

Installation af Postgres database

2023.04.17 Egon Nør

Vejledningen her tager udgangspunkt i installation af Postgres database version 15 med tilhørende pgAdmin på en Windows Server 2019

Indhold

Installation af Postgres database.....	1
Ændringshistorik.....	3
Serverbestykning	4
Download og installation af database cluster	5
Start pgAdmin 4.....	14
Klargør database cluster til import af EASY-A data	15
Opret roller, der giver adgang til de enkelte views	17
Opret en rolle, der giver read adgang til alt i databasen.....	18
Import af EASY-A data	19
Tildel rettigheder til roller for views og tabeller	20
Opret en elevadmbruger	21
Opret en brugeradgang i pgAdmin.....	22
Opret af database superuser.....	28
Sletning af en bruger:	28
Hints til administration af database cluster	29
Script til batch-afvikling af oprydning.....	29
Script til backup af database cluster.....	30
Overvågning af oprydning i databasen.....	31
Manuel start / stop af databasecluster:	32
Databasecluster firewall	32
Reload konfigurationsdata	32
Slet importeret base for at importere data igen.....	33
Flere skolers data på samme server	34
Opret ekstra database cluster	34
Tilret configuration for de enkelte DBcluster	34
Opret services til drift af DBcluster	35
Registrere de nye databasecluster som service, så de kører som service	35

Ændringshistorik

2023.03.21	PostgreSQL_Install_16_pub	Første release
2023.03.28	PostgreSQL_Install_17	Tilføjet serverbestykning Tilføjet opret af superuser Tilføjet sletning af en bruger
2023.04.17	PostgreSQL_Install_18	Grant rettigheder til role readonly_easydata Code page ændret fra 1251 til 1252 ved start af SQL Shell Ekstra parametre ved opret af database med initdb Flere skolers baser på samme server

Serverbestykning

PostgreSQL Stiller ikke væsentlig krav til serverbestykning på hverken CPU eller RAM

Diskplads til databasen afhænger af skolens EASY-A datamængde.

Følgende kan anvendes som udgangspunkt til diskbehov

	Zippet fil fra STIL	Udpakket	Database efter indlæsning	Backup med pg_dumpall
Skoler med største datamængde	2 Gb	14,5 Gb	25 Gb	15,5 Gb
Skoler med mellem datamængde	1 Gb	6 Gb	12 Gb	7,2 Gb
Skoler med mindste datamængde	500 Mb	2 Gb	4,8 Gb	4,8 Gb

Basen indeholder ca. 325 tabeller

Download og installation af database cluster

Downloades fra

<https://www.postgresql.org/download/windows/>

The screenshot shows the PostgreSQL website's 'Windows installers' page. The page title is 'Windows installers' with a Windows logo. Below the title is the heading 'Interactive installer by EDB'. The main content includes a note that the installer is certified by EDB, a warning that it is hosted by EDB and not on the PostgreSQL community servers, and a list of features like pgAdmin and StackBuilder. It also mentions that the installer can run in graphical or silent modes and is designed to be straightforward. A section for 'Platform support' lists the following data:

PostgreSQL Version	64 Bit Windows Platforms	32 Bit Windows Platforms
15	2019, 2016	
14	2019, 2016	

Vælg: Download the installer

<https://www.enterprisedb.com/downloads/postgres-postgresql-downloads>

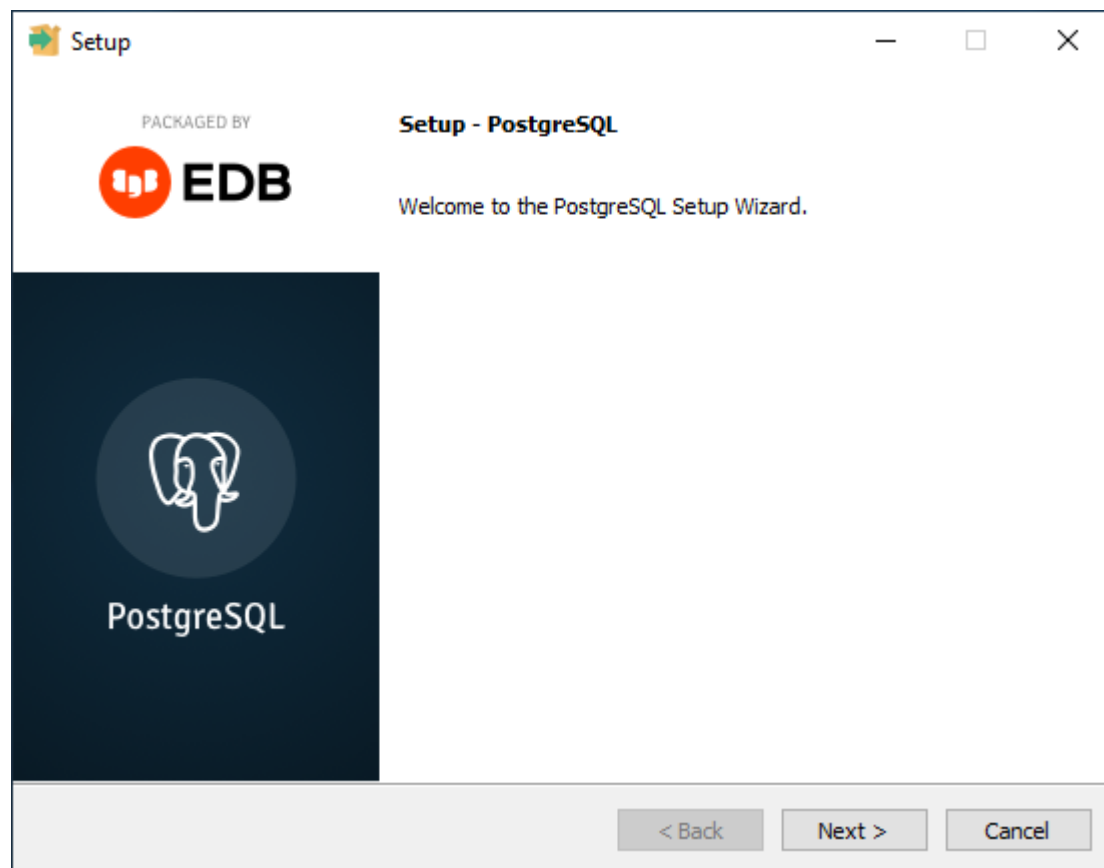
The screenshot shows the EnterpriseDB website's 'Download PostgreSQL' page. The page features a large heading 'Download PostgreSQL' and a sub-heading 'Open source PostgreSQL packages and installers from EDB'. Below this is a table with the following data:

PostgreSQL Version	Linux x86-64	Linux x86-32	Mac OS X	Windows x86-64	Windows x86-32
15.2	postgresql.org	postgresql.org			Not supported
14.7	postgresql.org	postgresql.org			Not supported

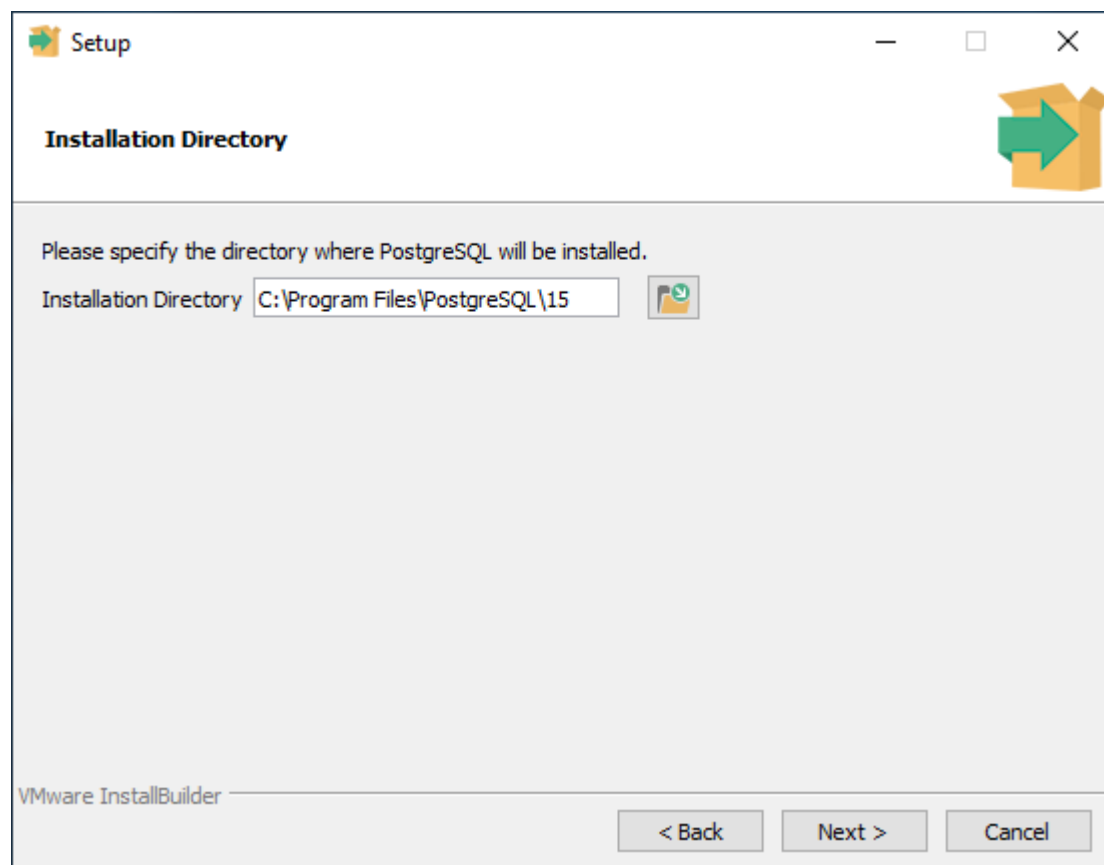
Vælg nyeste version 15

I det her eksempel er valgt version 15.2

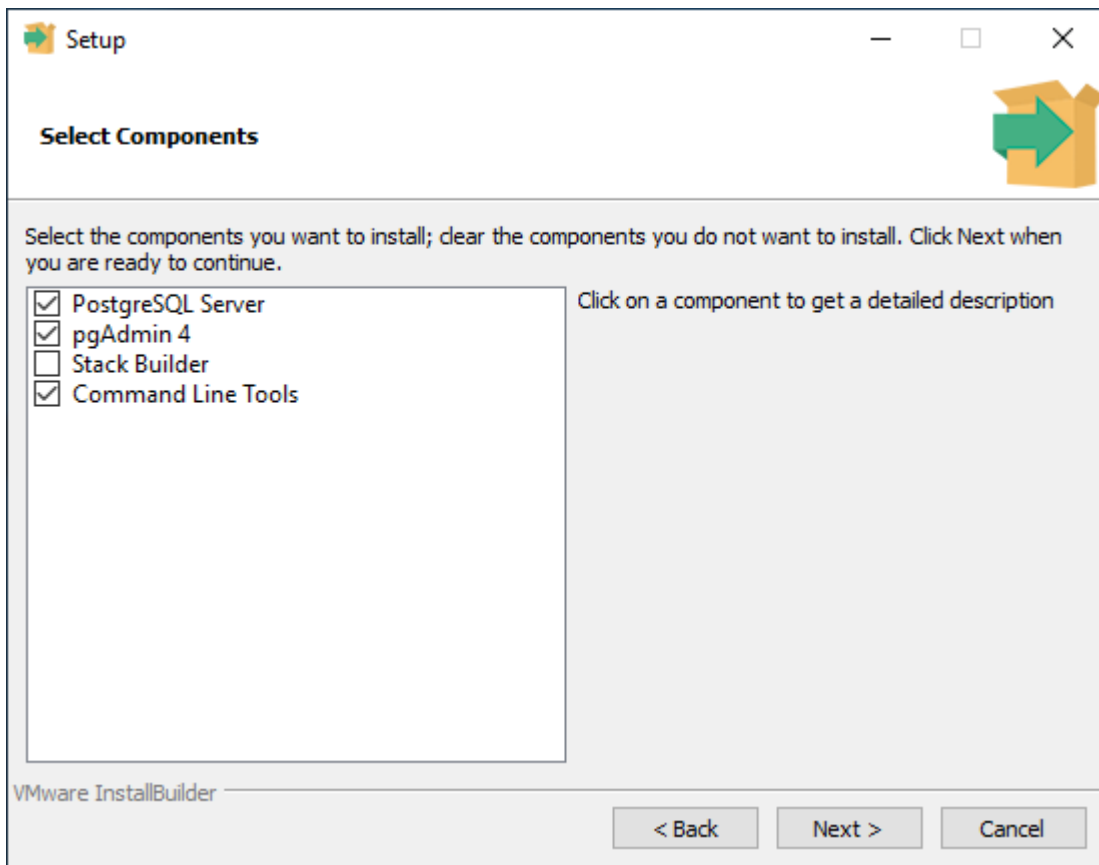
Kør postgresql-15.2-1-windows-x64.exe



Next

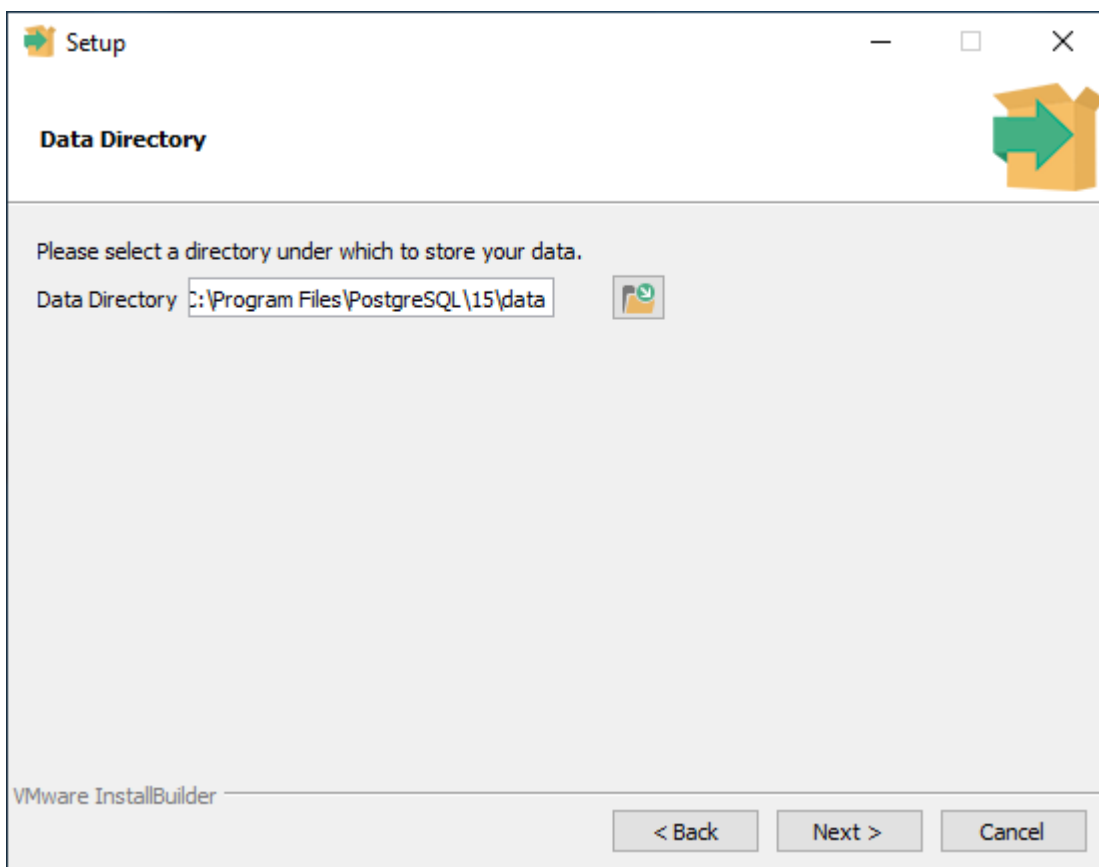


Next



Minus Stack Builder

Next



Skift evt. placeringen af databasen fra C:\Program Files\PostgreSQL\15\data

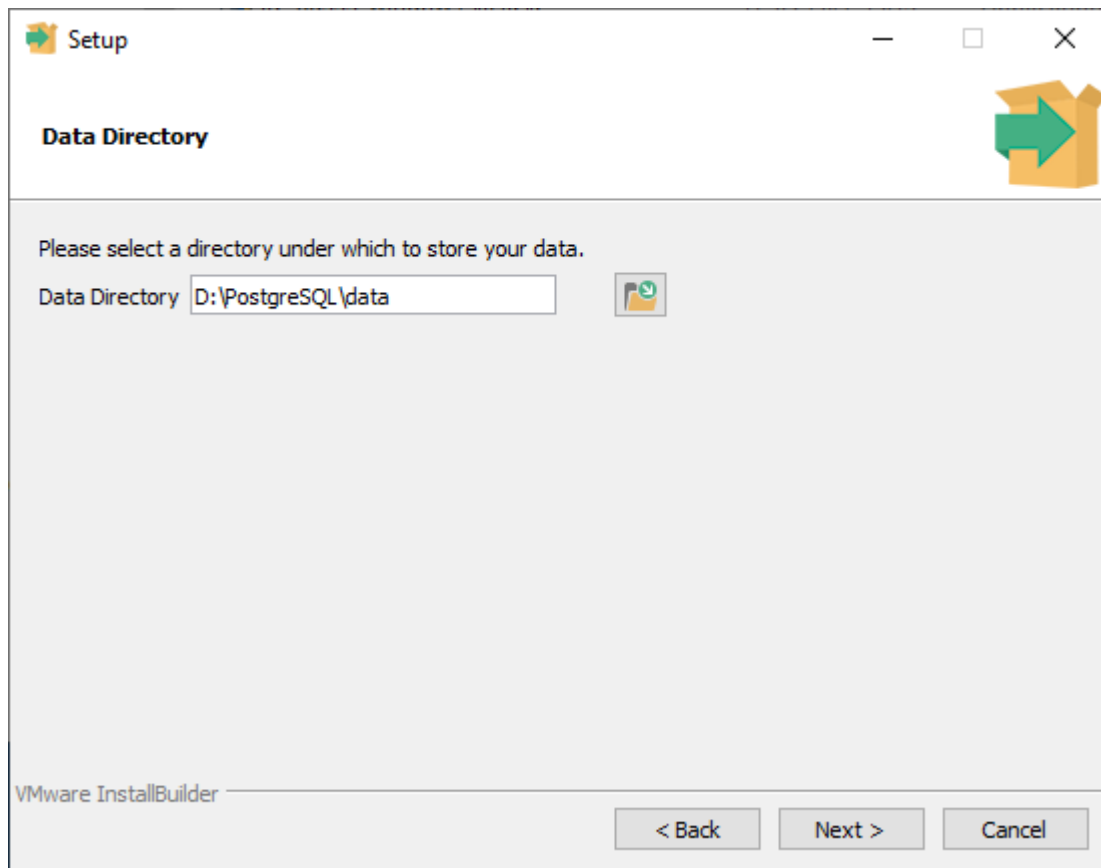
Til

D:\PostgreSQL\data

Eller hvis der skal oprettes flere skolebaser på samme server, så eks.

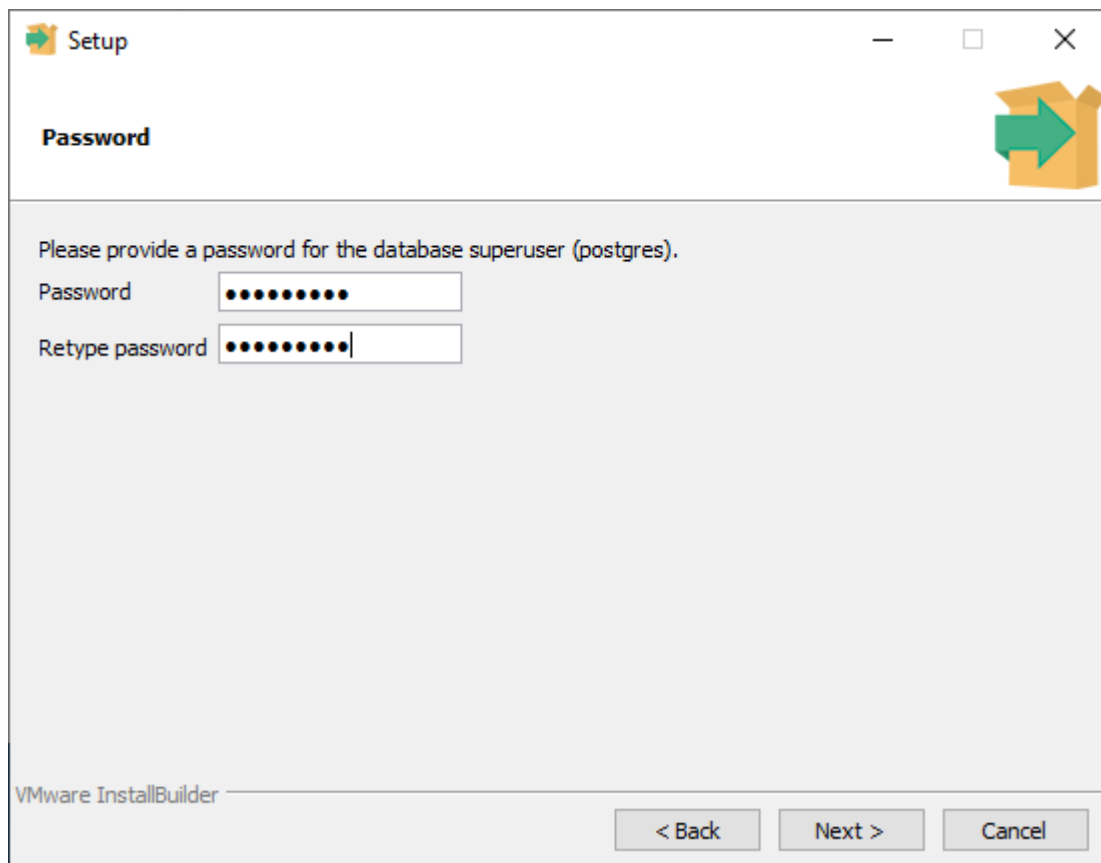
D:\PostgreSQL\data\mercantec

(Se nederst i dokumentet for oprettelse af flere skoler på samme installation)



The screenshot shows a window titled "Setup" with a "Data Directory" section. The text "Please select a directory under which to store your data." is displayed. Below this, the "Data Directory" field contains the path "D:\PostgreSQL\data". At the bottom of the window, there are three buttons: "< Back", "Next >", and "Cancel". The VMware InstallBuilder logo is visible in the bottom left corner.

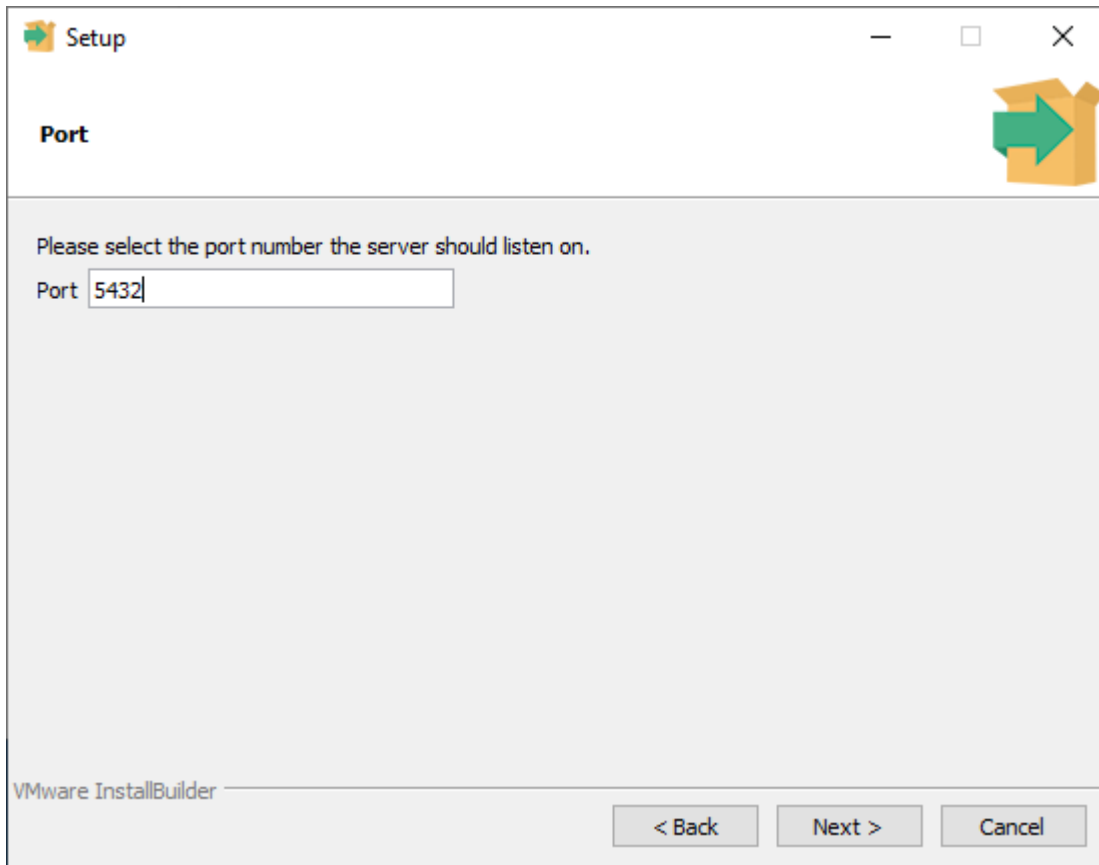
Next



The screenshot shows a window titled "Setup" with a "Password" section. The text "Please provide a password for the database superuser (postgres)." is displayed. Below this, there are two password input fields: "Password" and "Retype password". Both fields contain masked characters (dots). At the bottom of the window, there are three buttons: "< Back", "Next >", and "Cancel". The VMware InstallBuilder logo is visible in the bottom left corner.

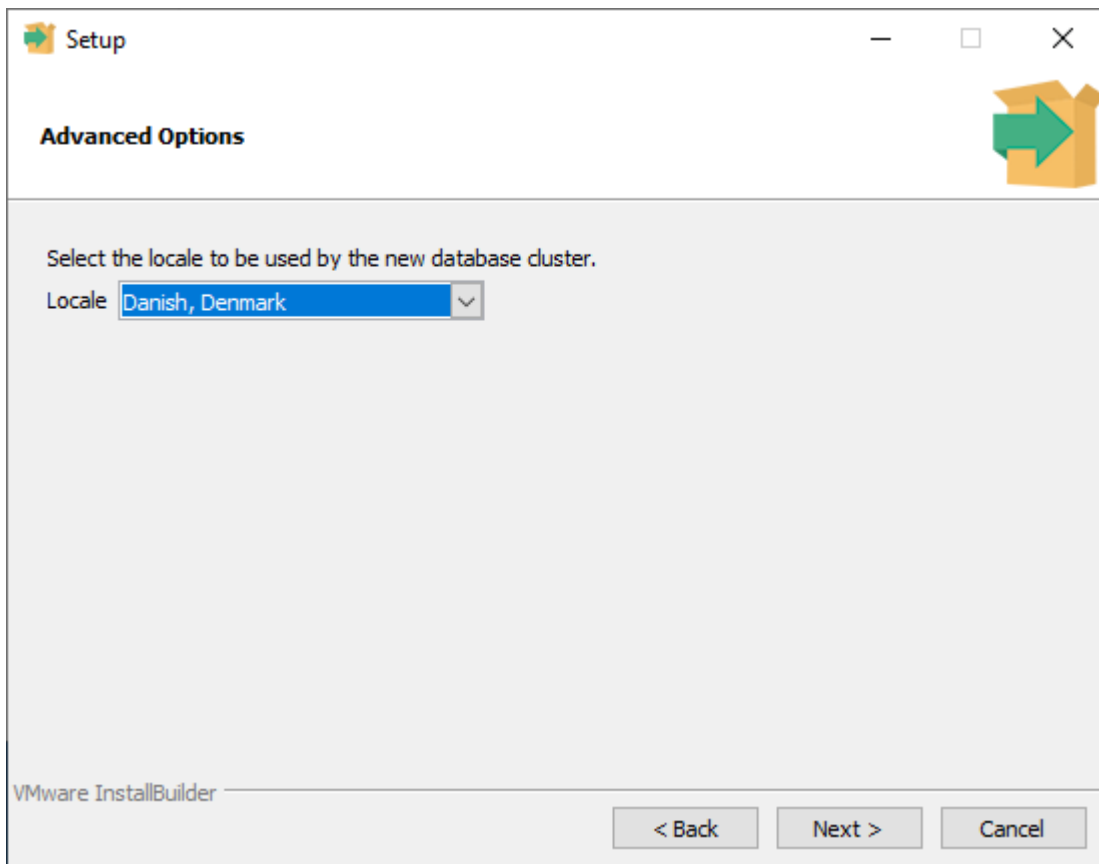
Indtast et godt password for databasebruger (ejer) postgres

Next



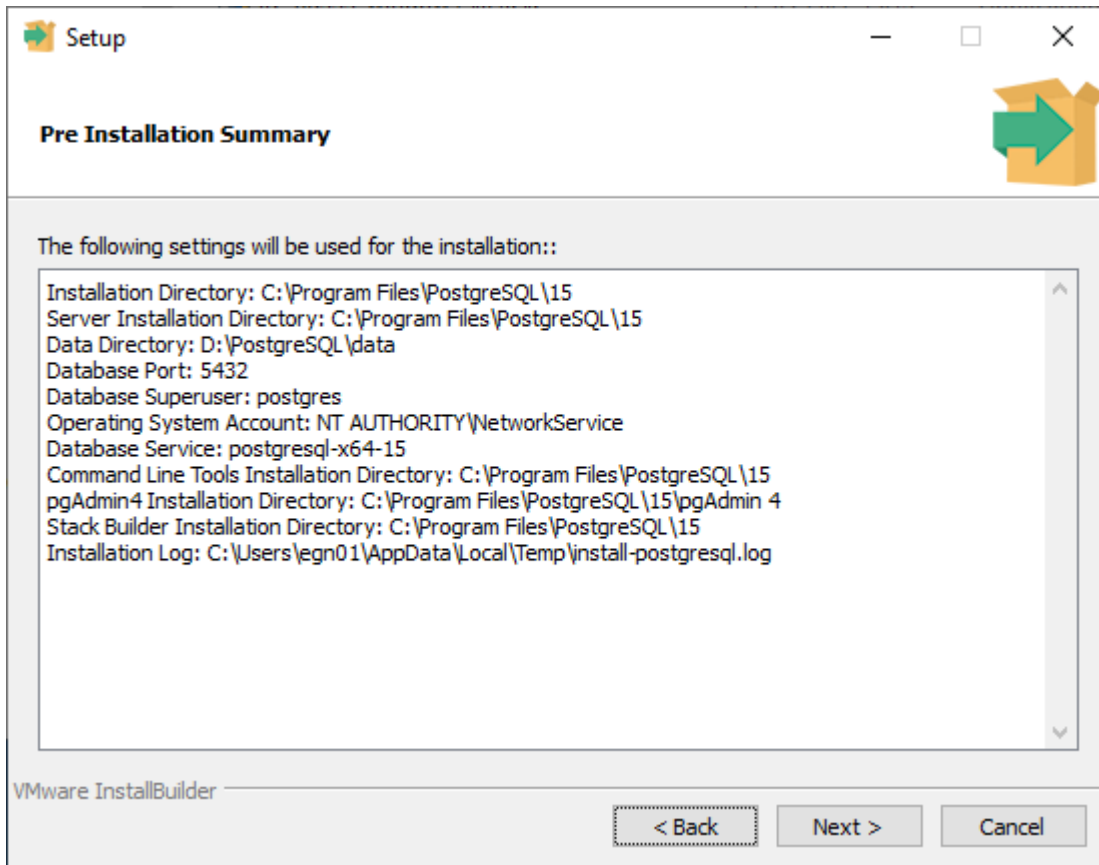
Next

(Skal der oprettes flere baser på samme server vælges alternative porte (5433, 5434, nnnn))



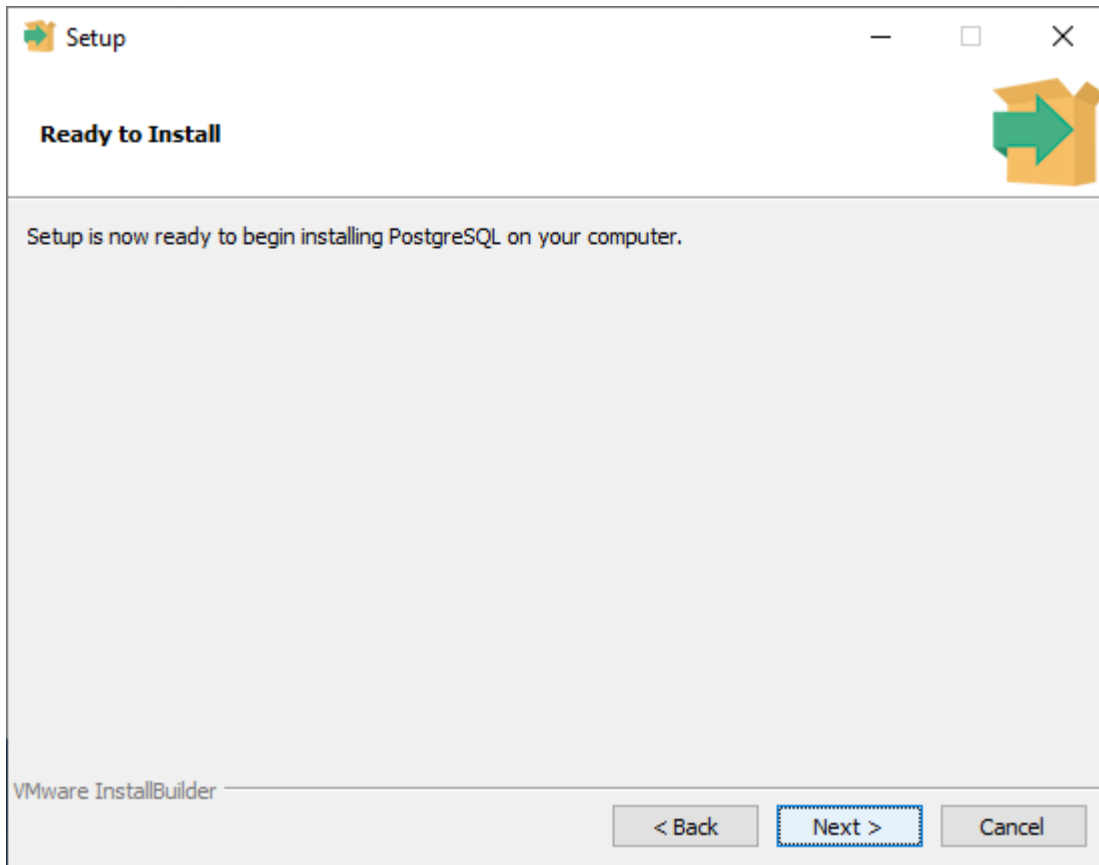
Skift til Danish, Denmark

Next

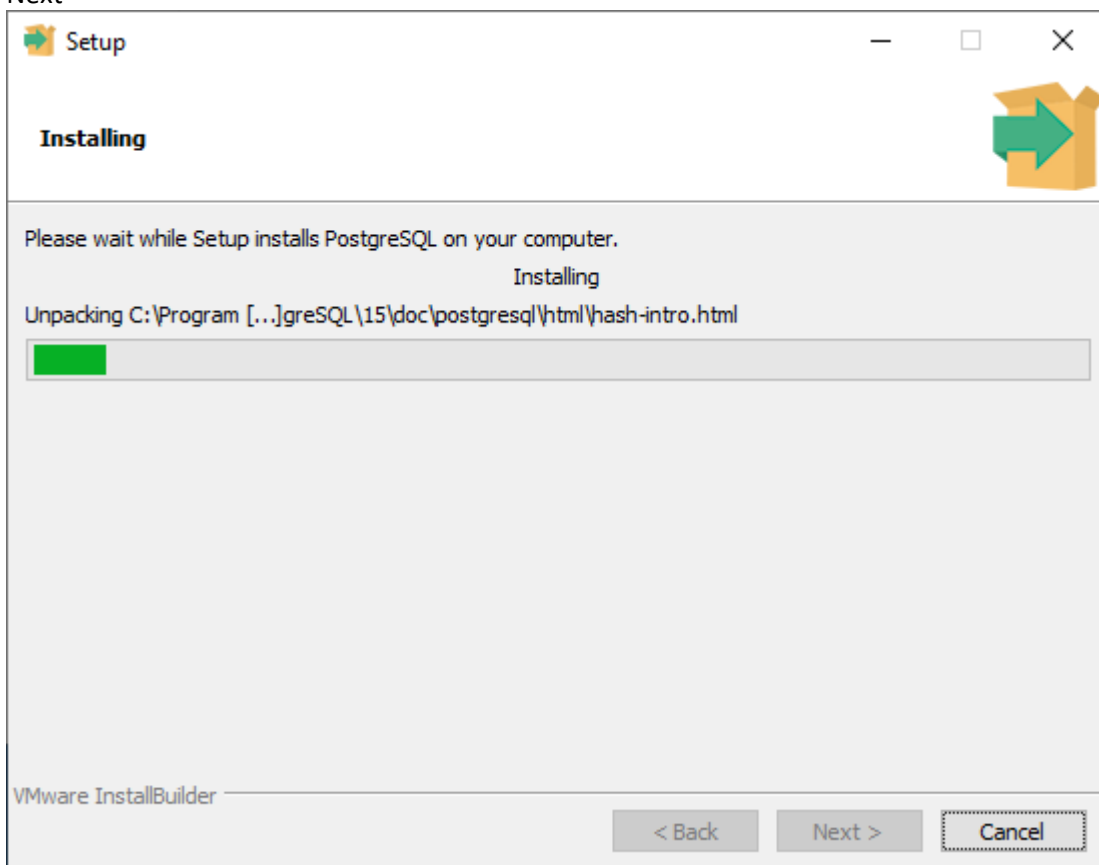


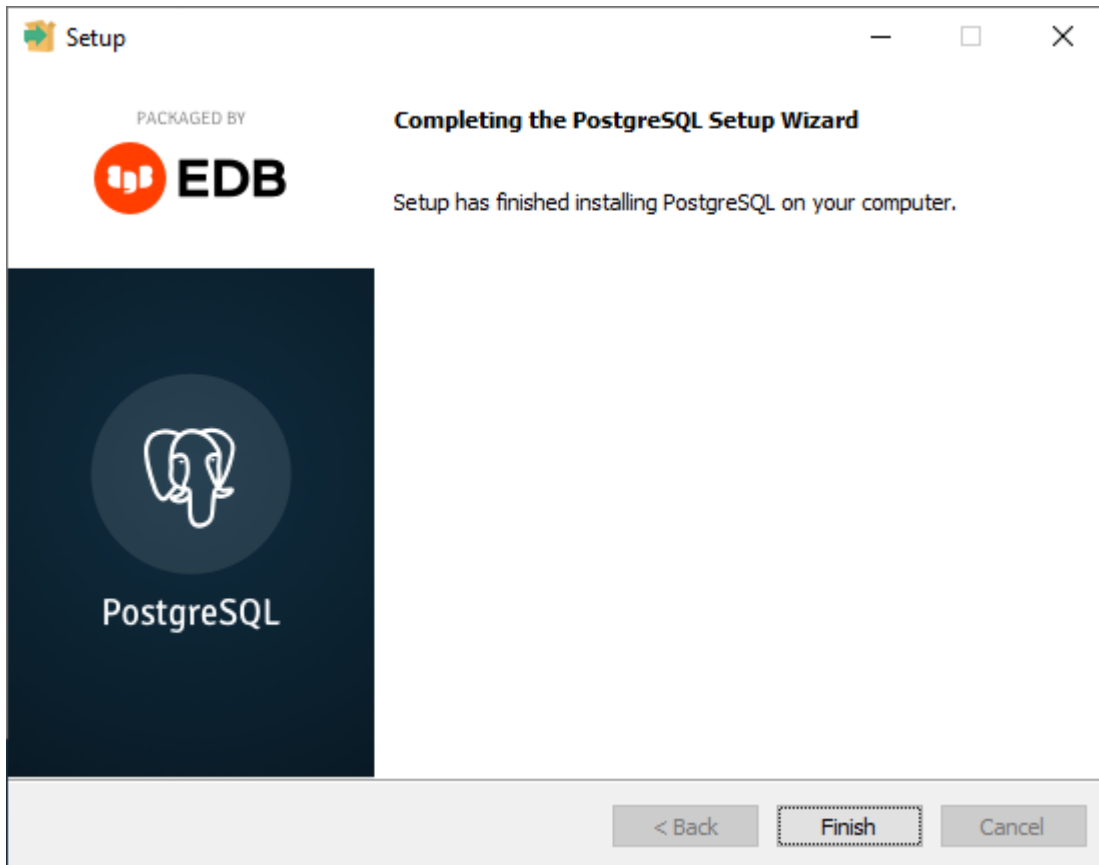
Installation Directory: C:\Program Files\PostgreSQL\15
Server Installation Directory: C:\Program Files\PostgreSQL\15
Data Directory: D:\PostgreSQL\data
Database Port: 5432
Database Superuser: postgres
Operating System Account: NT AUTHORITY\NetworkService
Database Service: postgresql-x64-15
Command Line Tools Installation Directory: C:\Program Files\PostgreSQL\15
pgAdmin4 Installation Directory: C:\Program Files\PostgreSQL\15\pgAdmin 4
Installation Log: C:\Users\egn01\AppData\Local\Temp\install-postgresql.log

Next



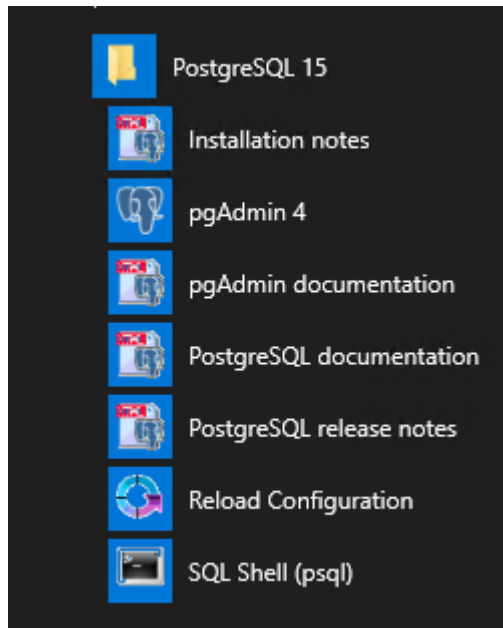
Next



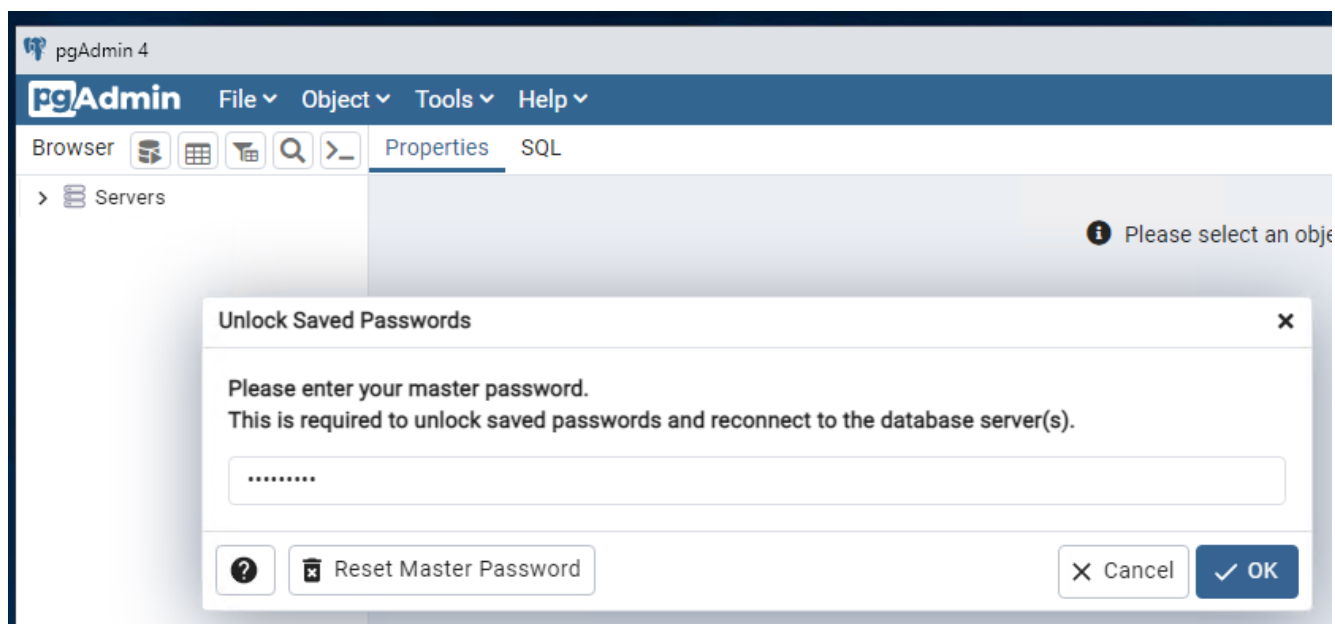


Finish

Det giver en menu-indgang PostgreSQL 15 indeholdende bl.a. pgAdmin 4 og SQL Shell (psql)



Start pgAdmin 4

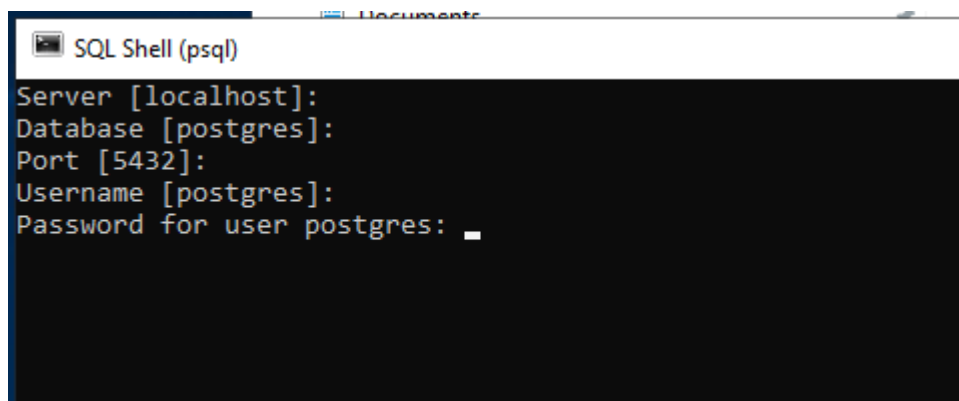


Vælg et godt password for PGAdmin master
OK og luk pgAdmin igen

Software er nu installeret.

Klargør database cluster til import af EASY-A data

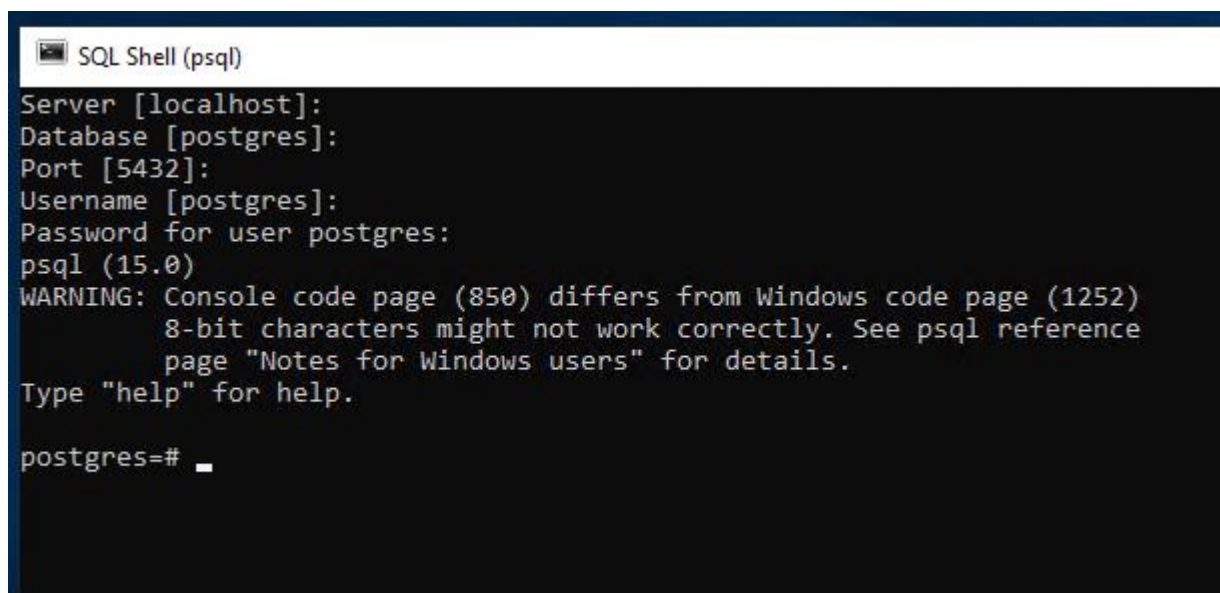
Vælg menupunktet PostgreSQL 15 – SQL Shell (psql)



```
SQL Shell (psql)
Server [localhost]:
Database [postgres]:
Port [5432]:
Username [postgres]:
Password for user postgres: _
```

Og tast Enter til Server, Database, Port og Userneme

Vælg relevant port og brug password valgt under installation af databasen

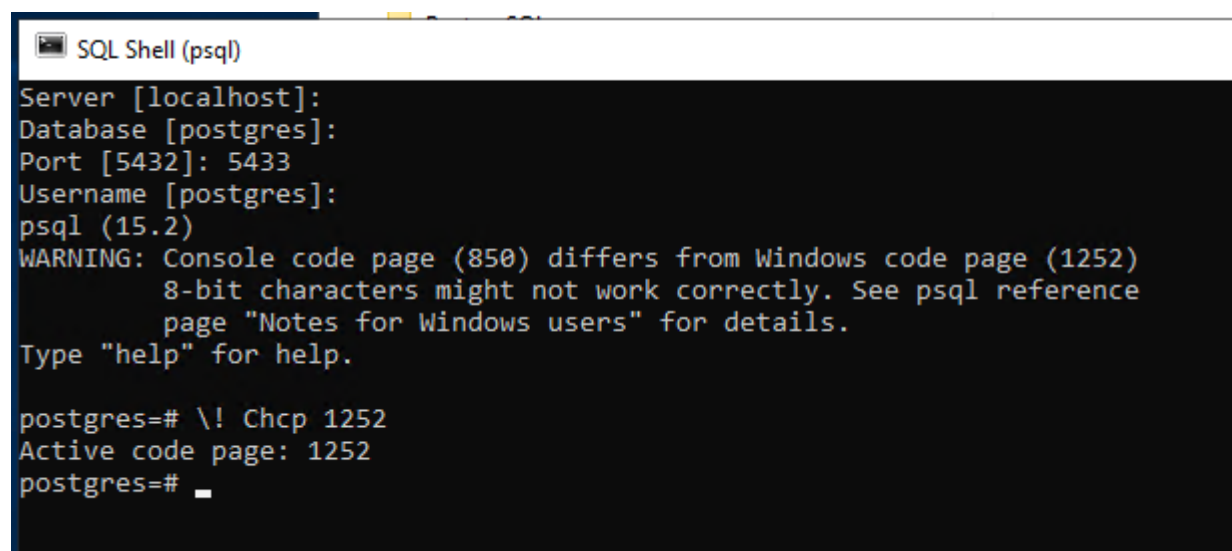


```
SQL Shell (psql)
Server [localhost]:
Database [postgres]:
Port [5432]:
Username [postgres]:
Password for user postgres:
psql (15.0)
WARNING: Console code page (850) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

postgres=# _
```

Skift Console code page med:

\! Chcp 1252



```
SQL Shell (psql)
Server [localhost]:
Database [postgres]:
Port [5432]: 5433
Username [postgres]:
psql (15.2)
WARNING: Console code page (850) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
Type "help" for help.

postgres=# \! Chcp 1252
Active code page: 1252
postgres=#
```

Man er nu logget på databasen som databaseuser postgres

Opret database schema-owner user:

```
CREATE USER easydata WITH
    LOGIN
    NOSUPERUSER
    CREATEDB
    NOCREATEROLE
    INHERIT
    NOREPLICATION
    CONNECTION LIMIT -1
    PASSWORD 'M1bQKBgQCp';
COMMENT ON ROLE easydata IS 'EASY-C data-owner';
```


Opret roller, der giver adgang til de enkelte views

```
CREATE ROLE read_view_elev_placeringer WITH
    NOLOGIN
    NOSUPERUSER
    NOCREATEDB
    NOCREATEROLE
    INHERIT
    NOREPLICATION
    CONNECTION LIMIT -1
    PASSWORD 'M1bQKBgQCp';
COMMENT ON ROLE read_view_elev_placeringer IS 'Read adgang til view elev_placeringer i schema easydata';
```

```
CREATE ROLE read_view_elev_resultater WITH
    NOLOGIN
    NOSUPERUSER
    NOCREATEDB
    NOCREATEROLE
    INHERIT
    NOREPLICATION
    CONNECTION LIMIT -1
    PASSWORD 'M1bQKBgQCp';
COMMENT ON ROLE read_view_elev_resultater IS 'Read adgang til view elev_resultater i schema easydata';
```

```
CREATE ROLE read_view_kvalifikationer_til_hovedf WITH
    NOLOGIN
    NOSUPERUSER
    NOCREATEDB
    NOCREATEROLE
    INHERIT
    NOREPLICATION
    CONNECTION LIMIT -1
    PASSWORD 'M1bQKBgQCp';
COMMENT ON ROLE read_view_kvalifikationer_til_hovedf IS 'Read adgang til view kvalifikationer_til_hovedf i
schema easydata';
```

```
CREATE ROLE read_view_sosu_uddannelsesplan WITH
    NOLOGIN
    NOSUPERUSER
    NOCREATEDB
    NOCREATEROLE
    INHERIT
    NOREPLICATION
    CONNECTION LIMIT -1
    PASSWORD 'M1bQKBgQCp';
COMMENT ON ROLE read_view_sosu_uddannelsesplan IS 'Read adgang til view sosu_uddannelsesplan i schema
easydata';
```

```
CREATE ROLE read_view_amu_holdplaceringer WITH
    NOLOGIN
    NOSUPERUSER
    NOCREATEDB
    NOCREATEROLE
    INHERIT
    NOREPLICATION
    CONNECTION LIMIT -1
    PASSWORD 'M1bQKBgQCp';
COMMENT ON ROLE read_view_amu_holdplaceringer IS 'Read adgang til view amu_holdplaceringer i schema
easycdata';
```

Opret en rolle, der giver read adgang til alt i databasen

```
CREATE ROLE readonly_easycdata WITH
    NOLOGIN
    NOSUPERUSER
    NOCREATEDB
    NOCREATEROLE
    INHERIT
    NOREPLICATION
    CONNECTION LIMIT -1
    PASSWORD 'M1bQKBgQCp';
COMMENT ON ROLE readonly_easycdata IS 'ReadOnly adgang til alle tabeller i schema easycdata';
```

Log ud af database med

\q

Import af EASY-A data

Den modtagne dumpfil (ora2pg_dump_XXX.gz) med skolens data kopieres til Postgres serveren et passende sted, eks.: D:\EASYAdata2PG\

Udpak filen og omdøb den, så den får efternavnet sql
Eks.: D:\EASYAdata2PG\ora2pg_dump_890\ora2pg_dump_890.sql

Start en Windows cmd prompt i "Administratør mode"

```
cd \Program Files\PostgreSQL\15
```

Set environment svarende til det database cluster, der skal importeres data i

```
set PGDATA=D:\PostgreSQL\data\  
set PGPORT=5432
```

Importer med nedenstående kommando på én linie!
(Skift skolenr til relevant nr)

```
.\bin\psql.exe -d postgres -U postgres --set ON_ERROR_STOP=on <  
D:\EASYAdata2PG\ora2pg_dump_890\ora2pg_dump_890.sql
```

Data importeres nu til databasen.

Tildel rettigheder til roller for views og tabeller

Start igen psql med menupunktet PostgreSQL 15 – SQL Shell (psql)
Med relevante oplysninger

Tildel læserettigheder til views via roller:

```
GRANT USAGE ON SCHEMA easydata TO read_view_elev_placeringer;  
GRANT select on easydata.elev_placeringer_demo TO read_view_elev_placeringer;  
GRANT select on easydata.elev_placeringer TO read_view_elev_placeringer;
```

```
GRANT USAGE ON SCHEMA easydata TO read_view_elev_resultater;  
GRANT select on easydata.elev_placeringer_demo TO read_view_elev_resultater;  
GRANT select on easydata.elev_placeringer TO read_view_elev_resultater;
```

```
GRANT USAGE ON SCHEMA easydata TO read_view_kvalifikationer_til_hovedf;  
GRANT select on easydata.elev_placeringer_demo TO read_view_kvalifikationer_til_hovedf;  
GRANT select on easydata.elev_placeringer TO read_view_kvalifikationer_til_hovedf;
```

```
GRANT USAGE ON SCHEMA easydata TO read_view_sosu_uddannelsesplan;  
GRANT select on easydata.elev_placeringer_demo TO read_view_sosu_uddannelsesplan;  
GRANT select on easydata.elev_placeringer TO read_view_sosu_uddannelsesplan;
```

```
GRANT USAGE ON SCHEMA easydata TO read_view_amu_holdplaceringer;  
GRANT select on easydata.elev_placeringer_demo TO read_view_amu_holdplaceringer;  
GRANT select on easydata.elev_placeringer TO read_view_amu_holdplaceringer;
```

Tildel læserettigheder til alle tabeller via rolle:

```
GRANT USAGE ON SCHEMA easydata TO readonly_easydata;  
GRANT SELECT ON ALL TABLES IN SCHEMA easydata TO readonly_easydata;
```

Tildel læse- og skriverettigheder til alle tabeller via rolle:

```
GRANT USAGE ON SCHEMA easydata TO readwrite_easydata;  
GRANT SELECT, INSERT, UPDATE, DELETE ON ALL TABLES IN SCHEMA easydata TO readwrite_easydata;
```

Opret en elevadmbruger

```
CREATE USER elevadm_test WITH  
    LOGIN  
    NOSUPERUSER  
    CREATEDB  
    NOCREATEROLE  
    INHERIT  
    NOREPLICATION  
    CONNECTION LIMIT -1  
    PASSWORD 'M1bQKBgQCp';
```

```
COMMENT ON ROLE elevadm_test IS 'Read adgang til alle udvalgte view i schema easydata';
```

Tildel rettigheder til elevadm-brugeren

Her eks. en bruger der må kigge i rrv_placeringer og kvalifikationer_til_hovedf

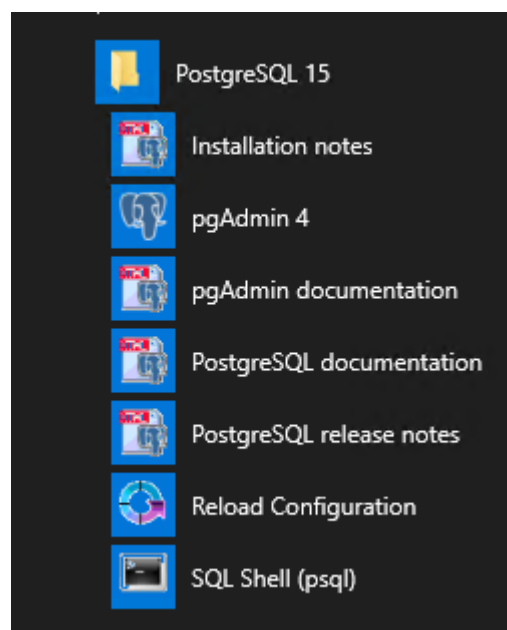
```
GRANT read_view_elev_placeringer TO "elevadm_test";  
GRANT read_view_kvalifikationer_til_hovedf TO "elevadm_test";
```

Skal en rettighed fratages en bruger gøres det med:

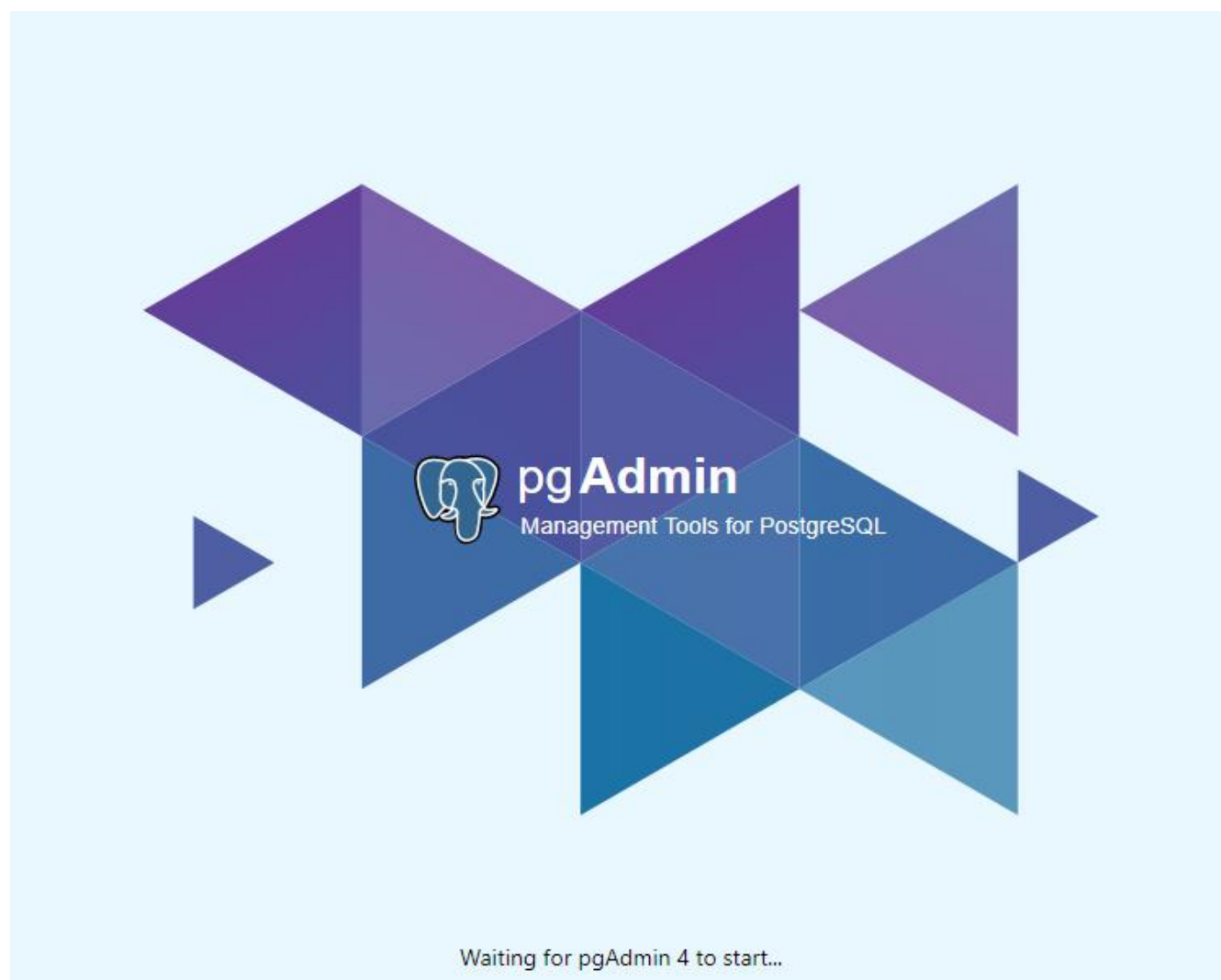
```
REVOKE read_view_kvalifikationer_til_hovedf from "elevadm_test";
```

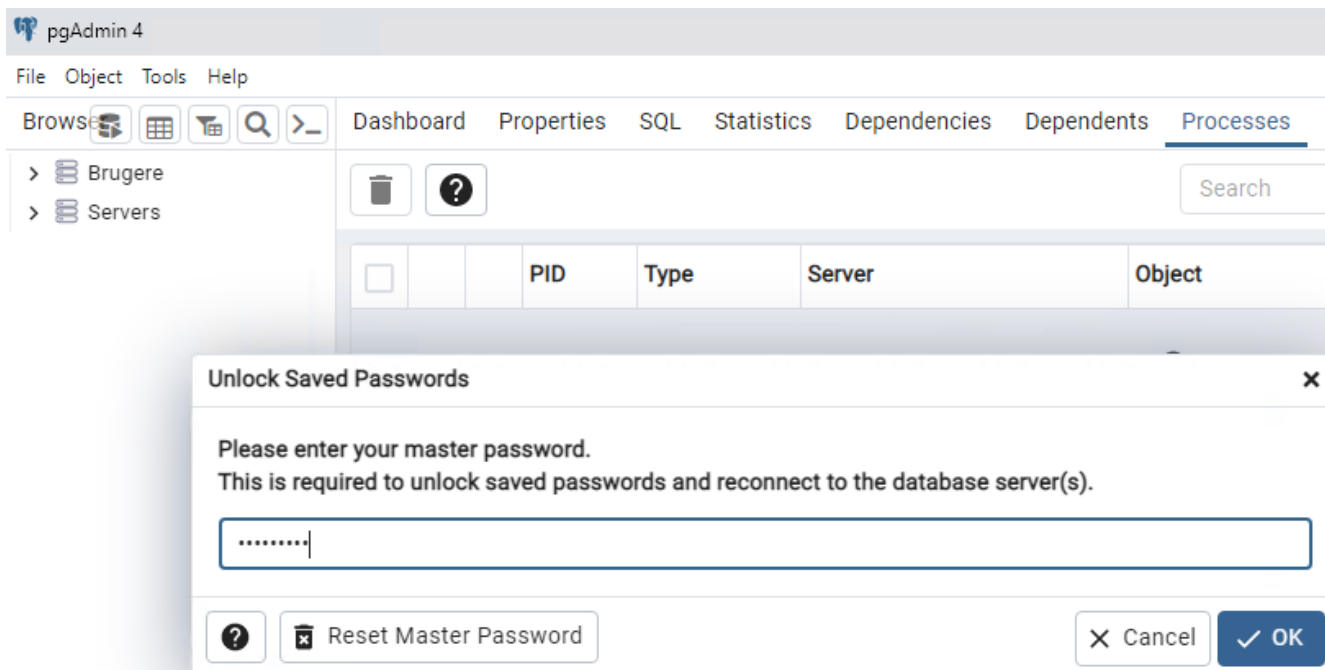
Opret en brugeradgang i pgAdmin

Start pgAdmin via menu-indgang PostgreSQL 15 – pgAdmin 4



pgAdmin tager lidt tid om at starte





Der anmodes om master password

Dette kan slås fra med

`MASTER_PASSWORD_REQUIRED = False`

I `C:\Program Files\PostgreSQL\15\pgAdmin 4\web\config_local.py`

Se evt.:

https://www.pgadmin.org/docs/pgadmin4/6.18/config_py.html

Register - Server



General Connection SSL SSH Tunnel Advanced

Name

Server group

Background

Foreground

Connect now?

Comments

Either Host name, Address or Service must be specified.



Close

Reset

Save

Register - Server

General **Connection** SSL SSH Tunnel Advanced

Host name/addresses: localhost

Port: 5432

Maintenance database: postgres

Username: egon.nor@stil.dk

Kerberos authentication?




Role:

Service:

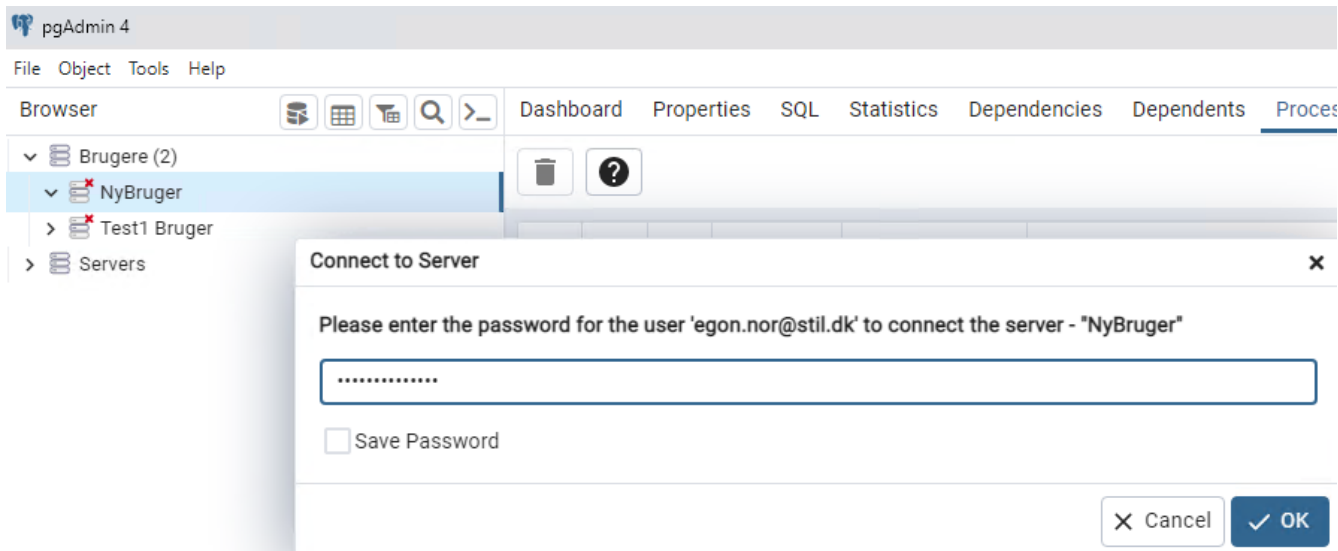
i *?* Close Reset Save

pgAdmin 4

File Object Tools Help

Browser   

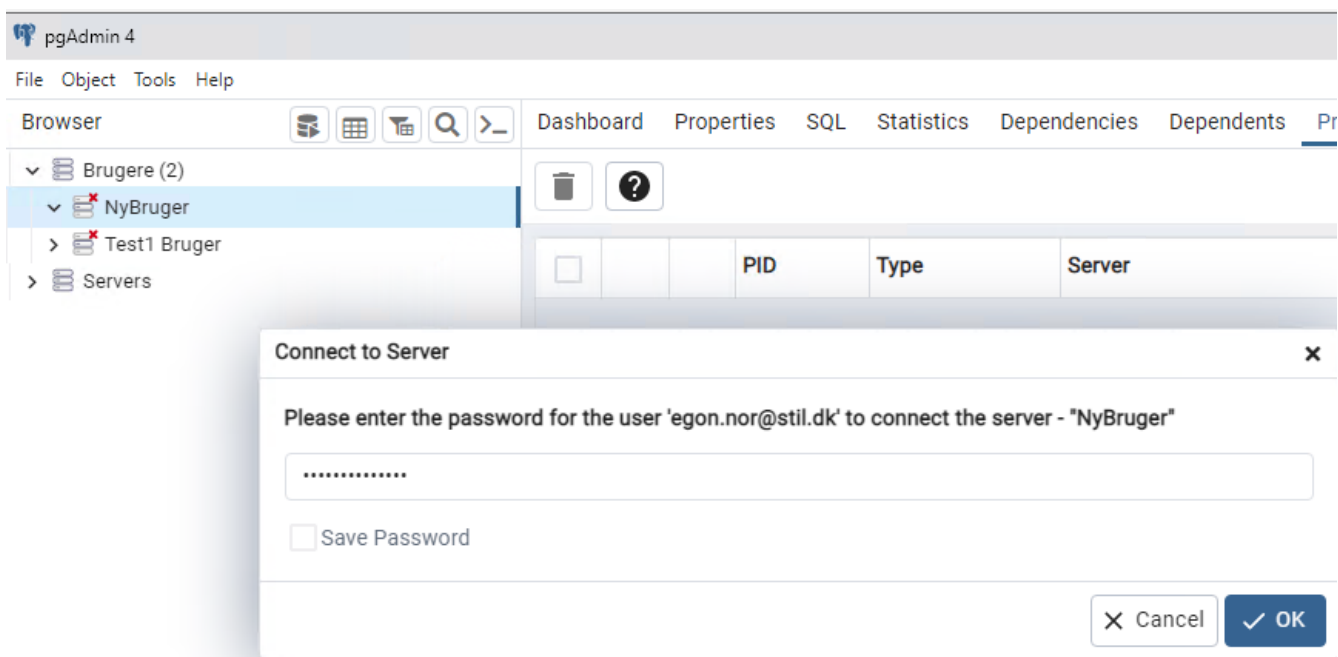
- Brugere (2)
 - NyBruger
 - Test1 Bruger**
 - Servers



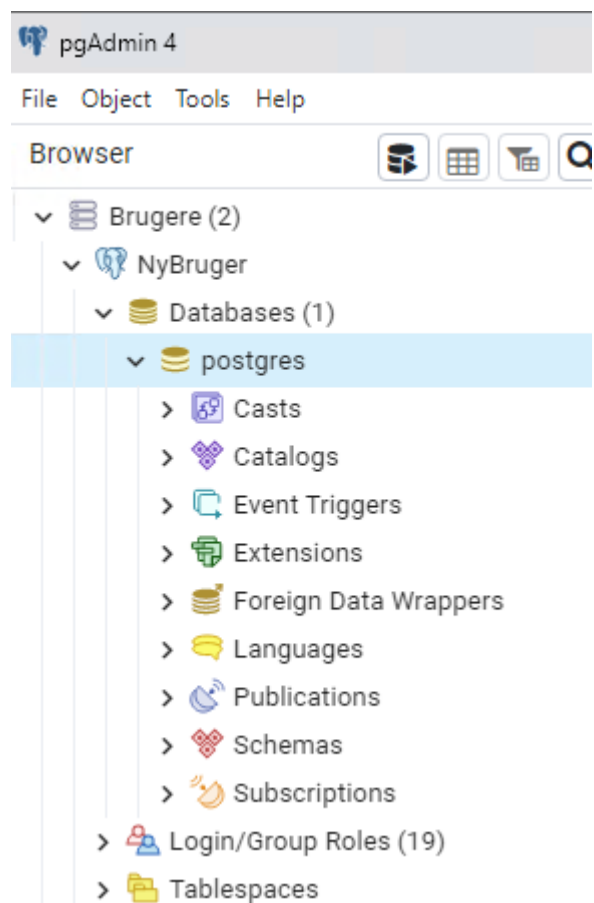
Mulighed for at brugere kan gemme password kan slås fra med

ALLOW_SAVE_PASSWORD = False

I C:\Program Files\PostgreSQL\15\pgAdmin 4\web\config_local.py



Brugeren er nu logget ind i databasen og kan kun hente data fra de objekter der er givet tilladelse til



Opret af database superuser

Oprettelse af en bruger med superuser rettigheder:

```
CREATE ROLE "egon.nor@stil.dk" WITH  
LOGIN  
SUPERUSER  
INHERIT  
CREATEDB  
CREATEROLE  
NOREPLICATION  
PASSWORD 'ArB2Eh1cjYc0bKB5USTg==#buLaeAlrW09RhITsa677b';
```

```
COMMENT ON ROLE "egon.nor@stil.dk" IS 'Superuser til administration af databasen';
```

Sletning af en bruger:

```
DROP ROLE IF EXISTS "egon.nor@stil.dk";
```

Hints til administration af database cluster

Script til batch-afvikling af oprydning

STIL anbefaler at skolerne afvikler oprydning én gang pr. måned.

Opret eks. en fil D:\PostgreSQL\bin\run_opryd_mercantec.cmd

Indsæt efterfølgende i filen (Tilret stinavne!):

```
REM Afvikling af oprydning i Mercantec database
```

```
set DATOTID=%DATE:~6,4%%DATE:~3,2%%DATE:~0,2%-%TIME:~0,2%%TIME:~3,2%
```

```
set PGBIN="C:\Program Files\PostgreSQL\15\bin\"
```

```
set LOG=%LOGDIR%oprydning_%SKOLE%_%DATOTID%.log
```

```
set LOGDIR=D:\PostgreSQL\bin\log\
```

```
set SKOLE=mercantec
```

```
set PGDATA=D:\PostgreSQL\data\mercantec
```

```
set PGPORT=5432
```

```
set PGDATABASE=postgres
```

```
set PGUSER=postgres
```

```
REM set PGPASSWORD='password'
```

```
echo %DATOTID% Start oprydning > %LOG%
```

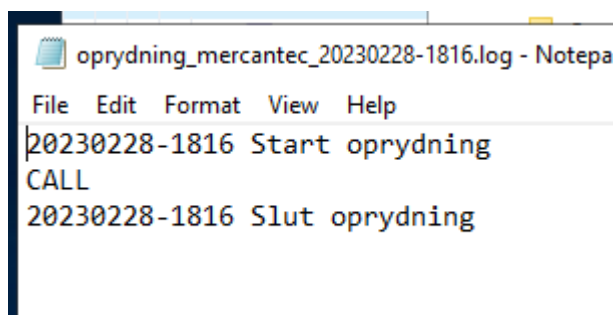
```
call %PGBIN%psql.exe -c "CALL easydata.oprydning_main();" >> %LOG%
```

```
set DATOTID=%DATE:~6,4%%DATE:~3,2%%DATE:~0,2%-%TIME:~0,2%%TIME:~3,2%
```

```
echo %DATOTID% Slut oprydning >> %LOG%
```

```
#####
```

Eks. på log-file



```
oprydning_mercantec_20230228-1816.log - Notepa
File Edit Format View Help
20230228-1816 Start oprydning
CALL
20230228-1816 Slut oprydning
```

Script til backup af database cluster

STIL anbefaler at der tages backup af databasen i forbindelse med hver kørsel af oprydning.

Der findes forskellige muligheder for backup af databasen

pg_dump, pg_dumpall, pg_basebackup og backup på filniveau

Eksempel på script til afvikling af pg_dumpall, der tager backup af hele database clusteret

Opret eks. en fil D:\PostgreSQL\bin\run_backup_mercantec.cmd

Indsæt efterfølgende i filen (Tilret stinavne!):

```
REM Afvikling af backup af Mercantec database
```

```
set SKOLE=mercantec
```

```
set PGDATA=D:\PostgreSQL\data\mercantec
```

```
set PGPORT=5432
```

```
set PGDATABASE=postgres
```

```
set PGUSER=postgres
```

```
set DATOTID=%DATE:~6,4%%DATE:~3,2%%DATE:~0,2%- %TIME:~0,2%%TIME:~3,2%
```

```
set PGBIN="C:\Program Files\PostgreSQL\15\bin\"
```

```
set LOGDIR=D:\PostgreSQL\bin\log\
```

```
set BACKUPDIR=D:\PostgreSQL\backup\
```

```
set LOG=%LOGDIR%backup_%SKOLE%_%DATOTID%.log
```

```
set BACKUPFILE=%BACKUPDIR%%SKOLE%_%DATOTID%.sql
```

```
echo %DATOTID% Start backup > %LOG%
```

```
call %PGBIN%pg_dumpall.exe --file=%BACKUPFILE% >> %LOG%
```

```
set DATOTID=%DATE:~6,4%%DATE:~3,2%%DATE:~0,2%- %TIME:~0,2%%TIME:~3,2%
```

```
echo %DATOTID% Slut backup >> %LOG%
```

Overvågning af oprydning i databasen

I pgAdmin kan afvikling af oprydning følges i log-tabellen `easydata.log_oprydning`

-- Se alle records med nyeste øverst:

```
SELECT * FROM easydata.log_oprydning ORDER BY loop_id DESC;
```

-- Se alle records fra afvikling de sidste tre dage med nyeste øverst:

```
SELECT * FROM easydata.log_oprydning  
where dato >= CURRENT_DATE - INTERVAL '3 day'  
ORDER BY loop_id DESC;
```

Manuel start / stop af databasecluster:

Start en Windows cmd prompt I "Administratør mode"

```
cd \Program Files\PostgreSQL\15
```

```
.\bin\pg_ctl stop -D "D:\PostgreSQL\data\  
.\bin\pg_ctl start -D "D:\PostgreSQL\data\  
.\bin\pg_ctl status -D "D:\PostgreSQL\data\"
```

Der bliver I forbindelse med installationen oprettet en service, der kører PostgreSQL databasen:

```
postgresql-x64-15
```

Denne kan også anvendes til stop/start af DBclusteret

Databasecluster firewall

Filen pg_hba.conf indeholder "firewall" for databasen

Tilret evt. D:\PostgreSQL\data\mercantec\pg_hba.conf med adgange for eksterne IP addr / porte
Se evt.:

<https://www.postgresql.org/docs/current/auth-pg-hba-conf.html>

Eks.

```
# TYPE DATABASE USER ADDRESS METHOD  
  
# IPv4 local connections:  
host all all 127.0.0.1/32 trust  
# IPv6 local connections:  
host all all ::1/128 trust  
# PGAdmin PROD  
host all all 195.231.169.15/32 md5
```

Brug md5 eller scram-sha-256

Reload konfigurationsdata

```
.\bin\pg_ctl reload -D " D:\PostgreSQL\data\mercantec"
```

Exit fra psql udføres med: \q

Slet importeret base for at importere data igen

Først skal der lige ændres på en parameter i konfigurationsfilen

```
D:\PostgreSQL\data\postgresql.conf
```

Linien:

```
#max_locks_per_transaction = 64
```

Ændres til

```
max_locks_per_transaction = 512
```

Efter ændringen er gemt skal konfigurationen reloades:

```
.\bin\pg_ctl reload -D " D:\PostgreSQL\data\"
```

Log på psql

```
cd \Program Files\PostgreSQL\15
```

Set environment

```
set PGDATA=D:\PostgreSQL\data\
```

```
set PGPORT=5432
```

```
.\bin\psql
```

```
DROP SCHEMA easydata CASCADE;
```

Log af database igen

```
\q
```

EASY-A data kan nu importeres igen

Kan også udføres ved at stoppe database clusteret og i filsystemet slette fra roden af database clusteret

Eks.: (D:\PostgreSQL\data\mercantec) og

Herved slettes ALT, incl. brugere og roller

Opret et databasecluster

```
.\bin\initdb --pgdata=D:\PostgreSQL\data\mercantec -E 'UTF-8' --locale="Danish, Denmark" --username=postgres
```

Starte database clusteret igen og oprette schema-owner user og roller

Importere data

Oprette brugere og tildele rettigheder.

Flere skolers data på samme server

Hvis der er behov for at køre flere skolers database kan det nemt gøres på én server

Der oprettes så et databasecluster per skole

Opret en logisk struktur til data, som eks.:

```
D:\PostgreSQL\data\mercantec
D:\PostgreSQL\data\hoverdal
D:\PostgreSQL\data\skole3
```

Vælg en unik port per dbcluster, som eks.

mercantec = 5432

hoverdal = 5433

skole3 = 54342

Opret ekstra database cluster

```
cd \Program Files\PostgreSQL\15
```

```
.\bin\initdb --pgdata= D:\PostgreSQL\data\mercantec -E 'UTF-8' --locale="Danish, Denmark" --username=postgres
```

```
.\bin\initdb --pgdata= D:\PostgreSQL\data\hoverdal -E 'UTF-8' --locale="Danish, Denmark" --username=postgres
```

```
.\bin\initdb --pgdata= D:\PostgreSQL\data\skole3 -E 'UTF-8' --locale="Danish, Denmark" --username=postgres
```

Tilret configuration for de enkelte DBcluster

Mercantec:

```
notepad D:\PostgreSQL\data\mercantec\postgresql.conf
```

(Her er port OK port=5432)

Ret linien med `max_locks_per_transaction` til

```
max_locks_per_transaction = 512
```

Hoverdal:

```
notepad D:\PostgreSQL\data\hoverdal\postgresql.conf
```

Set port OK port=5433

Ret linien med `max_locks_per_transaction` til

```
max_locks_per_transaction = 512
```

Skole3:

```
notepad D:\PostgreSQL\data\skole3\postgresql.conf
```

Set port OK port=5434

Ret linien med `max_locks_per_transaction` til

```
max_locks_per_transaction = 512
```

Opret services til drift af DBcluster

Fjern evt. først den service, postgresql-x64-15, der er oprettet sammen med installationen (For at ensrette navngivning)

Stop servicen og derefter:

```
.\bin\pg_ctl unregister -N postgresql-x64-15
```

Registrere de nye databasecluster som service, så de kører som service

```
.\bin\pg_ctl register -N postgresql-mercantec -U "LocalSystem" -D "D:\PostgreSQL\data\mercantec" -S auto
```

```
.\bin\pg_ctl register -N postgresql-hoverdal -U "LocalSystem" -D "D:\PostgreSQL\data\hoverdal" -S auto
```

```
.\bin\pg_ctl register -N postgresql-skole3 -U "LocalSystem" -D "D:\PostgreSQL\data\skole3" -S auto
```

Start de oprettede services

Oprettede services kan slettes igen med:

```
.\bin\pg_ctl unregister -N postgresql-mercantec
```

```
.\bin\pg_ctl unregister -N postgresql-hoverdal
```

```
.\bin\pg_ctl unregister -N postgresql-skole3
```

HUSK at bruge de relevante PGDATA og PGPORT når der eks. importeres data, oprettes roller/brugere m.m.

Som eks. for Mercantec her i eksemplet:

```
set PGDATA=D:\PostgreSQL\data\mercantec
set PGPORT=5432
.\bin\psql.exe -d postgres -U postgres --set ON_ERROR_STOP=on <
D:\EASYAdata2PG\ora2pg_dump_348\ora2pg_dump_348.sql
```

For Hoverdal:

```
set PGDATA=D:\PostgreSQL\data\hoverdal
set PGPORT=5433
.\bin\psql.exe -d postgres -U postgres --set ON_ERROR_STOP=on <
D:\EASYAdata2PG\ora2pg_dump_628\ora2pg_dump_628.sql
```