
Live Streaming on AWS with MediaStore **AWS Implementation Guide**



Live Streaming on AWS with MediaStore: AWS Implementation Guide

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Deliver resilient and secure real-time viewing experiences using AWS Elemental MediaLive and AWS Elemental MediaStore services

Publication date: *May 2020* (*last update* (p. 25): *July 2021*)

Amazon Web Services (AWS) helps broadcasters and content owners to automate media supply chains, streamline content distribution, and cost-effectively broadcast live content to a global audience. With AWS, you can seamlessly scale your infrastructure to meet demand, and pay only for what you use, helping you build highly available and cost-effective solutions for live video streaming.

The Live Streaming on AWS with MediaStore solution helps you build highly available live video streaming content using [AWS Elemental MediaLive](#) (MediaLive) and [AWS Elemental MediaStore](#) (MediaStore) services to deliver resilient and secure real-time viewing experiences to your customers.

This solution is used only during the live event. When you finish streaming, you can delete the solution's stack to help ensure that you only pay for the infrastructure you use.

This solution provides the following features:

- Automatically configures MediaLive and MediaStore to encode and originate your content for adaptive bitrate streaming across multiple screens via HTTP Live Streaming (HLS).
- Provides an elastic, highly available, global content delivery network for live video streaming using [Amazon CloudFront](#).
- Supports four input types ([RTP_PUSH](#) (p. 19), [RTMP_PUSH](#) (p. 19), [URL_PULL](#) (p. 18), and [INPUT_DEVICE](#) (p. 16)) as the source for your video stream, including a device input so you can use an [AWS Elemental Link](#) as the source for the input for your live channel

This implementation guide discusses architectural considerations and configuration steps for deploying the Live Streaming on AWS with MediaStore solution in the AWS Cloud. It includes a link to an [AWS CloudFormation](#) template that launches and configures the AWS services required to deploy this solution using AWS best practices for security and availability.

The guide is intended for IT infrastructure architects, administrators, and DevOps professionals who have practical experience with video streaming and architecting in the AWS Cloud.

Cost

You are responsible for the cost of the AWS services used while running this solution. As of July 2021, the cost for running this solution in the US East (N. Virginia) with:

- Approximately 1,000 viewers for a one hour live event using a standard definition (SD)-540p encoding profile is approximately **\$69.22 for the one hour event.**
- Approximately 10,000 viewers for a one hour live event using a high definition (HD)-1080p encoding profile is approximately **\$1,539.00 for the one hour event.**

These cost estimates depend on many factors, which are detailed in the following cost examples.

Note

The examples provided are likely *higher* than the actual costs of running this solution. The intent was to provide a guide to the pricing that is easily understood. Where assumptions were needed, we used factors that were straightforward to calculate and also likely be more expensive than the actual cost.

For an additional cost example for streaming a live event, refer to the [FAQs about live streaming on AWS](#) blog in the *AWS Media Blog*.

Cost Example 1

Cost example 1 covers a use case of approximately 1,000 viewers viewing a live event for about one hour with a **SD-540p** encoding profile selected in the CloudFormation template. This cost example is based on the following factors:

- Pricing Region: US-East-1, assuming standard pricing (no free-tier or discounts).
- Viewers consume the highest bitrate: Note that bitrate consumption is a mix of all the streams, but the highest bitrate is used in the calculation to show the upper cost range. Additionally, the [Quality-Defined Variable Bitrate](#) (QVBR) and variable video complexity can result in an output bandwidth that is 10-50% lower in price than the estimate provided in Table 1.
- 99% cache/hit ratio between the content delivery network (CDN) and AWS Elemental MediaStore.

Note

Storage of the test player is not included in this cost estimate.

Table 1 summarizes the total pricing for the live streaming event. Tables 2 through 4 break down the cost for each AWS service.

Table 1: Cost breakdown for 1,000 viewers for a one hour live event

AWS service	Function	Cost per hour
AWS Elemental MediaLive	Input and outputs for channel	\$1.71
AWS Elemental MediaStore	Ingest of channel	\$0.09
	Packaging and origination	\$0.18
Amazon CloudFront	Distribution	\$67.24
Total:		\$69.22/hour

AWS Elemental MediaLive pricing

Table 2 breaks down the AWS Elemental MediaLive pricing which assumes HD AVC input and SD AVC outputs with less than 10 Mbps bitrate and less than 30 frames per second (fps) frame rate.

Table 2: MediaLive pricing

Input / Output	Cost per hour
HD Input (AVC 10-20Mbps)	\$0.294
Output 1 SD (512x288, 400k)	\$0.354
Output 2 SD (640x360, 800k)	\$0.354
Output 3 SD (768x432, 1200k)	\$0.354
Output 4 SD (960x540, 1800k)	\$0.354
Total:	\$1.71/hour

AWS Elemental MediaStore pricing

MediaStore charges \$0.02 per Gigabyte (GB) per hour for standard live ingest, based on the aggregate bitrate of all live input streams. This example has four input streams, so the rate of GB streaming per hour is determined by:

- Adding the bitrate of all streams in either kbps or Mbps:
 - 400k + 800k + 1200k + 1800k = 4200 kbps
 - .4 + .8 + 1.2 + 1.8 = 4.2 Mbps
- Convert kbps or Mbps to Gigabits (Gbit) per second (ps). 1024 Mb = 1 Gbit:
 - 4.2 Mbps / 1024 = 0.0041015625 Gbits ps
- Convert Gbits to GB. 1 Gbit = 0.125 (or 1/8) GB.
 - 0.0041015625 Gbits ps * 0.125 = 0.0005126953125 GBps
- Convert GB per second to GB per hour:
 - 0.0005126953125 GBps * 60s * 60mins = 1.845703125 or 1.8 GB/hour

((sum of stream bitrates in Kbps) / 1024 (Mbps conversion)) / 1024 (Gbit conversion) * .125 (bits to Bytes conversion) * 60 seconds * 60 minutes = GB / hour

Table 3: MediaPackage ingest pricing

Input / Output	kbps
Output 1 SD (512x288, 400k)	400
Output 2 SD (640x360, 800k)	800
Output 3 SD (768x432, 1200k)	1200
Output 4 SD (960x540, 1800k)	1800
Total kbps:	4200

Input / Output	kbps
Convert kpbs to GB/hour 4,200 kpbs / 8 (bits to bytes) / 1024 (kpbs to Mbps) / 1024 (Mbps to Gbps) x 60 (seconds) x 60 (minutes)	1.80 GB/hour
GB/hour with redundancy	3.60 GB/hour
Cost (GB/hour * \$0.02)	\$0.072/hour

Table 4: MediaStore packaging and origin pricing

AWS service	Cost per hour
Total MediaStore with 1% of egress (7.91 GB x \$0.023)	\$0.18

Note

We assume that MediaStore serves 1% of the traffic to CloudFront and viewers, and the rest is served by CloudFront. Table 5 provides the 1% of egress for the MediaStore estimate in Table 4.

Viewer traffic pricing

The cost estimate for viewer traffic assumes that all viewers get the highest bitrate for the one hour live streaming event.

Table 5: Viewer traffic pricing

AWS service	Function	Cost per hour
Amazon CloudFront	Average Mbps per viewer	1.8
	Total MB per sec (1000 x 1.8 / 8)	225
	Total Egress per hour (225 / 1024 x 60 x 60)	791 GB/hour
Total (791 GB * \$0.085):		\$67.24/hour

Cost example 2

Cost example 1 covers a use case of approximately 10,000 viewers viewing a live event for about one hour with an **HD-1080p** encoding profile selected in the CloudFormation template. This cost example is based on the following factors:

- Pricing Region: US-East-1, assuming standard pricing (no free-tier or discounts).
- Viewers consume the highest bitrate: Note that bitrate consumption is a mix of all the streams, but the highest bitrate is used in the calculation to show the upper cost range. Additionally, the QVBR and

variable video complexity can result in an output bandwidth that is 10-50% lower in price than the estimate provided in Table 6.

- 99% cache/hit ratio between the CDN and AWS Elemental MediaStore.

Note

Storage of the test player is not included in this cost estimate.

Table 6 summarizes the total pricing for the live streaming event. Tables 7 through 10 breaks down the cost for each AWS service.

Table 6: Cost breakdown for 10,000 viewers for a one hour live event

AWS service	Function	Cost per hour
AWS Elemental MediaLive	Input and outputs for channel	\$3.11
AWS Elemental MediaStore	Ingest of channel	\$0.25
	Packaging and origination	\$4.15
Amazon CloudFront	Distribution	\$1,531.49
Total:		\$1,539.00/hour

AWS Elemental MediaLive pricing

Table 7 breaks down the AWS Elemental MediaLive pricing which assumes HD AVC input and both SD and HD AVC outputs with less than 10 Mbps bit rate and less than 30 fps frame rate.

Table 7: MediaLive pricing

Input / Output	Cost per hour
HD Input (AVC 10-20Mbps)	\$0.294
Output 1 SD (512x288, 400k)	\$0.354
Output 2 SD (640x360, 800k)	\$0.354
Output 3 SD (768x432, 1200k)	\$0.354
Output 4 SD (960x540, 1800k)	\$0.354
Output 5 HD (1280x720p, 2700k)	\$0.702
Output 6 HD (1920x1080p, 4100k)	\$0.702
Total:	\$3.11/hour

MediaStore ingest pricing

As detailed in Cost Example 1, MediaStore pricing is based on GB ingested per second across all streams of live output. Table 8 shows the conversion from kbps to Mbps to Gbits/second to GB/hour.

Table 8: MediaStore ingest pricing

Input / output	kbps
Output 1 SD (512x288_400k)	400
Output 2 SD (640x360_800k)	800
Output 3 SD (768x432_1200k)	1200
Output 4 SD (960x540_1800k)	1800
Output 5 (1280x720p_2700k)	2700
Output 6 (1920x1080p_4100k)	4100
Total kbps:	11000
Convert kpbs to GB/hour	4.72
11000 kbps / 8 (bits to bytes) / 1024 (kpbs to Mbps) / 1024 (Mbps to Gbps) x 60 (seconds) x 60 (minutes)	
GB/hour with redundancy	9.44
Total (GB/hour * \$0.02)	\$0.19/hour

Table 9: MediaStore packaging and origin pricing

AWS service	Cost per hour
Total MediaStore with 1% of egress (180 GB x \$0.023)	\$4.14

Note

We assume that MediaStore serves 1% of the traffic to CloudFront and viewers, and the rest is served by CloudFront. Table 10 provides the 1% of egress for the MediaStore estimate in Table 9.

Estimating the viewer traffic

The cost estimate for viewer traffic assumes that all viewers get the highest bitrate for the one hour live streaming event.

Table 10: Viewer traffic pricing

AWS service	Function	Cost per hour
Amazon CloudFront	Average Mbps per viewer	4.1
	Total MB per sec (10,000 x 4.1 / 8)	5125
	Total Egress per hour (5125 / 1024 x 60 x 60)	18017 GB/hour

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AWS service	Function	Cost per hour
	Total (18017 GB * \$0.085):	\$1,531.49/hour

Note

Pricing is per minute, with a minimum of 10 minutes. Prices are subject to change.

We recommend creating a [budget](#) through [AWS Cost Explorer](#) to help manage costs. Prices are subject to change. For full details, refer to the pricing webpages for [MediaLive](#) and [MediaStore](#), as well as the AWS services you will use in this solution.

Architecture overview

Deploying this solution **with the default parameters** builds the following environment in the AWS Cloud.

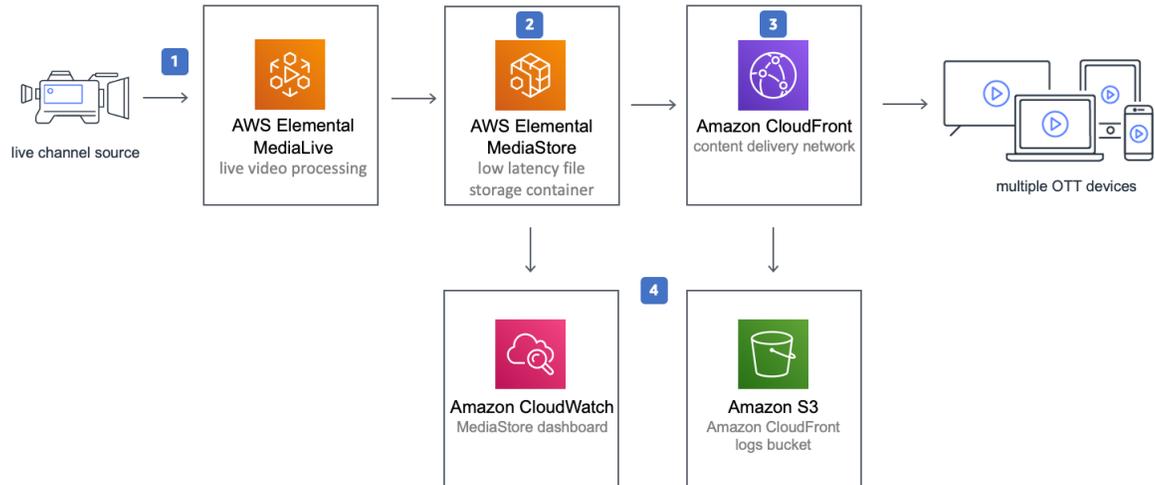


Figure 1: Live Streaming on AWS with MediaStore architecture

The AWS CloudFormation template launches the AWS products and services necessary to ingest, transcode, and deliver live streaming video.

1. AWS Elemental MediaLive ingests an input feed and transcodes your content into one adaptive bitrate (ABR) HTTP Live Streaming (HLS) stream as output.
2. AWS Elemental MediaStore provides a scalable highly-available storage container to host the encoded segments.
3. An Amazon CloudFront distribution is configured to use the MediaStore custom endpoints as its origin. The CloudFront distribution delivers your live stream to viewers with low latency and high transfer speeds.
4. An [Amazon Simple Storage Service](#) (Amazon S3) bucket stores the CloudFront logs, and an [Amazon CloudWatch](#) dashboard monitors the ingress and egress actions on the MediaStore container.

You can configure this solution to ingest Real-Time Transport Protocol (RTP), Real-Time Messaging Protocol (RTMP), HTTP Live Streaming (HLS), or live video from an AWS Elemental Link device. This solution also includes three [encoding profiles](#) (p. 10).

Note

AWS CloudFormation resources are created from [AWS Cloud Development Kit](#) (CDK) constructs.

Security

When you build systems on AWS infrastructure, security responsibilities are shared between you and AWS. This [shared model](#) can reduce your operational burden as AWS operates, manages, and controls the components from the host operating system and virtualization layer down to the physical security of the facilities in which the services operate. For more information about security on AWS, visit [AWS Cloud Security](#).

IAM roles

AWS Identity and Access Management (IAM) roles allow customers to assign granular access policies and permissions to services and users in the AWS Cloud. This solution creates IAM roles that grants the AWS Lambda function access to the other AWS services used in this solution.

Amazon CloudFront

This solution deploys a static website [hosted](#) in an Amazon S3 bucket. To help reduce latency and improve security, this solution includes an Amazon CloudFront distribution with an origin access identity, which is a special CloudFront user that helps restrict access to the solution's website bucket contents. For more information, see [Restricting Access to Amazon S3 Content by Using an Origin Access Identity](#).

Deployment considerations

Encoding profiles

The Live Streaming on AWS with MediaStore solution configures AWS Elemental MediaLive with one of three progressive, 30 frames per second encoding profiles. Choose one of the following encoding profiles.

- **HD-1080p profile:** 1920x1080, 1280x720, 960x540, 768x432, 640x360, 512x288
- **HD-720p profile:** 1280x720, 960x540, 768x432, 640x360, 512x288
- **SD-540p profile:** 960x540, 768x432, 640x360, 512x288

MediaStore lifecycle policy

This solution deploys an AWS Elemental MediaStore storage container with an attached lifecycle policy. By default, stored files will be deleted after five minutes, to clean up the expired HLS segments from the live stream. For more details, refer to [lifecycle policy](#) in the *AWS Elemental MediaStore documentation*.

Demo content

The solution includes a link to a demo HTTP Live Streaming (HLS) stream hosted in an Amazon Simple Storage Service (Amazon S3) bucket, which lets you test the solution without having to set up and configure a live stream. Deploying the solution with default parameters, will launch the demo.

Solution updates

To continue using this solution with the latest features and improvements, you must deploy the latest version of the AWS CloudFormation template as a new stack. This solution does not support updating an existing stack. For information to deploy the latest AWS CloudFormation template as a new stack, refer to [Launch the stack \(p. 12\)](#). After the new stack completes deployment, we recommend [uninstalling the previous version \(p. 21\)](#) to save on costs.

Regional deployment

This solution uses AWS Elemental MediaLive and MediaStore services, which are currently available in specific AWS Regions only. Therefore, you must launch this solution in an AWS Region where these services are available. For the most current service availability by Region, refer to the [AWS Regional Services List](#).

To use an AWS Elemental Link device as an input, you must launch this solution in the AWS Region where the device is configured.

AWS CloudFormation template

This solution uses AWS CloudFormation to automate the deployment of the Live Streaming on AWS with MediaStore solution on the AWS Cloud. It includes the following AWS CloudFormation template, which you can download before deployment:

[View
Template](#)

live-streaming-on-aws-with-mediastore.template: Use this template to launch the solution and all associated components. The default configuration deploys an AWS Lambda function, an AWS Elemental MediaLive input and channel, an AWS Elemental MediaStore container, Amazon CloudFront distributions, an Amazon CloudWatch log group, an Amazon CloudWatch dashboard, and an Amazon Simple Storage Service (Amazon S3) bucket, but you can also customize the template based on your specific needs.

Automated deployment

Before you launch the automated deployment, review the considerations discussed in this guide. Follow the step-by-step instructions in this section to configure and deploy the solution into your account.

Time to deploy: Approximately five minutes

Prerequisites

Before you launch the Live Streaming on AWS with MediaStore solution, you must create an AWS Identity and Access Management (IAM) role and associated policy, to allow MediaStore access to Amazon CloudWatch. Launching this solution without an IAM role and policy will be successful. However, the deployed Amazon CloudWatch dashboard will not be configured. For details on how to create an [IAM role and policy](#), refer to the *AWS Elemental MediaStore documentation*.

Note

This solution only requires one policy and role per account. However, they must be named `MediaStoreAccessLogsPolicy` and `MediaStoreAccessLogs`. The same role and policy will work for all deployments of this solution in any supported Region.

Launch the stack

Important

This solution includes an option to send anonymous operational metrics to AWS. We use this data to better understand how customers use this solution and related services and products. AWS owns the data gathered through this survey. Data collection is subject to the [AWS Privacy Policy](#).

To opt out of this feature, download the template, modify the AWS CloudFormation mapping section, and then use the AWS CloudFormation console to upload your template and deploy the solution. For more information, refer to the [Collection of operation metrics \(p. 22\)](#) section of this guide.

This automated AWS CloudFormation template deploys the Live Streaming on AWS with MediaStore solution on the AWS Cloud. Verify that you have created an AWS Elemental MediaStore IAM role and policy before deploying this solution.

Note

You are responsible for the cost of the AWS services used while running this solution. Refer to the [Cost \(p. 2\)](#) section for more details. For full details, refer to the pricing webpage for each AWS service you use in this solution.

1. Log in to the AWS Management Console and select the button to launch the `live-streaming-on-aws-with-mediastore` AWS CloudFormation template.



You can also [download the template](#) as a starting point for your own implementation.

- The template launches in the US East (N. Virginia) Region by default. To launch this solution in a different AWS Region, use the Region selector in the console navigation bar.

Note

This solution uses the AWS Elemental MediaLive and MediaStore services, which are currently available in specific AWS Regions only. Therefore, you must launch this solution in an AWS Region where these services are available. For the most current service availability by Region, refer to the [AWS Regional Services List](#).

- On the **Create stack** page, verify that the correct template shows in the **Amazon S3 URL** text box and choose **Next**.
- On the **Specify stack details** page, assign a name to your solution stack.
- Under **Parameters**, review the parameters for the template, and modify them as necessary. This solution uses the following default values.

Parameter	Default	Description
Deployment Options		
Source Input Type	URL_PULL	Specify the input type for MediaLive: RTP_PUSH, RTMP_PUSH, URL_PULL (HLS), or INPUT_DEVICE (AWS Elemental Link). Detailed instructions for each input type can be found in the appendix.
Source URL	<Optional input>	If you selected URL_PULL for Source Input Type , enter the URL for your source stream. By default this parameter contains the primary demo source URL.
Source Username	<Optional input>	If you selected URL_PULL for Source Input Type , enter the username for your source stream if using authentication. This value will be stored securely in AWS Systems Manager Parameter Store.
Source Password	<Optional input>	If you selected URL_PULL for Source Input Type , enter the password for your source stream if

Parameter	Default	Description
		using authentication. This value will be stored securely in AWS Systems Manager Parameter Store.
Input Security Group CIDR Block	<Optional input>	For RTP_PUSH and RTMP_PUSH input types, specify the CIDR block to restrict access to the MediaLive input endpoint. This should be the IP or IP range of your source stream location/network.
Encoding Profile	720	Specify the encoding profile to use with MediaLive.
Start MediaLive Channel	True	Choose whether to start the MediaLive channel when the solution is created. We recommend starting the channel if you will use the demo preview player.

6. Choose **Next**.
7. On the **Options** page, choose **Next**.
8. On the **Review** page, review and confirm the settings. Be sure to check the box acknowledging that the template will create AWS Identity and Access Management (IAM) resources.
9. Choose **Create** to deploy the stack.

You can view the status of the stack in the AWS CloudFormation console in the **Status** column. You should receive a **CREATE_COMPLETE** status in approximately five minutes.

Note

To test the live stream playback, navigate to the AWS CloudFormation stack **Outputs** tab, copy the Amazon CloudFront URL, and open the URL in any player compatible with HTTP Live Streaming (HLS). In the **Outputs** tab, you can also find links to the MediaLive and MediaStore console, and the Amazon CloudWatch dashboard. For more details, refer to [Amazon CloudWatch dashboard \(p. 20\)](#).

Additional resources

- [AWS CloudFormation](#)
- [AWS Elemental MediaLive](#)
- [AWS Elemental Link](#)
- [Amazon Simple Storage Service](#)
- [AWS Elemental MediaStore](#)
- [Amazon CloudWatch](#)
- [AWS Lambda](#)
- [AWS Identity and Access Management](#)

AWS Elemental Link input configuration

Version 1.1.0 of the solution includes support for the AWS Elemental Link device as a source for live streaming content. AWS Elemental Link offers a configuration-free, cost-efficient way to securely and reliably transfer video to AWS Elemental MediaLive. For more details on the device, refer to the [AWS Elemental Link product page](#).

To configure this solution to use an AWS Elemental Link device you will need:

- Your Link device powered on and connected to the internet.
- The Link device ID. To find the device ID, sign in to the AWS MediaLive console and navigate to **MediaLive Devices** in the AWS Region where your device is registered. The device is listed with the Link device ID.
- Launch the solution in the same Region as the Link device with the following parameters:
 - **Source Input Type:** INPUT_DEVICE
 - **AWS Elemental Link Input Device ID:** The ID of the Link device from the AWS Elemental MediaLive console. You can only attach a Link device to one input at a time. If the Link device is already attached to an input, you cannot create a new input using that device.
 - **Encoding Profile:** Select the profile that best matches your source resolution.
 - **Start MediaLive Channel:** If your device is ready to stream, select true. Otherwise, select false—you can start the MediaLive channel through the AWS MediaLive console when you're ready to stream.

Note

Refer to the [Creating an input topic](#) in the *AWS Elemental MediaLive User Guide* for a full list of input types and configuration details.

Parameters
Parameters are defined in your template and allow you to input custom values when you create or update a stack.

LIVE STREAM SOURCE
Source Input Type
Specify the input type for MediaLive (Default parameters are for the Demo video) for details on setting up each input type see <https://docs.aws.amazon.com/solutions/latest/live-streaming-on-aws-with-medialive/appendix-a.html>

URL_PULL CONFIGURATION
Source URL (REQUIRED)
For URL, PULL input type ONLY, specify the primary source URL, this should be a HTTP or HTTPS link to the stream manifest file.

Source Username (OPTIONAL)
For URL, PULL input type ONLY, if basic authentication is enabled on the source stream enter the username

Source Password (OPTIONAL)
For URL, PULL input type ONLY, if basic authentication is enabled on the source stream enter the password

RTP_PUSH / RTMP_PUSH CONFIGURATION
Input Security Group CIDR Block (REQUIRED)
For RTP and RTMP PUSH input types ONLY, specify the CIDR Block for the MediaLive SecurityGroup. Input security group restricts access to the input and prevents unauthorized third parties from pushing content into a channel that is associated with that input.

INPUT_DEVICE CONFIGURATION
Elemental Link Input Device ID
Specify the ID for your Elemental Link input device (please note a Link device can only be attached to one input at a time)

Figure 2: AWS Elemental Link input configuration

URL Pull (HLS) input configuration

URL Pull provides the option to ingest an HLS stream over HTTP or HTTPS. The following parameters are required to configure the solution to ingest an HLS stream:

- **Solution Input Type:** URL_PULL
- **Source URL:** The HTTP(s) link to the HLS stream manifest file. The default value is a demo stream from AWS.
- **Source Username:** Only required if you have basic authentication setup on your source HLS stream.
- **Source Password:** Only required if you have basic authentication setup on your source HLS stream.
- **Encoding Profile:** Select the profile that best matches your source resolution.
- **Start MediaLive Channel:** If your device is ready to stream, select **true**. Otherwise, select **false**—you can start the MediaLive channel through the AWS console when you're ready to stream.

Note

Refer to the [Creating an input topic](#) in the *AWS Elemental MediaLive User Guide* for a full list of input types and configuration details.

The screenshot displays the AWS console configuration for a URL Pull (HLS) input. It is organized into several sections:

- Parameters:** A header section with a sub-header "Parameters" and a description: "Parameters are defined in your template and allow you to input custom values when you create or update a stack."
- LIVE STREAM SOURCE:** A section with the sub-header "Source Input Type". Below it is a text description: "Specify the input type for MediaLive (Default parameters are for the Demo video) for details on setting up each input type see <https://docs.aws.amazon.com/solutions/latest/live-streaming-on-aws-with-medialive/appendix-a.html>". A dropdown menu is shown with "URL_PULL" selected.
- URL_PULL CONFIGURATION:** A section with the sub-header "Source URL (REQUIRED)". Below it is a text description: "For URL_PULL input type ONLY, specify the primary source URL, this should be a HTTP or HTTPS link to the stream manifest file." A text input field contains the URL: "https://d15an60oaeed9r.cloudfront.net/live_stream_v2/sports_reel_with_markers.m3u8".
- Source Username (OPTIONAL):** A section with a text description: "For URL_PULL input type ONLY, if basic authentication is enabled on the source stream enter the username". An empty text input field is provided.
- Source Password (OPTIONAL):** A section with a text description: "For URL_PULL input type ONLY, if basic authentication is enabled on the source stream enter the password". An empty text input field is provided.

Figure 3: URL Pull (HLS) input configuration

RTMP Push and RTP Push input configuration

RTP and RTMP Push provide the option to push a transport stream (TS) to AWS Elemental MediaLive. In both options, the following parameters are required to configure the solution:

- **Solution Input Type:** RTP_PUSH / RTMP_PUSH
- **Input Security Group CIDR Block:** A valid CIDR block used to create a security group to restrict access to the MediaLive input.
- **Encoding Profile:** Select the profile that best matches your source resolution.
- **Start MediaLive Channel:** If your device is ready to stream, select **true**. Otherwise, select **false**—you can start the MediaLive channel through the AWS console when you're ready to stream.

Note

Refer to the [Creating an input topic](#) in the *AWS Elemental MediaLive User Guide* for a full list of input types and configuration details.

The screenshot shows the 'Parameters' section of an AWS CloudFormation template. It is divided into three main sections: 'LIVE STREAM SOURCE', 'URL_PULL CONFIGURATION', and 'RTP_PUSH / RTMP_PUSH CONFIGURATION'. The 'LIVE STREAM SOURCE' section has a dropdown menu for 'Source Input Type' with 'RTP_PUSH' selected. The 'URL_PULL CONFIGURATION' section has three text input fields for 'Source URL (REQUIRED)', 'Source Username (OPTIONAL)', and 'Source Password (OPTIONAL)'. The 'RTP_PUSH / RTMP_PUSH CONFIGURATION' section has a text input field for 'Input Security Group CIDR Block (REQUIRED)' with the value '10.0.0.0/16' entered. The 'RTP_PUSH / RTMP_PUSH CONFIGURATION' section is highlighted with a red border in the image.

Parameters
Parameters are defined in your template and allow you to input custom values when you create or update a stack.

LIVE STREAM SOURCE
Source Input Type
Specify the input type for MediaLive (Default parameters are for the Demo video) for details on setting up each input type see <https://docs.aws.amazon.com/solutions/latest/live-streaming-on-aws-with-mediastore/appendix-a.html>

RTP_PUSH

URL_PULL CONFIGURATION
Source URL (REQUIRED)
For URL PULL input type ONLY, specify the primary source URL, this should be a HTTP or HTTPS link to the stream manifest file.

Source Username (OPTIONAL)
For URL PULL input type ONLY, if basic authentication is enabled on the source stream enter the username

Source Password (OPTIONAL)
For URL PULL input type ONLY, if basic authentication is enabled on the source stream enter the password

RTP_PUSH / RTMP_PUSH CONFIGURATION
Input Security Group CIDR Block (REQUIRED)
For RTP and RTMP PUSH input types ONLY, specify the CIDR Block for the MediaLive SecurityGroup. Input security group restricts access to the input and prevents unauthorized third parties from pushing content into a channel that is associated with that input.

10.0.0.0/16

Figure 4: RTMP Push and RTP Push input configuration

Amazon CloudWatch dashboard

The Live Streaming on AWS with MediaStore solution includes an Amazon CloudWatch dashboard that is configured to monitor the following AWS Elemental MediaStore data points captured in the Amazon CloudWatch Logs logs.

- Ingress TPM (Transaction Per Minute)
- Egress TPM (Transaction Per Minute)
- Put Object Latencies (Successful Requests)
- Get Object Latencies (Successful Requests)
- Ingress 2xx Status Count by Operation
- Ingress 4xx Status Count by Operation
- Ingress 5xx Status Count by Operation
- Egress 2xx Status Count by Operation
- Egress 4xx Status Count by Operation
- Egress 5xx Status Count by Operation

Uninstall the solution

You can uninstall the Live Streaming on AWS with MediaStore solution from the AWS Management Console, or by using the AWS Command Line Interface (AWS CLI). You must manually delete the Amazon Simple Storage Service (Amazon S3) buckets created by this solution. AWS Solutions Implementations do not automatically delete these resources in case you have stored data that you wish to retain.

Using the AWS Management Console

1. Sign in to the [AWS CloudFormation console](#).
2. On the **Stacks** page, select the solution stack.
3. Choose **Delete**.

Using AWS Command Line Interface

Verify that the AWS Command Line Interface (AWS CLI) is available in your environment. For installation instructions, refer to [What Is the AWS Command Line Interface](#) in the *AWS CLI User Guide*. After confirming the AWS CLI is available, run the following command.

```
$ aws cloudformation delete-stack --stack-name <your-stack-name>
```

Replace *<cloudformation-stack-name>* with the name of your CloudFormation stack.

Deleting the Amazon S3 buckets

This solution is configured to retain the Amazon S3 buckets if you decide to delete the AWS CloudFormation stack to prevent against accidental data loss. After uninstalling the solution, you can manually delete the S3 buckets if you do not need to retain the data. Follow these steps to delete the Amazon S3 buckets.

1. Sign in to the [Amazon S3 console](#).
2. Choose **Buckets** from the left navigation pane.
3. Locate the *<stack-name>* S3 buckets.
4. Select one of the S3 buckets and choose **Delete**.

Repeat the steps until you have deleted all the *<stack-name>* S3 buckets.

To delete the S3 buckets using AWS CLI, run the following command:

```
$ aws s3 rb s3://<bucket-name> --force
```

Alternatively, you can configure the AWS CloudFormation template to delete the Amazon S3 buckets automatically. Before deleting the stack, change the deletion behavior in the AWS CloudFormation [DeletionPolicy attribute](#).

Collection of operation metrics

This solution includes an option to send anonymous operational metrics to AWS. We use this data to better understand how customers use this solution to improve the services and products. When activated, the following information is collected and sent to AWS:

- **Solution ID:** The AWS solution identifier
- **Unique ID (UUID):** Randomly generated, unique identifier for each live streaming solution deployment
- **Timestamp:** Data-collection timestamp
- **Launch Data:** The AWS Region where the stack was launched
- **Source Input Type:** The input type selected at launch
- **Encoding Profile:** The encoding profile selected at launch
- **ChannelStart:** The option to start the MediaLive channel selected at launch

Note that AWS will own the data gathered via this survey. Data collection will be subject to the [AWS Privacy Policy](#). To opt out of this feature, complete the following steps before launching the AWS CloudFormation template:

1. Download the [AWS CloudFormation template](#) to your local hard drive.
2. Open the AWS CloudFormation template with a text editor.
3. Modify the AWS CloudFormation template mapping section as follows:

```
AnonymousData:  
  SendAnonymousData:  
    Data: Yes
```

to:

```
AnonymousData:  
  SendAnonymousData:  
    Data: No
```

4. Sign in to the [AWS CloudFormation console](#).
5. Select **Create stack**.
6. On the **Create stack** page, **Specify template** section, select **Upload a template file**.
7. Under **Upload a template file**, choose **Choose file** and select the edited template from your local drive.
8. Choose **Next** and follow the steps in [Launch the stack \(p. 12\)](#) in the Automated Deployment section of this guide.

Source code

Visit our [GitHub repository](#) to download the templates and scripts for this solution, and to share your customizations with others. The Live Streaming on AWS with MediaStore template is generated using the [AWS Cloud Development Kit \(CDK\)](#) (AWS CDK). Refer to the [README.md file](#) for additional information.

Contributors

The following individuals contributed to this document:

- Tom Nightingale
- Tom Gilman
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Revisions

Date	Change	
May 2020	Initial release	
June 2020	Release version 1.1.0: Added support for AWS Elemental Link.	
December 2020	Release version 1.2.0: Updated the AWS CloudFormation template; for more information, refer to the CHANGELOG.md file in the GitHub repository.	
July 2021	Release version 1.2.1: Bug fixes. For more information, refer to the CHANGELOG.md file in the GitHub repository. Documentation updates: Expanded the cost estimates to provide more granular information, clarified the collection of operational metrics information, and updated guide organization to improve readability.	

Notices

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