



Maintaining an environmental SDI in ArcGIS

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DATA MODELLING AND MODEL DRIVEN
IMPLEMENTATION OF DATA DISTRIBUTION workshop

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Contents

- SYKE and the maintained SDI in brief
- Present maintenance process of the INSPIRE data and services at SYKE
- LifeData project helps to develop the system
- Experiences from data transformations

SYKE in brief

- Finnish Environment Institute (SYKE) is
 - a research and expert organisation with about 700 employees
 - operating mainly under the Ministry of Environment
 - studying phenomena relating to environmental change and developing solutions related to the management of environmental change
 - a Legally Mandated Organisation (LMO) within INSPIRE
 - one of the biggest INSPIRE data providers in Finland in numbers of different datasets and themes
 - responsible for a great number of registers related to environmental monitoring and for a lot of e-reporting obligations

SYKE's environmental SDI: Centralised Management –Users Decentralised

- SYKE and its regional offices
- Ministry of the Environment
- The Housing Finance and Development Centre

- ELY centres
Regional Centres for Economic Development, Transport and the Environment

- AVI centres
Regional State Administrative Agencies

SYKE's SDI is developed and maintained by SYKE's Data and Information Centre:
Geoinformatics Services, Geoinformatics Systems, Geoinformatic Research and ICT services Groups



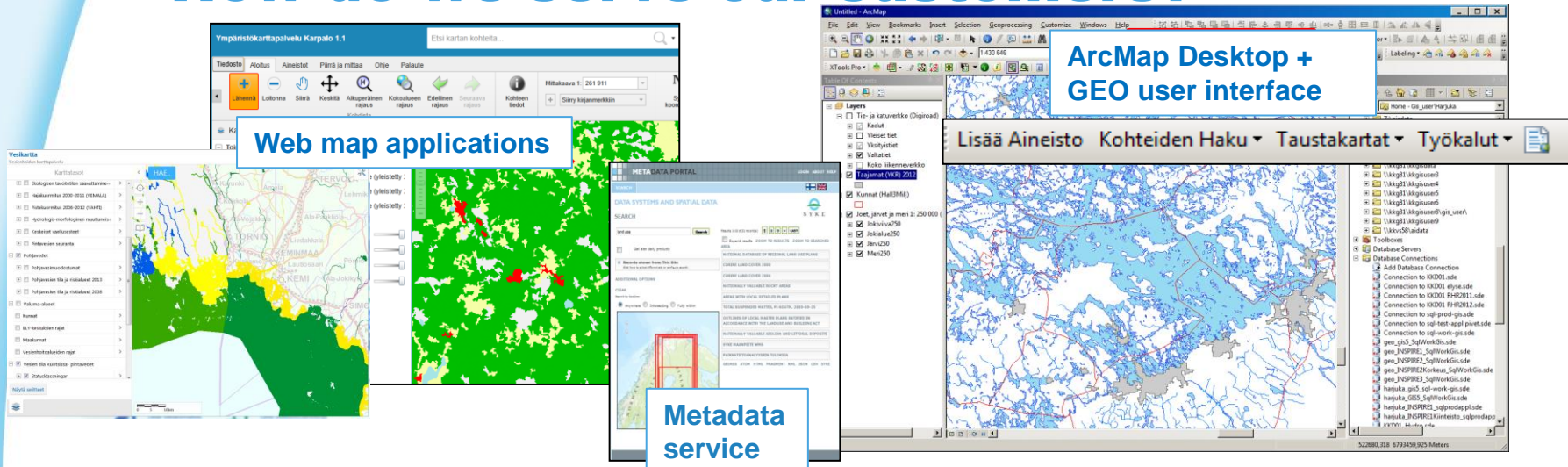
~ 200 different users
~ 40 users daily



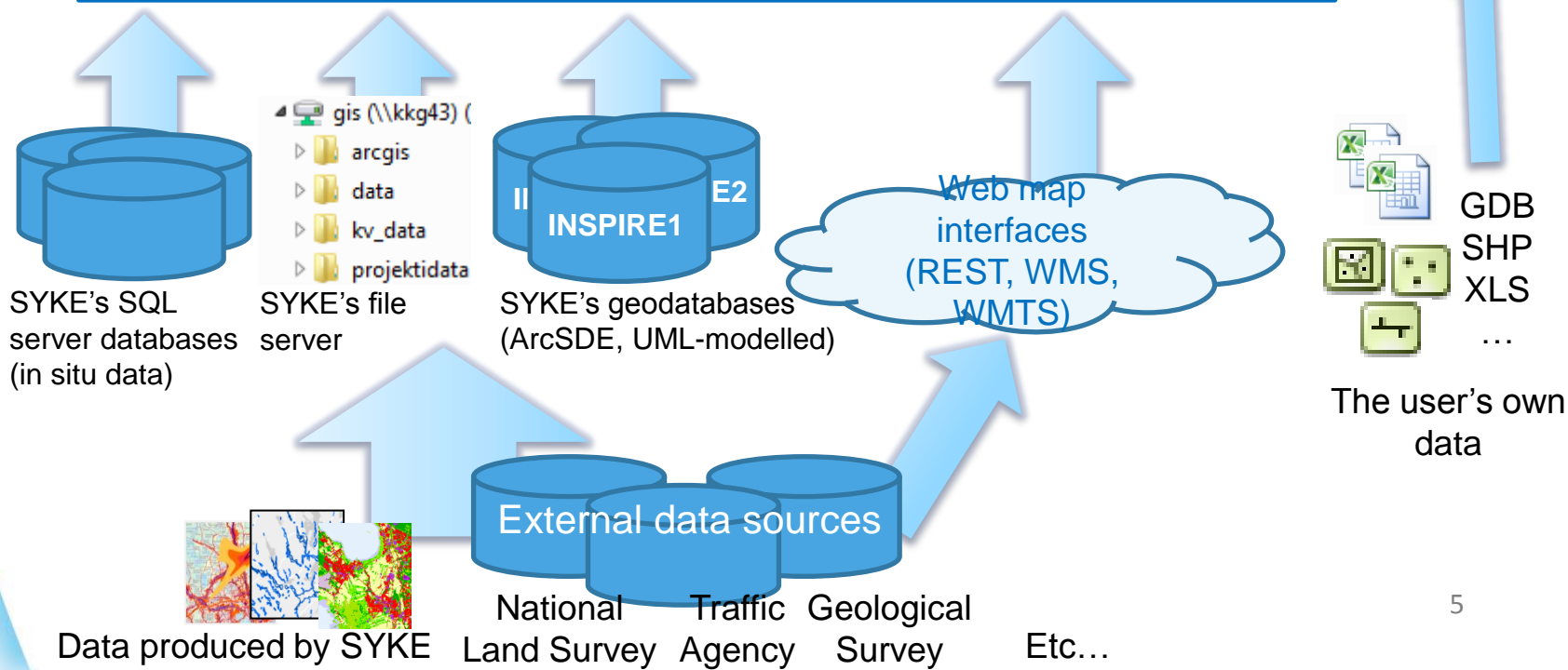
~ 500 different users
~ 200 users daily



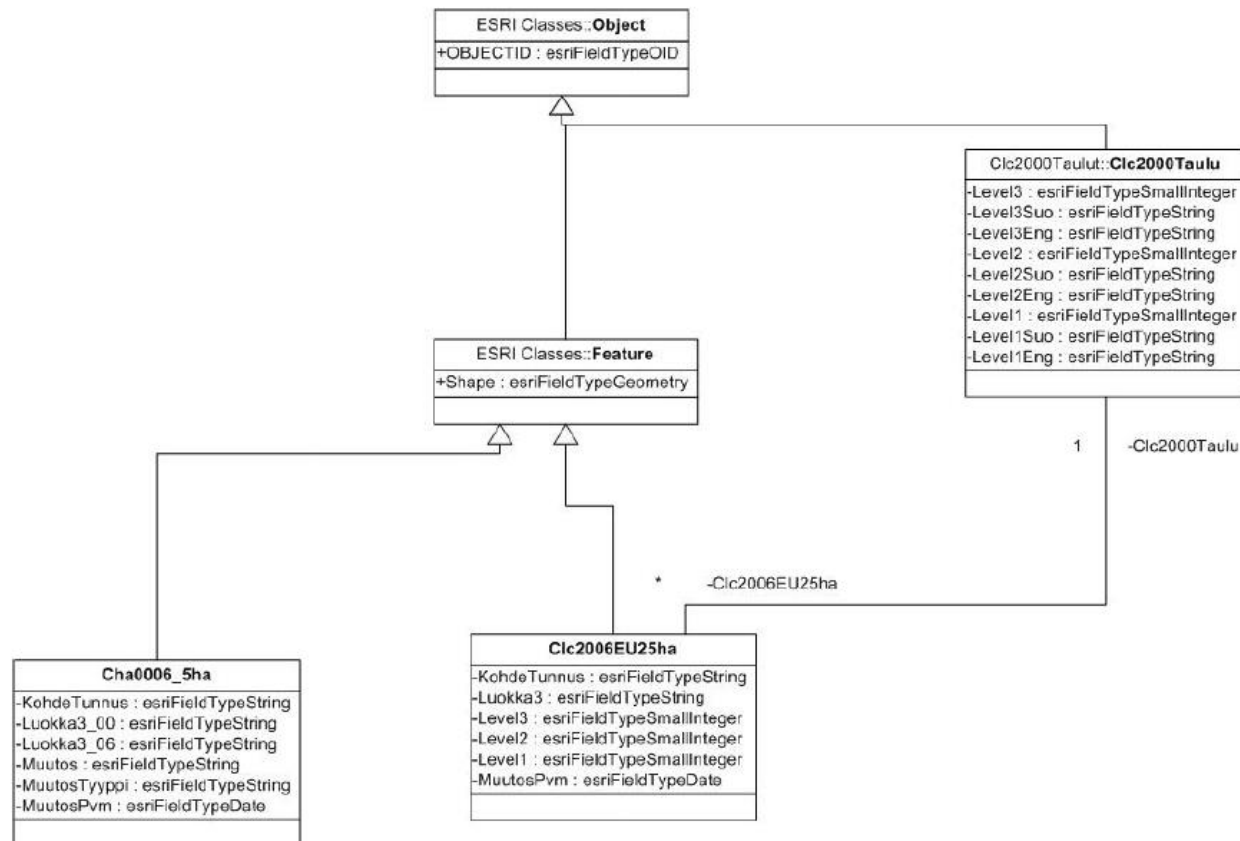
How do we serve our customers?



Data management



Example: Corine Land Cover 2006 (Vector data)



- ArcGIS user interface (GEO): spatial view based on the UML model
- Based on the spatial views -> download packages (mainly zipped shapefiles)

SYKE's Internet services

- OIVA environment and spatial data service www.ymparisto.fi/oiva
 - Downloadable datasets covering the whole of Finland
 - Download service LAPIO for downloading datasets from a user-defined area
 - INSPIRE WMS services and Atom feeds
- Metadata portal metatieto.ymparisto.fi/geoportal/
 - Descriptions in Finnish and in English
 - Attribute descriptions and UML models
 - CSW Interface for harvesting INSPIRE compliant metadata
- Spatial data web service <http://paikkatieto.ymparisto.fi/gis>
 - ArcGIS Online

OIVA - Ympäristö- ja paikkatietopalvelu asiantuntijoille



OIVA - ympäristö- ja paikkatietopalvelu
Palvelun käyttöehdot

Ympäristöhallinnon paikkatietoaineistot
Latauspalvelu LAPIO
Koko Suomen kattavat aineistopaketit
WMS-rajapintapalvelut
ATOM-syöte

Ympäristöhallinnon paikkatietoaineistot
Paikkatietoaineistot saa käyttöön lataamalla ne latauspalvelu LAPIO:sta tai koko Suomen kattavien aineistopakettien listalta. Latauspalvelu LAPIO on karttakäyttöliitymä, jossa aineistoja voi leikata kunta-, maakunta- tai suora- ja rajajaukoilla. Osa aineistoista on käytettävissä myös WMS-rajapintapalveluina. Lisäksi aineistojen lataamisessa voi hyödyntää INSPIRE-direktiivin mukaista atom-syötettä.

Paikkatietoaineistot ovat ETRS-TM35FIN-koordinaatistossa ESRI shape-muodossa. Aineistojen sijaintitarkkuus vaihtelee. Aineistokohtaiset tarkkuudet on kerrottu kunkin aineiston metatietokuvauksessa. Linkki metatietopalveluun löytyy vasemmasta sivupalkista.

Aineistoja päivitetään pääsääntöisesti 2 kertaa vuodessa. Aineistopäivitysten ajankohdat vuonna 2015 ovat 24.3., 26.5., 29.9. ja 1.12.

METATIETOPALVELU

PIKAOHJE HELP
SUOMEKSI IN ENGLISH

TIETOJÄRJESTELMÄT JA AINEISTOT

HAE METATIETOA

corine*

Katkaise hakusanat *-merkillä.
 Hae myös päivittävät kaukokartoitustuotteet

Metatietopalvelut: SYKEN metatietopalvelu
Klikkaa tästä hakeaksesi tietoja muista palveluista.

TARKENNA HAKUEHTOJA

TYHJENNÄ
Hae kartalta rajaamalla (shift+hiiren painike)
 Ei aluerajausta Osuu rajaukseen Kokonaan sisäpuolella

Hakutulokset 1-8 / 8

Avaa KOHDISTA TULOKSIIN ALKUPERÄINEN RAJAUS

CORINE LAND COVER 2000
CORINE LAND COVER 2006
CORINE MAANPEITE 2000
CORINE MAANPEITE 2006
CORINE MAANPEITE 2012
CORINE Land Cover 2012 kuvaa koko Suomen maankäyttöä ja maanpeitettä vuonna 2012. SYKessä EU:n Copernicus GioLand-hankkeessa tuotettiin Suomen alueelta maanpeiteaineistot sekä laadittiin maanpeitteen muutoksia vuosilla 2006-2012 kuvaavat aineistot. Aineist...
WWW-SIVU METATIETOKUVAUS METATIETO-XML KOHDISTA

SYKE
Suomen ympäristökeskus



Tervetuloa käyttämään SYKEN paikkatietopalveluita!

Tämän sivuston kautta saat käyttöön SYKEN paikkatietoaineistot, -rajapinnat ja -sovellukset. Paikkatietopalvelumme ovat vapaasti kaikkien käytettävissä ja ne tarjoavat monipuolista tietoa niin kansainvälisestä kuin rakennetusta ympäristöstämme.

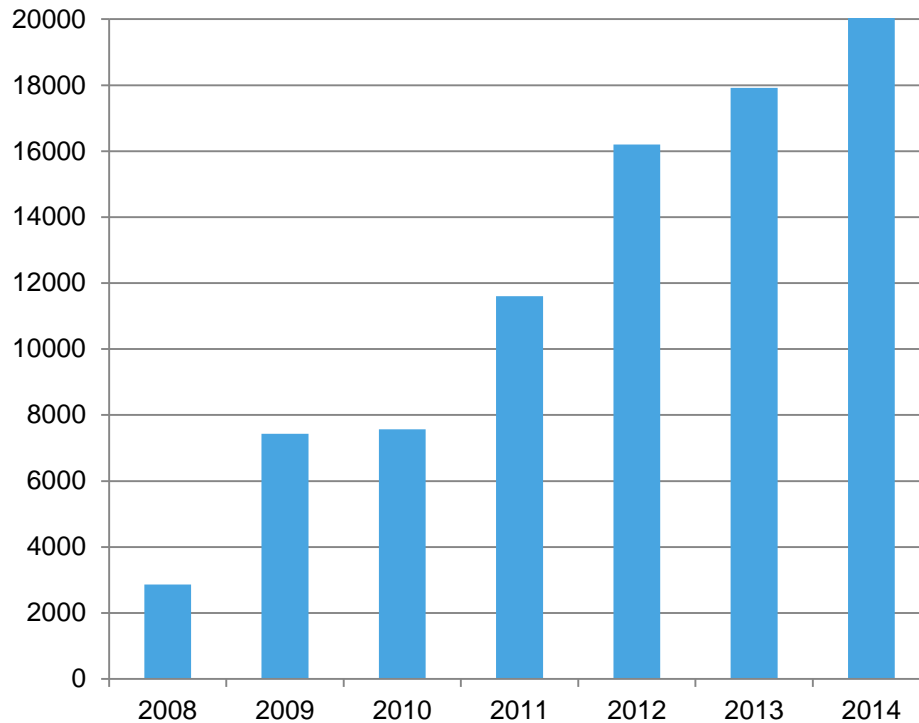
Lataa paikkatietoaineistoja Latauspalvelu Lapiossa

Tutustu aineistokuvaukseen Metatietopalvelussa

Palaute ja kysymykset | Lisätietoja Suomen ympäristökeskuksesta

Downloaded data sets

Downloaded data packages in total
data sets covering the whole country www.ymparisto.fi/oiva



Downloaded TOP 5 in 2014 (N=45)

1. Ground water bodies (GE)
2. Natura 2000 sites (PS)
3. Drainage areas (HY)
4. Nature protected areas (PS)
5. Corine Land Cover 2006 (LC)

INSPIRE WMS services and requests

ArcGIS REST Services Directory

[Home](#) > [services](#) > [INSPIRE](#)

[JSON](#) | [SOAP](#)

Folder: INSPIRE

Current Version: 10.21

View Footprints In: [ArcGIS.com](#)

Services:

- [INSPIRE/SYKE_AlueidenHallintaJaRajoitukset1 * AM1](#)
- [INSPIRE/SYKE_AlueidenHallintaJaRajoitukset2 * AM2](#)
- [INSPIRE/SYKE_EliomaantieteellisetAlueet * BG](#)
- [INSPIRE/SYKE_Eliomaantieteet](#)
- [INSPIRE/SYKE_Geologia \(Map\)](#)
- [INSPIRE/SYKE_Geologia GE](#)
- [INSPIRE/SYKE_Hydrografia \(Map\)](#)
- [INSPIRE/SYKE_Hydrografia HY](#)
- [INSPIRE/SYKE_Korkeus \(Map\)](#)
- [INSPIRE/SYKE_Korkeus EL](#)
- [INSPIRE/SYKE_Luonnonriskialueet * NZ](#)
- [INSPIRE/SYKE_Luonnonriskialueet PS](#)
- [INSPIRE/SYKE_Maanpeite \(Map\)](#)
- [INSPIRE/SYKE_Maanpeite LC](#)
- [INSPIRE/SYKE_Ortoilmakuvat OI](#)
- [INSPIRE/SYKE_SuojellutAlueet](#)
- [INSPIRE/SYKE_YmparistontilanneSeuranta * EF](#)

The name of the service	2012	2013	2014
INSPIRE_SYKE_Korkeus EL - Järvien syvyyskäyrät	9 977 745	36 878 918	27 951 518
INSPIRE_SYKE_SuojellutAlueet PS - Luonnonsuojelualueet ja Natura-aineistot	4 701 690	8 969 923	12 129 251
INSPIRE_SYKE_Hydrografia HY - Valuma-aluejako ja uomaverkosto	4 860 695	7 392 199	10 315 080
INSPIRE_SYKE_Geologia GE - Pohjavesialueet	2 406 134	5 116 132	11 635 858
INSPIRE_SYKE_Ortoilmakuvat OI - Image-satelliite image mosaics	1 064 992	1 906 033	1 209 387
INSPIRE_SYKE_AlueidenHallintaJaRajoitukset1 * AM1 - Water bodies according to the Water Framework Directive (2. period) and the water management areas		1 948 016	3 148 868
INSPIRE_SYKE_Luonnonriskialueet * NZ - Flood risk areas and Flood risk zonesTulvariskialueet ja tulvavaaravyöhykkeet		1 910 472	3 587 542
INSPIRE_SYKE_YmparistontilanSeuranta * EF - Hydrological monitoring sites, monitoring sites for the water management areas and groundwater bodies		1 437 017	2 592 326
INSPIRE_SYKE_Maanpeite LC - Corine Land Cover	470 544	636 728	784 670
INSPIRE_SYKE_EliomaantieteellisetAlueet * BG - Forest vegetation zones, Mire vegetation zones		308 506	597 677
INSPIRE_SYKE_AlueidenHallintaJaRajoitukset2 * AM2 - Beaches according to he Bathing Directive and maasto- ja vesiliikenteen rajoitusalueet -aineistot		253 189	968 841

* Service published 4.6.2013

What does the INSPIRE service maintenance involve today and later? (minimum requirement: twice a year) *Two weeks before?*

In year 2017: Automatic ETL-processes? National -> INSPIRE data	<i>Two weeks before?</i>
<p>Manual updating and publishing of the INSPIRE WMS services in an internal testing environment</p> <p>Updating (little effort): Updated data (file geodatabases) is manually copied</p> <p>Publishing new data/services (big effort): > 20 pages of instructions to reach INSPIRE WMS compliancy</p>	<i>Two weeks before</i>
Manual update of dataset and services metadata at the National INSPIRE metadata catalogue	<i>One week before</i>
<p>Notification of users about service maintenance/downtime, channels: National INSPIRE geoportal (Paikkatietoikkuna), Spatineo Monitor)</p> <p>Notification of changed/new services to the administrator of the national INSPIRE portal</p> <p>Semi-automatic update of the Atom-feeds</p>	<i>A couple of days before</i>
<p>Automatic copying of the data to the Internet environment</p> <p>Manual editing and copying of get capabilities documents</p> <p>Validation of the WMS services with Spatineo Monitor</p>	<i>The updating day</i>



LifeData project 2011-2015

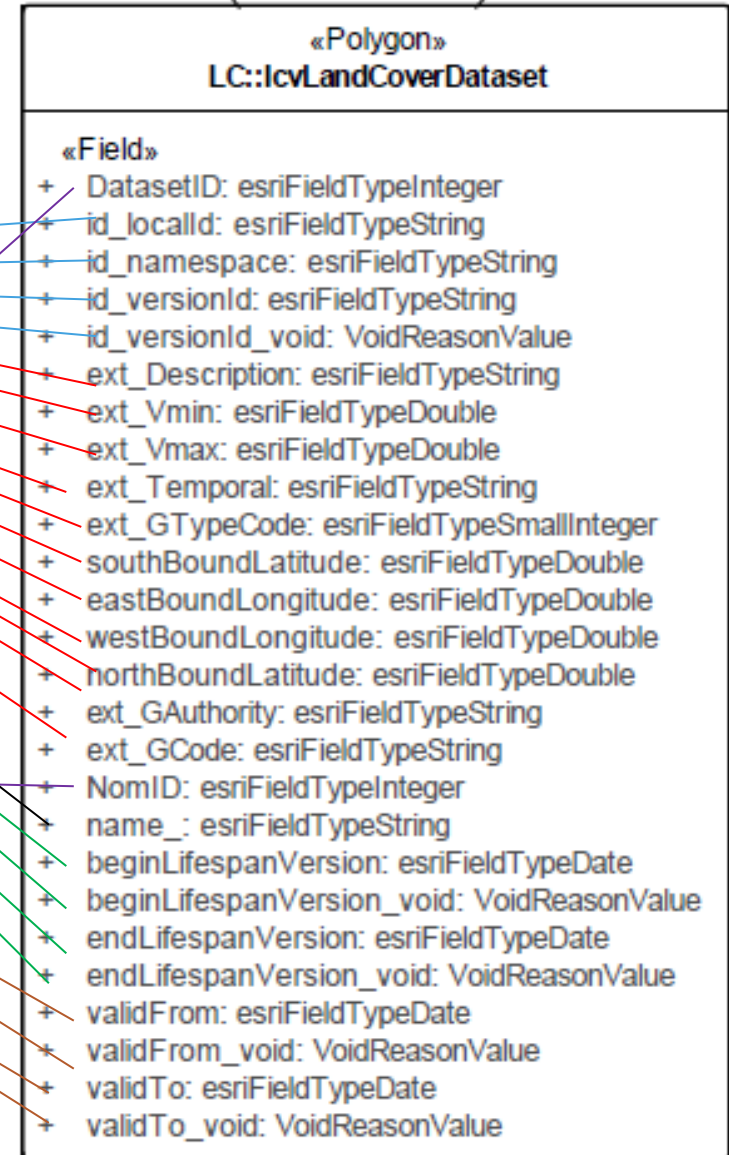
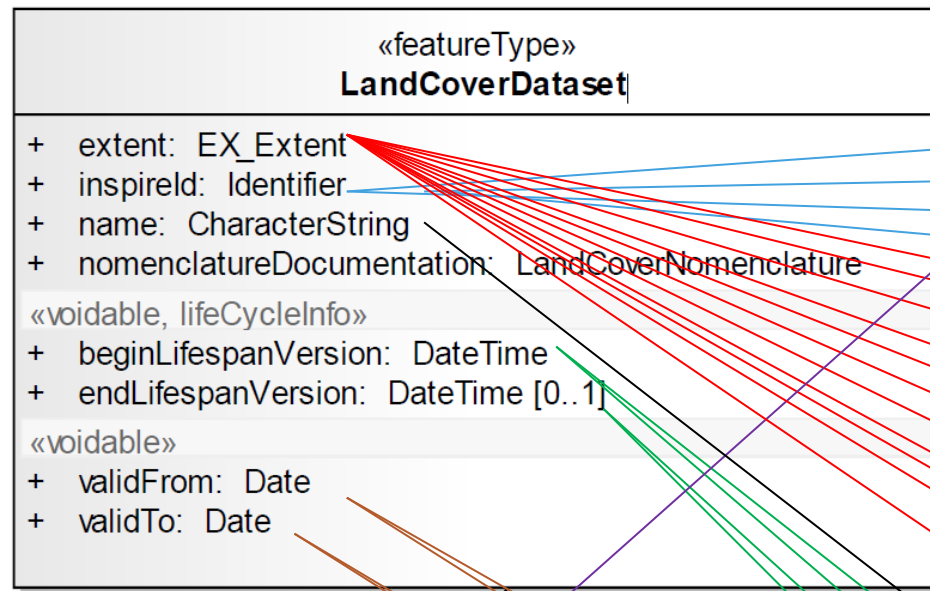
- Main objective: *The project develops new database management methods and user application systems and enables an easy access to databases.*
- Project partners represent the research centres for natural resources and environment
- Goals of the LifeData project in SYKE:
 - Can we also fulfil national demands/needs with INSPIRE when sharing our GIS datasets and using the INSPIRE data models?
 - Testing tools and finding out best practices



Data transformation tests

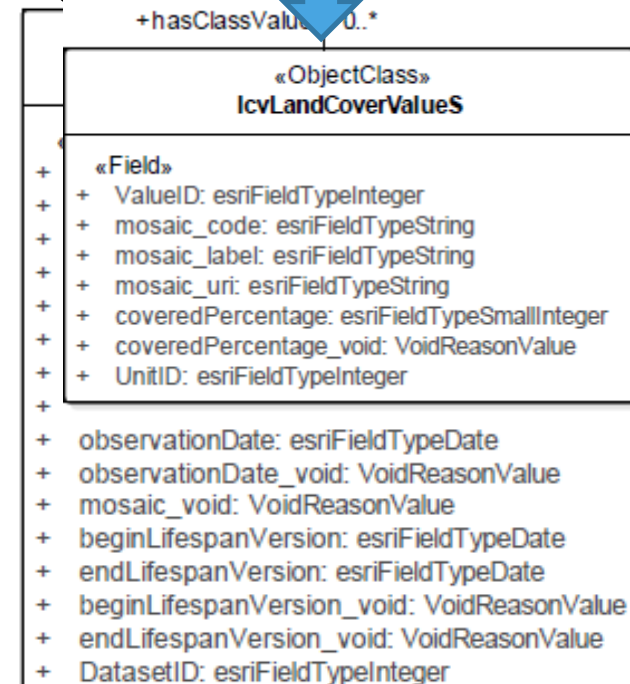
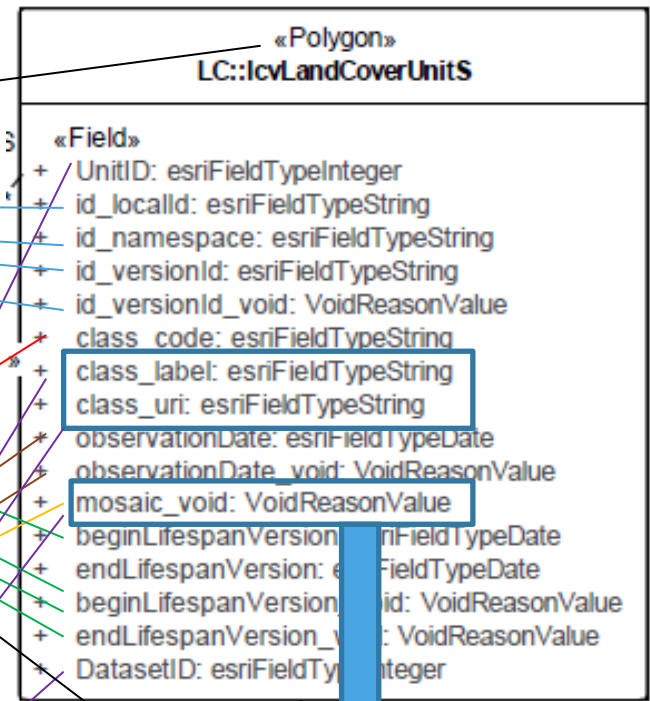
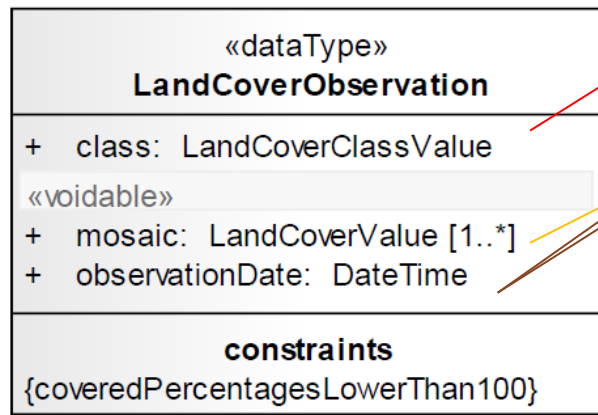
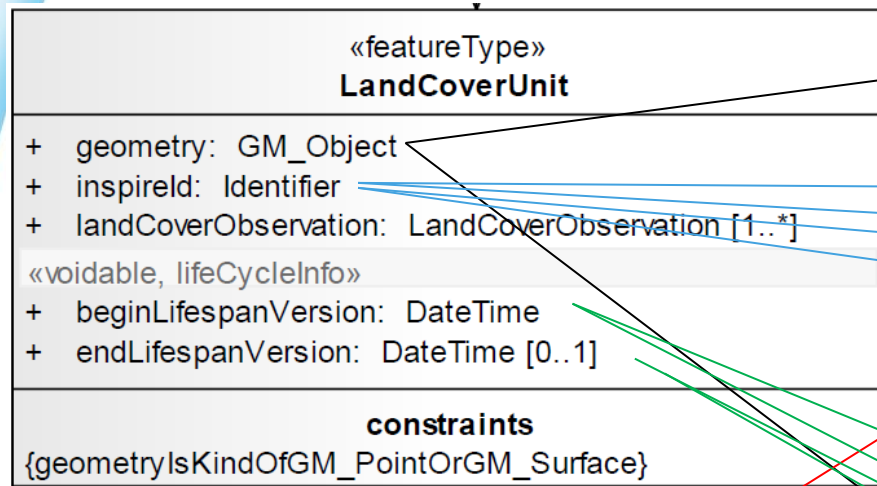
- Transformation of Corine Land Cover 2006 data into the Land Cover Core Vector data model
- ESRI LC Core Xml - > ESRI LC Core file geodatabase
- Attribute mapping and transformation in FME
- Email correspondence with EEA regarding the use of the CorineValue Code list and attributes related the code list owner
 - The answers of EEA have been shared at the platform for the INSPIRE Thematic Cluster for Land Cover and Land Use, for re-use by others
 - More information on the experiences will be shared in LifeData project reports and on the INSPIRE platform, in the Land Cover sub-group
 - Join INSPIRE Thematic Cluster Platform:
<https://themes.jrc.ec.europa.eu/>

Attribute mapping: DS LC versus ESRI LC



ESRI geodatabase ids (keys)

There are three options on how to implement the GeographicExtent of only one should be chosen:
 We chose Bounding Polygon +
 ext_GTypeCode (1) (ISO 19115: **extentTypeCode**)



Solutions other than in LC

DS: class_label, class_uri, mosaic_void, UnitID, DatasetID etc.

Experiences from the test

- A confusing mismatch between the ESRI LC attributes and the DS/GCM/ISO attributes
- A confusing mismatch between the ESRI data structure and the DS data structure
- All things cannot be found in the Data Specifications and the GCM
 - ISO standards
- The DS is not in always consistent. CorineClassValue = 111 or 1.1.1?

Questions and issues that rose

- Is INSPIRE compatibility possible without sharing vector data as GML-files in your Atom feeds or your WFS services?
 - “IRs do not oblige the usage of a specific encoding”
 - “This data specification proposes the use of GML as the default encoding”
- If we use restructured/flattened versions of the INSPIRE data models how can INSPIRE conformance be ensured?
- Not all GIS software can read INSPIRE GML by default
 - If we want to produce INSPIRE compliant WFS and/or Atom feeds and also fulfil the technical requirements of our users, it seems that we need to choose a software that does not only support the sharing of GML but also other formats

Conclusions

- Without INSPIRE we probably would not share as much data as we do today
 - In this sense we do serve our users better thanks to INSPIRE
- In the future the production line is likely to differentiate:
 - INSPIRE-compliant datasets and WMS and download services based on those + INSPIRE metadata
 - National datasets and WMS and download services based on those + our own more extensive metadata
- We need to learn more about ISO and OGC standards to not be dependent on the interpretations of others
- To ensure resource-efficiency and timely consistency
 - Need for automatic ETL processes, probably in FME
 - Transformation services?
 - We need to share examples and experiences

On the agenda in 2015

- Testing ArcGIS for INPSIRE
 - WMS
 - WFS
- EAGLE project financed by EEA (if accepted)
 - Data transformations:
Corine LC and Urban Atlas -> INSPIRE LC GML
- Technology investigation (Open Source)
- Learn more about standards
- Facilitate the implementation of INSPIRE in the Land Cover and Land Use themes



Thank you

- LifeData website: <http://www.metla.fi/life/lifedata/index.htm>