Rex Angelo Basulgan IT 426 Project
System Architecture

Rex's Photoshoot Scheduler
SA-001

Version 1
October 29, 2024

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Revisions/Versions

Document Number	Release/Revision	Release/Revision Date
SA-001	**1.0**	**October 29, 2024**

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Project Proposal

Project Name: Rex's Photoshoot Scheduler

Deliverable: A web application where it allows users to schedule photoshoots, select preferred date and times, able to choose the type of photoshoot, and receive a confirmation message. This scheduler will help people who are looking for a specific photoshoot more simpler and user friendly.

User Stories:

As a user, I want to fill in a form with my information so that I can book a photo shoot.

As a user, I want to select the preferred date and time of the photo shoot to check availability.

As a user, I want to specify the type of photoshoot so I can get the appropriate session.

As a user, I want to receive a confirmation email after the booking is successfully submitted.

As a user, I want to indicate my contact preference: email or phone, in which I should be notified.

As an administrator, I want a listing of photoshoots scheduled to manage my calendar effectively.

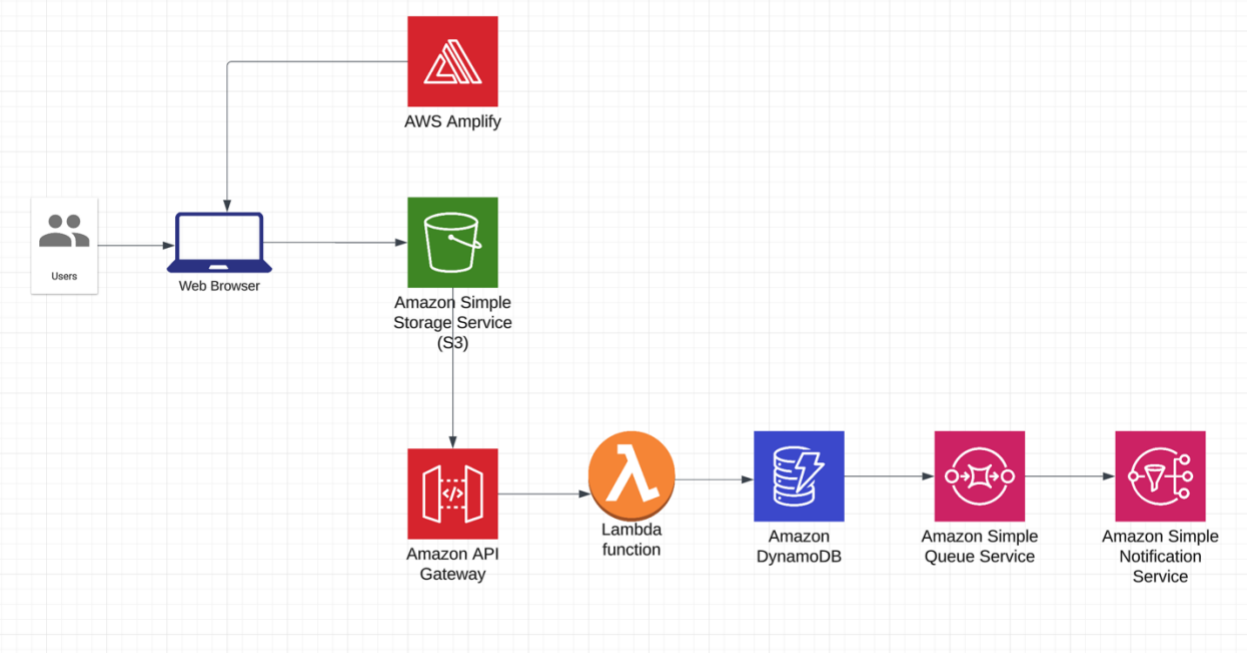
Admin- I want to be informed when the creation of a new photoshoot has taken place for tracking purposes of new bookings.

User- I want to see available time slots to avoid scheduling conflicts.

User- The interface should be very simple and intuitive so that one is easily able to submit a form and book.

User- I want to get a reminder before the photoshoot so that I will not forget my appointment.

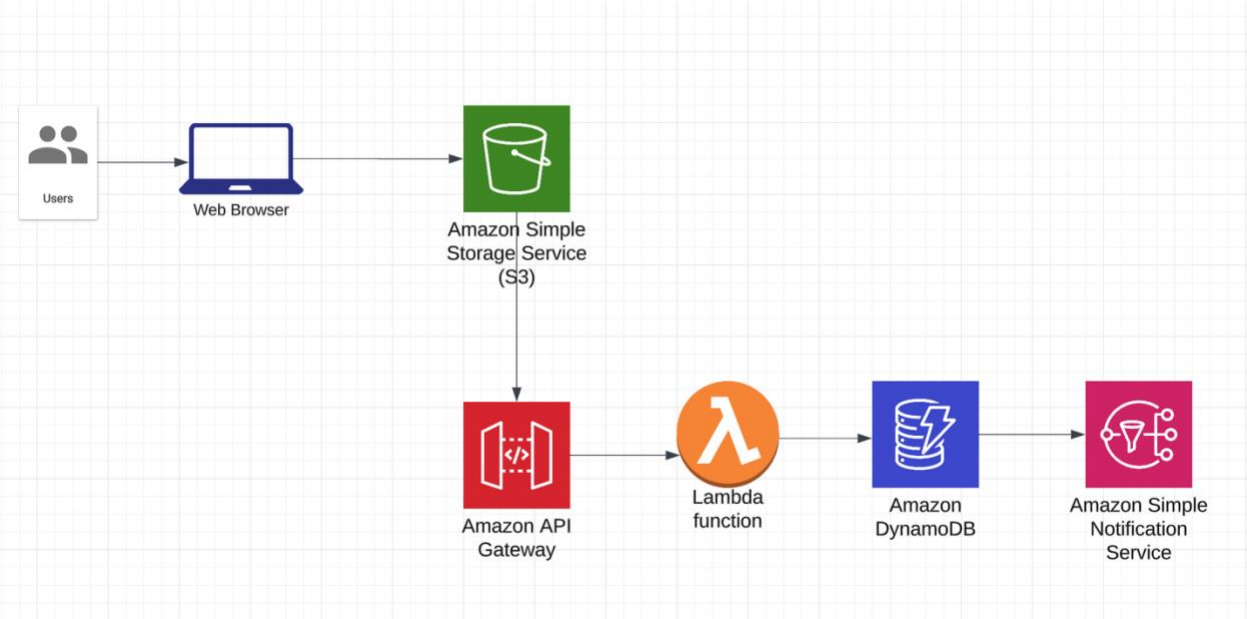
Original Architectural Design



Explanation:

The architecture will be composed of S3, hosting a static website that the users will access through their web browsers. The API Gateway acts as a bridge between the front end and the back end, enabling the site to make requests to Lambda functions. These functions will encapsulate the business logic, like fetching or updating of data in DynamoDB. For longer-running tasks, messages can also be set into SQS queues for asynchronous processing. SNS notifies the users or administrators when any particular events occur. AWS Amplify is optionally used to help deal with front-end resources and deployment.

Implemented Architectural Design



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SNS notifies the users or administrators when any particular events occur.

Challenges

Creating a website from scratch. It was challenging at the beginning because I needed to finalize my idea and make sure that everything worked.

The “Lab role” doesn’t have enough permission for most parts of the lab. Example SQS etc.

I tried SQS, but I did not have enough permission, so I just focused on SNS.

I also had a challenging time with my lambda and lambda code, where I needed to look for examples online and go back to my previous assignments. I also followed the video of Brother Strain on YouTube to make sure I did it right.

Guided Lab

Here's a step-by-steps for hosting your HTML in S3 and integrating it with the form submission to AWS:

1. Create an S3 Bucket:

In the S3 console, create a new bucket with a unique name (photoshootscheduler).
Choose the region closest to your audience for better performance. (N. Virginia)
Click Create Bucket

2. Upload HTML, CSS, and JavaScript Files:

Here's the link:
WEBSITE: https://photoshootscheduler.s3.us-east-1.amazonaws.com/index.html
HTML and CSS:
https://drive.google.com/drive/folders/10KltJdh2mslUA7UIHXUPR9ltcv0Ur_uO?usp=sharing

Go to the Objects tab and upload all your website files (index.html, css/styles.css, and any images or assets).

3. Check the URL

Go to your bucket, copy and paste your Object URL to a new tab or browser.
You notice that the website says access denied. Let's move to the next step.

4. Enable static website hosting

To enable static website hosting, go to the Properties tab of your bucket. Look for Static website hosting, then click edit. Inside the static website hosting, click enable. In the index document, type index.html. Leave everything in default, then save changes.

5. Set Permissions for Public Access:

   Go to the Permissions tab of your bucket, and edit the Bucket policy to allow public read access to your files.

Use this example policy, replacing YOUR_BUCKET_NAME with your actual bucket name:

JSON:

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

After enabling public access, you can view your site using the S3 Static Website URL found in the Static Website hosting section of your S3 bucket properties.

Create Lambda Function

Steps to Set Up HTTP API and Deploy

Step 1: Create and Configure the HTTP API

1. **Go to API Gateway**:
    - Navigate to **API Gateway** in the AWS Management Console.
    - Click **Create API**, then select **HTTP API**.
2. **Create an HTTP API**:
    - Name your API (e.g., PhotoshootAPI).
    - Under **Configure routes**, click **Add route** to create a route for the /schedule endpoint.
3. **Set the Method and Integration**:
    - For the **Method**, select POST.
    - Under **Integration**, choose **Lambda Function**.
    - In the **Lambda Function** field, choose the Lambda function that processes the form data (e.g., process_schedule_data).

- Click **Create** to save this route.

Step 2: Deploy the HTTP API

1. **Create a Stage** (if not already created):
   - After creating the HTTP API, go to **Deployments** in the left sidebar.
   - If no deployment stage exists, create a new stage by clicking **Create stage**.
   - Name the stage (e.g., prod) and click **Create**.
2. **Deploy the API**:
   - In the **Deployments** section, click **Deploy** to deploy your API.
   - Choose the stage (e.g., prod) where you want to deploy the API.

Step 3: Obtain the Invoke URL

1. **Find the Invoke URL**:
   - After deployment, go to the **Stages** section for your API.
   - The **Invoke URL** for the deployed stage (e.g., prod) will appear at the top of the page.
   - Copy this URL.
2. **Update Your Form's Action**:
   - In your HTML form, update the action attribute to point to the **Invoke URL** of your HTTP API, appending /schedule (or the correct endpoint path):

```
<form action="https://your-api-id.execute-api.your-region.amazonaws.com/prod/schedule" method="POST">
```

TEST THE SETUP

1. **Submit the Form**:
   - Go to your webpage and submit the form.
2. **Verify Lambda Execution**:
   - Check the **CloudWatch Logs** to verify that the Lambda function was triggered successfully.
3. **Check for Data**:
   - If you added logic to store the form data (e.g., in DynamoDB), verify that the data was saved as expected.
   - If you added notifications (e.g., via SNS), verify that the notifications were sent.

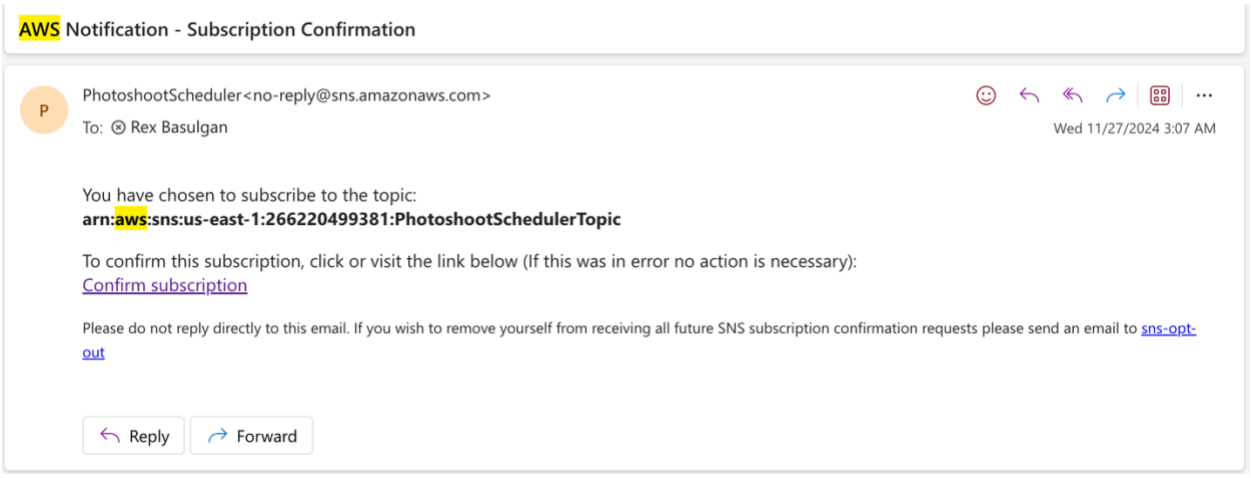
Step 1: Create an SNS Topic

1. **Log in to AWS Management Console** and navigate to **Amazon SNS**.
2. Click on **Topics** in the left menu.
3. Click **Create Topic**.
    - **Topic type**: Standard (for most cases; FIFO is for strict ordering and deduplication).
    - **Name**: PhotoshootSchedulerTopic.
4. Click **Create Topic**.

Step 2: Add Subscriptions

1. Go to the topic you just created (PhotoshootSchedulerTopic).
2. Click on the **Create subscription** button.
3. For **Protocol**, choose:
    - **Email**: If you want to send email notifications.
    - **Lambda**: To trigger your Lambda function.
    - **HTTP/S**: To send the data to a webhook or another system.
4. Enter the **endpoint** based on the protocol you selected (e.g., email address, Lambda ARN, or webhook URL).
5. Click **Create subscription**.
6. If using **email**, check your inbox for a confirmation email and confirm the subscription.

Here's the example screenshot:



Step 3: Integrate SNS with Your Lambda Function
Update your Lambda function to publish messages to the SNS topic when a form is submitted:
python
Copy code

UPDATE LAMBDA function:

```
import json

def lambda_handler(event, context):
    try:
        # Validate and parse the body
        if 'body' not in event or not event['body']:
            raise ValueError("Request body is missing or empty.")

        body = json.loads(event['body'])

        # Validate required fields
        required_keys = ['name', 'email', 'phone', 'date', 'time', 'type']
        for key in required_keys:
            if key not in body:
                raise KeyError(f"Missing required field: {key}")

        # Extract data
        name = body['name']
        email = body['email']
        phone = body['phone']
        date = body['date']
        time = body['time']
        photoshoot_type = body['type']

        # Return a successful response
        return {
            'statusCode': 200,
            'headers': {
                'Content-Type': 'application/json',
                'Access-Control-Allow-Origin': '*'
            },
            'body': json.dumps({
                'message': 'Your photoshoot has been scheduled successfully!',
                'data': {
```

```
            'name': name,
            'email': email,
            'phone': phone,
            'date': date,
            'time': time,
            'type': photoshoot_type
        }
    })
}

except (ValueError, KeyError, json.JSONDecodeError) as e:
    # Handle errors gracefully
    return {
        'statusCode': 400,
        'headers': {
            'Content-Type': 'application/json',
            'Access-Control-Allow-Origin': '*'
        },
        'body': json.dumps({
            'error': 'Failed to schedule photoshoot',
            'details': str(e)
        })
    }
```

Step 4: Update Lambda Environment Variables

1. Open the Lambda function in the AWS Console.
2. Under **Configuration**, go to **Environment variables**.
3. Add a new key-value pair:
    - **Key**: SNS_TOPIC_ARN
    - **Value**: The ARN of your SNS topic (arn:aws:sns:us-east-1:123456789012:PhotoshootSchedulerTopic).
4. Save the changes.

Step 5: Test the Integration

1. Deploy your Lambda function.
2. Submit the form from your web app.
3. Verify:
    - Email subscribers receive a notification with form details.
    - HTTP or Lambda subscribers process the message correctly.

Steps to Deploy This Lambda Function:

1. **Set Up the Lambda Function**:
    - Go to **AWS Lambda** and create a new function.

- Add the above code, and in the environment variables, set QUEUE_URL to your SQS queue URL.

2. **Connect Lambda to API Gateway**:
   - Create an API Gateway REST API.
   - Add a POST method to an endpoint like /schedule.
   - Link it to your Lambda function.

Create DYNAMODB

1. Create a DynamoDB Table

1. Go to the DynamoDB Console.
2. Click **"Create table"**.
3. Configure the table:
   - **Table Name**: PhotoshootSchedule (or your desired name).
   - **Partition Key**: id (String).
4. Click **"Create"**.

2. Update IAM Role

Ensure your Lambda function's IAM role has permissions to interact with DynamoDB.

Attach Policy:

1. Go to **IAM** in the AWS Console.
2. Find the role associated with your Lambda function.
3. Attach the AmazonDynamoDBFullAccess policy.

Update LAMBDA code:

```
import json

def lambda_handler(event, context):
    try:
        # Retrieve form data from the POST request
        body = json.loads(event['body'])
        name = body.get('name')
        email = body.get('email')
        phone = body.get('phone')
        date = body.get('date')
        time = body.get('time')
        photoshoot_type = body.get('type')

        # Optional: Process or save the data (e.g., store it in a database or send a confirmation email)
```

```
    # For now, we're just returning the received data as a response

    # Log the received data (optional but useful for debugging)
    print(f"Received data: {body}")

    # Return a successful response
    return {
        'statusCode': 200,
        'headers': {
            'Content-Type': 'application/json',
            'Access-Control-Allow-Origin': '*'  # CORS header for cross-origin requests
        },
        'body': json.dumps({
            'message': 'Your photoshoot has been scheduled successfully!',
            'data': {
                'name': name,
                'email': email,
                'phone': phone,
                'date': date,
                'time': time,
                'type': photoshoot_type
            }
        })
    }
except Exception as e:
    # Log the error for debugging
    print(f"Error occurred: {str(e)}")

    # Return an error response
    return {
        'statusCode': 400,
        'headers': {
            'Content-Type': 'application/json',
            'Access-Control-Allow-Origin': '*'  # CORS header
        },
        'body': json.dumps({
            'error': 'Failed to schedule photoshoot',
            'details': str(e)
        })
    }
```

4. Test the Integration

1. Deploy the updated Lambda function.
2. Use the **API Gateway URL** and test the form submission.
3. Verify the data is being stored in the DynamoDB table:
    - Go to DynamoDB in the AWS Console.
    - Select the PhotoshootSchedule table.
    - Check the **Items** tab for the submitted data.

Expected DynamoDB Table Structure

After submission, each item should look like this in the DynamoDB table:

id	name	email	phone	date	time	type
`Random numbers like 1234556gndkjdlgfgf`	John Doe	johndoe@example.com	1234567890	2024-12-10	10:00	Portrait

Time Sheets

DATE	ITEM	TIME SPENT	RUNNING TOTAL
Oct 29, 2024	Brainstorming and asking for ideas in class with my groupmate	1 hour	1 hour
November 2, 2024	Finalize my project and look for ideas online.	2 hours	3 hours
November 7, 2024	Create a website to use for this project and upload in s3 bucket	2 hours	5 hours
November 8, 2024	Create lambda function and API	4 hours	9 Hours
November 10, 2024	Updated the website and the guided lab.	2 hours	11 Hours
November 12, 2024	Started creating Architectural Design	2 hours	13 Hours
November 19, 2024	Starts with SQS / Lambda function	3 hours	16 Hours

November 26, 2024	SNS	1 hour	17 hours
December 3, 2024	SNS	2 hours	19 hours
December	Dynamo DB	2 hours	21 hours

Consulting Hours

DATE	GIVEN OR RECEIVED	WHO	ITEM	TIME SPENT
11/19/2024	Received	Michael Palopalo	IAM roles – He explained to me that the role that we use "Labrole" doesn't provide enough access to SQS, SES, and SNS.	5 mins.
11/19/2024	Given	Domingo Gallibu	Lambda Function – Explained how to use lambda functions and suggest some videos to follow.	10 mins.
11/19/2024	Received	Jonathan Crisanto	Jonathan mentioned that it plays crucial role in decoupling my frontend to my backend system. He showed me some examples too.	15 minutes
11/19/2024	Given	Jonathan Crisanto	I showed some examples of lambda functions. I also mentioned that he needs to code price scraper in Lambda to gather price information from	15 minutes

			product URL.	
11/26/2024	Received / Given	Maybelle	We talked about our plans for our project because we have same problem about the SQS.	5 minutes
11/26/2024	Received	Nico Gonzales	Asked about SNS process.	5 Minutes
11/26/2024	Given	Domingo Gallibu	Helped how to create SNS	5 minutes
11/26/2024	Given	Jonathan Crisanto	Jonathan needs help on how to connect api gateway. I told him that by creating a gateway, he could either use HTTP or REST for API type and what resource he's going to use like Lambda or HTTP endpoint.	5 minutes

Demo Video

Youtube Link: https://youtu.be/qUjQVDs8RtA