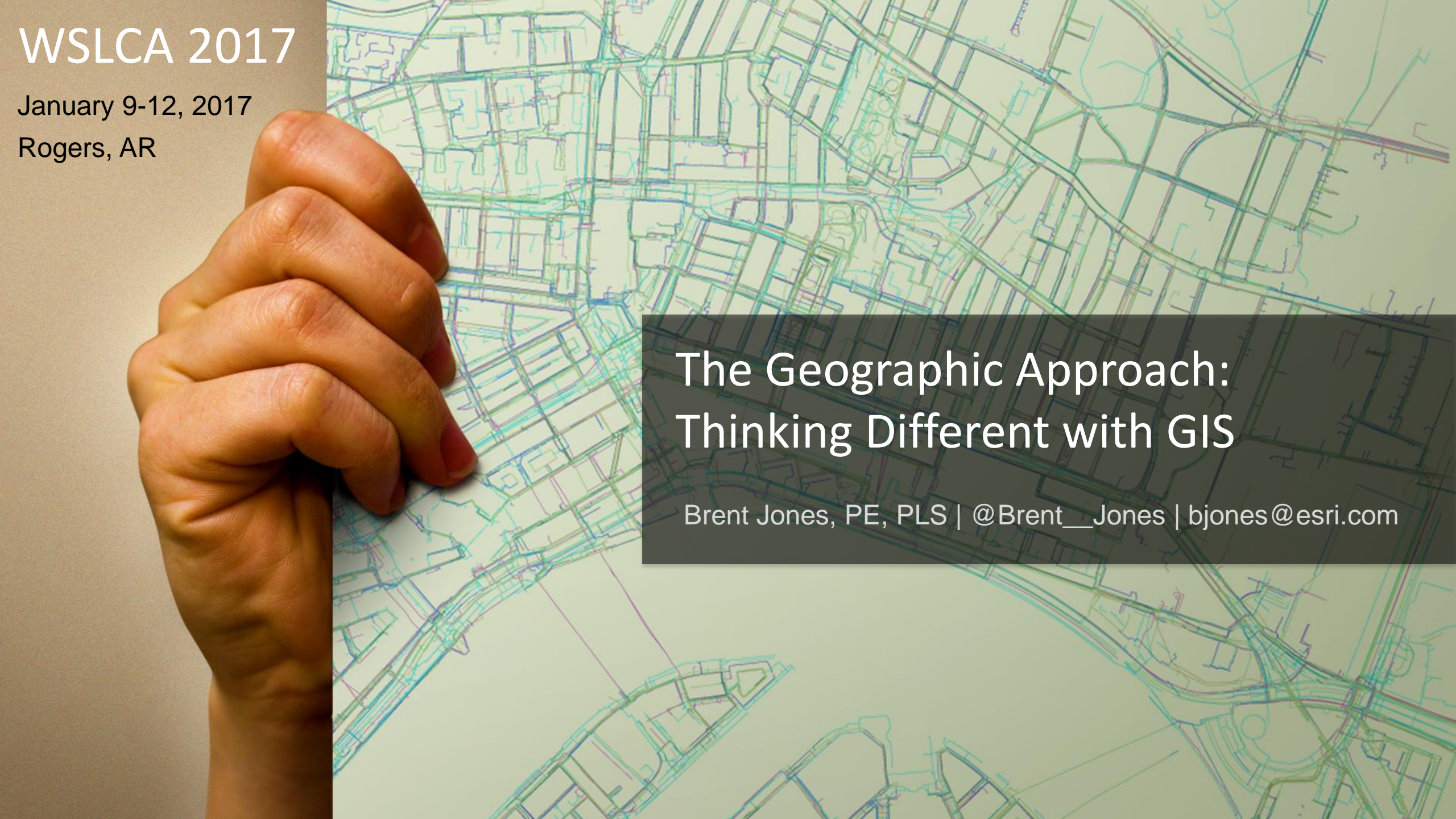


WSLCA 2017

January 9-12, 2017

Rogers, AR

A hand is shown on the left side of the image, holding a map. The map is filled with a dense network of colored lines in shades of blue, green, and purple, representing a complex geographic information system (GIS) dataset. The lines form a grid-like pattern with various shapes and sizes, suggesting a detailed urban or land-use plan. The background is a light, neutral color, and the overall image has a professional, technical feel.

# The Geographic Approach: Thinking Different with GIS

Brent Jones, PE, PLS | @Brent\_\_Jones | [bjones@esri.com](mailto:bjones@esri.com)

# Agenda

- Who We Are
- Land, Maps and GIS
- Web Maps
- Portals
- Apps and Web Maps
- Systems
- Land Records GIS Capabilities
- A Few Land Board Examples
- Open Discussion on Challenges and Opportunities



# Esri Community



**1,100** National Government Agencies

**2,200** States & Regional Agencies

**20,000** Cities & Local Governments

**30,000+** Businesses

**3,300** Utilities

**5,000** NGO's

**7,000** Colleges & Universities

*Our Relationship With Our Users Is Key*



# Land Records and Cadastre Leverages GIS

Property Values



Parcel Query

Planning



Development

Property Appraisal



Visualization



Landbase Mapping

Geodesign

Analysis

Valuation

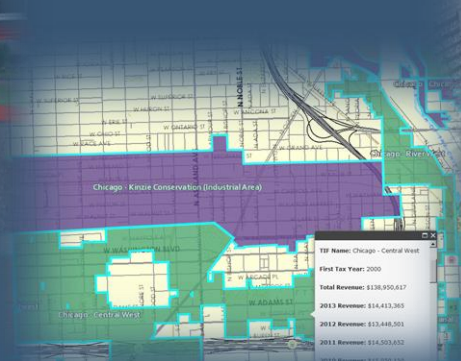
BIM



3D Analysis



Field Workforce Enablement



Compliance



Property Visualization

Cartography

Infrastructure Management

Maintenance

Field Data Collection



# Geography is the foundation

Context for where, why, how





# Maps

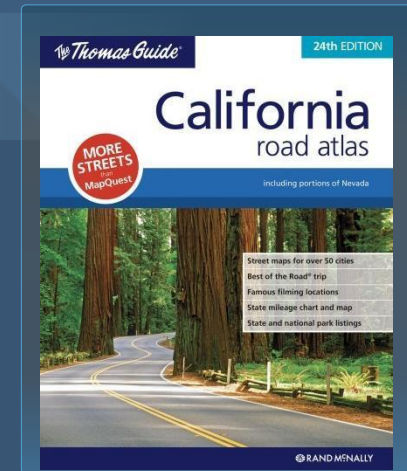
Capture knowledge and information



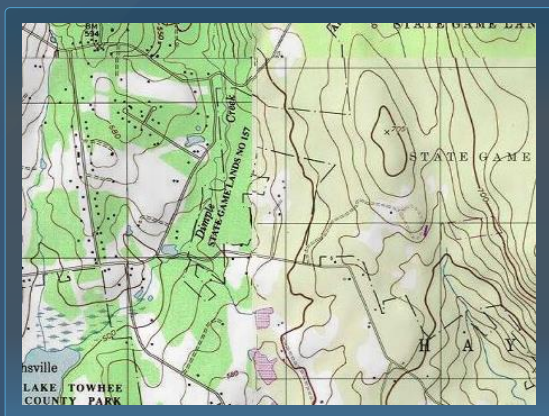
1300 B.C. Town Map



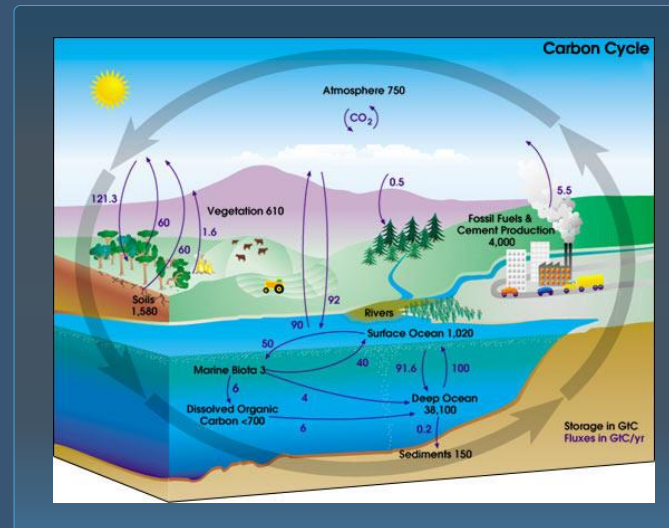
David Rumsey map



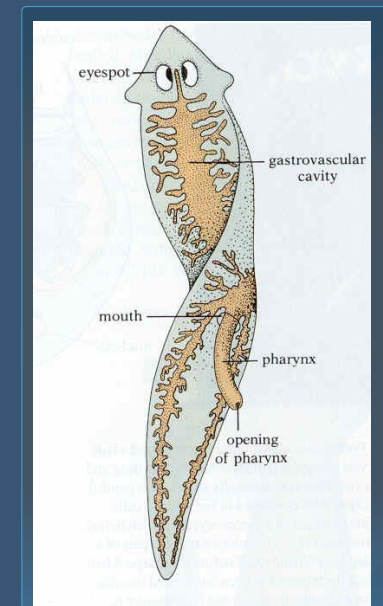
Thomas Bros Map



USGS Topo map



Carbon Cycle Map



Planaria Map



# Maps can transform data

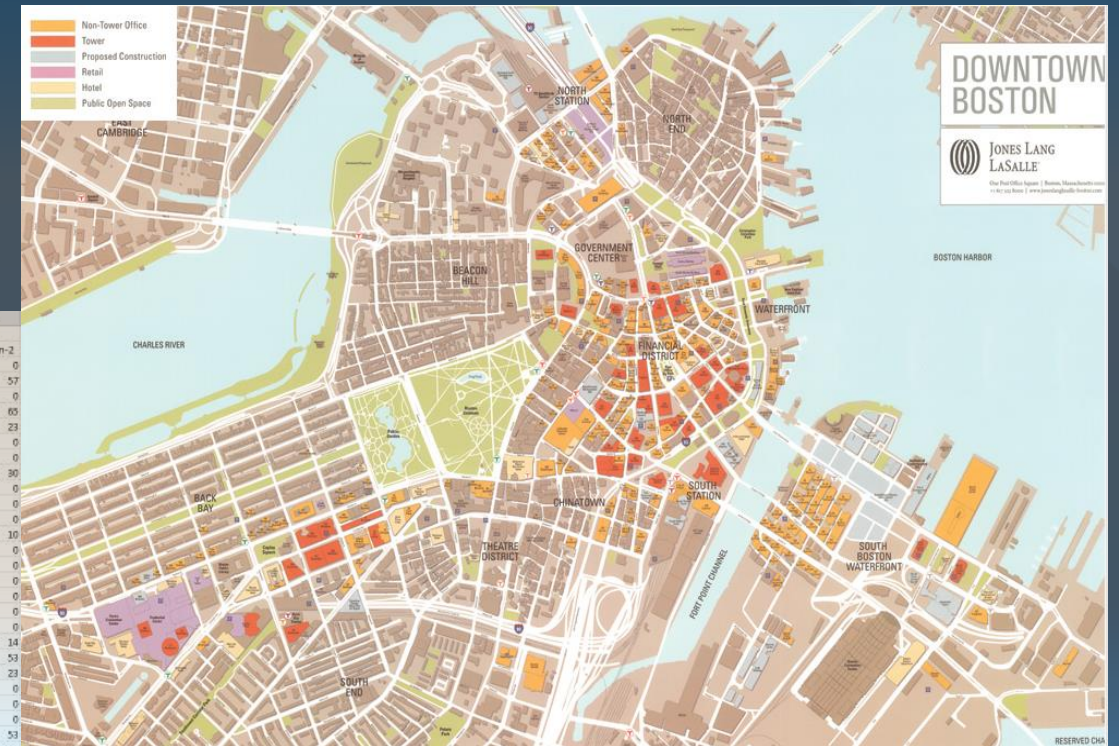
Make it come alive, add new context

Understandable

Shareable

Simple

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Internal	All												
2	Address	Content	Status	Col	Status	Title 1	Title 1 Len	Meta Des	Meta Key	Meta Key	H1-1	H1-len-1	H1-2	H1-len-2
3	http://sec	text/html	301	Moved	Permanently	0	0	0	0	0	0	0	0	0
4	http://www	text/html	200	OK	SEO Softw	34	SEO	144	0	SEO & Soc	23	Effectivel	57	0
5	http://cdn	image/jpeg	200	OK		0	0	0	0	0	0	0	0	0
6	http://www	text/html	200	OK	The TAGFI	26	0	0	0	The SEO	18	Transpare	63	0
7	http://www	text/html	200	OK	Learn SEO	18	0	0	0	Learn SEO	9	Beginner:	23	0
8	http://www	text/html	200	OK	Press and	25	0	0	0	Press & A	14	0	0	0
9	http://cdn	image/png	200	OK		0	0	0	0	0	0	0	0	0
10	http://www	text/html	200	OK	Analytics	23	0	0	0	The Daily	18	How Not t	30	0
11	http://www	image/png	200	OK		0	0	0	0	0	0	0	0	0
12	http://www	applicatio	200	OK		0	0	0	0	0	0	0	0	0
13	http://www	text/html	200	OK	SEO Event	19	0	0	0	SEOMoz E	13	0	0	0
14	http://www	text/html	200	OK	David Mih	77	View Davi	138	0	Member F	14	Edit Phot	10	0
15	http://cdn	text/css	200	OK		0	0	0	0	0	0	0	0	0
16	http://cdn	text/css	200	OK		0	0	0	0	0	0	0	0	0
17	http://www	text/html	200	OK	SEOMoz N	59	SEOMoz S	54	0	SEOMoz N	50	0	0	0
18	http://cdn	text/css	200	OK		0	0	0	0	0	0	0	0	0
19	http://cdn	image/jpeg	200	OK		0	0	0	0	0	0	0	0	0
20	http://cdn	image/png	200	OK		0	0	0	0	0	0	0	0	0
21	http://www	text/html	200	OK	External L	43	SEO best	153	0	External L	14	External L	14	0
22	http://www	text/html	200	OK	Technical	34	0	0	0	The Daily	18	Reli-Conf	53	0
23	http://www	text/html	200	OK	What is Te	32	Managing	332	0	The Daily	18	What is Te	27	0
24	http://w	text/html	200	OK	SEOMoz J	14	0	0	0	0	0	0	0	0
25	http://www	text/html	200	OK	MapPoint:	18	Explains S	115	0	0	0	0	0	0
26	http://cdn	image/jpeg	200	OK		0	0	0	0	0	0	0	0	0
27	http://www	text/html	200	OK	Technical	34	0	0	0	The Daily	18	Reli-Conf	53	0
28	http://www	text/html	200	OK	When It C	58	We all kn	377	0	The Daily	18	When It C	49	0
29	http://www	text/html	200	OK	Brett Bag	76	View Bret	144	0	Member F	14	Edit Phot	10	0
30	http://www	text/html	200	OK	Behavior I	37	0	0	0	The Daily	18	The Guide	41	0
31	http://www	text/html	200	OK	Contact SE	23	0	0	0	Contact SE	14	0	0	0
32	http://www	text/html	200	OK	Slingshot	39	View Sling	144	0	Member F	14	Edit Phot	10	0
33	http://www	text/html	200	OK	Alex Morr	68	View Alex	140	0	Member F	14	Edit Phot	10	0
34	http://www	text/html	200	OK	11 Google	59	Do you	101	0	The Daily	18	11 Google	50	0
35	http://www	text/html	200	OK	Sandeep F	73	View Sanc	152	0	Member F	14	Edit Phot	10	0
36	http://www	text/html	200	OK	Vijay Pash	78	View Vijay	142	0	Member F	14	Edit Phot	10	0
37	http://www	text/html	200	OK	The Evolu	31	Ever want	105	0	The Daily	18	The Evolu	22	0
38	http://www	text/html	200	OK	Why 2012	103	As we mo	342	0	The YouM	15	Why 2012	83	0





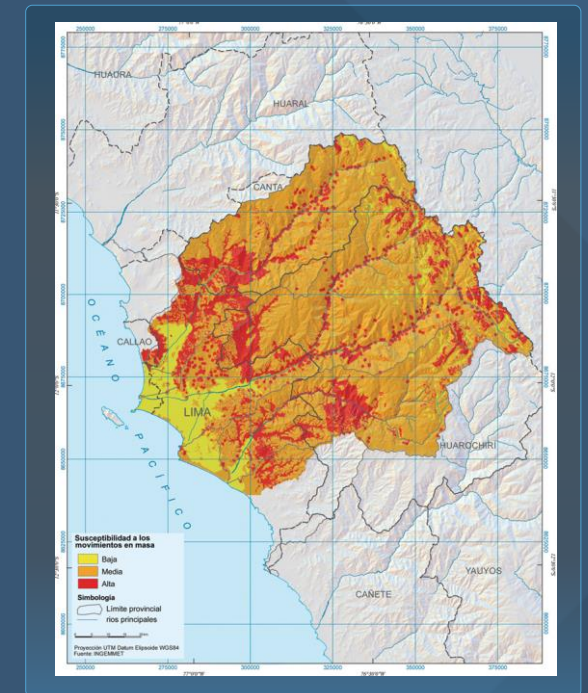
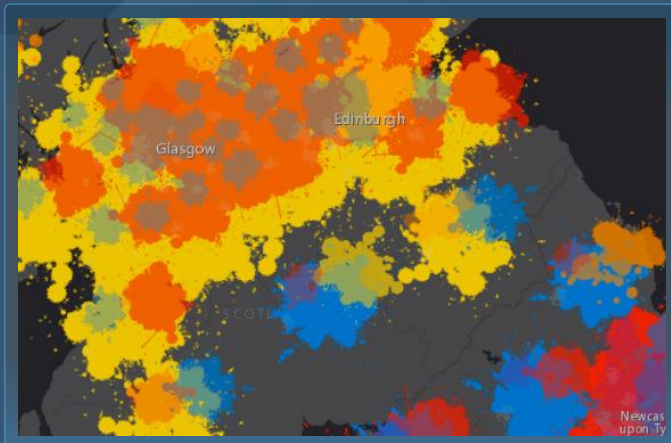
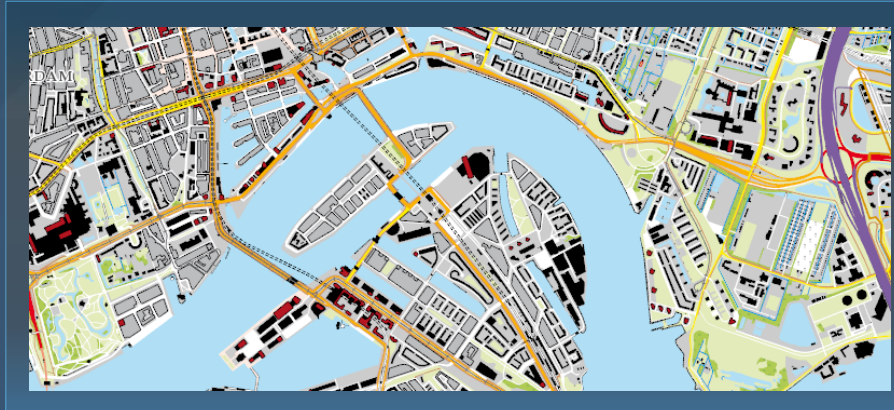
# GIS maps are works of art

How we communicate and share

Data model

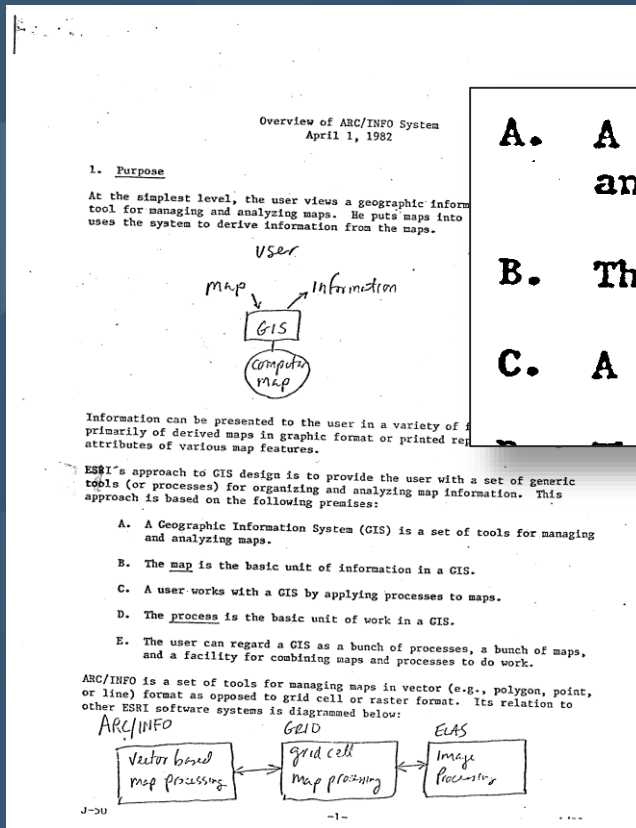
Authoritative

Use in many ways



# The importance of a map

## A fundamental building block of GIS

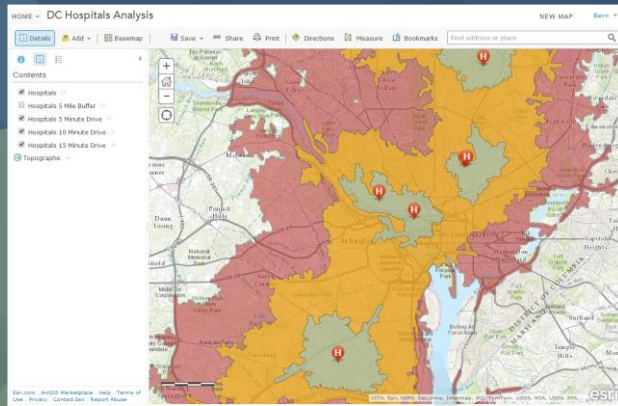


- A Geographic Information System (GIS) is a set of tools for managing and analyzing maps.
- The map is the basic unit of information in a GIS.
- A user works with a GIS by applying processes to maps.

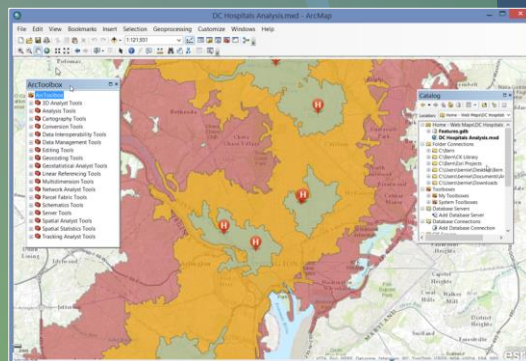


# The importance of a *web map*

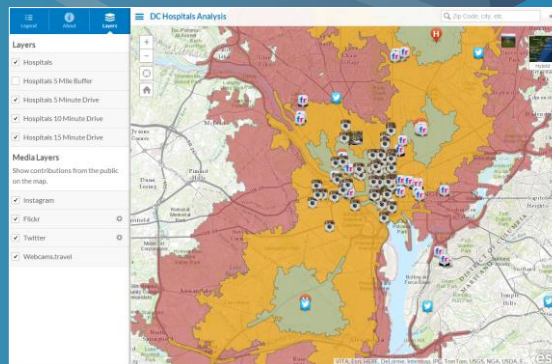
A fundamental building block of Web GIS



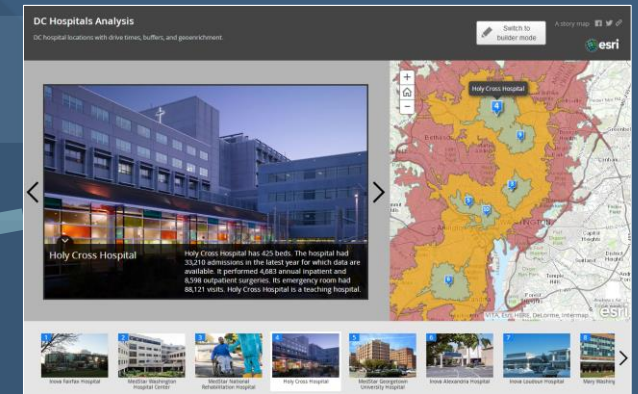
Map viewer  
(for authoring)



ArcGIS Desktop



App Templates



Story Maps



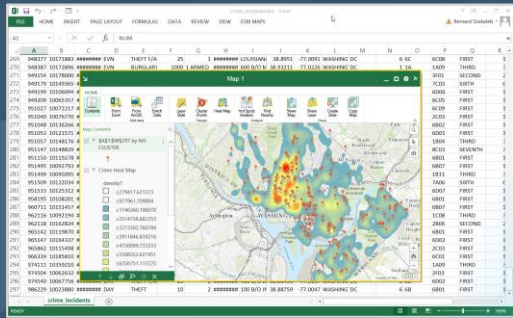
Workforce Apps



Devices

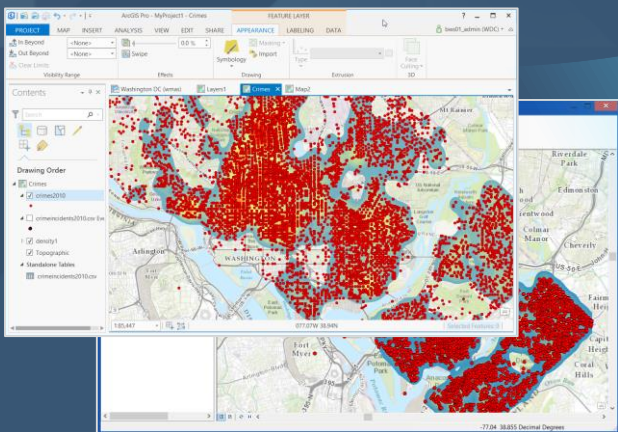
# Web maps bring information together

Integrate information and services across the platform

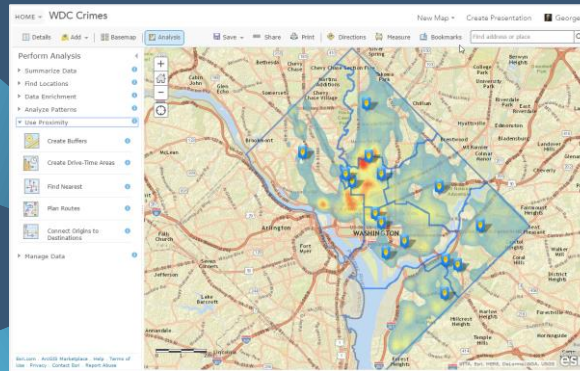


Office

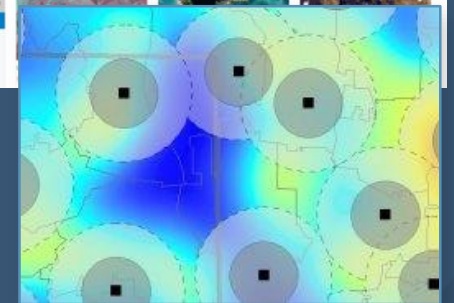
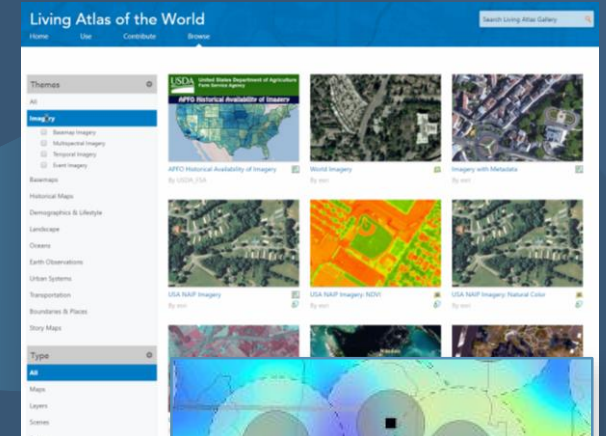
ArcGIS Desktop



Web Maps



Living Atlas



Hosted Services (SaaS)



Files  
Spreadsheets



Enterprise  
Systems and  
Services



# Web maps are part of a new information model

Abstracts and organizes all types of geographic data



# The ArcGIS Platform

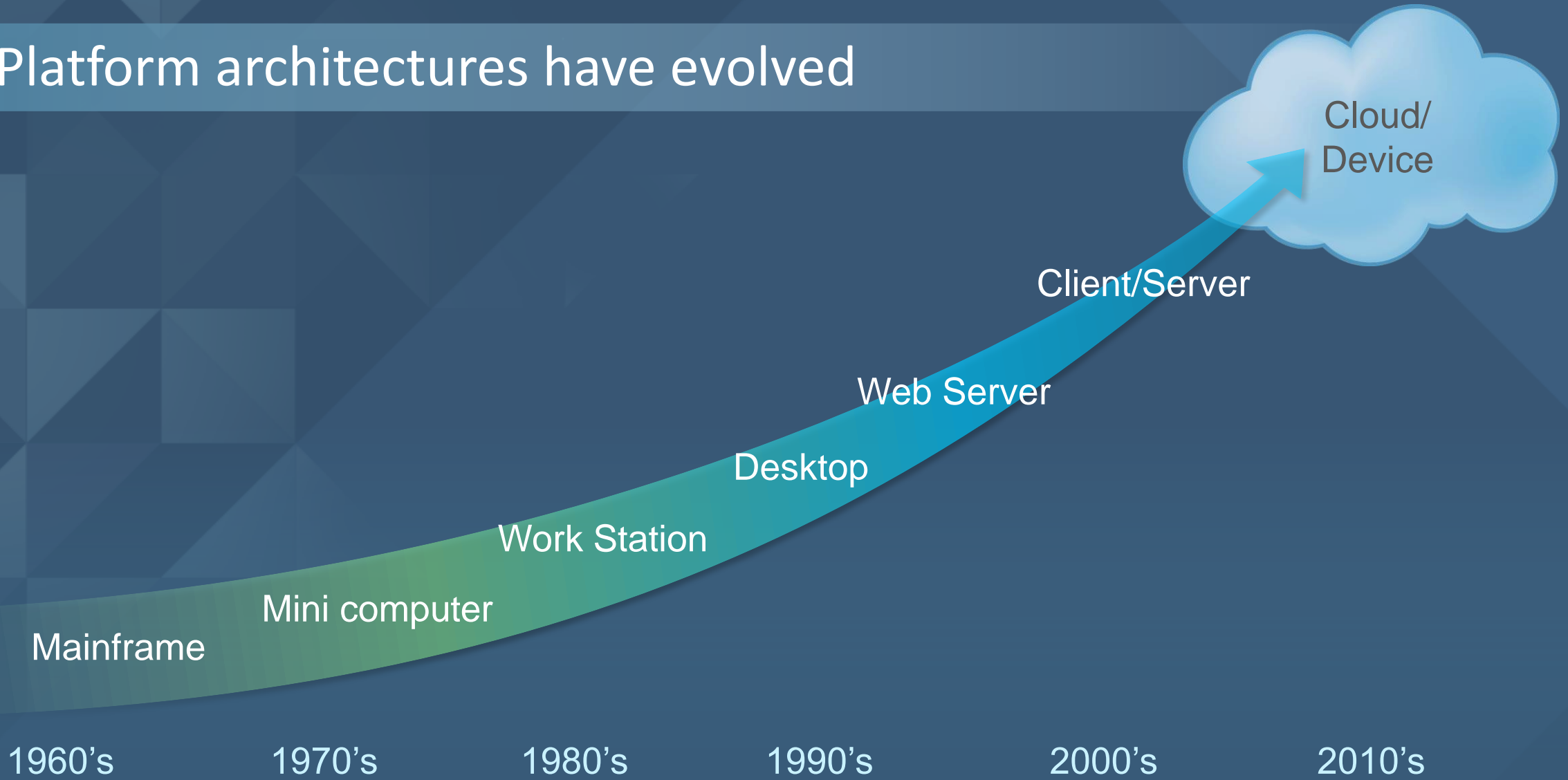
Make, use & share maps anytime, anywhere



# Platform architectures have evolved



# Platform architectures have evolved





# ArcGIS has evolved

Web GIS is a new pattern

## Applications

Collaborative

Mobile

Native

3D

Real-Time

Analytics

Configurable

Visualization

## Implementation

Open

Configuration

Web

Agile

Easier

Ready to Use

Standards



Web GIS

## Data

Lidar

Crowdsourcing

Drones

Sensors

Real-Time

Field Survey

Scientific Data

Remote Sensing

GPS

Social Media

UAVs

## Technology

Virtualization

Big Data

Location

Distributed Processing

Internet of Things

Smart Devices

Cloud

Faster Computing

Consumerization

Influenced by innovation in many areas

# ArcGIS is a Web GIS platform

A complete, integrated ecosystem

- Applications, data, services, APIs
- Cloud, desktops, servers, devices
- GIS professionals, knowledge workers, field crews, decision makers, public
- Scales for individuals, workgroups, organizations, enterprises, governments

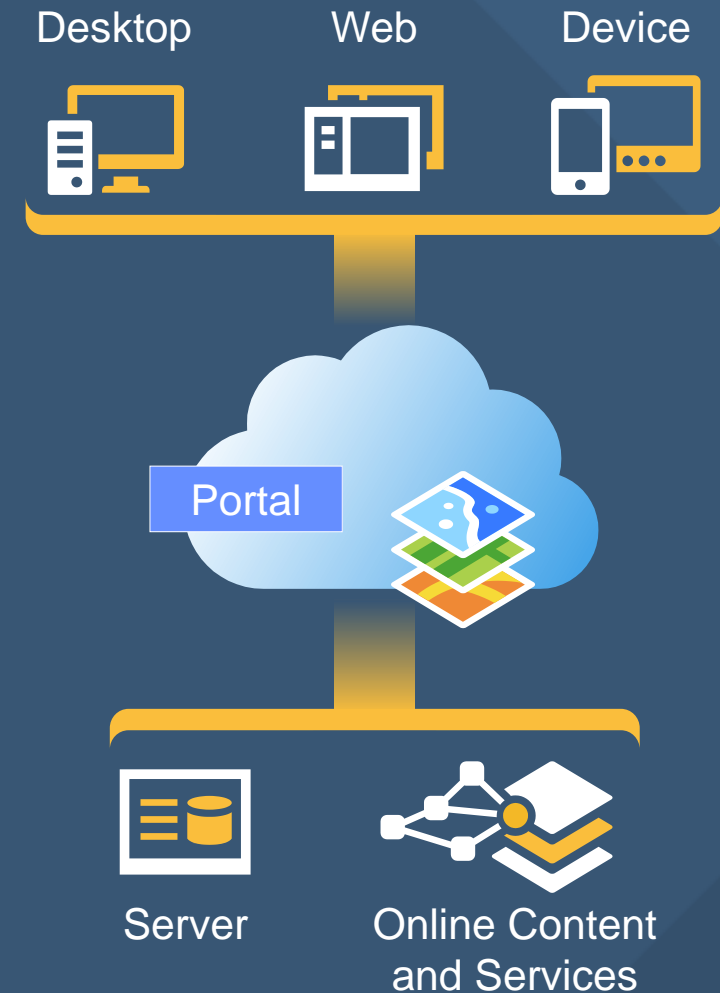




# What is Web GIS?

## Foundation of a modern GIS

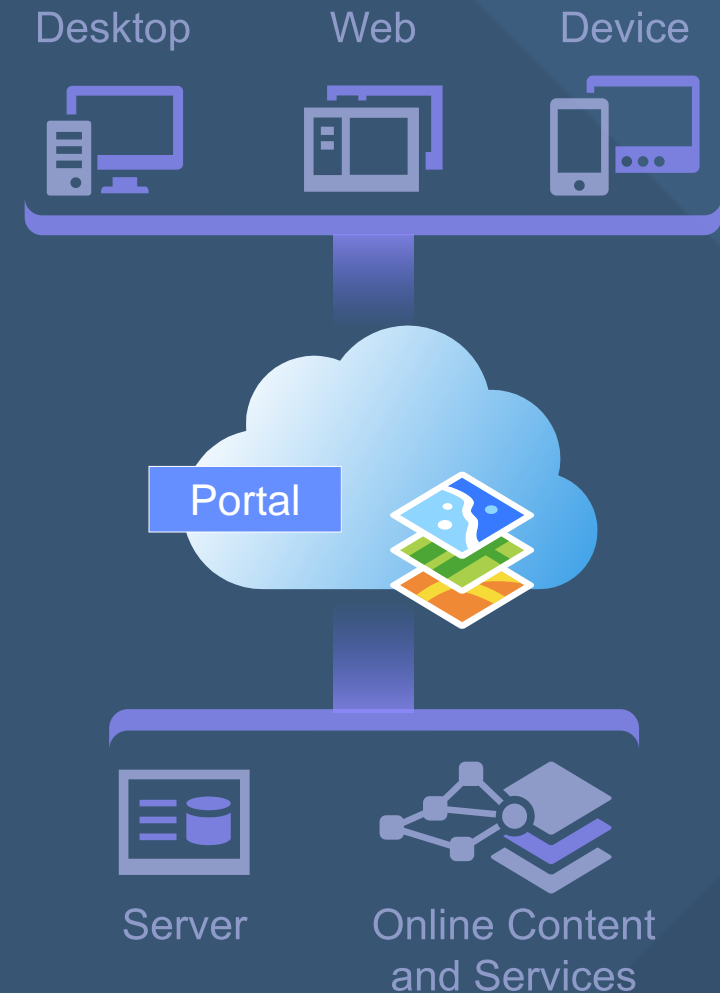
- A pattern, or architectural approach
- Powered by services
- Components are connected
- Uses a Portal
- In the cloud, on premises, or both



# What is a portal?

## Essential component of a modern GIS

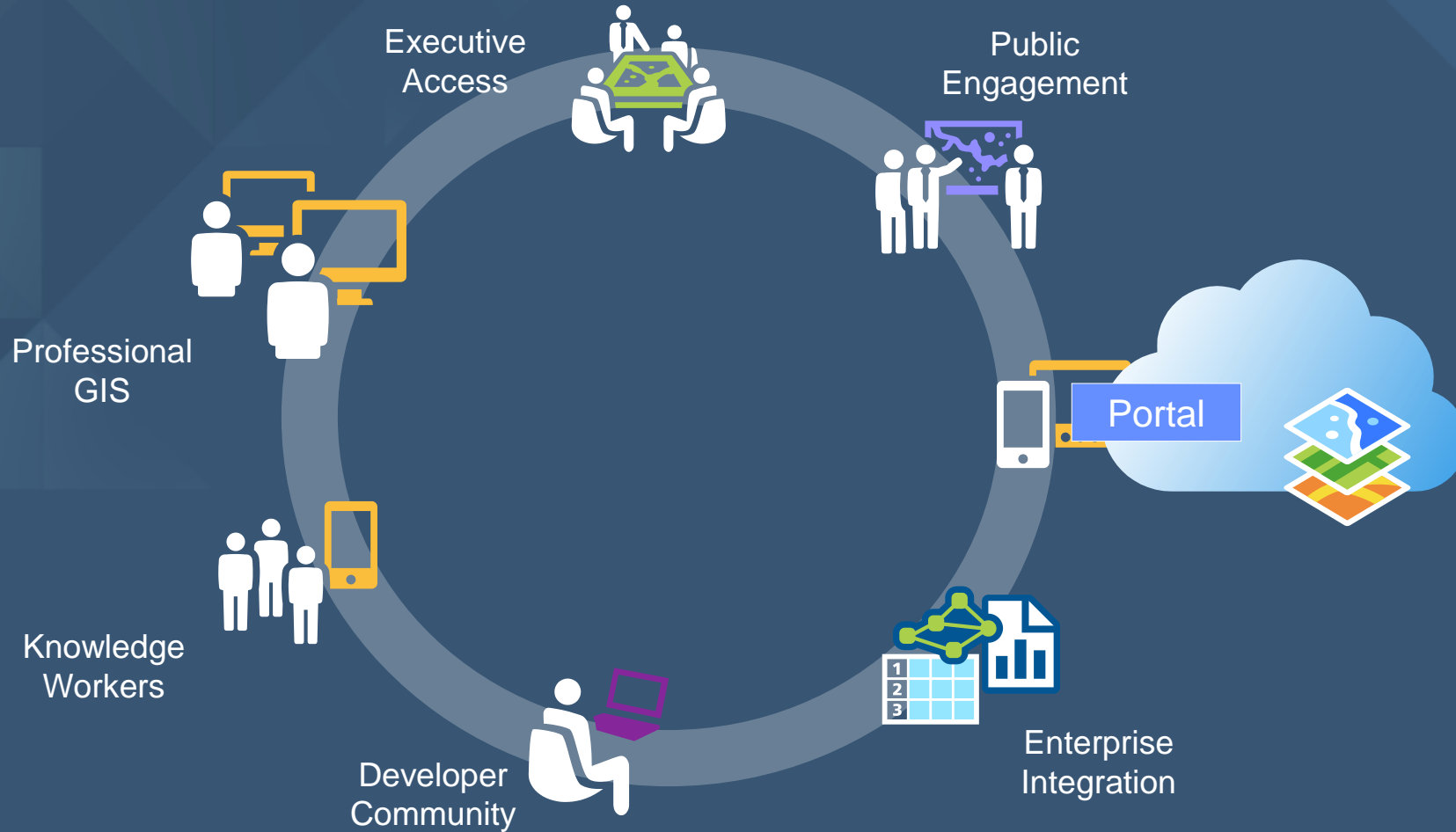
- Framework for managing and using content
- Supports Identity
- Manages users and collaboration
- Sharing model
- GeoInformation model
- Host in the Cloud (ArcGIS Online)
- Host on-premises (ArcGIS Server)





# Your Portal

The center of your geographic information ecosystem



# Portals

Public, private, open data, hubs



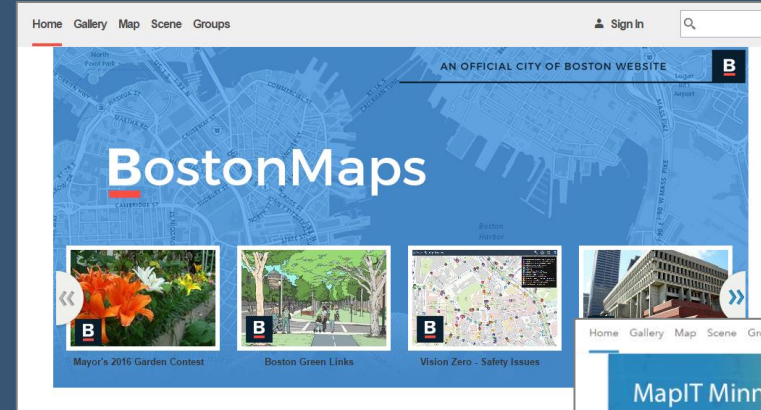
Home Gallery Map Scene Groups Sign In

**CABQ Maps**

Community Centers in Albuquerque Dog Parks in Albuquerque

This is the official site for GIS data from the City of Albuquerque.

Esrri.com | Help | Terms of Use | Privacy

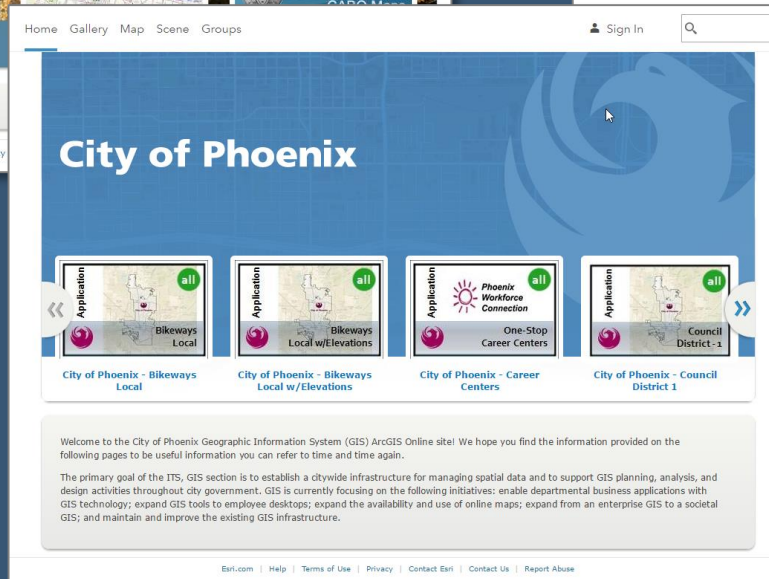


Home Gallery Map Scene Groups Sign In

AN OFFICIAL CITY OF BOSTON WEBSITE

**BostonMaps**

Mayor's 2016 Garden Contest Boston Green Links Vision Zero - Safety Issues



Home Gallery Map Scene Groups Sign In

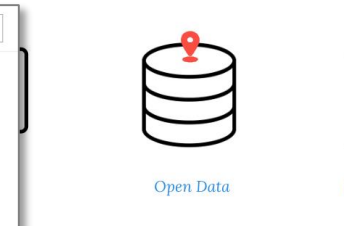
**City of Phoenix**

City of Phoenix - Bikeways Local City of Phoenix - Bikeways Local w/Elevations City of Phoenix - Career Centers City of Phoenix - Council District 1

Welcome to the City of Phoenix Geographic Information System (GIS) ArcGIS Online site! We hope you find the information provided on the following pages to be useful information you can refer to time and time again.

The primary goal of the ITS, GIS section is to establish a citywide infrastructure for managing spatial data and to support GIS planning, analysis, and design activities throughout city government. GIS is currently focusing on the following initiatives: enable departmental business applications with GIS technology; expand GIS tools to employee desktops; expand the availability and use of online maps; expand from an enterprise GIS to a societal GIS; and maintain and improve the existing GIS infrastructure.

Esrri.com | Help | Terms of Use | Privacy | Contact Esri | Contact Us | Report Abuse



Open Data



Home Gallery Map Scene Groups Sign In

**MapIT Minneapolis**

Rental Licensed Properties Dangerous Dogs Good Cause Restriction of Additional Rental Licenses Urban Tree Canopy

Open Rental Licenses in Minneapolis Dangerous Dogs Map Good Cause Restriction of Additional Rental Licenses Urban Tree Canopy and Park Trees

Welcome to MapIT Minneapolis!  
The City's enterprise mapping platform

This is your gateway to intelligent maps, focused applications and other "geoinformation" for Minneapolis. Answering the "where" question for any project, initiative or important decision is now easy for everyone!

You can use this portal to access maps, information, analytical tools, and even make your own maps. MapIT Minneapolis includes City maps and data along with map data from other sources to help you use the power of maps to make informed decisions.

Ask A Question Create A Map Map Data in Excel



# Web GIS shifts the focus

Changing our pattern, how we think, what we do

Client / Server

Stand Alone Desktop

Data Models

Static Data

Custom Applications

All Purpose Applications

Proprietary Data

Web Services & Apps

Connected Desktop

Web Maps

Real-Time

Configurable Templates and Apps

Focused Apps

Open Data & Shared Services

# Apps are powered by web maps

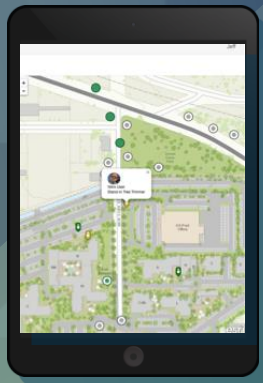
Enable GIS for anyone, on any device, anywhere, many tasks and workflows

Field Operations

Navigator



Workforce



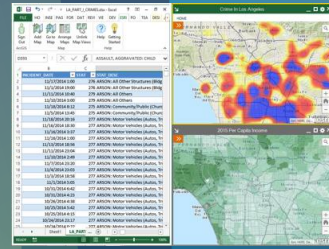
Survey123



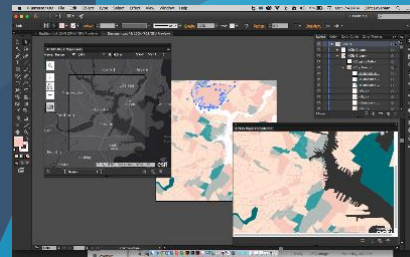
Collector

Office

Maps for Office



Adobe Creative Cloud



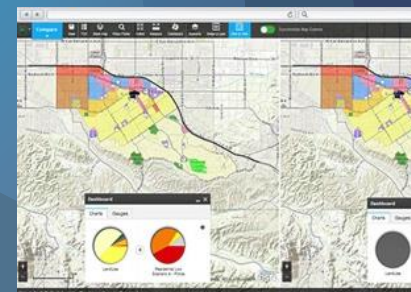
Dashboard



Explorer



GeoPlanner



Insights



Public

Open Data



Crowdsourcing



Story Maps

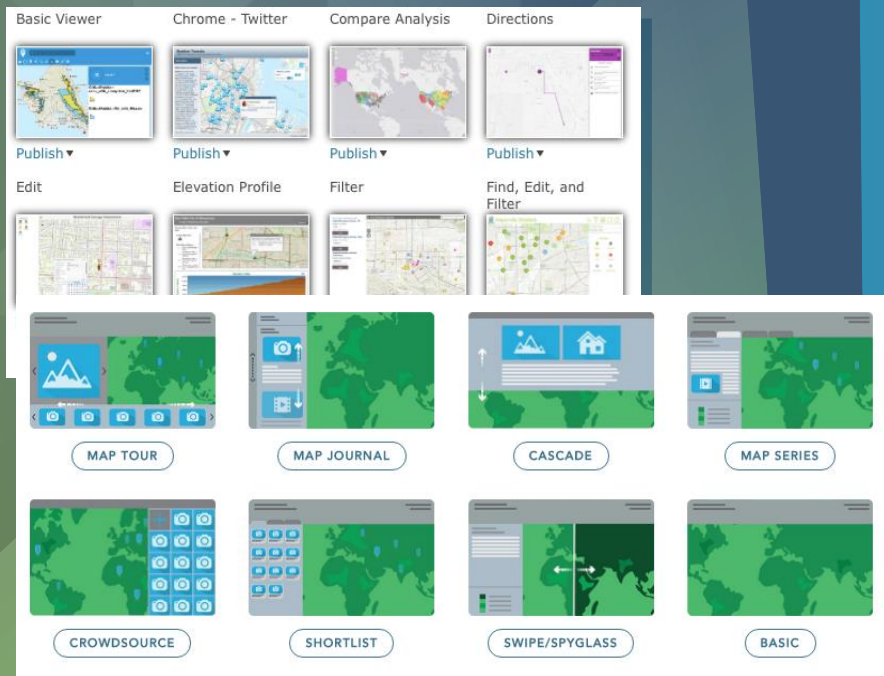




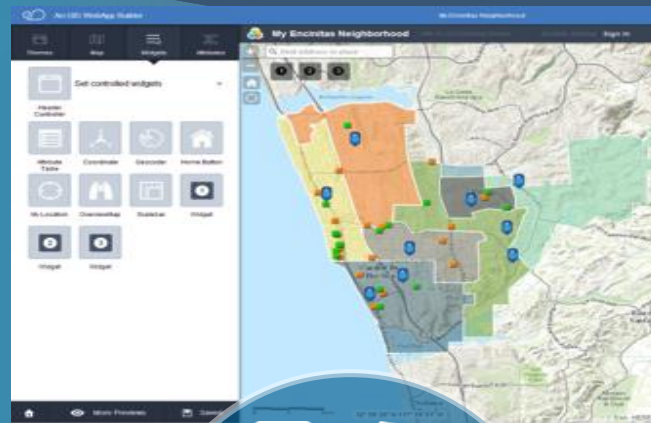
# Apps are easy to create

Templates and builders make it easy to create apps – no programming needed

## Web App Templates



## Web AppBuilder



Widgets

## AppStudio

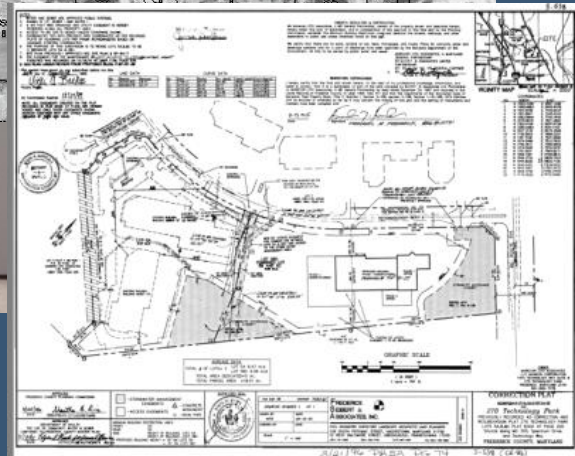
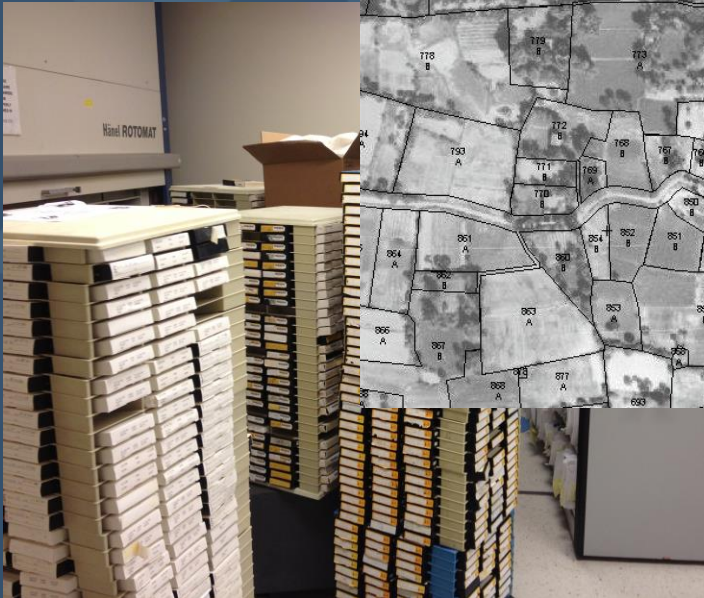


Native Apps

HTML 5 / Javascript

# System of Record

Organizes and Manages Record of Ownership, Value and Location



## Cadastral History



Quebec, Canada

## Parcel Query



Auckland,  
New Zealand

## Tax Parcels



Wisconsin

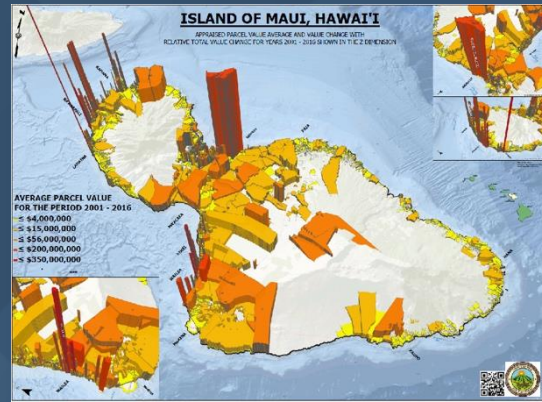




# System of Insight

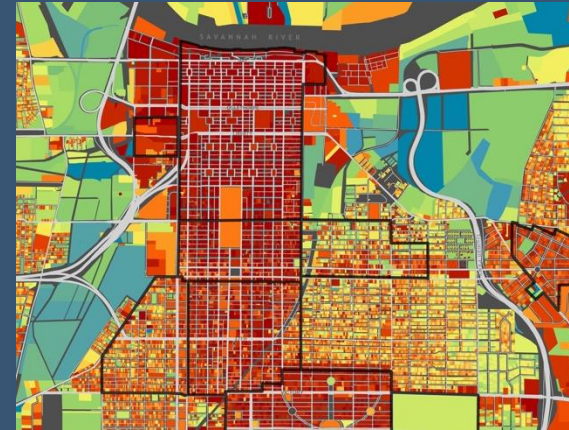
Understand the factors impacting property value and use

### Parcel Values



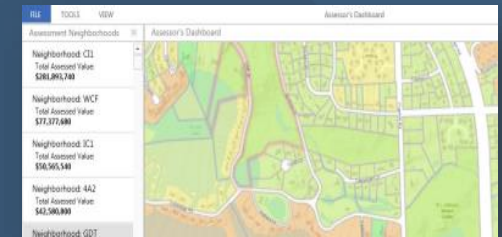
Maui

### Historic District Property Values

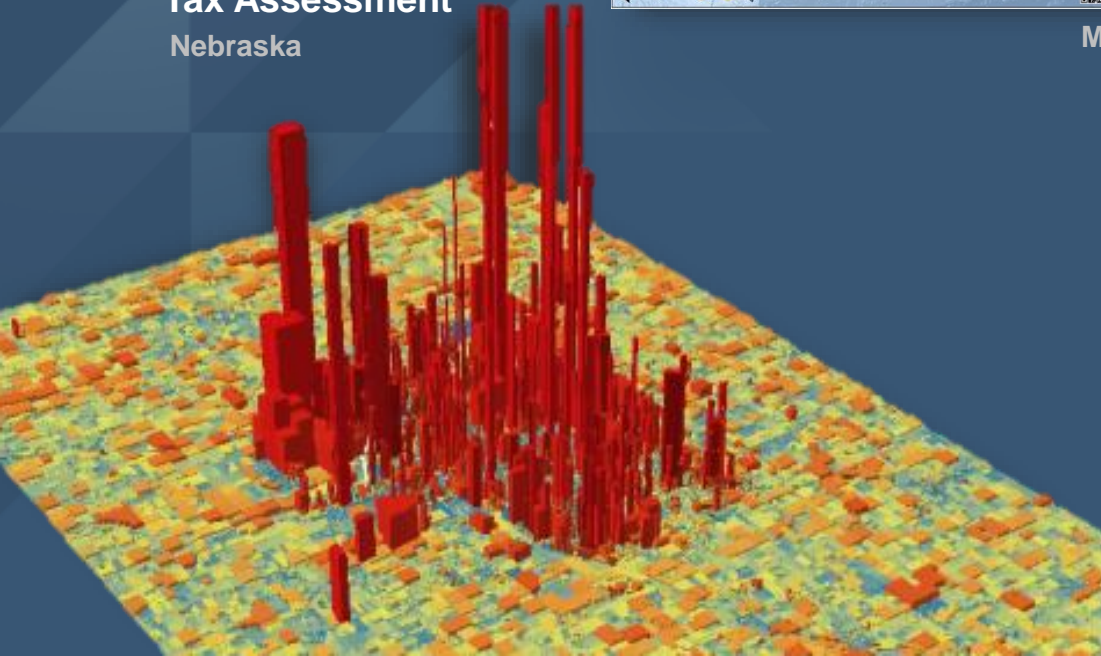


Georgia

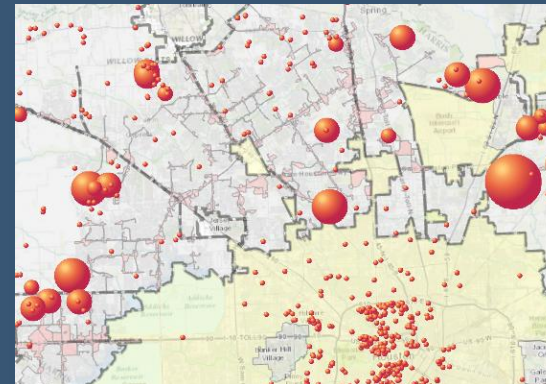
### Value Analysis Dashboard



### Tax Assessment Nebraska

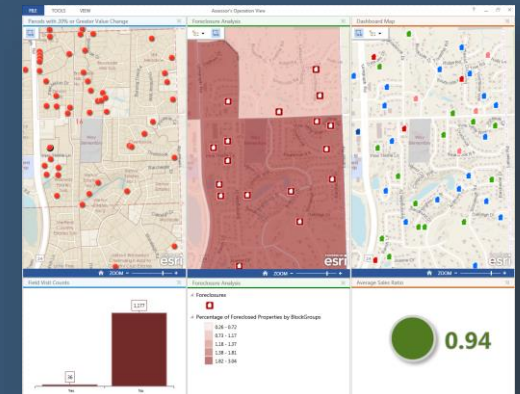


### Residential Platting



Texas

### Operations Dashboard





# System of Engagement

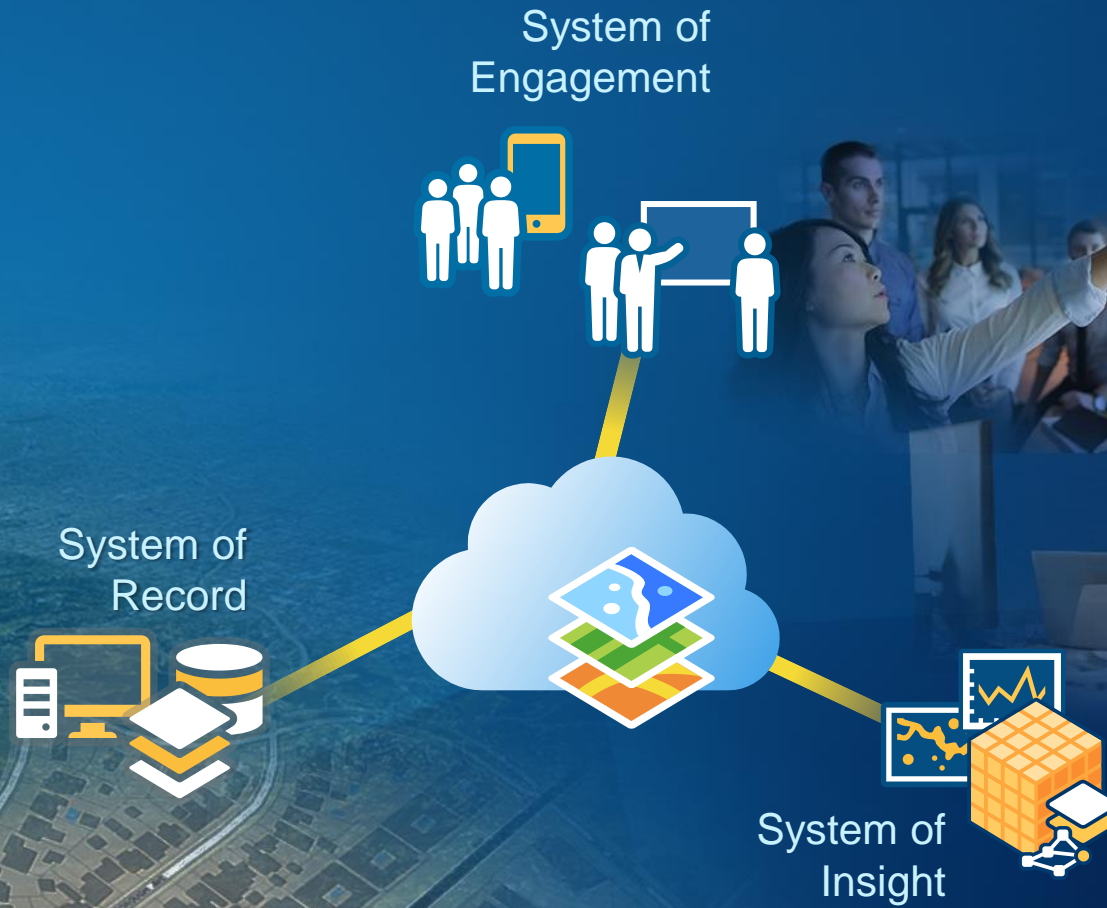
Engaging the public with government

Modern Transparency



# ArcGIS

## Enables Multiple Types of Systems



# A Complete Location Platform

Mapping, Analysis, Data Management, and Collaboration

## Location Enablement

Discover, use, make, and share maps at work -- anywhere, anytime

## Constituent Engagement

Facilitate and manage communication with stakeholders

## Decision Support

Inform execs and management with maps and location intelligence

## Field Mobility

Get authoritative information into and out of the field

## Analytics

Describe, predict, and improve business performance

## Location Data Management

Collect and organize location data about your assets and resources

*Common GIS use patterns....*



# Solutions for Land Records

Task focused, supporting requirements

Parcel Management



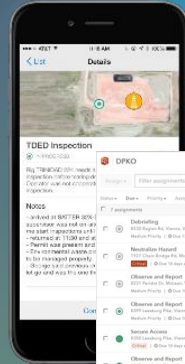
Parcel Editing

Map Production

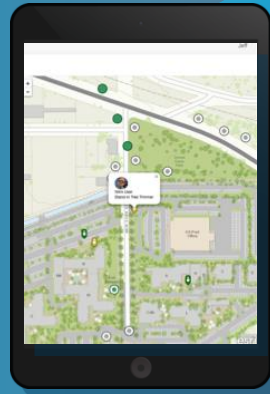


Quality Control

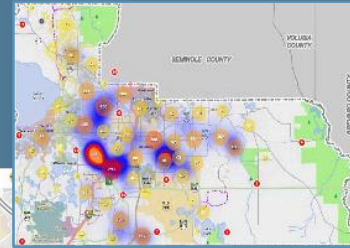
Field Operations



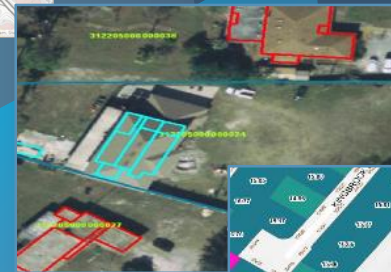
Mobile View & Edit



Valuation Analysis



Appraisal

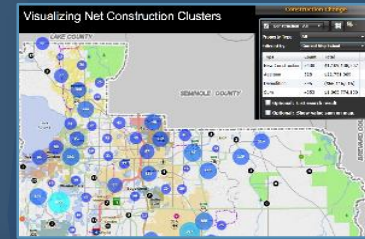


CAMA Visualization

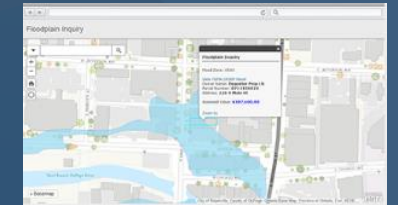


Public Engagement

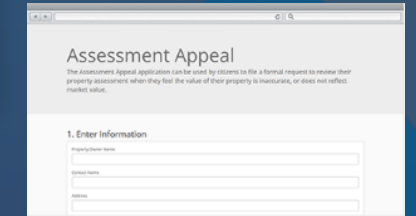
Foreclosure Mapping



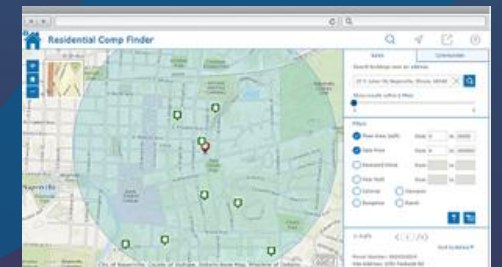
Permit Visualization



Identify Flood Risk



Assessment Appeals



Comp Finder

# Parcel Data Management

Improved, Efficient Workflows

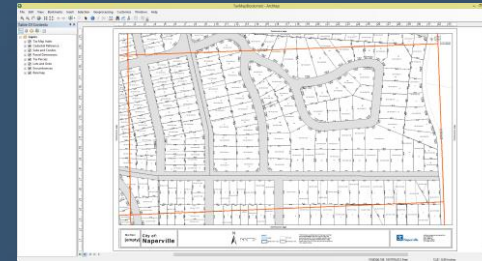
Deed Examining



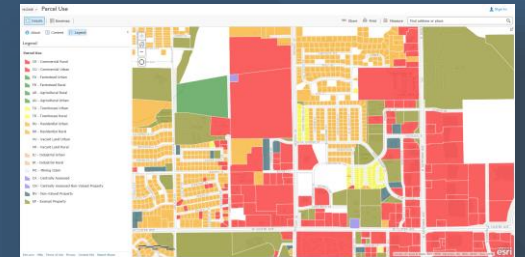
Workflow Manager



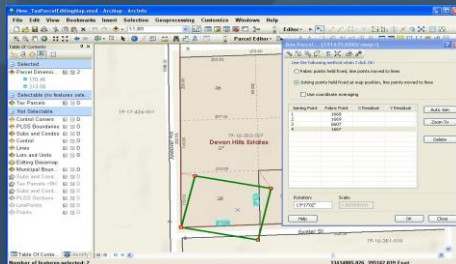
Tax Map Book



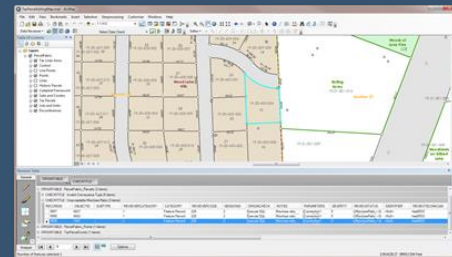
Community Parcels



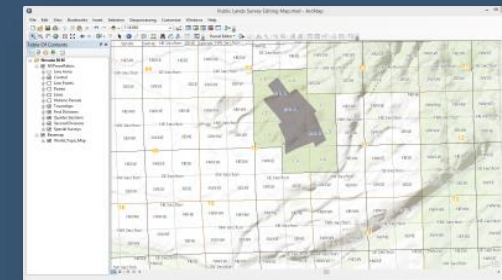
Parcel Editing Solution



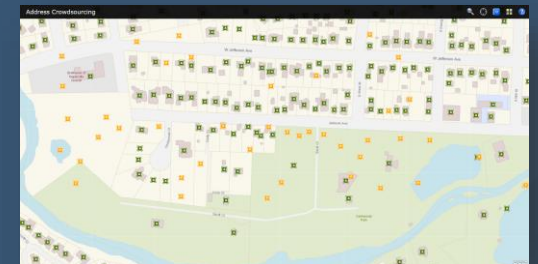
Data Reviewer for Tax Parcels



PLSS Editing



Addressing



*Collect, Organize and Manage Data.....*

# Purpose-Built Editing Tools

Defined workflows. Integrity, topology and history maintained

Feature  
Adjustment

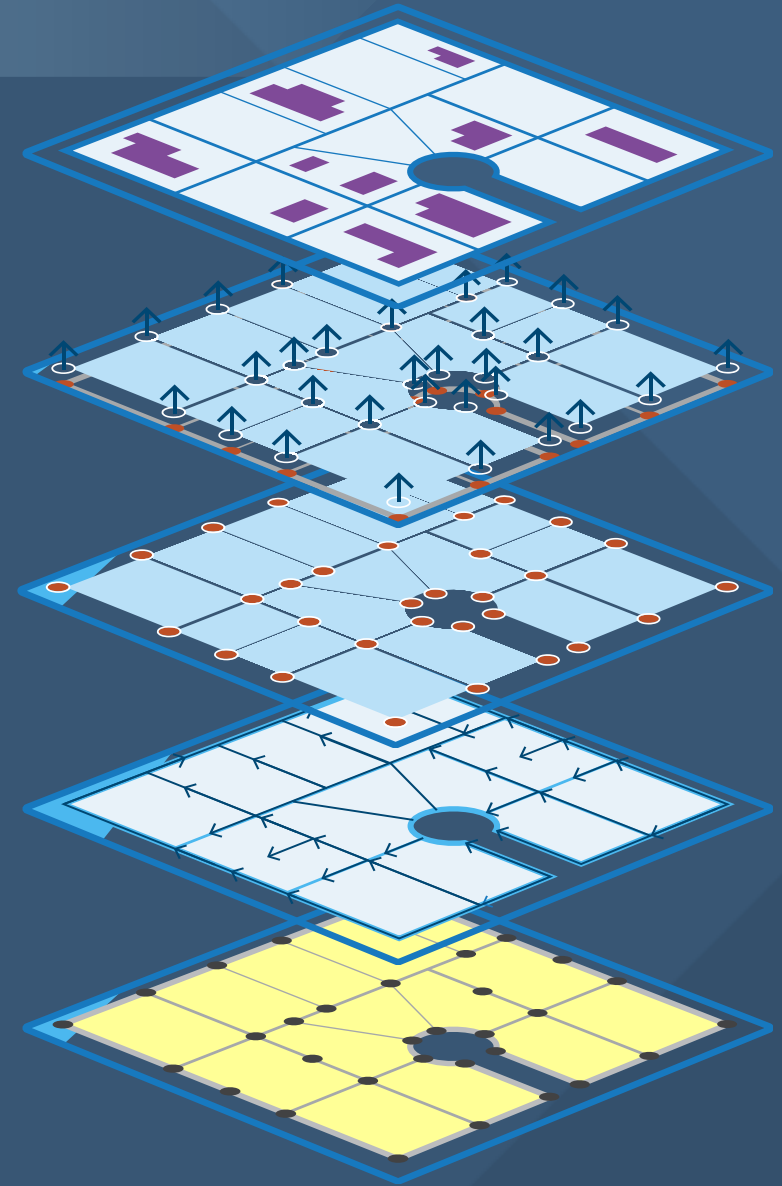
Coordinate  
Updates

Control Points

Fabric  
Adjustment

Measurements

Parcel Fabric





# Integrating Survey Measurements and PLSS

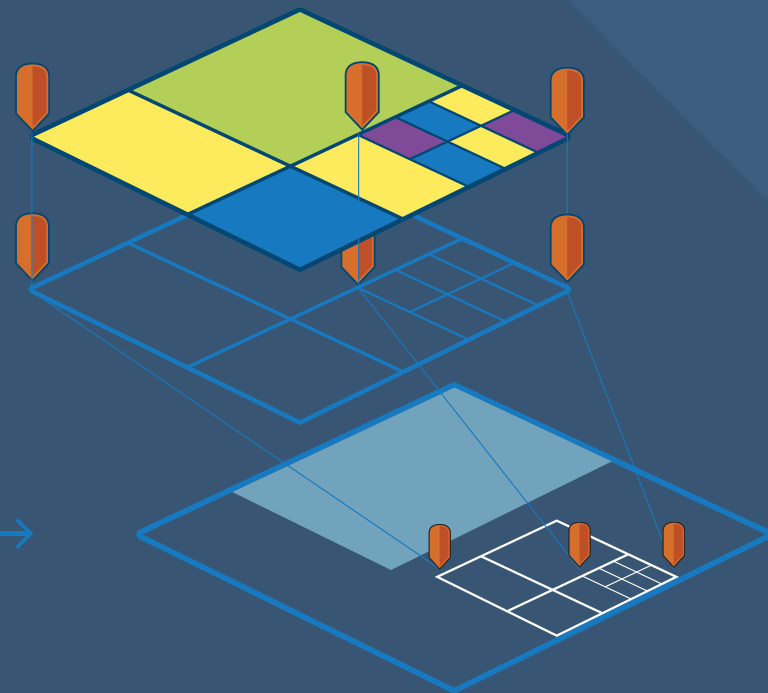
## BLM Adopted COTS Tools for Managing the PLSS



GIS

Parcels

PLSS



BLM – PLSS Managed in the Parcel Fabric

*Connecting layers with measurements.....*

# Community Parcels

## Web GIS Solution for Parcel Aggregation

Authoritative Parcel Data



Community Parcel Layer



Information Products



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



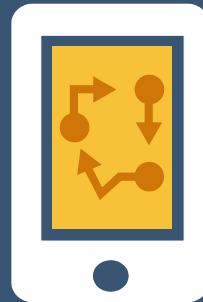
# Field Operations

Increase Field Efficiency and Insight

Workforce



Navigator



Collector



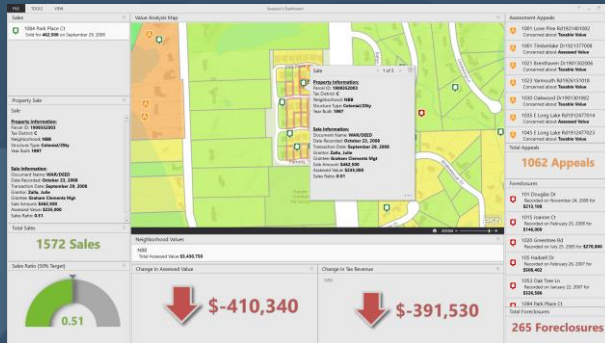
Photo Survey





# Valuation Analysis

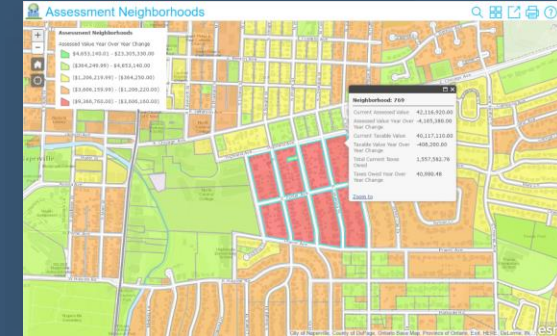
## Understanding Trends and Patterns in Value



Value Analysis Dashboard



Value Change Over Time



Assessment Neighborhoods

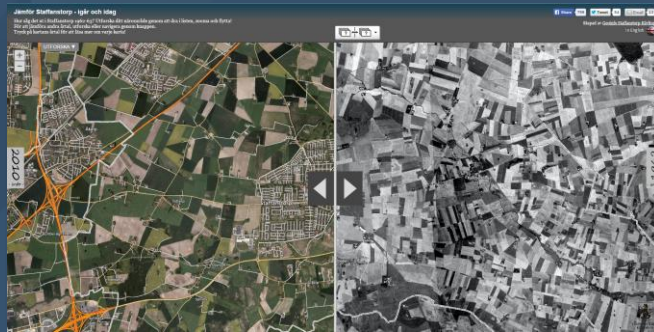
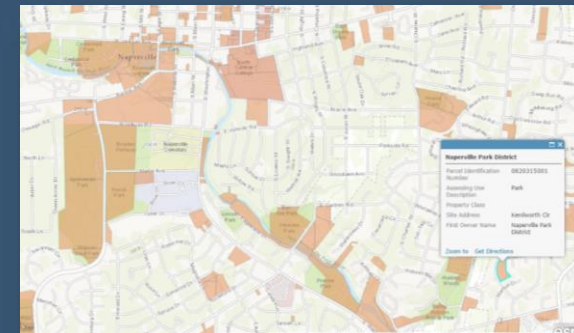


Image Comparison



Photo Survey

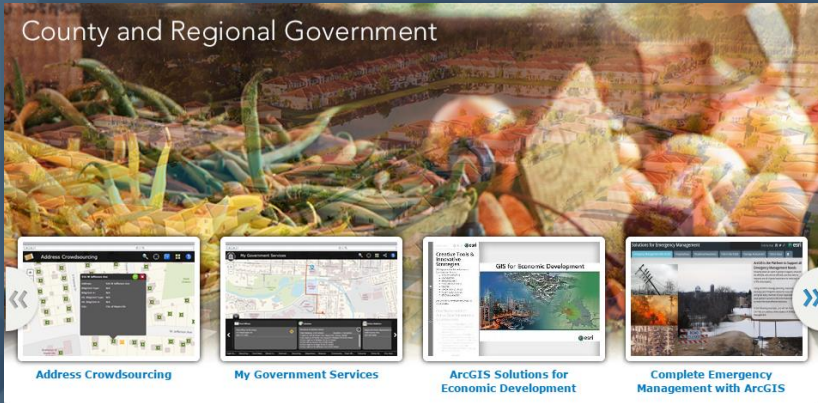


Exempt Properties

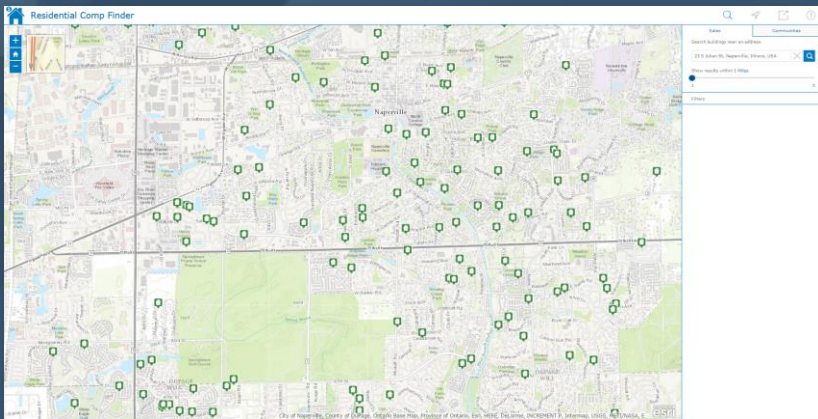


# Constituent/Public Engagement

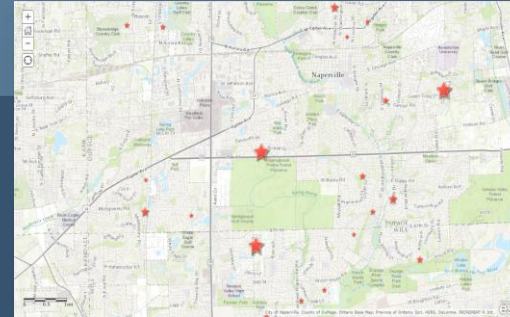
## Maintaining Taxpayer Trust and Confidence



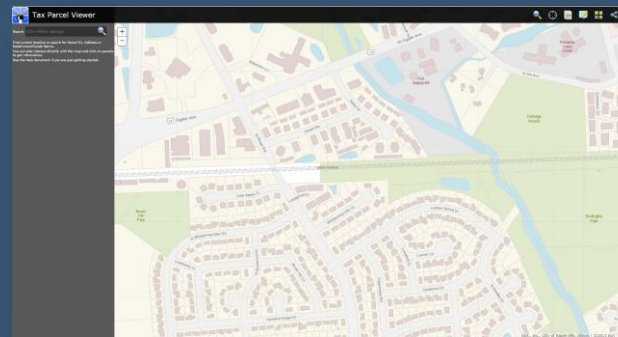
Portal



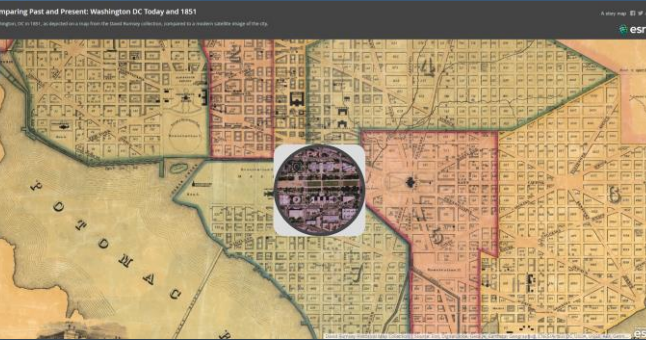
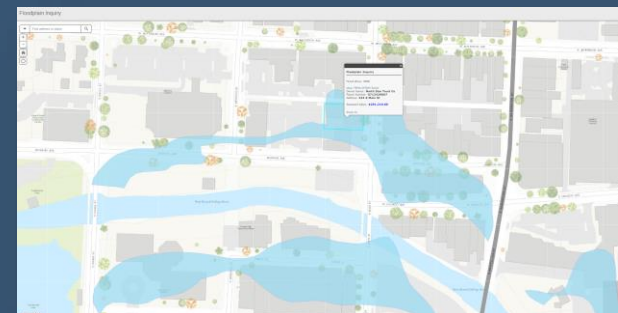
Comparable Sales Finder



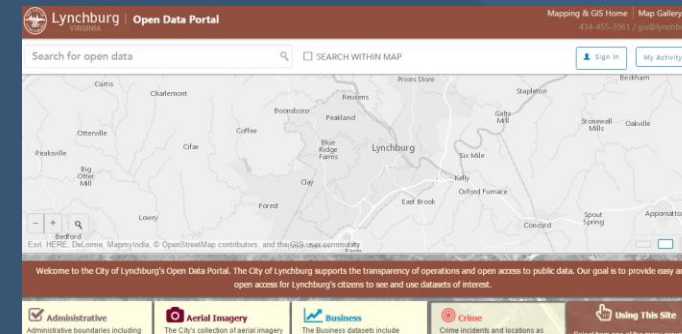
Top 25 Taxpayers



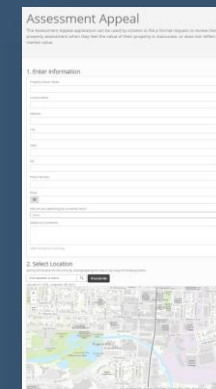
Tax Parcel Viewer



Story Maps



Open Data



Assessment Appeal

# Open Data Portal

Auto ETL, Custom Search, APIs.....



Open, discoverable, modern engagement.....



# Open Data

## COTS tools for connecting with the public

The screenshot shows the MD iMAP website interface. At the top left is the Maryland state logo with the text "MARYLAND .gov" and "MD iMAP MARYLAND'S MAPPING & GIS DATA PORTAL". Below this is a navigation bar with "HOME" and "GIS DATA CATALOG". A search bar contains the text "Search for open data" and a "SEARCH WITHIN MAP" checkbox. The main area displays a map of Maryland with labels for "Philadelphia", "Toms River", "Charleston", "Harrisonburg", and "Staunton". Map controls for zooming and searching are visible at the bottom left.

### Featured Data Sets



#### Property Data

Identify each property point in the State and the tax information that goes with it



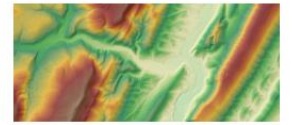
#### 6in Resolution Imagery

Access imagery so clear you can see the pitcher's mound at Oriole Park at Camden Yards



#### Road Centerlines

Set a course for Maryland and explore its 30,000 miles of interstates, highways and secondary roads



#### Shaded Relief Elevation

Explore the State in shaded relief bringing definition to the landscape of Maryland

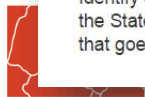
### GIS Data Categories



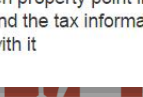
Agriculture



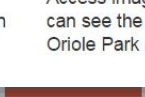
Biota



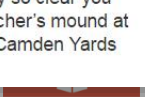
Boundaries



Business Economy



Demographics



Education



Elevation



Environment



Geoscientific



Health



Historic



Hydrology



Imagery



Location



Military



Planning Cadastre



Public Safety



Society



Structure



Transportation



Utility Telecom



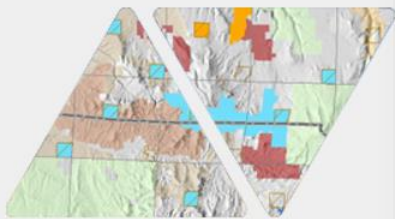
Weather

# Colorado State Land Board



About Us > Look Up Land

## Look Up Land



## Map Server



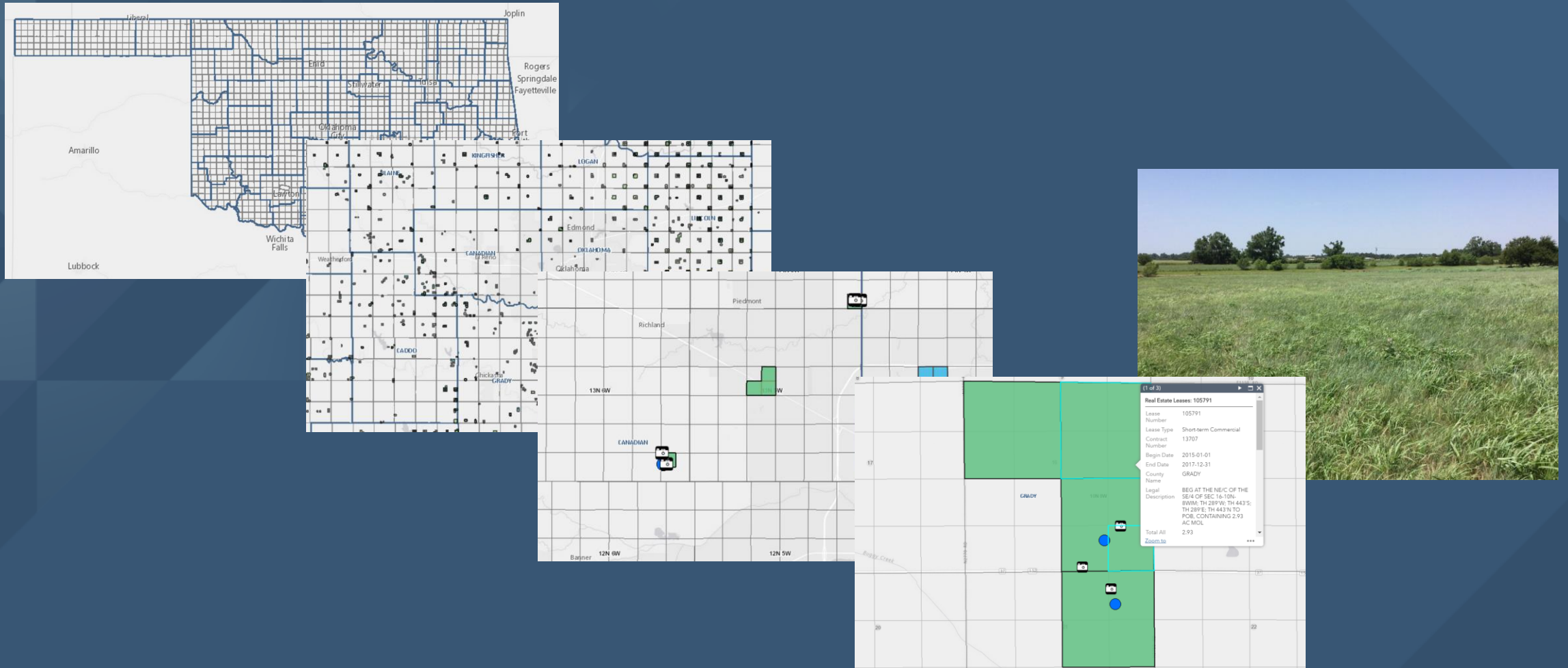
[Click here](#) to access the online map server to look up land records, find information about leasing and other activities on state land as well as overall characteristics and potential uses.

The fastest way to look up land records is by using the 'find' tool to search by Township/Range or Section, County, Lease Number, Lessee Name, Property Name or Lat/Long coordinates.

More help can be found in the help guide under the help tab.

- Agriculture Leases
- Recreation Leases
- Oil and Gas Auction
- Property Disposal
- Towers
- Hunting Atlas
- GIS Data.....

# Oklahoma Commissioners of the Land



<https://clo.maps.arcgis.com/apps/webappviewer/index.html?id=abe2290e8407433ead313bef01c82730>



# State of Utah School and Institutional – Trust Lands Administration



## Public Map Gallery

**WEB APP**

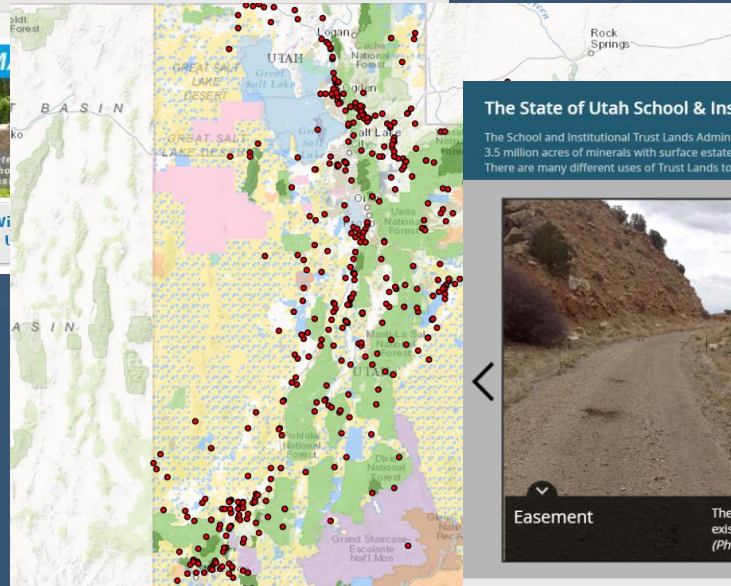
Competitive Lease Offering Story Map

**WEB MAP**

Coral Canyon Parcel Map

**WEB MAP**

Current Wildfires Map



Live Wildfires Map

State of Utah School and Institutional Trust Lands Administration Surface Auction  
October 10, 2016 Auction Parcels

This map displays current land auction parcels through the State of Utah School and Institutional Trust Lands Administration (SITLA). Some auction parcels may be sold at auction by SITLA on behalf of other agencies.

For more information please visit <http://trustlands.utah.gov/business-groups/surface-auction> or call (800) 228-2906.

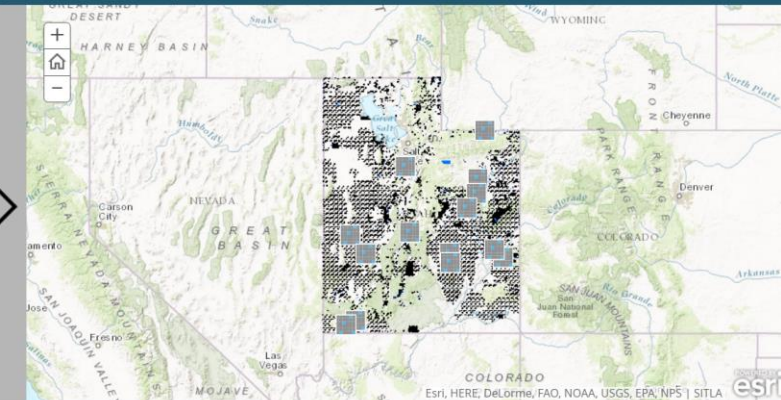
View by month:

- June Valley (PS 7620)
- Comb Ridge (PS 8581) **SITLA SURFACE AUCTION THIS MONTH**
- Green Canyon (PS 8190)
- Summer Rim (PS 8180)

<http://tlmap.trustlands.utah.gov/SurfaceAuction/deploy/>

## The State of Utah School & Institutional Trust Lands Administration - Use of Trust Lands

The School and Institutional Trust Lands Administration (SITLA) was created in 1994 to manage parcels of land (in a checkerboard pattern) granted to the state by Congress. Today, SITLA administers approximately 3.5 million acres of minerals with surface estate and an additional 1 million mineral only acres to provide funding and support to the permanent trust funds of the state's public schools and 11 other beneficiaries. There are many different uses of Trust Lands to help provide the funding and support. This map depicts a few of the most interesting. Click on the LINK to learn more about each use.



- Auctions Story Map
- Live Wildfires Map
- Story Map of all Lands
- Story Maps!

<http://sitla.maps.arcgis.com/home/index.html>

<http://tlmap.trustlands.utah.gov/trustLandsMapTour/>

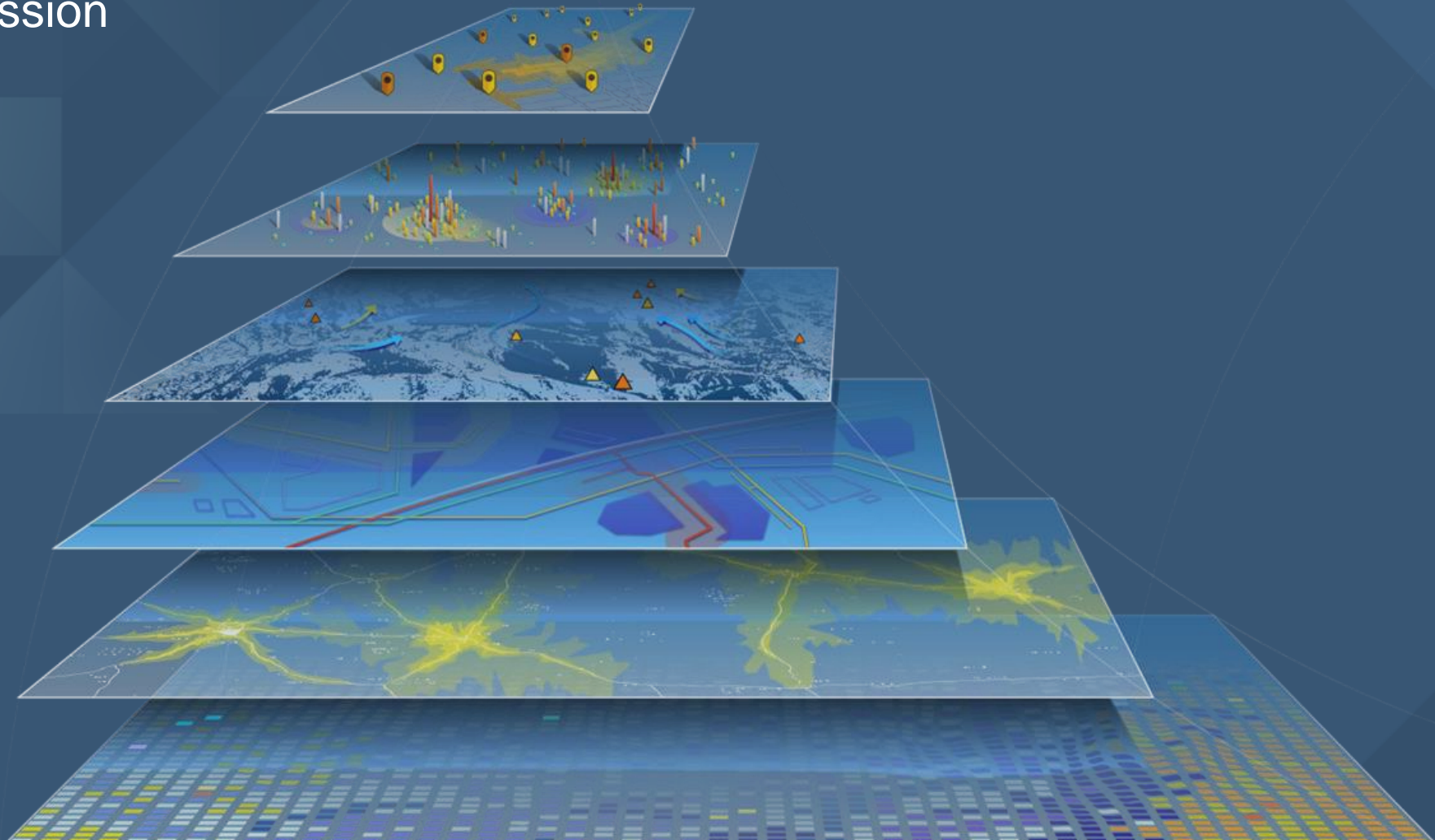
# Challenges

- Modernizing
- Maintaining trust and confidence
- Business systems out of sync
- Data currency
- Minimizing appeals
- Reducing counter traffic
- Discover untaxed property
- Efficiency
- Improving analysis
- Discovering trends and patterns
- Sharing across departments, organizations
- Field workforce management
- Reducing operational costs
- New devices, new technology
- Transparency
- Integration

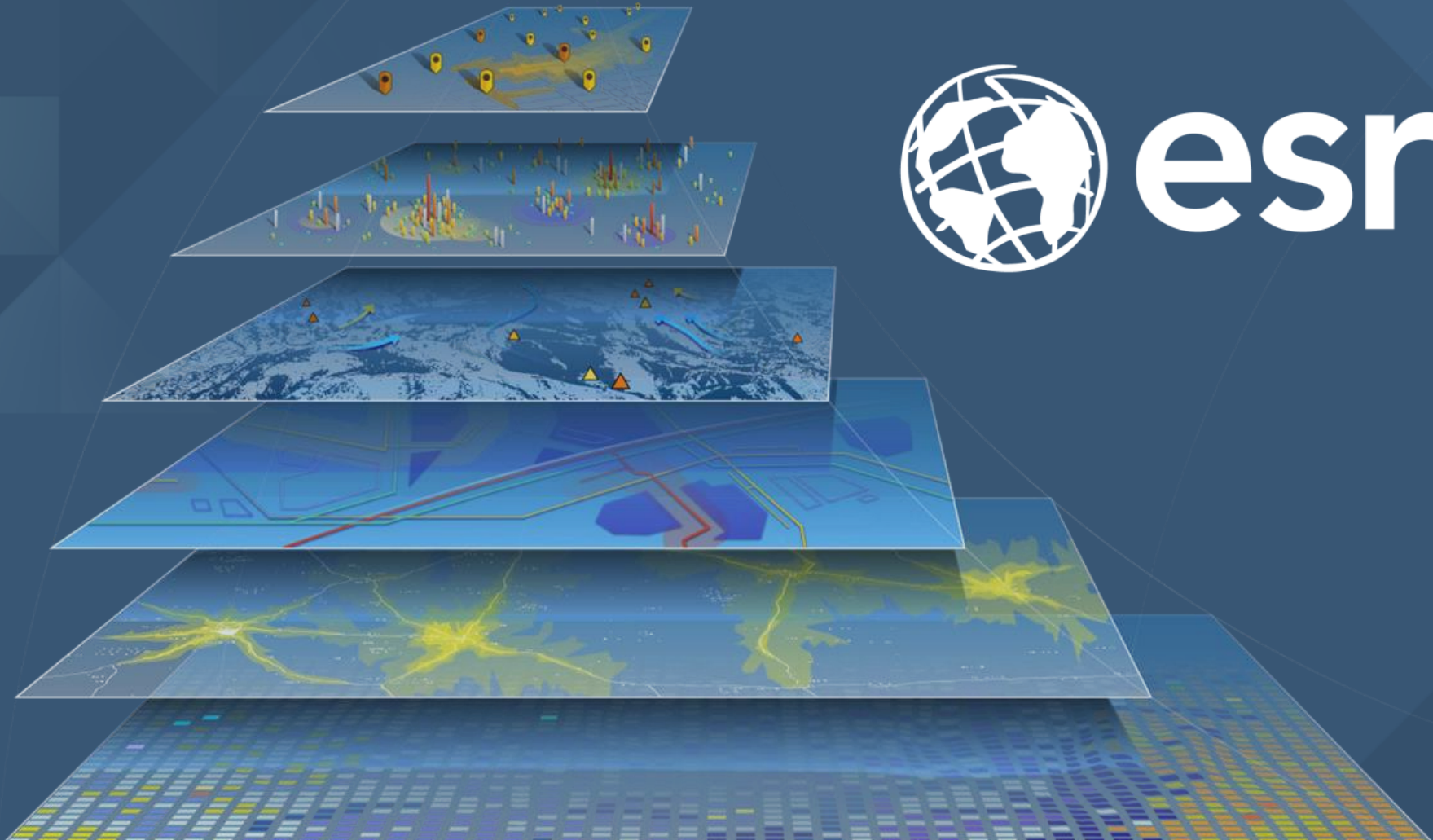


# Challenges.....

Open Discussion







esri®