

# Fullstack Development

# Preflight project - database

[Github Repo](#)

# Prerequisite

- Docker
  - Docker desktop
- Database management tools
  - Dbeaver

# Database choices

- Relational database (Comparison)
  - PostgreSQL
  - MariaDB / MySQL
  - SQLite
- NoSQL
  - Types
  - Vendors

# Docker 101

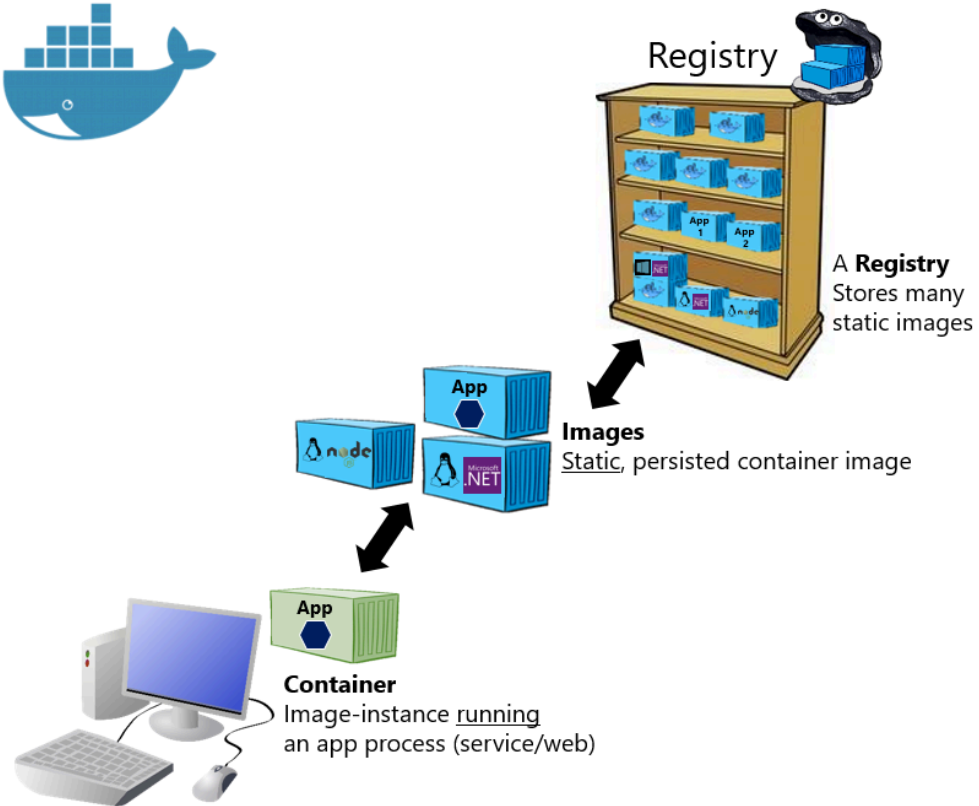
# Containers

- Containers provide a way of creating an isolated environment in which applications and their dependencies can live.
- Why?
  - Portability (save container to registry or even USB)
  - Consistency (works everywhere)
  - Easy deployment (can test on local machine)

# Docker

- A containerization platform
  - Leading player
- Alternative `Podman`

# Basic taxonomy in Docker



Hosted Docker  
Registry

Docker Trusted  
Registry on-prem.

**On-premises**  
(‘n’ private organizations)

Docker Hub  
Registry

Docker Trusted  
Registry on-cloud

Azure Container  
Registry

AWS Container  
Registry

**Public Cloud**  
(specific vendors)

Google  
Container  
Registry

Quay  
Registry





Other Cloud

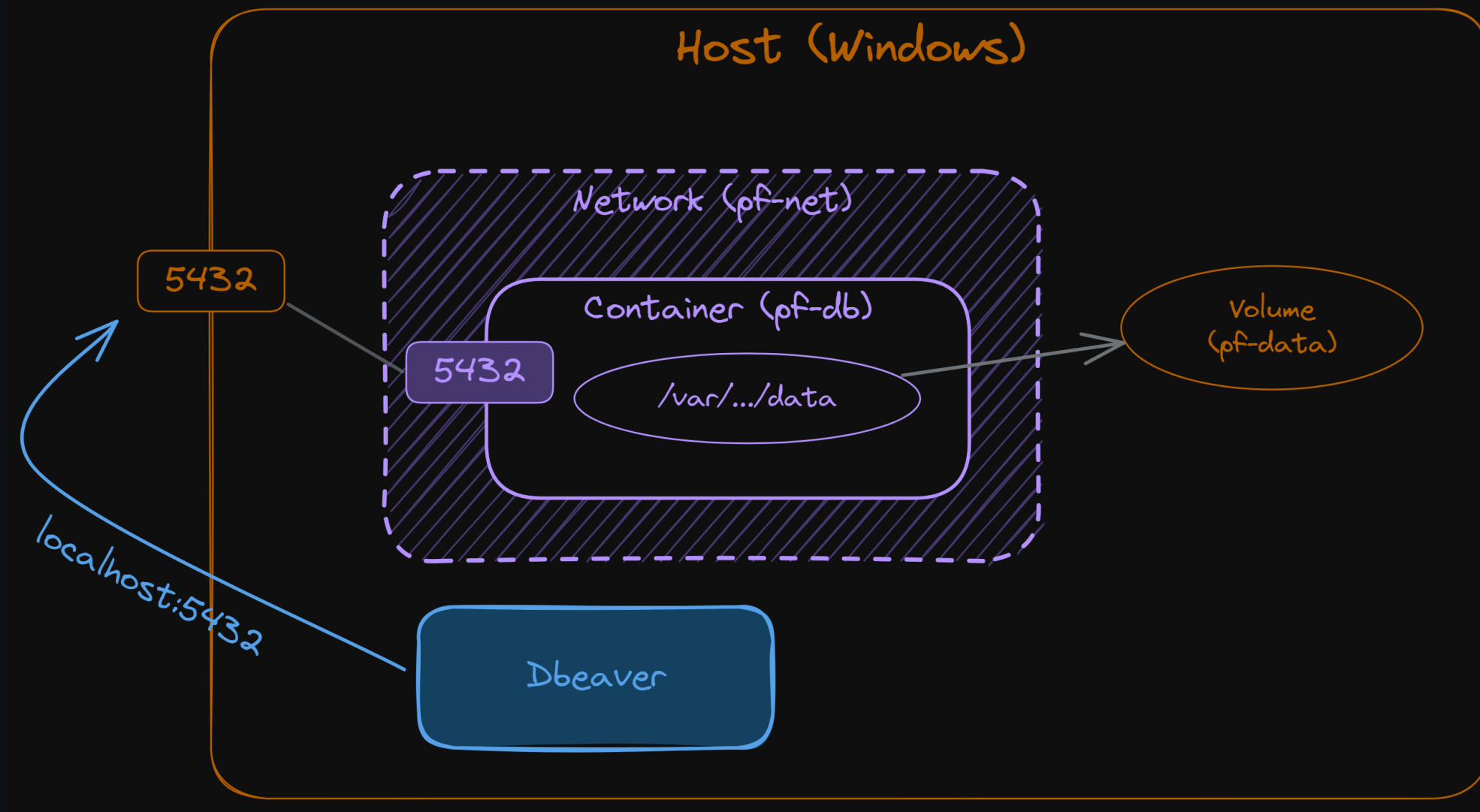


# Should you run database on docker container?

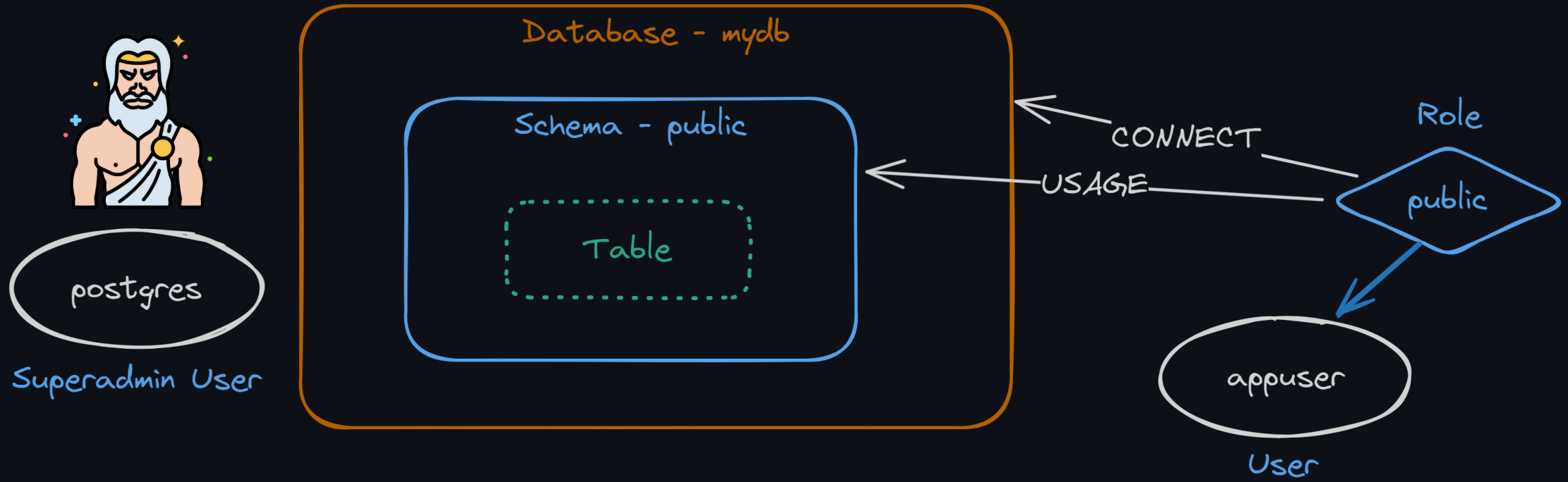
It depends.

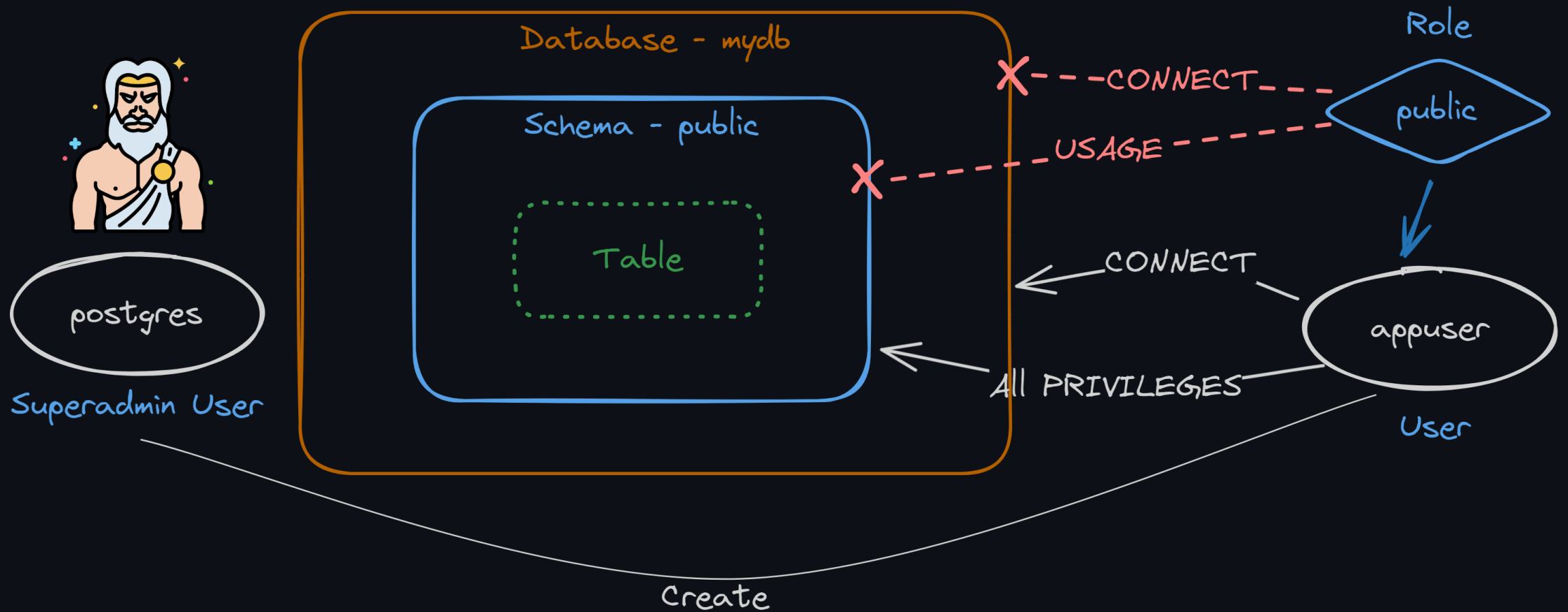
# Spinning up database instance

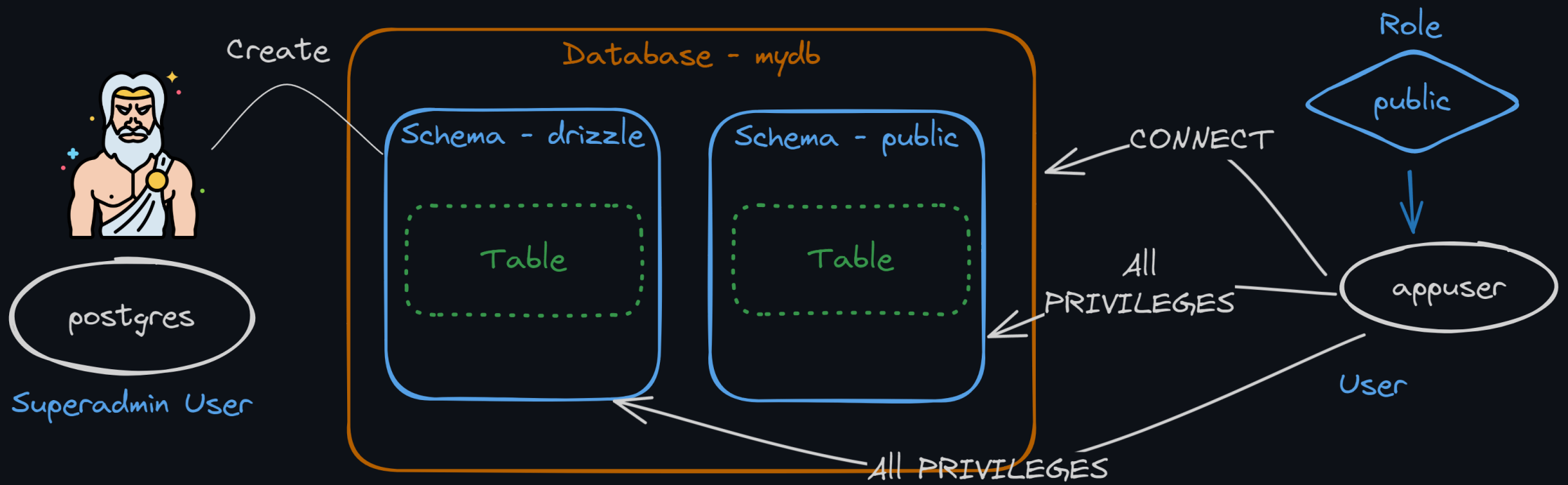
- Files
  -  `./.env` Copy from [here](#).
  -  `./.gitignore` [\(link\)](#)
  -  `./docker-compose.yml` [\(link\)](#)
-  `docker compose up -d`



# Database user management







# DB user management

- `docker exec -it pf-db bash`
- `psql -U postgres -d mydb`
  - Note that you do not need to input password here due to how the image is [setup](#). (See section in `POSTGRES_PASSWORD` )



- Don't forget to change the password for `appuser`.

```
REVOKE CONNECT ON DATABASE mydb FROM public;  
REVOKE ALL ON SCHEMA public FROM PUBLIC;  
CREATE USER appuser WITH PASSWORD '1234';  
CREATE SCHEMA drizzle;  
GRANT ALL ON DATABASE mydb TO appuser;  
GRANT ALL ON SCHEMA public TO appuser;  
GRANT ALL ON SCHEMA drizzle TO appuser;
```

## Note on `psql`

- `\l` to list all databases
- `\du` to list users
- `\dn` to list schema
- `\dt` to list tables
- `\c` to view connected database or change to another db.
- `\q` to quit

# ORM

- Object Relational Mapper
- A piece of software designed to translate between the data representations used by databases and those used in programming (in our case, Typescript).

# Why ORM?

- Get type information when interacting with database.
- Write schema file
  - Good for documentation
- Nice Tooling
  - Database synchronization
  - Schema generation from existing database
  - Database viewer
  - Migration tool

# Should you use ORM?

| It depends.

# JavaScript / TypeScript ORM

- List

# Setting up Drizzle

- `npm init -y`
- `npm i drizzle-orm postgres dotenv`
- `npm i -D drizzle-kit`
- `npm i typescript ts-node tsconfig-paths`





# TypeScript

- `npx tsc --init`
- Add this in `./tsconfig.json`




```
{
  "ts-node": {
    "require": ["tsconfig-paths/register"]
  },
  "compilerOptions": {
    // ...
    "baseUrl": "./",
    "paths": {
      "@db/*": [".db/*"]
    }
    // ...
  }
}
```





# Database initialization

- Files
  -  `./db/utills.ts` [\(Link\)](#)
  -  `./db/schema.ts` [\(Link\)](#)
  -  `./drizzle.config.ts` [\(Link\)](#)
-  `npx drizzle-kit push`

# Migration

-  `./db/migrate.ts` [\(Link\)](#)
-  `npx drizzle-kit generate`
-  `npx ts-node ./db/migrate.ts`

# CRUD

-  `./db/client.ts` [\(Link\)](#)
-  `./db/prototype.ts` [\(Link\)](#)
- `npx ts-node ./db/prototype.ts`

# Script

To save yourself some typing, add this in `package.json`

```
{
  // ...
  "scripts": {
    "db:generate": "drizzle-kit generate",
    "db:push": "drizzle-kit push",
    "db:migrate": "ts-node ./db/migrate.ts",
    "db:prototype": "ts-node ./db/prototype.ts"
  }
}
```