

COMP3207 - Cloud Application Development

Coursework 2: Individual Report

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Individual Contribution

- Actively participated in the planning phase defining solution requirements and assuming the Cloud Engineer role.
- Defined the tech stack for the application infrastructure, backend and frontend with the team.
- Set up Azure Cloud infrastructure using Terraform.
- Provisioned MongoDB database with CosmosDB.
- Provisioned Key Vault to store application Secrets.
- Provisioned Container Registry to store Docker images for deployment.
- Provisioned and configured Container Applications for the apps.
- Set up separate API containers for prod and dev to offer a stable API release to the frontend team.
- Set up CI/CD for Container Apps using GitHub Actions from a single repository (one repository deploys to all three environments).
- Set up Docker containers to support the tech stack - NodeJS and React for frontend, and Python with FastAPI for backend. Optimized the containers to use minimal resources when stored and deployed.
- Managed basic networking (both frontend and backend) to expose application endpoints through Docker containers.
- Set up CORS to enable frontend and backend communication.
- Connected Key Vault to Container Applications for the backend to inject secrets as environment variables at the deployment stage.
- Fixed a configuration issue where MongoDB entries were automatically deleted a set time after creation.
- Managed deployments for the Container Apps through the development lifecycle for both the dev and production branches of the application.
- Included standalone cloc scripts to keep track of codebase size (lines of code).

Reflection

My involvement in the group project as the Cloud Engineer of the team was an enriching experience for my backend-focused career with growth opportunities in coding, cloud deployment, group collaboration, innovation, and design. In this reflection, I delve into the transferable skills developed, identified strengths, problem-solving approaches and their potential application in my future programming projects or professional roles.

My role involved hands-on experience in Azure Cloud infrastructure setup using Terraform, provisioning a database with CosmosDB, configuring container applications with a Container Registry for Docker images, and CI/CD pipelines using GitHub Actions underscored the depth of the technical skills I had the opportunity to cultivate in the field of cloud deployment and containerization.

As the infrastructure was deployed on my Azure Cloud account, I quickly learned the importance of monitoring costs optimizing containers for minimal resource usage and integrating the Key Vault for securing application secrets, emphasizing the importance of thoughtful cloud architecture design. This transferable skill will prove useful in my future backend designs.

A notable challenge was configuring Container Apps with CI/CD as that is not a feature currently available through Terraform. That meant manually provisioning these resources with GitHub Actions using minimal documentation available to set up Secrets injection from the Key Vault. However, overcoming this challenge resulted in seamless deployments throughout the development process allowing the team to concentrate on coding instead of troubleshooting failed deploys.

In future roles, I will leverage these skills to streamline the development process, contribute to innovative solutions, and support effective teamwork. I found Terraform a powerful tool that radically changed my view on cloud development and I look forward to using it again for personal and professional projects as it made understanding cloud infrastructure as a programmatic problem closer to other backend development processes I always enjoyed.

In conclusion, these experiences served as a solid foundation for my future endeavours, enhancing my technical prowess working with collaborative and design-oriented aspects of software development.