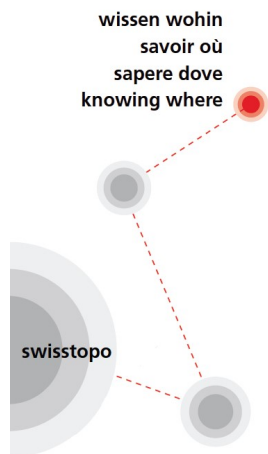




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Federal Spatial Data Infrastructure in Switzerland: Modeling, Harmonizing and Publishing Geospatial Data from Different Sources

Dr. Christine Najjar, Pasquale Di Donato, Dr. Patrick Gamma

**EUROSDR/AGILE/OGC/JRC/ELF WORKSHOP 'DATA MODELLING
AND MODEL DRIVEN IMPLEMENTATION OF DATA DISTRIBUTION'**

28 - 30 January 2015 Copenhagen



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Tools for Modeling



Tools for Implementing Models



Publishing Models



Metadata

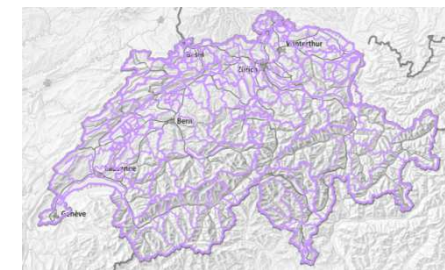
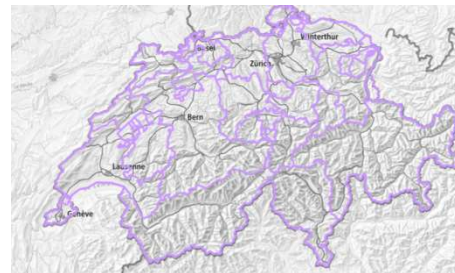
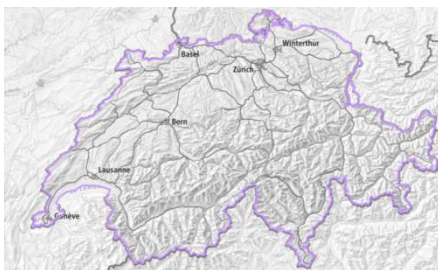
4. Data Management, Dissemination and Long-Term Availability



Situation in Switzerland

- Switzerland is a heterogeneous country with 4 official languages and organized as a federation of:
 - 26 Cantons
 - 2324 Municipalities
- Switzerland's administration is characterized by a high level of autonomy in Cantons and municipalities.

=>This political situation has a major impact on **organizational** and **technical** aspects of the Federal SDI (FSDI) and the way it can constitute an enabling platform at national level.





Legal Framework

- The **geoinformation law**, ratified 1st of July 2008, commits the federal offices and the cantons to provide harmonized basic geospatial data in their area of competence.
- The **geoinformation ordinance**, ratified 1st of July 2008, defines **354 basic geodata** sets.

The legal framework commits to:

- Create at least one **conceptual model** for each basic geodata set. INTERLIS is required as conceptual schema language
- Describe the data with a set of **standardized metadata**
- **Update** the data if necessary, and guarantee the **long-term availability** (i.e. keep older releases)
- Provide **view** and **download services**



Status Quo

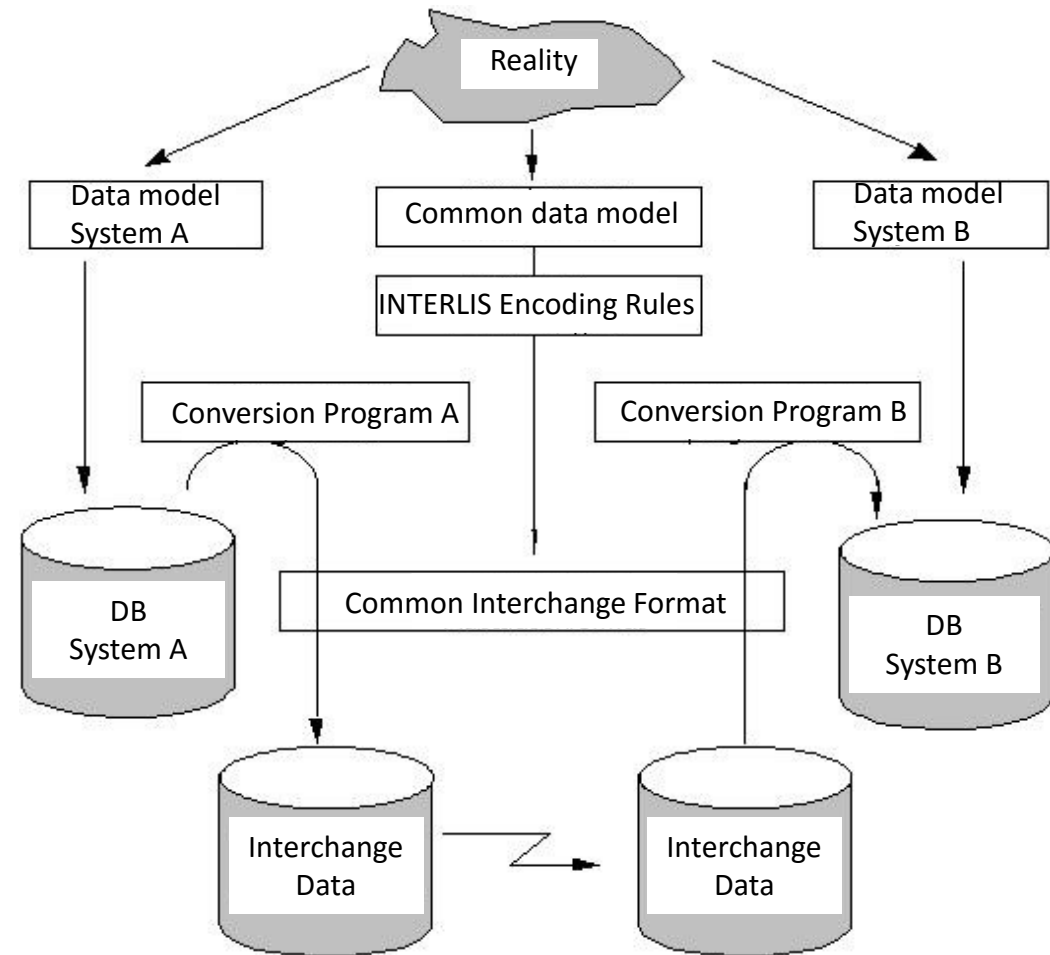
Currently...

- 51% of the **basic data models** have been ratified and published on the Model Repository. (models.geo.admin.ch)
- 48% of the federal basic geodata sets are offered as **view services** on the FSDI.
- 74% of the **metadata** of federal basic geodata sets are searchable in metadata application (geocat.ch).



Geodata Modeling in Switzerland

The **model-driven approach** has been used in Switzerland to describe spatial data on a system-independent level for 20 years.





Model-Driven Approach with INTERLIS in Switzerland

- Spatial data models are described in **INTERLIS**, a **conceptual description language** with a corresponding **transfer format**.
- Currently, INTERLIS 2.3 (textual description; mandatory) is used together with **UML** (graphical description: optional).
- **XML-based encoding rules** are available in order to generate the transfer format.
- **GML** encoding rules are also available since 2011.
- Data exchange is so far mainly **file-based**.



Geodata Modeling in Switzerland: History

- The need for a **standard exchange mechanism** in Switzerland dates back to late **1980's** and originates from the cadastral environment.
⇒ A detailed concept was launched, that led to the creation of the conceptual **description language** and **interchange format INTERLIS**.
- Data format for **INTERLIS 1** is text-based with ***.itf** extension
- The **core data model for cadastral survey** was based on INTERLIS and became an integral part of the new legal basis for digital cadastral survey in **1993**.
- INTERLIS became a **Swiss standard** in 1998 (SN 612030)



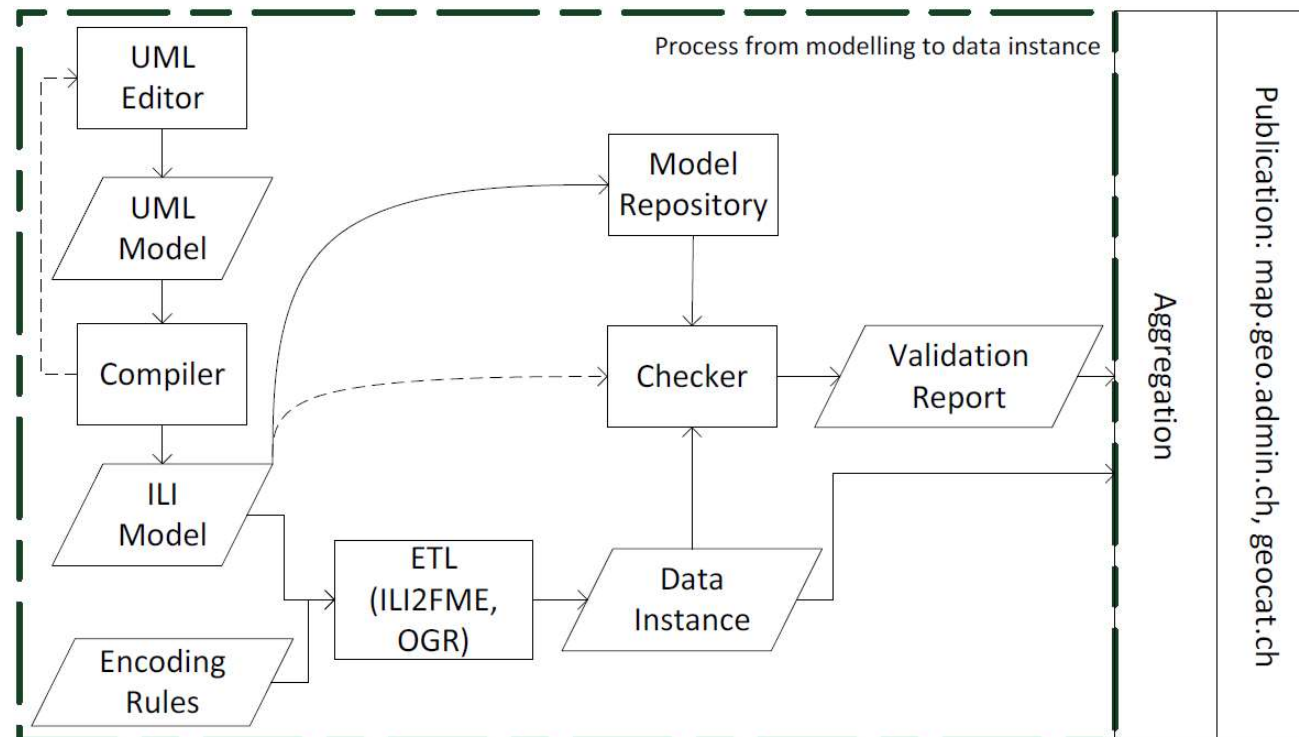
Geodata Modeling in Switzerland: History

- The increasing user-demand for **incremental updates, object orientation and use of XML as transfer format** led to the development of **INTERLIS 2 since 1998**.
- **Data format** for INTERLIS 2 is **XML-based** with a **.xtf** extension.
- INTERLIS 2 became a **Swiss standard** in 2003 (SN 612031)
- In 2011 a **GML encoding** of INTERLIS 2 was approved as eCH-Standard 0118



Geodata Modeling in Switzerland: Tools (I)

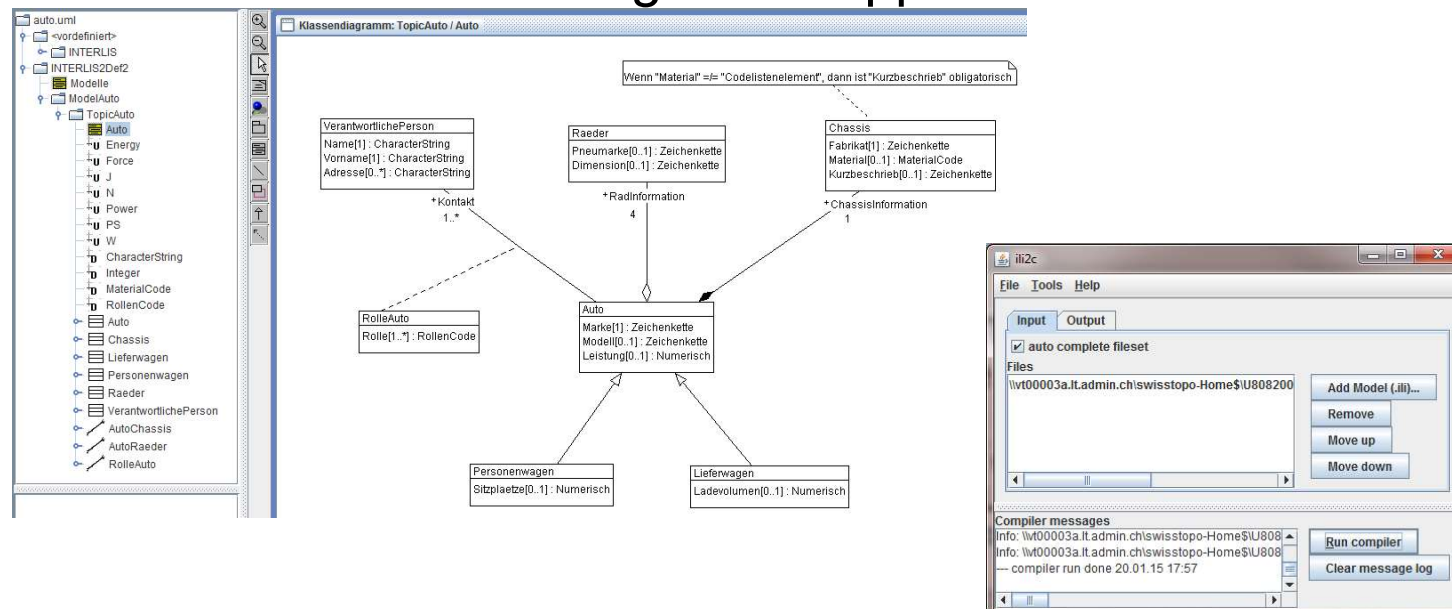
A set of tools has been developed and made available in order to support the entire process, from modelling to data instances:





Geodata Modeling in Switzerland: Tools for Modeling (II)

- The **INTERLIS-UML** editor offers **an intuitive, graphical interface** for the modeling on an application domain.

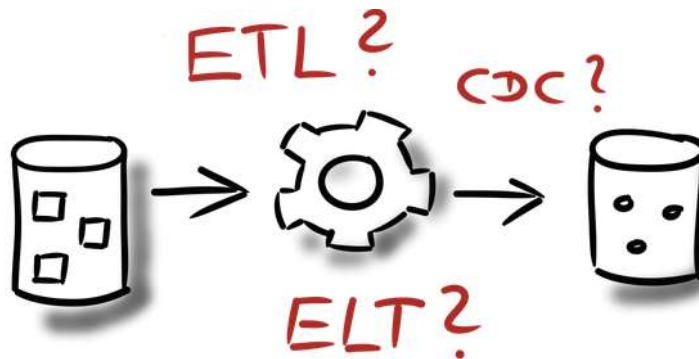


- The **INTERLIS Compiler** enables to check the **validity** and **consistency** of a data model and to derive its official and legally binding textual representation (so called ILI Model).





Geodata Modeling in Switzerland: Tools (III)

- Encoding rules for data instances in XML format are available;
- The **INTERLIS-Checker** enables to validate data instances against the respective ILI models.
- The ILI model and the encoding rules are the input of an **ETL process** to generate data instances:
 - ILI2FME is an FME plugin to read/write INTERLIS data;
 - OGR supports model-aware INTERLIS reading and writing





Geodata Modeling in Switzerland: Publication

- ILI models, including base models, are published and made available via the **Model Repository**. 
(<http://models.geo.admin.ch>)
- **Metadata** are generated, maintained and published via the web application called **geocat.ch**. 
(www.geocat.ch)



Metadata for Geodata Sets

- Metadata for basic geodata sets are **mandatory** by law.
- The Ordinance of the Federal Office of Topography on the Geoinformation (1st July 2008) prescribes the **Swiss standard** SN 612050 (**GM03** – a Swiss model for metadata) for the creation of metadata.
- GM03 is defined as **profile** of **ISO 19115/19119** and INSPIRE -ready
- Metadata are managed and published via the **web application geocat.ch** (GeoNetwork);
- Metadata are also published and searchable via a **CSW**.

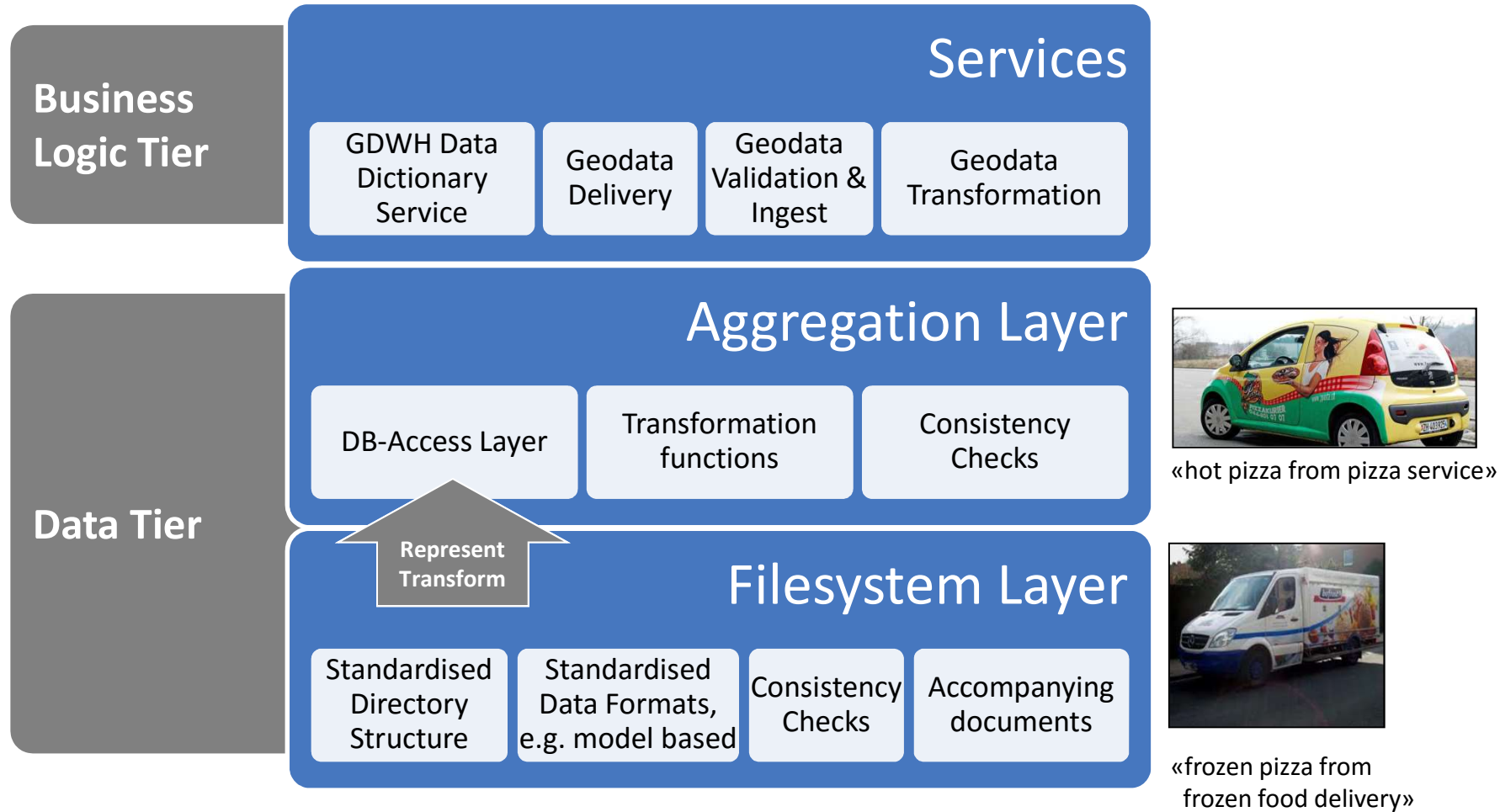


Long-term Availability of Data in the Swiss Federal SDI

- **Conserving** geodata on a long-term basis implies keeping it
 - a) *findable* → metadata catalog (geocat.ch)
 - b) *retrievable* → a safe storage system (see below)
 - c) *usable* → models; current GIS data formats
 - d) *documented* → additional documentation
- A storage system called **Geodata Warehouse** was built to support **long-term storage** of spatial data (vector & raster)
- The system stores **both the originally available** data as well as a **representation in current GIS technology** format
- For vector data: text-based INTERLIS interchange files (.xtf, .itf), where possible, along with the model (.ili) are stored
- Subsequent **migration to current technology over time** is comparably simple, or even archiving of the “package” (geodata + model + metadata + additional documentation)



Geodata Warehouse FSDI System architecture





<http://geo.admin.ch> Single Point of Access for Models, Metadata, Mapviewer & Geodata

geo.admin.ch: the federal geoportal

Search geodata...

2014 Public SWISS ICT AWARD

CONNECT

LAW

MAPS

NEWS

FAQ

TOP VIEWS

NEWS

video: geo.admin.ch in short

Swiss ICT Award: Significant distinction for map.geo.admin.ch

map.geo.admin.ch is now also available offline

How long do I have to drive from remote areas to centers in Switzerland? (ARE)

Swiss Geoportal @swiss_geoportal

[FR] Temps de parcours avec les transports individuels motorisés (TIM) vers un centre (ARE) bit.ly/1zdnipN pic.twitter.com/98RUjhxfb5

Base geodata

Full text search

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StoryMaps

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Geoservices

Advice and coordination

Task and responsibilities

Vision

Organisation

Legal framework



Map Viewer: map.geo.admin.ch

- **Basic geodata** sets are **integrated** into the Federal Spatial Data Infrastructure (either via Geodata Warehouse or directly)...
...and **published** on map.geo.admin.ch.
- The current implementation uses latest **web standards** (HTML5, CSS3, WebGL) in combination with open source **software components** (OL3, AngularJS and bootstrap);
- Behind the scene, a stack of web services in the **Amazon cloud** support the functionalities of the map viewer: this includes **OGC services** (WMS and WMTS mainly) plus several **REST services**;



Search location, maps, coordinates

Color map

Share

Print

Tools

Geocatalog Change topic

Base information and Planning

Nature and Environment

Population and Economy

Selection

hiking trails

Transparency



Close menu

