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PostgreSQL Upgrade Manual (14 to 16)

This manual guides you through the process of upgrading PostgreSQL from version 14 to 16 on an Ubuntu system. Upgrading your PostgreSQL server is a critical task that requires careful preparation, including backing up your data, installing the new version, migrating databases, and verifying the upgrade. Please follow the steps outlined below to ensure a smooth transition.

1. Database Backup

Before initiating the upgrade, it is essential to back up all your databases to prevent data loss. You can accomplish this using the `pg_dump` or `pg_dumpall` tools. Execute the following command to back up all databases:

```
$ sudo –u postgres pg_dumpall > all_databases.sql
```

This command will save the backup file `all_databases.sql` in your current terminal directory.

2. Install PostgreSQL 16

Add the PostgreSQL Official Repository

To install PostgreSQL 16, you first need to add the official PostgreSQL repository to your system:

```
$ wget --quiet -O - https://www.postgresql.org/media/keys/ACCC4CF8.asc | sudo apt-key add -
echo "deb http://apt.postgresql.org/pub/repos/apt jammy-pgdg main" | sudo tee /etc/apt/sources.list.d/pgdg.list
```

Replace `jammy` with the codename of your Ubuntu version, which can be found by executing

```
$ cat /etc/upstream-release/lsb-release.
```

Update Package List

Update your system's package list to include the newly added PostgreSQL repository:

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

Install PostgreSQL 16

Install the PostgreSQL 16 package:

```
$ sudo apt-get install postgresql-16
```

3. Upgrade Databases

To migrate databases from the old version to the new one, use the `pg_upgrade` tool. Ensure both PostgreSQL versions are stopped before proceeding:

```
$ sudo systemctl stop postgresql@14-main
$ sudo systemctl stop postgresql@16-main
```

Execute `pg_upgrade` from its full path and within a directory where the `postgres` user has read-write permissions:

```
$ cd /var/lib/postgresql
$ sudo -u postgres /usr/lib/postgresql/16/bin/pg_upgrade \
  -b /usr/lib/postgresql/14/bin \
  -B /usr/lib/postgresql/16/bin \
  -d /var/lib/postgresql/14/main \
  -D /var/lib/postgresql/16/main \
  -O "-c config_file=/etc/postgresql/16/main/postgresql.conf" \
  -o "-c config_file=/etc/postgresql/14/main/postgresql.conf"
```

4. Verification and Cleanup

Verify the New Version

Start the PostgreSQL 16 server and connect to your databases to ensure everything is working correctly:

```
$ sudo systemctl start postgresql@16-main
$ sudo systemctl status postgresql@16-main
```

Check PostgreSQL Port Configuration

Verify the PostgreSQL port configuration:

```
$ grep "^port" /etc/postgresql/16/main/postgresql.conf
```

Connect to the database using the appropriate port (default is 5432, but here it is 5433):

```
$ sudo -u postgres psql -p 5433
```

Remove the Old Version

If everything functions as expected, you may optionally remove the old PostgreSQL version:

```
$ sudo apt-get remove postgresql-14
```

Conclusion

You have successfully upgraded PostgreSQL from version 14 to 16. This manual covered backing up your databases, installing the new PostgreSQL version, migrating your databases, and verifying the upgrade. For more detailed information on each step or advanced configurations, consult the official PostgreSQL documentation.