Movie Magic–Smart Movie Ticket Booking System

Description:

With the increasing demand for a seamless and modern movie-watching experience, traditional ticket booking methods often fall short due to long queues, limited availability, and inconsistent service. To address this, the development team introduced Movie Magic—a smart, cloud-based movie ticket booking system. Built using Flask for backend development, hosted on AWS EC2, and integrated with DynamoDB for dynamic data management, the platform allows users to register, log in, and book movie tickets online with ease. Users can search for movies and events based on location, view real-time seat availability, and complete their bookings in just a few clicks. Upon booking, AWS SNS sends instant email notifications confirming ticket details, enhancing user engagement and trust. This cloud-native solution streamlines the entire movie ticketing process, ensuring fast, scalable, and user-friendly access to entertainment for all.

Scenarios :

Scenario 1: Efficient Ticket Booking System for Users

In the Movie Magic System, AWS EC2 provides a reliable infrastructure capable of handling multiple users accessing the platform simultaneously. For example, a user can log in, navigate to the movie selection page, and seamlessly browse available shows and events in their city. They can then select a showtime, pick their preferred seats using an interactive layout, and confirm the booking—all in real-time. Flask manages backend processes, ensuring smooth data flow and quick response times even during high-traffic periods such as weekends or blockbuster releases.

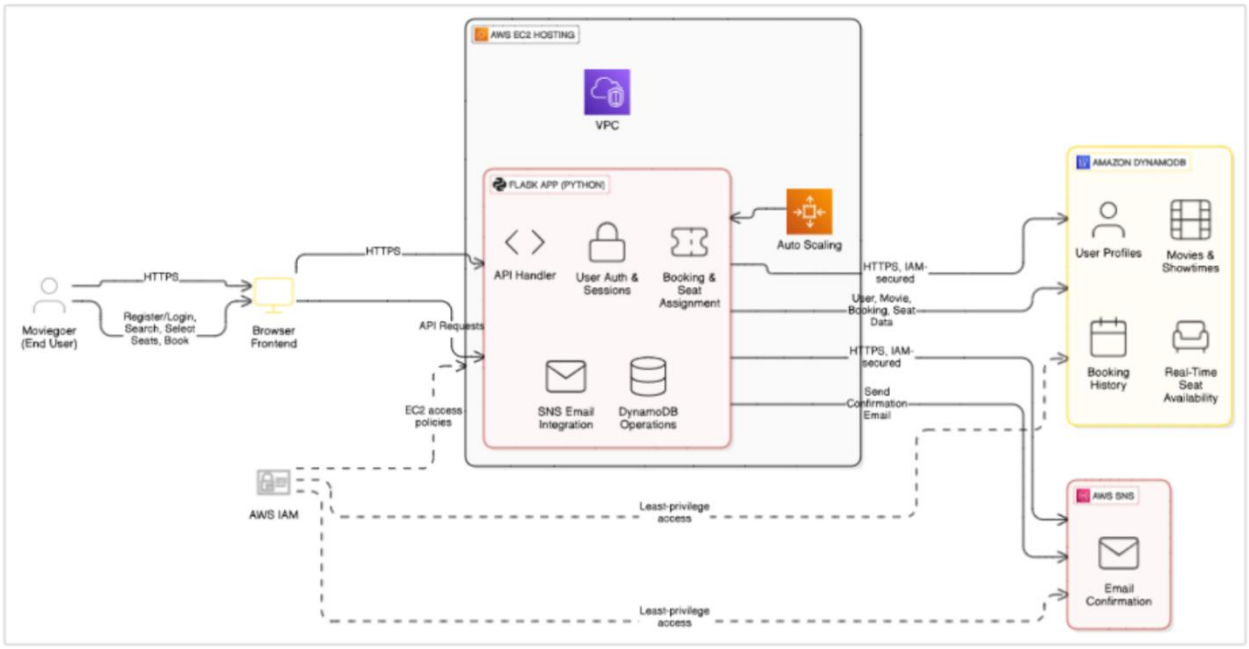
Scenario 2: Seamless Booking Confirmation Notifications

When a user completes a ticket booking, the Movie Magic System leverages AWS SNS to send instant email notifications to confirm the booking. For instance, once the booking is submitted, Flask processes the transaction, and SNS sends a customized email to the user with all ticket details, including movie name, date, time, and seat numbers. This real-time notification system enhances the customer experience and reduces uncertainty, while DynamoDB securely stores the booking records for both users and admins to manage and track.

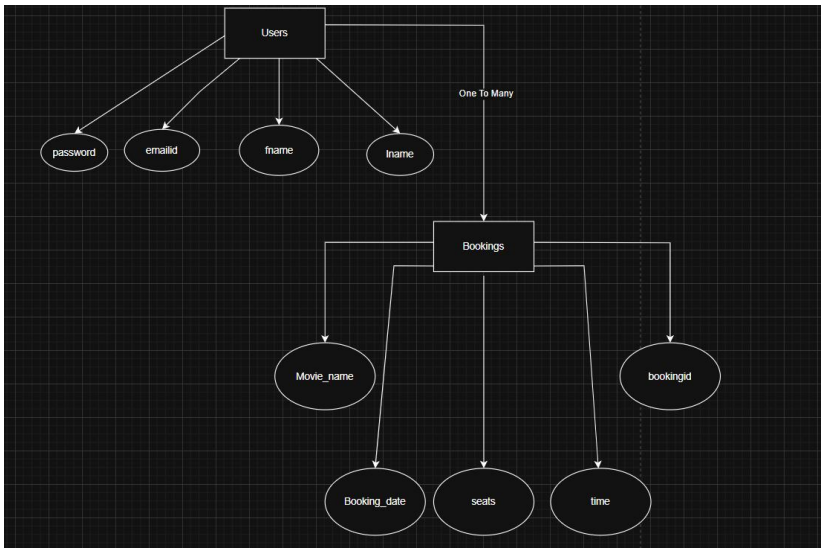
Scenario 3: Easy Access to Movies and Events

The Movie Magic platform offers users a seamless interface to explore currently running movies and upcoming live events. After logging in, a user can search by location or genre and instantly view listings with showtimes, ratings, and available seats. Flask dynamically fetches this data from DynamoDB, ensuring real-time updates on seat availability and event information. Meanwhile, the EC2-hosted application remains stable and responsive, even during traffic spikes, providing users with an uninterrupted and enjoyable booking experience.

AWS Architecture



ER Diagram



Pre-requisties:

- AWS Account Setup : For More Details Click Here
- AWS IAM (Identity and Access Management) : For More Details Click Here
- AWS EC2 (Elastic Compute Cloud) : For More Details Click Here

- AWS DynamoDB : For More Details Click Here
- Amazon SNS : For More Details Click Here

Project WorkFlow

Milestone 1. Backend Development and Application Setup

- Develop the Backend Using Flask.
- Integrate AWS Services Using boto3.

Milestone 2. AWS Account Setup and Login

- Set up an AWS account if not already done.
- Log in to the AWS Management Console

Milestone 3. DynamoDB Database Creation and Setup

- Create a DynamoDB Table.
- Configure Attributes for User Data and Book Requests.

Milestone 4. SNS Notification Setup

- Create SNS topics for book request notifications.
- Subscribe users and library staff to SNS email notifications.

Milestone 5. IAM Role Setup

- Create IAM Role
- Attach Policies

Milestone 6. EC2 Instance Setup

- Launch an EC2 instance to host the Flask application.
- Configure security groups for HTTP, and SSH access.

Milestone 7. Deployment on EC2

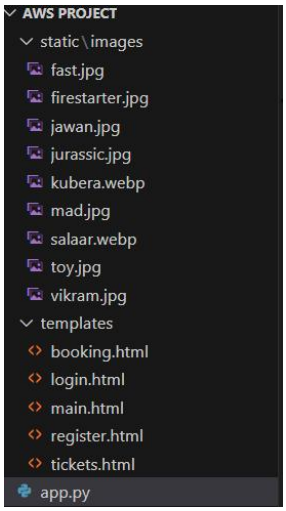
- Upload Flask Files
- Run the Flask App

Milestone 8. Testing and Deployment

- Conduct functional testing to verify user registration, login, book requests, and notifications.

MileStone 1: Backend Development and Application SetUp

- Firstly develop the backend structure using Flask



In this create a project folder named “AWS Project”. In that create a folder named templates in which we can store all the frontend html pages like login.html, register.html, booking.html, and other pages. And then create a folder named static->images which is used to store all the .jpg and other media files which you want to use in the project.

Description of Code

Flask App Initialization

```
from flask import Flask, request, render_template, redirect, url_for, session, flash
import boto3
import uuid
import os
```

Firstly, inport all the essesntial packages which are required to run the flask application, boto3 for dynamodb operations, uuid for generating the unique booking id's and os for accessing the environment variables like the secret keys etc

Initialize the flask application using the Flask(__name__)

```
# Flask setup
app = Flask(__name__)
app.secret_key = "b7127b5f7f99f682c84375c6e5cf4fa80734d4d790372f4ae3926a6b6f8c3c6f"
```

After that setup the dynamodb configuration

```
# AWS setup
REGION = 'us-east-1'
dynamodb = boto3.resource('dynamodb', region_name=REGION)
users_table = dynamodb.Table('userdata')
bookings_table = dynamodb.Table('Bookingdata')
```

AWS DynamoDB integration using the `boto3` library. It specifies the AWS region as `us-east-1`. The `dynamodb` object is created to interact with DynamoDB services. Two tables are accessed: `userdata` (for storing user details) and `Bookingdata` (for storing booking information). These tables will be used throughout the application to perform database operations.

SNS Configuration

```
sns = boto3.client('sns', region_name=REGION)
sns_topic_arn = 'arn:aws:sns:us-east-1:195275652542:BookingRequestNotifications'

# Send email via AWS SNS
def send_booking_email(email, movie, date, time, seat, booking_id):
    message = f"""
    🎟️ Booking Confirmed!

    Movie: {movie}
    Date: {date}
    Time: {time}
    Seat(s): {seat}
    Booking ID: {booking_id}

    Thank you for booking with us!
    """
    try:
        sns.publish(
            TopicArn=sns_topic_arn,
            Message=message,
            Subject="Your Movie Ticket Booking Confirmation"
        )
        return True
    except Exception as e:
        print(f"Error sending email via SNS: {e}")
        return False
```

This function uses AWS SNS to send a movie ticket booking confirmation email. It takes in details like email, movie, date, time, seat, and booking ID, and formats them into a user-friendly message. The message is then published to an SNS topic (`BookingRequestNotifications`) using the `boto3` client. The email subject is set as "Your Movie Ticket Booking Confirmation". If the message is successfully published, the function returns `True`. If there's an error, it catches the exception, prints the error message, and returns `False`. The email parameter assumes the recipient is already subscribed to the SNS topic.

Web Page Routing

- **Home Route**

```python
# Routes
@app.route('/')
def index():
    return render_template('login.html')
```

Desc : This Flask route defines the root URL `'/'` of the web application. When a user accesses the homepage, the `index()` function is called. It renders and returns the `login.html` template. This means users will be directed to the login page by default. The `@app.route` decorator binds the URL path to the function.

- **Register Route**

```python
@app.route('/register', methods=['GET', 'POST'])
def register():
    if request.method == 'POST':
        fname = request.form.get('fname')
        lname = request.form.get('lname')
        email = request.form.get('email')
        password = request.form.get('setPwd')
        confirm_password = request.form.get('confirmPwd')
        if not all([fname, lname, email, password, confirm_password]):
            return "All fields are required.", 400

        if password != confirm_password:
            return "Passwords do not match.", 400
        try:
            existing = users_table.get_item(Key={"email": email}).get("Item")
            if existing:
                return "User already registered.", 400
        except Exception as e:
            print("Error checking user:", e)
            return "Database error", 500
        try:
            users_table.put_item(Item={
                "first_name": fname,
                "last_name": lname,
                "email": email,
                "password": password
            })
            return redirect(url_for('index'))
        except Exception as e:
            print("Error inserting user:", e)
            return "Registration failed", 500

    return render_template('register.html')
```

Desc: This Flask route handles user registration via GET and POST methods. On POST, it collects form data: first name, last name, email, password, and confirm password. It checks that all fields are filled, and that the passwords match. Then it queries the DynamoDB `users_table` to check if the email already exists. If not, it inserts the new user into the table and redirects to the login page. If any errors occur during the process, appropriate error messages and status codes are returned. On GET, it simply renders the `register.html` template.

- **Login Route**

```python
@app.route('/login', methods=['GET', 'POST'])
def login():
    if request.method == 'POST':
        email = request.form.get('email')
        password = request.form.get('password')

        try:
            user = users_table.get_item(Key={"email": email}).get("Item")
            if user and user['password'] == password:
                session['user'] = email
                return redirect(url_for('main'))
        except Exception as e:
            print("Login error:", e)

        flash("Invalid credentials")
        return redirect(url_for('login'))

    return render_template('login.html')
```

Desc : This Flask route handles user login using GET and POST methods. On a POST request, it retrieves the email and password from the login form. It then checks the DynamoDB `users_table` for a matching user record. If the user exists and the password matches, the email is stored in the session and the user is redirected to the main page. If the login fails or an error occurs, it prints the error and redirects back to the login page with a flash message. On GET requests, it simply renders the `login.html` template.

- **Main Block and Booking block**

```python
@app.route('/main')
def main():
    if 'user' not in session:
        return redirect(url_for('login'))
    return render_template('main.html')
@app.route('/booking')
def booking_page():
    if 'user' not in session:
        return redirect(url_for('login'))
    movie = request.args.get('movie')
    booked = bookings_table.scan(
        FilterExpression=boto3.dynamodb.conditions.Attr("Movie").eq(movie)
    ).get("Items", [])
    booked_seats = []
    for b in booked:
        if "Seat" in b:
            seats = b["Seat"].split(", ")
            booked_seats.extend(seats)
    return render_template('booking.html', movie=movie, booked_seats=booked_seats)
```

Desc : The `/main` route renders the main page if the user is logged in; otherwise, it redirects to the login page. The `/booking` route shows the booking page for a selected movie. It fetches booked seats from DynamoDB for that movie and passes them to the `booking.html` template. Unauthenticated users are redirected to login.

- **Booking Confirmation Block**

```python
@app.route('/book', methods=['POST'])
def book_ticket():
    if 'user' not in session:
        return redirect(url_for('login'))

    data = {
        'email': session['user'],  # ✅ FIXED
        'Movie': request.form['movie'],
        'Date': request.form['date'],
        'Time': request.form['time'],
        'Seat': request.form['seat'],
        'BookingID': str(uuid.uuid4())
    }

    try:
        bookings_table.put_item(Item=data)

        # ✅ Send SNS email notification
        send_booking_email(
            data['email'], data['Movie'], data['Date'], data['Time'], data['Seat'], data['BookingID']
        )

        return render_template('tickets.html', booking=data)
    except Exception as e:
        print("Booking error:", e)
        flash("Booking failed. Please try again.")
        return redirect(url_for('main'))
```

Desc : This route handles movie ticket booking via POST. It checks user login, collects form data, and generates a unique booking ID. The data is stored in the DynamoDB `bookings_table`. Then, a booking confirmation email is sent using AWS SNS. If successful, it renders `tickets.html`; otherwise, it flashes an error.

- **Deployment Block**

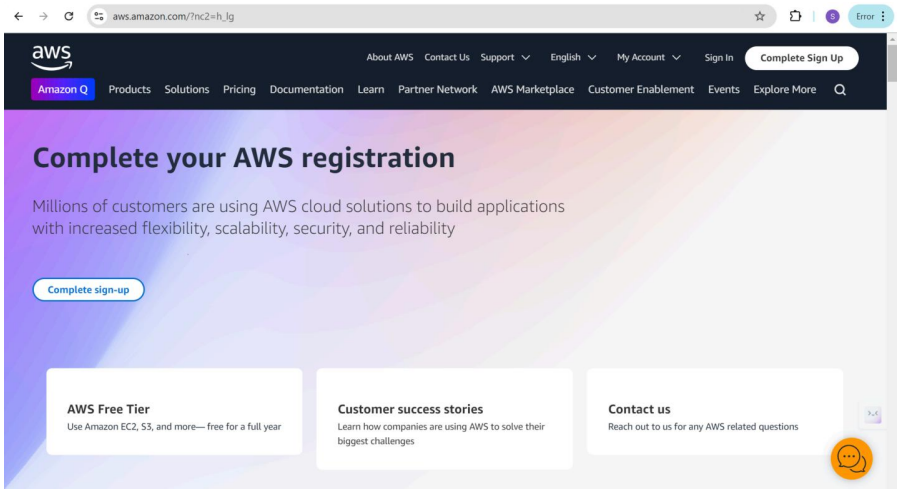
```
# Run the app
if __name__ == '__main__':
    app.run(host='0.0.0.0', port=5000, debug=True)
```

Desc : The application is configured to run on host '0.0.0.0', which allows devices across the local network to access it, making it handy for collaborative development or testing on multiple machines. It runs on port 5000, a common default for Flask apps, and the debug mode is turned on, offering developers enhanced error messages and auto-reloading during changes.

Milestone 2: AWS Account Setup and Login

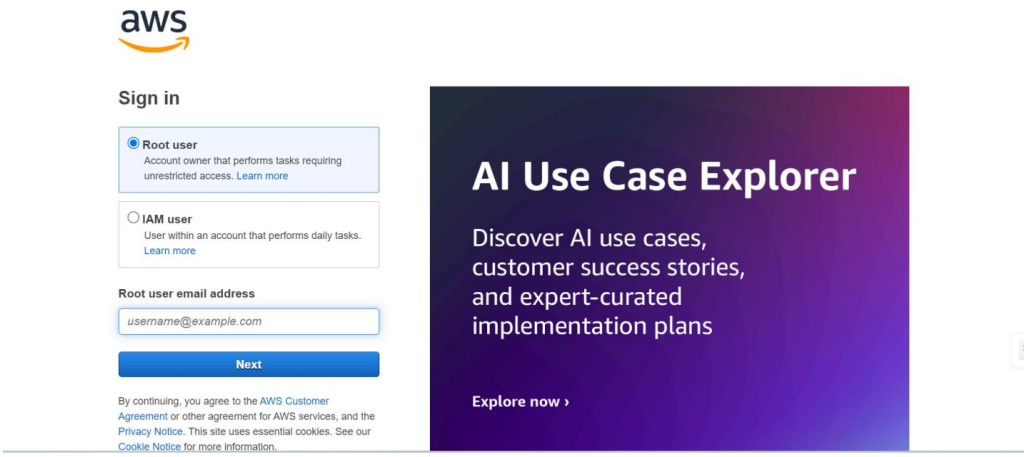
Activity 2.1: Set up an AWS account if not already done.

- Sign up for an AWS account and configure billing settings



Activity 2.2: Log in to the AWS Management Console

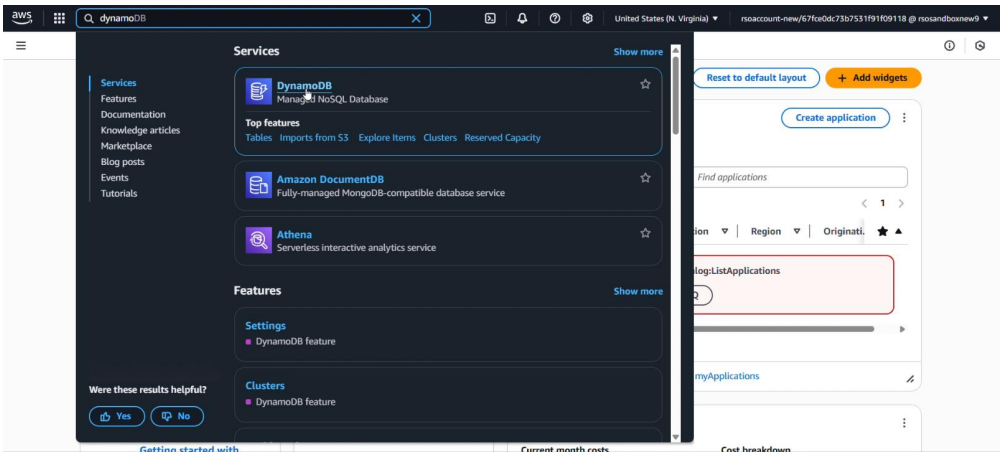
○ After setting up your account, log in to the [AWS Management Console]



Milestone 3. DynamoDB Database Creation and Setup

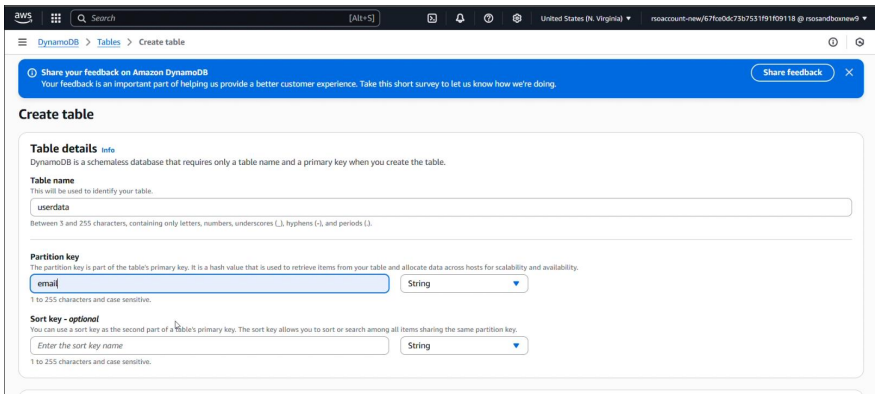
Activity 3.1 : Creating a Dynamodb table

For creating the table open the amazon console and search for dynamodb

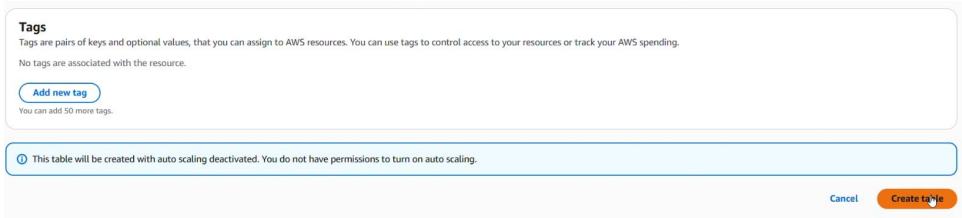


Activity 3.2 : Creating the tables (userdata and bookingdata) for storing information

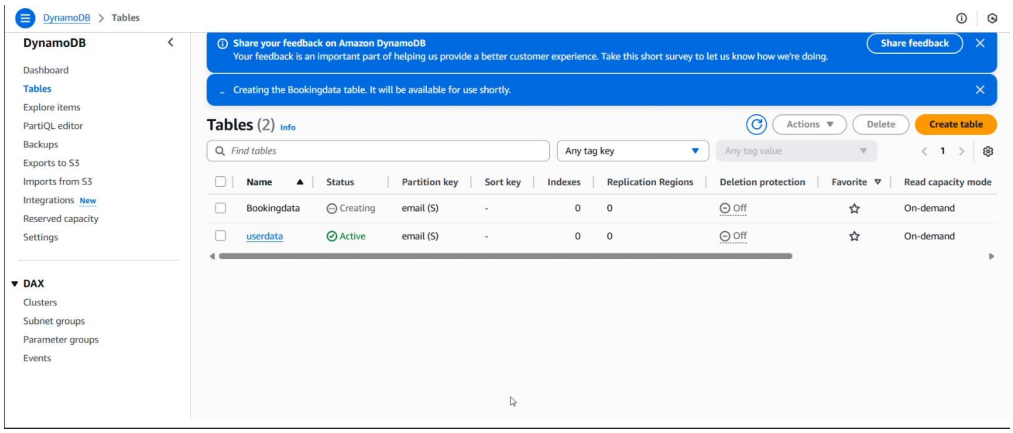
After this, select the dynamodb and clock on create table option. In that give the table as the same name in which we used in the flask code for storing the userdata and their credentials and give the partition key as email.



Now click on create table option after scrolling down, then a new table will appear in the dynamodb page



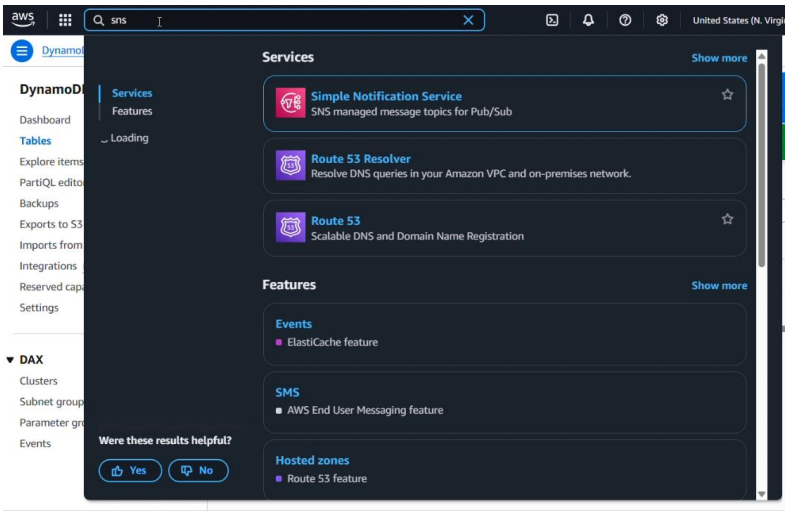
And repeat the same procedure for remaining tables present in the flask code i.e the bookingtable which is used to store the booking data



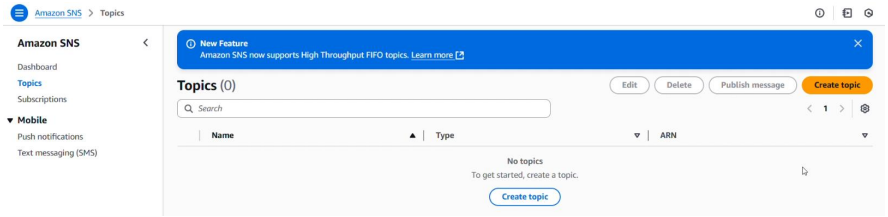
Milestone 4 : SNS Modification Setup

Activity 4.1 : Create SNS topic for book request notifications

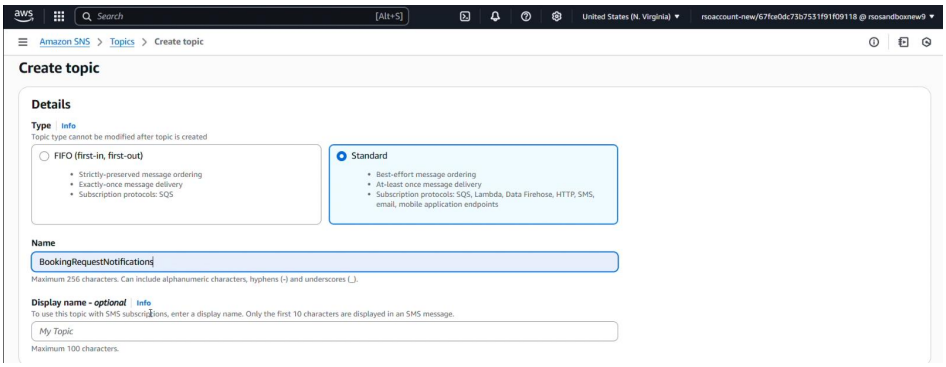
Firstly, In AWS search for SNS



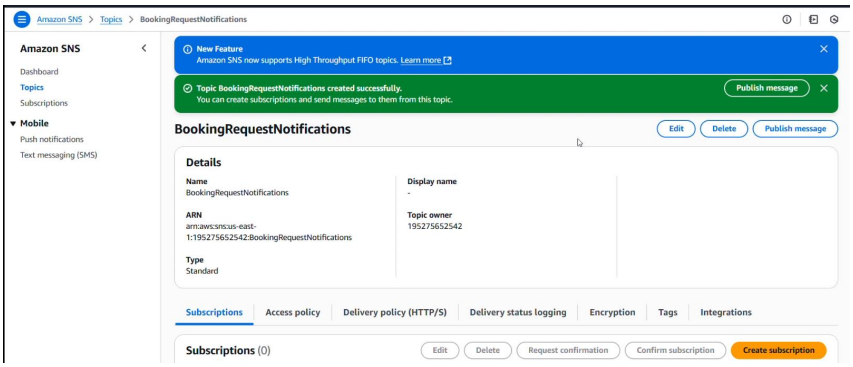
Select that one and in that click on create new topic



Open standard type for general notifications usecases and click on create topic

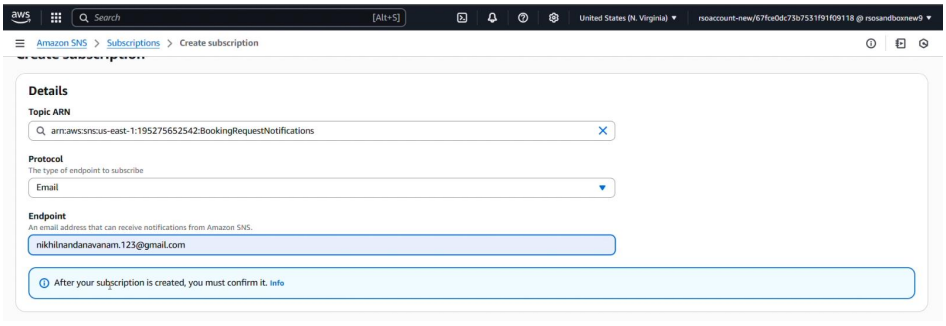


Now a topic will be created with the name of BookingRequestNotification

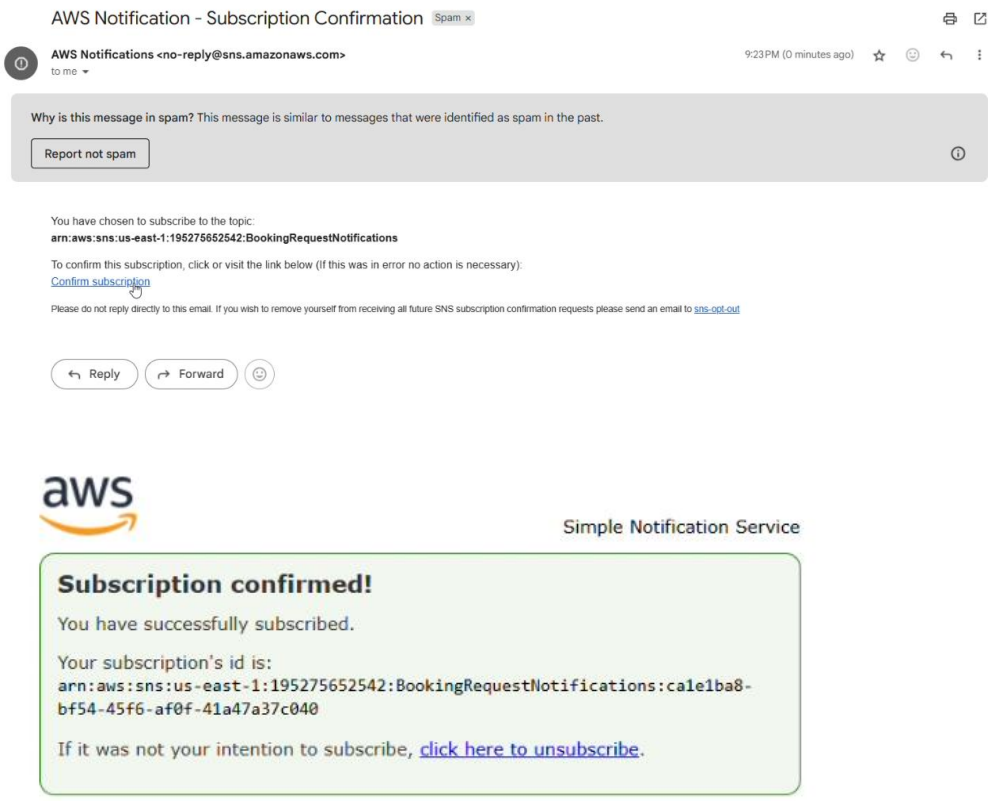


Activity 4.2 : Subscribe the users and library staff to SNS notifications

After creating a topic click on create subscription. In that we need to enter the type of protocol i.e email and the your emailid for subscription confirmation



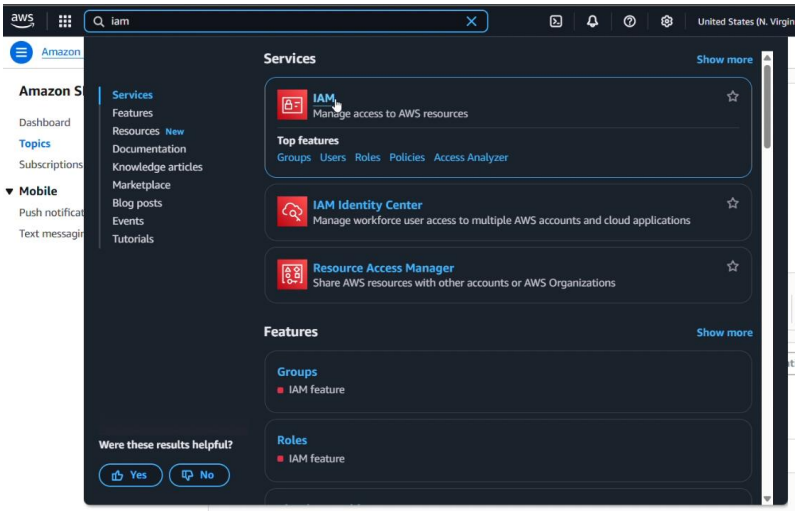
Check the mail which you entered in the subscription information. In that mail you'll see an subscription request mail like this and in that to click on "Confirm Subscription"



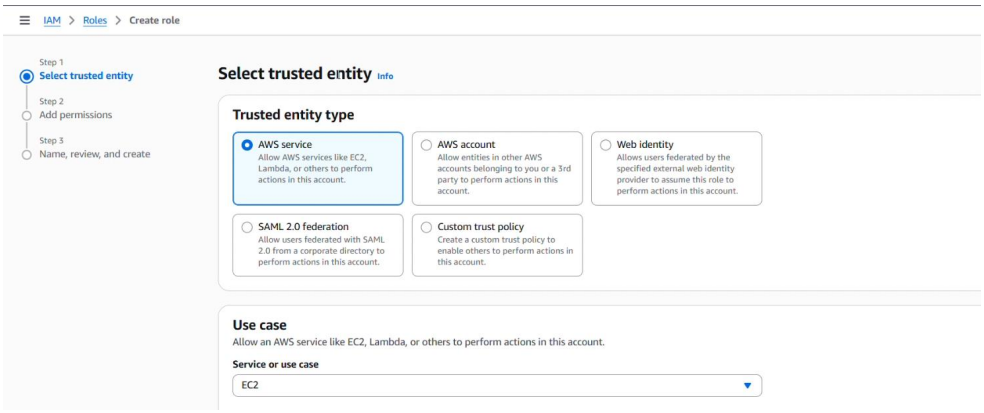
Milestone 5 : IAM Role

Activity 5.1 :Create an IAM role

Search for IAM in AWS

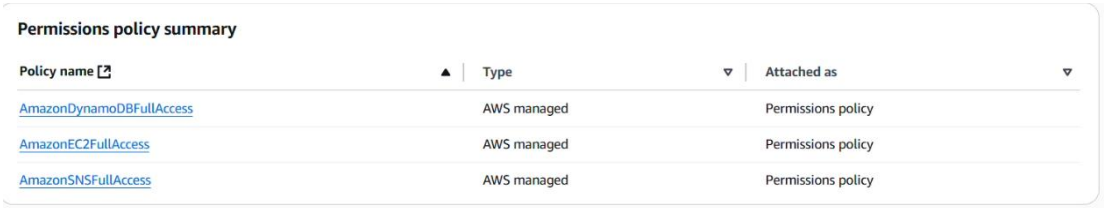


In that click on create role. After clicking that one you'll see a page to select the trusted entity. In trusted entity type select "AWS Service" and use case as "EC2"

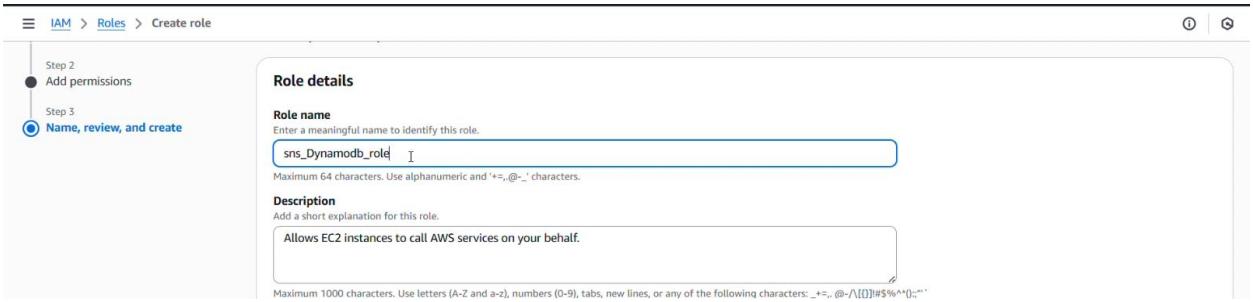


Activity 5.2 : Attach Policies

After that you need to add the permissions for EC2,SNS and dynamodb AmazonEC2FullAccess, AmazonDynamodbFullAccess and AmazonSNSFullAccess



Now give the IAM role and click on create role

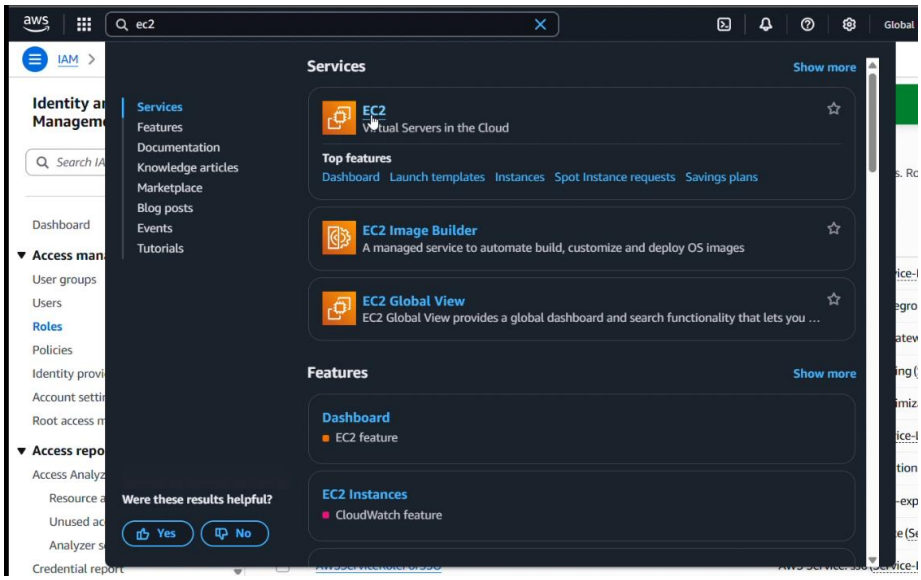


Then a new IAM role will be created

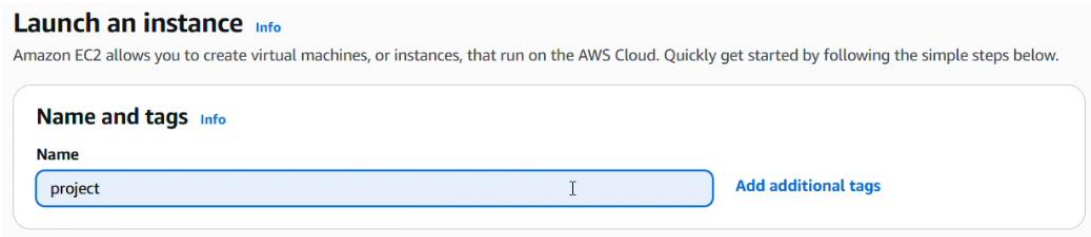
MileStone 6 : EC2 Instance Setup

Activity 6.1 : Launch an ec2 instance to host the flask application

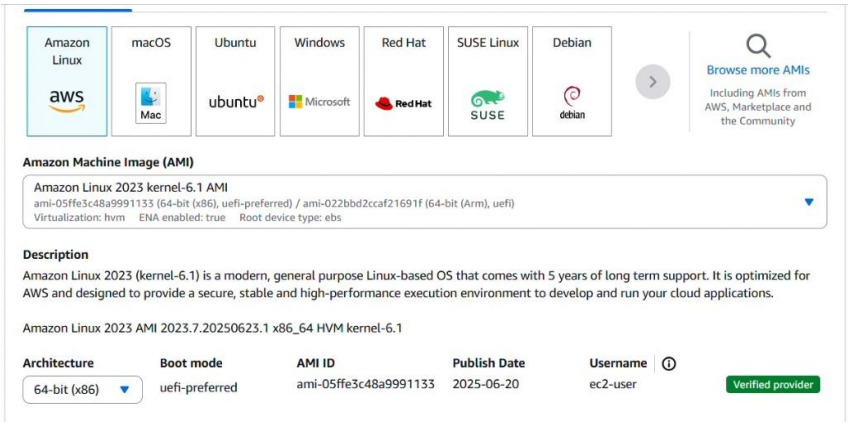
Search for EC2 and click on launch instance. It allows us to create a new instance for hosting the flask application and give a name for the instance



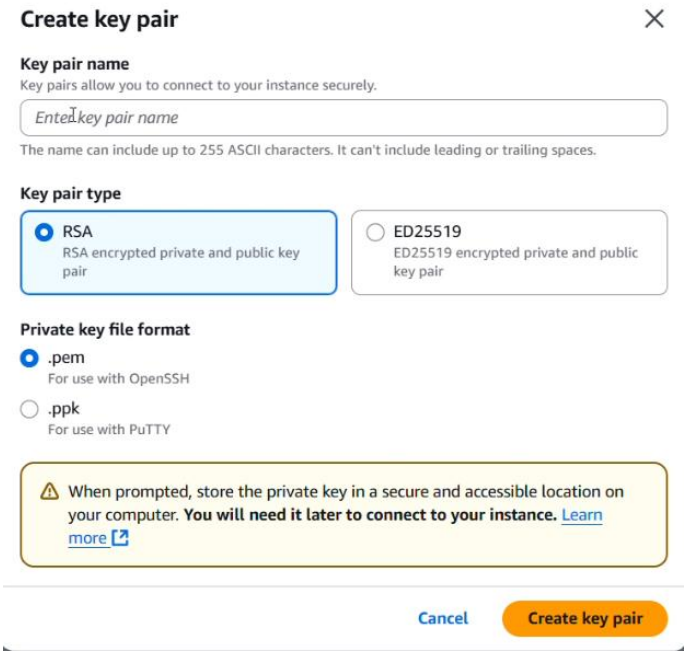
Give the instance name



Choose Amazon Linux 2 or Ubuntu as the AMI and t2.micro as the instance type (free-tier eligible).

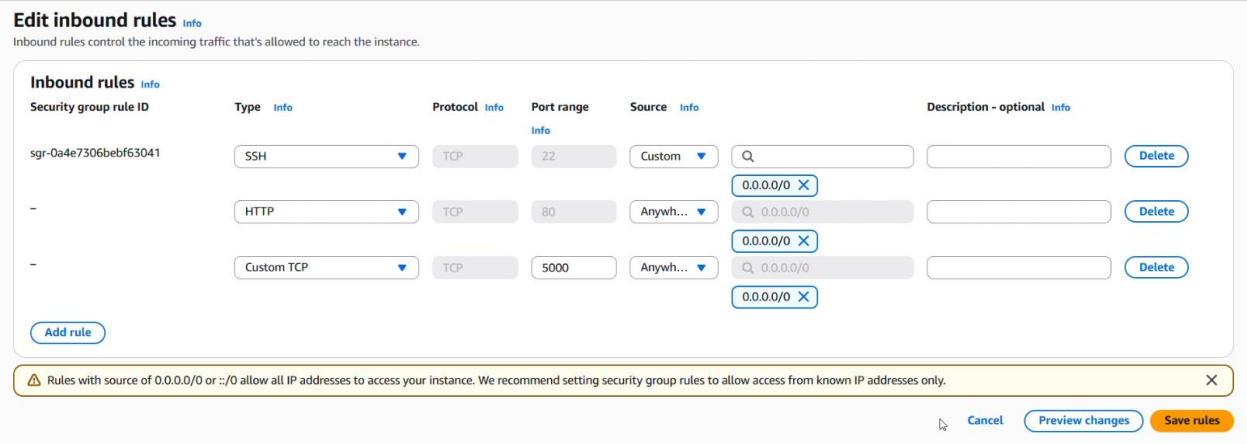


Create a new key pair and it will download the .pem file

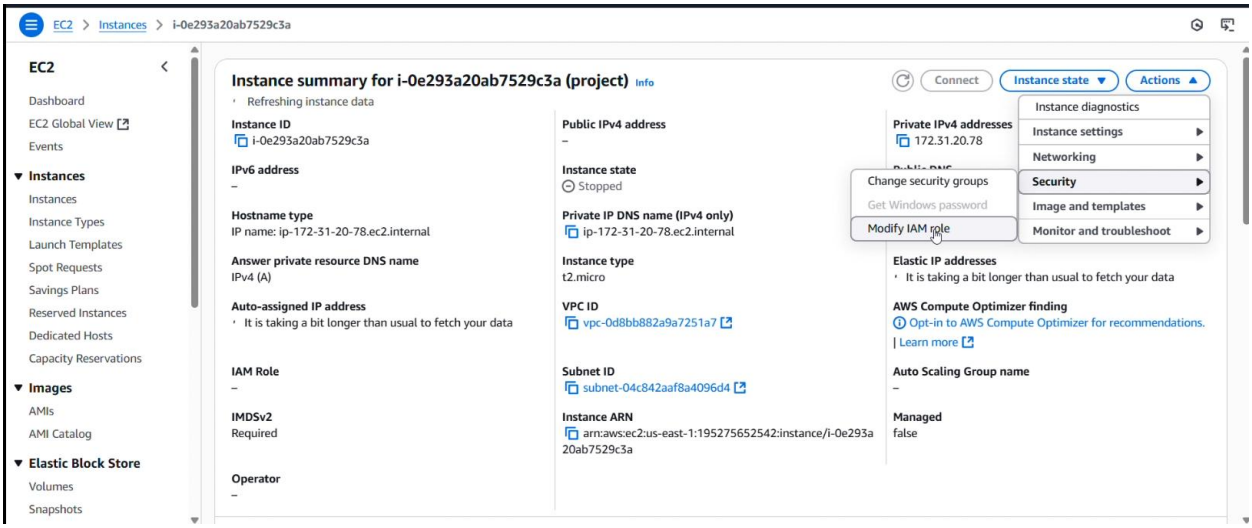


A new file named project.pem file will be downloaded

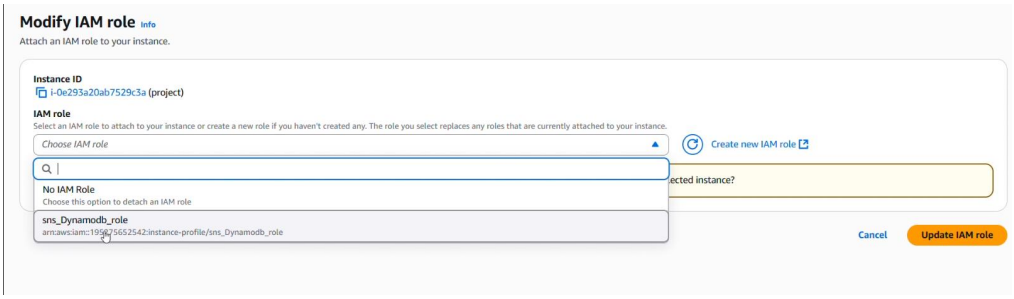
Activity 6.2:Configure security groups for HTTP, and SSH access.



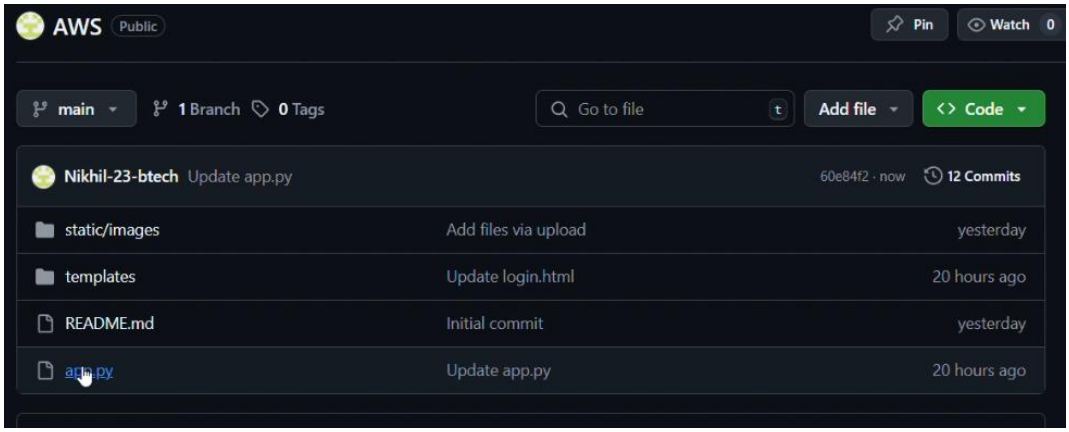
To connect to EC2 using ***EC2 Instance Connect***, start by ensuring that an ***IAM role*** is attached to your EC2 instance. You can do this by selecting your instance, clicking on ***Actions***, then navigating to ***Security*** and selecting ***Modify IAM Role*** to attach the appropriate role. After the IAM role is connected, navigate to the ***EC2*** section in the ***AWS Management Console***. Select the ***EC2 instance*** you wish to connect to. At the top of the ***EC2 Dashboard***, click the ***Connect*** button. From the connection methods presented, choose ***EC2 Instance Connect***. Finally, click ***Connect*** again, and a new browser-based terminal will open, allowing you to access your EC2 instance directly from your browser.



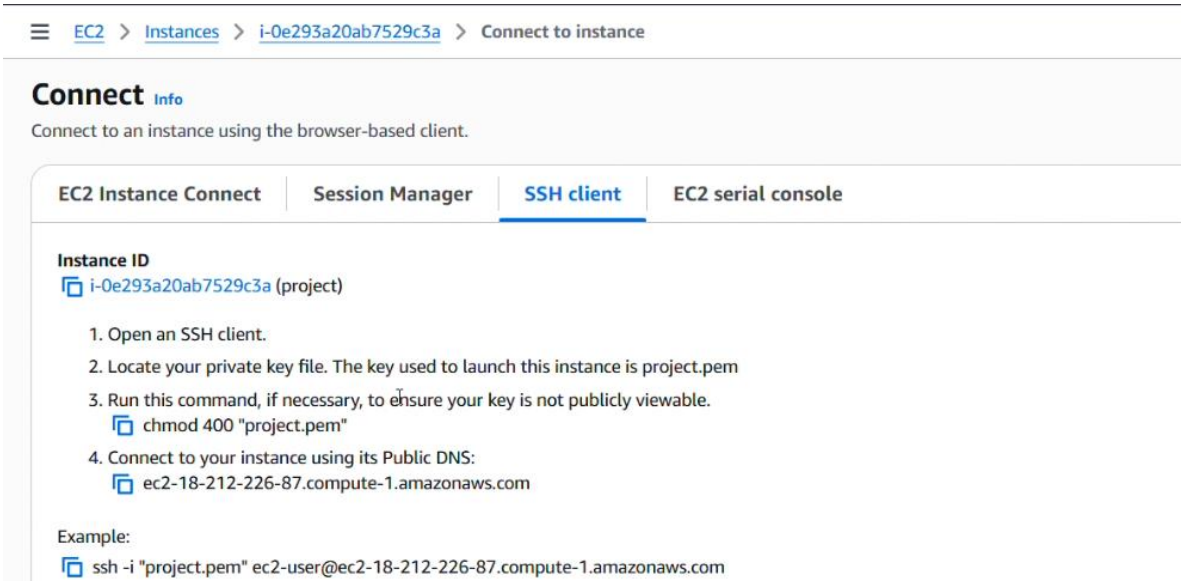
Modify the IAM role



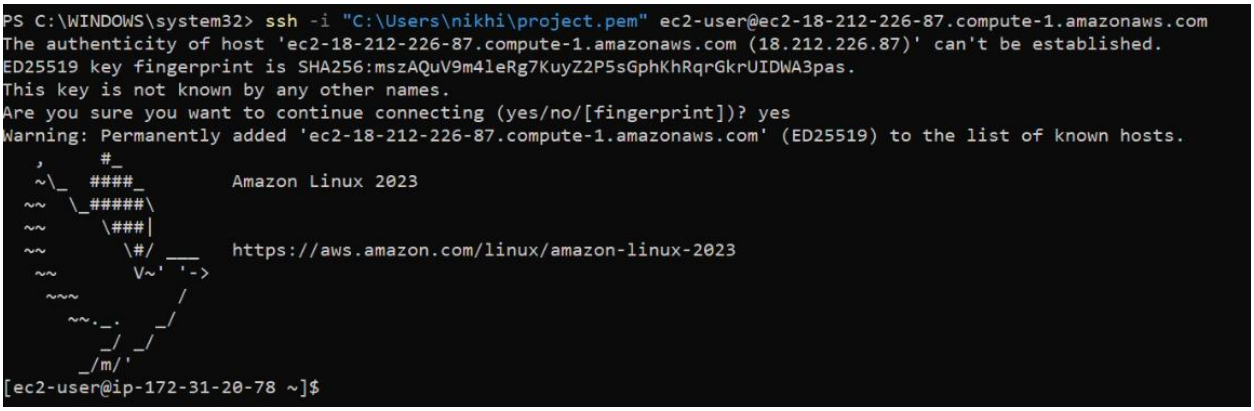
After modifying the IAM role start the instance and click on connect. Before this make sure that you have uploaded all the project related info to the github by creating a repository



Then if you click on connect option present in the EC2 page then in that it consists of many contents. In that click on SSH client



Now in your system open the Windows PromptShell and run it as administrator. Copy the example link which provided in the above image and paste that one in the prompt shell. Modify the project.pem file to the location in which that file located in your system. After running this command it shows like this



MileStone 7 : Deployment on EC2

Activity 7.1 : Upload the Flask App

Before proceeding to uploading the flask app run the following commands in the prompt shell

sudo yum update -y

sudo yum install python3 git

sudo yum install python3-pip -y

sudo pip3 install flask boto3

The below commands used to verify installations

flask --version

git --version

Now upload the flask application by using the command

git clone your-git-repo-link

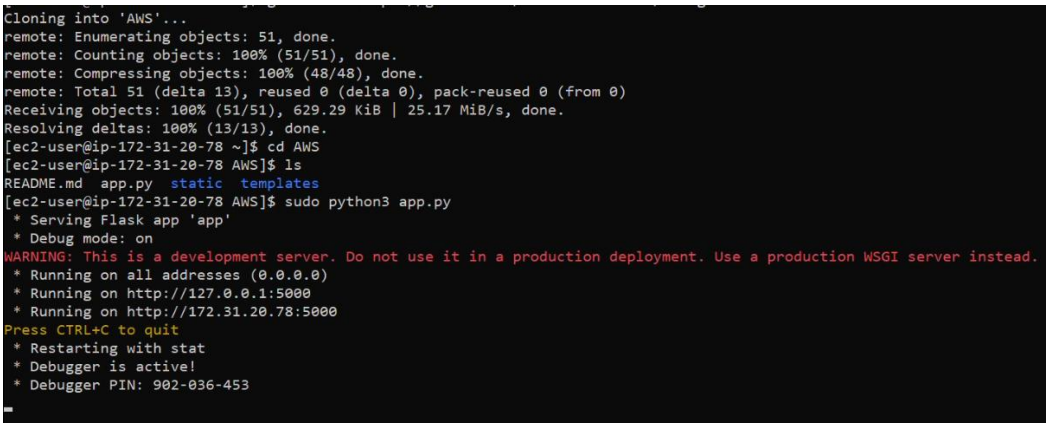
In place of your-git-repo-link modify or replace that one with the github link of your flask application which you recently uploaded all the project related files

Activity 7.2 Run the flask app

After cloning the git repository, navigate to that folder in which the app.py code exists by usig the cd command

After navigating to the directory run the below command for executing the app.py backend flask code

sudo python3 app.py



Now copy the public ipv4 address of the EC2 instance. After copying the ipv4 address open a new tab in the browser.In that type as the below format

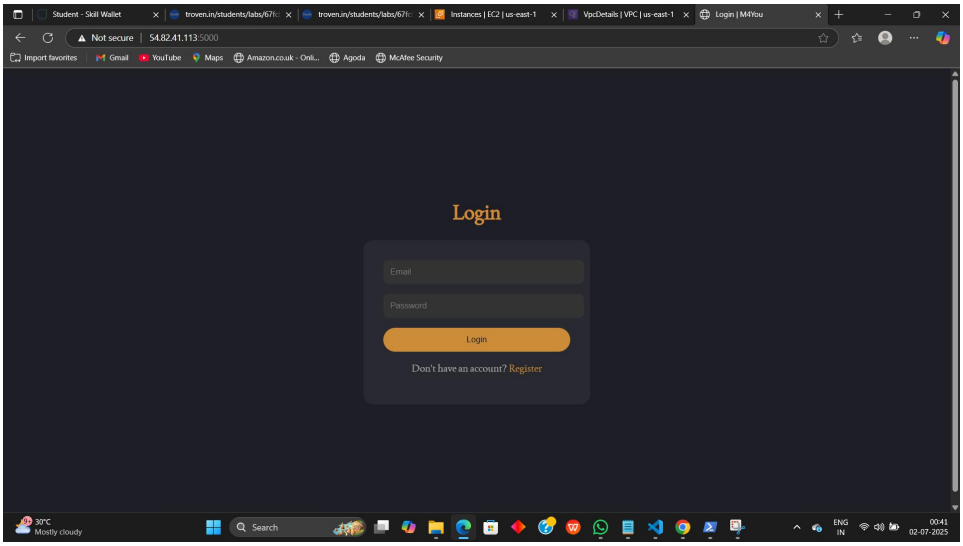
http://public-ipv4-address:port_number

Modify the public ipv4 address to the ipv4 address of the EC2 instance and port number to the port which you used in the flask code (ex: 5000)

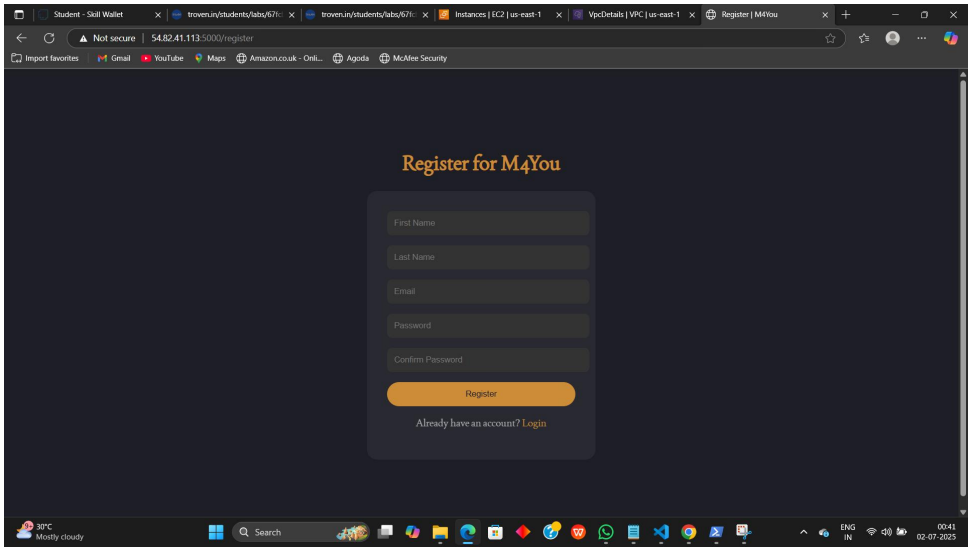
MileStone - 8 : Testing and Deployment

Activity 8.1 : Conduct functional testing to verify user registration, login, book requests, and notifications.

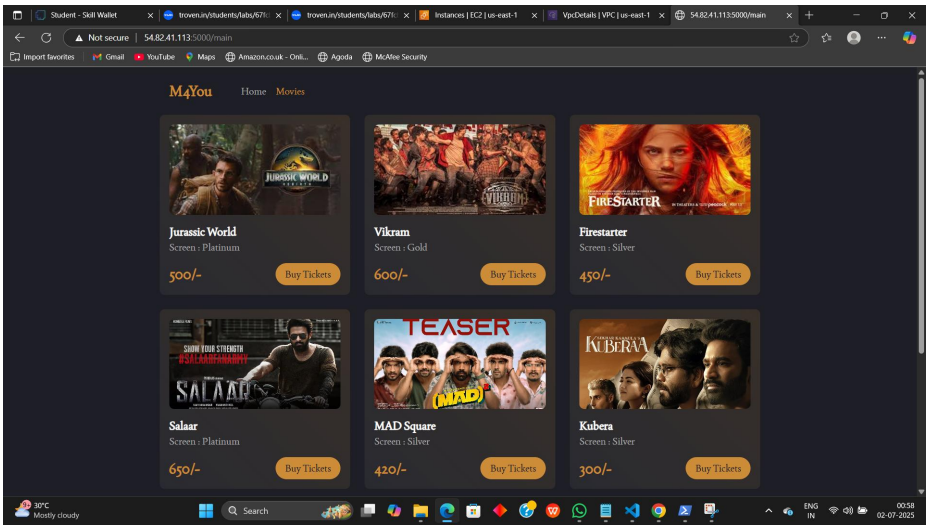
Login Page



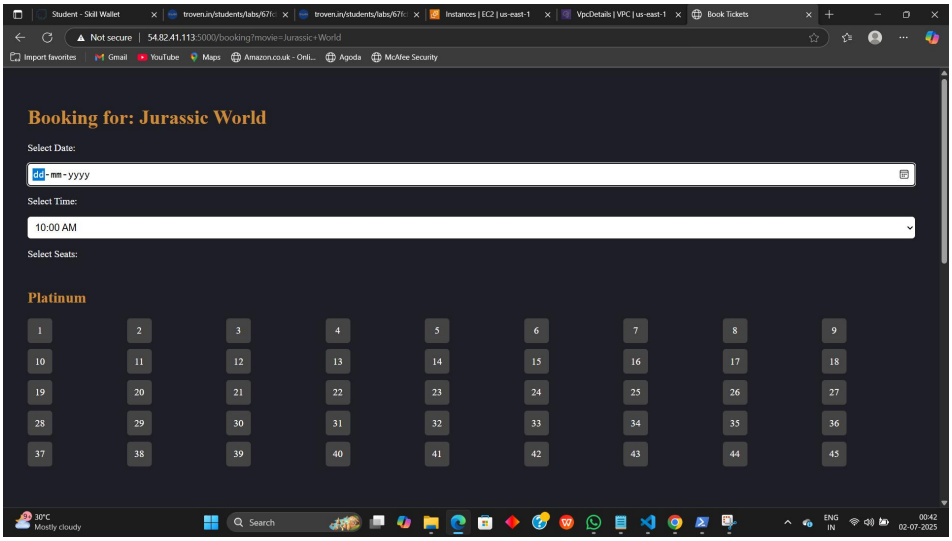
Register Page



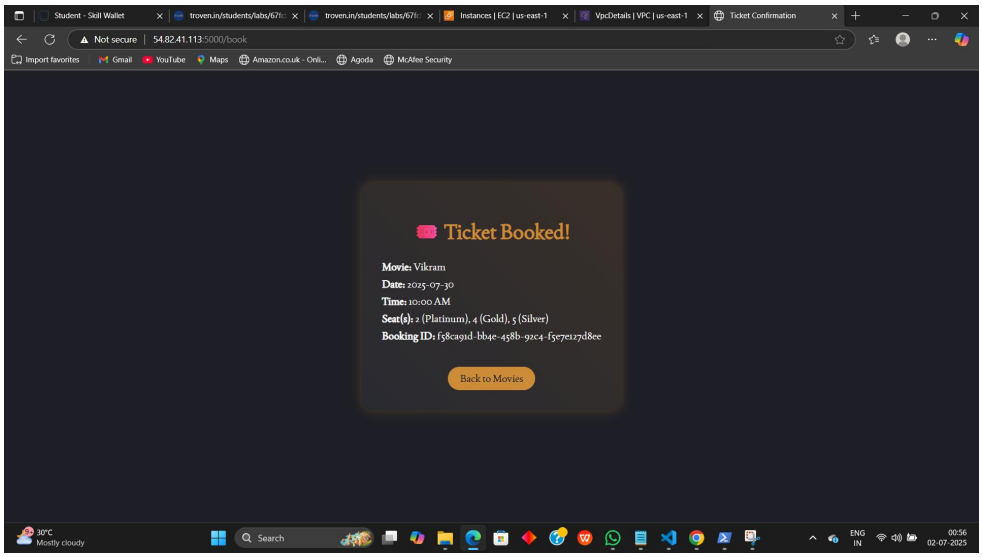
Main Page



Ticket booking page



Ticket Confirmation Page



Booking confirmation through email

Your Movie Ticket Booking Confirmation Inbox ×

AWS Notifications <no-reply@sns.amazonaws.com> Wed, Jul 2, 9:51 PM (11 hours ago)
to me

Booking Confirmed!

Movie: Salaar
Date: 2025-07-03
Time: 07:00 PM
Seat(s): 3 (Platinum), 5 (Platinum), 4 (Gold), 5 (Silver)
Booking ID: 67fbac4d-e477-4807-bef5-edb58ddac891

Thank you for booking with us!

--
If you wish to stop receiving notifications from this topic, please click or visit the link below to unsubscribe:
https://sns.us-east-1.amazonaws.com/unsubscribe.html?SubscriptionArn=arn:aws:sns:us-east-1:195275652542:BookingRequestNotifications:ca1e1ba8-bf54-45f6-af0f-41a47a37c040&Endpoint=nikhilnandanavanam.123@gmail.com

Please do not reply directly to this email. If you have any questions or comments regarding this email, please contact us at https://aws.amazon.com/support

Conclusion

The provided project is a web-based **Smart Movie Ticket Booking System** built using the Flask framework and integrated with AWS services. It allows users to register, log in, and book movie tickets through a simple and responsive user interface. The application stores user data and booking details in **AWS DynamoDB**, with two main tables: `userdata` for user credentials and profile information, and `Bookingdata` for storing movie booking details like movie name, date, time, and seat number. Unique booking IDs are generated using the `uuid` module.

Upon successful booking, the application uses **AWS SNS (Simple Notification Service)** to send a confirmation email to the user, enhancing the reliability and user experience. The system uses session handling to maintain login status and ensures that only registered users can make bookings. It includes multiple HTML templates (like login, register, main, booking, and ticket views) styled consistently for a seamless user experience.

The app also includes a static directory with movie poster images to enrich the interface visually. It demonstrates the effective use of cloud-based, serverless architecture by leveraging AWS for both data persistence and communication services. This project serves as a great example of integrating cloud tools with traditional web frameworks, making it suitable for small-scale theater management systems or educational use cases that teach cloud application deployment.