Arcade fundamentals for customization of popups

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ArcGIS Arcade - Introduction

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What is Arcade?

An innovative language expression to create custom content on ArcGIS

- mathematical calculations
- format text
- evaluate logical statement
- picture
- video
- audio (HTML configuration)

Characteristics

Portability across ArcGIS products

Arcade expression workflow

1. Determine output
2. Explore data
3. Plan expression
4. Write expression
5. Execute expression
6. Evaluate output

Arcade is unique

Thanks to the inclusion of features & geometry data types

Features

```
var d = Feature(myGeometry, "field1", 1, "field2", 2);
return d.field1 + d["field2"];  // returns 3
```

```
var population = $feature.Population;
```

```
// returns % change in votes from 2012 to 2016
Round(
  (
    ($feature["COUNTY_ID.VOTED_DEM_2016"] - $feature["COUNTY_ID.VOTED_DEM_2012"])
    / $feature["COUNTY_ID.VOTED_DEM_2012"]
  ) * 100,
2 );
```

```
var geom = Geometry($feature);
if( TypeOf(geom) == "Polygon" ){
  return firstVertex = geom.rings[0][0];  // The first vertex of the polygon
}
```

Geometry

```
// polyline with one path, which contains 4 vertices and 3 segments
// the third value in the vertex definition represents the z-value as indicated by the hasZ property
var line = Polyline({
  paths: [
    [  // path 0
      [-97.06138,32.837, 100],  // vertex 0; segment 0 start
      [-97.06133,32.836, 50],  // vertex 1; segment 0 end; segment 1 start
      [-97.06124,32.834, 20],  // vertex 2; segment 1 end; segment 2 start
      [-97.06127,32.832, 0]  // vertex 3; segment 2 end
    ]
  ],
  hasZ: true,
  spatialReference: { wkid: 102100 }
});
```

```
// polygon with one ring, which contains 4 vertices and 4 segments
// the third value in the vertex definition represents the z-value as indicated by the hasZ property
var shape = Polygon({
  rings: [
    [  // ring 0
      [-97.06138,32.837, 100],  // vertex 0; segment 0 start
      [-97.06133,32.836, 50],  // vertex 1; segment 0 end; segment 1 start
      [-97.06124,32.834, 20],  // vertex 2; segment 1 end; segment 2 start
      [-97.06127,32.832, 0]  // vertex 3; segment 2 end; segment 3 start
      [-97.06138,32.837, 100],  // vertex 4 (same as vertex 0); segment 3 end
    ]
  ],
  hasZ: true,
  spatialReference: { wkid: 102100 }
});
```

Arcade Basics

- Variables and Return statements

- Logical statements/functions
  - If else
  - When
  - IIF

population

Run

```
var population = Round($feature.BEVOLKINGSDICHTHEID * $feature.SHAPE_Area)
return population
```

```
if(x > 2){
  return "High"
}
else{
  return "Low"
}
```

```
When(x > 2 && x < 10, "Medium",
  x <= 2, "Low",
  "High")
```

```
// Returns "high" if condition is true and "low" if false
// Can be a sinlge line using implict return
IIF($feature.value > 100, "high", "low");
```

Frequently Used Functions

- DefaultValue

```
// returns a default value of 0 if the data field is empty
IIF(!IsEmpty($feature.fieldName), $feature.fieldName, 0);

// returns a default value of 0 if the data field is empty
DefaultValue($feature.fieldName, 0);
```

- Text: A value (i.e. date, number or other data type) to be converted to text with certain conversion

```
1   Text(123, '0000') // '0123'
2
3   Text(1.234, '#.#') // '1.2'
4
5   Text(0.3, '#%') // '30%'
6
7   Text(Now(), 'dddd, MMMM D, Y h:m:s')
8   //Thursday, may 22, 2025 11:43:11
9
```

This parameter accepts one of two values: everyword or firstword

Frequently Used Functions

- Decode: example translations of values

DecodeGebruikProp...

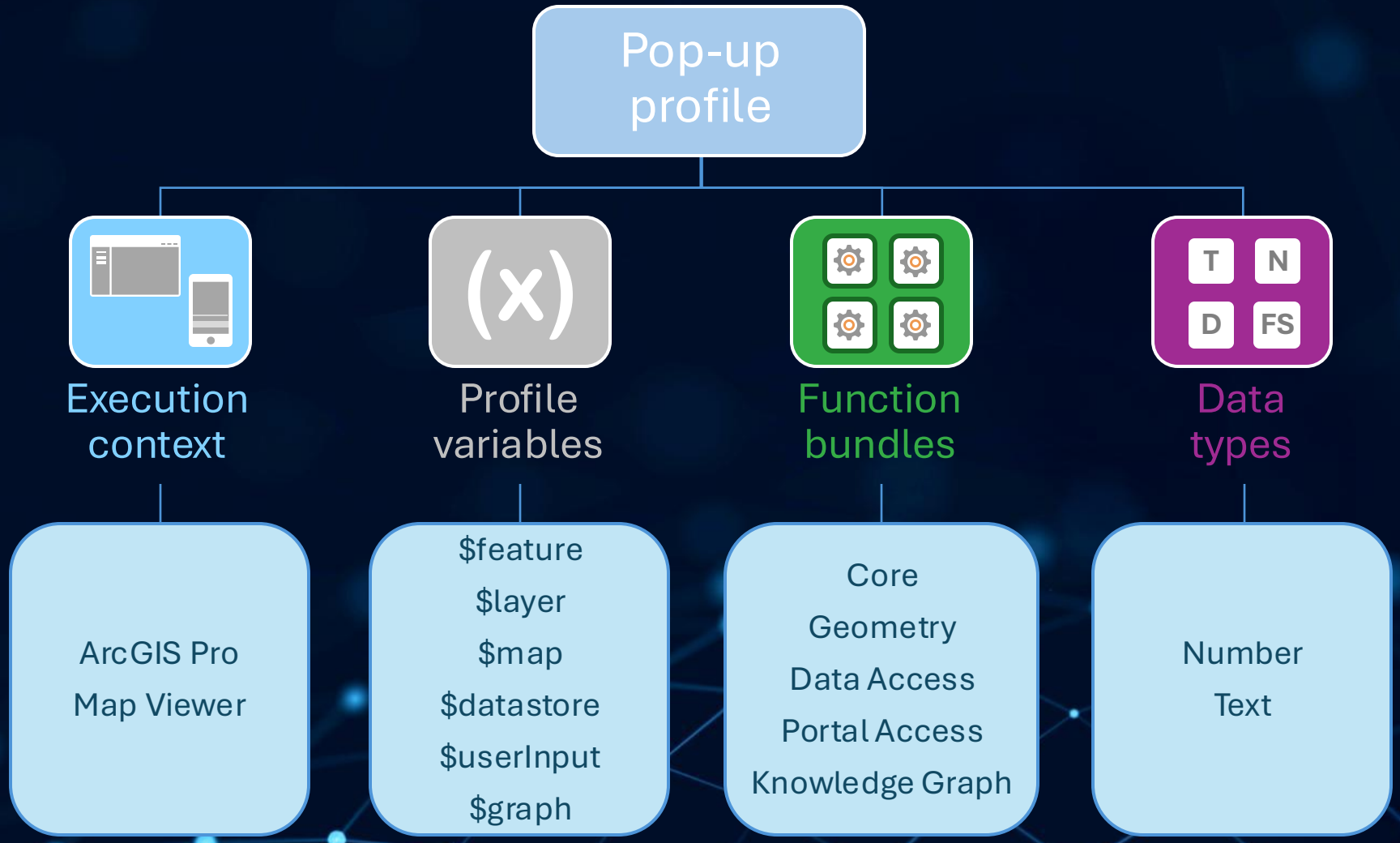
Run

```
1   return Decode($feature.Gebruik,
2   "IN_GEBRUIK", "In Use",
3   "BUITEN_GEBRUIK", "Out of Order",
4   "Other")
```

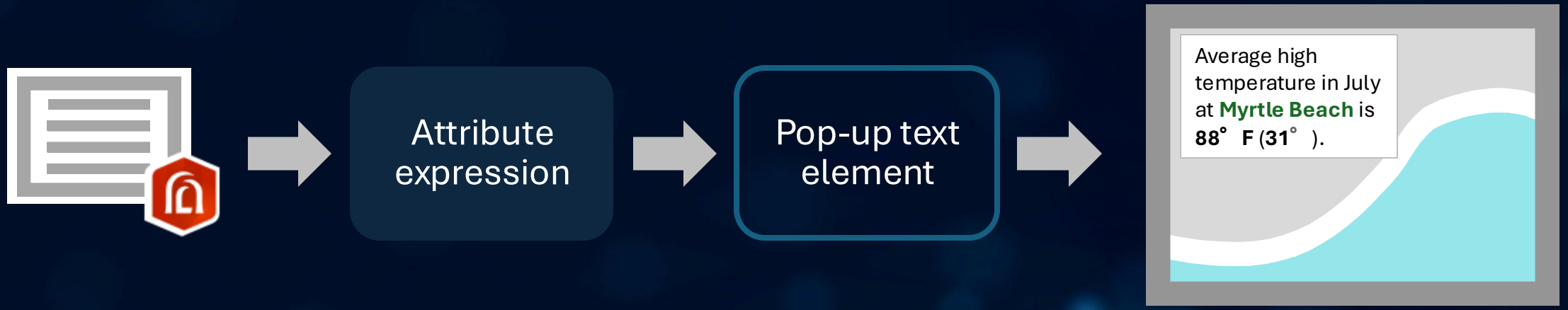
- Proper: Converts text into title case, this parameter accepts two values: ‘everyword or firstword’

```
1   return Proper($feature.WIJKNAAM, "firstword")
2
```

Using Arcade for popups



Using Arcade for popups



Using Arcade for popups

Author expression

```
if($feature.LANDUSE == “residential"){
  return "0000FF";}
if($feature.LANDUSE == "open space"){
  return "00FF00";}
```

Configure pop-up text template

```
This land use area is <span style="color:#{expression/expr0};">{LANDUSE}</span>.
```

ArcGIS

Wouter D’hollander

Intermediate concepts

- FeatureSets
  - Pull information from other layers
- Get FeatureSetByName/FeatureSetById
  - Find the layer in the current webmap using its name/Id

```
var availableCambioStations = FeatureSetByName($map, "Cambio")
```

```
FeatureSetById($map, "196c902502a-layer-4", ["Adresses"], false)
```

- FeatureSetByPortalItem
  - Get Attributes from a layer not in your map

```
var fs = featureSetByPortalItem(Portal('https://www.arcgis.com/'),
"774019f31f8549c39b5c72f149bbe74e", 0)
```

- FeatureSetByRelationshipClass
  - Return the related records for a feature based on the name of the relationshipclass

```
FeatureSetByRelationshipClass(inputFeature, relationshipClass, fieldNames?,
includeGeometry?) -> FeatureSet
```

FeatureSets: Don’ts and Do’s

- Don’t assume client-side operation are always faster
  - Scalability: Feature requests come in pages. Can take several seconds to load
- Don’t iterate through feature sets
  - Scalability: This requests all features in the layer
  - DO use the FeatureSet functions provided
- Don’t try to hack a creative solution
  - DO work with the system
- Do Use Browser developer tools to inspect the following when executing expression
  - Number of requests
  - Payload size
  - Timing

Intermediate concepts

- Geometry functions
  - Access and use of the geometries of a features

Run | Last results

```
1   return Area($feature, "square-kilometers")
```

NumberOfBikeDocki...

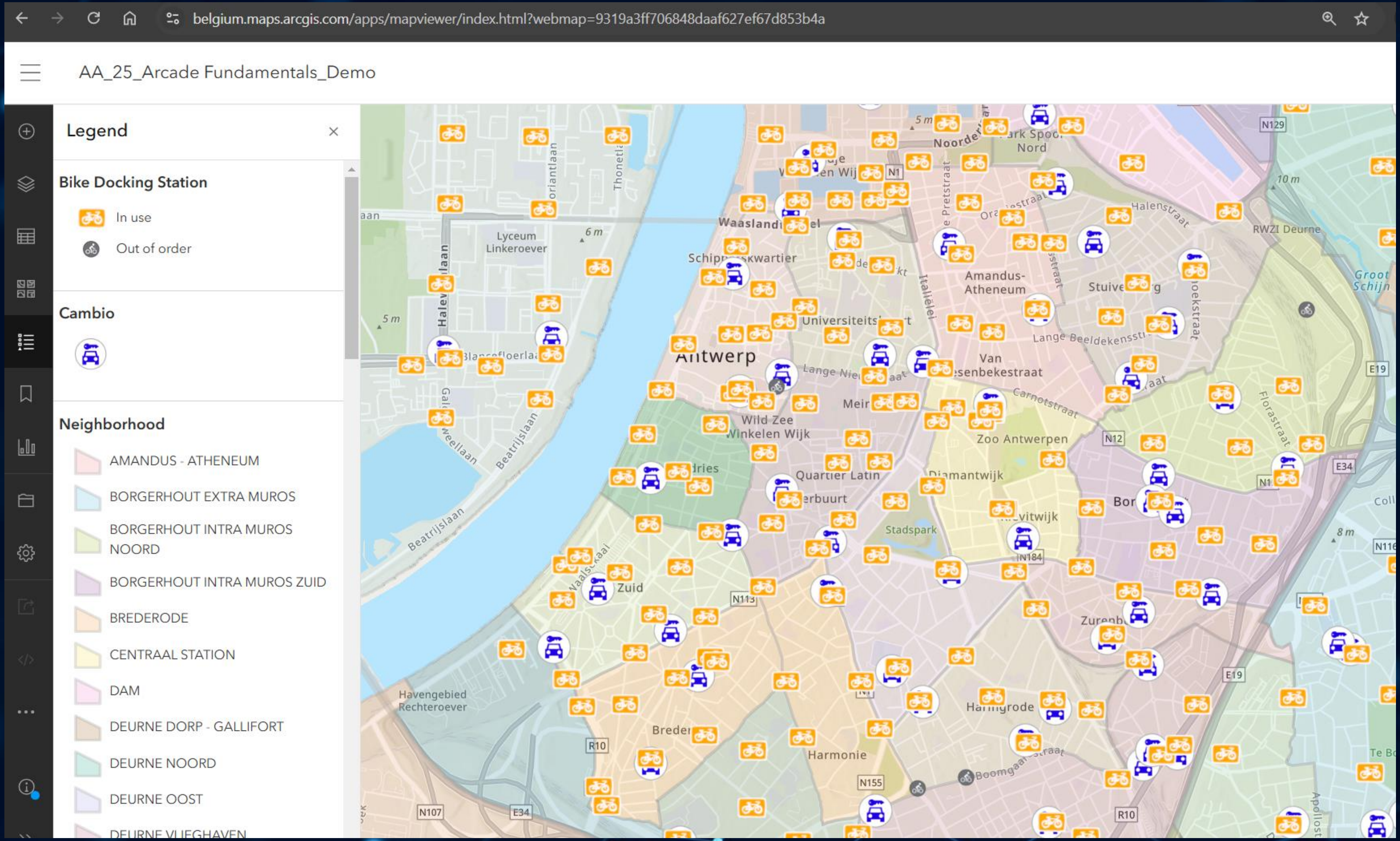
Run | Last results

```
1   //Define the featureset variable
2   var BikeDockingStationsFeatureSet = FeatureSetByName($map,"Bike Docking Station")
3   //get only the "in_used docking places : Gebruik = 'In_GEBRUIK'
4   var availableBikeDockingStations = filter(BikeDockingStationsFeatureSet, "Gebruik = 'IN_GEBRUIK'")
5   //intersect the feature set with the neighborhood
6   //and get the total number of docking stations for that neighborhood
7   var intersectBikeStation = Intersects(availableBikeDockingStations, $feature)
8   var TotalNumberOfPlaces = sum(intersectBikeStation,"Aantal_plaatsen" )
9   return TotalNumberOfPlaces
10
```

Demo

- Open Data from city of Antwerp
  - Layer with all the districts (neighborhood)
    - Attributes: Name, Population density
  - Layer with Public Bike Docking Stations
    - Attributes: Number of Bike Docks
  - Layer with Cambio parking spots

- Question:
  - Show for the Public Bike docking stations a popup
    - In which neighborhoods it’s locatated
    - An overview of the Cambio parking spots within 400m distance
      - https://belgium.maps.arcgis.com/apps/mapviewer/index.html?webmap=9319a3ff706848daaf627ef67d853b4a


belgium.maps.arcgis.com/apps/mapviewer/index.html?webmap=9319a3ff706848daaf627ef67d853b4a
AA_25_Arcade Fundamentals_Demo
Legend
Bike Docking Station
In use
Out of order
Cambio
Neighborhood
AMANDUS - ATHENEUM
BORGERHOUT EXTRA MUROS
BORGERHOUT INTRA MUROS NOORD
BORGERHOUT INTRA MUROS ZUID
BREDERODE
CENTRAAL STATION
DAM
DEURNE DORP - GALLIFORT
DEURNE NOORD
DEURNE OOST
Antwerp
Lyceum Linkeroever
Amandus-Atheneum
Zoo Antwerpen
Stadspark
Harmonie
Havengebied Rechteroever
RWZI Deurne
Universiteitskwartier
Quartier Latin
Diamantwijk
Zuid
Meir
Lange Beeldekensstraat
Van Kerckhovenstraat
Carnotstraat
Halenstraat
Beatrijslaan
Waalsekaai

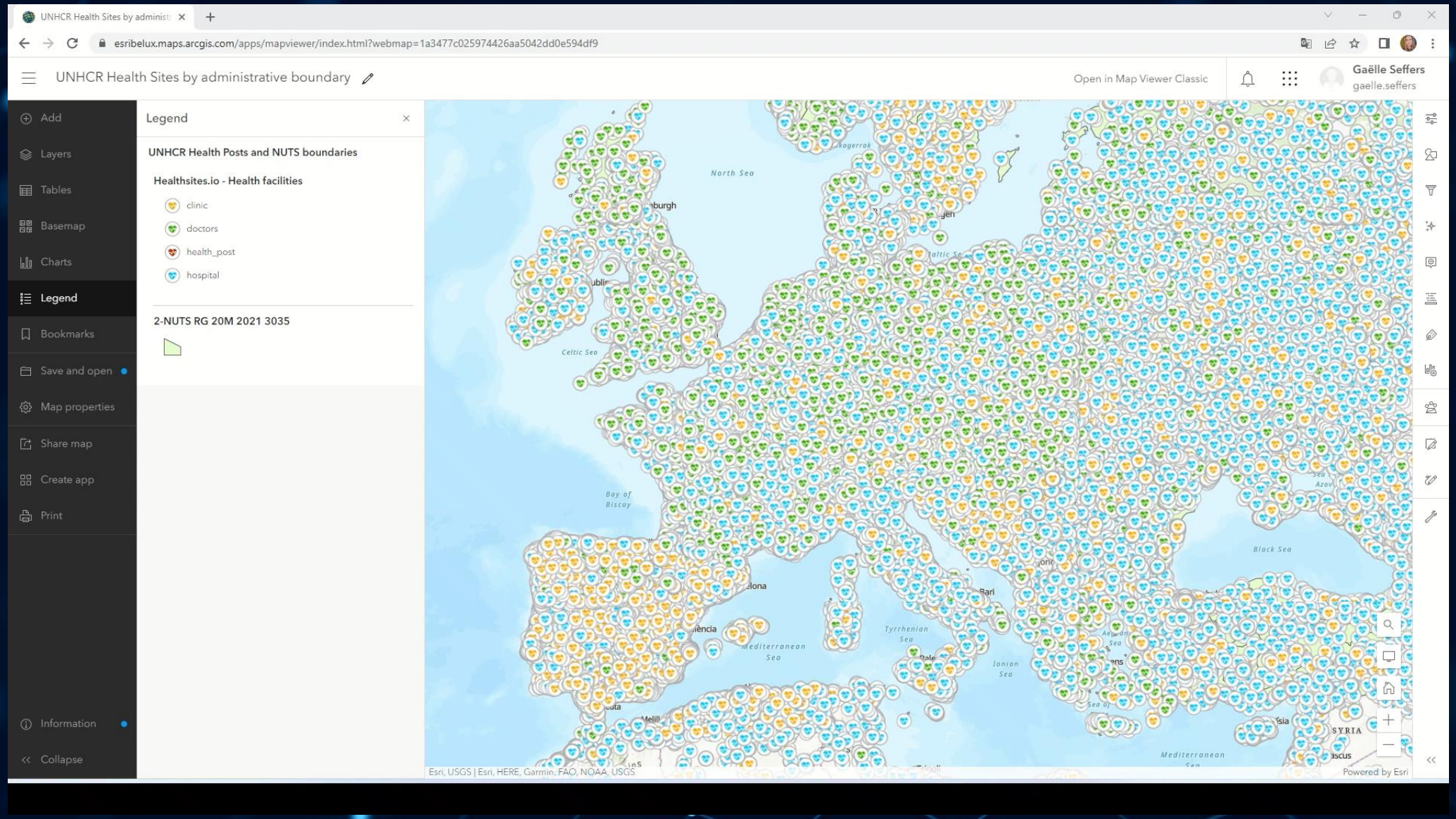
ArcGIS

Gaëlle Seffers

Demo

- Open Data from Healthsites.io and Nuts Boundaries
  - Layer with 4 types of Health Facilities
    - Attributes: Amenity
  - Layer with Nuts boundaries (2-NUTS)

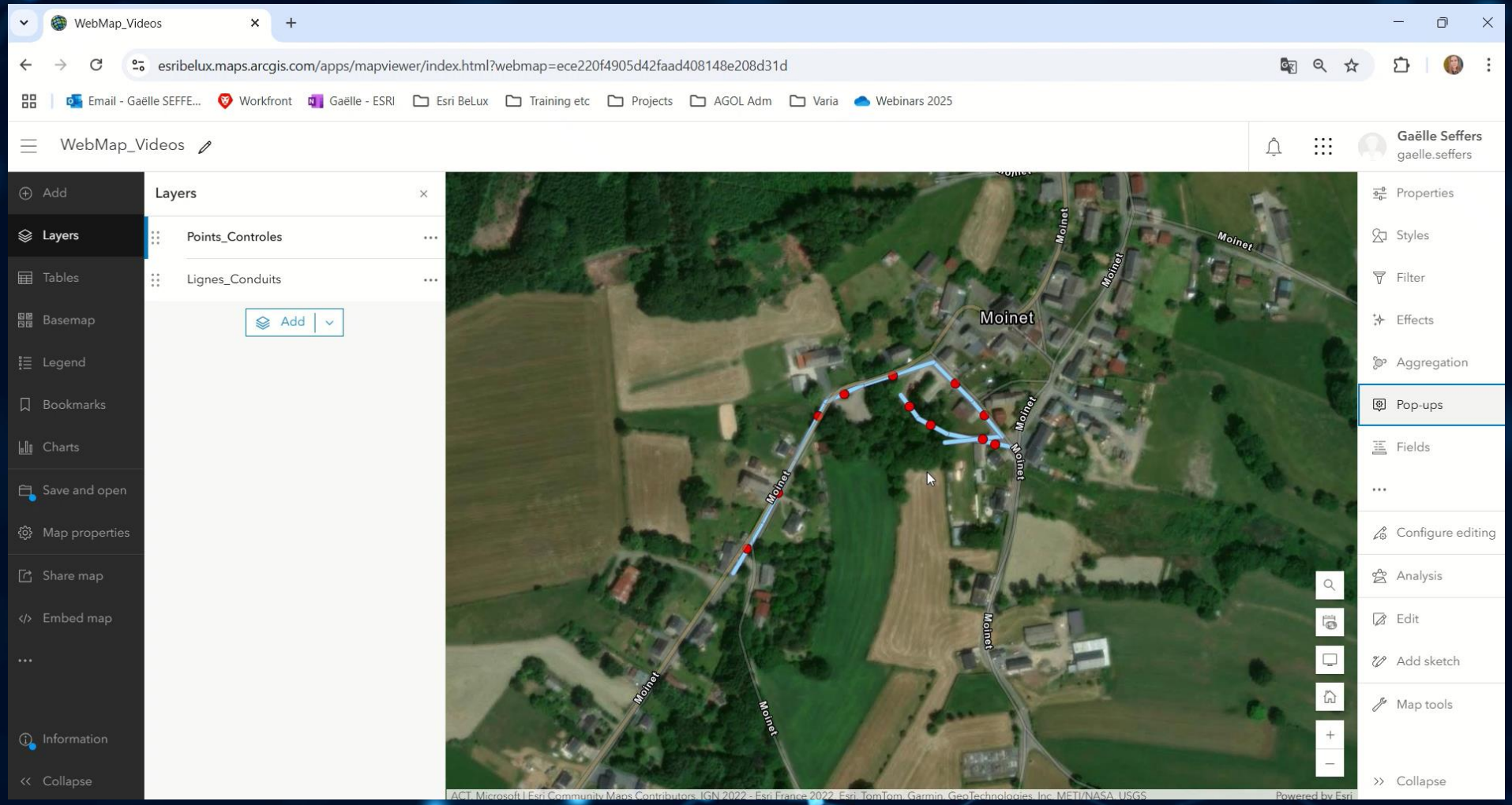
- Question:
  - Show in the NUTS popup
    - Top 3 health amenities of this certain regio
    - The number of these 3 health amenities in this certain cregio


UNHCR Health Sites by administ
esribelux.maps.arcgis.com/apps/mapviewer/index.html?webmap=1a3477c025974426aa5042dd0e594df9
UNHCR Health Sites by administrative boundary
Open in Map Viewer Classic
Gaëlle Seffers
gaelle.seffers
Add
Layers
Tables
Basemap
Charts
Legend
Bookmarks
Save and open
Map properties
Share map
Create app
Print
Information
Collapse
Legend
UNHCR Health Posts and NUTS boundaries
Healthsites.io - Health facilities
clinic
doctors
health_post
hospital
2-NUTS RG 20M 2021 3035
North Sea
Celtic Sea
Bay of Biscay
Mediterranean Sea
Tyrrhenian Sea
Ionian Sea
Black Sea
Sea of Azov
SYRIA
Esri, USGS | Esri, HERE, Garmin, FAO, NOAA, USGS
Powered by Esri

Demo

- Sample data from Project
  - Layer with Pipes
  - Layer with Control Points
    - Attributes: VideoLink, startTime

- Question:
  - Show in the Control Points popup
    - Playing the video – found in the link – on a certain startTime
    - The link to the video itself


WebMap_Videos
esribelux.maps.arcgis.com/apps/mapviewer/index.html?webmap=ece220f4905d42faad408148e208d31d
Email - Gaëlle SEFFE...
Workfront
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Esri BeLux
Training etc
Projects
AGOL Adm
Varia
Webinars 2025
WebMap_Videos
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Add
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Tables
Basemap
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Save and open
Map properties
Share map
Embed map
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Collapse
Layers
Points_Controles
Lignes_Conduits
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Styles
Filter
Effects
Aggregation
Pop-ups
Fields
Configure editing
Analysis
Edit
Add sketch
Map tools
Collapse
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Questions