

An aerial photograph of a busy shipping port. The foreground and background are filled with numerous shipping containers stacked in large piles. The containers are of various colors, including blue, red, orange, white, and green. They are arranged in a grid-like pattern. In the center of the image, there is a large, semi-transparent gray rectangular box. Inside this box, the word "Kubernetes" is written in a large, black, sans-serif font.

Kubernetes

Objectifs

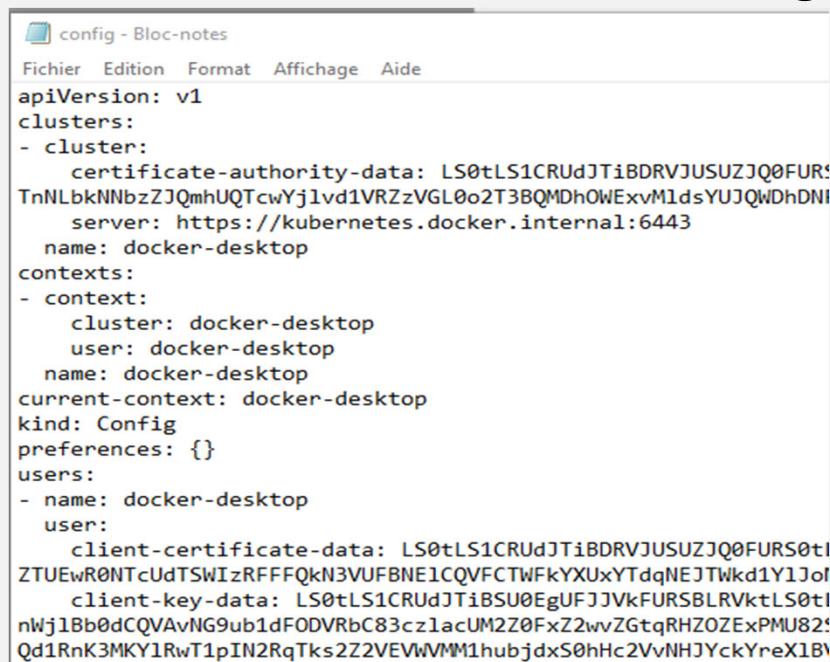
- Notre environnement de travail
- Déployer votre première application avec kubectl
- Création des pods

Notre environnement de travail

Retour sur Docker Desktop

- Un cluster avec un seul noeud (node) pour tout faire.
- Peu importe le cluster, kubectl à besoin d'un fichier config :

C:\Users\[usager]\.kube

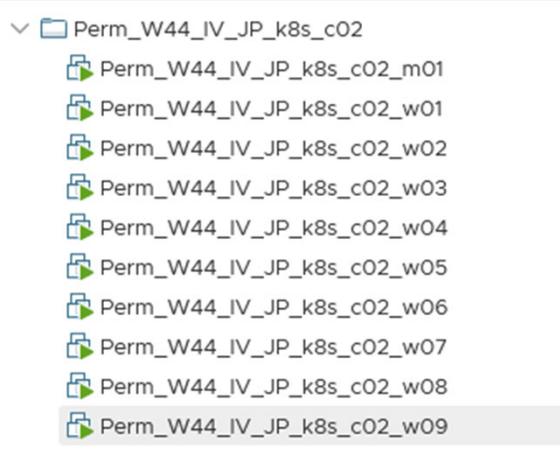


```
config - Bloc-notes
Fichier Edition Format Affichage Aide
apiVersion: v1
clusters:
- cluster:
    certificate-authority-data: LS0tLS1CRUdJTiBDRVJUSUZJQ0FURS0tI
TnNLbkNNbzJJQmhUQTcwYj1vd1VRZzVGL0o2T3BQMDhOWExvM1dsYUJQWDhDNI
    server: https://kubernetes.docker.internal:6443
    name: docker-desktop
contexts:
- context:
    cluster: docker-desktop
    user: docker-desktop
    name: docker-desktop
current-context: docker-desktop
kind: Config
preferences: {}
users:
- name: docker-desktop
  user:
    client-certificate-data: LS0tLS1CRUdJTiBDRVJUSUZJQ0FURS0tI
ZTUEwR0NTcUdTSWIzRFFFQkN3VUFBNE1CQVFCTWfkYXUxYTdqNEJTWkd1Y1JoI
    client-key-data: LS0tLS1CRUdJTiBSU0EgUFJJVkfFURSBLRVktLS0tI
nWj1Bb0dCQVAvNG9ub1dFODVRbC83czlacUM2Z0FxZ2wvZGtqRHZOZEPMU82!
Qd1Rnk3MKY1Rwt1pIN2RqTks2Z2VEVVMM1hubjdxS0hHc2VvNHJYckYreX1B!
```

Notre environnement de travail

Notre cluster

10 vms :



10 nœuds : 1 master et 9 worker

```
jpduches@VM-DevOpsJPD:~/k8s$ kubectl get nodes
NAME      STATUS   ROLES      AGE   VERSION
ivk8sc02m01 Ready    control-plane,master   25h   v1.20.10
ivk8sc02w01 Ready    <none>        25h   v1.20.10
ivk8sc02w02 Ready    <none>        25h   v1.20.10
ivk8sc02w03 Ready    <none>        25h   v1.20.10
ivk8sc02w04 Ready    <none>        25h   v1.20.10
ivk8sc02w05 Ready    <none>        25h   v1.20.10
ivk8sc02w06 Ready    <none>        25h   v1.20.10
ivk8sc02w07 Ready    <none>        25h   v1.20.10
ivk8sc02w08 Ready    <none>        25h   v1.20.10
ivk8sc02w09 Ready    <none>        25h   v1.20.10
jpduches@VM-DevOpsJPD:~/k8s$
```

Un fichier config dans maVm /home/[user]/.kube/config

```
1 apiVersion: v1
2 clusters:
3 - cluster:
4   certificate-authority-data:
5     LS0tLS1CRUdJTiBDRVJUSUZjQ0FURS0tLS0tCk1JSUM1eKNDQWMrZ0F3SUJBZ0lCQURBTkJna
6   server: https://10.100.2.90:6443
7   name: kubernetes-distant
8 contexts:
9 - context:
10   cluster: kubernetes-distant
11   namespace: jpd
12   user: kubernetes-admin-distant
13   name: kubernetes-admin@kubernetes
14 current-context: kubernetes-admin@kubernetes
15 kind: Config
16 preferences: {}
17 users:
18 - name: kubernetes-admin-distant
19   user:
20     client-certificate-data:
21       LS0tLS1CRUdJTiBDRVJUSUZjQ0FURS0tLS0tCk1JSURFekNDQWZ1Z0F3SUJBZ0lJSXgGa1RPVi
22     client-key-data:
23       LS0tLS1CRUdJTiBSU0EgUFJJjkFUR5BLRVktLS0tLQpNSUlFb2dJQkFB50NBUVBbmhwDc9ld
```

Peut-être visualisé avec :
\$kubectl config view
Ou édité avec nano, vi, code, etc.

Notre environnement de travail

Namespace

- Isole un ensemble de ressources
(Pods, Services, Deployments,...)
- Partage d'un cluster
 - Équipe / projet / clients
- Namespace par défaut si pas spécifié : default

```
j pduches@VM-DevOpsJPD:~/k8s$ kubectl get namespaces
NAME          STATUS  AGE
calico-apiserver  Active  4h58m
calico-system   Active  4h59m
default        Active  5h1m
development    Active  30s
jpd           Active  13m
kube-node-lease  Active  5h1m
kube-public    Active  5h1m
kube-system    Active  5h1m
pfl            Active  3h4m
production     Active  6s
test           Active  14s
tigera-operator  Active  4h59m
j pduches@VM-DevOpsJPD:~/k8s$ █
```

Notre environnement de travail

Liste des ``pods``

```
j pduches@VM-DevOpsJPD:~/k8s$ kubectl get pod --all-namespaces
NAMESPACE      NAME          READY   STATUS    RESTARTS   AGE
calico-apiserver  calico-apiserver-5b5cddc4db-6hzbr  1/1     Running   0          2d
calico-system   calico-kube-controllers-6b68fbcc84-skfmn  1/1     Running   0          2d
calico-system   calico-node-2ddpj  1/1     Running   0          2d
calico-system   calico-node-7wtx4  1/1     Running   0          2d
calico-system   calico-node-98t9g  1/1     Running   0          2d
calico-system   calico-node-b2lx5  1/1     Running   0          2d
calico-system   calico-node-fq956  1/1     Running   0          2d
calico-system   calico-node-mk54s  1/1     Running   0          2d
calico-system   calico-node-sqld2  1/1     Running   0          2d
calico-system   calico-node-vg48x  1/1     Running   0          2d
calico-system   calico-node-wxttm  1/1     Running   0          2d
calico-system   calico-node-xhbhp  1/1     Running   0          2d
calico-system   calico-typha-747bf9cf65-bzlk7  1/1     Running   0          2d
calico-system   calico-typha-747bf9cf65-fbjjl  1/1     Running   0          2d
calico-system   calico-typha-747bf9cf65-mwm5r  1/1     Running   0          2d
default         www           1/1     Running   0          22h
development     www           1/1     Running   0          65m
kube-system     coredns-74ff55c5b-jlrm7  1/1     Running   0          2d
kube-system     coredns-74ff55c5b-mcp77  1/1     Running   0          2d
kube-system     etcd-tvk8sc02m01  1/1     Running   0          2d
kube-system     kube-apiserver-ivk8sc02m01  1/1     Running   0          2d
kube-system     kube-controller-manager-ivk8sc02m01  1/1     Running   0          2d
kube-system     kube-proxy-4gks9   1/1     Running   0          2d
kube-system     kube-proxy-4r8kg   1/1     Running   0          2d
kube-system     kube-proxy-6mwcv   1/1     Running   0          2d
kube-system     kube-proxy-fmgb8   1/1     Running   0          2d
kube-system     kube-proxy-g486v   1/1     Running   0          2d
kube-system     kube-proxy-gmhmf   1/1     Running   0          2d
kube-system     kube-proxy-jn6vj   1/1     Running   0          2d
kube-system     kube-proxy-lqt2n   1/1     Running   0          2d
kube-system     kube-proxy-ph6th   1/1     Running   0          2d
```

```
j pduches@VM-DevOpsJPD:~/k8s$ kubectl get pod --namespace=development
NAME   READY   STATUS    RESTARTS   AGE
www    1/1     Running   0          66m
j pduches@VM-DevOpsJPD:~/k8s$ █
```

- Supprimer un pod dans un namespace qui n'est pas celui par défaut (présent dans le fichier .kube/config) :

```
j pduches@VM-DevOpsJPD:~/k8s$ kubectl delete pod/www --namespace=default
pod "www" deleted
j pduches@VM-DevOpsJPD:~/k8s$ █
```

Création namespace

```
# Crédit du namespaces development (option 1)
$ kubectl create namespace development
namespace "development" created ← En ligne de commande

# Suppression du namespace
$ kubectl delete namespace/development
namespace "development" deleted

# Crédit du namespace development (option 2)
$ cat development.yaml
{
  "kind": "Namespace",
  "apiVersion": "v1",
  "metadata": {
    "name": "development",
    "labels": {
      "name": "development"
    }
  }
}
$ kubectl create -f development.yaml
namespace "development" created ← Dans un fichier de spécification
```

Notre environnement de travail

Fichier config

Un fichier config dans maVm /home/[user]/.kube/config

Indiquer votre namespace :[matricule]

```
1 apiVersion: v1
2 clusters:
3 - cluster:
4   certificate-authority-data:
5     LS0tLS1CRUdJTiBDRVJUSUZJQ0FURS0tLS0tck1JSUM1ekNDQWMrZ0F3SUJBZ0lCQURBTkJna
6   server: https://10.100.2.90:6443
7   name: kubernetes-distant
8 contexts:
9 - context:
10   cluster: kubernetes-distant
11   namespace : jpd
12   user: kubernetes-admin-distant
13   name: kubernetes-admin@kubernetes
14 current-context: kubernetes-admin@kubernetes
15 kind: Config
16 preferences: {}
17 users:
18 - name: kubernetes-admin-distant
19   user:
20     client-certificate-data:
21       LS0tLS1CRUdJTiBDRVJUSUZJQ0FURS0tLS0tck1JSURFekNDQWZ1Z0F3SUJBZ0lJSXdGa1RPVi
22     client-key-data:
23       LS0tLS1CRUdJTiBSU0EgUFJJVkfURSBLRVktLS0tLQpNSUlFb2dJQkFBS0NBUVBbmhWdc9ld
```

Création d'un pod

- Démo sur vm :

```
$kubectl get nodes  
$nano www.yml  
$kubectl create -f www.yml  
$kubectl get pods  
$kubectl describe pod/www  
$kubectl logs pod/www  
$kubectl port-forward www 8080:80  
$kubectl delete po/www
```

```
apiVersion: v1  
kind: Pod  
metadata:  
  name: www  
spec:  
  containers:  
    - name: nginx  
      image: nginx:latest
```

```
jpduches@VM-DevOpsJPD:~/k8s/demo$ kubectl apply -f www.yml  
pod/www created  
jpduches@VM-DevOpsJPD:~/k8s/demo$ kubectl get pod  
NAME READY STATUS RESTARTS AGE  
www 0/1 ContainerCreating 0 6s  
jpduches@VM-DevOpsJPD:~/k8s/demo$ kubectl get pod  
NAME READY STATUS RESTARTS AGE  
www 1/1 Running 0 11s  
jpduches@VM-DevOpsJPD:~/k8s/demo$ █
```

Cycle de vie d'un pod

- Lancement d'un pod
 \$kubectl create -f POD_SPECIFICATION.yml
- Liste des Pods
 \$kubectl get pod
 Namespaces « default »
- Description d'un pod
 \$kubectl describe pod POD_NAME
 \$kubectl describe po/POD_NAME
- Log d'un container d'un pod
 \$kubectl logs pod POD_NAME[-c CONTAINER_NAME]
- Lancement d'une commande dans un Pod existant
 \$kubectl exec pod POD_NAME[-c CONTAINER_NAME]- Command
- Suppression d'un Pod
 \$kubectl delete pod POD_NAME

Commandes d'un pod

- Démo sur vm :

```
$kubectl apply -f www.yml
$kubectl get pods
$kubectl exec www -- nginx -v
$kubectl exec -t -i www -- /bin/bash
  root@nginx: /#pwd
  root@nginx: #exit
$kubectl delete po/www
```

Fichier www.yml

```
apiVersion: v1
kind: Pod
metadata:
  name: www
spec:
  containers:
    - name: nginx
      image: nginx:1.12.2
```

Debug de container

```
j pduches@VM-DevOpsJPD:~/k8s/exer14$ kubectl get pod
NAME    READY   STATUS        RESTARTS   AGE
wp      1/2     CrashLoopBackOff   6          10m
j pduches@VM-DevOpsJPD:~/k8s/exer14$ kubectl logs pod/wp
error: a container name must be specified for pod wp, choose one of: [wordpress mysql]
j pduches@VM-DevOpsJPD:~/k8s/exer14$ kubectl logs pod/wp mysql
2021-08-23 18:30:17+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 8.0.26-1debian10 started.
2021-08-23 18:30:17+00:00 [Note] [Entrypoint]: Switching to dedicated user 'mysql'
2021-08-23 18:30:17+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 8.0.26-1debian10 started.
2021-08-23 18:30:18+00:00 [ERROR] [Entrypoint]: Database is uninitialized and password option is not specified
      You need to specify one of the following:
      - MYSQL_ROOT_PASSWORD
      - MYSQL_ALLOW_EMPTY_PASSWORD
      - MYSQL_RANDOM_ROOT_PASSWORD
j pduches@VM-DevOpsJPD:~/k8s/exer14$ kubectl logs pod/wp wordpres
error: container wordpres is not valid for pod wp
j pduches@VM-DevOpsJPD:~/k8s/exer14$ kubectl logs pod/wp wordpress
WordPress not found in /var/www/html - copying now...
Complete! WordPress has been successfully copied to /var/www/html
No 'wp-config.php' found in /var/www/html, but 'WORDPRESS...' variables supplied; copying 'wp-config-docker.php' (WORDPRESS_DB_HOST WORDPRESS_DB_NAME WORDPRESS_DB_PASSWORD WORDPRESS_USER)
AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 192.168.119.197. Set the 'ServerName' directive globally to suppress this message
AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 192.168.119.197. Set the 'ServerName' directive globally to suppress this message
[Mon Aug 23 18:19:20.158553 2021] [mpm_prefork:notice] [pid 1] AH00163: Apache/2.4.48 (Debian) PHP/7.4.22 configured -- resuming normal operations
[Mon Aug 23 18:19:20.158599 2021] [core:notice] [pid 1] AH00094: Command line: 'apache2 -D FOREGROUND'
j pduches@VM-DevOpsJPD:~/k8s/exer14$
```

Utiliser l'aide mémoire de kubectl: <https://kubernetes.io/fr/docs/reference/kubectl/cheatsheet/>

- Pour le prochain cours
 - Avoir écouté la vidéo de Pierre François Léon :
 - <https://www.youtube.com/watch?v=71164-zrjac&list=PL1Cc1A0PTWee3ok4KQz0umqsVngtInSur&index=3&t=1123s>
24 minutes 22
 - Le PDF des manifestes est sur LÉA
 - Début du laboratoire 3