Kubernetes

- Install your first Kubernetes cluster

    - Install kubectl

    - Install K3D

- Or any other installer, we won't judge

choco install kubernetes-cli

```
PS C:\WINDOWS\system32> choco install kubernetes-cli
>>
Chocolatey v2.4.3
Installing the following packages:
kubernetes-cli
By installing, you accept licenses for the packages.
Downloading package from source 'https://community.chocolatey.org/api/v2/'
Progress: Downloading kubernetes-cli 1.33.0... 100%

kubernetes-cli v1.33.0 [Approved]
kubernetes-cli package files install completed. Performing other installation steps.
The package kubernetes-cli wants to run 'chocolateyInstall.ps1'.
Note: If you don't run this script, the installation will fail.
Note: To confirm automatically next time, use '-y' or consider:
choco feature enable -n allowGlobalConfirmation
Do you want to run the script?([Y]es/[A]ll - yes to all/[N]o/[P]rint): A

Extracting 64-bit C:\ProgramData\chocolatey\lib\kubernetes-cli\tools\kubernetes-client-windows-amd64.tar.gz to C:\ProgramData\chocolatey\lib\kubernetes-cli\tools...
C:\ProgramData\chocolatey\lib\kubernetes-cli\tools
Extracting 64-bit C:\ProgramData\chocolatey\lib\kubernetes-cli\tools\kubernetes-client-windows-amd64.tar to C:\ProgramData\chocolatey\lib\kubernetes-cli\tools...
C:\ProgramData\chocolatey\lib\kubernetes-cli\tools
 ShimGen has successfully created a shim for kubectl-convert.exe
 ShimGen has successfully created a shim for kubectl.exe
 The install of kubernetes-cli was successful.
  Deployed to 'C:\ProgramData\chocolatey\lib\kubernetes-cli\tools'

Chocolatey installed 1/1 packages.
 See the log for details (C:\ProgramData\chocolatey\logs\chocolatey.log).
```

kubectl version --client

```
PS C:\WINDOWS\system32> kubectl version --client
Client Version: v1.29.2
Kustomize Version: v5.0.4-0.20230601165947-6ce0bf390ce3
```

choco install k3d

```
PS C:\WINDOWS\system32> choco install k3d
Chocolatey v2.4.3
Installing the following packages:
k3d
By installing, you accept licenses for the packages.
Downloading package from source 'https://community.chocolatey.org/api/v2/'
Progress: Downloading k3d 5.8.3... 100%

k3d v5.8.3 [Approved]
k3d package files install completed. Performing other installation steps.
 ShimGen has successfully created a shim for k3d.exe
 The install of k3d was successful.
  Deployed to 'C:\ProgramData\chocolatey\lib\k3d'

Chocolatey installed 1/1 packages.
 See the log for details (C:\ProgramData\chocolatey\logs\chocolatey.log).
```

k3d version

```
PS C:\WINDOWS\system32> k3d version
k3d version v5.8.3
k3s version v1.31.5-k3s1 (default)
```

- Spin up your first Kubernetes cluster

    - 3 master nodes

    - 5 worker nodes

k3d cluster create mycluster –agents 5 –servers 3 –api-port 6550

```
PS C:\WINDOWS\system32> k3d cluster create mycluster --agents 5 --servers 3 --api-port 6550
INFO[0000] Prep: Network
INFO[0000] Re-using existing network 'k3d-mycluster' (35aa99f5caa7e5dbd01dfb3a5376986541afd1cc8df1b068af31f132752610f2)
INFO[0000] Created image volume k3d-mycluster-images
INFO[0000] Starting new tools node...
INFO[0000] Creating initializing server node
INFO[0000] Creating node 'k3d-mycluster-server-0'
INFO[0000] Starting node 'k3d-mycluster-tools'
INFO[0001] Creating node 'k3d-mycluster-server-1'
INFO[0002] Creating node 'k3d-mycluster-server-2'
INFO[0002] Creating node 'k3d-mycluster-agent-0'
INFO[0002] Creating node 'k3d-mycluster-agent-1'
INFO[0002] Creating node 'k3d-mycluster-agent-2'
INFO[0002] Creating node 'k3d-mycluster-agent-3'
INFO[0002] Creating node 'k3d-mycluster-agent-4'
INFO[0002] Creating LoadBalancer 'k3d-mycluster-serverlb'
INFO[0002] Using the k3d-tools node to gather environment information
INFO[0003] Starting new tools node...
INFO[0003] Starting node 'k3d-mycluster-tools'
INFO[0004] Starting cluster 'mycluster'
INFO[0004] Starting the initializing server...
INFO[0004] Starting node 'k3d-mycluster-server-0'
INFO[0008] Starting servers...
INFO[0008] Starting node 'k3d-mycluster-server-1'
        INFO[0027] Starting node 'k3d-mycluster-server-2'      INFO[0044] Starting agents...
                                  INFO[0044] Starting node 'k3d-mycluster-agent-4'      INFO[0044] Starting node 'k3d-mycluster-agent-3'
                      INFO[0044] Starting node 'k3d-mycluster-agent-2'
                              INFO[0045] Starting node 'k3d-mycluster-agent-0'
                  INFO[0045] Starting node 'k3d-mycluster-agent-1'
                                              INFO[0052] Starting helpers...
                      INFO[0053] Starting node 'k3d-mycluster-serverlb'
                                              INFO[0059] Injecting records for hostAliases (incl. host.k3d.internal) and for 10 network members into CoreDNS conf
igmap...
        INFO[0062] Cluster 'mycluster' created successfully!
                                    INFO[0062] You can now use it like this:
                kubectl cluster-info
```

k3d cluster list

```
PS C:\WINDOWS\system32> k3d cluster list
NAME          SERVERS    AGENTS    LOADBALANCER
mycluster     3/3        5/5       true
```

docker ps

```
PS C:\WINDOWS\system32> docker ps
CONTAINER ID   IMAGE                            COMMAND                  CREATED          STATUS                  PORTS                         NAMES
6810311ad9e1   ghcr.io/k3d-io/k3d-tools:5.8.3   "/app/k3d-tools noop"    About a minute ago   Up About a minute                                 k3d-mycluster-tools
1e887a864abf   ghcr.io/k3d-io/k3d-proxy:5.8.3   "/bin/sh -c nginx-pr…"   About a minute ago   Up 12 seconds       80/tcp, 0.0.0.0:6550->6443/tcp   k3d-mycluster-serverlb
6999ac5d77ba   rancher/k3s:v1.31.5-k3s1         "/bin/k3d-entrypoint…"   About a minute ago   Up 19 seconds                                    k3d-mycluster-agent-4
e41ac9ba07bf   rancher/k3s:v1.31.5-k3s1         "/bin/k3d-entrypoint…"   About a minute ago   Up 20 seconds                                    k3d-mycluster-agent-3
86fd7af5da25   rancher/k3s:v1.31.5-k3s1         "/bin/k3d-entrypoint…"   About a minute ago   Up 19 seconds                                    k3d-mycluster-agent-2
b06c6f7c5b1c   rancher/k3s:v1.31.5-k3s1         "/bin/k3d-entrypoint…"   About a minute ago   Up 19 seconds                                    k3d-mycluster-agent-1
67ca337a98da   rancher/k3s:v1.31.5-k3s1         "/bin/k3d-entrypoint…"   About a minute ago   Up 19 seconds                                    k3d-mycluster-agent-0
52e31d0f32a7   rancher/k3s:v1.31.5-k3s1         "/bin/k3d-entrypoint…"   About a minute ago   Up 37 seconds                                    k3d-mycluster-server-2
474f89516305   rancher/k3s:v1.31.5-k3s1         "/bin/k3d-entrypoint…"   About a minute ago   Up 56 seconds                                    k3d-mycluster-server-1
0c5c3cf0a872   rancher/k3s:v1.31.5-k3s1         "/bin/k3d-entrypoint…"   About a minute ago   Up About a minute                                k3d-mycluster-server-0
```

Containers   Give feedback ⟲

Container CPU usage ⓘ	Container memory usage ⓘ	Show charts
26.93% / 800% (8 CPUs available)	2.38GB / 7.48GB	

🔍 Search   ▥   ◉ Only show running containers

	Name	Image	Status	CPU (%)	Port(s)	Last started	Actions
☐	k3d-mycluster-server-0 0c5c3cf0a872	docker.io/rancher/k3s:v1.31.5-k3s1	Running	9.01%		2 hours ago	■ ⋮ 🗑
☐	k3d-mycluster-server-1 474f89516305	docker.io/rancher/k3s:v1.31.5-k3s1	Running	5.05%		2 hours ago	■ ⋮ 🗑
☐	k3d-mycluster-server-2 52e31d0f32a7	docker.io/rancher/k3s:v1.31.5-k3s1	Running	5.89%		2 hours ago	■ ⋮ 🗑
☐	k3d-mycluster-agent-0 67ca337a98da	docker.io/rancher/k3s:v1.31.5-k3s1	Running	0.88%		2 hours ago	■ ⋮ 🗑
☐	k3d-mycluster-agent-1 b06c6f7c5b1c	docker.io/rancher/k3s:v1.31.5-k3s1	Running	0.91%		2 hours ago	■ ⋮ 🗑
☐	k3d-mycluster-agent-2 86fd7af5da25	docker.io/rancher/k3s:v1.31.5-k3s1	Running	1.42%		2 hours ago	■ ⋮ 🗑
☐	k3d-mycluster-serverlb 1e887a864abf	ghcr.io/k3d-io/k3d-proxy:5.8.3	Running	0%	6550:6443 ↗	2 hours ago	■ ⋮ 🗑
☐	k3d-mycluster-agent-4 6999ac5d77ba	docker.io/rancher/k3s:v1.31.5-k3s1	Running	2.52%		2 hours ago	■ ⋮ 🗑
	k3d-mycluster-agent-3						

○ Play a bit with kubectl

■ kubectl get nodes

■ kubectl get pods --all-namespaces

kubectl get nodes

```
PS C:\WINDOWS\system32> kubectl config set-cluster k3d-mycluster --server=https://localhost:6550 --insecure-skip-tls-verify=true
>>
Cluster "k3d-mycluster" set.
```

```
PS C:\WINDOWS\system32> kubectl get nodes
NAME                      STATUS   ROLES                        AGE      VERSION
k3d-mycluster-agent-0     Ready    <none>                       2m12s    v1.31.5+k3s1
k3d-mycluster-agent-1     Ready    <none>                       2m12s    v1.31.5+k3s1
k3d-mycluster-agent-2     Ready    <none>                       2m13s    v1.31.5+k3s1
k3d-mycluster-agent-3     Ready    <none>                       2m12s    v1.31.5+k3s1
k3d-mycluster-agent-4     Ready    <none>                       2m12s    v1.31.5+k3s1
k3d-mycluster-server-0    Ready    control-plane,etcd,master    2m50s    v1.31.5+k3s1
k3d-mycluster-server-1    Ready    control-plane,etcd,master    2m38s    v1.31.5+k3s1
k3d-mycluster-server-2    Ready    control-plane,etcd,master    2m21s    v1.31.5+k3s1
```

kubectl get pods –all-namespaces

```
PS C:\WINDOWS\system32> kubectl get pods --all-namespaces
NAMESPACE     NAME                                      READY   STATUS      RESTARTS   AGE
kube-system   coredns-ccb96694c-wzw92                   1/1     Running     0          137m
kube-system   helm-install-traefik-crd-9qdfl            0/1     Completed   0          137m
kube-system   helm-install-traefik-qwphh                0/1     Completed   2          137m
kube-system   local-path-provisioner-5cf85fd84d-25r5k   1/1     Running     0          137m
kube-system   metrics-server-5985cbc9d7-hmxql           1/1     Running     0          137m
kube-system   svclb-traefik-49afed0a-6tjcp              2/2     Running     0          137m
kube-system   svclb-traefik-49afed0a-6twdp              2/2     Running     0          137m
kube-system   svclb-traefik-49afed0a-blndr              2/2     Running     0          137m
kube-system   svclb-traefik-49afed0a-chgx4              2/2     Running     0          137m
kube-system   svclb-traefik-49afed0a-nl7fm              2/2     Running     0          137m
kube-system   svclb-traefik-49afed0a-q425m              2/2     Running     0          137m
kube-system   svclb-traefik-49afed0a-rh5dh              2/2     Running     0          137m
kube-system   svclb-traefik-49afed0a-t2pnj              2/2     Running     0          137m
kube-system   traefik-5d45fc8cc9-s8v7h                  1/1     Running     0          137m
```

○ Destroy your first Kubernetes cluster

k3d cluster delete mycluster

```
PS C:\WINDOWS\system32> k3d cluster delete mycluster
INFO[0000] Deleting cluster 'mycluster'
INFO[0008] Deleting 1 attached volumes...
INFO[0008] Removing cluster details from default kubeconfig...
INFO[0008] Removing standalone kubeconfig file (if there is one)...
INFO[0008] Successfully deleted cluster mycluster!
```