



Esri International User Conference

San Diego, California

Technical Workshops | July 24th, 2012

Data Alignment and Management in ArcMap

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Agenda

- Overview/purpose of the session
 - Improve the spatial integrity of your data and keep it that way
- Aligning your data
 - Spatial Adjustment
 - Transformations
 - Rubbersheeting and attribute transfer
 - Bulk Geoprocessing Alignment Tools
 - Interactive Alignment Tools (new tools in ArcGIS 10.1)
- Managing your data once it is aligned
 - Understanding the tools (Snapping, Auto-Complete Polygon, etc.)
 - Map Topologies
 - Geodatabase Topologies
- Summary
- Fill out the session survey

Data Alignment and Management Overview

- Many “traditional” GIS domains have continuous data (Forestry, geology, land use, parcels, etc.)
- Having spatially accurate data has always been a goal for organizations, but not a high priority
- As use of data increases, this is changing
- Increase of more accurate data online also fueling the change



Data Alignment and Management Overview

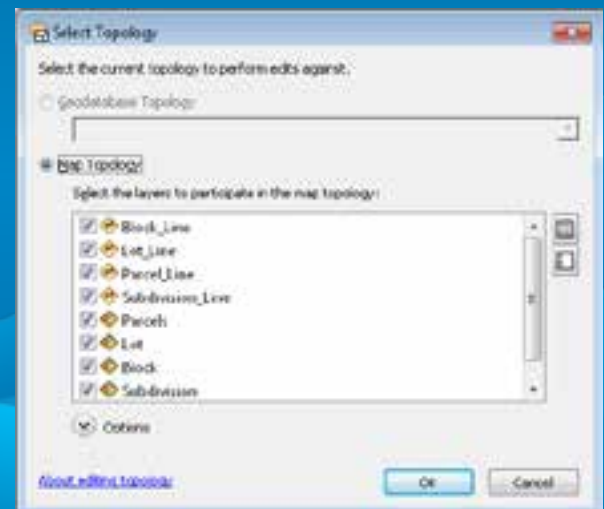
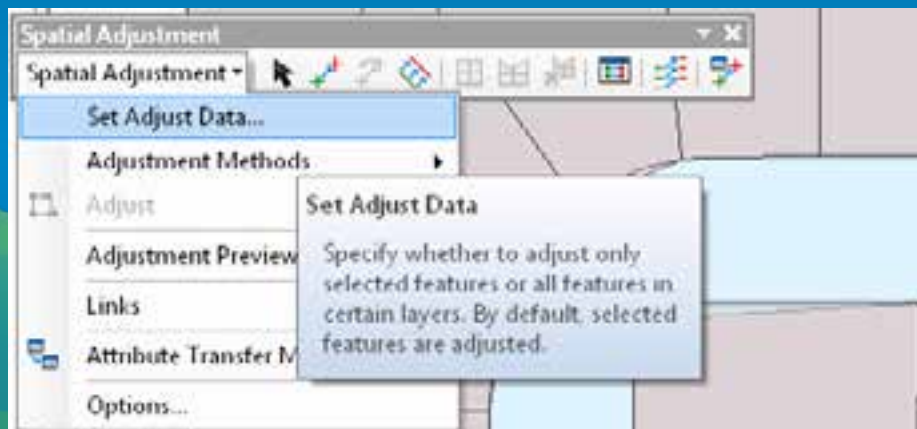
Common scenarios:

1. Editing methods to help ensure spatial integrity were not used.
2. Different data compilation techniques or data sources used.
3. Features created or updated at different points in time.
4. Features were created at different map scales.



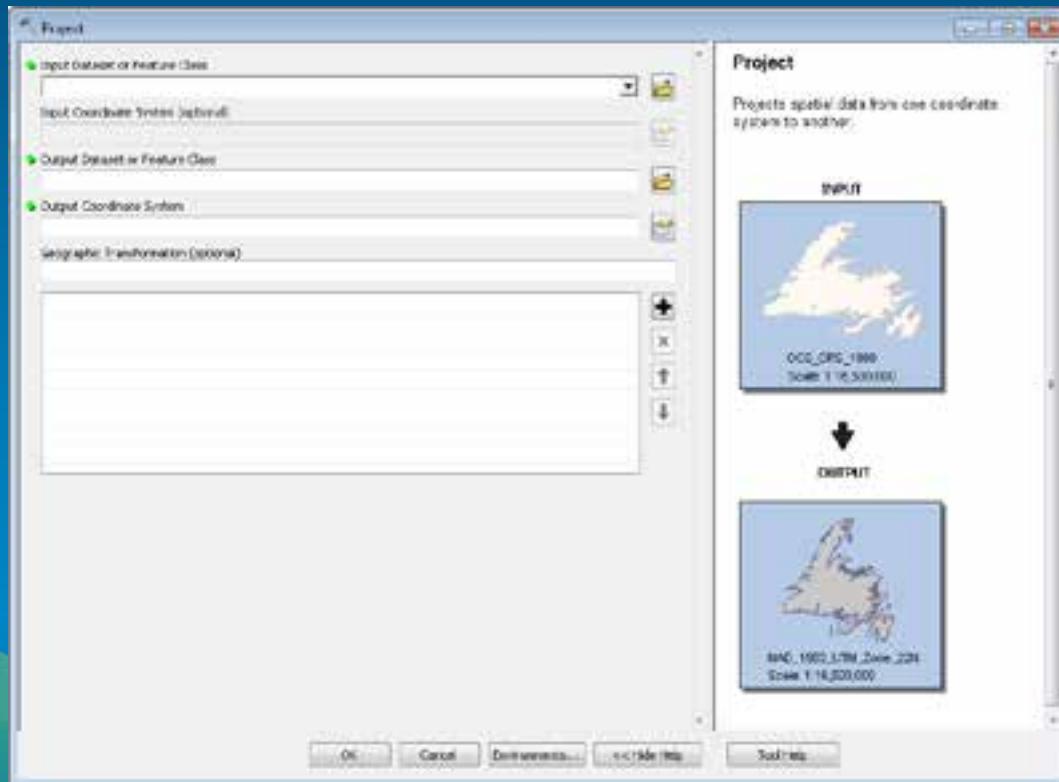
Data Alignment and Management Overview

- Purpose of the session:
 - Review tools available for improving spatial accuracy of your data
 - Spatial adjustment & Rubbersheeting
 - Alignment tools
 - Review tools available to maintaining accuracy & coincidence
 - Map Topologies & Geodatabase Topologies
 - Snapping capabilities, tracing tools, auto-complete, etc.
 - Review what's new for editing in ArcGIS 10.1



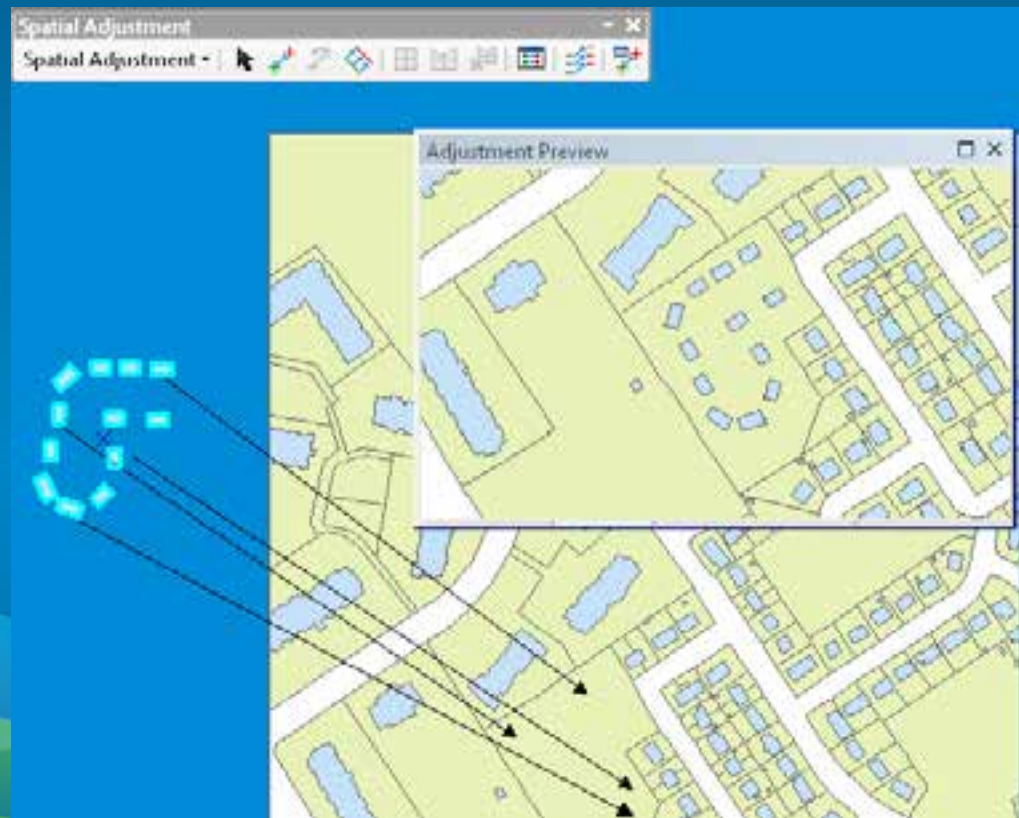
Spatial Adjustment

- Projections
 - Shift data between coordinate systems



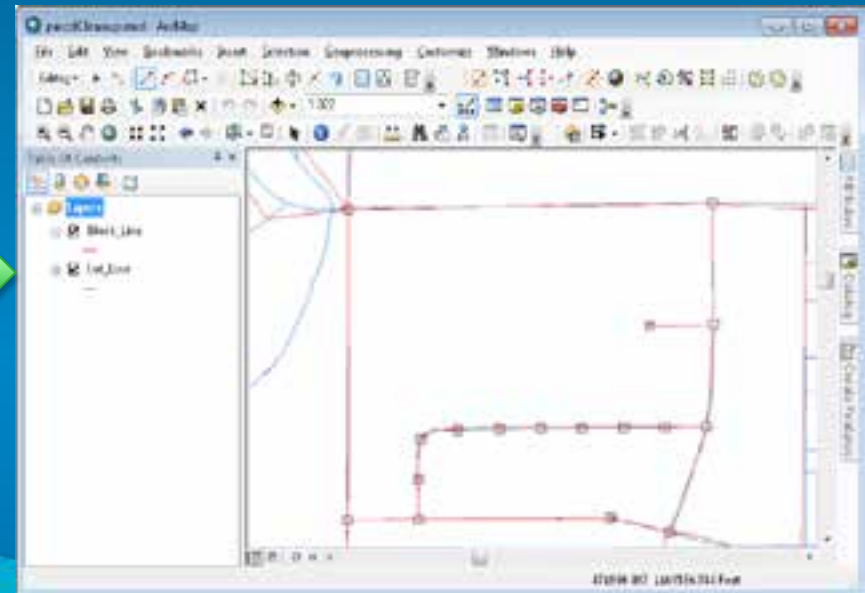
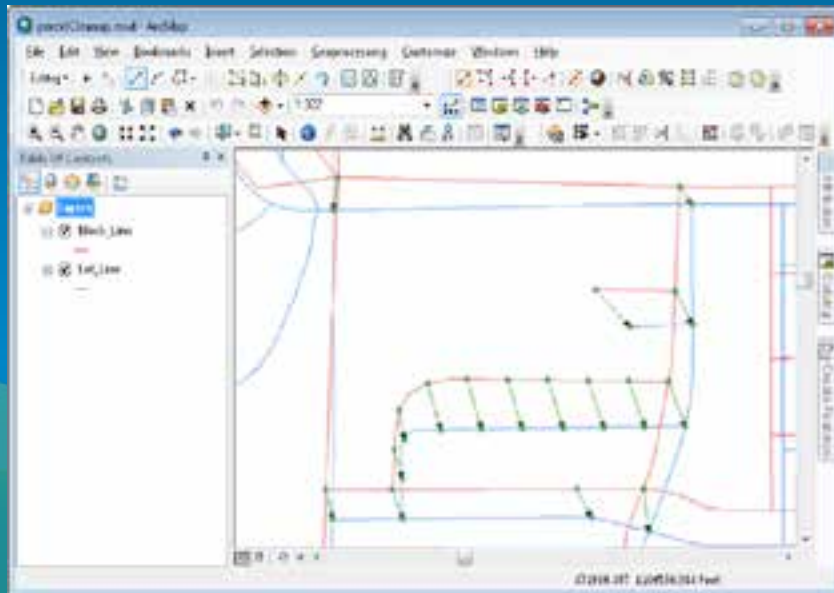
Spatial Adjustment

- Transformations
 - Shift data in coordinate space
 - Digitize coordinates to real world
 - CAD coordinates to real world
 - Meters to Feet



Spatial Adjustment

- Rubber Sheetting
 - Aligns local data
 - Integrating data from different scales and sources
 - Integrate 250K Hydro features into 50K data
 - Align Tiger lines with local roads



Spatial Adjustment Demonstration

Sean Jones



Adjustment Process

- **Create Links**
- **Set Adjust source**
- **Set Adjustment Method**
- **Preview**
- **Adjust**

Create Link
Elements



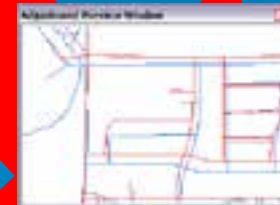
Set Adjustment
Source



Set Adjustment
Method



Preview
Adjustment

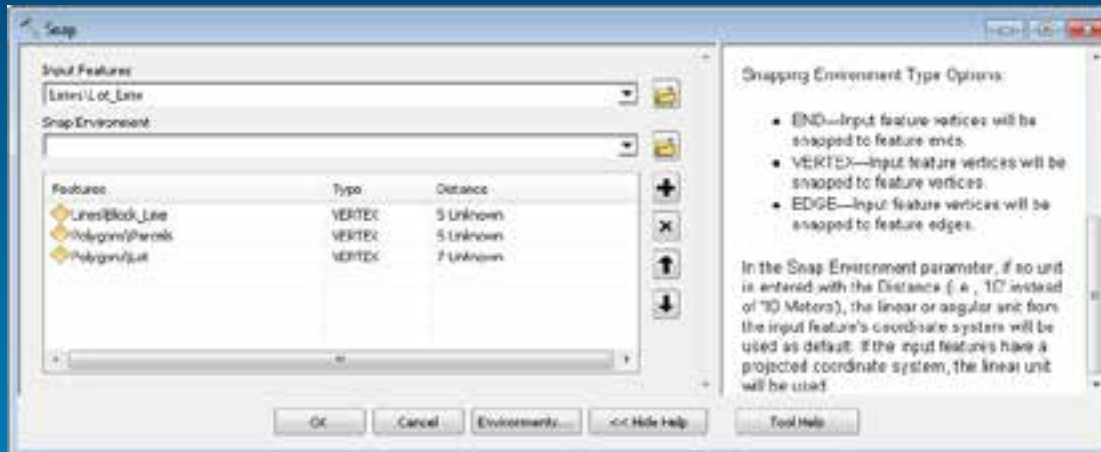


Adjust data

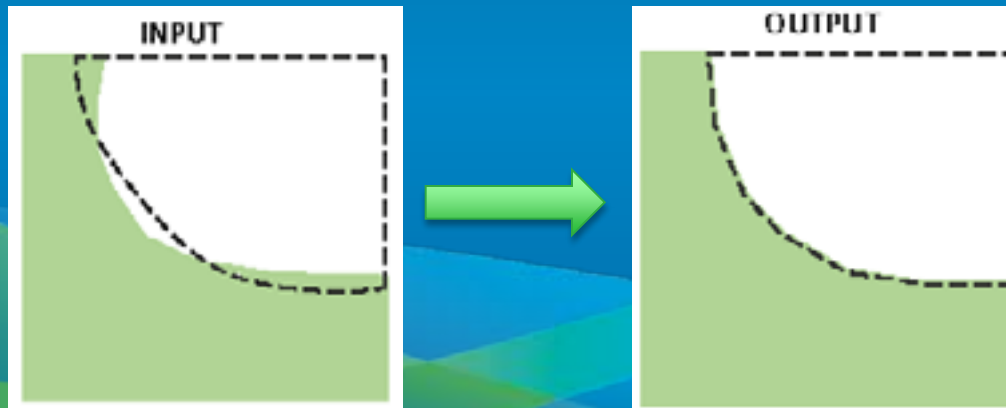


Bulk Geoprocessing Alignment Tools

- Snap – bulk snapping based on user specified rules



- Integrate – will make feature coincident within a tolerance



Interactive Alignment Tools

- Transformation tools and bulk geoprocessing tools work well at larger scales. Quite often, though, a more interactive solution is needed for small scale alignment clean up.
- New tools introduced at 10.1 to help with this process:
 - Align Edge – snap edges together to close gaps



- Align To Shape – adjust layers to traced shape



- Replace Geometry – create an entire new shape for a feature

Aligning Data

Sean Jones

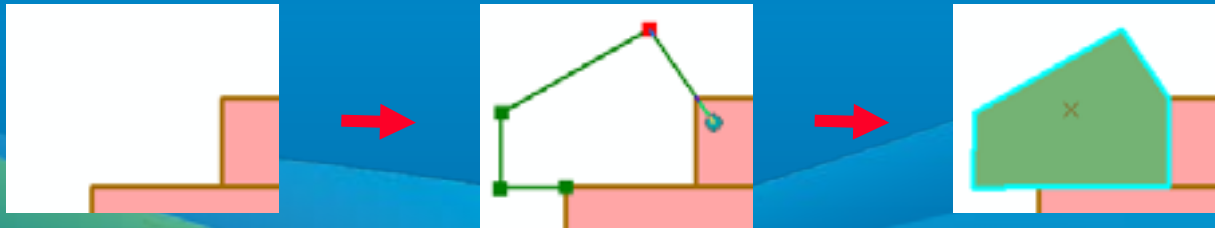


Summary of Aligning Data

- To shift data between coordinate systems - use Project GP tool
- To shift data in coordinate space – use Transformation tools
- To shift local data – use Rubbersheeting tools
- For interactive alignment on small scale – use new 10.1 tools
 - Align To Shape
 - Replace Geometry Tool
 - Align Edge Tool

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)



Editing Tools Demonstration

Sean Jones

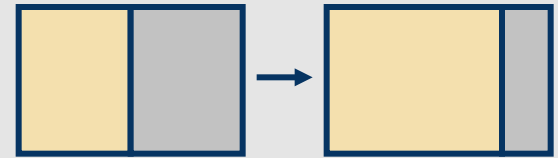


Topologies – Why would you want to use one?

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

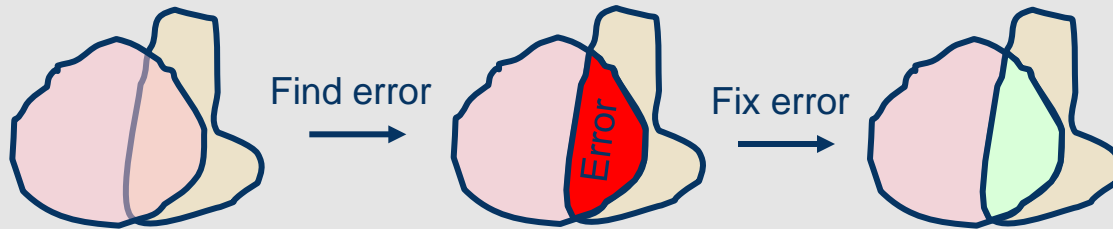
Move a parcel boundary



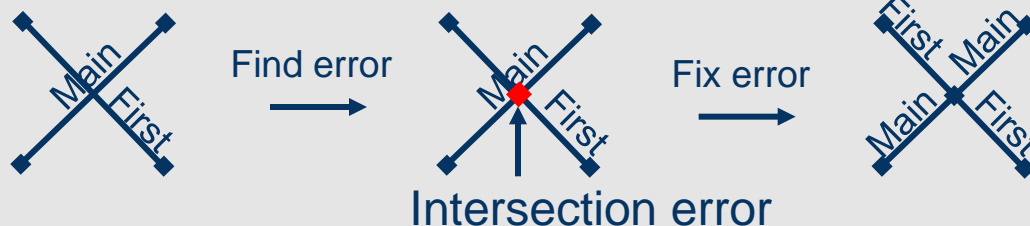
Move a pipe and its valves



Soil polygons must not overlap



Streets must not intersect



Topologies – What kinds are there?

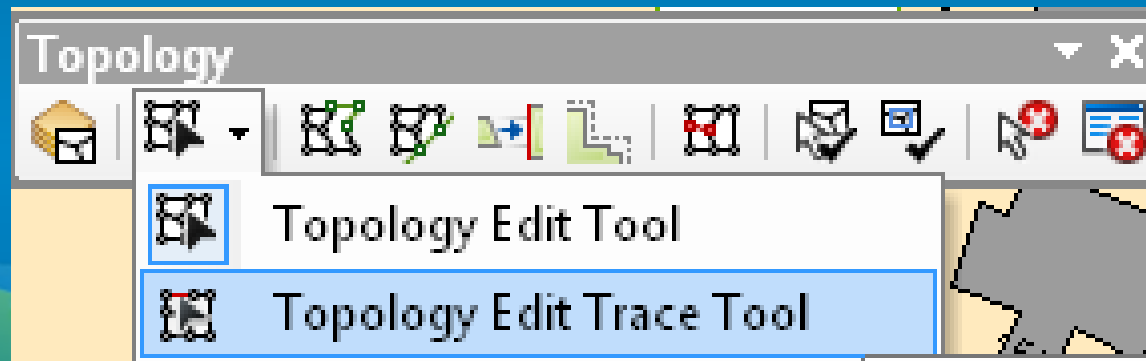
Two types of topologies:

1. **Map Topologies (requires only ArcView license)**
 - Allows editing of coincident geometries
 - 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 editing of coincident geometries
 - Allows rules to be defined and errors found
 - Can be used with feature classes in same dataset
 - Persisted in the database, dirty areas created when features edited



Topologies – Editing coincident geometries

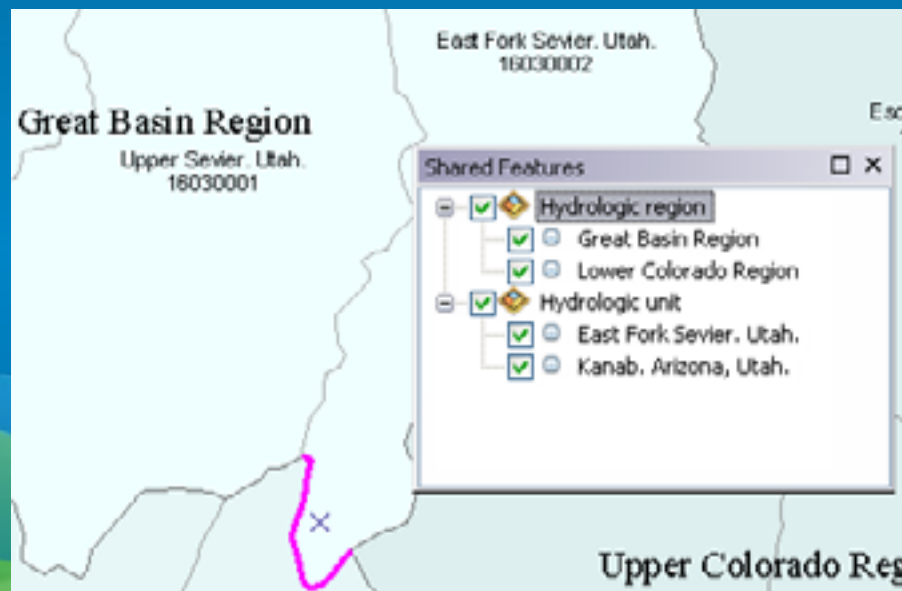
- Tools to select topology elements
 - Topology Edit Tool
 - Topology Edit Trace Tool (new at 10.1)
- Tools to update topology elements
 - Modify Edge
 - Reshape Edge
 - Align Edge (new at 10.1)
 - Generalize Edge (new at 10.1)



Construct Polygons, Split Polygons, and Planarize Lines moved to Advanced Editing Toolbar

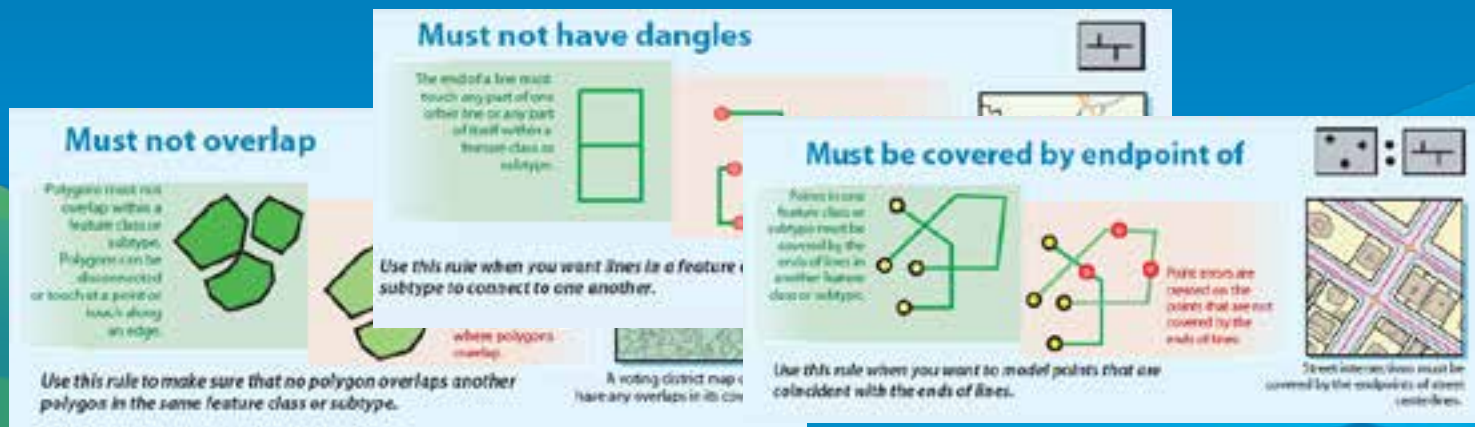
Topologies – Editing coincident geometries

- Other changes for 10.1
 - Shared Features window is now dockable (stays open while you work)
 - Easier to disconnect and reconnect edges (split-move of an edge)
 - Multiple selected edges can be reshaped at one time
 - New geoprocessing command to export topology errors
 - Ability to change versioned topology (add/remove rules, feature classes, etc.)



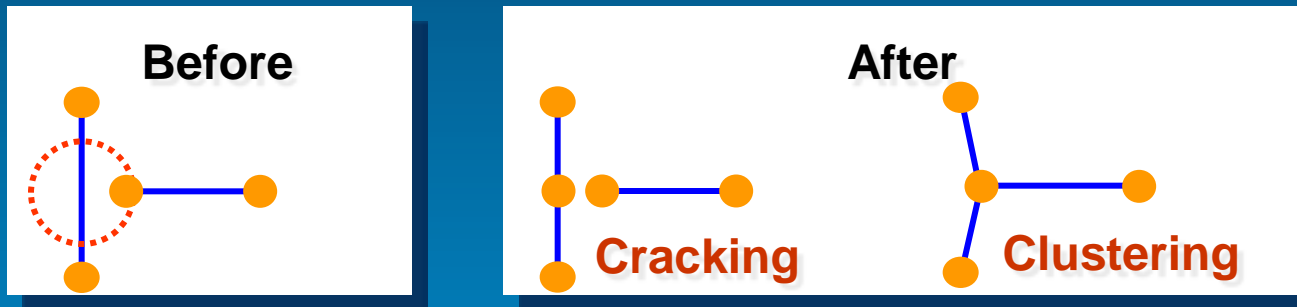
Geodatabase Topologies – Topology Rules

- 32 topology rules in ArcGIS 10.1
- Single feature class or between feature class
- Set at the 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

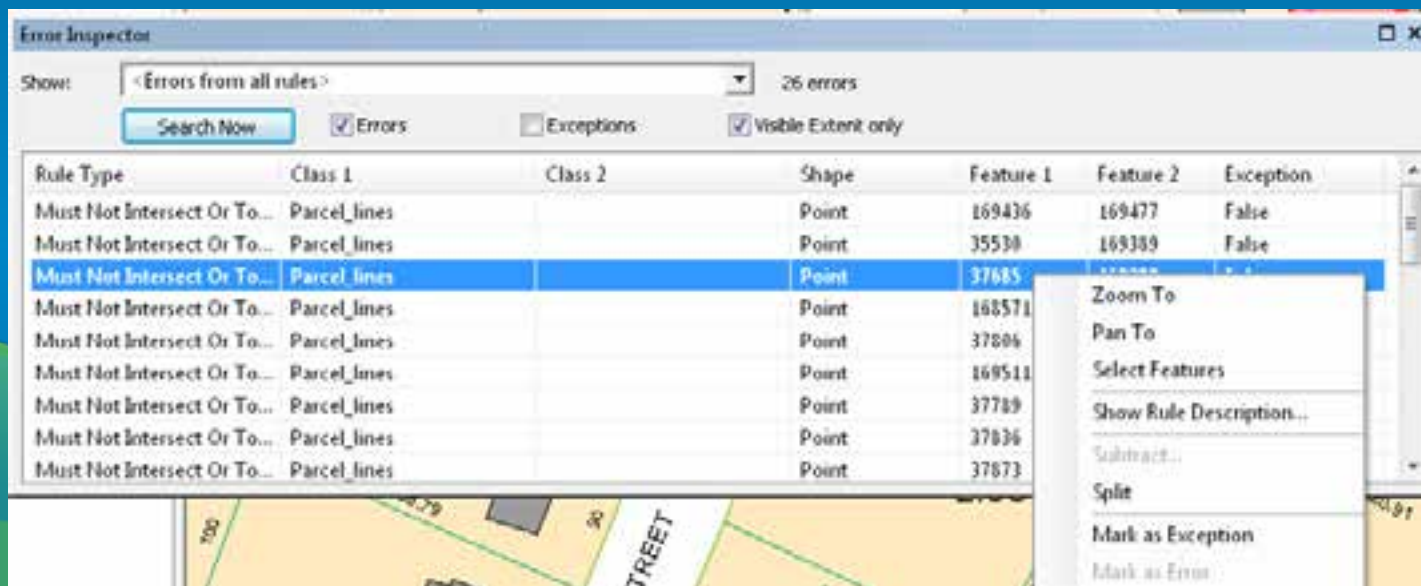
- Integrates geometries based on a cluster tolerance
 - **Cracking** – Vertices added at intersections of feature edges
 - **Clustering** – Snapping vertices that fall within cluster tolerance



- Validates topology rules which may generate errors
 - **Deletes errors if the rules are no longer violated**
- No new features are created
- Deletes features whose geometry cannot support the new shape
 - **Two point polygons, one point lines**

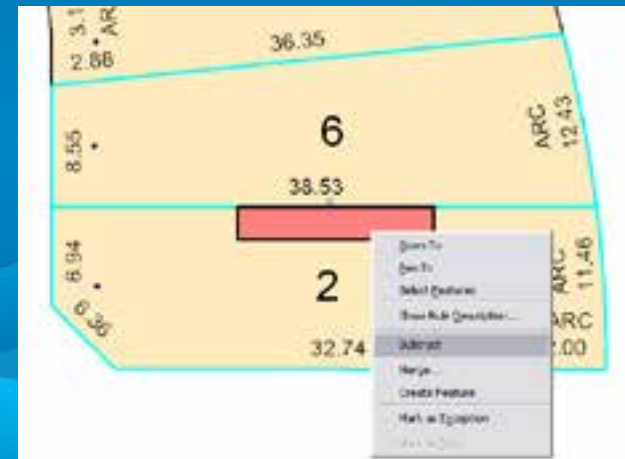
Geodatabase Topologies – Error Inspector

- Error Inspector lets you view and fix topology errors in a table. In the dialog you can see:
 - 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 Topology 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'
 - Error management is based on work flow
- Select the topology errors on the map
 - Creates an “Active Error Selection”
 - Context menu with fixes based on rule violated



Topology Demonstration

Sean Jones



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

Summary

- **New Tools/Capabilities for 10.1:**
 - Align To Shape
 - Replace Geometry Tool
 - Align Edge Tool
 - Topology Edit Trace Tool
 - Reshape multiple edges at once
- **Other sessions for Editing:**
 - Editing in ArcMap Intro – Thurs 1:30 pm, Room 8
 - Topology in the Geodatabase – Wed 10:15 am, Room 6C
 - Editing Tips & Tricks – Wed 3:15 pm, Thurs 1:30 pm, Room 6B
 - Editing Versioned Geodatabase Intro –Thurs 1:30 pm, Room 6F
 - Managing and Editing Anno (20) – Wed 1:30 pm & 4:05 pm, Room 1B
 - Authoring Maps for Desktop Editing (Demo) – Wed 11:00 am, Thurs 11:30 am, Geodatabase Management Exhibit Hall C



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