

FFmpeg RTP to AWS Elemental MediaLive to AWS
Elemental MediaPackage
Workflow Example



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INTRODUCTION

This workflow illustrates how to use FFmpeg as an RTP contribution encoder for the AWS Elemental MediaLive service. You can run the FFmpeg software on a ground appliance or an EC2 instance in the cloud. In this example “appliance” is the device running FFmpeg, streaming to AWS Elemental MediaLive.

In this scenario, you set up the RTP output from FFmpeg as an input into AWS Elemental MediaLive. You 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.

We strongly recommend that when you use RTP for inputs to MediaLive, you also enable Forward Error Correction (FEC). The FEC data is sent in parallel with the RTP output and allows the receiving device to rebuild corrupted or lost data in the RTP stream.

Note that FEC data is sent on additional ports, not in the actual RTP stream itself. The MPEG RTP transport is transmitted on port 5000, with FEC on ports 5002 & 5004. MediaLive has FEC enabled on its input and makes use of the FEC data once it's detected on the input.

Note: As part of its resiliency model, AWS Elemental MediaLive uses redundant encoding pipelines for Standard mode channels. FFmpeg does not offer an ability to send its output to more than one destination, so it isn't possible to leverage this level of redundancy for this particular workflow.

Note: To use this workflow in production, you must 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 RTP output is addressed in detail in this document.

ORDER OF WORK

1. Get needed information.
2. Create a channel 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: GET NEEDED INFORMATION

You need the public IP address (or addresses) from the appliance that runs FFmpeg.

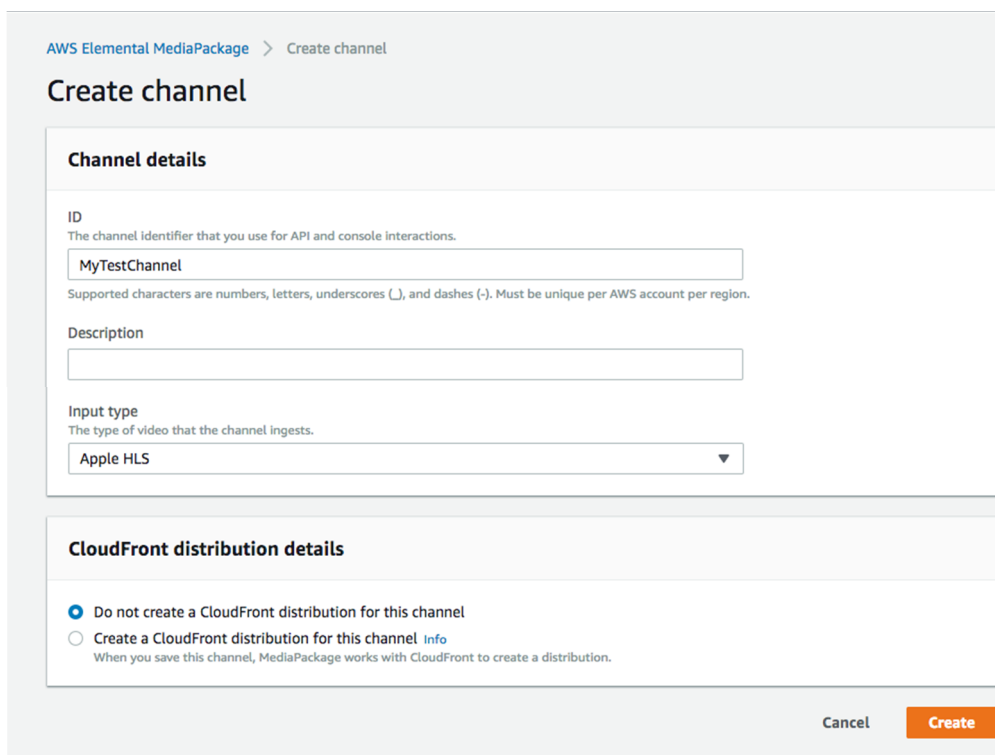
Note: If there is a firewall between the FFmpeg appliance and the internet (highly recommended), the public IP address is likely to be different from the address reported by the appliance. If so, determine the external address being used. The appliance network might also be configured to use a

pool of external IP addresses. In this case, you need the CIDR range for the entire pool to include in the Input Security Group.

STEP A: CREATE A CHANNEL IN AWS ELEMENTAL MEDIAPACKAGE

In order to create your AWS Elemental MediaLive channel, you must have a destination for that channel's output. For this example, use AWS Elemental MediaPackage as your destination. By using the MediaPackage output group type, you can configure the channel in MediaLive using only the name of the MediaPackage channel:

1. Log in to 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 appears. If not, the introductory landing page appears.
 - 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, you should now see the Create channel page:



AWS Elemental MediaPackage > Create channel

Create channel

Channel details

ID
The channel identifier that you use for API and console interactions.

MyTestChannel

Supported characters are numbers, letters, underscores (_), and dashes (-). Must be unique per AWS account per region.

Description

Input type
The type of video that the channel ingests.

Apple HLS

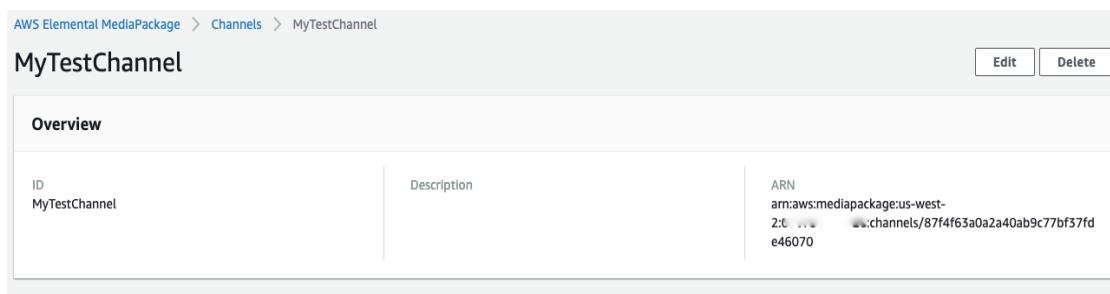
CloudFront distribution details

☒ Do not create a CloudFront distribution for this channel

☐ Create a CloudFront distribution for this channel [Info](#)
When you save this channel, MediaPackage works with CloudFront to create a distribution.

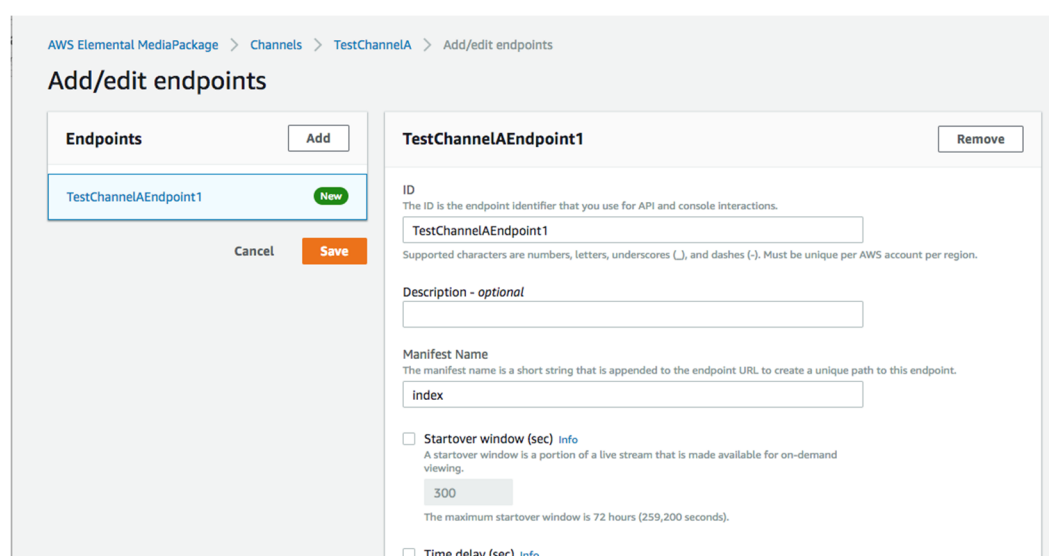
Cancel Create

4. Add a description if desired. 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 **ID** as you need it 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. 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 can 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. You can also 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 in to the AWS Elemental MediaLive console for the same region you just used to create your AWS Elemental MediaPackage channels and endpoints.
2. Choose the inputs:
 - a. If the standard service page appears, choose **Inputs** from the navigation panel on the left side.
 - b. 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.

Input details

Input name – *required*

testinput1

Input type – *required*

- ☒ **RTP**
Push your source to fixed endpoints with the real-time transport protocol.
- ☐ **RTMP (push)**
Push your source to fixed endpoints with the real-time messaging protocol.
- ☐ **RTMP (pull)**
Pull your source from external endpoints with the real-time messaging protocol.
- ☐ **HLS**
Pull your source from external endpoints with the HTTP protocol.
- ☐ **MP4**
Pull your source from external endpoints for MP4 files.
- ☐ **MediaConnect**
Push your MediaConnect flow output to fixed endpoints using AWS Media services protocol

4. Complete the fields:
 - a. **Input name:** Assign a meaningful name.
 - b. **Input type:** Choose **RTP**.
Note: Forward Error Correction (FEC) is always enabled on MediaLive inputs, so there is no option to enable or disable it.
 - c. **Network Mode:** Choose **Public**.
 - d. **Input security group:** Choose **Create**.

Input security group

Choose an input security group to use with your RTP or RTMP PUSH input type.

- ☐ **Use existing**
Attach an existing input security group to your channel.
- ☒ **Create**
Attach a new input security group to your channel.

New security group
Add CIDR-formatted strings to the new input security group, separated by commas or newlines

CIDR blocks to add
- None -

Create input security group

- e. **New security group:** Using CIDR format, type the set of IP addresses you gathered in the Prerequisite step. If you're entering a range, specify a mask that includes all of the addresses, or enter several CIDR entries to account for all of the addresses.

5. Choose **Create input security group**. The tile changes to show the newly created group.
6. Choose **Create**. The new input appears in the list of inputs.
7. Make a note of the endpoint URLs. You need to enter the first one of these in the FFmpeg command line(s) in the next step.
8. Leave this page open. You return to it in a later step.

STEP C: PREPARE THE APPLIANCE

Important: Depending on the length of the file you are using, you may want to wait to execute this command until after you have your AWS Elemental MediaLive channel in the Running state. Because this example uses RTP, a protocol that does not require acknowledgement from a destination, the command immediately starts streaming your content upon execution regardless of whether there is a channel there to receive it. Prepare the command line as shown below and leave it ready. You can switch to the terminal and hit **Enter** when you want to start streaming.

Note: You may have to recompile FFmpeg with support for PROMPEG to FEC. Assistance with the compiling of FFmpeg is outside of the scope of this document.

The basic command to transmit RTP with FEC is:

```
./FFmpeg -re -i <source_file> -c copy -map 0 -f rtp_mpegts -fec prompeg=1=5:d=20
rtp://<IP>:5000
```

Option	Definition
-re	Stream in real-time, using the frame rate of the source
-i <source_file>	Source file that will be transmitted
-c copy	Use the audio and video as-is (no transcoding)
-map 0	Use all streams in the source file
-f rtp_mpegts	Set the output format to MPEG-TS over RTP
-fec prompeg=1=5:d=20	Enable FEC and add 5 columns and 20 rows of FEC data
rtp://<IP>:5000	Output RTP to the address defined in <IP>, using port 5000

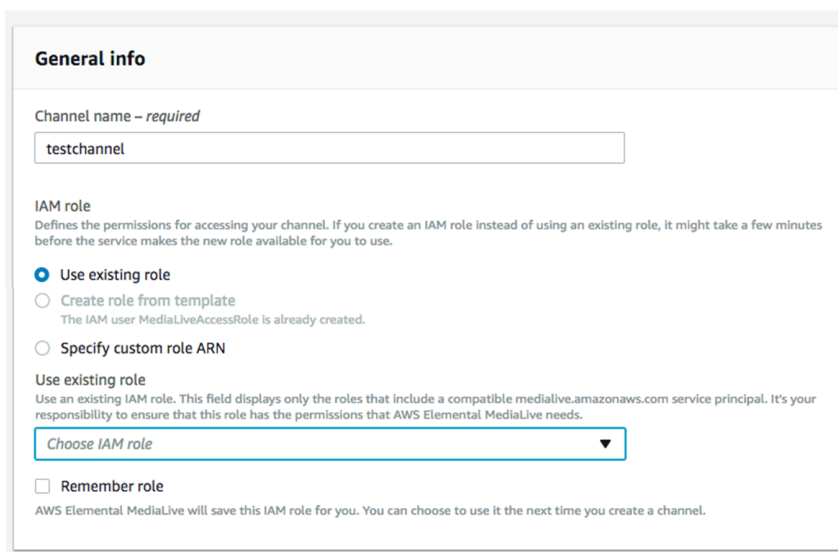
Example:

```
./FFmpeg -re -i mySourceFile.ts -c copy -map 0 -f rtp_mpegts -fec prompeg=1=5:d=20
rtp://192.0.2.100:5000
```

Note: The FFmpeg process can only send to a single destination. Use only the first IP address specified in your MediaLive input. You create a single-pipeline MediaLive channel to consume this source.

STEP D: CREATE A CHANNEL IN AWS ELEMENTAL MEDIALIVE

1. Switch back to the AWS Elemental MediaLive console.
2. From the left-hand column, choose **Channels**, then choose **Create channel**. The Create channel page appears.
3. For **Channel name**, type a meaningful identifier for the channel.
4. In the **Channel template** section, choose **HTTP Live Streaming (MediaPackage)**. The Channel navigation panel shows:
 - a. One output group named **MediaPackage group**
 - b. Ten outputs that all belong to that output group.
5. In the IAM role section, take the appropriate action:
 - a. If the **Create role from template** option is *enabled*, select that option and choose **Create IAM role**. This creates the role. Once you complete the creation, the role is automatically selected from the **Use existing role** drop-down.
 - b. If the **Create role from template** option is *grayed out*, select **Use existing role** and then select **MediaLiveAccessRole** from the drop-down.



General info

Channel name – *required*

testchannel

IAM role
Defines the permissions for accessing your channel. If you create an IAM role instead of using an existing role, it might take a few minutes before the service makes the new role available for you to use.

☒ Use existing role

☐ Create role from template
The IAM user MediaLiveAccessRole is already created.

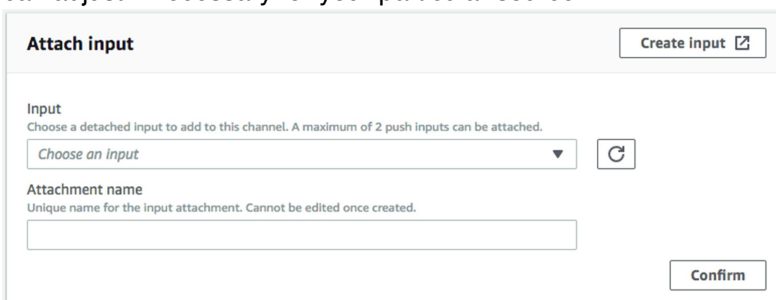
☐ Specify custom role ARN

Use existing role
Use an existing IAM role. This field displays only the roles that include a compatible medialive.amazonaws.com service principal. It's your responsibility to ensure that this role has the permissions that AWS Elemental MediaLive needs.

Choose IAM role

☐ Remember role
AWS Elemental MediaLive will save this IAM role for you. You can choose to use it the next time you create a channel.

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



Attach input Create input

Input
Choose a detached input to add to this channel. A maximum of 2 push inputs can be attached.

Choose an input

Attachment name
Unique name for the input attachment. Cannot be edited once created.

Confirm

9. In the left-hand column, navigate to “output groups” and choose the group named **MediaPackage group**. The Output Group details appear to the right.
10. In the **MediaPackage destination** section, copy and paste the MediaPackage ID from the channel you created earlier.
11. Delete the captions output. This channel template includes a WebVTT captions output. Since we didn’t define a caption selector on the input, nor did we configure captions on the source appliance, we don’t need it. Navigate to the **MediaPackage outputs** section and choose the **X** to the right of Output 10 (_webvtt) to delete the captions output.
12. 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

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 the terminal where you have your FFmpeg command line ready to run, then perform the command.

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

STEP F: CLEAN UP

To avoid additional charges, it’s important to stop and delete all of the resources you used.

1. In the AWS Elemental MediaPackage console, choose the channel you created. From the **endpoints** section of the channel detail page, select the check-box beside any endpoints and choose **Delete**. If you chose to enable a CloudFront distribution when you created the channel, you need to disable and delete the distribution in the CloudFront console as well.
2. At the top right of the channel detail page, choose **Delete**.
3. **Stop** streaming from the FFmpeg appliance.
4. In the AWS Elemental MediaLive console, under the channel listing, choose the radio button beside your channel, and then choose the **Stop** button.
5. Once the channel state has changed to **idle**, confirm the radio button is still selected, then from **Channel Actions** drop-down choose **Delete channel**.
6. From the **Inputs** section of the console, choose the radio button beside your input and then choose the **Delete** button from the top right.
7. From the **Input security group** section of the console, choose the radio button beside your input security group and then choose the **Delete** button from the top right.