

PostgreSQL

Gunnar

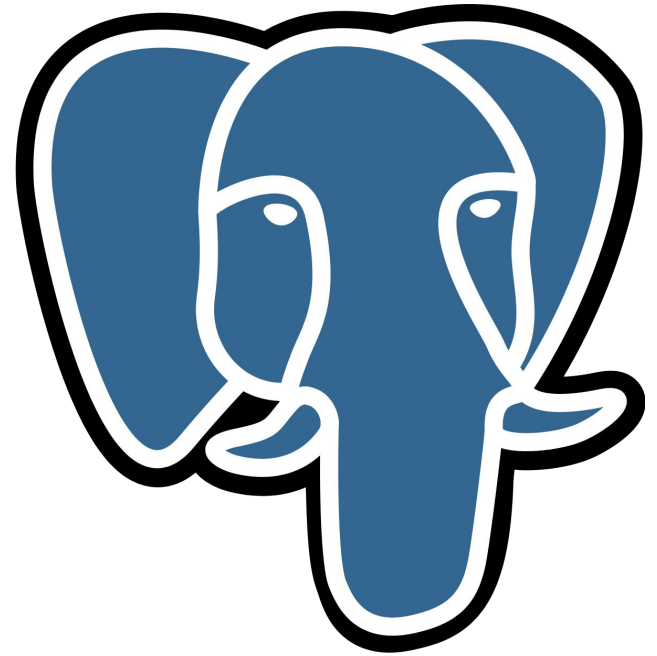


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PostgreSQL Introduction

- PostgreSQL is an open source relational database
- Full features database used in many applications
- In addition to standard SQL operations, PostgreSQL can store and query JSON objects
- JSON objects are stored in a separate JSON data type
- JSON operations are used as an extension to the SQL standard
- Other extensions of PostgreSQL include GIS location data and a text mining module

Installation

To install postgresql on a Ubuntu linux server:

```
$ sudo apt-get update
```

```
$ sudo apt-get install postgresql postgresql-contrib
```

Run from docker:

```
$ sudo docker run -d -p 5432:5432 postgres
```

```
$ sudo apt-get install postgresql-client
```

Docker commands

docker run : run a docker container

docker build: build docker container

docker ps: see running containers

docker stop: stop running container

docker logs: see logs from docker

Postgresql Command Line utility

Connect to database:

Installed in ubuntu

```
$ psql
```

Running in Docker:

```
$ psql -U postgres -h localhost
```

Get training DB

```
$ rm db.sql
```

```
$ wget https://s3-eu-west-1.amazonaws.com/test-meerkat/db.sql
```

Backing up and Restoring data

Simplest way to backup a database is to use `pg_dump`, i.e

```
$ pg_dump -U postgres -h localhost database_name > backup.sql
```

This creates a file “backup.sql” with all table definitions and all data

Restore by:

```
$ psql -U postgres -h localhost another_db < backup.sql
```


Create database and import test data

```
$ psql -U postgres -h localhost
```

```
psql (9.6.8, server 10.1)
```

```
WARNING: psql major version 9.6, server major version 10.
```

```
Some psql features might not work.
```

```
Type "help" for help.
```

```
postgres=# create database database_name;
```

```
postgres=# ctrl+d
```

```
$ psql -U postgres -h localhost database_name < db.sql
```

Querying

- Standard SQL language
- Tutorial : <https://www.w3schools.com/sql/>
- Connect to new DB:

```
$ psql -U postgres -h localhost database_name
```

```
database_name=# SELECT * from patients;
```

```
database_name=# SELECT count(*) from patients;
```

JSON Query

In test db we have a field “tests”. This is a JSON field.

Why?

- Allows data with arbitrary structure.
- No need for schema

JSON tutorial: <http://www.postgresqltutorial.com/postgresql-json/>

database_name=# SELECT tests->>'bp' from patients;

Exercises

- Find the number of records
- Find the average age
- Find the average age of patients with diabetes
- List all the different types of diseases
- Find all the patients with bp > 140
- Find any patients with diabetes with a glucose value < 7
- Find all patients with visit date after the 5th of March 2018
- Update the record with name="gunnar2" and set disease to diabetes
- Create a backup of your database, create a new database, import the old data in the new database

Export data to CSV

Export data to CSV for analysis in Excel.

```
COPY table_name TO '/tmp/file_name.csv' DELIMITER ',' CSV HEADER;
```

Exercise: Copy the patients table to a csv file and open it with excel