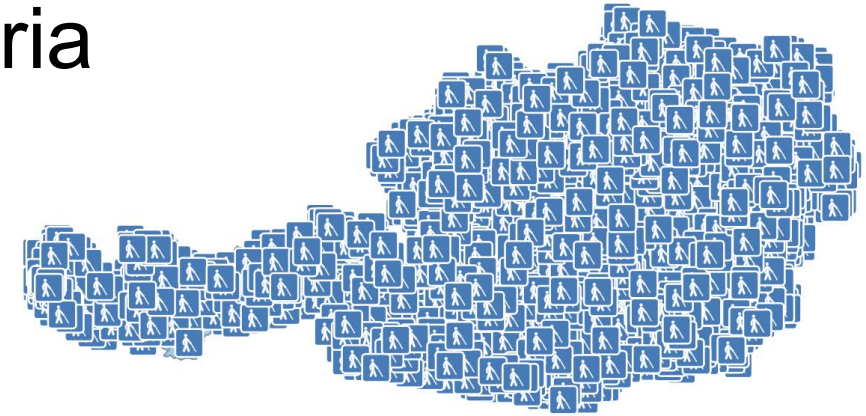
Modern Map Production

Collaborative cloud mapping for federal address, street network and basemap in Austria



Spatial Custodianship in AT - Agenda

Modern Map Production

Decentralized SDI

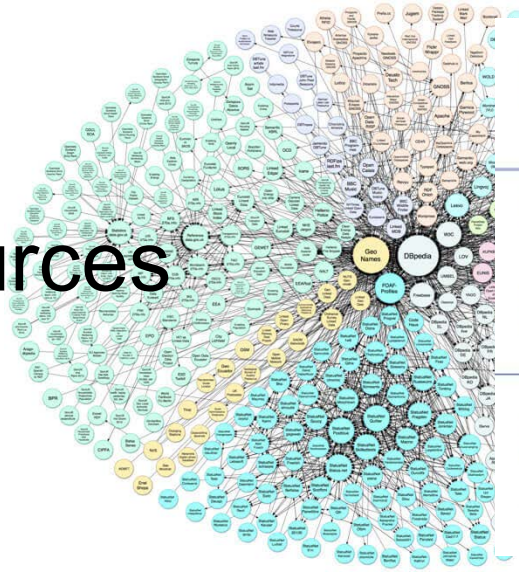
Levels of custodianship

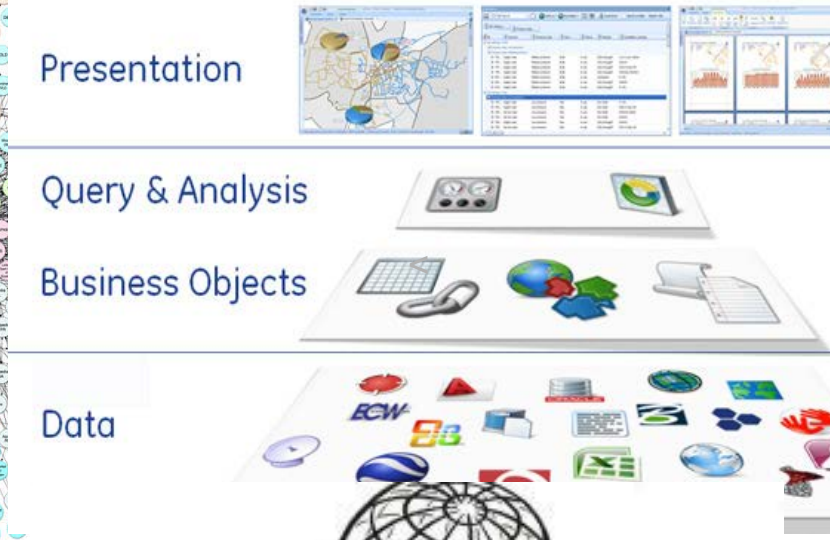
Examples from Austria

Resume

Modern Map Production

- Web of Data
- Distributed Sources
- Inhomogeneity
  - content,
  - quality,
  - lineage,
  - license models ...
- Delivery requirements (supply chain)

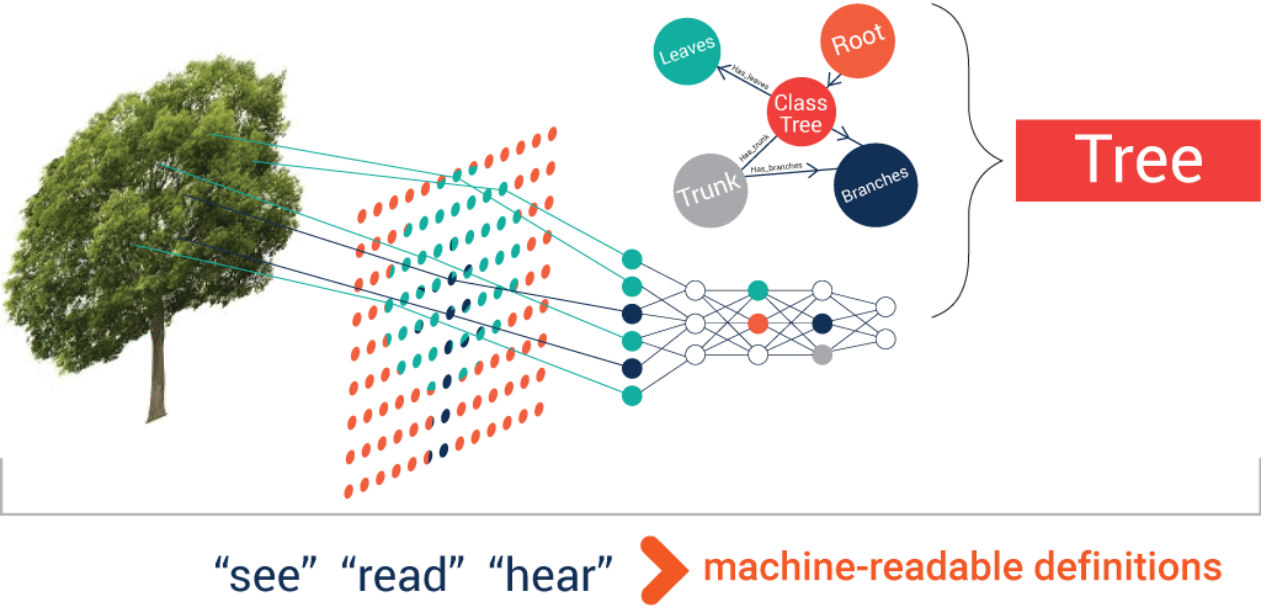




© Christopher Vorlet

Modern Map Production: Paradigm Change

- <Collect, Store and Process>
  vs.
  <Find, Bind, (Re-)Use>
- Decentralized SDI



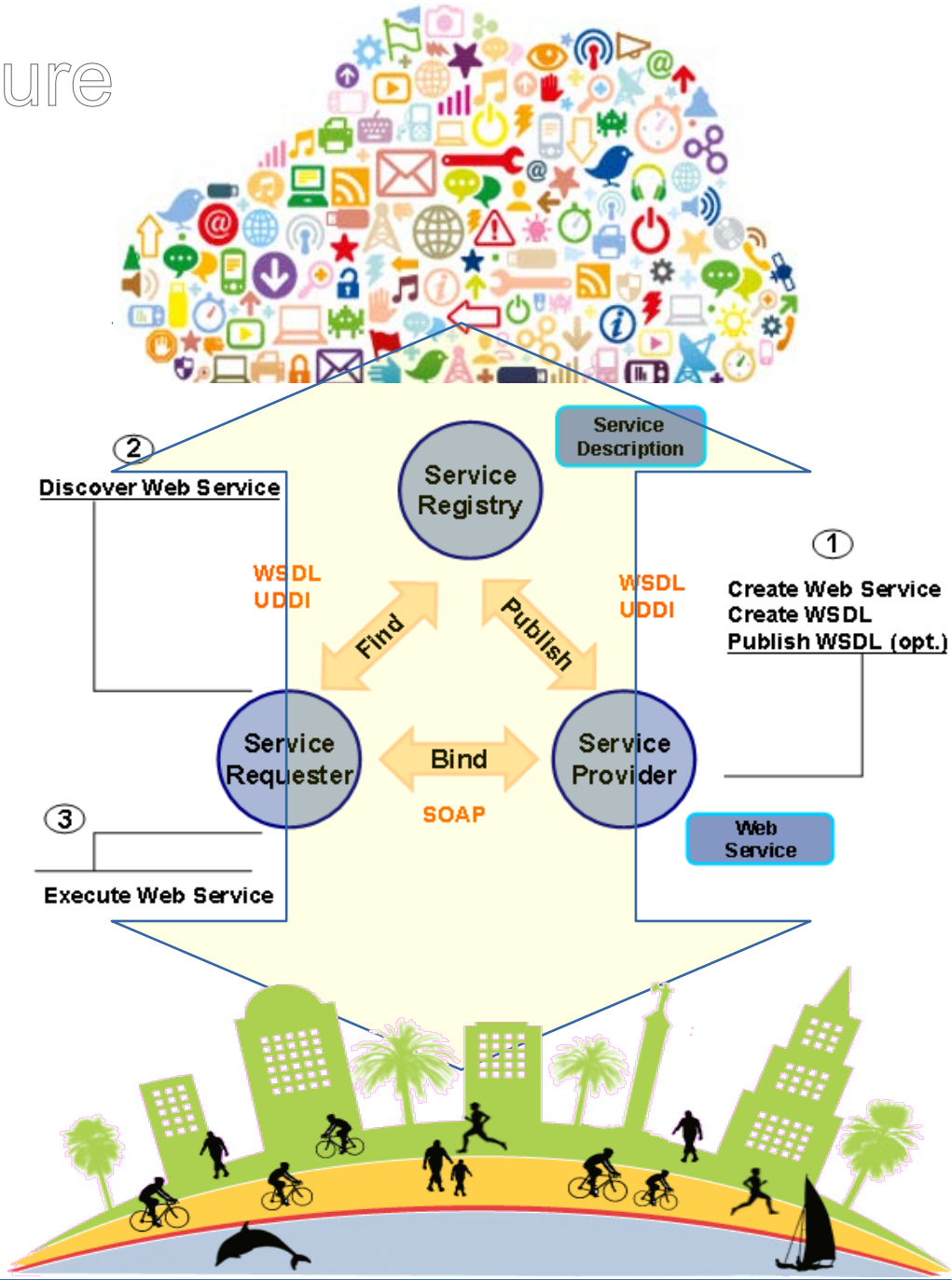
https://ontotext.com/wp-content/uploads/2018/04/What-is-Semantic-layer.png

https://upload.wikimedia.org/wikipedia/commons/e/ee/AWI-core-archive_hg.jpg

https://todcan.com/wp-content/uploads/2018/02/archive.jpg

Decentralized SDI = Service-Oriented Architecture

- Distributed nodes
- Extensible
- Usable
- Search-Find-Bind
  - **Publish**
  - Search and **Find**,
  - Access
    (technical, organisational and legal),
  - **Bind** / make use of geoinformation
    (e.g. in a map production procedure)



(INSPIRE) SDI Principles/-Aims

- Creation /maintenance of geospatial data: only at the **most effective and responsible body**.
- Provision of **consistent geospatial data**
- Geospatial data of one authority level can be **used by all other authority levels** (distributed data management).
- Conditions of **access and use** must not constrain the extensive use.
- **Metadata** of geospatial data, services and their accessibility and use have to be **publicly available without constraints**.

- The main technical solution: **Service-Oriented Architecture**

http://pickurcareer.com
media.eremedia.com

Pragmatic issues
"drawbacks" of an open extensible SDI

- Open extensible SDI
  - Extend with nodes (data providers) by their availability, feasibility, potential, content, ...
- Restrictions for
  - Quality?
  - Licensing?
  - Change adoption?

pixabay

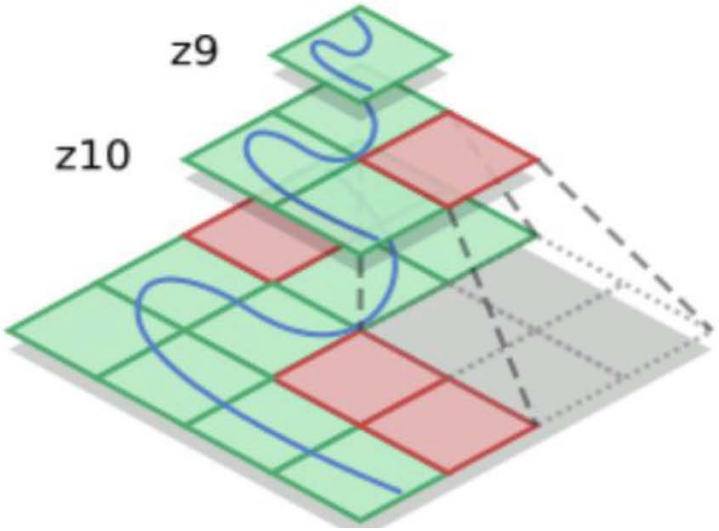
Pragmatic issues
"drawbacks" of an open extensible SDI

- Quality aspect scale
- Temporal coherence
- Redissemination
- Implementation speed of new requirements
- Harmonisation work per occurrence

https://www.etftrends.com/wp-content/uploads/2018/07/One-Drawback-of-Home-Insurance-Policies.jpg

Pragmatic issues: Scale

- Quality aspect scale: geoinformation is produced at **different authority levels with various local scales**, which will not match in data-integration
- Recommendation: specify scales for a set of use cases or presentation modes



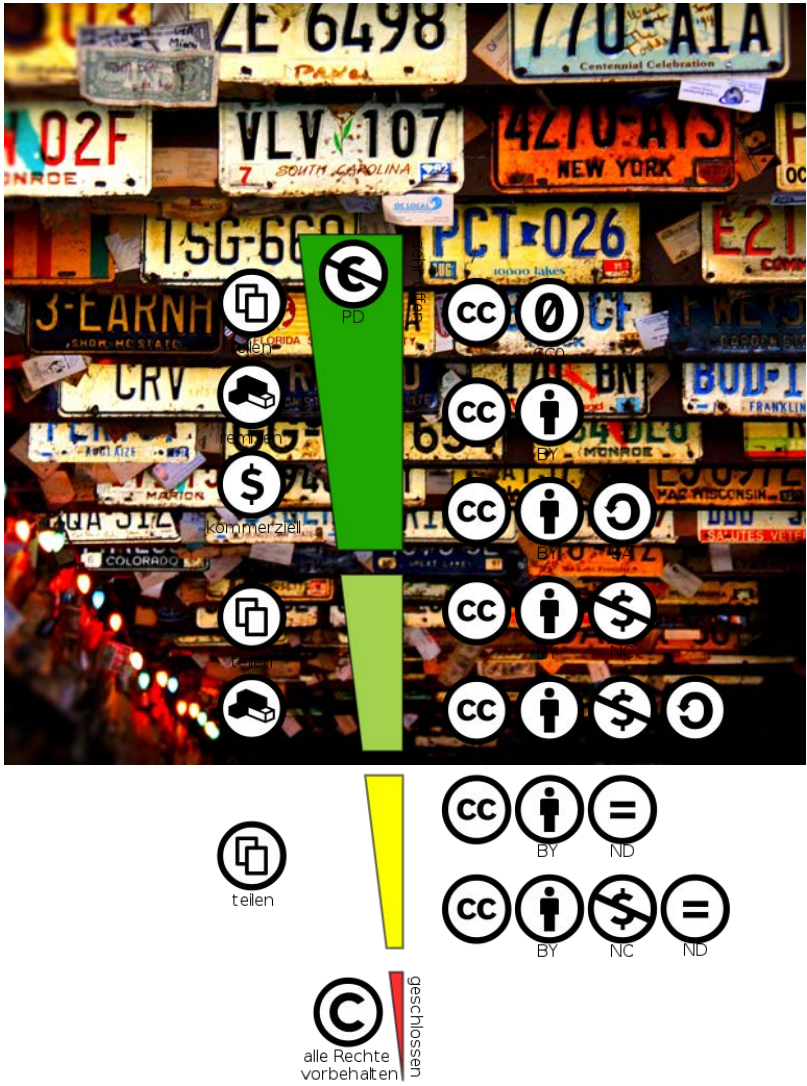
Pragmatic issues: Time

- Temporal coherence: geoinformation/data are produced with different timestamps.
  Although lifetime is recorded, consistent data integration is almost impossible
- An a-priory definition of **temporal reference points** is needed for time coherence

pixabay

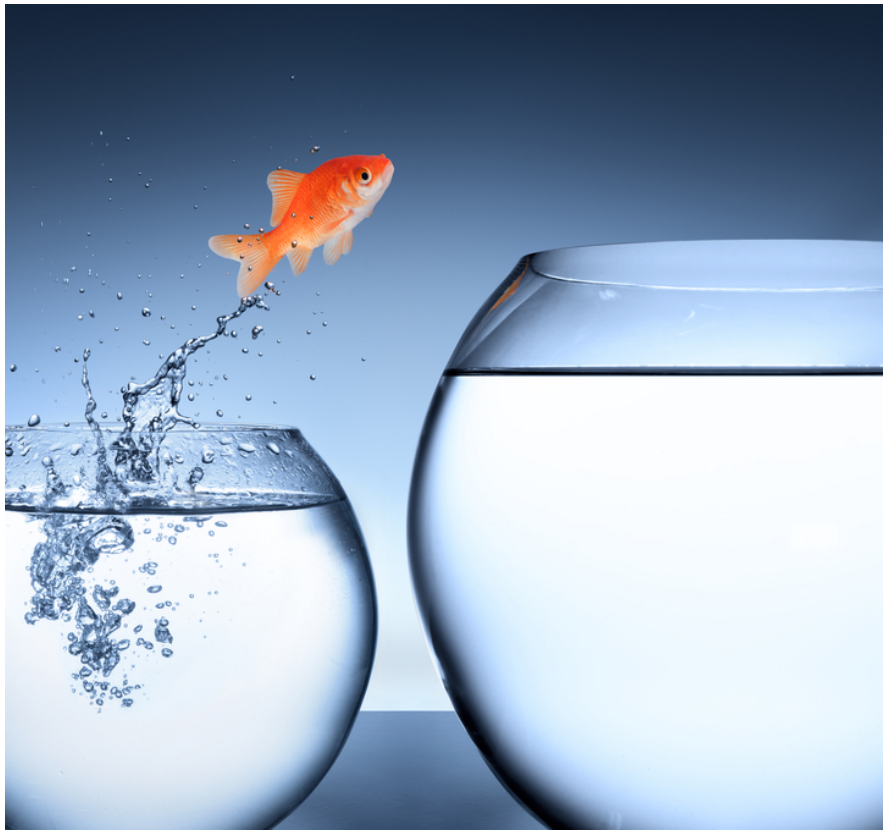
Pragmatic issues: Redissemination

- Redissemination:
  a key aspect for access and use of geoinformation/maps depends on a **common license consensus**
- A minimum consensus for a general license is needed for redissemination



Pragmatic issues: Implementation speed

- Organisational and technological constraints alter due to permanent developments, which lead to **new requirements and call for change** in the SDI framework
- A continuous change programme inclusive controlling is inevitable



Romolo Tavani/Shutterstock

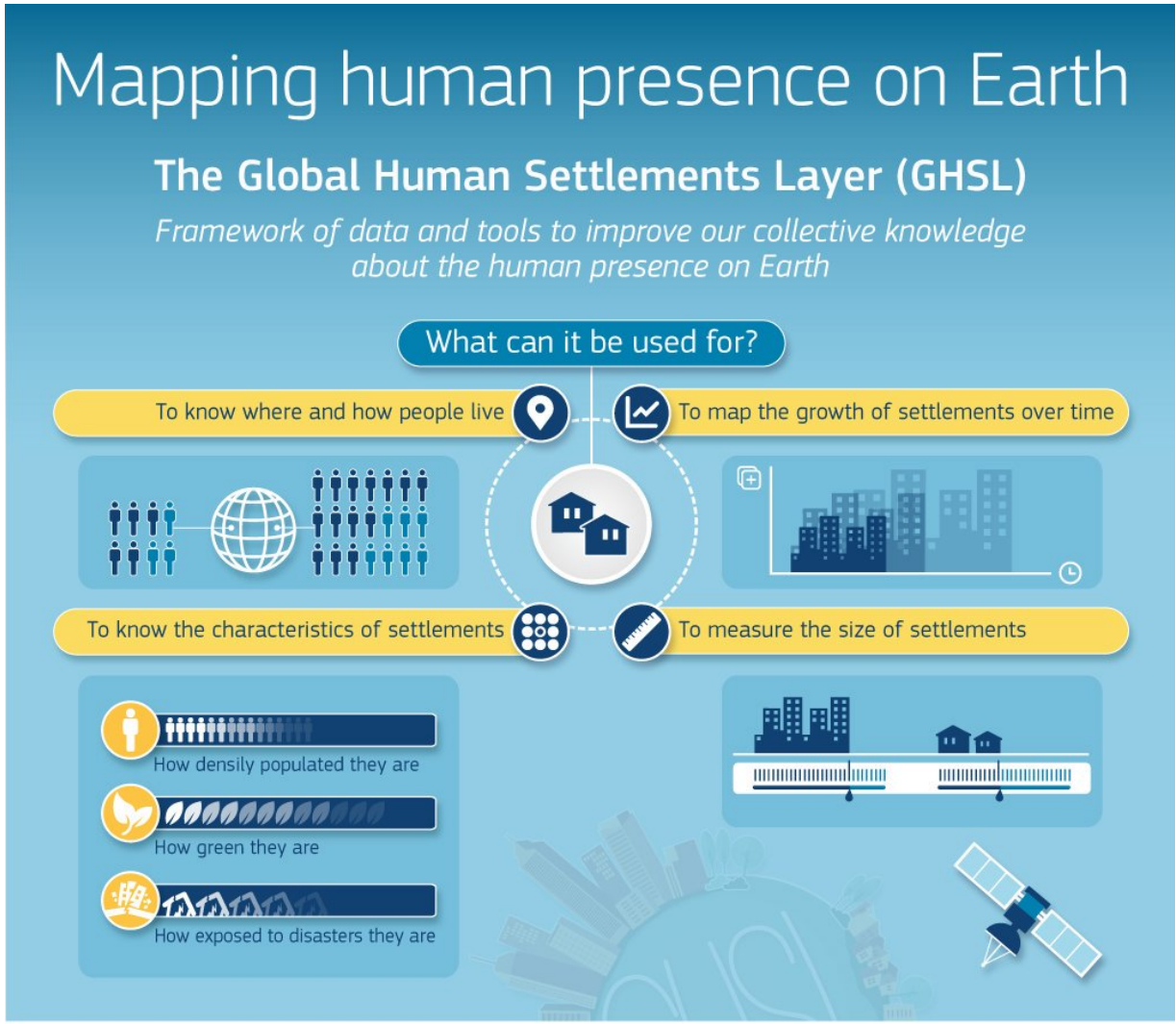
Pragmatic issues: Harmonisation

- Harmonisation on occurrence:
  any data integration and map production comes along with its own **specifics for data preparation (wrangling)**
- Data wrangling can not be avoided, even in harmonised data
- Harmonised data help to automate data wrangling

https://images.xenonstack.com/blog/
Different-Tasks-of-Data-Wrangling.jpg

Levels of spatial custodianship

- **Creation** of core datasets
- **Processing** and data-integration
- **Delivery** and product dissemination



Custodianship Use Cases in AT

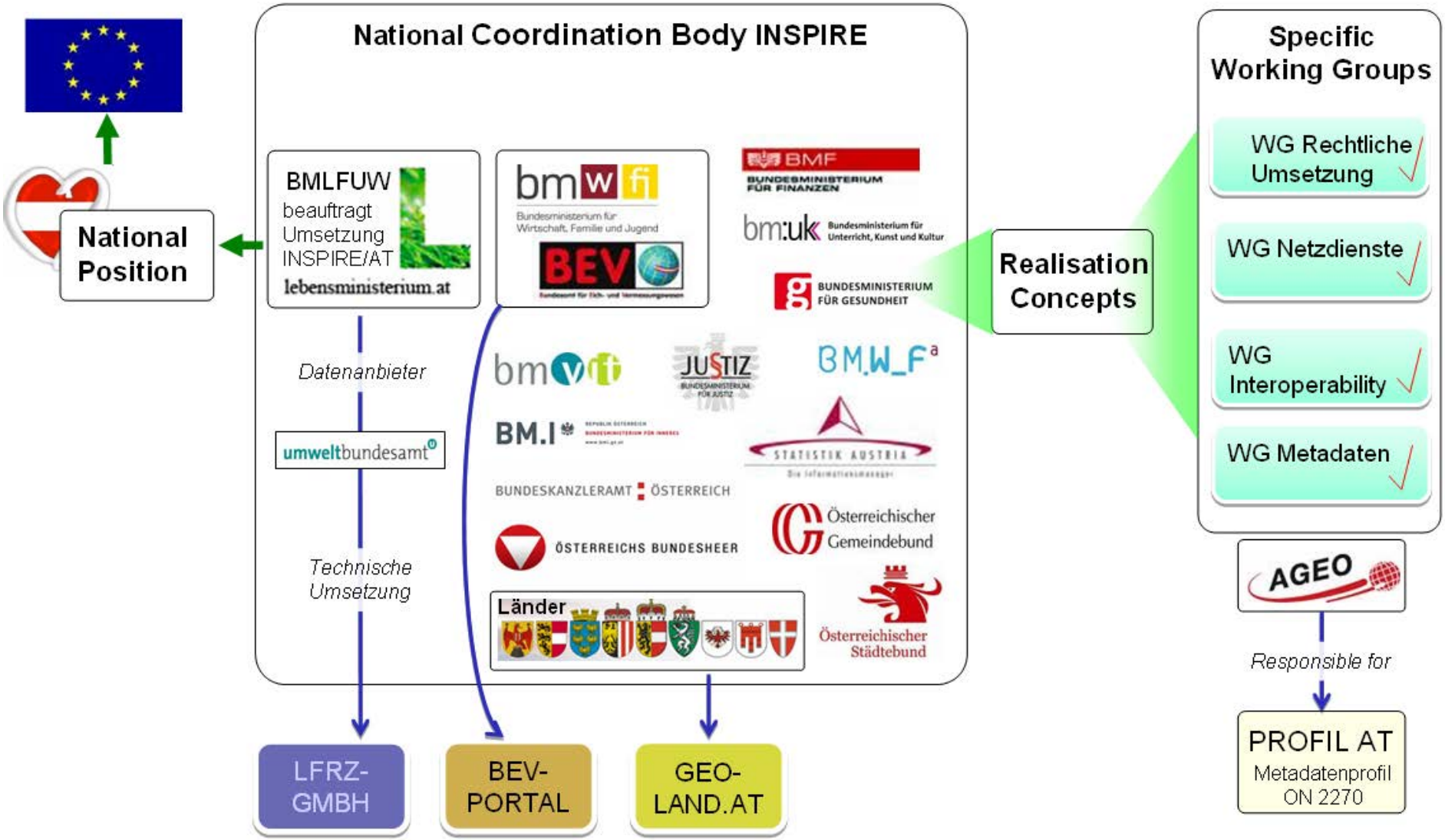
AUSTRIA

- 9 Provinces
- 2500 municipalities
- 83.879 km²
- 8,747 mio. People (2016)
- 62% Alpine Area

- Custodianship Use Cases:
  - Orthoimagery
  - TN/Basemap.at
  - Addresses

Schoppernau by Böhringer Friedrich/ Wikipedia

Example for coordination body: INSPIRE AT



Creation: Orthoimagery – in the past

Creation by

- NMCA,
  self flying,
  7 year cycle
- 9 provinces,
  commissioned
  on purpose
- Ministry of
  Environment,
  commissioned,
  on purpose
  (maximum 5 years)

Creation: Orthoimagery – presence

Creation by

- **Commissioned for a 3 year cycle,**
- **Partners are NMCA (controlling), Ministry of Sustainability, Provinces**
- **Licensing is up to each partner, does not interfere with any other partner**

Federal Ministry
Republic of Austria
Sustainability and Tourism

Länder

Federal Ministry
Republic of Austria
Digital and
Economic Affairs

BEV
Bundesamt für Eich- und Vermessungswesen

Creation: Orthoimagery – perspective

Planning

- **Collaborative creation of national airborne laserscanning**

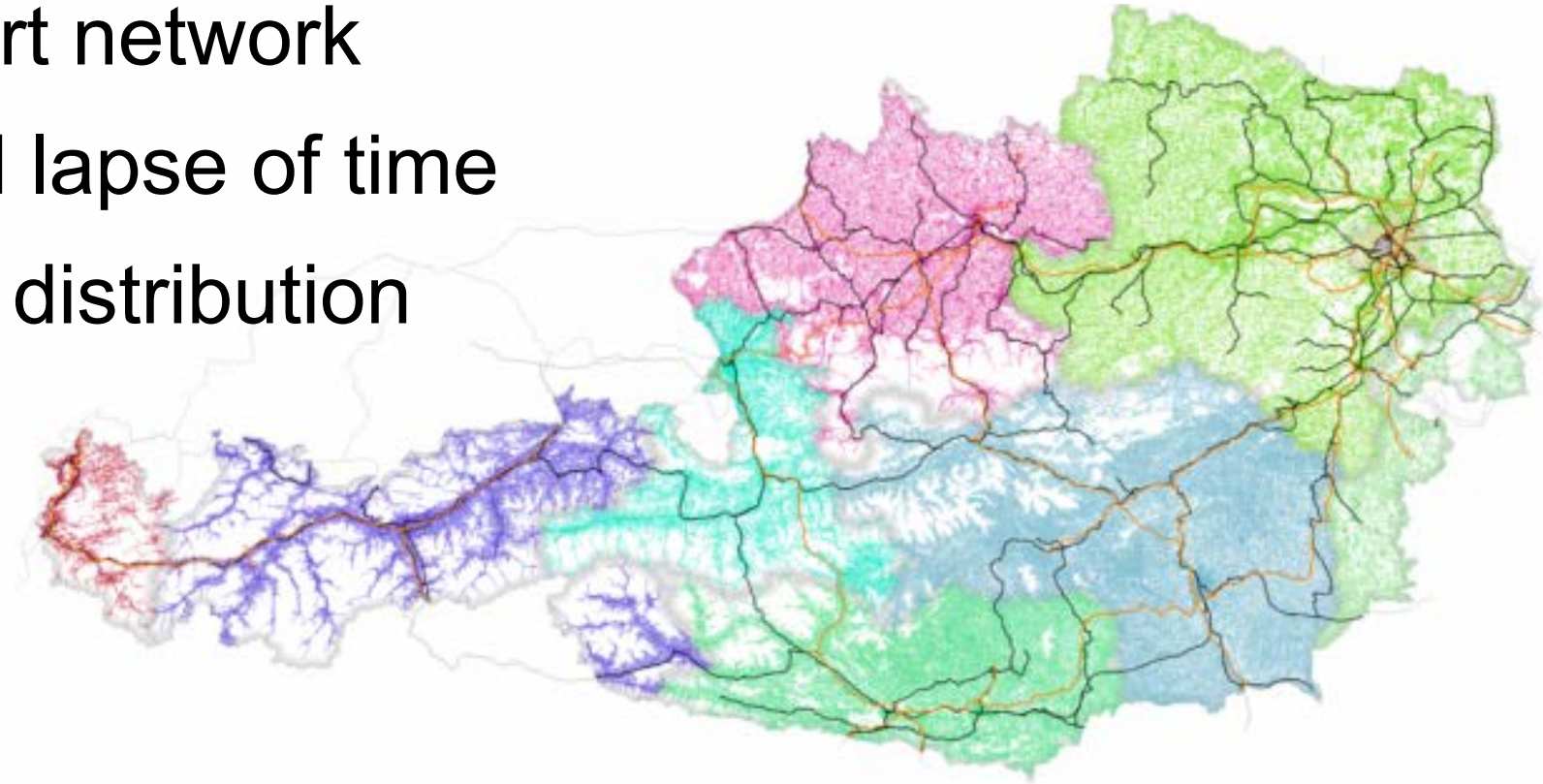
- **Difficulties:**
  - **Quality def.**
  - **Period**
  - **Coordination**
  - **Financing**

Processing: basemap.at

The 9 provinces of AT and partners continuously produce and provide a governmental basemap with an update frequency of 2 month

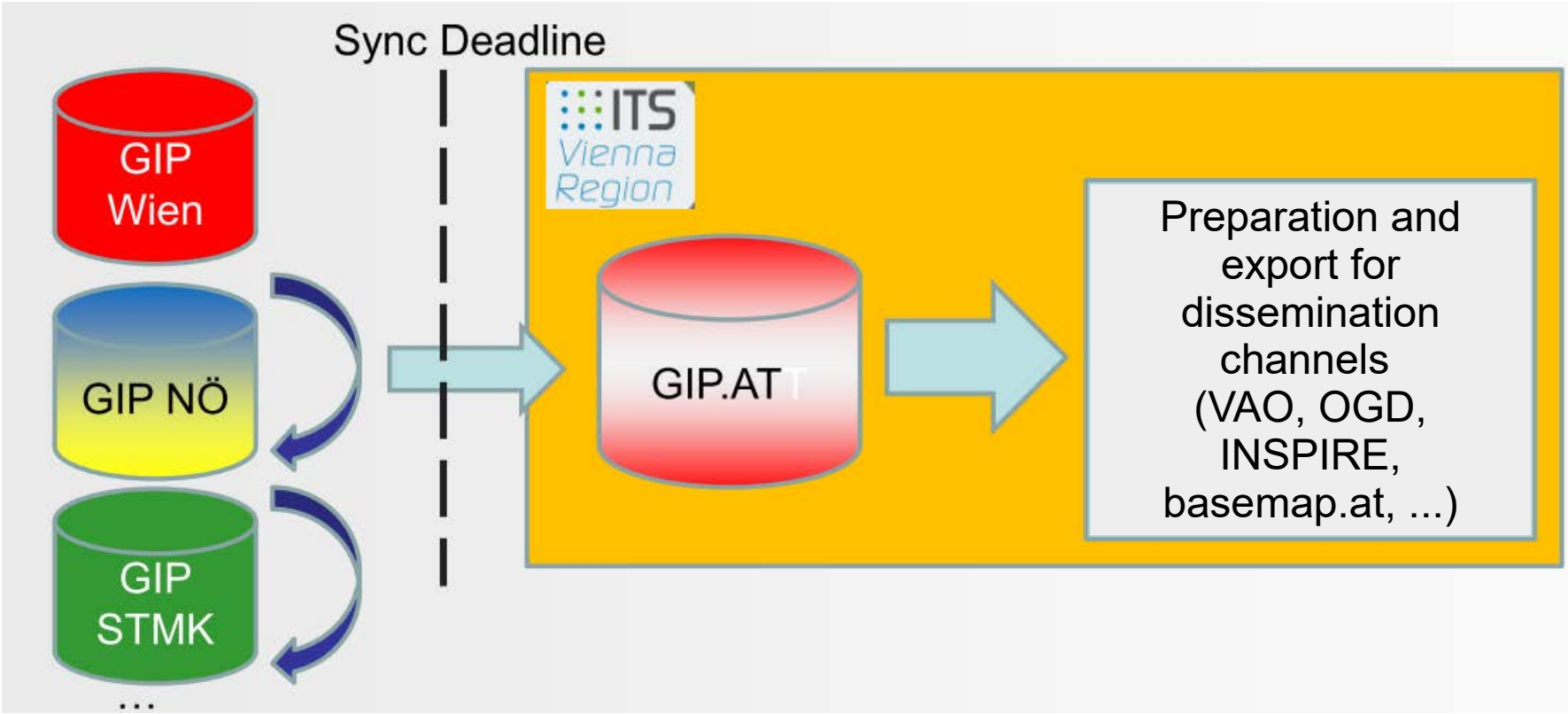
Processing: basemap.at

- Decentral production chain
- Comprehensive transport network
- Defined lapse of time
- Central distribution



Processing: basemap.at

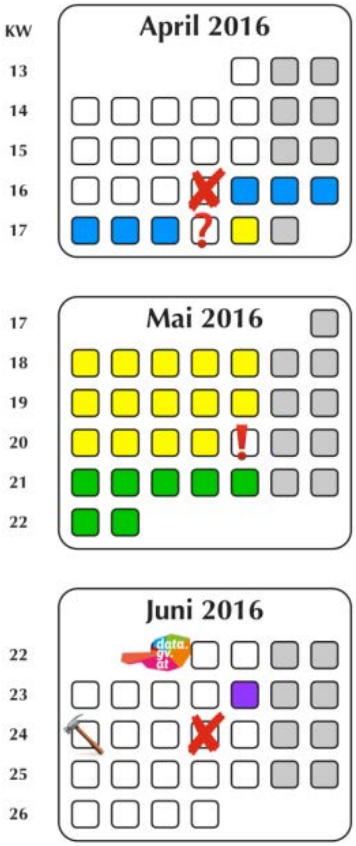
- Decentral processing chain



Lukas Nebel, GIP.AT

Processing: basemap.at

- Defined deadlines
- Deadlines are strict



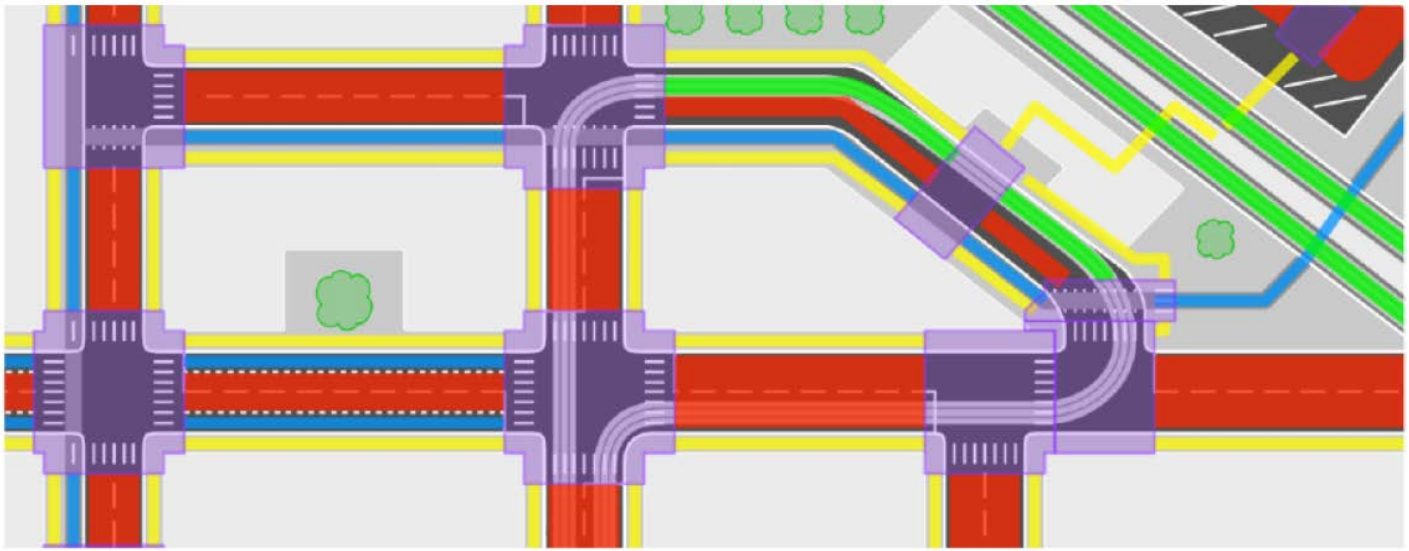
Aufbereitung OGD-Export, Version Juni 2016

✗	21. April	**Synchronisations-Deadline GIP 2016/04**
■		Synchronisation, interne Tests, Aufbereitung
?	28. April	**GIP Test-Export veröffentlicht**
■		Tests bei Partnern und Abnehmern, Rückmeldungen
!	20. Mai	**GIP Produktiv-Export veröffentlicht**
■		OGD-Export aufbereiten und dokumentieren
data.gv.at	1. Juni	**OGD-Export veröffentlicht**
		Hinweis auf Datenfehler
■		Datenfehler beheben
🔨	13. Juni	**Update OGD-Export**
✗	16. Juni	**Synchronisations-Deadline GIP 2016/06**

Lukas Nebel, GIP.AT

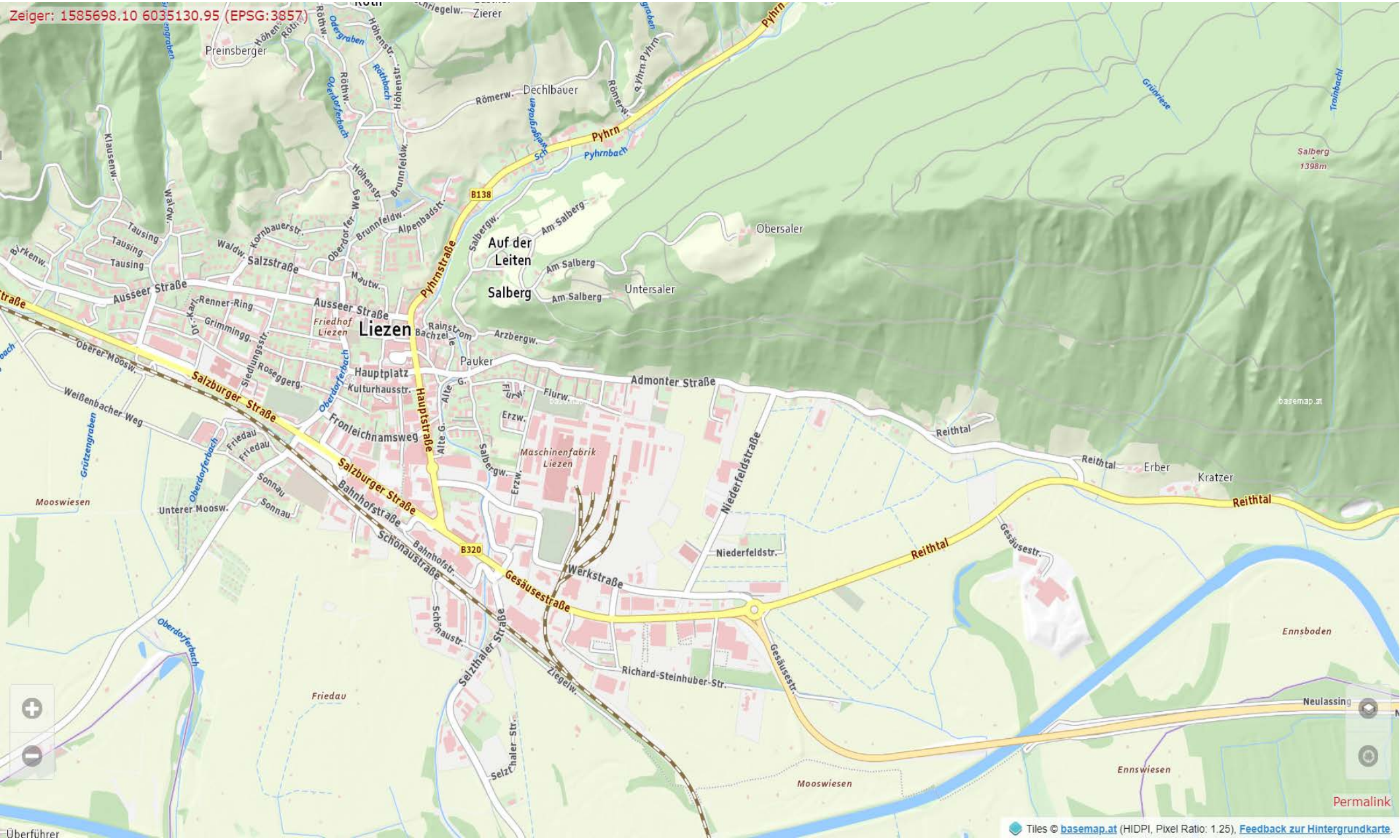
Processing: basemap.at

- Fully automated derivation
- from the transport network (routing) graph
- to a basemap at different levels

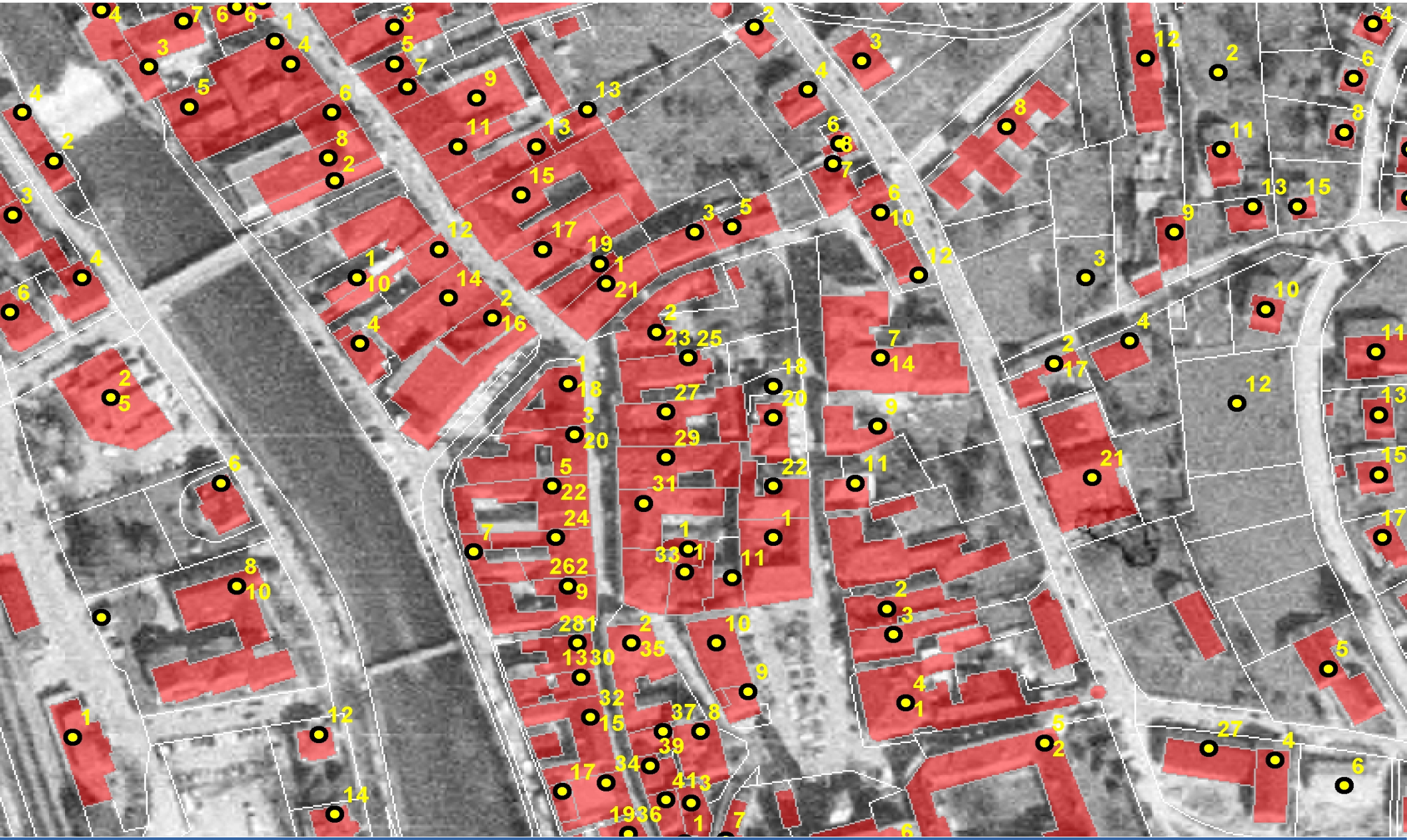


Lukas Nebel, GIP.AT

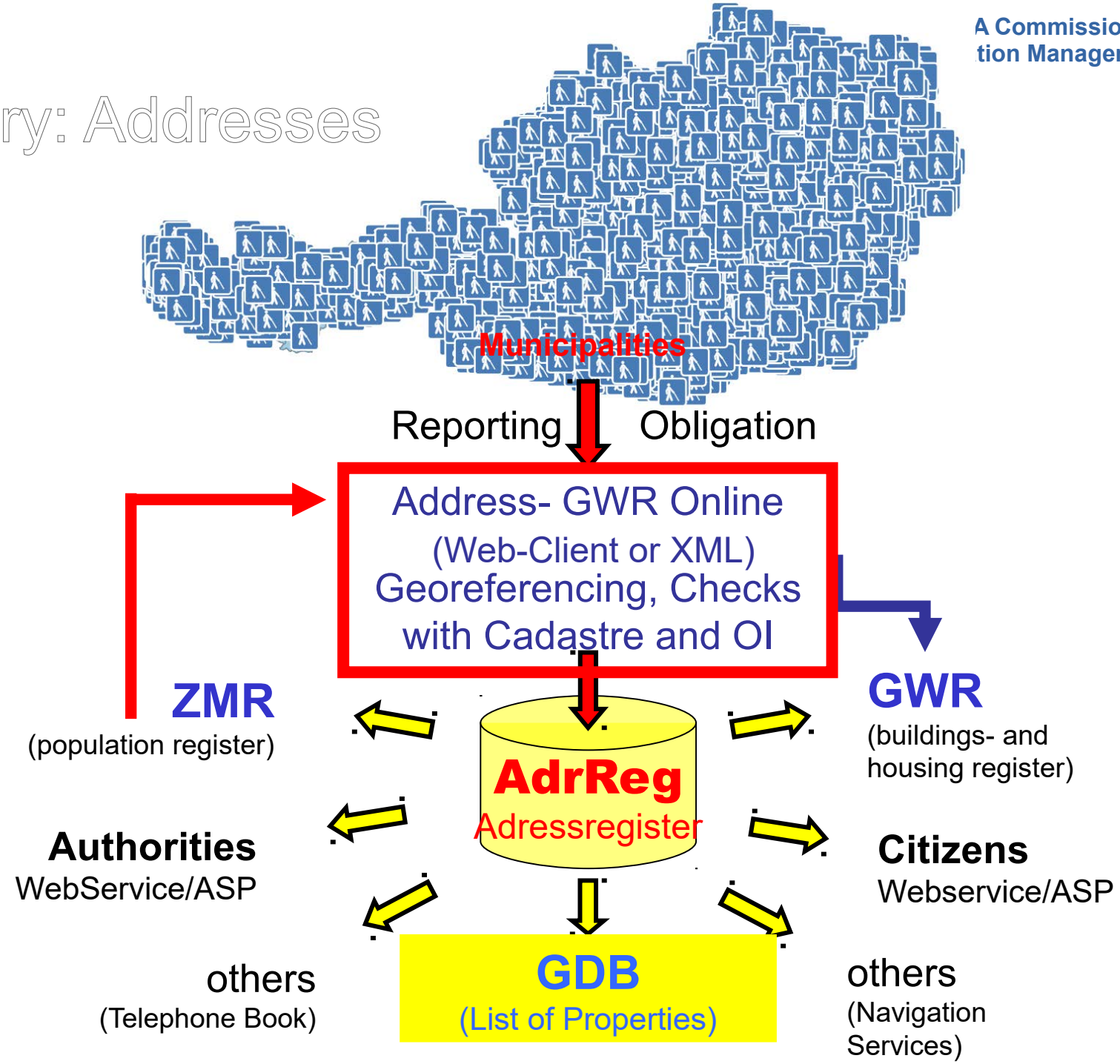
Delivery: basemap.at



Delivery: Central Address Register AT



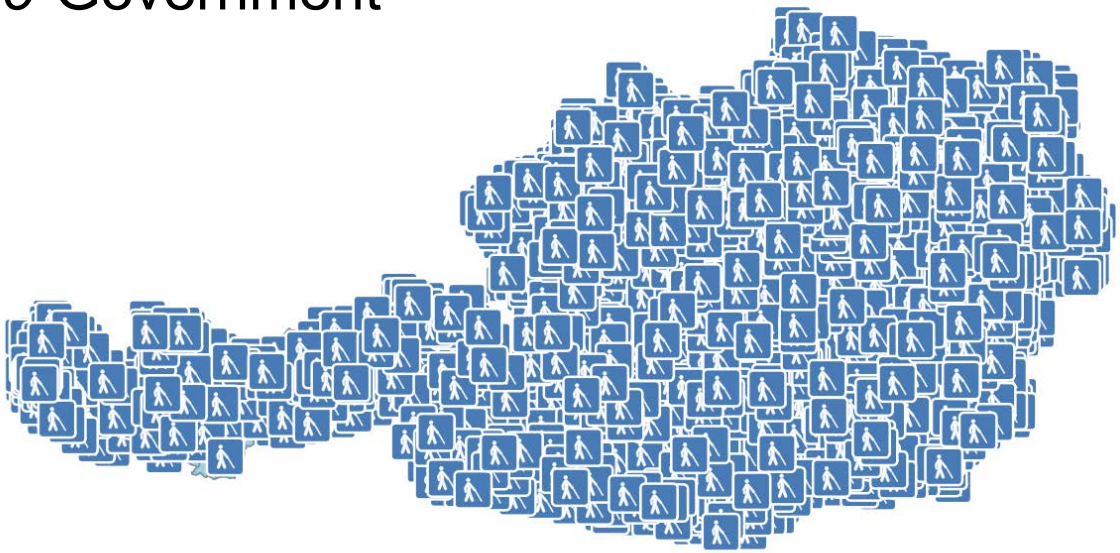
Delivery: Addresses



Delivery: Addresses

NMCA

- Maintains addresses of parcels within the list of properties (GDB)
- Provides/disseminates addresses centrally
- Provides Webservices for *e*-Government

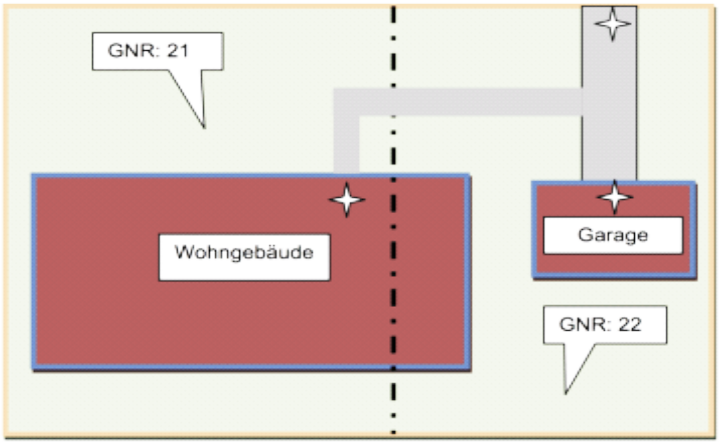


Municipalities

- Assign addresses
- Manage addresses
- Geocode new addresses with the help of NMCA´s geocoding services

Delivery: Addresses - Statistics

ADRESSE_GST (parcel adr):	**2.519.075**
ADRESSE (adr):	2.344.541
GEBAEUDE (buildings):	2.373.005
GEBAEUDE_FUNKTION:	380.099
GEMEINDE (communities):	2.100
ZAEHLSPRENGEL:	8.825
ORTSCHAFT (villages):	17.258
STRASSE (streets):	131.417



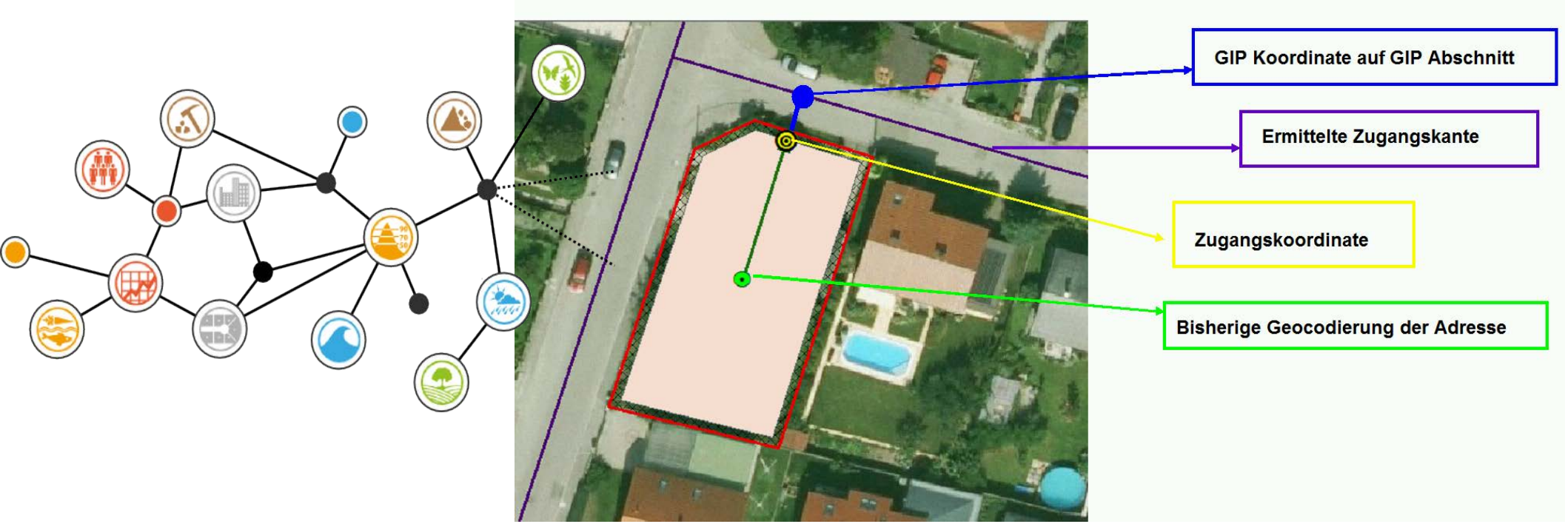
Delivery: Addresses - custodianship for quality

- Data integration to enhance address quality and routing functionality
- Combining street graph and addresses

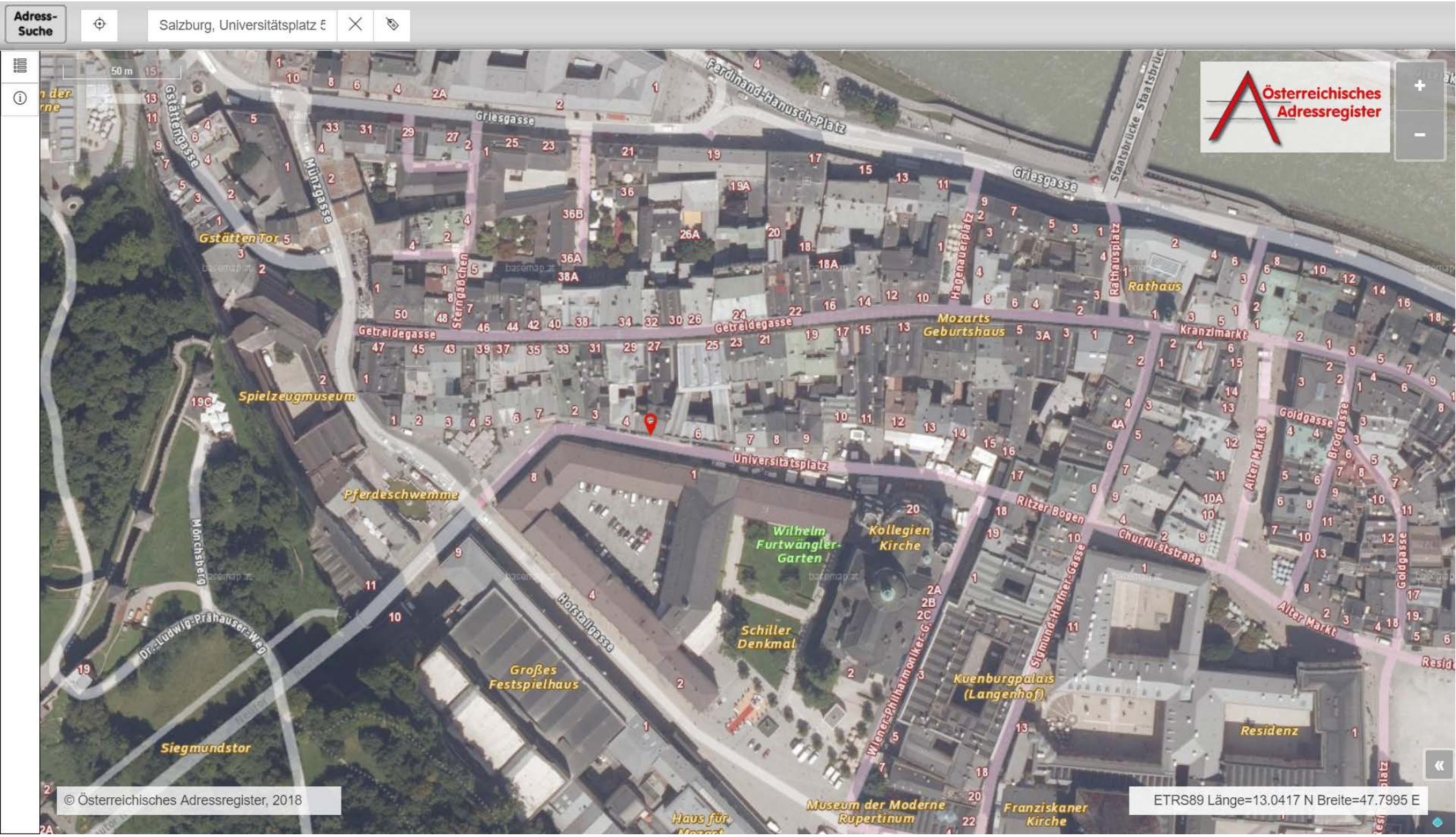
Delivery: Addresses - custodianship for quality

Collaborative Quality Enhancement

- Ability for routing (street graph)
- Parcel entrance identification
- Identifying inherent errors (due to misinterpretation)



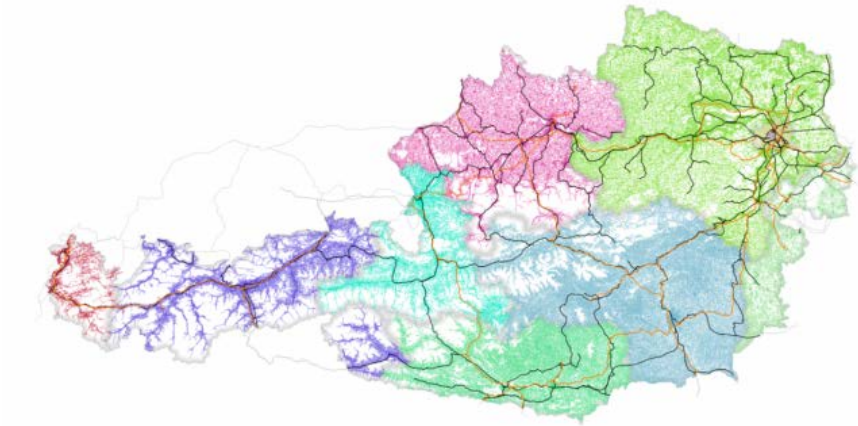
Delivery: Addresses - custodianship for quality



http://www.adressregister.at

Resume

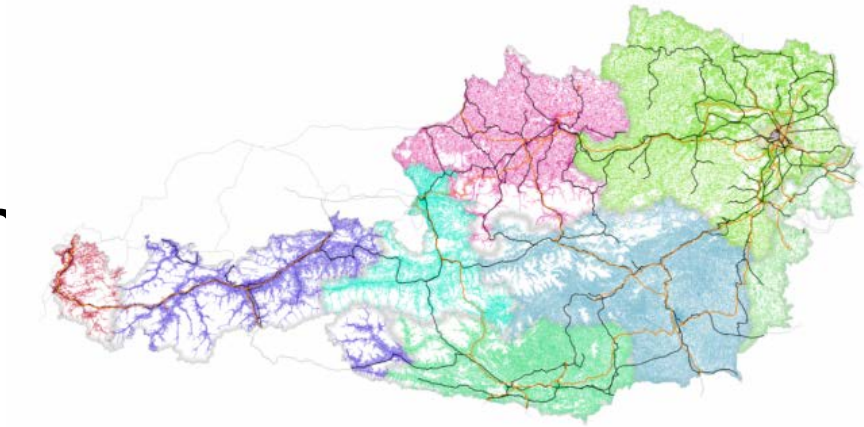
- SOA whenever possible!
  - Creates technological “freedom” (because of standard interfaces)
  - Establishes mutual dependency (balanced for all stakeholders)
  - Forces permanent changes (e.g. to follow security guidelines)
  - Enhances Quality (due to data integration)
  - Extensible stakeholder network



[2014] www.ethiopianreview.com

Resume: Needs

- Organisational specificatior
- Collective responsibility
- Process-flow involvement
- License commitment



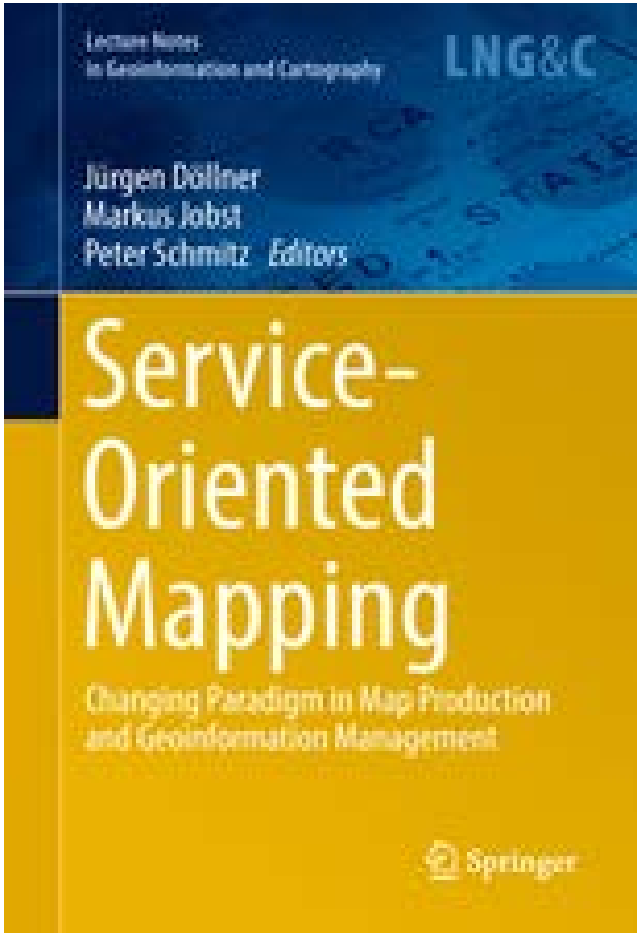
[2014] www.ethiopianreview.com

Contact

http://mapproduction.icaci.org

http://www.icaci.org (ICA)

markus@jobstmedia.at



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