

Experiment 05: Working with k3d and Rancher

Create our cluster for this experiment. We'll be working with the Rancher configuration for k3d. Rancher Labs was purchased by Suse this year to continue to provide solutions for IoT and Edge usages for Kubernetes in cloud-native application development and modernization.

```
k3d cluster create k3d-rancher --api-port 6550 --servers 1 --agents 3 --port 443:443@loadbalancer --wait
```

```
[36mINFO[0m[0000] Created network 'k3d-k3d-rancher'
[36mINFO[0m[0000] Created volume 'k3d-k3d-rancher-images'
[36mINFO[0m[0001] Creating node 'k3d-k3d-rancher-server-0'
[36mINFO[0m[0001] Creating node 'k3d-k3d-rancher-agent-0'
[36mINFO[0m[0001] Creating node 'k3d-k3d-rancher-agent-1'
[36mINFO[0m[0005] Creating node 'k3d-k3d-rancher-agent-2'
[36mINFO[0m[0005] Creating LoadBalancer 'k3d-k3d-rancher-serverlb'
[36mINFO[0m[0013] Cluster 'k3d-rancher' created successfully!
[36mINFO[0m[0014] You can now use it like this:
kubectl cluster-info
```

This folder should have been created in our k3d getting started lab, but just to be sure

```
mkdir .kube
```

```
cd .kube
```

```
C:\k3d\.kube> cd ..
```

On Windows:

```
set KUBECONFIG_FILE=C:\k3d\.kube\k3d-rancher

k3d kubeconfig get k3d-rancher > %KUBECONFIG_FILE%

set KUBECONFIG=%KUBECONFIG_FILE%
```

On MacOS or Linux

```
~/k3d/.kube $ export KUBECONFIG_FILE=~/.kube/k3d-rancher

~/k3d/.kube $ k3d kubeconfig get k3d-rancher > $KUBECONFIG_FILE

~/k3d/.kube $ export KUBECONFIG=$KUBECONFIG_FILE
```

On Windows:

set | grep KUBE

KUBECONFIG_FILE=C:\k3d\.kube\k3d-rancher

On MacOS:

set | grep KUBE

KUBECONFIG_FILE=~/.kube/k3d-rancher

kubectl cluster-info

Kubernetes master is running at https://0.0.0.0:6550

CoreDNS is running at https://0.0.0.0:6550/api/v1/namespaces/kube-system/services/kube-dns:dns/proxy

Metrics-server is running at https://0.0.0.0:6550/api/v1/namespaces/kube-system/services/https:metrics-server:/proxy

To further debug and diagnose cluster problems, use 'kubectl cluster-info dump'.

k3d cluster list

NAME	SERVICES	AGENTS	LOADBALANCER
k3d-rancher	1/1	3/3	true

For Windows:

type %KUBECONFIG_FILE%

For MacOS:

echo \$KUBECONFIG_FILE

apiVersion: v1

clusters:

- cluster:

certificate-authority-data:

LS0tLS1CRUdJTiBDRVJUSUZJQ0FURSB0tLS0tCk1JSUJWekNCL3FBREFnRUNBZ0VBTUFvR
0NDcUdTTTQ5QkFNQ01DTXhJVEFmQmdOVk1HR3N6Y3kxelpYSjIKWlhJdFkyRkFNVF
U1T1RZM01qUTRPUVEFIRncweU1EQTVNRGt4TnpJNE1EbGFGdzB6TURBNU1EY3hOekk0TU
RsYQpNQ014SVRBZk1hTIZCQU1NR0dzemN5MXpaWEoyWlhJdFkyRkFNVFU1T1RZM01qUT

```
RPVEJaTUJNR0J5cUdTTTQ5CkFnRUdDQ3FHU000OUF3RUhBMEIBQkdmRm53RUtycFVtbV
h3ckVFUFdaYSsxZWdYQWhPV2ZUZEorZU94UWo4U3kKUDgzSTJQbDYrTUQ4OUNMTIRTb
E1Ebk5pM3FvS1N0ZHdGZFRhOFRHQUxTS2pJekFoTUE0R0ExVWREd0VCL3dRRQpBd0IDc
ERBUEJnTIZIUk1CQWY4RUJUQURBUUgvTUFvR0NdCudTTTQ5QkFNQ0EwZ0FNRVVDSUF
VOGpaQ0RORkhMCkpDVkdOd2I2UXhxS0xPekp1NUtYV2JNdGZ0VVB4Ymc4QWIFQXNkQXF
JRm90R2JPcVk4OUxudU45eStrTU44M1AKU1pPWWRGMElyNUV2dXgwPQotLS0tLUVORCB
DRVJUSUZJQ0FURS0tLS0tCg==
```

server: https://0.0.0.0:6550

name: k3d-k3d-rancher

contexts:

- context:

cluster: k3d-k3d-rancher

user: admin@k3d-k3d-rancher

name: k3d-k3d-rancher

current-context: k3d-k3d-rancher

kind: Config

preferences: {}

users:

- name: admin@k3d-k3d-rancher

user:

password: dd79f910ebe64a30855bcd38b7425b98

username: admin

set KUBECONFIG=%KUBECONFIG_FILE%

kubectl get nodes

NAME	STATUS	ROLES	AGE	VERSION
k3d-k3d-rancher-agent-1	Ready	<none>	7m36s	v1.18.6+k3s1
k3d-k3d-rancher-agent-0	Ready	<none>	7m35s	v1.18.6+k3s1
k3d-k3d-rancher-agent-2	Ready	<none>	7m35s	v1.18.6+k3s1
k3d-k3d-rancher-server-0	Ready	master	7m34s	v1.18.6+k3s1

kubectl get pods

No resources found in default namespace.

kubectl config view -o jsonpath='{.users[*].name}'

'admin@k3d-k3d-rancher'

kubectl config get-contexts

CURRENT	NAME	CLUSTER	AUTHINFO	NAMESPACE
*	k3d-k3d-rancher	k3d-k3d-rancher	admin@k3d-k3d-rancher	

kubectl config current-context

k3d-k3d-rancher

kubectl create namespace cattle-system

namespace/cattle-system created

kubectl apply --validate=false -f <https://github.com/jetstack/cert-manager/releases/download/v0.15.0/cert-manager.crds.yaml>

customresourcedefinition.apiextensions.k8s.io/certificaterequests.cert-manager.io created
customresourcedefinition.apiextensions.k8s.io/certificates.cert-manager.io created
customresourcedefinition.apiextensions.k8s.io/challenges.acme.cert-manager.io created
customresourcedefinition.apiextensions.k8s.io/clusterissuers.cert-manager.io created
customresourcedefinition.apiextensions.k8s.io/issuers.cert-manager.io created
customresourcedefinition.apiextensions.k8s.io/orders.acme.cert-manager.io created

kubectl create namespace cert-manager

namespace/cert-manager created

k3d node list

NAME	ROLE	CLUSTER	STATUS
k3d-k3d-rancher-agent-0	agent	k3d-rancher	running
k3d-k3d-rancher-agent-1	agent	k3d-rancher	running
k3d-k3d-rancher-agent-2	agent	k3d-rancher	running
k3d-k3d-rancher-server-0	server	k3d-rancher	running
k3d-k3d-rancher-serverlb	loadbalancer	k3d-rancher	running

kubectl get nodes

NAME	STATUS	ROLES	AGE	VERSION
k3d-k3d-rancher-agent-1	Ready	<none>	27m	v1.18.6+k3s1
k3d-k3d-rancher-agent-0	Ready	<none>	27m	v1.18.6+k3s1
k3d-k3d-rancher-agent-2	Ready	<none>	27m	v1.18.6+k3s1
k3d-k3d-rancher-server-0	Ready	master	27m	v1.18.6+k3s1

kubectl get namespaces

NAME	STATUS	AGE
p-2v6dj	Active	22h

```
p-2244b      Active 22h
local        Active 22h
kube-node-lease Active 22h
default      Active 22h
cattle-global-data Active 22h
cattle-global-nt Active 22h
kube-public  Active 22h
cert-manager Active 22h
kube-system  Active 22h
user-l7m6j   Active 21h
cattle-system Active 22h
```

Helm Installation

Install Helm if not already present

<https://github.com/helm/helm/releases>

For Windows that would be

<https://get.helm.sh/helm-v3.6.0-windows-amd64.zip>

Unzip to the C:\helm folder or wherever you want the binary to live

For MacOS:

\$ brew install helm

For Windows:

Open powershell

PS> choco install helm

Open a Windows Command Prompt (CMD)

C:\> mkdir helm

C:\> cd \helm

C:\helm> dir windows-amd64\.

Volume in drive C is OS

Volume Serial Number is 5081-CA53

Directory of C:\helm\windows-amd64

```
09/09/2020 12:37 PM <DIR>      .
09/09/2020 12:37 PM <DIR>      ..
09/09/2020 12:37 PM          39,836,672 helm.exe
09/09/2020 12:37 PM          11,373 LICENSE
09/09/2020 12:37 PM           3,308 README.md
               3 File(s)  39,851,353 bytes
```

2 Dir(s) 173,093,220,352 bytes free

```
C:\helm> move windows-amd64\helm.exe .
```

1 file(s) moved.

```
C:\helm> helm version
```

```
version.BuildInfo{Version:"v3.3.1",  
GitCommit:"249e5215cde0c3fa72e27eb7a30e8d55c9696144", GitTreeState:"clean",  
GoVersion:"go1.14.7"}
```

```
C:\helm> helm repo add rancher-latest https://releases.rancher.com/server-charts/latest  
"rancher-latest" has been added to your repositories
```

```
C:\helm> helm repo add jetstack https://charts.jetstack.io
```

"jetstack" has been added to your repositories

```
C:\helm> helm repo update
```

```
Hang tight while we grab the latest from your chart repositories...  
...Successfully got an update from the "rancher-latest" chart repository  
...Successfully got an update from the "jetstack" chart repository  
Update Complete. *Happy Helming!*
```

```
c:\helm\helm install cert-manager jetstack/cert-manager --namespace cert-manager --  
version v0.15.0 --wait
```

Or from the c:\helm folder

Install Cert-Manager with a Helm 3 chart

```
C:\helm> helm install cert-manager jetstack/cert-manager --namespace cert-manager --  
version v0.15.0 --wait
```

```
NAME: cert-manager  
LAST DEPLOYED: Wed Sep 9 12:44:33 2020  
NAMESPACE: cert-manager  
STATUS: deployed  
REVISION: 1  
TEST SUITE: None  
NOTES:  
cert-manager has been deployed successfully!
```

In order to begin issuing certificates, you will need to set up a ClusterIssuer

or Issuer resource (for example, by creating a 'letsencrypt-staging' issuer).

More information on the different types of issuers and how to configure them can be found in our documentation:

<https://cert-manager.io/docs/configuration/>

For information on how to configure cert-manager to automatically provision Certificates for Ingress resources, take a look at the `ingress-shim` documentation:

<https://cert-manager.io/docs/usage/ingress/>

Rollout the cert-manager deployment

```
kubectl -n cert-manager rollout status deploy/cert-manager
```

deployment "cert-manager" successfully rolled out

Prime the container images we need to reduce the likelihood of timeout

```
docker pull rancher/rancher:v2.4.8
```

v2.4.8: Pulling from rancher/rancher

Digest: sha256:5a16a6a0611e49d55ff9d9fbf278b5ca2602575de8f52286b18158ee1a8a5963

Status: Image is up to date for rancher/rancher:v2.4.8

docker.io/rancher/rancher:v2.4.8

```
docker pull rancher/k3s:v1.18.6-k3s1
```

v1.18.6-k3s1: Pulling from rancher/k3s

Digest: sha256:a835d76608a2503af8b681bb5888499d7c3456902f6853c8c1031f4a884715ca

Status: Image is up to date for rancher/k3s:v1.18.6-k3s1

docker.io/rancher/k3s:v1.18.6-k3s1

```
docker pull rancher/server:latest
```

latest: Pulling from rancher/server

Digest: sha256:95b55603122c28baea4e8d94663aa34ad770bbc624a9ed6ef986fb3ea5224d91

Status: Image is up to date for rancher/server:latest

docker.io/rancher/server:latest

```
docker pull rancher/k3d-proxy:v3.0.1
```

v3.0.1: Pulling from rancher/k3d-proxy

Digest: sha256:2ff467bb4a25f904954f7f65e4c7c73134b53bd422f4229f106c7c202ee347e2
Status: Image is up to date for rancher/k3d-proxy:v3.0.1
docker.io/rancher/k3d-proxy:v3.0.1

Install Rancher with a Helm 3 chart

```
helm install rancher rancher-latest/rancher --namespace cattle-system --set  
hostname=rancher.k3d.localhost --wait --timeout 900s
```

NAME: rancher
LAST DEPLOYED: Fri Sep 11 08:34:47 2020
NAMESPACE: cattle-system
STATUS: deployed
REVISION: 1
TEST SUITE: None
NOTES:
Rancher Server has been installed.

NOTE: Rancher may take several minutes to fully initialize. Please standby while Certificates are being issued and Ingress comes up.

Check out our docs at <https://rancher.com/docs/rancher/v2.x/en/>

Browse to <https://rancher.k3d.localhost>

Happy Containering!

Rollout the rancher deployment

```
kubectl -n cattle-system rollout status deploy/rancher
```

deployment "rancher" successfully rolled out

Load the URL <https://rancher.k3d.localhost>

This requires that entry to be added to localhost 127.0.0.1 in our /etc/hosts file

On MacOS:

Edit the hosts file and add the following line

```
vim /etc/hosts
```

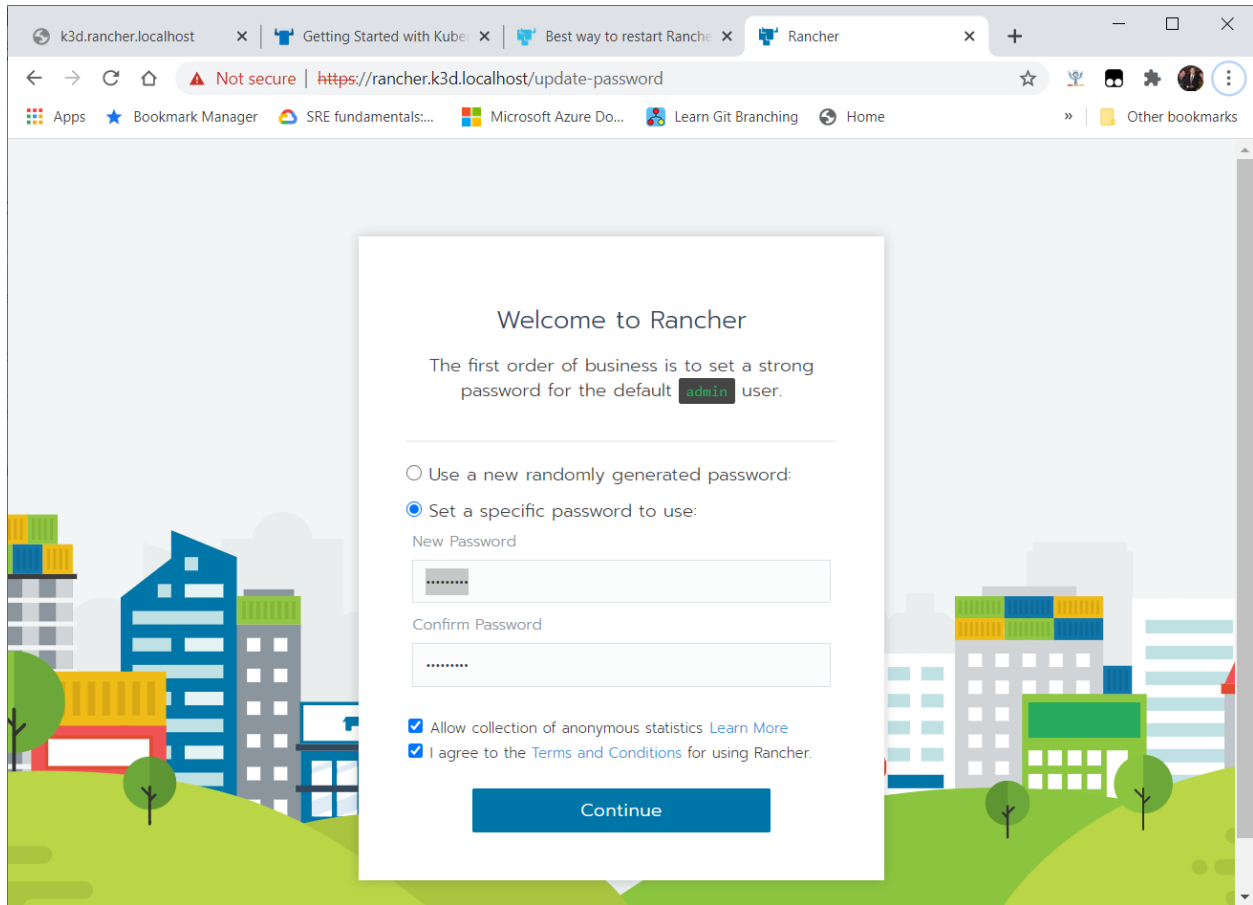
```
127.0.0.1 kubernetes.docker.internal rancher.k3d.localhost k3d.my.org sample.k3d.localhost
```

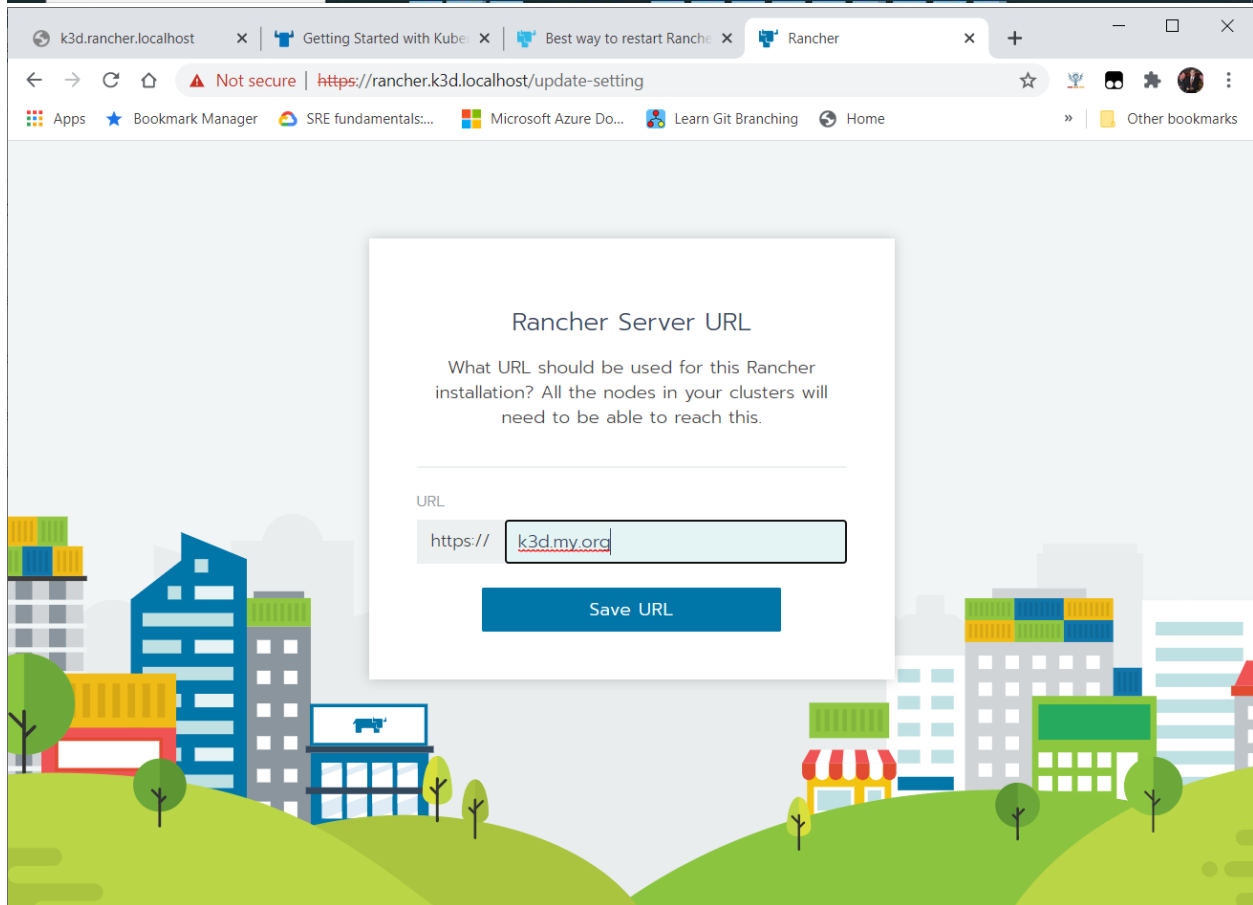
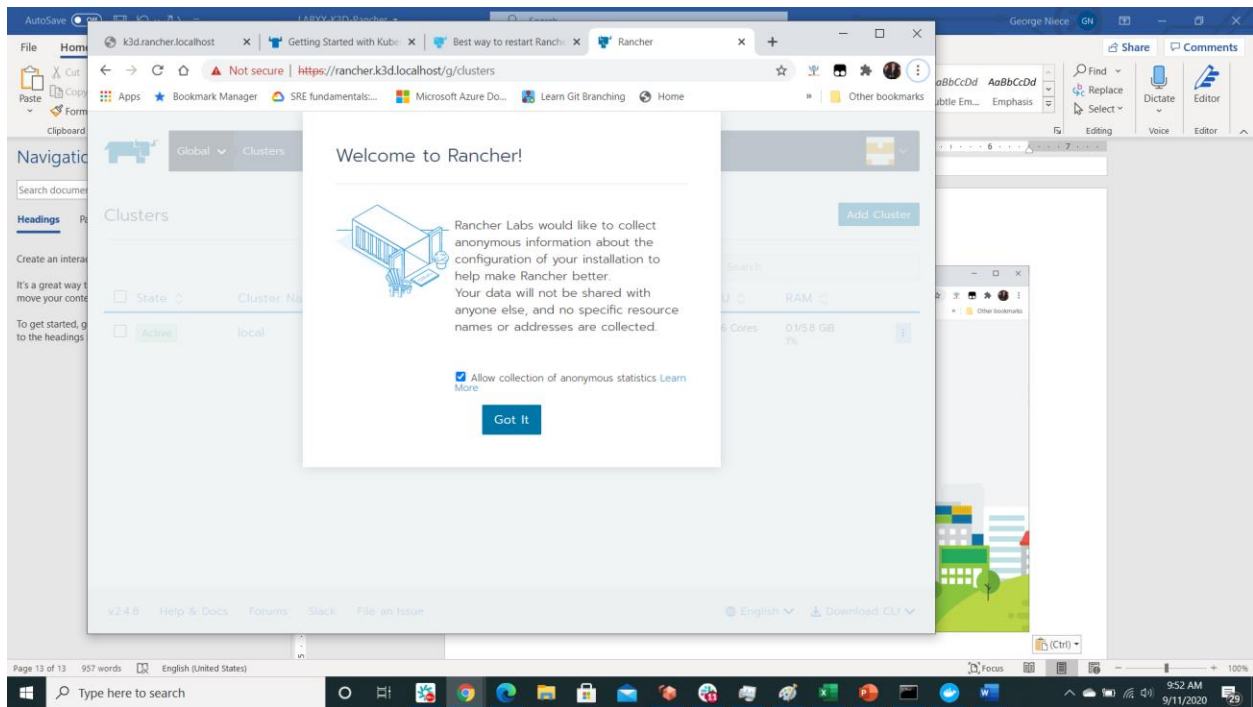
On Windows:

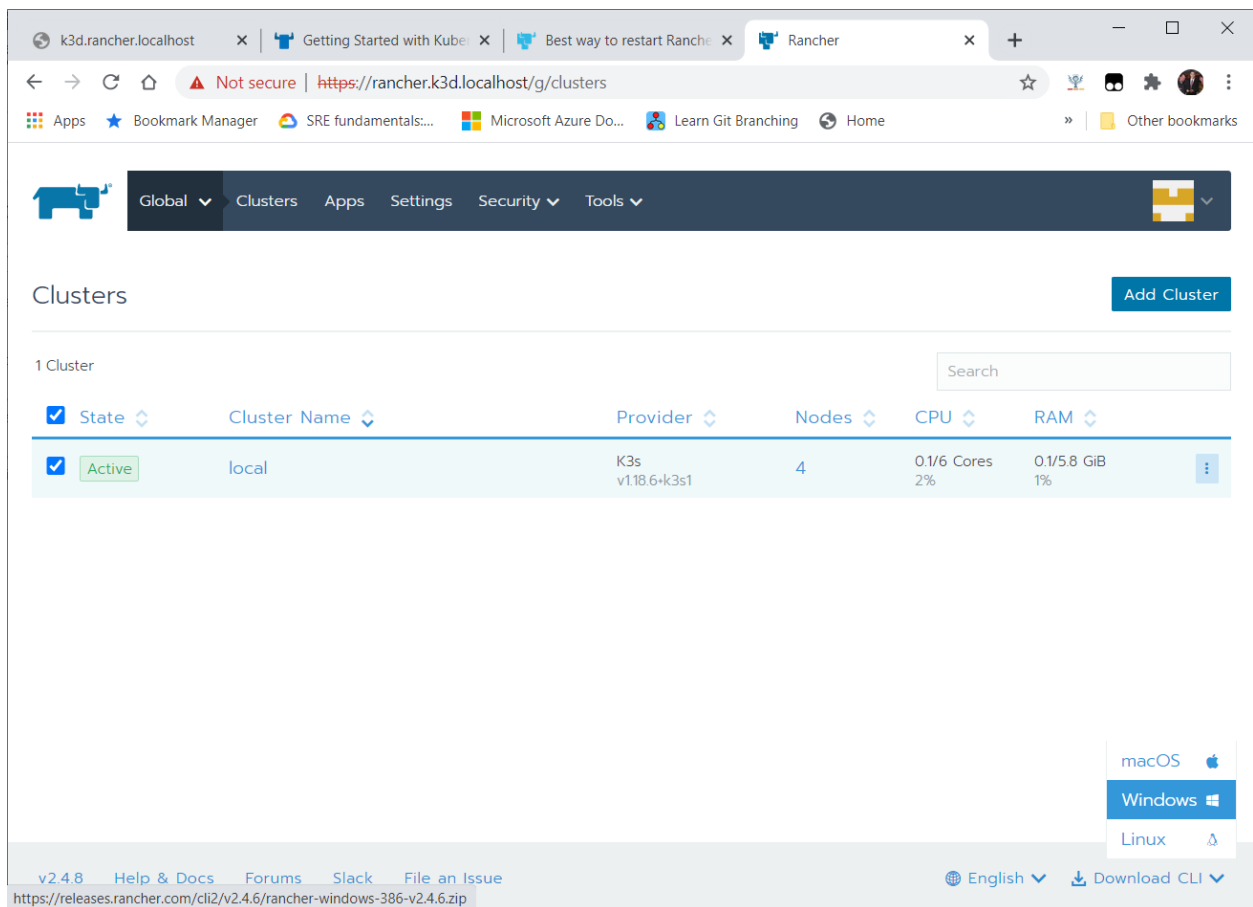
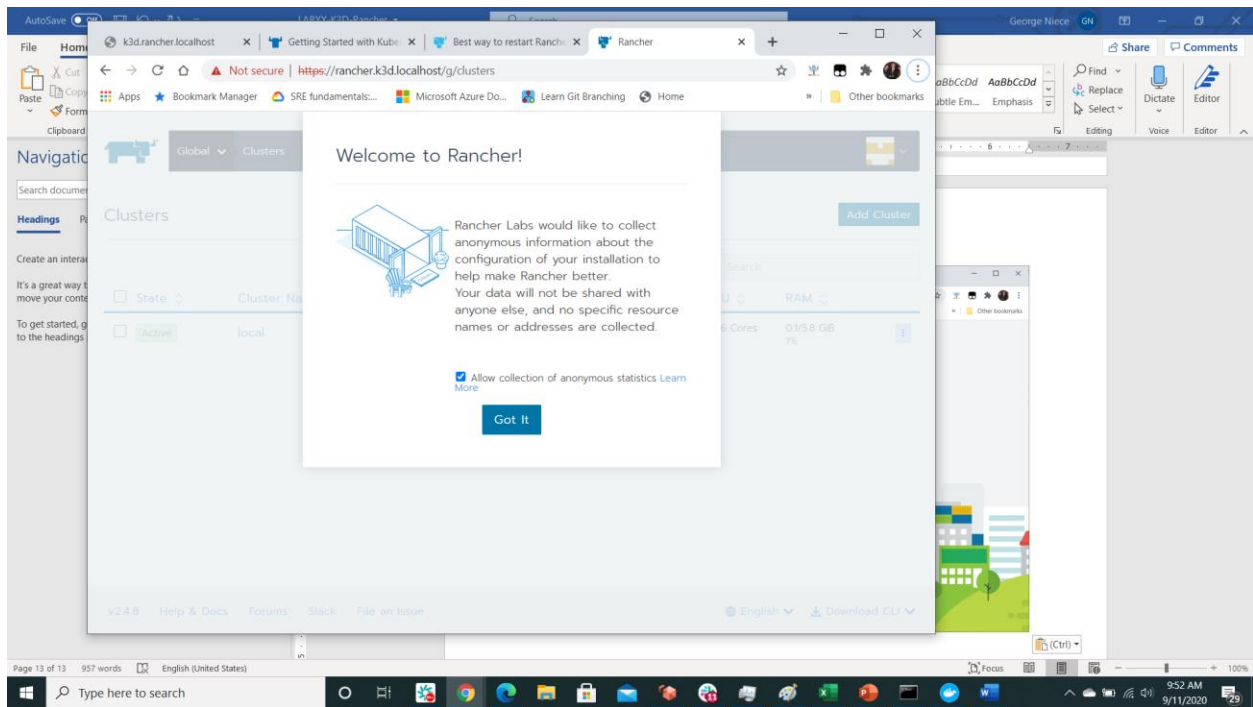
Edit the hosts file and add the following line

```
notepad c:\windows\system32\drivers\etc\hosts
```

```
127.0.0.1 kubernetes.docker.internal rancher.k3d.localhost k3d.my.org sample.k3d.localhost
```







k3d.rancher.localhostGetting Started with KubeBest way to restart RancherRancher

Not secure | https://rancher.k3d.localhost/g/clusters

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GlobalClustersAppsSettingsSecurityTools



Default Admin (admin)
Local User

API & KeysCloud CredentialsNode TemplatesPreferencesLog Out

Clusters

1 Cluster

<input checked="" type="checkbox"/> State	Cluster Name	Provider	No
<input checked="" type="checkbox"/> Active	local	K3s v1.18.6+k3s1	4

v2.4.8Help & DocsForumsSlackFile an Issue


EnglishDownload CLI

https://rancher.k3d.localhost/apikeys


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API & Keys

Add Key

API Keys are tied to your specific user (Default Admin) and can create, delete, and manipulate all Clusters and Projects which you have access to.

Endpoint: https://rancher.k3d.localhost/v3

Delete

<input type="checkbox"/>	State	Access Key	Description	Scope	Expires	Created
<input type="checkbox"/>	Active	telemetry	telemetry token	N/A	Never	2 minutes ago

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Clusters

Add Cluster

1 Cluster

Search

<input checked="" type="checkbox"/> State	Cluster Name	Provider	Nodes	CPU	RAM	
<input checked="" type="checkbox"/> Active	local	K3s v1.18.6+k3s1	4	0.1/6 Cores 2%	0.1/5.8 GiB 1%	


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localClusterNodesStorageProjects/NamespacesMembersToolsTry Dashboard

Dashboard: localLaunch kubectlKubeconfig File

Provider: K3sKubernetes Version: v1.18.6+k3s1Created: 8:37 AM

Enable Monitoring to see live metrics

1%
CPU
0.1 of 8 Reserved

1%
Memory
0.1 of 7.8 GiB Reserved

4%
Pods
19 of 440 Used

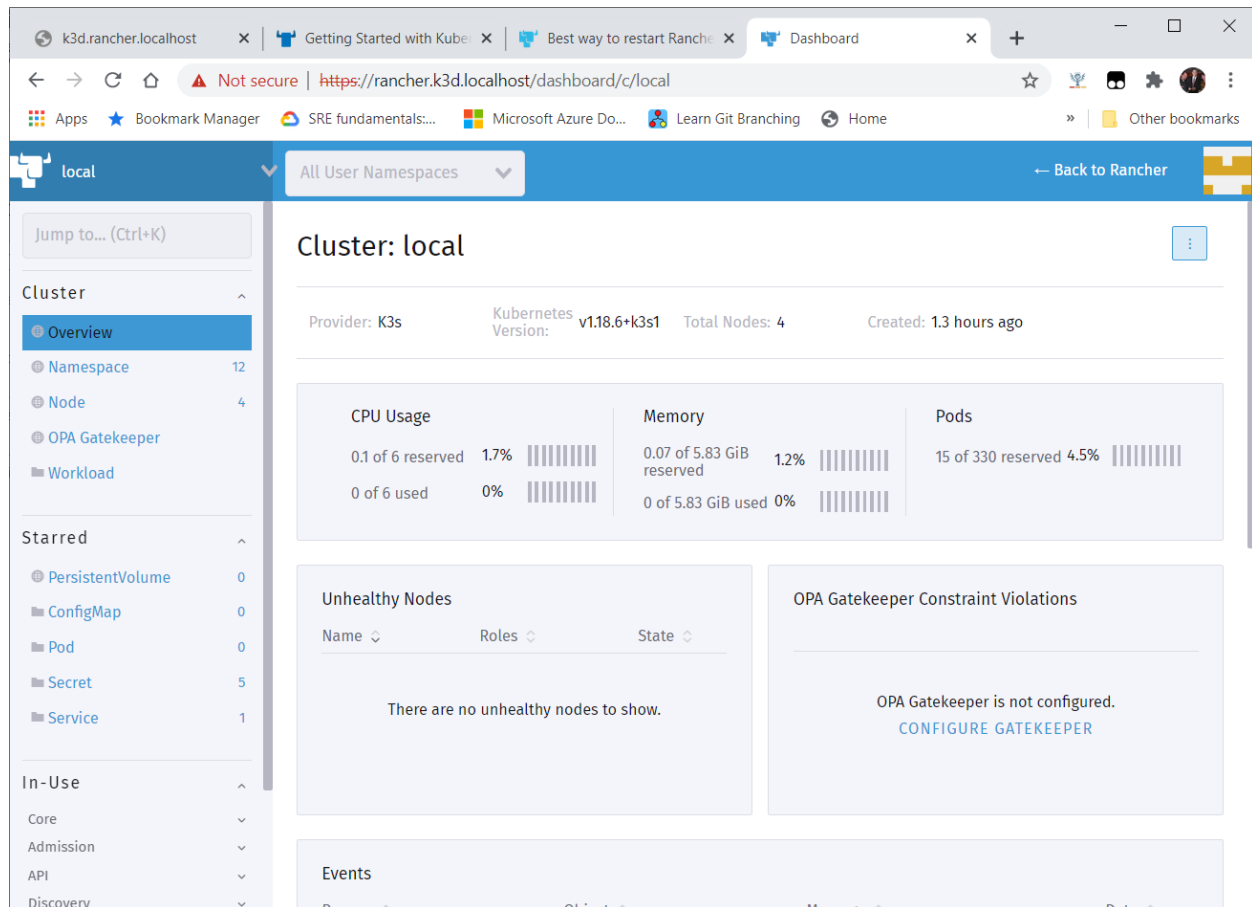
⚠ Etcd Not Applicable

✓ Controller Manager

✓ Scheduler

✓ Nodes

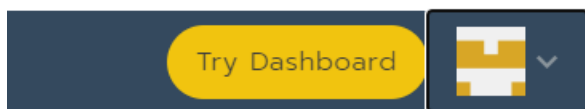
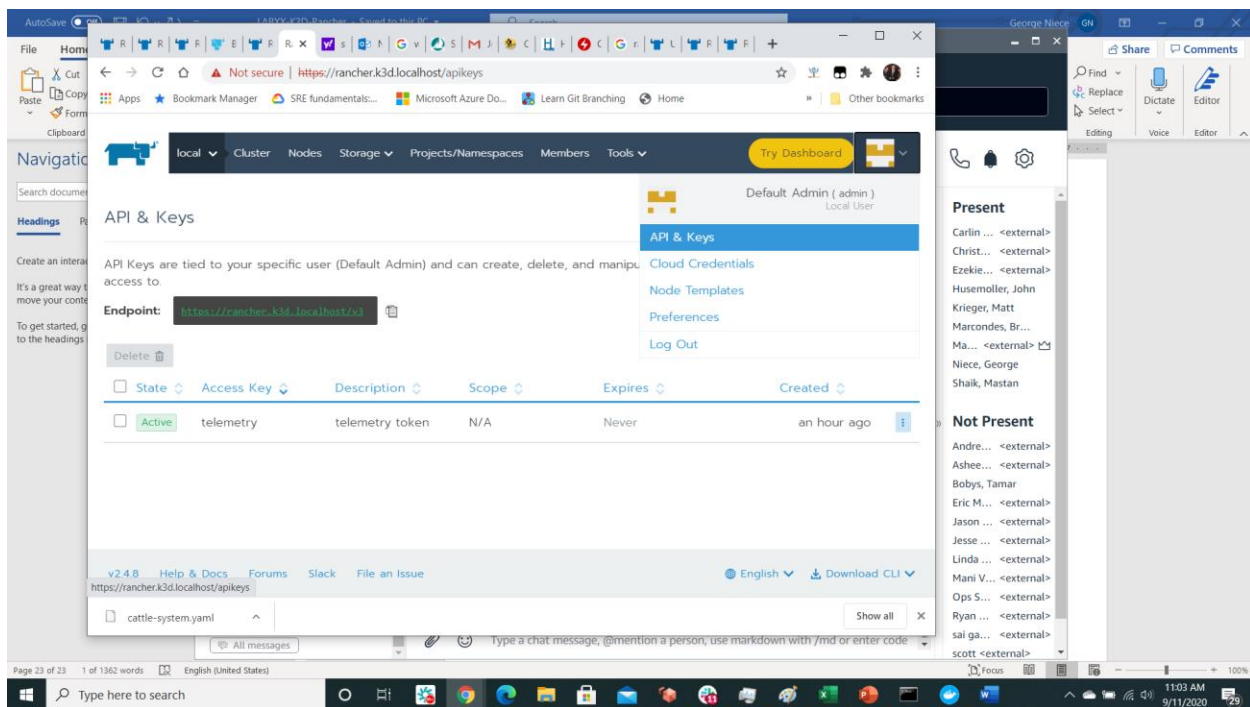
▶ Events
Events of current Cluster



<https://rancher.com/docs/rancher/v2.x/en/quick-start-guide/workload/>

<https://rancher.com/docs/rancher/v2.x/en/quick-start-guide/workload/quickstart-deploy-workload-ingress/>

<https://rancher.com/docs/rancher/v2.x/en/quick-start-guide/workload/quickstart-deploy-workload-nodeport/>



Clusters and Projects which you have

Add API Key

Description

ExperimentKey

Automatically Expire

- ☐ Never
- ☒ A day from now
- ☐ A month from now
- ☐ A year from now
- ☐ Custom - minutes

Scope

no scope

Cluster-scoped tokens can be used to interact directly with the Kubernetes API of clusters configured with an [Authorized Cluster Endpoint](#)

Create

Cancel

Information for API Key is displayed for Endpoint, Access Key, Secret Key and Bearer Token

API Key Created

Endpoint:
`https://rancher.k3d.localhost/v3`

Access Key (username):
`token-tkscw`

Secret Key (password):
`8zq8kcrhf8ttvgt4nh64gsck4jwzv8n5hz6hsfcbp8s5mppqn6dft9`

Access Key and Secret Key can be sent as the username and password for HTTP Basic auth to authorize requests. You can also combine them to use as a Bearer token:

Bearer Token:
`token-tkscw:8zq8kcrhf8ttvgt4nh64gsck4jwzv8n5hz6hsfcbp8s5mppqn6dft9`

Save the info above! This is the only time you'll be able to see it.
If you lose it, you'll need to create a new API key.

Close

API Key Created

Endpoint: <https://rancher.k3d.localhost/v3>

Access Key (username): `token-tkscw`

Secret Key (password): `8zq8kcrhf8ttvgt4nh64gsck4jwzv8n5hz6hsfcbp8s5mppqn6dft9`

Access Key and Secret Key can be sent as the username and password for HTTP Basic auth to authorize requests. You can also combine them to use as a Bearer token:

Bearer Token: `token-tkscw:8zq8kcrhf8ttvgt4nh64gsck4jwzv8n5hz6hsfcbp8s5mppqn6dft9`

Save the info above! This is the only time you'll be able to see it.
If you lose it, you'll need to create a new API key.

Working with the Rancher CLI

Download the Rancher CLI and drop that in the `c:\k3d\rancher-v2.4.6` folder, we download from the Rancher UI, but you can also find more here:

<https://rancher.com/docs/rancher/v2.x/en/cli/>

Execute the CLI to login to Rancher

rancher login --help

Login to a Rancher server

Usage:

```
rancher login [OPTIONS] [SERVERURL]
```

Options:

<code>--context value</code>	Set the context during login
<code>--token value, -t value</code>	Token from the Rancher UI
<code>--cacert value</code>	Location of the CACerts to use
<code>--name value</code>	Name of the Server
<code>--skip-verify</code>	Skip verification of the CACerts presented by the Server

rancher login https://rancher.k3d.localhost --token token-tkscw:8zq8kcrhf8ttvgt4nh64gsck4jwzv8n5hz6hsfcbp8s5mppqn6dft9


```
[36mINFO[0m[0007] Deleting image volume 'k3d-k3d-rancher-images'  
[36mINFO[0m[0007] Removing cluster details from default kubeconfig...  
[36mINFO[0m[0007] Removing standalone kubeconfig file (if there is one)...  
[36mINFO[0m[0007] Successfully deleted cluster k3d-rancher!
```

References

K3s <https://github.com/rancher/k3s/releases/tag/v1.16.15+k3s1>

<https://itnext.io/rancher-2-4-kubernetes-on-your-macos-laptop-with-docker-k3d-b578b1c7568b>

<https://medium.com/@yannalbou/k3d-k3s-k8s-perfect-match-for-dev-and-testing-896c8953acc0>

<https://medium.com/polarsquad/check-your-helm-deployments-ffe26014804>

<https://rancher.com/docs/rancher/v2.x/en/installation/k8s-install/helm-rancher/#7-verify-that-the-rancher-server-is-successfully-deployed>

<https://cert-manager.io/docs/installation/kubernetes/>

ImagePullBackoff

<https://managedkube.com/kubernetes/k8sbot/troubleshooting/imagepullbackoff/2019/02/23/imagepullbackoff.html>