PostgreSQL mentés és helyreállítás

Előkészítő műveletek

A mentés és helyreállítás gyakorlásához szükség van egy telepített és inicializált PostgreSQL adatbázis példányra. Mentések a pg01 (192.168.100.71) gépről készülnek. Helyreállításhoz a pg03 (192.168.100.73) gépet használjuk. A hozzáférések `trust` típusú hozzáférések, a gépek jelszó nélkül érik el egymást.

Teljes mentés és helyreállítás

Elsődleges gép beállítása

Telepített komponensek ellenőrzése

```
[root@pg01 ~]# rpm -qa | grep postgresql
postgresql18-libs-18.3-1PGDG.rhel9.7.x86_64
postgresql18-18.3-1PGDG.rhel9.7.x86_64
postgresql18-server-18.3-1PGDG.rhel9.7.x86_64
```

Adatbázis inicializálás

Az inicializálás során megadjuk az adatbázis alap kódkészletét és a WAL szegmensek méretét. Ezek a paraméterek utólag nem módosíthatók.

```
[postgres@pg01 ~]$ /usr/pgsql-18/bin/initdb --encoding=UTF8 --
locale=en_US.UTF-8 --wal-segsize=32 -D /var/lib/pgsql/18/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 locale "en_US.UTF-8".
The default text search configuration will be set to "english".

Data page checksums are enabled.

fixing permissions on existing directory /var/lib/pgsql/18/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 ... Europe/Budapest
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:

    /usr/pgsql-18/bin/pg_ctl -D /var/lib/pgsql/18/data -l logfile start
```

Konfiguráció módosítása

```
[postgres@pg01 ~]$ echo $PGDATA
/var/lib/pgsql/18/data

[postgres@pg01 ~]$ cp -a $PGDATA/pg_hba.conf $PGDATA/pg_hba.conf.orig

[postgres@pg01 ~]$ cp -a $PGDATA/postgresql.conf
$PGDATA/postgresql.conf.orig

[postgres@pg01 ~]$ cat > $PGDATA/pg_hba.conf <<'EOF'
# TYPE DATABASE USER ADDRESS METHOD
local all all trust
host all all 192.168.100.73/32 trust
host all all 127.0.0.1/32 trust
host all all ::1/128 trust

local replication all trust
host replication all 192.168.100.73/32 trust
host replication all 127.0.0.1/32 trust
host replication all ::1/128 trust
EOF

[postgres@pg01 ~]$ cat > $PGDATA/postgresql.conf <<'EOF'
listen_addresses = '*'
port = 5432
max_connections = 1000
shared_buffers = 128MB
dynamic_shared_memory_type = posix
max_wal_size = 2GB
min_wal_size = 160MB
log_destination = 'stderr'
logging_collector = on
log_directory = 'log'
log_filename = 'postgresql-%a.log'
log_rotation_age = 1d
log_rotation_size = 0
log_truncate_on_rotation = on
```

```
log_line_prefix = '%m [%p] '
log_timezone = 'Europe/Budapest'
autovacuum_worker_slots = 16
datestyle = 'iso, mdy'
timezone = 'Europe/Budapest'
lc_messages = 'en_US.UTF-8'
lc_monetary = 'en_US.UTF-8'
lc_numeric = 'en_US.UTF-8'
lc_time = 'en_US.UTF-8'
default_text_search_config = 'pg_catalog.english'
EOF
```

Ellenőrzés

```
[root@pg01 ~]# systemctl start postgresql-18

[root@pg01 ~]# psql -U postgres -l
                                                    List of databases
   Name    |  Owner   | Encoding | Locale Provider |   Collate   |    Ctype
|
 Locale | ICU Rules |   Access privileges
-----------+----------+----------+-----------------+-------------+----------
---+
--------+-----------+-----------------------
 postgres  | postgres | UTF8     | libc            | en_US.UTF-8 |
en_US.UTF-8 |
        |           |
 template0 | postgres | UTF8     | libc            | en_US.UTF-8 |
en_US.UTF-8 |
        |           | =c/postgres          +
           |          |          |                 |             |
|
        |           | postgres=CTc/postgres
 template1 | postgres | UTF8     | libc            | en_US.UTF-8 |
en_US.UTF-8 |
        |           | =c/postgres          +
           |          |          |                 |             |
|
        |           | postgres=CTc/postgres
(3 rows)
```

Amennyiben tűzfal védi a gépet, engedélyezni kell a PostgreSQL forgalmat a mentő gépről.

Mentő gép beállítása

Telepített komponensek ellenőrzése

```
[root@pg03 ~]# rpm -qa | grep postgresql
postgresql18-libs-18.3-1PGDG.rhel9.7.x86_64
postgresql18-18.3-1PGDG.rhel9.7.x86_64
postgresql18-server-18.3-1PGDG.rhel9.7.x86_64
```

Alap mentés készítése

Az $PGDATA adatbázis könyvtárnak üresnek kell lennie. Ha nem üres, akkor az adatbázis leállítása után töröljük a tartalmát.

```
[root@pg03 ~]# systemctl stop postgresql-18

[root@pg03 ~]# rm -rf /var/lib/pgsql/18/data/*
```

Kapcsolat tesztelése

```
[postgres@pg03 ~]$ /usr/pgsql-18/bin/psql -h pg01 -U postgres -c 'SELECT
now()'
              now
-------------------------------
 2026-04-29 09:35:25.404765+02
(1 row)
```

Alap mentés

Mentéshez a pg_basebackup programot használjuk.

```
[postgres@pg03 ~]$ /usr/pgsql-18/bin/pg_basebackup --host=pg01 --
username=postgres --format=p --wal-method=stream --checkpoint=fast --
progress --pgdata=/var/lib/pgsql/18/backups/backup-full-$(date
+'%Y%m%dT%H%M%S')
23708/23708 kB (100%), 1/1 tablespace
```

Ugyanez a mentés rövid kapcsolókkal

```
[postgres@pg03 ~]$ /usr/pgsql-18/bin/pg_basebackup -h pg01 -U postgres -F p
-X s -c fast -P -D /var/lib/pgsql/18/backups/backup-full-$(date
+'%Y%m%dT%H%M%S')
23709/23709 kB (100%), 1/1 tablespace
```

Mentés helyreállítása

A mentés helyreállításához a mentés könyvtár tartalmát át kell másolni a $PGDATA könvtárba.

```
[postgres@pg03 ~]$ cp -a /var/lib/pgsql/18/backups/backup-
```

```
full-20260429T094626/* /var/lib/pgsql/18/data/
```

El kell indítani a `postgresql` szolgáltatást.

```
[root@pg03 ~]# systemctl restart postgresql-18
```

Ellenőrizni kell az adatbázis állapotát

```
[root@pg03 ~]# psql -U postgres -l
                                                    List of databases
   Name    |  Owner   | Encoding | Locale Provider |   Collate   |    Ctype
|
 Locale | ICU Rules |   Access privileges
-----------+----------+----------+-----------------+-------------+----------
---+
--------+-----------+-----------------------
 postgres  | postgres | UTF8     | libc            | en_US.UTF-8 |
en_US.UTF-8 |
        |           |
 template0 | postgres | UTF8     | libc            | en_US.UTF-8 |
en_US.UTF-8 |
        |           | =c/postgres          +
           |          |          |                 |            |
|
        |           | postgres=CTc/postgres
 template1 | postgres | UTF8     | libc            | en_US.UTF-8 |
en_US.UTF-8 |
        |           | =c/postgres          +
           |          |          |                 |            |
|
        |           | postgres=CTc/postgres
(3 rows)

[root@pg03 ~]# cat /var/lib/pgsql/18/data/log/postgresql-Wed.log
2026-04-29 09:55:20.315 CEST [432] LOG:  starting PostgreSQL 18.3 on x86_64-
pc-linux-gnu, compiled by gcc (GCC) 11.5.0 20240719 (Red Hat 11.5.0-11), 64-
bit
2026-04-29 09:55:20.315 CEST [432] LOG:  listening on IPv4 address
"0.0.0.0", port 5432
2026-04-29 09:55:20.315 CEST [432] LOG:  listening on IPv6 address "::",
port 5432
2026-04-29 09:55:20.316 CEST [432] LOG:  listening on Unix socket
"/run/postgresql/.s.PGSQL.5432"
2026-04-29 09:55:20.317 CEST [432] LOG:  listening on Unix socket
"/tmp/.s.PGSQL.5432"
2026-04-29 09:55:20.320 CEST [439] LOG:  database system was interrupted;
last known up at 2026-04-29 09:46:26 CEST
2026-04-29 09:55:20.395 CEST [439] LOG:  starting backup recovery with redo
LSN 0/A000028, checkpoint LSN 0/A000080, on timeline ID 1
2026-04-29 09:55:20.398 CEST [439] LOG:  redo starts at 0/A000028
2026-04-29 09:55:20.398 CEST [439] LOG:  completed backup recovery with redo
```

```
LSN 0/A000028 and end LSN 0/A000120
2026-04-29 09:55:20.398 CEST [439] LOG:  consistent recovery state reached
at 0/A000120
2026-04-29 09:55:20.398 CEST [439] LOG:  redo done at 0/A000120 system
usage: CPU: user: 0.00 s, system: 0.00 s, elapsed: 0.00 s
2026-04-29 09:55:20.409 CEST [437] LOG:  checkpoint starting: end-of-
recovery immediate wait
2026-04-29 09:55:20.416 CEST [437] LOG:  checkpoint complete: wrote 0
buffers (0.0%), wrote 3 SLRU buffers; 0 WAL file(s) added, 0 removed, 2
recycled; write=0.002 s, sync=0.001 s, total=0.008 s; sync files=2,
longest=0.001 s, average=0.001 s; distance=16384 kB, estimate=16384 kB;
lsn=0/B000028, redo lsn=0/B000028
2026-04-29 09:55:20.418 CEST [432] LOG:  database system is ready to accept
connections
```

Archív WAL mentés és helyreállítás

Elsődleges gép beállítása

Az elsődleges gépen a korábbi beállítások mellett meg kell adnunk az archiválási utasításokat. Ezek a `$PGDATA/postgresql.conf` fájl módosításával vagy SQL utasítások segítségével valósítható meg. Az alábbi módszerek közül, csak az egyiket kell alkalmazni!

Közvetlen fájl szerkesztés

```
[postgres@pg01 ~]$ echo "archive_mode = 'on'" >> $PGDATA/postgresql.conf

[postgres@pg01 ~]$ echo "archive_command = 'test ! -f
/var/lib/pgsql/18/backups/%f && cp %p /var/lib/pgsql/18/backups/%f'" >>
$PGDATA/postgresql.conf

[postgres@pg01 ~]$ tail -n 2 $PGDATA/postgresql.conf
archive_mode = 'on'
archive_command = 'test ! -f /var/lib/pgsql/18/backups/%f && cp %p
/var/lib/pgsql/18/backups/%f'
```

SQL utasítások használata

```
[postgres@pg01 ~]$ cat $PGDATA/postgresql.auto.conf
# Do not edit this file manually!
# It will be overwritten by the ALTER SYSTEM command.

[postgres@pg01 ~]$ psql -c "ALTER SYSTEM SET archive_mode = 'on'"
ALTER SYSTEM

[postgres@pg01 ~]$ psql -c "ALTER SYSTEM SET archive_command = 'test ! -f
```

```
/var/lib/pgsql/18/backups/%f && cp %p /var/lib/pgsql/18/backups/%f'"
ALTER SYSTEM

[postgres@pg01 ~]$ cat $PGDATA/postgresql.auto.conf
# Do not edit this file manually!
# It will be overwritten by the ALTER SYSTEM command.
archive_mode = 'on'
archive_command = 'test ! -f /var/lib/pgsql/18/backups/%f && cp %p
/var/lib/pgsql/18/backups/%f'
```

A módosítások után újra kell indítani a `postgresql` szolgáltatást.

```
[root@pg01 ~]# systemctl restart postgresql-18
```

Ellenőrizni kell a beállítások érvényességét.

```
[postgres@pg01 ~]$ psql
psql (18.3)
Type "help" for help.

postgres=# SHOW archive_mode;
 archive_mode
--------------
 on
(1 row)

postgres=# SHOW archive_command;
                                archive_command
------------------------------------------------------------------------------
--
 test ! -f /var/lib/pgsql/18/backups/%f && cp %p
/var/lib/pgsql/18/backups/%f
(1 row)

postgres=# exit
```

Teszt adatok létrehozása

```
[postgres@pg01 ~]$ createuser test

[postgres@pg01 ~]$ createdb -O test test

[postgres@pg01 ~]$ psql -U test -d test -c 'CREATE TABLE test (id INT, data
TEXT)'
CREATE TABLE

[postgres@pg01 ~]$ psql -U test -d test -c "INSERT INTO test (id, data)
VALUES (1, 'backup előtt')"
INSERT 0 1
```

```
[postgres@pg01 ~]$ psql -U test -d test -c "SELECT now()"
              now
-------------------------------
 2026-04-29 13:22:50.856461+02
(1 row)
```

A mentő gépen készíteni kell egy alap mentést

```
[postgres@pg03 ~]$ /usr/pgsql-18/bin/pg_basebackup -h pg01 -U postgres -F p
-X s -c fast -P -D /var/lib/pgsql/18/backups/backup-full-$(date +'%Y%m%d')
31410/31410 kB (100%), 1/1 tablespace
```

Az elsődleges gépen adjunk hozzá további adatokat a táblához.

```
[postgres@pg01 ~]$ psql -U test -d test -c "INSERT INTO test (id, data)
VALUES (2, 'backup után')"
INSERT 0 1

[postgres@pg01 ~]$ psql -U test -d test -c "SELECT now()"
              now
-------------------------------
 2026-04-29 13:24:15.571397+02
(1 row)

[postgres@pg01 ~]$ psql -U test -d test -c "INSERT INTO test (id, data)
VALUES (3, 'törlés előtt')"
INSERT 0 1

[postgres@pg01 ~]$ psql -U test -d test -c "SELECT now()"
              now
-------------------------------
 2026-04-29 13:24:36.372224+02
(1 row)
```

Újabb adat kerül a táblába, mielőtt véletlen tábla törlés történik.

```
[postgres@pg01 ~]$ psql -U test -d test -c "INSERT INTO test (id, data)
VALUES (3, 'törlés előtt')"
INSERT 0 1

[postgres@pg01 ~]$ psql -U test -d test -c "SELECT now()"
              now
-------------------------------
 2026-04-29 13:24:36.372224+02
(1 row)

[postgres@pg01 ~]$ psql -U test -d test -c "DROP TABLE test"
DROP TABLE

[postgres@pg01 ~]$ psql -U test -d test -c "SELECT now()"
              now
```

```
-------------------------------
 2026-04-29 13:25:17.096924+02
(1 row)

[postgres@pg01 ~]$ psql -c "SELECT * FROM test"
ERROR:  relation "test" does not exist
LINE 1: SELECT * FROM test
                      ^
```

A tábla törlésre került, az adatok elvesztek. Minden módosítás a WAL állományokban található, amelyeket a mentő gépre kell továbbítani a helyreállításhoz. Ehhez az `rsync` utasítást használjuk.

Mentő gép előkészítése

A mentő gépen le kell állítani a `postgresql` szolgáltatást.

```
[root@pg03 ~]# systemctl stop postgresql-18
```

Utasítani kell az elsődleges gépet, hogy archiválja a WAL állományokat, amelyekben a változások vannak.

```
[root@pg03 ~]# psql -h pg01 -U postgres -d postgres -c "SELECT
pg_switch_wal()"
 pg_switch_wal
---------------
 0/603D708
(1 row)
```

Adatok helyreállítása

Előkészítő műveletek

WAL állományok szinkronizálása

```
[root@pg03 ~]# rsync -a root@pg01:/var/lib/pgsql/18/backups/
/var/lib/pgsql/18/backups/
root@pg01's password:
```

Alap mentés helyreállítása

```
[root@pg03 ~]# rm -rf /var/lib/pgsql/18/data/*

[root@pg03 ~]# cp -a /var/lib/pgsql/18/backups/backup-full-20260429/*
/var/lib/pgsql/18/data/
```

Törölni kell az az archiválás beállításait a `$PGDATA/postgresql.conf` vagy a `$PGDATA/postgresql.auto.conf` fájlokban. Ezen kívül érdemes a felesleges állományokat törölni.

```
[root@pg03 ~]# sed -i '/archive_mode =/d'
/var/lib/pgsql/18/data/postgresql.conf

[root@pg03 ~]# sed -i '/archive_mode =/d'
/var/lib/pgsql/18/data/postgresql.auto.conf

[root@pg03 ~]# sed -i '/archive_command =/d'
/var/lib/pgsql/18/data/postgresql.conf

[root@pg03 ~]# sed -i '/archive_command =/d'
/var/lib/pgsql/18/data/postgresql.auto.conf

[root@pg03 ~]# rm -rf /var/lib/pgsql/18/data/log/*
```

Visszaállás megadott időpontra

Hozzá kell adni a `$PGDATA/postgresql.conf` VAGY a `$PGDATA/postgresql.auto.conf` fájlhoz az helyreállításhoz szükséges adatokat és létre kell hozni a `$PGDATA/recovery.signal` állományt. A példában a tábla törlését megelőző pillanatot adtam meg.

```
[root@pg03 ~]# cat /var/lib/pgsql/18/data/postgresql.auto.conf
# Do not edit this file manually!
# It will be overwritten by the ALTER SYSTEM command.

[root@pg03 ~]# export RECOVERY_TIMESTAMP='2026-04-29 13:24:36.372224+02'

[root@pg03 ~]# cat >> /var/lib/pgsql/18/data/postgresql.auto.conf <<EOF
restore_command = 'cp /var/lib/pgsql/18/backups/%f %p'
recovery_target_time = '$RECOVERY_TIMESTAMP'
recovery_target_action = 'promote'
EOF

[root@pg03 ~]# cat /var/lib/pgsql/18/data/postgresql.auto.conf
# Do not edit this file manually!
# It will be overwritten by the ALTER SYSTEM command.
restore_command = 'cp /var/lib/pgsql/18/backups/%f %p'
recovery_target_time = '2026-04-29 13:24:36.372224+02'
recovery_target_action = 'promote'

[root@pg03 ~]# touch /var/lib/pgsql/18/data/recovery.signal

[root@pg03 ~]# chown -R postgres:postgres /var/lib/pgsql/18/data/
```

Adatbázis kezelő indítása

```
[root@pg03 ~]# systemctl restart postgresql-18

[root@pg03 ~]# psql -U test -d test -c "SELECT * FROM test"
 id |     data
```

```
----+--------------
  1 | backup előtt
  2 | backup után
  3 | törlés előtt
(3 rows)

[root@pg03 ~]# cat /var/lib/pgsql/18/data/log/postgresql-Wed.log
2026-04-29 13:28:29.087 CEST [1687] LOG:  starting PostgreSQL 18.3 on
x86_64-pc-linux-gnu, compiled by gcc (GCC) 11.5.0 20240719 (Red Hat
11.5.0-11), 64-bit
2026-04-29 13:28:29.087 CEST [1687] LOG:  listening on IPv4 address
"0.0.0.0", port 5432
2026-04-29 13:28:29.087 CEST [1687] LOG:  listening on IPv6 address "::",
port 5432
2026-04-29 13:28:29.088 CEST [1687] LOG:  listening on Unix socket
"/run/postgresql/.s.PGSQL.5432"
2026-04-29 13:28:29.089 CEST [1687] LOG:  listening on Unix socket
"/tmp/.s.PGSQL.5432"
2026-04-29 13:28:29.092 CEST [1694] LOG:  database system was interrupted;
last known up at 2026-04-29 13:23:46 CEST
cp: cannot stat '/var/lib/pgsql/18/backups/00000002.history': No such file
or directory
2026-04-29 13:28:29.193 CEST [1694] LOG:  starting backup recovery with redo
LSN 0/4000028, checkpoint LSN 0/4000080, on timeline ID 1
2026-04-29 13:28:29.205 CEST [1694] LOG:  restored log file
"000000010000000000000002" from archive
2026-04-29 13:28:29.219 CEST [1694] LOG:  starting point-in-time recovery to
2026-04-29 13:24:36.372224+02
2026-04-29 13:28:29.221 CEST [1694] LOG:  redo starts at 0/4000028
2026-04-29 13:28:29.232 CEST [1694] LOG:  restored log file
"000000010000000000000003" from archive
2026-04-29 13:28:29.243 CEST [1694] LOG:  completed backup recovery with
redo LSN 0/4000028 and end LSN 0/4000158
2026-04-29 13:28:29.243 CEST [1694] LOG:  consistent recovery state reached
at 0/4000158
2026-04-29 13:28:29.243 CEST [1687] LOG:  database system is ready to accept
read-only connections
cp: cannot stat '/var/lib/pgsql/18/backups/000000010000000000000004': No
such file or directory
2026-04-29 13:28:29.247 CEST [1694] LOG:  recovery stopping before commit of
transaction 769, time 2026-04-29 13:25:09.539651+02
2026-04-29 13:28:29.247 CEST [1694] LOG:  redo done at 0/603D270 system
usage: CPU: user: 0.00 s, system: 0.00 s, elapsed: 0.02 s
2026-04-29 13:28:29.247 CEST [1694] LOG:  last completed transaction was at
log time 2026-04-29 13:24:26.07963+02
2026-04-29 13:28:29.257 CEST [1694] LOG:  restored log file
"000000010000000000000003" from archive
cp: cannot stat '/var/lib/pgsql/18/backups/00000002.history': No such file
or directory
2026-04-29 13:28:29.273 CEST [1694] LOG:  selected new timeline ID: 2
cp: cannot stat '/var/lib/pgsql/18/backups/00000001.history': No such file
```

```
or directory
2026-04-29 13:28:29.304 CEST [1694] LOG:  archive recovery complete
2026-04-29 13:28:29.305 CEST [1692] LOG:  checkpoint starting: end-of-
recovery immediate wait
2026-04-29 13:28:29.312 CEST [1692] LOG:  checkpoint complete: wrote 39
buffers (0.2%), wrote 3 SLRU buffers; 0 WAL file(s) added, 0 removed, 1
recycled; write=0.002 s, sync=0.002 s, total=0.009 s; sync files=14,
longest=0.001 s, average=0.001 s; distance=33012 kB, estimate=33012 kB;
lsn=0/603D270, redo lsn=0/603D270
2026-04-29 13:28:29.315 CEST [1687] LOG:  database system is ready to accept
connections
2026-04-29 13:33:29.338 CEST [1692] LOG:  checkpoint starting: time
2026-04-29 13:33:29.757 CEST [1692] LOG:  checkpoint complete: wrote 4
buffers (0.0%), wrote 0 SLRU buffers; 0 WAL file(s) added, 0 removed, 0
recycled; write=0.403 s, sync=0.011 s, total=0.419 s; sync files=4,
longest=0.011 s, average=0.003 s; distance=17 kB, estimate=29713 kB;
lsn=0/6041970, redo lsn=0/6041918
```

Tipikus helyzetek

- Az archiválás nem tartalmazza a szükséges WAL-t ezért nem tudunk visszaállni egy megadott időpontra. Ilyenkor a forrás oldalon futtatni kell a `psql -c "SELECT pg_switch_wal()"` utasítást és újra áttölteni a helyreállító gépre.
- Ha nem hozzuk létre a '' recovery.signal '' állományt, akkor a pg_basebackup állaporta tér vissza és nem foglalkozik a recovery_target_time értékével.
- A recovery_target_action meghatározza, milyen állapotba kerüljön a postgresql a recovery során.

Ellenőrzés

Ha nincsenek pontos időadatok, akkor a WAL fájlok ellenőrzése lehet a megoldás. Ilyenkor nem a '' recovery_target_time = '' paramétert, hanem a '' recovery_target_lsn = '' értékét adjuk meg.

A `pg_waldump` program segít az LSN értékének meghatározásában.

```
[root@pg03 ~]# /usr/pgsql-18/bin/pg_waldump
/var/lib/pgsql/18/backups/000000010000000000000003
rmgr: XLOG        len (rec/tot):     49/  1413, tx:          0, lsn:
0/06000028, prev 0/04000158, desc: FPI_FOR_HINT , blkref #0: rel
1663/16385/1259 blk 0 FPW
rmgr: Heap        len (rec/tot):     54/   182, tx:        767, lsn:
0/060005B0, prev 0/06000028, desc: INSERT off: 2, flags: 0x00, blkref #0:
rel 1663/16385/16386 blk 0 FPW
rmgr: Transaction len (rec/tot):     34/    34, tx:        767, lsn:
0/06000668, prev 0/060005B0, desc: COMMIT 2026-04-29 13:24:10.043118 CEST
rmgr: Standby     len (rec/tot):     50/    50, tx:          0, lsn:
0/06000690, prev 0/06000668, desc: RUNNING_XACTS nextXid 768
latestCompletedXid 767 oldestRunningXid 768
rmgr: Heap        len (rec/tot):     75/    75, tx:        768, lsn:
0/060006C8, prev 0/06000690, desc: INSERT off: 3, flags: 0x00, blkref #0:
```

```
rel 1663/16385/16386 blk 0
rmgr: Transaction len (rec/tot):     34/    34, tx:        768, lsn:
0/06000718, prev 0/060006C8, desc: COMMIT 2026-04-29 13:24:26.079630 CEST
rmgr: Heap2       len (rec/tot):     57/   341, tx:          0, lsn:
0/06000740, prev 0/06000718, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 756, isCatalogRel: F, blkref #0: rel 1663/1/2619
blk 0 FPW
rmgr: XLOG        len (rec/tot):     49/  6637, tx:          0, lsn:
0/06000898, prev 0/06000740, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 1 FPW
rmgr: Heap2       len (rec/tot):     90/    90, tx:          0, lsn:
0/060022A0, prev 0/06000898, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 757, isCatalogRel: F, nplans: 2, nredirected: 1,
ndead: 0, nunused: 0, plans: [{ xmax: 0, infomask: 11009, infomask2: 32799,
ntuples: 1, offsets: [30] }, { xmax: 0, infomask: 11011, infomask2: 32799,
ntuples: 1, offsets: [31] }], redirected: [27->31], blkref #0: rel
1663/1/2619 blk 1
rmgr: Heap2       len (rec/tot):     57/  2293, tx:          0, lsn:
0/06002300, prev 0/060022A0, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 757, isCatalogRel: F, blkref #0: rel 1663/1/2619
blk 2 FPW
rmgr: XLOG        len (rec/tot):     49/  8217, tx:          0, lsn:
0/06002BF8, prev 0/06002300, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 3 FPW
rmgr: Heap2       len (rec/tot):     56/    56, tx:          0, lsn:
0/06004C30, prev 0/06002BF8, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 758, isCatalogRel: F, nplans: 0, nredirected: 0,
ndead: 1, nunused: 0, dead: [16], blkref #0: rel 1663/1/2619 blk 3
rmgr: XLOG        len (rec/tot):     49/  8193, tx:          0, lsn:
0/06004C68, prev 0/06004C30, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 5 FPW
rmgr: Heap2       len (rec/tot):    110/   110, tx:          0, lsn:
0/06006C88, prev 0/06004C68, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 758, isCatalogRel: F, nplans: 0, nredirected: 0,
ndead: 28, nunused: 0, dead: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28], blkref #0: rel
1663/1/2619 blk 5
rmgr: XLOG        len (rec/tot):     49/  4425, tx:          0, lsn:
0/06006CF8, prev 0/06006C88, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 6 FPW
rmgr: Heap2       len (rec/tot):    106/   106, tx:          0, lsn:
0/06007E48, prev 0/06006CF8, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 760, isCatalogRel: F, nplans: 3, nredirected: 1,
ndead: 0, nunused: 0, plans: [{ xmax: 0, infomask: 11009, infomask2: 32799,
ntuples: 1, offsets: [19] }, { xmax: 0, infomask: 11011, infomask2: 32799,
ntuples: 2, offsets: [20, 22] }, { xmax: 0, infomask: 11015, infomask2:
32799, ntuples: 1, offsets: [21] }], redirected: [18->22], blkref #0: rel
1663/1/2619 blk 6
rmgr: XLOG        len (rec/tot):     49/  8225, tx:          0, lsn:
0/06007EB8, prev 0/06007E48, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 7 FPW
```

```
rmgr: Heap2       len (rec/tot):    128/   128, tx:          0, lsn:
0/06009EF8, prev 0/06007EB8, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 760, isCatalogRel: F, nplans: 1, nredirected: 1,
ndead: 25, nunused: 0, plans: [{ xmax: 0, infomask: 11009, infomask2: 32799,
ntuples: 1, offsets: [28] }], redirected: [21->28], dead: [1, 2, 3, 4, 5, 6,
7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 26],
blkref #0: rel 1663/1/2619 blk 7
rmgr: XLOG        len (rec/tot):     49/  8177, tx:          0, lsn:
0/06009F78, prev 0/06009EF8, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 8 FPW
rmgr: Heap2       len (rec/tot):     56/    56, tx:          0, lsn:
0/0600BF88, prev 0/06009F78, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 760, isCatalogRel: F, nplans: 0, nredirected: 0,
ndead: 1, nunused: 0, dead: [1], blkref #0: rel 1663/1/2619 blk 8
rmgr: XLOG        len (rec/tot):     49/  6861, tx:          0, lsn:
0/0600BFC0, prev 0/0600BF88, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 13 FPW
rmgr: Heap2       len (rec/tot):    106/   106, tx:          0, lsn:
0/0600DAA8, prev 0/0600BFC0, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 762, isCatalogRel: F, nplans: 2, nredirected: 3,
ndead: 1, nunused: 0, plans: [{ xmax: 0, infomask: 11009, infomask2: 32799,
ntuples: 1, offsets: [22] }, { xmax: 0, infomask: 11011, infomask2: 32799,
ntuples: 3, offsets: [23, 24, 25] }], redirected: [16->23, 17->24, 18->25],
dead: [19], blkref #0: rel 1663/1/2619 blk 13
rmgr: XLOG        len (rec/tot):     49/  8105, tx:          0, lsn:
0/0600DB18, prev 0/0600DAA8, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 14 FPW
rmgr: Heap2       len (rec/tot):     56/    56, tx:          0, lsn:
0/0600FAE0, prev 0/0600DB18, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 763, isCatalogRel: F, nplans: 0, nredirected: 0,
ndead: 1, nunused: 0, dead: [18], blkref #0: rel 1663/1/2619 blk 14
rmgr: XLOG        len (rec/tot):     49/  8173, tx:          0, lsn:
0/0600FB18, prev 0/0600FAE0, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 15 FPW
rmgr: Heap2       len (rec/tot):     66/    66, tx:          0, lsn:
0/06011B20, prev 0/0600FB18, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 763, isCatalogRel: F, nplans: 0, nredirected: 0,
ndead: 6, nunused: 0, dead: [1, 2, 3, 4, 5, 6], blkref #0: rel 1663/1/2619
blk 15
rmgr: XLOG        len (rec/tot):     49/  8137, tx:          0, lsn:
0/06011B68, prev 0/06011B20, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 16 FPW
rmgr: Heap2       len (rec/tot):     80/    80, tx:          0, lsn:
0/06013B50, prev 0/06011B68, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 764, isCatalogRel: F, nplans: 1, nredirected: 0,
ndead: 4, nunused: 0, plans: [{ xmax: 0, infomask: 11011, infomask2: 31,
ntuples: 1, offsets: [36] }], dead: [5, 6, 7, 8], blkref #0: rel 1663/1/2619
blk 16
rmgr: XLOG        len (rec/tot):     49/  7809, tx:          0, lsn:
0/06013BA0, prev 0/06013B50, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 17 FPW
```

```
rmgr: Heap2       len (rec/tot):    134/   134, tx:          0, lsn:
0/06015A40, prev 0/06013BA0, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 766, isCatalogRel: F, nplans: 2, nredirected: 6,
ndead: 3, nunused: 0, plans: [{ xmax: 0, infomask: 11011, infomask2: 31,
ntuples: 3, offsets: [15, 16, 17] }, { xmax: 0, infomask: 11011, infomask2:
32799, ntuples: 7, offsets: [18, 19, 20, 21, 22, 23, 24] }], redirected:
[6->19, 8->20, 9->21, 10->22, 11->23, 12->24], dead: [7, 13, 14], blkref #0:
rel 1663/1/2619 blk 17
rmgr: XLOG        len (rec/tot):     49/  8197, tx:          0, lsn:
0/06015AC8, prev 0/06015A40, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 18 FPW
rmgr: Heap2       len (rec/tot):     84/    84, tx:          0, lsn:
0/06017AE8, prev 0/06015AC8, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 766, isCatalogRel: F, nplans: 1, nredirected: 0,
ndead: 3, nunused: 0, plans: [{ xmax: 0, infomask: 11011, infomask2: 31,
ntuples: 4, offsets: [20, 21, 22, 23] }], dead: [1, 2, 3], blkref #0: rel
1663/1/2619 blk 18
rmgr: XLOG        len (rec/tot):     49/  8213, tx:          0, lsn:
0/06017B40, prev 0/06017AE8, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 19 FPW
rmgr: Heap2       len (rec/tot):    134/   134, tx:          0, lsn:
0/06019B70, prev 0/06017B40, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 760, isCatalogRel: F, nplans: 2, nredirected: 0,
ndead: 0, nunused: 0, plans: [{ xmax: 0, infomask: 11009, infomask2: 31,
ntuples: 2, offsets: [22, 23] }, { xmax: 0, infomask: 11011, infomask2: 31,
ntuples: 25, offsets: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
16, 17, 18, 19, 20, 21, 24, 25, 26, 27] }], blkref #0: rel 1663/1/2619 blk
19
rmgr: Heap2       len (rec/tot):     64/  8256, tx:          0, lsn:
0/06019BF8, prev 0/06019B70, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0 FPW, blkref #1: rel
1663/1/2619 blk 19
rmgr: XLOG        len (rec/tot):     49/  8209, tx:          0, lsn:
0/0601BC50, prev 0/06019BF8, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 20 FPW
rmgr: Heap2       len (rec/tot):    144/   144, tx:          0, lsn:
0/0601DC80, prev 0/0601BC50, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 758, isCatalogRel: F, nplans: 3, nredirected: 0,
ndead: 0, nunused: 0, plans: [{ xmax: 0, infomask: 11009, infomask2: 31,
ntuples: 4, offsets: [20, 22, 23, 24] }, { xmax: 0, infomask: 11011,
infomask2: 31, ntuples: 21, offsets: [2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12,
13, 14, 15, 16, 17, 18, 19, 21, 25, 26] }, { xmax: 0, infomask: 11015,
infomask2: 31, ntuples: 1, offsets: [1] }], blkref #0: rel 1663/1/2619 blk
20
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/0601DD10, prev 0/0601DC80, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 20
rmgr: XLOG        len (rec/tot):     49/  8089, tx:          0, lsn:
0/0601DD50, prev 0/0601DD10, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 21 FPW
```

```
rmgr: Heap2       len (rec/tot):    132/   132, tx:          0, lsn:
0/0601FD08, prev 0/0601DD50, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 760, isCatalogRel: F, nplans: 1, nredirected: 0,
ndead: 0, nunused: 0, plans: [{ xmax: 0, infomask: 11011, infomask2: 31,
ntuples: 32, offsets: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32] }],
blkref #0: rel 1663/1/2619 blk 21
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/0601FD90, prev 0/0601FD08, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 21
rmgr: XLOG        len (rec/tot):     49/  8213, tx:          0, lsn:
0/0601FDD0, prev 0/0601FD90, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 22 FPW
rmgr: Heap2       len (rec/tot):    130/   130, tx:          0, lsn:
0/06021E00, prev 0/0601FDD0, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 760, isCatalogRel: F, nplans: 3, nredirected: 0,
ndead: 0, nunused: 0, plans: [{ xmax: 0, infomask: 11009, infomask2: 31,
ntuples: 1, offsets: [5] }, { xmax: 0, infomask: 11011, infomask2: 31,
ntuples: 17, offsets: [1, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17,
18, 19] }, { xmax: 0, infomask: 11015, infomask2: 31, ntuples: 1, offsets:
[2] }], blkref #0: rel 1663/1/2619 blk 22
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/06021E88, prev 0/06021E00, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 22
rmgr: XLOG        len (rec/tot):     49/  8041, tx:          0, lsn:
0/06021EC8, prev 0/06021E88, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 23 FPW
rmgr: Heap2       len (rec/tot):    124/   124, tx:          0, lsn:
0/06023E50, prev 0/06021EC8, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 763, isCatalogRel: F, nplans: 3, nredirected: 0,
ndead: 0, nunused: 0, plans: [{ xmax: 0, infomask: 11009, infomask2: 31,
ntuples: 5, offsets: [2, 3, 4, 5, 6] }, { xmax: 0, infomask: 11011,
infomask2: 31, ntuples: 10, offsets: [1, 7, 8, 9, 10, 11, 12, 13, 14, 16] },
{ xmax: 0, infomask: 11015, infomask2: 31, ntuples: 1, offsets: [15] }],
blkref #0: rel 1663/1/2619 blk 23
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/06023ED0, prev 0/06023E50, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 23
rmgr: XLOG        len (rec/tot):     49/  7721, tx:          0, lsn:
0/06023F10, prev 0/06023ED0, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 24 FPW
rmgr: Heap2       len (rec/tot):     96/    96, tx:          0, lsn:
0/06025D58, prev 0/06023F10, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 765, isCatalogRel: F, nplans: 1, nredirected: 0,
ndead: 0, nunused: 0, plans: [{ xmax: 0, infomask: 11011, infomask2: 31,
ntuples: 14, offsets: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14] }],
blkref #0: rel 1663/1/2619 blk 24
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
```

```
0/06025DB8, prev 0/06025D58, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 24
rmgr: XLOG        len (rec/tot):     49/  5193, tx:          0, lsn:
0/06025DF8, prev 0/06025DB8, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
blk 25 FPW
rmgr: Heap2       len (rec/tot):     92/    92, tx:          0, lsn:
0/06027260, prev 0/06025DF8, desc: PRUNE_VACUUM_SCAN
snapshotConflictHorizon: 766, isCatalogRel: F, nplans: 2, nredirected: 0,
ndead: 0, nunused: 0, plans: [{ xmax: 0, infomask: 11009, infomask2: 31,
ntuples: 1, offsets: [5] }, { xmax: 0, infomask: 11011, infomask2: 31,
ntuples: 5, offsets: [1, 2, 3, 4, 6] }], blkref #0: rel 1663/1/2619 blk 25
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/060272C0, prev 0/06027260, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 25
rmgr: XLOG        len (rec/tot):     49/  8241, tx:          0, lsn:
0/06027300, prev 0/060272C0, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
fork fsm blk 2 FPW
rmgr: Btree       len (rec/tot):     55/  3435, tx:          0, lsn:
0/06029350, prev 0/06027300, desc: VACUUM ndeleted: 0, nupdated: 46, blkref
#0: rel 1663/1/2696 blk 1 FPW
rmgr: Btree       len (rec/tot):     55/  1075, tx:          0, lsn:
0/0602A0D8, prev 0/06029350, desc: VACUUM ndeleted: 9, nupdated: 0, blkref
#0: rel 1663/1/2696 blk 2 FPW
rmgr: Btree       len (rec/tot):     55/  4055, tx:          0, lsn:
0/0602A510, prev 0/0602A0D8, desc: VACUUM ndeleted: 43, nupdated: 8, blkref
#0: rel 1663/1/2696 blk 4 FPW
rmgr: Heap2       len (rec/tot):     86/    86, tx:          0, lsn:
0/0602B4E8, prev 0/0602A510, desc: PRUNE_VACUUM_CLEANUP , isCatalogRel: F,
nplans: 0, nredirected: 0, ndead: 0, nunused: 18, unused: [1, 2, 3, 4, 5, 6,
7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18], blkref #0: rel 1663/1/2619 blk
0
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/0602B540, prev 0/0602B4E8, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 0
rmgr: Heap2       len (rec/tot):     76/    76, tx:          0, lsn:
0/0602B580, prev 0/0602B540, desc: PRUNE_VACUUM_CLEANUP , isCatalogRel: F,
nplans: 0, nredirected: 0, ndead: 0, nunused: 13, unused: [1, 2, 3, 4, 5, 6,
7, 8, 9, 10, 11, 13, 14], blkref #0: rel 1663/1/2619 blk 1
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/0602B5D0, prev 0/0602B580, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 1
rmgr: Heap2       len (rec/tot):     98/    98, tx:          0, lsn:
0/0602B610, prev 0/0602B5D0, desc: PRUNE_VACUUM_CLEANUP , isCatalogRel: F,
nplans: 0, nredirected: 0, ndead: 0, nunused: 24, unused: [1, 2, 3, 4, 5, 6,
7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24], blkref
#0: rel 1663/1/2619 blk 2
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
```

```
0/0602B678, prev 0/0602B610, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 2
rmgr: Heap2       len (rec/tot):     52/    52, tx:          0, lsn:
0/0602B6B8, prev 0/0602B678, desc: PRUNE_VACUUM_CLEANUP , isCatalogRel: F,
nplans: 0, nredirected: 0, ndead: 0, nunused: 1, unused: [16], blkref #0:
rel 1663/1/2619 blk 3
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/0602B6F0, prev 0/0602B6B8, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 3
rmgr: Heap2       len (rec/tot):    106/   106, tx:          0, lsn:
0/0602B730, prev 0/0602B6F0, desc: PRUNE_VACUUM_CLEANUP , isCatalogRel: F,
nplans: 0, nredirected: 0, ndead: 0, nunused: 28, unused: [1, 2, 3, 4, 5, 6,
7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26,
27, 28], blkref #0: rel 1663/1/2619 blk 5
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/0602B7A0, prev 0/0602B730, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 5
rmgr: Heap2       len (rec/tot):     68/    68, tx:          0, lsn:
0/0602B7E0, prev 0/0602B7A0, desc: PRUNE_VACUUM_CLEANUP , isCatalogRel: F,
nplans: 0, nredirected: 0, ndead: 0, nunused: 9, unused: [1, 2, 3, 4, 7, 8,
10, 11, 12], blkref #0: rel 1663/1/2619 blk 6
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/0602B828, prev 0/0602B7E0, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 6
rmgr: Heap2       len (rec/tot):    100/   100, tx:          0, lsn:
0/0602B868, prev 0/0602B828, desc: PRUNE_VACUUM_CLEANUP , isCatalogRel: F,
nplans: 0, nredirected: 0, ndead: 0, nunused: 25, unused: [1, 2, 3, 4, 5, 6,
7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 26],
blkref #0: rel 1663/1/2619 blk 7
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/0602B8D0, prev 0/0602B868, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 7
rmgr: Heap2       len (rec/tot):     52/    52, tx:          0, lsn:
0/0602B910, prev 0/0602B8D0, desc: PRUNE_VACUUM_CLEANUP , isCatalogRel: F,
nplans: 0, nredirected: 0, ndead: 0, nunused: 1, unused: [1], blkref #0: rel
1663/1/2619 blk 8
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/0602B948, prev 0/0602B910, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 8
rmgr: Heap2       len (rec/tot):     66/    66, tx:          0, lsn:
0/0602B988, prev 0/0602B948, desc: PRUNE_VACUUM_CLEANUP , isCatalogRel: F,
nplans: 0, nredirected: 0, ndead: 0, nunused: 8, unused: [8, 9, 10, 11, 12,
13, 14, 19], blkref #0: rel 1663/1/2619 blk 13
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/0602B9D0, prev 0/0602B988, desc: VISIBLE snapshotConflictHorizon: 0,
```

```
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 13
rmgr: Heap2       len (rec/tot):     52/    52, tx:          0, lsn:
0/0602BA10, prev 0/0602B9D0, desc: PRUNE_VACUUM_CLEANUP , isCatalogRel: F,
nplans: 0, nredirected: 0, ndead: 0, nunused: 1, unused: [18], blkref #0:
rel 1663/1/2619 blk 14
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/0602BA48, prev 0/0602BA10, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 14
rmgr: Heap2       len (rec/tot):     62/    62, tx:          0, lsn:
0/0602BA88, prev 0/0602BA48, desc: PRUNE_VACUUM_CLEANUP , isCatalogRel: F,
nplans: 0, nredirected: 0, ndead: 0, nunused: 6, unused: [1, 2, 3, 4, 5, 6],
blkref #0: rel 1663/1/2619 blk 15
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/0602BAC8, prev 0/0602BA88, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 15
rmgr: Heap2       len (rec/tot):     58/    58, tx:          0, lsn:
0/0602BB08, prev 0/0602BAC8, desc: PRUNE_VACUUM_CLEANUP , isCatalogRel: F,
nplans: 0, nredirected: 0, ndead: 0, nunused: 4, unused: [5, 6, 7, 8],
blkref #0: rel 1663/1/2619 blk 16
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/0602BB48, prev 0/0602BB08, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 16
rmgr: Heap2       len (rec/tot):     64/    64, tx:          0, lsn:
0/0602BB88, prev 0/0602BB48, desc: PRUNE_VACUUM_CLEANUP , isCatalogRel: F,
nplans: 0, nredirected: 0, ndead: 0, nunused: 7, unused: [1, 2, 3, 5, 7, 13,
14], blkref #0: rel 1663/1/2619 blk 17
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/0602BBC8, prev 0/0602BB88, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 17
rmgr: Heap2       len (rec/tot):     56/    56, tx:          0, lsn:
0/0602BC08, prev 0/0602BBC8, desc: PRUNE_VACUUM_CLEANUP , isCatalogRel: F,
nplans: 0, nredirected: 0, ndead: 0, nunused: 3, unused: [1, 2, 3], blkref
#0: rel 1663/1/2619 blk 18
rmgr: Heap2       len (rec/tot):     59/    59, tx:          0, lsn:
0/0602BC40, prev 0/0602BC08, desc: VISIBLE snapshotConflictHorizon: 0,
flags: 0x03, blkref #0: rel 1663/1/2619 fork vm blk 0, blkref #1: rel
1663/1/2619 blk 18
rmgr: XLOG        len (rec/tot):     49/  8241, tx:          0, lsn:
0/0602BC80, prev 0/0602BC40, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
fork fsm blk 1 FPW
rmgr: XLOG        len (rec/tot):     49/  8241, tx:          0, lsn:
0/0602DCD0, prev 0/0602BC80, desc: FPI_FOR_HINT , blkref #0: rel 1663/1/2619
fork fsm blk 0 FPW
rmgr: Heap        len (rec/tot):    119/  8243, tx:          0, lsn:
0/0602FD20, prev 0/0602DCD0, desc: INPLACE off: 38; relcache init file inval
dbid 1 tsid 1663; inval msgs: catcache 57 catcache 56 relcache 2696, blkref
```

```
#0: rel 1663/1/1259 blk 3 FPW
rmgr: Heap        len (rec/tot):    119/   779, tx:          0, lsn:
0/06031D70, prev 0/0602FD20, desc: INPLACE off: 46; relcache init file inval
dbid 1 tsid 1663; inval msgs: catcache 57 catcache 56 relcache 2619, blkref
#0: rel 1663/1/1259 blk 0 FPW
rmgr: Standby     len (rec/tot):    138/   138, tx:          0, lsn:
0/06032098, prev 0/06031D70, desc: INVALIDATIONS ; relcache init file inval
dbid 1 tsid 1663; inval msgs: catcache 57 catcache 56 catcache 57 catcache
56 relcache 2696 relcache 2619
rmgr: Standby     len (rec/tot):     50/    50, tx:          0, lsn:
0/06032128, prev 0/06032098, desc: RUNNING_XACTS nextXid 769
latestCompletedXid 768 oldestRunningXid 769
rmgr: Standby     len (rec/tot):     42/    42, tx:        769, lsn:
0/06032160, prev 0/06032128, desc: LOCK xid 769 db 16385 rel 16386
rmgr: XLOG        len (rec/tot):     49/  6945, tx:        769, lsn:
0/06032190, prev 0/06032160, desc: FPI_FOR_HINT , blkref #0: rel
1663/16385/2608 blk 3 FPW
rmgr: XLOG        len (rec/tot):     49/  8233, tx:        769, lsn:
0/06033CB8, prev 0/06032190, desc: FPI_FOR_HINT , blkref #0: rel
1663/16385/2608 blk 2 FPW
rmgr: Standby     len (rec/tot):     42/    42, tx:        769, lsn:
0/06035D00, prev 0/06033CB8, desc: LOCK xid 769 db 16385 rel 16389
rmgr: Standby     len (rec/tot):     42/    42, tx:        769, lsn:
0/06035D30, prev 0/06035D00, desc: LOCK xid 769 db 16385 rel 16390
rmgr: XLOG        len (rec/tot):     49/  4021, tx:        769, lsn:
0/06035D60, prev 0/06035D30, desc: FPI_FOR_HINT , blkref #0: rel
1663/16385/1247 blk 14 FPW
rmgr: XLOG        len (rec/tot):     49/  8013, tx:        769, lsn:
0/06036D30, prev 0/06035D60, desc: FPI_FOR_HINT , blkref #0: rel
1663/16385/2610 blk 0 FPW
rmgr: XLOG        len (rec/tot):     49/  8193, tx:        769, lsn:
0/06038C98, prev 0/06036D30, desc: FPI_FOR_HINT , blkref #0: rel
1663/16385/1249 blk 16 FPW
rmgr: XLOG        len (rec/tot):     49/  7633, tx:        769, lsn:
0/0603ACB8, prev 0/06038C98, desc: FPI_FOR_HINT , blkref #0: rel
1663/16385/1249 blk 54 FPW
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CAA8, prev 0/0603ACB8, desc: DELETE xmax: 769, off: 36, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/2610 blk 0
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CAE0, prev 0/0603CAA8, desc: DELETE xmax: 769, off: 53, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 54
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CB18, prev 0/0603CAE0, desc: DELETE xmax: 769, off: 54, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 54
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CB50, prev 0/0603CB18, desc: DELETE xmax: 769, off: 4, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1259 blk 0
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CB88, prev 0/0603CB50, desc: DELETE xmax: 769, off: 9, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/2608 blk 3
```

```
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CBC0, prev 0/0603CB88, desc: DELETE xmax: 769, off: 12, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/2608 blk 3
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CBF8, prev 0/0603CBC0, desc: DELETE xmax: 769, off: 41, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CC30, prev 0/0603CBF8, desc: DELETE xmax: 769, off: 40, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CC68, prev 0/0603CC30, desc: DELETE xmax: 769, off: 39, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CCA0, prev 0/0603CC68, desc: DELETE xmax: 769, off: 38, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CCD8, prev 0/0603CCA0, desc: DELETE xmax: 769, off: 36, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CD10, prev 0/0603CCD8, desc: DELETE xmax: 769, off: 35, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CD48, prev 0/0603CD10, desc: DELETE xmax: 769, off: 32, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CD80, prev 0/0603CD48, desc: DELETE xmax: 769, off: 33, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CDB8, prev 0/0603CD80, desc: DELETE xmax: 769, off: 34, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CDF0, prev 0/0603CDB8, desc: DELETE xmax: 769, off: 3, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1259 blk 0
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CE28, prev 0/0603CDF0, desc: DELETE xmax: 769, off: 15, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/2608 blk 3
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CE60, prev 0/0603CE28, desc: DELETE xmax: 769, off: 21, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1247 blk 14
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CE98, prev 0/0603CE60, desc: DELETE xmax: 769, off: 3, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/2608 blk 3
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CED0, prev 0/0603CE98, desc: DELETE xmax: 769, off: 20, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1247 blk 14
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CF08, prev 0/0603CED0, desc: DELETE xmax: 769, off: 136, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/2608 blk 2
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CF40, prev 0/0603CF08, desc: DELETE xmax: 769, off: 31, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
```

```
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CF78, prev 0/0603CF40, desc: DELETE xmax: 769, off: 30, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CFB0, prev 0/0603CF78, desc: DELETE xmax: 769, off: 29, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603CFE8, prev 0/0603CFB0, desc: DELETE xmax: 769, off: 28, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603D020, prev 0/0603CFE8, desc: DELETE xmax: 769, off: 27, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603D058, prev 0/0603D020, desc: DELETE xmax: 769, off: 26, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603D090, prev 0/0603D058, desc: DELETE xmax: 769, off: 24, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603D0C8, prev 0/0603D090, desc: DELETE xmax: 769, off: 25, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1249 blk 16
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603D100, prev 0/0603D0C8, desc: DELETE xmax: 769, off: 5, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/1259 blk 0
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603D138, prev 0/0603D100, desc: DELETE xmax: 769, off: 6, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1663/16385/2608 blk 3
rmgr: XLOG        len (rec/tot):     49/   193, tx:        769, lsn:
0/0603D170, prev 0/0603D138, desc: FPI_FOR_HINT , blkref #0: rel 1664/0/1214
blk 0 FPW
rmgr: Heap        len (rec/tot):     54/    54, tx:        769, lsn:
0/0603D238, prev 0/0603D170, desc: DELETE xmax: 769, off: 2, infobits:
[KEYS_UPDATED], flags: 0x00, blkref #0: rel 1664/0/1214 blk 0
rmgr: Transaction len (rec/tot):   1089/  1089, tx:        769, lsn:
0/0603D270, prev 0/0603D238, desc: COMMIT 2026-04-29 13:25:09.539651 CEST;
rels: base/16385/16386 base/16385/16389 base/16385/16390; dropped stats:
2/16385/16390 2/16385/16389 2/16385/16386; inval msgs: catcache 34 catcache
7 catcache 6 catcache 7 catcache 6 catcache 57 catcache 56 catcache 7
catcache 6 catcache 7 catcache 6 catcache 7 catcache 6 catcache 7 catcache 6
catcache 7 catcache 6 catcache 7 catcache 6 catcache 7 catcache 6 catcache 7
catcache 6 catcache 7 catcache 6 catcache 57 catcache 56 catcache 82
catcache 81 catcache 82 catcache 81 catcache 7 catcache 6 catcache 7
catcache 6 catcache 7 catcache 6 catcache 7 catcache 6 catcache 7 catcache 6
catcache 7 catcache 6 catcache 7 catcache 6 catcache 7 catcache 6 catcache
57 catcache 56 relcache 16390 relcache 16389 snapshot 2608 relcache 16389
snapshot 2608 snapshot 2608 snapshot 2608 relcache 16386 snapshot 2608
snapshot 1214
rmgr: Standby     len (rec/tot):     50/    50, tx:          0, lsn:
0/0603D6B8, prev 0/0603D270, desc: RUNNING_XACTS nextXid 770
latestCompletedXid 769 oldestRunningXid 770
rmgr: XLOG        len (rec/tot):     24/    24, tx:          0, lsn:
```

```
0/0603D6F0, prev 0/0603D6B8, desc: SWITCH
```

Visszaállás megadott LSN-re

Hozzá kell adni a $PGDATA/postgresql.conf VAGY a $PGDATA/postgresql.auto.conf fájlhoz az helyreállításhoz szükséges adatokat és létre kell hozni a $PGDATA/recovery.signal állományt. A példában a tábla törlését megelőző pillanatot adtam meg.

```
[root@pg03 ~]# cat /var/lib/pgsql/18/data/postgresql.auto.conf
# Do not edit this file manually!
# It will be overwritten by the ALTER SYSTEM command.

[root@pg03 ~]# export RECOVERY_LSN='0/0603CAA8'


[root@pg03 ~]# cat >>/var/lib/pgsql/18/data/postgresql.auto.conf <<EOF
# Do not edit this file manually!
# It will be overwritten by the ALTER SYSTEM command.
restore_command = 'cp /var/lib/pgsql/18/backups/%f %p'
recovery_target_lsn = '$RECOVERY_LSN'
recovery_target_action = 'promote'
EOF

[root@pg03 ~]# cat /var/lib/pgsql/18/data/postgresql.auto.conf
# Do not edit this file manually!
# It will be overwritten by the ALTER SYSTEM command.
restore_command = 'cp /var/lib/pgsql/18/backups/%f %p'
recovery_target_lsn = '0/0603CAA8'
recovery_target_action = 'promote'

[root@pg03 ~]# touch /var/lib/pgsql/18/data/recovery.signal

[root@pg03 ~]# chown -R postgres:postgres /var/lib/pgsql/18/data/
```

Adatbázis kezelő indítása

```
[root@pg03 ~]# systemctl restart postgresql-18
```

Adatok ellenőrzése

```
[root@pg03 ~]# psql -U test -d test -c "SELECT * FROM test"
 id |     data
----+--------------
  1 | backup előtt
  2 | backup után
  3 | törlés előtt
(3 rows)
```

WAL állományok ellenőrzése

A WAL ellenőrzése kritikus a sikeres helyreállításhoz. Az alábbi lépések segítségével meggyőződhetünk arról, hogy helyreállíthaó-e a rendszer.

Archiver állapot lekérdezése.

```
[root@pg01 ~]# psql -U postgres -x -c "SELECT archived_count,
last_archived_wal, last_archived_time, failed_count, last_failed_wal,
last_failed_time FROM pg_stat_archiver"
-[ RECORD 1 ]------+------------------------------
archived_count     | 4
last_archived_wal  | 000000010000000000000003
last_archived_time | 2026-04-29 13:26:05.951808+02
failed_count       | 0
last_failed_wal    |
last_failed_time   |
```

A `000000010000000000000003` előtti fájlokra nincs szükség amennyiben a legutóbbi `pg_basebackup` futatása utáni állapoprta kell visszaállni.

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