K3s Lightweight Kubernetes

CONCEPTS

K3s is one small binary: the install script drops it in /usr/local/bin, adds kubectl, crictl and ctr links, and sets up a systemd service.

Server control plane + datastore
↓ node-token
Agent K3S_URL + K3S_TOKEN
↓ registers
Cluster kubectl, manifests, snapshots
Install, join, operate

INSTALL

curl -sfL https://get.k3s.io | sh -
Install a single-node server

curl -sfL https://get.k3s.io | K3S_URL=https://<server>:6443 K3S_TOKEN=<token> sh -
Install as agent and join

curl -sfL https://get.k3s.io | INSTALL_K3S_VERSION=<version> sh -
Pin a version

INSTALL_K3S_EXEC="server --cluster-init"
Set the command and flags

K3S_KUBECONFIG_MODE=644
Make the kubeconfig readable

Install variables are saved into the service. Re-running the installer without them loses the old values.

SERVER AND AGENT

k3s server
Run a server node

k3s agent
Run a worker node

--cluster-init
Start an embedded-etcd cluster

--server https://<server>:6443
Join an existing cluster

--token <token>
Shared join secret

--tls-san <host-or-ip>
Add a name to the API cert

SERVER AND AGENT (cont.)

--disable traefik
Skip a packaged component

CONFIG FILE

/etc/rancher/k3s/config.yaml
Main config file

config.yaml

```
# flag names without the dashes
write-kubeconfig-mode: "0644"
tls-san:
  - k3s.example.com
disable:
  - traefik
node-taint+:
  - "dedicated=infra:NoSchedule"
```

CLI flags override the file. A key ending in + appends to the earlier value instead of replacing it.

/var/lib/rancher/k3s/server/manifests/
YAML here is auto-applied

CLUSTER AND NODES

/etc/rancher/k3s/k3s.yaml
Server kubeconfig

export KUBECONFIG=/etc/rancher/k3s/k3s.yaml
Use it with plain kubectl

k3s kubectl get nodes
Embedded kubectl

k3s kubectl get pods -A
All pods

/var/lib/rancher/k3s/server/node-token
Token to join agents

k3s crictl ps
Containers via the CRI

Copy k3s.yaml to your laptop and change the server address from 127.0.0.1 to the server's name.

SERVICE

systemctl status k3s
Server service state

systemctl status k3s-agent
Agent service state

sudo systemctl restart k3s
Restart after config changes

SERVICE (cont.)

journalctl -u k3s -f
Follow server logs

/usr/local/bin/k3s-uninstall.sh
Remove a server

/usr/local/bin/k3s-agent-uninstall.sh
Remove an agent

TOKENS AND CERTIFICATES

k3s certificate check
Show cert expiry

k3s certificate rotate
Rotate certs (stop K3s first)

ETCD AND BACKUPS

k3s etcd-snapshot save
Snapshot now

k3s etcd-snapshot ls
List snapshots

k3s server --cluster-reset --cluster-reset-restore-path=<snapshot>
Restore a snapshot

/var/lib/rancher/k3s/server/db/snapshots/
Default snapshot directory

RECIPES

Add a worker

```
# on the server
sudo cat /var/lib/rancher/k3s/server/node-token
# on the worker
curl -sfL https://get.k3s.io | K3S_URL=https://<server>:6443 K3S_TOKEN=<token> sh -
# back on the server
sudo k3s kubectl get nodes
```

HA with embedded etcd

```
# first server
curl -sfL https://get.k3s.io | K3S_TOKEN=<secret> sh -s - server --cluster-init
# more servers
curl -sfL https://get.k3s.io | K3S_TOKEN=<secret> sh -s - server --server https://<first>:6443
```

Restore from a snapshot

```
sudo systemctl stop k3s
sudo k3s server --cluster-reset \
  --cluster-reset-restore-path=<snapshot-path>
sudo systemctl start k3s
```