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

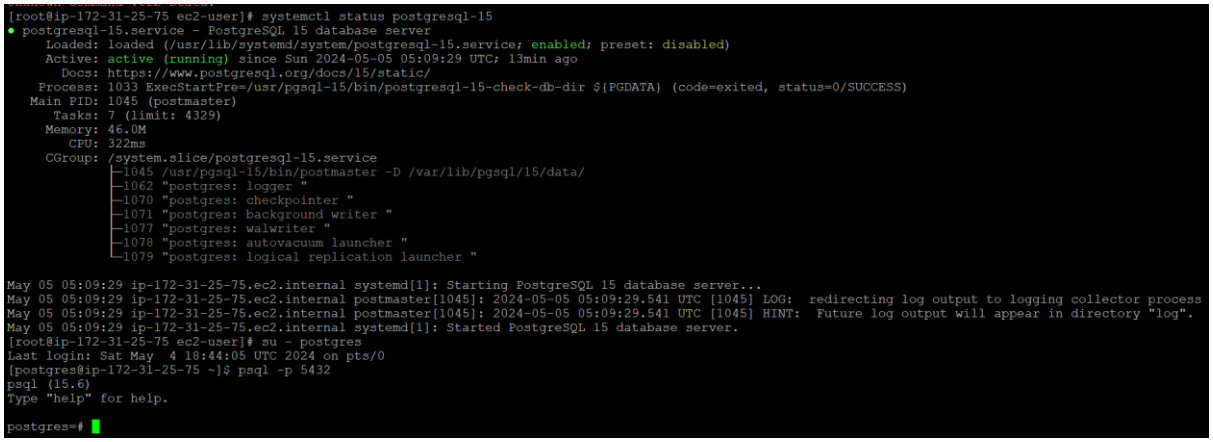
sudo dnf install -y postgresql15-server postgresql15-contrib postgresql15-plperl

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

sudo systemctl enable postgresql-15

sudo systemctl start postgresql-15

sudo systemctl status postgresql-15



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

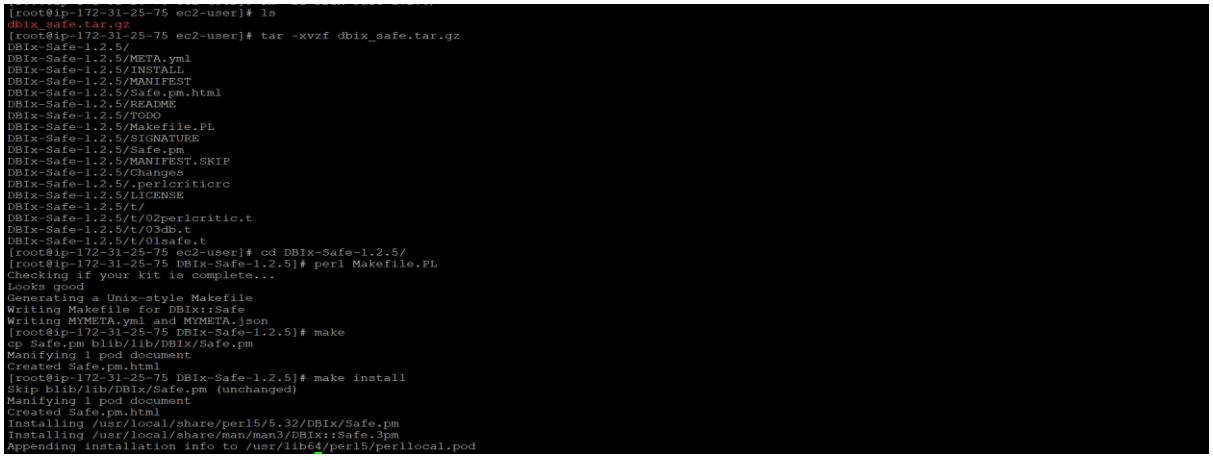
tar xzf dbix_safe.tar.gz

cd DBIx-Safe-1.2.5

perl Makefile.PL

make

make install



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

CREATE USER bucardo WITH LOGIN SUPERUSER;

CREATE DATABASE bucardo;

CREATE EXTENSION plperl;

```
[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   | Guiness   | 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=#
```