

LESSON 3

In this lesson we will create a User Profile Lambda function. This function will talk to Auth0 and retrieve information about the user. We will also set up an API Gateway. The API Gateway will allow our website to invoke the function.

Lastly, we will create a custom authorizer. A custom authorizer is a special Lambda function that the API Gateway executes to decide whether to allow or reject a request. We will use this custom authorizer to make sure that only authenticated users have access to the User Profile Lambda function.

NOTE: PLEASE CREATE ALL YOUR RESOURCES IN THE N. VIRGINIA REGION (US-EAST-1)

1. SET UP THE USER PROFILE LAMBDA FUNCTION

Let's get our User Profile Lambda function organized first.

- **Open** config.js file in your favourite text editor:
lesson-3/lambda/user-profile/config.js

You'll need to set your **AUTH0_DOMAIN**.

- **Install npm packages**

In the terminal / command-prompt, change to the directory of the function:

```
cd lesson-3/lambda/user-profile
```

Install npm packages by typing:

```
npm install
```

- **Zip Lambda function**

For OS X / Linux Users

Now create a ZIP file of the function, by typing:

```
npm run predeploy
```

For Windows

You will need to **zip up all the files** in the **lesson-3/lambda/user-profile** folder via the Windows Explorer GUI, or using a utility such as 7zip. (**Note: don't zip the user-profile folder. Zip up the files inside of it**).

- In the AWS console, click **Lambda**, and then click **Create a Lambda Function**.
- Skip over the blueprint and configure triggers.
- **Name** the function **user-profile** and make sure that **Node.js 4.3** is selected in the **Runtime** dropdown.
- Select **Upload a ZIP file**. Choose the zip file you just created:
/lesson-3/lambda/user-profile/Lambda-Deployment.zip
- Under Role select **lambda-s3-execution-role**.
- Click **Next** to go the Review screen and from there click **Create function** to finish.

2. CREATE THE API GATEWAY

The API Gateway needs to be set up to accept requests from our website. We need to create a resource, add support for a GET method, and enable Cross-Origin Resource Sharing (CORS). In the AWS console follow these steps:

- Click on **API Gateway**
- Type in a name for your API such as **24-Hour-Video** and, optionally, a description
- Click **Create API** to create your first API

Create new API

In Amazon API Gateway, an API refers to a collection of resources and methods that can be invoked through HTTPS endpoints.

☒ New API ☐ Clone from existing API ☐ Import from Swagger ☐ Example API

Name and description

Choose a friendly name and description for your API.

API name*
Description

* Required

Create API

3. CREATE RESOURCE AND METHOD

API's in the Gateway are built around resources. We are going to create a resource called *user-profile* and combine it with a GET method.

- Click **Create Resource** and type **User Profile** in the Resource Name. The *Resource Path* should be automatically filled in.
- Click *Create Resource* button to create and save the resource.

New Child Resource

Use this page to create a new child resource for your resource.

Resource Name*
Resource Path*

You can add path parameters using brackets. For example, the resource path **{username}** represents a path parameter called 'username'.

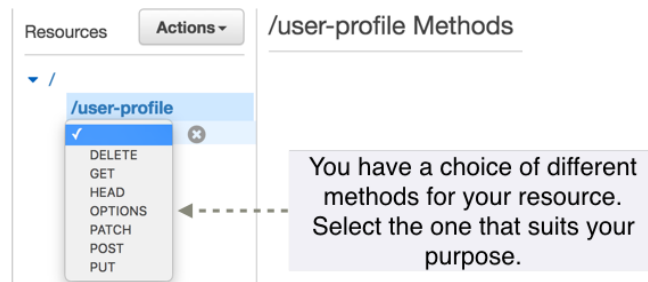
Resource Path will be automatically filled out based on your Resource Name. However, you can modify it yourself too.

* Required

Cancel

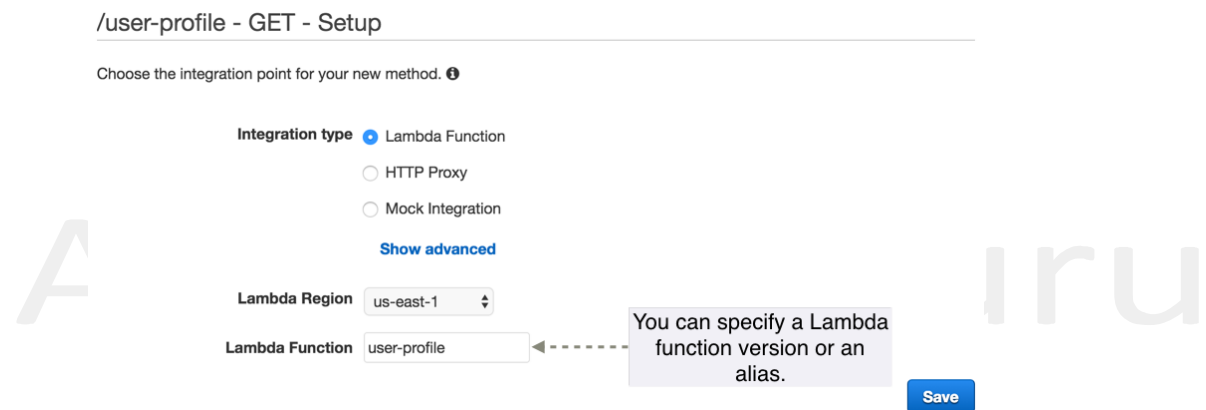
Create Resource

- The left-hand side list should now show */user-profile*. Click it and then click *Create Method* button to see a small dropdown under */user-profile*.
- From the dropdown select **GET** and click the button with the tick on it to confirm.



Having created the GET method, we need to configure the Integration Request. This is the screen you should be looking at right now. (If you are not on it, click **Integration Request** in the **Method Execution** screen of your GET function). An Integration Request specifies what Lambda function (or HTTP endpoint) the API Gateway should invoke.

- Click the **Lambda Function** radio button.
- Select your region (for example, **us-east-1**) from the Lambda Region dropdown.
- Type **user-profile** in the Lambda Function text box.



- Click **Save**.
- Click **OK** if you are asked if it's ok to add permission to the Lambda function.

4. ENABLING CORS

Next we need to enable CORS to be able to access our API Gateway endpoint.

- Click the **/user-profile** resource.
- Click **Actions**.
- Select **Enable CORS**.
- Click **Enable CORS and replace exists CORS headers** to save the configuration.
- Click **Yes, replace existing values** in the confirmation box that pops up.

Enable CORS

Cross-Origin Resource Sharing (CORS) allows browsers to make HTTP requests to servers with a different domain/origin. Specify which methods in the **/user-profile** resource are available to CORS requests. To define static values surround the value in single quotes (eg. 'amazon.com'). To define mappings use the syntax described in the Method Editor (eg. method.request.querystring.myQueryString).

Methods* ☒ GET ☒ OPTIONS ⓘ

Access-Control-Allow-Methods GET,OPTIONS ⓘ

Access-Control-Allow-Headers 'Content-Type,X-Amz-Date,Authorization' ⓘ

Access-Control-Allow-Origin* '*' ⓘ ⚠ ⏪ ⏩ --

▶ Advanced

Leaving this header set to * will make the resource accessible from any origin.

Enable CORS and replace existing CORS headers

5. MAPPING

We need to create a mapping to pass the bearer token from the request in to our Lambda function.

- Click the **GET** method under the **/user-profile** resource.
- Click **Integration Request**.
- Expand **Body Mapping Templates**.
- Click **Add mapping template**.
- Type in **application/json** and click the tick button.
- Select **Yes, secure this integration** if you see a dialog box titled **Change passthrough behavior**.
- In the template box type in the following code.

```
{
  "authToken" : "$input.params('Authorization')"
}
```

Request body passthrough ☐ When no template matches the request Content-Type header ⓘ
☒ When there are no templates defined (recommended) ⓘ
☐ Never ⓘ

Content-Type	
application/json	⊖

+ Add mapping template

Generate template:

```
1 - {
2   "authToken" : "$input.params('Authorization')"
3 }
```

- Click **Save** once you have finished

6. DEPLOY

Finally, we need to deploy the API and get a URL to invoke from the website.

- In the API Gateway make sure that your API is selected
- Click **Actions**
- Select **Deploy API**
- In the popup select **[New Stage]**
- Type **dev** as the Stage Name
- Click **Deploy** to provision the API

Deploy API

✕

Choose a stage where your API will be deployed. For example, a test version of your API could be deployed to a stage named beta.

Create different stages such as dev, test, and production for your API.

Deployment stage

New Stage

-----> **Stage name***

dev

Stage description

This is the stage used for development

Deployment description

Initial deployment

- The next page you will see will show the API URL and a number of options
- Copy the **Invoke URL** as you will need it later on

Invoke URL: <https://tlzyo7a7o9.execute-api.us-east-1.amazonaws.com/dev>

Settings

Stage Variables

SDK Generation

Export

Deployment History

Configure the metering and caching settings for the **dev** stage.

Cache Settings

Enable API cache ☐

CloudWatch Settings

Enable CloudWatch Logs ☒ ⓘ

Log level ERROR

Log full requests/responses data ☐

Enable CloudWatch Metrics ☒ ⓘ

This URL is needed to send requests to the API Gateway.

7. UPDATE THE WEBSITE

We need to update the website to invoke the right API Gateway URL.

- Copy the config.js file containing your account specific settings, from the last lesson.
Copy lesson-2/website/js/config.js to lesson-3/website/js/config.js

- Now edit the copied config file to add the following line:

apiBaseUrl: 'API GATEWAY INVOKE URL FROM STEP 6'

```
1 var configConstants = {
2   auth0: {
3     domain: 'serverless.auth0.com',
4     clientId: 'ab1Qdr91xU3KTGQ01e598bwee8MQr'
5   },
6   apiBaseUrl: 'https://tlzyo7a7o9.execute-api.us-east-1.amazonaws.com/dev'
7 };
```

Don't forget to save **config.js** when you are done.

8. A NEW ROLE

API Gateway supports custom request authorizers. These are Lambda functions that the API Gateways uses to authorize requests. Custom authorizers can validate a token and return an IAM policy to authorize the request. However, before we begin using custom authorizers we are going to create a different role for it.

- In the AWS console, click **Identity & Access Management** and then click **Roles**.
- Click **Create New Role** and name it **api-gateway-lambda-exec-role**
- In step 2 of the role creation process select **AWS Lambda**
- From the list of policies select **AWSLambdaBasicExecutionRole**
- Click **Next Step**
- Click **Create Role** to save and exit

9. CUSTOM AUTHORIZER

Having created a new IAM role we can begin work on the custom authorizer now.

- **Open** the config.js file in your favourite text editor:
lesson-3/lambda/custom-authorizer/config.js

You'll need to set your **AUTH0_SECRET**.

- **Install npm packages**

In the terminal / command-prompt, change to the directory of the function:

```
cd lesson-3/lambda/custom-authorizer
```

Install npm packages by typing:

```
npm install
```

- **Zip Lambda function**

For OS X / Linux Users

Now create create a ZIP file of the function, by typing:

```
npm run predeploy
```

For Windows

You will need to **zip up all the files** in the **lesson-3/lambda/custom-authorizer** folder via the Windows Explorer GUI, or using a utility such as 7zip. (**Note: don't zip the custom-authorizer folder. Zip up the files inside of it**).

- In the AWS console, click **Lambda**, and then click **Create a Lambda Function**.
- Skip over the blueprint and configure triggers.
- **Name** the function **custom-authorizer** and make sure that **Node.js 4.3** is selected in the **Runtime** dropdown.
- Select **Upload a ZIP file**. Choose the zip file you just created:
/lesson-3/lambda/custom-authorizer/Lambda-Deployment.zip
- Under Role select **api-gateway-lambda-exec-role**.
- Click **Next** to go to the Review screen and from there click **Create function** to finish.

10. ASSIGN CUSTOM AUTHORIZER

Having deployed our custom authorizer, we need to configure it so that it runs before our User Profile function.

- In the API Gateway open the **24 Hour Video** API.
- Click **Custom Authorizers** on the left.
- Click the **Create** button.
- Fill out the **New Custom Authorizer** form
 - Set the name as **custom-authorizer**
 - Select region (us-east-1)
 - Type in **custom-authorizer** as the name of the Lambda function.
 - Set the **Identity token source** to **method.request.header.Authorization**
- Click **Create** to create the custom authorizer.
- Confirm that you want to allow API Gateway to invoke the custom-authorizer function.

New Custom Authorizer

Provide a name, Lambda function, and identity token source for your custom authorizer.

Name*	<input type="text" value="custom-authorizer"/>	
Lambda region*	<input type="text" value="us-east-1"/>	
Lambda function*	<input type="text" value="custom-authorizer"/>	
Execution role	<input type="text" value="arn:aws:iam::myAccount:role/myRole"/>	
Identity token source*	<input type="text" value="method.request.header.Authorization"/>	
Token validation expression	<input type="text"/>	
Result TTL in seconds*	<input type="text" value="300"/>	

* Required

API Gateway can make a request to the authorizer using this role.

API Gateway can attempt to validate the token using a regular expression before the Lambda function is invoked.

Cancel Create

To make the custom authorizer invoke on the GET method, follow these steps:

- Click **Resources** under 24-hour-video
- Click **GET** under /user-profile

- Click **Method Request**
- Click the pencil next to **Authorization**.
- From the dropdown select **custom authorizer** and save.
- Deploy the API again.
 - Click **Actions**
 - Click **Deploy API**
 - Select **dev** as the **Deployment Stage**
 - Click **Deploy**

11. TEST THE SYSTEM

Lesson 3 is complete! Now it's time to test.

- In your terminal or command-prompt, change to the following folder:

```
lesson-3/website
```

- Run the following command to make sure that required npm components are installed:

```
npm install
```

- Now run:

```
npm start
```

- Open the web-site in your browser:
<http://localhost:8100>

To test whether everything has worked:

- Log in to the website by clicking on Login button.
- Click the profile button (it'll have your nickname and, possible, your picture). After a short wait you will see a modal box with your user information.

Isn't this fun!? There is actually more goodness to come 😊. See you in the next lesson.

Optional Exercises

Try to do the following exercises to confirm your understanding of concepts presented in this lesson.

1. Create a Lambda function (*user-profile-update*) for updating a user's personal profile. Assume that you can access the first name, last name, email address and the *userId* on the event object. Because we don't have a database yet, this function doesn't need to persist this information; however, you can log it to CloudWatch.
2. Create a POST method for the */user-profile* resource in the API Gateway. This method should invoke the *user-profile-update* function and pass in the user's information. It should use the custom authorizer developed in this lesson.
3. Create a page in the *24 Hour Video* website to allow signed-in users to update their first name, last name, and email. This information should be submitted to the *user-profile-update* function via the API Gateway.

4. Modify the User Profile Lambda function to no longer validate the JSON Web Token. This validation isn't needed due to the custom authorizer. The function should still request user information from the Auth0 *tokeninfo* endpoint.

A Cloud Guru