ERM Quality Management

Tony Baving and Marieke Kuijer, Kadaster NL

Producers meeting Amsterdam – September 2016

Many different validation tools

ArcGIS Data Reviewer

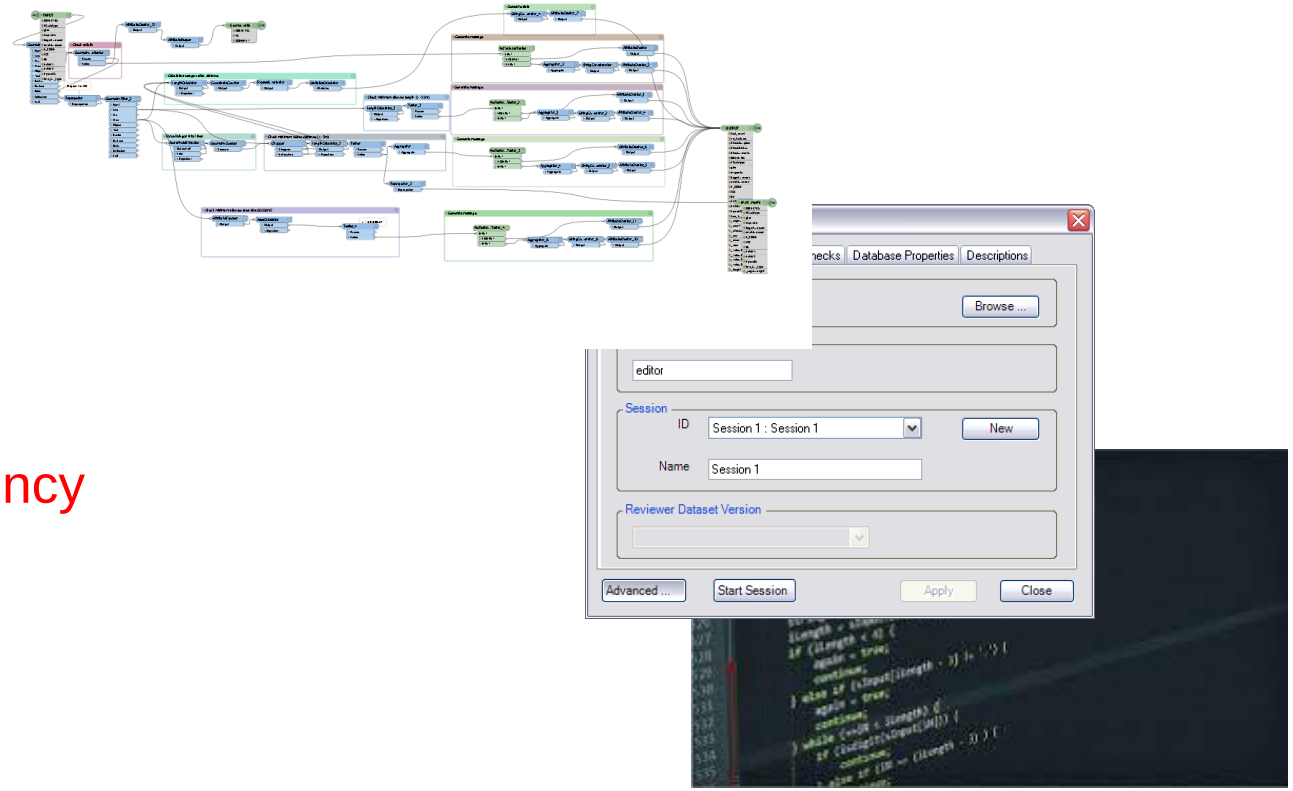
C# Tools

ExM Python tools

FME

National checks

Problems: licenses, maintenance, consistency



Idea

One validation tool:

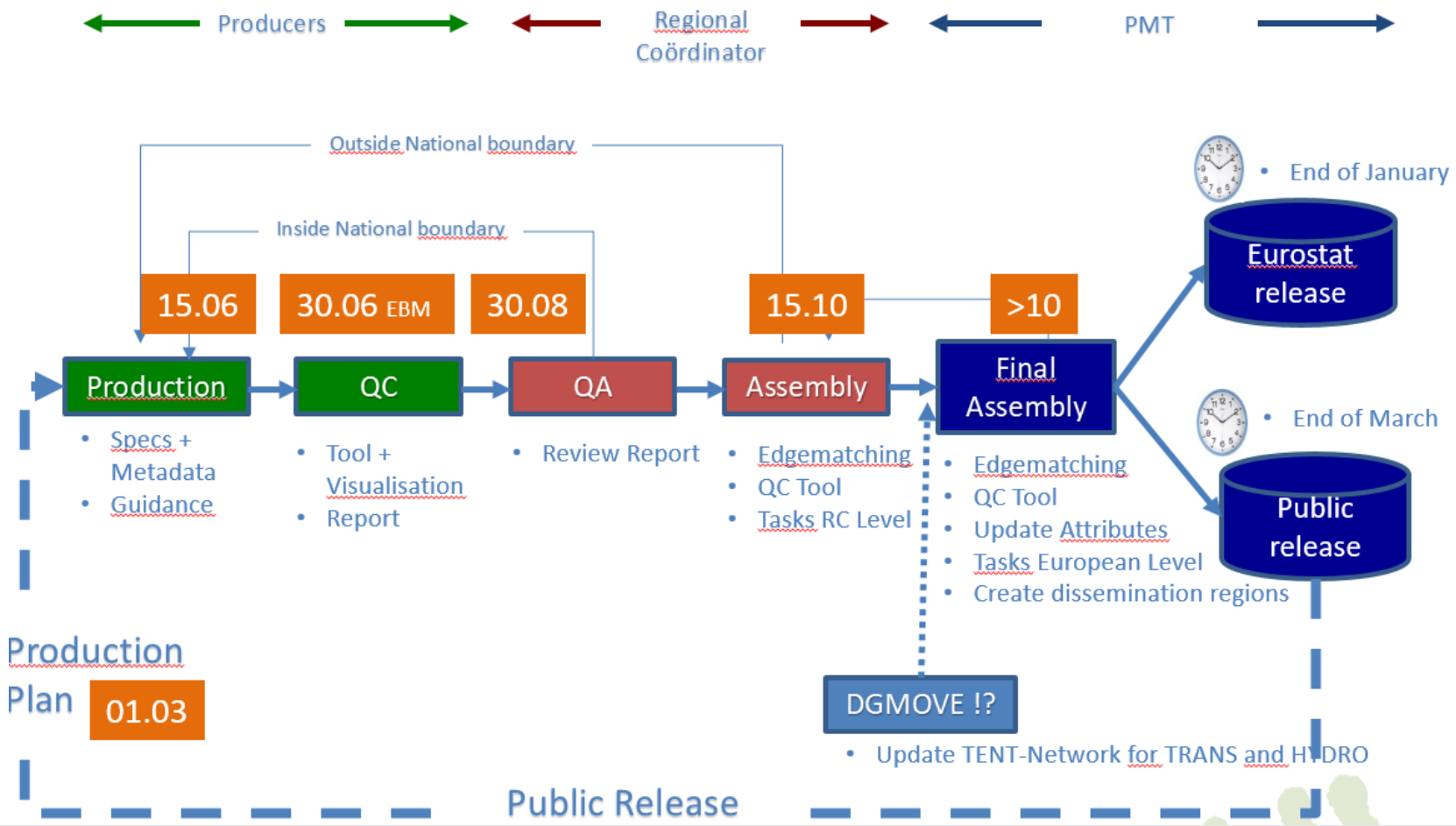
Used by producers, RCs and PMT

Objectives:

ArcGIS >10.1
Easy to use
Simple documentation
Flexible & adjustable
Spatial display of results

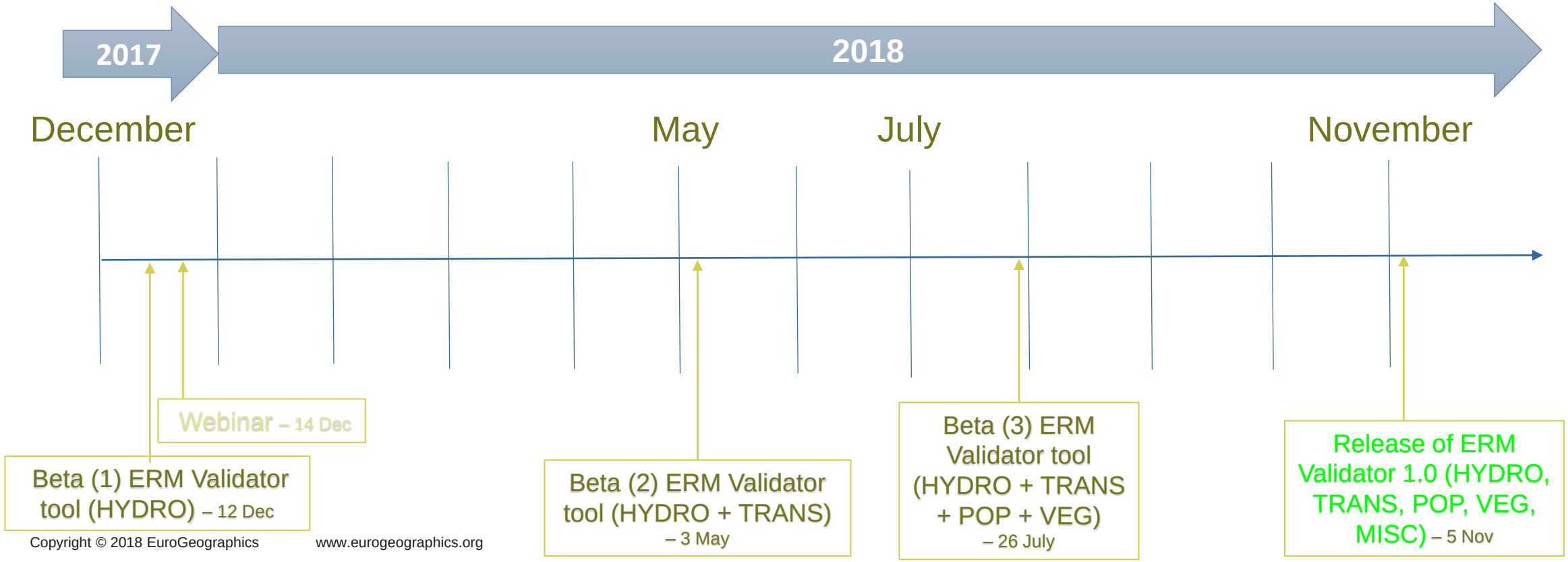
Raise quality of ERM data

Approach



Producers Meeting Lisbon - November 2017

Releases



Feedback

Most countries

22 responses via GoogleForms survey

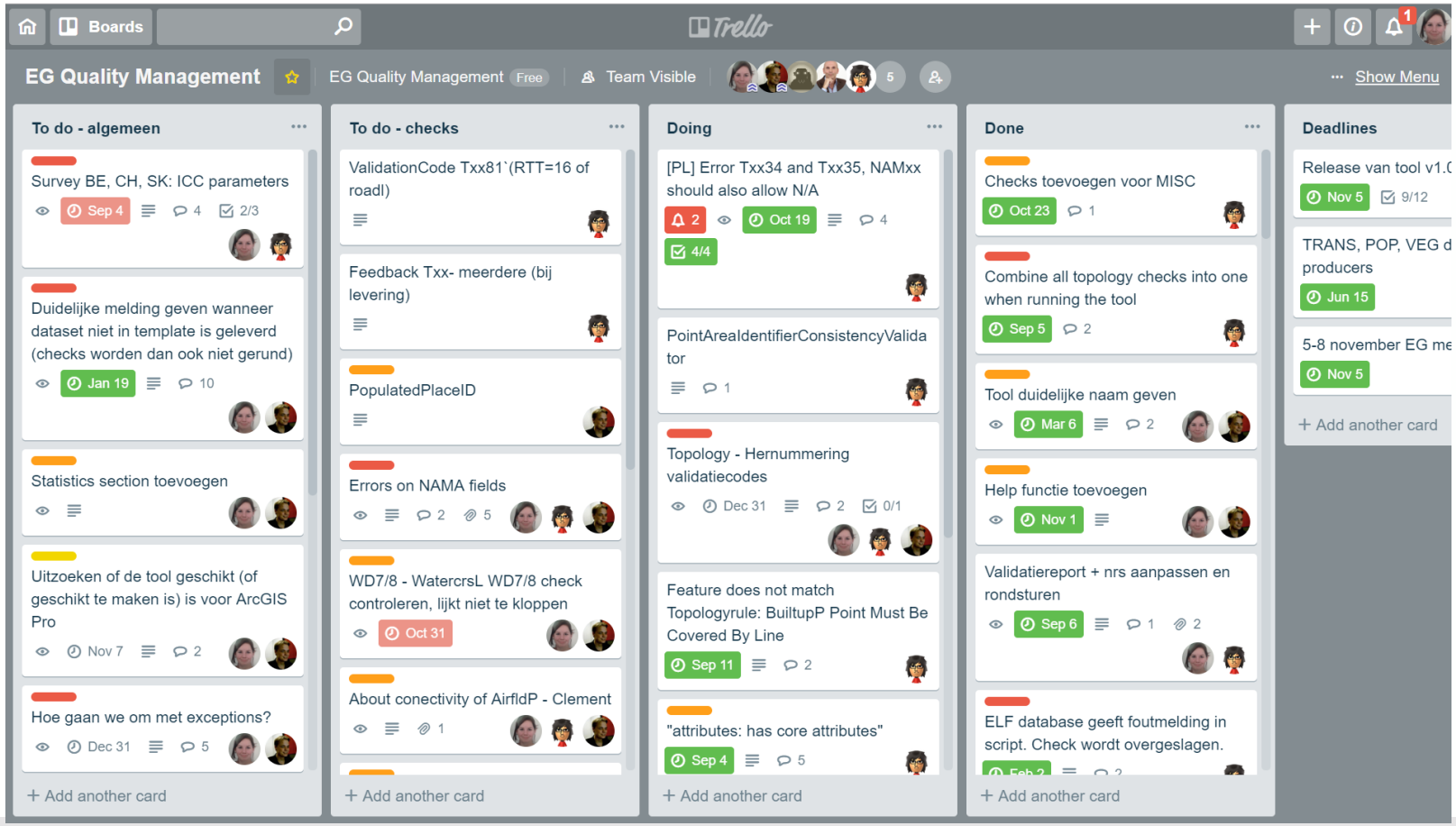
+/- 100 emails (producers/RCs)

Face-to-face at Producer Meeting

ftp-BKG

Thank you so much!!

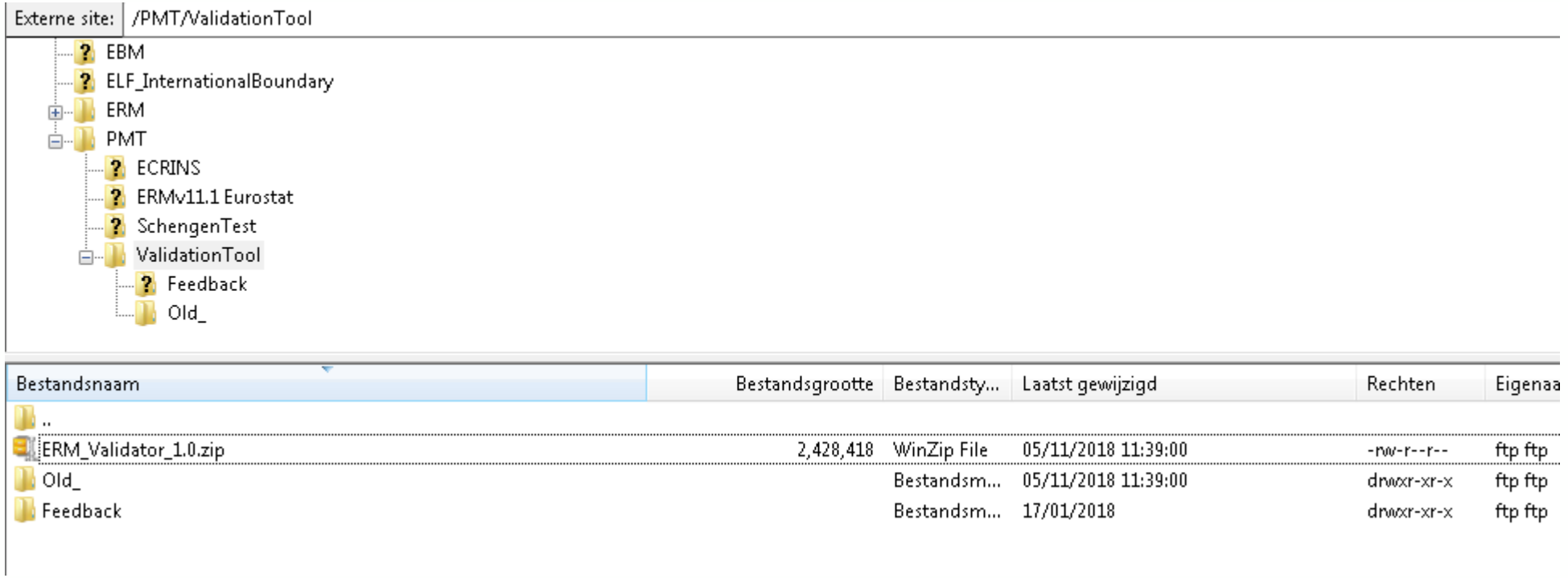
Backlog


Boards
Trello
EG Quality Management
EG Quality Management Free
Team Visible
Show Menu
To do - algemeen
Survey BE, CH, SK: ICC parameters
Sep 4
Duidelijke melding geven wanneer dataset niet in template is geleverd (checks worden dan ook niet gerund)
Jan 19
Statistics section toevoegen
Uitzoeken of de tool geschikt (of geschikt te maken is) is voor ArcGIS Pro
Nov 7
Hoe gaan we om met exceptions?
Dec 31
Add another card
To do - checks
ValidationCode Txx81`(RTT=16 of roadl)
Feedback Txx- meerdere (bij levering)
PopulatedPlaceID
Errors on NAMA fields
WD7/8 - WatercrsL WD7/8 check controleren, lijkt niet te kloppen
Oct 31
About conectivity of AirfldP - Clement
Add another card
Doing
[PL] Error Txx34 and Txx35, NAMxx should also allow N/A
Oct 19
4/4
PointAreaIdentifierConsistencyValidator
Topology - Hernummering validatiecodes
Dec 31
Feature does not match Topologyrule: BuiltupP Point Must Be Covered By Line
Sep 11
"attributes: has core attributes"
Sep 4
Add another card
Done
Checks toevoegen voor MISC
Oct 23
Combine all topology checks into one when running the tool
Sep 5
Tool duidelijke naam geven
Mar 6
Help functie toevoegen
Nov 1
Validatiereport + nrs aanpassen en rondsturen
Sep 6
ELF database geeft foutmelding in script. Check wordt overgeslagen.
Add another card
Deadlines
Release van tool v1.0
Nov 5
9/12
TRANS, POP, VEG d
producers
Jun 15
5-8 november EG me
Nov 5
Add another card

Producers meeting Zagreb – November 2018

Release *ERM Validator 1.0*

BKG-ftp server



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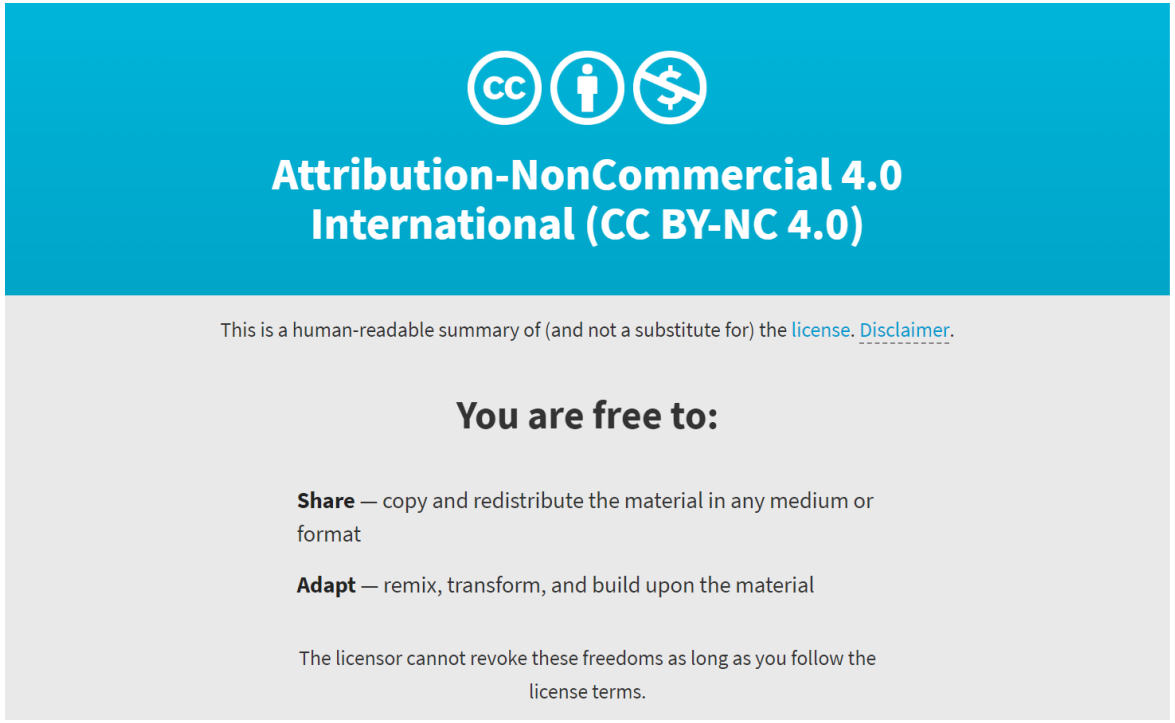
-> https://creativecommens.org/licenses/by-nc/4.0/



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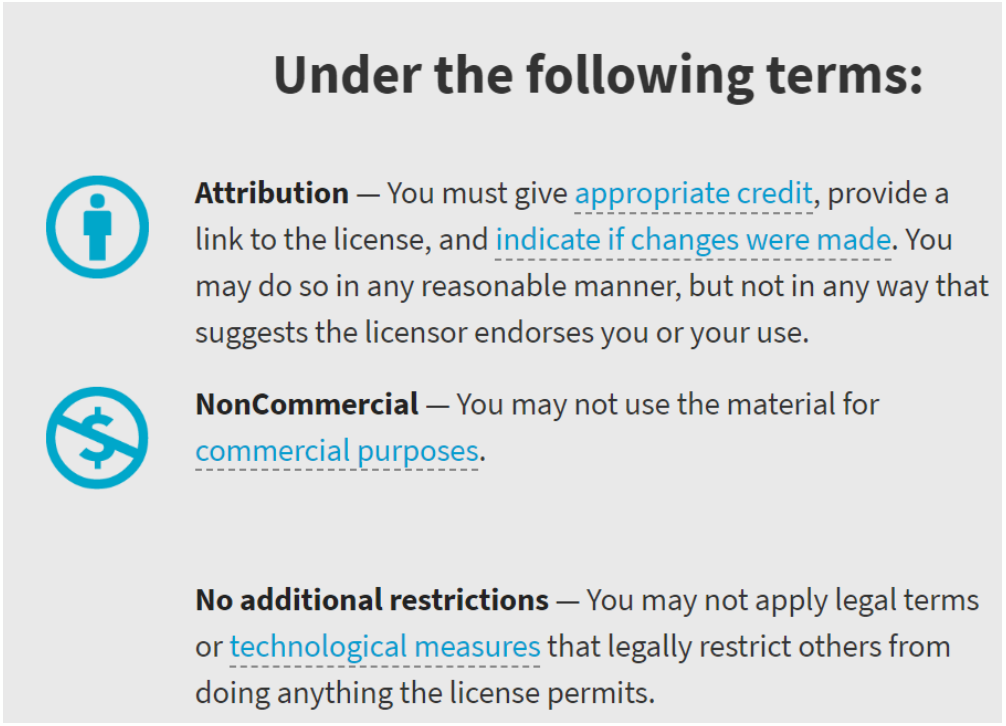

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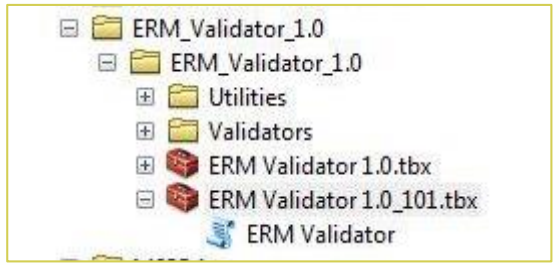
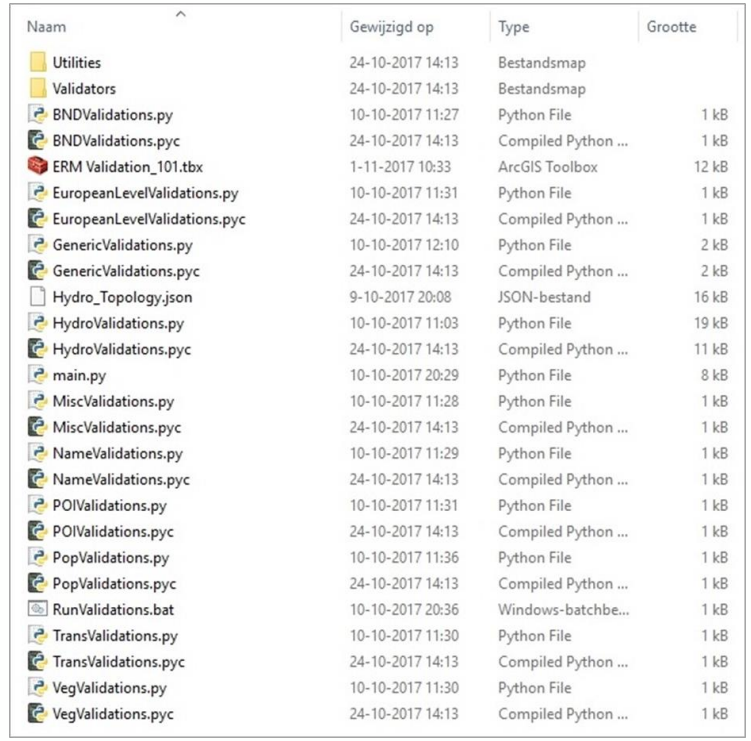
Zip-file

Excel report

generic	test code	test	implemented in the tool?
General Data Delivery	H001	feature classes AQUEDCTL, COASTA, COASTL, DAML, DAMC, LAKERESA, LANDICEA, ISLANDA, SEAA, SEASTRTL, SPRINGP, SPRINGC, SWAMPA, RAPIDSL, RAPIDSC, WATRCRSA, WATRCRSL, WELLP	☑
	H002	coordinate system (GEOGRAPHIC, decimal degrees)	☑
	H003	map extent (-25° < Lambda < 40° and 30° < Phi < 80°)	☑
	H004	mandatory feature classes COASTA, COASTL, DAML, DAMC, LAKERESA, LANDICEA(BJ030), ISLANDA, SEAA, SWAMPA, WATRCRSA, WATRCRSL must have features	☑
	H005	Empty or missing tables	☑
Geometric resolution (Tested in projection Lambert_Conformal_Conic_WGS84)	H006	Valid Geometry	☑
	H007	minimum allowed area size: 60 000m²	☑
	H008	minimum allowed distance between vertices of line and area features: 5m	☑
	H009	minimum allowed length of a line segment: 50m	☑
	H010	statistics of average distance between vertices	☐
Selection criteria (Tested in projection Lambert_Conformal_Conic_WGS84)	H011	The number of LAKERESA less than 400 000m²	☑
	H012	The number of WATRCRSA less than 200 000m²	☑
	H013	The number of SWAMPA, LANDICEA less than 400 000m²	☑
	H014	The number of ISLANDA less than 400 000m²	☑
	H015	The number of dams and locks less than 125m	☑
	H016	The number of dangling AQUEDCTL, WATRCRSL shorter than 1600m	☑
	H017	The number of shoreline construction (SEASTRTL)	☑

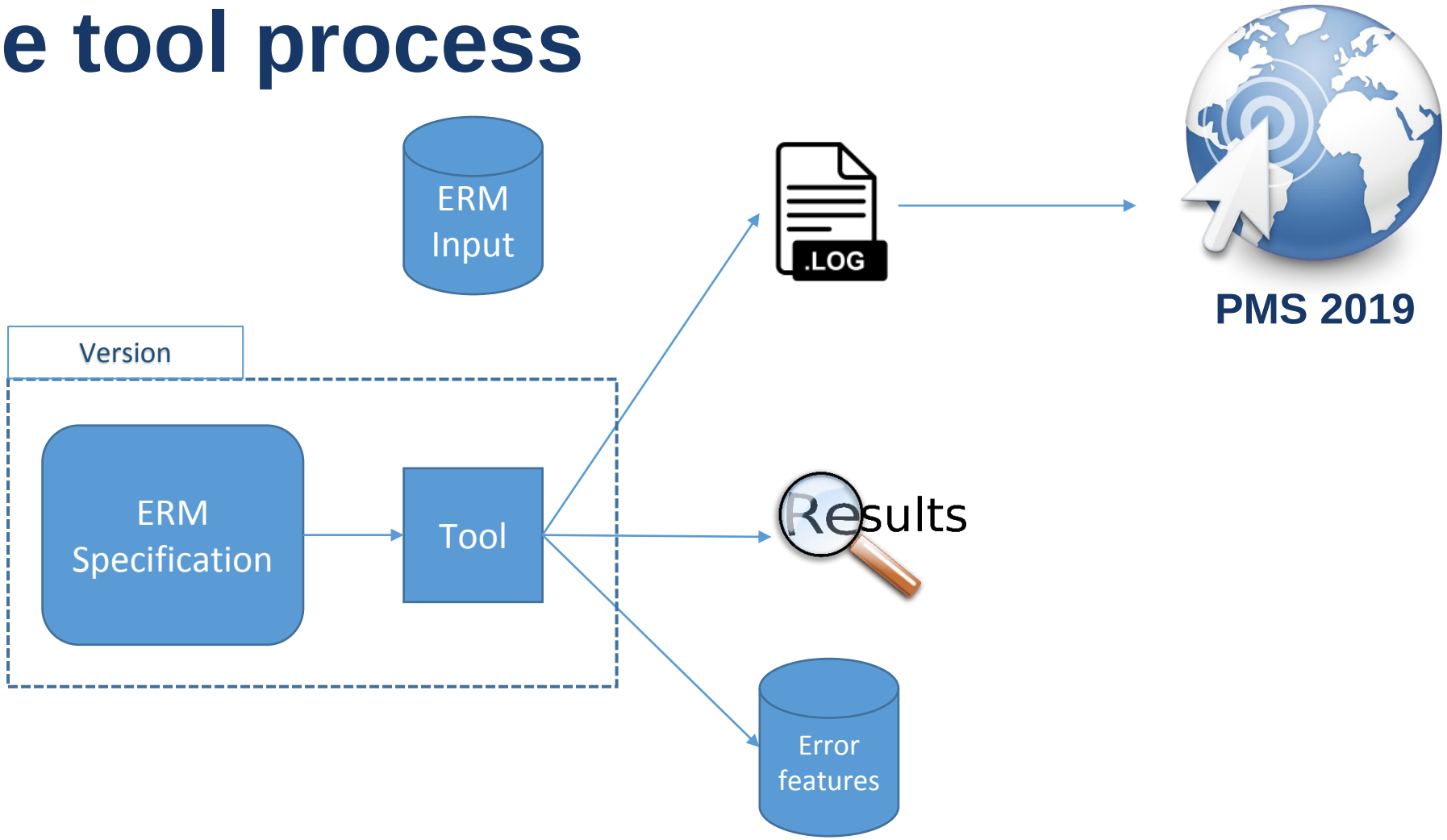
Tool





Naam	Gewijzigd op	Type	Grootte
Utilities	24-10-2017 14:13	Bestandsmap	
Validators	24-10-2017 14:13	Bestandsmap	
BNDValidations.py	10-10-2017 11:27	Python File	1 kB
BNDValidations.pyc	24-10-2017 14:13	Compiled Python ...	1 kB
ERM Validation_101.tbx	1-11-2017 10:33	ArcGIS Toolbox	12 kB
EuropeanLevelValidations.py	10-10-2017 11:31	Python File	1 kB
EuropeanLevelValidations.pyc	24-10-2017 14:13	Compiled Python ...	1 kB
GenericValidations.py	10-10-2017 12:10	Python File	2 kB
GenericValidations.pyc	24-10-2017 14:13	Compiled Python ...	2 kB
Hydro_Topology.json	9-10-2017 20:08	JSON-bestand	16 kB
HydroValidations.py	10-10-2017 11:03	Python File	19 kB
HydroValidations.pyc	24-10-2017 14:13	Compiled Python ...	11 kB
main.py	10-10-2017 20:29	Python File	8 kB
MiscValidations.py	10-10-2017 11:28	Python File	1 kB
MiscValidations.pyc	24-10-2017 14:13	Compiled Python ...	1 kB
NameValidations.py	10-10-2017 11:29	Python File	1 kB
NameValidations.pyc	24-10-2017 14:13	Compiled Python ...	1 kB
POIValidations.py	10-10-2017 11:31	Python File	1 kB
POIValidations.pyc	24-10-2017 14:13	Compiled Python ...	1 kB
PopValidations.py	10-10-2017 11:36	Python File	1 kB
PopValidations.pyc	24-10-2017 14:13	Compiled Python ...	1 kB
RunValidations.bat	10-10-2017 20:36	Windows-batchbe...	1 kB
TransValidations.py	10-10-2017 11:30	Python File	1 kB
TransValidations.pyc	24-10-2017 14:13	Compiled Python ...	1 kB
VegValidations.py	10-10-2017 11:30	Python File	1 kB
VegValidations.pyc	24-10-2017 14:13	Compiled Python ...	1 kB

Scheme tool process



Framework

25 validators

```
projectedDataset = ValidationUtilities.ProjectDataset(params["SourceDatabase"],"EuroRegionalMap",params["ResultDatabase"])

arcpy.env.workspace = projectedDataset#params["SourceDatabase"]
ValidationUtilities.AddOrigIDField()


resultDatabase = params["ResultDatabase"]
resultFolder = params["ResultFolder"]
runTime = params["RunTime"]

results = []
results.extend(FeatureCountValidator.Run("H001","AquedctL",1))
results.extend(AllowedAttributeValidator.Run("H002","WatrcrsA","SN","5020,5030"))
results.extend(AllowedAttributeValidator.Run("H002","WatrcrsA","ICC","'SK'"))
results.extend(AllowedAttributeValidator.Run("H002","SpringP","SWT","999"))
results.extend(AttributeNotNullValidator.Run("H003","WatrcrsA","ICC"))
results.extend(AttributeNotNullValidator.Run("H003","WatrcrsL","SN"))

results.extend(ExtentValidator.Run("H004","WatrcrsA",-25,30,40,80))
results.extend(MinimumAreaValidator.Run("H005","WatrcrsA",60000))
results.extend(MinimumLengthValidator.Run("H006","WatrcrsL",50))
results.extend(MinimumVertexDistanceValidator.Run("H007","WatrcrsA",5))

results.extend(AxisValidator.Run("H008","WatrcrsL","LOC=984",["LakeresA", "WatrcrsA", "SwampA"],mustBeInside=True))
#results.extend(AxisValidator.Run("H008","WatrcrsL","LOC <> 984 AND LOC <> 25 AND LOC <> 40",["LakeresA", "WatrcrsA"],mustBeInside=False))
```

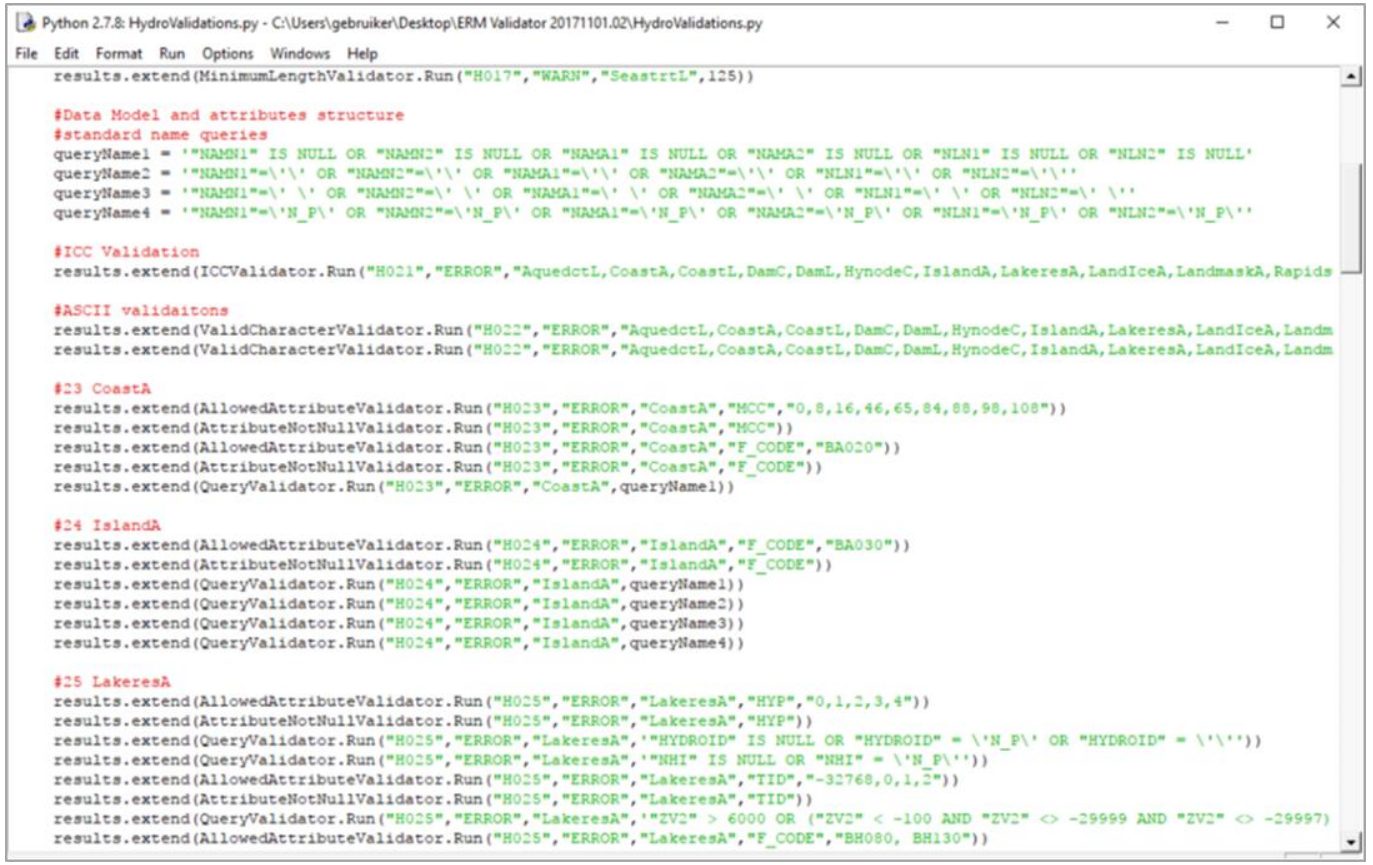
AllowedAttributeValidator.py	11/09/2018 15:10	Python File	2 kB
AttributeNotNullValidator.py	11/09/2018 15:10	Python File	2 kB
AxesValidator.py	11/09/2018 15:10	Python File	4 kB
ClassTableConsistencyValidator.py	11/09/2018 15:10	Python File	3 kB
CompletionRateValidator.py	11/09/2018 15:10	Python File	4 kB
ExtentValidator.py	11/09/2018 15:10	Python File	2 kB
FeatureCountValidator.py	11/09/2018 15:10	Python File	2 kB
GeodatabaseTemplateValidator.py	11/09/2018 15:10	Python File	11 kB
ICCValidator.py	11/09/2018 15:10	Python File	2 kB
MinimumAreaValidator.py	11/09/2018 15:10	Python File	2 kB
MinimumLengthValidator.py	11/09/2018 15:10	Python File	2 kB
MinimumVertexDistanceValidator.py	11/09/2018 15:10	Python File	4 kB
MustBeOutsideValidator.py	11/09/2018 15:10	Python File	4 kB
MustBeSinglePartValidator.py	11/09/2018 15:10	Python File	2 kB
NameFieldValidator.py	11/09/2018 15:10	Python File	3 kB
PointAreaIdentifierConsistencyValidator.py	11/09/2018 15:10	Python File	4 kB
ProximityValidator.py	14/09/2018 10:57	Python File	3 kB
QueryValidator.py	11/09/2018 15:10	Python File	2 kB
RegexValidator.py	11/09/2018 15:10	Python File	3 kB
TableClassConsistencyValidator.py	11/09/2018 15:10	Python File	3 kB
TopologyValidator.py	11/09/2018 15:10	Python File	16 kB
TransSpecificChecks.py	11/09/2018 15:10	Python File	20 kB
ValidationUtilities.py	31/10/2018 11:36	Python File	11 kB
ValidCharacterValidator.py	11/09/2018 15:10	Python File	3 kB
ValidGeometryValidator.py	11/09/2018 15:10	Python File	2 kB

Themes

5 ERM themes:

HYDRO, MISC, POP, TRANS, VEG,

~~POI~~, ~~NAME, BND~~



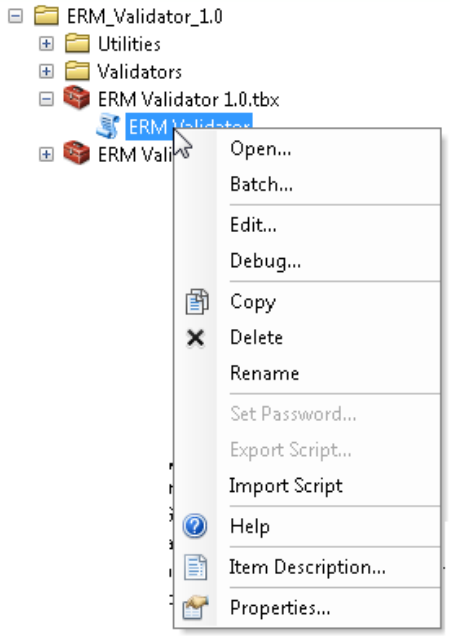
To get started

Download the latest version on BKG ftp server.

Dataset in ERM template format !

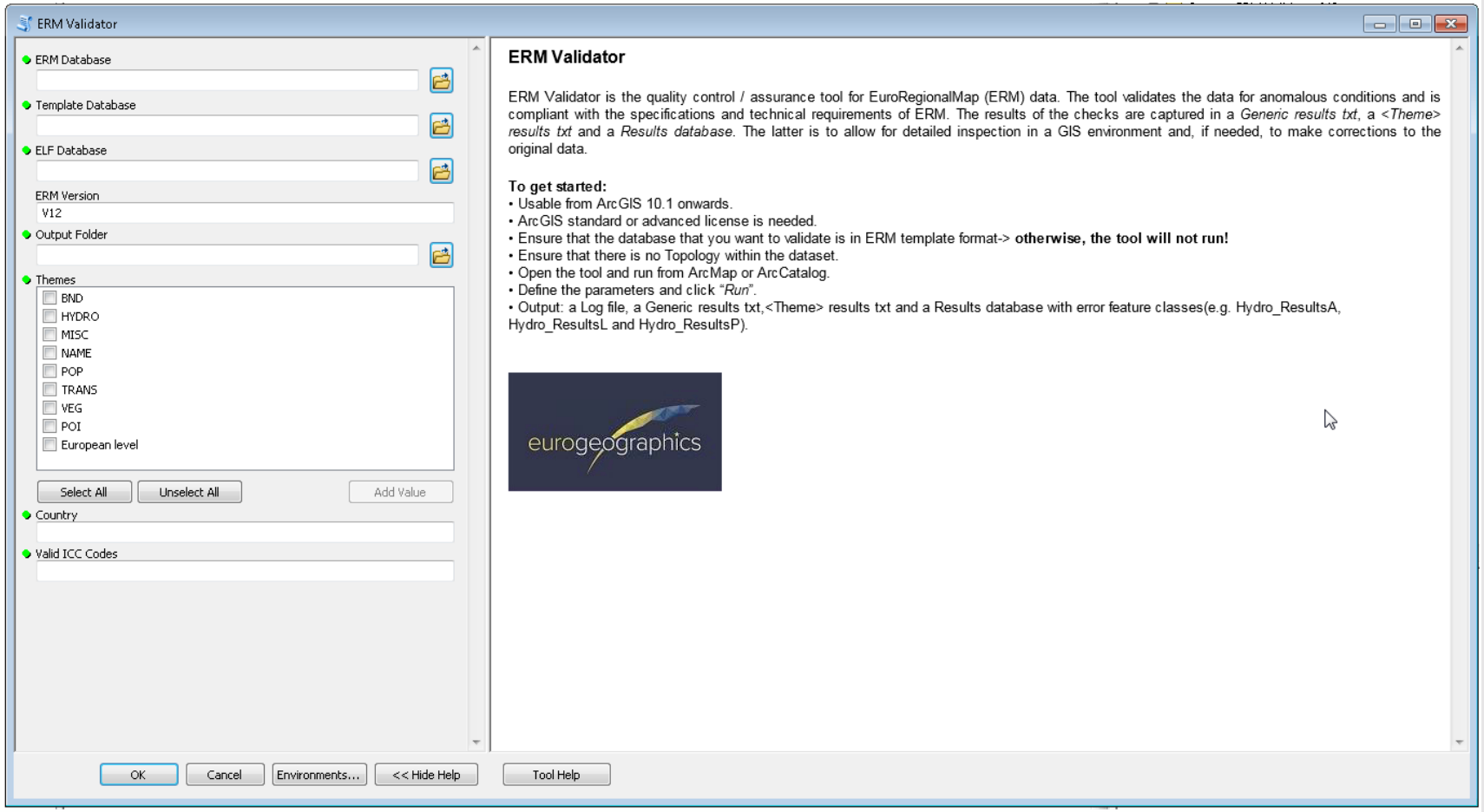
No topology in dataset allowed.

Open the tool from ArcMap or ArcCatalog



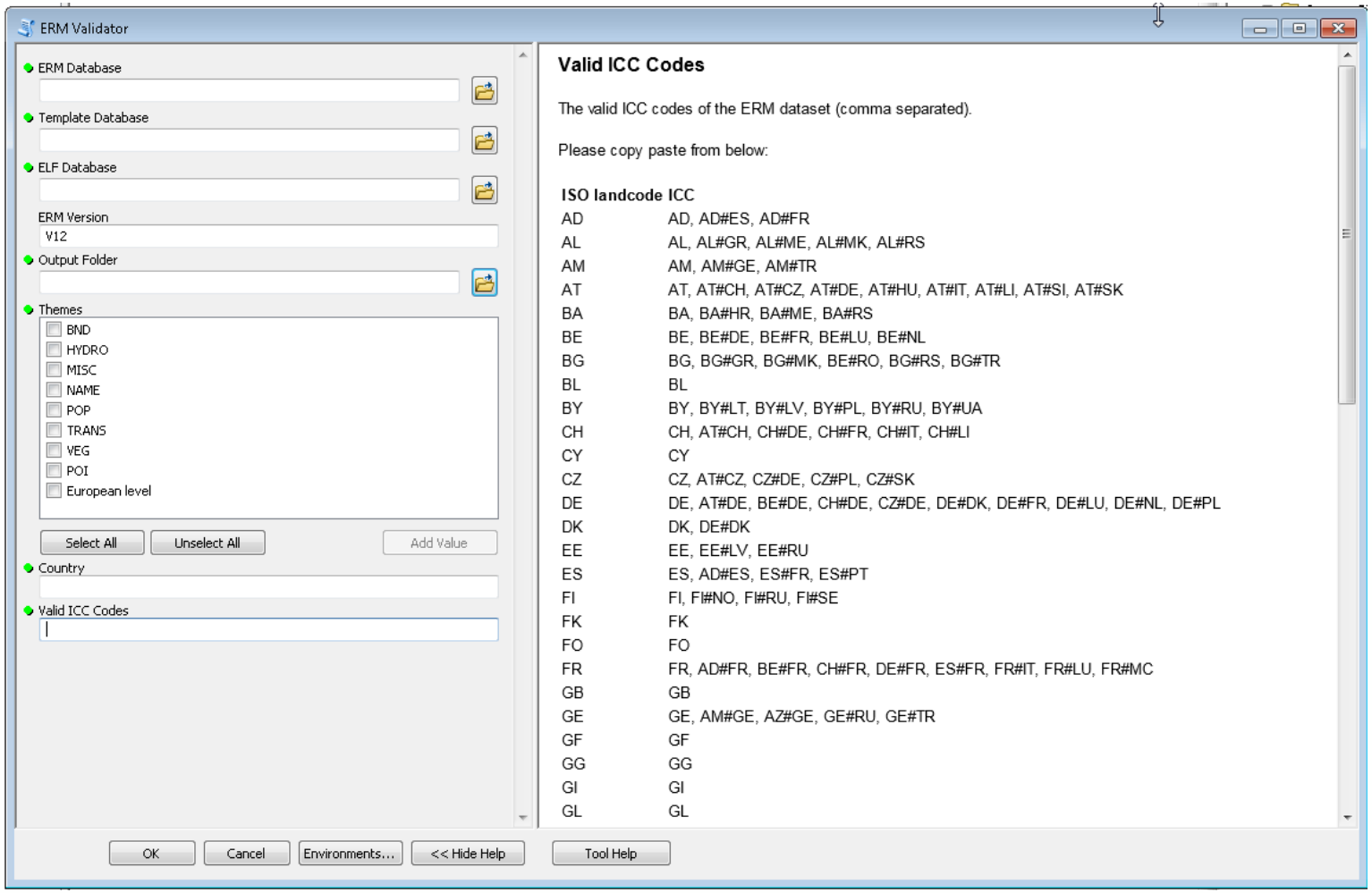
Parameters

Information added to ‘Help’ section



ICC

For now: please copy – paste the valid ICC codes from the ‘Help’ menu



Results

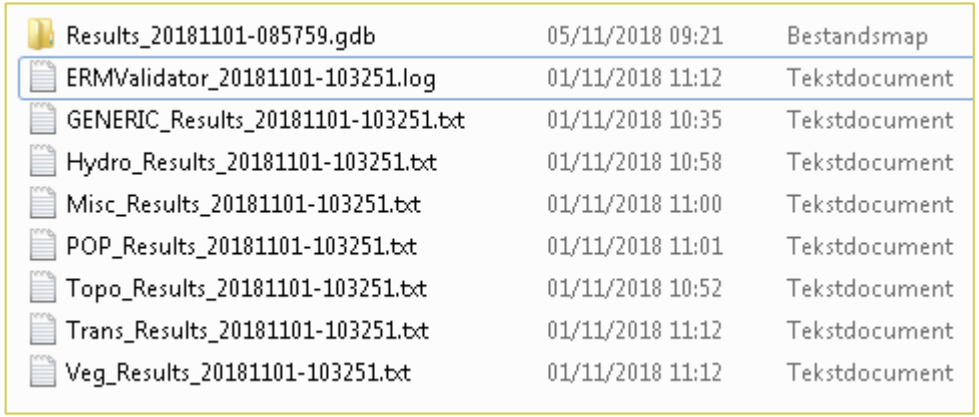
Runtime

Log file

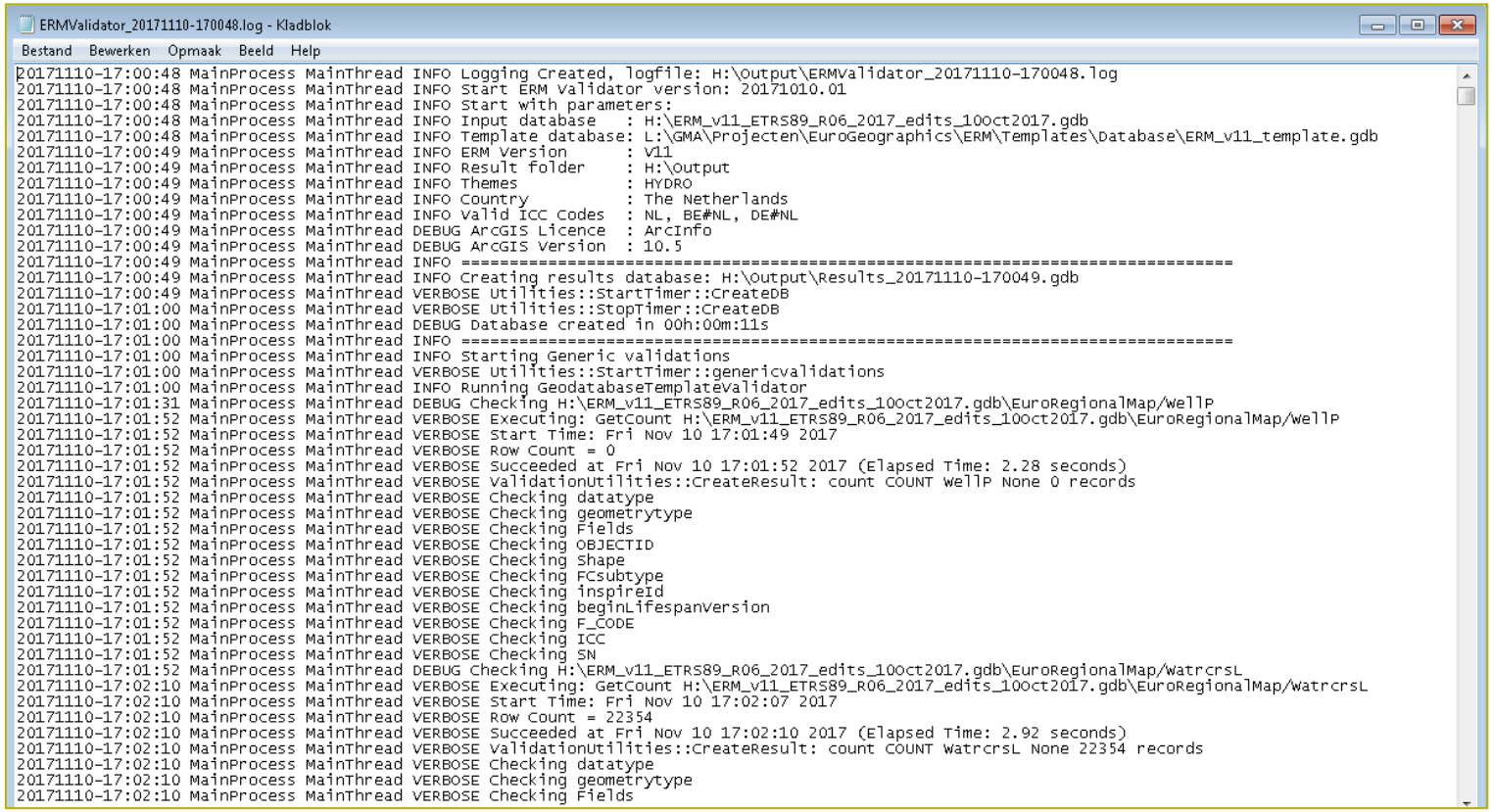
Generic Results txt file

<theme> Results txt file

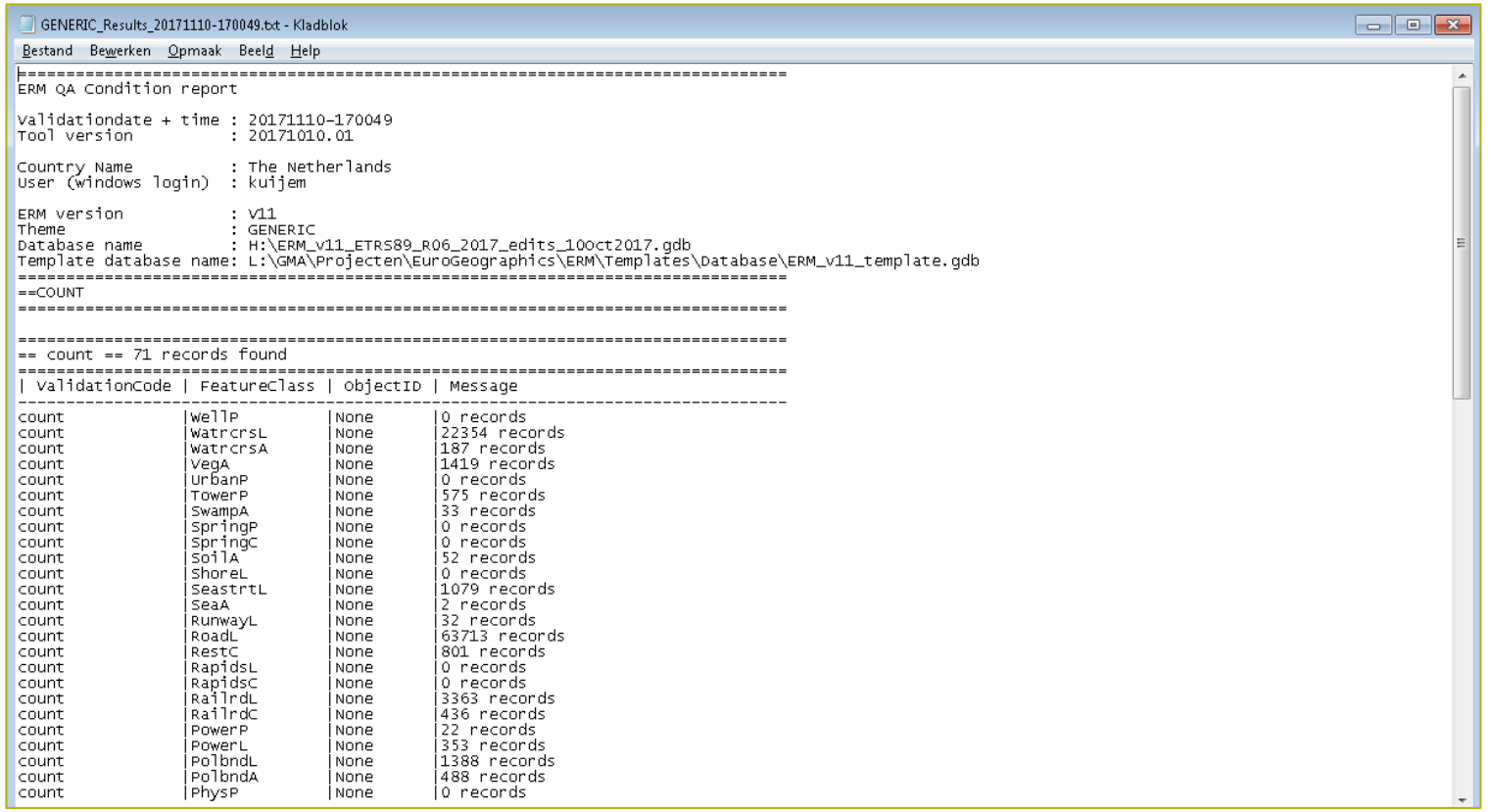
Results database



Log (.txt)



Generic results (.txt)

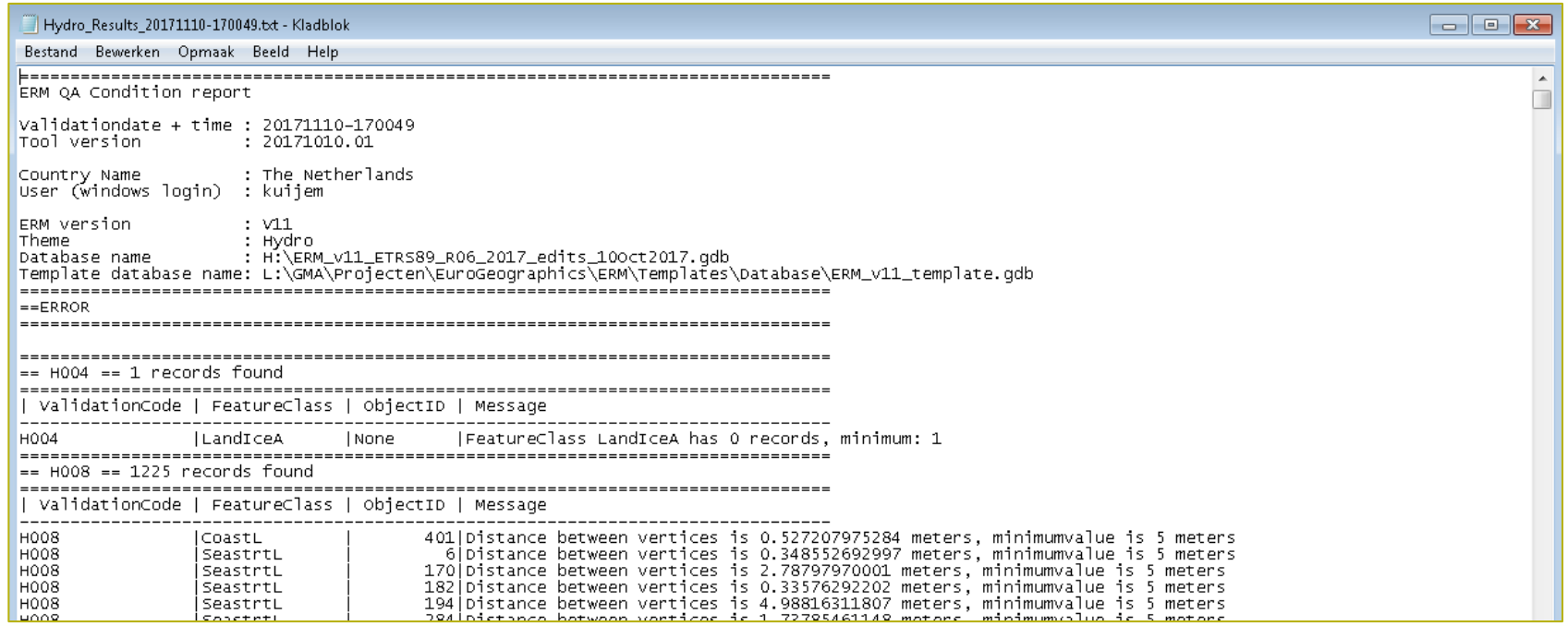


GENERIC_Results_20171110-170049.txt - Kladblok

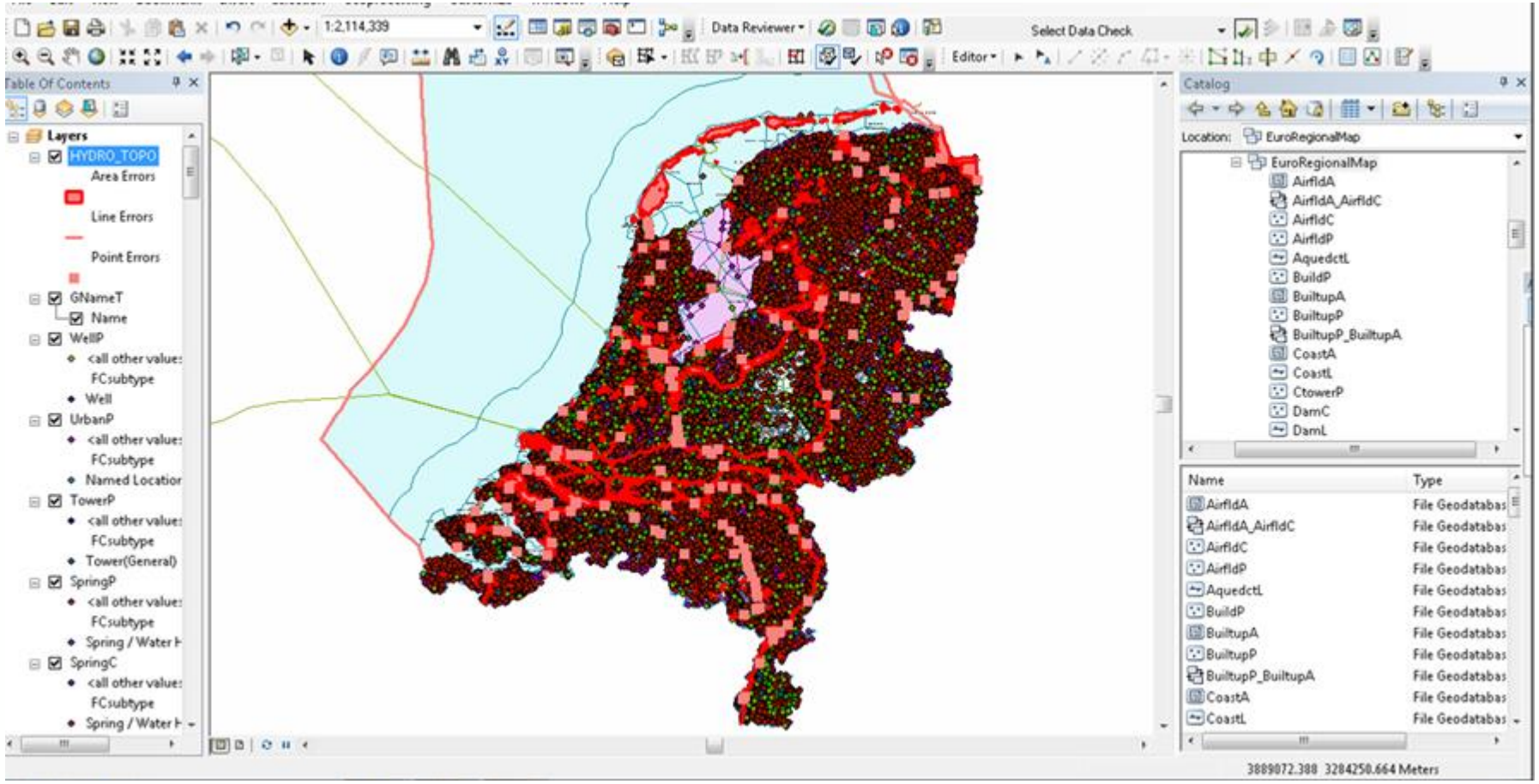
Bestand Bewerken Opmaak Beeld Help

```
================================================================================
ERM QA Condition report

Validationdate + time : 20171110-170049
Tool version          : 20171010.01

Country Name          : The Netherlands
User (windows login)  : kuijem

ERM version           : V11
Theme                 : GENERIC
Database name         : H:\ERM_v11_ETRS89_R06_2017_edits_10Oct2017.gdb
Template database name: L:\GMA\Projecten\EuroGeographics\ERM\Templates\Database\ERM_v11_template.gdb
================================================================================
==COUNT
================================================================================

================================================================================
== count == 71 records found
================================================================================
| ValidationCode | FeatureClass | ObjectID | Message
--------------------------------------------------------------------------------
count            |WellP         |None      |0 records
count            |WatrcrsL      |None      |22354 records
count            |WatrcrsA      |None      |187 records
count            |VegA          |None      |1419 records
count            |UrbanP        |None      |0 records
count            |TowerP        |None      |575 records
count            |SwampA        |None      |33 records
count            |SpringP       |None      |0 records
count            |SpringC       |None      |0 records
count            |SoilA         |None      |52 records
count            |ShoreL        |None      |0 records
count            |SeastrtL      |None      |1079 records
count            |SeaA          |None      |2 records
count            |RunwayL       |None      |32 records
count            |RoadL         |None      |63713 records
count            |RestC         |None      |801 records
count            |RapidsL       |None      |0 records
count            |RapidsC       |None      |0 records
count            |RailrdL       |None      |3363 records
count            |RailrdC       |None      |436 records
count            |PowerP        |None      |22 records
count            |PowerL        |None      |353 records
count            |PolbndL       |None      |1388 records
count            |PolbndA       |None      |488 records
count            |PhysP         |None      |0 records
```


Theme specific results (.txt)



Results database (.gdb)



Error features

- Results_20181101-085759.gdb
  - EuroRegionalMap
    - HYDRO_MISC_POP_TRANS_VEG_TOPO_line
    - HYDRO_MISC_POP_TRANS_VEG_TOPO_point
    - HYDRO_MISC_POP_TRANS_VEG_TOPO_poly
    - Hydro_ResultsA
    - Hydro_ResultsL
    - Hydro_ResultsP
    - IntercC_joinMotorways
    - Misc_ResultsL
    - Misc_ResultsP
    - POP_ResultsA
    - RailrdL_Network
    - RoadL_Network
    - Topo_ResultsA
    - Trans_ResultsL
    - Trans_ResultsP
    - Veg_ResultsA

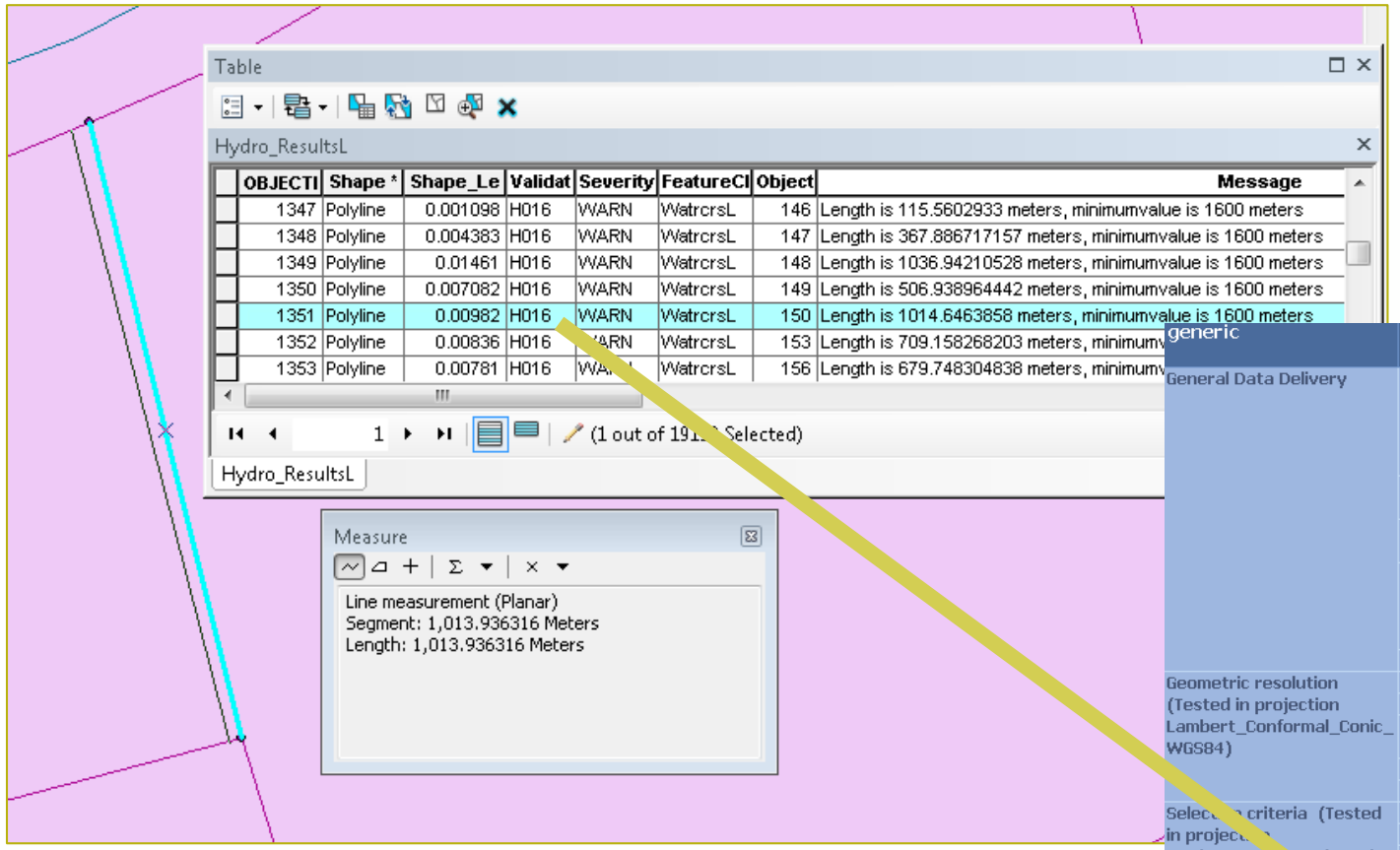
ERM Quality Management

Table

Hydro_ResultsL

OBJECTID *	Shape *	Shape_Length	ValidationCode	Severity	FeatureClassName	Object_ObjectId	Message
1212	Polyline	0.342998	H008	ERROR	WatrcrsL	22453	Distance between vertices is 0.342997740443 meters, minimumvalue is 5 meters
1213	Polyline	0.931634	H008	ERROR	WatrcrsL	22457	Distance between vertices is 0.93163351146 meters, minimumvalue is 5 meters
1214	Polyline	1.280222	H008	ERROR	WatrcrsL	22457	Distance between vertices is 1.28022201212 meters, minimumvalue is 5 meters
1215	Polyline	3.370807	H008	ERROR	WatrcrsL	22463	Distance between vertices is 3.37080711978 meters, minimumvalue is 5 meters
1216	Polyline	1.099411	H008	ERROR	WatrcrsL	22474	Distance between vertices is 1.09941076938 meters, minimumvalue is 5 meters
1217	Polyline	4.347994	H008	ERROR	WatrcrsL	22475	Distance between vertices is 4.34799369066 meters, minimumvalue is 5 meters
1218	Polyline	3.84941	H008	ERROR	WatrcrsL	22475	Distance between vertices is 3.84940964807 meters, minimumvalue is 5 meters
1219	Polyline	0.756976	H008	ERROR	WatrcrsL	22475	Distance between vertices is 0.756975672256 meters, minimumvalue is 5 meters
1220	Polyline	2.167425	H008	ERROR	WatrcrsL	22475	Distance between vertices is 2.16742485452 meters, minimumvalue is 5 meters
1221	Polyline	4.789757	H008	ERROR	WatrcrsL	22475	Distance between vertices is 4.78975682154 meters, minimumvalue is 5 meters
1222	Polyline	1.232783	H008	ERROR	WatrcrsL	22475	Distance between vertices is 1.23278297059 meters, minimumvalue is 5 meters
1223	Polyline	2.63628	H008	ERROR	WatrcrsL	22475	Distance between vertices is 2.6362795167 meters, minimumvalue is 5 meters
1224	Polyline	0.604365	H008	ERROR	WatrcrsL	22478	Distance between vertices is 0.604364864321 meters, minimumvalue is 5 meters
1225	Polyline	4.678775	H008	ERROR	WatrcrsL	22480	Distance between vertices is 4.67877528976 meters, minimumvalue is 5 meters
1226	Polyline	0.00032	H009	WARN	SeastrtL	53	Length is 23.5232607198 meters, minimumvalue is 50 meters
1227	Polyline	0.000287	H009	WARN	WatrcrsL	11325	Length is 31.8671387887 meters, minimumvalue is 50 meters
1228	Polyline	0.000973	H015	WARN	DamL	4	Length is 107.482305827 meters, minimumvalue is 125 meters
1229	Polyline	0.004717	H016	WARN	AquedctL	1	Length is 341.378883927 meters, minimumvalue is 1600 meters
1230	Polyline	0.003542	H016	WARN	AquedctL	2	Length is 294.724644768 meters, minimumvalue is 1600 meters
1231	Polyline	0.012312	H016	WARN	AquedctL	3	Length is 851.211175742 meters, minimumvalue is 1600 meters
1232	Polyline	0.0046	H016	WARN	AquedctL	4	Length is 321.482013634 meters, minimumvalue is 1600 meters
1233	Polyline	0.004072	H016	WARN	AquedctL	5	Length is 364.465483081 meters, minimumvalue is 1600 meters
1234	Polyline	0.013864	H016	WARN	WatrcrsL	4	Length is 1480.56256671 meters, minimumvalue is 1600 meters
1235	Polyline	0.010273	H016	WARN	WatrcrsL	6	Length is 730.53615716 meters, minimumvalue is 1600 meters
1236	Polyline	0.01463	H016	WARN	WatrcrsL	7	Length is 1033.21925549 meters, minimumvalue is 1600 meters
1237	Polyline	0.002811	H016	WARN	WatrcrsL	9	Length is 215.457326836 meters, minimumvalue is 1600 meters

ERM Quality Management



generic	test code	test	implemented in the tool?
General Data Delivery	H001	feature classes AQUEDCTL, COASTA, COASTL, DAML, DAMC, LAKERESA, LANDICEA, ISLANDA, SEAA, SEASTRTL, SPRINGP, SPRINGC, SWAMPA, RAPIDSL, RAPIDSC, WATRCRSA, WATRCRSL, WELLP	☑
	H002	coordinate system (GEOGRAPHIC, decimal degrees)	☑
	H003	map extent (-25° < Lambda < 40° and 30° < Phi < 80°)	☑
	H004	mandatory feature classes COASTA, COASTL, DAML, DAMC, LAKERESA, LANDICEA(BJ030), ISLANDA, SEAA, SWAMPA, WATRCRSA, WATRCRSL must have features	☑
	H005	Empty or missing tables	☑
Geometric resolution (Tested in projection Lambert_Conformal_Conic_ WGS84)	H006	Valid Geometry	☑
	H007	minimum allowed area size: 60 000m²	☑
	H008	minimum allowed distance between vertices of line and area features: 5m	☑
	H009	minimum allowed length of a line segment: 50m	☑
	H010	statistics of average distance between vertices	☐
Selec criteria (Tested in projec Lambert_Co mal_Conic_ WGS84)	H011	The number of LAKERESA less than 400 000m²	☑
	H012	The number of WATRCRSA less than 200 000m²	☑
	H013	The number of SWAMPA, LANDICEA less than 400 000m²	☑
	H014	The number of ISLANDA less than 400 000m²	☑
	H015	The number of dams and locks less than 125m	☑
	H016	The number of dangling AQUEDCTL, WATRCRSL shorter than 1600m	☑
	H017	The number of shoreline construction (SEASTRTL)	☑

Next steps

- Add checks that are not yet implemented (validation report)
- Integrate consistency checks from BKG – EBM/ERM
- Send overview of feedback received
- Modify user interface based on feedback received
- Add statistics session
- False positives?
- PMS results?
- How to handle with exceptions?
- ArcGIS Pro?

Next steps

- New version of ERM Validation tool in beginning of next production year
- More feedback is very welcome!

Question to the producers….

Who uses or is going to use ArcGIS Pro for ERM production?

Thank you for your attention!

Contact:

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