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ArcGIS Online: Web Mapping with Arcade Expressions

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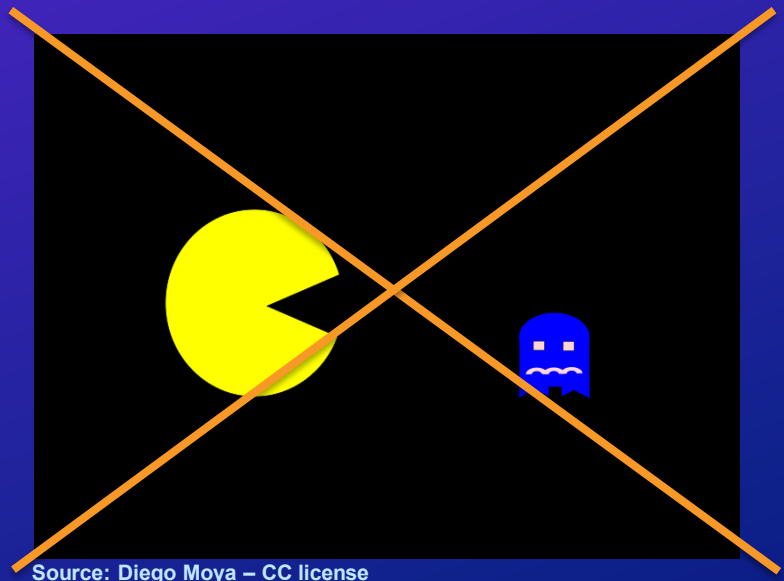
Agenda

- What is Arcade?
  - Demo: Write Your First Expression
- Why Use Arcade?
- Where to find it
  - Demo: Simple Arcade within a Web Map
- Adding complexity
  - Demo: Complex arcade expressions, Feature Sets
- Testing
- Considerations
- What's Next
- Resources

What is Arcade?

- Named after the arch not Pac-Man
- Lightweight expression language for working with your ArcGIS data (think excel for ArcGIS)
  - ArcGIS Pro
  - ArcGIS Online
  - Runtime SDKs
  - JavaScript API
  - Web Apps
- Simple or complex expressions to make data-driven adjustments to your web maps

Source: Andrew Dunn – CC license



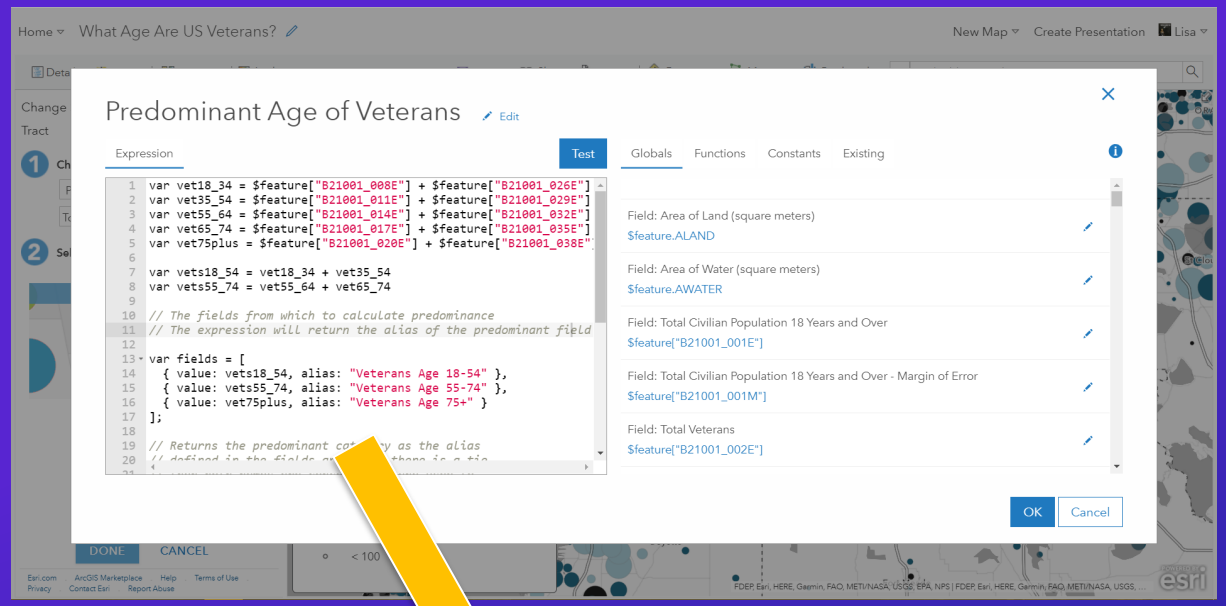
Source: Diego Moya – CC license

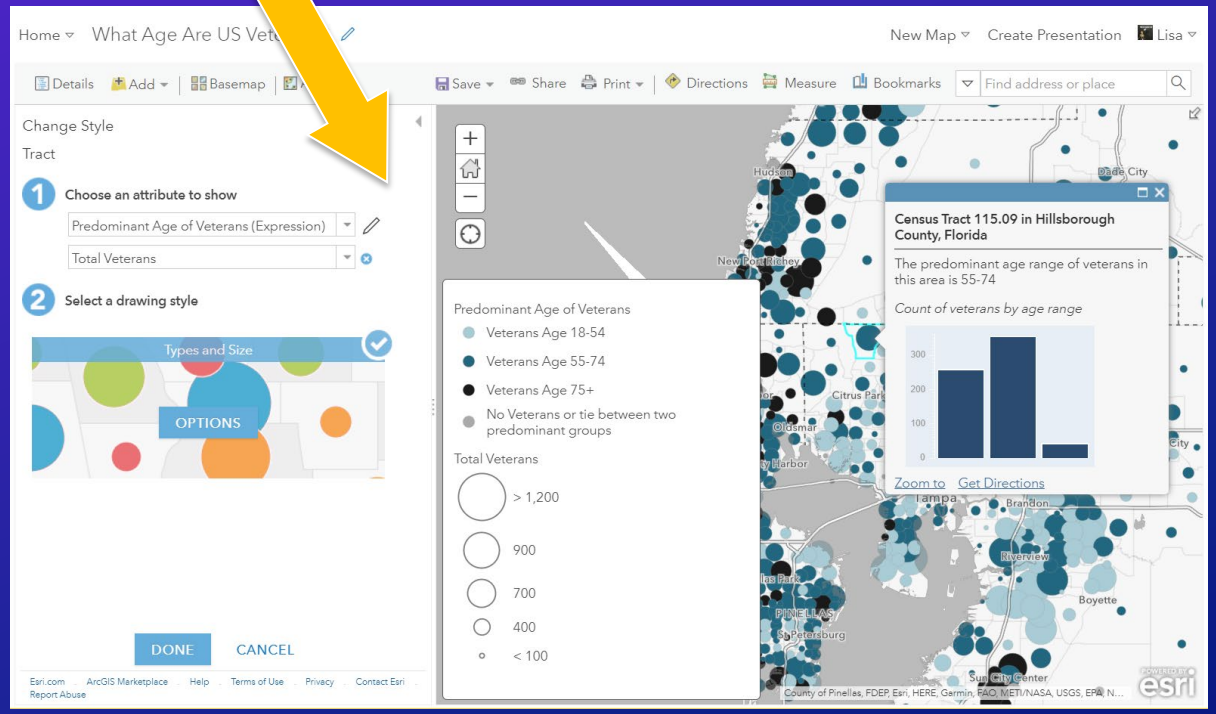
What is Arcade?

- Not a replacement for Python or geoprocessing
  - Arcade is lightweight and simple
- In-map calculator

Input/script → Arcade Executes → Resulting value

- Alternative to calculating a new field – meaning you don't have to own the layer



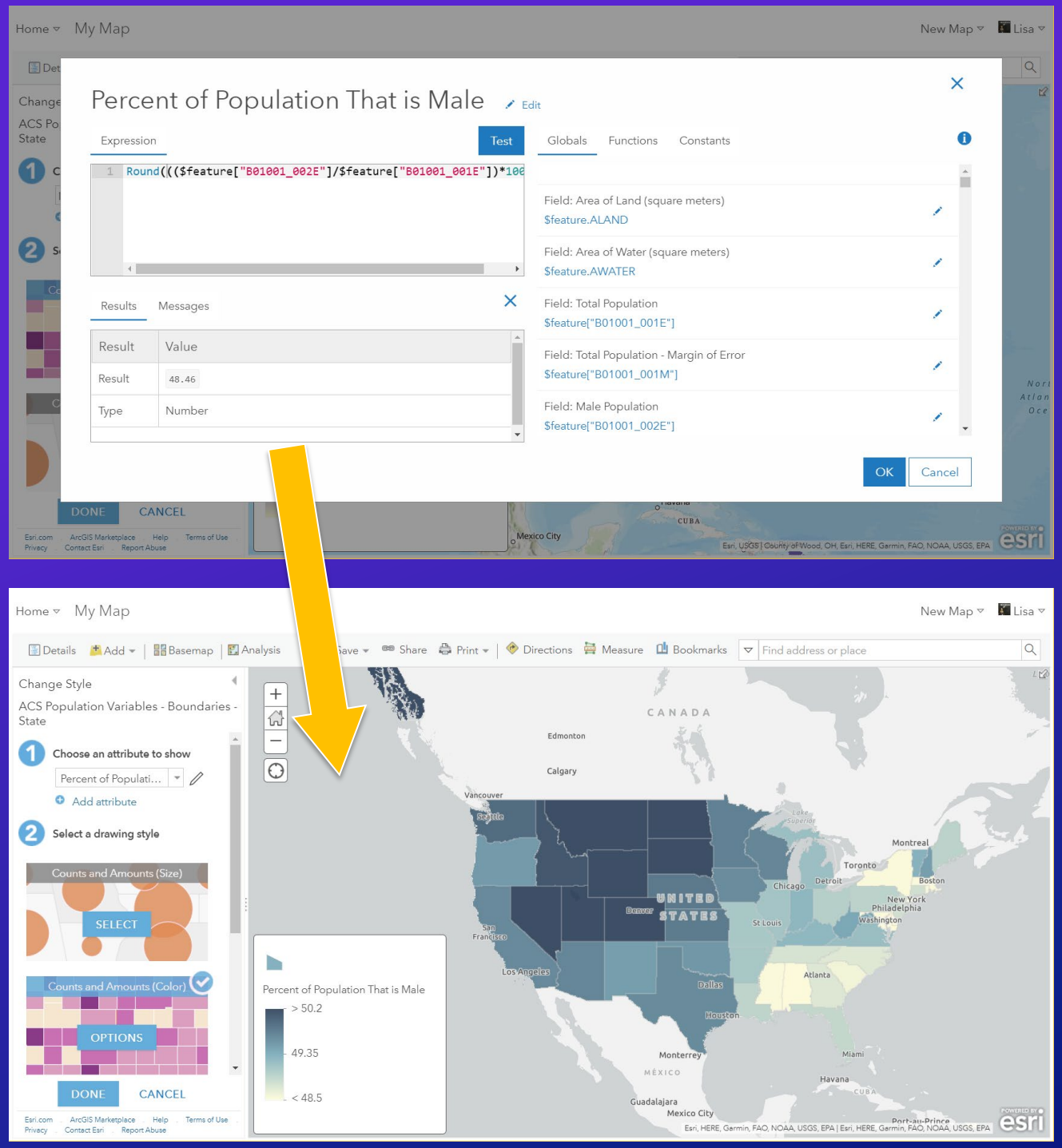


Why Use Arcade?

- On-the-fly calculations and data manipulation
- Forgot to add a field? Used the wrong data type? Don’t own the data? No problem!
- Easy to get started (excel-like functions and syntax)
- Expressions carry through to your downstream applications (portable)
- Secure
- Geospatial

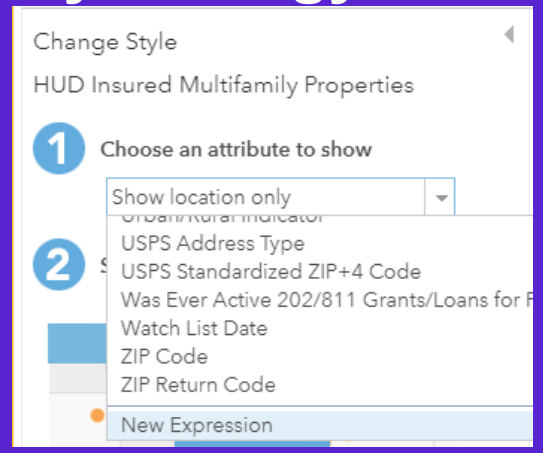
Simple but Powerful

- Excel-like
- Simple
  - Write a basic calculation
  - Use a built-in function
  - Re-use existing expressions
- Examples:
  - Combine fields together
  - Format existing fields
  - Unit conversion
  - Rotate symbols
  - Improved text labeling

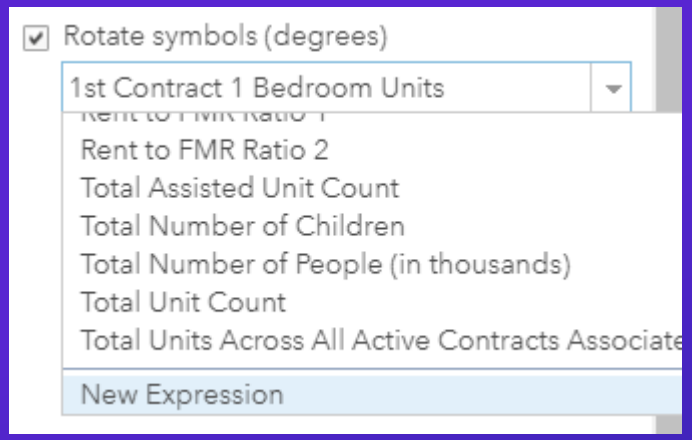


Where to find it in the Web Map

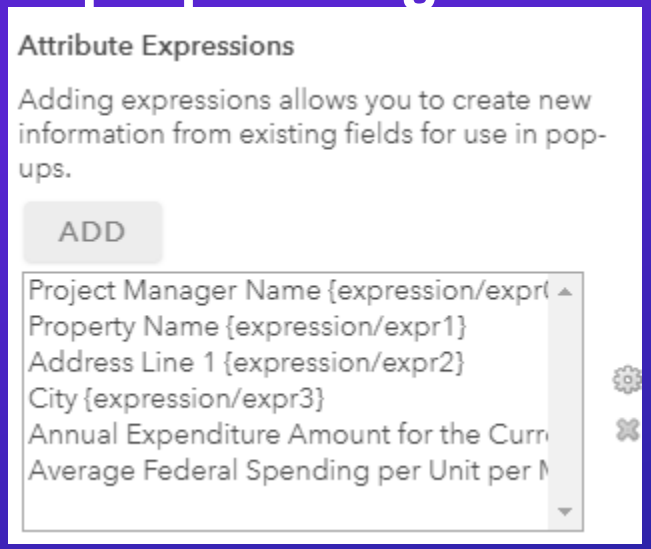
Symbology



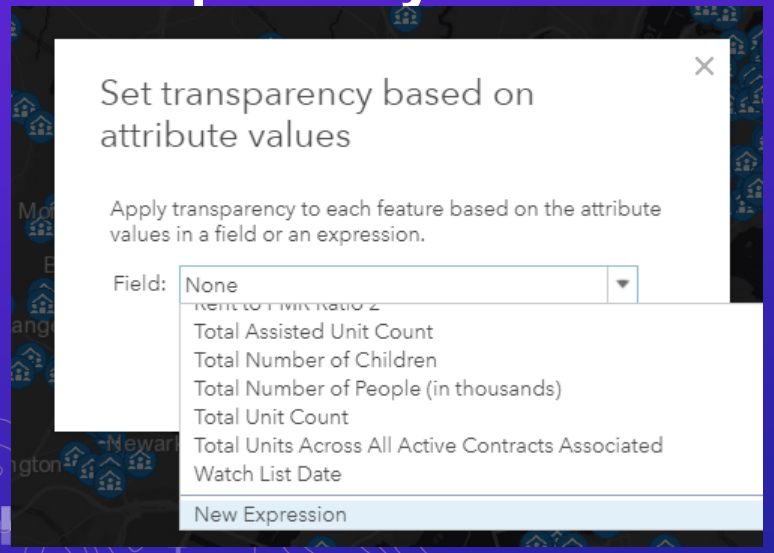
Rotation



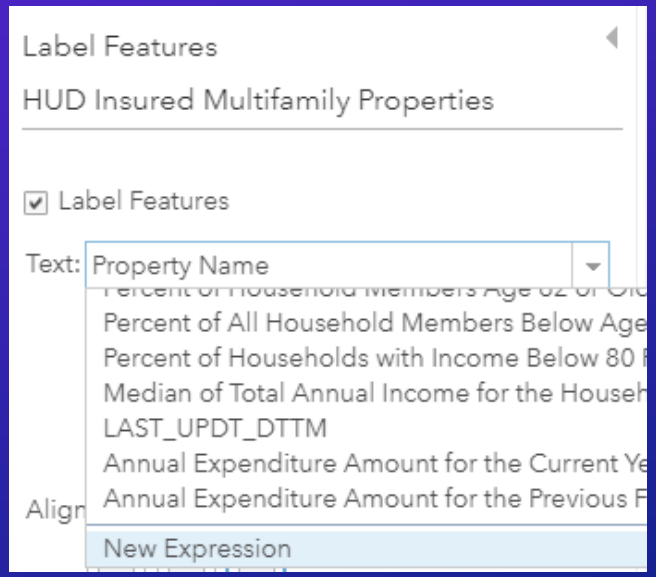
Pop-up Configuration



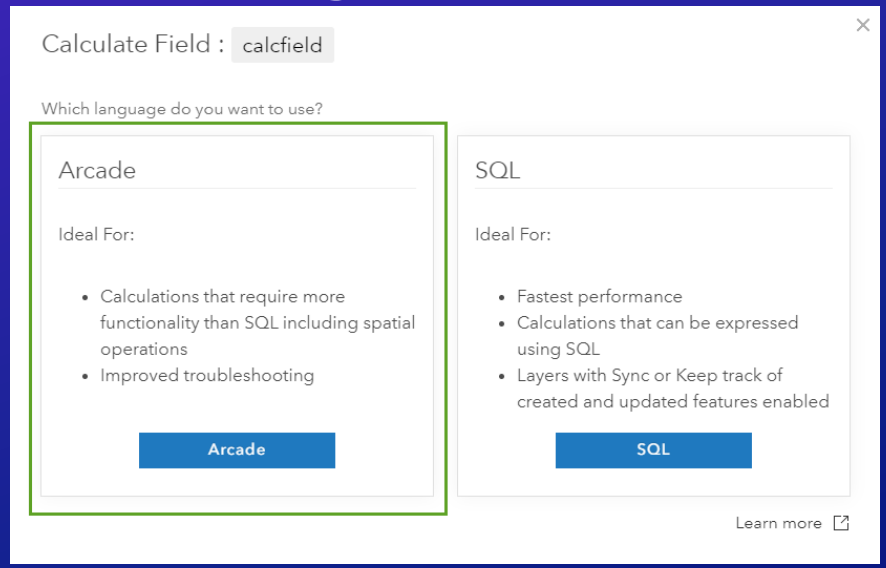
Transparency

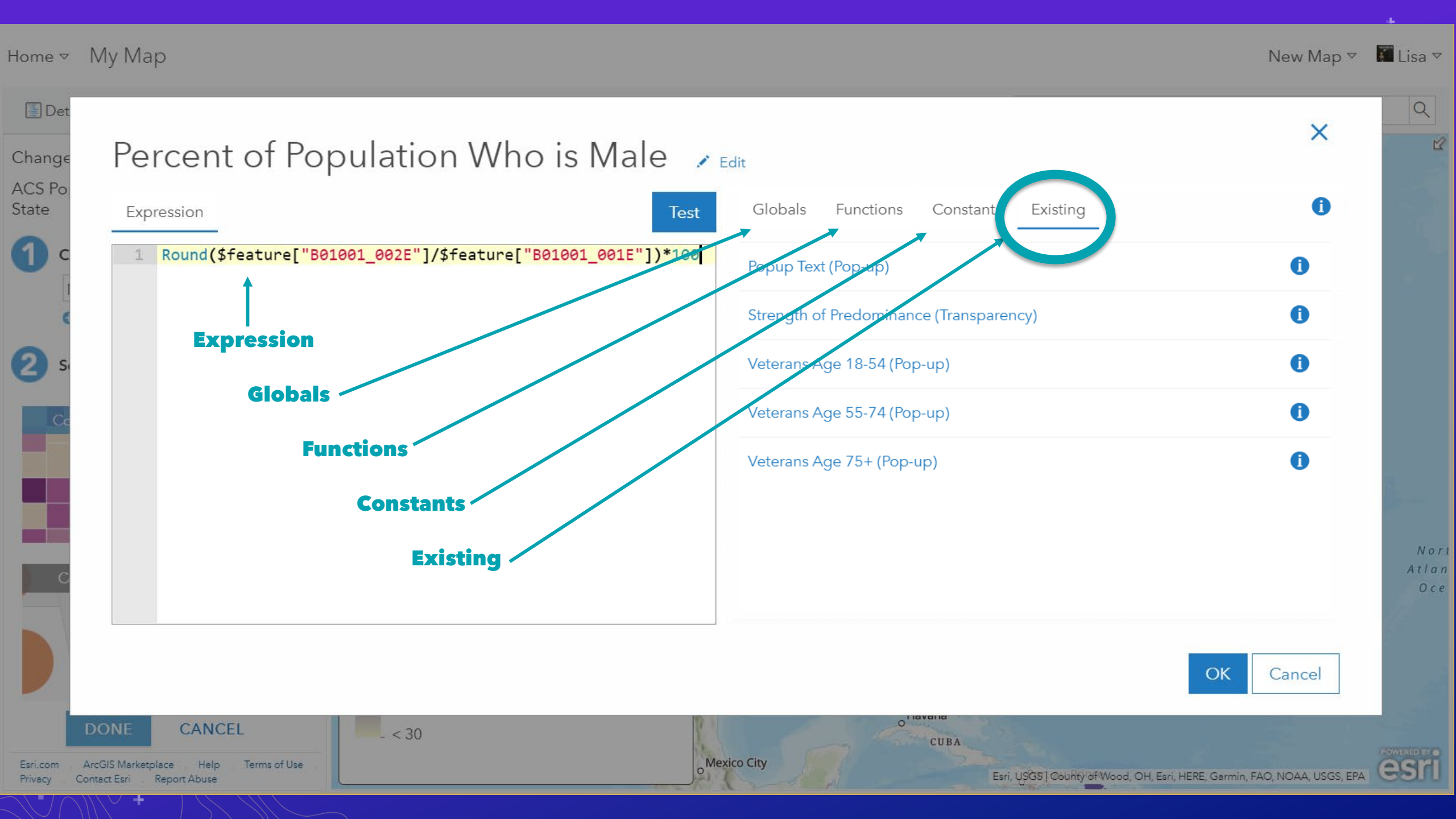


Labels



Calculating Field Values




Home
My Map
New Map
Lisa
Percent of Population Who is Male
Edit
Expression
Test
Globals
Functions
Constant
Existing
1
Round($feature["B01001_002E"]/$feature["B01001_001E"])*100
Expression
Globals
Functions
Constants
Existing
Popup Text (Pop-up)
Strength of Predominance (Transparency)
Veterans Age 18-54 (Pop-up)
Veterans Age 55-74 (Pop-up)
Veterans Age 75+ (Pop-up)
OK
Cancel
DONE
CANCEL
< 30
Mexico City
CUBA
Esri, USGS | County of Wood, OH, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA
Esri.com
ArcGIS Marketplace
Help
Terms of Use
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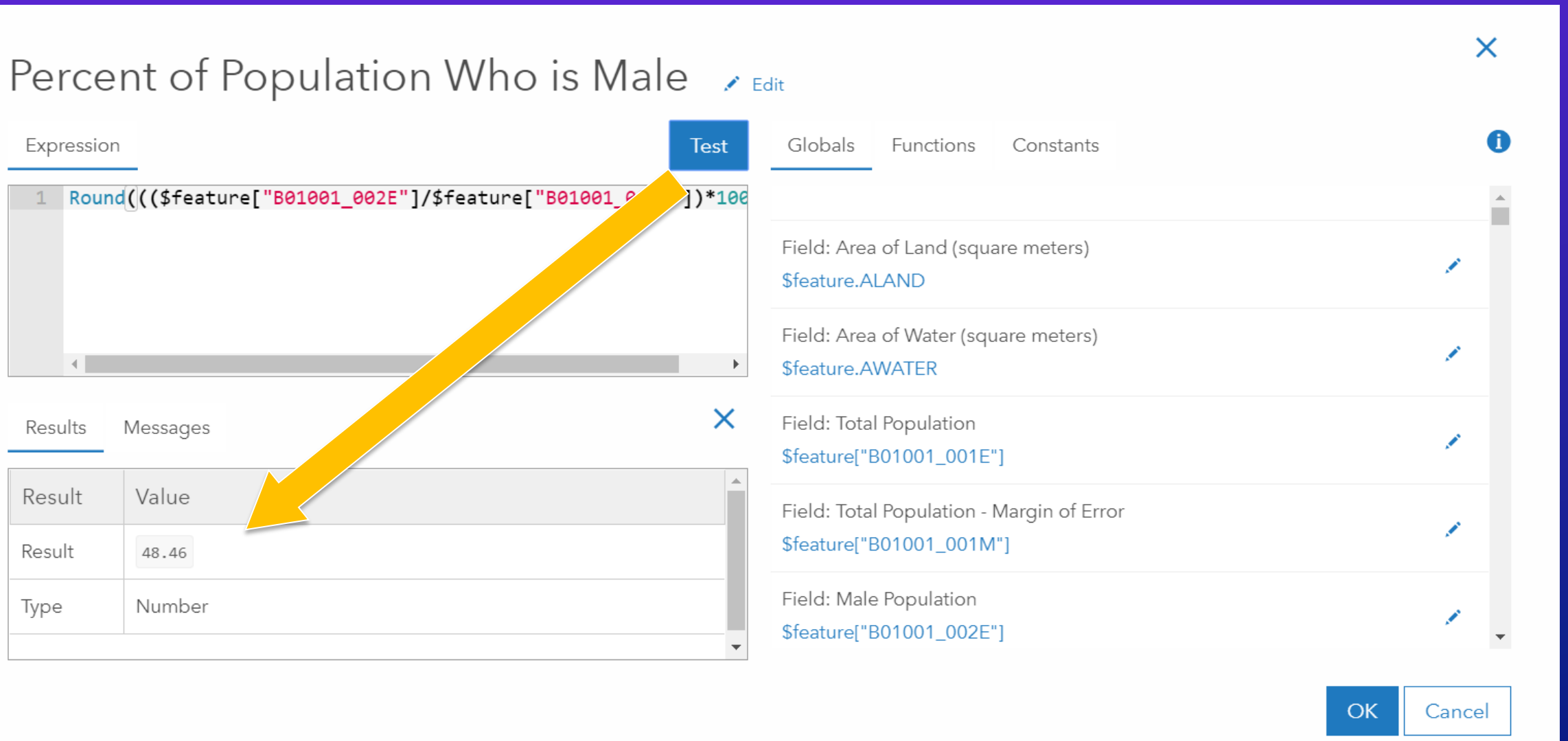
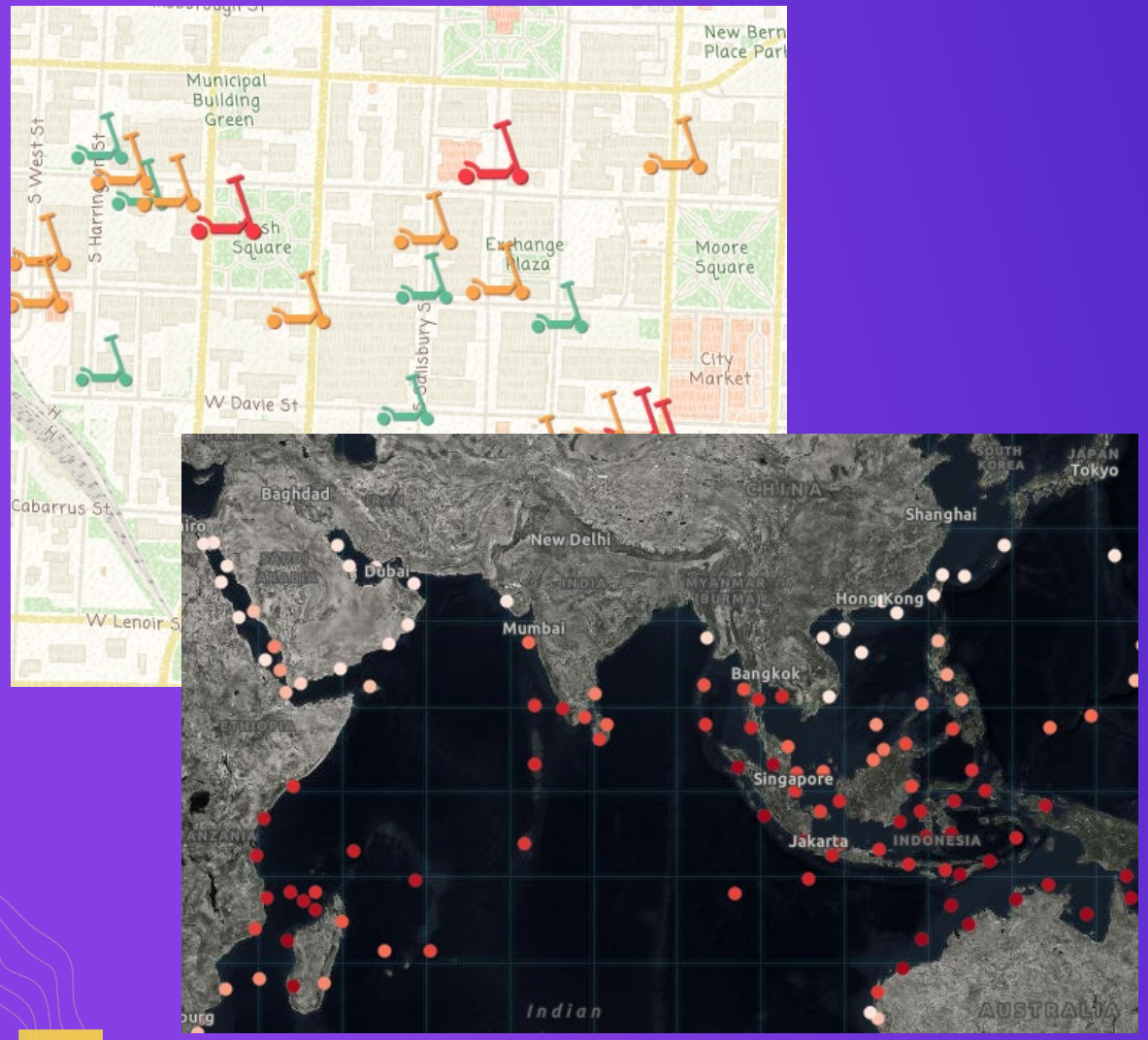
Contact Esri
Report Abuse

Test it!


Percent of Population Who is Male
Edit
Expression
Test
Globals
Functions
Constants
1
Round((($feature["B01001_002E"]/$feature["B01001_0
])*100
Results
Messages
Result
Value
Result
48.46
Type
Number
Field: Area of Land (square meters)
$feature.ALAND
Field: Area of Water (square meters)
$feature.AWATER
Field: Total Population
$feature["B01001_001E"]
Field: Total Population - Margin of Error
$feature["B01001_001M"]
Field: Male Population
$feature["B01001_002E"]
OK
Cancel



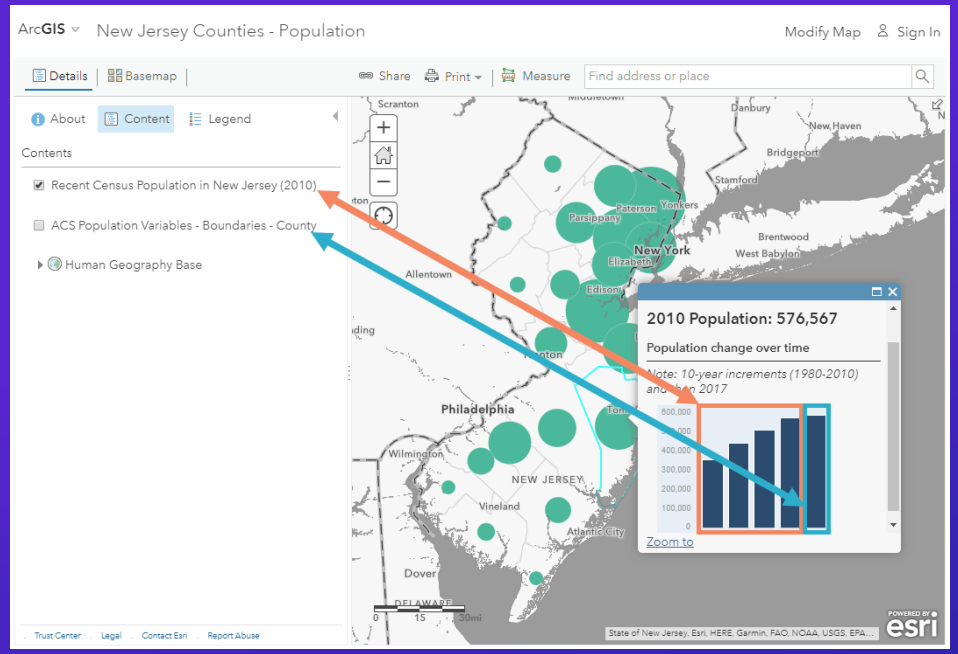
Simple Arcade within a Web Map

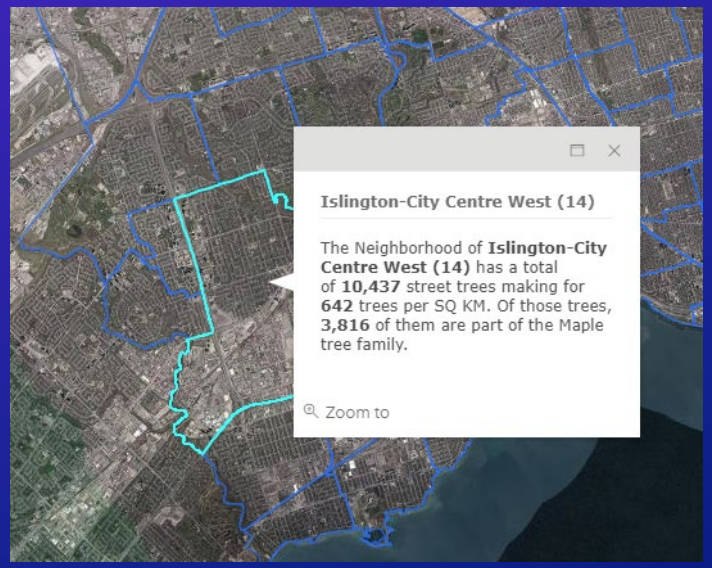
Lisa Berry/Paul Barker

Paul Barker

Adding Complexity

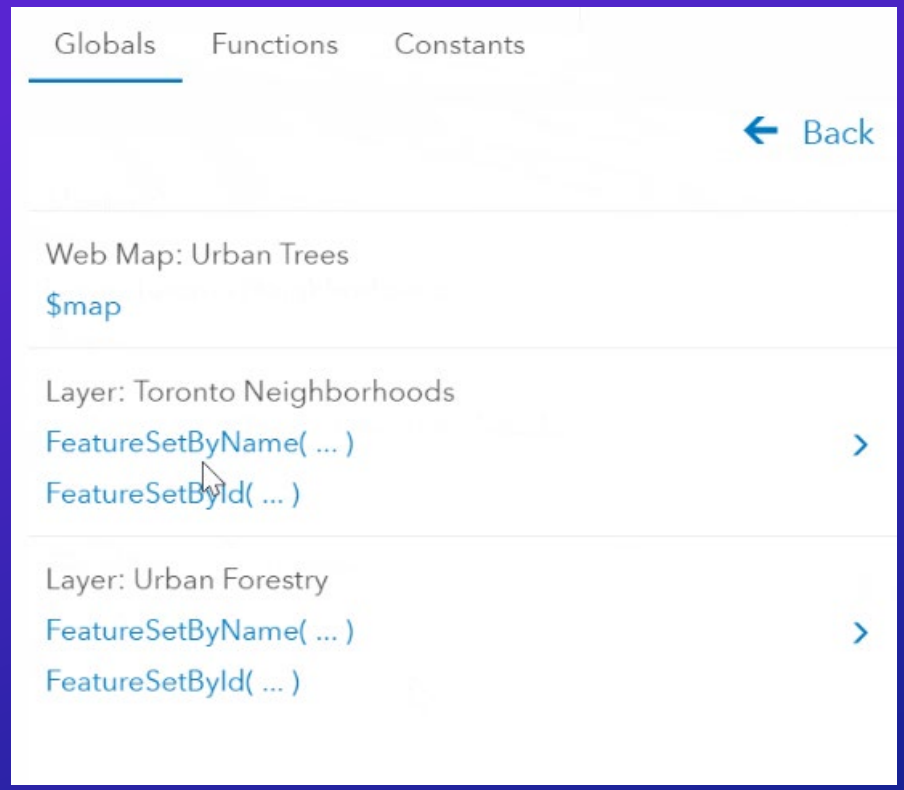
- Many options at your fingertips
  - Variables
  - User-built functions
  - Boolean logic
  - For loops
  - Conditional statements
  - Geometry functions
  - Feature Sets
- Examples:
  - Access related data in your popup
  - Perform complex field calculations:
    - an unique index created from multiple fields
    - render based on geographic relationships (field calculate)
    - Based on spatial relationships

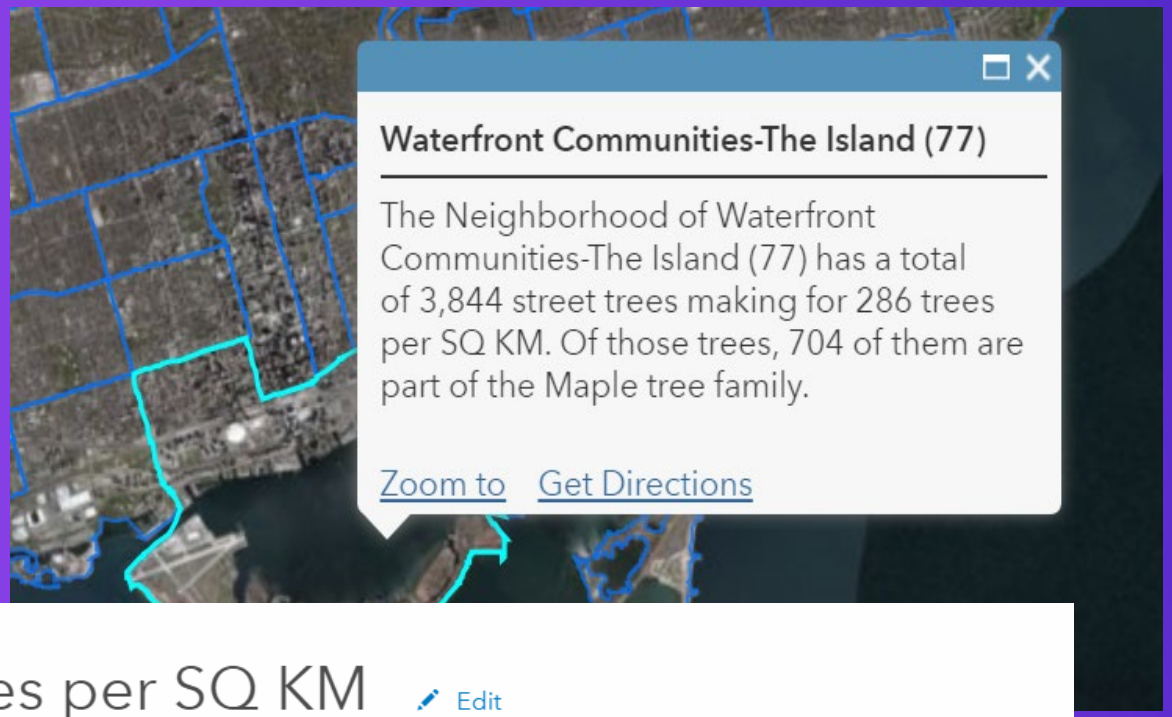




What's a Feature Set?

- Feature sets are a way to access information from multiple features
  - From the same layer or any layer within your map ($map) or service ($datastore)
  - Work with data that is related either informally or formally
  - Can be very powerful when used responsibly





Trees per SQ KM Edit

Expression

Test

```
1  // define the FeatureSet Variable
2  var trees = FeatureSetByName($map,"Urban Forestry")
3
4  // Intersect the featureset with the neighborhood
5  // and get the total number of trees (count) for that
6  // neighborhood
7  var countTrees = Count(Intersects(trees,$feature))
8  var treeDensity = countTrees / AreaGeodetic($feature, 'square-kilo
9  return Round(treeDensity,2)
10
```

Adding Complexity

Paul Barker/Lisa Berry

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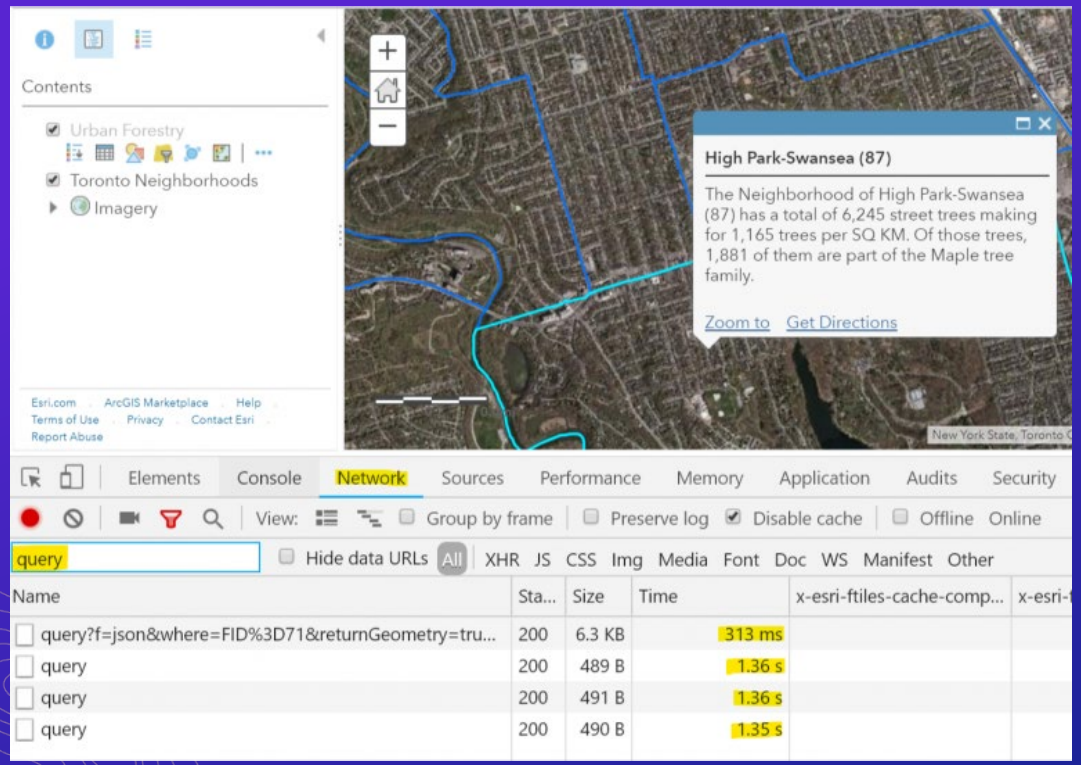
Troubleshoot your Expressions

- Plan things out in your head or on paper before you start
- The test feature and button are your friend
- Leverage console statements to debug code
- Factor out logic into functions in larger expressions



Considerations

- Check your network traffic – how big are your queries?
- When using feature sets, don’t make heavy queries (heavy = slow)
  - Use attribute queries instead of spatial queries when possible
- Each expression executes independent of one another (repeat queries ?)
- If you don’t need it, don’t request it!
- Chain functions as much as possible

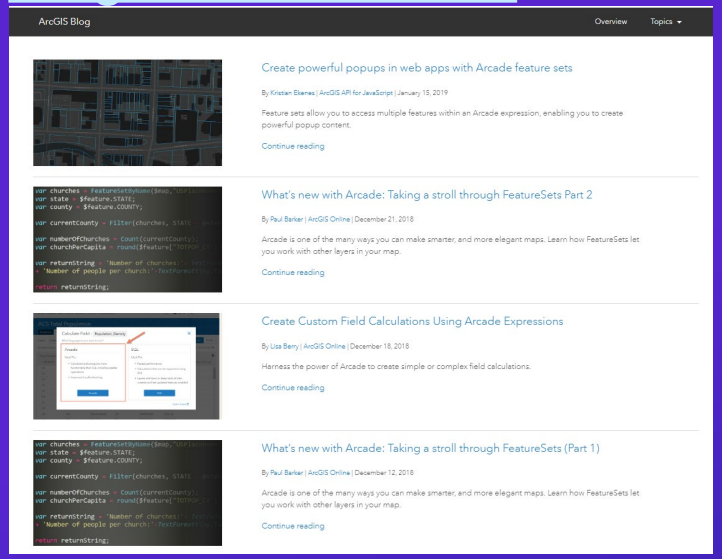
What's next

- Bitwise operators
- Template literals
- Functions to tell you more about your data
  - List subtypes, domains etc.

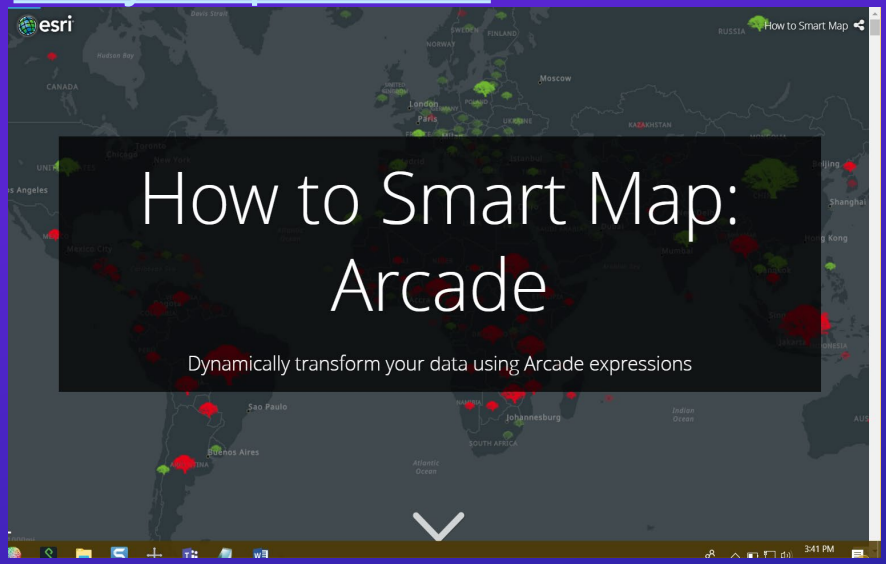
Resources for Arcade

http://esriurl.com/ArcadeResources

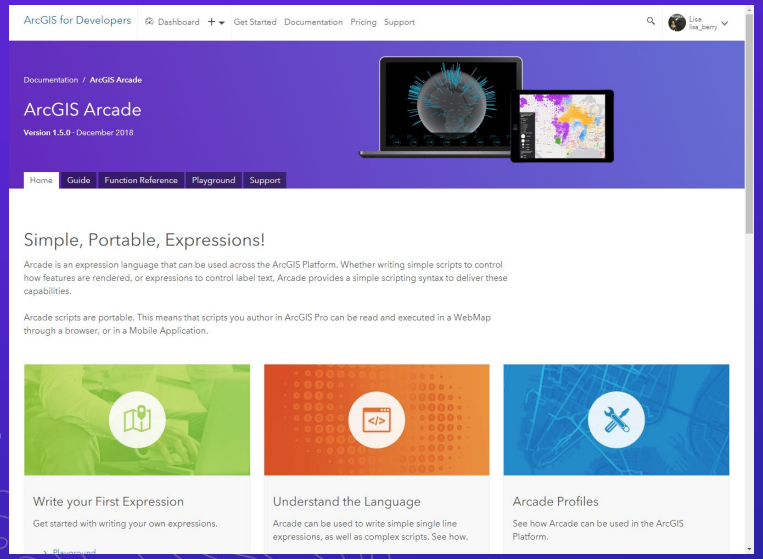
Blogs about Arcade



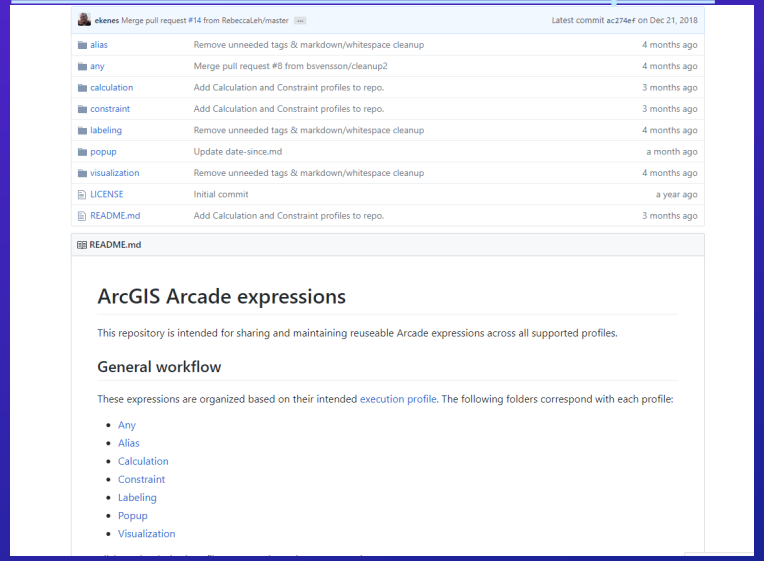
Story Map Tutorial



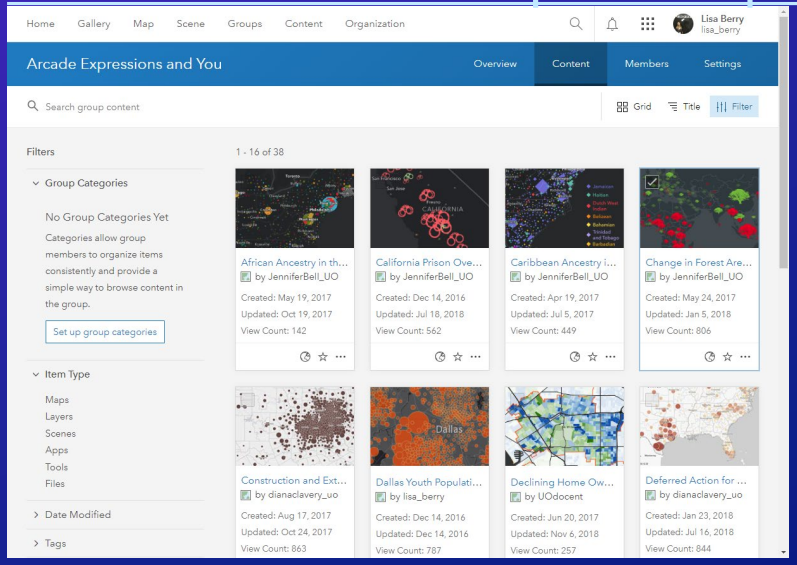
Documentation



GitHub – Arcade Examples



ArcGIS Online Group: Examples



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