Streaming Dynamic Content using Amazon CloudFront

**SPL-52 - Version 1.2.15**

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Note: Do not include any personal, identifying, or confidential information into the lab environment. Information entered may be visible to others.

Corrections, feedback, or other questions? Contact us at [*AWS Training and Certification*](https://support.aws.amazon.com/#/contacts/aws-training).

**Lab Overview**

In this lab, you will use Amazon CloudFront to deliver a dynamic (multiple bit-rate) stream to a connected device using Apple’s HLS (HTTP Live Streaming) protocol. The stream can also be played on any browser that supports the HLS protocol. In this lab, you will also use Amazon Elastic Transcoder to convert a source video into multiple bit-rates that will be delivered using CloudFront.

TOPICS COVERED

This lab covers:

* Creating multiple bit-rate versions of a given source media file using Amazon Elastic Transcoder.
* Delivering the dynamic (multi bit-rate) stream created by Amazon Elastic Transcoder, using Amazon CloudFront.

TECHNICAL KNOWLEDGE PREREQUISITES

To successfully complete this lab, you should be familiar with the basics of media encoding and have knowledge of core AWS services.

OTHER AWS SERVICES

Other AWS Services than the ones needed for this lab are disabled by IAM policy during your access time in this lab. In addition, the capabilities of the services used in this lab are limited to what’s required by the lab and in some cases are even further limited as an intentional aspect of the lab design. Expect errors when accessing other services or performing actions beyond those provided in this lab guide.

**What is HLS?**

Apple Inc. created the HLS protocol. HTTP Live Streaming can dynamically adjust movie playback quality to match the available speed of wired or wireless networks using an ordinary web server. It works by creating different quality streams. Each stream is then broken into chunks that are streamed sequentially to a client device. On the clients end, one can select streams of varying bit rates. This allows streaming sessions to adapt to different network speeds.

**What is a multi bit-rate stream?**

A single media file could be created in different bit-data rates. Each stream can be used to offer different quality media files to end-user devices based on the available network speed.

**What is Amazon Elastic Transcoder?**

Amazon Elastic Transcoder is media transcoding in the cloud. It is designed to be highly scalable, easy to use and cost-effective for developers and businesses to convert (or “transcode”) media files from their source format into versions that will playback on devices such as smartphones, tablets and PCs.

**What is Amazon CloudFront?**

Amazon CloudFront is a content delivery web service. It integrates with other Amazon Web Services to give developers and businesses an easy way to distribute content to end users with low latency, high data transfer speeds, and no minimum usage commitments.

**Start lab**

1. To launch the lab, at the top of the page, choose **Start lab**.

 You must wait for the provisioned AWS services to be ready before you can continue.

1. To open the lab, choose **Open Console**.

You are automatically signed in to the AWS Management Console in a new web browser tab.

**Do not change the Region unless instructed.**

COMMON SIGN-IN ERRORS

**Error: You must first sign out**



If you see the message, **You must first log out before logging into a different AWS account:**

* Choose the **click here** link.
* Close your **Amazon Web Services Sign In** web browser tab and return to your initial lab page.
* Choose **Open Console** again.

**Error: Choosing Start Lab has no effect**

In some cases, certain pop-up or script blocker web browser extensions might prevent the **Start Lab** button from working as intended. If you experience an issue starting the lab:

* Add the lab domain name to your pop-up or script blocker’s allow list or turn it off.
* Refresh the page and try again.

**Lab Preparation**

In this lab, you will be using a sample video file to configure a dynamic stream. For your convenience, an Amazon S3 bucket has already been created.

1. At the top of the page, in the unified search bar, search for and choose

S3

.

1. Choose the link for the bucket containing the string ***awstrainingreinvent***.
2. Choose on the **input** folder to open it. It contains a video file named **AmazonS3Sample.mp4**.

**Note:** From the time you log in to the console, it could take up to ten minutes for the file to appear in the Amazon S3 bucket. If you do not see it, choose the circular arrow icon on the upper right of the screen to refresh the contents of the bucket.

**Amazon CloudFront Configuration**

CREATE A CLOUDFRONT DISTRIBUTION

In this module, you will create an Amazon CloudFront distribution that will be used to deliver the multiple bit-rate files generated by Amazon Elastic Transcoder to end-user devices.

1. At the top of the page, in the unified search bar, search for and choose

CloudFront

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1. Choose **Create a CloudFront distribution** .
2. On the **Create distribution** page, in the **Origin** section:

* For **Origin Domain Name**, select the bucket containing the string **awstrainingreinvent** from the list.
* For **Origin access**, select **Public**.
* For **Web Application Firewall (WAF)**, select **Do not enable security protections**.

1. Scroll to the bottom of the page, then choose **Create distribution** .

**Amazon Elastic Transcoder Configuration**

CREATE A PIPELINE

In this section, you will create a pipeline that will manage the jobs to transcode the input file.

1. At the top of the page, in the unified search bar, search for and choose

Elastic Transcoder

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1. In the navigation bar of the Amazon Elastic Transcoder console, select the same region in which the Amazon S3 bucket was created.
2. On the Pipelines page, choose **Create a new Pipeline** .
3. For **Pipeline Name**, enter

InputPipeline

1. For **Input Bucket**, select the bucket containing the string **awstrainingreinvent** from the list.
2. For **IAM Role**, under **Other roles**, select **AmazonElasticTranscoderRole**. This is a role that was pre-created in this lab’s CloudFormation template that uses the managed policy AmazonElasticTranscoderRole. The Elastic Transcoder service will assume this role to access Amazon S3 and Amazon SNS resources in your lab account.
3. In the **Configuration for Amazon S3 Bucket for Transcoded Files and Playlists** section, enter the follow information:

* For **Bucket**, select the bucket containing the string **awstrainingreinvent** from the list.
* For **Storage Class**, select **Standard**.

1. In the **Configuration for Amazon S3 Bucket for Thumbnails** section, enter the following information:

* For **Bucket**, select the bucket containing the string **awstrainingreinvent** from the list.
* For **Storage Class**, select **ReducedRedundancy**.

1. Choose **Create Pipeline** .

CREATE A JOB

In this section, you will create a job under the Amazon Elastic Transcoder pipeline that was just created. The job does the work of transcoding the input file into multiple bit-rates as selected.

1. On the Pipelines page, choose **Create New Job** to create a transcoding job. You create the job in the pipeline (queue) that you want to use to transcode the video file.
2. For **Pipeline**, select **InputPipeline**.
3. For **Output Key Prefix**, enter

output/

.

Amazon Elastic Transcoder will prepend this value to the names of all files that the job will create (including output files, thumbnails and playlists).

1. For **Input Key**, select the input file labeled **input/AmazonS3Sample.mp4.**

CONFIGURE OUTPUT DETAILS

The settings in this section will determine how many output files (bit-rates) are created. We will configure three output files for this demo having three separate bit-rates (2Mbps, 1.5Mbps and 1Mbps). Each output bit-rate will require a separate output details section to be entered. This will also output a playlist file for each bit-rate, which lists all the segments making up the stream.

1. For **Preset:**, select **System preset: HLS 2M**
2. For **Segment Duration**, enter

10

 (which is the HLS default)

1. For **Output Key**, enter a unique prefix such as

HLS20M

 to name the segments created using this preset.

1. Choose **+ Add Another Output** and repeat the steps above to generate segments for presets **HLS 1.5M** and **HLS 1M** and then provide the respective prefixes names:

* HLS15M
* HLS10M

CONFIGURING PLAYLIST

The master playlist will combine all the individual bit-rate playlists and provide a single URL for the devices to playback the stream. To configure a playlist, do the following:

1. Under **Playlists (Adaptive Streaming)**, choose **Add Playlist** , then configure:

* **Master Playlist Name**

master

* **Playlist Format:** *HLSv3*

1. Select all the three outputs, which were entered in the previous section, to include them in this master playlist by choosing the **+** option under **Outputs in Master Playlist**.
2. Choose **Create New Job** .

The transcoding process should complete within a minute.

**Testing Playback of the Dynamic (multi bit-rate) Stream**

In this module, you will test the playback of the dynamic stream generated in the previous section using an iOS or Android device. You could also use an Android 4.x device to test the below exercise.

**Note** Certain browsers may not support this feature. Use the default web browser in the device to test.

CONSTRUCT THE PLAYBACK URL

The following components make up the playback URL while playing through Amazon CloudFront:

* Amazon CloudFront domain name.
* Path of the master playlist file in the Amazon S3 bucket (output generated by Elastic Transcoder):

http://<CloudFront domain name>/<master playlist file path in Amazon S3 bucket>

OBTAINING AMAZON CLOUDFRONT DOMAIN NAME (COMPONENT A).

1. At the top of the page, in the unified search bar, search for and choose

CloudFront

.

1. Select the **Amazon CloudFront** distribution that was previously created, and verify that the **Distribution Status** has changed to  Enabled .
2. Proceed to the next step only after the **Status** changes to  Enabled .
3. Choose the **Distribution** link.
4. Under **Details**,  copy the Distribution domain name and paste it into a text editor.

OBTAINING THE MASTER PLAYLIST FILE PATH (COMPONENT B)

1. At the top of the page, in the unified search bar, search for and choose

S3

.

1. Select the Amazon S3 bucket containing the string **awstrainingreinvent**.
2. Open the **output** folder (which contains the output of the transcoding job) and select the **master.m3u8** playlist file.

This is the file that you will play on your mobile device. Next, you’ll need to create the URL to the file from CloudFront.

1. In a text editor, construct the URL by appending

/output/master.m3u8

 to the end of your CloudFront domain name.

The new URL should look similar to: *d1ckwesahkbyvu.cloudfront.net/output/master.m3u8*

1. Email the URL to an account that can be accessed from your iOS or Android device.
2. Play the URL on the default browser.
3. The stream should start playing on your device and dynamically request the relevant segments based on your bandwidth and CPU conditions.

**End lab**

Follow these steps to close the console and end your lab.

1. Return to the **AWS Management Console**.
2. At the upper-right corner of the page, choose **AWSLabsUser**, and then choose **Sign out**.
3. Choose **End lab** and then confirm that you want to end your lab.

**Conclusion**

You have learned how AWS services such as S3, Elastic Transcoder and Amazon CloudFront could be used to deliver HLS media files to iOS or Android devices.

Congratulations! You now have successfully:

* Learned about the basic concepts and terminology of the Amazon Elastic Transcoder and Amazon CloudFront services.
* Created your own Amazon Elastic Transcoder Pipeline and Amazon CloudFront distribution.
* Used Amazon Elastic Transcoder to transcode a video file into different HLS formats and distribute it to remote devices using Amazon CloudFront.

**Additional Resources**

* [Amazon Elastic Transcoder and Amazon CloudFront](http://aws.amazon.com/elastictranscoder/)
* [Amazon CloudFront](http://aws.amazon.com/cloudfront/)

For feedback, suggestions, or corrections, please email us at [aws-course-feedback@amazon.com](mailto:aws-course-feedback@amazon.com).