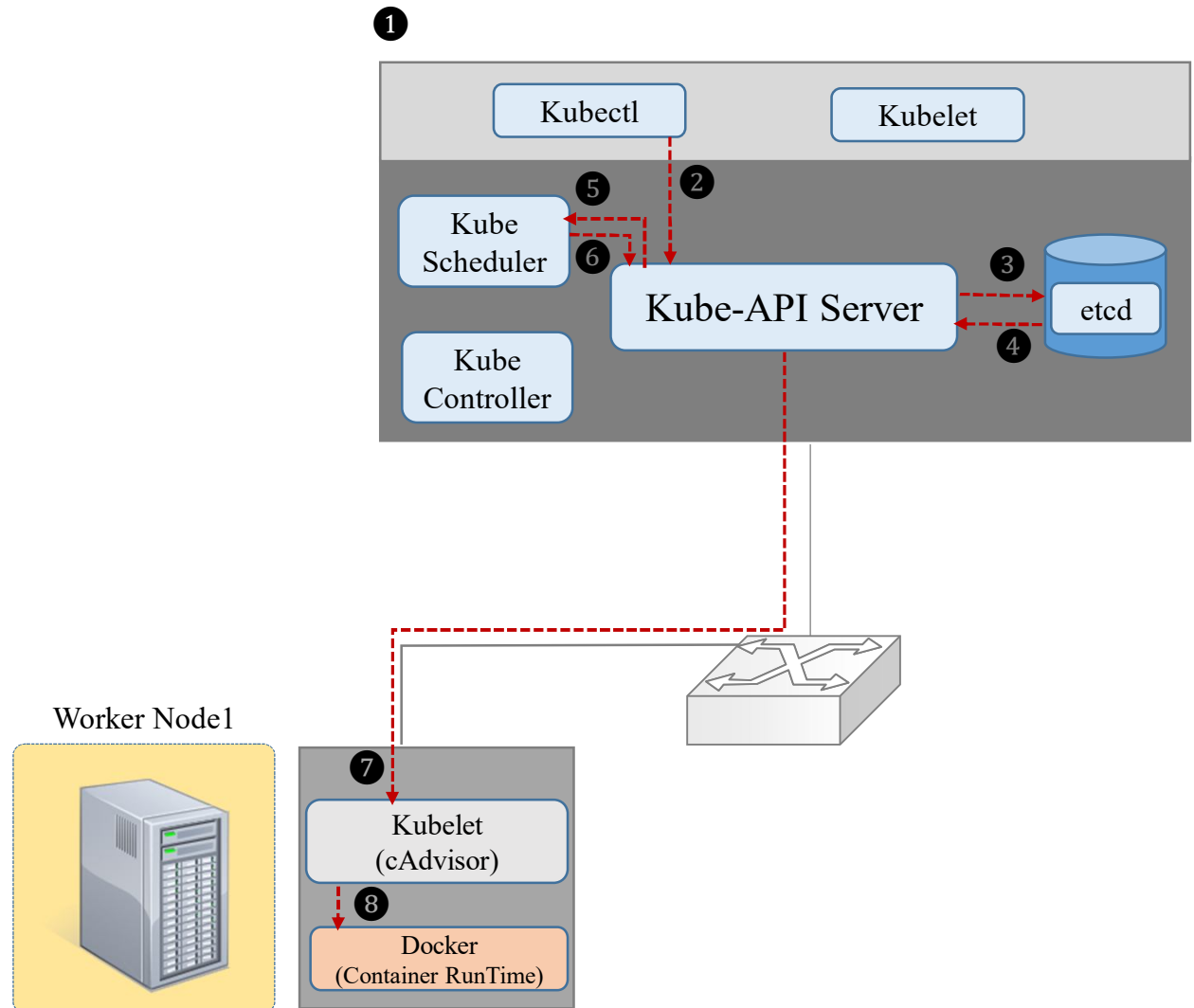


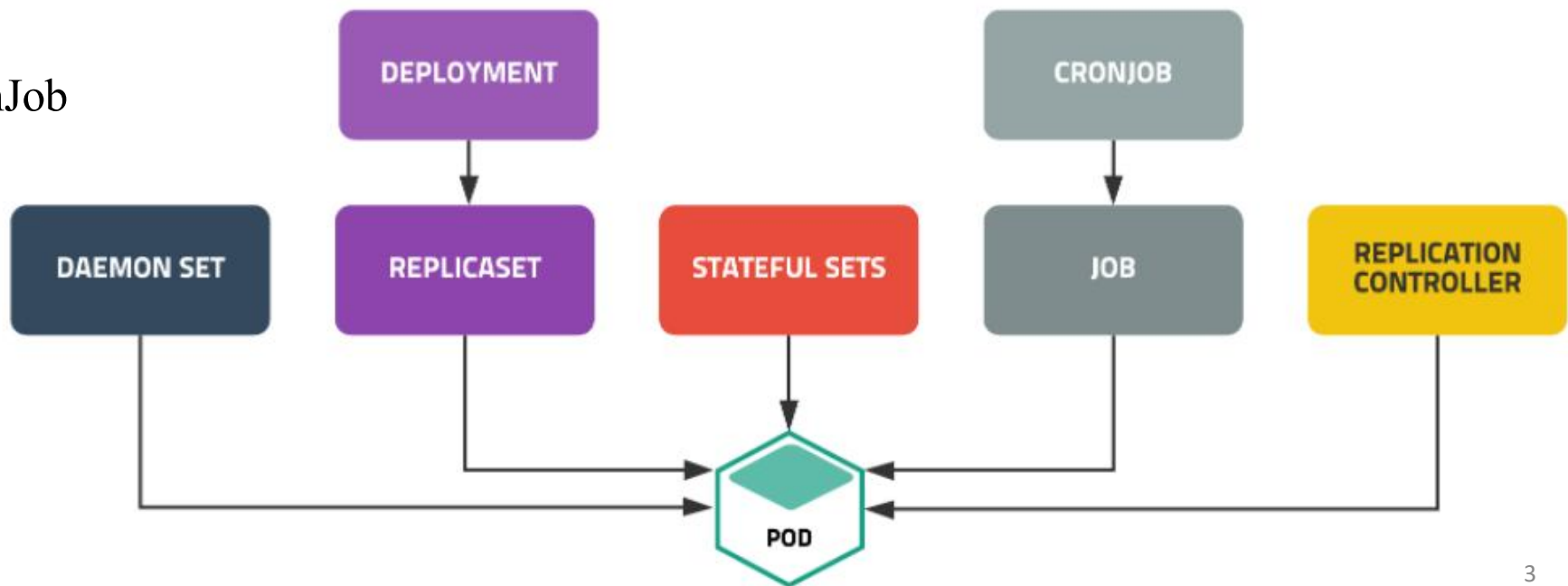
K8S Controller

Controller

- pod 개수를 보장
- 파드들을 관리하는 역할
 - 장시간 실행되는 파드 관리
 - 파드들의 주기적인 배치



- Replication Controller
- ReplicaSet
- Deployment
- DaemonSet
- StatefulSet
- Job
- CronJob



- Replication Controller
- ReplicaSet
- Deployment
- DaemonSet
- StatefulSet
- Job
- CronJob

```

apiVersion: v1
kind: ReplicationController
metadata:
  name: rc-main
spec:
  replicas: 2
  selector:
    app: main
    name: apache
    rel: stable
  template:
    metadata:
      labels:
        app: main
        name: apache
        rel: stable
    spec:
      containers:
        - name: webui
          image: httpd:2.2
          ports:
            - containerPort: 80

```

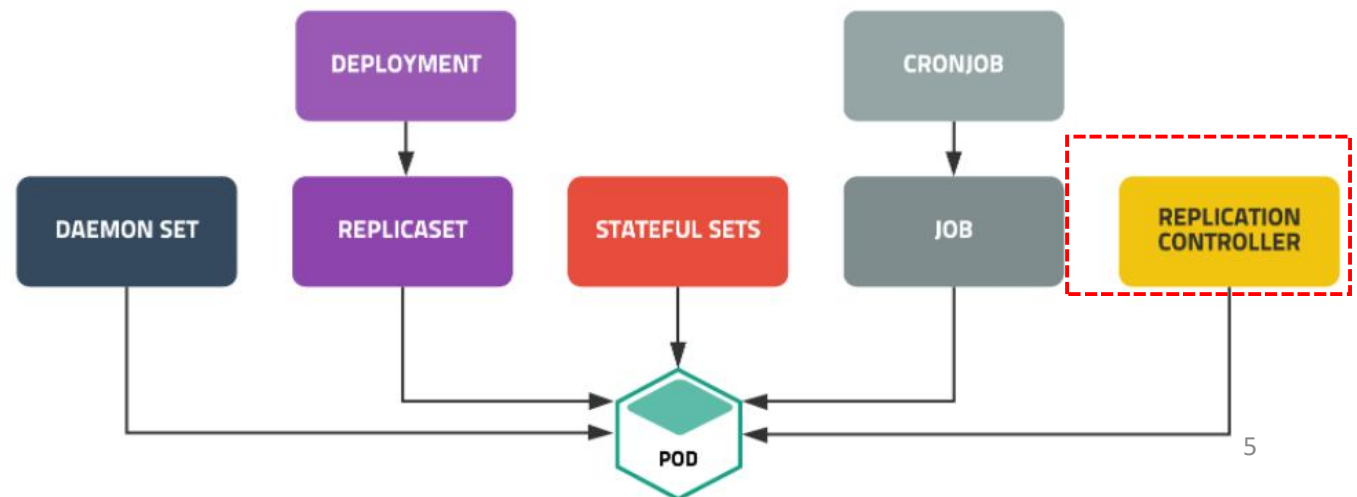
```

apiVersion: apps/v1
kind: ReplicaSet
metadata:
  name: nginx-replicaset
spec:
  template:
    metadata:
      name: nginx-replicaset
      labels:
        app: nginx-replicaset
    spec:
      containers:
        - name: nginx-replicaset
          image: nginx
          ports:
            - containerPort: 80
      replicas: 3
      selector:
        matchLabels:
          app: nginx-replicaset

```

1. Replication controller

- 지정한 숫자만큼의 pod가 항상 클러스터 안에서 실행되도록 관리
 - 요구하는 Pod 개수 보장
 - 파드 집합의 실행을 항상 안정적으로 유지하는 것을 목표
 - 요구하는 pod 개수가 부족하면 template을 이용해 pod 추가
 - 요구하는 pod 수보다 많으면 최근에 생성된 pod 삭제

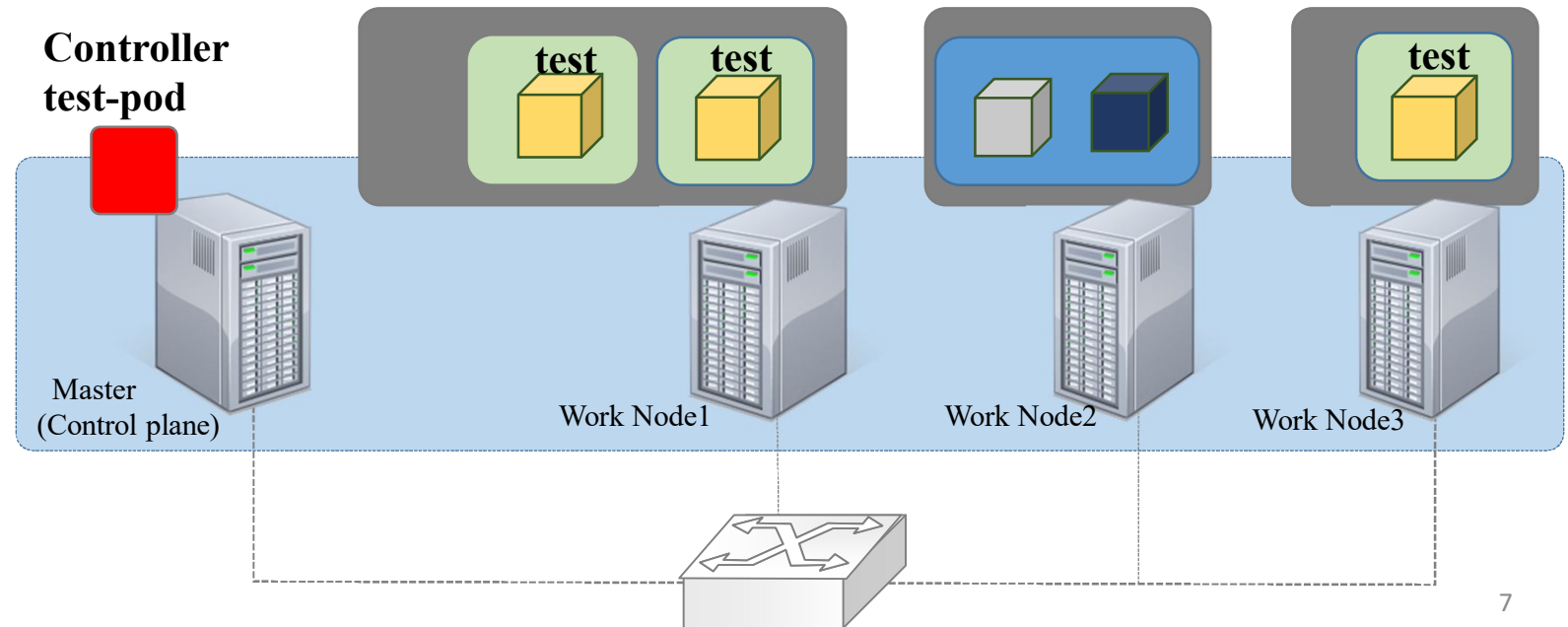


- 기본 구성
 - selector
 - replicas
 - template

```
apiVersion: apps/v1
kind: ReplicationController
metadata:
  name: <RC_name>
spec:
  replicas: <배포개수>
  selector:
    key: value
  template:
    <컨테이너 템플릿>
```

```
apiVersion: apps/v1
kind: ReplicationController
metadata:
  name: rc_test
spec:
  replicas: 3
  selector:
    app: test
  template:
    <컨테이너 템플릿>
```

```
apiVersion: v1
kind: ReplicationController
metadata:
  name: test-pod
spec:
  replicas: 3
  selector:
    app: test
  template:
```



```
apiVersion: v1
kind: Pod
metadata:
  name: test-pod
  labels:
    app: test
spec:
  containers:
  - name: nginx-container
    image: nginx:1.14
```

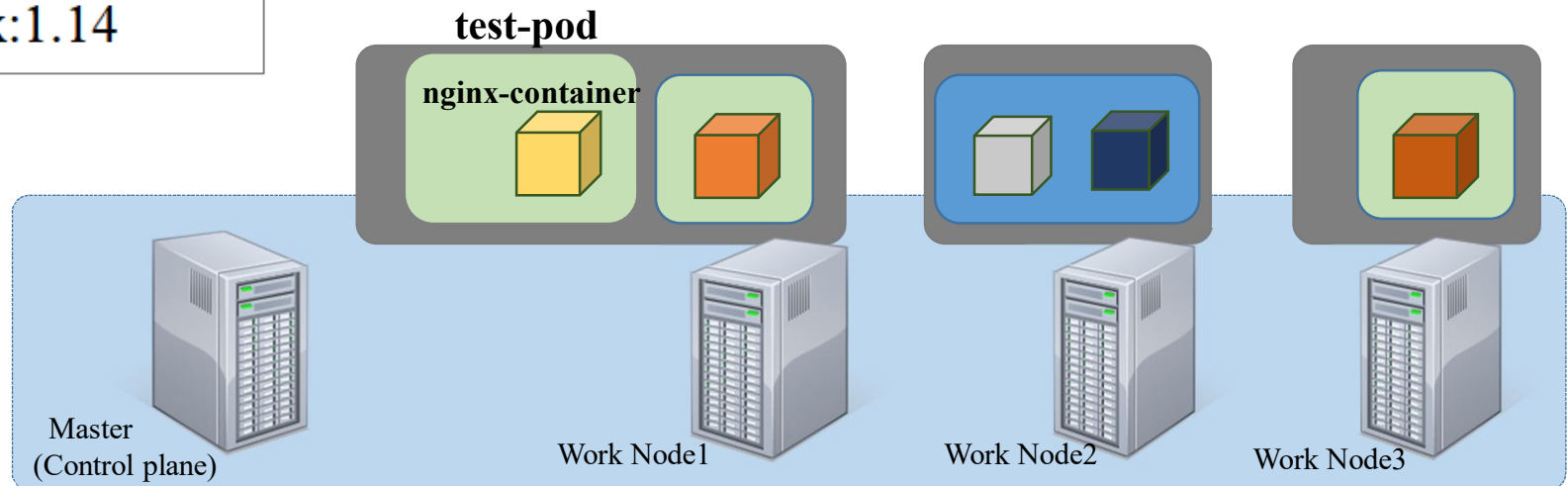
<<rc-exam.yaml>>

kubectl create -f rc_exam

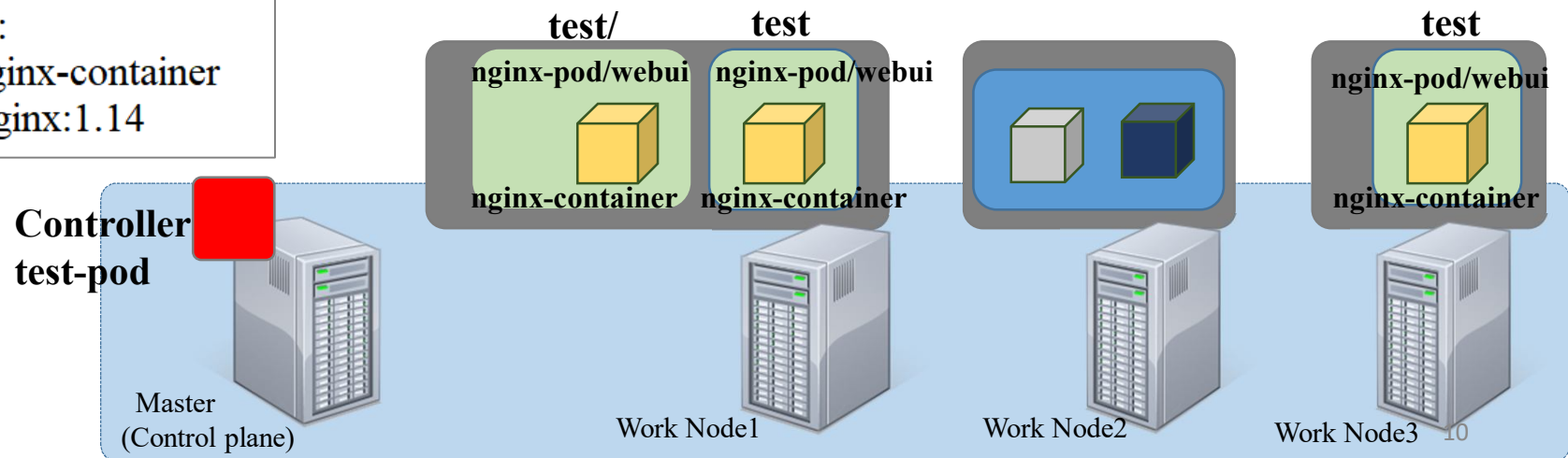
```
apiVersion: v1
kind: ReplicationController
metadata:
  name: test-pod
spec:
  replicas: 3
  selector:
    app: test
  template:
    metadata:
      name: nginx-pod
      labels:
        app: webui
    spec:
      containers:
      - name: nginx-container
        image: nginx:1.14
```

<<rc-exam.yaml>>

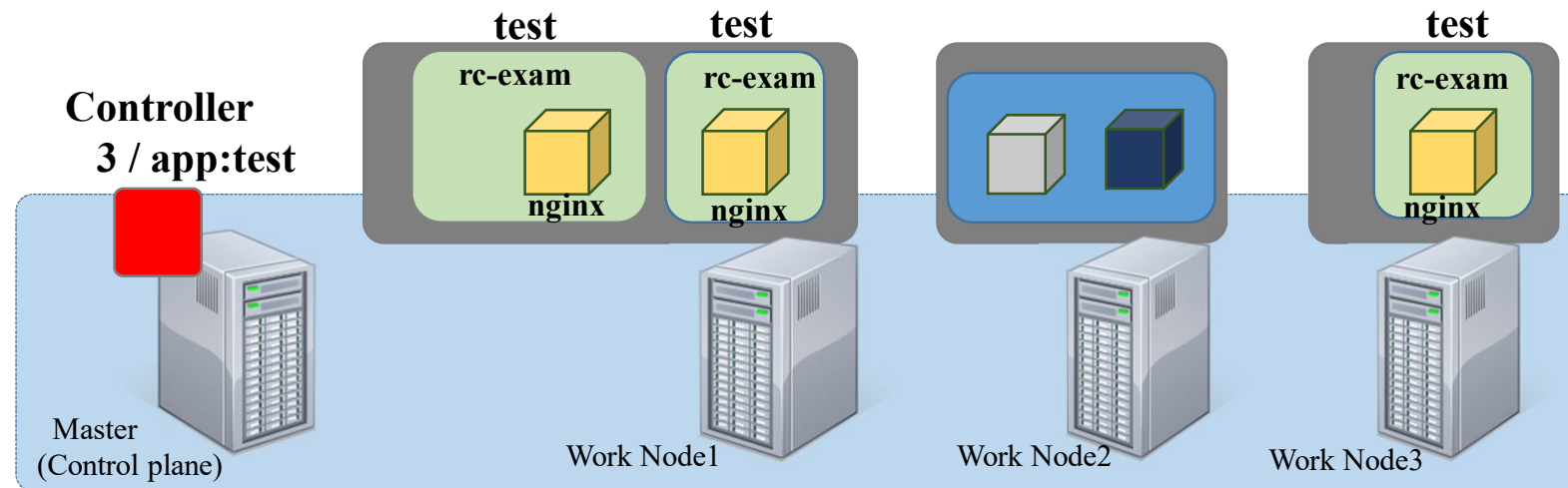

```
apiVersion: v1
kind: Pod
metadata:
  name: test-pod
  labels:
    app: test
spec:
  containers:
  - name: nginx-container
    image: nginx:1.14
```



```
apiVersion: v1
kind: ReplicationController
metadata:
  name: test-pod
spec:
  replicas: 3
  selector:
    app: test
  template:
    metadata:
      name: nginx-pod
    labels:
      app: webui
    spec:
      containers:
      - name: nginx-container
        image: nginx:1.14
```



```
kubectl create rc_exam --image=nginx --replica=3 --selector=app=test
```



kubectl get nodes

kubectl get nodes -o wide

```
[node1 ~]$ kubectl get nodes
NAME          STATUS    ROLES          AGE      VERSION
node1         Ready     control-plane,master  2m45s    v1.20.1
node2         Ready     <none>         78s      v1.20.1
node3         Ready     <none>         45s      v1.20.1
node4         NotReady  <none>         18s      v1.20.1
[node1 ~]$
[node1 ~]$ kubectl get nodes -o wide
NAME          STATUS    ROLES          AGE      VERSION    INTERNAL-IP
node1         Ready     control-plane,master  2m53s    v1.20.1    192.168.0.8
node2         Ready     <none>         86s      v1.20.1    192.168.0.7
node3         Ready     <none>         53s      v1.20.1    192.168.0.6
node4         Ready     <none>         26s      v1.20.1    192.168.0.5
[node1 ~]$
```

```

apiVersion: v1
kind: ReplicationController
metadata:
  name: rc-nginx
spec:
  replicas: 3
  selector:
    app: webui
  template:
    metadata:
      name: nginx-pod
    labels:
      app: webui
    spec:
      containers:
        - name: nginx-container
          image: nginx:1.14

```

<<rc-nginx.yaml>>

실습 1

kubectl create -f rc.nginx.yaml

```

[node1 ~]$ kubectl create -f rc-nginx.yaml
replicationcontroller/rc-nginx created
[node1 ~]$ kubectl get pods -o wide

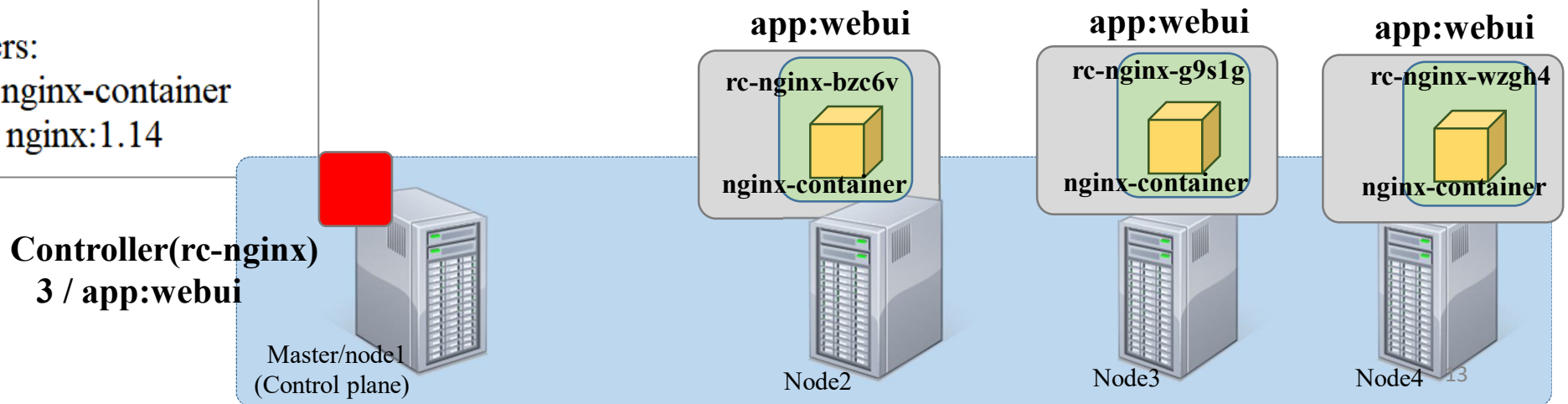
```

NAME	READY	STATUS	RESTARTS	AGE	IP	NODE
rc-nginx-bzc6v	1/1	Running	0	2m24s	10.5.1.2	node2
rc-nginx-g9slg	1/1	Running	0	2m24s	10.5.3.2	node3
rc-nginx-wzgh4	1/1	Running	0	2m24s	10.5.4.2	node4

```

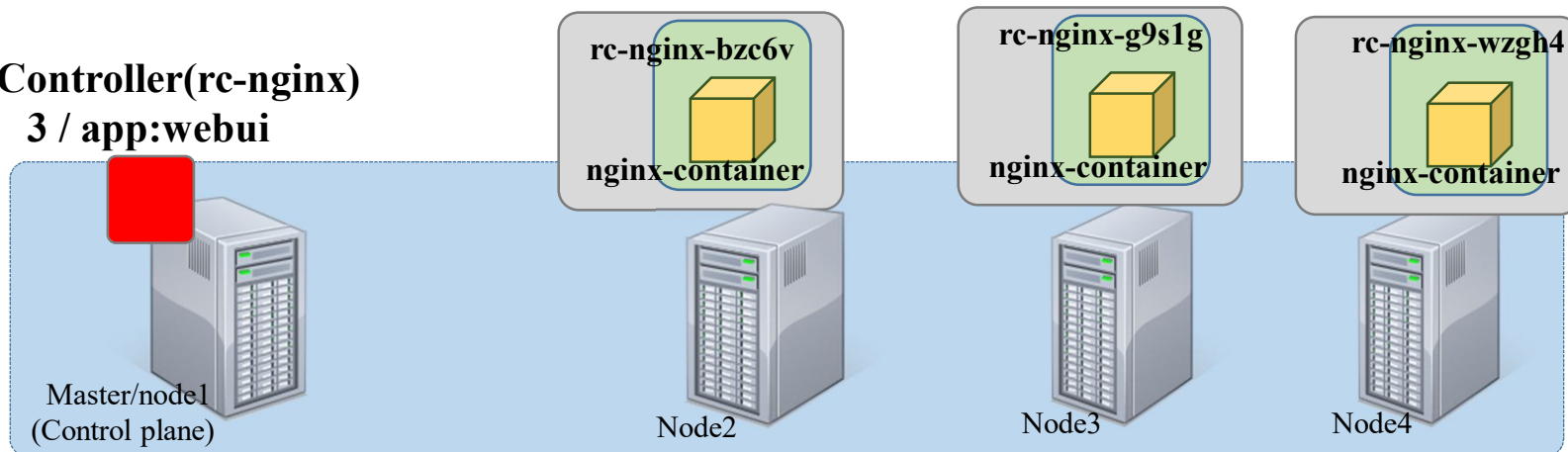
[node1 ~]$

```



```
[node1 ~]$ kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
rc-nginx-bzc6v 1/1     Running   0           10m
rc-nginx-g9slg 1/1     Running   0           10m
rc-nginx-wzgh4 1/1     Running   0           10m
[node1 ~]$
[node1 ~]$ kubectl get pods --show-labels
NAME          READY   STATUS    RESTARTS   AGE   LABELS
rc-nginx-bzc6v 1/1     Running   0           11m   app=webui
rc-nginx-g9slg 1/1     Running   0           11m   app=webui
rc-nginx-wzgh4 1/1     Running   0           11m   app=webui
[node1 ~]$
[node1 ~]$ kubectl get rc
NAME          DESIRED   CURRENT   READY   AGE
rc-nginx      3         3         3       11m
```

Controller(rc-nginx)
3 / app:webui



kubectl describe rc rc-nginx

```
[node1 ~]$ kubectl describe rc rc-nginx
```

```
Name:          rc-nginx
Namespace:     default
Selector:      app=webui
Labels:        app=webui
Annotations:   <none>
Replicas:      3 current / 3 desired
Pods Status:   3 Running / 0 Waiting / 0 Succeeded / 0 Failed
```

Pod Template:

```
Labels: app=webui
```

Containers:

nginx-container:

```
Image:          nginx:1.14
```

```
Port:           <none>
```

```
Host Port:      <none>
```

```
Environment:    <none>
```

```
Mounts:         <none>
```

```
Volumes:        <none>
```

Events:

Type	Reason	Age	From	Message
----	-----	----	----	-----
Normal	SuccessfulCreate	4m58s	replication-controller	Created pod: rc-nginx-wzgh4
Normal	SuccessfulCreate	4m58s	replication-controller	Created pod: rc-nginx-g9slg
Normal	SuccessfulCreate	4m58s	replication-controller	Created pod: rc-nginx-bzc6v

Scale-out

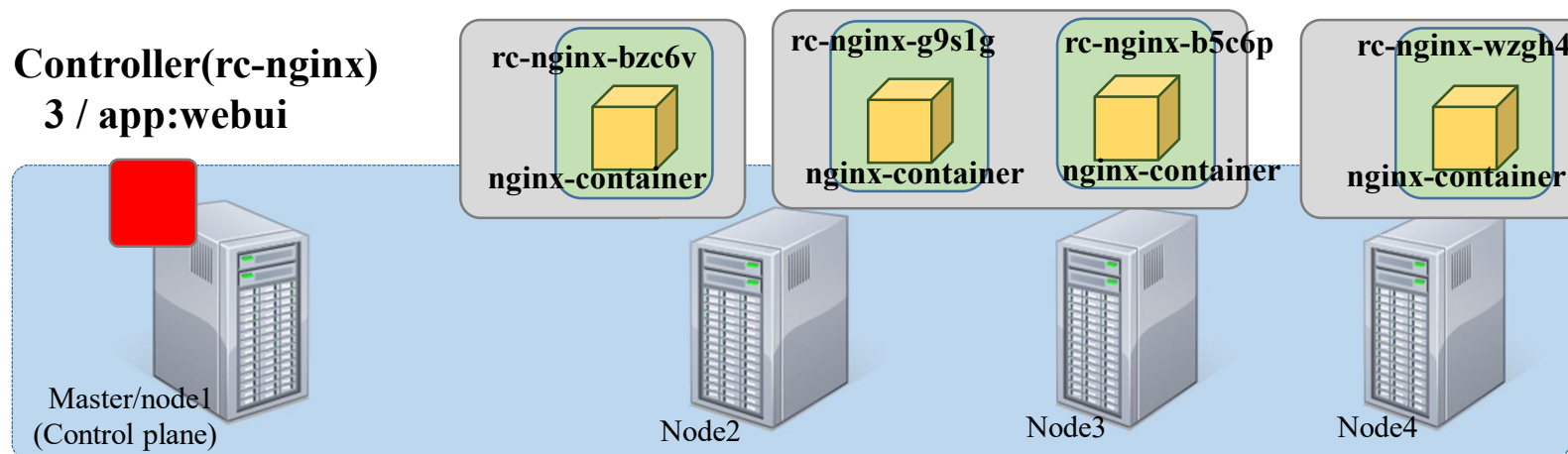
kubectl edit rc rc-nginx

```
# Please edit the object below. Lines beginning
# and an empty file will abort the edit. If an
# reopened with the relevant failures.
#
apiVersion: v1
kind: ReplicationController
metadata:
  creationTimestamp: "2022-05-05T01:37:34Z"
  generation: 1
  labels:
    app: webui
  name: rc-nginx
  namespace: default
  resourceVersion: "1606"
  uid: 6574e3ad-bf27-454d-87fc-8c8ad4359873
spec:
  replicas: 3
  selector:
    app: webui
  template:
    metadata:
      creationTimestamp: null
      labels:
        app: webui
    name: nginx-pod
```

```
# Please edit the object below. Lines beginn
# and an empty file will abort the edit. If
# reopened with the relevant failures.
#
apiVersion: v1
kind: ReplicationController
metadata:
  creationTimestamp: "2022-05-05T01:37:34Z"
  generation: 1
  labels:
    app: webui
  name: rc-nginx
  namespace: default
  resourceVersion: "1606"
  uid: 6574e3ad-bf27-454d-87fc-8c8ad4359873
spec:
  replicas: 4
  selector:
    app: webui
  template:
    metadata:
      creationTimestamp: null
      labels:
        app: webui
    name: nginx-pod
```



```
[node1 ~]$ kubectl edit rc rc-nginx
replicationcontroller/rc-nginx edited
[node1 ~]$ kubectl get pods
NAME                READY   STATUS    RESTARTS   AGE
rc-nginx-b5c6p      1/1     Running   0           11s
rc-nginx-bzc6v      1/1     Running   0           18m
rc-nginx-g9slg      1/1     Running   0           18m
rc-nginx-wzgh4      1/1     Running   0           18m
[node1 ~]$ kubectl get pods -o wide
NAME                READY   STATUS    RESTARTS   AGE   IP           NODE
rc-nginx-b5c6p      1/1     Running   0           25s   10.5.3.3     node3
rc-nginx-bzc6v      1/1     Running   0           18m   10.5.1.2     node2
rc-nginx-g9slg      1/1     Running   0           18m   10.5.3.2     node3
rc-nginx-wzgh4      1/1     Running   0           18m   10.5.4.2     node4
[node1 ~]$
```

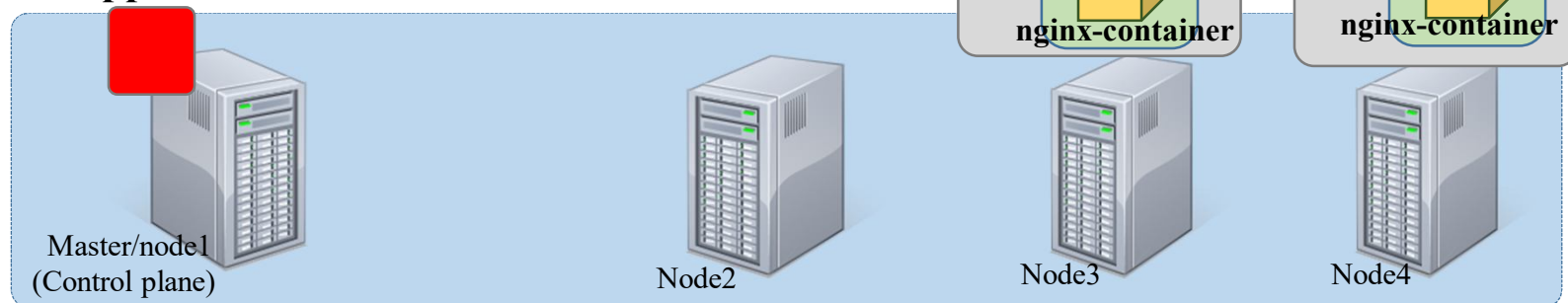


Scale-in

```
kubectl scale rc rc-nginx --replicas=2  
kubectl get pods -o wide
```

```
[node1 ~]$ kubectl get pods -o wide  
NAME                READY   STATUS    RESTARTS   AGE   IP        NODE   NOMINATED NODE  
rc-nginx-b5c6p      1/1     Running   0          25s   10.5.3.3   node3   <none>  
rc-nginx-bzc6v      1/1     Running   0          18m   10.5.1.2   node2   <none>  
rc-nginx-g9slg      1/1     Running   0          18m   10.5.3.2   node3   <none>  
rc-nginx-wzgh4      1/1     Running   0          18m   10.5.4.2   node4   <none>  
[node1 ~]$  
[node1 ~]$ kubectl scale rc rc-nginx --replicas=2  
replicationcontroller/rc-nginx scaled  
[node1 ~]$ kubectl get pods -o wide  
NAME                READY   STATUS    RESTARTS   AGE   IP        NODE   NOMINATED NODE  
rc-nginx-g9slg      1/1     Running   0          20m   10.5.3.2   node3   <none>  
rc-nginx-wzgh4      1/1     Running   0          20m   10.5.4.2   node4   <none>  
[node1 ~]$
```

Controller(rc-nginx)
3 / app:webui



Rolling-update(1)

kubectl edit rc rc-nginx

```
spec:
  containers:
  - image: nginx:1.14
    imagePullPolicy: IfNotPresent
    name: nginx-container
    resources: {}
    terminationMessagePath: /dev/termination-log
    terminationMessagePolicy: File
  dnsPolicy: ClusterFirst
  restartPolicy: Always
  schedulerName: default-scheduler
  securityContext: {}
  terminationGracePeriodSeconds: 30
```

```
spec:
  containers:
  - image: nginx:1.15
    imagePullPolicy: IfNotPresent
    name: nginx-container
    resources: {}
    terminationMessagePath: /dev/termination-log
    terminationMessagePolicy: File
  dnsPolicy: ClusterFirst
  restartPolicy: Always
  schedulerName: default-scheduler
  securityContext: {}
  terminationGracePeriodSeconds: 30
```

Rolling-update(2)

kubectl describe pods rc-nginx-XXXX

```
[node1 ~]$ kubectl get pods
NAME                READY   STATUS    RESTARTS   AGE
rc-nginx-g9slg      1/1     Running   0           31m
rc-nginx-wzgh4      1/1     Running   0           31m
[node1 ~]$ kubectl describe pods rc-nginx-g9slg
Name:                rc-nginx-g9slg
Namespace:           default
Priority:             0
Node:                node3/192.168.0.6
Start Time:          Thu, 05 May 2022 01:37:34 +0000
Labels:              app=webui
Annotations:          <none>
Status:              Running
IP:                  10.5.3.2
IPs:
  IP:                 10.5.3.2
Controlled By:        ReplicationController/rc-nginx
Containers:
  nginx-container:
    Container ID:      docker://0bc6a40c0b228bd8816fdb60c41
    Image:              nginx:1.14
    Image ID:           docker-pullable://nginx@sha256:f798f
```

Rolling-update(3)

kubectl delete pod rc-nginx-XXXX

kubectl get pods -o wide

kubectl describe pods rc-nginx-XXXX

```
[node1 ~]$ kubectl delete pod rc-nginx-g9slg
pod "rc-nginx-g9slg" deleted
[node1 ~]$ kubectl get pods -o wide
NAME                READY   STATUS    RESTARTS   AGE   IP
rc-nginx-jq6sc      1/1     Running   0          62s   10.5.1.3
rc-nginx-wzgh4      1/1     Running   0          38m   10.5.4.2
[node1 ~]$
[node1 ~]$ kubectl describe pods rc-nginx-jq6sc
Name:                rc-nginx-jq6sc
Namespace:           default
Priority:              0
Node:                 node2/192.168.0.7
Start Time:           Thu, 05 May 2022 02:14:36 +0000
Labels:               app=webui
Annotations:          <none>
Status:               Running
IP:                   10.5.1.3
IPs:
  IP:                  10.5.1.3
Controlled By:        ReplicationController/rc-nginx
```

Replication controller

<<Controller Pod 생성>>

- `kubectl create -f rc-nginx.yaml` → `kubectl get pods -o wide`

<<scale-out>>

- `kubectl edit rc rc-nginx` → `kubectl get pods -o wide`

<<scale-in>>

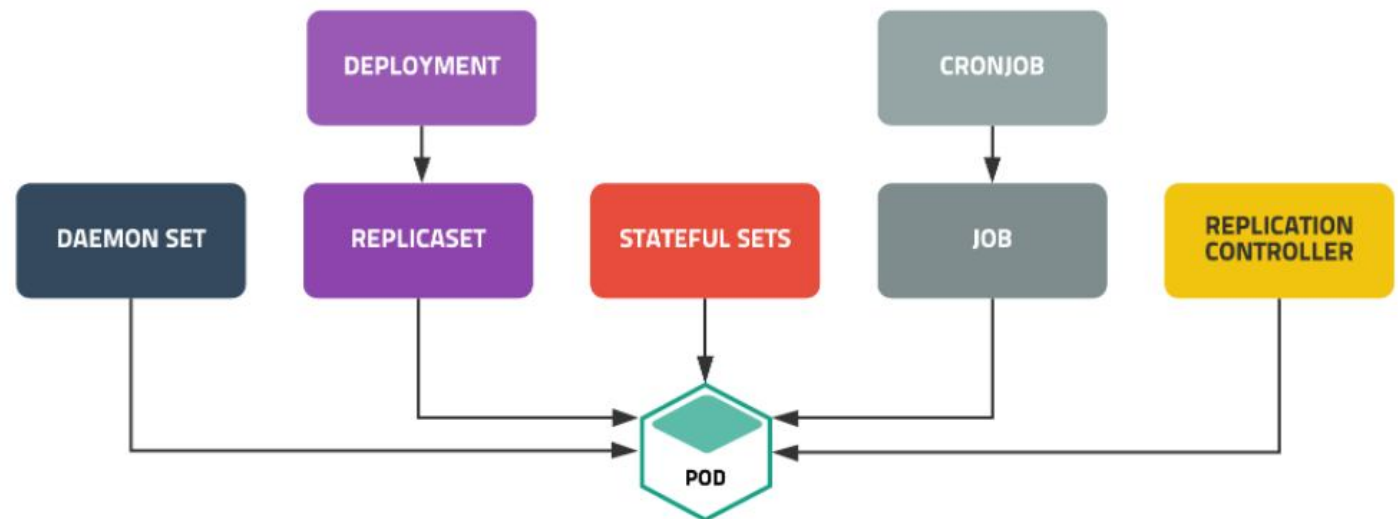
- `kubectl scale rc rc-nginx --replicas=2`
- `kubectl get pods -o wide`

<<rolling-update>>

- `kubectl edit rc rc-nginx`
- `kubectl describe pods rc-nginx-XXXX`
- `kubectl delete pod rc-nginx-XXXX`
- `kubectl get pods -o wide`
- `kubectl describe pods rc-nginx-XXXX`

2. Replicaset

- Replication controller의 발전형으로 Replication controller와 같은 동작 수행
- Replication controller보다 풍부한 selector 지원
 - 집합기반(set-based)의 selector 지원
- rolling-update 시 deployment 사용



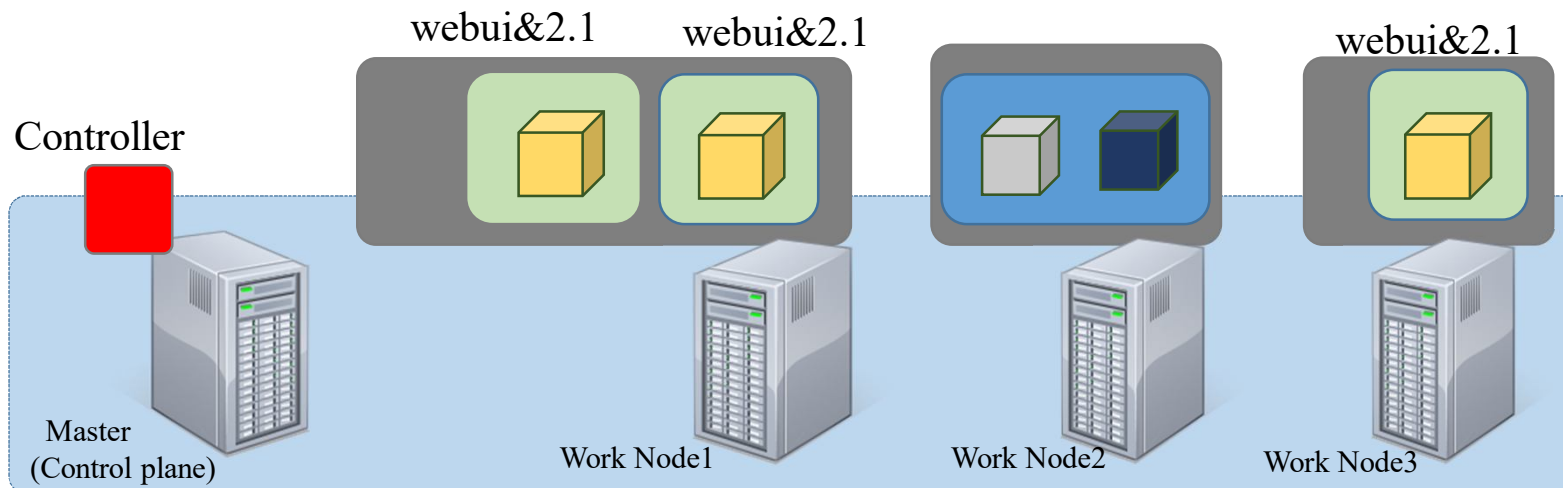
```
apiVersion: v1
kind: ReplicationController
metadata:
  name: rc-nginx
spec:
  replicas: 3
  selector:
    app: webui
  template:
    metadata:
      name: nginx-pod
    labels:
      app: webui
    spec:
      containers:
      - name: nginx-container
        image: nginx:1.14
```

```
apiVersion: apps/v1
kind: ReplicaSet
metadata:
  name: rs-nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: webui
  template:
    metadata:
      name: nginx-pod
    labels:
      app: webui
    spec:
      containers:
      - name: nginx-container
        image: nginx:1.14
```



```
replicas: 3
selector:
  app: webui
  version: "2.1"
```

```
replicas: 3
selector:
  matchLabels:
    app: webui
  matchExpressions:
    - {key: version, operator: In, value: ["2.1" ]}
```



matchExpression

연산자(operator)

In	Key와 values를 지정하여 key, value가 일치하는 pod만 연결
NotIn	Key는 일치하고 values는 일치하지 않는 pod에 연결
Exists	key에 맞는 label의 pod를 연결

```
replicas: 3
selector:
  matchLabels:
    app:webui
  matchExpressions:
    - {key: version, operator: In, value: ["2.1","2.2"]}
```

2.1버전 또는 2.2버전 존재

```
replicas: 3
selector:
  matchLabels:
    app:webui
  matchExpressions:
    - {key: version, operator: NotIn, value: ["2.1","2.2"]}
```

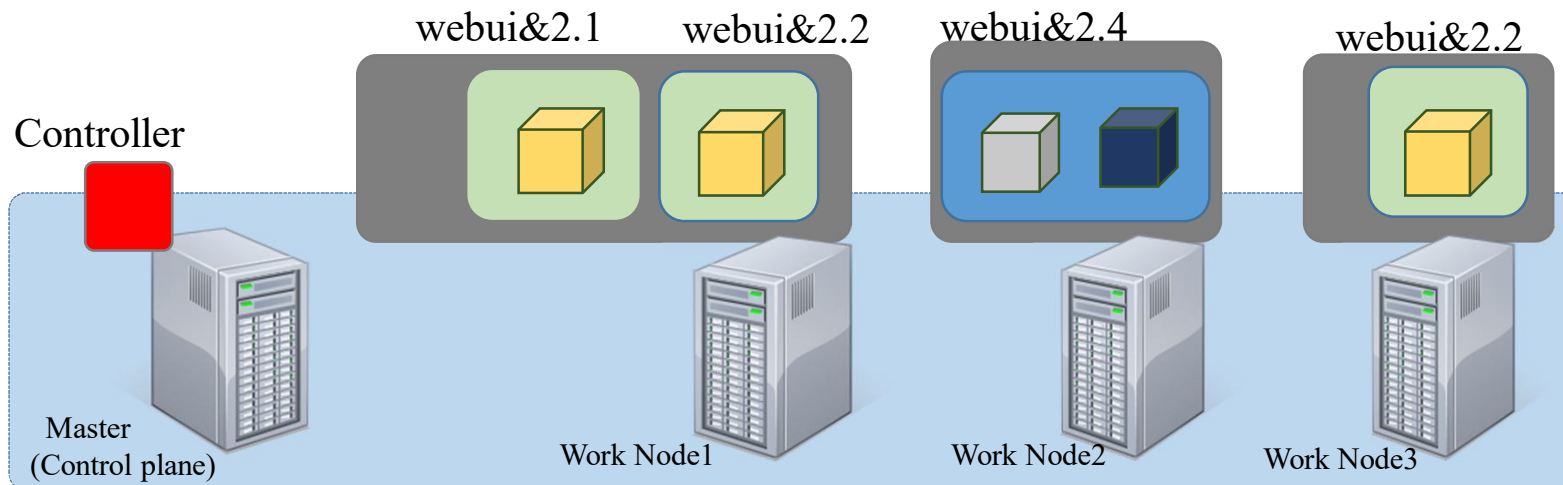
버전이 존재해서는 안됨

```
replicas: 3
selector:
  matchLabels:
    app:webui
  matchExpressions:
    - {key: version, operator: Exists}
```

버전이 존재만하면 됨

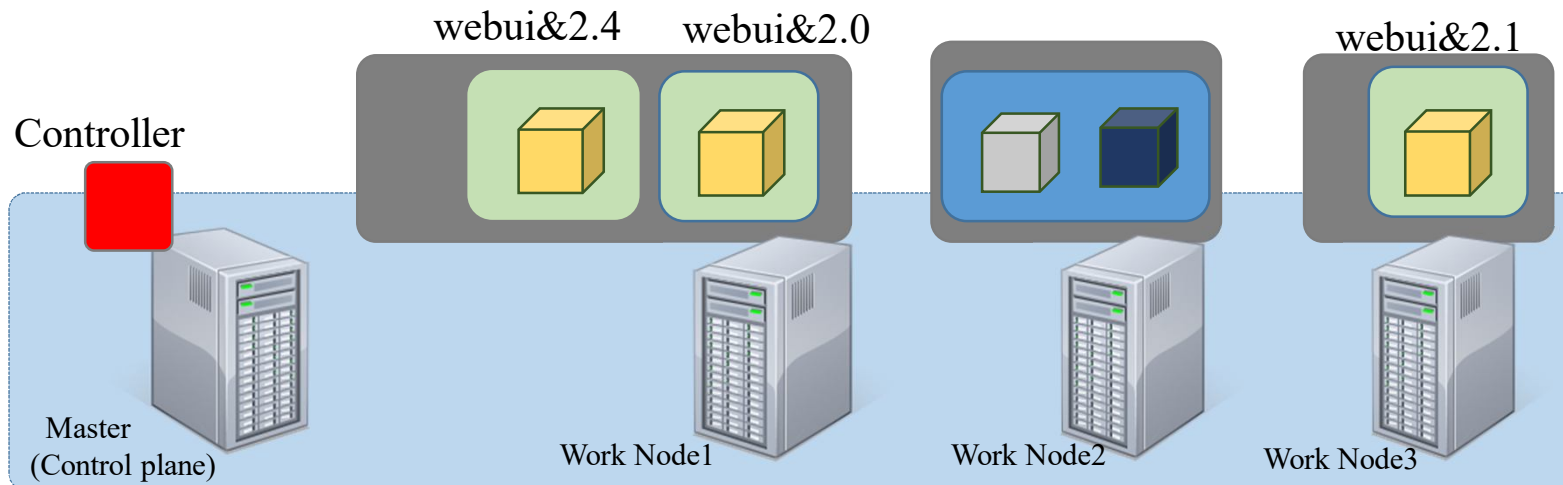
```
replicas: 3
selector:
  matchLabels:
    app:webui
  matchExpressions:
    - {key: version, operator: In, value: ["2.1","2.2"]}
```

label webui 그리고 2.1버전 또는 2.2버전인 pod가 3개 존재



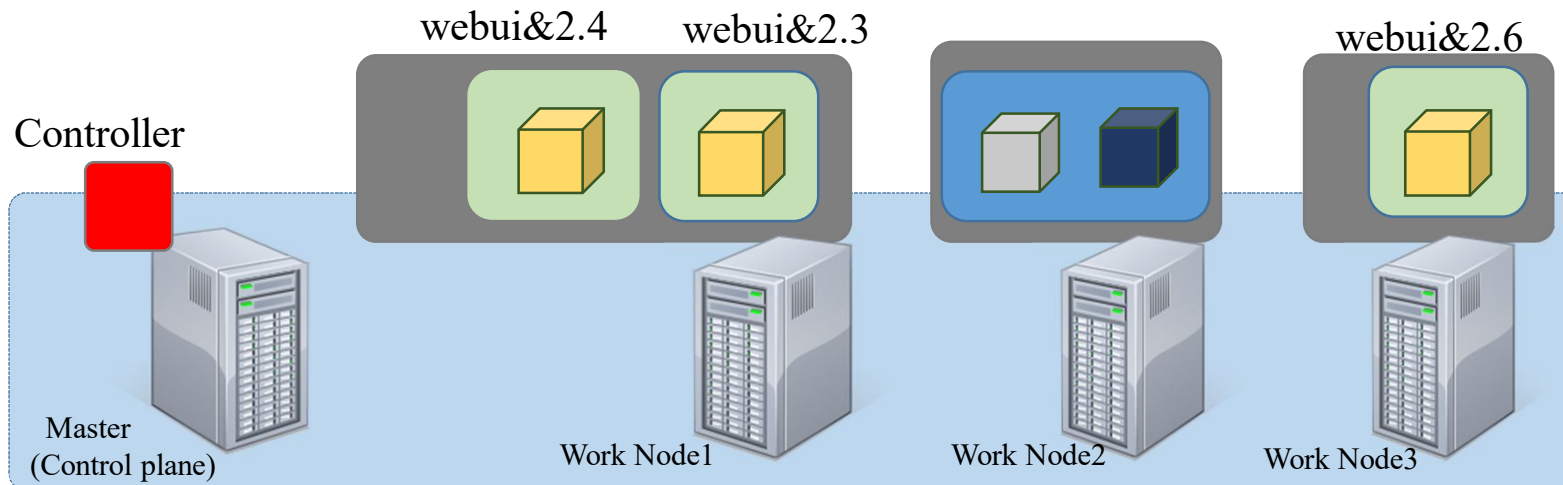
```
replicas: 3
selector:
  matchLabels:
    app:webui
  matchExpressions:
    - {key: version, operator: Exists}
```

label webui 그리고 version 값이 존재하는 pod가 3개 유지



```
replicas: 3
selector:
  matchLabels:
    app:webui
  matchExpressions:
    - {key: version, operator: NotIn, value: ["2.1","2.2"]}
```

label webui 그리고 version 버전이 2.1 또는 2.2 가 아닌 pod들이 3개 존재

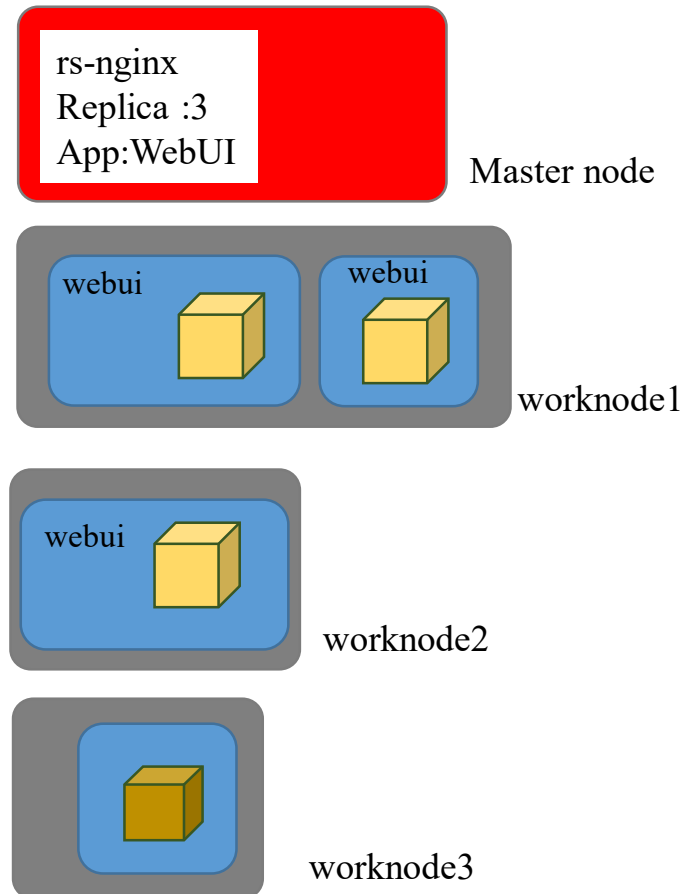


1) Replicaset 사용하기

```
apiVersion: apps/v1
kind: ReplicaSet
metadata:
  name: rs-nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: webui
  template:
    metadata:
      name: nginx-pod
    labels:
      app: webui
    spec:
      containers:
        - name: nginx-container
          image: nginx:1.14
```

<<rs-nginx.yaml>>

Controller



<<ReplicaSet Controller와 Pod 생성>>

kubectl delete rc rc-nginx //controller를 삭제하면 pod 삭제

kubectl get pods -o -wide

kubectl create -f rs-nginx.yaml 또는 kubectl apply -f rs-nginx

kubectl get pods --show-labels

kubectl get rs

kubectl create -f rs-nginx.yaml ≡ kubectl apply -f rs-nginx

kubectl get pods --show-labels

kubectl get rs

```
1 [node1 ~]$ kubectl delete rc rc-nginx
replicationcontroller "rc-nginx" deleted
2 [node1 ~]$ kubectl get pods -o wide
No resources found in default namespace.
[node1 ~]$
3 [node1 ~]$ vi rs-nginx.yaml
4 [node1 ~]$ kubectl create -f rs-nginx.yaml
replicaset.apps/rs-nginx created
5 [node1 ~]$ kubectl get pods --show-labels
NAME                READY   STATUS    RESTARTS   AGE   LABELS
rs-nginx-df9ns      1/1     Running   0           14s   app=webui
rs-nginx-l5gwj      1/1     Running   0           14s   app=webui
rs-nginx-xfb4b      1/1     Running   0           14s   app=webui
[node1 ~]$
6 [node1 ~]$ kubectl get replicaset
NAME          DESIRED   CURRENT   READY   AGE
rs-nginx      3          3         3       37s
[node1 ~]$
7 [node1 ~]$ kubectl get rs
NAME          DESIRED   CURRENT   READY   AGE
rs-nginx      3          3         3       44s
```


kubectl delete pods rs-nginx-XXXXXX

kubectl get pods --show-labels

```
1 [node1 ~]$ kubectl delete pods rs-nginx-df9ns
pod "rs-nginx-df9ns" deleted
2 [node1 ~]$ kubectl get pods --show-labels
```

NAME	READY	STATUS	RESTARTS	AGE	LABELS
rs-nginx-l5gwj	1/1	Running	0	91s	app=webui
rs-nginx-lvn54	1/1	Running	0	15s	app=webui
rs-nginx-xfb4b	1/1	Running	0	91s	app=webui

kubectl scale rs rs-nginx --replicas=2

kubectl get pods --show-labels

```
1 [node1 ~]$ kubectl scale rs rs-nginx --replicas=2
replicaset.apps/rs-nginx scaled
2 [node1 ~]$ kubectl get pods --show-labels
```

NAME	READY	STATUS	RESTARTS	AGE	LABELS
rs-nginx-l5gwj	1/1	Running	0	2m52s	app=webui
rs-nginx-lvn54	0/1	Terminating	0	96s	app=webui
rs-nginx-xfb4b	1/1	Running	0	2m52s	app=webui

```
3 [node1 ~]$ kubectl get pods --show-labels
```

NAME	READY	STATUS	RESTARTS	AGE	LABELS
rs-nginx-l5gwj	1/1	Running	0	3m3s	app=webui
rs-nginx-xfb4b	1/1	Running	0	3m3s	app=webui

2) Replicaset와 Pod와의 연관 관계

* Pod는 남겨두고 controller만 삭제

`kubectl delete rs rs-nginx --cascade=orphan`

`kubectl delete replicaset rs-nginx --cascade=orphan`



ReplicaSet
Controller

```
[node1 ~]$ kubectl delete rs rs-nginx --cascade=false
warning: --cascade=false is deprecated (boolean value) and can be replaced with --cascade=orphan.
replicaset.apps "rs-nginx" deleted
[node1 ~]$ kubectl get rs
No resources found in default namespace.
[node1 ~]$ kubectl get pods --show-labels
NAME                READY   STATUS    RESTARTS   AGE   LABELS
rs-nginx-l5gwj       1/1     Running   0           13m   app=webui
rs-nginx-xfb4b       1/1     Running   0           13m   app=webui
[node1 ~]$
```

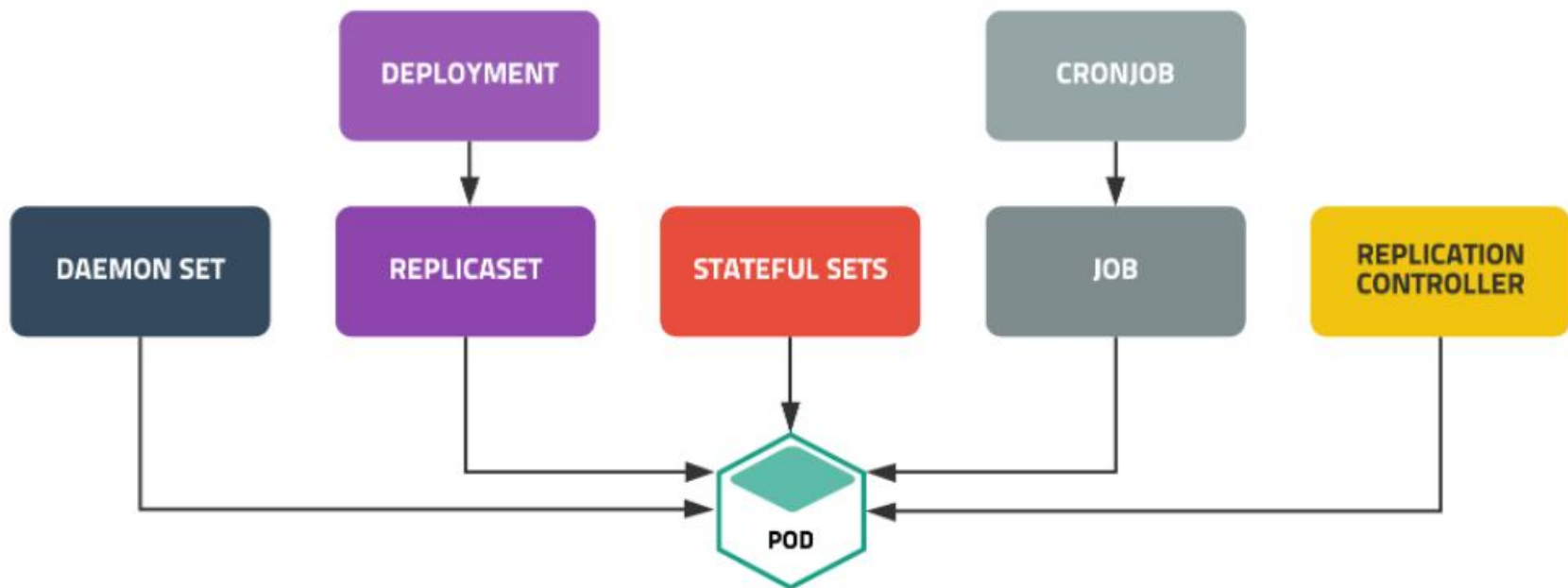
* `kubectl delete rs rs-nginx`

3. Deployment

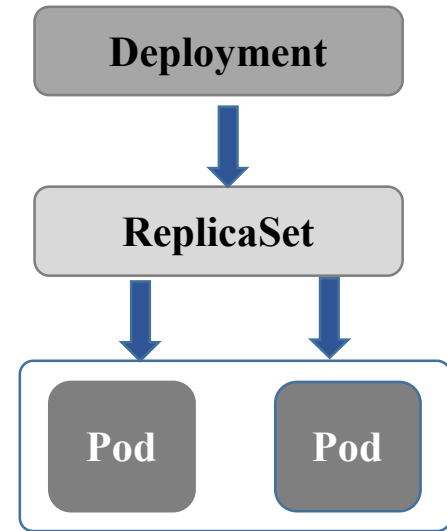
- ReplicaSet을 제어해주는 부모역할
- ReplicaSet을 컨트롤해서 Pod 수를 조절
- Rolling update & Rolling Back

Rolling Update

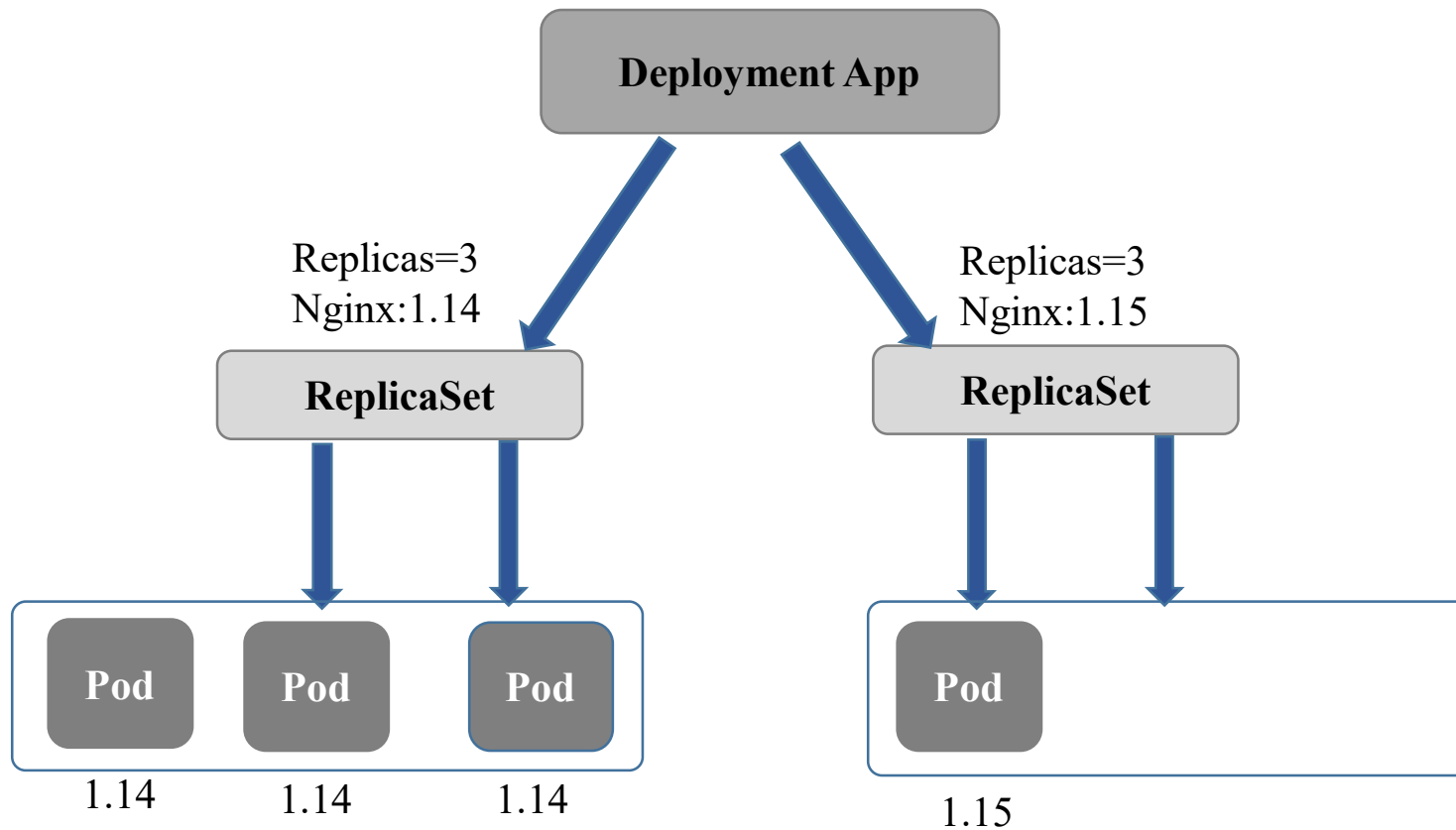
점진적으로 서비스 중단 없이 새로운 버전으로 업데이트



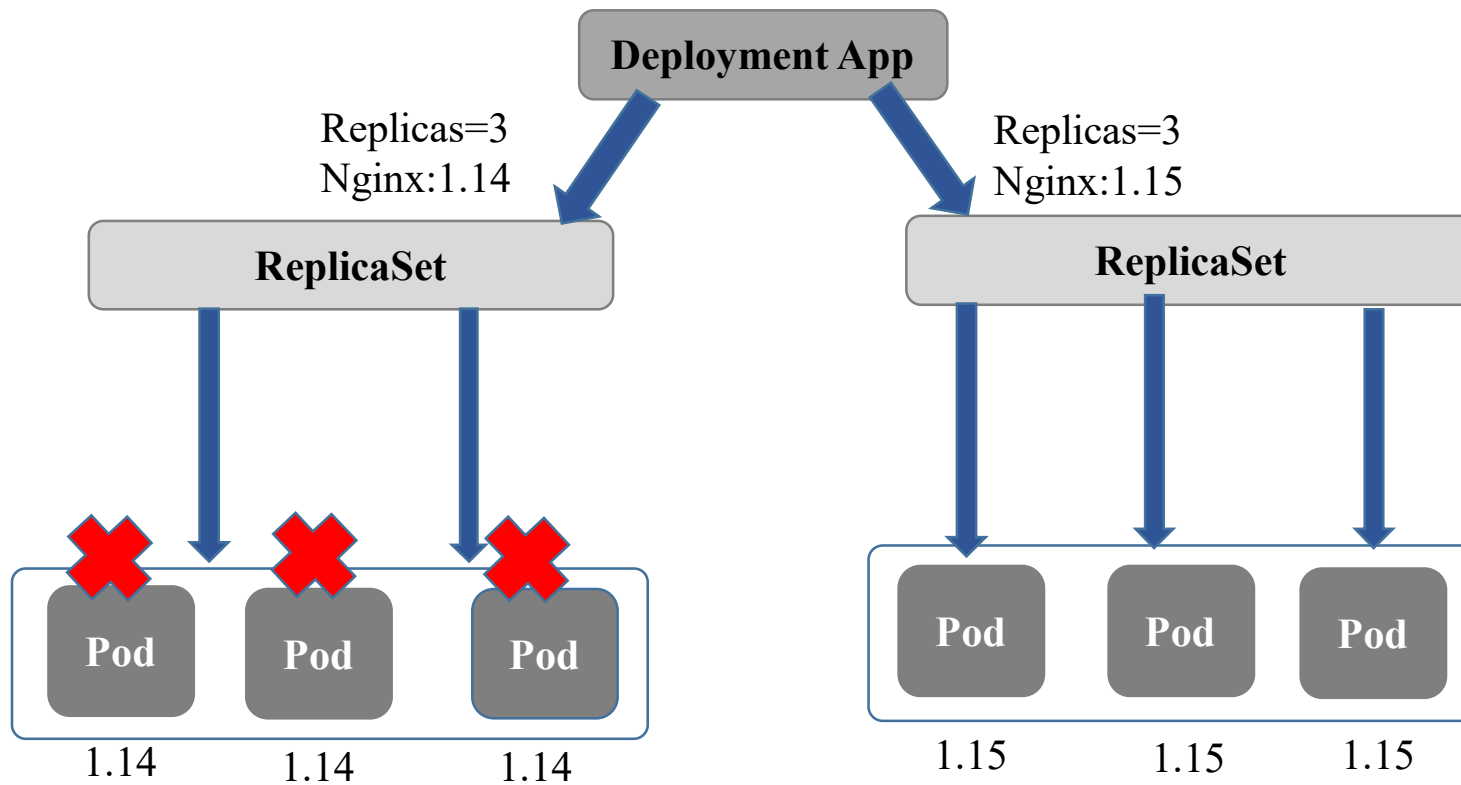
- ReplicaSet을 컨트롤해서 Pod수를 조절 실행시켜야 할 pod 개수를 유지
- Replicaset를 관리하면서 App 배포를 더 세밀하게 관리
 - App을 배포 시 rolling update
 - App 배포 도중 잠시 멈추거나 다시 배포 가능
 - App 배포 이후 이전 버전으로 rolling back 가능



```
kubectl set image deployment app-deploy app=nginx:1.15 --record
```



```
kubectl set image deployment app-deploy app=nginx:1.15 --record
```



<< rs-nginx.yaml >>

```
apiVersion: apps/v1
kind: ReplicaSet
```

```
metadata:
```

```
  name: rs-nginx
```

```
spec:
```

```
  replicas: 3
```

```
  selector:
```

```
    matchLabels:
```

```
      app: webui
```

```
  template:
```

```
    metadata:
```

```
      name: nginx-pod
```

```
      labels:
```

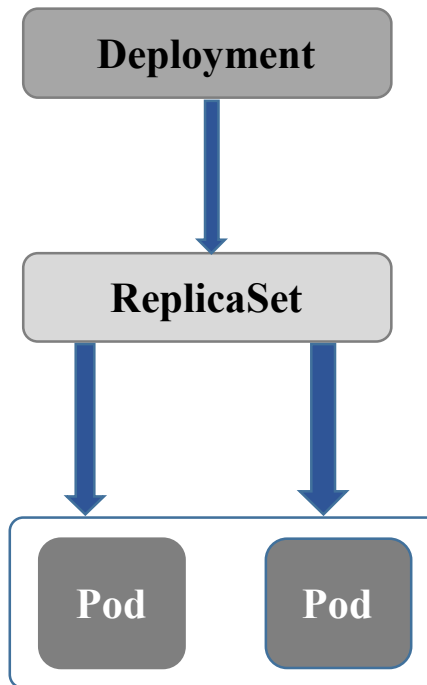
```
        app: webui
```

```
    spec:
```

```
      containers:
```

```
        - name: nginx-container
```

```
          image: nginx:1.14
```



<< deploy-nginx.yaml >>

```
apiVersion: apps/v1
kind: Deployment
```

```
metadata:
```

```
  name: deploy-nginx
```

```
spec:
```

```
  replicas: 3
```

```
  selector:
```

```
    matchLabels:
```

```
      app: webui
```

```
  template:
```

```
    metadata:
```

```
      name: nginx-pod
```

```
      labels:
```

```
        app: webui
```

```
    spec:
```

```
      containers:
```

```
        - name: nginx-container
```

```
          image: nginx:1.14
```

<< deploy-nginx.yaml >>

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: deploy-nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: webui
  template:
    metadata:
      name: nginx-pod
      labels:
        app: webui
    spec:
      containers:
        - name: nginx-container
          image: nginx:1.14
```

Deployment를 이용한 Pod 생성/유지

kubectl create -f deploy-nginx.yaml

kubectl get pods -o wide

kubectl get deploy,rs,pod

```
[node1 ~]$ vi deploy-nginx.yaml
[node1 ~]$ kubectl create -f deploy-nginx.yaml
deployment.apps/deploy-nginx created
[node1 ~]$ kubectl get pods -o wide
```

NAME	READY	STATUS	RESTARTS	AGE	IP	NODE
deploy-nginx-6d4c4cc4b8-4mjrg	1/1	Running	0	31s	10.5.3.2	node4
deploy-nginx-6d4c4cc4b8-dnlcc	1/1	Running	0	31s	10.5.2.2	node3
deploy-nginx-6d4c4cc4b8-xz2s9	1/1	Running	0	31s	10.5.1.2	node2

```
[node1 ~]$
[node1 ~]$ kubectl get deploy,rs,pod
```

NAME	READY	UP-TO-DATE	AVAILABLE	AGE
deployment.apps/deploy-nginx	3/3	3	3	45s

NAME	DESIRED	CURRENT	READY	AGE
replicaset.apps/deploy-nginx-6d4c4cc4b8	3	3	3	45s

NAME	READY	STATUS	RESTARTS	AGE
pod/deploy-nginx-6d4c4cc4b8-4mjrg	1/1	Running	0	45s
pod/deploy-nginx-6d4c4cc4b8-dnlcc	1/1	Running	0	45s
pod/deploy-nginx-6d4c4cc4b8-xz2s9	1/1	Running	0	45s

```
[node1 ~]$
```

kubectl delete pods deploy-nginx-XXXXXX-XXXXXXX

kubectl get pods

kubectl get rs deploy-nginx-XXXX

```
[node1 ~]$ kubectl delete pods deploy-nginx-6d4c4cc4b8-4mjrg
pod "deploy-nginx-6d4c4cc4b8-4mjrg" deleted
[node1 ~]$ kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
deploy-nginx-6d4c4cc4b8-dnlcc	1/1	Running	0	5m44s
deploy-nginx-6d4c4cc4b8-q4dft	1/1	Running	0	41s
deploy-nginx-6d4c4cc4b8-xz2s9	1/1	Running	0	5m44s

```
[node1 ~]$ kubectl get rs deploy-nginx-6d4c4cc4b8
```

NAME	DESIRED	CURRENT	READY	AGE
deploy-nginx-6d4c4cc4b8	3	3	3	7m9s

```
[node1 ~]$
```

<<replicaset 삭제>>

kubectl get rs

kubectl delete deploy-nginx-XXXX

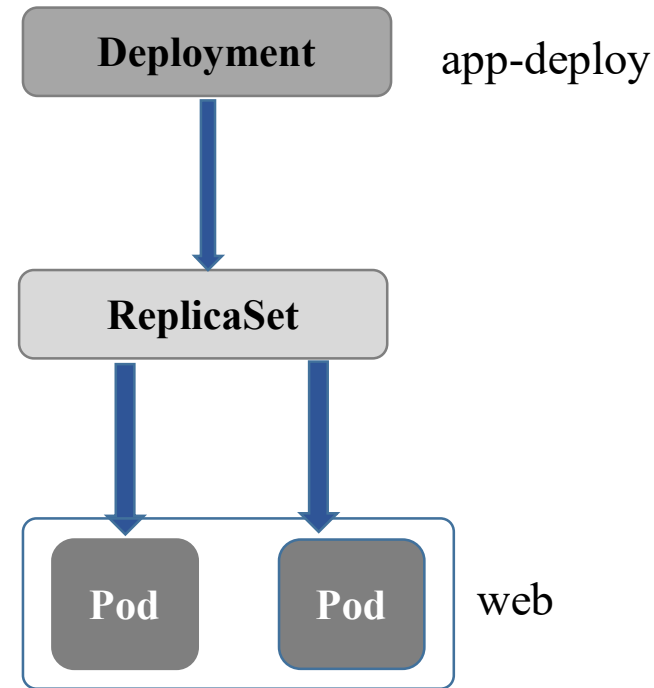
<<Deployment 삭제>>

kubectl get deploy

kubectl delete deployment deploy-nginx

Deployment Rolling Update

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: app-deploy
spec:
  selector:
    matchLabels:
      app: webui
  replicas: 3
  template:
    metadata:
      labels:
        app: webui
    spec:
      containers:
        - image: nginx:1.14
          name: web
          ports:
            - containerPort: 80
```



<< deployment-exam1.yaml >>

kubectl create -f deployment-exam1.yam **--record**

kubectl get deployment,rs,pod

```
controlplane $ vi deployment-exam1.yaml
controlplane $ kubectl create -f deployment-exam1.yaml --record
deployment.apps/app-deploy created
controlplane $ kubectl get deployment,rs,pod
```

NAME	READY	UP-TO-DATE	AVAILABLE	AGE
deployment.apps/app-deploy	0/3	3	0	14s

NAME	DESIRED	CURRENT	READY	AGE
replicaset.apps/app-deploy-7f6fffdcdd	3	3	0	14s

NAME	READY	STATUS	RESTARTS	AGE
pod/app-deploy-7f6fffdcdd-55vmx	0/1	ContainerCreating	0	14s
pod/app-deploy-7f6fffdcdd-6hh55	0/1	ContainerCreating	0	14s
pod/app-deploy-7f6fffdcdd-lql4w	0/1	ContainerCreating	0	14s

```
controlplane $
```

NAME	READY	STATUS	RESTARTS	AGE
pod/app-deploy-7f6fffdcdd-55vmx	0/1	ContainerCreating	0	14s
pod/app-deploy-7f6fffdcdd-6hh55	0/1	ContainerCreating	0	14s
pod/app-deploy-7f6fffdcdd-lq14w	0/1	ContainerCreating	0	14s

kubectl describe pods app-deploy-XXXXXX-XXXX

```
controlplane $ kubectl describe pods app-deploy-7f6fffdcdd-55vmx
Name:          app-deploy-7f6fffdcdd-55vmx
Namespace:     default
Priority:       0
Node:          node01/10.0.0.10
Start Time:    Wed, 11 May 2022 11:32:13 +0000
Labels:        app=webui
               pod-template-hash=7f6fffdcdd
Annotations:   <none>
Status:        Running
IP:            10.244.1.3
IPs:
  IP:          10.244.1.3
Controlled By: ReplicaSet/app-deploy-7f6fffdcdd
Containers:
  web:
    Container ID:  docker://4d318941b1917aaacbe3d3a5aa6a9ab7a45656db96c16792754
    Image:         nginx:1.14
    Image ID:      docker-pullable://nginx@sha256:f7988fb6c02e0ce69257d9bd9cf37
```


kubectl set image deployment app-deploy web=nginx:1.15 --record

```
controlplane $ kubectl set image deployment app-deploy web=nginx:1.15 --record
deployment.apps/app-deploy image updated
controlplane $ kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
app-deploy-67777997f5-6891v	1/1	Running	0	9s
app-deploy-7f6fffdcdd-55vmx	1/1	Running	0	3m2s
app-deploy-7f6fffdcdd-6hh55	1/1	Running	0	3m2s
app-deploy-7f6fffdcdd-lql4w	1/1	Running	0	3m2s

```
controlplane $ kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
app-deploy-67777997f5-6891v	1/1	Running	0	11s
app-deploy-67777997f5-15wvm	0/1	ContainerCreating	0	2s
app-deploy-7f6fffdcdd-55vmx	1/1	Running	0	3m4s
app-deploy-7f6fffdcdd-6hh55	1/1	Running	0	3m4s
app-deploy-7f6fffdcdd-lql4w	1/1	Terminating	0	3m4s

kubectl get pods

```
controlplane $ kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
app-deploy-67777997f5-6891v	1/1	Running	0	46s
app-deploy-67777997f5-h9fmd	1/1	Running	0	34s
app-deploy-67777997f5-15wvm	1/1	Running	0	37s

```
controlplane $
```

```
controlplane $ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
app-deploy-67777997f5-689lv        1/1     Running   0           46s
app-deploy-67777997f5-h9fmd        1/1     Running   0           34s
app-deploy-67777997f5-l5wwm        1/1     Running   0           37s
controlplane $
```

```
controlplane $ kubectl describe pods app-deploy-67777997f5-689lv
Name:                               app-deploy-67777997f5-689lv
Namespace:                           default
Priority:                             0
Node:                                node01/10.0.0.10
Start Time:                          Wed, 11 May 2022 11:35:06 +0000
Labels:                              app=webui
                                      pod-template-hash=67777997f5
Annotations:                          <none>
Status:                              Running
IP:                                  10.244.1.6
IPs:
  IP:                                10.244.1.6
Controlled By:                        ReplicaSet/app-deploy-67777997f5
Containers:
  web:
    Container ID:                     docker://1000a6255b6986d395a1de9f2a724ac3ea26d8bb6b290d31ee6
    Image:                            nginx:1.15
    Image ID:                         docker-pullable://nginx@sha256:23b4dcdf0d34d4a129755fc6f52e1
```


Deployment Rolling Update

kubectl set image deploy app-deploy web=nginx:1.16 --record

kubectl set image deploy app-deploy web=nginx:1.17 --record

kubectl set image deploy app-deploy web=nginx:1.15 --record

kubectl rollout *status* deployment app-deploy

kubectl rollout *pause* deployment app-deploy

kubectl rollout *resume* deployment app-deploy

kubectl rollout history deploy *app-deploy*

```
controlplane $ kubectl rollout history deploy app-deploy
deployment.apps/app-deploy
REVISION  CHANGE-CAUSE
7          kubectl create --filename=deployment-exam1.yaml --record=true
10         kubectl set image deployment app-deploy web=nginx:1.16 --record=true
11         kubectl set image deployment app-deploy web=nginx:1.17 --record=true
12         kubectl set image deployment app-deploy web=nginx:1.15 --record=true
```

Deployment Rolling Update

kubectl set image deploy app-deploy web=nginx:1.16 --record

kubectl set image deploy app-deploy web=nginx:1.17 --record

kubectl set image deploy app-deploy web=nginx:1.15 --record

kubectl rollout *status* deployment app-deploy

kubectl rollout *pause* deployment app-deploy

kubectl rollout *resume* deployment app-deploy

kubectl rollout history deploy *app-deploy*

```
controlplane $ kubectl rollout history deploy app-deploy
deployment.apps/app-deploy
REVISION  CHANGE-CAUSE
7          kubectl create --filename=deployment-exam1.yaml --record=true
10         kubectl set image deployment app-deploy web=nginx:1.16 --record=true
11         kubectl set image deployment app-deploy web=nginx:1.17 --record=true
12         kubectl set image deployment app-deploy web=nginx:1.15 --record=true
```

Deployment Rolldown

```
kubectl rollout history deploy app-deploy
```

```
kubectl rollout undo deploy app-deploy
```

```
kubectl rollout undo deploy app-deploy --to-revision=2
```

```
kubectl describe pods app-deploy-XXXXXX-XXXX
```

```
kubectl create -f deployment-exam2.yaml --record
```

```
Kubectl get deployment,rs,pod
```

```
nano deployment-exam2.yaml
```

```
kubectl apply -f deployment-exam2.yaml
```

```
kubectl rollout history deploy deploy-nginx
```