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Bundesamt für Landestopographie
Office fédéral de topographie
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Uffizi federal da topografia

Swiss Cadastral Core Data Model – Experiences of the last 15 years

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- History / Background
- Cadastral Data Model (introduced 1993)
- Experiences and Developments since
- Two Case Studies
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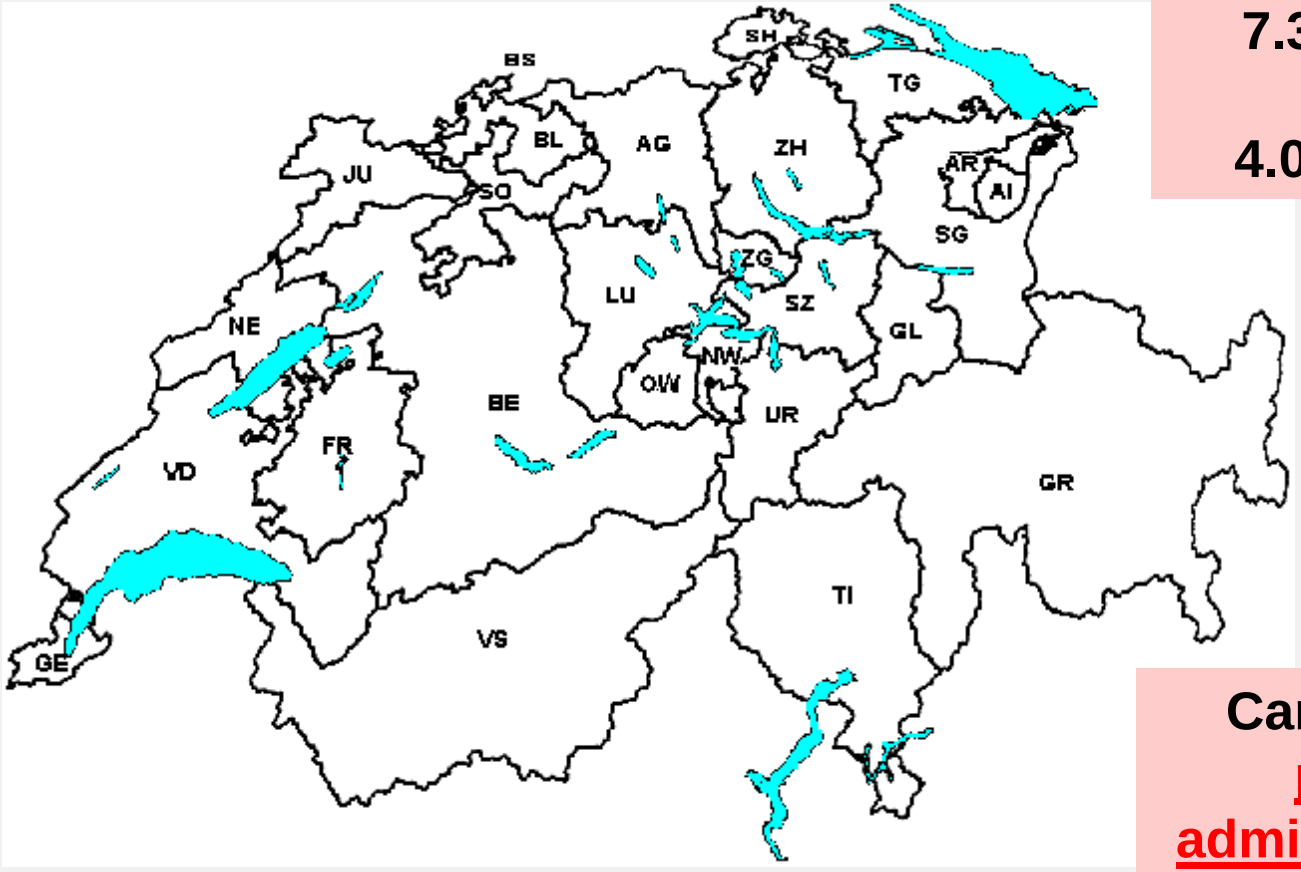
Switzerland: Federated Country with 26 Cantons…



7.3 million people
41'290 km2
4.0 million parcels

Cantons maintain political and administrative bodies on their own

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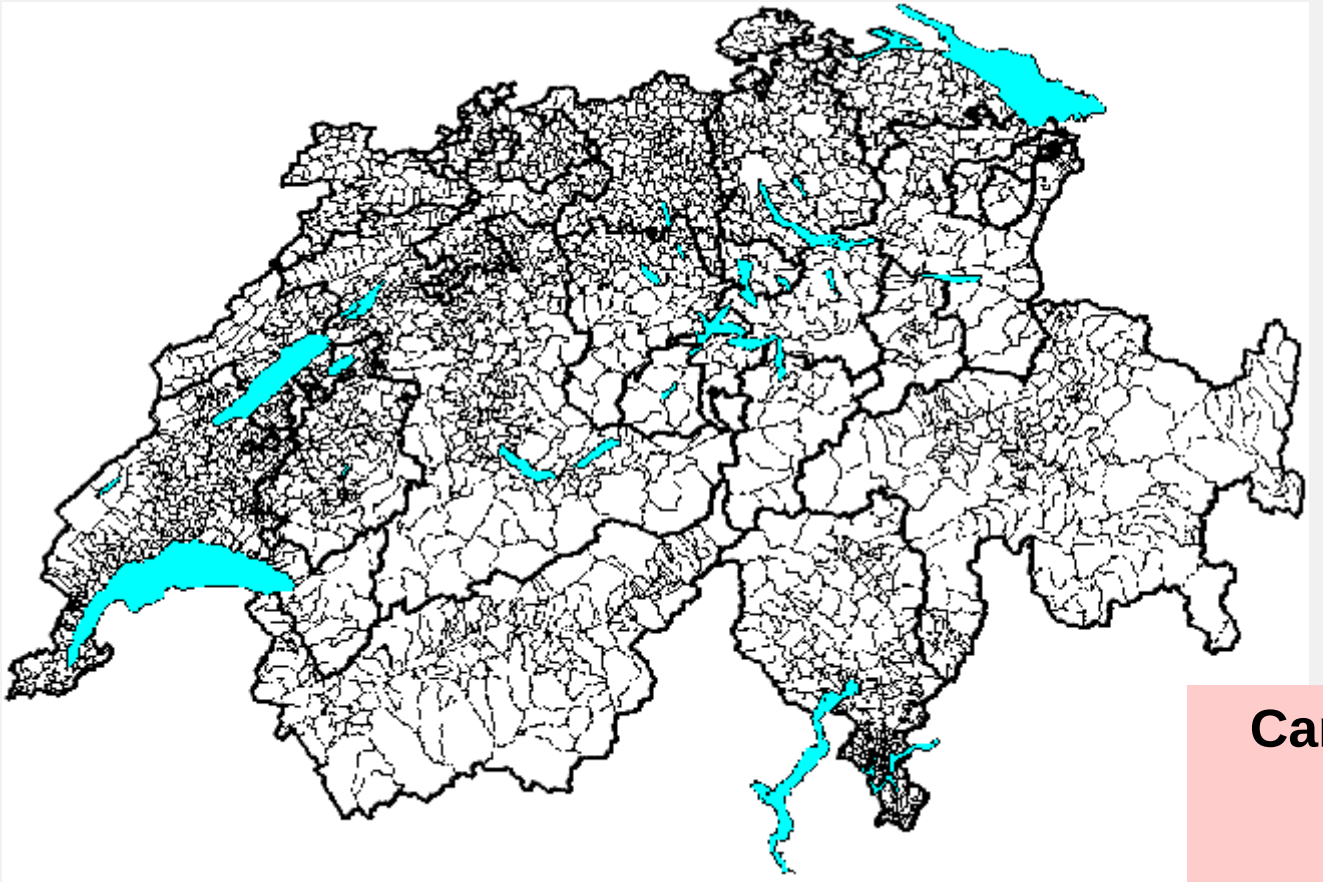
… and 2903 Municipalities



Cantons are further divided into municipalities

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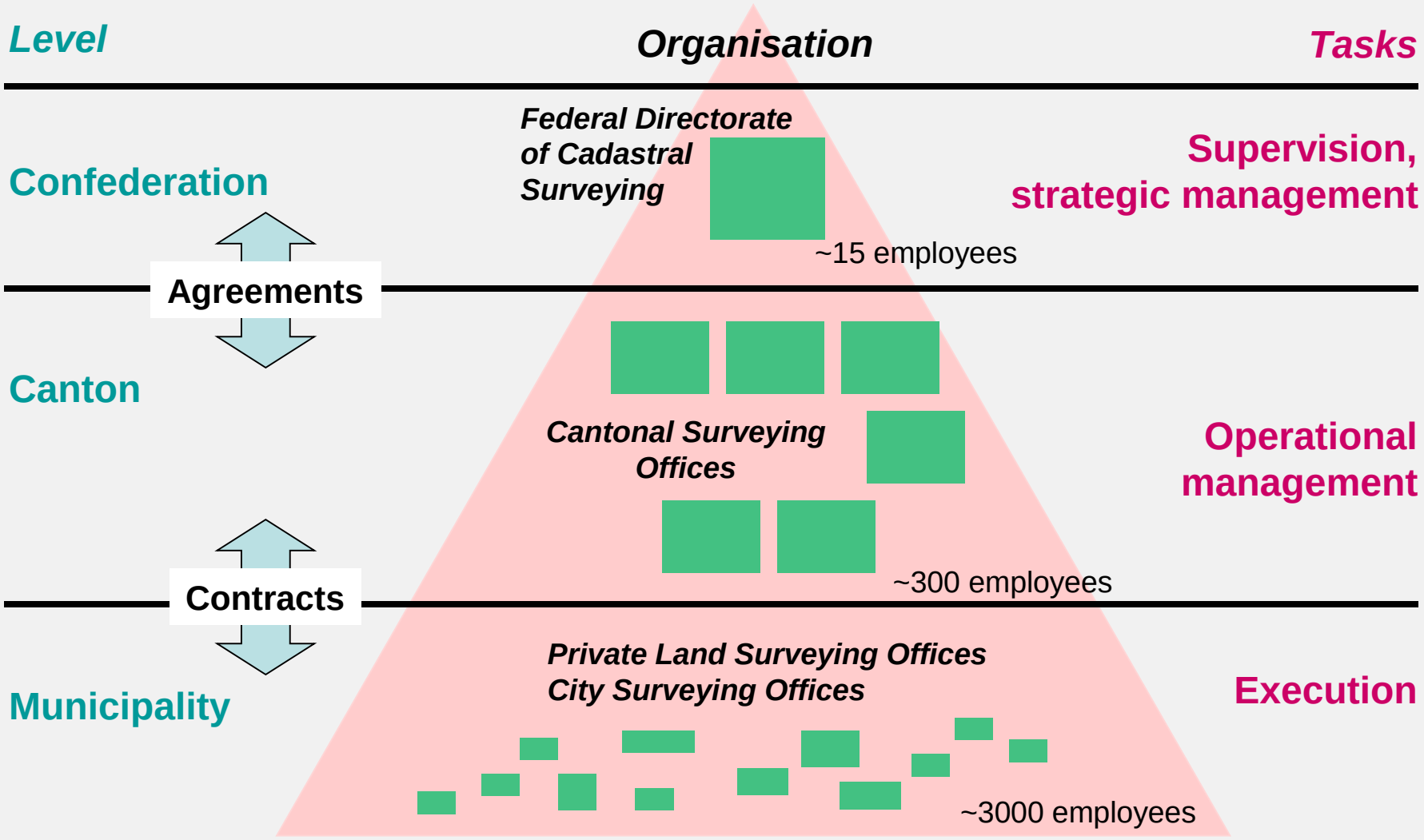
Organisation of cadastral surveying



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Reform of cadastral surveying (1980's)

Principles of Reform Project RAV:

- Minimum of regulations on the Federal level
- avoidance of double data acquisition
- increase of data actuality
- freedom of data acquisition method
- **data as basis for LIS as well (not only registry)**

1992

Legal basis for **AV93**:

- Ordnance for Official Surveying (**VAV, 1.1.1993**)
- Technical Ordnance for Official Surveying (**TVAV, 1.7. 1994**)

à extension of purpose (not only land registry, also land information in general)

à need of flexible data exchange mechanism

Reasons for data modelling

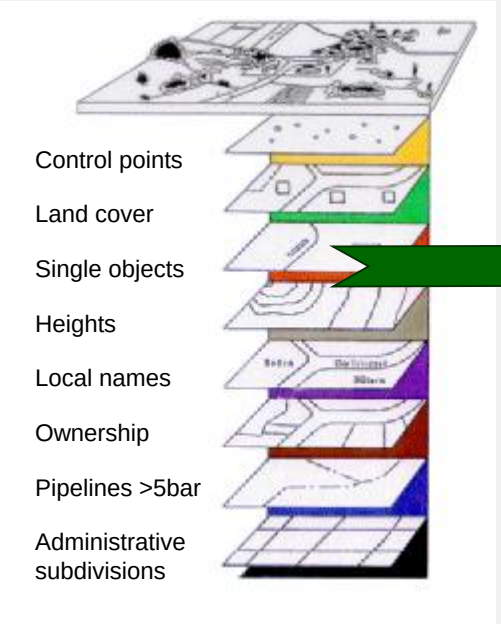
- high value of data vs. short life span of HW/SW
- data need to be transferred from older to newer systems
- devolution and networking (flexible and easy data sharing without information loss)

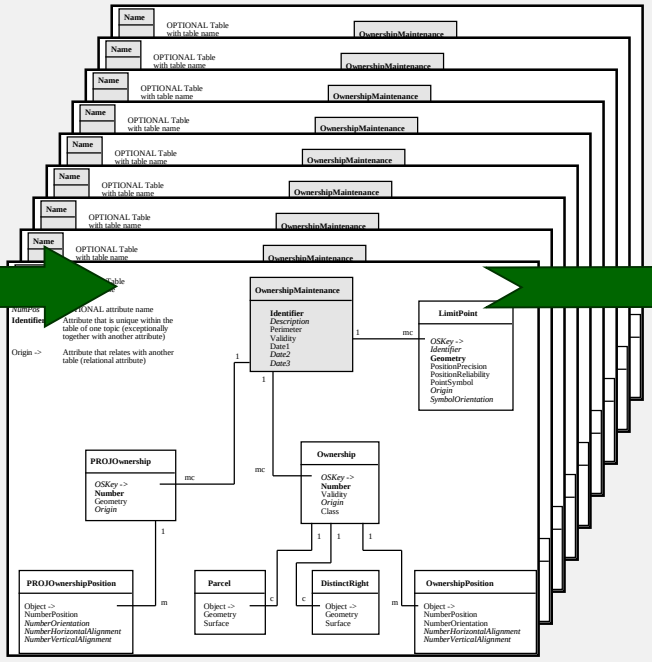
- product definition for introduction of tendering process (method and system independent) **à** model-based approach
- separation of data model and description language (data models always evolve, concept can be used for any other data model)

- quality checking and assurance
- long-time archiving

Core Data Model of Swiss Cadastral Surveying

Digital data description AV93 (introduced in 1993)






```
TRANSFER Data_Catalogue;
MODEL Basic_Data_Set
 DOMAIN
  LKoord = COORD2  480000.000   70000.000
                    840000.000  300000.000;
  HKoord = COORD3  480000.000   70000.000      0.000
                   840000.000  300000.000   5000.000;
  Height = DIM1  0.000  5000.000;
  Precision = [0 .. 300];
  Reliability = (yes, no);
  LetterOrientation = GRADS  0.0  400.0;
  Status = (planned, valid);

TOPIC Control_Points =
.........
END Control_Points;

TOPIC Land_Cover =
.........
END Land_Cover;

TOPIC Ownership =
  ...IN
  ...mentation = (border_stone, plastic_peg, cross,
                  not_monumented);
  OwnershipType = (parcel, distinct_right,
                  construction_right, water_source_
                  right);
TABLE LimitPoint =
   OSKey: OPTIONAL -> OwnershipMaintenance;
   Identifier:  OPTIONAL TEXT*12;
   Geometry:  LKoord;
   PositionPrecision:  Precision;
   PositionReliability:  Reliability;
   Origin:  OPTIONAL TEXT*30;
   SymbolOrientation:  OPTIONAL LetterOrientation;
   !! Default: 0.0
   IDENT
   Geometry;
 END LimitPoint;
END Ownership.
END Basic_Data_Set.
```

8 Information Layers
(Possibility to manage the layers separately)

Data Model (UML)
(8 Entity-Relationship-Diagrams)

Data Description Language INTERLIS

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INTERLIS

- object-oriented (can also deal with non-geographic data)
- effortless transfer of data without loss of semantic, topologic and geometric information
- complementary to UML (automatic generation of transfer file)
- clear distinction between real world object and its graphical representation
- structured language
- easily readable by humans

```
MODEL DM01AVCH24D

  TOPIC Liegenschaften =
   ......
   TABLE Grundstueck =
     Gueltigkeit: (rechtskraeftig, streitig);
     Art: Grundstuecksart; ......
   END Grundstueck;

   TABLE Liegenschaft =
     Liegenschaft_von: -> Grundstueck .....
   END Liegenschaft;

  END Liegenschaften.

END DM01AVCH24D.
```


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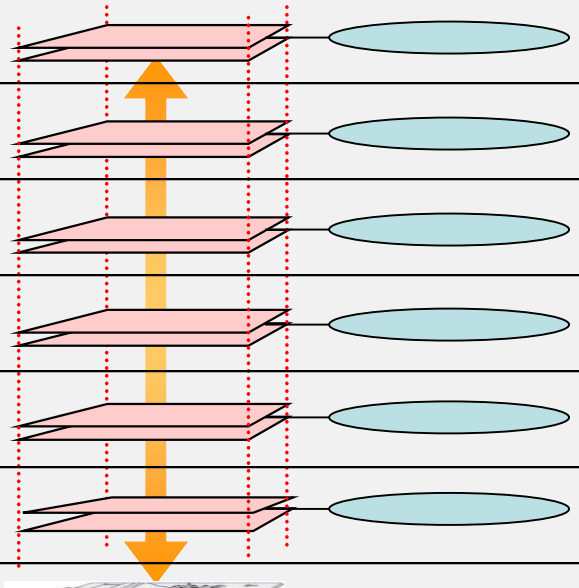
Possible Structure for LIS

Legal topic	spatial data / textual data	**Stakeholders (data owners)**
Water protection		Local government
Noise protection		Local government
Environmental protection		Environmental department
Land use planning		Planning department
Indigenous land rights		Tribe, clan
Collective land rights		Corporations
Land ownership, cadastre		National government State government Local government

Two preconditions:

common geodetic reference framework

common data modelling concept

Case Study DM.01

1994: introduction of data model "AV93"

Shortcomings in AV93 data model:

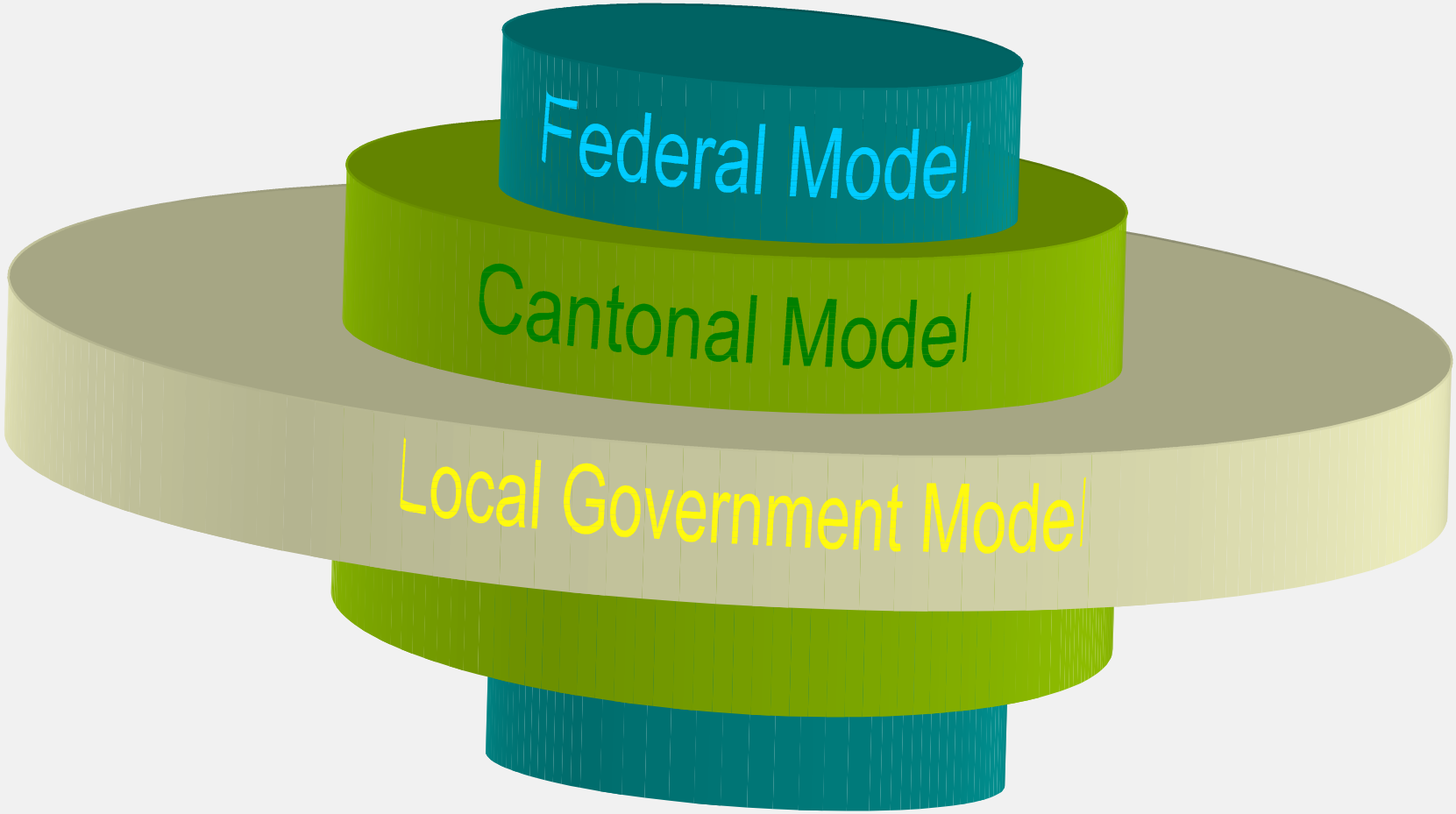
- one data model with cantonal options (for political reasons)
  - **à** heterogeneous development
  - **à** too many cantonal options
  - **à** no easy solution to consolidate data on federal level

2004: revised data model "DM.01"

Main changes are:

- one clearly defined federal data model
- hierarchy of data models (Cantons can add options to federal model, but have to provide data in federal model)
- checking of data becomes much easier **à** introduction of check service on Internet
- technical possibility of incremental updating (requires OID and INTERLIS2)

Federal Model as Core for Other Models



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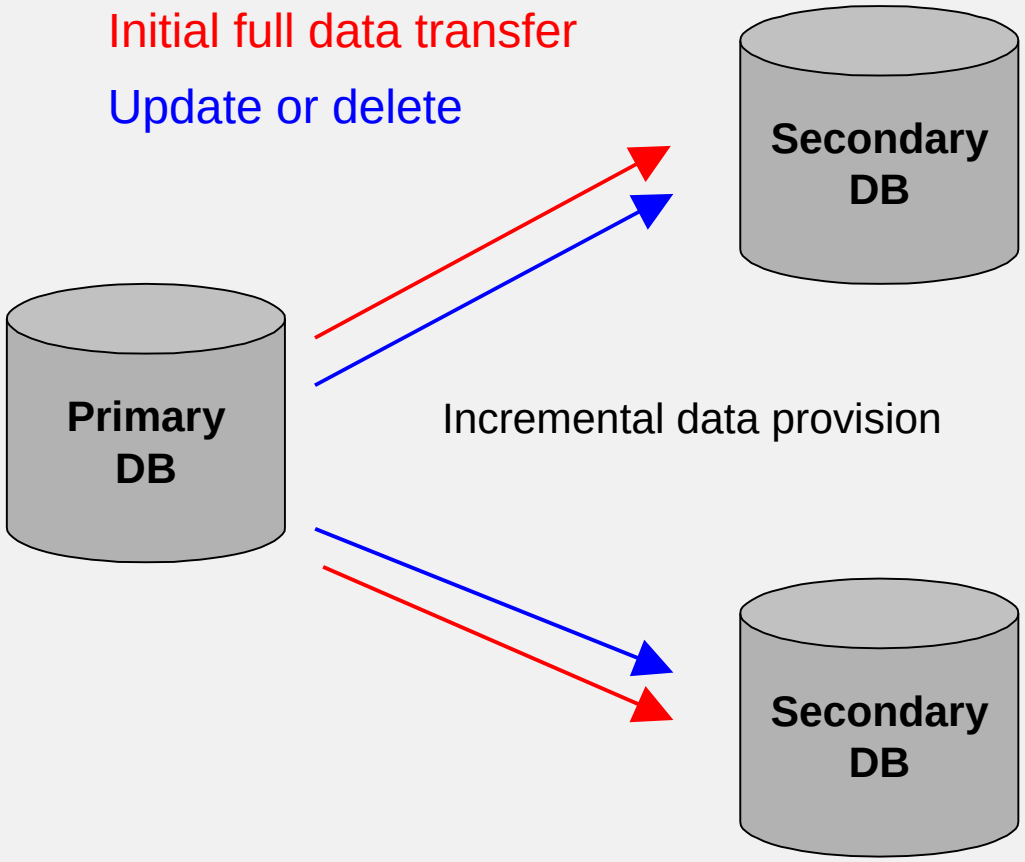
Incremental Updating with INTERLIS2



Incremental updating requires the introduction of an object ID (OID).

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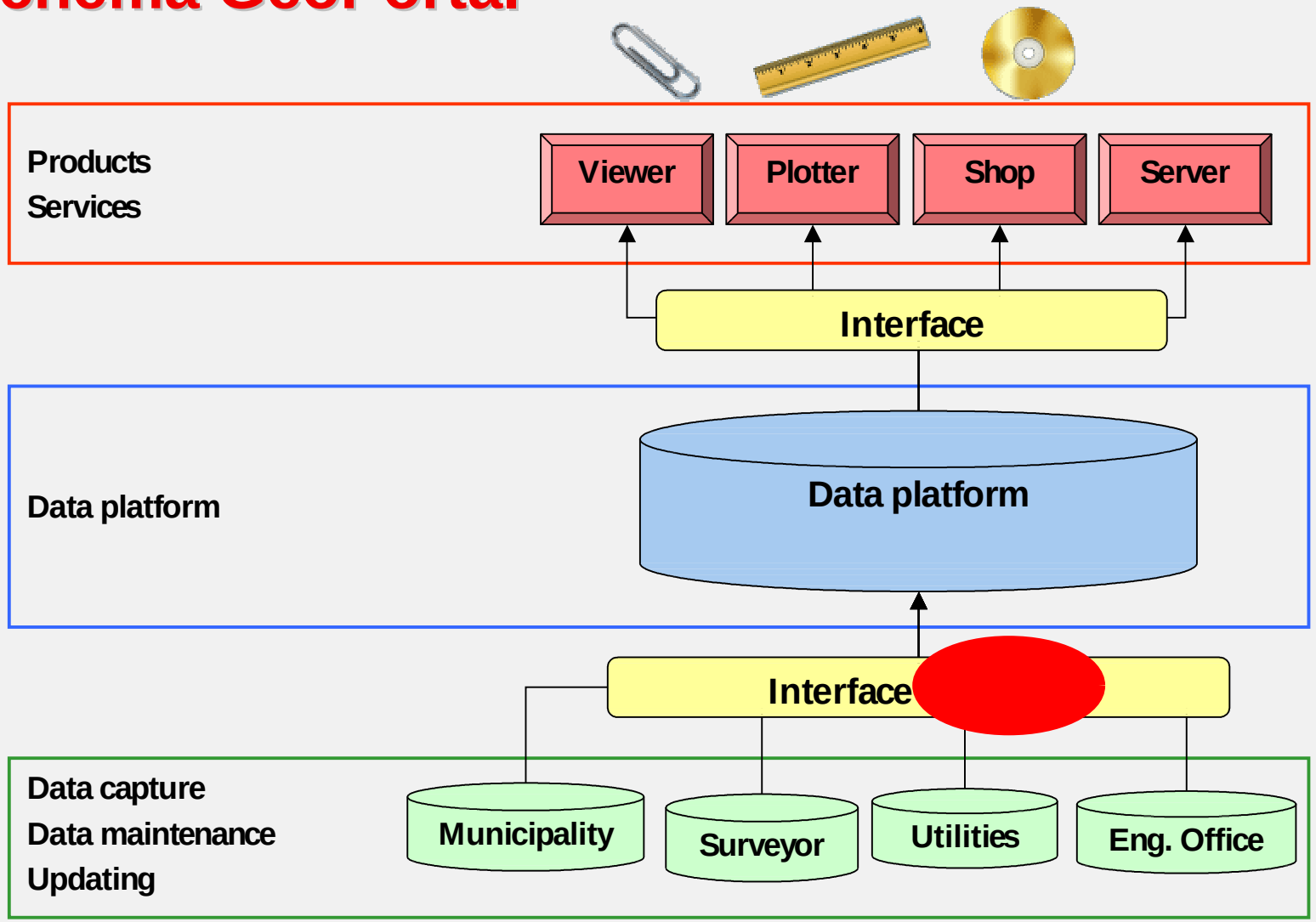
Strengths and Weaknesses of INTERLIS2 and GML3

	Strengths	Weaknesses
INTERLIS2	• precise and lean • version 1 already passed the test of practice • evolution rather than revolution • many software tools • UML and text	• only modelling and transfer • 'island' solution (national solution) • too good version 1 • yet unclear role of XML (schema) • how to deal with further extensions?
GML3	• large basis in market • pragmatic modelling language • part of a standard family • application language	• flood of versions • large and complex • restrictions of the XML schema • cryptic model descriptions • lack of practice • lack of producer support

(Nebiker, 2004)

Schema GeoPortal



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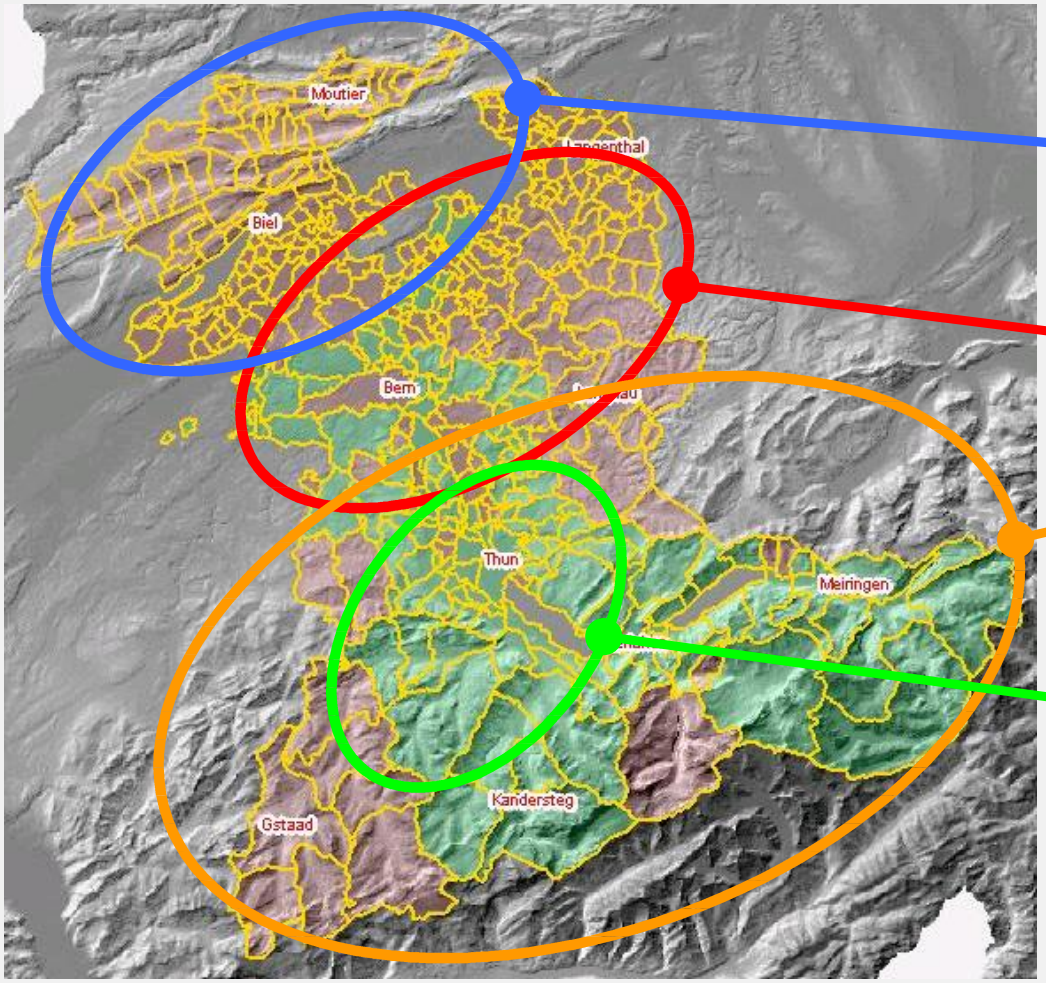
be-geo.ch



- Seeland / Jura
- Region Bern
- beodat
- Thun-Innertport

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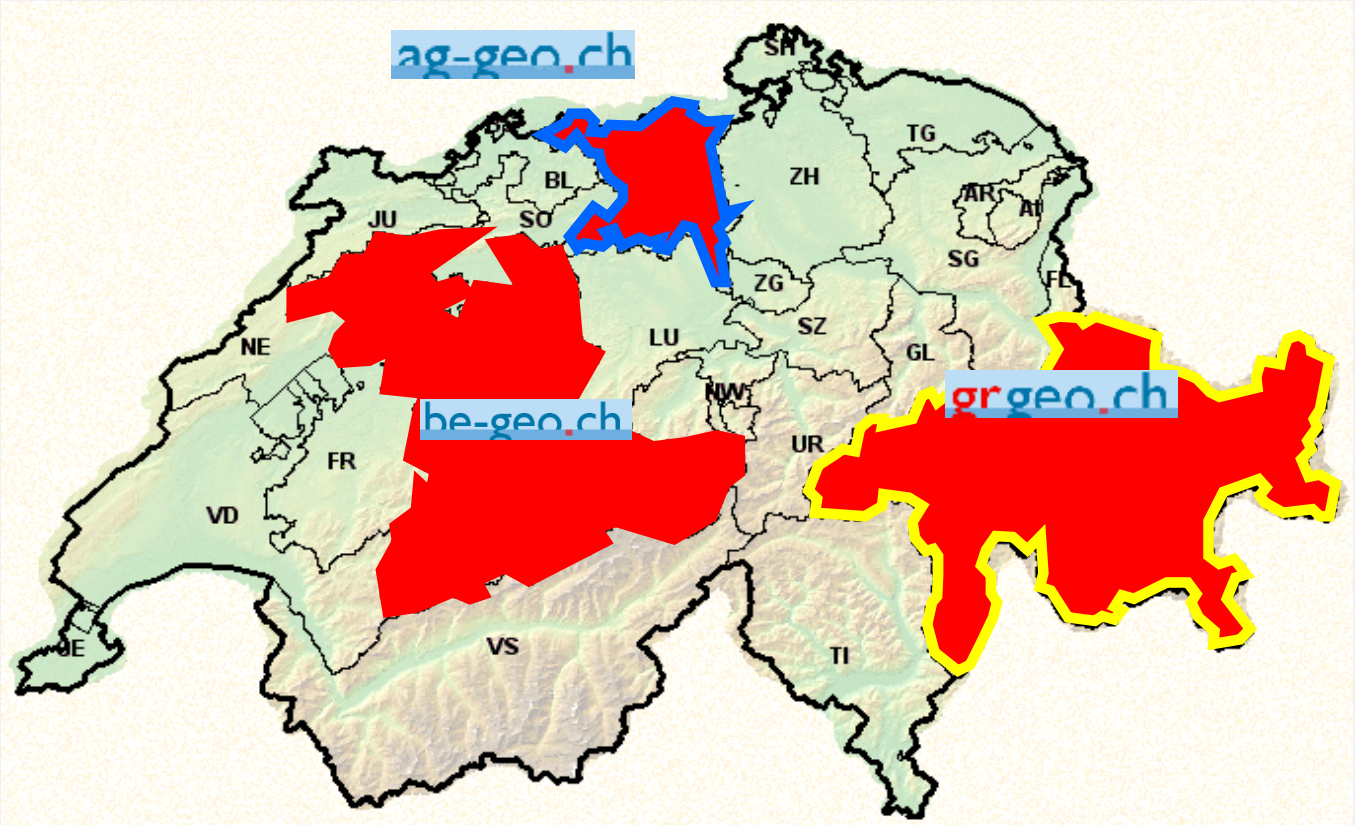
regio-geo.ch / e-geo.ch



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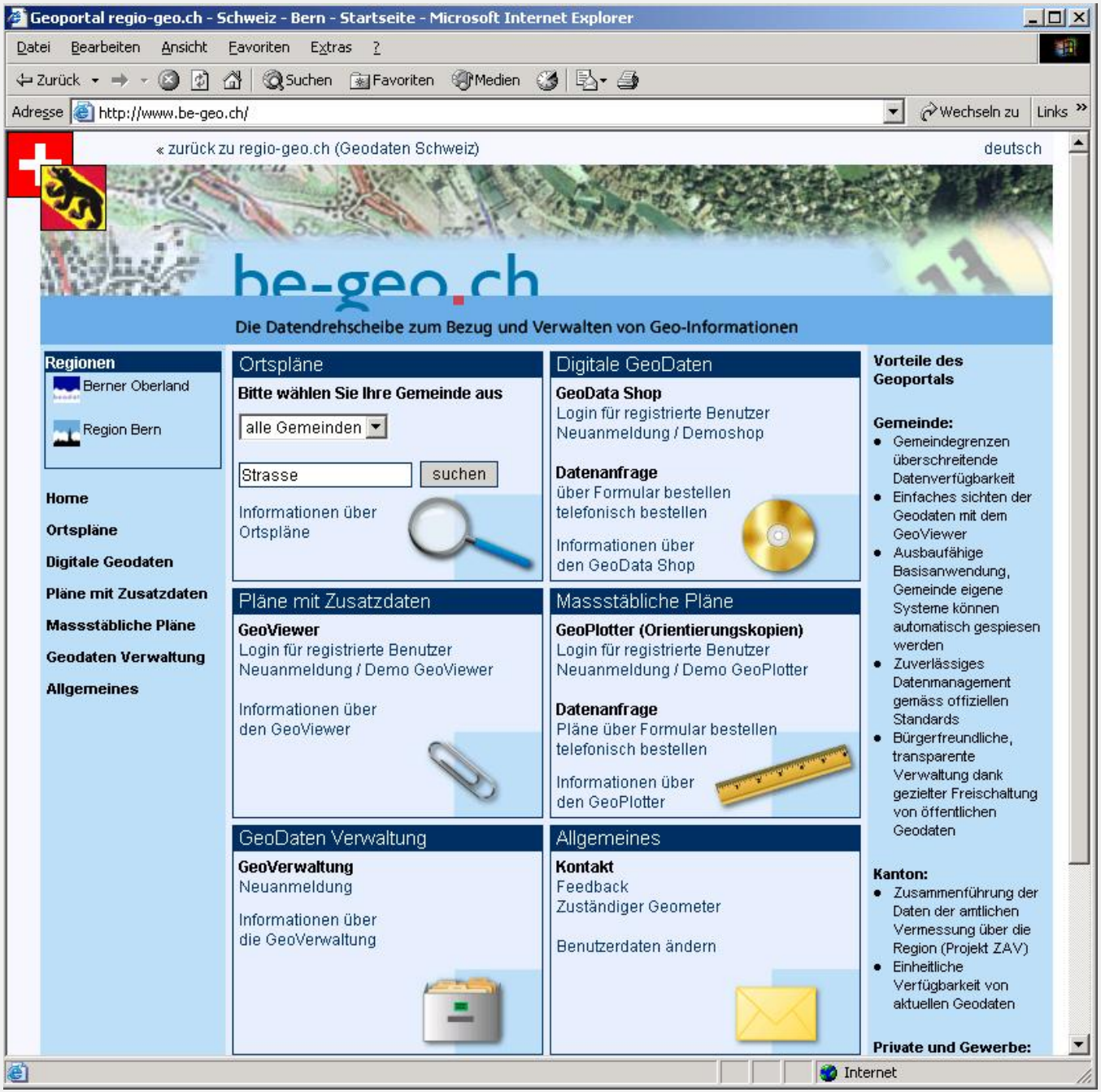
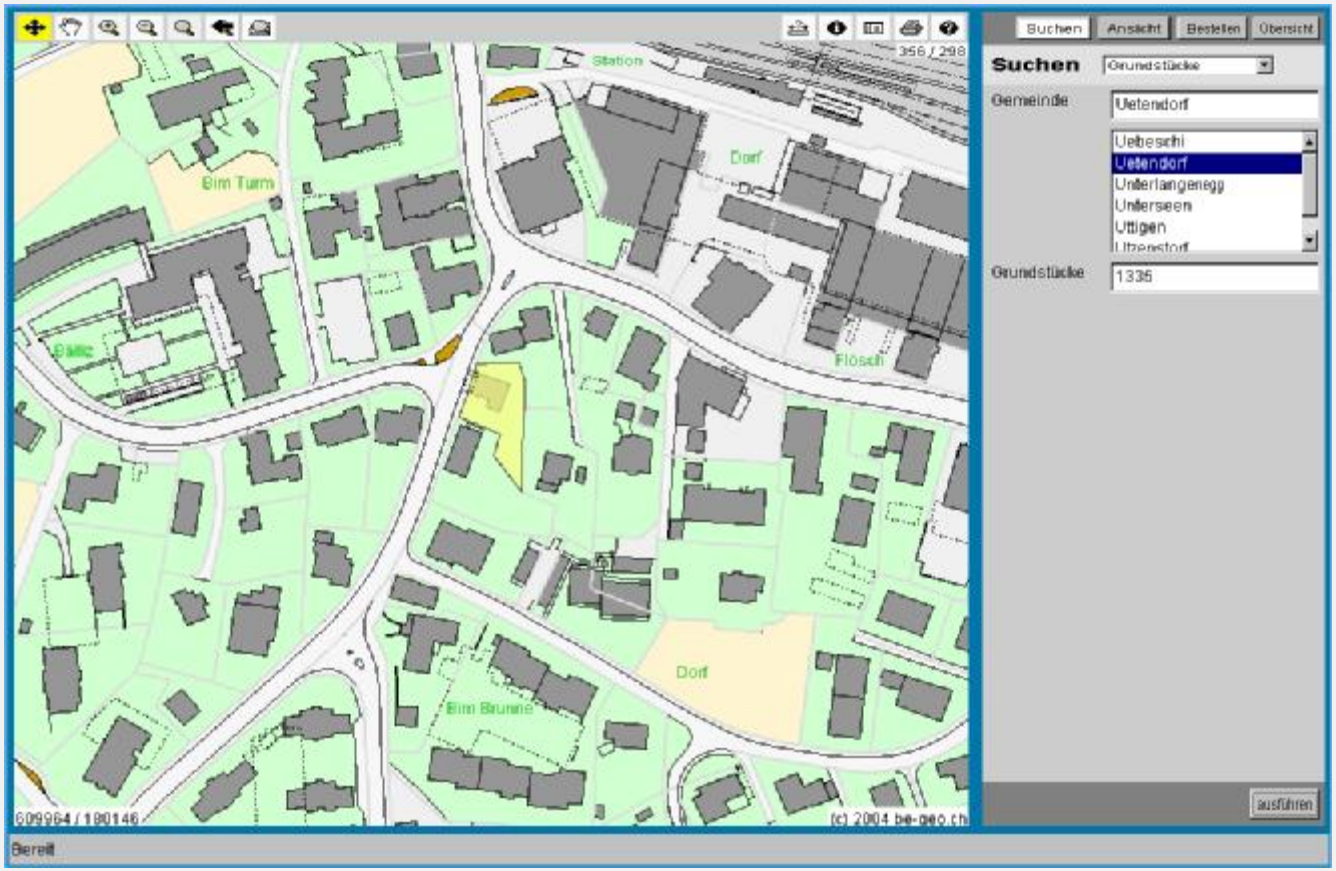

Geoportal regio-geo.ch - Schweiz - Bern - Startseite - Microsoft Internet Explorer
Datei Bearbeiten Ansicht Favoriten Extras ?
Zurück Suchen Favoriten Medien
Adresse http://www.be-geo.ch/
Wechseln zu Links
« zurück zu regio-geo.ch (Geodaten Schweiz)
deutsch
be-geo.ch
Die Datendrehscheibe zum Bezug und Verwalten von Geo-Informationen
Regionen
Berner Oberland
Region Bern
Home
Ortspläne
Digitale Geodaten
Pläne mit Zusatzdaten
Massstäbliche Pläne
Geodaten Verwaltung
Allgemeines
Ortspläne
Bitte wählen Sie Ihre Gemeinde aus
alle Gemeinden
Strasse
suchen
Informationen über Ortspläne
Digitale GeoDaten
GeoData Shop
Login für registrierte Benutzer
Neuanmeldung / Demoshop
Datenanfrage
über Formular bestellen
telefonisch bestellen
Informationen über den GeoData Shop
Pläne mit Zusatzdaten
GeoViewer
Login für registrierte Benutzer
Neuanmeldung / Demo GeoViewer
Informationen über den GeoViewer
Massstäbliche Pläne
GeoPlotter (Orientierungskopien)
Login für registrierte Benutzer
Neuanmeldung / Demo GeoPlotter
Datenanfrage
Pläne über Formular bestellen
telefonisch bestellen
Informationen über den GeoPlotter
GeoDaten Verwaltung
GeoVerwaltung
Neuanmeldung
Informationen über die GeoVerwaltung
Allgemeines
Kontakt
Feedback
Zuständiger Geometer
Benutzerdaten ändern
Vorteile des Geoportals
Gemeinde:
Gemeindegrenzen überschreitende Datenverfügbarkeit
Einfaches sichten der Geodaten mit dem GeoViewer
Ausbaufähige Basisanwendung, Gemeinde eigene Systeme können automatisch gespiesen werden
Zuverlässiges Datenmanagement gemäss offiziellen Standards
Bürgerfreundliche, transparente Verwaltung dank gezielter Freischaltung von öffentlichen Geodaten
Kanton:
Zusammenführung der Daten der amtlichen Vermessung über die Region (Projekt ZAV)
Einheitliche Verfügbarkeit von aktuellen Geodaten
Private und Gewerbe:
Internet

GeoData-Shop

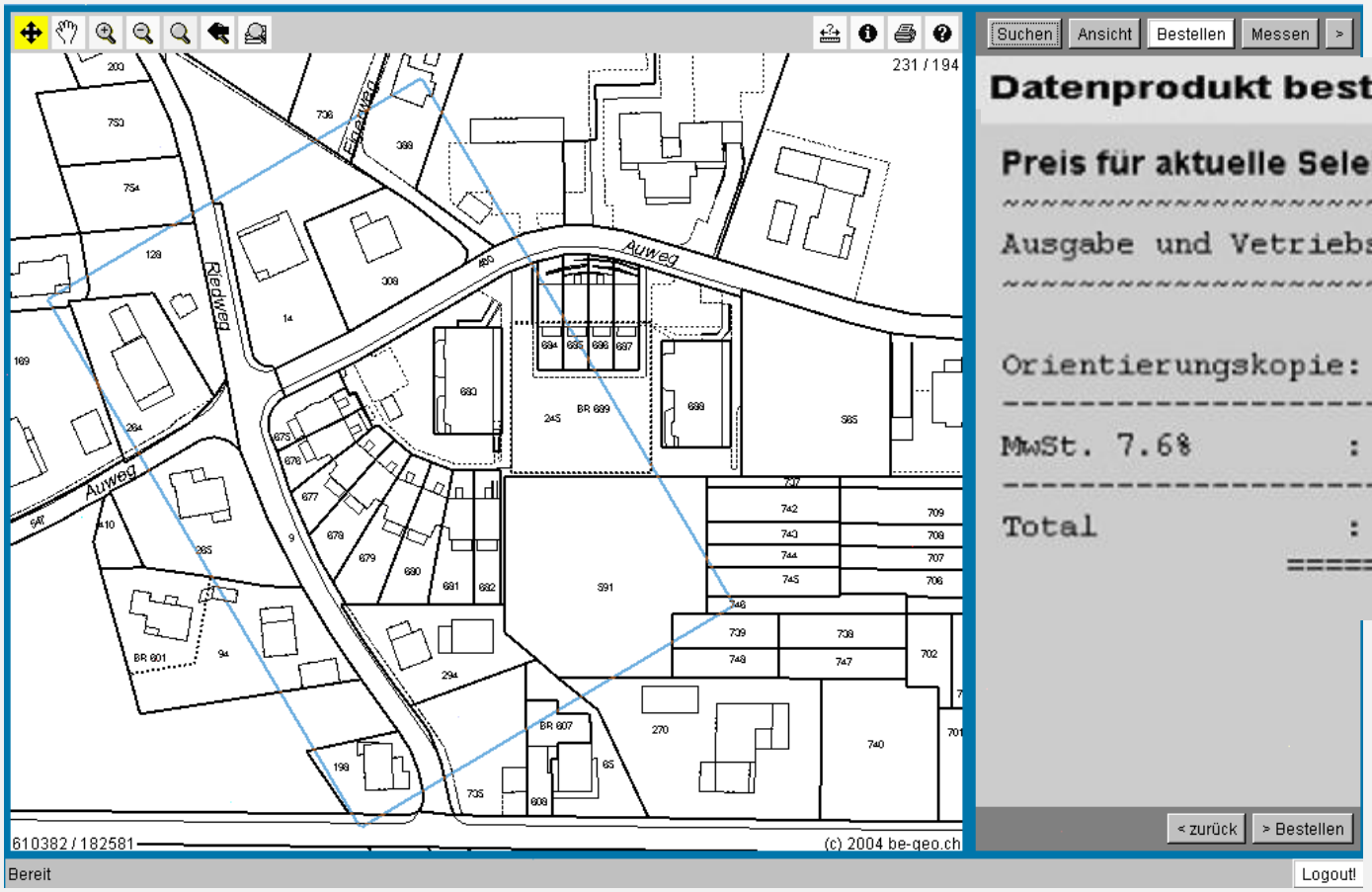
Ausschnitt suchen



GeoDaten-Shop
Information über vorhandene Datensätze
Suchen nach Adressen und Parzellen
Bestellen in Standardformaten Geobau und INTERLIS

GeoPlotter

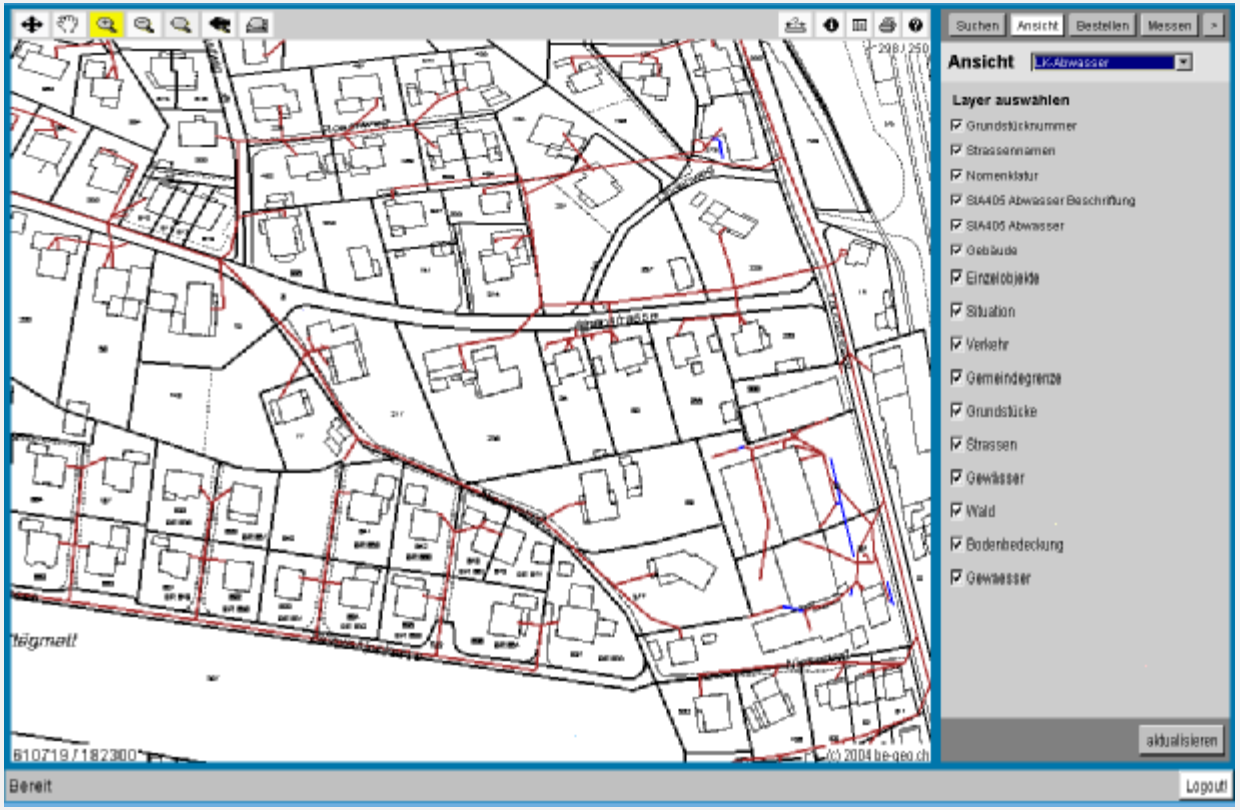
Preisberechnung



GeoPlotter
Sichten und drucken von massstäblichen Plänen

GeoViewer

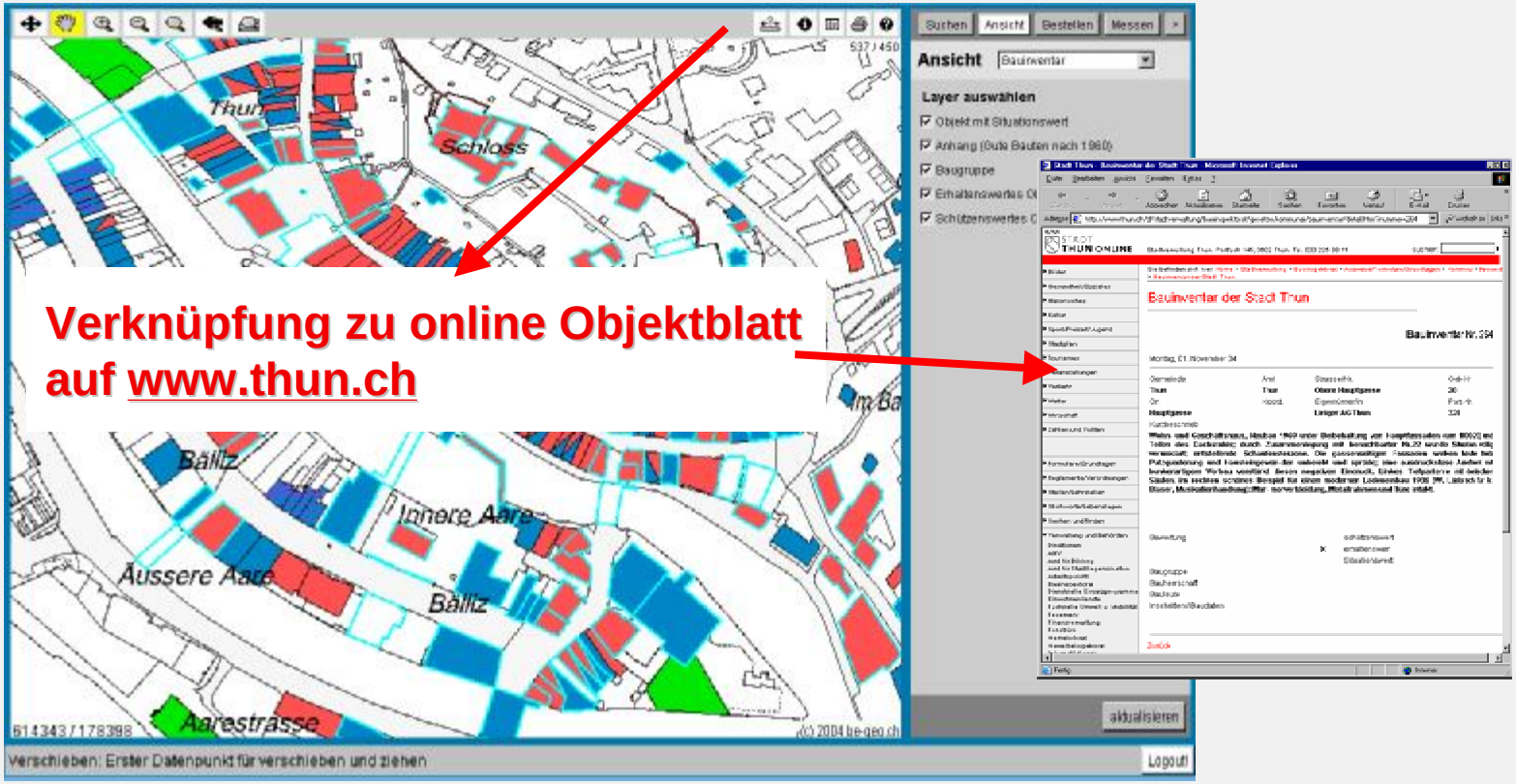
Ansicht LK Abwasser



GeoViewer Zusätzlich zu *GeoPlotter* :
Anbindung an GRUDIS
Nutzer- und Sichtenverwaltung
Individuelle Freigabe der Gemeindedaten (z.B. Leitungskataster)

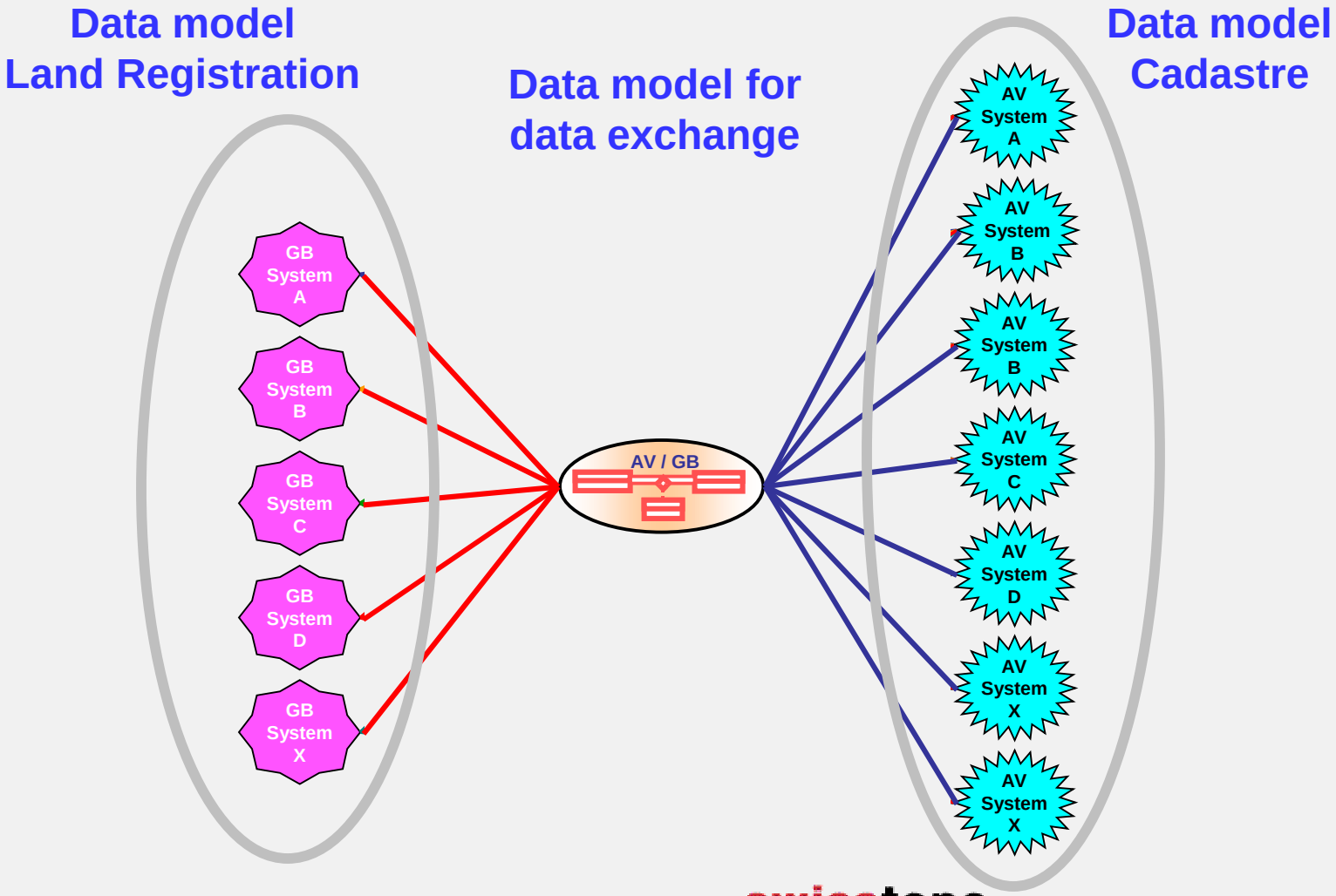
GeoViewer

Bauinventar Stadt Thun



GeoViewer Zusätzlich zu *GeoPlotter* :
Anbindung an GRUDIS
Nutzer- und Sichtenverwaltung
Individuelle Freigabe der Gemeindedaten (z.B. Leitungskataster)

Case Study "Kleine Schnittstelle"



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Lessons Learned (1/2)

- constant dialogue between authorities and private sector is crucial
- very important political argument: data are the most expensive element in cadastre – and therefore have to be protected against the fast changes in hard- and software systems;
- acceptance of INTERLIS concept in practice was not very high initially; only the development and provision of software tools made a difference and produced tangible benefits;
- creation of a competence centre for data modelling and data exchange provided the crucial support for the INTERLIS concept;

Lessons Learned (2/2)

- the supervising body for cadastral surveying on the federal level used its subsidy system to put financial pressure on the implementation of the INTERLIS concept;
- transparent communication: it was important to communicate that the data model as well as the description language are in constant development; the first revisions have now been made with DM.01 and INTERLIS2 and the changes were understood and accepted by partners.