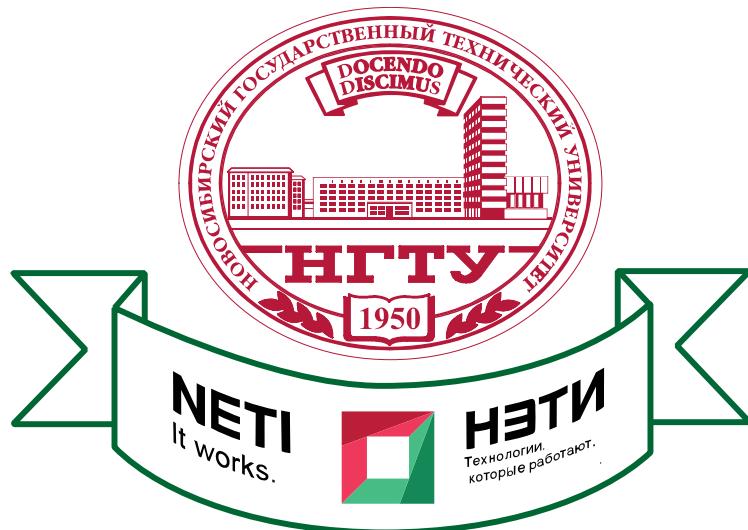


Министерство науки и высшего образования
Российской Федерации

Федеральное государственное бюджетное
образовательное учреждение высшего образования

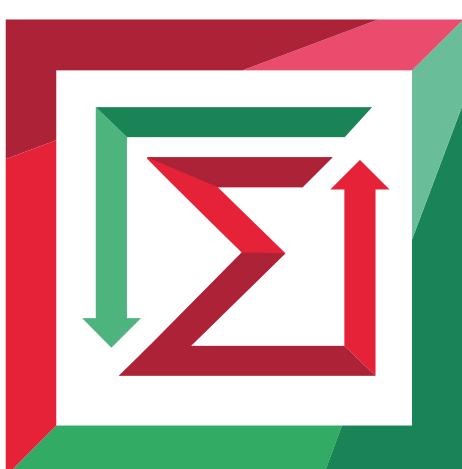
«НОВОСИБИРСКИЙ ГОСУДАРСТВЕННЫЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ»



Кафедра теоретической и прикладной информатики

Лабораторная работа № 4

по дисциплине «Администрирование информационных систем»



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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)  
                                         # (change requires restart)  
                                         # begin with 0 to use octal notation  
                                         # (change requires restart)  
                                         # (change requires restart)
```

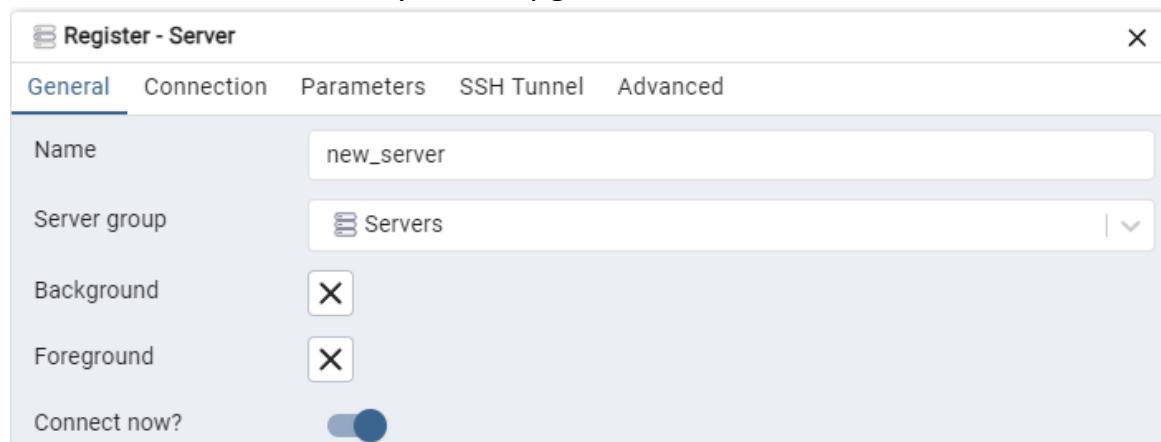
Запустили службу /opt/pgpro/std-15/bin/pg_ctl -D /var/lib/pgpro/std-11-sec/data -l logfile start

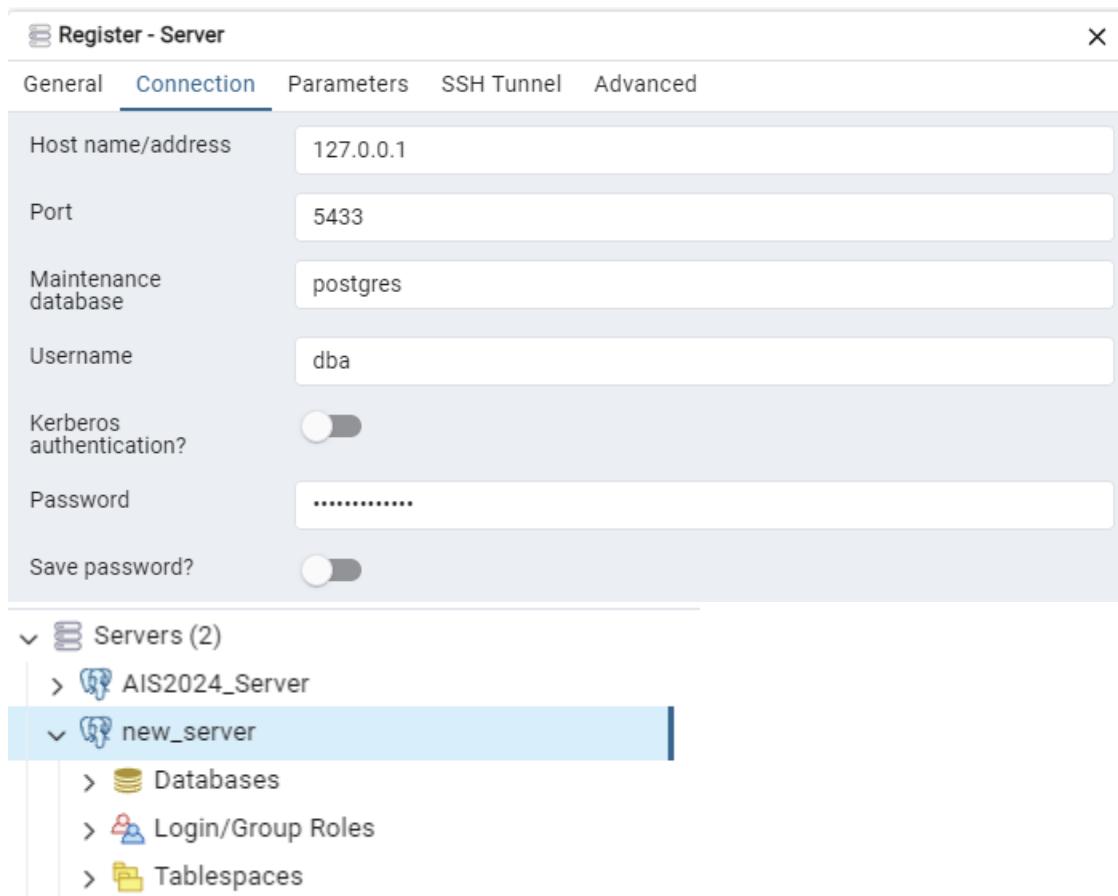
```
[postgres@centos-stream-8 ~]$ /opt/pgpro/std-15/bin/pg_ctl -D /var/lib/pgpro/std-11-sec/data -l logfile start  
waiting for server to start.... done  
server started  
[postgres@centos-stream-8 ~]$
```

Создали суперпользователя:

```
[dba@centos-stream-8 ~]$ sudo -Hiu 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:





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 ~]$ 
```

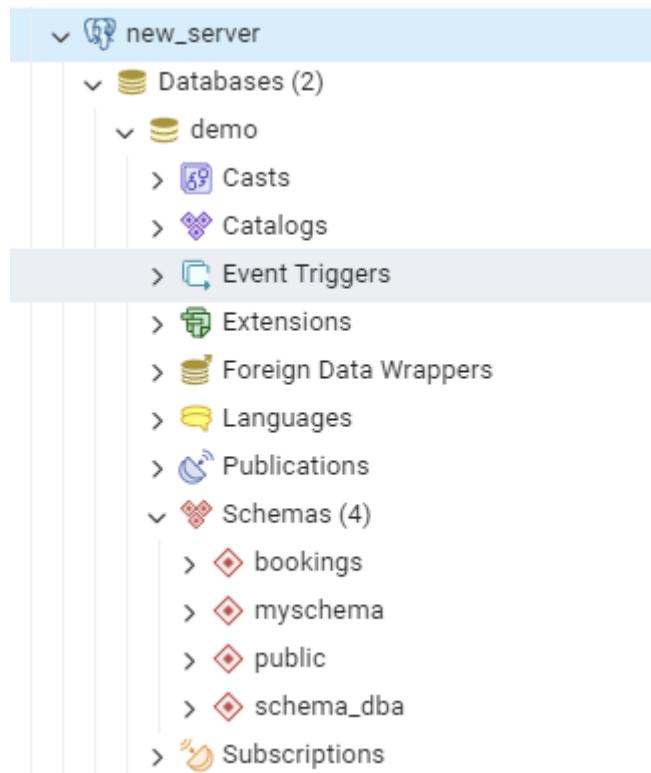
```
[dba@centos-stream-8 ~]$ psql -p 5433 -d postgres
psql (15.5)
Type "help" for help.

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-11-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 archive00000001000000000000000017
[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      :
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                         1/1

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

Проверили после установки:

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

```
[root@centos-stream-8 ~]# sudo -Hiu 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 -Hiu 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 -Hiu 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 -Hiu 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 -Hiu 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 -Hiu postgres /opt/pgpro/std-15/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: S9S8SQL, 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]$
```

Склейли последнюю инкрементную копию с полной.

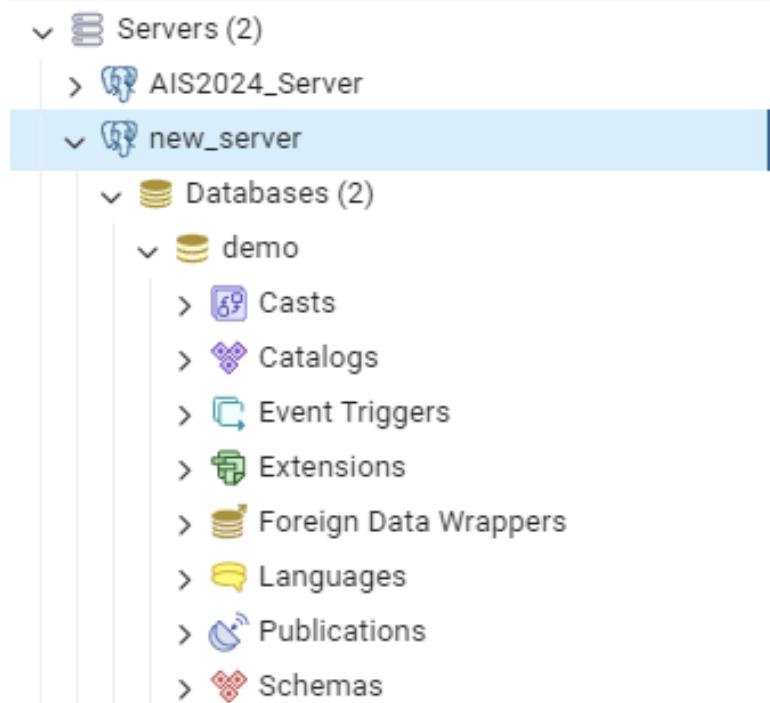
```
[dba@centos-stream-8 catalog]$ sudo -Hiu postgres /opt/pgpro/std-15/bin/pg_probackup merge -B /home/dba/catalog --instance bckp4 -i S9S8QL
INFO: Merge started
INFO: Merging backup S9S8QL with parent chain
INFO: Validate parent chain for backup S9S8QL
INFO: Validating backup S9S7PY
INFO: Backup S9S7PY 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]$ [REDACTED]

[dba@centos-stream-8 ~]$ sudo -Hiu postgres /opt/pgpro/std-15/bin/pg_probackup restore -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 ~]$ [REDACTED]

[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]$ [REDACTED]
```



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.