Model driven approach for web-based cross-border GIS applications

XXIII International FIG Congress
München, 8-13 October 2006

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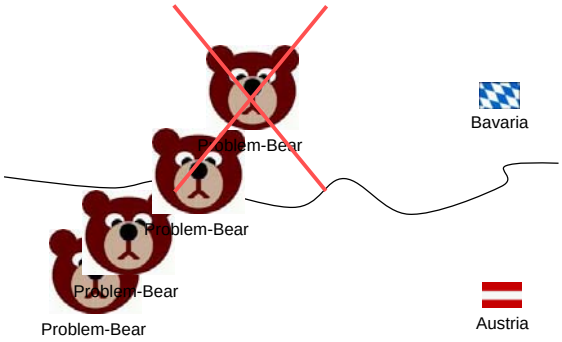

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2. Existing approaches for web-based cross-border GIS:
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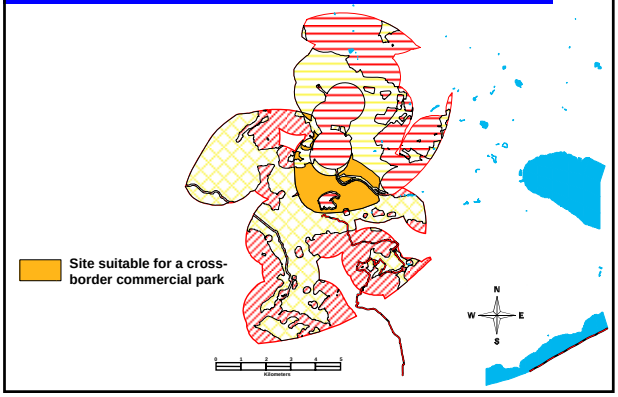
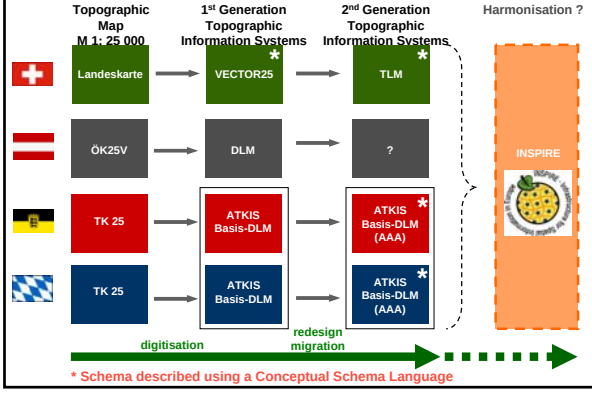
3. New: Model driven approach for web-based cross-border GIS (*md*WFS – joint research project between TU München an ETH Zürich)
4. Conclusions and future work

Use case: regional planning – site selection for a commercial park



Web-based cross-border GIS: regional planning use case in the Lake Constance Region

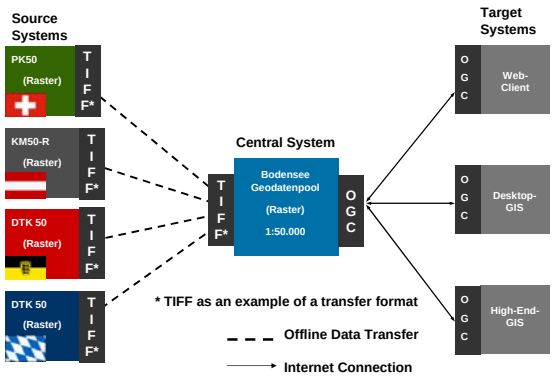
Evolution of Topographic Information Systems in Switzerland, Austria and Germany



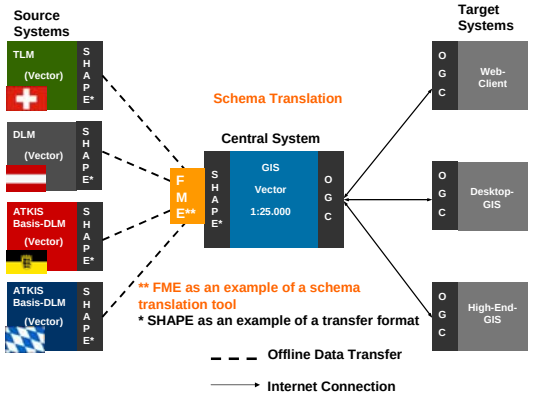
Classification criteria of web-based cross-border GIS

- Data integration from source systems into a central system:
  - Yes, a central system exists
  - No, direct connection between source and target systems
- Data type (in source, central, target systems):
  - Raster
  - Vector
- Data harmonisation:
  - Not at all
  - Spatial reference system
  - Geometry/Topology
  - Symbolisation
  - Data models (schemas)
- Vendor independence:
  - Vendor independent (standards based)
  - Vendor specific (proprietary)

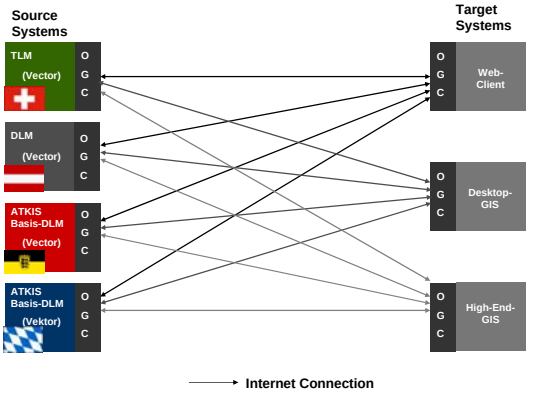
Case study 1: integrating raster data into a central system



Case study 2: integrating vector data into a central system



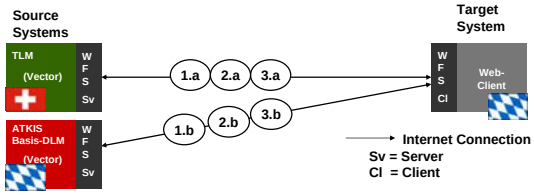
Case study 3: Distributed System using OGC WMS/WFS



Shortcomings of existing approaches

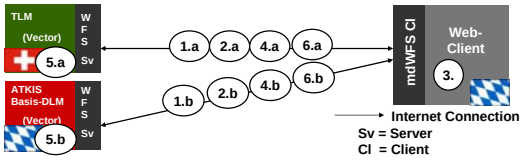
- Data integration into central system:
  - costly,
  - requires expert knowledge,
  - format conversions often lossy,
  - redundant data storage possibly means outdated data
- Distributed system using OGC WMS/WFS interfaces:
  - OWS allow for *syntactic* interoperability but do not allow for *semantic* interoperability:
    - conceptual schemas of source systems hidden from target systems
    - schema translation not supported yet

Regional planning example using OGC WFS as is



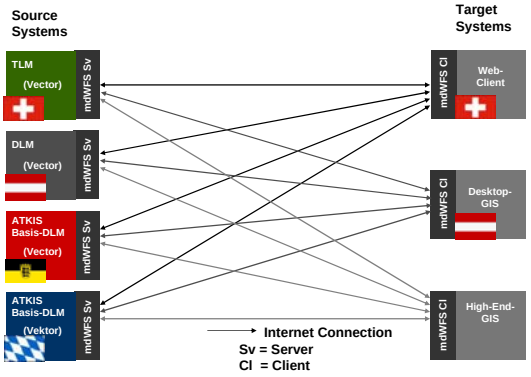
1. WFS *GetCapabilities* request + response: names of feature types that can be served by both WFS servers. User must decide which of the feature types that stand for commercial parks in the Swiss system correspond to those in the Bavarian System
2. WFS *DescribeFeatureType* request + response: schema of features at level of transfer format
3. WFS *GetFeature* request + response: User gets data form both WFS servers that corresponds to the schemas of each of the source systems, not to Bavarian schema

Model Driven Web Feature Service (*md*WFS): Idea: web based schema translation at conceptual level

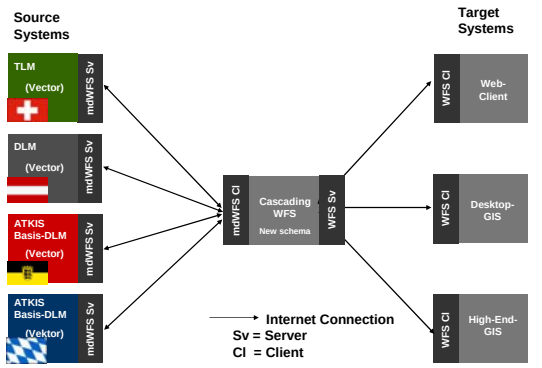


1. *md*WFS request: What does conceptual schema of data you serve look like?
2. *md*WFS response: conceptual schema
3. User either formulates schema translation rules between Bavarian and Swiss conceptual schema or uses existing rules
4. *md*WFS request containing schema translation rules and filter criteria
5. *md*WFS selects data and performs schema translation (if necessary)
6. *md*WFS response: requested data corresponding to the Bavarian Schema

Model Driven Web Feature Service (*md*WFS). Configuration I: user-defined schema translation rules



Model Driven Web Feature Service (*md*WFS). Configuration I: predefined schema translation rules



Conclusions and future work

Project *md*WFS addresses problem of semantic heterogeneity

→ Web based schema translation at conceptual level

→ Advantages:

- → User gets data corresponding to target schema not only in desired transfer format
- → Simplified access to schema translation for users

→ Formal language for formulating mapping rules currently being developed at ETH Zürich

→ Detailed information on new approach will be outcome of joint research between TU München and ETH Zürich
funded by
"Deutsches Bundesamt für Kartographie und Geodäsie" and
"Swisstopo"

Thank's for your attention!

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