LIVE VIDEO STREAMING

"How do I stream live video content on AWS?"

Overview

Amazon Web Services (AWS) offers its customers several methods to cost-effectively deliver live video content to a global audience on the AWS Cloud. These methods combine multiple AWS services with third-party AWS Partner Network (APN) products to help customers build cost-effective OTT solutions for live video streaming, however it is not always easy to decide between the potential options.

This document provides best practices and guidance to consider when choosing a live video streaming solution, third-party products to get you started with live video streaming on the AWS Cloud, and an AWS-provided solution that integrates an existing AWS Elemental Cloud deployment with other AWS services to build a highly available and cost-effective architecture that delivers an exceptional real-time viewing experience.

The following sections assume basic knowledge of architecting on the AWS Cloud, live video streaming, adaptive bit-rate streaming, video encoding, and video packaging.

General Best Practices

When streaming live video in the cloud, there are some universal video-streaming principles that will help you build highly scalable, performant, and resilient live streaming video solutions. Before you implement a streaming solution, determine the requirements for your use case. Consider your sources, encoding and playout formats, as well as the devices you want to target. Then, choose a solution that meets those requirements. Also, weigh the entire cost of the solution against the desired video quality and overall flexibility, scalability, and redundancy. Keeping these general principles in mind, consider the following best practices for live streaming video on the AWS Cloud:

- To maximize the number of different devices you can target, encode your source at high quality (resolution and bit rate). Once in the AWS Cloud, transcode that contribution stream into multiple playout resolutions and formats. Encoding a single stream is more cost effective than encoding multiple streams and requires less bandwidth. Transcode and package your stream into multiple playout formats so your customers can view your content on computers, set-top boxes, tablets, smartphones, gaming consoles, and connected TVs.
- To provide the best experience for all viewers, utilize HTTP-based adaptive bit rate (ABR) formats to let each device continually negotiate the highest quality bit-rate stream available. ABR formats automatically adjust the quality of the delivered content to match the bandwidth available to each client device. Using ABR-based delivery greatly reduces buffering, provides a fast start time, and allows customers to have the optimal viewing experience for a customer's available bandwidth.
- Choose a streaming solution that compliments your company's existing processes and skill sets to ensure that you can manage and modify your solution to meet future requirements. This will simplify and streamline your live streaming video workflow and reduce operational complexity for developers.
- Clearly define an end-to-end workflow with a specific and well-understood design for redundancy and failover. Ensure transcoding, packaging, and origination software and settings are optimized for troubleshooting and management at scale.

Application on AWS

The AWS Cloud provides flexible infrastructure and tools to support both diverse partner offerings and self-managed live streaming video solutions. In general, the desired encoding and playout formats, as well as a company's experience, budget, business requirements, and end-to-end workflow will determine which approach is most appropriate. The following sections describe native AWS services, an automated AWS-provided solution for live video streaming using AWS Elemental Cloud, and third-party products for live video streaming.

AWS Solutions

AWS customers can choose to build their own live video streaming solutions. This can be a cost-effective, scalable way to help companies meet their live streaming needs.

Amazon CloudFront

Amazon CloudFront can be used to deliver your live adaptive bitrate media content at scale to a global audience. Amazon CloudFront provides you the scale and flexible pay-as-you-go pricing model, and the use of HTTP protocols for streaming your live event offers your viewers easy access to your content. With Amazon CloudFront, you can use any software that outputs HTTP-based protocols to stream live video content, and Amazon CloudFront will cache and distribute that content globally.

AWS Elemental Cloud

AWS Elemental Cloud is a platform built on AWS infrastructure that enables video providers to rapidly deploy multiscreen offerings for live and on-demand content. The platform automatically provisions and dynamically scales any combination of AWS Elemental video processing, delivery, and storage services within a secure private network. The flexibility of AWS Elemental Cloud allows content programmers, broadcasters, pay TV operators, and enterprise customers to quickly and easily create enriched video offerings.

AWS Elemental Cloud supports HLS, HDS, MSS, and MPEG-DASH along with advanced video encoding features such as HEVC, Dolby Digital audio, and motion graphic insertion.

AWS Elemental Live

AWS Elemental Live provides real-time video and audio encoding for linear pay TV broadcast and live streaming to new media platforms. The software-based solution performs simultaneous processing of multiple video outputs, delivering the high-quality, high-efficiency performance required for formatting live video for any device. AWS Elemental Live is designed to integrate seamlessly into an end-to-end real-time video delivery workflow, evolve as technology requires, and maximize revenue opportunities.

AWS Elemental Delta

AWS Elemental Delta is a video delivery platform designed to optimize the monetization, management, and distribution of multiscreen video across internal and external IP networks. Through just-in-time (JIT) video packaging and intelligent caching, the platform enables a complete solution for time-shifted TV and real-time content delivery with advanced levels of customization and control, including network bandwidth optimization, profile manipulation, and highly targeted ad insertion.

Live Streaming with AWS Elemental Cloud

AWS also offers an automated solution that integrates AWS Elemental Cloud with additional AWS functionality such as Elastic Load Balancing, Auto Scaling, and Amazon CloudFront to build a highly performant, scalable architecture that optimizes the viewing experience. Customers can easily deploy the solution in minutes using AWS CloudFormation. For more information, see Live Video Streaming webpage on the AWS website.

Third-Party Solutions

The AWS Partner Network offers a variety of comprehensive live streaming video solutions that can help make it easier for companies of any size or stage of development to deliver live video content on the AWS Cloud. When selecting a third-party product, look for a solution that is easy to configure, leverages your company's existing technologies, and provides the desired encoding and playout formats.

This approach may be appropriate for customers who have an existing partner tool in place for encoding and packaging on-premises live video streams and want to extend their solution to incorporate live video streams from cloud resources.

Ooyala

Ooyala's suite of video workflow, publishing, analytics, and advertising products help you engage your audience and earn more with personalized OTT experiences. For more information, see the Ooyala webpage in the AWS Partner Network.

Brightcove

Brightcove lets you rapidly deploy high-quality live and on-demand video across multiple platforms with no development costs. For more information, see the Brightcove webpage in the AWS Partner Network.

Nginx Plus

Nginx Plus streams content to any device, enhanced with appropriate access controls, bandwidth management, and session persistence. For more information, see the Nginx Plus webpage in the AWS Marketplace.

Wowza Media Systems

Wowza delivers an extensible solution set that provides unparalleled customization, configuration, and control for an unlimited number of streaming use cases. For more information, see the Wowza Media Systems webpage in the AWS Marketplace.

Adobe Media Server

Adobe Media Services enables a single packaging and protection workflow for delivering all your video assets to the broadest device landscape. For more information, see the Adobe Media Server webpage in the AWS Marketplace.

Unified Streaming

Unified Streaming delivers video content to multiple clients and devices, with built-in support for DRM, multiple types of audio, and subtitles. For more information, see the Unified Streaming webpage in the AWS Marketplace.

Resources

Amazon Elastic Transcoder Documentation	https://aws.amazon.com/documentation/elastictranscoder/ AWS webpage with links to detailed Amazon Elastic Transcoder documentation including the full Developer Guide, and relevant API reference documentation
Amazon CloudFront Documentation	https://aws.amazon.com/documentation/cloudfront/ AWS webpage with links to detailed Amazon CloudFront documentation including the full Developer Guide, and relevant API reference documentation
Live HTTP Streaming Using CloudFront and Adobe Media Server 5.0	http://docs.aws.amazon.com/AmazonCloudFront/latest/DeveloperGuide/LiveStreamingAdobeMediaServer5.0.html Tutorial that explains how to get started with Amazon CloudFront and Adobe Media Server 5.0 running on an Amazon EC2 instance
Live HTTP Streaming Using Wowza Streaming Engine 4.2	http://docs.aws.amazon.com/AmazonCloudFront/latest/DeveloperGuide/live-streaming-wowza.html Tutorial that explains how to get started with Amazon CloudFront and Wowza Streaming Engine 4.2 running on an Amazon EC2 instance
Live HTTP Streaming Using Amazon CloudFront and Any HTTP Origin	http://docs.aws.amazon.com/AmazonCloudFront/latest/DeveloperGuide/live-streaming-http-origin.html Tutorial that explains how to get started Amazon CloudFront and any live encoder that outputs HTTP-based streams
Video on Demand on AWS	https://aws.amazon.com/answers/media-entertainment/video-on-demand-on-aws/ AWS webpage that introduces an AWS solution that automatically provisions the services necessary to build a scalable, distributed architecture that ingests, stores, processes, and delivers video content.