


Software Containerization

Project 2021 - Group 12

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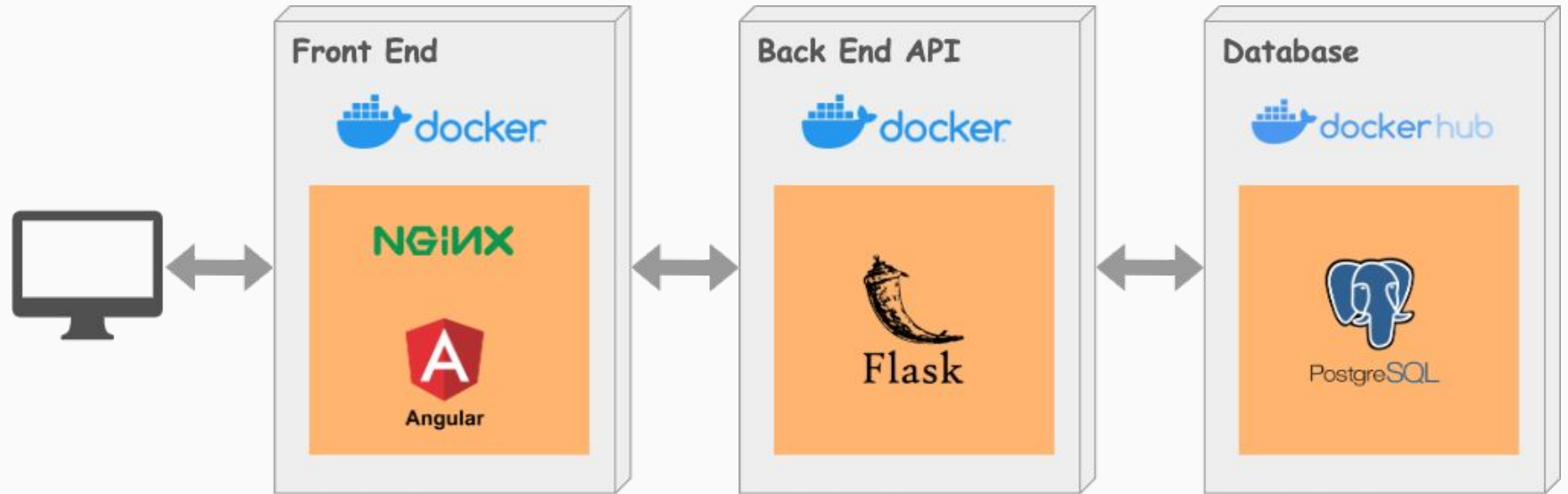


Agenda

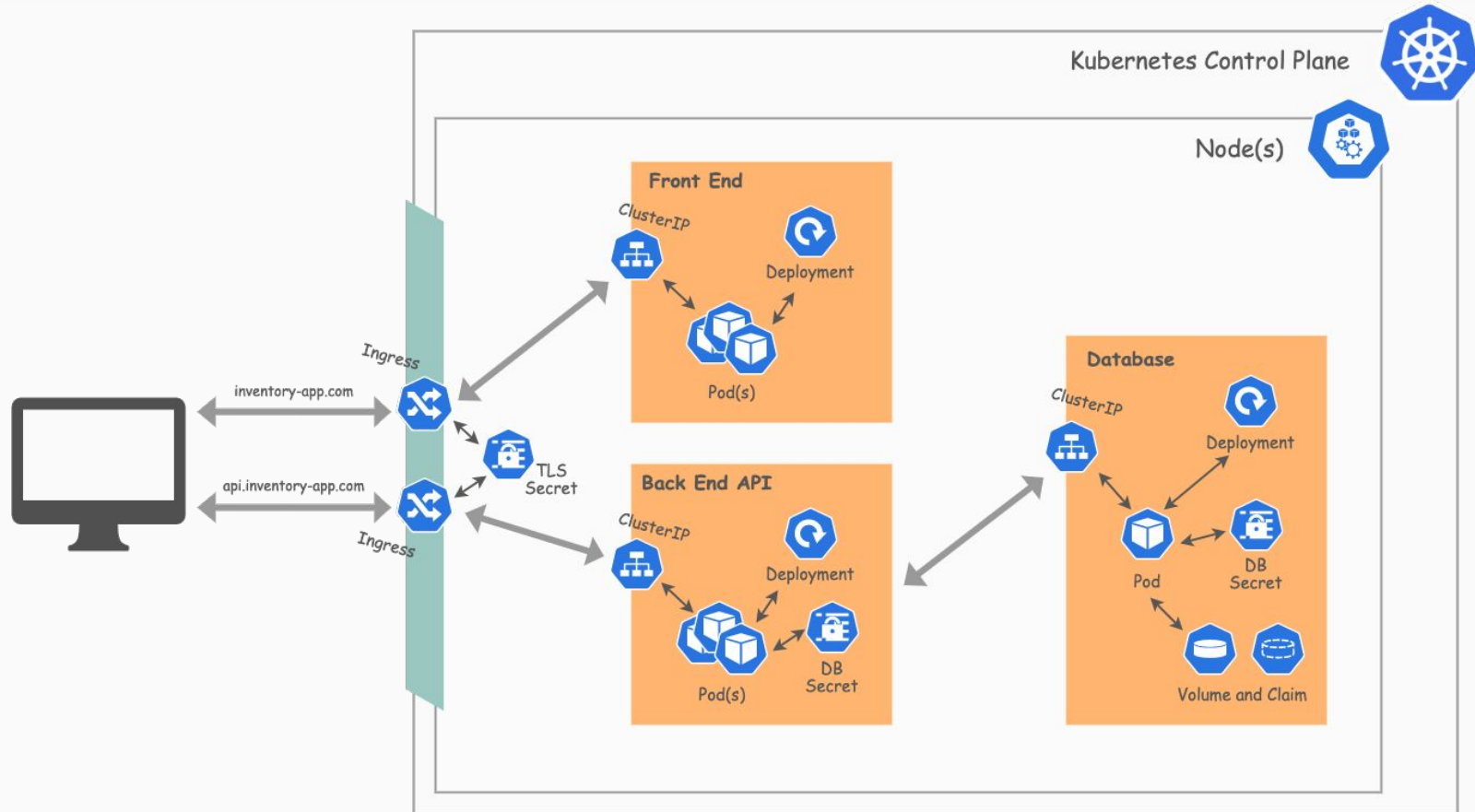
- Architecture
- Configuration
- Deployment
- Upgrade
- ServiceMesh (Istio) and Prometheus
- Google Cloud Platform

Architecture

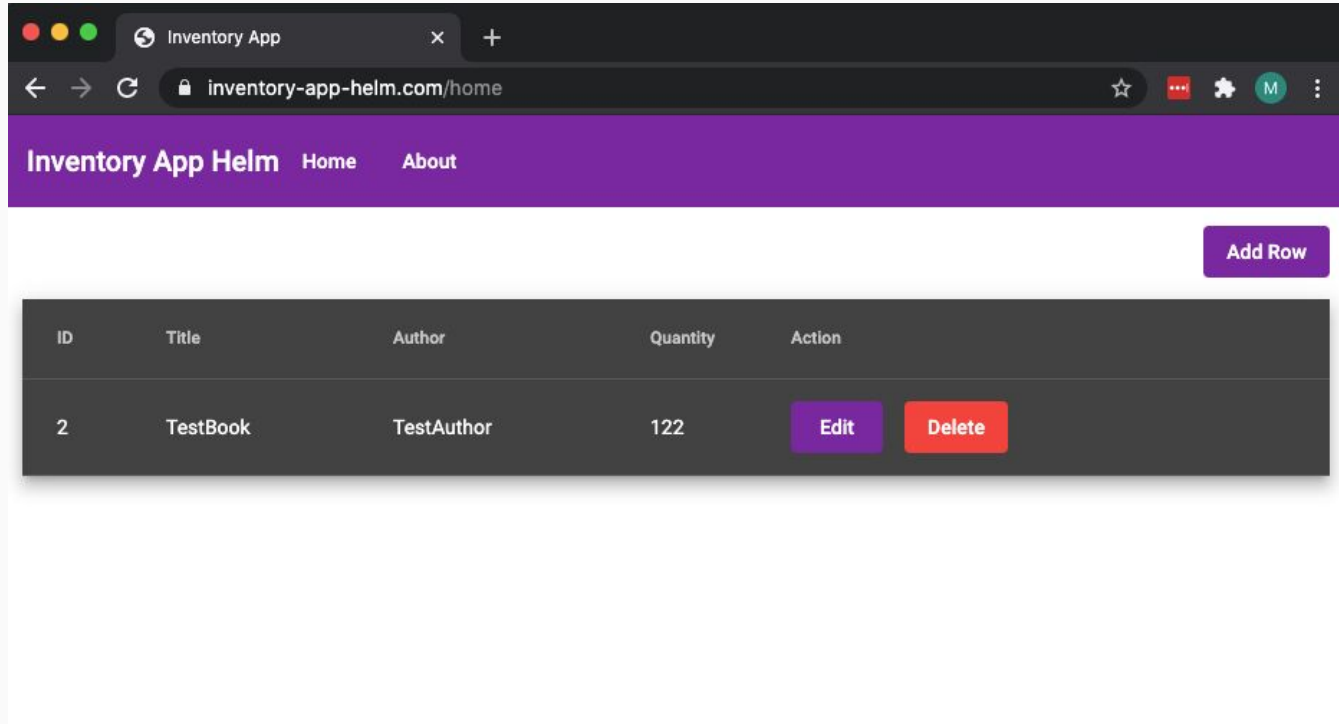
Docker Architecture



Kubernetes Architecture



App Demo



Nginx CORS

```
annotations:
```

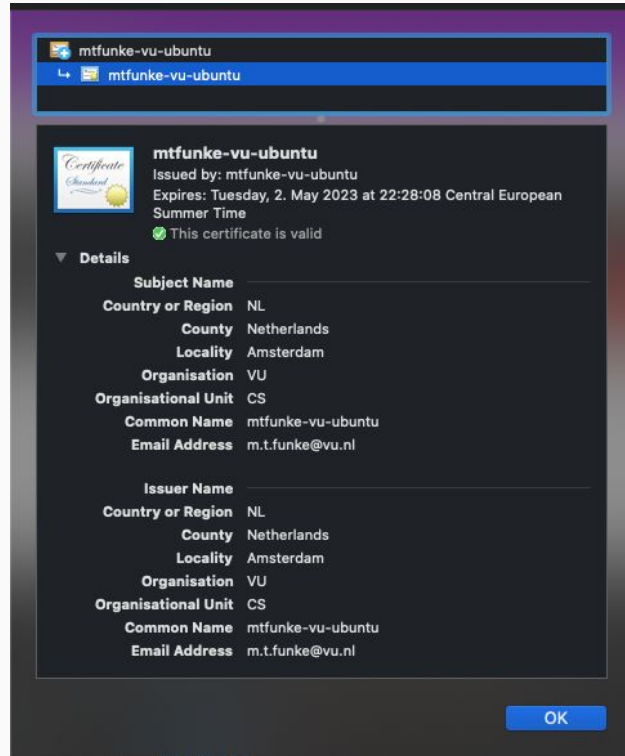
```
  nginx.ingress.kubernetes.io/enable-cors: "true"
```

```
  nginx.ingress.kubernetes.io/cors-allow-methods: "PUT, GET, POST, OPTIONS"
```

```
  nginx.ingress.kubernetes.io/cors-allow-origin: "*"
```

```
  nginx.ingress.kubernetes.io/cors-allow-credentials: "true"
```

```
---
```



Architecture [demo]

- ✓ Docker Architecture
- ✓ Kubernetes Architecture
- ✓ CORS configuration
- ✓ TLS configuration

Configuration

[demo]

Configuration [demo]

- ✓ Host is running a single node
- ✓ Kubernetes status and add-ons.
- ✓ MetalLB Load Balancer configuration
- ✓ Default storage class `microk8s-hostpath`
- ✓ Kubernetes registry and images

Deployment

[demo]

Deployment via Helm3 [demo]

- ✓ Helm3 chart and sub-charts
- ✓ PostgreSQL `postStart` DB schema migration
- ✓ Helm3 installation
- ✓ Horizontal scaling
- ✓ Helm3 uninstallation

Upgrade
[demo]

Upgrade [demo]

- ✓ API source-code change
- ✓ New Image tag and push to local repository
- ✓ Deployment: Rollout
- ✓ Deployment: Canary-Update

Istio ServiceMesh

[demo]

- ✓ Configured Istio Gateway and VirtualService
- ✓ Configured mTLS
- ✓ Integrated Istio components into Helm chart
- ✓ Ran queries against Prometheus

GCloud Platform

[demo]

- ✓ Build the docker image
- ✓ Push to the Google Cloud Registry
- ✓ Adapt the Ingress template to api
- ✓ Install the helm package
- ✓ Expose the app with a LoadBalancer

Source-code repository:

- <https://github.com/FunkeMT/nl.vu.containerization>

References:

- <https://amlanscloud.com/reactappdeploy/>
- <https://mickeyabhi1999.medium.com/build-and-deploy-a-web-app-with-react-flask-nginx-postgresql-docker-and-google-kubernetes-e586de159a4d>