## The Client

The client is a UK based foreign language broadcaster with viewers spread across the globe. They broadcast over satellite and had a crude and unreliable web and VOD (Video on Demand) platform. For security and privacy reasons, the client name is not disclosed in this document, but can be made available if required on signing an NDA.

## ABCI's engagement

We were initially requested to look at issues with the live web stream, and were then asked to look at migrating the streams and VOD content to a new platform in order to have a better reach to more customers. ABCI was then commissioned to build a VOD delivery and live stream 'back-end' to support a new website provided by others. Comprehensive monitoring for the clients' users was required to ensure content was available soon after linear playout.

## What we did

After an initial analysis, we determined that a wider range of bitrate profiles were needed for both live streams and catch-up VOD content. The existing library of VOD content was considered too low quality to re-transcode to new profiles, and re-sourcing source content would bee too onerous a task for a stretched operations team. The concept of 'Live-to-VOD' was created, where any new or repeat programme that had not already been converted into VOD assets would be automatically converted.

A second delivery path for older, but important programmes also needed to be provided.

Using the AWS platform, which includes many useful media conversion tools, as well as a comprehensive and extensible content delivery network (CDN), we produced the logic and monitoring to deliver the appropriate media files to the live CDN. Interfaces to traffic systems and content management system (CMS) meant only content with appropriate rights was delivered and made available when it was complete and without error.

We defined and deployed all AWS components (S3 storage, EC2 compute, Cloudfront CDN and many others) as well as wrote the code (mostly MS .Net C# and ASPX) to run the processes.

For the first year we provided first line support, as during this period, there was a very large amount to content being processed through the various delivery paths. After the new services went live, full handover training was provided to the clients' own staff who now provide that support. Minor issues are forwarded on to us where the client cannot resolve issues directly themselves.

## Project Highlights

The new live stream system went live very early in the project, meaning many more end user devices (iOS, Android as well as more web browsers) could be used to view content. Users on poor internet connections were able to view low bitrate profiles, and users with good connection were able to get very high-quality HD content for the first time. Usage statistics showed more than a doubling of end user reach in the first week of the new service being implemented and grew month on month for the following few months.

## Biggest Challenge

No matter how carefully a system is implemented, only when end users (who have very different pressures to those of a system developer) are involved, do unforeseen exceptions become exposed. Users had been told that '*a programme should be delivered a couple of minutes after the live programme ends*', and took that as definitive. On not seeing a delivery completed in their expected time, they then resent through an alternate path, which caused a chase situation. With further failures, users resent multiple times compounding the issues.

Better exception handling was implemented, but more importantly a more robust monitoring system was built to allow users to better understand where a programme was in the processing workflow and whether to take action or to wait a little longer.

It is an interesting fact that the monitoring system is now far more complex than the media processing systems.

## What we learnt most

Two important lessons came out of this project: firstly, that operators will always do things that you never expected. What seems logical to a developer is not necessarily logical to a system user. There is no easy way around this, other then to be prepared to evolve systems to account for new exceptions. Secondly, it is completely possible to build and deploy this kind of system when it is already live. By building systems in small modules, keeping critical services running while replacing and upgrading others is achievable with careful planning.

## Project Outcomes

The new VOD platform has been running for over a year and now has tens of thousands of programmes available to viewers. The client is more-or-less self sufficient in first level support with only around half an hour a week support calls to us. The client continues to make great programmes that are available on their website and mobile platforms within a few minutes of broadcast, with most programmes delivered requiring no intervention by their operations team.