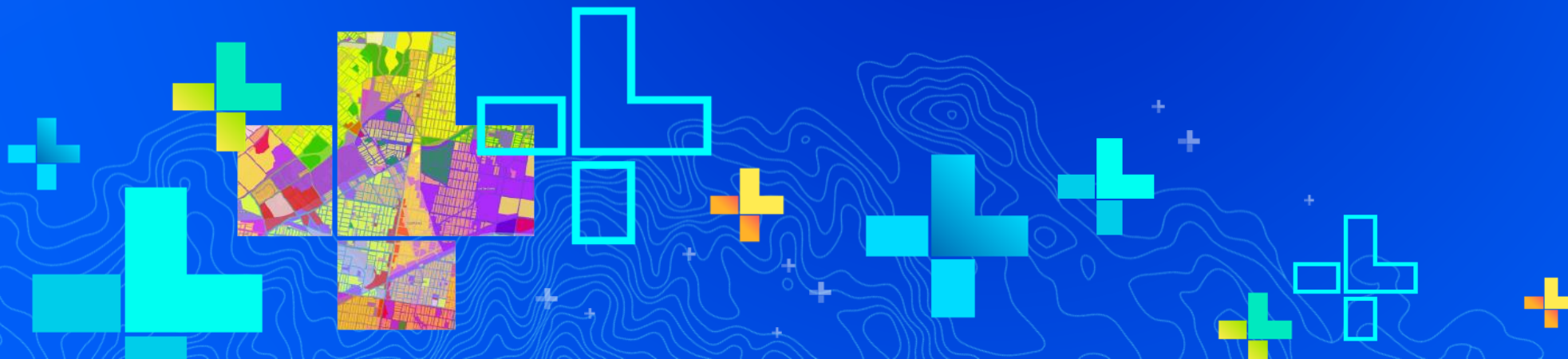




Ensuring Data Quality with Attribute Rules and Contingent Values

Hussein Nasser & Supriya Khadke

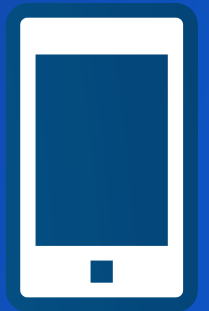
SEE
WHAT
OTHERS
CAN'T



Agenda

- What does ensure data quality mean?
- Why is it important?
- New geodatabase functionality
 - Contingent Values
 - Attribute Rules
- Demos

Please silence cell phones



Data Quality

- **Ensuring data quality**
 - Data entry
 - Restrict invalid data from getting in
 - Domains, Subtypes, Default values
 - Data review
 - Check the data and flag invalid data as errors based on a rule base engine.
 - Topology, Data Reviewer
- **Geodatabase functionality**
 - Contingent Values
 - Attribute Rules



Contingent Values

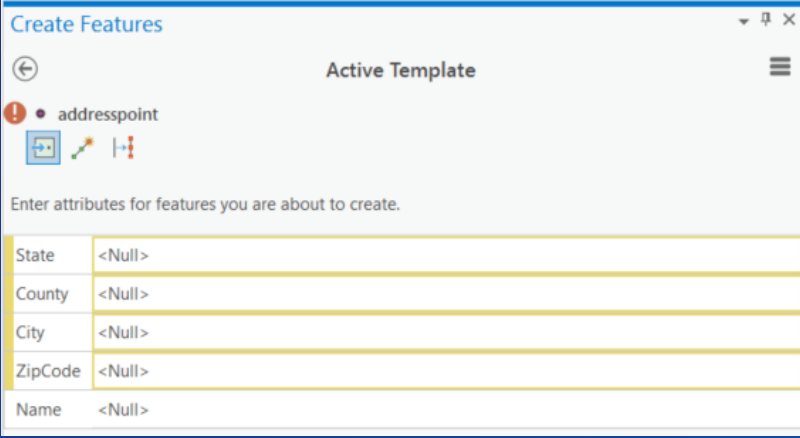


Contingent Values

- Introduced in ArcGIS Pro 2.3
- Built-in geodatabase functionality
- Data Entry
 - Restrict valid attribute values for multiple “contingent” fields
 - Field Groups

<Address Point>

- Name
- State
- County
- City
- ZipCode



Create Features

Active Template

addresspoint

Enter attributes for features you are about to create.

State	<Null>
County	<Null>
City	<Null>
ZipCode	<Null>
Name	<Null>

Contingent Values

Create Features

Active Template

! addresspoint

Enter attributes for features you are about to create.

State	<Null>
County	Field_Group
City	California
ZipCode	Texas
Name	<Show All>

Contingent Values

Create Features

Active Template

! addresspoint

Enter attributes for features you are about to create.

State	California
County	<Null>
City	Field_Group
ZipCode	Orange County
Name	Riverside County
	San Bernardino County
	<Partial Matches>
	<Show All>

Contingent Values

Three overlapping 'Create Features' dialog boxes are shown, illustrating the process of selecting values for an 'addresspoint' feature template. The dialog boxes are stacked, with the most recent one in the foreground.

The foreground dialog box is titled 'Create Features' and shows the 'Active Template' as 'addresspoint'. It contains the instruction 'Enter attributes for features you are about to create.' and a table of attributes:

Attribute	Value
State	California
County	San Bernardino County
City	<Null>
ZipCode	Field_Group
Name	Chino
	Colton
	Redlands
	Yucaipa
	<Partial Matches>
	<Show All>

Contingent Values

Create Features

Active Template

! addresspoint

Enter attributes for features you are about to create.

State	California
County	San Bernardino County
City	Redlands
ZipCode	<Null>
Name	Field_Group

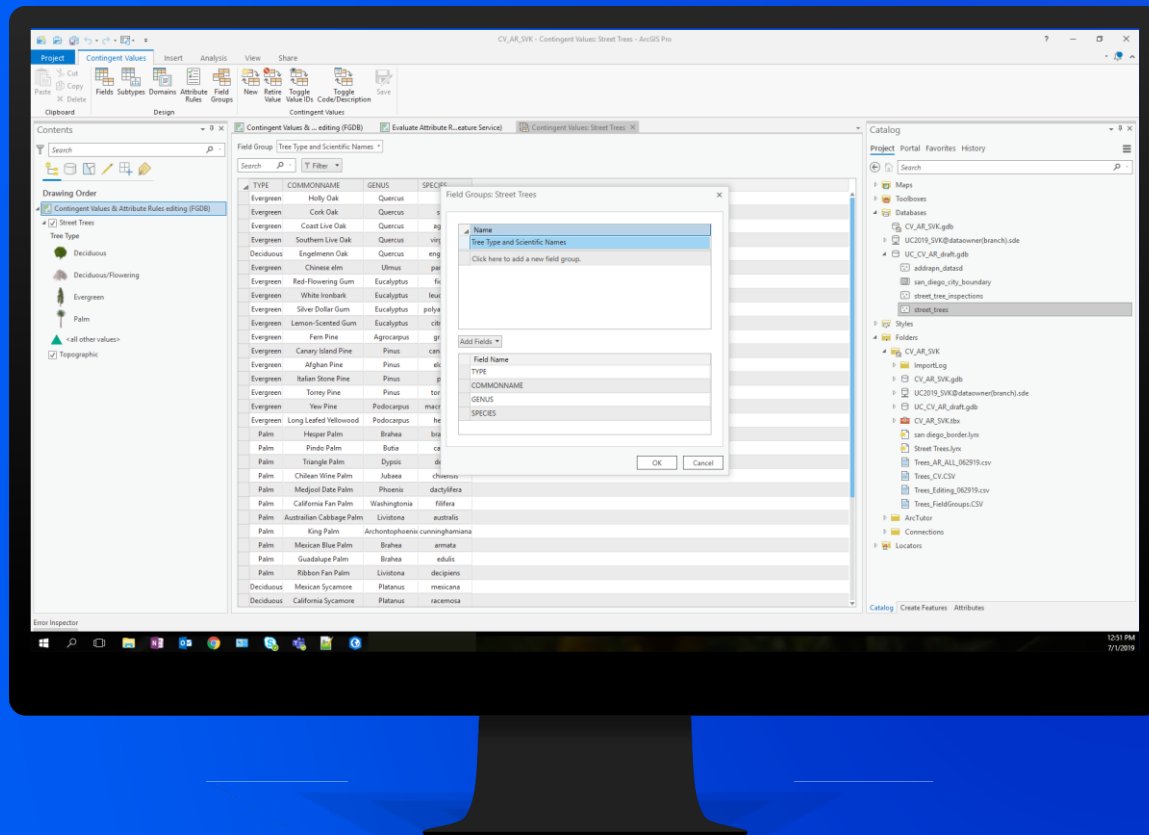
92373

92374

92375

<Partial Matches>

<Show All>



Contingent Values Demo

- GIS Administrator
 - Data editors
 - Tree data
 - Tree Type (i.e Deciduous, Evergreen, etc.)
 - Genus
 - Species
 - Common Name

Attribute Rules

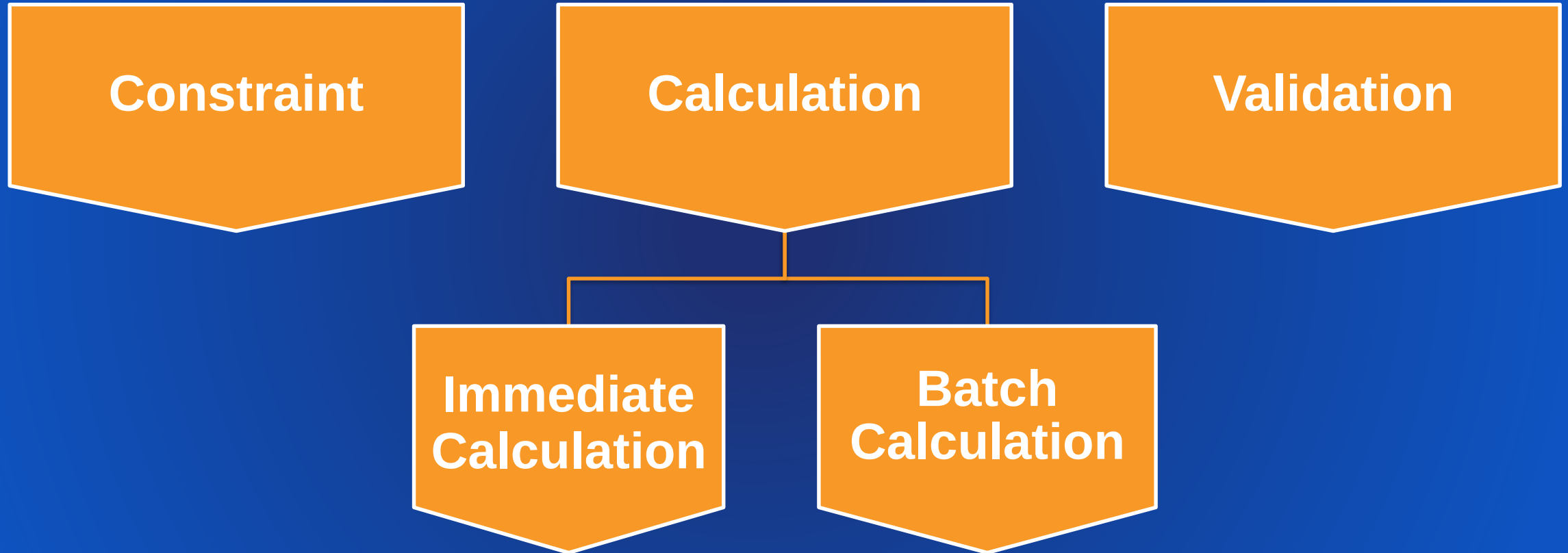


Attribute Rules

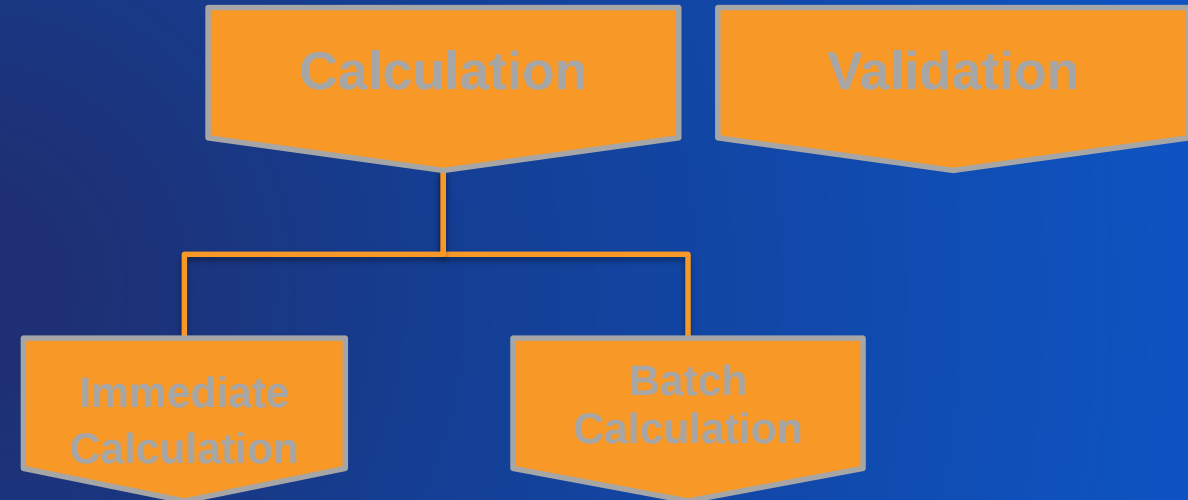
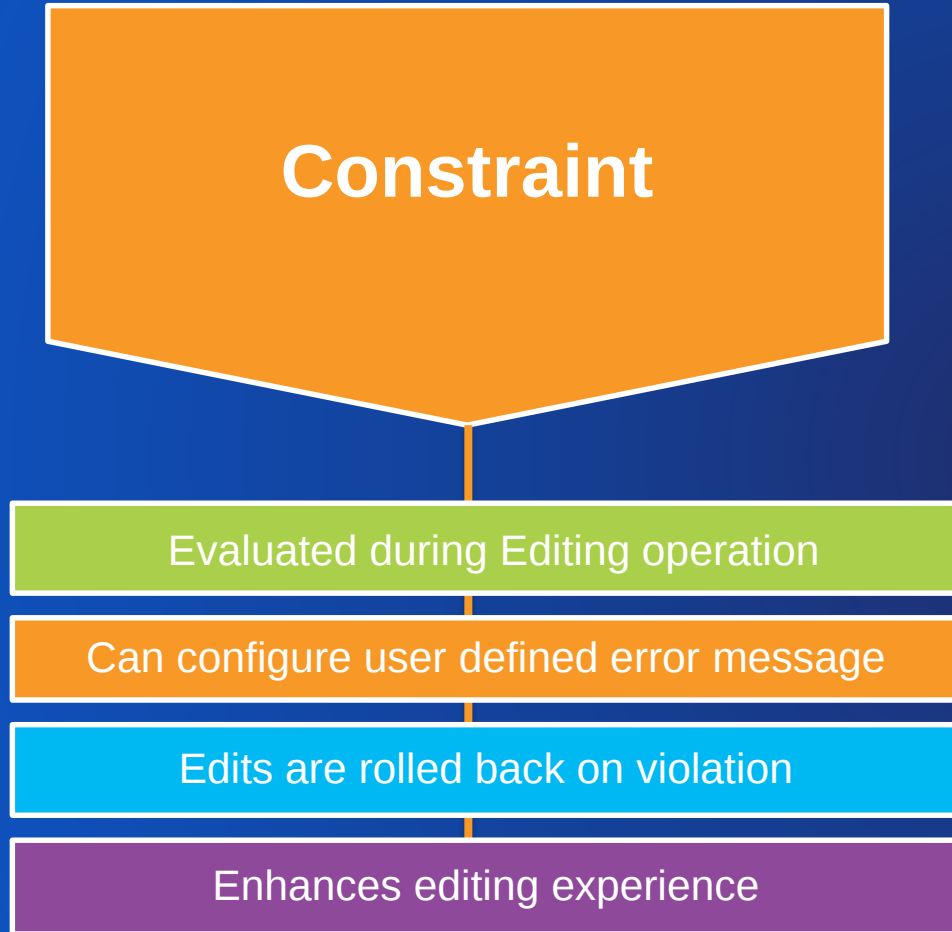
- Introduced in ArcGIS Pro 2.1
- Built-in geodatabase functionality
- Use Arcade to configure rules
- Data Entry
 - Populate attributes
 - Restrict invalid edits
- Data Review
 - Generate errors on invalid existing features



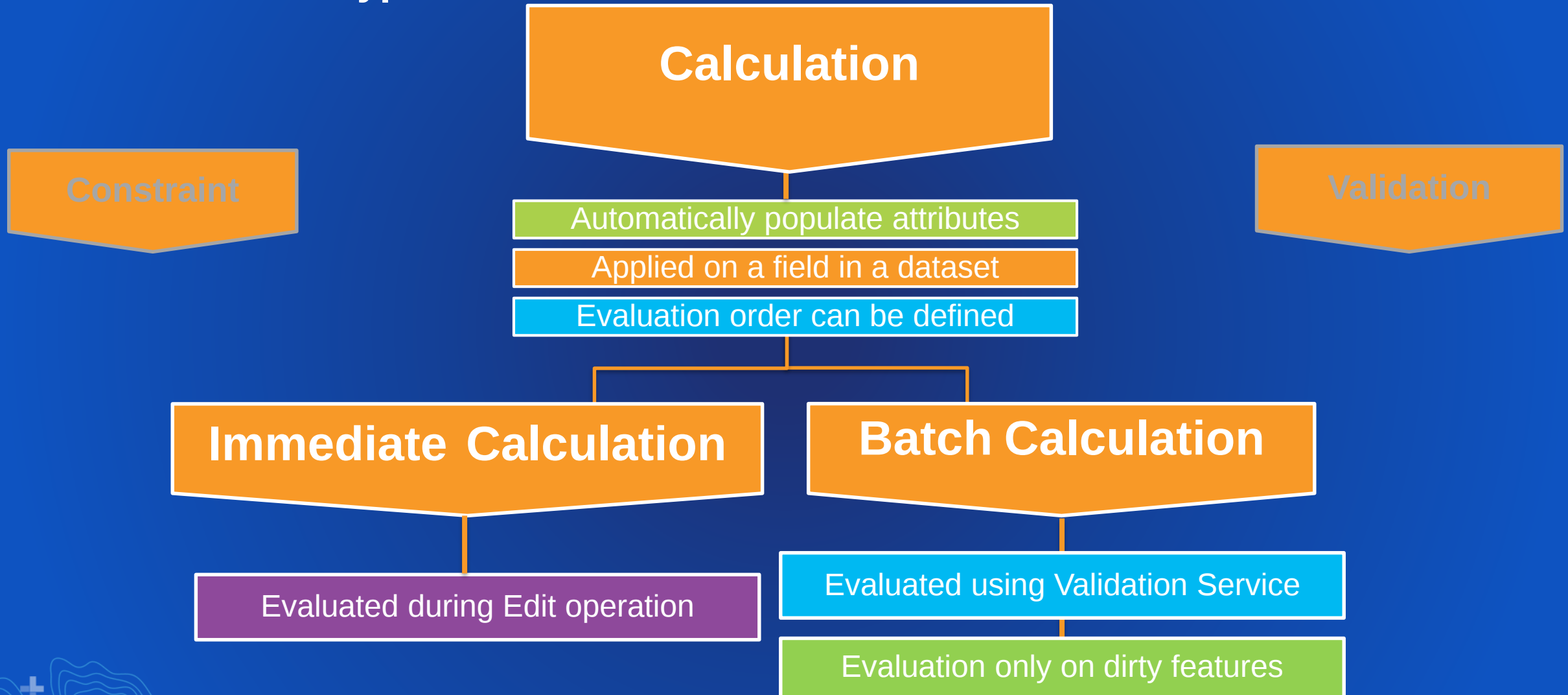
Attribute Rule Types



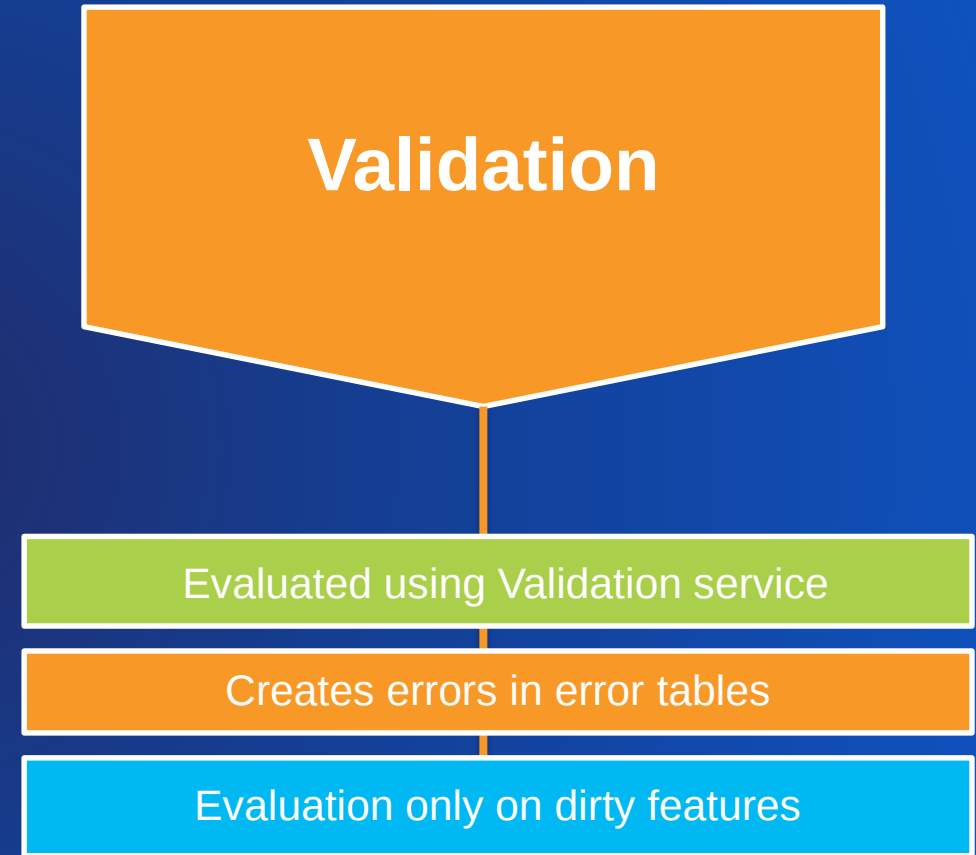
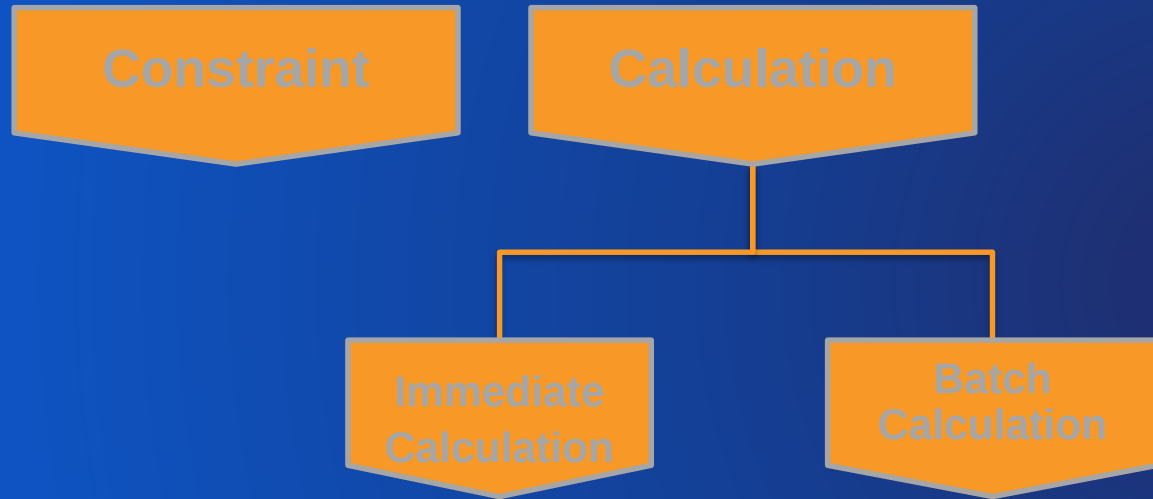
Attribute Rule Types

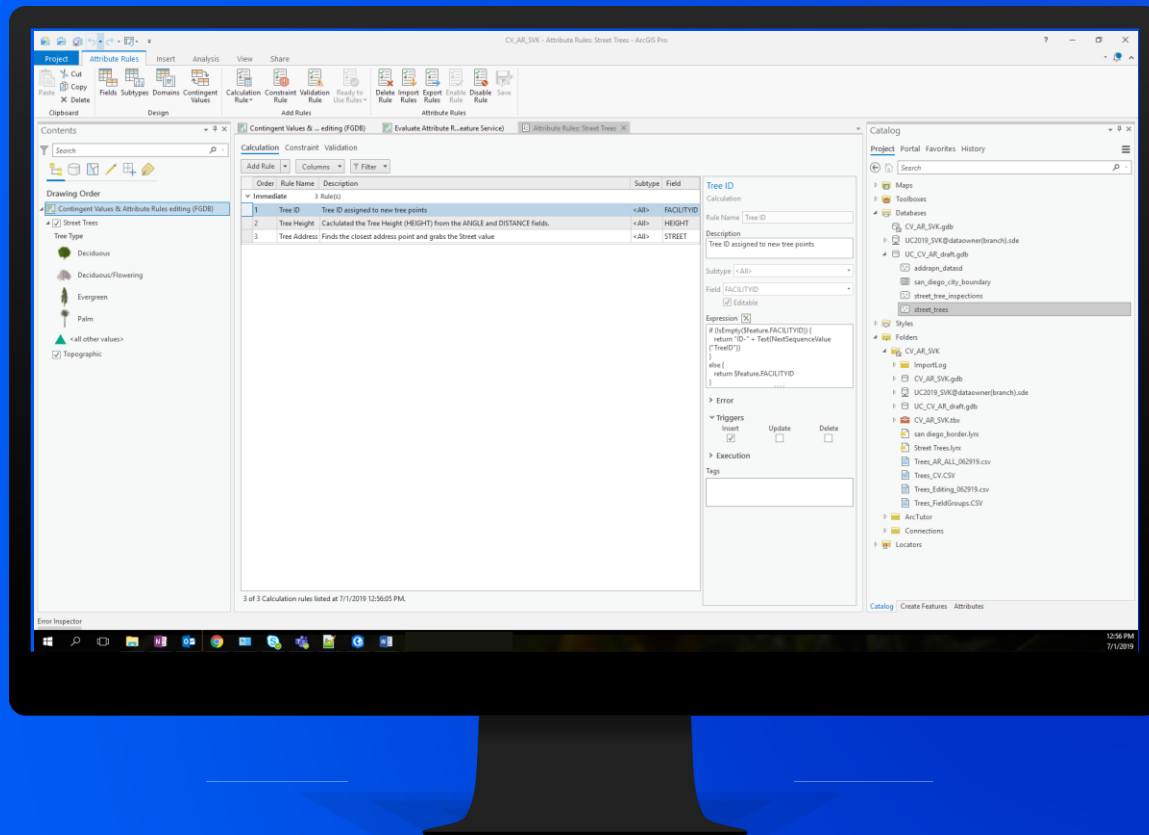


Attribute Rule Types



Attribute Rule Types





Attribute Rules Demo

- GIS Administrator
 - Data editors
 - Tree data
 - Automatically enter Tree ID
 - Calculate Tree Height
 - Ensure angle is less than 90 degrees
 - Batch calculate X and Y values
 - Edit other feature classes
 - Create errors for features outside city limits
 - Create errors for missing comments

Attribute Rules Demo: Arcade examples

```
//Arcade to auto populate a tree's FacilityID.  
//Uses an existing database sequence called TreeID  
//To use in immediate or batch calculation rule.  
if (IsEmpty($feature.FACILITYID)) {  
    return "ID-" + Text(NextSequenceValue("TreeID"))  
} else {  
    return $feature.FACILITYID  
}
```

```
//Arcade to calculate the Tree Height from the tree's angle  
and distance measurements.  
//To use in immediate or batch calculation rule.  
var radians = $feature.ANGLE * 0.0174533  
Tan(radians) * $feature.ANGLEDISTANCE
```

Attribute Rules Demo: Arcade examples

```
//Arcade to find the closest Address Point to the feature (tree point).
//Returns the address point's street name.
//To use in immediate or batch calculation rule.
var fsB = FeatureSetByName($datastore, "addrpn_datasd", ["streetname"],
true)
var abuff = Buffer(Geometry($feature), 1, 'kilometers')
var fsClosest = Intersects(fsB, abuff)
var minDistance = Infinity
if (Count(fsClosest) <= 0) {
    return $feature.STREET
} else {
    var closestb
    for (var b in fsClosest) {
        var bDistance = Distance(b, $feature, "meters");
        if (bDistance < minDistance) {
            minDistance = bDistance;
            closestb = b.streetname
        }
    }
    return closestb
}
```

Attribute Rules Demo: Arcade examples

```
//Arcade return the X coordinate for the point feature  
//To use in immediate or batch calculation rule.  
Text (Geometry($feature).X)
```

```
//Arcade return the Y coordinate for the point feature  
//To use in immediate or batch calculation rule.  
Text (Geometry($feature).Y)
```

Attribute Rules Demo: Arcade examples

```
//Arcade example of DML, Data Manipulation Language
//Populates another feature class with tree information if there are wires
//To use in immediate or batch calculation rule.
var fsInspections = FeatureSetByName($datastore, 'street_tree_inspections', ['globalid', 'tree_guid'], false)
var treeGlobalID = $feature.GlobalID
var inspectionSet = Filter(fsInspections, 'Tree_GUID=@treeGlobalID')
var og_comments = $feature.comments
var matchedInsp = Count(inspectionSet)
//Checks if the tree already exists in the inspections feature class
if (matchedInsp == 0) {
  if ($feature.WIRES == 'Yes') {
    //Adds records in the Inspections feature class if Tree has Wires=Yes
    var facilityid = $feature.facilityid
    var treetype = $feature.type
    var commonname = $feature.commonname
    var street = $feature.street
    var wires = $feature.wires
    var condition = $feature.condition
    var x_geom = $feature.x
    var y_geom = $feature.y
    var tree_gID = $feature.globalid
    return {
      'result': og_comments,
      'edit': [{
        'className': 'street_tree_inspections',
        'adds': [{
          'attributes': {
            'facilityid': facilityid,
            'type': treetype,
            'commonname': commonname,
            'street': street,
            'wires': wires,
            'condition': condition,
            'comments': og_comments,
            'tree_guid': tree_gID,
            'x': x_geom,
            'y': y_geom
          },
          'geometry': Geometry($feature)
        }]
      }]
    }
  } else {
    return og_comments
  }
} else {
  //Deletes records in the Inspections feature class if Tree has Wires=No
  if ($feature.WIRES == 'No') {
    var inspection = First(inspectionSet)
    var inspect_gID = inspection.globalid
    return {
      'result': og_comments,
      'edit': [{
        'className': 'street_tree_inspections',
        'deletes': [{
          'globalid': inspect_gID
        }]
      }]
    }
  } else {
    return og_comments
  }
}
```

Attribute Rules Demo: Arcade examples

```
//Arcade to check if Angle field is less than 90.  
//To use in constraint or validation rule.  
//Prevents edit for constraint rule.  
//Creates error for validation rule.  
$feature.ANGLE<=90
```

```
//Arcade to check if the tree is within city boundary  
//To use in constraint or validation rule.  
//Prevents edit for constraint rule.  
//Creates error for validation rule.  
var fsSDBoundary = FeatureSetByName($datastore, "san_diego_city_boundary", ["objectid"], true)  
var cityfeature = First(fsSDBoundary)  
if (isEmpty(cityfeature)) {  
    //Return error if city boundary is empty  
    return {  
        'errorMessage': 'San Diego city boundary dataset is empty'  
    }  
} else {  
    //Compares city boundary and tree point  
    var tree_geom = Geometry($feature)  
    var city_geom = Geometry(cityfeature)  
    //Checks if tree is within city boundary  
    var tree_inside = Within(tree_geom, city_geom)  
    return tree_inside  
}
```

Summary



Ensuring Data Quality | Summary

- **Data Entry**
 - Contingent Values
 - Attribute Rules
 - Immediate Calculation
 - Constraint
- **Data Review**
 - Attribute Rules
 - Batch Calculation
 - Validation



Related Presentations

- **Ready to Use Rules: Data Reviewer**

- **Tuesday**

- ArcGIS Data Reviewer: An Introduction (Offering #1)
 - Room 30 C | 08:30 am - 09:30 am

- **Wednesday**

- ArcGIS Data Reviewer: An Introduction (Offering #2)
 - Room 30 E | 08:30 am - 09:30 am
 - ArcGIS Data Reviewer: Implementing Ready-to-Use Rules across the platform
 - Demo Theater 4 | 10:00 am - 10:45 am

- **Thursday**

- ArcGIS Data Reviewer: Advanced Data Validation
 - Room 30 E | 08:30 am - 09:30 am

- **Arcade**

- **Tuesday**

- Arcade: An Introduction (Offering #1)
 - Ballroom 06 E | 08:30 am - 09:30 am

- **Wednesday**

- Arcade: An Introduction (Offering #2)
 - Ballroom 06 E | 04:00 pm – 05:00 pm

List of Resources

- **Attribute Rules**

- **Blogs**

- Attribute Rules: What's new in ArcGIS Pro 2.3 and ArcGIS Enterprise 10.7
 - <https://www.esri.com/arcgis-blog/products/arcgis-pro/data-management/attribute-rules-whats-new-in-arcgis-pro-2-3-and-arcgis-enterprise-10-7/>
 - Introducing new design views in ArcGIS Pro 2.3
 - <https://www.esri.com/arcgis-blog/products/data-management/data-management/introducing-new-design-views-in-arcgis-pro-2-3/>

- **Videos**

- Attribute Rules From Scratch
 - <https://www.youtube.com/watch?v=HuWymMh6igk>
 - Attribute Rules Presentation
 - <https://www.youtube.com/watch?v=-2W1H0xr90o>

- **Attribute Rules Help**

- <https://pro.arcgis.com/en/pro-app/help/data/geodatabases/overview/an-overview-of-attribute-rules.htm>

- **Arcade**

- **Blogs**

- What's new with Arcade: Taking a stroll through FeatureSets (Part 1)
 - <https://www.esri.com/arcgis-blog/products/mapping/mapping/whats-new-with-arcade-taking-a-stroll-through-featuresets-part-1/>
 - What's new with Arcade: Taking a stroll through FeatureSets (Part 2)
 - <https://www.esri.com/arcgis-blog/products/mapping/mapping/whats-new-with-arcade-taking-a-stroll-through-featuresets-part-2/>

- **Playground**

- <https://developers.arcgis.com/arcade/playground/>

- **Arcade Help**

- <https://developers.arcgis.com/arcade/>

Questions

