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

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FME™
WORLD TOUR
2015

Agenda

FME & INSPIRE

- Consuming, Writing & Validation

Implementation Stories

- Swedish EPA and Transportation Authority
- UK Land Registry
- Conterra
  - Sax4INSPIRE
  - IMIDA

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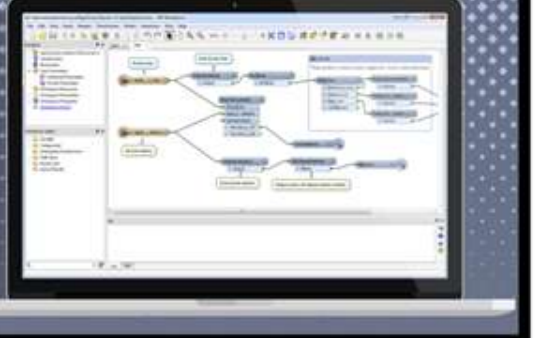
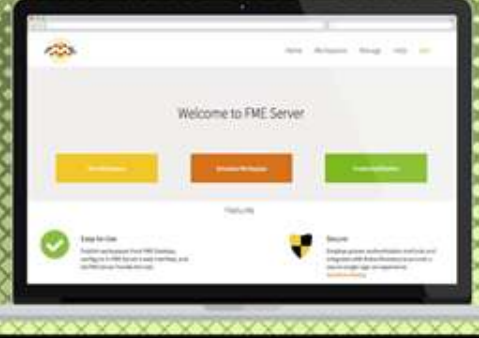
FME™

3 CORE PRODUCTS

DESKTOP



SERVER



CLOUD

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.

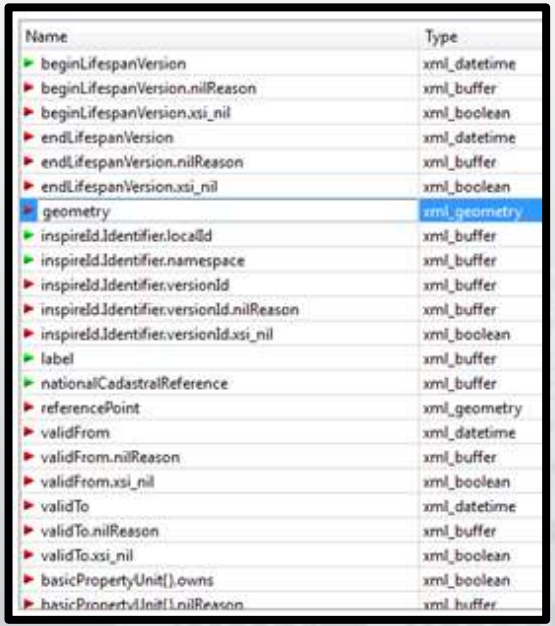
Schema Based Writing

Makes GML writing EASY

Map directly to destination feature type fields, like other formats

Multiple, complex geometry support

XMLTemplater not needed for GML!



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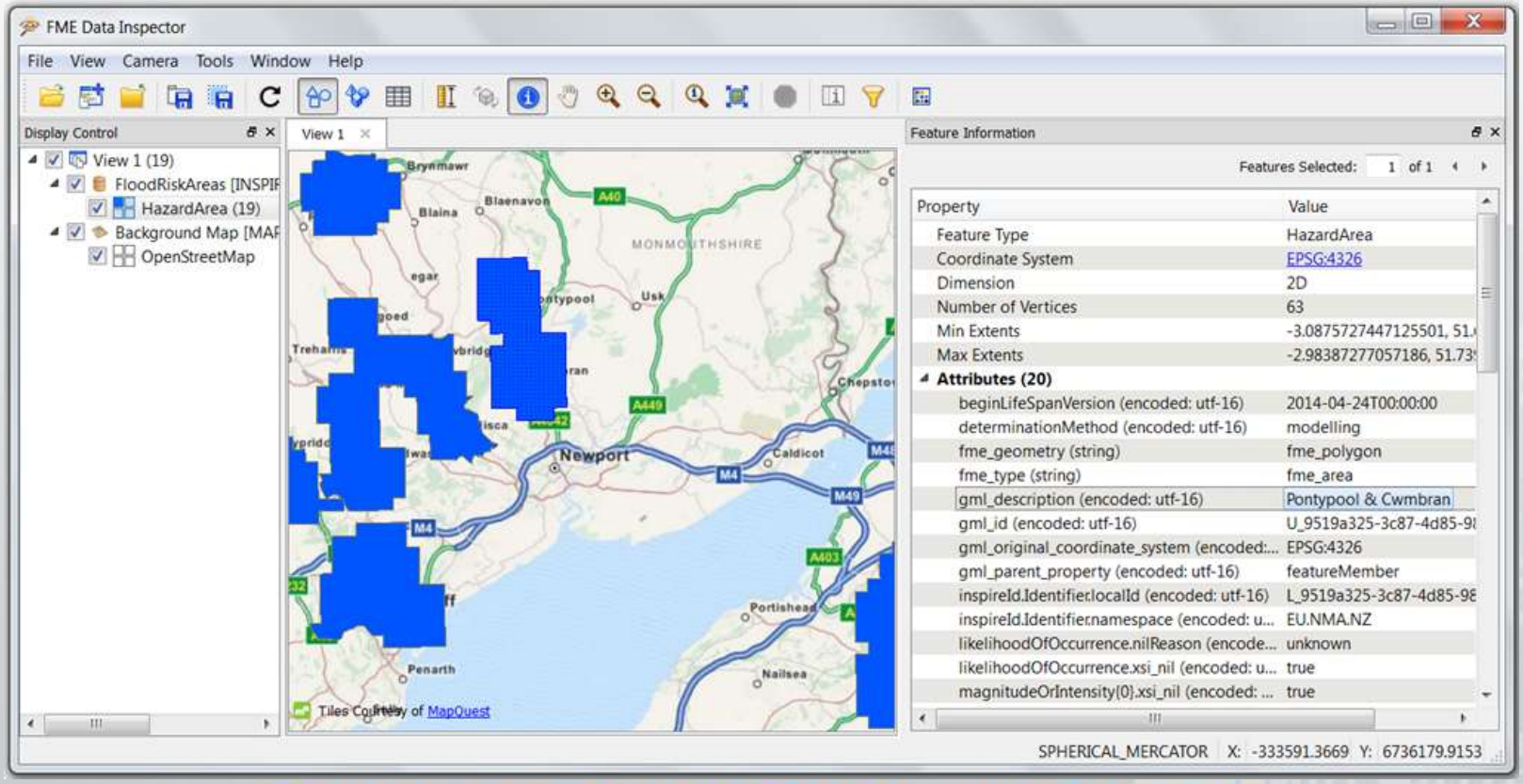
beginLifespanVersion.xsi_nil	xml_boolean
endLifespanVersion	xml_datetime
endLifespanVersion.nilReason	xml_buffer
endLifespanVersion.xsi_nil	xml_boolean
geometry	xml_geometry
inspireId.Identifier.localId	xml_buffer
inspireId.Identifier.namespace	xml_buffer
inspireId.Identifier.versionId	xml_buffer
inspireId.Identifier.versionId.nilReason	xml_buffer
inspireId.Identifier.versionId.xsi_nil	xml_boolean
label	xml_buffer
nationalCadastralReference	xml_buffer
referencePoint	xml_geometry
validFrom	xml_datetime
validFrom.nilReason	xml_buffer
validFrom.xsi_nil	xml_boolean
validTo	xml_datetime
validTo.nilReason	xml_buffer
validTo.xsi_nil	xml_boolean
basicPropertyUnit{}.owns	xml_boolean
basicPropertyUnit{}.nilReason	xml_buffer

INSPIRE GML Writing



CONNECT. TRANSFORM. AUTOMATE.

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

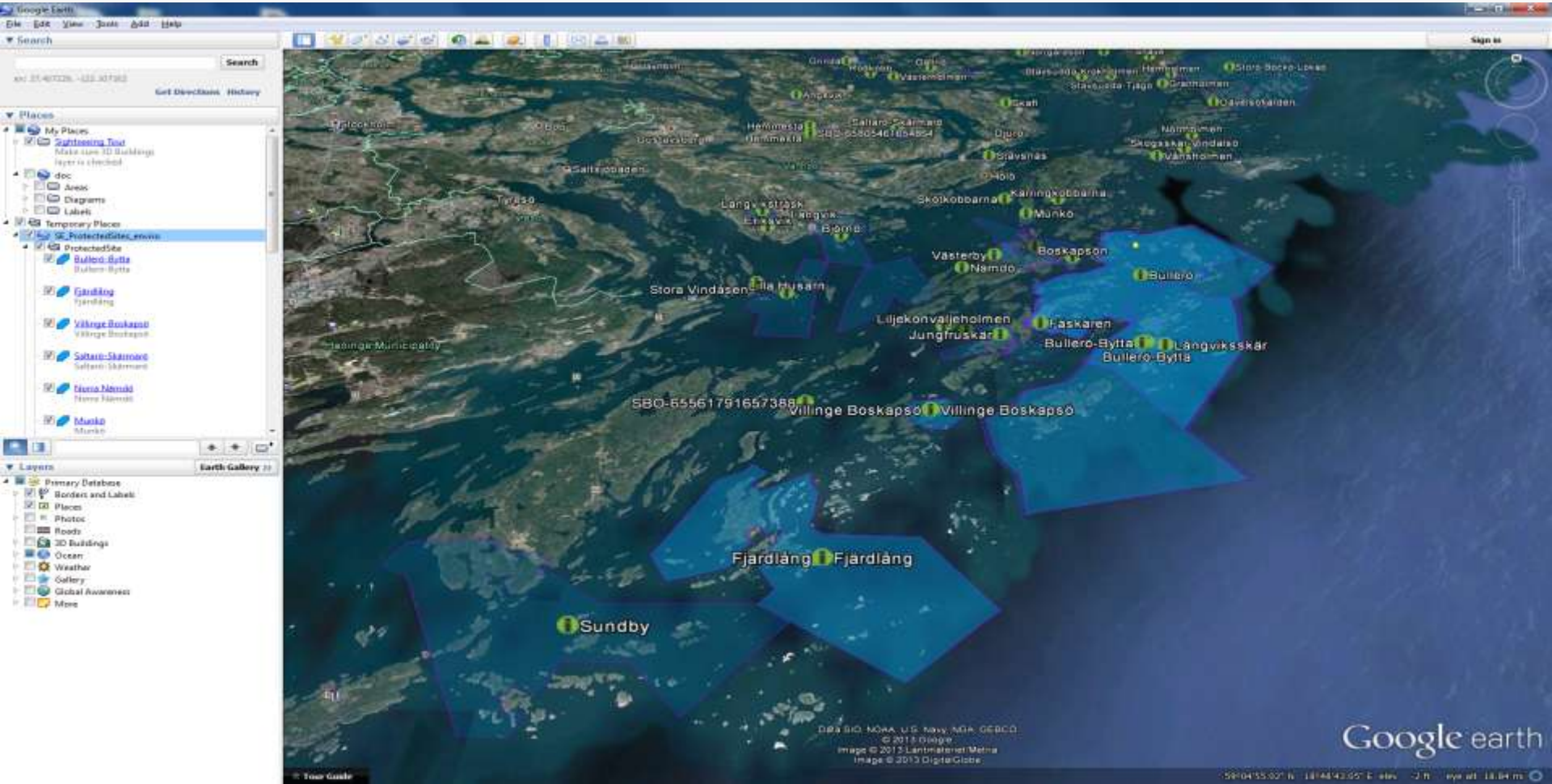
INSPIRE Projects in Sweden by Metria

- **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

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

FME example – INSPIRE theme Protected Sites

In this example we are updating an existing dataset where we already have a metadata document.

INSPIRE
Infrastructure for Spatial Information in Europe

D2.8.I.9 INSPIRE Data Specification on Protected Sites – Guidelines

Title	D2.8.I.9 INSPIRE Data Specification on *Protected sites* – Guidelines
Creator	INSPIRE Thematic Working Group *Protected sites*
Date	2010-04-26
Subject	INSPIRE Data Specification for the spatial data theme *Protected sites*
Publisher	INSPIRE Thematic Working Group *Protected sites*
Type	Text
Description	This document describes the INSPIRE Data Specification for the spatial data theme *Protected sites*
Contributor	Members of the INSPIRE Thematic Working Group *Protected sites*
Format	Portable Document Format (PDF)
Source	
Rights	Public
Identifier	INSPIRE_DataSpecification_PS_v3.1.pdf
Language	En
Relation	Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)
Coverage	Project duration

Solution – QC service

QC-report

Metadata XML

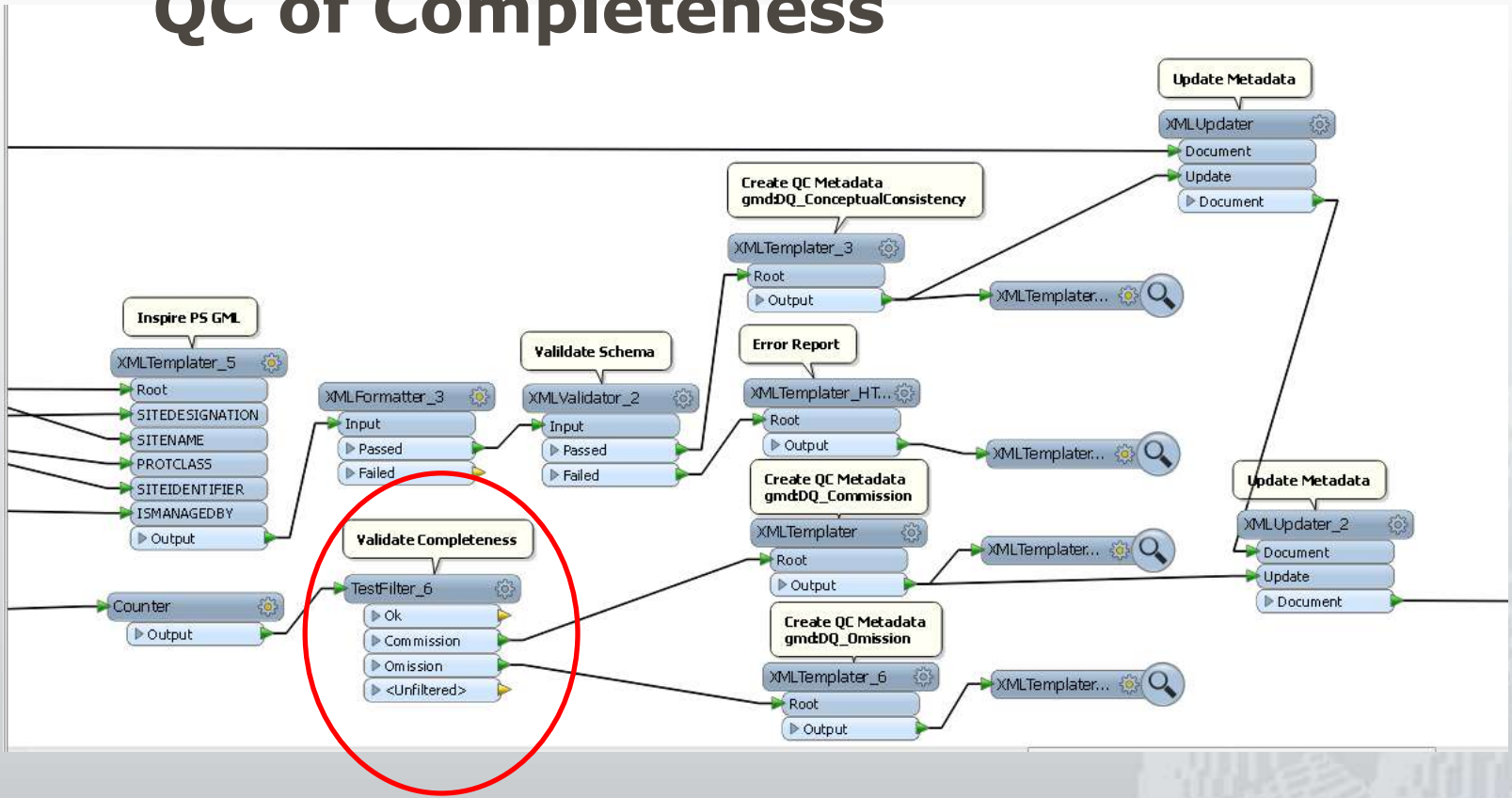
Metadata portal

QC-service on FME server

Dataset GML

INSPIRE WFS/SOS

QC of Completeness



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

TRAFIKVERKET

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

TRAFIKVERKET

SWEDISH NATIONAL HERITAGE BOARD
RIKSANTIKVARIEÄMBETET

NATUR VÅRDS VERKET
SWEDISH ENVIRONMENTAL PROTECTION AGENCY

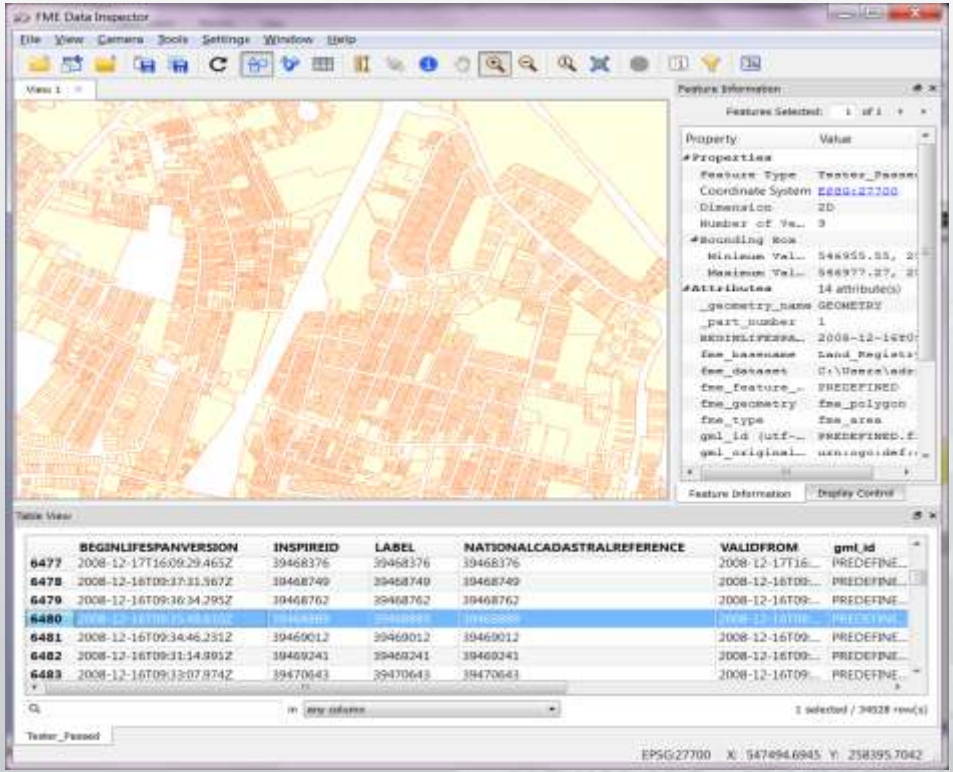
1spatial.com

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



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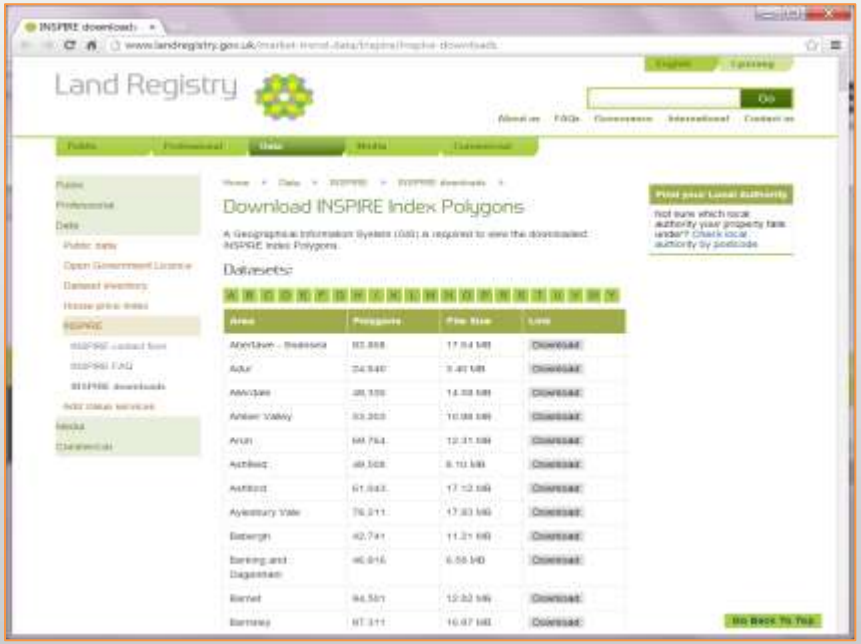
INSPIRE Index Polygons

Download Service



WMS on-line View Service

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Project Background

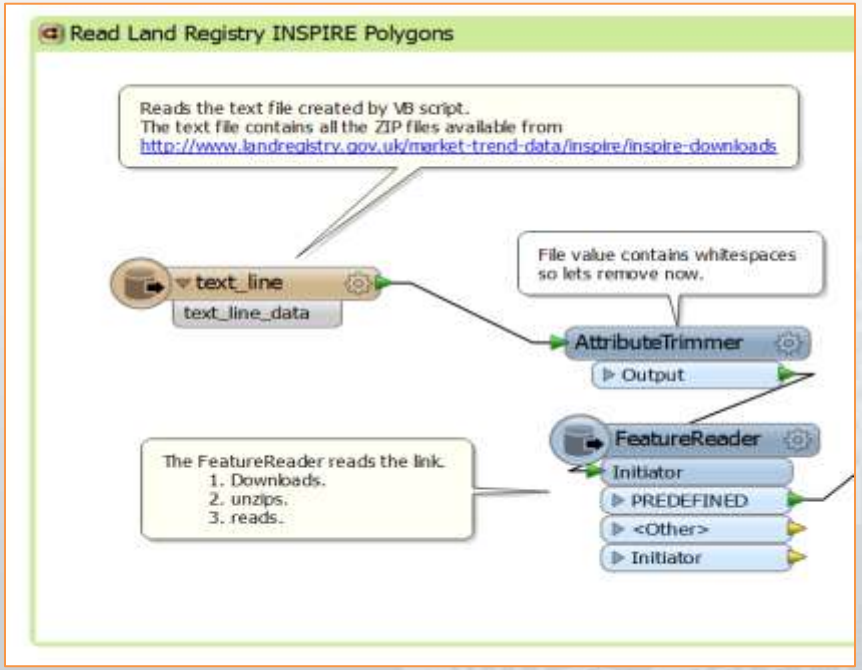
- Land Registry Index Polygons are updated monthly.
- An automated process to download files.
- Associate with the nearest post code centroid.
- Load into an Oracle database.

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.

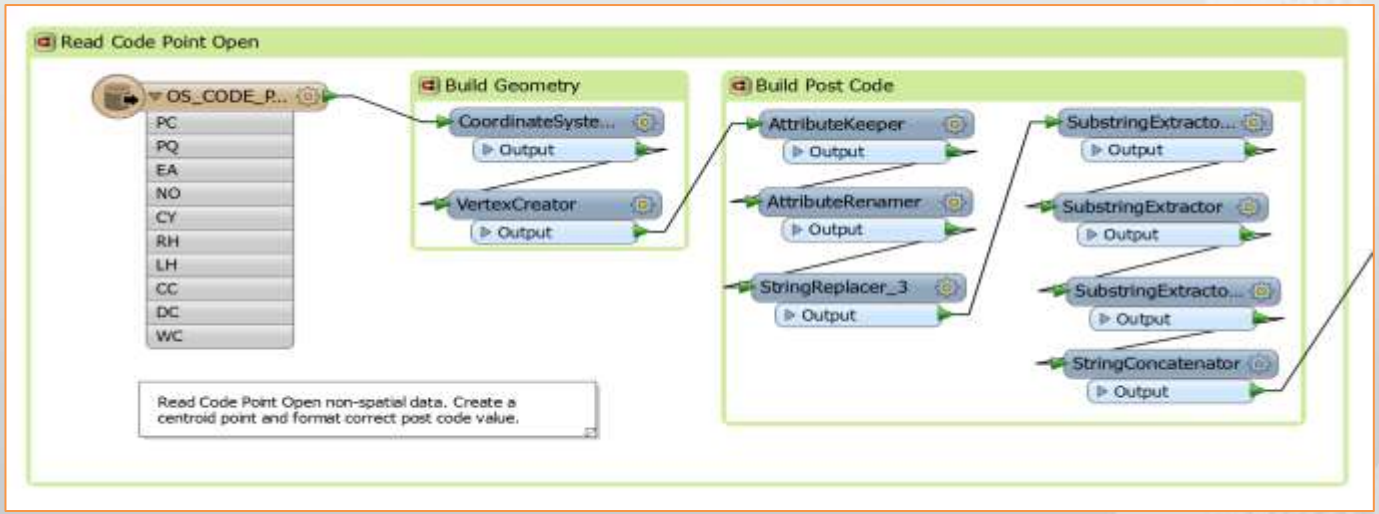
Process – Read INSPIRE Polygons

- Text file FME input.
- Inline reading using FeatureReader:
  - INSPIRE GML format
  - Download
  - Un-zip
  - Read
- Manage Geometry



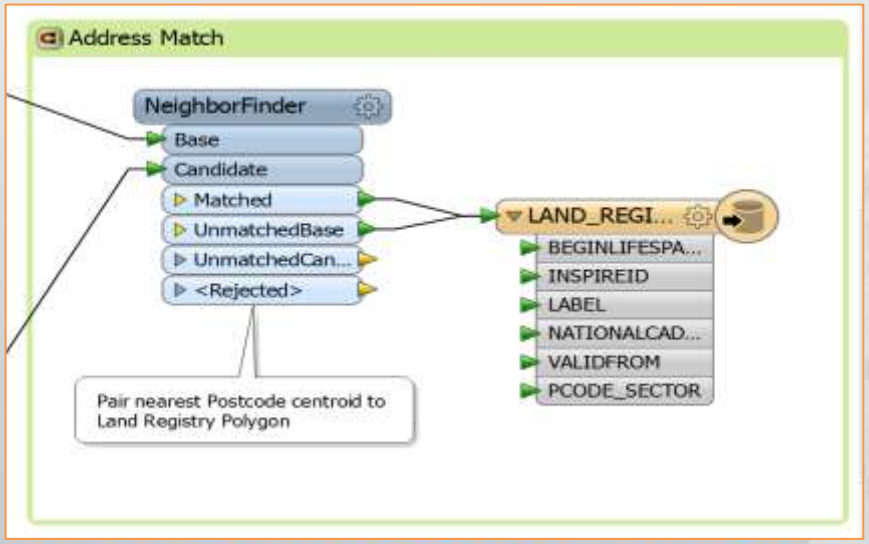
Process – Read OS Code Point Open

- 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.

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

Sax4INSPIRE – INSPIRE

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

GeoSN

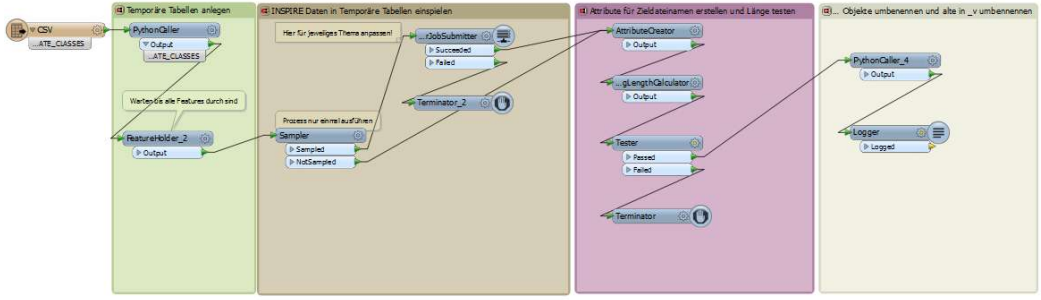
Architecture

- 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



https://geodienste.sachsen.de/fmeserver/schedules

Home > Schedules

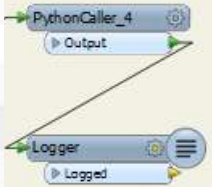
Schedules

- Home
- Repositories
- Jobs
- Notifications
- Schedules
- Security
- Services

New

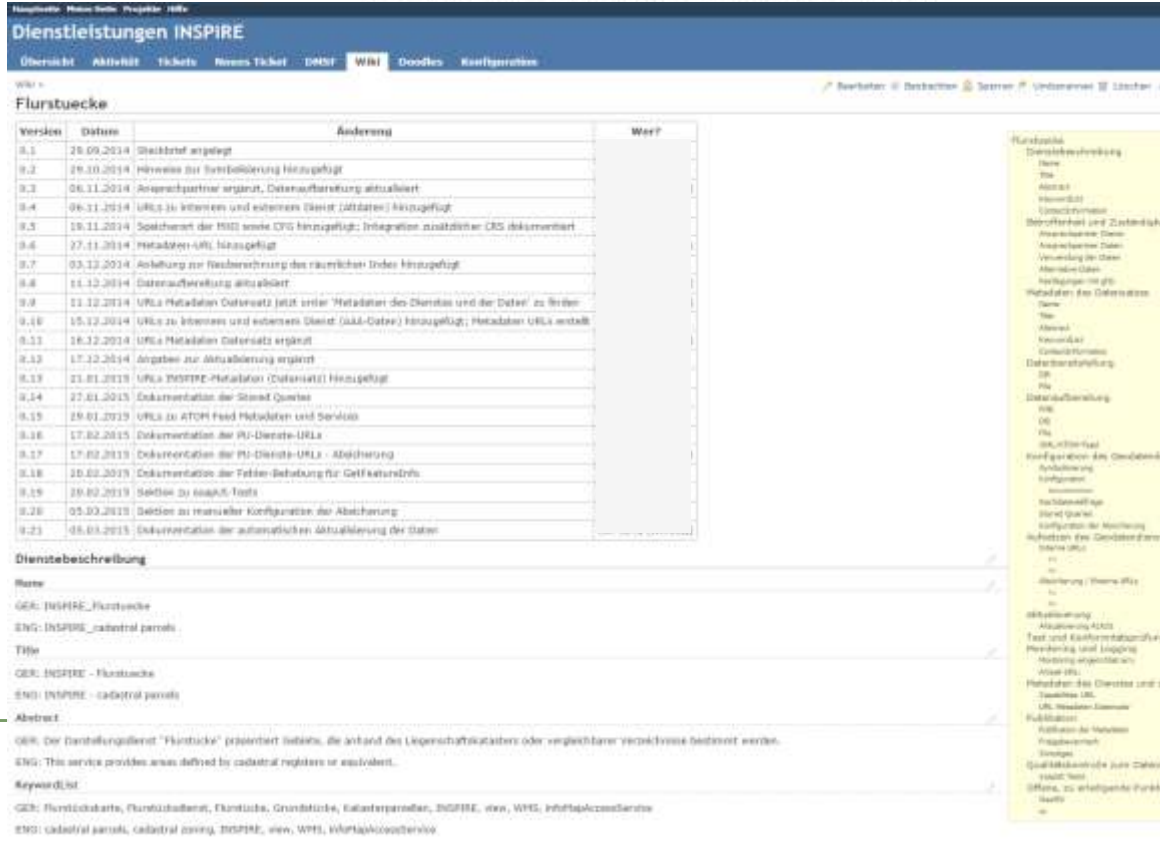
Name	Category	Start Time	End Time	Recurrence	Workspace
Backup_Configuration	Utilities	2012-01-01 02:00:00	N/A	DAY * 1	backupConfiguration.fmw
INSPIRE_Update_AU	inspire	2015-04-23 13:22:00	N/A	WEEK * 1	AU_Aktualisierung.fmw
INSPIRE_Update_CP	inspire	2015-04-23 13:00:00	N/A	WEEK * 1	CP_Aktualisierung.fmw
INSPIRE_Update_GN	inspire	2015-04-06 23:00:00	N/A	MONTH * 3	GN_Aktualisierung.fmw
List Baustellen	WFS Kaskade	2015-05-06 22:00:00	N/A	DAY * 1	list.fmw
Purge_Jobs	Utilities	2013-08-02 20:01:29	N/A	DAY * 1	purgeJobs.fmw
Purge_Logs	Utilities	2013-08-02 20:01:29	N/A	DAY * 1	purgeLogs.fmw
WFSKaskade rp-ce	kaskade	2013-12-16 13:58:38	N/A	DAY * 1	WFS_Kaskade.fmw

Objekte umbenennen und alte in _v umbenennen



Outcome

- Services are available
- Data is frequently updated
  (frequency between 1week and 6month)
- 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 Activites

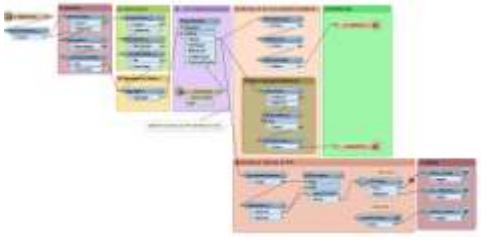
- Conceptual Mapping of INSPIRE and Observations Data
- ETL Processing
- INSPIRE ATOM Feeds & SOS services + client for observations

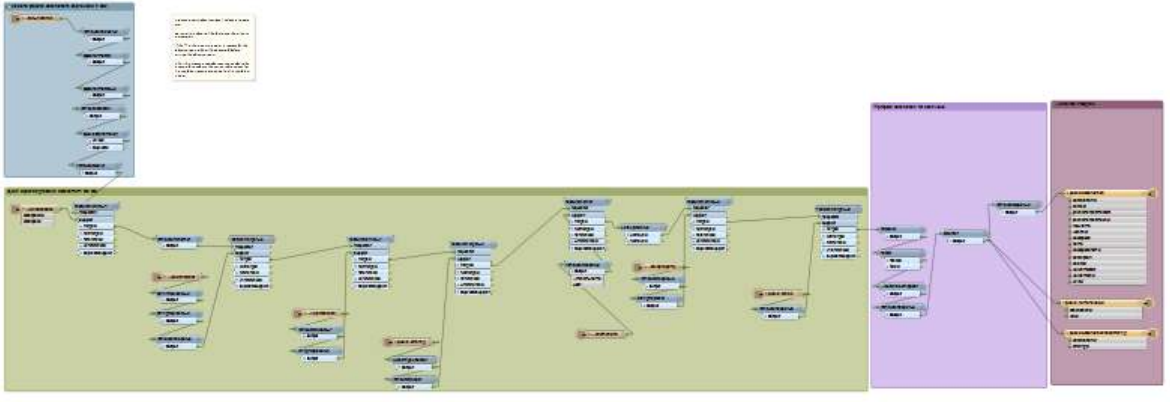
SOS & INSPIRE

- 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 Facilites Data (GML)





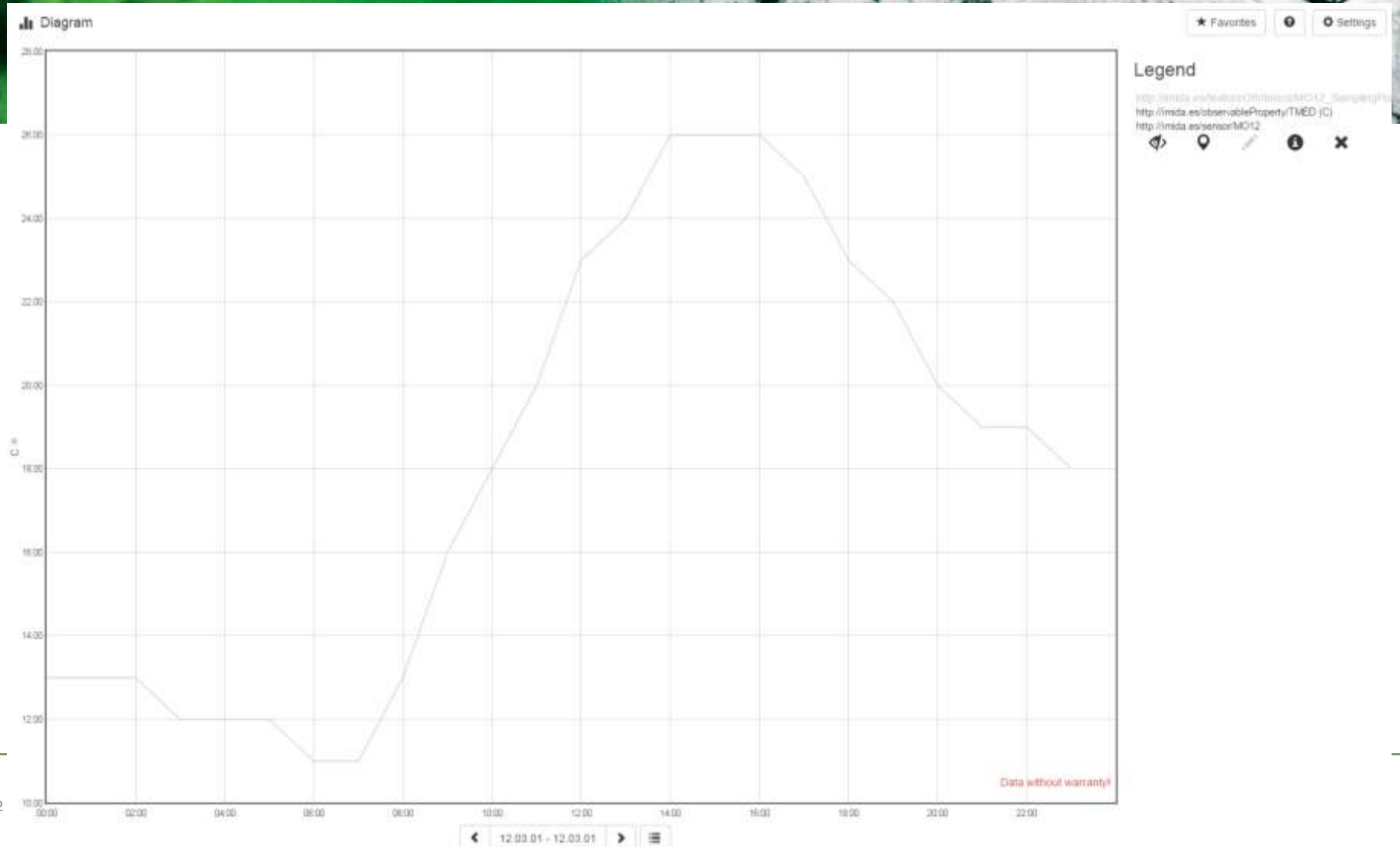
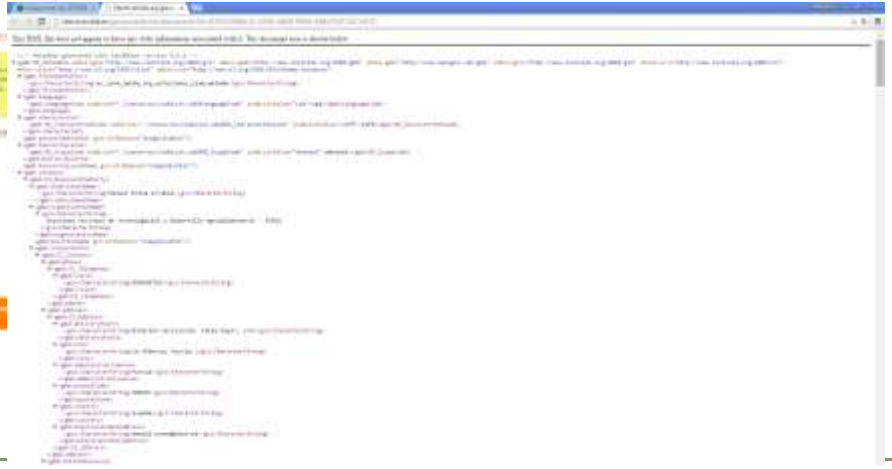


Diagram
★ Favorites
Settings
Legend
http://imida.es/observableProperty/TMED (C)
http://imida.es/sensor/MO12
C °
Data without warranty!
12.03.01 - 12.03.01

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

CONNECT. TRANSFORM. AUTOMATE.

FME Bridges the Gap

Proprietary

esri Partner Network Silver

Microsoft

Bentley Sustaining Infrastructure

ORACLE PARTNER

AUTODESK. Authorised Developer

Open Standards

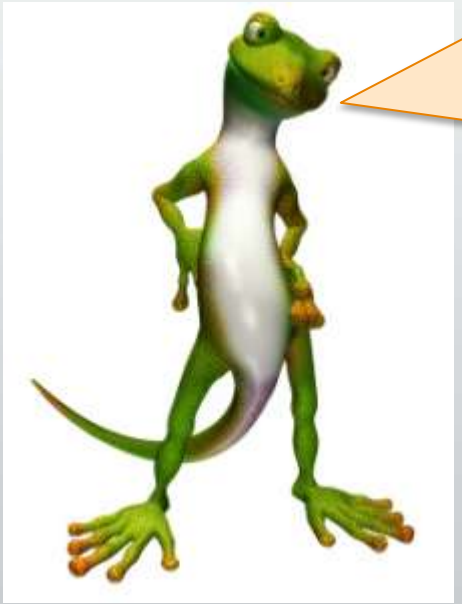
INSPIRE - Infrastructure for Spatial Information in Europe

OGC®

ISO

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!

CONNECT. TRANSFORM. AUTOMATE.

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

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