

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

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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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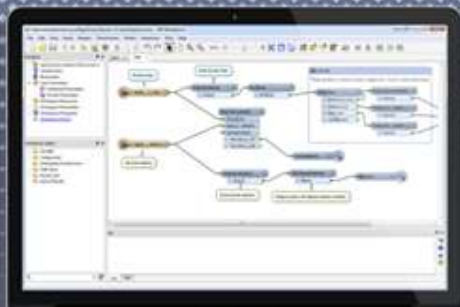


SAFE SOFTWARE™

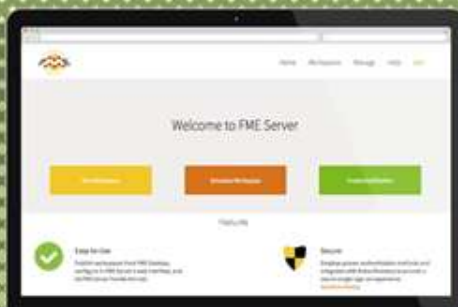
3 CORE PRODUCTS



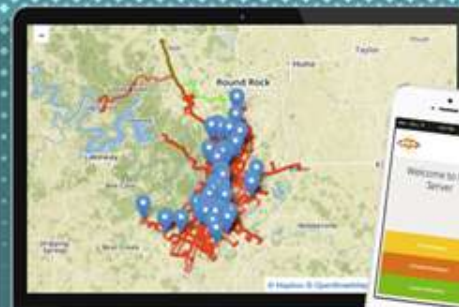
DESKTOP



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**

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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!

Name	Type
beginLifespanVersion	xml_datetime
beginLifespanVersion.nilReason	xml_buffer
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

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INSPIRE GML Writing

Feature Information

Features Selected: 1 of 1

Property	Value
Feature Type	HazardArea
Coordinate System	EPSG:4326
Dimension	2D
Number of Vertices	63
Min Extents	-3.0875727447125501, 51.4
Max Extents	-2.98387277057186, 51.73
Attributes (20)	
beginLifeSpanVersion (encoded: utf-16)	2014-04-24T00:00:00
determinationMethod (encoded: utf-16)	modelling
fme_geometry (string)	fme_polygon
fme_type (string)	fme_area
gml_description (encoded: utf-16)	Pontypool & Cwmbran
gml_id (encoded: utf-16)	U_9519a325-3c87-4d85-9f
gml_original_coordinate_system (encoded: ...)	EPSG:4326
gml_parent_property (encoded: utf-16)	featureMember
inspireId.Identifier.localId (encoded: utf-16)	L_9519a325-3c87-4d85-9f
inspireId.Identifier.namespace (encoded: u:...	EU.NMA.NZ
likelihoodOfOccurrence.nilReason (encode:...	unknown
likelihoodOfOccurrence.xsi_nil (encoded: u:...	true
magnitudeOrIntensity(0).xsi_nil (encoded: ...)	true

Spherical_Mercator X: -333591.3669 Y: 6736179.9153

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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

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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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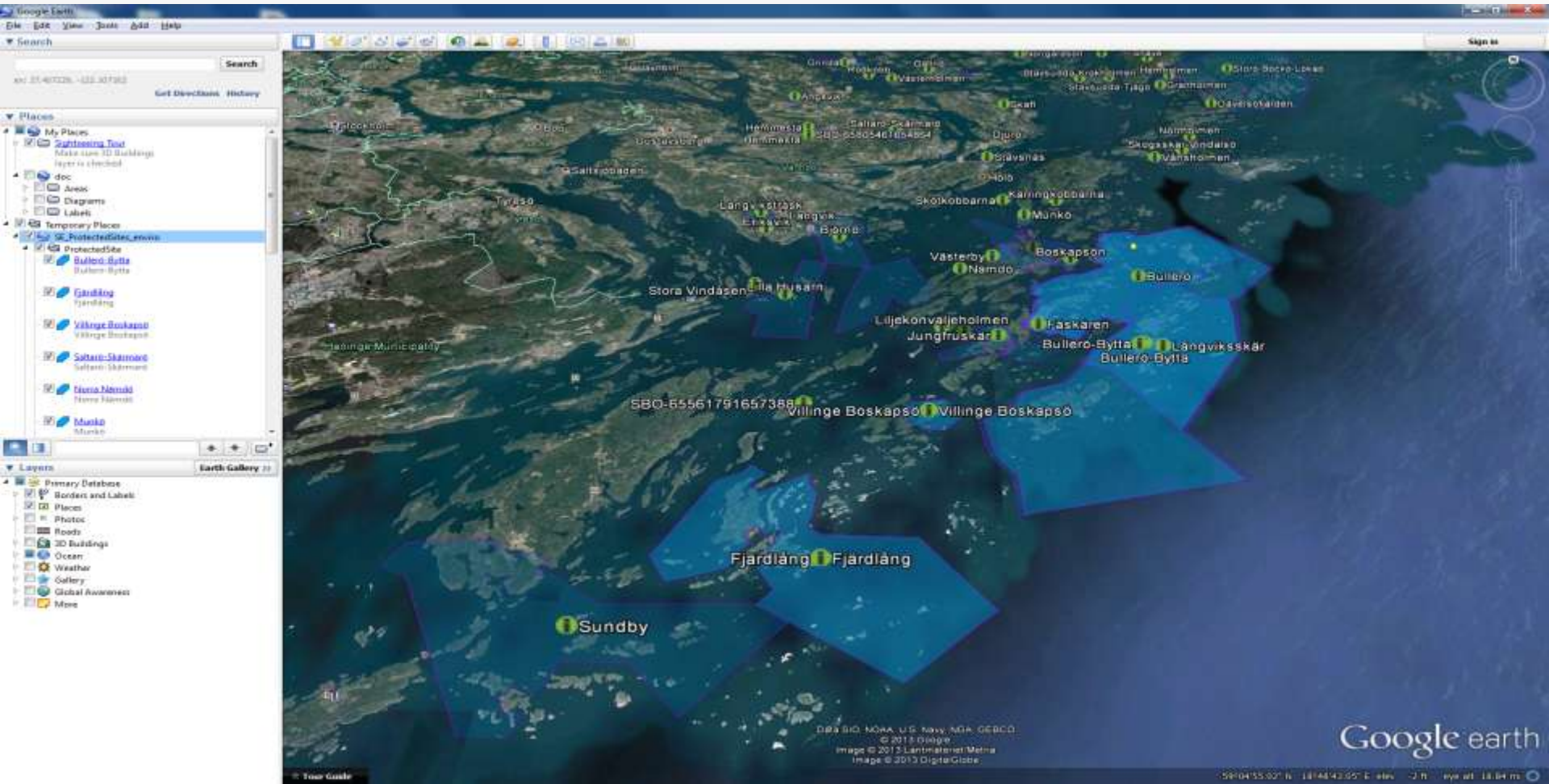
Swedish Protected Sites Update



- 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

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SE Protected Sites KML





Swedish environmental agency Environmental monitoring data

- Challenges:
 - Distributed data collection
 - Time from data delivery to data publication
 - Data quality
 - Metadata



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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

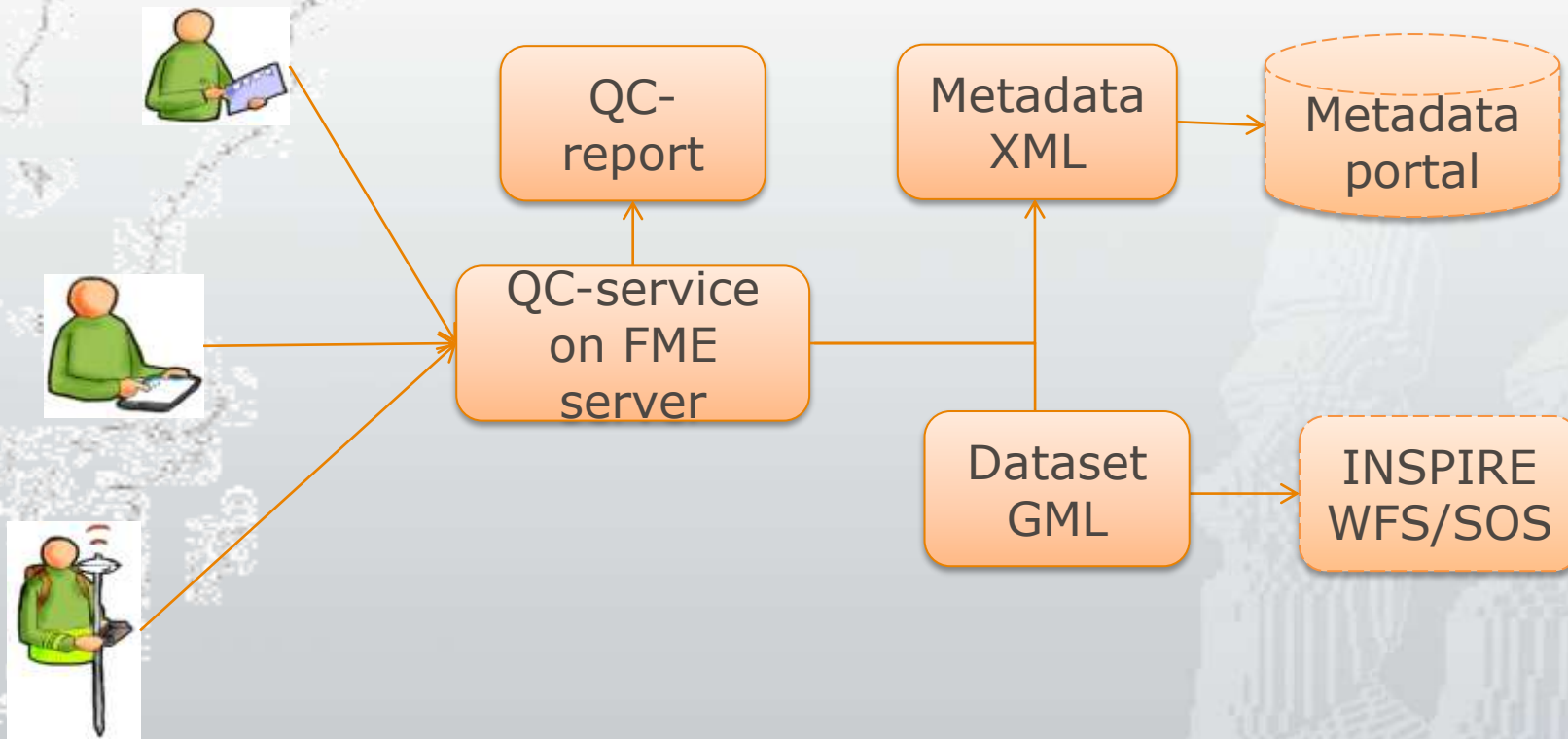
D2.8.1.9 INSPIRE Data Specification on Protected Sites – Guidelines

Title	D2.8.1.9 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

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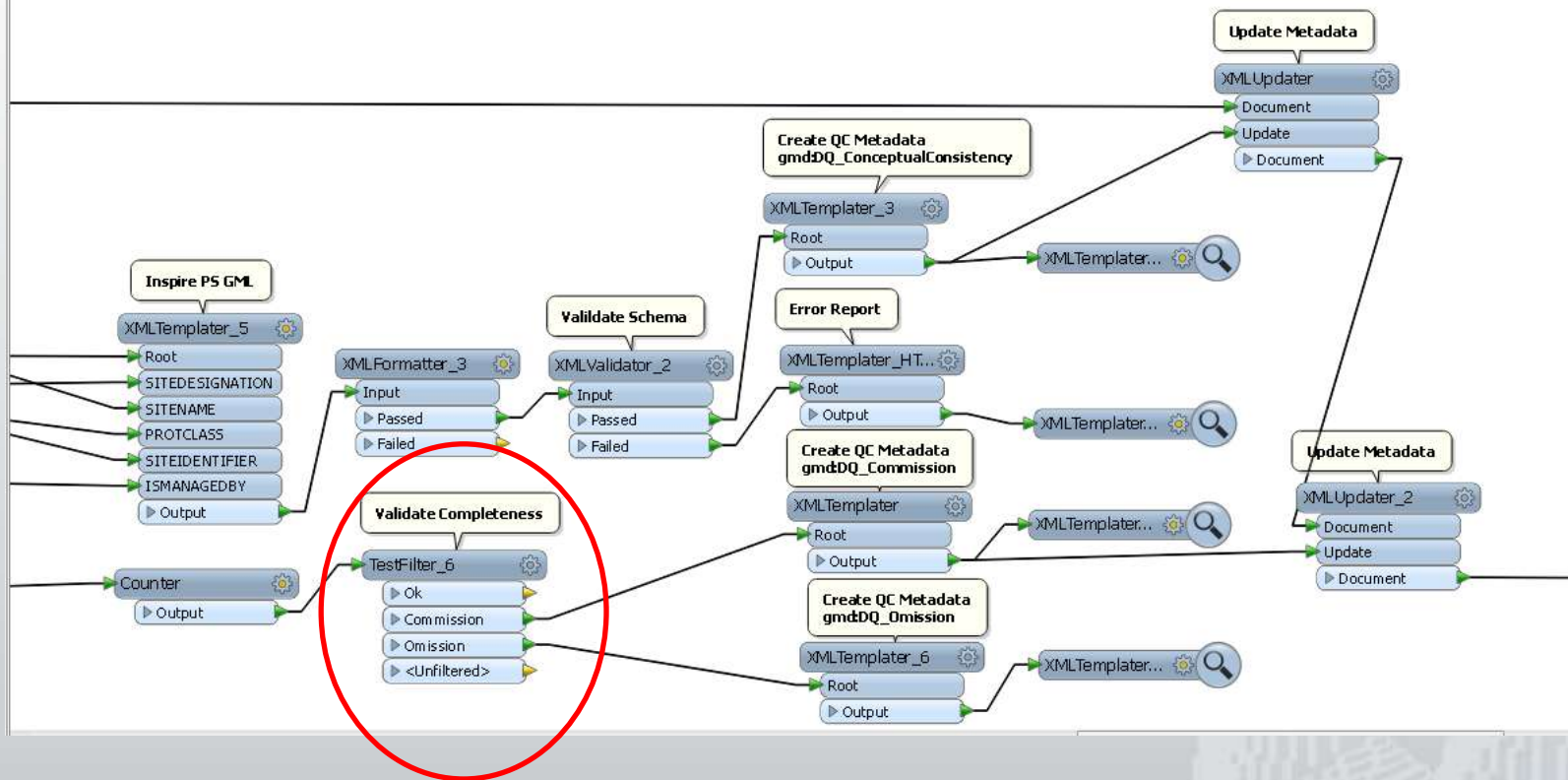
Solution – QC service



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QC of Completeness



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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



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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



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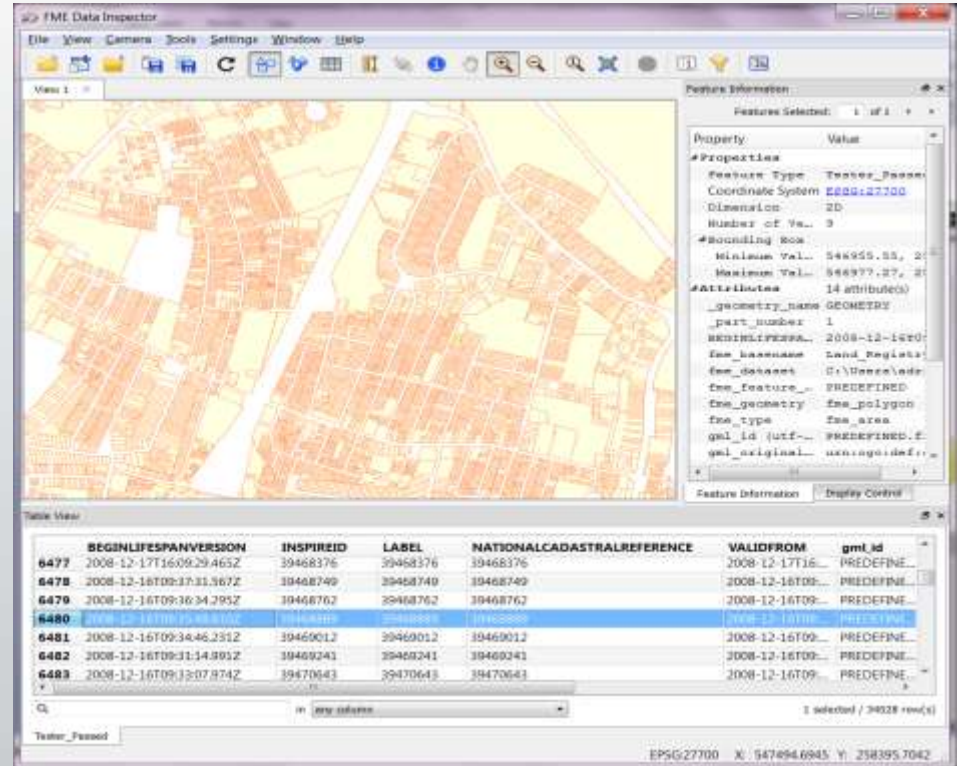
Reading Land Registry INSPIRE Data Rip, Zip & Ship



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

The screenshot shows the Land Registry website interface. The main heading is "Download INSPIRE Index Polygons". Below this, there is a note: "A Geographic Information System (GIS) is required to view the downloaded INSPIRE Index Polygons." A "Download" button is visible. On the right, there is a "Find your Local Authority" section with a note: "Not sure which local authority your property falls under? Check local authority by postcode." Below this is a "Datasets" section with a table listing various areas and their corresponding polygons and file sizes.

Area	Polygons	File Size	Link
Abertawe - Swansea	83,888	17.84 MB	Download
Adur	24,947	5.47 MB	Download
Amwys	48,138	14.88 MB	Download
Amwrthwyll	93,283	10.88 MB	Download
Arfon	64,764	12.31 MB	Download
Ardara	49,328	8.10 MB	Download
Ardara	61,843	17.12 MB	Download
Aylesbury Vale	78,211	17.83 MB	Download
Bathurst	42,741	11.21 MB	Download
Bathurst and Dagenham	46,816	8.88 MB	Download
Barnet	84,501	12.82 MB	Download
Barnes	87,311	16.87 MB	Download

WMS on-line View Service

The screenshot shows the Data.gov.uk website interface. The main heading is "Land Registry INSPIRE Index Polygons Service Metadata". Below this, there is a "Responsible Party" section: "Land Registry (Spatial Data)". A "Preview on Map" button is visible. On the right, there is a "DATASET COORDS" section with a map showing the location of the dataset. Below the map, there is a "DATA RESOURCES (1)" section with a link to "Land Registry INSPIRE View".

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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.

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Process – Get Source Datasets



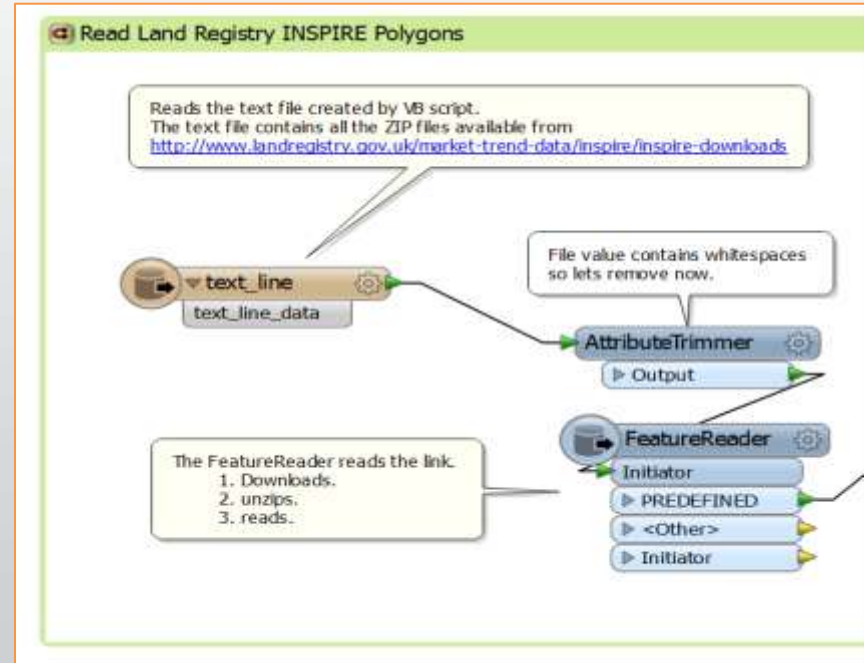
- The Download site provides a link to a zip file for each area.
- VBS script run via IE11 is used to scrape the download website and 'rip' the url for each zip file.
- A text file is created containing with url for each zip file.

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Process – Read INSPIRE Polygons



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

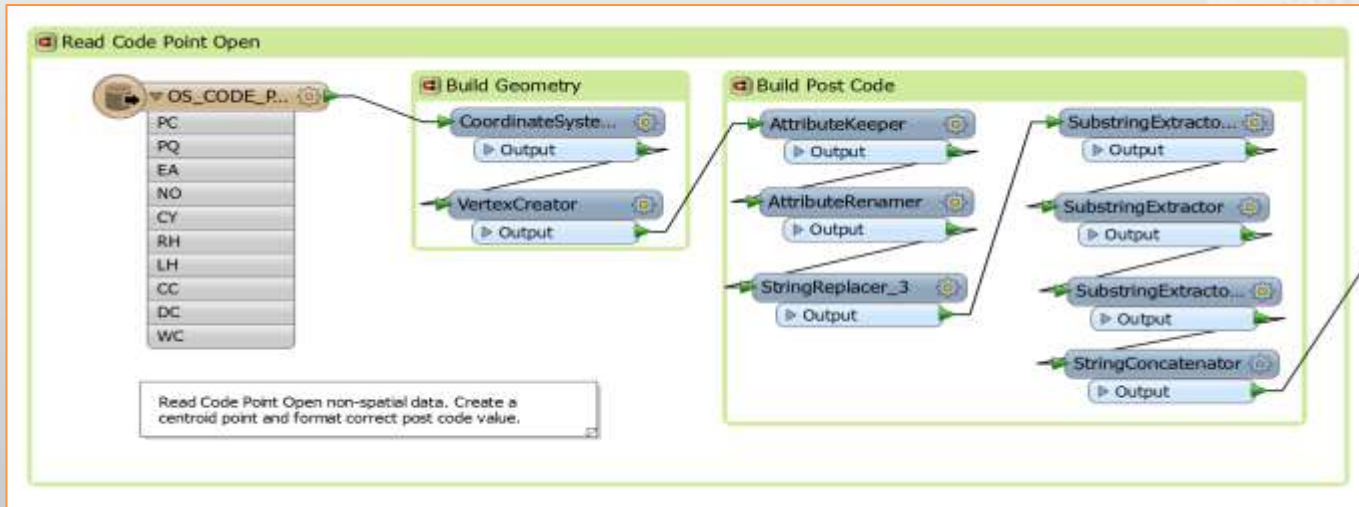


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Process – Read OS Code Point Open



- Read Code Point dataset from Oracle.
- Transform to spatial data and re-structure attributes.

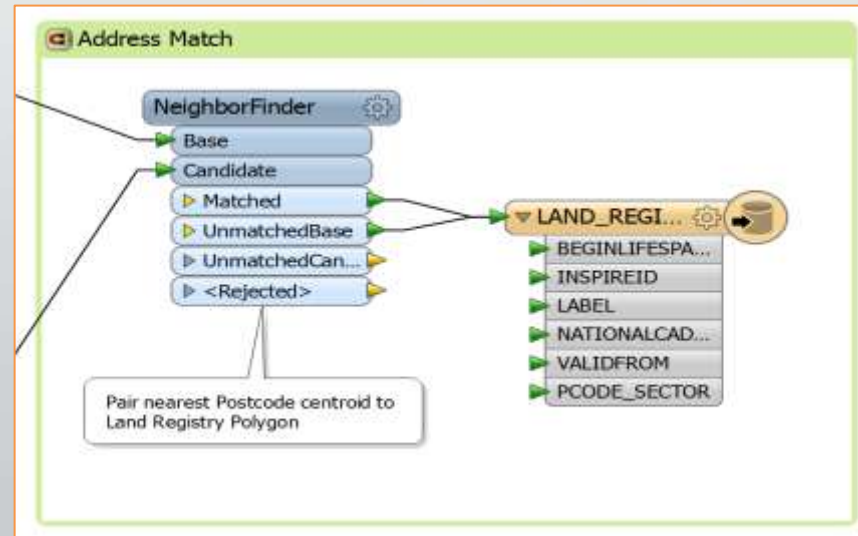


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Process – Merge & Write



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



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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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*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





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

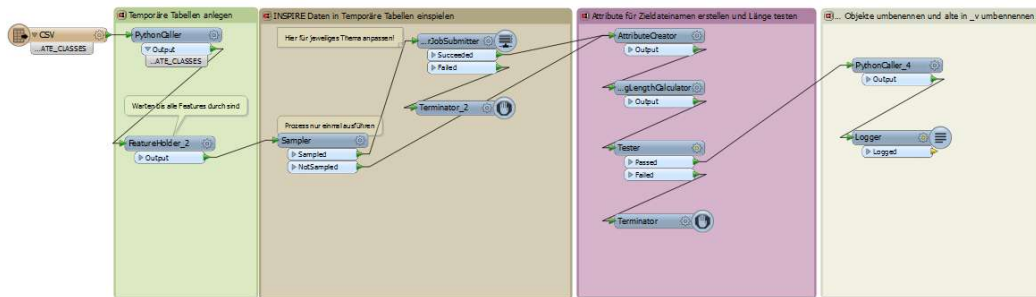


sax4INSPIRE

- 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/fimservet/schedules

Home > Schedules

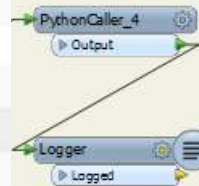
Schedules



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

Name	Category	Start Time	End Time	Recurrence	Workspace
<input type="checkbox"/> Backup_Configuration	Utilities	2012-01-01 02:00:00	N/A	DAY * 1	backupConfiguration.fmw
<input type="checkbox"/> INSPIRE_Update_AU	inspire	2015-04-23 13:22:00	N/A	WEEK * 1	AU_Aktualisierung.fmw
<input type="checkbox"/> INSPIRE_Update_CP	inspire	2015-04-23 13:00:00	N/A	WEEK * 1	CP_Aktualisierung.fmw
<input type="checkbox"/> INSPIRE_Update_GN	inspire	2015-04-08 23:00:00	N/A	MONTH * 3	GN_Aktualisierung.fmw
<input type="checkbox"/> List_Baustellen	WFS Kaskade	2015-05-06 22:00:00	N/A	DAY * 1	list.fmw
<input type="checkbox"/> Purge_Jobs	Utilities	2013-06-02 20:01:29	N/A	DAY * 1	purgeJobs.fmw
<input type="checkbox"/> Purge_Logs	Utilities	2013-06-02 20:01:29	N/A	DAY * 1	purgeLogs.fmw
<input type="checkbox"/> WFSKaskade qp-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 1 week and 6month)
- All processes are documented

[Überblick](#) | [Aktuelle](#) | [Tickets](#) | [News](#) | [Ticket](#) | [DSM](#) | **[WMI](#)** | [Doodles](#) | [Kooperations](#)

Flurstuecke

Version	Datum	Änderung	Wert
9.1	26.09.2014	Steckbrief angelegt	
9.2	26.10.2014	Hinweise zur Betriebsführung hinzugefügt	
9.3	06.11.2014	Ansprechpartner ergänzt, Datenaufbereitung aktualisiert	
9.4	06.11.2014	URLs zu internem und externem Dienst (aktuell) hinzugefügt	
9.5	19.11.2014	Speicherung der MID sowie CIFG hinzugefügt; Integration zusätzlicher CRS dokumentiert	
9.6	27.11.2014	Metadaten-URLs hinzugefügt	
9.7	03.12.2014	Absicherung zur Readerschönung des räumlichen Index hinzugefügt	
9.8	14.12.2014	Datenaufbereitung aktualisiert	
9.9	11.12.2014	URLs Metadaten Datensatz jetzt unter 'Metadaten des Dienstes und der Daten' zu finden	
9.10	15.12.2014	URLs zu internem und externem Dienst (GIS-Cache) hinzugefügt; Metadaten-URLs erstellt	
9.11	16.12.2014	URLs Metadaten Datensatz ergänzt	
9.12	17.12.2014	Angabe zur Aktualisierung ergänzt	
9.13	21.01.2015	URLs INSPIRE-Metadaten (Datenakt) hinzugefügt	
9.14	27.01.2015	Dokumentation der Steuert-Queries	
9.15	19.01.2015	URLs zu ATOP Feed Metadaten und Service	
9.16	17.02.2015	Dokumentation der FI-Dienst-URLs	
9.17	17.02.2015	Dokumentation der FI-Dienst-URLs - Absicherung	
9.18	20.03.2015	Dokumentation der Fehler-Behandlung für GEFKursInfo	
9.19	19.03.2015	Selbst-Du-Service-Test	
9.20	05.03.2015	Selbst-Du-manuelle-Konfiguration der Absicherung	
9.21	05.03.2015	Dokumentation der automatisierten Aktualisierung der Daten	

Dienstbeschreibung

Name:

GER: INSPIRE_Flurstuecke
 ENG: INSPIRE_cadastral parcels

Titel:

GER: INSPIRE - Flurstuecke
 ENG: INSPIRE - cadastral parcels

Abstract:

GER: Der Darstellungsdienst 'Flurstuecke' präsentiert Ist-Daten, die anhand des Liegenschaftskatasters oder vergleichbarer vorgegebene bestimmt werden.
 ENG: This service provides areas defined by cadastral registers or equivalent.

Keyword:

GER: Flurstueckdaten, Flurstueckbestand, Flurstuecke, Grundstücke, Katasterparzellen, INSPIRE, www, WMI, info@accs-service
 ENG: cadastral parcels, cadastral zoning, INSPIRE, www, WMI, info@accs-service


Flurstuecke Details:

Dienstbeschreibung
 Name
 Typ
 Access
 Niveau/OS
 Einsatzbereich
Benutzerrollen und Zuständigkeiten
 Annehmungen Daten
 Verwendung der Daten
 Annehmungen Daten
 Nutzungsregeln
Metadaten des Dienstes
 Name
 Typ
 Access
 Niveau/OS
 Einsatzbereich
Datenaufbereitung
 SP
 Typ
Datenaufbereitung
 WMI
 DE
 EN
 FI
 WMI/ATOP Feed
Konfiguration des Dienstes
 Anhebung
 Selbst-Du-Service-Test
 Absicherung
 manuelle-Konfiguration
 Selbst-Du-Service-Test
 Selbst-Du-manuelle-Konfiguration der Absicherung
Auflisten von Dienstebenen
 Interne URLs
 FI
 Absicherung / Thema WMI
 FI
WMI-Schnittstelle
 Aktualisierung AKCS
 Test und Kooperationsentwicklung
 Probenziehung und Logging
 Monitoring eingebunden
 WMI-URLs
 Metadaten des Dienstes und des Dienstes URL
 URL Metadaten-Daten
Publikation
 Kollaboration der Verwalter
 Probenziehung
 Steuergesamtheit
 Qualitätskriterien des Dienstes
 FI/WMI/OS
 WMI, zu erhaltende Punkt-Service
 WMI



Outlook

- Annex 2 & 3 Themes are scheduled for this summer
- Buildings
- Elevation
- Orthoimagery
- ...

An aerial photograph showing a stark contrast between a lush green field on the left and a severely cracked, light-colored, arid landscape on the right. The cracks in the dry area form a complex, branching network. The text is overlaid on the top left of the image.

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

con•terra

52north
exploring horizons



Project Activities

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



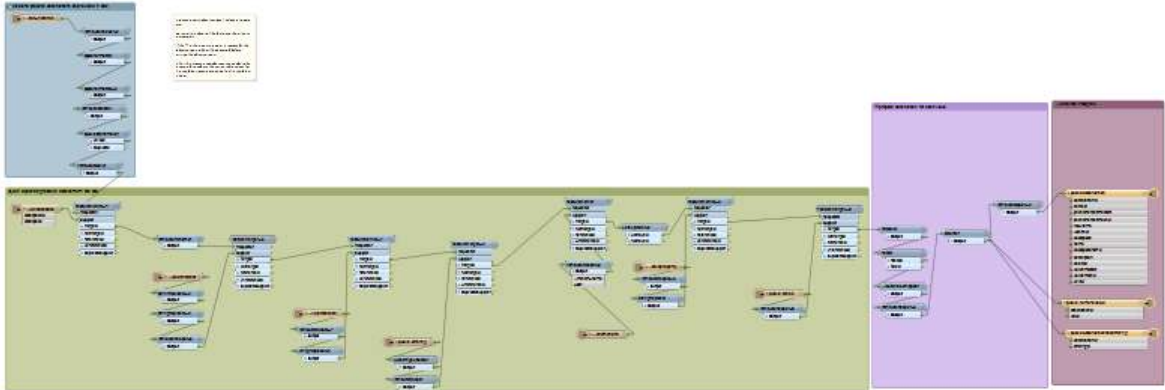
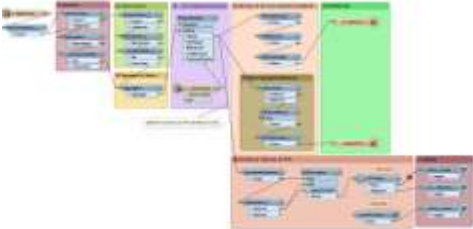
SOS & INSPIRE

- 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)



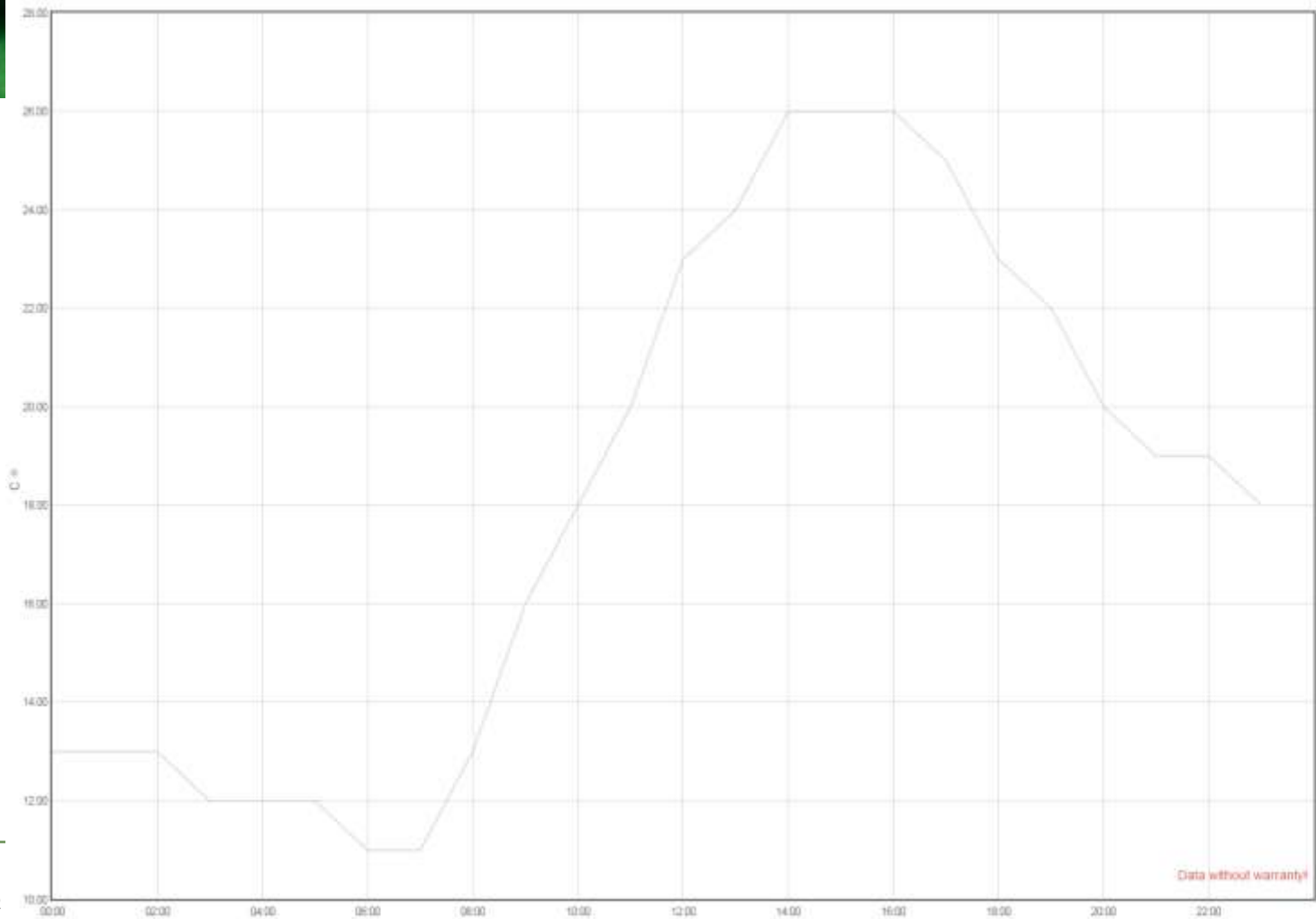
ETL Processing

- FME & INSPIRE Solution Pack for FME
 - > Transform Stations data (location, capabilities) to INSPIRE Environmental Monitoring Facilities Data (GML)



Diagram

★ Favorites ⓘ ⚙ Settings



Legend

http://imda.es/observables/01/observables/MO12_Sampling
[http://imda.es/observableProperty/TMED\(C\)](http://imda.es/observableProperty/TMED(C))
<http://imda.es/sensor/MO12>



Data without warranty!



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

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FME Bridges the Gap



Proprietary



Open Standards

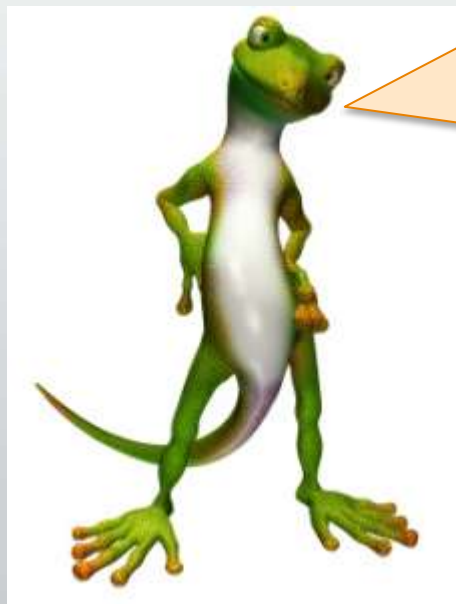


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FME:

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!

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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

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Thank You!

- Questions?
- For more information:
 - [Sören Dupke s.dupke@conterra.de](mailto: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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