MedTech
MEDITERRANEAN
INSTITUTE OF TECHNOLOGY
SOUTH MEDITERRANEAN UNIVERSITY

CS 453: Cloud and Pervasive computing
Session: Fall 2024
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Lab Exam

1. Architecture

1.1. What is a Kubernetes node and what are the types of nodes in a Kubernetes cluster?

1.2. List and briefly explain the three Master plane components in Kubernetes.

2. Kubernetes-Application

2.1. List four Kubernetes resources.

2.2. Explain the difference between ConfigMap and Secret usage scenarios and provide a simple example where using a Secret would be more appropriate than a ConfigMap.

2.3. Create a ConfigMap named 'app-config' that will provide a configuration file 'config.txt' with the message 'This is a configuration message from ConfigMap!' for our Python application.

2.4. "Create a Secret named 'app-secret' that will store the password 'mysecretpassword' to be used as an environment variable in our Python application."

2.5. Create a deployment named 'python-app' that:

- Uses image ' qtmas/lab-exam-ex2:1.0'
- Runs 2 replicas
- Exposes port 5000
- Mounts the ConfigMap 'app-config' at '/config'
- Sets environment variables:
    - APP_PASSWORD from the secret
    - APP_ENV with value 'production'

2.6. Create a NodePort service named 'python-service' that exposes the python-app deployment created in 2.5

3. Helm

3.1. Give a short definition of Helm.

3.2. Convert the manifests given into a Helm chart. You need to:

3.2.1. Create values.yaml with appropriate variables for:

a. Application name
b. labels
c. image tag
d. number of replicas
e. resource limits and requests
f. Service name
g. service type
h. ports

3.2.2. Create the templates using these values