AWS MOBILE SIMPLE VIDEO STREAMING AND TRANSCODING

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Abstract— **A place of web services to frame, to handle, and to re-configure the existing technical era, AWS has reached everywhere. AWS is a cloud based platform to help you perform, handle, and manage any kind of task, which includes databases services, storage and so much more. AWS is a platform, which is highly cost-effective and is likewise very industry friendly. Managing budgets, with the pay as you go, vendetta helps the user to manage frames, without hinderance. This pay as you use models signifies, the dynamic pricing and cost effective services that it meets. Solely for start-ups, or any other project idea as a freelancer, AWS meets the needs for both of them.**

The Pandemic crossed the lengths when people weren't allowed to go out, but the only way it all turned out well, was because of the Online streaming. From a small gathering to worship god, singing holy songs on live streams, to getting entertained, streaming helped everyone. Especially at this time, new emerging platforms for streaming, transcoding and giving out an optimized result, on several devices like smartphones, laptops, tablets, etc. AWS, and its several services like Elastic Transcoder, S3 buckets, CloudFront tops the chart. Streaming with AWS can be entertaining, fun, and secure as well. This project aims to find out, the optimization, delivering the streamed videos with minimal latency.

Keywords— **AWS, AWS Cloud Front, AWS S3, Video Transcoding and Streaming, Amazon Elastic Transcoder.**

I. INTRODUCTION

AWS services are often accustomed do numerous things, inside the cloud, these services are ascendible and helps you method your data. the most aim of the project is to stream and transcode video, through Amazon Elastic Transcoder.

Transparently and automatically, Amazon Elastic Transcoder manages concerns throughout the media transcoding process for you. There's no have to be compelled to administer software, scale hardware, tune performance, or otherwise manage transcoding infrastructure. you just produce a transcoding "job" specifying the placement of your supply media file and the way you wish it transcoded. Amazon Elastic Transcoder conjointly provides transcoding presets for widespread output formats, which suggests that you just don't have to be compelled to guess concerning that settings work best on specific devices. of these options are offered via service API, AWS SDKs and also the AWS Management Console.

Like alternative Amazon net Services products, there are not any contracts or monthly commitments for mistreatment Amazon Elastic Transcoder — you simply pay supported the minutes you wish to transcode, and backbone of the content transcoded.

But to know all of that, one should know what is video streaming and how does it work. Streaming is a process or a technique of viewing video or listening to any audio, without having it downloaded on your device.

The major importance of streaming is that it only requires internet, and all other aspects are handled by the platform itself. The other aspects like, storage, buffering time, quality, and money is saved. It's a pay as you go model everywhere.

To answer the question of how does streaming work, it is important for one to understand networking and cloud. The audio and video data packets are broken into several packets, each of these contain a small piece of the whole file. The audio/ video player in the browsers collects all these data packets and interprets them, forming it into the original video/ audio file respectively.

Another concept that one should know is buffering, it is generally used to identify as the data packets that are having a delay, or simply saying that the connection is interrupted, hence the data packets aren't received timely.

Including buffering, there are other factors that can be responsible to slow down your streaming, a few of them are listed below:

1. Network latency.

2. Network Congestion.

Network latency: When the user is trying to access their choice of data, but due to the latency, it holds back.

Network Congestion: A full trafficked network can turn down the performance if the hardware systems are capable of capturing the load of the amount of user, at a time.

Considering all of this, streaming is still charged as one of the most blooming factories. Let's understand how has streaming affected different industries and how can streaming be one of the most booming industries of all times.
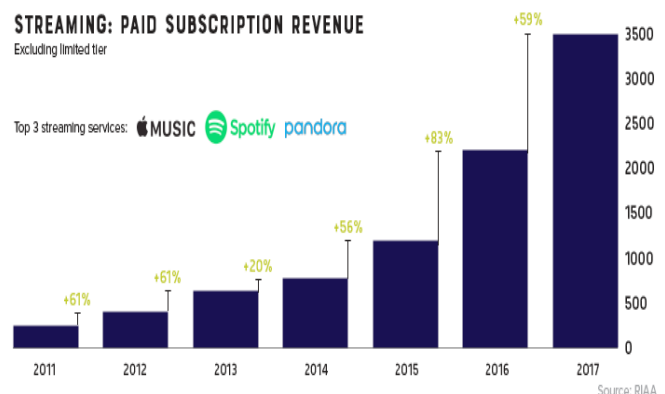
The physical device line-up, and the physical format sales are only 17% left in the market. The paid revenue subscriptions have more than 200% increase in last three years.

II. MOTIVATION

Throughout most social media platforms, currently that the pandemic has stayed for months, these platforms are largely used for entertainment.

Hence, the creators of the platforms are earning approach too much. you'll click a hover-ton and begin viewing a live broadcast, but what do the creators get? They get money. On prime of that, there are variety of alternative platforms created specifically for live streaming. however why is live video such an enormous deal?

While on TV, the content and accessibility are limited, on on-line streaming there's endless content accessible free and with mobile devices. Even though viewers still have the time constraint on live streaming, it's additional versatile than on TV. they'll watch on their phones and, most of the times, they can conjointly watch the recording of the live video later.

One of the most reasons why live streaming is so important, for brands and individuals, is owing to the amount of interaction and engagement it offers. No alternative platform or promoting strategy permits for such level of interaction. Live streaming also has the best rate of engagement of all content types.

The demand of video streaming has growth of more than 100M people a year. A global report shows video streaming is valued to be marketed, and is sized approximately, more than 42 USA Billion Dollars. This stats taken in 2019 are projecting the growth of the video streaming that has come into demand recently. Video streaming industry has been bringing new innovations such as AI and blockchain to secure their network of streaming, and also to improve the video quality as per user's choice.
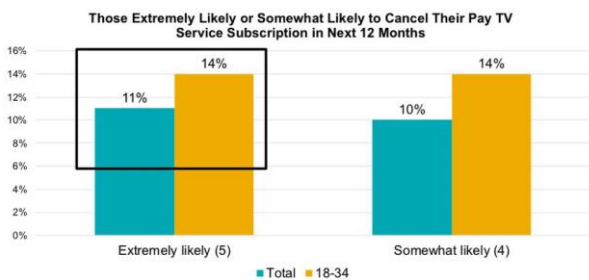
Cutting cable cords to watch online streaming videos, shows the non-essential but much demanded luck in streaming.

The time period interaction brings your audience nearer to you and opens an excellent communication channel. you'll raise them inquiries to get to understand them higher and that they can do the same. What's more, after they act with every other, it creates a way of community and they can associate you with it.
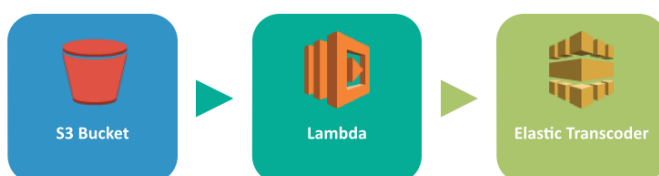
III. METHODOLOGY.

The credibility of this project is prepared by the small steps researched from AWS DOCS, and several other feedback who tried to put forward this streaming process.

1. The idea is to first create S3 buckets, for the storage and one for optimization. The two tasks will be performed on two different S3 buckets. One for storing the video files we want to make available for streaming, one for storing a version of the videos that is optimized for streaming to smartphones and tablets.

2. Then, it is proceeded by taking help of the service, Elastic Transcoder. The Elastic Transcoder pipeline is created for a purpose of optimizing the streamed video. Once the uploaded videos are up for users, they are transferred to storage, and using Lambda function.

3. This is a step to create AWS Lambda. As mentioned above, AWS Lambda's function is to put forward the video file, from transcoder to storage service. With this , it also is responsible for pushing it to, the second S3 bucket, which will store the final video file.

4. Furthermore, almost job is done, but the latency handling and the lag seen by the end users still needs to be rectified. Configuring CloudFront, will help to distribute the optimized video files, that are uploaded to stream, from the second S3 bucket, with the help of the content delivery network (CDN) .
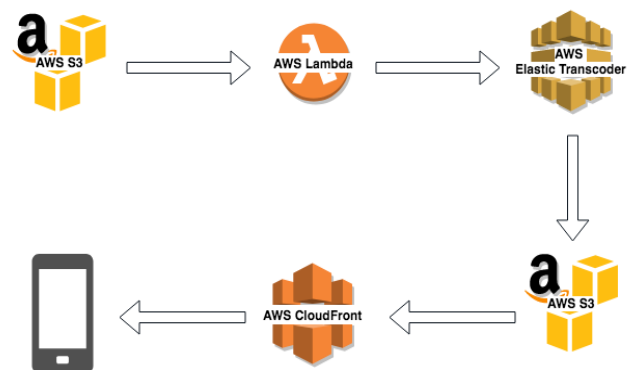
When all these steps are completed at once, and all these components are working fine, they will handle the process by triggering one another in the sequence mentioned below:

1. A video file is uploaded to the first S3 bucket.

2. This content signals Lambda function to do its job that is to push it to the pipeline.

3. The Elastic Transcoder pipeline transcodes the video into maximized size and clarity, for making it available to all other devices.

4. It is stored in the S3 bucket, and streaming can be done.

5. Once the streaming is started, CloudFront loads the video file in the process, from the second bucket S3, and streams it for the end users, providing them with less optimization and no minimal lag.

After configuring the pipeline, lambda function and the two buckets, the pipeline takes video as an input to the S3 bucket, converts it into a streaming optimized file, and distributes it to the files through CDN for minimal lag and low latency experience.

As all of this gets completed, this configuration can be tested by the link generated by the console of AWS S3 bucket. Clicking on the link will open the file and the user can start to stream it without any restrictions.

IV. CHALLENGES.

There are no possible successful projects without challenges. When there was no possible transcoder, it is difficult to store files and push them into different devices, but as its said, AWS Elastic Transcoder, has been developed, there are challenges of streaming the video with a quality of more than 1080p without any possible lag.

Lagging videos or livestreams can be a disconnect to the end-user very easily. The main problems faced are, sound lag, which means the video is going on the correct speed but the audio, or speaker's voice does not match with the video output.

The other problem is video lag, this is a more dangerous one to handle as the consumer is relying on what they see. This problem simply means, the video lags but the audio is coming out fine. The intensity of the video doesn't matches with the audio, hence it testifies against the probable cause of streaming.

The third problem is the quality of the stream. If you have good internet connection and the video quality isn't good enough, the first blame is on the platform. After which, the probability of the user watching the stream goes by 50%. In today's world, the quality has risen more than just 1080p/ HDR videos that have been streamed online. Hence with the consistency of the process from storage files to streaming it online with CloudFront, one has to take care about the quality as well.

As per some of the YouTube statistics, more people are turning into streamers. Here, there careers rely on streaming, hence just like a 9 to 5 job, their job is to stream for hours, the stored content within this time can take up to numerous GBs. Handling the S3 bucket, to separate one stream data from the other, and turning it out as a performance based workload is a big time challenge.

Nonetheless, the challenges mentioned like video lagging or sound lagging have been already finished as a part of this project. The video quality of the stream is also up to the mark as per the trending stats. The major concern is the storage and the security within the same. That leads to the web browsing part of the project which can be taken into the consideration at the end or as the scope.

V. SCOPE

As the current state of the project focuses on video streaming, and to transcode it to other devices. The scope aims to filter all the challenges. The Amazon S3 bucket , will be used to perform the same in the environment of JAVA. This extension adds automatic video transcoding of uploaded videos to adaptive multi-bitrate formats. When your mobile app users upload video files to the 'user-files' Amazon S3 bucket of your AWS Mobile Hub backend, the files will automatically be transcoded to HLS(HTTP Live Streaming) format, and they will be placed in the "hosting' Amazon S3 bucket. Your Amazon CloudFront distribution will stream the video files in the downlink direction to devices using adaptive multi-bitrate protocols in order to reduce bandh-width, reduce buffering, and optimize the user experience in watching the videos.
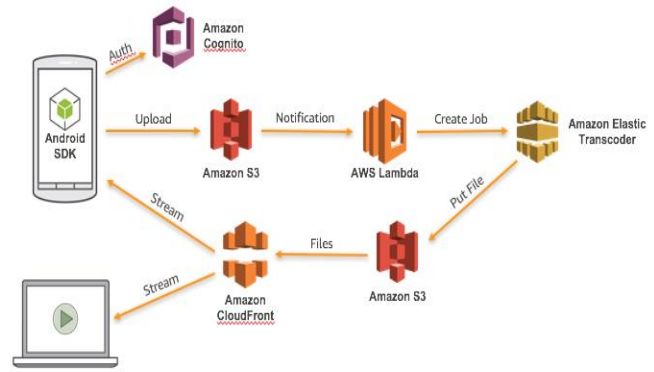
Steps to perform this, with a rough idea are given below:

- Install AWS CLI
- Setup Permissions
- Create AWS Mobile Hub Project
- Install Mobile Backend Extension
- Build and Deploy Website
- Build Mobile App
- Upload a Video

Nonetheless, this is the future aspect of the project being performed. The main aim is to live stream and transcode through sole AWS services.

VI. CONCLUSION

A project of smart research and a handful of colleagues, bringing together a live streaming through AWS. In conclusion, it can be clearly witnessed, that this solution is designed to convert high levels of streaming, many hours of continuous gaming and transcoding the same streamed video for different devices was a successful task to perform. This solution to handle and manage our own data, and lagging videos that might hinder the performance of millennials of our generation, is a tough job, but a necessity to do.

The aim completes with good quality streaming, enhanced performance, rich, also well architected and high available workflow. The live streams are all the more in the demand, and we should remember it has out-casted TV industry, music industry and Movie industry as well. Summoning up to the final statement that this project successfully covers the goals that were kept and is fully functional with any possible video that needs to be streamed live or stored for users to view later.

VII. ACKNOWLLDGEMENTS

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