41891 Cloud Computing Infrastructure

Assessment 2: Group Major Project

Aden Northcote 13960570
Christopher Atchison 13911870
Rory O'Hara 13919749

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1 Background

SmartV is a popular online platform providing a wide range of video tools to end-users. Services are provided to consumers over the internet and include video streaming and delivery, video searching, video editing, video transcoding and adaptation.

The SmartV platform is well used and is currently experiencing significant growth in user-base. This trend has prompted a transition from on-premises infrastructure to the cloud with the aim of future-proofing the company's scalability and cost-competitiveness.

2 Business Requirements

The operating model of the SmartV platform relies heavily on ready access to large amounts of storage, compute, and networking capability. This is especially true given the large amounts of high resolution video data the platform is expected to process and store. The business requirements captured from this understanding are presented here in two sections: the non-functional requirements relating to SmartV's operations and the functional requirements relating to the cloud infrastructure specifically.

2.1 Operational Requirements

The requirements outlined here represent non-functional and operational functions of the cloud infrastructure solution.

Scalability

Scalability represents a primary business objective for SmartV's transition to cloud-based infrastructure, and underlies most of the business requirements outlined in this document. The deployment of scalable infrastructure provides SmartV the ability to react to fluctuations in platform usage while minimising any costs associated with under-utilised infrastructure.

Availability

The SmartV platform's customer-facing model requires services to be highly available to end-users, ensuring uninterrupted access to videos and features. Services need to be available even during peak usage times or unforeseen spikes in demand.

Reliability

The cloud infrastructure used to enable SmartV must also prioritise high availability, with resilient architecture that minimises downtime and ensures continuous service delivery.

Security

A high level of security is required to protect user data and the SmartV platform itself. All data hosted by the cloud infrastructure should be encrypted and subject to strict access control and authentication. Both ingress and egress traffic should be restricted with additional monitoring across the network and infrastructure enabling incident detection and response.

2.2 Infrastructure Requirements

The functional requirements of the cloud infrastructure itself form the core project, with each item listed here built on the operational requirements outlined above.

Storage

Effective storage management is a key requirement of SmartV's infrastructure, with the service housing massive amounts of multi-media data for its users. All stored data also needs to be safely and regularly replicated for back-ups and disaster recovery.

Compute

The computational intensity of video based workloads necessitates significant amounts of domain-specific compute availability in the form of graphics processing unit (GPU) access, as well as the additional components required to support them.

Network

High throughput and reliable networking is key to effective delivery of SmartV services.

Infrastructure Management

Deployed cloud infrastructure should be fully managed and configurable in anticipation of changes in future requirements, deployment of new services, and regular updates and maintenance.

3 Cloud Architecture and Design

3.1 Platform Selection

3.2 Design Assumptions

3.3 Infrastructure Design

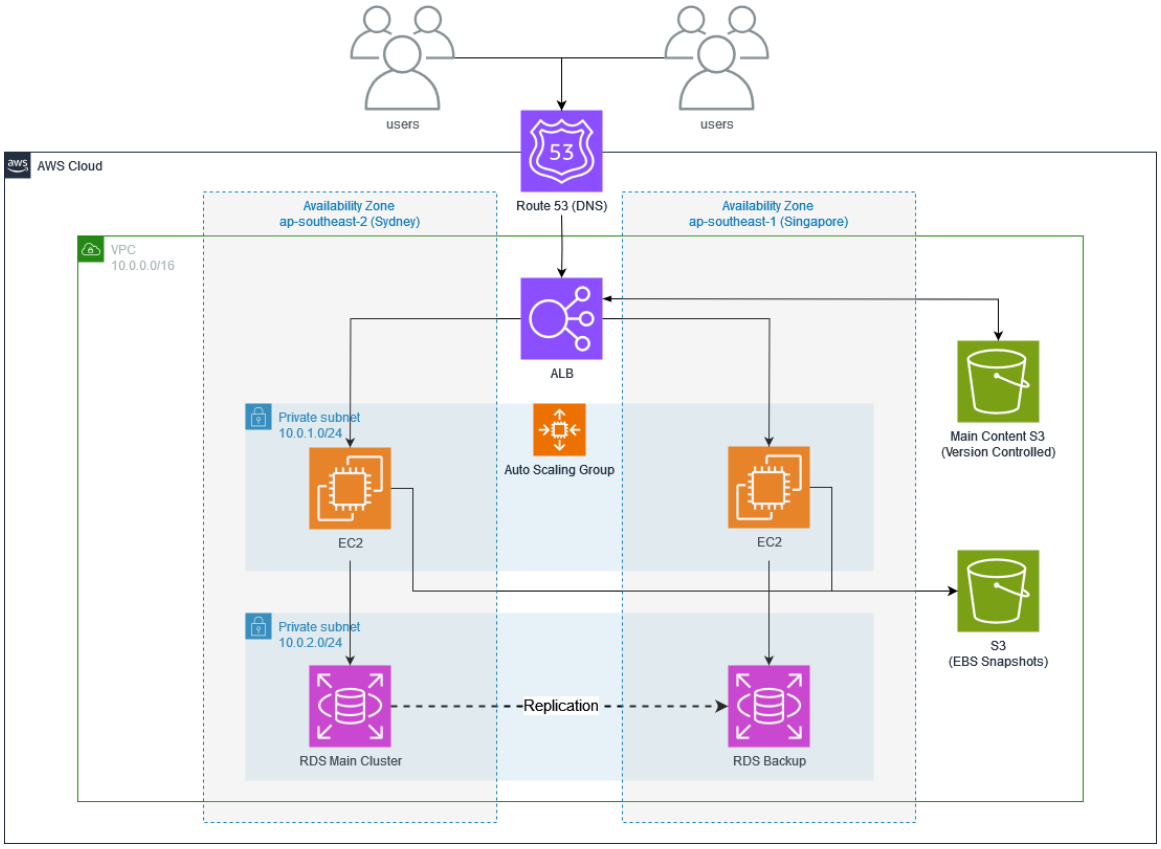

Figure 1: Cloud Infrastructure Topology

3.4 Infrastructure Components

3.5 Pricing

4 Considerations and Challenges

5 Evolution of Technology