Faculty of Engineering & Applied Science

SOFE 4790U
Distributed Systems

Lab 1: Introduction to Google Kubernetes Engine (GKE)

Group#: 14

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Deliverables 1:

Discussion:

Summarize what you have learned about docker and Kubernetes including the used terminologies and their descriptions. What's the advantages and disadvantages of using docker images against using virtual machines?

Docker:
- Software platform that allows for one to build and deploy applications
- Standardized units called containers that have libraries, system tools, code, and runtime
- One will be able to deploy and scale apps into any environment and guarantee your code will run
- Used to computerize the deployments of applications in lightweight units
- Docker functions by providing a simple way to run code
- It's a OS for containers
- Containers virtualize the OS of a server
- Its installed on every server and will provide simple commands to build, start and stop containers

Docker	
Engine	-Open-source containerization technology to build and containerize applications -installed on host machine, uses a client-server architecture, communicates with Rest api
Client and Server	Client - gateway/interface layer between user and some implementation which is accessed from the terminal Server- runs product and gets request from clients, responsible to perform tasks requested
Image	-Read-only template containing a set of instructions for the creation of a container that runs on the Docker platform
Container	- self-contained executable software package -includes applications and their dependencies, runs on same infrastructure & share same

	operating system
Registry	-used for distributing and hosting images which are stored in repositories where users are able to be use push/pull commands to interact with these registries

Docker Image vs Virtual Machine

Docker Image	Virtual Machine
Containers share the host operating system which makes it lightweight	Has its guest OS above the host OS which makes it heavy weight
Has more security risks and vulnerabilities since they share host kernel	No share OS, there is a strong isolation in the host kernel
Easily portable	Difficult porting
Boots in seconds	Boots in minutes
High resource usage	Low resource usage
Hardware level process isolation	Operating system level process isolation

Kubernetes:
- Manages containerized services and workloads to facilitate automation
- Provides a framework to run distributed systems resiliently
- Pods are made up of multiple containers located on the host machine
- Control plane: collection of processes controlling kubernetes nodes
- Nodes: perform the tasks requested and assigned by control plane
- Pod: group of containers deployed to a node

Problems and Solutions:
Some problems I faced during this lab include syntax errors and authorization issues. The first error I encountered was the line *kubectl logs <pod-name> 2>&1 |grep GENERATED* I placed the pod name within the "<" brackets which is why I received an error message because the "<" bracket was supposed to be removed. My next error I faced was from the command line ALTER USER 'root'@'localhost' IDENTIFIED BY <new-password>; This command line was giving me errors, so I had to adjust the code in order to create a new password. The new line I used was ALTER USER 'root'@'localhost' IDENTIFIED BY "new-password"; I had to use quotation marks around my new password for the command line to run successfully.

Deliverable 2:
MySQL Deployment:

https://drive.google.com/file/d/1-VOXz3pSBcFb9ZQgQqEhU8tiX_QaqsGo/view?usp=sharing

Deliverable 3:
MongoDB Deployment:
https://drive.google.com/file/d/1H21Nak8rIqK-0IMe9gwT4BXBzros1vax/view?usp=sharing