

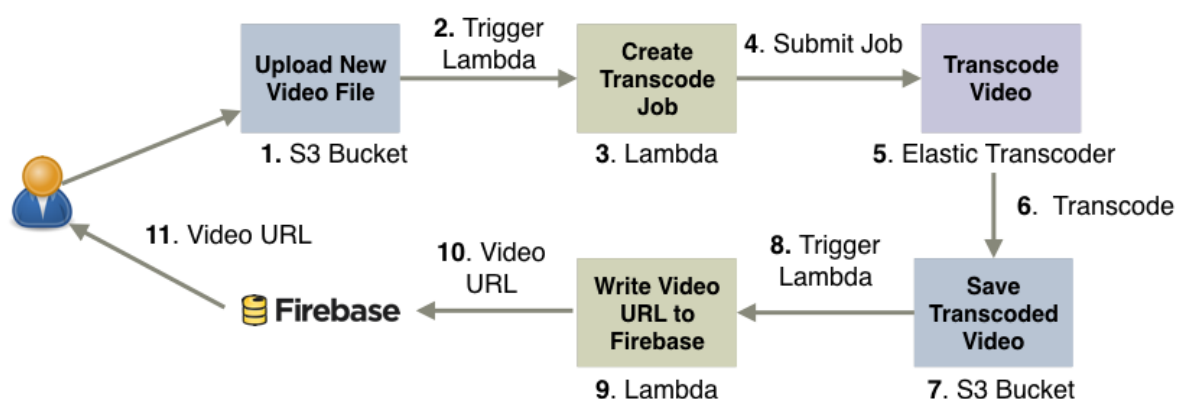
LESSON 5

In this lesson, we'll connect our video transcoding pipeline in AWS with our web site so that web site users can view transcoded videos.

We'll do this using an online database service called Firebase. Firebase is a no-SQL database, that has rich JavaScript support and can stream data updates directly to user's connected devices using web-sockets.

We'll do this by:

- Creating a firebase database.
- Connecting our web site to fetch the URLs of videos from Firebase.
- Modifying our existing "transcode-video" lambda function to write to Firebase, so that connected browsers can show that a transcoding operation is taking place.
- Adding a new lambda function "push-transcoded-url-to-firebase", which writes the URLs of videos in S3 to Firebase.
- Configuring the transcoded s3 bucket to trigger this lambda function when a new transcoded video arrives, so that the locations of newly transcoded videos are published to Firebase and made available to users.



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

1. CREATE A FIREBASE DATABASE

First, you need to create a Firebase account.

- Visit <https://www.firebase.com/> to create a free account. Click **See our new website** button.
- Click **Get Started For Free** button.



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GET STARTED FOR FREE

- Register with your Google Account.
- You will be taken to the console. In the console click **Create New Project**.



Firebase



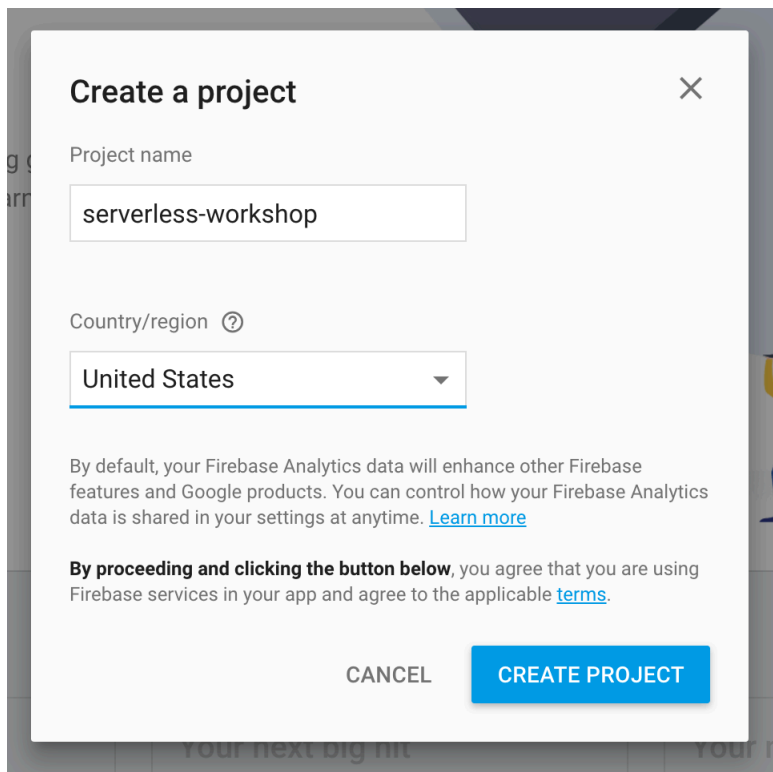
Welcome to Firebase

Tools from Google for developing great apps, engaging with your users, and earning more through mobile ads. [Learn more](#)

CREATE NEW PROJECT

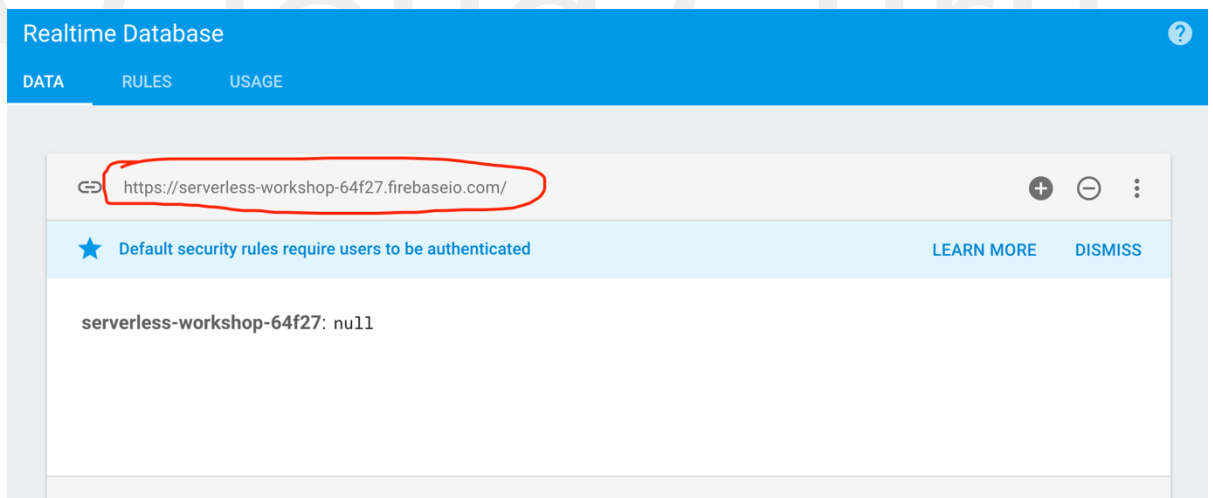
[or import a Google project](#)

- Give your project a name like, “serverless-workshop”, and click “Create Project”.

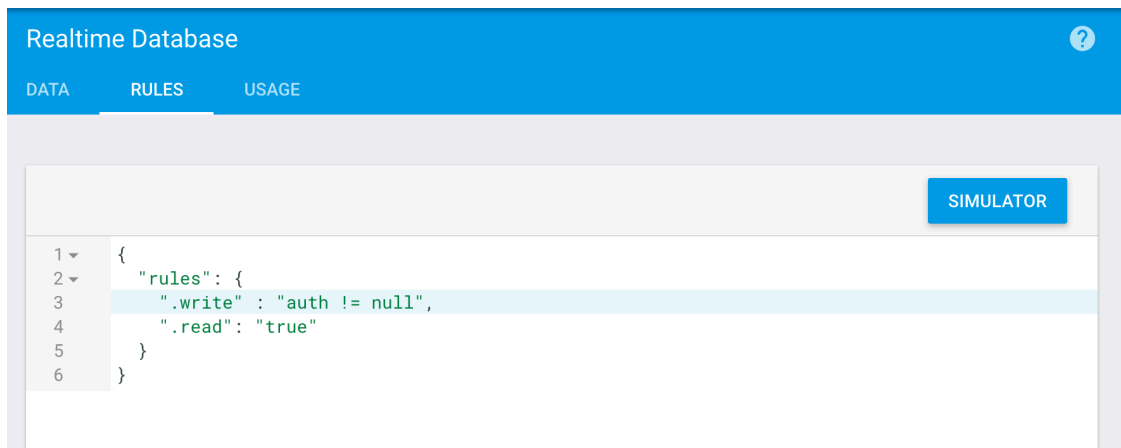


The screenshot shows a 'Create a project' dialog box. At the top, it says 'Create a project' with a close button (X). Below this, there is a 'Project name' field containing 'serverless-workshop'. Underneath is a 'Country/region' dropdown menu set to 'United States'. A paragraph of text explains that Firebase Analytics data will enhance other features and Google products, with a link to 'Learn more'. Below this, a bolded statement says: 'By proceeding and clicking the button below, you agree that you are using Firebase services in your app and agree to the applicable terms.' At the bottom, there are two buttons: 'CANCEL' and 'CREATE PROJECT'.

- Your project is created which comes with a database. Let's check it out. Click **Database** in the left-hand side menu.
- You'll see you have an empty database. That's OK, we'll add some data later. For now, take note of the database URL. We will need it.



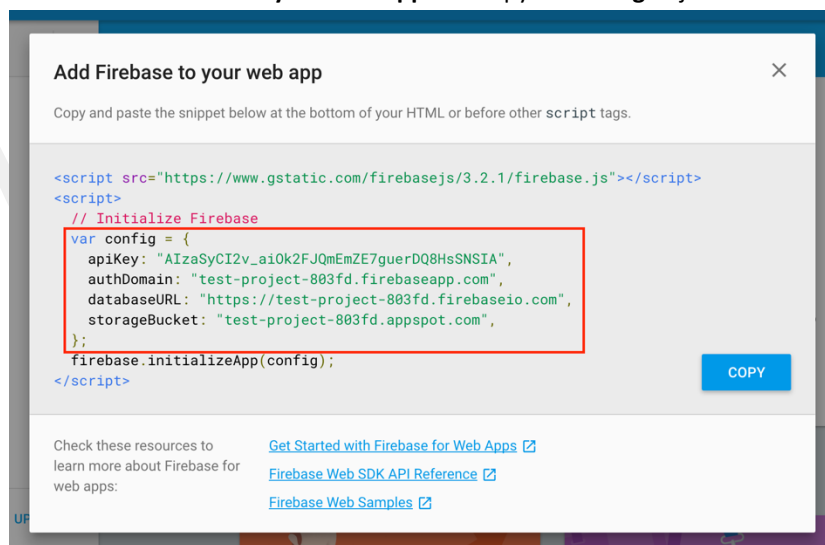
- Click on **Rules**
- Set ".read" to "true"
- Click **Publish** to save



2. MODIFY WEBSITE TO ACCESS FIREBASE

Now we're going to connect our web site to Firebase.

- Copy the config.js file containing your account specific settings, from the last lesson. Copy lab-4/website/js/config.js to lab-5/website/js/config.js
- Go the **Firebase** console and click on the project name in the left hand corner.
- Click on **Add Firebase to your web app** and copy the **config** object.



- Paste the config object to video-controller.js where it says: **/* PASTE CONFIG HERE */** in connectToFirebase function.
- In your terminal or command-prompt, change to the following folder:

```
lab-5/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:

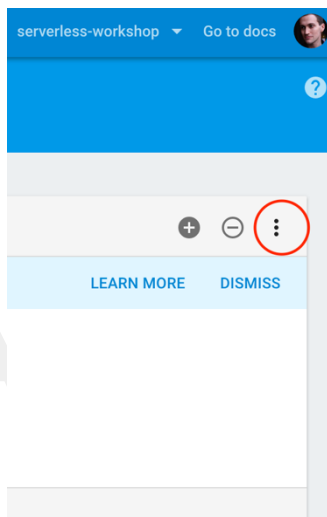
<http://localhost:8100>

You should see a blue spinner in the center of the page. This will continue spinning until some videos are found in Firebase, which we'll add next...

3. TEST WITH SOME SAMPLE DATA

To validate that our web site is connected to Firebase, we'll load some sample data into the Firebase database. This data points to some videos we've already transcoded for you.

- To show off the push-based update features of firebase, make sure the 24-hour video site is open on your screen.
- In another browser window, open your firebase database just like you had in Step 1.
- Press the **Hamburger** button in the top right-hand corner of the screen.

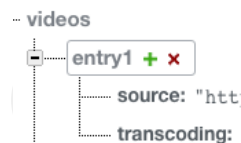


- From the menu select **Import JSON**.
- Upload the json file from the following location:
lab-5/data/firebase-sample-data.json

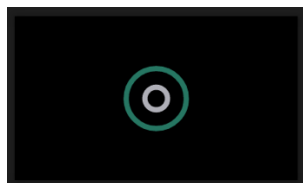
- Your firebase data will now be populated:



- Your web site will have automatically updated, as Firebase pushed the new data directly to your web browser via web sockets.
- Have a play, modifying the data in Firebase and watching the web-site update automatically:
 - **Delete** an entry, and watch it disappear from the web-site



- Change the **transcoding** flag on one of the entries from false to **true**.
The transcoding flag is used to indicate that a file has been uploaded, but is currently being transcoded. This allows the UI to show an entry for it with an animation showing that something is in progress. Change the flag and watch the UI update to show the transcoding indicator:



4. MODIFY VIDEO TRANSCODE LAMBDA FUNCTION FOR FIREBASE

Before we proceed to modify Lambda functions we need to create service accounts in Firebase.

- In **Firebase** click on the **Settings** button
- Select **Permissions**
- Select **Service Accounts**
- Click **Create Service Account** button
- Set a service account name like “workshop”
- From the **Role** dropdown, select **Project** and then **Editor**.
- Click “Furnish a new private key” and make sure that JSON is selected.

- Leave everything else as is and click create. Save the JSON file in to the folder that has the rest of your files (i.e. save it in to the lab-5/lambda/transcode-video-firebase-enabled function folder).

Create service account

Service account name ?
workshop

Role ?
Editor

Service account ID

workshop
@test-project-803fd.iam.gserviceaccount.com

☒ Furnish a new private key

Downloads a file that contains the private key. Store the file securely because this key cannot be recovered if lost.

Key type

☒ JSON
Recommended

☐ P12
For backward compatibility with code using the P12 format

☐ Enable G Suite Domain-wide Delegation

Grants a client access to all users' data on a G Suite domain without manual authorisation on their part. [Learn more](#)

CANCEL
CREATE

Now we're going to modify the existing video-transcode lambda function, to have it push a new entry into Firebase with transcoding: true. With this in place, the user interface will be able to show a placeholder of a video showing an animation, while the video transcodes.

In Lesson 4 we configured file uploads, and this upload system created a unique key for each file that was uploaded (this key was used in the path when the file was stored in S3). We'll have our lambda function recognize this key and use it as the unique key for the video in Firebase.

- ZIP up your lambda function

For OS X / Linux Users

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

```
cd lab-5/lambda/transcode-video-firebase-enabled
```

Install npm packages by typing:

```
npm install
```

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 **lab-5/lambda/video-transcoder-firebase-enabled** folder via the Windows Explorer GUI, or using a utility such as 7zip. (**Note: don't zip the video-transcoder-firebase-enabled folder. Zip up the files inside of it**).

- In the AWS console click **Lambda**
- Select your **'transcode-video'** function
- Choose **Upload a .ZIP File** from Code Entry Type and click **Upload**:

Lambda > Functions > transcode-video ARN - arn:aws:lambda:us-east-1:038221756127:function:transcode-video

Qualifiers ▾ Test Actions ▾

This function contains external libraries. Uploading a new file will override these libraries.

Code Configuration Triggers Monitoring ?

Code entry type: Upload a .ZIP file ▾

Function package: Upload

For files larger than 10 MB, consider uploading via S3.

- Select the ZIP file of the Lambda function you just created.
- Create two more environment variables with the keys **SERVICE_ACCOUNT** and **DATABASE_URL** and enter your database url, and the name of the JSON Service Account file you created earlier in this step.

You can define Environment Variables as key-value pairs that are accessible from your function code. These are useful to store configuration settings without the need to change function code. [Learn more](#). For storing sensitive information, we recommend encrypting values using KMS and the console's encryption helpers.

Enable encryption helpers ☐

A

Environment variables

ELASTIC_TRANSCODER_PIPELINE_ID	1490833093197-vuzh4a	✕
ELASTIC_TRANSCODER_REGION	us-east-1	✕
SERVICE_ACCOUNT	serverless-workshop-2414e5b8f0d1.json	✕
DATABASE_URL	https://serverless-workshop-9402c.firebaseio.com	✕
Key	Value	✕

- Click the **Save** button to upload the function and save your environment variables.
- Test that this works by opening the 24-hour video web-site and uploading a video. Within a few seconds of the upload completing, you should see a new entry appear in the video list, showing the transcoding animation. This animation will remain forever, because we haven't yet connected anything to update firebase once the transcoding has completed.

5. CREATE NEW LAMBDA FUNCTION: PUSH-TRANSCODED-URL-TO-FIREBASE

Now we're going to complete the final piece of the system: We're going to add a new lambda function, that will trigger every time a newly transcoded video arrives in the second, transcoded S3 bucket. This lambda function will write the public URL of the video to Firebase (so that the browser can play the video). It will also set transcoding: false, indicating the transcoding has completed.

- Open a terminal / command-prompt and navigate to the following folder:

```
lab-5/lambda/push-transcoded-url-to-firebase
```

- Install npm packages by typing:


```
npm install
```

- **Now ZIP up your 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 **lab-5/lambda/push-transcoded-url-to-firebase** folder via the Windows Explorer GUI, or using a utility such as 7zip. (**Note: don't zip the push-transcoded-url-to-firebase 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.
- **Name** the function **push-transcoded-url-to-firebase**
- Select **Upload a ZIP file**. Choose the zip file you just created:
/lab-5/lambda/push-transcoded-url-to-firebase/Lambda-Deployment.zip
- Under Role select **lambda-s3-execution-role**.
 - Create two environment variables with the keys **SERVICE_ACCOUNT** and **DATABASE_URL** and enter your Database URL, and the name of the JSON Service Account file you created earlier in this step.
 - Create an environment variable with key **S3** and value of your (second) transcoded bucket name. e.g. **https://s3.amazonaws.com/serverless-video-transcoded-ps**.
 - Create one final environment variable with the key **BUCKET_REGION** and set its value to **us-east-1**.

You can define Environment Variables as key-value pairs that are accessible from your function code. These are useful to store configuration settings without the need to change function code. [Learn more](#). For storing sensitive information, we recommend encrypting values using KMS and the console's encryption helpers.

Enable encryption helpers ☐

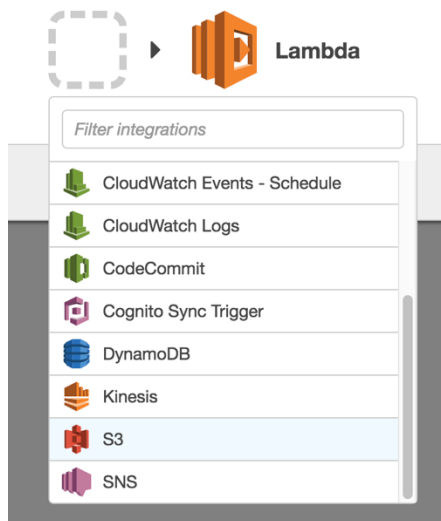
Environment variables	S3	https://s3.amazonaws.com/danparker-sy	✕
	DATABASE_URL	https://serverless-workshop-9402c.fireba	✕
	SERVICE_ACCOUNT	serverless-workshop-2414e5b8f0d1.json	✕
	BUCKET_REGION	us-east-1	✕
	Key	Value	✕

- Click **Next** to go the Review screen and from there click **Create function** to finish.

6. MODIFY TRANSCODED VIDEO BUCKET TO TRIGGER NEW LAMBDA FUNCTION

Now we need to configure S3 to invoke the new push-transcoded-url-to-firebase lambda function when a newly transcoded video arrives in the destination bucket:

- In the Lambda console click on the **Triggers** tab and click **Add trigger**.
- In the popup dialog, click to the left of the orange lambda logo and scroll down the list until you find S3 and select that.



- Select the second bucket (e.g. serverless-video-transcoded).
- In the event type dropdown, select **ObjectCreated (All)**.
- Enter a suffix of **.mp4**

We do this to ensure that the lambda function is only called when new videos arrived. The elastic transcoder may drop other assets in the bucket (such as thumbnails, or JSON files) which should not trigger the lambda function.

Add trigger

Configure your Lambda function **push-transcoded-url-to-firebase** to respond to events from the selected trigger. Click on the box below to select your trigger type.

S3 Lambda

Bucket: danparker-sydney-serve ⓘ

Event type: Object Created (All) ⓘ

Prefix: e.g. images/ ⓘ

Suffix: mp4 ⓘ

Lambda will add the necessary permissions for Amazon S3 to invoke your Lambda function from this bucket. [Learn more](#) about the Lambda permissions model.

Enable trigger ☒ ⓘ

Cancel Submit

- Press **Submit** and AWS will link your S3 bucket and Lambda function.

7. TEST SYSTEM END-TO-END

The system is complete, it's time to test it end-to-end!

- Open the 24-hour video web site in your browser.
- Upload a video file. The progress bar will show as the video uploads.
- Once upload completes, a tile will appear in the user interface representing the video. It will contain an animation, indicating that the video is being transcoded.
- Once transcoding is complete, the transcoding animation will be replaced by the video.
- Click on the video to watch it play. You'll notice that this is running in a web-friendly, lower quality 480p format.

Congratulations – you now have completely serverless web-site that authenticates users, allows them to upload video files, transcodes these videos to a web friendly format and then makes them available to all users of the web site.

Optional Exercises:

1. In the website, move the config object from video-controller.js to the config file.

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