Using the Web to Bring Your Geographic Information to Life

Fed UC 2010

Clint Brown & Charlie Frye

Presentation

- **Traditional role:** You build authoritative content for your subject matter and area of interest
- New opportunities are available to deliver your information
- Use of the Web means you can integrate others' content
- **New Mission:** Make your information available and useful via maps on the web

Bring your information to life on the web

Making the case for great maps

- **Maps are one of the fundamental ways that humans communicate**
- **Maps communicate an overwhelming amount of detail, complexity, and information**
- **“Elegant display of geographic information is as important as the data itself.”**

-- GIS Cartography: A Guide to Effective Map Design
Gretchen Peterson

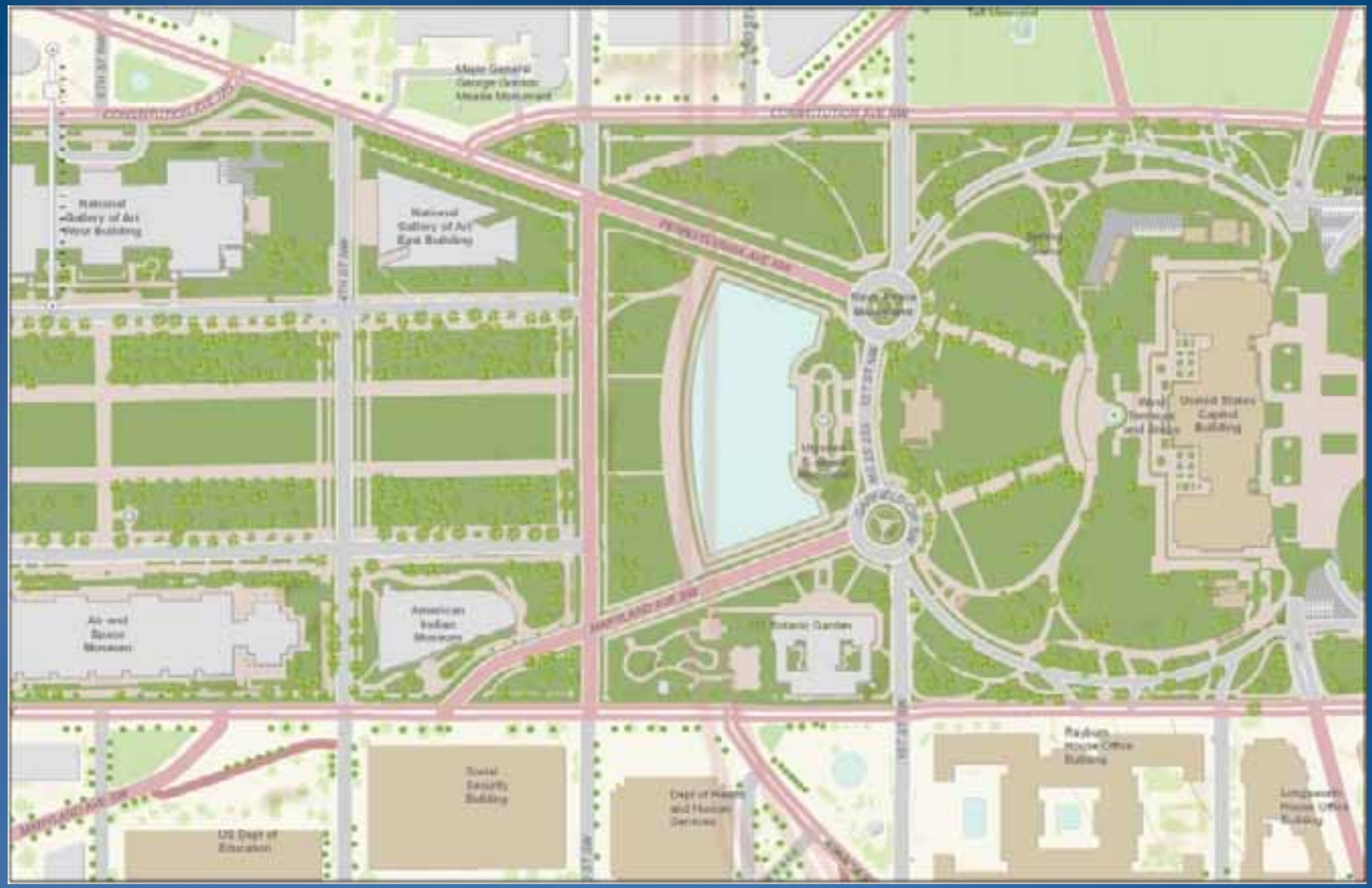
Maps are how we communicate with GIS

Everybody uses maps

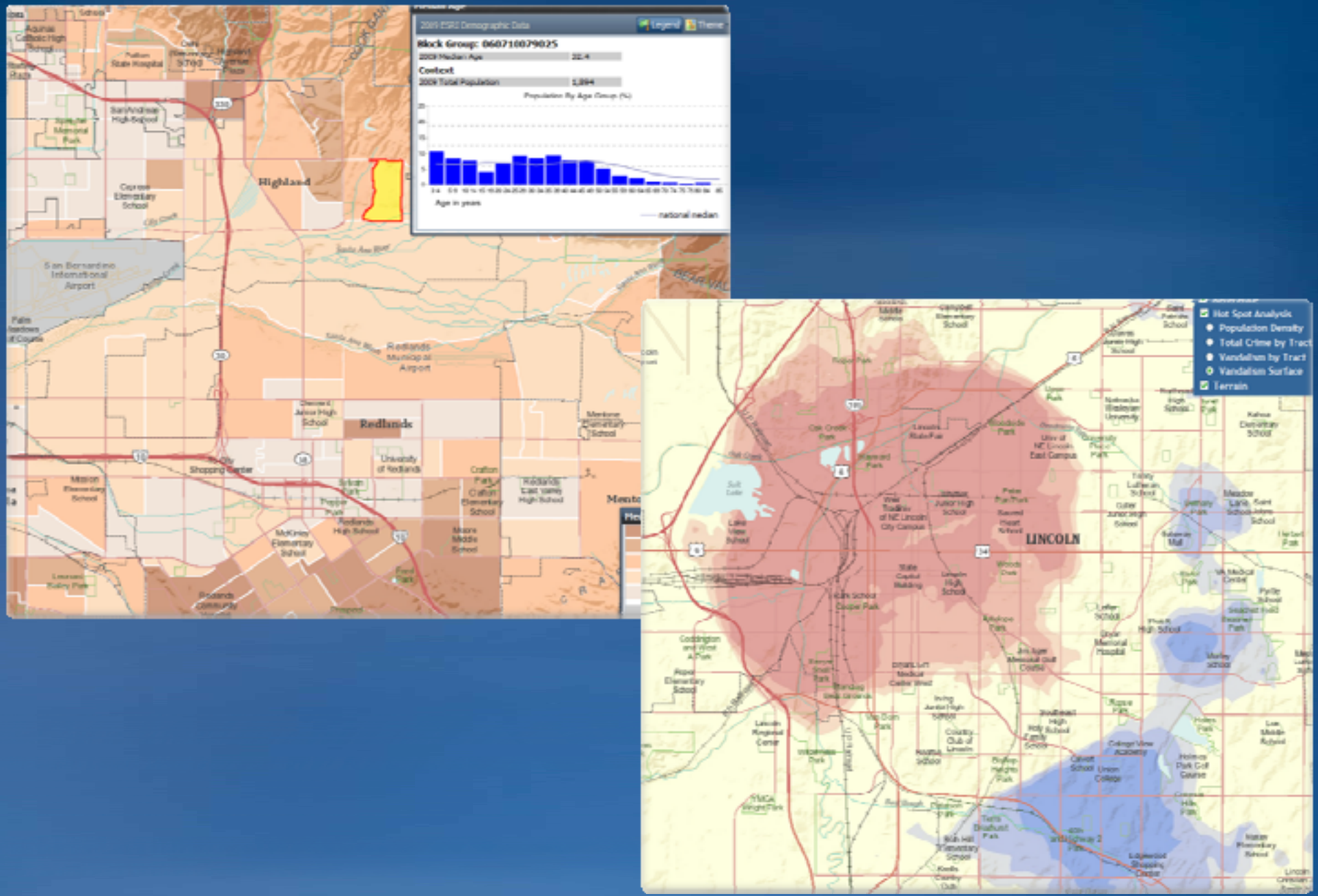
Everyone understands maps and appreciates good maps

People use maps for many activities

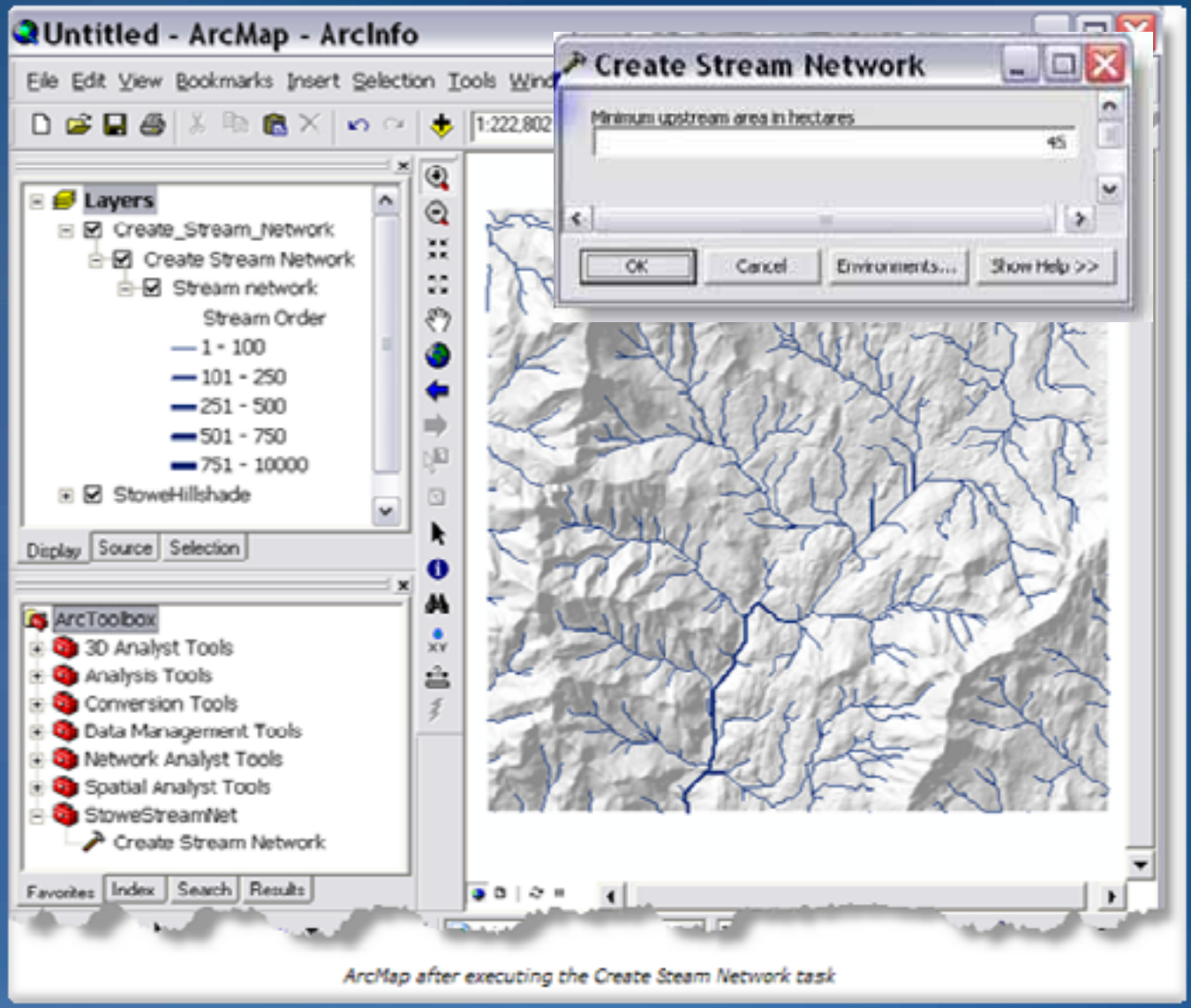
- To communicate and convey large amounts of information



To find patterns



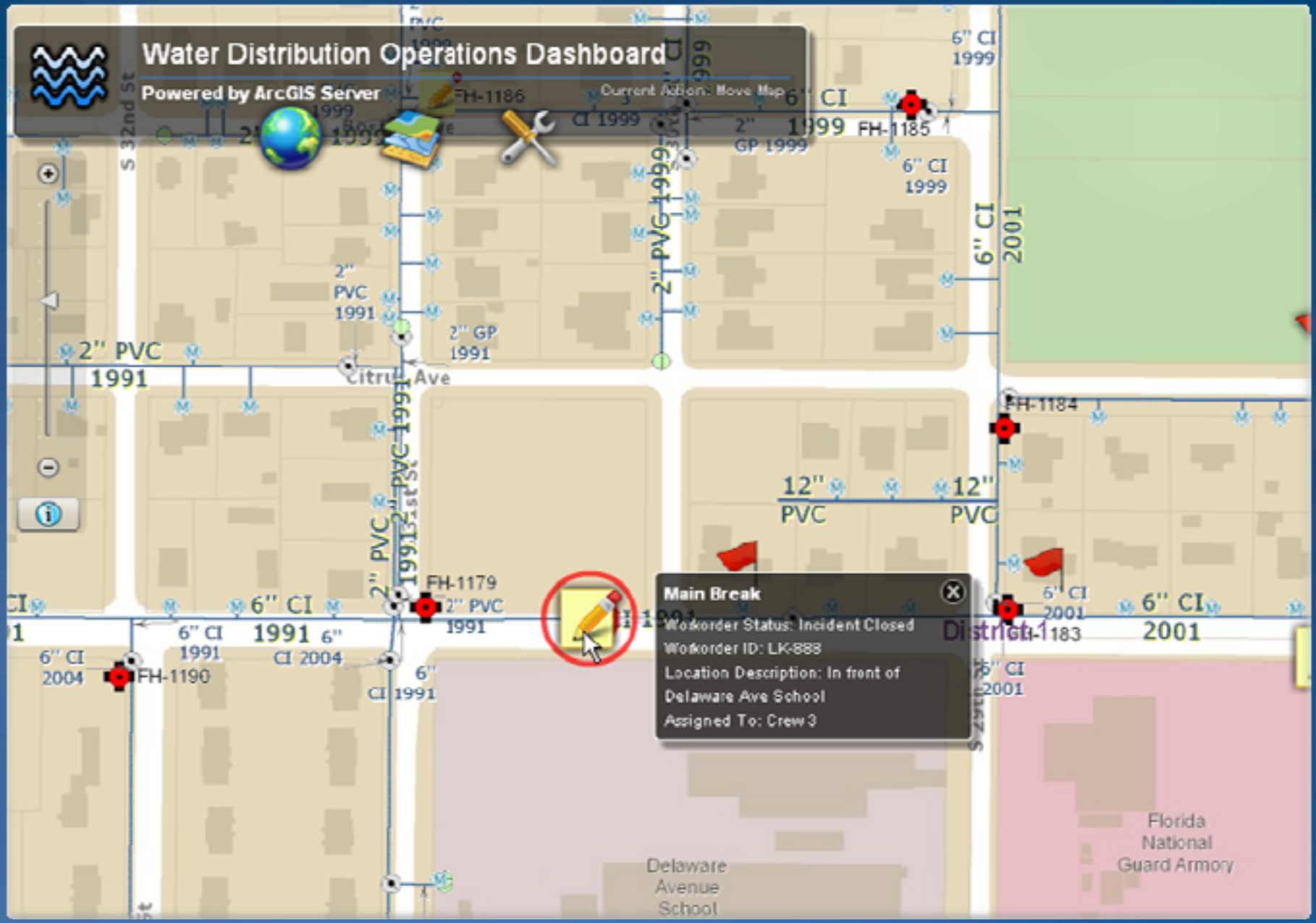
To derive new information using analysis



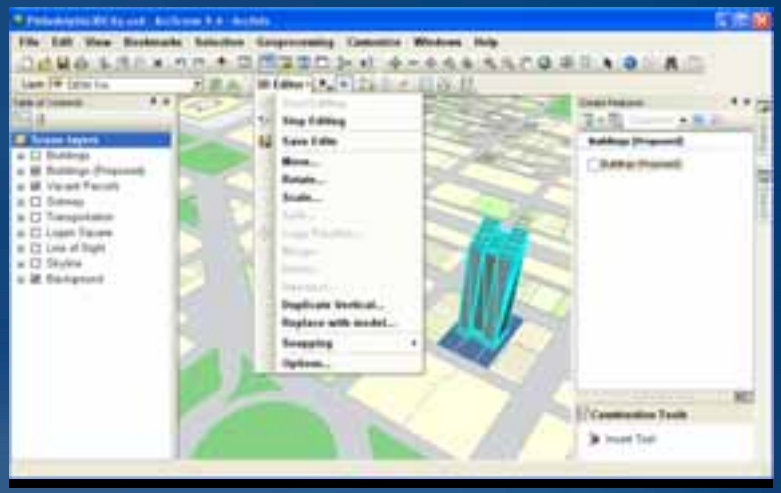
ArcMap after executing the Create Steam Network task

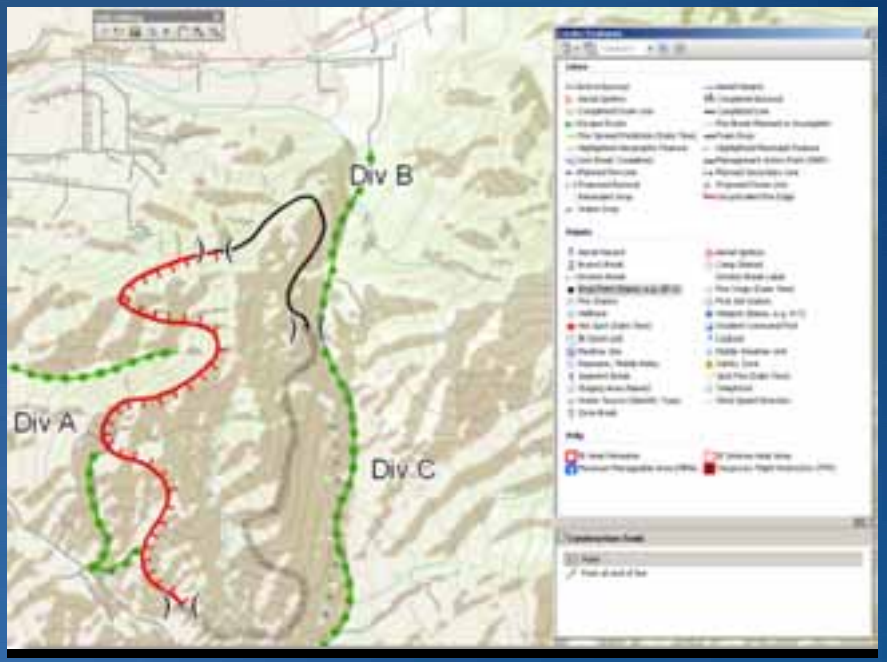
To communicate ideas, concepts, designs, …

To get status reports



To compile geographic information





Many GIS organizations maintain information inventories (e.g., Hydrology, Soils, Geology, Transportation, Boundaries, Parcels, etc.)

What is a Web Map?

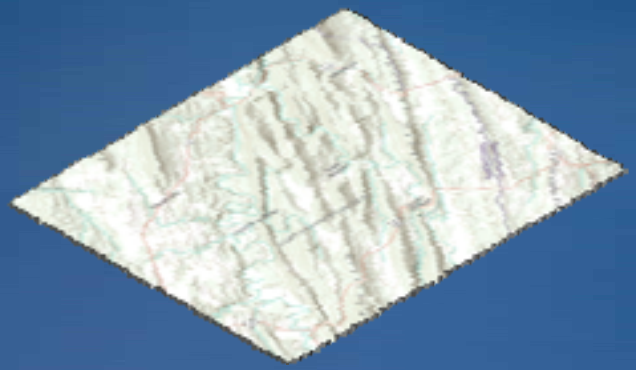
- One or more map services
- Integrated into a web application
- That users interact with
- To accomplish meaningful tasks
- Simply and quickly

Web Maps

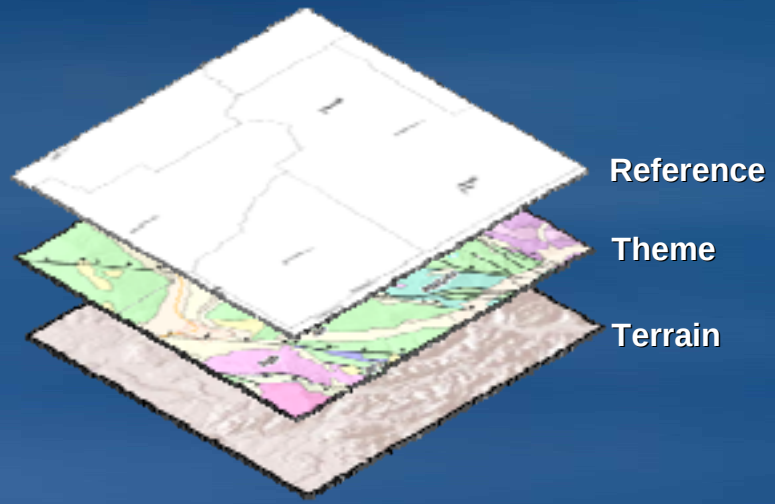
Design implications

- A web map is a *set* of web map layers.
- Each web map layer is based on a web map service.
- A web map service in ArcGIS is published using a map document.
- You author your web map layers as map documents in ArcMap and publish them as map services.
- You combine a *set* of web map layers from multiple web map services in your web map application.

Base Map Layers

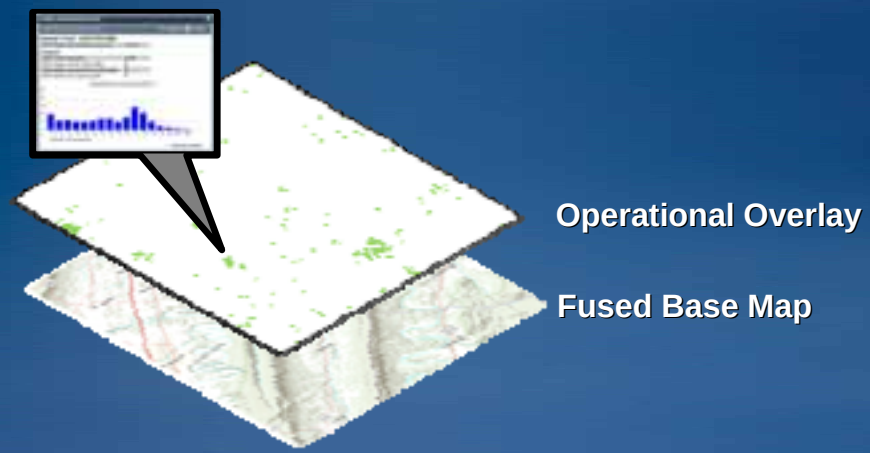


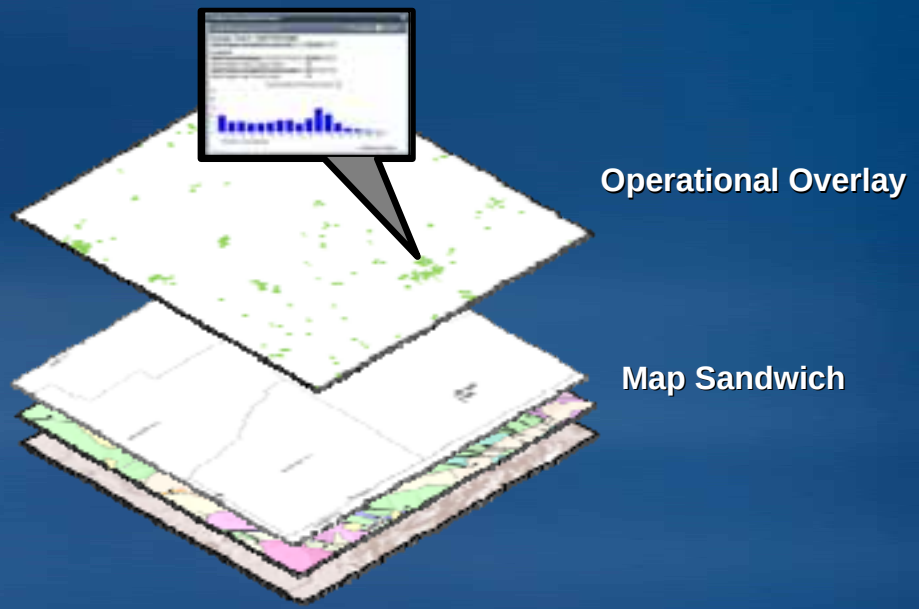
Fused base map



Map Sandwich

Basemaps plus operational overlays form map building blocks

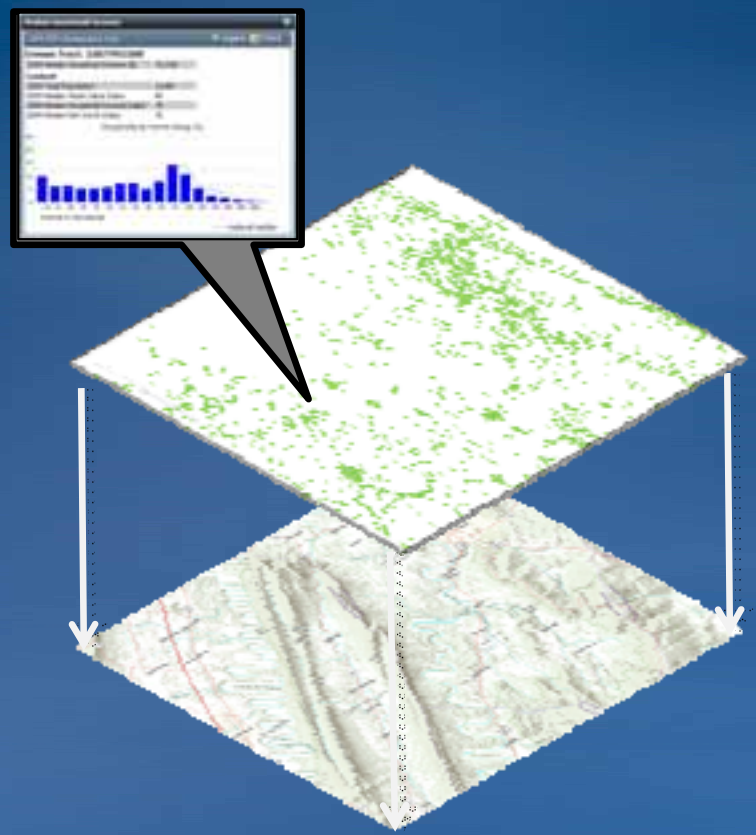




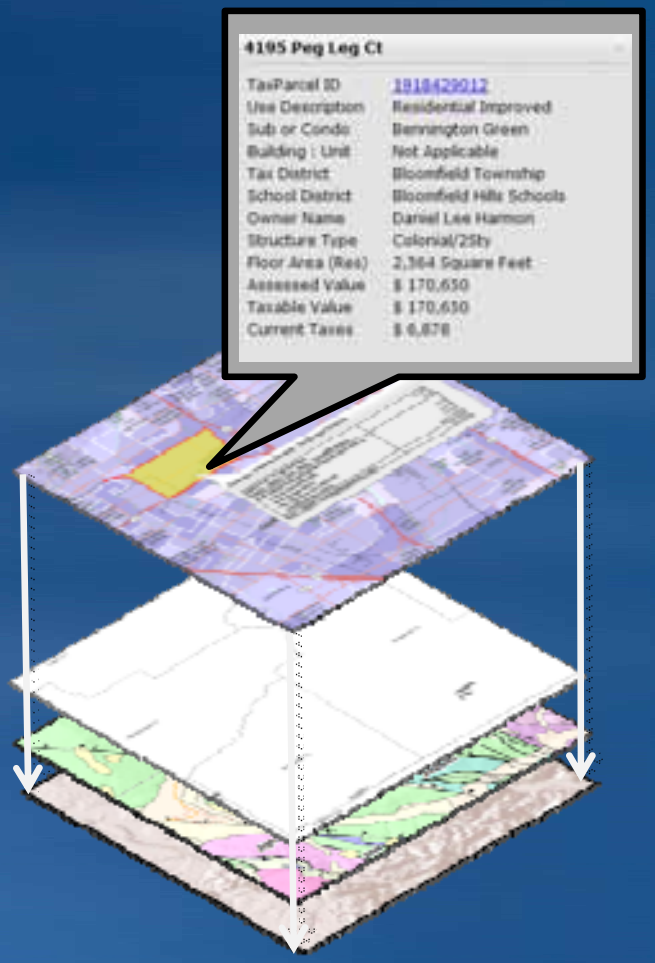
Key concept

- Operational overlays:
  - Layers as Interactive Reports
  - Results of analytical operations
  - Query Results
  - Live sensor feeds

Basemaps plus operational overlays form map building blocks

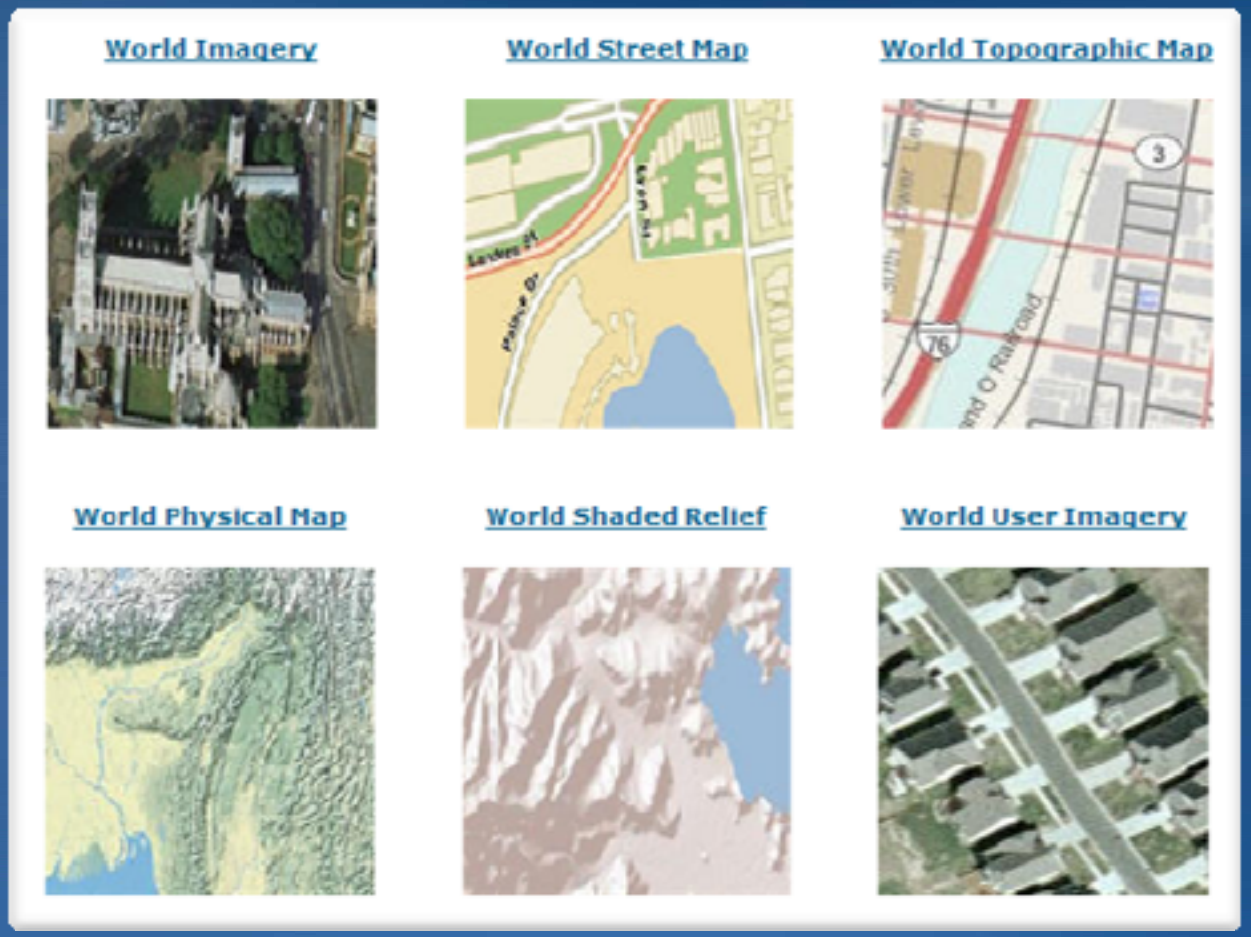


Topographic Map

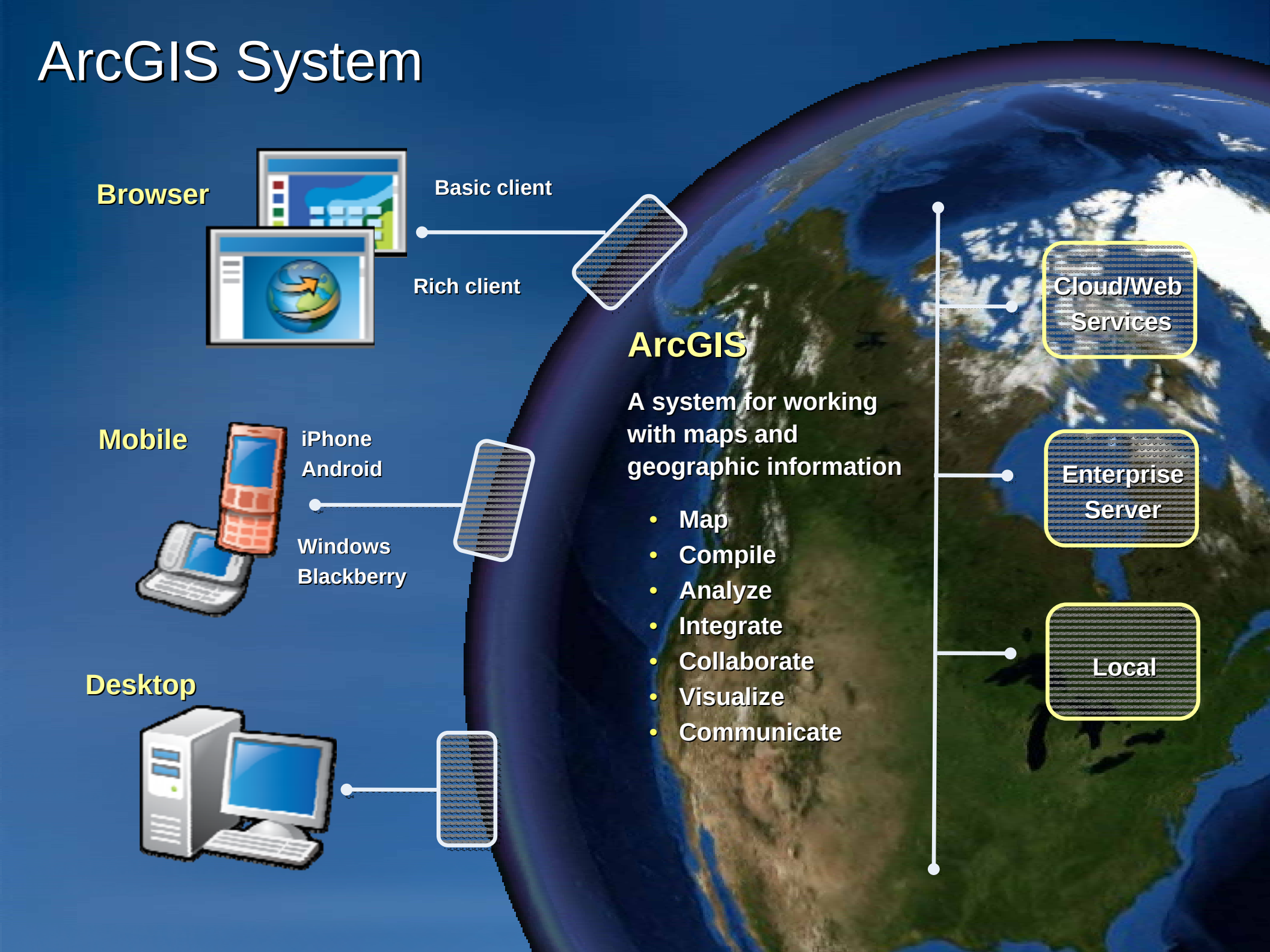


Geology Map

ArcGIS is about making, using, and sharing maps for many purposes

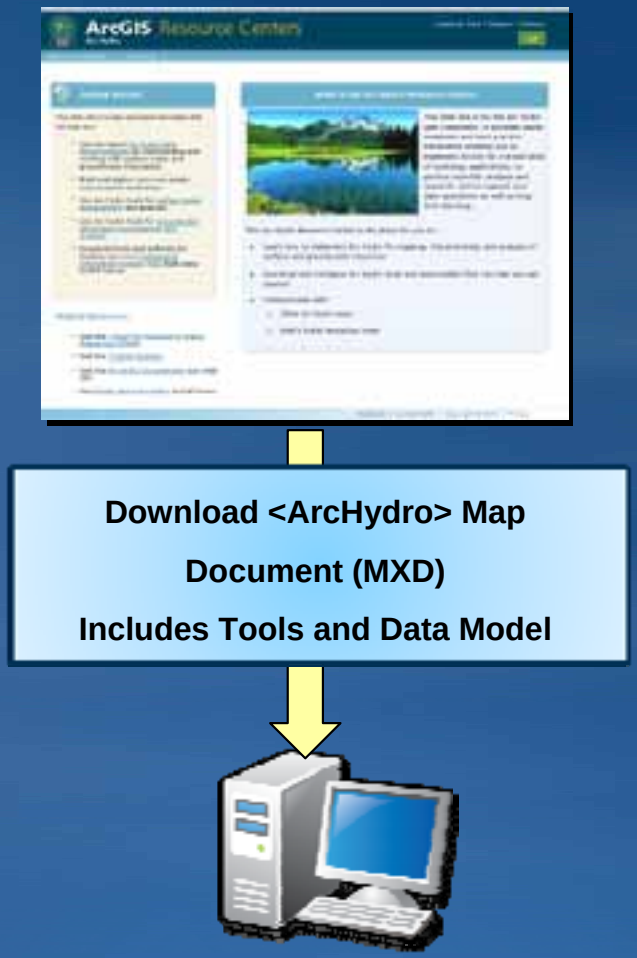


ArcGIS System



Map Packages and Layer Packages

Encapsulate how GIS data is displayed, used, compiled, derived, . . .



ArcGIS Desktop transforms into a focused workstation via map packages and layer packages

ArcGIS users build and maintain important geographic information

What GIS users do:		Create:
Mapping	→	Map documents (Mxd, Mpk)
Imagery	→	Image catalogs (Mosaics)
Editing	→	Feature templates (Lyr, Lpk)
Geoprocessing	→	Models and Python Scripts (Tbx, Py)
Build Geodatabases	→	ArcSDE, File, and Personal GDB's
Create address & place name datasets	→	Locators (Loc)
Item descriptions	→	Search Index

ArcGIS Online Makes Sharing Maps & Data Simple

Users Can Share Their Maps

SHARING

. . . An Online Resource for ArcGIS Users

Putting these ideas to work – Charlie Frye

Key points

- There is a new map media called a web map
- This is one of many map patterns for the web and is already widely used (e.g., by Google, Microsoft Bing, ArcGIS Online, etc.)
- This pattern involves the use of multi-scale base maps plus operational overlays (mashups)
- Each map is published as an open map service on the web
  - Published with multiple API's: REST, SOAP, WMS, WCS, KML
- A Web Map combines these in a common application.
- Simple HTML API's are used to assemble web applications that reference the REST endpoints (URL's).
- Only a few dozen lines of code are needed to create great web maps
- With ArcGIS Online, making a map will b even easier (No web programming)

Key Points

- The GIS community builds and maintains important information sets
- Maps – both 2D and 3D, are the way that geographic information is brought to life
- However, most GIS professionals are not cartographers.
- There is a GIS mapping “community”
  - The mapping community can provide the designs and build map specifications for web delivery.
  - The mapping community can share its designs and maps.

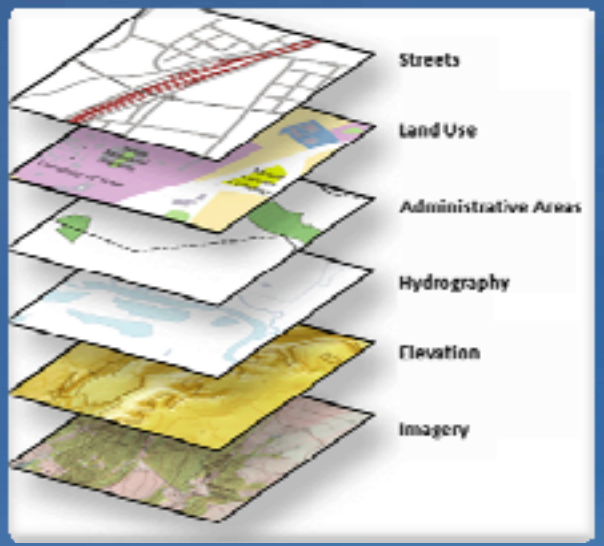
Base Maps plus Operational Overlays

There are many types of “base maps”

- Consumer maps provide imagery and streets. These are important but do not provide the context for addressing all problems.
- Additional web maps are needed to provide the context or framework for addressing a range of problems.
- The GIS community can provide these base maps.
- Very few web maps can be built by a single organization.
- A collaborative effort is needed to bring our content together.

Maps are made from a series of layers

- Layers represent **logical collections** of information – Roads, Trails, Surface Elevation, Hydro, . . .
- The **contents** of each map are organized as a series of layers
- There are a number of **types** of layers



A map is a GIS information model . . .

. . . GIS is founded on map layer concepts

There are many types of layers

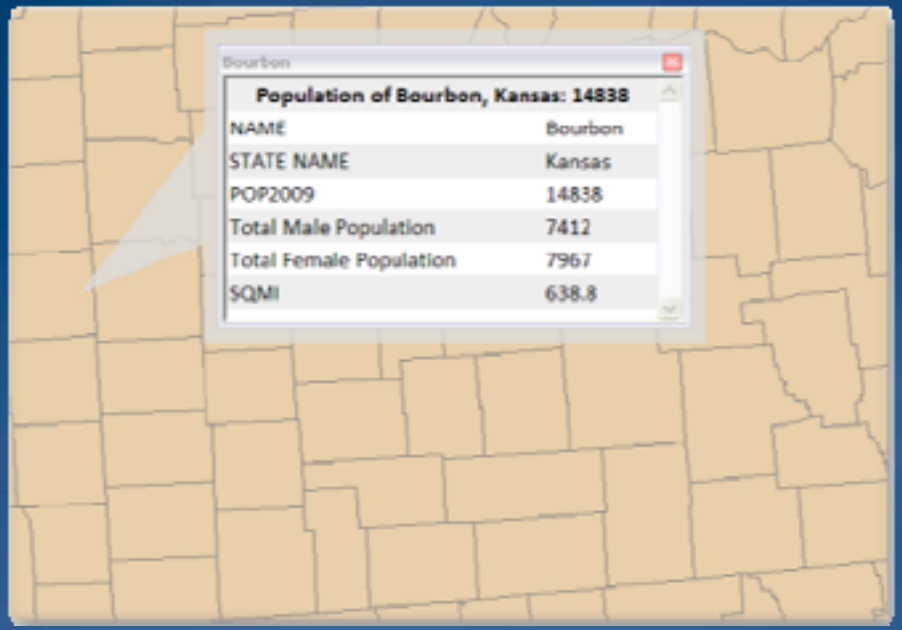
Basemap, Feature, Imagery, Surface, Derived

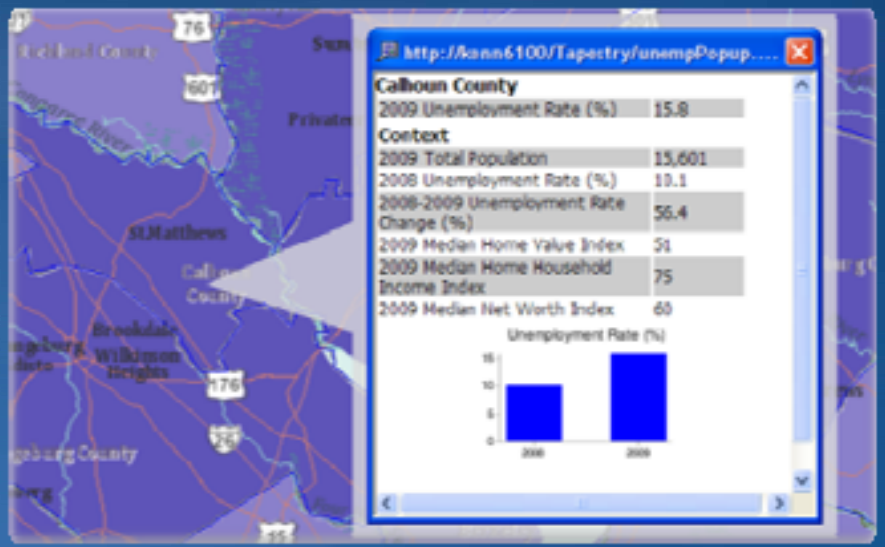
Recent developments for the web and software enable us to use a new web map pattern

- Web context
- Your user expectations
- New web programming paradigms

Operational Layers

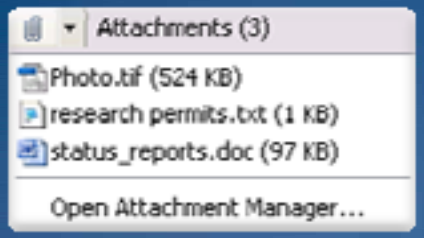
Feature layers have information popups

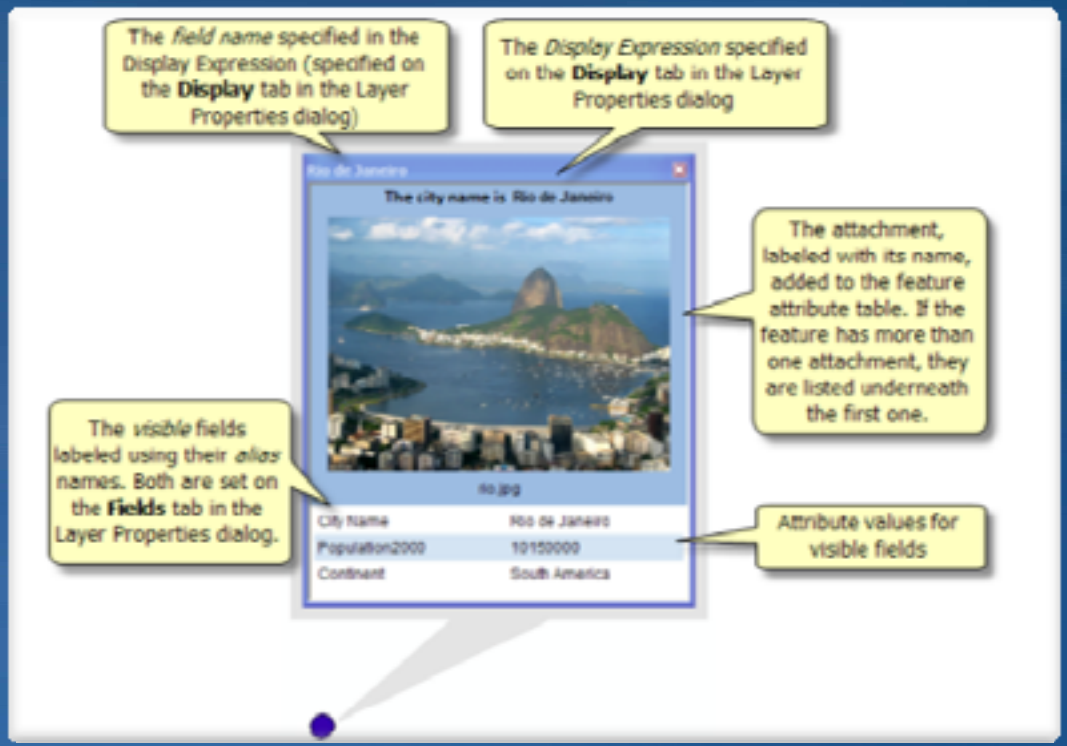




Feature layers have attachments

Add photos and other documents to a feature

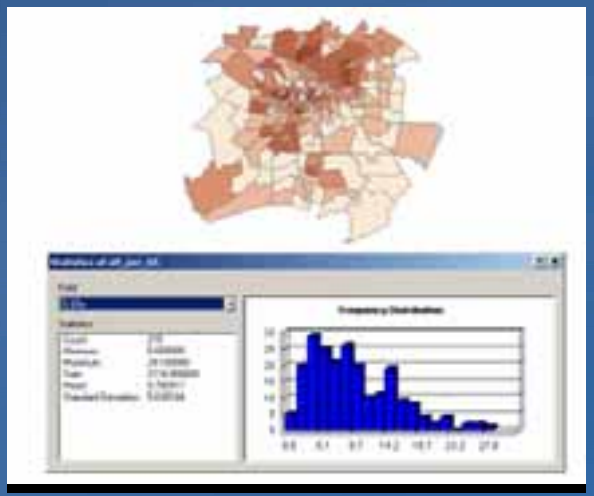




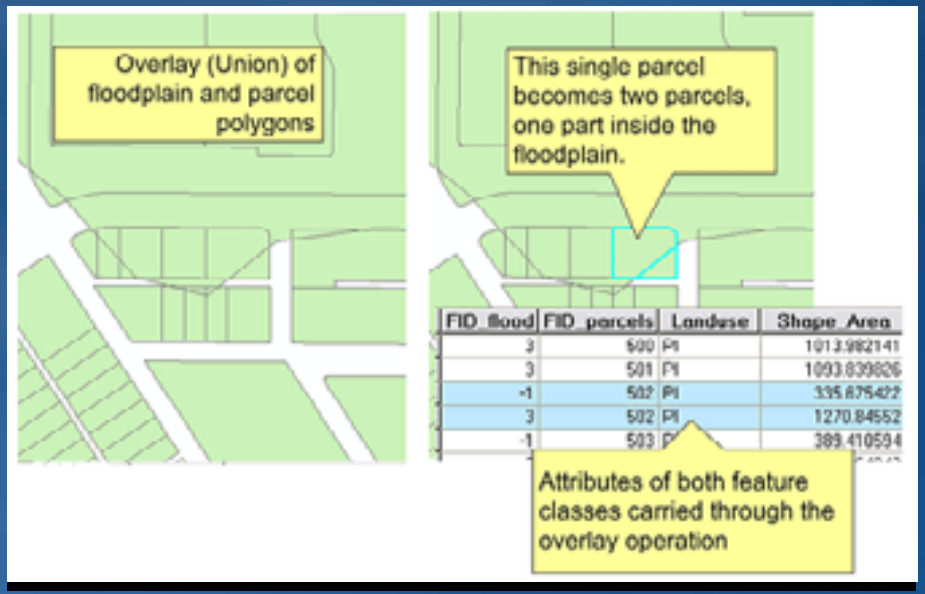
Derived layers
Geoprocessing Results

Areas within 2-, 4-, and 6-hours by truck

Travel times between cities



Spatial statistics



Polygon overlay of flood plains on parcels

Just another mashup in web map apps