Cadastre – From Vision to GIS

FIG Workshop On Standardization
in the Cadastral Domain
Bamberg, Germany
December 2004
Steve Grise, Carsten Bjornsson - ESRI
Topics of Discussion

• The Cadastre 2014 initiative
• Methods and technology
• Physical data base design
• Spatial relationships
• Queries and indexes
• Implementing Cadastre 2014
• Publicizing cadastre data
• Conclusion
Review of Cadastre 2014

- Land objects are the legal inventory
- Survey descriptions are a part of the inventory
- Proposes an object-oriented model
- Maintain relationships with other group definitions
- Land can be modeled using multiple land objects
- Cadastral systems are not isolated but work with other land information systems
GIS and Cadastre 2014

- GIS evolved to utilize object relational as an enterprise system
- Visualize data as maps
- Analyze geographic data and create derived information
- Support queries
- Share data with other systems using standards
Methods and Technology

- Verify the conceptual design supports the applications of land administration
- Define tabular structure and relationships in a logical design
- Create the physical design
Physical Database Design

- Spatial associated objects
- Spatial objects
- Subtypes for grouping objects
- Relationship classes
- Topology
- Rules to define legal values
A catalog

A folder with geographic data

A geodatabase

A feature dataset

A junction feature class

An edge feature class

A geometric network

A relationship class

An object class
Defining Spatial Relationships

• Association
• Topology – data integrity
• Reference to coordinate systems
Topology

“A legal description polygon object must share boundary with a surveyed boundary line”.
Topology in Cadastral Systems

- A set of rules which enable administration and practitioners to model real world objects
- Enforces data integrity
Queries and Indexes

• Performance consideration
• Indexes improve query performance
• Tested and tuned
Implementing Cadastre 2014

- Cadastral systems grow to be large multi-user enterprises
- Scalability
- Long transactions
- Different user, different requirements
- Publicizing the data
Scalability

• Two design approaches
  – database tables
  – GIS binary compression

• User environment
  – work flow considerations
  – version management
Editing Process

• Spatial objects and their relationships create unique work flows not found in common database technology
• Multi-user, long transactions
• Maintenance of transaction history
• Disconnected from the system
Publicizing Cadastral Data

• Considerations
  – integration of spatial data and analyses into business process
  – openness
  – interoperability
  – metadata
  – Web services
  – communication
Conclusion

Implementing Cadastre 2014 represents just the beginning. Cadastre 2014 is a framework for an extensible and flexible data model. Current GIS technology provides the tools and technology to support the data and workflows in an enterprise cadastral/land records system.