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# AWS Elemental MediaPackage

## User Guide



## **AWS Elemental MediaPackage: User Guide**

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## Table of Contents

What Is AWS Elemental MediaPackage? .....	1
Are You a First-Time User of AWS Elemental MediaPackage? .....	1
Concepts and Terminology .....	1
How AWS Elemental MediaPackage Works .....	2
Features of AWS Elemental MediaPackage .....	3
Related Services .....	4
Accessing AWS Elemental MediaPackage .....	5
Pricing for AWS Elemental MediaPackage .....	5
Regions for AWS Elemental MediaPackage .....	5
Setting Up .....	6
Signing Up for AWS .....	6
Creating an Admin IAM User .....	6
Creating a Non-Admin IAM User .....	7
(Optional) Setting Up Encryption .....	8
Getting Started .....	9
Prerequisites .....	9
Step 1: Access AWS Elemental MediaPackage .....	9
Step 2: Create a Channel .....	9
Step 3: Create Endpoints .....	10
(Optional) Step 4: Monitor AWS Elemental MediaPackage Activity .....	10
Step 5: Clean Up .....	11
Working with Channels .....	12
Creating a Channel .....	12
Viewing Channel Details .....	13
Editing a Channel .....	13
Deleting a Channel .....	13
Adding an Endpoint to a Channel .....	14
Working with Endpoints .....	15
Creating an Endpoint .....	15
Creating an HLS Endpoint .....	16
Creating a Microsoft Smooth Streaming Endpoint .....	19
Creating a Common Media Application Format (CMAF) Endpoint .....	21
Creating a DASH Endpoint .....	25
Viewing All Endpoints Associated with a Channel .....	28
Viewing a Single Endpoint .....	28
Editing an Endpoint .....	28
Deleting an Endpoint .....	29
Previewing an Endpoint .....	29
Time-shifted Viewing .....	31
Rules for Start and End Parameters .....	31
DASH Parameter Rules .....	32
HLS and CMAF Parameter Rules .....	32
Microsoft Smooth Parameter Rules .....	33
Rendition Groups .....	34
When to Use Rendition Groups .....	34
When Not to Use Rendition Groups .....	34
Multi-period DASH .....	36
How it Works .....	36
Monitoring .....	39
Monitoring with CloudWatch .....	39
AWS Elemental MediaPackage CloudWatch Metrics .....	40
AWS Elemental MediaPackage CloudWatch Dimensions .....	43
Monitoring with CloudWatch Events .....	44
AWS Elemental MediaPackage Events .....	45

Working with CDNs .....	47
Limits .....	48
Soft Limits .....	48
Hard Limits .....	48
Resources .....	50
Document History .....	51
Earlier Updates .....	51
AWS Glossary .....	53

# What Is AWS Elemental MediaPackage?

AWS Elemental MediaPackage is a just-in-time video packaging and origination service that runs in the AWS Cloud. With MediaPackage, you can deliver highly secure, scalable, and reliable video streams to a wide variety of playback devices and content distribution networks (CDNs).

AWS Elemental MediaPackage offers a broadcast-grade viewing experience for viewers, while allowing you the flexibility to control and protect your content. Additionally, the built-in resiliency and scalability of MediaPackage means that you have the right amount of resources at the right time, with no manual intervention required.

## Topics

- [Are You a First-Time User of AWS Elemental MediaPackage? \(p. 1\)](#)
- [Concepts and Terminology \(p. 1\)](#)
- [How AWS Elemental MediaPackage Works \(p. 2\)](#)
- [Features of AWS Elemental MediaPackage \(p. 3\)](#)
- [Related Services \(p. 4\)](#)
- [Accessing AWS Elemental MediaPackage \(p. 5\)](#)
- [Pricing for AWS Elemental MediaPackage \(p. 5\)](#)
- [Regions for AWS Elemental MediaPackage \(p. 5\)](#)

## Are You a First-Time User of AWS Elemental MediaPackage?

If you are a first-time user of AWS Elemental MediaPackage, we recommend that you begin by reading the following sections:

- [How AWS Elemental MediaPackage Works \(p. 2\)](#)
- [Concepts and Terminology \(p. 1\)](#)
- [Features of AWS Elemental MediaPackage \(p. 3\)](#)
- [Getting Started with AWS Elemental MediaPackage \(p. 9\)](#)

## Concepts and Terminology

AWS Elemental MediaPackage includes the following components:

### Channel

A *channel* represents the entry point for a content stream into AWS Elemental MediaPackage. Upstream encoders such as AWS Elemental MediaLive send content to the channel. When MediaPackage receives a content stream, it packages the content and outputs the stream from an endpoint that you create on the channel. There is one channel for each incoming set of ABR streams.

## Endpoint

An *endpoint* is part of a channel and represents the packaging aspect of AWS Elemental MediaPackage. When you create an endpoint on a channel, you indicate what streaming format, packaging parameters, and features the output stream will use. Downstream devices request content from the endpoint. A channel can have multiple endpoints.

## Just-in-time packaging

AWS Elemental MediaPackage performs *just-in-time packaging* (JITP). When a playback device requests content, MediaPackage dynamically customizes the live video streams and creates a manifest in a format that is compatible with the requesting device.

## Origination service

AWS Elemental MediaPackage is considered an *origination service* because it is the point of distribution for media content delivery.

## Packager

A *packager* prepares output streams for access by different types of players. The packager type specifies the streaming format that AWS Elemental MediaPackage delivers from the endpoint (either DASH-ISO, Microsoft Smooth Streaming, CMAF, or Apple HLS). Additional packager settings include buffer and update durations and manifest tag handling instructions.

A packager is a part of an endpoint. Each endpoint must have one, and only one, packager. To use different packager types for the same content, create multiple endpoints on the channel.

## Stream

A *stream* refers to the content input and output of AWS Elemental MediaPackage. An upstream encoder sends a live stream as an input to MediaPackage to the channel. When a downstream device requests playback of the content, MediaPackage dynamically packages the stream (including specifying the packager type, adding encryption, and configuring track outputs) and delivers it to the requesting device as an output of the endpoint. An endpoint can produce multiple streams.

## Track

*Tracks* make up the output content stream. AWS Elemental MediaPackage includes selected video, audio, and subtitles or captions tracks in the output stream. The stream delivers the tracks to the player (either directly or through a CDN), and the player plays back the tracks based on player logic or network conditions (such as available bandwidth).

# How AWS Elemental MediaPackage Works

AWS Elemental MediaPackage uses just-in-time format conversion to deliver over-the-top (OTT) video from a single source to a wide variety of playback devices or content delivery networks (CDNs).

Here is the general processing flow:

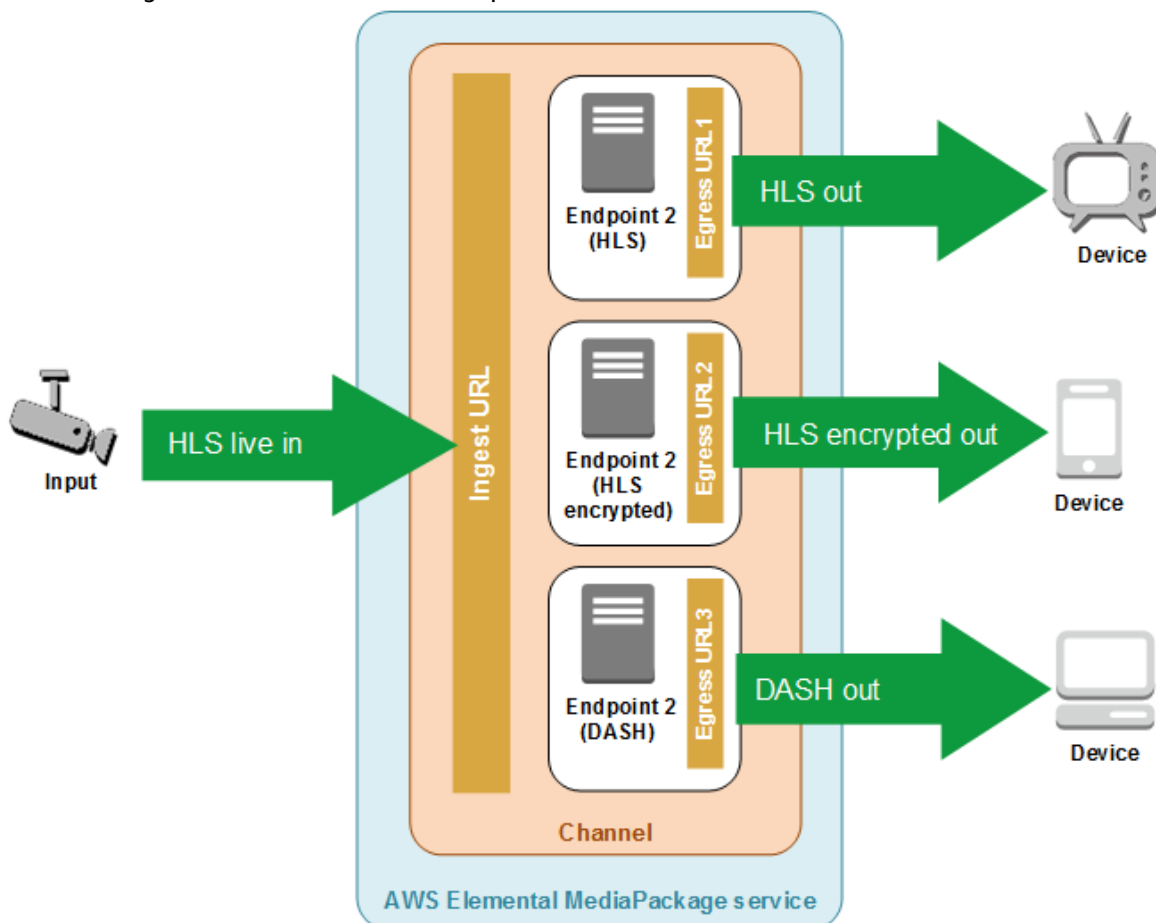
1. An upstream encoder (such as AWS Elemental MediaLive) sends an HLS live stream over WebDAV to the AWS Elemental MediaPackage channel ingest URL, and includes the channel's access credentials (as supplied in MediaPackage). AWS scales resources up and down to handle the incoming traffic.
2. A downstream device requests content from AWS Elemental MediaPackage through the endpoint egress URL. A downstream device is either a video player or a content distribution network (CDN). The egress URL is associated with an endpoint for a specific streaming format (either Apple HLS, DASH-ISO, CMAF, or Microsoft Smooth Streaming).
3. When AWS Elemental MediaPackage receives the playback request from the downstream device, it dynamically packages the stream according to the settings that you specified on the endpoint.

Packaging can include adding encryption and configuring audio, video, and subtitles or captions track outputs.

4. AWS Elemental MediaPackage delivers the output stream over HTTPS to the requesting device. As with ingest, AWS scales resources up and down to handle changes in traffic.
5. AWS Elemental MediaPackage logs activity through Amazon CloudWatch. You can view information like the number of content requests and ingress or egress bytes. For information about viewing MediaPackage metrics in CloudWatch, see [Monitoring AWS Elemental MediaPackage with Amazon CloudWatch](#) (p. 39).

Throughout the ingest and egress processes, AWS Elemental MediaPackage detects and mitigates potential infrastructure failures before they become a problem for viewers.

The following illustration shows the overall process.



## Features of AWS Elemental MediaPackage

AWS Elemental MediaPackage supports the following features:

### Audio

AWS Elemental MediaPackage supports multi-language audio inputs, as well as the following audio codecs:

- AAC stereo

- Dolby AC3 and E-AC3 (Dolby Digital and Dolby Digital+)

AWS Elemental MediaPackage accepts these codecs from the input source and passes them through to the output stream.

#### Captions

AWS Elemental MediaPackage supports input 608/708 captions and passes them through to the output stream.

#### DRM

AWS Elemental MediaPackage supports content protection through digital rights management (DRM).

#### Subtitles

AWS Elemental MediaPackage supports input WebVTT text-based subtitles. MediaPackage translates the subtitles to the appropriate format based on the packager that is used on the endpoint:

- For HLS and CMAF: WebVTT is passed through
- For DASH: subtitles are translated to EBU-TT
- For Microsoft Smooth Streaming: subtitles are translated to DFXP

#### Time-shift Viewing

AWS Elemental MediaPackage allows playback of a stream at a time earlier than the current time. Start-over, catch-up TV, and time delay are all supported. For more information about setting up time-shift capabilities, see [Time-shifted Viewing Reference in AWS Elemental MediaPackage \(p. 31\)](#).

#### Video

AWS Elemental MediaPackage supports the input H.264 video codec and passes it through to the output stream. Common Media Application Format (CMAF) endpoints in MediaPackage also support H.265/HEVC and HDR-10 following the Apple spec to applicable playback devices.

#### Whitelisting

AWS Elemental MediaPackage supports restricting network access to the endpoint. To take advantage of this feature, you must enter the allowed IP addresses on the endpoint. For more information about adding whitelisting information, see [Access Control Fields \(p. 18\)](#).

## Related Services

- **Amazon CloudFront** is a global content delivery network (CDN) service that securely delivers data and videos to your viewers. Use CloudFront to deliver content with the best possible performance. For more information, see [Amazon CloudFront](#).
- **Amazon CloudWatch** is a monitoring service for AWS Cloud resources and the applications that you run on AWS. Use CloudWatch to track metrics such as ingress and egress request counts. For more information, see [Amazon CloudWatch](#).
- **AWS Elemental MediaLive** is a live video processing service that encodes high-quality live video streams for broadcast television and multi-screen devices. Use AWS Elemental MediaLive to encode content streams and send them to AWS Elemental MediaPackage for packaging. For more information about how encoders (such as AWS Elemental MediaLive) work with MediaPackage, see [How AWS Elemental MediaPackage Works \(p. 2\)](#).
- **AWS Identity and Access Management (IAM)** is a web service that helps you securely control access to AWS resources for your users. Use IAM to control who can use your AWS resources (authentication) and what resources users can use in which ways (authorization). For more information, see [Setting Up \(p. 6\)](#).



## Accessing AWS Elemental MediaPackage

You can access AWS Elemental MediaPackage through the console, AWS Command Line Interface (AWS CLI), or MediaPackage REST API.

- Console access:

```
https://<region>.console.aws.amazon.com/mediapackage/home
```

- AWS CLI endpoint:

```
aws mediapackage
```

- AWS Elemental MediaPackage REST API endpoint:

```
https://config.mediapackage.<region>.amazonaws.com
```

## Pricing for AWS Elemental MediaPackage

As with other AWS products, there are no contracts or minimum commitments for using AWS Elemental MediaPackage. You are charged only for AWS resources that your account uses. Pricing is pay-as-you-go and consists of the following:

- A per GB charge for ingested content
- A per GB charge for content that is streamed out of AWS Elemental MediaPackage

Content that is cached and served from a content distribution network (CDN) does not incur this per GB charge.

For detailed pricing information, see [AWS Elemental MediaPackage Pricing](#).

## Regions for AWS Elemental MediaPackage

To reduce latency in your applications, AWS Elemental MediaPackage offers a regional endpoint for your requests. To view the list of regions where MediaPackage is available, see [AWS Elemental MediaPackage Regions](#).

# Setting Up AWS Elemental MediaPackage

Before you use AWS Elemental MediaPackage for the first time, you must sign up for AWS if you don't already have an AWS account. Next, you must create AWS Identity and Access Management (IAM) users to allow access to MediaPackage.

## Topics

- [Signing Up for AWS \(p. 6\)](#)
- [Creating an Admin IAM User \(p. 6\)](#)
- [Creating a Non-Admin IAM User \(p. 7\)](#)
- [\(Optional\) Setting Up Encryption \(p. 8\)](#)

## Signing Up for AWS

If you do not have an AWS account, use the following procedure to create one.

### To sign up for AWS

1. Open <https://aws.amazon.com/> and choose **Create an AWS Account**.
2. Follow the online instructions.

## Creating an Admin IAM User

When you first create an AWS account, you begin with a single sign-in identity that has complete access to all AWS services and resources in the account. This identity is called the AWS account *root user* and is accessed by signing in with the email address and password that you used to create the account. We strongly recommend that you do not use the root user for your everyday tasks, even the administrative ones. Instead, adhere to the [best practice of using the root user only to create your first IAM user](#). Then securely lock away the root user credentials and use them to perform only a few account and service management tasks.

In this procedure, you will use the AWS account root user to create your first IAM user. You will add this IAM user to an Administrators group, to ensure that you have access to all services and their resources in your account. The next time that you access your AWS account, you should sign in with the credentials for this IAM user.

To create users with limited permissions, see [Creating a Non-Admin IAM User \(p. 7\)](#).

### To create an IAM user for yourself and add the user to an Administrators group

1. Use your AWS account email address and password to sign in as the *AWS account root user* to the IAM console at <https://console.aws.amazon.com/iam/>.

#### Note

We strongly recommend that you adhere to the best practice of using the **Administrator** IAM user below and securely lock away the root user credentials. Sign in as the root user only to perform a few [account and service management tasks](#).

2. In the navigation pane of the console, choose **Users**, and then choose **Add user**.
3. For **User name**, type **Administrator**.
4. Select the check box next to **AWS Management Console access**, select **Custom password**, and then type the new user's password in the text box. You can optionally select **Require password reset** to force the user to create a new password the next time the user signs in.
5. Choose **Next: Permissions**.
6. On the **Set permissions** page, choose **Add user to group**.
7. Choose **Create group**.
8. In the **Create group** dialog box, for **Group name** type **Administrators**.
9. For **Filter policies**, select the check box for **AWS managed - job function**.
10. In the policy list, select the check box for **AdministratorAccess**. Then choose **Create group**.
11. Back in the list of groups, select the check box for your new group. Choose **Refresh** if necessary to see the group in the list.
12. Choose **Next: Review** to see the list of group memberships to be added to the new user. When you are ready to proceed, choose **Create user**.

You can use this same process to create more groups and users, and to give your users access to your AWS account resources. To learn about using policies to restrict users' permissions to specific AWS resources, go to [Access Management](#) and [Example Policies](#).

For information about creating users with limited permissions, see [Creating a Non-Admin IAM User \(p. 7\)](#).

## Creating a Non-Admin IAM User

Users in the Administrators group for an account have access to all AWS services and resources in that account. This section describes how to create users with permissions that are limited to AWS Elemental MediaPackage.

### To create users who can access AWS Elemental MediaPackage

1. In the navigation pane of the IAM console, choose **Users**, and then choose **Add user**.
2. For **User name**, type the name that the user will use to sign in to AWS Elemental MediaPackage.
3. Select the check box next to **AWS Management Console access**, select **Custom password**, and then type the new user's password in the box. You can optionally select **Require password reset** to force the user to create a password the next time the user signs in.
4. Choose **Next: Permissions**.
5. On the **Set permissions for user** page, choose **Attach existing policies directly**.
6. In the policy list, search for and add the policy with the appropriate AWS Elemental MediaPackage permissions level:
  - Use **AWSElementalMediaPackageFullAccess** to allow the user to perform all actions on all resources in AWS Elemental MediaPackage.
  - Use **AWSElementalMediaPackageReadOnly** to provide the user read-only rights for all resources in AWS Elemental MediaPackage.
7. Add policies to allow the AWS Elemental MediaPackage console to make calls to Amazon CloudWatch on the user's behalf. Without these policies, the user is able to use the service's API only (not the console). Choose one of these options:
  - Use **ReadOnlyAccess** to allow AWS Elemental MediaPackage to communicate with CloudWatch, and also provide the user read-only access to all AWS services on your account.

- Use **CloudWatchReadOnlyAccess**, **CloudWatchEventsReadOnlyAccess**, and **CloudWatchLogsReadOnlyAccess** to allow AWS Elemental MediaPackage to communicate with CloudWatch, and limit the user's read-only access to CloudWatch.
8. Choose **Next: Review** to see the list of policies to be added to the new user. When you are ready to proceed, choose **Create user**.

## (Optional) Setting Up Encryption

Protect your content from unauthorized use through encryption. Digital rights management (DRM) systems provide keys to MediaPackage for content encryption, and licenses to supported players for decryption.

To encrypt content, you must have a DRM solution provider. To get set up, see <http://docs.aws.amazon.com/speke/latest/documentation/customer-onboarding.html>.

# Getting Started with AWS Elemental MediaPackage

This Getting Started tutorial shows you how to use the AWS Elemental MediaPackage console to create a channel and endpoints for streaming live videos.

## Topics

- [Prerequisites \(p. 9\)](#)
- [Step 1: Access AWS Elemental MediaPackage \(p. 9\)](#)
- [Step 2: Create a Channel \(p. 9\)](#)
- [Step 3: Create Endpoints \(p. 10\)](#)
- [\(Optional\) Step 4: Monitor AWS Elemental MediaPackage Activity \(p. 10\)](#)
- [Step 5: Clean Up \(p. 11\)](#)

## Prerequisites

Before you can use AWS Elemental MediaPackage, you need an AWS account and the appropriate permissions to access, view, and edit MediaPackage components. Complete the steps in [Setting Up \(p. 6\)](#), and then return to this tutorial.

## Step 1: Access AWS Elemental MediaPackage

Using your IAM credentials, sign in to the AWS Elemental MediaPackage console:

```
https://<region>.console.aws.amazon.com/mediapackage/home
```

## Step 2: Create a Channel

The channel is the first component in AWS Elemental MediaPackage. It represents the input to MediaPackage for incoming content from an encoder such as AWS Elemental MediaLive.

AWS Elemental MediaPackage does not require that you supply any customer data. There are no fields in channels where there is an expectation that you will provide customer data.

### To create a channel

1. On the AWS Elemental MediaPackage **Channels** page, choose **Create channel**.
2. For **ID**, type a name that describes the channel, such as **channelHLS1**. The ID is the primary identifier for the channel, and must be unique for your account in the region. Supported characters are letters, numbers, underscore (`_`), and dash (`-`). You cannot use spaces in the ID.
3. Keep the defaults for the remaining fields, and then choose **Create channel**.

AWS Elemental MediaPackage displays the new channel's details page.

4. On the channel's details page, note the values for **Input URL**, **Username**, and **Password**. AWS Elemental MediaPackage securely generates these values when it creates the channel. You can't change the values.

Provide the information from these fields to the person in charge of the upstream encoder. In the stream configuration in the encoder, this person must type the destination as the input URL, and the WebDAV credentials as the channel's user name and password. The upstream encoder must push WebDAV over HTTPS to AWS Elemental MediaPackage, and include these credentials.

## Step 3: Create Endpoints

The endpoint is attached to a channel, and represents the output of the content. You can associate multiple endpoints to a single channel. Each endpoint gives players and downstream CDNs (such as Amazon CloudFront) access to the content for playback.

AWS Elemental MediaPackage does not require that you supply any customer data. There are no fields in endpoints where there is an expectation that you will provide customer data.

### To create an endpoint

1. On the **Channels** page, choose the channel that the endpoint will be associated with.
2. On the details page for the channel, choose either **Add and edit endpoint** or **Add endpoints** if there are no existing endpoints.
3. For **ID**, type a name that describes the endpoint, such as **HLSendpoint1**. The ID is the primary identifier for the endpoint, and must be unique for your account in the region. Supported characters are letters, numbers, underscore (\_), and dash (-). You cannot use spaces in the ID.
4. Keep the defaults for the remaining fields, and then choose **Save endpoints**.

AWS Elemental MediaPackage displays the channel's details page, including the endpoint that you just created.

5. On the channel's details page, note the value in the **URL** field for the endpoint. Provide this information to the person in charge of the downstream device (CDN or player). In the downstream device, this person must type the request destination as the endpoint's URL.

## (Optional) Step 4: Monitor AWS Elemental MediaPackage Activity

Use Amazon CloudWatch to track AWS Elemental MediaPackage activity, such as the counts of ingest and egress bytes, response times, and request counts.

### To view metrics using the CloudWatch console

Metrics are grouped first by the service namespace, and then by the various dimension combinations within each namespace.

1. Open the CloudWatch console at <https://console.aws.amazon.com/cloudwatch/>.
2. In the navigation pane, choose **Metrics**.
3. Under **All metrics**, choose the **AWS/MediaPackage** namespace.
4. Select the metric dimension to view the metrics (for example, choose `channel` to view metrics per channel). For a list of AWS Elemental MediaPackage metrics, see [AWS Elemental MediaPackage CloudWatch Metrics](#) (p. 40).

## Step 5: Clean Up

To avoid extraneous charges, be sure to delete all unnecessary channels and endpoints. You must delete all endpoints on a channel before the channel can be deleted.

### To delete an endpoint

1. On the **Channels page**, choose the channel that the endpoint is associated with.
2. On the channel details page, choose the name of the endpoint to be deleted.
3. On the endpoint details page, choose **Delete endpoint**.
4. On the **Delete Endpoints** page, choose **Save all**.

### To delete a channel

1. On the **Channels** page, choose the channel using one the following methods:
  - Choose the channel name
  - Select the check box next to the channel name
2. Choose **Delete selected** or **Delete channel**.
3. In the confirmation dialog box, choose **Delete**.

AWS Elemental MediaPackage removes the channel and all associated endpoints.

# Working with Channels in AWS Elemental MediaPackage

A channel holds all the information that AWS Elemental MediaPackage needs to ingest a live content stream from a source such as AWS Elemental MediaLive or another encoder. The channel receives content, and after packaging it, outputs it through an endpoint to downstream devices (such as video players or CDNs) that request the content.

After you create a channel, AWS Elemental MediaPackage provides an ingest URL that is fixed for the lifetime of the channel, regardless of any failures or upgrades that might happen over time. The output of the upstream encoder points to the URL for stream delivery to MediaPackage.

## Topics

- [Creating a Channel \(p. 12\)](#)
- [Viewing Channel Details \(p. 13\)](#)
- [Editing a Channel \(p. 13\)](#)
- [Deleting a Channel \(p. 13\)](#)
- [Adding an Endpoint to a Channel \(p. 14\)](#)

## Creating a Channel

Create a channel to start receiving content streams. Later, you add an endpoint to the channel. This endpoint is the access point for content playback requests.

You can use the AWS Elemental MediaPackage console, the AWS CLI, or the MediaPackage API to create a channel. For information about creating a channel through the AWS CLI or MediaPackage API, see the [AWS Elemental MediaPackage API Reference](#).

When you're creating a channel, do not put sensitive identifying information like customer account numbers into free-form fields such as the **Name** field. This includes when you work with AWS Elemental MediaPackage using the console, REST API, AWS CLI, or AWS SDKs. Any data that you enter into MediaPackage might get picked up for inclusion in diagnostic logs or Amazon CloudWatch Events.

### To create a channel (console)

1. Open the AWS Elemental MediaPackage console at <https://console.aws.amazon.com/mediapackage/>.
2. On the **Channels** page, choose **Create channel**.
3. For **ID**, type a name that describes the channel. The ID is the primary identifier for the channel, and must be unique for your account in the region.
4. (Optional) For **Description**, type any descriptive text that helps you to identify the channel.
5. For **Input type**, choose **Apple HLS**.
6. Choose **Create channel**.

AWS Elemental MediaPackage displays the new channel's details page.

The channel is active and can start receiving content as soon as it's created. AWS Elemental MediaPackage scales resources up and down to allow the right amount of capacity for your traffic.



## Viewing Channel Details

View all channels that are configured in AWS Elemental MediaPackage, or view the details of a specific channel, including the endpoints that are associated with it.

You can use the AWS Elemental MediaPackage console, the AWS CLI, or the MediaPackage API to view channel details. For information about viewing details about a channel through the AWS CLI or MediaPackage API, see the [AWS Elemental MediaPackage API Reference](#).

### To view channels (console)

1. Open the AWS Elemental MediaPackage console at <https://console.aws.amazon.com/mediapackage/>.
2. If the **Channels** page doesn't appear, on the AWS Elemental MediaPackage home page, choose **Skip and go to console**.

All existing channels are displayed on the console.

3. (Optional) To adjust your viewing preferences (such as page size and properties that are displayed), choose **Preferences**.
4. To view more information about a specific channel, choose the name of the channel that you want to view.

AWS Elemental MediaPackage displays important information such as the values for **Input URL** and the WebDAV **Username** and **Password**. Provide this information for the upstream encoder stream destination settings.

## Editing a Channel

Edit a channel's description for easier identification later. You can edit only the description on a channel.

You can use the AWS Elemental MediaPackage console, the AWS CLI, or the MediaPackage API to edit a channel. For information about editing a channel through the AWS CLI or MediaPackage API, see the [AWS Elemental MediaPackage API Reference](#).

When you're editing a channel, do not put sensitive identifying information like customer account numbers into free-form fields such as the **Name** field. This includes when you work with AWS Elemental MediaPackage using the console, REST API, AWS CLI, or AWS SDKs. Any data that you enter into MediaPackage might get picked up for inclusion in diagnostic logs or Amazon CloudWatch Events.

### To edit a channel (console)

1. Open the AWS Elemental MediaPackage console at <https://console.aws.amazon.com/mediapackage/>.
2. If the **Channels** page doesn't appear, on the AWS Elemental MediaPackage home page, choose **Skip and go to console**.
3. On the **Channels** page, choose the name of the channel that you want to edit.
4. On the channel's details page, choose **Edit channel**.
5. Revise the description.
6. Choose **Save changes**.

## Deleting a Channel

Delete a channel to stop AWS Elemental MediaPackage from receiving further content. You must delete the channel's endpoints (as described in [Deleting an Endpoint \(p. 29\)](#)) before you can delete the channel.

You can use the AWS Elemental MediaPackage console, the AWS CLI, or the MediaPackage API to delete a channel. For information about deleting a channel through the AWS CLI or MediaPackage API, see the [AWS Elemental MediaPackage API Reference](#).

#### To delete a channel (console)

1. Open the AWS Elemental MediaPackage console at <https://console.aws.amazon.com/mediapackage/>.
2. If the **Channels** page doesn't appear, on the AWS Elemental MediaPackage home page, choose **Skip and go to console**.
3. On the **Channels** page, choose the channel using one of the following methods:
  - Choose the channel name
  - Select the check box next to the channel name
4. Choose **Delete selected** or **Delete channel**.
5. In the confirmation dialog box, choose **Delete** to proceed with the deletion.

## Adding an Endpoint to a Channel

Add an endpoint to a channel to allow downstream video players and content distribution networks (CDNs) to start requesting content playback.

You can use the AWS Elemental MediaPackage console, the AWS CLI, or the MediaPackage API to add an endpoint to a channel. For information about adding through the AWS CLI or MediaPackage API, see the [AWS Elemental MediaPackage API Reference](#).

For instructions on adding endpoints to a channel from the AWS Elemental MediaPackage console, see [Working with Endpoints](#) (p. 15).

# Working with Endpoints in AWS Elemental MediaPackage

An endpoint defines a single delivery point of a channel. The endpoint holds all the information that is needed for AWS Elemental MediaPackage to integrate with a player or content distribution network (CDN) such as Amazon CloudFront. Configure the endpoint to output content in one of the available stream formats:

- Apple HLS – packages content to Apple HTTP Live Streaming (HLS)
- Microsoft Smooth – packages content for Microsoft Smooth Streaming players
- CMAF – packages content to devices that support Apple HLS fragmented MP4 (fMP4)
- DASH-ISO – packages content for the DASH-ISO ABR streaming protocol

Additionally, the endpoint holds information about digital rights management (DRM) and encryption integration, stream bit rate presentation order, and more.

## Topics

- [Creating an Endpoint \(p. 15\)](#)
- [Viewing All Endpoints Associated with a Channel \(p. 28\)](#)
- [Viewing a Single Endpoint \(p. 28\)](#)
- [Editing an Endpoint \(p. 28\)](#)
- [Deleting an Endpoint \(p. 29\)](#)
- [Previewing an Endpoint \(p. 29\)](#)

## Creating an Endpoint

Create an endpoint on a channel to define how AWS Elemental MediaPackage prepares content for delivery. Content can't be served from a channel until it has an endpoint.

When you create an endpoint, AWS Elemental MediaPackage assigns it a public URL that is fixed for the lifetime of the endpoint, regardless of any failures or upgrades that might happen over time. This URL is how the player or CDN accesses the stream from the endpoint.

You can use the AWS Elemental MediaPackage console, the AWS CLI, or the MediaPackage API to create an endpoint. For information about creating an endpoint through the AWS CLI or MediaPackage API, see the [AWS Elemental MediaPackage API Reference](#).

AWS Elemental MediaPackage does not require that you supply any customer data. There are no fields in endpoints where there is an expectation that you will provide customer data.

## Topics

- [Creating an HLS Endpoint \(p. 16\)](#)
- [Creating a Microsoft Smooth Streaming Endpoint \(p. 19\)](#)

- [Creating a Common Media Application Format \(CMAF\) Endpoint \(p. 21\)](#)
- [Creating a DASH Endpoint \(p. 25\)](#)

## Creating an HLS Endpoint

Create an endpoint that formats content for devices that support Apple HLS.

### To create an Apple HLS endpoint (console)

1. Access the channel that the endpoint will be associated with, as described in [Viewing Channel Details \(p. 13\)](#).
2. On the details page for the channel, choose either **Add and edit endpoint** or **Add endpoints** if there are no existing endpoints.
3. Complete the fields as described in the following topics:
  - [New Endpoint Fields \(p. 16\)](#)
  - [Packager Settings Fields \(p. 17\)](#)
  - [Encryption Fields \(p. 17\)](#)
  - [Access Control Fields \(p. 18\)](#)
  - [Streams to Include Fields \(p. 18\)](#)
4. Choose **Save endpoints**.

The new endpoint is displayed in the endpoints section of the channel's details page.

The endpoint is active and can deliver content as soon as requests are sent to its URL endpoints. AWS Elemental MediaPackage scales resources up and down to allow the right amount of capacity for your traffic.

## New Endpoint Fields

When you're creating an endpoint, do not put sensitive identifying information like customer account numbers into free-form fields such as the **Name** field. This includes when you work with AWS Elemental MediaPackage using the console, REST API, AWS CLI, or AWS SDKs. Any data that you enter into MediaPackage might get picked up for inclusion in diagnostic logs or Amazon CloudWatch Events.

1. For **ID**, type a name that describes the endpoint. The ID is the primary identifier for the endpoint, and must be unique for your account in the region.
2. (Optional) For **Description**, type any descriptive text that helps you to identify the endpoint later.
3. For **Manifest name**, type a short string that will be appended to the end of the endpoint URL. The manifest name helps to create a unique path to this endpoint.
4. (Optional) To allow time-shifted playback (start-over and catch-up TV), select **Startover window** and type the maximum amount of time that viewers can seek back on content. For more information about implementing start-over and catch-up TV, see [Time-shifted Viewing Reference in AWS Elemental MediaPackage \(p. 31\)](#).
5. (Optional) To delay when content is available to players, type the duration (in seconds) for the delay in **Time delay**. The minimum time is five seconds. The maximum time is 86,400 seconds (24 hours).

Use time delay to redefine the live point and make content available at a time that equals "now" minus the delay specified. With a 60-second time delay, content that AWS Elemental MediaPackage receives at 12:20 isn't available until 12:21. Requests for playback at 12:20 are served with content from 12:19. Likewise, if you're serving content across time zones, you can set a time delay equal to the time zone difference to make content available at, for example, 8:00 local time.

When you use time delay in conjunction with a startover window, the time delay duration must be less than the startover window duration.

## Packager Settings Fields

1. For **Type**, choose **Apple HLS**.
2. (Optional) For **Segment duration**, type the duration (in seconds) of each segment. If the value that you type here is different from the input segment size, AWS Elemental MediaPackage rounds segments to the nearest multiple of the input segment duration.
3. (Optional) For **Playlist window duration**, type the total duration (in seconds) of the manifest.
4. (Optional) To group all audio tracks into a single HLS rendition group, select **Use audio rendition group**. For more information about rendition groups, see [Rendition Groups Reference in AWS Elemental MediaPackage](#) (p. 34).
5. (Optional) In stream sets with a single video track, to include an additional I-frame only stream along with the other tracks in the manifest, select **Include IFrame only stream**. AWS Elemental MediaPackage inserts EXT-I-FRAMES-ONLY tags in the manifest, and then compiles and includes an I-frames only playlist in the stream. This playlist enables player functionality like fast forward and rewind.
6. (Optional) To include EXT-X-PROGRAM-DATE-TIME tags in the output manifest, select **Program date/time interval**, and then type the interval for AWS Elemental MediaPackage to insert the tags in the manifest.

The EXT-X-PROGRAM-DATE-TIME tag synchronizes the stream to the wall clock, enabling functionality like viewer seek in the playback timeline and time display on the player.

7. (Optional) In **Ad markers**, choose how ad markers are included in the packaged content.

Choose from the following:

- **None** – Omit all SCTE-35 ad markers from the output.
- **SCTE-35 enhanced** – Generate ad markers and blackout tags based on the SCTE-35 input messages from the input source.
- **Passthrough** – Copy the SCTE-35 ad markers directly from the input HLS input manifest to the output manifest.

## Encryption Fields

Protect your content from unauthorized use through encryption. Digital rights management (DRM) systems provide keys to MediaPackage for content encryption, and licenses to supported players for decryption.

### Note

To encrypt content, you must have a DRM solution provider. To get set up, see <http://docs.aws.amazon.com/speke/latest/documentation/customer-onboarding.html>.

1. To serve content without copyright protection, keep **No encryption** selected.
2. To serve content with copyright protection, choose **Encrypt content** and complete the additional fields as follows:
  - a. **Resource ID** – Identifier that you define for the content, which is sent to the key server to identify the current endpoint. How unique you make this depends on how fine-grained you want access controls to be. The service does not allow you to use the same ID for two simultaneous encryption processes.

The following example shows a resource ID:

```
MovieNight20171126093045
```

- b. **System IDs** – Unique identifiers for your streaming protocol and DRM system. Provide up to two IDs for DASH and exactly one for the other streaming protocols. If you provide more than one system ID, enter them on separate lines, and do not separate them with commas or any other punctuation. For a list of common system IDs, see [DASH-IF System IDs](#). If you do not know your IDs, ask your DRM solution provider.
- c. **URL** – The URL from the API Gateway proxy that you set up to talk to your key server.

The following example shows a URL:

```
https://lwm2dx1f33.execute-api.us-west-2.amazonaws.com/SpekeSample/copyProtection
```

- d. **Role ARN** – The Amazon Resource Name (ARN) of the IAM role that provides you access to send your requests through API Gateway. Get this from your DRM solution provider.

The following example shows a role ARN:

```
arn:aws:iam::012345678901:role/SpekeAccess
```

- e. **Encryption method** – Choose **Sample-AES** for Apple HLS Fairplay or **AES-128** for Apple HLS AES-128.
- f. **(Optional) Constant initialization vector** – A 128-bit, 16-byte hex value represented by a 32-character string that is used with the key for encrypting content.
- g. **(Optional) Key rotation interval** – The frequency, in seconds, of key changes for live workflows, in which content is streamed real time. The service retrieves content keys before the live content begins streaming, and then retrieves them as needed over the lifetime of the workflow. By default, key rotation is set to 60 seconds, which is equivalent to setting it to 60. To disable key rotation, set this interval to 0 (zero).

The following example setting causes the service to rotate keys every thirty minutes:

```
1800
```

- h. **(Optional) Repeat EXT-X-KEY** – Boolean that indicates whether to repeat the key before every segment of the manifest. By default, the key is written just once, after the header and before the segments. If you choose **Repeat EXT-X-KEY**, the manifest is written as header, key, segment, key, segment, key, and so on, with every segment preceded by the key. Choose this according to the needs of the player. Choosing this might result in an increase in client requests to the DRM server.

## Access Control Fields

1. To serve content to all requesting IP address, choose **Allow all incoming clients**.
2. To limit the IP addresses that this endpoint serves, choose **Restrict by IP address**.
3. In **Whitelist**, type the IP addresses that this endpoint serves content to.

## Streams to Include Fields

1. (Optional) For **Stream order**, choose from the following:
  - **Original** to sort the output streams in the same order that the incoming source uses.
  - **Ascending** to sort the output streams starting with the lowest bit rate and ending with the highest.

- **Descending** to sort the output streams starting with the highest bit rate and ending with the lowest.
2. To make all incoming streams available for playback from this endpoint, select **Include all incoming streams**.
  3. To limit which incoming streams are available for playback from this endpoint, select **Filter incoming streams** and enter filter criteria:
    - (Optional) For **Min video bitrate**, type the minimum bit rate threshold that video tracks must meet to be available for playback from this endpoint.
    - (Optional) For **Max video bitrate**, type the maximum bit rate that video tracks can have to be available for playback from this endpoint.

The minimum and maximum values take into account only the video bit rates. If the video bit rate is *below the minimum* specified rate, it is *not* included in the output, regardless of the sum of the bit rates for other tracks. Likewise, if the video bit rate is *below the maximum* specified rate, it is included in the output, regardless of the sum of the bit rates for other tracks.

## Creating a Microsoft Smooth Streaming Endpoint

Create an endpoint that formats content for devices that support Microsoft Smooth Streaming.

### To create a Microsoft Smooth endpoint (console)

1. Access the channel that the endpoint will be associated with, as described in [Viewing Channel Details \(p. 13\)](#).
2. On the details page for the channel, choose either **Add and edit endpoint** or **Add endpoints** if there are no existing endpoints.
3. Complete the fields as described in the following topics:
  - [New Endpoint Fields \(p. 19\)](#)
  - [Packager Settings Fields \(p. 20\)](#)
  - [Encryption Fields \(p. 20\)](#)
  - [Access Control Fields \(p. 21\)](#)
  - [Streams to Include Fields \(p. 21\)](#)
4. Choose **Save endpoints**.

The new endpoint is displayed in the endpoints section of the channel's details page.

## New Endpoint Fields

When you're creating an endpoint, do not put sensitive identifying information like customer account numbers into free-form fields such as the **Name** field. This includes when you work with AWS Elemental MediaPackage using the console, REST API, AWS CLI, or AWS SDKs. Any data that you enter into MediaPackage might get picked up for inclusion in diagnostic logs or Amazon CloudWatch Events.

1. For **ID**, type a name that describes the endpoint. The ID is the primary identifier for the endpoint, and must be unique for your account in the region.
2. (Optional) For **Description**, type any descriptive text that helps you to identify the endpoint later.
3. For **Manifest name**, type a short string that will be appended to the end of the endpoint URL. The manifest name helps to create a unique path to this endpoint.
4. (Optional) To create a window of the live stream that's available for on-demand viewing, select **Startover window** and type the size of the window (in seconds). Viewers can start-over or catch-up on

content that falls within the window. For more information about implementing start-over and catch-up TV, see [Time-shifted Viewing Reference in AWS Elemental MediaPackage \(p. 31\)](#).

5. (Optional) To delay when content is available to players, type the duration (in seconds) for the delay in **Time delay**. The minimum time is five seconds. The maximum time is 86,400 seconds (24 hours).

Use time delay to redefine the live point and make content available at a time that equals "now" minus the delay specified. With a 60-second time delay, content that AWS Elemental MediaPackage receives at 12:20 isn't available until 12:21. Requests for playback at 12:20 will be served with content from 12:19. Likewise, if you're serving content across time zones, you can set a time delay equal to the time zone difference to make content available at, for example, 8:00 local time.

When you use time delay in conjunction with a startover window, the time delay duration must be less than the startover window duration.

## Packager Settings Fields

1. For **Type**, choose **Microsoft Smooth**.
2. (Optional) For **Segment duration**, type the duration (in seconds) of each segment. If the value that you type here is different from the input segment size, AWS Elemental MediaPackage rounds segments to the nearest multiple of the input segment duration.
3. (Optional) For **Manifest window duration**, type the total duration (in seconds) of the manifest.

## Encryption Fields

Protect your content from unauthorized use through encryption. Digital rights management (DRM) systems provide keys to MediaPackage for content encryption, and licenses to supported players for decryption.

### Note

To encrypt content, you must have a DRM solution provider. To get set up, see <http://docs.aws.amazon.com/speke/latest/documentation/customer-onboarding.html>.

1. To serve content without copyright protection, keep **No encryption** selected.
2. To serve content with copyright protection, choose **Encrypt content** and complete the additional fields as follows:
  - a. **Resource ID** – Identifier that you define for the content, which is sent to the key server to identify the current endpoint. How unique you make this depends on how fine-grained you want access controls to be. The service does not allow you to use the same ID for two simultaneous encryption processes.

The following example shows a resource ID:

```
MovieNight20171126093045
```

- b. **System IDs** – Unique identifiers for your streaming protocol and DRM system. Provide up to two IDs for DASH and exactly one for the other streaming protocols. If you provide more than one system ID, enter them on separate lines, and do not separate them with commas or any other punctuation. For a list of common system IDs, see [DASH-IF System IDs](#). If you do not know your IDs, ask your DRM solution provider.
- c. **URL** – The URL from the API Gateway proxy that you set up to talk to your key server.

The following example shows a URL:

```
https://1wm2dx1f33.execute-api.us-west-2.amazonaws.com/SpekeSample/copyProtection
```



- d. **Role ARN** – The Amazon Resource Name (ARN) of the IAM role that provides you access to send your requests through API Gateway. Get this from your DRM solution provider.

The following example shows a role ARN:

```
arn:aws:iam::012345678901:role/SpekeAccess
```

## Access Control Fields

1. To serve content to all requesting IP address, choose **Allow all incoming clients**.
2. To limit the IP addresses that this endpoint serves, choose **Restrict by IP address**.
3. In **Whitelist**, type the IP addresses that this endpoint serves content to.

## Streams to Include Fields

1. (Optional) For **Stream order**, choose from the following:
  - **Original** to sort the output streams in the same order that the incoming source uses.
  - **Ascending** to sort the output streams starting with the lowest bit rate and ending with the highest.
  - **Descending** to sort the output streams starting with the highest bit rate and ending with the lowest.
2. To make all incoming streams available for playback from this endpoint, select **Include all incoming streams**.
3. To limit which incoming streams are available for playback from this endpoint, select **Filter incoming streams** and enter filter criteria:
  - (Optional) For **Min video bitrate**, type the minimum bit rate threshold that video tracks must meet to be available for playback from this endpoint.
  - (Optional) For **Max video bitrate**, type the maximum bit rate that video tracks can have to be available for playback from this endpoint.

The minimum and maximum values take into account only the video bit rates. If the video bit rate is *below the minimum* specified rate, it is *not* included in the output, regardless of the sum of the bit rates for other tracks. Likewise, if the video bit rate is *below the maximum* specified rate, it is included in the output, regardless of the sum of the bit rates for other tracks.

## Creating a Common Media Application Format (CMAF) Endpoint

Create an endpoint that formats content for devices that support Apple HLS fragmented MP4 (fMP4).

### To create a CMAF endpoint (console)

1. Access the channel that the endpoint will be associated with, as described in [Viewing Channel Details \(p. 13\)](#).
2. On the details page for the channel, choose either **Add and edit endpoint** or **Add endpoints** if there are no existing endpoints.
3. Complete the fields as described in the following topics:
  - [New Endpoint Fields \(p. 22\)](#)
  - [Packager Settings Fields \(p. 22\)](#)

- [HLS Manifest Fields \(p. 23\)](#)
- [Encryption Fields \(p. 23\)](#)
- [Access Control Fields \(p. 24\)](#)
- [Streams to Include Fields \(p. 24\)](#)

4. Choose **Save endpoints**.

The new endpoint is displayed in the endpoints section of the channel's details page.

The endpoint is active and can deliver content as soon as requests are sent to its URL endpoints. AWS Elemental MediaPackage scales resources up and down to allow the right amount of capacity for your traffic.

## New Endpoint Fields

When you're creating an endpoint, do not put sensitive identifying information like customer account numbers into free-form fields such as the **Name** field. This includes when you work with AWS Elemental MediaPackage using the console, REST API, AWS CLI, or AWS SDKs. Any data that you enter into MediaPackage might get picked up for inclusion in diagnostic logs or Amazon CloudWatch Events.

1. For **ID**, type a name that describes the endpoint. The ID is the primary identifier for the endpoint, and must be unique for your account in the region.
2. (Optional) For **Description**, type any descriptive text that helps you to identify the endpoint later.
3. (Optional) For **Manifest name**, type a short string that will be appended to the end of the endpoint URL. The manifest name helps to create a unique path to this endpoint.
4. (Optional) To create a window of the live stream that's available for on-demand viewing, select **Startover window** and type the size of the window (in seconds). Viewers can start-over or catch-up on content that falls within the window. For more information about implementing start-over and catch-up TV, see [Time-shifted Viewing \(p. 31\)](#).
5. (Optional) To delay when content is available to players, type the duration (in seconds) for the delay in **Time delay**. The minimum time is five seconds. The maximum time is 86,400 seconds (24 hours).

Use time delay to redefine the live point and make content available at a time that equals "now" minus the delay specified. With a 60-second time delay, content that AWS Elemental MediaPackage receives at 12:20 isn't available until 12:21. Requests for playback at 12:20 will be served with content from 12:19. Likewise, if you're serving content across time zones, you can set a time delay equal to the time zone difference to make content available at, for example, 8:00 local time.

When you use time delay in conjunction with a startover window, the time delay duration must be less than the startover window duration.

## Packager Settings Fields

The Packager settings fields hold general information about the endpoint.

1. For **Type**, choose **Common Media Application Format (CMAF)**.
2. (Optional) For **Segment duration**, type the duration (in seconds) of each segment. If the value that you type here is different from the input segment size, AWS Elemental MediaPackage rounds segments to the nearest multiple of the input segment duration.
3. (Optional) For **Segment prefix**, type a custom name for the segments in the HLS child manifest. The segment prefix is prepended to the segment name to create a unique identifier for each segment.

## Example

If the segment prefix is **movie**, a segment from the child manifest is `movie_1_2.ts`.

## HLS Manifest Fields

The HLS manifest fields allow you to define values for this manifest.

1. For **ID**, type a name that describes this manifest. The ID is the primary identifier for the manifest, and must be unique for this endpoint.
2. For **Manifest name**, type a string that will be appended to the end of the endpoint URL. The manifest name helps to create a unique path to this manifest on this endpoint. The HLS manifest name overrides the manifest name that you provided in the New Endpoint **Manifest name** field (if applicable).
3. (Optional) For **Playlist window duration**, type the total duration (in seconds) of the manifest.
4. (Optional) In **Ad markers**, choose how ad markers are included in the packaged content.

Choose from the following:

- **None** – Omit all SCTE-35 ad markers from the output.
  - **SCTE-35 enhanced** – Generate ad markers and blackout tags based on the SCTE-35 input messages from the input source.
  - **Passthrough** – Copy the SCTE-35 ad markers directly from the input HLS input manifest to the output manifest.
5. (Optional) To include EXT-X-PROGRAM-DATE-TIME tags in the output manifest, select **Program date/time interval**, and then type the interval for AWS Elemental MediaPackage to insert the tags in the manifest.

The EXT-X-PROGRAM-DATE-TIME tag synchronizes the stream to the wall clock, enabling functionality like viewer seek in the playback timeline and time display on the player.

6. (Optional) In stream sets with a single video track, to include an additional I-frame only stream along with the other tracks in the manifest, select **Include IFrame only stream**. AWS Elemental MediaPackage inserts EXT-I-FRAMES-ONLY tags in the manifest, and then compiles and includes an I-frames only playlist in the stream. This playlist enables player functionality like fast forward and rewind.

## Encryption Fields

Protect your content from unauthorized use through encryption. Digital rights management (DRM) systems provide keys to MediaPackage for content encryption, and licenses to supported players for decryption.

### Note

To encrypt content, you must have a DRM solution provider. To get set up, see <http://docs.aws.amazon.com/speke/latest/documentation/customer-onboarding.html>.

1. To serve content without copyright protection, keep **No encryption** selected.
2. To serve content with copyright protection, choose **Encrypt content** and complete the additional fields as follows:
  - a. **Resource ID** – Identifier that you define for the content, which is sent to the key server to identify the current endpoint. How unique you make this depends on how fine-grained you want access controls to be. The service does not allow you to use the same ID for two simultaneous encryption processes.

The following example shows a resource ID:

```
MovieNight20171126093045
```

- b. **System IDs** – Unique identifiers for your streaming protocol and DRM system. Provide up to two IDs for DASH and exactly one for the other streaming protocols. If you provide more than one system ID, enter them on separate lines, and do not separate them with commas or any other punctuation. For a list of common system IDs, see [DASH-IF System IDs](#). If you do not know your IDs, ask your DRM solution provider.
- c. **URL** – The URL from the API Gateway proxy that you set up to talk to your key server.

The following example shows a URL:

```
https://1wm2dx1f33.execute-api.us-west-2.amazonaws.com/SpekeSample/copyProtection
```

- d. **Role ARN** – The Amazon Resource Name (ARN) of the IAM role that provides you access to send your requests through API Gateway. Get this from your DRM solution provider.

The following example shows a role ARN:

```
arn:aws:iam::012345678901:role/SpekeAccess
```

- e. **(Optional) Key rotation interval** – The frequency, in seconds, of key changes for live workflows, in which content is streamed real time. The service retrieves content keys before the live content begins streaming, and then retrieves them as needed over the lifetime of the workflow. By default, key rotation is set to 60 seconds, which is equivalent to setting it to 60. To disable key rotation, set this interval to 0 (zero).

The following example setting causes the service to rotate keys every thirty minutes:

```
1800
```

## Access Control Fields

1. To serve content to all requesting IP address, choose **Allow all incoming clients**.
2. To limit the IP addresses that this endpoint serves, choose **Restrict by IP address**.
3. In **Whitelist**, type the IP addresses that this endpoint serves content to.

## Streams to Include Fields

1. (Optional) For **Stream order**, choose from the following:
  - **Original** to sort the output streams in the same order that the incoming source uses.
  - **Ascending** to sort the output streams starting with the lowest bit rate and ending with the highest.
  - **Descending** to sort the output streams starting with the highest bit rate and ending with the lowest.
2. To make all incoming streams available for playback from this endpoint, select **Include all incoming streams**.
3. To limit which incoming streams are available for playback from this endpoint, select **Filter incoming streams** and enter filter criteria:
  - (Optional) For **Min video bitrate**, type the minimum bit rate threshold that video tracks must meet to be available for playback from this endpoint.

- (Optional) For **Max video bitrate**, type the maximum bit rate that video tracks can have to be available for playback from this endpoint.

The minimum and maximum values take into account only the video bit rates. If the video bit rate is *below the minimum* specified rate, it is *not* included in the output, regardless of the sum of the bit rates for other tracks. Likewise, if the video bit rate is *below the maximum* specified rate, it *is* included in the output, regardless of the sum of the bit rates for other tracks.

## Creating a DASH Endpoint

Create an endpoint that formats content for devices that support MPEG-DASH.

### To create an MPEG-DASH endpoint (console)

1. Access the channel that the endpoint will be associated with, as described in [Viewing Channel Details \(p. 13\)](#).
2. On the details page for the channel, choose either **Add and edit endpoint** or **Add endpoints** if there are no existing endpoints.
3. Complete the fields as described in the following topics:
  - [New Endpoint Fields \(p. 25\)](#)
  - [Packager Settings Fields \(p. 26\)](#)
  - [Encryption Fields \(p. 26\)](#)
  - [Access Control Fields \(p. 27\)](#)
  - [Streams to Include Fields \(p. 27\)](#)
4. Choose **Save endpoints**.

The new endpoint is displayed in the endpoints section of the channel's details page.

## New Endpoint Fields

When you're creating an endpoint, do not put sensitive identifying information like customer account numbers into free-form fields such as the **Name** field. This includes when you work with AWS Elemental MediaPackage using the console, REST API, AWS CLI, or AWS SDKs. Any data that you enter into MediaPackage might get picked up for inclusion in diagnostic logs or Amazon CloudWatch Events.

1. For **ID**, type a name that describes the endpoint. The ID is the primary identifier for the endpoint, and must be unique for your account in the region.
2. (Optional) For **Description**, type any descriptive text that helps you to identify the endpoint later.
3. For **Manifest name**, type a short string that will be appended to the end of the endpoint URL. The manifest name helps to create a unique path to this endpoint.
4. (Optional) To allow time-shifted playback (start-over and catch-up TV), select **Startover window** and type the maximum amount of time that viewers can seek back on content. For more information about implementing start-over and catch-up TV, see [Time-shifted Viewing Reference in AWS Elemental MediaPackage \(p. 31\)](#).
5. (Optional) To delay when content is available to players, type the duration (in seconds) for the delay in **Time delay**. The minimum time is five seconds. The maximum time is 86,400 seconds (24 hours).

Use time delay to redefine the live point and make content available at a time that equals "now" minus the delay specified. With a 60-second time delay, content that AWS Elemental MediaPackage receives at 12:20 isn't available until 12:21. Requests for playback at 12:20 will be served with content from 12:19. Likewise, if you're serving content across time zones, you can set a time delay equal to the time zone difference to make content available at, for example, 8:00 local time.

When you use time delay in conjunction with a startover window, the time delay duration must be less than the startover window duration.

## Packager Settings Fields

1. For **Type**, choose **DASH-ISO**.
2. (Optional) For **Segment duration**, type the duration (in seconds) of each segment. If the value that you type here is different from the input segment size, AWS Elemental MediaPackage rounds segments to the nearest multiple of the input segment duration.
3. (Optional) For **Manifest window duration**, type the total duration (in seconds) of the manifest.
4. (Optional) In **Profile**, specify a DASH profile, like HbbTV.

Choose from the following:

- **None** – the output doesn't use a DASH profile
  - **Hbbtv 1.5** – the output is HbbTV-compliant
5. (Optional) For **Min update period**, type the minimum amount of time (in seconds) that the player should wait before requesting manifest updates. A lower value means that manifests are updated more frequently, but a lower value also contributes to request and response network traffic.
  6. (Optional) For **Min buffer time**, type the minimum amount of time (in seconds) that a player must keep in the buffer. If network conditions interrupt playback, the player will have additional buffered content before playback fails, allowing for recovery time before the viewer's experience is affected.
  7. (Optional) For **Suggested presentation delay**, enter the amount of time (in seconds) that the player should be from the end of the manifest. This sets the content start point back x seconds from the end of the manifest (the point where content is live). For example, with a 35-second presentation delay, requests at 5:30 receive content from 5:29:25. When used with time delay, AWS Elemental MediaPackage adds the suggested presentation delay to the time delay duration.
  8. For **Period triggers**, choose how AWS Elemental MediaPackage creates media presentation description (MPD) periods in the DASH output manifest. Choose from the following:
    - **None** – AWS Elemental MediaPackage doesn't create additional periods. It formats the manifest as a single period and doesn't include SCTE-35 markers in the segments.
    - **Trigger new periods on ads** – AWS Elemental MediaPackage creates and inserts in the manifest multiple periods based on SCTE-35 ad markers from the input content. These periods separate portions of the content, such as setting boundaries between the main content and ad content. For more information about how AWS Elemental MediaPackage configures periods in the manifest, see [Multi-period DASH in AWS Elemental MediaPackage \(p. 36\)](#).

### Important

Multiple periods are required if you use AWS Elemental MediaTailor for personalized ad insertion in DASH content. For more information about this service, see the [AWS Elemental MediaTailor User Guide](#).

## Encryption Fields

Protect your content from unauthorized use through encryption. Digital rights management (DRM) systems provide keys to MediaPackage for content encryption, and licenses to supported players for decryption.

### Note

To encrypt content, you must have a DRM solution provider. To get set up, see <http://docs.aws.amazon.com/speke/latest/documentation/customer-onboarding.html>.

1. To serve content without copyright protection, keep **No encryption** selected.

2. To serve content with copyright protection, choose **Encrypt content** and complete the additional fields as follows:

- a. **Resource ID** – Identifier that you define for the content, which is sent to the key server to identify the current endpoint. How unique you make this depends on how fine-grained you want access controls to be. The service does not allow you to use the same ID for two simultaneous encryption processes.

The following example shows a resource ID:

```
MovieNight20171126093045
```

- b. **System IDs** – Unique identifiers for your streaming protocol and DRM system. Provide up to two IDs for DASH and exactly one for the other streaming protocols. If you provide more than one system ID, enter them on separate lines, and do not separate them with commas or any other punctuation. For a list of common system IDs, see [DASH-IF System IDs](#). If you do not know your IDs, ask your DRM solution provider.
- c. **URL** – The URL from the API Gateway proxy that you set up to talk to your key server.

The following example shows a URL:

```
https://lwm2dx1f33.execute-api.us-west-2.amazonaws.com/SpekeSample/copyProtection
```

- d. **Role ARN** – The Amazon Resource Name (ARN) of the IAM role that provides you access to send your requests through API Gateway. Get this from your DRM solution provider.

The following example shows a role ARN:

```
arn:aws:iam::012345678901:role/SpekeAccess
```

- e. **(Optional) Key rotation interval** – The frequency, in seconds, of key changes for live workflows, in which content is streamed real time. The service retrieves content keys before the live content begins streaming, and then retrieves them as needed over the lifetime of the workflow. By default, key rotation is set to 60 seconds, which is equivalent to setting it to 60. To disable key rotation, set this interval to 0 (zero).

The following example setting causes the service to rotate keys every thirty minutes:

```
1800
```

## Access Control Fields

1. To serve content to all requesting IP address, choose **Allow all incoming clients**.
2. To limit the IP addresses that this endpoint serves, choose **Restrict by IP address**.
3. In **Whitelist**, type the IP addresses that this endpoint serves content to.

## Streams to Include Fields

1. (Optional) For **Stream order**, choose from the following:
  - **Original** to sort the output streams in the same order that the incoming source uses.
  - **Ascending** to sort the output streams starting with the lowest bit rate and ending with the highest.
  - **Descending** to sort the output streams starting with the highest bit rate and ending with the lowest.

2. To make all incoming streams available for playback from this endpoint, select **Include all incoming streams**.
3. To limit which incoming streams are available for playback from this endpoint, select **Filter incoming streams** and enter filter criteria:
  - (Optional) For **Min video bitrate**, type the minimum bit rate threshold that video tracks must meet to be available for playback from this endpoint.
  - (Optional) For **Max video bitrate**, type the maximum bit rate that video tracks can have to be available for playback from this endpoint.

The minimum and maximum values take into account only the video bit rates. If the video bit rate is *below the minimum* specified rate, it is *not* included in the output, regardless of the sum of the bit rates for other tracks. Likewise, if the video bit rate is *below the maximum* specified rate, it is included in the output, regardless of the sum of the bit rates for other tracks.

## Viewing All Endpoints Associated with a Channel

View all endpoints that are associated with a specific channel to ensure that the content is available in all necessary stream formats.

You can use the AWS Elemental MediaPackage console, the AWS CLI, or the MediaPackage API to view the endpoints that are associated with a channel. For information about viewing endpoints through the AWS CLI or MediaPackage API, see the [AWS Elemental MediaPackage API Reference](#).

### To view a channel's endpoints (console)

1. Access the channel that the endpoint is associated to, as described in [Viewing Channel Details \(p. 13\)](#).  
AWS Elemental MediaPackage displays all existing endpoints as a table or as individual cards.
2. (Optional) To adjust your viewing preferences (such as page size and properties that are displayed), choose **Preferences**.

## Viewing a Single Endpoint

View the details about a specific endpoint to obtain its playback URL and to view the packaging settings that it is currently using.

You can use the AWS Elemental MediaPackage console, the AWS CLI, or the MediaPackage API to view the details of an endpoint. For information about viewing endpoint details through the AWS CLI or MediaPackage API, see the [AWS Elemental MediaPackage API Reference](#).

### To view a single endpoint's details (console)

1. Access the channel that the endpoint is associated with, as described in [Viewing Channel Details \(p. 13\)](#).
2. On the channel's details page, choose the endpoint name to view details such as package information and playback preview. For downstream device requests, you must provide the endpoint URL from the **Endpoint URL** field.

## Editing an Endpoint

Edit the packaging preferences on an endpoint to optimize the viewing experience. You can't change the packager type after you save an endpoint. To serve content with a different packager, create a different endpoint.



You can use the AWS Elemental MediaPackage console, the AWS CLI, or the MediaPackage API to change an endpoint's settings. For information about editing an endpoint through the AWS CLI or MediaPackage API, see the [AWS Elemental MediaPackage API Reference](#).

When you're editing an endpoint, do not put sensitive identifying information like customer account numbers into free-form fields such as the **Name** field. This includes when you work with AWS Elemental MediaPackage using the console, REST API, AWS CLI, or AWS SDKs. Any data that you enter into MediaPackage might get picked up for inclusion in diagnostic logs or Amazon CloudWatch Events.

#### To edit an endpoint (console)

1. Access the channel that the endpoint is associated with, as described in [Viewing Channel Details \(p. 13\)](#).
2. On the channel's details page, do one of the following:
  - Choose **Add and edit endpoints** and on the **Edit** page, choose the endpoint to edit.
  - Choose the name of the endpoint to edit, and then choose **Edit endpoint**.
3. Edit the endpoint options that you want to change.

For information about endpoint attributes, see [Creating an Endpoint \(p. 15\)](#).

4. Choose **Save all**.

## Deleting an Endpoint

Endpoints can serve content until they are deleted. Delete the endpoint if it should no longer respond to playback requests. You must delete all endpoints from a channel before you can delete the channel.

#### Warning

If you delete an endpoint, the playback URL stops working.

You can use the AWS Elemental MediaPackage console, the AWS CLI, or the MediaPackage API to delete an endpoint. For information about deleting an endpoint through the AWS CLI or MediaPackage API, see the [AWS Elemental MediaPackage API Reference](#).

#### To delete an endpoint (console)

1. Access the channel that the endpoint is associated with, as described in [Viewing Channel Details \(p. 13\)](#).
2. On the channel details page, choose the endpoint name.
3. On the endpoint details page, choose **Delete endpoint**.
4. On the **Delete Endpoints** page, choose **Save all**.

## Previewing an Endpoint

Preview an endpoint's playback to ensure that AWS Elemental MediaPackage is receiving the content stream and can package it. The preview is helpful for avoiding playback failures after the endpoint is published, as well as for troubleshooting later if there are any playback issues.

You can use the AWS Elemental MediaPackage console to preview playback from the endpoint.

#### To preview an endpoint's playback (console)

1. Access the channel that the endpoint is associated with, as described in [Viewing Channel Details \(p. 13\)](#).

2. On the channel's details page, locate the endpoint name.
3. To preview playback, do one of the following:
  - Choose **Play** to play content with the embedded player.
  - Choose **QR code** to view and scan the QR code for playback on a compatible device.

# Time-shifted Viewing Reference in AWS Elemental MediaPackage

*Time-shifted viewing* means that viewers can start watching a live stream at a time earlier than "now," allowing them to join from the beginning a show that's already in progress or to watch a show that's already completed. AWS Elemental MediaPackage allows a content retention window of up to 72 hours for time-shifted viewing. Time-shifted functionality is controlled by the MediaPackage endpoint and by the start and end parameters provided in the content request URL.

## To enable time-shifted viewing

1. Enable time-shifted viewing by typing a value for **Startover time** on the AWS Elemental MediaPackage endpoint object. You can do this through either the MediaPackage console or the REST API.

When requests with start and end parameters are sent to this endpoint, AWS Elemental MediaPackage generates a manifest within the window that is indicated in the request. If no start and end parameters are used, the service generates a standard manifest.

### Note

You might notice that the manifest lags behind real time when you initially create a startover window on an endpoint. This is because AWS Elemental MediaPackage starts filling the manifest from the start of the window, and works up to "now." So if you have a 24-hour startover window, MediaPackage fills the manifest starting 24 hours ago and working up to "now."

2. Ensure that content requests contain start and end parameters as needed. AWS Elemental MediaPackage accepts requests for up to six hours of content.

For packager-specific rules about how you can notate the parameters, see [Rules for Start and End Parameters \(p. 31\)](#).

The start and end parameters determine the time boundaries of the manifest. Expected behaviors are as follows:

- If both start and end parameters are used in the URL, the resulting manifest has a fixed start and end point that correspond to the specified start and end parameters.
- If a start parameter is specified but not an end, the resulting manifest has a fixed start point that corresponds to the specified start parameter, and the end of the manifest grows as the live content progresses. You can use a start time that's up to 6 hours in the past.
- If an end parameter is specified but no start, the resulting manifest starts "now" and has a fixed endpoint that corresponds to the specified end parameter.
- If no parameters are specified, a standard manifest is generated starting "now" with no endpoint.

## Rules for Start and End Parameters

Start and end parameters denote the beginning and end of a time-shifted manifest. The playback device can append parameters to the end of a manifest request or include the parameters within the request.

In all cases, the date and time must be notated in one of the following formats:

- ISO 8601 dates, such as 2017-08-18T21:18:54+00:00
- POSIX (or Epoch) time, such as 1503091134

The following topics describe the location rules by packager type.

#### Topics

- [DASH Parameter Rules \(p. 32\)](#)
- [HLS and CMAF Parameter Rules \(p. 32\)](#)
- [Microsoft Smooth Parameter Rules \(p. 33\)](#)

## DASH Parameter Rules

Start and end parameters in the URL request for DASH content can use standard parameter notation, or can be included as path elements in the URL.

- Query parameter notation – start and end parameters are included at the end of the request URL

#### Example

```
https://cf98fa7b2ee4450e.mediapackage.us-east-1.amazonaws.com/out/  
v1/997cbb27697d4863bb65488133bff26f/sports.mpd?start=1513717228&end=1513720828
```

- Path elements – start and end parameters are included in the path of the request URL

#### Example

```
https://cf98fa7b2ee4450e.mediapackage.us-east-1.amazonaws.com/out/  
v1/997cbb27697d4863bb65488133bff26f/start/2017-12-19T13:00:28-08:00/end/  
2017-12-19T14:00:28-08:00/sports.mpd
```

## HLS and CMAF Parameter Rules

Start and end parameters in the URL request for HLS content can use standard parameter notation, or can be included as path elements in the URL. The rules for HLS and CMAF are the same, except that when you're inserting path elements in the CMAF endpoint, the elements have to be after the manifest ID in the URL.

- Query parameter notation – start and end parameters are included at the end of the request URL

#### Example HLS

```
https://cf98fa7b2ee4450e.mediapackage.us-east-1.amazonaws.com/out/  
v1/064134724fd74667ba294657a674ae72/  
comedy.m3u8?start=2017-12-19T13:00:28-08:00&end=2017-12-19T14:00:28-08:00
```

#### Example CMAF

```
https://cf98fa7b2ee4450e.mediapackage.us-east-1.amazonaws.com/  
out/v1/064134724fd74667ba294657a674ae72/manifest_id/  
news.m3u8?start=2018-04-04T01:14:00-08:00&2018-04-04T02:15:00-08:00
```

- Path elements – start and end parameters are included in the path of the request URL

#### Example HLS

```
https://cf98fa7b2ee4450e.mediapackage.us-east-1.amazonaws.com/out/  
v1/064134724fd74667ba294657a674ae72/start/1513717228/end/1513720828/comedy.m3u8
```

#### Example CMAF

```
https://cf98fa7b2ee4450e.mediapackage.us-east-1.amazonaws.com/out/  
v1/064134724fd74667ba294657a674ae72/manifest_id/start/1522807213/end/1522800013/news.m3u8
```

## Microsoft Smooth Parameter Rules

Start and end parameters in the URL request for Microsoft Smooth Streaming content can be included as path elements in the URL.

- Path elements – start and end parameters are included in the path of the request URL

#### Example

```
https://cf98fa7b2ee4450e.mediapackage.us-east-1.amazonaws.com/out/  
v1/1f76b3b4f94c44a485c0e4e560afe50e/start/1513717228/end/1513720828/drama.ism/Manifest
```

# Rendition Groups Reference in AWS Elemental MediaPackage

*Rendition groups* are used in HLS and CMAF outputs. A rendition group collects all subtitle or audio tracks and makes them available for all video renditions in the stream. When you enable rendition groups, AWS Elemental MediaPackage pulls together all audio variants (such as different languages or codecs) and groups them for use with any video rendition. MediaPackage automatically puts subtitles into a rendition group.

Audio and subtitles tracks are required to be in their own rendition groups on CMAF endpoints.

The following sections further describe when you can use rendition groups.

## Note

DASH and Microsoft Smooth do not use rendition groups. This is because all audio, video, and subtitle or caption tracks are presented to the player, and the player determines which are used during playback.

## Topics

- [When to Use Rendition Groups \(p. 34\)](#)
- [When Not to Use Rendition Groups \(p. 34\)](#)

## When to Use Rendition Groups

Rendition groups are used only in HLS and CMAF outputs. Rendition groups are most beneficial when you have multiple languages or multiple audio codecs in your streams. Rendition groups should be used in the following use cases:

- On CMAF endpoints, if there are any audio or subtitle tracks

CMAF requires all audio tracks in one rendition group, and all subtitles in another. Audio or subtitles can't be muxed with video tracks.

- One or more video tracks with multiple audio languages or codecs

When rendition groups are enabled, AWS Elemental MediaPackage pulls all audio renditions together for shared use between the video tracks. In this way, you don't have to duplicate all the audio options across all the video tracks.

- Multiple audio-only tracks and multiple subtitle tracks

When both the audio tracks and subtitle tracks are in rendition groups, all the audio options can be combined with any subtitle track.

- One audio-only track and multiple subtitle tracks

AWS Elemental MediaPackage automatically pulls subtitle tracks into a rendition group so that the audio track can be used with any subtitle. Because there is only one audio and the subtitles are already grouped, you don't need to tell MediaPackage to use rendition groups in this case.

## When Not to Use Rendition Groups

Rendition groups can't or shouldn't be used in the following use cases:

- Multiple video tracks in the stream, but only one language or codec is used for the audio. If the same audio is used with multiple audio tracks, and rendition groups are also used, then your rendition group will have duplicates of the same audio track (one for each video).

Keep the audio and video muxed in the stream, and do not use a rendition group.

- DASH or Microsoft Smooth Streaming outputs. These protocols do not support rendition groups. Instead, the output stream includes all tracks, and the player determines which to play based on rules from the player side or from the manifest (such as language or bit rate selection).

To limit the tracks available to a player, use the stream selection options from the AWS Elemental MediaPackage console or the REST API.

# Multi-period DASH in AWS Elemental MediaPackage

A period is a chunk of content in the DASH manifest, defined by a start time and duration. By default, the entire manifest is contained in one period but AWS Elemental MediaPackage can partition the DASH manifest into multiple periods to indicate boundaries between ads and the main content. For example, if you're using MediaPackage with a downstream ad service such as AWS Elemental MediaTailor, choose **Trigger new period on ads** on the MPEG-DASH endpoint in MediaPackage. This option tells MediaPackage that the DASH manifest is to be formatted with multiple periods.

- For information about AWS Elemental MediaTailor, see the [AWS Elemental MediaTailor User Guide](#).
- For information about DASH-ISO endpoints in AWS Elemental MediaPackage, see [Creating a DASH Endpoint \(p. 25\)](#).
- For more information about how multi-period DASH works in AWS Elemental MediaPackage, see the following *How it Works* section.

## How it Works

To use the multi-period DASH feature, the input to AWS Elemental MediaPackage must have SCTE-35 ad marker messages. These messages inform MediaPackage of where to create period boundaries. This is how MediaPackage processes those messages:

1. AWS Elemental MediaPackage detects the SCTE-35 messages from the input source.
2. Using the attributes of the SCTE-35 messages, AWS Elemental MediaPackage calculates where the boundaries are between the end of the main content and the ads. This calculation is  $(\text{scte35 ptsAdjustment} + \text{scte35 ptsTime}) / (\text{EventStream timescale})$ .

### Example

In the following example, the period starts at 44.075 seconds because  $(183003 + 3783780) / 90000 = 44.075$ :

```
<Period start="PT44.075S" id="21">
  <EventStream timescale="90000" schemeIdUri="urn:scte:scte35:2013:xml">
    <Event>
      <scte35:SpliceInfoSection protocolVersion="0" ptsAdjustment="183003" tier="4095">
        <scte35:SpliceInsert spliceEventId="1000" spliceEventCancelIndicator="false"
          outOfNetworkIndicator="true" spliceImmediateFlag="false" uniqueProgramId="7"
          availNum="1" availsExpected="4">
          <scte35:Program><scte35:SpliceTime ptsTime="3783780"/></scte35:Program>
        </scte35:SpliceInsert>
      </scte35:SpliceInfoSection>
    </Event>
  </EventStream>
  .
  .
</Period>
```

3. AWS Elemental MediaPackage inserts the `EventStream`, `Event`, and `scte35` tags with additional information into the manifest and surrounds the ad period with a `Period` tag, as shown in the preceding example. MediaPackage groups all adaptation sets before the first ad period into a period, and any subsequent adaptation sets after the ad are grouped into a period, until the next SCTE-35



marker. Here is a complete manifest example with multiple periods. It uses SpliceInsert SCTE-35 ad markers:

### Example

```
<?xml version="1.0" encoding="utf-8"?>
<MPD>
  <Period start="PT0.000S" id="0" duration="PT44.075S">
    <AdaptationSet mimeType="video/mp4" segmentAlignment="true"
    subsegmentAlignment="true" startWithSAP="1" subsegmentStartsWithSAP="1"
    bitstreamSwitching="true">
      <Representation id="1" width="960" height="540" frameRate="30000/1001"
      bandwidth="1000000" codecs="avc1.4D401F">
        <SegmentTemplate timescale="30000" media="index_video_1_0_${Number$.mp4?
m=1528413503" initialization="index_video_1_0_init.mp4?m=1528413503" startNumber="6"
presentationTimeOffset="0">
          <SegmentTimeline>
            <S t="361301" d="60060" r="15"/>
          </SegmentTimeline>
        </SegmentTemplate>
      </Representation>
    </AdaptationSet>
    <AdaptationSet mimeType="audio/mp4" segmentAlignment="0" lang="eng">
      <Representation id="2" bandwidth="96964" audioSamplingRate="48000"
      codecs="mp4a.40.2">
        <SegmentTemplate timescale="48000" media="index_audio_2_0_${Number$.mp4?
m=1528413503" initialization="index_audio_2_0_init.mp4?m=1528413503" startNumber="6"
presentationTimeOffset="0">
          <SegmentTimeline>
            <S t="578305" d="96256" r="3"/>
            <S t="963329" d="95232"/>
            <S t="1058561" d="96256" r="5"/>
            <S t="1636097" d="95232"/>
            <S t="1731329" d="96256" r="3"/>
          </SegmentTimeline>
        </SegmentTemplate>
      </Representation>
    </AdaptationSet>
  </Period>
  <Period start="PT44.075S" id="21">
    <EventStream timescale="90000" schemeIdUri="urn:scte:scte35:2013:xml">
      <Event>
        <scte35:SpliceInfoSection protocolVersion="0" ptsAdjustment="183003" tier="4095">
          <scte35:SpliceInsert spliceEventId="1000" spliceEventCancelIndicator="false"
          outOfNetworkIndicator="true" spliceImmediateFlag="false" uniqueProgramId="7"
          availNum="1" availsExpected="4">
            <scte35:Program><scte35:SpliceTime ptsTime="3783780"/></scte35:Program>
          </scte35:SpliceInsert>
        </scte35:SpliceInfoSection>
      </Event>
    </EventStream>
    <AdaptationSet mimeType="video/mp4" segmentAlignment="true"
    subsegmentAlignment="true" startWithSAP="1" subsegmentStartsWithSAP="1"
    bitstreamSwitching="true">
      <Representation id="1" width="960" height="540" frameRate="30000/1001"
      bandwidth="1000000" codecs="avc1.4D401F">
        <SegmentTemplate timescale="30000" media="index_video_1_0_${Number$.mp4?
m=1528413503" initialization="index_video_1_0_init.mp4?m=1528413503" startNumber="22"
presentationTimeOffset="1322261">
          <SegmentTimeline>
            <S t="1322261" d="60060" r="13"/>
          </SegmentTimeline>
        </SegmentTemplate>
      </Representation>
    </AdaptationSet>
  </Period>
</MPD>
```

```
</AdaptationSet>
<AdaptationSet mimeType="audio/mp4" segmentAlignment="0" lang="eng">
  <Representation id="2" bandwidth="96964" audioSamplingRate="48000"
codecs="mp4a.40.2">
  <SegmentTemplate timescale="48000" media="index_audio_2_0_$.mp4?
m=1528413503" initialization="index_audio_2_0_init.mp4?m=1528413503" startNumber="22"
presentationTimeOffset="2115617">
    <SegmentTimeline>
      <S t="2116353" d="96256"/>
      <S t="2212609" d="95232"/>
      <S t="2307841" d="96256" r="5"/>
      <S t="2885377" d="95232"/>
      <S t="2980609" d="96256" r="4"/>
    </SegmentTimeline>
  </SegmentTemplate>
</Representation>
</AdaptationSet>
</Period>
</MPD>
```

If your input has TimeSignal SCTE-35 ad markers instead of SpliceInsert, the EventStream within the ad period looks like this:

```
<EventStream timescale="90000" schemeIdUri="urn:scte:scte35:2013:xml">
  <Event>
    <scte35:SpliceInfoSection protocolVersion="0" ptsAdjustment="183265" tier="4095">
      <scte35:TimeSignal>
        <scte35:SpliceTime ptsTime="1350000"/>
      </scte35:TimeSignal>
      <scte35:SegmentationDescriptor segmentationEventId="1073741825"
segmentationEventCancelIndicator="false" segmentationDuration="450000">
        <scte35:DeliveryRestrictions webDeliveryAllowedFlag="false"
noRegionalBlackoutFlag="true" archiveAllowedFlag="true" deviceRestrictions="3"/>
        <scte35:SegmentationUpid segmentationUpidType="1" segmentationUpidLength="3"
segmentationTypeId="48" segmentNum="0" segmentsExpected="0">012345</
scte35:SegmentationUpid>
      </scte35:SegmentationDescriptor>
    </scte35:SpliceInfoSection>
  </Event>
</EventStream>
```

AWS Elemental MediaPackage also embeds scte35:SpliceInsert messages as metadata in the individual video segments.

If you're using a downstream ad service, that service looks for the SCTE-35 markers in the manifest that AWS Elemental MediaPackage provides and inserts ads based on those markers.

# Monitoring AWS Elemental MediaPackage

Monitoring is an important part of maintaining the reliability, availability, and performance of AWS Elemental MediaPackage and your other AWS solutions. AWS provides the following monitoring tools to watch MediaPackage, report when something is wrong, and take automatic actions when appropriate:

- *Amazon CloudWatch* monitors your AWS resources and the applications that you run on AWS in real-time. You can collect and track metrics, create customized dashboards, and set alarms that notify you or take actions when a specified metric reaches a threshold that you specify. For example, you can have CloudWatch track CPU usage or other metrics of your Amazon EC2 instances and automatically launch new instances when needed. For more information, see the [Amazon CloudWatch User Guide](#).
- *Amazon CloudWatch Events* delivers a near real-time stream of system events that describe changes in AWS resources. CloudWatch Events enables automated event-driven computing, as you can write rules that watch for certain events and trigger automated actions in other AWS services when these events happen. For more information, see the [Amazon CloudWatch Events User Guide](#).

## Topics

- [Monitoring AWS Elemental MediaPackage with Amazon CloudWatch \(p. 39\)](#)
- [Monitoring AWS Elemental MediaPackage with Amazon CloudWatch Events \(p. 44\)](#)

## Monitoring AWS Elemental MediaPackage with Amazon CloudWatch

You can monitor AWS Elemental MediaPackage using CloudWatch, which collects raw data and processes it into readable, near real-time metrics. These statistics are kept for 15 months, so that you can access historical information and gain a better perspective on how your web application or service is performing. You can also set alarms that watch for certain thresholds, and send notifications or take actions when those thresholds are met. For more information, see the [Amazon CloudWatch User Guide](#).

### To view metrics using the AWS Elemental MediaPackage console

AWS Elemental MediaPackage displays metrics throughout the console.

1. Open the AWS Elemental MediaPackage console at <https://console.aws.amazon.com/mediapackage/>.
2. Navigate to the appropriate page to view metrics:
  - For metrics on all channels and endpoints in the region, go to the **Channels** page.
  - For metrics on a specific channel and all of its endpoints, go to the channel's details page.
  - For metrics on a specific endpoint and its channel, go to the endpoint's details page.
3. (Optional) To refine the metrics view, choose **Open in CloudWatch**.

### To view metrics using the CloudWatch console

Metrics are grouped first by the service namespace, and then by the various dimension combinations within each namespace.

1. Sign in to the AWS Management Console and open the CloudWatch console at <https://console.aws.amazon.com/cloudwatch/>.
2. In the navigation pane, choose **Metrics**.
3. Under **All metrics**, choose the **AWS/MediaPackage** namespace.
4. Choose the metric dimension to view the metrics (for example, choose `channel` to view metrics per channel).

#### To view metrics using the AWS CLI

At a command prompt, use the following command:

```
aws cloudwatch list-metrics --namespace "AWS/MediaPackage"
```

## AWS Elemental MediaPackage CloudWatch Metrics

The `AWS/MediaPackage` namespace includes the following metrics. AWS Elemental MediaPackage publishes metrics to CloudWatch every minute, if not sooner.

Metric	Description
<code>EgressBytes</code>	<p>Number of bytes that AWS Elemental MediaPackage successfully outputs for each request. If MediaPackage doesn't receive any requests for egress in the specified interval, then no data is given.</p> <p>Units: Bytes</p> <p>Valid statistics:</p> <ul style="list-style-type: none"><li>• <code>Average</code> – average bytes (<code>Sum/SampleCount</code>) that AWS Elemental MediaPackage outputs over the configured interval.</li><li>• <code>Maximum</code> – largest individual output request (in bytes) made to AWS Elemental MediaPackage.</li><li>• <code>Minimum</code> – smallest individual output request (in bytes) made to AWS Elemental MediaPackage.</li><li>• <code>SampleCount</code> – number of requests that is used in the statistical calculation.</li><li>• <code>Sum</code> – total number of bytes that AWS Elemental MediaPackage outputs over the configured interval.</li></ul> <p>Valid dimensions:</p> <ul style="list-style-type: none"><li>• <code>Channel</code></li><li>• <code>Combination Channel and OriginEndpoint</code></li><li>• <code>No dimension</code></li></ul>
<code>EgressRequestCount</code>	<p>Number of content requests that AWS Elemental MediaPackage receives. If MediaPackage doesn't receive any requests for egress in the specified interval, then no data is given.</p>

Metric	Description
	<p>Units: Count</p> <p>Valid statistics:</p> <ul style="list-style-type: none"> <li>Sum – total number of egress requests that AWS Elemental MediaPackage receives.</li> </ul> <p>Valid dimensions:</p> <ul style="list-style-type: none"> <li>Channel</li> <li>Combination Channel and OriginEndpoint</li> <li>StatusCodeRange</li> <li>Combination Channel and StatusCodeRange</li> <li>Combination Channel, OriginEndpoint, and StatusCodeRange</li> <li>No dimension</li> </ul>
EgressResponseTime	<p>The time that it takes AWS Elemental MediaPackage to process each egress request. If MediaPackage doesn't receive any requests for egress in the specified interval, then no data is given.</p> <p>Units: Milliseconds</p> <p>Valid statistics:</p> <ul style="list-style-type: none"> <li>Average – average amount of time (Sum/SampleCount) that it takes AWS Elemental MediaPackage to process egress requests over the configured interval.</li> <li>Maximum – longest amount of time (in milliseconds) that it takes AWS Elemental MediaPackage to process an egress request and provide a response.</li> <li>Minimum – shortest amount of time (in milliseconds) that it takes AWS Elemental MediaPackage to process an egress request and provide a response.</li> <li>SampleCount – number of requests that is used in the statistical calculation.</li> <li>Sum – total amount of time that it takes AWS Elemental MediaPackage to process egress requests over the configured interval.</li> </ul> <p>Valid dimensions:</p> <ul style="list-style-type: none"> <li>Channel</li> <li>Combination Channel and OriginEndpoint</li> </ul>

Metric	Description
IngressBytes	<p>Number of bytes that AWS Elemental MediaPackage ingests for each request. If MediaPackage doesn't receive any requests for egress in the specified interval, then no data is given.</p> <p>Units: Bytes</p> <p>Valid statistics:</p> <ul style="list-style-type: none"><li>• <b>Average</b> – average bytes (Sum/SampleCount) that AWS Elemental MediaPackage ingests over the configured interval.</li><li>• <b>Maximum</b> – largest individual ingest request (in bytes) made to AWS Elemental MediaPackage.</li><li>• <b>Minimum</b> – smallest individual ingest request (in bytes) made to AWS Elemental MediaPackage.</li><li>• <b>SampleCount</b> – number of requests that is used in the statistical calculation.</li><li>• <b>Sum</b> – total number of bytes that AWS Elemental MediaPackage ingests over the configured interval.</li></ul> <p>Valid dimensions:</p> <ul style="list-style-type: none"><li>• Channel</li><li>• No dimension</li></ul>

Metric	Description
IngressResponseTime	<p>The time that it takes AWS Elemental MediaPackage to process each ingest request. If MediaPackage doesn't receive any requests for egress in the specified interval, then no data is given.</p> <p>Units: Milliseconds</p> <p>Valid statistics:</p> <ul style="list-style-type: none"> <li><b>Average</b> – average amount of time (Sum/SampleCount) that it takes AWS Elemental MediaPackage to process ingest requests over the configured interval.</li> <li><b>Maximum</b> – longest amount of time (in milliseconds) that it takes AWS Elemental MediaPackage to process an ingest request and provide a response.</li> <li><b>Minimum</b> – shortest amount of time (in milliseconds) that it takes AWS Elemental MediaPackage to process an ingest request and provide a response.</li> <li><b>SampleCount</b> – number of requests that is used in the statistical calculation.</li> <li><b>Sum</b> – total amount of time that it takes AWS Elemental MediaPackage to process ingest requests over the configured interval.</li> </ul> <p>Valid dimensions:</p> <ul style="list-style-type: none"> <li>Channel</li> <li>No dimension</li> </ul>

## AWS Elemental MediaPackage CloudWatch Dimensions

You can filter the `AWS/MediaPackage` data using the following dimensions.

Dimension	Description
No Dimension	<p>Metrics are aggregated and shown for all channels, endpoints, or status codes.</p>
Channel	<p>Metrics are shown only for the specified channel.</p> <p>Value: The auto-generated GUID of the channel.</p> <p>Can be used alone or with other dimensions:</p> <ul style="list-style-type: none"> <li>Alone to show metrics for only the specified channel.</li> </ul>

Dimension	Description
	<ul style="list-style-type: none"><li>• With the <code>originEndpoint</code> dimension to show metrics for the specified endpoint that is associated with the specified channel.</li></ul>
<code>OriginEndpoint</code>	<p>Metrics are shown for the specified channel and endpoint combination.</p> <p>Value: The auto-generated GUID of the endpoint.</p> <p>Must be used in conjunction with the <code>channel</code> dimension.</p>
<code>StatusCodeRange</code>	<p>Metrics are shown for the specified status code range.</p> <p>Value: <code>2xx</code>, <code>3xx</code>, <code>4xx</code>, or <code>5xx</code>.</p> <p>Can be used alone or with other dimensions:</p> <ul style="list-style-type: none"><li>• Alone to show all egress requests for the specified status range.</li><li>• With the <code>channel</code> dimension to show egress requests for all endpoints that are associated with the specified channel, with the specified status code range.</li><li>• With the <code>channel</code> and <code>originEndpoint</code> dimensions to show egress requests with a specific status code range on the specified endpoint that is associated with the specified channel.</li></ul>

## Monitoring AWS Elemental MediaPackage with Amazon CloudWatch Events

Amazon CloudWatch Events enable you to automate your AWS services and respond automatically to system events such as application availability issues or error conditions. AWS services deliver events to CloudWatch Events in near real-time. You can write simple rules to indicate which events are of interest to you, and what automated actions to take when an event matches a rule. The actions that can be automatically triggered include the following:

- Invoking an AWS Lambda function
- Invoking Amazon EC2 Run Command
- Relaying the event to Amazon Kinesis Data Streams
- Activating an AWS Step Functions state machine

An example of using CloudWatch Events with AWS Elemental MediaPackage is notifying an Amazon SNS topic if you reach the maximum stream ingest.

For more information about creating rules in CloudWatch Events, see the [Amazon CloudWatch Events User Guide](#).



For a list of events that AWS Elemental MediaPackage emits, see [AWS Elemental MediaPackage Events \(p. 45\)](#).

## AWS Elemental MediaPackage Events

AWS Elemental MediaPackage integrates with Amazon CloudWatch Events to notify you of certain events that affect your channels and endpoints. Each event is represented in [JSON \(JavaScript Object Notation\)](#) and contains the event name, the date and time when the event occurred, the channel or endpoint affected, and more. You can use CloudWatch Events to collect these events and set up rules that route them to one or more *targets* such as AWS Lambda functions, Amazon SNS topics, Amazon SQS queues, streams in Amazon Kinesis Data Streams, or built-in targets.

For more information about using CloudWatch Events with other kinds of events, see the [Amazon CloudWatch Events User Guide](#).

The following topics describe the CloudWatch Events that AWS Elemental MediaPackage creates.

### Topics

- [Input Notification Events \(p. 45\)](#)
- [Key Provider Notification Events \(p. 45\)](#)

## Input Notification Events

A channel in AWS Elemental MediaPackage has exceeded the limit for the number of input streams. For information about limits, see [Limits in AWS Elemental MediaPackage \(p. 48\)](#).

```
{
  "id": "7bf73129-1428-4cd3-a780-95db273d1602",
  "detail-type": "MediaPackage Input Notification",
  "source": "aws.mediapackage",
  "account": "aws\_account\_id",
  "time": "2015-11-11T21:29:54Z",
  "region": "us-west-2",
  "resources": [
    "arn:aws:mediapackage:us-west-2:aws\_account\_id:channels/262ff182d46d4b399fcabea1364df682"
  ],
  "detail": {
    "event": "MaxIngestStreamsError",
    "message": "Parent Manifest [%s] has [23] streams, more than [20] allowed: (index\_1.m3u8, index\_2.m3u8, index\_3.m3u8, index\_4.m3u8, index\_5.m3u8, index\_6.m3u8, index\_7.m3u8, index\_8.m3u8)"
  }
}
```

## Key Provider Notification Events

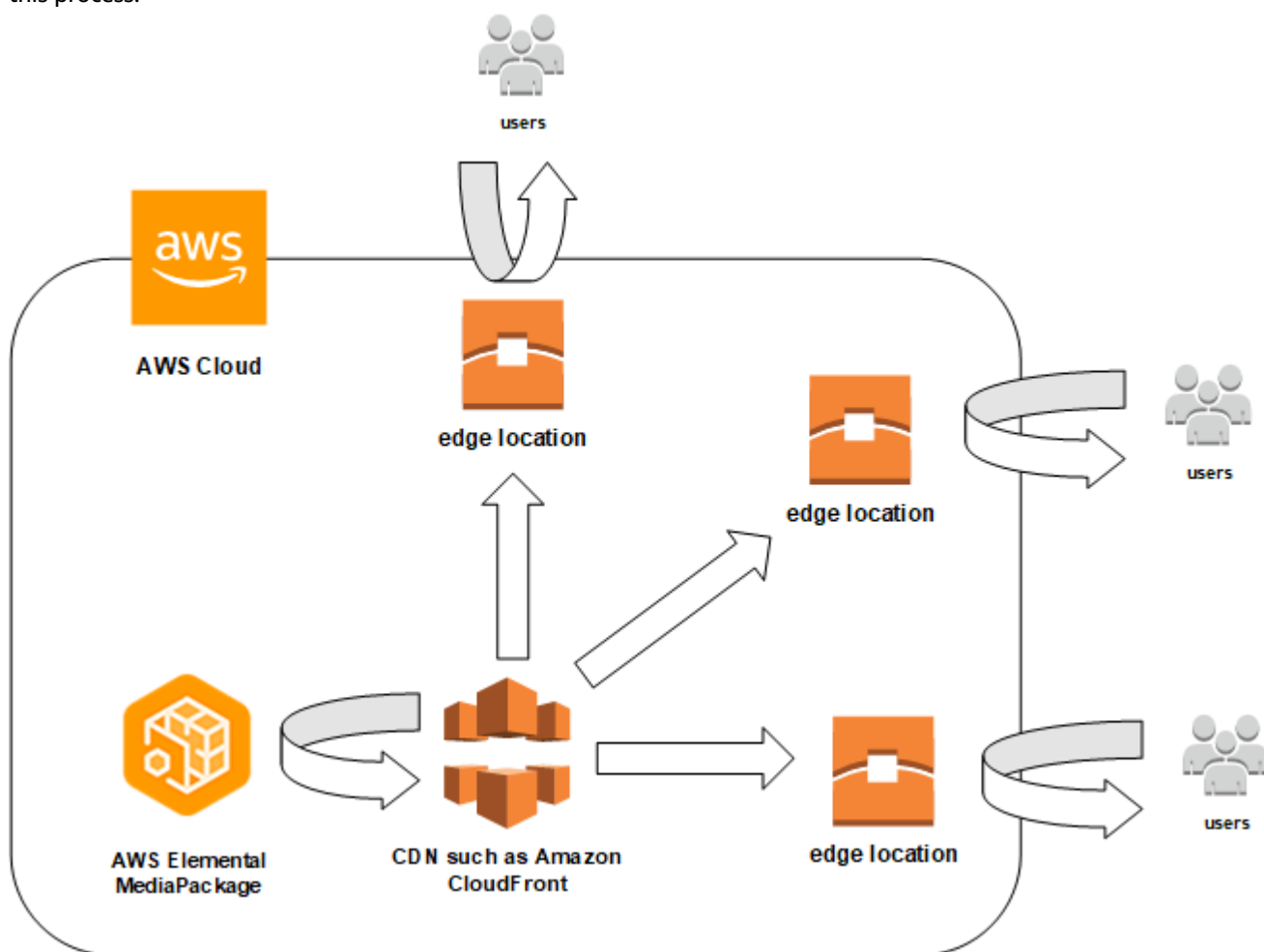
When you're using content encryption on an endpoint, AWS Elemental MediaPackage can't reach the key provider. For information about DRM and encryption, see <http://docs.aws.amazon.com/speke/latest/documentation/>.

```
{
  "id": "7bf73129-1428-4cd3-a780-98ds273d1602",
  "detail-type": "MediaPackage Key Provider Notification",
  "source": "aws.mediapackage",
  "account": "aws\_account\_id",
  "time": "2015-11-11T21:29:54Z",
  "region": "us-west-2",
}
```

```
  "resources":[
    "arn:aws:mediapackage:us-
west-2:aws_account_id:origin_endpoints/70b44e2e666c4bdc9e5f4488e1f1aa99"
  ],
  "detail":{
    "event": "KeyProviderError",
    "message": "message-text"
  }
}
```

# Working with Content Delivery Networks (CDNs)

You can use a content delivery network (CDN) such as [Amazon CloudFront](#) to serve the content that you store in AWS Elemental MediaPackage. A CDN is a globally distributed set of servers that caches content such as videos. When a user requests your content, the CDN routes the request to the edge location that provides the lowest latency. If your content is already cached in that edge location, the CDN delivers it immediately. If your content is not currently in that edge location, the CDN retrieves it from your origin (the MediaPackage endpoint, in this case) and distributes it to the user. The following illustration shows this process.



## Using AWS Elemental MediaPackage as an Origin in Amazon CloudFront

After you create a channel and its endpoints in AWS Elemental MediaPackage, note the URLs for each of the endpoints. These URLs are what you use for the origin domain names for your CloudFront distribution. You need one origin for each endpoint on the channel in MediaPackage.

For detailed steps about creating a distribution with AWS Elemental MediaPackage endpoints as the origins, see [Delivering Live Streaming Video](#) in the *Amazon CloudFront Developer Guide*.

# Limits in AWS Elemental MediaPackage

The following sections provide information about the limits in AWS Elemental MediaPackage. For information about requesting an increase to soft limits, see [AWS Service Limits](#). Hard limits cannot be changed.

## Soft Limits

The following table describes limits in AWS Elemental MediaPackage that can be increased. For information about changing limits, see [AWS Service Limits](#).

Resource	Default Limit
Maximum Channels	<p>10</p> <p><b>Note</b> Increasing your channel limit doesn't always mean that you also need to increase your endpoints. For example, if you need 14 channels and want to serve HLS, HLS encrypted, and DASH content from each channel, you need only three endpoints for each channel (one for each output type). The default endpoint limit is 10 so, although you do need a channel limit increase, you don't need to increase your endpoint limit. You won't exceed the limit of 10 endpoints <i>per channel</i>.</p>
Maximum Endpoints per Channel	<p>10</p> <p>This is a <i>per channel</i> limit. Each endpoint represents the output package that you use. If one channel serves HLS, HLS encrypted, DASH, DASH encrypted, Microsoft Smooth, and Microsoft Smooth encrypted content, then that channel has six endpoints and falls within the 10 endpoints limit. If you have 10 channels set up this same way, then you still haven't exceeded the limit because each channel uses only 6 endpoints.</p>

## Hard Limits

The following table describes limits within AWS Elemental MediaPackage that can't be increased.

<b>Resource or Operation</b>	<b>Limit</b>
Ingest Stream Limits	20 streams per channel, and 10 tracks per stream
Maximum Content Retention	72 hours
Maximum Live Manifest Length	5 minutes
Maximum Time-shifted Manifest Length	6 hours
Request Rates per Channel	<ul style="list-style-type: none"><li>• Ingest: 50 requests per second</li><li>• Egress: 200 requests per second</li></ul>
REST API Requests	<ul style="list-style-type: none"><li>• Steady state: 5 requests per second</li><li>• Bursting: 50 requests per second</li></ul>

# AWS Elemental MediaPackage Resources

The following table lists related resources that you'll find useful as you work with AWS Elemental MediaPackage.

Resource	Description
<a href="#">Classes and Workshops</a>	Links to role-based and specialty courses as well as self-paced labs to help sharpen your AWS skills and gain practical experience.
<a href="#">AWS Developer Tools</a>	Links to developer tools, SDKs, IDE tool kits, and command line tools for developing and managing AWS applications.
<a href="#">AWS Whitepapers</a>	Links to a comprehensive list of technical AWS whitepapers, covering topics such as architecture, security, and economics and authored by AWS Solutions Architects or other technical experts.
<a href="#">AWS Support Center</a>	The hub for creating and managing your AWS Support cases. Also includes links to other helpful resources, such as forums, technical FAQs, service health status, and AWS Trusted Advisor.
<a href="#">AWS Support</a>	The primary web page for information about AWS Support, a one-on-one, fast-response support channel to help you build and run applications in the cloud.
<a href="#">Contact Us</a>	A central contact point for inquiries concerning AWS billing, account, events, abuse, and other issues.
<a href="#">AWS Site Terms</a>	Detailed information about our copyright and trademark; your account, license, and site access; and other topics.

# Document History for User Guide

The following table describes important changes in each release of the *AWS Elemental MediaPackage User Guide* after May 2018. For notification about updates to this documentation, you can subscribe to an RSS feed.

- **API version:** 1.0
- **Latest documentation update:** July 18, 2018

Change	Description	Date
Added information about multi-period DASH.	Added <i>Multi-period DASH in AWS Elemental MediaPackage</i> topic to discuss the purpose and functionality of multiple periods in DASH manifests.	July 18, 2018
Added content delivery network (CDN) information.	Added <i>Working with CDNs</i> topic to discuss how AWS Elemental MediaPackage works with CDNs such as Amazon CloudFront.	May 31, 2018

## Earlier Updates

The following table describes important changes in each release of the *AWS Elemental MediaPackage User Guide* before May 2018.

Change	Description	Date
Initial document creation.	New document.	November 27, 2017
Corrected links and added whitelisting.	Corrected links to the AWS Elemental MediaPackage console and AWS Elemental MediaPackage API Reference.  In <i>Working with Endpoints</i> , added reference to access control fields.	December 1, 2017
Added IAM policy information specific to AWS Elemental MediaPackage.	In <a href="#">Setting Up AWS Elemental MediaPackage (p. 6)</a> , added instructions for creating non-admin roles with limited permissions.	December 13, 2017
Added hard limit information.	In <a href="#">Limits in AWS Elemental MediaPackage (p. 48)</a> , added information about limits that can't be changed (hard limits).	December 20, 2017

Change	Description	Date
Updated IAM policy information.	In <a href="#">Setting Up AWS Elemental MediaPackage (p. 6)</a> , added information about policies specific to AWS Elemental MediaPackage.	January 5, 2018
Added Amazon CloudWatch Events information.	Added <a href="#">the section called "Monitoring with CloudWatch Events" (p. 44)</a> section about the CloudWatch Events that AWS Elemental MediaPackage supports.	February 14, 2018
Added CMAF endpoint information.	Added <a href="#">Creating a Common Media Application Format (CMAF) Endpoint (p. 21)</a> section for new output type.	April 6, 2018
Updated feature functionality.	In <a href="#">Features of AWS Elemental MediaPackage (p. 3)</a> , added feature support for HDR-10.	April 30, 2018
Added content distribution network (CDN) information.	Added topic <a href="#">Working with Content Delivery Networks (CDNs) (p. 47)</a> to discuss how AWS Elemental MediaPackage works with CDNs such as Amazon CloudFront.	May 31, 2018

**Note**

- The AWS Media Services are not designed or intended for use with applications or in situations requiring fail-safe performance, such as life safety operations, navigation or communication systems, air traffic control, or life support machines in which the unavailability, interruption or failure of the services could lead to death, personal injury, property damage or environmental damage.



# AWS Glossary

For the latest AWS terminology, see the [AWS Glossary](#) in the *AWS General Reference*.