

# Labels, Selectors, ReplicationController and replicaset in Kubernetes

**object Labels and Selectors**

- Labels are the mechanism you use to Organise Kubernetes Objects.
- A Label is a key-value pair without any predefined meaning that can be attached to the objects. **Name: bhupinder Class: pods**
- Labels are similar to tags in AWS or git where you use a name to quick reference.
- So you are free to choose labels as you need it to refer an environment which is used for dev or Testing or Production, refer a product group like Department A, Department B.

→ Multiple labels can be added to a single object.

```
vi pod5.yml
kind: Pod
apiVersion: v1
metadata:
  name: delhipod
  labels:
    env: developments
    class: pods
spec:
  containers:
    - name: c00
      image: ubuntu
      command: ["/bin/bash", "-c", "while true; do echo Hello-bhupinder; sleep 5; done"]
```

→ Kubectl apply -f pod5.yml  
→ Kubectl get pods --show-labels

- Label ek key value pair hota hai, hum jaldi sein kisi cheej kar dhudh kar lane ke liye label lagate hai.
- Hum ek object par ek sein jada label laga sakte hai.
- Label agar humko define karna hota hai toh usko hum apne yml file mein andar metadata mein andar define karte hai.

## ➔ nano pod5.yml

```
kind: Pod
```

```
apiVersion: v1
```

```
metadata:
```

```
  name: delhipod
```

```
  labels:
```

```
    satyamkey: tripathivalue
```

```
    haryana: gurgaon
```

```
spec:
```

```
  containers:
```

```
    - name: c00
```

```
      image: ubuntu
```

```
      command: ["/bin/bash", "-c", "while true; do echo Hello-Gurgaon, how are you; sleep 5 ; done"]
```

```
root@ip-172-31-44-30:~/home/ubuntu
GNU nano 4.8
kind: Pod
apiVersion: v1
metadata:
  name: delhipod
  labels:
    satyamkey: tripathivalue
    haryana: gurgaon
spec:
  containers:
    - name: c00
      image: ubuntu
      command: ["/bin/bash", "-c", "while true; do echo Hello-Gurgaon, how are you; sleep 5 ; done"]
```

#### → **kubectl apply -f pod5.yml**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl apply -f pod5.yml
pod/delhipod created
root@ip-172-31-44-30:/home/ubuntu#
```

#### → **kubectl get pods**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods
NAME      READY   STATUS    RESTARTS   AGE
delhipod  1/1     Running   0          96s
root@ip-172-31-44-30:/home/ubuntu#
```

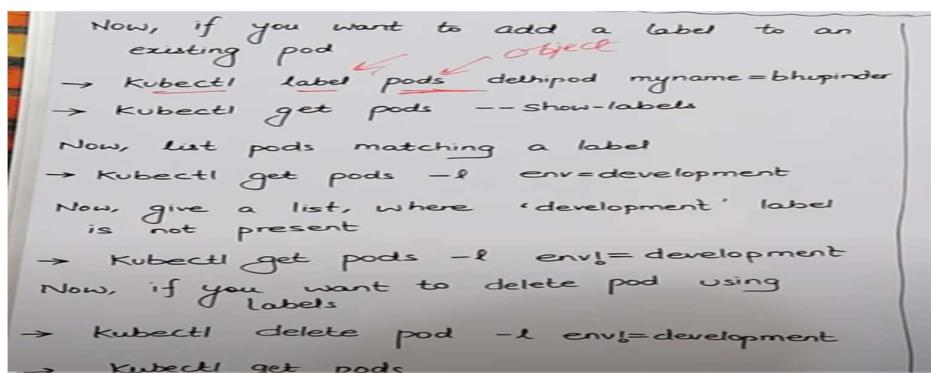
#### → **kubectl get pods -o wide**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods -o wide
NAME      READY   STATUS    RESTARTS   AGE      IP           NODE      NOMINATED NODE   READINESS GATES
delhipod  1/1     Running   0          3m10s   172.17.0.3   ip-172-31-44-30   <none>    <none>
root@ip-172-31-44-30:/home/ubuntu#
```

#### → **kubectl get pods --show-labels**

Agar mujhe check karna ho ki kis pod par kaun sa label laga huva hai toh uske liye hum ye command use karenge.

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods --show-labels
NAME      READY   STATUS    RESTARTS   AGE      LABELS
delhipod  1/1     Running   0          4m35s   haryana=gurgaon,satyamkey=tripathivalue
root@ip-172-31-44-30:/home/ubuntu#
```



#### → **kubectl label pods delhipod myname=satyam**

- Agar mujhe koi running par koi label define karna ho toh uske liye hum ye command use karenge.
- Mene kubectl mein baad label likha hai phir uske baad pod aur phir pod ka name matlab kehane ka ki mene kubelet mein baad bata diya hai ki label lagao pod mein andar jaakar aur **delhipod** naam ka jo pod hai uspar **label laga do**, aur phir mene define kiya **key value myname** meri **key** hai aur **satyam** mera **value** hai.

```
root@ip-172-31-44-30:/home/ubuntu# kubectl label pods delhipod myname=satyam
pod/delhipod labeled
root@ip-172-31-44-30:/home/ubuntu#
```

#### → **kubectl get pods --show-labels**

- Ab mere pod mein andar mene jitane label define kiye honge sab dikh jayega iss command mein, aur mujhe 3 label dikhenge is pod mein, jisme mein 2 mene apana yml file mein andar define kar rakha hai aur ek label mene apana previously command mein bataya hai .myname = Satyam .

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods --show-labels
NAME      READY   STATUS    RESTARTS   AGE      LABELS
delhipod  1/1     Running   0          14m     haryana=gurgaon,myname=satyam,satyamkey=tripathivalue
root@ip-172-31-44-30:/home/ubuntu#
```

#### → **kubectl get pods -l haryana=gurgaon**

- agar mere pass bahut saree pod bane huve hai aur mujhe label daal kar pata karna hai ki vo label kaun sein pod mein pada hai toh uske liye hum ye command use Karenge,
- -l iska matlab label hai aur phir haryana mene ekey di hai aur Gurgaon value.
- Mene label kein andar **selector** ko bhi laga rakha hai, matlab haryana kein baad jo (=) lagaya hai us (=) **yaha selector ka kaam kar raha hai** matlab haryana kein andar jaha-jaha Gurgaon define huva hogा kewal vahi value yaha par show hogi, but aisa bhi ho sakta hai ki hum ye chahate hai aise pod humko batao jisme haryana ki value Gurgaon na batayi gayi ho, toh uske liye hum jo command use karenge vo neechे likhi hai.

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods -l haryana=gurgaon
NAME      READY   STATUS    RESTARTS   AGE
delhipod  1/1     Running   0          18m
root@ip-172-31-44-30:/home/ubuntu#
```

#### → **kubectl get pods -l haryana!=gurgaon**

- mene yaha ! laga rakha hai matlab define kar rakha hai ki mujhe vahi pod dikhana jaha par haryana ki value Gurgaon na ho .
- aba mere pass present mein kewal eak hi pod hai isliye vo show nahi kar raha multiple pod hota toh show kar deta.

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods -l haryana!=gurgaon
No resources found in default namespace.
root@ip-172-31-44-30:/home/ubuntu#
```

#### → **kubectl delete pod -l haryana=Gurgaon**

- agar mujhe apne pod ko label ki help sein delete karna ho toh hum ye command use karenge,
- jaha jaha haryana ki value Gurgaon hogi vo sab pod yein delete kar dega..

```
root@ip-172-31-44-30:/home/ubuntu# kubectl delete pods -l haryana=gurgaon
pod "delhipod" deleted
root@ip-172-31-44-30:/home/ubuntu#
```

#### → **kubectl delete pod -l haryana!=Gurgaon**

- jis bhi label mein haryana ki value Gurgaon hogi usko chodh kar baki sab pod ko ye command delete kar dega jiski key haryana define hui hogi
- present mein mere pass koi bhi pod nahi hai isliye

```
root@ip-172-31-44-30:/home/ubuntu# kubectl delete pods -l haryana!=gurgaon
No resources found
root@ip-172-31-44-30:/home/ubuntu#
```

## Labels - Selectors

- Unlike name/UIDs, labels do not provide uniqueness, as in general, we can expect many objects to carry the same label.
- Once labels are attached to an object, we would need filters to narrow down and these are called as label Selectors.
- The API currently supports two types of Selectors - Equality based and Set based.
- A Label Selector can be made of multiple requirements which are comma-separated

Equality Based : ( $=$ ,  $\neq$ )

name: bhupinder

Class: nodes

project: development

Set based : (in,notin and exists)

env in (production, dev)

env notin (team1, team2)

→ Kubernetes also supports set-based Selectors i.e. match multiple values

→ kubectl get pods -l 'env in (development, testing)'

→ kubectl get pods -l 'env notin (development, testing)'

→ kubectl get pods -l class=pods,  
myname=bhu

- labels ki koi bhi unique id aur unique name nahi hota,
- hum same tarah ka label multiple pod mein laga sakte hai mlabels ka koi unique id nahi hai ki agar ek pod mein laga diya toh dusare mein nahi laga sakte, humari ichaa hum kitane bhi pod kein andar label laga sakte hai,
- label ki help sein hum grouping kar sakte hai **for.ex.**, agar mujhe check karna ho ki Gurgaon haryana kein naam sein jitane bhi pod mein mene label lagaya h sab aajaye toh isase faydaa hai humko ki jitane pod kein andar hum Gurgaon haryana kein naam sein label laga rakhe honge vo sab dikh jayenge yaha.

## Selector :-

- hum label kein beech mein jo sign define karte hai usko hum kehate hai selector
- e.x haryana = gurgaon , isme = highlight jo kiya hai vo selector hai.
- e.x haryana != gurgaon, isme != selector hai matlab ki not equal to ki haryana ki value jaha Gurgaon na ho vo batao.

For example:- create a pod

```
root@ip-172-31-44-30:/home/ubuntu# kubectl apply -f pod5.yml | pod/delhipod created
root@ip-172-31-44-30:/home/ubuntu#
```

### Equality based selector :-

- name=satyam
- profile=software

### Not equality based selector:-

- name!=satyam
- profile!=software

### Set based selector:- (in, notin, exists)

#### ➤ kubectl get pods -l 'haryana in (gurgaon,tripathivalue)'

matlab jaha-jaha name ki value satyam aur shivam de rakhi hai vo sab label mujhe dikha do.

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods -l 'haryana in (gurgaon,tripathivalue)'
NAME      READY   STATUS    RESTARTS   AGE
delhipod  1/1     Running   0          3m44s
root@ip-172-31-44-30:/home/ubuntu#
```

#### ➤ kubectl get pods -l 'haryana notin (gurgaon,tripathivalue)'

name key kein andar jo bhi satyam aur shivam naam sein value de rakhi hai un sabko chodhkar bakii sab label idhar dikha do .

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods -l 'haryana notin (gurgaon,tripathivalue)'
No resources found in default namespace.
root@ip-172-31-44-30:/home/ubuntu#
```

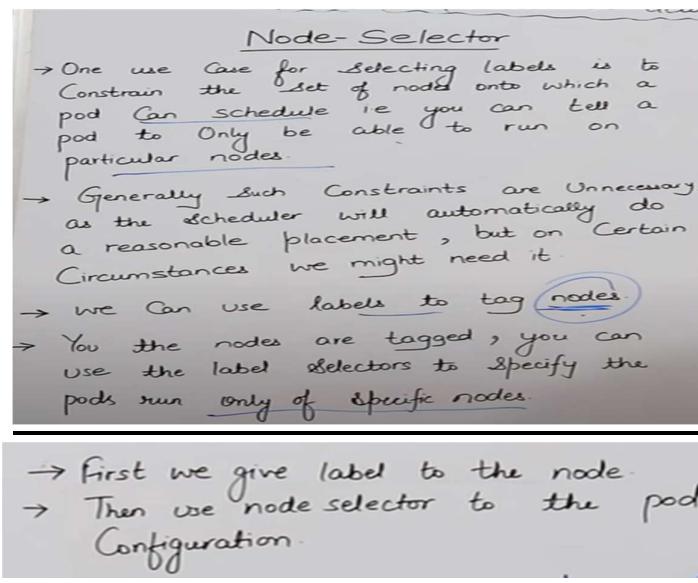
#### ➤ kubectl get pods -l haryana=gurgaon,satyamkey=tripathivalue

mene yaha 2 label lagaya hai agar mujhe eak sath multiple label laga kar check karne hai toh hum ye command use karenge.

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods -l haryana=gurgaon,satyamkey=tripathivalue
NAME      READY   STATUS    RESTARTS   AGE
delhipod  1/1     Running   0          9m9s
root@ip-172-31-44-30:/home/ubuntu#
```

=====

## Node Selector



## NODE SELECTOR EXAMPLE

```
kind: Pod
apiVersion: v1
metadata:
  name: nodelabels
  labels:
    env: development
spec:
  containers:
    - name: c00
      image: ubuntu
      command: ["/bin/bash", "-c", "while true; do echo Hello-Bhupinder; sleep 5 ; done"]
  nodeSelector:
    hardware: t2-medium

```

root@ip-172-31-44-30: /home/ubuntu  
GNU nano 4.8

```
kind: Pod
apiVersion: v1
metadata:
  name: nodelabels
  labels:
    env: development
spec:
  containers:
    - name: c00
      image: ubuntu
      command: ["/bin/bash", "-c", "while true; do echo Hello-Bhupinder; sleep 5 ; done"]
  nodeSelector:
    hardware: t2-medium
```

pod6.yml

- node selector ka kaam hota hum jis node mein chahe us node mei pod bana sakte hai.
- agar mere pass 4 node bane pade hai A,B,C,D kein naam sein mein chahata hum mera pod mere B node mein jaakar bane toh hum vo bhi kar sakte hai hum b node mein andar jaakar koi label dedenge aur phir vahi label command mein dalunga ki mera pod is label par jaakar ban jaye jaha bhi iss name ka label bana pada hai.
- agar in the case humare pass B naam sein 4 node hai aur mein naya pod banana chahata hu node mein andar toh us case mein kubernetes ko jisme jagah samjh aayegi vo automatically us node mein jaakar pod create kar dega.

- Hum node mein label lagayege aur phir vahi label mein pod banante samay laga dunga ki isi label vale node par jaakar tum pod banao toh vo jaakar vaha bana dega .

### → kubectl get pods

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods
NAME        READY   STATUS    RESTARTS   AGE
delhipod    1/1     Running   0          167m
nodelabels  0/1     Pending   0          2m1s
root@ip-172-31-44-30:/home/ubuntu#
```

- Isme pending isliye aa raha kyuki mene yml mein andar **node selector** mein andar **hardware** define kiya hai ki , ki jo bhi node mein andar **t2-medium** name sein **label** define huva hai uspar jaakar mera yein pod create kar do but actually mein mere pass koi bhi **t2-medium** label kisi bhi **node par nahi laga hai** iski wajah sein mera pod ban hi nahi paya.

### → kubectl describe pod nodelabels

hum dekh sakte hai node selectors mein andar **hardware = t2-medium** diya hai label aur present mein humare node mein andar mene **t2-medium** label nah lagaya hai .

```
root@ip-172-31-44-30:/home/ubuntu#
root@ip-172-31-44-30:/home/ubuntu# kubectl describe pod nodelabels
Name:           nodelabels
Namespace:      default
Priority:       0
Node:           <none>
Labels:          env=development
Annotations:    <none>
Status:         Pending
IP:
IPs:            <none>
Containers:
  c00:
    Image:      ubuntu
    Port:        <none>
    Host Port:  <none>
    Command:
      /bin/bash
      -c
      while true; do echo Hello-Bhupinder; sleep 5 ; done
    Environment: <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-9t1sv (ro)
Conditions:
  Type        Status
  PodScheduled  False
Volumes:
  kube-api-access-9t1sv:
    Type:      Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds: 3607
    ConfigMapName:      kube-root-ca.crt
    ConfigMapOptional:  <nil>
    DownwardAPI:        true
    QoS Class:          BestEffort
  Node-Selectors:  hardware=t2-medium
  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
  ----      ----     --           --           --
  Warning   FailedScheduling 14s (x23 over 22m)  default-scheduler  0/1 nodes are available: 1 node(s) didn't match Pod's node affinity/selector.
root@ip-172-31-44-30:/home/ubuntu#
```

### → kubectl get nodes

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get nodes
NAME        STATUS   ROLES      AGE   VERSION
ip-172-31-44-30  Ready    control-plane,master  5h22m  v1.22.3
root@ip-172-31-44-30:/home/ubuntu#
```

→ **kubectl label nodes ip-172-31-44-30 hardware=t2-medium**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl label nodes ip-172-31-44-30 hardware=t2-medium
node/ip-172-31-44-30 labeled
root@ip-172-31-44-30:/home/ubuntu#
```

Ab mene apane node mein upar label laga diya jisase mera pod connect ho jaye jo mene yml script mein selector lagaya tha ab mera vo connect ho jayega . kyuki mene yml mein define kar rakha tha ki jisme hardware= t2-medium label laga ho usi node mein jaake mera pod banana toh ab iss command sein mene apane node mein andar label laga diya aur ab mera pod connect jayega .

→ **kubectl get pods**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods
NAME      READY   STATUS    RESTARTS   AGE
delhipod  1/1     Running   0          5h31m
nodelabels 1/1     Running   0          166m
root@ip-172-31-44-30:/home/ubuntu#
```

Hum dekh sakte hai ki mera pod ab unning mein aagaya matlab mera pod node mein connect hogaya.

→ **kubectl delete -f pod6.yml**

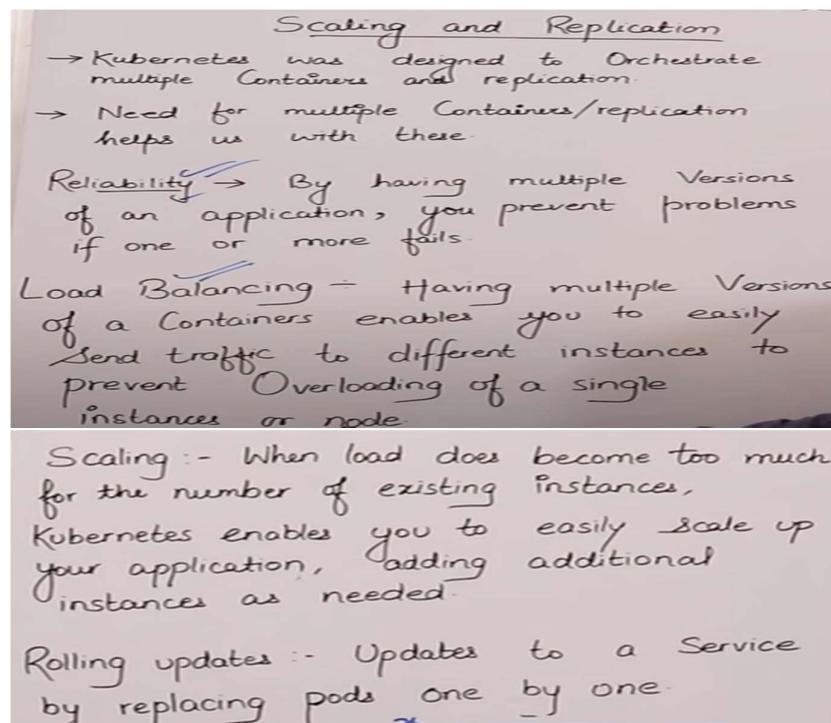
```
root@ip-172-31-44-30:/home/ubuntu# kubectl delete -f pod6.yml
pod "nodelabels" deleted
root@ip-172-31-44-30:/home/ubuntu#
```

---

## Scalling and replication

### Replica :-

- Replica hum kehate hai duplicate pod ko matlab agar humare pass koi pod hai aur hum chahate hai ki is pod ki ek duplicate copy bana kar rakhele toh us duplicate copy of pod ko hum replica kehate hai
- Agar mere pass kisi node mein 2 replica hai aur vo dono running zone mein hai aur in the case agar ek pod bhi fail hogaya toh humare user ko dikkat na ho isliye kubernetes mein **replica** naam ki cheej hoti hai, matlab jab humara koi ek pod fail hogaya toh us dauraan bhi humko service deni hogi user ko, jab tak dusara pod recreate nahi hojata isliye agar replica pod hai humare node mein toh vo user ko service dedega.



### Load -Balancing =

- Load balancing kein through hum apane container, pod aur instance sab cheijo ko ghaata badha sakte hai

## Replication Controller

- Pehle jab hum yml file pod banana dein liye likhate thee toh uske andar **kind : pod** likhate thee toh vo kewal pod create kar deta tha agar kisi bhi reason sein humara pod cancel ya fail hogaya toh vo dubara apane aap create nahi ho sakta , but agar hum **kind: replication controller** lagate hai , toh agar pod kisi bhi reason sein failed hota hai toh vo apane aap us pod ko new create kar dega , aur jo pod fail huva thaas uske andar jitane container thee aur data thaas vo sab naye pod mein andar apane aap aajayenge.
- Agar hum yml mein **kind:replication controller** likh rakhe hai toh agar humara pod fail bhi hota hai toh ek naya pod apane aap create kardega apane aap .
- Replication controller hardum recommend karta hai ki humara minimum **eak pod** hardum running condition mein ho, matlab **replica= 1** likhenge toh 1 replica matlab eak pod create hogya **replica= 2** likhenge toh 2 pod create hogya , jitana likheneg utani replica create hogi .

... in detail Part-2

### Replication Controller

Kind: ReplicationController → this defines to Create the object of Replication type  
apiVersion: v1  
metadata:  
name: myreplica

Spec:  
replicas: 2 → this element defines the desired number of pods  
Selector: → tells the Controller which pods to watch/belong to this rc  
myname: bhupinder → this must match the labels

template: → template element defines a template to launch a new pod

metadata:  
name: testpodG  
labels:  
myname: bhupinder → Selectors values need to match the labels values specified in the pod template

Spec:  
Containers:  
- name: COO  
image: Ubuntu  
Command: ["bin/bash", "-c", "while true; do echo hello-bhupinder; sleep 5; done"]

## REPLICATION CONTROLLER YML

```
kind: ReplicationController
apiVersion: v1
metadata:
  name: myreplica
spec:
  replicas: 2
  selector:
    myname: Satyam
  template:
    metadata:
      name: testpod6
    labels:
      myname: Satyam
  spec:
    containers:
      - name: c00
        image: ubuntu
        command: ["/bin/bash", "-c", "while true; do echo Hello-India; sleep 5 ; done"]
```

Kind: replication controller

➔ nano pod.yml

```
root@ip-172-31-44-30:/home/ubuntu
GNU nano 4.8                                     pod7.yml
kind: ReplicationController
apiVersion: v1
metadata:
  name: myreplica
spec:
  replicas: 2
  selector:
    myname: Satyam
  template:
    metadata:
      name: testpod6
    labels:
      myname: Satyam
  spec:
    containers:
      - name: c00
        image: ubuntu
        command: ["/bin/bash", "-c", "while true; do echo Hello-INDIA; sleep 5 ; done"]
```

→ replicas: 2

➤ Iska matlab mene 5 pod create kiya hai

→ selector:

myname: Satyam

iska matlab mene replica keen andar selector lagaya hai ki agar satyam naam sein related koi pod fail hota hai toh usko phir sein create kardo . aur mene myname:satyam eak label laga rakha hai .

template:

metadata:

name: testpod6

labels:

myname: Tripathi

➤ mene eak template bana rakha hai matlab ki jab mera pod fail ho toh is template keen hi basis par mera naya pod create kar do ,jaise mene 5 replica likha hai matlab mere 5 pod create kar do same template keen.

labels:

myname: Satyam

➤ mene jo name selector keen andar de rakha hai vahi name same mujhe apne label keen andar bhi dena hoga nahi toh error aayega ,aisa isliye kyu ki same label name millega tabhi aake vo naya pod create kar payega nahi toh nahi kar pyega.

→ kubectl apply -f pod7.yml

```
root@ip-172-31-44-30:/home/ubuntu# root@ip-172-31-44-30:/home/ubuntu# kubectl apply -f pod7.yml
replicationcontroller/myreplica created
root@ip-172-31-44-30:/home/ubuntu#
```

→ kubectl get rc

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get rc
NAME      DESIRED   CURRENT   READY   AGE
myreplica 2          2          2      6m40s
root@ip-172-31-44-30:/home/ubuntu#
```

mein dekh sakta hu mene apne yml file mein likha tha ki mujhe 2 replica chahiye toh isane 2 replica create kar di.

rc matlab replication controller ,matlab mein apna replica check karna chah raha

mene 2 desired state dalli thi aur vo dono sahi chal rahi hum dekh sakte ha image mein.

→ kubectl describe rc myreplica

```
c:\ Select root@ip-172-31-44-30: /home/ubuntu
root@ip-172-31-44-30:/home/ubuntu# kubectl describe rc myreplica
Name:           myreplica
Namespace:      default
Selector:       myname=Satyam
Labels:         myname=Satyam
Annotations:    <none>
Replicas:      2 current / 2 desired
Pods Status:   2 Running / 0 Waiting / 0 Succeeded / 0 Failed
Pod Template:
  Labels:  myname=Satyam
  Containers:
    c00:
      Image:  ubuntu
      Port:   <none>
      Host Port: <none>
      Command:
        /bin/bash
        -c
        while true; do echo Hello-INDIA; sleep 5 ; done
      Environment:  <none>
      Mounts:      <none>
      Volumes:     <none>
  Events:
    Type  Reason          Age   From            Message
    ----  ----          ----  --   --             -----
    Normal SuccessfulCreate 16m   replication-controller  Created pod: myreplica-nx8kr
    Normal SuccessfulCreate 16m   replication-controller  Created pod: myreplica-qw4m6
root@ip-172-31-44-30:/home/ubuntu#
```

Mene apne yml file mein andar jo naam diye hogा usko hi daal kar search karenge, toh aajayega , hum dekh sakte ha meri desired state aur running state same hai .

→ kubectl get pods

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
delhipod      1/1     Running   0          27h
myreplica-nx8kr  1/1     Running   0          31m
myreplica-qw4m6  1/1     Running   0          31m
root@ip-172-31-44-30:/home/ubuntu#
```

→ kubectl delete pod myreplica-nx8kr

agar mein apna eak pod delete kar raha toh mein ye command use karunga, but pod delete jaise hoga turant eak naya pod apne aap create kar dega , yahi replica ka fayada hota hai ki agar pod fail hogya toh apne aap create kar dega naya pod

aur ab jo naya pod create huva hai uska name or ip dono change hai.

```
root@ip-172-31-44-30:/home/ubuntu# kubectl delete pod myreplica-nx8kr
pod "myreplica-nx8kr" deleted
root@ip-172-31-44-30:/home/ubuntu#
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
delhipod      1/1     Running   0          27h
myreplica-q512n  1/1     Running   0          74s
myreplica-qw4m6  1/1     Running   0          35m
root@ip-172-31-44-30:/home/ubuntu#
```

→ **kubectl get rc**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get rc
NAME      DESIRED   CURRENT   READY   AGE
myreplica  2         2         2       52m
root@ip-172-31-44-30:/home/ubuntu#
```

→ **kubectl describe rc myreplica**

```
c:\ Select root@ip-172-31-44-30: /home/ubuntu
root@ip-172-31-44-30:/home/ubuntu# kubectl describe rc myreplica
Name:           myreplica
Namespace:      default
Selector:       myname=Satyam
Labels:         myname=Satyam
Annotations:    <none>
Replicas:      2 current / 2 desired
Pods Status:   2 Running / 0 Waiting / 0 Succeeded / 0 Failed
Pod Template:
  Labels:  myname=Satyam
  Containers:
    c00:
      Image:      ubuntu
      Port:       <none>
      Host Port:  <none>
      Command:
        /bin/bash
        -c
        while true; do echo Hello-INDIA; sleep 5 ; done
      Environment: <none>
      Mounts:     <none>
      Volumes:    <none>
  Events:
    Type  Reason          Age   From            Message
    ----  -----          ----  -->             -----
    Normal SuccessfulCreate 53m   replication-controller  Created pod: myreplica-nx8kr
    Normal SuccessfulCreate 53m   replication-controller  Created pod: myreplica-qw4m6
    Normal SuccessfulCreate 19m   replication-controller  Created pod: myreplica-q5l2n
root@ip-172-31-44-30:/home/ubuntu#
```

Mein red line event mein jo underline kiya hai ye mene delete kar diya thaas pod  
isliye event mein ye bhi shw ho raha hm jo bhi create karenge bhalle vo delete ho  
jaye but isme dikhega vo event kein andar

Hum dekh sakte hai humar desired 2 replicas hai jo ki fullfill hai , mene pod delete  
karne ke baad khud pod nahi banaya yml file mein replica define hai isliye  
kubernetes aap naya pod create kar diya .

## scalling

→ kubectl scale --replicas=8 rc -l myname=Satyam

```
root@ip-172-31-44-30:/home/ubuntu# kubectl scale --replicas=8 rc -l myname=Satyam
replicationcontroller/myreplica scaled
root@ip-172-31-44-30:/home/ubuntu#
```

Ye command hum tab use karte hai jab humko replica badhani ho ya kaam karana ho .

Mene isliye scale likha hai phir replica=8 isliye likha ki 8 replica banana hai , phir mene label lagaya hai myname=satyam ,matlab ye label jaha mlle vaha jaakar 8 replica create kar do .

Hum output mein dekh sakte hai humari replica scalled hogayi hai .

Iss process ko hum scale-up replica kehate hai

→ kubectl get rc

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get rc
NAME      DESIRED   CURRENT   READY    AGE
myreplica  8         8         3        70m
root@ip-172-31-44-30:/home/ubuntu# kubectl get rc
NAME      DESIRED   CURRENT   READY    AGE
myreplica  8         8         6        70m
root@ip-172-31-44-30:/home/ubuntu# kubectl get rc
NAME      DESIRED   CURRENT   READY    AGE
myreplica  8         8         7        70m
root@ip-172-31-44-30:/home/ubuntu# kubectl get rc
NAME      DESIRED   CURRENT   READY    AGE
myreplica  8         8         8        70m
root@ip-172-31-44-30:/home/ubuntu#
```

Hum dekh sakte hai humari replica dheere-dheere create ho rahi, mene 5 second mein yein 3 baar chalaya aur phir 3 second mein isane sab po ready kar diye .

→ kubectl get pods

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods
NAME      READY   STATUS    RESTARTS   AGE
delhipod  1/1     Running   0          28h
myreplica-2kxpx  1/1     Running   0          12m
myreplica-k9w74  1/1     Running   0          12m
myreplica-lkdm6  1/1     Running   0          12m
myreplica-m4cf6  1/1     Running   0          12m
myreplica-m4dtj  1/1     Running   0          12m
myreplica-q512n  1/1     Running   0          48m
myreplica-qgcc1  1/1     Running   0          12m
myreplica-qw4m6  1/1     Running   0          82m
root@ip-172-31-44-30:/home/ubuntu#
```

Ab humare pass 8 pod ban gaye hai .

→ **kubectl scale --replicas=1 rc -l myname=Satyam**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl scale --replicas=1 rc -l myname=Satyam
replicationcontroller/myreplica scaled
```

Hum dekh sakte hai ki humare pass kewal 1 replica bachii.baki sab delete ho gayi , is process ko hum scale down kehate hai

→ **kubectl get rc**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get rc
NAME      DESIRED   CURRENT   READY   AGE
myreplica 1         1         1       88m
root@ip-172-31-44-30:/home/ubuntu#
```

Now , we have only one replica .

→ **kubectl get pods**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods
NAME        READY   STATUS    RESTARTS   AGE
delhipod    1/1     Running   0          28h
myreplica-qw4m6 1/1     Running   0          92m
root@ip-172-31-44-30:/home/ubuntu#
```

→ **kubectl delete -f pod7.yml**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl delete -f pod7.yml
replicationcontroller "myreplica" deleted
root@ip-172-31-44-30:/home/ubuntu#
```

→ **kubectl get rc**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get rc
No resources found in default namespace.
root@ip-172-31-44-30:/home/ubuntu#
```

→ **kubectl get pods**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods
NAME        READY   STATUS    RESTARTS   AGE
delhipod    1/1     Running   0          28h
myreplica-qw4m6 1/1     Terminating   0          96m
root@ip-172-31-44-30:/home/ubuntu#
```

Now replica terminating is process

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods
NAME        READY   STATUS    RESTARTS   AGE
delhipod    1/1     Running   0          28h
root@ip-172-31-44-30:/home/ubuntu#
```

Terminated

## Replica Set

### Replica Set

- Replica Set is a next generation Replication Controller.
- The replication Controller only supports equality-based selector whereas the replica set supports set-based selector i.e filtering according to set of values.
- Replicaset rather than the Replication Controller is used by other objects like deployment.

### Difference between Replication controller & Replica based set

**Replication control** = Equality based selector hota hai

**Replica based set** = Set based selector hota hai ye

Replica based set **Replication control** ka **advanced version** hai .  
Ye **replication control** aur **replica based** dono par kaam karta hai .

Dono mein difference ye hai ki hum yml file mein andar jo version likhate the replication control mein usme hum v1 mein pehale app nahi likhate thee e.x ,

but replica based mein hum **api/version = apps/v1**

- Pehale replication control used hota tha but ab replica set use hota aisa isliye kyu ki **replication control** mein kewal **equality or not equality selector** hum use kar sakte thee, but hum **replica set** mein andar **multiple selector** use kar sakte hai

## EXAMPLE OF REPLICA SET

```
kind: ReplicaSet
apiVersion: apps/v1
metadata:
  name: myrs
spec:
  replicas: 2
  selector:
    matchExpressions:          # these must match the labels
      - {key: myname, operator: In, values: [satyam, shivam, sundaram]}
      - {key: env, operator: NotIn, values: [production]}
  template:
    metadata:
      name: testpod7
    labels:
      myname: shivam
    spec:
      containers:
        - name: c00
          image: ubuntu
          command: ["/bin/bash", "-c", "while true; do echo Hello India; sleep 5 ; done"]
```

```
GNU nano 4.8                                     pod8.yml
root@ip-172-31-44-30:/home/ubuntu
kind: ReplicaSet
apiVersion: apps/v1
metadata:
  name: myrs
spec:
  replicas: 2
  selector:
    matchExpressions:          # these must match the labels
      - {key: myname, operator: In, values: [satyam, shivam, sundaram]}
      - {key: env, operator: NotIn, values: [production]}
  template:
    metadata:
      name: testpod7
    labels:
      myname: shivam
    spec:
      containers:
        - name: c00
          image: ubuntu
          command: ["/bin/bash", "-c", "while true; do echo Hello India; sleep 5 ; done"]
```



mene label mein shivam naam define kiya hai , aur selector mein andar mene shivam name define kar rakha hai matlab agar usko shivam naam ka label kahi millega toh vo jaakar ;od create kar dega

→ **kubectl apply -f pod8.yml**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl apply -f pod8.yml
replicaset.apps/myrs created
root@ip-172-31-44-30:/home/ubuntu#
```

→ kubectl get rs

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get rs
NAME      DESIRED   CURRENT   READY    AGE
myrs      2          2          2        8m58s
root@ip-172-31-44-30:/home/ubuntu#
```

→ kubectl get pods

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods
NAME        READY   STATUS    RESTARTS   AGE
delhipod    1/1     Running   0          46h
myrs-cmrtk  1/1     Running   0          15m
myrs-tskn7  1/1     Running   0          15m
root@ip-172-31-44-30:/home/ubuntu#
```

→ kubectl scale --replicas=1 rs/myrs

```
root@ip-172-31-44-30:/home/ubuntu# kubectl scale --replicas=1 rs/myrs
replicaset.apps/myrs scaled
root@ip-172-31-44-30:/home/ubuntu#
```

mene **myrs** apne pod ka name yml mein diya hai aur mene yml file mein pehle usko 2 pod diye theebut ab kam kar diya ab 2 sein ghata kar mene eak replica kar diya

hum replica ko badha aur ghata dono sakte hai .

→ kubectl get pods

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods
NAME        READY   STATUS    RESTARTS   AGE
delhipod    1/1     Running   0          47h
myrs-cmrtk  1/1     Running   0          25m
root@ip-172-31-44-30:/home/ubuntu#
```

Hum dekh sakte hai ab humare pass kewal 1 pod bacha huva hai .

→ Kubectl get rs

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get rs
NAME      DESIRED   CURRENT   READY    AGE
myrs      1          1          1        30m
root@ip-172-31-44-30:/home/ubuntu#
```

Ab mere pass kewal eak replica bachi hui hai

→ **kubectl delete pod myrs-cmrtk**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl delete pod myrs-cmrtk
pod "myrs-cmrtk" deleted
root@ip-172-31-44-30:/home/ubuntu#
```

Mere pass **myrs-cmrtk** iss naam ka jo bana tha mene usko delete kar diya .

→ **kubectl get pods**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods
NAME      READY   STATUS    RESTARTS   AGE
delhipod  1/1     Running   0          47h
myrs-s6m87 1/1     Running   0          2m51s
root@ip-172-31-44-30:/home/ubuntu#
```

Mein dekh sakta hu ki mere pass **myrs-s6m87** nam ka naya pod create hogaya aisa isliye kyuki mene **replica** eak bana rakhi hai jaise hi pod delete huva vo automatically same replica create kardegi means , do option ho sakta hai pod delete karne kay ya toh replica 0 kar de ya toh phir yml file hi delete kar de. Aur hum replica delete kar denge tabh sab pod hat jayenge .

→ **Kubectl delete rs/myrs**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl delete rs/myrs
replicaset.apps "myrs" deleted
root@ip-172-31-44-30:/home/ubuntu# kubectl get rs
No resources found in default namespace.
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods
NAME      READY   STATUS    RESTARTS   AGE
delhipod  1/1     Running   0          47h
myrs-s6m87 1/1     Terminating   0          8m36s
root@ip-172-31-44-30:/home/ubuntu#
```

Mein yaha replica-set hi delete kar diya toh iss wajah sein ab mere pass ab yaha koi replica bachi h nahi aur jab mene pod check kiya toh mere pass koi pod bhi nahi bacha.

→ **Kubectl get pods**

```
root@ip-172-31-44-30:/home/ubuntu# kubectl get pods
NAME      READY   STATUS    RESTARTS   AGE
delhipod  1/1     Running   0          47h
root@ip-172-31-44-30:/home/ubuntu#
```

Mein dekh sakta hu mere pass ab yaha koi bhi pod nahi bache huye sab delete hog aye hai