Project Echo GCP Architecture – Phase 1

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Overview

Project Echo wishes to deploy the project to Google Cloud Platform. As there are many components which will be delivered over differing timeframes this document outlines the first phase / initial architecture that can be delivered within T2 2024.

Problem Statement

An architectural design is required to deploy the project to GCP within T2 2024. Throughout discussions with the product owner and Neel (cloud team lead) we have identified our goal of deploying Echo Store and Echo API this trimester.

Current State

Currently Project Echo runs using docker containers on a developer's local machine. Docker Compose is used to orchestrate the build and run of the containers. As this is the developer's local machine it is a sandboxed environment.

Scope

In scope

- Echo Store
- Echo API

These two components have been chosen as the first to be deployed to GCP as the store is the primary dependency of other components and Echo API is the interface to that store.

Out of Scope

- Echo Engine
- Echo HMI
- Echo MQTT server
- Echo Redis
- Echo Simulator

These components are out of scope for this phase and will have their deployments planned in later phases.

Considerations

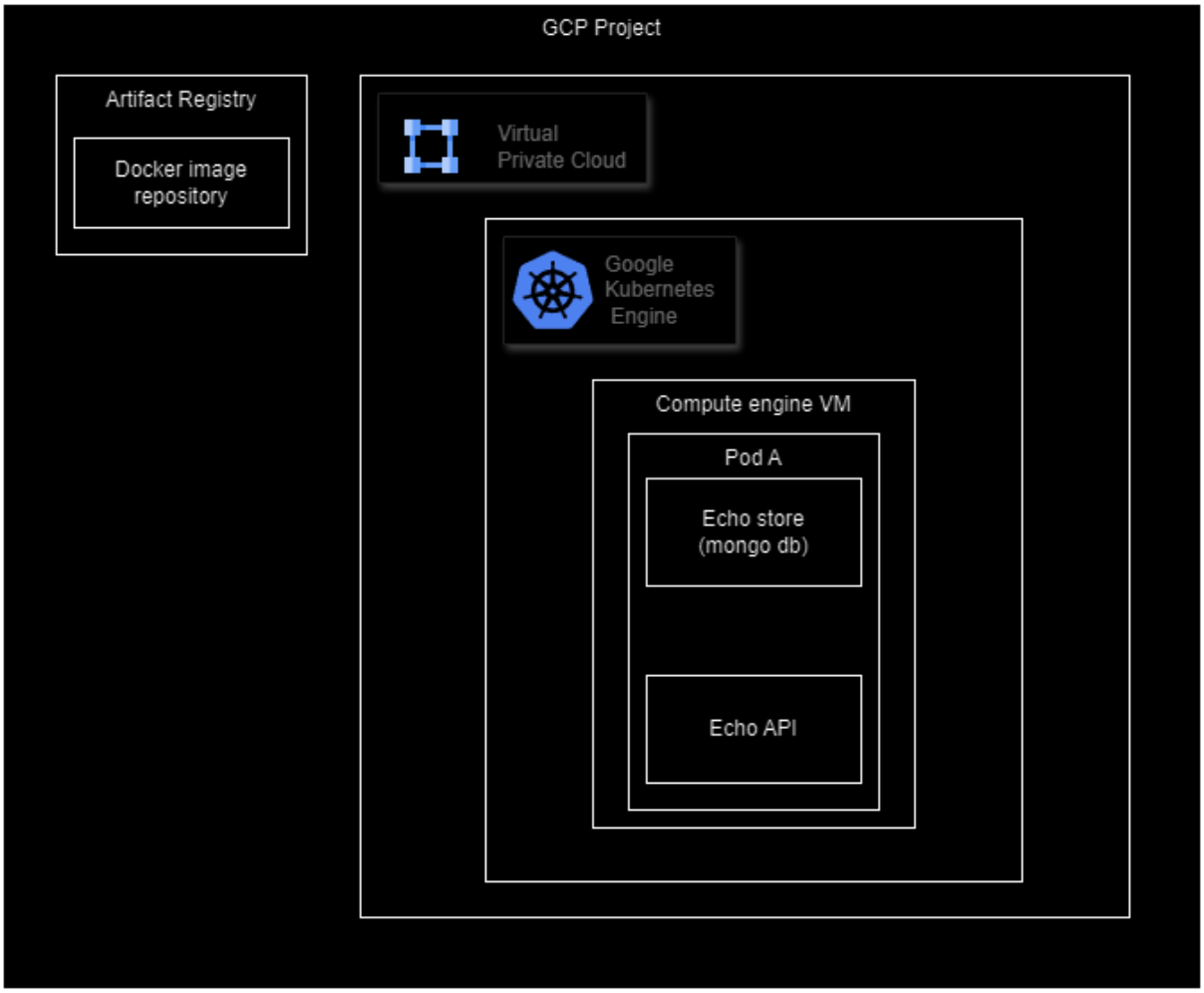
- Delivery timeframe. Ideally this infrastructure will be deployed and running by the end of T2 2024.
- Cost should be kept as low as possible.
- Simplicity. As this system is a university project it will be kept as simple yet as ‘proper’ as possible. Best practices are encouraged but may not always be applied. IE, the GKE cluster may not have High Availability across all zones within a region.

Security

- As the public cloud is being used security is of the upmost importance. Deakin’s guard rails for GCP will be followed.

Proposed Design

This design is largely a set of reference architectures that can be used as flows relating to the components have already been highlighted in other documentation.



Reference Architecture

Artifact Registry – Docker image repository

Project Echo already builds these and as they are required in GCP within Google Kubernetes Engine (GKE) or Cloud run they will be stored within an Artifact Registry repository.

Virtual Private Cloud

A Virtual Private Cloud (VPC) is the network for services within a GCP project.

Google Kubernetes Engine

The suggestion is to run the project's containers within pods on GKE. For the MongoDB store pod a persistent volume can be used. To start with the services can be deployed within a single pod, though this may change during implementation or in a later phase.

Compute Engine Virtual Machine

These are the compute instances used by GKE.

Reference Links

https://cloud.google.com/artifact-registry/docs/docker/store-docker-container-images

https://cloud.google.com/kubernetes-engine/docs/concepts/kubernetes-engine-overview

https://cloud.google.com/kubernetes-engine/docs/concepts/persistent-volumes#dynamic_provisioning