**PostgreSQL**

**Definition:** PostgreSQL, often referred to as Postgres, is a powerful, open-source relational database management system (RDBMS) that emphasizes extensibility and SQL compliance. It supports a wide range of data types and advanced features such as complex queries, foreign keys, triggers, updatable views, and transactional integrity.

**Example: Setting Up PostgreSQL**

**Step-by-Step Example (Ubuntu):**

1. **Install PostgreSQL:**

sh

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sudo apt update

sudo apt install postgresql postgresql-contrib

1. **Start and Enable PostgreSQL Service:**

sh

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sudo systemctl start postgresql

sudo systemctl enable postgresql

1. **Switch to the PostgreSQL User:**

sh

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sudo -i -u postgres

1. **Access PostgreSQL Command Line Interface:**

sh

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psql

1. **Create a New Database and User:**

sql

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CREATE DATABASE mydatabase;

CREATE USER myuser WITH ENCRYPTED PASSWORD 'mypassword';

GRANT ALL PRIVILEGES ON DATABASE mydatabase TO myuser;

1. **Exit the PostgreSQL Interface:**

sql

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**pgAdmin 4**

**Definition:** pgAdmin 4 is an open-source management tool for PostgreSQL, providing a graphical interface for database administration and development. It allows users to interact with PostgreSQL databases, execute SQL queries, manage database objects, and perform various administrative tasks.

**Example: Setting Up pgAdmin 4**

**Step-by-Step Example (Ubuntu):**

1. **Install pgAdmin 4:**
   * Add the pgAdmin 4 repository:

sh

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curl https://www.pgadmin.org/static/packages\_pgadmin\_org.pub | sudo apt-key add -

sudo sh -c 'echo "deb https://ftp.postgresql.org/pub/pgadmin/pgadmin4/apt/ubuntu $(lsb\_release -cs) pgadmin4" > /etc/apt/sources.list.d/pgadmin4.list && apt update'

* + Install pgAdmin 4:

sh

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sudo apt install pgadmin4

* + Configure pgAdmin 4:

sh

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sudo /usr/pgadmin4/bin/setup-web.sh

1. **Access pgAdmin 4:**
   * Open a web browser and navigate to http://localhost/pgadmin4.
   * Log in with the email and password you set during the setup.
2. **Connect to PostgreSQL Database:**
   * In pgAdmin 4, right-click on "Servers" and select "Create" > "Server".
   * Enter connection details:
     + **Name**: MyPostgresServer
     + **Host**: localhost
     + **Port**: 5432
     + **Username**: myuser
     + **Password**: mypassword
   * Click "Save" to connect.

By using PostgreSQL and pgAdmin 4, you can efficiently manage databases with a powerful command-line tool and an intuitive graphical interface, making database administration and development easier.

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