SOFE 4790U: Distributed Computing

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Lab 1: Introduction to Google Kubernetes Engine (GKE)

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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?

Summary of Docker and Kubernetes :

Docker:

Docker is a lightweight tool that does not require guest os to share projects across different work environments. Docker automates the deployment of applications for use across different working environments. One example of these different environments could be between developers and testers. Docker aims to make this transition seamless. Docker also allows for frameworks to be running on different applications at once freeing up space.

The Docker engine is split up into four main sections. Client and Server, Docker Images, Docker Containers, Docker registry. The client and server are connected through a rest API which facilitates the communication between the two elements. The docker images are within the Docker server and the registry, an image is a template for how to create docker containers and is built using a docker file. The container is instructions for how the environment will look. Which include the applications and their libraries. The registry allows other users to access the Docker images.

Kubernetes:

Kubernetes is an open-source platform for managing containers. Kubernetes was created to combat monoliths and reduce deployment time. This resulted in microservices which split the service into smaller sections. These microservices were independent and could be updated separately instead of updating the whole system. The containers are used to package applications to be delivered as one and take up less space. Kubernetes creates scalability and less downtime.

Docker Advantages and Disadvantages compared to Virtual Machines:

Advantages:
- Docker requires much less memory space
- Docker has quicker launch times
- Docker has generally higher performance for containers as compared to running multiple virtual machines
- Docker has greater scalability
- Docker has higher efficiency
- Docker has Higher portability
- Docker has shared data leading to more data space

Disadvantages:
- VMs are more secure
- VMs can change hosts easily
- VMs have more established the functionality
- VMs have better management tools
- VMs are cheaper

Design

MongoDB is another type of database. It's required to deploy it using GKE using a YAML file. If you used any Kubernetes tool in your deployment that is not included in the lab you should describe it and why you used it

Deliverables

1.
See above
2.
https://drive.google.com/file/d/1ug80hWpNEM3dyHK9TiECA6FMGTO0BnA4/view?usp=sharing
3.
https://drive.google.com/file/d/1Q8FQHjUJ5jQdPimV9ZzJhENNtHqYn8iv/view?usp=sharing