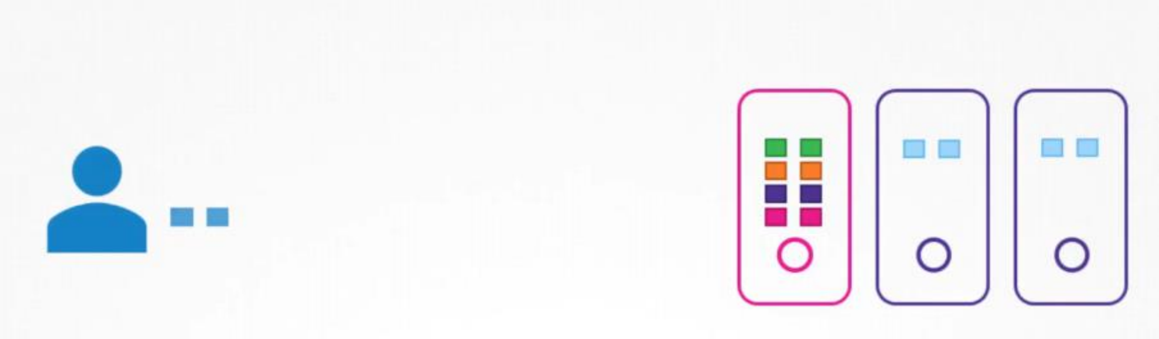
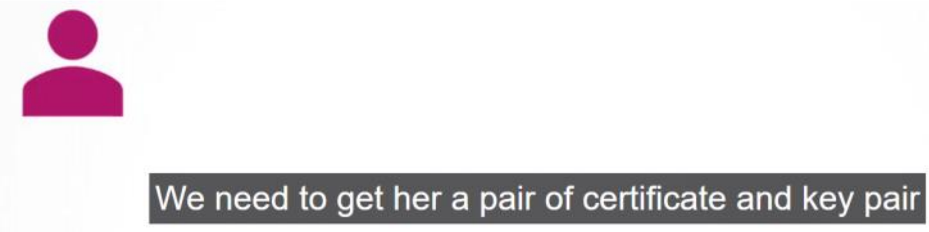
Monday, 24 October 2022 14.10

TLS CERTIFICATES

Certificate Workflow & API



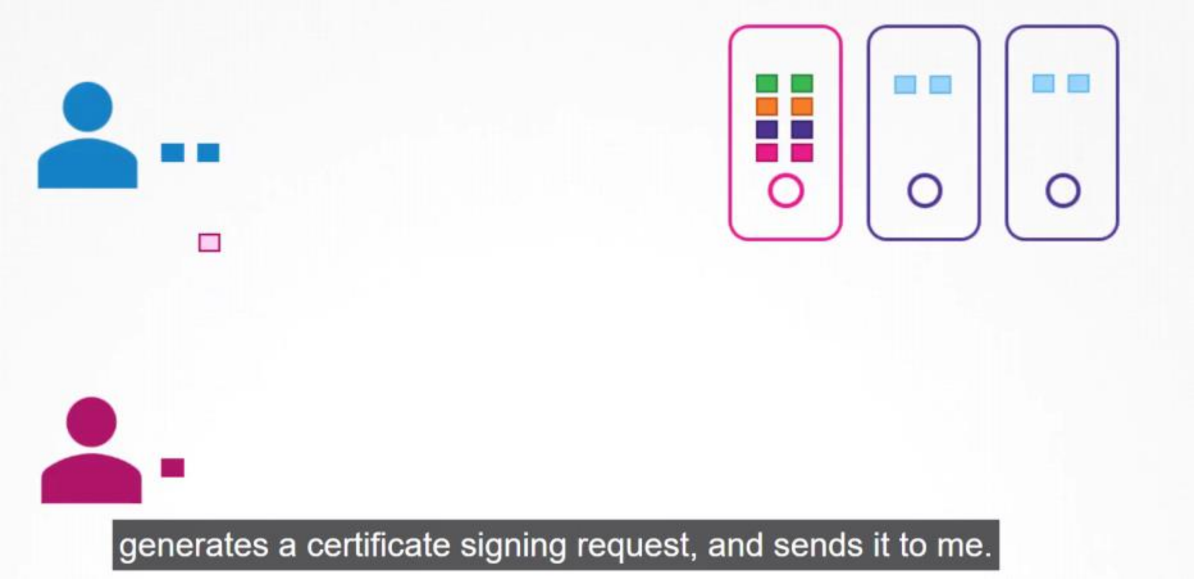
I have my own admin certificate and key.



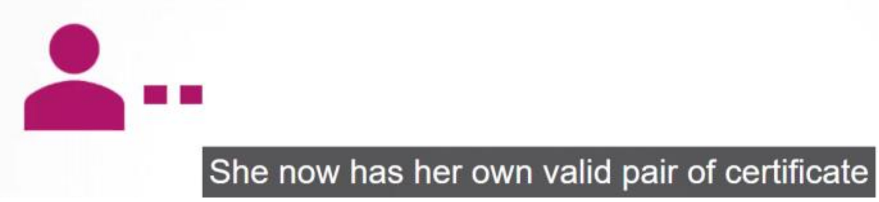
We need to get her a pair of certificate and key pair

for her to access the cluster.

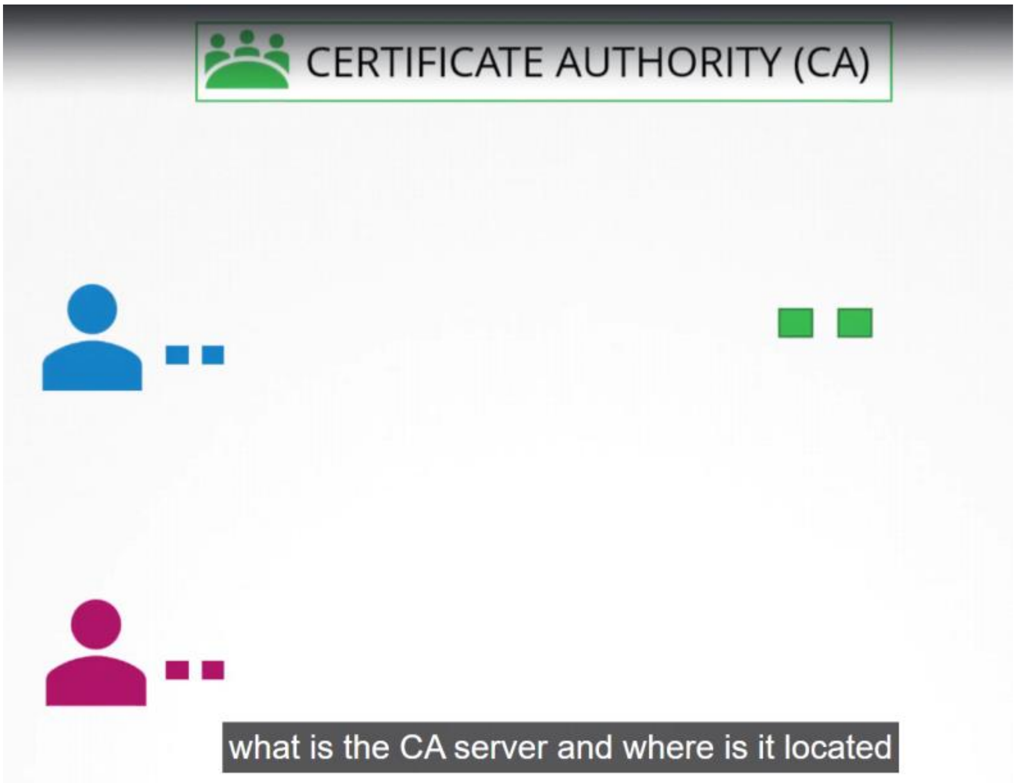
She creates her own private key,



generates a certificate signing request, and sends it to me.

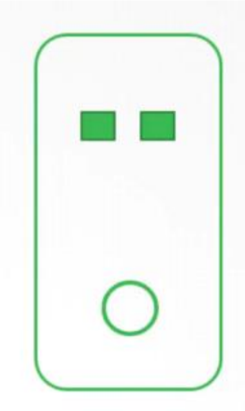


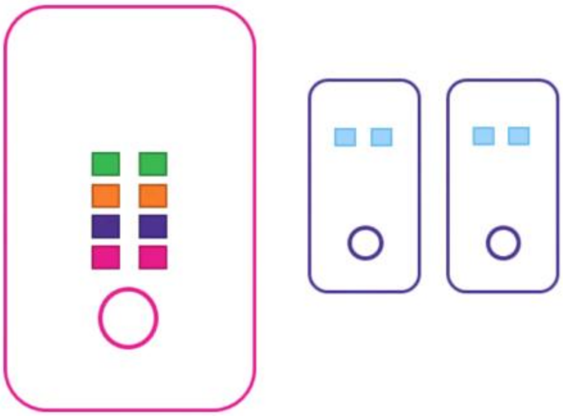
She now has her own valid pair of certificate



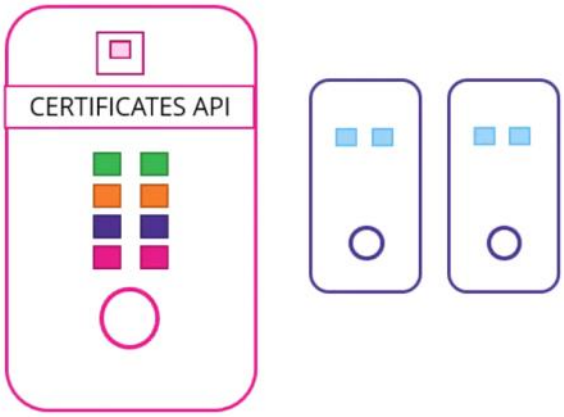
CERTIFICATE AUTHORITY (CA)

what is the CA server and where is it located

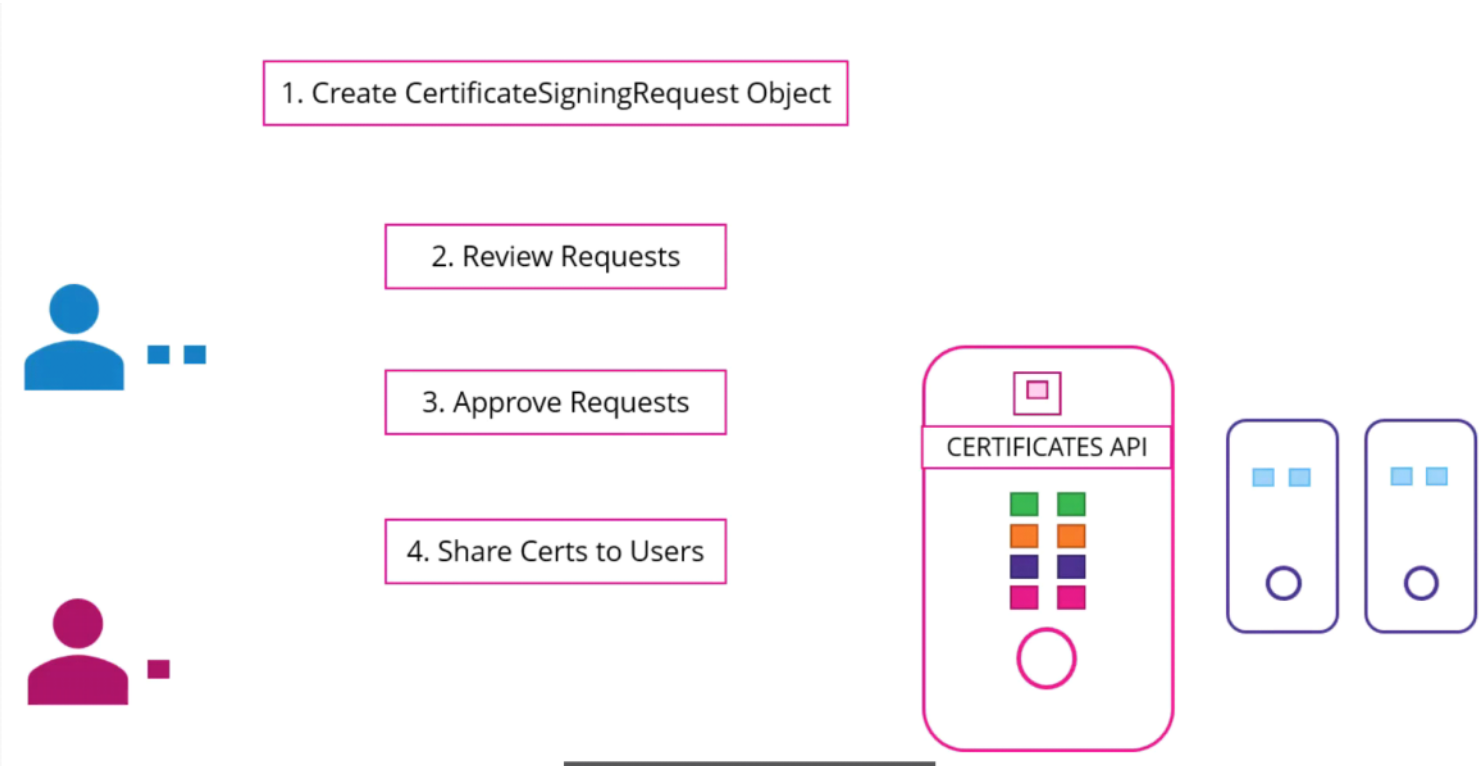




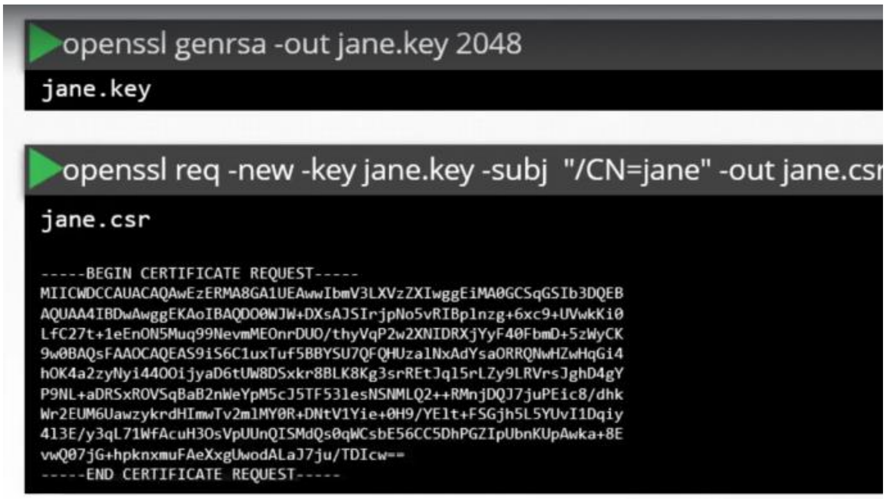
CERTIFICATES API



creates a Kubernetes API object



A user first creates a key



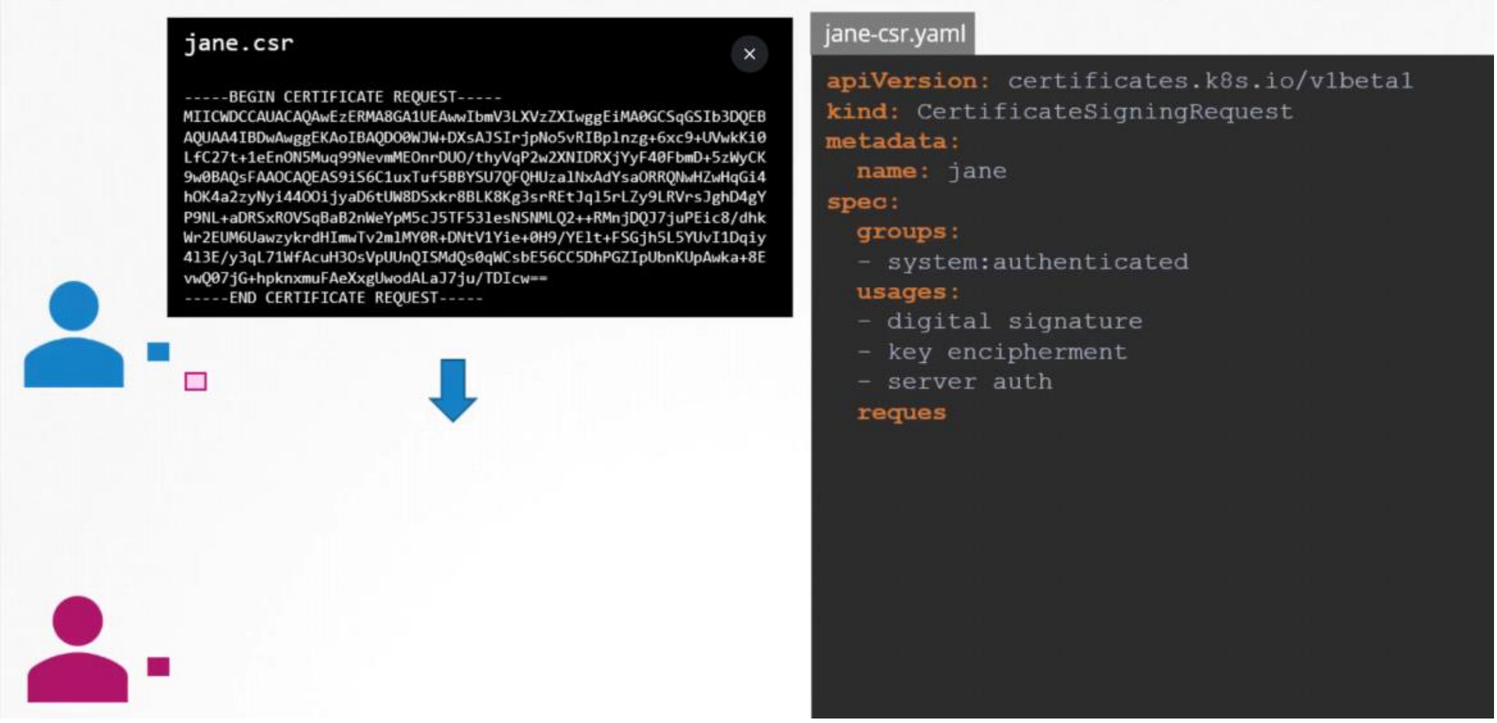
```
openssl genrsa -out jane.key 2048
jane.key
```

```
openssl req -new -key jane.key -subj  "/CN=jane" -out jane.csr
jane.csr

-----BEGIN CERTIFICATE REQUEST-----
MIICWDCCAUACAQAwEzERMA8GA1UEAwwIbmV3LXVzZXIwggEiMA0GCSqGSIb3DQEB
AQUAA4IBDwAwggEKAoIBAQDO0WJW+DXsAJSIrjpNo5vRIBplnzg+6xc9+UVwkKi0
LfC27t+1eEnON5Muq99NevmMEOnrDUO/thyVqP2w2XNIDRXjYyF40FbmD+5zWyCK
9w0BAQsFAAOCAQEAS9iS6C1uxTuf5BBYSU7QFQHUzalNxAdYsaORRQNwHZwHqGi4
hOK4a2zyNyi44OOijyaD6tUW8DSxkr8BLK8Kg3srREtJql5rLZy9LRVrsJghD4gY
P9NL+aDRSxROVSqBaB2nWeYpM5cJ5TF53lesNSNMLQ2++RMnjDQJ7juPEic8/dhk
Wr2EUM6UawzykrdHImwTv2mlMY0R+DNtV1Yie+0H9/YElt+FSGjh5L5YUvI1Dqiy
413E/y3qL71WfAcuH3OsVpUUnQISMdQs0qWCsbE56CC5DhPGZIpUbnKUpAwka+8E
vwQ07jG+hpknxmuFAeXxgUwodALaJ7ju/TDIcw==
-----END CERTIFICATE REQUEST-----
```

The administrator takes a key

and creates a certificate signing request object.



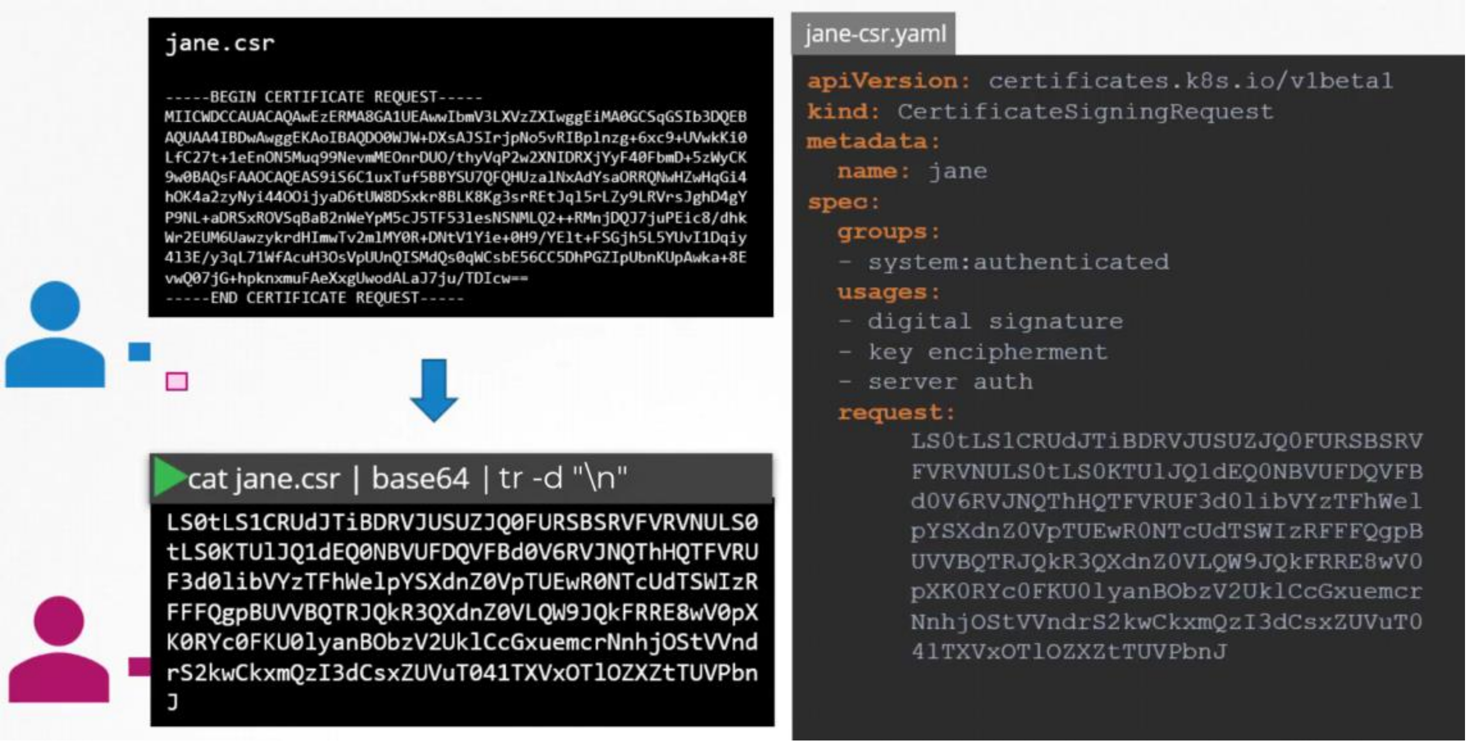
jane.csr

```
-----BEGIN CERTIFICATE REQUEST-----
MIICWDCCAUACAQAwEzERMA8GA1UEAwwIbmV3LXVzZXIwggEiMA0GCSqGSIb3DQEB
AQUAA4IBDwAwggEKAoIBAQDO0WJW+DXsAJSIrjpNo5vRIBplnzg+6xc9+UVwkKi0
LfC27t+1eEnON5Muq99NevmMEOnrDUO/thyVqP2w2XNIDRXjYyF40FbmD+5zWyCK
9w0BAQsFAAOCAQEAS9iS6C1uxTuf5BBYSU7QFQHUzalNxAdYsaORRQNwHZwHqGi4
hOK4a2zyNyi44OOijyaD6tUW8DSxkr8BLK8Kg3srREtJql5rLZy9LRVrsJghD4gY
P9NL+aDRSxROVSqBaB2nWeYpM5cJ5TF53lesNSNMLQ2++RMnjDQJ7juPEic8/dhk
Wr2EUM6UawzykrdHImwTv2mlMY0R+DNtV1Yie+0H9/YElt+FSGjh5L5YUvI1Dqiy
4l3E/y3qL71WfAcuH3OsVpUUnQISMdQs0qWCsbE56CC5DhPGZIpUbnKUpAwka+8E
vwQ07jG+hpknxmuFAeXxgUwodALaJ7ju/TDIcw==
-----END CERTIFICATE REQUEST-----
```

jane-csr.yaml

```yaml
apiVersion: certificates.k8s.io/v1beta1
kind: CertificateSigningRequest
metadata:
  name: jane
spec:
  groups:
  - system:authenticated
  usages:
  - digital signature
  - key encipherment
  - server auth
  reques
```

, it must be encoded using the base 64 command.



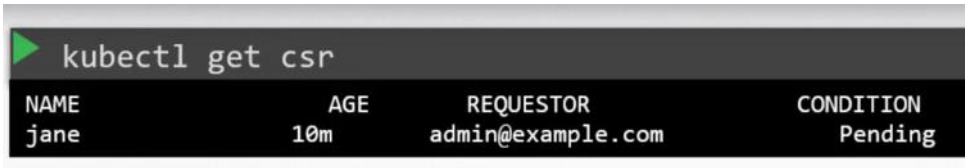
jane.csr

```
-----BEGIN CERTIFICATE REQUEST-----
MIICWDCCAUACAQAwEzERMA8GA1UEAwwIbmV3LXVzZXIwggEiMA0GCSqGSIb3DQEB
AQUAA4IBDwAwggEKAoIBAQDO0WJW+DXsAJSIrjpNo5vRIBplnzg+6xc9+UVwkKi0
LfC27t+1eEnON5Muq99NevmMEOnrDUO/thyVqP2w2XNIDRXjYyF40FbmD+5zWyCK
9w0BAQsFAAOCAQEAS9iS6C1uxTuf5BBYSU7QFQHUzalNxAdYsaORRQNwHZwHqGi4
hOK4a2zyNyi44OOijyaD6tUW8DSxkr8BLK8Kg3srREtJql5rLZy9LRVrsJghD4gY
P9NL+aDRSxROVSqBaB2nWeYpM5cJ5TF53lesNSNMLQ2++RMnjDQJ7juPEic8/dhk
Wr2EUM6UawzykrdHImwTv2mlMY0R+DNtV1Yie+0H9/YElt+FSGjh5L5YUvI1Dqiy
4l3E/y3qL71WfAcuH3OsVpUUnQISMdQs0qWCsbE56CC5DhPGZIpUbnKUpAwka+8E
vwQ07jG+hpknxmuFAeXxgUwodALaJ7ju/TDIcw==
-----END CERTIFICATE REQUEST-----
```

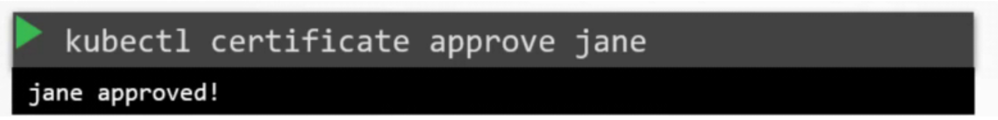
```
cat jane.csr | base64 | tr -d "\n"
LS0tLS1CRUdJTiBDRVJUSUZJQ0FURSBSRVFVRVNULS0
tLS0KTUlJQ1dEQ0NBVUFDQVFBd0V6RVJNQThHQTFVRU
F3d0libVYzTFhWelpYSXdnZ0VpTUEwR0NTcUdTSWIzR
FFFQgpBUVVBQTRJQkR3QXdnZ0VLQW9JQkFRRE8wV0pX
K0RYc0FKU0lyanBObzV2UklCcGxuemcrNnhjOStVVnd
rS2kwCkxmQzI3dCsxZUVuT041TXVxOTl0ZXZtTUVPbn
J
```

jane-csr.yaml

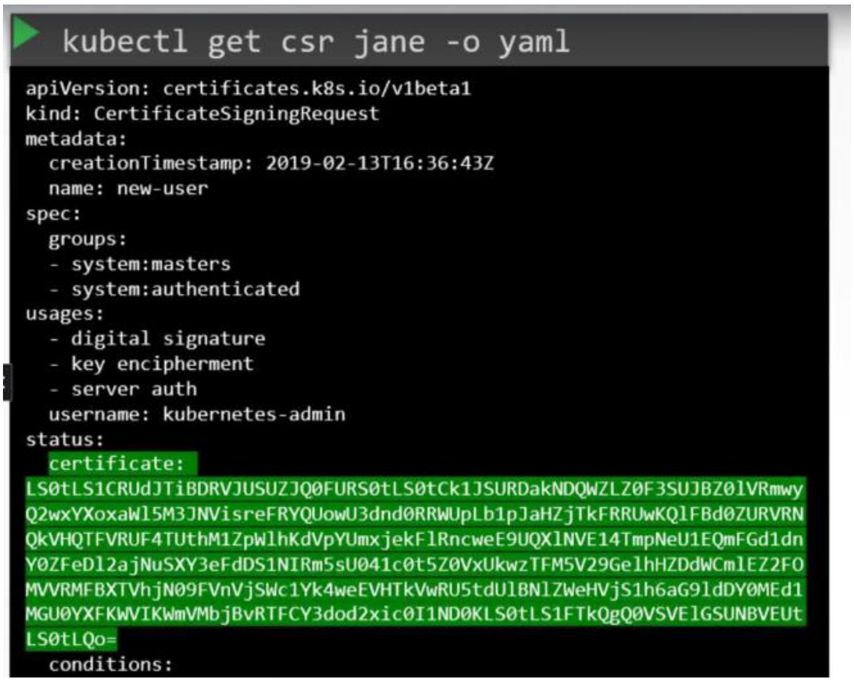
```yaml
apiVersion: certificates.k8s.io/v1beta1
kind: CertificateSigningRequest
metadata:
  name: jane
spec:
  groups:
  - system:authenticated
  usages:
  - digital signature
  - key encipherment
  - server auth
  request:
      LS0tLS1CRUdJTiBDRVJUSUZJQ0FURSBSRV
      FVRVNULS0tLS0KTUlJQ1dEQ0NBVUFDQVFB
      d0V6RVJNQThHQTFVRUF3d0libVYzTFhWel
      pYSXdnZ0VpTUEwR0NTcUdTSWIzRFFFQgpB
      UVVBQTRJQkR3QXdnZ0VLQW9JQkFRRE8wV0
      pXK0RYc0FKU0lyanBObzV2UklCcGxuemcr
      NnhjOStVVndrS2kwCkxmQzI3dCsxZUVuT0
      41TXVxOTl0ZXZtTUVPbnJ
```



```
kubectl get csr
NAME              AGE        REQUESTOR                 CONDITION
jane              10m      admin@example.com             Pending
```

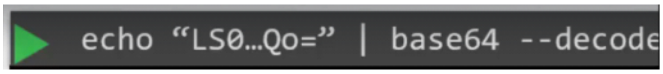


```
kubectl certificate approve jane
jane approved!
```

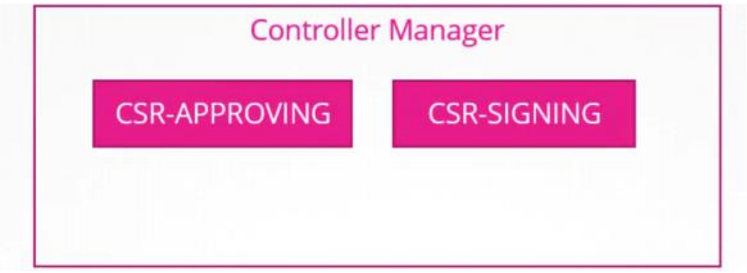


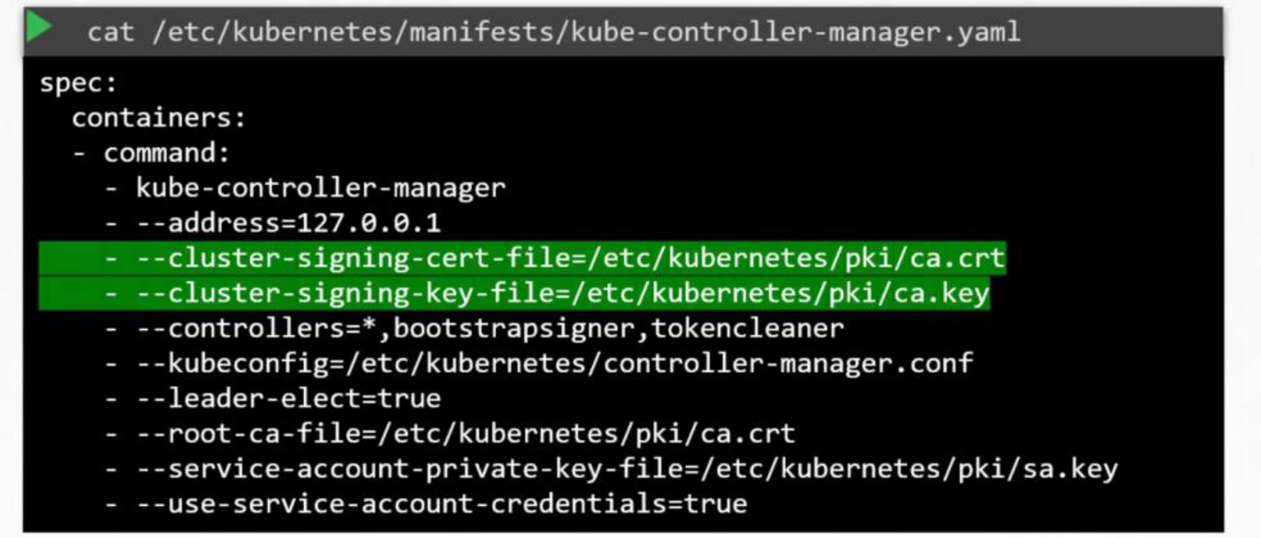
```
kubectl get csr jane -o yaml
```

```
apiVersion: certificates.k8s.io/v1beta1
kind: CertificateSigningRequest
metadata:
  creationTimestamp: 2019-02-13T16:36:43Z
  name: new-user
spec:
  groups:
  - system:masters
  - system:authenticated
usages:
  - digital signature
  - key encipherment
  - server auth
  username: kubernetes-admin
status:
  certificate:
LS0tLS1CRUdJTiBDRVJUSUZJQ0FURS0tLS0tCk1JSURDakNDQWZLZ0F3SUJBZ01VRmwy
Q2wxYXoxaWl5M3JNVisreFRYQUowU3dnd0RRWUpLb1pJaHZjTkFRRUwKQ1FBd0ZURVRN
QkVHQTFVRUF4TUthM1ZpWlhKdVpYUmxjekFlRncweE9UQXlNVE14TmpNeU1EQmFGd1dn
Y0ZFeDl2ajNuSXY3eFdDS1NIRm5sU041c0t5Z0VxUkwzTFM5V29GelhHZDdWCmlEZ2FO
MVVRMFBXTVhjN09FVnVjSWc1Yk4weEVHTkVwRU5tdUlBNlZWeHVjS1h6aG9ldDY0MEd1
MGU0YXFKWVIKWmVMbjBvRTFCY3dod2xic0I1ND0KLS0tLS1FTkQgQ0VSVElGSUNBVEUt
LS0tLQo=
  conditions:
```



```
echo “LS0…Qo=” | base64 --decode
```





```
cat /etc/kubernetes/manifests/kube-controller-manager.yaml
```

```
spec:
  containers:
  - command:
    - kube-controller-manager
    - --address=127.0.0.1
    - --cluster-signing-cert-file=/etc/kubernetes/pki/ca.crt
    - --cluster-signing-key-file=/etc/kubernetes/pki/ca.key
    - --controllers=*,bootstrapsigner,tokencleaner
    - --kubeconfig=/etc/kubernetes/controller-manager.conf
    - --leader-elect=true
    - --root-ca-file=/etc/kubernetes/pki/ca.crt
    - --service-account-private-key-file=/etc/kubernetes/pki/sa.key
    - --use-service-account-credentials=true
```