# Data Alignment and Management in ArcMap

Lisa Stanners, Sean Jones

#### 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**



#### **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

Snap Input Features Lines\Lot_Line Snap Environment			× 🖆	Snapping Environment Type Options: • END—Input feature vertices will be snapped to feature ends. • VERTEX—Input feature vertices will be
Features  Lines\Block_Line  Polygons\Parcels  Polygons\Lot	Type VERTEX VERTEX VERTEX	Distance 5 Unknown 5 Unknown 7 Unknown		snapped to feature vertices. • EDGE—Input feature vertices will be snapped to feature edges. In the Snap Environment parameter, if no unit is entered with the Distance (i.e., '10' instead of '10 Meters'), the linear or angular unit from the input feature's coordinate system will be used as default. If the input features have a projected coordinate system, the linear unit will be used.
	OK Ca	ancel Environments	. << Hide Help	Tool Help

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









#### **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

🔓 Select Topology	<b>—</b>
Select the current topology to perform edits against.	
🔿 <u>G</u> eodatabase Topology	
	~
Map Topology	
Select the layers to participate in the map topology:	
☑   Block_Line	<u> </u>
▼ ⊗ Lot_Line	
V 😵 Parcel_Line	
V Subuvision_time	-
Options	,
About editing topology OK	Cancel

#### **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





#### **Must not have dangles**



Use this rule when you want lines in a feature class or subtype to connect to one another.



A street network has line segments that connect. If segments end for dead-end roads or cul-de-sacs, you could choose to set as exceptions during an edit session.



#### **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

Error Inspector			-				Π×
Show: <a>Errors from all</a>	Errors from all rules> 26 errors						
Search Now	Errors	Exceptions	Visible Extent only				
Rule Type	Class 1	Class 2	Shape	Feature 1	Feature 2	Exception	
Must Not Intersect Or To	Parcel_lines		Point	169436	169477	False	-
Must Not Intersect Or To	Parcel_lines		Point	35530	169389	False	-
Must Not Intersect Or To	Parcel_lines		Point	37685	7 7		
Must Not Intersect Or To	Parcel_lines		Point	168571	Zoom To Pan To		
Must Not Intersect Or To	Parcel_lines		Point	37806			
Must Not Intersect Or To	Parcel_lines		Point	169511	Select Features		
Must Not Intersect Or To	Parcel_lines		Point	37789	Show Rule Description		
Must Not Intersect Or To	Parcel_lines		Point	37836	Culture at		-
Must Not Intersect Or To	Parcel_lines		Point	37873	Subtract		-
	979			2.00	Split		~0.91
						Mark as Exception	
	~~~		55	/	Mark as Erro	ir.	

#### **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

#### Thank you...

Please fill out the session survey in your mobile app
Click on this session in the agenda
Click "Technical Workshop Survey"
Answer a few short questions and enter any comments

Paper – pick up and put in drop box



Understanding our world.