

# TOPOLOGY WORKSHOP EXERCISES

## STATE OF OKLAHOMA TRAINING

### Creating a Topology

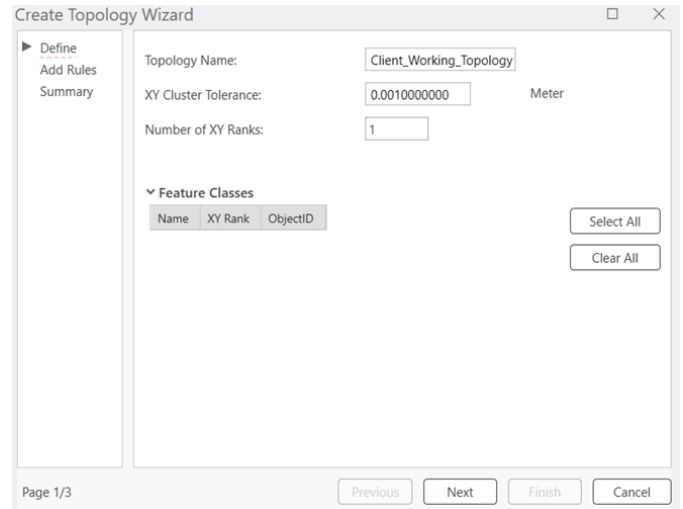
#### Exercise 1

##### Step 1: Prepare Your Data

- Topology works only in a geodatabase within a feature dataset

##### Step 2: Create a Topology

- In the Catalog pane, navigate to **TopologyWorkshop.gdb**, expand and right-click the feature dataset NG911 > **New > Topology**
- Name your topology **NG911\_Topology** and set the cluster tolerance (default is fine)
- Select All layers within the feature dataset to participate in the topology



##### Step 3: Add Topology Rules

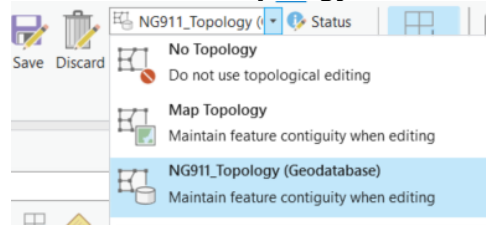
- Go to Rules tab > **Add Rule**
- Add the following topology rules:

Rules					
Feature Class 1	Subtype 1	Rule	Feature Class 2	Subtype 2	
ROAD_CENTERLINE		Must Not Intersect (Line)			
ROAD_CENTERLINE		Must Be Single Part (Line)			
ROAD_CENTERLINE		Must Be Inside (Line-Area)	DISCREPANCYAGENCY_BOUNDARY		
ROAD_CENTERLINE		Must Be Inside (Line-Area)	ESZ_BOUNDARY		
ESZ_BOUNDARY		Must Not Overlap (Area)			
ESZ_BOUNDARY		Must Not Have Gaps (Area)			

Click here to add a new rule.

##### Step 4: Validate the Topology

- Add the topology to a map:
  - Drag it from the Catalog pane into your map
- Go to Edit tab > Select the new **NG911\_Topology (Geodatabase)**



- Open **Error Inspector** and on top ribbon choose **Validate**
- Errors will appear in the Error Inspector pane

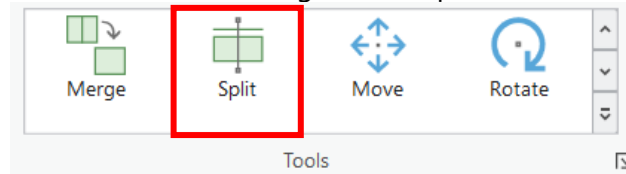
##### Step 5: Locate Errors

- Using Error Inspector, zoom to errors and investigate the scenarios

## Correcting Topology Errors – Local Dataset

### Exercise 2

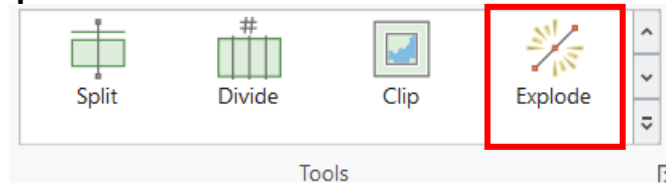
- Select **Bookmark #1 – Intersecting Roads**
- Select the intersecting Road Centerline, in the tools, choose **Split**. With **snapping enabled**, double-click on the selected segment to split the feature at the proper location.



- Open the attribute table of the two created segments. Verify or update the following attributes:
  - Left and Right ranges
  - NGUID values
  - City/Community/ESN fields

### Exercise 3

- Select **Bookmark #2 – Multipart Segment**
- Select the multipart Road Centerline, open the attribute table and view the segment's attributes.
- In Tools, choose **Explode**



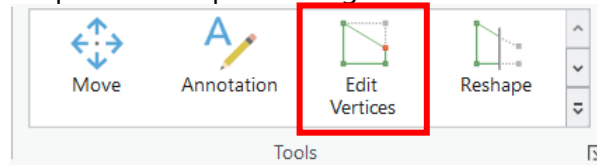
- Notice the attributes of the newly created segments. Verify or update the following attributes:
  - Left and Right ranges
  - NGUID values
  - City/Community/ESN fields

### Exercise 4

- Select **Bookmark #3 – Road Split on Boundary**
- Select the two Road Centerline that crosses the ESZ Boundary without breaking
- In Tools, choose **Split**. With snapping enabled, double-click on the selected segment to split the feature at the proper location along the ESZ Boundary edge.
- Notice the attributes of the newly created segments. Verify or update the following attributes:
  - Left and Right ranges
  - NGUID values
  - ESN and MSAG Community values

## Exercise 5

- Select **Bookmark #4 – Stacked Roads with Multiple Names**
- Select the two Road Centerline with stacked geometry
- Open the attribute table and review the associated address points and determine which segment correlates to the appropriate side of the road.
- Re-select one segment. Within Tools, choose **Edit Vertices**. We will modify the two segments to create “pinch points” and parallel segments.



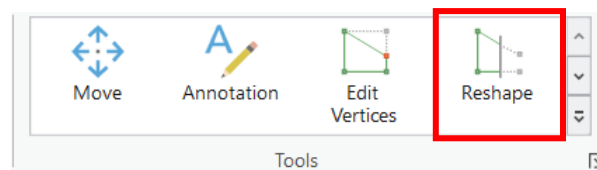
- Navigate to the endpoint of the road and either adjust an existing vertex or **add a new vertex**.
- Select the added vertex and pull it away from the stacked road. Repeat for the startpoint of the segment.
- Repeat the process for the other stacked road segment creating two pinched segments with parallel geometry.



- Update the attributes of the two segments to represent the addresses accurately.
  - **Inside ranges** of the road segments can be updated to **0-0** where they do not represent addresses.

## Exercise 6

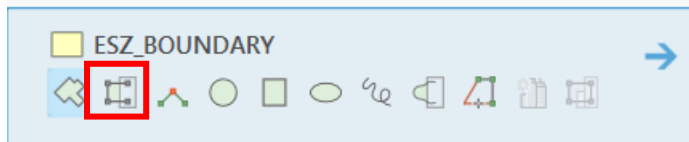
- Select **Bookmark #5 – Stacked Roads Along Boundary**
- Select the two Road Centerline with stacked geometry
- Open the attribute table and review the associated address points and determine which segment correlates to the appropriate side of the road.
- Re-select the segment that is intended to exist within ESN 6204 boundary and represents the address point.
- Within Tools, choose **Reshape**. Modify the segment to create “pinch points” and parallel segments.



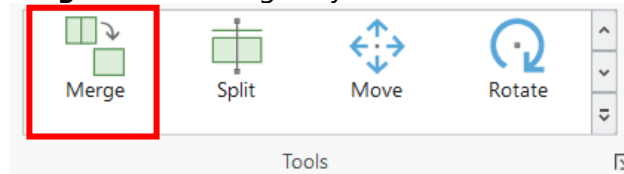
- Start reshaping the selected segment by first placing a vertex on the endpoint of selected road and begin reshaping to draw the “pinch point” and parallel geometry. Be sure to end the reshape on at the endpoint vertex of the selected segment.
- Repeat the process for the other stacked road segment creating two pinched segments with parallel geometry.
- Update the attributes of the two segments to represent the addresses and boundaries accurately.
  - **Inside ranges** of the road segments can be updated to **0-0** where they do not represent addresses.
  - Update **ESN Left and Right** values of each segment.

### Exercise 7

- Select **Bookmark #6 – Gaps in ESZ Boundary**
- Zoom to **one of the gaps** in the boundary and choose the **Create Features** window
- Within the Create Features window, choose **Auto Complete Polygon**



- Within the gap area, place two vertices and end the sketch. This will create a new polygon feature that completely fills the confined gap area.
- Select the newly created polygon and the other ESZ polygon that this area should be merged into. Choose **Merge** in the Tools gallery.



- In the Merge pane, select the correct polygon to **preserve attributes**. This should be the existing polygon, not the newly created polygon.
- Topology Efficiency:
  - Next, zoom out to the full extent of the gaps within the ESZ Boundary.
  - Use a **combination of reshape, auto complete polygon, and merge** to resolve the remaining 6 gaps all at once.

### Exercise 8

- Select **Bookmark #7 – Overlap in ESZ Boundary**
- Within Tools, choose **Reshape**. Select the overlapping polygon and draw to reshape the area to create a gap to see the neighboring boundary edge where the boundary will be aligned to.
- Use **Auto Complete Polygon** to fill the gap area.
- Select the newly created polygon and the other ESZ polygon that this area should be merged into. Choose **Merge** in the Tools gallery.

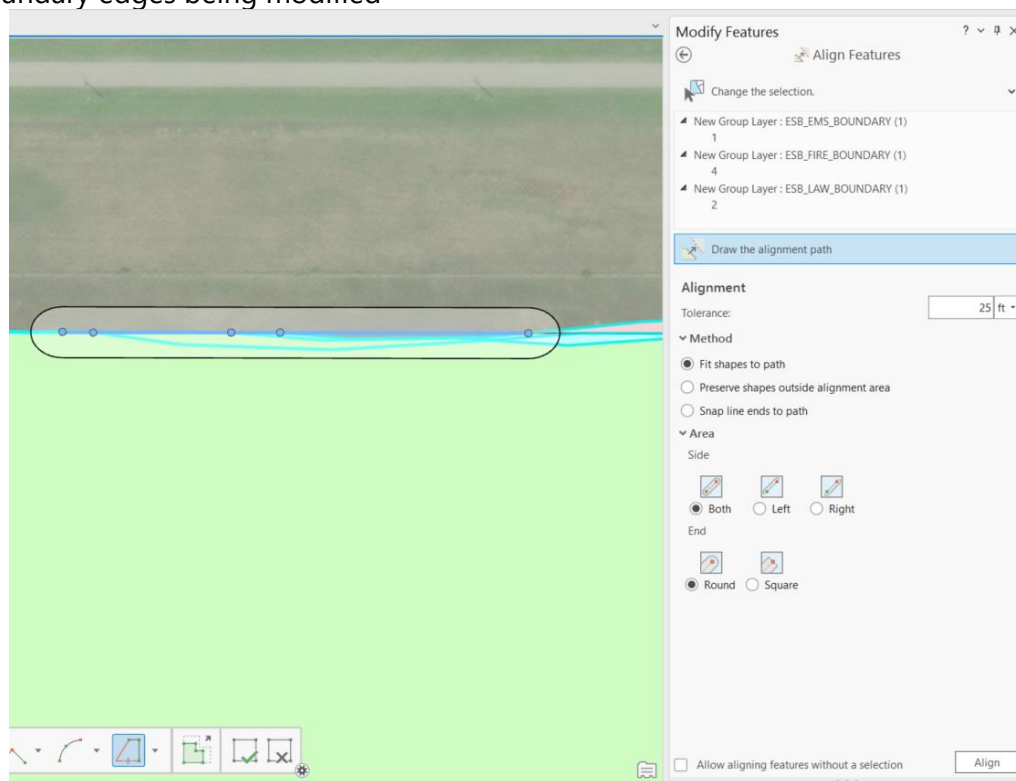
- In the Merge pane, select the correct polygon to **preserve attributes**. This should be the existing polygon, not the newly created polygon.

### Exercise 9

- Select **Bookmark #8 – Align Boundary Edges**
- We will be aligning the EMS, Fire, and Law boundary to the ESZ boundary edge.
- Within the Contents pane make EMS, Fire, and Law boundary to the ESZ boundary the only visible layers.
- Turn off the ESZ Boundary as a selectable layer
- In your map, select the EMS, Fire, and Law boundary you wish to modify
- Within tools, select **Align Features** and hover over the ESZ Boundary edge, dropping a point to begin tracing the edge you wish to align to

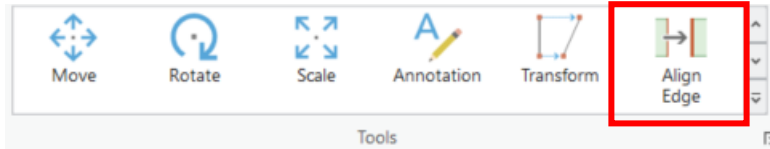


- End your sketch and adjust the **Tolerance** to ensure the buffer encompasses all the boundary edges being modified

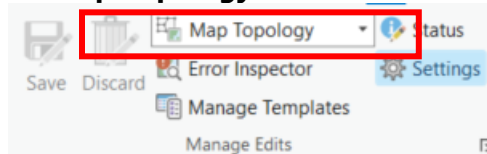


## Exercise 10

- Select **Bookmark #9 – Align Edge**
- Now use the **Align Edge** tool to align the EMS, Fire, and Law boundary to the ESZ boundary edges



- Adjust the Topology to be the **Map Topology**



- Within tools, select **Align Edge** and hover over the gap areas. Notice the map topology automatically identifies the topology discrepancy.
- Note, **dotted line** indicated which edge your boundary will align to. **Solid line** is the edge that will be moved. Click to update topology.
- Repeat for each of the boundaries along the edge.



# Correcting Topology Errors – Coordinating Neighboring Datasets

## Exercise 11 – Data Gathering Discussion

### Downloading Data from OKMaps

- Navigate to OKMAPS website: <https://okmaps.org/OGI/search.aspx>
- Expand the **Public Safety grouping** and select Address Points
- Click the **download arrow** to download the statewide Address Points layers. Note, by downloading from this location, the zip file will contain all three layers – Addresses, Road Centerlines, and PSAP boundaries.



- **Unzip the downloaded file** and add the layers within your ArcGIS Pro map

### How to Add Web Map Service (WMS) from OKMaps

- Expand the GIS Servers folder in the catalog tree
- Double click Add WMS Server
- In the URL text box, enter <https://okmaps.org/geoserver/wms?>
- Click the Get Layers button
- If the connection is successful, click the OK button

## Exercise 12

- Select **Bookmark #10 – Snap to Vertex – RCL**
- Modify the Road Centerline within your PSAP boundary to snap to statewide Road Centerline layer
- Select the segment inside of your PSAP and **Edit Vertices**. Grab the endpoint and snap to the statewide road segment endpoint.



- Next, review the roads that span north and south along the PSAP boundary
- Update the geometry of the segments to create **pinched point segments with geometry completely inside of the PSAP boundary**