

# Leveraging the *Where* of Geographic Data

GIS II Data Management

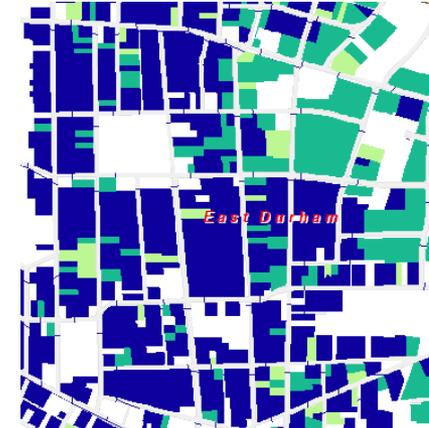


- With multiple layers in your maps - are you interested in the relationships between these layers?
- Let's consider some useful tools:
  - Spatial selection
  - Spatial Join



## Components

- Spatial (where?)
  - *Geometry or shape of an object*
  - *Where it is located*
- Attributes (what?)
  - *Tabular data*
  - *Describes an object*

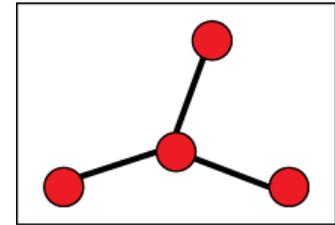


OWNER_ST	LANDUSE_DE	PHYS_ADD	CONSTTYP	YEARBUILT	R
MD	VAC AG/ 10 ACRES OR >	0 OLD OXFORD RD			0
NC	VAC AG/ 10 ACRES OR >	0 RED MOUNTAIN RD			0
NC	PRESENT-USE/AGRICULTUR	0 COUNTY LINE RD			0
NC	VAC AG/ TMBR 20 ACRES &	0 COUNTY LINE RD			0
NC	RES/ RURAL RES W/ ACREAG	811 COUNTY LINE RD	R/SD/CL-D/SH-2/AV	1985	
NC	RES/ RURAL RES W/ ACREAG	721 COUNTY LINE RD	R/SD/CL-D B/SH-2/AV	1985	

## A brief discussion on topology in a GIS

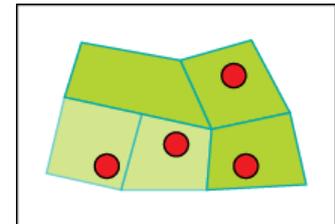
### Connectivity

Connections between objects



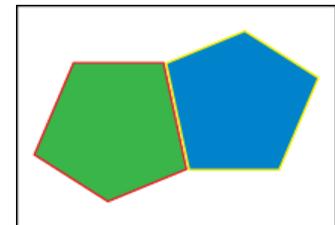
### Containment

Maintenance of boundaries and closed areas to define relationships with other objects



### Adjacency

Relationships between objects that are next to each other



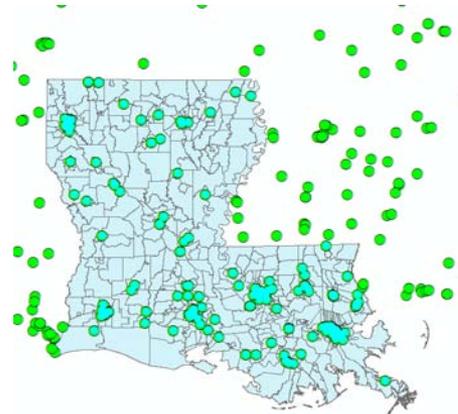
## **Spatial selections/queries: Asking questions of your data**

Select features in one or more layers based on relationship to other features

## **Spatial Joins: Connecting your data**

Uses spatial associations between layers to append fields from one layer to another

- Select features based on location relative to other features
- Number of methods to select features within a layer or another layer
  - Point
  - Line
  - Polygon
- Not permanent



Select By Location

Select features from one or more target layers based on their location in relation to the features in the source layer.

Selection method:  
select features from

Target layer(s):

- NAICS\_722211
- NAICS\_445230
- NAICS\_445110
- NAICS\_445120
- 2009\_census\_trt\_ID
- 2009\_census\_trt\_IN
- 2009\_census\_trt\_LA
- 2009\_census\_trt\_MI
- 2009\_census\_trt\_MT
- 2009\_census\_trt\_ME
- 2009\_census\_trt\_NY

Only show selectable layers in this list

Source layer:  
2009\_census\_trt\_LA  
 Use selected features (0 features selected)

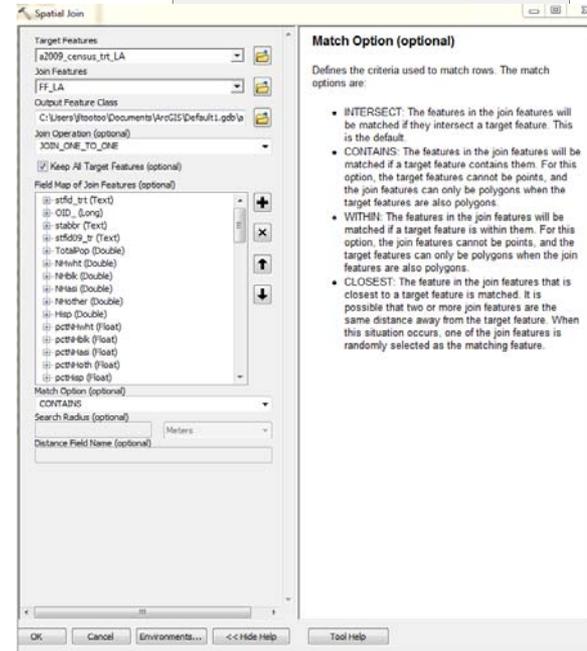
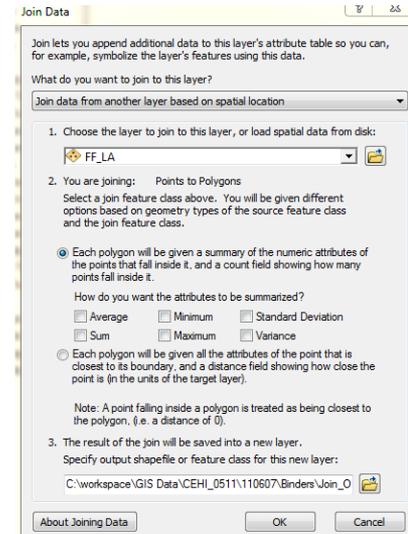
Spatial selection method:  
Target layer(s) features have their centroid in the Source layer feature

Apply a search distance  
200000.000000 Meters

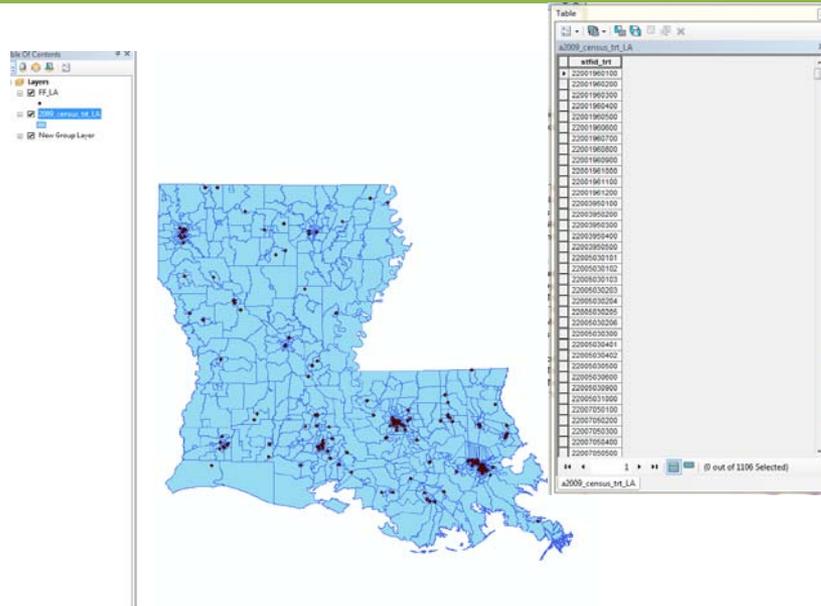
Help OK Apply Close

- Determine which layers can be selected
- Good if you have many layers in one project
- Displays number of selected features and display expression

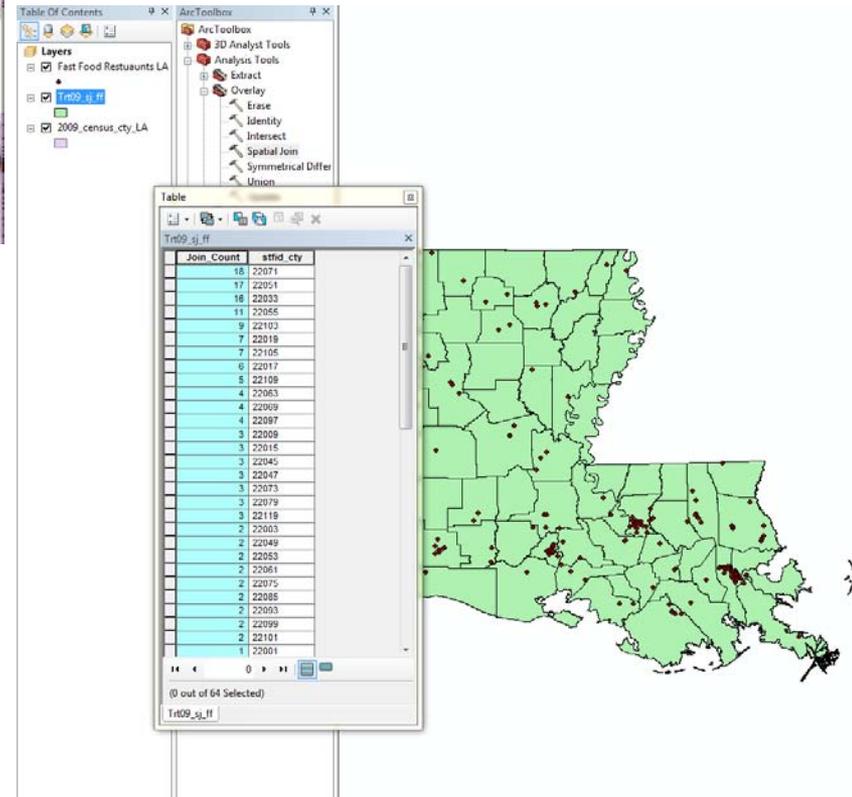
- Join based on location of two layers
  - Creates new layer
  - Appends tables (join to target)
  
- Based on the relationship(s) between the two participating layers
  - Intersection
  - Containment
  - Within
  - Closest



# Spatial Join Example



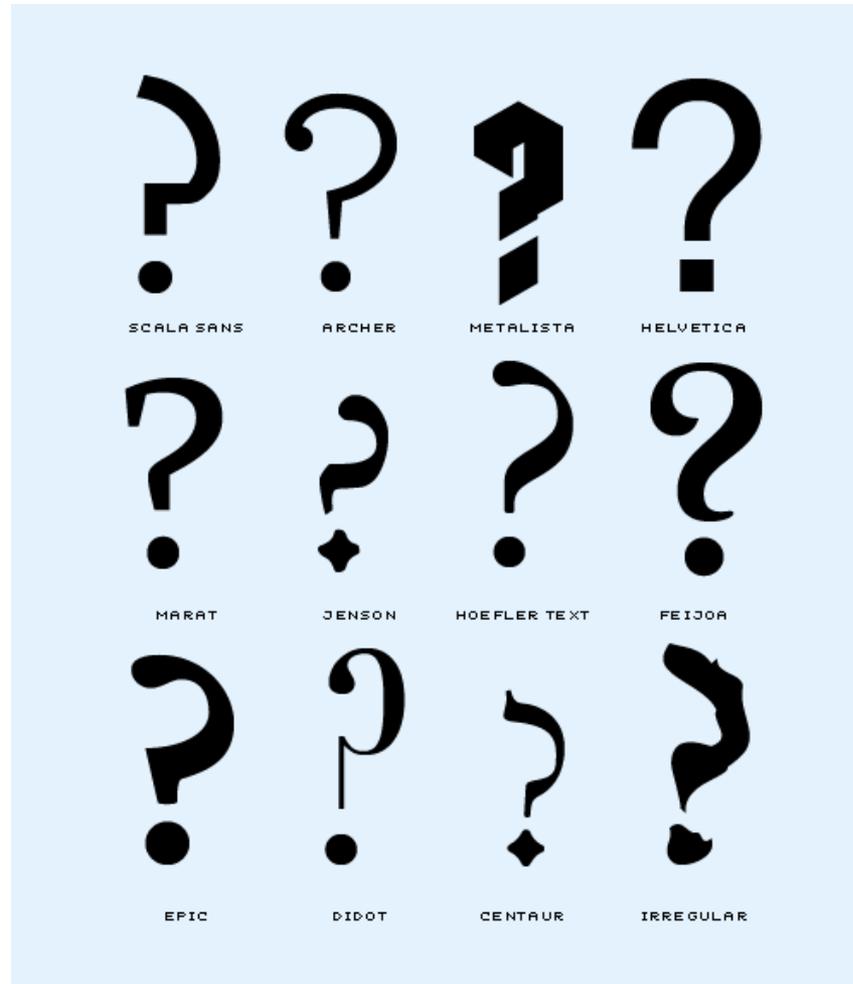
**No Spatial Join**



**With Spatial Join**

- **Cardinality**

- **What is the spatial relationship you are leveraging?**



# Spatial Join ArcMap Reference

Target feature	Join feature	INTERSECT	CONTAINS	WITHIN	CLOSEST
Point	Point	A join point is matched to a target point at the same location.	Same as INTERSECT	Same as INTERSECT	A join point is matched to the nearest target point within the search radius.
Point	Line	A join line is matched to a target point that it intersects.	Not applicable	A join line is matched to a target point contained within the line.	A join line is matched to the nearest target point within the search radius.
Point	Polygon	A join polygon is matched to a target point that is inside or on the boundary of the polygon.	Not applicable	A join polygon is matched to a target point that is inside the boundary of the polygon.	A join polygon is matched to the nearest target point within the search radius.
Line	Point	A join point is matched to a target line that it intersects.	A join point is matched to a target line that contains it.	Not applicable	A join point is matched to the nearest target line within the search radius.
Line	Line	A join line is matched to a target line that it intersects. This includes lines that cross or are coincident.	A join line is matched to a target line that completely contains it. Here the join line is coincident with the target line.	A join line is matched to a target line that falls completely within the join line. Here the target line is coincident with the join line.	A join line is matched to the nearest target line within the search radius.
Line	Polygon	A join polygon is matched to a target line that it intersects.	Not applicable	A join polygon is matched to a target line that is inside the boundary of the join polygon.	A join polygon is matched to the nearest target line within the search radius.
Polygon	Point	A join point is matched to a target polygon that it intersects or is inside of.	A join point is matched to a target polygon that contains it.	Not applicable	A join point is matched to the nearest target polygon within the search radius.
Polygon	Line	A join line is matched to a target polygon that it intersects or is inside of.	A join line is matched to a target polygon that contains it.	Not applicable	A join line is matched to the nearest target polygon within the search radius.
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