Serverless Cloud Solution

Group 8

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aws academy

Problem Statement

Company X is a manufacturing company and produces widgets. Company X is in the process innovating their inspection process which has been completely manual to this point. Inspectors take pictures of widgets to ensure that the widgets are within compliance standards set by the Quality Assurance Group.

*As a concrete implementation Company X is in the business of manufacturing Golden Retrievers on an assembly line.

Objective

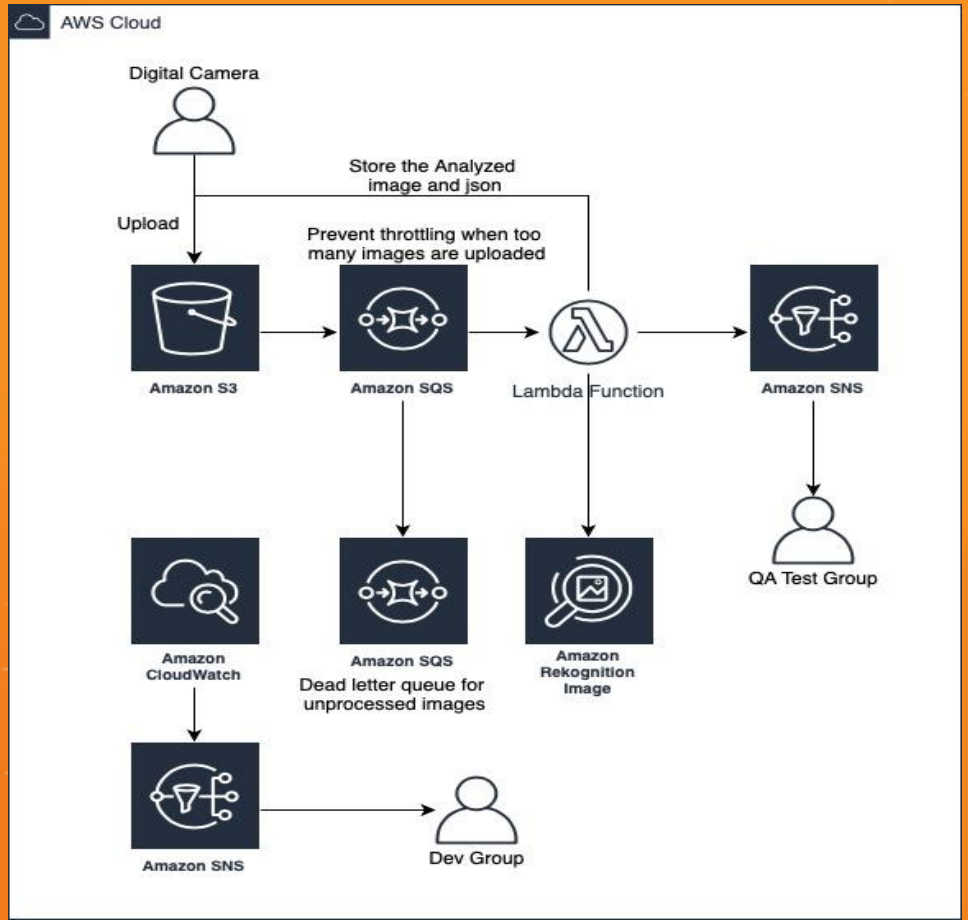
-The objective of this new project is to automate and innovate the existing process.

1. A digital picture of the widget is taken by a worker on the assembly line
2. The image is analyzed by the inspector to determine if each of the expected objects on the widget are present
3. Once the inspection is complete, a message is sent to the Quality Control group with the results of the inspector's analysis.
4. The original images as well as the analyzed images are stored for compliance purposes for 3 years

Requirements

1) The current manual inspection process must be as automated as possible (fully automated)
2) The design and implementation must be serverless and leverage AWS best practices architecture
3) The inspection process will be automated using AWS image recognition services
4) The architecture/implementation will be completely event based starting with the presence of the digital image from the assembly line (assume that there is a camera on the assembly line that is able to take images and store them in the cloud).

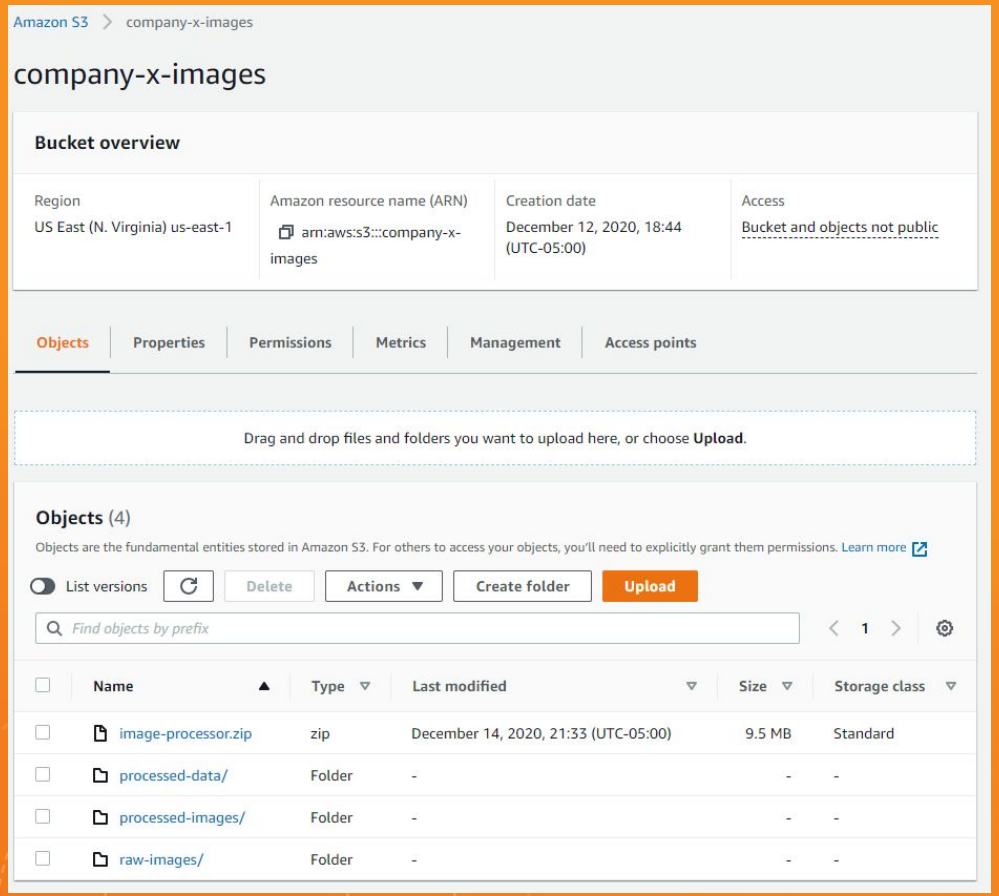
Architecture



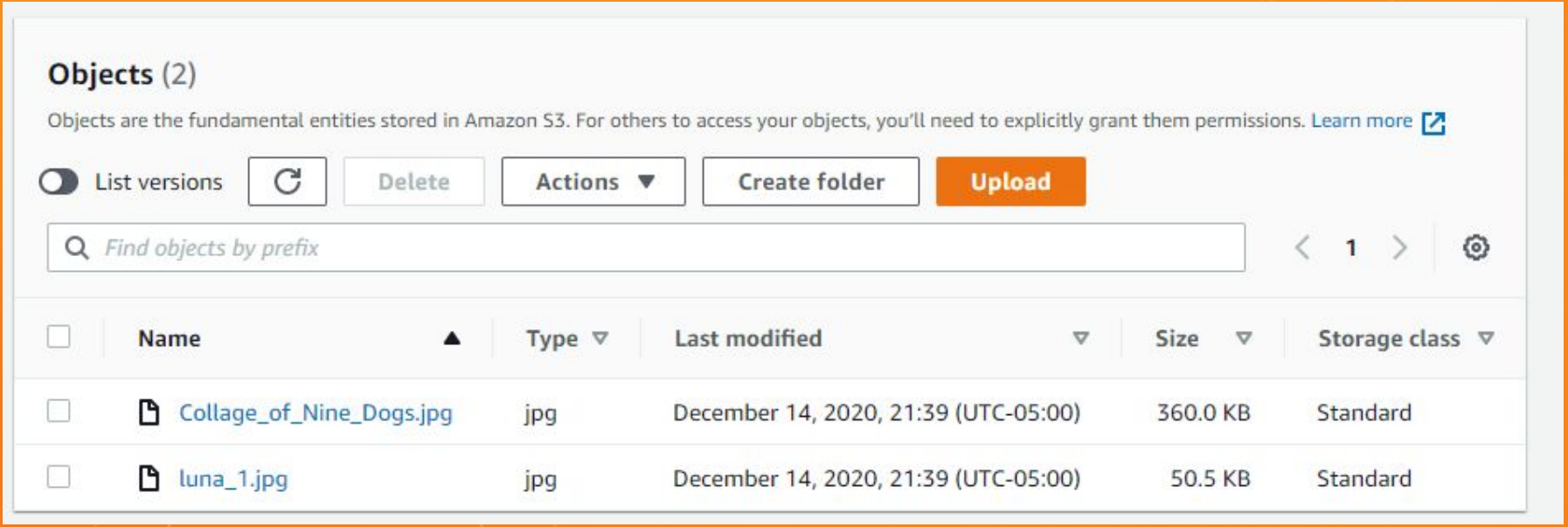
Components

- S3: Store the original and the analyzed images
- SQS
  - Queue: Prevent Throttling of lambda
  - Dead Letter Queue: Stores unprocessed messages
- Lambda: Serverless computation
- Rekognition: Inspect the image
- SNS:
  - notify-qa-group: Notify the Quality Control group
  - Notify-dev: Monitoring the cloudwatch alarms
- CloudWatch: Monitoring the application

S3


Amazon S3 > company-x-images
company-x-images
Bucket overview
Region
US East (N. Virginia) us-east-1
Amazon resource name (ARN)
arn:aws:s3:::company-x-images
Creation date
December 12, 2020, 18:44 (UTC-05:00)
Access
Bucket and objects not public
Objects
Properties
Permissions
Metrics
Management
Access points
Drag and drop files and folders you want to upload here, or choose Upload.
Objects (4)
Objects are the fundamental entities stored in Amazon S3. For others to access your objects, you'll need to explicitly grant them permissions. Learn more
List versions
Delete
Actions
Create folder
Upload
Find objects by prefix
1
Name
Type
Last modified
Size
Storage class
image-processor.zip
zip
December 14, 2020, 21:33 (UTC-05:00)
9.5 MB
Standard
processed-data/
Folder
-
-
-
processed-images/
Folder
-
-
-
raw-images/
Folder
-
-
-

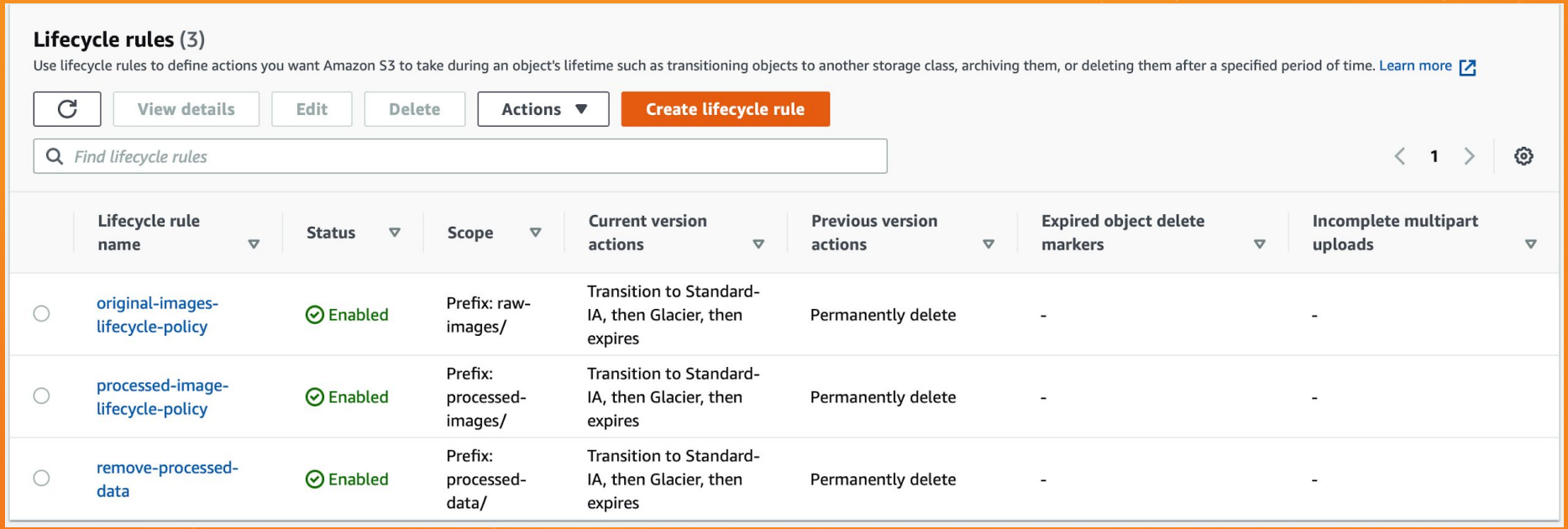
Raw image upload



Processed Image

*An image is deemed verified if it detects 1 and only 1 Golden Retriever

Lifecycle policies



Lifecycle rules (3)

Use lifecycle rules to define actions you want Amazon S3 to take during an object's lifetime such as transitioning objects to another storage class, archiving them, or deleting them after a specified period of time. Learn more

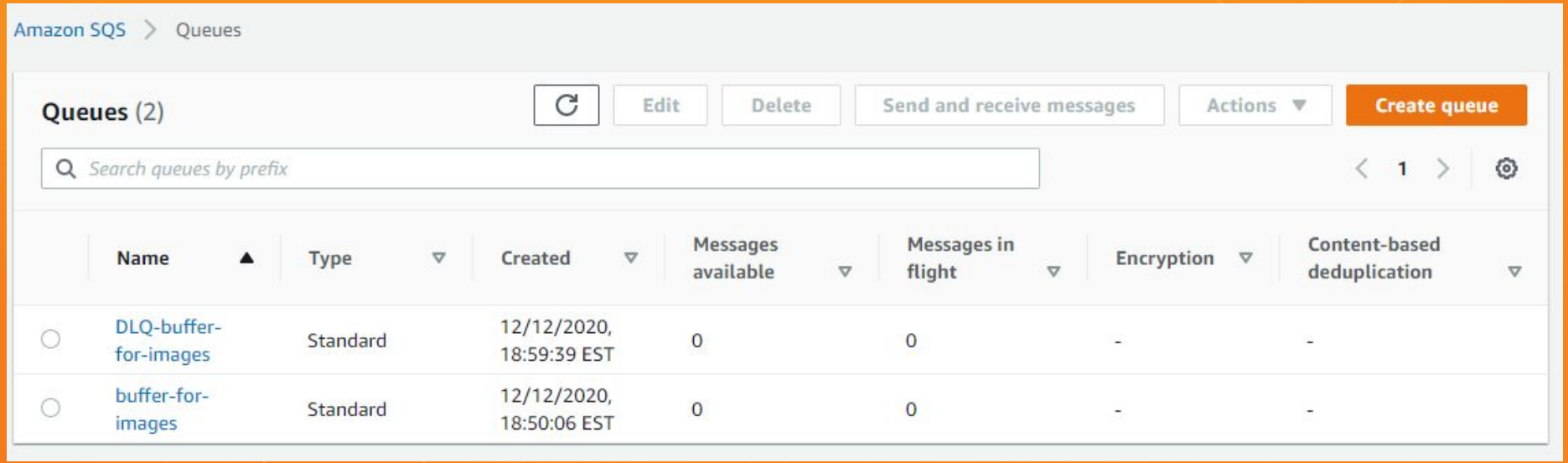
View details | Edit | Delete | Actions | Create lifecycle rule

Find lifecycle rules

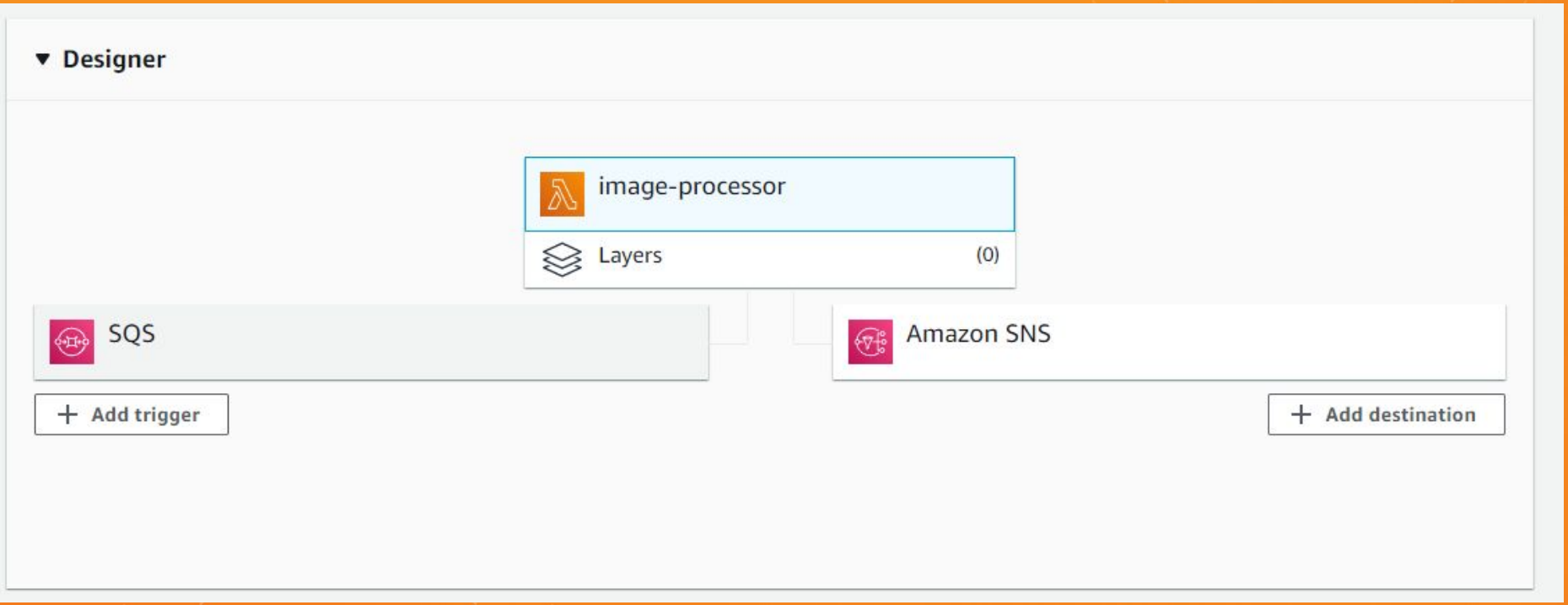
1

Lifecycle rule name	Status	Scope	Current version actions	Previous version actions	Expired object delete markers	Incomplete multipart uploads
original-images-lifecycle-policy	Enabled	Prefix: raw-images/	Transition to Standard-IA, then Glacier, then expires	Permanently delete	-	-
processed-image-lifecycle-policy	Enabled	Prefix: processed-images/	Transition to Standard-IA, then Glacier, then expires	Permanently delete	-	-
remove-processed-data	Enabled	Prefix: processed-data/	Transition to Standard-IA, then Glacier, then expires	Permanently delete	-	-

SQS

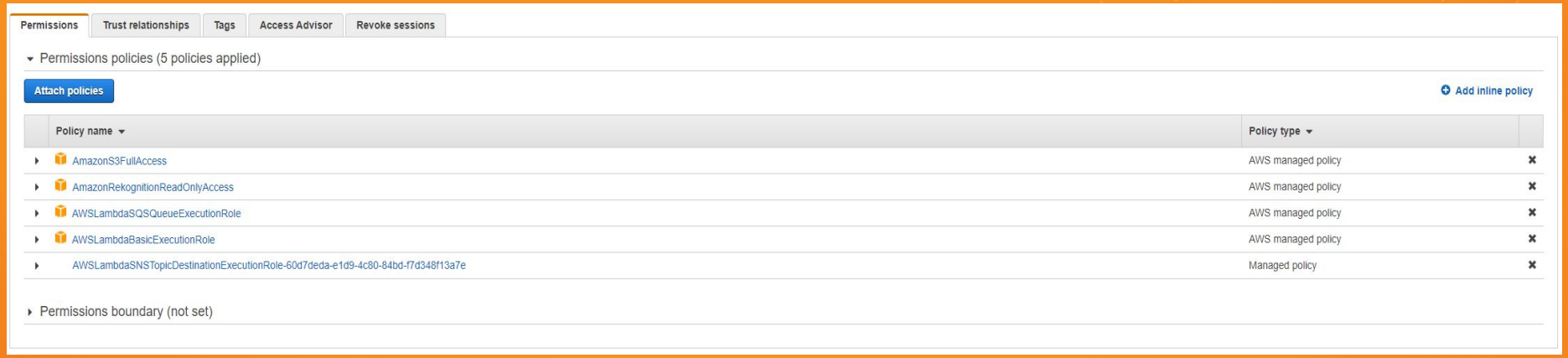

Amazon SQS > Queues
Queues (2)
Edit
Delete
Send and receive messages
Actions
Create queue
Search queues by prefix
1
Name
Type
Created
Messages available
Messages in flight
Encryption
Content-based deduplication
DLQ-buffer-for-images
Standard
12/12/2020, 18:59:39 EST
0
0
-
-
buffer-for-images
Standard
12/12/2020, 18:50:06 EST
0
0
-
-

Lambda

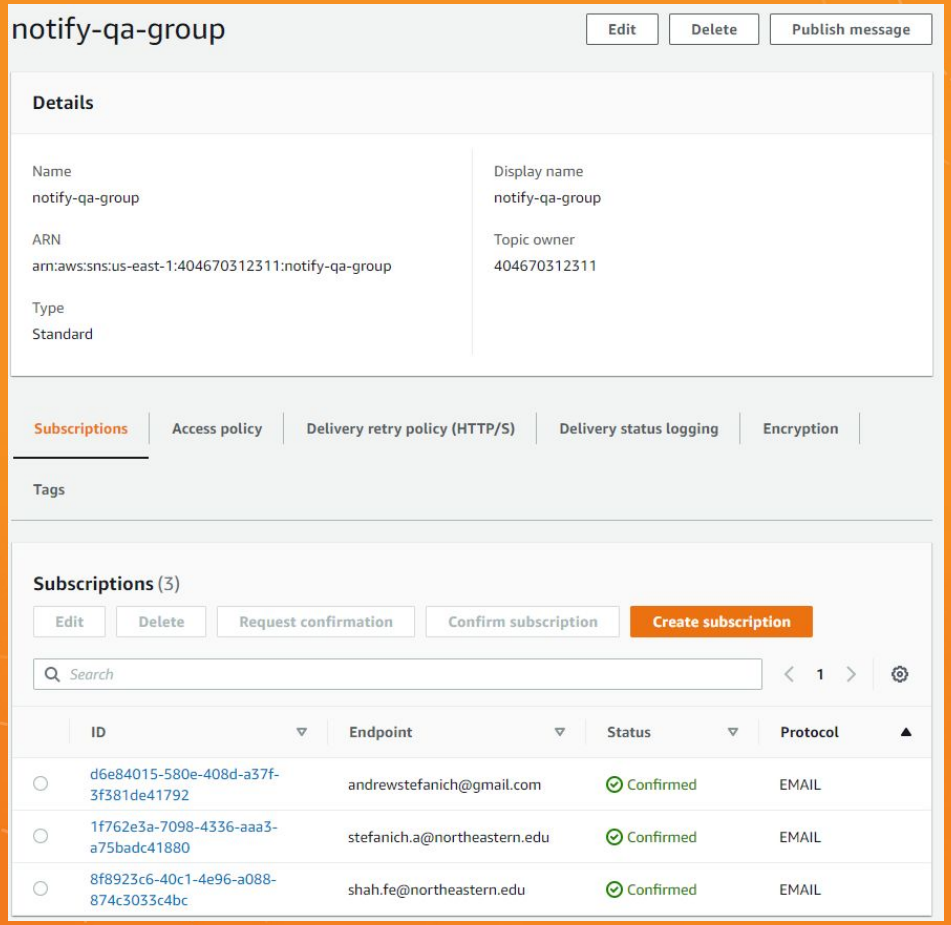


https://github.com/xelese/FOC-final-project-serverless

Permissions (for AWS Lambda)

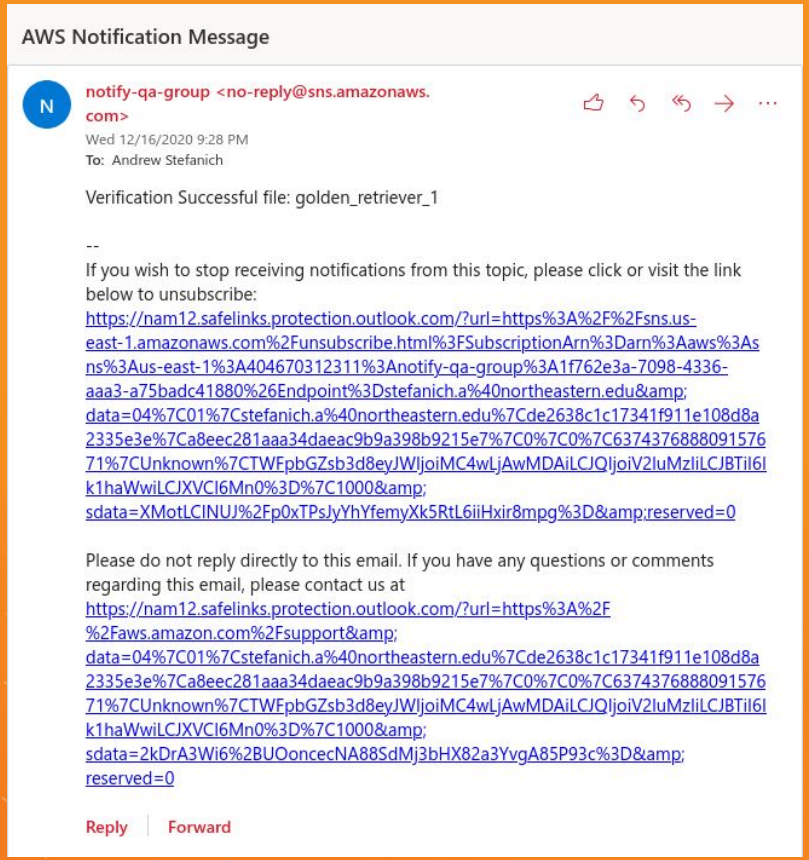


SNS


notify-qa-group
Edit
Delete
Publish message
Details
Name
notify-qa-group
Display name
notify-qa-group
ARN
arn:aws:sns:us-east-1:404670312311:notify-qa-group
Topic owner
404670312311
Type
Standard
Subscriptions
Access policy
Delivery retry policy (HTTP/S)
Delivery status logging
Encryption
Tags
Subscriptions (3)
Edit
Delete
Request confirmation
Confirm subscription
Create subscription
Search
1
ID
Endpoint
Status
Protocol
d6e84015-580e-408d-a37f-3f381de41792
andrewstefanich@gmail.com
Confirmed
EMAIL
1f762e3a-7098-4336-aaa3-a75badc41880
stefanich.a@northeastern.edu
Confirmed
EMAIL
8f8923c6-40c1-4e96-a088-874c3033c4bc
shah.fe@northeastern.edu
Confirmed
EMAIL

Demonstration

Email (Verification Success)


AWS Notification Message

N

notify-qa-group <no-reply@sns.amazonaws.com>

Wed 12/16/2020 9:28 PM

To: Andrew Stefanich

Verification Successful file: golden_retriever_1

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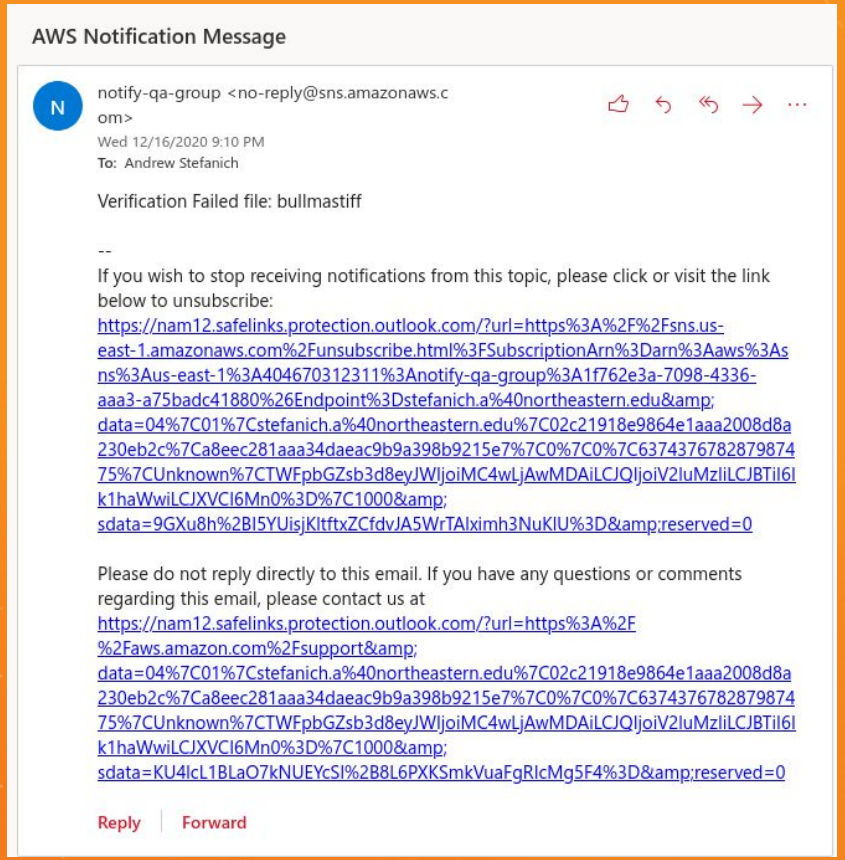
Reply | Forward

Email (Verification Failure)



AWS Notification Message

N

notify-qa-group <no-reply@sns.amazonaws.com>

Wed 12/16/2020 9:10 PM

To: Andrew Stefanich

Verification Failed file: bullmastiff

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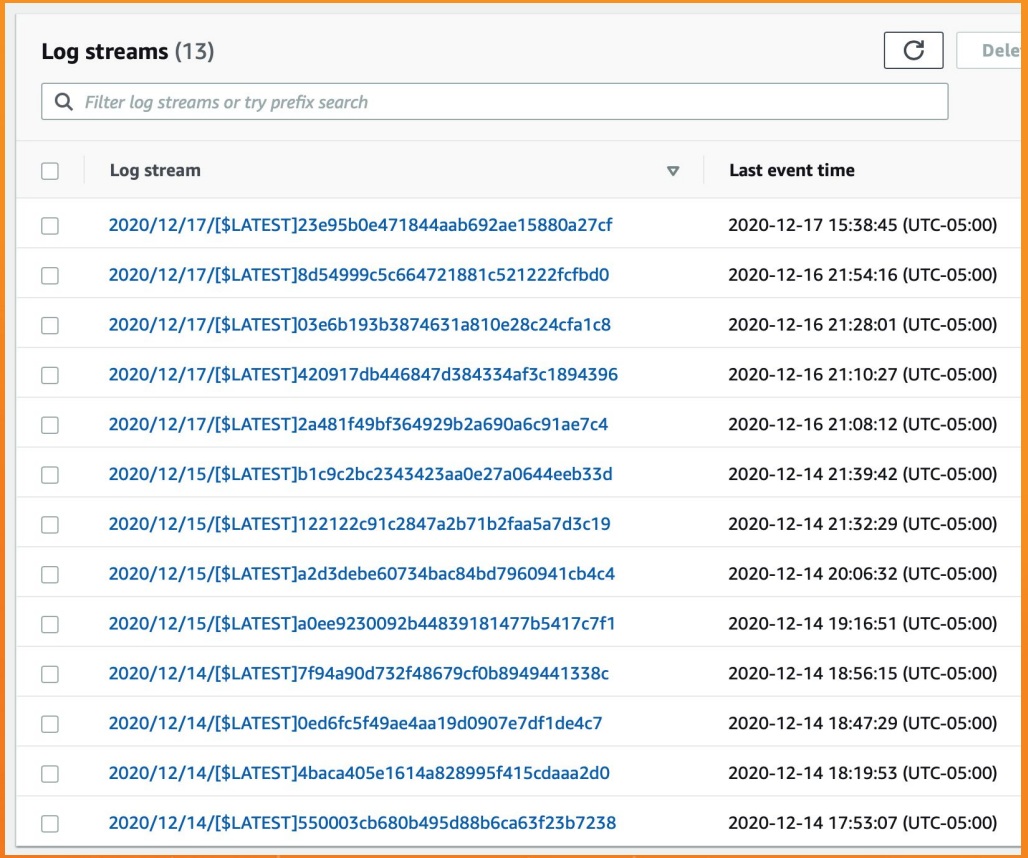
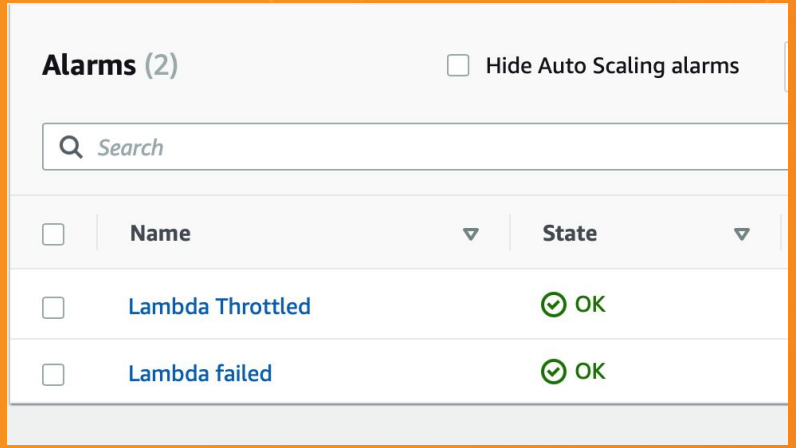
Reply | Forward

CloudWatch





CloudWatch Logs

CloudWatch Alarms

Thank you!