

# ESCOLA POLITÉCNICA DA UNIVERSIDADE DE SÃO PAULO DEPARTAMENTO DE ENGENHARIA DE SISTEMAS ELETRÔNICOS

## **AVALIAÇÃO INTERMEDIÁRIA - PSI5120**

NOME No. USP

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### 1. CLUSTER KUBERNETES USING MINIKUBE

#### 1.1 Enable metrics-server

| jean@jean-Insp | iron-15-3 | 3520:~/Documents | /PSI5120 | \$ kubectl | get nodes |
|----------------|-----------|------------------|----------|------------|-----------|
| NAME           | STATUS    | ROLES            | AGE      | VERSION    |           |
| minikube       | Ready     | control-plane    | 91m      | v1.30.0    |           |
| minikube-m02   | Ready     | <none></none>    | 2m8s     | v1.30.0    |           |
| minikube-m03   | Ready     | <none></none>    | 31s      | v1.30.0    |           |

## 1.2 Deploy php-apache server

jean@jean-Inspiron-15-3520:~/Documents/PSI5120\$ kubectl apply -f https://k8s.io/examples/application/php-apache.yaml
deployment.apps/php-apache created
service/php-apache created

## 1.3 Creating the Horizontal Pod Autoscaler

jean@jean-Inspiron-15-3520:~/Documents/PSI5120\$ kubectl autoscale deployment php-apache --cpu-percent=50 --min=1 --max=10
horizontalpodautoscaler.autoscaling/php-apache autoscaled

#### 1.4 Status without load

| FEI. SCOPP.  |                       | po p        | p opoeme |         |          |       |  |  |  |
|--|-----------------------|-------------|----------|---------|----------|-------|--|--|--|
| jean@jean-Inspiron-15-3520:~/Documents/PSI5120\$ kubectl get hpa |                       |             |          |         |          |       |  |  |  |
| NAME   | REFERENCE             | TARGETS     | MINPODS  | MAXPODS | REPLICAS | AGE   |  |  |  |
| php-apache   | Deployment/php-apache | cpu: 0%/50% |          | 10      |          | 3m23s |  |  |  |

## 1.5 Sending load to php-apache server

Jampigan-Inspiran-15-3232-5 kubectl run - t --tty load-generator --rn --tnage-busybox1.23 --restart-blever -- /bh/sh -c "white skep 0.81; do wget -q -0- http://php-spoch.ex done" If you don't see a command prompt, rry pressing enter.

of load for load for

#### 1.6 Status with load

| jean@jean-Inspiron-15-3520:~/Documents/PSI5120\$ kubectl get hpa |                       |               |         |         |          |     |  |  |  |
|--|-----------------------|---------------|---------|---------|----------|-----|--|--|--|
| NAME   | REFERENCE             | TARGETS       | MINPODS | MAXPODS | REPLICAS | AGE |  |  |  |
| php-apache   | Deployment/php-apache | cpu: 213%/50% |         | 10      |          | 16m |  |  |  |

## 1.7 Replicas count

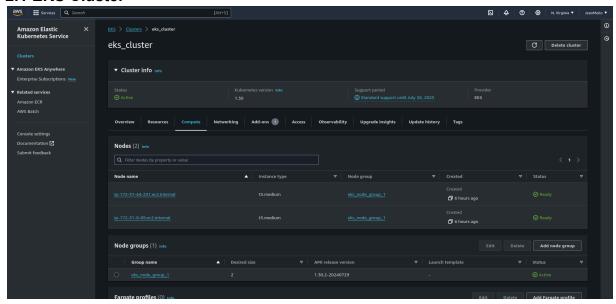
| LL -L         | -/-      |                |               |            |                |                  |
|---------------|----------|----------------|---------------|------------|----------------|------------------|
| jean@jean-Ins | spiron-1 | 5-3520:~/Docur | ments/PSI5120 | \$ kubectl | get deployment | php-apache       |
| NAME          | READY    | UP-TO-DATE     | AVAILABLE     | AGE It     |                | nutes to stabili |
| php-apache    | 5/5      |                |               | 18m        |                | v it may banno   |

# 1.8 Status when stopped load

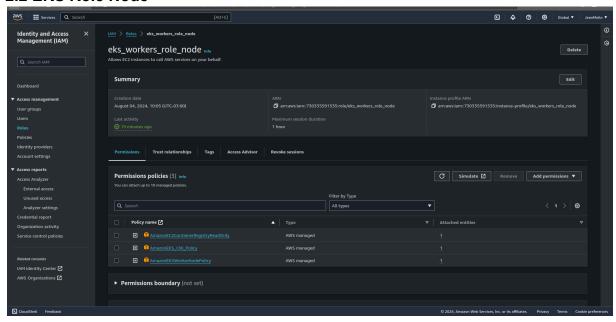
| jean@jean-In | spiron-15-3520:~/Documer | nts/PSI5120\$ kub | ectl get hp | oa php-apac | chewatch | he created<br>ed |
|--------------|--------------------------|-------------------|-------------|-------------|----------|------------------|
| NAME         | REFERENCE                | TARGETS           | MINPODS     | MAXPODS     | REPLICAS | AGE              |
| php-apache   | Deployment/php-apache    | cpu: 213%/50%     |             | 10          |          | 16m              |
| php-apache   | Deployment/php-apache    | cpu: 59%/50%      |             | 10          |          | 17m              |
| php-apache   | Deployment/php-apache    | cpu: 0%/50%       | 1           | 10          | 5        | 18m              |

#### 2. CLUSTER AWS EKS

#### 2.1 EKS Cluster



#### 2.2 EKS Role Node



#### 2.3 Settings AWS CLI on the local computer

```
jean@jean-Inspiron-15-3520:~/Documents/myprojects$ aws sts get-caller-identity
{
    "UserId": "730335591535",
    "Account": "730335591535",
    "Arn": "arn:aws:iam::730335591535:root"
}
```

#### 2.4 Setting EKS Cluster

```
jean@jean-Inspiron-15-3520:~/Documents/myprojects$ aws eks update-kubeconfig --region us-east-1 --name ek
s_cluster
Added new context arn:aws:eks:us-east-1:730335591535:cluster/eks_cluster to /home/jean/.kube/config
```

#### 2.5 Deployment NGINX

#### 2.6 Nodes of the EKS Cluster

| jean@jean-Inspiron-15-3520:-/Documents/PSIS120\$ kubectl get nodes -o wide |                               |  |  |  |  |  |  |  |                               |                     |
|--|-------------------------------|--|--|--|--|--|--|--|-------------------------------|---------------------|
|  | NAME                          |  |  |  |  |  |  |  |                               | CONTAINER-RUNTIME   |
|  | ip-172-31-44-251.ec2.internal |  |  |  |  |  |  |  |                               | containerd://1.7.11 |
|  | ip-172-31-8-69.ec2.internal   |  |  |  |  |  |  |  | 5.10.220-209.869.amzn2.x86 64 | containerd://1.7.11 |

#### 2.7 Status with no load

| jean@jean-Inspiron-15-3520:~/Documents/PSI5120\$ kubectl get hpa |                       |             |         |         |          |      |  |  |  |
|--|-----------------------|-------------|---------|---------|----------|------|--|--|--|
| NAME   | REFERENCE             | TARGETS     | MINPODS | MAXPODS | REPLICAS | AGE  |  |  |  |
| php-apache   | Deployment/php-apache | cpu: 0%/50% |         | 10      |          | 159m |  |  |  |

#### 2.8 Status with load

| jean@jean-In | spiron-15-3520:~/Docume | nts/PSI5120\$ kub | ectl get | hpa php-apa | achewatch |      |
|--------------|-------------------------|-------------------|----------|-------------|-----------|------|
| NAME         | REFERENCE               | TARGETS           | MINPODS  | MAXPODS     | REPLICAS  | AGE  |
| php-apache   | Deployment/php-apache   | cpu: 45%/50%      |          | 10          |           | 165m |
| php-apache   | Deployment/php-apache   | cpu: 46%/50%      |          | 10          |           | 165m |
| php-apache   | Deployment/php-apache   | cpu: 47%/50%      |          | 10          |           | 165m |
| php-apache   | Deployment/php-apache   | cpu: 48%/50%      |          | 10          |           | 165m |
| php-apache   | Deployment/php-apache   | cpu: 44%/50%      |          | 10          |           | 165m |
| php-apache   | Deployment/php-apache   | cpu: 49%/50%      |          | 10          |           | 166m |
| php-apache   | Deployment/php-apache   | cpu: 43%/50%      |          | 10          |           | 166m |
| php-apache   | Deployment/php-apache   | cpu: 9%/50%       |          | 10          |           | 166m |
| php-apache   | Deployment/php-apache   | cpu: 0%/50%       |          | 10          |           | 166m |
| php-apache   | Deployment/php-apache   | cpu: 0%/50%       |          | 10          |           | 171m |
| php-apache   | Deployment/php-apache   | cpu: 0%/50%       |          | 10          |           | 171m |
| php-apache   | Deployment/php-apache   | cpu: 0%/50%       | 1        | 10          | 1         | 171m |

#### **ANEXOS**

```
nginx-deployment.yaml apiVersion: apps/v1
kind: Deployment
metadata:
```

## php-apache.yaml

#### apiVersion: apps/v1

```
metadata:
apiVersion: v1
metadata:
```

# **REFERÊNCIAS**

Mello, J., Egydio J., Grobman, R. **Repositório para o trabalho da matéria PSI5120.** <a href="https://github.com/JeanMX/PSI5120/tree/main">https://github.com/JeanMX/PSI5120/tree/main</a>.