



UNIVERSIDAD MODELO  
Escuela de Ingeniería

Ingeniería En Desarrollo de Tecnología y Software

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Sistemas multidimensionales.

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## Objetivo del documento

- Documentar el proceso de creación de contenedores con la herramienta Docker.
- Documentar el proceso de creación de repositorios con la herramienta Github.
- Documentar el proceso de implementación en los servicios de AWS.

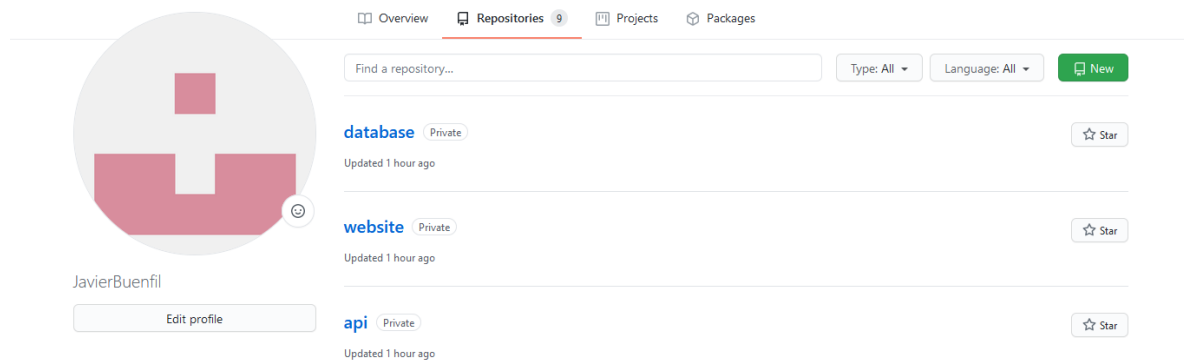
## Alcance del documento

Aprender a automatizar la implementación y creación de páginas web mediante el uso de herramientas como Docker y Github en AWS.

## Procesos

### Repositorios

Se crearon los repositorios en mi github



Se clonaron localmente los repositorios

s PC > Secundario (D:) > Universidad > Sistemas multidimensional >				Search Sistema:
Name	Date modified	Type	Size	
api	11/10/2020 12:02 AM	File folder		
db	11/10/2020 12:02 AM	File folder		
web	11/10/2020 12:02 AM	File folder		

## Levantamiento de contenedores

```
See any operating system documentation about shared libraries for
more information, such as the ld(1) and ld.so(8) manual pages.
-----
```

```
Build complete.
Don't forget to run 'make test'.

Installing shared extensions:     /usr/local/lib/php/extensions/no-debug-non-zts-20180731/
find . -name \*.gcno -o -name \*.gcda | xargs rm -f
find . -name \*.lo -o -name \*.o | xargs rm -f
find . -name \*.la -o -name \*.a | xargs rm -f
find . -name \*.so | xargs rm -f
find . -name .libs -a -type d|xargs rm -rf
rm -f libphp.la      modules/* libs/*
Removing intermediate container d678272bf37d
--> 4e956035e268
Step 7/7 : COPY php.ini $PHP_INI_DIR/php.ini
--> 5f1be864af7e

Successfully built 5f1be864af7e
Successfully tagged api_phpapiclude:latest
```







```
Successfully built 5f1be864af7e
Successfully tagged api_phpapiclude:latest
WARNING: Image for service phpapiclude was built because it did not already exist. To rebuild this image you must
re-run `docker-compose build` or `docker-compose up --build`.
Pulling nginxapiclude (nginx:)...
latest: Pulling from library/nginx
bb79b6b2107f: Already exists
5a9f1c0027a7: Pull complete
b5c20b2b484f: Pull complete
166a2418f7e8: Pull complete
1966ea362d23: Pull complete
Digest: sha256:aeade65e99e5d5e7ce162833636f692354c227ff438556e5f3ed0335b7cc2f1b
Status: Downloaded newer image for nginx:latest
Creating phpapiclude ... done
Creating nginxapiclude ... done
```

```
latest: Pulling from webdevops/php-apache
bed26d33875: Pull complete
11b29a9c730: Pull complete
30bda195c84: Pull complete
8bf9a5ad49e: Pull complete
c8b85719399: Pull complete
0611fcc1b5e: Pull complete
70f19977fc5: Pull complete
131985698ec: Pull complete
5538e0c8933: Pull complete
43f884b2c0e: Pull complete
0d592fa47f1: Pull complete
3f32720a7f3: Pull complete
f8bf6213034: Pull complete
356225c2f81: Pull complete
Digest: sha256:acf080564bcb304227fa26af92457dd486b37c812debd7b0042b84010268d4bd
Status: Downloaded newer image for webdevops/php-apache:latest
Creating websiteclase ... done
```

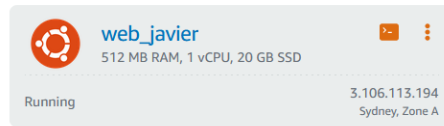
## Nube

Cree mis instancias de Lightsail.

ZONE A

 <b>api_Javier</b> 512 MB RAM, 1 vCPU, 20 GB SSD	 	 <b>database_Javier</b> 512 MB RAM, 1 vCPU, 20 GB SSD	 
Running	18.185.17.168 Frankfurt, Zone A	Running	52.59.201.189 Frankfurt, Zone A

ZONE A



## Instalación Docker en Instancias

```
Setting up python3-software-properties (0.98.9.2) ...
Setting up gnupg-agent (2.2.19-3ubuntu2) ...
Setting up libcurl4:amd64 (7.68.0-1ubuntu2.2) ...
Setting up curl (7.68.0-1ubuntu2.2) ...
Setting up software-properties-common (0.98.9.2) ...
Processing triggers for libc-bin (2.31-0ubuntu9) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for dbus (1.12.16-2ubuntu2.1) ...
Processing triggers for ca-certificates (20201027ubuntu0.20.04.1) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...
done.
root@ip-172-26-8-157:/home/ubuntu# curl -fsSL https://download.docker.com/linux/ubuntu/gpg
| sudo apt-key add -
OK
root@ip-172-26-8-157:/home/ubuntu# sudo apt-key fingerprint 0EBFCD88
pub   rsa4096 2017-02-22 [SCEA]
      9DC8 5822 9FC7 DD38 854A  E2D8 8D81 803C 0EBF CD88
uid           [ unknown] Docker Release (CE deb) <docker@docker.com>
sub   rsa4096 2017-02-22 [S]

root@ip-172-26-8-157:/home/ubuntu# pub   rsa4096 2017-02-22 [SCEA]
```

```
root@ip-172-26-8-157:/home/ubuntu# docker
Usage:  docker [OPTIONS] COMMAND

A self-sufficient runtime for containers

Options:
  -c, --config string      Location of client config files (default "/root/.docker")
  --context string         Name of the context to use to connect to the daemon
                           (overrides DOCKER_HOST env var and default context set
                           with "docker context use")
  -D, --debug              Enable debug mode
  -H, --host list          Daemon socket(s) to connect to
  -l, --log-level string   Set the logging level
                           ("debug"|"info"|"warn"|"error"|"fatal") (default "info")
  --tls                   Use TLS; implied by --tlsverify
  --tlscacert string       Trust certs signed only by this CA (default
                           "/root/.docker/ca.pem")
  --tlscert string         Path to TLS certificate file (default
                           "/root/.docker/cert.pem")
  --tlskey string          Path to TLS key file (default "/root/.docker/key.pem")
  --tlsverify              Use TLS and verify the remote
  -v, --version            Print version information and quit

Management Commands:
  builder      Manage builds
  config       Manage Docker configs
```

```

Unpacking docker-ce-cli (5:19.03.13-3-0-ubuntu-focal) ...
Selecting previously unselected package docker-ce.
Preparing to unpack .../5-docker-ce_5%3a19.03.13-3-0-ubuntu-focal_amd64.deb ...
Unpacking docker-ce (5:19.03.13-3-0-ubuntu-focal) ...
Setting up aufs-tools (1:4.14+20190211-1ubuntu1) ...
Setting up containerd.io (1.3.7-1) ...
Created symlink /etc/systemd/system/multi-user.target.wants/containerd.service → /lib/systemd/system/containerd.service.
Setting up docker-ce-cli (5:19.03.13-3-0-ubuntu-focal) ...
Setting up pigz (2.4-1) ...
Setting up cgroupfs-mount (1.4) ...
Setting up docker-ce (5:19.03.13-3-0-ubuntu-focal) ...
Created symlink /etc/systemd/system/multi-user.target.wants/docker.service → /lib/systemd/system/docker.service.
Created symlink /etc/systemd/system/sockets.target.wants/docker.socket → /lib/systemd/system/docker.socket.
Processing triggers for systemd (245.4-4ubuntu3.1) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libc-bin (2.31-0ubuntu9) ...
root@ip-172-26-11-91:/home/ubuntu# sudo curl -L "https://github.com/docker/compose/releases/download/1.27.4/docker-compose-$(uname -s)-$(uname -m)" -o /usr/local/bin/docker-compose
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left   Speed
100 651    100 651    0    0  9041    0 --:--:-- --:--:-- --:--:--  9041
100 11.6M  100 11.6M    0    0 4393k    0 0:00:02 0:00:02 --:--:-- 4683k
root@ip-172-26-11-91:/home/ubuntu# sudo chmod +x /usr/local/bin/docker-compose
root@ip-172-26-11-91:/home/ubuntu#

```

api\_javier  
18.185.17.168



```

exec      Run a command in a running container
export    Export a container's filesystem as a tar archive
history   Show the history of an image
images    List images
import    Import the contents from a tarball to create a filesystem image
info      Display system-wide information
inspect   Return low-level information on Docker objects
kill      Kill one or more running containers
load      Load an image from a tar archive or STDIN
login     Log in to a Docker registry
logout    Log out from a Docker registry
logs      Fetch the logs of a container
pause     Pause all processes within one or more containers
port      List port mappings or a specific mapping for the container
ps        List containers
pull      Pull an image or a repository from a registry
push      Push an image or a repository to a registry
rename    Rename a container
restart   Restart one or more containers
rm        Remove one or more containers
rmi       Remove one or more images
run       Run a command in a new container
save I    Save one or more images to a tar archive (streamed to STDOUT by default)
search    Search the Docker Hub for images
start     Start one or more stopped containers
stats     Display a live stream of container(s) resource usage statistics
stop      Stop one or more running containers
tag       Create a tag TARGET_IMAGE that refers to SOURCE_IMAGE
top       Display the running processes of a container
unpause   Unpause all processes within one or more containers
update    Update configuration of one or more containers
version   Show the Docker version information
wait      Block until one or more containers stop, then print their exit codes

```

Run 'docker COMMAND --help' for more information on a command.

```
root@ip-172-26-9-62:/home/ubuntu#
```

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3.106.113.194



Clonación de repositorio.

```

root@ip-172-26-8-157:/home# git clone https://github.com/JavierBuenfil/database.git
Cloning into 'database'...
Username for 'https://github.com': javierbuenfil95@hotmail.com
Password for 'https://javierbuenfil95@hotmail.com@github.com':
remote: Enumerating objects: 11, done.
remote: Counting objects: 100% (11/11), done.
remote: Compressing objects: 100% (8/8), done.
remote: Total 11 (delta 1), reused 11 (delta 1), pack-reused 0
Unpacking objects: 100% (11/11), 15.73 KiB | 39.00 KiB/s, done.
root@ip-172-26-8-157:/home# cd db
bash: cd: db: No such file or directory
root@ip-172-26-8-157:/home# ls

```

```

root@ip-172-26-11-91:/home/ubuntu# sudo curl -L "https://github.com/docker/compose/releases/download/1.27.4/docker-compose-$(uname -s)-$(uname -m)" -o /usr/local/bin/docker-compose
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total   Spent    Left  Speed
100  651  100  651    0     0  9041      0 --:--:-- --:--:-- --:--:--  9041
100 11.6M  100 11.6M    0     0 4393k      0 0:00:02 0:00:02 --:--:-- 4683k
root@ip-172-26-11-91:/home/ubuntu# sudo chmod +x /usr/local/bin/docker-compose
root@ip-172-26-11-91:/home/ubuntu# git clone https://github.com/JavierBuenfil/api.git
Cloning into 'api'...
Username for 'https://github.com': javierbuenfil95@hotmail.com
Password for 'https://javierbuenfil95@hotmail.com@github.com':
remote: Enumerating objects: 9109, done.
remote: Counting objects: 100% (9109/9109), done.
remote: Compressing objects: 100% (5827/5827), done.
Receiving objects: 34% (3098/9109), 4.76 MiB | 1.82 MiB/s

```

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18.185.17.168

```

root@ip-172-26-9-62:/home/ubuntu# cd ..
root@ip-172-26-9-62:/home# git clone https://github.com/JavierBuenfil/website.git
Cloning into 'website'...
Username for 'https://github.com': javierbuenfil95@hotmail.com
Password for 'https://javierbuenfil95@hotmail.com@github.com':
remote: Enumerating objects: 5, done.
remote: Counting objects: 100% (5/5), done.
remote: Compressing objects: 100% (4/4), done.
remote: Total 5 (delta 0), reused 5 (delta 0), pack-reused 0
Unpacking objects: 100% (5/5), 855 bytes | 427.00 KiB/s, done.
root@ip-172-26-9-62:/home# ls
ubuntu website
root@ip-172-26-9-62:/home#

```

web\_javier  
3.106.113.194

Montaje de contenedor.

```

root@ip-172-26-8-157:/home/database# docker-compose up -d
Creating network "database_default" with the default driver
Pulling db (mariadb:...)
latest: Pulling from library/mariadb
6a5697faee43: Pull complete
ba13d3bc422b: Pull complete
a254829d9e55: Pull complete
2ee2cadd29fc: Pull complete
6915a184049d: Pull complete
5ca6ffdb5f56: Pull complete
1537f7bbef8b: Pull complete
5790e54322d1: Pull complete
ea98cb829471: Pull complete
a46bde67834a: Pull complete
78334cd64cf3: Pull complete
5ffdad591cf6: Pull complete
Digest: sha256:2960a3d1ddb35dd454066b45005b4f694e18af76648833f1b9d93ab90cee7cf2
Status: Downloaded newer image for mariadb:latest
Creating database_db_1 ... done
root@ip-172-26-8-157:/home/database#

```

```
database_javier - terminal | Lightsail - Mozilla Firefox
https://lightsail.aws.amazon.com/ls/remote/eu-central-1/instances/database_Javier/terminal?protocol=ssh

root@ip-172-26-8-157:/home/ubuntu# dir
root@ip-172-26-8-157:/home/ubuntu# ls
root@ip-172-26-8-157:/home/ubuntu# cd ..
root@ip-172-26-8-157:/home# git clone https://github.com/JavierBuenfil/database.git
Cloning into 'database'...
Username for 'https://github.com': javierbuenfil95@hotmail.com
Password for 'https://javierbuenfil95@hotmail.com@github.com':
remote: Enumerating objects: 11, done.
remote: Counting objects: 100% (11/11), done.
remote: Compressing objects: 100% (8/8), done.
remote: Total 11 (delta 1), reused 11 (delta 1), pack-reused 0
Unpacking objects: 100% (11/11), 15.73 KiB | 39.00 KiB/s, done.
root@ip-172-26-8-157:/home# cd db
bash: cd: db: No such file or directory
root@ip-172-26-8-157:/home# ls
database  ubuntu
root@ip-172-26-8-157:/home# cd database
root@ip-172-26-8-157:/home/database# ls
config  docker-compose.yml  files
root@ip-172-26-8-157:/home/database# docker-compose up -d
Creating network "database_default" with the default driver
Pulling db (mariadb:latest)...
latest: Pulling from library/mariadb
5697faee43: Extracting [=====] 17.99MB/28
56BBbc422b: Download complete
47B4829d9e55: Download complete
2ee2cadd29fc: Download complete
5915a184049d: Download complete
5ca6ffdb5f56: Download complete
1537f7bbef8b: Download complete
5790e54322d1: Download complete
5a98cb829471: Download complete
5a46bde67834a: Download complete
78334cd64cf3: Downloading [=====] 26.79MB/9
1.15MB591cf6: Download complete
922kB
```

database\_javier  
18.185.17.168

```
root@ip-172-26-11-91:/home/api# docker-compose up -d
Creating network "api_default" with the default driver
Pulling nginxapiclase (nginx:latest)...
latest: Pulling from library/nginx
bb79b6b2107f: Extracting [=====] 14.45MB/27
09MBB0027a7: Download complete
6.49MB2b484f: Download complete
166a2418f7e8: Download complete
1966ea362d23: Download complete
64B
```

api\_Javier  
18.185.17.168

```
Successfully built 2c1fc900e666
Successfully tagged api_phpapiclase:latest
WARNING: Image for service phpapiclase was built because it did not already exist. To rebuild this image you must use `docker-compose build` or `docker-compose up --build`.
Creating phpapiclase ... done
Creating nginxapiclase ... done
root@ip-172-26-11-91:/home/api#
```

api\_Javier  
18.185.17.168



```

root@ip-172-26-9-62:/home/website# docker-compose up -d
Creating network "website_default" with the default driver
Pulling websiteclase (webdevops/php-apache:...)
latest: Pulling from webdevops/php-apache
5bed26d33875: Extracting [>] 294.9kB/26
169MB8a9c730: Download complete
5.37kB195c84: Download complete
78bf9a5ad49e: Download complete
4c8b85719399: Downloading [>] 19.55kB/1
1922MBcc1b5e: Waiting
f70f19977fc5: Waiting
5131985698ec: Waiting
65538e0c8933: Waiting
d43f884b2c0e: Waiting
20d592fa47f1: Waiting
d3f32720a7f3: Waiting
2f8bf6213034: Waiting
8356225c2f81: Waiting

```



web\_javier  
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```

ubuntu website
root@ip-172-26-9-62:/home# cd website
root@ip-172-26-9-62:/home/website# docker-compose up -d
Creating network "website_default" with the default driver
Pulling websiteclase (webdevops/php-apache:...)
latest: Pulling from webdevops/php-apache
5bed26d33875: Pull complete
f11b29a9c730: Pull complete
930bda195c84: Pull complete
78bf9a5ad49e: Pull complete
4c8b85719399: Pull complete
30611fcc1b5e: Pull complete
f70f19977fc5: Pull complete
5131985698ec: Pull complete
65538e0c8933: Pull complete
d43f884b2c0e: Pull complete
20d592fa47f1: Pull complete
d3f32720a7f3: Pull complete
2f8bf6213034: Pull complete
8356225c2f81: Pull complete
Digest: sha256:acf080564bcb304227fa26af92457dd486b37c812debd7b0042b84010268d4bd
Status: Downloaded newer image for webdevops/php-apache:latest
Creating websiteclase ... done
root@ip-172-26-9-62:/home/website#

```



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3.106.113.194



## Seguridad y redundancia

Configuración de puertos de ip.

IP addresses

Public IP ⓘ

3.106.113.194

Create static IP

Private IP ⓘ

172.26.9.62

Private IP addresses allow you to communicate securely with other internal resources.

Firewall ⓘ

Create rules to open ports to the internet, or to a specific IP address or range.


[Learn more about firewall rules](#)

+ Add rule

Application	Protocol	Port or range / Code	Restricted to
Custom	TCP	3886	Any IP address



Creación de instantánea de web.




**web\_javier**  
512 MB RAM, 1 vCPU, 20 GB SSD  
Ubuntu  
Sydney, Zone A (ap-southeast-2a)  
[Manage tags](#)

StopReboot

Status: **Running**  
Private IP: 172.26.9.62 Public IP: **3.106.113.194**

ConnectStorageMetricsNetworking**Snapshots**TagsHistoryDelete

Manual snapshots [?](#)  
You can create a snapshot to back up your instance, its system disk, and attached disks.  
[+ Create snapshot](#)  
⚙ Snapshotting... "javier\_web\_snapshot"  
Showing 1 of 1 snapshots



**web\_javier**  
512 MB RAM, 1 vCPU, 20 GB SSD  
Ubuntu  
Sydney, Zone A (ap-southeast-2a)  
[Manage tags](#)

StopReboot

Status: **Running**  
Private IP: 172.26.9.62 Public IP: **3.106.113.194**

ConnectStorageMetricsNetworking**Snapshots**TagsHistoryDelete


Manual snapshots [?](#)  
You can create a snapshot to back up your instance, its system disk, and attached disks.  
[+ Create snapshot](#)  
> 📅 **November 10, 2020 - 3:31 AM** "javier\_web\_snapshot" ⋮  
Showing 1 of 1 snapshots

Creación de segunda instancia.

## Create an instance from a snapshot

### Snapshot source


You are restoring from the following snapshot:




**javier\_web\_snapshot**  
**November 10, 2020 - 3:31 AM**  
512 MB RAM, 1 vCPU, 20 GB SSD, instance snapshot

 Sydney (ap-southeast-2)

ZONE A



**web\_javier**  
512 MB RAM, 1 vCPU, 20 GB SSD  
Running  
3.106.113.194  
Sydney, Zone A



**web\_javier2**  
512 MB RAM, 1 vCPU, 20 GB SSD  
Pending  
52.63.68.112  
Sydney, Zone A

Creación de subdominio.

## DNS records

Lightsail currently supports A, CNAME, MX, NS, SRV, and TXT record types.

[Learn about DNS record types](#)

A record ▼

— Associate your domain or a subdomain with an IP address.

Subdomain

javier

.idts.com.mx

Resolves to

web\_javier

Creación de balanceador y asignación de instancia.



### LoadBalancer\_Javier

Load balancer  
Sydney, all zones (ap-southeast-2)

[Manage tags](#)

DNS name: **462466c39e5c97b4cd314a231f8444f0-1731684346.ap-southeast-2.elb.amazonaws.com**


[How do I use my domain with this load balancer?](#)

**Target instances** [Inbound traffic](#) [Metrics](#) [Tags](#) [Delete](#)

#### Target instances

⚠ Traffic is only being routed to a single instance:

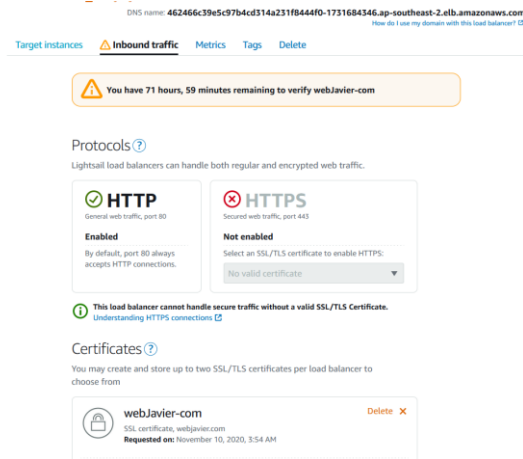
🔗 [Attach another](#)



**web\_javier**  
512 MB RAM, 1 vCPU, 20 GB SSD  
Ubuntu  
⚙ Attaching...

**i** Your instances will receive traffic from this load balancer on port 80  
[Learn more about load balancing](#)

Creación de certificado SSL.



## Resumen

Se documentó todo el proceso que se enseñó en clase, empezando por la creación de los repositorios en github, clonación localmente de estos mismos y creación de contenedores en el mismo equipo en un principio. Una vez realizado esto aprendimos a utilizar algunos de los servicios de AWS, más específicamente a crear instancias en Lightsail, Instantáneas, Balanceadores y configurar el firewall de estos mismos. Para finalizar se clonaron los repositorios en sus debidas instancias y se levantaron los contenedores. Con esto se aprendió de manera practica como levantar páginas web de manera eficiente y rápida utilizando herramientas y servicios web.