

POD in Kubernetes

```
controlplane:~$ kubectl get node
NAME      STATUS   ROLES    AGE   VERSION
controlplane Ready   control-plane 15d   v1.32.1
node01    Ready   <none>    15d   v1.32.1

controlplane:~$ kubectl api-resources
NAME                                SHORTNAMES  APIVERSION  NAMESPACE  KIND
bindings                           cs          v1          true        Binding
componentstatuses                  cs          v1          false       ComponentStatus
configmaps                         cm          v1          true        ConfigMap
endpoints                          ep          v1          true        Endpoints
events                             ev          v1          true        Event
limitranges                        limits      v1          true        LimitRange
namespaces                         ns          v1          false       Namespace
nodes                              no          v1          false       Node
persistentvolumeclaims             pvc        v1          true        PersistentVolumeClaim
persistentvolumes                  pv         v1          false       PersistentVolume
pods                               po          v1          true        Pod
podtemplates                       vt          v1          true        PodTemplate
replicationcontrollers              rc          v1          true        ReplicationController
resourcequotas                     quota       v1          true        ResourceQuota
secrets                            sv          v1          true        Secret
serviceaccounts                    sa          v1          true        ServiceAccount
services                           svc         v1          true        Service
mutatingwebhookconfigurations      admissionregistration.k8s.io/v1 false       MutatingWebhookConfiguration
validatingadmissionpolicies        admissionregistration.k8s.io/v1 false       ValidatingAdmissionPolicy
validatingadmissionpolicybindings  admissionregistration.k8s.io/v1 false       ValidatingAdmissionPolicyBinding
validatingwebhookconfigurations    admissionregistration.k8s.io/v1 false       ValidatingWebhookConfiguration
customresourcedefinitions          crd,crds   apiextensions.k8s.io/v1 false       CustomResourceDefinition
apiservices                        apiregistration.k8s.io/v1 false       APIService
controllerrevisions                ds          apps/v1     true        ControllerRevision
daemonsets                         ds          apps/v1     true        DaemonSet
deployments                        deploy     apps/v1     true        Deployment
replicasets                        rs          apps/v1     true        ReplicaSet
statefulsets                       sts        apps/v1     true        StatefulSet
selfsubjectreviews                 authentication.k8s.io/v1 false       SelfSubjectReview
volumeattachments                  storage.k8s.io/v1 false       VolumeAttachment

controlplane:~$ kubectl run pod1 --image=nginx
pod/pod1 created

controlplane:~$ kubectl get pod
NAME    READY   STATUS    RESTARTS   AGE
pod1    1/1     Running   0           9s

controlplane:~$ kubectl describe pod pod1
Name:         pod1
Namespace:    default
Priority:      0
Service Account: default
Node:         node01/172.30.2.2
Start Time:   Mon, 07 Apr 2025 12:22:13 +0000
Labels:       run=pod1
Annotations:   cni.projectcalico.org/containerID: aebc79ebe3c56055d42e02e28b7f50c64027dbb45eb32ff13f0ba41d7ad01660
               cni.projectcalico.org/podIP: 192.168.1.4/32
               cni.projectcalico.org/podIPs: 192.168.1.4/32
Status:       Running
IP:           192.168.1.4
IPs:          IP: 192.168.1.4
Containers:
  pod1:
    Container ID: containerd://8681808617f32568e08403544e2b2b1da2d2723084a7eeda1fd1d62f63a43a35
    Image:         nginx
    Image ID:      docker.io/library/nginx@sha256:124b44bfc9ccd1f3cedf4b592d4d1e8bddb78b51ec2ed5056c52d3692baebc19
    Port:         <none>
    Host Port:     <none>
    State:         Running
      Started:     Mon, 07 Apr 2025 12:22:20 +0000
    Ready:         True
    Restart Count: 0
    Environment:   <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-kz087 (ro)
```

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Normal Started 54s kubelet Started container pod1
controlplane:~$ kubectl run pod2 --image=nginx2
pod/pod2 created
controlplane:~$ kubectl get pod
NAME READY STATUS RESTARTS AGE
pod1 1/1 Running 0 2m22s
pod2 0/1 ContainerCreating 0 5s
controlplane:~$ kubectl get pod
NAME READY STATUS RESTARTS AGE
pod1 1/1 Running 0 2m27s
pod2 0/1 ErrImagePull 0 10s
controlplane:~$ kubectl get pod
NAME READY STATUS RESTARTS AGE
pod1 1/1 Running 0 2m29s
pod2 0/1 ErrImagePull 0 12s
controlplane:~$ kubectl get pod
NAME READY STATUS RESTARTS AGE
pod1 1/1 Running 0 2m35s
pod2 0/1 ErrImagePull 0 18s
controlplane:~$ kubectl describe pod pod2
Name: pod2
Namespace: default
Priority: 0
Service Account: default
Node: node01/172.30.2.2
Start Time: Mon, 07 Apr 2025 12:24:30 +0000
Labels: run=pod2
Annotations: cni.projectcalico.org/containerID: 679793231ad0ca3e511a6e622e9c8844757dc681e3cca00457e6347a96f2d8e6
cni.projectcalico.org/podIP: 192.168.1.5/32
cni.projectcalico.org/podIPs: 192.168.1.5/32
Status: Pending
IP: 192.168.1.5
IPs: 192.168.1.5

```

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controlplane:~$ ^C
controlplane:~$ kubectl get pod
NAME READY STATUS RESTARTS AGE
nginx 1/1 Running 0 34m
nginx1 1/1 Running 0 31m
nginx4 1/2 CrashLoopBackOff 6 (4m47s ago) 10m
pod1 1/1 Running 0 45m
pod2 1/1 Running 0 43m
controlplane:~$ kubectl delete pod nginx
pod "nginx" deleted
controlplane:~$ kubectl get pod
NAME READY STATUS RESTARTS AGE
nginx1 1/1 Running 0 33m
nginx4 1/2 CrashLoopBackOff 7 (60s ago) 11m
pod1 1/1 Running 0 47m
pod2 1/1 Running 0 44m
controlplane:~$ kubectl exec -it nginx1 -- /bin/bash
error: unknown flag: -- /bin/bash
See 'kubectl exec --help' for usage.
controlplane:~$ kubectl exec -it nginx1 -- /bin/bash
root@nginx1:/#

```

Created a pod with two containers.

```
controlplane:~$ kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
myapp-pod     2/2     Running   0           16m
nginx         1/1     Running   0           12s
controlplane:~$ vi pod2.yaml
controlplane:~$ kubectl apply -f pod2.yaml
The Pod "nginx" is invalid: spec.containers: Forbidden: pod updates may not add or remove containers
controlplane:~$ vi pod2.yaml
controlplane:~$ kubectl apply -f pod2.yaml
The Pod "pod_2_con" is invalid: metadata.name: Invalid value: "pod_2_con": a lowercase RFC 1123 subdomain must consist of lower case alphanumeric characters, '-' or '.', and must start and end with an alphanumeric character (e.g. 'example.com', regex used for validation is '[a-z0-9]([-a-z0-9]*[a-z0-9])?(\.[-a-z0-9]*[a-z0-9])?')
controlplane:~$ vi pod2.yaml
controlplane:~$ kubectl apply -f pod2.yaml
pod/pod2con created
controlplane:~$ kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
myapp-pod     2/2     Running   0           22m
nginx         1/1     Running   0           6m24s
pod2con       2/2     Running   0           29s
controlplane:~$ cat pod2.yaml
apiVersion: v1
kind: Pod
metadata:
  name: pod2con
spec:
  containers:
  - name: nginx
    image: nginx:1.14.2
    ports:
    - containerPort: 80
  - name: busybox
    image: busybox
    command: ["/bin/sh", "-ec", "sleep 1000"]
controlplane:~$
```

Created a pod using custom Docker image from my Docker Hub

```
controlplane:~$ cat custom.yaml
apiVersion: v1
kind: Pod
metadata:
  name: custom1
spec:
  containers:
  - name: mycontainer
    image: sirisha1202/pythonimage1
    ports:
    - containerPort: 80
```

```

controlplane:~$ vi custom.yaml
controlplane:~$ kubectl apply -f custom.yaml
pod/custom1 created
controlplane:~$ kubectl get pods
NAME          READY   STATUS             RESTARTS   AGE
custom1       0/1     ContainerCreating   0           12s
myapp-pod     2/2     Running             0           31m
nginx         1/1     Running             0           15m
pod2con       2/2     Running             0           9m26s
controlplane:~$ kubectl get pods
NAME          READY   STATUS             RESTARTS   AGE
custom1       0/1     ContainerCreating   0           17s
myapp-pod     2/2     Running             0           31m
nginx         1/1     Running             0           15m
pod2con       2/2     Running             0           9m31s
controlplane:~$ kubectl get pods
NAME          READY   STATUS             RESTARTS   AGE
custom1       1/1     Running             0           19s
myapp-pod     2/2     Running             0           31m
nginx         1/1     Running             0           15m
pod2con       2/2     Running             0           9m33s
controlplane:~$ kubectl describe pod custom1
Name:         custom1
Namespace:    default
ContainersReady:    True
PodScheduled:       True
Volumes:
  kube-api-access-qs5bd:
    Type:              Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds: 3607
    ConfigMapName:      kube-root-ca.crt
    ConfigMapOptional:  <nil>
    DownwardAPI:        true
OS Class:            BestEffort
Node-Selectors:
  <none>
Tolerations:
  node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
  node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type    Reason            Age   From          Message
  ----    -
  Normal  Scheduled         40s   default-scheduler  Successfully assigned default/custom1 to node01
  Normal  Pulling           39s   kubelet        Pulling image "sirisha1202/pythonimage1"
  Normal  Pulled            22s   kubelet        Successfully pulled image "sirisha1202/pythonimage1" in 17.419s (17.419s including waiting). Image
  size: 51156532 bytes.
  Normal  Created           22s   kubelet        Created container: mycontainer
  Normal  Started           22s   kubelet        Started container mycontainer

```