

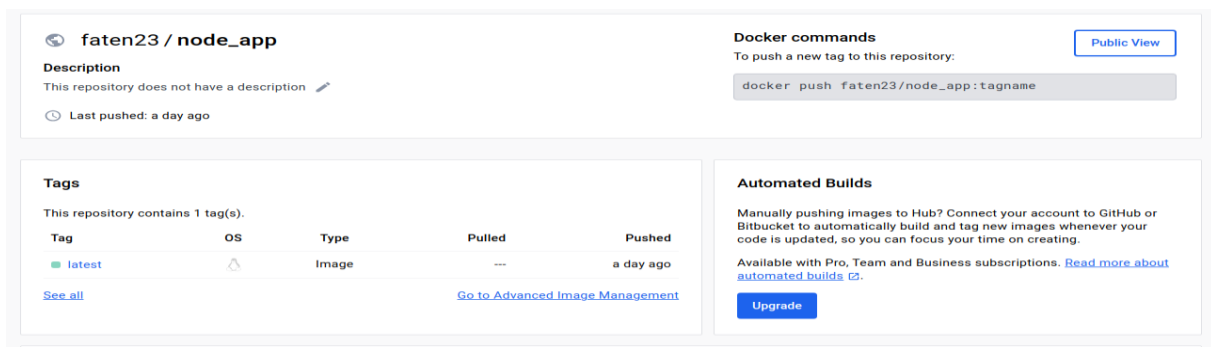
Documentation projet << Orchestration & Surveillance >>

Ce projet comporte 3 étapes :

- Création et publication des images sur Dockerhub
- l'orchestration via Kubernetes sur un cluster Minikube
- Création de playbooks Ansible pour la configuration des métriques avec Prometheus et la visualisation via Grafana.

1. Création et Publication de l'image docker sur Dockerhub :

- Création DockerFile
- Créer l'image Docker : `docker build -t node-app .`
- Exécuter l'image Docker : `docker run -p 4000:4000 --name my-node-app node-app`
- Ouvrir Dockerhub : `docker login`
- Identifier l'image Docker : `docker tag node_app:latest faten23/node_app:latest`
- Publier l'image sur Dockerhub : `docker push faten23/node_app:latest`



2. l'orchestration via Kubernetes sur un cluster Minikube :

- Démarrer le cluster minikube

```
faten@faten-virtual-machine:~/scripting$ minikube start --driver=docker
minikube v1.31.2 on Ubuntu 22.04
minikube 1.32.0 is available! Download it: https://github.com/kubernetes/minikube/releases/tag/v1.32.0
To disable this notice, run: 'minikube config set WantUpdateNotification false'

Using the docker driver based on existing profile

The requested memory allocation of 2200MiB does not leave room for system overhead (total system memory: 2928MiB). You may face stability issues.
Suggestion: Start minikube with less memory allocated: 'minikube start --memory=2200mb'

Starting control plane node minikube in cluster minikube
Pulling base image ...
Restarting existing docker container for "minikube" ...

Docker is nearly out of disk space, which may cause deployments to fail! (87% of capacity). You can pass '--force' to skip this check.
Suggestion:

Try one or more of the following to free up space on the device:

1. Run "docker system prune" to remove unused Docker data (optionally with "-a")
2. Increase the storage allocated to Docker for Desktop by clicking on:
Docker icon > Preferences > Resources > Disk Image Size
3. Run "minikube ssh -- docker system prune" if using the Docker container runtime
Related issue: https://github.com/kubernetes/minikube/issues/9024

Preparing Kubernetes v1.27.4 on Docker 24.0.4 ...
Configuring bridge CNI (Container Networking Interface) ...
Verifying Kubernetes components...
  ■ Using image gcr.io/k8s-minikube/storage-provisioner:v5
Enabled addons: storage-provisioner, default-storageclass
Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default
```

- Exécuter le fichier deploymentservice.yml : `kubectl apply -f deploymentservice.yml`

- Afficher les informations de deployments : `kubectl get deployment`

```
faten@faten-virtual-machine:~/scripting$ kubectl get deployment
NAME                READY    UP-TO-DATE    AVAILABLE    AGE
nodeapp-deployment  1/1      1              1            23h
```

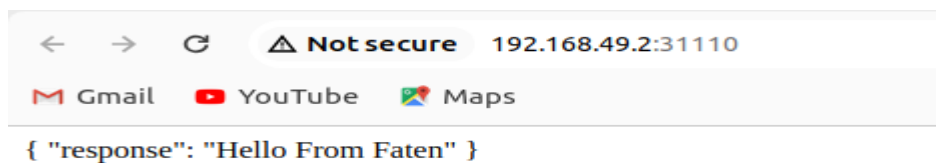
- Afficher les informations de services : `Kubectl get svc`

```
faten@faten-virtual-machine:~/scripting$ kubectl get svc
NAME                TYPE          CLUSTER-IP    EXTERNAL-IP    PORT(S)          AGE
kubernetes          ClusterIP     10.96.0.1     <none>         443/TCP          43h
nodeapp-service     LoadBalancer 10.111.151.83 <pending>      5000:31110/TCP   23h
```

- Afficher des informations sur l'affichage de deployment : `minikube service nodeapp-service`

```
faten@faten-virtual-machine:~/scripting$ minikube service nodeapp-service
-----|-----|-----|-----|
| NAMESPACE | NAME          | TARGET PORT | URL                  |
|-----|-----|-----|-----|
| default   | nodeapp-service | 5000        | http://192.168.49.2:31110 |
|-----|-----|-----|-----|
🌐 Opening service default/nodeapp-service in default browser...
faten@faten-virtual-machine:~/scripting$ Opening in existing browser session.
```

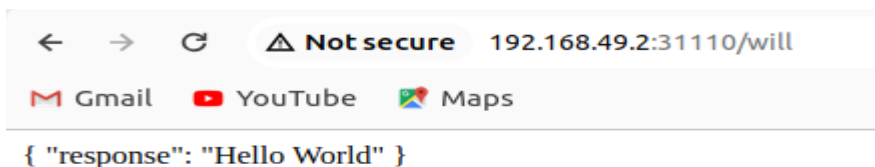
- Accéder au navigateur



← → ↻ ⚠ Not secure 192.168.49.2:31110

📧 Gmail 📺 YouTube 🗺 Maps

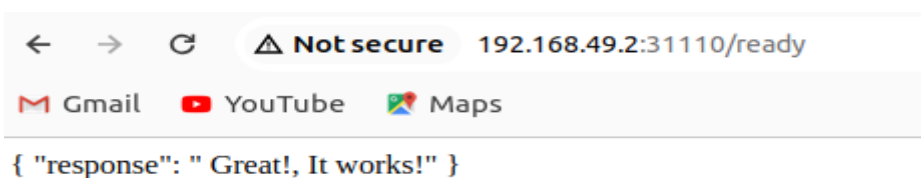
```
{ "response": "Hello From Faten" }
```



← → ↻ ⚠ Not secure 192.168.49.2:31110/will

📧 Gmail 📺 YouTube 🗺 Maps

```
{ "response": "Hello World" }
```



← → ↻ ⚠ Not secure 192.168.49.2:31110/ready

📧 Gmail 📺 YouTube 🗺 Maps

```
{ "response": " Great!, It works!" }
```

3. Création de playbooks Ansible pour la configuration des métriques avec Prometheus et la visualisation via Grafana.

- Création `metrics.js` , `playbook1.yml` and `prometheus.yml`
- Exécuter le playbook ansible : `ansible-playbook playbook1.yml`

- Accéder au Prometheus

localhost:9090/targets?search=

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Prometheus Alerts Graph Status Help

Targets

All scrape pools Unhealthy Collapse All Filter by endpoint or labels

nodejs-app (1/1 up) show less

Endpoint	State	Labels	Last Scrape	Scrape Duration	Error
http://localhost:4000/metrics	UP	instance="localhost:4000" job="nodejs-app"	19m 29s ago	18.734ms	

Not secure faten-virtual-machine:4000/metrics

Gmail YouTube Maps

```
# HELP process_cpu_user_seconds_total Total user CPU time spent in seconds.
# TYPE process_cpu_user_seconds_total counter
process_cpu_user_seconds_total 167.94297500000002

# HELP process_cpu_system_seconds_total Total system CPU time spent in seconds.
# TYPE process_cpu_system_seconds_total counter
process_cpu_system_seconds_total 74.93719300000005

# HELP process_cpu_seconds_total Total user and system CPU time spent in seconds.
# TYPE process_cpu_seconds_total counter
process_cpu_seconds_total 242.88016799999999

# HELP process_start_time_seconds Start time of the process since unix epoch in seconds.
# TYPE process_start_time_seconds gauge
process_start_time_seconds 1700824552

# HELP process_resident_memory_bytes Resident memory size in bytes.
# TYPE process_resident_memory_bytes gauge
process_resident_memory_bytes 19877888

# HELP process_virtual_memory_bytes Virtual memory size in bytes.
# TYPE process_virtual_memory_bytes gauge
process_virtual_memory_bytes 606507008

# HELP process_heap_bytes Process heap size in bytes.
# TYPE process_heap_bytes gauge
process_heap_bytes 62636032

# HELP process_open_fds Number of open file descriptors.
# TYPE process_open_fds gauge
process_open_fds 21

# HELP process_max_fds Maximum number of open file descriptors.
# TYPE process_max_fds gauge
process_max_fds 1048576

# HELP nodejs_eventloop_lag_seconds Lag of event loop in seconds.
# TYPE nodejs_eventloop_lag_seconds gauge
nodejs_eventloop_lag_seconds 0.026130013

# HELP nodejs_eventloop_lag_min_seconds The minimum recorded event loop delay.
# TYPE nodejs_eventloop_lag_min_seconds gauge
nodejs_eventloop_lag_min_seconds 0.01056768

# HELP nodejs_eventloop_lag_max_seconds The maximum recorded event loop delay.
# TYPE nodejs_eventloop_lag_max_seconds gauge
nodejs_eventloop_lag_max_seconds 0.010575871
```

- Accéder au Grafana et lancer la query nodejs_heap_size_used_bytes

