

**Universidad Modelo**

**Ingeniería en desarrollo de tecnología y  
software**

**Segundo parcial  
Sistemas multidimensionales**

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10/11/20**

# 1. Objetivo.

Realizar un sitio web sencillo, con su propia base de datos y api con seguridad del sistema, usando GitHub y contenedores para subirlo a la nube de Amazon Lightsail, para poder crear respaldos del sitio web de manera mas eficiente.

# 2. Alcance.

Explicar mediante una GUI la creación de repositorios, base de datos y api en GitHub, clonarlas en el computador y utilizar Docker para alzar el repositorio. De igual manera mostrar como poder subirlo a la nube de Amazon Lightsail y configurarla mediante la terminal de Linux y añadir seguridad y colocar el balanceador de carga.

# 3. Procesos.

## 3.1 Repositorios



### 3.1.1 Creación de Repositorios

Creación de repositorios en GitHub

#### Create a new repository



A repository contains all project files, including the revision history. Already have a project repository elsewhere?  
[Import a repository.](#)

Owner \*      Repository name \*

 MarioChico / api 

Great repository names are short and memorable. Need inspiration? How about [verbose-journey](#)?

Description (optional)

- ☐  **Public**  
Anyone on the internet can see this repository. You choose who can commit.
- ☒  **Private**  
You choose who can see and commit to this repository.

#### Initialize this repository with:

Skip this step if you're importing an existing repository.

- ☐ **Add a README file**  
This is where you can write a long description for your project. [Learn more.](#)
- ☐ **Add .gitignore**  
Choose which files not to track from a list of templates. [Learn more.](#)
- ☐ **Choose a license**  
A license tells others what they can and can't do with your code. [Learn more.](#)

Create repository

## Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository.](#)

Owner \*



MarioChico ▾

Repository name \*

/ database ✓

Great repository names are **database is available.** Need inspiration? How about **cautious-winner**?

Description (optional)

☒



**Public**

Anyone on the internet can see this repository. You choose who can commit.

☐



**Private**

You choose who can see and commit to this repository.

**Initialize this repository with:**

Skip this step if you're importing an existing repository.

☐ **Add a README file**

This is where you can write a long description for your project. [Learn more.](#)

☐ **Add .gitignore**

Choose which files not to track from a list of templates. [Learn more.](#)

☐ **Choose a license**

A license tells others what they can and can't do with your code. [Learn more.](#)

Create repository

## Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository.](#)

Owner \*



MarioChico ▾

Repository name \*

/ website ✓

Great repository names are short and memorable. Need inspiration? How about **friendly-train**?

Description (optional)

☐



**Public**

Anyone on the internet can see this repository. You choose who can commit.

☒



**Private**

You choose who can see and commit to this repository.

**Initialize this repository with:**

Skip this step if you're importing an existing repository.

☐ **Add a README file**

This is where you can write a long description for your project. [Learn more.](#)


☐ **Add .gitignore**

Choose which files not to track from a list of templates. [Learn more.](#)

☐ **Choose a license**

A license tells others what they can and can't do with your code. [Learn more.](#)

Create repository



MarioChico

Edit profile

Highlights

- Arctic Code Vault Contributor

Organizations

Overview

Repositories 8

Projects

Packages

ProTip! Updating your profile with your name, location, and a profile picture helps other GitHub users get to know you. [Edit profile](#)

Find a repository... Type: All Language: All [New](#)

website Private

Updated 1 minute ago

Star

database

Updated 2 minutes ago

Star

api Private

Updated 4 minutes ago

Star

### 3.1.2 Clonación de Repositorios en Local

Go to file Add file Code

Clone

HTTPS SSH GitHub CLI

https://github.com/MarioChico/database

Use Git or checkout with SVN using the web URL.

Open with GitHub Desktop

Download ZIP

Go to file Add file Code

Clone

HTTPS SSH GitHub CLI

https://github.com/MarioChico/website.

Use Git or checkout with SVN using the web URL.

Open with GitHub Desktop

Download ZIP

Go to file Add file Code

Clone

HTTPS SSH GitHub CLI

https://github.com/MarioChico/api.git

Use Git or checkout with SVN using the web URL.

Open with GitHub Desktop

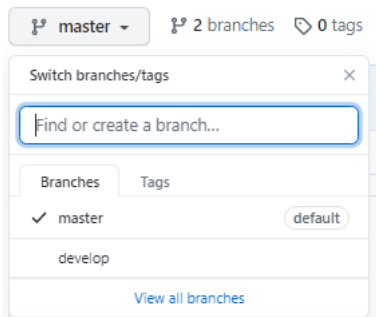
Download ZIP

### 3.1.3 Creación del contenedor

```
Windows PowerShell
PS D:\sistemasMulti\dbPrueba> docker-compose up -d
Creating network "dbprueba_default" with the default driver
Pulling db (mariadb):...
latest: Pulling from library/mariadb
Digest: sha256:2960a3d1ddb35dd454066b45005b4f694e18af76648833f1b9d93ab90cee7cf2
Status: Downloaded newer image for mariadb:latest
Creating dbprueba_db_1 ... done
PS D:\sistemasMulti\dbPrueba> cd ..
PS D:\sistemasMulti>
```

Este equipo > DATA (D:) > sistemasMulti > dbPrueba > files				Buscar en files
Nombre	Fecha de modificación	Tipo	Tamaño	
comidas	10/11/2020 10:48 p. m.	Carpeta de archivos		
mysql	10/11/2020 10:48 p. m.	Carpeta de archivos		
performance_schema	10/11/2020 10:47 p. m.	Carpeta de archivos		
aria_log.00000001	10/11/2020 10:48 p. m.	Archivo 00000001	32 KB	
aria_log_control	10/11/2020 10:48 p. m.	Archivo	1 KB	
ib_buffer_pool	10/11/2020 10:48 p. m.	Archivo	1 KB	
ib_logfile0	10/11/2020 10:48 p. m.	Archivo	96,304 KB	
ibdata1	10/11/2020 10:48 p. m.	Archivo	12,288 KB	
ibtmp1	10/11/2020 10:48 p. m.	Archivo	12,288 KB	
multi-master.info	10/11/2020 10:47 p. m.	Archivo INFO	0 KB	

### 3.1.4 Creación de ramas, Master y Develop



## 3.2 Nube

### 3.2.1 Creación de instancias Lightsail

#### Identify your instance

Your Lightsail resources must have unique names.

databaseMario × 1

#### TAGGING OPTIONS

Use tags to filter and organize your resources in the Lightsail console. Key-value tags can also be used to organize your billing, and to control access to your resources.

[Learn more about tagging.](#)

#### Key-only tags ?

+ Add key-only tags

#### Key-value tags ?

+ Add key-value tag


Create instance

Sort by **Region** and then by **Zone**

Create instance

Tokyo (ap-northeast-1)

ZONE A


**websiteMario**  
512 MB RAM, 1 vCPU, 20 GB SSD

Pending

52.199.196.33  
Tokyo, Zone A


Virginia (us-east-1)

ZONE A

**apiMario**  
512 MB RAM, 1 vCPU, 20 GB SSD

Running

54.164.175.28  
Virginia, Zone A

**databaseMario**  
512 MB RAM, 1 vCPU, 20 GB SSD

Running

54.164.164.186  
Virginia, Zone A

### 3.2.2 Instalación Docker en Instancias

```
websiteMario - Terminal | Lightsail - Perfil 1: Microsoft Edge
https://lightsail.aws.amazon.com/ls/remote/ap-northeast-1/instances/websiteMario/terminal?protocol=ssh
ubuntu@ip-172-26-9-167:~$ sudo snap install docker
docker 19.03.11 from Canonical✓ installed
ubuntu@ip-172-26-9-167:~$
ubuntu@ip-172-26-9-167:~$
ubuntu@ip-172-26-9-167:~$
ubuntu@ip-172-26-9-167:~$
ubuntu@ip-172-26-9-167:~$
ubuntu@ip-172-26-9-167:~$
ubuntu@ip-172-26-9-167:~$
ubuntu@ip-172-26-9-167:~$
ubuntu@ip-172-26-9-167:~$ docker
Usage: docker [OPTIONS] COMMAND
A self-sufficient runtime for containers
Options:
  --config string      Location of client config files (default
                        "/home/ubuntu/snap/docker/471/.docker")
  -c, --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
                        "/home/ubuntu/snap/docker/471/.docker/ca.pem")
```

```
apiMario - Terminal | Lightsail - Perfil 1: Microsoft Edge
https://lightsail.aws.amazon.com/ls/remote/us-east-1/instances/apiMario/terminal?protocol=ssh
See 'snap info docker' for additional versions.

ubuntu@ip-172-26-11-115:~$ sudo snap install docker
docker 19.03.11 from Canonical✓ installed
ubuntu@ip-172-26-11-115:~$ docker

Usage:  docker [OPTIONS] COMMAND

A self-sufficient runtime for containers

Options:
  --config string      Location of client config files (default
                        "/home/ubuntu/snap/docker/471/.docker")
  -c, --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")
                        Use TLS; implied by --tlsverify
  --tls                Use TLS; implied by --tlsverify
  --tlscacert string    Trust certs signed only by this CA (default
                        "/home/ubuntu/snap/docker/471/.docker/ca.pem")
  --tlscert string      Path to TLS certificate file (default
                        "/home/ubuntu/snap/docker/471/.docker/cert.pem")
  --tlskey string       Path to TLS key file (default
                        "/home/ubuntu/snap/docker/471/.docker/key.pem")
  --tlsverify           Use TLS and verify the remote
```

apiMario  
54.164.175.28

```
databaseMario - Terminal | Lightsail - Perfil 1: Microsoft Edge
https://lightsail.aws.amazon.com/ls/remote/us-east-1/instances/databaseMario/terminal?protocol=ssh

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      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.
ubuntu@ip-172-26-3-110:~$
```

databaseMario  
54.164.164.186

### 3.2.4 Montaje de Contenedor

```
Unpacking objects: 100% (8/8), done.
root@ip-172-26-7-105:/home# cd website
root@ip-172-26-7-105:/home/website# docker-compose up -d
Creating network "website_default" with the default driver
Pulling websiteteclase (webdevops/php-apache:latest)...
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
5131985698ac: 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 websiteteclase ... done
root@ip-172-26-7-105:/home/website#
```

```
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 22029855a36f
--> 149abb906ede
Step 7/7 : COPY php.ini $PHP_INI_DIR/php.ini
--> e2f28be3de15

Successfully built e2f28be3de15
Successfully tagged api_phpapiclae:latest
WARNING: Image for service phpapiclae was built because it did not already exist. To rebuild this image you must use 'docker-compose build' or 'docker-compose up --build'.
Creating nginxapiclae ... done
Creating phpapiclae ... done
root@ip-172-26-14-28:/home/API#
```


### 3.2.5 Configuración de aplicaciones

Sort by **Region** and then by **Zone**

Create instance

Tokyo (ap-northeast-1)

ZONE A



websiteMario

512 MB RAM, 1 vCPU, 20 GB SSD


Pending

52.199.196.33

Tokyo, Zone A

Virginia (us-east-1)

ZONE A




apiMario

512 MB RAM, 1 vCPU, 20 GB SSD

Running

54.164.175.28

Virginia, Zone A



databaseMario

512 MB RAM, 1 vCPU, 20 GB SSD

Running

54.164.164.186

Virginia, Zone A



## 3.3 Seguridad y Redundancia

### 3.3.1 Configuración de firewall (Puertos e Ip`s

[Connect](#) [Storage](#) [Metrics](#) [Networking](#) [Snapshots](#) [Tags](#) [History](#) [Delete](#)

#### IP addresses

Public IP ?

52.199.196.33

Create static IP

Private IP ?

172.26.9.167





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	
SSH	TCP	22	Any IP address Lightsail browser SSH/RDP ?	 
HTTP	TCP	80	Any IP address	 

### 3.3.2 Creación de instancia Web

#### Manual snapshots ?

You can create a snapshot to back up your instance, its system disk, and attached disks.

+ Create snapshot


 Snapshotting...	"websiteMario-1605141491"
---	---------------------------

Showing 1 of 1 snapshots

### 3.3.3 Creación de segunda instancia Web

# Snapshot source

You are restoring from the following snapshot:




websiteMario-1605141491


November 11, 2020 - 6:38 PM

512 MB RAM, 1 vCPU, 20 GB SSD, instance snapshot

# Instance location ?




You are creating this instance in **Tokyo, Zone A** (ap-northeast-1a)

 [Change zone](#)



APAC

## ZONE A




websiteMario

512 MB RAM, 1 vCPU, 20 GB SSD





Running

52.199.196.33  
Tokyo, Zone A



websiteMarioSnaps

512 MB RAM, 1 vCPU, 20 GB SSD




Pending

54.168.244.175  
Tokyo, Zone A



## Virginia (us-east-1)

## ZONE A




apiMario

512 MB RAM, 1 vCPU, 20 GB SSD





Running

54.164.175.28  
Virginia, Zone A



databaseMario

512 MB RAM, 1 vCPU, 20 GB SSD



Running

54.164.164.186  
Virginia, Zone A

### 3.3.5 Creación de balanceador de carga

#### Identify your load balancer

Your Lightsail load balancers must all have unique names.

LoadBalancerChico

##### TAGGING OPTIONS

Use tags to filter and organize your resources in the Lightsail console. Key-value tags can also be used to organize your billing, and to control access to your resources.

[Learn more about tagging.](#)

Key-only tags

+ Add key-only tags

Key-value tags

+ Add key-value tag

This load balancer will cost 18 USD per month.

### 3.3.6 Asignación de instancias a balanceador de carga

#### Target instances

Traffic will be evenly distributed to the following instances:

Attach another  
All available instances in **Tokyo** attached



websiteMario

512 MB RAM, 1 vCPU, 20 GB SSD  
Ubuntu

⚙️ Attaching...




websiteMarioSnaps


512 MB RAM, 1 vCPU, 20 GB SSD  
Ubuntu

⚙️ Attaching...

### 3.3.7 Creación de certificado SSL

 **idts-com-mx** Delete ✕


SSL certificate, idts.com.mx  
**Requested on:** November 11, 2020, 6:58 PM

Status:  **Validation in progress...**  
You must prove you control the domains and subdomains specified in this certificate before it can be used for HTTPS encryption.

**Please create a DNS record for each domain with the following values:**

IDTS.COM.MX Validating...  
**Record type:** CNAME  
**Name:** \_74773f71f563a305e211df1666637400.idts.com.mx.  
**Value:** \_65bc1173acd59b080da91acaa42b272f.zbkrxsrfvj.acm-validations.aws.

MARIOCHICO.IDTS.COM.MX Validating...  
**Record type:** CNAME  
**Name:** \_6d6175cb43c13346e167ddf812e8509b.mariochico.idts.com.mx.  
**Value:** \_80063bbd46eabb2641f80eb2113a1220.zbkrxsrfvj.acm-validations.aws.

[How does DNS validation work?](#) 

## 4. Resumen

La practica de Docker para crear repositorios, clonarlos y montarlos es muy fácil, esto nos ayuda mucho pues es una manera sencilla de alzar la página web.

Con ayuda de tecnología como GitHub facilita el proceso de la configuración, al realizar todo el proceso desde una terminal.

Una vez terminado el proceso local se pasa a la nube, en Amazon Lightsail, es muy fácil e intuitiva, que permite tener algunas instancias sin gastar, aunque después de un tiempo se deba pagar. Una vez que se alzaron los contenedores se paso a la seguridad que de igual manera es sencilla, se añaden puertos para el firewall de manera muy rápida y crear el snapshot de la pagina web, así como crear una segunda instancia de la página web y tener el respaldo de la misma, se añade el certificado SSL y se finaliza el proceso para subir la página web.