

Federal GIS Conference

February 9–10, 2015 | Washington, DC



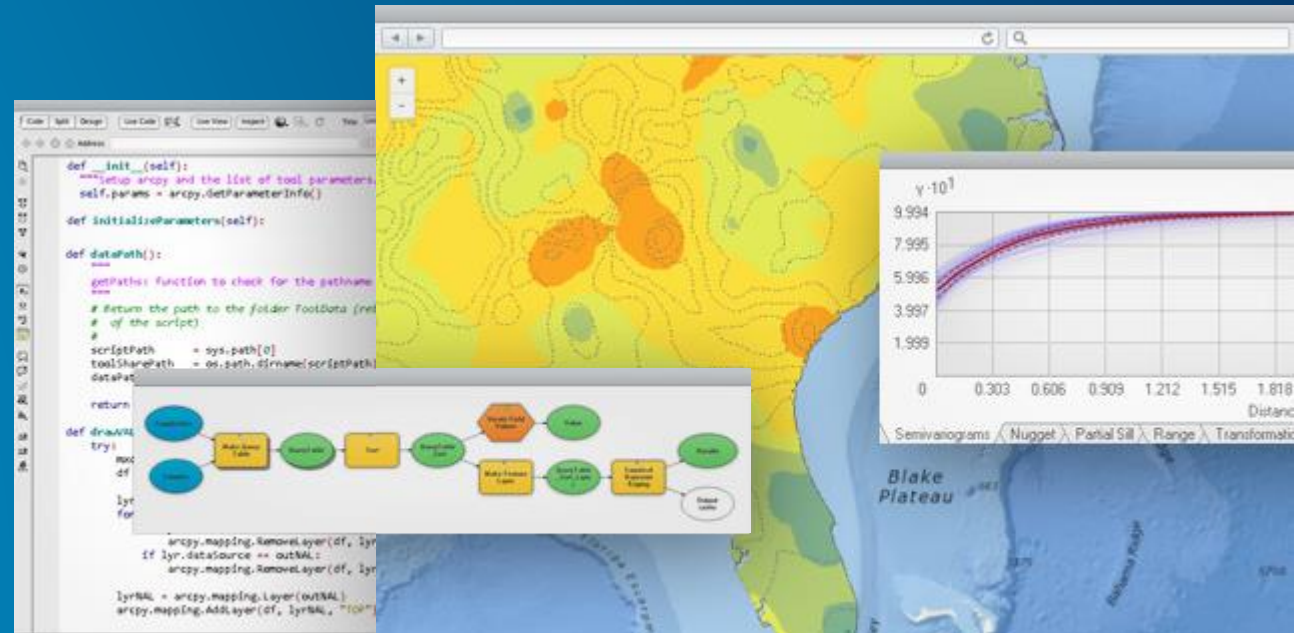
ArcGIS Pro: What's New in Analysis

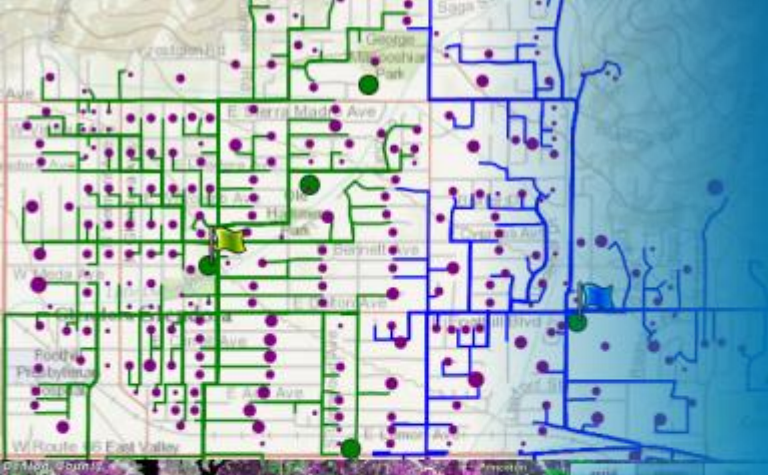
James Sullivan

What is analysis?

Analysis transforms raw data into information or knowledge.

Spatial analysis does this for geographic or spatial data.





Who? What? **Where?** When? Why?

Spatial analysis answers “where” questions.



Where is the best location for a new community center?

Where is an area with high crime rates?

Where has the landscape changed in the last 10 years?



Analysis in ArcGIS Desktop

Make analysis easy

Single tools that run common workflows like summarizing within an area, aggregating points, etc.

Make it fast

More tools using parallel processing

Continual improvements to vector overlay

With better/more correct analysis results

Better distance calculations/geodesic



Analysis in ArcGIS Pro

ArcGIS Pro provides incredible capabilities for performing analysis in 2d and 3d.

Performance (~20%) + scalability + visualization

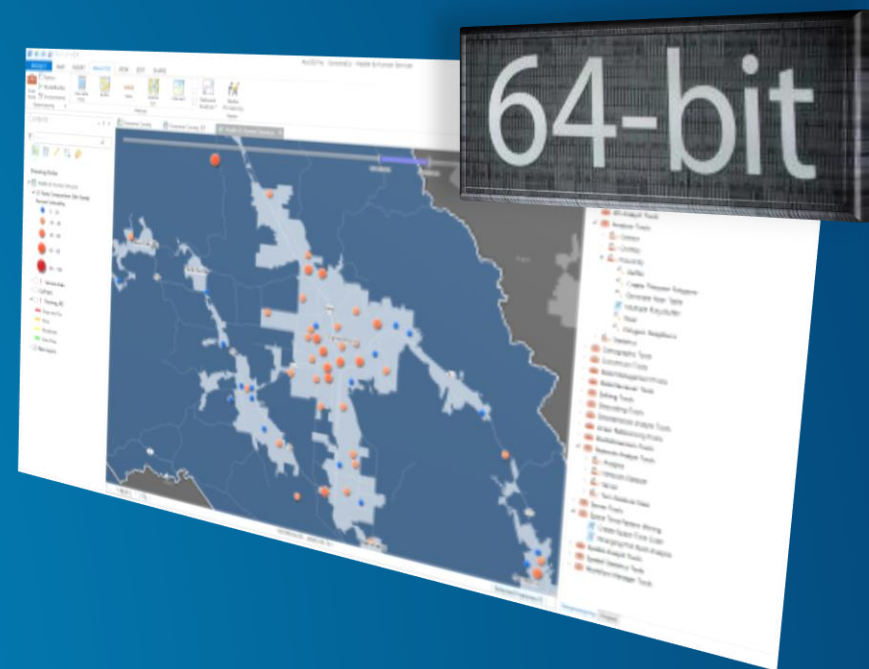
Geoprocessing

Raster analysis

Network analysis

3d analysis

Statistical analysis



Analysis in ArcGIS Pro

The **ANALYSIS** ribbon tab provides access to

Gallery of powerful analytic tools

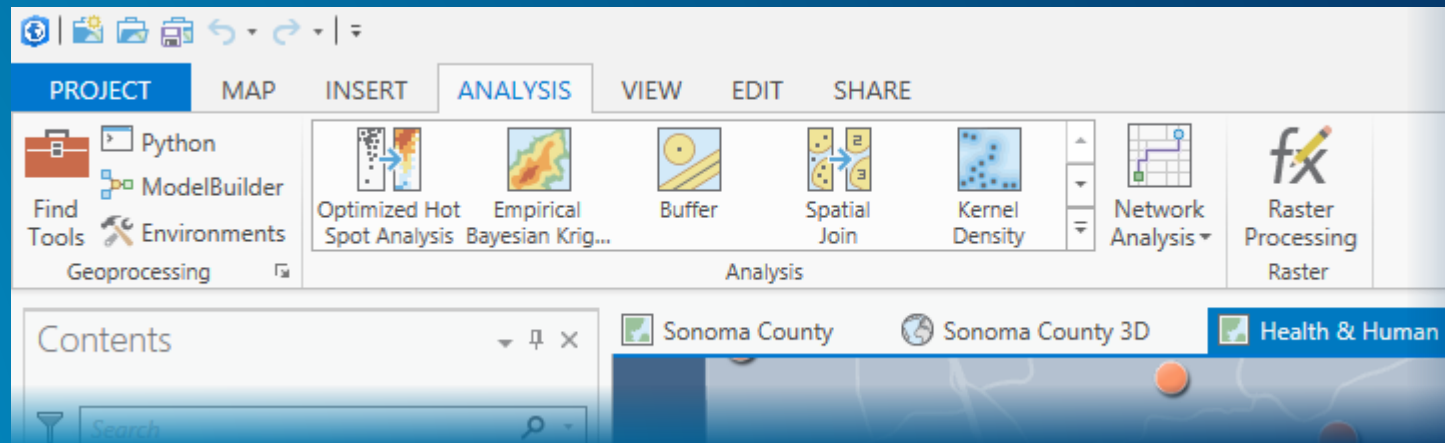
Suite of all geoprocessing tools

Python command line

ModelBuilder

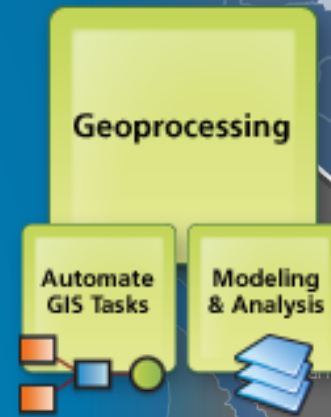
Network analysis

Imagery processing



Geoprocessing

Processing geographic data



Geoprocessing

Spatial Join

Parameters | Environments

Target Features: California Urban Areas

Join Features: CalFresh Vendors

Output Feature Class: CA_UrbanAreas_SpatialJoin

Join Operation: Join one to one

Keep All Target Features

Field Map of Join Features

Output Fields (+)	Source	Properties
UA_ID	Merge Rule: First	
NAME	Base Layers\California Urban	
LSAD	POP2010	
LSAD_DESC		Add New Source v
POP2010		
POP10_SQMI		
HSE_UNITS		
SQMI		
Shape_Length		
Shape_Area		
InSonoma		

Match Option: Intersect

Search Radius: [] Kilometers

Run

What is geoprocessing?

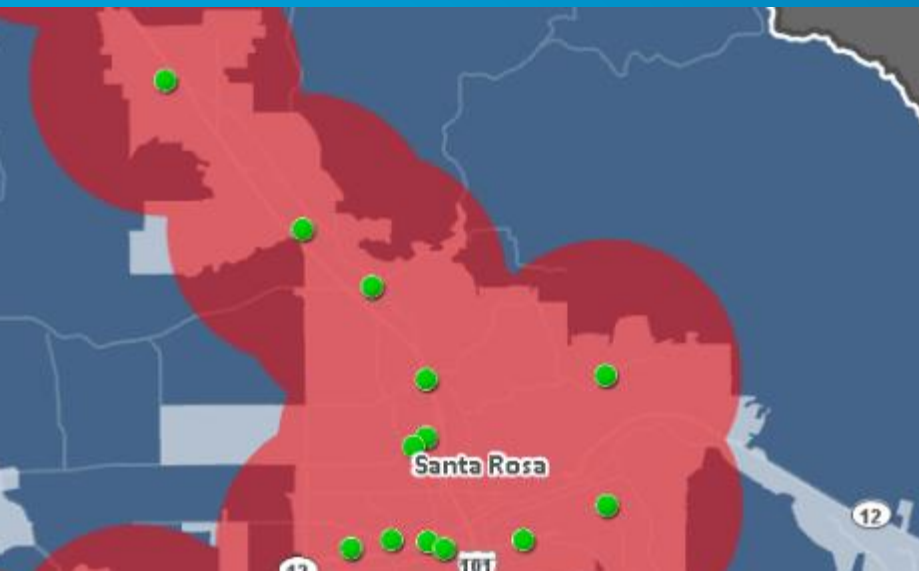
Geoprocessing is a rich suite of tools for **processing geographic data**.

Spatial analysis + manage GIS data

A typical geoprocessing tool processes input data and produces an output.

E.g. Buffer a map layer to create areas around the layer's features

You can model and automate geoprocessing workflows using ModelBuilder or Python.



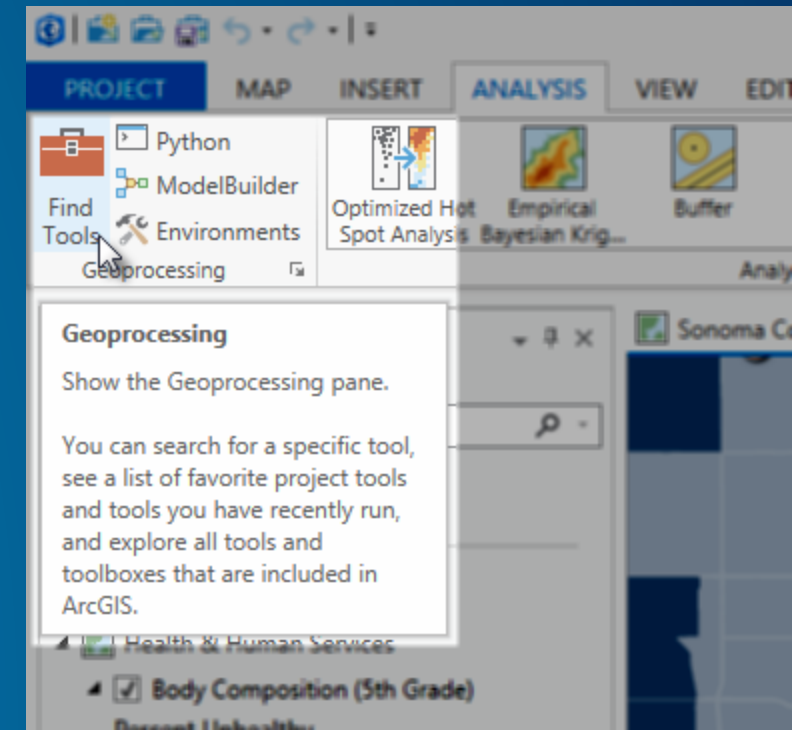
Geoprocessing in ArcGIS Pro

Familiar user experience with some key productivity improvements.

Most tools, models, and Python scripts that work in ArcMap will work in Pro.

ArcObjects-based custom tools are not supported.

Analyze for Pro tool checks models and scripts for unsupported tools, data, and Python code.



Geoprocessing pane

You find and run geoprocessing tools in the Geoprocessing pane.

A dockable pane where you can...

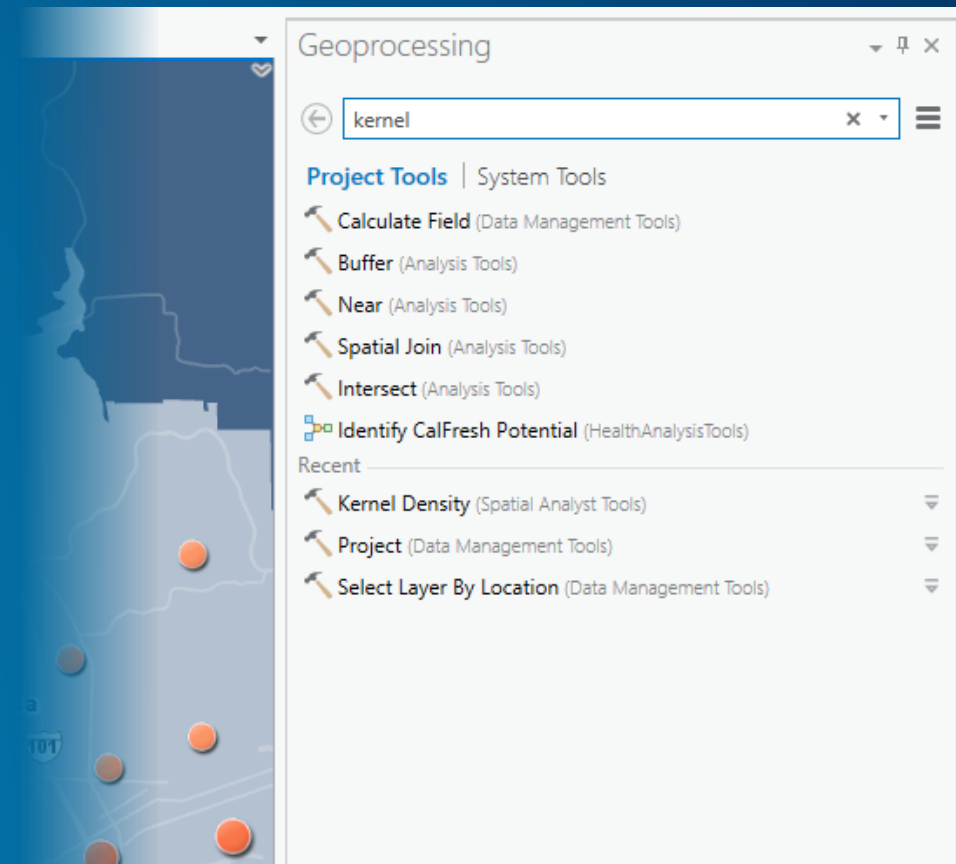
search for a specific tool

see favorite and recently run tools

browse a list of all tools

After finding the right tool, the tool dialog opens in the pane.

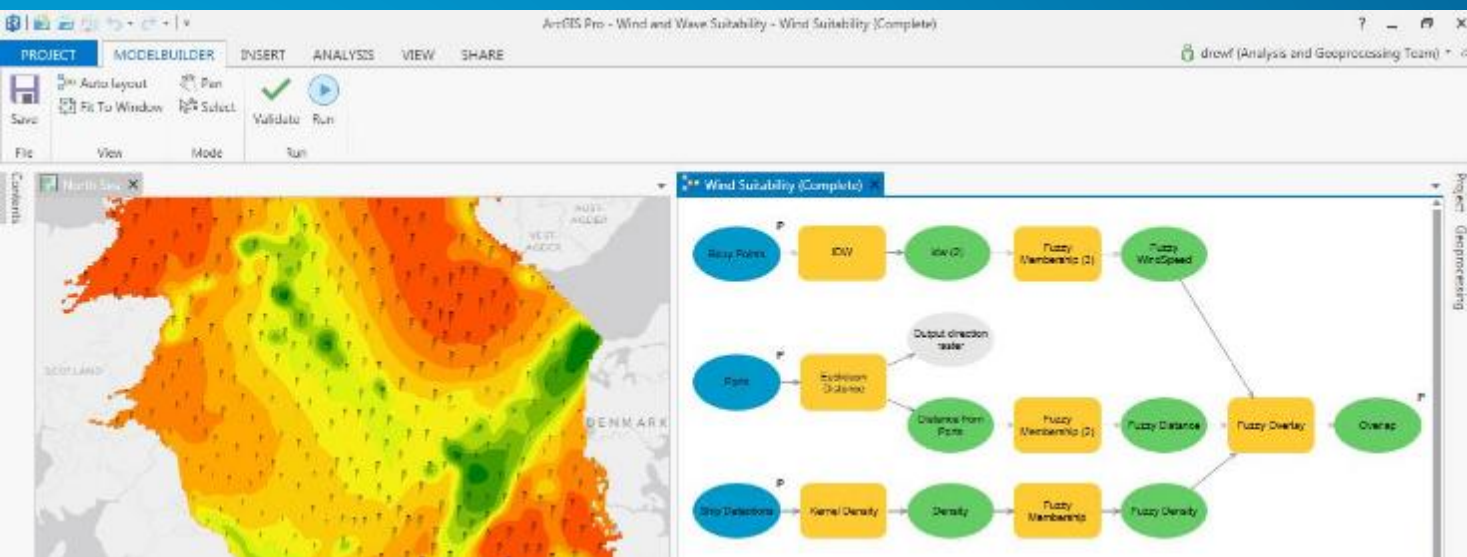
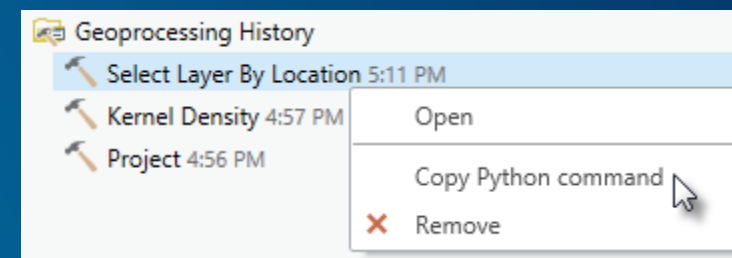
Your map remains the focus.



Create a geoprocessing workflow

Make a Python script tool that runs Python code

To get started, run the tool in Pro, then
Copy Python command and paste into script file.

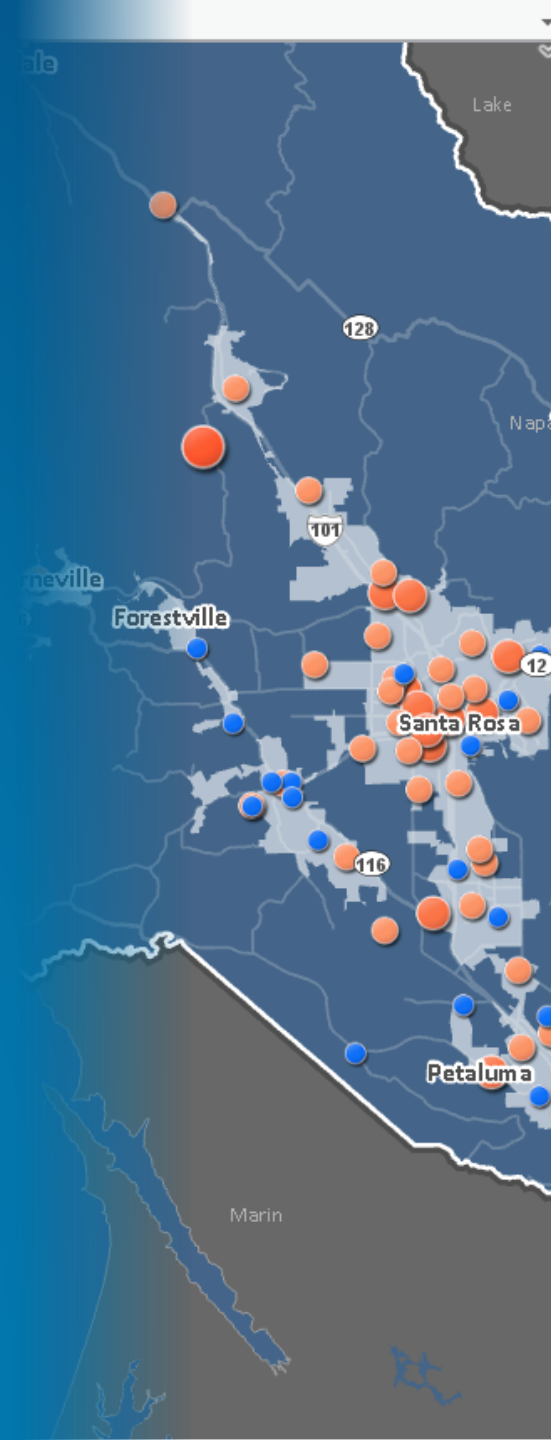


Build a model of your workflow
using ModelBuilder.

Connect tools and data to
form a diagram that
represents your workflow.

Geoprocessing

Demo



Geoprocessing

Spatial Join

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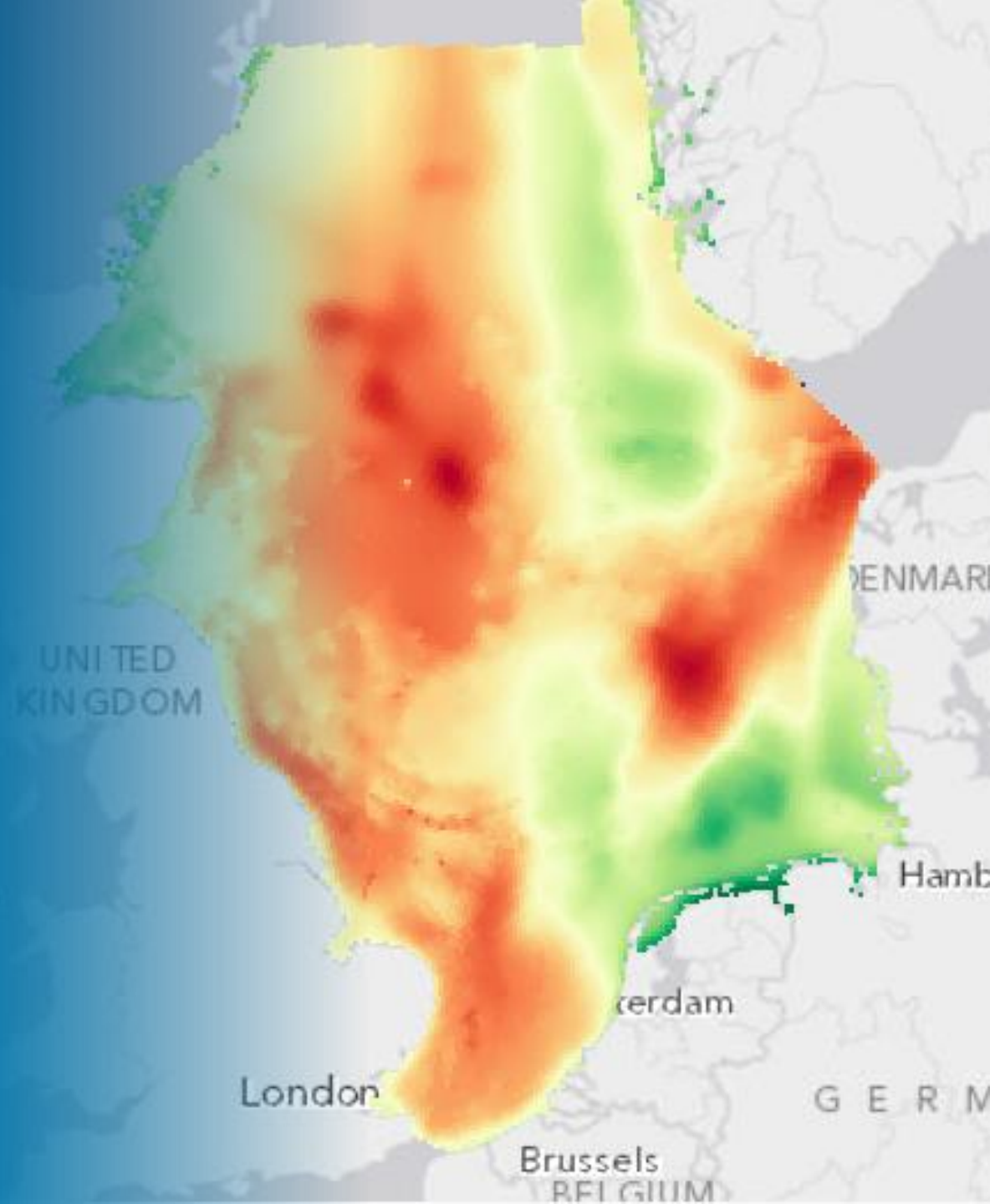
Match Option: Intersect

Search Radius: [] Kilometers

Run

Raster Analysis

Spatial Analyst extension



Raster analysis

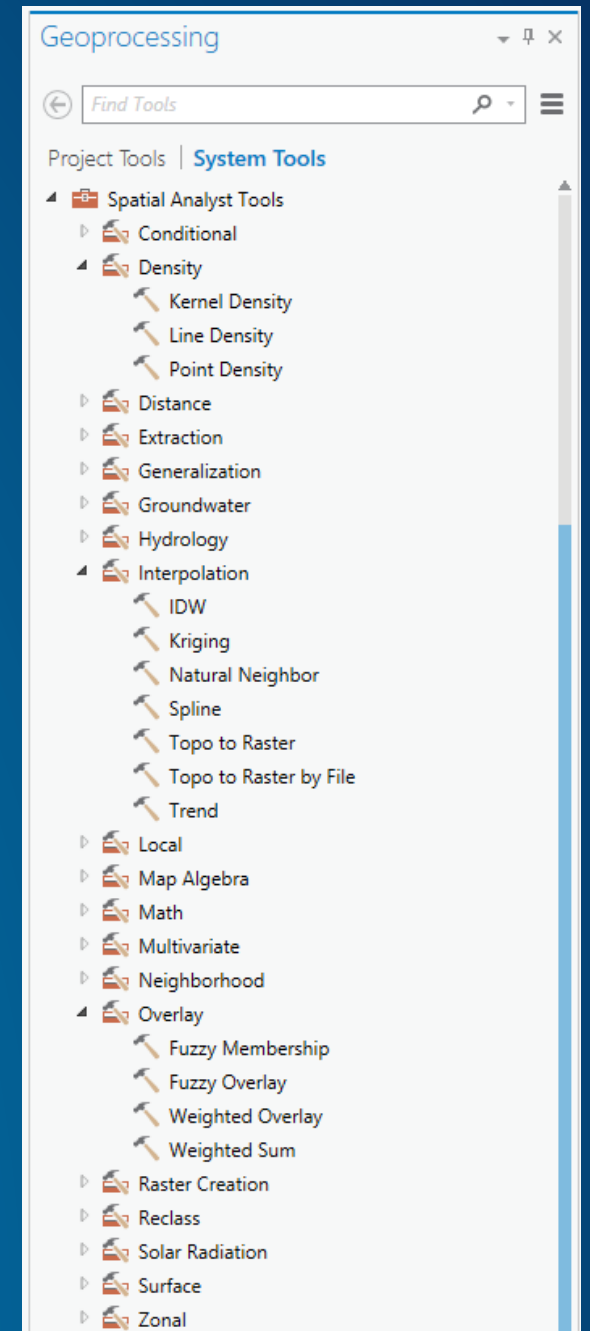
Spatial Analyst includes 170+ geoprocessing tools.

Integrates both vector and raster spatial analysis.

Range of applications including suitability modeling, hydrological analysis, surface interpolation, and more.

Powerful map algebra language

Raster Calculator



Raster analysis

Improved user experience of tools and controls
access to key raster analysis environments

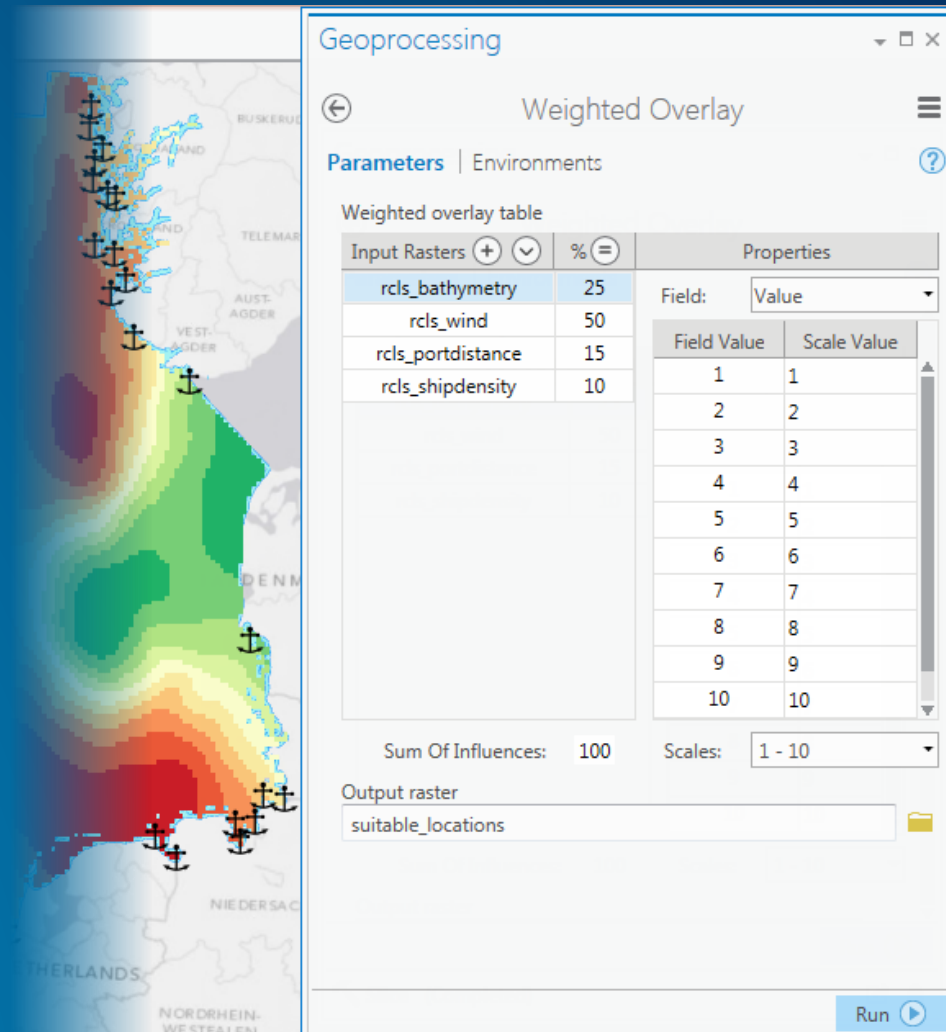
Cellsize, snap raster, mask, etc.

More tools use parallel processing/multi-core

Reclassify, Weighted Overlay, Zonal Statistics

New tools in ArcGIS Desktop

Rescale By Function, geodesic Viewshed,
and Classification



Geoprocessing

Weighted Overlay

Parameters | Environments

Weighted overlay table

Input Rasters	%	Properties
rcls_bathymetry	25	Field: Value
rcls_wind	50	Field Value Scale Value
rcls_portdistance	15	1 1
rcls_shipdensity	10	2 2
		3 3
		4 4
		5 5
		6 6
		7 7
		8 8
		9 9
		10 10

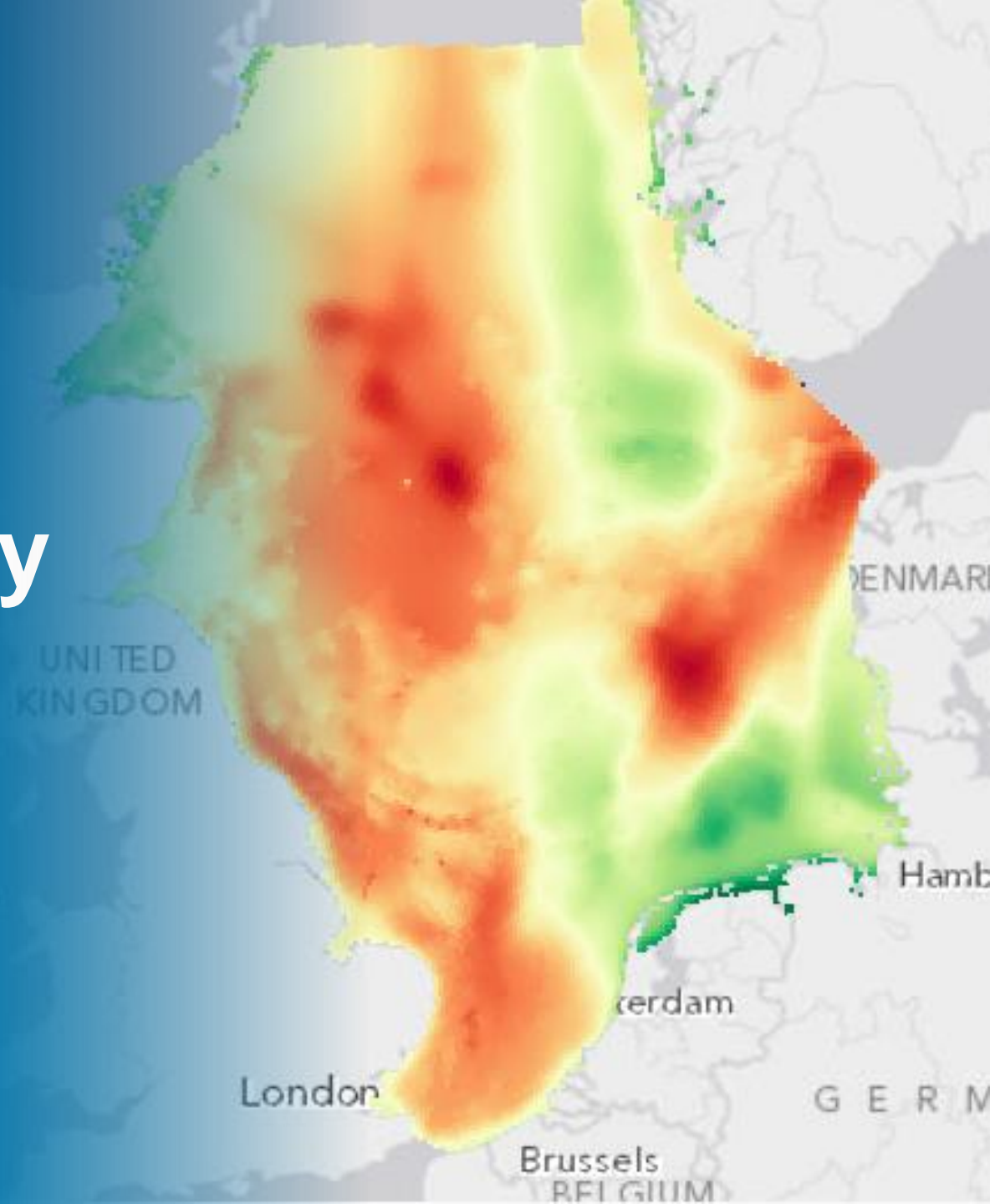
Sum Of Influences: 100 Scales: 1 - 10

Output raster
suitable_locations

Run

Wind power suitability

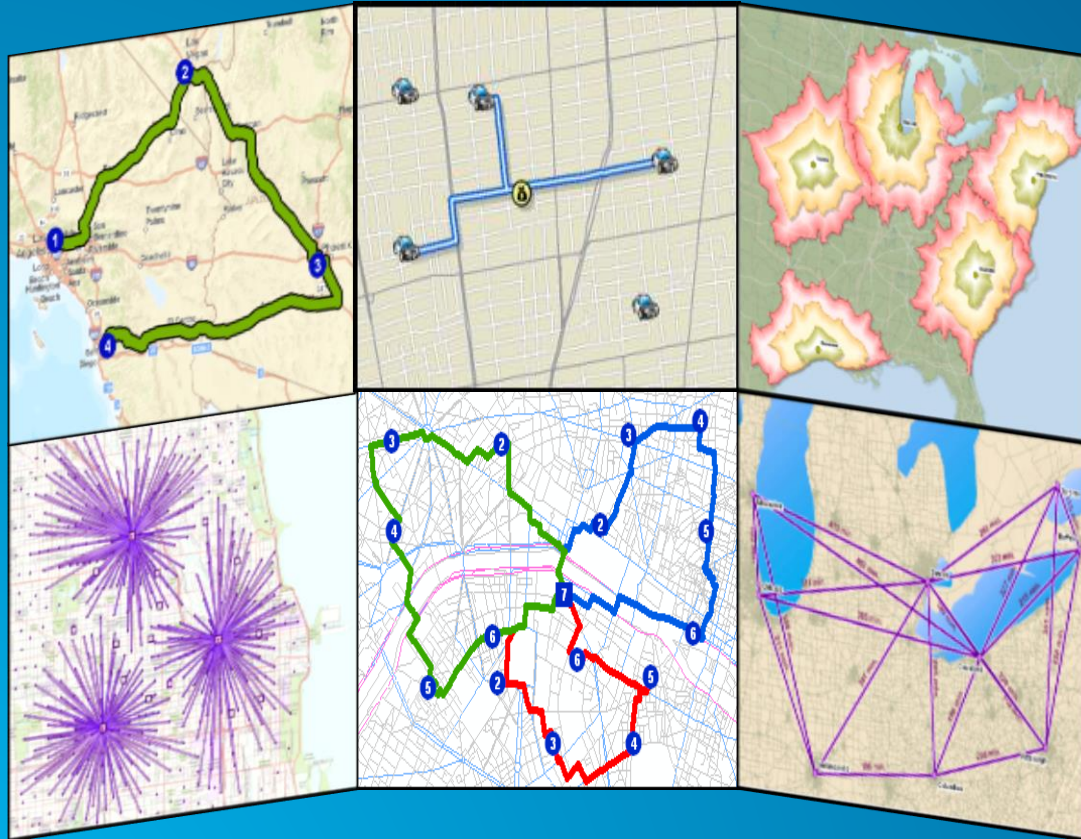
Demo



Network analysis



Network Analysis



Routing / Directions

Closest facility

Drive-time / service areas

Location – Allocation

Vehicle routing problem

Origin – Destination matrix

Network analysis in ArcGIS Pro

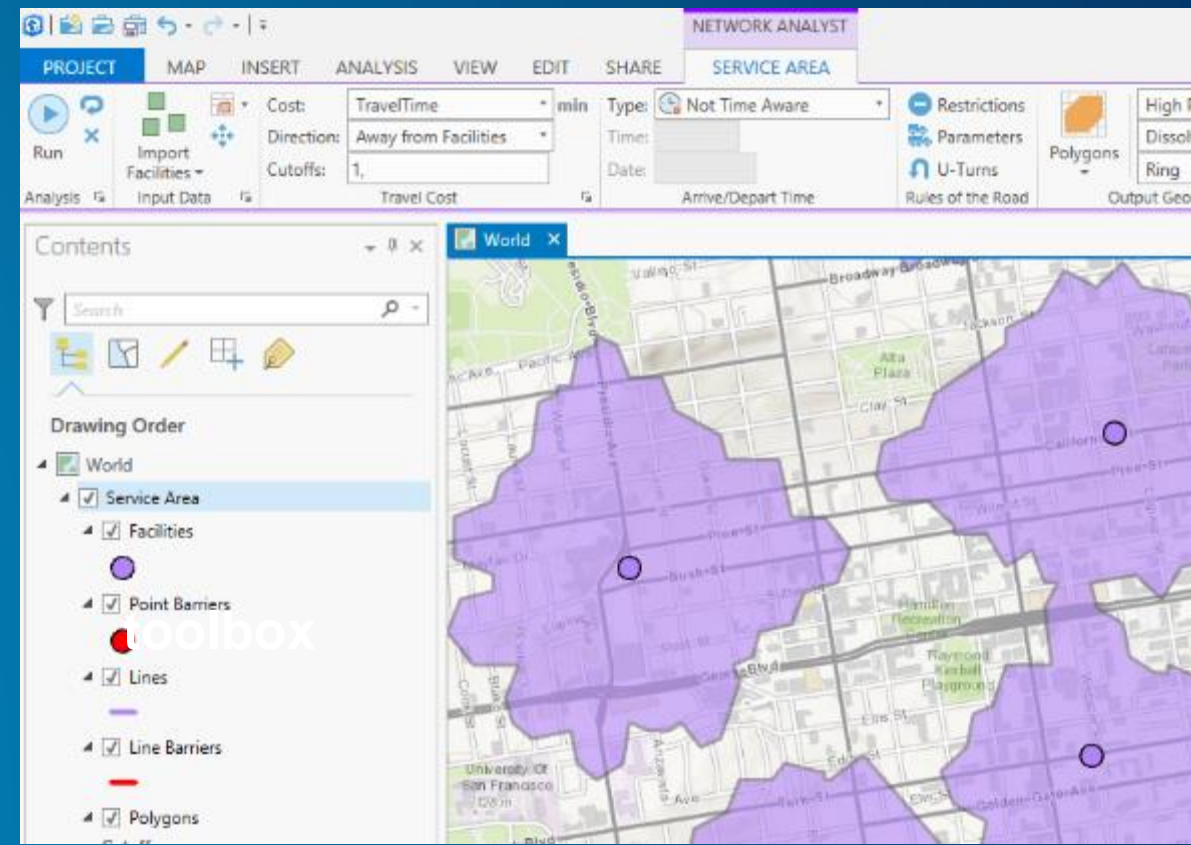
2D and 3D network analysis

Start with Analysis > Network Analysis >
Service Area or Route

Contextual ribbon tab for different network
analysis layers

Add locations, configure, and run

Other analysis accomplished through
geoprocessing tools in Network Analyst



Network analysis services

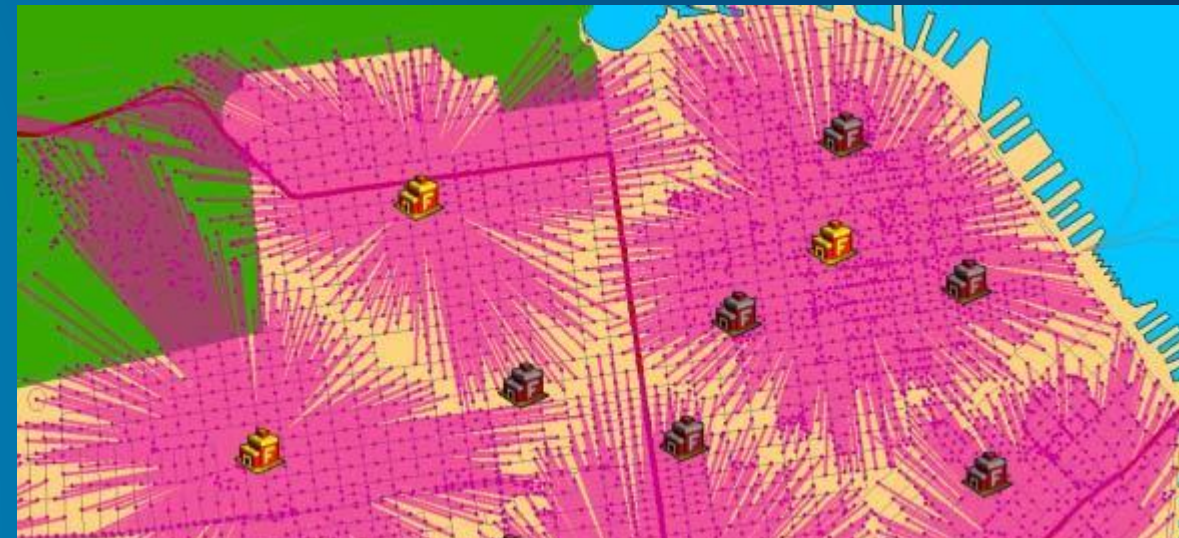
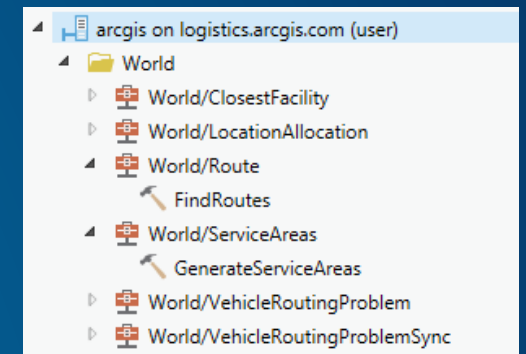
Don't have your own network data or don't know how to use it?
ArcGIS ready-to-use services

Requires ArcGIS Organizational account; credits consumed

Services use premium street network data with historical current traffic estimates and world-wide coverage.

<http://logistics.arcgis.com/arcgis/services>

Use

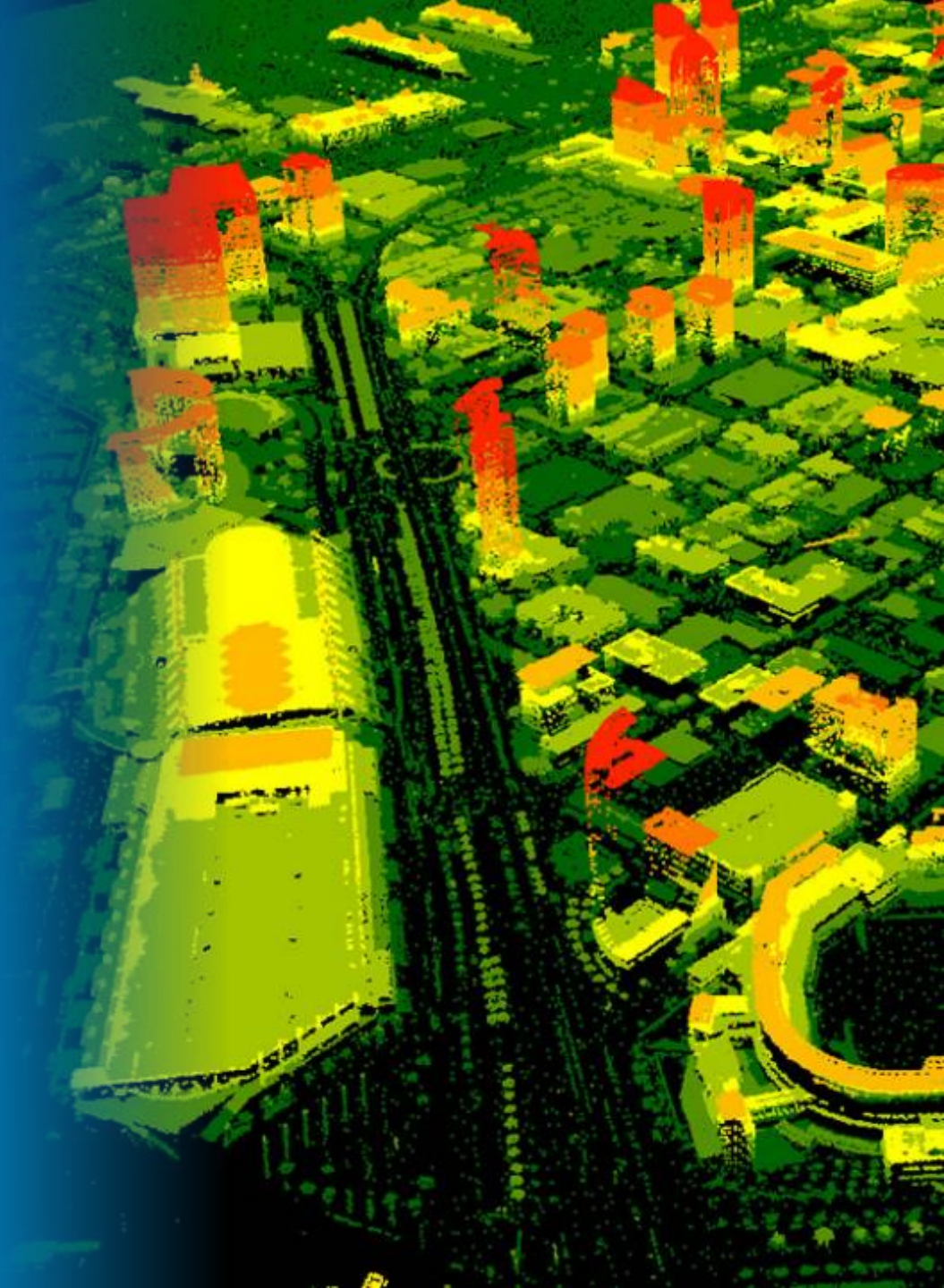


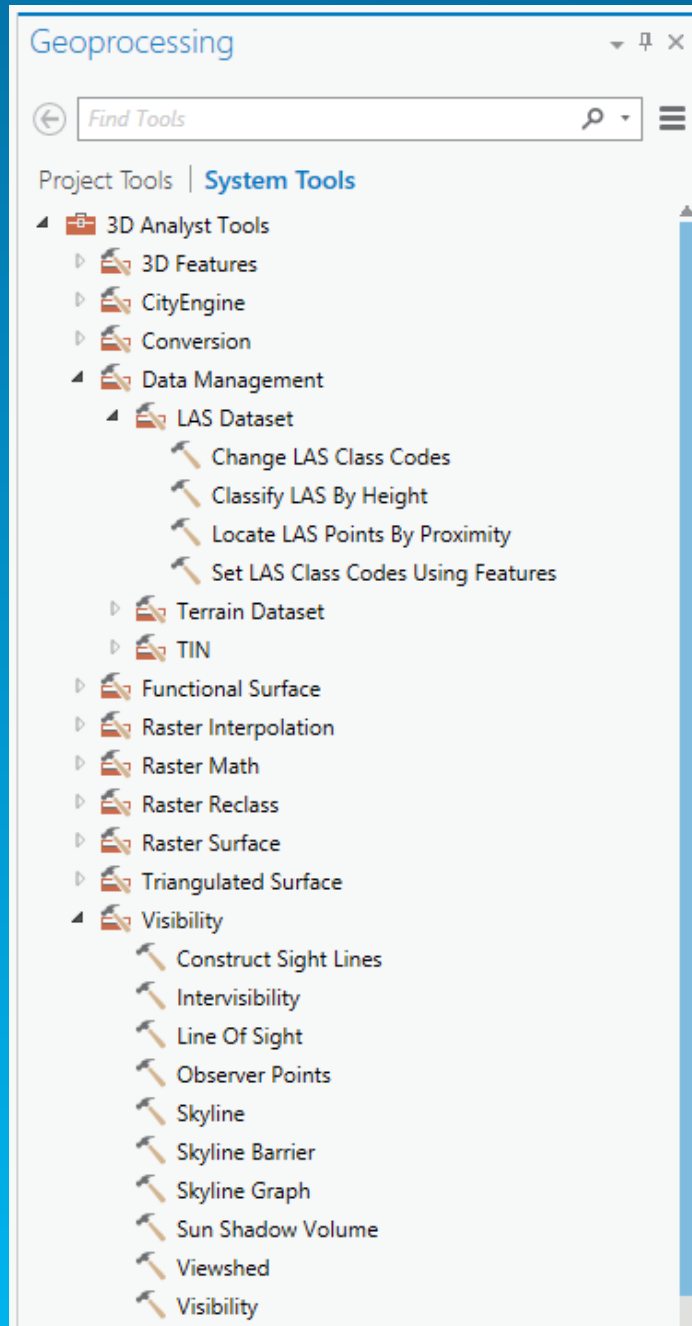
Network analysis

Demo



3D Analysis





3D Analyst extension

100+ geoprocessing tools for elevation surface creation and analysis, using vectors, rasters and TIN-based models.

Support for analysis and visualization of Lidar and point-cloud data through the LAS dataset.

Measuring distances/proximity and evaluating spatial relationships in 3D.

Volumetric and visibility analysis

3D analysis

New tools in ArcGIS Desktop

Classify LAS By Height

Lidar point classification relative to height above ground

Example: characterize vertical structure of tree canopy

Locate LAS Points By Proximity

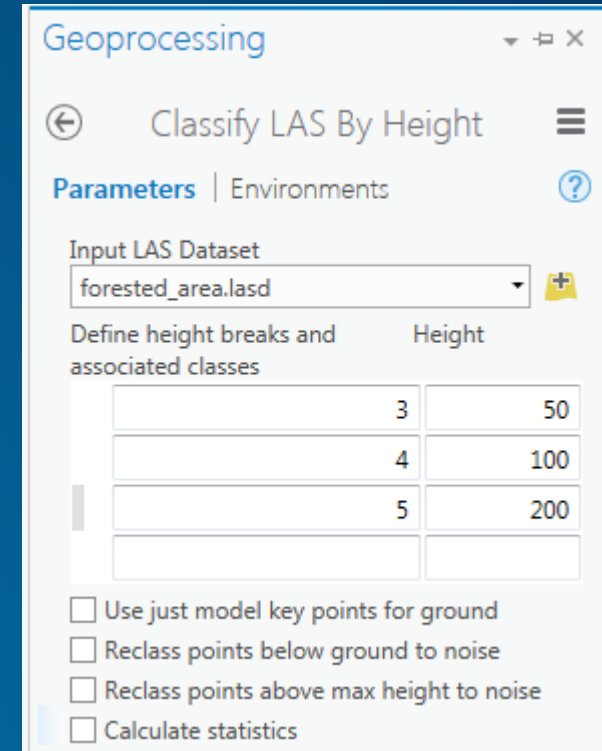
Find 3D distance between LAS points and other features or multipatch faces

Example: identify right of way encroachments such as vegetation close to power lines

LAS Point Statistics By Area

Min, max, mean, stdev of z for points within polygons

Example: find max height of all LAS points within building footprints



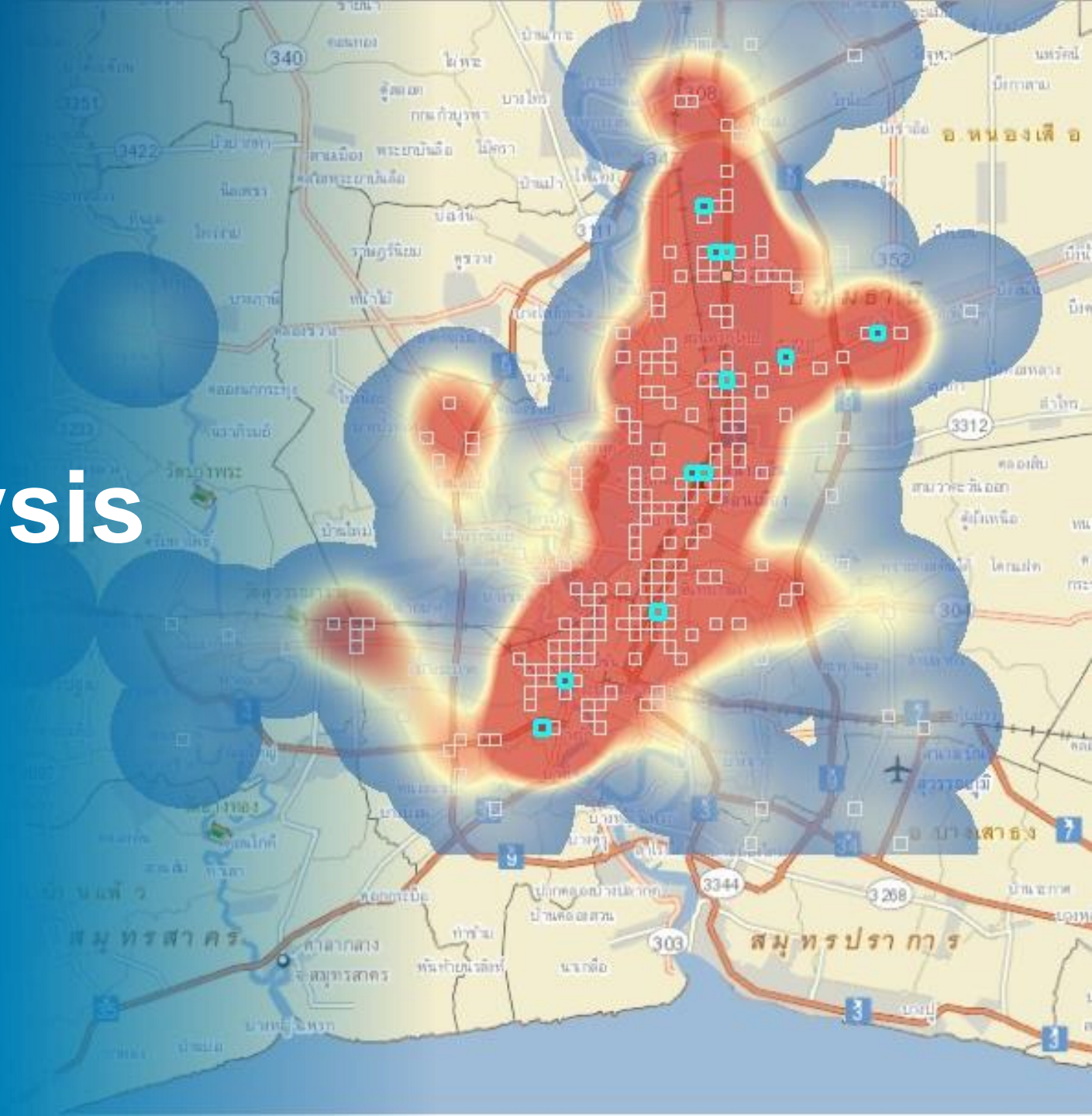
3D Analysis

Demo



Statistical analysis

Spatial and geostatistics



Geostatistical Analyst

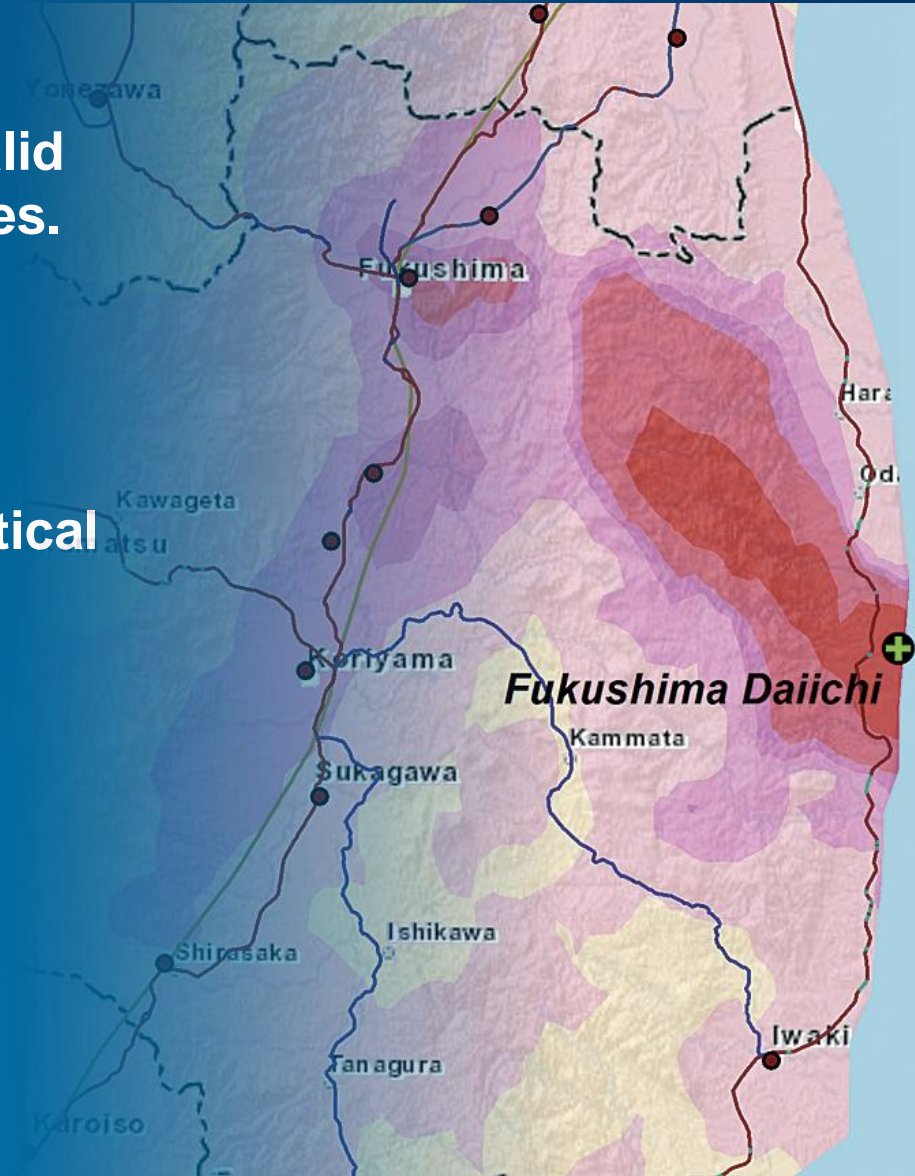
Interactive modeling tools for creating statistically valid prediction surfaces along with prediction uncertainties.

Predict between known measurements – interpolation

Off-the-shelf tools for calculating extremely accurate interpolation surfaces without configuration of statistical models.

Empirical Bayesian Kriging

No Geostatistical Wizard in first release of Pro – only the existing geoprocessing tools.



Spatial Statistics

Tools for analyzing spatial distributions, patterns, processes and relationships in 2D, 3D, and 4D (time)

Summarize key characteristics of a spatial distribution

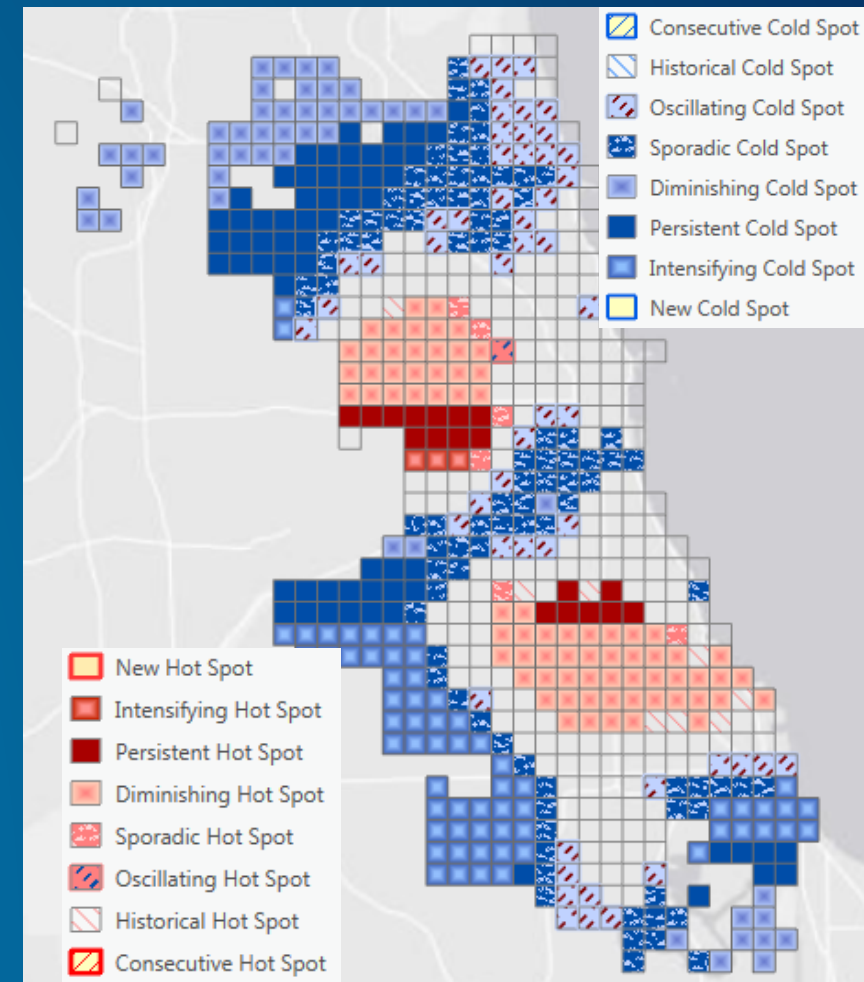
Identify significant clusters and outliers

Model and explore spatial relationship through regression

New tools in ArcGIS Pro

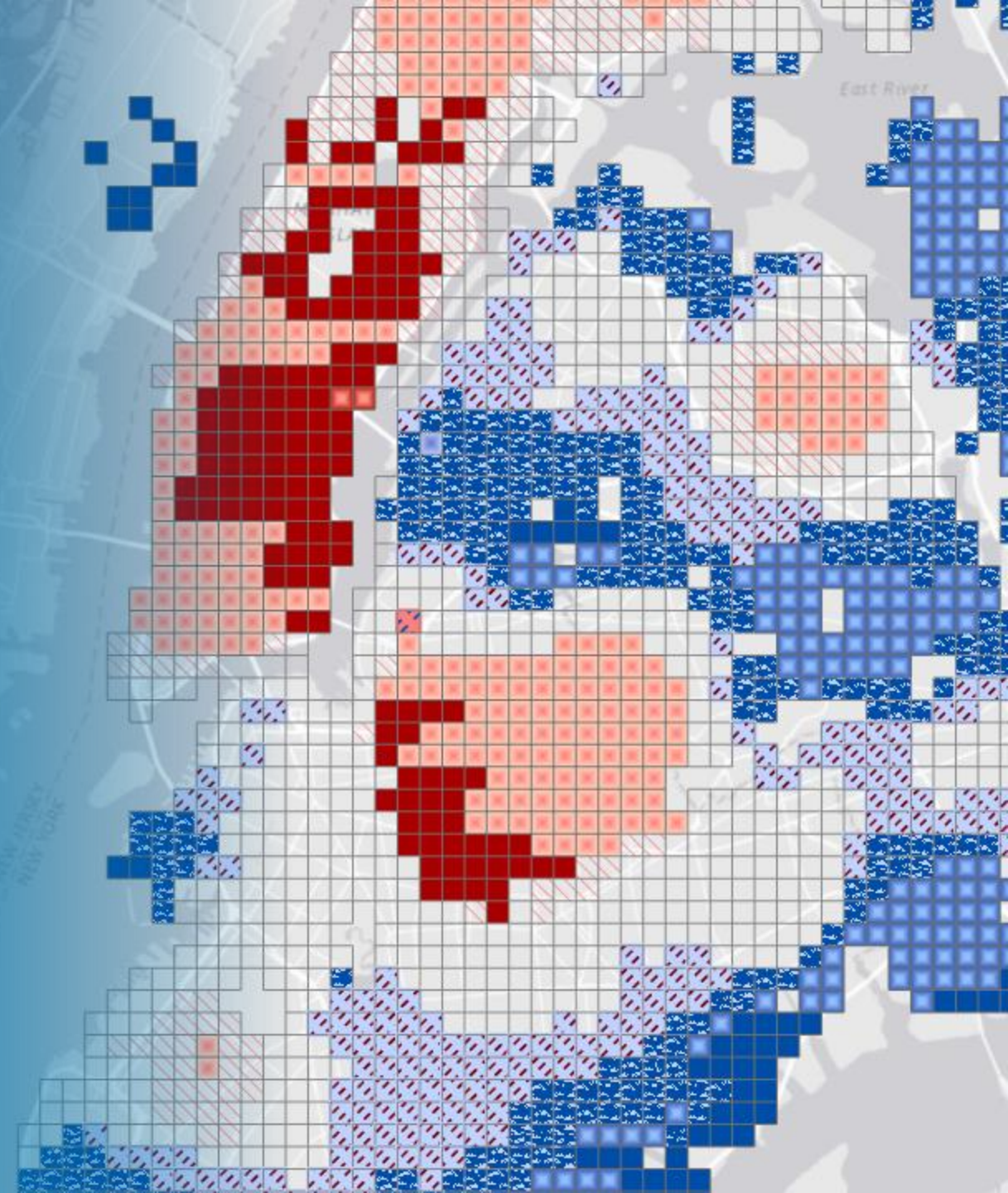
Create Space Time Cube: Aggregates data into multidimensional data structure

Emerging Hot Spot Analysis: Identify hot and cold spot trends – new, intensifying, diminishing, sporadic, etc.



Statistical analysis

Demo



Learn more about spatial analysis

<http://pro.arcgis.com/en/analysis/>

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**Don't forget to complete
a session evaluation form!**

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Print your customized Certificate of Attendance!

Printing stations located on L St. Bridge, next to registration

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GIS Solutions EXPO, Hall D

Monday, 12:30pm – 6:30pm

Tuesday, 10:45 AM–4:00 PM

- Exhibitors
- Hands-On Learning Lab
- Technical & Extended Support
- Demo Theater
- Esri Showcase

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Networking Reception:

National Museum of American History

Tuesday, 6:30 PM–9:30 PM
Bus Pickup located on L Street

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Interested in diving deeper into Esri technology?

Add a day to your Fed GIS experience and register to attend the Esri DevSummit Washington DC. Stop by the registration counter to sign up.



Understanding our world.