Advanced GIS Tools for Quality Control and Data Quality Automation

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Data and Map Production

- Workflows
- Quality Control
- Editing
- Cartography

...Focused on Quality, User Needs, and Innovation
What is a ‘Parcel Fabric’?

- A specialized dataset for managing parcels
- A ‘Parcel’ is comprised of
  - One polygon
  - A sequence of lines
  - Corner points (A line has a ‘From’ and a ‘To’ point)
Parcel fabric data model

- **Plans**
  - Represent the legal document
  - Store record information

- **Parcels**
  - Polygon defined by a sequence of lines (traverse)

- **Lines**
  - Store the recorded dimensions
  - Have a To and a From point

- **Points**
  - Have X Y Z coordinates
  - Can have a control point
Managing the Legal Record

- Recorded dimensions don't change when geometry is modified
- Recorded Stated Area ≠ shape area
- Legal start/end dates ≠ system start/end date
- Parcels are associated to their legal source (plan)
Historic Parcels

- Historic parcels are automatically created
- Historic and current parcels are aligned

Historic parcels save time
Topological Integrity Between Parcels

- No more slivers and gaps between parcels
- ‘Lines Points’ are points that are located on an adjacent parcel line (“back lot problem”)
Overlapping parcels
Parcel fabric data model

- Overlapping parcels share common points. Example: Subdivisions, Lots, Tax Parcels…
Efficient Built-in Workflows

- Built in workflows
- Step by step instructions
- Reduce learning curve
- Improve efficiency
Improve Spatial Accuracy

- Weighted least square adjustment (LSA)
- Adjust parcels to control network
  - Run when new control points become available
- Straighten tangent lines

Example:
Imagery exposes poor spatial accuracy. After adjustment (redo) the parcels align with the high resolution accurate imagery.
Align other features

- Many datasets are based on parcels
- Instead of manually realigning data →
- Use feature adjustment

Example:

After parcels are adjusted using control, the administrative boundary is spatially adjusted to align with the parcels
Map Series Automation

- Create a map series at will
- Comply with standards
- Dynamic map elements update for every page (book & page, extent, scale…)
- Save time: focus on data maintenance and not on ‘paper drafting’
- Single information model / dataset
- Different maps for different purposes
COTS (Commercial off-the-shelf)

- Parcel Editor comes with ArcGIS Desktop
- Used to edit parcel fabrics
- Edit, analyze and share data using ArcGIS
Summary

- **Efficiency gains:**
  - Faster processing
  - Reduce redundant work/duplicated effort
  - Maps can be generated automatically

- **Publish updates:**
  - Transparency – provide timely access to authoritative current data
  - Better decision making across departments
  - Better customer service using public facing maps and apps

- **Quality**
  - Better data integrity
  - Improve spatial accuracy
  - Maintain historical records

*Efficiency, Quality, Fairness, Better Customer Service, COTS*
What is ArcGIS Data Reviewer?
Data Quality Management for ArcGIS

- Provides
  - Rule-based validation
  - Interactive tools
  - Track errors

- For individuals and enterprise
  - Saves time/money
  - Less rework

- For multiple domains
  - Configurable
  - Extendable
Data quality management
Capabilities of the ArcGIS platform

**Geodatabase integrity**
- Schema constraints
- Geoprocessing tools
- Data load checks
- Versioning

**Advanced data types**
- Topologies
- Geometric networks

**ArcGIS Data Reviewer**
- Automated review
- Semi-automated review
- Error management
- Quality reporting
Automate data validation

- Data quality checks
  - 42 configurable checks
    - Attributes
    - Spatial relationships
    - Feature integrity
    - Metadata
- Custom check
Automate data validation with batch jobs

- Define and encapsulate quality requirements
- Configure automated checks
- Design once and execute many times
Centralized error information
Some Examples of European Land Administration Authorities Using Esri

Covering the complete spectrum of Cadastre & Land Registration Systems

- Belgium Cadastre
- Greek Cadastre
- Latvia State Land Service
- Survey of Israel
- Slovak Cadastre
- German States
- France Local Government
- Austria BEV
- Bulgaria Cadastre Agency
- Sweden’s Lantmateriet
- Lithuania’s State Enterprise Centre of Registers
- Turkey’s General Directorate of Land Registry & Cadastre
- Russia Rosreestr
- Romania’s ANCPI
- Cyprus Department of Lands & Surveys
- FYRO Macedonia Cadastre