

Custom GIS Tools: How & Why

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2015 Ohio GIS Conference

September 22, 2015



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Introduction

Benefits of custom tools

Identifying when a custom tool is useful

Basic types of GIS tools

Getting started with custom tools

Examples

Questions

When is a Tool Useful

Frequent tasks

Infrequent tasks

Preparing tasks for other staff

Automating background tasks

Types of GIS Tools

Model Builder

Python

.NET

Model Builder

Combines existing geoprocessing tools

Can incorporate scripts and nested models

Ideal for routine task automation

Getting Starting with Model Builder

ArcCatalog is all you need!

Automate one of your routine tasks

Export as a Python script and schedule



Getting Starting with Model Builder

ArcCatalog is all you need!

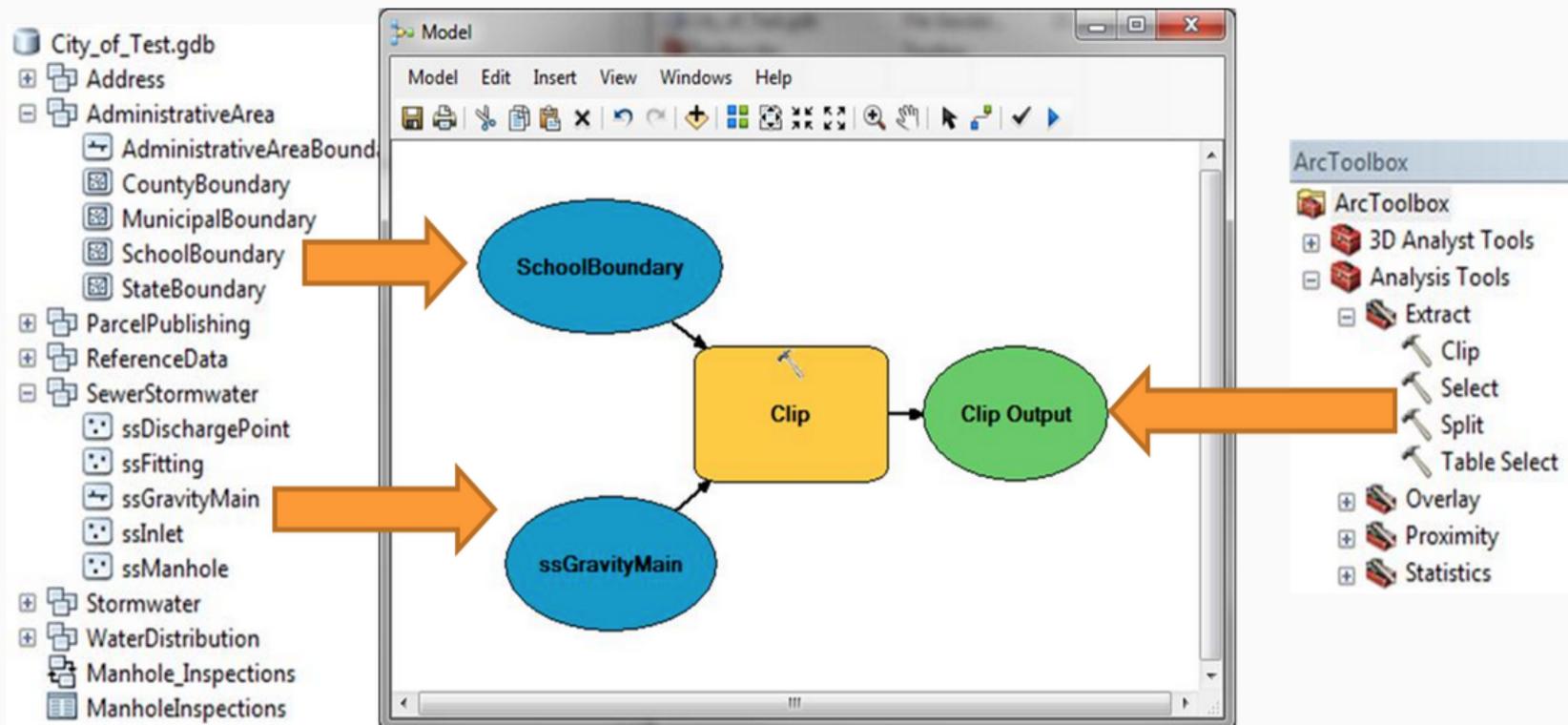
Automate one of your routine tasks

Export as a Python script and schedule



Model Builder Example

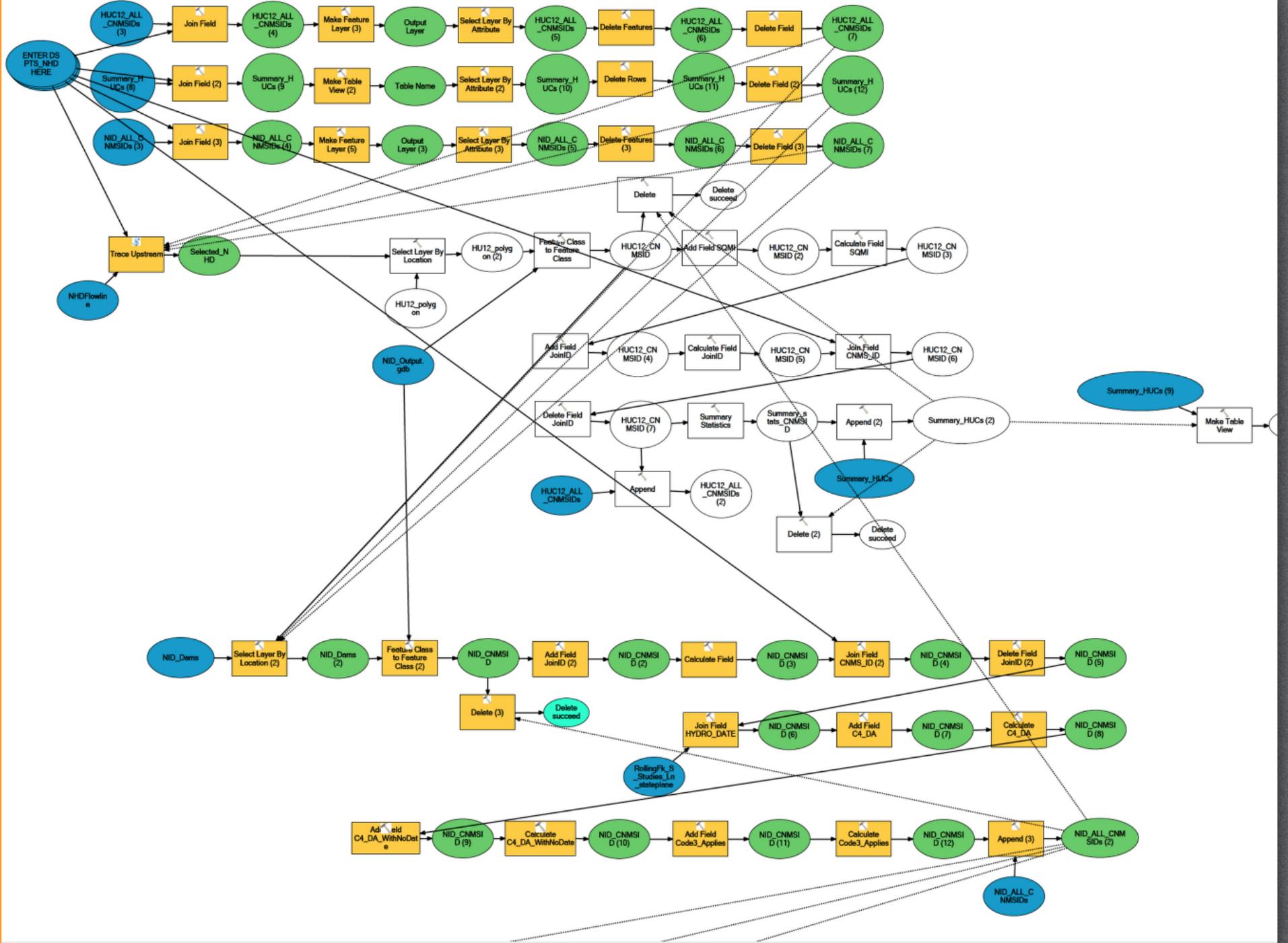
A Good One



Model Builder Example

A Bad One







WARNING

**TECHNICAL
CONTENT
AHEAD**

Getting Started with Python

Download an example

Examine and adjust an existing Model Builder export

Online resources

Python Example

Monitor Instrumentation

View real time subsurface profiles

Python Example

Monitor Instrumentation

View real time subsurface profiles



Python Example

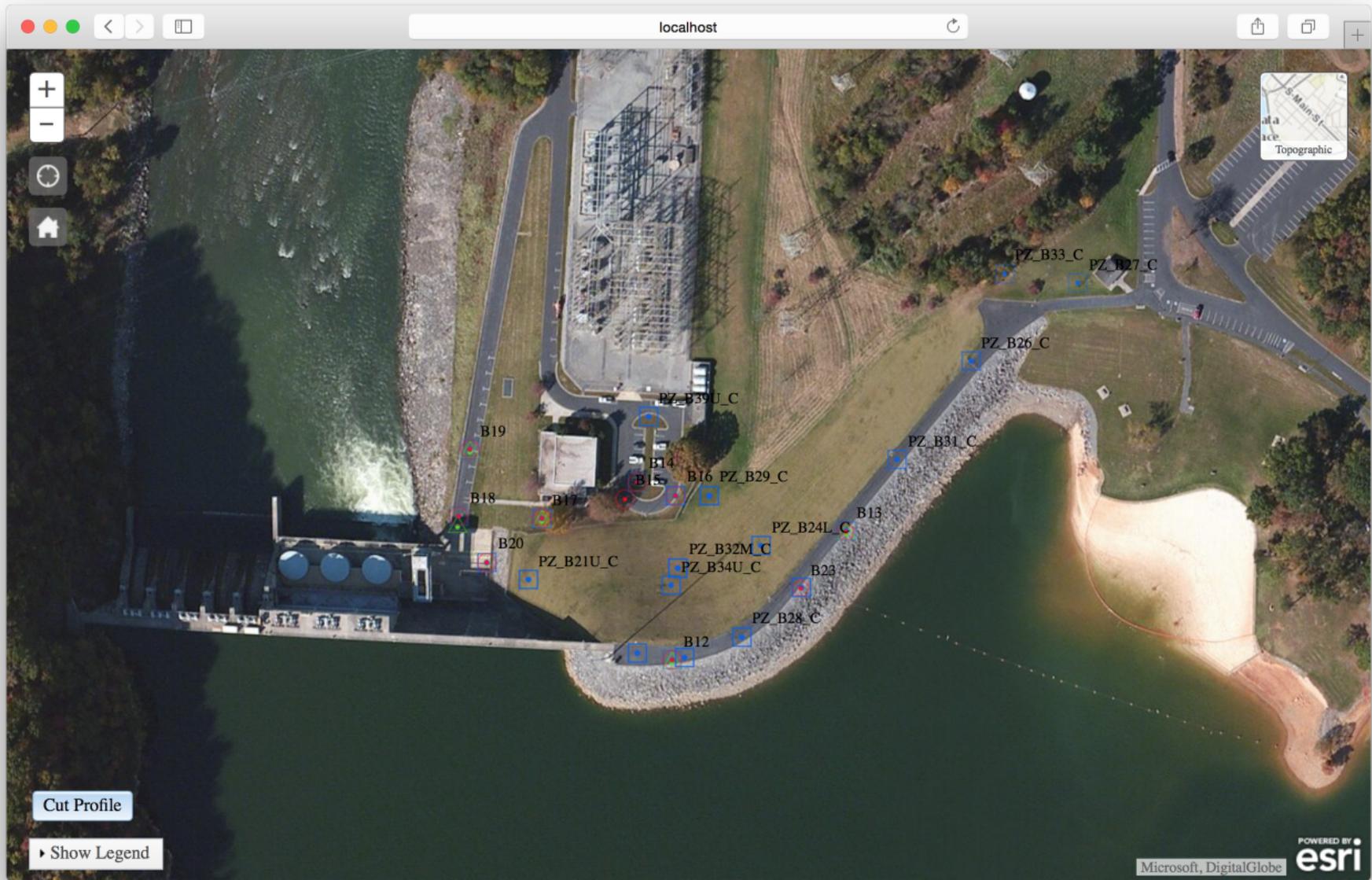
Monitor Instrumentation

View real time subsurface profiles

Python Example

Monitor Instrumentation

View real time subsurface profiles



Show me the Code!

Mixture of Python and Psuedo-code

Tryin' to keep it simple

Website sends the line verticies to the server as 2-d array

```
in_src = '[  
    [822.7,311.5],[772.5,142.5],...  
    ]'
```

Create the Profile

```
profile_dbf = os.path.join(WORKSPACE, "profile.dbf")
arcpy.CheckOutExtension('3D')
arcpy.StackProfile_3d(PROFILE, SURFACE, profile_dbf)
arcpy.CheckInExtension('3D')
```

Create the Profile Points

Another 2-d Array

```
with DBF(profile_dbf) as table:  
    for row in table:  
        data_pt = [row['X'], row['Y1'], row['Y2']]  
        profile_data.append(data_pt)  
json.dumps(profile_data)
```

Create the Profile Points

Another 2-d Array

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with DBF(profile_dbf) as table:  
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ArcObjects/Runtime SDK

More focused on stand alone applications.
Python can handle most ArcMap AddIns now.

ArcObjects **Old and Broke**

- Older .NET/Java/C++
- Convoluted API
- More difficult debugging, logging, & error handling
- Easy to upgrade from VBA

Runtime SDK **New Hotness**

- Java/WPF (And More)
- Sleeker and Purpose Built
- The Future

Getting Started with .NET

With Great Power Comes Great Responsibility

ArcObjects

- Visual Studio 2010 (Old, Old, Old)
- No Supported Free Version
- Very Developer-Centric Documentation

Runtime SDK

- VS 2012/2013 (Probably 2015)
- VS Community Edition is Free (and feature packed)
- Lots of Tutorials
<http://developers.arcgis.com>

So Where Do I Start?

Not as straight-forward

Download VS 2013 - visualstudio.com

Try a tutorial - developers.arcgis.com

.NET Examples

MapBooks (Data Driven Pages)

Sign Inventory Tool



Sign inventory form

Attributes

Sign ID: 0.9.01

Road: Pleasant Grove Rd

Status: Active

Installation Date: Thursday, October 20, 2011

Replacement Date: 10/20/2011

MUTCD

Type: School Bus Stop Ahead

Category: Warning

Code: S3-1

Comments:

Change Record Restore

Sign Text: School Bus Stop Ahead

Sign Size: 30x30

Facing Direction: South

Location: Right

Post Material: Wood

Condition Rating: 4

Sign Reflectivity: 0

Letter Reflectivity:

Sheeting Type: unknown

Warranty: 0

Photo: 

Sign Query

Type: All

Category: All

Status: All

Road Name:

Replacement Date Range

From: Thursday, June 07, 2011

To: Thursday, June 07, 2011

Select All Run Query

Records 6797 total record(s)

Go to 21 of 6797 Zoom To

Clear Query

-30282968.405 12792645.127 Feet