

Upgrading a PostgreSQL cluster using bucardo:

OS: Redhat Linux 9

Old PostgreSQL version:9.6.24

New PostgreSQL version:15.6

Old DB Server IP: 172.31.30.113

New DB Server IP: 172.31.25.75

On Old DB Server:

Step1) Collect the database objects and allow remote connectivity between both the servers.

```
[postgres@ip-172-31-30-114 ~]$ /usr/local/pgsql/bin/psql -d dvdrental
psql (9.6.24)
Type "help" for help.

dvdrental=# \dt+
          List of relations
Schema | Name      | Type  | Owner  | Size  | Description
-----|-----|-----|-----|-----|-----
public | actor     | table | postgres | 40 kB |
public | address   | table | postgres | 88 kB |
public | category  | table | postgres | 8192 bytes |
public | city      | table | postgres | 64 kB |
public | country   | table | postgres | 8192 bytes |
public | customer  | table | postgres | 96 kB |
public | film      | table | postgres | 464 kB |
public | film_actor | table | postgres | 264 kB |
public | film_category | table | postgres | 72 kB |
public | inventory | table | postgres | 224 kB |
public | language  | table | postgres | 8192 bytes |
public | payment   | table | postgres | 888 kB |
public | rental    | table | postgres | 1224 kB |
public | staff     | table | postgres | 16 kB |
public | store     | table | postgres | 8192 bytes |
(15 rows)

dvdrental=#
```

```
# IPv6 local connections:
host        all              all               ::1/128         trust
host        all              all              172.31.25.75/32 trust
```

On New DB Server:

Step1) Install PostgreSQL latest version and additional packages.

```
sudo dnf install -y https://download.postgresql.org/pub/repos/yum/reporpms/EL-9-x86\_64/pgdg-redhat-repo-latest.noarch.rpm
```

```
sudo dnf -qy module disable postgresql
```

```
sudo dnf install -y postgresql15-server postgresql15-contrib postgresql15-plperl
```

```
sudo /usr/pgsql-15/bin/postgresql-15-setup initdb
```

```
sudo systemctl enable postgresql-15
```

```
sudo systemctl start postgresql-15
```

```
sudo systemctl status postgresql-15
```

```
[root@ip-172-31-25-75 ec2-user]# systemctl status postgresql-15
● postgresql-15.service - PostgreSQL 15 database server
   Loaded: loaded (/usr/lib/systemd/system/postgresql-15.service; enabled; preset: disabled)
   Active: active (running) since Sun 2024-05-05 05:09:29 UTC; 13min ago
     Docs: https://www.postgresql.org/docs/15/static/
   Process: 1033 ExecStartPre=/usr/pgsql-15/bin/postgresql-15-check-db-dir %$PGDATA (code=exited, status=0/SUCCESS)
    Main PID: 1045 (postmaster)
       Tasks: 7 (limit: 4329)
      Memory: 46.0M
         CPU: 322ms
    CGroup: /system.slice/postgresql-15.service
            └─1045 /usr/pgsql-15/bin/postmaster -D /var/lib/pgsql/15/data/
              └─1062 "postgres: logger "
                └─1070 "postgres: checkpointer "
                  └─1071 "postgres: background writer "
                    └─1077 "postgres: walwriter "
                      └─1078 "postgres: autovacuum launcher "
                        └─1079 "postgres: logical replication launcher "
```

```
May 05 05:09:29 ip-172-31-25-75.ec2.internal systemd[1]: Starting PostgreSQL 15 database server...
May 05 05:09:29 ip-172-31-25-75.ec2.internal postmaster[1045]: 2024-05-05 05:09:29.541 UTC [1045] LOG:  redirecting log output to logging collector process
May 05 05:09:29 ip-172-31-25-75.ec2.internal postmaster[1045]: 2024-05-05 05:09:29.541 UTC [1045] HINT:  Future log output will appear in directory "log".
May 05 05:09:29 ip-172-31-25-75.ec2.internal systemd[1]: Started PostgreSQL 15 database server.
[root@ip-172-31-25-75 ec2-user]# su - postgres
Last login: Sat May  4 18:44:05 UTC 2024 on pts/0
[postgres@ip-172-31-25-75 ~]$ psql -p 5432
psql (15.6)
Type "help" for help.

postgres=#
```

Step2) Bucardo requires the Perl module DBIx::Safe to be installed.

#Install perl libraries

yum install perl-* -y

#Install bucardo requirement perl module DBIx::Safe

https://bucardo.org/downloads/dbix_safe.tar.gz

tar xzf dbix_safe.tar.gz

cd DBIx-Safe-1.2.5

perl Makefile.PL

make

make install

```
[root@ip-172-31-25-75 ec2-user]# ls
dbix_safe.tar.gz
[root@ip-172-31-25-75 ec2-user]# tar -xvzf dbix_safe.tar.gz
DBIx-Safe-1.2.5/
DBIx-Safe-1.2.5/META.yml
DBIx-Safe-1.2.5/INSTALL
DBIx-Safe-1.2.5/MANIFEST
DBIx-Safe-1.2.5/Safe.pm.html
DBIx-Safe-1.2.5/README
DBIx-Safe-1.2.5/TODOL
DBIx-Safe-1.2.5/Makefile.PL
DBIx-Safe-1.2.5/SIGNATURE
DBIx-Safe-1.2.5/Safe.pm
DBIx-Safe-1.2.5/MANIFEST.SKIP
DBIx-Safe-1.2.5/Changes
DBIx-Safe-1.2.5/.perlcriticrc
DBIx-Safe-1.2.5/LICENSE
DBIx-Safe-1.2.5/t/
DBIx-Safe-1.2.5/t/02perlcritic.t
DBIx-Safe-1.2.5/t/03db.t
DBIx-Safe-1.2.5/t/01safe.t
[root@ip-172-31-25-75 ec2-user]# cd DBIx-Safe-1.2.5/
[root@ip-172-31-25-75 DBIx-Safe-1.2.5]# perl Makefile.PL
Checking if your kit is complete...
Looks good
Generating a Unix-style Makefile
Writing Makefile for DBIx::Safe
Writing MYMETA.yml and MYMETA.json
[root@ip-172-31-25-75 DBIx-Safe-1.2.5]# make
cp Safe.pm blib/lib/DBIx/Safe.pm
Manifying 1 pod document
Created Safe.pm.html
[root@ip-172-31-25-75 DBIx-Safe-1.2.5]# make install
Skip blib/lib/DBIx/Safe.pm (unchanged)
Manifying 1 pod document
Created Safe.pm.html
Installing /usr/local/share/perl5/5.32/DBIx/Safe.pm
Installing /usr/local/share/man/man3/DBIx::Safe.3pm
Appending installation info to /usr/lib64/perl5/perllocal.pod
```

Step3) Connct DB ,create database & plperl extension for bucardo

CREATE USER bucardo WITH LOGIN SUPERUSER;

CREATE DATABASE bucardo;

CREATE EXTENSION plperl;

```
postgres=# \q
[postgres@ip-172-31-25-75 ~]$ psql
psql (15.6)
Type "help" for help.

postgres=# CREATE USER bucardo WITH LOGIN SUPERUSER;
CREATE DATABASE bucardo;
CREATE EXTENSION plperl;
CREATE ROLE
CREATE DATABASE
CREATE EXTENSION
postgres=#
```

Step4) Create directories for Bucardo service.

```
sudo mkdir -p /var/log/bucardo /var/run/bucardo
```

```
sudo chown -R postgres:postgres /var/log/bucardo /var/run/bucardo
```

```
[root@ip-172-31-25-75 DBIx-Safe-1.2.5]# sudo mkdir -p /var/log/bucardo /var/run/bucardo
[root@ip-172-31-25-75 DBIx-Safe-1.2.5]# sudo chown -R postgres:postgres /var/log/bucardo /var/run/bucardo
```

Step5) Install bucardo.

<https://github.com/bucardo/bucardo/archive/refs/heads/master.zip>

```
unzip master.zip
```

```
cd /home/ec2-user/bucardo-master
```

```
perl Makefile.PL
```

```
make
```

```
make install
```

```
[root@ip-172-31-25-75 bucardo-master]# perl Makefile.PL
Checking if your kit is complete...
Looks good
Warning: prerequisite Pod::Parser 0 not found.
Generating a Unix-style Makefile
Writing Makefile for Bucardo
Writing MYMETA.yml and MYMETA.json
[root@ip-172-31-25-75 bucardo-master]# make
cp bucardo.schema blib/share/bucardo.schema
cp Bucardo.pm blib/lib/Bucardo.pm
cp bucardo blib/script/bucardo
"/usr/bin/perl" -MExtUtils:MY -e 'MY->fixin(shift)' -- blib/script/bucardo
Manifying 1 pod document
Manifying 1 pod document
[root@ip-172-31-25-75 bucardo-master]# make install
Manifying 1 pod document
Manifying 1 pod document
Installing /usr/local/share/perl5/5.32/Bucardo.pm
Installing /usr/local/share/man/man1/bucardo.1pm
Installing /usr/local/share/man/man3/Bucardo.3pm
Installing /usr/local/bin/bucardo
Installing /usr/local/share/bucardo/bucardo.schema
Appending installation info to /usr/lib64/perl5/perllocal.pod
```

#Install bucardo on its own database and check status

```
su - postgres
```

```
/usr/local/bin/bucardo install
```

```
[postgres@ip-172-31-25-75 ~]$ /usr/local/bin/bucardo install
This will install the bucardo database into an existing Postgres cluster.
Postgres must have been compiled with Perl support,
and you must connect as a superuser

Current connection settings:
1. Host: <none>
2. Port: 5432
3. User: bucardo
4. Database: bucardo
5. PID directory: /var/run/bucardo
Enter a number to change it, P to proceed, or Q to quit: P

Attempting to create and populate the bucardo database and schema
Database creation is complete

Updated configuration setting "piddir"
Installation is now complete.
If you see errors or need help, please email bucardo-general@bucardo.org

You may want to check over the configuration variables next, by running:
bucardo show all
Change any setting by using: bucardo set foo=bar

[postgres@ip-172-31-25-75 ~]$ /usr/local/bin/bucardo status
No syncs have been created yet.
```

#Check status

/usr/local/bin/bucardo status

```
[postgres@ip-172-31-25-75 bucardo]$ /usr/local/bin/bucardo status
```

Name	State	Last good	Time	Last I/D	Last bad	Time
source_to_target	No records found					

```
[postgres@ip-172-31-25-75 bucardo]$
```

Step6) Take Old DB schema backup and restore into New DB.

#Take schema backup

Pg_dump -d dvdrental -h 172.31.30.114 -s -v > dvdrental_schema.sql

```
[postgres@ip-172-31-25-75 ~]$ pg_dump -d dvdrental -h 172.31.30.114 -s -v > dvdrental_schema.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
```

#Create and restore database

CREATE DATABASE dvdrental_new;

psql -d dvdrental_new < dvdrental_schema.sql

```
[postgres@ip-172-31-25-75 ~]$ psql
psql (15.6)
Type "help" for help.

postgres=# CREATE DATABASE dvdrental_new;
CREATE DATABASE
postgres=# \q
[postgres@ip-172-31-25-75 ~]$ psql -d dvdrental_new < dvdrental_schema.sql
SET
SET
SET
SET
SET
set_config
-----
(1 row)

SET
SET
SET
SET
ALTER SCHEMA
CREATE TYPE
ALTER TYPE
CREATE DOMAIN
```

#Connect DB and check objects

```
[postgres@ip-172-31-25-75 ~]$ psql -d dvdrental_new
psql (15.6)
Type "help" for help.

dvdrental_new=# \dt+
          List of relations

```

Schema	Name	Type	Owner	Persistence	Access method	Size	Description
public	actor	table	postgres	permanent	heap	0 bytes	
public	address	table	postgres	permanent	heap	0 bytes	
public	category	table	postgres	permanent	heap	0 bytes	
public	city	table	postgres	permanent	heap	0 bytes	
public	country	table	postgres	permanent	heap	0 bytes	
public	customer	table	postgres	permanent	heap	0 bytes	
public	film	table	postgres	permanent	heap	8192 bytes	
public	film_actor	table	postgres	permanent	heap	0 bytes	
public	film_category	table	postgres	permanent	heap	0 bytes	
public	inventory	table	postgres	permanent	heap	0 bytes	
public	language	table	postgres	permanent	heap	0 bytes	
public	payment	table	postgres	permanent	heap	0 bytes	
public	rental	table	postgres	permanent	heap	0 bytes	
public	staff	table	postgres	permanent	heap	8192 bytes	
public	store	table	postgres	permanent	heap	0 bytes	

```
(15 rows)
```

Step7) Create sync between Old DB and New DB using bucardo.

#Add databases

/usr/local/bin/bucardo add database old_db dbname=dvdrental host=172.31.30.114
user=postgres

/usr/local/bin/bucardo add database new_db dbname=dvdrental_new host=localhost
user=postgres

```
[postgres@ip-172-31-25-75 ~]$ /usr/local/bin/bucardo add database old_db dbname=dvdrental host=172.31.30.114 user=postgres
Added database "old_db"
[postgres@ip-172-31-25-75 ~]$ /usr/local/bin/bucardo add database new_db dbname=dvdrental_new host=localhost user=postgres
Added database "new_db"
[postgres@ip-172-31-25-75 ~]$
```

#List databases

/usr/local/bin/bucardo list database

```
[postgres@ip-172-31-25-75 ~]$ /usr/local/bin/bucardo list database
Database: new_db Status: active Conn: psql -U postgres -d dvdrental_new -h localhost
Database: old_db Status: active Conn: psql -U postgres -d dvdrental -h 172.31.30.114
[postgres@ip-172-31-25-75 ~]$
```

#Add sync

/usr/local/bin/bucardo add sync source_to_target tables=all dbs=old_db:source,new_db:target
onetimecopy=1

```
[postgres@ip-172-31-25-75 ~]$ /usr/local/bin/bucardo add sync source_to_target tables=all dbs=old_db:source,new_db:target onetimecopy=1
Added sync "source_to_target"
Created a new relgroup named "source_to_target"
Created a new dbgroup named "source_to_target"
  Added table "public.actor"
  Added table "public.address"
  Added table "public.category"
  Added table "public.city"
  Added table "public.country"
  Added table "public.customer"
  Added table "public.film"
  Added table "public.film_actor"
  Added table "public.film_category"
  Added table "public.inventory"
  Added table "public.language"
  Added table "public.payment"
  Added table "public.rental"
  Added table "public.staff"
  Added table "public.store"
```

#Start bucardo and check status

/usr/local/bin/bucardo start

/usr/local/bin/bucardo status

```
[postgres@ip-172-31-25-75 bucardo]$ /usr/local/bin/bucardo start
Checking for existing processes
Starting Bucardo
[postgres@ip-172-31-25-75 bucardo]$ /usr/local/bin/bucardo status
PID of Bucardo MCP: 29647
=====
Name          State      Last good    Time    Last I/D    Last bad    Time
=====
source_to_target | Good      | 19:37:01    | 3s     | 0/0        | none       |
[postgres@ip-172-31-25-75 bucardo]$
```

Step8) Verify New DB objects.

```
[postgres@ip-172-31-25-75 bucardo]$ psql -d dvdrental_new
psql (15.6)
Type "help" for help.

dvdrental_new=# \dt+
              List of relations
Schema | Name          | Type  | Owner  | Persistence | Access method | Size  | Description
-----+-----+-----+-----+-----+-----+-----+-----
public | actor          | table | postgres | permanent   | heap           | 40 kB |
public | address        | table | postgres | permanent   | heap           | 88 kB |
public | category       | table | postgres | permanent   | heap           | 8192 bytes |
public | city           | table | postgres | permanent   | heap           | 64 kB |
public | country        | table | postgres | permanent   | heap           | 8192 bytes |
public | customer       | table | postgres | permanent   | heap           | 96 kB |
public | film           | table | postgres | permanent   | heap           | 464 kB |
public | film_actor     | table | postgres | permanent   | heap           | 272 kB |
public | film_category  | table | postgres | permanent   | heap           | 72 kB |
public | inventory      | table | postgres | permanent   | heap           | 232 kB |
public | language       | table | postgres | permanent   | heap           | 8192 bytes |
public | payment        | table | postgres | permanent   | heap           | 896 kB |
public | rental         | table | postgres | permanent   | heap           | 1232 kB |
public | staff          | table | postgres | permanent   | heap           | 16 kB |
public | store          | table | postgres | permanent   | heap           | 8192 bytes |
(15 rows)

dvdrental_new=# select * from actor limit 4;
 actor_id | first_name | last_name | last_update
-----+-----+-----+-----
1 | Penelope | Guinness | 2013-05-26 14:47:57.62
2 | Nick    | Wahlberg | 2013-05-26 14:47:57.62
3 | Ed      | Chase   | 2013-05-26 14:47:57.62
4 | Jennifer | Davis   | 2013-05-26 14:47:57.62
(4 rows)

dvdrental_new=#
```