

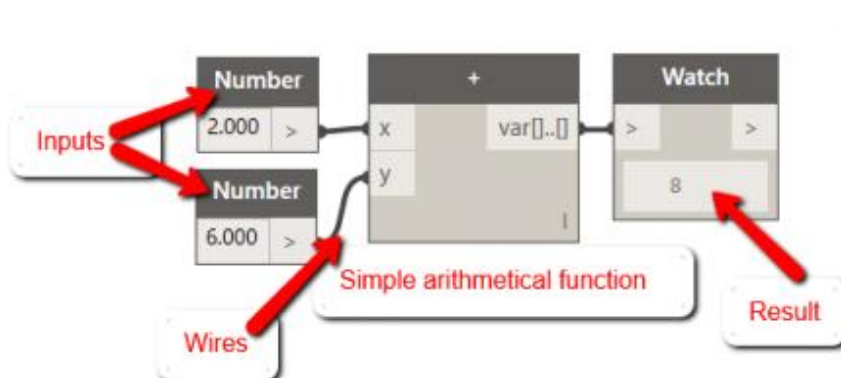
Dynamo for Revit 2017 - Automatic Labelling of Doors with Level Reference

Using Dynamo to count doors and automatically label according to Revit Floor Level.

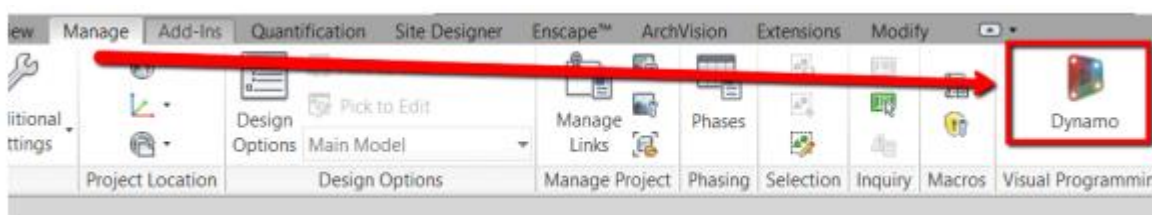
Revit is a big step forward over conventional CAD in terms of coordination and the amount of data that a project can contain. However, there is sometimes a need for a tool to work out an optimal design, explore design options in a more analytical way and test out a design or to simply automate repetitive tasks.

A tool for this is supplied with Revit, known as Dynamo for Revit. Dynamo is a free and open source scripting tool. Its interface is visual in nature, working from a node based concept. Some developers have utilised the Dynamo scripts to create some useful tools to aid in fabrication of parts like Dynamo Unfold and the Structural Analysis Toolkit for Structural Engineers to query and refine a structural frame.

A simple script is shown in the Dynamo help. Although this is a very simple task we can do much more impressive things, like create complex geometry, build lists, analyse parts, locations and call up a range of information on Revit Families. e.g. Door Reference and Level location.



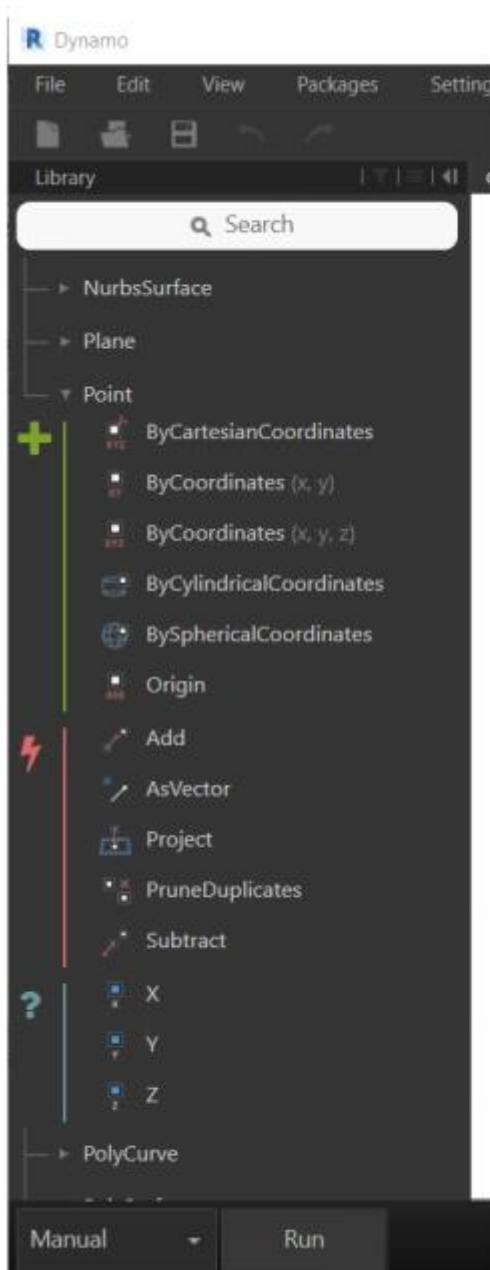
To access Dynamo, it is now located under the Manage tab in Revit, it also may be worth downloading and installing the latest version of Dynamo, which at the time of writing is 1.1.0, rather than the version supplied. (0.9x)



Clicking on Dynamo will fire up a second window where we can start to create a script.

One of the things we have to get our heads around is locating and understanding the application of Dynamo nodes.

These can be located from the Category and library list on the side panel. A predictive text style search box can also be used.



Dynamo Node Category List

The different colours are significant as they will do different tasks according to what is desired and needed in the script.



Create, adds objects by a range of different options

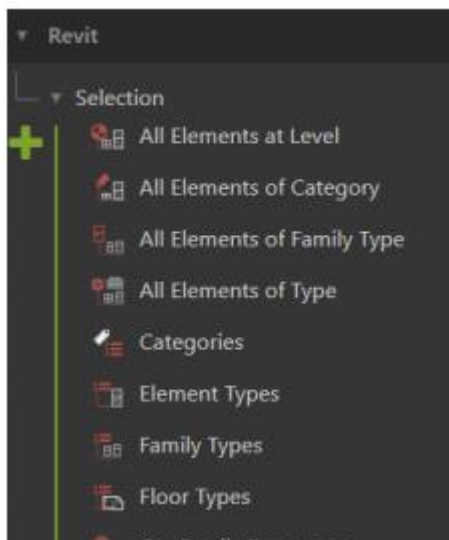


Modify, copy objects, perform boolean operations, insert points along other objects etc.

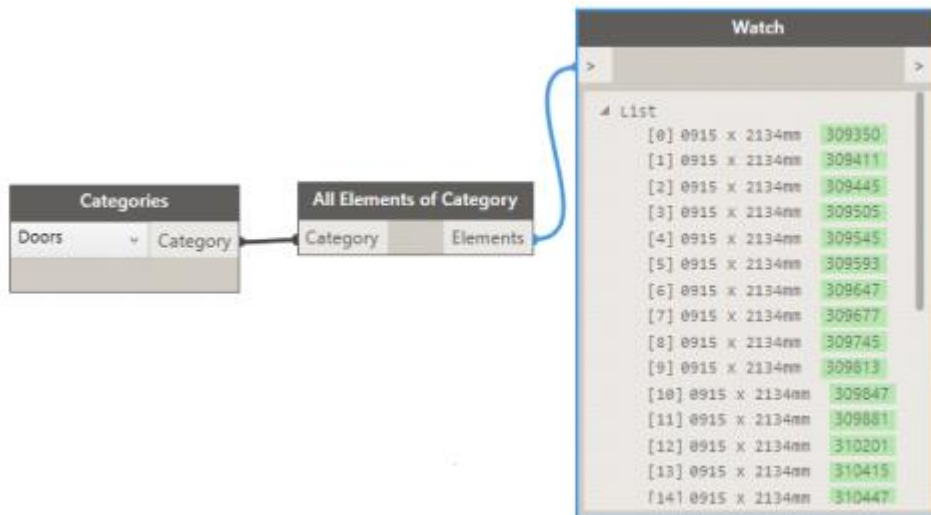


Query, obtains information, coordinates, length, direction, object data etc.

library is particularly useful as we can use the create nodes to list and sort various Revit families and extract data to generate a door reference which we'll feed back into the Revit Project. The Revit/Selection is what we see below:-



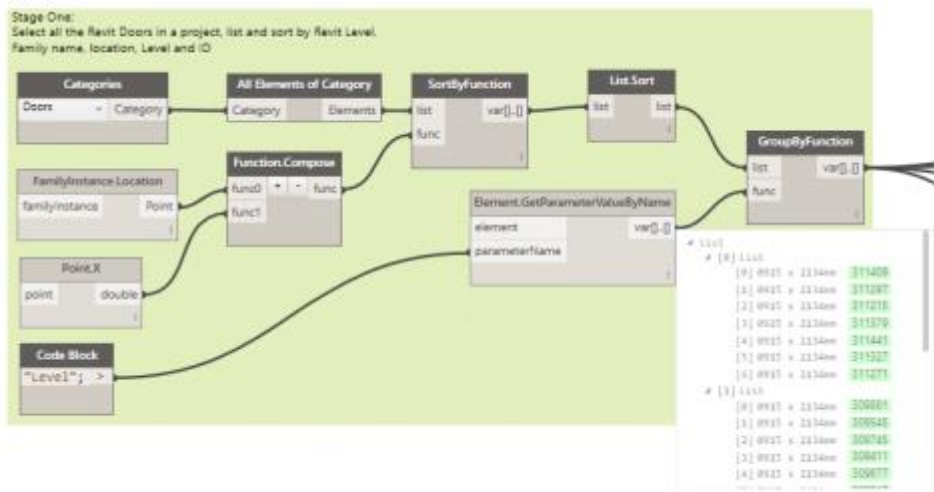
By choosing a node and clicking onscreen we can get something like below. Wiring the nodes and running the script will populate the results into a Watch node if desired.



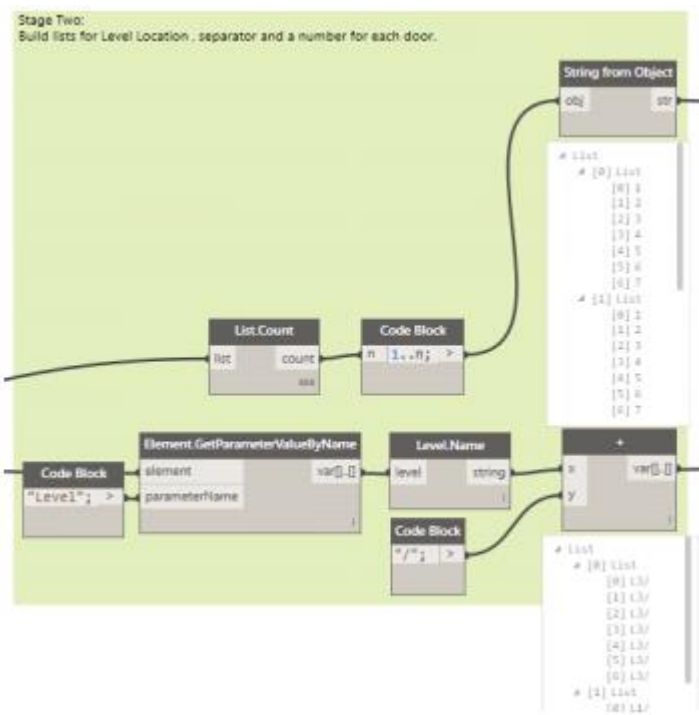
The Watch node is a valuable asset in diagnosing scripts and showing what information has been obtained and being driven so far.

Notice the counting of the elements, the family type name and unique ID. All of this can be utilised and sorted. In this case we want to break down all the doors by Level. So to do that we need another list!

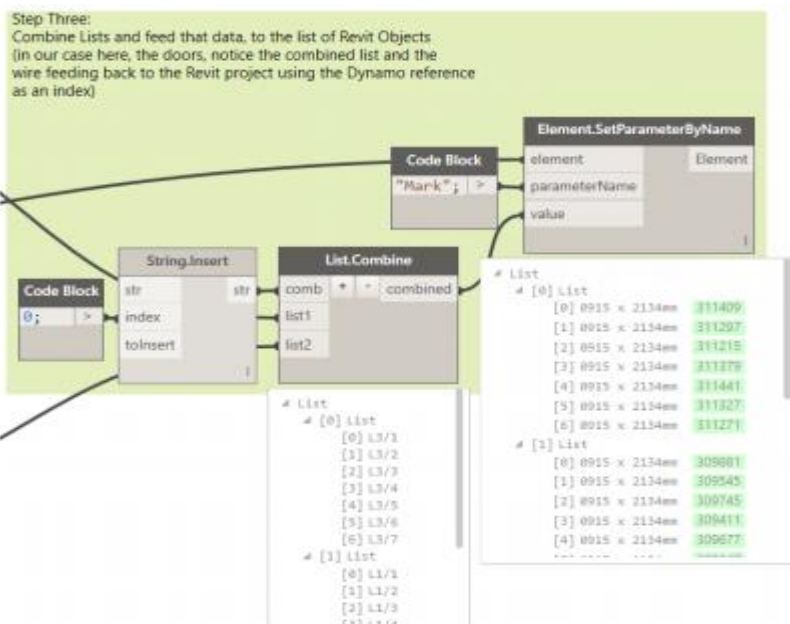
We use a Codeblock (another Dynamo essential) to obtain the level name within Revit to sort the doors into a more useful list.



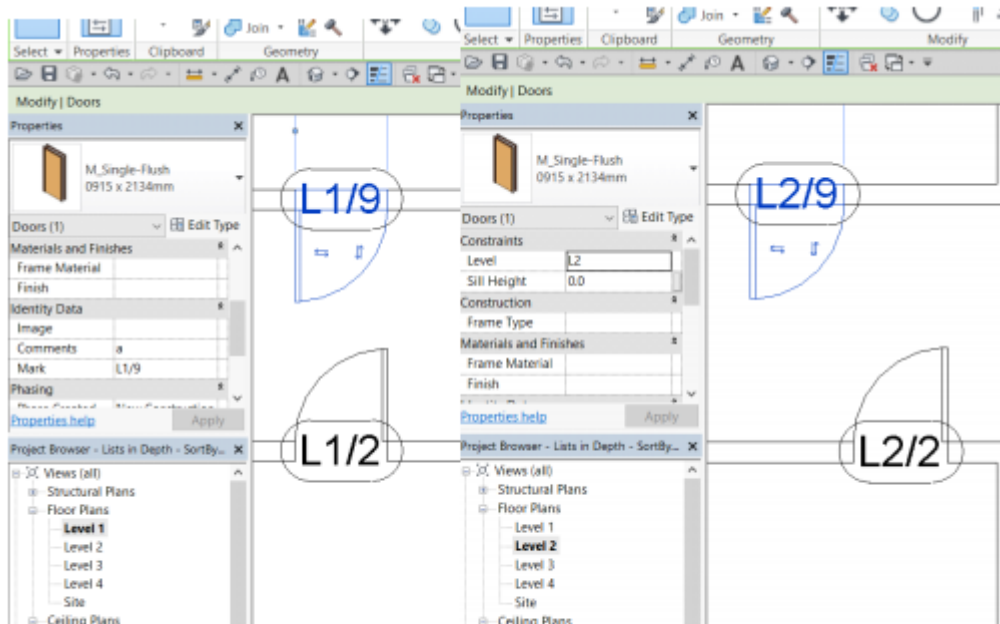
With the next step we can use Dynamo to obtain two lists of our door objects. The first is an index starting from a number and incrementing by one per level. The second list obtains the Level name and separator character which will be assigned per door.



The third and next step in the script is to combine the two lists and feed those combined values back to our door objects in our Revit project.



Key nodes here are List.Combine and Element.SetParameterByName, which will merge our two lists together and feed the project with a combined result. By going back to our Revit Project we can see below that Dynamo has been busy!



Mark parameter for all the doors in a Revit Project have been updated by Dynamo

Upon inspection of the floor plan views, we can see that all the doors have Mark values which contain the level name, a separator '/' and a unique number. This has been done for all floors; Level 1 has L1/*, Level 2 has L2/* and so on.

The number and indeed the parameter data can still be tweaked as desired. The tags were added manually by using the Revit Tag All command, but that too could be automated and added to the Dynamo script.

Using Dynamo to automatically place adaptive components on a mass.

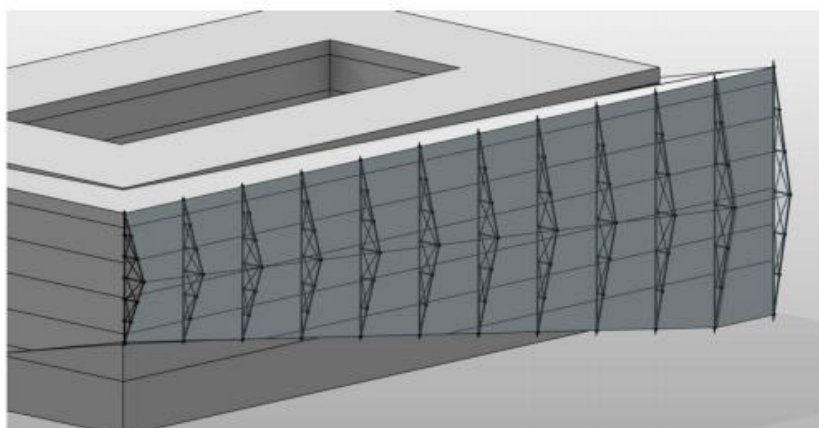
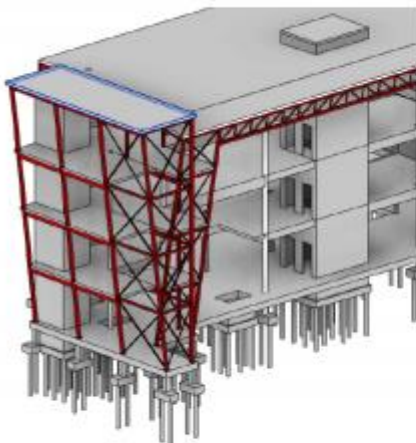


Image Credit: Johan Cantryn

Other examples of using Dynamo could be the obtaining of coordinates for foundations schedules. As it ties in with the Revit API and such information can be easily obtained and be fed into schedules. Colouring evacuation lines linked to time for fire drawings and placing multiple views on multiple sheets are other commonly used examples, as well as driving an optimised conceptual design model. The possibilities are endless.

Dynamo driving a piling schedule to MS Excel



	A	B	C	D
	Type	X	Y	Node ID
1	250 mm - TL	-86297.52296	-28325.98235	567903
2	250 mm - TL	-86297.52296	-18325.98235	567902
3	250 mm - TL	-86297.52296	-29421.85257	567929
4	250 mm - TL	-86497.52296	-29421.85257	567921
5	250 mm - TL	-87077.52296	-29421.85257	567928
6	250 mm - TL	-87077.52296	-29421.85257	567928
7	250 mm - TL	-86777.52296	-29421.85257	567928
8	250 mm - TL	-86477.52296	-29421.85257	567921
9	250 mm - TL	-86177.52296	-29421.85257	567921
10	250 mm - TL	-85877.52296	-29421.85257	567921
11	250 mm - TL	-85577.52296	-29421.85257	567921
12	250 mm - TL	-85277.52296	-29421.85257	567921
13	250 mm - TL	-84977.52296	-29421.85257	567921
14	250 mm - TL	-84677.52296	-29421.85257	567921
15	250 mm - TL	-84377.52296	-29421.85257	567921
16	250 mm - TL	-84077.52296	-29421.85257	567921
17	250 mm - TL	-83777.52296	-29421.85257	567921
18	250 mm - TL	-83477.52296	-29421.85257	567921
19	250 mm - TL	-83177.52296	-29421.85257	567921
20	250 mm - TL	-82877.52296	-29421.85257	567921
21	250 mm - TL	-82577.52296	-29421.85257	567921
22	250 mm - TL	-82277.52296	-29421.85257	567921
23	250 mm - TL	-81977.52296	-29421.85257	567921
24	250 mm - TL	-81677.52296	-29421.85257	567921
25	250 mm - TL	-81377.52296	-29421.85257	567921
26	250 mm - TL	-81077.52296	-29421.85257	567921
27	250 mm - TL	-80777.52296	-29421.85257	567921
28	250 mm - TL	-80477.52296	-29421.85257	567921
29	250 mm - TL	-80177.52296	-29421.85257	567921
30	250 mm - TL	-79877.52296	-29421.85257	567921
31	250 mm - TL	-79577.52296	-29421.85257	567921
32	250 mm - TL	-79277.52296	-29421.85257	567921
33	250 mm - TL	-78977.52296	-29421.85257	567921
34	250 mm - TL	-78677.52296	-29421.85257	567921
35	250 mm - TL	-78377.52296	-29421.85257	567921
36	250 mm - TL	-78077.52296	-29421.85257	567921
37	250 mm - TL	-77777.52296	-29421.85257	567921
38	250 mm - TL	-77477.52296	-29421.85257	567921
39	250 mm - TL	-77177.52296	-29421.85257	567921
40	250 mm - TL	-76877.52296	-29421.85257	567921
41	250 mm - TL	-76577.52296	-29421.85257	567921
42	250 mm - TL	-76277.52296	-29421.85257	567921
43	250 mm - TL	-75977.52296	-29421.85257	567921
44	250 mm - TL	-75677.52296	-29421.85257	567921
45	250 mm - TL	-75377.52296	-29421.85257	567921
46	250 mm - TL	-75077.52296	-29421.85257	567921
47	250 mm - TL	-74777.52296	-29421.85257	567921
48	250 mm - TL	-74477.52296	-29421.85257	567921
49	250 mm - TL	-74177.52296	-29421.85257	567921
50	250 mm - TL	-73877.52296	-29421.85257	567921
51	250 mm - TL	-73577.52296	-29421.85257	567921
52	250 mm - TL	-73277.52296	-29421.85257	567921
53	250 mm - TL	-72977.52296	-29421.85257	567921
54	250 mm - TL	-72677.52296	-29421.85257	567921
55	250 mm - TL	-72377.52296	-29421.85257	567921
56	250 mm - TL	-72077.52296	-29421.85257	567921
57	250 mm - TL	-71777.52296	-29421.85257	567921
58	250 mm - TL	-71477.52296	-29421.85257	567921
59	250 mm - TL	-71177.52296	-29421.85257	567921
60	250 mm - TL	-70877.52296	-29421.85257	567921
61	250 mm - TL	-70577.52296	-29421.85257	567921
62	250 mm - TL	-70277.52296	-29421.85257	567921
63	250 mm - TL	-69977.52296	-29421.85257	567921
64	250 mm - TL	-69677.52296	-29421.85257	567921
65	250 mm - TL	-69377.52296	-29421.85257	567921
66	250 mm - TL	-69077.52296	-29421.85257	567921
67	250 mm - TL	-68777.52296	-29421.85257	567921
68	250 mm - TL	-68477.52296	-29421.85257	567921
69	250 mm - TL	-68177.52296	-29421.85257	567921
70	250 mm - TL	-67877.52296	-29421.85257	567921
71	250 mm - TL	-67577.52296	-29421.85257	567921
72	250 mm - TL	-67277.52296	-29421.85257	567921
73	250 mm - TL	-66977.52296	-29421.85257	567921
74	250 mm - TL	-66677.52296	-29421.85257	567921
75	250 mm - TL	-66377.52296	-29421.85257	567921
76	250 mm - TL	-66077.52296	-29421.85257	567921
77	250 mm - TL	-65777.52296	-29421.85257	567921
78	250 mm - TL	-65477.52296	-29421.85257	567921
79	250 mm - TL	-65177.52296	-29421.85257	567921
80	250 mm - TL	-64877.52296	-29421.85257	567921
81	250 mm - TL	-64577.52296	-29421.85257	567921
82	250 mm - TL	-64277.52296	-29421.85257	567921
83	250 mm - TL	-63977.52296	-29421.85257	567921
84	250 mm - TL	-63677.52296	-29421.85257	567921
85	250 mm - TL	-63377.52296	-29421.85257	567921
86	250 mm - TL	-63077.52296	-29421.85257	567921
87	250 mm - TL	-62777.52296	-29421.85257	567921
88	250 mm - TL	-62477.52296	-29421.85257	567921
89	250 mm - TL	-62177.52296	-29421.85257	567921
90	250 mm - TL	-61877.52296	-29421.85257	567921
91	250 mm - TL	-61577.52296	-29421.85257	567921
92	250 mm - TL	-61277.52296	-29421.85257	567921
93	250 mm - TL	-60977.52296	-29421.85257	567921
94	250 mm - TL	-60677.52296	-29421.85257	567921
95	250 mm - TL	-60377.52296	-29421.85257	567921
96	250 mm - TL	-60077.52296	-29421.85257	567921
97	250 mm - TL	-59777.52296	-29421.85257	567921
98	250 mm - TL	-59477.52296	-29421.85257	567921
99	250 mm - TL	-59177.52296	-29421.85257	567921
100	250 mm - TL	-58877.52296	-29421.85257	567921

Image Credit: Johan Contryn - Datech

In a way this is very reminiscent of using AutoLISP with AutoCAD. For tedious and repetitive tasks, using scripting in any project becomes an essential part of any project and to maximise profitability and ensure compliance with data standards in BIM execution plans.

