Prospects prototyping the new ELS architecture

Saulius Urbanas, Jari Reini, EuroGeographics

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EuroGeographics’ vision for future European Location Services

To provide the single access point for international users of harmonised, pan-European, authoritative geospatial information and services.

For National mapping, cadastral and land registry authorities to be recognised in our International effort to contribute to the wider public good.
European Location Services Transition Programme objectives

*European Location Framework project*

- Established standards, tools, technical infrastructure and pilot services – the ELF Platform
- Pilot products & services to defined standards (INSPIRE-compliant spatial reference data, harmonised at a cross-border and pan-European level)

*Transition Programme (Oct 2016 – Oct 2018)*

- Build on ELF Platform and hand-over ownership of the ELF platform from ELF Consortium to EuroGeographics
- Design and build operational and customer focused services with key partners (Kartverket, Kadaster, OSGB, NLSFI, BKG)
- Establish the organisational model for operations

*Operational European Location Services*

- Provide reliable and efficient products/services for pan-European users
- Single point of access for licensing official data on European level
- Business model and business case in place
- Delivery organisation decided
- Operational model implemented

#OpenELS
Current ELS / Open ELS Architecture

- Monitor
- Performance
- Validation

Testing and monitoring

Security and licensing

Open ELS services

- WMS
- WMTS
- Geo Locator
- WFS Cascading

Member state services

WMS

WFS 2.0 (w/ paging or wo/ maxfeatures)
Current (distributed) ELS / Open ELS architecture

Advantages
• Partners host and maintain their own services
• Update cycles may be very fast

Disadvantages
• Some of the services are responding slowly
• WFS paging missing or maxfeatures limit is low
• Cross-border harmonization shall be implemented by each Data provider
Toward more centralized approach

Open ELS hackathon in Kartverket, Hønefoss, Norway, 3-5 September 2018

- Participants: Kartverket, National Land Survey of Finland and EuroGeographics
- Centralised architecture has been prototyped
- Objective - to upload country-specific GML files to a centralized PostGIS data store and distribute the data through OGC interfaces
- Address data have been used for testing the content
The data model is based on the UML model (Sparx Enterprise Architect)

- reduce options and unused constraints
- keep the INSPIRE structure
- remove most voidable and optional elements
- make some central elements mandatory
XML schema (xsd) and DDL commands were created for the database to be initialized (GIStools by Arkitektum)
From GML to DB model: use of Hale Studio – ETL tool

- GML data was read and converted to the database model by wetransform.to’s Open Source HALE tool
- The modified data was uploaded to the database using HALE's JDBC connection to the PostGIS database.

![Diagram showing ETL process with Hale Studio](image: wetransform.to)
Schema mapping process

1) Create a Data Model (UML)
2) Data model is created for schemas and DB definition statements
3) The HALE tool reads the target schema and the GML file to be read
4) The HALE tool is used to create mapping between input data and the target model
5) The data of the target model is downloaded to the PostGIS DB

OGC interfaces were implemented using an open source Geoserver that connects to the PostGIS database and shares the data with the WFS standard.
Open ELS future technology prototype - activities

- Simplified data model (addresses)
- Data models to XML schemas (using ShapeChange)
- Conversion from XML schemas to database model
- ETL process (Extract-Transform-Load) Inspire AD-data to new simplified model
- Publish content through WFS and WFS3 with alternative encodings
  - GML
  - JSON
  - JSON-LD
  - GeoJSON
  - Geopackage
  - Etc
- Testing change only updates
Open ELS future technology prototype

Centralised services

Security – httpd basic auth + XSLT rewriter

- WFS 3.0 Geojson, etc
- Geo-package download
- WFS Central 6 themes (Simplified schema)

WFS Cascading+ version2

- Geoserver Mapcache
- WMS: CIM
- WMTS: TBM

Geo-Locator

GeoDCAT Metadata

National services

Change detection

WMS/WFS

ATOM Feed (GML)

A  B  C
Conclusions

- A central architecture is a good way to serve content from data providers which haven’t an advanced tech infrastructure
- Secure storage for pan-European data
- Simplified schema -> easier to consume
- Easier to configure proper service performance
- Way forward to assure a cross-border harmonization offering a pan-European data content
- Wider variety of delivery products (datasets, services, apps)
- Demands for bigger capacities in the central node
  - Technical: storage, CPUs, HW/SW
  - Expertise: domain experts, web-service experts…