LESSON 3

In Lesson 3, you are you going to begin building an image processor in AWS. Our slackbot will react to images uploaded in slack and replace all people's faces with smileys.

Over the course of the next few lessons, we are going to:

- Allow users to upload images via Slack
- Save the uploaded image to an S3 bucket
- Detect faces in each image
- Determine the emotion of each face
- Replace the face with emoji
- Save a new photo to an S3 bucket
- Upload the new photo back to Slack
- Allow any user to recall any image via the botty

1. START YOUR ENGINES

- Before you begin, create a copy of your **serverless-chatbot** folder and name it **lesson3** (`$ cp -r serverless-chatbot lesson 3)`. We are going to re-use a lot of the files.
- Navigate into your **lesson3** folder.

2. EDIT SERVERLESS.YML

Over the next few steps, you are going to create a new function that will orchestrate faceswap, create an S3 bucket for images, and modify the existing echo function to download images files from Slack into an an S3 bucket. The process will be simple.

Step 1: When a user uploads a photo, Slack will invoke our Lambda function; this Lambda function will grab the image from Slack and upload it to an S3 bucket.

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Step 2: That upload to S3 will kick of an S3 event that will automatically trigger a different Lambda function to process the image and swap faces with smileys based on people's look. There are a few more steps after that, but let's get this done first.

- Open **serverless.yml** and modify it to match the following code snippet:

```
service: serverless-chatbot

provider:
  name: aws
  runtime: nodejs6.10
  profile: serverless-chatbot
  stage: dev
  iamRoleStatements:
    - Effect: "Allow"
      Action:
        - s3:GetObject
        - s3:PutObject
      Resource: arn:aws:s3:::${self:custom.uploadBucket}/*
custom:
  uploadBucket: ${self:service}-${self:provider.stage}-uploads-YOURINITIALS
functions:
  hello:
    handler: handler.endpoint
    events:
```

```
      - http:
          path: echo
          method: post
    environment:
      POST_MESSAGE_URL: 'https://slack.com/api/chat.postMessage?'
      BOT_ACCESS_TOKEN: 'YOUR_BOT_ACCESS_TOKEN'
      BOT_ID: 'YOUR_BOT_ID'
      VERIFICATION_TOKEN: 'YOUR_VERIFICATION_TOKEN'
  faceswap:
    handler: faceswap.execute
    events:
      - s3:
          bucket: ${self:custom.uploadBucket}
          event: s3:ObjectCreated:*
```

In the above code snippet we've added a **`faceswap`** function, a custom bucket name, and explicitly specified a stage (dev as opposed to production). The process of deploying this **severless.yml** will automatically create the required function and S3 bucket and connect them together.

- If you look at the above code, you'll see that the bucket name has **YOURINITIALS** at the end. Bucket names are globally unique so we recommend putting your initials or a string of random characters at the very end. That will avoid clashes with other people.

3. EDIT HANDLER.JS

You will now repurpose **handler.js**. In the previous lesson, the Lambda function had a very simple job. It would echo back anything that was written in Slack. Now it's going to do something a little bit more advanced: it will take any image file uploaded to Slack and then upload it to the S3 bucket we specified in **serverless.yml** (in the previous step).

- Open **handler.js** and replace its contents with the following code.

```
'use strict';

const https = require('https');
const fs = require('fs');
const aws = require('aws-sdk');
const qs = require('querystring');
const s3 = new aws.S3();

const uploadToBucket = function(filename) {
    var bodystream = fs.createReadStream(process.env.TEMP_FOLDER + filename);

    return new Promise((resolve, reject) => {
        s3.putObject({
           Bucket: process.env.UPLOAD_BUCKET,
           Key: filename,
           Body: bodystream
        }, function(error, data){
           if (error){
            return reject(error);
           }
           return resolve();
```

```
        });
    });
};

const downloadFileToSystem = function(path, filename) {
    var file = fs.createWriteStream(process.env.TEMP_FOLDER + filename);

    const options = {
        hostname: process.env.SLACK_HOSTNAME,
        path: path,
        headers: {
            authorization: 'Bearer ' + process.env.BOT_ACCESS_TOKEN
        }
    };

    return new Promise((resolve, reject) => {
        const request = https.get(options, (response) => {

            if (response.statusCode < 200 || response.statusCode > 299) {
                reject(new Error('Failure downloading file: ' + response.statusCode));
            }

            response.pipe(file);

            file.on('finish', function() {
                file.close(() => resolve());
            });
        });

        request.on('error', (err) => reject(err))
    })
};

const updateStatusInSlack = function(filename, channel) {
  return new Promise((resolve, reject) => {

    const response = {
        token: process.env.BOT_ACCESS_TOKEN,
        channel: channel,
        text: 'I am working on ' + filename + '... should be done soon.'
      }

      const URL = process.env.POST_MESSAGE_URL + qs.stringify(response);

      https.get(URL, (res) => {
        const statusCode = res.statusCode;
        resolve();
      })
  });
}
```

```
module.exports.endpoint = (event, context, callback) => {
  const request = JSON.parse(event.body);

  if (request.event.type && request.event.type === 'message' &&
      request.event.subtype && request.event.subtype === 'file_share') {

    const path = request.event.file.url_private_download;
    const filename = request.event.file.name;
    const channel = request.event.channel;

    downloadFileToSystem(path, filename)
      .then(() => uploadToBucket(filename))
      .then(() => updateStatusInSlack(filename, channel))
      .then(() => callback(null, {statusCode: 200}))
      .catch(() => callback(null, {statusCode: 500}));

      return;
  }

  callback(null, {statusCode: 200});
};
```

This code does a few simple things:

- It detects when a file has been shared.
- It then downloads the file to the local file system.
- Then it uploads the file to an S3 bucket.
- And, then it writes a message to Slack.

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You might also notice that this code refers to **`process.env.BOT_ACCESS_TOKEN`** and **`process.env.TEMP_FOLDER`**. As we've learnt previously, these are environment variables and we need to add them. Modify the **hello** function definition in **serverless.yml** so that it looks like the following. ***Be sure to use your own* BOT_ACCESS_TOKEN *and* VERIFICATION_TOKEN.**

```
functions:
  hello:
    handler: handler.endpoint
    events:
      - http:
          path: echo
          method: post
    environment:
      POST_MESSAGE_URL: 'https://slack.com/api/chat.postMessage?'
      BOT_ACCESS_TOKEN: 'xoxb-159279836768-FOst5DLfEzmQgkz7cte5qiIv'
      VERIFICATION_TOKEN: 'wiM5uBXy2CcvIfTnyIdfhoVw'
      UPLOAD_BUCKET: ${self:custom.uploadBucket}
      SLACK_HOSTNAME: 'files.slack.com'
      TEMP_FOLDER: '/tmp/'
```

4. FACEOFF!

You are now going to create a new function: **faceswap**. This is the main function that will perform image analysis and replace faces with emojis. In this lesson, however, we are just going to create a shell for the function. We will work on its implementation in the next lesson.

- Create a new file called **faceswap.js** and copy the following code to it

```
'use strict';

module.exports.execute = (event, context, callback) => {
  console.log(event);

  callback(null);
};
```

5. DEPLOY

Time to deploy what you have built.

- Deploy the two function by running **serverless deploy** from the terminal.
- Check that the new **faceswap** function was created in the AWS Lambda console and have a look at the S3 console to see if you can find the new S3 bucket.

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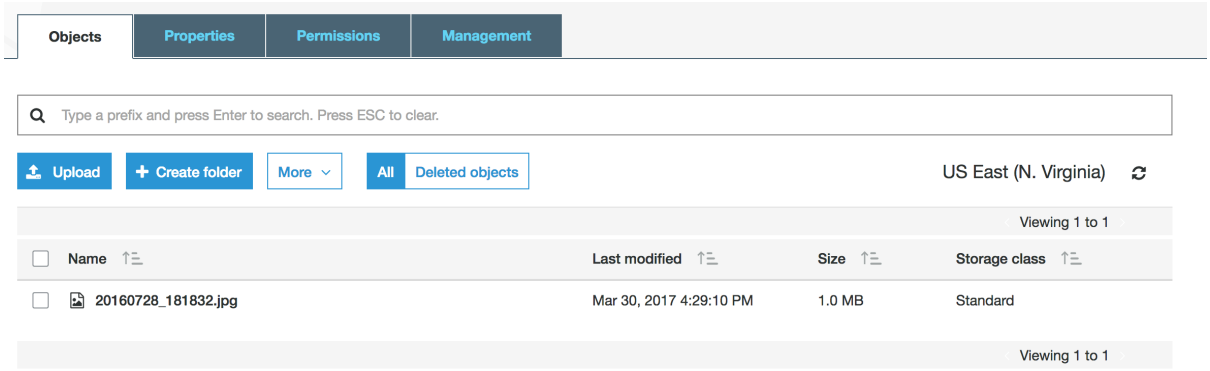
- Go back to your **#general** Slack channel and upload an image file. After a few seconds you should receive a message from *botty* telling you that it is working on the upload.
- Go to the S3 console and click on your upload bucket. Check that the file is there. Open it and verify it's the same file.



That's it for lesson 3! It's lunchtime, so let's take a break and regroup afterwards. But, if you've finished this and still have time left over, go on to the next lesson.