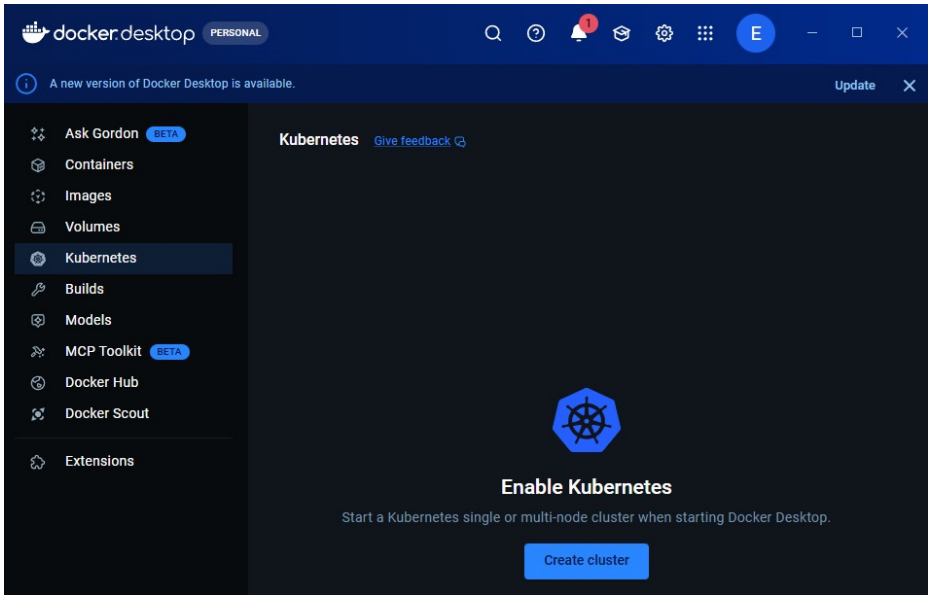
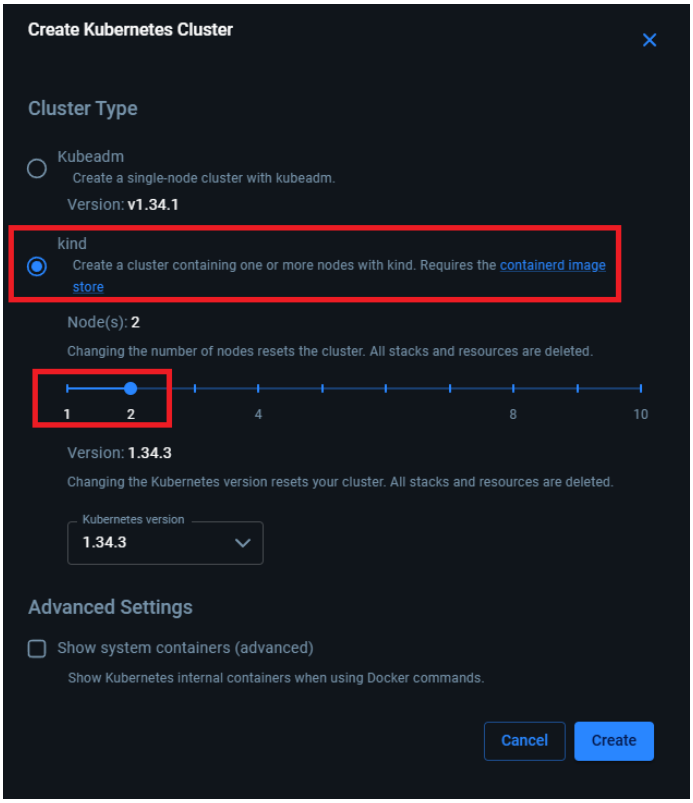
Chapitre 5 – Kubernetes : plateforme de déploiement des applications conteneurisées

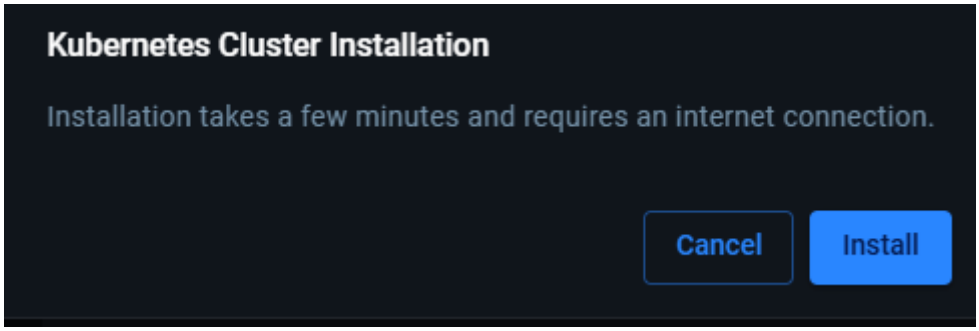
→ Affichage du panel Kubernetes :

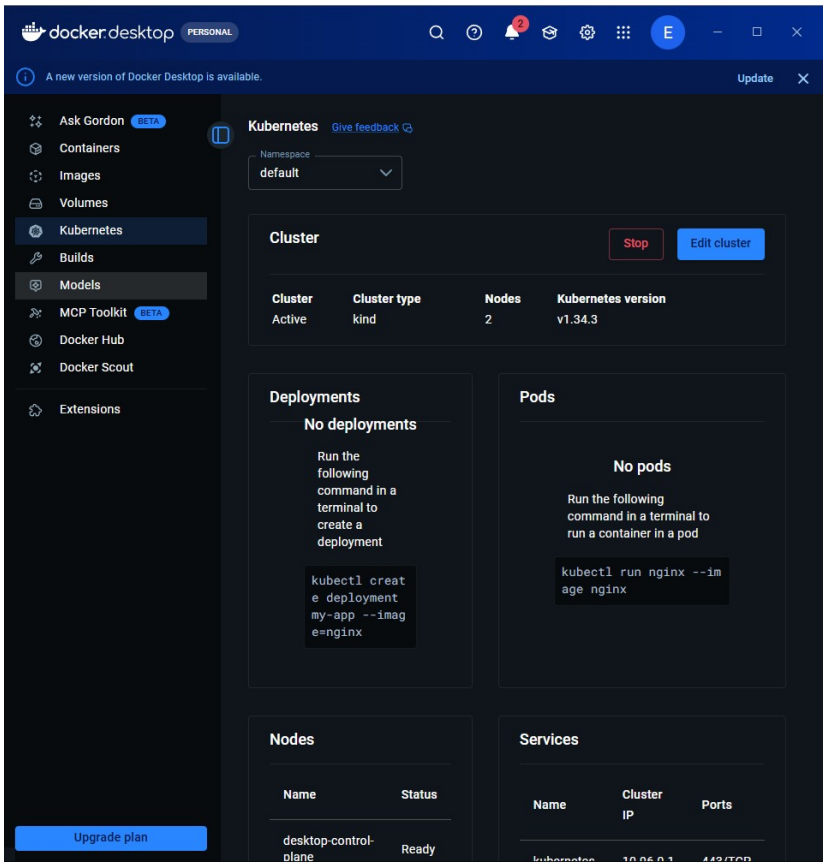


→ Cluster kind avec deux notes :

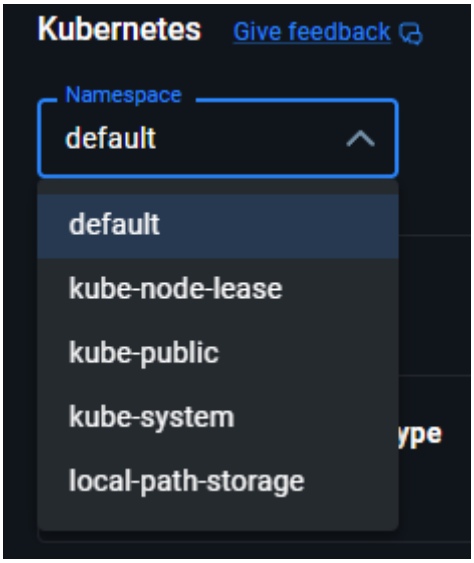


→ Installation de Kubernetes :

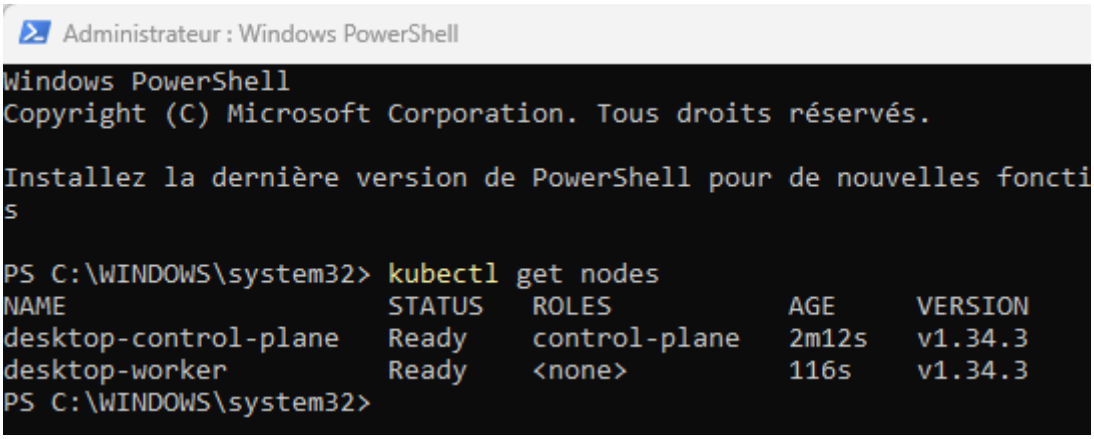




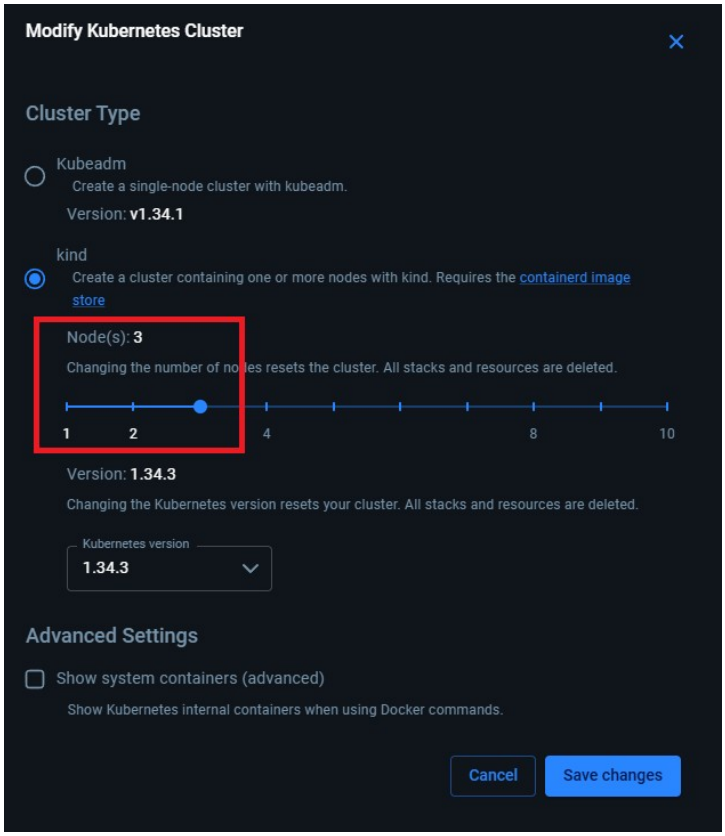
→ Namespace par défaut :



→ Affichage des nodes dans un terminal Powershell :

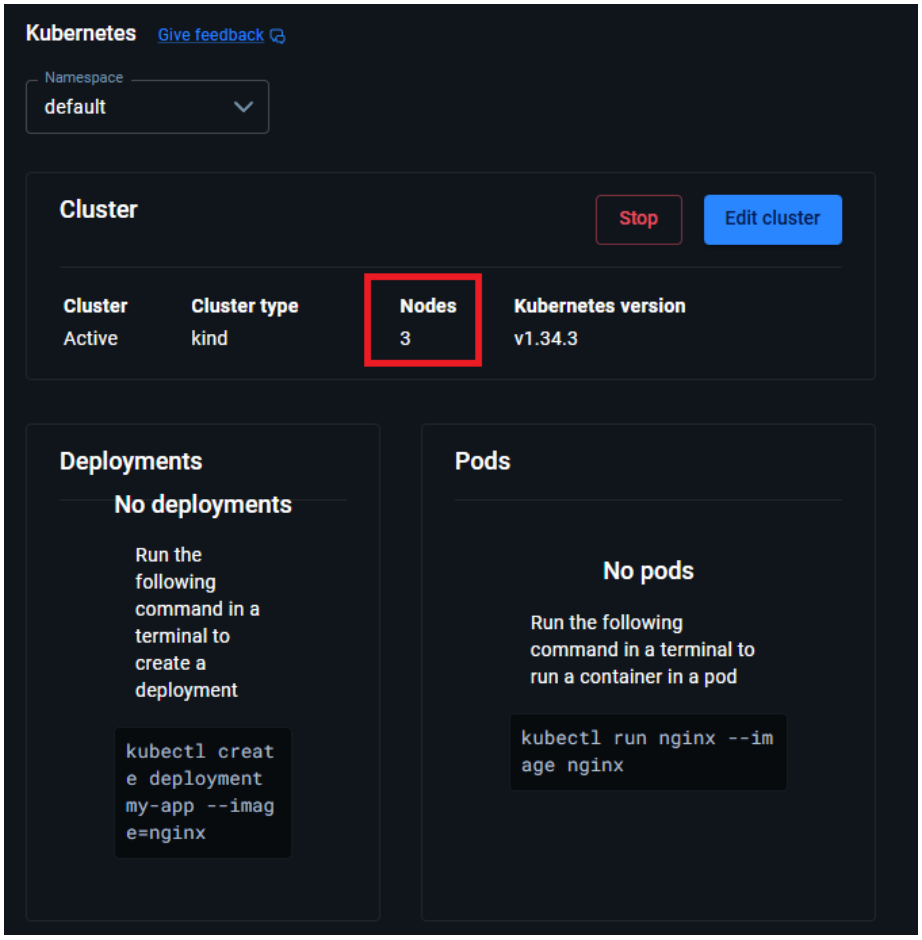


→ Modification de deux à trois nodes :

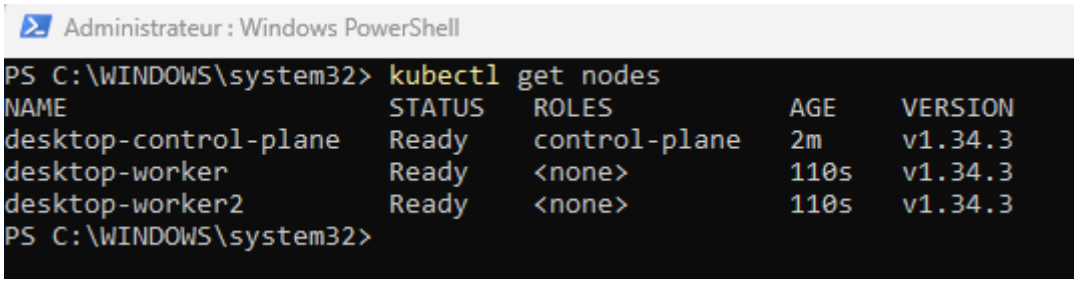


→ Case « show advanced systems » cochée :

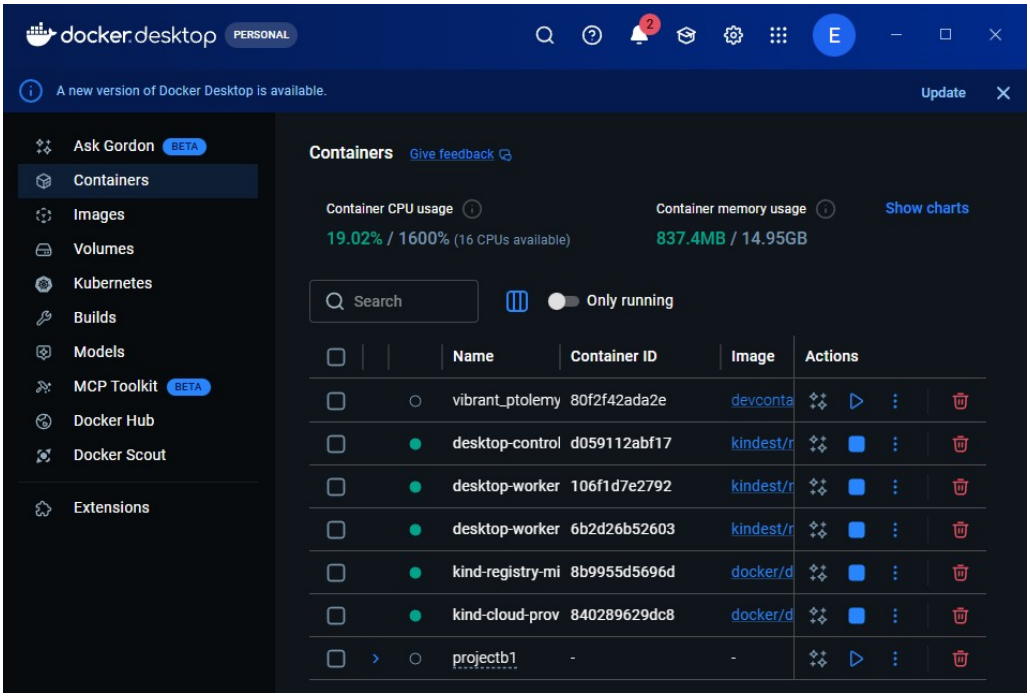
→ Conteneur redémarré avec 3 nodes :



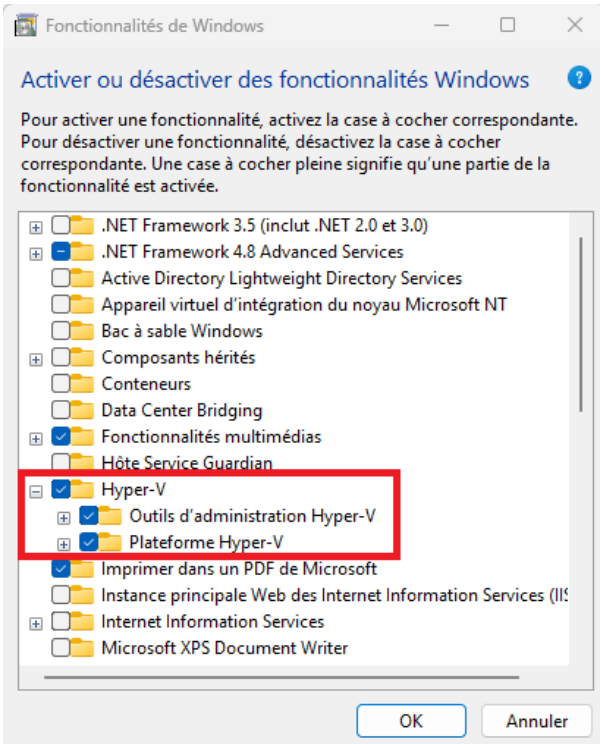
→ Affichage des 3 nodes dans Powershell :



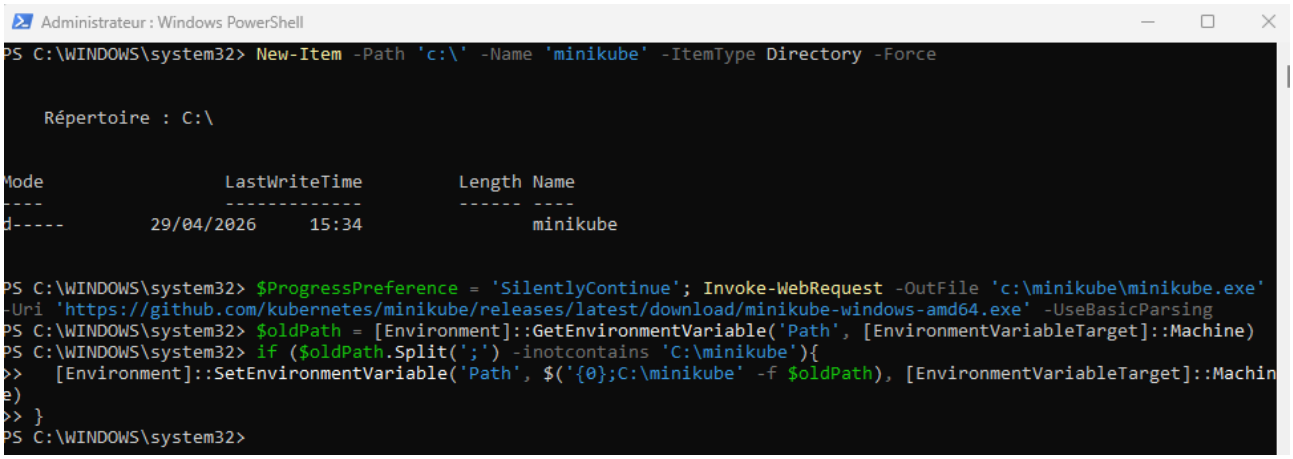
→ Affichage des conteneurs dans Docker Desktop :



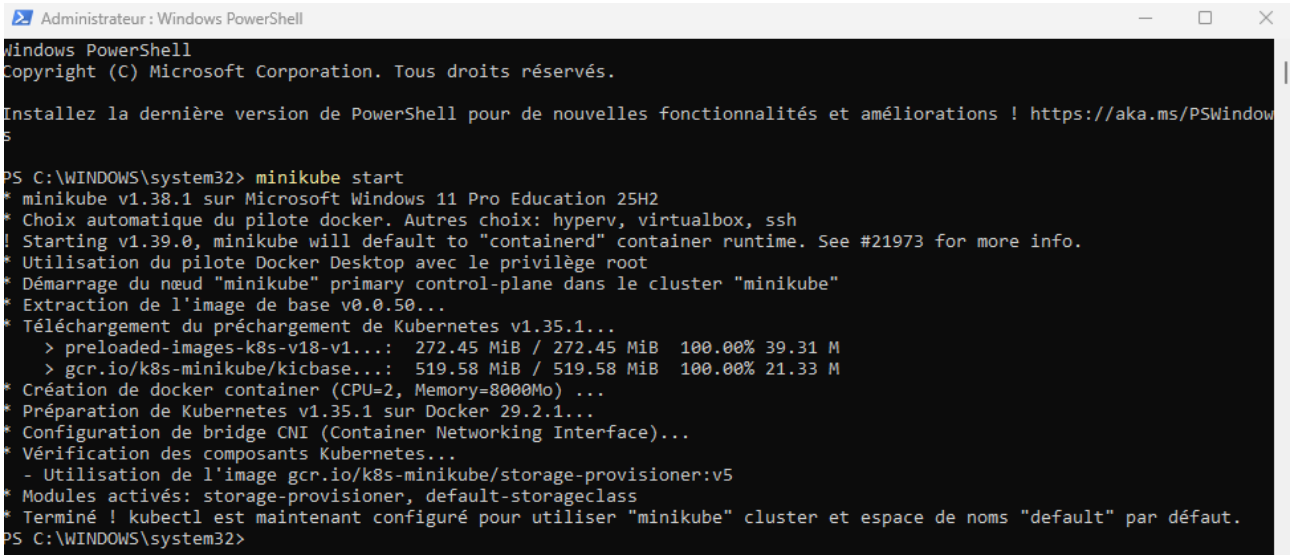
→ Activation des fonctionnalités de Hyper V :



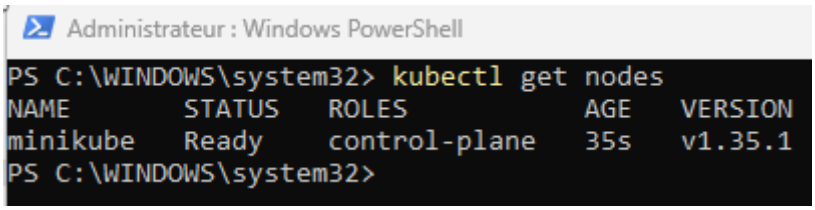
→ Copie des commandes du site de minikube :



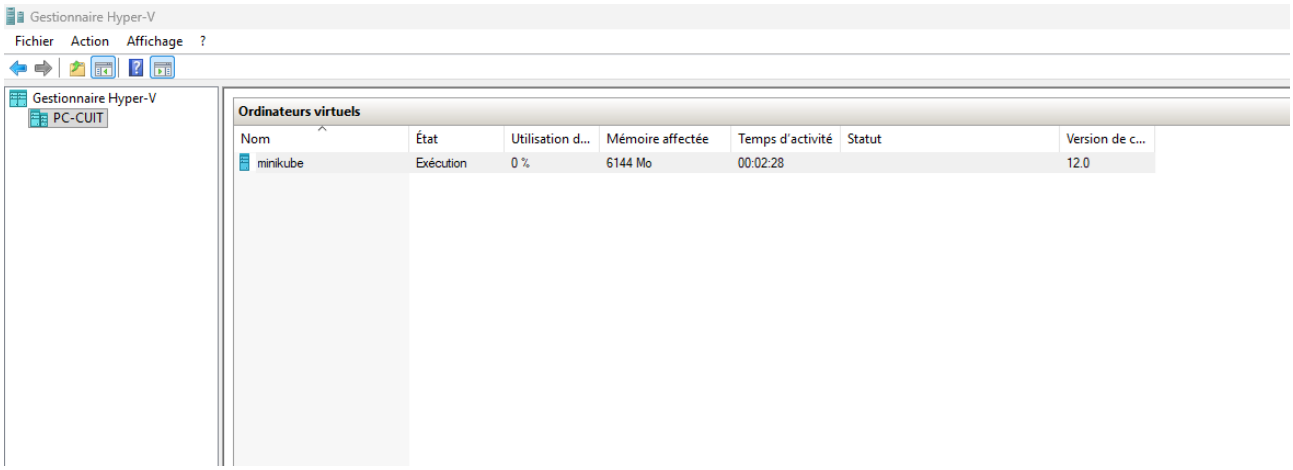
→ Démarrage de minikube :



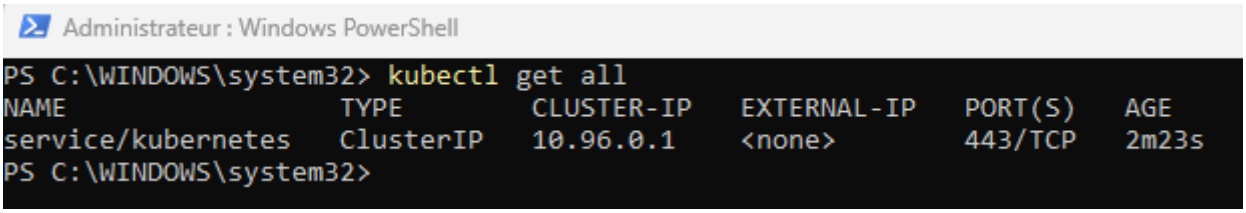
→ Affichage du node minikube :



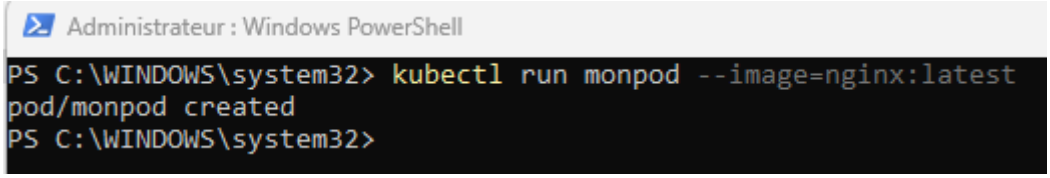
→ Affichage de la nouvelle VM minikube créée dans le gestionnaire Hyper V :



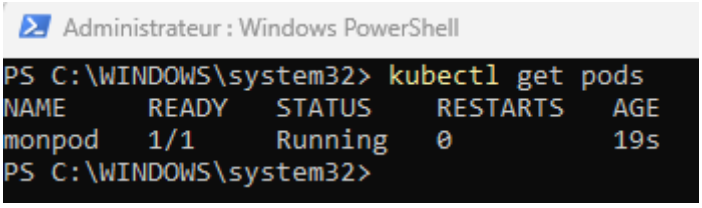
→ Affichage de tout les objets :



→ Création du pod monpod :



→ Affichage des pods :



→ Affichage de tout les objets :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl get all
NAME          READY   STATUS    RESTARTS   AGE
pod/monpod    1/1     Running   0          34s

NAME                 TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)   AGE
service/kubernetes   ClusterIP   10.96.0.1    <none>        443/TCP   4m5s
PS C:\WINDOWS\system32>
```

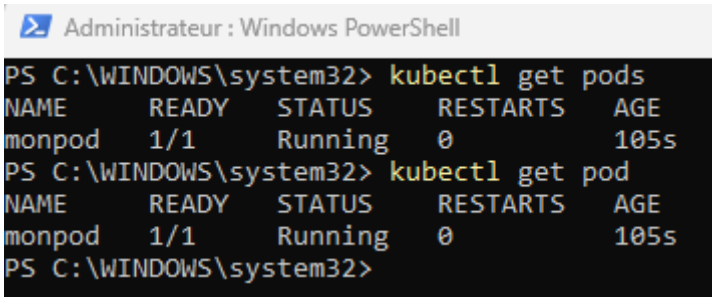
→ Affichage des logs du pod :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl logs pod/monpod
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Sourcing /docker-entrypoint.d/15-local-resolvers.envsh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2026/04/29 13:44:22 [notice] 1#1: using the "epoll" event method
2026/04/29 13:44:22 [notice] 1#1: nginx/1.29.8
2026/04/29 13:44:22 [notice] 1#1: built by gcc 14.2.0 (Debian 14.2.0-19)
2026/04/29 13:44:22 [notice] 1#1: OS: Linux 6.6.87.2-microsoft-standard-WSL2
2026/04/29 13:44:22 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2026/04/29 13:44:22 [notice] 1#1: start worker processes
2026/04/29 13:44:22 [notice] 1#1: start worker process 29
2026/04/29 13:44:22 [notice] 1#1: start worker process 30
2026/04/29 13:44:22 [notice] 1#1: start worker process 31
2026/04/29 13:44:22 [notice] 1#1: start worker process 32
2026/04/29 13:44:22 [notice] 1#1: start worker process 33
2026/04/29 13:44:22 [notice] 1#1: start worker process 34
2026/04/29 13:44:22 [notice] 1#1: start worker process 35
2026/04/29 13:44:22 [notice] 1#1: start worker process 36
2026/04/29 13:44:22 [notice] 1#1: start worker process 37
2026/04/29 13:44:22 [notice] 1#1: start worker process 38
2026/04/29 13:44:22 [notice] 1#1: start worker process 39
2026/04/29 13:44:22 [notice] 1#1: start worker process 40
2026/04/29 13:44:22 [notice] 1#1: start worker process 41
2026/04/29 13:44:22 [notice] 1#1: start worker process 42
2026/04/29 13:44:22 [notice] 1#1: start worker process 43
2026/04/29 13:44:22 [notice] 1#1: start worker process 44
PS C:\WINDOWS\system32>
```

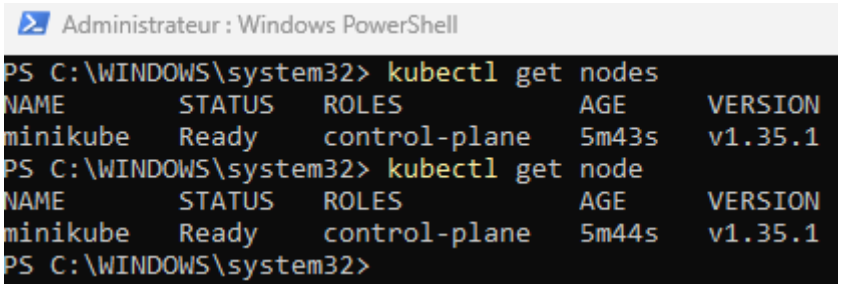
→ Affichage des espaces de noms :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl get namespace
NAME              STATUS   AGE
default           Active   4m57s
kube-node-lease   Active   4m57s
kube-public       Active   4m57s
kube-system       Active   4m57s
PS C:\WINDOWS\system32>
```

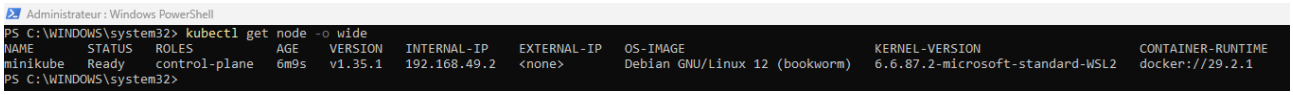
→ La commande fonctionne aussi bien avec « pod » que « pods » :



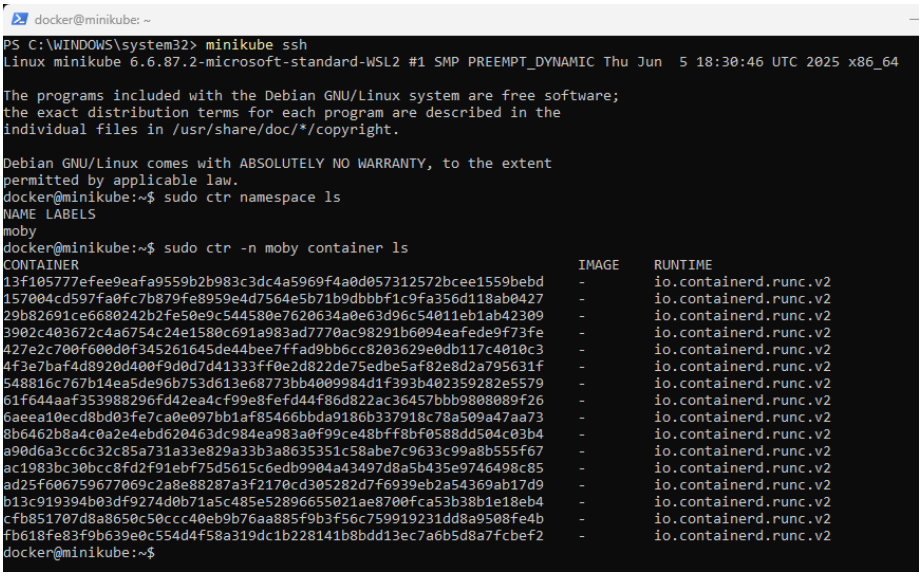
→ De même pour les commandes nodes :



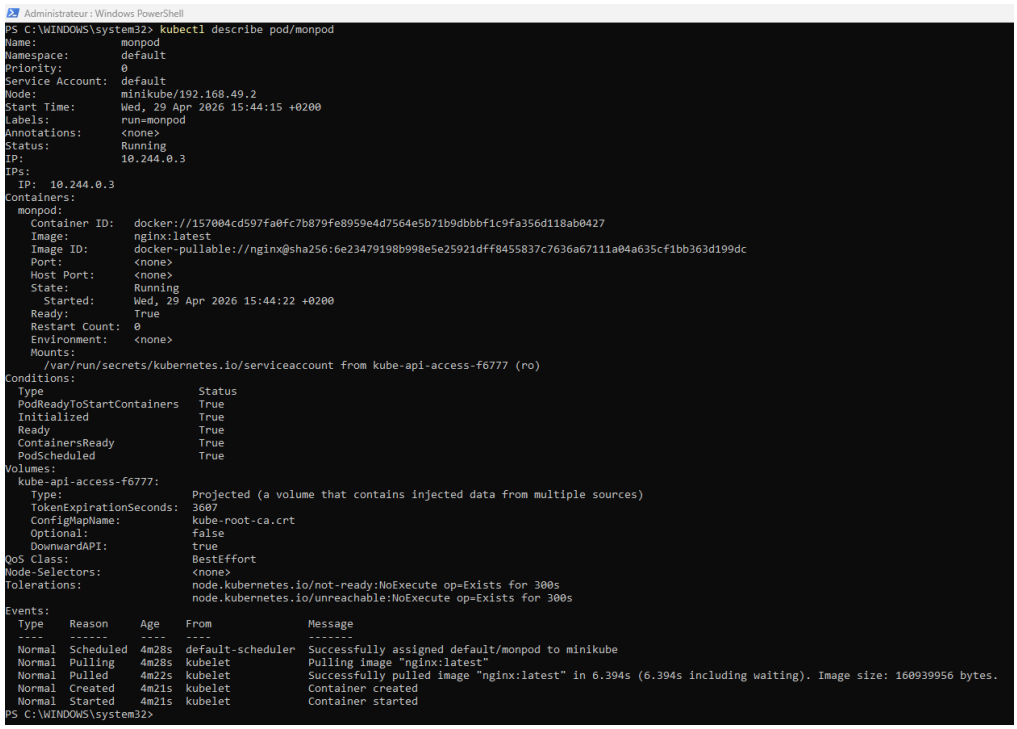
→ Affichage des champs supplémentaires :



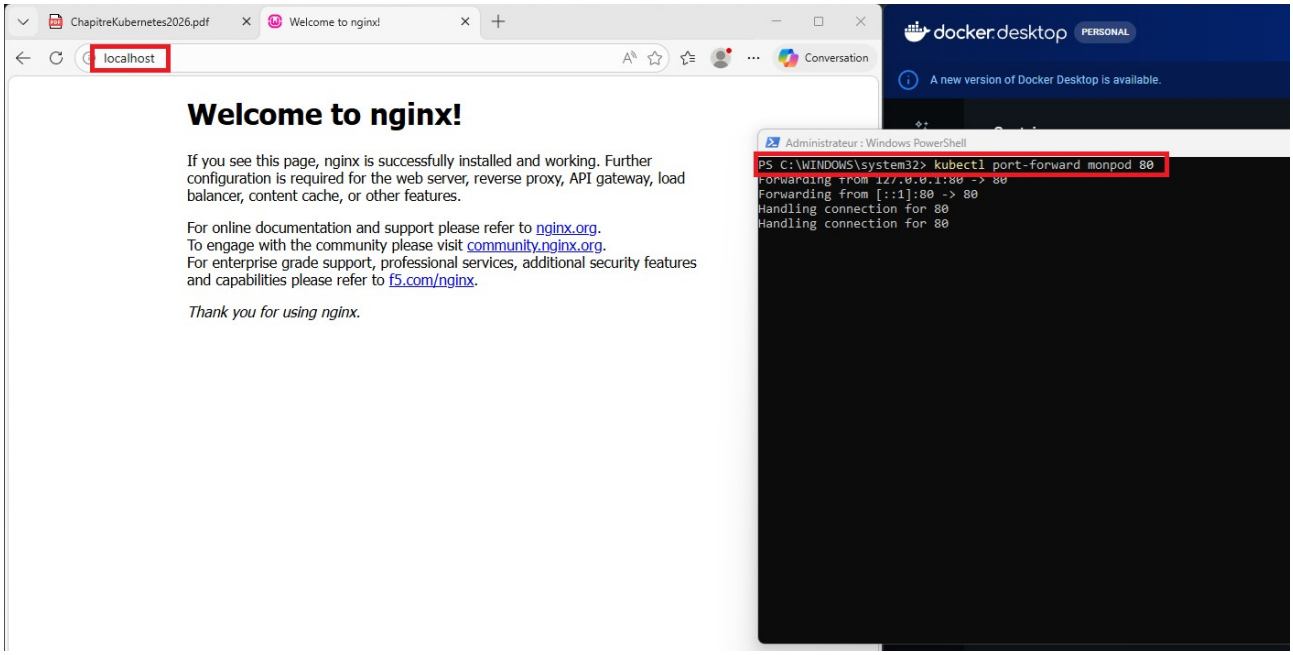
→ Connexion en SSH sur le cluster et affichage des conteneurs dans l'espace de noms par défaut moby :



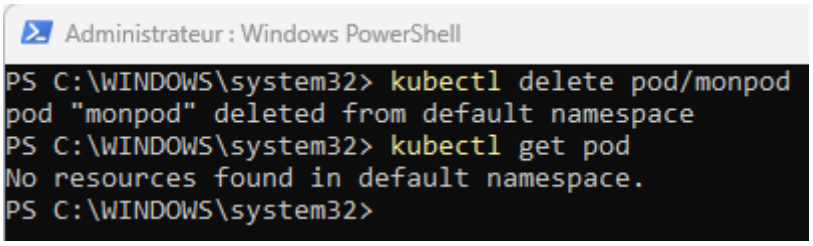
→ Affichage de la description du pod monpod :



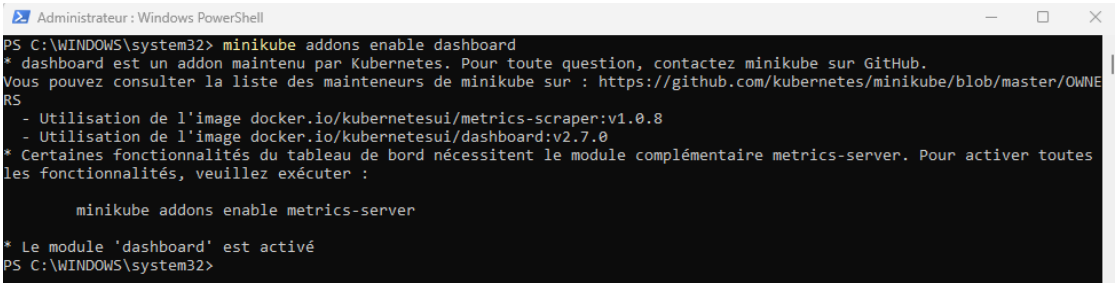
→ Accès au site web Nginx du pod :



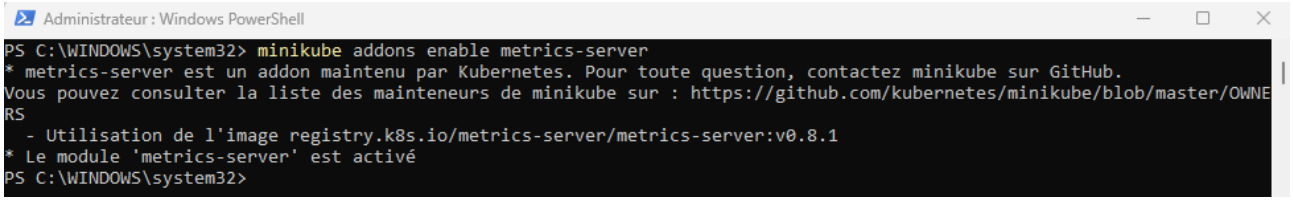
→ Suppression du pod monpod :



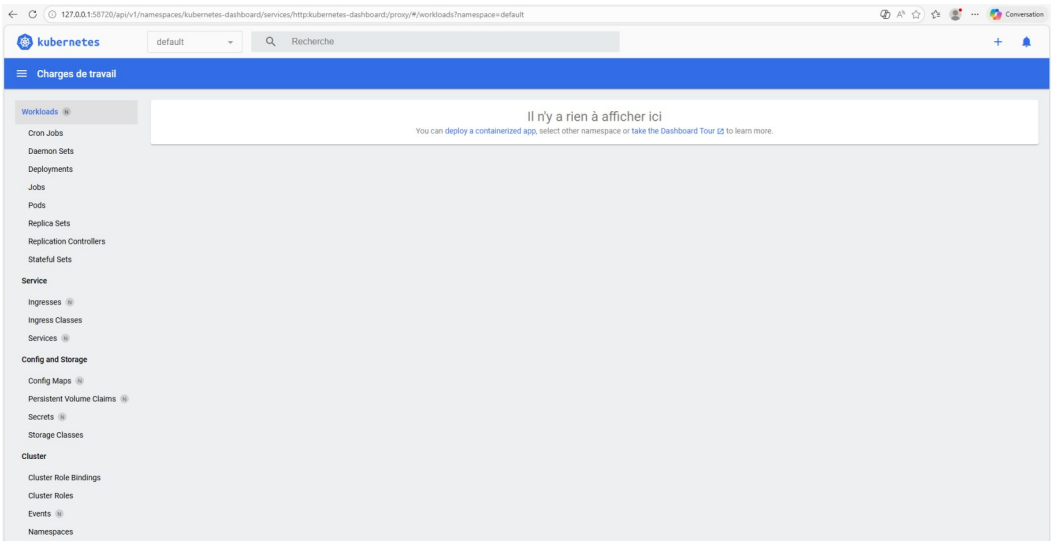
→ Activation de l'add-on dashboard :



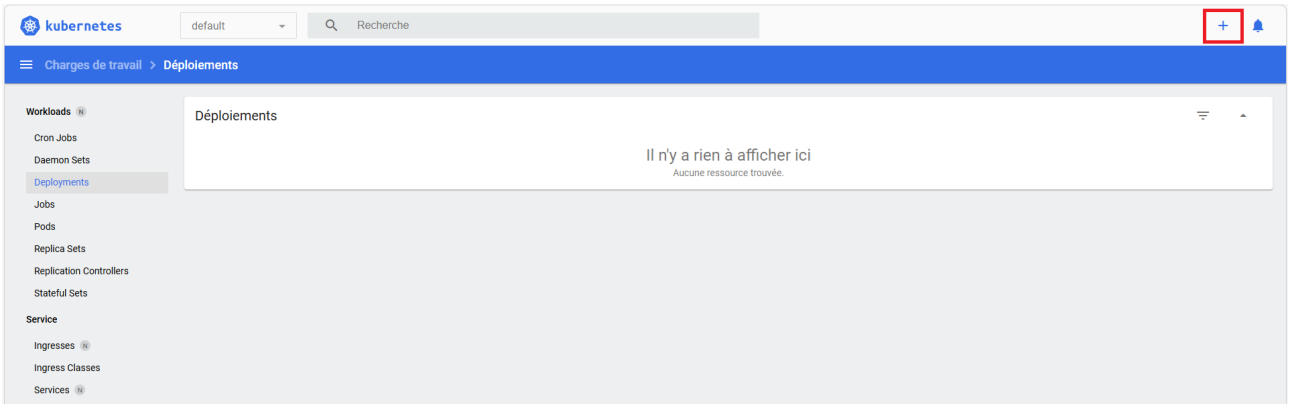
→ Activation de l'add-on metrics-server :



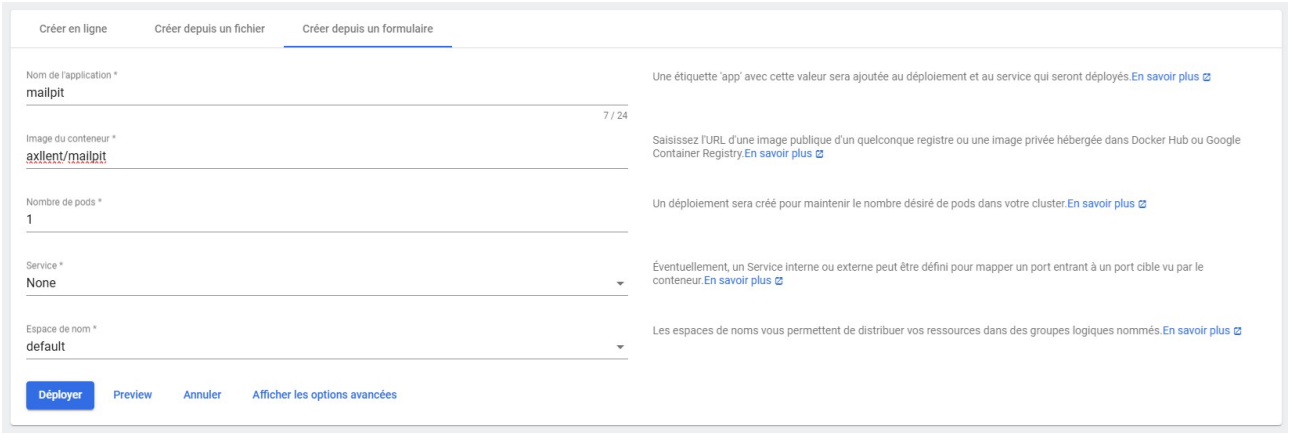
→ Affichage du dashboard (n'affiche pas toutes les métriques dû à un problème) :



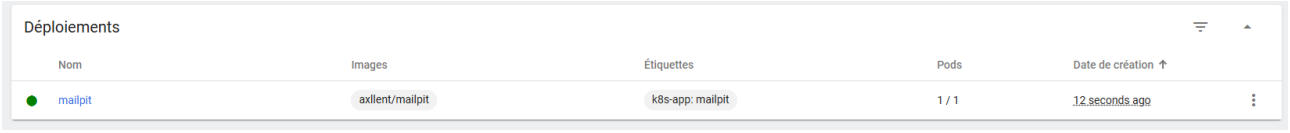
→ Nouveau déploiement :



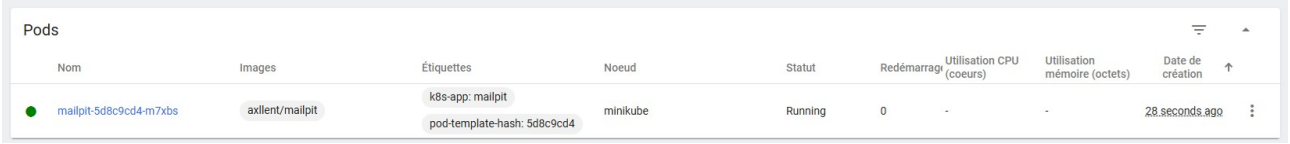
→ Création à partir d'un formulaire :



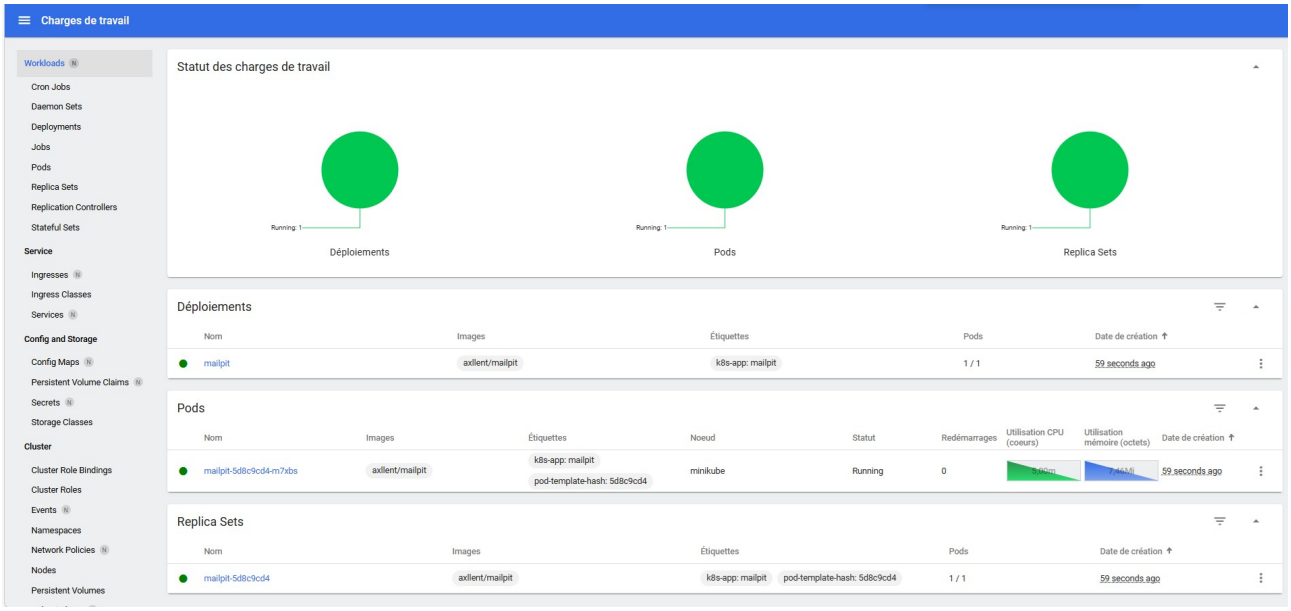
→ Affichage du nouveau déploiement :



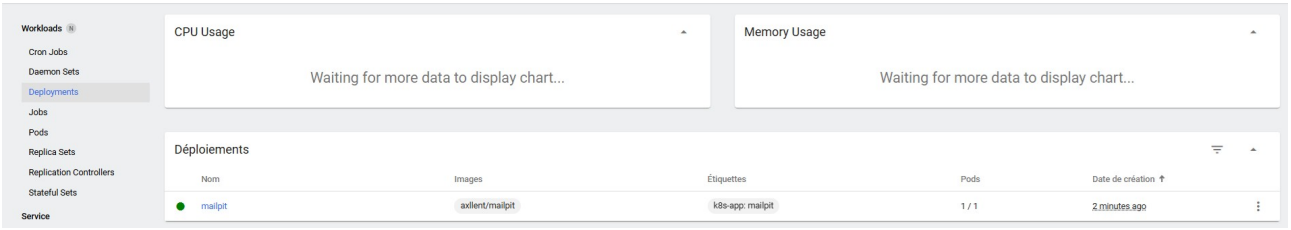
→ Affichage du nouveau pod :



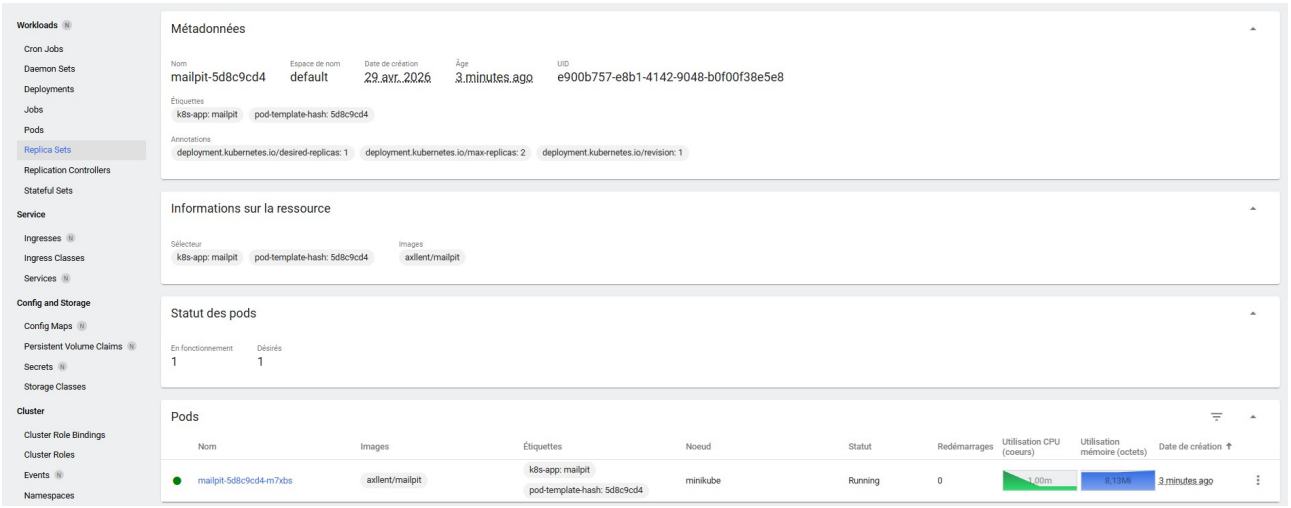
→ Affichage complet du dashboard avec les déploiements, pods, etc... :



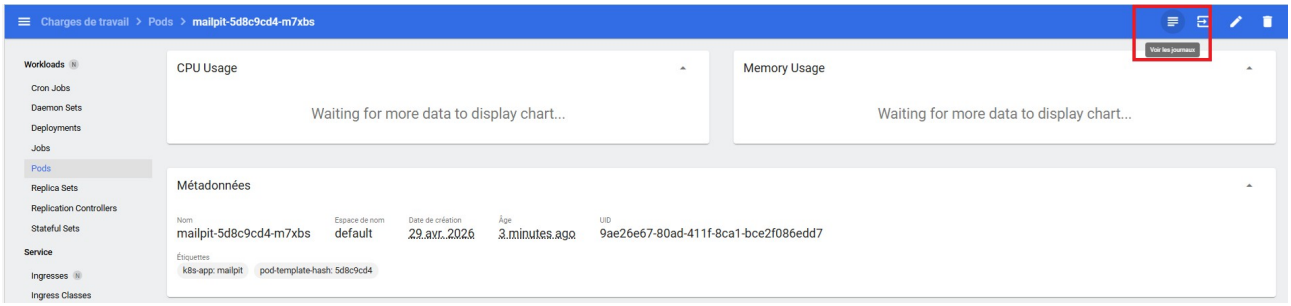
→ Affichage de l'onglet déploiement :



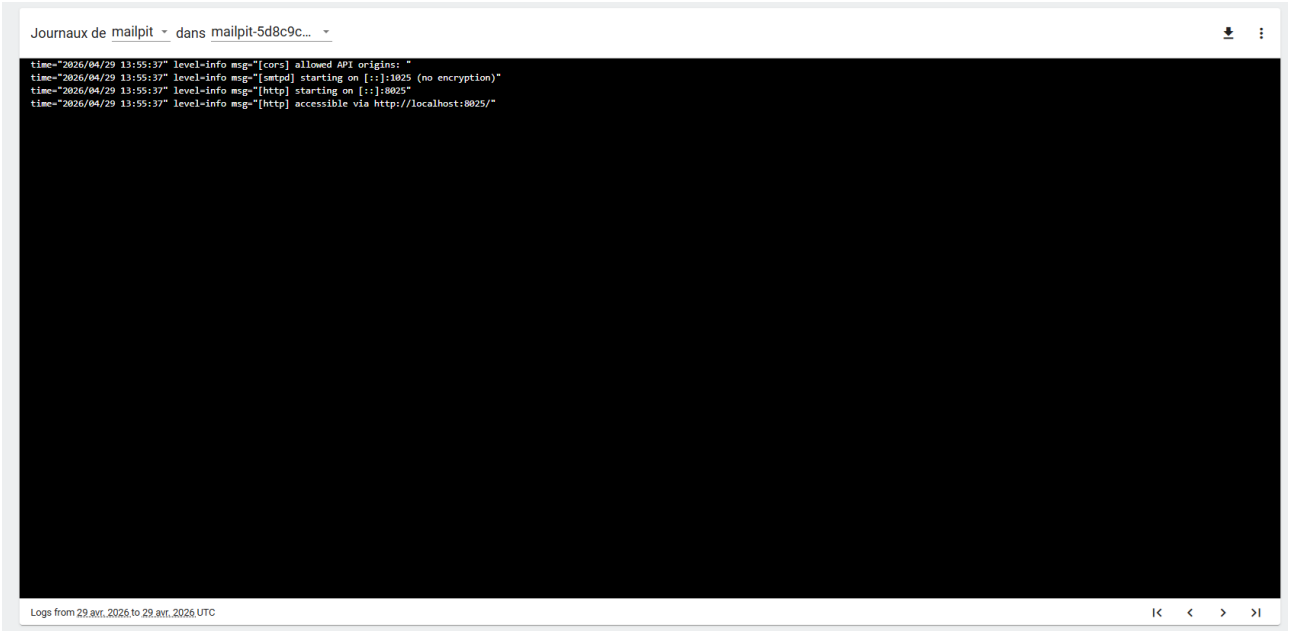
→ Affichage des métadonnées et autres :



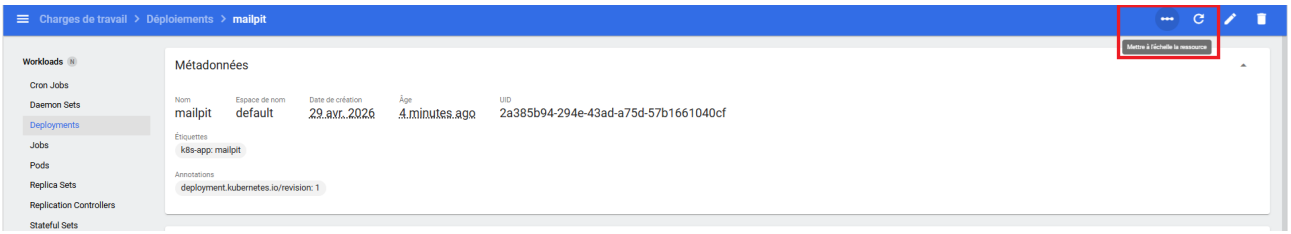
→ Affichage des logs du pod :



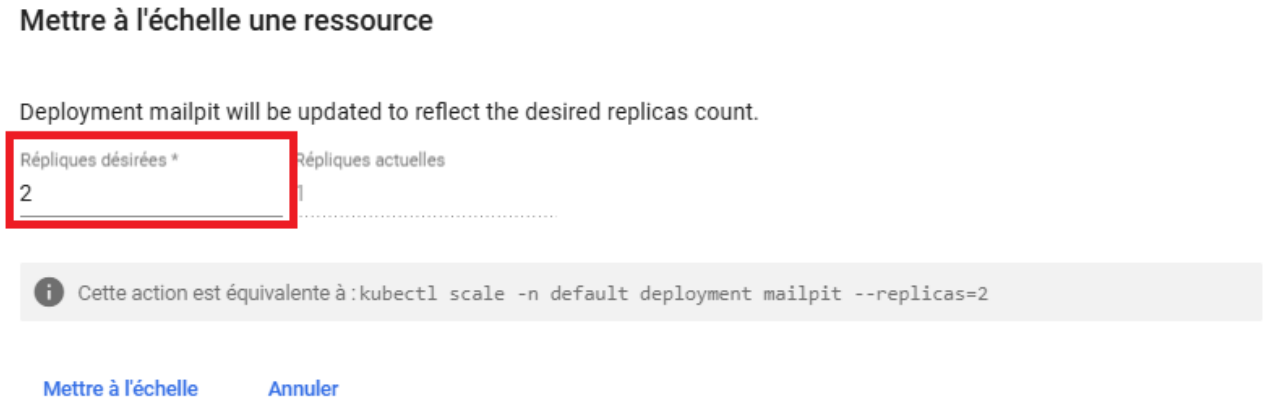
→ Logs depuis le terminal du dashboard :



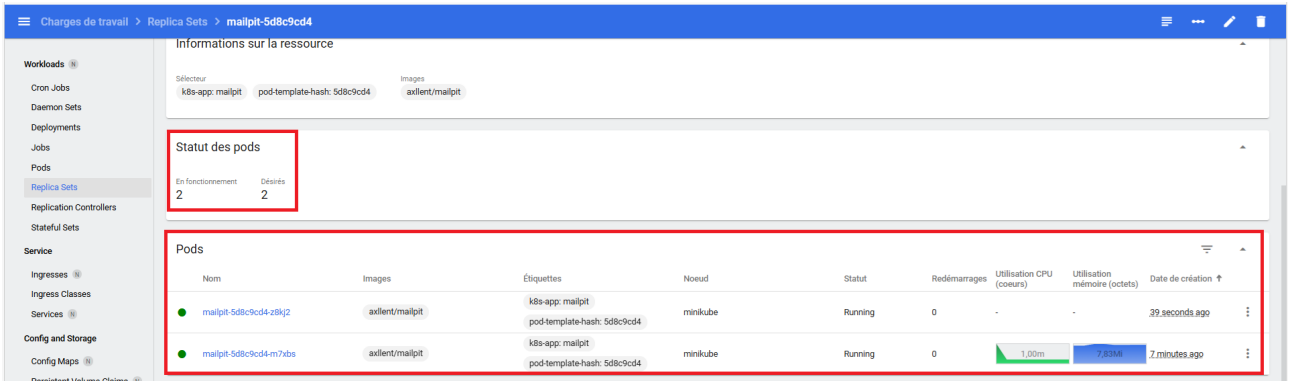
→ Mise à l'échelle :



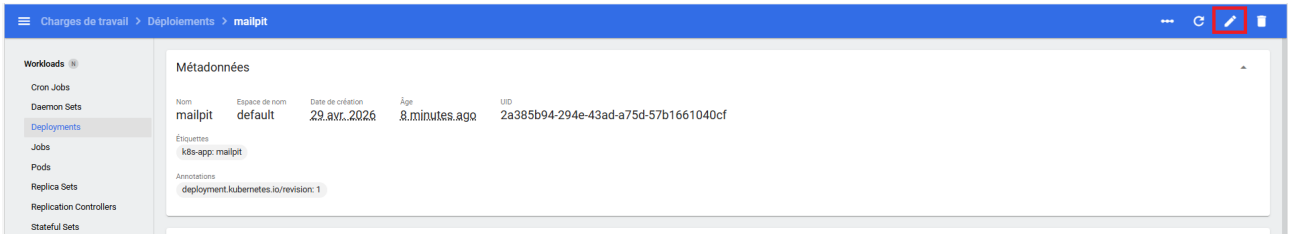
→ 2 réplicatas :



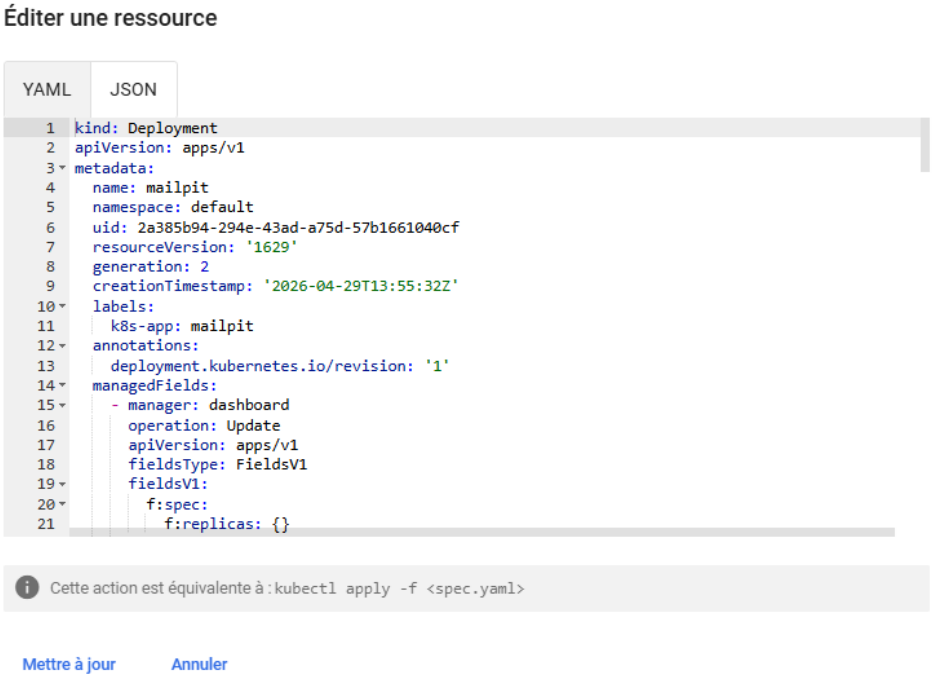
→ Affichage des deux réplicatas :



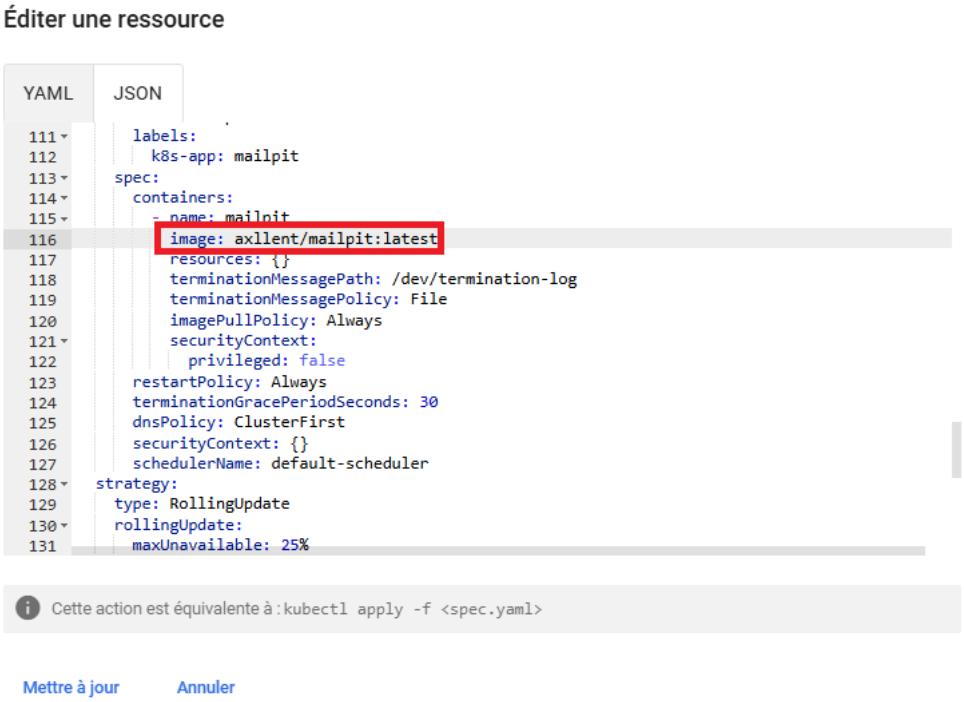
→ Modification :



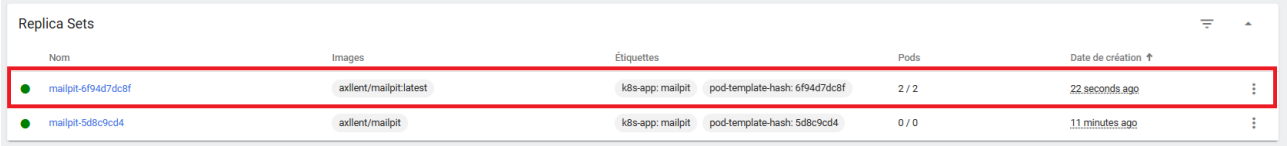
→ Modification du code yaml :



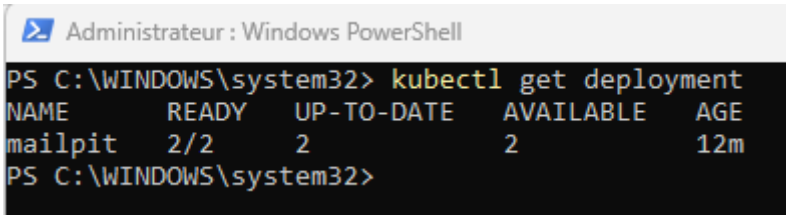
→ Modification de la ligne d'image en rajoutant le latest :



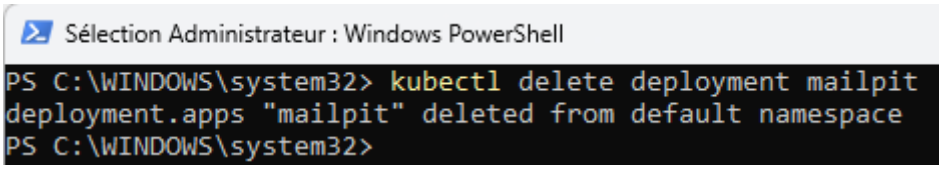
→ Recréation d'un nouveau ReplicaSet :



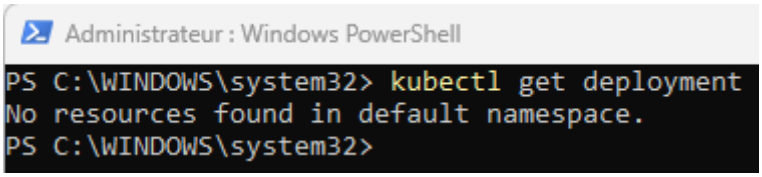
→ Affichage des déploiements :



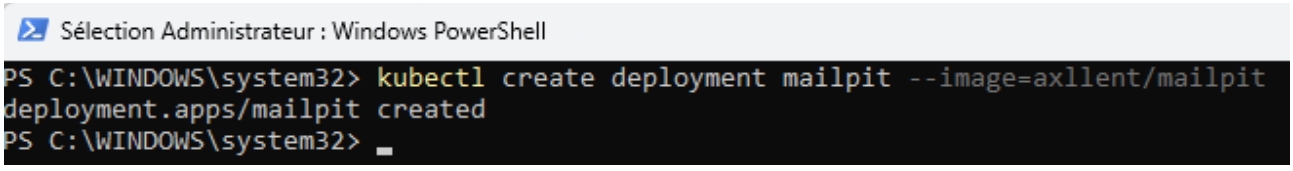
→ Suppression du déploiement mailpit :



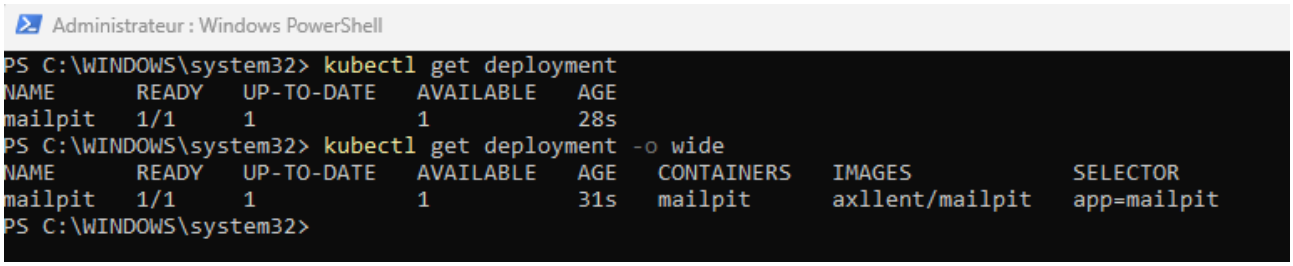
→ Affichage de la liste des déploiements pour le moment vide :



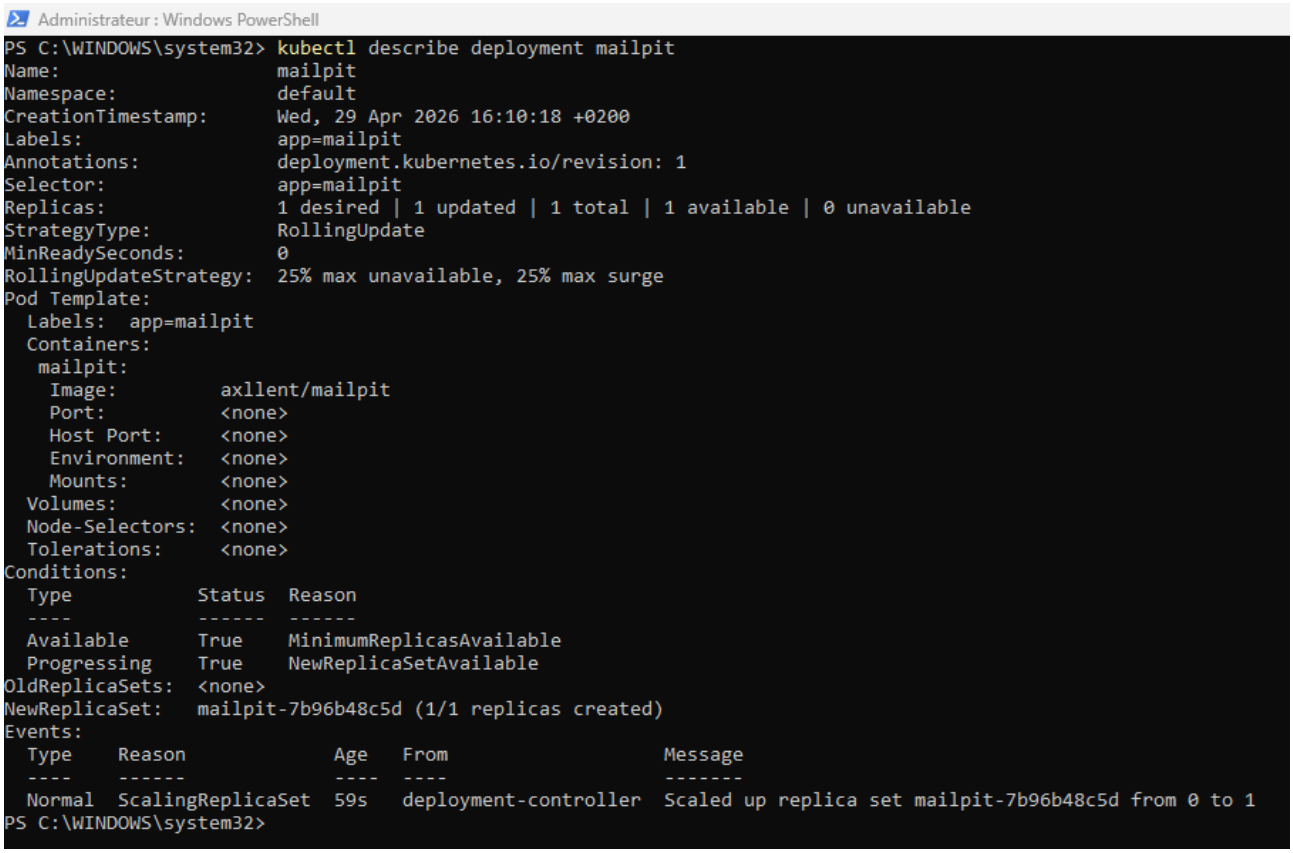
→ Création d'un nouveau déploiement mailpit :



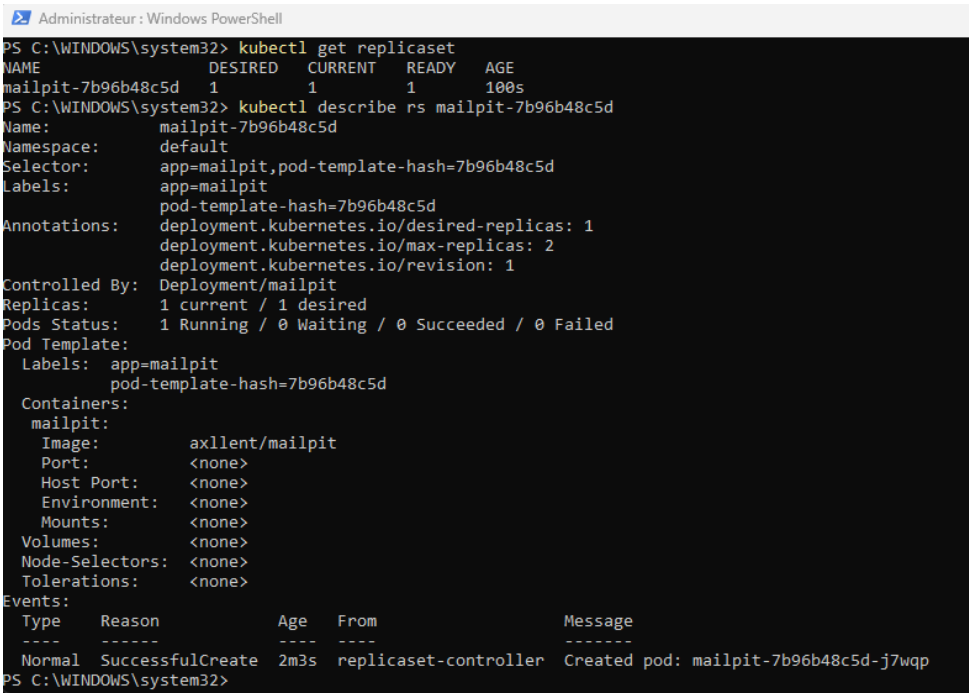
→ Affichage des déploiements :



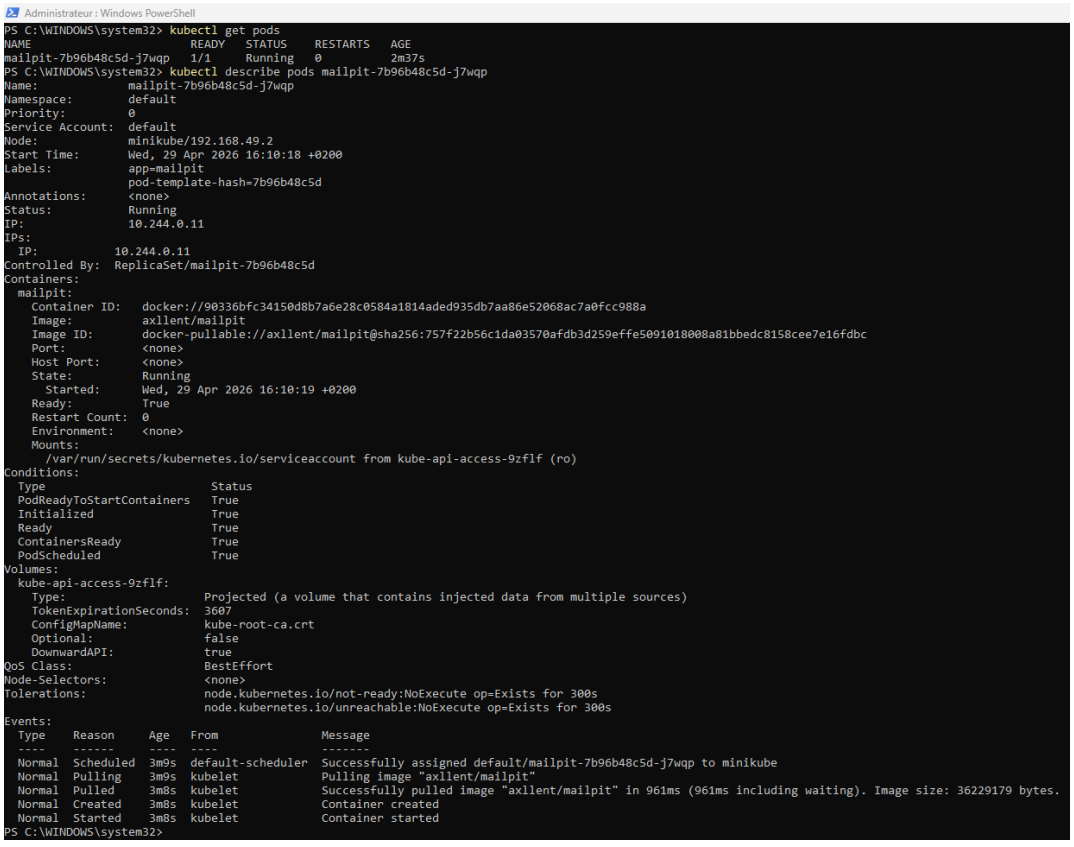
→ Affichage de la description du déploiement mailpit :



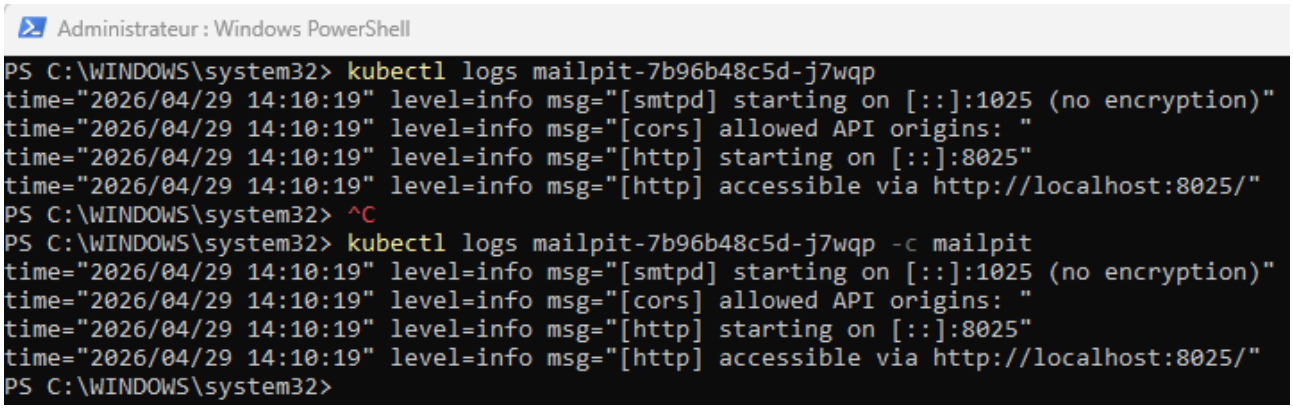
→ Affichage de la liste de réplicas et de la description du ReplicaSet mailpit :



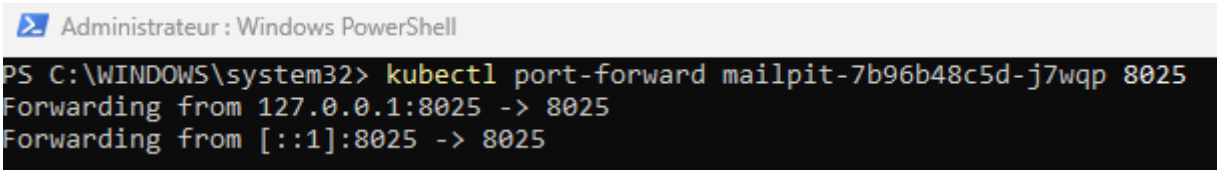
→ Affichage de la liste des pods et de la description du pod mailpit :



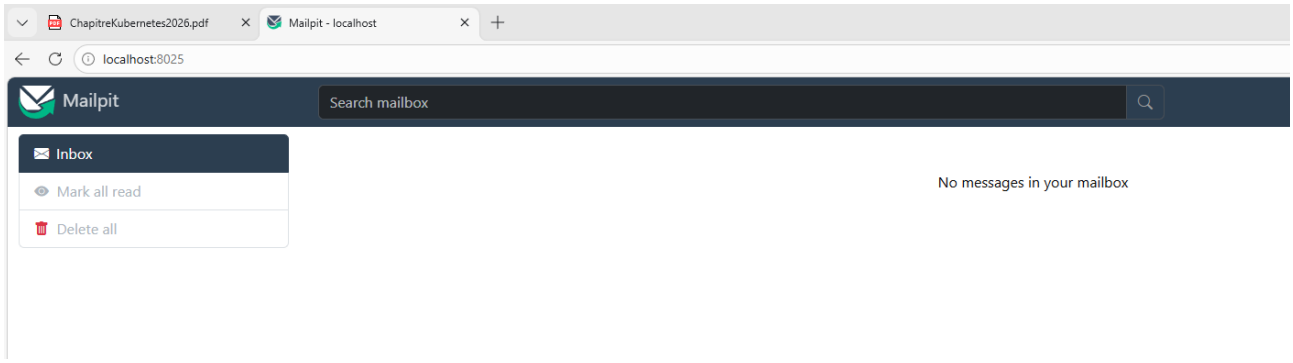
→ Affichage des logs du pod et conteneur :



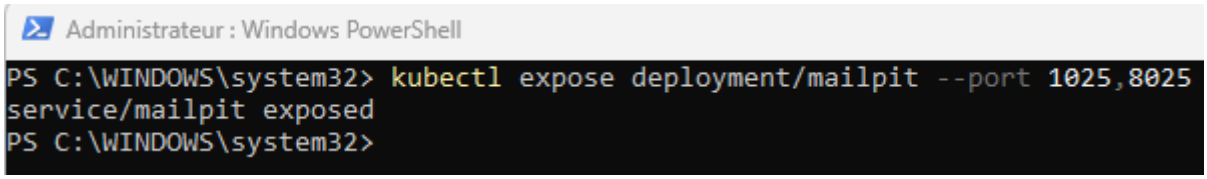
→ Accès à l'application mailpit :



→ Accès à la page web mailpit :



→ Création d'une entrée DNS stable pour mailpit :



→ Lancement du pod mailpit en mode interactif :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl exec -it mailpit-7b96b48c5d-j7wqp -- sh
/ # getent hosts mailpit
10.106.104.106    mailpit.default.svc.cluster.local  mailpit.default.svc.cluster.local mailpit
/ #
```

→ Lancement d'un pod de test pour vérifier la connectivité DNS :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl run -it --rm pod-test --image=alpine sh
All commands and output from this session will be recorded in container logs, including credentials and sensitive inform
ation passed through the command prompt.
If you don't see a command prompt, try pressing enter.
/ # nslookup mailpit
Server:         10.96.0.10
Address:        10.96.0.10:53

** server can't find mailpit.cluster.local: NXDOMAIN

** server can't find mailpit.svc.cluster.local: NXDOMAIN

** server can't find mailpit.svc.cluster.local: NXDOMAIN

Name:   mailpit.default.svc.cluster.local
Address: 10.106.104.106


** server can't find mailpit.cluster.local: NXDOMAIN

/ # exit
Session ended, resume using 'kubectl attach pod-test -c pod-test -i -t' command when the pod is running
pod "pod-test" deleted from default namespace
PS C:\WINDOWS\system32>
```

→ Scalabilité de 2 réplicas sur le pod mailpit :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl scale deployment mailpit --replicas=2
deployment.apps/mailpit scaled
PS C:\WINDOWS\system32>
```

→ Affichage du nouveau pod créé grâce au ReplicaSet :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl get deployment mailpit
NAME      READY   UP-TO-DATE   AVAILABLE   AGE
mailpit   2/2     2            2           11m
PS C:\WINDOWS\system32> kubectl get pods -l app=mailpit
NAME                       READY   STATUS    RESTARTS   AGE
mailpit-7b96b48c5d-75255   1/1     Running   0          48s
mailpit-7b96b48c5d-j7wqp   1/1     Running   0          11m
PS C:\WINDOWS\system32>
```

→ Activation du module ingress :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> minikube addons enable ingress
* ingress est un addon maintenu par Kubernetes. Pour toute question, contactez minikube sur GitHub.
Vous pouvez consulter la liste des mainteneurs de minikube sur : https://github.com/kubernetes/minikube/blob/master/OWNE
RS
* Après que le module est activé, veuiller exécuter "minikube tunnel" et vos ressources ingress seront disponibles à "12
7.0.0.1"
  - Utilisation de l'image registry.k8s.io/ingress-nginx/controller:v1.14.3
  - Utilisation de l'image registry.k8s.io/ingress-nginx/kube-webhook-certgen:v1.6.7
  - Utilisation de l'image registry.k8s.io/ingress-nginx/kube-webhook-certgen:v1.6.7
* Vérification du module ingress...
* Le module 'ingress' est activé
PS C:\WINDOWS\system32>
```

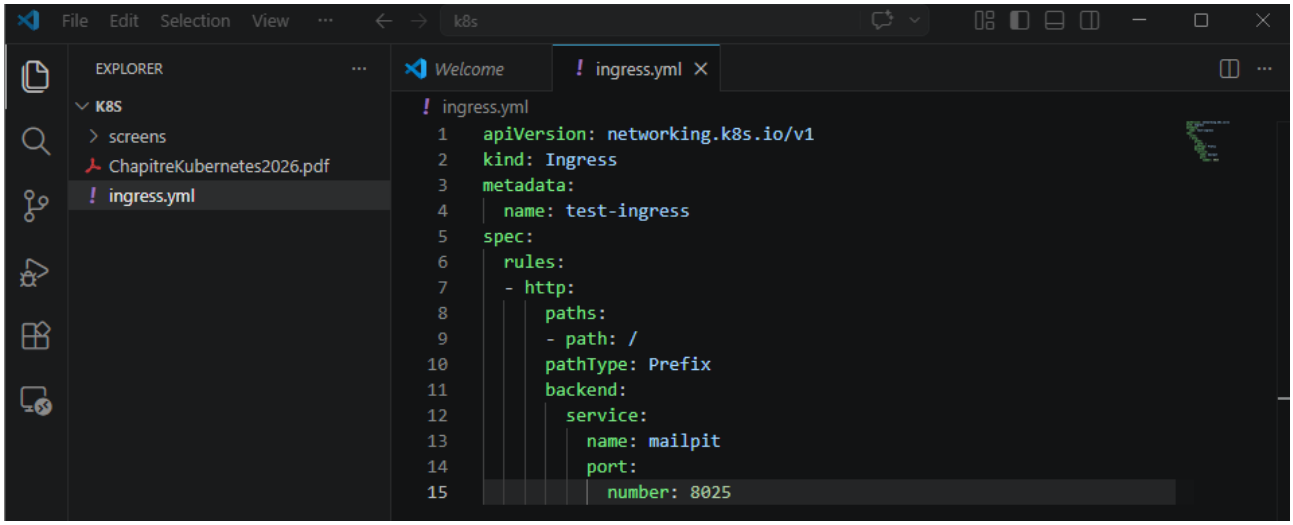
→ Affichage du namespace ingress :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl get namespace
NAME                   STATUS   AGE
default                Active   42m
ingress-nginx          Active   49s
kube-node-lease        Active   42m
kube-public            Active   42m
kube-system            Active   42m
kubernetes-dashboard   Active   32m
PS C:\WINDOWS\system32>
```

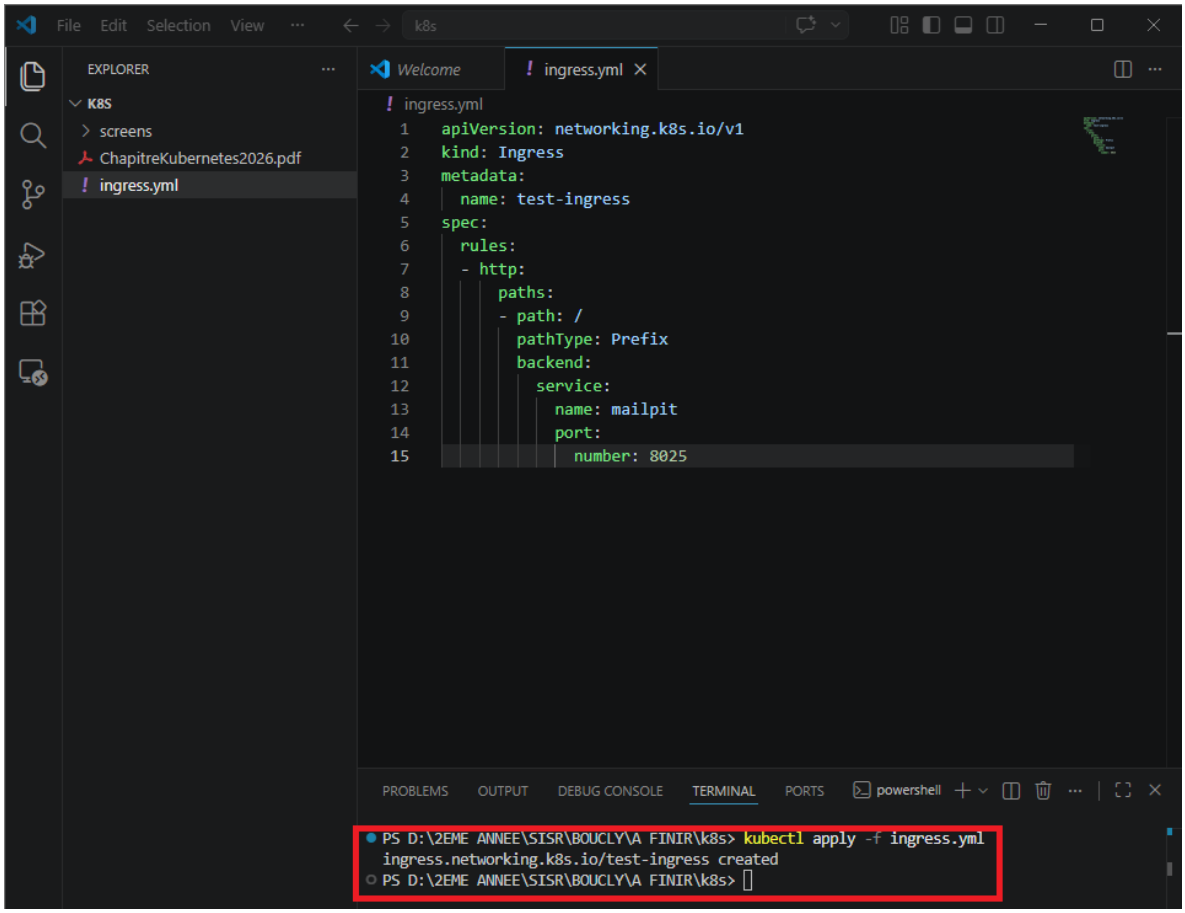
→ Affichage des pods ingress-nginx :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl -n ingress-nginx get pods -l app.kubernetes.io/name
NAME                                        READY   STATUS      RESTARTS   AGE
ingress-nginx-admission-create-zzqdf        0/1     Completed   0          96s
ingress-nginx-admission-patch-mprwd         0/1     Completed   0          96s
ingress-nginx-controller-596f8778bc-9zpmk   1/1     Running     0          96s
PS C:\WINDOWS\system32>
```

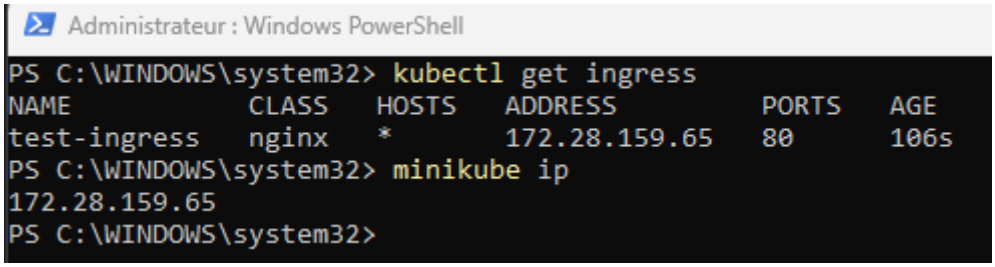
→ Création d'un fichier ingress.yaml :



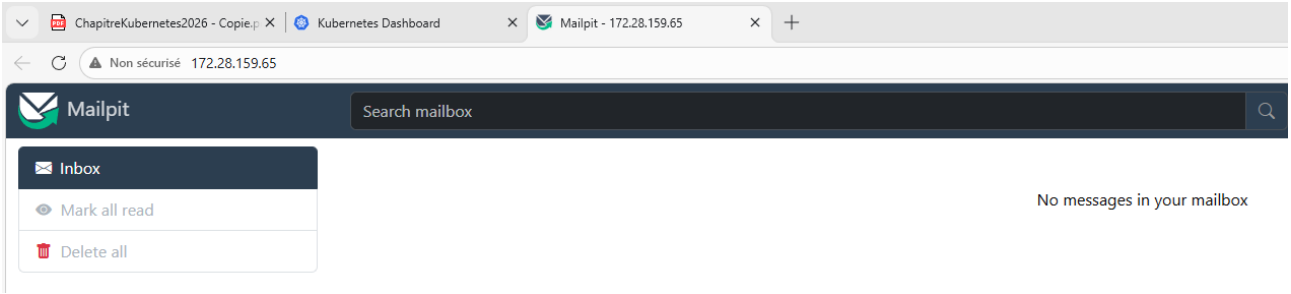
→ Applicatif des modification du fichier :



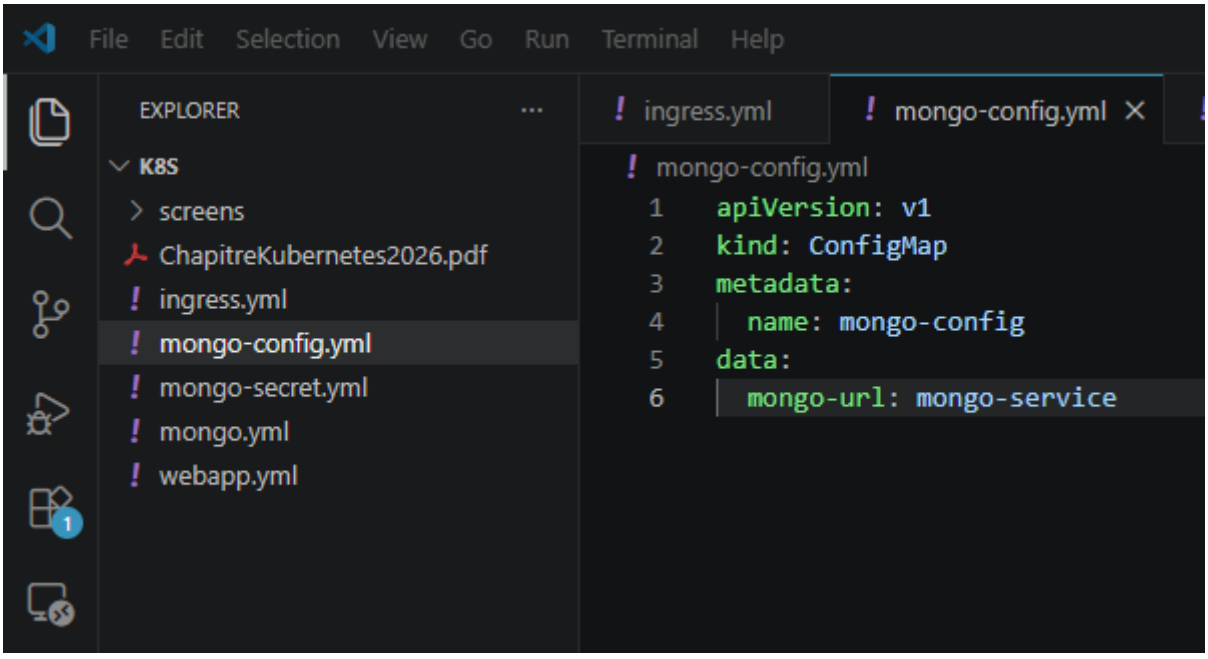
→ Affichage de la liste ingress et de l'adresse IP utilisée par minikube :



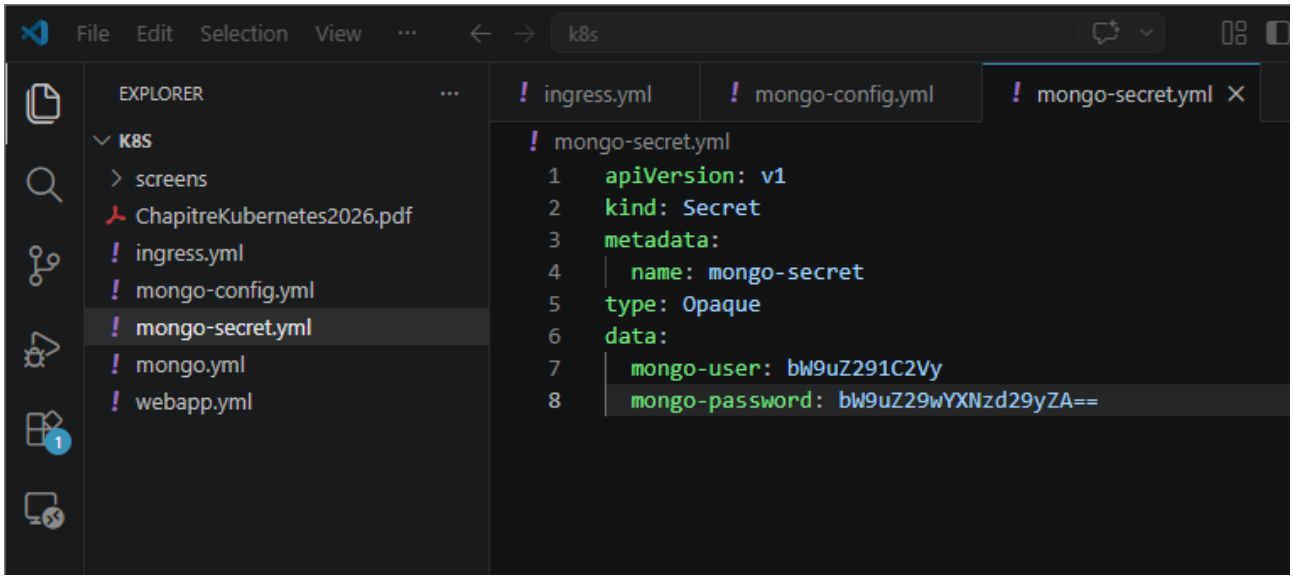
→ Connexion au mailpit depuis l'adresse IP :



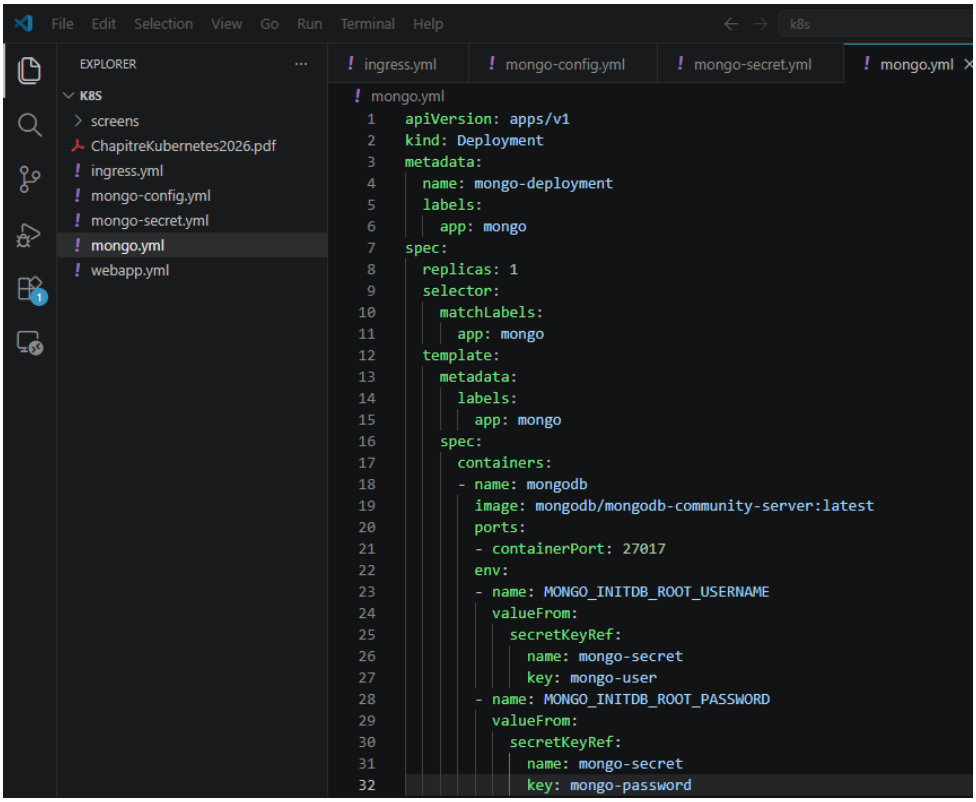
→ Création du fichier mongo-config.yaml :

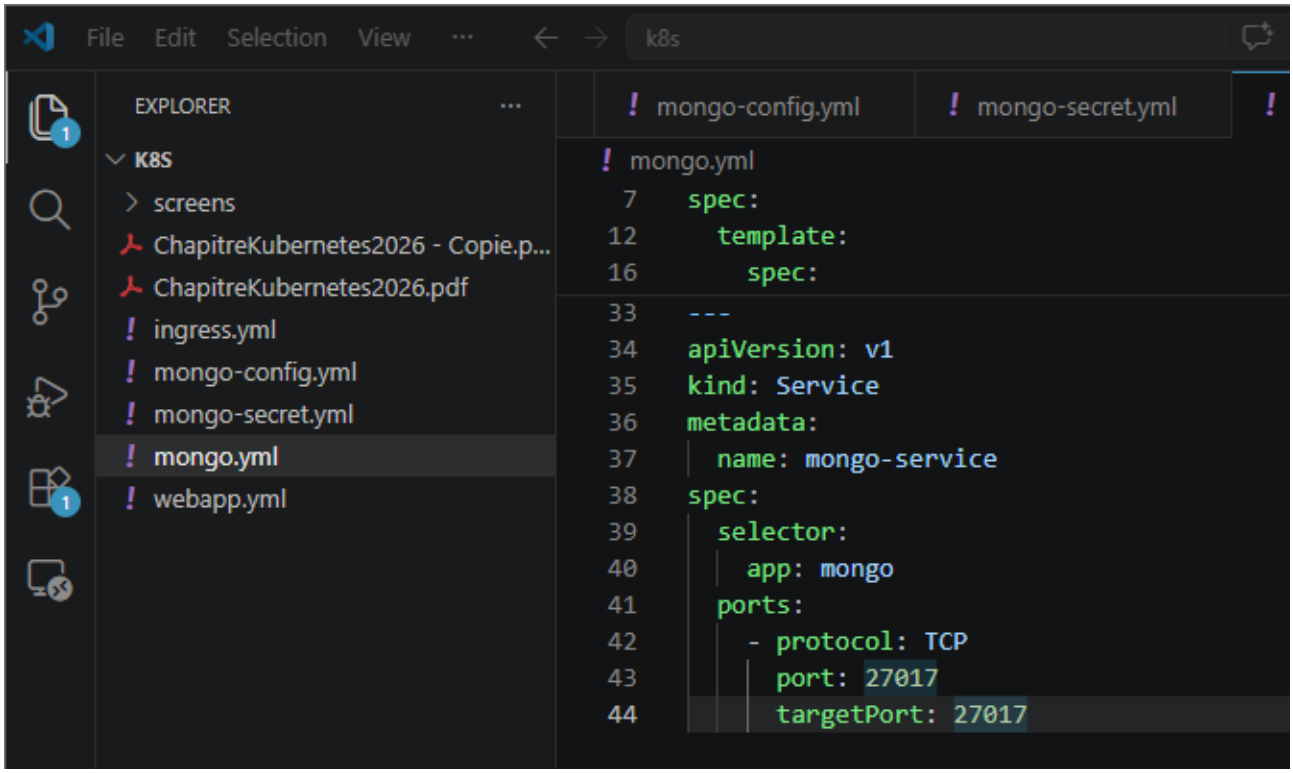


→ Création du fichier mongo-secret :

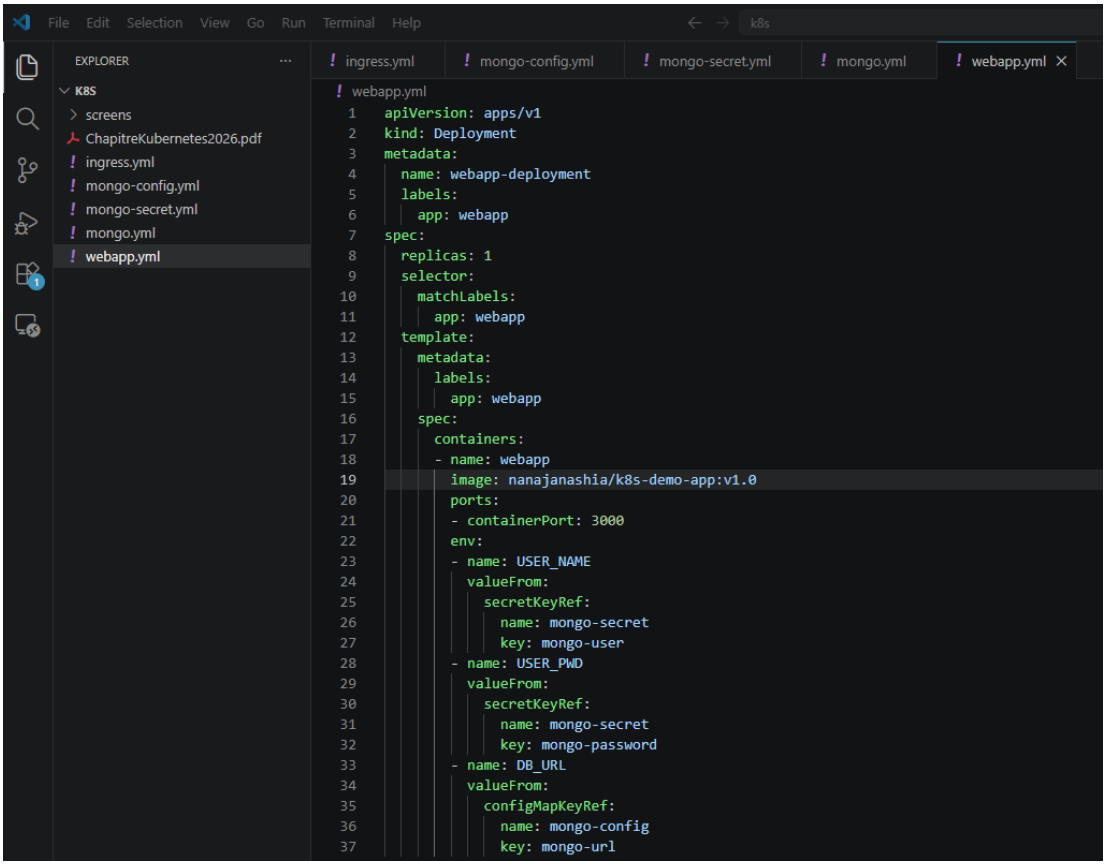


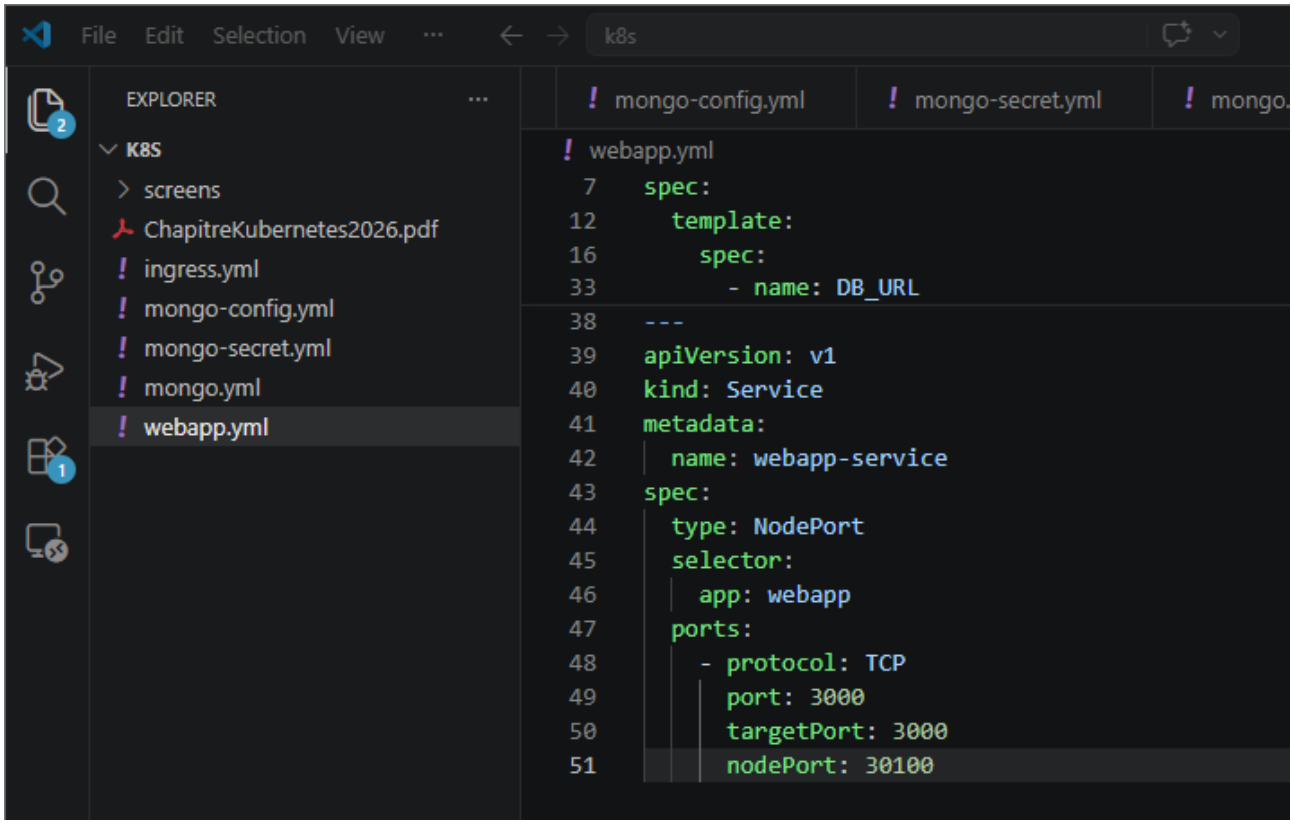
→ Création du fichier mongo.yaml :



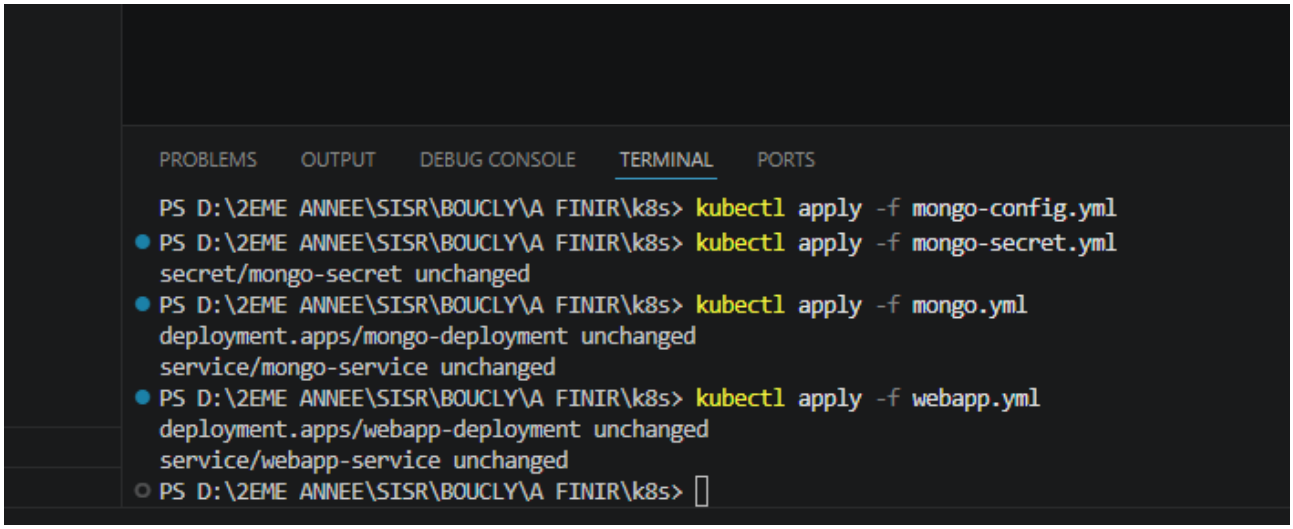


→ Création du fichier webapp.yaml :





→ Applicatif des composants :



→ Affichage de la liste des objets créés :

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s> kubectl get all
NAME                                    READY   STATUS             RESTARTS   AGE
pod/mailpit-7b96b48c5d-6htkw            1/1     Running            0          16m
pod/mongo-deployment-744864fdd7-2s659   1/1     Running            0          115s
pod/webapp-deployment-857fd5c54d-l85nf  0/1     ImagePullBackOff   0          51s

NAME                     TYPE        CLUSTER-IP       EXTERNAL-IP   PORT(S)              AGE
service/kubernetes       ClusterIP   10.96.0.1        <none>        443/TCP              25m
service/mailpit          ClusterIP   10.96.179.223    <none>        1025/TCP,8025/TCP    14m
service/mongo-service    ClusterIP   10.110.132.250   <none>        27017/TCP            4m3s
service/webapp-service   NodePort    10.104.232.222   <none>        3000:30100/TCP       51s

NAME                                READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/mailpit             1/1     1            1           16m
deployment.apps/mongo-deployment    1/1     1            1           115s
deployment.apps/webapp-deployment   0/1     1            0           51s

NAME                                          DESIRED   CURRENT   READY   AGE
replicaset.apps/mailpit-7b96b48c5d            1         1         1       16m
replicaset.apps/mongo-deployment-744864fdd7   1         1         1       115s
replicaset.apps/webapp-deployment-857fd5c54d  1         1         0       51s
```

```
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s> kubectl get configmap
NAME               DATA   AGE
kube-root-ca.crt   1      26m
mongo-config       1      6m23s
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s> kubectl get secret
NAME           TYPE     DATA   AGE
mongo-secret   Opaque   2      6m2s
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s>
```

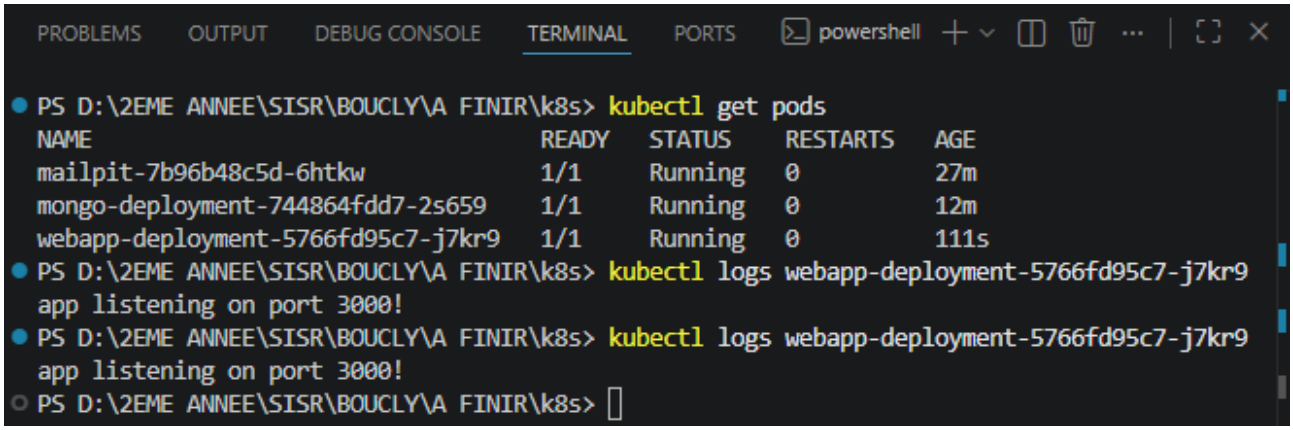
→ Description du service webapp-service :

```
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s> kubectl describe service webapp-service
Name:                     webapp-service
Namespace:                default
Labels:                   <none>
Annotations:              <none>
Selector:                 app=webapp
Type:                     NodePort
IP Family Policy:         SingleStack
IP Families:              IPv4
IP:                       10.104.232.222
IPs:                      10.104.232.222
Port:                     <unset>  3000/TCP
TargetPort:               3000/TCP
NodePort:                 <unset>  30100/TCP
Endpoints:
Session Affinity:         None
External Traffic Policy:  Cluster
Internal Traffic Policy:  Cluster
Events:                   <none>
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s>
```

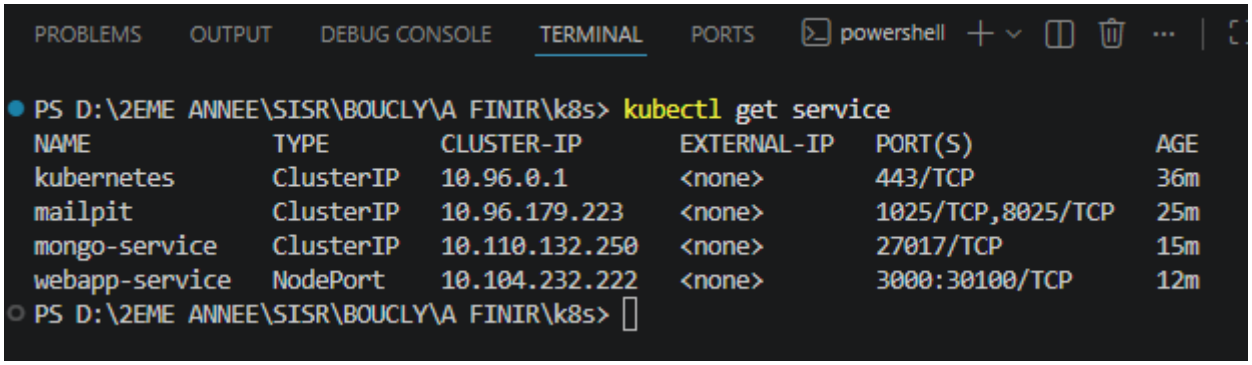
→ Description du pod associé :

```
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s> kubectl describe pod webapp-deployment-5766fd95c7-j7kr9
Name:             webapp-deployment-5766fd95c7-j7kr9
Namespace:        default
Priority:         0
Service Account:  default
Node:             minikube/172.28.159.65
Start Time:       Thu, 30 Apr 2026 11:47:50 +0200
Labels:           app=webapp
                  pod-template-hash=5766fd95c7
Annotations:      <none>
Status:           Running
IP:               10.244.0.14
IPs:
  IP:           10.244.0.14
Controlled By:  ReplicaSet/webapp-deployment-5766fd95c7
Containers:
  webapp:
    Container ID:   docker://2e3283fbc88e3a7dfffa3d3e21163bd2edb0c8eb80a445905997e771f98da33c
    Image:          nanajanashia/k8s-demo-app:v1.0
    Image ID:       docker-pullable://nanajanashia/k8s-demo-app@sha256:6f554135da39ac00a1c2f43e44c2b0b54ca13d3d8044da969361e7781adb7f95
    Port:           3000/TCP
    Host Port:      0/TCP
    State:          Running
      Started:      Thu, 30 Apr 2026 11:47:51 +0200
    Ready:          True
    Restart Count:  0
    Environment:
      USER_NAME:  <set to the key 'mongo-user' in secret 'mongo-secret'>      Optional: false
      USER_PWD:   <set to the key 'mongo-password' in secret 'mongo-secret'>  Optional: false
      DB_URL:     <set to the key 'mongo-url' of config map 'mongo-config'>   Optional: false
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-ftx6v (ro)
Conditions:
  Type                        Status
  PodReadyToStartContainers   True
  Initialized                 True
  Ready                       True
  ContainersReady             True
  PodScheduled                True
Volumes:
  kube-api-access-ftx6v:
    Type:                    Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds:  3607
    ConfigMapName:           kube-root-ca.crt
    Optional:                false
    DownwardAPI:             true
QoS Class:                   BestEffort
Node-Selectors:              <none>
Tolerations:                 node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
                             node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
```

→ Affichage des logs du pod webapp :



→ Affichage des services :



→ Affichage de l'ip utilisée pas minikube :

→ Le node minikube a bien la même adresse IP :

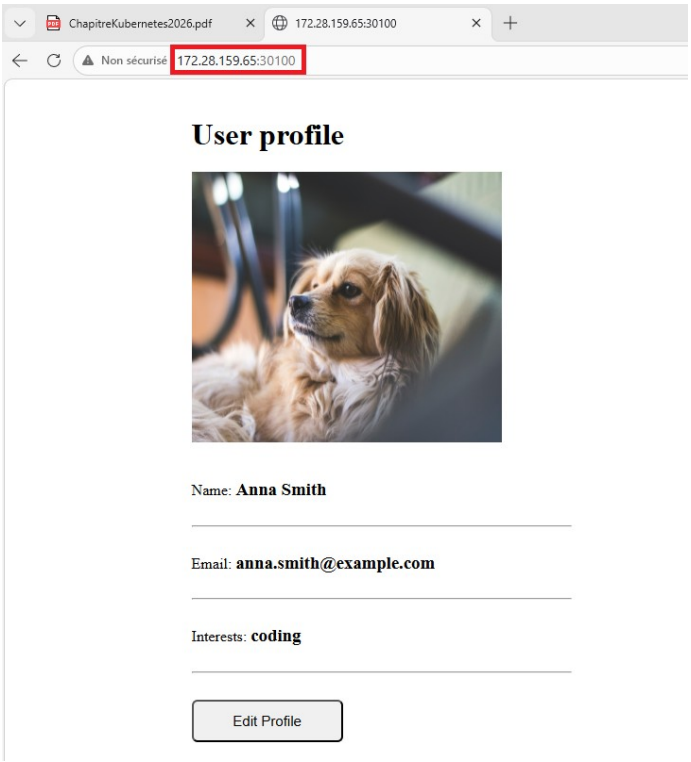
```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s> kubectl get node
NAME       STATUS   ROLES           AGE   VERSION
minikube   Ready    control-plane   39m   v1.35.1
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s> kubectl get node -o wide
NAME       STATUS   ROLES           AGE   VERSION   INTERNAL-IP    EXTERNAL-IP   OS-IMAGE           KERNEL-VERSION   CONTAINER-RUNTIME
minikube   Ready    control-plane   39m   v1.35.1   172.28.159.65  <none>        Buildroot 2025.02  6.6.95           docker://28.5.2
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s>
```

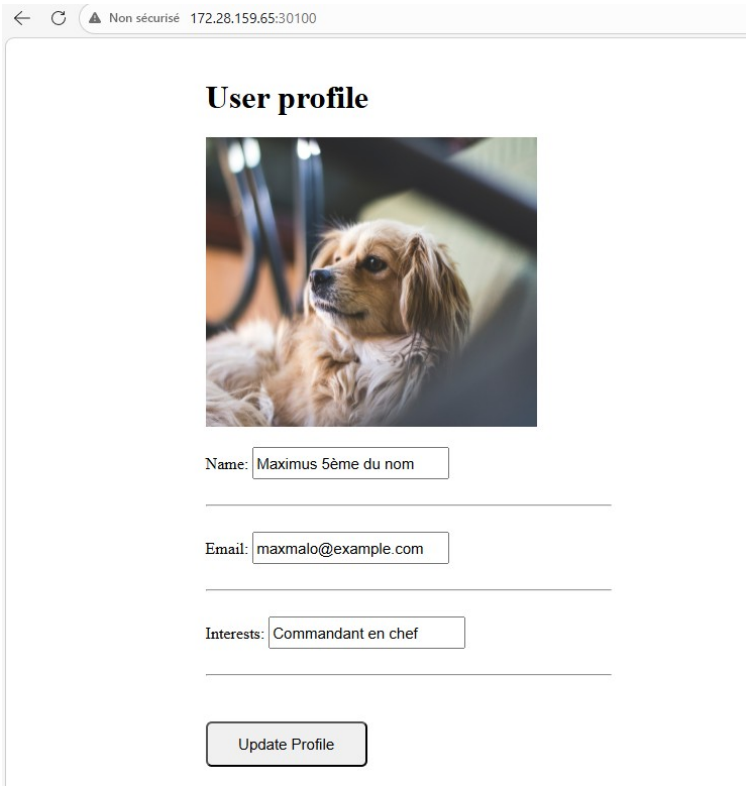
→ Affichage des services et des pods actifs :

```
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s> kubectl get svc -o wide
NAME             TYPE        CLUSTER-IP       EXTERNAL-IP   PORT(S)             AGE   SELECTOR
kubernetes       ClusterIP   10.96.0.1        <none>        443/TCP             40m   <none>
mailpit          ClusterIP   10.96.179.223    <none>        1025/TCP,8025/TCP   29m   app=mailpit
mongo-service    ClusterIP   10.110.132.250   <none>        27017/TCP           19m   app=mongo
webapp-service   NodePort    10.104.232.222   <none>        3000:30100/TCP      15m   app=webapp
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s> kubectl get pod -o wide
NAME                                READY   STATUS    RESTARTS   AGE    IP            NODE       NOMINATED NODE   READINESS GATES
mailpit-7b96b48c5d-6htkw            1/1     Running   0          31m    10.244.0.10   minikube   <none>           <none>
mongo-deployment-744864fdd7-2s659   1/1     Running   0          16m    10.244.0.11   minikube   <none>           <none>
webapp-deployment-5766fd95c7-j7kr9  1/1     Running   0          6m7s   10.244.0.14   minikube   <none>           <none>
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s>
```

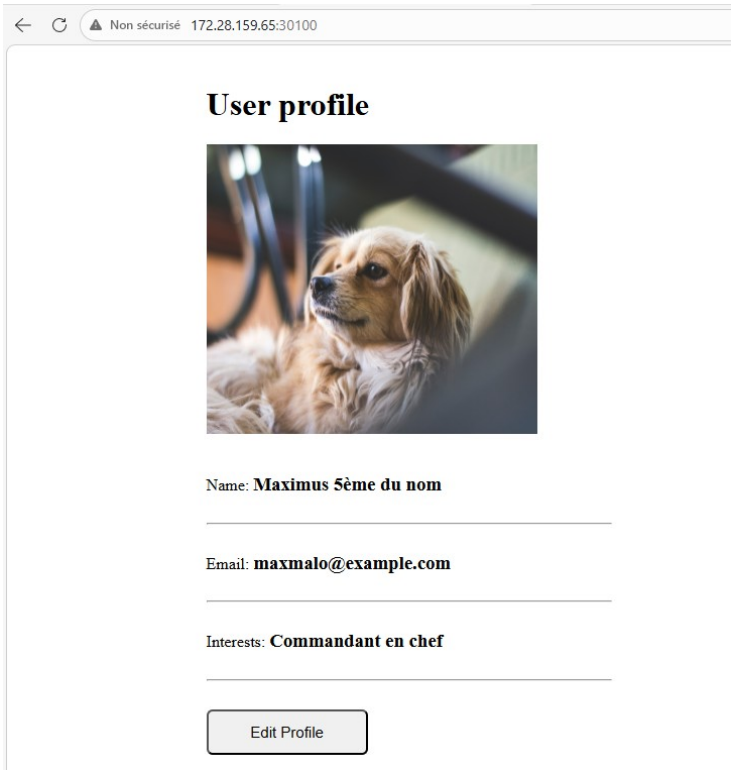
→ Connexion à la page web :



→ Modification des champs depuis le site :

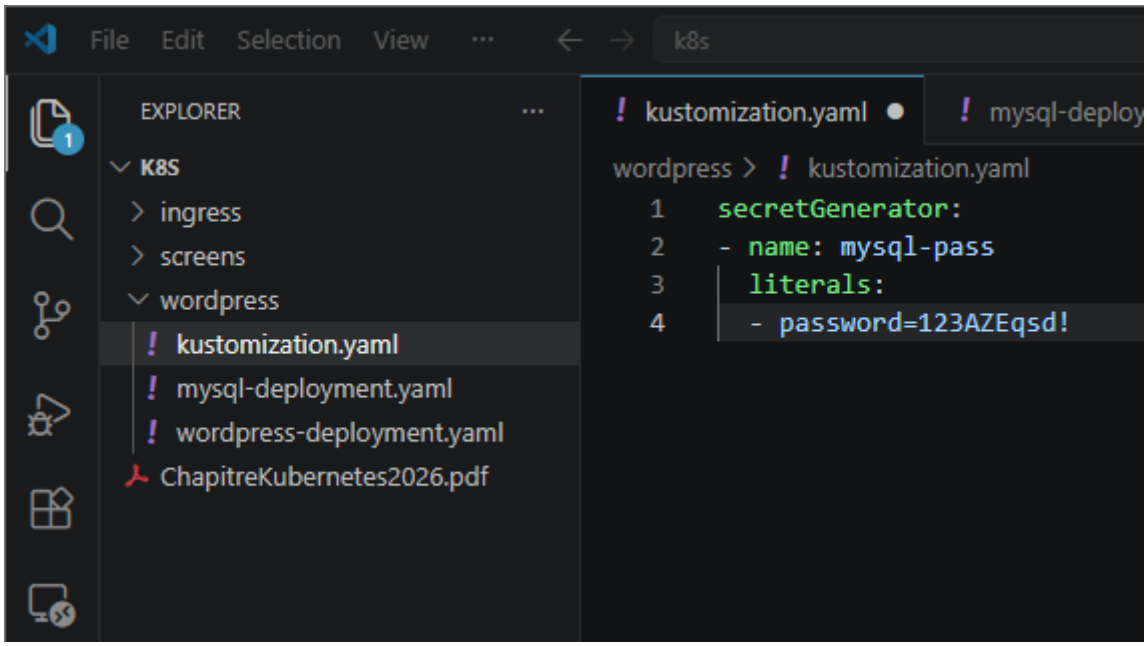


→ Les modifications sont bien prises en compte :

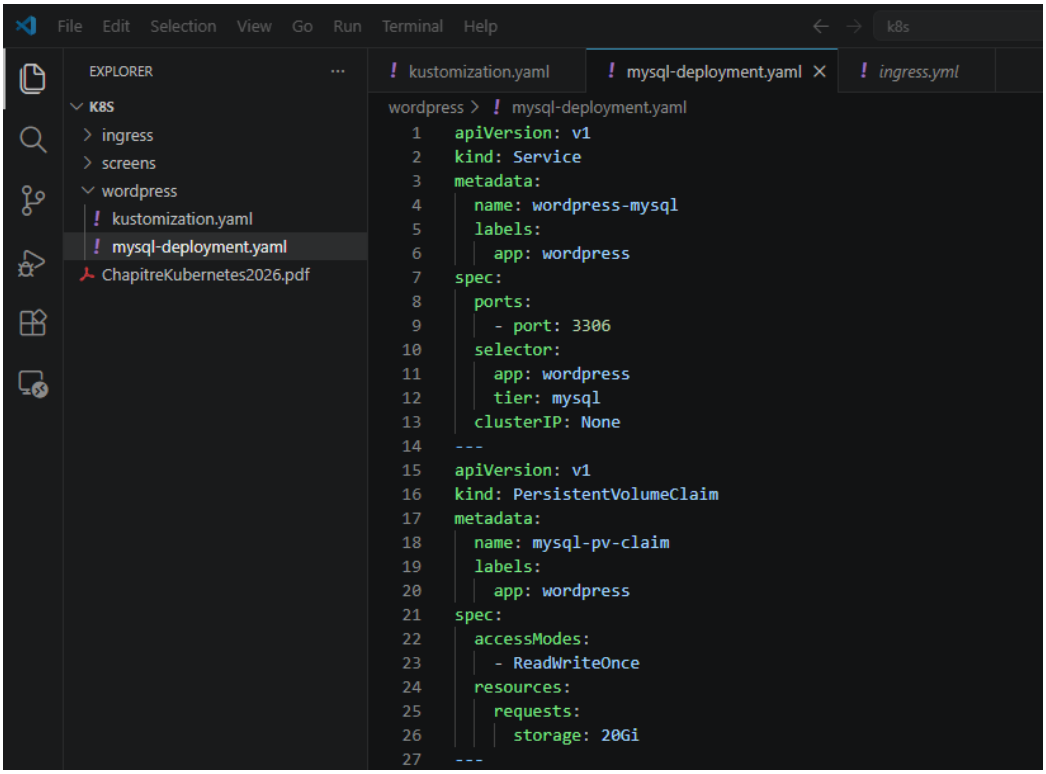


PARTIE WORDPRESS

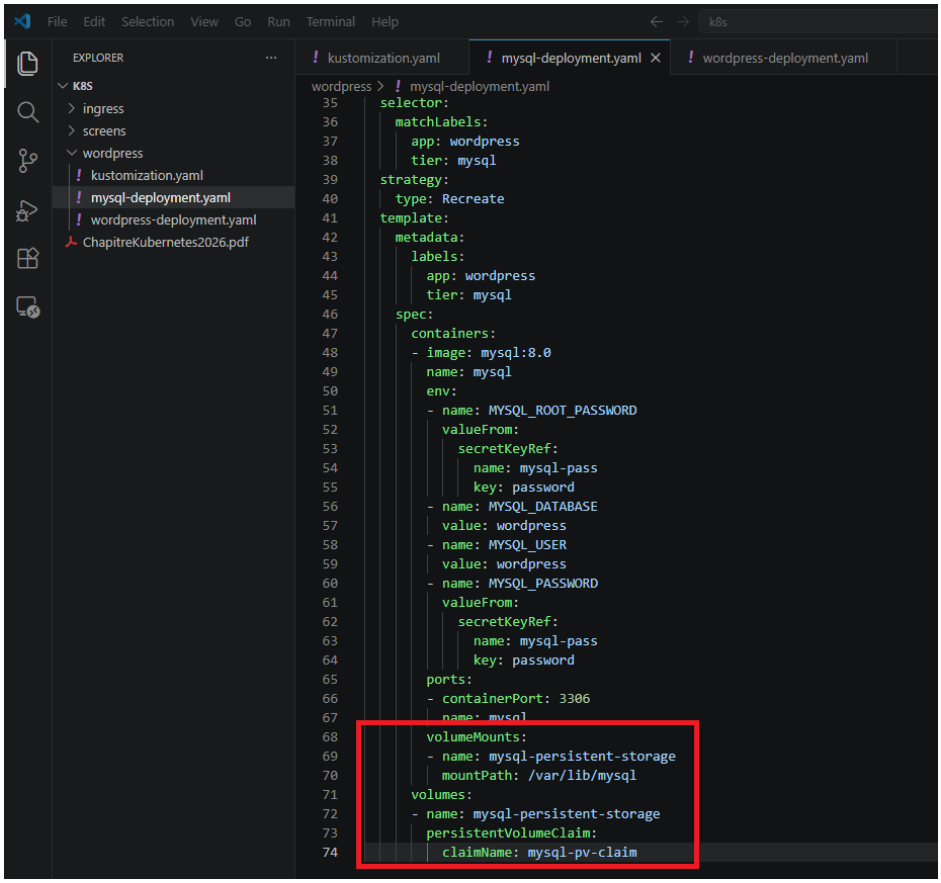
→ Création d'un fichier kustomization.yaml :



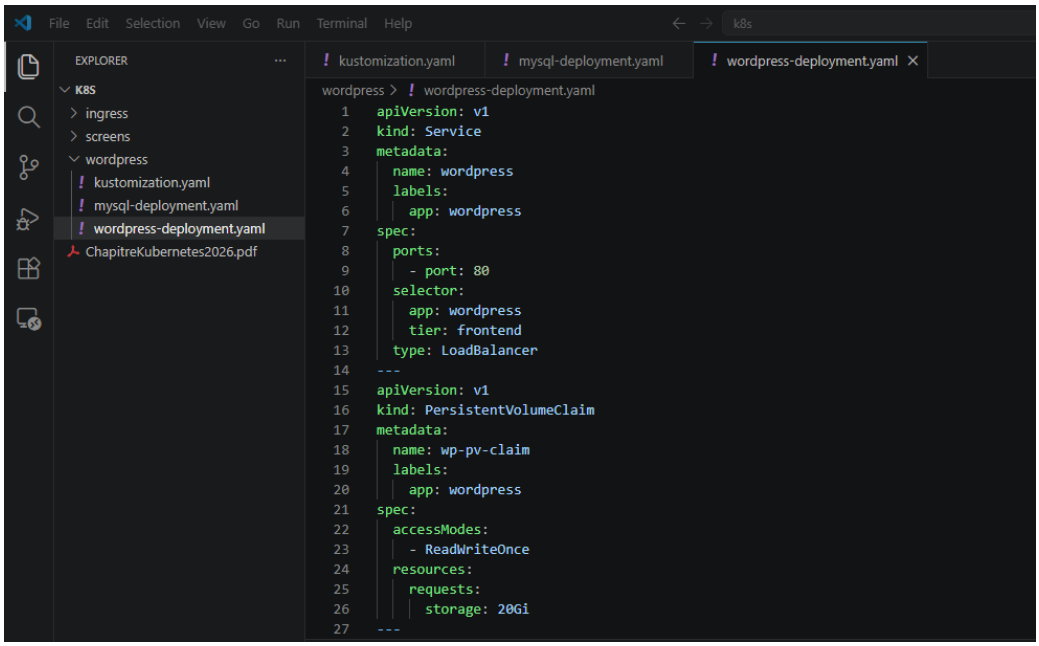
→ Création d'un fichier mysql-deployment.yaml :



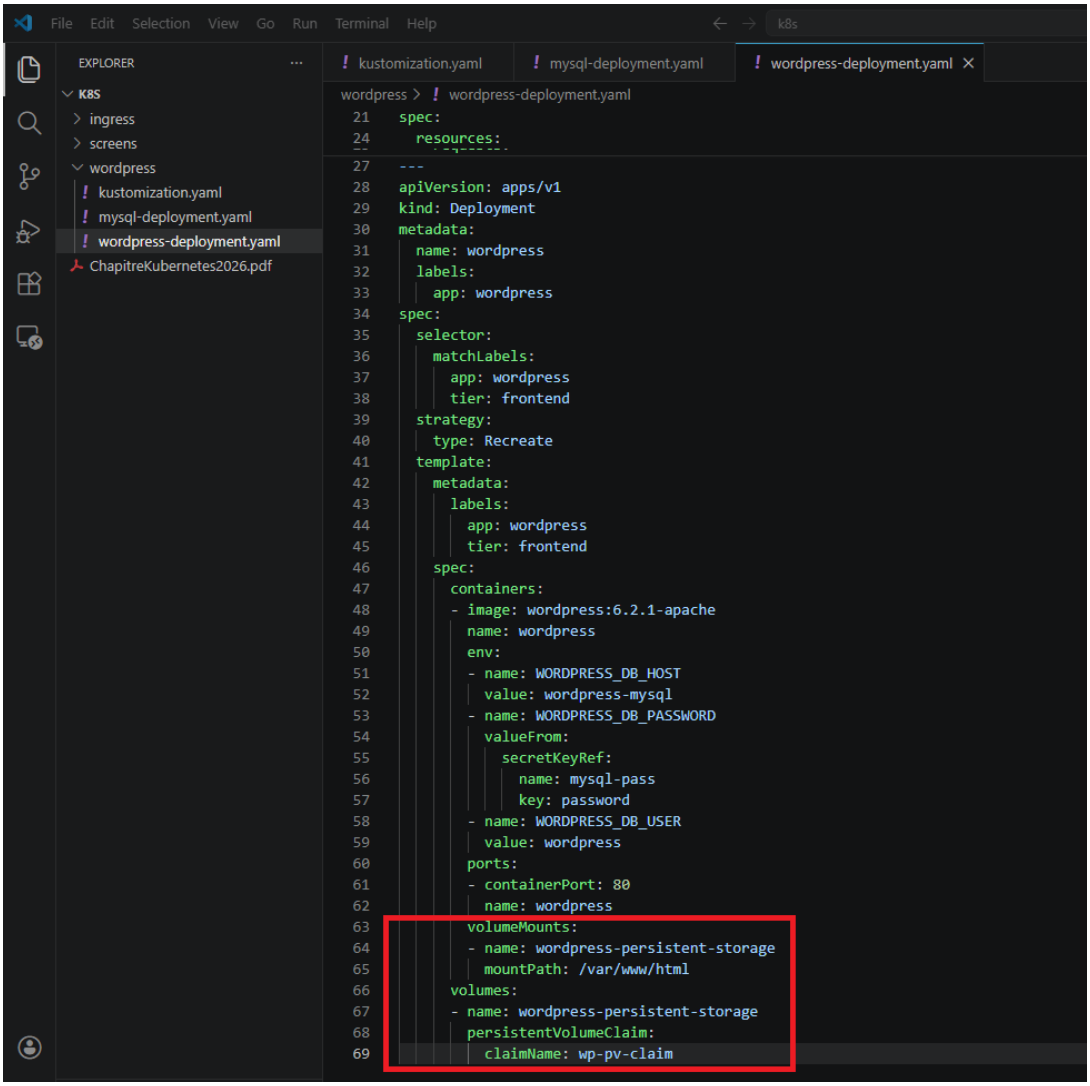
→ Indication de la création des volumes persistants :



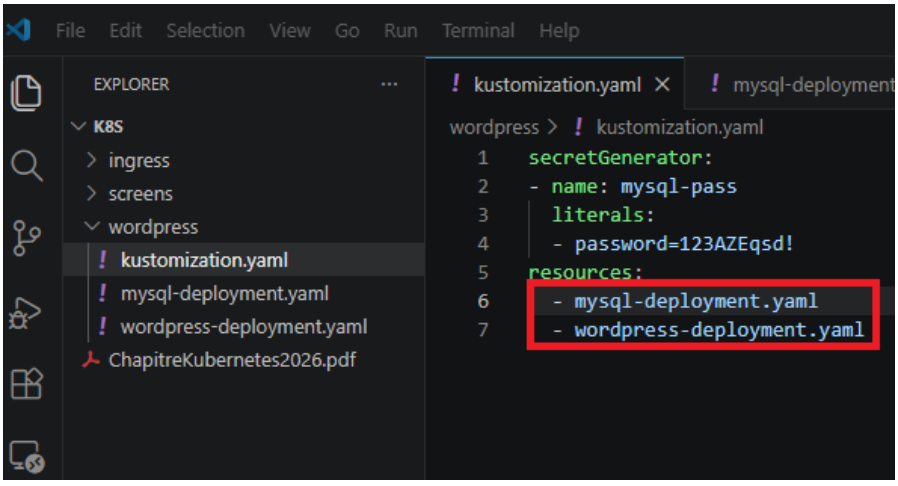
→ Création d'un fichier wordpress-customisation.yaml :



→ Indication des volumes persistants :



→ Ajout des fichiers dans les ressources du fichier kustomization.yaml :



→ Applicatif des fichiers de configuration :

```
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s> kubectl apply -k .\wordpress\
secret/mysql-pass-67ffctdkmh created
service/wordpress created
service/wordpress-mysql created
persistentvolumeclaim/mysql-pv-claim created
persistentvolumeclaim/wp-pv-claim created
deployment.apps/wordpress created
deployment.apps/wordpress-mysql created
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s>
```

→ Affichage du secret de mysql :

```
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s> kubectl get secrets
NAME                  TYPE     DATA   AGE
mongo-secret          Opaque   2      36m
mysql-pass-67ffctdkmh Opaque   1      33s
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s>
```

→ Affichage des volumes dynamiques :

```
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s> kubectl get pvc
NAME            STATUS   VOLUME                                     CAPACITY   ACCESS MODES   STORAGECLASS   VOLUMEATTRIBUTESCLASS   AGE
mysql-pv-claim  Bound    pvc-7319c2ba-9079-4d1f-a3b7-0cd11955cacf   20Gi       RWO            standard       <unset>                 74s
wp-pv-claim     Bound    pvc-7649b4cd-5219-4d88-bc9f-762d888f874e   20Gi       RWO            standard       <unset>                 74s
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s>
```

→ Affichage des pods Wordpress :

```
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s> kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
mailpit-7b96b48c5d-6htkw            1/1     Running   0          50m
mongo-deployment-744864fdd7-2s659   1/1     Running   0          35m
webapp-deployment-5766fd95c7-j7kr9  1/1     Running   0          24m
wordpress-7546459c86-tcnmj          1/1     Running   0          108s
wordpress-mysql-f5b7865ff-d5xjv     1/1     Running   0          108s
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s>
```

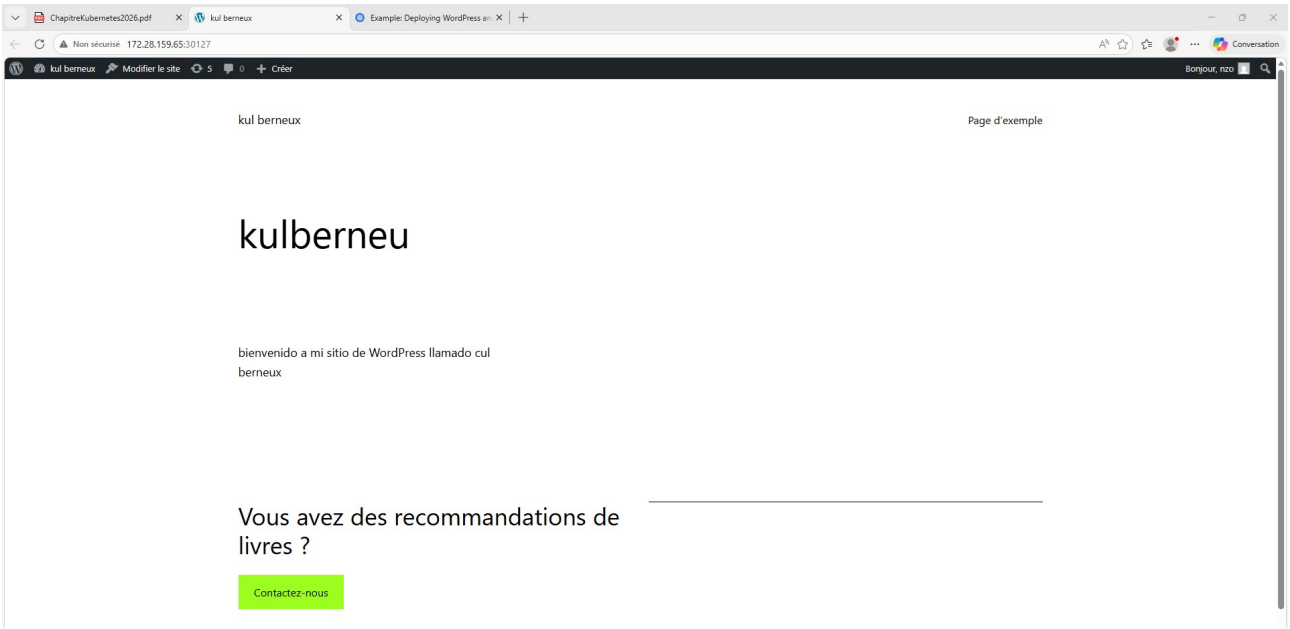
→ Affichage du service Wordpress :

```
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s> kubectl get services wordpress
NAME        TYPE           CLUSTER-IP     EXTERNAL-IP   PORT(S)        AGE
wordpress   LoadBalancer   10.107.26.33   <pending>     80:30127/TCP   2m35s
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s>
```

→ Utilisation de la commande qui affiche l'url précise du Wordpress :

```
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s> minikube service wordpress --url
http://172.28.159.65:30127
PS D:\2EME ANNEE\SISR\BOUCLY\A FINIR\k8s>
```

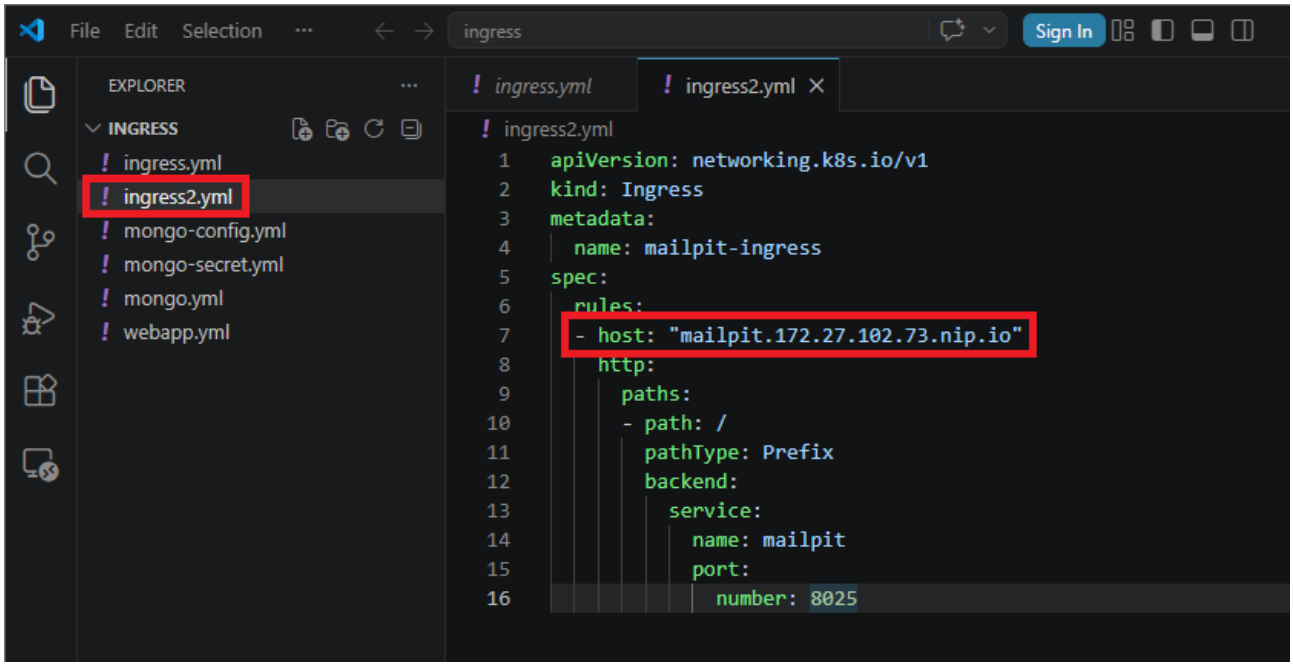
→ Connexion au site Wordpress et customisation rapide de la page d'accueil :



→ Informations du ingress mailpit :

```
PS C:\WINDOWS\system32> kubectl get ingress
NAME           CLASS   HOSTS   ADDRESS          PORTS   AGE
test-ingress   nginx   *       172.27.102.73    80      36s
PS C:\WINDOWS\system32> minikube ip
172.27.102.73
PS C:\WINDOWS\system32>
```

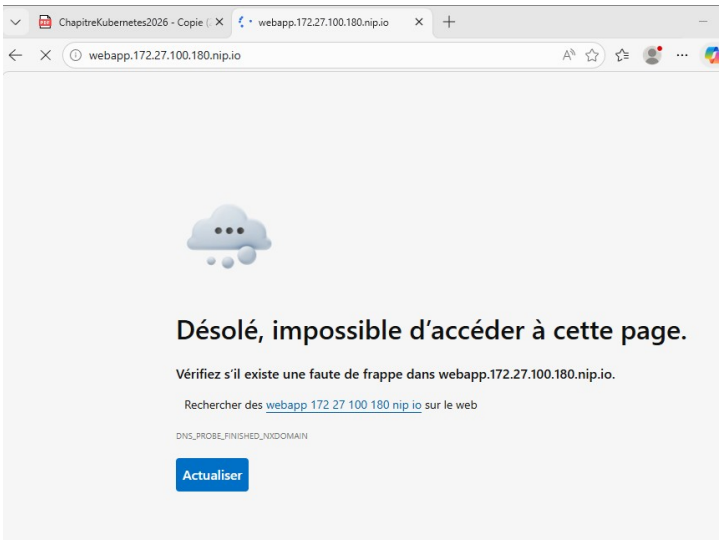
→ Création d'un nouveau fichier ingress mailpit ingress2.yml :



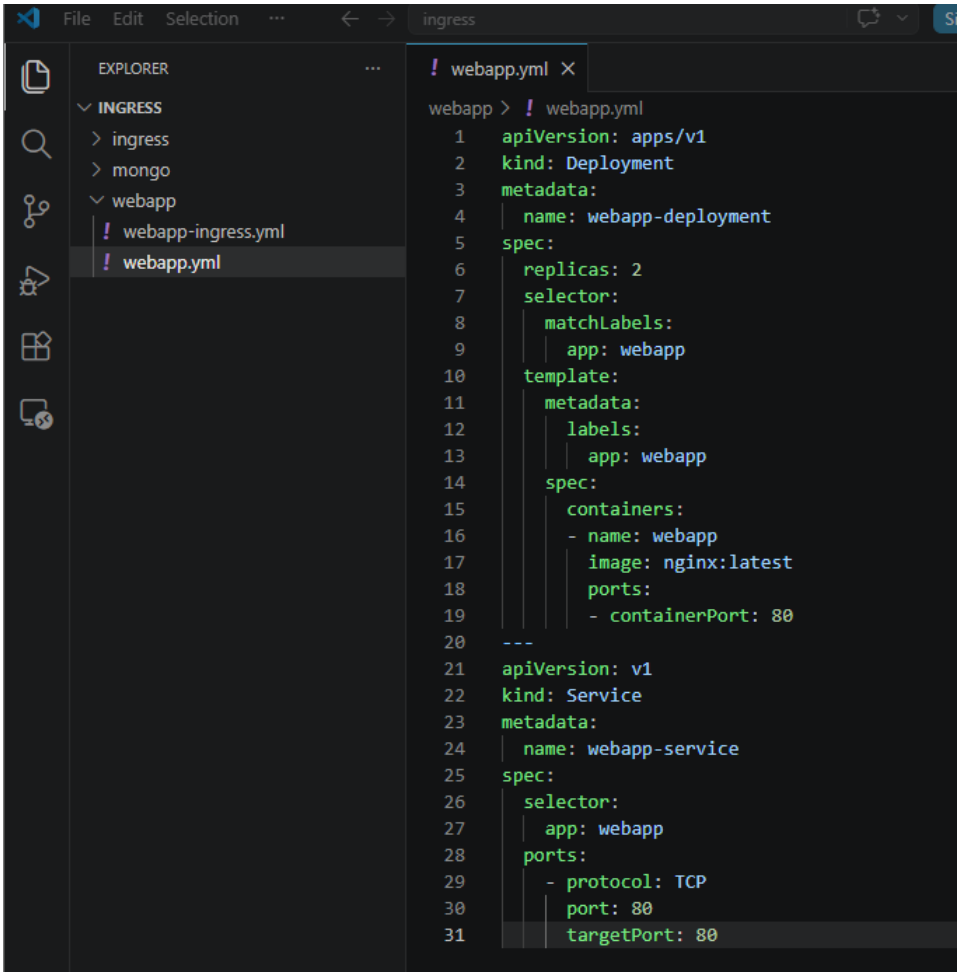
→ Applicatif du fichier :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\ingress> kubectl apply -f ingress2.yml
ingress.networking.k8s.io/mailpit-ingress created
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\ingress>
```

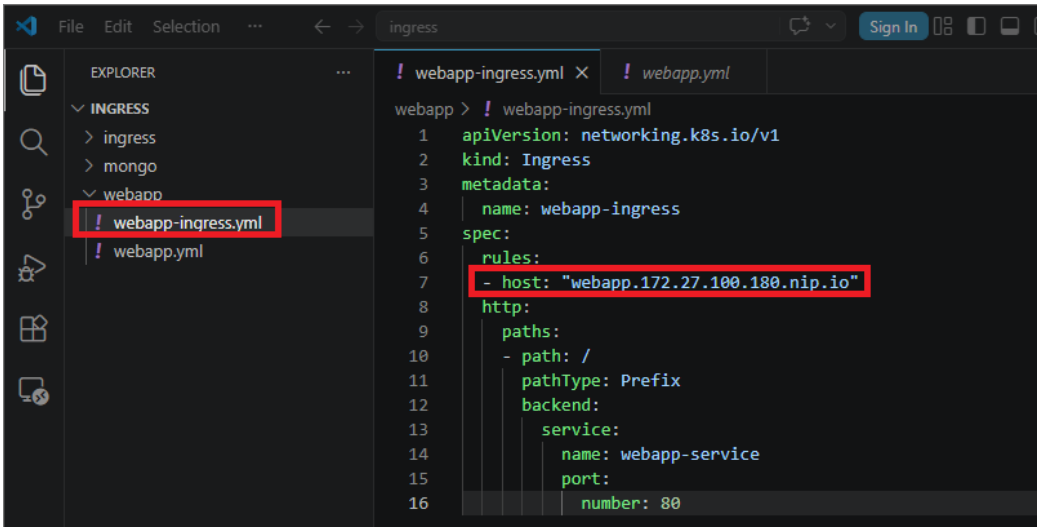
→ Site non joignable dû au problème de résolution DNS interne :



→ Création d'un objet deployment et service dans le fichier webapp.yml :



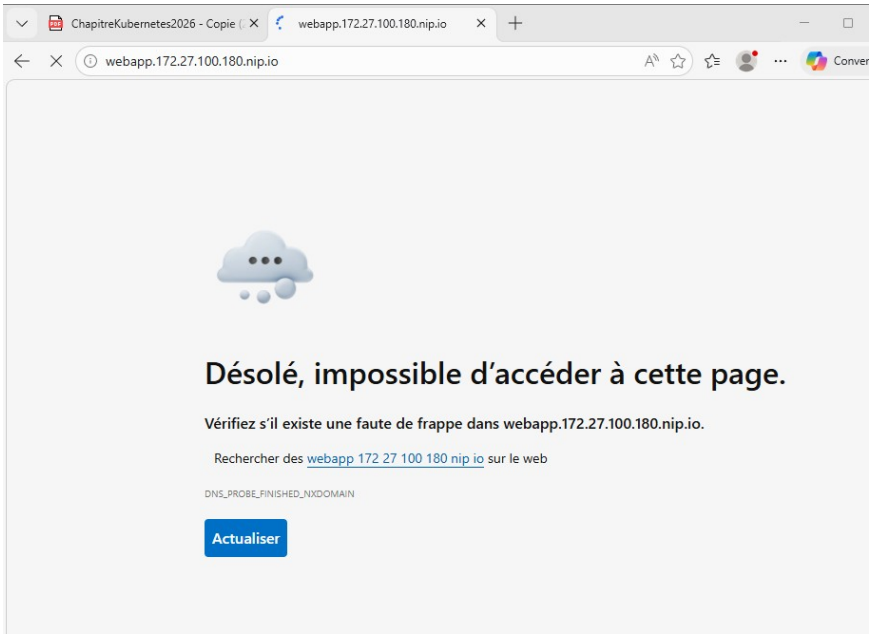
→ Création du fichier webapp-ingress.yml :



→ Applicatif des deux fichier yml :

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  powershell - webapp
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\ingress\webapp> kubectl apply -f webapp.yml
deployment.apps/webapp-deployment unchanged
service/webapp-service unchanged
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\ingress\webapp> kubectl apply -f webapp-ingress.yml
ingress.networking.k8s.io/webapp-ingress unchanged
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\ingress\webapp>
```

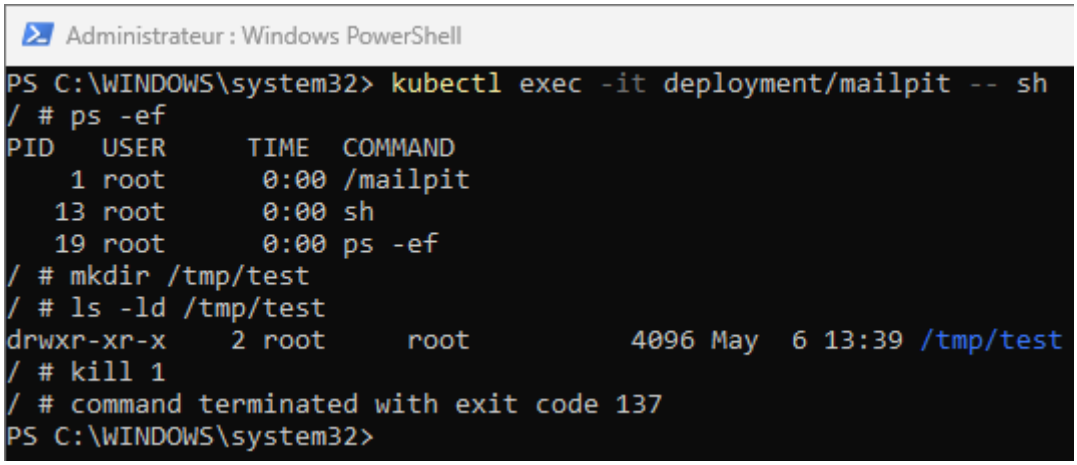
→ Site également non joignable dû au problème de résolution DNS interne :



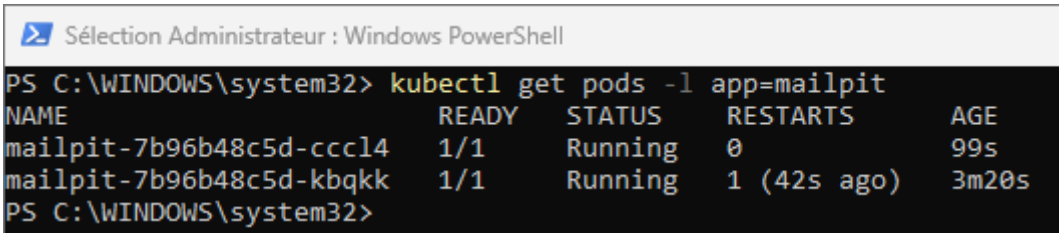
→ Vérification de l'état des pods :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl get pods -l app=mailpit
NAME                       READY   STATUS    RESTARTS   AGE
mailpit-7b96b48c5d-cccl4   1/1     Running   0          5s
mailpit-7b96b48c5d-kbqkk   1/1     Running   0          106s
PS C:\WINDOWS\system32>
```

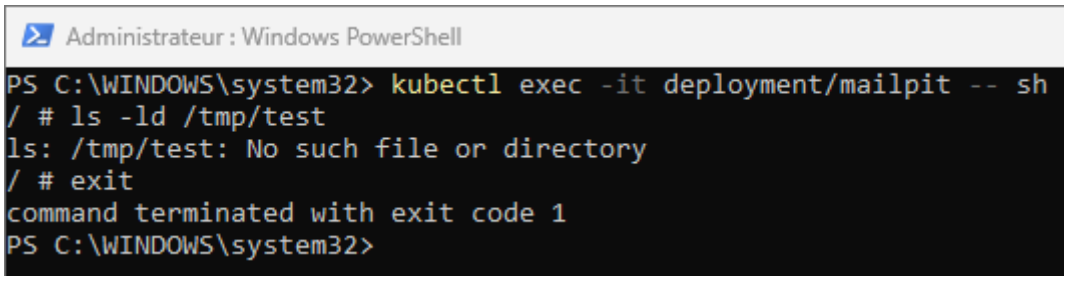
→ Connexion au pod mailpit et création d'un dossier test puis processus mailpit tué :



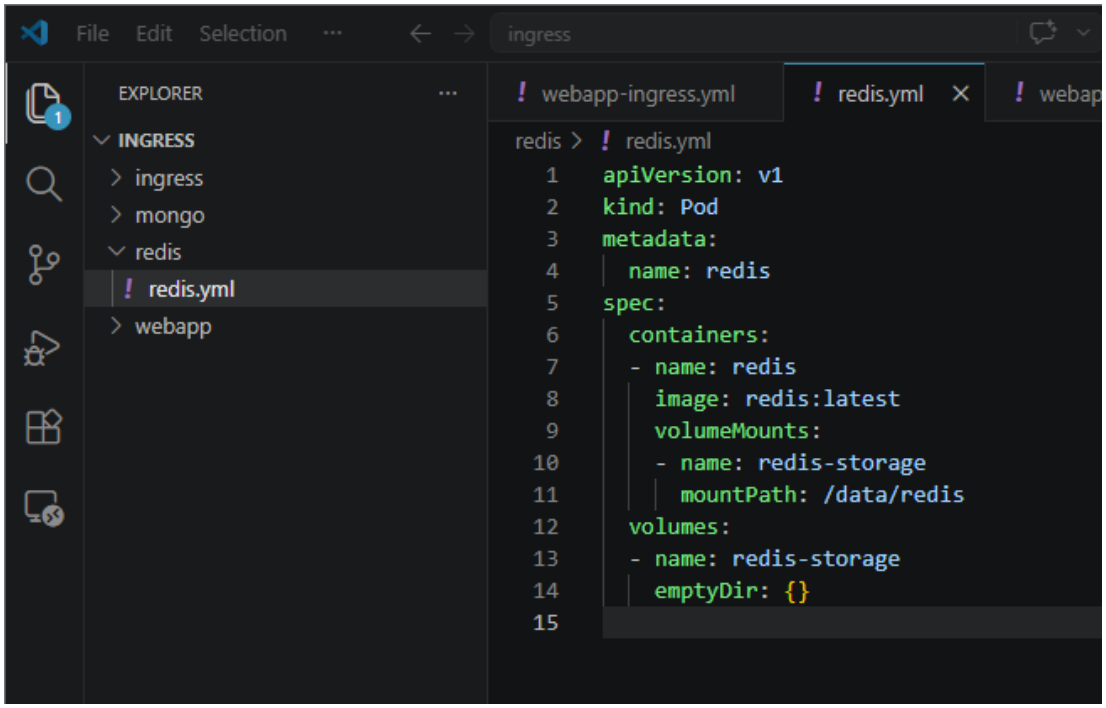
→ Le pod a redémarré automatiquement en créant un nouveau pod :



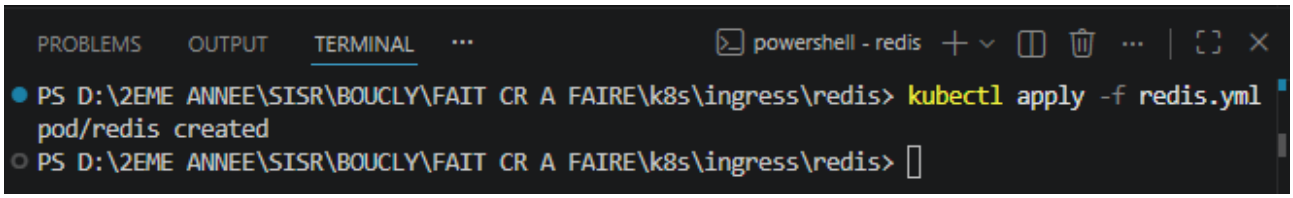
→ Le dossier test n'existe plus sur le nouveau pod :



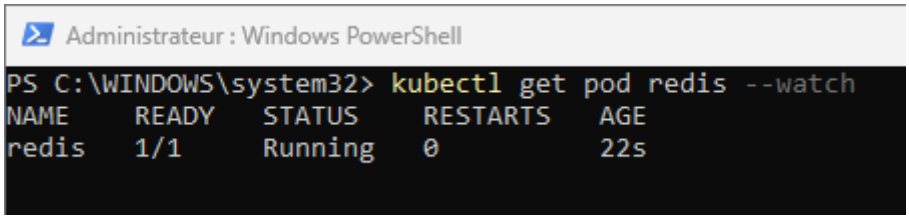
→ Création du fichier redis.yaml :



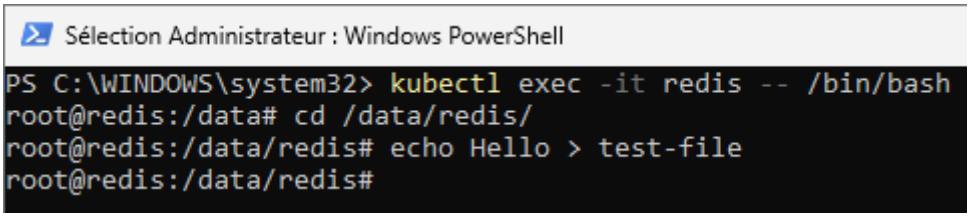
→ Création du pod redis :



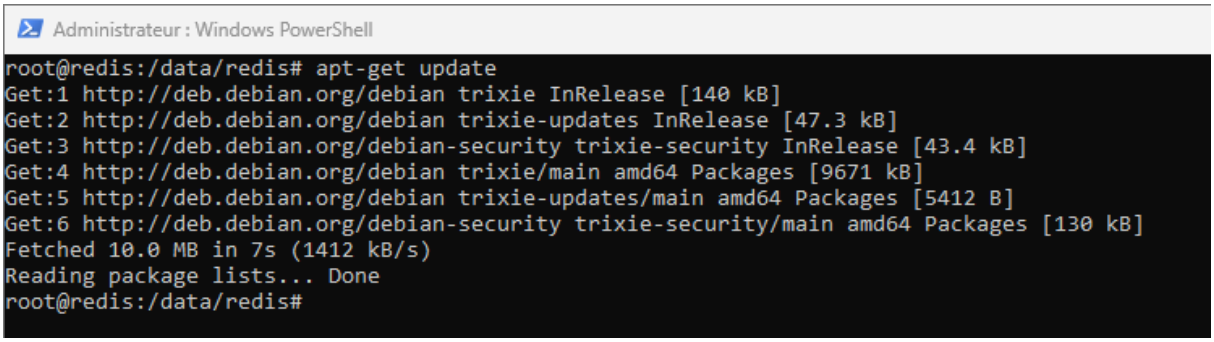
→ Pod bien créé et en cours d'exécution :



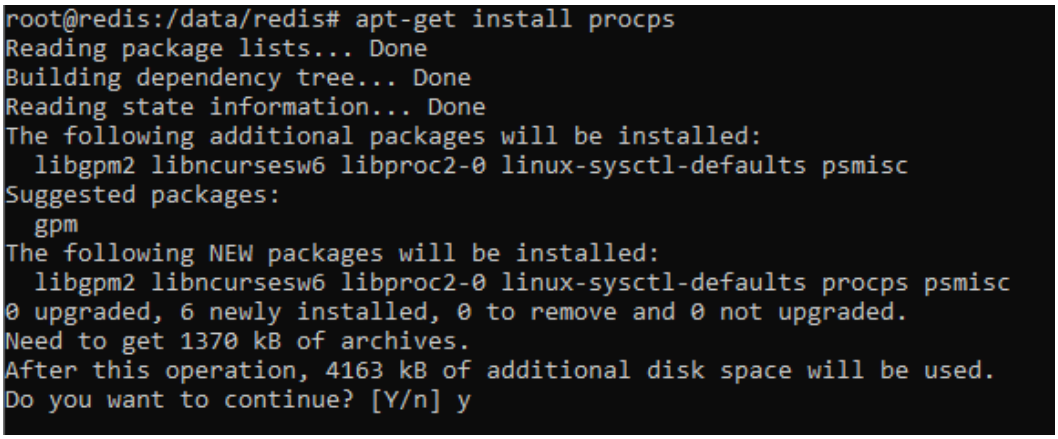
→ Création d'un fichier test dans dossier redis du pod redis :



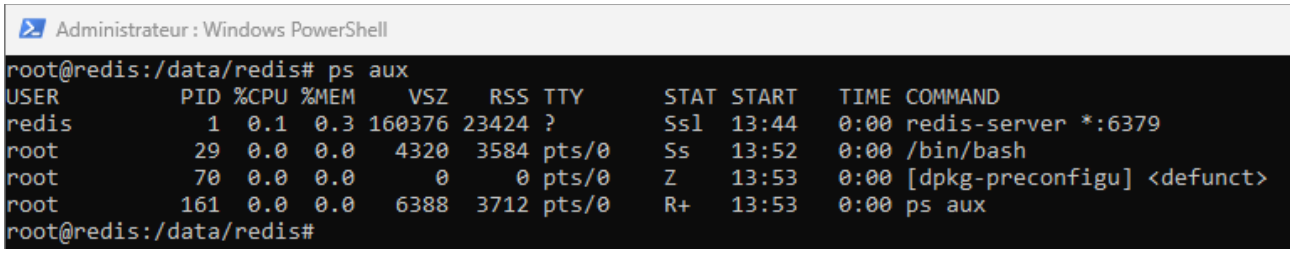
→ Mise à jour des paquets du pod :



→ Installation du paquet propcs :



→ Affichage des processus en cours :



→ Arrêt du processus redis :

```
root@redis:/data/redis# kill 1
root@redis:/data/redis# command terminated with exit code 137
PS C:\WINDOWS\system32>
```

→ Le pod a été recréé et redémarré :

```
Sélection Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl get pod redis --watch
NAME    READY   STATUS    RESTARTS      AGE
redis   1/1     Running   1 (47s ago)   18m
```

→ Le fichier test-file dans le pod est encore présent :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl exec -it redis -- /bin/bash
root@redis:/data# cd /data/redis
root@redis:/data/redis# ls
test-file
root@redis:/data/redis# exit
exit
PS C:\WINDOWS\system32>
```

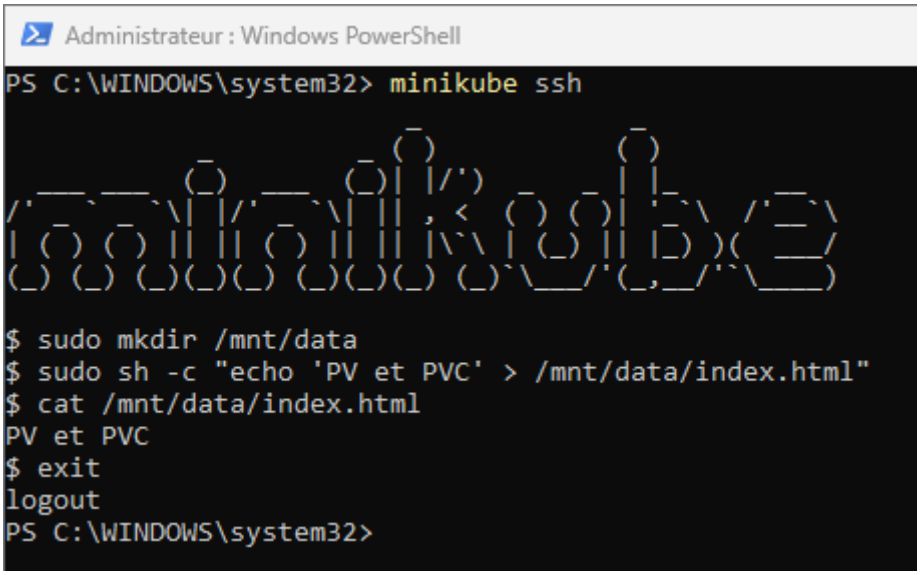
→ Suppression du pod redis :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl delete pod redis
pod "redis" deleted from default namespace
PS C:\WINDOWS\system32>
```

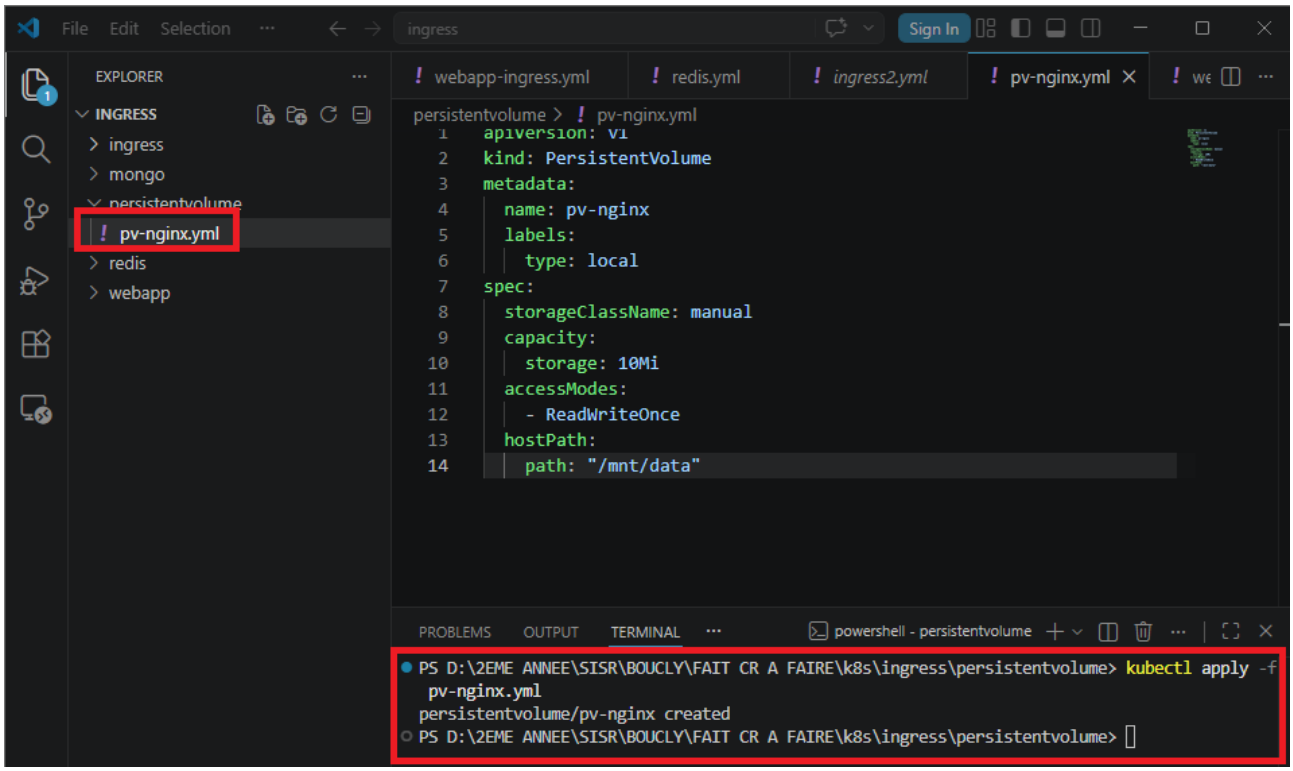
→ Le pod n'est maintenant plus accessible :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl get pod redis --watch
Error from server (NotFound): pods "redis" not found
PS C:\WINDOWS\system32>
```

→ Connexion en SSH à minikube et création d'un fichier index.html en le testant :



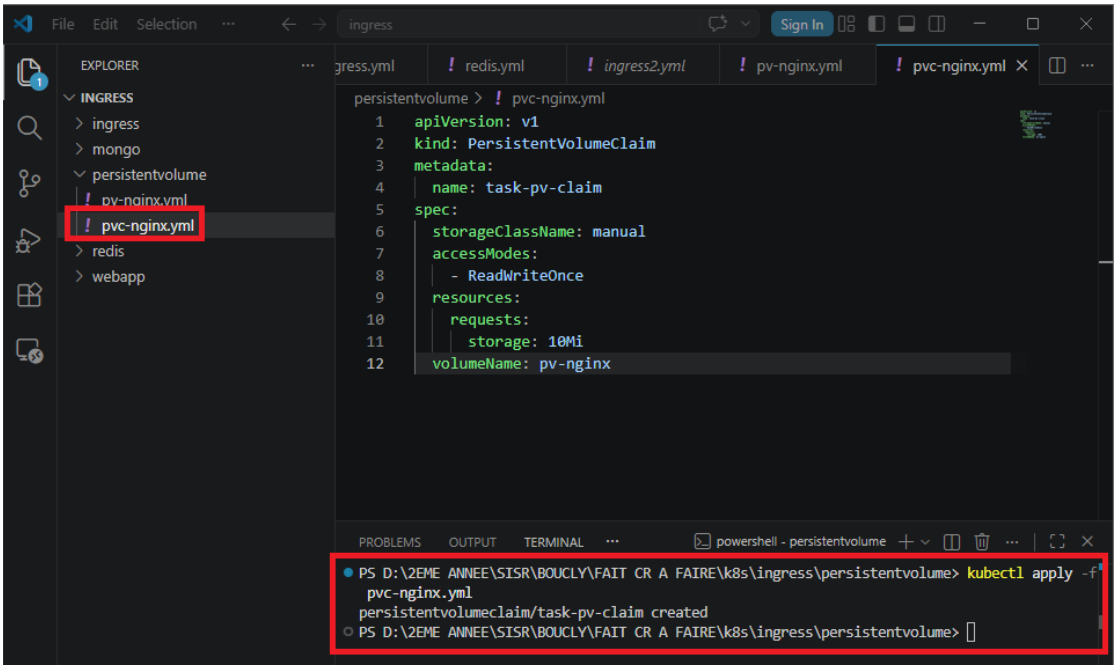
→ Création du fichier pv-nginx.yml et applicatif du fichier :



→ Le volume est bien créé :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl get pv pv-nginx
NAME       CAPACITY   ACCESS MODES   RECLAIM POLICY   STATUS      CLAIM   STORAGECLASS   VOLUMEATTRIBUTESCLASS   REASON   AGE
pv-nginx   10Mi       RWO            Retain           Available           manual         <unset>                          49s
PS C:\WINDOWS\system32>
```

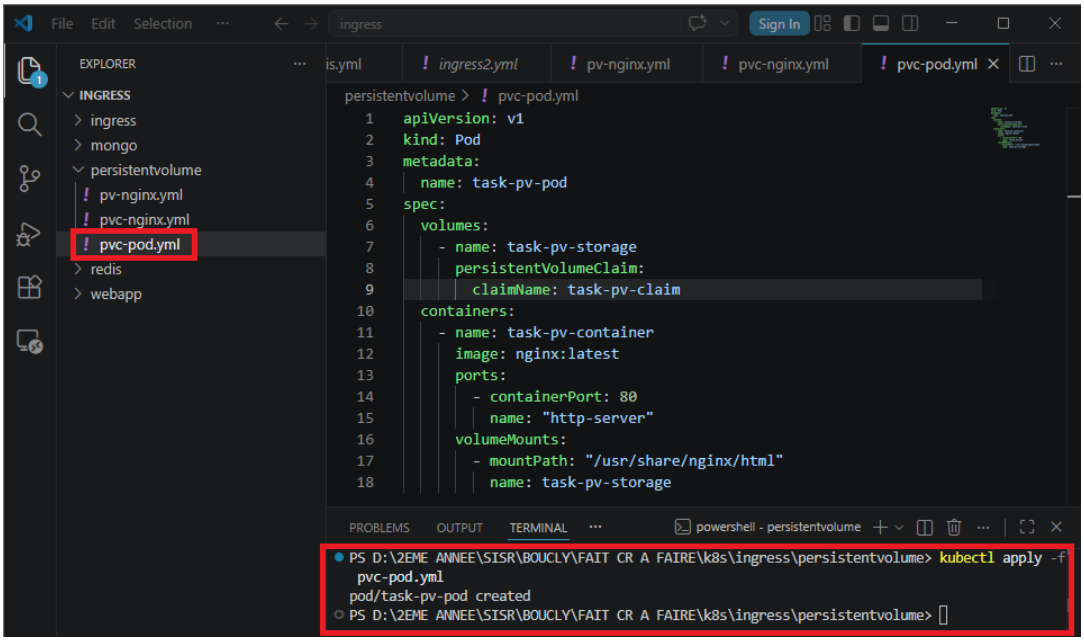
→ Création du fichier pvc-nginx.yml et applicatif :



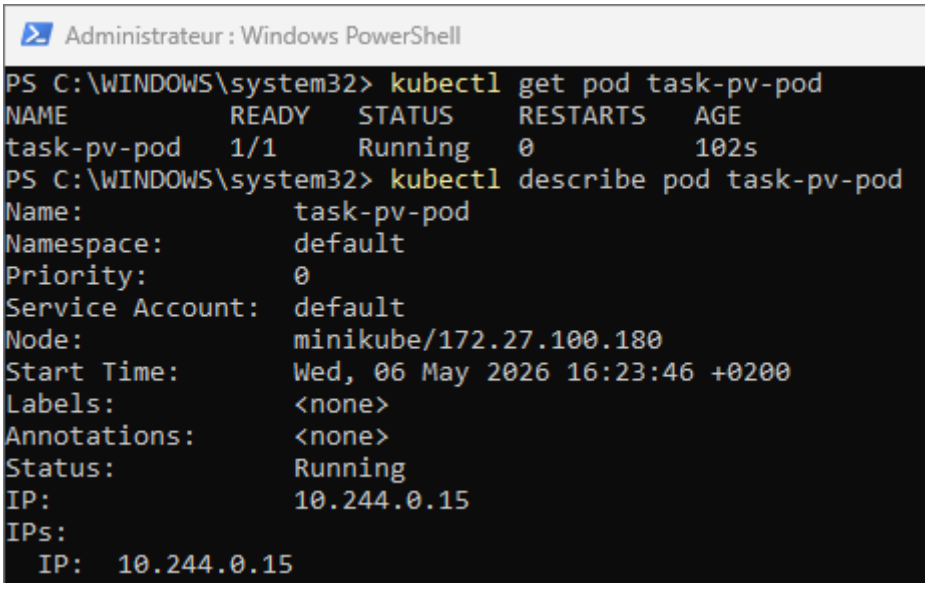
→ Affichage du volume persistant et du claim :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl get pv pv-nginx
NAME       CAPACITY   ACCESS MODES   RECLAIM POLICY   STATUS   CLAIM                   STORAGECLASS   VOLUMEATTRIBUTESCLASS   REASON   AGE
pv-nginx   10Mi       RWO            Retain           Bound    default/task-pv-claim   manual         <unset>                          3m59s
PS C:\WINDOWS\system32> kubectl get pvc
NAME            STATUS   VOLUME     CAPACITY   ACCESS MODES   STORAGECLASS   VOLUMEATTRIBUTESCLASS   AGE
task-pv-claim   Bound    pv-nginx   10Mi       RWO            manual         <unset>                 58s
PS C:\WINDOWS\system32>
```

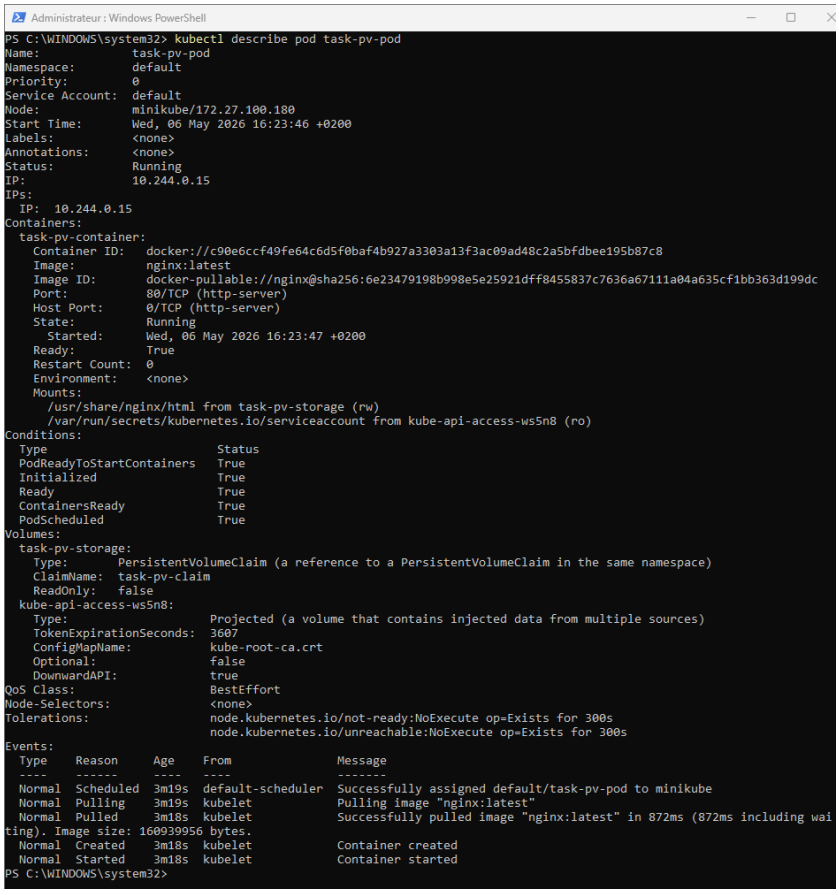
→ Création du fichier pvc-pod.yml et intégration du fichier :



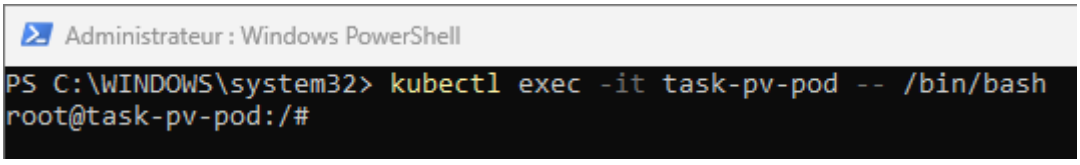
→ Affichage du pod et de ses détails :



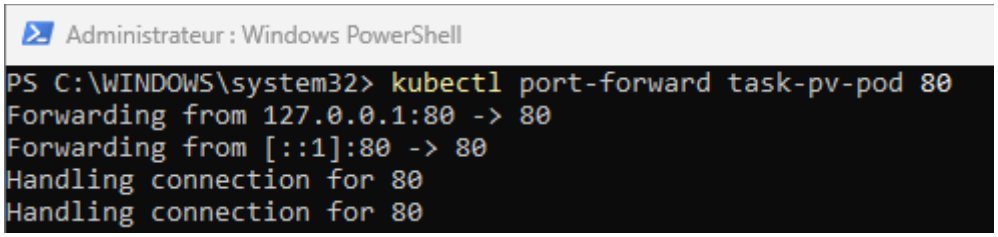
→ Détails du pod :



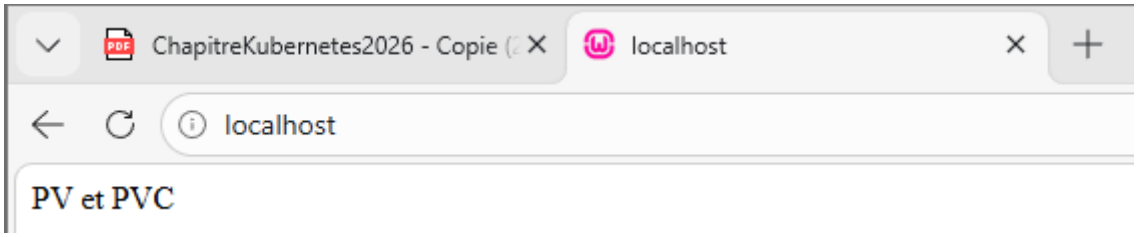
→ Connexion au pod en mode interactif :



→ Port forward sur le port 80 :



→ Connexion en HTTP au localhost :



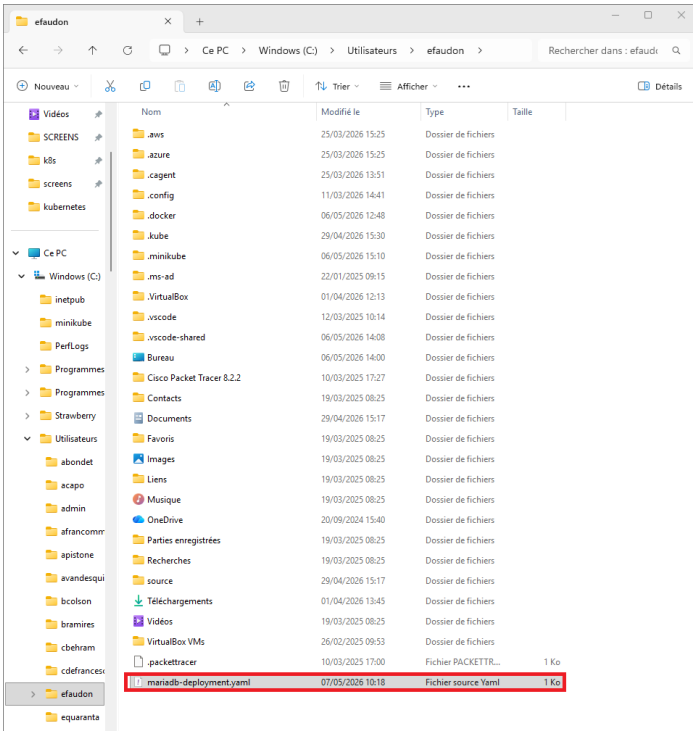
→ Mise à jour des paquets du pod et curl du site localhost :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl exec -it task-pv-pod -- /bin/bash
root@task-pv-pod:/# apt-get update
Get:1 http://deb.debian.org/debian trixie InRelease [140 kB]
Get:2 http://deb.debian.org/debian trixie-updates InRelease [47.3 kB]
Get:3 http://deb.debian.org/debian-security trixie-security InRelease [43.4 kB]
Get:4 http://deb.debian.org/debian trixie/main amd64 Packages [9671 kB]
Get:5 http://deb.debian.org/debian trixie-updates/main amd64 Packages [5412 B]
Get:6 http://deb.debian.org/debian-security trixie-security/main amd64 Packages [130 kB]
Fetched 10.0 MB in 1s (9203 kB/s)
Reading package lists... Done
root@task-pv-pod:/# apt-get install curl
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
curl is already the newest version (8.14.1-2+deb13u2).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
root@task-pv-pod:/# curl http://localhost
PV et PVC
root@task-pv-pod:/#
```

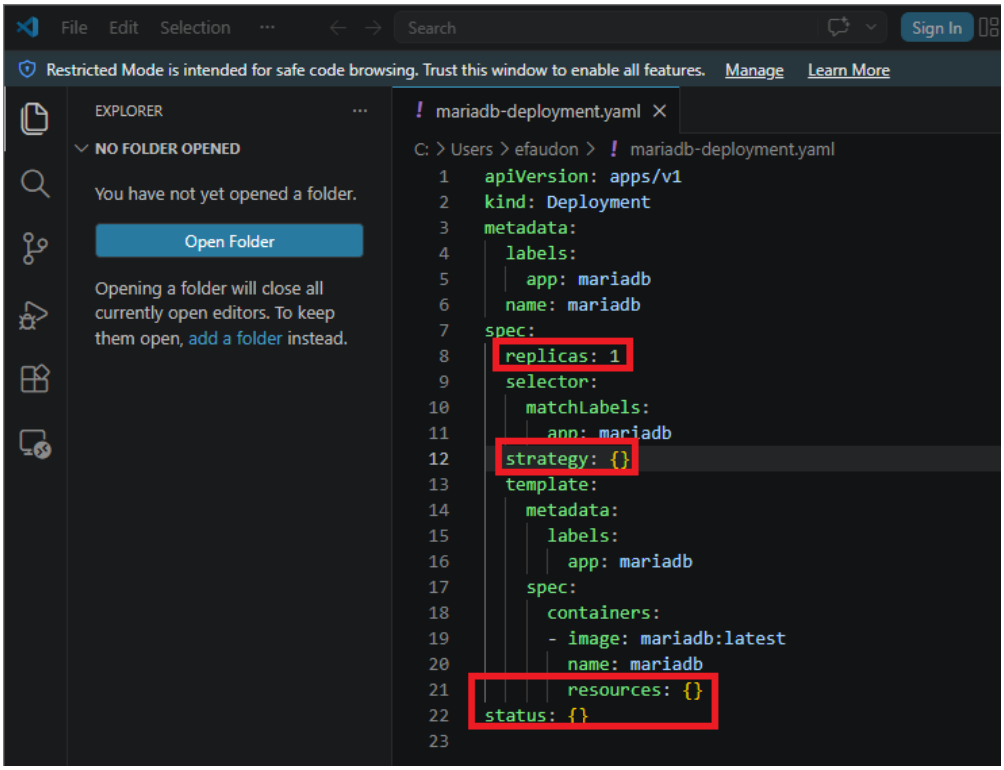
→ Déploiement pas créé directement et qui met le output dans un fichier mariadb-deployment.yaml :

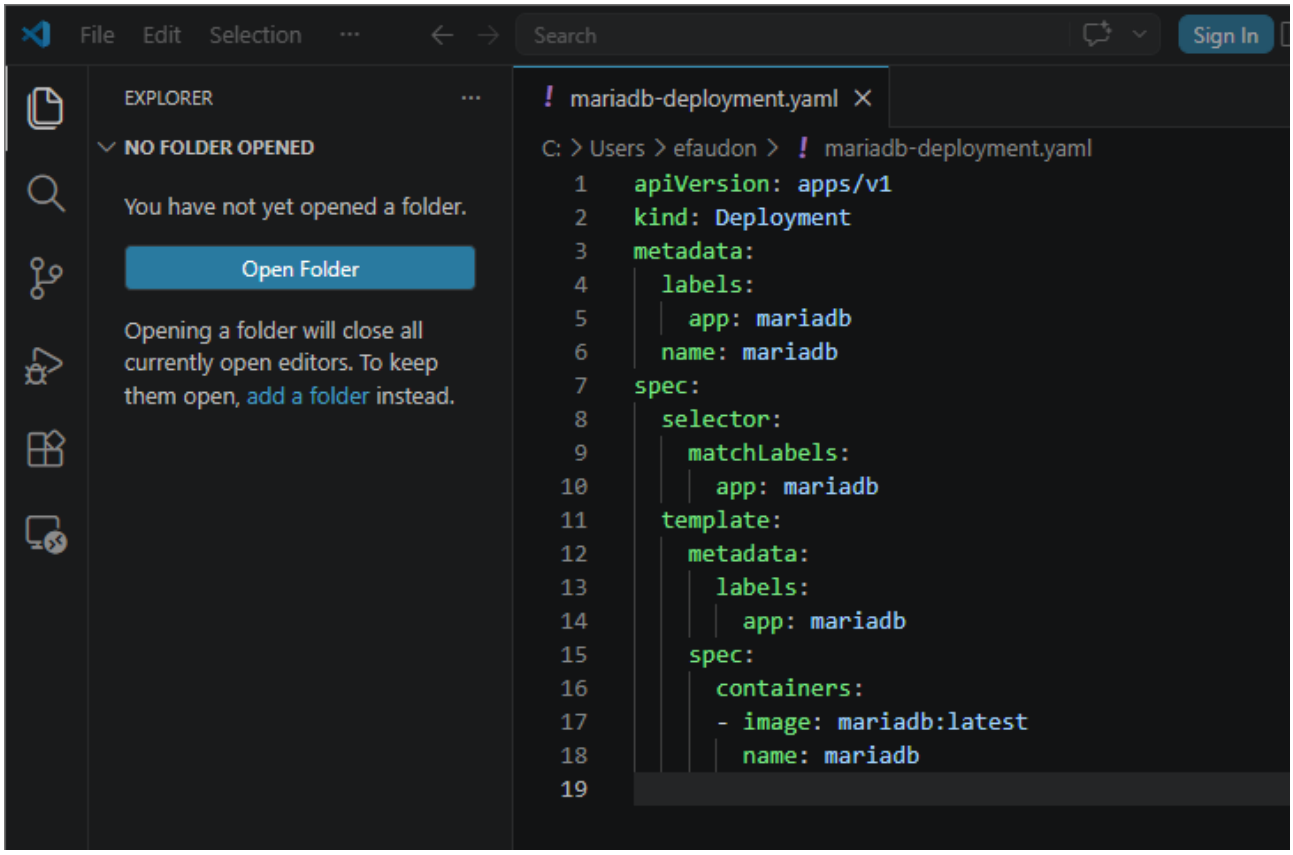
```
Windows PowerShell
PS C:\Users\efaudon> kubectl create deployment mariadb --image=mariadb:latest --dry-run=client --output yaml > mariadb-deployment.yaml
PS C:\Users\efaudon>
```

→ Affichage du fichier yaml dans l'explorateur de fichier :

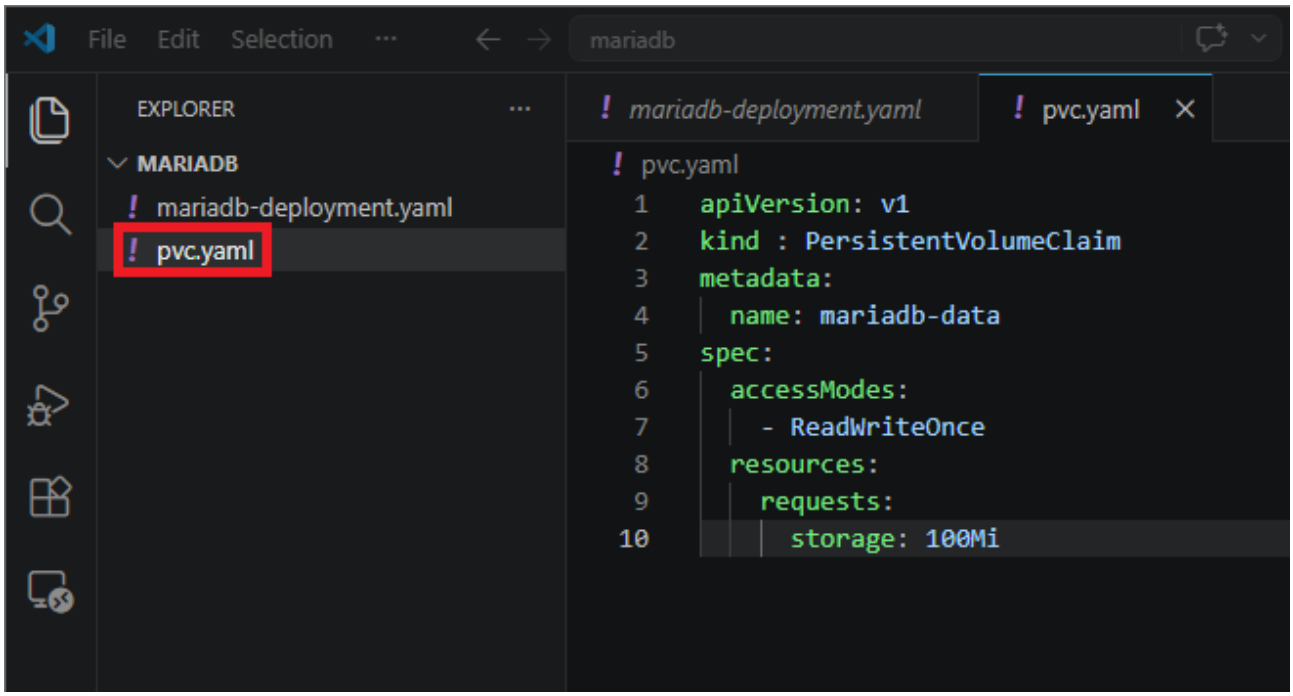


→ Suppression des lignes replicas strategy et resources status dans le fichier :





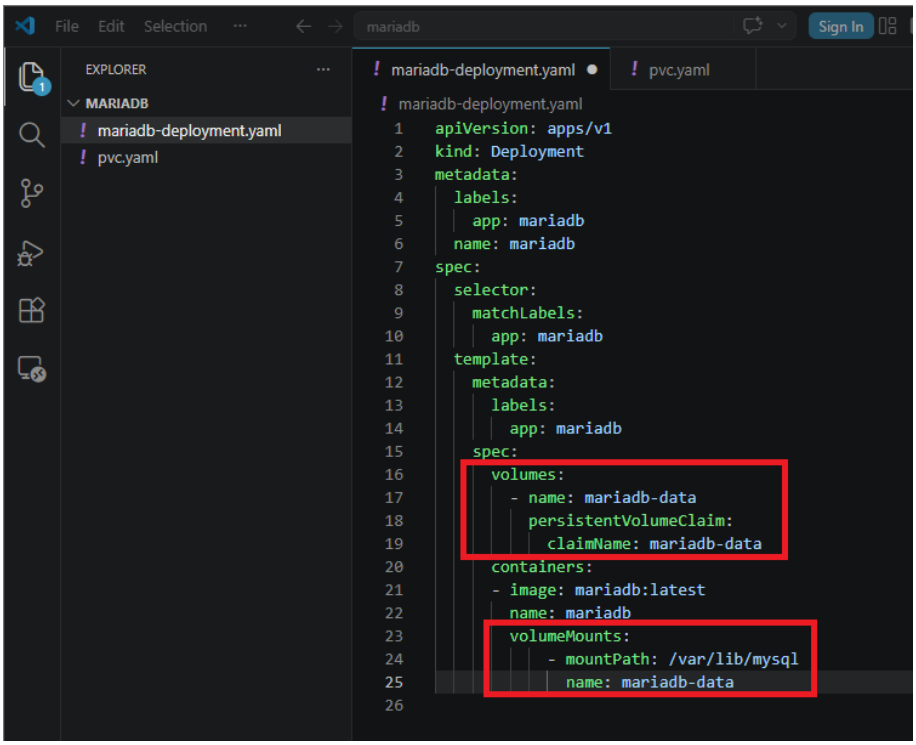
→ Création d'un fichier de demande de volume :



→ Intégration du fichier :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl apply -f pvc.yaml
persistentvolumeclaim/mariadb-data created
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

→ Indication des volumes dans le fichier déploiement mariadb :



→ Intégration du fichier déploiement :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl apply -f mariadb-deployment.yaml
deployment.apps/mariadb created
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

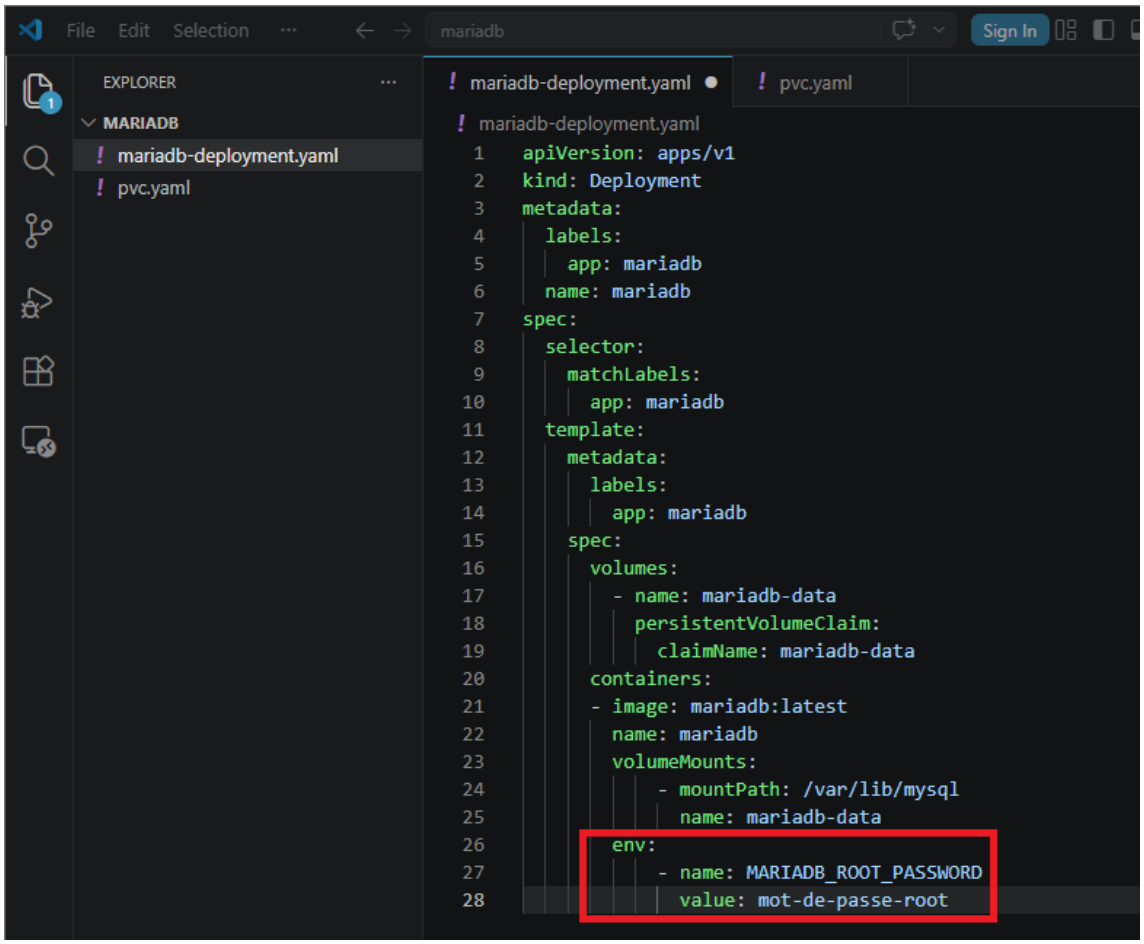
→ Erreur lors du démarrage du pod :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl get pod -l app=mariadb
NAME                       READY   STATUS    RESTARTS      AGE
mariadb-5c476b5c79-c78x8   0/1     Error     2 (21s ago)   31s
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

→ Les variables d'identifiants ne sont pas indiquées :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl logs -l app=mariadb
2026-05-07 08:45:44+00:00 [Note] [Entrypoint]: Entrypoint script for MariaDB Server 1:12.2.2+maria~ubu2404 started.
2026-05-07 08:45:44+00:00 [Warn] [Entrypoint]: /sys/fs/cgroup///memory.pressure not writable, functionality unavailable to MariaDB
2026-05-07 08:45:44+00:00 [Note] [Entrypoint]: Switching to dedicated user 'mysql'
2026-05-07 08:45:44+00:00 [Note] [Entrypoint]: Entrypoint script for MariaDB Server 1:12.2.2+maria~ubu2404 started.
2026-05-07 08:45:45+00:00 [ERROR] [Entrypoint]: Database is uninitialized and password option is not specified
        You need to specify one of MARIADB_ROOT_PASSWORD, MARIADB_ROOT_PASSWORD_HASH, MARIADB_ALLOW_EMPTY_ROOT_PASSWORD and MARIADB_RANDOM_ROOT_PASSWORD
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

→ Indication des variables d'environnement du mot de passe :



→ Reconfiguration du déploiement :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl apply -f mariadb-deployment.yaml
deployment.apps/mariadb configured
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

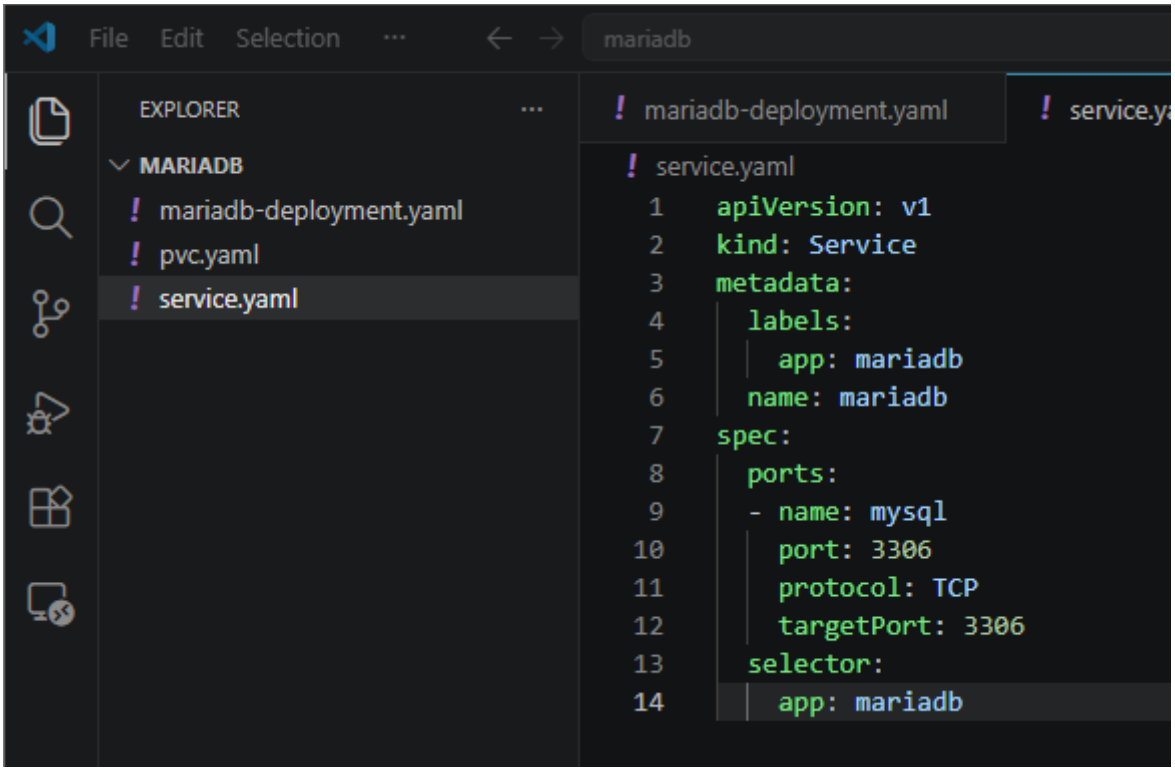
→ Pod maintenant opérationnel :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl get pod -l app=mariadb
NAME                       READY   STATUS    RESTARTS   AGE
mariadb-5bbb9c9b6d-z48nd   1/1     Running   0          27s
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

→ Connexion au conteneur et test de la connectivité :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl exec -it deployment/mariadb -- bash
root@mariadb-5bbb9c9b6d-z48nd:/# mariadb-admin status -p$MARIADB_ROOT_PASSWORD
Uptime: 113  Threads: 1  Questions: 1  Slow queries: 0  Opens: 17  Open tables: 10  Queries per second avg: 0.008
root@mariadb-5bbb9c9b6d-z48nd:/# exit
exit
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

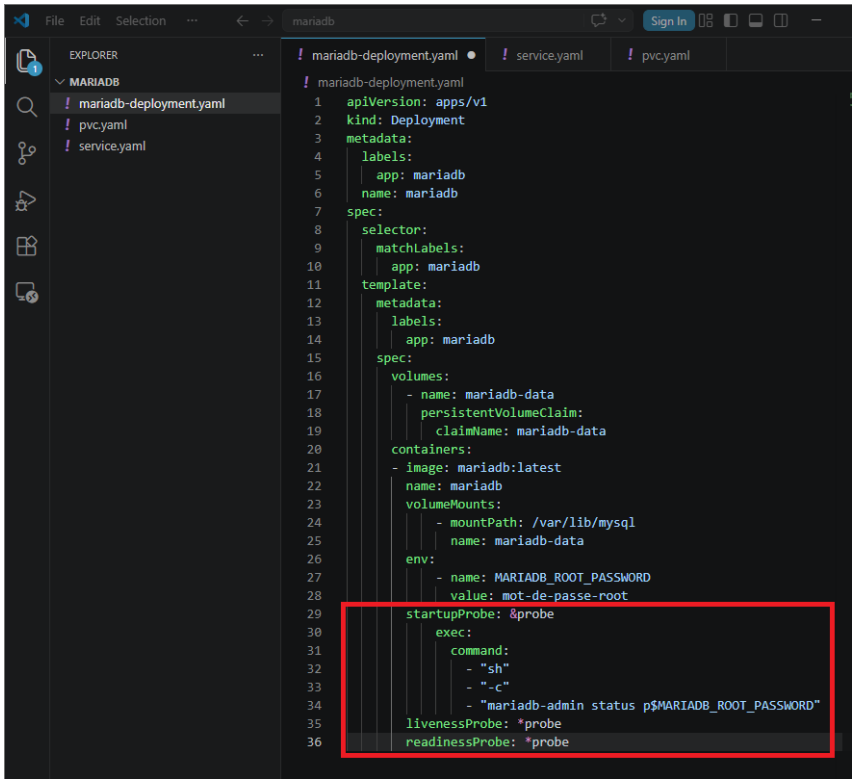
→ Création du fichier service.yaml :



→ Intégration du service :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl apply -f service.yaml
service/mariadb created
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

→ Modification du fichier de déploiement en ajoutant la surveillance de la BDD :



→ Applicatif des modifications :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl apply -f mariadb-deployment.yaml
deployment.apps/mariadb configured
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

→ Un deuxième pod est créé :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl get pods -l app=mariadb
NAME                       READY   STATUS    RESTARTS   AGE
mariadb-5bbb9c9b6d-z48nd   1/1     Running   0          8m35s
mariadb-7865c7bbf8-mlr26   0/1     Running   0          32s
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

→ Description du nouveau pod :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl describe pods mariadb-7865c7bbf8-mlr26
Name:             mariadb-7865c7bbf8-mlr26
Namespace:        default
Priority:         0
Service Account:  default
Node:             minikube/172.31.117.198
Start Time:       Thu, 07 May 2026 10:58:29 +0200
Labels:           app=mariadb
                  pod-template-hash=7865c7bbf8
Annotations:      <none>
Status:           Running
IP:               10.244.0.32
IPs:
  IP:           10.244.0.32
Controlled By:  ReplicaSet/mariadb-7865c7bbf8
Containers:
  mariadb:
    Container ID:   docker://fcbedbf7b0e3fbc0206cb4113912a3b08ac47f3313ed8af1db3a22e0eebf19f9
    Image:          mariadb:latest
    Image ID:       docker-pullable://mariadb@sha256:e0236fc6386e7eacd9359e59d0a078bd7aa0d18280d36d13061121bedeaee903
    Port:           <none>
    Host Port:      <none>
    State:          Running
      Started:      Thu, 07 May 2026 10:59:34 +0200
    Last State:     Terminated
      Reason:       Error
      Exit Code:    1
      Started:      Thu, 07 May 2026 10:59:02 +0200
      Finished:     Thu, 07 May 2026 10:59:33 +0200
    Ready:          False
    Restart Count:  2
    Liveness:       exec [sh -c mariadb-admin status p$MARIADB_ROOT_PASSWORD] delay=0s timeout=1s period=10s #success=1 #failure=3
    Readiness:      exec [sh -c mariadb-admin status p$MARIADB_ROOT_PASSWORD] delay=0s timeout=1s period=10s #success=1 #failure=3
    Startup:        exec [sh -c mariadb-admin status p$MARIADB_ROOT_PASSWORD] delay=0s timeout=1s period=10s #success=1 #failure=3
    Environment:
      MARIADB_ROOT_PASSWORD:  mot-de-passe-root
    Mounts:
      /var/lib/mysql from mariadb-data (rw)
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-xm8xh (ro)
Conditions:
  Type                        Status
  PodReadyToStartContainers   True
  Initialized                 True
  Ready                       False
  ContainersReady             False
  PodScheduled                True
Volumes:
  mariadb-data:
    Type:       PersistentVolumeClaim (a reference to a PersistentVolumeClaim in the same namespace)
    ClaimName:  mariadb-data
    ReadOnly:   false
  kube-api-access-xm8xh:
    Type:                     Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds:   3607
    ConfigMapName:            kube-root-ca.crt
```

→ Erreur de connexion au serveur mariaDB :

```
    Optional:                false
    DownwardAPI:             true
QoS Class:                   BestEffort
Node-Selectors:              <none>
Tolerations:                 node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
                             node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type     Reason     Age                From               Message
  ----     ------     ----               ----               -------
  Normal   Scheduled  75s                default-scheduler  Successfully assigned default/mariadb-7865c7bbf8-mlr26 to minikube
  Normal   Pulled     74s                kubelet            Successfully pulled image "mariadb:latest" in 857ms (857ms including waiting). Image size: 335568219 bytes.
  Normal   Pulled     42s                kubelet            Successfully pulled image "mariadb:latest" in 869ms (869ms including waiting). Image size: 335568219 bytes.
  Normal   Killing    15s (x2 over 45s)  kubelet            Container mariadb failed startup probe, will be restarted
  Normal   Pulling    11s (x3 over 74s)  kubelet            Pulling image "mariadb:latest"
  Normal   Created    10s (x3 over 74s)  kubelet            Container created
  Normal   Started    10s (x3 over 74s)  kubelet            Container started
  Normal   Pulled     10s                kubelet            Successfully pulled image "mariadb:latest" in 862ms (862ms including waiting). Image size: 335568219 bytes.
  Warning  Unhealthy  5s (x7 over 65s)   kubelet            Startup probe failed: mariadb-admin: connect to server at 'localhost' failed
error: 'Can't connect to local server through socket '/run/mysqld/mysqld.sock' (2)'
Check that mariadbd is running and that the socket: '/run/mysqld/mysqld.sock' exists!
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

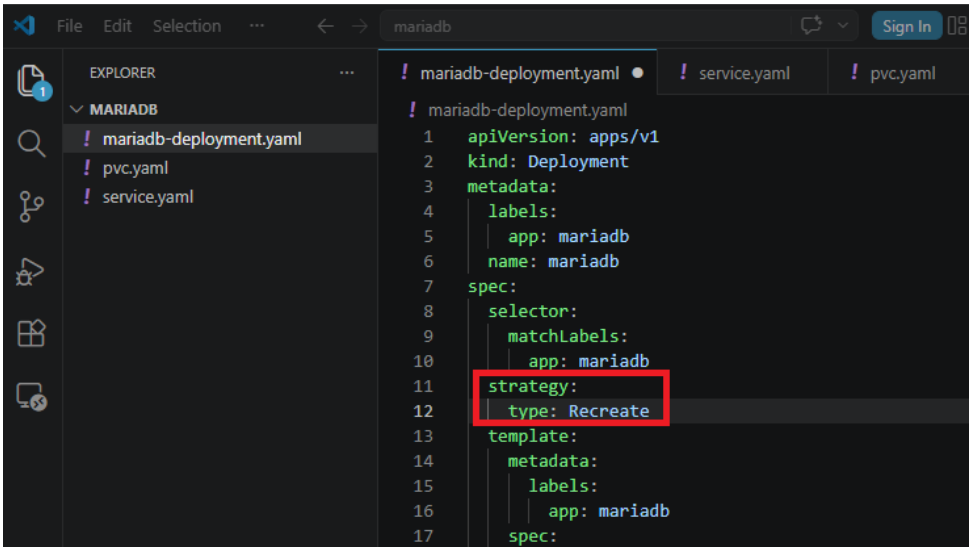
→ Le deuxième pod n'est pas actif :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl get pod -l app=mariadb
NAME                       READY   STATUS             RESTARTS      AGE
mariadb-5bbb9c9b6d-z48nd   1/1     Running            0             11m
mariadb-7865c7bbf8-mlr26   0/1     CrashLoopBackOff   4 (25s ago)   3m4s
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

→ Affichage des logs du pod qui montre que le fichier de lock est déjà utilisé par le premier pod :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl logs mariadb-7865c7bbf8-mlr26
2026-05-07 09:02:07+00:00 [Note] [Entrypoint]: Entrypoint script for MariaDB Server 1:12.2.2+maria~ubu2404 started.
2026-05-07 09:02:07+00:00 [Warn] [Entrypoint]: /sys/fs/cgroup///memory.pressure not writable, functionality unavailable to MariaDB
2026-05-07 09:02:07+00:00 [Note] [Entrypoint]: Switching to dedicated user 'mysql'
2026-05-07 09:02:07+00:00 [Note] [Entrypoint]: Entrypoint script for MariaDB Server 1:12.2.2+maria~ubu2404 started.
2026-05-07 09:02:08+00:00 [Note] [Entrypoint]: MariaDB upgrade not required
2026-05-07  9:02:08 0 [Note] Starting MariaDB 12.2.2-MariaDB-ubu2404 source revision d26a6f44c1f2119377e79a9540886c6d8c01472f server_uid Uplr+e4cAGwdsRX0DlWEfTIOYlg= as process 1
2026-05-07  9:02:08 0 [ERROR] mariadbd: Can't lock aria control file '/var/lib/mysql/aria_log_control' for exclusive use, error: 11. Will retry for 30 seconds
2026-05-07  9:02:38 0 [ERROR] mariadbd: Got error 'Could not get an exclusive lock; file is probably in use by another process' when trying to use aria control file '/var/lib/mysql/aria_log_control'
2026-05-07  9:02:38 0 [ERROR] Plugin 'Aria' registration as a STORAGE ENGINE failed.
2026-05-07  9:02:38 0 [Note] InnoDB: Compressed tables use zlib 1.3
2026-05-07  9:02:38 0 [Note] InnoDB: Number of transaction pools: 1
2026-05-07  9:02:38 0 [Note] InnoDB: Using crc32 + pclmulqdq instructions
2026-05-07  9:02:38 0 [Note] mariadbd: O_TMPFILE is not supported on /tmp (disabling future attempts)
2026-05-07  9:02:38 0 [Note] InnoDB: Using io_uring
2026-05-07  9:02:38 0 [Note] InnoDB: innodb_buffer_pool_size_max=128m, innodb_buffer_pool_size=128m
2026-05-07  9:02:38 0 [Note] InnoDB: Completed initialization of buffer pool
2026-05-07  9:02:38 0 [Note] InnoDB: File system buffers for log disabled (block size=512 bytes)
2026-05-07  9:02:38 0 [ERROR] InnoDB: Unable to lock ./ibdata1 error: 11
2026-05-07  9:02:38 0 [Note] InnoDB: Check that you do not already have another mariadbd process using the same InnoDB data or log files.
2026-05-07  9:02:38 0 [ERROR] InnoDB: Plugin initialization aborted with error Generic error
2026-05-07  9:02:38 0 [Note] InnoDB: Starting shutdown...
2026-05-07  9:02:38 0 [ERROR] Plugin 'InnoDB' registration as a STORAGE ENGINE failed.
2026-05-07  9:02:38 0 [Note] Plugin 'FEEDBACK' is disabled.
2026-05-07  9:02:38 0 [Note] Plugin 'wsrep-provider' is disabled.
2026-05-07  9:02:38 0 [ERROR] Could not open mysql.plugin table: "Unknown storage engine 'Aria'". Some plugins may be not loaded
2026-05-07  9:02:38 0 [ERROR] Failed to initialize plugins.
2026-05-07  9:02:38 0 [ERROR] Aborting
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

→ Indicaion de la variable strategy recreate dans le fichier de déploiement :



→ Prise en compte de modifications :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl apply -f mariadb-deployment.yaml
deployment.apps/mariadb configured
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

→ Le pod reste en CrashLookBackOff :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl get pod -l app=mariadb --watch
NAME                       READY   STATUS             RESTARTS      AGE
mariadb-7865c7bbf8-mlr26   0/1     CrashLoopBackOff   7 (5s ago)   8m16s
```

→ Suppression du pod :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl delete pods -l app=mariadb
pod "mariadb-7865c7bbf8-mlr26" deleted from default namespace
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

→ Le pod a été automatiquement recréé et est fonctionnel :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl get pod -l app=mariadb
NAME                       READY   STATUS    RESTARTS   AGE
mariadb-7865c7bbf8-pjnfq   0/1     Running   0          28s
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

→ Augmentation du nombre de pods et montée en charge mais le pod n'arrive toujours pas démarrer :

```
Administrateur : Windows PowerShell
PS C:\WINDOWS\system32> kubectl scale deployment mariadb --replicas=2
deployment.apps/mariadb scaled
PS C:\WINDOWS\system32> kubectl get pods -l app=mariadb --watch
NAME                       READY   STATUS             RESTARTS      AGE
mariadb-7865c7bbf8-pjnfq   0/1     Running            2 (20s ago)   81s
mariadb-7865c7bbf8-r9sjz   0/1     Running            0             12s
mariadb-7865c7bbf8-pjnfq   0/1     Running            3 (1s ago)    92s
mariadb-7865c7bbf8-r9sjz   0/1     Running            1 (2s ago)    32s
mariadb-7865c7bbf8-pjnfq   0/1     Running            4 (1s ago)    2m2s
mariadb-7865c7bbf8-r9sjz   0/1     Running            2 (2s ago)    62s
mariadb-7865c7bbf8-pjnfq   0/1     CrashLoopBackOff   4 (1s ago)    2m32s
```

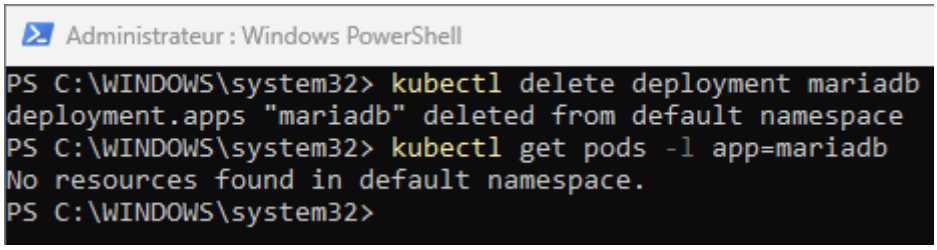
→ Affichage des détails du pod :

```
PS C:\WINDOWS\system32> kubectl describe pods mariadb-7865c7bbf8-pjnfq
Name:             mariadb-7865c7bbf8-pjnfq
Namespace:        default
Priority:         0
Service Account:  default
Node:             minikube/172.31.117.198
Start Time:       Thu, 07 May 2026 11:08:13 +0200
Labels:           app=mariadb
                  pod-template-hash=7865c7bbf8
Annotations:      <none>
Status:           Running
IP:               10.244.0.33
IPs:
  IP:           10.244.0.33
Controlled By:  ReplicaSet/mariadb-7865c7bbf8
Containers:
  mariadb:
    Container ID:   docker://bb5d78c104cb07ac6c8d8229612b9b21328c8f545692c6604a44c6b3c98e1068
    Image:          mariadb:latest
    Image ID:       docker-pullable://mariadb@sha256:e0236fc6386e7eacd9359e59d0a078bd7aa0d18280d36d13061121bedeaee903
    Port:           <none>
    Host Port:      <none>
    State:          Running
      Started:      Thu, 07 May 2026 11:11:39 +0200
    Last State:     Terminated
      Reason:       Completed
      Exit Code:    0
      Started:      Thu, 07 May 2026 11:10:15 +0200
      Finished:     Thu, 07 May 2026 11:10:44 +0200
    Ready:          False
    Restart Count:  5
    Liveness:       exec [sh -c mariadb-admin status p$MARIADB_ROOT_PASSWORD] delay=0s timeout=1s period=10s #success=1 #failure=3
    Readiness:      exec [sh -c mariadb-admin status p$MARIADB_ROOT_PASSWORD] delay=0s timeout=1s period=10s #success=1 #failure=3
    Startup:        exec [sh -c mariadb-admin status p$MARIADB_ROOT_PASSWORD] delay=0s timeout=1s period=10s #success=1 #failure=3
    Environment:
      MARIADB_ROOT_PASSWORD:  mot-de-passe-root
    Mounts:
      /var/lib/mysql from mariadb-data (rw)
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-svjfz (ro)
Conditions:
  Type                        Status
  PodReadyToStartContainers   True
  Initialized                 True
  Ready                       False
  ContainersReady             False
  PodScheduled                True
Volumes:
  mariadb-data:
    Type:       PersistentVolumeClaim (a reference to a PersistentVolumeClaim in the same namespace)
    ClaimName:  mariadb-data
    ReadOnly:   false
  kube-api-access-svjfz:
    Type:                    Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds:  3607
    ConfigMapName:           kube-root-ca.crt
    Optional:                false
    DownwardAPI:             true
QoS Class:                   BestEffort
Node-Selectors:              <none>
```

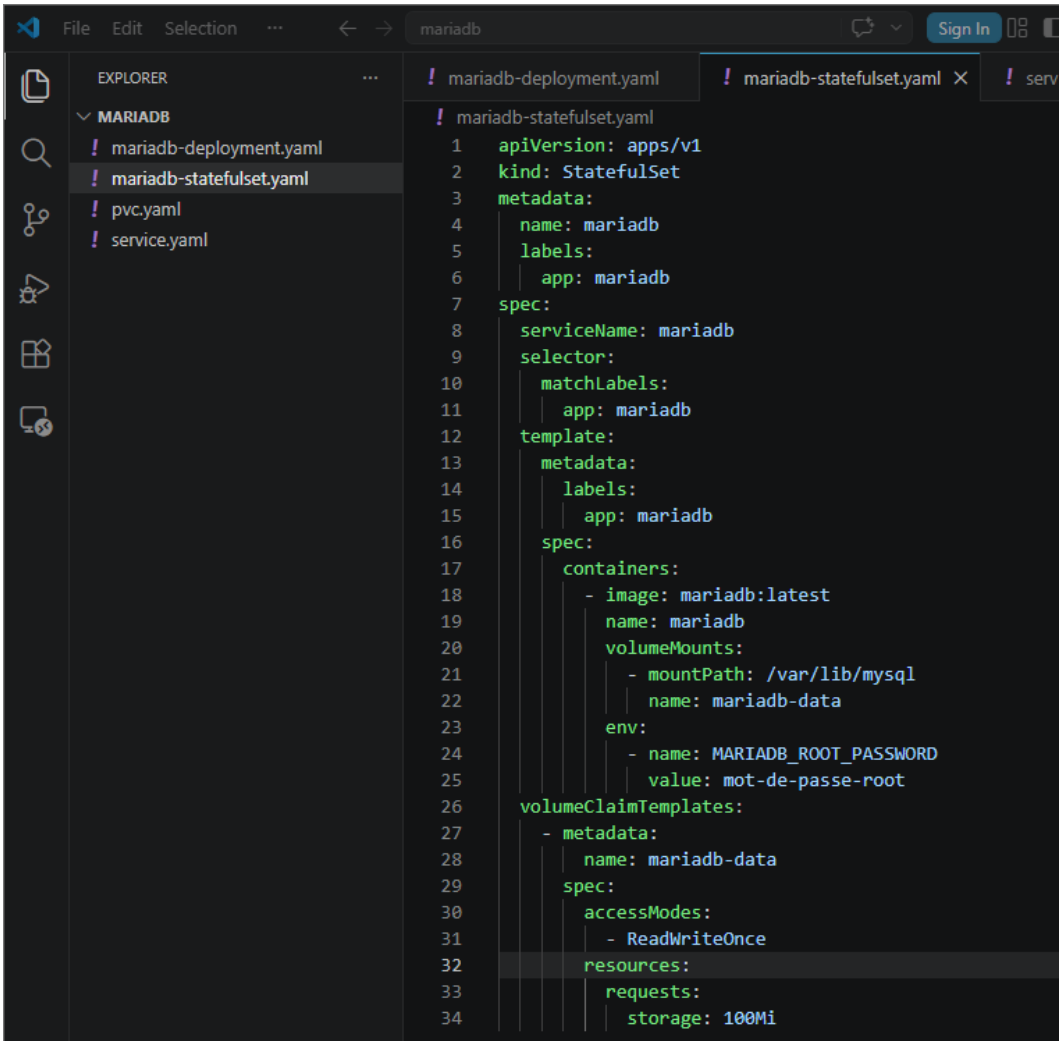
→ Même erreur avec le fichier sock :

```
Tolerations:                 node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
                             node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type     Reason     Age                   From               Message
  ----     ------     ----                  ----               -------
  Normal   Scheduled  3m45s                 default-scheduler  Successfully assigned default/mariadb-7865c7bbf8-pjnfq to minikube
  Normal   Pulled     3m44s                 kubelet            Successfully pulled image "mariadb:latest" in 857ms (857ms including waiting). Image size: 335568219 bytes.
  Normal   Pulled     3m14s                 kubelet            Successfully pulled image "mariadb:latest" in 819ms (819ms including waiting). Image size: 335568219 bytes.
  Normal   Pulled     2m44s                 kubelet            Successfully pulled image "mariadb:latest" in 844ms (844ms including waiting). Image size: 335568219 bytes.
  Normal   Pulled     2m14s                 kubelet            Successfully pulled image "mariadb:latest" in 836ms (836ms including waiting). Image size: 335568219 bytes.
  Normal   Pulling    104s (x5 over 3m45s)  kubelet            Pulling image "mariadb:latest"
  Normal   Created    103s (x5 over 3m44s)  kubelet            Container created
  Normal   Started    103s (x5 over 3m44s)  kubelet            Container started
  Normal   Pulled     103s                  kubelet            Successfully pulled image "mariadb:latest" in 873ms (873ms including waiting). Image size: 335568219 bytes.
  Normal   Killing    75s (x5 over 3m15s)   kubelet            Container mariadb failed startup probe, will be restarted
  Warning  Unhealthy  75s (x13 over 3m35s)  kubelet            Startup probe failed: mariadb-admin: connect to server at 'localhost' failed
error: 'Access denied for user 'root'@'localhost' (using password: NO)'
  Warning  BackOff    65s (x3 over 74s)     kubelet  Back-off restarting failed container mariadb in pod mariadb-7865c7bbf8-pjnfq_default(673f3e71-44af-432e-b5ca-49875b21f6fc)
  Warning  Unhealthy  5s (x4 over 2m5s)     kubelet  Startup probe failed: mariadb-admin: connect to server at 'localhost' failed
error: 'Can't connect to local server through socket '/run/mysqld/mysqld.sock' (2)'
Check that mariadbd is running and that the socket: '/run/mysqld/mysqld.sock' exists!
PS C:\WINDOWS\system32>
```

→ Suppression de déploiement mariaDB :



→ Création du fichier mariadb-statefulset.yaml :



→ Applicatif du fichier :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl apply -f mariadb-statefulset.yaml
statefulset.apps/mariadb created
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

→ Affichage du pod qui est fonctionnel :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl apply -f mariadb-statefulset.yaml
statefulset.apps/mariadb created
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl get pods -l app=mariadb --watch
NAME        READY   STATUS    RESTARTS   AGE
mariadb-0   1/1     Running   0          75s
```

→ Affichage des volumes persistants :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl get pvc
NAME                     STATUS   VOLUME                                     CAPACITY   ACCESS MODES   STORAGECLASS   VOLUMEATTRIBUTESCLASS   AGE
mariadb-data             Bound    pvc-93ac3a01-6f43-432e-80fb-29751de3425d   100Mi      RWO            standard       <unset>                 44m
mariadb-data-mariadb-0   Bound    pvc-d0f471a3-8cdd-40c5-8384-595ca3c90567   100Mi      RWO            standard       <unset>                 3m49s
task-pv-claim            Bound    pv-nginx                                   10Mi       RWO            manual         <unset>                 19h
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

→ Scalabilité du statefulset :

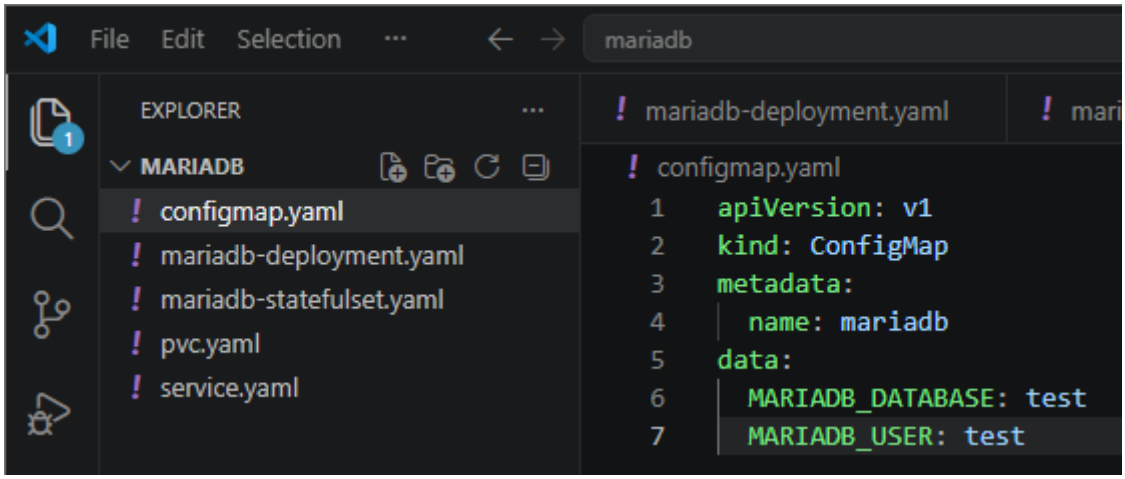
```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl scale sts mariadb --replicas=2
statefulset.apps/mariadb scaled
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

→ Affichage des volumes et des pods :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl get pvc -l app=mariadb
NAME                     STATUS   VOLUME                                     CAPACITY   ACCESS MODES   STORAGECLASS   VOLUMEATTRIBUTESCLASS   AGE
mariadb-data-mariadb-0   Bound    pvc-d0f471a3-8cdd-40c5-8384-595ca3c90567   100Mi      RWO            standard       <unset>                 5m42s
mariadb-data-mariadb-1   Bound    pvc-02a67912-0ef0-4bc3-9fd2-db75856d7137   100Mi      RWO            standard       <unset>                 32s
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl get pods -l app=mariadb
NAME        READY   STATUS    RESTARTS   AGE
mariadb-0   1/1     Running   0          5m49s
mariadb-1   1/1     Running   0          39s
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl get pods,pvc -l app=mariadb
NAME              READY   STATUS    RESTARTS   AGE
pod/mariadb-0     1/1     Running   0          5m59s
pod/mariadb-1     1/1     Running   0          49s

NAME                                                  STATUS   VOLUME                                     CAPACITY   ACCESS MODES   STORAGECLASS   VOLUMEATTRIBUTESCLASS   AGE
persistentvolumeclaim/mariadb-data-mariadb-0          Bound    pvc-d0f471a3-8cdd-40c5-8384-595ca3c90567   100Mi      RWO            standard       <unset>                 5m59s
persistentvolumeclaim/mariadb-data-mariadb-1          Bound    pvc-02a67912-0ef0-4bc3-9fd2-db75856d7137   100Mi      RWO            standard       <unset>                 49s
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

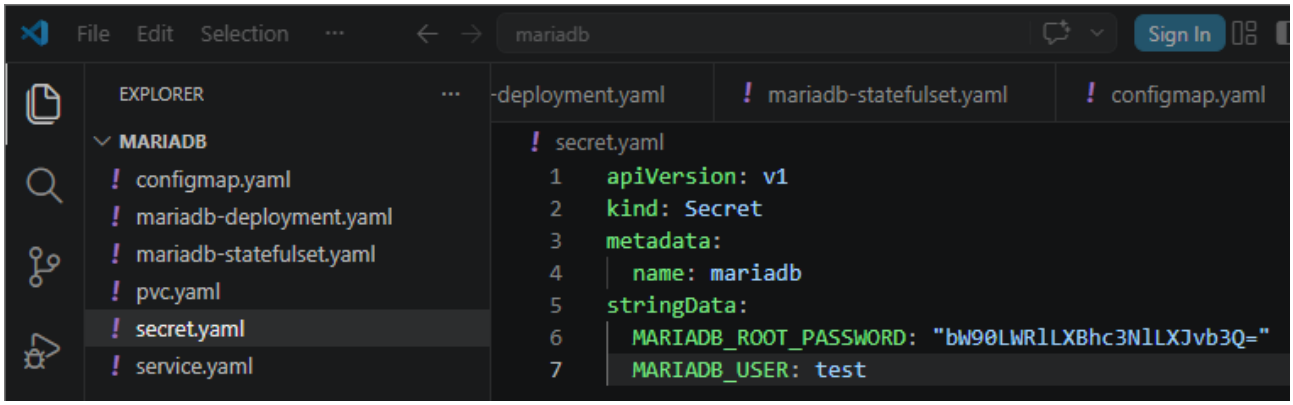
→ Création du fichier configmap.yaml :



→ Applicatif du fichier :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl apply -f configmap.yaml
configmap/mariadb created
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

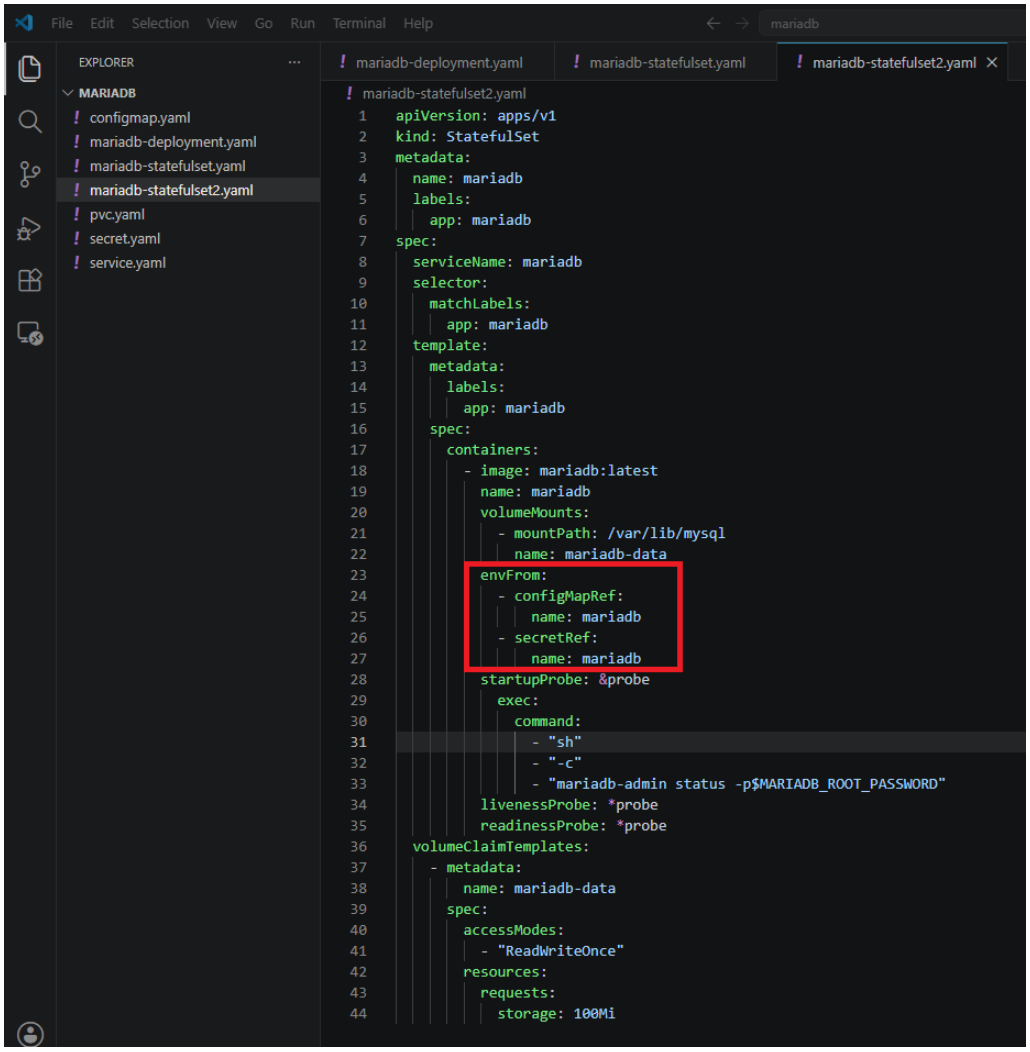
→ Création du fichier secret.yaml :



→ Applicatif du fichier :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl apply -f secret.yaml
secret/mariadb created
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```

→ Création d'un nouveau fichier statefulset avec la nouvelle variable envFrom :



→ Applicatif du fichier, la base est maintenant opérationnelle :

```
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb> kubectl apply -f mariadb-statefulset2.yaml
statefulset.apps/mariadb configured
PS D:\2EME ANNEE\SISR\BOUCLY\FAIT CR A FAIRE\k8s\scripts\mariadb>
```