

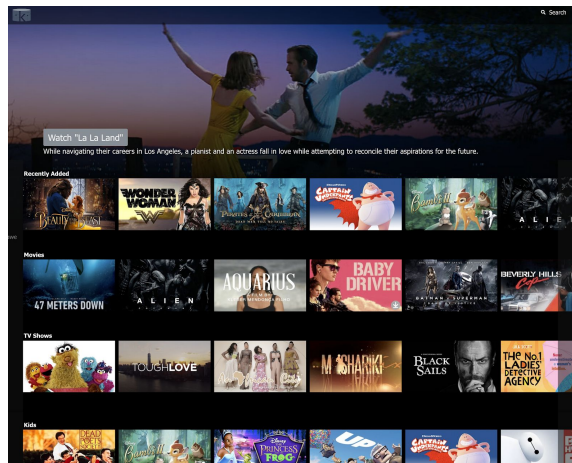
A Case Study of Central VC Video and Publishing System



About Central VC

Central VC was founded over 25 years ago as a venture capital firm and often funds startup ideas and nourishes them until they can exist on their own as a viable product.

In this particular case, Central VC wanted to create a new product centered on video-playback from a home appliance that supports local storage for media assets (like Tivo), but with distribution of content transferred overnight via LTE networks to countries with underserved/non-existent broadband capabilities.



The Challenges

Movies need to be stored in multiple formats to support wireless access to home devices (phone, tablet, desktop), but also need to be encoded in such a way as to fit within the maximum chunk-size permitted by LTE origin-points and transmitters. Movie files can be immense, particularly 4K and 8K renditions and subsequent bitrates for desktop, tablet and phones. Large cloud-based storage capacity was needed at Content Delivery Network (CDN) points close to the under-developed country destinations being served.



Because the FCC would shut down any project that requires broadcasting LTE signals within unlicensed spectrum within the U.S., one cannot simply set up a cell phone tower in the office for development without being heavily fined and shut down. Often development and testing had to be conducted in a special cell-signal-proof room with a transmitter.

A centralized Content Management System would have to be created to keep track of which home LTE units contained which video files, and whether the files successfully transferred, or whether the user's box had been turned off. User's "wishlist" requests for movies would be synchronized with the host server to intelligently create download queues based on user-demand.

The Solution

IMPLERUS implemented Amazon Simple Storage Service (S3) for movie and TV show primary storage. Amazon S3 is cross-region replicated from the US-East region to the US-West region to provide asynchronous copying, and thus greater availability and durability. While this is not Central VC's primary storage location, they wanted a new Amazon S3 repository to move files in and out of due to industry regulations on the seasons that they can show certain content. As their seasonal content changes, the average size for their Amazon S3 repository is 750GB to 4 TB of data. They wanted this repository to become the primary storage for this product as well as the renditions for different systems.

IMPLERUS utilizes Amazon Elastic Transcoder to transcode all movie source video files to the appropriate rendition and chunk-sizes to support transmission over the LTE networks.

IMPLERUS implemented Amazon Elastic Compute Cloud (EC2) instances to provide the master command-central content management system which controlled all the home boxes, determined which movies/TV shows to send, and at what time.

IMPLERUS created an Amazon CloudFront distribution to provide global CDN distribution and decrease latency. AWS Web Application Firewall (WAF) and AWS Shield are used to protect the Central VC product from SQL-injection, Cross-scripting attacks, and other security measures.

IMPLERUS created an Amazon Lightsail instance for the investor and marketing pages. IMPLERUS also created a web server and AndroidTV app running on the device itself with local storage to render movie playback for the home media hub unit.



```
001
Sending: /var/www/html/Videos/movies/alien_covenant/gear9/fileSequence.ts 34%
speed: 622675.8872816019 b/sec size: 4289939476 transferred: 1440770507
elapsed: 2313.837 remaining: 4675.685

Sending: /var/www/html/Videos/movies/pirates_dead_men_tell_no_tales/gear9
/fileSequence.ts 32%
speed: 663540.9055637103 b/sec size: 4538082180 transferred: 1419474296
elapsed: 2139.22 remaining: 4699.97

Sending: /var/www/html/Videos/movies/war_for_the_planet_of_the_apes/gear9
/fileSequence.ts 30%
speed: 553824.549135756 b/sec size: 2259968492 transferred: 658970600
elapsed: 1189.826 remaining: 2890.832

Sending: /var/www/html/Videos/movies/kong_skull_island/gear9/fileSequence.ts
9%
speed: 841659.331404361 b/sec size: 1940269604 transferred: 162910499
elapsed: 193.54 remaining: 2111.751

Sending: /var/www/html/Videos/movies/boss_baby/gear3/fileSequence.ts 2%
speed: 452931.31629281864 b/sec size: 522201208 transferred: 10538088
elapsed: 23.004 remaining: 1129.933

Sending: /var/www/html/Videos/movies/gifted/gear3/fileSequence.ts 4%
speed: 808678.5605632579 b/sec size: 539967772 transferred: 18682781
elapsed: 23.009 remaining: 644.707

Sending: /var/www/html/Videos/movies/baby_driver/gear3/fileSequence.ts 5%
speed: 1198846.048984414 b/sec size: 600088668 transferred: 26574893
elapsed: 22.007 remaining: 478.548

Sending: /var/www/html/Videos/movies/the_house/gear3/fileSequence.ts 2%
speed: 456751.9720031108 b/sec size: 471101116 transferred: 8496165
elapsed: 18.002 remaining: 1008.917
```

The Benefits

Amazon S3 allows for virtually unlimited space to store not only the source-movie files, but also all the renditions for different platforms. All movie source-files are tightly guarded with industry-standard digital-right-management encryption. Amazon S3 buckets were built with private access for only the application and approved personnel, encryption of all files and user/API level activity tracking using AWS CloudTrail. Amazon S3 is providing scalability, durability (99.999999999%), version control, cross-region replication along with compliance and audit capabilities. This solution allowed them to have a central repository for their application data while still maintaining control of their content to comply with industry regulations for release of content.

Amazon CloudFront allows the centralized movie repository can be colocated anywhere in the world where an Amazon Availability Zone is located, with the push of a button. Amazon CloudFront points to the Amazon S3 origin for content delivery.

AWS WAF and AWS Shield settings help protect assets from SQL-injection attacks, Cross-Site-Scripting attacks and other security issues.

Amazon EC2 instances allows for the ability to scale based on need of the content management system which could someday be connected with many hundreds of thousands of connections.

Lessons Learned

After initial development and testing, we determined that our video-chunk-sizes were too large to transmit over an LTE network. Thankfully, with Amazon Elastic Transcoder, we could



change the chunk-size parameters and with the push of a button, re-encode the entire video library.

About IMPLERUS

IMPLERUS Corporation is a Northern Virginia-based AWS Advanced-Tier IT consulting and services firm dedicated to providing innovative solutions to the Intelligence Community, public and private-sectors.

We design, build, integrate and manage solutions for cloud-based applications and system architectures.

Our clients range from Fortune-level global VC firms to government intelligence and defense agencies through our successful relationships with satisfied clients over 25+ years.

For more information or to contact IMPLERUS, please visit us at www.implerus.com