Data Alignment and Management in ArcMap

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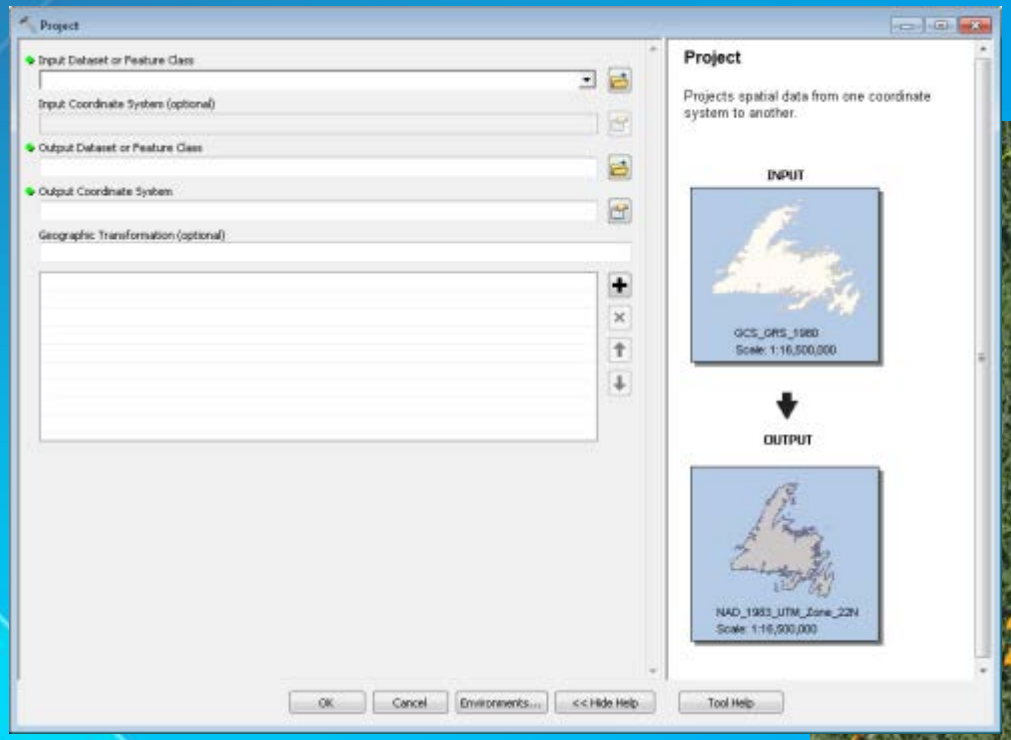
Agenda

- Review tools available for improving spatial accuracy of your data
  - Spatial adjustment & Rubber sheeting
  - Snapping capabilities, tracing tools, auto-complete, etc.
  - Alignment tools
- Review tools available to maintaining accuracy & coincidence
  - Map Topologies & Geodatabase Topologies

Spatial Adjustment

Projections

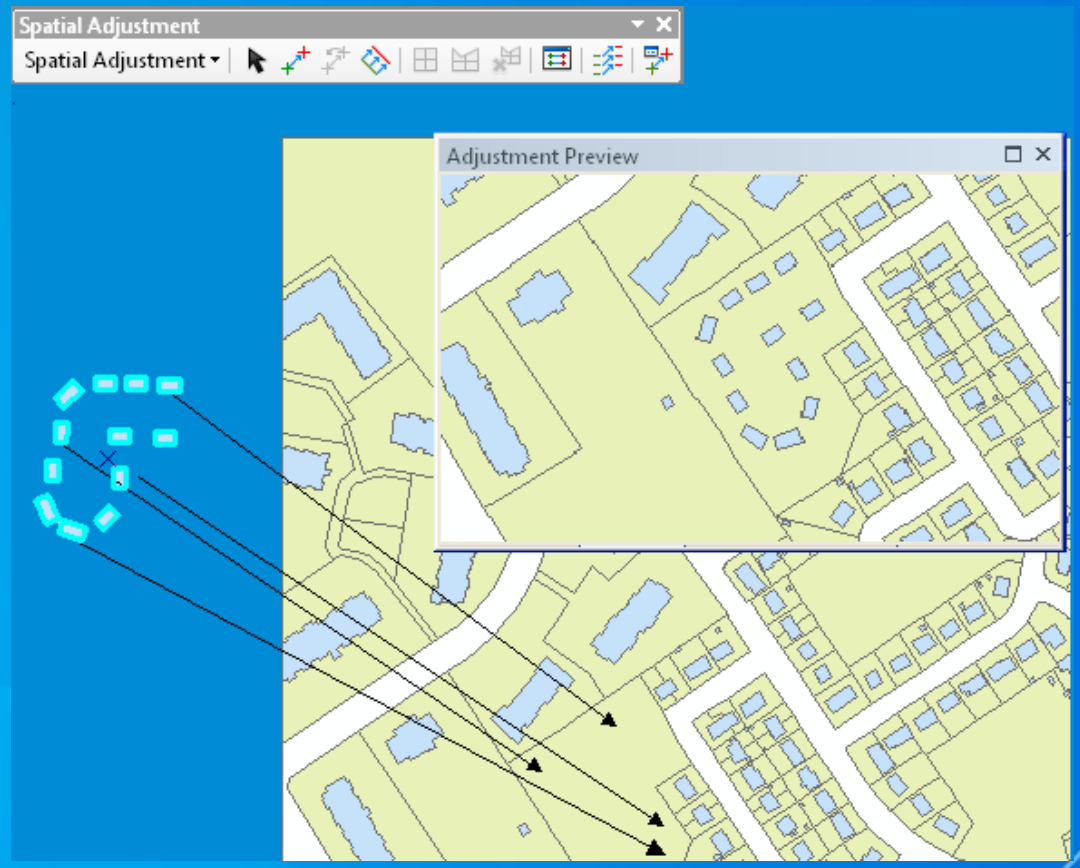
- **Shift data between coordinate systems**



Spatial Adjustment

Transformations

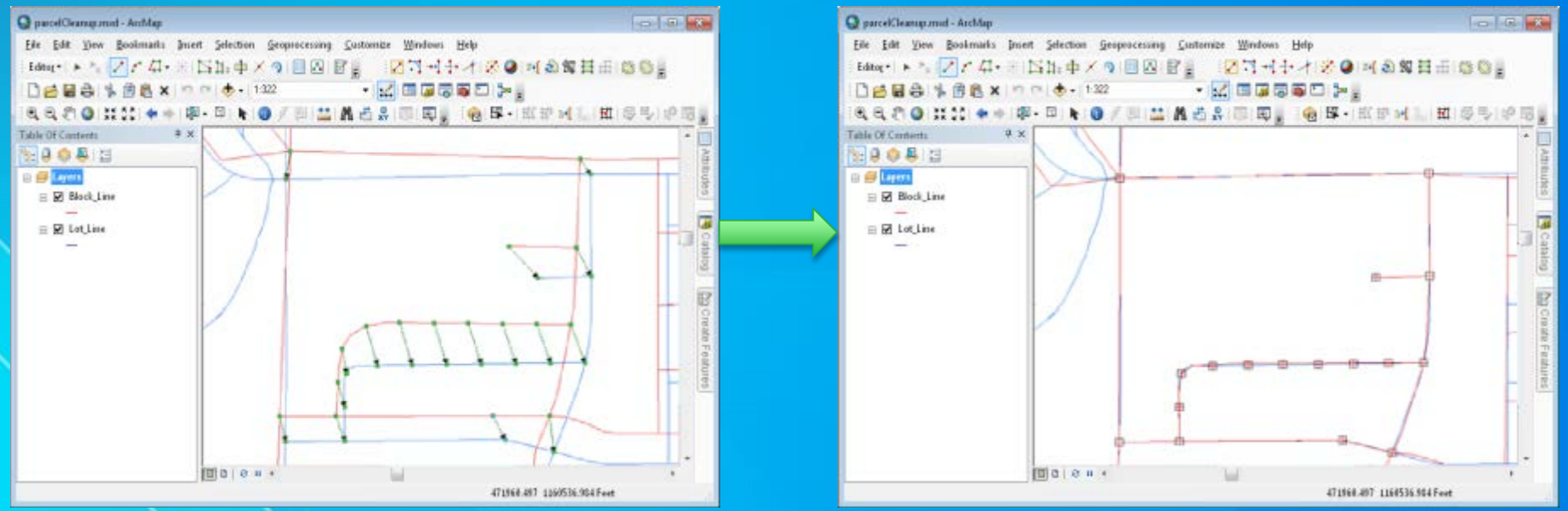
- **Shift data in coordinate space**
  - Digitize coordinates to real world
  - CAD coordinates to real world
  - Meters to Feet



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

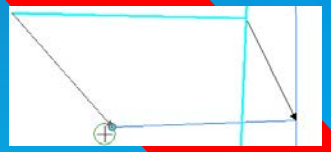


Spatial Adjustment Demo

Summary of Adjustment Process

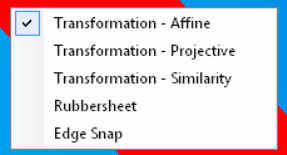
- **Create Links**
- **Set Adjust source**
- **Set Adjustment Method**
- **Preview**
- **Adjust**

Create Link Elements

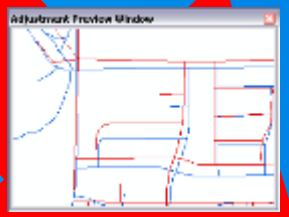


Set Adjustment Source

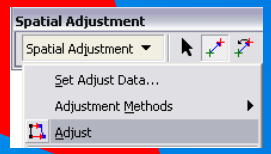
Set Adjustment Method



Preview Adjustment

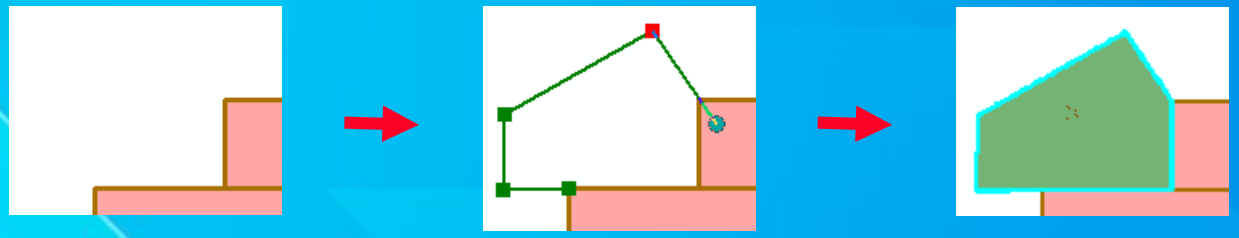


Adjust data



Keeping Your Data Aligned

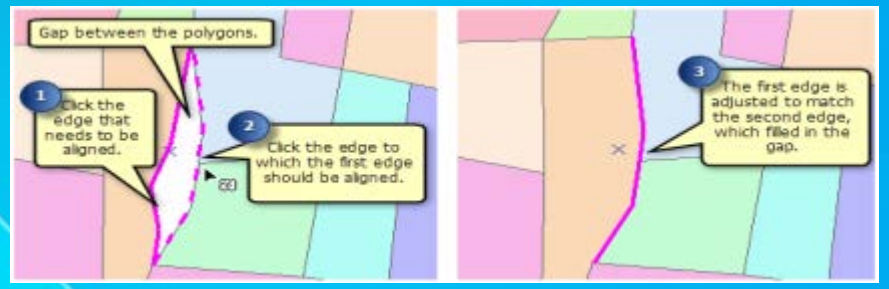
- Know what the basic tools are and how to use them
  - Snapping environment
    - Basic snapping
    - “Classic” snapping
    - Snap to feature
  - Auto-Complete (polygon and freehand)
  - Trace construction tool
  - Extend and Trim tools
  - Auxiliary anchor (Rotate and Scale tools)



Keeping Your Data Aligned

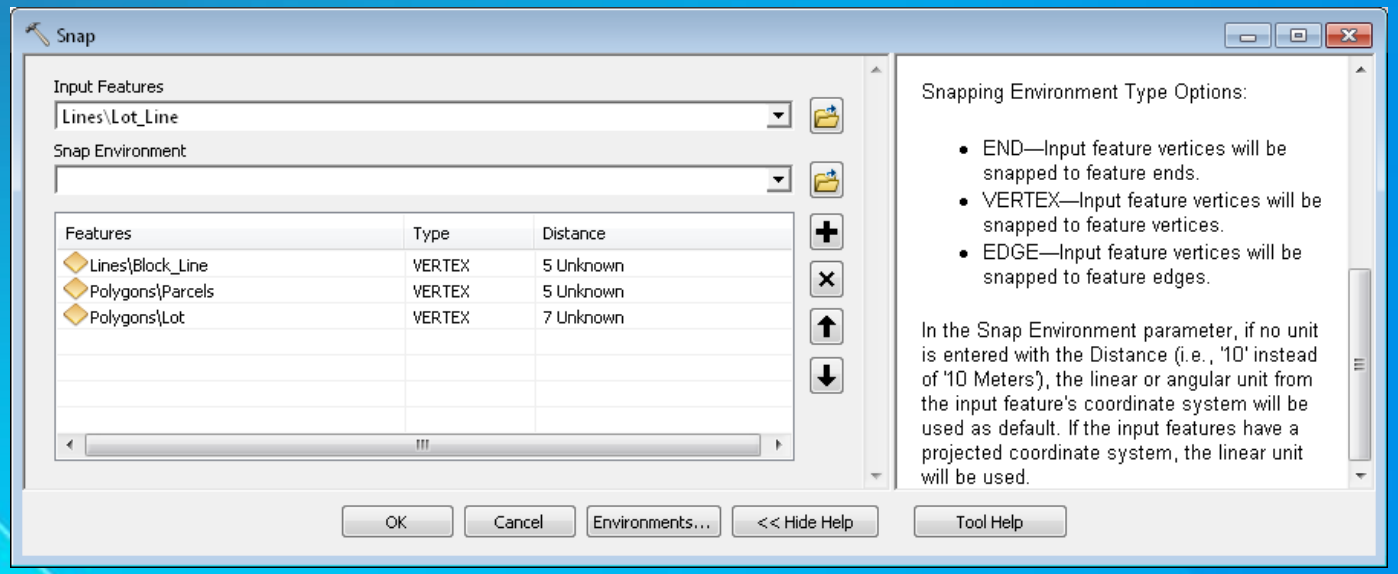
- **New tools introduced at 10.1 to help with this process:**
  - **Align To Shape – adjust layers to traced shape**

  - **Align Edge – snap edges together to close gaps**



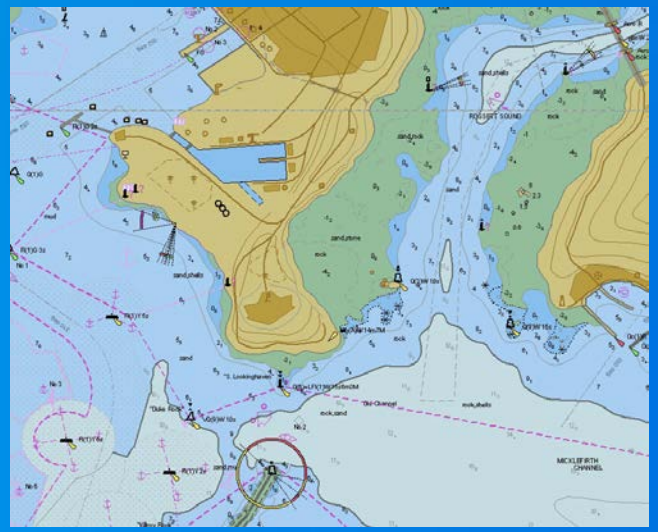
Geoprocessing Alignment Tools

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



- **Integrate**

Aligning Data Demo

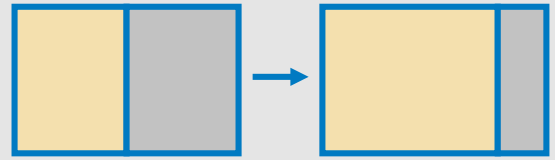


Topologies – Why would you want to use one?

1. **Tools for editing coincident geometries between feature classes**

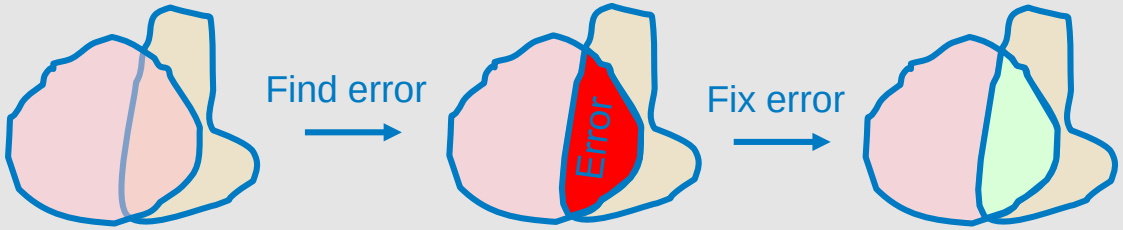
2. **Tools for finding and fixing errors based on rules you define**

Move a parcel boundary

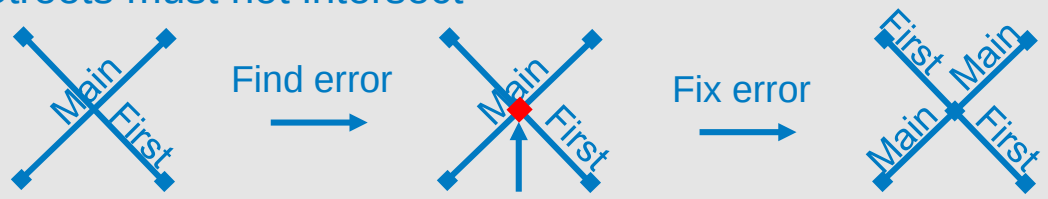


Move a pipe and its valves

Soil polygons must not overlap



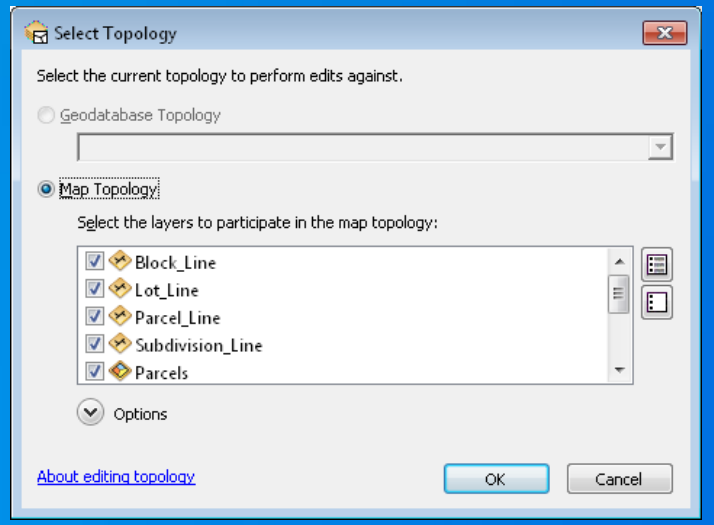
Streets must not intersect



Topologies – What kinds are there?

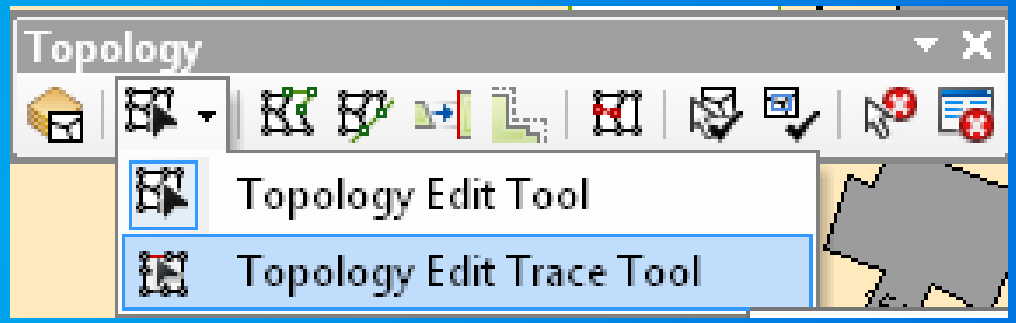
1. **Map Topologies (requires only Basic license)**
   - Can be used with feature classes or shapefiles in same workspace
   - Saved in map document, not in the geodatabase

2. **Geodatabase Topologies (requires Standard license)**
   - Allows rules to be defined and errors found
   - Must be used with feature classes in same dataset
   - Persisted in the database, dirty areas created when features edited

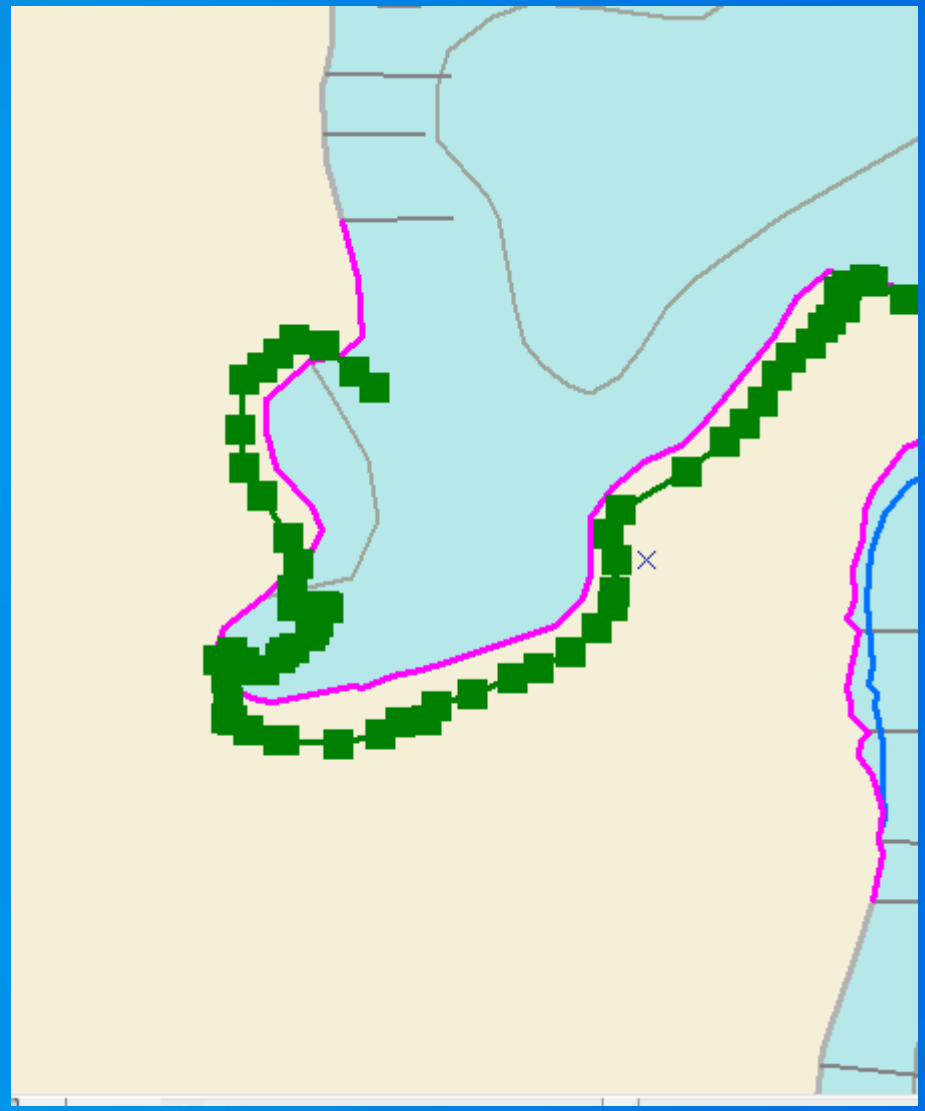


Topologies – Editing coincident geometries

- Tools to select topology elements
  - Topology Edit Tool
  - Topology Edit Trace Tool
- Tools to update topology elements
  - Modify Edge
  - Reshape Edge
  - Align Edge
  - Generalize Edge
  - Reconnect Nodes

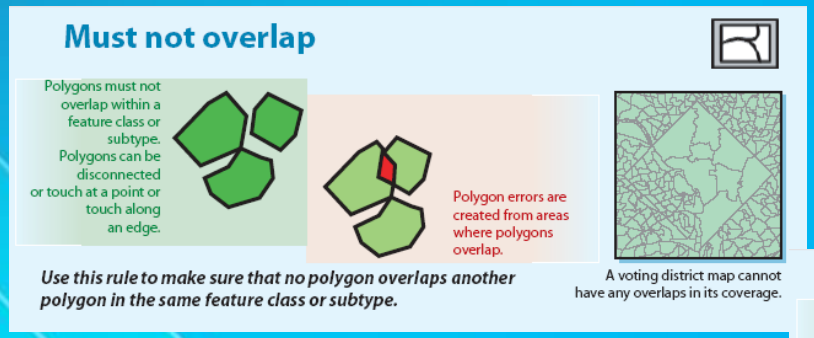


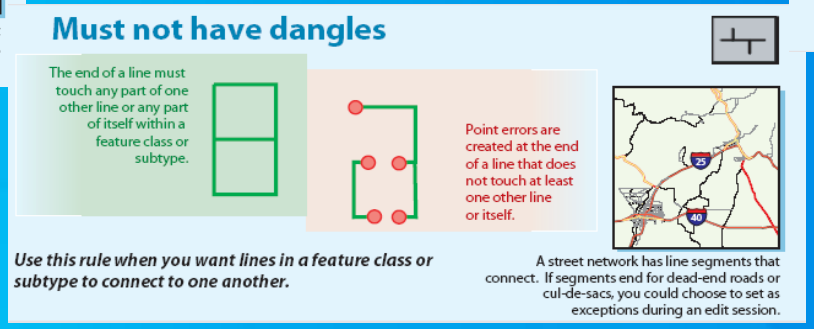
Topology Editing Tools Demo

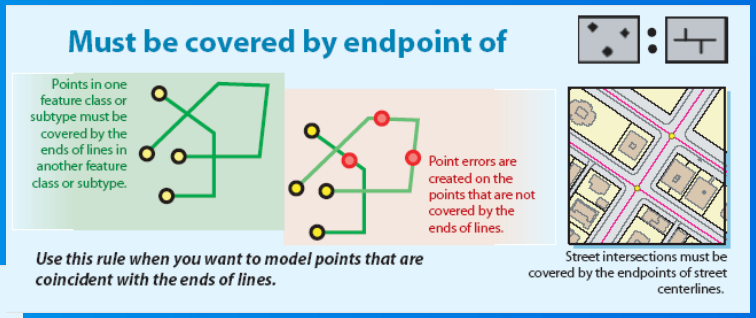


Geodatabase Topologies – Topology Rules

- 32 topology rules
- Single or multiple feature classes
- Apply to feature class or subtype level
- Categorized by geometry type (polygon, line, point)
- Can also export topology errors with a Geoprocessing command
  - i.e Soil Polygons can't have gaps between them

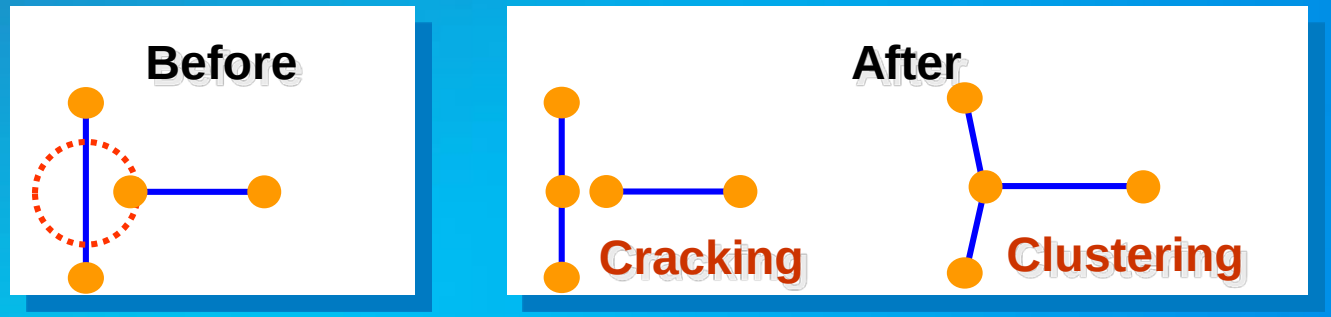






Geodatabase Topologies – Validating a Topology

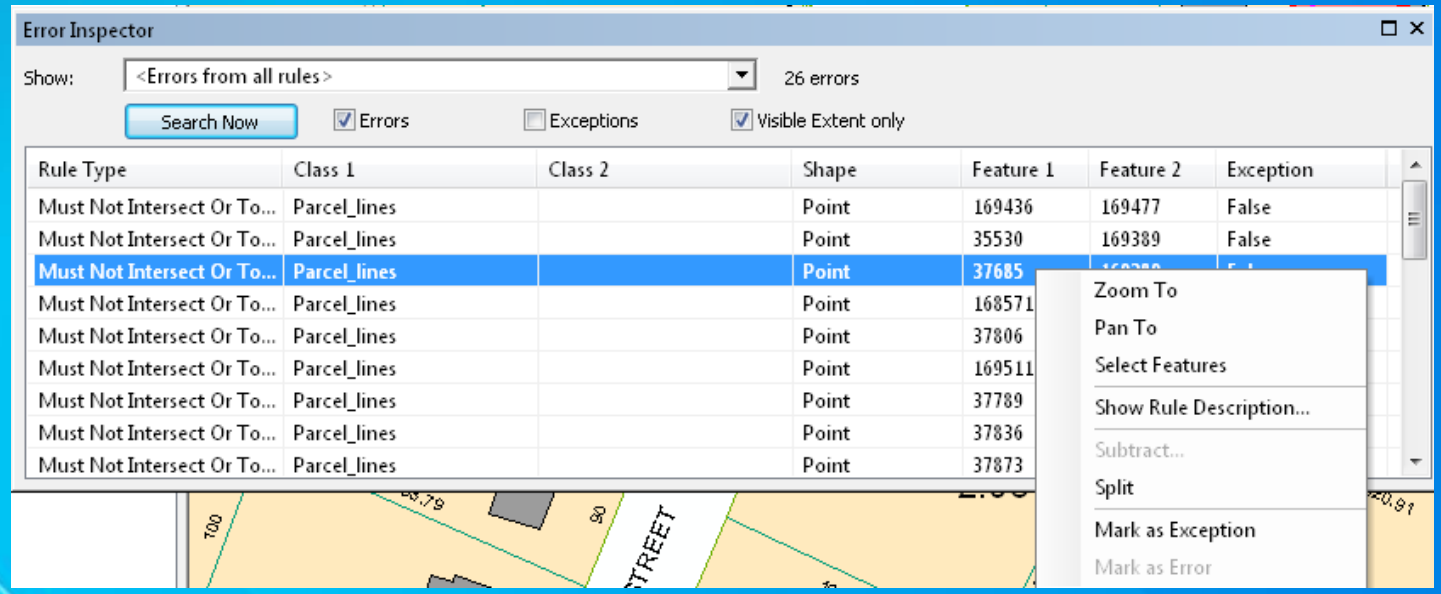
- Integrates geometries based on a cluster tolerance
  - Cracking –Vertices added at intersections of feature edges
  - Clustering – Snapping vertices that fall within cluster tolerance



- 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

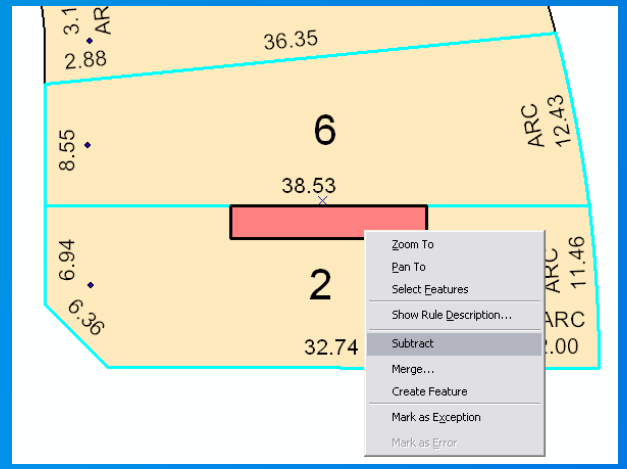


Geodatabase Topologies – Editing Errors

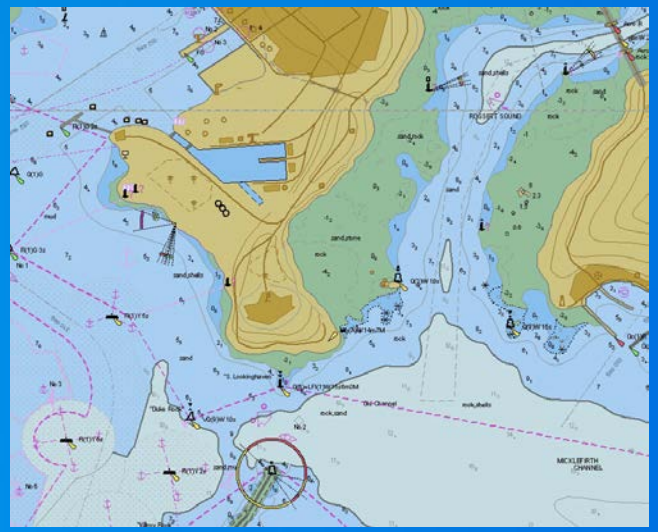
- Errors cannot be deleted directly, the features must be edited and the topology re-validated
- Three options for correcting errors:
  1. Leave the error in the database
  2. Fix the error
  3. Elevate the error to exception status. This allows you to say this rule applies everywhere except ‘here’

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

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