

FIT5225 Assignment 2 – Individual Report

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FIT 5225 Cloud Computing and Security

Role and Contribution

My primary responsibility in this project was authentication, authorisation, security, and multi-cloud integration. I configured AWS Cognito Hosted UI to support user registration, email verification, login, logout, and token-based authentication. I also configured API Gateway authorisers so that protected endpoints were accessible only to authenticated users, and I verified through testing that unauthorised requests were correctly rejected.

As the project progressed, my responsibilities expanded beyond authentication. I was responsible for the design and implementation of the notification subsystem hosted on GCP using Cloud Run and Firestore. This subsystem allows users to subscribe to wildlife species tags and receive email notifications when matching media is uploaded. I proposed Firestore as the subscription store, Cloud Run for serverless notification processing, and a digest-style workflow that groups multiple images into a single email.

I also designed and implemented secure communication between AWS and GCP using Workload Identity Federation. This allowed AWS Lambda functions to invoke private Cloud Run services without relying on long-lived credentials or shared secrets. I also performed extensive integration testing, identifying defects involving uploads, duplicate detection, validation logic, and tag updates.

Technical Challenges and Learning

The most challenging aspect of my work was implementing secure cross-cloud communication between AWS and GCP. While developing the notification subsystem, I encountered authentication and permission issues involving IAM policies, workload identity pools, and Cloud Run identity tokens. I chose Workload Identity Federation because it provided stronger security for the project's multi-cloud architecture. Resolving these problems required understanding both AWS and GCP security models and close collaboration with teammates.

Another challenge involved diagnosing Cognito email delivery issues. Although logs indicated emails were being sent successfully, users were not receiving them. After extensive investigation, the emails were eventually found in spam folders. This experience reinforced the importance of verifying assumptions before pursuing more complex solutions.

Through this project, I gained practical experience with cloud security, federated identity management, and multi-cloud integration.

Teamwork Reflection

I was very satisfied with the teamwork experience throughout this project. Three members of the team lived near campus, allowing us to work together in person during the final stages of

development. The remaining team member lived further away but still contributed actively through Zoom, WeChat, GitHub, and shared Google Drive documents. Communication was frequent, and team members were consistently responsive and willing to help each other solve problems.

Initially, I felt that my assigned responsibilities were smaller than those of other team members, particularly compared with the machine learning, database, and frontend components. However, after taking ownership of the notification subsystem and a substantial share of the testing and integration work, the workload became more balanced. One challenge was coordinating design decisions when not everyone was physically present, especially for frontend-related discussions. Nevertheless, the team adapted well to these constraints and successfully integrated authentication, backend processing, database services, notifications, and the frontend into a working multi-cloud system before the deadline.