
Live Streaming on AWS with Amazon S3 Implementation Guide



Live Streaming on AWS with Amazon S3: Implementation Guide

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Deliver resilient and secure real-time viewing experiences using AWS Elemental MediaLive and Amazon S3 services

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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 Amazon S3 solution helps you build highly available live video streaming content using [AWS Elemental MediaLive](#) and [Amazon Simple Storage Service](#) (Amazon S3) 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 Amazon S3 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. 20), [RTMP_PUSH](#) (p. 20), [URL_PULL](#) (p. 19), and [INPUT_DEVICE](#) (p. 17)) 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 Amazon S3 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 March 2022, 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 **\$1.76** for live encoding and packaging + **\$67.24** for 791 GB distribution = **\$69.00 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 **\$3.18** for live encoding and packaging + **\$1531.49** for 18,017 GB distribution = **\$1,534.67 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: While bitrate consumption is a mix of all the streams, we used the highest bitrate 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 Amazon S3.

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
Amazon S3	Storage	\$0.01

AWS service	Function	Cost per hour
	Requests	\$0.04
Amazon CloudFront	Distribution	\$67.24
Total:		\$69.00

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, 1,200k)	\$0.354
Output 4 SD (960x540, 1,800k)	\$0.354
Total:	\$1.71

Amazon S3 pricing

Amazon S3 charges \$0.023 per Gigabyte (GB) per month for the first 50 Terabytes (TB) stored in the bucket. The volume of storage billed in a month is based on the average storage used throughout the month. This can be determined by size of objects and how long they are stored. For this example, 21 segments for 4 bitrates are stored at all times. The cost of storage per hour is as follows:

- Add the bitrate of all streams in Kbps:
 - $400k + 800k + 1,200k + 1,800k = 4,200$ Kbps
- Calculate size of four-second segment (for all bitrates combined):
 - $4,200$ Kbps * 4 seconds = 16,800 Kb
- Total size of segments stored at a time:
 - $16,800$ Kb * 21 segments = 352,800 Kb
- Total Kb-hour usage:
 - $352,800$ Kb * 1 hour storage = 352,800 Kb-hours
- Convert to GB-months:
 - $352,800$ Kb-hours / 8 bits per byte / 1,000,000 Kb per GB / 744 hours in month = 0.00006 GB-months

$$0.00006 \text{ GB-months} * \$0.023 = \$0.00001 \text{ per hour of storage}$$

The cost will continue to accumulate per hour as long as the objects are not removed from the bucket. Cost of storage is billed monthly.

Table 3: Amazon S3 storage pricing

Input / output	Kbps
Output 1 SD (512x288, 400k)	400
Output 2 SD (640x360, 800k)	800
Output 3 SD (768x432, 1,200k)	1,200
Output 4 SD (960x540, 1,800k)	1,800
Total Kbps:	4,200
Compute total Kb stored	352,800 Kb
4,200 kbps * 4 seconds * 21 segments	
GB-month usage for one hour	0.00006 GB
Cost (GB/hour * \$0.023)	\$0.000001/hour

Amazon S3 charges \$0.005 per 1,000 requests for PUT, COPY, POST, and LIST requests. This example has four input streams, so the number of requests can be approximated by the following:

1. Calculate the number of segments:
 - 3,600 seconds of content / 4 second segments = 900 segments
 - 900 segments * 4 input streams = 3,600 segments
2. Calculate the number of manifest updates:
 - 4 input streams * 3,600 seconds of content / updates every 4 seconds = 3,600 manifest updates
3. Add total segments to total manifest updates to get the number of PUT requests:
 - 3,600 + 3,600 = 7,200 PUT requests per hour

Table 4: Amazon S3 request pricing

Request	Quantity
PUT ts segments	3,600
PUT manifest files	3,600
Total requests:	7,200
Cost (total requests/1000 * \$0.005)	\$0.036/hour

Data transfers from S3 to Amazon CloudFront are free of charge.

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 second (1,000 x 1.8 / 8)	225
	Total egress per hour (225 / 1,024 x 60 x 60)	791 GB/hour
Total (791 GB * \$0.085):		\$67.24

Cost example 2

Cost example 2 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 Amazon S3.

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 break 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
Amazon S3	Storage	\$0.01
	Requests	\$0.06
Amazon CloudFront	Distribution	\$1,531.49
Total:		\$1,534.67

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, 1,200k)	\$0.354
Output 4 SD (960x540, 1,800k)	\$0.354
Output 5 HD (1280x720p, 2,700k)	\$0.702
Output 6 HD (1920x1080p, 4,100k)	\$0.702
Total:	\$3.11

Amazon S3 pricing

As detailed in Cost Example 1, Amazon S3 pricing is based on GB of storage per month. Table 8 shows the conversion from Kbps to Mbps to Gbps to GB/hour to get the total GB of storage for the hour-long stream.

Table 8: Amazon S3 pricing

Input / output	Kbps
Output 1 (512x288_400k)	400
Output 2 (640x360_800k)	800
Output 3 (768x432_1,200k)	1,200
Output 4 (960x540_1,800k)	1,800
Output 5 (1280x720p_2,700k)	2,700
Output 6 (1920x1080p_4,100k)	4,100
Total Kbps:	11,000
Compute total Kb stored	924,000 Kb
11,000 Kbps * 4 seconds * 21 segments	
GB-month usage for one hour	0.0002
924,000 Kb-hours / 8 bits per byte / 1,000,000 Kb per GB / 744 hours	
Total (GB/hour * \$0.023)	\$0.000005

Table 9: Amazon S3 request pricing

Request	Quantity
PUT ts segments	5,400
PUT manifest files	5,400
Total requests:	10,800
Cost (total requests/1000 * \$0.005)	\$0.054/hour

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)	5,125
	Total Egress per hour (5,125 / 1,024 x 60 x 60)	18,017 GB/hour
Total (18,017 GB * \$0.085):		\$1,531.49

Note

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

Amazon CloudWatch metrics cost

Amazon CloudWatch charges \$0.30 per metric per month for the first 10,000 metrics. This solution uses 11 metrics, so the cost for an hour-long stream can be determined by:

$$11 \text{ (number of metrics)} * 1 \text{ (hours of streaming)} / 720 \text{ (hours per month)} * \$0.30 = \$0.005$$

For more information about metrics, refer to [Amazon CloudWatch metrics \(p. 21\)](#).

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 each AWS service used in this solution.

Architecture overview

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

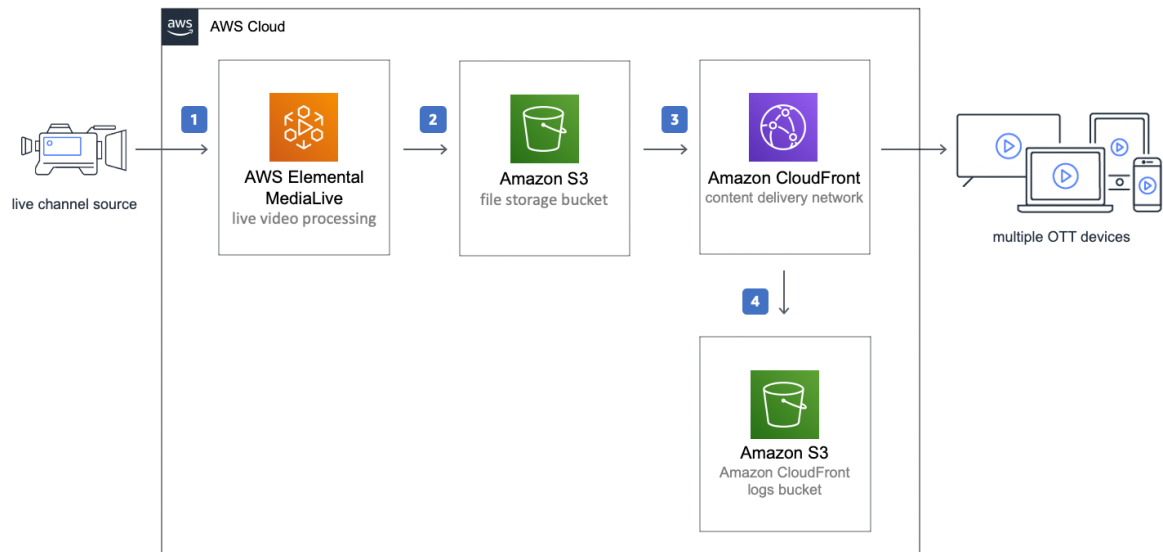


Figure 1: Live Streaming on AWS with Amazon S3 architecture

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. [Amazon Simple Storage Service \(Amazon S3\)](#) provides a scalable highly-available storage bucket to host the encoded segments.
3. An [Amazon CloudFront](#) distribution is configured to use the Amazon S3 custom endpoints as its origin. The CloudFront distribution delivers your live stream to viewers with low latency and high transfer speeds.
4. An Amazon S3 bucket stores the CloudFront logs.

You can configure this solution to ingest Real-Time Transport Protocol (RTP), Real-Time Messaging Protocol (RTMP), HTTP Live Streaming (HLS) content, 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 Amazon S3 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

Demo content

The solution includes a link to a demo HTTP Live Streaming (HLS) stream hosted in an 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, launches 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 \(p. 13\)](#). After the new stack completes deployment, we recommend [uninstalling the previous version \(p. 23\)](#) to save on costs.

Regional deployment

This solution uses AWS Elemental MediaLive, which is 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.

Supported deployment Regions

Live Streaming on AWS with Amazon S3 is supported in the following AWS Regions:

Region name	Region ID
US East (N. Virginia)	us-east-1
US East (Ohio)	us-east-2

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Supported deployment Regions

Region name	Region ID
US West (Northern California)	us-west-1
US West (Oregon)	us-west-2
Asia Pacific (Mumbai)	ap-south-1
Asia Pacific (Seoul)	ap-northeast-2
Asia Pacific (Singapore)	ap-southeast-1
Asia Pacific (Sydney)	ap-southeast-2
Asia Pacific (Tokyo)	ap-northeast-1
Europe (Frankfurt)	eu-central-1
Europe (Ireland)	eu-west-1
Europe (London)	eu-west-2
Europe (Paris)	eu-west-3
Europe (Stockholm)	eu-north-1
South America (Sao Paulo)	sa-east-1

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:

An orange rounded rectangular button with the text "View template" in white, bold, sans-serif font.

live-streaming-on-aws-with-amazon-s3.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, Amazon CloudFront distributions, and Amazon S3 buckets, but you can customize the template to meet 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

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 operational metrics \(p. 24\)](#) section of this guide.

This automated AWS CloudFormation template deploys the Live Streaming on AWS with Amazon S3 solution on the AWS Cloud.

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-amazon-s3.template` AWS CloudFormation template.



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

2. 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 Amazon S3 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](#).

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

Parameter	Default	Description
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 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.

Parameter	Default	Description
Encoding Profile	HD-720	Specify the encoding profile to use with MediaLive.
Start MediaLive Channel	No	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). For more details, refer to [Amazon CloudWatch metrics \(p. 21\)](#).

Additional resources

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

AWS Elemental Link input configuration

This 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 need the following:

- A 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

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

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>

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

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

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>

URL_PULL ▼

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

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

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

The screenshot shows a configuration page with the following sections:

- 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>. A dropdown menu is set to **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. (Empty text box)
- Source Username (OPTIONAL). For URL PULL input type ONLY, if basic authentication is enabled on the source stream enter the username. (Empty text box)
- Source Password (OPTIONAL). For URL PULL input type ONLY, if basic authentication is enabled on the source stream enter the password. (Empty text box)
- 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. A text box contains **10.0.0.0/16**.

Figure 4: RTMP Push and RTP Push input configuration

Amazon CloudWatch metrics

The Live Streaming on AWS with Amazon S3 solution activates Amazon CloudWatch metrics to monitor Amazon S3 requests made to the live stream distribution bucket. Out of the 16 metrics available for Amazon S3 requests, the following metrics are used for this solution:

- All requests
- PUT requests
- DELETE requests
- HEAD requests
- LIST requests
- Bytes downloaded
- Bytes uploaded
- 4xx errors
- 5xx errors
- First byte latency
- Total request latency

To deactivate CloudWatch metrics for the live stream distribution bucket, remove the metrics filter:

1. Sign in to the [AWS CloudFormation console](#).
2. On the **Stacks** page, select the solution stack.
3. Select the **Outputs** tab.
4. View bucket metrics by selecting the hyperlink for the **BucketMetrics** output.
5. Choose **Manage filters** then select the filter.
6. Choose **Delete**.

Update the solution

If you have previously deployed the solution, use the following instructions to upgrade your solution to the latest version:

1. Uninstall the previously deployed solution. Refer to [Uninstall the solution \(p. 23\)](#).
2. Launch the latest template. Refer to [Deployment \(p. 13\)](#).

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 `<your-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 operational 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 \(p. 13\)](#) 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 Amazon S3 template is generated using the [AWS Cloud Development Kit \(CDK\)](#). Refer to the [README.md file](#) for additional information.

Revisions

Date	Change	
May 2020	Initial release	
June 2020	Release v1.1.0: Added support for AWS Elemental Link.	
December 2020	Release v1.2.0: Updated the AWS CloudFormation template. For more information, refer to the CHANGELOG.md file in the GitHub repository.	
July 2021	Release v1.2.1: 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.	
September 2021	Release v2.0.0: bug fixes. For more information, refer to the CHANGELOG.md file in the GitHub repository.	
November 2021	Release v2.1.0: bug fixes. For more information, refer to the CHANGELOG.md file in the GitHub repository.	
January 2022	Release v2.1.1: bug fixes. For more information, refer to the CHANGELOG.md file in the GitHub repository.	
March 2022	Release v3.0.0: Updated to use Amazon S3 rather than AWS Elemental MediaStore as live streaming origin. For more information, refer to the CHANGELOG.md file in the GitHub repository.	

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Notices

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AWS glossary

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