INSPIRE Implementation Stories and Data Harmonization Solution Patterns at Land Management Agencies Across Europe

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Agenda

FME & INSPIRE
- Consuming, Writing & Validation

Implementation Stories
- Swedish EPA and Transportation Authority
- UK Land Registry
- Conterra
  - Sax4INSPIRE
  - IMIDA
FME and INSPIRE

- **Consume INSPIRE** – Leverage existing INSPIRE content and services
- **Schema Transformation*** – the hard problem that FME makes easier and automates. (e.g. conterra’s ISP for FME)
- **Publishing INSPIRE** – INSPIRE writer and web service support – easily meet INSPIRE requirements - no code!
- **Complex Geometries** – FME’s powerful data modeling supports raster coverages, surfaces, 3D, point clouds, needed for Annex II, III
- **Web Services** - workspace as web service broker via FMEServer**

CONNECT. TRANSFORM. AUTOMATE.
Schema Based Writing

Makes GML writing EASY

Map directly to destination feature type fields, like other formats

Multiple, complex geometry support

XMLTemplateter not needed for GML!
INSPIRE GML Writing
Example INSPIRE Solutions by FME Partners

- con terra (> 50 implementations across Europe)
- Metria, Sweden (Protected Areas; Transportation)
- 1-Spatial; Dotted Eyes, UK
- AED Sicad (NAS to INSPIRE conversions)
- Spatialworld, Finland (National Land Survey)
- Veremes, France (INSPIRE writer testing)
- Vicrea, NL
- GIM, BE
- SWECO, Denmark, GST
Example INSPIRE Solutions: Metria

INSPIRE Projects in Sweden by Metria

- **Swedish EPA**: Protected Sites Harmonization
  - Data integration from HelComm, Natura and EPA

- **Swedish Transportation and Administration**
  - Data Upload, QA, Services and Download

- **Archeological and environmental costing analysis**
  - Invoke Services
  - Swedish Transportation, EPA, Heritage Board

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Swedish Protected Sites Update

- Swedish Environmental Protection Agency
  - Production system for download services following on the successful pilot last year.
  - Metria hosts the protected sites view services.
  - Metria performs schema mapping for five protected sites source datasets to INSPIRE using FME Server.
  - KommunML support
SE Protected Sites KML
Swedish environmental agency
Environmental monitoring data

- Challenges:
  - Distributed data collection
  - Time from data delivery to data publication
  - Data quality
  - Metadata
In this example we are updating an existing dataset where we already have a metadata document.
Solution – QC service

QC-report

Metadata XML

Metadata portal

Dataset GML

INSPIRE WFS/SOS

QC-service on FME server

CONNECT. TRANSFORM. AUTOMATE.
QC of Completeness

CONNECT. TRANSFORM. AUTOMATE.
Swedish Transportation Administration: Validation

- System supports propagation of municipal and regional road data to national dataset
- Data model transformation and QC to translate 2.5 million road links into NVDB
- Transform between NVDB and INSPIRE
- Workflows automated by FME and FME Server
- Validation key to support upload services
Swedish Transportation Administration: Invoked Services

- Supports estimation of new road costs related to archeological and protected sites
- Site potential using terrain model and historic coast lines
- WFS Sources:
  - The Swedish Transport Administration roads
  - Swedish EPA Protected sites
  - Swedish National Heritage Board Archaeological findings
- Result: PDF showing site potential
Reading Land Registry INSPIRE Data
Rip, Zip & Ship
INSPIRE Index Polygons

- INSPIRE compliant
- A sub-set of Land Registry Index Polygons representing freehold land and property registered in England and Wales.
- A unique identification number (Land Registry-INSPIRE ID) which can be used to obtain the title registration and plan information for each polygon.
- 348 Areas
- 21+ Million Polygons
- 4+ GB
Project Background

- Land Registry Index Polygons are updated monthly.
- An automated process to download files.
- Associate with the nearest post code centroid.
- Load into an Oracle database.
Process – Get Source Datasets

- The Download site provides a link to a zip file for each area.
- VBS script run via IE11 is used to scrape the download website and ‘rip’ the url for each zip file.
- A text file is created containing with url for each zip file.
Process – Read INSPIRE Polygons

- Text file FME input.
- Inline reading using FeatureReader:
  - INSPIRE GML format
  - Download
  - Un-zip
  - Read
- Manage Geometry
Process – Read OS Code Point Open

• Read Code Point dataset from Oracle.
• Transform to spatial data and re-structure attributes.
Process – Merge & Write

- Conflate datasets and add post code to index polygon
- Write to Oracle database
Conclusions

- Easy to set-up a complex process.
- Integrate with existing processes.
- INSPIRE framework allows further expansion with minimal extra development work.
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The project in a nutshell

- Name: sax4INSPIRE
- Client: Saxon State Spatial Data and Land Survey Corporation (GeoSN)
- Goal: Harmonize data and provide services the spatial data infrastructure (SDI) and INSPIRE
  > Geoportal, Search, Map Viewer, View, Download, Transformation and Gazetteer services, Security and Access control, Monitoring and Logging, Spatial ETL, Spatial data storage, Update Cycle
Architecture

- Test and Productive Environments (main components)
  - ArcGIS for Server with ArcGIS for INSPIRE SOE
  - FME with INSPIRE Solution Pack
  - FME Server
  - securityManager / terraCatalog / …
- Documentation: Redmine
sax4INSPIRE

- Conceptual Mapping
  - 7 Themes from Annex 1 & 2 & 3
  - 15+ datasets
- ETL Processing
  - 20+ Workspaces + FME Server Schedules
- Create & Publish INSPIRE View and Download Services + ATOM Feeds
- Develop and Implement Update process
Update plan
## Schedules

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### PythonCaller_4
- Output
- Logger
- Logged

Objekte umbenennen und alte in _v_ umbenennen.
Outcome

- Services are available
- Data is frequently updated (frequency between 1 week and 6 months)
- All processes are documented
Outlook

- Annex 2 & 3 Themes are scheduled for this summer
- Buildings
- Elevation
- Orthoimagery
- …
INSPIRE Compliant Provision of Metrological Sensor Data at IMIDA Murcia, Spain
Client: IMIDA

- The Institute of Agricultural and Food Research and Development of Murcia
  - Is an autonomous, state-funded research institute
  - Is situated in La Alberca (Murcia), comes under the aegis of the Regional Department of Agriculture and Water, and carries out research into agriculture, forestry, food, fishing, shell-fish culture and marine aquaculture in general.
SIAM (Agrarian Information System of Murcia)

- 45 automatic stations in irrigated areas
  - 30 IMIDA, 15 Ministry de Agriculture
- Estimate the reference evapotranspiration (ET0) and irrigation needs of crops
  - 10 minutes observation intervals
  - Temperature
  - Relative humidity
  - Global radiation incident wind speed and direction
  - Dew point temperature
  - Vapor pressure deficit and precipitation
Project outline

- Team:
  - con terra: FME & INSPIRE
  - 52North: SOS and O&M
- Volume: 2 weeks
Project Activities

- Conceptual Mapping of INSPIRE and Observations Data
- ETL Processing
- INSPIRE ATOM Feeds & SOS services + client for observations
SOS & INSPIRE

- Already available: Guidelines for the use of Observations & Measurements and Sensor Web Enablement-related standards in INSPIRE Annex II and III data specification development
- Does not define the interface
- Proposal for an update of the Technical Guidance document for INSPIRE Download services (52° North)
ETL Processing

- FME & INSPIRE Solution Pack for FME
  - Transform Stations data (location, capabilities) to INSPIRE Environmental Monitoring Facilities Data (GML)
Feed SOS with stations and observations data FME using HTTP InsertSensor calls for the stations.

Directly access SOS DB (PostGIS) with FME for Observations 45 Mio Values.

Set up JavaScript Client for SOS 42 SOS services + client for observations
INSPIRE ATOM Feeds
Lessons Learned / Outlook

- FME Processes can be updated and extended with further themes/ phenomena
- FME processes can be automated (actualization of data)
- SOS provides OGC standardized interface for observation data
  - direct and flexible access to observation data of the weather stations with SOS clients
  - significant benefit in the use of sensor data
- Add real time observations to SOS (with FME Server)
FME and INSPIRE

FME simplifies the process of achieving EU INSPIRE* compliance - without any coding - through its abilities to:

- **Read INSPIRE** data using a number of readers, including the INSPIRE GML Reader
- **Prepare data** for contribution to INSPIRE through data transformation and schema mapping
- **Write INSPIRE compliant data** using the INSPIRE GML Writer, with built-in application schemas and complex geometry support
- **Validate data** to ensure compliance with XML, OGC and INSPIRE standards
- **Share INSPIRE data** using FME Server’s web services
FME Bridges the Gap

Proprietary

Open Standards

CONNECT. TRANSFORM. AUTOMATE.
FME: The tool for INSPIRE GML and Services

**FME:** A complete toolset for creating, transforming, distributing and using INSPIRE data and services.

No coding! No XSLT!
INSPIRE Implementations: Lessons Learned

Projects demonstrate harmonization principles:
- assembly, transformation, validation and publication

Integration between proprietary and open standards
- especially as deployment moves to regional and local agencies

Increased focus on consuming INSPIRE services – need to provide value to stakeholders

Need for spatial data services that support common client data streams
- PDF, KML, HTML etc

Seeing options for more simplistic / pragmatic architectures
- (atom feeds rather than WFS)

Capacity for automation quality assurance and scalability

Need to plan for communication of INSPIRE requirements and to address stakeholder concerns: human factor > any technical challenge
Thank You!

- Questions?
- For more information:
  - Sören Dupke s.dupke@conterra.de
  - dean.hintz@safe.com
  - FMEpedia:
    - INSPIRE GML Tutorial
FME INSPIRE Tutorial:
https://knowledge.safe.com/articles/How_To/INSPIRE