Data Alignment and Management in ArcMap

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Agenda

• The need for data alignment
• Review tools available for improving spatial accuracy of your data
  - Spatial adjustment & Rubbersheeting
  - Snapping capabilities, tracing tools, auto-complete, etc.
  - Alignment tools
• Review tools available to maintaining accuracy & coincidence
  - Map Topologies & Geodatabase Topologies
Data Alignment

• Many GIS domains have continuous data (Forestry, geology, land use, parcels, etc.)
• Spatially accurate data not always a priority
• Data sharing increased demand for accuracy
Data Alignment

Common scenarios:

1. Editing without regards to spatial integrity.
2. Different data sources.
3. Features created or updated at different points in time.
4. Features created at different map scales.
Spatial Adjustment

Projections

- Shift data between coordinate systems
Spatial Adjustment
Transformations

• Shift data in coordinate space
  - Digitize coordinates to real world
  - CAD coordinates to real world
  - Meters to Feet
Spatial Adjustment

Rubber Sheeting

- Aligns local data
- Integrating data from different scales and sources
  - Integrate 250K Hydro features into 50K data
  - Align national roads with local roads
Spatial Adjustment Demo
Summary of Adjustment Process

- Create Links
- Set Adjust source
- Set Adjustment Method
- Preview
- Adjust
Keeping Your Data Aligned

- Know what the basic tools are and how to use them
  - Snapping environment
    - Basic snapping
    - “Classic” snapping
    - Snap to feature
  - Auto-Complete (polygon and freehand)
  - Trace construction tool
  - Extend and Trim tools
  - Auxiliary anchor (Rotate and Scale tools)
Keeping Your Data Aligned

- New tools introduced at 10.1 to help with this process:
  - Align To Shape – adjust layers to traced shape
  - Align Edge – snap edges together to close gaps
Geoprocessing Alignment Tools

- **Snap** – bulk snapping based on user specified rules
  - Edit session

- **Integrate**
Aligning Data Demo
Topologies – Why would you want to use one?

Two main reasons for using a topology:
1. Tools for editing coincident geometries between feature classes
2. Tools for finding and fixing errors based on rules you define
Topologies – What kinds are there?

Two types of topologies:

1. Map Topologies (requires only ArcView license)
   - Can be used with feature classes or shapefiles in same workspace
   - Not persisted, but saved in map document

2. Geodatabase Topologies (requires ArcEditor license)
   - Allows rules to be defined and errors found
   - Must be used with feature classes in same dataset
   - Persisted in the database
Topologies – Editing coincident geometries

- Tools to select topology elements
  - Topology Edit Tool
  - Topology Edit Trace Tool

- Tools to update topology elements
  - Modify Edge
  - Reshape Edge
  - Align Edge
  - Generalize Edge
  - Reconnect Nodes
Topology Editing
Tools Demo
Geodatabase Topologies – Topology Rules

• 32 topology rules
• Single or multiple feature classes
• Apply to feature class or subtype level
• Categorized by geometry type (polygon, line, point)
• Examples
  - Soil polygons can’t have gaps between them
  - Parcels can’t overlap
  - Address points must be inside parcels
Geodatabase Topologies – Validating a Topology

• Integrates geometries based on a cluster tolerance
  - **Cracking** – Vertices added at intersections of feature edges
  - **Clustering** – Snapping vertices that fall within cluster tolerance

• Validates topology rules which may generate errors
  - Deletes errors if the rules are no longer violated

• No new features are created
Geodatabase Topologies – Error Inspector

- Error Inspector lets you view and fix topology errors in a table.
  - The rule violated
  - The feature class or classes involved in the error
  - The geometry of the error
  - The feature ID of the features involved in the error
  - Whether or not the error has been marked as an exception
Geodatabase Topologies – Editing Errors

- Topology errors represent violations of topology rules. Need to edit the features to remove the topology errors.
  - Errors cannot be deleted directly, the features must be edited and the topology re-validated
  - Three options for correcting errors:
    - Leave the error in the database
    - Fix the error
    - Elevate the error to exception status. This allows you to say this rule applies everywhere except ‘here’
Geodatabase Topologies – Editing Errors

• Select the topology errors on the map
  - Creates an “Active Error Selection”
  - Context menu with fixes based on rule

• Revalidate after edits
Topology Errors Demo
Summary of Topologies

• If you just need to edit coincident boundaries – consider a map topology
• If you need to define and validate rules – use a geodatabase topology
• With geodatabase topologies:
  - Build and validate to improve spatial integrity between your data layers
  - Use the available editor tools to find and fix your errors
  - Use automated fixes as much as you can, but they aren’t the answer for every error
Thank you...

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