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)

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Modern Map Production: Paradigm Change

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

“see” “read” “hear” ➔ machine-readable definitions


https://upload.wikimedia.org/wikipedia/commons/e/ee/AWI-core-archive_hg.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**
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?
Pragmatic issues
“drawbacks” of an open extensible SDI

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

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.
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
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
Example for coordination body: INSPIRE AT

National Coordination Body INSPIRE

Specific Working Groups
- WG Rechtliche Umsetzung
- WG Netzdiensle
- WG Interoperability
- WG Metadaten

Realisation Concepts

Responsible for
- PROFIL AT
  Metadatenprofil CN 2270
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
Planning

- Collaborative creation of national airborne laserscanning

- Difficulties:
  - Quality def.
  - Period
  - Coordination
  - Financing
The 9 provinces of AT and partners continuously produce and provide a governmental basemap with an update frequency of 2 months.
• Decentral production chain
• Comprehensive transport network
• Defined lapse of time
• Central distribution
• Decentral processing chain
• 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
- 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
ICA Commission on
Map Production and Geoinformation Management

Delivery: basemap.at
Delivery: Central Address Register AT
Delivery: Addresses

Municipalities

Reporting Obligation

Address- GWR Online
(Web-Client or XML)
Georeferencing, Checks
with Cadastre and OI

ZMR
(population register)

Authors
WebService/ASP

AdrReg
(Addressregister)

GWR
(buildings- and
housing register)

Citizens
Webservice/ASP

GDB
(List of Properties)

others
(Telephone Book)

others
(Navigation
Services)
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
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 specification
- Collective responsibility
- Process-flow involvement
- License commitment
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https://www.springer.com/de/book/9783319724331