60.000 clashes – 60 nodes – 60 seconds

‘Automation’ Example
Navisworks Clash Tracking

Thorsten Strathaus
Flanagan Lawrence

60.000 clashes – 60 nodes – 60 seconds

‘Automation’ Example
Navisworks Clash Tracking

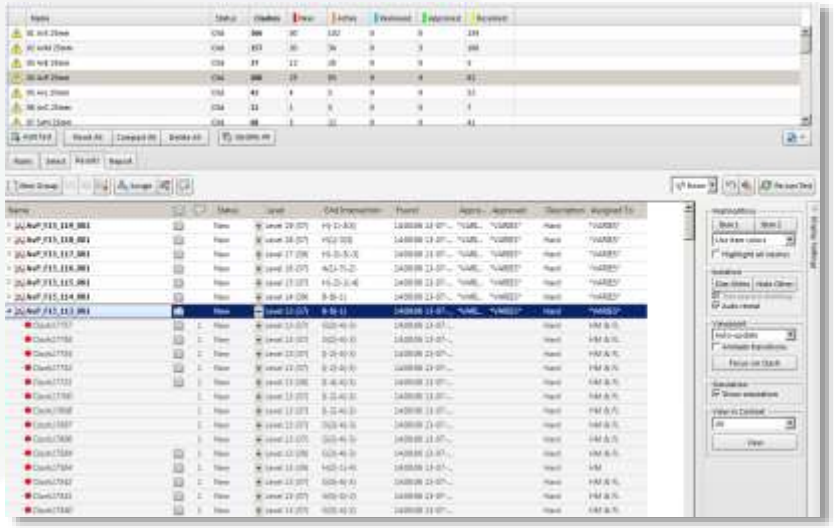
DynaWorks16
Adam Sheather
#Gytaco

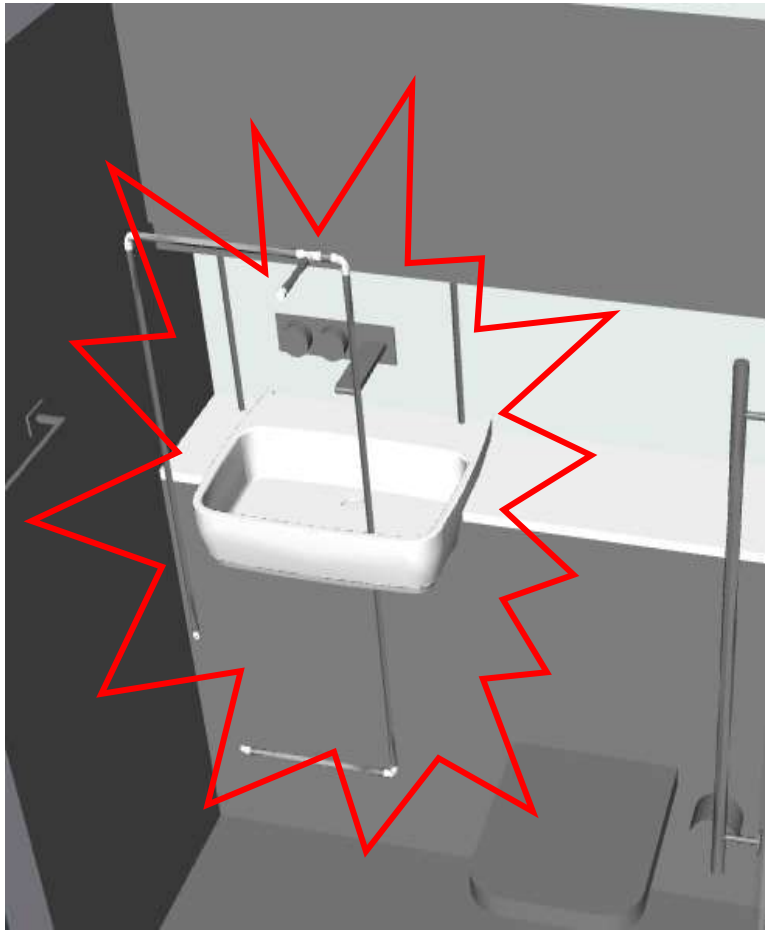
Alto Apartments
Wembley Park
UK BIM Level 2
Bi-weekly Model Federations

Standard Navisworks Clash Analysis

‘Automation’ Example
Navisworks Clash Tracking

- Use an existing Clash Analysis

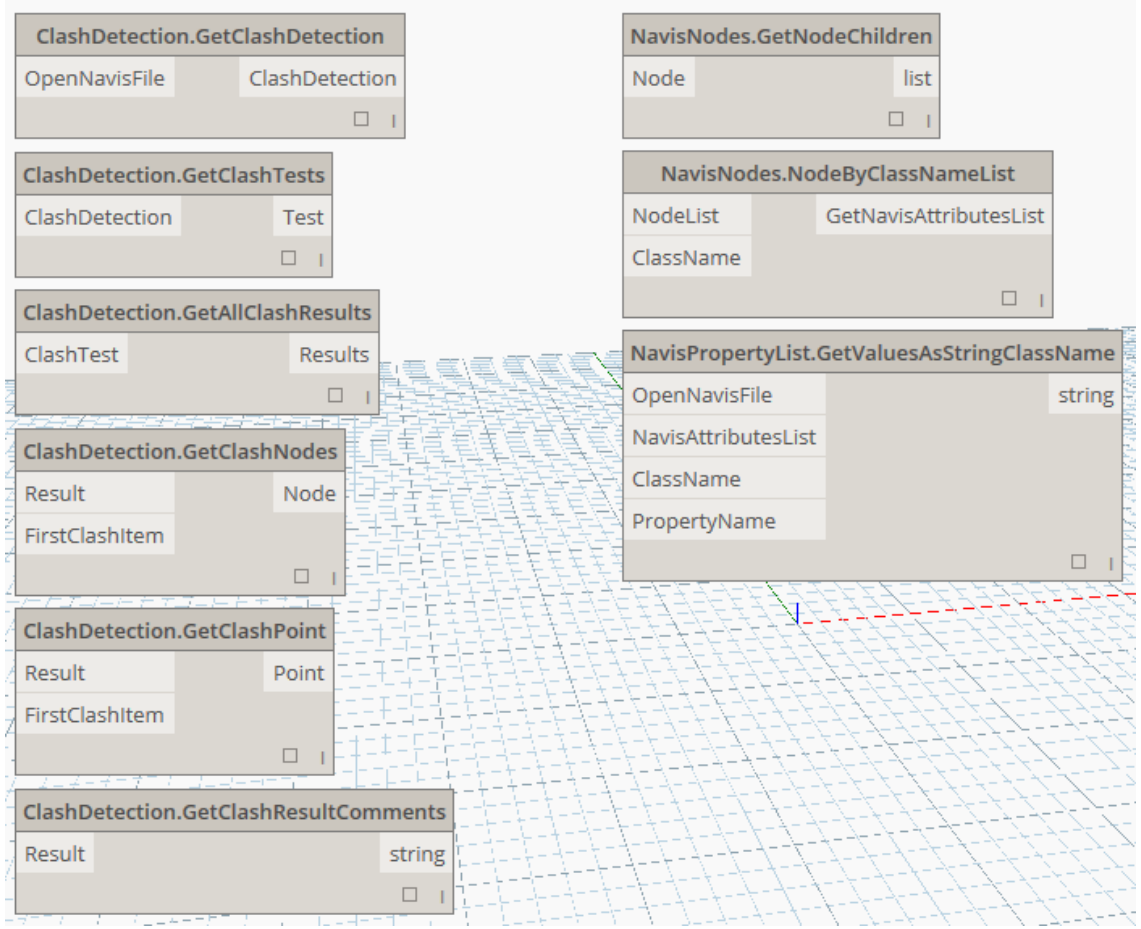




DynaWorks16 Components

‘Automation’ Example
Navisworks Clash Tracking

- Use an existing Clash Analysis
- Intro to Dynaworks



Workflow

‘Automation’ Example
Navisworks Clash Tracking

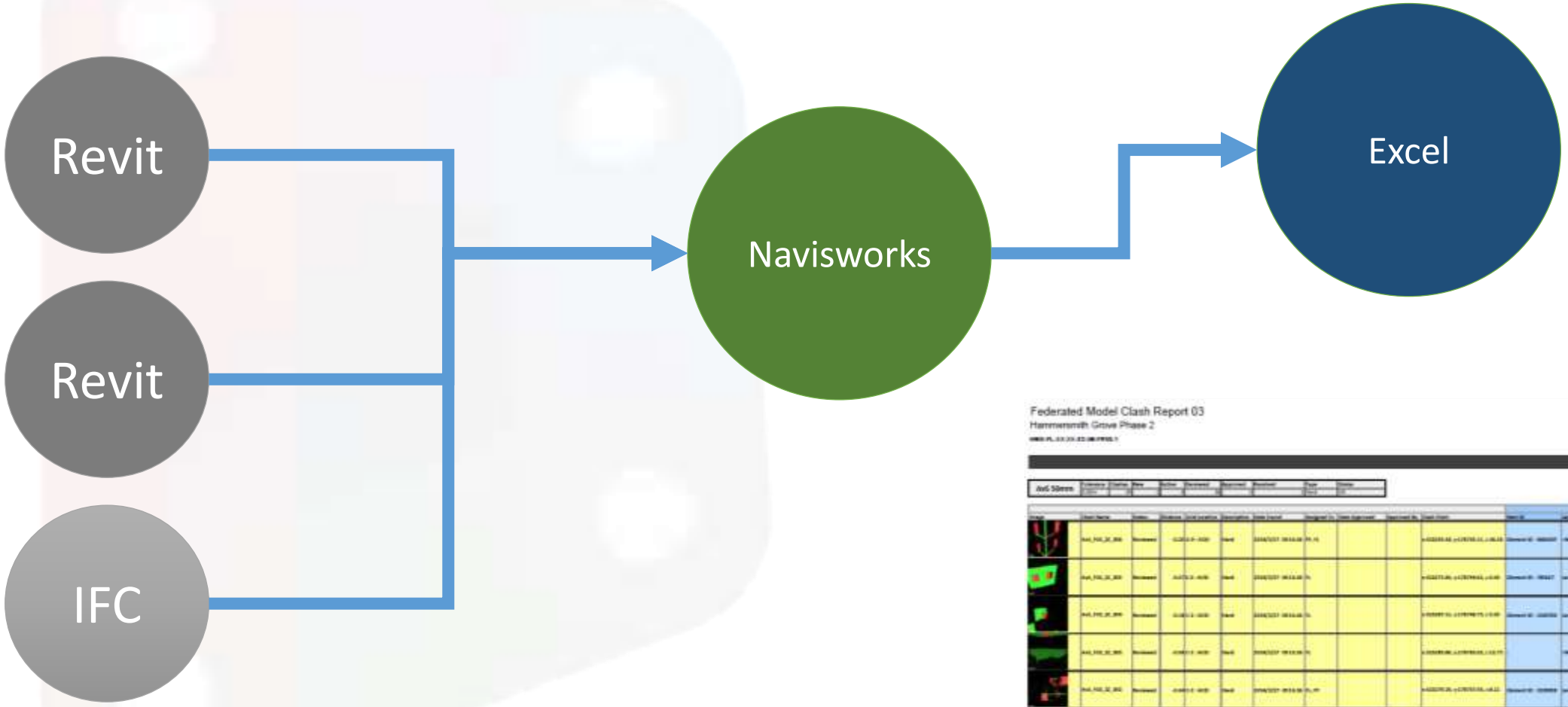
- Use an existing Clash Analysis
- Intro to Dynaworks
- Simple Database Access

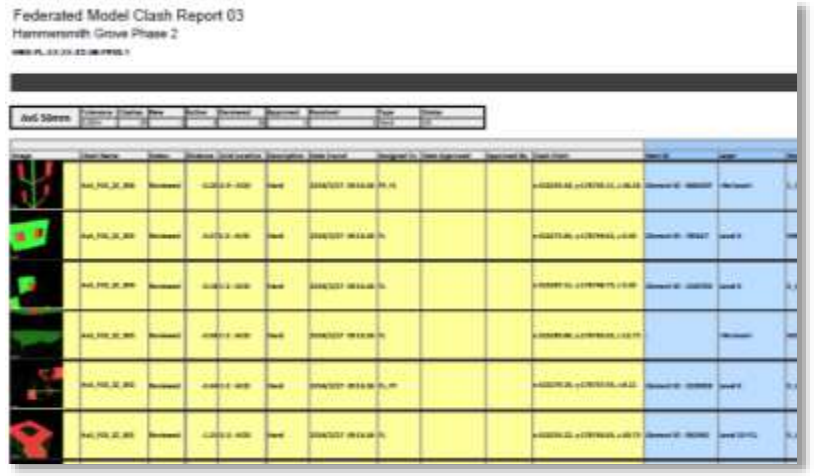
Goal

‘Automation’ Example
Navisworks Clash Tracking

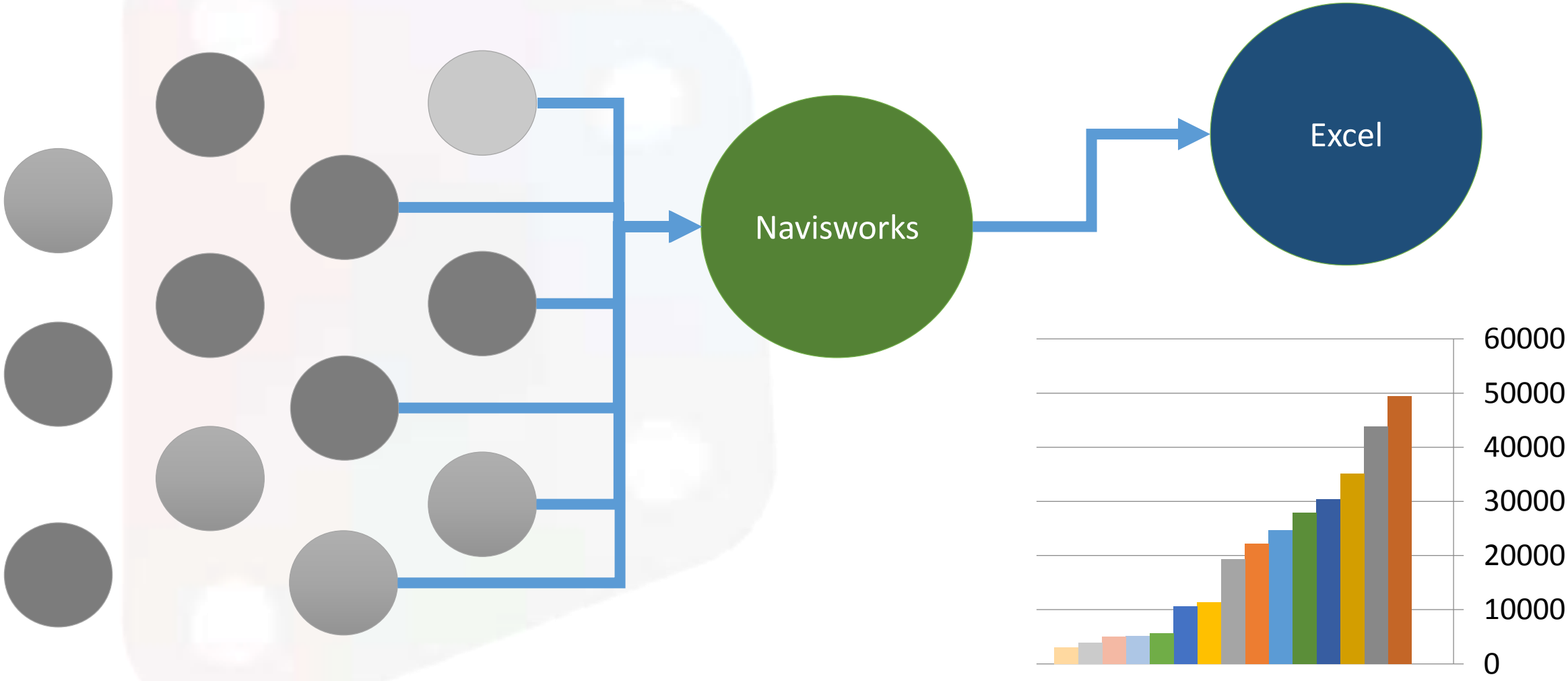
- Use an existing Clash Analysis
- Intro to Dynaworks
- Simple Database Access
- Automated Clash & Performance Tracking

Project setup

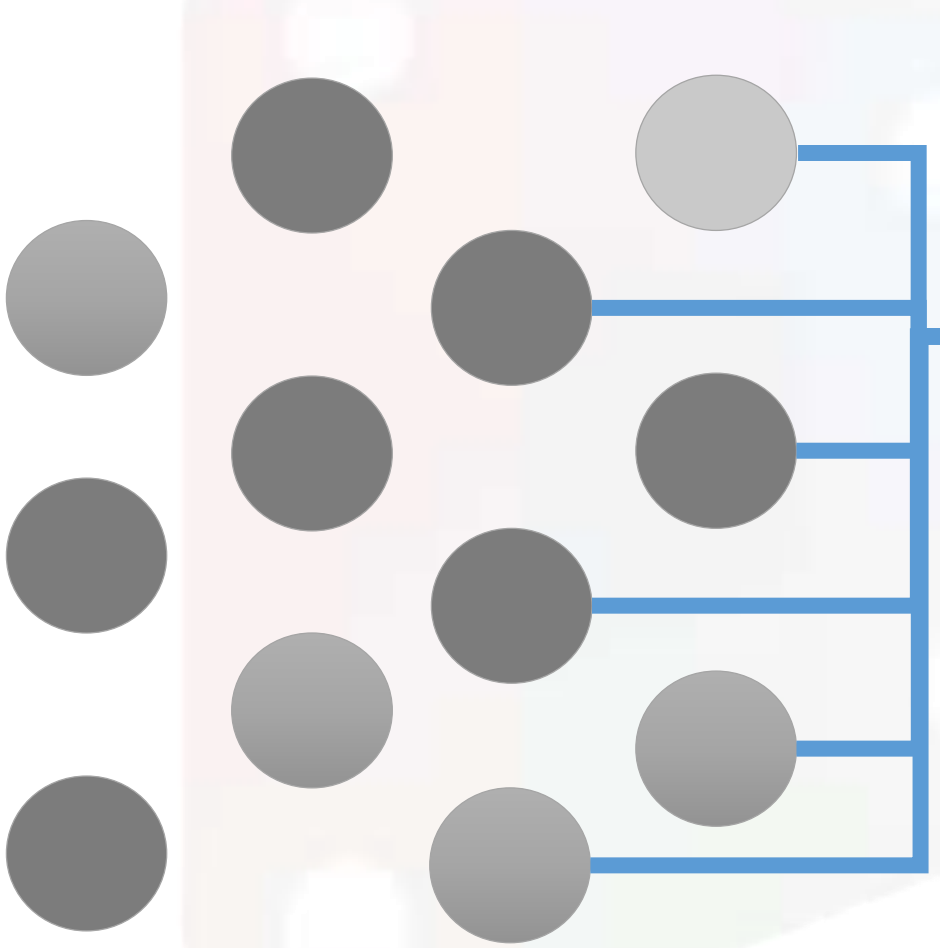




A bit later

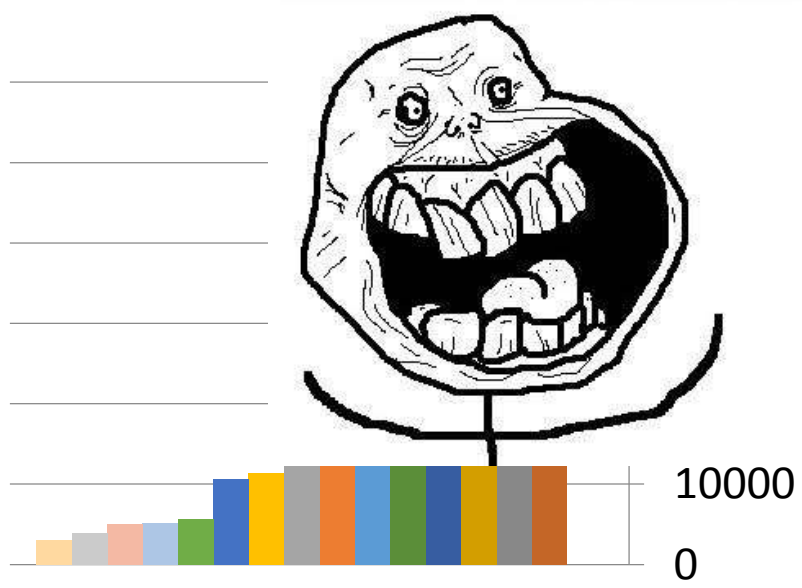


A bit later..

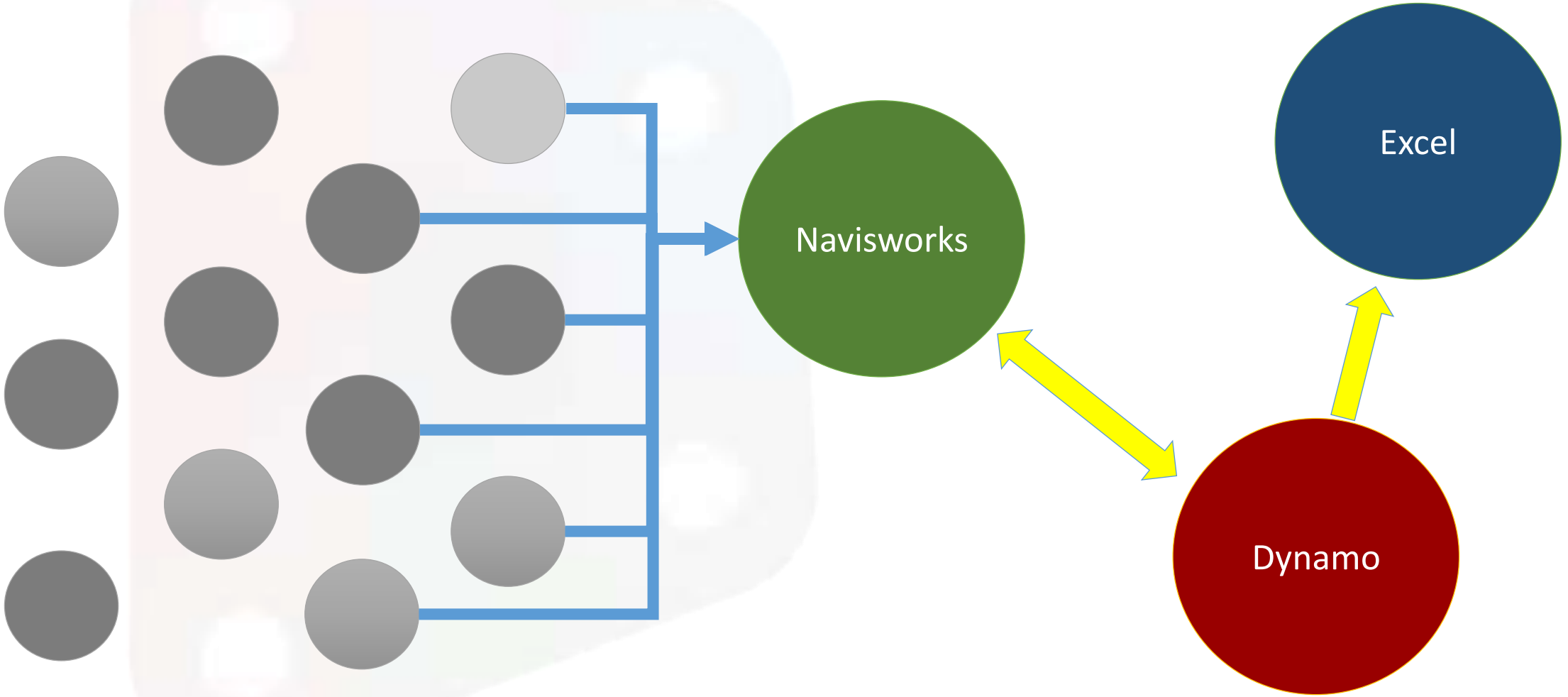


Navisworks

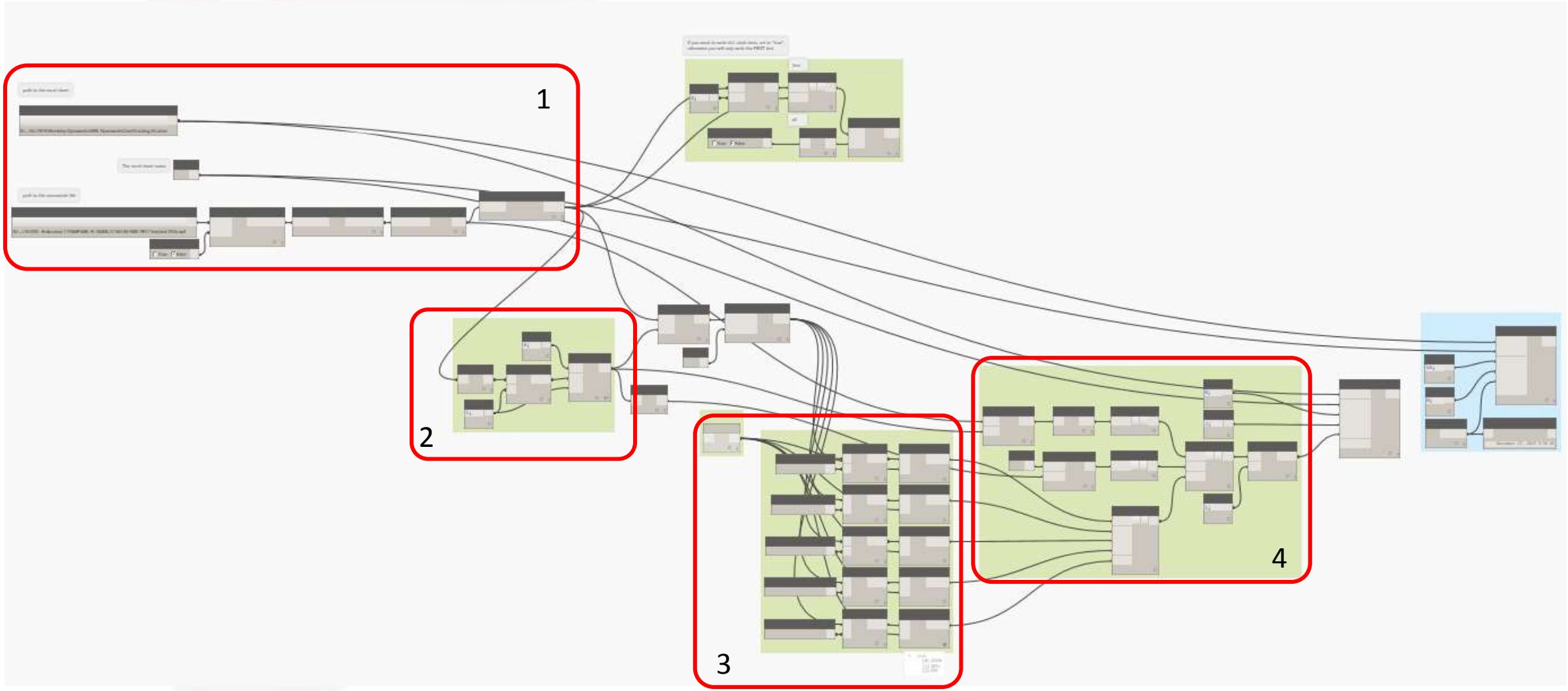
Excel



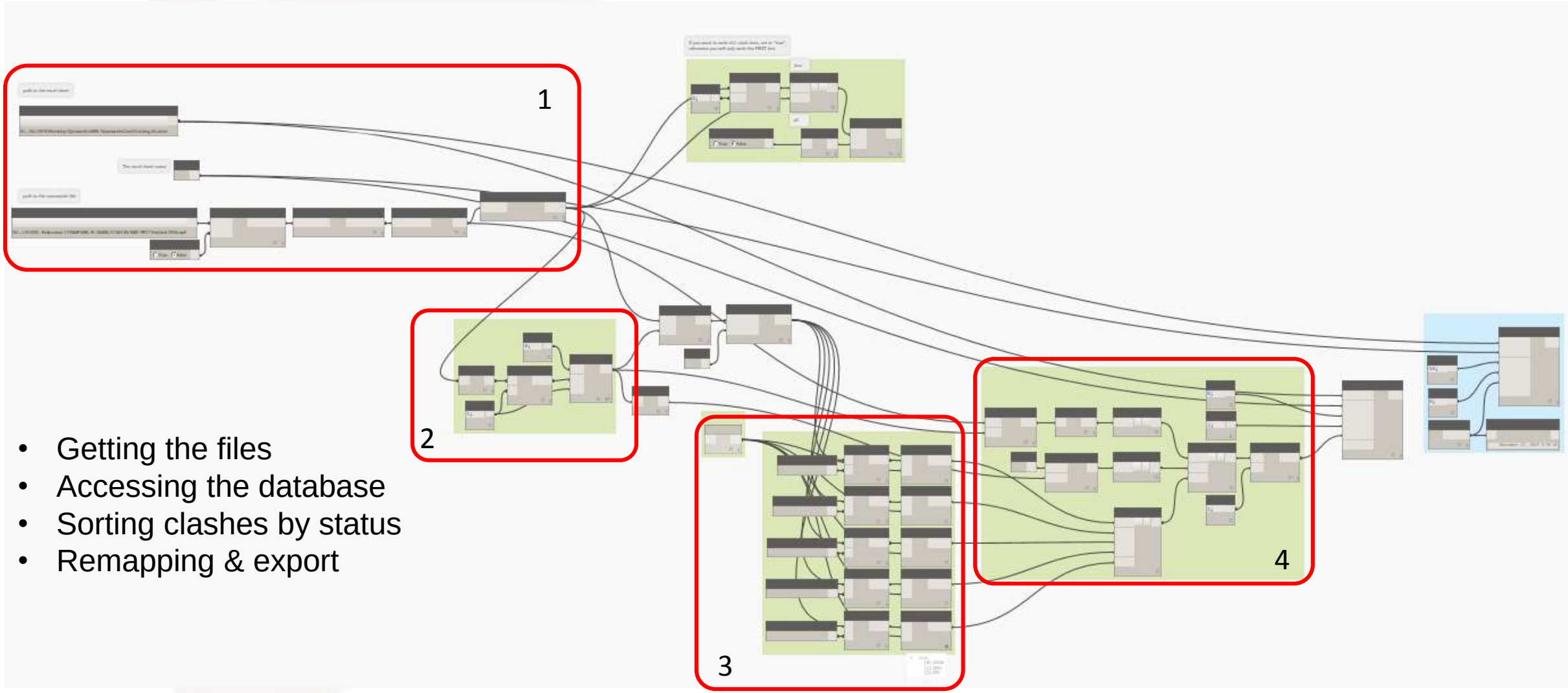
Automation as solution



Dynamo Graph

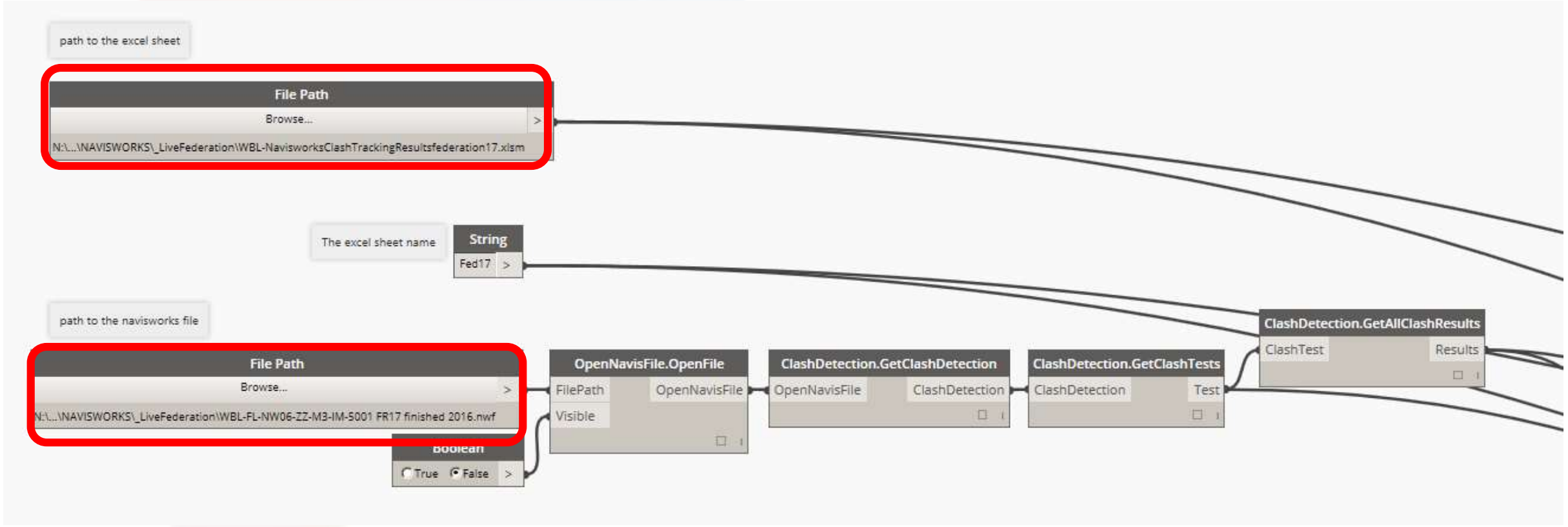


Dynamo Graph

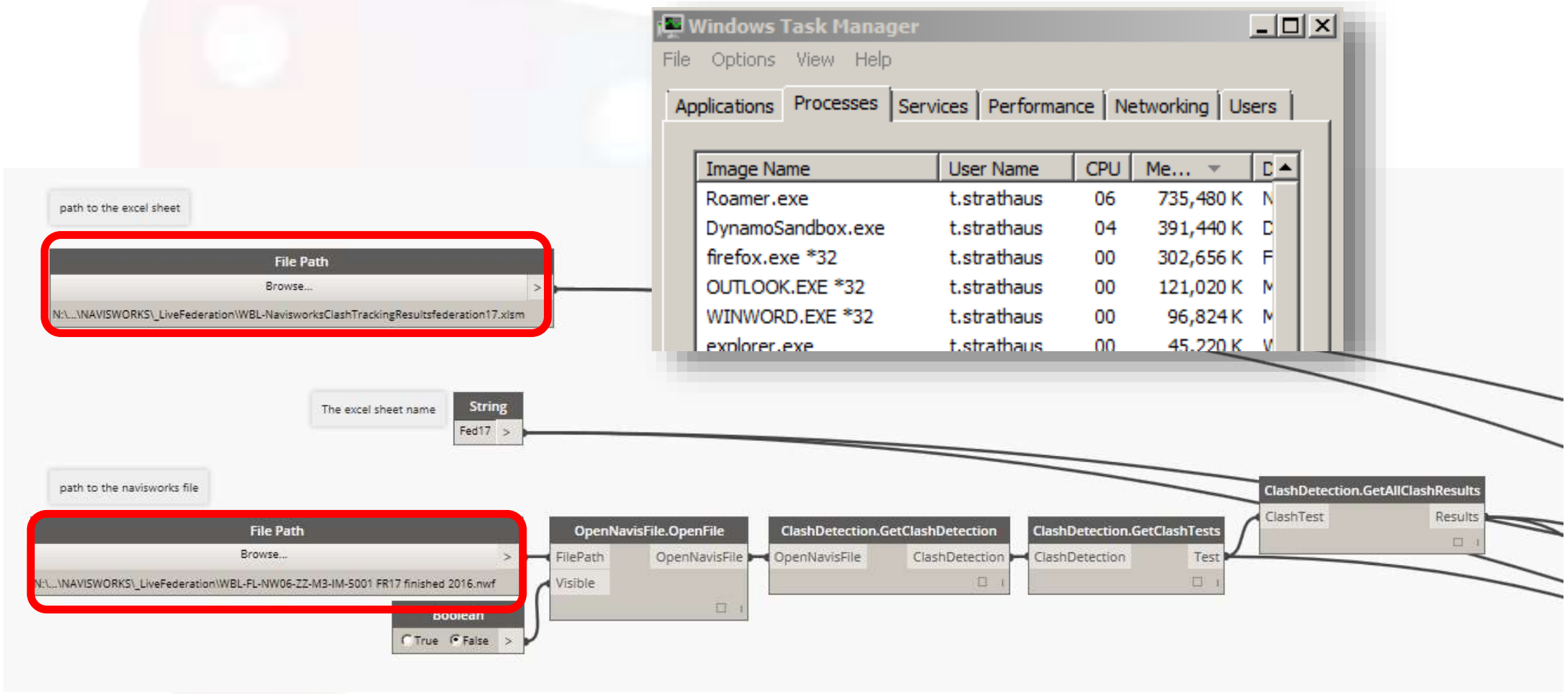


- Getting the files
- Accessing the database
- Sorting clashes by status
- Remapping & export

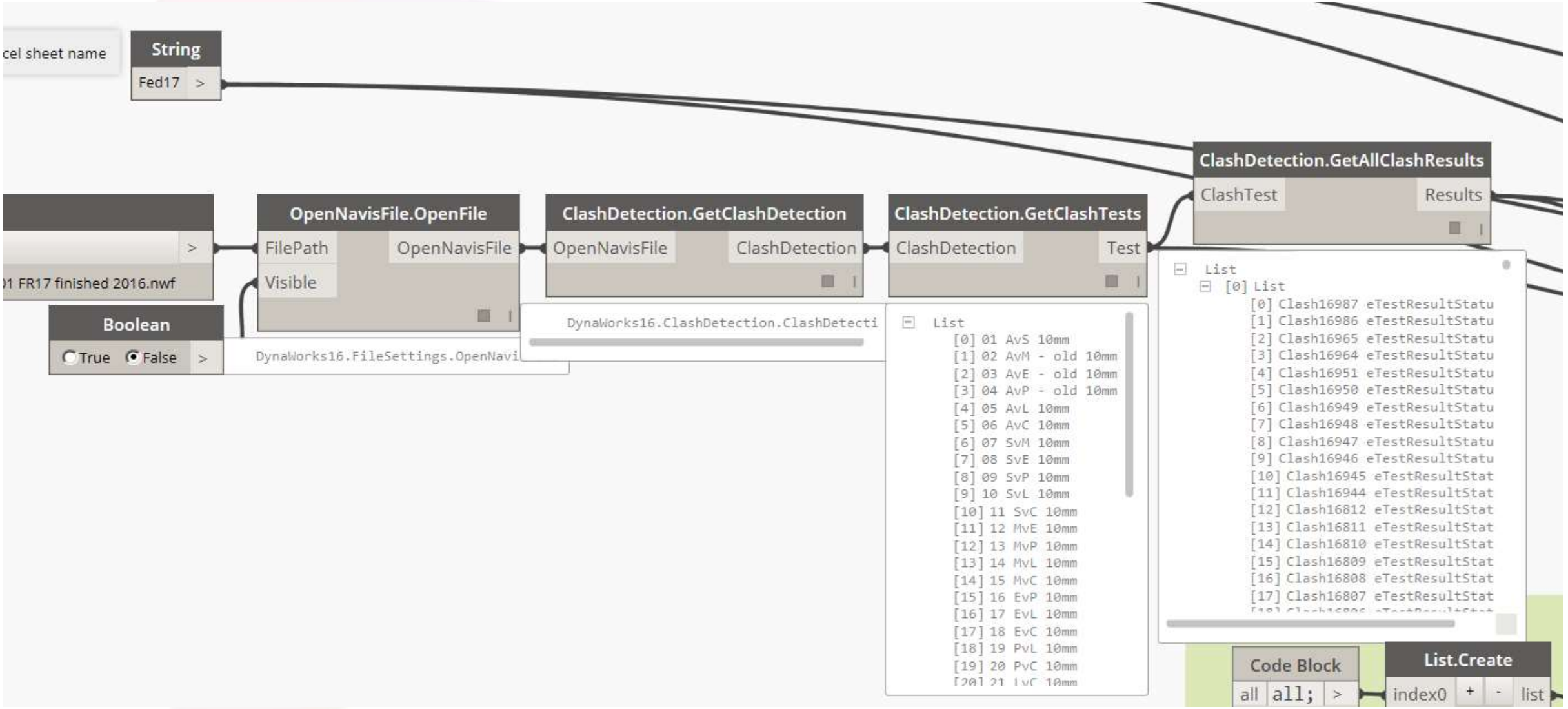
Getting started



The roamer


Windows Task Manager
File Options View Help
Applications Processes Services Performance Networking Users
Image Name User Name CPU Me...
Roamer.exe t.strathaus 06 735,480 K
DynamoSandbox.exe t.strathaus 04 391,440 K
firefox.exe *32 t.strathaus 00 302,656 K
OUTLOOK.EXE *32 t.strathaus 00 121,020 K
WINWORD.EXE *32 t.strathaus 00 96,824 K
explorer.exe t.strathaus 00 45,220 K
path to the excel sheet
File Path
Browse...
N:\...\NAVISWORKS_LiveFederation\WBL-NavisworksClashTrackingResultsfederation17.xlsm
The excel sheet name
String
Fed17
path to the navisworks file
File Path
Browse...
N:\...\NAVISWORKS_LiveFederation\WBL-FL-NW06-ZZ-M3-IM-5001 FR17 finished 2016.nwf
Boolean
True False
OpenNavisFile.OpenFile
FilePath
Visible
OpenNavisFile
ClashDetection.GetClashDetection
OpenNavisFile
ClashDetection
ClashDetection.GetClashTests
ClashDetection
Test
ClashDetection.GetAllClashResults
ClashTest
Results

Accessing the database

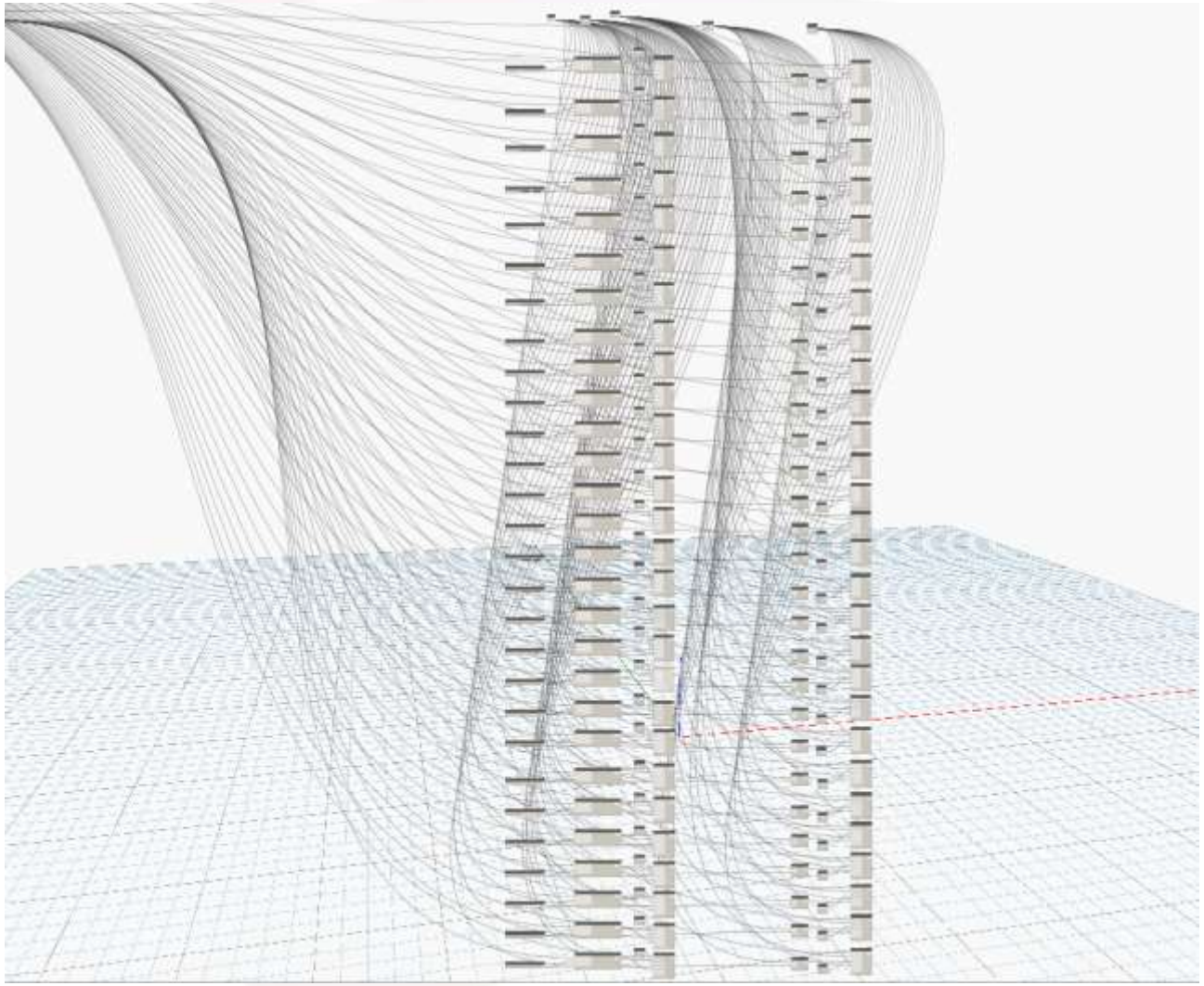


Sorting Clashes by Status

Status	Clashes	New	Active	Reviewed	Approved	Resolved
Old	**404**	38	126	0	0	240
Old	**160**	1	41	0	0	118
Old	**39**	1	30	0	0	8
Old	**203**	6	114	0	0	83
Old	**48**	4	10	0	0	34
Old	**14**	2	3	0	1	8
Old	**77**	2	28	0	1	46
Old	**9**	3	1	0	1	4
Old	**168**	24	70	0	0	74

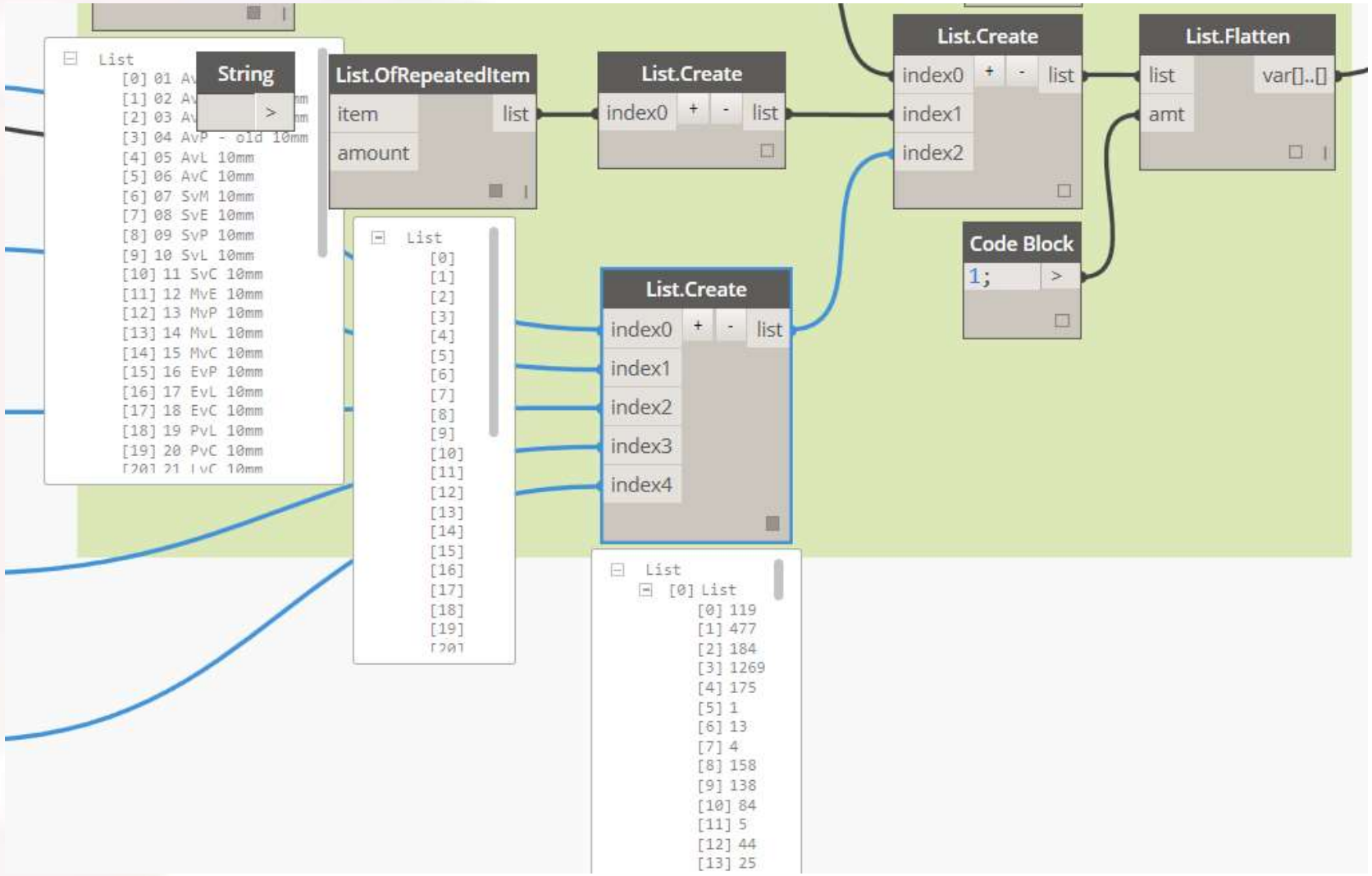
“eTestResultStatus_NEW”
“eTestResultStatus_ACTIVE”
“eTestResultStatus_REVIEWED”
“eTestResultStatus_APPROVED”
“eTestResultStatus_RESOLVED”

Repetitive Nodes – List Management

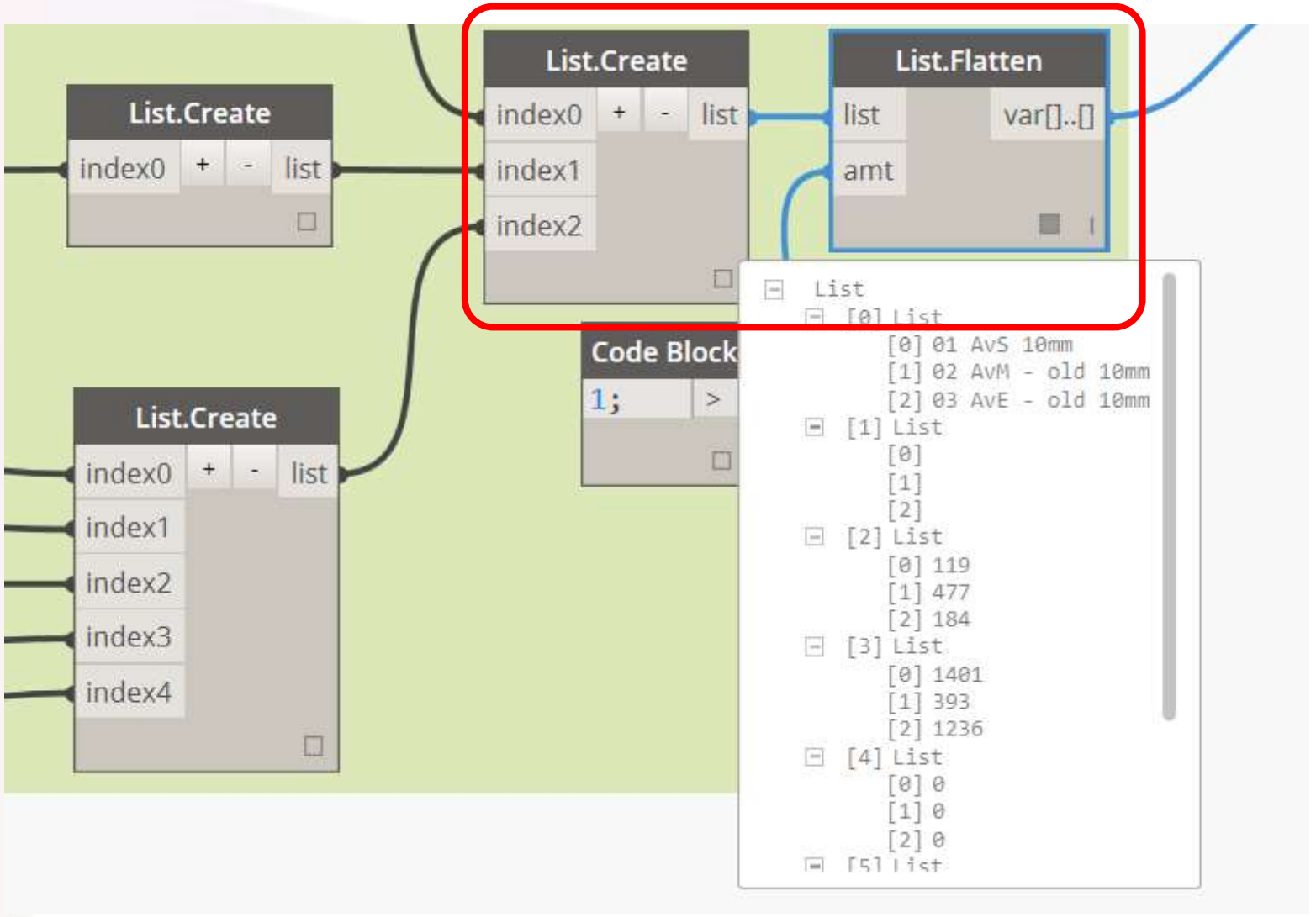


50 AvP 0-fire rated Part. Wall 10mm
51 AvP Facade 10mm
52 AvP Pods 10mm
53 AvP ZZ 10mm
54 AvP Dura Grating 10mm

Re-Mapping …

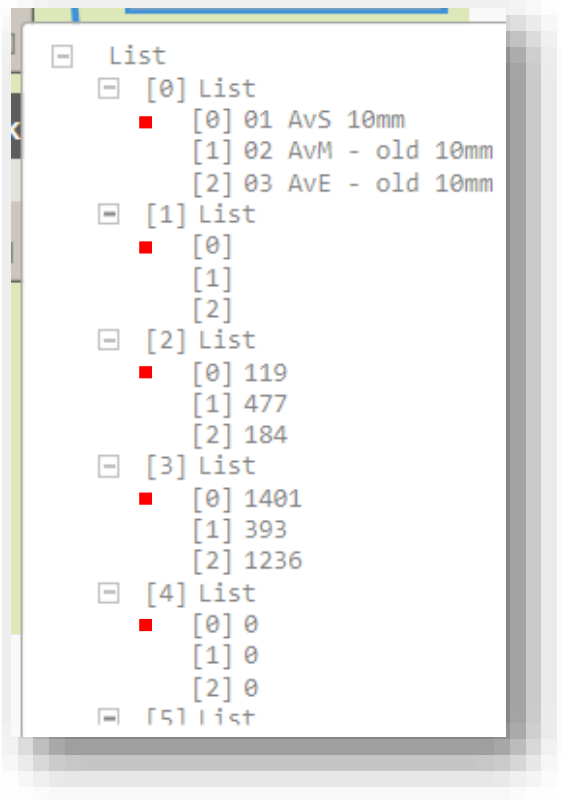

List
[0] 01 Av
[1] 02 Av
[2] 03 Av
[3] 04 AvP - old 10mm
[4] 05 AvL 10mm
[5] 06 AvC 10mm
[6] 07 SvM 10mm
[7] 08 SvE 10mm
[8] 09 SvP 10mm
[9] 10 SvL 10mm
[10] 11 SvC 10mm
[11] 12 MvE 10mm
[12] 13 MvP 10mm
[13] 14 MvL 10mm
[14] 15 MvC 10mm
[15] 16 EvP 10mm
[16] 17 EvL 10mm
[17] 18 EvC 10mm
[18] 19 PvL 10mm
[19] 20 PvC 10mm
String
List.OfRepeatedItem
item
amount
list
List.Create
index0
index1
index2
index3
index4
List.Flatten
var[]..[]
amt
Code Block
1;
List
[0] List
[0] 119
[1] 477
[2] 184
[3] 1269
[4] 175
[5] 1
[6] 13
[7] 4
[8] 158
[9] 138
[10] 84
[11] 5
[12] 44
[13] 25

Flattening Lists of Lists into Excel format



Data Transfer

	A	B	C	D	E
1	Clashtest		01 AvS 10mm	02 AvM - old 10mm	03 AvE - old 10mm
2					
3	New		119	477	184
4	Active		1401	393	1236
5	Reviewed		0	0	0
6	Approved		1235	0	0
7	Resolved		15196	2831	879
8					
9					
10	Unresolved New+Active		1520	870	1420
11	Total		17951	3701	2299
12					
13	CLEAR CELLS				
14					
15					
16	last data exchange				
17	16/11/2015 12:41				
18					
19					
20					
21					
22					



Dynamo Graph

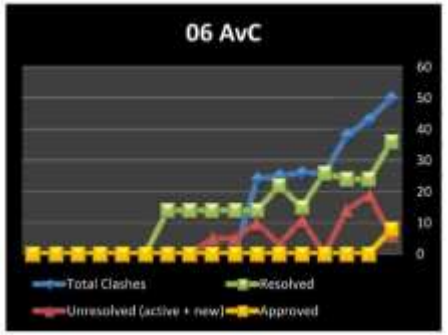
Clashes Total																
Row Labels	Sum of Fed16	Sum of Fed15	Sum of Fed14	Sum of Fed13	Sum of Fed12	Sum of Fed11	Sum of Fed10	Sum of Fed09	Sum of Fed08	Sum of Fed07	Sum of Fed06	Sum of Fed05	Sum of Fed04	Sum of Fed03	Sum of Fed02	Sum of Fed01
01 AvS	16606	16369	16113	15016	11822	10884	10153	9785	8967	5017	4580	3371	3163	3039	2135	1442
02 AvM -old	3224	2851	3071	2503	2324	2161	1931	1765	1544	1406	1341	1251	1228	1224	1161	1075
03 AvE - old	2115	1968	1786	95	95	77	54	53	33	16	16	12	12	12	10	3
04 AvP -old	22260	17950	15093	10824	10120	8885	6991	5663	4207	1895	1850	109	64	60	5	0
05 AvL	576	527	471	370	366	358	284	222	160	70	48	37	11	9	0	0
06 AvC	43	38	26	26	25	24	19	19	14	14	14	0	0	0	0	0
07 SvM	651	611	907	893	879	876	843	809	714	682	665	609	602	602	507	473
08 SvE	36	34	26	8	8	8	8	8	8	8	8	8	8	8	8	5
09 SvP	7043	6699	4344	4160	4039	4021	3854	3469	3469	2005	1962	124	60	60	9	0
10 SvL	492	481	446	377	377	359	343	265	198	135	80	61	27	21	0	0
11 SvC	509	490	395	254	251	203	160	123	5	68	68	0	0	0	0	0
12 MvE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 MvP	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0
14 MvL	72	68	52	14	14	14	14	14	7	1	1	0	0	0	0	0
15 MvC	6	5	4	4	4	4	3	2	2	2	2	0	0	0	0	0
16 EvP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 EvL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 EvC	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 PvL	28	22	14	14	13	12	12	8	8	4	4	0	0	0	0	0
20 PvC	52	10	1	1	1	1	0	0	0	0	0	0	0	0	0	0
21 LvC	20	20	20	20	20	20	20	20	19	19	19	0	0	0	0	0
22 AvEC	572	526	331	166												
23 SvEC	505	488	426	287												
24 MvEC	198	178	158	33												
25 EvEC	10	6	0	0												
26 PvEC	21	5	2	0												
27 LvEC	34	33	21	6												
28 CvEC	81	69	54	36												
30 AvM 0-fire rated Part. Wall	1187															
31 AvM Façade	101															
32 AvM Pods	35															
33 AvM ZZ	345															
40 AvE 0-fire rated Part. Wall	58															
41 AvE Façade	13															
42 AvE Pods	0															
43 AvE ZZ	1944															

Click on the Clash-Sets to focus the table

Total Clashes

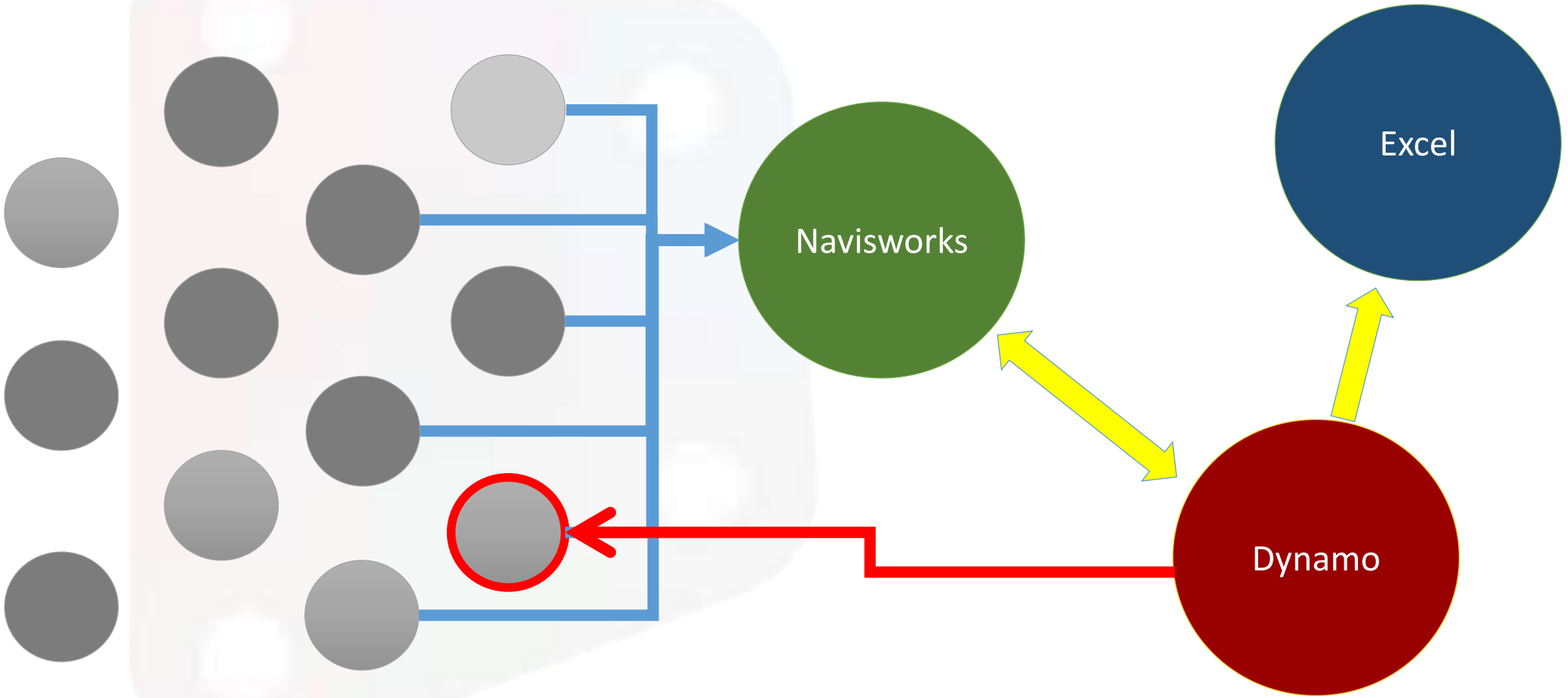
- 01 AvS
- 02 AvM -old
- 03 AvE - old
- 04 AvP -old
- 05 AvL
- 06 AvC
- 07 SvM
- 08 SvE
- 09 SvP
- 10 SvL
- 11 SvC
- 12 MvE
- 13 MvP
- 14 MvL
- 15 MvC
- 16 EvP
- 17 EvL
- 18 EvC
- 19 PvL
- 20 PvC
- 21 LvC
- 22 AvEC
- 23 SvEC
- 24 MvEC
- 25 EvEC

Automated Tracker

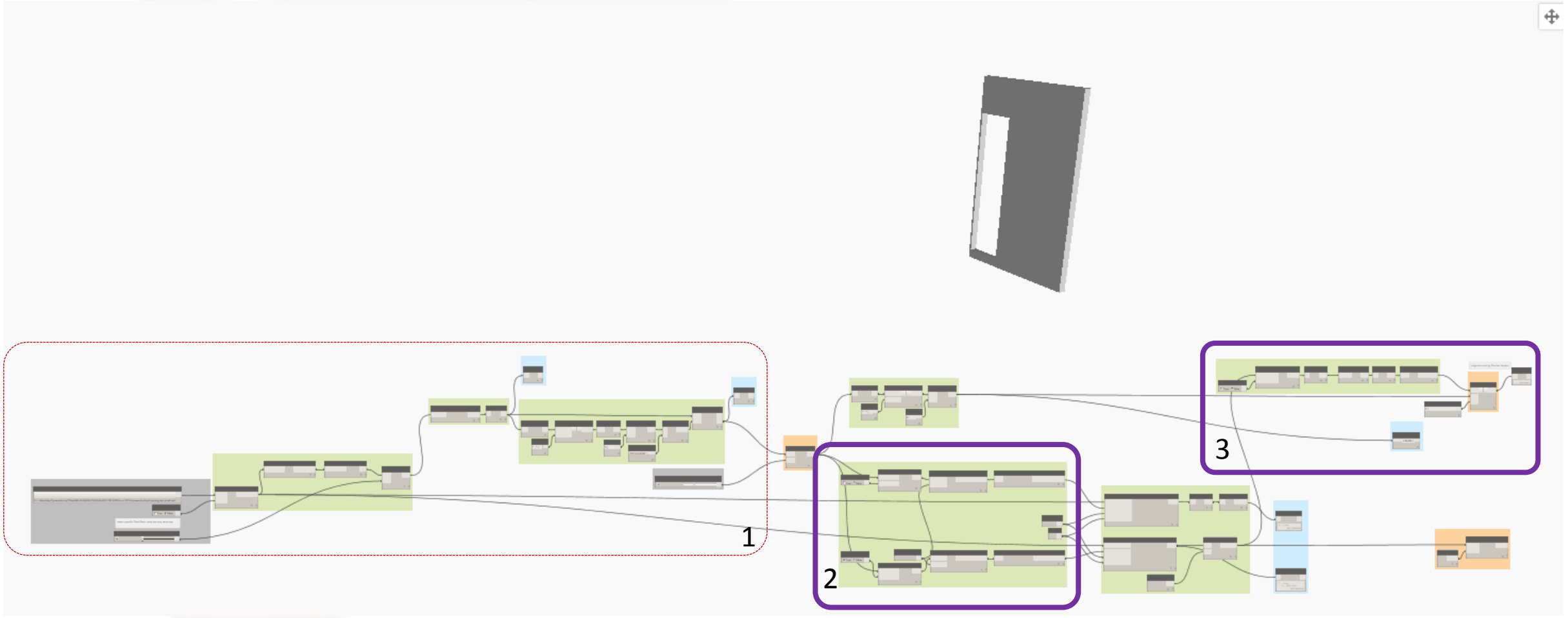


End of part I

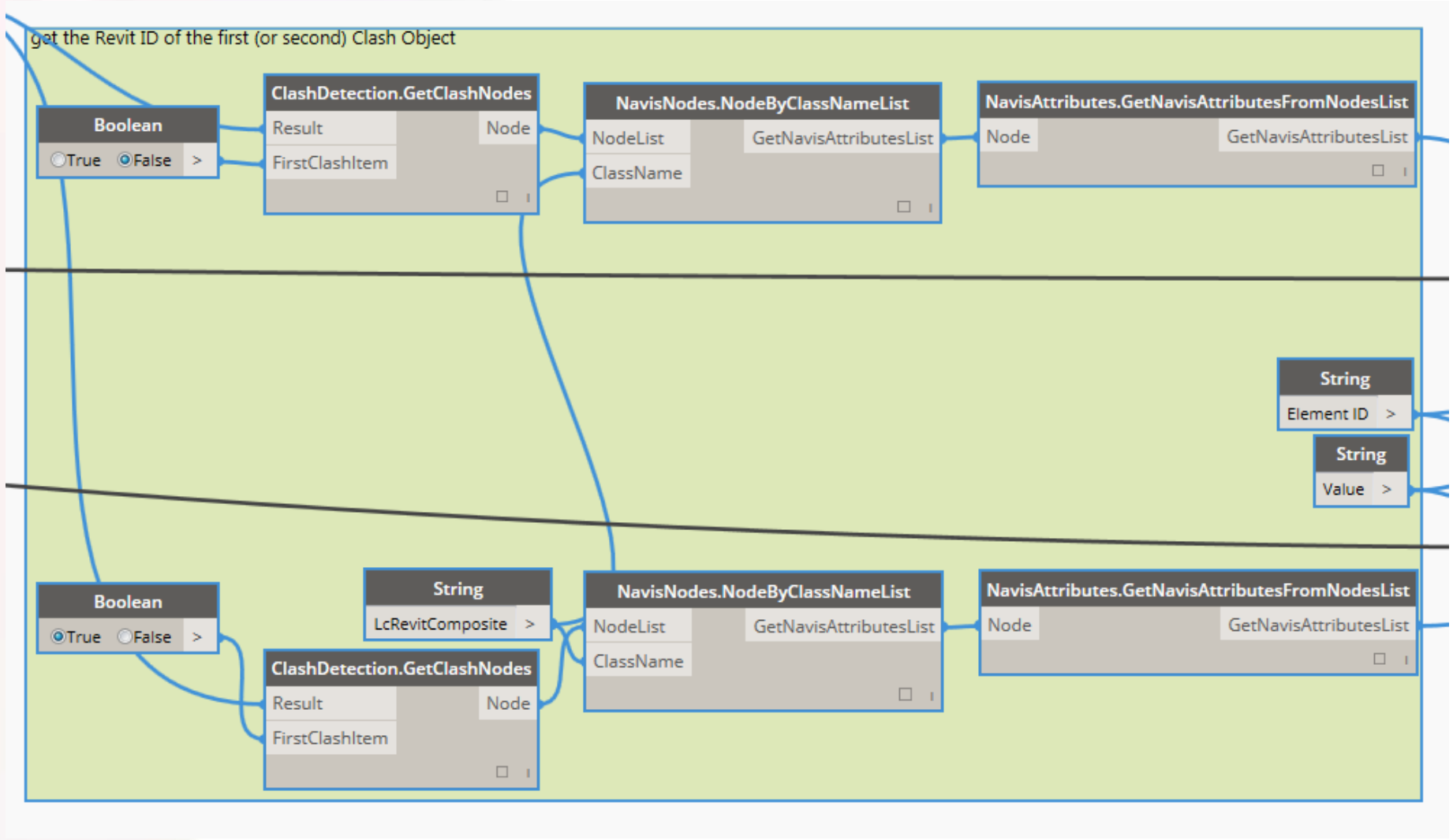
Automation as solution



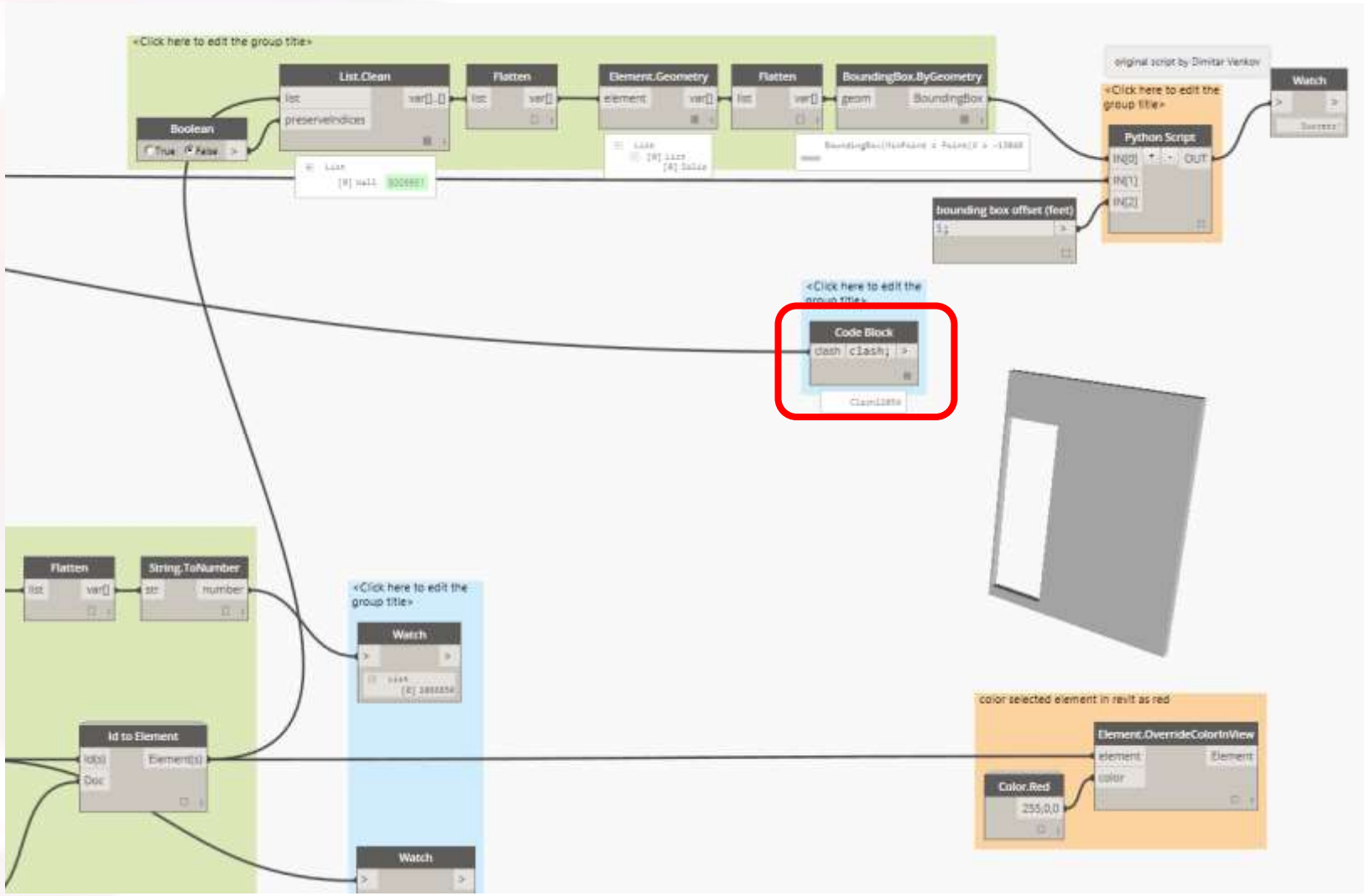
Revit Auto-Section Box



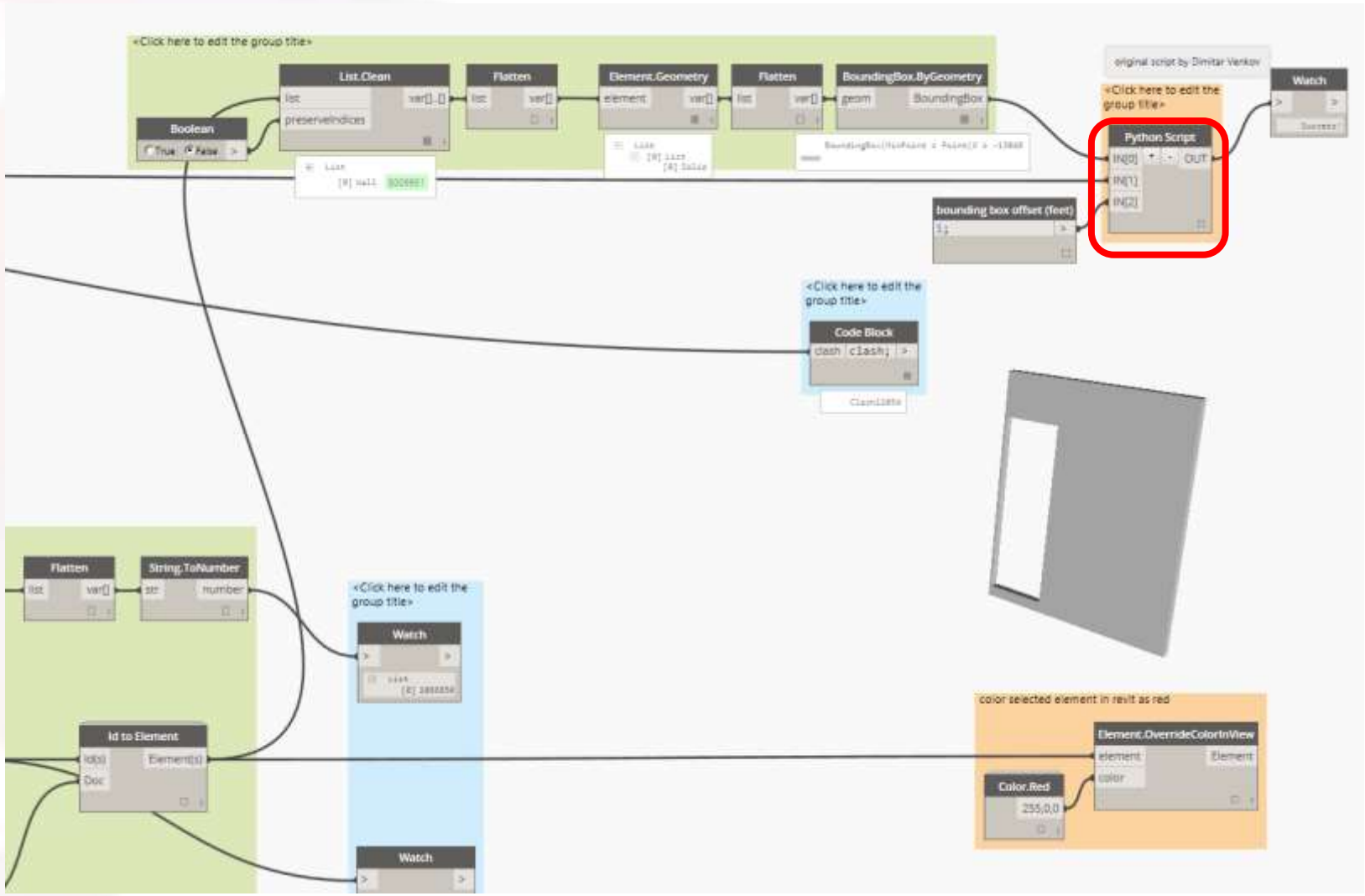
Getting Data from Item 1 and 2



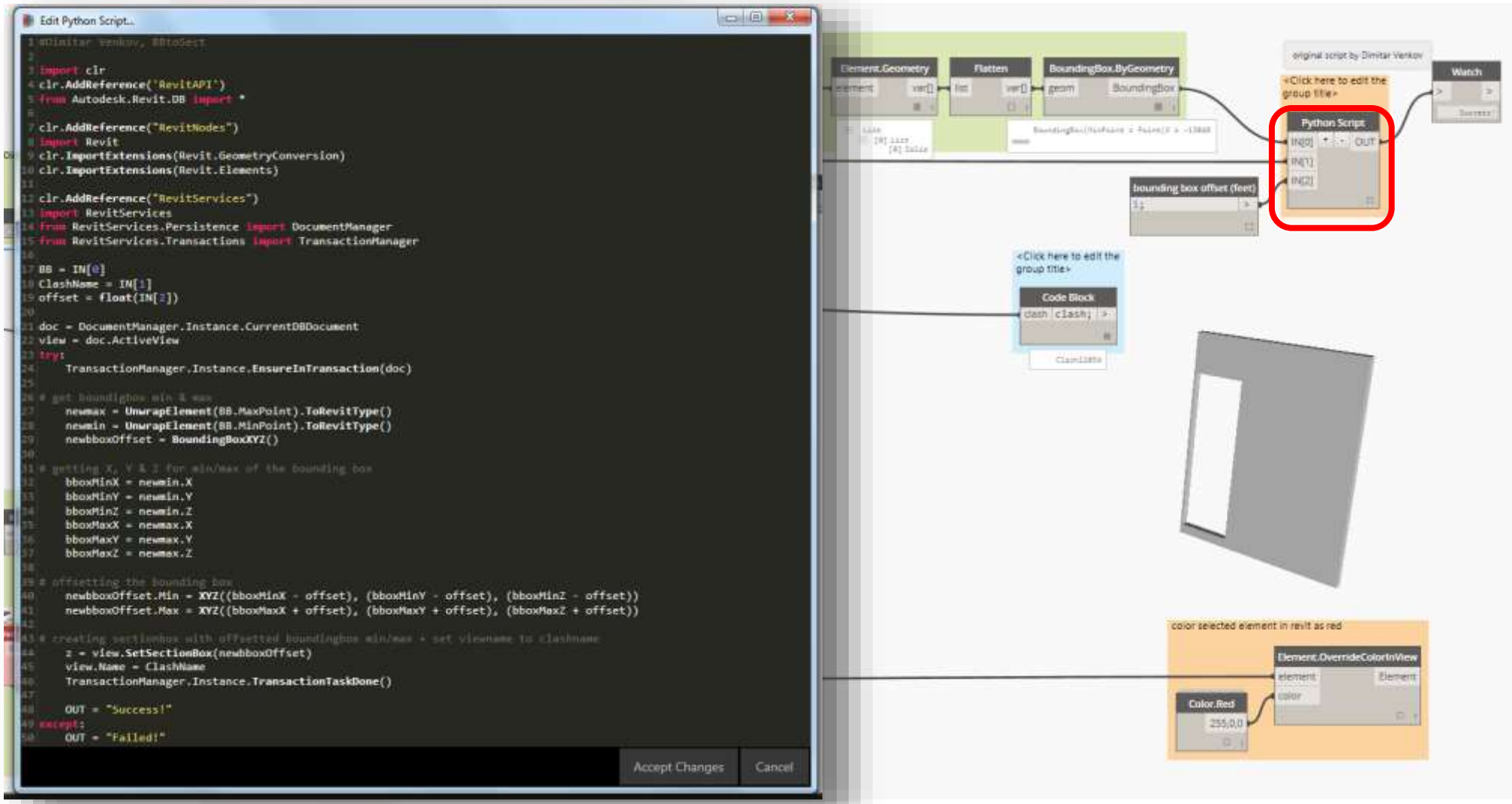
Get Clash No.


«Click here to edit the group title»
List.Clean
Flatten
Element.Geometry
Flatten
BoundingBox.ByGeometry
Boolean
True
False
original script by Dimitar Venkov
«Click here to edit the group title»
Python Script
IN[0]
IN[1]
IN[2]
OUT
Watch
bounding box offset (feet)
«Click here to edit the group title»
Code Block
clash
clash;
Flatten
String.ToNumber
«Click here to edit the group title»
Watch
Id to Element
Doc
Watch
color selected element in revit as red
Element.OverrideColorInView
element
color
Element
Color.Red
255,0,0

Create Section Box

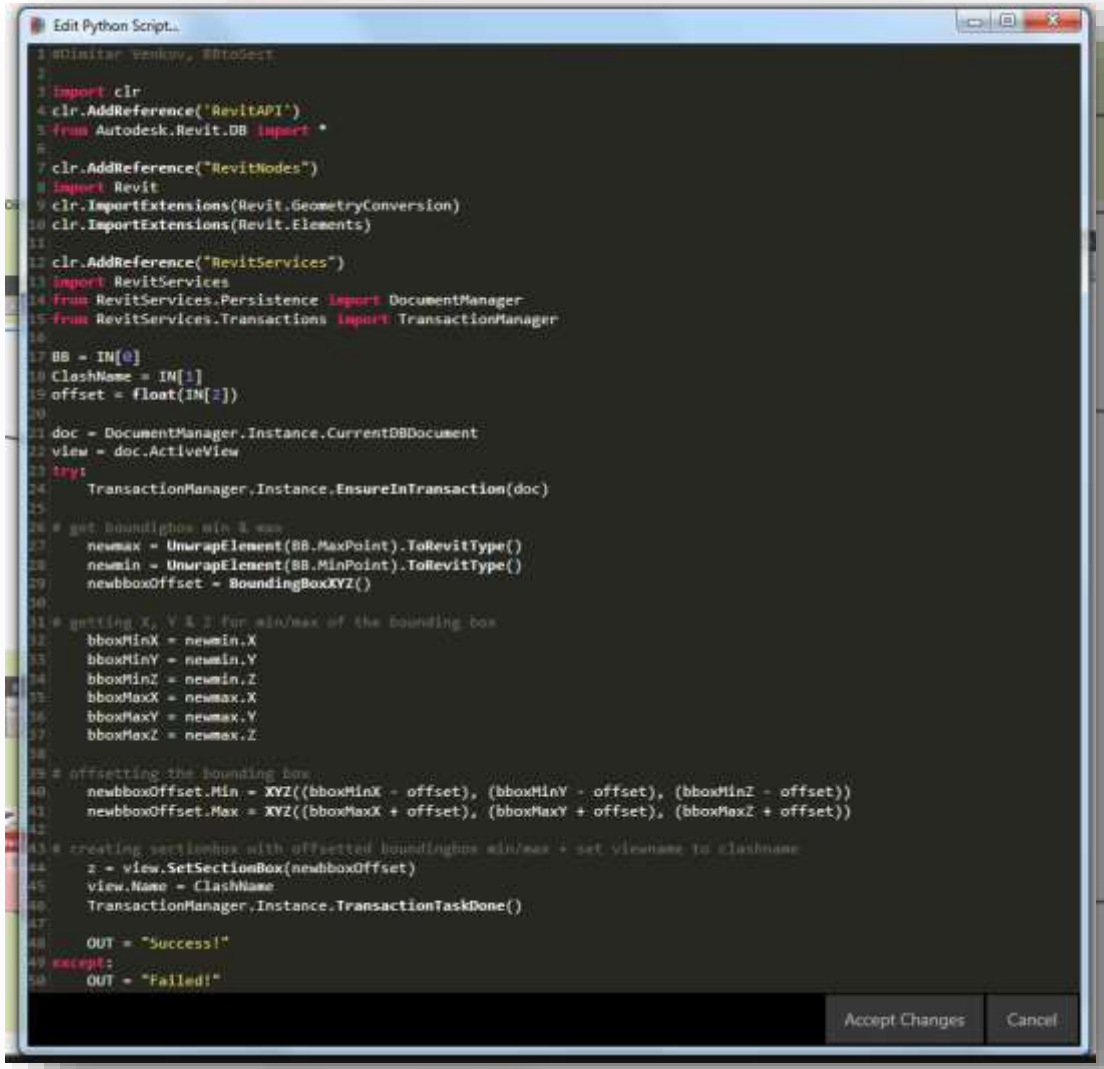


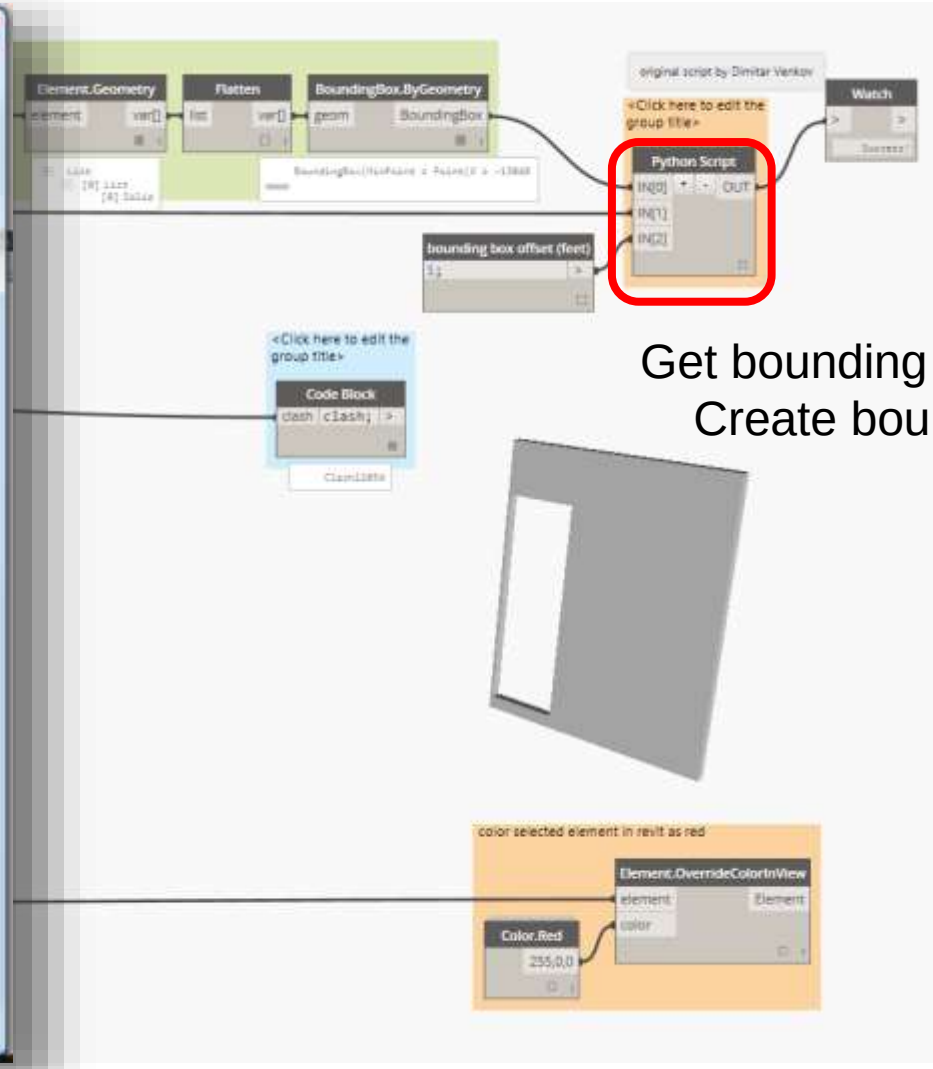
Python API Access



Python script by Dimitar Venko

Python API Access

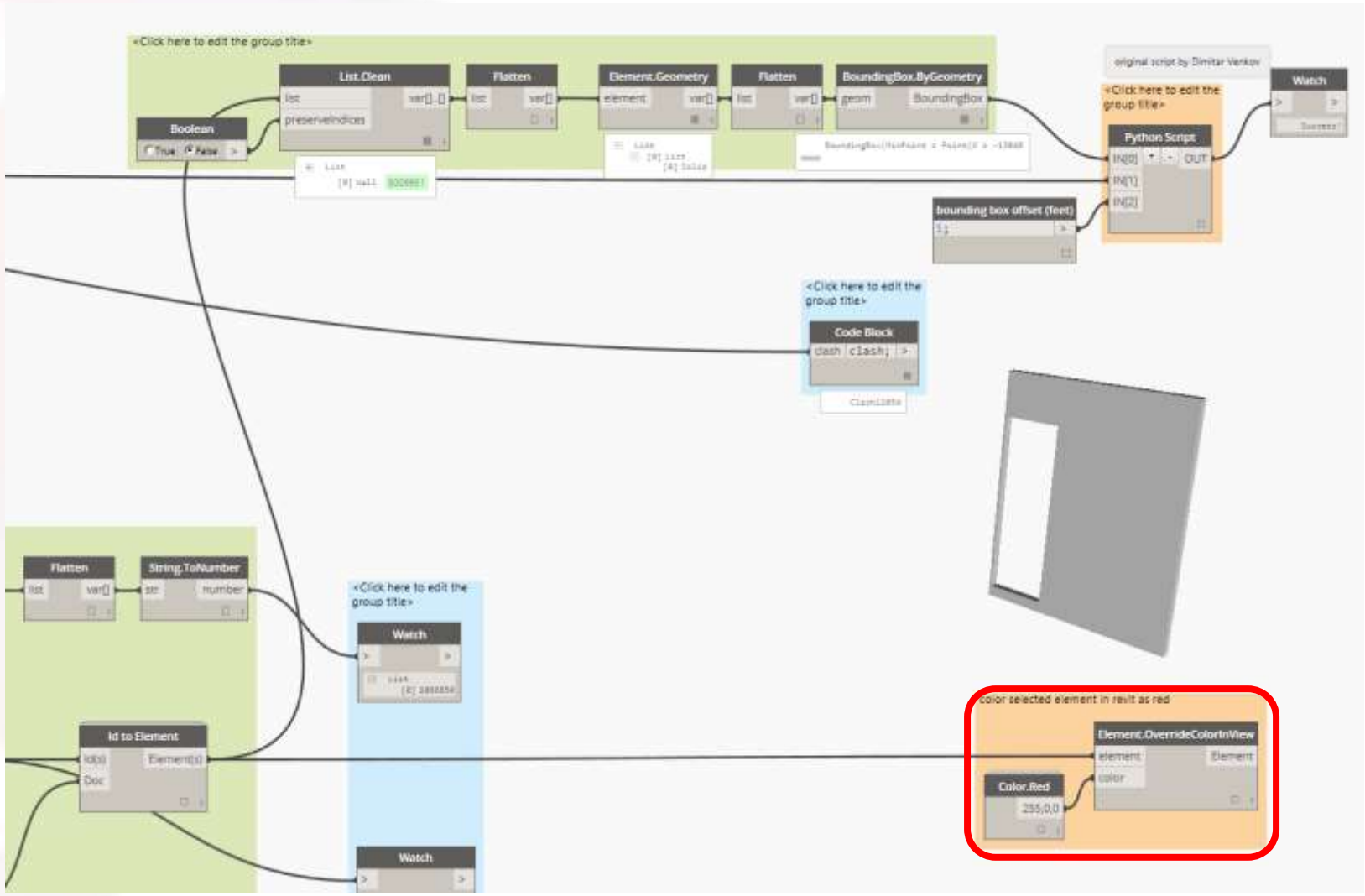




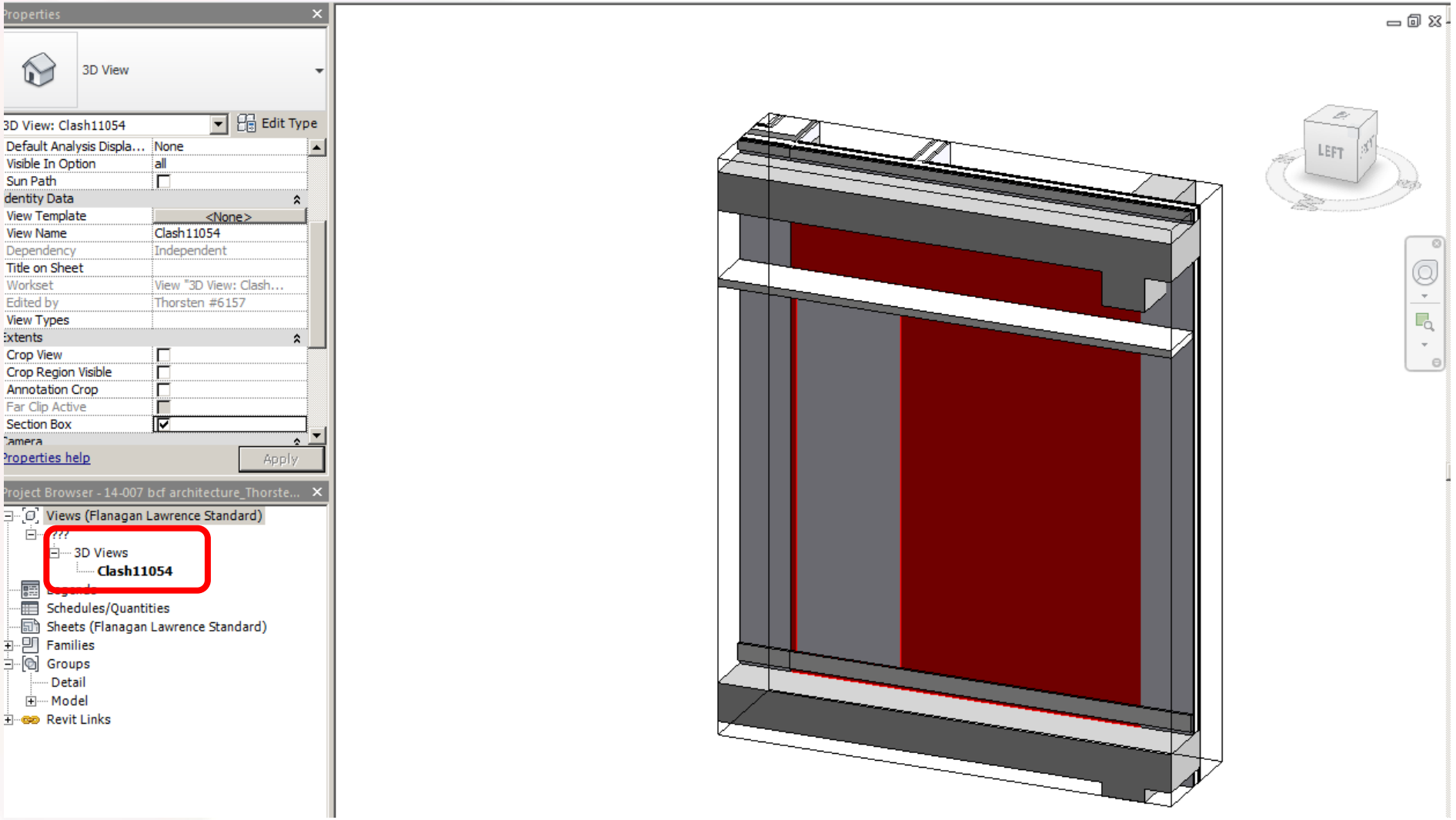
Get element
Get bounding box from element
Create bounding box in Revit

Python script by Dimitar Venko

Override Colour of Element to Highlight



Generated View in Revit



End of part II