# **🛠️ How to Upgrade PostgreSQL 16 to 17 Using**pg\_dump**and**psql

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[Jeyaram Ayyalusamy](https://medium.com/@jramcloud1?source=post_page---byline--ed9e1b88ee81---------------------------------------)

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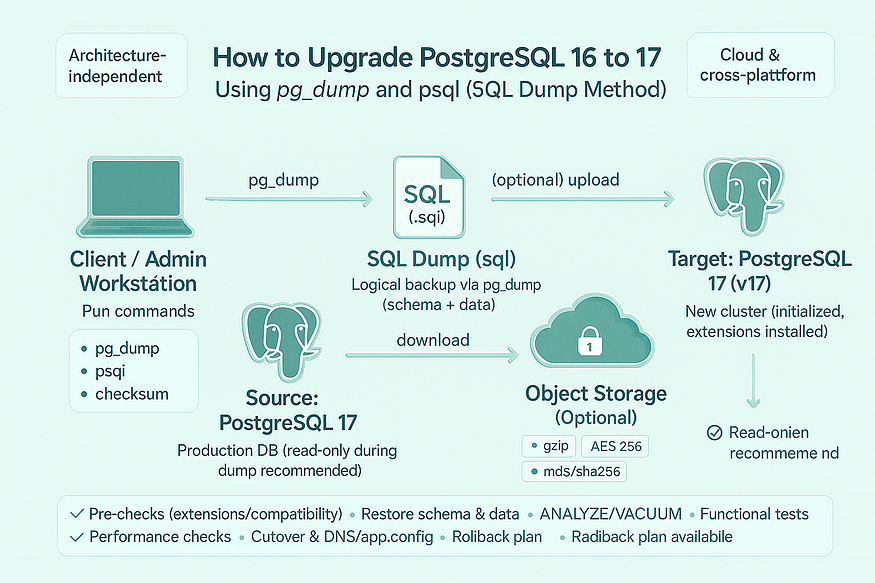
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Upgrading a PostgreSQL database is a task every database administrator eventually faces. While there are several ways to perform a major version upgrade, one of the ****most reliable and portable**** methods is using pg\_dump and psql.

In this guide, we’ll walk through how to upgrade your PostgreSQL database from ****version 16 to version 17**** using an SQL dump — a method that’s architecture-independent and ideal for cloud or cross-platform environments.

## **💡 Why Use**pg\_dump**for an Upgrade?**

While tools like pg\_upgrade are faster, they require both the old and new versions of PostgreSQL to be present on the same machine, and often assume the same OS or architecture. pg\_dump is different.

## **✅ Key Benefits of Using**pg\_dump**:**

* ****Works across different machines**** (e.g., EC2 to local, 32-bit to 64-bit)
* ****Compatible with newer versions**** of PostgreSQL
* ****Simple and flexible****, requires only shell access
* ****Non-blocking**** — other users can still use the database while the dump is in progress
* ****Internally consistent**** — you get a reliable snapshot of your data

## **📦 Step 1: Create an SQL Dump from PostgreSQL 16**

First, take a full backup of your database using the pg\_dump utility. This creates an SQL file containing all the commands needed to recreate your database schema and data in PostgreSQL 17.

## **🔧 Example:**

sudo su - postgres  
  
psql  
  
pg\_dump dvdrental -v > /tmp/dvdrental.sql

****Explanation:****

* dvdrental: Name of the database you’re backing up
* -v: Enables verbose output so you can monitor progress
* >: Redirects output to an SQL file (/tmp/dvdrental.sql)

📝 Make sure you’re running this command from the machine where PostgreSQL 16 is installed and the database is accessible.

[ec2-user@ip-172-31-29-162 ~]$ sudo su - postgres  
Last login: Sun Aug 17 22:31:37 UTC 2025 on pts/1  
[postgres@ip-172-31-29-162 ~]$

[postgres@ip-172-31-29-162 ~]$ psql  
psql (16.10)  
Type "help" for help.  
  
postgres=#  
postgres=#  
postgres=#

[postgres@ip-172-31-29-162 ~]$ pg\_dump dvdrental -v > /tmp/dvdrental.sql  
pg\_dump: last built-in OID is 16383  
pg\_dump: reading extensions  
pg\_dump: identifying extension members  
pg\_dump: reading schemas  
pg\_dump: reading user-defined tables  
pg\_dump: reading user-defined functions  
pg\_dump: reading user-defined types  
pg\_dump: reading procedural languages  
pg\_dump: reading user-defined aggregate functions  
pg\_dump: reading user-defined operators  
pg\_dump: reading user-defined access methods  
pg\_dump: reading user-defined operator classes  
pg\_dump: reading user-defined operator families  
pg\_dump: reading user-defined text search parsers  
pg\_dump: reading user-defined text search templates  
pg\_dump: reading user-defined text search dictionaries  
pg\_dump: reading user-defined text search configurations  
pg\_dump: reading user-defined foreign-data wrappers  
pg\_dump: reading user-defined foreign servers  
pg\_dump: reading default privileges  
pg\_dump: reading user-defined collations  
pg\_dump: reading user-defined conversions  
pg\_dump: reading type casts  
pg\_dump: reading transforms  
pg\_dump: reading table inheritance information  
pg\_dump: reading event triggers  
pg\_dump: finding extension tables  
pg\_dump: finding inheritance relationships  
pg\_dump: reading column info for interesting tables  
pg\_dump: finding table default expressions  
pg\_dump: flagging inherited columns in subtables  
pg\_dump: reading partitioning data  
pg\_dump: reading indexes  
pg\_dump: flagging indexes in partitioned tables  
pg\_dump: reading extended statistics  
pg\_dump: reading constraints  
pg\_dump: reading triggers  
pg\_dump: reading rewrite rules  
pg\_dump: reading policies  
pg\_dump: reading row-level security policies  
pg\_dump: reading publications  
pg\_dump: reading publication membership of tables  
pg\_dump: reading publication membership of schemas  
pg\_dump: reading subscriptions  
pg\_dump: reading large objects  
pg\_dump: reading dependency data  
pg\_dump: saving encoding = UTF8  
pg\_dump: saving standard\_conforming\_strings = on  
pg\_dump: saving search\_path =  
pg\_dump: creating TYPE "public.mpaa\_rating"  
pg\_dump: creating DOMAIN "public.year"  
pg\_dump: creating FUNCTION "public.\_group\_concat(text, text)"  
pg\_dump: creating FUNCTION "public.film\_in\_stock(integer, integer)"  
pg\_dump: creating FUNCTION "public.film\_not\_in\_stock(integer, integer)"  
pg\_dump: creating FUNCTION "public.get\_customer\_balance(integer, timestamp without time zone)"  
pg\_dump: creating FUNCTION "public.inventory\_held\_by\_customer(integer)"  
pg\_dump: creating FUNCTION "public.inventory\_in\_stock(integer)"  
pg\_dump: creating FUNCTION "public.last\_day(timestamp without time zone)"  
pg\_dump: creating FUNCTION "public.last\_updated()"  
pg\_dump: creating SEQUENCE "public.customer\_customer\_id\_seq"  
pg\_dump: creating TABLE "public.customer"  
pg\_dump: creating FUNCTION "public.rewards\_report(integer, numeric)"  
pg\_dump: creating AGGREGATE "public.group\_concat(text)"  
pg\_dump: creating SEQUENCE "public.actor\_actor\_id\_seq"  
pg\_dump: creating TABLE "public.actor"  
pg\_dump: creating SEQUENCE "public.category\_category\_id\_seq"  
pg\_dump: creating TABLE "public.category"  
pg\_dump: creating SEQUENCE "public.film\_film\_id\_seq"  
pg\_dump: creating TABLE "public.film"  
pg\_dump: creating TABLE "public.film\_actor"  
pg\_dump: creating TABLE "public.film\_category"  
pg\_dump: creating VIEW "public.actor\_info"  
pg\_dump: creating SEQUENCE "public.address\_address\_id\_seq"  
pg\_dump: creating TABLE "public.address"  
pg\_dump: creating SEQUENCE "public.city\_city\_id\_seq"  
pg\_dump: creating TABLE "public.city"  
pg\_dump: creating SEQUENCE "public.country\_country\_id\_seq"  
pg\_dump: creating TABLE "public.country"  
pg\_dump: creating VIEW "public.customer\_list"  
pg\_dump: creating VIEW "public.film\_list"  
pg\_dump: creating SEQUENCE "public.inventory\_inventory\_id\_seq"  
pg\_dump: creating TABLE "public.inventory"  
pg\_dump: creating SEQUENCE "public.language\_language\_id\_seq"  
pg\_dump: creating TABLE "public.language"  
pg\_dump: creating VIEW "public.nicer\_but\_slower\_film\_list"  
pg\_dump: creating SEQUENCE "public.payment\_payment\_id\_seq"  
pg\_dump: creating TABLE "public.payment"  
pg\_dump: creating SEQUENCE "public.rental\_rental\_id\_seq"  
pg\_dump: creating TABLE "public.rental"  
pg\_dump: creating VIEW "public.sales\_by\_film\_category"  
pg\_dump: creating SEQUENCE "public.staff\_staff\_id\_seq"  
pg\_dump: creating TABLE "public.staff"  
pg\_dump: creating SEQUENCE "public.store\_store\_id\_seq"  
pg\_dump: creating TABLE "public.store"  
pg\_dump: creating VIEW "public.sales\_by\_store"  
pg\_dump: creating VIEW "public.staff\_list"  
pg\_dump: processing data for table "public.actor"  
pg\_dump: dumping contents of table "public.actor"  
pg\_dump: processing data for table "public.address"  
pg\_dump: dumping contents of table "public.address"  
pg\_dump: processing data for table "public.category"  
pg\_dump: dumping contents of table "public.category"  
pg\_dump: processing data for table "public.city"  
pg\_dump: dumping contents of table "public.city"  
pg\_dump: processing data for table "public.country"  
pg\_dump: dumping contents of table "public.country"  
pg\_dump: processing data for table "public.customer"  
pg\_dump: dumping contents of table "public.customer"  
pg\_dump: processing data for table "public.film"  
pg\_dump: dumping contents of table "public.film"  
pg\_dump: processing data for table "public.film\_actor"  
pg\_dump: dumping contents of table "public.film\_actor"  
pg\_dump: processing data for table "public.film\_category"  
pg\_dump: dumping contents of table "public.film\_category"  
pg\_dump: processing data for table "public.inventory"  
pg\_dump: dumping contents of table "public.inventory"  
pg\_dump: processing data for table "public.language"  
pg\_dump: dumping contents of table "public.language"  
pg\_dump: processing data for table "public.payment"  
pg\_dump: dumping contents of table "public.payment"  
pg\_dump: processing data for table "public.rental"  
pg\_dump: dumping contents of table "public.rental"  
pg\_dump: processing data for table "public.staff"  
pg\_dump: dumping contents of table "public.staff"  
pg\_dump: processing data for table "public.store"  
pg\_dump: dumping contents of table "public.store"  
pg\_dump: executing SEQUENCE SET actor\_actor\_id\_seq  
pg\_dump: executing SEQUENCE SET address\_address\_id\_seq  
pg\_dump: executing SEQUENCE SET category\_category\_id\_seq  
pg\_dump: executing SEQUENCE SET city\_city\_id\_seq  
pg\_dump: executing SEQUENCE SET country\_country\_id\_seq  
pg\_dump: executing SEQUENCE SET customer\_customer\_id\_seq  
pg\_dump: executing SEQUENCE SET film\_film\_id\_seq  
pg\_dump: executing SEQUENCE SET inventory\_inventory\_id\_seq  
pg\_dump: executing SEQUENCE SET language\_language\_id\_seq  
pg\_dump: executing SEQUENCE SET payment\_payment\_id\_seq  
pg\_dump: executing SEQUENCE SET rental\_rental\_id\_seq  
pg\_dump: executing SEQUENCE SET staff\_staff\_id\_seq  
pg\_dump: executing SEQUENCE SET store\_store\_id\_seq  
pg\_dump: creating CONSTRAINT "public.actor actor\_pkey"  
pg\_dump: creating CONSTRAINT "public.address address\_pkey"  
pg\_dump: creating CONSTRAINT "public.category category\_pkey"  
pg\_dump: creating CONSTRAINT "public.city city\_pkey"  
pg\_dump: creating CONSTRAINT "public.country country\_pkey"  
pg\_dump: creating CONSTRAINT "public.customer customer\_pkey"  
pg\_dump: creating CONSTRAINT "public.film\_actor film\_actor\_pkey"  
pg\_dump: creating CONSTRAINT "public.film\_category film\_category\_pkey"  
pg\_dump: creating CONSTRAINT "public.film film\_pkey"  
pg\_dump: creating CONSTRAINT "public.inventory inventory\_pkey"  
pg\_dump: creating CONSTRAINT "public.language language\_pkey"  
pg\_dump: creating CONSTRAINT "public.payment payment\_pkey"  
pg\_dump: creating CONSTRAINT "public.rental rental\_pkey"  
pg\_dump: creating CONSTRAINT "public.staff staff\_pkey"  
pg\_dump: creating CONSTRAINT "public.store store\_pkey"  
pg\_dump: creating INDEX "public.film\_fulltext\_idx"  
pg\_dump: creating INDEX "public.idx\_actor\_last\_name"  
pg\_dump: creating INDEX "public.idx\_fk\_address\_id"  
pg\_dump: creating INDEX "public.idx\_fk\_city\_id"  
pg\_dump: creating INDEX "public.idx\_fk\_country\_id"  
pg\_dump: creating INDEX "public.idx\_fk\_customer\_id"  
pg\_dump: creating INDEX "public.idx\_fk\_film\_id"  
pg\_dump: creating INDEX "public.idx\_fk\_inventory\_id"  
pg\_dump: creating INDEX "public.idx\_fk\_language\_id"  
pg\_dump: creating INDEX "public.idx\_fk\_rental\_id"  
pg\_dump: creating INDEX "public.idx\_fk\_staff\_id"  
pg\_dump: creating INDEX "public.idx\_fk\_store\_id"  
pg\_dump: creating INDEX "public.idx\_last\_name"  
pg\_dump: creating INDEX "public.idx\_store\_id\_film\_id"  
pg\_dump: creating INDEX "public.idx\_title"  
pg\_dump: creating INDEX "public.idx\_unq\_manager\_staff\_id"  
pg\_dump: creating INDEX "public.idx\_unq\_rental\_rental\_date\_inventory\_id\_customer\_id"  
pg\_dump: creating TRIGGER "public.film film\_fulltext\_trigger"  
pg\_dump: creating TRIGGER "public.actor last\_updated"  
pg\_dump: creating TRIGGER "public.address last\_updated"  
pg\_dump: creating TRIGGER "public.category last\_updated"  
pg\_dump: creating TRIGGER "public.city last\_updated"  
pg\_dump: creating TRIGGER "public.country last\_updated"  
pg\_dump: creating TRIGGER "public.customer last\_updated"  
pg\_dump: creating TRIGGER "public.film last\_updated"  
pg\_dump: creating TRIGGER "public.film\_actor last\_updated"  
pg\_dump: creating TRIGGER "public.film\_category last\_updated"  
pg\_dump: creating TRIGGER "public.inventory last\_updated"  
pg\_dump: creating TRIGGER "public.language last\_updated"  
pg\_dump: creating TRIGGER "public.rental last\_updated"  
pg\_dump: creating TRIGGER "public.staff last\_updated"  
pg\_dump: creating TRIGGER "public.store last\_updated"  
pg\_dump: creating FK CONSTRAINT "public.customer customer\_address\_id\_fkey"  
pg\_dump: creating FK CONSTRAINT "public.film\_actor film\_actor\_actor\_id\_fkey"  
pg\_dump: creating FK CONSTRAINT "public.film\_actor film\_actor\_film\_id\_fkey"  
pg\_dump: creating FK CONSTRAINT "public.film\_category film\_category\_category\_id\_fkey"  
pg\_dump: creating FK CONSTRAINT "public.film\_category film\_category\_film\_id\_fkey"  
pg\_dump: creating FK CONSTRAINT "public.film film\_language\_id\_fkey"  
pg\_dump: creating FK CONSTRAINT "public.address fk\_address\_city"  
pg\_dump: creating FK CONSTRAINT "public.city fk\_city"  
pg\_dump: creating FK CONSTRAINT "public.inventory inventory\_film\_id\_fkey"  
pg\_dump: creating FK CONSTRAINT "public.payment payment\_customer\_id\_fkey"  
pg\_dump: creating FK CONSTRAINT "public.payment payment\_rental\_id\_fkey"  
pg\_dump: creating FK CONSTRAINT "public.payment payment\_staff\_id\_fkey"  
pg\_dump: creating FK CONSTRAINT "public.rental rental\_customer\_id\_fkey"  
pg\_dump: creating FK CONSTRAINT "public.rental rental\_inventory\_id\_fkey"  
pg\_dump: creating FK CONSTRAINT "public.rental rental\_staff\_id\_key"  
pg\_dump: creating FK CONSTRAINT "public.staff staff\_address\_id\_fkey"  
pg\_dump: creating FK CONSTRAINT "public.store store\_address\_id\_fkey"  
pg\_dump: creating FK CONSTRAINT "public.store store\_manager\_staff\_id\_fkey"  
[postgres@ip-172-31-29-162 ~]$

## **📤 Step 2: Transfer the Dump File (if needed)**

If your PostgreSQL 17 instance is on a different machine (e.g., a cloud server or staging environment), transfer the SQL dump file using scp.

Use the target (PostgreSQL 17) private IP address to copy the dump file via scp from the PostgreSQL 16 source to the PostgreSQL 17 target. If you have a .pem file, use the command below; otherwise, use WinSCP.

# from the source instance  
chmod 400 /path/to/target-key.pem  
scp -i /path/to/target-key.pem /tmp/dvdrental.sql ec2-user@172.31.27.249:/tmp/

## **Example:**

scp /tmp/dvdrental.sql postgres@172.31.27.249:/tmp

* Replace 54.146.215.111 with the IP of the PostgreSQL 17 server.
* Make sure the postgres user has SSH access and permission to write to /tmp.

## **🧩 Step 3: Restore into PostgreSQL 17**

Once PostgreSQL 17 is installed and initialized on the target machine, use psql to restore the dump file into a new database.

## **Example:**

sudo su - postgres  
  
psql  
  
CREATE DATABASE dvdrental;  
  
exit  
  
psql dvdrental < /tmp/dvdrental.sql

This command will:

* Create all tables, indexes, users, functions, and data as they were in the original database
* Work correctly even if you’re restoring from an older version to a newer one

⚠️ Ensure that the destination database dvdrental\_restored has already been created and that your postgres user has the necessary permissions.

[ec2-user@ip-172-31-27-249 ~]$ sudo su - postgres  
Last failed login: Sun Aug 17 22:47:16 UTC 2025 from 172.31.29.162 on ssh:notty  
There were 2 failed login attempts since the last successful login.  
[postgres@ip-172-31-27-249 ~]$  
[postgres@ip-172-31-27-249 ~]$

[postgres@ip-172-31-27-249 ~]$ psql  
psql (17.6)  
Type "help" for help.  
  
postgres=#  
postgres=# CREATE DATABASE dvdrental;  
CREATE DATABASE  
postgres=#  
postgres=# exit  
[postgres@ip-172-31-27-249 ~]$

[postgres@ip-172-31-27-249 ~]$ psql dvdrental < /tmp/dvdrental.sql  
SET  
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 set\_config  
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(1 row)  
  
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ALTER TYPE  
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CREATE FUNCTION  
ALTER FUNCTION  
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COPY 4581  
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COPY 14596  
COPY 16044  
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 setval  
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 1000  
(1 row)  
  
 setval  
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 4581  
(1 row)  
  
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 6  
(1 row)  
  
 setval  
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 32098  
(1 row)  
  
 setval  
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 16049  
(1 row)  
  
 setval  
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[postgres@ip-172-31-27-249 ~]$

## **⚡ Alternative: Direct Transfer Between Servers (Optional)**

If both the source (PostgreSQL 16) and destination (PostgreSQL 17) instances are running and network-accessible, you can use pg\_dump and psql together in a pipe to copy the database directly.

I practiced the following steps on a Vagrant machine running on my local laptop.

## **Example:**

PGPASSWORD='postgres' pg\_dump -h 192.168.10.11 -U postgres dvdrental | PGPASSWORD='postgres' psql -h 192.168.10.12 -U postgres dvdrental

****Explanation:****

* 192.168.10.11: IP of the source (PostgreSQL 16)
* 192.168.10.12: IP of the destination (PostgreSQL 17)
* Assumes that both dvdrental databases exist on both ends

⚠️ This method works best for **smaller databases**. For larger datasets, the two-step method (dump and then transfer) is more reliable and controllable.

[postgres@pgdb1 ~]$ PGPASSWORD='postgres' pg\_dump -h 192.168.10.11 -U postgres dvdrental | PGPASSWORD='postgres' psql -h 192.168.10.12 -U postgres dvdrental  
SET  
SET  
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 set\_config  
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(1 row)  
  
SET  
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CREATE TYPE  
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CREATE DOMAIN  
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CREATE SEQUENCE  
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CREATE TABLE  
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CREATE FUNCTION  
ALTER FUNCTION  
CREATE AGGREGATE  
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COPY 16044  
COPY 2  
COPY 2  
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ALTER TABLE  
CREATE INDEX  
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CREATE INDEX  
CREATE TRIGGER  
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ALTER TABLE  
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ALTER TABLE  
ALTER TABLE  
ALTER TABLE  
ALTER TABLE  
ALTER TABLE  
ALTER TABLE  
ALTER TABLE  
ALTER TABLE  
ALTER TABLE  
ALTER TABLE  
[postgres@pgdb1 ~]$

## **🧪 Verifying the Upgrade**

Once the data is restored:

1. Connect to the new PostgreSQL 17 instance:

psql dvdrental  
\l+

[postgres@pgdb2 ~]$  
[postgres@pgdb2 ~]$ psql dvdrental  
psql (17.6)  
Type "help" for help.  
  
dvdrental=#   
  
dvdrental=# \l+  
 List of databases  
 Name | Owner | Encoding | Locale Provider | Collate | Ctype | Locale | ICU Rules | Access privileges | Size  
 | Tablespace | Description  
-----------+----------+----------+-----------------+-------------+-------------+--------+-----------+-----------------------+--------  
-+------------+--------------------------------------------  
 dvdrental | postgres | UTF8 | libc | en\_US.UTF-8 | en\_US.UTF-8 | | | | 15 MB  
 | pg\_default |  
 postgres | postgres | UTF8 | libc | en\_US.UTF-8 | en\_US.UTF-8 | | | | 15 MB  
 | pg\_default | default administrative connection database  
 template0 | postgres | UTF8 | libc | en\_US.UTF-8 | en\_US.UTF-8 | | | =c/postgres +| 7321 kB  
 | pg\_default | unmodifiable empty database  
 | | | | | | | | postgres=CTc/postgres |  
 | |  
 template1 | postgres | UTF8 | libc | en\_US.UTF-8 | en\_US.UTF-8 | | | =c/postgres +| 7547 kB  
 | pg\_default | default template for new databases  
 | | | | | | | | postgres=CTc/postgres |  
 | |  
(4 rows)  
  
dvdrental=#

2. Run a few sanity checks:

\dt -- list tables   
\du -- list users   
SELECT COUNT(\*) FROM actor;

[postgres@pgdb2 ~]$ psql dvdrental  
psql (17.6)  
Type "help" for help.  
  
dvdrental=#  
dvdrental=# \dt  
 List of relations  
 Schema | Name | Type | Owner  
--------+---------------+-------+----------  
 public | actor | table | postgres  
 public | address | table | postgres  
 public | category | table | postgres  
 public | city | table | postgres  
 public | country | table | postgres  
 public | customer | table | postgres  
 public | film | table | postgres  
 public | film\_actor | table | postgres  
 public | film\_category | table | postgres  
 public | inventory | table | postgres  
 public | language | table | postgres  
 public | payment | table | postgres  
 public | rental | table | postgres  
 public | staff | table | postgres  
 public | store | table | postgres  
(15 rows)  
  
dvdrental=# \du  
 List of roles  
 Role name | Attributes  
-----------+------------------------------------------------------------  
 postgres | Superuser, Create role, Create DB, Replication, Bypass RLS  
  
  
dvdrental=# SELECT COUNT(\*) FROM actor;  
 count  
-------  
 200  
(1 row)  
  
dvdrental=#

3. Confirm application compatibility by pointing test applications at the new DB.

## **🧹 Cleanup (Optional)**

After you’ve verified the migration:

* Remove temporary dump files from both servers
* Reconfigure your applications to point to the PostgreSQL 17 host
* Set up regular backups and monitoring for the new version

## **🧭 Summary**

Upgrading PostgreSQL from version 16 to 17 using pg\_dump and psql offers a ****portable and safe**** path — especially useful for cross-platform migrations or when pg\_upgrade isn’t a good fit.