

Project Report: Cloud-based Media Streaming Web Application

Introduction

The project aims to develop a cloud-based Media Streaming Web application that will serve as a prototype for learning about various cloud features. The team will design and develop a video streaming application similar to Netflix, which will help them understand the design principles and technologies used in large-scale streaming platforms. They will explore techniques for optimizing content delivery, such as caching, CDNs, and adaptive streaming, to ensure consistent performance for a growing user base. The project will also focus on microservices and serverless architecture, which involves breaking down a complex system into smaller, manageable components, making it easier to maintain and scale. Additionally, the team will learn how to transcode video files into different formats and resolutions and implement adaptive streaming to ensure compatibility with various devices and internet speeds.

Objectives and Goals

- **Highly available & scalable streaming service application:** A functional video streaming platform that can efficiently serve content to users with minimal delays and high quality.
- **Infrastructure as Code (IaC) using Terraform:** Automate the provisioning and management of the AWS infrastructure resources, making it easier to deploy, maintain, and scale the application over time.
- **AWS architecture diagram:** A detailed and well-organized diagram illustrating the AWS architecture components, their relationships, and data flows within the system.
- **Working frontend applications:** Web application that allows users to access the streaming service, browse content, and manage their profiles.
- **Backend services and APIs:** A set of serverless functions and APIs that handle user requests, content aggregation, and other essential operations.
- **Content transcoding and adaptive streaming:** A system for converting video files into multiple formats and resolutions.
- **Documentation:** Clear and concise documentation that covers the system architecture, components, and deployment steps, enabling other persons to understand the design and implementation.

Significance of the Project

After completing the project, we will be able to understand how a streaming service like Netflix works on the cloud and create a small-scale architecture representing the same.

Progress

Our team has completed the first 3 User Stories and is currently working on the next 2 tasks.

1. ☒ Automate infrastructure provisioning and management (User Story 11)

2. ☒ Set up a frontend for the streaming service (User Story 4)
3. ☒ Create backend services and APIs (User Story 5)
4. ☐ Implement a CDN for content distribution (User Story 2)
5. ☐ Design and develop microservices (User Story 6)

Next Steps

The team will focus on completing the following User Stories:

- Watch high-quality videos without buffering (User Story 1)
- Adapt video quality based on device and internet speed (User Story 7)
- Upload videos in various formats (User Story 8)
- Automatic video transcoding (User Story 15)
- Quick service loading (User Story 3)
- Understand system documentation (User Story 16)

Development Strategy

We are using the Azure DevOps tools to keep track of our work and create the User Stories for all our tasks. We are working on them and will complete the project on time. Let's us know if you need access to our Azure DevOps for monitoring our progress.

Conclusion

The project provides a valuable learning opportunity for the team to gain hands-on experience in building a cloud-based web application, with a focus on video streaming architecture, scalability, performance optimization, microservices, serverless architecture, content transcoding, adaptive streaming, frontend development, and AWS services. The skills and knowledge gained from this project will be valuable in developing modern, user-friendly, and scalable applications on the cloud.