



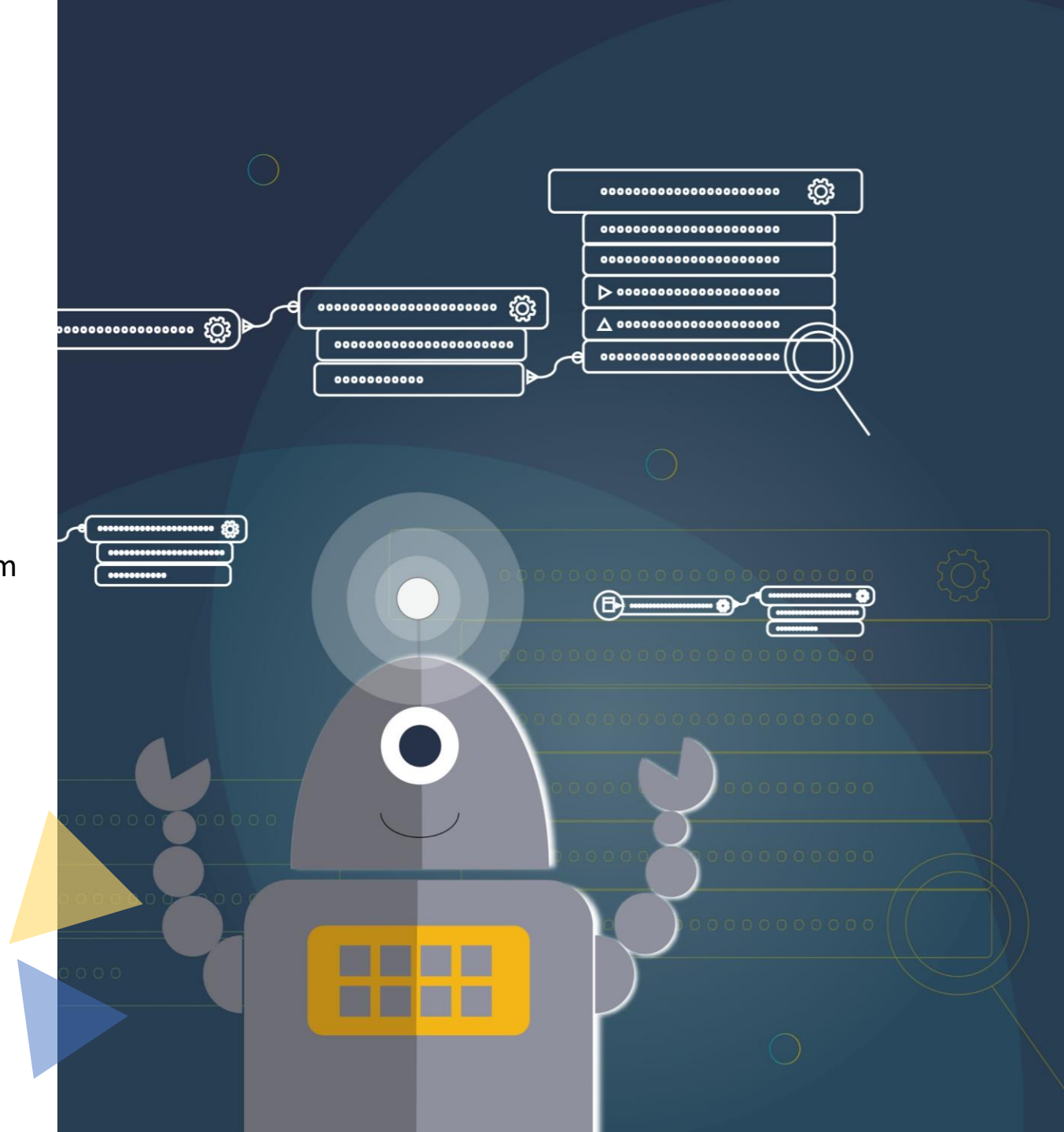
# MANAGE DATABASE UPDATE WITH FME

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EUROSENSE ROMANIA



# MAIN GOALS

- ▶ Update an area covering over 30.000 sqkm, 4 spatial data themes and 16 layers
- ▶ Follow update rules described in more than 1000 pages of technical documentation
- ▶ Correction for small and time consuming errors resulted from the update process
- ▶ QC of the geometry against over 150 topologic rules with 0.1% tolerance
- ▶ Keep an accurate record of all the changes
- ▶ Maintain the planned scheduler for the delivery of the data





An aerial photograph of the New York City skyline, featuring numerous skyscrapers and a dense urban landscape. The image has a blue color overlay. A quote is centered over the middle of the image, and the name 'Henry Ford' is positioned to the right of the quote.

“There are no big problems, there are just  
a lot of little problems.”

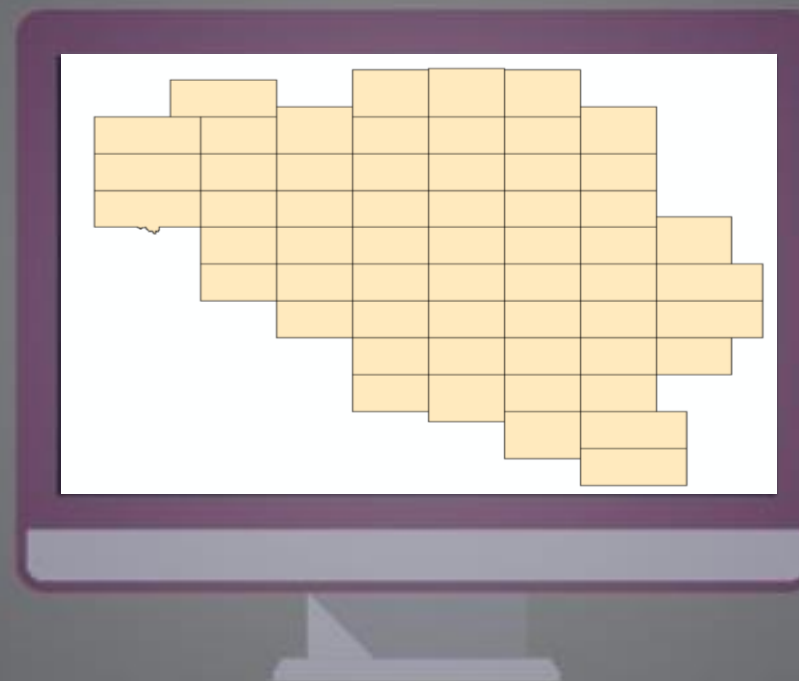
**Henry Ford**

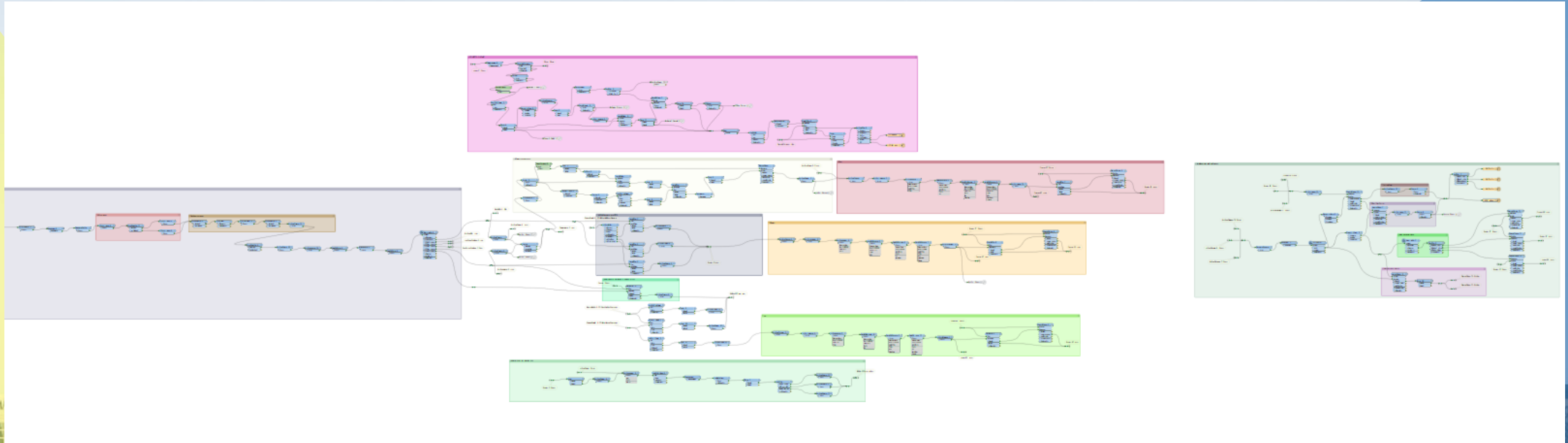


# Data structure

- ▶ Road network
- ▶ Water Network
- ▶ Constructions
- ▶ Landcover

Class of objects	PGGD/GAW Denomination
Road segment	RO_RoadSegment
Dirt road segment	RO_DirtroadSegment
Non-driveway path segment	RO_PathSegment
Bridge/tunnel/culvert	CO_Brunnel
Obstruction/obstacle	RO_Obstruction
Milestone	NET_KilometerMarker
Building	CO_Building
Particular area construction (PPC)	CO_ParticularPolyConstruction
Additional area construction (APG)	CO_AdditionalPolyGeometry
Particular linear construction (PLC)	CO_ParticularLineConstruction
Particular punctual construction (PPtC)	CO_ParticularPointConstruction
Additional punctual geometry (APtG)	CO_AdditionnalPointGeometry
Watercourse segment (WCS)	HY-WatercourseSegment
Watercourse area (WC)	HY_WatercourseSurface
Water area (WS)	HY_WaterSurface
Landcover	LC_GroundLevellandcoverZone







“Best way to escape from our problems is to solve them... using FME”

Anonymous


Design workbenches to be run for  
as many as possible of the  
repetitive actions



Building\_PPC\_check.fme



Building\_PPC\_check.fmw



Crosstheme\_check.fme



Crosstheme\_check.fmw



Geometry\_check.fme



Geometry\_check.fmw



Roads\_check.fme



Roads\_check.fmw



Water\_check.fme



Water\_check.fmw

# TRANSLATIONS AND PARAMETERS FOR EACH THEME

Water network check

Constructions check

FME Quick Translator

Updated File Geodatabase: [redacted] ...

Snapping Tolerance: 0.15

Min\_distance\_between\_buildings: 0.20

Snapping\_distance\_for\_Z: 0.5 ...

Defaults OK Cancel

Geometry check

FME Quick Translator

File Geodatabase: [redacted] ...

Snapping distance to vertices\_XY: 0.25

Snapping\_distance\_for\_Z: 0.5 ...

Maximum\_gap\_distance: 2

Defaults OK Cancel

Cross theme check

FME Quick Translator

File Geodatabase: [redacted] ...

Defaults OK Cancel

FME Quick Translator

File Geodatabase: [redacted] ...

Feature Types to Read: RO\_Obstruction RO\_PathSegment RO\_RoadSegment ...

Min\_distance\_between\_consecutive\_vertices: 0.15 ...

Min\_distance\_between\_non-consecutive\_vertices: 0.2

Defaults OK Cancel

Road network check

FME Quick Translator

SourceDataset\_GEODATABASE\_FILE: [redacted] ...

Snapping distance for narrowpassage and barriers not on the road: 0.2

Distance for proximity search of Netkmmarkers: 20

Minimum segment length: 3 ...

Snapping\_distance\_for\_Z: 0.7 ...

Snapping distance to segments\_XY: 0.2

Snapping distance to vertices\_XY: 0.25

Maximum\_gap\_distance: 2

Defaults OK Cancel

Landcover check

FME Quick Translator

Source File Geodatabase: [redacted] ...



Maximum gap area: 1000 ...



Snapping Distance: 0.25



Defaults OK Cancel







# OTHER ADDITIONAL TRANSLATION


 Landcover\_splitter\_RO.fme  
 Landcover\_splitter\_RO.fmw


 Merge\_RASTER\_AOI.fme  
 Merge\_RASTER\_AOI.fmw



 Stereo\_image\_matching.fme  
 Stereo\_image\_matching.fmw



 Export\_gdb\_to\_mdb.fme  
 Export\_gdb\_to\_mdb.fmw



 Rework\_overlap\_detection.fme  
 Rework\_overlap\_detection.fmw

 Monitoring\_mysql.fmw

 Map\_evaluation.fmw

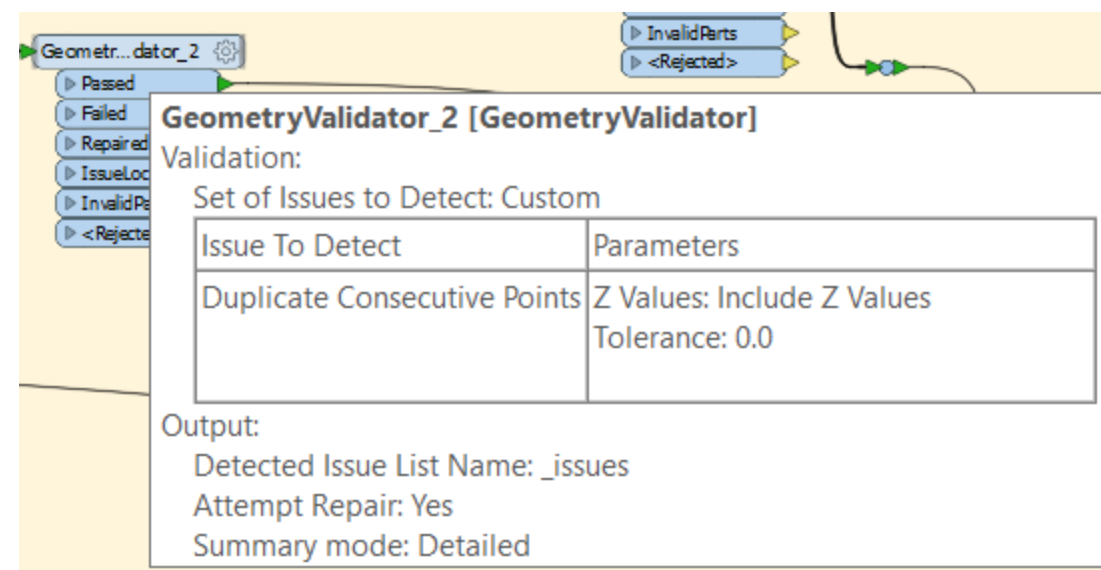
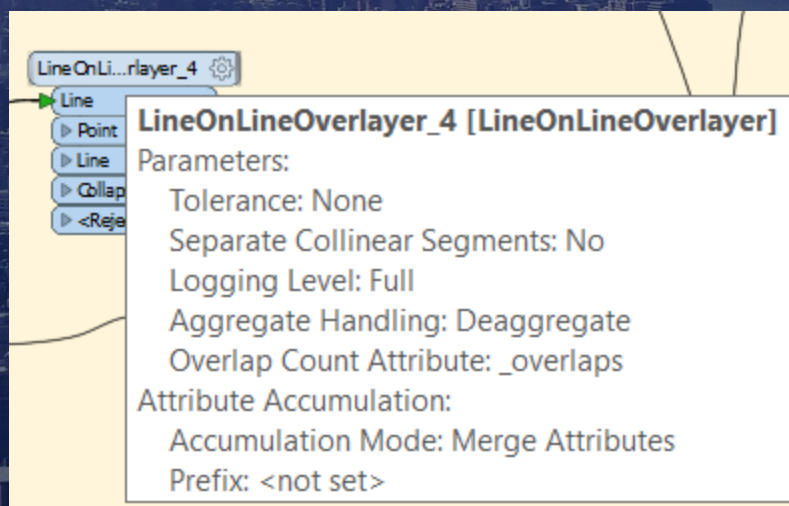
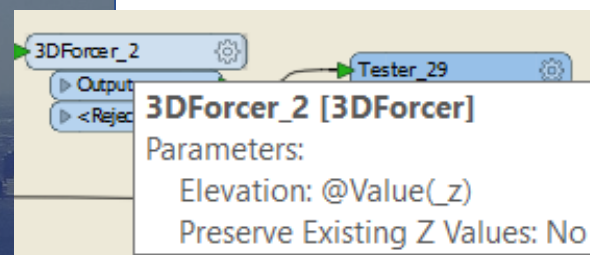
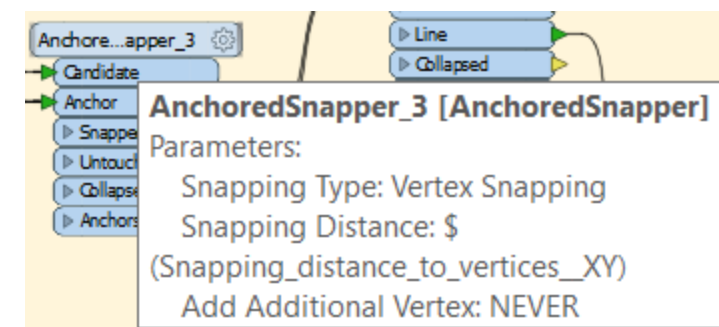
 LC\_LIMIT\_EXTRA\_extender\_v2.fme  
 LC\_LIMIT\_EXTRA\_extender\_v2.fmw

 Clip\_extraction.fme  
 Clip\_extraction.fmw

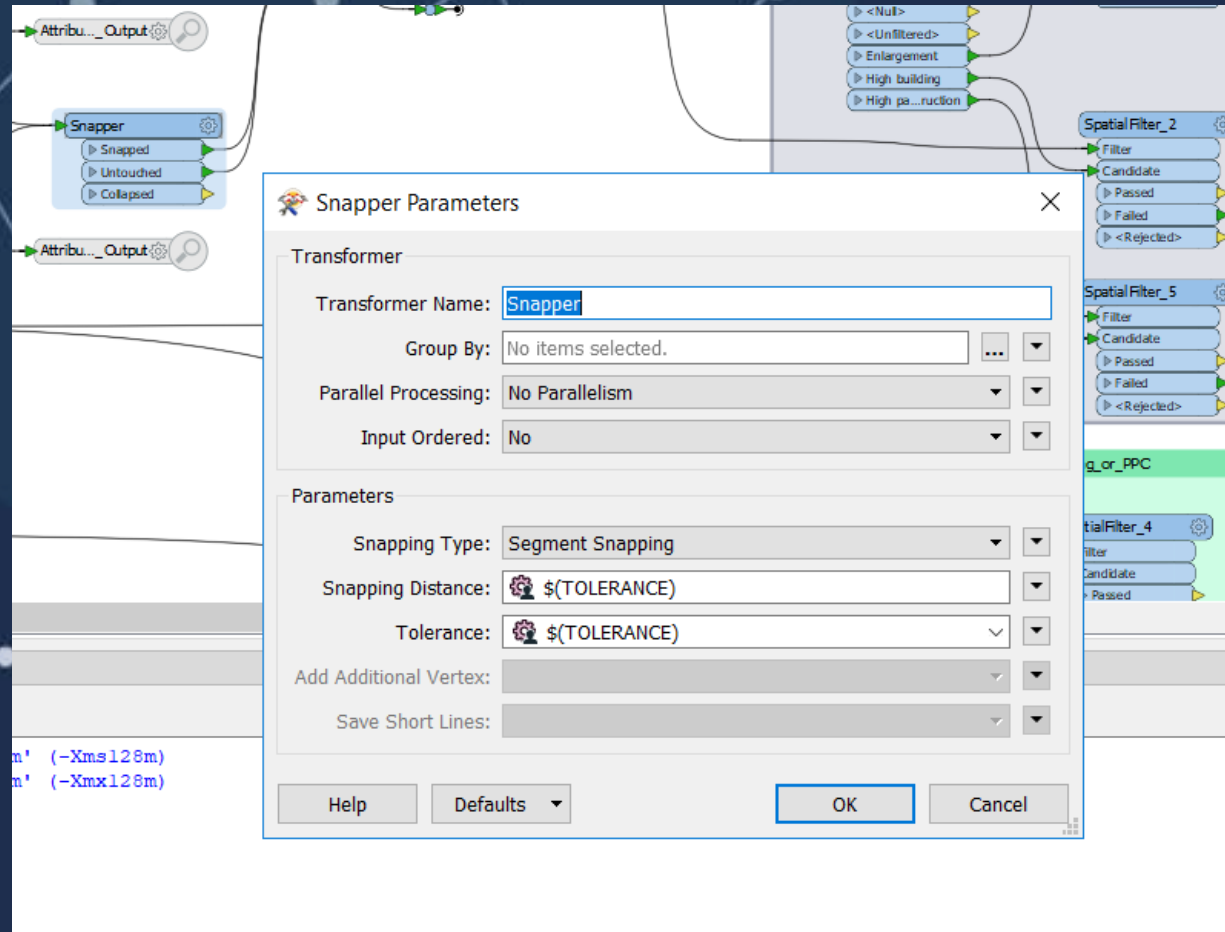
 Building\_special\_-1.fme  
 Building\_special\_-1.fmw



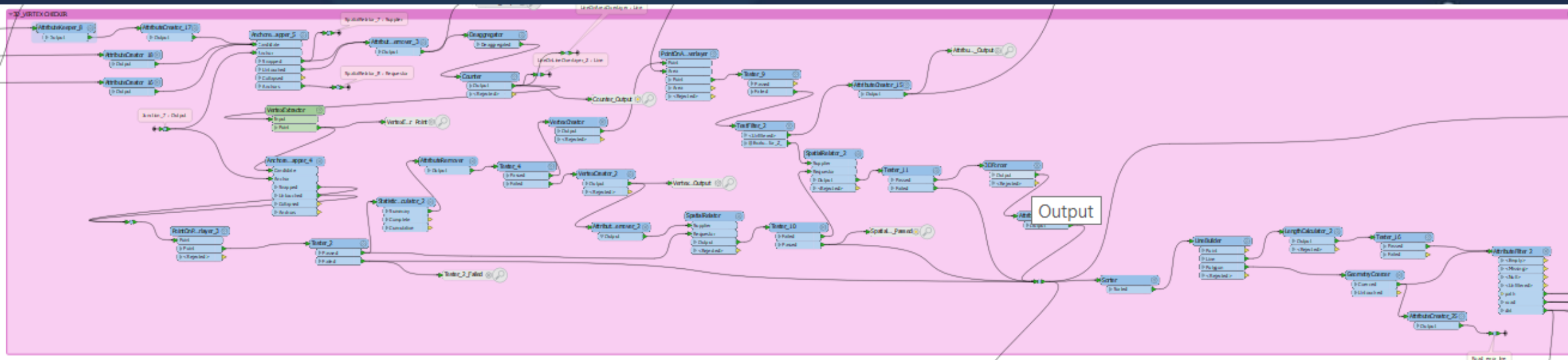
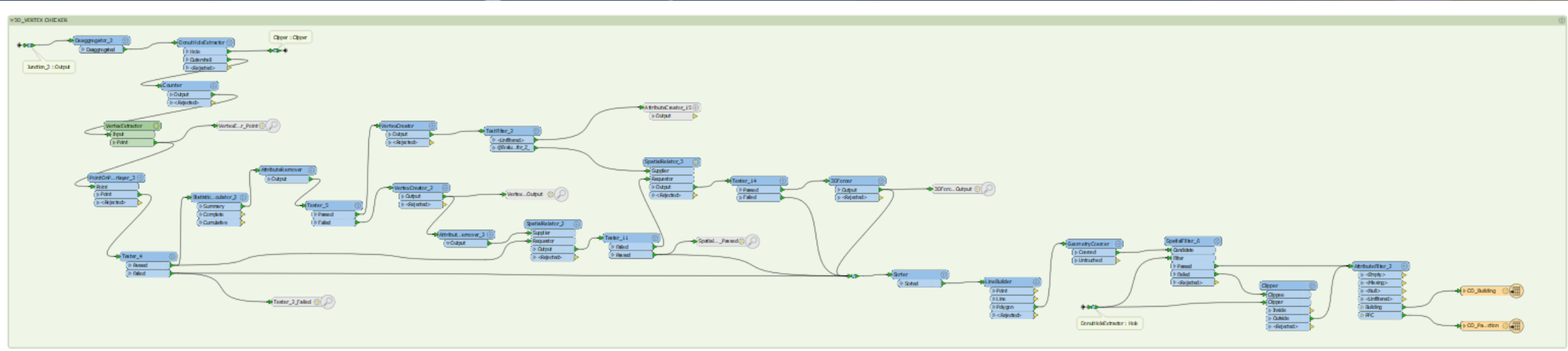
# Automatic 3D correction of small geometry error ( <0.5 m)



# SNAPPER AND IMPROVED 3D SNAPPER





# SNAPPER AND IMPROVED 3D SNAPPER






## Group rules for specific theme under thematic workbenches

 Building\_PPC\_check.fme

 Building\_PPC\_check.fmw

 Crosstheme\_check.fme

 Crosstheme\_check.fmw

 Geometry\_check.fme

 Geometry\_check.fmw

 Roads\_check.fme

 Roads\_check.fmw

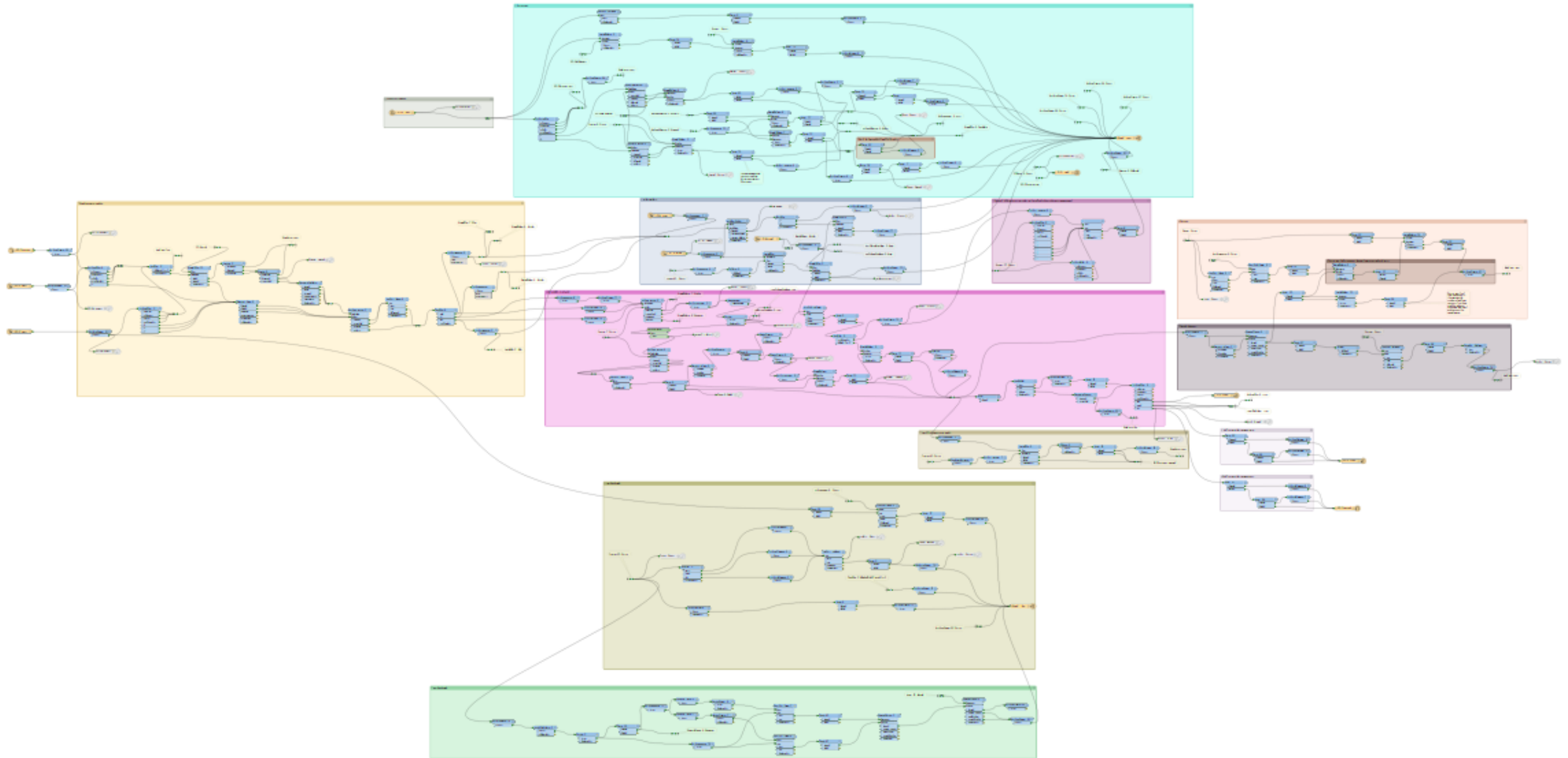
 Water\_check.fme

 Water\_check.fmw

# Topologic rules

1	Règle CQ (Cohérence topologique)	Spec	LAYER_CHK	GP	FME TOOL
2					
39	Short_WCsegment_links_WCsegment	0.10%	HY_WatercourseSegment	HY	Water_check
40	Short_WCsegment_links_WCsegment	0.10%	HY_WatercourseSegment	HY	Water_check
41	Short_WCsegment_links_WCsegment	0.10%	HY_WatercourseSegment	HY	Water_check
42	unsplitted_WCsegment	0.10%	HY_WatercourseSegment	HY	
43	WCsegment_does_not_cross_DirtroadSegment	0.10%	HY_WatercourseSegment	HY	Cross_theme_check
44	WCsegment_does_not_cross_PathSegment	0.10%	HY_WatercourseSegment	HY	Cross_theme_check
45	WCsegment_does_not_cross_RoadSegment	0.10%	HY_WatercourseSegment	HY	Cross_theme_check
46	WCsegment_has_WCSurface	0.10%	HY_WatercourseSegment	HY	Water_check
47	WCsegment_does_not_cross_WCsegment	0.10%	HY_WatercourseSegment	HY	Water_check
48	WCsegment_does_not_intersect_Building	0.10%	HY_WatercourseSegment	HY	Cross_theme_check
49	WCsegment_does_not_overlap_Dirtroadsegment	0.10%	HY_WatercourseSegment	HY	Cross_theme_check
50	WCsegment_does_not_overlap_Pathsegment	0.10%	HY_WatercourseSegment	HY	Cross_theme_check
51	WCsegment_does_not_overlap_PLC	0.10%	HY_WatercourseSegment	HY	Cross_theme_check
52	WCsegment_does_not_overlap_Roadsegment	0.10%	HY_WatercourseSegment	HY	Cross_theme_check
53	WCsegment_does_not_overlap_WCsegment	0.10%	HY_WatercourseSegment	HY	Water_check
54					
55	WCSurface_has_WCsegment	0.10%	HY_WatercourseSurface	HY	Water_check
56	WCSurface_does_not_overlap_Building	0.10%	HY_WatercourseSurface	HY	Cross_theme_check
57	WCSurface_does_not_overlap_LC	0.10%	HY_WatercourseSurface	HY	Cross_theme_check
58	WCSurface_does_not_overlap_PPC	0.10%	HY_WatercourseSurface	HY	Cross_theme_check
59	WCSurface_does_not_overlap_WaterSurface	0.10%	HY_WatercourseSurface	HY	Water_check
60	WCSurface_does_not_overlap_WCSurface	0.10%	HY_WatercourseSurface	HY	Water_check
61	WCSurface_ShippingCanal_has_WCsegment_navigable	0.10%	HY_WatercourseSurface	HY	Water_check
62	Watersurface_does_not_overlap_Building	0.10%	HY_WaterSurface	HY	Cross_theme_check
63	Watersurface_must_not_overlap_LC	0.10%	HY_WaterSurface	HY	Cross_theme_check
64	Watersurface_does_not_overlap_PPC	0.10%	HY_WaterSurface	HY	Cross_theme_check

# Thematic workbench





An aerial photograph of a city skyline, likely New York City, with a blue overlay. The text 'Keep a record of all the actions and progress' is written in white. To the right of the text are two overlapping blue triangles pointing right.

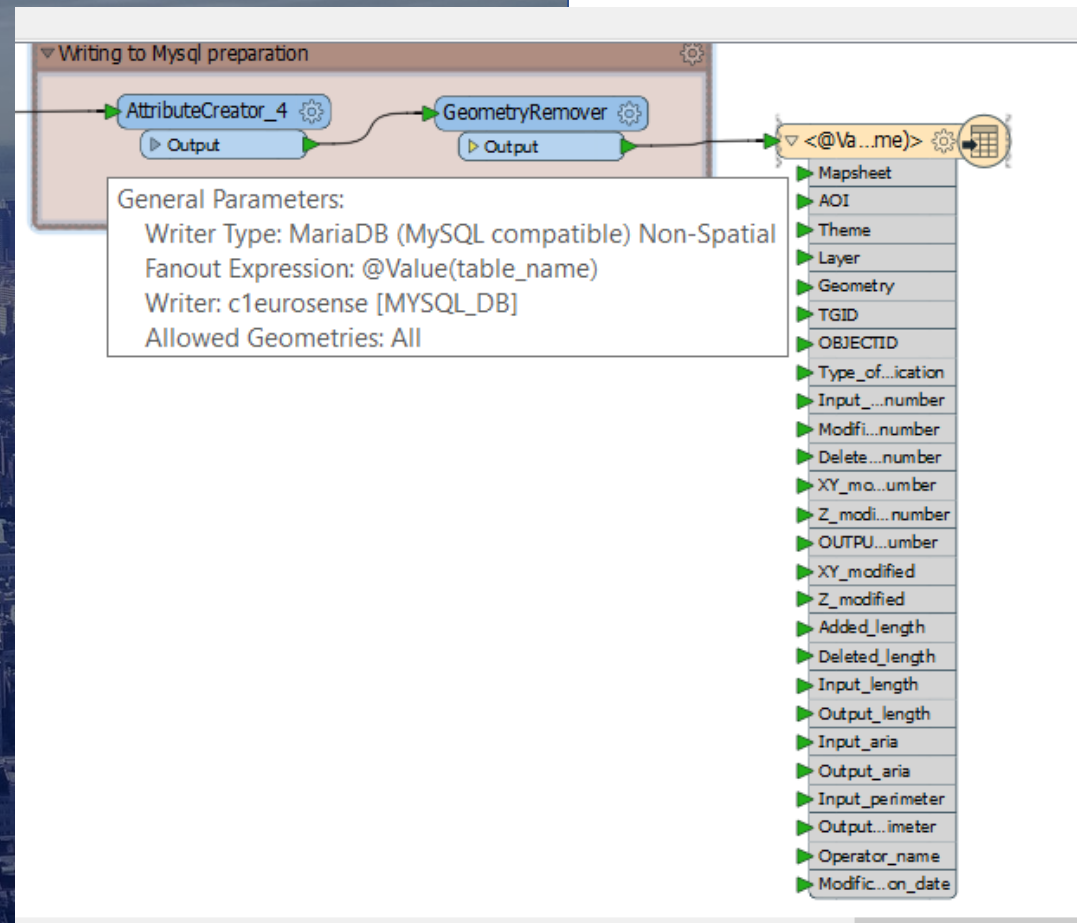
## Keep a record of all the actions and progress

### In order to:

- ▶ Have a tracking of all the modification done on data
- ▶ Ensure all steps of the data processing are made
- ▶ Have a status in real time of the current state and take appropriate decisions
- ▶ Have a general overview of the effort involved at present and better adjust resources for the next cycle.

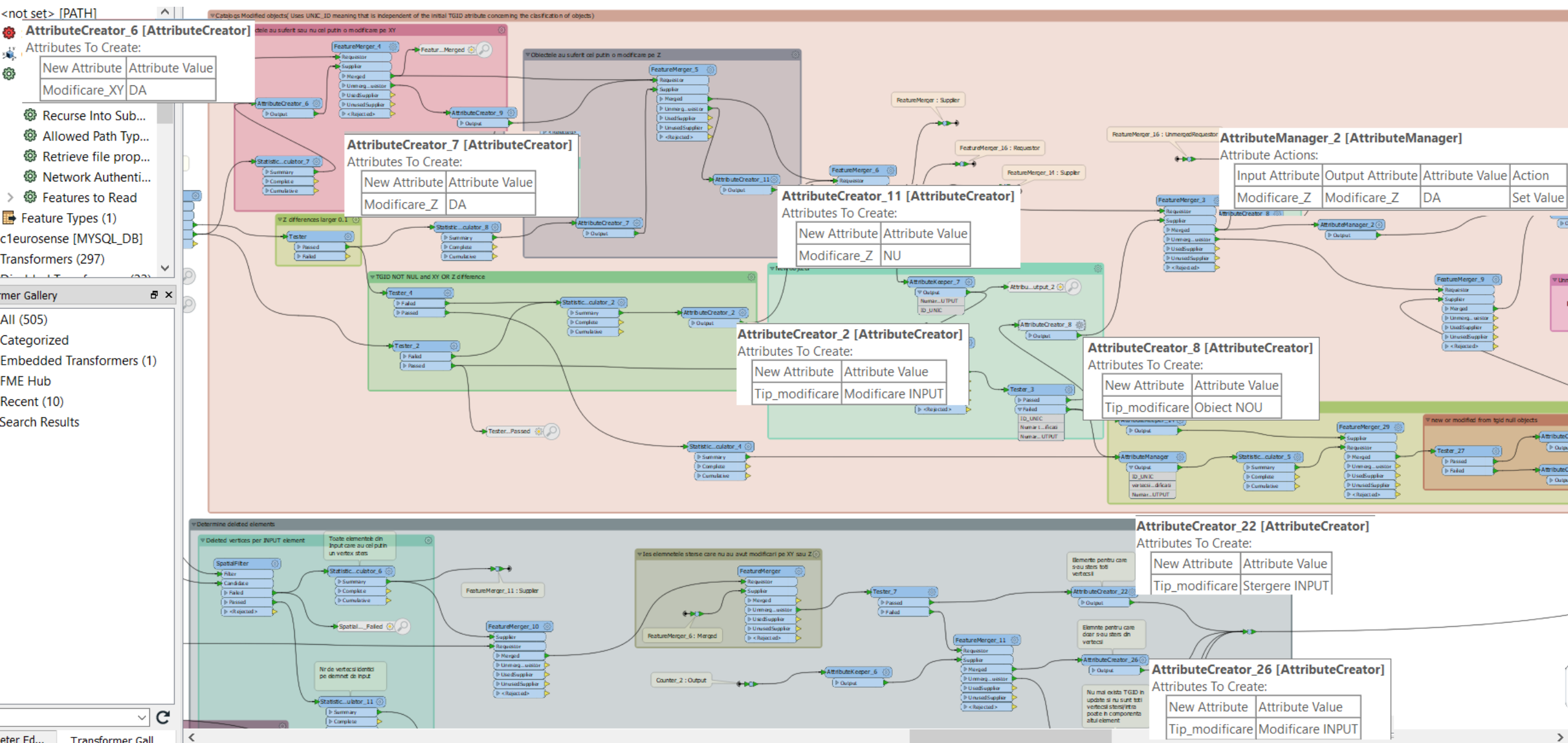
# Use FME to extract updates history

Source and update spatial database are compared in near real time and modifications are stored to MYSQL tables



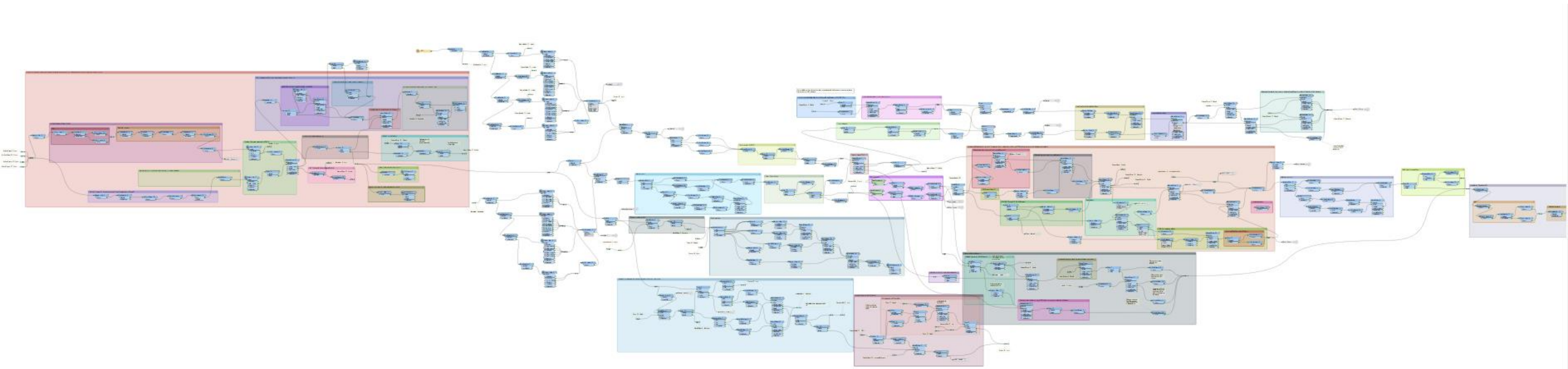


# Classify updates into classes





Keep a record of all the actions and progress



Use MYSQL database to store the  
history of modification

Update features

ID	Mapsheet	AOI	Theme	Layer	Geometry	TGID	OBJECTID	Type_of_modification	Input_vertex_number	Modified_vertex_number	Deleted_vertex_number	XY_modified_vertex_number
392369	24	24_1N	Building	CO_ParticularPoly	area	<null>	109	Obiect NOU	<null>	64	<null>	64
392370	24	24_1N	Building	CO_ParticularPoly	area	<null>	110	Obiect NOU	<null>	64	<null>	64
392371	24	24_1N	Building	CO_ParticularPoly	area	<null>	111	Obiect NOU	<null>	64	<null>	64
392372	24	24_1N	Building	CO_ParticularPoly	area	<null>	115	Obiect NOU	<null>	4	<null>	4
392373	24	24_1N	Building	CO_ParticularPoly	area	<null>	118	Obiect NOU	<null>	4	<null>	4
392374	24	24_1N	Building	CO_Building	area	{741C	11519	Modificare INPUT	<null>	2	<null>	2
392375	24	24_1N	Building	CO_Building	area	{EFAB	12436	Modificare INPUT	<null>	1	<null>	1
392376	24	24_1N	Building	CO_Building	area	{987E	101	Modificare INPUT	10	4	4	4
392377	24	24_1N	Building	CO_Building	area	{FDC4	107	Modificare INPUT	6	2	2	2
392378	24	24_1N	Building	CO_Building	area	{2E5C	273	Modificare INPUT	6	2	2	2
392379	24	24_1N	Building	CO_Building	area	{DFE1	438	Modificare INPUT	10	2	4	2
392380	24	24_1N	Building	CO_Building	area	{3158	679	Modificare INPUT	18	2	4	2
392381	24	24_1N	Building	CO_Building	area	{D3D3	978	Modificare INPUT	16	2	3	2

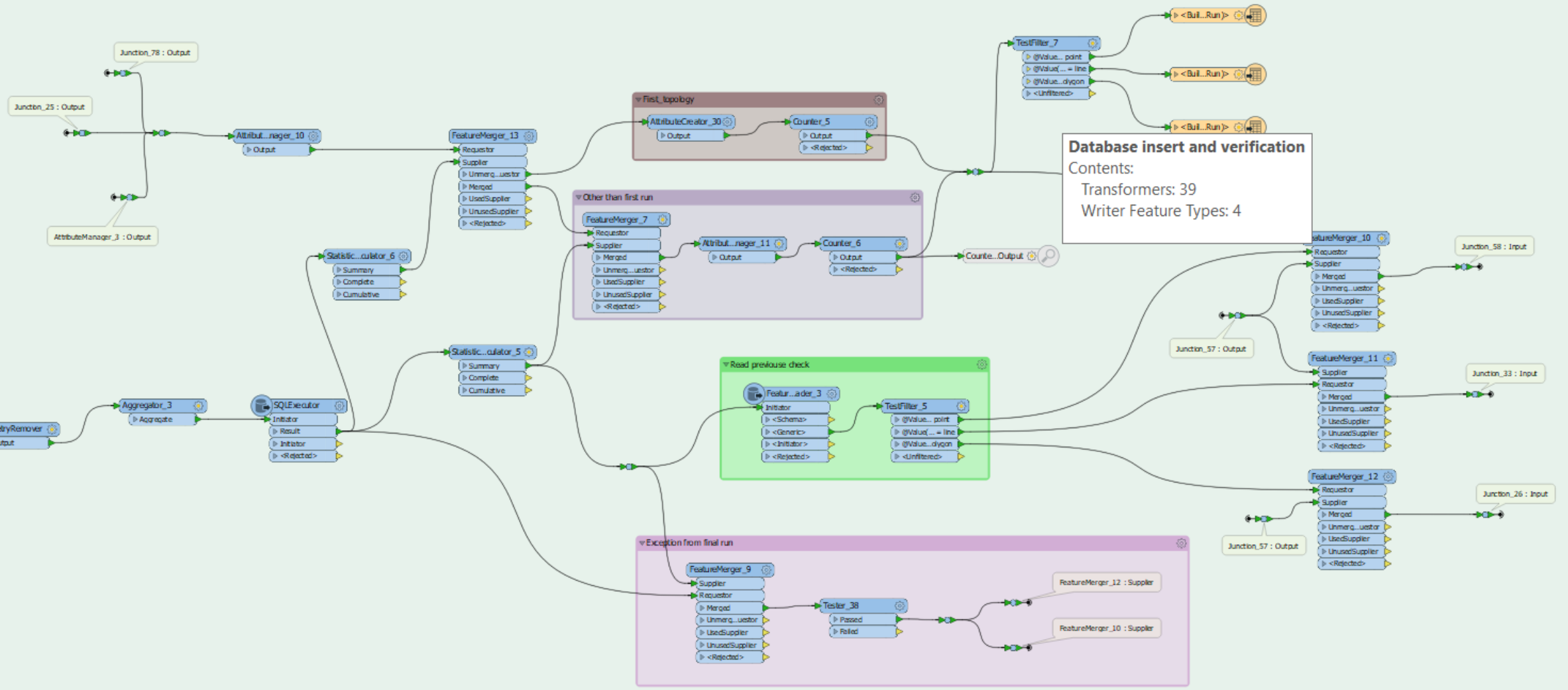
Use MYSQL database to store the  
history of modification

Update features

per	OUTPUT_vertex_number	XY_modified	Z_modified	Added_length	Deleted_length	Input_length	Output_length	Input_aria	Output_aria	Input_perimeter	Output_perimeter
64		DA	DA	<null>	<null>	<null>	<null>	<null>	32.559	<null>	20.235
64		DA	DA	<null>	<null>	<null>	<null>	<null>	30.965	<null>	19.734
64		DA	DA	<null>	<null>	<null>	<null>	<null>	22.939	<null>	16.985
4		DA	DA	<null>	<null>	<null>	<null>	<null>	23.122	<null>	24.68
4		DA	DA	<null>	<null>	<null>	<null>	<null>	38.554	<null>	31.146
10		DA	NU	<null>	<null>	<null>	<null>	<null>	633.384	<null>	127.758
18		DA	NU	<null>	<null>	<null>	<null>	<null>	312.003	<null>	97.757
10		DA	NU	85.554	87.252	<null>	<null>	657.723	629.335	125.672	123.975
6		DA	NU	17.409	17.768	<null>	<null>	158.602	150.539	53.025	52.665
6		DA	NU	31.125	30.555	<null>	<null>	105.48	110.459	45.555	46.125
8		DA	NU	166.698	170.547	<null>	<null>	2385.353	2334.522	230.808	226.958
16		DA	NU	39.036	50.928	<null>	<null>	461.889	433.948	146.967	135.075
15		DA	NU	14.497	20.96	<null>	<null>	157.497	131.696	72.748	66.286



# Keep a track of topological errors corrected



Use spatial database datasets to  
store a record of all the automatic  
QC

## Topology rules

- [-] Mapsheet\_19\_20
  - [+] 00\_Input\_Data
  - [+] 01\_Split\_before\_prod
  - [+] 02\_HydroUpdate
  - [+] 03\_End\_HydroUpdate
  - [-] 04\_Building
    - [-] MAP\_19\_3N
      - [-] MAP\_19\_3N.gdb
        - [-] Building
          - [-] Building\_PPC\_error\_point
        - [-] Cross\_theme\_error
          - [-] Cross\_theme\_error\_line
          - [-] Cross\_theme\_error\_point
          - [-] Cross\_theme\_error\_polygon
        - [-] Geometry\_check
          - [-] Geometry\_check\_line
        - [-] CO\_AdditionalPointGeometry
        - [-] CO\_AdditionalPolygonGeometry
        - [-] CO\_Brunnel

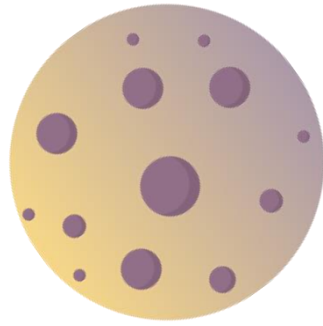
Use MYSQL database to store a  
record of all the automatic QC

## Topology rules

Drag a column header here to group by that column

ID	Error_	Maps	Theme	AOI	Error_ty	Feature_class	Error_nam	Geomet	ORIG_OBJECT	TGID	Exception	Solved	Run	Ins
Click here to define a filter														
4300	8	35_43	Building	43_1	Building	CO_ParticularPolyConstru	PPC_must_	polygon	<null>	{DFF60E9F-06F6-4510-A269-3FFDC9B95	<input checked="" type="checkbox"/>	1	1	3/:
4301	9	35_43	Building	43_1	Building	CO_ParticularPolyConstru	PPC_must_	polygon	<null>	{E1D63D7C-894B-429C-AD63-93C56BD1	<input checked="" type="checkbox"/>	1	1	3/:
4302	10	35_43	Building	43_1	Building	CO_Building	Building_m	polygon	<null>	{4C13DF5B-325E-465D-86E3-689202688	<input checked="" type="checkbox"/>	1	1	3/:
4303	11	35_43	Building	43_1	Building	CO_Building	Building_m	polygon	<null>	{BDF7D3F7-B7E0-4E2B-B6B1-F782CFEF	<input checked="" type="checkbox"/>	1	1	3/:
4304	1	35_43	Building	43_1	Geometry	CO_Building	Consecutive	line	53	{725B612C-B8FA-46AF-9C48-609837885	<input type="checkbox"/>	1	1	3/:
4305	12	35_43	Building	43_1	Building	CO_Building	Points of	point	<null>	{A0ED19F3-84D8-4B46-B90F-3E1866A0	<input type="checkbox"/>	<null>	2	3/:
4306	13	35_43	Building	43_1	Building	CO_Building	Points of	point	<null>	{E426567A-7D13-447C-B6EB-2D88E8B9	<input type="checkbox"/>	<null>	2	3/:
4307	14	35_43	Building	43_1	Building	CO_Building	Points of	point	<null>	{2C5BED77-A998-4F76-841D-5EF334958	<input type="checkbox"/>	<null>	2	3/:
4308	15	35_43	Building	43_1	Building	CO_Building	Points of	point	<null>	{333720AB-A2F0-4DB4-AA35-D5280EE4	<input type="checkbox"/>	<null>	2	3/:
4309	16	35_43	Building	43_1	Building	CO_ParticularPolyConstru	Points of	point	<null>	{51364CC8-EBDC-464F-809B-C470C6CC9	<input type="checkbox"/>	<null>	2	3/:
4310	17	35_43	Building	43_1	Building	CO_ParticularPolyConstru	Building_m	polygon	<null>	{51364CC8-EBDC-464F-809B-C470C6CC9	<input type="checkbox"/>	<null>	2	3/:





Thank you for your attention