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INGENIERÍA EN SISTEMAS
COMPUTACIONALES

DevSecOps - Desarrollo, Seguridad y Operaciones de Software

Prof. Salvador Acevedo

9° SEMESTRE

EVALUACIÓN 1 - [AVANCE DE PROYECTO INTEGRADOR]

Fecha:14/09/25

REPORTE DE PROYECTO:

Orquestación de Servicios con Docker Compose

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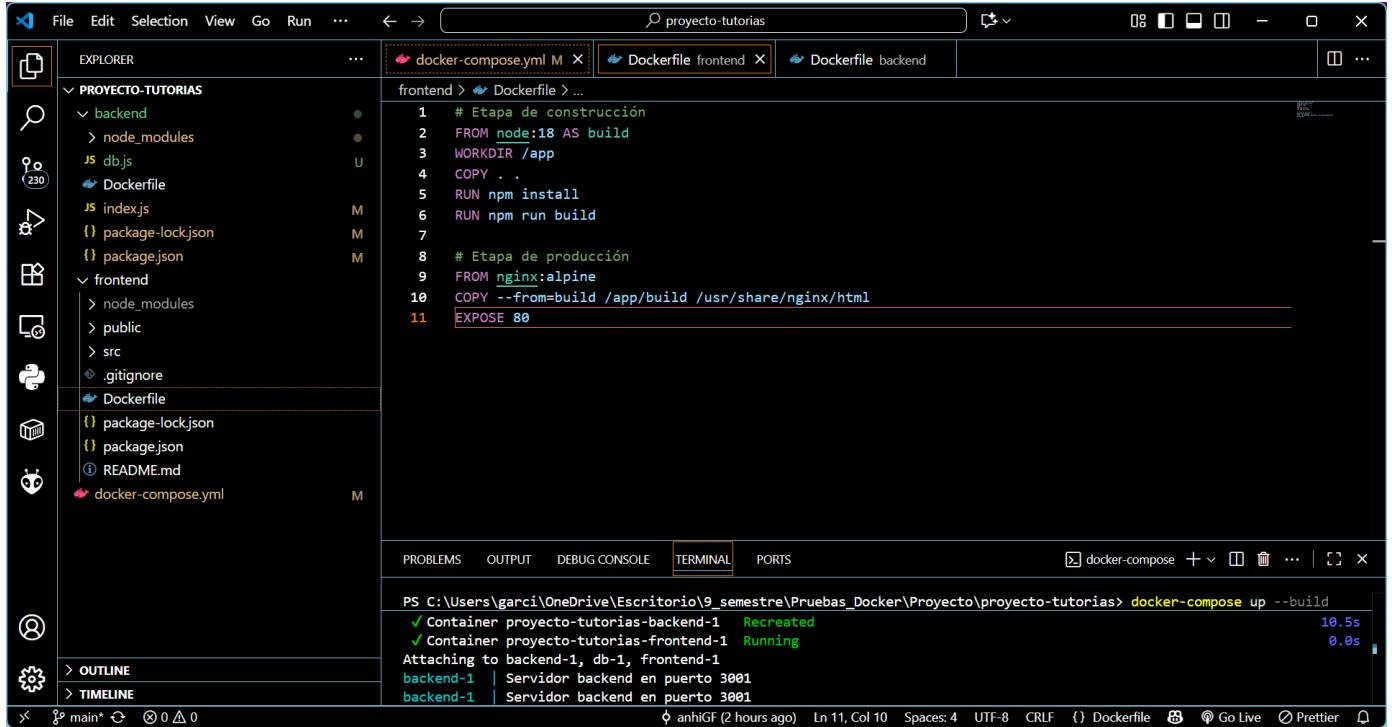
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Introducción

El presente reporte documenta el proceso de orquestación de tres servicios utilizando Docker Compose: un frontend en React, un backend en Node.js con Express y una base de datos MySQL para la persistencia. A través de la contenedорización y la automatización del despliegue con Docker, se logró ejecutar todo el sistema de forma modular, portable y escalable.

Procedimiento: Configuración del Frontend (React)

Ubicación: Carpeta frontend/



The screenshot shows the VS Code interface with the following details:

- EXPLORER:** Shows the project structure under "PROYECTO-TUTORIAS".
 - backend:** Contains node_modules, db.js, Dockerfile, index.js, package-lock.json, package.json, and README.md.
 - frontend:** Contains node_modules, public, src, .gitignore, Dockerfile, package-lock.json, package.json, and README.md.
- Dockerfile frontend:** Content:

```
1 # Etapa de construcción
2 FROM node:18 AS build
3 WORKDIR /app
4 COPY . .
5 RUN npm install
6 RUN npm run build
7
8 # Etapa de producción
9 FROM nginx:alpine
10 COPY --from=build /app/build /usr/share/nginx/html
11 EXPOSE 80
```
- TERMINAL:** Content:

```
PS C:\Users\garci\OneDrive\Escritorio\9_semestre\Pruebas_Docker\Proyecto\projeto-tutorias> docker-compose up --build
✓ Container proyecto-tutorias-backend-1 Recreated 10.5s
✓ Container proyecto-tutorias-frontend-1 Running 0.0s
Attaching to backend-1, db-1, frontend-1
backend-1 | Servidor backend en puerto 3001
backend-1 | Servidor backend en puerto 3001
```

Configuración del Backend (Node.js + Express)

Ubicación: Carpeta backend/



The screenshot shows the VS Code interface with the following details:

- EXPLORER:** Shows the project structure under "PROYECTO-TUTORIAS".
 - backend:** Contains node_modules, db.js, Dockerfile, index.js, package-lock.json, package.json.
- Dockerfile backend:** Content:

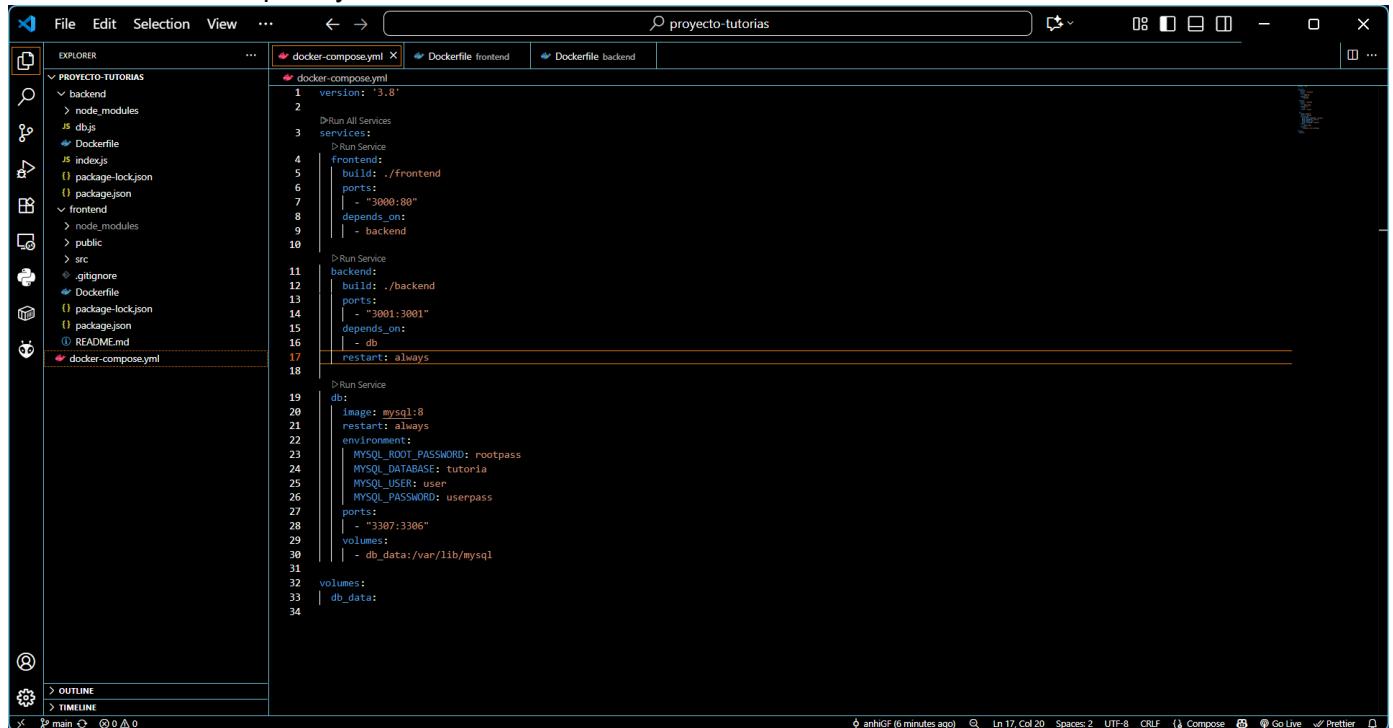
```
1 FROM node:18
2 WORKDIR /app
3 COPY . .
4 RUN npm install
5 EXPOSE 3001
6 CMD ["node", "index.js"]
7
```

Configuración de la Base de Datos (MySQL)

Imagen usada: mysql:8 (desde Docker Hub)
No se usó Dockerfile, solo configuración en docker-compose.yml.

Archivo de Orquestación Docker Compose

Archivo docker-compose.yml:



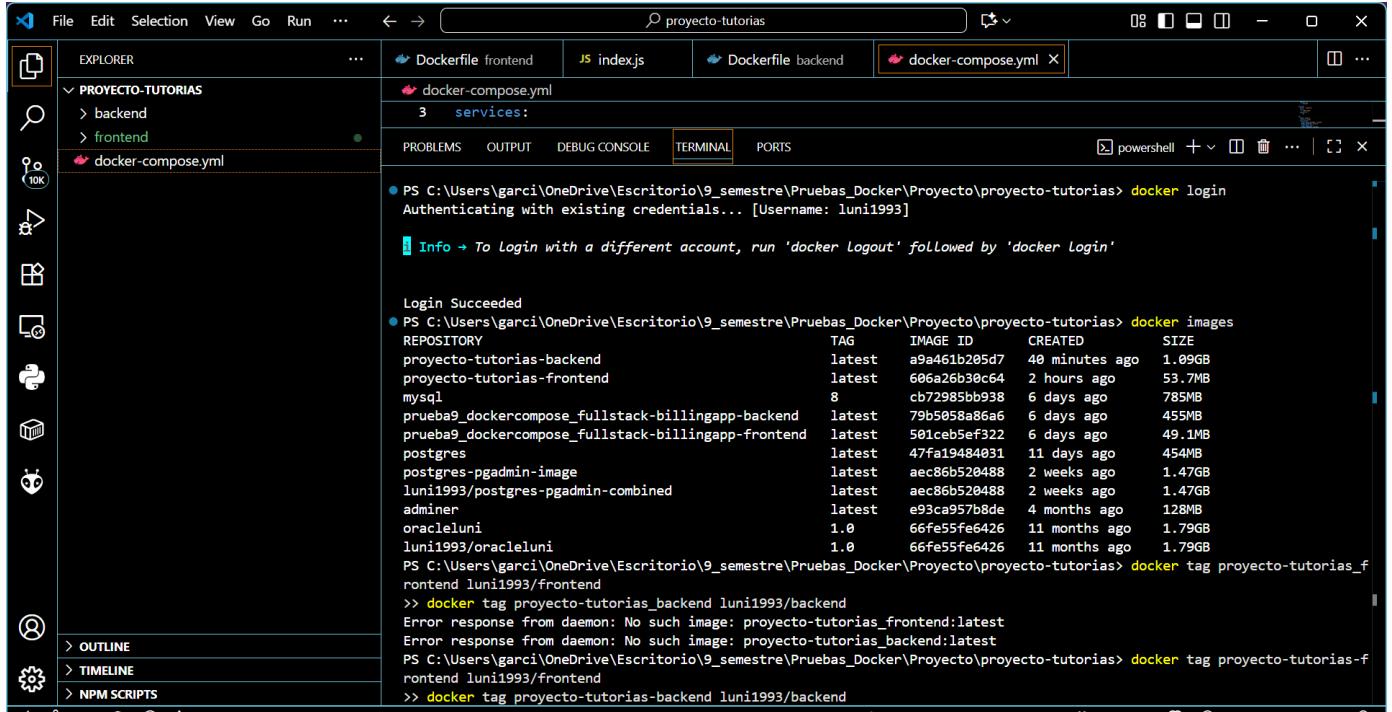
```
version: '3.8'
services:
  frontend:
    build: ./frontend
    ports:
      - "3000:80"
    depends_on:
      - backend
  backend:
    build: ./backend
    ports:
      - "3001:3001"
    depends_on:
      - db
    restart: always
  db:
    image: mysql:8
    restart: always
    environment:
      MYSQL_ROOT_PASSWORD: rootpass
      MYSQL_DATABASE: tutorial
      MYSQL_USER: user
      MYSQL_PASSWORD: userpass
    ports:
      - "3307:3306"
    volumes:
      - db_data:/var/lib/mysql
volumes:
  db_data:
```

Subida de Imágenes a Docker Hub

Se crearon las siguientes imágenes personalizadas y fueron subidas a Docker Hub bajo la cuenta luni1993:

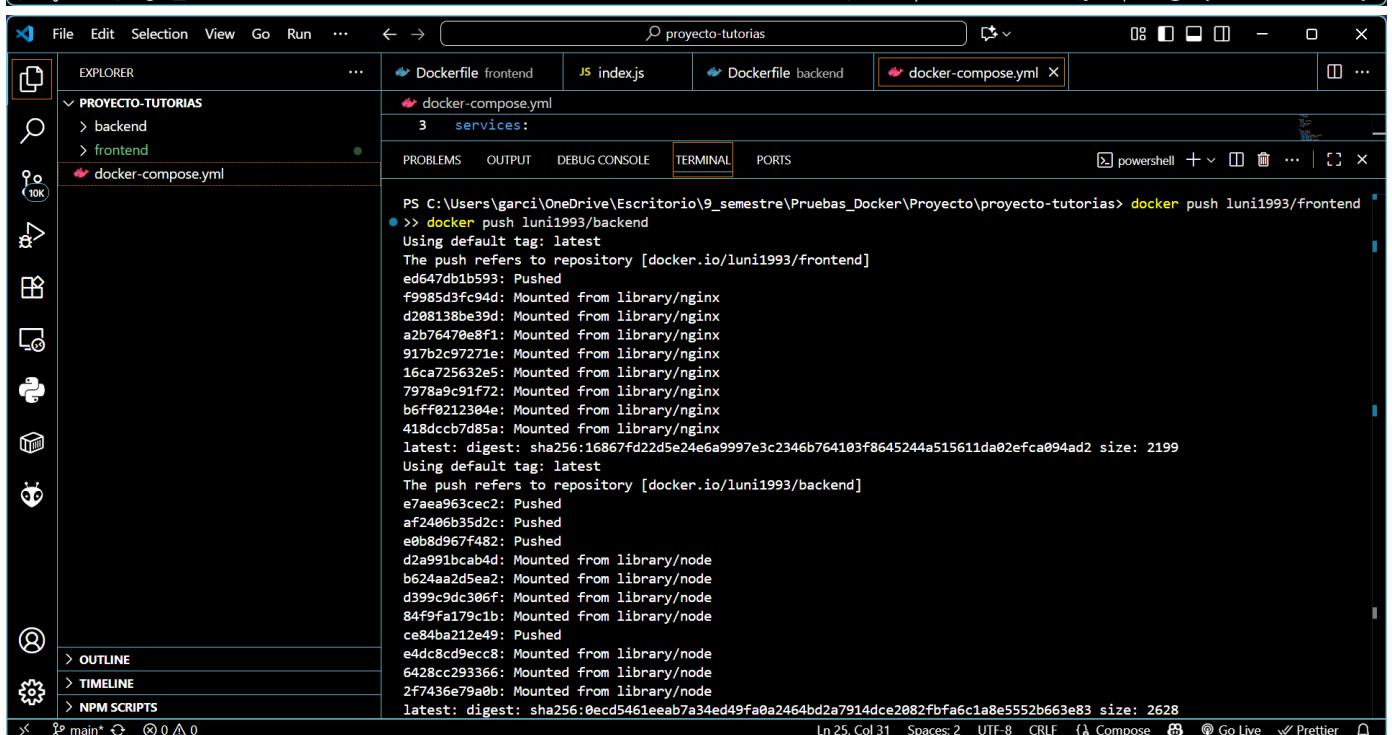
-  Frontend:
<https://hub.docker.com/r/luni1993/frontend>
-  Backend:
<https://hub.docker.com/r/luni1993/backend>

Pasos realizados:



```
File Edit Selection View Go Run ... ← → ⚡ proyecto-tutorias ⚡ ... PROYECTO-TUTORIAS > backend > frontend docker-compose.yml 3 services: PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS powershell + ⚡ ... PS C:\Users\garcia\OneDrive\Escritorio\9_semestre\Pruebas_Docker\Proyecto\proyecto-tutorias> docker login  
Authenticating with existing credentials... [Username: luni1993]  
  
Info → To Login with a different account, run 'docker Logout' followed by 'docker Login'  
  
Login Succeeded  
PS C:\Users\garcia\OneDrive\Escritorio\9_semestre\Pruebas_Docker\Proyecto\proyecto-tutorias> docker images  
REPOSITORY TAG IMAGE ID CREATED SIZE  
proyecto-tutorias-backend latest a9a61b205d7 40 minutes ago 1.09GB  
proyecto-tutorias-frontend latest 606a26b30c64 2 hours ago 53.7MB  
mysql 8 cb72985bb938 6 days ago 785MB  
prueba9_dockercompose_fullstack-billingapp-backend latest 79b5058a86a6 6 days ago 455MB  
prueba9_dockercompose_fullstack-billingapp-frontend latest 501ceb5ef322 6 days ago 49.1MB  
postgres latest 47fa1948a031 11 days ago 454MB  
postgres-pgadmin-image latest aec86b520488 2 weeks ago 1.47GB  
luni1993 postgres-pgadmin-combined latest aec86b520488 2 weeks ago 1.47GB  
adminer latest e93ca957b8de 4 months ago 128MB  
oracleluni 1.0 66fe55fe6426 11 months ago 1.79GB  
luni1993 oracleluni 1.0 66fe55fe6426 11 months ago 1.79GB  
PS C:\Users\garcia\OneDrive\Escritorio\9_semestre\Pruebas_Docker\Proyecto\proyecto-tutorias> docker tag proyecto-tutorias_f  
rontend luni1993/frontend  
>> docker tag proyecto-tutorias_backend luni1993/backend  
Error response from daemon: No such image: proyecto-tutorias_backend:latest  
Error response from daemon: No such image: proyecto-tutorias_backend:latest  
PS C:\Users\garcia\OneDrive\Escritorio\9_semestre\Pruebas_Docker\Proyecto\proyecto-tutorias> docker tag proyecto-tutorias-f  
rontend luni1993/frontend  
>> docker tag proyecto-tutorias-backend luni1993/backend
```

Ln 25, Col 31 Spaces: 2 UTF-8 CRLF { Compose ⚡ Go Live ✎ Prettier



```
File Edit Selection View Go Run ... ← → ⚡ proyecto-tutorias ⚡ ... PROYECTO-TUTORIAS > backend > frontend docker-compose.yml 3 services: PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS powershell + ⚡ ... PS C:\Users\garcia\OneDrive\Escritorio\9_semestre\Pruebas_Docker\Proyecto\proyecto-tutorias> docker push luni1993/frontend  
>> docker push luni1993/backend  
Using default tag: latest  
The push refers to repository [docker.io/luni1993/frontend]  
ed647db1b593: Pushed  
f9985d3fc94d: Mounted from library/nginx  
d208138be39d: Mounted from library/nginx  
a2b76470e8f1: Mounted from library/nginx  
917b2c97271e: Mounted from library/nginx  
16ca725632e5: Mounted from library/nginx  
7978a9c91f72: Mounted from library/nginx  
b6ff0212304e: Mounted from library/nginx  
418dcc7d85a: Mounted from library/nginx  
latest: digest: sha256:16867fd22d5e24e6a9997e3c2346b764103f8645244a515611da02efca094ad2 size: 2199  
Using default tag: latest  
The push refers to repository [docker.io/luni1993/backend]  
e7aea963cec2: Pushed  
af2406b35d2c: Pushed  
e0b8d967f482: Pushed  
d2a991cab4d: Mounted from library/node  
b624aa2d5sea2: Mounted from library/node  
d399c9dc306f: Mounted from library/node  
84f9fa179c1b: Mounted from library/node  
ce84ba212e49: Pushed  
e4dc8cd9ecc8: Mounted from library/node  
6428cc293366: Mounted from library/node  
2f7436e79a0b: Mounted from library/node  
latest: digest: sha256:0ecd5461eeab7a34ed49fa0a2464bd2a7914dce2082fbfa6c1a8e5552b663e83 size: 2628
```

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Docker desktop

The screenshot shows the Docker Desktop application window. The left sidebar has a dark theme with white text and icons. The 'Containers' option is selected, highlighted with a grey background. The main area is titled 'Containers' with a 'Give feedback' link. It displays system resource usage: 'Container CPU usage' at 1.34% / 800% (8 CPUs available) and 'Container memory usage' at 498.1MB / 7.47GB. A 'Show charts' button is also present. Below this, a search bar and a filter toggle ('Only show running containers') are shown. A table lists seven running containers with columns for Name, Container ID, Image, Port(s), CPU (%), and Actions. The table includes icons for opening logs, viewing ports, and deleting. At the bottom, status information shows 'Engine running', system resources (RAM 1.79 GB, CPU 0.38%), disk usage (Disk: 17.44 GB used / limit 1006.85 GB), and a 'Restart to update' button.

	Name	Container ID	Image	Port(s)	CPU (%)	Actions
<input type="checkbox"/>	postgres-pgaddr	053e5a1f5eac	postgres:port	8080:5050 Show all ports (2)	0%	
<input type="checkbox"/>	prueba9_docker	-	-	-	0%	
<input type="checkbox"/>	proyecto-tutoria	-	-	-	1.34%	
<input type="checkbox"/>	db-1	cf391afdbab79	mysql:8	3307:3306	1.34%	
<input type="checkbox"/>	frontend-1	e497c07e7b91	proyecto-tu	3000:80	0%	
<input type="checkbox"/>	backend-1	2b0a80e11bc6	proyecto-tu	3001:3001	0%	

The screenshot shows the Docker Desktop application window with the 'Images' option selected in the sidebar. The main area is titled 'Images' with a 'Give feedback' link. It displays local images under the 'Local' tab, showing 10 images with a total size of 6.26 GB / 4.34 GB in use. A 'My Hub' tab is also visible. A 'Last refresh: 3 hours ago' message with a refresh icon is present. Below this, a search bar and a filter icon are shown. A table lists the images with columns for Name, Tag, Image ID, Creation time, Size, and Actions. The table includes icons for opening logs, viewing ports, and deleting. At the bottom, status information shows 'Engine running', system resources (RAM 1.79 GB, CPU 1.50%), disk usage (Disk: 17.44 GB used / limit 1006.85 GB), and a 'Restart to update' button.

	Name	Tag	Image ID	Cre...	Size	Actions
<input type="checkbox"/>	proyecto-tutorias-bac	latest	ecd1c4c0b90f	29 minutes ago	1.09 GB	
<input type="checkbox"/>	luni1993/backend	latest	a9a461b205d7	2 hours ago	1.09 GB	
<input type="checkbox"/>	proyecto-tutorias-fror	latest	606a26b30c64	3 hours ago	53.66 MB	
<input type="checkbox"/>	luni1993/frontend	latest	606a26b30c64	3 hours ago	53.66 MB	
<input type="checkbox"/>	mysql	8	cb72985bb938	6 days ago	785.14 MB	
<input type="checkbox"/>	prueba9_dockercomp	latest	79b5058a86a6	6 days ago	454.54 MB	

 docker desktop PERSONAL

Search Ctrl+K ? ⓘ 🔍 ⚙️ ⚡ ⌂ L - X

Ask Gordon BETA

Containers

Images

Volumes **Give feedback ↗**

Builds

Models BETA

MCP Toolkit BETA

Docker Hub

Docker Scout

Extensions

Volumes

Manage your volumes, view usage, and inspect their contents. [Learn more ↗](#)

Search

Create

	Name ↑	Created	Size	Actions
<input type="checkbox"/>	2004f402bd42b3764336c444c27d4ea95e784c9b9198d3ca0bbb8b	16 days ago	45.7 MB	  
<input type="checkbox"/>	7a4e5ab77e9d21ef14ea04a914d4eb23d6c804293f673d261016c5!	6 days ago	0 Bytes	  
<input type="checkbox"/>	abbfc9231055248c7178a774d41630fdf077f9417caad630da2eb33	6 days ago	57.9 MB	  
<input type="checkbox"/>	ae32ee5a5f22c5e0154de91e173f38083c85e6379b66dc82a81bea0`	6 days ago	57.9 MB	  
<input type="checkbox"/>	af108455c07c6f5c4302904d5797be919d65d5130223d4b33c2f8dal	6 days ago	0 Bytes	  
<input type="checkbox"/>	pgadmin_data	16 days ago	0 Bytes	  
<input type="checkbox"/>	postgres_data	16 days ago	45.2 MB	  
<input type="checkbox"/>	proyecto-tutorias_db_data	3 hours ago	208.3 MB	  

Showing 8 items

Engine running | RAM 1.79 GB CPU 0.75% Disk: 17.44 GB used (limit 1006.85 GB) >_ ⚡ Restart to update

Repositorio de GitHub

Repositorio GitHub:

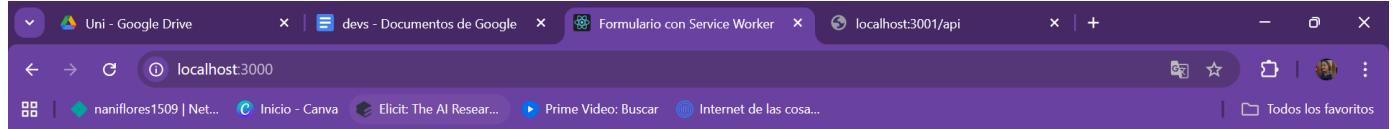
The screenshot shows a GitHub repository interface with the following details:

- Current repository:** Proyecto
- Current branch:** main
- Last fetched:** just now
- Changes:** No branches to compare
- History:** LEVANTAR TODO CON DOCKER COMPOSE (anhiGF, 1 hour ago), backend conectado a MySQL (anhiGF, just now), CONFIGURAR EL BACKEND (NODE + EXPRESS) (anhiGF, 2 hours ago), CONFIGURAR EL FRONTEND (REACT) (anhiGF, 2 hours ago), Initial commit (anhiGF, 2 hours ago)
- Commit Details:** LEVANTAR TODO CON DOCKER COMPOSE (anhiGF, 1 hour ago)
- File Changes:** 1 changed file: proyecto-tutorias\docker-compose.yml
- Detailed View:** A diff view of the docker-compose.yml file showing the following changes:

```
@@ -0,0 +1,32 @@
1 + version: '3.8'
2 +
3 + services:
4 +   frontend:
5 +     build: ./frontend
6 +     ports:
7 +       - "3000:80"
8 +     depends_on:
9 +       - backend
10 +
11 +   backend:
12 +     build: ./backend
13 +     ports:
14 +       - "3001:3001"
15 +     depends_on:
16 +       - db
17 +
18 +   db:
19 +     image: mysql:8
20 +     restart: always
21 +     environment:
22 +       MYSQL_ROOT_PASSWORD: rootpass
23 +       MYSQL_DATABASE: ...
```

Resultados

Frontend



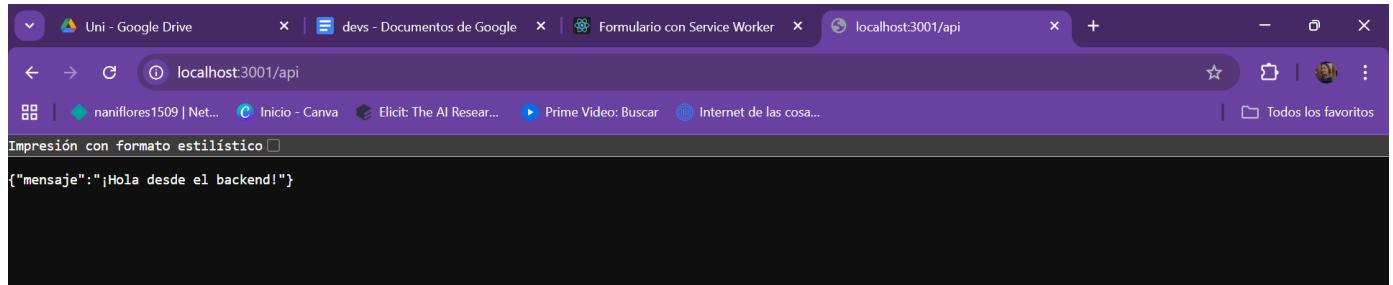
Formulario de registro

Nombre

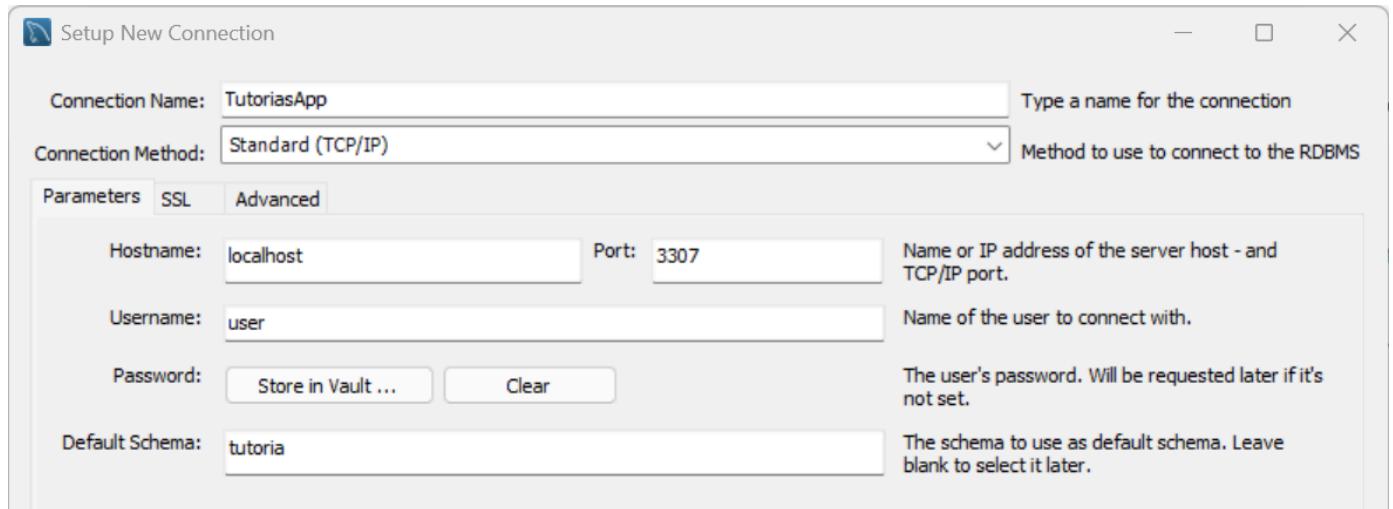
Correo electrónico

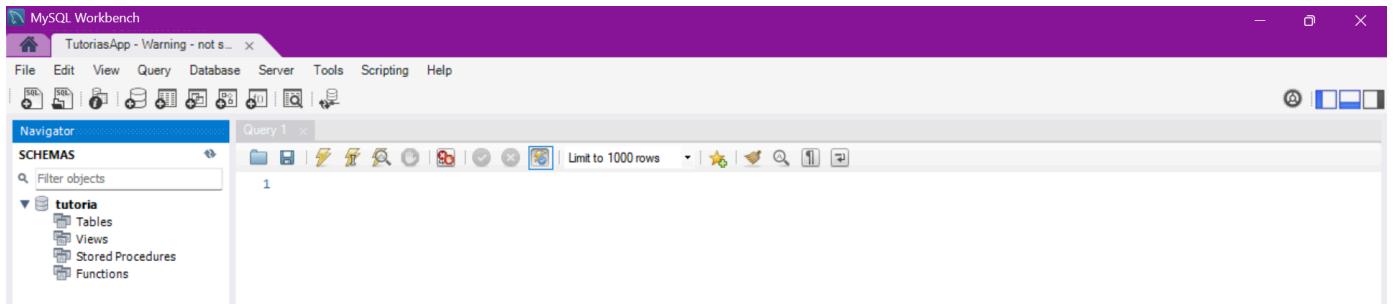
Enviar

Backend



DB



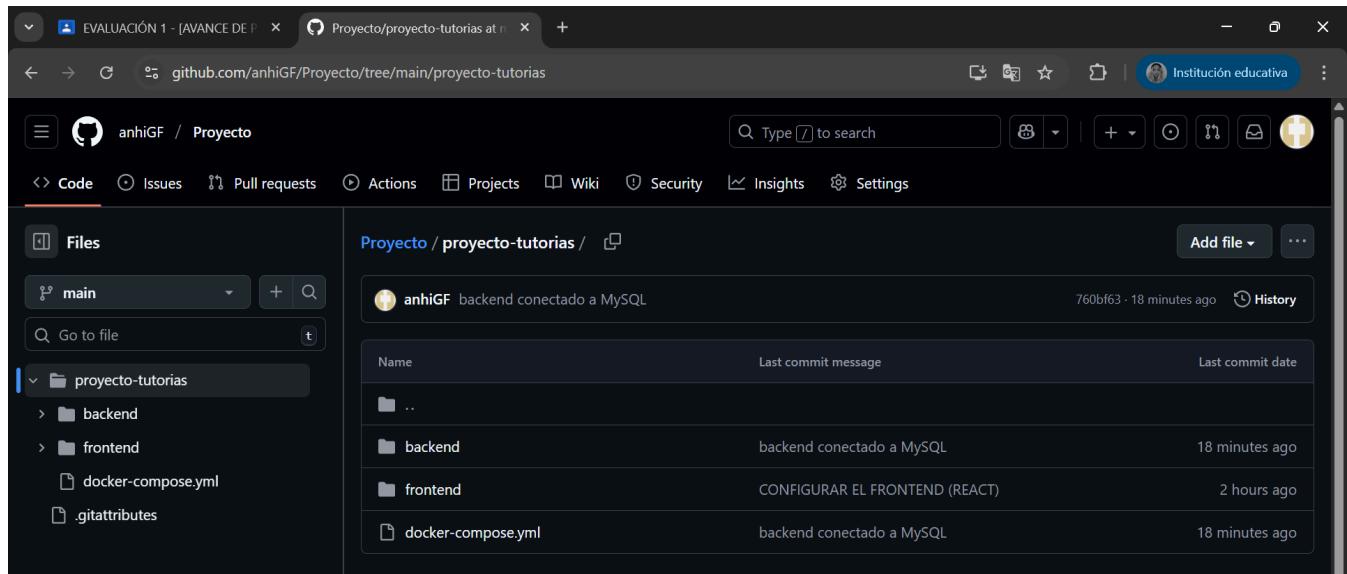


DOCKER HUB

A screenshot of a web browser displaying the Docker Hub interface. The address bar shows "hub.docker.com/repositories/luni1993". The main header includes "hub", "Explore", and "My Hub". A banner at the top right says "+ New Building AI Agents is Now Easy →". On the left, a sidebar for the user "luni1993" (Docker Personal) shows options for "Repositories", "Collaborations", "Settings", "Default privacy", "Notifications", "Billing", "Usage", "Pulls", and "Storage". The main content area is titled "Repositories" and shows a list of repositories under the namespace "luni1993".

Name	Last Pushed	Contains	Visibility	Scout
luni1993/backend	5 minutes ago	IMAGE	Public	Inactive
luni1993/frontend	17 minutes ago	IMAGE	Public	Inactive
luni1993/oracleluni	13 days ago	IMAGE	Public	Inactive
luni1993/postgres-pgadmin-combined	16 days ago	IMAGE	Public	Inactive
luni1993/posgres_v1	20 days ago		Public	Inactive

GITHUB



The screenshot shows a GitHub repository named 'Proyecto' belonging to user 'anhiGF'. The 'Code' tab is selected. On the left, the file tree shows a 'main' branch with a 'backend' folder containing a 'docker-compose.yml' file, and a 'frontend' folder. The right side displays a commit history for the 'main' branch. The most recent commit was made 18 minutes ago by 'anhiGF' and is titled 'backend conectado a MySQL'. This commit also triggered a deployment, as indicated by the green checkmark icon in the commit message. Other commits in the list include 'backend conectado a MySQL' (18 minutes ago), 'CONFIGURAR EL FRONTEND (REACT)' (2 hours ago), and another 'backend conectado a MySQL' (18 minutes ago). A search bar at the top right allows users to search for specific files.

Conclusiones

Se logró construir y orquestar exitosamente una aplicación web utilizando Docker Compose. El uso de contenedores facilitó el aislamiento de los servicios y la portabilidad del sistema. La práctica fortaleció conocimientos sobre imágenes personalizadas, redes internas de Docker y despliegue multi-servicio en ambientes controlados.

Referencias