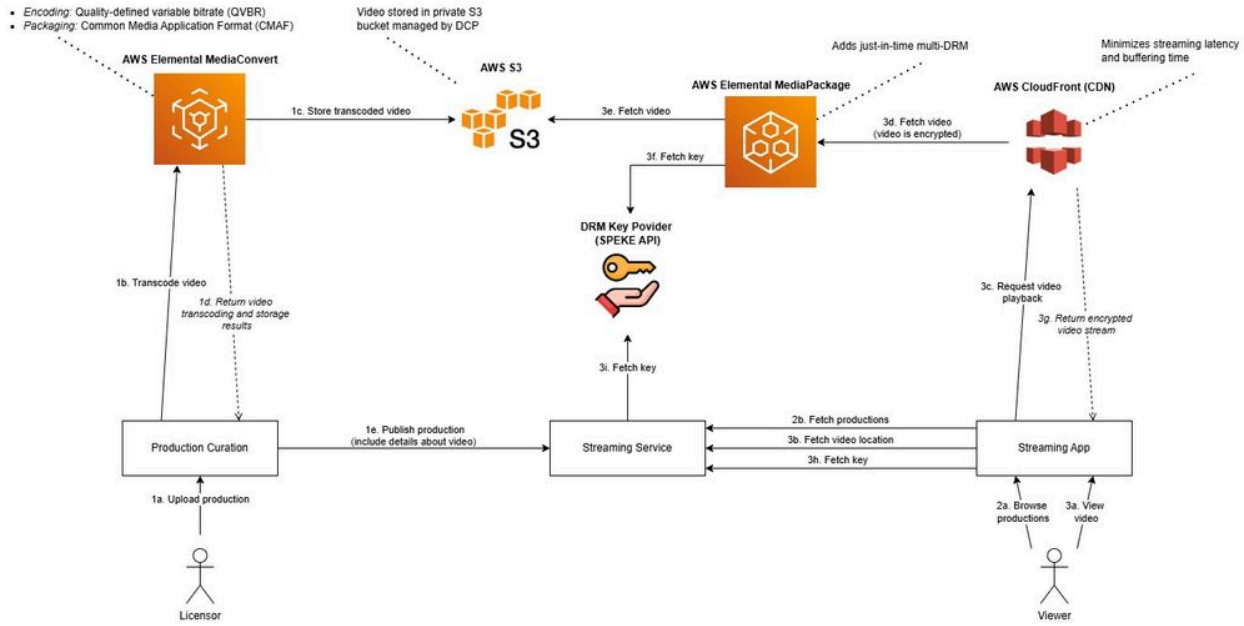
Video transcoding, DRM and streaming

Overview

This page provides a quick overview of how a video (film, TV show, or promotion) is prepared for streaming and is securely streamed for viewing on the DCP+ Streaming App.

General architecture

Figure - Component and flow diagram



Actors

- **Licensor** - A party that grants streaming permission to DCP+ to make their film and TV productions available to viewers in the Streaming App and receives royalties in return. They are responsible for uploading a production (film or TV show with accompanying feature and promotion videos) to be made available for streaming.
- **Viewer** - A person with an account accessing the DCP+ application. They browse the productions in the DCP+ library and view a production's promotion and feature videos.

Components

DCP+ Components

- **Production Curation -** Provides production curation features for DCP+.
- **Streaming Service -** Responsible for accepting curated content from the Production Curation and making that content available to the Streaming App. It also centrally tracks the state required by the Streaming App, allowing all instances of the Streaming App to rebuild their state from scratch and share it across all supported device types. The Streaming Service handles the heavy lifting in determining what content to provide to a Streaming App, thereby simplifying the development efforts of the Streaming App, enhancing consistency across Streaming Apps, and minimizing Streaming App processing and storage requirements to prevent overloading resource-constrained devices, such as TVS.
- **Streaming App -** Responsible for fetching content from the Streaming Service and making it available to Viewers. The Viewer uses the Streaming App's video player to view videos. The Streaming App supports multiple devices, including web browsers, Google/Apple Smart TVS, and Google/Apple mobile devices. It can easily be extended to support other devices.
- **DRM Key Provider -** Provides encryption keys to the Elemental MediaPackage through a SPEKE-compliant API. It also provides licenses to media players for decryption.

AWS Components

- **Elemental MediaConvert** - Responsible for encoding – Quality-Defined Variable Bitrate (QVBR) – and packaging – Common Media Application Format (CMAF) – videos.
- **S3** - Responsible for securely storing transcoded videos in private S3 buckets managed by DCP.
- **Elemental MediaPackage** - Responsible for adding just-in-time multi-DRM encryption. This approach utilizes systems like Widevine, FairPlay, and PlayReady to secure content for various devices and browsers.
- **CloudFront** - A Content Delivery Network (CDN) that improves media streaming by distributing content across multiple servers globally, minimizing latency, reducing buffering, and enhancing security. This results in faster content delivery, increased reliability, and a more user-friendly streaming experience.

Flows

1. Upload production

a. A Licensor uploads a production they wish to make available on DCP+. Production includes metadata about the production, promotional images, promotional videos and the feature (film/TV show) video itself.

b. Production Curation submits each video (feature and promotional) to Elemental MediaConvert for encoding and packaging.

c. Elemental MediaConvert submits the encoded and packaged video to S3 for storage.

d. Elemental MediaConvert returns details about the encoded and packaged video to the Production Curation, including the location of the video in S3

e. Production Curation publishes the production (including details about the videos) to the Streaming Service to make it available to the Streaming App.

2. Browse productions

a. A Viewer uses the Streaming App to browse, search, and review productions they consider viewing.

b. The Streaming App fetches productions from the Streaming Service based on the Viewer's inputs.

3. View video

a. A Viewer decides to view a promotion or feature video.

b. The Streaming App checks with the Streaming Service if the Viewer has acquired the rights to view the video, and if so, the Streaming Service returns details on locating the video.

c. The Streaming App's media player requests CloudFront to play the video.

d. CloudFront fetches the encrypted video from Elemental MediaPackage

e. Elemental MediaPackage fetches the unencrypted video from S3.

f. Elemental MediaPackage fetches a key from the DRM key provider and uses the key to DRM encrypt the video.

g. Elemental MediaPackage returns an encrypted video stream to the Streaming App media player. The Media Player works with the Streaming App to fetch the key to decrypt the video and play it.

h. The Streaming App fetches the key from the Streaming Service.

f. The Streaming Service fetches the key from the DRM Key Provider.