

Министерство науки и высшего образования
Российской Федерации

Федеральное государственное бюджетное
образовательное учреждение высшего образования

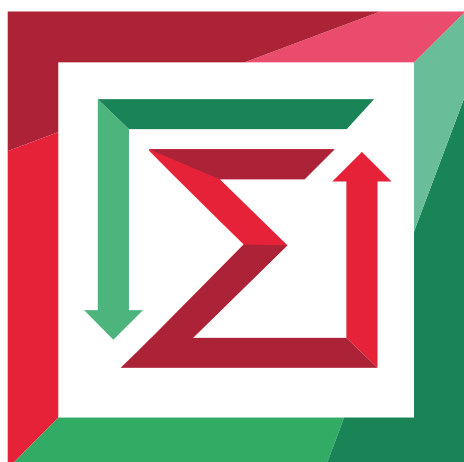
«НОВОСИБИРСКИЙ ГОСУДАРСТВЕННЫЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ»



Кафедра теоретической и прикладной информатики

Лабораторная работа № 4

по дисциплине «Администрирование информационных систем»



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Группа:	ПМИ-02
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Новосибирск

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Ход работы

1. Развернуть резервный кластер

Под пользователем postgres создали каталог данных:

```
[postgres@centos-stream-8 ~]$ mkdir /var/lib/pgpro/std-11-sec
[postgres@centos-stream-8 ~]$ initdb -D /var/lib/pgpro/std-11-sec/data
The files belonging to this database system will be owned by user "postgres".
This user must also own the server process.

The database cluster will be initialized with this locale configuration:
    provider:            icu
    ICU locale:          en-US
    LC_COLLATE:          en_US.UTF-8
    LC_CTYPE:            en_US.UTF-8
    LC_MESSAGES:        en_US.UTF-8
    LC_MONETARY:         en_US.UTF-8
    LC_NUMERIC:          en_US.UTF-8
    LC_TIME:             en_US.UTF-8
The default database encoding has been set to "UTF8".
The default text search configuration will be set to "english".

Data page checksums are enabled.

creating directory /var/lib/pgpro/std-11-sec/data ... ok
creating subdirectories ... ok
selecting dynamic shared memory implementation ... posix
selecting default max_connections ... 100
selecting default shared_buffers ... 128MB
selecting default time zone ... Asia/Novosibirsk
creating configuration files ... ok
running bootstrap script ... ok
performing post-bootstrap initialization ... ok
syncing data to disk ... ok

initdb: warning: enabling "trust" authentication for local connections
initdb: hint: You can change this by editing pg_hba.conf or using the option -A,
or --auth-local and --auth-host, the next time you run initdb.

Success. You can now start the database server using:

    /opt/pgpro/std-15/bin/pg_ctl -D /var/lib/pgpro/std-11-sec/data -l logfile start

[postgres@centos-stream-8 ~]$
```

Изменили конфигурационный параметр порта прослушивания в файле postgres.conf port = 5433

```
[postgres@centos-stream-8 ~]$ cd /var/lib/pgpro/std-11-sec/data
[postgres@centos-stream-8 data]$ ls
base                pg_hba.conf        pg_notify          pg_stat            pg_twophase        postgresql.auto.conf
global             pg_ident.conf      pg_replslot       pg_stat_tmp       PG_VERSION         postgresql.conf
pg_commit_ts       pg_logical         pg_serial         pg_subtrans       pg_wal
pg_dynshmem        pg_multixact       pg_snapshots      pg_tblspc         pg_xact
[postgres@centos-stream-8 data]$
```

```

#-----
# CONNECTIONS AND AUTHENTICATION
#-----

# - Connection Settings -

#listen_addresses = 'localhost'          # what IP address(es) to listen on;
#                                           # comma-separated list of addresses;
#                                           # defaults to 'localhost'; use '*' for all
#                                           # (change requires restart)
port = 5433                               # (change requires restart)
max_connections = 100                     # (change requires restart)
#superuser_reserved_connections = 3       # (change requires restart)
#unix_socket_directories = '/tmp'         # comma-separated list of directories
#                                           # (change requires restart)
#unix_socket_group = ''                   # (change requires restart)
#unix_socket_permissions = 0777          # begin with 0 to use octal notation
#                                           # (change requires restart)

```

Запустили службу /opt/pgpro/std-15/bin/pg_ctl -D /var/lib/pgpro/std-11-sec/data -l logfile start

```

[postgres@centos-stream-8 ~]$ /opt/pgpro/std-15/bin/pg_ctl -D /var/lib/pgpro/std-11-sec/data -l logfile start
waiting for server to start.... done
server started
[postgres@centos-stream-8 ~]$

```

Создали суперпользователя:

```

[dba@centos-stream-8 ~]$ sudo -H -i postgres createuser -sP dba -p 5433
[sudo] password for dba:
Enter password for new role:
Enter it again:
[dba@centos-stream-8 ~]$

```

Подключились к этой службе из pgAdmin:

The screenshot shows the 'Register - Server' dialog box in pgAdmin. The 'General' tab is active. The 'Name' field is filled with 'new_server'. The 'Server group' dropdown menu shows 'Servers' selected. There are two checkboxes, 'Background' and 'Foreground', both of which are unchecked. At the bottom, the 'Connect now?' toggle switch is turned on (blue).

Register - Server

General

Connection

Parameters

SSH Tunnel

Advanced

Host name/address

127.0.0.1

Port

5433

Maintenance database

postgres

Username

dba

Kerberos authentication?

Password

.....

Save password?

Servers (2)

> AIS2024_Server

new_server

Databases

Login/Group Roles

Tablespaces

2. Логическое копирование и восстановление

Уничтожили ранее созданную в отдельном табличном пространстве таблицу и табличное пространство, созданное в ЛР №2.

```
demo=# \dn
      List of schemas
  Name      | Owner
  -----+-----
 bookings   | dba
 myschema   | user1
 public     | pg_database_owner
 schema_dba | dba
(4 rows)

demo=# drop table schema_dba.flights_copies;
DROP TABLE
demo=# drop tablespace table_dba;
DROP TABLESPACE
demo=#
```

Сделали с помощью pg_dump копию б.д. demo. Привели ее размер.

Бригада	Формат копирования
2,5,8,11	D

```
[dba@centos-stream-8 ~]$ pg_dump -F d -f /home/dba/dump/ demo
[dba@centos-stream-8 ~]$ du -sh dump
22M      dump
[dba@centos-stream-8 ~]$
```

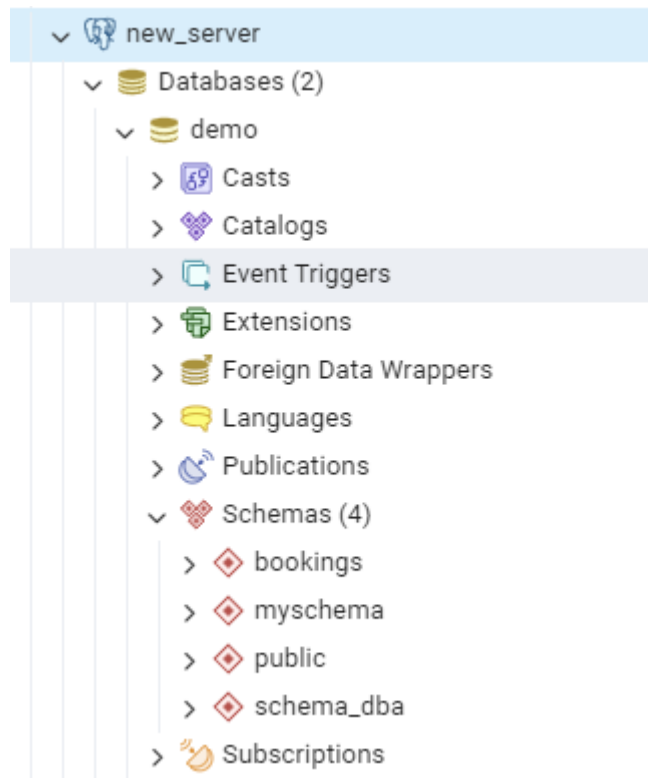
```
[dba@centos-stream-8 ~]$ psql -p 5433 -d postgres
psql (15.5)
Type "help" for help.

postgres=# CREATE DATABASE demo;
CREATE DATABASE
postgres=#
```

Восстановили с помощью pg_restore на резервном кластере.

```
[dba@centos-stream-8 ~]$ pg_restore -p 5433 -U dba -d demo /home/dba/dump/
```

В pgAdmin проверили наличие б.д. после восстановления.



3. Настройка архивации журналов и резервное копирование

Включили архивацию журналов. Архивы сегментов размещали в подкаталоге домашнего каталога. Убедились, что у пользователя postgres будут права записи в него.

```
[dba@centos-stream-8 ~]$ mkdir archives
```

```
demo=# alter system set archive_command to 'cp %p /home/dba/archives/archive%f';
ALTER SYSTEM
demo=# alter system set archive_mode=on;
ALTER SYSTEM
```

```
[postgres@centos-stream-8 ~]$ /opt/pgpro/std-15/bin/pg_ctl -D /var/lib/pgpro/std-15-sec/data -l logfile restart
waiting for server to shut down.... done
server stopped
waiting for server to start.... done
server started
```

```
demo=# show archive_mode;
archive_mode
-----
on
(1 row)

demo=#
```

```
demo=# show archive_command;
archive_command
-----
cp %p /home/dba/archives/archive%f
(1 row)

demo=#
```

Выполнили сценарии модификации таблиц, аналогичные ЛР №3.

```
import psycopg2
from time import sleep
conn = psycopg2.connect("dbname='demo' user='dba' host='127.0.0.1' port = 5433")

cur = conn.cursor()
cur.execute("""select a.*
               from bookings.tickets a
               order by a.ticket_no limit 100""")
rows = cur.fetchall()
for i in rows:
    cur.execute("""update bookings.tickets set      passenger_id = SUBSTRING(
ger_id) - 1) where  ticket_no = %s""", (i[0],))
    sleep(1)

conn.commit()
```

После этого проверили наличие архивных сегментов в созданном каталоге.

```
[dba@centos-stream-8 archives]$ ls -la
total 16388
drwxrwxrwx. 2 postgres postgres      45 Mar  3 23:40 .
drwxrwxrwx. 9 dba         dba        4096 Mar  3 23:47 ..
-rw-----. 1 postgres postgres 16777216 Mar  3 23:40 archive00000000100000000000000017
[dba@centos-stream-8 archives]$
```

Выполнили горячую резервную копию используя pg_basebackup.

```
[dba@centos-stream-8 ~]$ mkdir basebackup
[dba@centos-stream-8 ~]$ pg_basebackup -D /home/dba/basebackup -h localhost -p 5433
[dba@centos-stream-8 ~]$ du -sh basebackup/
319M    basebackup/
[dba@centos-stream-8 ~]$
```

Сравнили объем полученной резервной копии с объемом каталога данных кластера.

```
[root@centos-stream-8 ~]# du -sh /var/lib/pgpro/std-11-sec/data
655M    /var/lib/pgpro/std-11-sec/data
[root@centos-stream-8 ~]#
```

Объем полученной резервной копии 319М меньше объема каталога данных кластера 655М.

4. Резервное копирование и восстановление с использованием pg_probackup

Установили pg_probackup

\$ sudo yum install pg-probackup-std-15

```
-----
Total                                                                 1.1 MB/s | 433 kB    00:00
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing      :                                1/1
  Installing     : pg-probackup-std-15-2.7.2-1.el8.x86_64 1/1
  Running scriptlet: pg-probackup-std-15-2.7.2-1.el8.x86_64 1/1
  Verifying      : pg-probackup-std-15-2.7.2-1.el8.x86_64 1/1

Installed:
  pg-probackup-std-15-2.7.2-1.el8.x86_64

Complete!
[root@centos-stream-8 ~]#
```

Проверили после установки:

\$ sudo -H postgres /opt/pgpro/std-15/bin/pg_probackup

```
[root@centos-stream-8 ~]# sudo -H postgres /opt/pgpro/std-15/bin/pg_probackup
ERROR: No subcommand specified. Please run with "help" argument to see possible subcommands.
[root@centos-stream-8 ~]#
```

Создали пользователя в postgres для работы в pg_probackup.

```
demo=# CREATE ROLE backup WITH LOGIN;
GRANT USAGE ON SCHEMA pg_catalog TO backup;
GRANT EXECUTE ON FUNCTION current_setting(text) TO backup;
GRANT EXECUTE ON FUNCTION pg_is_in_recovery() TO backup;
GRANT EXECUTE ON FUNCTION pg_start_backup(text, boolean, boolean) TO backup;
GRANT EXECUTE ON FUNCTION pg_stop_backup() TO backup;
GRANT EXECUTE ON FUNCTION pg_stop_backup(boolean, boolean) TO backup;
GRANT EXECUTE ON FUNCTION pg_create_restore_point(text) TO backup;
GRANT EXECUTE ON FUNCTION pg_switch_wal() TO backup;
GRANT EXECUTE ON FUNCTION txid_current() TO backup;
GRANT EXECUTE ON FUNCTION txid_current_snapshot() TO backup;
GRANT EXECUTE ON FUNCTION txid_snapshot_xmax(txid_snapshot) TO backup;
ALTER ROLE backup WITH REPLICATION;
CREATE ROLE
demo=# GRANT USAGE ON SCHEMA pg_catalog TO backup;
GRANT
demo=# GRANT EXECUTE ON FUNCTION current_setting(text) TO backup;
GRANT
demo=# GRANT EXECUTE ON FUNCTION pg_is_in_recovery() TO backup;
GRANT
demo=# GRANT EXECUTE ON FUNCTION pg_start_backup(text, boolean, boolean) TO backup;
ERROR:  function pg_start_backup(text, boolean, boolean) does not exist
demo=# GRANT EXECUTE ON FUNCTION pg_stop_backup() TO backup;
ERROR:  function pg_stop_backup() does not exist
demo=# GRANT EXECUTE ON FUNCTION pg_stop_backup(boolean, boolean) TO backup;
ERROR:  function pg_stop_backup(boolean, boolean) does not exist
demo=# GRANT EXECUTE ON FUNCTION pg_create_restore_point(text) TO backup;
GRANT
demo=# GRANT EXECUTE ON FUNCTION pg_switch_wal() TO backup;
GRANT
demo=# GRANT EXECUTE ON FUNCTION txid_current() TO backup;
GRANT
demo=# GRANT EXECUTE ON FUNCTION txid_current_snapshot() TO backup;
GRANT
demo=# GRANT EXECUTE ON FUNCTION txid_snapshot_xmax(txid_snapshot) TO backup;
GRANT
demo=# ALTER ROLE backup WITH REPLICATION;
ALTER ROLE
demo=#
```

Создали каталог копий.


```
[dba@centos-stream-8 ~]$ mkdir catalog
[dba@centos-stream-8 ~]$ sudo chown postgres:postgres catalog
[sudo] password for dba:
[dba@centos-stream-8 ~]$ sudo /opt/pgpro/std-15/bin/pg_probackup init -B /home/dba/catalog/
INFO: Backup catalog '/home/dba/catalog' successfully initialized
```

```
[dba@centos-stream-8 catalog]$ ls -la
total 4
drwxrwxr-x.  4 postgres postgres  32 Mar  4 00:04 .
drwxrwxrwx. 11 dba         dba    4096 Mar  4 00:02 ..
drwx-----.  2 root       root      6 Mar  4 00:04 backups
drwx-----.  2 root       root      6 Mar  4 00:04 wal
[dba@centos-stream-8 catalog]$
```

```
[dba@centos-stream-8 catalog]$ sudo chown postgres:postgres backups/
[dba@centos-stream-8 catalog]$ sudo chown postgres:postgres wal/
```

Выполнили полную резервную копию. Получили ее размер, сравнили с размером резервной копии полученной pg_basebackup.

```
[dba@centos-stream-8 catalog]$ sudo -H postgres /opt/pgpro/std-15/bin/pg_probackup add-instance -B /home/dba/catalog -D /var/lib/pgpro/std-15/data --instance bckp4
INFO: Instance 'bckp4' successfully initialized
```

```
[dba@centos-stream-8 catalog]$ sudo -H postgres /opt/pgpro/std-15/bin/pg_probackup backup -B /home/dba/catalog --instance bckp4 -b full --stream
INFO: Backup start, pg_probackup version: 2.7.2, instance: bckp4, backup ID: S9S7PY, backup mode: FULL, wal mode: STREAM, remote: false, compress-algorithm: none, compress-level: 1
INFO: This PostgreSQL instance was initialized with data block checksums. Data block corruption will be detected
WARNING: Current PostgreSQL role is superuser. It is not recommended to run pg_probackup under superuser.
INFO: Database backup start
INFO: wait for pg_backup_start()
INFO: PGDATA size: 303MB
INFO: Current Start LSN: 0/14000028, TLI: 1
INFO: Start transferring data files
INFO: Data files are transferred, time elapsed: 4s
INFO: wait for pg_stop_backup()
INFO: pg_stop_backup() successfully executed
INFO: stop_stream_lsn 0/14F40000 currentpos 0/14F40000
INFO: backup->stop_lsn 0/14000570
INFO: Getting the Recovery Time from WAL
INFO: Syncing backup files to disk
INFO: Backup files are synced, time elapsed: 2s
INFO: Validating backup S9S7PY
INFO: Backup S9S7PY data files are valid
INFO: Backup S9S7PY resident size: 319MB
INFO: Backup S9S7PY completed
[dba@centos-stream-8 catalog]$
```

```
[dba@centos-stream-8 ~]$ du -sh basebackup/
319M    basebackup/
[dba@centos-stream-8 ~]$
```

```
[dba@centos-stream-8 catalog]$ sudo du -sh backups/bckp4
323M    backups/bckp4
[dba@centos-stream-8 catalog]$
```

Заметили разницу в 4 МБ.

Произвели изменения в данных, аналогичные п.3.

```
[dba@centos-stream-8 ~]$ python3 script.py & python3 script.py &
[1] 4810
[2] 4811
```

Выполнили инкрементную копию. Получили ее размер.


```
[dba@centos-stream-8 ~]$ sudo -H postgres /opt/pgpro/std-15/bin/pg_probackup backup -B /home/dba/catalog --instance bckp4 -b delta --stream^C
[1]- Done python3 script.py
[2]+ Done python3 script.py
[dba@centos-stream-8 ~]$ ps
  PID TTY          TIME CMD
  4712 pts/1    00:00:00 bash
  4842 pts/1    00:00:00 ps
[dba@centos-stream-8 ~]$ sudo -H postgres /opt/pgpro/std-15/bin/pg_probackup backup -B /home/dba/catalog --instance bckp4 -b delta --stream
[sudo] password for dba:
INFO: Backup start, pg_probackup version: 2.7.2, instance: bckp4, backup ID: S9S8DC, backup mode: DELTA, wal mode: STREAM, remote: false, compress-algorithm: none, compress-level: 1
INFO: This PostgreSQL instance was initialized with data block checksums. Data block corruption will be detected
WARNING: Current PostgreSQL role is superuser. It is not recommended to run pg_probackup under superuser.
INFO: Database backup start
INFO: wait for pg_backup_start()
INFO: Parent backup: S9S7PY
INFO: PGDATA size: 303MB
INFO: Current Start LSN: 0/16000028, TLI: 1
INFO: Parent Start LSN: 0/14000028, TLI: 1
INFO: Start transferring data files
INFO: Data files are transferred, time elapsed: 2s
INFO: wait for pg_stop_backup()
INFO: pg_stop_backup() successfully executed
INFO: stop_stream_lsn 0/17000000 currentpos 0/17000000
INFO: backup->stop_lsn 0/160005A8
INFO: Getting the Recovery Time from WAL
INFO: Syncing backup files to disk
INFO: Backup files are synced, time elapsed: 0
INFO: Validating backup S9S8DC
INFO: Backup S9S8DC data files are valid
INFO: Backup S9S8DC resident size: 16MB
INFO: Backup S9S8DC completed
[dba@centos-stream-8 ~]$
```

```
[dba@centos-stream-8 catalog]$ sudo ls -la backups/bckp4/
total 4
drwx-----. 4 postgres postgres 59 Mar  4 00:24 .
drwx-----. 3 postgres postgres 19 Mar  4 00:08 ..
-rw-----. 1 postgres postgres 131 Mar  4 00:08 pg_probackup.conf
drwx-----. 3 postgres postgres 97 Mar  4 00:10 S9S7PY
drwx-----. 3 postgres postgres 97 Mar  4 00:24 S9S8DC
[dba@centos-stream-8 catalog]$
```

```
[dba@centos-stream-8 catalog]$ sudo du -sh backups/bckp4/S9S8DC
17M    backups/bckp4/S9S8DC
[dba@centos-stream-8 catalog]$
```

Повторно произвели изменения данных и выполнили инкрементную копию.

```
[dba@centos-stream-8 ~]$ sudo -H postgres /opt/pgpro/std-l5/bin/pg_probackup backup -B /home/dba/catalog --instance bckp4 -b delta --stream
INFO: Backup start, pg_probackup version: 2.7.2, instance: bckp4, backup ID: S9S8QL, backup mode: DELTA, wal mode: STREAM, remote: false, compress-algorithm: none, compress-level: 1
INFO: This PostgreSQL instance was initialized with data block checksums. Data block corruption will be detected
WARNING: Current PostgreSQL role is superuser. It is not recommended to run pg_probackup under superuser.
INFO: Database backup start
INFO: wait for pg_backup_start()
INFO: Parent backup: S9S8DC
INFO: PGDATA size: 303MB
INFO: Current Start LSN: 0/18000028, TLI: 1
INFO: Parent Start LSN: 0/16000028, TLI: 1
INFO: Start transferring data files
INFO: Data files are transferred, time elapsed: 1s
INFO: wait for pg_stop_backup()
INFO: pg_stop_backup() successfully executed
INFO: stop_stream_lsn 0/19000000 currentpos 0/19000000
INFO: backup->stop_lsn 0/18000570
INFO: Getting the Recovery Time from WAL
INFO: Syncing backup files to disk
INFO: Backup files are synced, time elapsed: 0
INFO: Validating backup S9S8QL
INFO: Backup S9S8QL data files are valid
INFO: Backup S9S8QL resident size: 16MB
INFO: Backup S9S8QL completed
[dba@centos-stream-8 ~]$
```

```
[dba@centos-stream-8 catalog]$ sudo ls -la backups/bckp4/
total 4
drwx-----. 5 postgres postgres 73 Mar  4 00:32 .
drwx-----. 3 postgres postgres 19 Mar  4 00:08 ..
-rw-----. 1 postgres postgres 131 Mar  4 00:08 pg_probackup.conf
drwx-----. 3 postgres postgres 97 Mar  4 00:10 S9S7PY
drwx-----. 3 postgres postgres 97 Mar  4 00:24 S9S8DC
drwx-----. 3 postgres postgres 97 Mar  4 00:32 S9S8QL
[dba@centos-stream-8 catalog]$
```

Склеили последнюю инкрементную копию с полной.

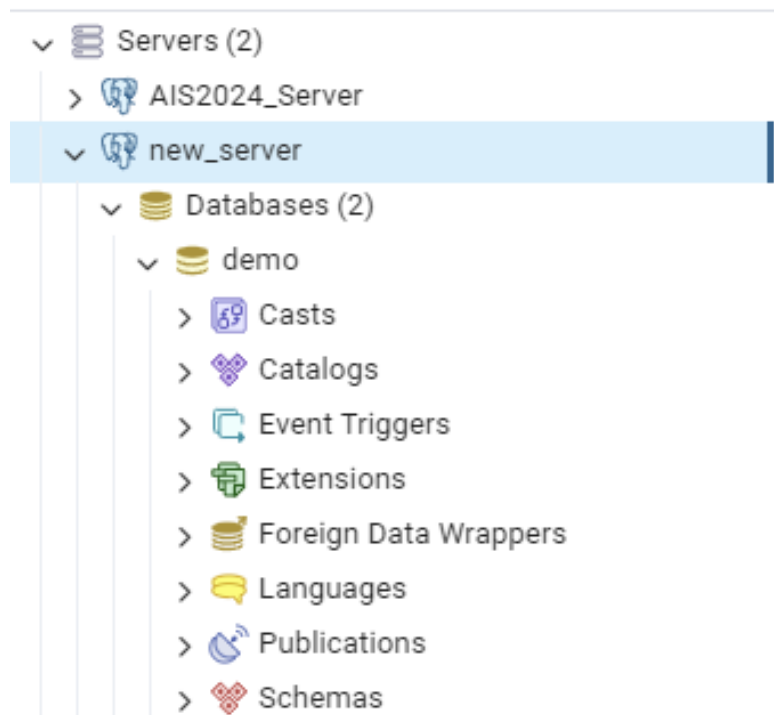
```
[dba@centos-stream-8 catalog]$ sudo -H postgres /opt/pgpro/std-l5/bin/pg_probackup merge -B /home/dba/catalog --instance bckp4 -i S9S8QL
INFO: Merge started
INFO: Merging backup S9S8QL with parent chain
INFO: Validate parent chain for backup S9S8QL
INFO: Validating backup S9S7PY
INFO: Backup S9S7PY data files are valid
INFO: Validating backup S9S8DC
INFO: Backup S9S8DC data files are valid
INFO: Validating backup S9S8QL
INFO: Backup S9S8QL data files are valid
INFO: Start merging backup files
INFO: Backup files are successfully merged, time elapsed: 3s
INFO: Backup to delete: S9S7PY
INFO: Backup to delete: S9S8DC
INFO: Delete: S9S8DC 2024-03-04 00:24:50+07
INFO: Backup to delete: S9S8QL
INFO: Delete: S9S8QL 2024-03-04 00:32:46+07
INFO: Rename merged full backup S9S7PY to S9S8QL
INFO: Validating backup S9S7PY
INFO: Backup S9S7PY data files are valid
INFO: Merge of backup S9S8QL completed
[dba@centos-stream-8 catalog]$
```

Восстановили на втором кластере полученную копию.

```
[postgres@centos-stream-8 std-11-sec]$ rm -rf data  
[postgres@centos-stream-8 std-11-sec]$
```

```
[dba@centos-stream-8 ~]$ sudo -H postgres /opt/pgpro/std-15/bin/pg_probackup r  
estore -D /var/lib/pgpro/std-11-sec/data -B /home/dba/catalog/ --instance bckp4  
INFO: Tablespace 16530 will be restored using old path "/home/dba/tab"  
INFO: Validating backup S9S8QL  
INFO: Backup S9S8QL data files are valid  
INFO: Backup S9S8QL WAL segments are valid  
INFO: Backup S9S8QL is valid.  
INFO: Restoring the database from backup at 2024-03-04 00:32:45+07  
INFO: Start restoring backup files. PGDATA size: 319MB  
INFO: Backup files are restored. Transferred bytes: 319MB, time elapsed: 2s  
INFO: Restore incremental ratio (less is better): 100% (319MB/319MB)  
INFO: Syncing restored files to disk  
INFO: Restored backup files are synced, time elapsed: 1s  
INFO: Restore of backup S9S8QL completed.  
[dba@centos-stream-8 ~]$
```

```
[root@centos-stream-8 dba]# su - postgres  
Last login: Mon Mar  4 00:36:09 +07 2024 on pts/1  
[postgres@centos-stream-8 ~]$ cd /var/lib/pgpro/std-11-sec/data  
[postgres@centos-stream-8 data]$ ls  
backup_label      pg_hba.conf       pg_snapshots      pg_wal  
base              pg_ident.conf     pg_stat           pg_xact  
current_logfiles  pg_logical        pg_stat_tmp       postgresql.auto.conf  
global           pg_multixact      pg_subtrans       postgresql.conf  
log              pg_notify        pg_tblspc  
pg_commit_ts     pg_replslot      pg_twophase  
pg_dynshmem      pg_serial        PG_VERSION  
[postgres@centos-stream-8 data]$
```



Убедимся, что данные действительно корректно восстановлены. Сравним:

1) Размеры баз данных:

```

[dba@centos-stream-8 ~]$ psql -d demo -p 5433
psql (15.5)
Type "help" for help.

demo=# SELECT pg_size_pretty(pg_database_size(current_database()));
pg_size_pretty
-----
281 MB
(1 row)

demo=# \q
[dba@centos-stream-8 ~]$ psql -d demo -p 5432
psql (15.5)
Type "help" for help.

demo=# SELECT pg_size_pretty(pg_database_size(current_database()));
pg_size_pretty
-----
281 MB
(1 row)

```

2) Списки таблиц:

```

[dba@centos-stream-8 ~]$ psql -d demo -p 5433
psql (15.5)
Type "help" for help.

demo=# SELECT table_name FROM information_schema.tables
demo=# WHERE table_schema NOT IN ('information_schema','pg_catalog');
table_name
-----
bookings
flights_v
ticket_flights
boarding_passes
aircrafts
flights
airports
seats
tickets
table1
table2
(11 rows)

demo=# \q
[dba@centos-stream-8 ~]$ psql -d demo -p 5432
psql (15.5)
Type "help" for help.

demo=# SELECT table_name FROM information_schema.tables
demo=# WHERE table_schema NOT IN ('information_schema','pg_catalog');
table_name
-----
bookings
flights_v
ticket_flights
boarding_passes
aircrafts
flights
airports
seats
tickets
table1
table2
(11 rows)

```

3) Количество записей в определенной таблице:

```
[dba@centos-stream-8 ~]$ psql -d demo -p 5433
psql (15.5)
Type "help" for help.

demo=# SELECT count(*) FROM bookings.tickets;
 count
-----
 366733
(1 row)

demo=# \q
[dba@centos-stream-8 ~]$ psql -d demo -p 5432
psql (15.5)
Type "help" for help.

demo=# SELECT count(*) FROM bookings.tickets;
 count
-----
 366733
(1 row)
```

Наблюдаем совпадение во всех тестах. Восстановление корректно.