Considering Spatial Data

GIS I: Organizing Principles

Children's Environmental Health Initiative

Overview

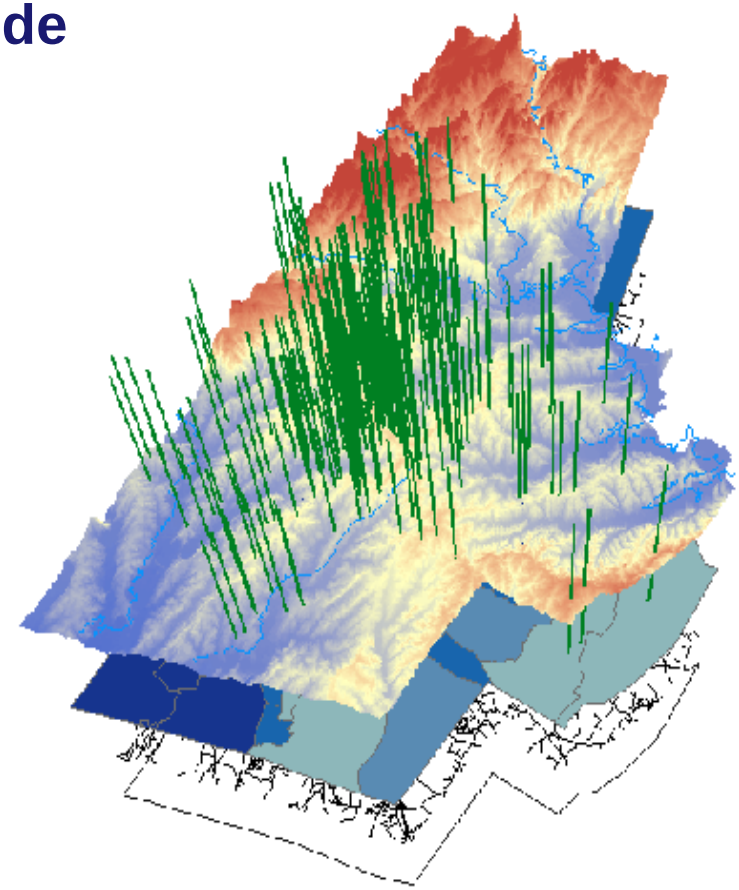
- What is spatial data?
- Spatial data formats
- Organizing spatial data
- Sources of spatial data

Learning Objectives

- Types of data you might encounter
- Difference between raster and vector data
- Safely and effectively moving data
- Where to look for appropriate and accurate data

What is Spatial Data?

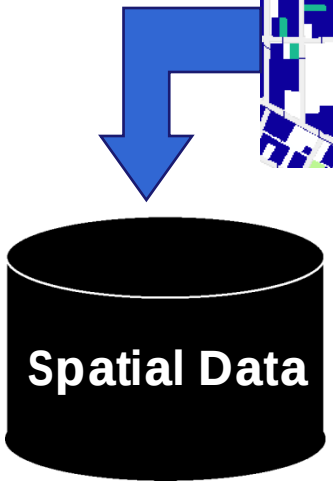
- Any piece of data with a geographic component
  - Latitude/longitude
  - Street address
  - Zip code
  - County



Spatial Data

- **Geographic data in ArcGIS Desktop**
  - Abstraction of real world entities
  - Feature classes linking geographic features and tabular attributes
  - Vector and raster data formats

Geography

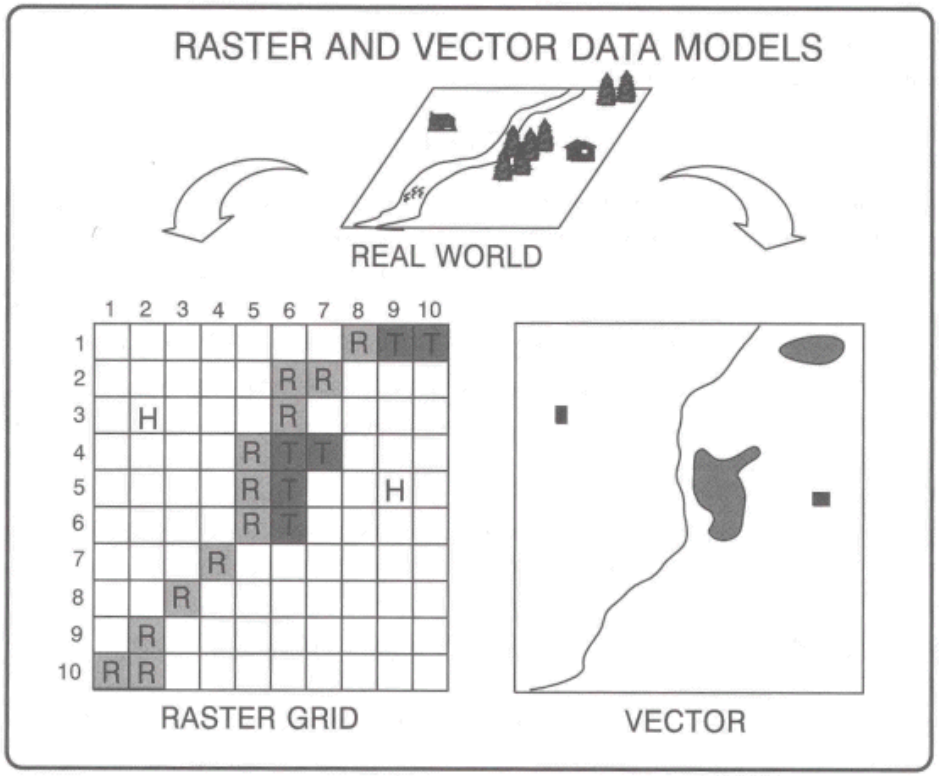


Attribute

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 BV/SH-2/AV	1985	

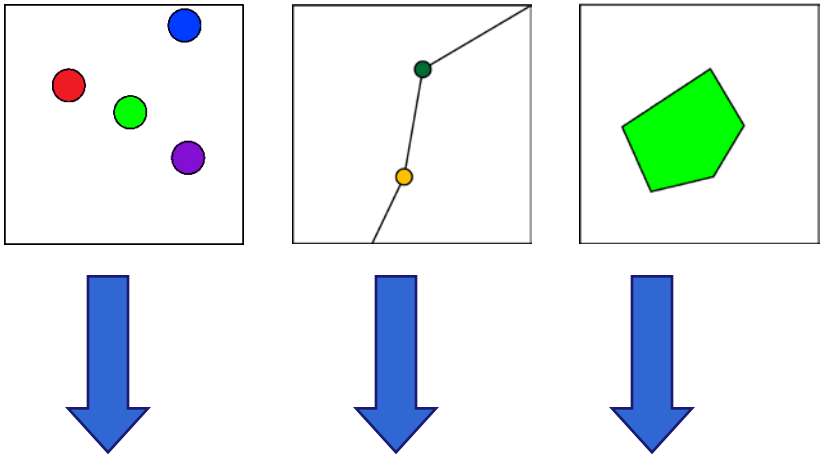
Storing Abstracted Objects

- Two primary methods for digital storage
  - Vector formats discretely identify shape coordinates
  - Raster formats assign square cells to real world entities



Vector Data Formats

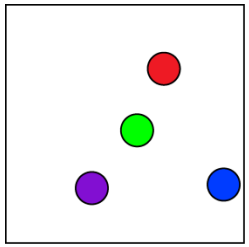
- Shapefile
- Coverage
- GeoDatabase
- CAD files



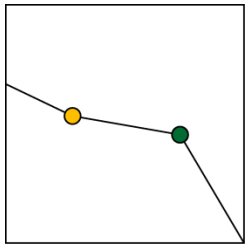
Feature class or feature dataset

Abstraction of Real World Entities

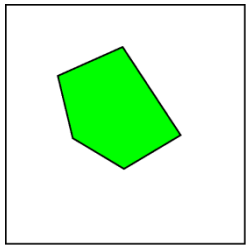
- **In vector based spatial data, real world entities are abstracted into three basic shapes**
  - **Points:**
    - *facility locations*
    - *patient homes*
    - *fast food restaurants*



  - **Lines:**
    - *roads*
    - *rivers/streams*
    - *movements*

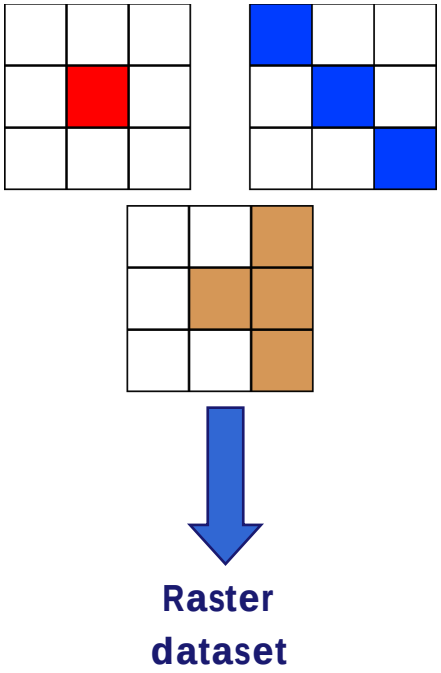


  - **Polygons:**
    - *census geographies*
    - *State/county/city extents*
    - *lakes/ponds*



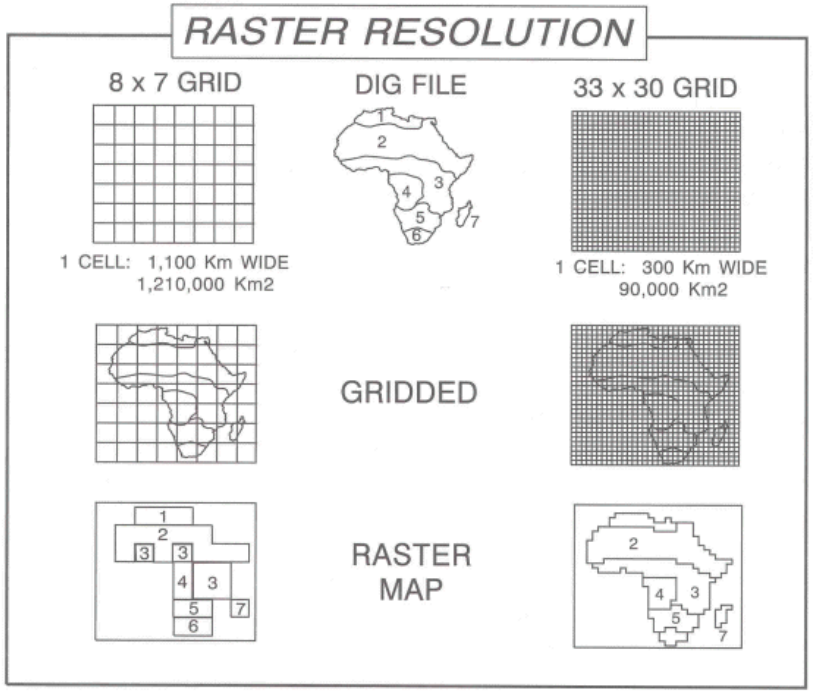
Raster Data Formats

- Image
- Grid



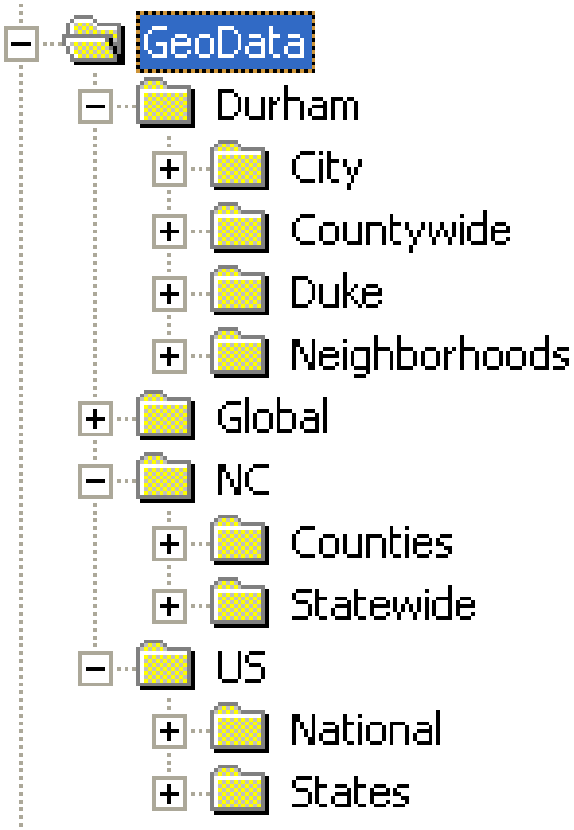
Data Format: Images and Grids

- Sources of data:
  - Remote sensing
  - Scanned photos
  - Digital orthophotos
- Rows and columns of equal sized cells
  - Each cell stores a value
  - Resolution depends on cell size
- Images
  - tiff, bmp, sid, jpeg, ERDAS files
- Grids (Arc native raster format)
  - Image vs. grid- function of the content of a pixel



Organizing Spatial Data

- **Folder structure**
- **Non-spatial database**
- **Geodatabase**

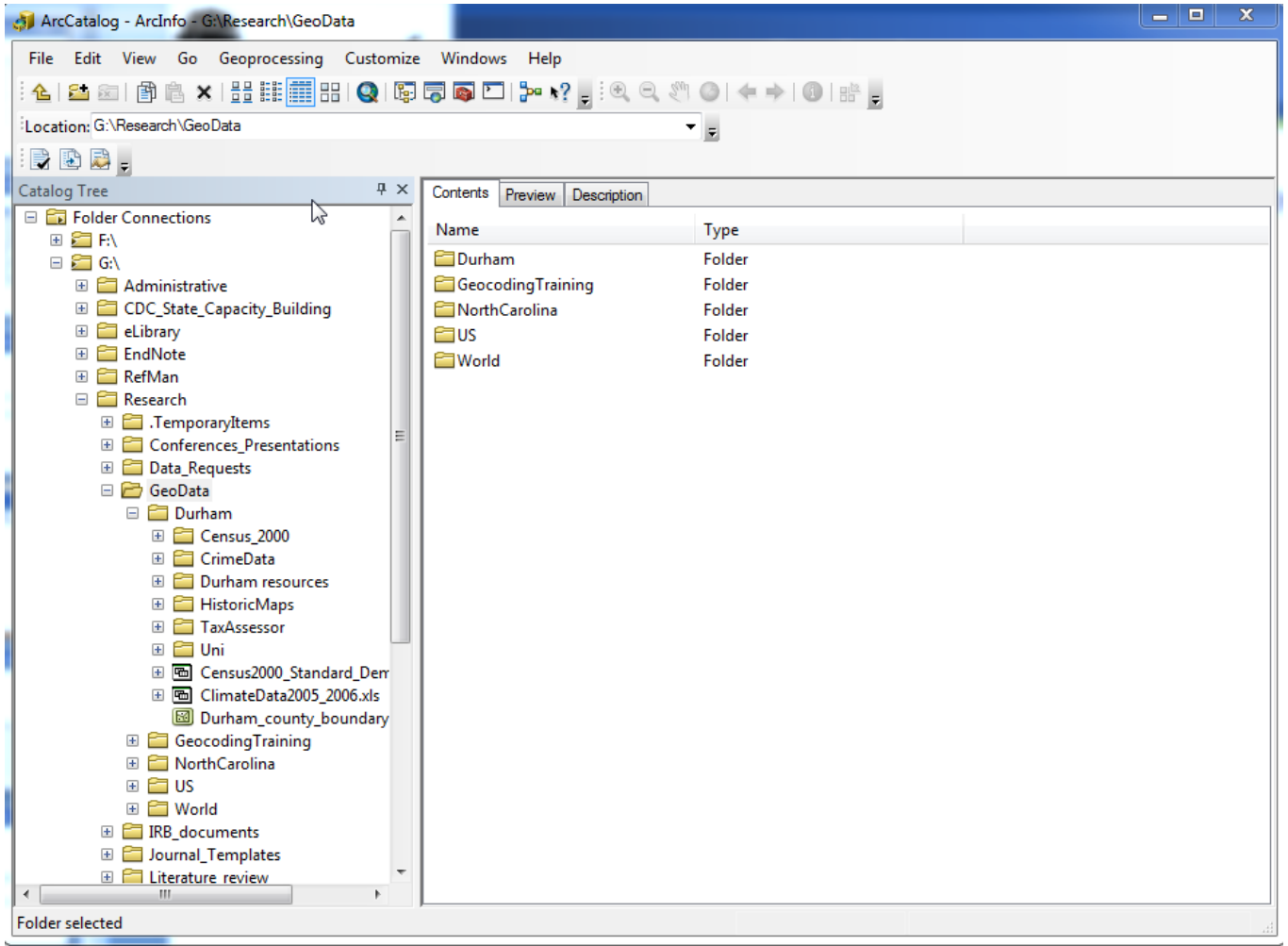


Data Format: Shapefile

- **Shapefile**
  - **Each shapefile consists of at least 3 files:**
    - **shapefile.shp;**
    - **shapfile.shx; and**
    - **shapefile.dbf;**
    - **spatial reference information if present is stored in the .prj file**
  - **Attribute storage**
    - **No matter the feature type, a shapefile's default attribute table is stored in a dBase format (.dbf)**

Using ArcCatalog

- Window into your data
- Browse your data
  - Graphical
  - Textual
- Manage your data
- Create and view data documentation (metadata)



Viewing Data: Four Ways

Contents | Preview | Description

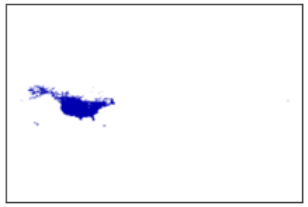
Name: **streets**
Type: **SDC Feature Class**

Contents | Preview | Description

Print | Edit | Validate | Export | Import

U.S. and Canada Detailed Streets

SDC Feature Database



Tags

line, interstates, limited-access roads, highways, major roads, streets, secondary roads, connecting roads, local roads, ferries, one-ways, speeds, addresses, road feature codes, routing, geocoding, transportation, location, United States, Canada, 2005

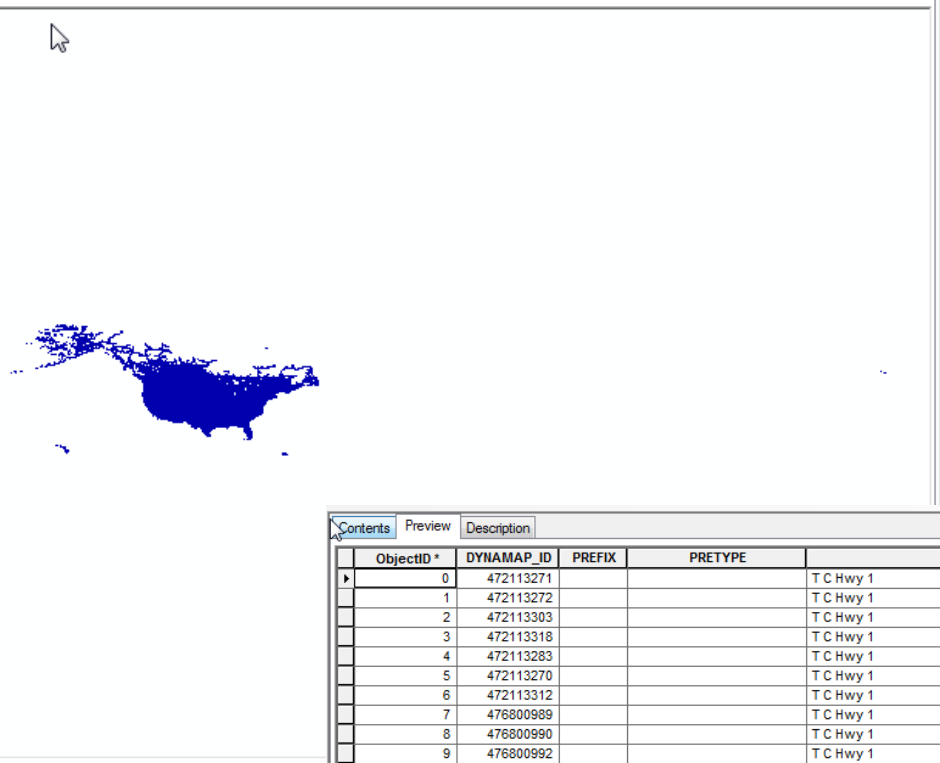
Summary

There is no summary for this item.

Description

U.S. and Canada Detailed Streets represents streets, highways, roads with and without limited access, secondary and connecting roads, local and rural roads, roads with special characteristics, access ramps, and ferries within the United States and Canada. This data set contains road network features such as arterial classification, speed, and direction of travel. It contains address

Contents | Preview | Description



Preview: Geography

Contents | Preview | Description

ObjectID *	DYNAMAP_ID	PREFIX	PRETYPE	
0	472113271			T C Hwy 1
1	472113272			T C Hwy 1
2	472113303			T C Hwy 1
3	472113318			T C Hwy 1
4	472113283			T C Hwy 1
5	472113270			T C Hwy 1
6	472113312			T C Hwy 1
7	476800989			T C Hwy 1
8	476800990			T C Hwy 1
9	476800992			T C Hwy 1
10	472113292			T C Hwy 1
11	472113291			T C Hwy 1
12	472113877			T C Hwy 1
13	472113861			T C Hwy 1
14	472113275			T C Hwy 1
15	472113297			T C Hwy 1
16	472113276			T C Hwy 1
17	472113277			T C Hwy 1
18	472113873			T C Hwy 1
19	472113280			T C Hwy 1
20	472113296			T C Hwy 1
21	472113875			T C Hwy 1
22	472113884			T C Hwy 1
23	472113883			T C Hwy 1
24	476800991			T C Hwy 1
25	472113879			T C Hwy 1

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Preview: Table

Spatial Data Sources

- Established spatial datasets
- Established tabular datasets
  - BRFSS - www.cdc.gov/BRFSS
  - Census - www.census.gov
- State/County/city GIS
  - Idaho – http://gis.idaho.gov/portal/
  - Indiana – http://www.indianamap.org/
  - Louisiana - http://lagic.lsu.edu/datacatalog/
  - Maine - http://www.maine.gov/megis/
  - Michigan - http://www.mcgi.state.mi.us/mgdl/
  - Montana - http://nris.mt.gov/gis/
  - New York - http://www.nysgis.state.ny.us/
- GIS clearinghouses
  - http://data.geocomm.com/
  - http://www.geodata.gov
  - http://www-atlas.usgs.gov/