Lab 10 - sprawozdanie

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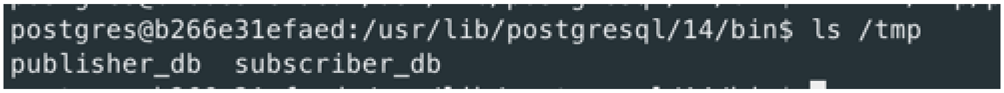
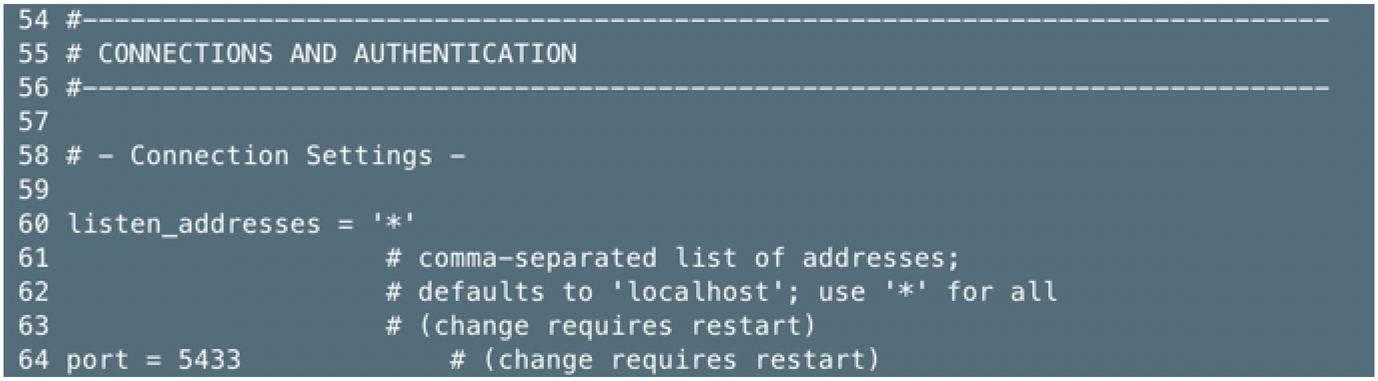
Przebieg ćwiczenia

Utworzono serwery `publisher_db` i `subscriber_db`

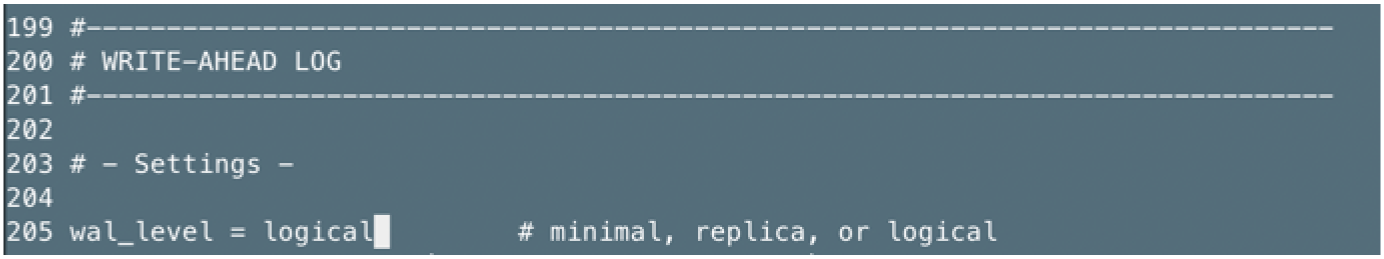


```
postgres@b266e31efaed:/usr/lib/postgresql/14/bin$ ls /tmp
publisher_db  subscriber_db
```

Ustawiono port `publisher_db` na 5433 oraz `wal_level` na `logical`

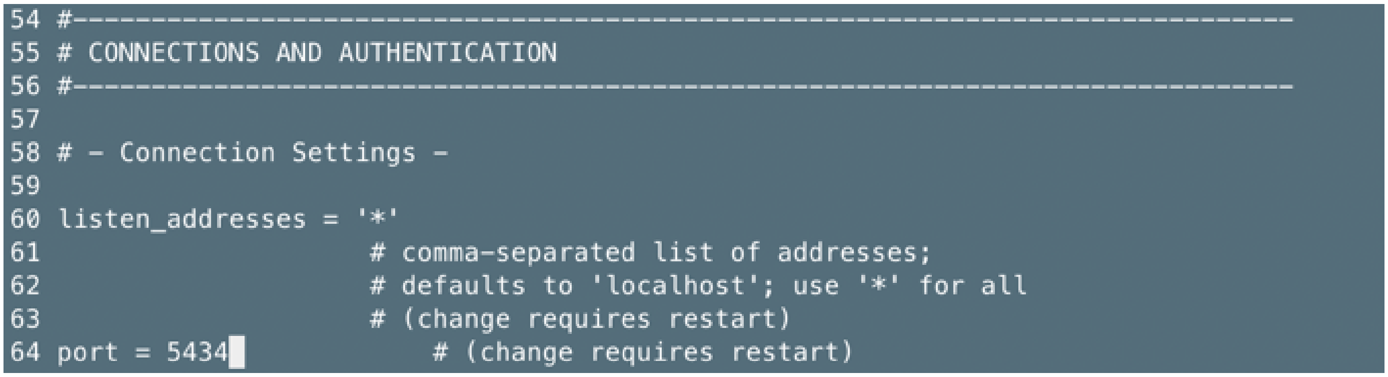


```
#------------------------------------------------------------------------------
# CONNECTIONS AND AUTHENTICATION
#------------------------------------------------------------------------------

# - Connection Settings -

listen_addresses = '*'
                    # comma-separated list of addresses;
                    # defaults to 'localhost'; use '*' for all
                    # (change requires restart)
port = 5433                 # (change requires restart)
```



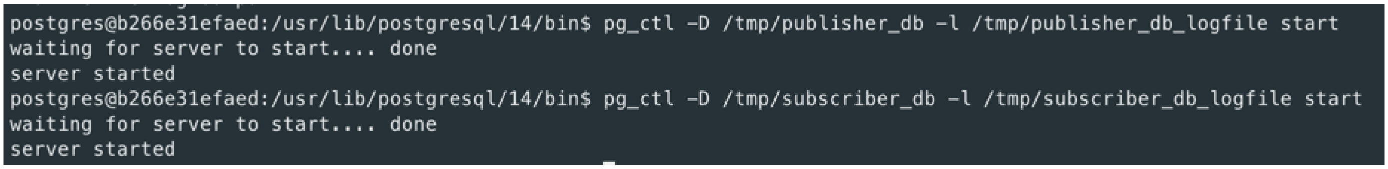
```
#------------------------------------------------------------------------------
# WRITE-AHEAD LOG
#------------------------------------------------------------------------------

# - Settings -

wal_level = logical         # minimal, replica, or logical
```

Ustawiono port `subscriber_db` na 5434



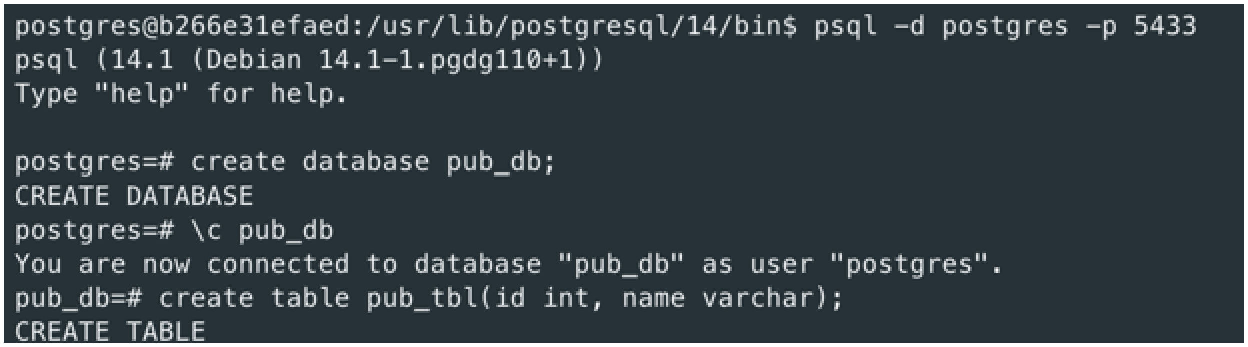
```
#------------------------------------------------------------------------------
# CONNECTIONS AND AUTHENTICATION
#------------------------------------------------------------------------------

# - Connection Settings -

listen_addresses = '*'
                    # comma-separated list of addresses;
                    # defaults to 'localhost'; use '*' for all
                    # (change requires restart)
port = 5434                 # (change requires restart)
```

Uruchomiono obie instancje



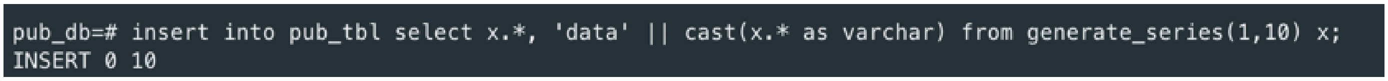
```
postgres@b266e31efaed:/usr/lib/postgresql/14/bin$ pg_ctl -D /tmp/publisher_db -l /tmp/publisher_db_logfile start
waiting for server to start.... done
server started
postgres@b266e31efaed:/usr/lib/postgresql/14/bin$ pg_ctl -D /tmp/subscriber_db -l /tmp/subscriber_db_logfile start
waiting for server to start.... done
server started
```

Połączono się z serwerem `publisher_db` , utworzono w nim baze `pub_db` , a w niej tabelę `pub_tbl`

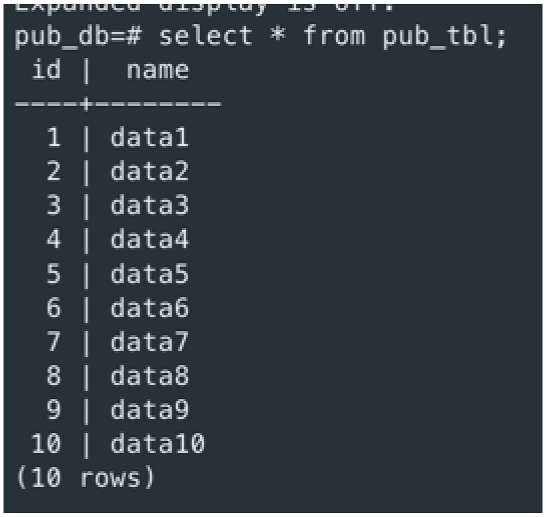


```
postgres@b266e31efaed:/usr/lib/postgresql/14/bin$ psql -d postgres -p 5433
psql (14.1 (Debian 14.1-1.pgdg110+1))
Type "help" for help.

postgres=# create database pub_db;
CREATE DATABASE
postgres=# \c pub_db
You are now connected to database "pub_db" as user "postgres".
pub_db=# create table pub_tbl(id int, name varchar);
CREATE TABLE
```

Wygenerowano 10 wierszy w tabeli

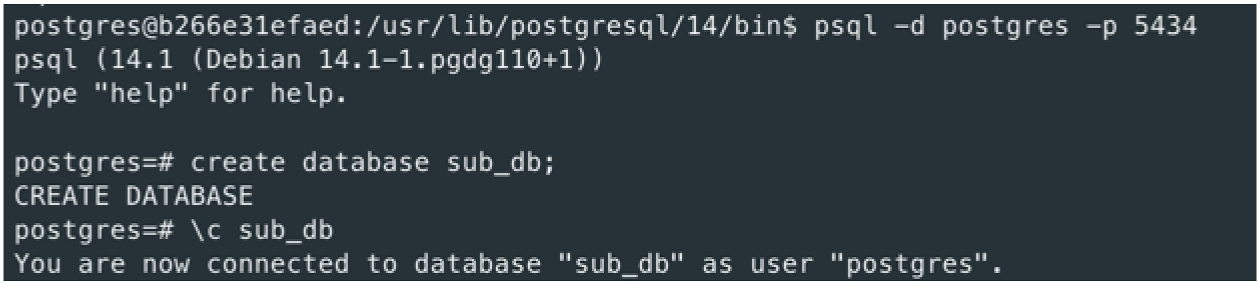


```
pub_db=# insert into pub_tbl select x.*, 'data' || cast(x.* as varchar) from generate_series(1,10) x;
INSERT 0 10
```



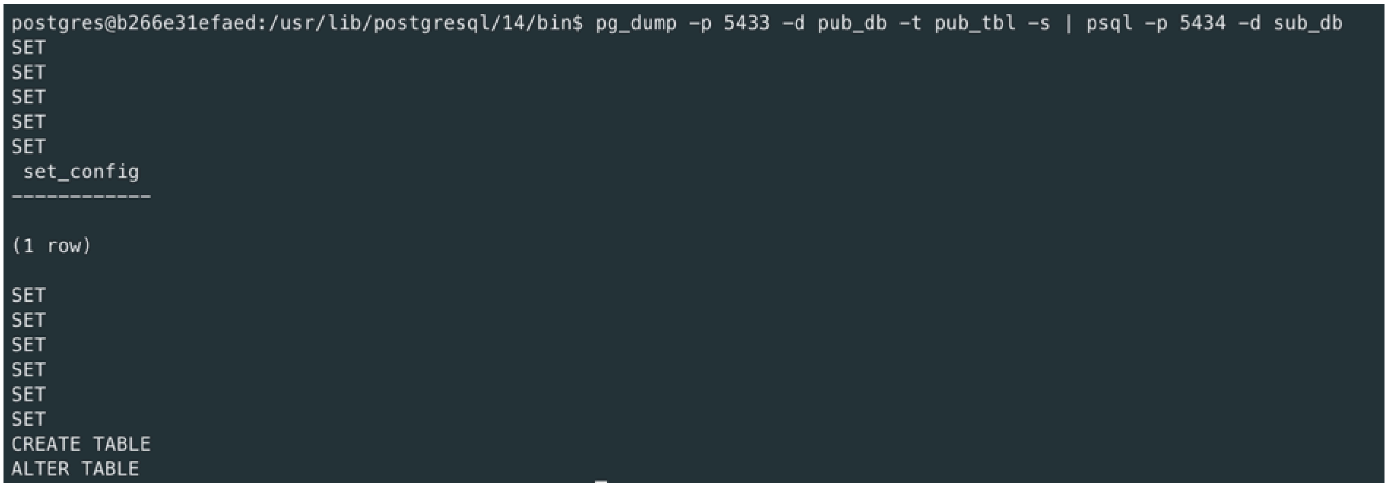
```
Expanded display is off.
pub_db=# select * from pub_tbl;
 id |  name
----+--------
  1 | data1
  2 | data2
  3 | data3
  4 | data4
  5 | data5
  6 | data6
  7 | data7
  8 | data8
  9 | data9
 10 | data10
(10 rows)
```

Utworzono na serwerze `subscriber_db` bazę `sub_db`

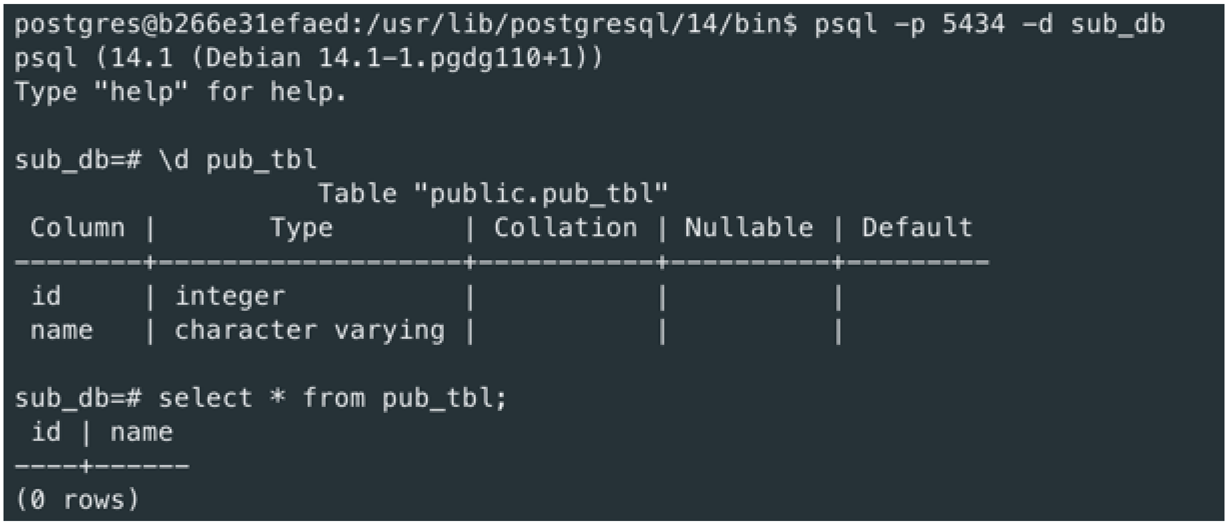


```
postgres@b266e31efaed:/usr/lib/postgresql/14/bin$ psql -d postgres -p 5434
psql (14.1 (Debian 14.1-1.pgdg110+1))
Type "help" for help.

postgres=# create database sub_db;
CREATE DATABASE
postgres=# \c sub_db
You are now connected to database "sub_db" as user "postgres".
```

Przekopiowano schemat tabeli `pub_tbl` do bazy `sub_db`

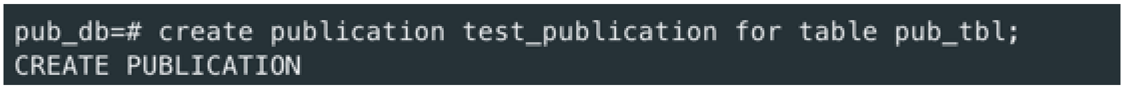


```
postgres@b266e31efaed:/usr/lib/postgresql/14/bin$ pg_dump -p 5433 -d pub_db -t pub_tbl -s | psql -p 5434 -d sub_db
SET
SET
SET
SET
SET
 set_config
------------

(1 row)

SET
SET
SET
SET
SET
SET
CREATE TABLE
ALTER TABLE
```



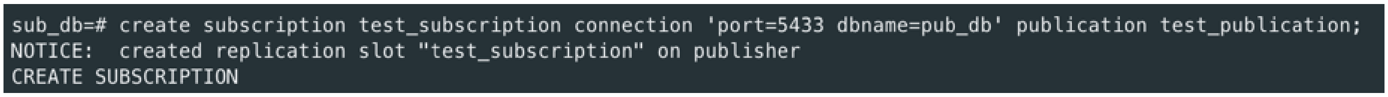
```
postgres@b266e31efaed:/usr/lib/postgresql/14/bin$ psql -p 5434 -d sub_db
psql (14.1 (Debian 14.1-1.pgdg110+1))
Type "help" for help.

sub_db=# \d pub_tbl
                   Table "public.pub_tbl"
 Column |       Type        | Collation | Nullable | Default
--------+-------------------+-----------+----------+---------
 id     | integer           |           |          |
 name   | character varying |           |          |

sub_db=# select * from pub_tbl;
 id | name
----+------
(0 rows)
```

W bazie `pub_db` utworzono publikację `test_publication` na tabeli `pub_tbl`



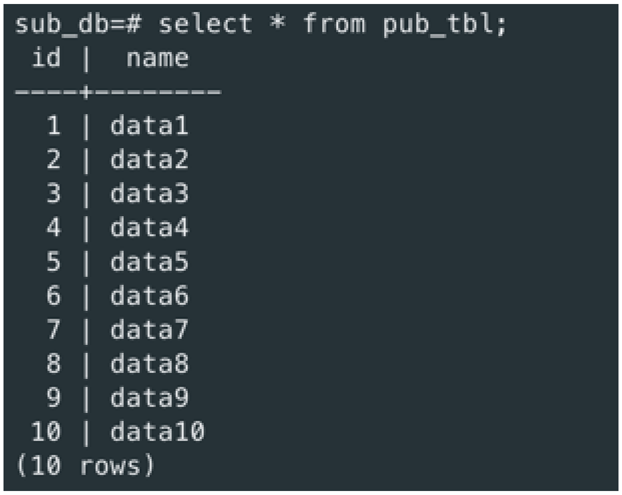
```
pub_db=# create publication test_publication for table pub_tbl;
CREATE PUBLICATION
```

W bazie `sub_db` utworzono subskrypcję `test_subscription` na wcześniej stworzoną publikację



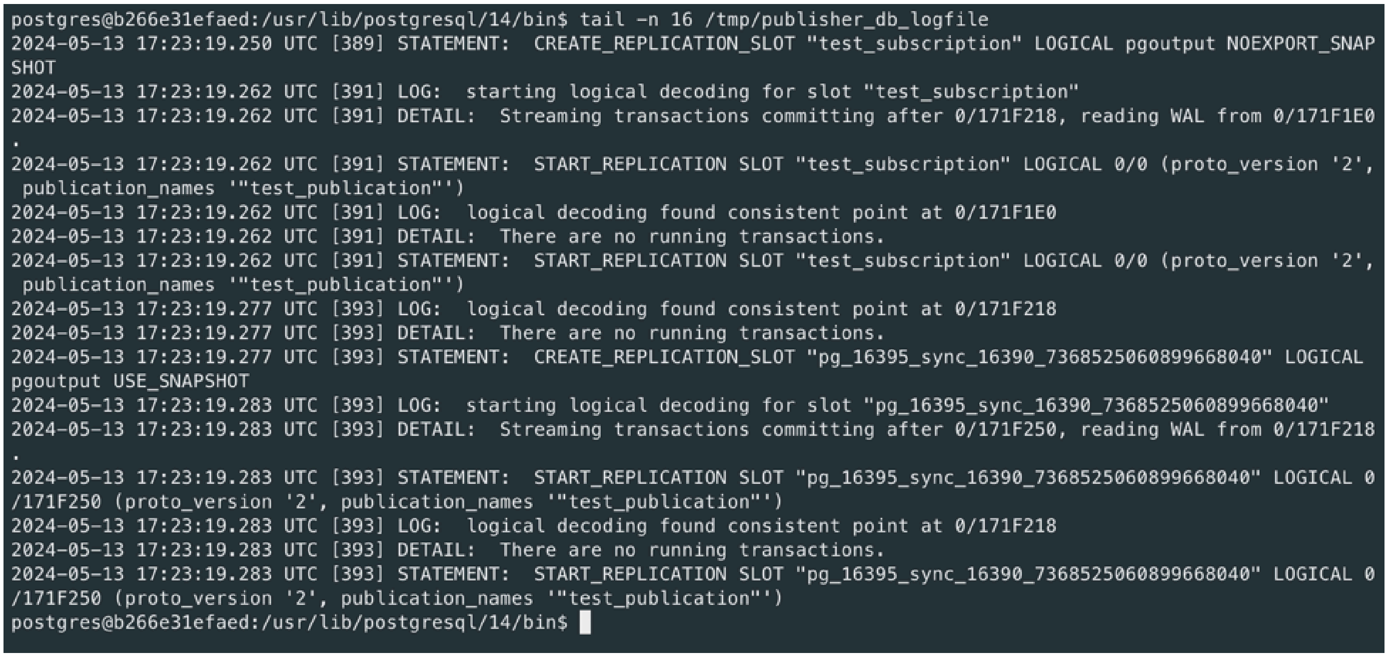
```
sub_db=# create subscription test_subscription connection 'port=5433 dbname=pub_db' publication test_publication;
NOTICE:  created replication slot "test_subscription" on publisher
CREATE SUBSCRIPTION
```

W bazie `sub_db` dane w tabeli `pub_tbl` zostały przekopiowane



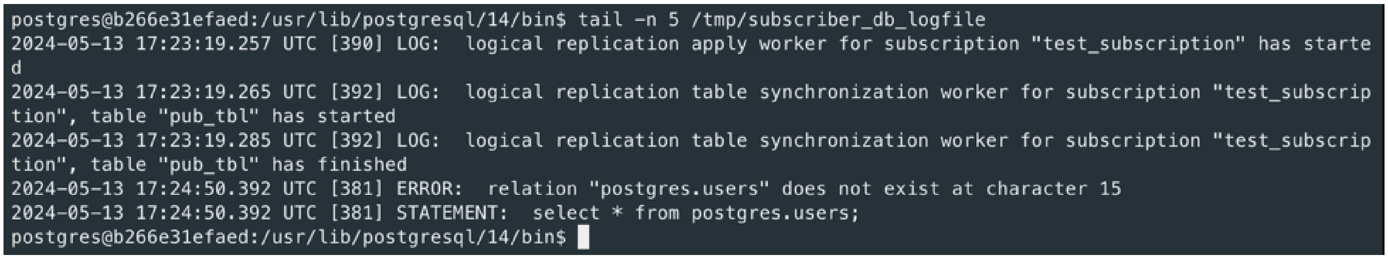
```
sub_db=# select * from pub_tbl;
 id |  name
----+--------
  1 | data1
  2 | data2
  3 | data3
  4 | data4
  5 | data5
  6 | data6
  7 | data7
  8 | data8
  9 | data9
 10 | data10
(10 rows)
```

W logach publishera widać utworzenie publikacji



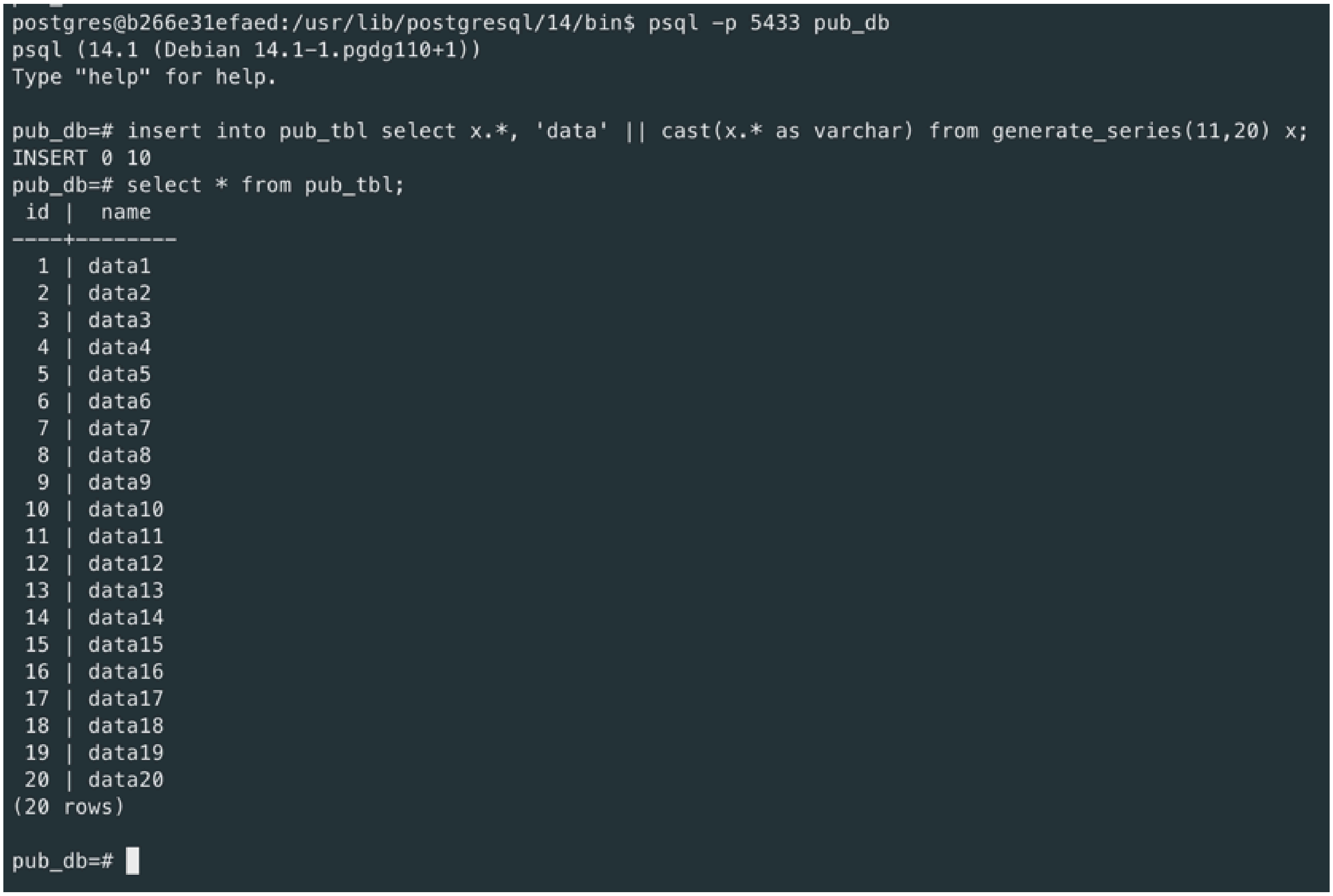
```
postgres@b266e31efaed:/usr/lib/postgresql/14/bin$ tail -n 16 /tmp/publisher_db_logfile
2024-05-13 17:23:19.250 UTC [389] STATEMENT:  CREATE_REPLICATION_SLOT "test_subscription" LOGICAL pgoutput NOEXPORT_SNAP
SHOT
2024-05-13 17:23:19.262 UTC [391] LOG:  starting logical decoding for slot "test_subscription"
2024-05-13 17:23:19.262 UTC [391] DETAIL:  Streaming transactions committing after 0/171F218, reading WAL from 0/171F1E0
.
2024-05-13 17:23:19.262 UTC [391] STATEMENT:  START_REPLICATION SLOT "test_subscription" LOGICAL 0/0 (proto_version '2',
 publication_names '"test_publication"')
2024-05-13 17:23:19.262 UTC [391] LOG:  logical decoding found consistent point at 0/171F1E0
2024-05-13 17:23:19.262 UTC [391] DETAIL:  There are no running transactions.
2024-05-13 17:23:19.262 UTC [391] STATEMENT:  START_REPLICATION SLOT "test_subscription" LOGICAL 0/0 (proto_version '2',
 publication_names '"test_publication"')
2024-05-13 17:23:19.277 UTC [393] LOG:  logical decoding found consistent point at 0/171F218
2024-05-13 17:23:19.277 UTC [393] DETAIL:  There are no running transactions.
2024-05-13 17:23:19.277 UTC [393] STATEMENT:  CREATE_REPLICATION_SLOT "pg_16395_sync_16390_7368525060899668040" LOGICAL
pgoutput USE_SNAPSHOT
2024-05-13 17:23:19.283 UTC [393] LOG:  starting logical decoding for slot "pg_16395_sync_16390_7368525060899668040"
2024-05-13 17:23:19.283 UTC [393] DETAIL:  Streaming transactions committing after 0/171F250, reading WAL from 0/171F218
.
2024-05-13 17:23:19.283 UTC [393] STATEMENT:  START_REPLICATION SLOT "pg_16395_sync_16390_7368525060899668040" LOGICAL 0
/171F250 (proto_version '2', publication_names '"test_publication"')
2024-05-13 17:23:19.283 UTC [393] LOG:  logical decoding found consistent point at 0/171F218
2024-05-13 17:23:19.283 UTC [393] DETAIL:  There are no running transactions.
2024-05-13 17:23:19.283 UTC [393] STATEMENT:  START_REPLICATION SLOT "pg_16395_sync_16390_7368525060899668040" LOGICAL 0
/171F250 (proto_version '2', publication_names '"test_publication"')
postgres@b266e31efaed:/usr/lib/postgresql/14/bin$
```

W logach subscribera widać utworzenie subskrypcji



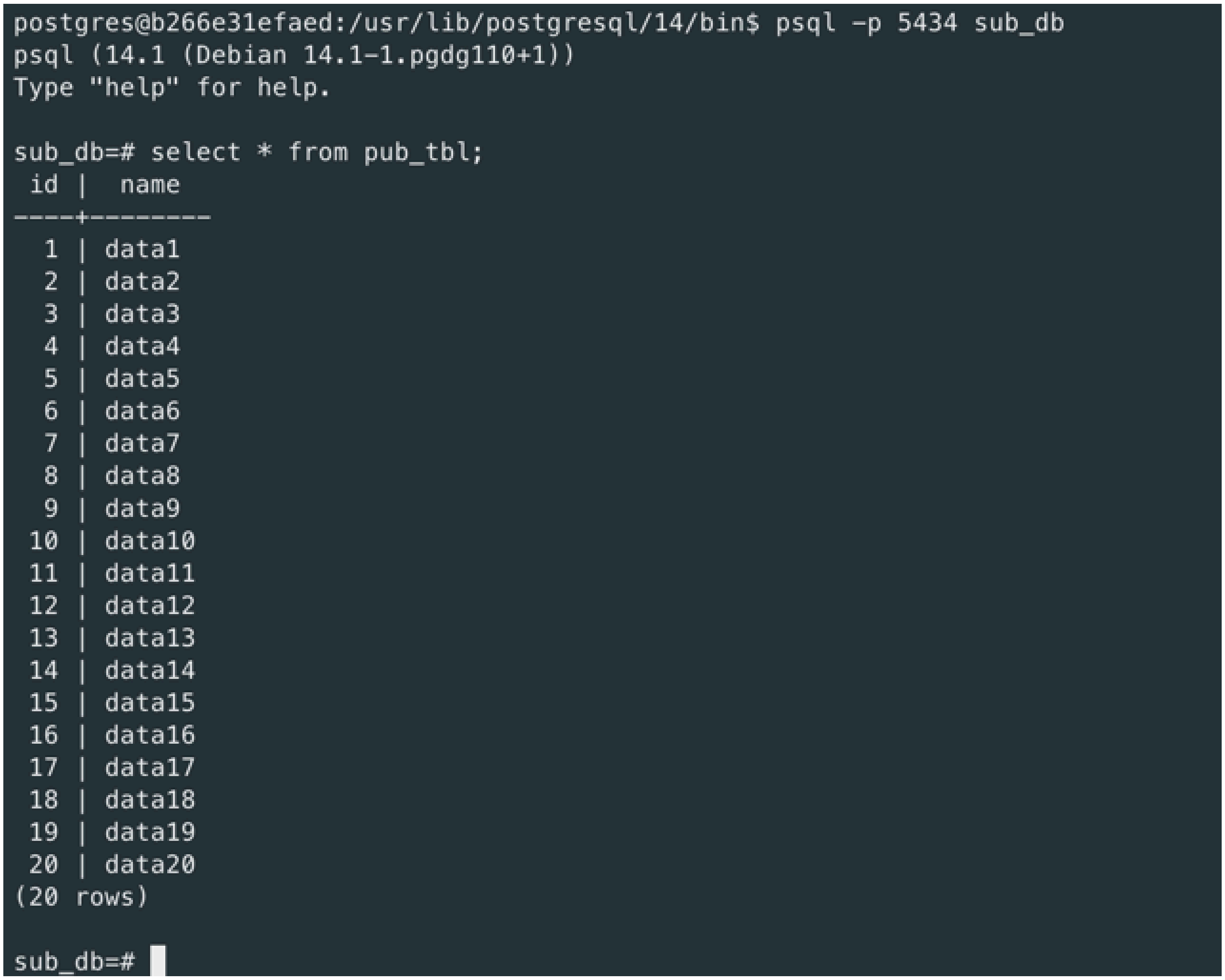
```
postgres@b266e31efaed:/usr/lib/postgresql/14/bin$ tail -n 5 /tmp/subscriber_db_logfile
2024-05-13 17:23:19.257 UTC [390] LOG:  logical replication apply worker for subscription "test_subscription" has starte
d
2024-05-13 17:23:19.265 UTC [392] LOG:  logical replication table synchronization worker for subscription "test_subscrip
tion", table "pub_tbl" has started
2024-05-13 17:23:19.285 UTC [392] LOG:  logical replication table synchronization worker for subscription "test_subscrip
tion", table "pub_tbl" has finished
2024-05-13 17:24:50.392 UTC [381] ERROR:  relation "postgres.users" does not exist at character 15
2024-05-13 17:24:50.392 UTC [381] STATEMENT:  select * from postgres.users;
postgres@b266e31efaed:/usr/lib/postgresql/14/bin$
```

Utworzenie nowych 10 rekordów w bazie `pub_db` w tabeli `pub_tbl`



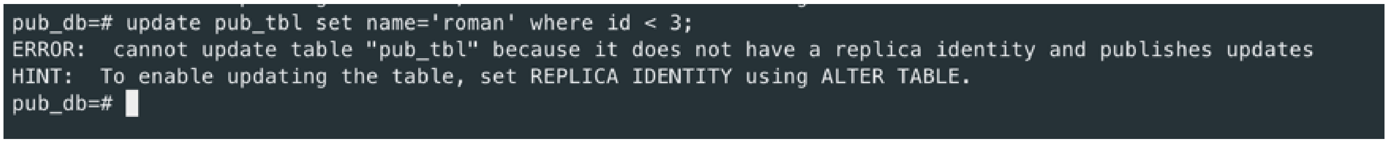
```
postgres@b266e31efaed:/usr/lib/postgresql/14/bin$ psql -p 5433 pub_db
psql (14.1 (Debian 14.1-1.pgdg110+1))
Type "help" for help.

pub_db=# insert into pub_tbl select x.*, 'data' || cast(x.* as varchar) from generate_series(11,20) x;
INSERT 0 10
pub_db=# select * from pub_tbl;
 id |  name
----+--------
  1 | data1
  2 | data2
  3 | data3
  4 | data4
  5 | data5
  6 | data6
  7 | data7
  8 | data8
  9 | data9
 10 | data10
 11 | data11
 12 | data12
 13 | data13
 14 | data14
 15 | data15
 16 | data16
 17 | data17
 18 | data18
 19 | data19
 20 | data20
(20 rows)

pub_db=# 
```

Rekordy zostały przekopiowane do bazy `sub_db`



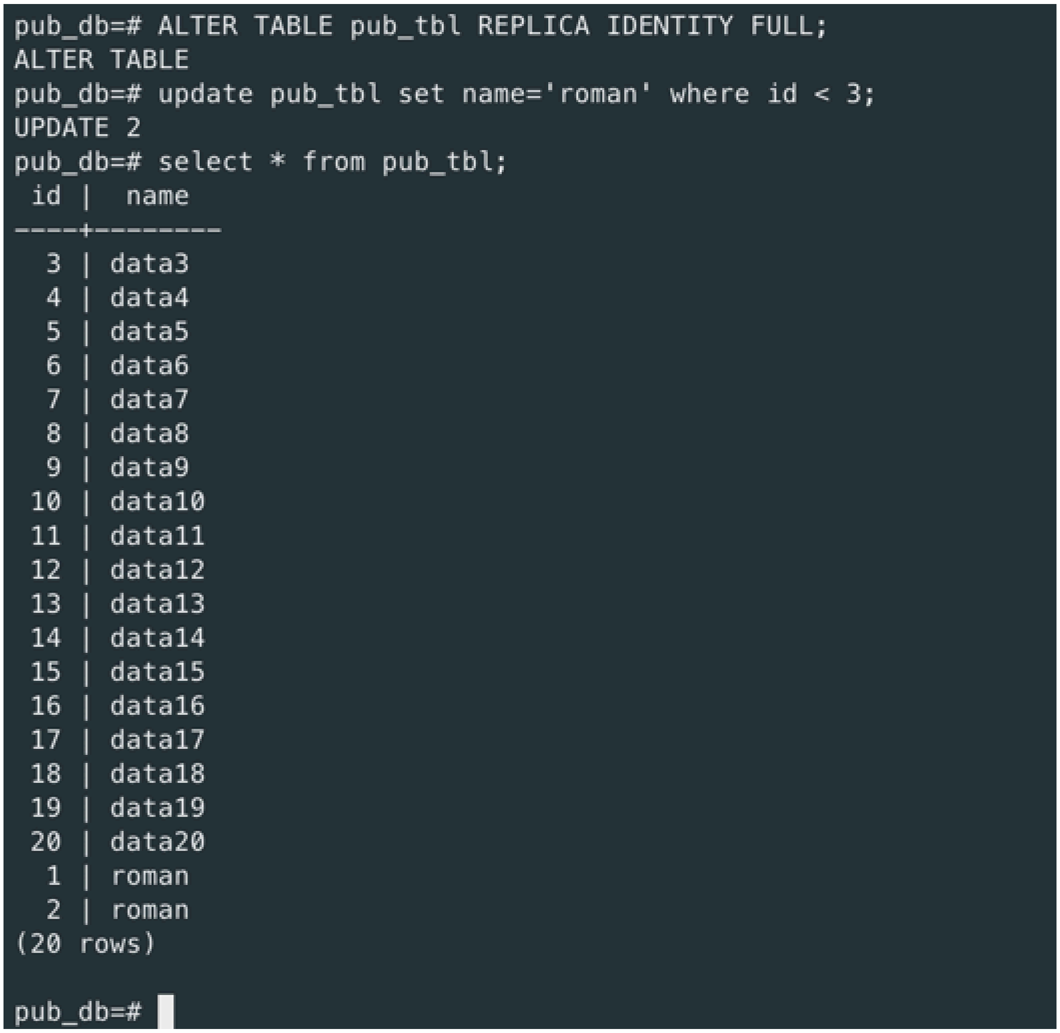
```
postgres@b266e31efaed:/usr/lib/postgresql/14/bin$ psql -p 5434 sub_db
psql (14.1 (Debian 14.1-1.pgdg110+1))
Type "help" for help.

sub_db=# select * from pub_tbl;
 id |  name
----+--------
  1 | data1
  2 | data2
  3 | data3
  4 | data4
  5 | data5
  6 | data6
  7 | data7
  8 | data8
  9 | data9
 10 | data10
 11 | data11
 12 | data12
 13 | data13
 14 | data14
 15 | data15
 16 | data16
 17 | data17
 18 | data18
 19 | data19
 20 | data20
(20 rows)

sub_db=# 
```

Nie udało się wykonać komendy update, otrzymaliśmy następujący komunikat o błędzie



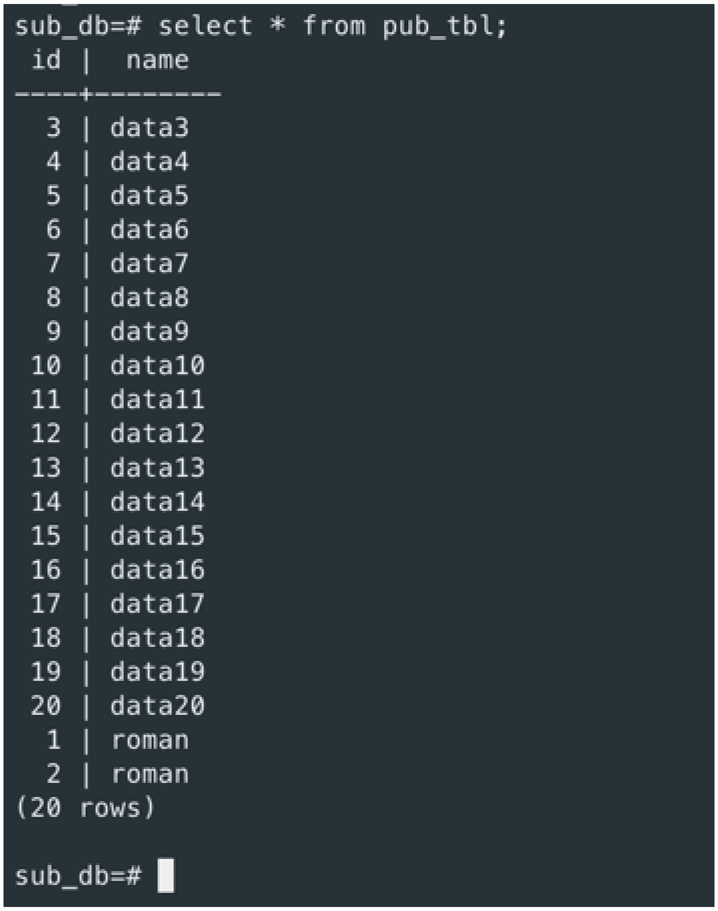
```
pub_db=# update pub_tbl set name='roman' where id < 3;
ERROR:  cannot update table "pub_tbl" because it does not have a replica identity and publishes updates
HINT:  To enable updating the table, set REPLICA IDENTITY using ALTER TABLE.
pub_db=# 
```

Według informacji które znaleźliśmy, jest to spowodowane brakiem primary key w tabeli, ale można to też obejść wykonując proponowane przez postgresa polecenie



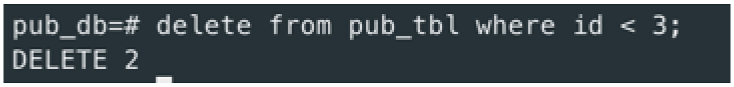
```
pub_db=# ALTER TABLE pub_tbl REPLICA IDENTITY FULL;
ALTER TABLE
pub_db=# update pub_tbl set name='roman' where id < 3;
UPDATE 2
pub_db=# select * from pub_tbl;
 id |  name
----+--------
  3 | data3
  4 | data4
  5 | data5
  6 | data6
  7 | data7
  8 | data8
  9 | data9
 10 | data10
 11 | data11
 12 | data12
 13 | data13
 14 | data14
 15 | data15
 16 | data16
 17 | data17
 18 | data18
 19 | data19
 20 | data20
  1 | roman
  2 | roman
(20 rows)

pub_db=# 
```

Dane zostały poprawnie uaktualnione w replice



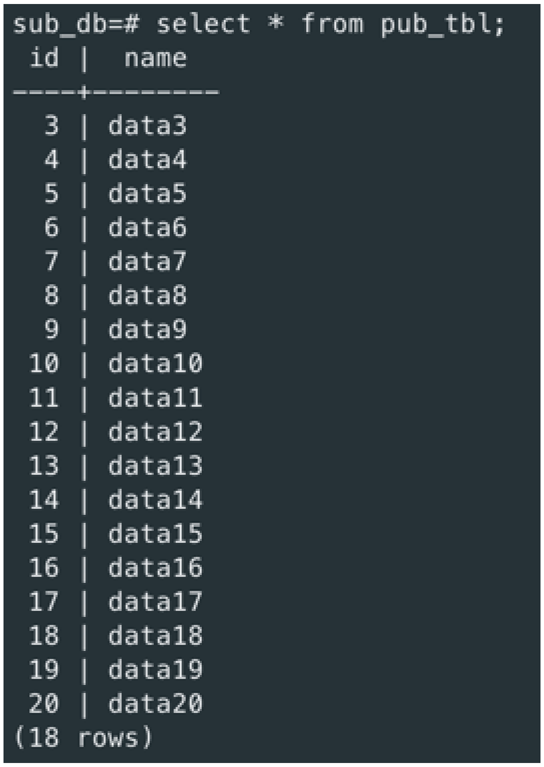
```
sub_db=# select * from pub_tbl;
 id |  name
----+--------
  3 | data3
  4 | data4
  5 | data5
  6 | data6
  7 | data7
  8 | data8
  9 | data9
 10 | data10
 11 | data11
 12 | data12
 13 | data13
 14 | data14
 15 | data15
 16 | data16
 17 | data17
 18 | data18
 19 | data19
 20 | data20
  1 | roman
  2 | roman
(20 rows)

sub_db=#
```

Wykonano komende delete na serwerze publishera



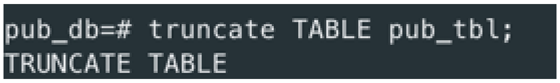
```
pub_db=# delete from pub_tbl where id < 3;
DELETE 2
```

Rekordy zostały usunięte również z subscribera



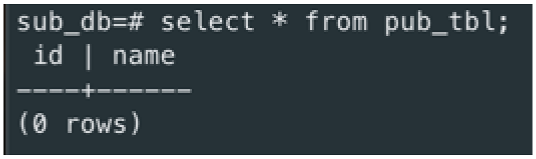
```
sub_db=# select * from pub_tbl;
 id |  name
----+--------
  3 | data3
  4 | data4
  5 | data5
  6 | data6
  7 | data7
  8 | data8
  9 | data9
 10 | data10
 11 | data11
 12 | data12
 13 | data13
 14 | data14
 15 | data15
 16 | data16
 17 | data17
 18 | data18
 19 | data19
 20 | data20
(18 rows)
```

Wykonano komende truncate na serwerze publishera



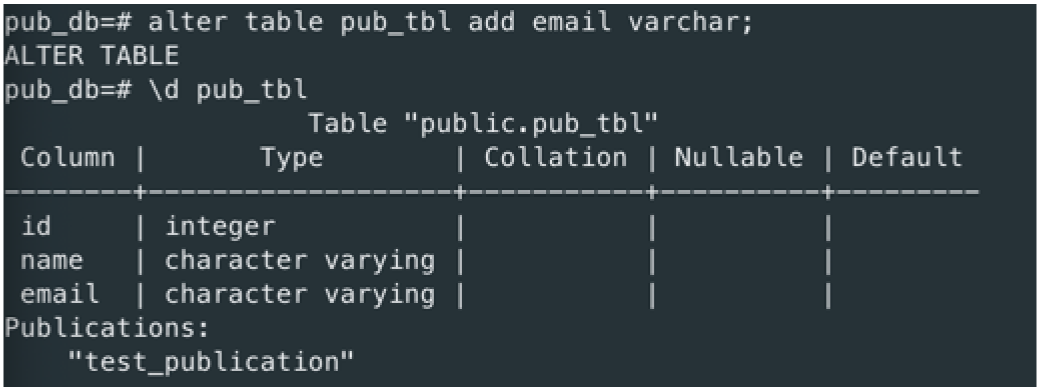
```
pub_db=# truncate TABLE pub_tbl;
TRUNCATE TABLE
```

Rekordy zostały usunięte również z subscribera



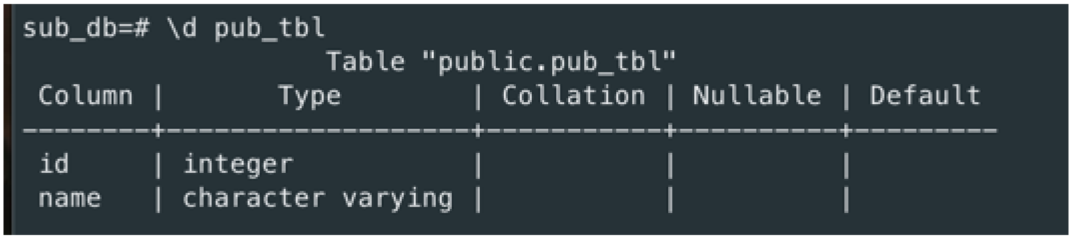
```
sub_db=# select * from pub_tbl;
 id | name
----+------
(0 rows)
```

Dodano do tabeli publishera nową kolumnę



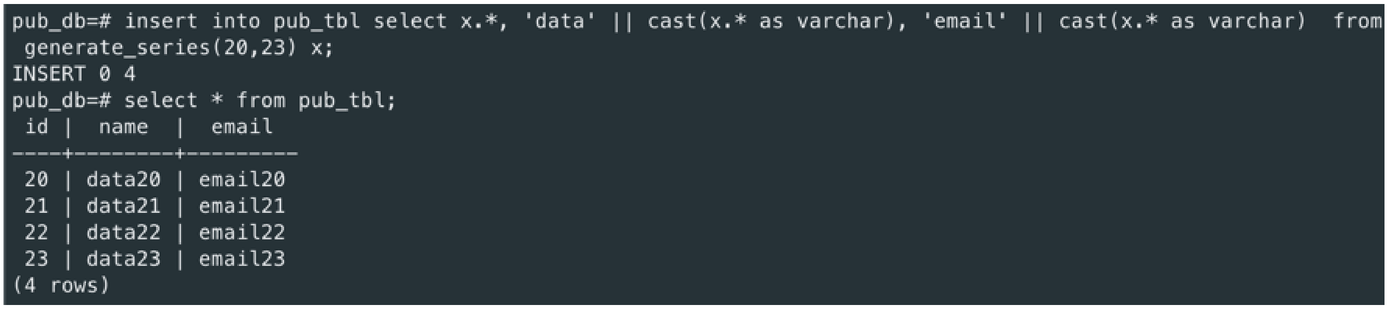
```
pub_db=# alter table pub_tbl add email varchar;
ALTER TABLE
pub_db=# \d pub_tbl
                   Table "public.pub_tbl"
 Column |       Type        | Collation | Nullable | Default
--------+-------------------+-----------+----------+---------
 id     | integer           |           |          |
 name   | character varying |           |          |
 email  | character varying |           |          |
Publications:
    "test_publication"
```

Kolumna nie została zreplikowana na serwerze subscribera



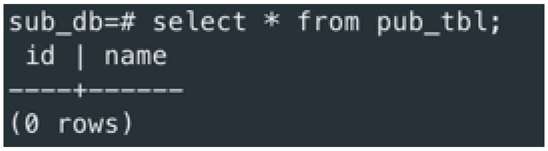
```
sub_db=# \d pub_tbl
                   Table "public.pub_tbl"
 Column |       Type        | Collation | Nullable | Default
--------+-------------------+-----------+----------+---------
 id     | integer           |           |          |
 name   | character varying |           |          |
```

Do zmodyfikowanej tabeli publishera dodano nowe rekordy



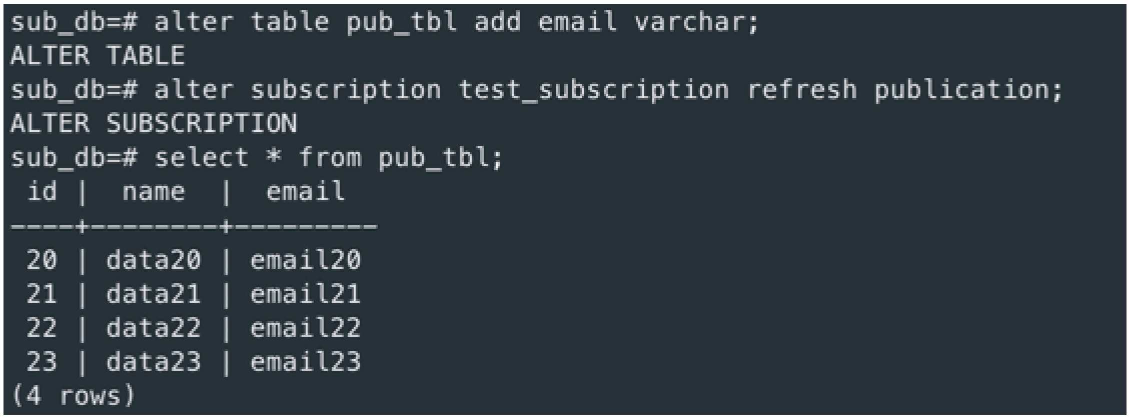
```
pub_db=# insert into pub_tbl select x.*, 'data' || cast(x.* as varchar), 'email' || cast(x.* as varchar)  from
 generate_series(20,23) x;
INSERT 0 4
pub_db=# select * from pub_tbl;
 id |  name  |  email
----+--------+---------
 20 | data20 | email20
 21 | data21 | email21
 22 | data22 | email22
 23 | data23 | email23
(4 rows)
```

Rekordy nie zostały zreplikowane do tabeli subscribera



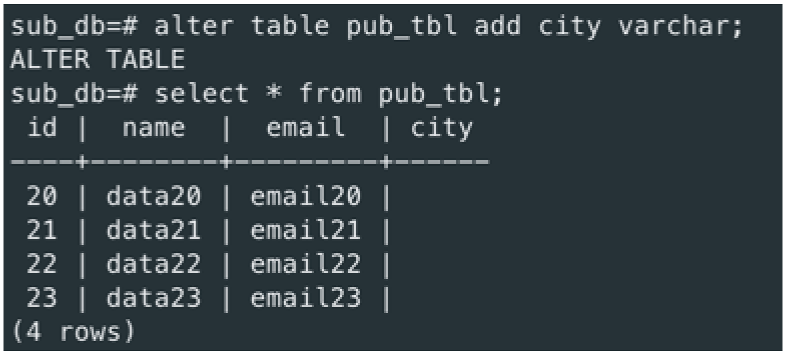
```
sub_db=# select * from pub_tbl;
 id | name
----+------
(0 rows)
```

Aby naprawić replikację do tabeli subscribera dodano nową kolumnę a następnie odświeżono subskrypcję



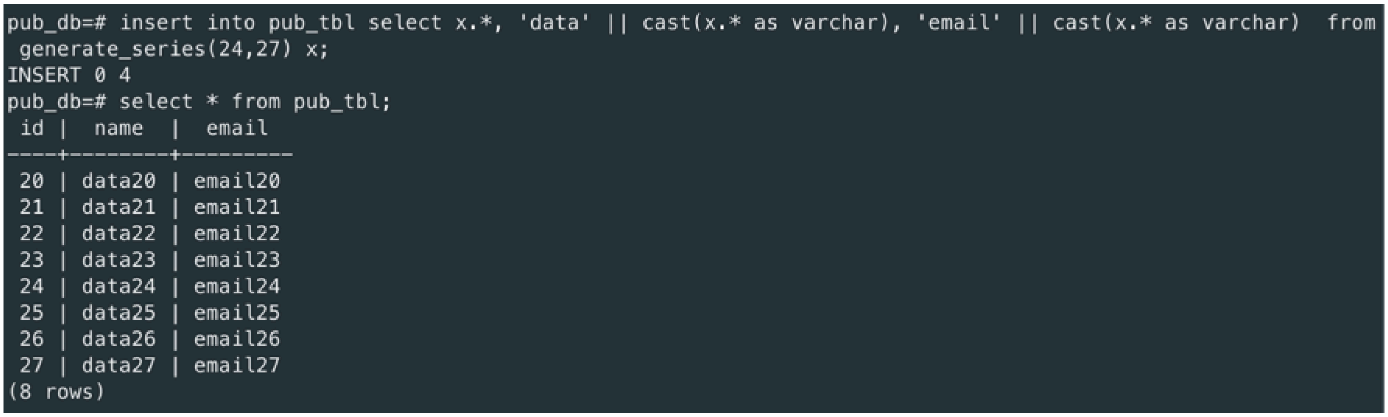
```
sub_db=# alter table pub_tbl add email varchar;
ALTER TABLE
sub_db=# alter subscription test_subscription refresh publication;
ALTER SUBSCRIPTION
sub_db=# select * from pub_tbl;
 id |  name  |  email
----+--------+---------
 20 | data20 | email20
 21 | data21 | email21
 22 | data22 | email22
 23 | data23 | email23
(4 rows)
```

Do tabeli subscribera dodano nową kolumnę



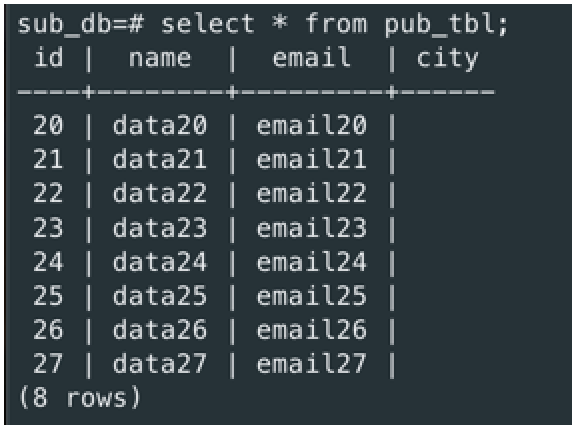
```
sub_db=# alter table pub_tbl add city varchar;
ALTER TABLE
sub_db=# select * from pub_tbl;
 id |  name  |  email  | city
----+--------+---------+------
 20 | data20 | email20 |
 21 | data21 | email21 |
 22 | data22 | email22 |
 23 | data23 | email23 |
(4 rows)
```

Do tabeli publishera dodano nowe rekordy



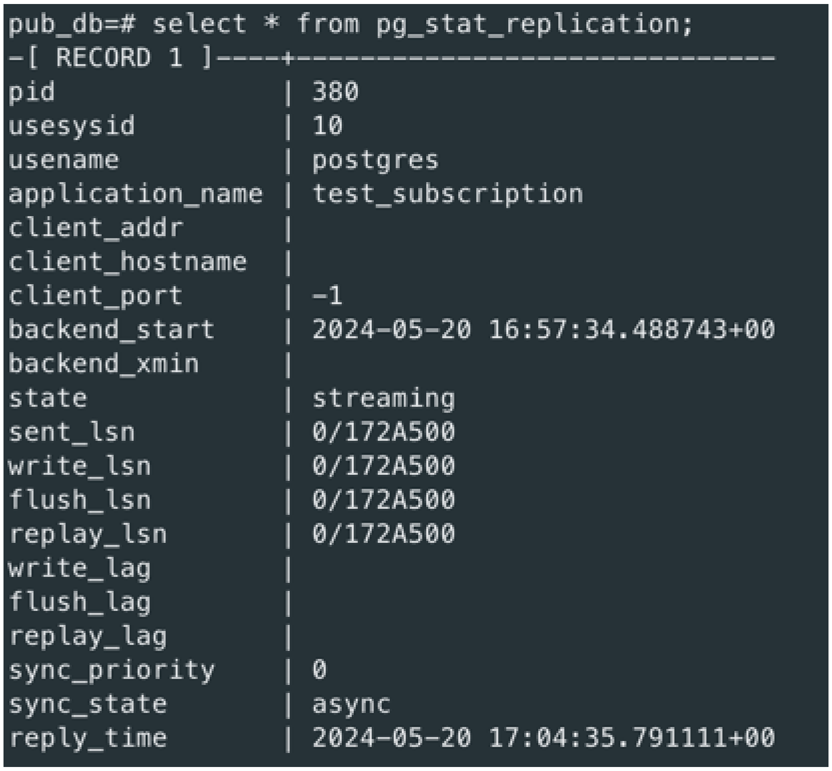
```
pub_db=# insert into pub_tbl select x.*, 'data' || cast(x.* as varchar), 'email' || cast(x.* as varchar)  from
 generate_series(24,27) x;
INSERT 0 4
pub_db=# select * from pub_tbl;
 id |  name  |  email
----+--------+---------
 20 | data20 | email20
 21 | data21 | email21
 22 | data22 | email22
 23 | data23 | email23
 24 | data24 | email24
 25 | data25 | email25
 26 | data26 | email26
 27 | data27 | email27
(8 rows)
```

Rekordy zostały zreplikowane w tabeli subscribera, ich wartość w nowej kolumnie wynosiła `null`



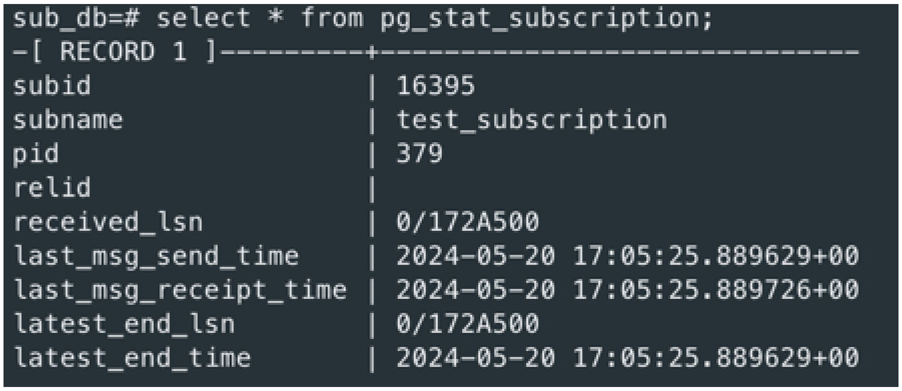
```
sub_db=# select * from pub_tbl;
 id |  name  |  email  | city
----+--------+---------+------
 20 | data20 | email20 |
 21 | data21 | email21 |
 22 | data22 | email22 |
 23 | data23 | email23 |
 24 | data24 | email24 |
 25 | data25 | email25 |
 26 | data26 | email26 |
 27 | data27 | email27 |
(8 rows)
```

Dane replikacji z serwera publishera (tabela `pg_stat_replication`)



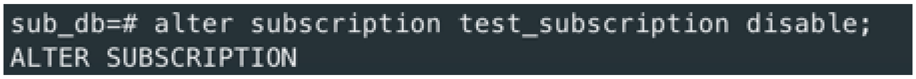
```
pub_db=# select * from pg_stat_replication;
-[ RECORD 1 ]----+------------------------------
pid              | 380
usesysid         | 10
usename          | postgres
application_name | test_subscription
client_addr      |
client_hostname  |
client_port      | -1
backend_start    | 2024-05-20 16:57:34.488743+00
backend_xmin     |
state            | streaming
sent_lsn         | 0/172A500
write_lsn        | 0/172A500
flush_lsn        | 0/172A500
replay_lsn       | 0/172A500
write_lag        |
flush_lag        |
replay_lag       |
sync_priority    | 0
sync_state       | async
reply_time       | 2024-05-20 17:04:35.791111+00
```

Na serwerze subscribera tabela `pg_stat_replication` jest pusta, dane replikacji są zapisane w tabeli `pg_stat_subscription`



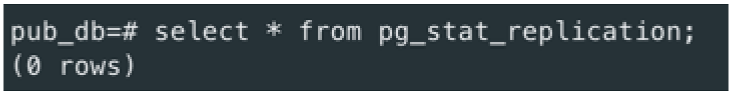
```
sub_db=# select * from pg_stat_subscription;
-[ RECORD 1 ]---------+------------------------------
subid                 | 16395
subname               | test_subscription
pid                   | 379
relid                 |
received_lsn          | 0/172A500
last_msg_send_time    | 2024-05-20 17:05:25.889629+00
last_msg_receipt_time | 2024-05-20 17:05:25.889726+00
latest_end_lsn        | 0/172A500
latest_end_time       | 2024-05-20 17:05:25.889629+00
```

Zatrzymano subskrypcję na serwerze subscribera



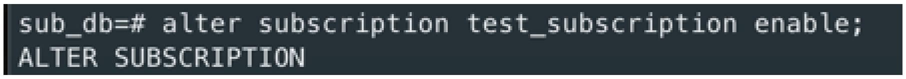
```
sub_db=# alter subscription test_subscription disable;
ALTER SUBSCRIPTION
```

Na serwerze publishera tabela `pg_stat_replication` jest pusta



```
pub_db=# select * from pg_stat_replication;
(0 rows)
```

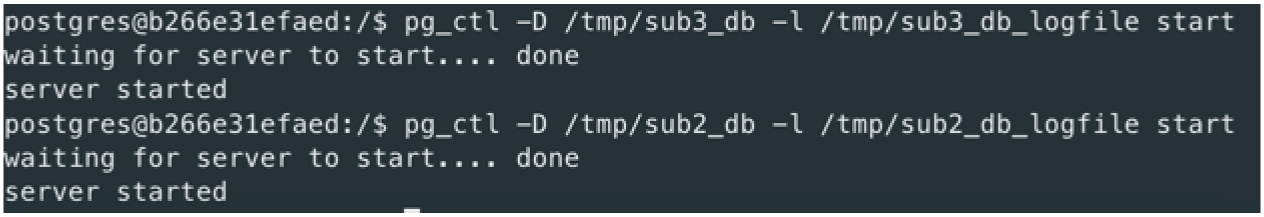
Ponownie uruchomiono subskrypcję



```
sub_db=# alter subscription test_subscription enable;
ALTER SUBSCRIPTION
```

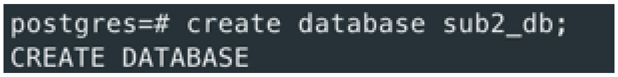
Rozszerzenie konfiguracji

Utworzono 2 nowe serwery - `sub2_db` na porcie `5435` i `sub3_db` na porcie `5436`

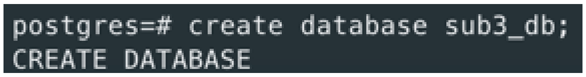


```
postgres@b266e31efaed:/$ pg_ctl -D /tmp/sub3_db -l /tmp/sub3_db_logfile start
waiting for server to start.... done
server started
postgres@b266e31efaed:/$ pg_ctl -D /tmp/sub2_db -l /tmp/sub2_db_logfile start
waiting for server to start.... done
server started
```

Utworzono na nich odpowiednio bazy `sub2_db` i `sub3_db`

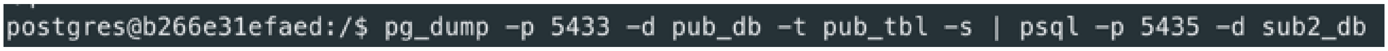


```
postgres=# create database sub2_db;
CREATE DATABASE
```

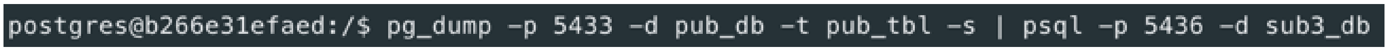


```
postgres=# create database sub3_db;
CREATE DATABASE
```

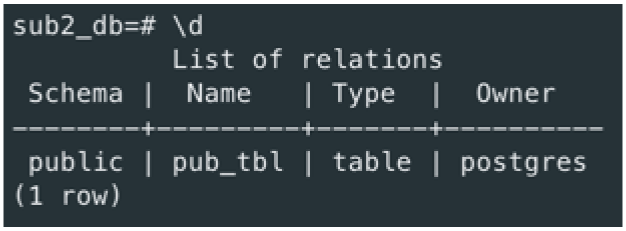
Przekopiowano schemat tabeli `pub_tbl` do nowo utworzonych baz



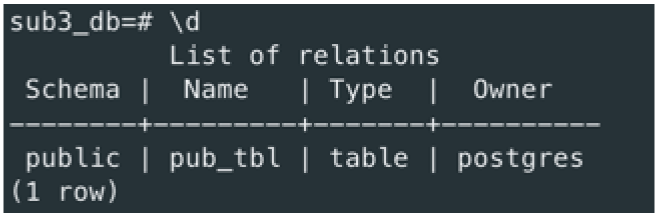
```
postgres@b266e31efaed:/$ pg_dump -p 5433 -d pub_db -t pub_tbl -s | psql -p 5435 -d sub2_db
```



```
postgres@b266e31efaed:/$ pg_dump -p 5433 -d pub_db -t pub_tbl -s | psql -p 5436 -d sub3_db
```

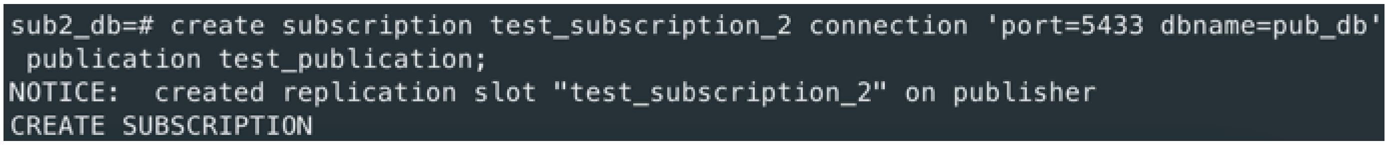


```
sub2_db=# \d
          List of relations
 Schema |  Name   | Type  |  Owner
--------+---------+-------+----------
 public | pub_tbl | table | postgres
(1 row)
```

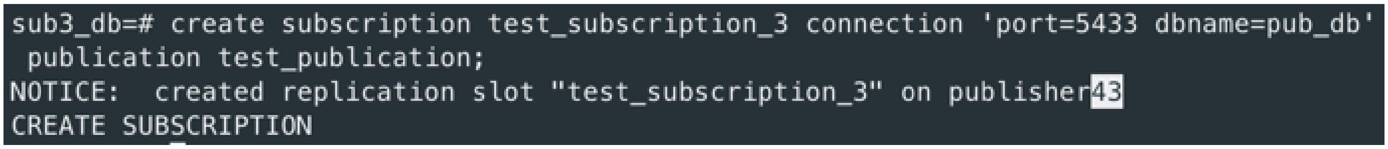


```
sub3_db=# \d
          List of relations
 Schema |  Name   | Type  |  Owner
--------+---------+-------+----------
 public | pub_tbl | table | postgres
(1 row)
```

Stworzono subskrypcję na obu bazach do bazy publishera

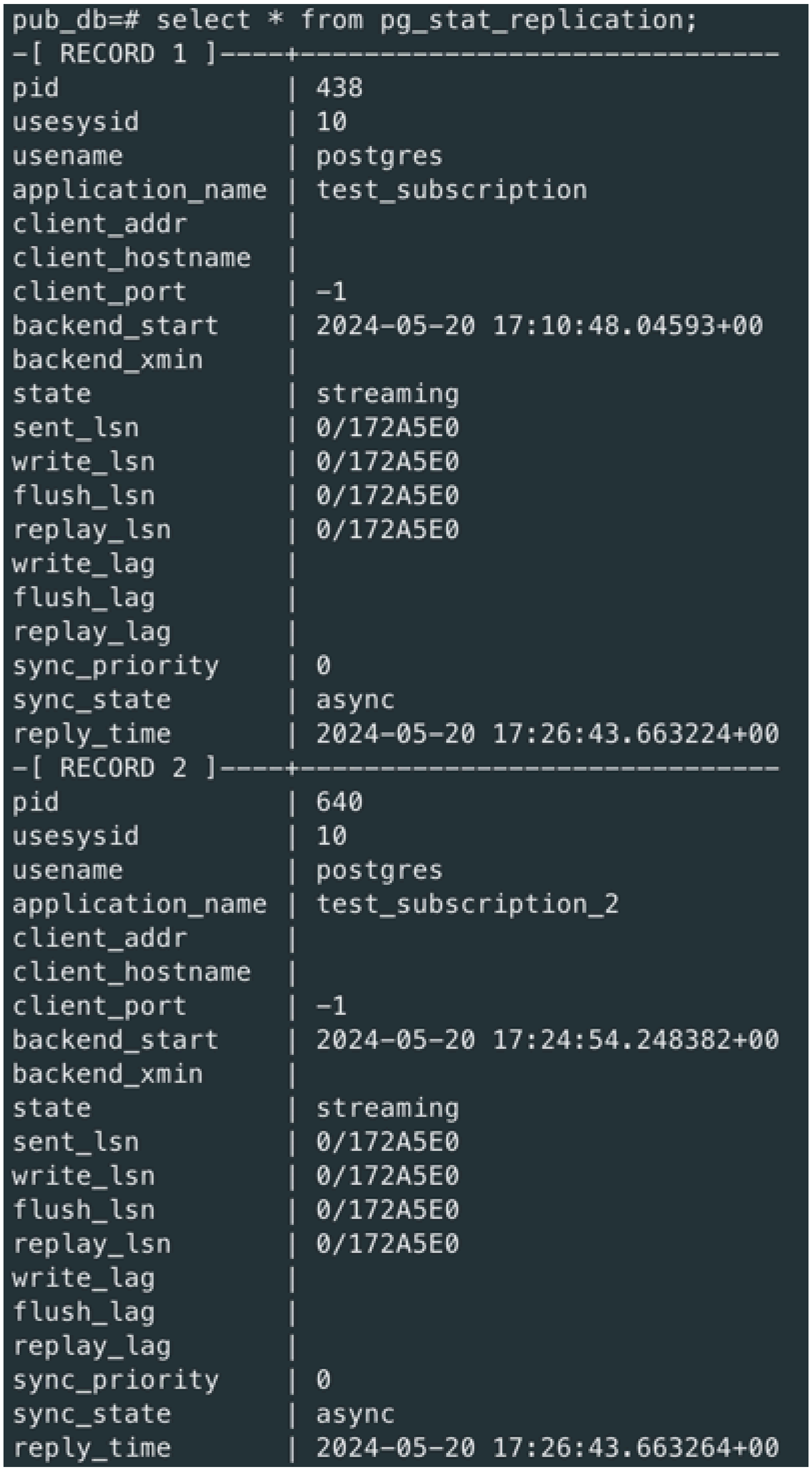


```
sub2_db=# create subscription test_subscription_2 connection 'port=5433 dbname=pub_db'
 publication test_publication;
NOTICE:  created replication slot "test_subscription_2" on publisher
CREATE SUBSCRIPTION
```

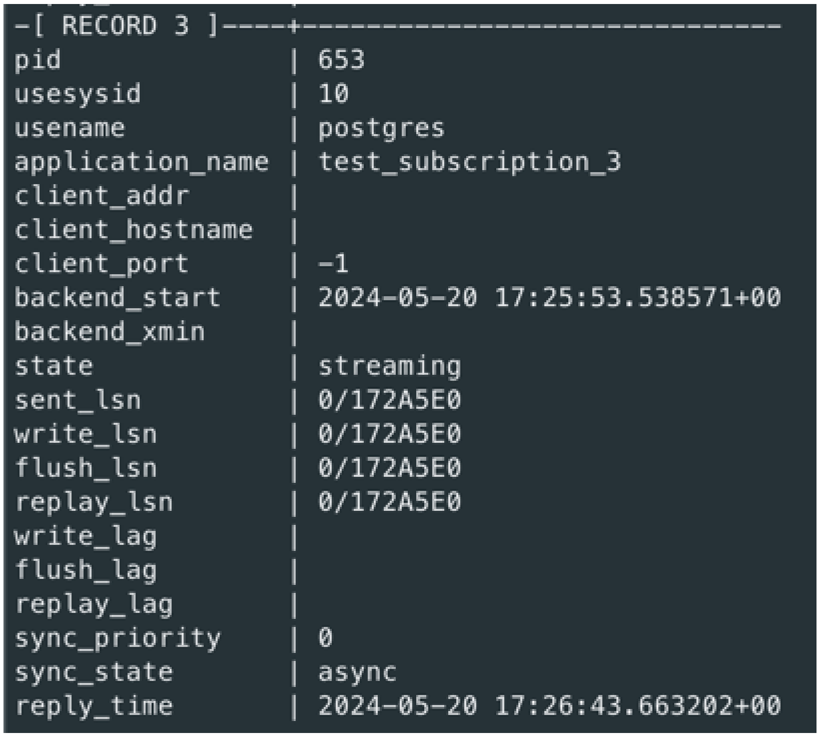


```
sub3_db=# create subscription test_subscription_3 connection 'port=5433 dbname=pub_db'
 publication test_publication;
NOTICE:  created replication slot "test_subscription_3" on publisher43
CREATE SUBSCRIPTION
```

Wszystkie 3 subskrypcje są widoczne w tabeli `pg_stat_replication` publishera

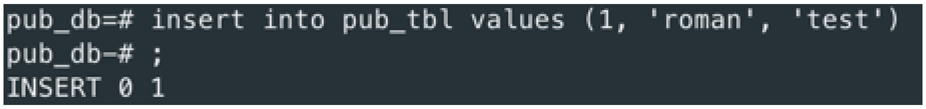


```
pub_db=# select * from pg_stat_replication;
-[ RECORD 1 ]----+------------------------------
pid              | 438
usesysid         | 10
usename          | postgres
application_name | test_subscription
client_addr      |
client_hostname  |
client_port      | -1
backend_start    | 2024-05-20 17:10:48.04593+00
backend_xmin     |
state            | streaming
sent_lsn         | 0/172A5E0
write_lsn        | 0/172A5E0
flush_lsn        | 0/172A5E0
replay_lsn       | 0/172A5E0
write_lag        |
flush_lag        |
replay_lag       |
sync_priority    | 0
sync_state       | async
reply_time       | 2024-05-20 17:26:43.663224+00
-[ RECORD 2 ]----+------------------------------
pid              | 640
usesysid         | 10
usename          | postgres
application_name | test_subscription_2
client_addr      |
client_hostname  |
client_port      | -1
backend_start    | 2024-05-20 17:24:54.248382+00
backend_xmin     |
state            | streaming
sent_lsn         | 0/172A5E0
write_lsn        | 0/172A5E0
flush_lsn        | 0/172A5E0
replay_lsn       | 0/172A5E0
write_lag        |
flush_lag        |
replay_lag       |
sync_priority    | 0
sync_state       | async
reply_time       | 2024-05-20 17:26:43.663264+00
```



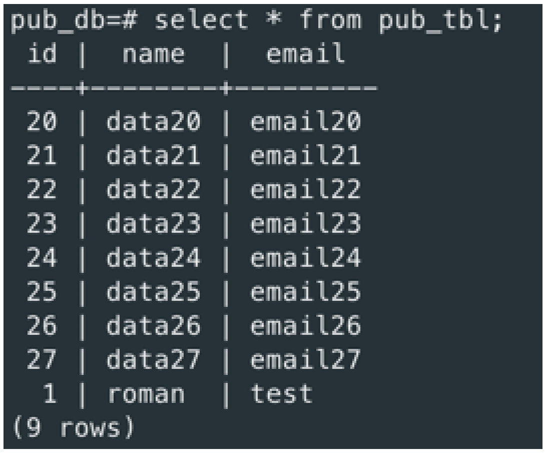
```
-[ RECORD 3 ]----+------------------------------
pid              | 653
usesysid         | 10
usename          | postgres
application_name | test_subscription_3
client_addr      |
client_hostname  |
client_port      | -1
backend_start    | 2024-05-20 17:25:53.538571+00
backend_xmin     |
state            | streaming
sent_lsn         | 0/172A5E0
write_lsn        | 0/172A5E0
flush_lsn        | 0/172A5E0
replay_lsn       | 0/172A5E0
write_lag        |
flush_lag        |
replay_lag       |
sync_priority    | 0
sync_state       | async
reply_time       | 2024-05-20 17:26:43.663202+00
```

Dodano nowy rekord do tabeli w bazie publishera

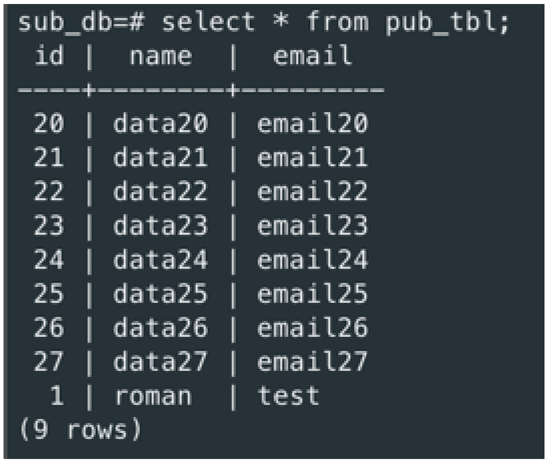


```
pub_db=# insert into pub_tbl values (1, 'roman', 'test')
pub_db-# ;
INSERT 0 1
```

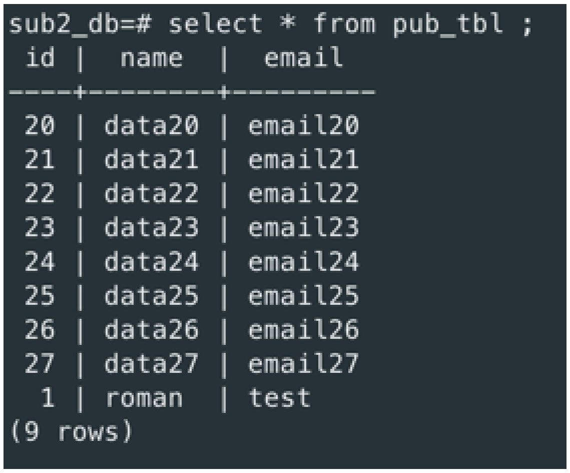
Wszystkie bazy posiadają takie same rekody w tabeli



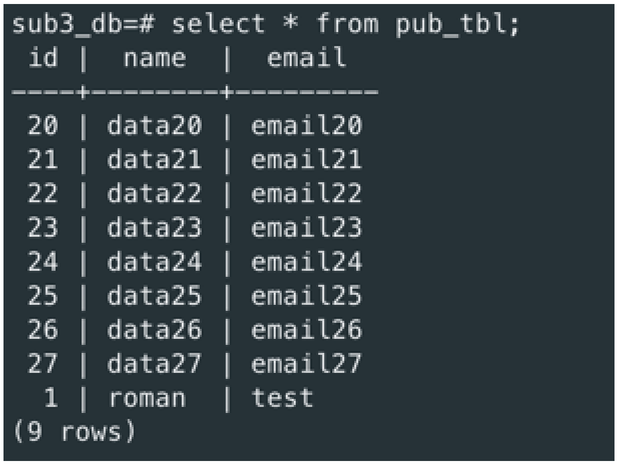
```
pub_db=# select * from pub_tbl;
 id |  name  |  email
----+--------+---------
 20 | data20 | email20
 21 | data21 | email21
 22 | data22 | email22
 23 | data23 | email23
 24 | data24 | email24
 25 | data25 | email25
 26 | data26 | email26
 27 | data27 | email27
  1 | roman  | test
(9 rows)
```



```
sub_db=# select * from pub_tbl;
 id |  name  |  email
----+--------+---------
 20 | data20 | email20
 21 | data21 | email21
 22 | data22 | email22
 23 | data23 | email23
 24 | data24 | email24
 25 | data25 | email25
 26 | data26 | email26
 27 | data27 | email27
  1 | roman  | test
(9 rows)
```

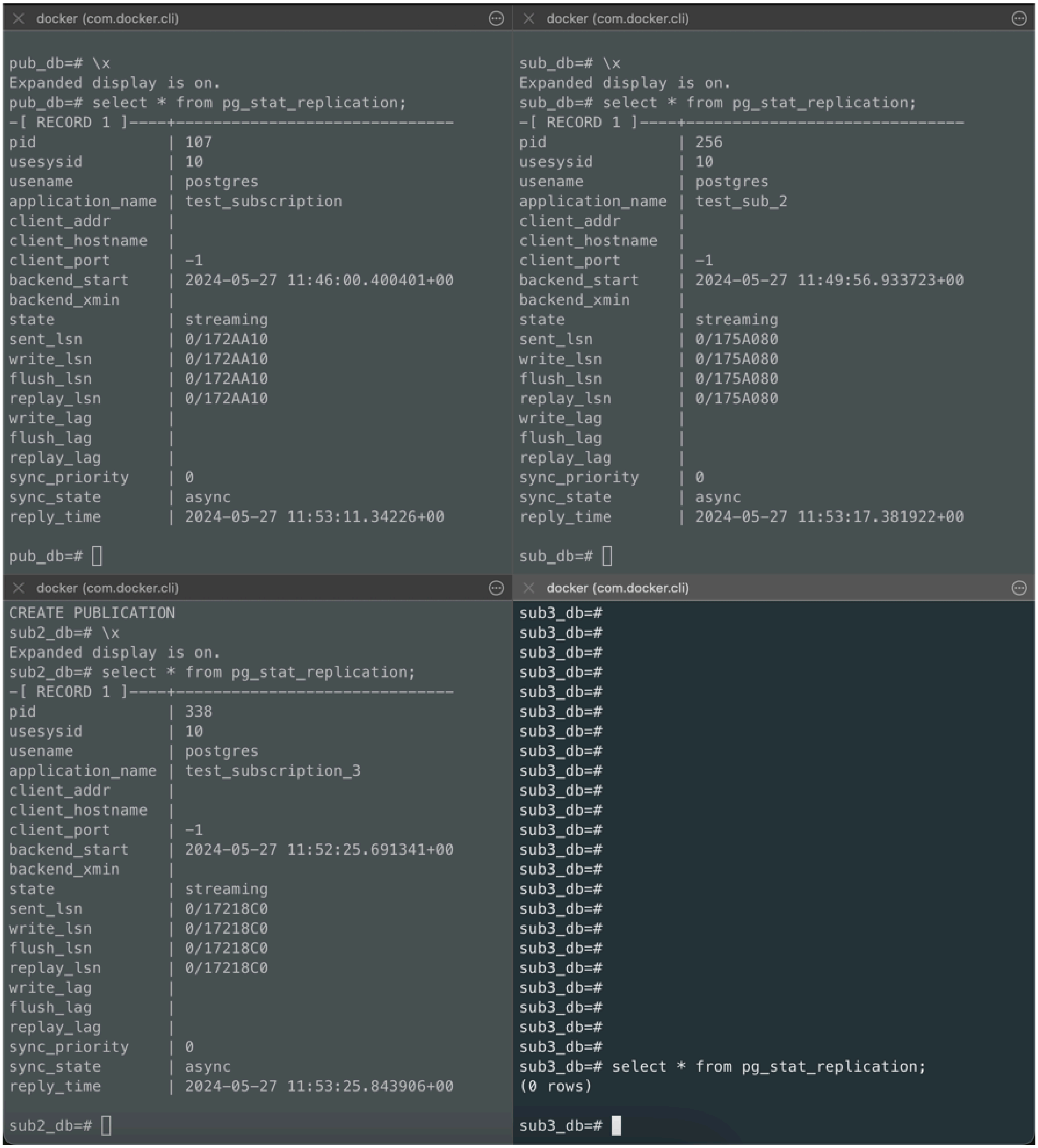


```
sub2_db=# select * from pub_tbl ;
 id |  name  |  email
----+--------+---------
 20 | data20 | email20
 21 | data21 | email21
 22 | data22 | email22
 23 | data23 | email23
 24 | data24 | email24
 25 | data25 | email25
 26 | data26 | email26
 27 | data27 | email27
  1 | roman  | test
(9 rows)
```



```
sub3_db=# select * from pub_tbl;
 id |  name  |  email
----+--------+---------
 20 | data20 | email20
 21 | data21 | email21
 22 | data22 | email22
 23 | data23 | email23
 24 | data24 | email24
 25 | data25 | email25
 26 | data26 | email26
 27 | data27 | email27
  1 | roman  | test
(9 rows)
```

Następnie zmieniono sposób replikacji na kaskadowy (publisher -> sub1 -> sub2 -> sub3)

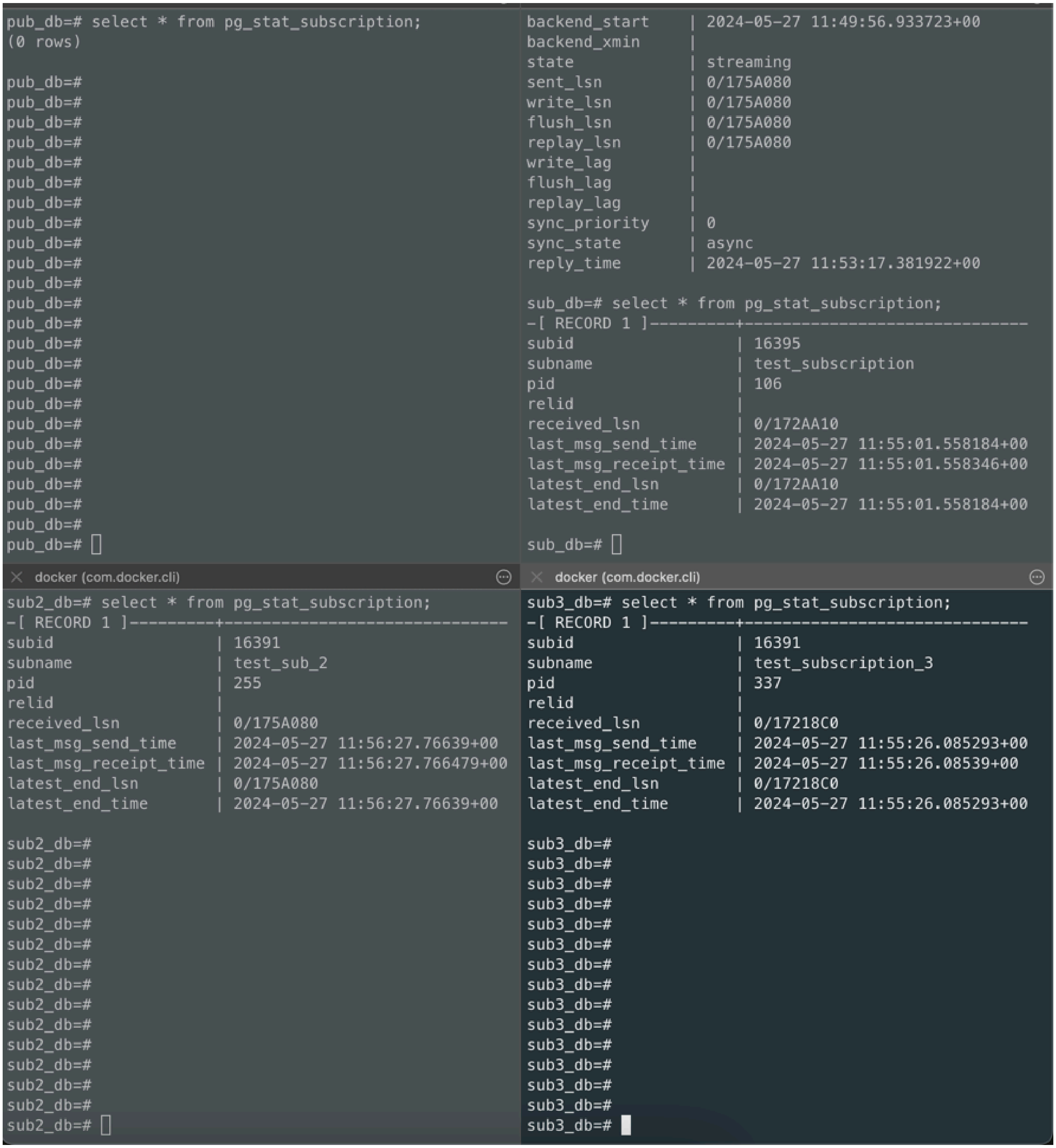


```
pub_db=# \x
Expanded display is on.
pub_db=# select * from pg_stat_replication;
-[ RECORD 1 ]----+------------------------------
pid              | 107
usesysid         | 10
usename          | postgres
application_name | test_subscription
client_addr      |
client_hostname  |
client_port      | -1
backend_start    | 2024-05-27 11:46:00.400401+00
backend_xmin     |
state            | streaming
sent_lsn         | 0/172AA10
write_lsn        | 0/172AA10
flush_lsn        | 0/172AA10
replay_lsn       | 0/172AA10
write_lag        |
flush_lag        |
replay_lag       |
sync_priority    | 0
sync_state       | async
reply_time       | 2024-05-27 11:53:11.34226+00

pub_db=#
```

```
sub_db=# \x
Expanded display is on.
sub_db=# select * from pg_stat_replication;
-[ RECORD 1 ]----+------------------------------
pid              | 256
usesysid         | 10
usename          | postgres
application_name | test_sub_2
client_addr      |
client_hostname  |
client_port      | -1
backend_start    | 2024-05-27 11:49:56.933723+00
backend_xmin     |
state            | streaming
sent_lsn         | 0/175A080
write_lsn        | 0/175A080
flush_lsn        | 0/175A080
replay_lsn       | 0/175A080
write_lag        |
flush_lag        |
replay_lag       |
sync_priority    | 0
sync_state       | async
reply_time       | 2024-05-27 11:53:17.381922+00

sub_db=#
```

```
CREATE PUBLICATION
sub2_db=# \x
Expanded display is on.
sub2_db=# select * from pg_stat_replication;
-[ RECORD 1 ]----+------------------------------
pid              | 338
usesysid         | 10
usename          | postgres
application_name | test_subscription_3
client_addr      |
client_hostname  |
client_port      | -1
backend_start    | 2024-05-27 11:52:25.691341+00
backend_xmin     |
state            | streaming
sent_lsn         | 0/17218C0
write_lsn        | 0/17218C0
flush_lsn        | 0/17218C0
replay_lsn       | 0/17218C0
write_lag        |
flush_lag        |
replay_lag       |
sync_priority    | 0
sync_state       | async
reply_time       | 2024-05-27 11:53:25.843906+00

sub2_db=#
```

```
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=# select * from pg_stat_replication;
(0 rows)

sub3_db=#
```



```
pub_db=# select * from pg_stat_subscription;
(0 rows)

pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
pub_db=#
```

```
backend_start    | 2024-05-27 11:49:56.933723+00
backend_xmin     |
state            | streaming
sent_lsn         | 0/175A080
write_lsn        | 0/175A080
flush_lsn        | 0/175A080
replay_lsn       | 0/175A080
write_lag        |
flush_lag        |
replay_lag       |
sync_priority    | 0
sync_state       | async
reply_time       | 2024-05-27 11:53:17.381922+00

sub_db=# select * from pg_stat_subscription;
-[ RECORD 1 ]---------+------------------------------
subid                 | 16395
subname               | test_subscription
pid                   | 106
relid                 |
received_lsn          | 0/172AA10
last_msg_send_time    | 2024-05-27 11:55:01.558184+00
last_msg_receipt_time | 2024-05-27 11:55:01.558346+00
latest_end_lsn        | 0/172AA10
latest_end_time       | 2024-05-27 11:55:01.558184+00

sub_db=#
```

```
sub2_db=# select * from pg_stat_subscription;
-[ RECORD 1 ]---------+------------------------------
subid                 | 16391
subname               | test_sub_2
pid                   | 255
relid                 |
received_lsn          | 0/175A080
last_msg_send_time    | 2024-05-27 11:56:27.76639+00
last_msg_receipt_time | 2024-05-27 11:56:27.766479+00
latest_end_lsn        | 0/175A080
latest_end_time       | 2024-05-27 11:56:27.76639+00

sub2_db=#
sub2_db=#
sub2_db=#
sub2_db=#
sub2_db=#
sub2_db=#
sub2_db=#
sub2_db=#
sub2_db=#
sub2_db=#
sub2_db=#
sub2_db=#
sub2_db=#
sub2_db=#
sub2_db=#
```

```
sub3_db=# select * from pg_stat_subscription;
-[ RECORD 1 ]---------+------------------------------
subid                 | 16391
subname               | test_subscription_3
pid                   | 337
relid                 |
received_lsn          | 0/17218C0
last_msg_send_time    | 2024-05-27 11:55:26.085293+00
last_msg_receipt_time | 2024-05-27 11:55:26.08539+00
latest_end_lsn        | 0/17218C0
latest_end_time       | 2024-05-27 11:55:26.085293+00

sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
sub3_db=#
```