

# Ejercicio 1:

```
vagrant@oom2425-k8s-master:~$ kubectl get nodes -o wide
NAME                STATUS    ROLES    AGE   VERSION   INTERNAL-IP   EXTERNAL-IP   OS-IMAGE             KERNEL-VERSION   CONTAINER-RUNTIME
oom2425-k8s-master   Ready     control-plane  37m   v1.29.15   192.168.56.10 <none>         Ubuntu 22.04.5 LTS   5.15.0-134-generic   containerd://1.7.26
oom2425-k8s-worker1   Ready     <none>    35m   v1.29.15   192.168.56.11 <none>         Ubuntu 22.04.5 LTS   5.15.0-134-generic   containerd://1.7.26
oom2425-k8s-worker2   Ready     <none>    35m   v1.29.15   192.168.56.12 <none>         Ubuntu 22.04.5 LTS   5.15.0-134-generic   containerd://1.7.26

vagrant@oom2425-k8s-master:~$ kubectl cluster-info
Kubernetes control plane is running at https://192.168.56.10:6443
CoreDNS is running at https://192.168.56.10:6443/api/v1/namespaces/kube-system/services/kube-dns/dns/proxy

To further debug and diagnose cluster problems, use 'kubectl cluster-info dump'.

vagrant@oom2425-k8s-master:~$ kubectl get blockaffinities
NAME                AGE
oom2425-k8s-master-10-10-3-192-26  36m
oom2425-k8s-worker1-10-10-3-64-26   34m
oom2425-k8s-worker2-10-10-1-128-26  34m

vagrant@oom2425-k8s-master:~$
```

Cargas de trabajo

Pods

Replica Sets

Controladores de Replicación

Stateful Sets

Service

Ingresses

Ingress Classes

Services

Configuración y Almacenamiento

Config Maps

Persistent Volume Claims

Secretos

Clases de almacenamiento

Clúster

Mapeo de Rol de Clúster

Cluster Roles

Eventos

Espacios de Nombre

Políticas de Red

Nodos

Volumenes Persistentes

Vinculaciones de roles

Roles

nginx-5f4cf5b5b4-gx462

Metadata

Información del recurso

Condiciones

Controlado por

nginx-5f4cf5b5b4-gx462

default

25 mar, 2025

a minute ago

bc3b2aa6-5f61-400b-ae5f-9096ccd75421

replicaset/nginx-5f4cf5b5b4

Labels

k8s-app: nginx pod-template-hash: 5f4cf5b5b4

Annotations

cnl.projectcalico.org/containerID cnl.projectcalico.org/podIP: 10.10.1.130/32 cnl.projectcalico.org/podIPs: 10.10.1.130/32

Node

oom2425-k8s-worker2

Status

Running

IP

10.10.1.130

Class God

BestEffort

Restarta

0

Cuenta de Servicio

default

Tipo	Estado	Último sondeo	Última transición	Motivo	Mensaje
PodReadyToStartContainers	True	-	a minute ago	-	-
Initialized	True	-	a minute ago	-	-
Ready	True	-	a minute ago	-	-
ContainersReady	True	-	a minute ago	-	-
PodScheduled	True	-	a minute ago	-	-

Name

nginx-5f4cf5b5b4

Kind

replicaset

Pods

1 / 1

Age

a minute ago

## Ejercicio 2:

```
vagrant@oom2425-k8s-master:~$ kubectl get pods -o wide
NAME          READY   STATUS    RESTARTS   AGE   IP            NODE          NOMINATED NODE   READINESS GATES
nginx-pod     1/1     Running   0           2m6s  10.10.1.133  oom2425-k8s-worker2  <none>          <none>

vagrant@oom2425-k8s-master:~$ kubectl describe pod nginx-pod
Name:          nginx-pod
Namespace:     default
Priority:       0
Service Account: default
Node:          oom2425-k8s-worker2/192.168.56.12
Start Time:    Sat, 29 Mar 2025 12:20:08 +0000
Labels:        <none>
Annotations:   cni.projectcalico.org/containerID: 51503b1213b5744af13de334be7fa50db117d33aac06b43233394697eb3558bd
                cni.projectcalico.org/podIP: 10.10.1.133/32
                cni.projectcalico.org/podIPs: 10.10.1.133/32
Status:        Running
IP:            10.10.1.133
IPs:           IP: 10.10.1.133
Containers:
  nginx-container:
    Container ID:   containerd://340c802ddb3920e6ec000b57633fc1c0c7cfd4b37acc52868b06da771210735e
    Image:          nginx
    Image ID:       docker.io/library/nginx@sha256:124b44bfc9ccd1f3cedf4b592d4d1e8bddb78b51ec2ed5056c52d3692baebc19
    Port:           80/TCP
    Host Port:      0/TCP
    State:          Running
      Started:      Sat, 29 Mar 2025 12:20:10 +0000
      Ready:        True
      Restart Count: 0
    Environment:    <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-t4wzj (ro)
Conditions:
  Type                     Status
  PodReadyToStartContainers True
  Initialized              True
  Ready                    True
  ContainersReady          True
  PodScheduled             True
Volumes:
  kube-api-access-t4wzj:
    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   2m25s default-scheduler Successfully assigned default/nginx-pod to oom2425-k8s-worker2
  Normal   Pulling     2m24s kubelet        Pulling image "nginx"
  Normal   Pulled      2m23s kubelet        Successfully pulled image "nginx" in 1.188s (1.188s including waiting)
  Normal   Created     2m23s kubelet        Created container: nginx-container
  Normal   Started     2m23s kubelet        Started container nginx-container

vagrant@oom2425-k8s-master:~$
```

```

vagrant@oom2425-k8s-master:~$ kubectl describe replicaset nginx-replicaset
Name:          nginx-replicaset
Namespace:     default
Selector:      app=nginx
Labels:        <none>
Annotations:   <none>
Replicas:      2 current / 2 desired
Pods Status:   2 Running / 0 Waiting / 0 Succeeded / 0 Failed
Pod Template:
  Labels:  app=nginx
  Containers:
    nginx-container:
      Image:        nginx
      Port:         80/TCP
      Host Port:    0/TCP
      Environment:  <none>
      Mounts:       <none>
      Volumes:      <none>
Events:
  Type      Reason          Age   From                      Message
  ----      -
  Normal    SuccessfulCreate 117s  replicaset-controller     Created pod: nginx-replicaset-ctngl
  Normal    SuccessfulCreate 117s  replicaset-controller     Created pod: nginx-replicaset-r5v7h

vagrant@oom2425-k8s-master:~$ kubectl get pods -o wide
NAME                                READY   STATUS    RESTARTS   AGE   IP            NODE                NOMINATED NODE   READINESS GATES
nginx-replicaset-ctngl              1/1     Running   0           2m14s  10.10.1.134   oom2425-k8s-worker2  <none>            <none>
nginx-replicaset-r5v7h              1/1     Running   0           2m14s  10.10.3.80   oom2425-k8s-worker1  <none>            <none>
vagrant@oom2425-k8s-master:~$

```

```

vagrant@oom2425-k8s-master:~$ kubectl describe deployment nginx-deployment
Name:          nginx-deployment
Namespace:     default
CreationTimestamp: Sat, 29 Mar 2025 12:44:07 +0000
Labels:        <none>
Annotations:   deployment.kubernetes.io/revision: 1
Selector:      app=nginx
Replicas:      2 desired | 2 updated | 2 total | 2 available | 0 unavailable
StrategyType:  RollingUpdate
MinReadySeconds: 0
RollingUpdateStrategy: 25% max unavailable, 25% max surge
Pod Template:
  Labels:  app=nginx
  Containers:
    nginx-container:
      Image:        nginx:1.21.6
      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:  nginx-deployment-dd575fbfd (2/2 replicas created)
Events:
  Type      Reason          Age   From                      Message
  ----      -
  Normal    ScalingReplicaSet 97s   deployment-controller     Scaled up replica set nginx-deployment-dd575fbfd to 2

vagrant@oom2425-k8s-master:~$ kubectl get pods -o wide
NAME                                READY   STATUS    RESTARTS   AGE   IP            NODE                NOMINATED NODE   READINESS GATES
nginx-deployment-dd575fbfd-g26xm     1/1     Running   0           101s  10.10.1.137   oom2425-k8s-worker2  <none>            <none>
nginx-deployment-dd575fbfd-x2tnf     1/1     Running   0           101s  10.10.3.82   oom2425-k8s-worker1  <none>            <none>
vagrant@oom2425-k8s-master:~$

```

```

vagrant@oom2425-k8s-master:~$ kubectl apply -f /vagrant/ej2/nginx-deployment.yml
deployment.apps/nginx-deployment configured
vagrant@oom2425-k8s-master:~$ kubectl get deployments -o wide
NAME                                READY   UP-TO-DATE   AVAILABLE   AGE   CONTAINERS   IMAGES           SELECTOR
nginx-deployment                    4/4     4             4           75s   nginx-container  nginx:1.26.3     app=nginx

vagrant@oom2425-k8s-master:~$ kubectl get replicaset -o wide
NAME                                DESIRED   CURRENT   READY   AGE   CONTAINERS   IMAGES           SELECTOR
nginx-deployment-59bd8d4d9b         4         4         4       16s   nginx-container  nginx:1.26.3     app=nginx,pod-template-hash=59bd8d4d9b
nginx-deployment-dd575fbfd          0         0         0       83s   nginx-container  nginx:1.21.6     app=nginx,pod-template-hash=dd575fbfd

vagrant@oom2425-k8s-master:~$ kubectl get pods -o wide
NAME                                READY   STATUS    RESTARTS   AGE   IP            NODE                NOMINATED NODE   READINESS GATES
nginx-deployment-59bd8d4d9b-bnb8k   1/1     Running   0           20s   10.10.3.96   oom2425-k8s-worker1  <none>            <none>
nginx-deployment-59bd8d4d9b-ghcfw   1/1     Running   0           20s   10.10.1.147  oom2425-k8s-worker2  <none>            <none>
nginx-deployment-59bd8d4d9b-tbkvh   1/1     Running   0           21s   10.10.3.94   oom2425-k8s-worker1  <none>            <none>
nginx-deployment-59bd8d4d9b-vwzvd   1/1     Running   0           22s   10.10.1.146  oom2425-k8s-worker2  <none>            <none>
vagrant@oom2425-k8s-master:~$

```

### Ejercicio 3:

```
vagrant@oom2425-k8s-master:~$ kubectl describe service nginx-service
Name: nginx-service
Namespace: default
Labels: <none>
Annotations: <none>
Selector: app=nginx
Type: ClusterIP
IP Family Policy: SingleStack
IP Families: IPv4
IP: 10.111.161.141
IPs: 10.111.161.141
Port: http 8080/TCP
TargetPort: 80/TCP
Endpoints: 10.10.1.148:80,10.10.1.149:80,10.10.3.97:80 + 1 more...
Session Affinity: None
Events: <none>
vagrant@oom2425-k8s-master:~$ kubectl get pods -o wide
NAME READY STATUS RESTARTS AGE IP NODE NOMINATED NODE READINESS GATES
nginx-deployment-59bd8d4d9b-8jwkt 1/1 Running 0 17s 10.10.1.149 oom2425-k8s-worker2 <none> <none>
nginx-deployment-59bd8d4d9b-9x482 1/1 Running 0 17s 10.10.3.97 oom2425-k8s-worker1 <none> <none>
nginx-deployment-59bd8d4d9b-vzgp4 1/1 Running 0 17s 10.10.3.98 oom2425-k8s-worker1 <none> <none>
nginx-deployment-59bd8d4d9b-z4fmr 1/1 Running 0 17s 10.10.1.148 oom2425-k8s-worker2 <none> <none>
vagrant@oom2425-k8s-master:~$ kubectl get services -o wide
NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE SELECTOR
kubernetes ClusterIP 10.96.0.1 <none> 443/TCP 4d1h <none>
nginx-service ClusterIP 10.111.161.141 <none> 8080/TCP 14m app=nginx
vagrant@oom2425-k8s-master:~$
```

```
vagrant@oom2425-k8s-master:~$ curl 10.111.161.141:8080
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
html { color-scheme: light dark; }
body { width: 35em; margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif; }
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

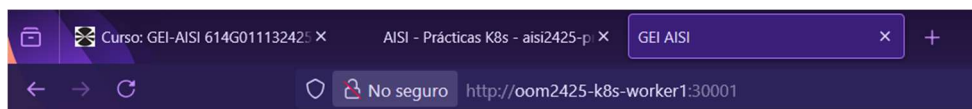
<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
vagrant@oom2425-k8s-master:~$
```

```
vagrant@oom2425-k8s-master:~$ kubectl describe service nginx-service
Name: nginx-service
Namespace: default
Labels: <none>
Annotations: <none>
Selector: app=nginx
Type: NodePort
IP Family Policy: SingleStack
IP Families: IPv4
IP: 10.102.46.15
IPs: 10.102.46.15
Port: http 8080/TCP
TargetPort: 80/TCP
NodePort: http 30001/TCP
Endpoints: 10.10.1.151:80,10.10.1.152:80,10.10.3.100:80 + 1 more...
Session Affinity: None
External Traffic Policy: Cluster
Events: <none>


vagrant@oom2425-k8s-master:~$ kubectl get services -o wide
NAME          TYPE          CLUSTER-IP    EXTERNAL-IP    PORT(S)          AGE    SELECTOR
kubernetes    ClusterIP     10.96.0.1     <none>          443/TCP          4d1h   <none>
nginx-service  NodePort      10.102.46.15  <none>          8080:30001/TCP   17s    app=nginx

vagrant@oom2425-k8s-master:~$
```



 UNIVERSIDADE DA CORUÑA

GEI AISI: 2024/2025

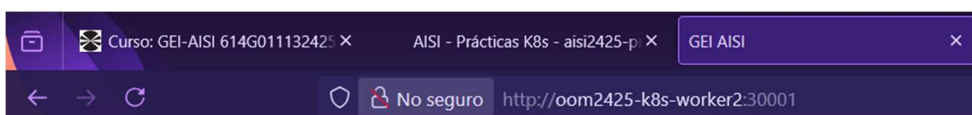



Nginx Web Server (K8s cluster)

Página web de Óscar Olveira Miniño


<http://oom2425-k8s-worker1:30001/>

Sat Mar 29 2025 16:47:20 GMT+0100 (hora estándar de Europa central)



 UNIVERSIDADE DA CORUÑA

GEI AISI: 2024/2025



Nginx Web Server (K8s cluster)

Página web de Óscar Olveira Miniño

<http://oom2425-k8s-worker2:30001/>

Sat Mar 29 2025 16:48:09 GMT+0100 (hora estándar de Europa central)

Ejercicio 4:

```
vagrant@oom2425-k8s-master:~$ kubectl get namespaces
NAME                STATUS AGE
aisi                 Active 3m28s
default              Active 4d2h
kube-node-lease      Active 4d2h
kube-public          Active 4d2h
kube-system          Active 4d2h
kubernetes-dashboard Active 4d2h

vagrant@oom2425-k8s-master:~$ kubectl get services -o wide -n aisi
NAME                TYPE        CLUSTER-IP      EXTERNAL-IP  PORT(S)          AGE   SELECTOR
mongodb-service     ClusterIP   10.104.52.53    <none>       27017/TCP        3m13s app=mongodb
webapp-service      NodePort    10.96.66.32     <none>       3200:30100/TCP   3m4s  app=webapp

vagrant@oom2425-k8s-master:~$ kubectl get deployments -o wide -n aisi
NAME                READY   UP-TO-DATE   AVAILABLE   AGE   CONTAINERS   IMAGES                               SELECTOR
mongodb-deployment  1/1     1             1           3m22s mongodb      mongo:5.0                                app=mongodb
webapp-deployment   3/3     3             3           3m13s webapp       nanajanashia/k8s-demo-app:v1.0         app=webapp

vagrant@oom2425-k8s-master:~$ kubectl get pods -o wide -n aisi
NAME                READY   STATUS    RESTARTS   AGE   IP            NODE                NOMINATED NODE   READINESS GATES
mongodb-deployment-5d5bcbccb-hq8hs  1/1     Running   0          3m33s  10.10.1.153   oom2425-k8s-worker2 <none>            <none>
webapp-deployment-75749b8c84-9j5kv  1/1     Running   0          3m24s  10.10.3.101   oom2425-k8s-worker1 <none>            <none>
webapp-deployment-75749b8c84-r82qt  1/1     Running   0          3m24s  10.10.1.154   oom2425-k8s-worker2 <none>            <none>
webapp-deployment-75749b8c84-rzbq2  1/1     Running   0          3m24s  10.10.1.155   oom2425-k8s-worker2 <none>            <none>

vagrant@oom2425-k8s-master:~$ kubectl get configmaps -n aisi
NAME                DATA   AGE
kube-root-ca.crt    1       4m2s
mongodb-config      1       3m54s

vagrant@oom2425-k8s-master:~$ kubectl get secrets -n aisi
NAME                TYPE   DATA   AGE
mongodb-secret      Opaque 2       3m54s

vagrant@oom2425-k8s-master:~$
```



User profile



Name: **oom2425**

Email: **oscar.olveira@udc.es**

Interests: **fútbol, informática, F1**

Edit Profile

## Ejercicio 5:

```
vagrant@oom2425-k8s-master:~$ kubectl get all
NAME                                     READY   STATUS    RESTARTS   AGE
pod/apache-deployment-6cdb6447c8-2jrm9  1/1     Running   0           2m30s
pod/apache-deployment-6cdb6447c8-jhf8n  1/1     Running   0           2m30s
pod/apache-deployment-6cdb6447c8-ndzrv  1/1     Running   0           2m30s
pod/nginx-deployment-7cccbbdb48-2bjvk   1/1     Running   0           117s
pod/nginx-deployment-7cccbbdb48-l7lps   1/1     Running   0           117s
pod/shell-pod                           1/1     Running   0           72m

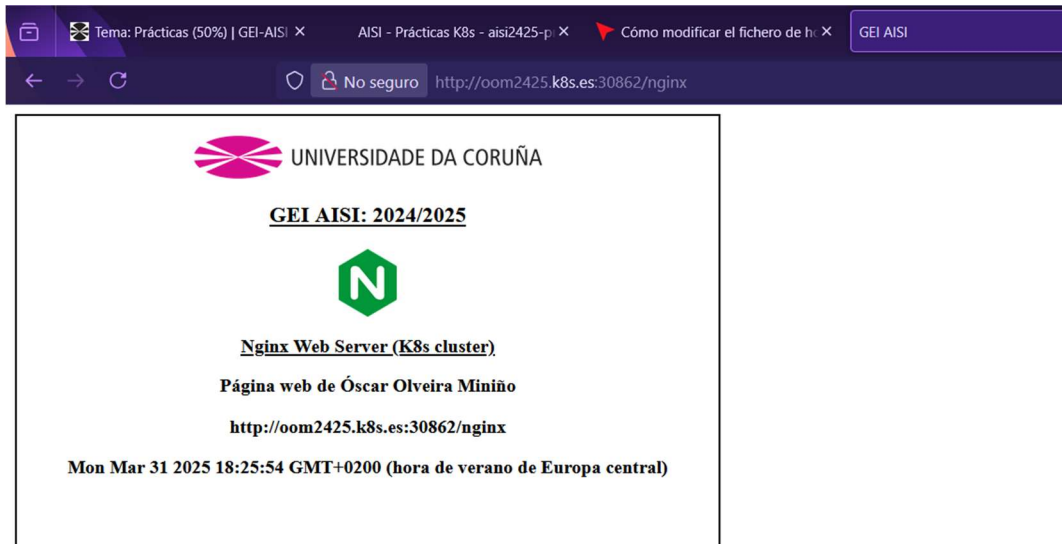
NAME                                TYPE          CLUSTER-IP      EXTERNAL-IP   PORT(S)          AGE
service/apache-service             ClusterIP      10.111.118.134  <none>        9090/TCP         2m30s
service/kubernetes                 ClusterIP      10.96.0.1       <none>        443/TCP          4d2h
service/nginx-service              ClusterIP      10.108.156.136  <none>        8080/TCP         117s

NAME                                READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/apache-deployment  3/3     3             3           2m30s
deployment.apps/nginx-deployment   2/2     2             2           117s

NAME                                DESIRED   CURRENT   READY   AGE
replicaset.apps/apache-deployment-6cdb6447c8  3         3         3       2m30s
replicaset.apps/nginx-deployment-7cccbbdb48   2         2         2       117s
vagrant@oom2425-k8s-master:~$
```

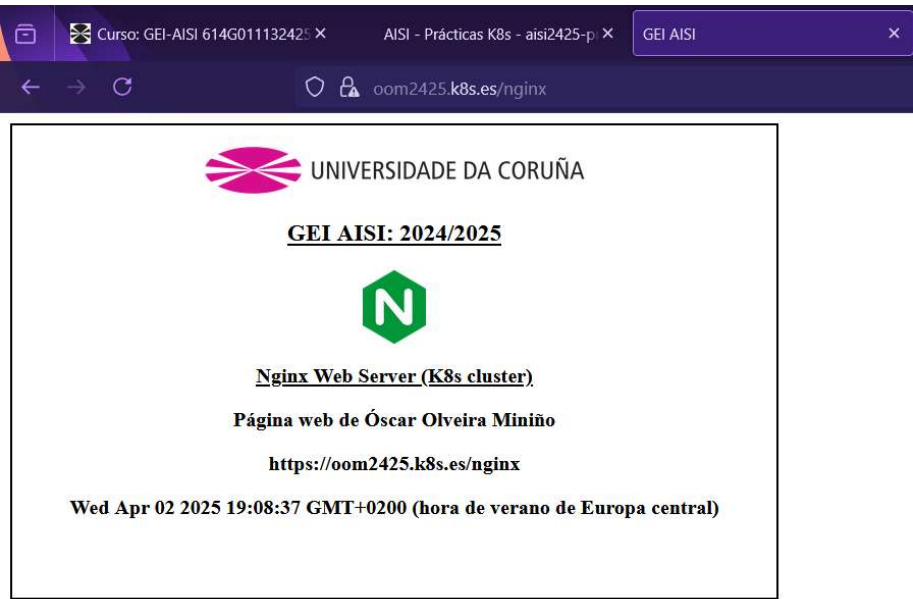
```
vagrant@oom2425-k8s-master:~$ curl 10.111.118.134:9090
<html>
<head>
  <meta charset="UTF-8">
  <title>GEI AISI</title>
  <script type="text/javascript">
    function getName() {
      var name = "Óscar Olveira Miniño";
      document.getElementById("myName").innerHTML = name;
    }
    function getURL() {
      document.write(window.location.href);
    }
    function getTime() {
      document.getElementById("current_date").innerHTML = Date();
    }
  </script>
</head>
<body onload="getName()">
  <div style="width:600px;height:370px;border:2px solid #000;text-align: center;">
    <strong>
      <p></p>
      <h3><u>GEI AISI: 2024/2025</u></h3>
      <p>
      <p><u>Apache Web Server (K8s cluster)</u></p>
      <p>Página web de <span id="myName"></span></p>
      <p><script>getURL();</script></p>
      <p><div id="current_date"><script>getTime();</script></p>
    </strong>
  </div>
</body>
</html>
vagrant@oom2425-k8s-master:~$
```

```
vagrant@oom2425-k8s-master:~$ curl 10.108.156.136:8080
<html>
<head>
  <meta charset="UTF-8">
  <title>GEI AISI</title>
  <script type="text/javascript">
    function getName() {
      var name = "Óscar Oliveira Miniño";
      document.getElementById("myName").innerHTML = name;
    }
    function getURL() {
      document.write(window.location.href);
    }
    function getTIME() {
      document.getElementById("current_date").innerHTML = Date();
    }
  </script>
</head>
<body onload="getName()">
  <div style="width:600px;height:370px;border:2px solid #000;text-align: center;">
    <strong>
      <p></p>
      <h3><u>GEI AISI: 2024/2025</u></h3>
      <p>
      <p><u>Nginx Web Server (K8s cluster)</u></p>
      <p>Página web de <span id="myName"></span></p>
      <p><script>getURL();</script></p>
      <p><div id="current_date"><script>getTIME();</script></p>
    </strong>
  </div>
</body>
</html>
vagrant@oom2425-k8s-master:~$
```



Ejercicio 6:

```
vagrant@oom2425-k8s-master:~$ kubectl describe ingress
Name:          ingress
Labels:         <none>
Namespace:     default
Address:        192.168.56.20
Ingress Class:  nginx
Default backend: <default>
Rules:
  Host      Path      Backends
  ----      -
  oom2425.k8s.es
    /apache  apache-service:9090 (10.10.1.168:80,10.10.1.169:80,10.10.3.109:80)
    /nginx   nginx-service:8080 (10.10.1.170:80,10.10.3.110:80)
Annotations:  nginx.ingress.kubernetes.io/rewrite-target: /
Events:
  Type      Reason      Age          From                      Message
  ----      -
  Normal    Sync        4m30s (x2 over 5m14s)  nginx-ingress-controller  Scheduled for sync
vagrant@oom2425-k8s-master:~$
```



Ejercicio 7:

```
vagrant@oom2425-k8s-master:~$ kubectl get services -o wide -n aisi
NAME                TYPE        CLUSTER-IP    EXTERNAL-IP    PORT(S)          AGE    SELECTOR
mongodb-service     ClusterIP   10.101.114.76 <none>         27017/TCP        107s   app=mongodb
webapp-service      LoadBalancer 10.104.72.109 192.168.56.20  80:31287/TCP    103s   app=webapp

vagrant@oom2425-k8s-master:~$ kubectl describe service webapp -n aisi
Name:                webapp-service
Namespace:           aisi
Labels:              <none>
Annotations:         metallb.io/ip-allocated-from-pool: default
Selector:            app=webapp
Type:               LoadBalancer
IP Family Policy:    SingleStack
IP Families:         IPv4
IP:                 10.104.72.109
IPs:                10.104.72.109
LoadBalancer Ingress: 192.168.56.20
Port:               <unset> 80/TCP
TargetPort:         3000/TCP
NodePort:           <unset> 31287/TCP
Endpoints:          10.10.1.178:3000,10.10.1.179:3000,10.10.3.118:3000
Session Affinity:    None
External Traffic Policy: Cluster
Events:
  Type     Reason          Age          From              Message
  ----     -
  Normal   IPAllocated     117s        metallb-controller Assigned IP ["192.168.56.20"]
  Normal   nodeAssigned    115s (x2 over 116s) metallb-speaker announcing from node "oom2425-k8s-worker2" with protocol "layer2"

vagrant@oom2425-k8s-master:~$
```



User profile



Name: **Anna Smith**

Email: **anna.smith@example.com**

Interests: **coding**

Edit Profile

