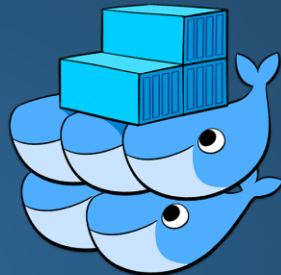


IMPLEMENTACIÓN DE
DOCKER SWARM
EN



AMAZON WEB SERVICES
USANDO
AUTO SCALING GROUPS
Y
ELASTIC LOAD BALANCING

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Noviembre - 2018

Creando un Dockerfile

- Partirá de una imagen limpia de Debian.
- Instalará los paquetes: net-tools, curl, mysql, apache2, php y otros paquetes necesarios relacionados: wget, nano, curl, openssh-server y supervisor.
- Creará una BBDD Wordpress con usuario y password y le otorgará permisos.
- Copiará un contenido de una instalación previamente configurada con un theme personalizado y adaptado de Wordpress, asignará el propietario www-data al directorio.
- Creará un directorio en el contenedor y copiará en él los certificados SSL para el dominio de la web. (Del dominio "itgal.es" adquirido a través del registrar (registrador) 1&1).
- Copiará dos ficheros Virtualhost previamente configurados al servidor Apache2 del contenedor y habilitará los módulos utilizados y necesarios para Apache2.
- Creará y configurará un usuario para para la conexión SSH al contenedor.
- Establecerá un banner motd personalizado.
- Expondrá públicamente los puertos para SSH/22, HTTP/80 y HTTPS/443.
- Establecerá como entrypoint (CMD) del contenedor la ejecución de supervisord.

Subir imagen a Docker Hub

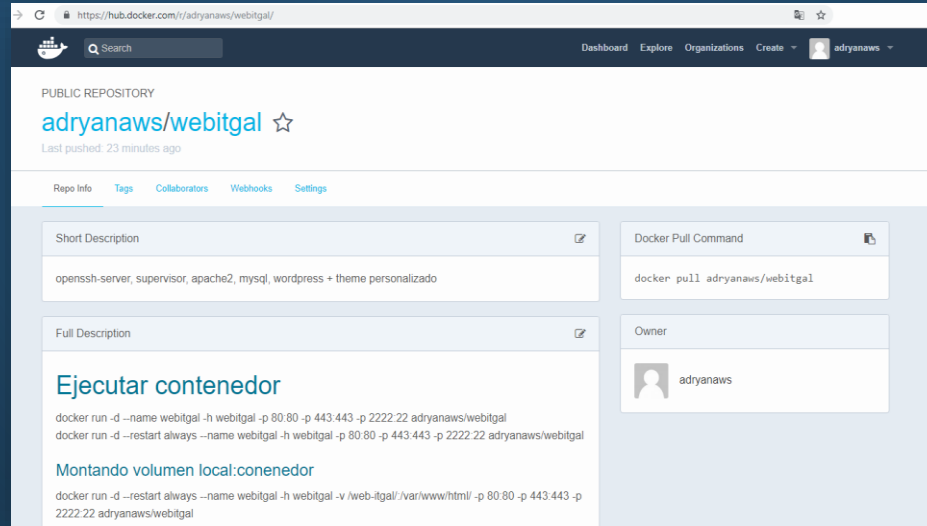
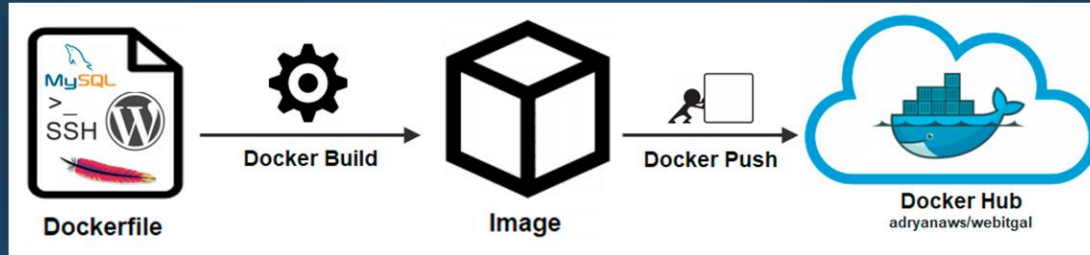
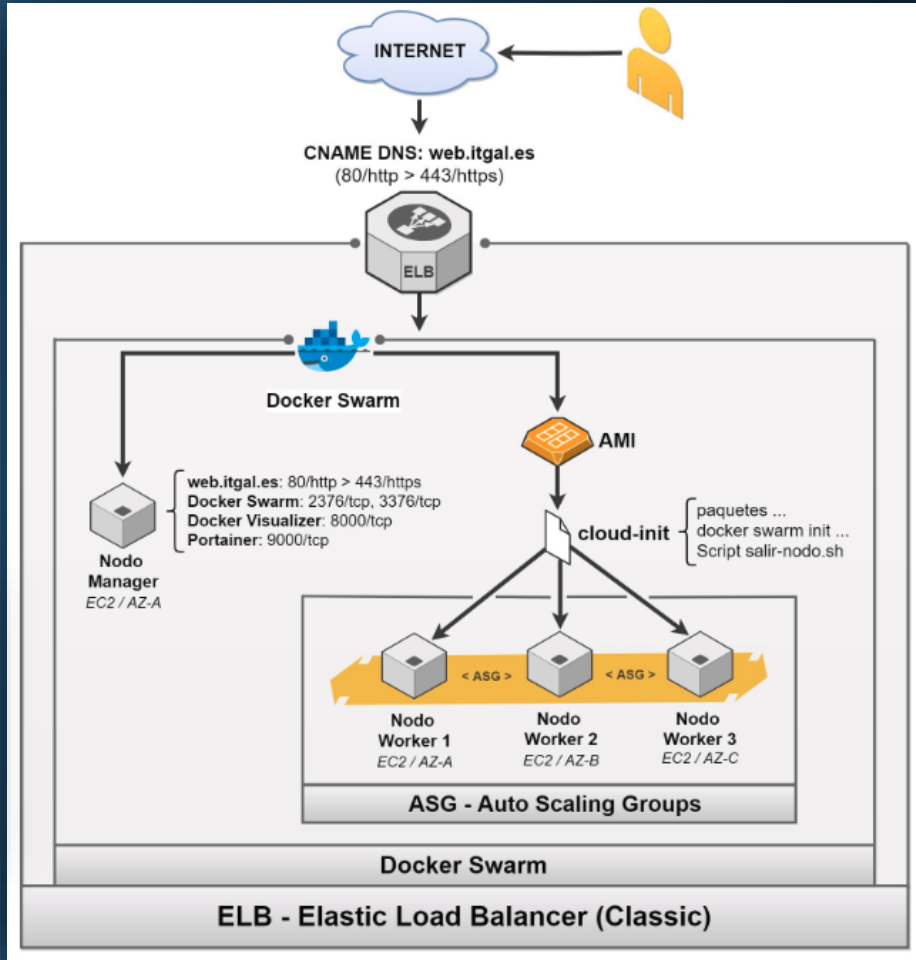
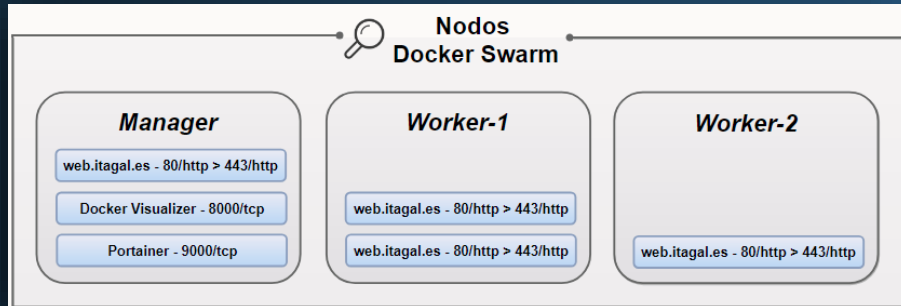


Diagrama AWS:

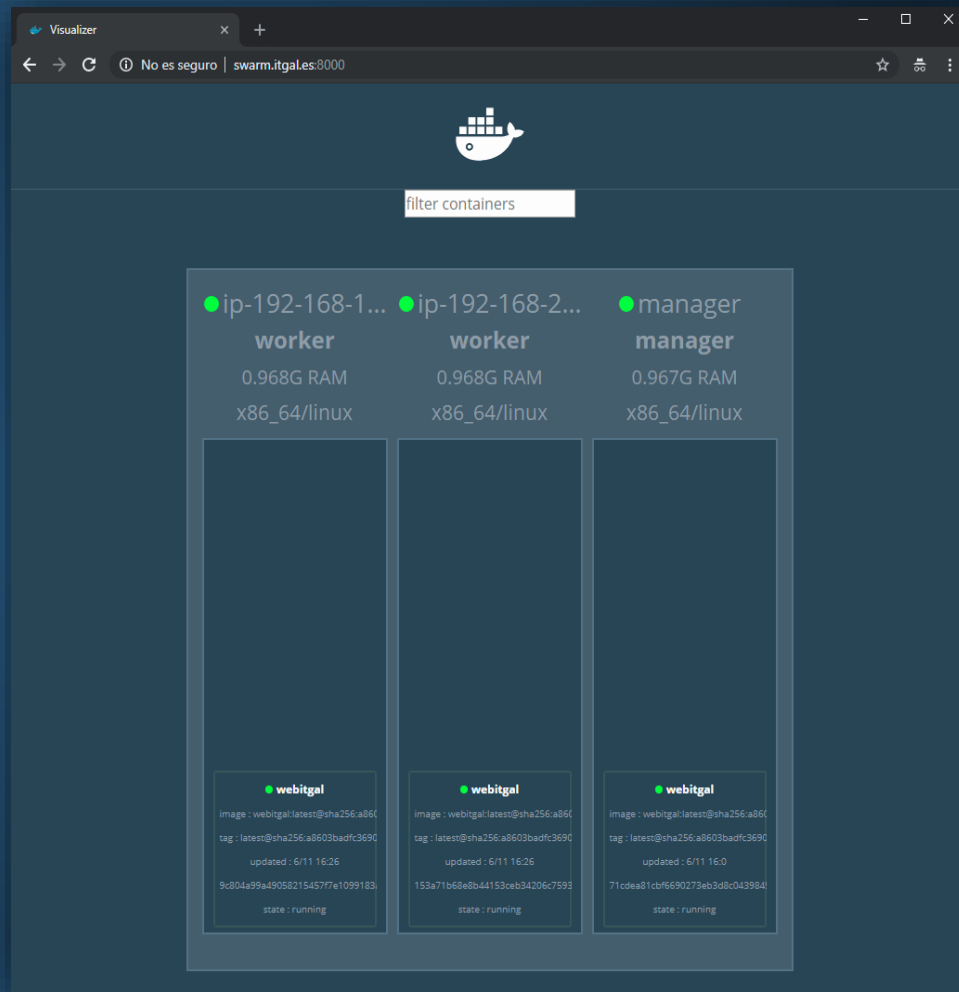
Docker Swarm, Auto Scaling Group, Elastic Load Balancer



Docker Swarm:

Crear el servicio con tres tareas de réplica en tres nodos desplegados con ASG

```
root@manager:~# docker service create \
> --name webitgal \
> --publish 80:80 \
> --publish 443:443 \
> --replicas 3 \
> --update-parallelism 1 \
> --update-delay 5s \
> --restart-condition on-failure \
> adryanaws/webitgal
8eoqdtcmx20mne3iepo2074px
overall progress: 3 out of 3 tasks
1/3: running [=====>]
2/3: running [=====>]
3/3: running [=====>]
verify: Service converged
```



Elastic Load Balancer:

Balanceador de carga entre instancias EC2 gestionadas por ASG e instancia fija correspondiente al nodo manager.

The screenshot shows the AWS Management Console for the Elastic Load Balancing service. The left sidebar contains navigation links for Lifecycle Manager, NETWORK & SECURITY, Security Groups, Elastic IPs, Placement Groups, Key Pairs, Network Interfaces, LOAD BALANCING, Load Balancers, Target Groups, AUTO SCALING, Launch Configurations, Auto Scaling Groups, SYSTEMS MANAGER SERVICES, Run Command, State Manager, Configuration Compliance, Automations, Patch Compliance, Patch Baselines, and SYSTEMS MANAGER SHARED RESOURCES. The main content area shows the 'webitgal-elb' load balancer details. The 'Instances' tab is selected, displaying a table of instances. The 'Edit Availability Zones' section shows a table of subnets across three availability zones.

Instance ID	Name	Availability Zone	Status
i-03eb1d9f7026152b8	manager	us-east-2a	InService
i-099cfa1f37b387fd9	worker-asg	us-east-2a	InService
i-091d9052f05d11941	worker-asg	us-east-2c	InService
i-0e75f06d199d19785	worker-asg	us-east-2b	InService

Availability Zone	Subnet ID	Subnet CIDR	Instance Count	Healthy?
us-east-2a	subnet-0b19817cd7df19036	192.168.10.0/24	2	Yes
us-east-2b	subnet-0911a6029b2cfd1f	192.168.20.0/24	1	Yes
us-east-2c	subnet-0c9951c8e9731abb	192.168.30.0/24	1	Yes

Crear un registro CNAME en la configuración DNS que apunte al DNS Name del ELB

The screenshot shows the 'Basic Configuration' section of the 'webitgal-elb' load balancer. The 'Name' field is 'webitgal-elb'. The 'DNS name' field is highlighted with a red arrow and contains the text 'webitgal-elb-1790521091.us-east-2.elb.amazonaws.com (A Record)'.

Load balancer: webitgal-elb

Description Instances Health Check Listeners Monitoring Tags Migration

Basic Configuration

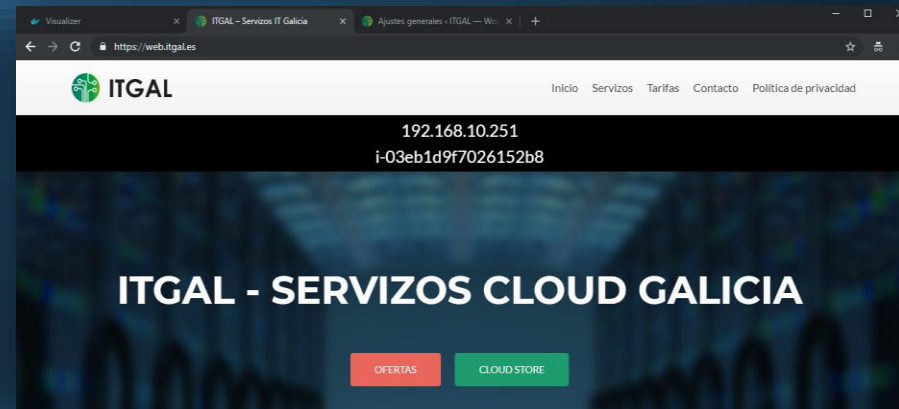
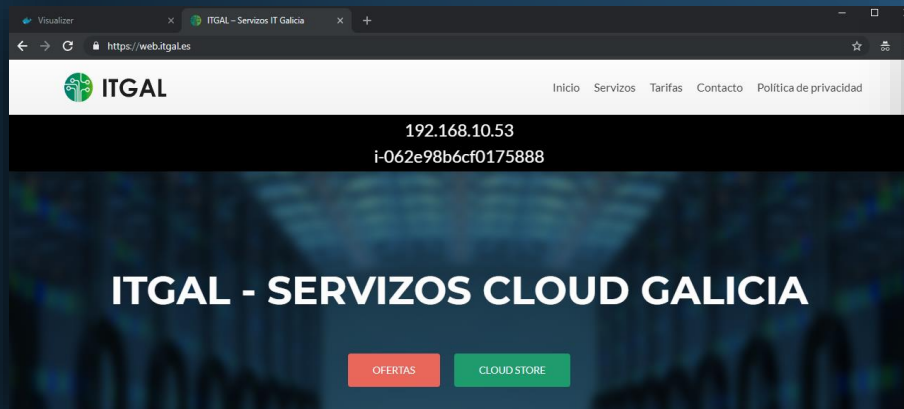
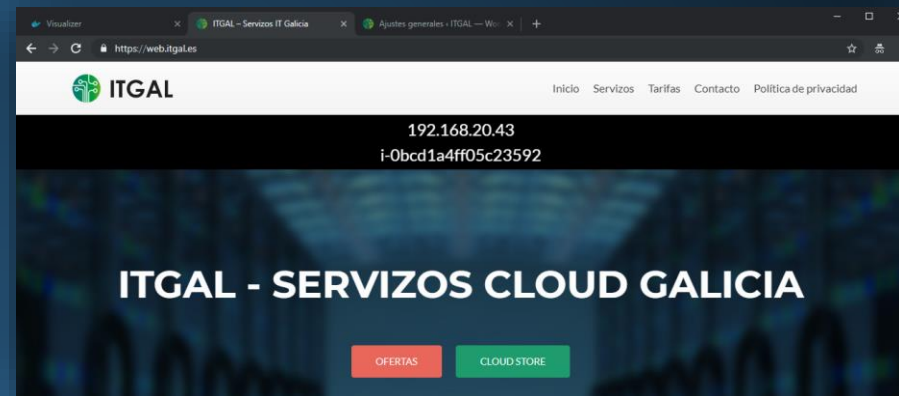
Name: webitgal-elb

* DNS name: webitgal-elb-1790521091.us-east-2.elb.amazonaws.com (A Record)

Elastic Load Balancer:

Balanceo de carga entre instancias EC2 (nodos Swarm). Para el servicio replicado "webital"

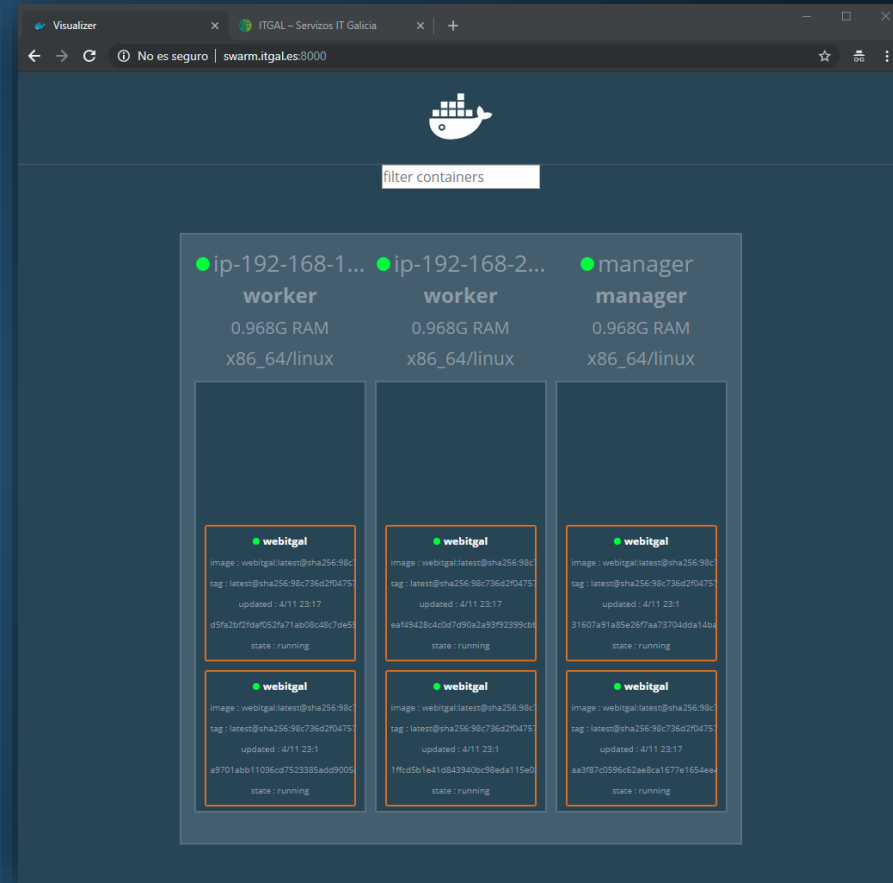
```
<div style="background-color:black;color:white;font-size:1.5em;text-align:center;padding:5px;width:100%">
<?php echo
file_get_contents("http://169.254.169.254/latest/meta-data/local-ipv4"); ?>
<br />
<?php echo
file_get_contents("http://169.254.169.254/latest/meta-data/instance-id"); ?>
</div>
```



Docker Swarm:

Actualizar el servicio con tres tareas de réplica

```
root@manager:~# docker service update --replicas=6 webitgal
webitgal
overall progress: 6 out of 6 tasks
1/6: running [=====>]
2/6: running [=====>]
3/6: running [=====>]
4/6: running [=====>]
5/6: running [=====>]
6/6: running [=====>]
verify: Service converged
```



Auto Scaling Group

Scale-out en una instancia que se agregará al nodo Swarm

The image shows the AWS Management Console interface for editing an Auto Scaling Group. On the left, a sidebar lists the 'webitgal-asg' group with a 'Desired Capacity' of 2, indicated by a red arrow. The main panel displays the 'Edit details - webitgal-asg' dialog box. This dialog contains various configuration options for the group, including launch instances, capacity, availability zones, subnets, load balancers, and health checks.

Edit details - webitgal-asg

Launch Instances Using ☐ Launch Template ☒ Launch Configuration

Launch Configuration

Desired Capacity (indicated by a red arrow)

Min

Max

Availability Zone(s)

Subnet(s)

Classic Load Balancers

Target Groups

Health Check Type

Health Check Grace Period

Instance Protection

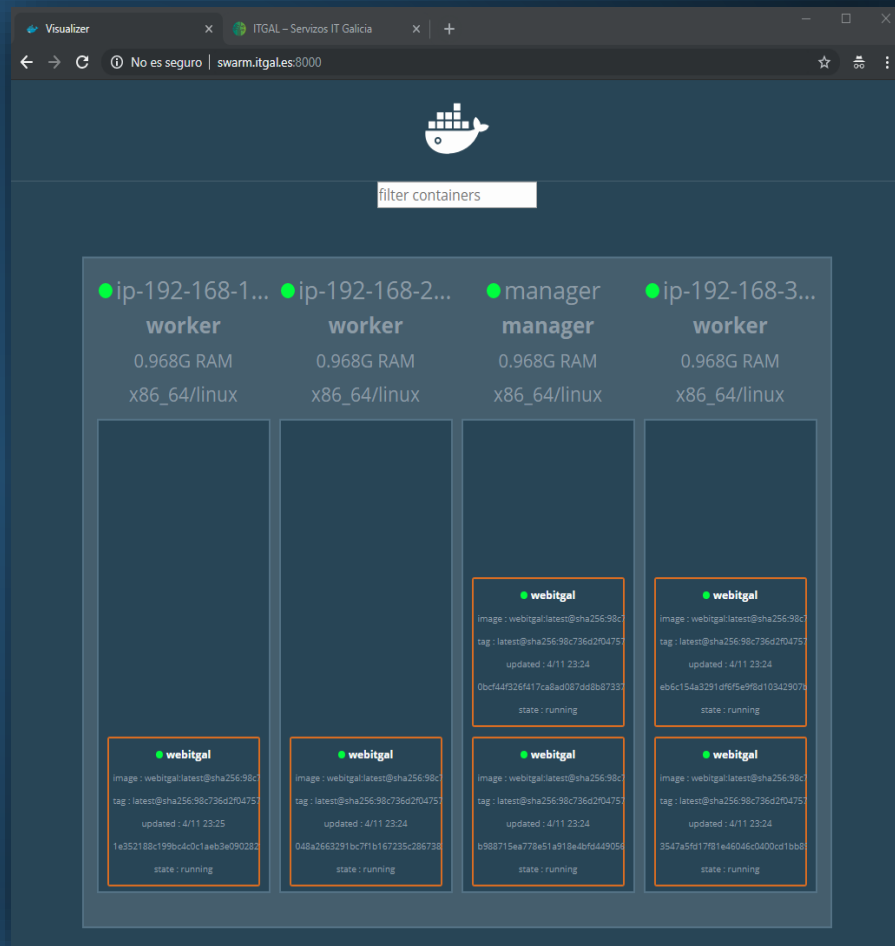
Termination Policies

Buttons: Cancel, Save

Docker Swarm:

Actualización de servicio con las mismas tareas de réplicas anteriores, creando así el rebalanceo de carga entre los nodos del Swarm

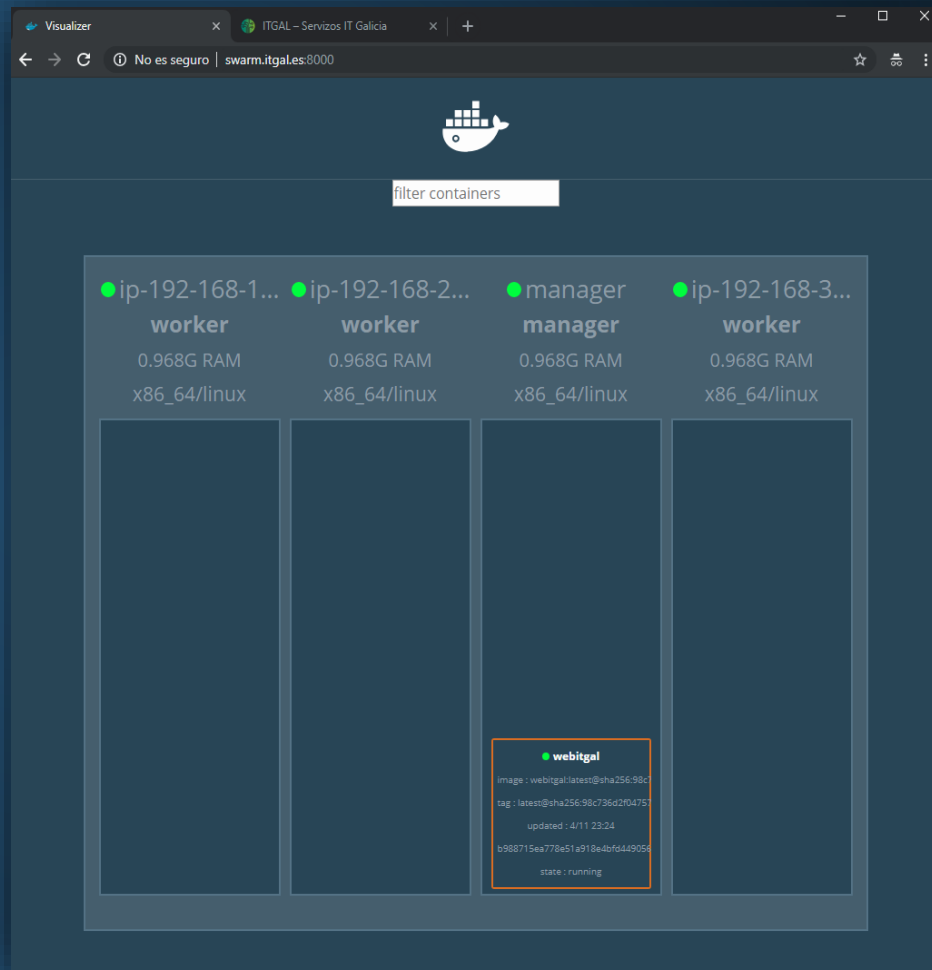
```
root@manager:~# docker service update --force webitgal
webitgal
overall progress: 6 out of 6 tasks
1/6: running [=====>]
2/6: running [=====>]
3/6: running [=====>]
4/6: running [=====>]
5/6: running [=====>]
6/6: running [=====>]
verify: Service converged
```



Docker Swarm:

Actualización de servicio para reducir las tareas de réplicas a uno

```
root@manager:~# docker service update --replicas=1
webitgal
webitgal
overall progress: 1 out of 1 tasks
1/1: running
[=====>]
verify: Service converged
```



Auto Scaling Group

Scale-in a cero en todas las instancias desplegadas

The image shows the AWS Management Console interface for an Auto Scaling Group named 'webitgal-asg'. On the left, the 'Details' tab is selected, showing the group's configuration: Launch Configuration 'webitgal-launch-asg', Desired Capacity '3', Min '0', and Max '6'. A red arrow points to the 'Desired Capacity' value '3'. On the right, the 'Edit details - webitgal-asg' modal is open. It shows the 'Launch Instances Using' section with 'Launch Configuration' selected. The 'Launch Configuration' dropdown is set to 'webitgal-launch-asg'. The 'Desired Capacity' input field is highlighted with a red arrow pointing to the value '0'. The 'Min' input field is also set to '0', and the 'Max' input field is set to '6'. The 'Availability Zone(s)' section shows three zones: 'us-east-2a', 'us-east-2b', and 'us-east-2c'. The 'Subnet(s)' section shows three subnets: 'subnet-0b19817cd7df19036(192.168.10.0/24) | webitgal-subnet-a | us-east-2a', 'subnet-0c9951cf8e9731abb(192.168.30.0/24) | webitgal-subnet-c | us-east-2c', and 'subnet-0911a6029b2cddd1f(192.168.20.0/24) | webitgal-subnet-b | us-east-2b'. The 'Classic Load Balancers' section shows 'webitgal-elb'.

Resource Groups

Create Auto Scaling group Actions

Filter: Filter Auto Scaling groups...

Name	Launch Configuration	Instances
webitgal-asg	webitgal-launch-asg	3

Auto Scaling Group: webitgal-asg

Details Activity History Scaling Policies

Launch Configuration webitgal-launch-asg

Desired Capacity 3

Min 0

Max 6

Edit details - webitgal-asg

Launch Instances Using

- Launch Template
- Launch Configuration**

Launch Configuration webitgal-launch-asg

Desired Capacity 0

Min 0

Max 6

Availability Zone(s) us-east-2a us-east-2b us-east-2c

Subnet(s)

- subnet-0b19817cd7df19036(192.168.10.0/24) | webitgal-subnet-a | us-east-2a
- subnet-0c9951cf8e9731abb(192.168.30.0/24) | webitgal-subnet-c | us-east-2c
- subnet-0911a6029b2cddd1f(192.168.20.0/24) | webitgal-subnet-b | us-east-2b

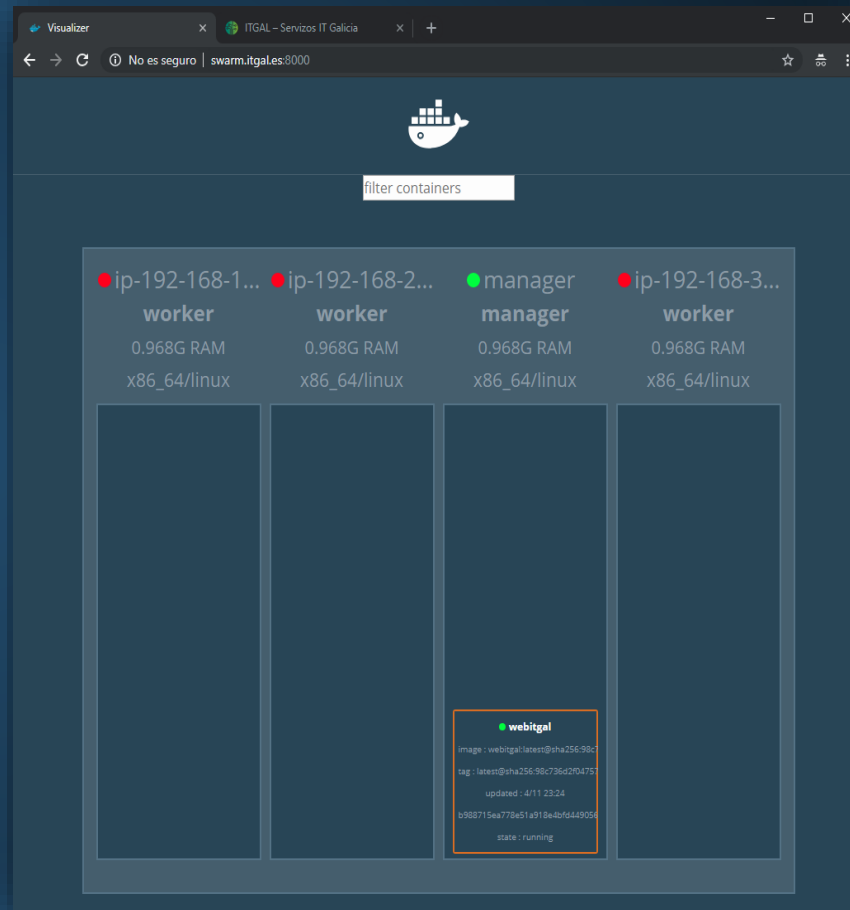
Classic Load Balancers webitgal-elb

Docker Swarm:

Después del scale-in a cero, el estado de los nodos es "Down"

```
root@manager:~# docker node ls
```

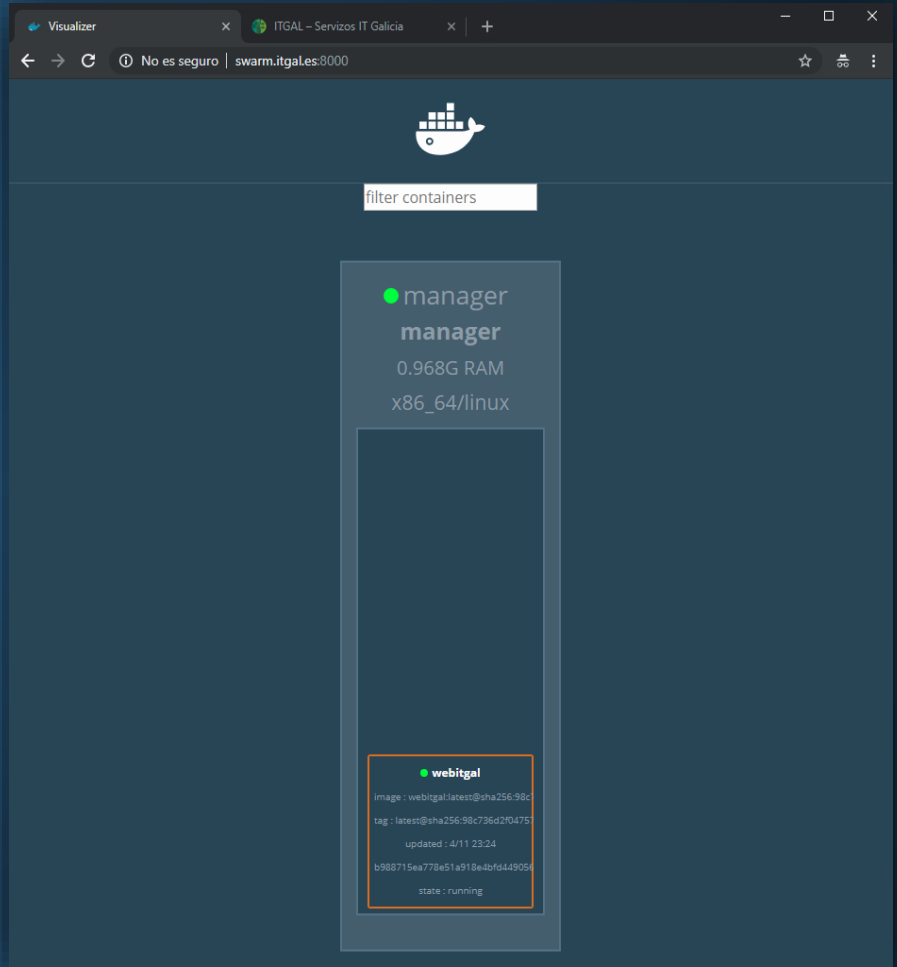
ID	HOSTNAME	STATUS
AVAILABILITY	MANAGER	STATUS
ENGINE	VERSION	
eyxf2pqhfbprckm6db44761zj	ip-192-168-10-64	Down
Active		18.06.1-ce
qw84n3ev09yhc30vlmddrwpzb	ip-192-168-20-133	Down
Active		18.06.1-ce
togf7g1cv22rol9c9jowj1ioh	ip-192-168-30-222	Down
Active		18.06.1-ce
b5mm1cmv2d2jr1dgh5r1r3oqk *	manager	Ready
Active	Leader	18.06.1-ce



Bash Script:

Script para eliminar nodos “down” del Swarm de nodos. (Instancias en estado “terminated”)

```
#!/bin/bash
nodo_down=$(docker node ls | grep Down | sed -n '1p' |
awk '{print $1}')
while [ "$nodo_down" != "" ];
do
    nodo_down=$(docker node ls | grep Down | sed -n '1p'
| awk '{print $1}')
    docker node rm --force "$nodo_down"
done
```





<https://www.youtube.com/watch?v=HzsBiJgrOo>

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