

Práctica 2: Docker

Iago Domínguez Cameán <iago.dominguez.camean@udc.es>

Iker García Calviño <iker.gcalvino@udc.es>

Ejercicio 1

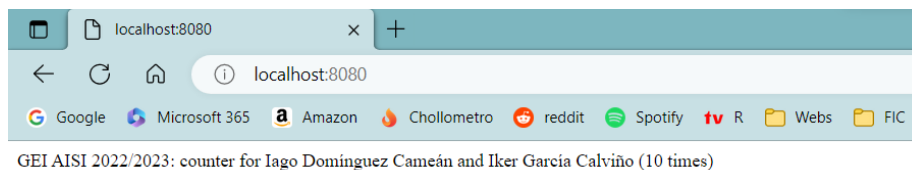
```
vagrant@idc-aisi2223-docker:/vagrant/ej1$ docker image ls
REPOSITORY          TAG             IMAGE ID        CREATED         SIZE
idc-aisi2223-redis  latest         f00de4e79166   34 seconds ago  308MB
debian              buster-slim    207e649c30bf   2 weeks ago    69.3MB
vagrant@idc-aisi2223-docker:/vagrant/ej1$ docker history idc-aisi2223-redis
IMAGE               CREATED          CREATED BY          SIZE      COMMENT
f00de4e79166        49 seconds ago  /bin/sh -c #(nop)  ENTRYPOINT ["/bin/sh" "-c...  0B
f88f4253eb24        50 seconds ago  /bin/sh -c #(nop)  EXPOSE 6379/tcp              0B
b16aaffe53ac        50 seconds ago  /bin/sh -c #(nop)  USER redis                  0B
4bf62cb5188e        51 seconds ago  /bin/sh -c #(nop)  WORKDIR /data                0B
4eb984f3cced        51 seconds ago  /bin/sh -c mkdir $REDIS_DATA && chown redis:... 0B
699fd4ed986a        53 seconds ago  /bin/sh -c #(nop)  ENV REDIS_DATA=/data         0B
6b039ca9b7c0        53 seconds ago  /bin/sh -c apt-get update && apt-get instal... 239MB
207e649c30bf        2 weeks ago    /bin/sh -c #(nop)  CMD ["bash"]                 0B
<missing>           2 weeks ago    /bin/sh -c #(nop)  ADD file:6c5da7126f75c404a... 69.3MB
vagrant@idc-aisi2223-docker:/vagrant/ej1$
```

Figure 1: Imagen idc-aisi2223-redis

```
vagrant@idc-aisi2223-docker:/vagrant/ej1$ docker run --name redis-client --entrypoint redis-cli idc-aisi2223-redis -h 172.17.0.2 ping
PONG
vagrant@idc-aisi2223-docker:/vagrant/ej1$ docker ps -a
CONTAINER ID   IMAGE             COMMAND                  CREATED    STATUS      PORTS      NAMES
fe4504f4f6f1   idc-aisi2223-redis  "redis-cli -h 172.17..." 4 seconds ago  Exited (0) 3 seconds ago          redis-client
34b3ccbe7222   idc-aisi2223-redis  "redis-server '--pro..." 37 minutes ago  Up 37 minutes    6379/tcp    redis-server
vagrant@idc-aisi2223-docker:/vagrant/ej1$
```

Figure 2: Contenedores servidor y cliente de Redis

Ejercicio 2



localhost:8080

localhost:8080

Google Microsoft 365 Amazon Chollometro reddit Spotify tv R Webs FIC

GEI AISI 2022/2023: counter for Iago Domínguez Cameán and Iker García Calviño (10 times)

Figure 3: Aplicación web Flask - host

```
vagrant@idc-aisi2223-docker:~$ docker run --rm --name webapp --link redis-server -p 80:5000 idc-aisi2223-webcounter
* Serving Flask app 'counter.py'
* Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:5000
* Running on http://172.17.0.3:5000
Press CTRL+C to quit
* Restarting with stat
* Debugger is active!
* Debugger PIN: 996-247-268
10.0.2.2 - - [04/Mar/2023 17:10:15] "GET / HTTP/1.1" 200 -
10.0.2.2 - - [04/Mar/2023 17:10:15] "GET /favicon.ico HTTP/1.1" 404 -
10.0.2.2 - - [04/Mar/2023 17:10:18] "GET / HTTP/1.1" 200 -
10.0.2.2 - - [04/Mar/2023 17:10:20] "GET / HTTP/1.1" 200 -
10.0.2.2 - - [04/Mar/2023 17:10:20] "GET / HTTP/1.1" 200 -
10.0.2.2 - - [04/Mar/2023 17:10:21] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [04/Mar/2023 17:10:28] "GET / HTTP/1.1" 200 -
10.0.2.2 - - [04/Mar/2023 17:10:35] "GET / HTTP/1.1" 200 -
10.0.2.2 - - [04/Mar/2023 17:10:35] "GET /favicon.ico HTTP/1.1" 404 -
```

Figure 4: Aplicación web Flask - webapp

```
vagrant@idc-aisi2223-docker:~$ docker ps
CONTAINER ID   IMAGE      COMMAND                  CREATED        STATUS        PORTS                               NAMES
b7ed005044b3   idc-aisi2223-webcounter   "flask run"             2 minutes ago   Up 2 minutes (healthy)   0.0.0.0:80->5000/tcp, :::80->5000/tcp   webapp
e980ab452c87   idc-aisi2223-redis        "redis-server '--pro..." 7 hours ago     Up 7 hours              6379/tcp                               redis-server

vagrant@idc-aisi2223-docker:~$ docker logs webapp
* Serving Flask app 'counter.py'
* Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:5000
* Running on http://172.17.0.3:5000
Press CTRL+C to quit
* Restarting with stat
* Debugger is active!
* Debugger PIN: 730-957-520
127.0.0.1 - - [04/Mar/2023 23:42:48] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [04/Mar/2023 23:43:18] "GET / HTTP/1.1" 200 -
10.0.2.2 - - [04/Mar/2023 23:43:46] "GET / HTTP/1.1" 200 -
10.0.2.2 - - [04/Mar/2023 23:43:48] "GET / HTTP/1.1" 200 -
10.0.2.2 - - [04/Mar/2023 23:43:48] "GET /favicon.ico HTTP/1.1" 404 -
127.0.0.1 - - [04/Mar/2023 23:43:49] "GET / HTTP/1.1" 200 -
10.0.2.2 - - [04/Mar/2023 23:43:49] "GET / HTTP/1.1" 200 -
10.0.2.2 - - [04/Mar/2023 23:43:49] "GET /favicon.ico HTTP/1.1" 404 -
10.0.2.2 - - [04/Mar/2023 23:43:49] "GET / HTTP/1.1" 200 -
10.0.2.2 - - [04/Mar/2023 23:43:50] "GET /favicon.ico HTTP/1.1" 404 -
127.0.0.1 - - [04/Mar/2023 23:44:19] "GET / HTTP/1.1" 200 -
vagrant@idc-aisi2223-docker:~$ curl localhost:80
GEI AISI 2022/2023: counter for Iago Dominguez Cameán and Iker García Calviño (34 times)
vagrant@idc-aisi2223-docker:~$
```

Figure 5: Aplicación web Flask en segundo plano

Ejercicio 3

```
vagrant@idc-ais12223-docker:~$ docker compose -f /vagrant/ej3/compose.yml ps
NAME                IMAGE                                COMMAND                                SERVICE    CREATED        STATUS        PORTS
ej3-redis-1         idc-ais12223-redis                 "redis-server '--pro..."            redis      26 seconds ago    Up 25 seconds    6379/tcp
ej3-webapp-1        idc-ais12223-webcounter             "flask run"                          webapp     26 seconds ago    Up 24 seconds (healthy)    0.0.0.0:80->5000/tcp, :::80->5000/tcp
vagrant@idc-ais12223-docker:~$ cat /vagrant/ej3/compose.yml | grep links
vagrant@idc-ais12223-docker:~$ cat /vagrant/ej3/src/counter.py | grep "GEI AISI"
return "GEI AISI 2022/2023: my new counter for Iago Domínguez Cameán and Iker García Calviño ({}) times"\n'.format(count)
vagrant@idc-ais12223-docker:~$ curl localhost
GEI AISI 2022/2023: my new counter for Iago Domínguez Cameán and Iker García Calviño (6 times)
vagrant@idc-ais12223-docker:~$
```

Figure 6: Aplicación multicontenedor sin link

Ejercicio 4

```
vagrant@idc-ais12223-docker:/vagrant/ej4$ docker stack deploy -c stack.yml mystack
Creating network mystack_default
Creating service mystack_redis
Creating service mystack_webapp
vagrant@idc-ais12223-docker:/vagrant/ej4$ docker stack ls
NAME                SERVICES
mystack             2
vagrant@idc-ais12223-docker:/vagrant/ej4$ docker stack services mystack
ID                NAME                NODE                REPLICAS    IMAGE                                PORTS
xcg8khz8k8b      mystack_redis        localhost:5000/idc-ais12223-redis:latest    1/1          localhost:5000/idc-ais12223-redis:latest    *:80->5000/tcp
4er7F5t33y6g     mystack_webapp       localhost:5000/idc-ais12223-webcounter:latest    3/3          localhost:5000/idc-ais12223-webcounter:latest
vagrant@idc-ais12223-docker:/vagrant/ej4$ docker stack ps mystack
ID                NAME                IMAGE                                NODE                DESIRED STATE    CURRENT STATE    ERROR    PORTS
z6beniyh6j1z     mystack_redis.1      localhost:5000/idc-ais12223-redis:latest    idc-ais12223-docker-worker    Running          Running 42 seconds ago
s94znc38q6v      mystack_webapp.1     localhost:5000/idc-ais12223-webcounter:latest    idc-ais12223-docker-worker    Running          Running 26 seconds ago
aczk8byuok6p     mystack_webapp.2     localhost:5000/idc-ais12223-webcounter:latest    idc-ais12223-docker-worker    Running          Running 29 seconds ago
lraay94c2k6h     mystack_webapp.3     localhost:5000/idc-ais12223-webcounter:latest    idc-ais12223-docker-worker    Running          Running 26 seconds ago
vagrant@idc-ais12223-docker:/vagrant/ej4$ docker ps
CONTAINER ID        IMAGE                                COMMAND                                CREATED        STATUS        PORTS        NAMES
edaa8a88b71       localhost:5000/idc-ais12223-webcounter:latest    "flask run"                          53 seconds ago    Up 51 seconds (healthy)    5000/tcp    mystack_webapp.2_m6zk8byuok6paki12rkv59pw
fb841f7e393       registry:2            "/entrypoint.sh /etc..."            22 minutes ago    Up 22 minutes    5000/tcp    registry.1.sql386gtvldxo6imdvysqc4k
vagrant@idc-ais12223-docker:/vagrant/ej4$
```

Figure 7: Comprobaciones del stack - manager

```
vagrant@idc-ais12223-docker-worker:~$ docker stack ls
Error response from daemon: This node is not a swarm manager. Worker nodes can't be used to view or modify cluster state. Please run this command on a manager node or promote the current node to a manager.
vagrant@idc-ais12223-docker-worker:~$ docker ps
CONTAINER ID        IMAGE                                COMMAND                                CREATED        STATUS        PORTS        NAMES
s94znc38q6v        localhost:5000/idc-ais12223-webcounter:latest    "flask run"                          2 minutes ago    Up 2 minutes (healthy)    5000/tcp    mystack_webapp.1.s94znc38q6vgyhybz1saw6
746d618f089        localhost:5000/idc-ais12223-webcounter:latest    "flask run"                          2 minutes ago    Up 2 minutes (healthy)    5000/tcp    mystack_webapp.1.s94znc38q6vgyhybz1saw6
746d618f089        localhost:5000/idc-ais12223-redis:latest         "redis-server '--pro..."            2 minutes ago    Up 2 minutes    6379/tcp    mystack_redis.1.z6beniyh6j1zsq126f9jnc18f
vagrant@idc-ais12223-docker-worker:~$
```

Figure 8: Comprobaciones del stack - worker

```

vagrant@idc-aisi2223-docker:/vagrant/ej4$ docker stack services mystack
ID            NAME            MODE            REPLICAS        IMAGE            PORTS
xg6khz8zkk8  mystack_redis    replicated       2/1             localhost:5000/idc-aisi2223-redis:latest
4e77f9t33y6g mystack_webapp    replicated       3/3             localhost:5000/idc-aisi2223-webcounter:latest   *:80->5000/tcp
vagrant@idc-aisi2223-docker:/vagrant/ej4$ docker service scale mystack_webapp=4
mystack_webapp scaled to 4
overall progress: 4 out of 4 tasks
1/4: running [=====>]
2/4: running [=====>]
3/4: running [=====>]
4/4: running [=====>]
verify: Service converged
vagrant@idc-aisi2223-docker:/vagrant/ej4$ docker stack services mystack
ID            NAME            MODE            REPLICAS        IMAGE            PORTS
xg6khz8zkk8  mystack_redis    replicated       2/1             localhost:5000/idc-aisi2223-redis:latest
4e77f9t33y6g mystack_webapp    replicated       4/4             localhost:5000/idc-aisi2223-webcounter:latest   *:80->5000/tcp
vagrant@idc-aisi2223-docker:/vagrant/ej4$ docker stack ps mystack
ID            NAME            IMAGE            NODE            DESIRED STATE   CURRENT STATE   ERROR   PORTS
z6beniyh0jlz  mystack_redis.1  localhost:5000/idc-aisi2223-redis:latest  idc-aisi2223-docker-worker  Running          Running 9 minutes ago
s94znc84qsv   mystack_webapp.1 localhost:5000/idc-aisi2223-webcounter:latest idc-aisi2223-docker-worker  Running          Running 9 minutes ago
m3z80yus4ep   mystack_webapp.2 localhost:5000/idc-aisi2223-webcounter:latest idc-aisi2223-docker-worker  Running          Running 9 minutes ago
f9aay04czckh  mystack_webapp.3 localhost:5000/idc-aisi2223-webcounter:latest idc-aisi2223-docker-worker  Running          Running 9 minutes ago
rh7j660asves mystack_webapp.4 localhost:5000/idc-aisi2223-webcounter:latest idc-aisi2223-docker-worker  Running          Running 31 seconds ago
vagrant@idc-aisi2223-docker:/vagrant/ej4$ docker service scale mystack_webapp=2
mystack_webapp scaled to 2
overall progress: 2 out of 2 tasks
1/2: running [=====>]
2/2: running [=====>]
verify: Service converged
vagrant@idc-aisi2223-docker:/vagrant/ej4$ docker stack services mystack
ID            NAME            MODE            REPLICAS        IMAGE            PORTS
xg6khz8zkk8  mystack_redis    replicated       2/1             localhost:5000/idc-aisi2223-redis:latest
4e77f9t33y6g mystack_webapp    replicated       2/2             localhost:5000/idc-aisi2223-webcounter:latest   *:80->5000/tcp
vagrant@idc-aisi2223-docker:/vagrant/ej4$ curl localhost
GEI AISI 2022/2023: my new counter for Iago Dominguez Caneán and Iker Garcia Calviño (132 times)
vagrant@idc-aisi2223-docker:/vagrant/ej4$

```

Figure 9: Escalada del servicio

Ejercicio 5

```

vagrant@idc-aisi2223-docker:/vagrant/ej3$ docker service ls
ID            NAME            MODE            REPLICAS        IMAGE            PORTS
2u4z73vtssvo registry         replicated       1/1             registry:2
0auvqcd38516 webapp           replicated       5/5             localhost:5000/idc-aisi2223-webcounter:latest   *:80->5000/tcp
vagrant@idc-aisi2223-docker:/vagrant/ej3$ docker service ps redis webapp
ID            NAME            IMAGE            NODE            DESIRED STATE   CURRENT STATE   ERROR   PORTS
n71buosauwp  redis.1         localhost:5000/idc-aisi2223-redis:latest  idc-aisi2223-docker-worker  Running          Running 6 minutes ago
qpx2h8femgs  webapp.1        localhost:5000/idc-aisi2223-webcounter:latest idc-aisi2223-docker-worker  Running          Running 6 minutes ago
b5bunf8a0m6  webapp.2        localhost:5000/idc-aisi2223-webcounter:latest idc-aisi2223-docker-worker  Running          Running 6 minutes ago
bap10r0rwhn  webapp.3        localhost:5000/idc-aisi2223-webcounter:latest idc-aisi2223-docker-worker  Running          Running 6 minutes ago
onqg03mbyj2  webapp.4        localhost:5000/idc-aisi2223-webcounter:latest idc-aisi2223-docker-worker  Running          Running 6 minutes ago
mndkzr7kcy   webapp.5        localhost:5000/idc-aisi2223-webcounter:latest idc-aisi2223-docker-worker  Running          Running 6 minutes ago
vagrant@idc-aisi2223-docker:/vagrant/ej3$ docker ps
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS          NAMES
86e08077e6d1  localhost:5000/idc-aisi2223-webcounter:latest  "flask run"             6 minutes ago  Up 6 minutes  5000/tcp       webapp.5.mndkzr7kcyx10qpf7rvkup0
a1cd4d4e16d1  localhost:5000/idc-aisi2223-webcounter:latest  "flask run"             6 minutes ago  Up 6 minutes  5000/tcp       webapp.2.b5bunf8a0m6w5g83t9dy
db092f47fac8  registry:2                                     "/entrypoint.sh /etc..." 41 minutes ago  Up 41 minutes  5000/tcp       registry.1.ubdnw8o6k4mk85716875se3ob
vagrant@idc-aisi2223-docker:/vagrant/ej3$

```

Figure 10: Despliegue de servicios Docker en un clúster Swarm

```

vagrant@idc-aisi2223-docker:/vagrant/ej3$ docker service inspect --pretty webapp
ID:          ctav9pycw1p2tx6yhnu9cc33v
Name:        webapp
Service Mode: Replicated
  Replicas:  5
Placement:
UpdateConfig:
  Parallelism: 1
  On failure:  pause
  Monitoring Period: 5s
  Max failure ratio: 0
  Update order: stop-first
RollbackConfig:
  Parallelism: 1
  On failure:  pause
  Monitoring Period: 5s
  Max failure ratio: 0
  Rollback order: stop-first
ContainerSpec:
  Image:      localhost:5000/idc-aisi2223-webcounter:latest
  Init:       false
Mounts:
  Target:     /src
  Source:     /vagrant/ej3/src
  ReadOnly:   false
  Type:       bind
Resources:
Networks: idc-aisi2223-network
Endpoint Mode: vip
Ports:
  PublishedPort = 80
  Protocol = tcp
  TargetPort = 5000
  PublishMode = ingress

vagrant@idc-aisi2223-docker:/vagrant/ej3$ curl localhost
GEI AISI 2022/2023: my new counter for Iago Domínguez Cameán and Iker García Calviño (1 times)
vagrant@idc-aisi2223-docker:/vagrant/ej3$

```

Figure 11: Servicio webapp en red la red idc-aisi2223-network