Cadastral Information System

- Is a register
  - To store and deliver information about tenure
  - To process updates
- Is transaction oriented
  - Much like banking systems
  - Only data of far more complex structure
- Parcel-based systems
  - Set of polygons without gaps and overlapping

Transaction Processing on Planar Partition for Cadastral Application

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Approaches to updating geometry

- Traditional
  - Small group of experts
  - General purpose geometry editing tools
  - Editing directly to the database
  - Strictly in-house

- Alternative?
  - Much more experts (not only in-house)
  - Focus on the data (instead on technology)

Why?

- Outsourcing
  
  **Statement 5 on Cadastre 2014**
  
  **Cadastre 2014 will be highly privatized! Public and private sector are working closely together!**
  
  **Comment:** Public systems need to be less flexible and customer-oriented than those of private organizations. Risk and economic costs demand this level of flexibility and efficiency. Risk-bearing may be avoided better by private institutions. For necessary security, however, public involvement is indispensable.
  
  **Consequences:** This private initiative is a means to achieve the public goal of public ownership and control.
Basic principles

- The transactions
  - Precise model
  - Simple enough (for outsourcing)
- The transaction testing/execution engine
  - Provide maximum level of data consistency
  - Preferably Real time processing

Three tier approach

Data tier
- Polygons of planar partition

Middle tier (transaction processing)
- Rules on transaction consistency
- Data model for transaction

Interface tier
- CAD
- Desktop GIS
- Custom tailored geometry editing app.
Testing transactions on planar partition

- Topological approach used
  - Stored half-edges for entire planar partition
  - On line half-edge extraction from new polys
- On-line topology testing (using half-edges)
  - Any inconsistencies detected and reported

Performance issues

- In-memory spatial index (created on-line)
- Uniform planar subdivision UPS (2 levels)
  - UPS0 for points (nodes)
  - UPS1 for lines (edges)
Conclusions

- Hi performance topology engine
  - for polygons of planar partition
- Easily outsourced
  - DBMS centric
  - Dxf exchange format very simple
- Oracle DBMS used highly scalable
- Vektoria (implemented using the concept)
  - Installations in Cadastral offices in Croatia and Bosnia and Herzegovina

Thank you...

...Q&A