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Open Source Software in daily Bavarian cadastral work – Practical experience

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Open Source Software Solutions in Cadastre, FIG Congress Sydney, 13.04.2010

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Open Source Software in daily Bavarian cadastral work – Practical experience

Presentation outline

- Framework (implementation, standardization, organization)
- ICT in the Bavarian cadastral administration
- OSS Experiences (technology, software, basic requirements policy issues)
- Examples
- Conclusion

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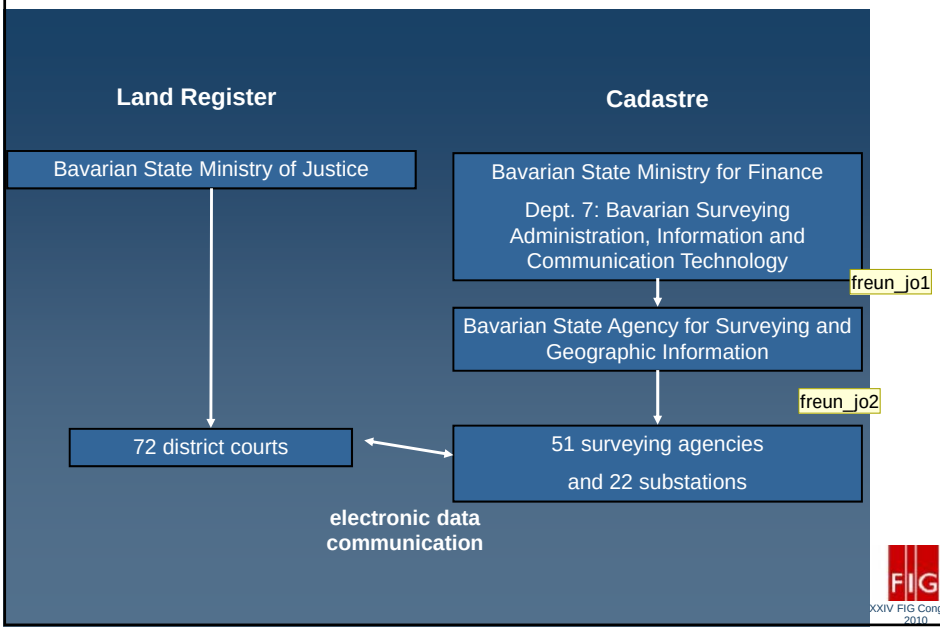
Organisation of Land Administration in Bavaria



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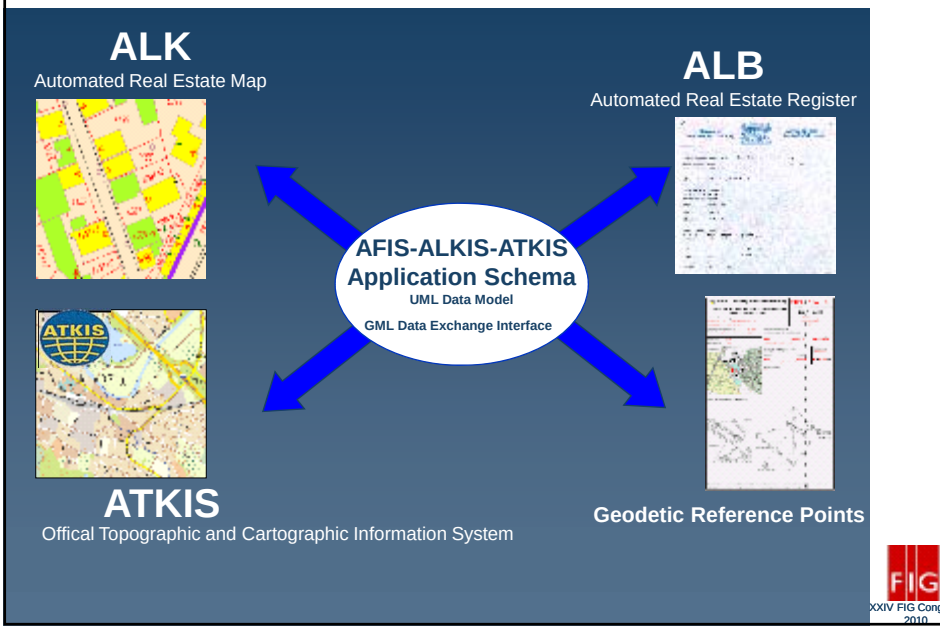
The German National Geodatabase – Reference Data



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freun_jo1 LVG: Professional and technical competence for all aspects of land surveying and cadastre
Freund, Johann (LVG); 15-10-2007

freun_jo2 execute cadastal surveying and maintain the cadastre in a GIS-System (based on open source)
Freund, Johann (LVG); 15-10-2007

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The new Cadastral Information System

AFIS Official fixed point information system
ALKIS Official Real Estate Cadastre Information System
ATKIS Official topographic cartographic information system

ALKIS = Official Real Estate Cadastre Information System =

Amtliches **L**iegenschafts**k**ataster-**I**nformations**s**ystem

- Standard for the federal states of Germany
- Conformant to ISO and OGC standards
- Integration of spatial and alphanumeric data (e.g. parcels and owners)
- Implementation by the federal states (in Bavaria **self development** based on open source software)

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Framework for Developing Cadastral Systems in Germany

GI-standards

GI-specifications

SDI Germany

*IN*frastructure for *SP*atial *I*nfo*R*mation in *E*urope *INSPIRE*

INSPIRE is the a harmonised framework directive for implementation of a European spatial data infrastructure (ESDI)

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The consequent use of ISO Standards

The application of basic ISO standards in any GIS (e.g. ALKIS) will help to:

- Increase the understanding and usage of geographic information
- Increase the availability, access, integration, and sharing of geographic information
- Promote the efficient, effective, and economic use of digital geographic information and associated hardware and software systems
- Allow any software developer to analyze the specific demands and to derive an implementation model out of the conceptual data model
- Implement open source tools to support components of an application schema (e.g. ISO 19107 Spatial Schema)

The German cadastral authorities have consequently adopted these objectives and decided to consider the ISO standards within the new AAA application schema as far as possible.

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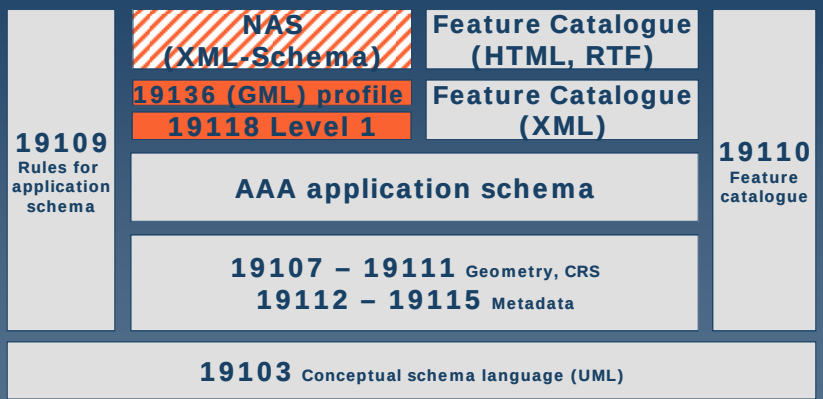
Consequent use of International Standards - Data Harmonization

INSPIRE recommendation: ISO 19109 and referred standards are promoted as ESDI rules for specifying data structures and semantics.



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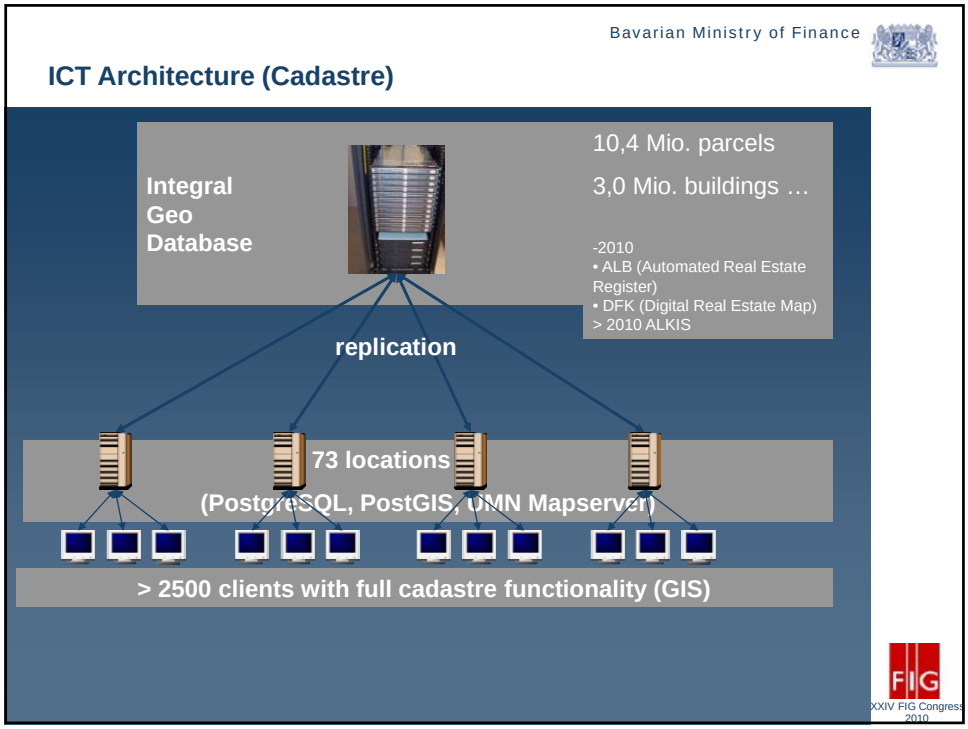
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ICT Architecture (Cadastre)
Integral
Geo
Database
10,4 Mio. parcels
3,0 Mio. buildings …
-2010
• ALB (Automated Real Estate Register)
• DFK (Digital Real Estate Map)
> 2010 ALKIS
replication
73 locations
(PostgreSQL, PostGIS, UMN Mapserver)
> 2500 clients with full cadastre functionality (GIS)
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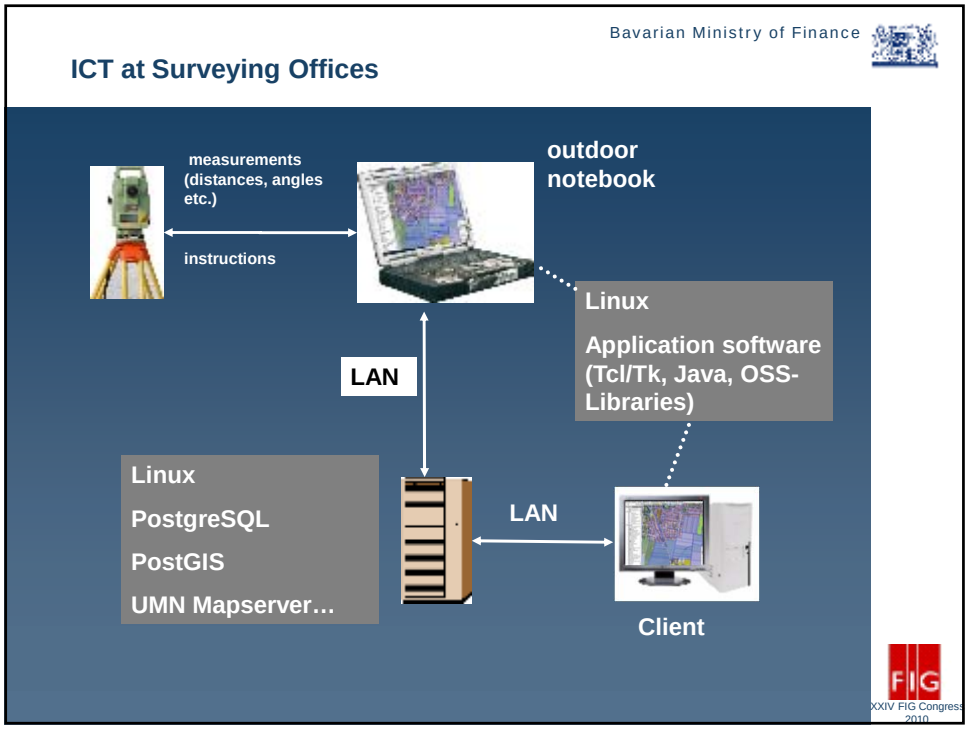
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ICT at Surveying Offices
measurements
(distances, angles etc.)
instructions
outdoor
notebook
Linux
Application software
(Tcl/Tk, Java, OSS-Libraries)
LAN
Linux
PostgreSQL
PostGIS
UMN Mapserver…
LAN
Client
FIG
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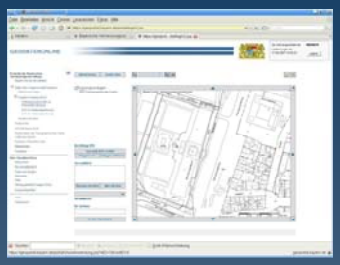
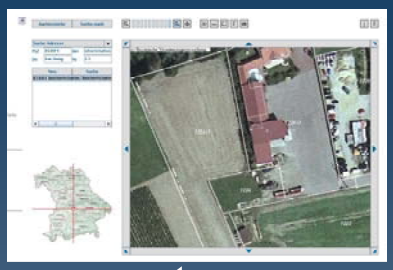
Online Data Distribution





GeodatenOnline

Bayern-Viewer

Integral Geo Database

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Experiences OSS - Technology

- Technical requirements (performance, stability etc.) are fulfilled by OSS products
- PostgreSQL is a powerful database for GIS purposes based on ISO-standards
- System requirements are lower for open source products than for commercial products
- Good maintainability
- Installation can be efficiently automated (from one location to 73 servers and 2500 clients without manual interaction)
- Products can be easily adapted to changing needs
- Fast reaction

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Experiences OSS - Software

- Commercial software solutions: do they really meet the demands of a specific country and of specfic workflows?
- There is a demand for open source core cadastral functions (no one should reinvent the wheel)
- WMS, WFS: modular components inter-operating on web services -> spatial data infrastructure -> accessibility to cadastral informations („web services for geo-enabling the world“)
- The reputation of Open Source Software is not the very best. People assume that installation is difficult, the operation is complicated and there is bad support. Even it has been proved that it is not the case in the Bavarian Administration for Surveying this assumption is still there.

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Basic Requirements

- Technical skills: programming languages (Java etc.), DBMS, SDBMS (PostgreSQL), system, networks and …
- Data migration (to meet the rules of the data-model) and data collection -> in Bavaria the most work-intensive and technical challenging task
- Understanding of ISO methodology

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Policy Issues

- OSS is not yet accepted everywhere (due to the misunderstandings as difficult installation, complicated operation, bad support …)
- No License costs: 73 (server) x 0,00 + 2500 (clients) x 0,00 = 0

Annual report of the Bavarian Supreme Court of Accounts (2001)
(controlling body of national finances)

In its annual report the Bavarian Supreme Court of Accounts argues for the application of open source software in public administration. In a particular chapter "application of open source" it criticises the public IT's strong dependence of a single software producer – Microsoft – and shows options for the application of open source software.

- The application of open source products is fixed in the Bavarian IT-standards.

Bavarian IT-standards in public administration

Operating Systems

IT-Standards für die bayerische Staatsverwaltung **Betriebssystem für Client – Fat Client**	**BayITS-04** Stand: 01.08.2007

3 **Produktkatalog**

Produkt	Version	Kategorie	Begründung
Suse Linux mit KDE-Desktop	mindestens SuSE Linux Enterprise Desktop 10	Standard	
Suse Linux mit KDE-Desktop	mindestens openSUSE 10	Standard	
Microsoft Windows	Windows XP	Standard	
Microsoft Windows	Windows 2000	erlaubt	
Microsoft Windows	Vista	in Beobachtung	

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Bavarian IT-standards in public administration

Data Base Management Systems (DBMS) for Complex Applications

IT-Standards für die bayerische Staatsverwaltung
Datenbanksystem
BayITS-08
Stand: 01.08.2007

2.3 Produktkatalog

Produkt	Version	Kategorie	Begründung
Microsoft SQL-Server	**2000**	**Standard**	
Microsoft SQL-Server	2005	in Beobachtung	
ORACLE	**9i, 10g**	**Standard**	Hoher Verbreitungsgrad bei unternehmenskritischen Anforderungen. Allerdings hohe Lizenzgebühren.
ADABAS C	3	erlaubt	robustes und leistungsfähiges Datenbank-System
DB2	**7**	**Standard**	Relationales DB-System der Fa. IBM, läuft auch auf IBM-Großrechner
PostgreSQL	**7.4**	**Standard**	OSS-Produkt Einsatz in der Vermessungsverwaltung Vermessungsverwaltung bietet Produktsupport an
PostgreSQL	7.3.x	erlaubt	
PostgreSQL	8	in Beobachtung	
MySQL	**5**	**Standard**	
Tamino XML Server	**4.2**	**Standard**	zukunftsorientiertes Datenbanksystem mit nativer XML-Implementierung

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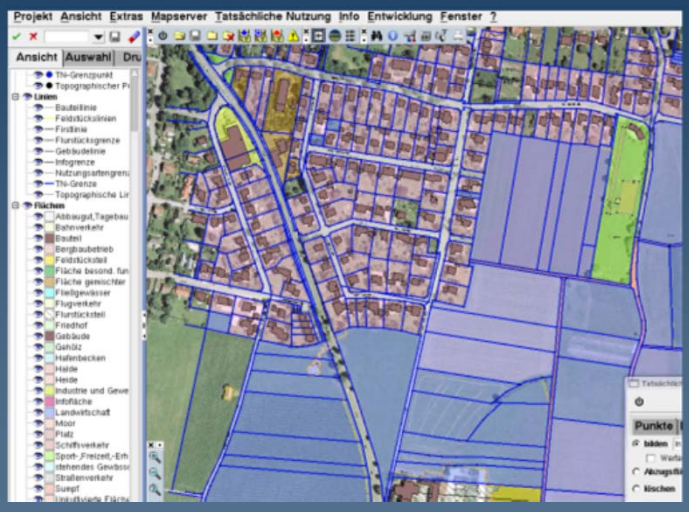
Examples

1. Collection of Land Use Data
2. Web Services, Bayern-Viewer Agrar



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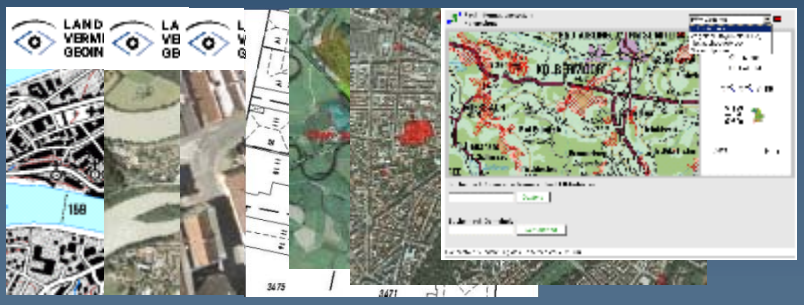
Geoservices

Based on OGC Web Map Service (WMS) , implemented by UMN Web Map Server

- Request of digital maps in raster format (PNG, GIF, TIFF, JPEG) coming from seperated digital geographic databases
- Displaying with an ordinary web browser



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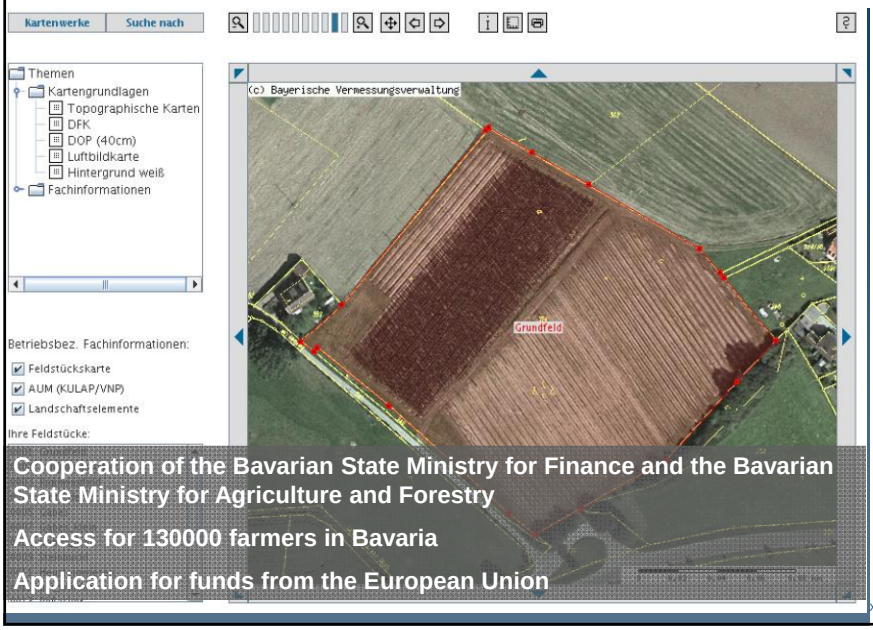
Bayern-Viewer Agrar



Cooperation of the Bavarian State Ministry for Finance and the Bavarian State Ministry for Agriculture and Forestry

Access for 130000 farmers in Bavaria

Application for funds from the European Union

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The way forward: One Cadastral GIS for all?

- Q: Is it possible to develop a cadastral application that fulfills the demands of every country? No. (Germany: 16 federal states)

  But: every country uses GIS functionalities, cadastral, calculation and surveying operations. They can be combined to a customized solution. This is the chance of Open Source.
- Define standardized core processes as a sublevel of the main processes that depend on local requirements such as laws and regulations (-> Land Administration Domain Model, LADM)
- Scalable toolkit for cadastral and land registration purposes
- Business processes and technical solutions must be adjusted to one another

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Conclusion

Even if there are still some challenges and definitely a lot of things to be done before Open Source Software can be sufficiently implemented, the experiences in Bavaria are very positive.

freun_jo3

It has been shown that the implementation of Open Source applications is a reasonable approach in the field of cadastral administration.

Thank You !

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Slide 22

freun_jo3 acpects to be considered when buildung up an open source initiative:

data model (CCDM?)
data ! (migration, collection)
business processes
subjective aspects: precudices
policy
consulting
...

Freund, Johann (LVG); 24-10-2007