

WRITTEN BY MR. HUYNH NAM

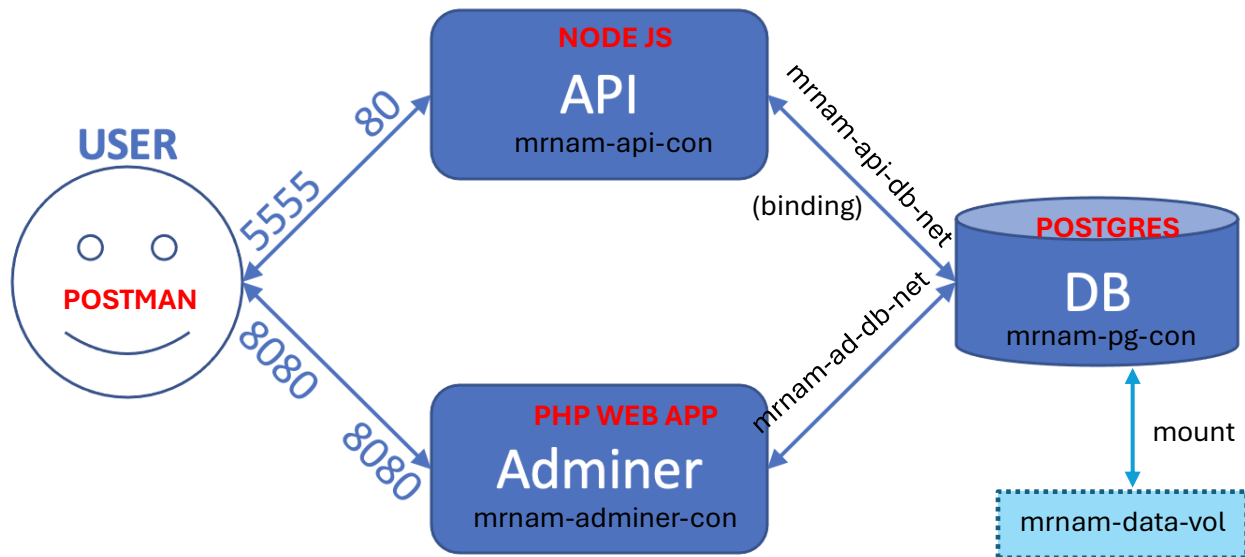
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XÂY DỰNG HỆ THỐNG ỨNG DỤNG DỊCH VỤ VỚI DOCKER COMPOSE

Mô hình



(Nếu giả lập trên máy ảo Virtual Box thì chạy Virtual Box dưới quyền Administrator)

1. Sao chép file file-docker-compose-1.yml vào thư mục gốc của osboxes
`scp -r C:\file-docker-compose-1.yml osboxes@192.168.2.26:`
2. Vào ssh để xem kết quả copy
`ssh osboxes@192.168.2.26`

```
osboxes@osboxes:~$ ls
backend database file-docker-compose-1.yml flask_app
```

3. Kiểm tra tất cả các tài nguyên như cấu hình

`sudo docker image ls -a`

```
osboxes@osboxes:~$ sudo docker image ls -a
REPOSITORY          TAG         IMAGE ID      CREATED      SIZE
mrnam-api-image     latest     1167908f5ba5  13 days ago  125MB
adminer             latest     fd3b195a8d79  7 weeks ago  250MB
postgres            latest     75b7bff7c3ad  7 weeks ago  425MB
```

`sudo docker container ls -a`

```
osboxes@osboxes:~$ sudo docker container ls -a
CONTAINER ID   IMAGE      COMMAND                  CREATED        STATUS        PORTS        NAMES
```

`sudo docker network ls`

```
osboxes@osboxes:~$ sudo docker network ls
NETWORK ID     NAME      DRIVER    SCOPE
b119ac3265f2   bridge   bridge    local
566473afbac0   host     host      local
d2a45d575e86   none     null      local
```



```
sudo docker volume ls
```

```
osboxes@osboxes:~$ sudo docker volume ls
```

DRIVER	VOLUME NAME
local	osboxes

```
sudo docker system prune
```

```
osboxes@osboxes:~$ sudo docker system prune
WARNING! This will remove:
- all stopped containers
- all networks not used by at least one container
- all dangling images
- unused build cache

Are you sure you want to continue? [y/N] y
Deleted Containers:
102298585fa664e8a1714fb0160f64f1e5b47701e409fa16f82b99cd153e674e
6bb85cb94f9df8fbbda35d573e32d7a574a63c6a2f5829043acb67e8296c68f0

Deleted Networks:
osboxes_mrnam-api-db-net

Total reclaimed space: 153B
```

4. Cài đặt docker-compose

```
sudo apt install docker-compose
```

```

@ubuntu:~$ sudo apt install docker-compose
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
docker-ce docker-ce-cli python3-compose python3-distutils python3-docker python3-dockerpty python3-docopt
python3-dotenv python3-libtoto python3-texttable python3-websocket
Suggested packages:
  aufs-tools cgroupfs-mount | cgroup-lite
Recommended packages:
  docker.io
The following NEW packages will be installed:
docker-compose python3-compose python3-distutils python3-docker python3-dockerpty python3-docopt python3-dotenv
python3-libtoto python3-texttable python3-websocket
The following packages will be upgraded:
  docker-ce docker-ce-cli
2 upgraded, 10 newly installed, 0 to remove and 46 not upgraded.
Need to get 38.5 MB of archives.
After this operation, 10.9 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu mantic/main amd64 python3-libtoto all 3.11.5-1 [70.9 kB]
Get:2 http://archive.ubuntu.com/ubuntu mantic/main amd64 python3-distutils all 3.11.5-1 [131 kB]
Get:3 http://archive.ubuntu.com/ubuntu mantic/universe amd64 python3-websocket all 1.2.3-1 [34.7 kB]
Get:4 http://archive.ubuntu.com/ubuntu mantic/universe amd64 python3-docker all 5.0.3-1 [89.3 kB]
Get:5 http://archive.ubuntu.com/ubuntu mantic/universe amd64 python3-dockerpty all 0.4.1-4 [11.5 kB]
Get:6 http://archive.ubuntu.com/ubuntu mantic/universe amd64 python3-docopt all 0.6.2-4.1 [25.9 kB]
Get:7 http://archive.ubuntu.com/ubuntu mantic/universe amd64 python3-dotenv all 1.0.0-1 [21.9 kB]
Get:8 http://archive.ubuntu.com/ubuntu mantic/universe amd64 python3-texttable all 1.6.7-1 [11.0 kB]
Get:9 http://archive.ubuntu.com/ubuntu mantic/universe amd64 docker-compose all 1.29.2-6 [85.1 kB]
Get:10 http://archive.ubuntu.com/ubuntu mantic/universe amd64 docker-ce-compare all 1.29.2-6 [14.1 kB]
Get:11 https://download.docker.com/linux/ubuntu mantic/stable amd64 docker-ce-cli amd64 5:25.0.1-1-ubuntu.23.10-mantic
13.7 MB
Get:12 https://download.docker.com/linux/ubuntu mantic/stable amd64 docker-ce amd64 5:25.0.1-1-ubuntu.23.10-mantic [24
48]
98% [12 docker-ce 618 kB/24.3 MB 3%]
2,086 kB/s

```

5. Kiểm tra version của docker compose

docker compose version

```
osboxes@osboxes:~$ sudo docker compose version
Docker Compose version v2.21.0
```

6. Tiến hành compose hệ thống đã cấu hình theo thiết kế, bấm Ctrl C nếu quá trình compose bị fail và restart liên tục (hệ thống cố gắng compose)



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sudo docker-compose -f file-docker-compose-1.yml up

```
osboxes@osboxes:~$ sudo docker-compose -f file-docker-compose-1.yml up
[sudo] password for osboxes:
Creating network "osboxes_mrnam-api-db-net" with the default driver
Creating volume "osboxes_mrnam-data-vol" with default driver
Creating mrnam-api-con ... done
Creating mrnam-pg-con ... done
Attaching to mrnam-api-con, mrnam-pg-con
mrnam-pg-con | The files belonging to this database system will be owned by user "postgres".
mrnam-pg-con | This user must also own the server process.
mrnam-pg-con |
mrnam-pg-con | The database cluster will be initialized with locale "en_US.utf8".
mrnam-pg-con | The default database encoding has accordingly been set to "UTF8".
mrnam-pg-con | The default text search configuration will be set to "english".
mrnam-pg-con |
mrnam-pg-con | Data page checksums are disabled.
mrnam-pg-con |
mrnam-pg-con | fixing permissions on existing directory /var/lib/postgresql/data ... ok
mrnam-pg-con | creating subdirectories ... ok
mrnam-pg-con | selecting dynamic shared memory implementation ... posix
mrnam-pg-con | selecting default max_connections ... 100
mrnam-pg-con | selecting default shared_buffers ... 128MB
mrnam-pg-con | selecting default time zone ... Etc/UTC
mrnam-pg-con | creating configuration files ... ok
mrnam-pg-con | running bootstrap script ... ok
```

```
mrnam-api-con | > practic@1.0.0 start /usr/src/app
mrnam-api-con | > node start.js
mrnam-api-con |
mrnam-api-con | Server started listening on port 80
mrnam-pg-con | performing post-bootstrap initialization ... ok
mrnam-pg-con | syncing data to disk ... ok
mrnam-pg-con |
mrnam-pg-con | initdb: warning:
mrnam-pg-con | Success. You can now start the database server using:
mrnam-pg-con |
mrnam-pg-con |     pg_ctl -D /var/lib/postgresql/data -l logfile start
mrnam-pg-con |
mrnam-pg-con | enabling "trust" authentication for local connections
mrnam-pg-con | initdb: hint: You can change this by editing pg_hba.conf or using the option -A, or --auth-local and --auth-host, the next time you run initdb.
mrnam-pg-con | waiting for server to start....2024-02-29 17:32:00.390 UTC [47] LOG:  starting PostgreSQL 16.1 (Debian 16.1-1.pgdg120+1) on x86_64-pc-linux-gnu, compiled by gcc (Debian 12.2.0-14) 12.2.0, 64-bit
mrnam-pg-con | 2024-02-29 17:32:00.397 UTC [47] LOG:  listening on Unix socket "/var/run/postgresql/.s.PGSQL.5432"
mrnam-pg-con | 2024-02-29 17:32:00.424 UTC [50] LOG:  database system was shut down at 2024-02-29 17:31:58 UTC
mrnam-pg-con | 2024-02-29 17:32:00.440 UTC [47] LOG:  database system is ready to accept connections
mrnam-pg-con | done
mrnam-pg-con | server started
mrnam-pg-con | CREATE DATABASE
mrnam-pg-con |
mrnam-pg-con | /usr/local/bin/docker-entrypoint.sh: running /docker-entrypoint-initdb.d/init-db.sql
mrnam-pg-con | CREATE TABLE
mrnam-pg-con | INSERT 0 5
mrnam-pg-con |
mrnam-pg-con | 2024-02-29 17:32:00.754 UTC [47] LOG:  received fast shutdown request
mrnam-pg-con | waiting for server to shut down....2024-02-29 17:32:00.765 UTC [47] LOG:  aborting any active transactions
mrnam-pg-con | 2024-02-29 17:32:00.771 UTC [47] LOG:  background worker "logical replication launcher" (PID 53) exited with exit code 1
mrnam-pg-con | 2024-02-29 17:32:00.774 UTC [48] LOG:  shutting down
mrnam-pg-con | 2024-02-29 17:32:00.789 UTC [48] LOG:  checkpoint starting: shutdown immediate
mrnam-pg-con | 2024-02-29 17:32:01.517 UTC [48] LOG:  checkpoint complete: wrote 933 buffers (5.7%); 0 WAL file(s) added, 0 removed, 0 recycled; write=0.066 s, sync=0.625 s, total=0.743 s; sync files=306, longest=0.016 s, average=0.003 s; distance=4278 kB, estimate=4278 kB; lsn=0/1918338, redo lsn=0/1918338
mrnam-pg-con | 2024-02-29 17:32:01.544 UTC [47] LOG:  database system is shut down
mrnam-pg-con | done
mrnam-pg-con | server stopped
mrnam-pg-con |
mrnam-pg-con | PostgreSQL init process complete; ready for start up.
mrnam-pg-con |
mrnam-pg-con | 2024-02-29 17:32:01.630 UTC [1] LOG:  starting PostgreSQL 16.1 (Debian 16.1-1.pgdg120+1) on x86_64-pc-linux-gnu, compiled by gcc (Debian 12.2.0-14) 12.2.0, 64-bit
mrnam-pg-con | 2024-02-29 17:32:01.631 UTC [1] LOG:  listening on IPv4 address "0.0.0.0", port 5432
mrnam-pg-con | 2024-02-29 17:32:01.631 UTC [1] LOG:  listening on IPv6 address ":::", port 5432
mrnam-pg-con | 2024-02-29 17:32:01.646 UTC [1] LOG:  listening on Unix socket "/var/run/postgresql/.s.PGSQL.5432"
mrnam-pg-con | 2024-02-29 17:32:01.666 UTC [65] LOG:  database system was shut down at 2024-02-29 17:32:01 UTC
mrnam-pg-con | 2024-02-29 17:32:01.683 UTC [1] LOG:  database system is ready to accept connections
```

Tiến hành dùng POSTMAN để GET và POST dữ liệu, quan sát log server ghi lại và chờ hệ thống đồng bộ

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```
mrnam-api-con | Getting all books
mrnam-api-con | Adding book with title DevOps Lesson by author MR.HUYNH NAM
mrnam-pg-con | 2024-02-29 17:37:01.760 UTC [63] LOG: checkpoint starting: time
mrnam-pg-con | 2024-02-29 17:37:06.966 UTC [63] LOG: checkpoint complete: wrote 49 buffers (0.3%); 0 WAL file(s) added, 0 removed, 0 recycled; write=5.145 s, sync=0.032 s, total=5.207 s; sync files=16, longest=0.003 s, average=0.002 s; distance=261 kB, estimate=261 kB; lsn=0/1959A98, redo lsn=0/1959A60
```

Bấm (Ctrl C) để quay lại command line, tuy nhiên sẽ tắt hết các container đang chạy, ta sẽ phải start lại container

7. Ta có thể bật chương trình cmd khác để ssh vào hệ thống và kiểm tra các thông tin của hệ thống đang chạy

sudo docker container ls -a

```
osboxes@osboxes:~$ sudo docker container ls -a
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                               NAMES
fcdd35f91d9f   mrnam-api-image "docker-entrypoint.s..." 8 minutes ago  Up 8 minutes  0.0.0.0:5555->80/tcp, :::5555->80/tcp  mrnam-api-con
c9ac8f9ca29b   postgres      "docker-entrypoint.s..." 8 minutes ago  Up 8 minutes  0.0.0.0:5432->5432/tcp, :::5432->5432/tcp  mrnam-pg-con
```

sudo docker network ls

```
osboxes@osboxes:~$ sudo docker network ls
NETWORK ID    NAME                DRIVER    SCOPE
df94830d1cd3  bridge             bridge    local
566473afbac0  host               host      local
d2a45d575e86  none              null      local
45146ac9a746  osboxes_mrnam-api-db-net  bridge    local
```

sudo docker volume ls

```
osboxes@osboxes:~$ sudo docker volume ls
DRIVER    VOLUME NAME
local     osboxes_mrnam-data-vol
```

8. Sinh viên xóa hết toàn hệ thống đang có và viết lại file file-docker-compose-2.yml tương ứng với hệ thống đã thiết kế. Sau đó, tiến hành compose hệ thống