Streamlining Geoprocessing with ModelBuilder

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Topics

- Geoprocessing
- Navigating ArcToolbox
- Using ModelBuilder
- Learning More
Geoprocessing
Geoprocessing

Data + Function = Data

An Operation Used to Manipulate GIS Data

<table>
<thead>
<tr>
<th>Well type</th>
<th>Drilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building owner</td>
<td>Smith</td>
</tr>
<tr>
<td>Soil type</td>
<td>Sandy</td>
</tr>
</tbody>
</table>
Analysis capabilities in ArcGIS Desktop

Point pattern analysis

Single-layer operations

Multiple-layer operations

Core Functionality

Extensions

Raster analysis

Surface analysis

Temporal analysis

Geostatistical analysis

Business analysis

Spatial Analyst

3D Analyst

Tracking Analyst

Geostatistical Analyst

Business Analyst
Dissolving Features

• Simplify data based on common attribute values

Input features with attribute values

Fewer output features with attribute values
Clipping Features

- Use one feature class to define the boundary of another
Scalable Geoprocessing Functions

ArcInfo 269 Tools at 9.2
Plus more coverage tools

ArcEditor 208 Tools at 9.2
Can also write to all other GDB types

ArcView 183 Tools at 9.2
Write to file geodatabase, pGDB or .shp

Additional Extension Tools
3D Analyst Tools
Spatial Analyst Tools
Geostatistical Analyst Tools…
How Do I Know Which Tools Are Available to Me?

- ArcInfo licenses have access to all geoprocessing tools
- ArcView or ArcEditor users can choose to see only the tools available or to see “locked” tools
- ArcGIS Desktop Help
  - “Licensing for Geoprocessing Tools” topic
  - ArcGIS 9 Geoprocessing Commands Quick Reference Guide (.pdf)
Navigating ArcToolbox
ArcToolbox Window

- Available in ArcCatalog and ArcMap
- Geographic processing functions
  - Data management, analysis, and conversion
  - Your Custom Tools
Geoprocessing Interfaces

Dialogs

ModelBuilder

ArcObjects

ModelBuilder

ArcObjects

.NET, VB, Visual C++

Scripting

Python, JScript, VBScript

Commands

... Shared Tools, Scripts, and Models
Geoprocessing Tip:

Sometimes it is faster to use a tool than it is to do a task through the User Interface!

- **Examples**
  - Deleting Multiple Fields
  - Tagging Point Features with Attributes from a Polygon
Creating Models with Model Builder
What is ModelBuilder?

- Application for creating geoprocessing models
- Allows for creation of flowcharts you can process
- Streamlines and automates analysis workflows
- Models stored in custom toolboxes
Why use ModelBuilder for analysis?

- Automate and manage geoprocessing tasks
- Run complex succession of processes as one tool
- Plug in additional tools and parameters as needed
- Manage intermediate data
- See visual representation of analysis operations
Model Elements

- **Input Data**: data that exists before model is run
  - Blue Oval
- **Tool**: operation performed on input data
  - Yellow-orange Rectangle
- **Derived Data**: output data created by a function
  - Green Oval
- **Process**: Set of elements
  - Run one process at a time
  - or all at once
Constructing a Model

- Drag and drop tools from toolbox and data from ArcCatalog
- Connect the data to the tool
- Modify the settings of the tool
How to Execute Models

- Run from Model Builder
- Run a single process from Model Builder
- As a tool from toolbox
Geoprocessing Tip:

You can control whether ArcGIS Desktop allows overwriting of geoprocessing outputs.
(Tools > Options)
Demonstration: Building a Model – the Basics
Enhancing a Model
Model Parameters

- Allow for User Input
- Are Used when Running Model as Dialog
- Can Create a Data Independent Tool
Variables in Models

• Can be Parameters or Environment Settings
• Share Value between Processes
• Allow for User Input
Intermediate Data

- Outputs are set to Intermediate by Default
- Use context menu to change setting
- Intermediate data **is not** deleted when models are run from ModelBuilder window
- Intermediate data **is** deleted when models are run from a dialog box or the command line
Edit Text on Model Elements to Control Text on Dialog
This tool can be used to tag input data with attributes from a polygon feature class.
Sharing a Model

- Toolboxes are stored in .tbx files
  
  C:\Documents and Settings\<User_Name>\Application Data
  \ESRI\ArcToolbox\My Toolboxes

- List appears in ArcCatalog

- Be sure recipients have access to all data

- Can set data paths as relative to toolbox (Model Properties)
Demonstration: Enhancing a Model
Learning More
Geoprocessing Using ModelBuilder

60 minutes  TS  OH

Viewing Requirements

Overview

Geoprocessing is an essential aspect of GIS that provides the ability to analyze and process geographic data. Geoprocessing tools can be accessed in ArcGIS via dialog boxes, the command line, multipart scripts, or visual workflow models. ModelBuilder provides a graphical modeling framework for designing and implementing geoprocessing models that can include system tools, scripts, models, and data. This seminar discusses how ModelBuilder can be used to create advanced procedures and workflows.

The presenter will discuss:

- Creating, editing, and running models
- How to make models more dynamic by exposing model parameters and working with environment settings and variables
- Validating, repairing, and documenting models to share with others

Author: ESRI

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Not only did I learn how to use ModelBuilder, but I also picked up a few tricks for using ArcToolbox.

Ryan Brawe, Kentucky
Getting Started with Scripting in ArcGIS 9

Many GIS users are familiar with scripts and the benefits they provide, including being able to automate everyday tasks. Each generation of ESRI software provides a scripting environment: ArcInfo Workstation offers AML; ArcView 3.x offers Avenue; and ArcGIS 9 now offers a scripting environment that can use a variety of scripting languages like VBScript, Python, JScript, and Perl. In this training seminar, participants learn exactly what can be accomplished within the ArcGIS 9 scripting environment. All examples and demonstrations will use Python.
Instructor-Led Training
Questions?