Advances in GIS Technology
Supporting the Land Administration Domain Model

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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*
ArcGIS is the platform for land administration systems.
GIS – The Platform for Land Administration

- Land Applications
- Land Services
- Land Information Data

Tenure
- Cadaster
- Titling
- Surveying
- Addressing
- Census
- ROW

Valuation
- Valuation
- Taxation
- Subsidies

Land Use
- Land Use
- Permitting
- Land Consolidation
- Eviction

Land Development
- Permitting
- Acquisition
- Expropriation
- Preemption

Land Market
- Land Market
- Trading
### Modern Architecture

<table>
<thead>
<tr>
<th>How You Integrate</th>
<th>What You Integrate</th>
<th>Why You Integrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client / Server</td>
<td>Web Services &amp; Apps</td>
<td>Custom Applications</td>
</tr>
<tr>
<td>Stand-Alone Desktop</td>
<td>Connected Desktop</td>
<td>Configurable Templates &amp; Apps</td>
</tr>
<tr>
<td>Data Models</td>
<td>Web Maps &amp; Layers</td>
<td>Proprietary Data</td>
</tr>
<tr>
<td>Static Data</td>
<td>Real-Time</td>
<td>Open Data &amp; Shared Services</td>
</tr>
<tr>
<td>Single Server</td>
<td>Distributed Computing</td>
<td>3D Features</td>
</tr>
<tr>
<td>Single Server</td>
<td>Distributed Computing</td>
<td>2D Features</td>
</tr>
<tr>
<td>Custom Applications</td>
<td>Configurable Templates &amp; Apps</td>
<td>Proprietary Data</td>
</tr>
<tr>
<td>Proprietary Data</td>
<td>Open Data &amp; Shared Services</td>
<td>3D Features</td>
</tr>
<tr>
<td>Digital Cartography</td>
<td>Smart Mapping</td>
<td>Spatial Analysis</td>
</tr>
<tr>
<td>2D Features</td>
<td>3D Features</td>
<td>Spatiotemporal &amp; Big Data Analytics</td>
</tr>
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<td>Spatiotemporal &amp; Big Data Analytics</td>
<td>3D Features</td>
</tr>
</tbody>
</table>
Web Services

Organizes and Securely Sharing Data

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

https://

http://esriland.maps.arcgis.com/home/item.html?id=5969689b642840e39cf0491669484e0b
Web GIS is a Transformational Architecture

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 Are Bringing the Power of GIS to Everyone
Extending the Reach of GIS

Across Organizations and Beyond
Tens of Thousands of Open Datasets & Curated Living Atlas

Basemaps

Demographics and Lifestyle

Transportation

Urban Systems

Boundaries and Places

Imagery

Landscape

Oceans

Earth Observations

GIS Content

Ready-to-Use Maps and Data

Millions of User Contributions . . . Billions of Views per Week
Extending GIS Capabilities Everywhere

App options:

- **Apps**
- **Field**
  - Collector
  - Navigator
  - Survey123
  - Drone2Map
  - Workforce

- **Office**
  - ArcGIS Earth
  - Explorer
  - Maps for Office
  - Maps for SharePoint
  - Maps for Adobe Creative Cloud
  - Maps for Power BI
  - CityEngine
  - GeoPlanner
  - Business Analyst

- **Community**
  - Story Maps
  - Initiatives
  - Open Data
  - Photo Survey
  - Quick Report
  - Crowdsourcing Polling

- **Focused, Powerful, and Ready-to-Use**

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Options for extending GIS capabilities everywhere include Apps like Collector, Navigator, Survey123, and Drone2Map for the field, and Apps like ArcGIS Earth, Explorer, Maps for Office, Maps for SharePoint, Maps for Adobe Creative Cloud, Maps for Power BI, CityEngine, GeoPlanner, and Business Analyst for the office. Community options include Story Maps, Initiatives, Open Data, Photo Survey, Quick Report, and Crowdsourcing Polling.
What Apps to Use?

- Collector
- Survey123
- Explorer
- Operations Dashboard
- Drone2Map

Support your workforce and workflows.....
Support Data/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

- Collecting Data
- Coordinating Work
- Advanced Navigation
- Mapping and Markup

Connecting the Field with the Enterprise
Uncovering value locked in your data....
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

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.
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.
Fit-for-Purpose Case Studies

COTS Land Administration

Kenya

Colombia

Cadastre is a Necessary Precondition to Sustainable Economy
Colombia
Collaborative Partnering for the Future of Colombia

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

Apps

Base Maps and Data

Browser Capabilities

Many More......

Reports
Fit For Purpose LA & GIS
FFP processes with FFP technology

Collector App → 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
Kenya

Community Adjudication

http://go.esri.com/fit4purposekenya