



**Rules-based  
spatial data quality  
engineering:**

**Implementation of  
data quality  
standards**

Seb Lessware, 1Spatial



# Data Quality Engineering

- Define Quality
- Measure Quality
- Improve Quality
- Maintain Quality
- Master Data Management





## Define Quality

- Real world issues via consistency checks:
  - Meets schema specifications
  - Internal consistency
  - External consistency





## Define Quality

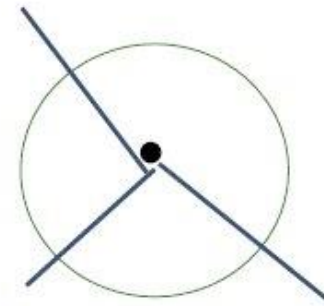
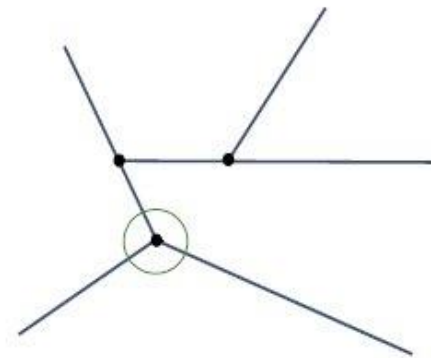
- ISO, OGC, INSPIRE...
- Product Specs (schema, accuracy, precision, ranges, codelists)
- Local Semantics
- Mandatory and Optional rules





## Measure Quality

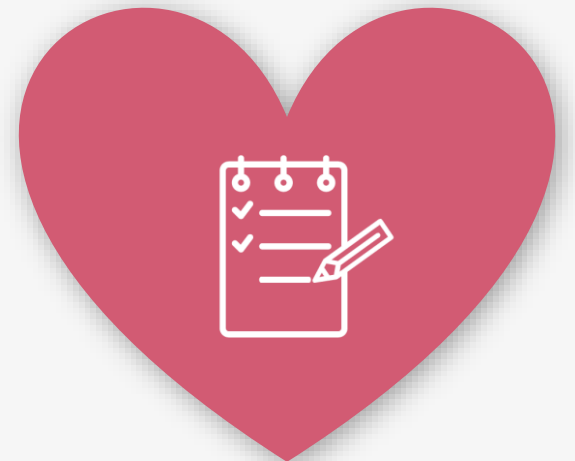
- Schema, codelists, ranges
- Geometry: Type, Validity
- Positional Accuracy
- Topology
- Semantics (Classification, meaning)





## Measure Quality

- Using **Rules**, you can check your data to ensure it **conforms to the right specifications**
- No-code business **rules catalogue**: repeatable, searchable and shareable (No Python rats' nests)
- Issues are **reported clearly** so you can take the required action.
- Quality can be **quantitatively measured** and tracked as metadata





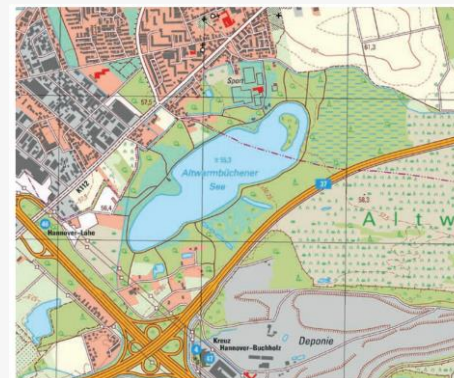
## Improve Quality: Fix

- Manual
- Auto: Fix Geometry Errors (e.g. spikes) and Topology Errors (e.g. overlaps, gaps)
- Auto: Fix Attribute consistency
- Auto: Fix Semantic (classification) errors
- Auto: Positional Accuracy Shifts

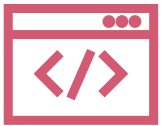


## Improve Quality: Infer New

- Polygonise, Restructure
- Infer missing features
- Generalise small scale from large scale

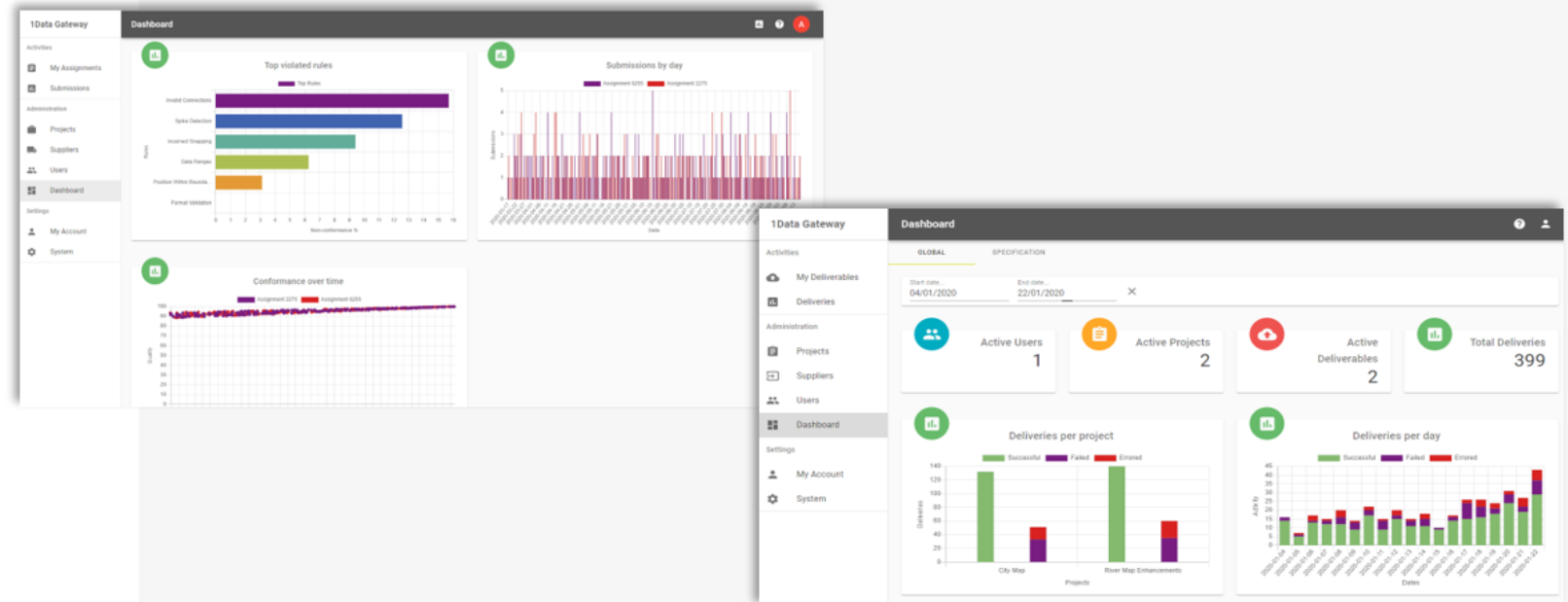






# Maintain (Repeat)

- Re-run rules
- Automatically for changes or new imports or periodic whole data
- Record results as metadata
- Track trends
- Independent of other tools



# Trends

**Data Providers:** OS Ireland, OS N.Ireland, OS GB, Danish Geodata Agency, Defence, German States

- ▶ 3D checks
- ▶ Check and Integrate: Sensed/Automated/AI processed data
- ▶ Accept and Integrate: External suppliers
- ▶ Master Data Management, Lifecycle

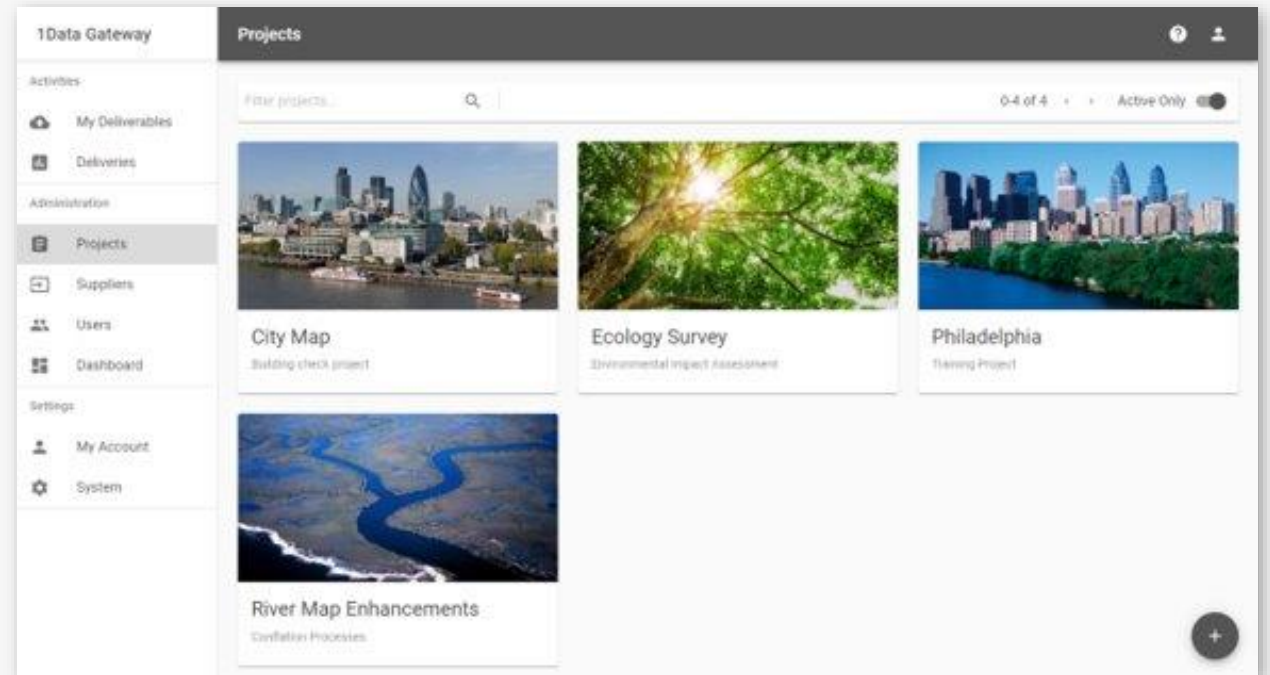


# Trends

## Asset Managers/Data Aggregators:

Utilities, Environment Agency (UK),  
Rail (HS2, UK), US Census Bureau,  
National Underground Asset Register (NUAR)

- ▶ Data Aggregation Portals
  - ▶ Check before you load
  - ▶ Formats, Schemas, SRS, Location
- ▶ File Management
- ▶ Digital Twins: Lifecycle
- ▶ Quality data for AI processes



# Rules Camp: At the stand outside

- Speak to us (Charley Glynn, Seb Lessware, Dan Warner)
- Try the 1Integrate Rules Engine
- See examples
- Share Ideas, Requirements



7th Annual

**SMARTER** DATA  
SMARTER **WORLD**

2023

2nd November, London