How To Persist Data In A Dockerized Postgres Database Using Volumes ?

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Docker and Postgres are two widely used tools in the software development field. Docker simplifies the deployment process by encapsulating applications within a container while Postgres provides a robust and reliable database to store and manage data. In this guide, I will first briefly discuss Docker and Postgres. Then I will guide you through the various steps to persist your Postgres container data using docker volumes.

What is Docker

Docker encapsulates the application and its dependencies into compact units called containers. Containers contain everything that an application needs to run such as libraries, system tools, code, and runtime. This approach greatly enhances **portability and scalability**. It removes the dependencies of building, testing, and running an application on a particular operating system and hardware. Docker is a very fast, lightweight, and resource-efficient tool. Unlike the traditional virtualization techniques, docker containers share the host operating system kernel which helps the developers to run more containers on a single host. This results in **maximizing resource utilization** and **reducing infrastructure costs**. Overall, we can say that Docker has become a very important tool for developers and organizations to accelerate their software deployment and delivery pipelines.

What is Postgres

PostgreSQL is commonly referred to as **Postgres**. Postgres is an open-source relational database that is used for storing and managing data efficiently. It ensures data integrity as it follows the ACID properties. Postgres provides a variety of features including transactions, complex queries, indexing, and replication. In addition to its core features, Postgres also supports

internationalization and text search. These features make Postgres a suitable choice for diverse linguistic and text processing needs. Postgres is widely used in many industries such as healthcare, finance, and telecommunications. We can say overall Postgres is a comprehensive and versatile solution for storing, managing, and analyzing data.

Pre-requisites

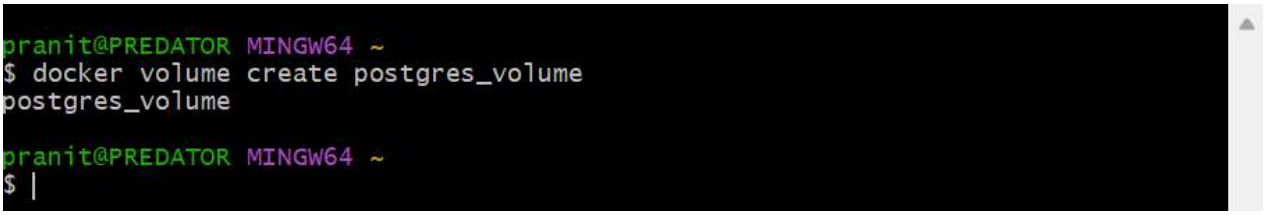
Before moving to the next section make sure you have installed Docker on your system. If you have not installed follow these detailed geeksforgeeks articles to install docker on your system.

- For Windows users: Docker – Installation on Windows
- For Ubuntu users: How To Install and Configure Docker in Ubuntu?

Steps to Persist Data In A Dockerized Postgres Using Volumes

Step 1: Create a docker volume. This volume will help in persisting the data.

```
docker volume create postgres_volume
```



Step 2: Run a Postgres docker container using docker volume.

```
docker run -d \
  --name postgres \
  -e POSTGRES_PASSWORD=gfg \
  -v postgres_volume:/var/lib/postgresql/data \
  postgres:latest
```

```
pranit@PREDATOR MINGW64 ~
$ docker run -d \
  --name postgres \
  -e POSTGRES_PASSWORD=gfg \
  -v postgres_volume:/var/lib/postgresql/data \
  postgres:latest
4487fc621adfac4b9679da9ed454f7edb62d71889b25283756d45be6626a8362

pranit@PREDATOR MINGW64 ~
$
```

Step 3: Go inside the docker container.

```
docker exec -it postgres psql -U postgres
```

```
pranit@PREDATOR MINGW64 ~
$ docker exec -it postgres psql -U postgres
psql (16.0 (Debian 16.0-1.pgdg120+1))
Type "help" for help.

postgres=#
```

Step 4: Create a database.

```
CREATE DATABASE demo_db;
```

```
pranit@PREDATOR MINGW64 ~
$ docker exec -it postgres psql -U postgres
psql (16.0 (Debian 16.0-1.pgdg120+1))
Type "help" for help.

postgres=# CREATE DATABASE demo_db;
CREATE DATABASE
postgres=#
```

Step 5: Try to connect the database.


```
pranit@PREDATOR MINGW64 ~
$ docker exec -it postgres psql -U postgres
psql (16.0 (Debian 16.0-1.pgdg120+1))
Type "help" for help.

postgres=# CREATE DATABASE demo_db;
CREATE DATABASE
postgres=# \c demo_db
You are now connected to database "demo_db" as user "postgres".
demo_db=#
```

Step 6: Create a table inside the database and insert some demo data . Then exit.

```
CREATE TABLE gfg_articles (id SERIAL PRIMARY KEY, name VARCHAR(255));
```

```
pranit@PREDATOR MINGW64 ~
$ docker exec -it postgres psql -U postgres
psql (16.0 (Debian 16.0-1.pgdg120+1))
Type "help" for help.

postgres=# CREATE DATABASE demo_db;
CREATE DATABASE
postgres=# \c demo_db
You are now connected to database "demo_db" as user "postgres".
demo_db=# CREATE TABLE gfg_articles (id SERIAL PRIMARY KEY, name VARCHAR(255));
CREATE TABLE
demo_db=# ~
```

```
INSERT INTO gfg_articles (name) VALUES ('Docker 1'), ('Jenkins 2'),
('K8s 3');
```

```
pranit@PREDATOR MINGW64 ~
$ docker exec -it postgres psql -U postgres
psql (16.0 (Debian 16.0-1.pgdg120+1))
Type "help" for help.

postgres=# \c demo_db
You are now connected to database "demo_db" as user "postgres".
demo_db=# INSERT INTO gfg_articles (name) VALUES ('Docker 1'), ('Jenkins 2'), ('K8s 3');
INSERT 0 3
demo_db=#
```

You can use the below command to exit the Postgres terminal.

```
\q
```

Step 7: Now delete the Postgres docker container.

```
docker stop postgres
docker rm postgres
```

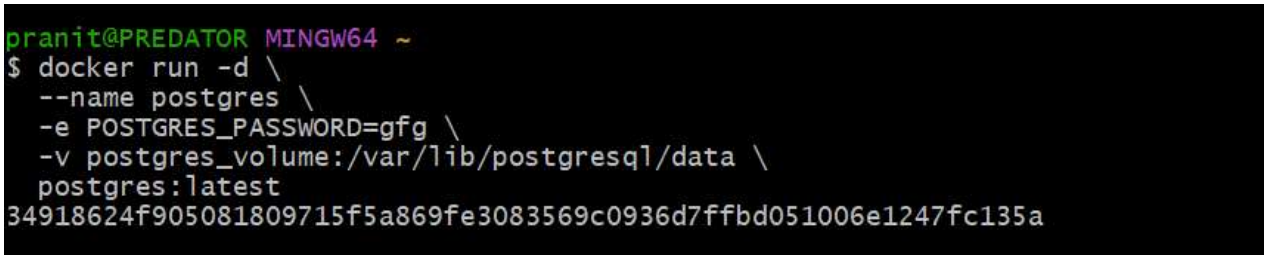
```
pranit@PREDATOR MINGW64 ~
$ docker stop postgres
postgres

pranit@PREDATOR MINGW64 ~
$ docker rm postgres
postgres

pranit@PREDATOR MINGW64 ~
$
```

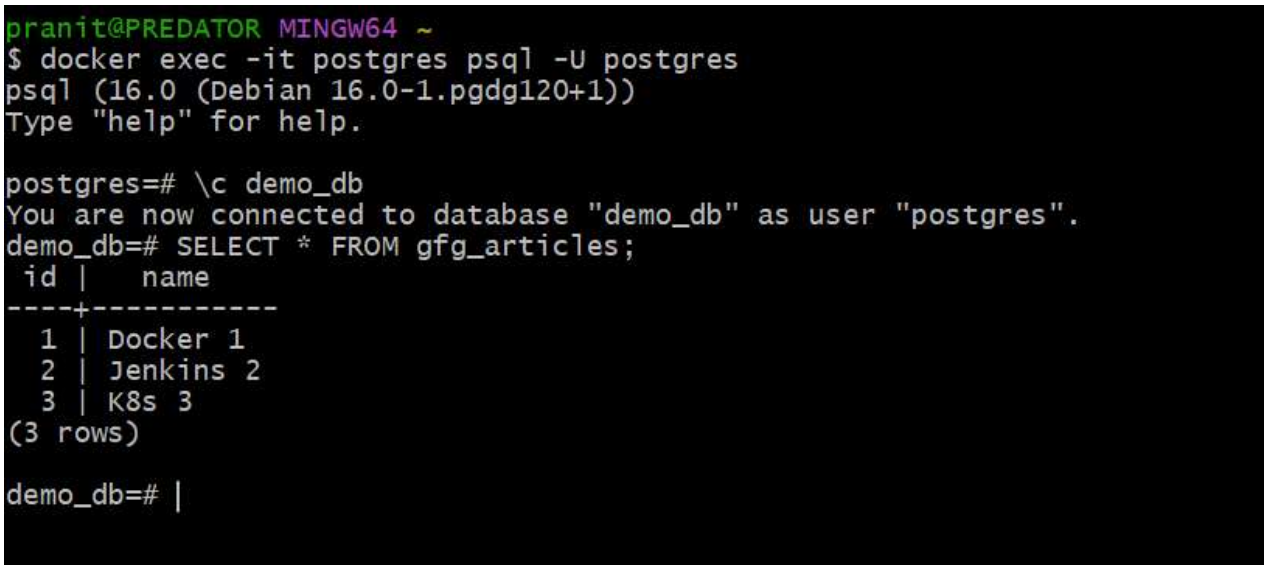
Step 8: Create again a Postgres docker container using the docker volume (*created in Step 1*).

```
docker run -d \
  --name postgres \
  -e POSTGRES_PASSWORD=gfg \
  -v postgres_volume:/var/lib/postgresql/data \
  postgres:latest
```



Step 9: Finally go inside the docker container and verify that whether the database and table is present or not. (*run the commands below one by one*)

```
docker exec -it postgres psql -U postgres
\c demo_db
SELECT * FROM gfg_articles;
```



Conclusion

Here in this guide we first learn what is Docker . Then learned some basics about Postgres . Then we have followed various steps to persist the Postgres data using docker volumes . We started by creating a Postgres docker container using a docker volume . Then added some dummy database

and dummy table to the database . Then deleted the Postgres docker container and recreate the Postgres docker container to verify whether the Postgres data persists or not .

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