

Simulate Distributed IPAM

Overview:

In this assignment, I will leverage a queue service to provide IP addresses in a client/server architecture. Leverage Amazon SQS to return the most recently available IP address.

Technology:

Language: Java

Develop Tool: IntelliJ IDEA

Build Tool: Apache maven

Cloud Service: AWS SQS

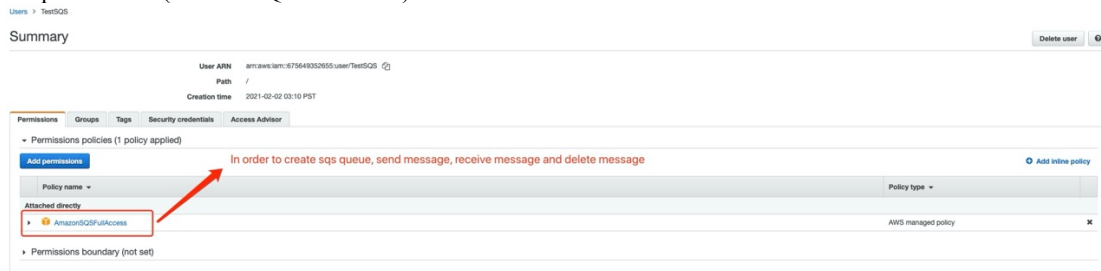
Implement:

1. Create an AWS account
2. Create an IAM user (TestSQS)



| Find users by username or access key | Groups | Access key age | Password age | Last activity | MFA |
|--------------------------------------|----------------|----------------|--------------|---------------|-------------|
| Administrator | Administrators | Yesterday | Yesterday | None | Not enabled |
| TestSQS | None | Yesterday | None | Yesterday | Not enabled |
| TestSQS | None | Yesterday | None | Today | Not enabled |

3. Set permissions (AmazonSQSFullAccess)



Summary

User ARN: arn:aws:iam::67564932655:user/TestSQS

Path: /

Creation time: 2021-02-02 03:10 PST

Permissions policies (1 policy applied)

Attached directly

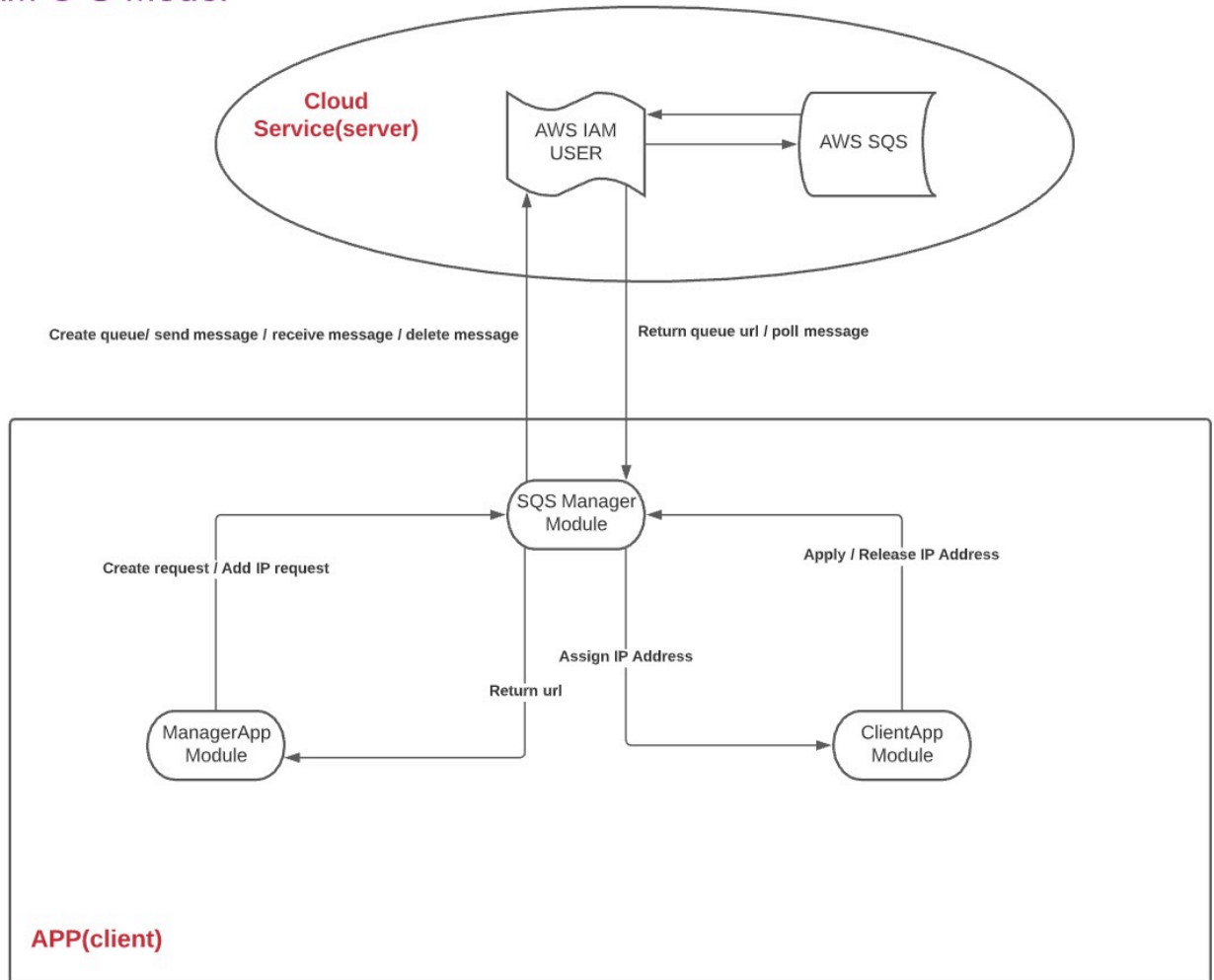
AmazonSQSFullAccess

Policy type: AWS managed policy

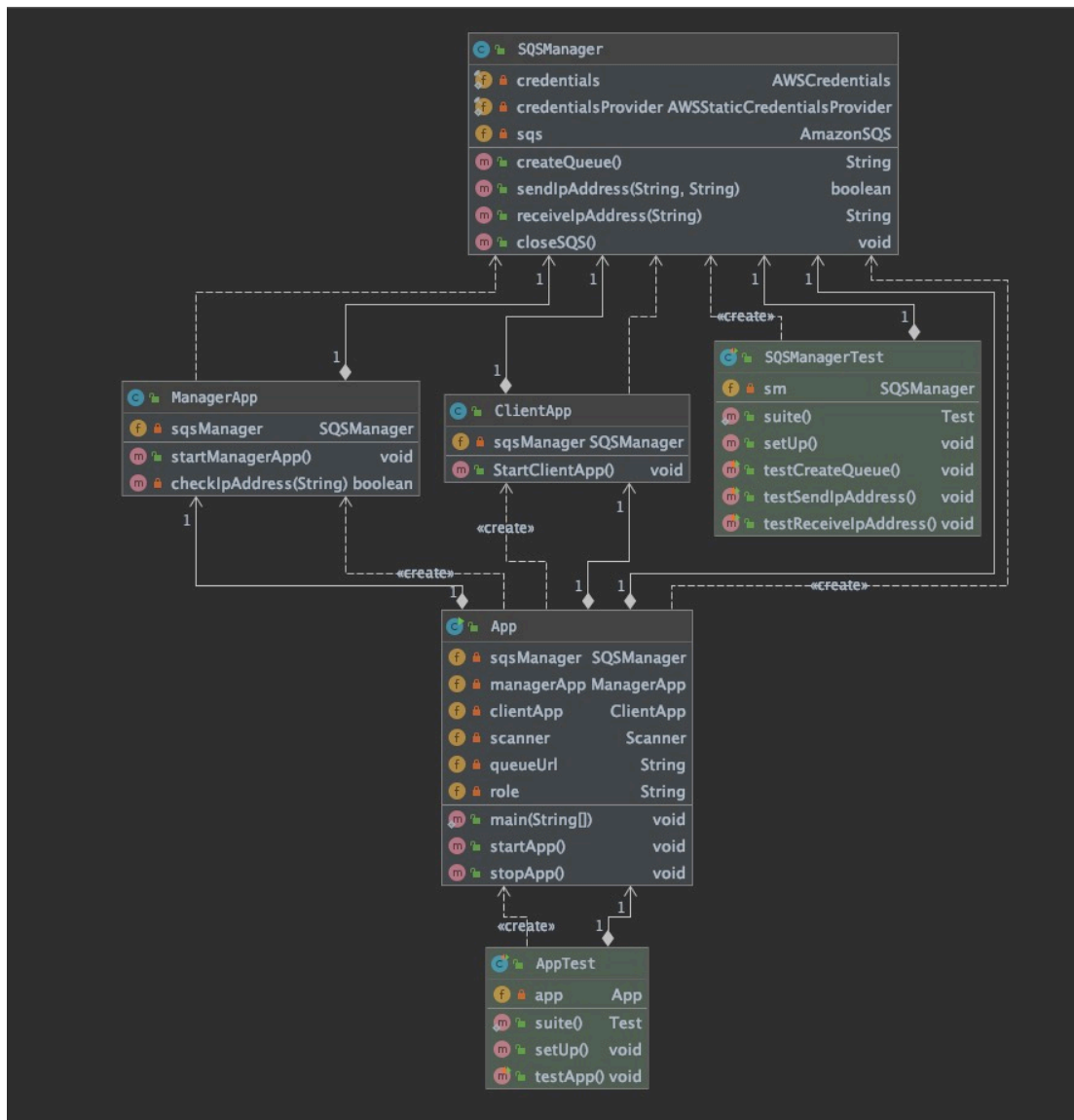
4. Get the Access Key ID and the Secret Access Key
5. Configure credentials (In order to Ensure the cloud service are easy to access, I save the credentials in the application)
6. Start to develop the application.
7. Build a new class called "SQSManager" which is used to communicate with AWS sqs service. The class supports to build Amazon sqs client, create sqs queue, send message, receive message, delete message and close connection.
8. Build a new class called "App" and create an instance of "SQSManager".
9. Build a new class called "ManagerApp". By calling "SQSManager" functions, this class can be used to create sqs queue and add IP address.
10. Build a new class called "ClientApp". By calling "SQSManager" functions, this class can be used to apply IP address and release IP address.

Architecture:

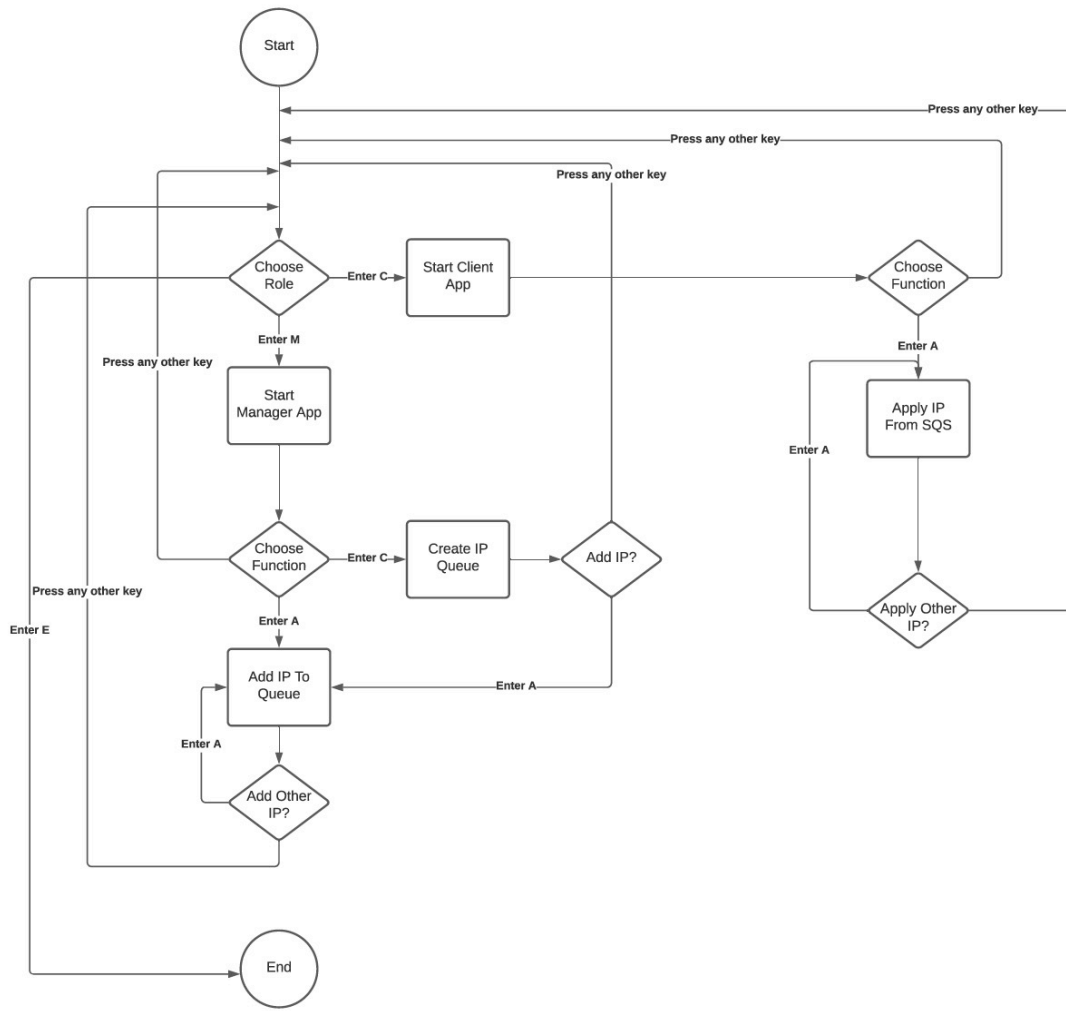
IPAM C-S Model



UML:



Workflow:



SQS:

The screenshot shows the Amazon SQS console. At the top, there's a 'Queues (2)' section with a search bar and a 'Create queue' button. Below this is a table listing two queues:

| Name | Type | Created | Messages available | Messages in flight | Encryption | Content-based deduplication |
|--------------------------|------|------------------------|--------------------|--------------------|------------|-----------------------------|
| A1_IP_ADDRESS_QUEUE.fifo | FIFO | 2/3/2021, 01:52:54 PST | 3 | 0 | - | Disabled |
| MyTestQueue.fifo | FIFO | 2/3/2021, 02:00:36 PST | 1 | 0 | - | Disabled |

Red arrows point to the queue names with labels: 'Be used for IPAM' pointing to 'A1_IP_ADDRESS_QUEUE.fifo' and 'Be used for Test Case' pointing to 'MyTestQueue.fifo'.

Below the table, the details for 'A1_IP_ADDRESS_QUEUE.fifo' are shown. The 'Type' is 'FIFO'. The 'URL' is 'https://sqs.us-east-2.amazonaws.com/675649352655/A1_IP_ADDRESS_QUEUE.fifo'. The 'Default visibility timeout' is '30 Seconds'. The 'Delivery delay' is '5 Seconds'.

Running Result:

```
*****
* Please Chose Your Role :
* 1.Manager (Enter M)
* 2.Client (Enter C)
* 3.Exit (Enter E)
*****
>>M
*****
* -Manager> You can do the following things:
* 1.Create a new ip queue(Enter C)
* 2.Add a new ip address to the queue(Enter A)
* 3.Return to main menu(Press any other key)
*****
>>C
Create SQS Queue Successfully! The URL is : https://sqs.us-east-2.amazonaws.com/675649352655/A1_IP_ADDRESS_QUEUE.fifo
*****
* 1.Add a new ip address to the queue(Enter A)
* 2.Return to main menu(Press any other key)
*****
>>A
Please enter the new ip address:
>>192.168.0.1
Add new IP address successfully!!
*****
* 1.Continue to add ip address (Enter A)
* 2.Return to main menu(Press any other key)
*****
>>A
Please enter the new ip address:
>>192.168.0.2
Add new IP address successfully!!
*****
* 1.Continue to add ip address (Enter A)
* 2.Return to main menu(Press any other key)
*****
>>A
Please enter the new ip address:
>>192.168.0.3
Add new IP address successfully!!
*****
* 1.Continue to add ip address (Enter A)
* 2.Return to main menu(Press any other key)
*****
>>
```

Red arrows point to the URL and the IP addresses with labels: 'Create sqs queue and return the url' pointing to the URL and 'After creating queue, add three IP to the queue' pointing to the IP addresses.

```

*****
* Please Chose Your Role : *
* 1.Manager (Enter M) *
* 2.Client (Enter C) *
* 3.Exit (Enter E) *
*****
>>C
*****
* <Client> You can do the following things: *
* 1.Apply a new IP address(Enter A) *
* 2.Return to main menu(Press any other key) *
*****
>>A Enter "A" to apply the first IP
You get an IP address: 192.168.0.1
*****
* 1.Apply other IP address(Enter A) *
* 2.Return to main menu(Press any other key) *
*****
>>A Before getting the second IP, release the first one
Release IP address(192.168.0.1) successfully!!
You get an IP address: 192.168.0.2
*****
* 1.Apply other IP address(Enter A) *
* 2.Return to main menu(Press any other key) *
*****
>>A Get the last IP
Release IP address(192.168.0.2) successfully!!
You get an IP address: 192.168.0.3
*****
* 1.Apply other IP address(Enter A) *
* 2.Return to main menu(Press any other key) *
*****
>>A Get 192.168.0.1 again
Release IP address(192.168.0.3) successfully!!
You get an IP address: 192.168.0.1
*****
* 1.Apply other IP address(Enter A) *
* 2.Return to main menu(Press any other key) *
*****
>>

```