

Kubernetes Mini-Project

Prerequisites:

- › Containerize (*Dockerize*) our usual lovely apache application.
- › Push the Docker image to your DockerHub account.

Kubernetes:

- › Deploy an EKS cluster call **playground-cluster** with 3 nodes in **us-west-2**.
- › Create a **Deployment** for our apache application with two (5) replica of your pod.
- › Create a **Load Balancer service** to expose our apache application on port 80.
- › Create a GITHUB repository call **kubernetes-apache-webapp** and upload your Dockerfile alongside with all your Kubernetes manifest files.

Submission:

- › Your github repo link
- › Screenshot of command *kubecttl describe service* and *kubecttl describe pod*
- › Screenshot of your app running



1- Screenshot showing EKS cluster called playground-cluster with 3 nodes

```
2024-08-20 23:21:08 [I] waiting for CloudFormation stack "eksctl-playground-cluster-cluster"
2024-08-20 23:21:39 [I] waiting for CloudFormation stack "eksctl-playground-cluster-cluster"
2024-08-20 23:22:39 [I] waiting for CloudFormation stack "eksctl-playground-cluster-cluster"
2024-08-20 23:23:40 [I] waiting for CloudFormation stack "eksctl-playground-cluster-cluster"
2024-08-20 23:24:40 [I] waiting for CloudFormation stack "eksctl-playground-cluster-cluster"
2024-08-20 23:25:41 [I] waiting for CloudFormation stack "eksctl-playground-cluster-cluster"
2024-08-20 23:26:41 [I] waiting for CloudFormation stack "eksctl-playground-cluster-cluster"
2024-08-20 23:27:42 [I] waiting for CloudFormation stack "eksctl-playground-cluster-cluster"
2024-08-20 23:28:42 [I] waiting for CloudFormation stack "eksctl-playground-cluster-cluster"
2024-08-20 23:29:43 [I] waiting for CloudFormation stack "eksctl-playground-cluster-cluster"
2024-08-20 23:29:46 [I] recommended policies were found for "vpc-cni" addon, but since OIDC is disabled on the cluster, eksctl cannot configure the requested permissions; the recommended way to provide IAM permissions for "vpc-cni" addon is via pod identity associations; after addon creation is completed, add all recommended policies to the config file, under "addon.PodIdentityAssociations", and run "eksctl update add
on"
2024-08-20 23:29:46 [I] creating addon
2024-08-20 23:29:47 [I] successfully created addon
2024-08-20 23:29:48 [I] creating addon
2024-08-20 23:29:48 [I] successfully created addon
2024-08-20 23:29:49 [I] creating addon
2024-08-20 23:29:49 [I] successfully created addon
2024-08-20 23:31:52 [I] building managed nodegroup stack "eksctl-playground-cluster-nodegroup-ng-fdae8e0d"
2024-08-20 23:31:53 [I] deploying stack "eksctl-playground-cluster-nodegroup-ng-fdae8e0d"
2024-08-20 23:31:53 [I] waiting for CloudFormation stack "eksctl-playground-cluster-nodegroup-ng-fdae8e0d"
2024-08-20 23:32:23 [I] waiting for CloudFormation stack "eksctl-playground-cluster-nodegroup-ng-fdae8e0d"
2024-08-20 23:33:07 [I] waiting for CloudFormation stack "eksctl-playground-cluster-nodegroup-ng-fdae8e0d"
2024-08-20 23:34:48 [I] waiting for CloudFormation stack "eksctl-playground-cluster-nodegroup-ng-fdae8e0d"
2024-08-20 23:34:48 [I] waiting for the control plane to become ready
2024-08-20 23:34:49 [✓] saved kubeconfig as "C:\Users\tache\.kube\config"
2024-08-20 23:34:49 [I] no tasks
2024-08-20 23:34:49 [✓] all EKS cluster resources for "playground-cluster" have been created
2024-08-20 23:34:49 [✓] created 0 nodegroup(s) in cluster "playground-cluster"
2024-08-20 23:34:49 [I] nodegroup "ng-fdae8e0d" has 3 node(s)
2024-08-20 23:34:49 [I] node "ip-192-168-20-171.us-west-2.compute.internal" is ready
2024-08-20 23:34:49 [I] node "ip-192-168-32-42.us-west-2.compute.internal" is ready
2024-08-20 23:34:49 [I] node "ip-192-168-89-189.us-west-2.compute.internal" is ready
2024-08-20 23:34:49 [I] waiting for at least 3 node(s) to become ready in "ng-fdae8e0d"
2024-08-20 23:34:49 [I] nodegroup "ng-fdae8e0d" has 3 node(s)
2024-08-20 23:34:49 [I] node "ip-192-168-20-171.us-west-2.compute.internal" is ready
2024-08-20 23:34:49 [I] node "ip-192-168-32-42.us-west-2.compute.internal" is ready
2024-08-20 23:34:49 [I] node "ip-192-168-89-189.us-west-2.compute.internal" is ready
2024-08-20 23:34:49 [✓] created 1 managed nodegroup(s) in cluster "playground-cluster"
2024-08-20 23:34:51 [I] kubecttl command should work with "C:\Users\tache\.kube\config", try 'kubecttl get nodes'
2024-08-20 23:34:51 [✓] EKS cluster "playground-cluster" in "us-west-2" region is ready
PS C:\WINDOWS\system32> kubecttl get nodes
NAME                                STATUS  ROLES  AGE  VERSION
ip-192-168-20-171.us-west-2.compute.internal Ready  <none>  3m48s  v1.30.2-eks-1552a00
ip-192-168-32-42.us-west-2.compute.internal Ready  <none>  3m52s  v1.30.2-eks-1552a00
ip-192-168-89-189.us-west-2.compute.internal Ready  <none>  3m55s  v1.30.2-eks-1552a00
PS C:\WINDOWS\system32>
```

EKS > Clusters

Clusters (1) Info

Filter clusters

< 1 >

Cluster name	Status	Kubernetes version	Support period	Upgrade poli...	Created
playground-cluster	Active	1.30	Standard support until July 28, 2025	Extended	27 minutes ago

Instances (3) Info

Last updated 3 minutes ago

Connect

Instance state

Actions

Launch instances

Find Instance by attribute or tag (case-sensitive)

Running

< 1 >

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IP
playground-cl...	i-0f50e46ec230a0189	Running	t3.medium	2/2 checks passec	View alarms +	us-west-2c	ec2-18-23
playground-cl...	i-0c67ebc0f2b0cd211	Running	t3.medium	2/2 checks passec	View alarms +	us-west-2a	ec2-54-20
playground-cl...	i-0c1799e74c4d8d29c	Running	t3.medium	2/2 checks passec	View alarms +	us-west-2b	ec2-54-24

2- Screenshot showing the command kubectl describe pods

```
PS C:\Users\tache\OneDrive\Documents\Cloudformation-project\kubernetes-apache-webapp> kubectl describe apache-app
error: the server doesn't have a resource type "apache-app"
PS C:\Users\tache\OneDrive\Documents\Cloudformation-project\kubernetes-apache-webapp> kubectl describe pods
Name:          apache-app
Namespace:     default
Priority:       0
Service Account: default
Node:          ip-192-168-89-189.us-west-2.compute.internal/192.168.89.189
Start Time:    Thu, 22 Aug 2024 10:49:37 -0500
Labels:        <none>
Annotations:   <none>
Status:        Running
IP:            192.168.65.192
IPs:
IP: 192.168.65.192
Containers:
  apache-container:
    Container ID:  containerd://cf4159f1580c481ba8f2df420e1f94bae8a45889c5b54fdef33535b5c230dad6
    Image:         etachenko/elie_apache_image:v1.0.1
    Image ID:      docker.io/etachenko/elie_apache_image@sha256:297eff9474d604632c044ea844d789b351fa4ec91ec99026c70e0bd6044ec3c3
    Port:         80/TCP
    Host Port:     0/TCP
    State:         Running
      Started:     Thu, 22 Aug 2024 10:49:48 -0500
      Ready:       True
      Restart Count: 0
    Environment:   <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-xhfp7 (ro)
Conditions:
  Type              Status
  PodReadyToStartContainers  True
  Initialized         True
  Ready               True
  ContainersReady      True
  PodScheduled        True
Volumes:
  kube-api-access-xhfp7:
    Type:              Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds: 3607
```

```

Volumes:
  kube-api-access-xhfp7:
    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: <none>
Tolerations: node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
              node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type     Reason      Age    From          Message
  ----     -
  Normal    Scheduled   2m16s  default-scheduler  Successfully assigned default/apache-app to ip-192-168-89-189.us-west-2.compute.internal
  Normal    Pulling     2m16s  kubelet        Pulling image "etachenko/elie_apache_image:v1.0.1"
  Normal    Pulled      2m5s   kubelet        Successfully pulled image "etachenko/elie_apache_image:v1.0.1" in 10.559s (10.559s including waiting). Image
size: 200456218 bytes.
  Normal    Created     2m5s   kubelet        Created container apache-container
  Normal    Started     2m5s   kubelet        Started container apache-container
PS C:\Users\tache\OneDrive\Documents\Cloudformation-project\kubernetes-apache-webapp>

```

3- Screenshot showing the command kubectl describe deployment

```

PS C:\Users\tache\OneDrive\Documents\Cloudformation-project\kubernetes-apache-webapp> kubectl describe deployment
Name:          apache-deployment
Namespace:     default
CreationTimestamp: Thu, 22 Aug 2024 12:18:03 -0500
Labels:        app=apache
Annotations:    deployment.kubernetes.io/revision: 1
Selector:      app=apache
Replicas:      5 desired | 5 updated | 5 total | 5 available | 0 unavailable
StrategyType:  RollingUpdate
MinReadySeconds: 0
RollingUpdateStrategy: 25% max unavailable, 25% max surge
Pod Template:
  Labels:  app=apache
  Containers:
    apache-container:
      Image:      etachenko/elie_apache_image:v1.0.1
      Port:       80/TCP
      Host Port:  0/TCP
      Environment: <none>
      Mounts:      <none>
      Volumes:      <none>
Conditions:
  Type           Status  Reason
  ----           -
  Available      True    MinimumReplicasAvailable
  Progressing    True    NewReplicaSetAvailable
OldReplicaSets: <none>
NewReplicaSet:  apache-deployment-86b599484b (5/5 replicas created)
Events:
  Type     Reason      Age    From          Message
  ----     -
  Normal    ScalingReplicaSet 16m   deployment-controller  Scaled up replica set apache-deployment-86b599484b to 5
PS C:\Users\tache\OneDrive\Documents\Cloudformation-project\kubernetes-apache-webapp>

```

4- Screenshot showing the command kubectl describe Service

```

Annotations:      <none>
Selector:         app=apache
Type:            LoadBalancer
IP Family Policy: SingleStack
IP Families:      IPv4
IP:              10.100.213.142
IPs:             10.100.213.142
LoadBalancer Ingress: ae06531bdaf8c4f1fafad62dacc5e39b-1217169133.us-west-2.elb.amazonaws.com
Port:            <unset> 80/TCP
TargetPort:      80/TCP
NodePort:        <unset> 30520/TCP
Endpoints:       192.168.23.109:80,192.168.53.87:80,192.168.8.105:80 + 2 more...
Session Affinity: None
External Traffic Policy: Cluster
Events:
  Type    Reason              Age   From                  Message
  ----    -
  Normal  EnsuringLoadBalancer 46m   service-controller    Ensuring load balancer
  Normal  EnsuredLoadBalancer  45m   service-controller    Ensured load balancer

Name:          kubernetes
Namespace:     default
Labels:        component=apiserver
               provider=kubernetes
Annotations:    <none>
Selector:      <none>
Type:          ClusterIP
IP Family Policy: SingleStack
IP Families:   IPv4
IP:            10.100.0.1
IPs:           10.100.0.1
Port:          https 443/TCP
TargetPort:    443/TCP
Endpoints:     192.168.125.18:443,192.168.173.77:443
Session Affinity: None
Events:        <none>
PS C:\Users\tache\OneDrive\Documents\Cloudformation-project\kubernetes-apache-webapp>

```

5- Screenshot showing the app running

⚠ Not secure | ae06531bdaf8c4f1fafad62dacc5e39b-1217169133.us-west-2.elb.amazonaws.com

Welcome to ELIE TACHENKO Dockerized Web Page

This page presents Docker as a platform for developing, shipping, and running applications.

Docker enables to separate applications from infrastructure allowing to deliver software quickly.