DALHOUSIE UNIVERSITY

Faculty of Computer Science

CSCI 5410 Serverless Data Processing

Assignment-2

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Part A

Summary

I have developed the front end of the application i.e. login page, user registration page, state information page using React JS. For handling database operations and handling the get and post requests from front end, I have written services using Node JS. To sending http requests from front end to back end, I have used Axios library. I have also created a MySQL database in Amazon RDS and created 2 tables: user, and status. In the user table, I am storing the details given by the user while registration and in the status table, I am storing the email id, time stamp, whether the user is online or offline. After writing the separate services for login, registration, and state information, I have created docker images for each service [6]. By creating docker images with google cloud SDK shell, the images will be automatically uploaded to google container registry [4]. I have created 3 services namely login, register, stateinfo in google cloud run [3]. While creating the services, I have attached the images that were uploaded to google container registry earlier. After the services are created, I have taken the URL generated by google cloud run and used them in my front end to send http get and post requests. I have run the react app using 'npm start' and tested the application to check all the login, registration, and state information features. I have presented the screenshots for all the steps that I have performed in this task. I find google cloud easier to use when compared to AWS due to the integration of features such as Google Container Registry, Google SDK Shell, Google Run. The service creation and attaching the images to services is also straight forward and the documentation is also clear.

Screenshots

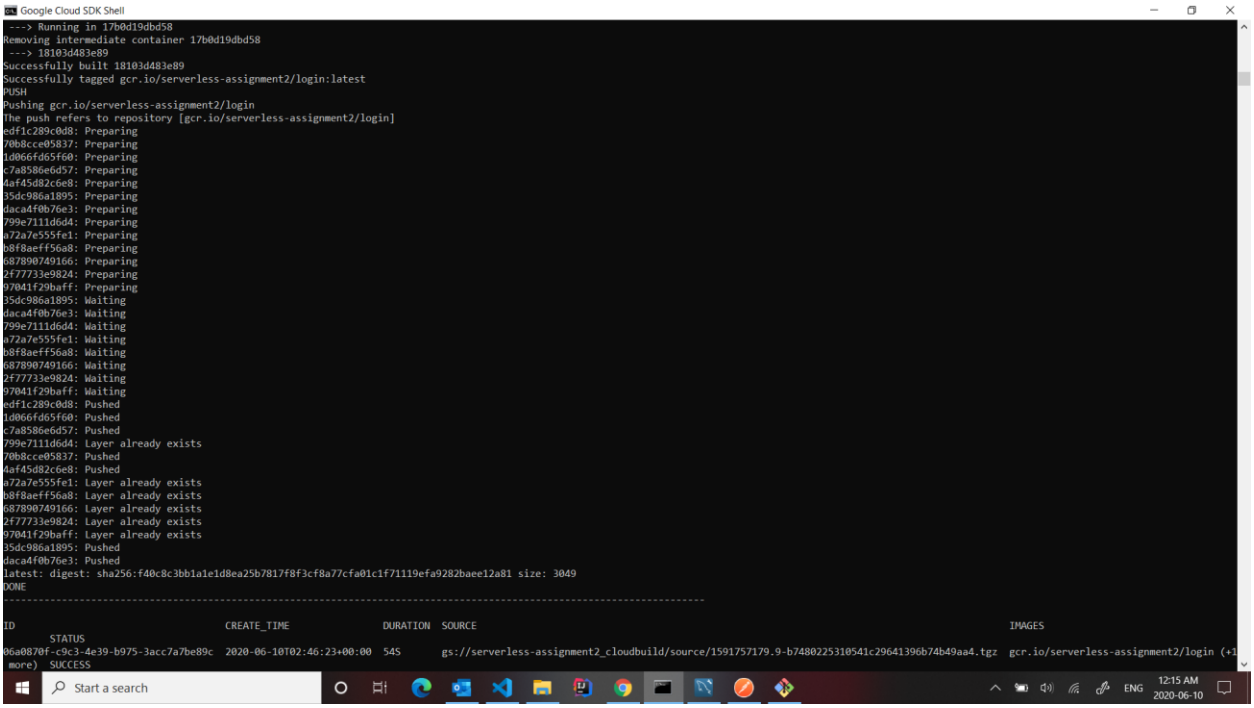
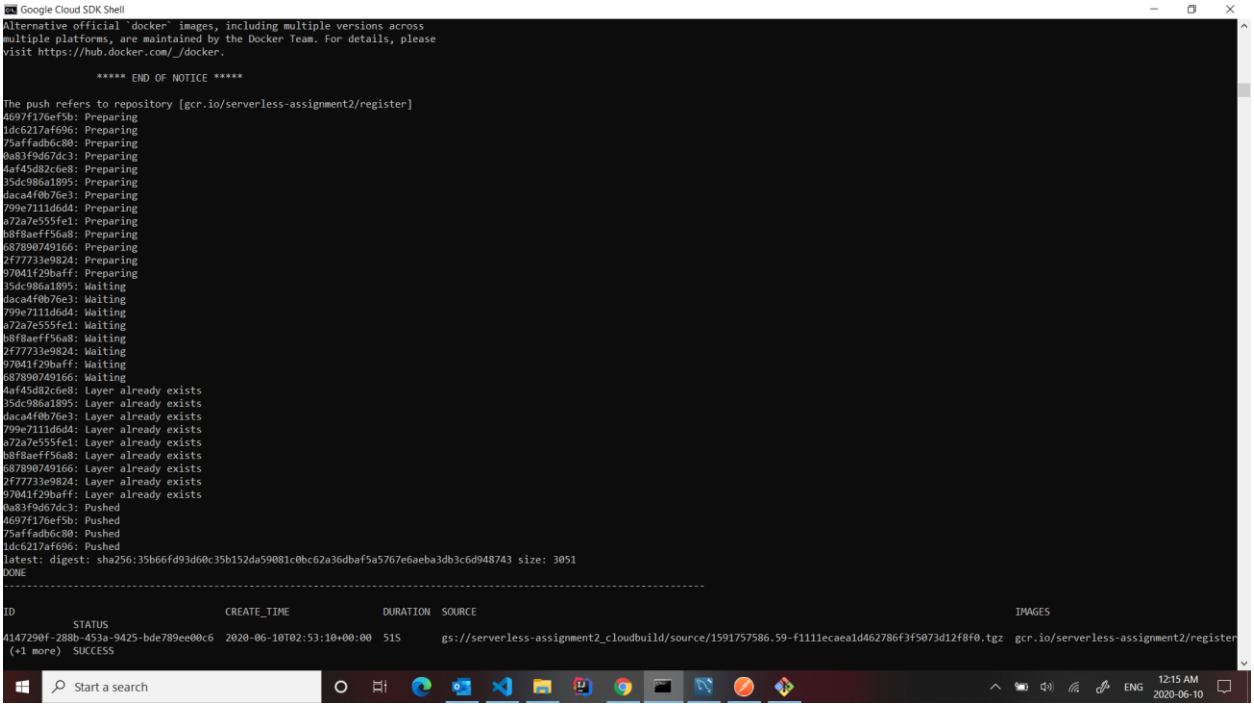


Figure 1: Login Container



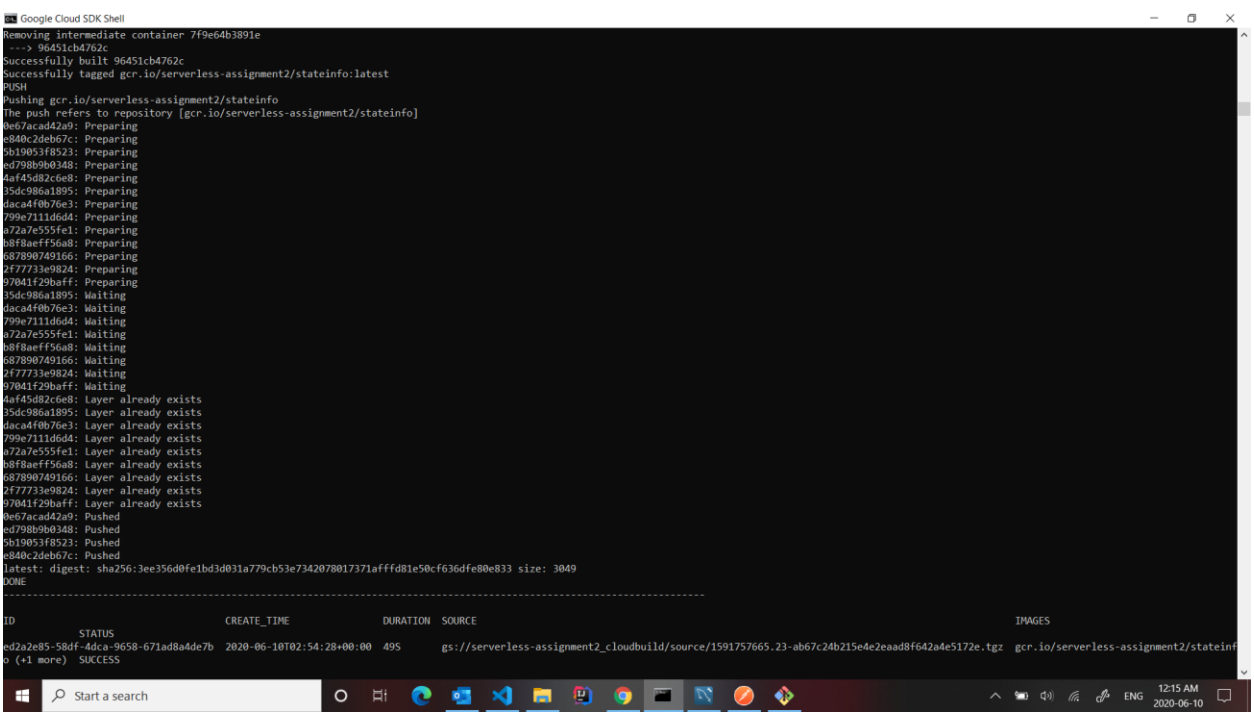
```
Google Cloud SDK Shell
Alternative official `docker` images, including multiple versions across
multiple platforms, are maintained by the Docker Team. For details, please
visit https://hub.docker.com/_/docker.

               ***** END OF NOTICE *****

The push refers to repository [gcr.io/serverless-assignment2/register]
4697f176ef5b: Preparing
1dc6217af696: Preparing
75affadb6c80: Preparing
0a83f9d67dc3: Preparing
4af45d82c6e8: Preparing
35dc986a1895: Preparing
daca4f0b76e3: Preparing
799e7111d6d4: Preparing
a72a7e555fe1: Preparing
b8f8aeff56a8: Preparing
687890749166: Preparing
2f77733e9824: Preparing
97041f29baff: Preparing
35dc986a1895: Waiting
daca4f0b76e3: Waiting
799e7111d6d4: Waiting
a72a7e555fe1: Waiting
b8f8aeff56a8: Waiting
2f77733e9824: Waiting
97041f29baff: Waiting
687890749166: Waiting
4af45d82c6e8: Layer already exists
35dc986a1895: Layer already exists
daca4f0b76e3: Layer already exists
799e7111d6d4: Layer already exists
a72a7e555fe1: Layer already exists
b8f8aeff56a8: Layer already exists
687890749166: Layer already exists
2f77733e9824: Layer already exists
97041f29baff: Layer already exists
0a83f9d67dc3: Pushed
4697f176ef5b: Pushed
75affadb6c80: Pushed
1dc6217af696: Pushed
latest: digest: sha256:35b66fd93d60c35b152da59081c0bc62a36dbaf5a5767e6aeba3db3c6d948743 size: 3051
DONE
------------------------------------------------------------------------------------------------------------------------

ID                                      CREATE_TIME                DURATION  SOURCE                                                                                    IMAGES
            STATUS
4147290f-288b-453a-9425-bde789ee00c6    2020-06-10T02:53:10+00:00  51S       gs://serverless-assignment2_cloudbuild/source/1591757586.59-f1111ecaea1d462786f3f5073d12f8f0.tgz  gcr.io/serverless-assignment2/register
 (+1 more)  SUCCESS
```

Figure 2: Registration Container



```
Google Cloud SDK Shell
Removing intermediate container 7f9e64b3891e
 ---> 96451cb4762c
Successfully built 96451cb4762c
Successfully tagged gcr.io/serverless-assignment2/stateinfo:latest
PUSH
Pushing gcr.io/serverless-assignment2/stateinfo
The push refers to repository [gcr.io/serverless-assignment2/stateinfo]
0e67acad42a9: Preparing
e840c2deb67c: Preparing
5b19053f8523: Preparing
ed798b9b0348: Preparing
4af45d82c6e8: Preparing
35dc986a1895: Preparing
daca4f0b76e3: Preparing
799e7111d6d4: Preparing
a72a7e555fe1: Preparing
b8f8aeff56a8: Preparing
687890749166: Preparing
2f77733e9824: Preparing
97041f29baff: Preparing
35dc986a1895: Waiting
daca4f0b76e3: Waiting
799e7111d6d4: Waiting
a72a7e555fe1: Waiting
b8f8aeff56a8: Waiting
687890749166: Waiting
2f77733e9824: Waiting
97041f29baff: Waiting
4af45d82c6e8: Layer already exists
35dc986a1895: Layer already exists
daca4f0b76e3: Layer already exists
799e7111d6d4: Layer already exists
a72a7e555fe1: Layer already exists
b8f8aeff56a8: Layer already exists
687890749166: Layer already exists
2f77733e9824: Layer already exists
97041f29baff: Layer already exists
0e67acad42a9: Pushed
ed798b9b0348: Pushed
5b19053f8523: Pushed
e840c2deb67c: Pushed
latest: digest: sha256:3ee356d0fe1bd3d031a779cb53e7342078017371afffd81e50cf636dfe80e833 size: 3049
DONE
------------------------------------------------------------------------------------------------------------------------

ID                                      CREATE_TIME                DURATION  SOURCE                                                                                    IMAGES
            STATUS
ed2a2e85-58df-4dca-9658-671ad8a4de7b    2020-06-10T02:54:28+00:00  49S       gs://serverless-assignment2_cloudbuild/source/1591757665.23-ab67c24b215e4e2eaad8f642a4e5172e.tgz  gcr.io/serverless-assignment2/stateinf
o (+1 more)  SUCCESS
```

Figure 3: State Information Container

Google Cloud SDK Shell

```
C:\Users\vamsi\Term-3\Serverless Data Processing\Assignment-2\assign2\authentication\stateinfo>gcloud container images list
NAME
gcr.io/serverless-assignment2/login
gcr.io/serverless-assignment2/register
gcr.io/serverless-assignment2/stateinfo
Only listing images in gcr.io/serverless-assignment2. Use --repository to list images in other repositories.

C:\Users\vamsi\Term-3\Serverless Data Processing\Assignment-2\assign2\authentication\stateinfo>
```

Figure 4: Docker Images List

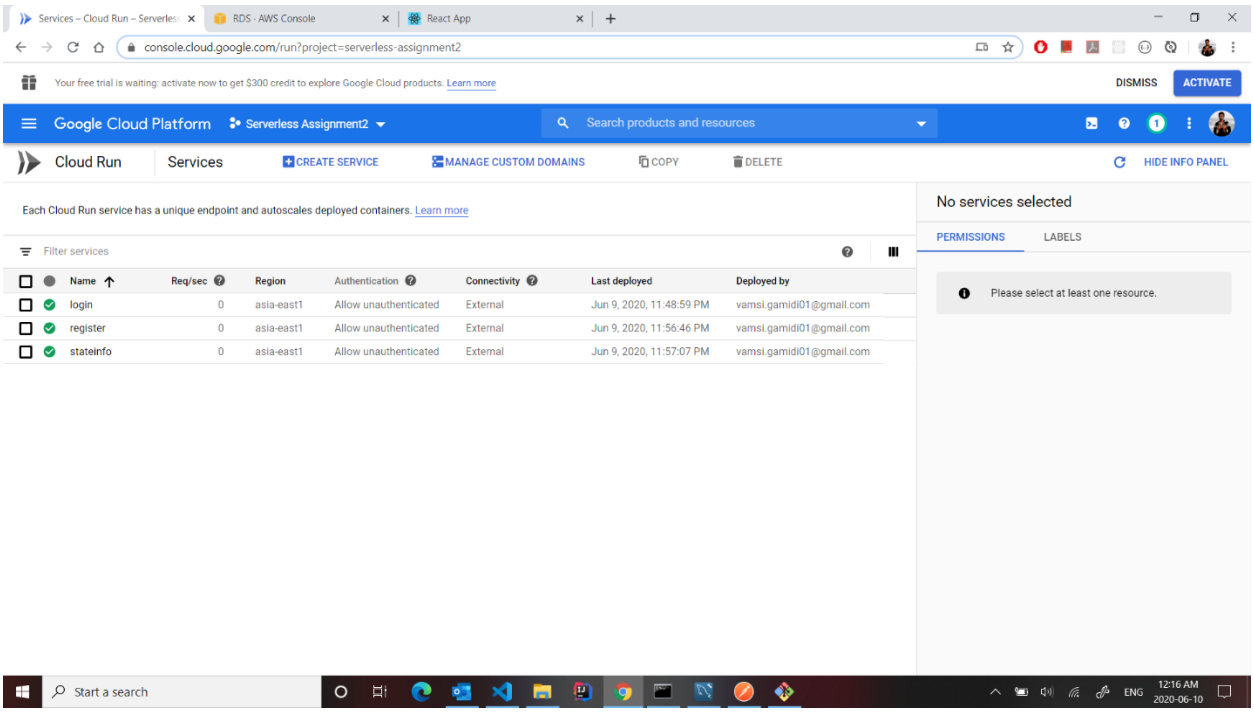


Figure 5: Services in Google Cloud Run

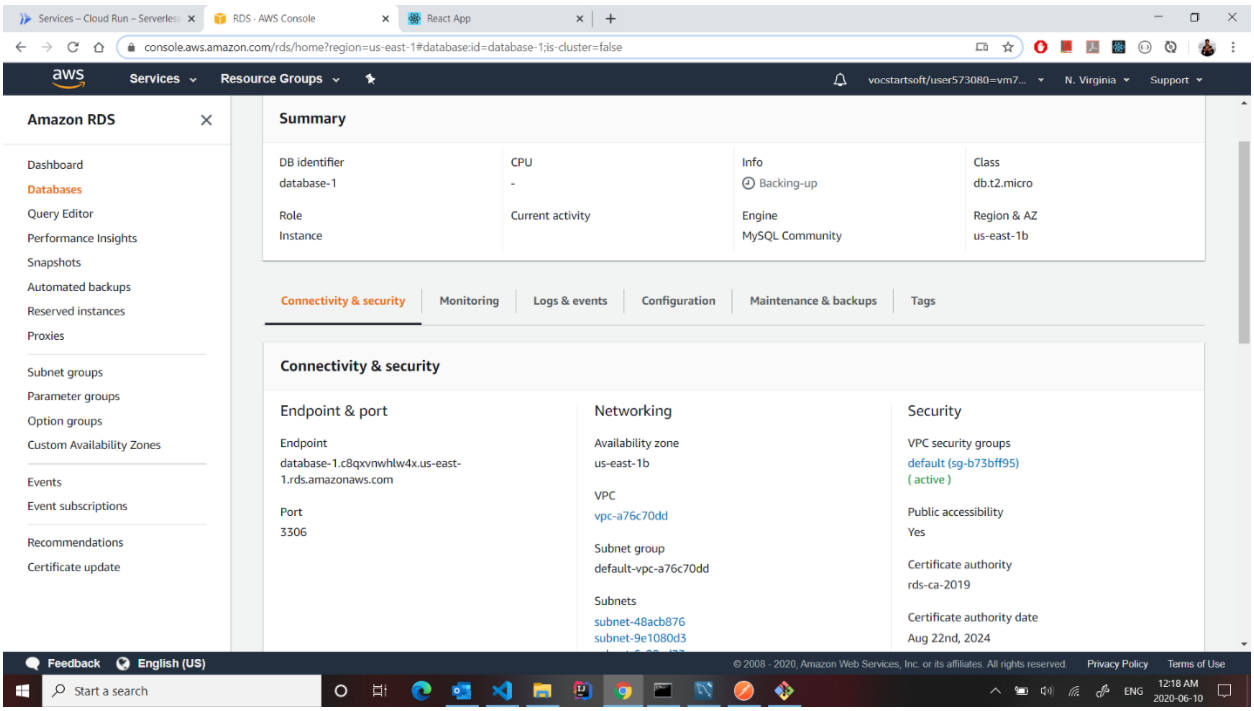


Figure 6: RDS MySQL Database

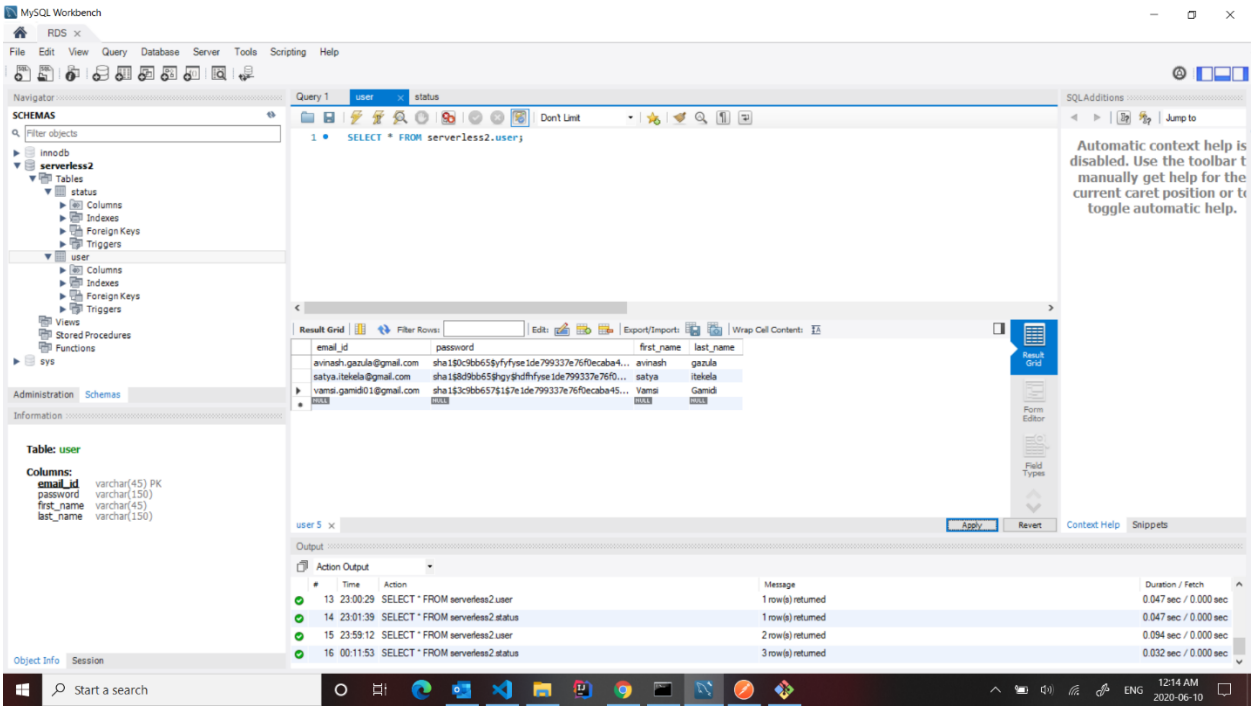


Figure 7: User Table data

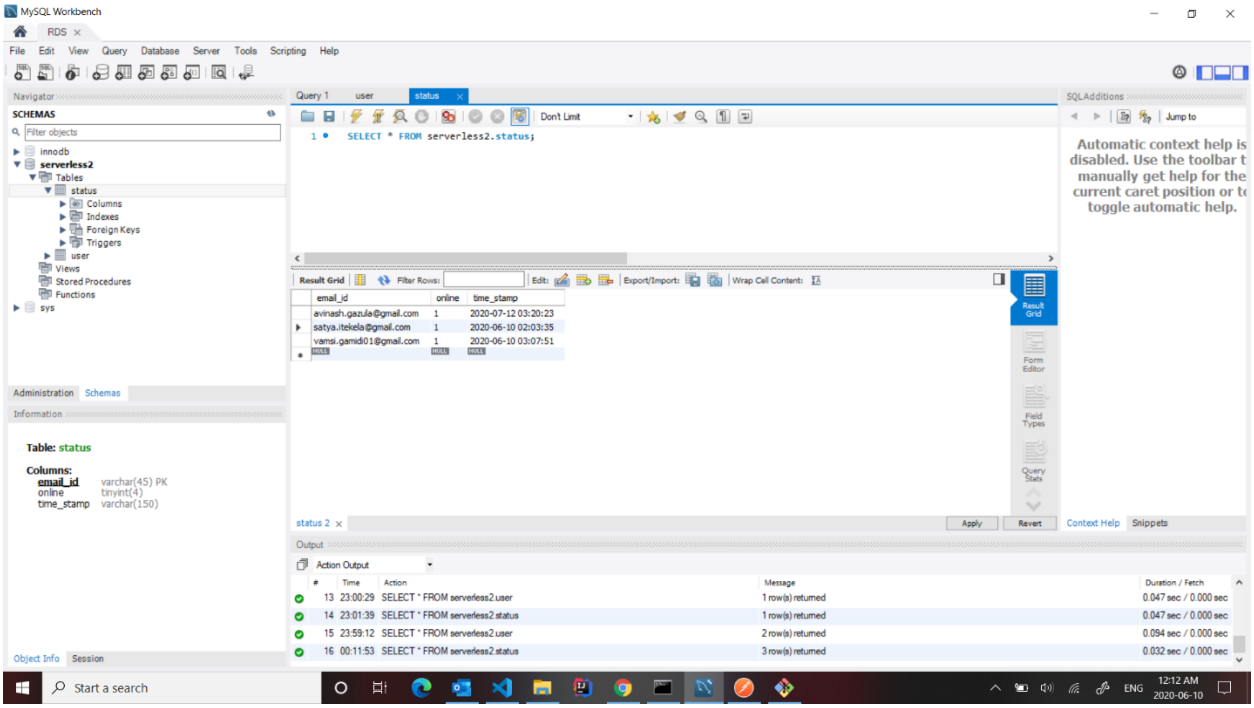


Figure 8: Status Table data

Source Code Snippets

Steps to run the Application

To run the application (front-end), please follow the below steps:

- Download the zip file
- Unzip the file
- Open the folder in VS Code
- Open terminal in VS Code
- Run ‘cd client’
- Run ‘npm install’
- Run ‘npm start’
- Application will be opened in the browser

Snippet 1: Changing the User Status to Online

```
exports.setOnline = (req, res, next) => {
    var sql = `insert into status values("${req.params.emailId}", true, now())
    on duplicate key update online=true, time_stamp=now()`;
```

```
    connection.query(sql, function (err, result){
        console.log(sql);
        if(!err){
        console.log("Status Updated");
        return res.status(200).json({
            success: true
          });
        }
        else{
            console.log(err);
        }
    })
}
```

Snippet 2: Setting Status to offline after Logout

```
exports.logout = (req, res, next) => {
  var sql = `update status set online=false, time_stamp=now() where email_id="${r
eq.params.emailId}"`;
  try {
    connection.query(sql, function (err, result) {
      if (!err) {
        console.log(result);
        console.log("Logged Out");
        return res.status(200).json({
          success: true,
        });
      } else {
        console.log(err);
      }
    });
  } catch (e) {
    console.log(e);
  }
};
```

Snippet 3: Sending Post Request for Registration

```
const handleSubmit = (e) => {
    e.preventDefault();
    axios.post('https://register-y6nn3qcdoq-de.a.run.app/users/register', {
        emailId,
        password,
```

```
        firstName,
        lastName
    }).then(response => {
          history.push('/login')
          console.log(response);
        }).catch(
        error => console.log(error)
    );
}
```

Testing

Test Case 1

User should be able to register by giving details such as email id, password, first name, last name.

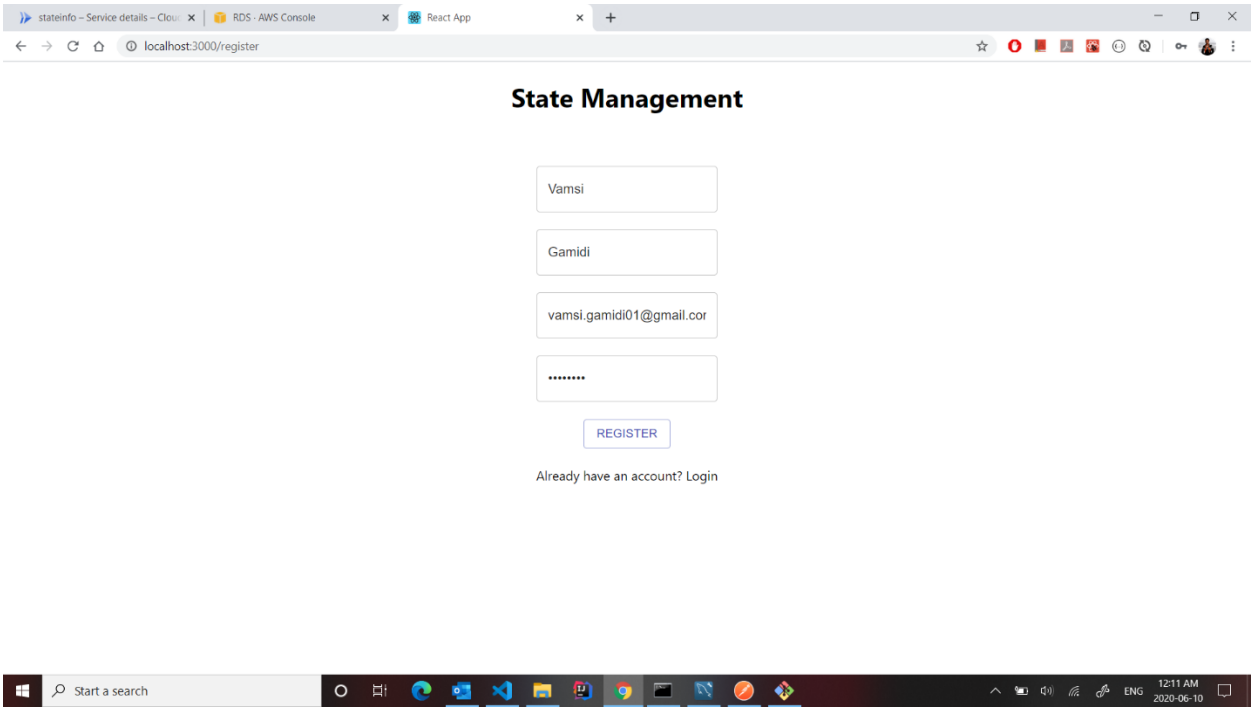


Figure 9: Registration Page

Test Case 2

After successful registration, user should be taken to login screen. In the login screen, by entering valid credentials, user should be able to login.

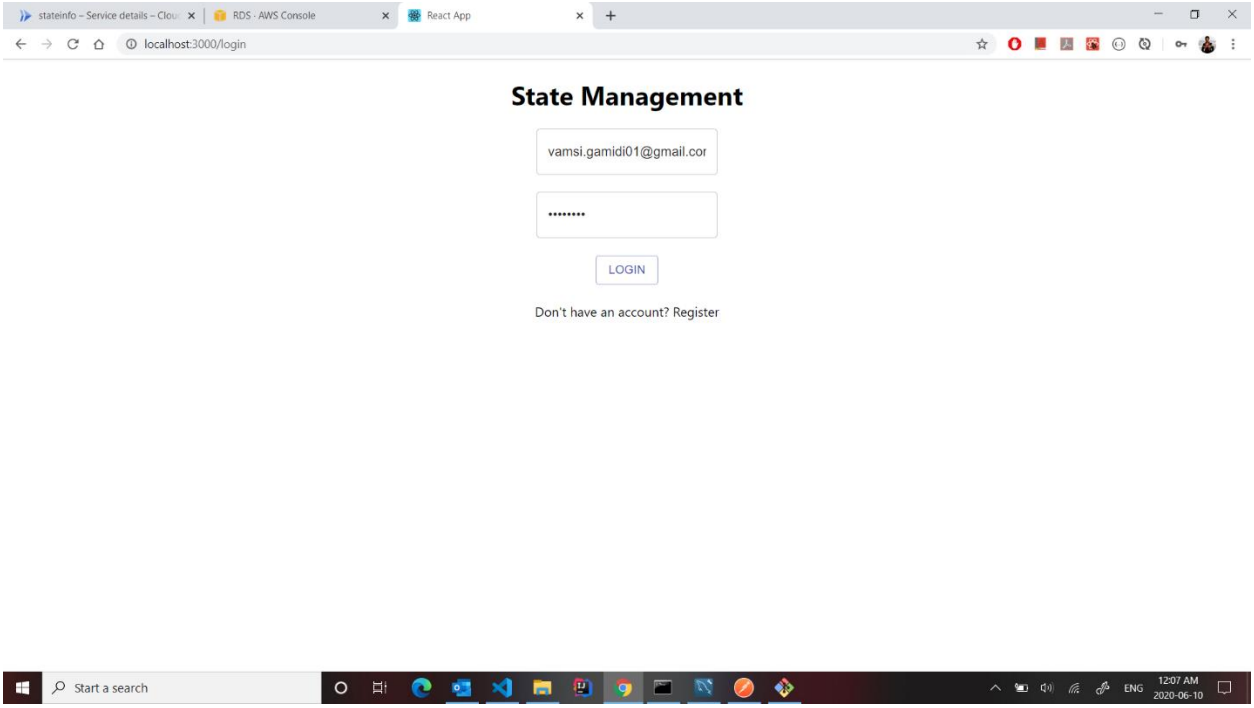


Figure 10: Login Page

Test Case 3

After logging in by entering valid credentials, user should be taken to state information screen where the list of all online users will be displayed.

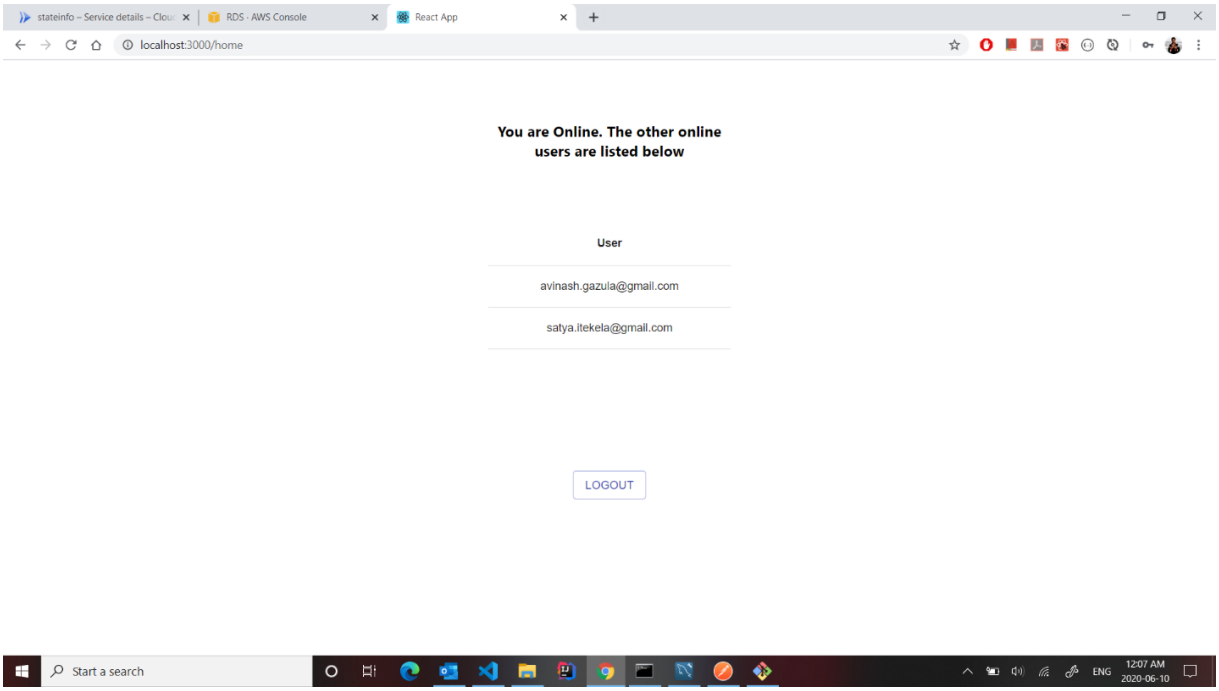


Figure 11: State Information Screen

Part B

Summary

Amazon Lex is a service provided by Amazon Web Services for building chat bots. Amazon Lex supports integration with services such as AWS Lambda, AWS MobileHub, AWS CloudWatch [1]. By using Amazon Lex, I have created a custom bot with the name 'PizzaForAll' and session timeout period of 10 mins [2]. After creating the bot, I have created an intent for pizza pickup. I have added a custom slot type 'PizzaType' for specifying the type of the pizza. Later, I have added the utterance message, slots, and Response messages. After building the bot, I have tested it and provided screenshots. After completing the pizza pickup task, I have created another intent for delivery task. I have added utterance message, slots, and response message relevant to delivery task and tested the bot. Please go through the screenshots provided in which I have demonstrated every step in creation and testing of the bot.

Screenshots

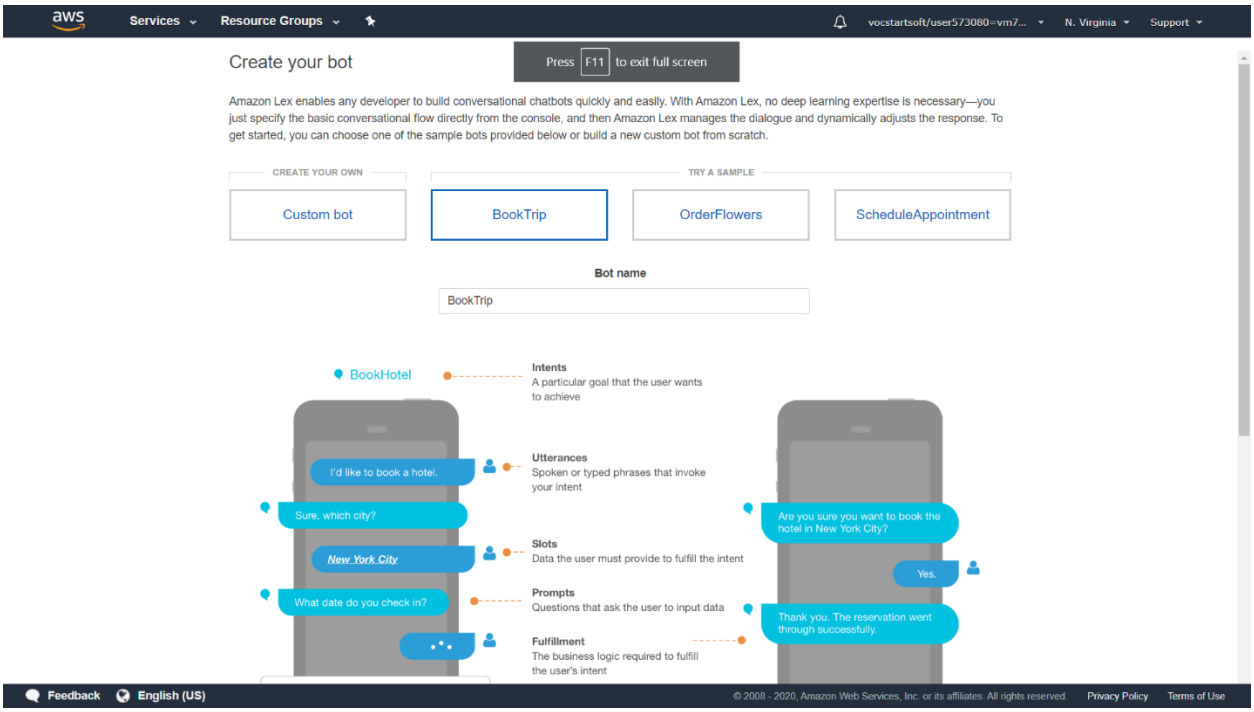


Figure 12: Bot Creation Home Page

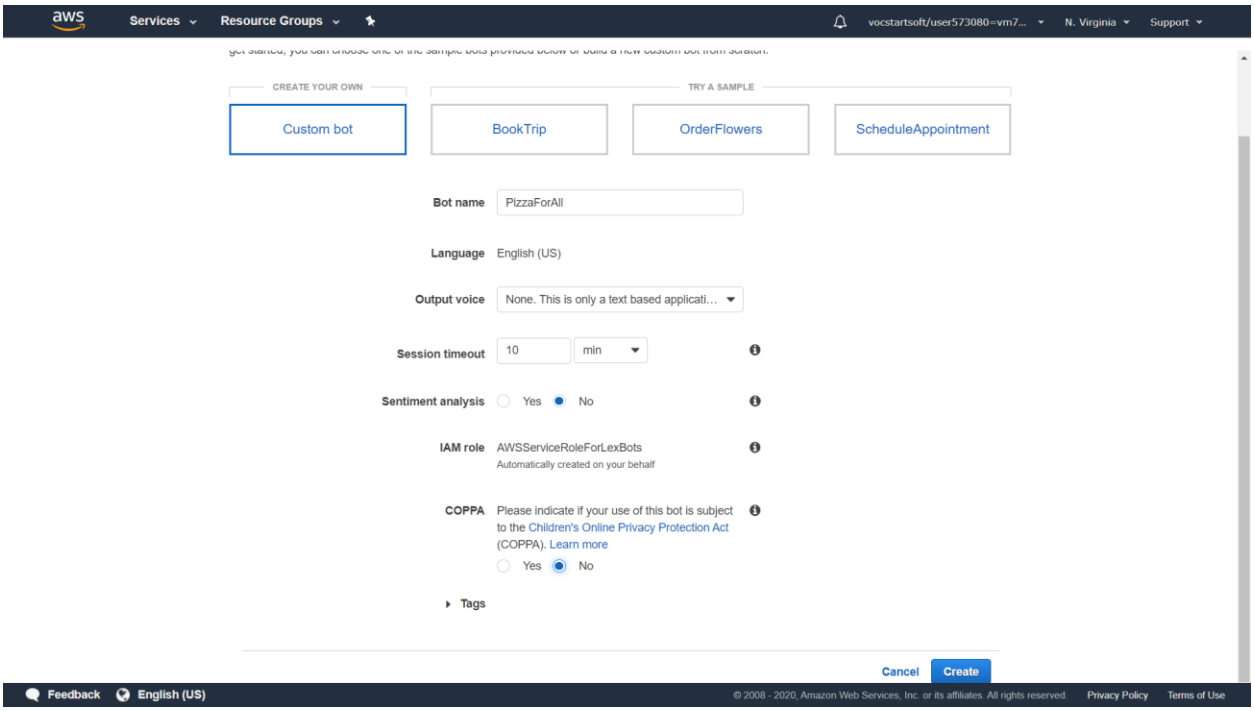


Figure 13: Bot Details

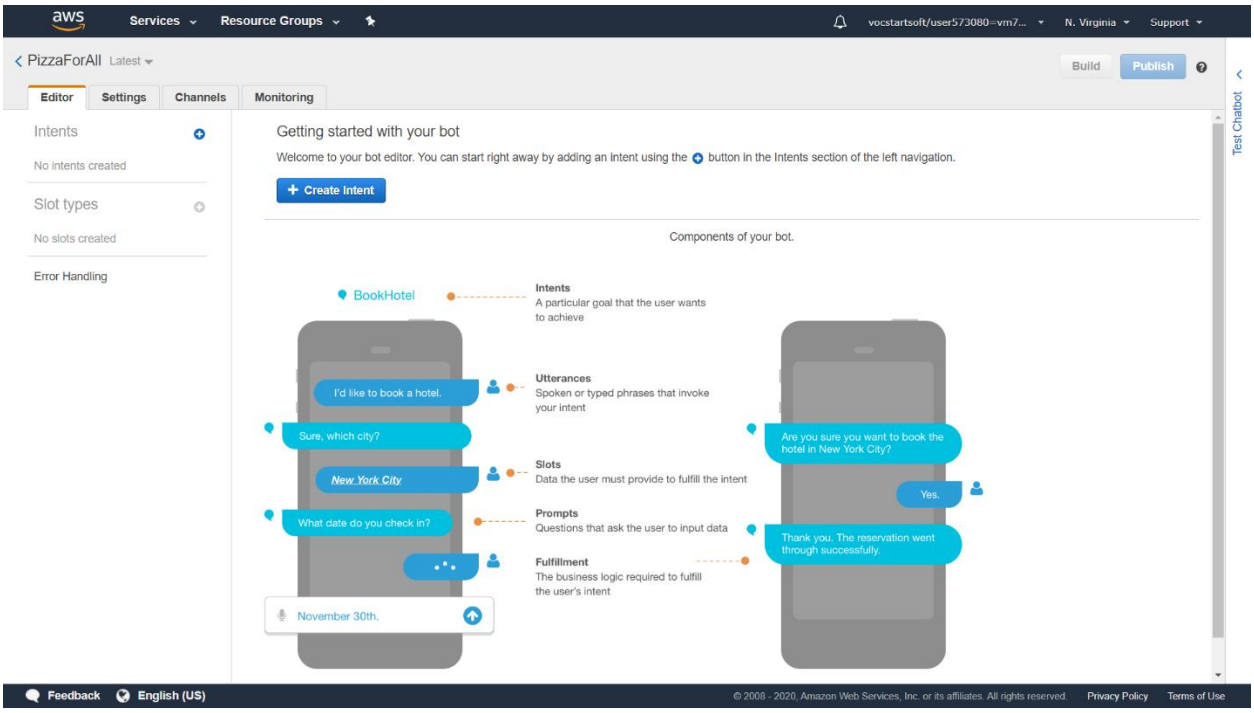


Figure 14: Bot Home Page after Creation

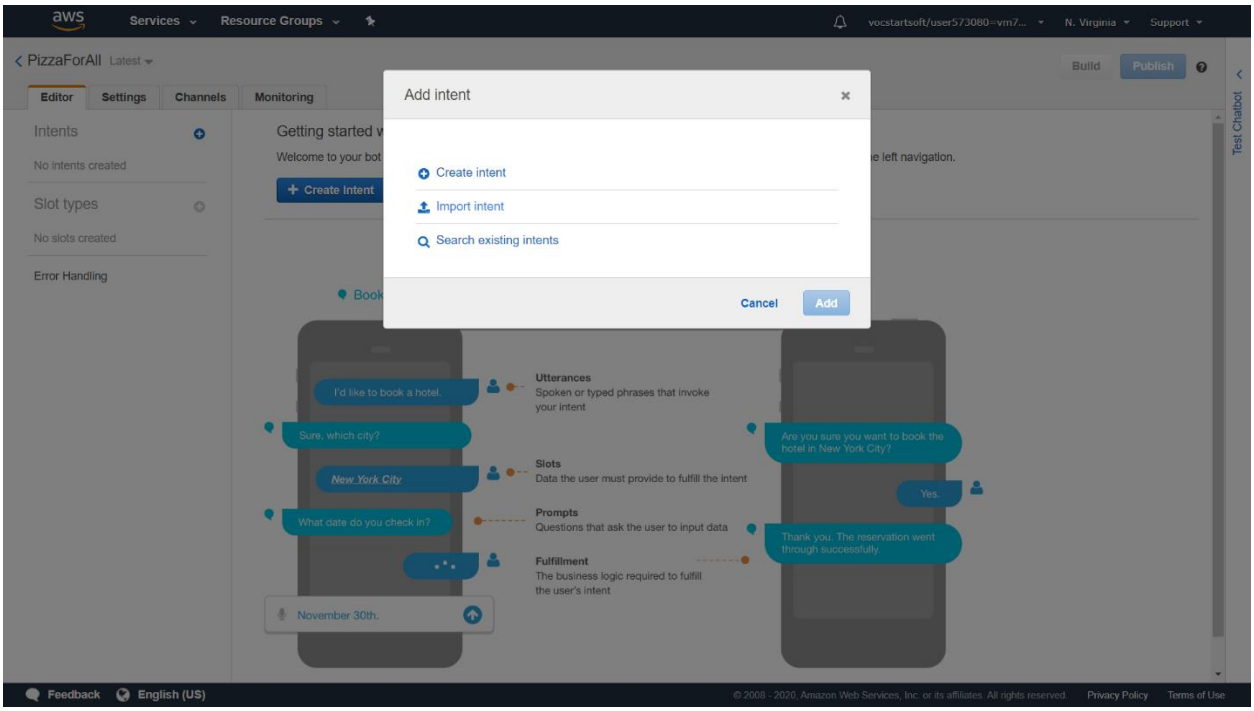


Figure 15: Intent Creation

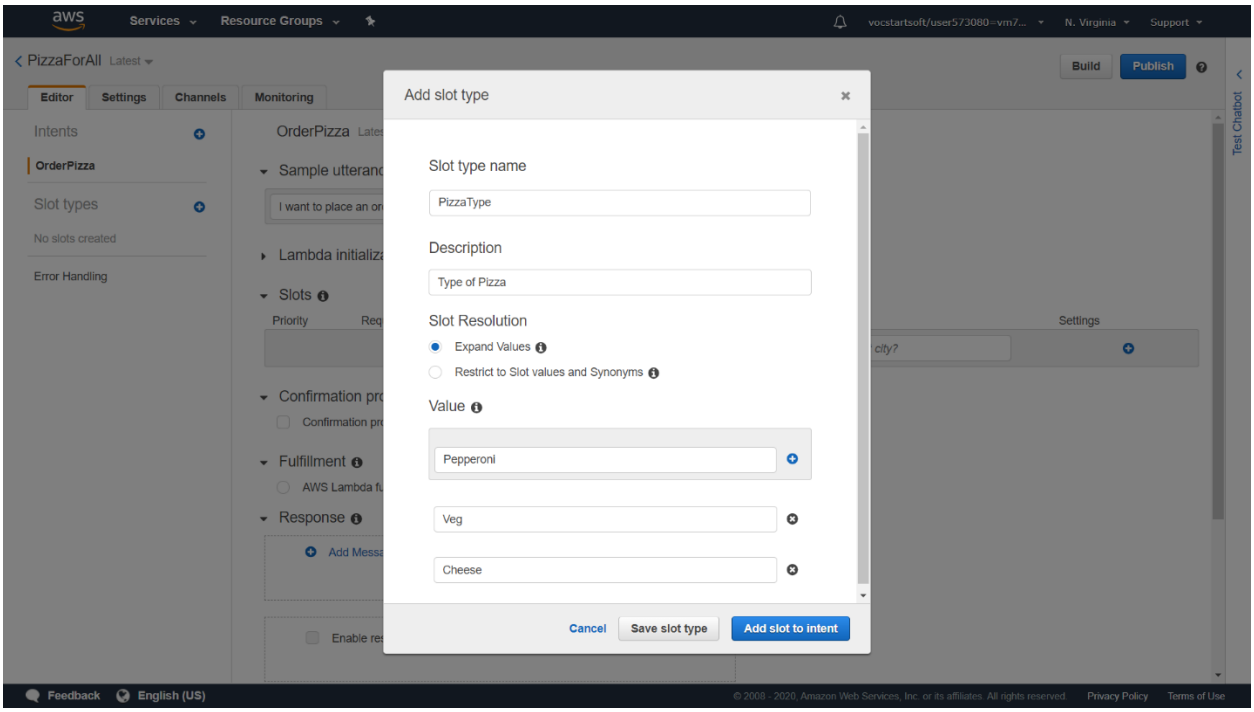


Figure 16: Adding slot to intent

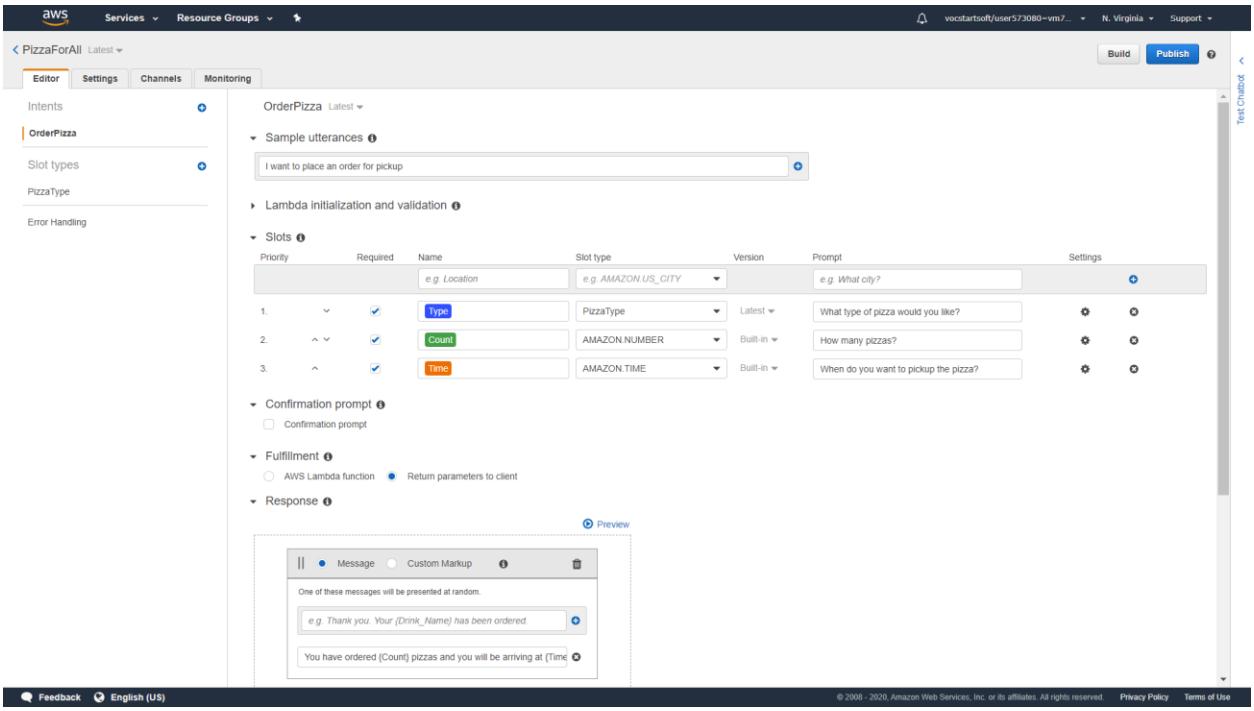


Figure 17: Adding Utterance, Slots, Responses for Order Pickup

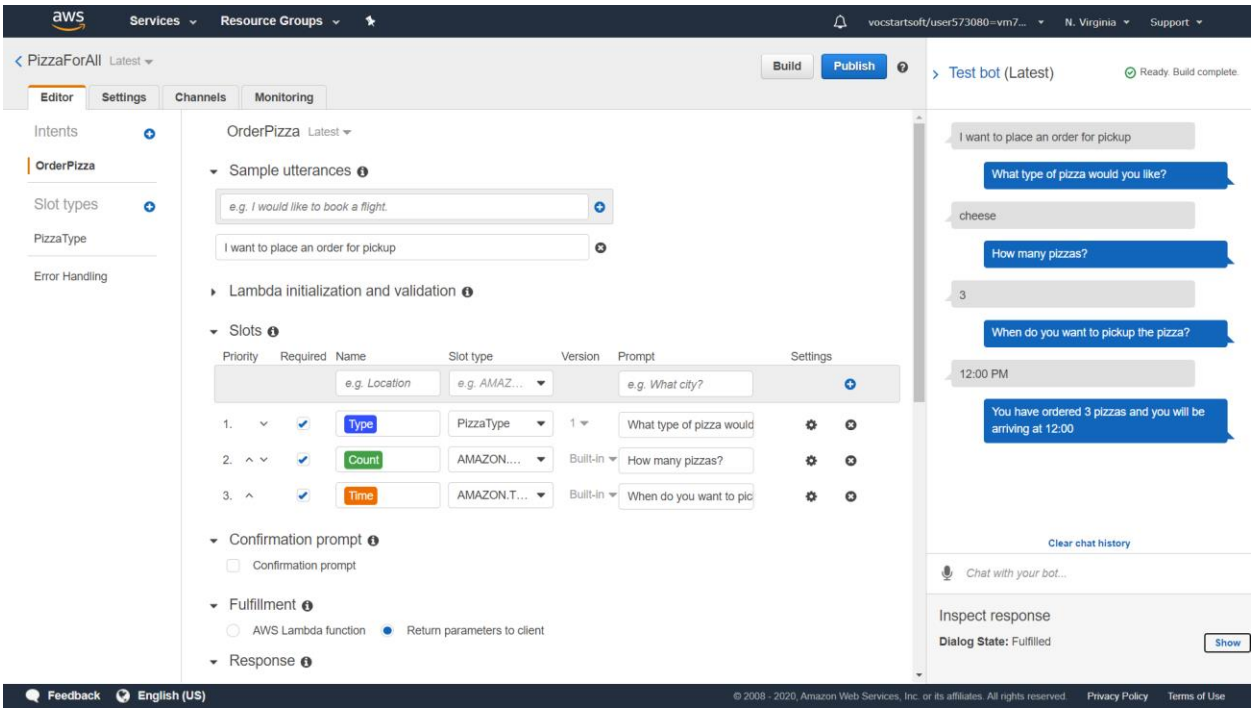


Figure 18: Testing bot for order pickup

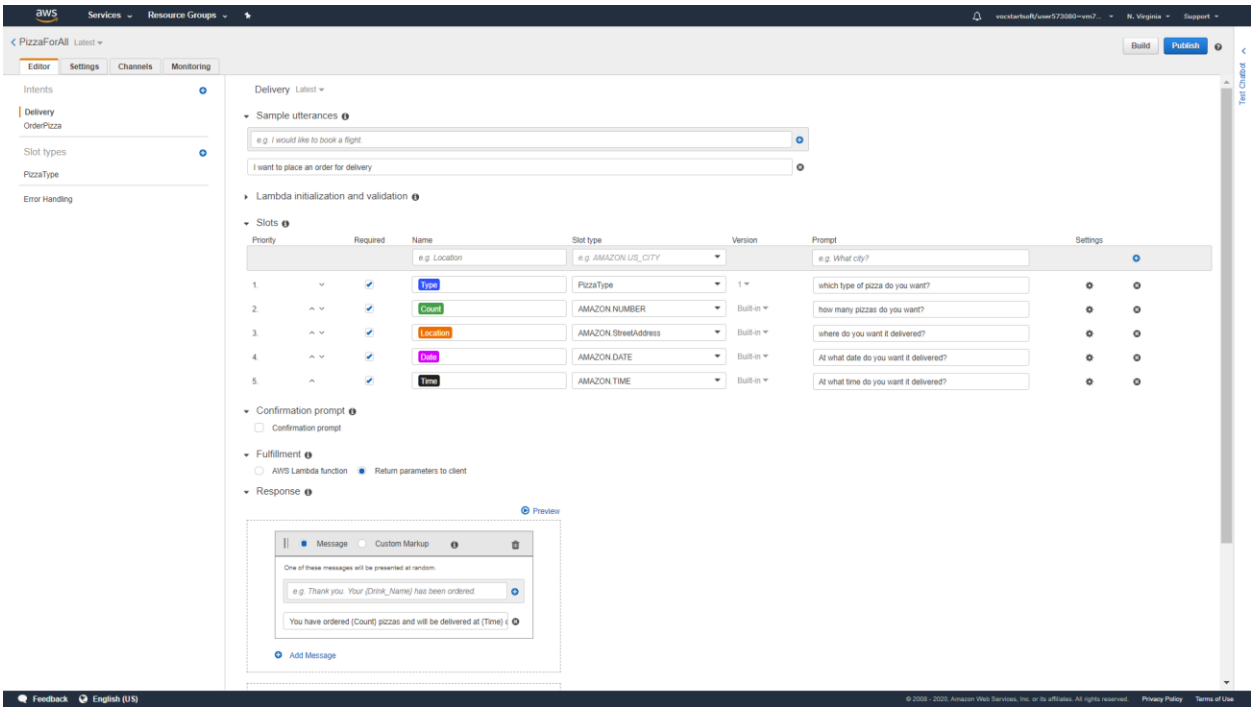


Figure 19: Adding Utterance, Slots, Response for Order Delivery

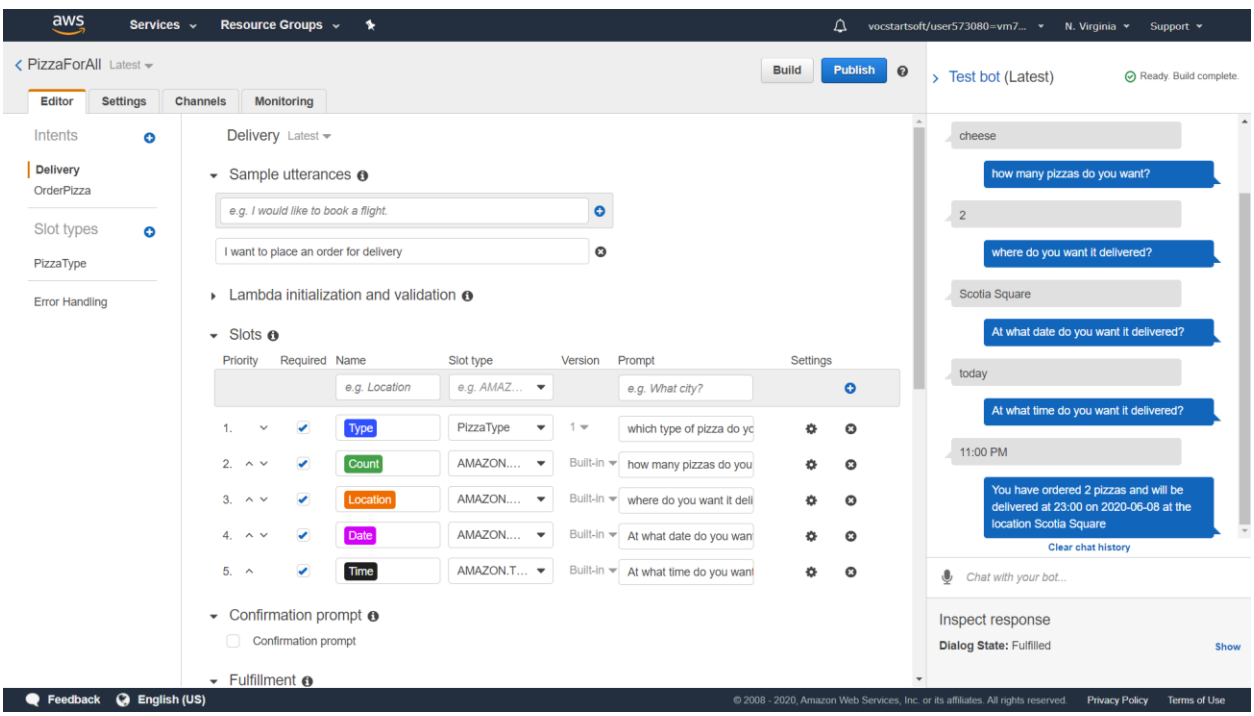


Figure 20: Testing bot for Order Delivery

References

[1]"Amazon Lex – Build Conversation Bots", *Amazon Web Services, Inc.*, 2020. [Online]. Available: https://aws.amazon.com/lex/. [Accessed: 08- Jun- 2020]

[2]"Step 1: Create an Amazon Lex Bot (Console) - Amazon Lex", *Docs.aws.amazon.com*, 2020. [Online]. Available: https://docs.aws.amazon.com/lex/latest/dg/gs-bp-create-bot.html. [Accessed: 08- Jun- 2020].

[3]"Cloud Run: Container to production in seconds | Google Cloud", *Google Cloud*, 2020. [Online]. Available: https://cloud.google.com/run. [Accessed: 08- Jun- 2020]

[4]"Container Registry | Google Cloud", *Google Cloud*, 2020. [Online]. Available: https://cloud.google.com/container-registry. [Accessed: 09- Jun- 2020]

[5]"Pushing and pulling images | Container Registry Documentation", *Google Cloud*, 2020. [Online]. Available: https://cloud.google.com/container-registry/docs/pushing-and-pulling. [Accessed: 09- Jun- 2020]

[6]"Deploy and run a container with Cloud Run on Node.js", *Codelabs.developers.google.com*, 2020. [Online]. Available: https://codelabs.developers.google.com/codelabs/cloud-run-hello/#0. [Accessed: 09- Jun- 2020].