

# Best Practices for Geoprocessing Services

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# Overview

- **What is a Geoprocessing Service**
- **Input**
- **Process**
- **Demo: Common Geoprocessing Troubleshooting**
- **Output**
- **Question Time**

# Geoprocessing Service

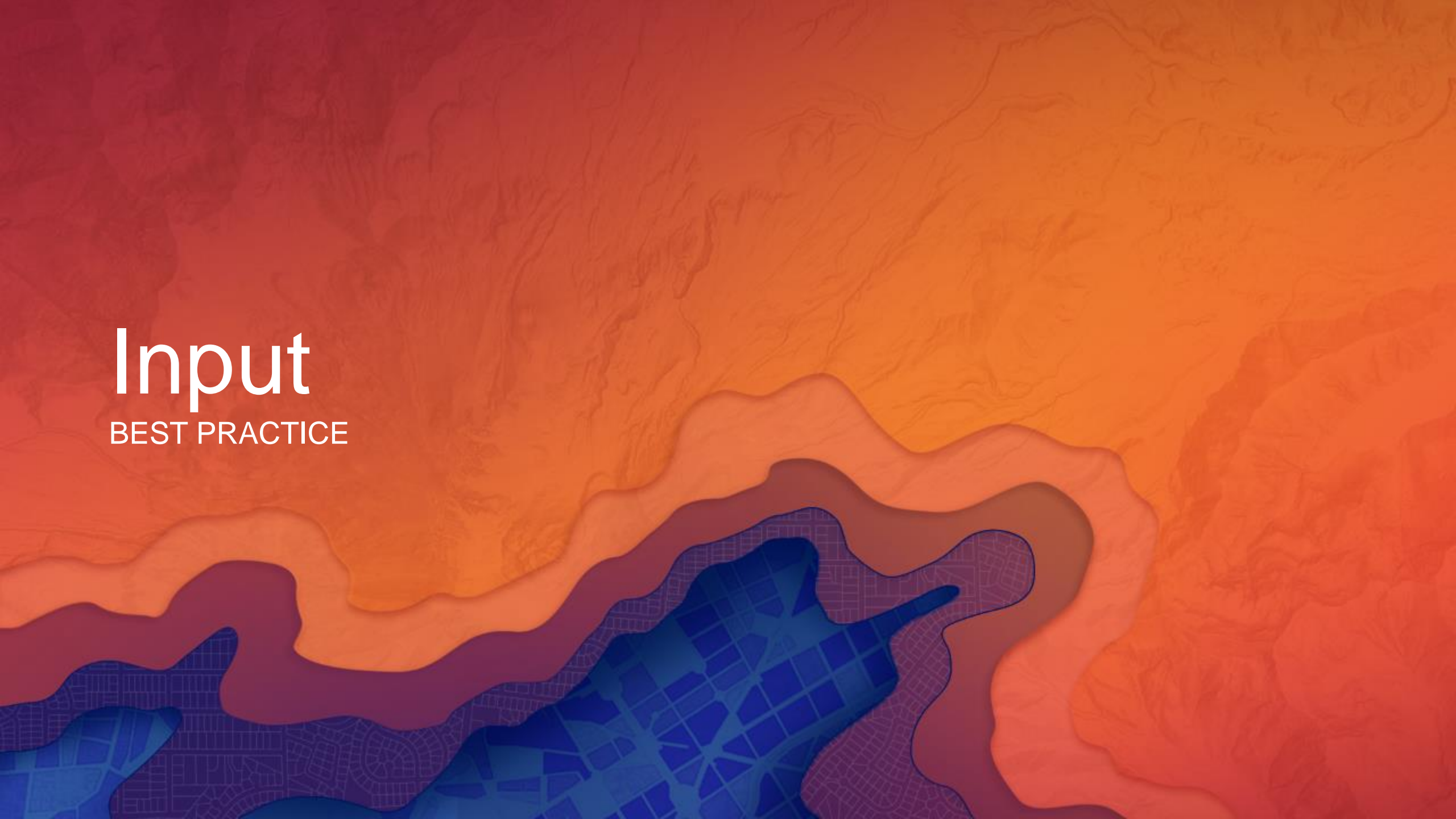
- What is a Geoprocessing Service?





# Input

BEST PRACTICE



# Input

- Input data type

## Data types for geoprocessing tool parameters

ArcMap 10.4 | [Other versions](#) ▾

- Where data types are needed
- Determining a parameter's data type
- String syntax
- Data types and scripting objects

Geoprocessing is built around the concept of data types. Every tool parameter has an associated data type that defines the contents of the variable. Some simple data types are string (any set of alphanumeric characters), Boolean (a true/false value), and long (an integer value between -2,147,483,648 and 2,147,483,647). In addition to these simple data types, there are dozens of other data types built specifically for data found in ArcGIS, such as field, coordinate system, and extent.

Documentation for each data type is found in [Geoprocessing\\_data\\_types.pdf](#). If this link doesn't work, you can open the document (`Geoprocessing_data_types.pdf`) from the `\arcgis\Documentation` folder in your ArcGIS for Desktop installation location.

To view this document, you need a copy of Adobe Reader, which you can download free from <http://www.adobe.com/products/acrobat/readstep.html>.

# Input

- Input mode
- User defined value
- Choice list
- Constant value

Service Editor

Connection: zonazoo.esri Service Name: deleteme

Import Add Result Preview Analyze Publish

General

Capabilities

Geoprocessing

Parameters

Pooling

Processes

Buffer

**Input Features**

Output Feature Class

Distance [value or field]

Side Type

End Type

Dissolve Type

Dissolve Field(s)

Method

Item Description

**Input Features**

Name: (required) Input Features

Description: (required) The input point, line, or polygon features to be buffered.

Type: ☒ Required ☐ Optional

**Input mode:** Choice list

User defined value

Choice list

Constant value

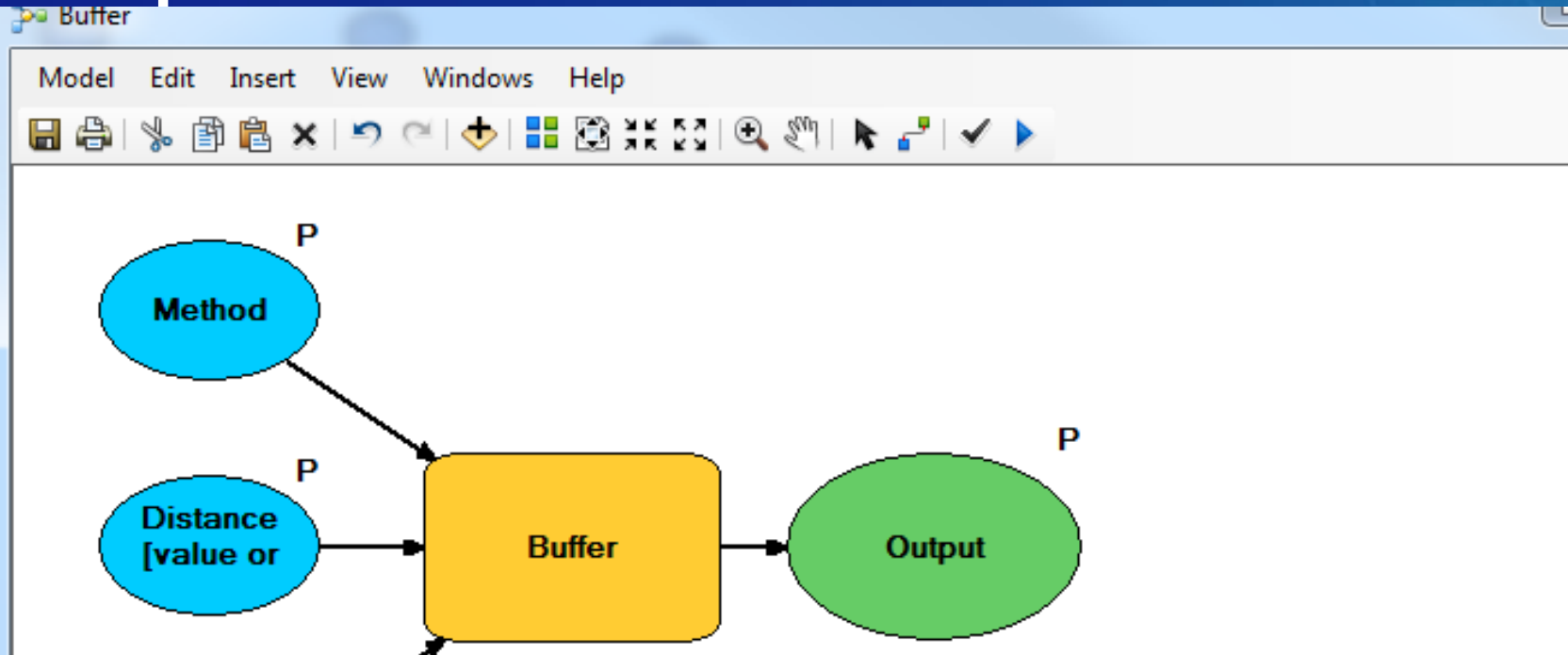
Default value:

Layers

<input checked="" type="checkbox"/>	Atlanta_Results
<input checked="" type="checkbox"/>	Atlanta_Results_Buffer1
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	

[About task parameter settings](#)

# Input mode



The screenshot shows the 'Buffer' tool's parameter dialog box. It has a title bar 'Buffer' and a yellow status bar at the top that says 'Click error and warning icons for more information'. The dialog is organized into sections: 'Input' with a dropdown menu showing 'C:\Users\xueh7833\Documents\ArcGIS\California.gdb\Cities'; 'Output' with a dropdown menu showing 'C:\Users\xueh7833\Documents\ArcGIS\2016\Presentation\FileGDB.gdb\Output'; 'Distance [value or field]' with radio buttons for 'Linear unit' (selected) and 'Field', a text box with '10', and a dropdown menu with 'Miles'; and 'Method (optional)' with a dropdown menu showing 'PLANAR'.

# Input mode

Constant value

Service Editor

Connection: arcgis on jing7.esri.com\_6080 (admin) Service Name...

Import Add Result Preview Analyze Publish

- General
- Capabilities
- Geoprocessing
- Parameters
- Pooling
- Processes
- Buffer
- Input**
- Output
- Distance [value or field]
- Method
- Item Description
- Sharing

### Input

Name: (required)

Description: (required)

Type: ☒ Required ☐ Optional

Input mode:

Constant value:

[About task parameter settings](#)



# Input mode

Choice list

Service Editor

Connection: arcgis on jing7.esri.com\_6080 (admin) Service Name...

Import Add Result Preview Analyze Publish

- General
- Capabilities
- Geoprocessing
- Parameters
- Pooling
- Processes
- Buffer
  - Input
  - Output
  - Distance [value or field]
  - Method**
- Item Description
- Sharing

### Method

Name: (required)

Description: (required)

Type: ☐ Required ☒ Optional

Input mode:

Default value:

	Value
<input checked="" type="checkbox"/>	GEODESIC
<input checked="" type="checkbox"/>	PLANAR
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	

[About task parameter settings](#)

# Input mode

User defined value

Service Editor

Connection: arcgis on jing7.esri.com\_6080 (admin) Service Name...

Import Add Result Preview Analyze Publish

- General
- Capabilities
- Geoprocessing
- Parameters
- Pooling
- Processes
- Buffer
  - Input
  - Output
  - Distance [value or field]**
  - Method
- Item Description
- Sharing

### Distance [value or field]

Name: (required) Distance [value or field]

Description: (required)

Type: ☒ Required ☐ Optional

Input mode: User defined value

Default value: 10 Miles

[About task parameter settings](#)

# Share Web Tool from ArcGIS Pro

- Web tools allow you to share your analysis with others in your organization's portal. Data is stored and processing occurs on a server that is federated with your portal, which makes it possible for a number of client apps in the ArcGIS platform to run the analysis, even at the same time.

# Input mode

REST

## Submit Job (Buffer)

Distance [value or field]:  
(*GPLinearUnit*)

```
{  
  "distance": 10,  
  "units": "esriMiles"  
}
```

Method:  
(*GPString*)

PLANAR

### Options:

Output Spatial Reference:

Process Spatial Reference:

ReturnZ:

☐ True ☒ False

ReturnM:

☐ True ☒ False

Format:

HTML ▼

Submit Job (GET)

Submit Job (POST)



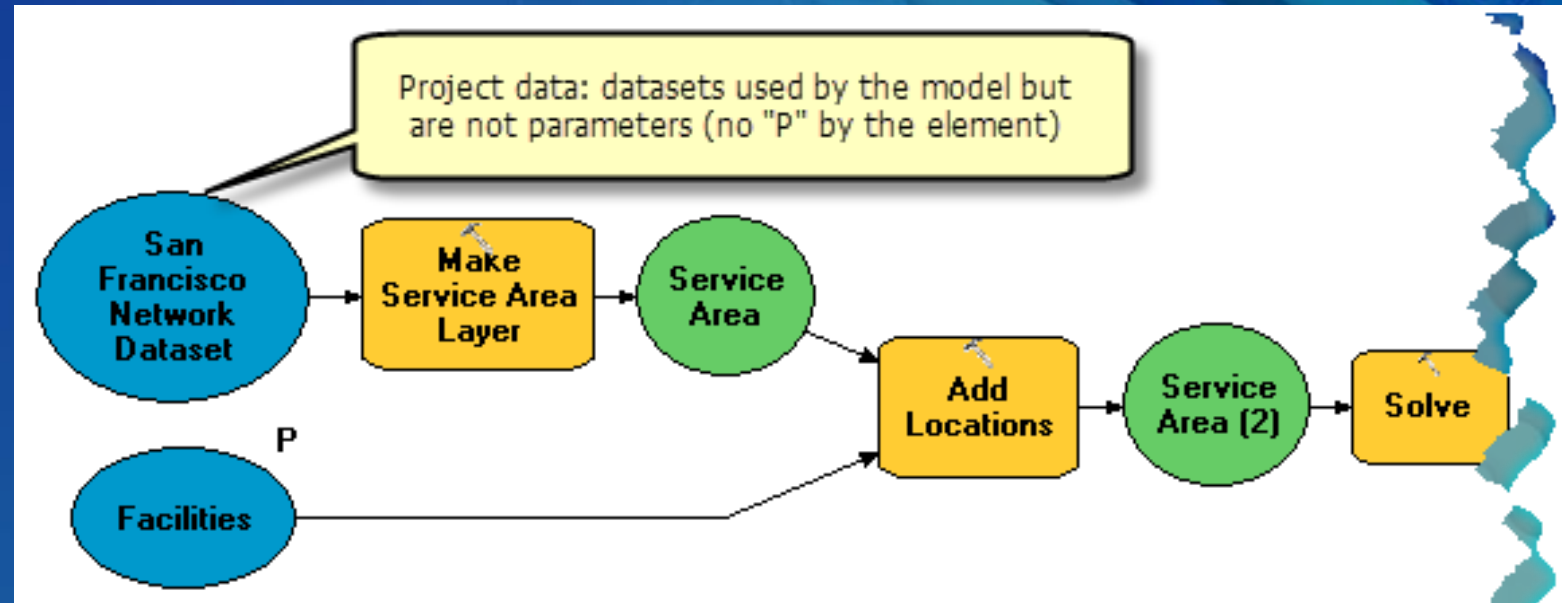
# Process

BEST PRACTICES

# Process

Publishing – Essential Vocabulary

- **Project data** - Term used by geoprocessing to describe input data that is not a parameter



```
import arcpy

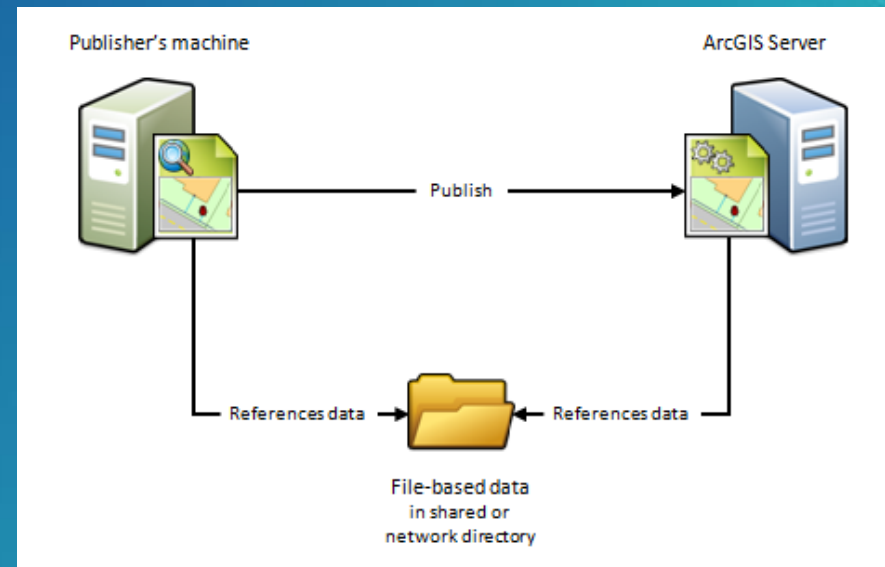
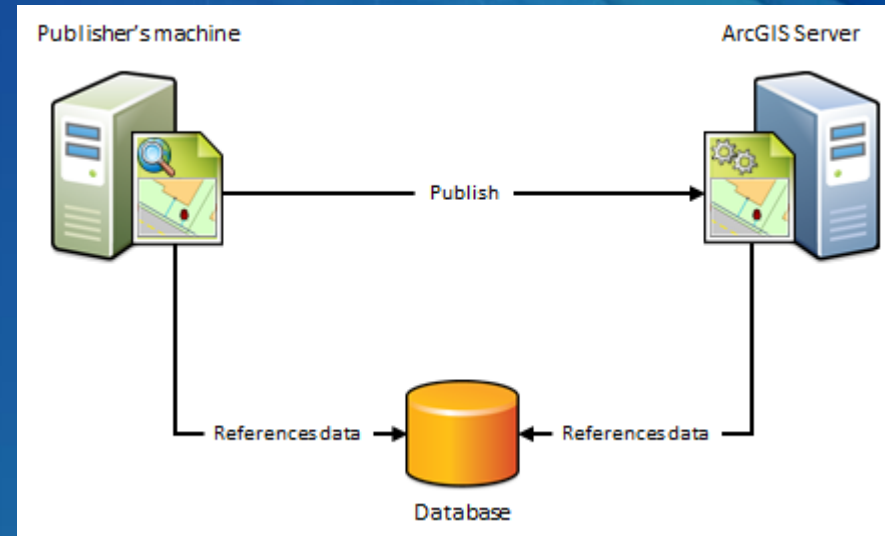
# The inputPoints variable is considered to be project data
# since it is not an input parameter.
#
inputPoints = r"c:\data\Toronto\residential.gdb\shelters"

arcpy.Buffer_analysis(inputPoints, 'shelterBuffers', '1500 Meters')
```

# Process

## Publishing – Essential Vocabulary

- **data store** – A catalog of data that can be found & accessed by ArcGIS Server. (Not to be confused with ArcGIS Data Store)



# Process

## The Publishing Process

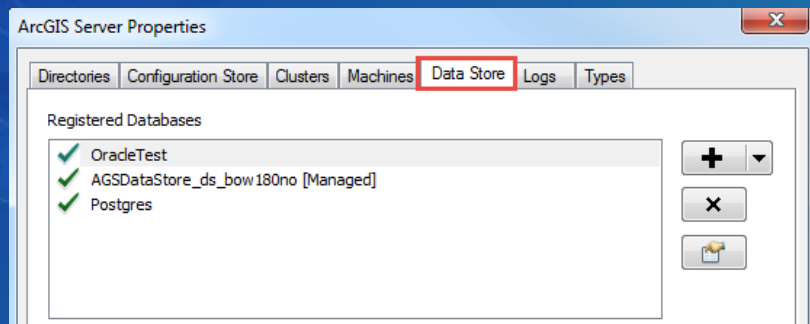
- Script or model is scanned
- Project data identified



- If in the datastore,
- data store will be used



- If NOT in the datastore
- Package Workspace is created (data is copied to this location)



/home/arcgis1031/arcgis/server/usr/directories/arcgissystem/arcgisinput/DataCopiedToServer.GPServer/extracted/v101					
Name	Ext	Size	Changed	Rights	Owner
..			6/17/2016 9:02:59 AM	rw-x-----	arcgis1031
default.gdb			6/17/2016 9:02:57 AM	rw-x-----	arcgis1031
manhattanks.gdb			6/17/2016 9:02:57 AM	rw-x-----	arcgis1031
DataCopiedToServer.rlt		23,040 B	6/17/2016 9:02:39 AM	rw-----	arcgis1031
DataCopiedToServer.tbx		96,768 B	6/17/2016 9:02:39 AM	rw-----	arcgis1031



# Process

- ArcMap and ArcGIS Server have to be the same version.

## ArcGIS REST Services Directory

[Home](#) > [services](#) > [deleteme \(GPServer\)](#)

[JSON](#) | [SOAP](#)

### deleteme (GPServer)

**Service Description:** Creates buffer polygons around input features to a specified distance.

**Tasks:**

*None*

**Execution Type:** esriExecutionTypeAsynchronous

**Result Map Server Name:**

**MaximumRecords:** 1000

**Child Resources:** [Info](#)

# Process

- Message Level of GP service
- None
- Error
- Warning
- Info

The screenshot shows the 'Service Editor' window for a service named 'Buffer'. The left sidebar contains a list of tabs: General, Capabilities, Geoprocessing, Parameters (selected), Pooling, Processes, and Item Description. The main area is titled 'Parameters' and contains the following settings:

- Cluster:** Choose the Cluster hosting the service (dropdown menu set to 'default').
- Execution Mode:** Radio buttons for Synchronous and Asynchronous (Recommended for long-running services). The Asynchronous option is selected. There is also a checkbox for 'View results with a map service' which is unchecked.
- Properties:** A dropdown menu for 'Message Level' is set to 'None'. A text box for 'Maximum number of records returned by the server' is set to '1000'.
- Directories:** Four fields are shown: 'Jobs Directory' (C:\arcgisserver\directories\arcgisjobs), 'Virtual Jobs Directory' (/rest/directories/arcgisjobs), 'Output Directory' (C:\arcgisserver\directories\arcgisoutput), and 'Virtual Output Directory' (/rest/directories/arcgisoutput).

At the bottom of the main area is a link: [About geoprocessing service settings](#). The bottom of the window has 'OK' and 'Cancel' buttons.

# Process

- Message Level
- None

## ArcGIS REST Services Directory

[Home](#) > [services](#) > [Buffer \(GPService\)](#) > [Buffer](#) > [j1f7d7240077243d7b4f1ac0d9c14ab19](#)

[JSON](#)

### Job Details: **j1f7d7240077243d7b4f1ac0d9c14ab19 (Buffer)**

**Job ID:** j1f7d7240077243d7b4f1ac0d9c14ab19

**Job Status:** esriJobSucceeded

#### Results:

- [Output](#)

#### Inputs:

- [Distance value or field](#)
- [Method](#)

# Process

- Message Level
- Info

ArcGIS REST Services Directory

[Home](#) > [services](#) > [Buffer \(GPService\)](#) > [Buffer](#) > [je96abf871ab64946b9e098e0f6917e65](#)

[Login](#) | [Get Token](#)

[Help](#) | [API Reference](#)

[JSON](#)

**Job Details: je96abf871ab64946b9e098e0f6917e65 (Buffer)**

**Job ID:** je96abf871ab64946b9e098e0f6917e65

**Job Status:** esriJobSucceeded

**Results:**

- [Output](#)

**Inputs:**

- [Distance\\_value\\_or\\_field](#)
- [Method](#)

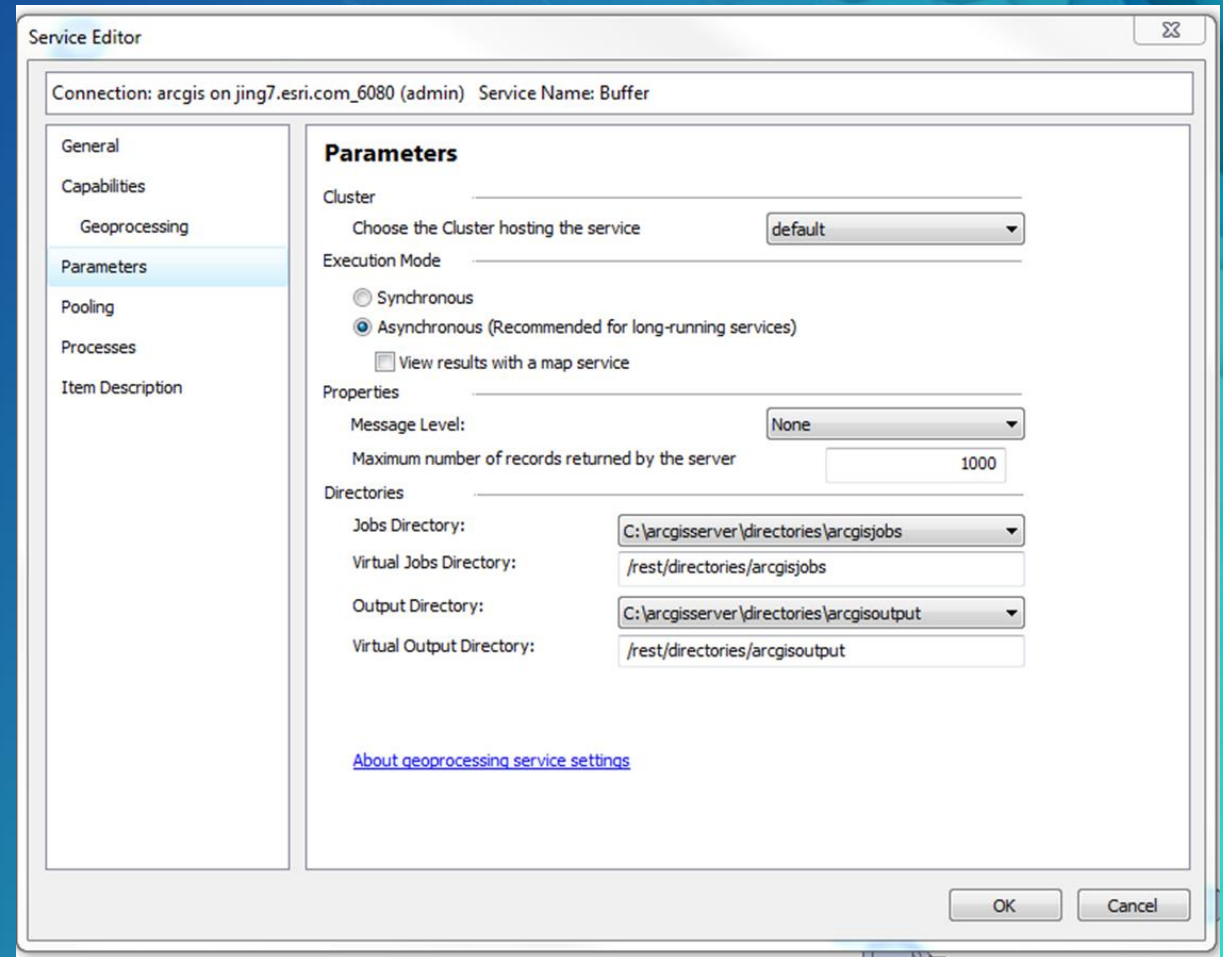
**Job Messages:**

- *esriJobMessageTypeInformative:* Executing (Buffer): Buffer c:\arcgisserver\directories\arcgisjobs\buffer\_gpservice\je96abf871ab64946b9e098e0f6917e65\scratch\scratch.gdb\Output "10 Miles" PLANAR
- *esriJobMessageTypeInformative:* Start Time: Thu May 26 13:35:25 2016
- *esriJobMessageTypeInformative:* Executing (Buffer): Buffer C:\Users\xueh7833\Documents\ArcGIS\California.gdb\Cities c:\arcgisserver\directories\arcgisjobs\buffer\_gpservice\je96abf871ab64946b9e098e0f6917e65\scratch\scratch.gdb\Output "10 Miles" PLANAR
- *esriJobMessageTypeInformative:* Start Time: Thu May 26 13:35:25 2016
- *esriJobMessageTypeInformative:* Executing (Buffer): Buffer C:\Users\xueh7833\Documents\ArcGIS\California.gdb\Cities c:\arcgisserver\directories\arcgisjobs\buffer\_gpservice\je96abf871ab64946b9e098e0f6917e65\scratch\scratch.gdb\Output "10 Miles" FULL ROUND NONE # PLANAR
- *esriJobMessageTypeInformative:* Start Time: Thu May 26 13:35:25 2016
- *esriJobMessageTypeInformative:* Succeeded at Thu May 26 13:35:27 2016 (Elapsed Time: 1.65 seconds)
- *esriJobMessageTypeInformative:* Succeeded at Thu May 26 13:35:27 2016 (Elapsed Time: 2.21 seconds)
- *esriJobMessageTypeInformative:* Succeeded at Thu May 26 13:35:27 2016 (Elapsed Time: 2.21 seconds)



# Process

- Execution mode
  - Synchronous
  - Asynchronous (long-running services)



The screenshot shows the 'Service Editor' window for a service named 'Buffer'. The left sidebar contains a list of tabs: General, Capabilities, Geoprocessing, Parameters (selected), Pooling, Processes, and Item Description. The main area is titled 'Parameters' and contains the following settings:

- Cluster:** A dropdown menu set to 'default' with the label 'Choose the Cluster hosting the service'.
- Execution Mode:** Two radio buttons: 'Synchronous' and 'Asynchronous (Recommended for long-running services)'. The 'Asynchronous' option is selected. There is also a checkbox for 'View results with a map service' which is unchecked.
- Properties:** A 'Message Level' dropdown set to 'None' and a text field for 'Maximum number of records returned by the server' set to '1000'.
- Directories:** Four fields with dropdown menus:
  - Jobs Directory: C:\arcgisserver\directories\arcgisjobs
  - Virtual Jobs Directory: /rest/directories/arcgisjobs
  - Output Directory: C:\arcgisserver\directories\arcgisoutput
  - Virtual Output Directory: /rest/directories/arcgisoutput

At the bottom of the main area is a link: [About geoprocessing service settings](#). The bottom of the window has 'OK' and 'Cancel' buttons.

# Process

Execution mode

- Synchronous

## ArcGIS REST Services Directory

[Home](#) > [services](#) > [Buffer \(GPServer\)](#) > [Buffer](#) > [execute](#)

### Execute Task (Buffer)

Distance [value or field]:  
(*GPLinearUnit*)

```
{  
  "distance": 10,  
  "units": "esriMiles"  
}
```

Method:  
(*GPString*)

#### Options:

Output Spatial Reference:

Process Spatial Reference:

ReturnZ:

☐ True ☒ False

ReturnM:

☐ True ☒ False

Format:

HTML ▼

Execute Task (GET)

Execute Task (POST)

# Process

Execution mode

- Asynchronous

## ArcGIS REST Services Directory

[Home](#) > [services](#) > [Buffer \(GPServer\)](#) > [Buffer](#) > [submitJob](#)

### Submit Job (Buffer)

Distance [value or field]:  
(*GPLinearUnit*)

```
{  
  "distance": 10,  
  "units": "esriMiles"  
}
```

Method:  
(*GPString*)

PLANAR

#### Options:

Output Spatial Reference:

Process Spatial Reference:

ReturnZ:

☐ True ☒ False

ReturnM:

☐ True ☒ False

Format:

HTML ▼

Submit Job (GET)

Submit Job (POST)

# Process

- Search error code in resource center

**ArcGIS REST Services Directory**

[Home](#) > [services](#) > [Buffer \(GPServer\)](#) > [Buffer](#) > [jf5351ceb503547219bbaaf5b9975519c](#)

[JSON](#)

**Job Details: jf5351ceb503547219bbaaf5b9975519c (Buffer)**

**Job ID:** jf5351ceb503547219bbaaf5b9975519c

**Job Status:** esriJobFailed

**Job Messages:**

- *esriJobMessageTypeInformative*: Submitted.
- *esriJobMessageTypeInformative*: Executing...
- *esriJobMessageTypeError*: ERROR 000732: Input: Dataset C:\Users\xueh7833\Documents\ArcGIS\California.gdb\Cities does not exist or is not supported
- *esriJobMessageTypeError*: Failed.



# Process

- Error code in documentation

000732: <value>: Dataset <value> does not exist or is not supported.

## Description

The tool was unable to open your dataset.

There are several reasons that could prevent a tool from opening a particular dataset. Most fall into one of these categories:

- The tool could not find the data because the input data path was typed incorrectly or does not exist.
- The data is in an unsupported data format.
- The data is not supported by this particular tool.

## Solution

Check the data path used to make sure it exists and can be accessed by ArcGIS. Correct as required and run the tool again.

If the data does exist, one of the following situations may have occurred:

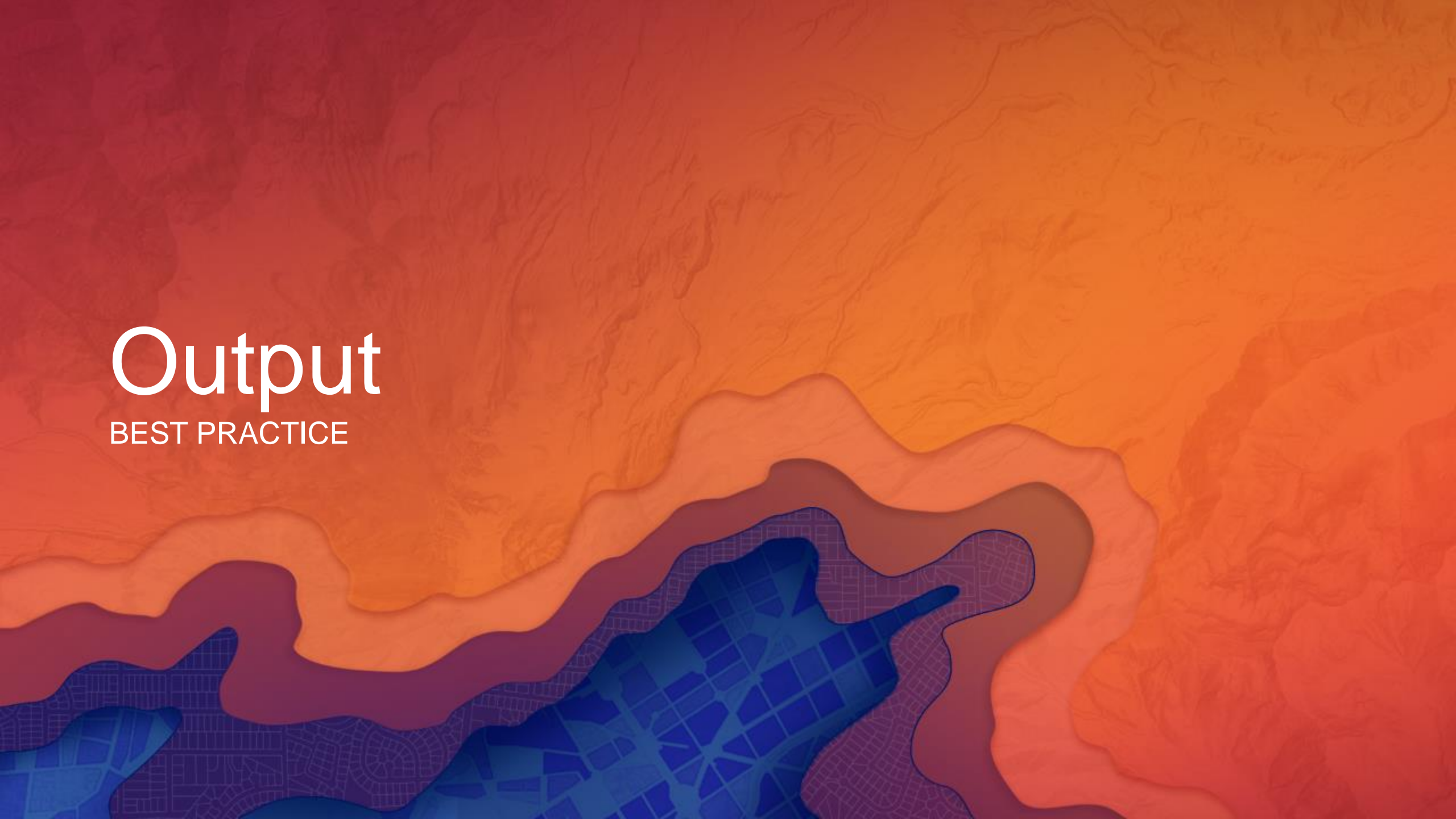
- 64-bit processing does not support some data formats. Use another format.  
[Learn more about supported data types and items](#)
- An invalid subtype on the dataset. To fix this, go to the feature class properties, click the **Subtypes** tab, and reenter the default subtype code. If the default is 0, click the cell with 0 and reenter that same value. Apply the change by clicking **OK**. You will now be able to use the dataset.
- In ArcGIS Engine for Linux, a text file cannot be used as an input to a tool with an input table parameter, such as [Copy Rows](#) or [Make XY Event Layer](#). On Windows you can convert the file to another format using the [Table To Table](#) tool.
- The [Register\\_As\\_Versioned](#) and [Unregister\\_As\\_Versioned](#) tools cannot run against a controller dataset, such as a Geometric Network, Topology, Network Dataset, or Terrain. To fix this, run these tools against the feature dataset that

# Demo

BEST PRACTICE - TROUBLESHOOTING

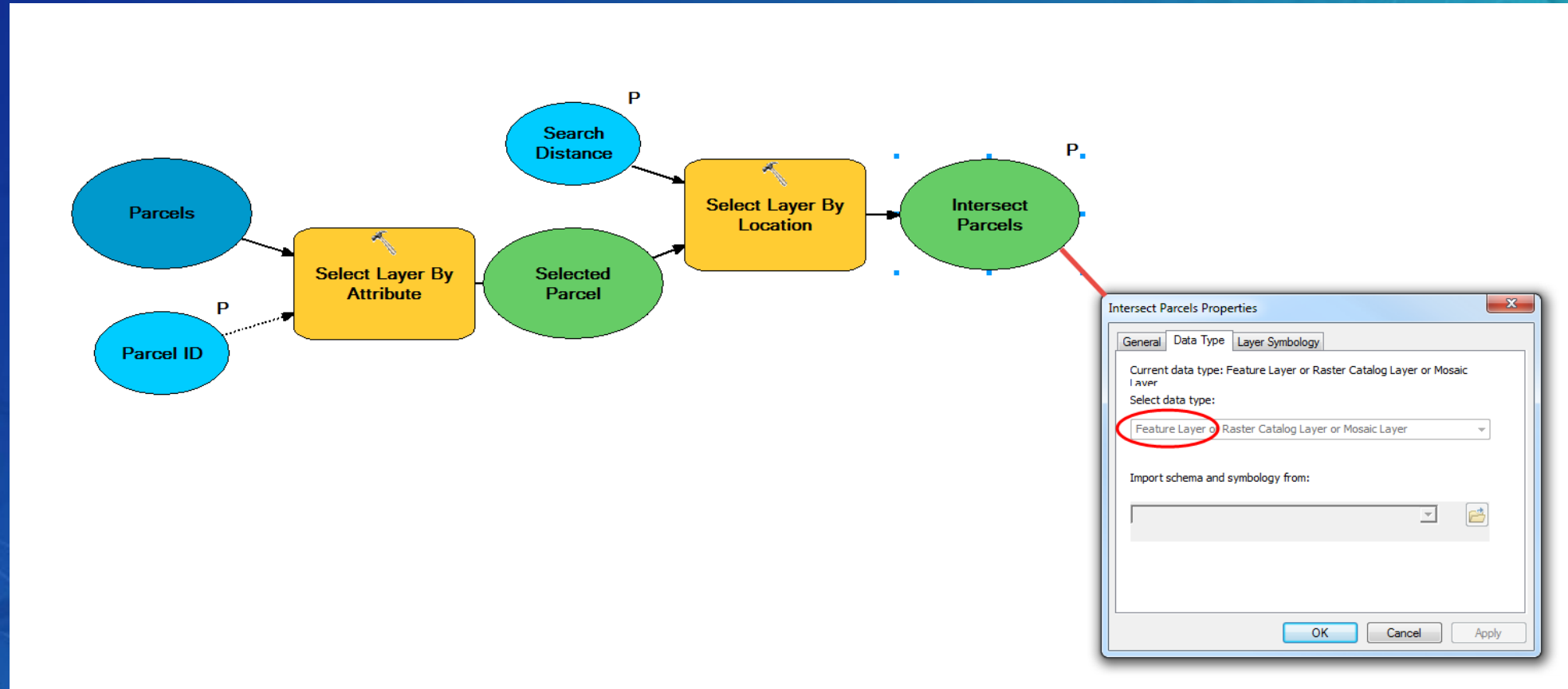
# Output

BEST PRACTICE



# Output

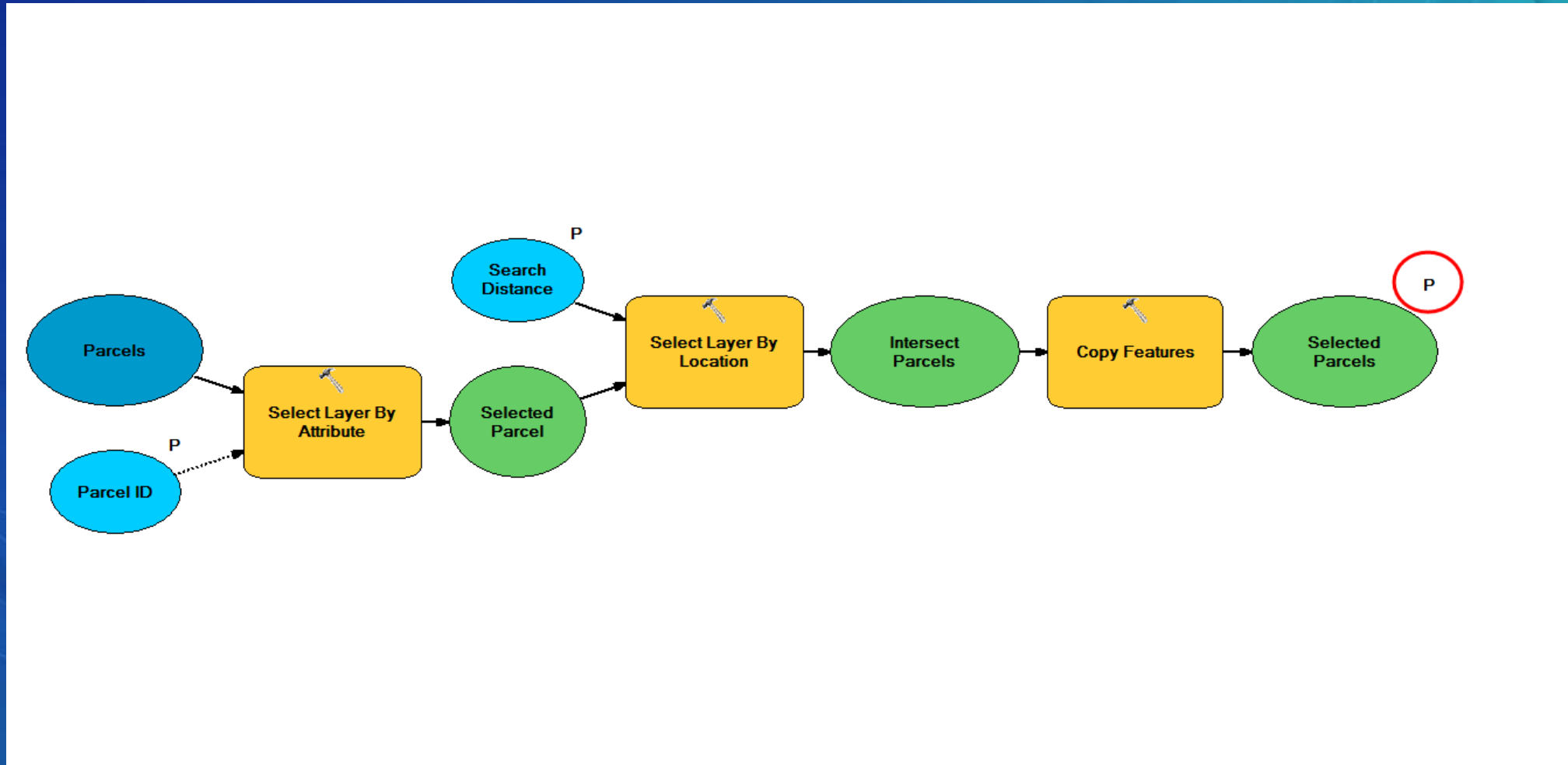
- Like input, there are different data types for output parameters





# Output

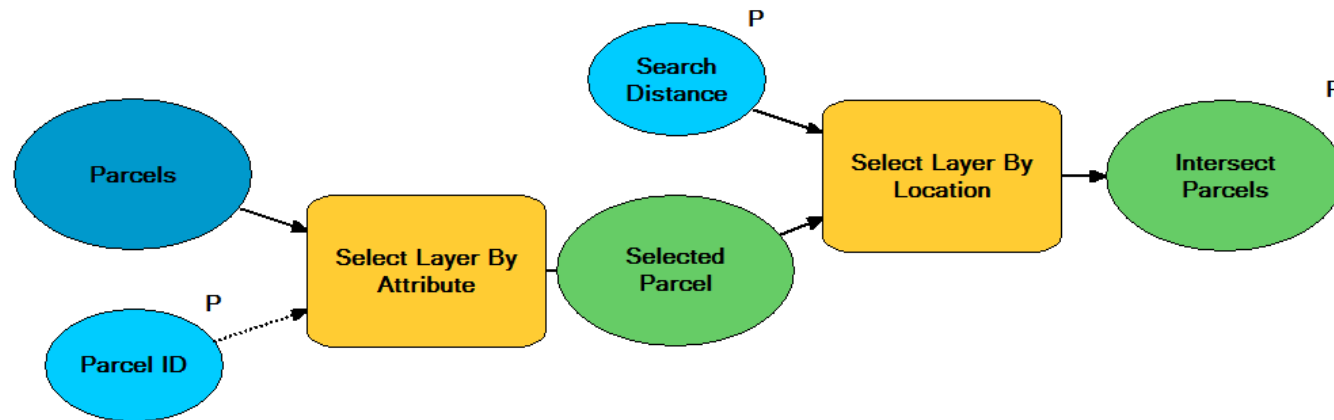
- Output MUST be a model parameter





# Output

- Select Layer By Attribute, Select Layer By Location
- The feature selection won't show up in application



# Output

- Exceeded transfer limit

esri.com | Web GIS | Sign Out | Help

**ArcGIS Server Manager** Services Site Security Logs

Manage Services OGC Services KML Network Links Sharing

Editing: [Site \(root\)](#) > [Demo](#) > TroubleShoot [Help](#) [Save and Restart](#) [Cancel](#)

**General**  
**Parameters**  
Capabilities  
Pooling  
Processes  
Item Description

**Cluster**  
Choose the cluster hosting this service: default

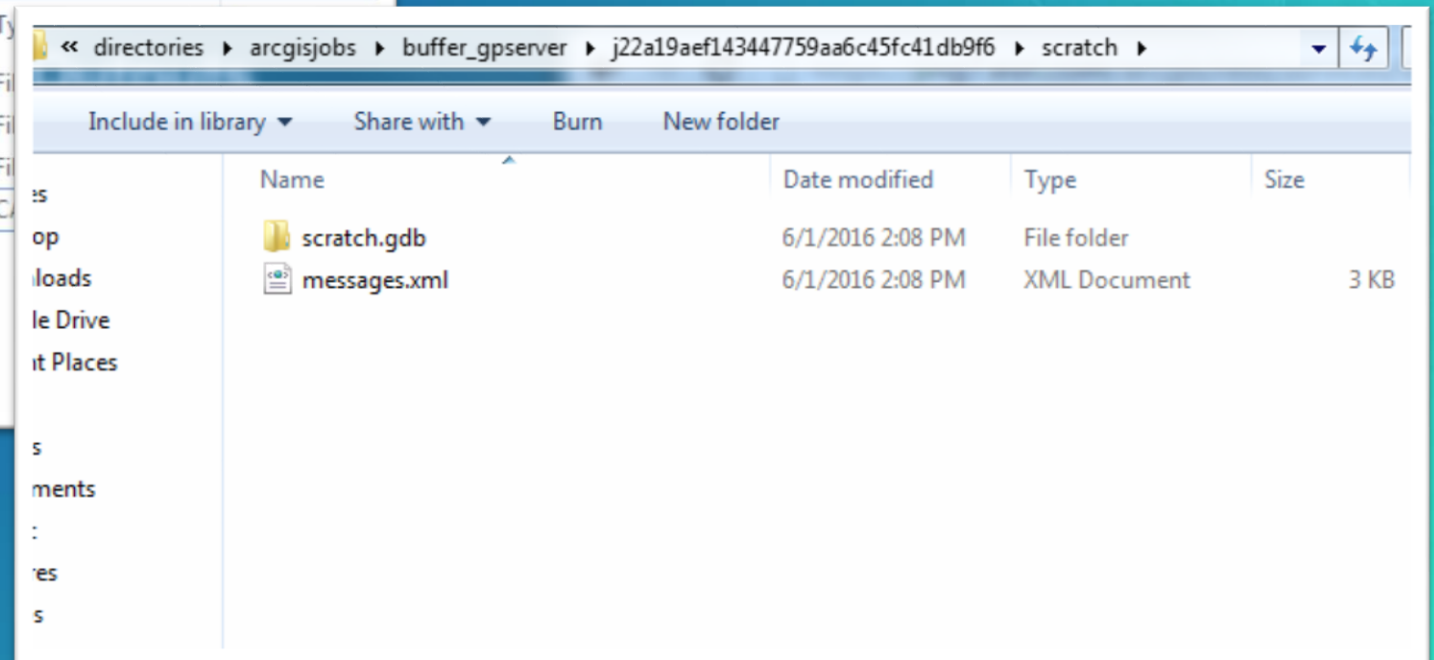
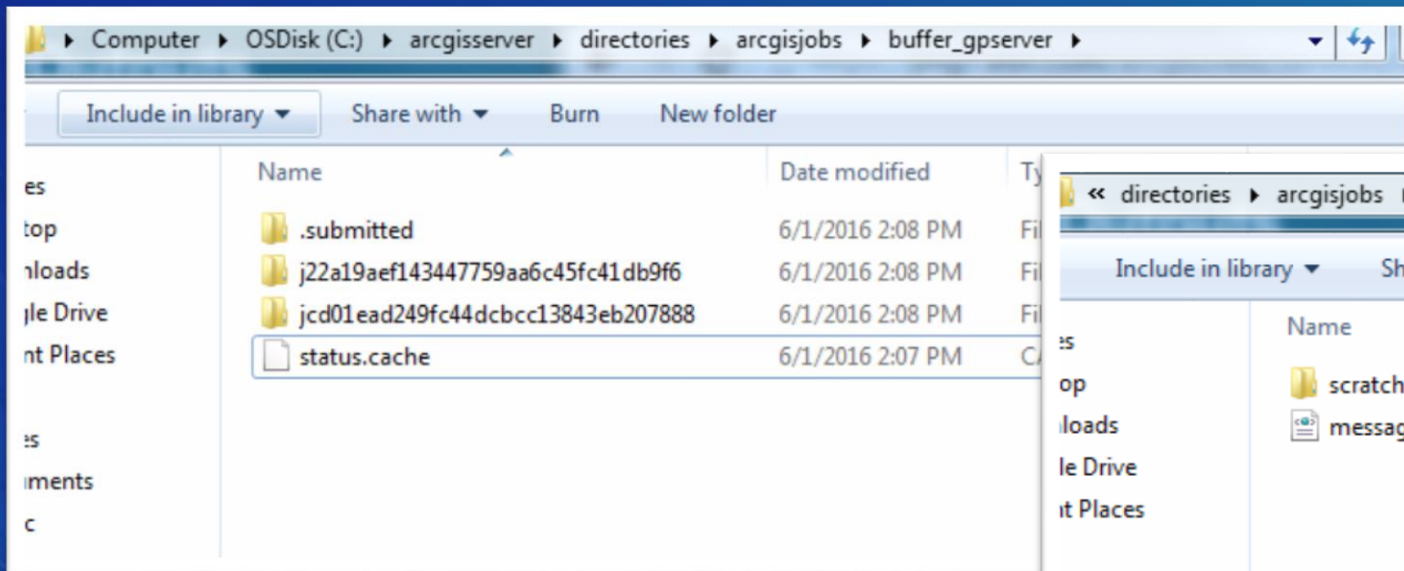
**Execution Mode**  
☐ Synchronous  
☒ Asynchronous (Recommended for long-running services)  
☐ View results with a map service

**Properties**  
Message Level: Info  
Maximum Number of Records Returned by Server: 1000

**Directories**  
Jobs Directory: C:\arcgisserver\directories\arcgisjobs  
Output Directory: C:\arcgisserver\directories\arcgisoutput

# Output

- Set your output to be in scratchGDB or in\_memory
- In a python script, use `os.path.join(arcgpy.env.scratchGDB, "points")`
- scratchGDB is created in  
...\\arcgisserver\\directories\\arcgisjobs\\<name>\_gpserver\\<jobid>\\scratch



The background of the slide is an abstract composition of wavy, organic shapes in various shades of blue and teal. The colors range from deep navy blue to light turquoise, creating a textured, layered effect. The shapes flow across the frame, with some areas appearing more saturated than others, giving it a sense of depth and movement.

**Questions?**





esri

THE  
SCIENCE  
OF  
WHERE