

# Hands - On L3: Installing Docker & Building a Multi - Container Microservice

## Successful PostgreSQL Setup with Docker

```
sudeeptabal@Sudeptas-MacBook-Air / % docker pull postgres
Using default tag: latest
latest: Pulling from library/postgres
9b85f7788b0b: Download complete
9428761563b0: Download complete
9b85f7788b0b: Pull complete
9428761563b0: Pull complete
42acada82f9e: Pull complete
e78ac9296143: Pull complete
2c2dc2c5bec: Pull complete
d902a23b5be4: Pull complete
Digest: sha256:29e0bb09c0e7fc265ea9f4367de9622e55bae60b97e7cce740c2d63c2ebc0
Status: Downloaded newer image for postgres:latest
docker.io/library/postgres:latest
sudeeptabal@Sudeptas-MacBook-Air / % docker run -d -p 5432:5432 --name postgres1 -e POSTGRES_PASSWORD=pass12345 postgres
96cad82e63589a3c0fc117845d5995e0eeae1eab5ff5ae67d9d7727524805
sudeeptabal@Sudeptas-MacBook-Air / % docker run -d -p 5432:5432 --name postgres1 -e POSTGRES_PASSWORD=pass12345 postgres
docker: Error response from daemon: Conflict. The container name "/postgres1" is already in use by container "96cad82e63589a3c0fc117845d5995e0eeae1eab5ff5ae67d9d7727524805". You have to remove (or rename) that container to be able to reuse that name.

Run 'docker run --help' for more information
sudeeptabal@Sudeptas-MacBook-Air / % docker run -d -p 5432:5432 --name postgres2 -e POSTGRES_PASSWORD=pass12345 postgres
234d84f6edfcee1ca4aeeb32fe11a45853213f57eddbd62a5753d52817a37728
docker: Error response from daemon: failed to set up container networking: driver failed programming external connectivity on endpoint postgres2 (4b6535db37a75795e6890c738cc59414be8eb0c6af058aefb8a4b0ebc342ee): Bind for 0.0.0.0:5432 failed: port is already allocated

Run 'docker run --help' for more information
sudeeptabal@Sudeptas-MacBook-Air / % docker ps -a
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                               NAMES
234d84f6edfc   postgres      "docker-entrypoint.s..." About a minute ago Up 2 minutes   0.0.0.0:5432->5432/tcp, [::]:5432->5432/tcp   postgres2
96cad82e6358   postgres      "docker-entrypoint.s..." 2 minutes ago   Up 2 minutes   0.0.0.0:5432->5432/tcp, [::]:5432->5432/tcp   postgres1
276ae012e528   cloudcomputing_assignment1_dockercontainers-appgmment1_dockercontainers-app-1 18 hours ago   Exited (0) 18 hours ago                       cloudcomputing_assi
b92dacf6ed7   cloudcomputing_assignment1_dockercontainers-dbgmment1_dockercontainers-db-1    18 hours ago   Exited (0) 10 minutes ago                       cloudcomputing_assi
sudeeptabal@Sudeptas-MacBook-Air / % docker stop postgres1
postgres1
sudeeptabal@Sudeptas-MacBook-Air / % docker rm postgres1
postgres1
sudeeptabal@Sudeptas-MacBook-Air / % docker run -d -p 5432:5432 --name postgres1 -e POSTGRES_PASSWORD=pass12345 postgres
d68137d29ef2182cc131397a7afae9b7d7d82a4e8ff839e9f1f60aac9f2fffd
sudeeptabal@Sudeptas-MacBook-Air / % docker exec -it postgres1 bash
root@d68137d29ef2:/# psql -d postgres -U postgres
psql (17.6 (Debian 17.6-1.pgdg13+1))
Type "help" for help.

postgres=#
```

## Successful application run in VSCode

The screenshot shows the VS Code interface with a Flask application running. The Explorer panel on the left shows the project files: `app.py`, `compose.yaml`, `Dockerfile`, and `requirements.txt`. The main editor displays the `app.py` file, which imports `Flask`, `Redis`, and `Flask-Redis` to create a Flask application with a Redis cache. The terminal at the bottom shows the application output, including Redis configuration and Flask startup logs. The output indicates that the application is running successfully on port 5000.

```
redis-1 1:02 Sep 2025 20:07:58.440 * <search> Cluster configuration: AUTO partitions, type: 0, coordinator timeout: 0ms
redis-1 1:02 Sep 2025 20:07:58.441 * <search> Register write commands
redis-1 1:02 Sep 2025 20:07:58.442 * Module 'search' loaded from /usr/local/lib/redis/modules//redisearch.so
redis-1 1:02 Sep 2025 20:07:58.442 * <timeseries> RedisTimeSeries version 80200, git_sha=1439d4a439ca9c063e6ef124a510abff09a5d493
redis-1 1:02 Sep 2025 20:07:58.442 * <timeseries> Redis version found by RedisTimeSeries : 8.2.1 - oss
redis-1 1:02 Sep 2025 20:07:58.442 * <timeseries> Registering configuration options: [
redis-1 1:02 Sep 2025 20:07:58.442 * <timeseries> { ts-compaction-policy : }
redis-1 1:02 Sep 2025 20:07:58.442 * <timeseries> { ts-num-threads : 3 }
redis-1 1:02 Sep 2025 20:07:58.442 * <timeseries> { ts-retention-policy : 0 }
redis-1 1:02 Sep 2025 20:07:58.442 * <timeseries> { ts-duplicate-policy : block }
redis-1 1:02 Sep 2025 20:07:58.442 * <timeseries> { ts-chunk-size-bytes : 4096 }
redis-1 1:02 Sep 2025 20:07:58.442 * <timeseries> { ts-encoding : compressed }
redis-1 1:02 Sep 2025 20:07:58.442 * <timeseries> { ts-ignore-max-time-diff : 0 }
redis-1 1:02 Sep 2025 20:07:58.442 * <timeseries> { ts-ignore-max-val-diff : 0.000000 }
redis-1 1:02 Sep 2025 20:07:58.442 * <timeseries> ]
redis-1 1:02 Sep 2025 20:07:58.443 * <timeseries> Detected redis oss
redis-1 1:02 Sep 2025 20:07:58.443 * <timeseries> Enabled diskless replication
redis-1 1:02 Sep 2025 20:07:58.443 * Module 'timeseries' loaded from /usr/local/lib/redis/modules//redistimeseries.so
redis-1 1:02 Sep 2025 20:07:58.447 * <ReJSON> Created new data type 'ReJSON-RL'
redis-1 1:02 Sep 2025 20:07:58.447 * <ReJSON> version: 80200 git sha: unknown branch: unknown
redis-1 1:02 Sep 2025 20:07:58.447 * <ReJSON> Exported RedisJSON_V1 API
redis-1 1:02 Sep 2025 20:07:58.447 * <ReJSON> Exported RedisJSON_V2 API
redis-1 1:02 Sep 2025 20:07:58.447 * <ReJSON> Exported RedisJSON_V3 API
redis-1 1:02 Sep 2025 20:07:58.447 * <ReJSON> Exported RedisJSON_V4 API
redis-1 1:02 Sep 2025 20:07:58.447 * <ReJSON> Exported RedisJSON_V5 API
redis-1 1:02 Sep 2025 20:07:58.447 * <ReJSON> Enabled diskless replication
redis-1 1:02 Sep 2025 20:07:58.448 * <ReJSON> Initialized shared string cache, thread safe: false.
redis-1 1:02 Sep 2025 20:07:58.448 * Module 'ReJSON' loaded from /usr/local/lib/redis/modules//rejson.so
redis-1 1:02 Sep 2025 20:07:58.448 * <search> Acquired RedisJSON_V5 API
redis-1 1:02 Sep 2025 20:07:58.448 * <ReJSON> Server initialized
redis-1 1:02 Sep 2025 20:07:58.449 * Ready to accept connections tcp
web-1 * Serving Flask app 'app.py'
web-1 * Debug mode: off
web-1 WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server inste
web-1 * Running on all addresses (0.0.0.0)
web-1 * Running on http://127.0.0.1:5000
web-1 * Running on http://172.19.0.3:5000
web-1 Press CTRL+C to quit
192.168.65.1 - - [02/Sep/2025 20:08:24] "GET / HTTP/1.1" 200 -
web-1 192.168.65.1 - - [02/Sep/2025 20:08:25] "GET /favicon.ico HTTP/1.1" 404 -
web-1 192.168.65.1 - - [02/Sep/2025 20:08:30] "GET / HTTP/1.1" 200 -
```

# Docker desktop container logs

The screenshot shows the Docker Desktop interface with the 'Containers' tab selected. The container 'docker\_handson-web-1' is highlighted, showing its ID 'e31cea6ecb8a' and image 'docker\_handson-web:latest'. The status is 'Running (7 minutes ago)'. The 'Logs' tab is active, displaying the following log entries:

```
* Serving Flask app 'app.py'
* Debug mode: off
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://172.19.0.3:5000
Press CTRL+C to quit
192.168.65.1 - - [02/Sep/2025 20:08:24] "GET / HTTP/1.1" 200 -
192.168.65.1 - - [02/Sep/2025 20:08:25] "GET /favicon.ico HTTP/1.1" 404 -
192.168.65.1 - - [02/Sep/2025 20:08:30] "GET / HTTP/1.1" 200 -
```

The bottom status bar indicates 'Engine running', 'RAM 1.78 GB', 'CPU 0.12%', 'Disk: 2.80 GB used (limit 223.63 GB)', and 'v4.45.0'.

The screenshot shows the Docker Desktop interface with the 'Containers' tab selected. The container 'postgres1' is highlighted, showing its ID 'd68137d29ef2' and image 'postgres:latest'. The status is 'Running (2 hours ago)'. The 'Logs' tab is active, displaying the following log entries:

```
2025-09-02 17:50:20.399 UTC [51] LOG: database system was shut down at 2025-09-02 17:50:20 UTC
2025-09-02 17:50:20.401 UTC [48] LOG: database system is ready to accept connections
done
server started

/usr/local/bin/docker-entrypoint.sh: ignoring /docker-entrypoint-initdb.*

waiting for server to shut down...2025-09-02 17:50:20.526 UTC [48] LOG: received fast shutdown request
2025-09-02 17:50:20.528 UTC [48] LOG: aborting any active transactions
2025-09-02 17:50:20.529 UTC [48] LOG: background worker "logical replication launcher" (PID 54) exited with exit code 1
2025-09-02 17:50:20.529 UTC [49] LOG: shutting down
2025-09-02 17:50:20.530 UTC [49] LOG: checkpoint starting: shutdown immediate
2025-09-02 17:50:20.533 UTC [49] LOG: checkpoint complete: wrote 3 buffers (0.0%); 0 WAL file(s) added, 0 removed, 0 recycled; write=0.001 s,
sync=0.001 s, total=0.004 s; sync files=2, longest=0.001 s, average=0.001 s; distance=0 kB, estimate=0 kB; lsn=0/14ED7B8, redo lsn=0/14ED7B8
2025-09-02 17:50:20.534 UTC [48] LOG: database system is shut down
done
server stopped

PostgreSQL init process complete; ready for start up.

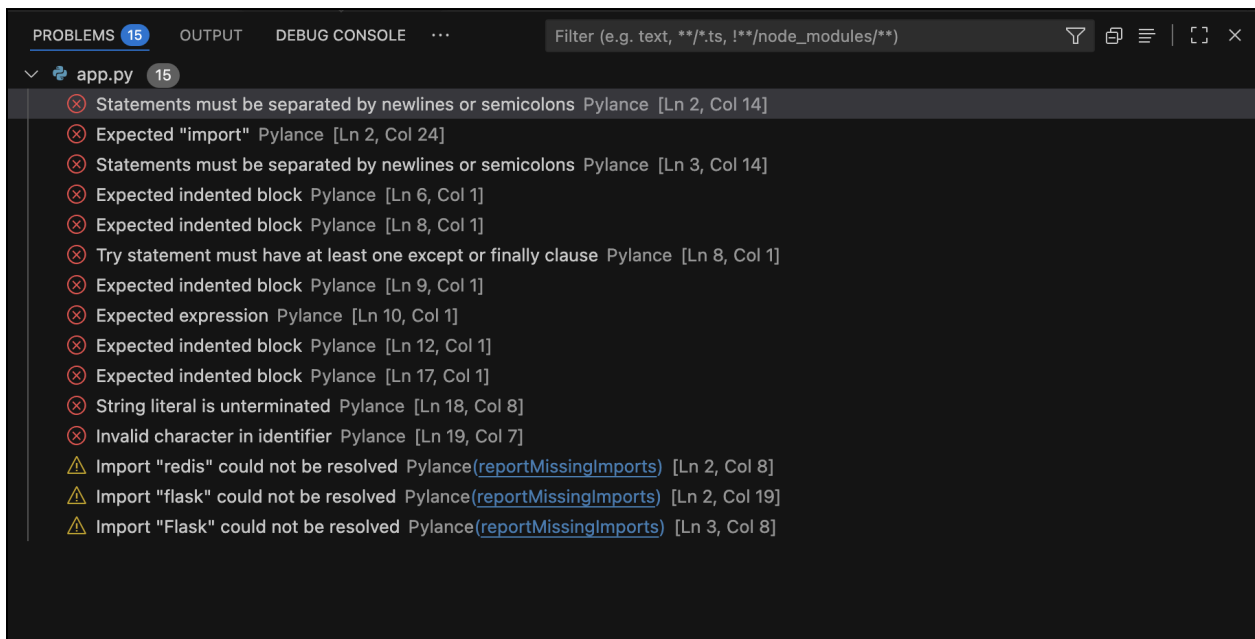
2025-09-02 17:50:20.652 UTC [1] LOG: starting PostgreSQL 17.6 (Debian 17.6-1.pgdg13+1) on aarch64-unknown-linux-gnu, compiled by gcc (Debian
14.2.0-19) 14.2.0, 64-bit
2025-09-02 17:50:20.652 UTC [1] LOG: listening on IPv4 address "0.0.0.0", port 5432
2025-09-02 17:50:20.652 UTC [1] LOG: listening on IPv6 address ":::", port 5432
2025-09-02 17:50:20.654 UTC [1] LOG: listening on Unix socket "/var/run/postgresql/.s.PGSQL.5432"
2025-09-02 17:50:20.657 UTC [62] LOG: database system was shut down at 2025-09-02 17:50:20 UTC
2025-09-02 17:50:20.660 UTC [1] LOG: database system is ready to accept connections
2025-09-02 17:55:20.755 UTC [60] LOG: checkpoint starting: time
2025-09-02 17:55:25.252 UTC [60] LOG: checkpoint complete: wrote 46 buffers (0.3%); 0 WAL file(s) added, 0 removed, 0 recycled; write=4.482 s,
sync=0.005 s, total=4.498 s; sync files=11, longest=0.003 s, average=0.001 s; distance=269 kB, estimate=269 kB; lsn=0/1530FF8, redo lsn=0/1530FA0
```

The bottom status bar indicates 'Engine running', 'RAM 1.78 GB', 'CPU 0.13%', 'Disk: 2.80 GB used (limit 223.63 GB)', and 'v4.45.0'.

## On opening application in a browser



## Error Encountered



## Errors fixed:

