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Learning Common GIS Workflows

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Agenda

- Common GIS Workflows
  - Building a geodatabase
  - Editing
  - Performing analysis
  - Mapping
  - Sharing

ArcGIS 10 — A Complete System

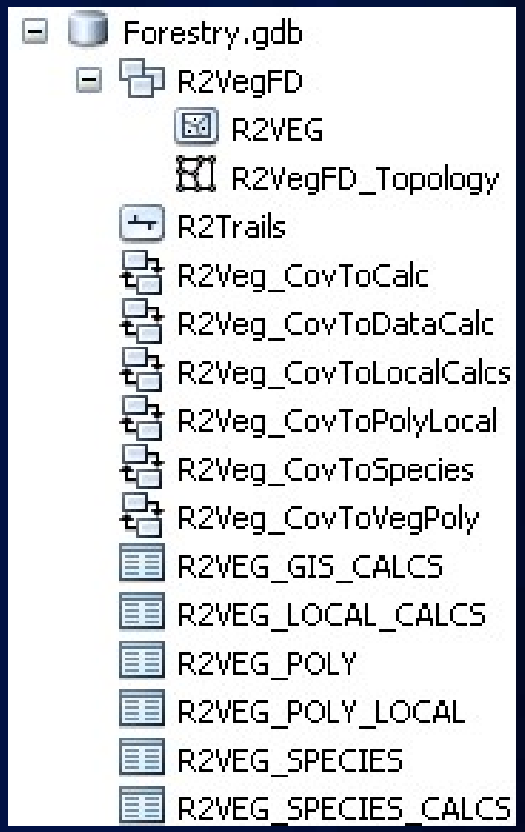
Easier
More Powerful
and Everywhere

GIS Workflow:

Building a geodatabase

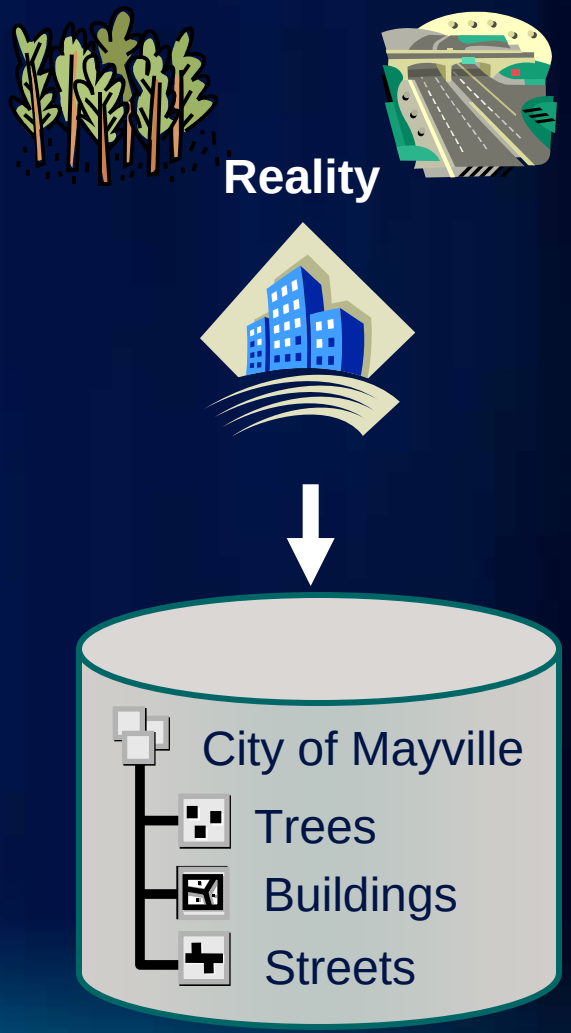
What is a geodatabase?

- Core ArcGIS data model
- Repository of all geographic data
  - Feature classes, Raster datasets, Tables, Annotation, Relationships, Networks, Topology
- Ability to create behavior
- Scalable



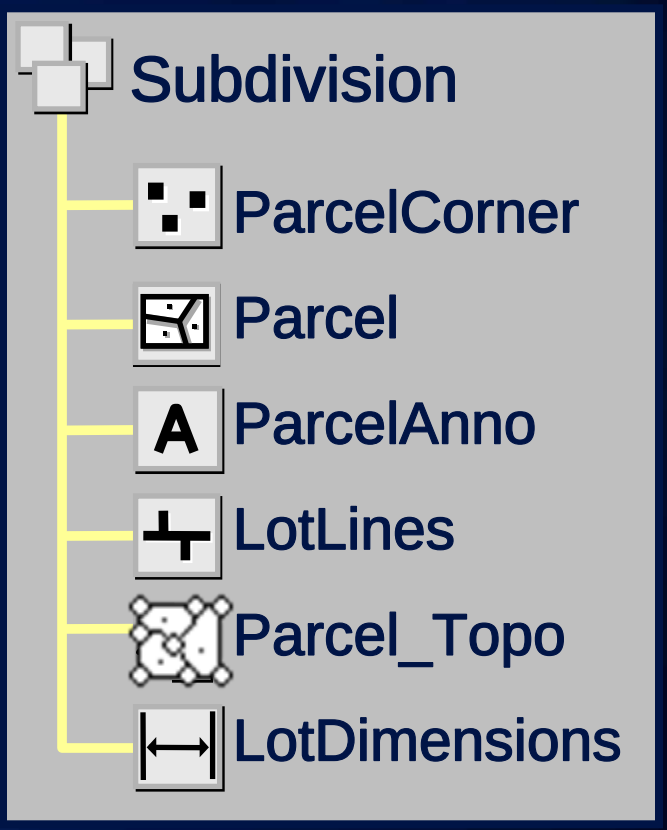
Simple feature classes

- Table that stores geographic features and attributes
  - Point, line, and polygon geometry
  - Allows for XY coordinates and Z and M measures
  - Has associated spatial reference
  - Each record represents a feature
- Organize geographic entities into thematic layers



Feature datasets

- Element for storing spatially-related feature classes
  - Share same spatial reference
- Required for additional behavior
  - Geodatabase topology
  - Geometric network
  - Network datasets



Geodatabase workflow

- Create schema
- Import/load data
- Pre-process data to store geodatabase behavior
- Create and apply behavior
- Use and edit in ArcMap
- Feature and attribute validation

Demonstration

Building a geodatabase

GIS Workflow:

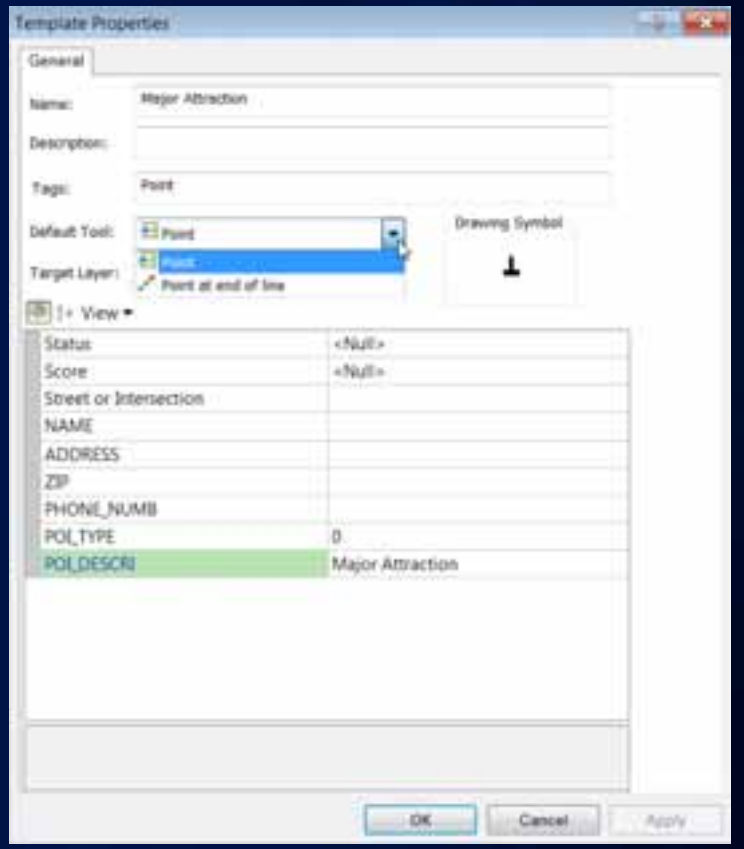
Editing

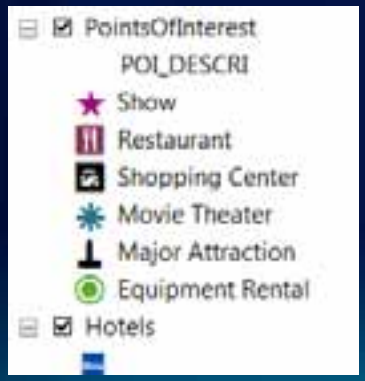
Editing workflow

- Select workspace and data frame to edit
- Start an edit session
- Set editing environment (i.e. snapping)
- Edit geometry (choose feature template, construction tool)
- Edit attributes
- Save edits and exit

Authoring Maps for Editing

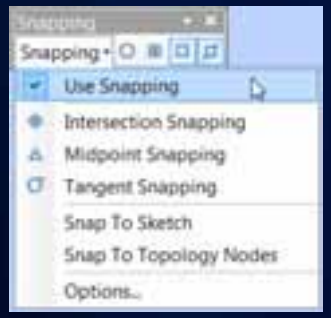
- Author geodatabase schema
- Author Map and layers
  - Basemaps
  - Set Field properties
- Author feature templates

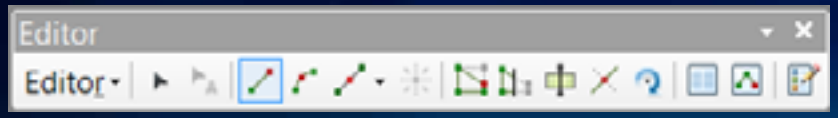


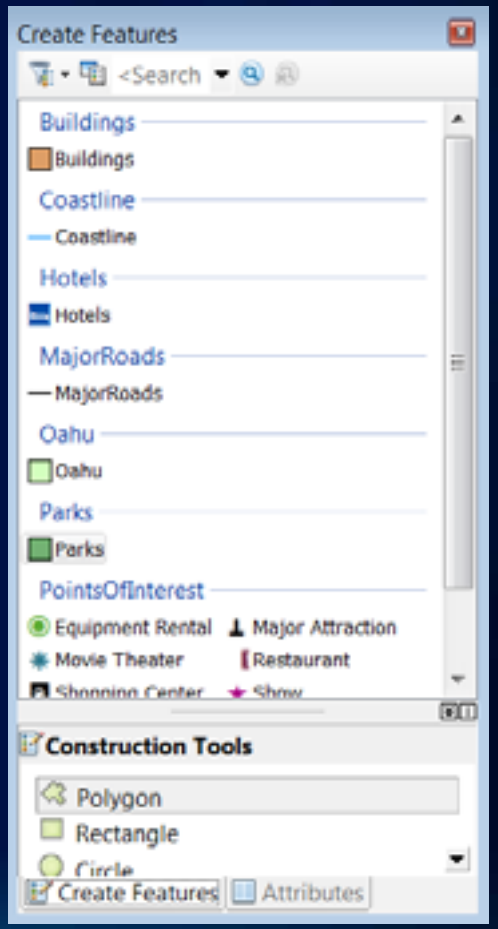


Editing geometry

- Feature template editing
- Efficient feature construction
- Simplified snapping environment
- Enhanced productivity

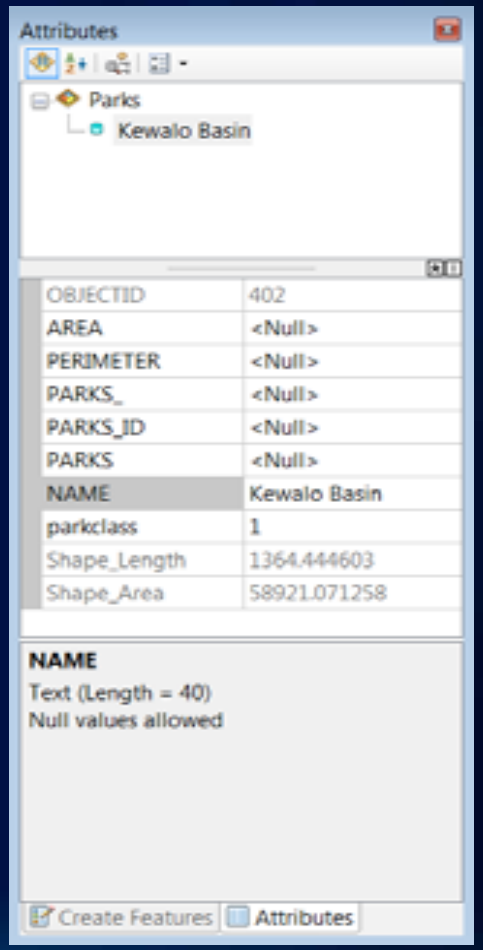






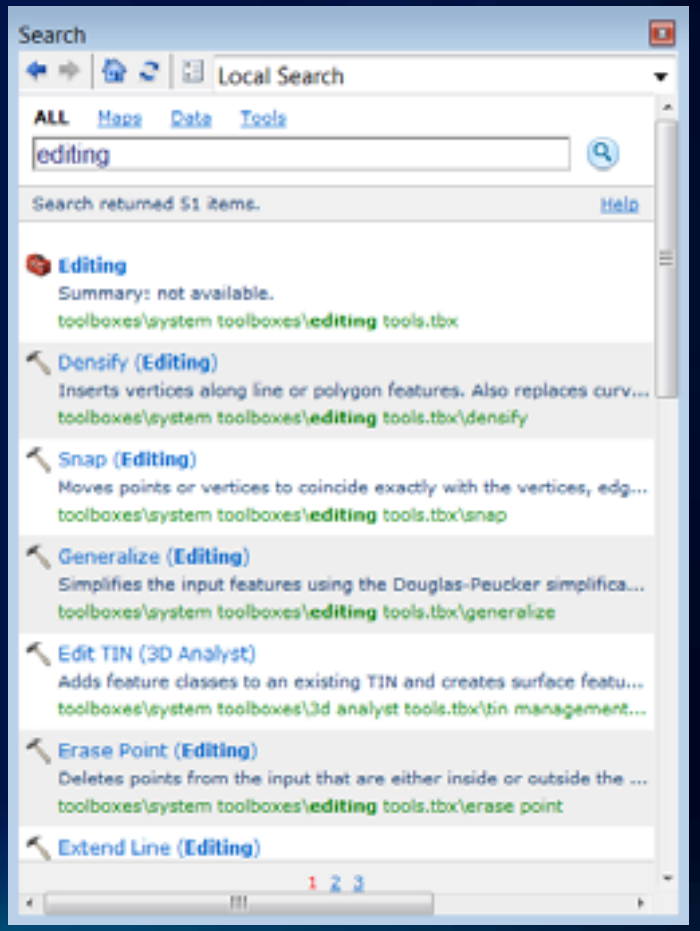
Editing attributes

- Change values for newly digitized feature
- ArcGIS automatically populates OBJECT ID, Shape_Length and Shape_Area fields
- Edit existing values
- Copy and paste values between features

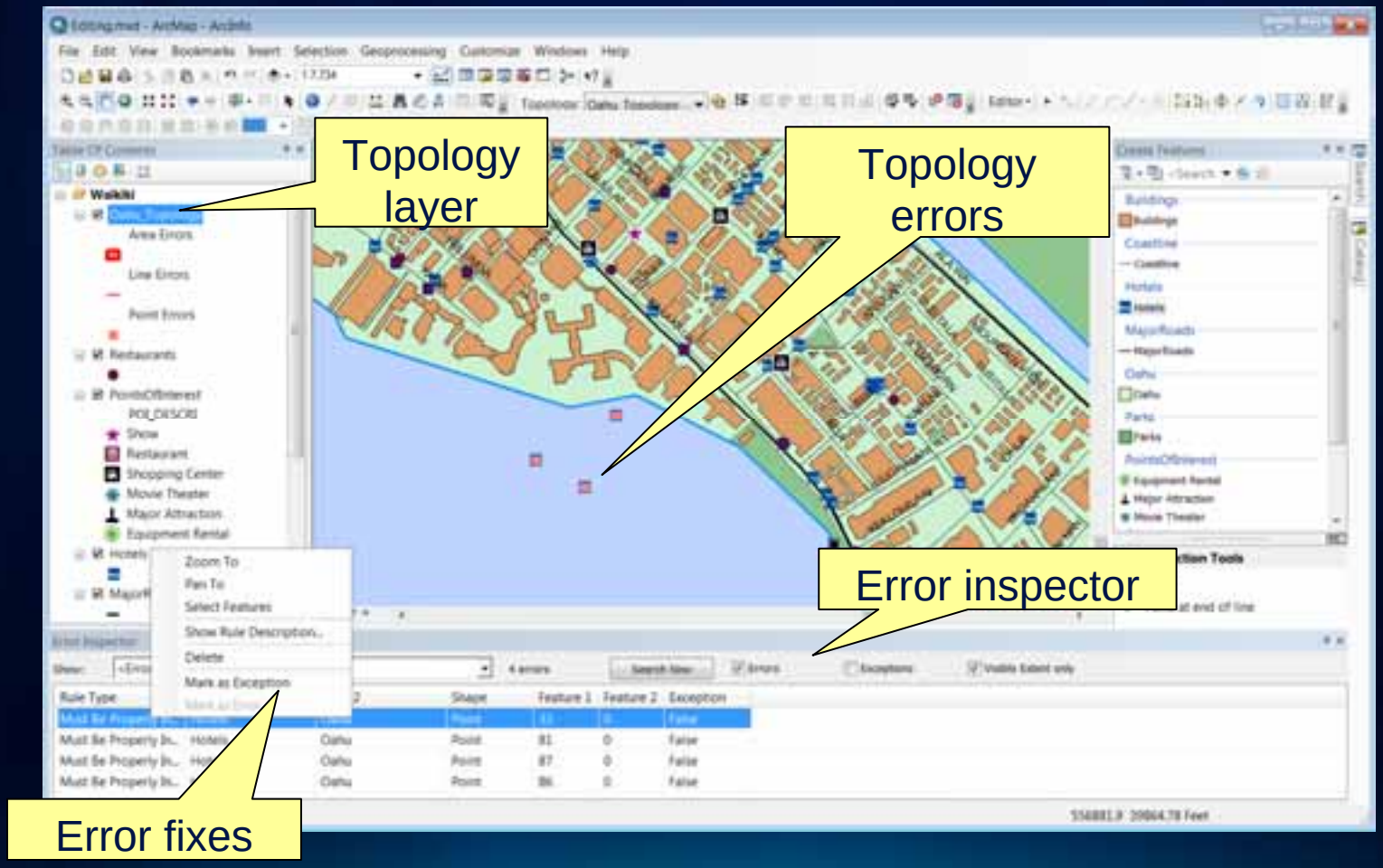


Editing with Geoprocessing

- Geoprocessing tools designed for editing
  - Tied to edit session
  - No new output generated
- Helps address many data integrity issues



Editing with geodatabase topology



Demonstration

Editing workflow

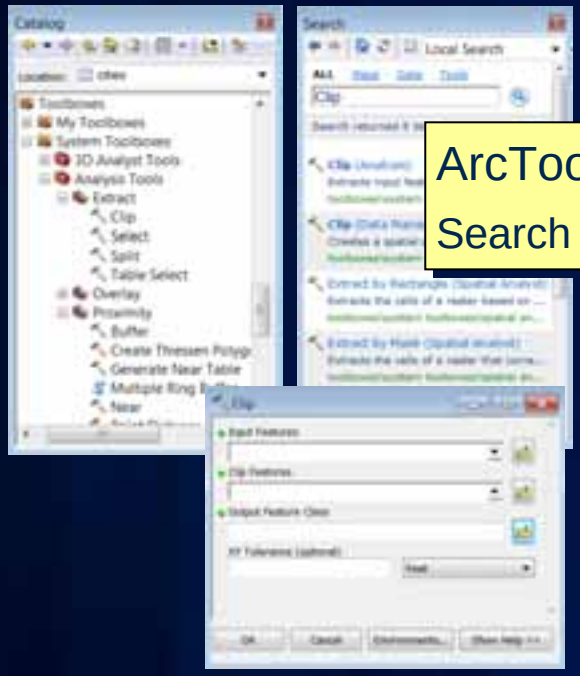
GIS Workflow:

Analysis

Geoprocessing

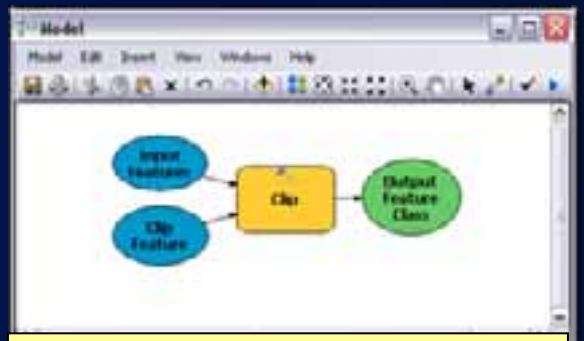
- Performing a task with geographic data
  - Simple or complex
- Examples:
  - Querying data
  - Performing analysis
  - Editing data
  - Converting data
  - Projecting data

Geoprocessing framework



ArcToolbox

Search for tools



ModelBuilder

Graphic documentation

Chain many tools together

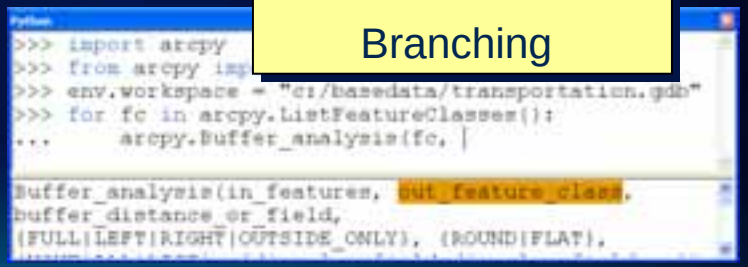
ArcObjects

Automate tools with code

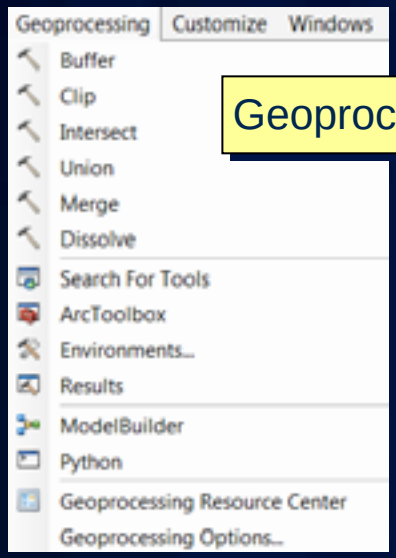
Python Scripts

Batch processing

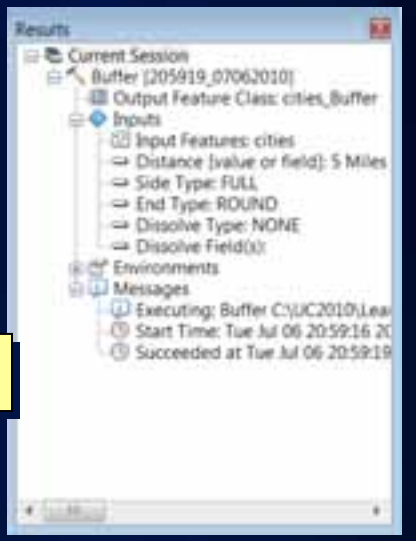
Branching



Easy access to geoprocessing options



Geoprocessing menu

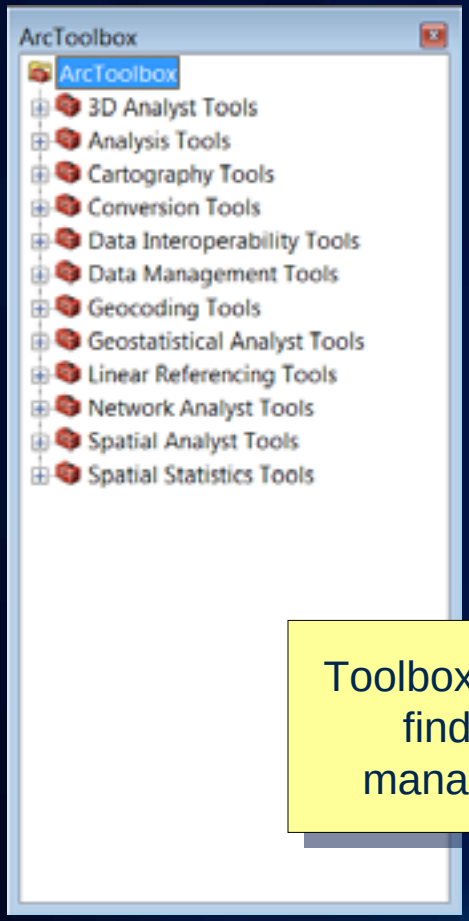


Geoprocessing results

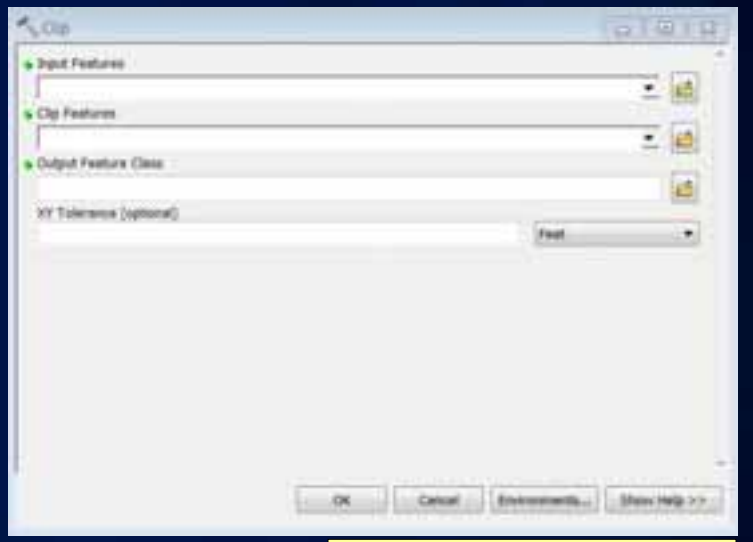
Geoprocessing options

Environment settings

Geoprocessing – ArcToolbox



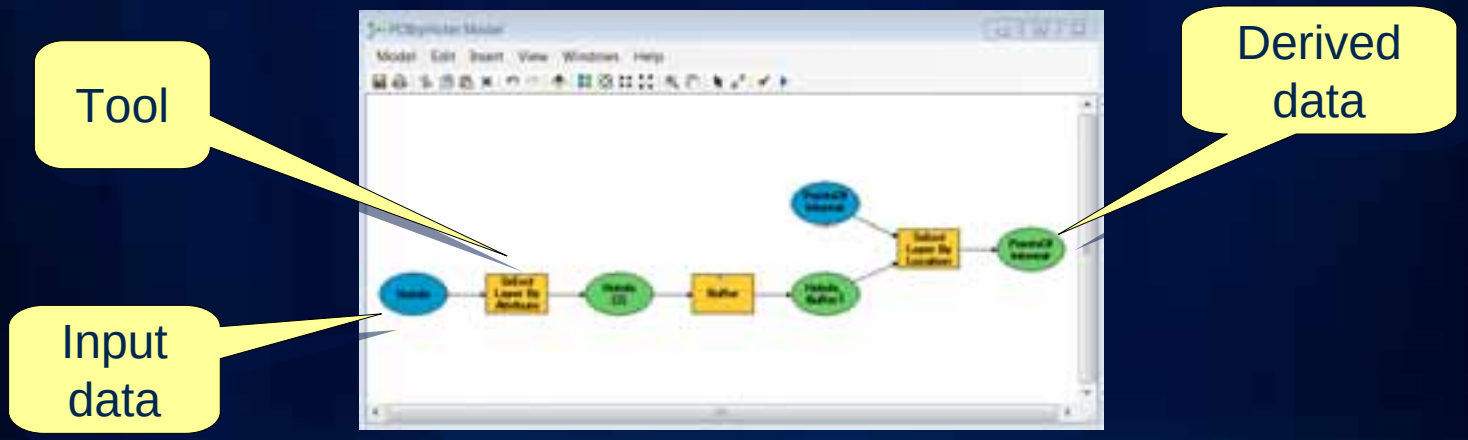
Toolbox window for finding and managing tools



Enter parameters

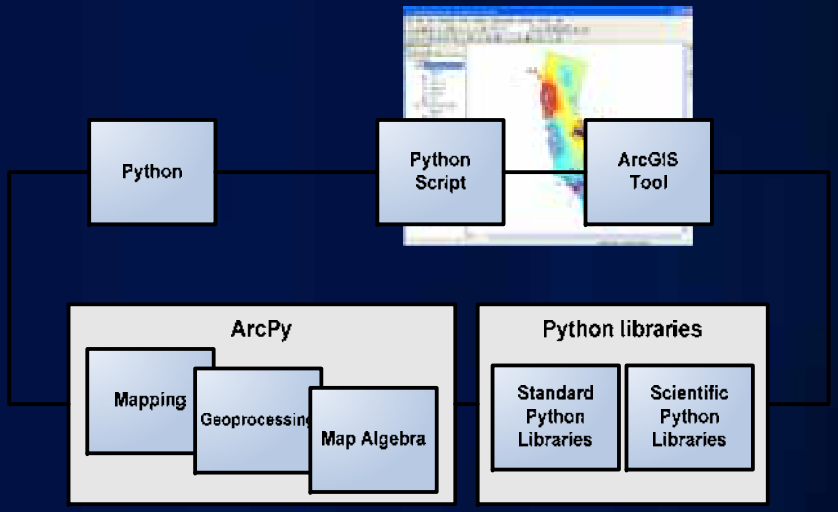
Geoprocessing – Models

- Requires a custom toolbox
- Design in ModelBuilder
  - add data, set parameters, chain processes together
- Change model parameters and re-execute



Geoprocessing – Scripts

- Python window
  - Included in ArcGIS
  - Intellisense
  - Can access tools, environments
- ArcPy is a native Python site-package




```
Python
>>> import arcpy
>>> from arcpy import env
>>> env.workspace = "c:/basedata/transportation.gdb"
>>> for fc in arcpy.ListFeatureClasses():
...     arcpy.Buffer_analysis(fc,

Buffer_analysis(in_features, out_feature_class,
buffer_distance_or_field,
{FULL|LEFT|RIGHT|OUTSIDE_ONLY}, {ROUND|FLAT},
```

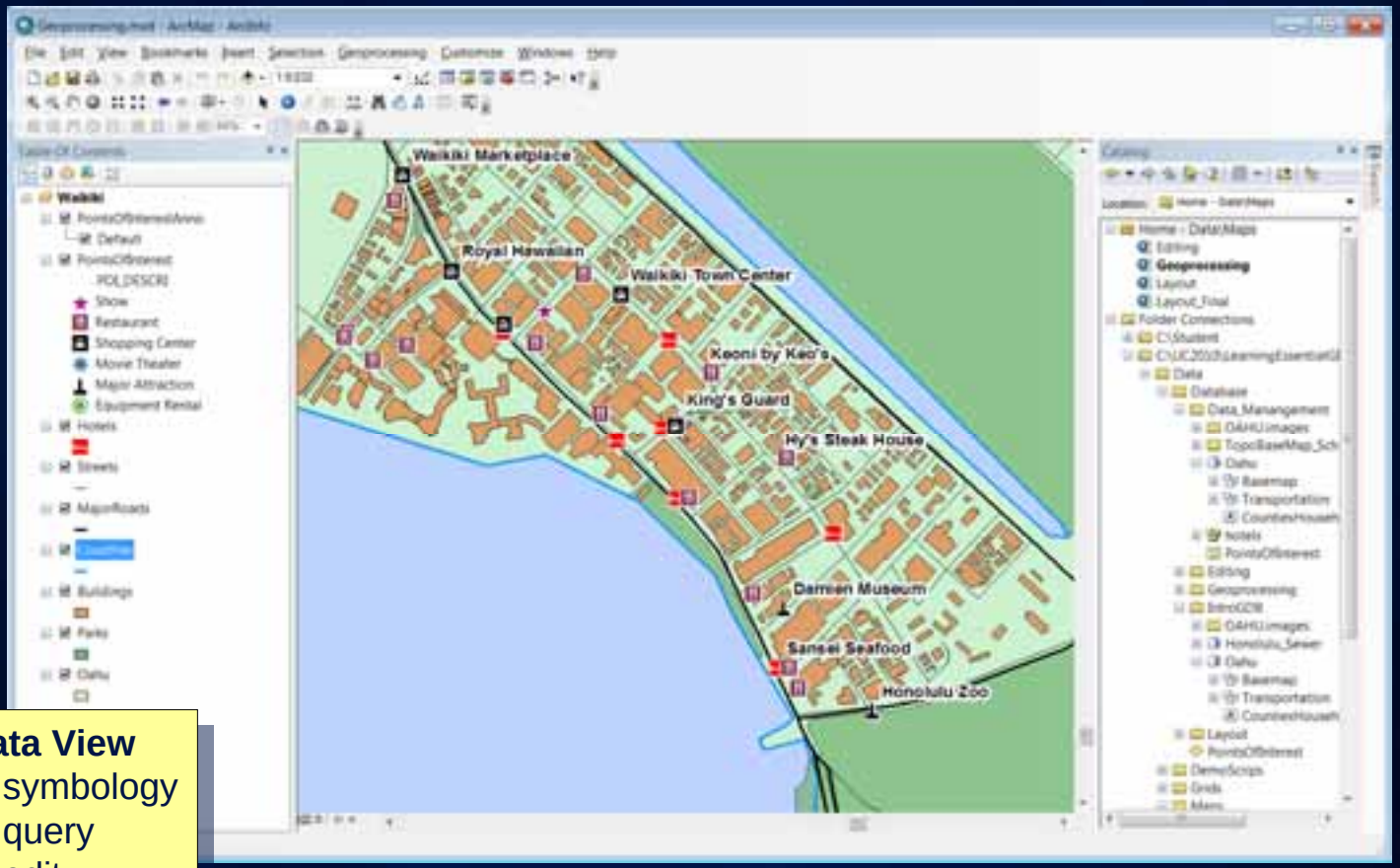
Demonstration

Analysis workflow

GIS Workflow:

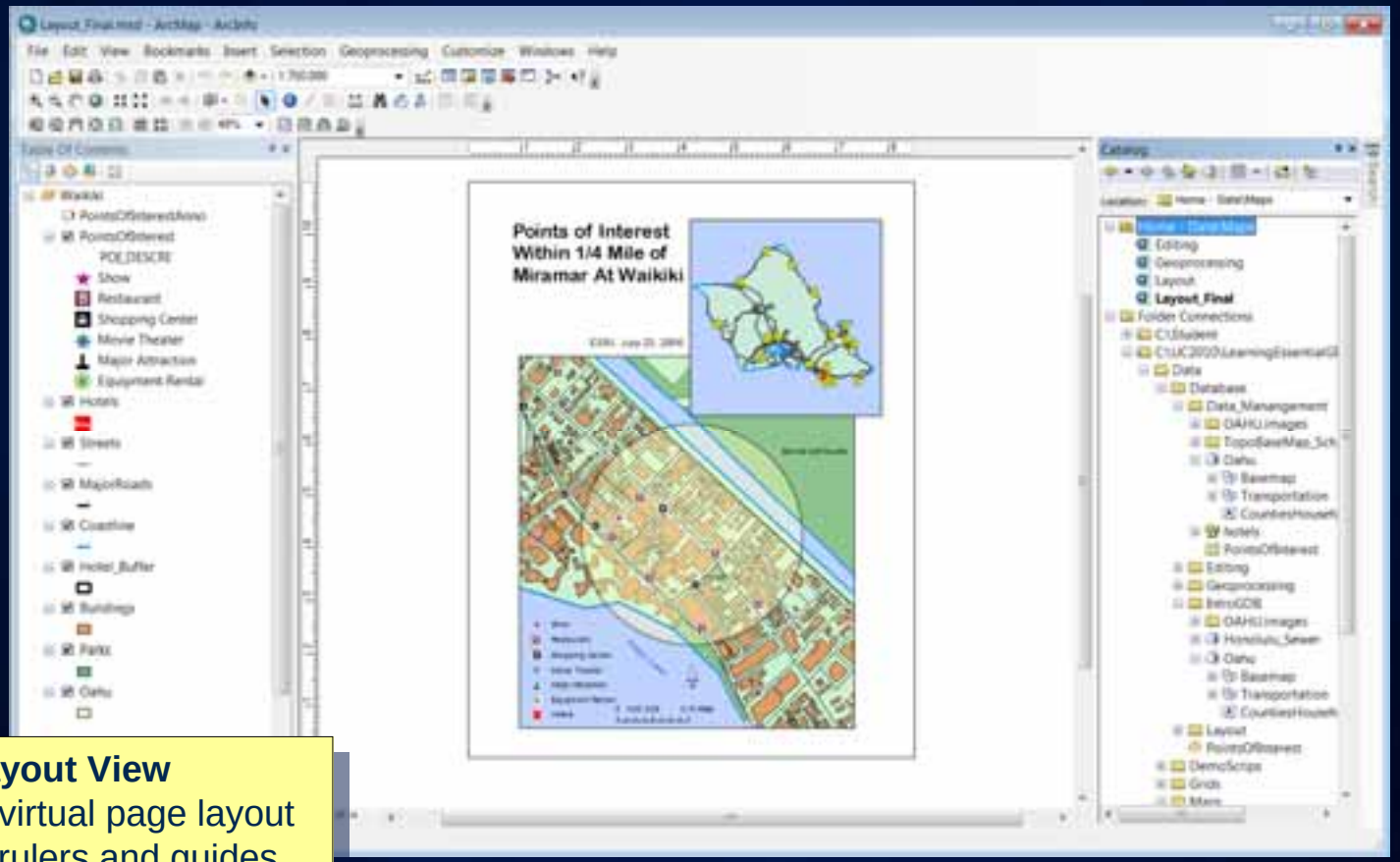
Creating maps

Data View



Data View
- symbology
- query
- edit
- analysis

Layout View

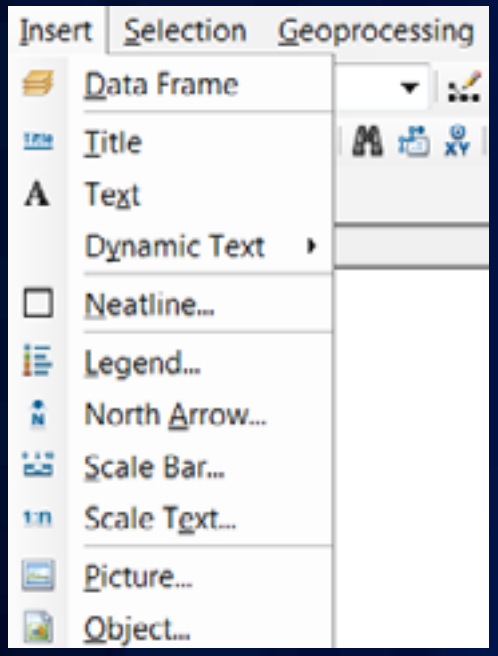


Layout View

- virtual page layout
- rulers and guides
- layout toolbar
- map elements

Map elements

Adding map elements



Insert Menu

* **Some map elements are dynamic**
- **Data Frame**
- **Legend**
- **North Arrow**
- **Scale Bar**
- **Scale Text**

Drawing Toolbar
- for text and graphics

Exporting maps

- Export to common formats – pdf, jpeg, tiff, bmp, etc.
- Add to other documents

Lake Victoria

Lake Victoria is 68,800 square kilometers (25,650 square miles). It is the largest lake in Africa and one of the largest in the world in surface area. It does have a season of deep vertical mixing, when the lake becomes isothermal. Sometimes referred to as Victoria Nyanza, it is the main reservoir of the Nile River. Though not so pastoral as when British explorer John Hanning Speke became the first European to explore its shores, it is now home to a comfortable lake resort with a friendly and relaxing environment where you can experience unique flora and fauna.

The recent history of Lake Victoria is one of dramatic change in limnological parameters and native fishery stocks. Two hydroelectricity dams appear to be threatening the health of Lake Victoria, but social organization around the lake places an emphasis on environmental protection.

The Lake Victoria Fisheries Organization was formed through a convention signed in 1994 by Kenya, Tanzania and Uganda. The main road access to Lake Victoria is via Kisumu, directly from Nairobi by bus or private transport. Lake Victoria perch was formerly called the Nile perch. However, it is not a true perch, nor did it ever live in the Nile.

Map exported as TIFF file and added to word processing document

Demonstration

Creating maps workflow

GIS Workflow:

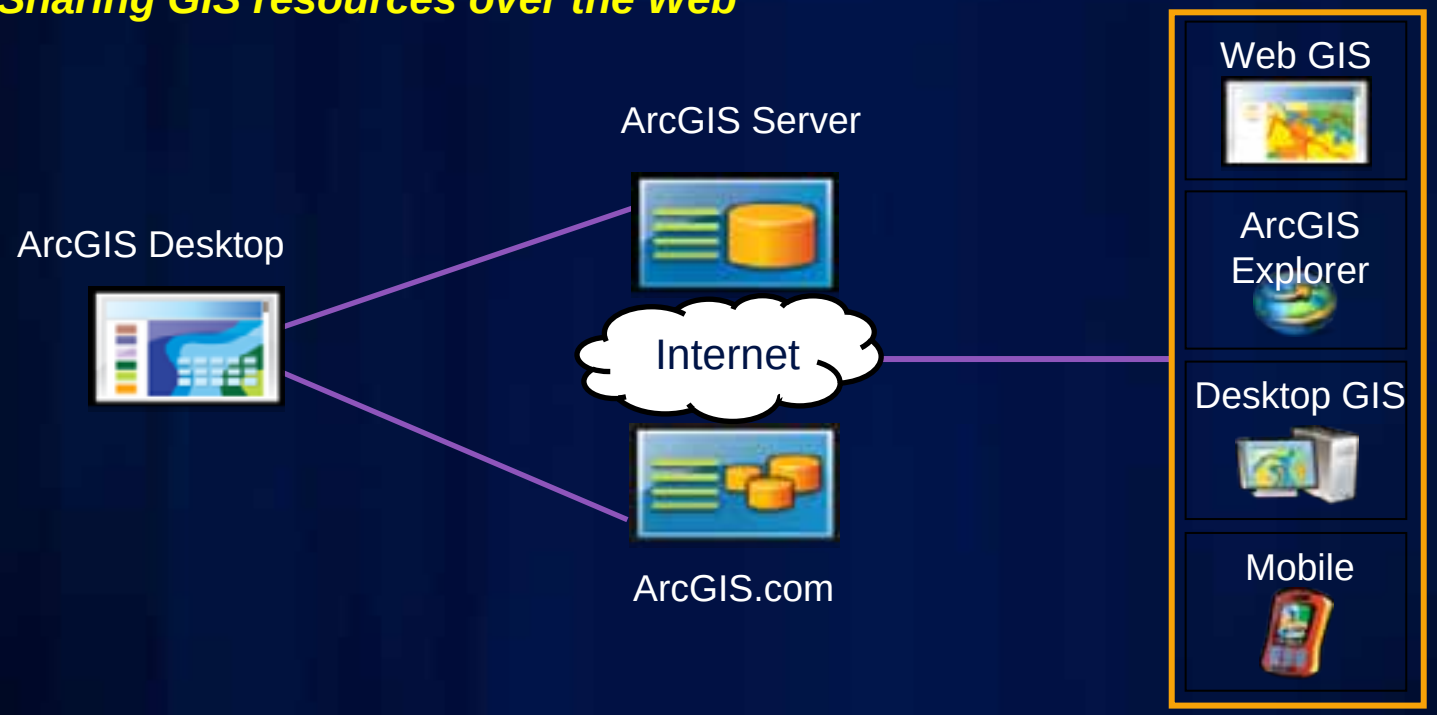
Sharing

Sharing options

- Local network (shared directory)
- Intranet
- Internet

ArcGIS Server and the Web

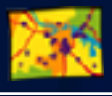
Sharing GIS resources over the Web



Author → Publish → Use

The Web as a GIS platform

ArcGIS Server – sharing GIS resources

GIS resource		GIS service
	Map document *or* Map service definition	Map service
	Address locator	Geocode service
	File geodatabase *or* Personal geodatabase *or* Database connection file	Geodata service
	Toolbox *or* Map document with a tool layer	Geoprocessing service
	Does not require a GIS resource	Geometry service
	Globe document	Globe service
	Raster dataset *or* Mosaic dataset	Image service
	Folders & geodatabases of GIS content that you want to search	Search service

ArcGIS Online

Maps

- Basemaps, maps, and layers
- Map templates

Apps

- Ready-to-use browser and mobile applications
- Configurable app templates (Flex, Silverlight)
- Developer APIs
    - JavaScript, Flex, Silverlight, iOS, WP7, Android
- Code and samples

Tools

- Geocoding, gazetteer, and geoprocessing services
- Add-ins

Additional hosted and on-premise capabilities coming soon....

ArcGIS.com

A new website, and a new component of the ArcGIS System

Like other components of the ArcGIS System, ArcGIS Online is built-in

When you visit ArcGIS.com you can

- Explore a gallery of featured maps and apps
- Use maps, and make your own
- Search for shared items and groups
- Login to ArcGIS Online to
  - Save and share maps you make
  - Join and create groups

What Can You Share Online?

- Layers
  - Layer packages (.lpk)
  - Layer files (.lyr)
  - Map and globe services
- Maps
  - Map packages (.mpk)
  - Desktop maps (.mxd, .3dd, .sxd)
- Tools
  - Services (geocoding, network analysis
- Web Maps
  - Mashup Your Own Data with Online Data and Services
  - Share Your Custom Web Map

Demonstration

Sharing workflow

Summary

- Building Geodatabase
  - Feature dataset, feature class, annotation, raster data
- Editing in ArcGIS
  - Editing environment and tools
- Geoprocessing
  - Automate tasks and analysis
- Creating and Using a map in ArcMap
  - Design map layout and add map elements
- Sharing
  - Intranet and internet

Training resources

http://www.esri.com/training

- **Instructor-Led or Online Courses**
  - **ArcGIS Desktop I: Getting Started with GIS**
  - **ArcGIS Desktop II: Tools and Functionality**
  - **ArcGIS Desktop III: GIS Workflows and Analysis**
  - **Building Geodatabases**
  - **Performing Advanced Analysis with ArcGIS**

Questions