Environment setup for *CBIM-Revit Graph Compiler*

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Introduction

- What is the CBIM-Revit Graph Compiler (CGC)?
  - The CGC is designed to retrieve building information from the Revit original database and convert it to a core-extension graph-based data repository[1].

- What tools are used for CGC?
  - CGC is developed by using Revit Dynamo, third-party Dynamo libraries, Python, and third-party Python libraries.

- How to use CGC?
  - CGC contains two parts:

    1) A well-prepared Dynamo code file. This part can retrieve building raw data from the Revit database and save object attributes as csv files and geometry as ply files.

    2) A python source code. It can read the csv files and compile it as an RDF graph.

  - Basically, you run the Dynamo code to get the temporary data then run the Python code to compile the csv temporary file as a ttl file.

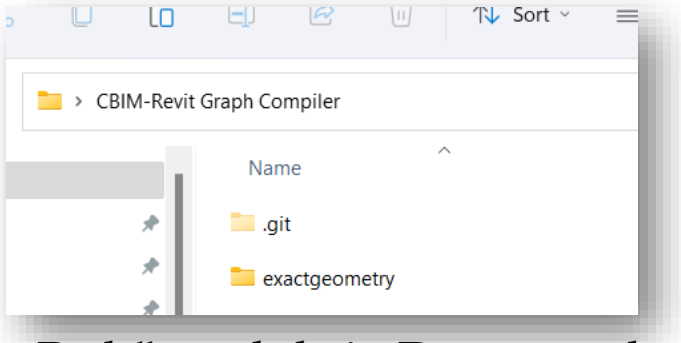
[1] Ouyang, B., Z. Wang, and R. Sacks. "Semantic enrichment of object associations across federated BIM semantic graphs in a common data environment." In ECPPM 2022-eWork and eBusiness in Architecture, Engineering and Construction 2022, pp. 591-598. CRC Press, 2023.

Requirements

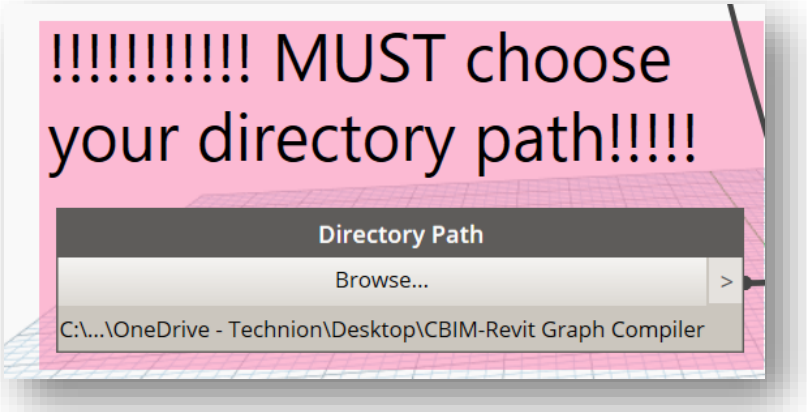
- Revit-side
  - Revit 2022 version.
  - Dyanmo == 2.10.1. It should be installed inside the Revit 2022 defautly.
  - MEPover. Search and install from the Dynamo market.
- Python-side
  - Python == 3.8.3
  - Please use Anaconda to install all other third-party python libraries from environment.yml.
    - The anaconda installation is from here.
    - Recovery the environment from the yml file is here.
- CGC source code
  - https://github.com/ZijianWang-ZW/CBIM-Revit_Graph_Compiler

Setup

1. Download and install all required software and tools with exactly the same versions.
2. Open the Dynamo file (*graph_construction_part1.dyn*) from Revit
3. Change the saving directory path in Dynamo
   - Make sure there is a subfolder named “exactgeometry” in your selected directory path

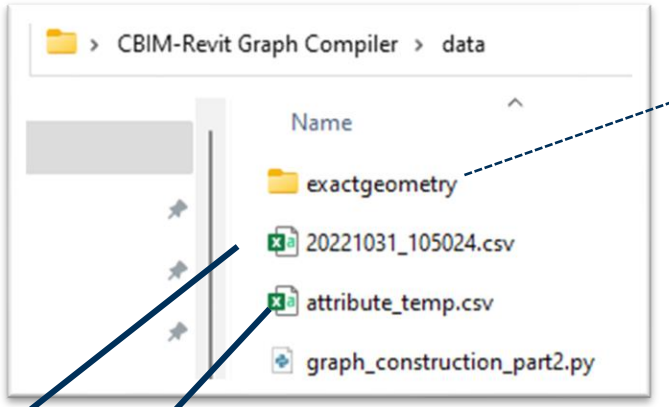


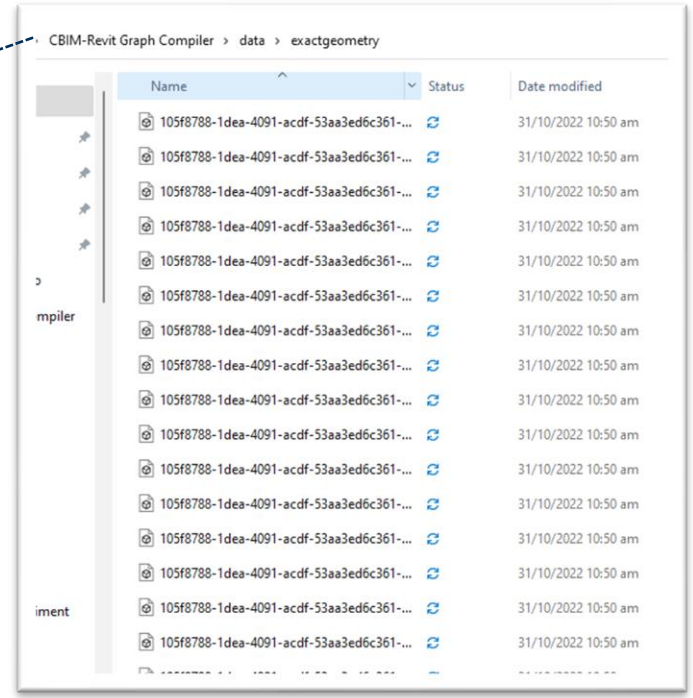
   - Find the ”Directory Path” module in Dynamo, choose your own folder or the cloned CGC repository, like the following screenshot.



Usage

1. Open your model in Revit. Run the Dynamo code. After that, all building object information will be retrieved and saved into csv file and geometry PLY files. Your folder should look like this:





The building information at the saving moment

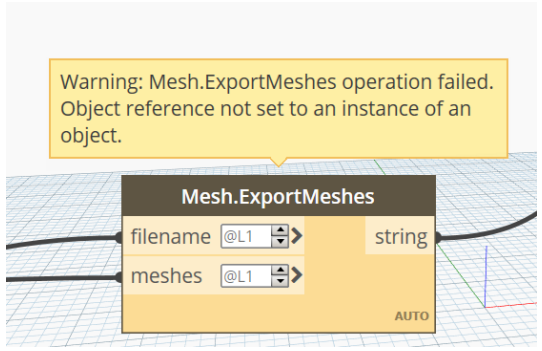
The latest version if you change many times

2. Open **graph_contruction_part2.py** and change lines 502-506 according to your requirements. Run the python file and you will get the final TTL file.

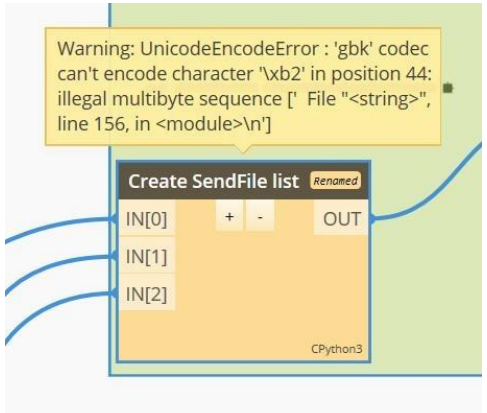
```
(dynamo) C:\Users\Zijian Wang\OneDrive - Technion\Desktop\CBIM-Revit Graph Compiler\data>python graph_construction_part2.py
Site
Building
Levels
Levels
Doors
```

Possible problems

- CGC is really strict to environment. We only tested the listed software and cannot guarantee other versions
- Sometimes, Dynamo will remind “possible errors” like this which may be caused by retrieving and merging exact geometry by using external libraries. You can ignore them.



- If you meet problems about “UnicodeEncodeError”, you can try to put “encoding=‘utf-8’ in the code.




```
149
150     # create this file and write the attribute dictionary into the
151     with open(temp_file_path, 'w', encoding='utf-8') as f:
152         f.write("==========\n") # add seperators bewteen elements
153         # here is to write all parameters of one element
154         for each in all_ele_para:
155             for key in each.keys():
156                 f.write("%s, %s\n" % (key, each[key]))
157             f.write("==========\n") # add seperators bewteen elemen
158         f.close()
159
```

Other

- If you meet problems during installation, please google first.
- If you find that the code has functional errors, like cannot retrieve full data, compilation errors for the RDF graph, please contact me by the email: zijian.wang@campust.technion.ac.il