

A futuristic landscape with a person standing on a cliff, looking out over a vast, glowing terrain. The scene is overlaid with a complex, multi-layered hexagonal grid pattern in various colors (blue, purple, green, yellow). The background features a starry sky and a large, glowing celestial body.

Advances in GIS Technology

Supporting the Land Administration Domain Model

Brent Jones PE, PLS

Esri

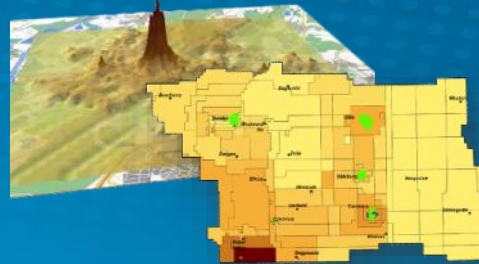
Land Administration Systems

GIS is the Technology Platform

Digital Cadastre Mapping



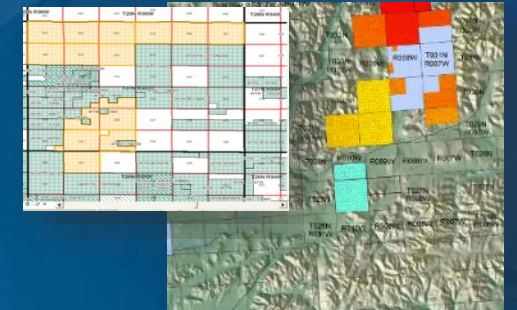
Property Valuation



Transaction Analysis



Integrated Land Management



Field Data Collection



Address Systems



Resource Leases



National Data Portal

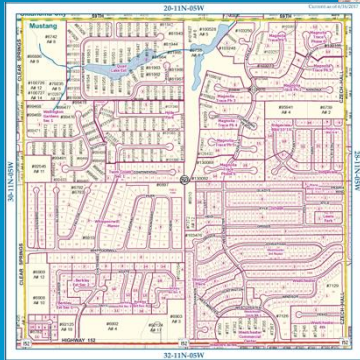


Powering Land Administration Systems Worldwide.....

Collect, Manage, Analyze and Securely Share Land Information

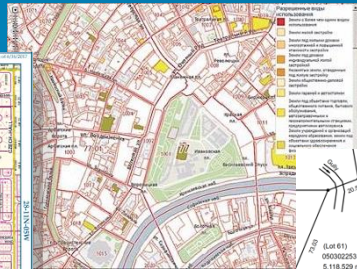
ArcGIS is the platform for land administration systems

Tax Map



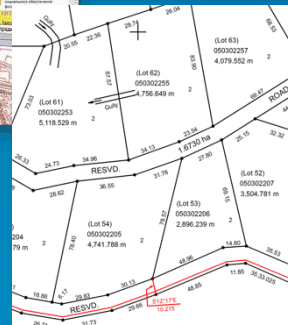
Canadian County, Oklahoma

Land Registration



Russia

Cadastral



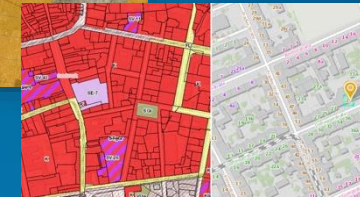
Jamaica
National Land Agency

Predicting Vacancy



Pennsylvania
City of Philadelphia

Public Land
Use Portal



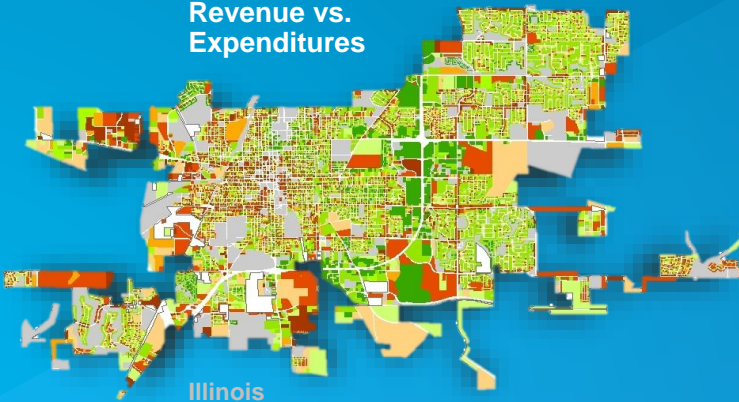
Austria
SynerGIS

Interagency Collaboration



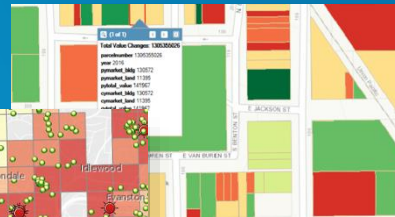
The Netherlands
Provincie Noord-Holland

Revenue vs.
Expenditures

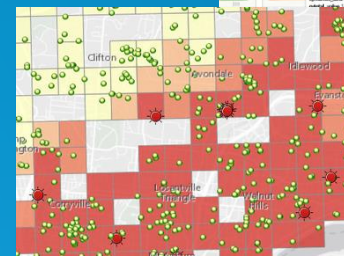


Illinois
GISRDC

Assessed Value

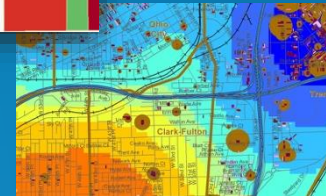


Tax Appeals



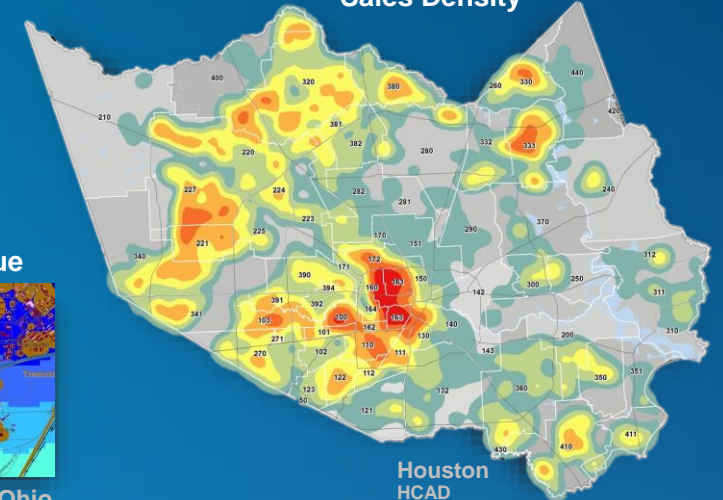
Ohio
DEVNET Incorporated

Change in
Property Value



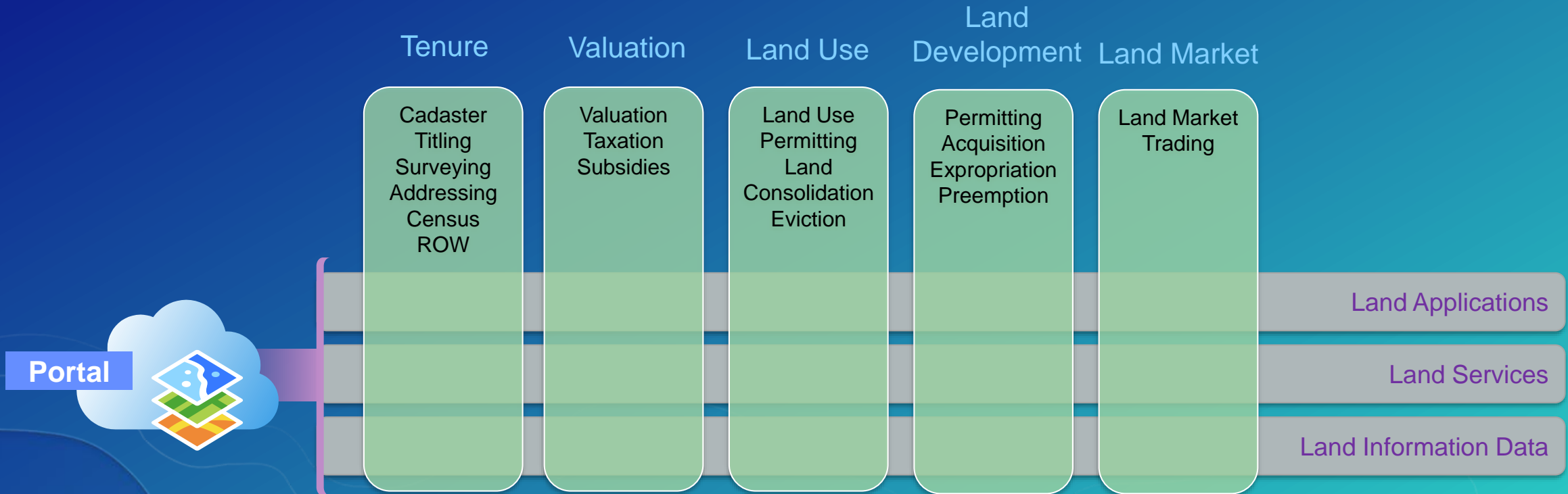
Ohio
Cleveland State University

Sales Density



Houston
HCAD

GIS – The Platform for Land Administration



Enabling New Capabilities



How You Integrate

Client / Server → **Web Services & Apps**

Stand-Alone Desktop → **Connected Desktop**

What You Integrate

Data Models → **Web Maps & Layers**

Static Data → **Real-Time**

Single Server → **Distributed Computing**

Why You Integrate

Custom Applications → **Configurable Templates & Apps**

Proprietary Data → **Open Data & Shared Services**

2D Features → **3D Features**

Spatial Analysis → **Spatiotemporal & Big Data Analytics**

Digital Cartography → **Smart Mapping**

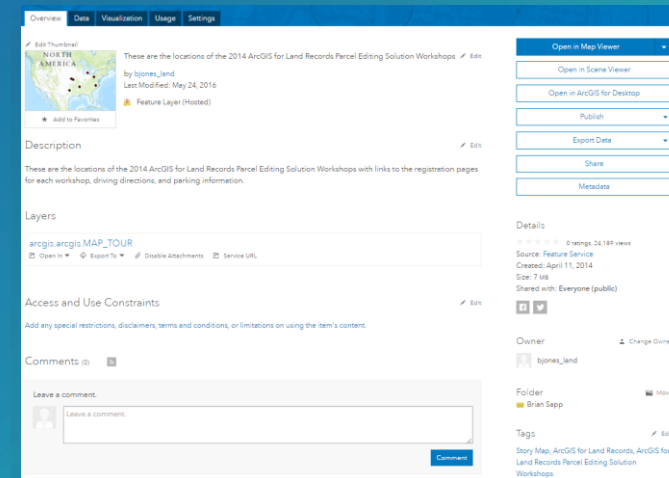
Web Services

Organizes and Securely Sharing Data.....

https://

- Secure/Identity
- Standards-based
- Controlled Access via Identity
- Control Who Does What
 - View
 - Query
 - Edit
- Monitor/Track

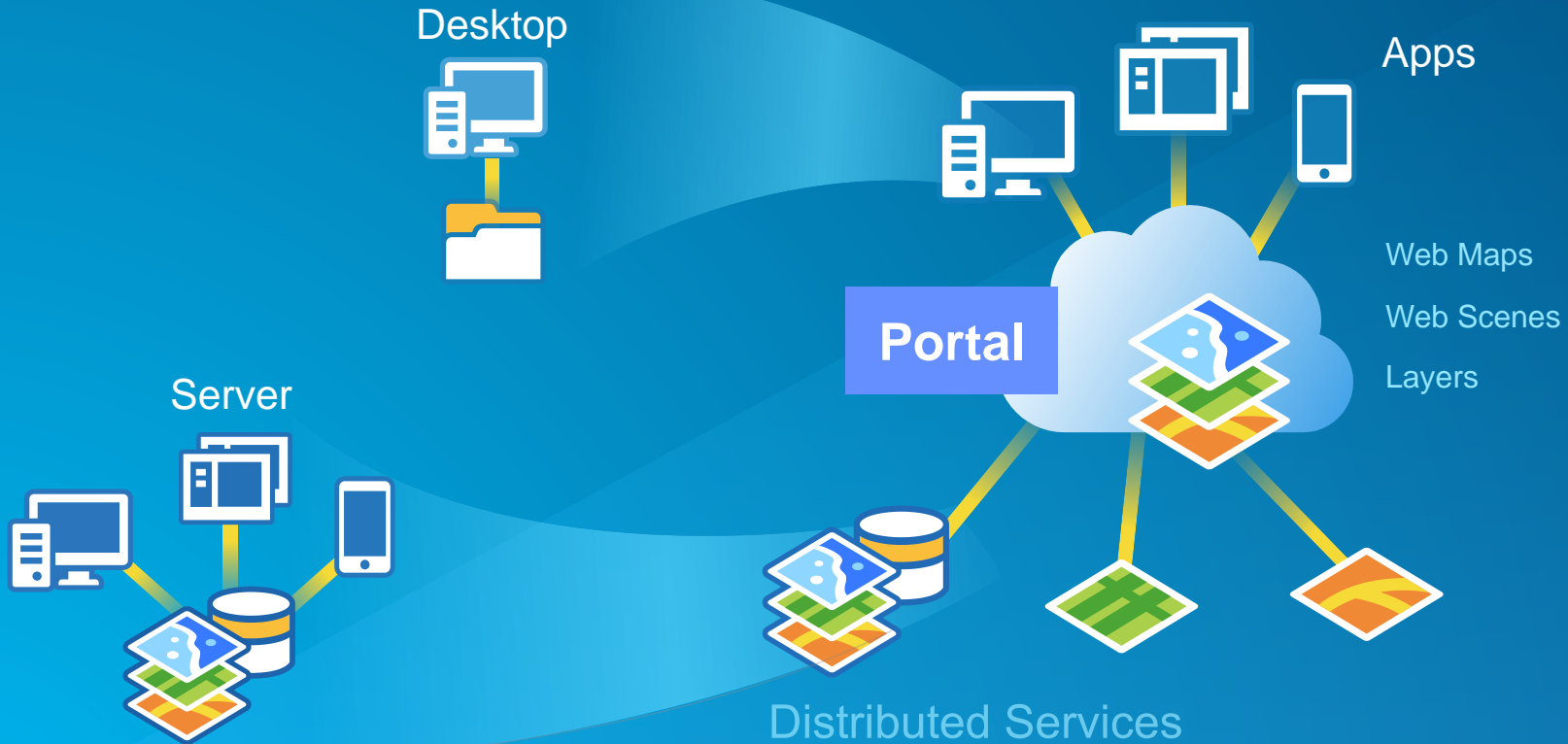
<http://esriland.maps.arcgis.com/home/item.html?id=5969689b642840e39cf0491669484e0b>



Web GIS

WebGIS is a Transformational Architecture

Web GIS



Bringing Together Systems with Modern Architecture.....

Web GIS Simplifies Working With All Types of Data

Using Web Maps, Scenes, and Layers

Creating
A Common Language

Apps

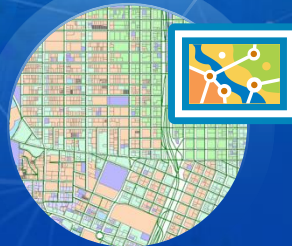
Distributed



Imagery



Tabular



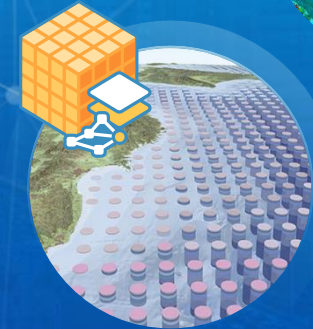
Vector



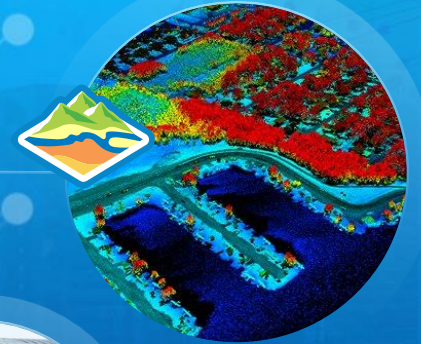
3D



Real-Time
(IoT)



Big Data



Lidar

Apps Are Bringing the Power of GIS to Everyone

Extending the Reach of GIS



Across Organizations and Beyond

GIS Content

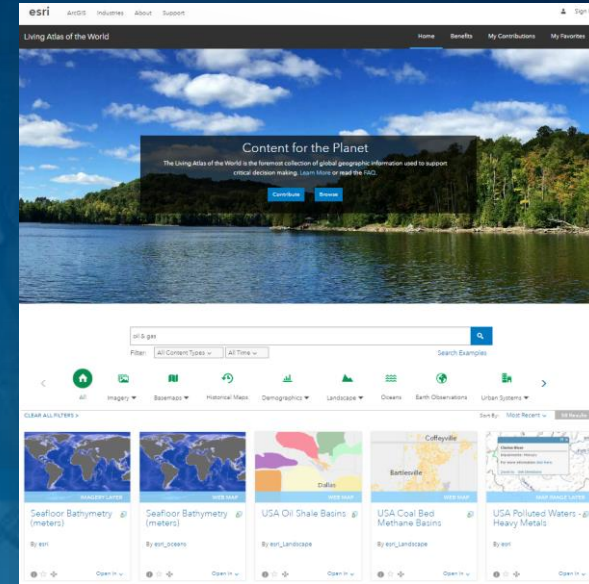
Ready-to-Use Maps and Data

Tens of Thousands of Open Datasets &
Curated *Living Atlas*

Basemaps
Demographics
and Lifestyle
Transportation
Urban Systems
Boundaries and Places



Imagery
Landscape
Oceans
Earth Observations



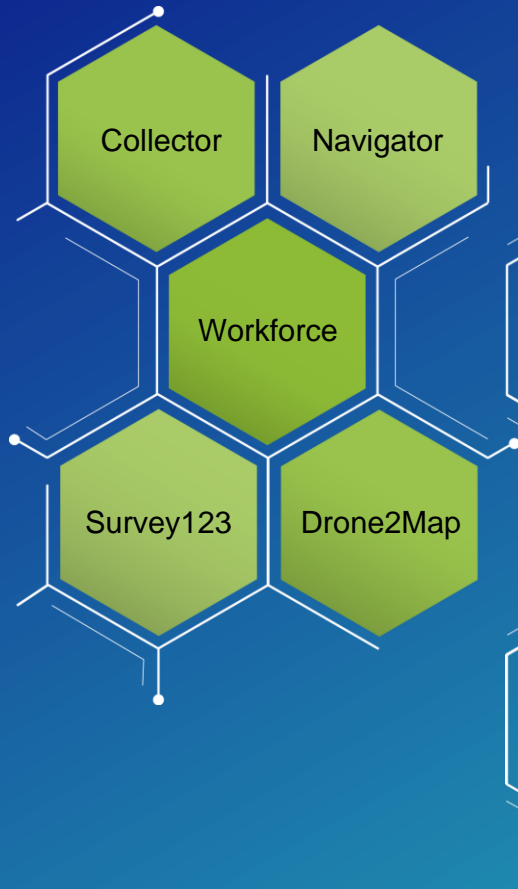
Millions of User Contributions . . . Billions of Views per Week



Apps

Extending GIS Capabilities Everywhere

Field



Office



Community



Focused, Powerful, and Ready-to-Use

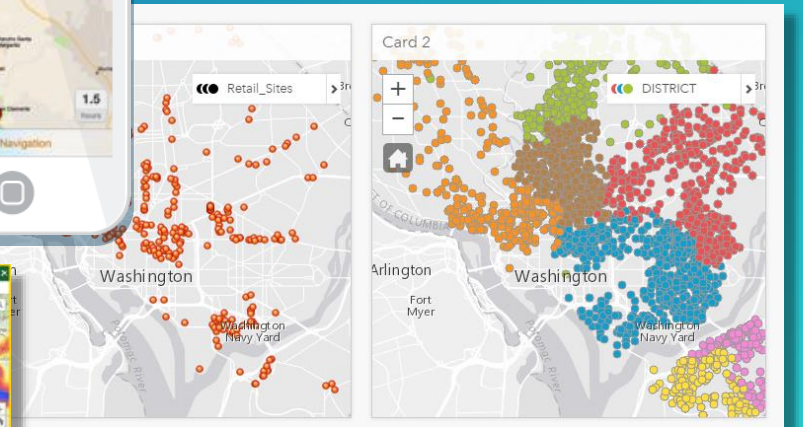
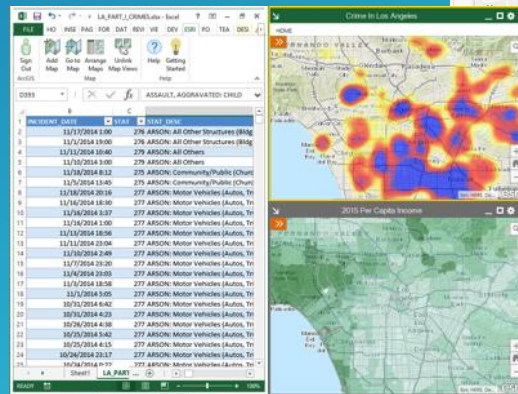
What Apps to Use?

Powered by Services

- Collector
- Survey123
- Explorer
- Operations Dashboard
- Drone2Map



Maps for Office



Insights

Support your workforce and workflows.....

GIS for Cadastral Agencies

Supporting All Requirements

Parcel Management

Field Operations

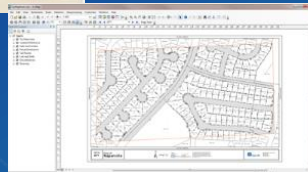
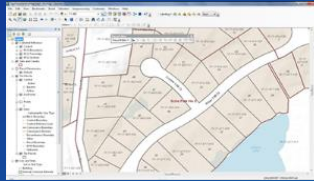
Value Analytics

Public Relations

Quality Control



Parcel Editing



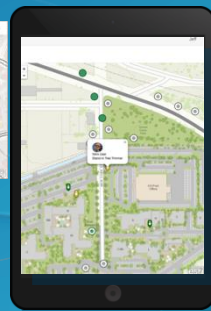
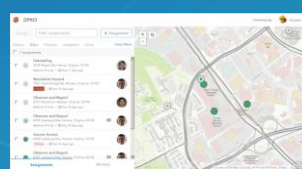
Map Production



Address Management

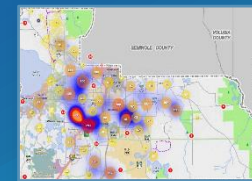


Mobile Access to View & Edit

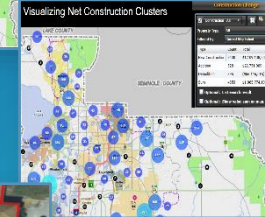


Workforce

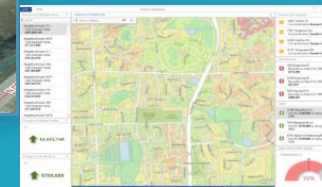
Foreclosure Mapping



Construction Permit Visualization



Property Appraisal



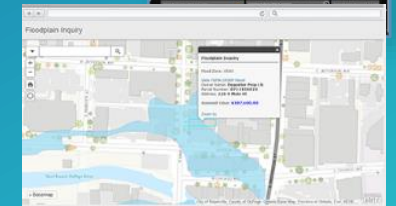
Visualize Property Value



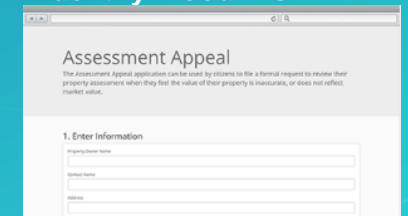
CAMA Visualization



Modern Public Access



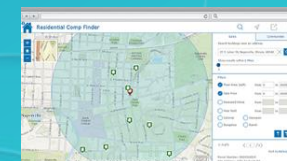
Identify Flood Risk



File Assessment Appeals



My Tax Distribution



Residential Comp Finder

Support Data/Parcel Aggregation

Web GIS solution for parcel aggregation

Authoritative Parcel Data



Community Parcel Layer



Information Products



Revenue
Audit
Health
Transportation
Econ/Dev
Environment
....

Contributor Tools

Aggregation Model

Maps and Apps

COTS Tools for aggregating and sharing.....

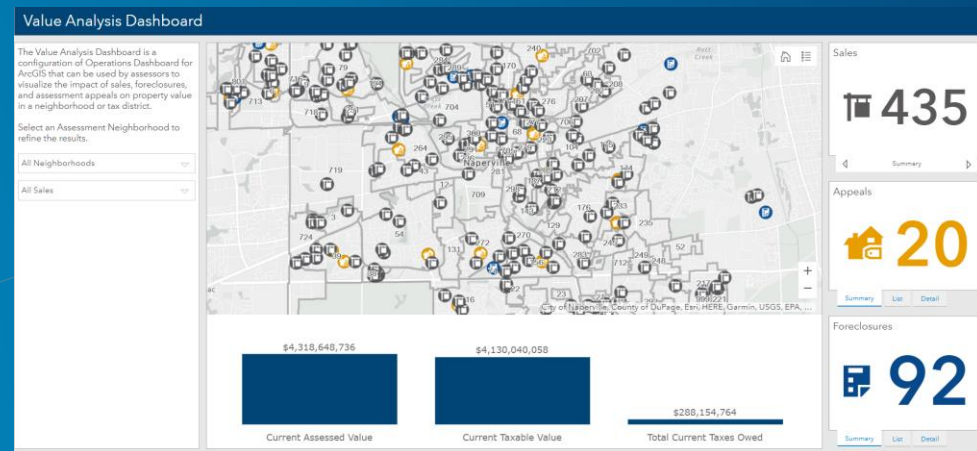
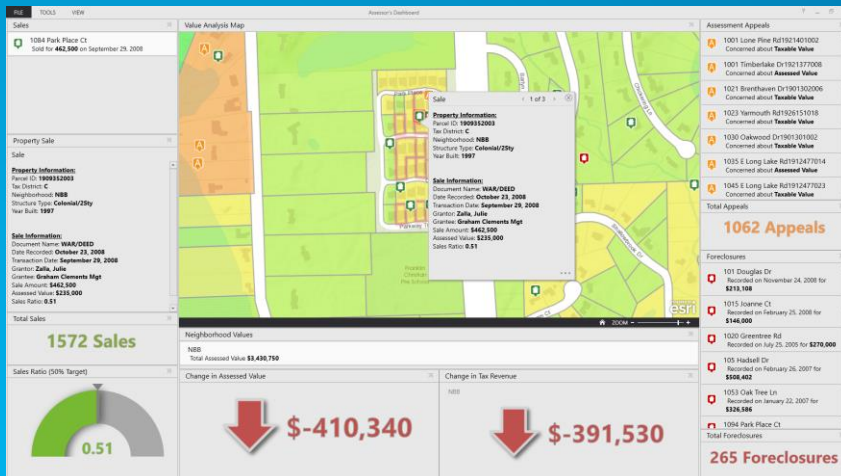
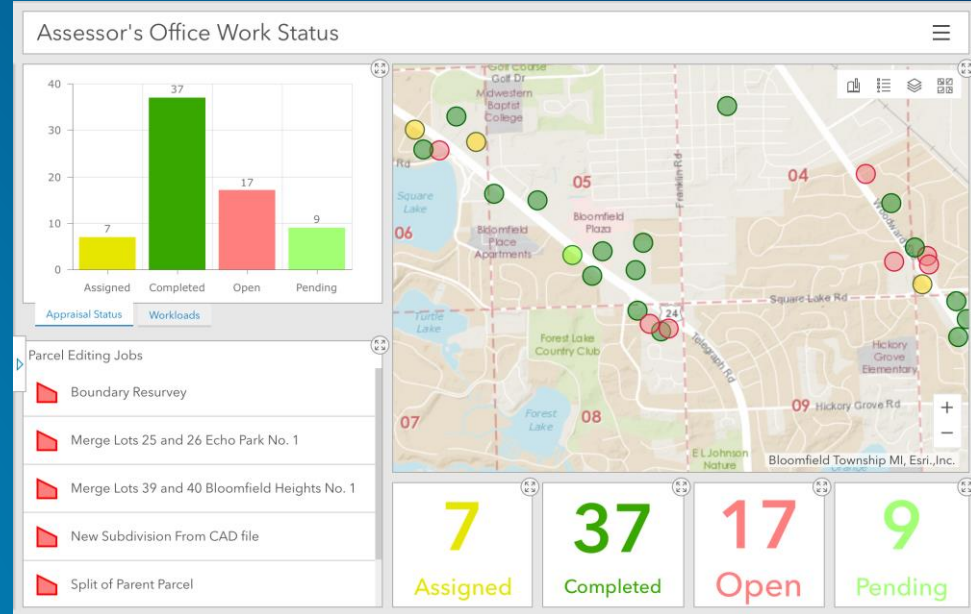
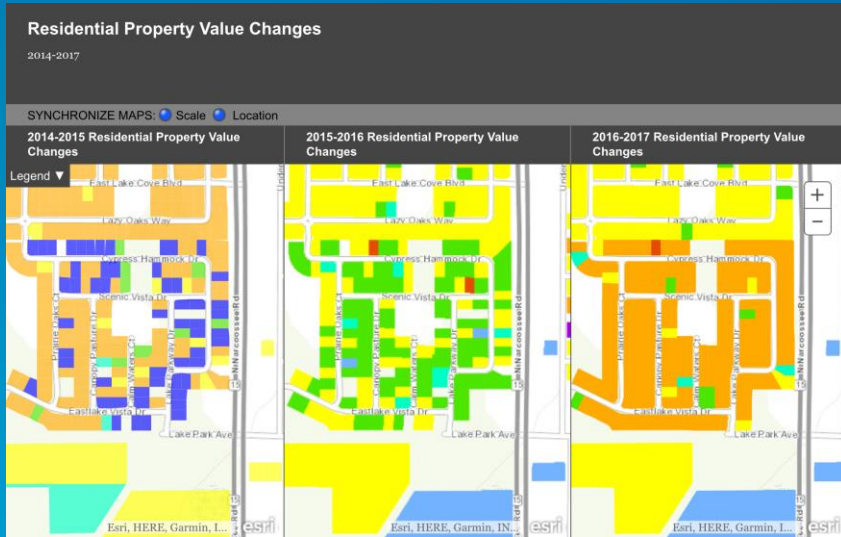
GIS for the Field

Field Data Collection and Field Force Management



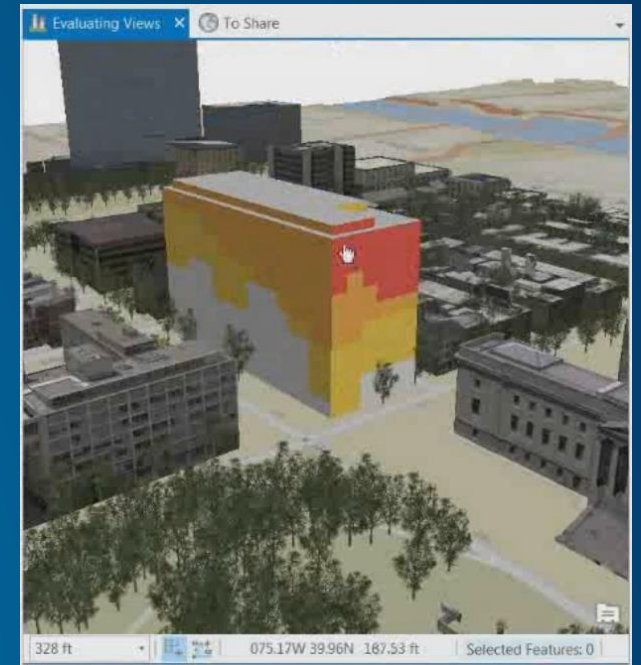
Monitoring

Make Decisions at a Glance

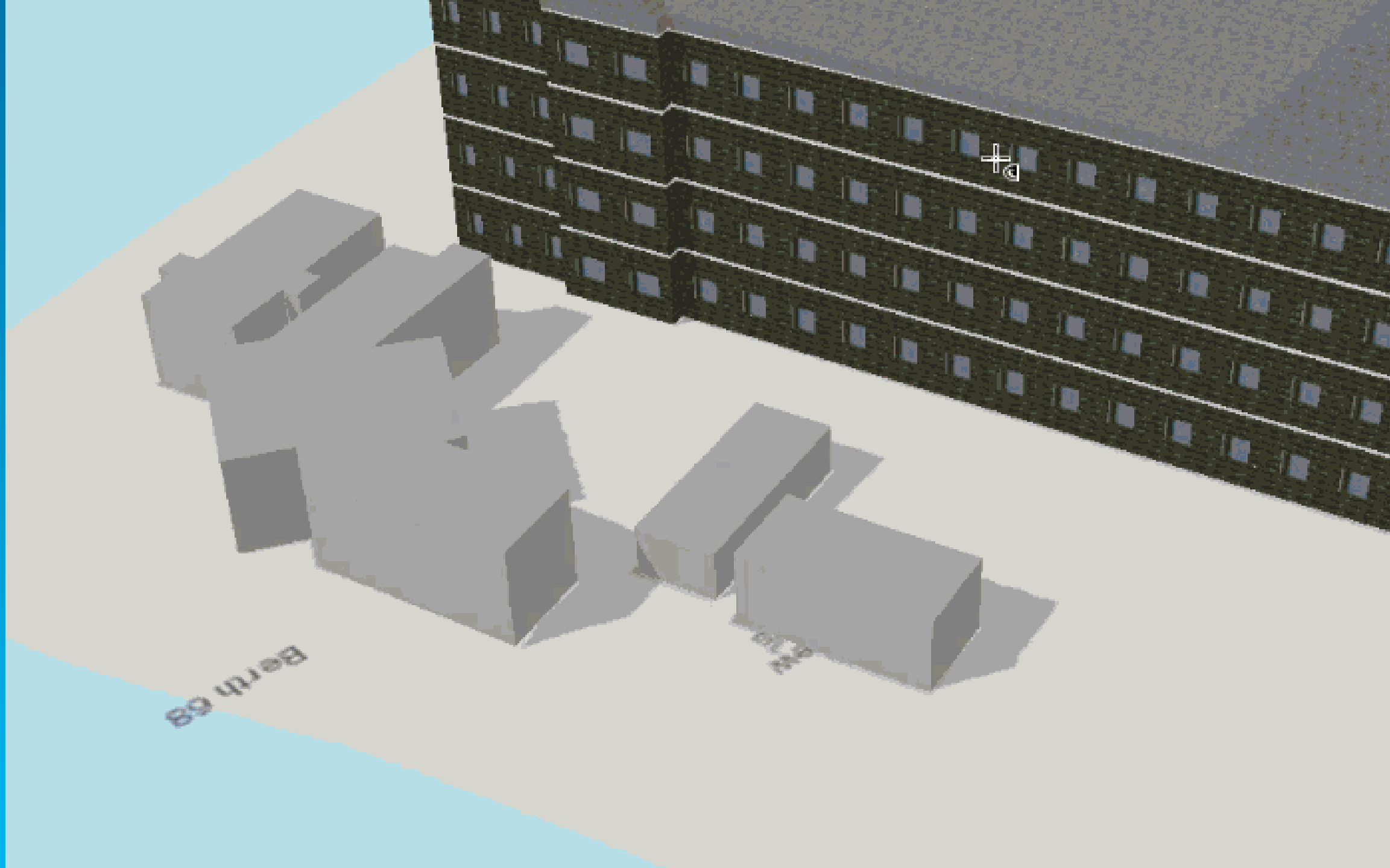


3D Elements in Valuation

Analysis, Visualization, Maps and Apps

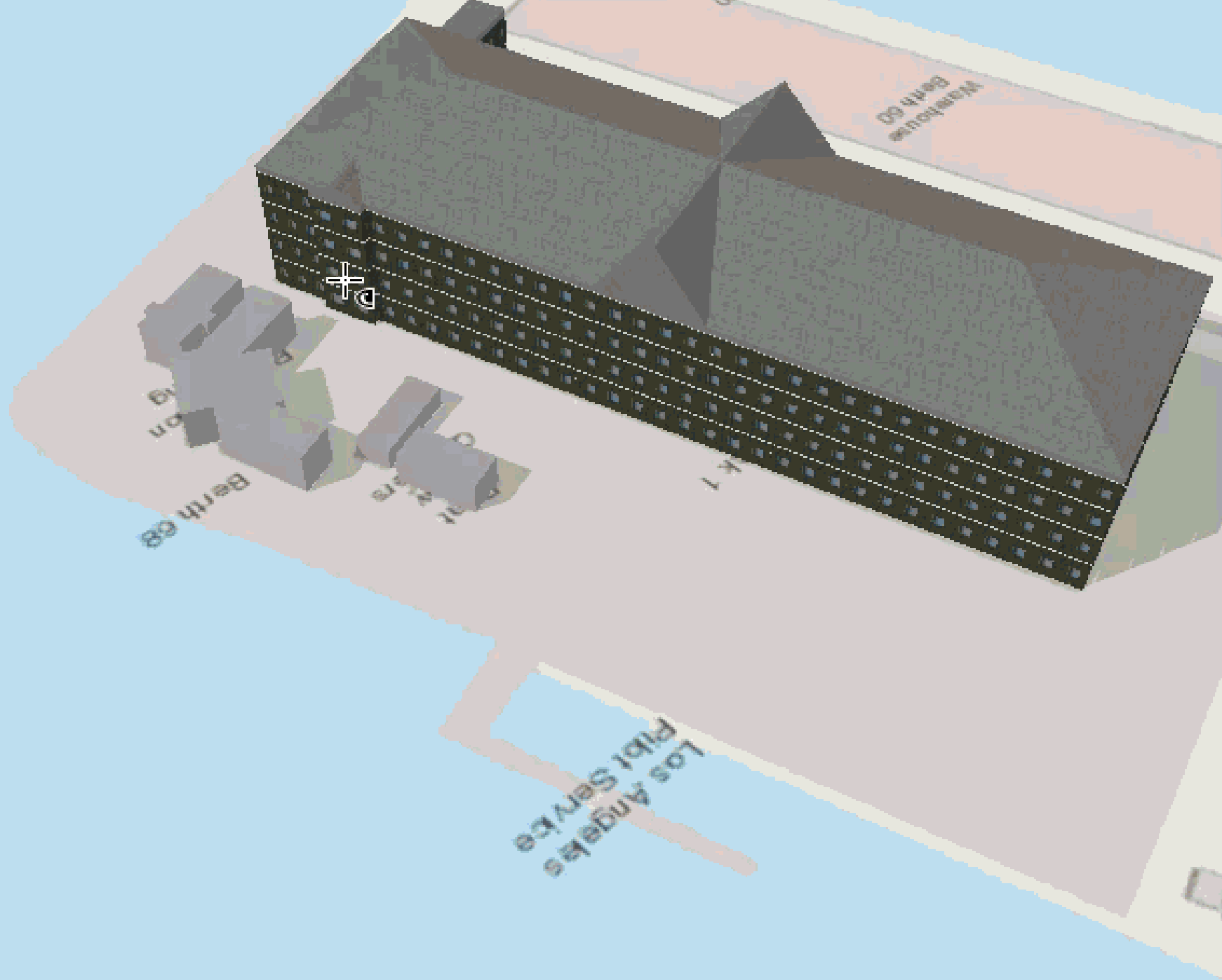


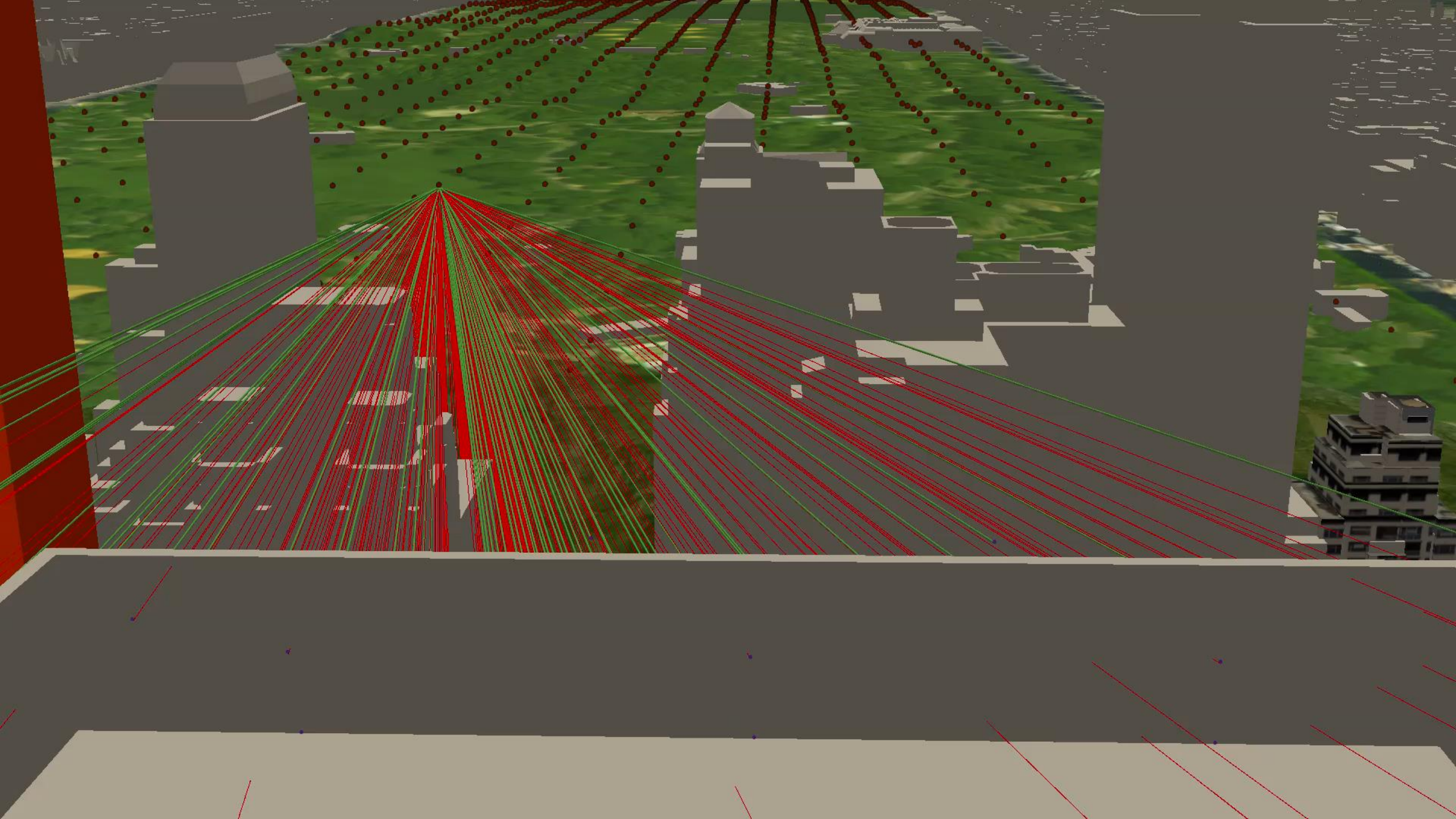
Uncovering value locked in your data.....



Berth 08

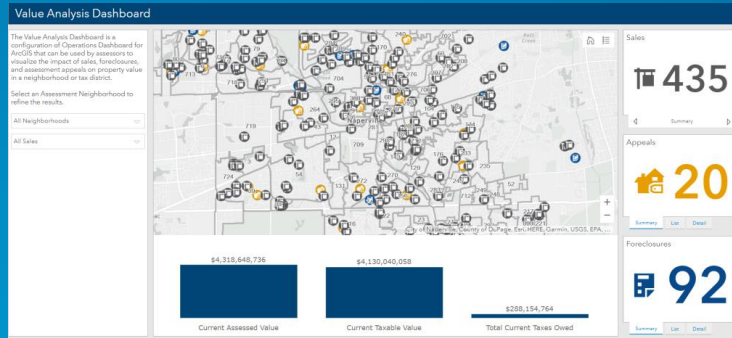
Berth 09





Value Analytics

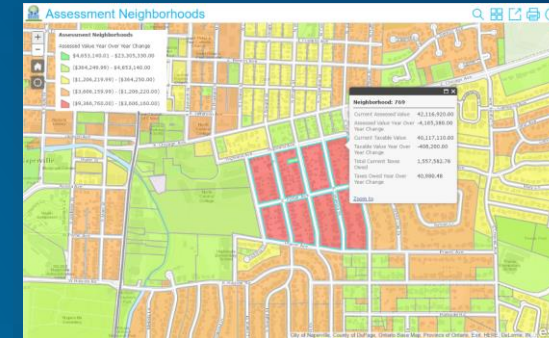
Analysis, Visualization, Maps and Apps



Value Analysis Dashboard



Value Change Over Time



Assessment Neighborhoods

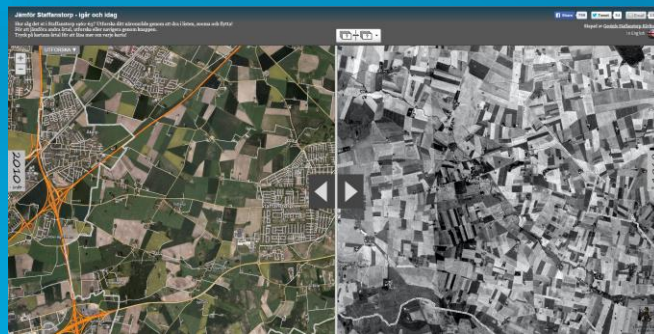


Image Comparison

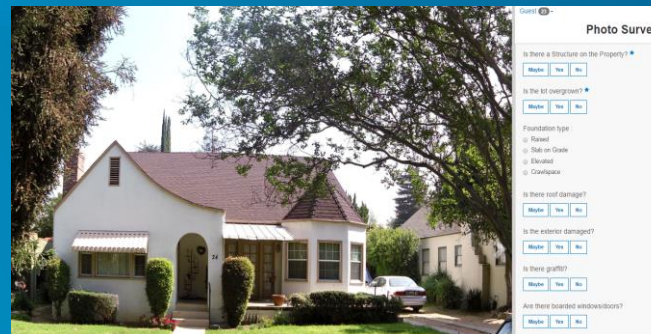
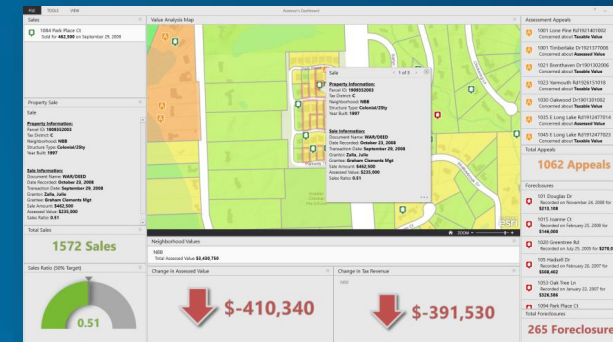


Photo Survey



Configurable Dashboards

Discover and visualize trends and patterns....

Geostatistics

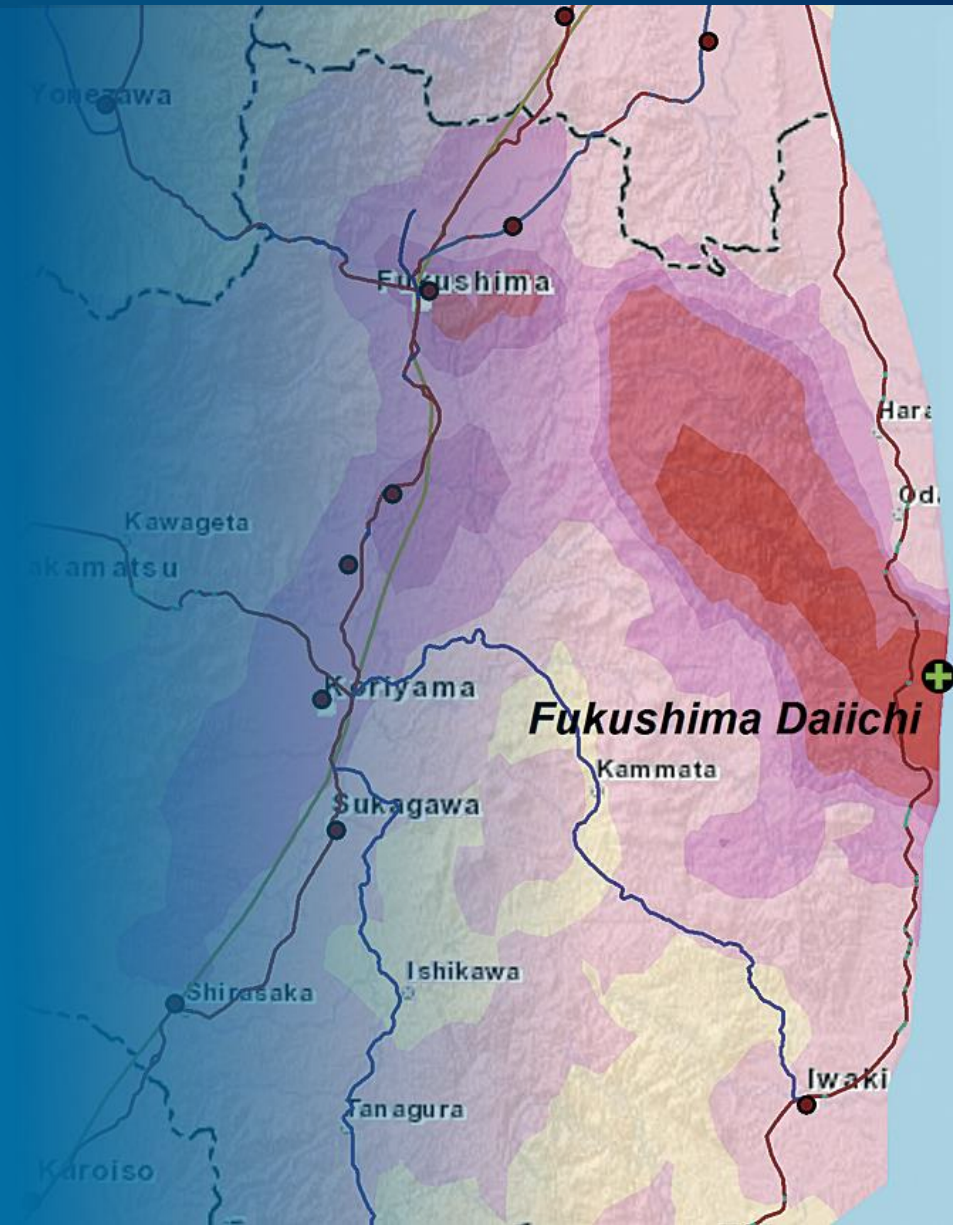
Leveraging Where in Your Statistics

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

Predict between known measurements – interpolation

Calculating extremely accurate interpolation surfaces without configuration of statistical models.

Empirical Bayesian Kriging



Spatial Statistics

Leveraging Where in Your 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

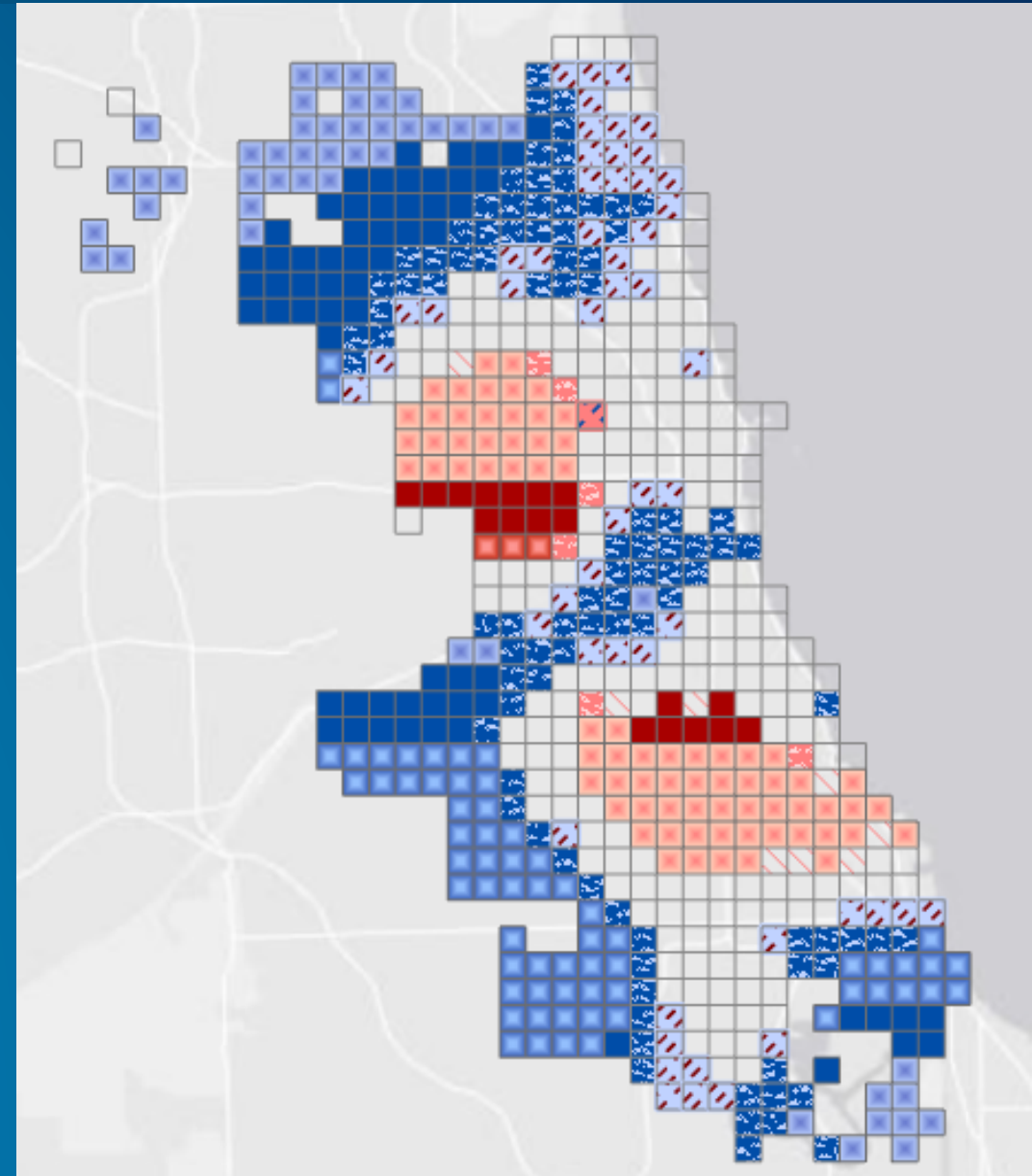
Model and explore spatial relationship through regression

New tools Create Space Time Cube:

Aggregates data into multidimensional data structure

Emerging Hot Spot Analysis:

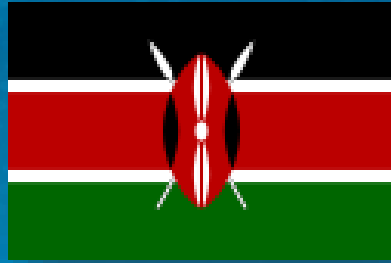
Identify hot and cold spot trends – new, intensifying, diminishing, sporadic, etc.



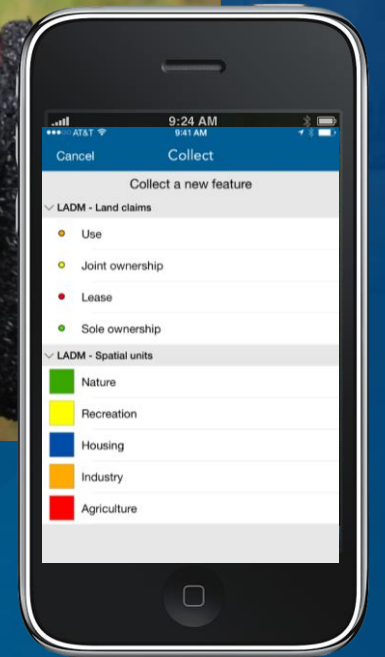
Fit-for-Purpose Case Studies

scots Land Administration

Kenya



Colombia



Cadastre is a Necessary Precondition to Sustainable Economy.....

Colombia



Plano Topografico de Cortesia
 "Producto como demostración, no tiene respaldo oficial"

CUADRO DE COORDENADAS

Vertice	Norte	Este
055	1,029,300	988,660
056	1,029,312	988,669
057	1,029,313	988,664
058	1,029,362	988,673
059	1,029,362	988,673
060	1,029,405	988,695
061	1,029,413	988,702
062	1,029,442	988,715
063	1,029,483	988,732
064	1,029,488	988,737
065	1,029,461	988,746
066	1,029,474	988,761
067	1,029,491	988,766
068	1,029,468	988,807
069	1,029,430	988,837
070	1,029,429	988,842
071	1,029,378	988,797
072	1,029,360	988,773
073	1,029,319	988,746
074	1,029,268	988,772
075	1,029,198	988,816
076	1,029,147	988,783

Coordenadas Matada SINGLAS - BOGOTÁ
 EPSG:3116

Lote No.	Area aprox. (m²)
25799000000000401400000000	24,817

0 25 50 75 100 m



Collaborative

Partnering for the Future of Colombia

- IGAC – National Mapping Agency
- Kadaster International
- Trimble
- Esri
- Esri Colombia



ISO 19152:2012 [®]

Geographic information -- Land Administration Domain Model (LADM)

FISMA Authorization & Accreditation

TRUSTe
CERTIFIED PRIVACY

FedRAMP

Ensuring secure cloud computing for the Federal Government



esri Colombia

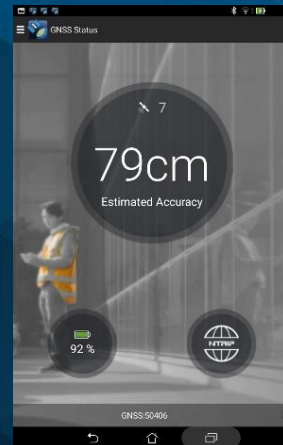
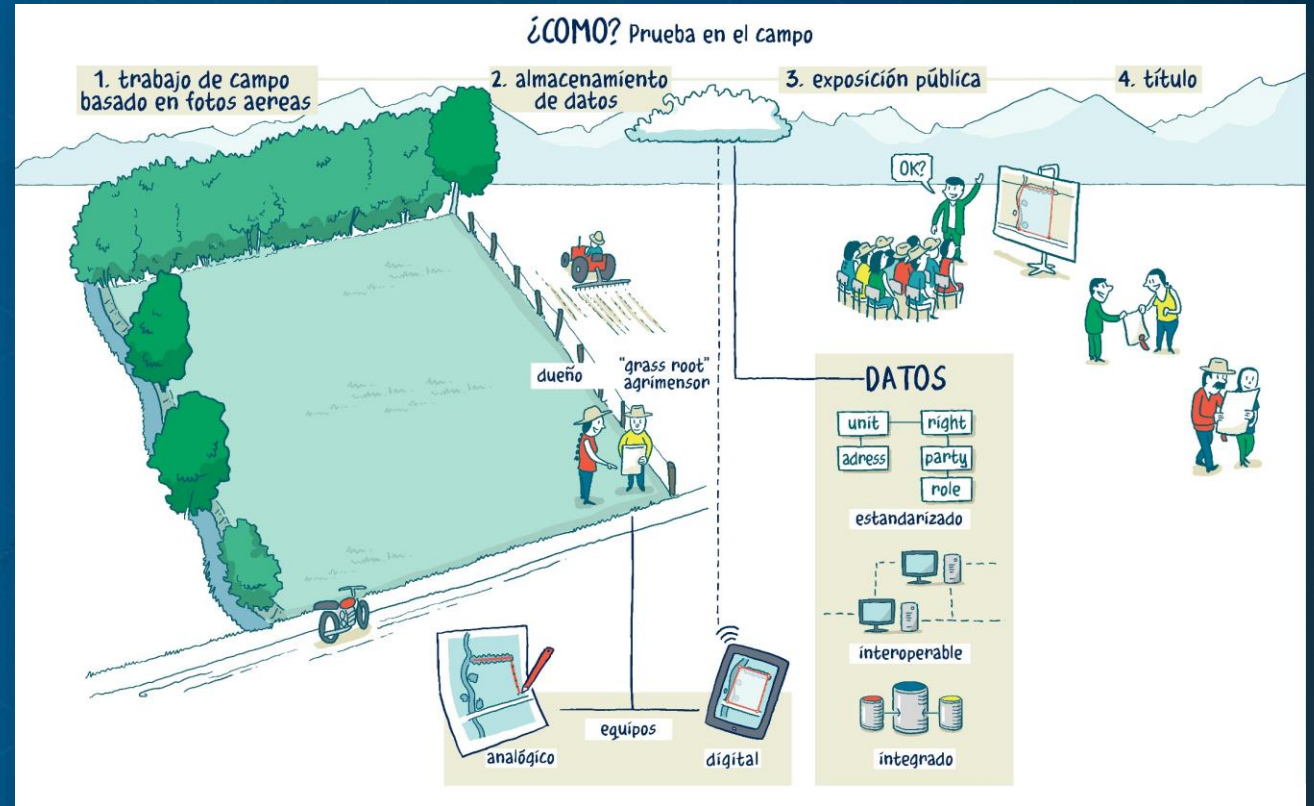


Typical Situation

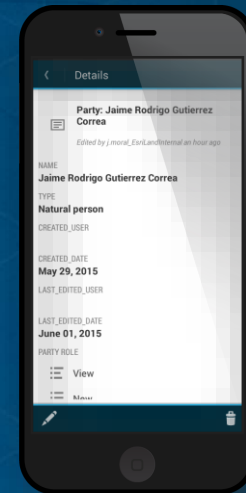
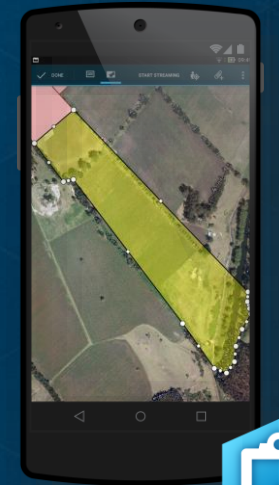


Methodology

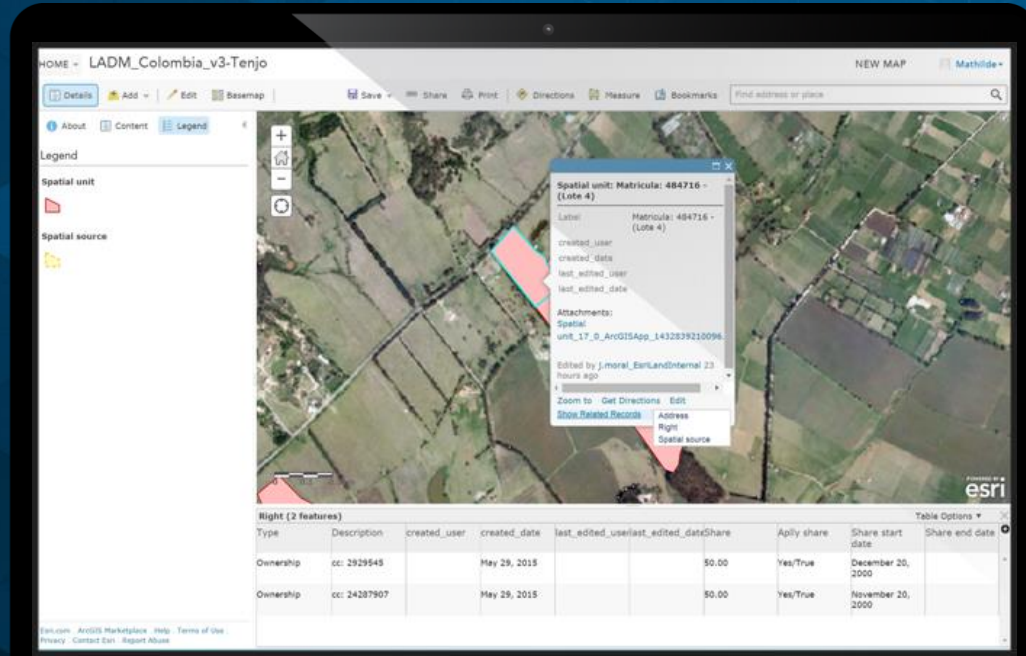
- Data model LADM
- Trimble R1 GNSS (sub-meter)
- Ortho photos (digital)
- Collector for ArcGIS on Android
- Cloud storage Data (spatial and legal)
- Collect Once - participatory aspect



Methodology



LADM in ArcGIS Online



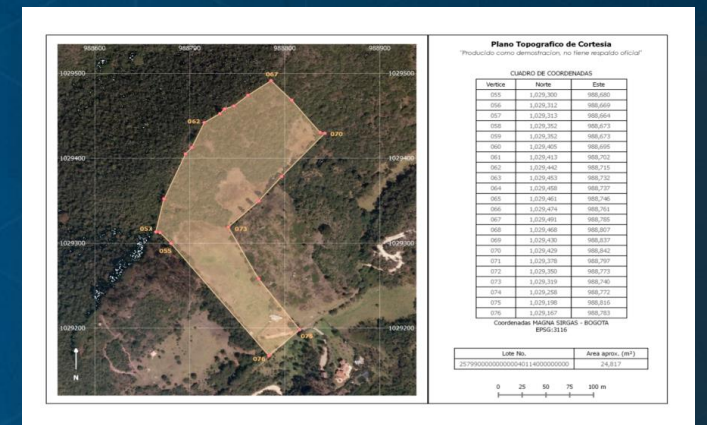
Browser
Capabilities



Apps



Base Maps and Data



Reports

Many More.....

Fit For Purpose LA & GIS

FFP processes with FFP technology

LADM
Hosted Services

Browser Editing



Kenya

Fit-for-Purpose Land Administration



<http://go.esri.com/fit4purposekenya>

Community-based Solutions.....

Kenya

Citizen Assisted Surveying



<http://go.esri.com/fit4purposekenya>

Community Driven Solutions.....

Kenya

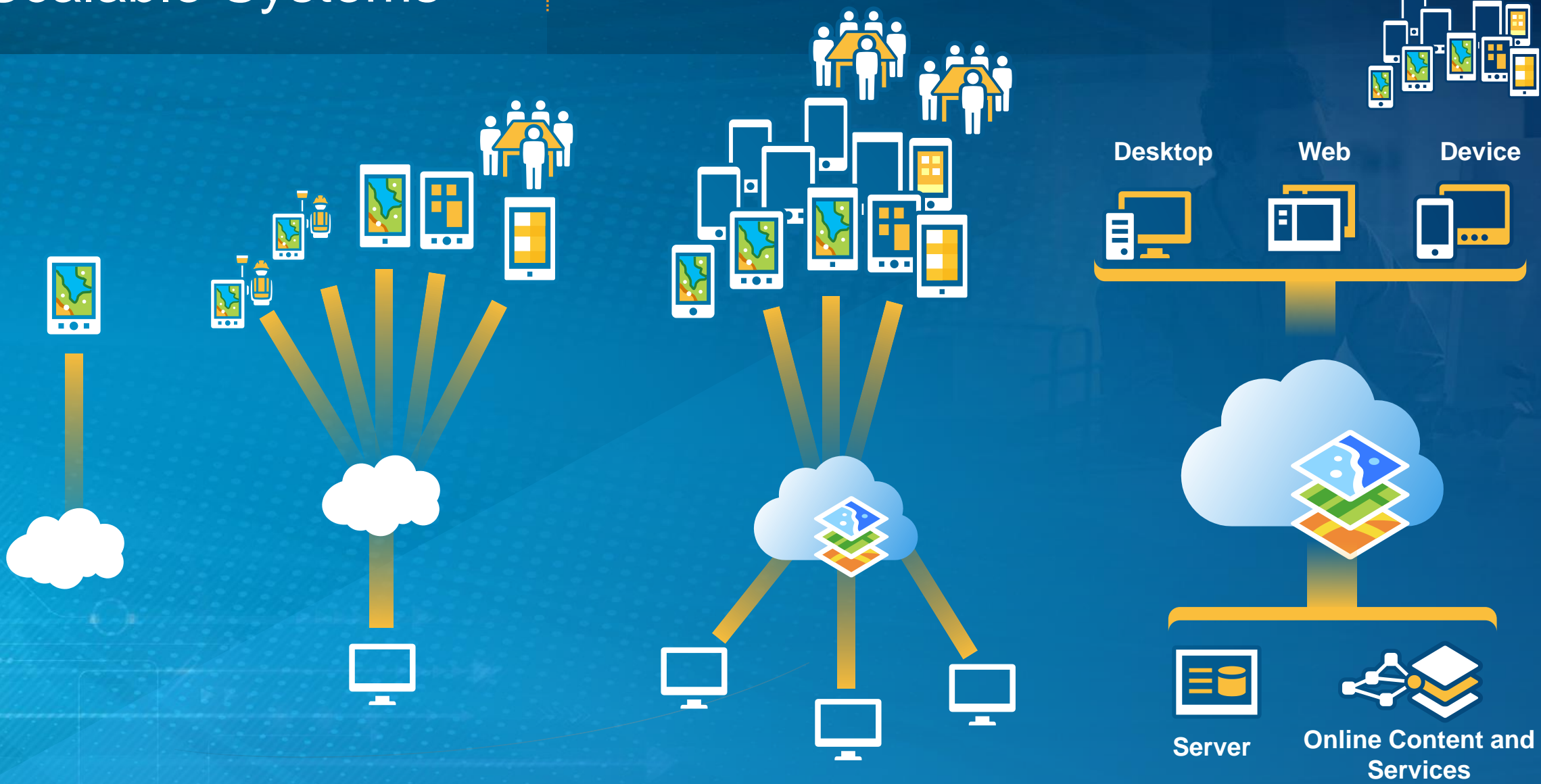
Community Adjudication



<http://go.esri.com/fit4purposekenya>

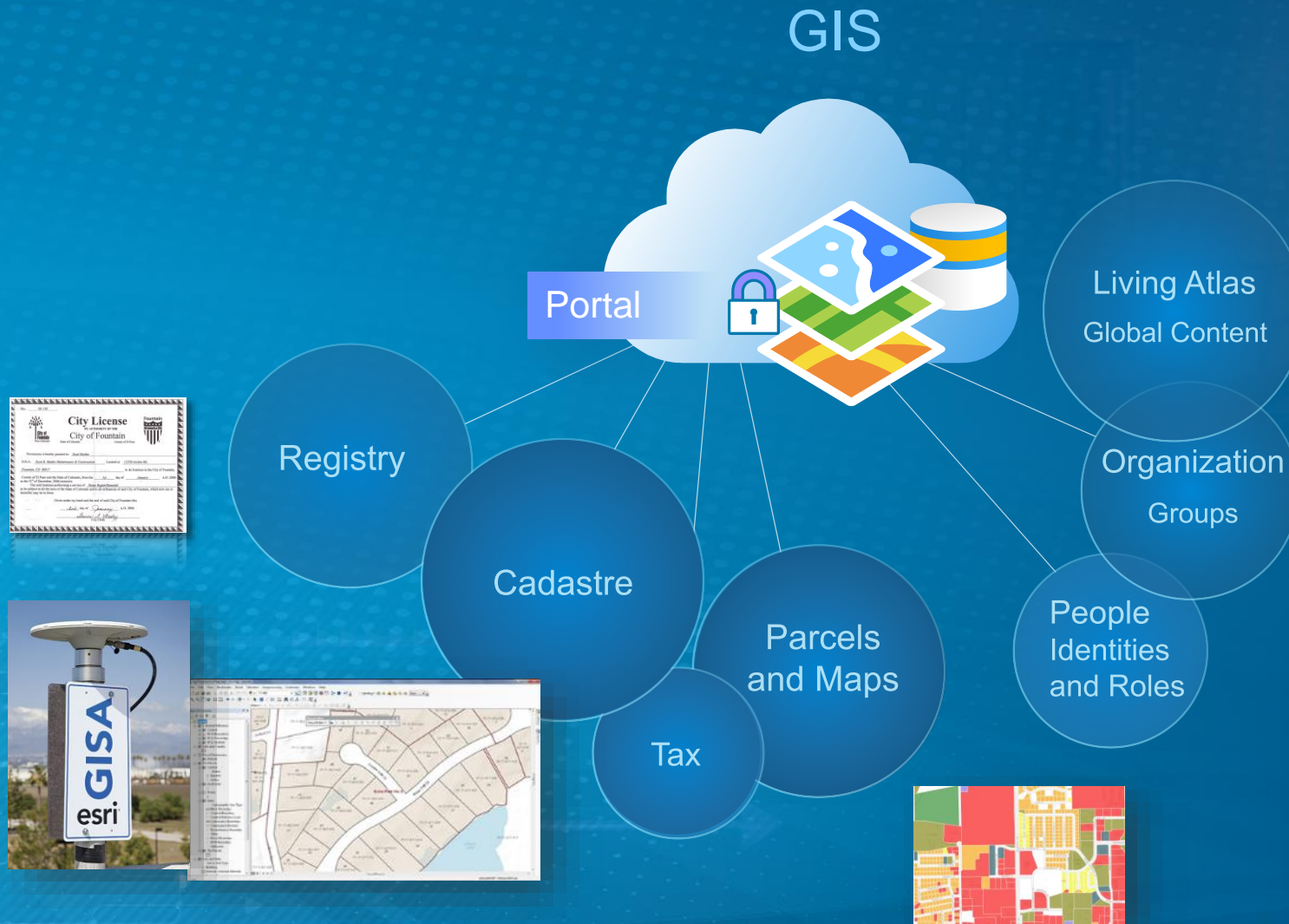
Community Driven Solutions.....

Scalable Systems



Modern Cadastral Platform – Web GIS

Supporting Global Cadastre Requirements





esri

THE
SCIENCE
OF
WHERE