aws elemental

FFMPEG RTMP TO AWS ELEMENTAL MEDIALIVE TO AWS ELEMENTAL MEDIAPACKAGE

Workflow Example

CONTENTS

INTRODUCTION

This workflow example illustrates how to use ffmpeg as an RTMP contribution encoder for the AWS Elemental MediaLive service. The ffmpeg software may be run on a ground appliance or an EC2 instance in the cloud. For simplicity, this example uses “appliance” to reference the device from which ffmpeg will stream the source to AWS Elemental MediaLive.

In this scenario, you will set up the RTMP output from ffmpeg as an input into AWS Elemental MediaLive. You will then set up AWS Elemental MediaLive to produce an HLS output that contains an ABR stream set. This output is the input into AWS Elemental MediaPackage.

Important: AWS Elemental MediaLive uses two inputs, encoder pipelines, and outputs for fault-tolerance and redundancy. The ffmpeg program does not support sending to multiple destinations, therefore this example will only send to one of the pipelines, and in the event of an input loss or pipeline failure the workflow will not function until the problem is corrected.

Note: To use this workflow in production, it is highly recommended you use the AWS Elemental MediaPackage endpoint as an origin for a CDN such as Amazon CloudFront. The AWS Elemental MediaPackage console includes an option to create a CloudFront distribution during channel creation.

REQUIREMENTS

To perform this procedure, you must have some experience using ffmpeg. Only the specific configuration related to creating the RTMP output will be addressed in detail in this document.

ORDER OF WORK

1. Obtain needed information.
2. Create two channels in AWS Elemental MediaPackage.
3. Create an input in AWS Elemental MediaLive.
4. Prepare the appliance.
5. Create a channel in AWS Elemental MediaLive.
6. Start the video stream.

PREREQUISITE: OBTAIN NEEDED INFORMATION

Obtain the public IP address (or addresses) from the appliance that will run ffmpeg.

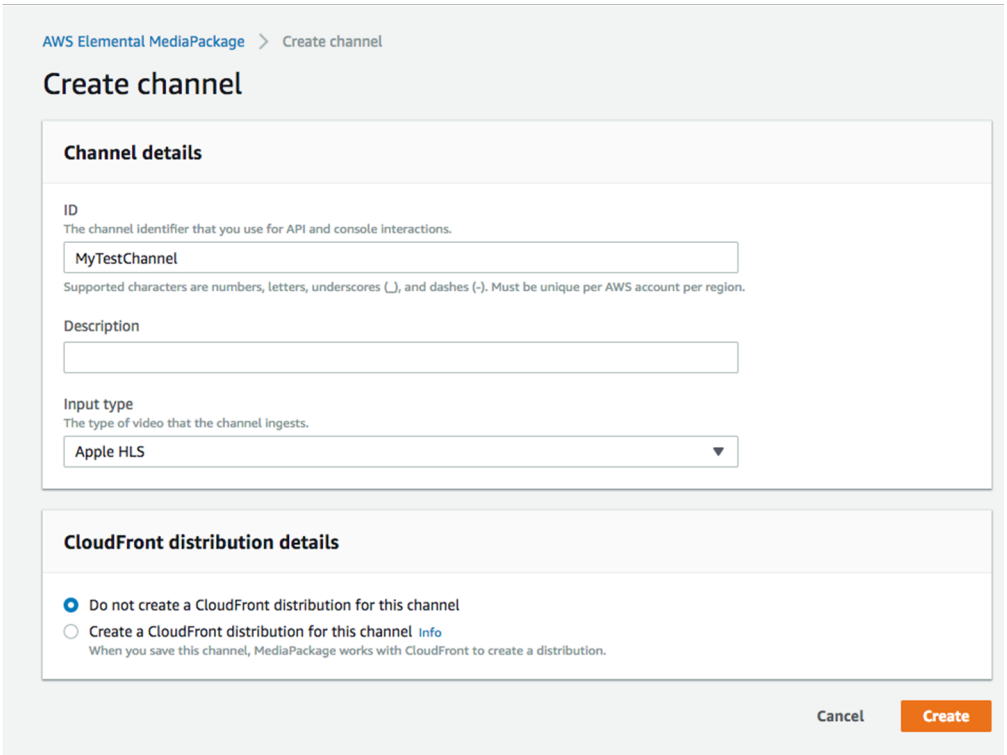
Note: If there is a firewall between the ffmpeg appliance and the internet (highly recommended), the public IP addresses will likely be different from those that the appliance reports. If so, you need to determine the external address being used. The appliance network might also be configured to utilize a pool of external IP addresses. In this case, you will need the CIDR range for the entire pool to include in the Input Security Group.

STEP A: CREATE CHANNELS IN AWS ELEMENTAL MEDIAPACKAGE

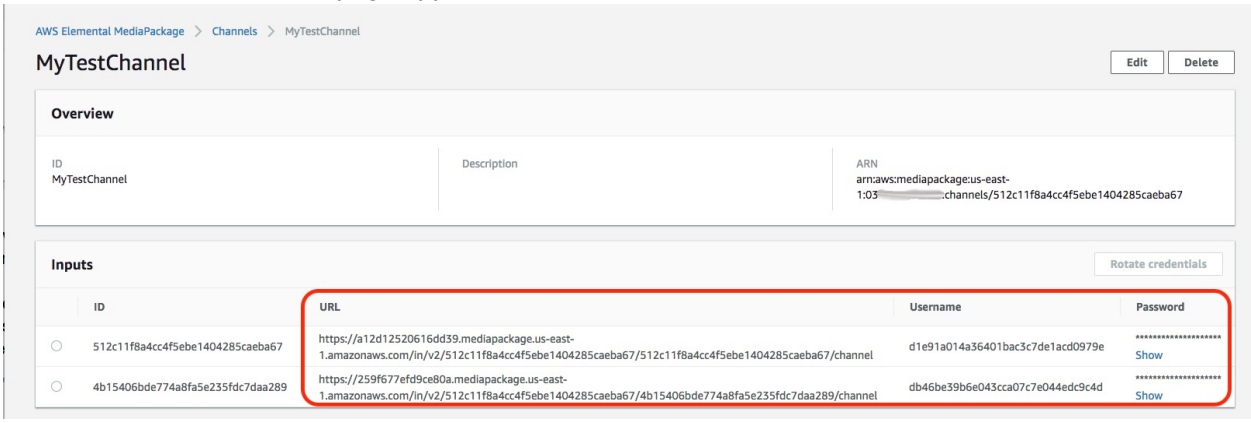
In order to create your AWS Elemental MediaLive channel, you must first know the destination URLs and credentials for your output(s). For this example, use AWS Elemental MediaPackage as your destination.

MediaLive requires two output endpoints per output group, so create two MediaPackage channels as follows:

1. Log into the AWS Elemental MediaPackage console for the same region where you will be using AWS Elemental MediaLive.
2. If you have previously created channels in MediaPackage, the channel listing view will appear. Otherwise the introductory landing page will appear.
    a. From the landing page, enter a channel name and choose **Next Step**.
    b. From the Channel Listing page, choose **Create Channel**.
3. For either case above, you should now see the Create channel page:

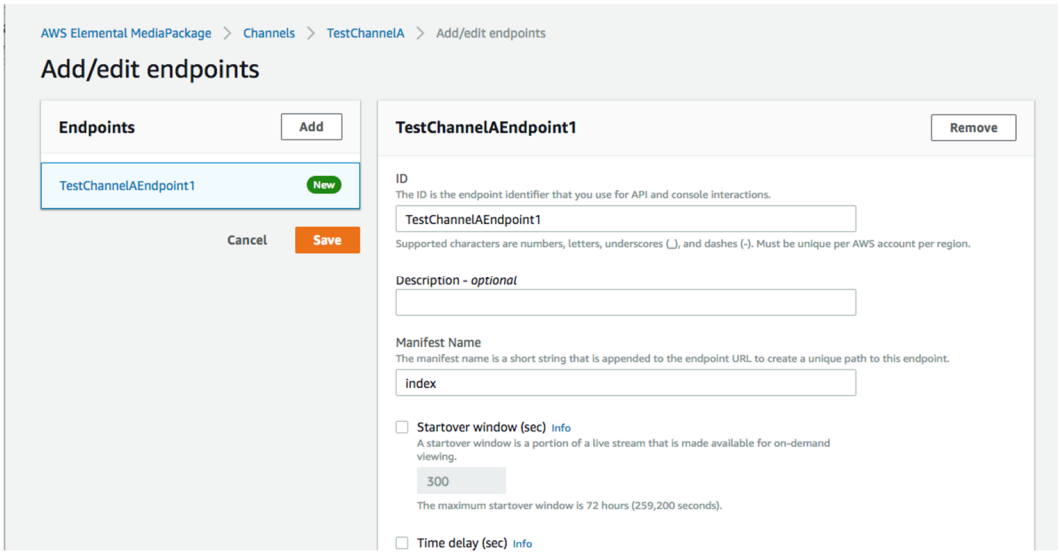


4. Add a description if desired. Note that there is an option to create a CloudFront distribution to work with this channel. For production workloads it is important to place a content distribution network (CDN) in front of the MediaPackage endpoints. Choose **Create** to save and create the channel. The channel detail page appears.



Make a note of the **Input URL**, **Username**, and **Password** for each of the two inputs (use the **show** button to reveal the password) as you will need to use these values when creating your AWS Elemental MediaLive channel.

5. Just below the channel detail tile choose **Add endpoints** to create an appropriate endpoint to be able to view your channel. For this example, it is sufficient to create a simple HLS endpoint so just give it a unique name in the **ID** field and choose **Save** to create the endpoint.



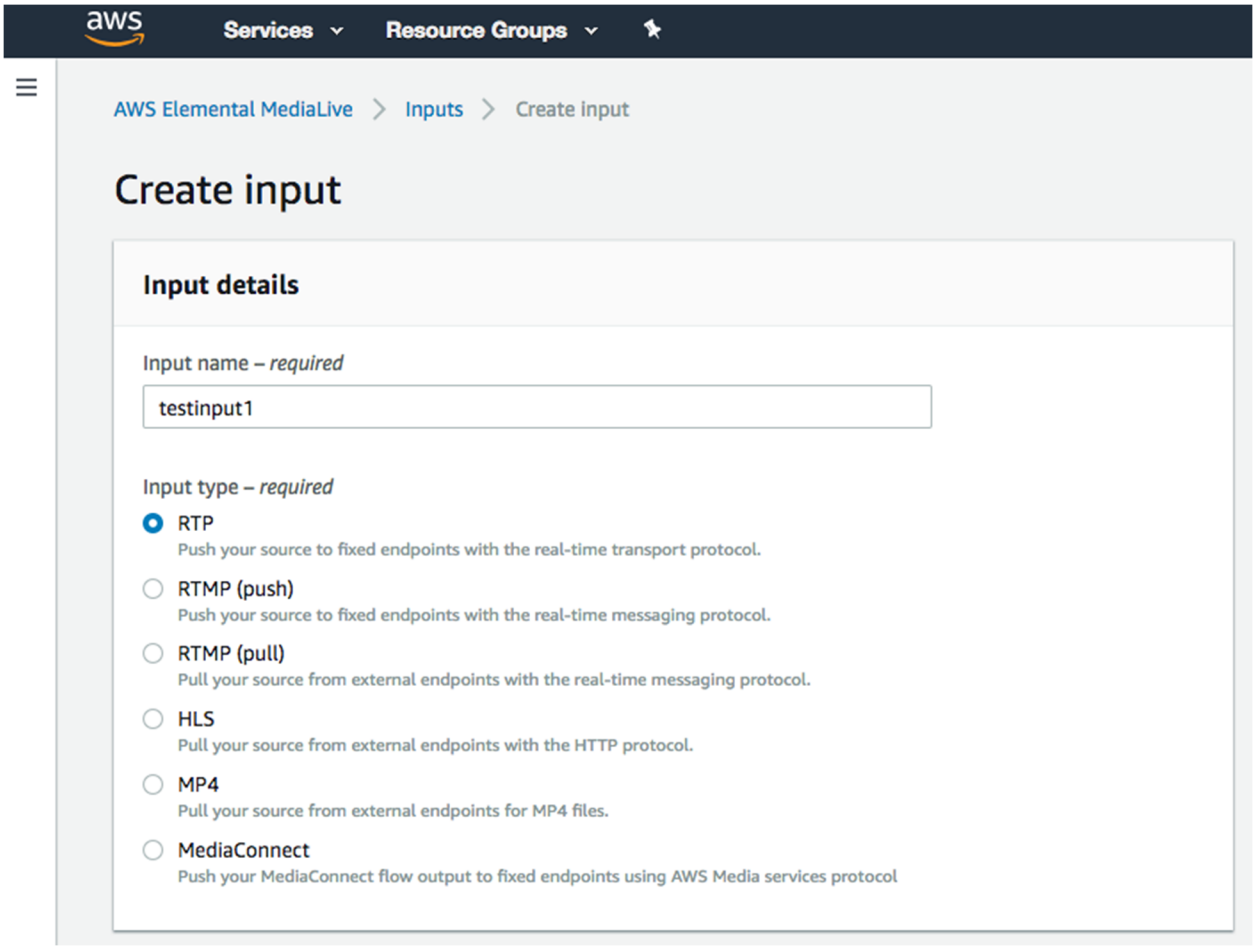
When the MediaLive channel is up and running you will be able to point an HLS compatible player or browser at the endpoint (or the CloudFront URL if you enabled CloudFront at channel creation) to view the channel, or you can preview if from inside the MediaPackage console.

6. Keep this browser session active so you can easily come back later to check your channel.

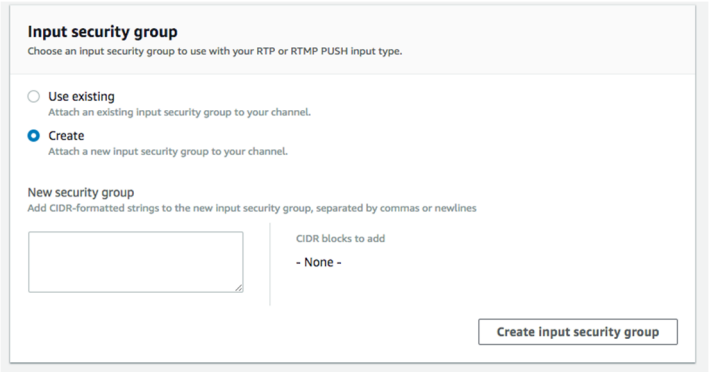
STEP B: SET UP INPUTS IN AWS ELEMENTAL MEDIALIVE

1. In a new browser tab or window, log into the AWS Elemental MediaLive console for the same region you just used to create your AWS Elemental MediaPackage channels and endpoints.
2. Take the appropriate action:
   - If the standard service page appears, choose **Inputs** from the navigation panel on the left side.
   - If the service landing page appears, expand the left-hand menu by choosing the three horizontal lines near the top just below the AWS icon. Choose **Inputs**.

   The Input listing page appears.
3. Choose **Create input**. The Create input page appears

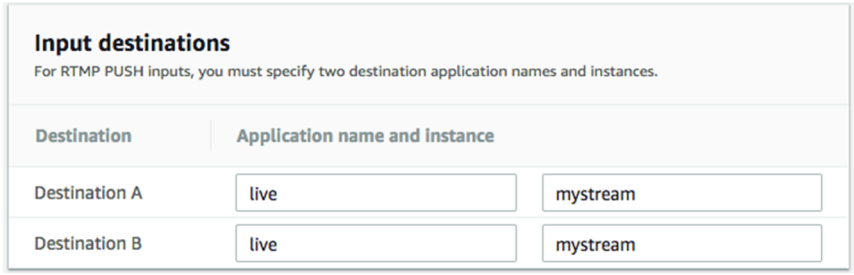


4. Complete the fields as follows:
   - **Input name:** Assign a meaningful name.
   - **Input type**: Choose **RTMP (push)**.
   - **Input security group**: Choose **Create**.

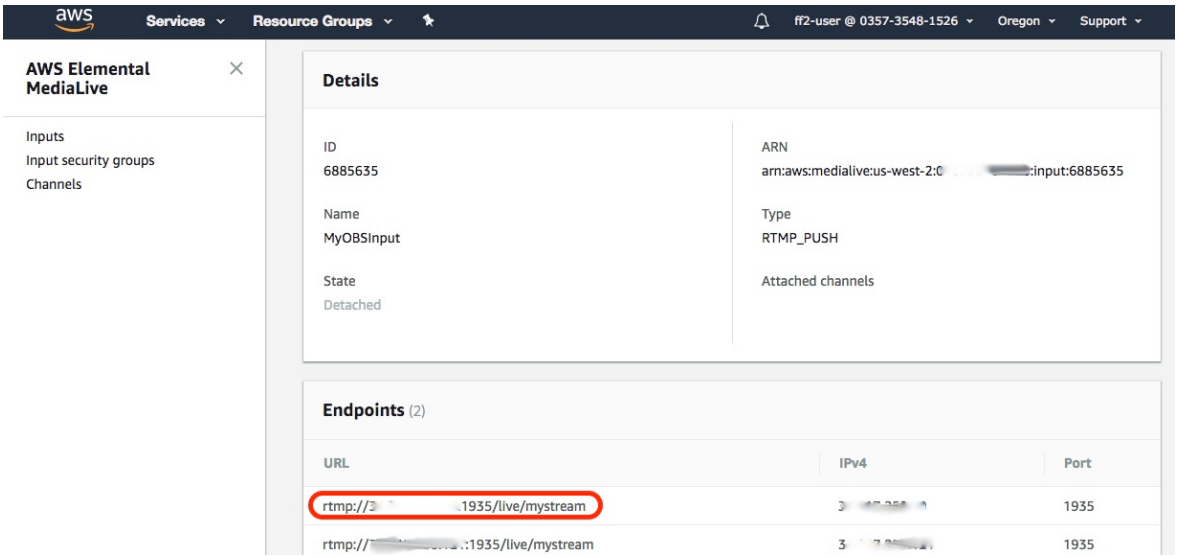


   - **New security group**: Using CIDR format, type the set of IP addresses from the Prerequisite step in this document. If you're entering a range, specify a mask that encompasses all of the addresses, or enter several CIDR entries to encompass all of the addresses.

5. Choose **Create input security group**. The tile changes to show the newly created group.
6. In the **Input destinations** section, enter an **application name** and **instance** (stream name) in the fields provided. These should match the settings you will use with the ffmpeg command-line.



7. Choose **Create**. The new input appears in the list of inputs.
8. Open the detail page for the newly-created inputs, and make a note of the endpoint URLs, as you will need to enter them in the ffmpeg command line in Step C below.



9. Leave this page open. You will return to it in a later step.

STEP C: PREPARE THE APPLIANCE

Do not execute the command line as described below until you have the AWS Elemental MediaLive channel in the Running state.

In this step, you prepare the command so you can switch back to the terminal when your channel is running and just hit Enter to start. Only when the channel is running will the required handshake between source and destination be possible.

Be aware that:

- You may have to recompile ffmpeg with support for librtmp. Assistance with the compiling of librtmp, its dependencies, and ffmpeg is outside of the scope of this document.
- RTMP has very specific codec and rate requirements. See the Adobe FLV File Format Specification for more information.

The basic command to transmit RTMP with FEC is as follows:

```
ffmpeg -re -i <source_file> -ar 44100 -ac 2 -ab 128k -vcodec libx264 -f flv
rtmp://<IP>/AppName/AppInstance
```

Where the options are as described in the table.

Option	Definition
-re	Stream in real-time, using the frame rate of the source
-i <source_file>	Source file that will be transmitted
-ar 44100	Set the audio sampling frequency to 44.1 kHz
-ac 2	Set audio to 2-channel
-ab 128k	Set audio bit rate to 128 kbps
-vcodec libx264	Set video codec to x264
-f flv	Set output format to Adobe FLV
rtmp://<IP>/AppName/AppInstance	Output RTMP to the address defined in <IP>, using the specified application name and instance

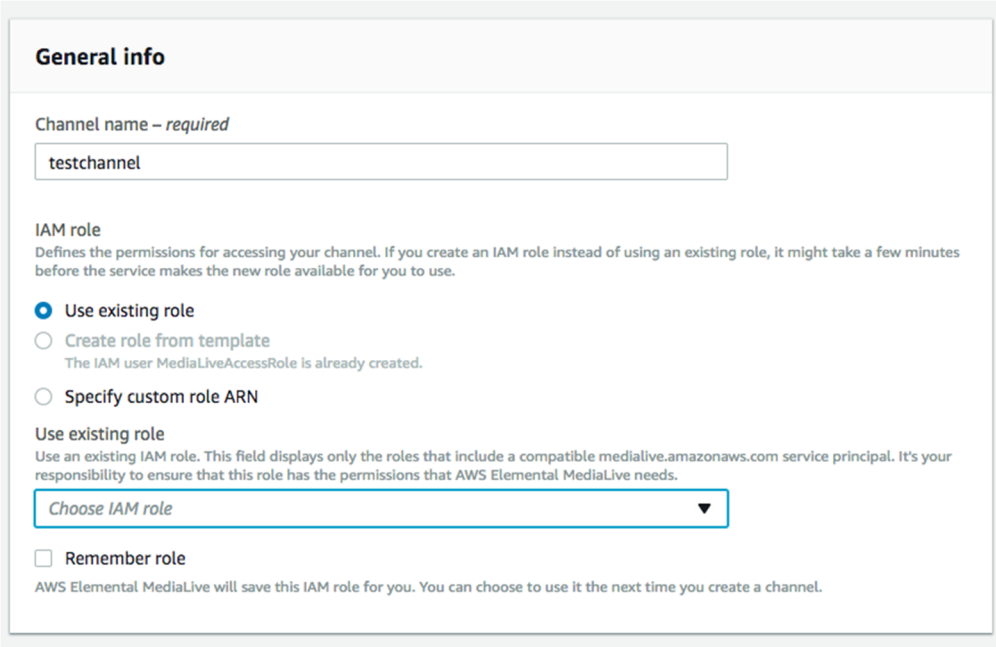
Example:

```
ffmpeg -re -i mySourceFile .ts -ar 44100 -ac 2 -ab 128k -vcodec libx264 -f flv
rtmp://192.0.2.100/live/myStream
```

STEP D: CREATE A CHANNEL IN AWS ELEMENTAL MEDIALIVE

1. Switch back to the AWS Elemental MediaLive console.
2. Choose **Channels** from the left-hand column, then choose **Create channel**. The Create channel page appears.
3. For **Channel name**, type a meaningful identifier for the channel.
4. Still on this page, move down to the **Channel template** section. In the Template field, choose **HTTP Live Streaming**. The Channel navigation panel on the left is populated with:
   - One output group named TN2224 (HLS)
   - Ten outputs that all belong to that output group.
5. In the IAM role section, take the appropriate action:

- If the **Create role from template** option is *enabled*, select that option and choose **Create IAM role**. The role is created. Once the creation process is complete, the role is automatically selected from the **Use existing role** drop-down.
- If the **Create role from template** option is *grayed out*, select **Use existing role** and then select **MediaLiveAccessRole** from the dropdown.



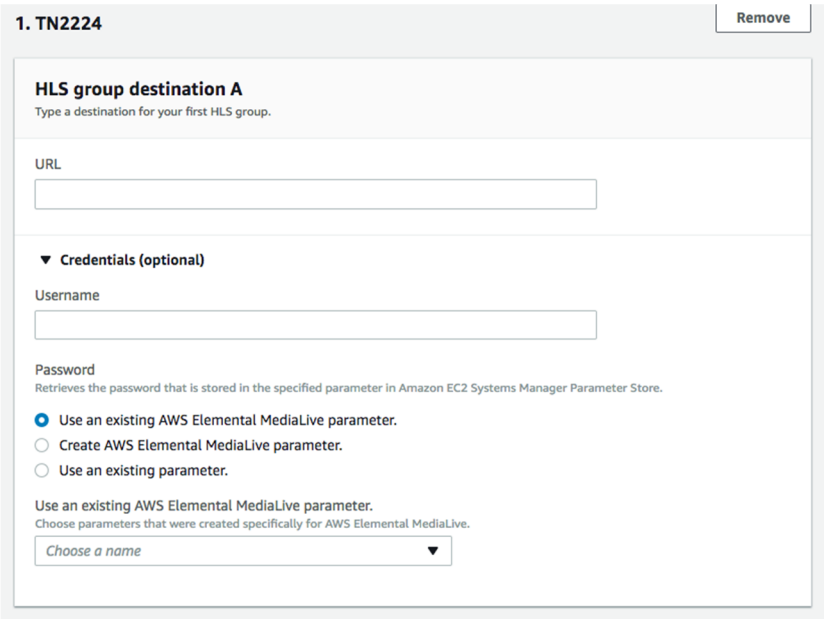
6. Under Input specifications, adjust the Maximum input bitrate, input resolution, and codec as appropriate for the content you will be sending from your appliance.
7. In the left-hand column choose the Add button beside **Input attachments**. The Attach input card appears to the right. Choose the input you created earlier from the drop-down and then choose Confirm. Additional options appear to configure the network input settings, which you can adjust if necessary for your particular source.

8. In the navigation panel on the left under **Output groups**, choose the **TN2224 (HLS)** output group. The details for that output group appear to the right.

9. In the **HLS group destination A** section, expand the **Credentials** sub-section, then complete the fields with the information from the *first* input of the AWS Elemental MediaPackage channel you

created earlier (as described in Step A, part 4).

- **URL**: Type the first URL.
- **Username**: Type the first username.
- From the list of **Password** options, select the **Create AWS Elemental MediaLive parameter** radio button. In **Name**, enter a meaningful name for the EC2 parameter store entry where your credentials will be stored.
- **Password**: Type the first password from the AWS Elemental MediaPackage channel. The password will be stored securely in the AWS EC2 parameter store under the name medialive/<name you entered above>.



Choose the **Create AWS Elemental MediaLive parameter** button to create it.

10. Repeat step 9 for **HLS group destination B**, using the information from the *second* channel that you created in AWS Elemental MediaPackage. You must specify two destinations to create a valid AWS Elemental MediaLive channel.
11. Under HLS settings, change “Input Loss Action” from EMIT_OUTPUT to PAUSE_OUTPUT. This will allow AWS Elemental MediaPackage to detect a loss of input on one of the MediaLive pipelines and switch any endpoints using the failed pipeline to use the other redundant pipeline.
12. This channel template includes a WebVTT captions output. However, we didn’t define a caption selector on the input, nor did we configure captions on the source appliance. Navigate to the HLS outputs card and choose the X to the right of Output 10 (_webvtt) to delete the captions output.
13. Choose **Create channel**. The page with the list of channels appears, showing the new channel. The status of the channel changes from Creating to Idle.

STEP E: START STREAMING THE VIDEO

You must start the event on the appliance and the AWS Elemental MediaLive channel in the correct order. This example uses RTMP, so you must start the AWS Elemental MediaLive channel first. Otherwise, the RTMP connection will fail.

1. In AWS Elemental MediaLive, on the Channels page, choose the radio button next to your new channel. The buttons along the top are enabled.
2. Choose **Start**. The channel state changes to Starting, and then to Running.
3. Switch to ffmpeg and start the stream connection.

Video should start streaming from the appliance through to AWS Elemental MediaLive, then to AWS Elemental MediaPackage, where you can view it in a preview window.