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DEPARTAMENTO DE ENGENHARIA DE SISTEMAS ELETRÔNICOS

**AVALIAÇÃO INTERMEDIÁRIA - PSI5120**

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## 1. CLUSTER KUBERNETES USING MINIKUBE

### 1.1 Enable metrics-server

```
jean@jean-Inspiron-15-3520:~/Documents/PSI5120$ kubectl get nodes
```

NAME	STATUS	ROLES	AGE	VERSION
minikube	Ready	control-plane	91m	v1.30.0
minikube-m02	Ready	<none>	2m8s	v1.30.0
minikube-m03	Ready	<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

```
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%	1	10	1	3m23s

### 1.5 Sending load to php-apache server

```
jean@jean-Inspiron-15-3520:~/Documents/PSI5120$ kubectl run -l -t --image=busybox:1.28 --restart=Never -- /bin/sh -c 'while sleep 0.01; do wget -q -O- http://php-apache; done'
```

### 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%	1	10	1	16m

### 1.7 Replicas count

```
jean@jean-Inspiron-15-3520:~/Documents/PSI5120$ kubectl get deployment php-apache
```

NAME	READY	UP-TO-DATE	AVAILABLE	AGE
php-apache	5/5	5	5	18m

1.8 Status when stopped load

```
jean@jean-Inspiron-15-3520:~/Documents/PSI5120$ kubectl get hpa php-apache --watch
```

NAME	REFERENCE	TARGETS	MINPODS	MAXPODS	REPLICAS	AGE
php-apache	Deployment/php-apache	cpu: 213%/50%	1	10	5	16m
php-apache	Deployment/php-apache	cpu: 59%/50%	1	10	5	17m
php-apache	Deployment/php-apache	cpu: 0%/50%	1	10	5	18m

## 2. CLUSTER AWS EKS

### 2.1 EKS Cluster

The screenshot displays the AWS Management Console for the Amazon Elastic Kubernetes Service (EKS). The left sidebar shows the navigation menu with 'Amazon Elastic Kubernetes Service' selected. The main content area shows the 'eks\_cluster' details page. The 'Cluster info' section indicates the cluster is 'Active' with a 'Kubernetes version' of '1.30'. The 'Nodes' section shows two nodes, both with 'Instance type' 't3.medium' and 'Node group' 'eks\_node\_group\_1', both in 'Ready' status. The 'Node groups' section shows one group, 'eks\_node\_group\_1', with a 'Desired size' of '2' and 'AMI release version' '1.30.2-20240729'.

Node name	Instance type	Node group	Created	Status
ip-172-31-44-251.ec2.internal	t3.medium	eks_node_group_1	Created 6 hours ago	Ready
ip-172-31-6-69.ec2.internal	t3.medium	eks_node_group_1	Created 6 hours ago	Ready

Group name	Desired size	AMI release version	Launch template	Status
eks_node_group_1	2	1.30.2-20240729	-	Active

### 2.2 EKS Role Node

The screenshot displays the AWS Management Console for the Identity and Access Management (IAM) service. The left sidebar shows the navigation menu with 'Identity and Access Management (IAM)' selected. The main content area shows the 'eks\_workers\_role\_node' details page. The 'Summary' section shows the role was created on 'August 04, 2024, 10:05 (UTC-05:00)' and has a 'Last activity' of '19 minutes ago'. The 'Permissions' section shows three attached policies: 'AmazonEC2ContainerRegistryReadOnly', 'AmazonEKS\_CNI\_Policy', and 'AmazonEKSWorkerNodePolicy', all of which are 'AWS managed'.

Policy name	Type	Attached entities
AmazonEC2ContainerRegistryReadOnly	AWS managed	1
AmazonEKS_CNI_Policy	AWS managed	1
AmazonEKSWorkerNodePolicy	AWS managed	1

## 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 eks_cluster
Added new context arn:aws:eks:us-east-1:730335591535:cluster/eks_cluster to /home/jean/.kube/config
```

## 2.5 Deployment NGINX

```
jean@jean-Inspiron-15-3520:~/Documents/myprojects$ kubectl apply -f nginx-deployment.yaml
deployment.apps/nginx-deployment created
jean@jean-Inspiron-15-3520:~/Documents/myprojects$ kubectl expose deployment nginx-deployment --name=nginx-service --port=80 --target-port=80 --type=LoadBalancer
service/nginx-service exposed
jean@jean-Inspiron-15-3520:~/Documents/myprojects$ kubectl get service nginx-service
```

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP
nginx-service	LoadBalancer	10.100.232.87	a970547089ffe471aacc8bc180422aae-277052515.us-east-1.elb.amazonaws.com

## 2.6 Nodes of the EKS Cluster

```
jean@jean-Inspiron-15-3520:~/Documents/PSI5120$ kubectl get nodes -o wide
```

NAME	STATUS	ROLES	AGE	VERSION	INTERNAL-IP	EXTERNAL-IP	OS-IMAGE	KERNEL-VERSION	CONTAINER-RUNTIME
ip-172-31-44-251.ec2.internal	Ready	<none>	148m	v1.30.2-eks-1552ad0	172.31.44.251	54.175.194.100	Amazon Linux 2	5.10.220-209.869.amzn2.x86_64	containerd://1.7.11
ip-172-31-8-69.ec2.internal	Ready	<none>	148m	v1.30.2-eks-1552ad0	172.31.8.69	3.238.186.206	Amazon Linux 2	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%	1	10	1	159m

## 2.8 Status with load

```
jean@jean-Inspiron-15-3520:~/Documents/PSI5120$ kubectl get hpa php-apache --watch
```

NAME	REFERENCE	TARGETS	MINPODS	MAXPODS	REPLICAS	AGE
php-apache	Deployment/php-apache	cpu: 45%/50%	1	10	6	165m
php-apache	Deployment/php-apache	cpu: 46%/50%	1	10	6	165m
php-apache	Deployment/php-apache	cpu: 47%/50%	1	10	6	165m
php-apache	Deployment/php-apache	cpu: 48%/50%	1	10	6	165m
php-apache	Deployment/php-apache	cpu: 44%/50%	1	10	6	165m
php-apache	Deployment/php-apache	cpu: 49%/50%	1	10	6	166m
php-apache	Deployment/php-apache	cpu: 43%/50%	1	10	6	166m
php-apache	Deployment/php-apache	cpu: 9%/50%	1	10	6	166m
php-apache	Deployment/php-apache	cpu: 0%/50%	1	10	6	166m
php-apache	Deployment/php-apache	cpu: 0%/50%	1	10	6	171m
php-apache	Deployment/php-apache	cpu: 0%/50%	1	10	2	171m
php-apache	Deployment/php-apache	cpu: 0%/50%	1	10	1	171m

## ANEXOS

### nginx-deployment.yaml

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
  labels:
    app: nginx
spec:
  replicas: 1
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
        - name: nginx
          image: public.ecr.aws/t1f2w6h8/ekswelcome:v1
          ports:
            - containerPort: 80
```

### php-apache.yaml

```
apiVersion: apps/v1
```

```
kind: Deployment
metadata:
  name: php-apache
spec:
  selector:
    matchLabels:
      run: php-apache
  template:
    metadata:
      labels:
        run: php-apache
    spec:
      containers:
        - name: php-apache
          image: registry.k8s.io/hpa-example
          ports:
            - containerPort: 80
          resources:
            limits:
              cpu: 500m
            requests:
              cpu: 200m
```

```
---
```

```
apiVersion: v1
kind: Service
metadata:
  name: php-apache
  labels:
    run: php-apache
spec:
  ports:
    - port: 80
  selector:
    run: php-apache
```



## REFERÊNCIAS

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