FME UC: Working With BIM

Course Title	Working with BIM
Product Type	FME Desktop
FME Version	2022.0

Description

BIM workflows give facilities managers, architects, and engineers key information for better-informed infrastructure planning and management. You will learn how to convert data to and from BIM while preserving its rich attribute information. We'll also cover transforming it for easy sharing and analysis in other applications. By the end, you will know how to solve the most common BIM, CAD & GIS integration challenges using FME.

Content Overview

1. Importing Revit Data
2. Importing IFC
3. Writing To a New IFC
4. Updating IFC

Pre-requisites

It is recommended to take the Working with 3D Geometry training before this session if you have no prior 3D knowledge. Familiarity with FME Desktop, at least to the extent covered by the Getting Started with FME tutorial, or Introduction to FME Desktop training.

Step-by-Step Instruction

You'll find starting workspaces for each exercise below in C:/FMEData2022/Resources/Working With BIM/Data/…

Exercise 1: Importing Revit Data

In this exercise we will explore a simple Revit file in FME and get familiar with both the data and the reader parameters.

1. Open FME Data Inspector

You can find FME Data Inspector either from:

- Inside FME Workbench by going to Tools > FME Data Inspector…
- Inside workbench, hitting the hot keys CTRL + ALT + D
- The Start menu and going to FME Desktop > FME Data Inspector

2. Inspect Duplex_A.rvt

Drag and drop Duplex_A.rvt into FME Data Inspector from:
C:/FMEData2022/Resources/FMEUC22/Working With BIM/Data/Duplex_A.rvt.

Exercise 2: Importing IFC

Part 1: Read IFC, extract property sets, and simplify geometry

In this exercise, we will create a workspace that extracts property sets into attributes, expose them, and then simplify IFC geometry to make it easier to output to other formats. If you run into any snags at any point in this workspace, please feel free to open up *ReadIFC_final.fmw* for the completed workspace.

1. Open ReadIFC_start.fmw

Open ReadIFC_start.fmw in FME Workbench and run the workspace to inspect the feature caches.

2. Extract property sets to attributes

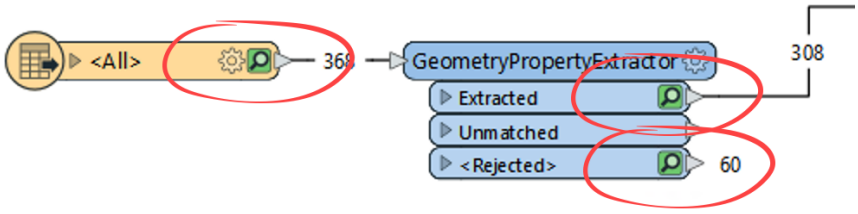
Add a GeometryPropertyExtractor between the IFC reader feature type and the Inspector. In the GeometryProperty parameters, set *Prefix Extracted Trait with Geometry Name* to ‘Yes’. Run the workspace to view the property sets as attributes.

If the workspace fails, right-click on the <Rejected> output port, then for Workspace: Rejected Feature Handling select Continue, or connect a Logger to the <Rejected> port.

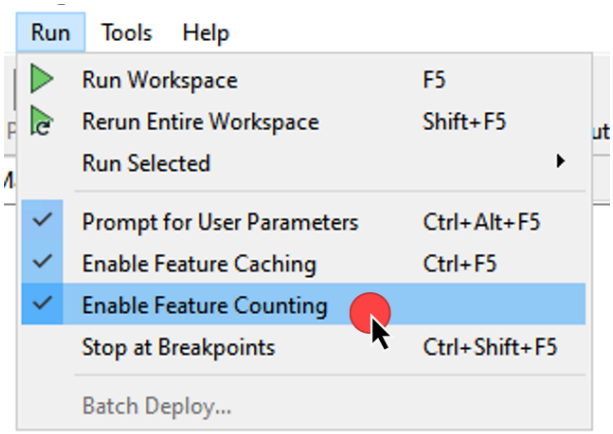
3. Expose new attributes with an AttributeExposer

Now that our property sets have been extracted into attributes, we need to make these attributes accessible in our workflow by exposing them. Add an AttributeExposer and connect it to the *output* port of the GeometryPropertyExtractor.

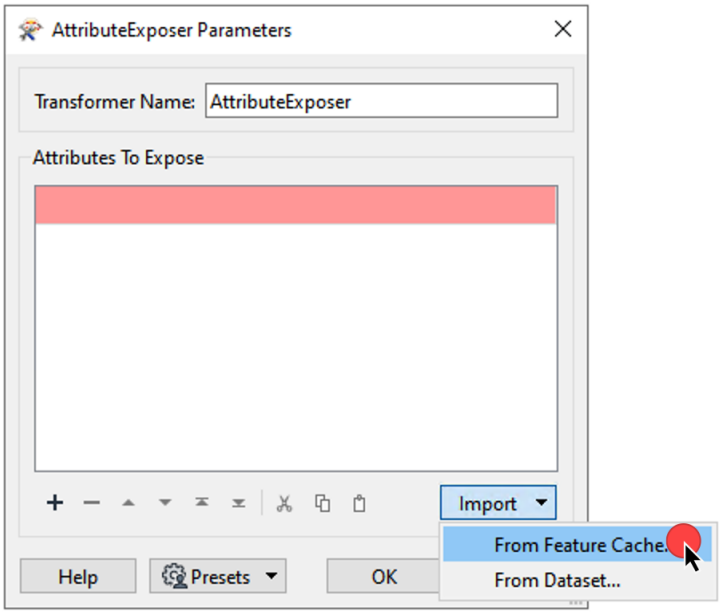
If you haven't run the workspace to the end of the GeometryPropertySetter, run it now to fill the feature cache. It should look something like this:



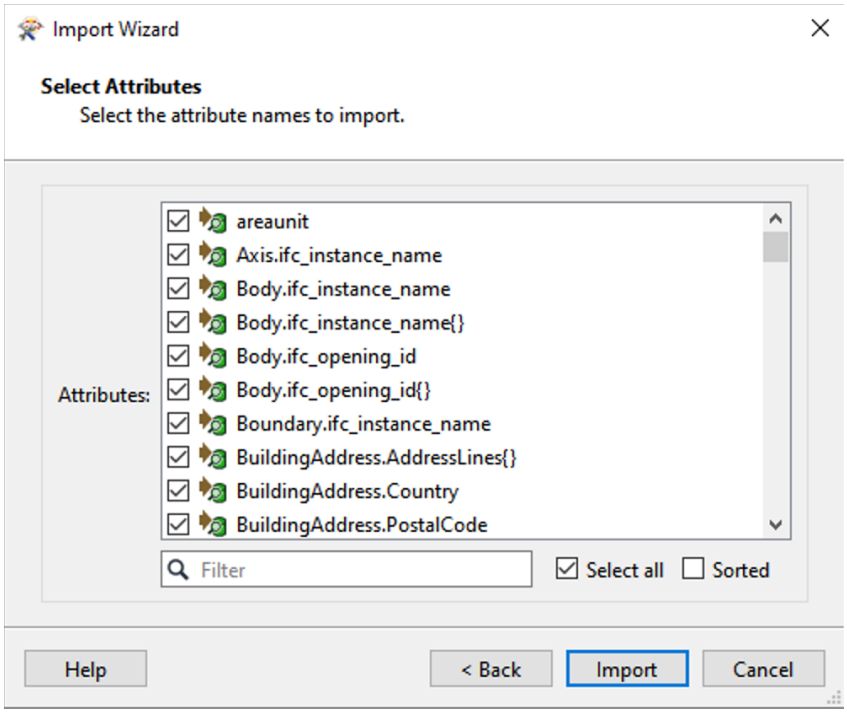
If you aren't seeing these green icons, you may need to go to *Run* > *Enable Feature Caching* and just make sure it is checked.



In the AttributeExposer, select *Import* at the bottom right and select 'From Feature Cache…'.



In the Import Wizard, check ‘Select all’ and Import.

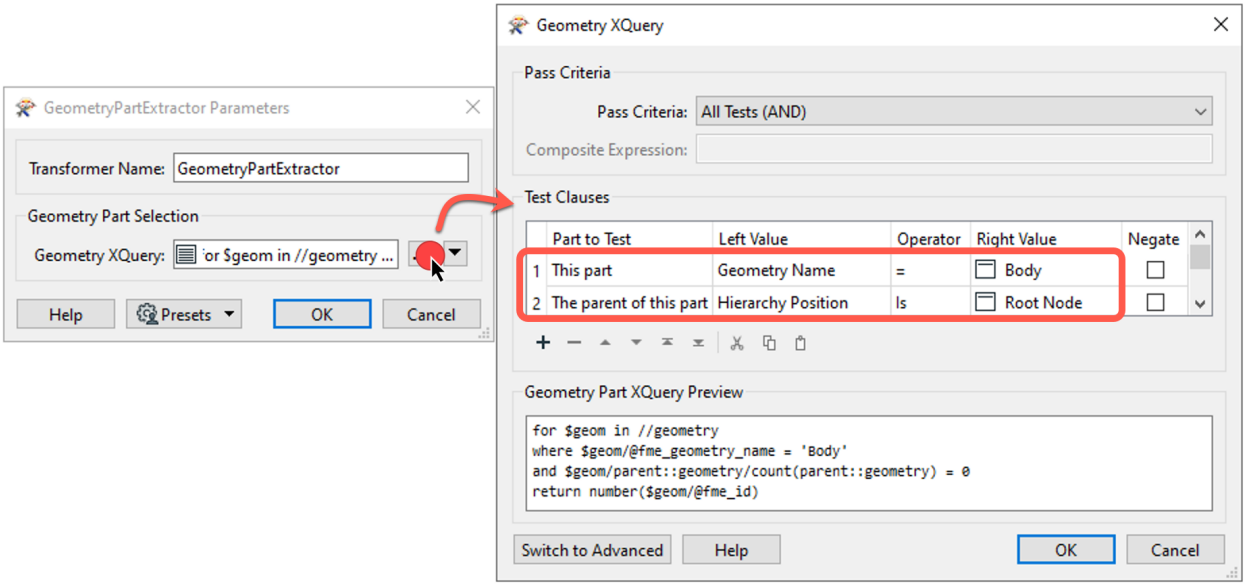


Run the workspace. All attributes should be exposed now.

4. Simplify the geometry using a GeometryPartExtractor

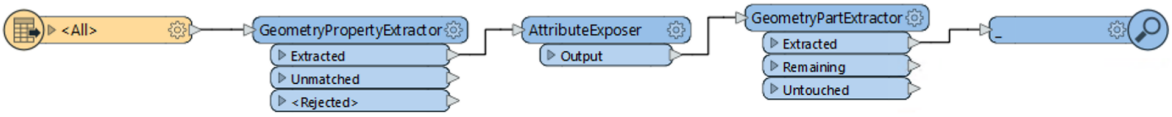
Connect a GeometryPartExtractor between the AttributeExposer and the Inspector. Select the ellipsis (three dots) in the GeometryPartExtractor parameters and fill in the Test Clauses with the two lines below:

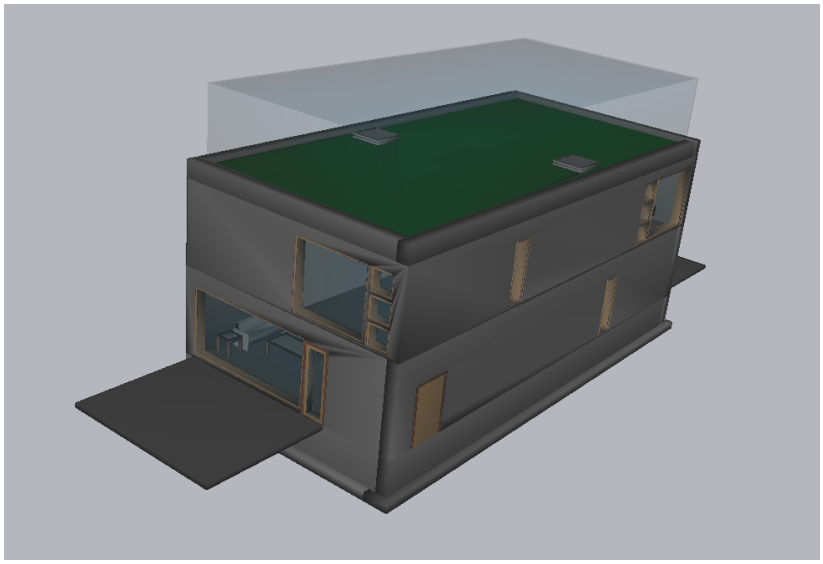
- *This part Geometry Name = Body*
- *The parent of this part Hierarchy Position Is Root Node*



5. Run the full workspace

Your completed workspace should look like this:





If you had any trouble with your workspace at any point, you can open up the completed workspace, *ReadIFC_final.fmw* to view the completed workspace.

Part 2: Calculate Volume with GQuery

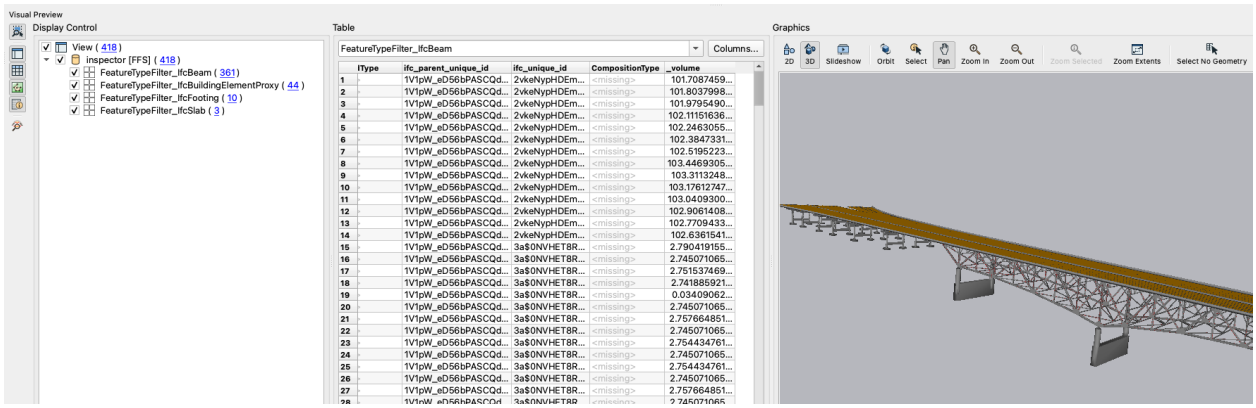
This workspace is part of a demonstration to filter thousands of rivet heads out of a bridge IFC model to get a more accurate measurement of volume.

1. Open FilterRivets.fmw

Ensure that the source IFC reader is pointing to C:/FMEData2022/Resources/FMEUC22/Working With BIM/Data/Bridge.ifc.

2. Run the Workspace

Run the workspace and explore the outputs in Visual Preview or FME Data Inspector.

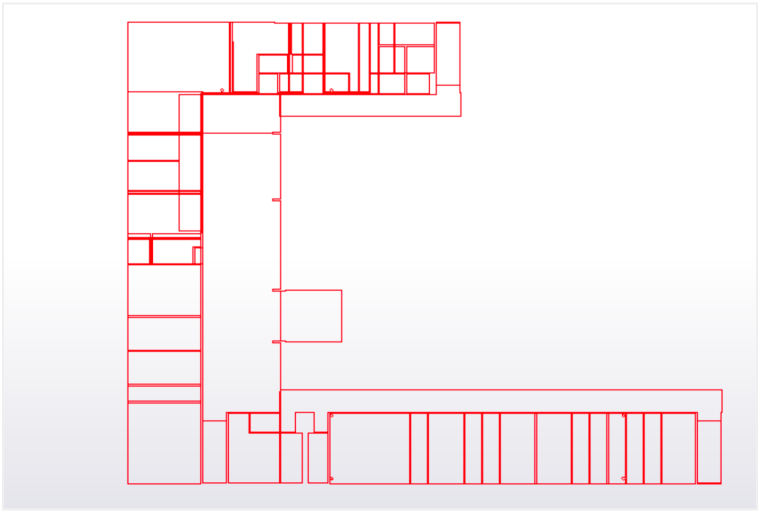


Exercise 3: Writing to a New IFC

The next two exercises will have you follow along with the demonstration.

1. Inspect Floorplan.dwg in FME Data Inspector

Open FME Data Inspector and drag and drop Floorplan.dwg from C:/FMEData2022/Resources/FMEUC22/Working With BIM/Data/Floorplan.dwg. Select the format Autodesk AutoCAD Map 3D Object Data [Autocad_OD].

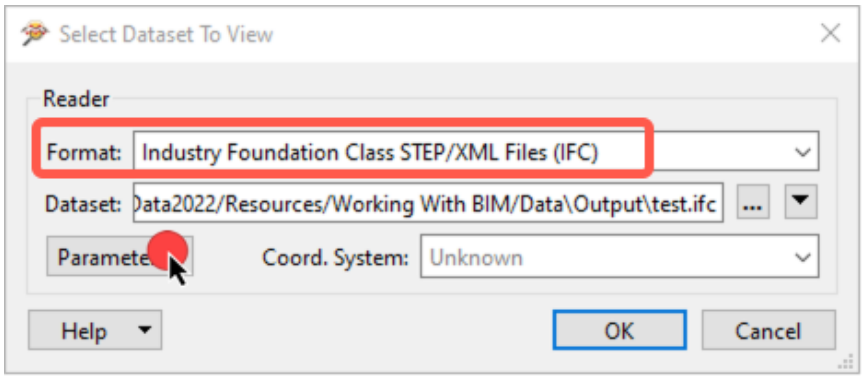


2. Open DWGToIFC.fmw in FME Workbench

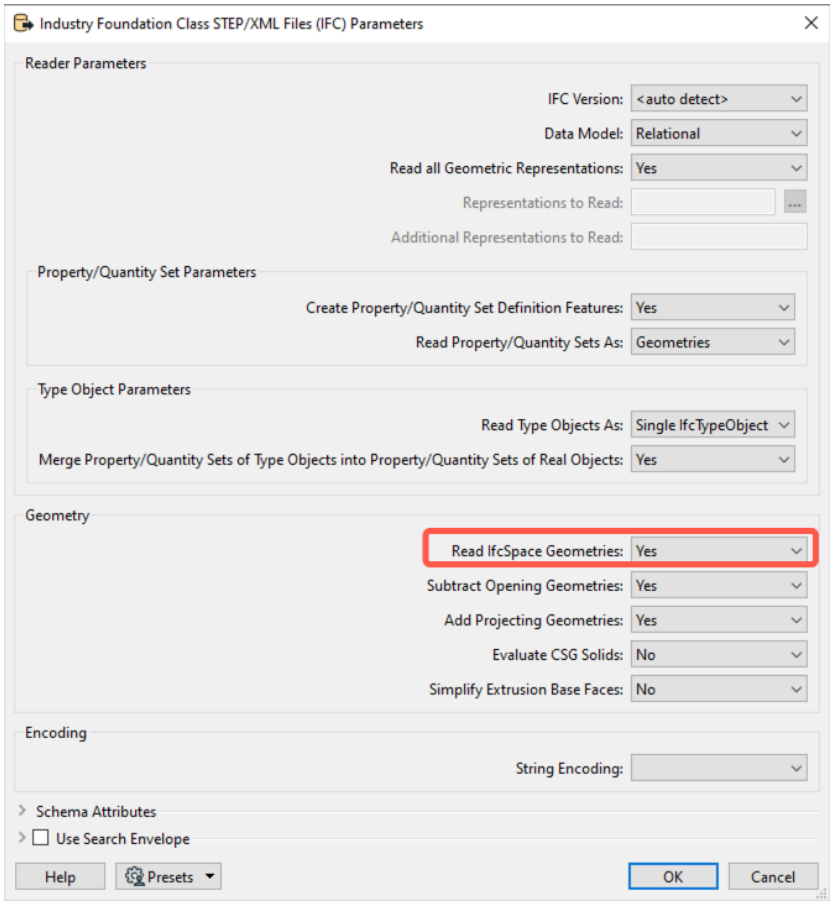
Here we will walk through creating IfcBuildingStorey, geometry, property sets, and property set definitions. This workspace is complete and nothing needs to be changed here.

3. Run the workspace

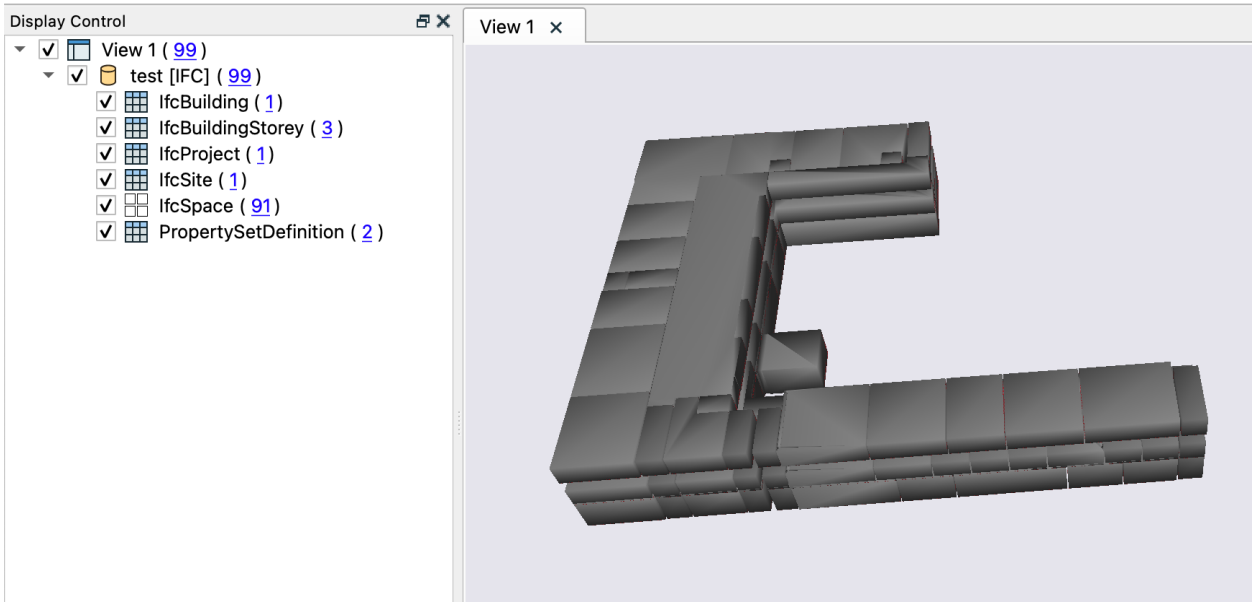
Run the workspace, then inspect the output test.ifc in FME Data Inspector to check for the new property sets. In the Select Dataset to View dialog, be sure to pick *Industry Foundation Class STEP/XML FIles (IFC)* rather than the *IFC With Data Views* format.



In the Parameters, set *Read IfcSpace Geometries* to 'Yes' and press OK to view the dataset.



The dataset will look like this. Check the Feature Information window along with the demonstration to view the new property sets.

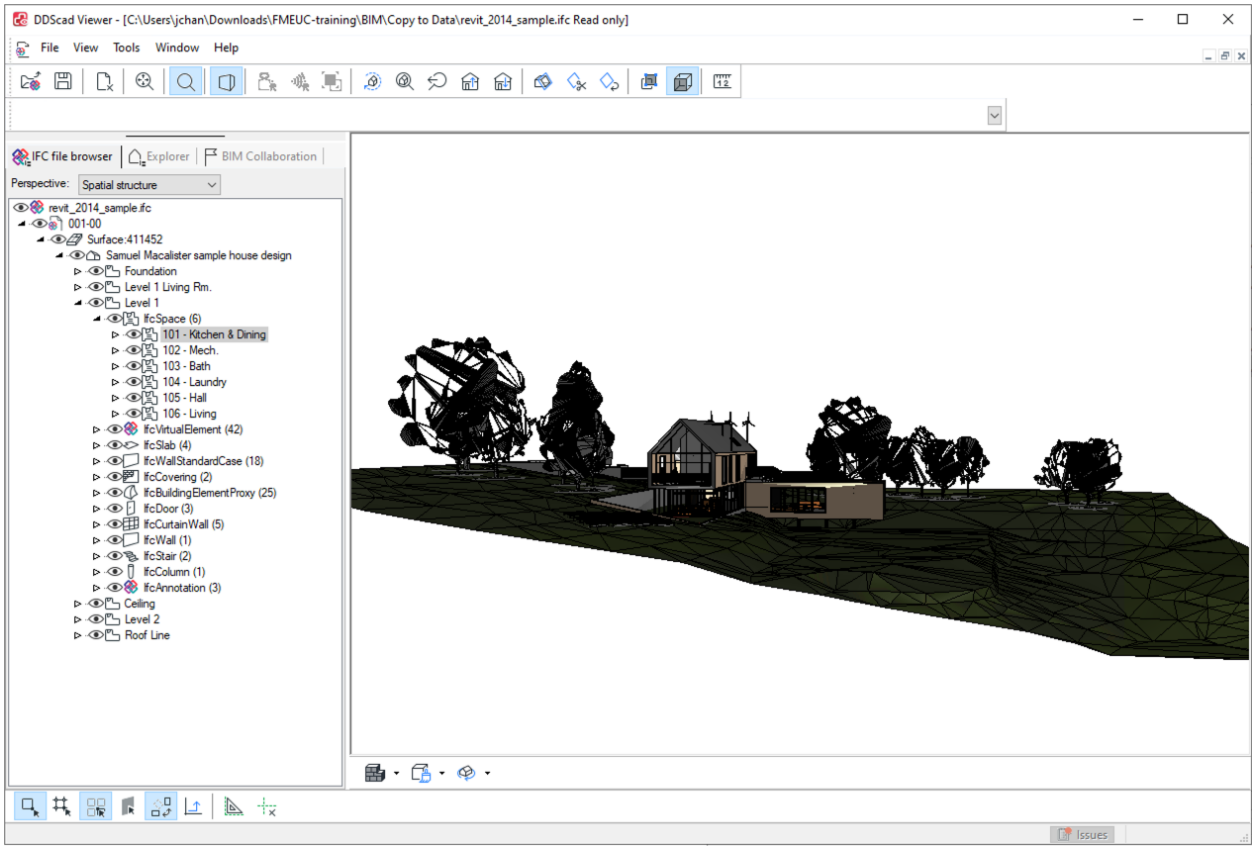


Exercise 4: Updating IFC

Update and existing IFC file with an excel spreadsheet. Here we will be updating the LongName values to the same values in French.

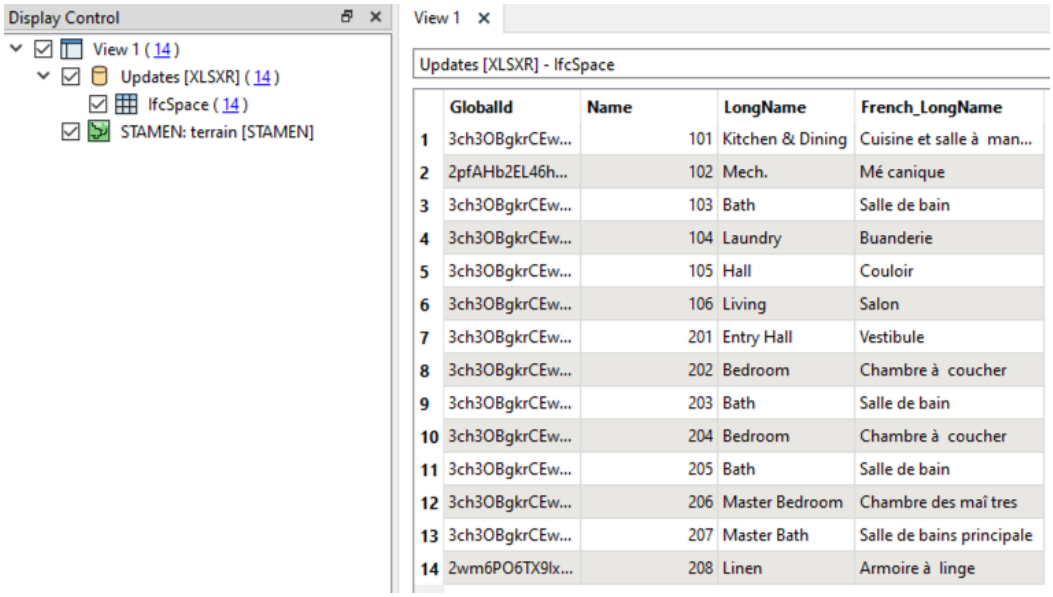
1. Open revit_2014_sample.ifc in DDS-CAD

Follow along with the demonstration to view space names. Expand Level 1 > IfcSpace.



2. Inspect Updates.xls

Open Updates.xls in FME Data Inspector to view the new column French_LongName.



	GlobalId	Name	LongName	French_LongName
1	3ch3OBgkrCEw...	101	Kitchen & Dining	Cuisine et salle à man...
2	2pfAHb2EL46h...	102	Mech.	Mé canique
3	3ch3OBgkrCEw...	103	Bath	Salle de bain
4	3ch3OBgkrCEw...	104	Laundry	Buanderie
5	3ch3OBgkrCEw...	105	Hall	Couloir
6	3ch3OBgkrCEw...	106	Living	Salon
7	3ch3OBgkrCEw...	201	Entry Hall	Vestibule
8	3ch3OBgkrCEw...	202	Bedroom	Chambre à coucher
9	3ch3OBgkrCEw...	203	Bath	Salle de bain
10	3ch3OBgkrCEw...	204	Bedroom	Chambre à coucher
11	3ch3OBgkrCEw...	205	Bath	Salle de bain
12	3ch3OBgkrCEw...	206	Master Bedroom	Chambre des maî tres
13	3ch3OBgkrCEw...	207	Master Bath	Salle de bains principale
14	2wm6PO6TX9lx...	208	Linen	Armoire à linge

3. Open TranslateSpaceNames.fmw

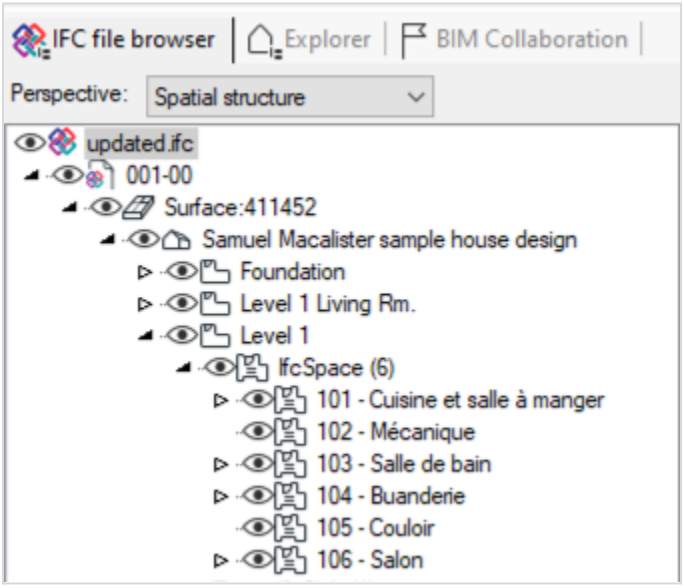
The demonstration will walk you through key parts of the workspace.

4. Run the workspace

Explore the feature caches at highlighted parts of the workspace to see what they do.

5. Open updated.ifc in DDS-CAD

View the updated space names and Identity properties. We can see that the space names have now been updated to the French space names.



Congratulations! You've completed all the exercises in the Working With BIM course! Here are some additional resources below:

Additional Resources

- Tutorial: Simplifying IFC geometries for easier conversion
- Tutorial: AutoCAD to IFC Conversion Example
- Tutorial: Updating IFC Example
- Webinar: Extend the Value of Your BIM Data with FME: Part 1
- Webinar: Extend the Value of Your BIM (& Revit) Daa With FME: Part 2

Data Attribution

Data used in this course are available to the public domain and are made available by the sources below:

- Autodesk Revit sample
- buildingSmart Alliance's Common Building Information Model Files - Duplex A
- Nemetschek Vectorworks - Riverside Building in Washington, DC