Building a Robust Media Streaming Server on AWS

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ABSTRACT_ For architects and platform operators, delivering media content on the internet at scale presents a special set of difficulties. End users demand the best possible experience, which includes dependable delivery, minimal startup latency, and a large selection of content. Sharp peaks in demand for popular material make it more difficult to ensure consistent low latency and dependable delivery when live streaming is involved. In addition, media owners must guarantee the security of their content to safeguard the interests of rights holders, their own bottom line, and their good name. Amazon CloudFront is a content delivery network (CDN) that offers low latency, fast transfer speeds, developer-friendly environments, and safe delivery of data, video, apps, and API activities to clients worldwide. AWS services and physical sites that are directly linked to the AWS Global Infrastructure are integrated with CloudFront. In this context, live streaming and online-delivered video on demand (VOD) programming are examples of media workloads.

1.INTRODUCTION

Media Streaming is a process where various kinds of media are continuously accessed and transmitted to an end client which is being conveyed by the provider [1]. It is done where current events are transmitted, TV series or movies are watched on a user's computer or mobile phone, radio jockey (RJ) or Internet radio and numerous other programs are broadcast [15]. The client watches the videos online yet it is difficult to watch the video without buffering, as it is transmitted from the centralized data servers and on this server different client attempts to watch the video online simultaneously and it sets load on the servers so at some point numerous clients couldn't watch it appropriately and begin with the buffering, or sometimes the video cannot be reached [1].

Streaming media is either video or audio content sent over the Internet in a compact form, instead of storing it into on a hard disk. As a result of media sharing, clients don’t need to download a file to watch and play it. Users can easily rewind, forward, pause, interrupt the streaming video [15].

AWS Media Services is a collection of cloud services that produce media appropriate for streaming both live and on-demand and enhanced for your observer's playback gadgets [16].

Content Delivery Networks (CDNs) are designed for delivery to end-users of digital content. CDN technologies advance network use by committee network connections, caching servers, and growing use of peer-to peer applications, Amazon Web Services is mostly recognized as the main infrastructure as a service cloud [3].

It provides its users many ways to convey live video material cost-adequately to a worldwide crowd on the AWS Cloud. AWS gives a live streaming service that blends AWS Elemental Media Live with AWS Elemental Media Package to establish an exceptionally robust and flexible framework that conveys the live content around the world [20]. AWS plays a crucial role within all suppliers of cloud service. Cloud storage, such as EC2 at AWS, enables users to raise or reduce processing powers seconds instead of days or hours. Consumers can conveniently build, activate and exit one or more instances (i.e. virtual computing environments) for a range of and programs [14]. Biggest companies and the coolest tech firms trust AWS to supply a diverse range of warehousing game development, data housing and many more

2.LITERATURE SURVEY

Abdullah Alqahtani et al. [11] proposed a brief review of the security issues faced by cloud infrastructure. They have also discussed various security vulnerabilities that are acting as a barrier to the use of Amazon Web Services (AWS). Gurudatt Kulkarni et al. [12] proposed a deep analysis of cloud computing service that is Infrastructure-as-a-service and highlighted the duties of an IAAS provider along with the facilities provided to the IAAS client. They have also discussed Elastic Cloud Compute (EC2) which is a service of

AWS. Mr. Arabolu Chandra Sekhar et al. [13] proposed in detail about Amazon Web Services (AWS) and have also discussed in short about all the services provided by it such as Amazon S3, Amazon EC2, etc. Marco Balduzzi et al. [9] proposed General protection issues involved with the use of virtual machine files from public cloud service provider catalogs. They have also explained the architecture and development of an integrated program that was used to instantiate and evaluate the protection of public AMIs on Amazon EC2.

T. Madhuri et al. [3] proposed a brief comparison between the two cloud providers Amazon and Microsoft Azure so that it gets easy to select the best among the

two cloud service providers. Swapnil Jadhav et al. [1] proposed an algorithm so that users can get a benefit of continuous video streaming with no buffering problem. They made this algorithm for customer satisfaction and also to save their money by providing them with good quality videos. Swati Raut et al. [10] proposed a detailed study on media streaming service using cloud storage. They have introduced this new technique so that a user can do the usage of multimedia content from anywhere and at any time.

VIDEO STREAMING: Video streaming relates to the transfer of video processed in real-time [4]. It has made some amazing progress from the old days when it was difficult to transfer videos across the Internet [17]. In streaming, video content is played as it comes across the internet, in the way that there is no waiting time for a full download. The rate at which frames of the videos are streamed defines the consistency and efficiency of the video service [5]. Many small companies today use video streaming to get their consumers attached to the product and make them feel more linked to their business goals [17].

3.PROPOSED SYSTEM

CloudFront has a global footprint with more than 200 edge locations in over 40 countries across five continents, providing global access for your viewers. AWS continues to extend CloudFront based on growth and anticipated customer needs. Availability is one of the high-priority design tenets of CloudFront. Metropolitan areas have the highest concentration of traffic, and CloudFront provides multiple edge locations for scale and performance. These locations are deployed in different facilities to provide a high degree of resilience. A cluster of edge locations in a single area gives CloudFront the ability to route viewers quickly to another location in close proximity without noticeable performance impact. CloudFront edge locations have multiple connections to local internet service providers (ISPs) and global carriers through internet exchanges and direct private fiber connections. This minimizes video delivery latency, reduces probability of congestion and traffic loss, and provides high availability. Edge locations also leverage the AWS global network, which connects AWS Regions and edge locations. The AWS global network provides high bandwidth, resilience and redundancy at scale. This gives you consistent performance, high availability and also shields your viewers from internet instabilities and changing conditions. The quality of the connection from the origin to the edge location is just as important as the proximity of the edge location to the viewer, providing low

latency and avoiding rebuffering, which is a factor in reducing viewer churn. AWS works closely with our customers to understand their current and future traffic patterns to guide further expansion with new edge locations and scaling of the existing locations. This can be particularly relevant when planning the launch of your video platform in a new Region or anticipating high peak events

3.1 IMPLEMENTATION

For an AWS project involving a media streaming server, you can use various AWS services and modules to build a scalable and reliable streaming infrastructure. Here's a description of some key modules and services you might consider using:

Amazon EC2 (Elastic Compute Cloud): EC2 instances can be used to host your media streaming server software, such as Nginx with the RTMP module or Wowza Streaming Engine. You can choose instance types based on your performance and scalability requirements.

Amazon S3 (Simple Storage Service): S3 can be used to store your media files, including video and audio content. You can use S3 to store both the original media files and transcoded versions for adaptive bitrate streaming.

Amazon CloudFront: CloudFront is a content delivery network (CDN) that can be used to deliver your media content to viewers with low latency and high transfer speeds. CloudFront can cache content at edge locations around the world, reducing the load on your streaming server.

Amazon RDS (Relational Database Service): RDS can be used to store metadata about your media files, such as titles, descriptions, and user data. You can use RDS to manage and query this metadata efficiently.

Amazon CloudWatch: CloudWatch can be used to monitor the performance of your streaming server and other AWS resources. You can set up alarms to be notified of any issues or performance bottlenecks.

AWS Elemental Media Convert: Media Convert can be used to transcode your media files into different formats and bitrates for adaptive bitrate streaming. You can integrate MediaConvert into your workflow to automatically transcode uploaded media files.

AWS Lambda: Lambda functions can be used to automate various tasks in your streaming workflow, such as generating thumbnails, processing user requests, or triggering transcoding jobs.

Amazon API Gateway: API Gateway can be used to create APIs for your streaming server, allowing clients to interact with your server programmatically. You can use

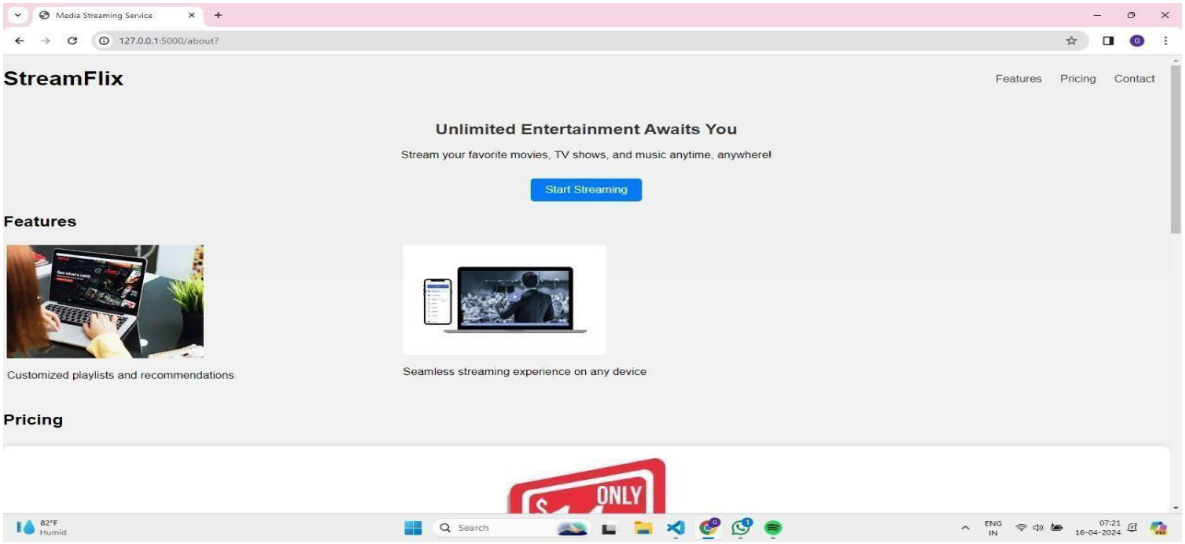
API Gateway to manage authentication, rate limiting, and other API- related tasks.

Amazon DynamoDB: DynamoDB can be used to store session data, user preferences, or other dynamic information related to your streaming server.

3.1.1. USER:

Represents the user's identity and provides access to various features and functionalities. Meanwhile, a profile usually refers to a specific section or page within a user's account that displays information about the user. It represents the user's public or semi-public persona within the system

4.RESULTS AND DISCUSSION



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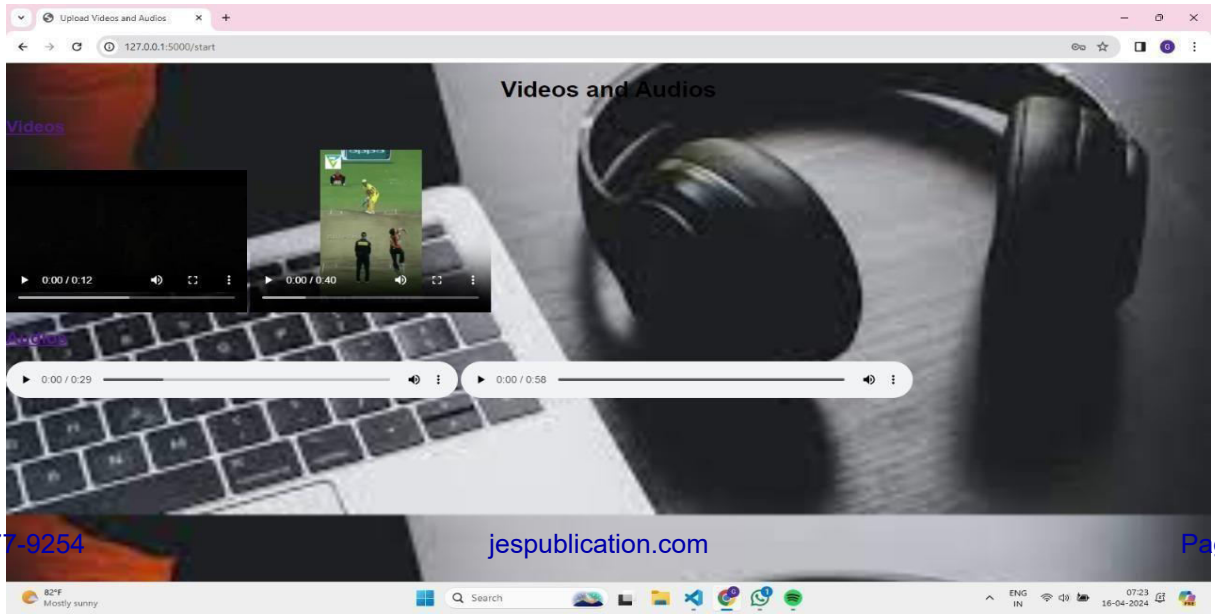

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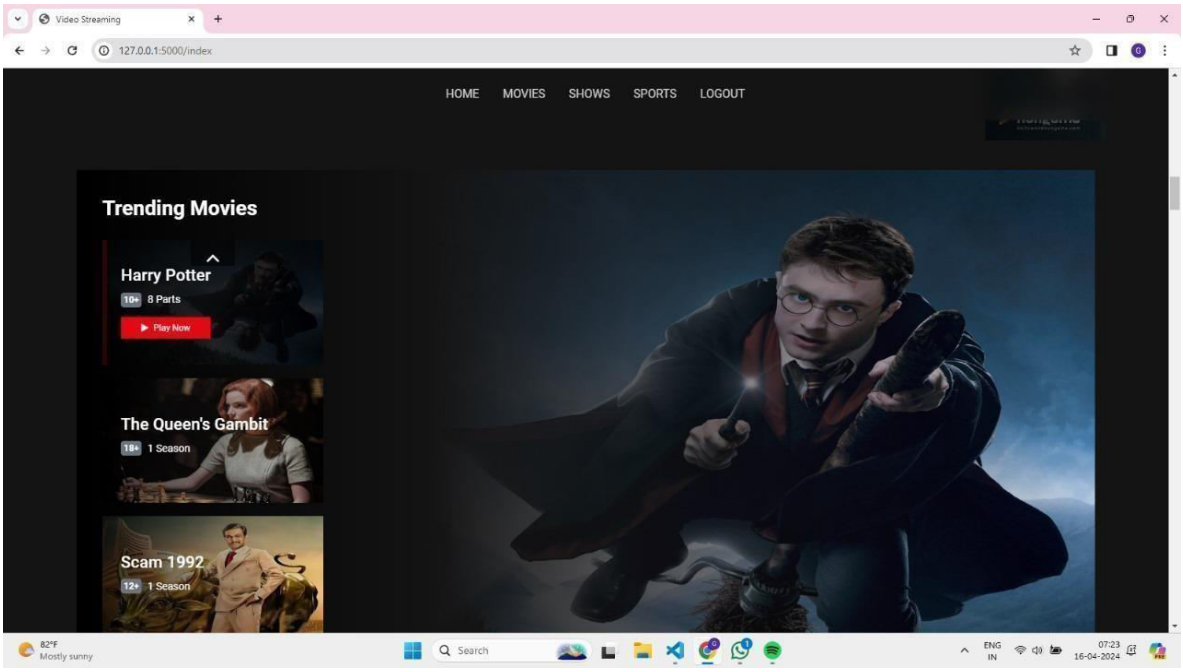

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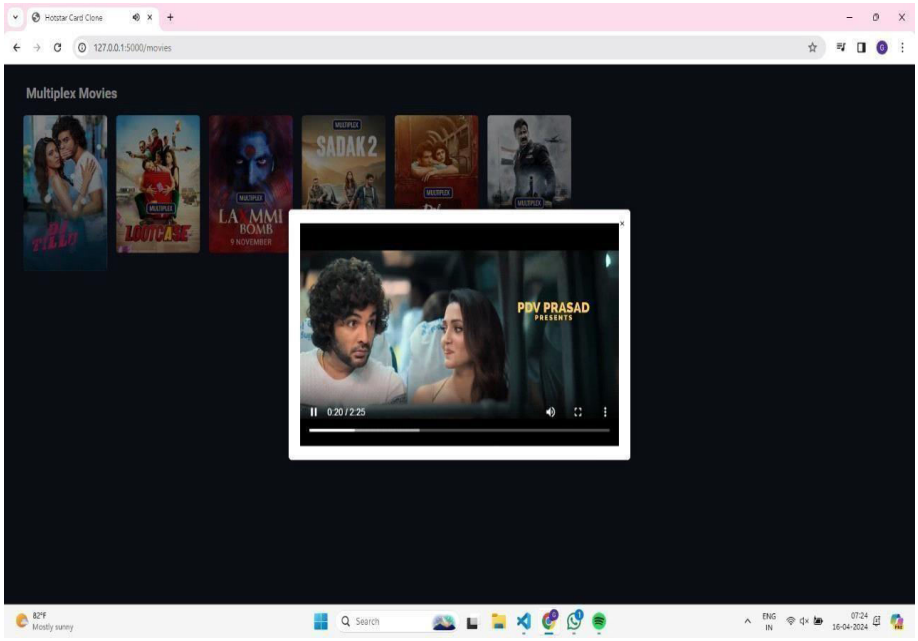

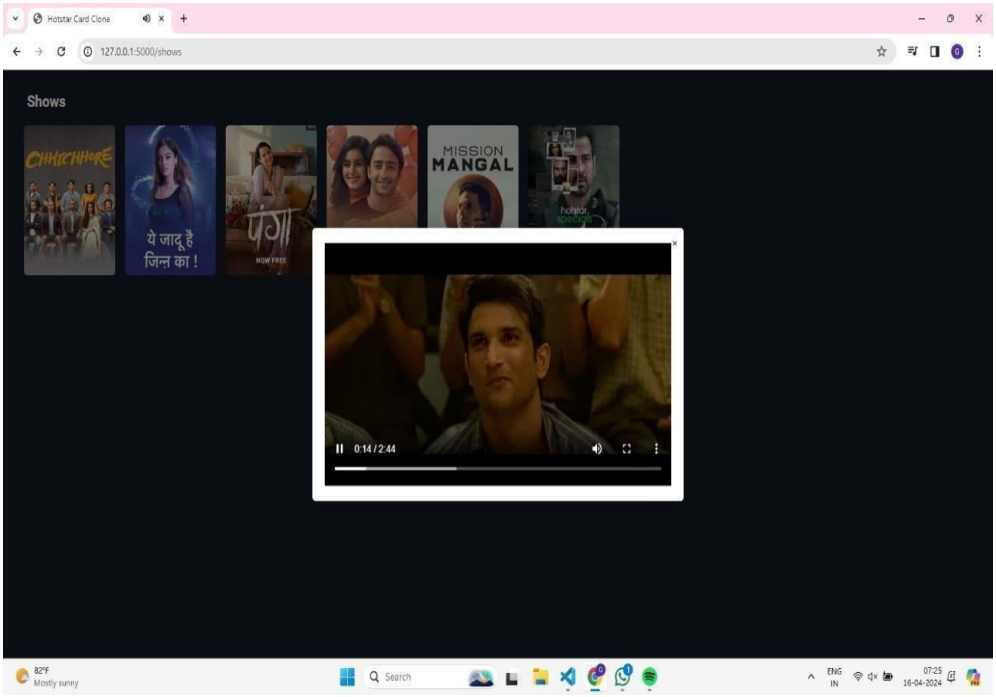
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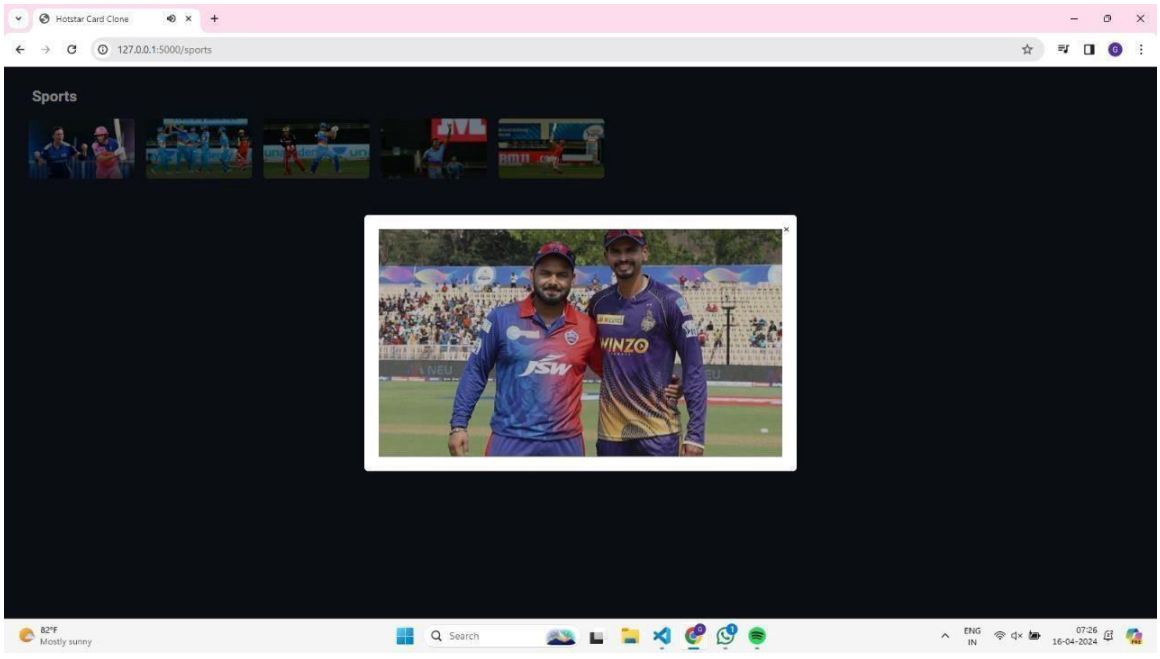
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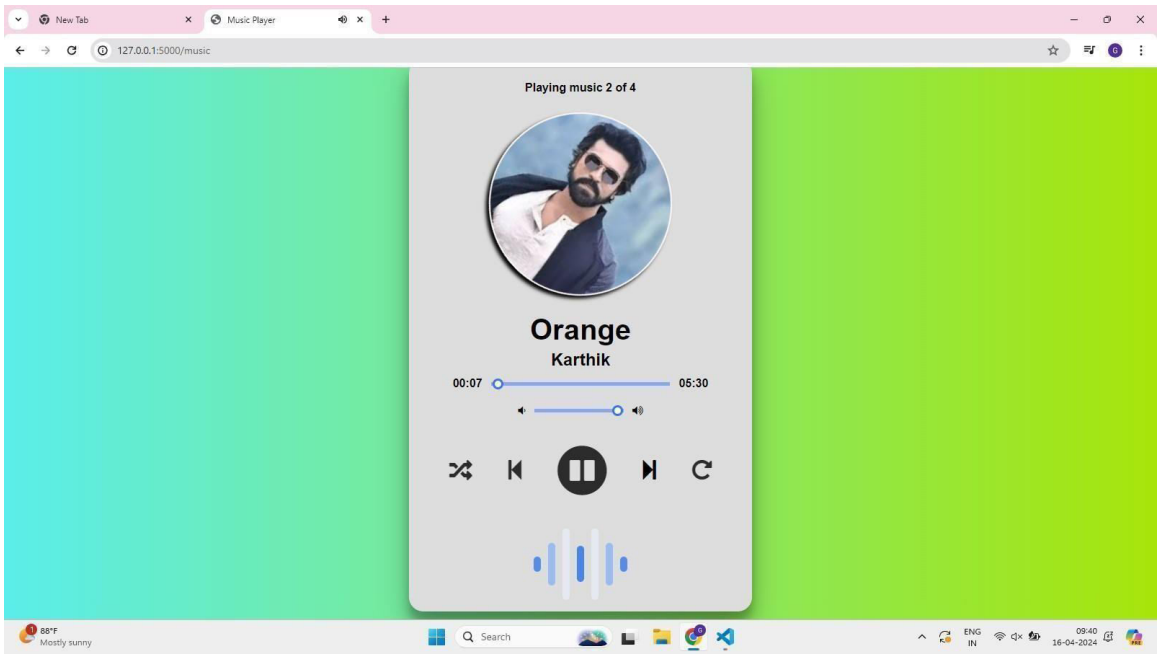
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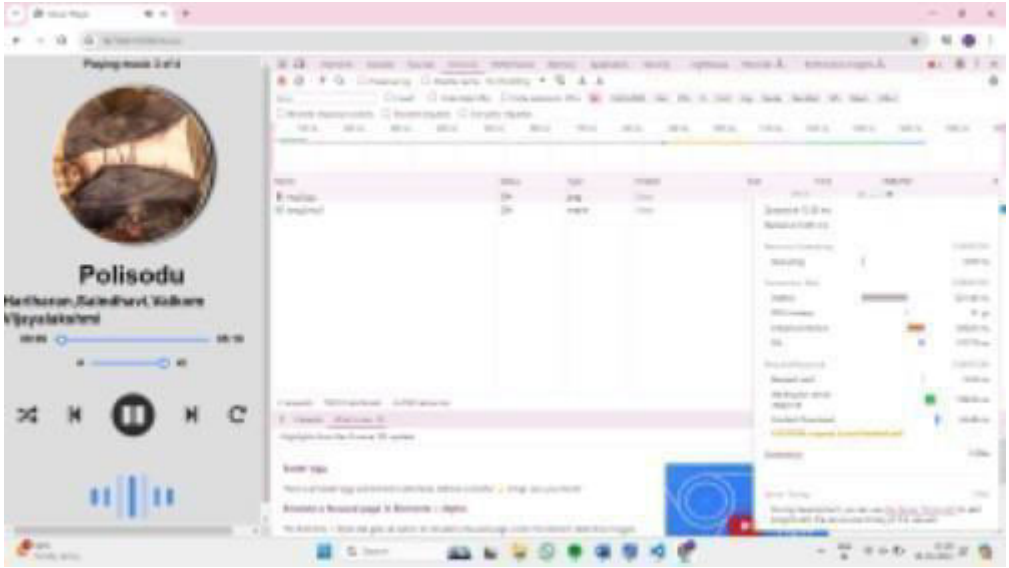
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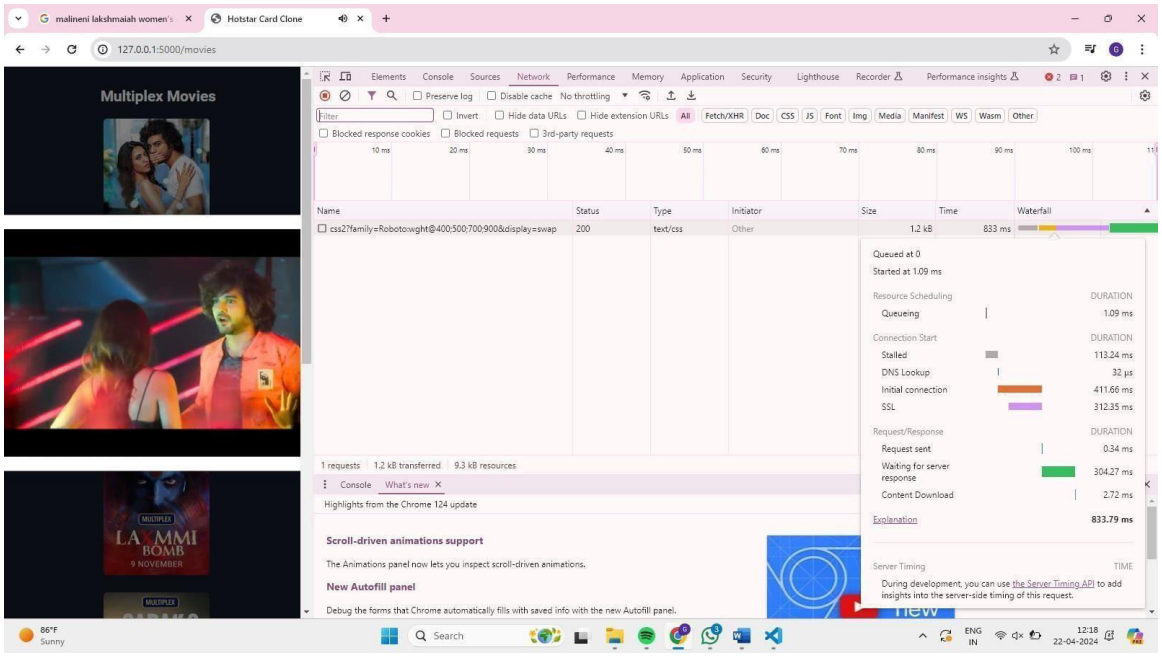

5.CONCLUSION

This article reviews media streaming and considers services offered by Amazon Web Services (AWS). Media streaming providers typically need to provide the video in multiple file formats and in the appropriate format based on the viewer's system characteristics. Pre-transcoding is a method that adds additional expenses for streaming providers who rely on cloud infrastructure. Efficiency is achieved when exporting content to S3 in a number of ways while executing AWS media streaming in the cloud. Different AWS services combined with specific third-party software could be utilised to provide different types of video streaming. Despite being an object storage service, S3 needs to recover and retain AWS data over the network. In order to extend present methods to Cloud service, development and delivery, it is necessary to find new architecture models and server-based design structures in order to generate Web application definition using a method that is more akin to human thought than it is at the moment. The necessity for various new computer systems that can be incorporated into the impending cloud services has been reflected in these advances. For the end customers of Amazon Web Services to find cloud computing useful, more study is required in this area.

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