AWS Elemental MediaConvert for Video Editing

A Course Project Report Submitted in partial fulfillment of the course requirements for the award of grades in the subject of

CLOUD BASED AIML SPECIALITY
(22SDCS07A)

by

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Certificate

This is Certified that the project entitled **"Cloud- Based Video Editing Platform using AWS Elemental MediaConvert"** which is a work carried out by Basuthkar Anushka (2210030416), in partial fulfillment of the course requirements for the award of grades in the subject of **CLOUD BASED AIML SPECIALITY**, during the year **2024-2025**. The project has been approved as it satisfies the academic requirements.

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1. INTRODUCTION

With the increasing demand for video content across platforms such as YouTube, social media, and corporate training, efficient video processing has become crucial[6]. Traditional video editing requires high-end hardware and manual effort, making it expensive and time-consuming.[5]

Cloud-based video editing provides a scalable and cost-effective way to process, edit, and deliver high-quality video content. This project explores a cloud-based video processing platform using AWS Elemental MediaConvert. The goal is to automate video editing and transcoding by leveraging AWS cloud services, eliminating the need for on-premises infrastructure.

The platform enables users to upload raw video files, which are transcoded into various formats, resolutions, and bitrates for smooth playback on devices. With the use of AWS, this solution does away with on-premises hardware needs, lowers processing time, and has guaranteed high availability. The project is geared towards applications such as content development, live streaming, and business video production.[7]

By using Amazon S3 for storage, AWS IAM for security, and MediaConvert for processing, this solution provides an efficient, scalable, and cost-effective approach to video editing. The project demonstrates how AWS enables serverless, automated, and high-quality video processing with minimal user intervention.[1]

2. AWS SERVICES USED AS PART OF THE PROJECT

1. Amazon S3

Amazon Simple Storage Service (Amazon S3) is an object storage service offering industry-leading scalability, data availability, security, and performance. By integrating S3 with AWS Elemental MediaConvert, videos can be processed directly from the storage, ensuring a seamless workflow. With lifecycle policies, outdated or unnecessary video files can be automatically archived or deleted, optimizing storage costs. With cost-effective storage classes and easy-to-use management features, you can optimize costs, organize and analyze data, and configure fine-tuned access controls to meet specific business and compliance requirements.[2]

2. AWS IAM

AWS Identity and Access Management (IAM) plays a crucial role in securing access to the cloud-based video editing platform. IAM is used to define roles and permissions, ensuring that only authorized users and services can access specific AWS resources. IAM policies are implemented to grant MediaConvert permissions to read videos from S3 and store the processed files back securely. By enforcing the principle of least privilege, IAM enhances system security while preventing unauthorized access or modifications. Additionally, IAM integrates with AWS CloudTrail to enable auditability and monitoring of access logs.[3]

3. AWS Elemental MediaConvert

AWS Elemental MediaConvert is the core video processing engine in this workflow. It enables professional-grade video transcoding by converting video files into multiple formats, adjusting resolution, and optimizing compression. MediaConvert supports a wide range of video formats, including MP4, HLS, and MPEG-DASH, ensuring compatibility across different devices. It also provides advanced features such as noise reduction, subtitle embedding, multi-bitrate streaming, and watermarking for content protection. The service is fully managed and serverless, allowing it to scale automatically based on demand without requiring manual resource management.[4]

By integrating these AWS services, the cloud-based video editing platform becomes highly automated, scalable, and efficient. Amazon S3 stores the video content, IAM ensures secure access management, and MediaConvert performs the required video processing operations. This architecture eliminates the need for on-premises hardware, reduces processing time, and ensures high availability, making it an ideal solution for applications such as content creation, business video production, and live streaming.

3. STEPS INVOLVED IN SOLVING PROJECT PROBLEM STATEMENT

Traditional video editing requires manual effort, high processing power, and storage, making it inefficient for large-scale content creation. This project aims to develop an automated cloud-based video processing system that efficiently handles video format conversion, compression, and delivery using AWS.

Steps:

Step 1: User Uploads Video to S3.

Step 2: Create an IAM Role for MediaConvert to access in S3 bucket.

Step 3: Create job in MediaConvert and integrate with the IAM Role.

Step 4: Video Processing with AWS Elemental MediaConvert.

Step 5: Select output bucket which stores the processed video in S3.

Step 6: If we have disabled block public access we can watch it in browser or download in local computer.

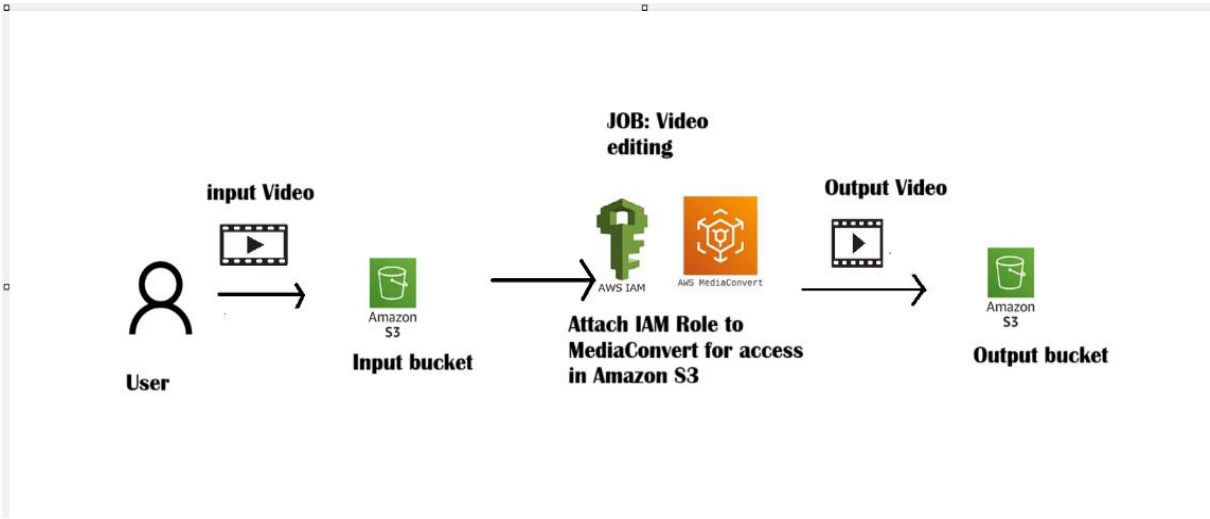

Fig. 3.1 Work Flow of the Project.

4. STEPWISE SCREENSHOTS WITH BRIEF DESCRIPTION

STEP-1: Log in to AWS Console:

- Go to https://aws.amazon.com/console/
- Log in with your credentials.
- Search for S3 in the search bar.

STEP-2: Open Amazon S3 and create a bucket for input:

- Click “Create bucket”.
- Enter a unique name, e.g., video-processing-input-1.
- Uncheck “Block all public access” to make content viewable.
- Click “Create bucket”.

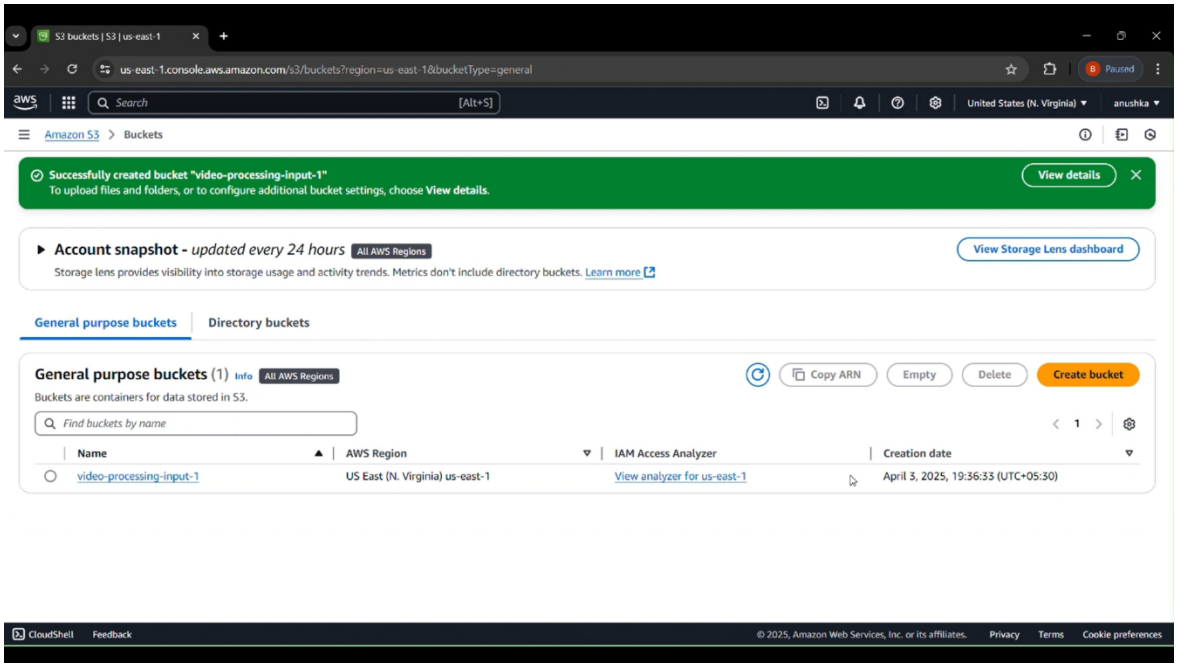

Fig. 4.2 Create input bucket.

STEP-3: Create another bucket for keeping the processed video

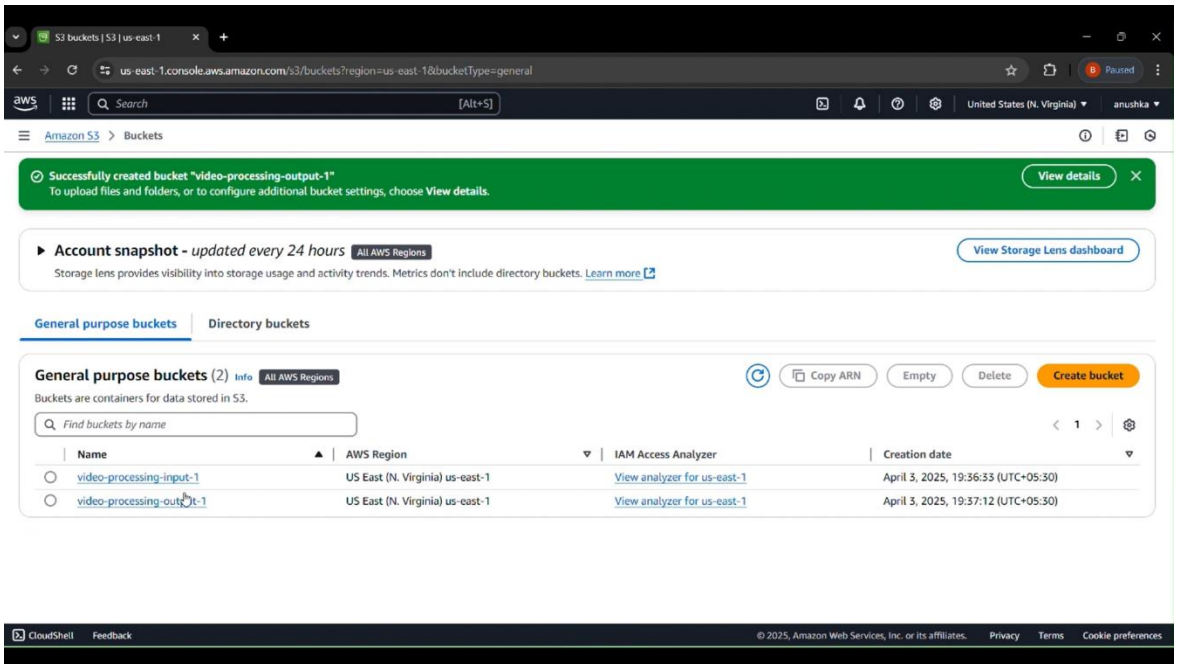

Fig. 4.3 Create output bucket.

STEP-4: Upload the video in the input bucket.

- Open the newly created bucket.
- Click “Upload” → Select your video file.
- Click “Upload” to add them to the bucket.

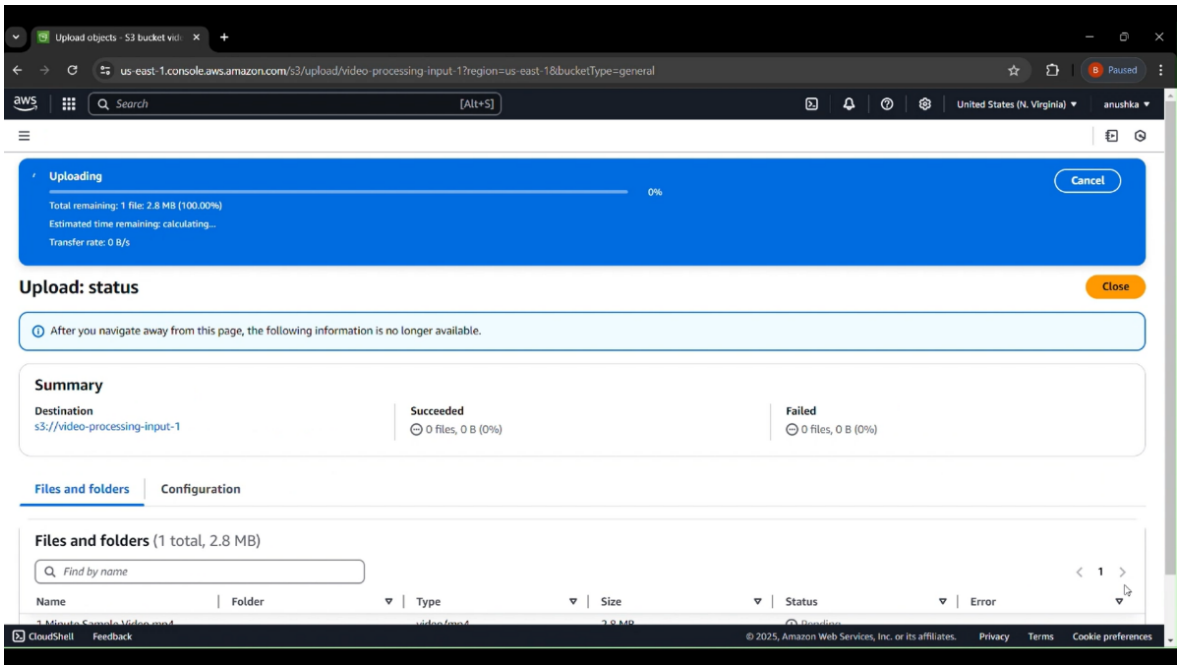

Fig. 4.4 Upload the video file in input bucket.

STEP-5: Go to AWS IAM and create a Role for MediaConvert to access S3 bucket.

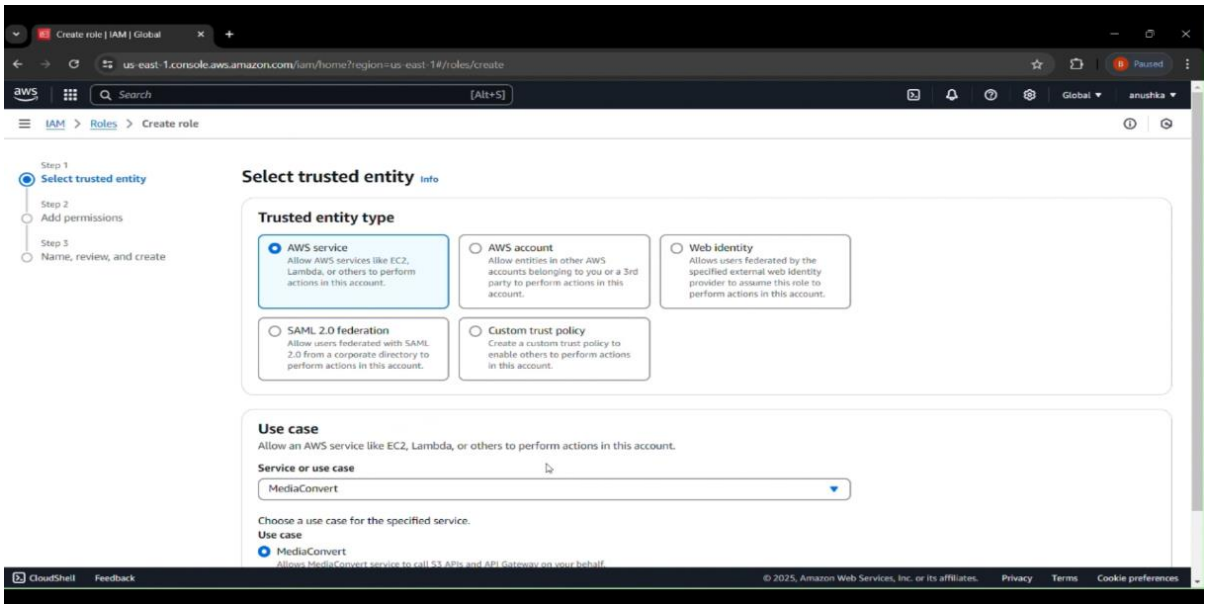

Fig. 4.5.1 Role in IAM

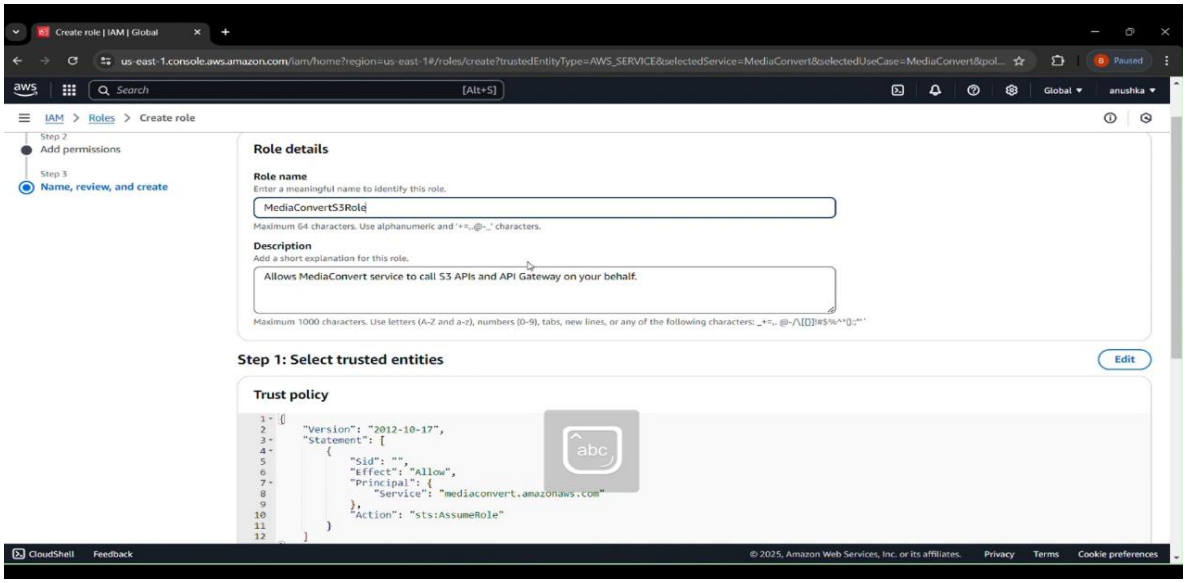

Fig. 4.5.2 Create IAM Role for MediaConvert to access in S3.

STEP-6: IAM Role is created.

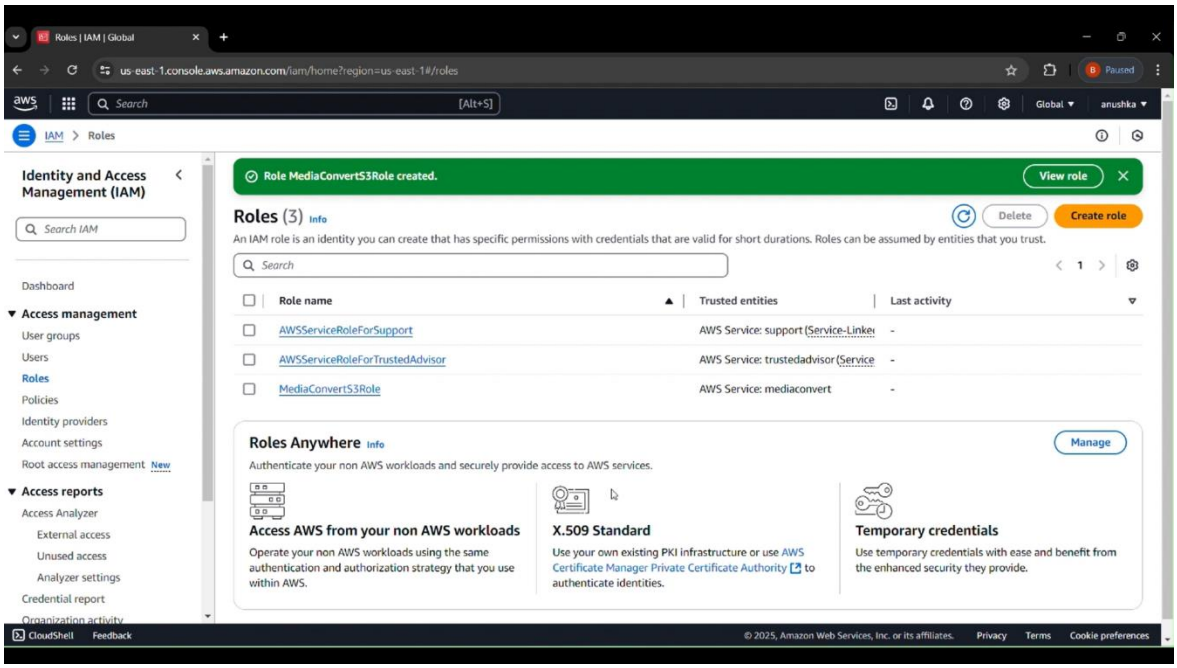

Fig. 4.6 IAM Role is created.

STEP-7: Go to MediaConvert > Create a job.

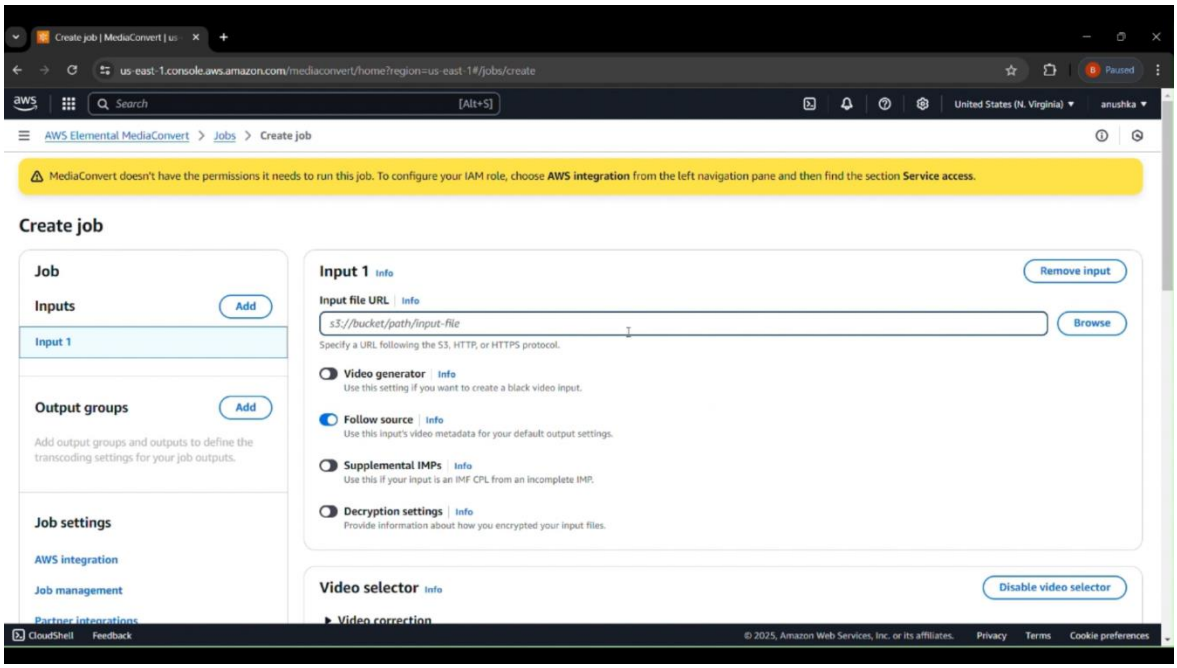

Fig. 4.7 Create a job in MediaConvert.

STEP-8: Choose input bucket and file.

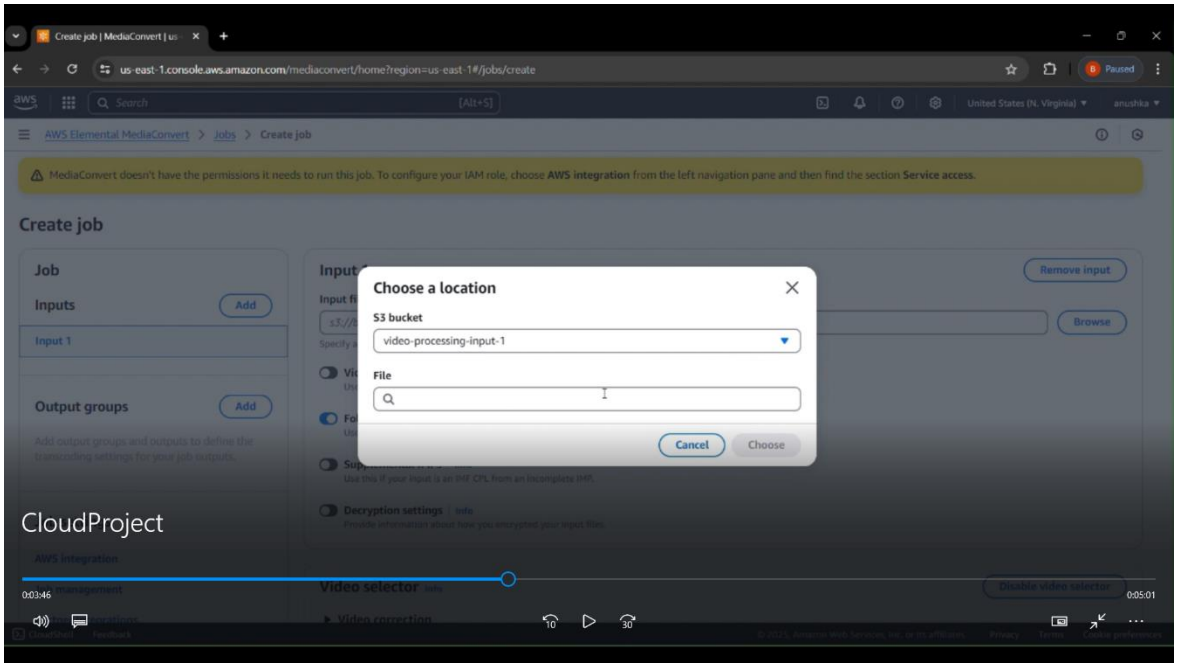

Fig. 4.8 Choose input bucket in job.

STEP-9: In output group select type of input.

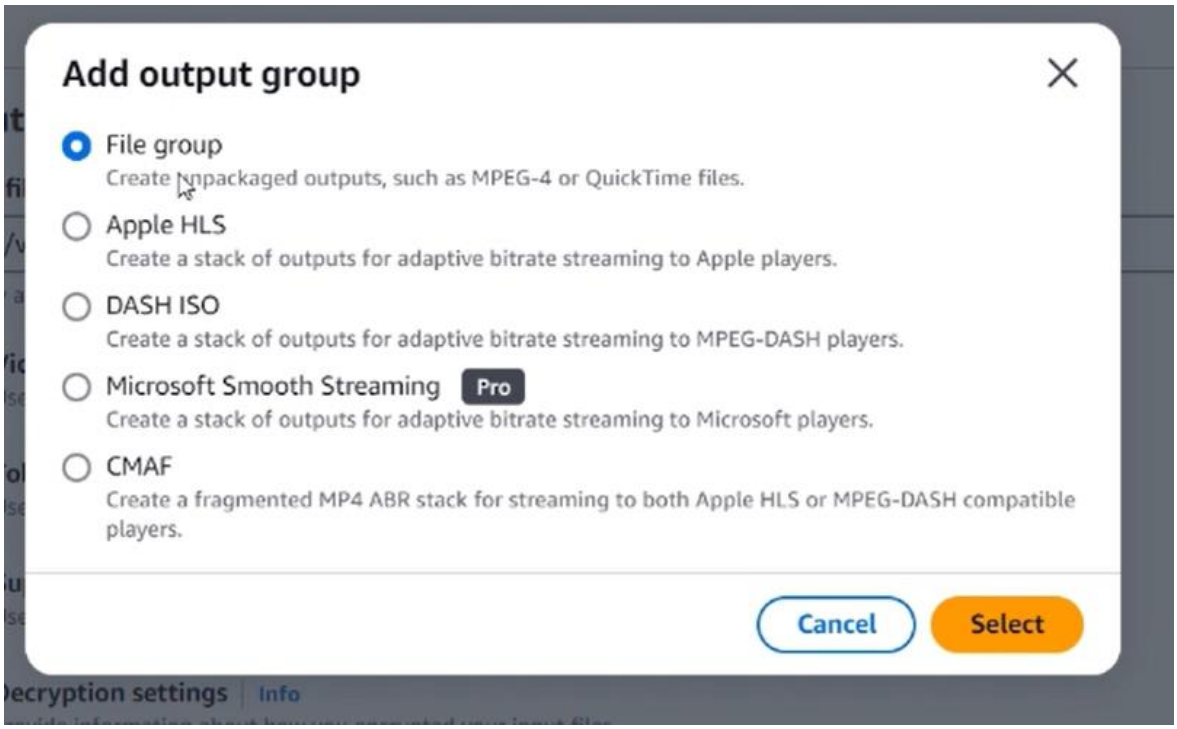

Fig. 4.9 Select File group

STEP-10: Select the destination of the processed video.

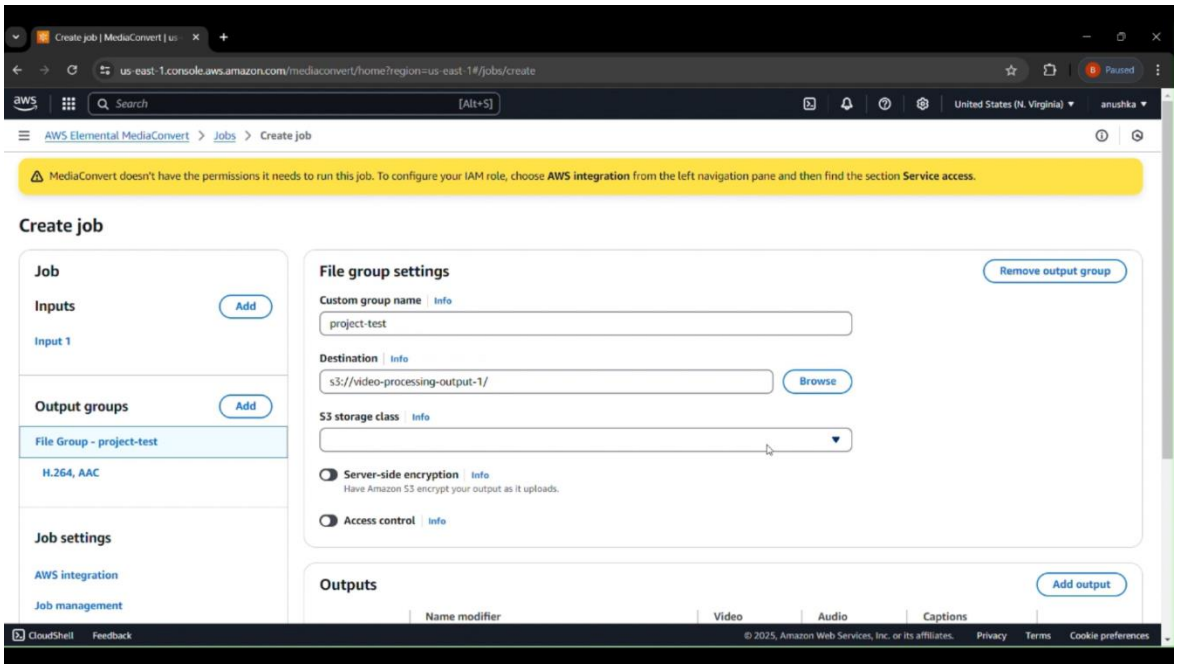

Fig. 4.10 Select the output file.

STEP-11: Select the Output preset which shows the options for resolution, bitrate speed, and type of category.

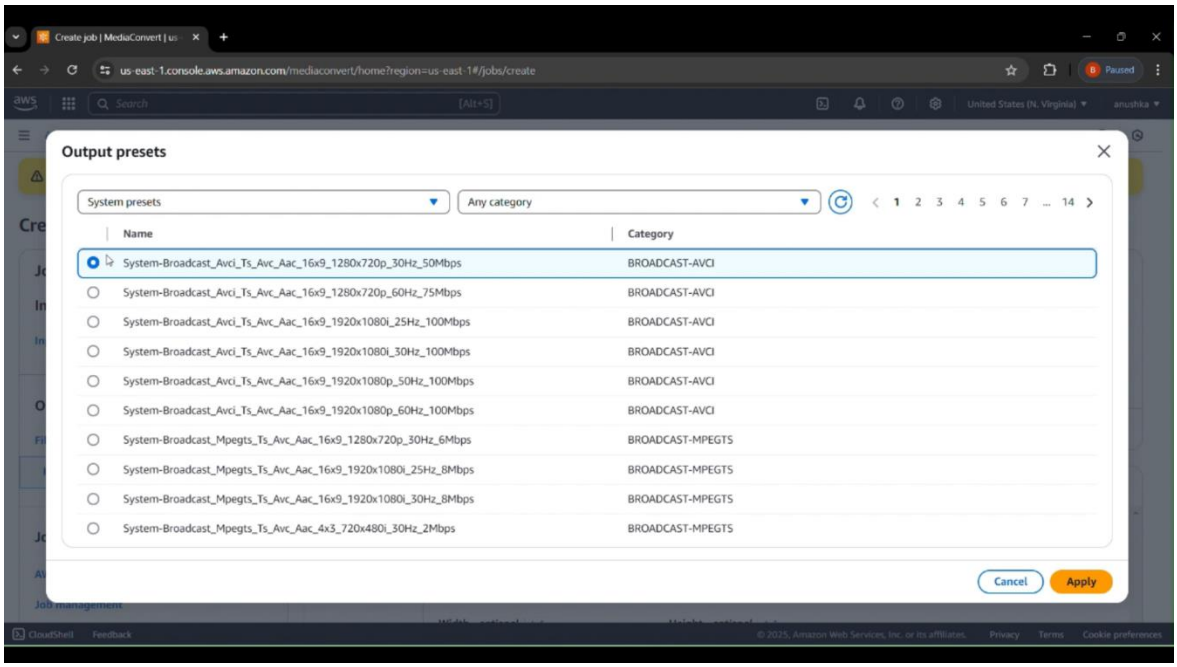

Fig. 4.11 Select the output preset.

STEP-12: Integrate the service role to the job.

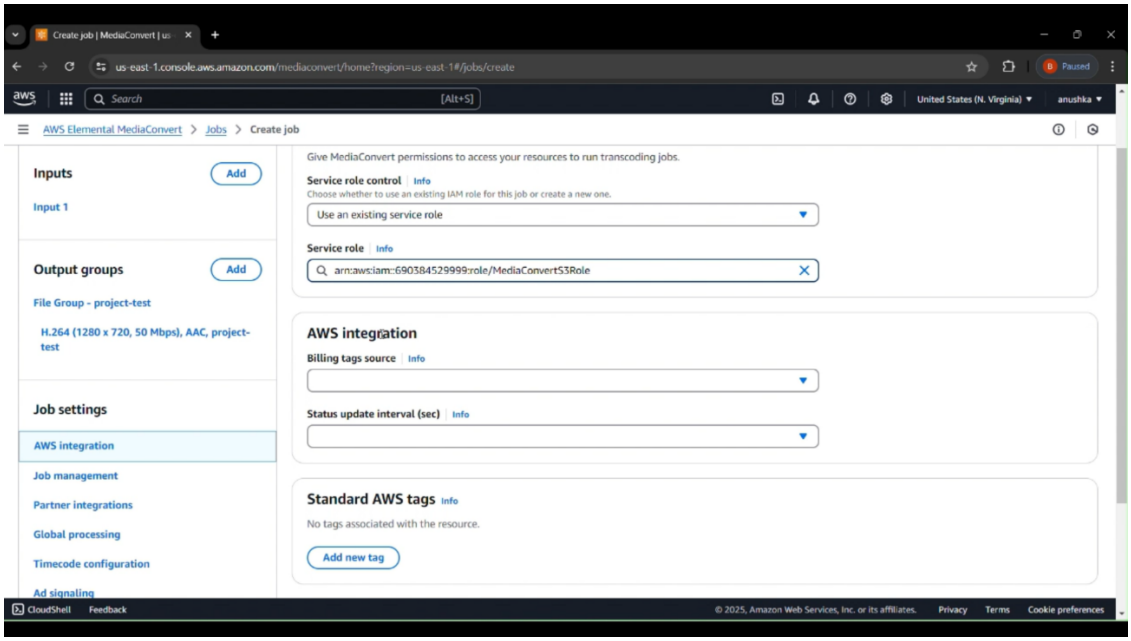

Fig. 4.12 Integrate IAM Role to the job.

STEP-13: The job is completed.

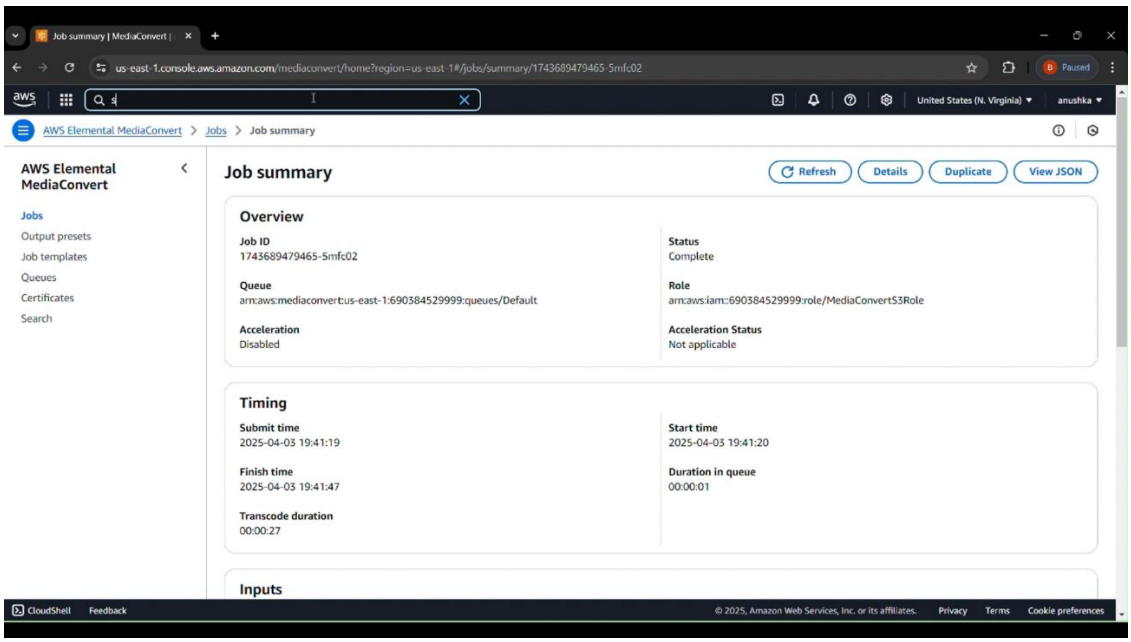

Fig. 4.13 Job is completed.

STEP-14: The processed video is in the output bucket.

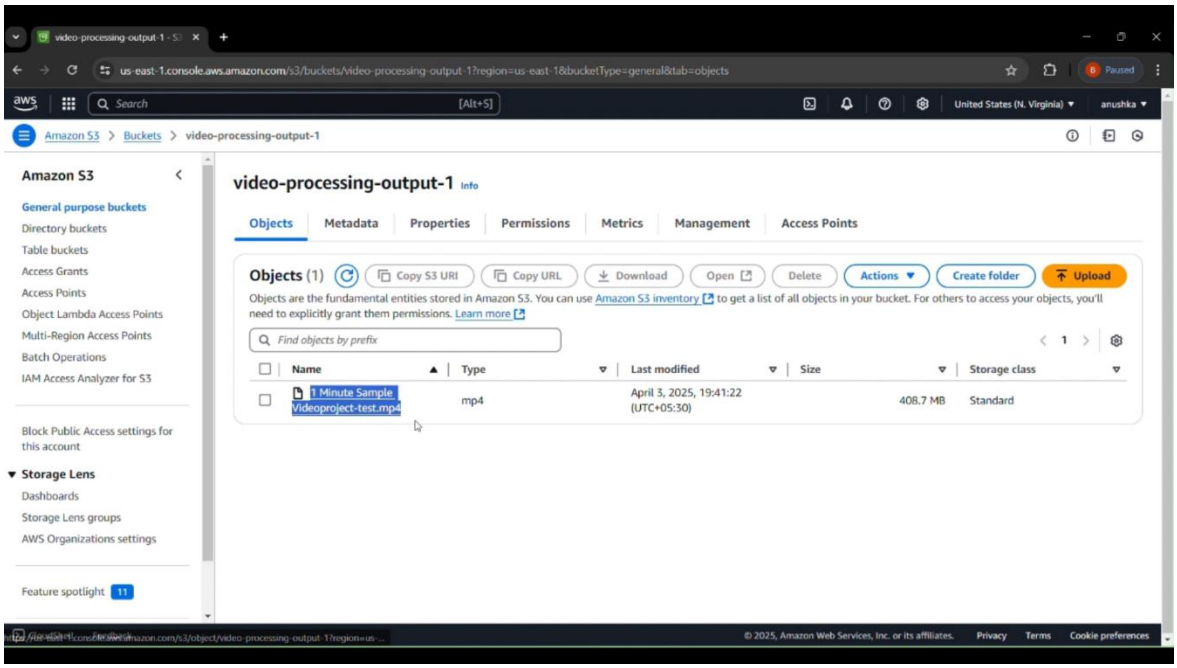

Fig. 4.14 Processed video is stored in output bucket.

STEP-15: We can download or open directly in browser.

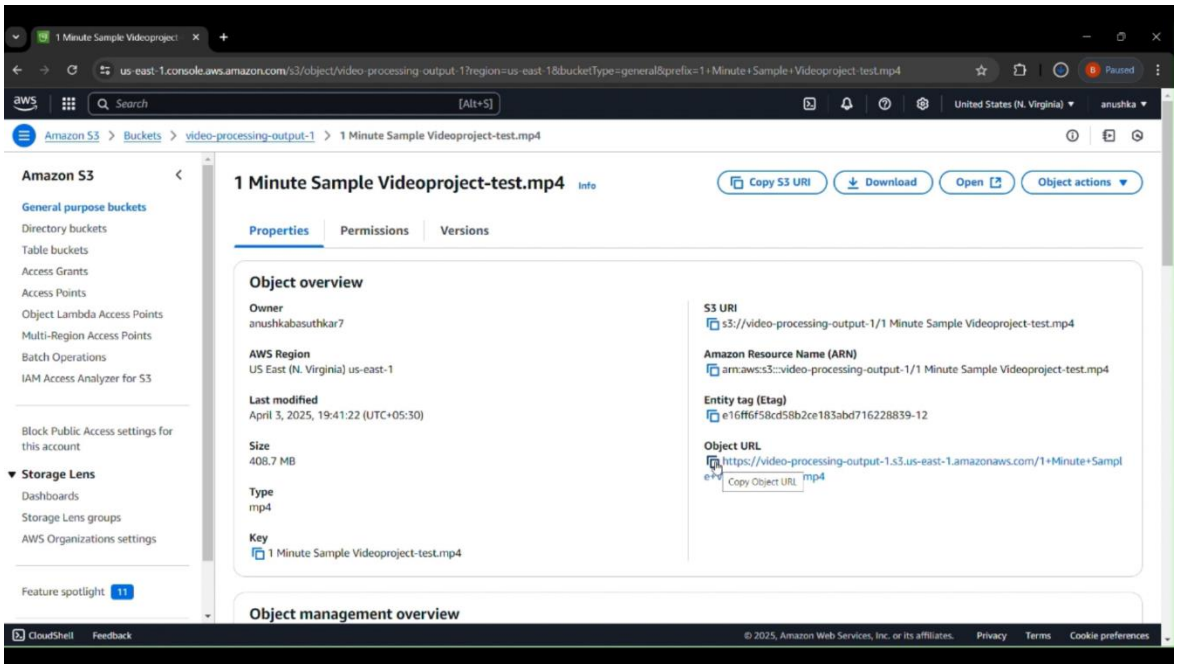

Fig. 4.15 We can download the processed video.

STEP-16: The edited video is played on VLC.

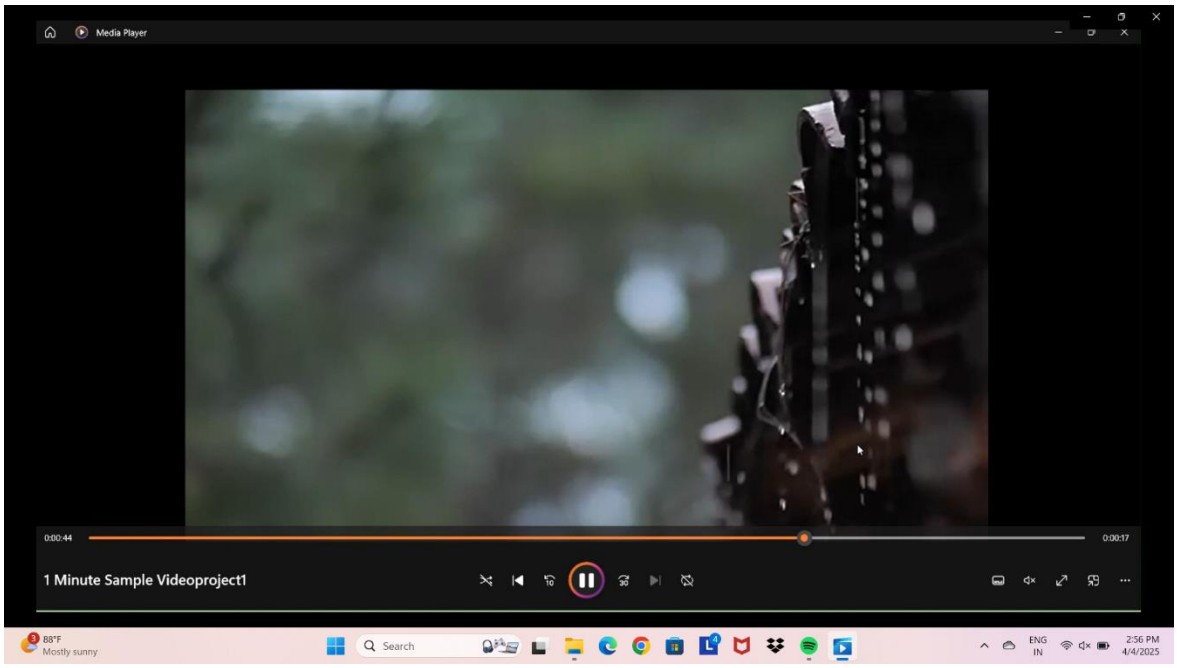

Fig. 4.16 The edited video.

5. LEARNING OUTCOMES

1. Understanding AWS Cloud-Based Video Processing

Through this project, I have gained a clear understanding of how cloud infrastructure can be used to handle video processing tasks. You learn how cloud-based services eliminate the need for physical hardware, reduce processing time, and improve scalability.

2. Using Core AWS Services

Become familiar with key AWS services like Amazon S3 for storage, AWS IAM for secure access control, and AWS Elemental MediaConvert for media processing. This includes setting up IAM roles, managing permissions, and configuring S3 buckets and MediaConvert jobs.

3. Implementing Video Editing Features

Apply concepts like video transcoding, compression, resolution scaling and subtitle embedding. These editing functions are critical in media workflows and are automated using AWS tools.

4. Deploying a Practical Solution

This project helps you design and deploy a simple, cost-effective cloud-based platform that can be scaled for real-world applications such as online education, content creation, or business communication.

6. CONCLUSION

The implementation of a cloud-based video editing platform using AWS services such as Amazon S3, IAM, and AWS Elemental MediaConvert demonstrates the power and flexibility of cloud computing in handling media workflows. This project eliminates the dependency on traditional, hardware-intensive video editing setups and offers a cost-effective, scalable, and efficient solution for video processing. By automating tasks like format conversion, compression, resolution scaling, and subtitle embedding, the platform ensures faster turnaround times and high-quality outputs. It also enhances accessibility, allowing users to process and retrieve videos anytime and from anywhere. Overall, the project not only strengthens the understanding of cloud infrastructure but also offers real-world applicability in fields such as content creation, education, business communication, and entertainment.

7. REFERENCES

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