



## Exercise 5.1: Configuring TLS Access

### Overview

Using the Kubernetes API, **kubectl** makes API calls for you. With the appropriate TLS keys you could run **curl** as well use a **golang** client. Calls to the kube-apiserver get or set a PodSpec, or desired state. If the request represents a new state the **Kubernetes Control Plane** will update the cluster until the current state matches the specified state. Some end states may require multiple requests. For example, to delete a ReplicaSet, you would first set the number of replicas to zero, then delete the ReplicaSet.

An API request must pass information as JSON. **kubectl** converts **.yaml** to JSON when making an API request on your behalf. The API request has many settings, but must include **apiVersion**, **kind** and **metadata**, and **spec** settings to declare what kind of container to deploy. The **spec** fields depend on the object being created.

We will begin by configuring remote access to the kube-apiserver then explore more of the API.

1. Begin by reviewing the **kubectl** configuration file. We will use the three certificates and the API server address.

```
student@cp:~$ less $HOME/.kube/config
```

```
<output_omitted>
```

2. We will create a variables using certificate information. You may want to double-check each parameter as you set it. Begin with setting the **client-certificate-data** key.

```
student@cp:~$ export client=$(grep client-cert $HOME/.kube/config |cut -d " " -f 6)
```

```
student@cp:~$ echo $client
```

```
LSOtLS1CRUdJTiBDRVJUSUZJQ0FURSBtLS0tCk1JSUM4akNDQWRxZ0F3SUJ  
BZ01JRy9wbC9rWEpNdmd3RFFZSktvWklodmNOQVFFTEJRQXdGVEVUTUJFR0  
ExVUUKQXhNS2EzVmlaWEp1WlhSbGN6QWVGdzB4TnpFeU1UTXh0e1EyTXpKY  
UZ3MHhPREV5TVRNeE56UTJNe1JhTURReApGekFWQmdOVk1REBk41YzNS  
<output_omitted>
```

3. Almost the same command, but this time collect the **client-key-data** as the **key** variable.

```
student@cp:~$ export key=$(grep client-key-data $HOME/.kube/config |cut -d " " -f 6)
```

```
student@cp:~$ echo $key
```

```
<output_omitted>
```

4. Finally set the **auth** variable with the **certificate-authority-data** key.

```
student@cp:~$ export auth=$(grep certificate-authority-data $HOME/.kube/config |cut -d " " -f 6)
```

```
student@cp:~$ echo $auth
```

```
<output_omitted>
```

5. Now encode the keys for use with **curl**.

```
student@cp:~$ echo $client | base64 -d - > ./client.pem

student@cp:~$ echo $key | base64 -d - > ./client-key.pem

student@cp:~$ echo $auth | base64 -d - > ./ca.pem
```

6. Pull the API server URL from the config file. Your hostname or IP address may be different.

```
student@cp:~$ kubectl config view |grep server
```

```
server: https://k8scp:6443
```

7. Use **curl** command and the encoded keys to connect to the API server. Use your hostname, or IP, found in the previous command, which may be different than the example below.

```
student@cp:~$ curl --cert ./client.pem \
  --key ./client-key.pem \
  --cacert ./ca.pem \
  https://k8scp:6443/api/v1/pods
```

```
{
  "kind": "PodList",
  "apiVersion": "v1",
  "metadata": {
    "selfLink": "/api/v1/pods",
    "resourceVersion": "239414"
  },
  <output_omitted>
```

8. If the previous command was successful, create a JSON file to create a new pod. Remember to use **find** and search for this file in the tarball output, it can save you some typing.

```
student@cp:~$ vim curlpod.json
```

```
{
  "kind": "Pod",
  "apiVersion": "v1",
  "metadata": {
    "name": "curlpod",
    "namespace": "default",
    "labels": {
      "name": "examplepod"
    }
  },
  "spec": {
    "containers": [{
      "name": "nginx",
      "image": "nginx",
      "ports": [{"containerPort": 80}]
    }]
  }
}
```

9. The previous **curl** command can be used to build a XPOST API call. There will be a lot of output, including the scheduler and taints involved. Read through the output. In the last few lines the phase will probably show Pending, as it's near the beginning of the creation process.

```
student@cp:~$ curl --cert ./client.pem \
  --key ./client-key.pem --cacert ./ca.pem \
  https://k8scp:6443/api/v1/namespaces/default/pods \
  -XPOST -H'Content-Type: application/json' \
  -d@curlpod.json
```

```
{
  "kind": "Pod",
  "apiVersion": "v1",
  "metadata": {
    "name": "curlpod",
    <output_omitted>
  }
}
```

10. Verify the new pod exists and shows a Running status.

```
student@cp:~$ kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
curlpod	1/1	Running	0	45s