```
controlplane ~ ➜ kubectl get nodes
NAME           STATUS   ROLES                  AGE   VERSION
controlplane   Ready    control-plane,master   11m   v1.26.0+k3s1
```

How many nodes are part of the cluster? 1

What is the flavor and version of Operating System on which the Kubernetes nodes are running? Alpine linux

kubectl describe nodes

```
Boot ID:                    5839e350-384e-41c0-9558-8
Kernel Version:             5.4.0-1102-gcp
OS Image:                   Alpine Linux v3.16
Operating System:           linux
Architecture:               amd64
Container Runtime Version:  containerd://1.6.12-k3s1
Kubelet Version:            v1.26.0+k3s1
```

PODS :
Deploy pod in minikube cluster :
Pod – most basic and smallest unit in Kubernetes .
In kubectl describe command – we can see whole details of pod .
Event shows whole event occurred while running the pod .

Kubectl get pods -o wide : It will show details like internal ip , nodes .

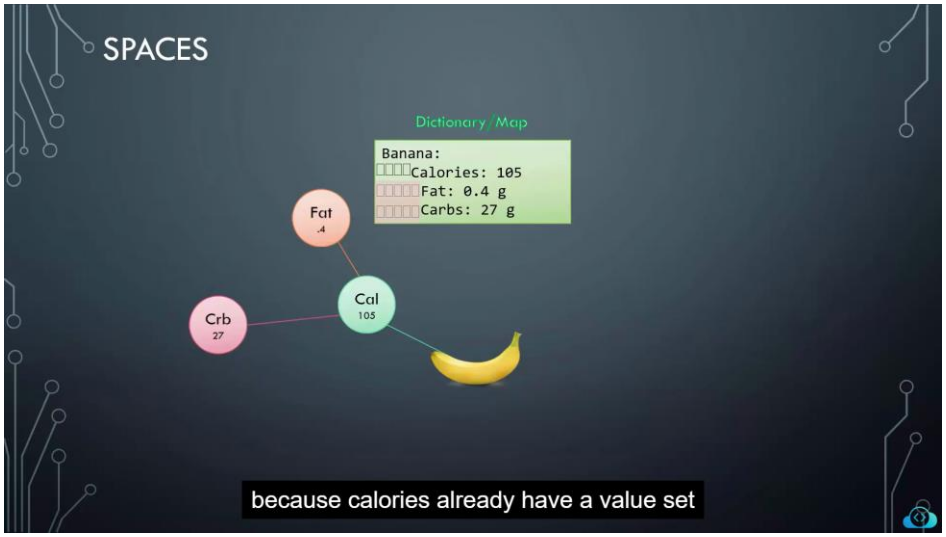
To create a pod from the command line, use the command:
Create an NGINX Pod

kubectl run nginx --image=nginx

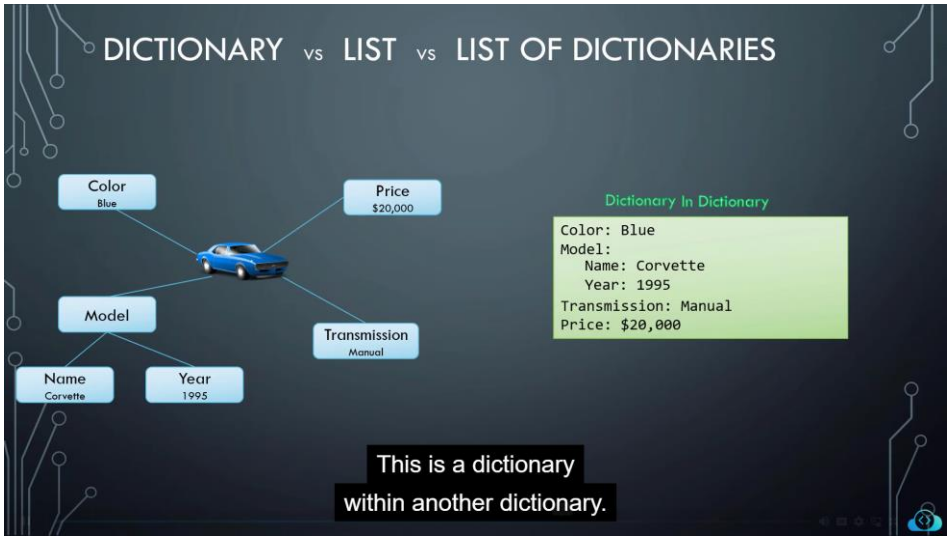
As of version 1.18, kubectl run (without any arguments such as --generator) will create a pod instead of a deployment.
To create a deployment using imperative command, use kubectl create:

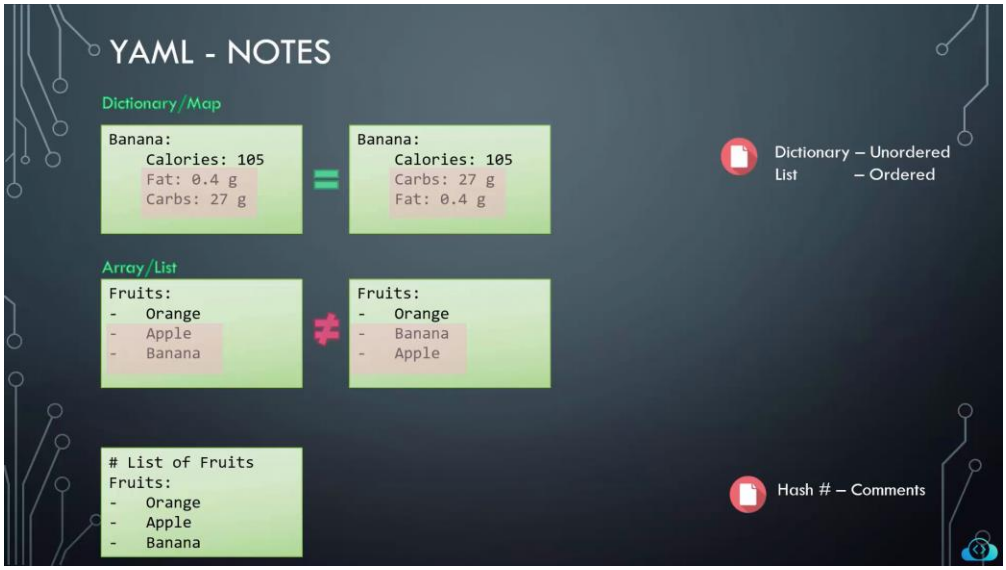
kubectl create deployment nginx --image=nginx

YAML :



This is incorrect .





Create sample YAML files .
Given a dictionary with the property property1 and value value1
Add an additional property property2 and value value2.

SOL:
property1: value1
property2: value2

Given a dictionary with the property name and value apple. Add additional properties to the dictionary.

Key/Property	**Value**
name	apple
color	red
weight	90g

SOL:
name: apple
color: red
weight: 90g

Dictionary in Dictionary><
A dictionary employee is given. Add the remaining properties to it using information from the table below.

Key/Property	**Value**
name	john
gender	male
age	24

SOL:
employee:
  name: john
  gender: male
  age: 24

Dictionary in Dictionary in Dictionary><

Now try adding the address information. Note the address is a dictionary

Key/Property	Value
name	john
gender	male
age	24
address	<table><tr><th>Key/Property</th><th>Value</th></tr><tr><td>city</td><td>edison</td></tr><tr><td>state</td><td>new jersey</td></tr><tr><td>country</td><td>united states</td></tr></table>

SOL:

```
employee:
   name: john
   gender: male
   age: 24
   address:
      city: edison
      state: new jersey
      country: united states
```

Given an array of apples. Add a new apple to the list to make it a total of 4.

SOL:
- apple
- apple
- apple
- apple

Add two more to make it 6.
SOL :
- apple
- apple
- apple
- apple
- apple
- apple

Add two 'mango'es to the list.

SOL:
- apple
- apple
- apple
- apple
- apple
- mango
- mango

We would like to add additional details for each item, such as color, weight etc. We have updated the first one for you. Similarly modify the remaining items to match the below data.

Fruit	Color	Weight
apple	red	100g
apple	red	90g
mango	yellow	150g

```
-
  name: apple
  color: red
  weight: 100g
-
  name: apple
  color: red
  weight: 90g
-
  name: mango
  color: yellow
  weight: 150g
```

We would like to record information about multiple employees. Convert the dictionary employee to an array employees.

DICT :

```
employee:
  name: john
  gender: male
  age: 24
```

ARRAY :

```
employees:
  -
    name: john
    gender: male
    age: 24
```

Add an additional employee to the list using the below information.

Key/Property	Value
name	sarah
gender	female
age	28

SOL :

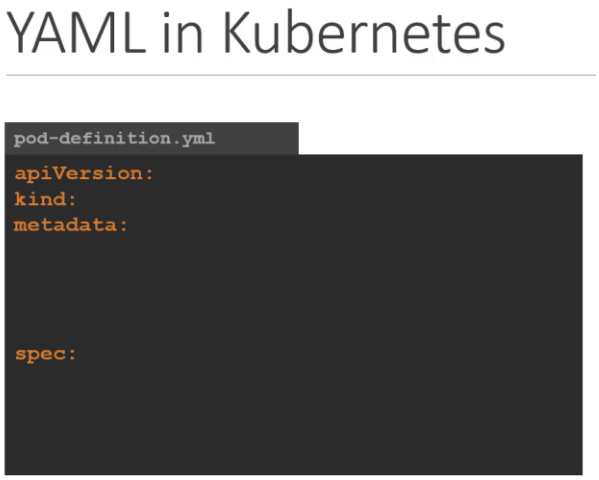
```
employees:
  -
    name: john
    gender: male
    age: 24
  -
    name: sarah
    gender: female
    age: 28
```

Now try adding the pay information. Remember while address is a dictionary, payslips is an array of month and amount

Key/Property	Value
name	john
gender	male
age	24
address	...
payslips	<table><tr><th>#</th><th>month</th><th>amount</th></tr><tr><td>1</td><td>june</td><td>1400</td></tr><tr><td>2</td><td>july</td><td>2400</td></tr><tr><td>3</td><td>august</td><td>3400</td></tr></table>

```
employee:
  name: john
  gender: male
  age: 24
  address:
    city: edison
    state: 'new jersey'
    country: 'united states'
  payslip:
    -
      month: june
      amount: 1400
    -
      month: july
      amount: 2400
    -
      month: august
      amount: 3400
```

YAML IN PODS :



Top level or root level parameters in kuberneets manifest . It is rpesent in all manifests files .
Metadata is data about aboject – eg its name , label etc

pod-definition.yml

```yaml
apiVersion: v1
kind: Pod
metadata:
  name: myapp-pod
  labels:
      app: myapp
      type: front-end
spec:
```

Kind	Version
POD	v1
Service	v1
ReplicaSet	apps/v1
Deployment	apps/v1

We will define more information based on kind in spec field .

kubectl create -f pod-definition-file.yml - to create Kubernetes pod .

```
> kubectl get pods
NAME            READY     STATUS    RESTARTS   AGE
myapp-pod       1/1       Running   0          20s
```

```
> kubectl describe pod myapp-pod
Name:         myapp-pod
Namespace:    default
Node:         minikube/192.168.99.100
Start Time:   Sat, 03 Mar 2018 14:26:14 +0800
Labels:       app=myapp
              name=myapp-pod
Annotations:  <none>
Status:       Running
IP:           172.17.0.24
Containers:
  nginx:
    Container ID:   docker://830bb56c8c42a86b4bb70e9c1488fae1bc38663e4918b6c2f5a783e7688b8c9d
    Image:          nginx
    Image ID:       docker-pullable://nginx@sha256:4771d09578c7c6a65299e110b3ee1c0a2592f5ea2618d2
    Port:           <none>
    State:          Running
      Started:      Sat, 03 Mar 2018 14:26:21 +0800
    Ready:          True
    Restart Count:  0
    Environment:    <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from default-token-x95w7 (ro)
Conditions:
  Type           Status
  Initialized    True
  Ready          True
  PodScheduled   True
```

Create pod using yaml definition file .
Create yaml file with pod specifications in it .

```
admin@ubuntu-server kubernetes-for-beginners # cat pod.yaml
apiVersion: v1
kind: Pod
metadata:
  name: nginx
  labels:
    app: nginx
    tier: frontend
spec:
  containers:
  - name: nginx
    image: nginx
```

Kubectl create and apply command works the same .

```
admin@ubuntu-server kubernetes-for-beginners # kubectl apply -f pod.yaml
pod/nginx created
admin@ubuntu-server kubernetes-for-beginners #
admin@ubuntu-server kubernetes-for-beginners #
admin@ubuntu-server kubernetes-for-beginners # kubectl get pods
NAME    READY   STATUS              RESTARTS   AGE
nginx   0/1     ContainerCreating   0          7s
admin@ubuntu-server kubernetes-for-beginners #
admin@ubuntu-server kubernetes-for-beginners #
admin@ubuntu-server kubernetes-for-beginners # kubectl get pods
NAME    READY   STATUS    RESTARTS   AGE
nginx   1/1     Running   0          9s
```

Kubectl describe to get additional information of pods .

```
controlplane ~ ➜ kubectl get pods
No resources found in default namespace.

controlplane ~ ➜ kubectl get pod
No resources found in default namespace.
```

How many pods exist on the system? 0

Create a new pod with the nginx image. -

```
controlplane ~ ✖ kubectl run nginx --image=nginx
pod/nginx created
```

How many pods are created now? 4

```
controlplane ~ ✖ kubectl get pods
NAME             READY   STATUS    RESTARTS   AGE
nginx            1/1     Running   0          73s
newpods-mvgd4    1/1     Running   0          17s
newpods-4959p    1/1     Running   0          17s
newpods-zqz2v    1/1     Running   0          17s
```

What is the image used to create the new pods? Busybox

```
controlplane ~ ➜ kubectl describe pod newpods-mvgd4
Name:             newpods-mvgd4
Namespace:        default
Priority:         0
Service Account:  default
Node:             controlplane/172.25.0.65
Start Time:       Sun, 02 Apr 2023 14:45:52 +0000
Labels:           tier=busybox
Annotations:      <none>
Status:           Running
IP:               10.42.0.11
IPs:
  IP:           10.42.0.11
Controlled By:  ReplicaSet/newpods
Containers:
  busybox:
    Container ID:  containerd://6f99526d7ec0e0f3a23bb0
    Image:         busybox
```

Which nodes are these pods placed on? controlplane

```
controlplane ~ ➜ kubectl describe pod nginx
Name:             nginx
Namespace:        default
Priority:         0
Service Account:  default
Node:             controlplane/172.25.0.65
```

How many containers are part of the pod webapp? 2

```
controlplane ~ ➜ kubectl get pods
NAME             READY   STATUS         RESTARTS   AGE
nginx            1/1     Running        0          5m16s
newpods-mvgd4    1/1     Running        0          4m20s
newpods-4959p    1/1     Running        0          4m20s
newpods-zqz2v    1/1     Running        0          4m20s
webapp           1/2     ErrImagePull   0          35s
```

What images are used in the new webapp pod? Nginx & agentx

```
controlplane ~ ➜ kubectl describe pod webapp
Name:             webapp
Namespace:        default
Priority:         0
Service Account:  default
Node:             controlplane/172.25.0.65
Start Time:       Sun, 02 Apr 2023 14:49:37 +0000
Labels:           <none>
Annotations:      <none>
Status:           Pending
IP:               10.42.0.13
IPs:
  IP:  10.42.0.13
Containers:
  nginx:
    Container ID:   containerd://71d9a36f2e0950b521
    Image:          nginx
    Image ID:       docker.io/library/nginx@sha256:
    Port:           <none>
    Host Port:      <none>
    State:          Running
      Started:      Sun, 02 Apr 2023 14:49:38 +0000
    Ready:          True
    Restart Count:  0
    Environment:    <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount
  agentx:
    Container ID:
    Image:          agentx
    Image ID:
    Port:           <none>
    Host Port:      <none>
    State:          Waiting
      Reason:       ImagePullBackOff
    Ready:          False
    Restart Count:  0
```

What is the state of the container agentx in the pod webapp? Error or waiting

```
Events:
  Type     Reason     Age                  From               Message
  ----     ------     ----                 ----               -------
  Normal   Scheduled  2m32s                default-scheduler  Successfully assigned default/webapp to controlplane
  Normal   Pulling    2m32s                kubelet            Pulling image "nginx"
  Normal   Pulled     2m31s                kubelet            Successfully pulled image "nginx" in 450.339419ms (45
  Normal   Created    2m31s                kubelet            Created container nginx
  Normal   Started    2m31s                kubelet            Started container nginx
  Normal   Pulling    107s (x3 over 2m31s)  kubelet            Pulling image "agentx"
  Warning  Failed     107s (x3 over 2m30s)  kubelet            Failed to pull image "agentx": rpc error: code = Unkn
ibrary/agentx:latest": failed to resolve reference "docker.io/library/agentx:latest": pull access denied, repository
ssage: insufficient_scope: authorization failed
  Warning  Failed     107s (x3 over 2m30s)  kubelet            Error: ErrImagePull
  Normal   BackOff    69s (x6 over 2m30s)   kubelet            Back-off pulling image "agentx"
  Warning  Failed     69s (x6 over 2m30s)   kubelet            Error: ImagePullBackOff
```

Why do you think the container agentx in pod webapp is in error? Docker image doesn't exist

```
Events:
  Type     Reason     Age                  From               Message
  ----     ------     ----                 ----               -------
  Normal   Scheduled  2m32s                default-scheduler  Successfully assigned default/webapp to controlplane
  Normal   Pulling    2m32s                kubelet            Pulling image "nginx"
  Normal   Pulled     2m31s                kubelet            Successfully pulled image "nginx" in 450.339419ms (450.358939ms including waiting)
  Normal   Created    2m31s                kubelet            Created container nginx
  Normal   Started    2m31s                kubelet            Started container nginx
  Normal   Pulling    107s (x3 over 2m31s)  kubelet            Pulling image "agentx"
  Warning  Failed     107s (x3 over 2m30s)  kubelet            Failed to pull image "agentx": rpc error: code = Unknown desc = failed to pull and
ibrary/agentx:latest": failed to resolve reference "docker.io/library/agentx:latest": pull access denied, repository does not exist or may require
ssage: insufficient_scope: authorization failed
  Warning  Failed     107s (x3 over 2m30s)  kubelet            Error: ErrImagePull
  Normal   BackOff    69s (x6 over 2m30s)   kubelet            Back-off pulling image "agentx"
  Warning  Failed     69s (x6 over 2m30s)   kubelet            Error: ImagePullBackOff
```

What does the READY column in the output of the kubectl get pods command indicate?
Running container / total container in pod

Delete the webapp Pod.

```
controlplane ~ ➜ kubectl delete pod webapp
pod "webapp" deleted
```

Create a new pod with the name redis and with the image redis123.
Use a pod-definition YAML file. And yes the image name is wrong!

```
controlplane ~ ➜ cat pod.yaml
apiVersion: v1
kind: Pod
metadata:
  name: redis
spec:
  containers:
  - name: redis
    image: redis123
```

```
controlplane ~ ➜ kubectl apply -f pod.yaml
pod/redis created
```

```
controlplane ~ ✖ kubectl get pods
NAME            READY   STATUS             RESTARTS   AGE
nginx           1/1     Running            0          16m
newpods-mvgd4   1/1     Running            0          16m
newpods-4959p   1/1     Running            0          16m
newpods-zqz2v   1/1     Running            0          16m
redis           0/1     ImagePullBackOff   0          110s
```

OR

```
controlplane ~ ➜ kubectl run redis --image=redis123 --dry-run=client -o yaml > redis.yaml
```

```
controlplane ~ ➜ cat redis.yaml
apiVersion: v1
kind: Pod
metadata:
  creationTimestamp: null
  labels:
    run: redis
  name: redis
spec:
  containers:
  - image: redis123
    name: redis
    resources: {}
  dnsPolicy: ClusterFirst
  restartPolicy: Always
status: {}
```

Now change the image on this pod to redis.

```
controlplane ~ ➜ kubectl edit pod redis
pod/redis edited
```

Update the file

```
controlplane ~ ➜ cat pod.yaml
apiVersion: v1
kind: Pod
metadata:
  name: redis
spec:
  containers:
  - name: redis
    image: redis
```

```
controlplane ~ ➜ kubectl apply -f pod.yaml
pod/redis configured
```