



Schweizerische Eidgenossenschaft  
Confédération suisse  
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Bundesamt für Landestopografie swisstopo  
Geodäsie und Eidgenössische Vermessungsdirektion

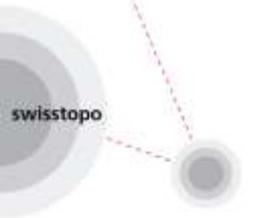
**Presented at the FIG Working Week 2019,  
April 22-26, 2019 in Hanoi, Vietnam**

wissen wohin  
savoir où  
sapere dove  
knowing where

# 10 Years "Law on Geoinformation" (GeolG) in Switzerland – The International Context

FIG-Working Week 2019  
Hanoi, Vietnam, 22-26 April 2019

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Scientific Associate





# Legal basis for cadastre and geoinformation

Year	Legal act	Purpose
1912	<b>Civil code</b>	Security of ownership, efficient land market, and mortgaging of real estates
1919	<b>Instructions for cadastral surveying</b>	Definition of standardized methods
1993	<b>Ordinance on cadastral surveying</b>	Digital format of cadastral surveying, extension of purpose beyond land registry to information systems
2004	<b>New article in Constitution</b>	Stronger legal foundation for national surveying, cadastral surveying, and geodata infrastructures
2008	<b>Law on Geoinformation (GeoIG)</b>	<ul style="list-style-type: none"><li>•A uniform legal basis for all land information based on the various federal decrees (incl. cadastral surveying)</li><li>•A legal basis for the introduction of a cadastre for public legal restrictions on landownership rights (PLR-Cadastre)</li></ul>

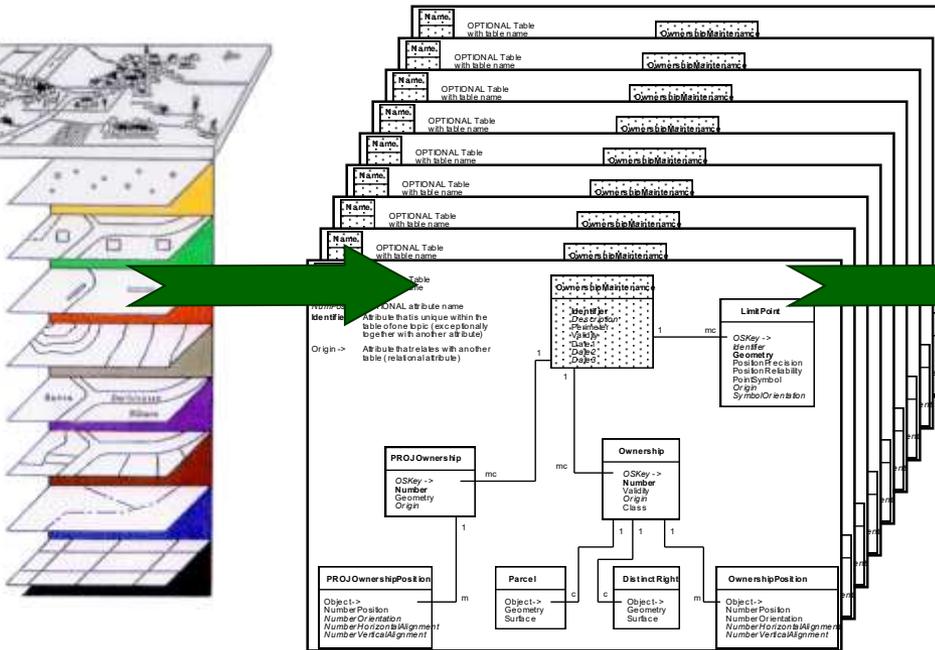




# Core Data Model of Swiss Cadastral Surveying

Digital data description AV93 (introduced in 1993)

- Control points
- Land cover
- Single objects
- Heights
- Local names
- Ownership
- Pipelines >5bar
- Administrative subdivisions



```

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 =
  .....
  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.

```

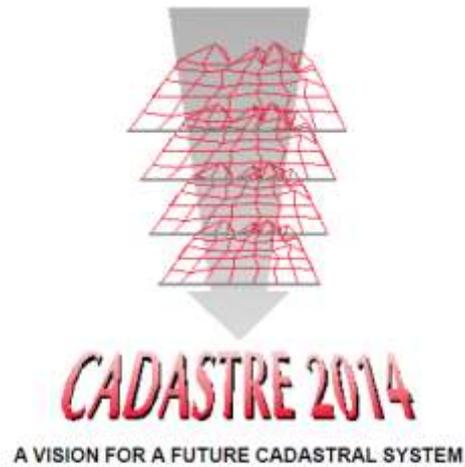
8 Information Layers  
(Possibility to manage the layers separately)

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

Data Description Language  
INTERLIS



# International Developments

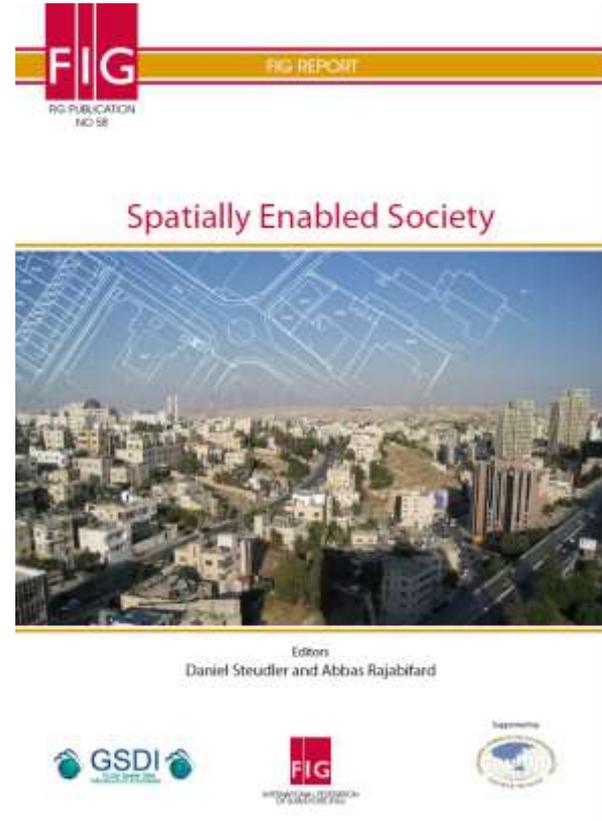


Jürg Kaufmann • Daniel Steudler  
with the Working Group 1 of FIG Commission 7



July 1998

1998



Spatially Enabled Society

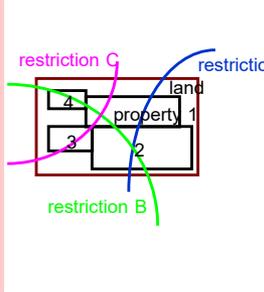
Editors  
Daniel Steudler and Abbas Rajabifard



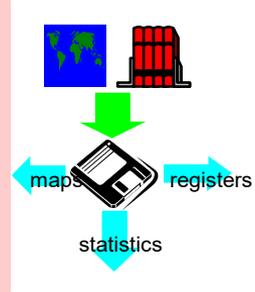
2012



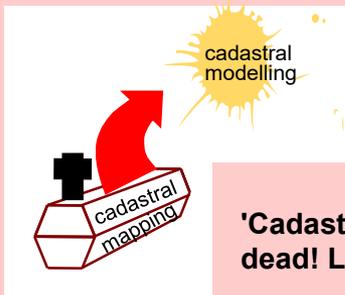
# Cadastré 2014 – Six vision statements



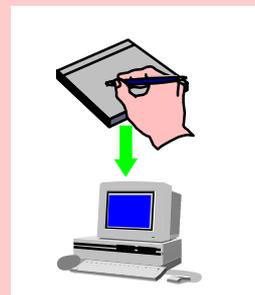
**Cadastré 2014 will show the complete legal situation of land, including public rights and restrictions!**



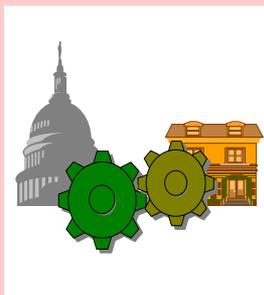
**The separation between 'maps' and 'registers' will be abolished!**



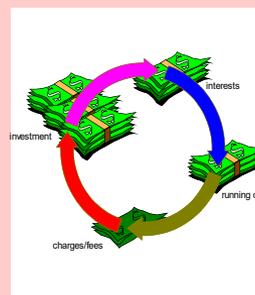
**'Cadastral mapping' will be dead! Long live modelling!**



**'Paper and pencil cadastre' will be gone!**



**Cadastré 2014 will be highly privatized! Public and private sector are working closely together!**



**Cadastré 2014 will be cost recovering!**

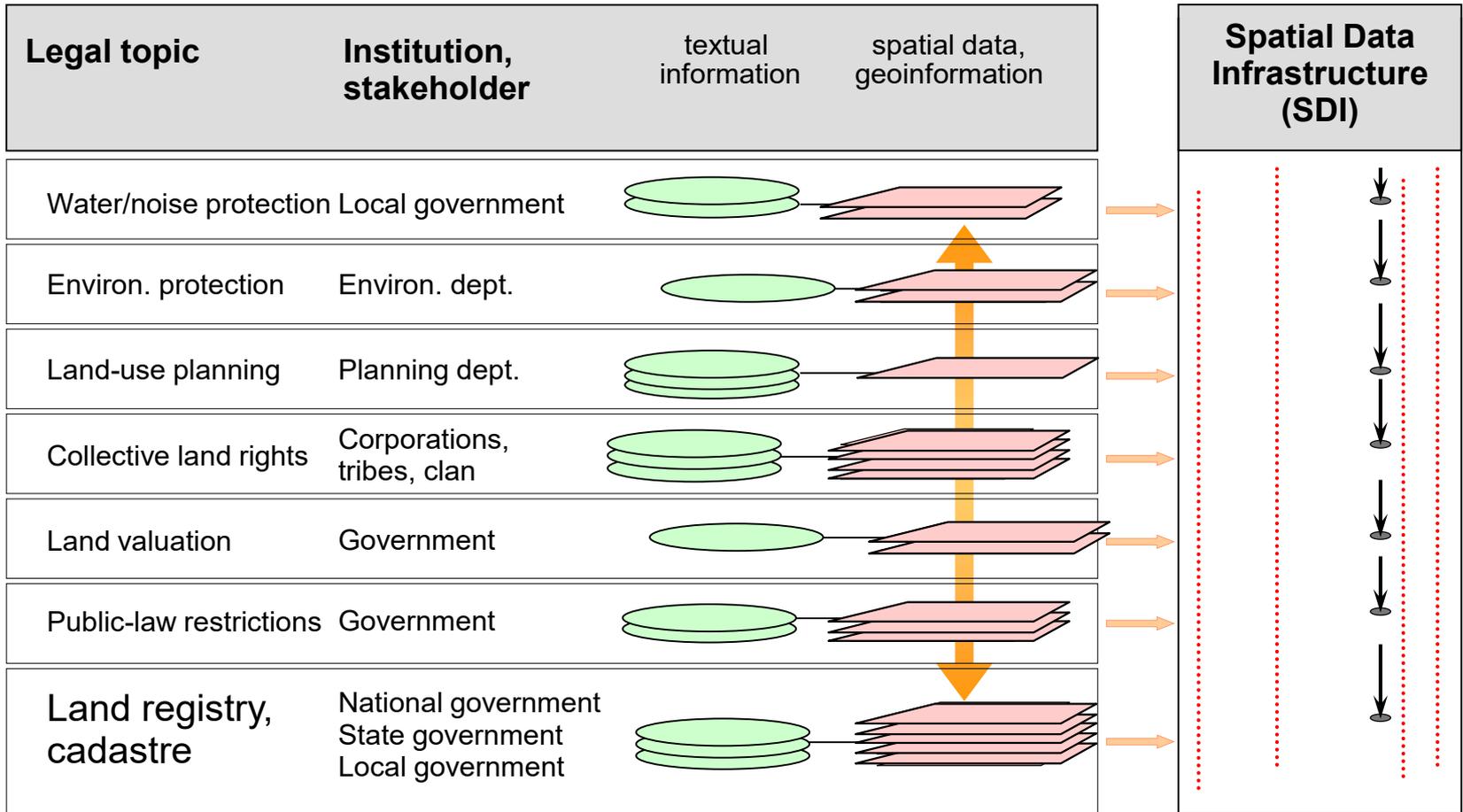


## **Spatially Enabled Society – Six key elements**

- **Legal framework** for basic geoinformation;
- Common **data integration concept**;
- **Positioning infrastructure** for the common reference framework;
- **Network infrastructure** to enable integration and sharing of spatial data through the spatial data infrastructure SDI;
- **Landownership information** as one of the basic information topics;
- **Data and information** principles.

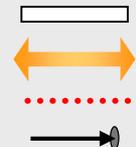


# Common Data Integration Concept



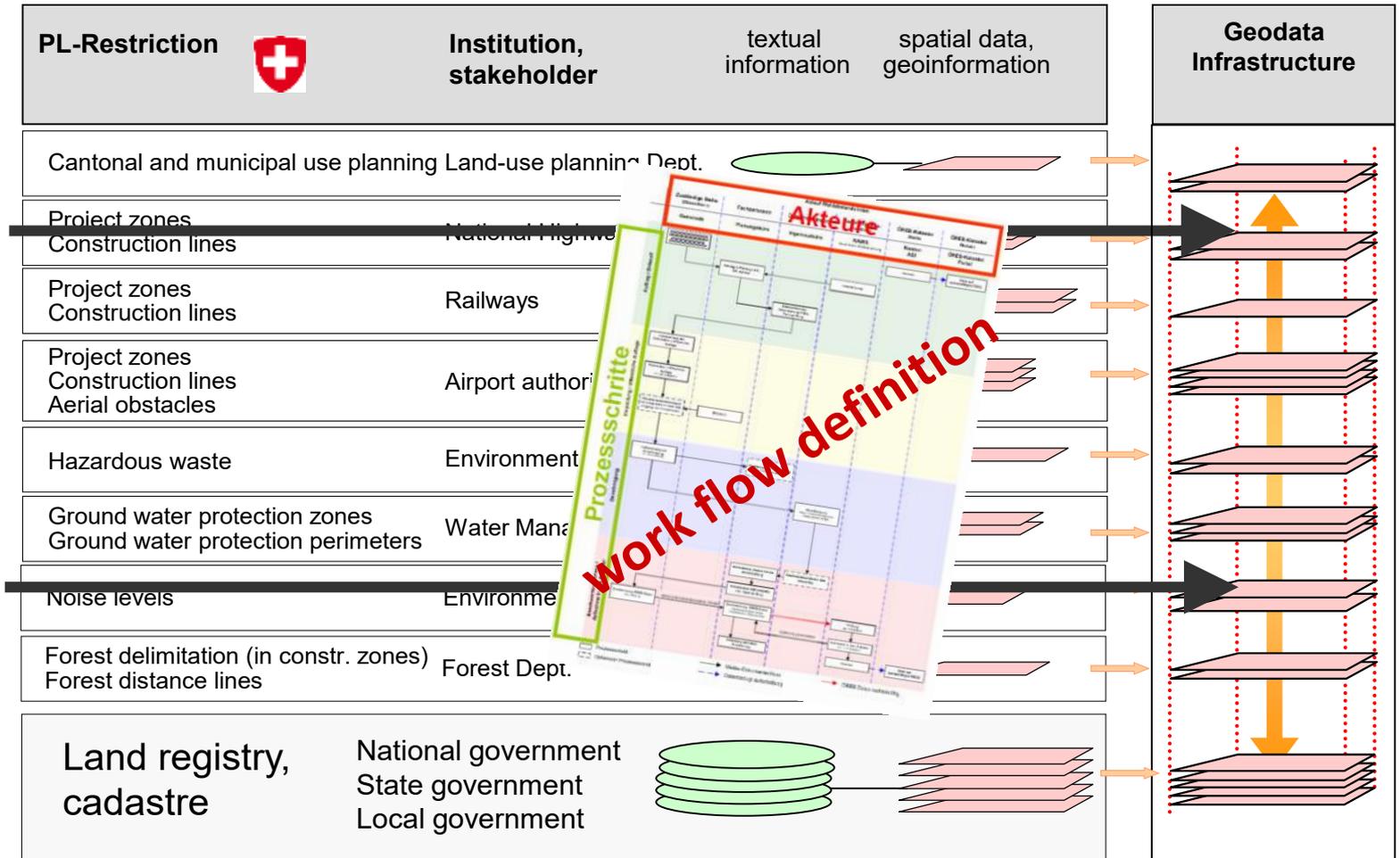
**Four basic principles for a common data integration concept:**

- 1) *to respect the legal / institutional independence of stakeholders*
- 2) *to use a standardized data modelling concept*
- 3) *to use a common geodetic reference framework*
- 4) *no logic relations between objects in different topic except through geographic location*





# 17 Public-law restrictions in Swiss cadastre (full coverage by 2020)





# Benchmarking of Swiss Cadastre – Against Cadastre2014 Vision Statements

<b>Statement 1</b>	<b>Cadastre 2014 will show the complete legal situation of land, including public rights and restrictions!</b>
 Situation in 2019:	new cadastre on Public-Law Restrictions with 17 data topics is being introduced until end of 2019
Opportunities:	<ul style="list-style-type: none"><li>➤ to include another approx. 20 topics</li><li>➤ the introduction of underground facilities</li></ul>
<b>Statement 2</b>	<b>The separation between 'maps' and 'registers' will be abolished!</b>
 Situation in 2019:	Land registration and cadastral surveying are still two separate organizations. The cooperation, however, works well on a technical level.
Opportunities:	<ul style="list-style-type: none"><li>➤ cooperation can still be improved</li><li>➤ to establish a common understanding of both organizations in providing a common service to clients</li></ul>



# Benchmarking of Swiss Cadastre – Against Cadastre2014 Vision Statements



<b>Statement 3</b>	<b>Cadastral mapping will be dead! Long live modelling!</b>
 Situation in 2019:	Standardized data modelling and data exchange has been established in 1993. The change of paradigm away from paper maps to digital data happened very early.
Opportunities:	➤ To further develop and promote the common data integration concept.
<b>Statement 4</b>	<b>'Paper and pencil - cadastre' will have gone!</b>
 Situation in 2019:	The introduction of the digital data format happened in 1993.
Opportunities:	➤ To support and foster the development of SDIs on national and cantonal levels.



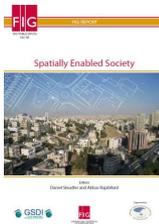
# Benchmarking of Swiss Cadastre – Against Cadastre2014 Vision Statements



<b>Statement 5</b>	<b>Cadastre 2014 will be highly privatized! Public and private sector are working closely together!</b>
 Situation in 2019:	With approx. 87%, the private sector is heavily involved in the operation of the cadastral system.
Opportunities:	➤ To keep the private sector involved in future developments, mainly because innovation comes in through the private sector.
<b>Statement 6</b>	<b>Cadastre 2014 will be cost recovering!</b>
 Situation in 2019:	The Swiss cadastral system is not cost recovering in direct terms. However, it is an essential pillar in the economic stability of the country.
Opportunities:	➤ To keep the stability and to keep developing and promoting the economic contributions.



# Benchmarking of Swiss Cadastre – Against SES Key Elements

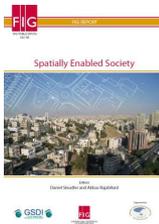


<b>SES Element 1</b>	<b>A legal framework to provide the institutional structure for data sharing, discovery, and access.</b>
 Situation in 2019:	The legal framework has been established with the introduction of the GeolG in 2008.
Opportunities:	➤ To continue and carefully observe future developments within the geodata context.

<b>SES Element 2</b>	<b>A sound data integration concept to ensure multi-sourced data integration and interoperability.</b>
 Situation in 2019:	Data exchange and data integration in a federal, rather decentralized context had to be dealt with from early on and is a central element for future developments
Opportunities:	➤ To recognize and further promote this concept.



# Benchmarking of Swiss Cadastre – Against SES Key Elements

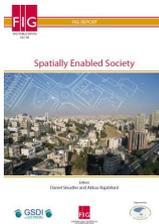


<b>SES Element 3</b>	<b>A positioning infrastructure to enable and benefit from precise positioning possibilities.</b>
 Situation in 2019:	A stable and sound positioning infrastructure has been in place in Switzerland since the 19 <sup>th</sup> century and has always been updated and upgraded to a full scale CORS.
Opportunities:	➤ To continue the positive developments and contributions.

<b>SES Element 4</b>	<b>A spatial data infrastructure to facilitate data sharing, to reduce duplication and to link data producers, providers and value adders to data users based on a common goal of data sharing.</b>
 Situation in 2019:	Switzerland adopted a Federal Strategy for Geoinformation in 2001 and implemented an NSDI in the following years.
Opportunities:	➤ The continued extension of the SDI with more partners and more data topics is a good sign for the development in the right direction.



# Benchmarking of Swiss Cadastre – Against SES Key Elements



<b>SES Element 5</b>	<b>Land ownership information, as the dominant issue in the interactions between government, businesses and citizens relating to land and water resources.</b>
 Situation in 2019:	The Swiss cadastral system is working properly in a well maintained organizational and technical context.
Opportunities:	➤ To continue the positive developments and contributions.
<b>SES Element 6</b>	<b>Data and information to respect certain basic principles and to increase the availability and interoperability of free to re-use spatial data from different actors and sectors.</b>
 Situation in 2019:	Cadastral surveying took a long period of time to achieve full data coverage, and still is not fully at 100%.
Opportunities:	➤ The cooperation among the different administrative levels can further be improved.



# Summary of Benchmarking results

	1	2	3	4	5	6
<b>Cadaastre 2014 vision statements</b>						
<b>SES key elements</b>						

- in most areas, the Swiss cadastral system is well underway
- very good and stable basis (legal, organizational, technical)
- focus on services and user needs can be improved
- slow in reaching full (territorial) coverage



## The Swiss way of thinking ...

- cadastral data are more than ever part of SDI / geoinformation;
- data and information need to be shared within the profession and with partners (horizontal, vertical, across sectors), therefore **data exchange** is essential;
- clearly defined **data models** are fundamental for data exchange; in consequence, we do not talk of maps and plans, we are talking and thinking in data sets;
- data models need to be under the control of the **public sector** (not software companies or private sector organizations);
- the **four principles of the "Common Data Integration Concept"** need to be followed by all partners; only then modular and flexible SDIs can be established and operated.