ArcGIS Enterprise: Out-of-the-Box Spatial Analysis

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Agenda

- What is spatial analysis?
- Spatial analysis with ArcGIS Enterprise
- Analysis demos:
  - Sunflower proximity to bees
  - Tourists in DC
  - Analyzing urban tree health
- Resources for you

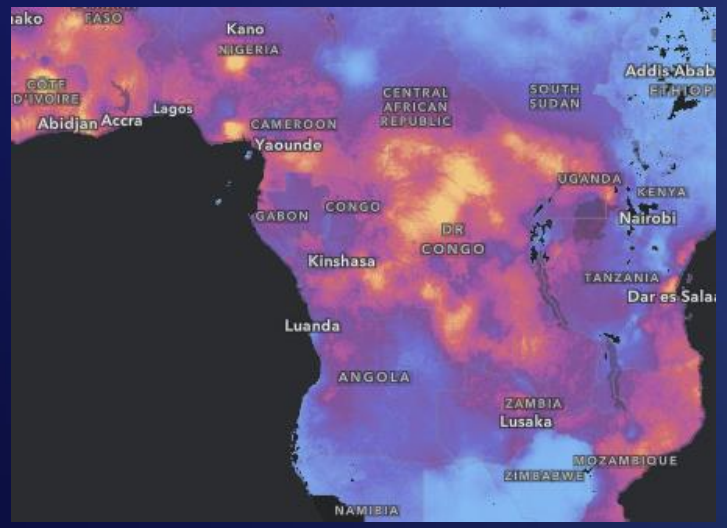
Note – this session will be most applicable for those who are just getting familiar with spatial analysis or need a refresher!

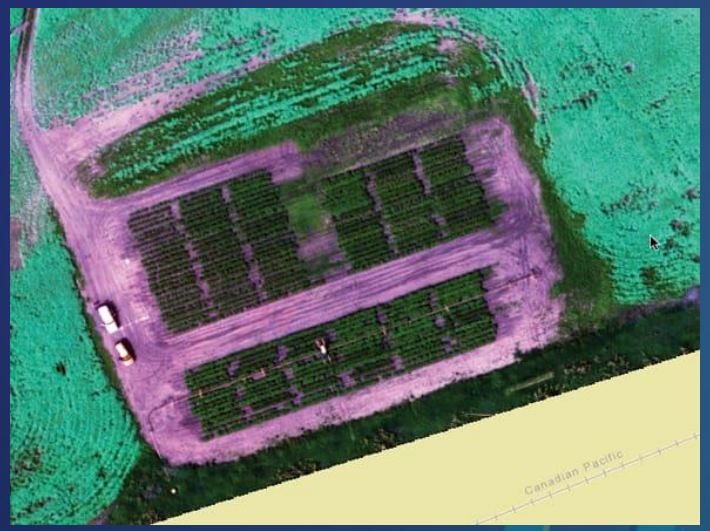
Quick Poll

- Do you currently have ArcGIS Enterprise?
- Are you familiar with spatial analysis tools in the portal?
- Do you use spatial analysis tools in ArcGIS Online?

What is spatial analysis?

- The process of examining the locations, attributes, and relationships of features in spatial data through analytical techniques in order to address a question or gain useful knowledge.
- Spatial analysis extracts information or creates new information from data.





Crime studies
Drought analysis
Land use planning
Calculating viewshed
Assessing crop health
Visualizing solar radiation exposure
Emergency management and response

THE LANGUAGE OF SPATIAL ANALYTICS

Using *The Science of Where* to understand our world—mapping where things are, how they relate, what it all means, and what actions to take.

Understanding where

1. Understanding where things are (location maps).
2. Understanding where the variations and patterns in values are (comparative maps).
3. Understanding where and when locations and values change.

Measuring size, shape, and distribution

4. Calculating individual feature geometries.
5. Calculating geometries and distributions of feature collections.

Determining how places are related

6. Determining what is nearby or coincident.
7. Determining and summarizing what is within an area(s).
8. Determining what is closest.
9. Determining what is visible from a given location(s).
10. Determining overlapping relationships in space and time.

Finding the best locations and paths

11. Finding the best locations that satisfy a set of criteria.
12. Finding the best allocation of resources to geographic areas.
13. Finding the best route, path, or flow along a network.
14. Finding the best route, path, or corridor across open terrain.
15. Finding the best supply locations given known demand and a travel network.

Detecting and quantifying patterns

16. Where are the significant hot spots, anomalies, and outliers?
17. What are the local, regional, and global spatial trends?
18. Which features/pixels are similar, and how can they be clustered, classified, and identified?
19. Are spatial patterns changing over time?

Making predictions

20. Given a success case, identifying, ranking, and predicting similar locations.
21. Finding the factors that explain observed spatial patterns and making predictions.
22. Interpolating a continuous surface and trends from discrete sample observations.
23. Predicting how and where objects spatially interact (attraction and decay).
24. Predicting how and where objects affect wave propagation.
25. Predicting where phenomena will move, flow, or spread.
26. Predicting what-if.

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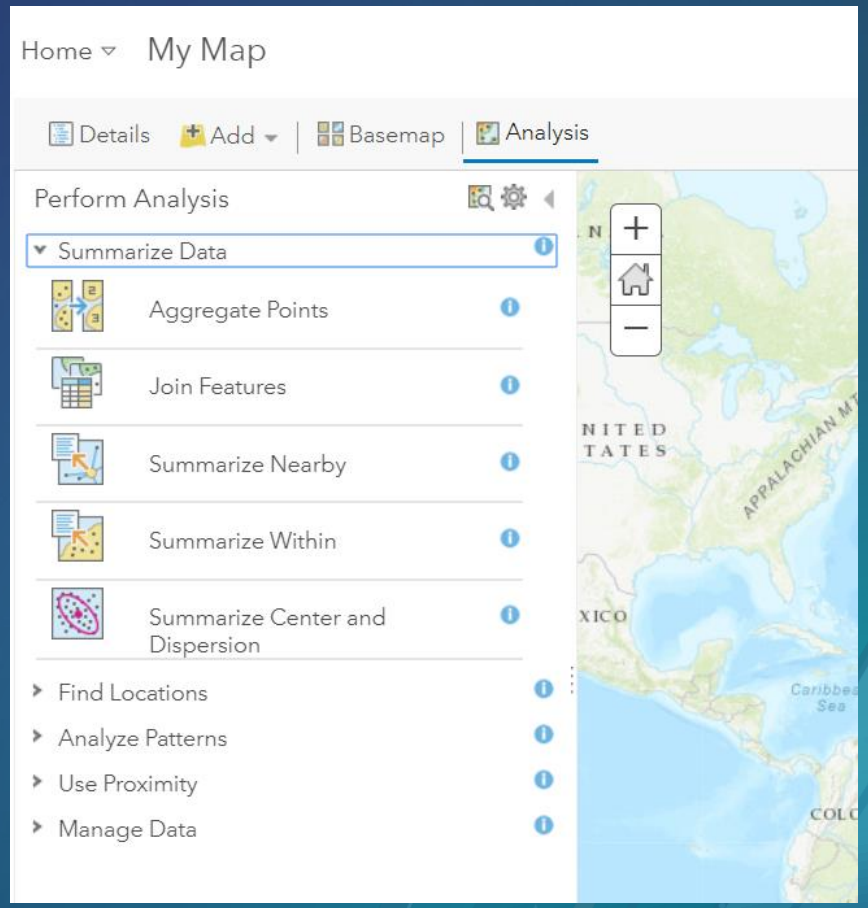
https://www.esri.com/training/catalog/5acd157885785d4ea0ae930b/the-language-of-spatial-analytics/

Out-of-the-box spatial analysis with ArcGIS Enterprise

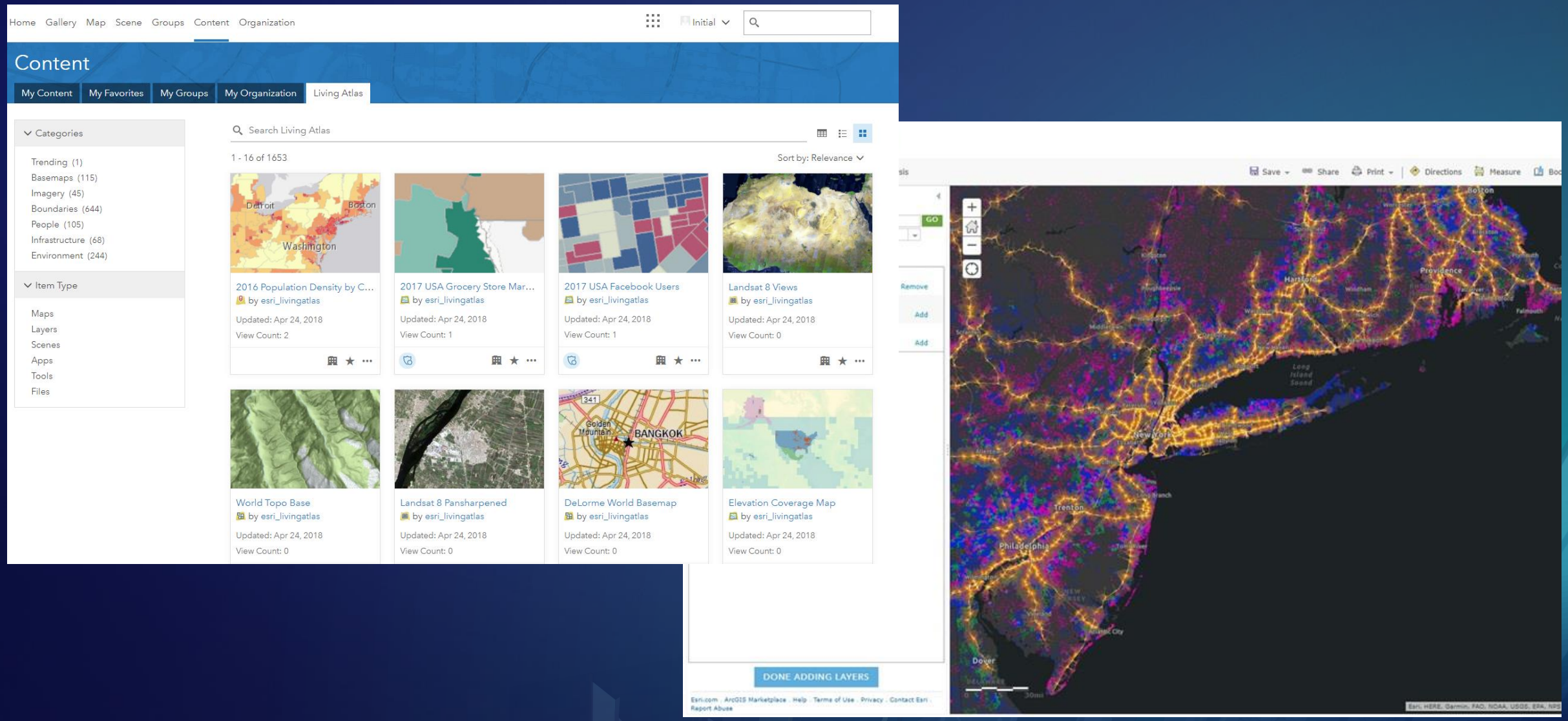
Feature Analysis

- Summarize Data
- Find Locations
- Data Enrichment
- Analyze Patterns
- Use Proximity
- Manage Data

- 27 standard tools



Out-of-the-box data with ArcGIS Enterprise – Living Atlas of the World



Adding more spatial analysis capabilities…

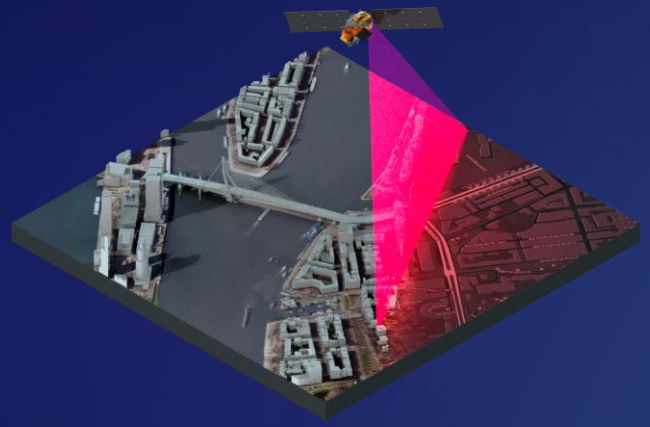
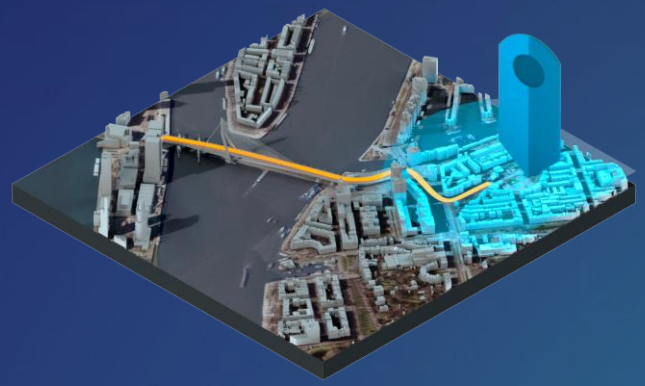
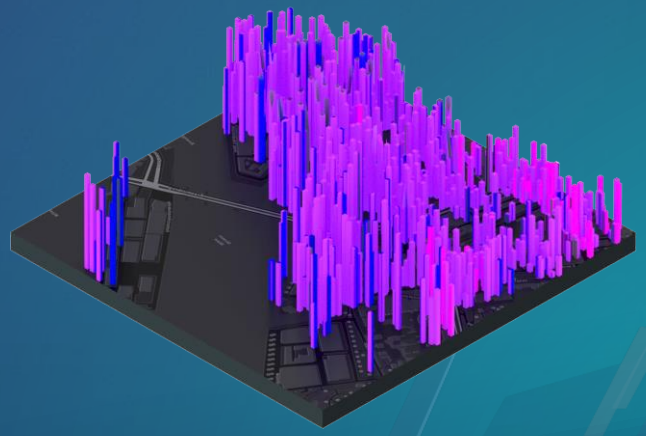


Image Server



GeoEvent Server

Business Analyst Server



GeoAnalytics Server

Spatial analysis workflow

Prerequisites for spatial analysis

- ArcGIS Enterprise base deployment (portal, hosting server, data store, web adaptors)
- Configure feature analysis – standard tools under Organization > Edit Setting > Servers
- Configure utility services if using select tools
  - Network utility service : Summarize Nearby using travel mode, Create Drive-Time Areas, Find Nearest using travel modes
  - Geoenrichment utility service : Enrich Layer tool
- Level 2 Named User with proper privileges under content and analysis
  - Use standard feature analysis
  - Create, update, delete content
  - Publish hosted feature layers
  - Additional privileges needed if using travel modes, elevation or geoenrichment

Demos

Sunflower and Bee Analysis

Sunflower and bee analysis

- Where are areas in Texas where we observed sunflowers but did not observe bees?
  - Sunflowers depend on bees for pollination (and we depend on sunflowers for sunflower oil)
  - Bees typically travel no more than 3-4 miles to forage
  - We want to take crowdsourced data from iNaturalist to identify any areas in Texas that have recorded sightings of sunflowers but no bees within a 4 mile buffer
  - We will use these results as a study area for further data collection

- Data:
  - Honeybee observations
  - Helianthus observations (sunflowers)
  - From iNaturalist
- Analysis Tools:
  - Create Buffers
  - Find Existing Locations
  - Aggregate Points

Tourists in DC

Art Tourists in DC

- Which art-saturated area should we explore given our limited time in DC?
  - We are visiting DC for a brief afternoon
  - We would like to visit as many public art installations as possible – ideally 10
  - However, we are on foot and need to stay close (5 min walk) to any given metro station at all times

- Data:
  - Metro Stations in DC
  - Washington DC Public Art
  - From Open Data DC
- Analysis Tools:
  - Create Drive Time Areas
  - Find Point Clusters

Urban Tree Health

Urban tree health

- Are are there trees in Brooklyn in poor health? If so, where...and why?
  - New York City ran a TreesCount! street tree census in 2015 - 2016
  - Over 2,200 volunteers participated to collect data on over half a million trees
  - We'd like to analyze the results based on tree health and identify if there are common reported problems with trees in poor health

- Data:
  - 2015 Street Tree Census
  - NYC Open Data
- Analysis Tools:
  - Calculate Density
  - Summarize Within

Additional Resources

- https://www.esri.com/en-us/arcgis/analytics/overview - Analytics website
- Use the standard feature analysis tools in ArcGIS Enterprise - technical help
- Training Seminar | ArcGIS Pro: Analysis and Geoprocessing Essentials - Free training seminar
- The Language of Spatial Analysis E-Book (Esri.com/library/books/the-language-of-spatial-analysis.pdf)

Related sessions

- Spatial Analysis: The Road Ahead
  - Wednesday, 1:00pm – 2:00pm
- Understanding the Basics: Introduction to the Language of Spatial Analysis
  - Wednesday, 2:30pm – 3:30pm
- Data Visualization for Spatial Analysis
  - Thursday 10:00am – 11:00am
- Apply Spatial Analysis Techniques to Make Better Decisions
  - Thursday, 8:30am – 9:30am
- *Spatial Analysis in ArcGIS Online: An Introduction*
  - *(Tuesday)*

We encourage you to visit the showcase area to talk with Product Engineers and Developers!

Thank you!

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