Core concepts- 13%

Pod

1	Kubectl run –dry-run –o yaml nginx --image=nginx --restart=Never -l name=abc,boy=karthi --env=location=jp --env=cnt=jp -port=80 -- /bin/sh -c "echo hi world" > pod.yaml
2	kubectl run --generator=run-pod/v1 nginx --image=nginx --port=8080 --command echo hi
3	kubectl get pod podname –o yaml –export > pod.yaml
4	kubectl set image pod/nginx nginx=nginx:1.7.1
5	kubectl exec podname -it bash **or** kubectl exec podname –it -- /bin/sh # get inside the pod

ReplicationController

1	kubectl run replicontrolr --generator=run/v1 --image=redis --replicas=2 --dry-run -o yaml

ReplicaSet

1	kubectl run --generator=deployment/v1beta1 nginx --image=nginx --dry-run --replicas=4 -o yaml // edit the Deployment to replicaSet , remove strategy and empty properties
2	kubectl scale –replicas=3 rc/rc1 rc/rc2 rc/rc3 | kubectl scale deploy mydeploy –replicas=5

Deployments

1	kubectl run --dry-run nginx --image=nginx -l name=abc,boy=karthi --env=location=jp --env=cnt=jp --port=80 -o yaml --replicas=5 -- /bin/sh -c "echo hi world" > dep.yaml
2	kubectl set image deploy nginx nginx=nginx:1.7.1
3	kubectl run --generator=deployment/v1beta1 nginx --image=nginx --dry-run --replicas=4 -o yaml
4	kubectl autoscale deploy nginx --min=5 --max=10 --cpu-percent=80 --dry-run -o yaml

Service:

1	kubectl create service clusterip ngservice --tcp=80:80 --dry-run -o yaml
2	kubectl create service nodeport nginx --tcp=80:8000 --node-port=30080 --dry-run -o yaml
3	kubectl expose deployment nginx --type=NodePort --port=80 --target-port=8000 --name=nginx-serv --dry-run -o yaml kubectl expose deployment nginx –port=80 –target-port=8000
4	kubectl run --image=nginx ng --port=8080 --expose --dry-run -o yaml kubectl run nginx --image=nginx --restart=Never --port=80 --expose

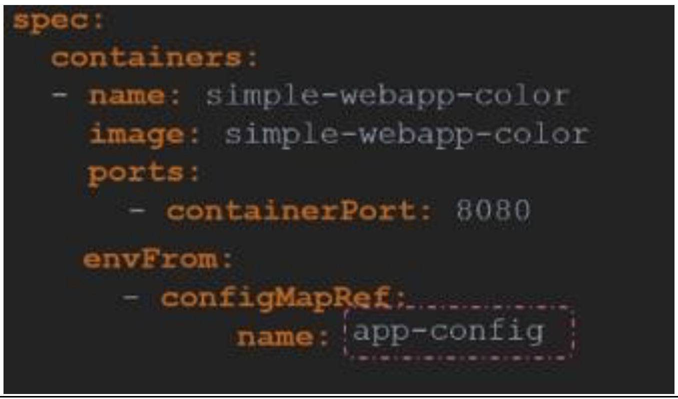
NameSpaces:

1.	Kubectl create namespace mynamespace
2	kubectl get all --all-namespaces
3	kubectl run nginx –image=nginx –n mynamespace

MultiPod container- 10%

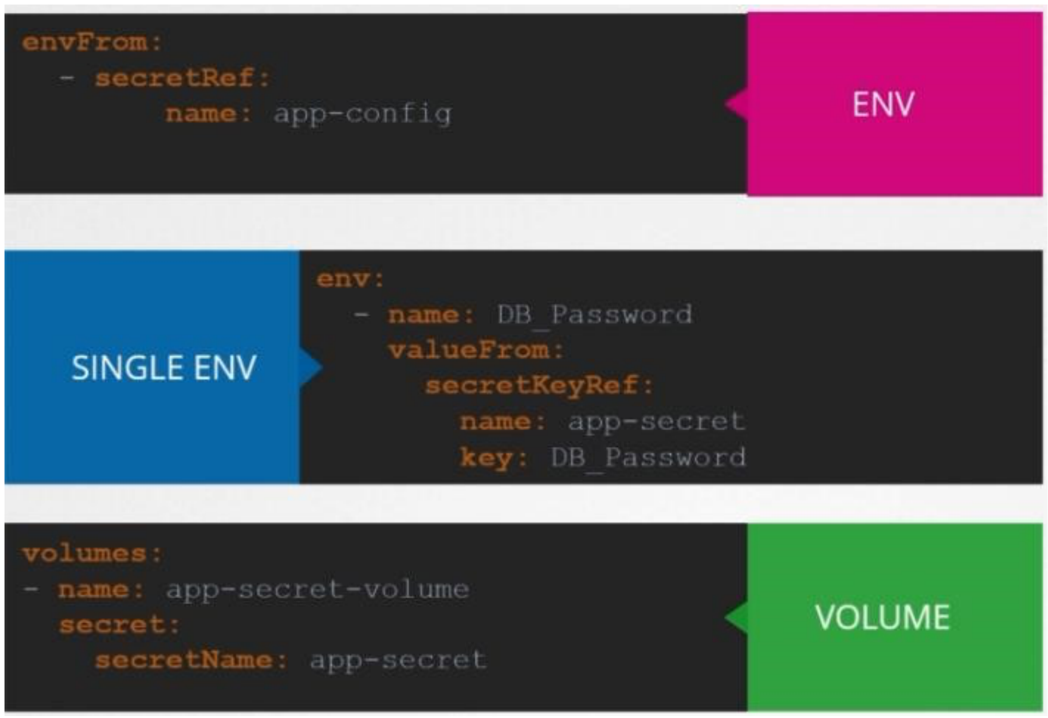
	Patterns : Side car , Adapter, ambassador
	Generate single container and Practise copy paste many containers Insering Env variables/ mounting Volumes
1	kubectl exec –it pod-name -c container-name-2 -- /bin/sh

Configurations- 18%

1.	Know about command (entryPoint) and args (cmd) , env
2.	Kubectl create cm app-config –from-litereal=name=abc –from-literal=boy=karth
3.	 `spec:` / `containers:` / `- name: simple-webapp-color` / `image: simple-webapp-color` / `ports:` / `- containerPort: 8080` / `envFrom:` / `- configMapRef:` / `name: app-config`
4.	Kubectl create secret generic app-secret –from-literal=DB_HOST=mysql

```yaml
spec:
  containers:
  - name: simple-webapp-color
    image: simple-webapp-color
    ports:
      - containerPort: 8080
    envFrom:
      - configMapRef:
            name: app-config
```

5



```
envFrom:
  - secretRef:
        name: app-config
```

```
env:
  - name: DB_Password
    valueFrom:
      secretKeyRef:
        name: app-secret
        key: DB_Password
```

```
volumes:
- name: app-secret-volume
  secret:
    secretName: app-secret
```

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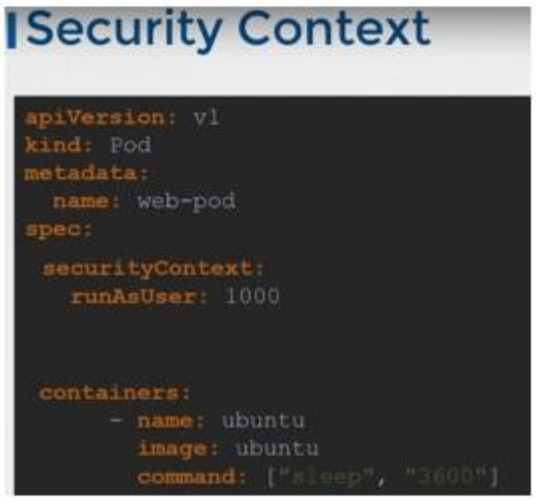
Security contexts

Pod level:

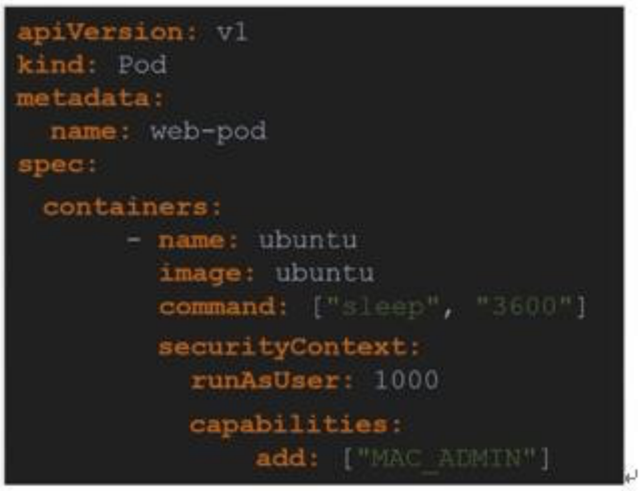


Security Context

```
apiVersion: v1
kind: Pod
metadata:
  name: web-pod
spec:
 securityContext:
   runAsUser: 1000


 containers:
       - name: ubuntu
         image: ubuntu
         command: ["sleep", "3600"]
```

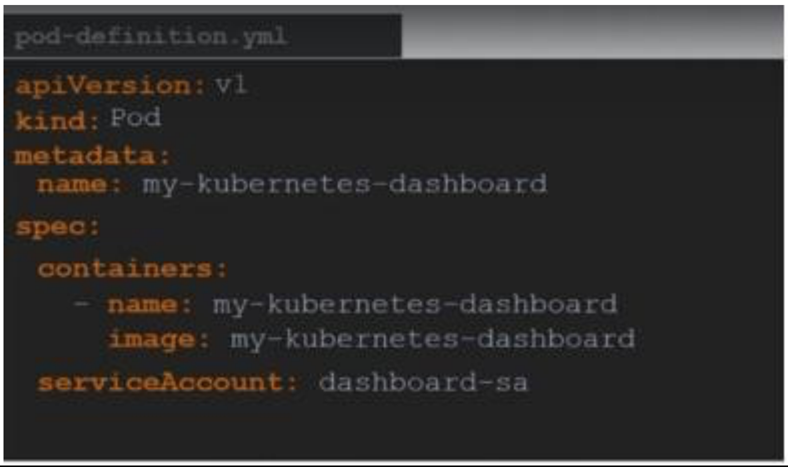
Container level (here only capabilities supported)



```
apiVersion: v1
kind: Pod
metadata:
  name: web-pod
spec:
  containers:
        - name: ubuntu
          image: ubuntu
          command: ["sleep", "3600"]
          securityContext:
            runAsUser: 1000
            capabilities:
                add: ["MAC_ADMIN"]
```

7. Kubectl create sa my-service-account

8



```
pod-definition.yml

apiVersion: v1
kind: Pod
metadata:
 name: my-kubernetes-dashboard
spec:
 containers:
   - name: my-kubernetes-dashboard
     image: my-kubernetes-dashboard
 serviceAccount: dashboard-sa
```

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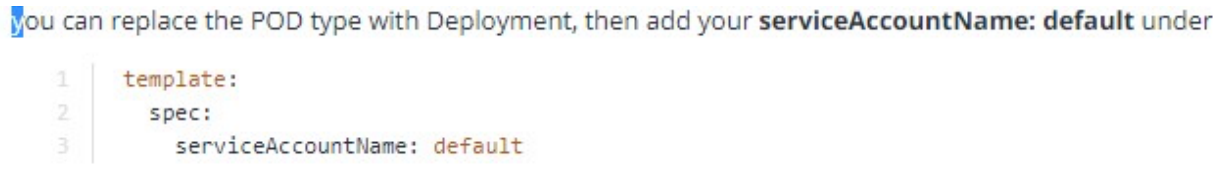


you can replace the POD type with Deployment, then add your **serviceAccountName: default** under

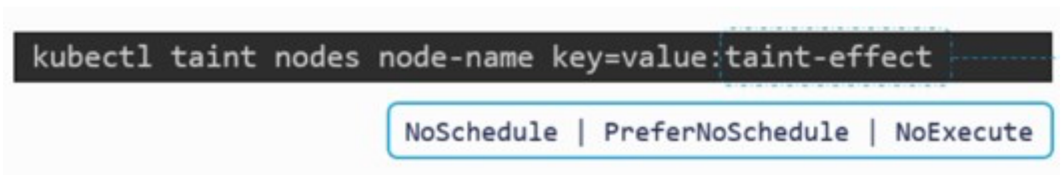
```
template:
  spec:
    serviceAccountName: default
```

10

kubectl run nginx --image=nginx --restart=Never

--requests=cpu=100m,memory=256Mi --limits=cpu=200m,memory=512Mi --dry-run -o yaml

11



```
kubectl taint nodes node-name key=value:taint-effect
```

NoSchedule | PreferNoSchedule | NoExecute

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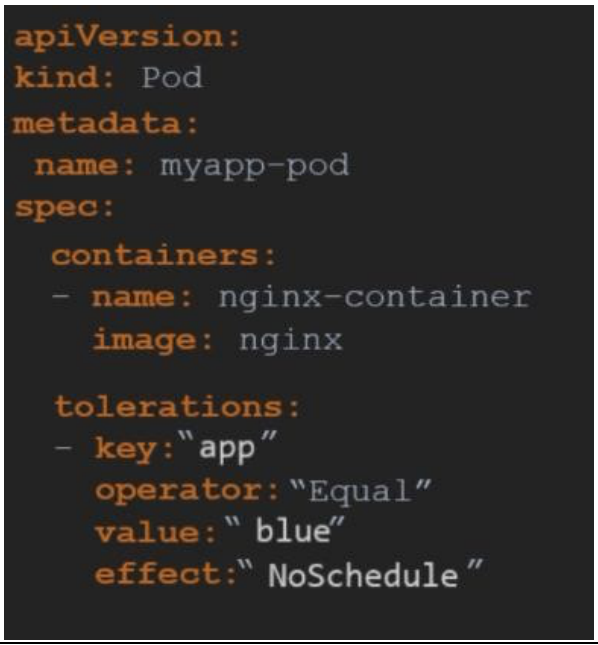
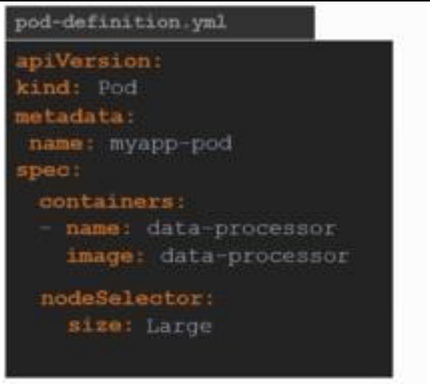


```
apiVersion:
kind: Pod
metadata:
 name: myapp-pod
spec:
  containers:
  - name: nginx-container
    image: nginx

  tolerations:
  - key:"app"
    operator:"Equal"
    value:" blue"
    effect:" NoSchedule "
```

13

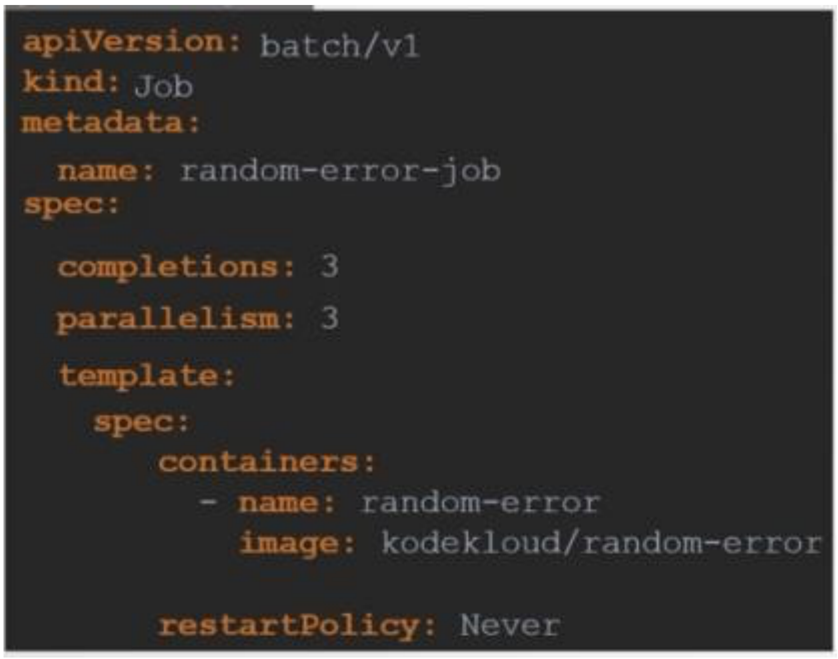
Kubectl label node node-name size=Large

14	 pod-definition.yml
	`apiVersion:`
	`kind: Pod`
	`metadata:`
	`  name: myapp-pod`
	`spec:`
	`  containers:`
	`  - name: data-processor`
	`    image: data-processor`
	`  nodeSelector:`
	`    size: Large`

15	Node affinity -> more options In, NotIn, Exists, DoesNotExist, Gt, Lt ; Get template from k8s.io/docs

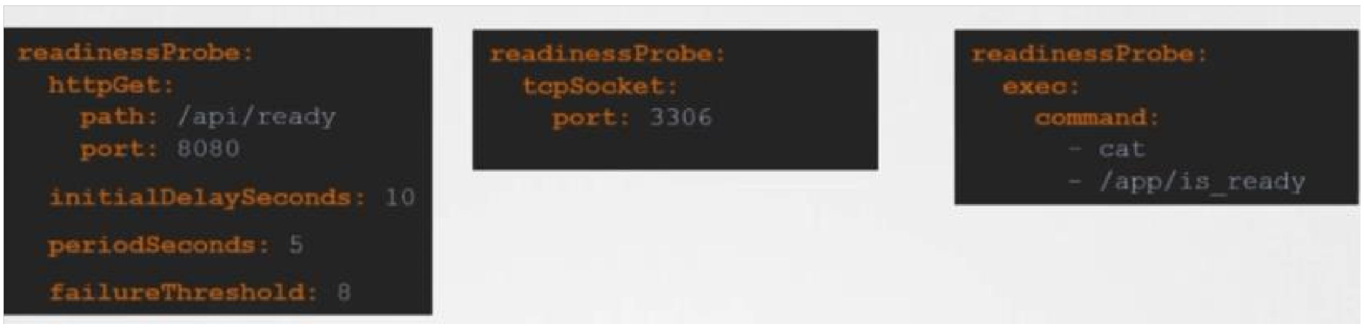
POD DESIGN – 20%

1	Kubectl get pods –selector app=App1 Kubectl get pod –show-labels // to display all labels Kubectl get pod –L app // capital L for only specifying Key . Kubectl get pod –l app=karthi
2	kubectl label pod nginx2 app=v2 kubectl label pod nginx2 app=v2 –overwrite kubectl label po nginx1 nginx2 nginx3 app- // to remove app label from the pods
3	kubectl annotate po nginx1 nginx2 nginx3 description='my description' kubectl annotate po nginx1 nginx2 nginx3 description- Kubectl rollout status deployment my-app-deployment
	Kubectl rollout history deployment my-app-deployment kubectl rollout pause deploy nginx // to pause the rollout kubectl rollout resume deploy nginx
4	Strategy -> Recreate and Rolling update
5	kubectl rollout undo deployment/mydeploy kubectl rollout undo deploy nginx --to-revision=2
6	kubectl run --generator=job/v1 --image=ubuntu myjob --restart=OnFailure -- /bin/sh -c 'echo hello;sleep 30;echo world'

	 **backoffLimit: 25 # This is so the job does not quit before it succeeds**
	kubectl run --generator=cronjob/v1beta1 --image=ubuntu cron-job --restart=Never --schedule="30 21 * * *"

```yaml
apiVersion: batch/v1
kind: Job
metadata:
  name: random-error-job
spec:
  completions: 3
  parallelism: 3
  template:
    spec:
      containers:
        - name: random-error
          image: kodekloud/random-error

      restartPolicy: Never
```

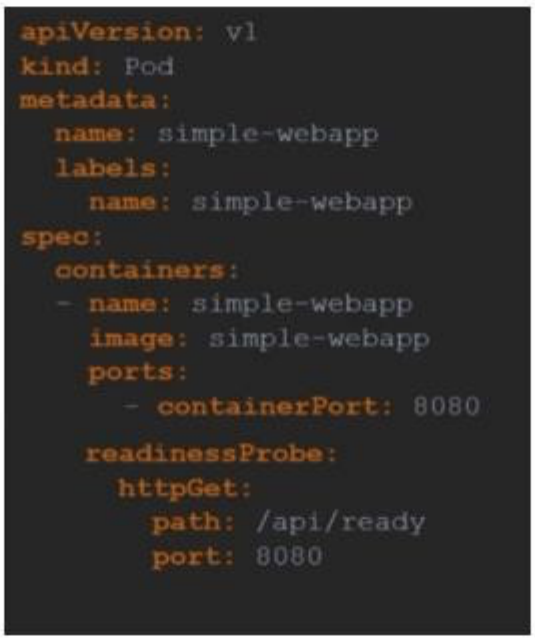
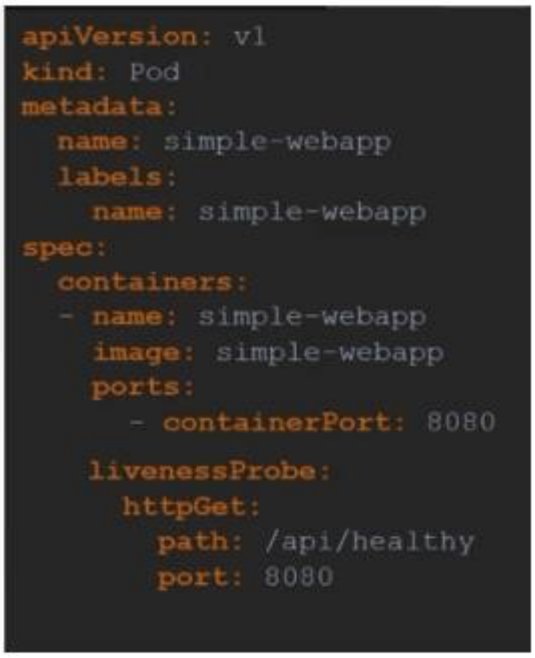
Observability – 18%

1.	

```yaml
readinessProbe:
  httpGet:
    path: /api/ready
    port: 8080
  initialDelaySeconds: 10
  periodSeconds: 5
  failureThreshold: 8
```

```yaml
readinessProbe:
  tcpSocket:
    port: 3306
```

```yaml
readinessProbe:
  exec:
    command:
      - cat
      - /app/is_ready
```

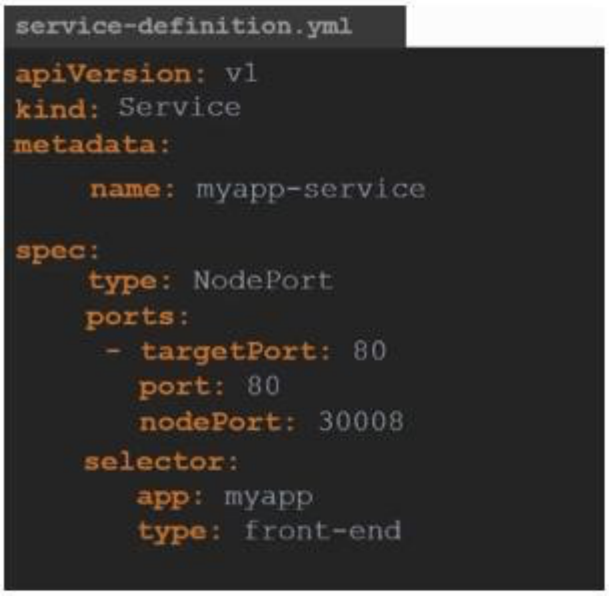
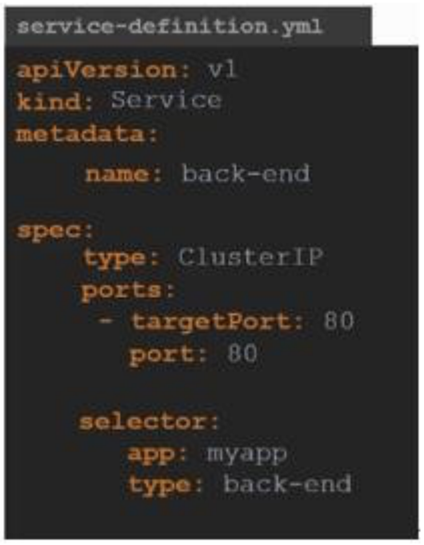
2	 

```yaml
apiVersion: v1
kind: Pod
metadata:
  name: simple-webapp
  labels:
    name: simple-webapp
spec:
  containers:
  - name: simple-webapp
    image: simple-webapp
    ports:
      - containerPort: 8080

    readinessProbe:
      httpGet:
        path: /api/ready
        port: 8080
```

```yaml
apiVersion: v1
kind: Pod
metadata:
  name: simple-webapp
  labels:
    name: simple-webapp
spec:
  containers:
  - name: simple-webapp
    image: simple-webapp
    ports:
      - containerPort: 8080

    livenessProbe:
      httpGet:
        path: /api/healthy
        port: 8080
```

3	Kubectl logs –f pod-name container-name Kubectl logs podname
4	Kubectl top node

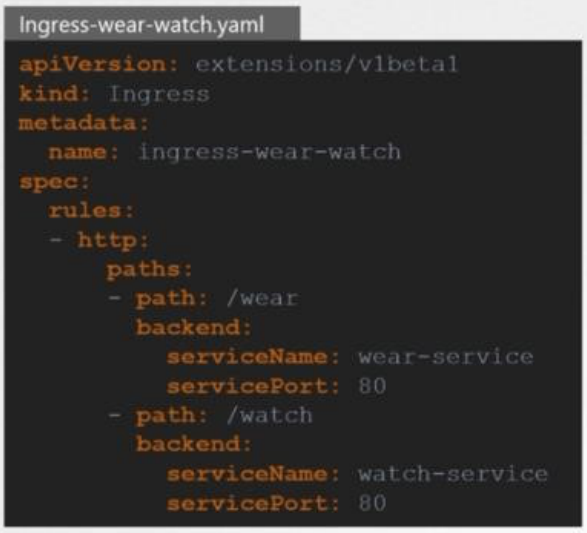
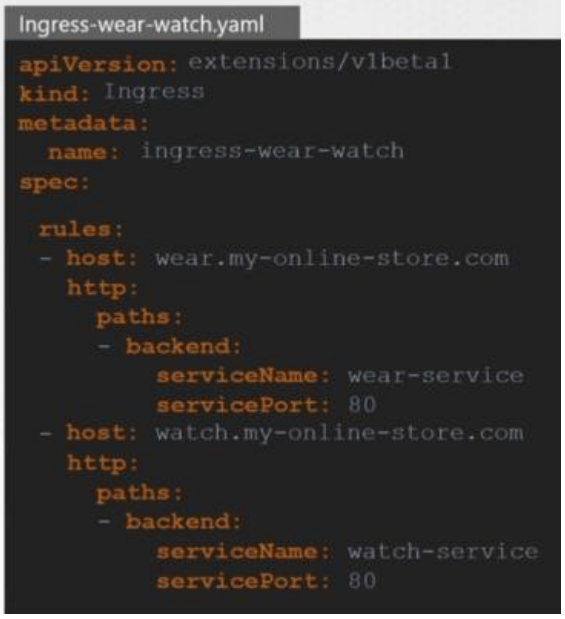
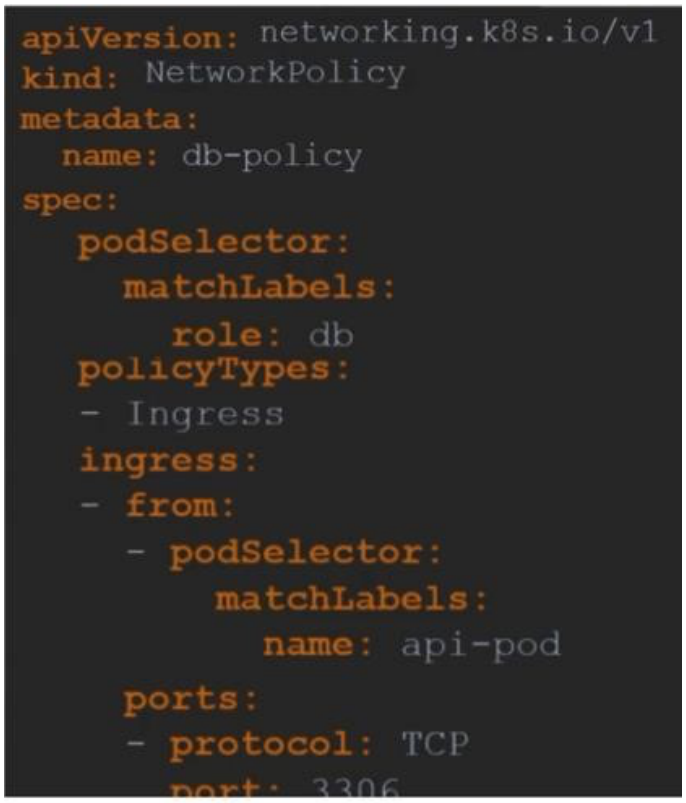
Network and Services – 13%

1	 

```yaml
service-definition.yml
apiVersion: v1
kind: Service
metadata:

    name: myapp-service

spec:
    type: NodePort
    ports:
     - targetPort: 80
       port: 80
       nodePort: 30008
    selector:
       app: myapp
       type: front-end
```

```yaml
service-definition.yml
apiVersion: v1
kind: Service
metadata:

    name: back-end

spec:
    type: ClusterIP
    ports:
     - targetPort: 80
       port: 80

    selector:
       app: myapp
       type: back-end
```

2	**kubectl create service nodeport webapp-service --node-port=30080 --tcp=8080:8080 --dry-run -o yaml > t.yaml**

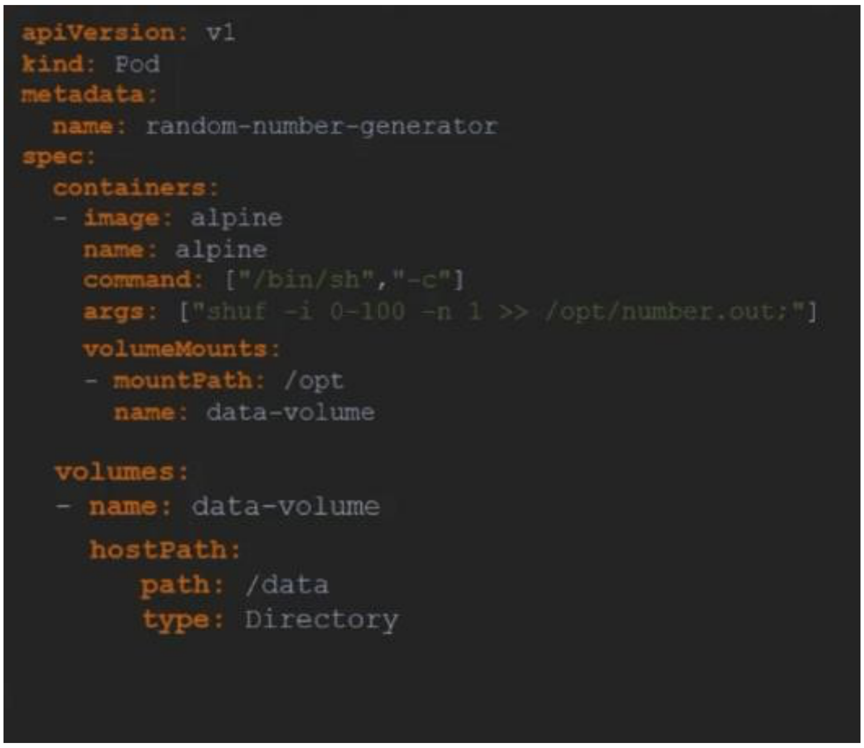
	kubectl run nginx --image=nginx --restart=Never --port=80 --expose
3	 
4	

```yaml
apiVersion: extensions/v1beta1
kind: Ingress
metadata:
  name: ingress-wear-watch
spec:
  rules:
  - http:
      paths:
      - path: /wear
        backend:
          serviceName: wear-service
          servicePort: 80
      - path: /watch
        backend:
          serviceName: watch-service
          servicePort: 80
```

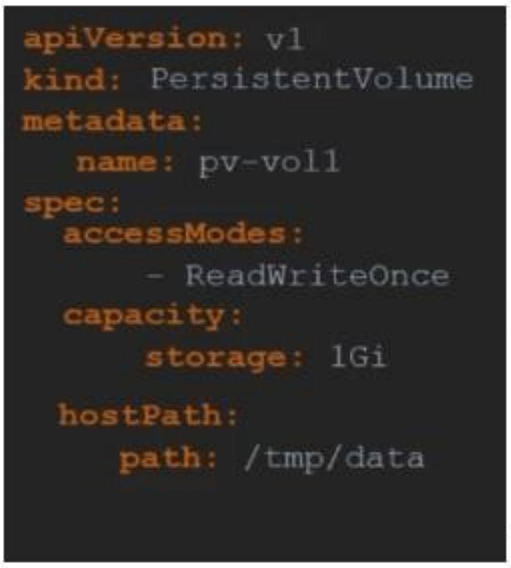
```yaml
apiVersion: extensions/v1beta1
kind: Ingress
metadata:
  name: ingress-wear-watch
spec:

 rules:
 - host: wear.my-online-store.com
   http:
     paths:
     - backend:
         serviceName: wear-service
         servicePort: 80
 - host: watch.my-online-store.com
   http:
     paths:
     - backend:
         serviceName: watch-service
         servicePort: 80
```

```yaml
apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
  name: db-policy
spec:
  podSelector:
    matchLabels:
      role: db
  policyTypes:
  - Ingress
  ingress:
  - from:
    - podSelector:
        matchLabels:
          name: api-pod
    ports:
    - protocol: TCP
      port: 3306
```

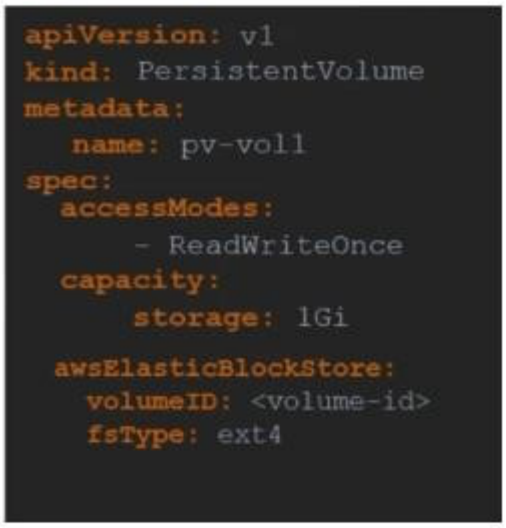
State Persistence – 8%



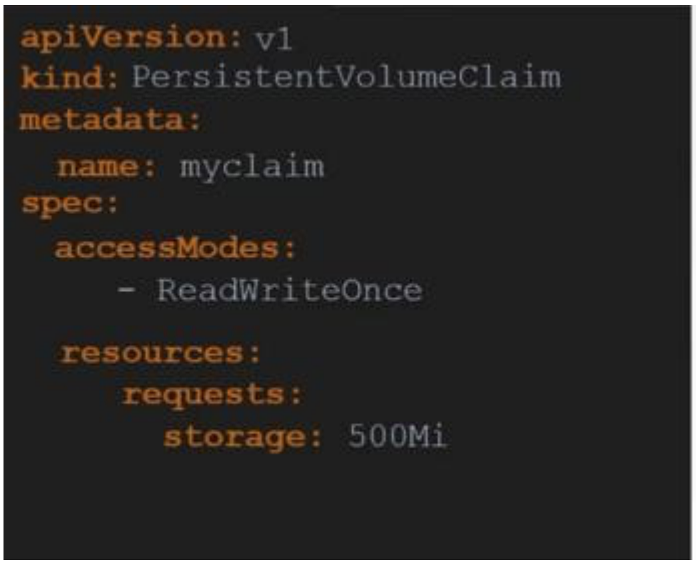
```
apiVersion: v1
kind: Pod
metadata:
  name: random-number-generator
spec:
  containers:
  - image: alpine
    name: alpine
    command: ["/bin/sh","-c"]
    args: ["shuf -i 0-100 -n 1 >> /opt/number.out;"]
    volumeMounts:
    - mountPath: /opt
      name: data-volume

  volumes:
  - name: data-volume
    hostPath:
       path: /data
       type: Directory
```



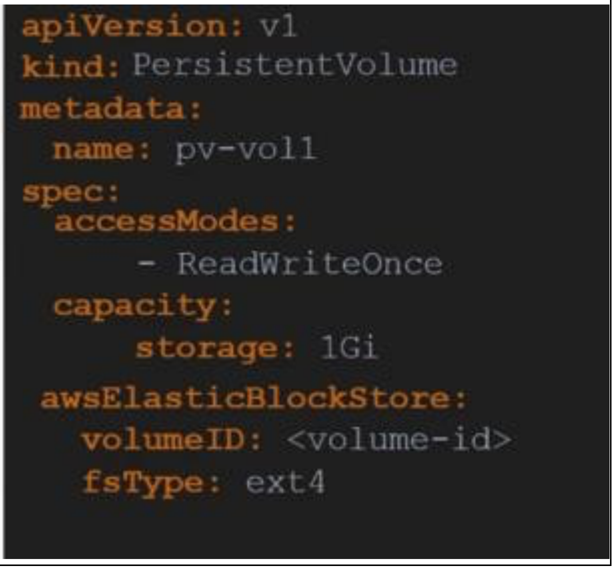
```
apiVersion: v1
kind: PersistentVolume
metadata:
   name: pv-vol1
spec:
  accessModes:
       - ReadWriteOnce
  capacity:
       storage: 1Gi
  hostPath:
      path: /tmp/data
```



```
apiVersion: v1
kind: PersistentVolume
metadata:
   name: pv-vol1
spec:
  accessModes:
       - ReadWriteOnce
  capacity:
       storage: 1Gi
  awsElasticBlockStore:
    volumeID: <volume-id>
    fsType: ext4
```

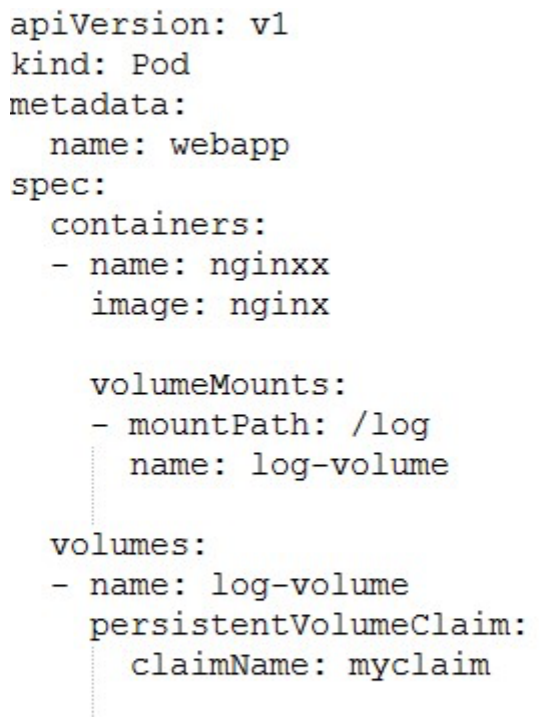


```yaml
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: myclaim
spec:
  accessModes:
     - ReadWriteOnce

  resources:
     requests:
       storage: 500Mi
```



```yaml
apiVersion: v1
kind: PersistentVolume
metadata:
  name: pv-vol1
spec:
  accessModes:
       - ReadWriteOnce
  capacity:
       storage: 1Gi
  awsElasticBlockStore:
    volumeID: <volume-id>
    fsType: ext4
```

Use PVC in the POD



```yaml
apiVersion: v1
kind: Pod
metadata:
  name: webapp
spec:
  containers:
  - name: nginxx
    image: nginx

    volumeMounts:
    - mountPath: /log
      name: log-volume

  volumes:
  - name: log-volume
    persistentVolumeClaim:
      claimName: myclaim
```