Midterm Review: 3D Query

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Project Topic

We aim to compare different databases for 3D buildings, benchmarking common operations performed on this data.

- CityGML
- CSV files

Datasets

- opencitymodel
  - Contains data for all buildings in the United States. (some cities missing)
  - AWS S3 Bucket
- PLUTO
  - Extensive land use and geographic data at the tax lot level
  - CSV
- awesome-citygml
  - Contains a list of open datasets

Database

- 3dcitydb
  - 3D geo database to store, represent and manage 3d city models on top of a rdbms
  - Schema based on CityGML format
  - Collection of SQL scripts
  - PostGreSQL/PostGIS dbms

Pluto CSV queries

1. Examine dataset: see what information you need
    a. Might need to trim dataset in beginning as file might be too large
2. Load CSV file as a table to MySQL Workbench
3. Query the data

Example

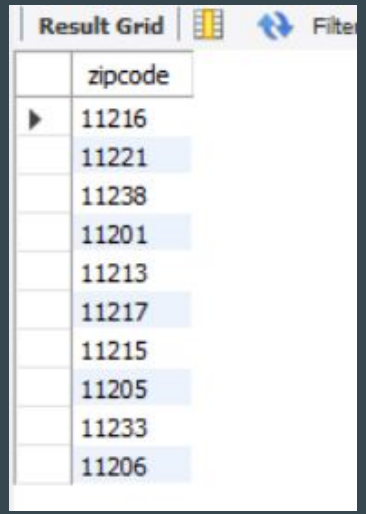
Table: pluto_22v3_1

Columns:

borough	text
block	int
lot	int
cd	int
bct2020	int
bctcb2020	bigint
ct2010	int
cb2010	int
schooldist	int
council	int
zipcode	int
firecomp	text
policeprct	int
healthcenterdistrict	int
healtharea	int
sanitboro	int
sanitdistrict	text
sanitsub	text
address	text
zonedist1	text

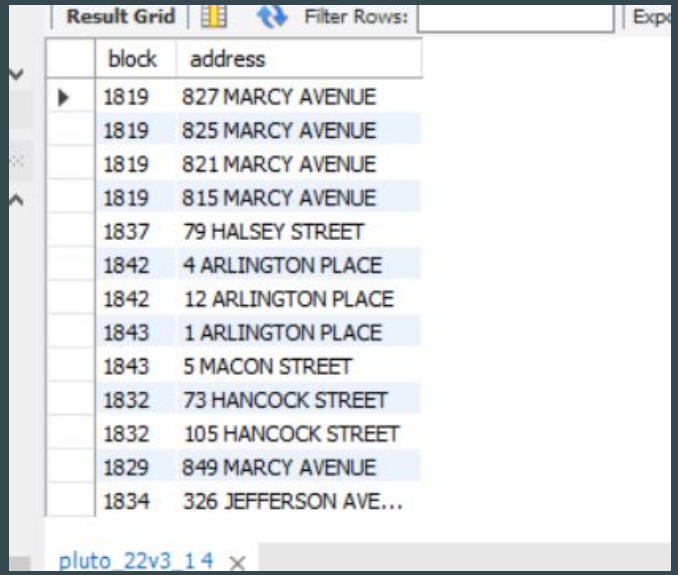
Sample query 1

```
2 •  select distinct zipcode from pluto_22v3_1
3    where numfloors=2 and schooldist=13 and borough='BK';
```



Sample query 2

```
5 •  select distinct block, address from pluto_22v3_1
6    where histdist='Bedford Historic District';
```



Result Grid | Filter Rows: | Exp

block	address
1819	827 MARCY AVENUE
1819	825 MARCY AVENUE
1819	821 MARCY AVENUE
1819	815 MARCY AVENUE
1837	79 HALSEY STREET
1842	4 ARLINGTON PLACE
1842	12 ARLINGTON PLACE
1843	1 ARLINGTON PLACE
1843	5 MACON STREET
1832	73 HANCOCK STREET
1832	105 HANCOCK STREET
1829	849 MARCY AVENUE
1834	326 JEFFERSON AVE...

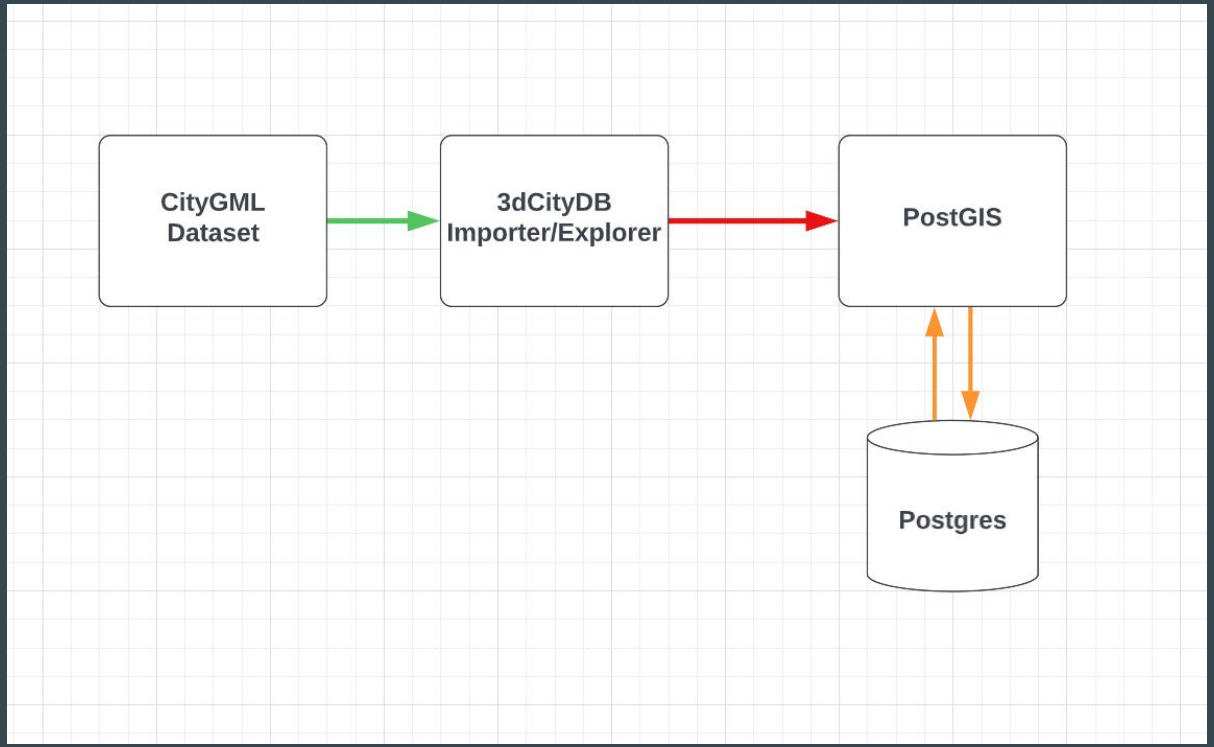
pluto_22v3_1 4 ×

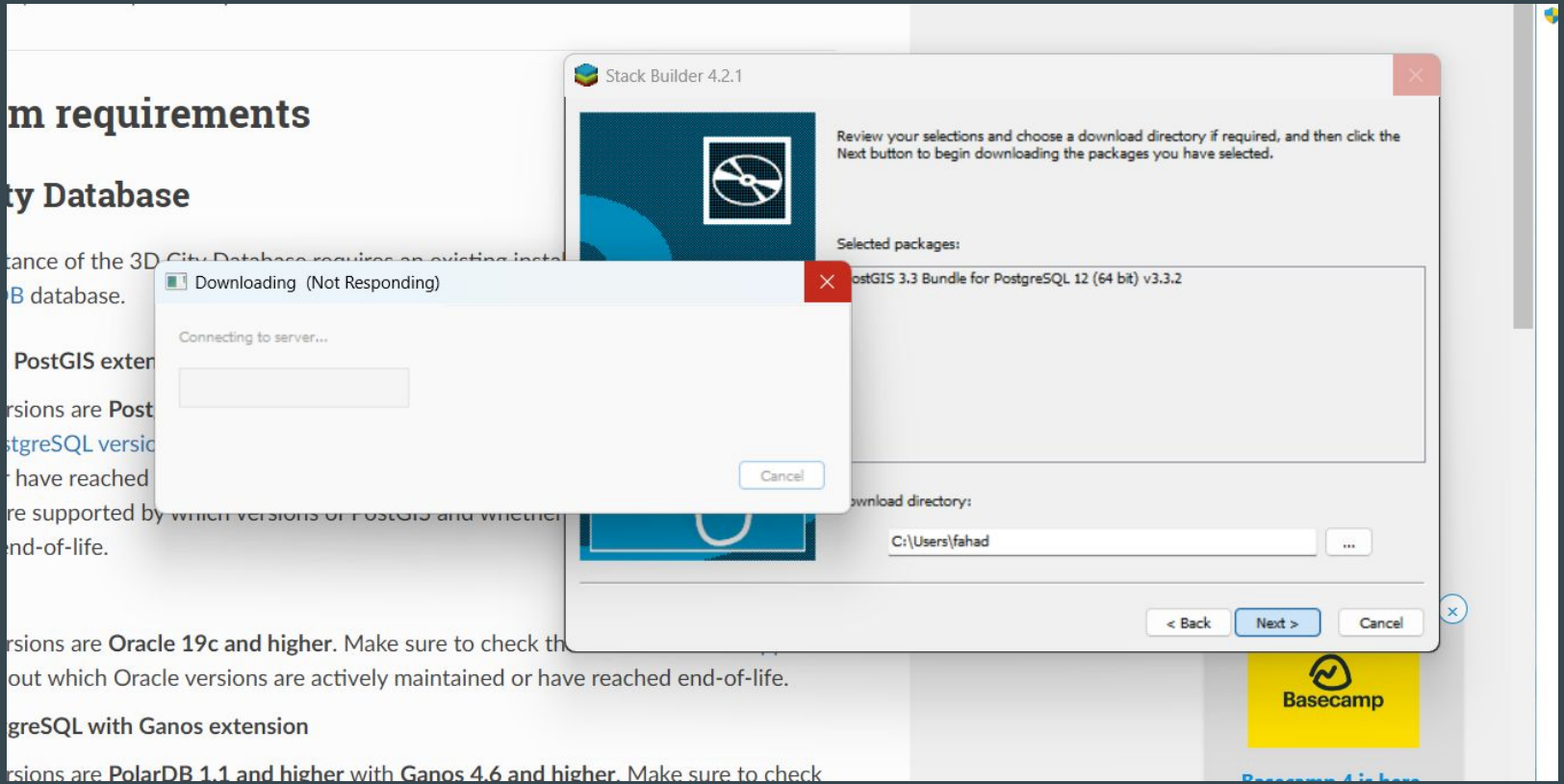
Next Steps

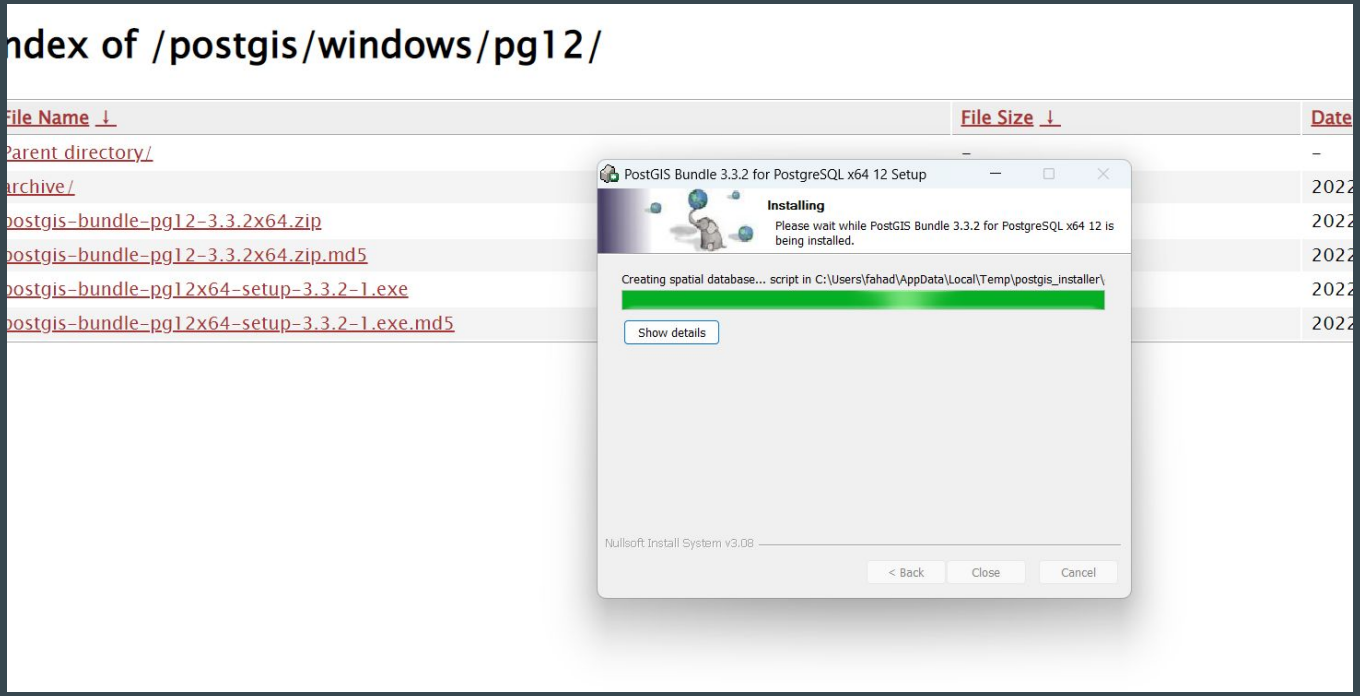
- Extension to cityGML: trying Docker to allow conversion from GML to SQL
- Test out on different robust datasets
- Method where anyone can query data
- Analyze results

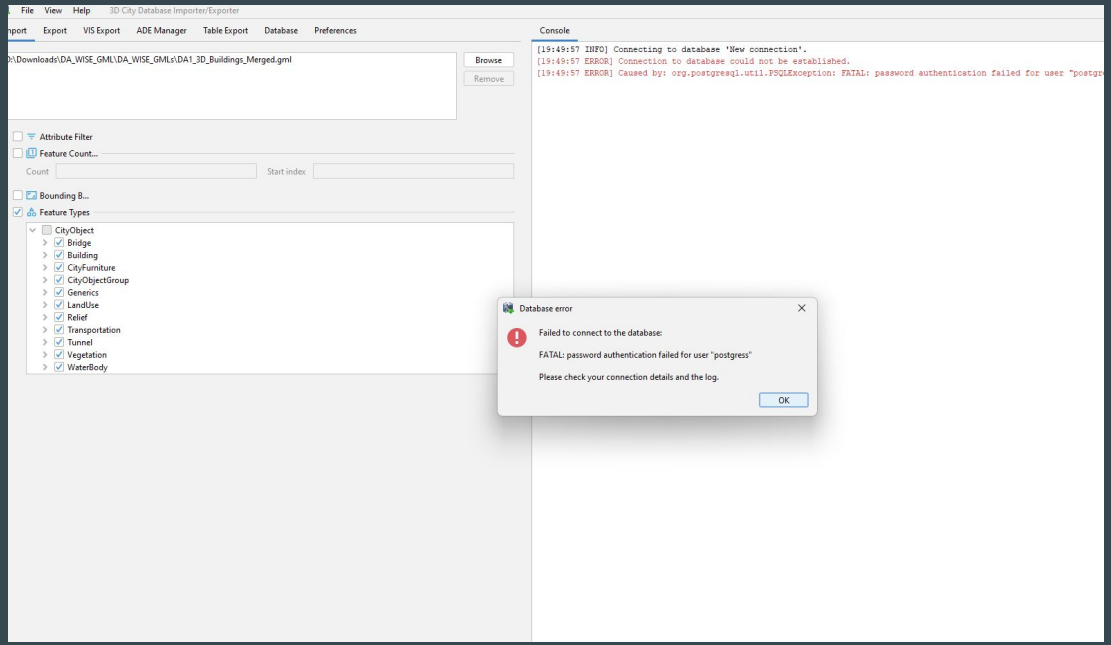
Current State

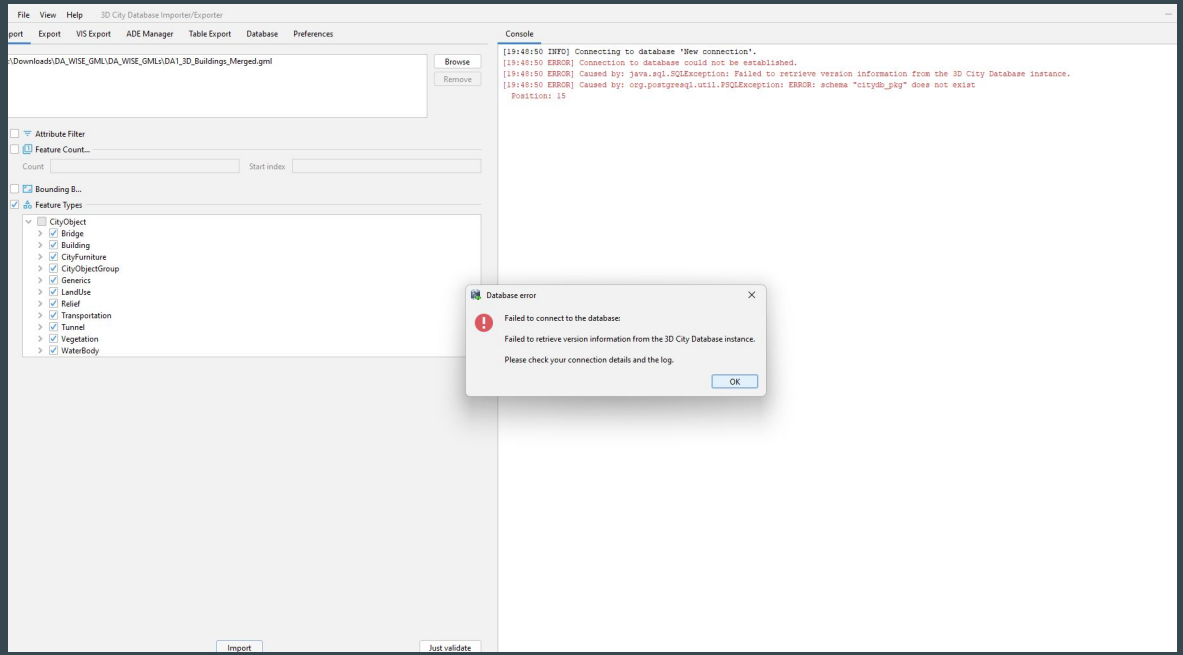
-

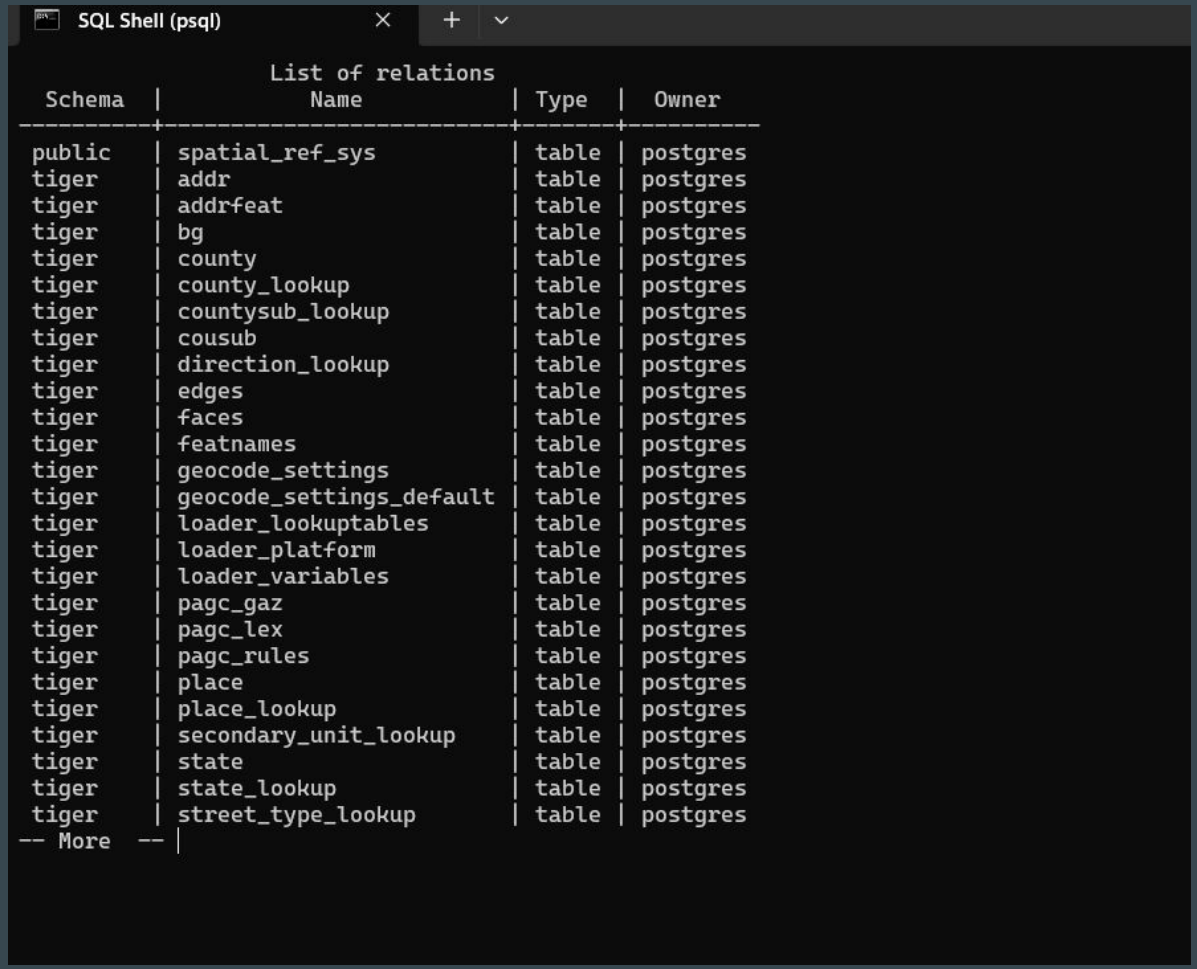



m requirements
ty Database
tance of the 3D City Database requires an existing instal
DB database.
PostGIS exten
rsions are Post
tgreSQL versio
have reached
re supported by which versions of PostGIS and whether
end-of-life.
rsions are Oracle 19c and higher. Make sure to check th
out which Oracle versions are actively maintained or have reached end-of-life.
greSQL with Ganos extension
rsions are PolarDB 1.1 and higher with Ganos 4.6 and higher. Make sure to check
Downloading (Not Responding)
Connecting to server...
Cancel
Stack Builder 4.2.1
Review your selections and choose a download directory if required, and then click the Next button to begin downloading the packages you have selected.
Selected packages:
ostGIS 3.3 Bundle for PostgreSQL 12 (64 bit) v3.3.2
ownload directory:
C:\Users\fahad
...
< Back
Next >
Cancel
Basecamp


ndex of /postgis/windows/pg12/
File Name ↓
File Size ↓
Date
Parent directory/
archive/
postgis-bundle-pg12-3.3.2x64.zip
postgis-bundle-pg12-3.3.2x64.zip.md5
postgis-bundle-pg12x64-setup-3.3.2-1.exe
postgis-bundle-pg12x64-setup-3.3.2-1.exe.md5
PostGIS Bundle 3.3.2 for PostgreSQL x64 12 Setup
Installing
Please wait while PostGIS Bundle 3.3.2 for PostgreSQL x64 12 is being installed.
Creating spatial database... script in C:\Users\fahad\AppData\Local\Temp\postgis_installer\
Show details
Nullsoft Install System v3.08
< Back
Close
Cancel


File View Help
3D City Database Importer/Exporter
Import Export VIS Export ADE Manager Table Export Database Preferences
D:\Downloads\DA_WISE_GML\DA_WISE_GML\DA1_3D_Buildings_Merged.gml
Browse
Remove
Attribute Filter
Feature Count...
Count
Start index
Bounding B...
Feature Types
CityObject
Bridge
Building
CityFurniture
CityObjectGroup
Generics
LandUse
Relief
Transportation
Tunnel
Vegetation
WaterBody
Console
[19:49:57 INFO] Connecting to database 'New connection'.
[19:49:57 ERROR] Connection to database could not be established.
[19:49:57 ERROR] Caused by: org.postgresql.util.PSQLException: FATAL: password authentication failed for user "postgres"
Database error
Failed to connect to the database:
FATAL: password authentication failed for user "postgress"
Please check your connection details and the log.
OK


File View Help
3D City Database Importer/Exporter
port
Export
VIS Export
ADE Manager
Table Export
Database
Preferences
:\Downloads\DA_WISE_GML\DA_WISE_GML\DA1_3D_Buildings_Merged.gml
Browse
Remove
Attribute Filter
Feature Count...
Count
Start index
Bounding B...
Feature Types
CityObject
Bridge
Building
CityFurniture
CityObjectGroup
Generics
LandUse
Relief
Transportation
Tunnel
Vegetation
WaterBody
Import
Just validate
Console
[19:48:50 INFO] Connecting to database 'New connection'.
[19:48:50 ERROR] Connection to database could not be established.
[19:48:50 ERROR] Caused by: java.sql.SQLException: Failed to retrieve version information from the 3D City Database instance.
[19:48:50 ERROR] Caused by: org.postgresql.util.PSQLException: ERROR: schema "citydb_pkg" does not exist
Position: 15
Database error
Failed to connect to the database:
Failed to retrieve version information from the 3D City Database instance.
Please check your connection details and the log.
OK


SQL Shell (psql)
List of relations
Schema | Name | Type | Owner
public | spatial_ref_sys | table | postgres
tiger | addr | table | postgres
tiger | addrfeat | table | postgres
tiger | bg | table | postgres
tiger | county | table | postgres
tiger | county_lookup | table | postgres
tiger | countysub_lookup | table | postgres
tiger | cousub | table | postgres
tiger | direction_lookup | table | postgres
tiger | edges | table | postgres
tiger | faces | table | postgres
tiger | featnames | table | postgres
tiger | geocode_settings | table | postgres
tiger | geocode_settings_default | table | postgres
tiger | loader_lookuptables | table | postgres
tiger | loader_platform | table | postgres
tiger | loader_variables | table | postgres
tiger | pagc_gaz | table | postgres
tiger | pagc_lex | table | postgres
tiger | pagc_rules | table | postgres
tiger | place | table | postgres
tiger | place_lookup | table | postgres
tiger | secondary_unit_lookup | table | postgres
tiger | state | table | postgres
tiger | state_lookup | table | postgres
tiger | street_type_lookup | table | postgres
-- More --