

VISUALIZATION OF QUALITY CONTROL RESULTS USING DASHBOARDS

21/11/2025

NGI
Nationaal
Geografisch
Instituut



IGN
Institut
Géographique
National

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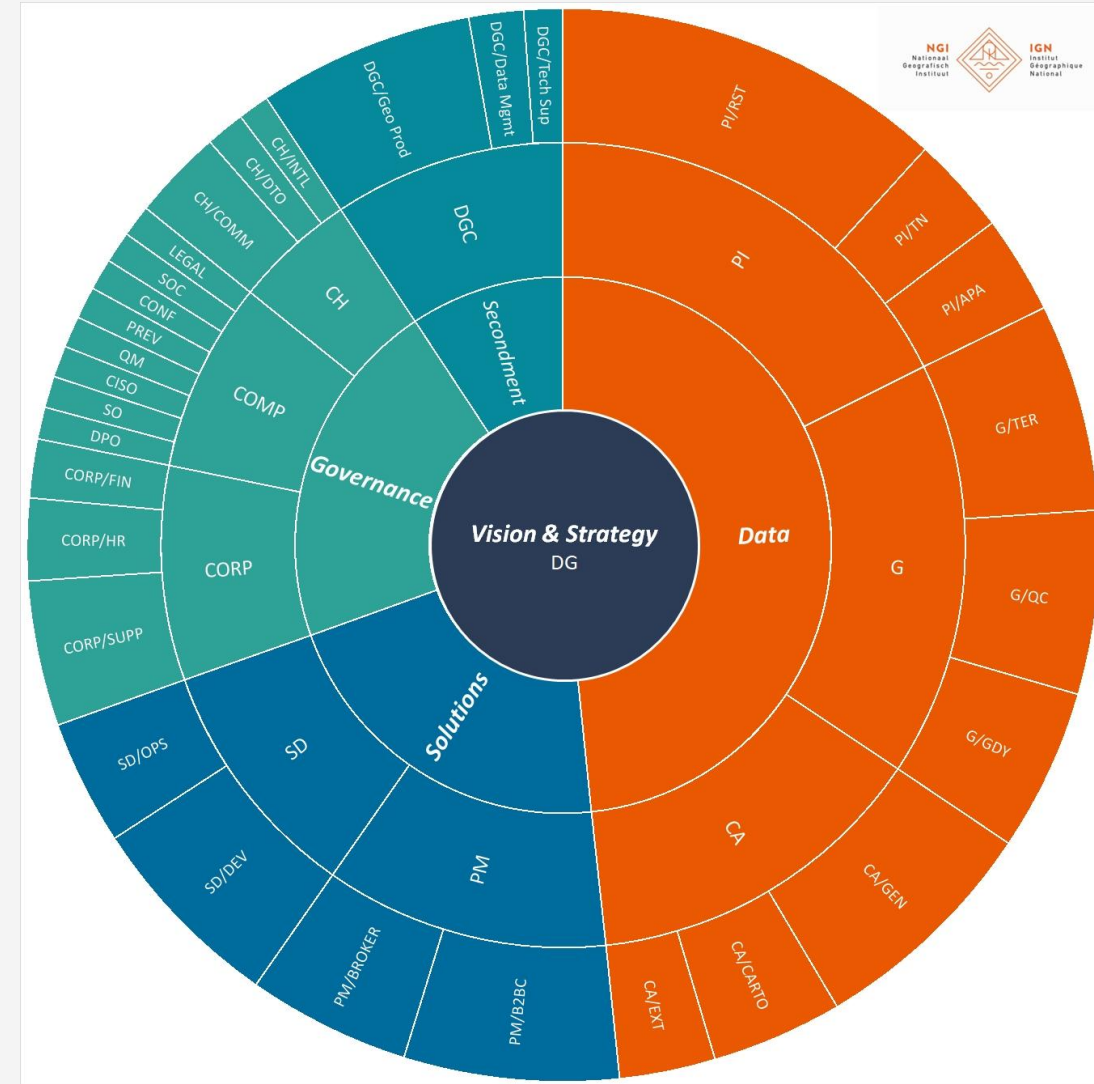
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Context

NGI Belgium

Legal mandate of NGI Belgium:

- Installation and maintenance of geodetic network and precision leveling network
- Keeping topographic map up to date
- to undertake works, studies and experiments that are of general interest within its field of activities



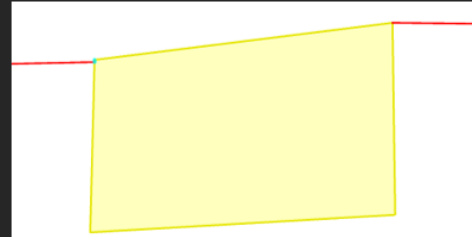
Context

QC team activities

- Quality control team has two kinds of checks:
 - Automated checks for validation of geometry, topology, domains

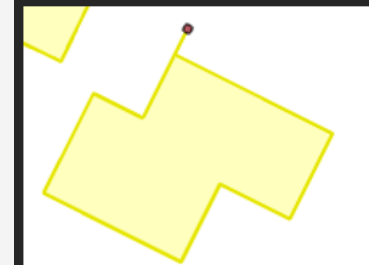
CO_Building :

- 3 x consecutive vertices $< 0.15\text{ m}$:



651080 – 625869

1 x spike $< 1^\circ$:

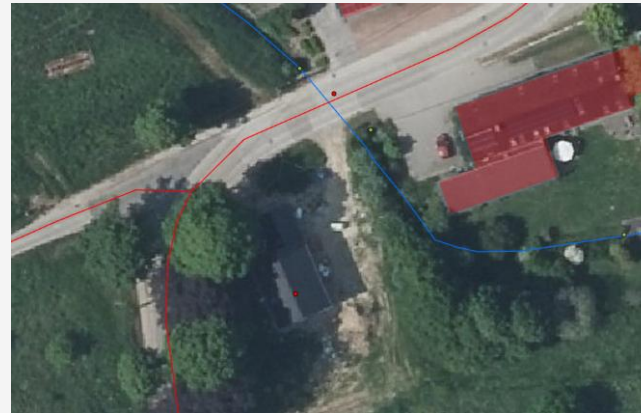
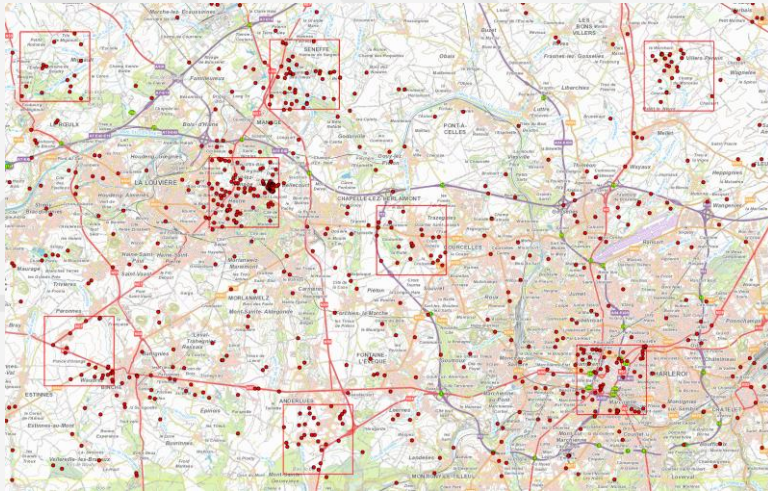


655412 - 636762

Context

QC team activities

- Quality control team has two kinds of checks:
 - Visual checks for validation of completeness, positional accuracy and thematic accuracy: Use of test objects and test zones



133	Point	RO_RoadSegment	Commission	Geen weg meer	<Null>
134	Point	RO_RoadSegment	Attributes	Breedte 4m	<Null>
135	Point	RO_RoadSegment	Classification	Aardeweg	<Null>
136	Point	RO_RoadSegment	Positional Accuracy	10-25m: rondpunt geworden	<Null>
137	Point	RO_RoadSegment	Commission	Restricted < 50m	<Null>
138	Point	RO_RoadSegment	Attributes	Breedte 4m	<Null>
139	Point	RO_RoadSegment	Attributes	Breedte	<Null>
140	Point	RO_RoadSegment	Attributes	Breedte	<Null>
141	Point	RO_RoadSegment	Attributes	Breedte	<Null>
142	Point	RO_RoadSegment	Classification	Aardeweg	<Null>
143	Point	RO_RoadSegment	Attributes	Breedte	<Null>
144	Point	RO_RoadSegment	Positional Accuracy	Laten aansluiten op weg ten zuiden	<Null>
145	Point	RO_RoadSegment	Positional Accuracy	Situatie veranderd	<Null>
146	Point	RO_RoadSegment	Attributes	Roadwithseparatedcarriageways = false	<Null>
147	Point	RO_RoadSegment	Positional Accuracy	<Null>	<Null>
148	Point	RO_RoadSegment	Attributes	Breedte	<Null>

QC team activities

- Reporting of quality control results before 2025

Test Reference (unique ID)	Data Quality Element	Data Quality Sub-Element	Test source	Sample size	Data Quality Requirement	Data Quality Measure	Data Quality Assessment Method	Test Types		Time and Date of the start of the test		Name of the controller	Result of the test	Extra comments	Reference to the results				
								Manual	Automated	Date	Time								
QA_CO_Buildin g-Test_01	Age of the data	-	NORGOC	Full dataset?	Estimated age of the data	Number or description of the estimated age of the data	Yes	-	31/07/2024	13:00	Joren Van Gysegem	Most recent: 01/03/2024							
QA_CO_Buildin g-Test_02	Completeness	Commission	0	Full dataset or sampling via ISO 2059-1	Existence data present in the data set	Rate of excess items: number of excess items in the data set or sample in relation to the number of items that should have been present	Yes	-	09/07/2024	09:00	Maxim Tedesco	0.81%		Results_QA_F46-gb1-error_VC					
QA_CO_Buildin g-Test_03	Completeness	Commission	table D.4 in [50985]	Full dataset	Number of duplicate instances	Number of duplicate instances: error (count total number of rows) Applications of feature instances within the data set	-	Yes	02/07/2024	09:00	Joan-Yves Depasse	0							
QA_CO_Buildin g-Test_04	Completeness	Omission	table D.7 in [50985]	Full dataset or sampling via ISO 2059-1	Data absent from the data set	Rate of missing items: number of missing items in the data set or sample in relation to the number of items that should have been present	Yes	-	09/07/2024	09:00	Maxim Tedesco	1.11%		Results_QA_F46-gb1-error_VC					
QA_CO_Buildin g-Test_05	Logical consistency	Conceptual consistency	table D.12 in [50985]	Full dataset	Adherence to rules of the conceptual schema concerning geometric requirements	Non-compliance rate with respect to the rules of the conceptual schema: number of items in the data set that are not compliant with the rules of the conceptual schema in relation to the total number of items in the data set	-	Yes	02/07/2024	09:00	Joan-Yves Depasse	0.16%		Results_QA_F46-gb1-CO_Building_1 Results_QA_F46-gb1-CO_Building_2 Results_QA_F46-gb1-CO_Building_3					
QA_CO_Buildin g-Test_06	Logical consistency	Conceptual consistency	table D.12 in [50985]	Full dataset	Adherence to rules of the conceptual schema concerning attribute combinations	Non-compliance rate with respect to the rules of the conceptual schema: number of items in the data set that are not compliant with the rules of the conceptual schema in relation to the total number of items in the data set	-	Yes	09/07/2024	09:00	Annerieke Schepers	0.02%	data source	number of objects	number of errors	number of objects with error	percentage of objects with error	proportion of errors for the feature class compared to the total number of errors in the database	proportion of objects in error for the feature class compared to the total number of objects in error in the database
QA_CO_Buildin g-Test_08	Logical consistency	Domain consistency	table D.17 in [50985]	Full dataset	Adherence of values to the value domain	Value domain compliance rate: number of items in the data set that are in conformance with their value domain in relation to the total number of items in the data set	-	Yes	09/07/2024	09:00	Annerieke Schepers	0.00%	updated database (0a_db_to_test) not updated database (0a_original_db)	220464 0	335 -	270 -	0.12% -	100% -	100% -
QA_CO_Buildin g-Test_10	Logical consistency	Topological consistency	NORGOC	Full dataset	Correctness of the explicitly encoded topological characteristics of a data set	Non-compliance rate with respect to the predetermined topological rules: number of items in the data set that are not compliant with the predetermined topological rules in relation to the total number of these items in the data set	-	Yes	09/07/2024	09:00	Annerieke Schepers	0.01%	updated database (tested): CO_AdditionalPointGeometry CO_AdditionalPolygonGeometry CO_Brunnel	96 28 684	0 0 0	0 0 0	- - -	- - -	- - -
QA_CO_Buildin g-Test_11	Positional accuracy	Absolute or external accuracy	NORGOC	Full dataset or sampling via ISO 2059-1	Horizontal accuracy: rate of positional errors in a given interval	Rate of positional errors in a given interval: number of positional uncertainties in a given interval in relation to the total number of measured positions Example: 25% has horizontal accuracy of +/- 0m, 50% has horizontal accuracy of +/- 2m and 75% has horizontal accuracy of +/- 5m	Yes	-	09/07/2024	09:00	Maxim Tedesco	8.60%	CO_Building CO_ParticularLineConstruction CO_ParticularPointConstruction CO_ParticularPolyConstruction HY_WatercourseSegment HY_WatercourseSurface HY_WaterSurface LC_GroundLevelLandcoverZone NET_KilometreMarker RO_DirtRoadSegment RO_Obstruction RO_PathSegment RO_RoadSegment	143873 7078 3810 626 4203 65 909 5402 776 1690 2715 8238 40271	267 47 0 0 0 0 0 5 0 0 2 6	230 30 0 0 0 0 0 5 0 0 2 3	0.16% 0.42% - - - - - 0.09% - - 0.02% 0.01%	79.7% 14.03% - - - - - 3.88% - - 0.6% 1.79%	85.19% 11.11% - - - - - 1.85% - - 0.74% 1.11%
not updated database (not tested):																			
type of error														-	number of errors in the database	number of objects with this error in the database	percentage of objects with this error in the database	percentage of the number of this error compared to the total number of errors in the database	percentage of objects containing this error compared to the total number of objects in error in the database
consecutive vertices < 0.15 m														-	18	13	0.01%	5.37%	4.81%
hole < 15 m²														-	263	226	0.1%	78.51%	83.7%
loop														-	18	18	0.01%	5.37%	6.67%
non-consecutive vertices < 0.20 m														-	3	2	0%	0.9%	0.74%
overlapping vertices - caused by loop														-	17	17	0.01%	5.07%	6.3%
shape_length < 1 m														-	13	13	0.01%	3.88%	4.81%
spike < 1*														-	3	2	0%	0.9%	0.74%

Dashboards

Introduction

Why a dashboard?

- Clear representation of quality
- Monitor quality
- Decisions on production
- Motivation

Advantages Power BI:

- User friendly visualizations
- Dynamic graphs/tables
- Supports many data types



Power BI

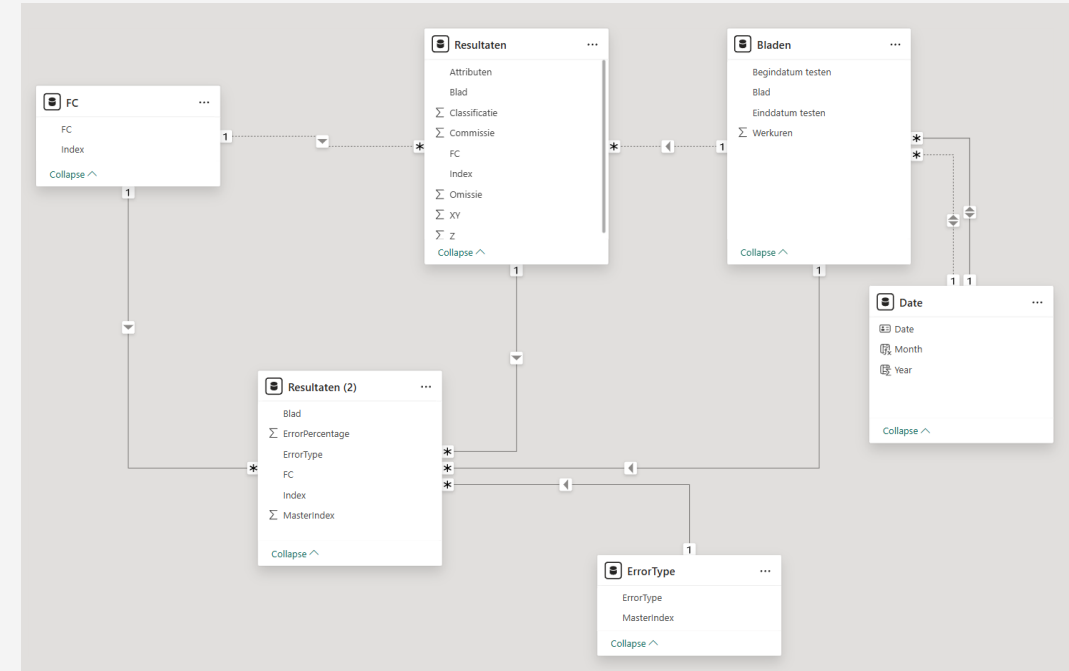
Objectives

- Overview of error percentage:
 - By map sheet 50k
 - By feature class
 - By error type (omission, commission, positional accuracy xy/z, attributes, classification)
- Helps identifying problems with our data
 - → Correct use of resources

Dashboard visual tests

How?

- Excel table gets updated when concluding the test of a map sheet:
 - Fact table containing error percentages
 - Dimension tables who can be used for 'slicing' and 'grouping':
 - Map sheet 50k
 - Error type
 - Feature class



Dashboard visual tests

Example

Dashboard Results QA

ErrorType

Attributen

Classificatie

Commissie

Omissie

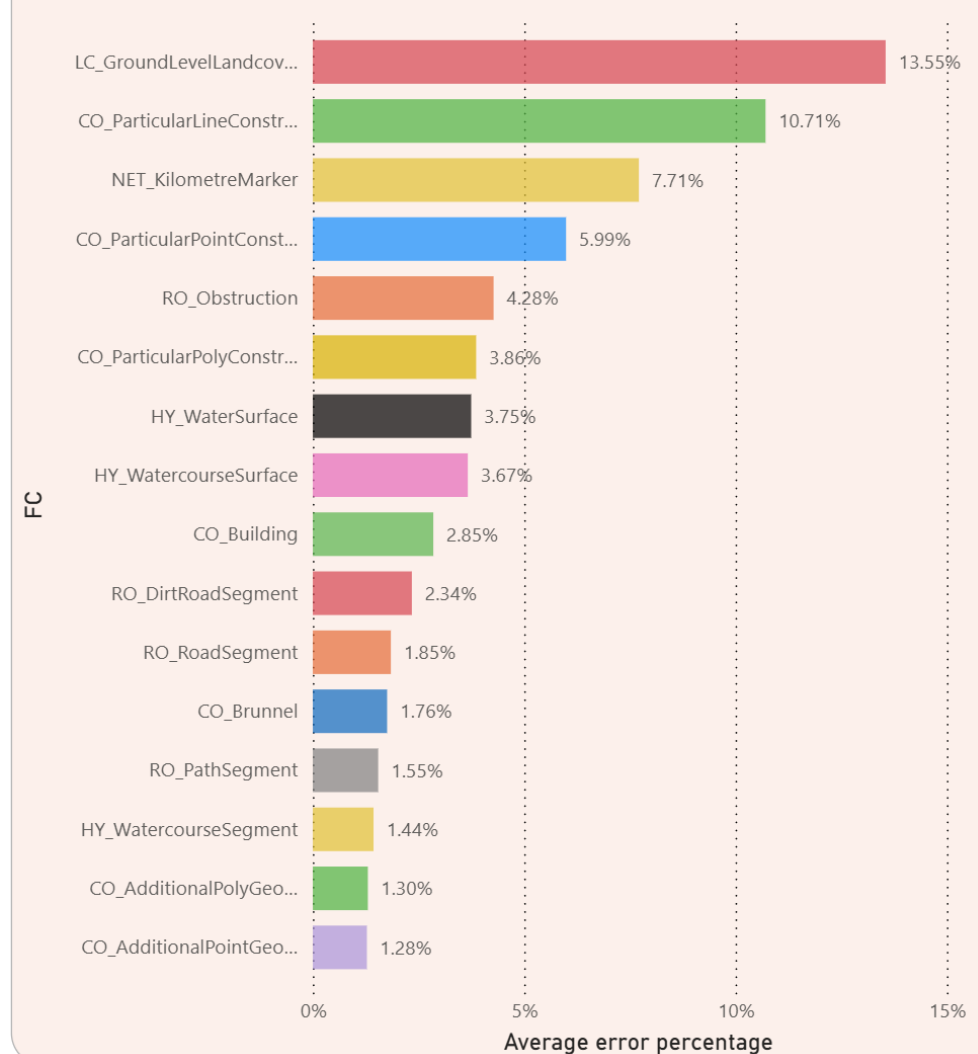
XY

Z

Average error percentage by sheet



Average error percentage by FC



Dashboard

Geometric requirements

Objectives:

- Overview of problems in regard to the geometric requirements
- Can be done on all data of Belgium at once
- Monitoring the evolution

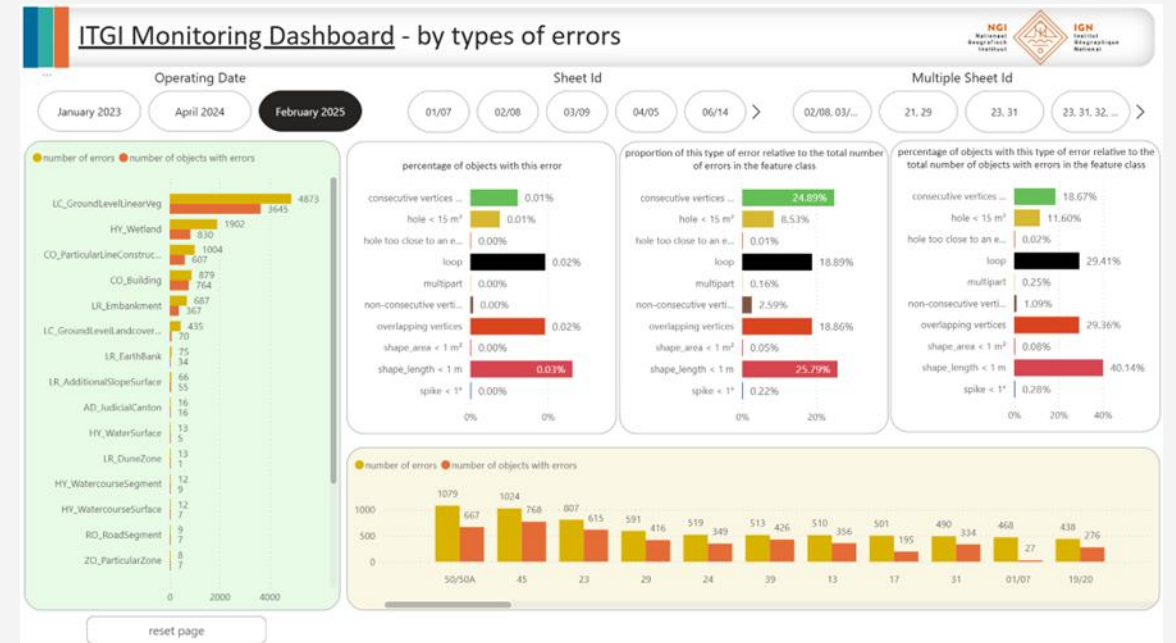
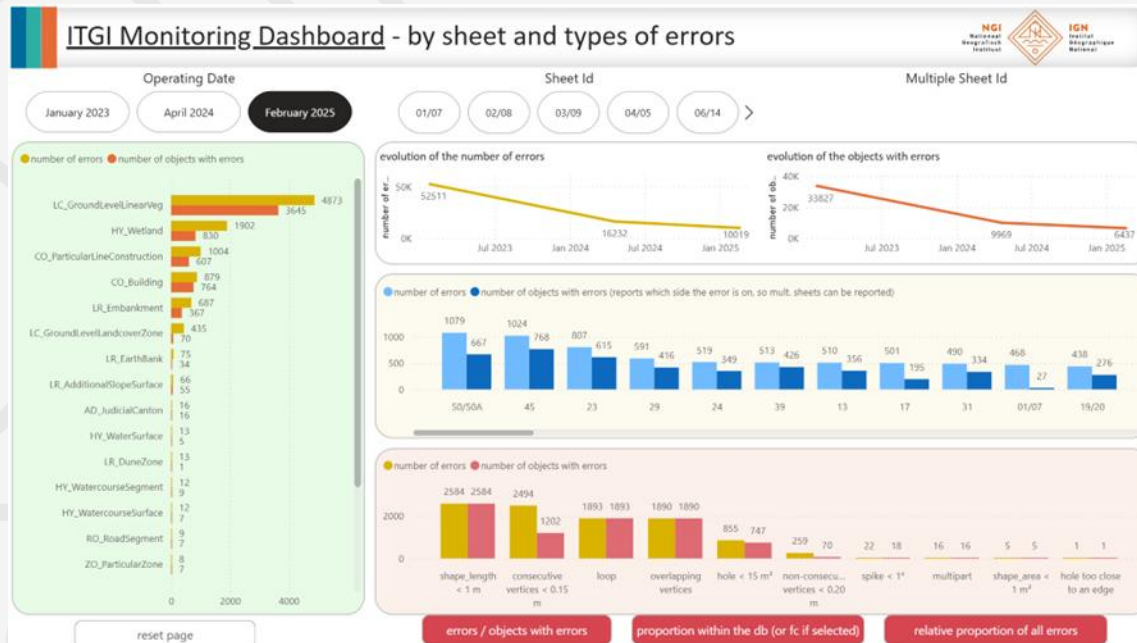
How:

- Error detection: FME scripts
- Transcribed to Excel file

Frequency: 3-4 times per year



Dashboard geometric requirements Example



Dashboard

Topology

Objectives:

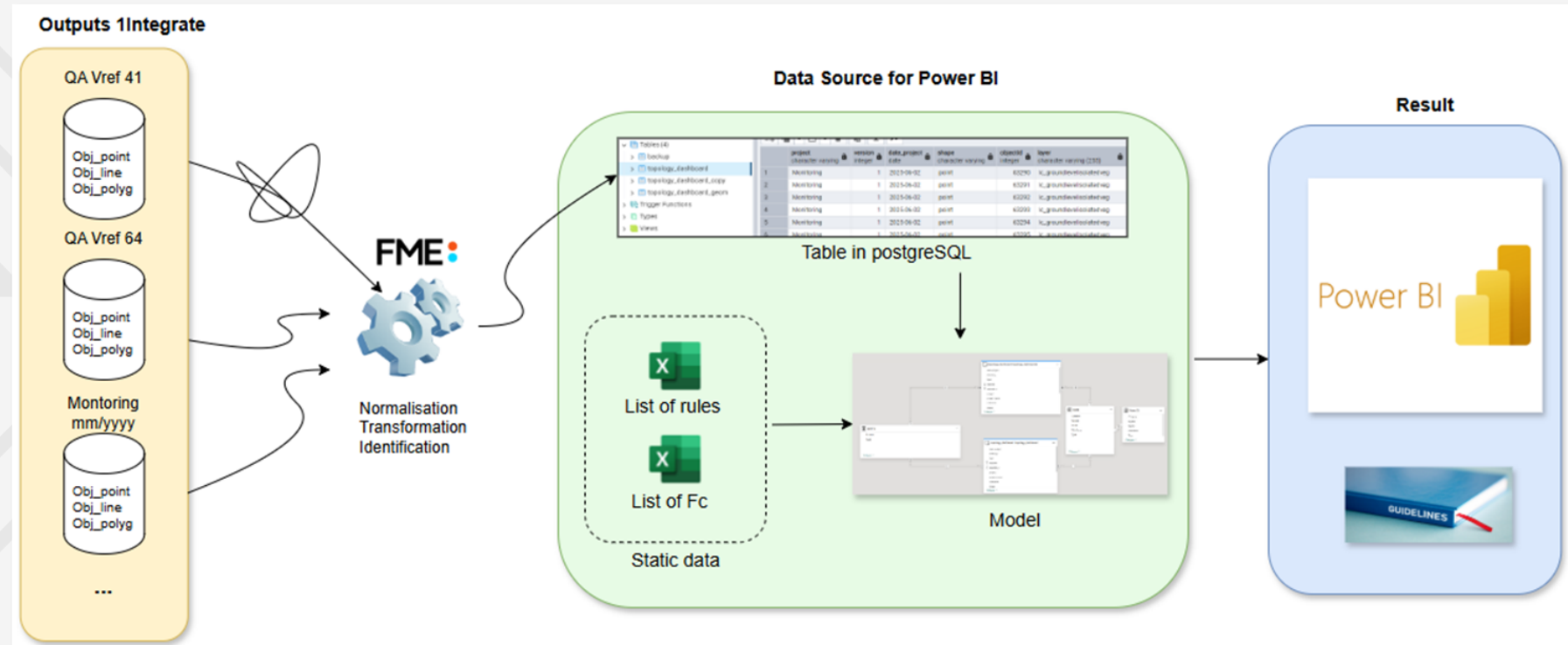
- Overview of problems in regard to the topological relationships
- Monitoring the evolution
- Aid in decision making

How:

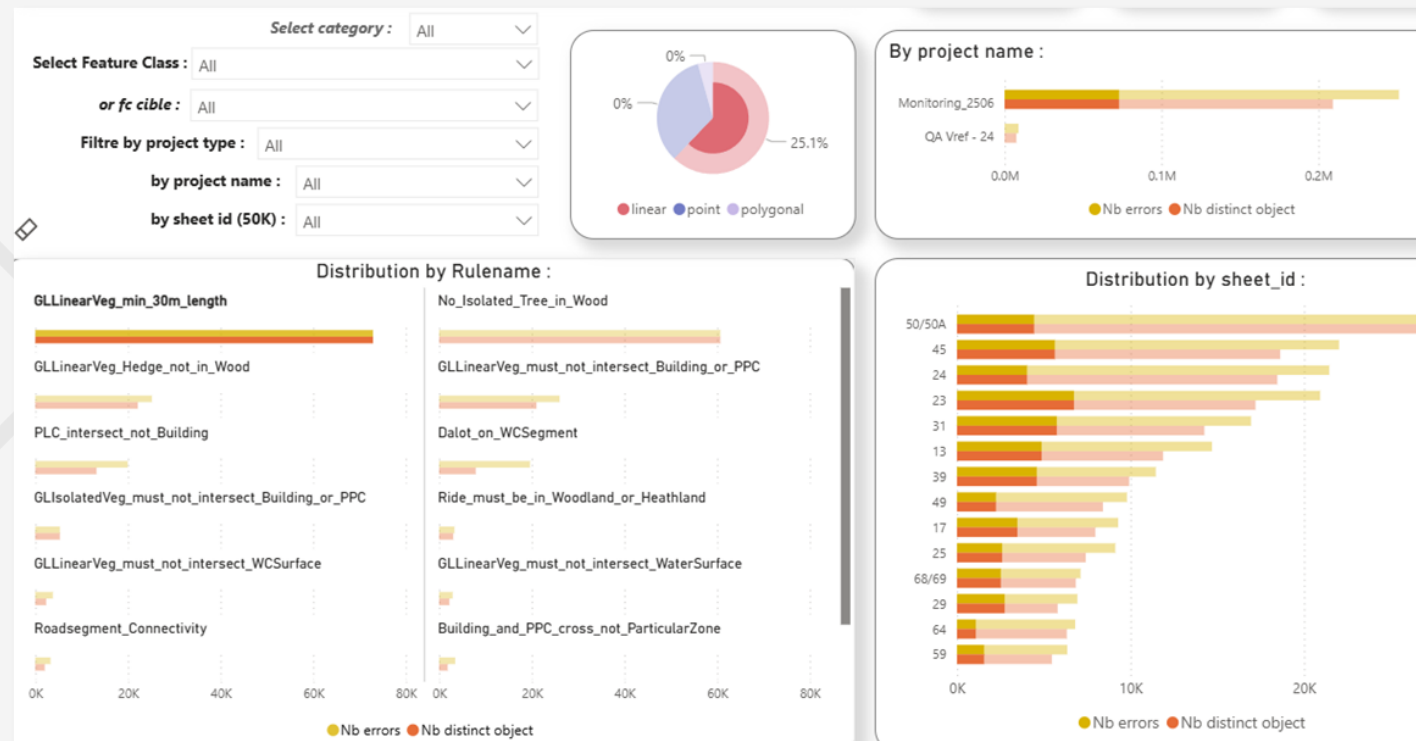
- Error detection: 1Integrate
- Transcribed to PostgreSQL

For the moment, only per map sheet (and not on whole of Belgium)

Dashboard Topology



Dashboard topology Example



Dashboard Demo



Conclusion

- Dashboard = useful for visualizing quality control results
- Dynamic graphs make it easy to change what you want to analyse
- Can aid in decision making
- But:
 - Graphs need to be interpreted!
 - Sudden changes in numbers can be due to changes in procedures (in production or quality team)!

Thanks for your attention!

