XVI Simposio y XI Asamblea

Comité Permanente sobre el Catastro en Iberoamérica

INSTITUTO CATASTRAL DE LIMA

Machu Picchu – Peru

1986





Modernizing Land Governance With GIS

Kees de Zeeuw
Esri Global

GIS Serves Your Entire Organization

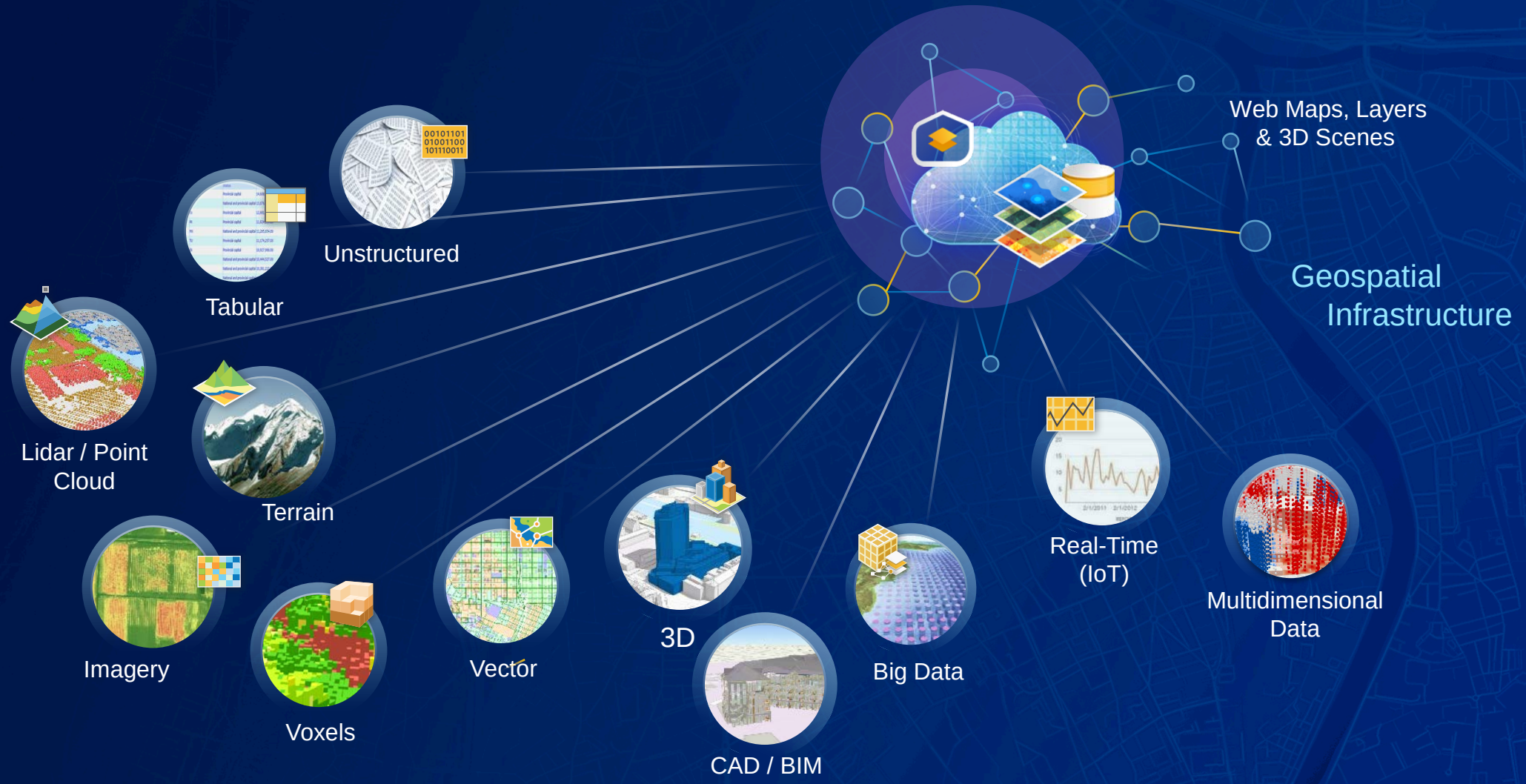
Delivering insights and efficiency to your entire organization



- Cross Cutting
- Shared
- Authoritative
- Real-Time

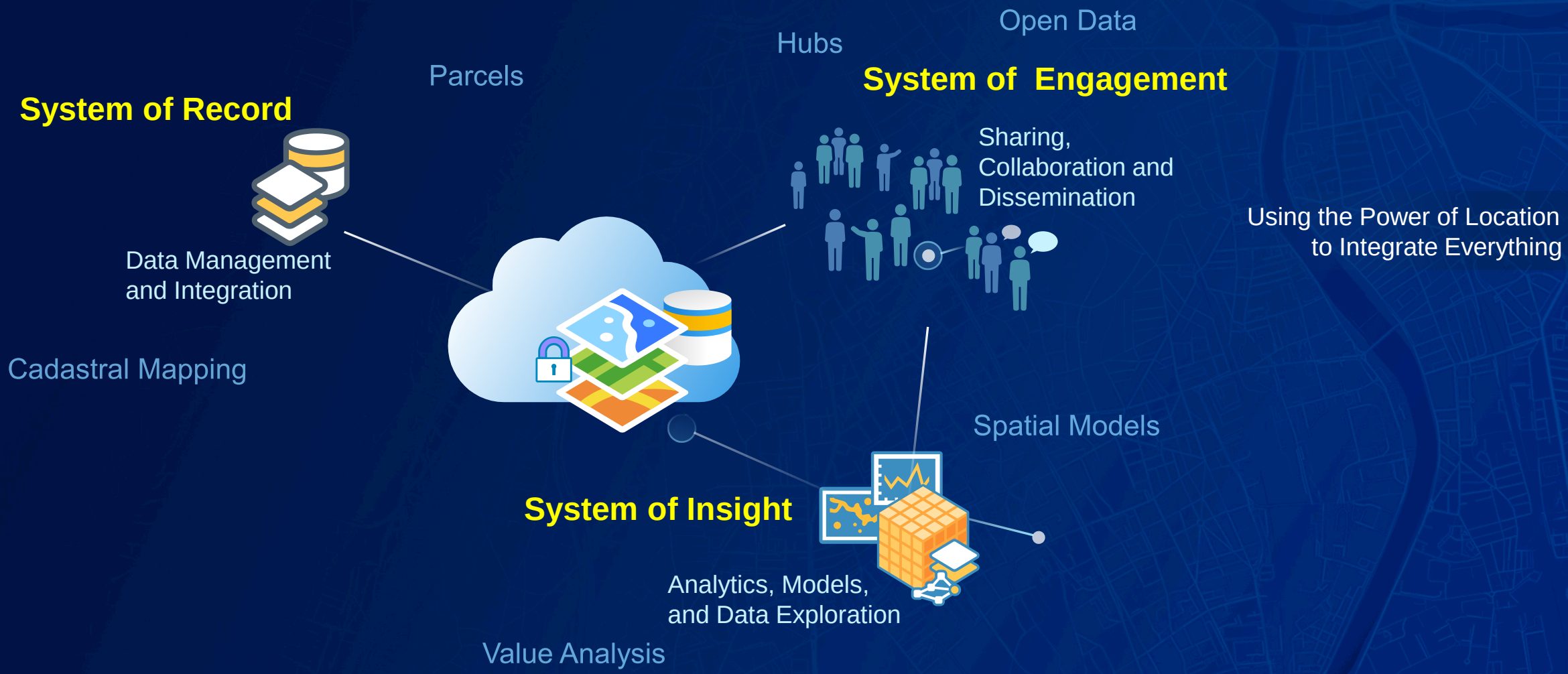
GIS Integrates Every Type and Format of Data

…..Making Them Directly Usable as Services



GIS is an Enterprise Platform

Geospatial infrastructure integrating workflows and data of all types



GIS Technology Is Advancing Rapidly

Integrating and Leveraging Many Innovations



Expanding into nearly all areas of society…..

A Platform for LA

Collect

- Attribute
- Survey
- Geodetic
- BIM
- Drone
- Field
- Satellite

Manage

- ***LADM***
- ***QA/QC***
- ***Standardized workflows***



Online content
Web Services

Analyze


GeoAI


Dashboards


Value Property


Spatial Adjustment

Produce


Cadastral map


Valuation Roll


Addresses


Titles/Deeds

Open Data

Share

Stakeholders

- Planning
- Utilities
- Surveyors
- Banks & Financial Institutions
- Emergency Response
- Tax & Valuation
- Housing
- Executives

Land Administration

Platform Technology for Land Administration



Arc GIS Powers Modern Land Administration Systems ……

GIS and Land Administration

Enabling new business models…..



Configuration

over

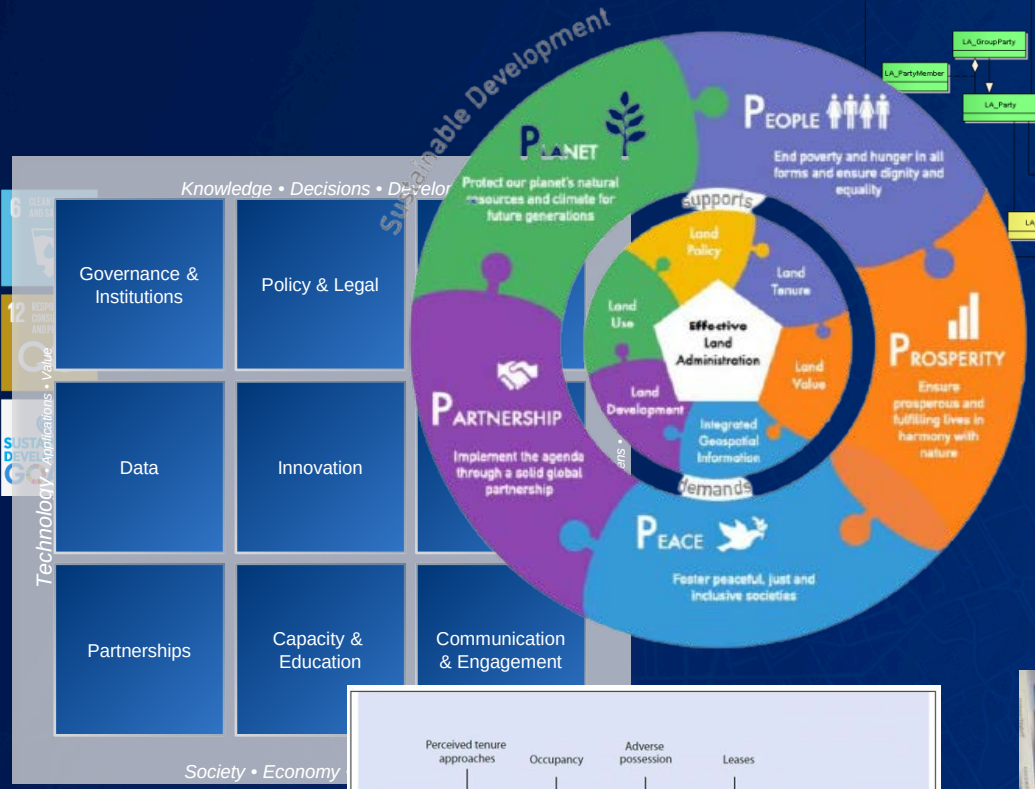
Customization

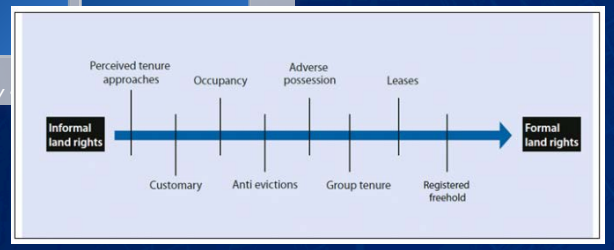
Geospatial Infrastructure Enabling Land Administration Systems Worldwide

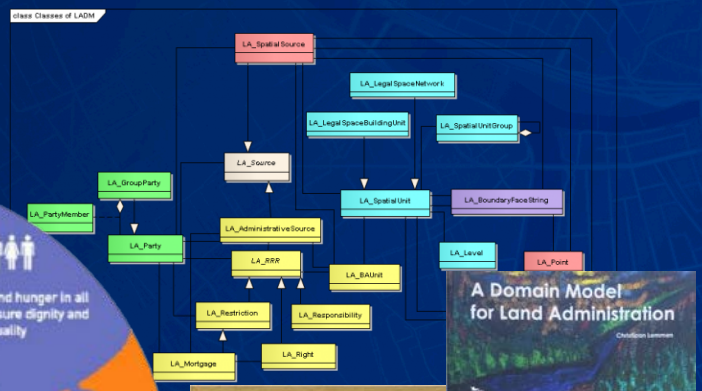
Global Standards, Frameworks, Initiatives, Models, Data…..

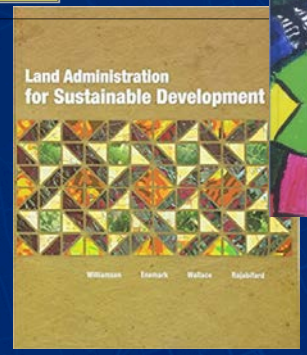
The cookbook for modernizing land administration



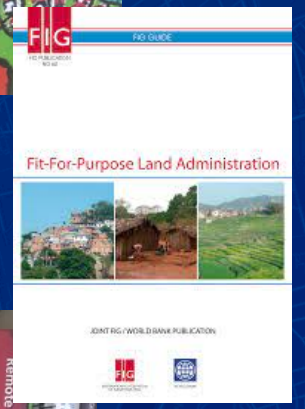










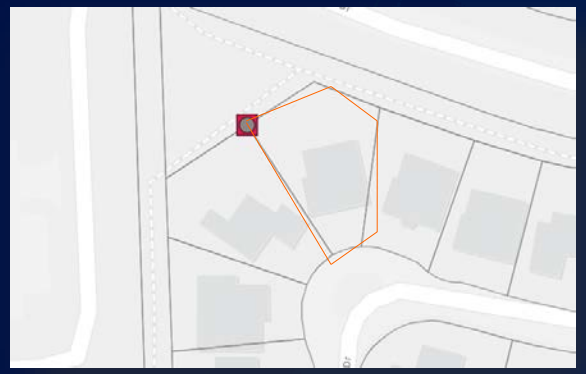




Parcel Management

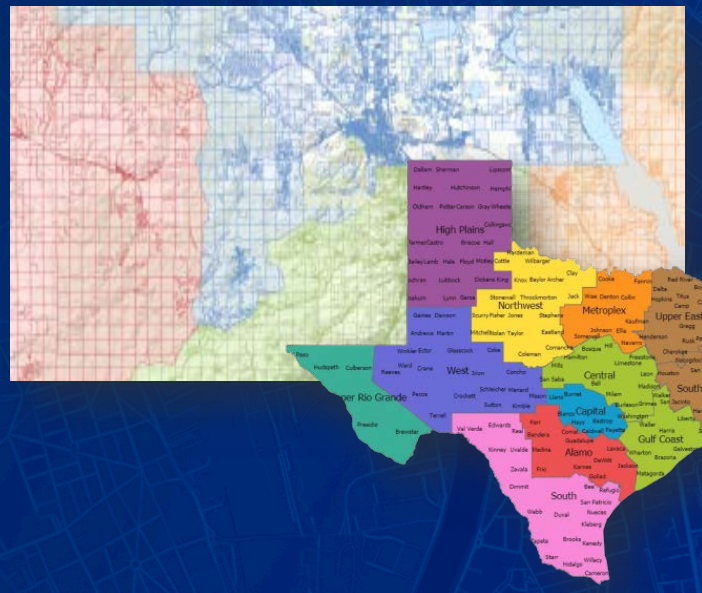
Purpose-built tools for parcel management and cadastre

Draft Deed Descriptions



Workflow Management & Tasks

Parcel Aggregation



Data Quality Tools for Parcels

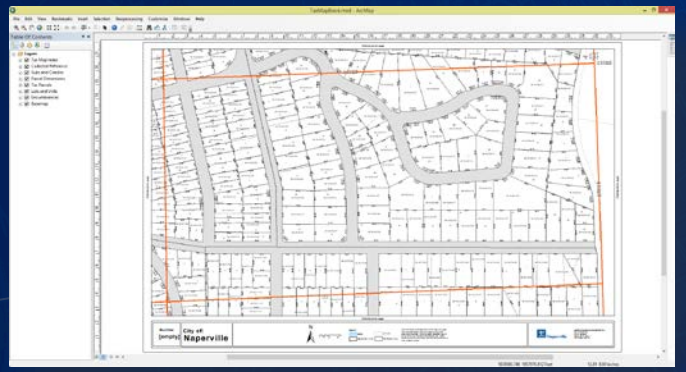
Least Squares Analysis & Adjustment

Parcel Topology

Parcel Fabric



Map Book Production

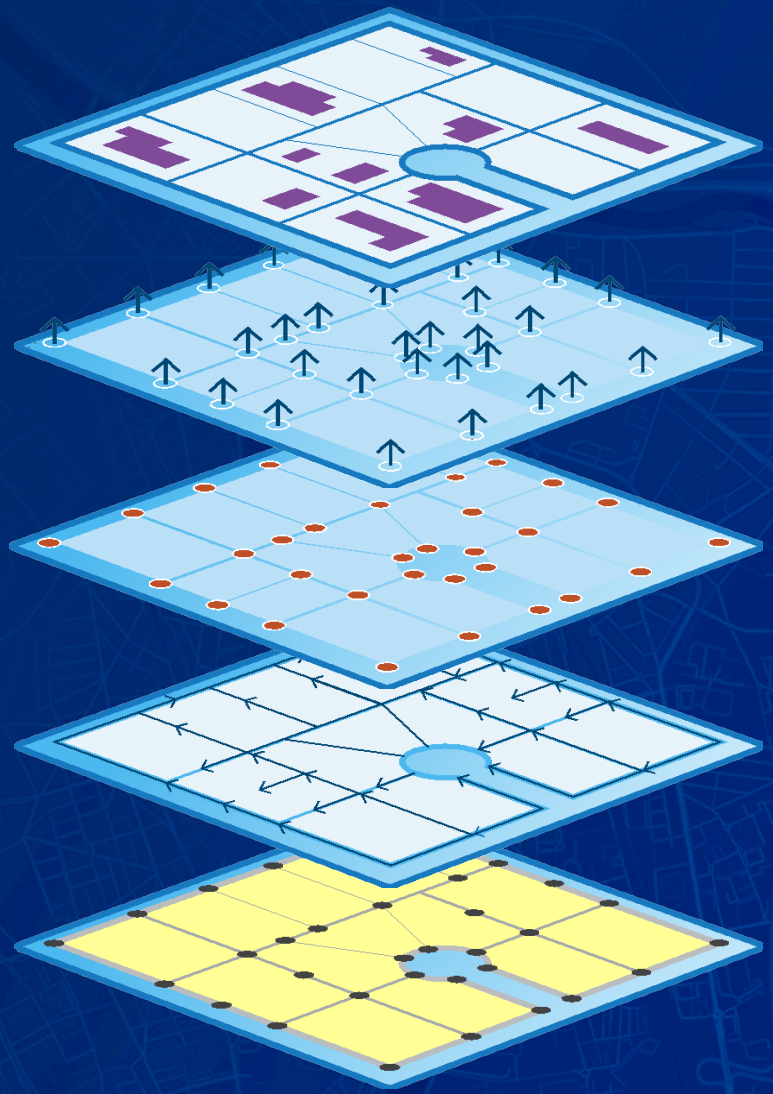


Improve efficiency and data quality…..

Parcel Fabric

Complete parcel management solution

- Configurable, localized workflows
- Supports ‘Record driven workflows’ and ‘Quality driven workflows’
- Meets modern cadastral requirements: 2.5D, coordinate based, lineage, digital submission…
- Works “anywhere": any client, any cadastral system / land description
- Easy to adopt and fast to deploy
- Efficient, scalable, configurable



Integrating Valuation with the Broader Land Administration

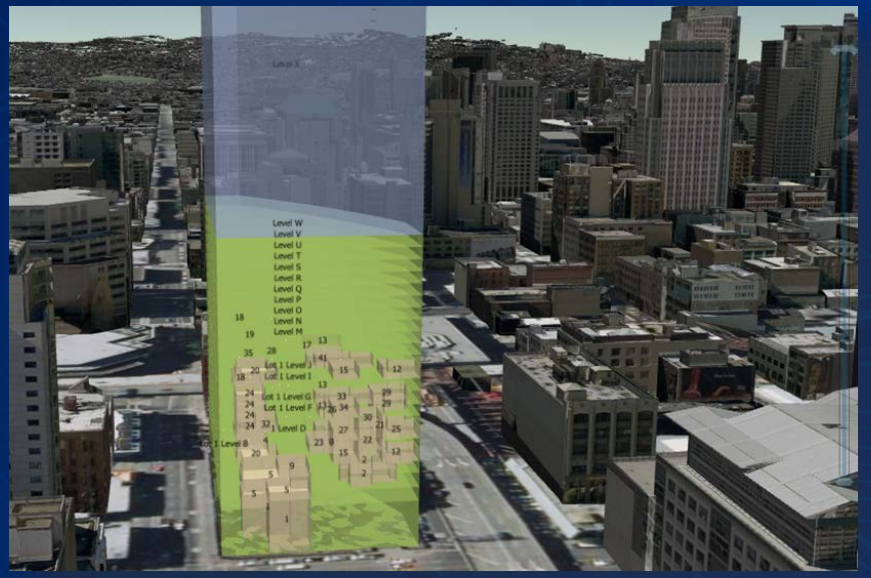
Leverage the value of your data



3D Parcels and Cadastre

- Extrude and visualize parcels in 3D/4D
- Line of sight and viewshed analytics
- Calculate volumes
- Dynamic dashboards
- BIM/AutoCAD Integration

3D Parcels



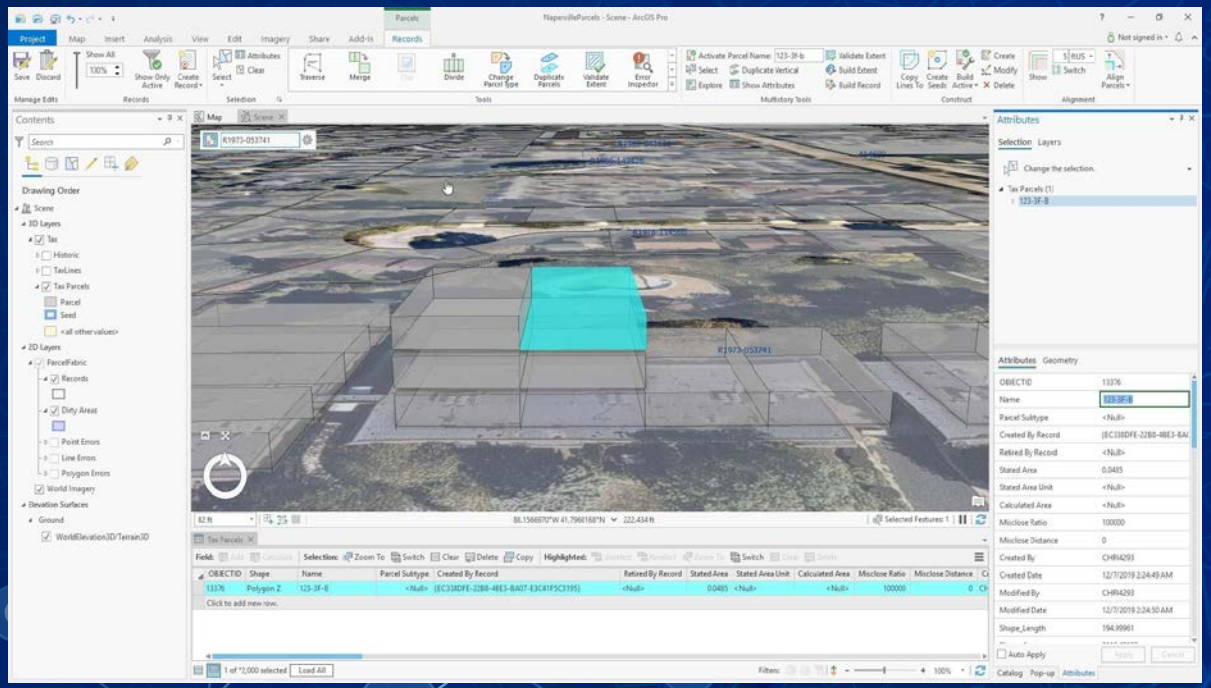


Line of Sight

BIM Integration



3D Analysis

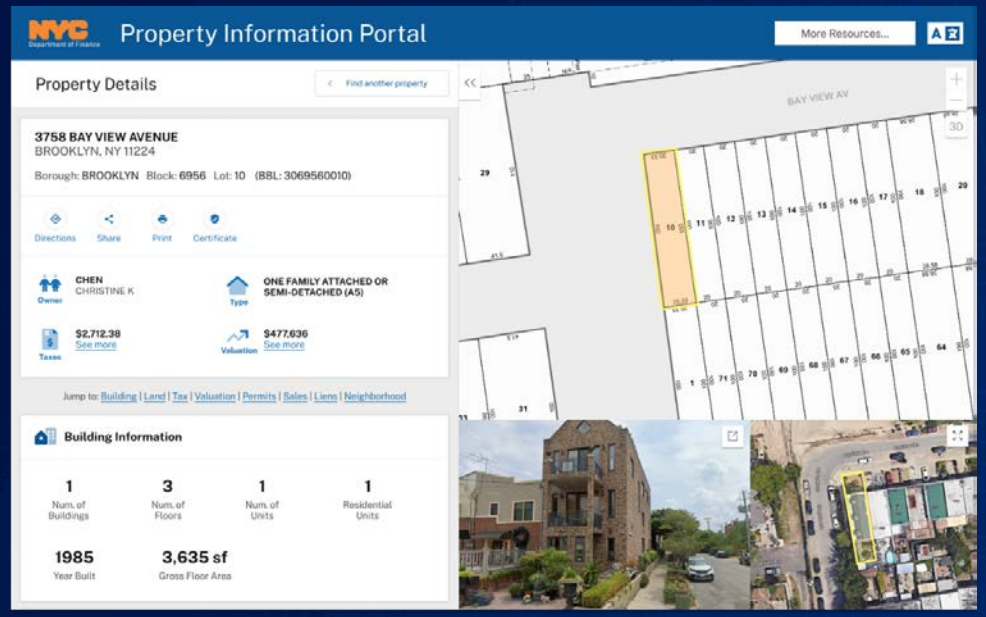


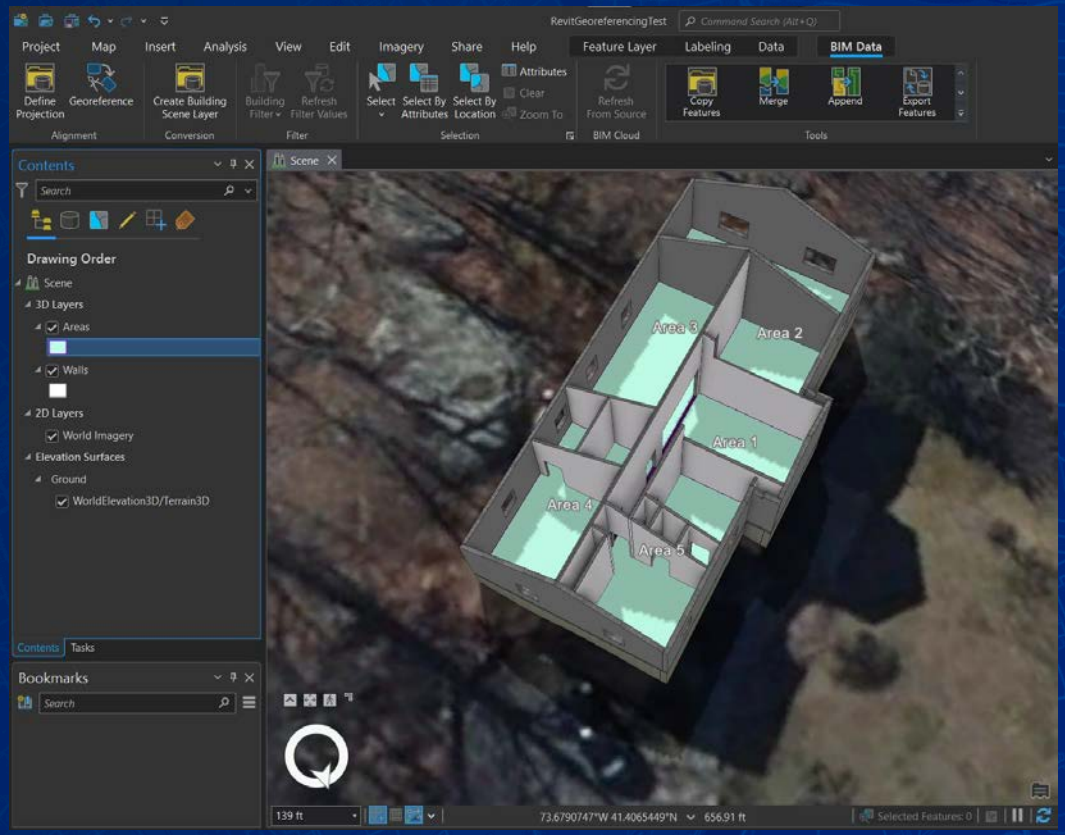
New York City Department of Finance

ROLLS OUT 3D CADASTRE

The NYC DOF recently released its modernized Digital Tax Map (DTM) with 3D capability. The system can manage challenging use cases such as air rights and subterranean lots and allows for digital submission of BIM design files for review and integration into the DTM.

https://propertyinformationportal.nyc.gov/





Artificial Intelligence (AI) in GIS

NB:

- Rubbish in, rubbish out!
- QA/QC
- Metadata

GeoAI

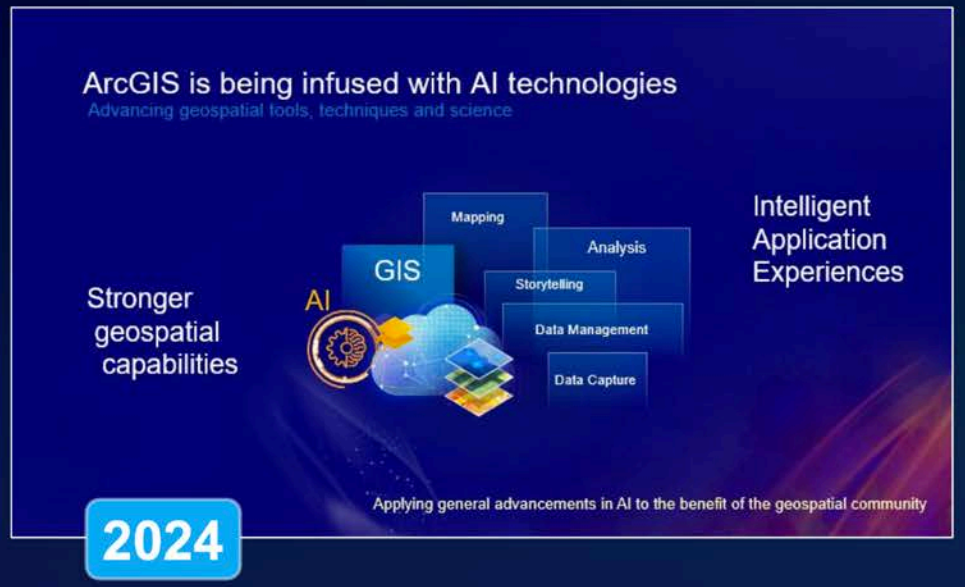
Expanding and powering the *Science of GIS*, with AI models, tools and techniques, to automate data extraction at scale and uncover valuable insights faster than ever.

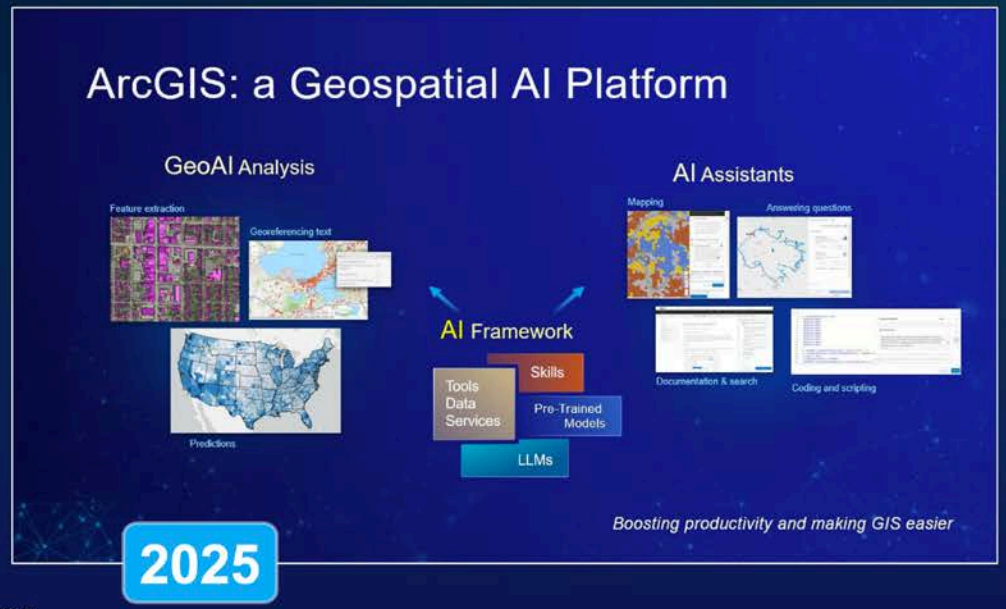
AI Agents & Assistants

Enhancing the *Experience* of GIS, using intelligent *AI agents* & *assistants*, to understand intent, get insights, perform GIS tasks and generate GIS content.



The *AI in ArcGIS* story is evolving…





- AI is becoming more central to ArcGIS
- AI Framework provides foundational AI capabilities
- More extensibility opportunities:
  - Automation, Integrations
  - New: Extensibility of assistants and Geospatial AI services

GeoAI

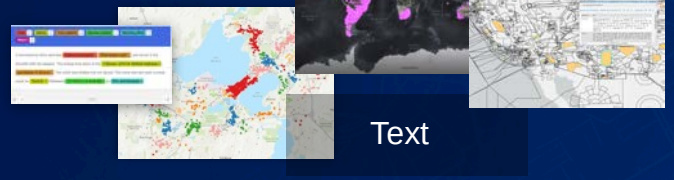
Unlock the power of AI in GIS

Extracting Data

- Imagery
- Text

Analyzing Data

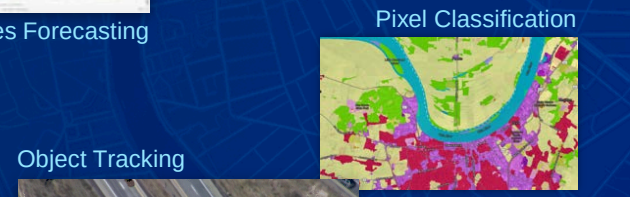
- Vector
- Tabular
- Time series



Text



Vector & Tabular



GeoAI



Imagery & Remote Sensing







Libraries ML /DL

Accelerating intelligent decision-making

Examples GeoAI

Land Administration

City of Cape Town

Building Extraction



Multiresolution Object Detection with Text SAM (esri.com)

Cyprus – Department of Lands and Surveus

Automatic Feature extraction

- Assess unregistered (& untaxed) buildings
- Out of the box DL model + retraining
- Processed imagery for whole island
  - 90%+ buildings detected
  - <5% false positives



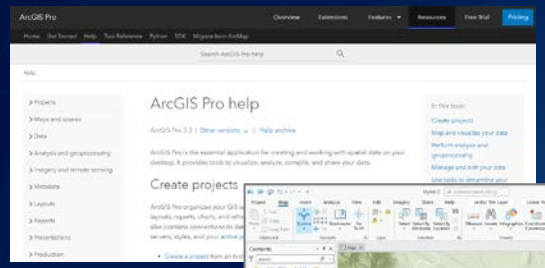
AI Assistants

Leveraging Generative AI to streamline your work and make GIS easier for everyone

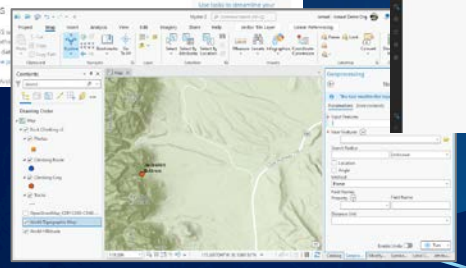
Assistants for..

- Mapping
- Analysis
- App creation
- Data management
- Administration
- Search
- Learning
- …

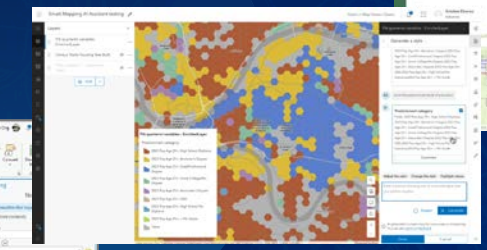
Documentation



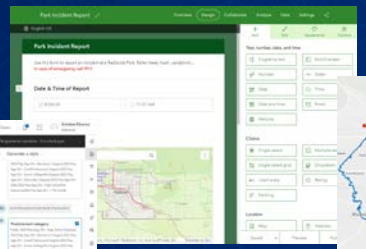
ArcGIS Pro



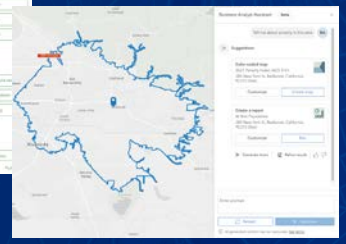
Smart Mapping



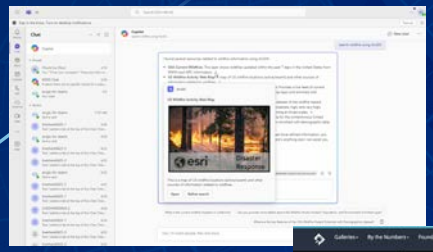
ArcGIS Survey123



Business Analyst



ArcGIS for Microsoft Teams



Configurable Assistant Apps



ArcGIS

Boosting productivity

and making GIS easier



Also in the works…

- Enhanced search
- Coding assistants for Arcade and Python
- Streamlined metadata editor
- Many more…

Example AI Assistant

Creating a Survey in Survey123



Conclusions

- GIS enables spatial data integration for Land Administration
- Use open standards and existing frameworks (FFP, LADM, FELA, …)
- Parcel Fabric is a Out of the Box Parcel Management System in GIS
- Configuration over customization
- Ongoing developments:
  - Valuation and taxation
  - 3D representation, 2.5D Cadastre
  - AI: GeoAI and AI Assistants





Thank you!

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