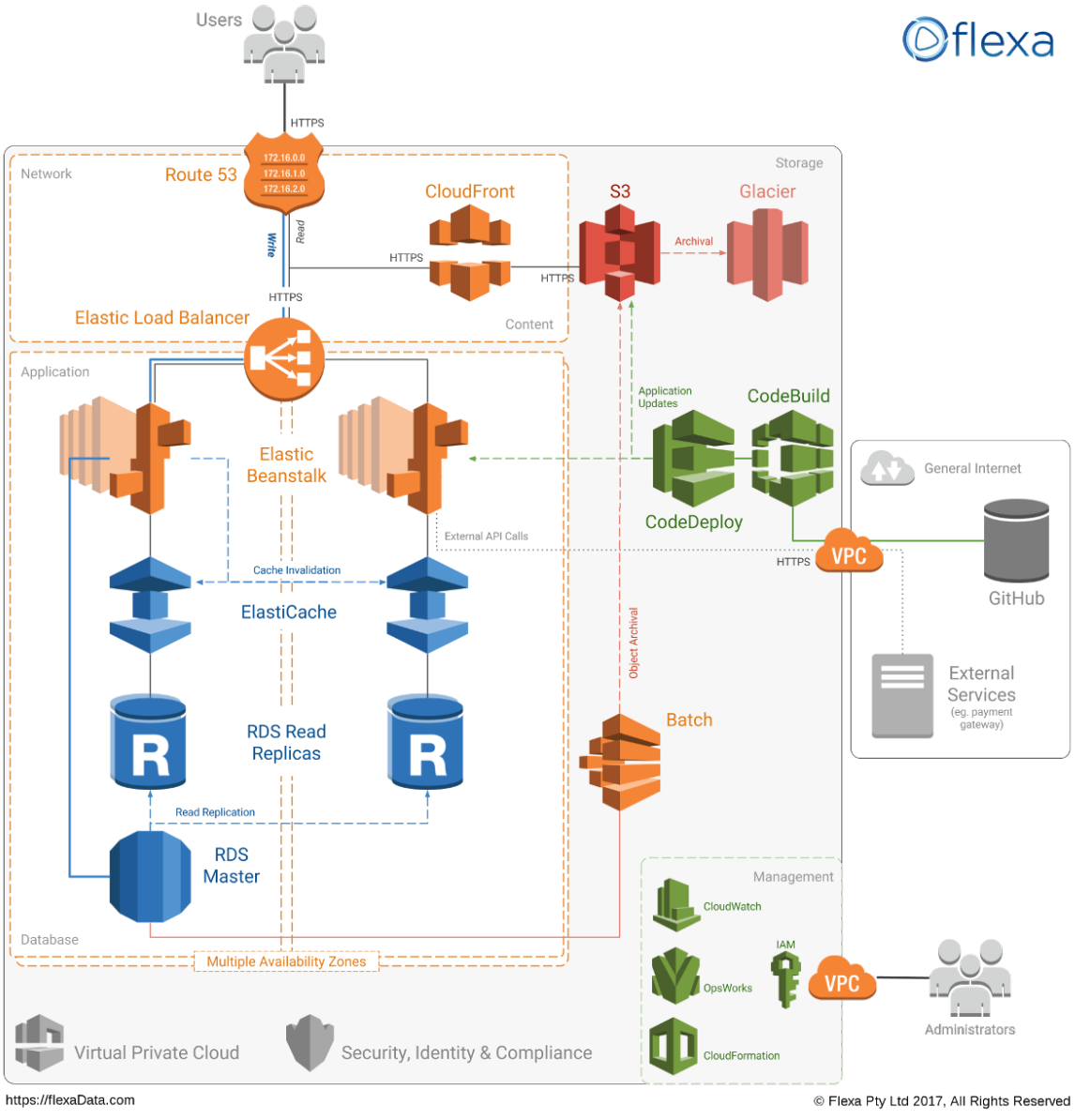
RESULTS:

This project assesses the Amazon Web Services (AWS), the world's leading cloud provider. AWS provides a very resilient, safe, and secure platform for storing computing, database, and other services[3]. Many AWS services are used to deploy an end to end website, including EC2, S3, RDS, and Route 53. In step 11, we test the created website by entering employee details; in step 12, the details are successfully submitted. In step 13, we see that the entries are written to the database, and in step 14, our S3 storage reflects the details of the image uploaded.

FUTURE WORK:

Our goal was to understand how we can use all these AWS services to deploy an end to end website. Our next improvement for future implementations would be to improve the website design and scale it up using other AWS services like AWS Elastic Beanstalk. Additionally, we can improve the resiliency and scalability by using a load balancer such as HAProxy. Services such as firewall, CDN (content delivery network), pipelining, and scaling

features can be added to the website to improve user experience, as seen in the architecture given below.



https://flexaData.com

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[2] M. S. says: D. A. Says: L. says: E. C. says: A. says: and A. S. Says: "AWS Tutorial – Learn Amazon Web Services from Experts - Intellipaat," Intellipaat Blog. [Online]. Available: https://intellipaat.com/blog/tutorial/amazon-web-services-aws-tutorial/. [Accessed: 25-Nov-2020].

[3] S. Shokeen and A. Singh, "Deploying an e-commerce website using Amazon Web Services," 2019 International Conference on Contemporary Computing and Informatics (IC3I), Singapore, Singapore, 2019, pp. 94-100, DOI: 10.1109/IC3I46837.2019.9055586.

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[6] "Amazon Route 53," Amazon. [Online]. Available: https://aws.amazon.com/route53/. [Accessed: 25-Nov-2020].