

Tools for Marine Spatial Planning

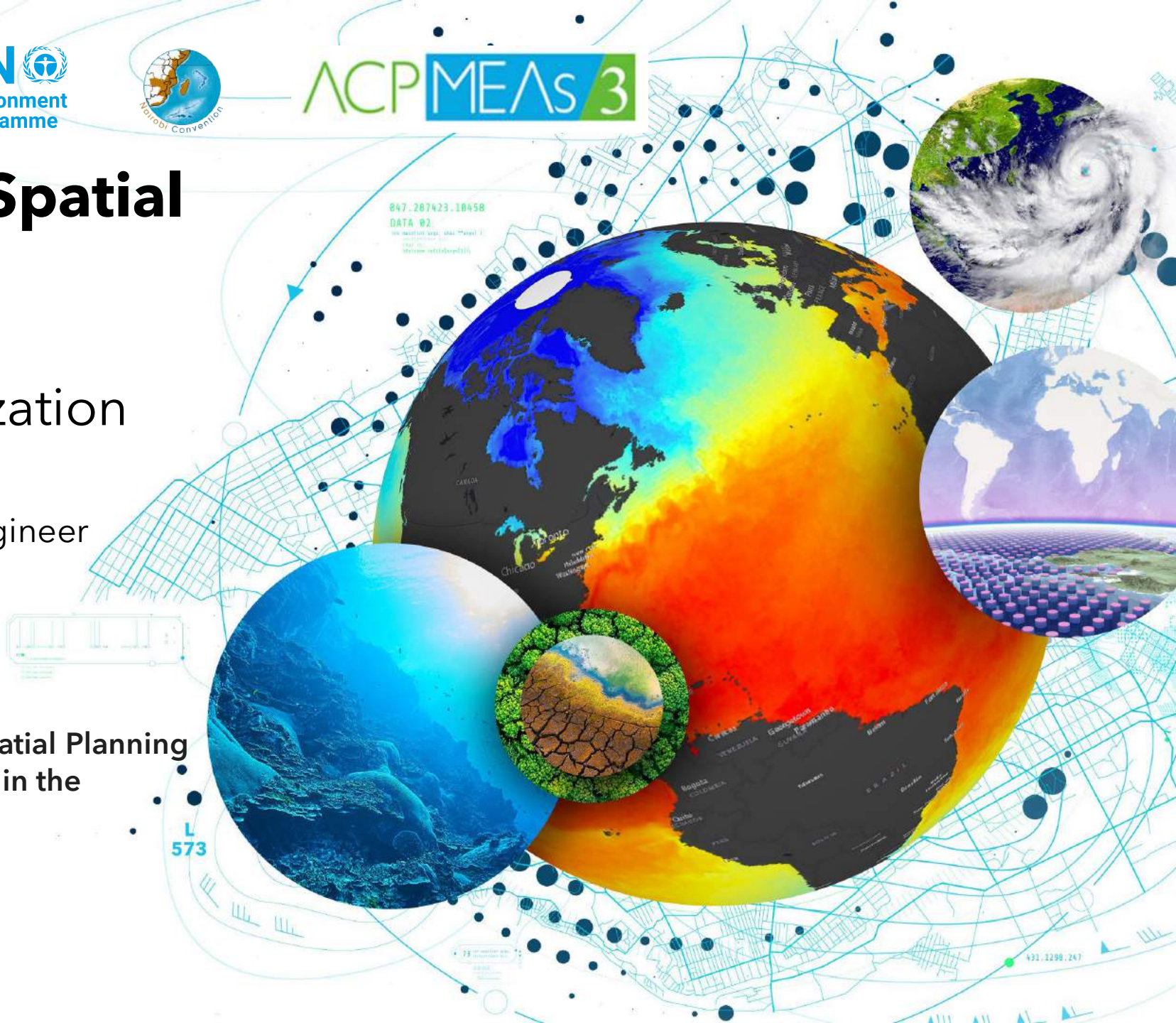
Mapping and Visualization

Sidney Nyongesa | Solutions Engineer

2023

Capacity development in Marine Spatial Planning
Tools and Information Management in the
WIO Region

Mombasa, Kenya



A world map with a grid overlay, where numerous glowing points in shades of purple, blue, and yellow are scattered across the continents, representing global users. The background is a dark blue gradient.

esri

World Leader in Geographic Information Systems (GIS)

Over 10 Million Users

Growing, Strong and Impactful

33,000 Businesses

12,000 Colleges & Universities

8,600 Utilities

12,600 NGOs

1,200 National Government Agencies

12,000 States & Regional Agencies

30,800 Cities & Local Governments

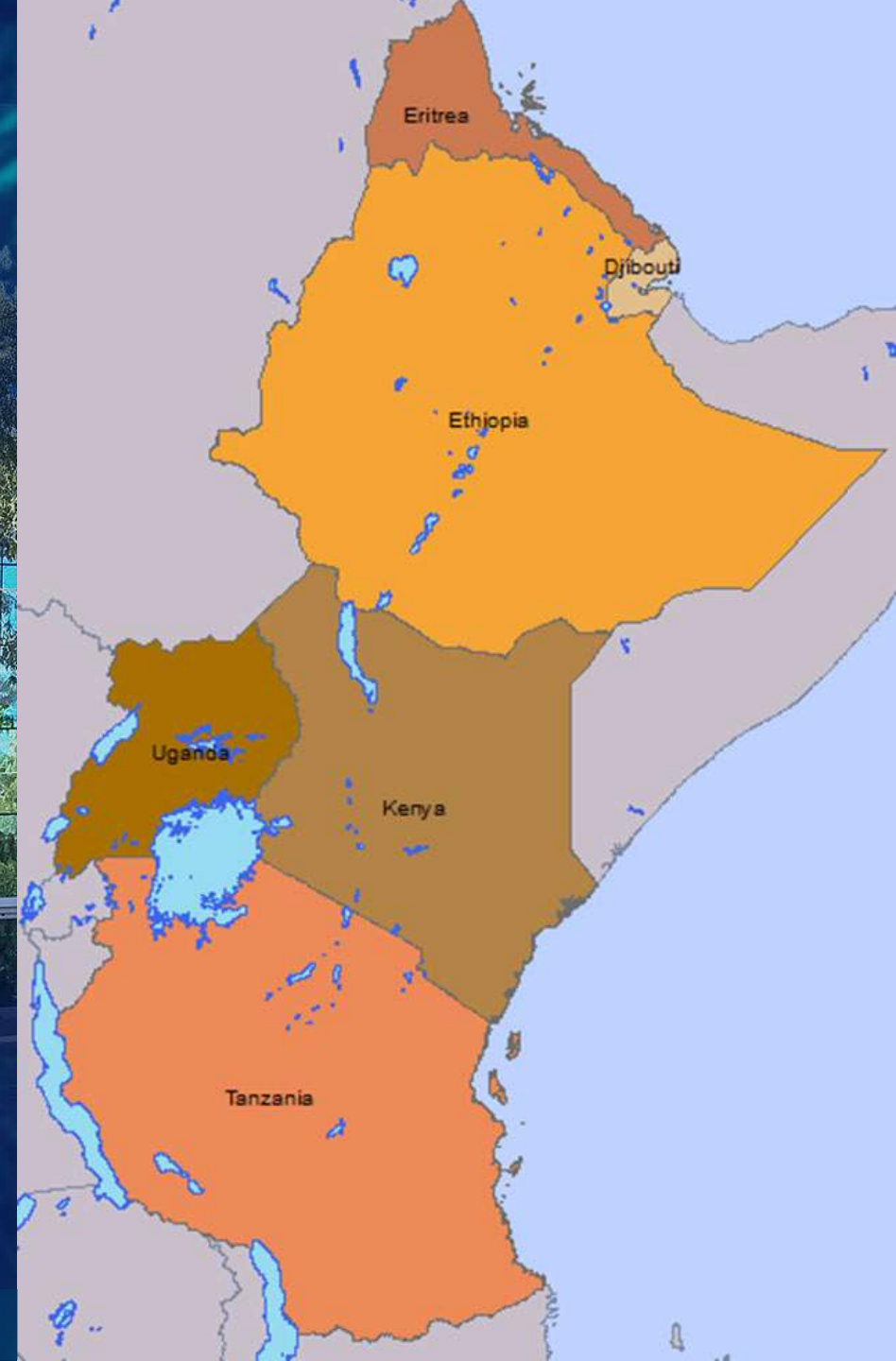
Serving Our Users

Advancing GIS & The Science of Where

Strong and Growing

Engineering and
Science Focus

Software Development & Products	Technical Support	Education & Training
Professional Services	Partnerships	International Activities
Marketing	Business Development	Operations



... Working Together to Make a Difference

Partner Ecosystem

3000
Global Partners

Products &
Solutions

System
Integration

Implementation
Services

Content &
Information
Products

Complementary
Technology

Global Technology Partners

- Autodesk
- Adobe
- Apple
- Cisco
- Dell
- IBM
- Microsoft
- NVIDIA
- Salesforce
- SAP
- SAS
- Trimble

Global Services Partners

- Accenture
- Atos
- Deloitte
- Infosys
- KPMG
- PwC
- TCS

Infrastructure Partners

- Amazon Web Services
- Google
- IBM
- Microsoft Azure
- SAP



VISION

GIS

CREATING THE WORLD
YOU WANT TO SEE

What Kind of World
Do You Want to See?

Healthy

Equitable

Prosperous

Peaceful

In Balance with Nature

Secure

Sustainable



Sustainability Starts with Geography . . .

Seeing the World as One Single Ecosystem

Geography Provides the Science & Fundamental Language

Illuminating Patterns & Discovering Relationships

Organizing & Integrating All the Factors

Social

Economic

Environmental

Health & Welfare

Demographics

Industrialization

Development

Energy

Equity & Equality

Population

Infrastructure

Education

Financial

Oceans

Ecosystem Services

Climate

Forests

Biodiversity

Water

Geography

... and The Geographic Approach

Provide a Way of Thinking and Problem-Solving ...

... That Integrates Geographic Information & Science



Collaborative

Integrated

Multidisciplinary

Holistic

Science-Based

Visual & Understandable



Mapping What Is

... And What Can Be

... A Foundation for Positive Action

Helping Organizations Understand & Explain



GIS

Enables The Geographic Approach

A Powerful Platform for ...

Creating Understanding ...

Exploring Alternatives ...

Finding Solutions ...

Explaining ...

... and Taking Action



Data
Collection

Visualization &
Mapping

Analysis &
Modeling

Planning &
Geodesign

Decision-
Making

Action

Improving How We
Create the Future

GIS Enabling Living Digital Twins

Integrating
All Types of Content

Real-Time

Transactionally
Maintained

3D / 4D

Supporting Many
Applications

Accessible
Anywhere

A Foundation for Smart Cities



GIS Apps Are Becoming Pervasive

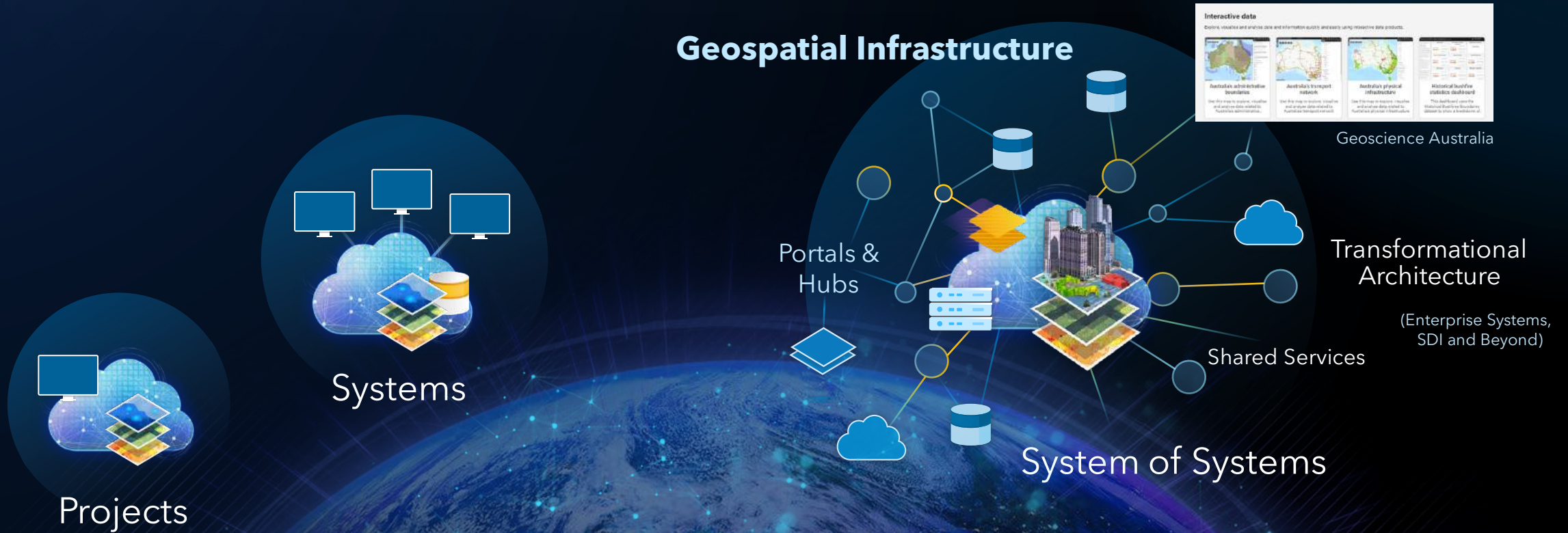
Opening Access to GIS

... And Dramatically Expanding Its Reach



Distributed GIS Is Interconnecting Your Work

Creating a Platform for Shared Understanding & Collaboration



Opening Many New Opportunities
Across and Among Organizations

GIS Technology Is Already Contributing . . .

To a More Sustainable World

Your Work Provides the Evidence . . .

Urban Planning

Organizing Communities

Addressing Homelessness

Siting Renewable Energy

Conservation Planning

Habitat Restoration



Community Planning

Prioritizing Investment

Planning for Sustainability

Finding Equitable Outcomes

Supply Chain Optimization

Environmental Monitoring
and Assessment

Resource Management

Increasing Efficiency

Conservation Planning



You Are Expanding
the GIS Profession Rapidly

But Much More Is Required . . .

GIS Professionals

Have an Important Role to Play
in Creating a Sustainable World . . .

Understanding the Situation We Are in . . .
. . . and Explaining It to Others

Determining
What's Needed and Wanted

Creating Holistic Solutions

GEOGRAPHIC APPROACH

Making Sustainability a Priority

Leveraging the Latest Science
and Technology

Maintaining
Public Trust

Creating the World You Want to See Requires . . .
. . . GIS, the Geographic Approach, and You





ArcGIS

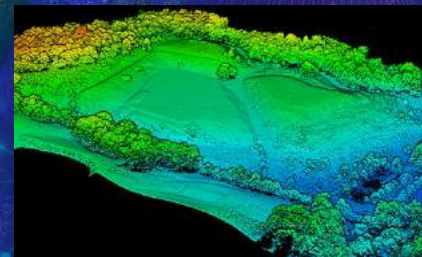
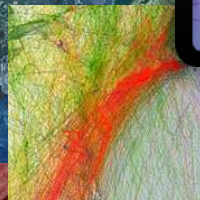
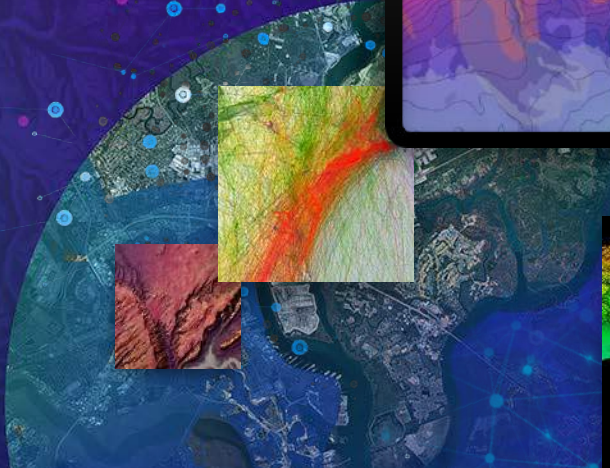
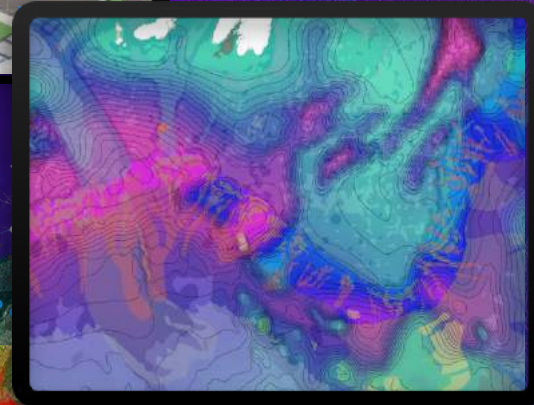
OUR WORK

Creating Useful Technology
Helping Our Users to Be Successful

Products

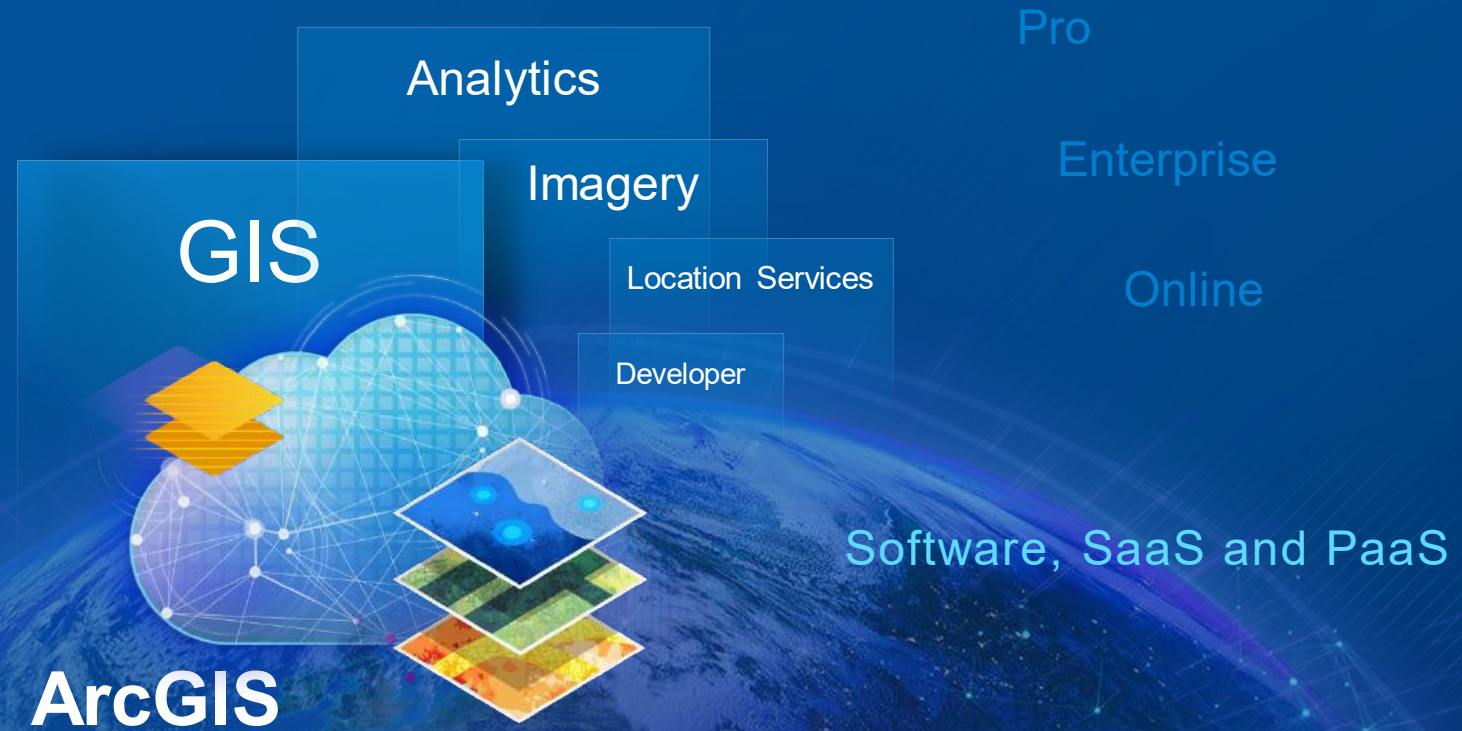
Education

Support



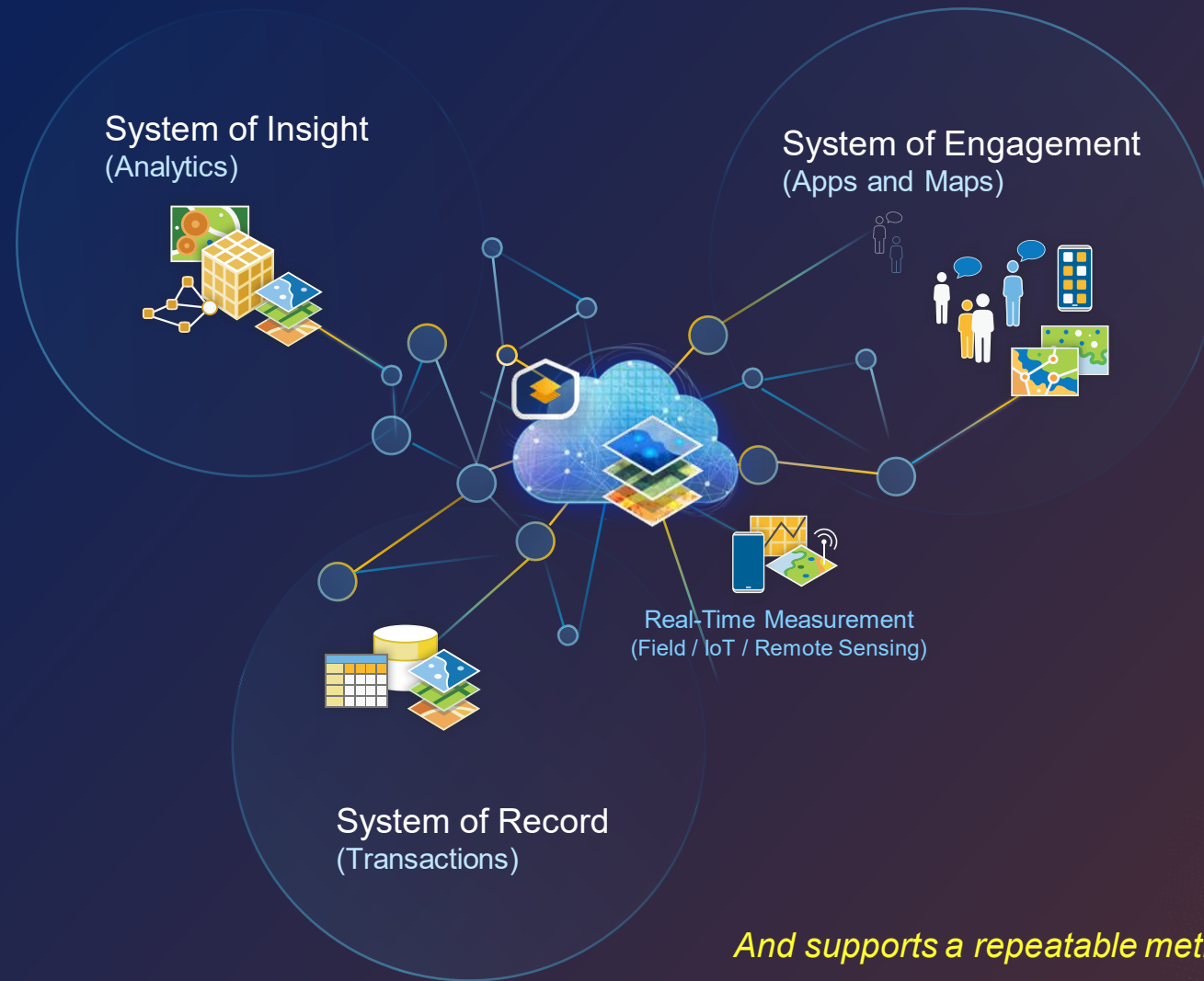
ArcGIS

A Comprehensive Geospatial System –
Supporting Multiple Communities



ArcGIS

Supports Three Fundamental Systems



And supports a repeatable method for key GIS workflows

Common Patterns of ArcGIS Use | Supporting the MSP Process

Mapping & Visualization



Understand locations and relationships with maps and visual representations

Data Management



Collect, organize, and maintain accurate locations and details about assets and resources

Field Mobility



Manage and enable a mobile workforce to collect and access information in the field

Monitoring



Track, manage, and monitor assets and resources in real-time

Analytics



Discover, quantify, and predict trends and patterns to improve outcomes

Design & Planning



Evaluate alternative solutions and create optimal designs

Decision Support



Gain situational awareness, and enable information-driven decision making

Constituent Engagement



Communicate and collaborate with citizens and external communities of interest

Sharing & Collaboration



Empower everyone to easily discover, use, make, and share geographic information

Capabilities



Mapping



Field Operations



Spatial Analysis
& Data Science



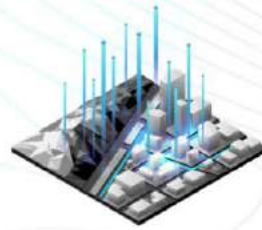
Imagery & Remote
Sensing



Real-Time
Visualization &
Analytics



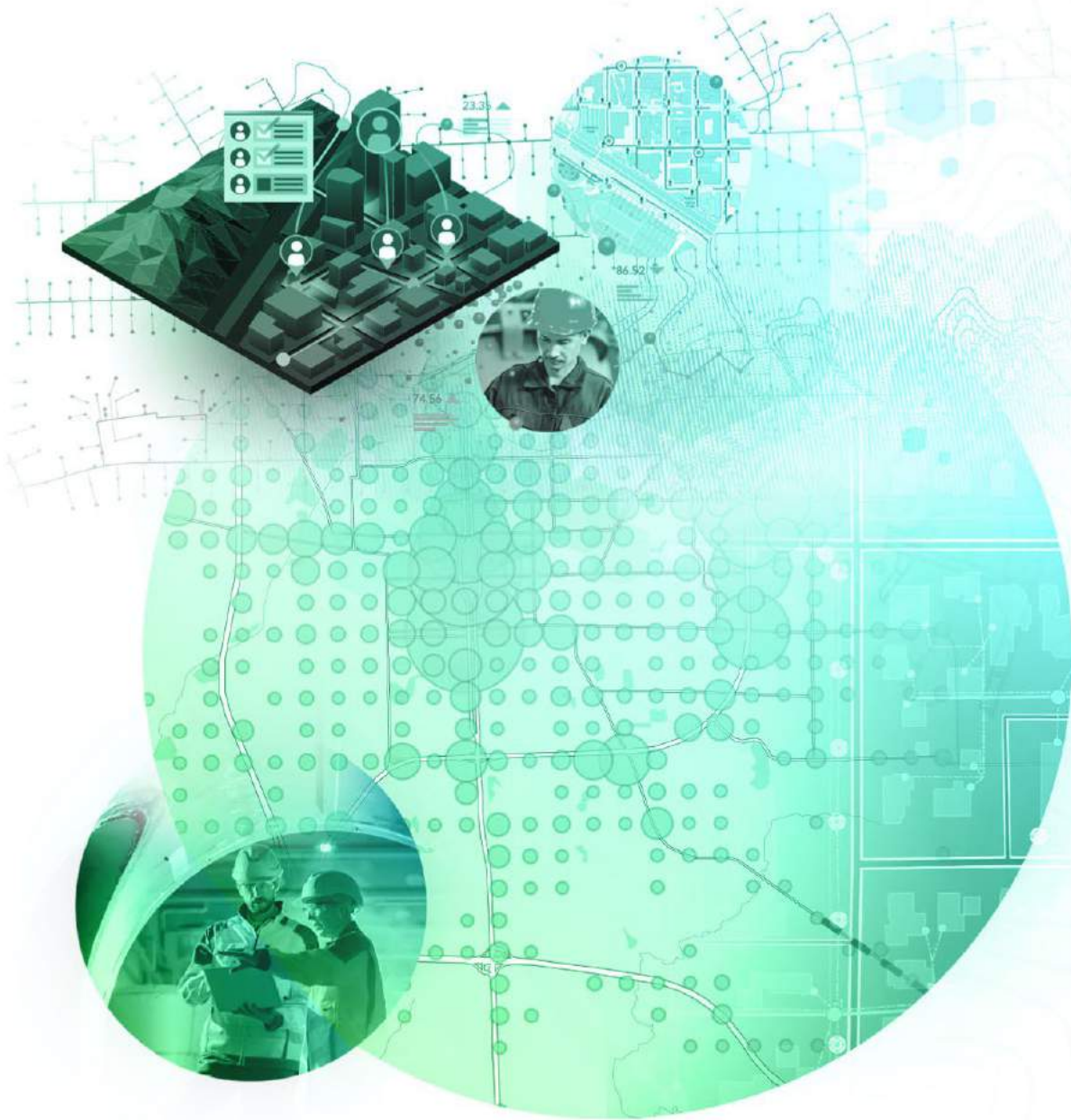
3D Visualization
& Analytics



Data
Management



Developer
APIs





Products



ArcGIS Enterprise

The foundational software system for GIS, powering mapping and visualization, analytics, and data management across your organization



ArcGIS Pro

The world's leading GIS software, ArcGIS Pro provides data visualization, advanced analysis, and authoritative data maintenance in 2D, 3D, and 4D.



ArcGIS Platform

A platform-as-a-service for developers to integrate market-leading, high-quality location services, data, and mapping tools into apps and business systems.



ArcGIS Online

A cloud-based software-as-a-service solution designed for creating and sharing interactive web maps and performing geospatial analysis.

ArcGIS

Supports Many Implementation Patterns

- Common Platform
- Shareable Resources
- Scalable
- Reliable
- Secure



*Open and Interoperable . . .
Easily Integrated with Other Systems*

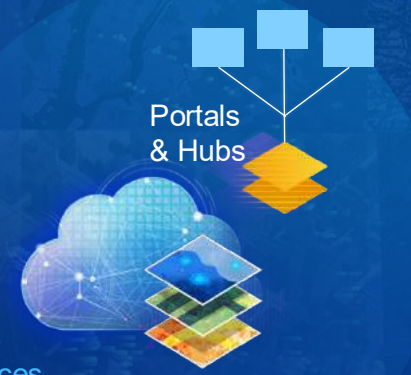
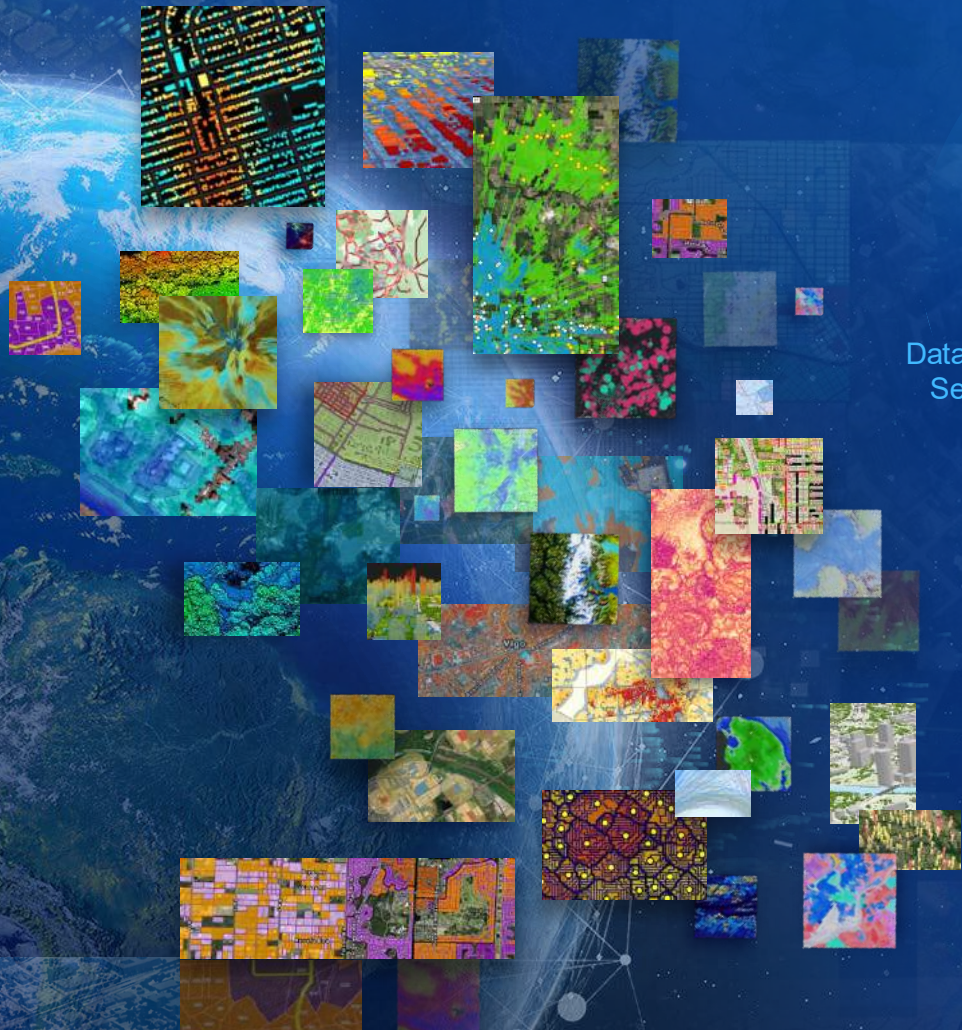
ArcGIS

Integrates and Manages All Types of Data



ArcGIS

Is a Content Sharing & Collaboration Platform
Organizing & Providing Access to Geographic Content



Search & Discovery

Open Data

Public &
Private Sharing

Online & Enterprise

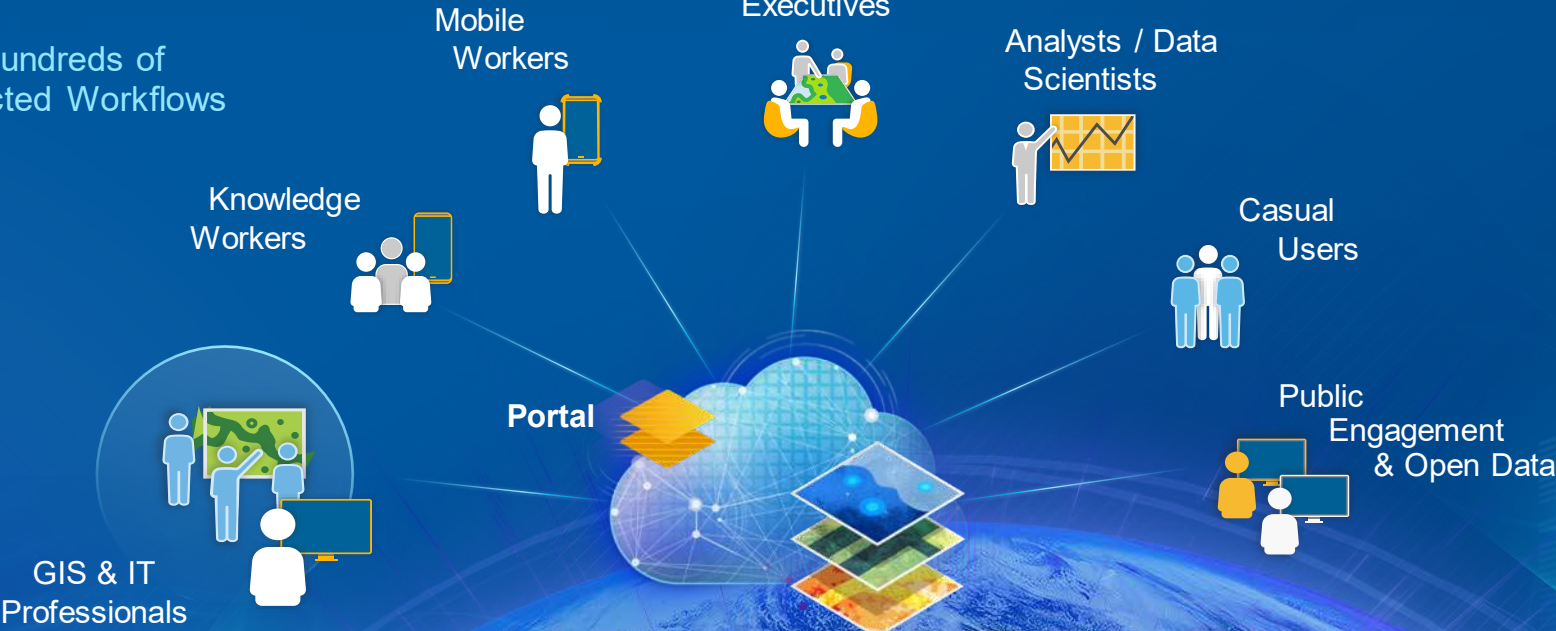


Tens of Millions of Shared . . .
Maps, Datasets and Apps

*Creating the World's Largest
Digital Library of Maps & Data*

ArcGIS Is an Enterprise System

Supporting Hundreds of Interconnected Workflows



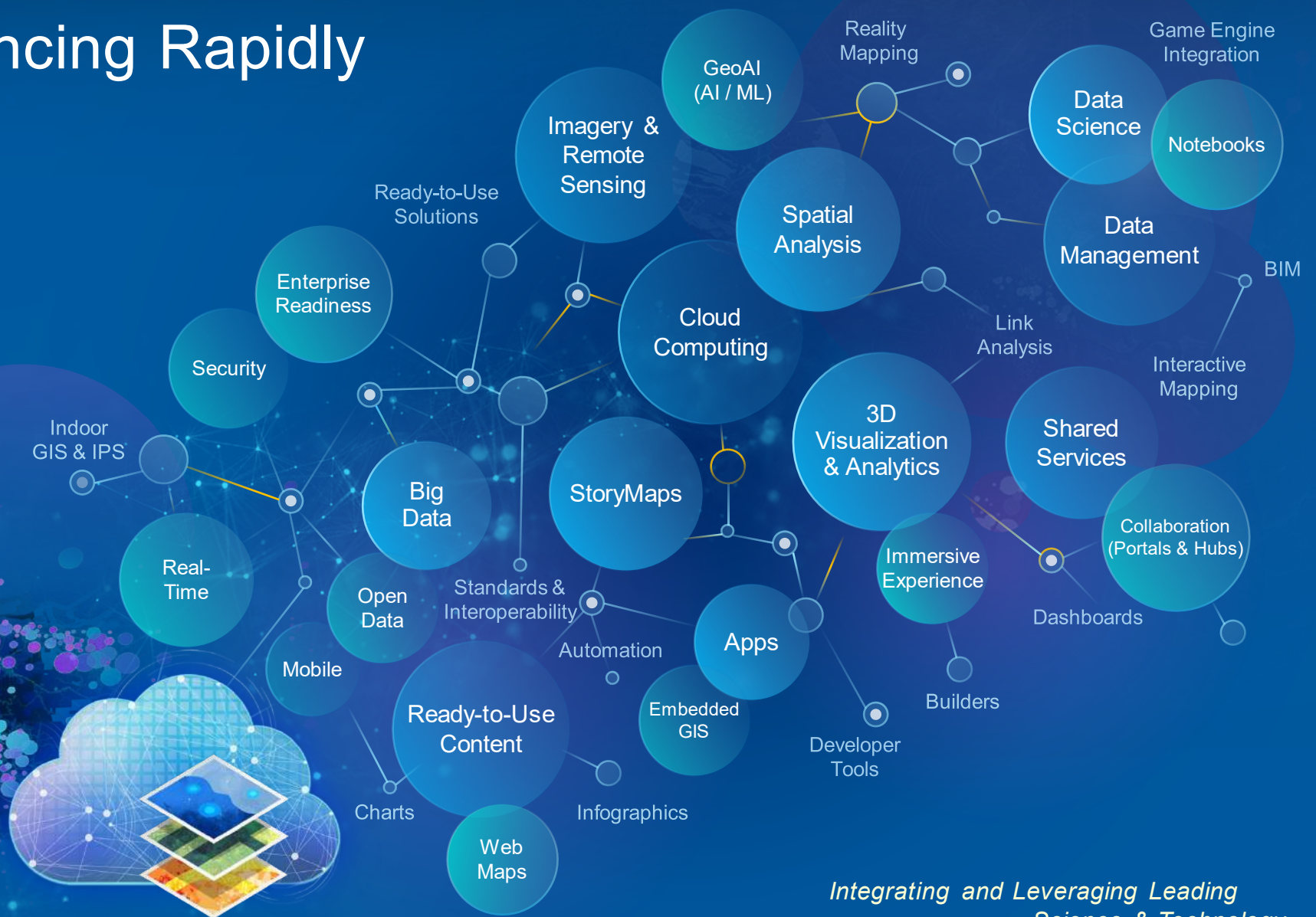
A Well-Architected Platform
Supporting Mission-Critical Applications

Empowering Many Forms of Collaboration and Communication



ArcGIS Is Advancing Rapidly

Many New Innovations



Integrating and Leveraging Leading Science & Technology

ArcGIS Includes the Living Atlas of the World

Ready-to-Use Basemaps & Layers

Billions of Maps Served Daily

Massive . . .

Rapidly Growing . . .

Curated . . .

10,000+ Items

- Maps, Layers and Apps
- Authoritative
- Ready-to-Use
- Updated Continually

Demographics
Habitats Landscape
Basemaps Land Cover
Environment Transportation
Infrastructure Hydro Movement
Imagery Traffic Business
POI Biodiversity
Boundaries Elevation
Weather Oceans
Soils Hazards



new

Global

- 3D Basemaps & Layers
- Land Use (2017–2021)
- Places (POIs) Layers
- OpenStreetMap Layers
- Analysis-Ready Imagery
- Climate Layers
- World Pop. 2000–2020
- Air Quality
- Premium Location Services

new

US

- Hydrology (NHDPlus)
- Census ACS (2017–2021)
- DOT National Addresses
- FCC Broadband Data
- NAIP Imagery (2021)

Built from Best Available Commercial and Community Sources

ArcGIS

A Complete Mapping & Cartographic System

**Powerful
Capabilities**

Generalization

Symbology

Printing /
Export

Dynamic
Visualization

Layouts

Dashboards

Smart /
Interactive
Mapping

Map Apps

StoryMaps

Labeling

Editing

Charts

Automation

Adobe
Integration

Graphic
Effects

Map
Production

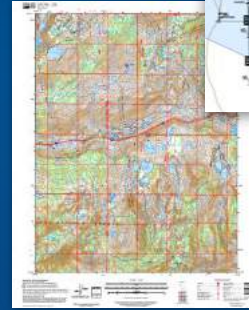
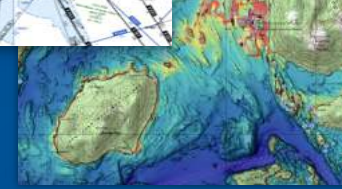
Color
Ramps

Ready-to-Use
Basemaps & Layers

Aeronautical



Bathymetry



Topographic

Statistical



Dashboards



Thematic



Categorical



Streets



Utilities



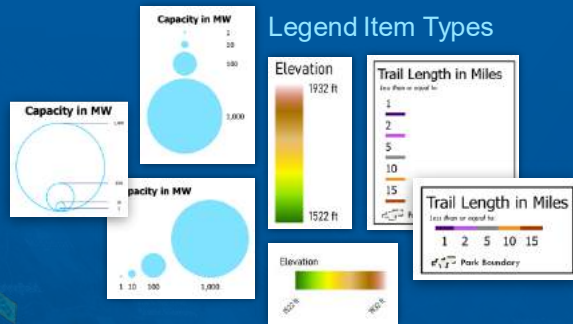
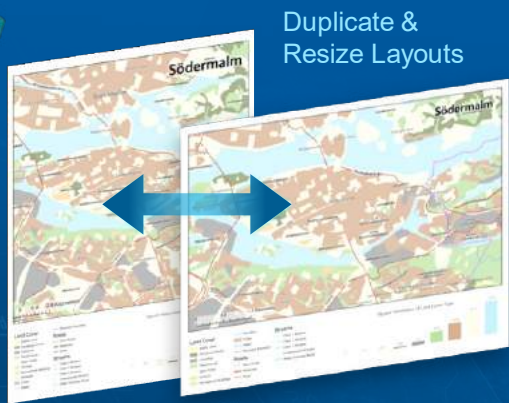
Parcels

Advancing Cartographic Science & Map Visualization

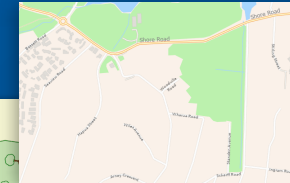
Mapping & Cartography

Enhanced Layout, Symbolology, Labeling & Generalization

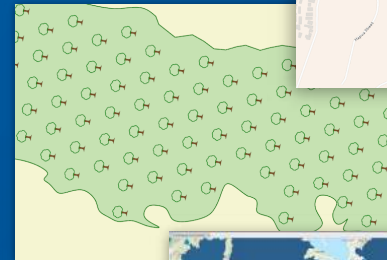
ArcGIS Pro



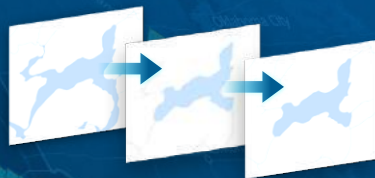
Polygon Fill
Angle Alignment



Scale-Based
Label Sizing

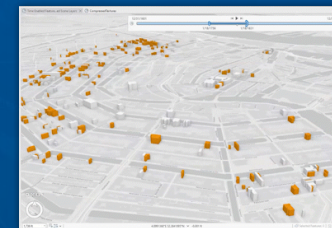
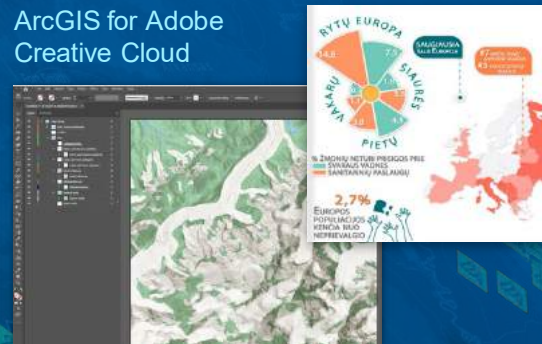


Feature Drawing Order



Hydro Generalization

ArcGIS for Adobe
Creative Cloud



Time-Enabled Scene Layers

New & Improved

- Duplicate & Resize Layouts
- Legend Item Types
- Scale-Based Label Sizing
- Animated Symbolology
- Import Symbol Layers
- Polygon Fill Angle Alignment
- Feature Drawing Order
- Time-Enabled Scene Layers
- Adobe Support
- Hydro Generalization
- Performance

Making the Creation of Beautiful Maps Easier

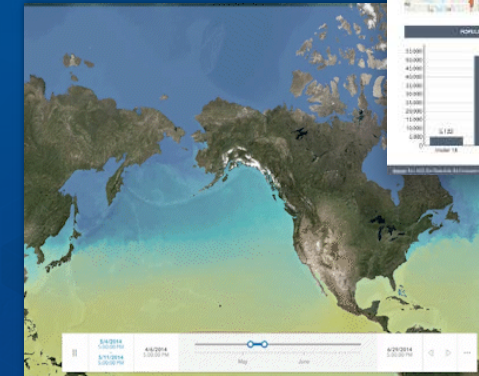
Interactive Web Mapping

Smart and Fast Data-Driven Visualization

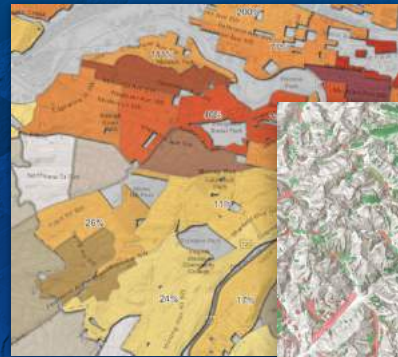
Infographics



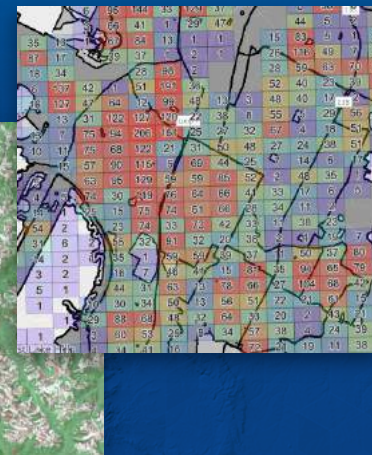
Multidimensional Imagery Time Slider



Layer Effects



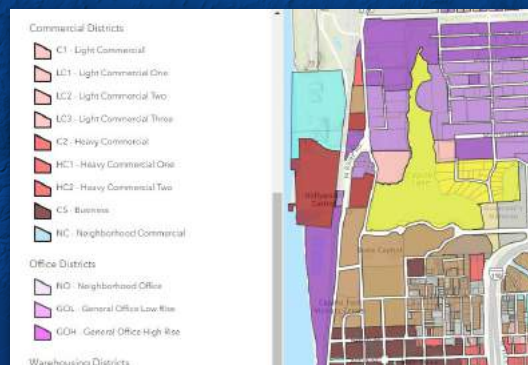
Client-Side Binning



New & Improved

- Improved Symbology & Graphics
- Images as Symbols
- Large Dataset Support
- Group Layers
- More Clustering & Binning
- Strategic Layers
- Performance

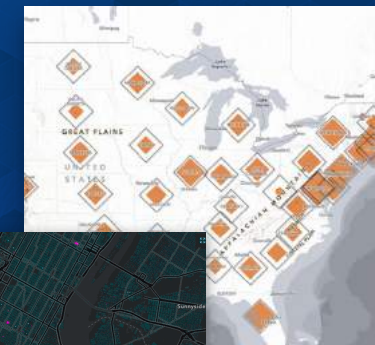
Legend & Type Grouping



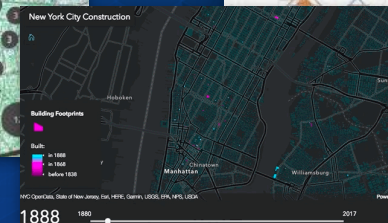
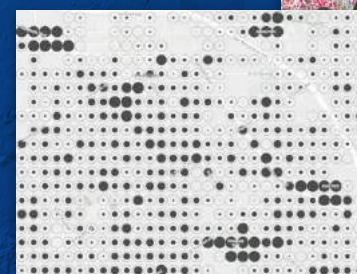
Feature Aggregation



Smart Mapping



Wurman Dots (Coming)



Thematic Mapping

Leveraging the Power of the Browser

Instant Apps

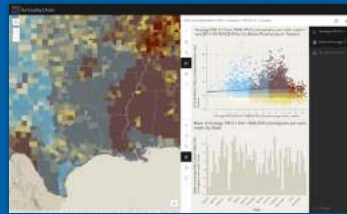
Templates That Transform Web Maps into Apps

Templates

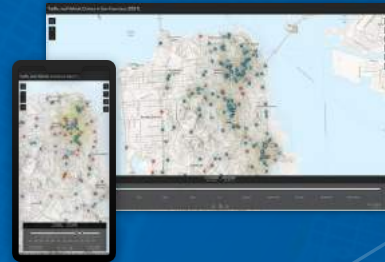
- 3D Viewer
- Atlas (Beta)
- Attachment Viewer
- Basic
- Category Gallery
- Chart Viewer
- Countdown
- Exhibit
- Imagery Viewer
- Insets
- Interactive Legend
- Media Map
- Nearby
- Portfolio
- Public Notification
- Sidebar
- Slider
- Zone Lookup

Easy to Configure and Use

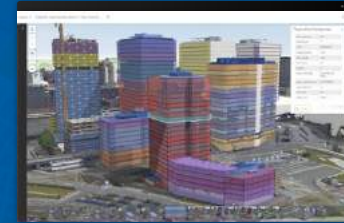
Chart Viewer



Slider



3D Viewer



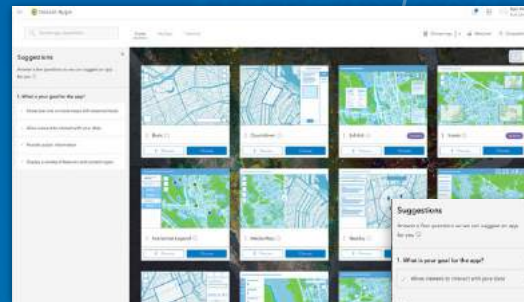
Coming

- Observer
- Reporter
- Manager

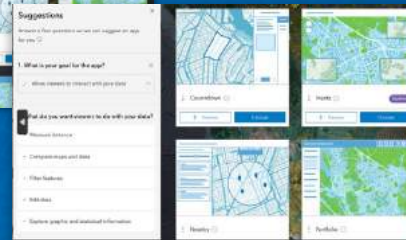
Interactive Legend



Media Map



Instant Apps Gallery & Guidance



Sidebar



Atlas



new



Instantly Creating Web & Mobile Apps . . .

new

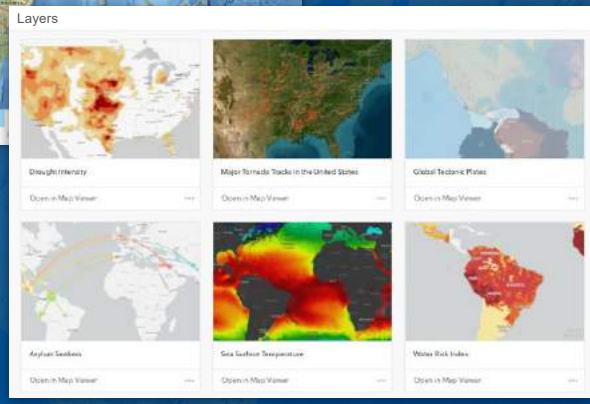
Atlas Creates an Interactive Web Experience

Based on a Collection of Curated Maps and Layers

Used for Publishing and Disseminating GIS-Based Atlases



Collections of Web Maps & Layers . . .



Examples

- Education
- Local Government
- Science
- Situations & Disasters
- Projects

Supports

- Map Viewing (2D / 3D)
- Transparency, Swipe
- Layer Mashup
- Pop-Ups
- Measure
- Sketch
- Export

New Instant App

. . . Providing a Modern Atlas Experience

Creating New Forms of Understanding

Storytelling with Maps

Communicating Geographic Knowledge Widely

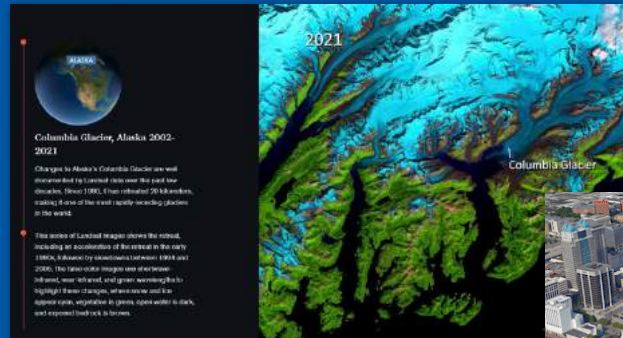
Common Uses

- Sharing Maps & Reports
- Public Engagement
- Presentations
- Education
- . . . and More!



Collections—Groups of Stories

Custom Designs

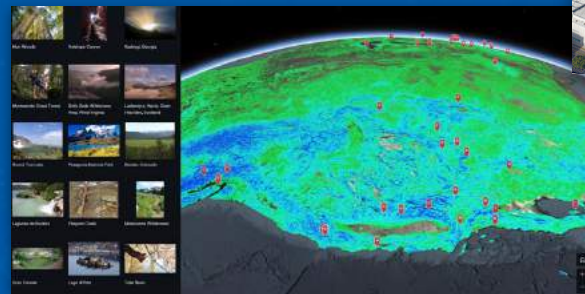


ArcGIS StoryMaps

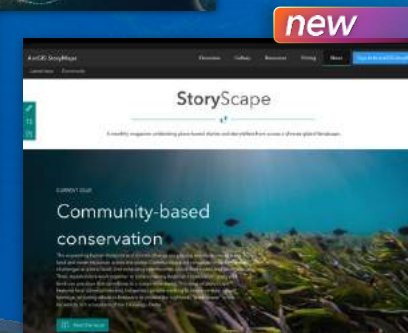
Simple Map Editing & Markup



Map Choreography



Multimedia—Images, Videos, Audio



E-magazine



Briefings (Coming Soon)

New & Improved

- Mapping
- Undo / Redo
- Collaboration
- Collections
- Automation (Python)
- Text & Image Editor
- Accessibility

Coming

- More Templates
- Tables
- Theme & Text Enhancements
- E-magazine
- Briefings (Beta)

Growing Rapidly

Millions of Stories Published

. . . Leveraging the Language of Mapping

Dashboards Dynamic Visual Reporting

- Easy to Configure
- Ready-to-Use
- Interactive
- Highly Scalable
- Embeddable



New & Improved

- Mobile Support
- Accessibility
- Interactive Selection
- Arcade Editor
- Download CSV

Coming

- 3D Scenes
- Multilanguage
- Attribute Editing
- Templates
- Automation
- Additional Accessibility



Providing Relevant & Timely Information at a Glance

Smart Mapping for Microsoft 365 Users

Helping Them See Their Data in Its Spatial Context

Excel



Spatially Enable

Power BI



Location Intelligence

Mapping

Geocoding

Geoenrichment

Teams



Collaboration

SharePoint



Discover and Share

ArcGIS for Microsoft 365



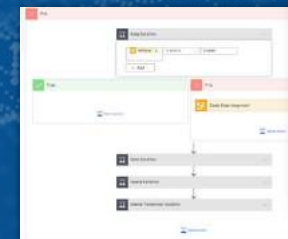
Online and Enterprise

Integrates Living Atlas, Maps & Layers

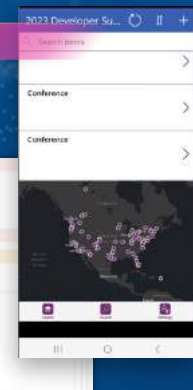
Power Apps

new

Power Automate



Spatial Automation



- No Code / Low Code
- Configurable Components

Configurable Apps

Bringing ArcGIS Mapping to Knowledge Workers Worldwide

ArcGIS

A Comprehensive Spatial Analytics System

Powerful Capabilities

AI, ML & DL

Mapping

Data Engineering

Vector Analytics

Image & Raster Analytics

Spatiotemporal Statistics

Graph Analytics

Advanced Visualization

GeoAI

3D Analysis

Modeling

Big Data

Real-Time

Network Analysis

Statistical Modeling

Python Scripting

Interactive Charts

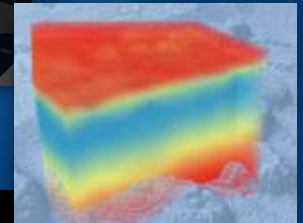
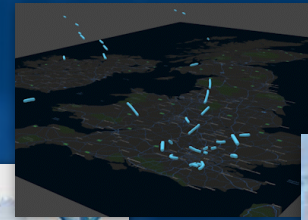
Visual Modeling

Graph Analytics

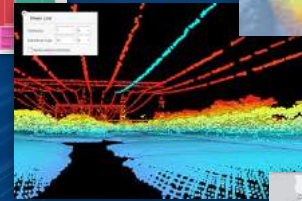
Density-Based Clustering with Time



Spatial Data Exploration

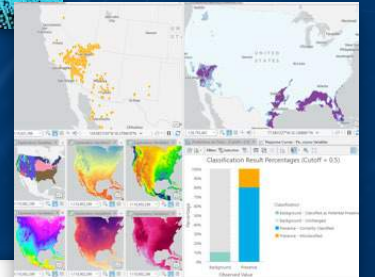


Voxels



Point Cloud Classification

Presence-Only Prediction



Raster Analytics & Modeling

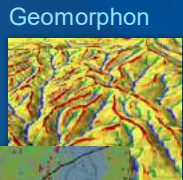


Thousands of Tools . . .
Empowering Analysts & Data Scientists

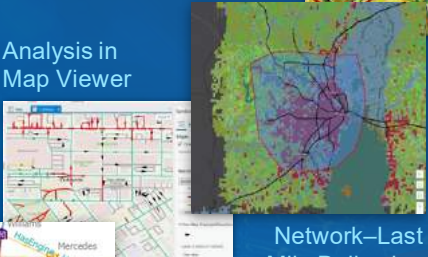
Spatial Analysis and Data Science

Many New Tools & Methods

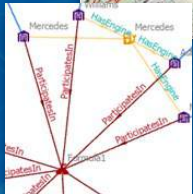
Analytics
(Vector, Raster & Graph)



Analysis in
Map Viewer

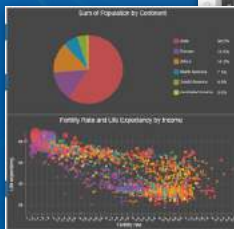


Network—Last
Mile Deliveries



Knowledge Graph

Visualization &
Exploration



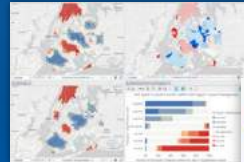
Charts in
Map Viewer



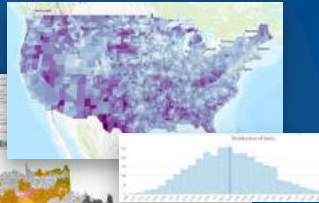
Pie &
Donut
Charts

Spatial Statistics

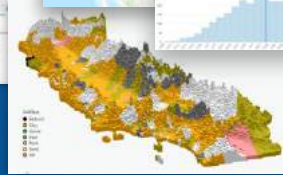
Hot Spot Comparison



Multivariable Index

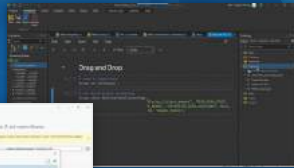


3D Nearest
Neighbor

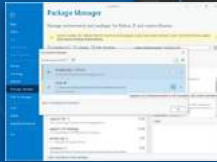


Modeling &
Scripting

Notebooks Drag and Drop



Python
Environment
Upgrades



ModelBuilder

GeoAI

Multiscale GWR



Many Pretrained Models



Time-Series
Classification



Big Data
Analytics



Cloud-Native Tools
and Functions

Snap Tracks



GeoAnalytics
Engine (Spark)

New & Improved

- 60+ New Tools
- GeoAI Models
- Analysis in Map Viewer
- Time Series Forecasting
- Predictive Modeling
- Multivariable Index
- Pie and Donut Charts
- Big Data Tools
- . . . Quality, Performance & Productivity

Coming

- ModelBuilder on the Web
- Spatial Algorithms

Enabling Insights . . .
. . . Supporting Decision-Making

Integrating AI Into Analytics – GeoAI

Ready-to-Use Tools & Models for Feature Extraction & Predictive Analytics

New & Improved

- 30 Pretrained Models
- GeoAI Toolbox
- AI-Assisted Labeling
- AutoML / AutoDL
- New Model Types
- Point Cloud Classification

Coming

- Fairness in ML
- Multimodal Input
- Model Explainability



Leveraging Open Science Libraries

... Automating, Processing & Accelerating
... Data Analytics

Pretrained GeoAI Models

Included with ArcGIS

- Cars
- License Plate Blurring
- Parking Lots
- Parking Spots
- Humans
- Crowd Counting
- Face Blurring
- Land Cover
- Buildings
- Roads
- Parcels
- Ag Fields
- Swimming Pools
- Well Pads
- Power Lines
- Transmission Towers
- Insulator Defects
- Wind Turbines
- Solar Arrays
- Solar Panels

- Ships
- Shipwrecks
- Oil Spills
- Cloud Masking
- Water Bodies
- Pavement Cracks
- Arctic Seals
- Elephants
- Seabirds
- Mangroves
- Palm Trees
- Trees
- Plant Leaf Disease
- Common Object Detection
- Text Parsing from Photo
- Object Tracking
- Segment Anything Model (SAM)

... and Many More

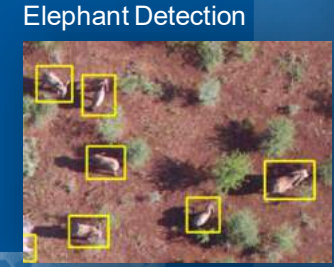
State & Local Government
Public Safety
Natural Resources
Commercial Business
National Security
Insurance
Conservation
Transportation
Utilities



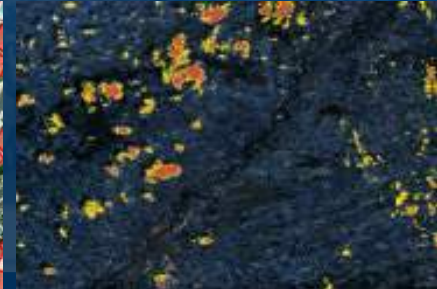
Road Extraction (Global)



Wind Turbine Detection



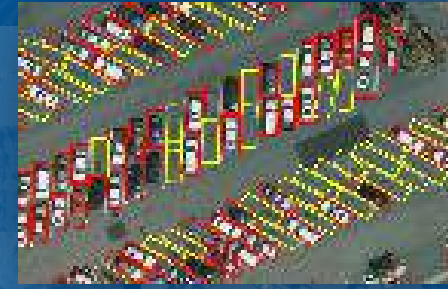
Elephant Detection



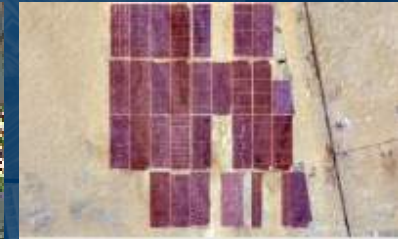
Cloud Mask Generation



Building Footprints



Parking Spot Detection



Solar Park Classification



Land-Cover Classification

Real-Time Visualization and Analytics

Integrating Sensors & IoT with ArcGIS



GeoEvent Server

- Integration
- Configurability
- Performance

Velocity (SaaS)

- Visualization
- Analytic Authoring
- IoT Ingestion



Supporting Operations & Improving Decision-Making



Link Analysis and Visualization

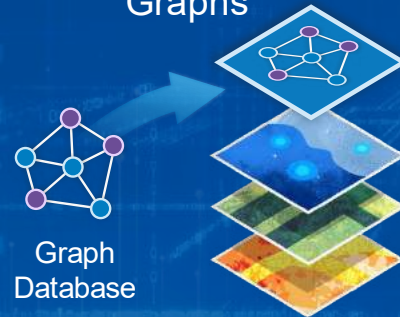
Integrating Knowledge Graphs (Entity-Relationship Networks)

Supports

- Visualization & Mapping
- Spatial & Nonspatial Data
- Link Analysis
- Editing & Sharing
- Graph Analysis & Query
- Python & Neo4j Support

ArcGIS Knowledge

Knowledge Graphs



Spatially Enriching & Integrating



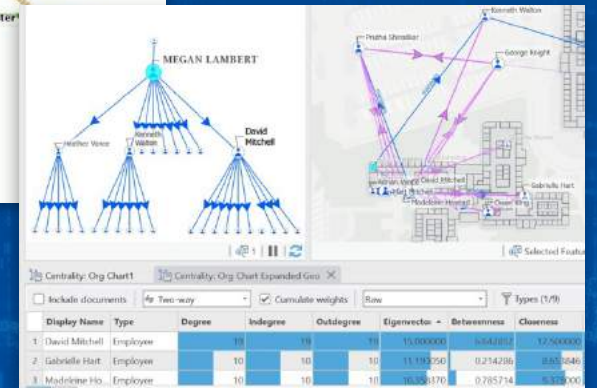
Intelligence & Crime



Supply Chain



Facility & Asset Management



Applications

- Social Networks
- Supply Chains
- Intelligence
- Communications
- Crime
- Risk Analysis

Coming

- Web App
- Provenance

Spatial Data Exploration Interactive Visual Analytics

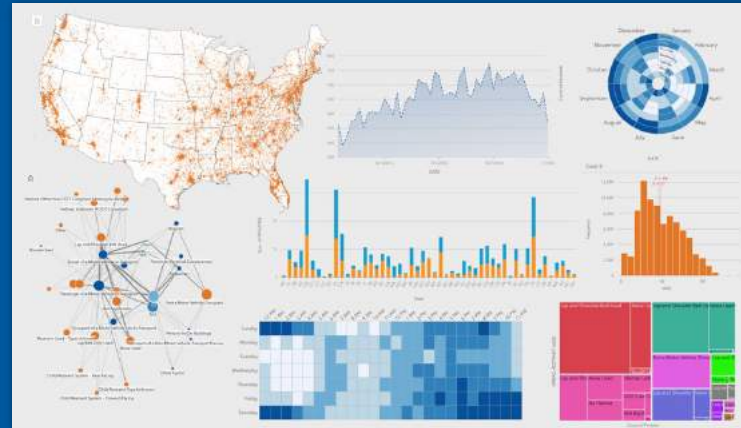
ArcGIS Insights

Connects & Works with All
Types of Enterprise Data

New & Improved

- Analytics
- Smart Mapping & Charting
- Report Designer
- Data Engineering
- Data Connections

Web and Desktop



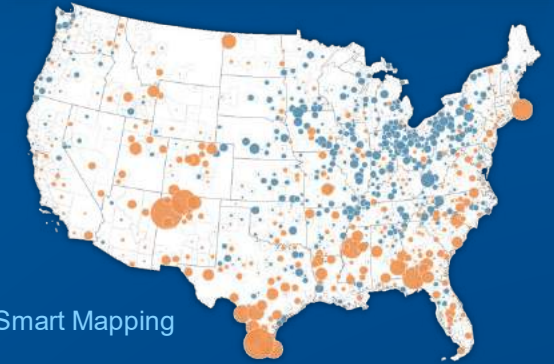
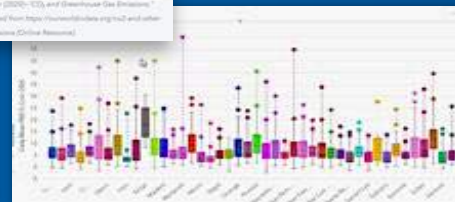
Reporting

Country*	2014-2017**	2018-2020**	2014-2020**
1. Afghanistan	12,347	12,118	
2. Albania	4,363	4,355	
3. Algeria	414,517	391,892	
4. Armenia	67,982	90,633	
5. Azerbaijan	38,923	37,721	
6. Bahamas	2,038	2,338	
7. Bahrain	38,899	38,991	
8. Bangladesh	98,279	92,862	
10. Belarus	1,251	1,082	
11. Belgium	81,022	87,483	
12. Benin	98,349	83,789	
13. Bolivia	6,881	6,881	

* Data attribution: Annual, Policy and Plan Review (2020) "CO2 and Greenhouse Gas Emissions"
Published online at OurWorldInData.org. Retrieved from: <https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions> (Static Resource)

Shareable Interactive Visualization

Statistics



Smart Mapping

Reports &
Visualizations

Advanced
Analysis

Data Engineering

Data Access



Empowering Spatial and Business Analysts

ArcGIS

Is a Complete 3D GIS
Managing, Integrating and Applying All Types of 3D Content



Powerful
Capabilities

- Visualization
- Meshes
- Reality Mapping
- Analytics
- 3D Features
- Immersive Experience
- Editing
- Data Management
- Voxels
- Design
- Surfaces
- Basemaps
- Parametric Modeling

BIM

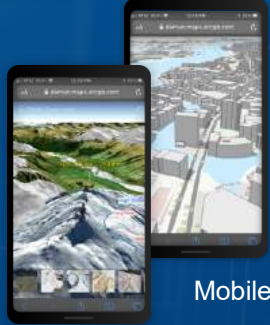
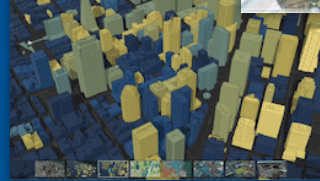
Smart City

Emergency
Evacuation

Analytics

Visualization

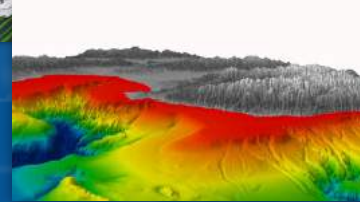
Mobile / Field



AEC



Asset Management



Terrain



Building Review

Operations

A Platform for Living Digital Twins

3D Capabilities Are Advancing Across ArcGIS

Visualization

High-Quality Visual Effects



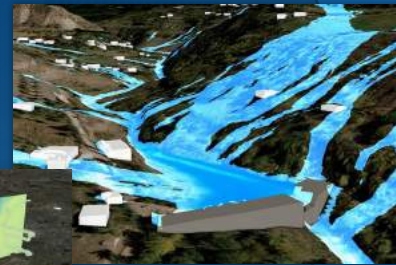
Global (Earth)



3D Heat Maps

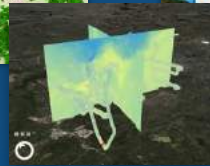
Analysis

Point Cloud Classification (Deep Learning)



Flood Simulation

3D Interpolation (Voxels)



Formats & Content

3D Mesh



new



3D Basemaps



3D Object Feature Layer

Editing



Updating with 3D Models



Authoring Voxel Layers



Clip & Ship 3D Scenes

Immersive Experiences



Game Engine Integration (Unity, Unreal)

Virtual Reality



AR Scene Viewing



A Foundation for Living Digital Twins

New & Improved

- 3D Basemap
- Animated Symbols
- Line of Sight
- Visual & Weather Effects
- Floor Awareness
- GeoJSON Support
- Clip & Ship
- Voxel Layers on the Web
- Game Engines (Maps SDK)
- Heat Maps

Coming

- Flood Simulation
- Transportation Analysis
- Improved Web Editing
- 3D Tiles

ArcGIS

A Comprehensive Imagery and Remote Sensing System

Powerful Capabilities

Hosting

Terrain Analytics

Exploitation

Reality Mapping

All Image Types & Formats

GeoAI

2D & 3D Data Production

Visualization

Dissemination

Raster Analytics

Dynamic Image Processing

Orthomapping

Drone Processing

Massive Content

Classification

Multidimensional Analysis

3D Reality Capture (Mesh)

Multispectral

Raster Analytics

Drone

Lidar

USFS FIA - BIGMAP

Integrating and Managing All Types of Imagery within ArcGIS



Imagery Capabilities

Reality Mapping

- Drone, Aerial & Satellite
- DSM & DTM
- True Ortho
- 3D Mesh & Point Cloud



Rich Content

120+ Imagery Layers:

- World Imagery
- Landsat
- Sentinel (1, 2 & 5P)
- NAIP
- ArcGIS Living Atlas

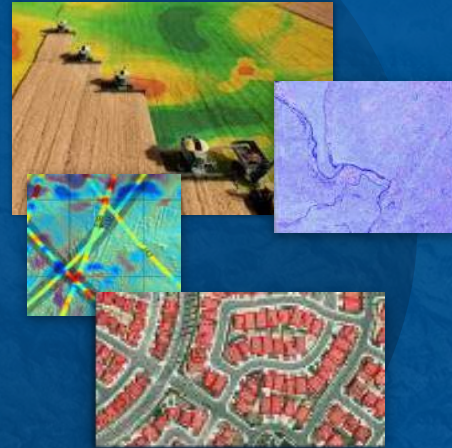
... & Multiple Content Providers



Analysis

180+ Tools:

- GeoAI
- Classification
- Change Detection
- Feature Extraction
- Multidimensional
- Raster Analytics



Visualization

- Image Interpretation
- Map & Image Space
- Oriented Imagery
- Stereo
- Video



Data Management

- All Formats & Types
- Cached, Tiled & Dynamic
- Open Standards (STAC)
- Massively Scalable
- Highly Performant

Image Catalog



Video Server (Coming)

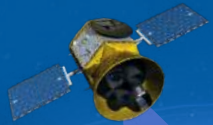


Transforming Imagery into Useful Information

Reality Mapping

Creating Accurate 3D Representations
... Using Imagery

Any Scale & Extent



new

ArcGIS Reality

- Pro Extension
- Studio App
- Drone Mapping Apps

Outputs

- 3D Meshes
- True Orthos
- Orthomosaics
- Digital Surface Models
- Point Clouds
- Moving Object Removal

Coming

- Satellite Support
- Distributed Processing



Data Courtesy of Bluesky International

City- & Countrywide 3D Mapping from Aerial Imagery

Fast and Massively Scalable ...
Modernizing Photogrammetry and Map Production

Drone Reality Mapping

Supporting Planning, Collecting and Processing of Drone Imagery

End-to-End Apps
(SaaS & Desktop)

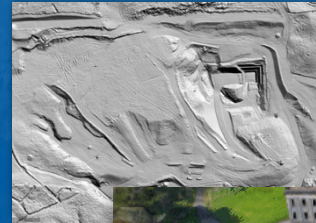
Site Scan
Drone2Map



Outputs

- 3D Point Clouds
- 3D Meshes
- Elevation Models
- True Orthos
- Multispectral & Thermal
- Contours
- Tiled Imagery Layers
- Oriented Imagery Catalogs

Elevation Model



Contours



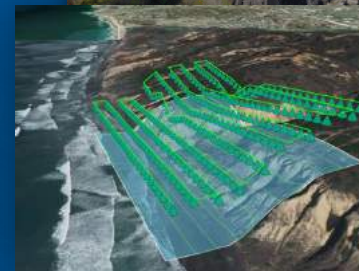
Monitor Vegetation



Model the Environment



Mission Planning Flight App



Terrain Following

3D Mesh



Point Cloud

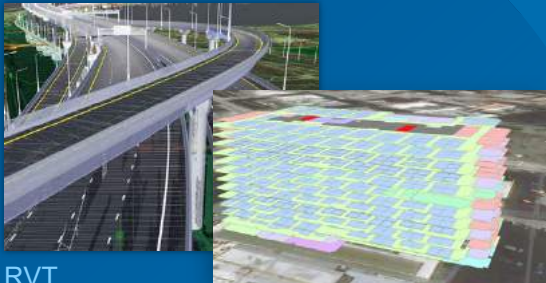
Powered by Reality Engine

ArcGIS

Provides a Platform to Integrate CAD & BIM

Bringing Together Multiple Communities & Workflows

Access CAD & BIM Data



RVT

IFC



DXF & DWG



ArcGIS Pro

Integrating ArcGIS with Autodesk Documents



Interconnecting Systems

GeoBIM

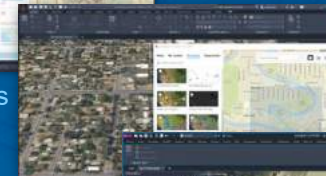
ArcGIS Online & Enterprise

Autodesk Construction Cloud

Access ArcGIS from Autodesk Apps



InfraWorks



Map 3D



Civil 3D



AutoCAD

ArcGIS Online & Enterprise

Strategic Partnership with Autodesk

Enriching GIS . . .

. . . and Supporting the Design, Build and Management Life Cycle

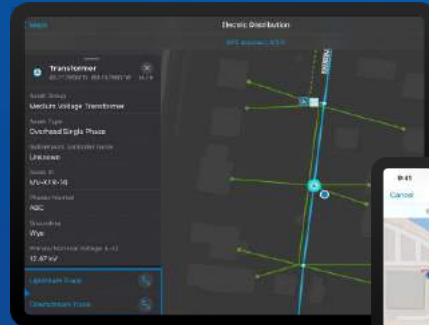
ArcGIS

Supports Enterprise Field Operations

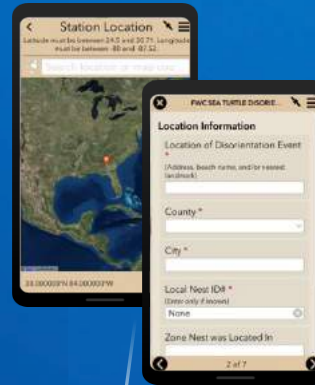
Mobile Data Collection
Enterprise Data Access



Field Maps
(Map Centric)



Survey123
(Form Centric)



Connected &
Disconnected

QuickCapture



New & Improved

- Location Sharing
- AI Assistants
- Sensor Support
- Security (Smart Cards)
- Geofencing / Alerts
- Calculations (Arcade)
- Windows 11 Support
- Multilingual Forms

Synchronizing
Office & Field Activities

Dashboards

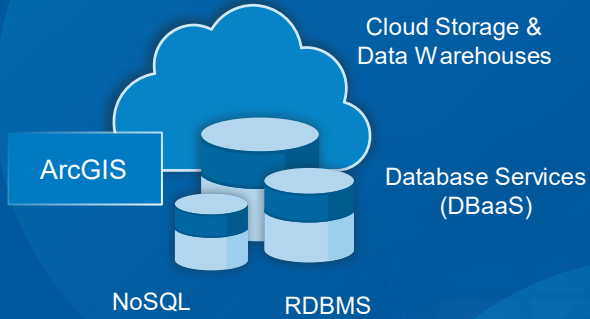


Includes Task
Management & Navigation . . .

. . . Transforming Mobile Workflows
Connecting Field Workers to the Enterprise . . .

ArcGIS Provides Enterprise Geospatial Data Management

Integrating with Leading Data Technologies



Modern Industry Models (Services Based)



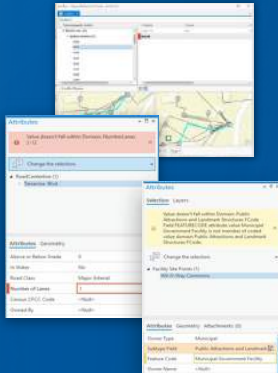
Editing Enhancements

- Nonversioned Editing
- 3D Features & Meshes
- COGO & Alignment Tools
- Linear Referencing
- QA / QC Tools
- Web Editing App (Coming)



Geodatabase Advancements

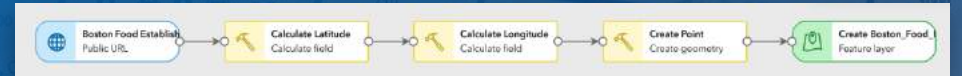
- Mobile Geodatabases
- 64-Bit Identifiers
- New Date / Time Fields
- Schema Reporting



Data Engineering

- Improved UI / UX
- New Tools
- Data Integration App (ArcGIS Online) Transforms Data into Features

Data Pipelines



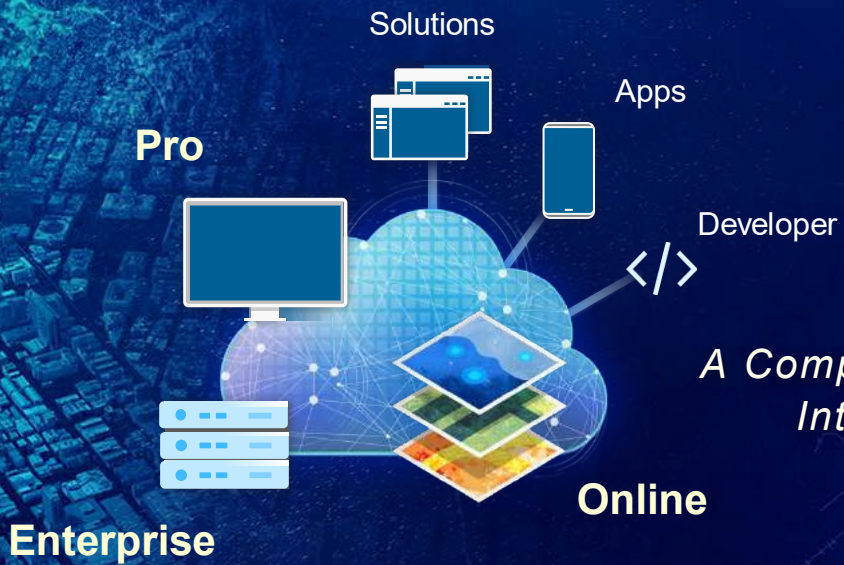
Major Focus on Performance, Scalability and Quality



ArcGIS Is Open and Interoperable

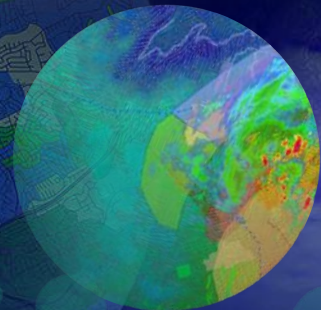
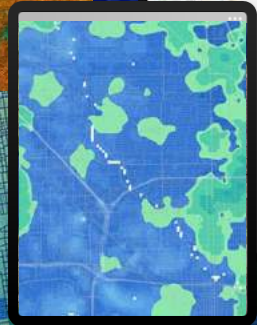
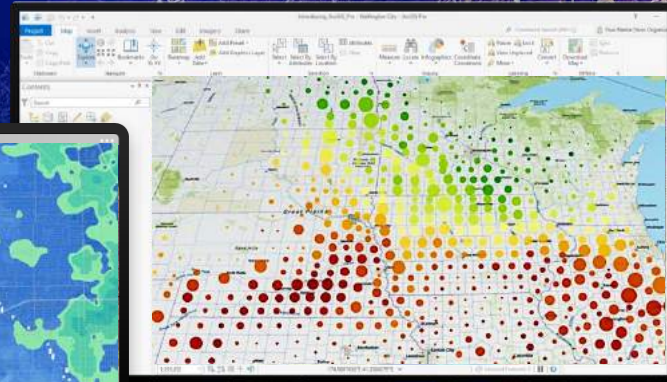
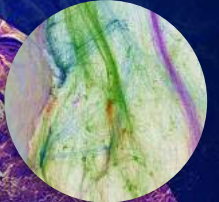


ArcGIS Products



A Comprehensive & Integrated System

```
object {4}
  image {5}
    registry : dock
    username : null
    password : null
    repository : esri/locker
    tag : 11.0.0.1037
  install {5}
    enterprise :
    context :
    allowed :
    ingress :
    loadba :
```



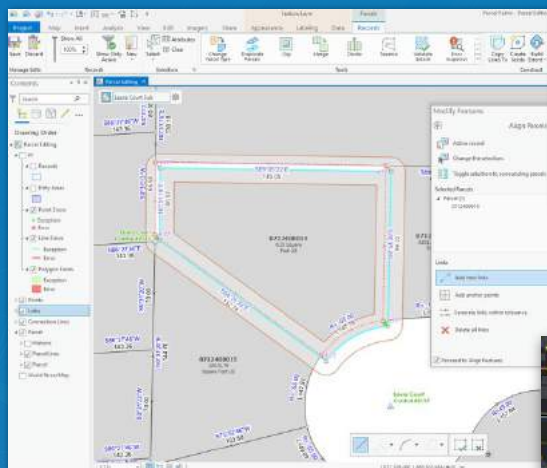
ArcGIS Pro Professional Desktop GIS

New & Improved

- Cartographic Tools
- Feature Drawing Order
- Geoprocessing Tools
- ModelBuilder Enhancements
- Knowledge Graphs
- Catalog Layers
- Magnifier Window
- Data Engineering
- Performance & Productivity

Coming (Q4)

- 3D Tiles
- Save Projects in Portal
- Undo on Nonversioned Data
- Schema Reporting
- Presentations
- Thematic Map Series
- Flood Simulation Modeling



Parcel Editing



Zoning



Utilities

ArcGIS Pro & Extensions



Tightly Coupled with
Online & Enterprise

Advanced Mapping, Visualization, Editing and Analysis


Supporting Individuals, Teams
... and Enterprise Organizations



ArcGIS Pro Extensions Integrating Focused Capabilities


Many Improvements and Innovations


Production Mapping & Charting


Analytics


Spatial Analyst 

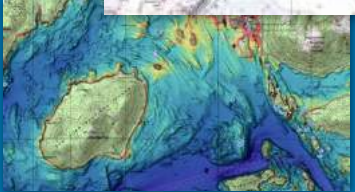
3D Analyst 





Topographic 

Aviation 

Maritime 

Bathymetry 

Network Analyst 


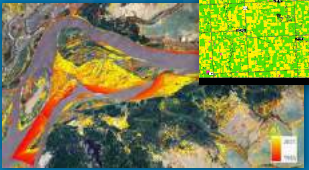
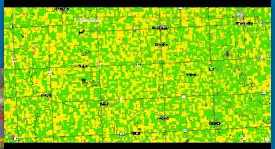
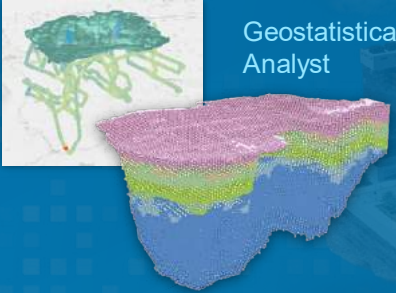
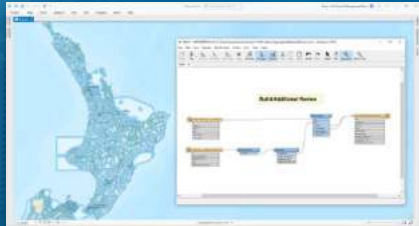
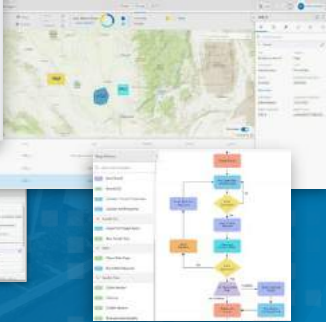
Knowledge 


Image Analyst 



Geostatistical Analyst 

Data Management


Data Interoperability 

Workflow Manager 

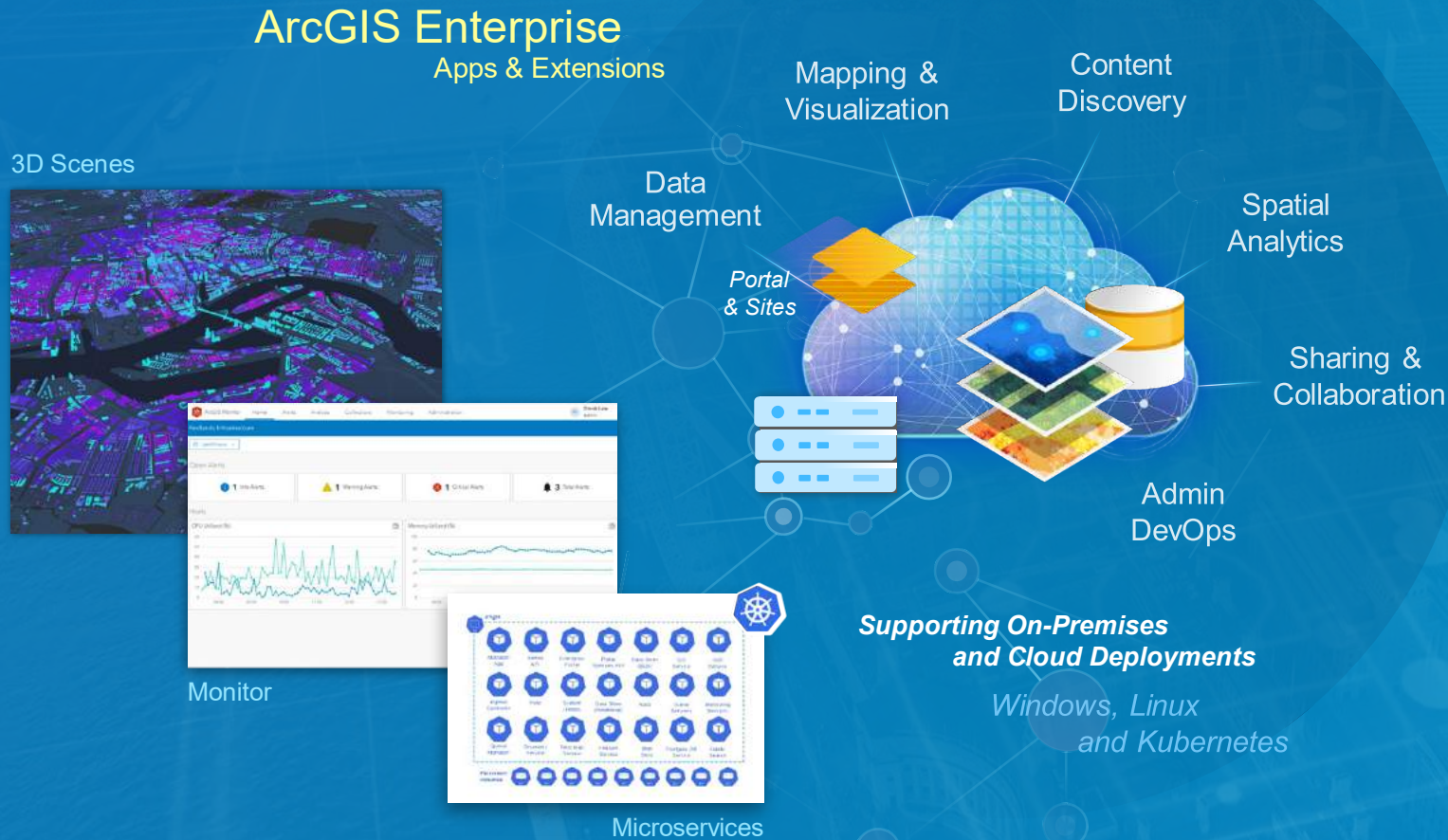
Reality 

3D Mesh 

Data Courtesy of Aerometrex

Data Reviewer 

ArcGIS Enterprise GIS Infrastructure for an Organization



New & Improved

- Map Viewer
- Apps (Dashboards, StoryMaps, Instant Apps, ...)
- Distributed Collaboration (Two-Way Sync)
- GeoPackage Export
- Webhooks
- ArcGIS Monitor
- Cloud Data Warehouses
- Security

Coming

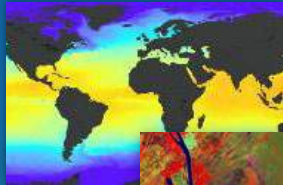
- Video Server
- OIDC & SAML Enhancements
- Knowledge Web App
- Enhanced Editing App
- Kubernetes Enhancements

Extensions

- Monitor
- Image Server
- GeoEvent Server
- Notebook Server
- Knowledge Server
- Workflow Manager
- Production Mapping

ArcGIS Online GIS as SaaS

Image Hosting & Raster Analytics



2D / 3D Basemaps



3D Visualization



Analysis



Map Viewer



Advanced Visualization

ArcGIS Online & Extensions

Growing Rapidly (30%+)

- 3 Million+ Users
- 60 Million+ Items
- 14 Million+ Feature Layers

New & Improved (June)

- Map Viewer
- 3D Scene Viewer
- Instant Apps
- Analysis in Map Viewer
- Data Management
- Improved Administration
- Editing Related Records
- Image Hosting
- Raster Analytics
- Data Pipelines – Beta

Coming

- Restore Items
- Enhanced Editing
- Advanced Item Monitoring
- Item Relationships
- Multilingual Web Applications
- FedRAMP Moderate 2023
- ISO 27001

Extensions

- Hub
- Velocity
- Image (Hosted Imagery)
- Premium Feature Data Store
- Workflow Manager

ArcGIS Hub Supports Community Engagement and Collaboration

Organizing Initiatives, Teams & Activities

Provides
Open Data

Projects &
Initiatives

Organizes Teams,
Volunteers &
Communities

Creates
Engagement

New & Improved

- Location-Aware Discussions
- Community Data Uploads
- Map-Based Surveys
- Geographic Search Filter

Coming

- Idea Boards
- Site Versioning
- Detailed Site Metrics

Over 50 Thousand
Deployments



Initiatives . . .



Communities

Tree Initiative



Tucson, AZ

Conservation Action



The Nature Conservancy

Homeless Count



Contra Costa County

Bringing Together Governments, People & Organizations

ArcGIS Solutions Ready-to-Use ArcGIS Configurations

Preconfigured

Tools
Data Models
Apps
Workflows
Maps
Initiatives
Add-Ins
Dashboards



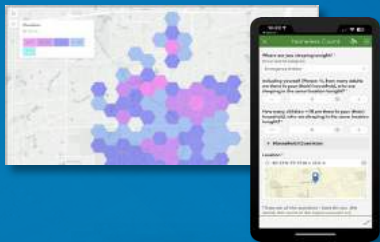
Local & State Governments



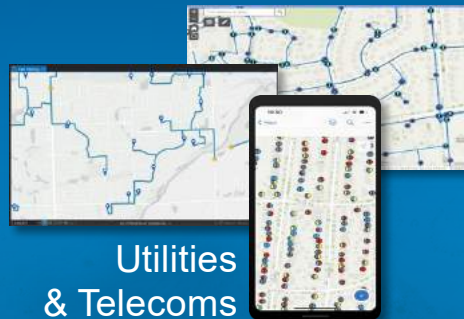
SDGs



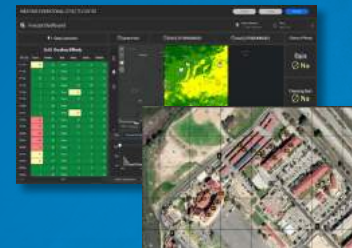
Emergency Management & Public Safety



Health & Human Services



Utilities & Telecoms



Defense & Security

Industries

- Local Government
- Land Records
- Public Works
- Emergency Management
- Utilities / Network Management
- Planning and Development
- Natural Resources
- Transportation
- Defense
- Public Safety
- Telecommunications
- Conservation
- Elections
- Health & Human Services

- Extensive (150+)
- Easy to Deploy
- Fully Supported
- Included with ArcGIS

... Helping Organizations Quickly Realize Value

ArcGIS Focused Products

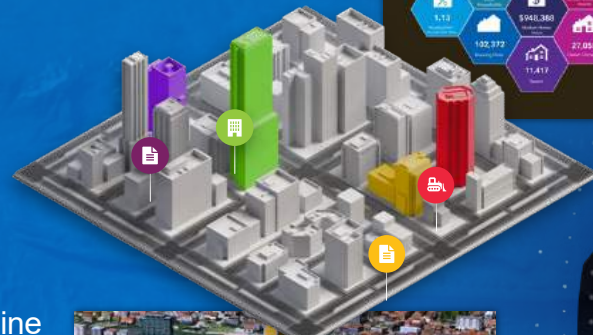
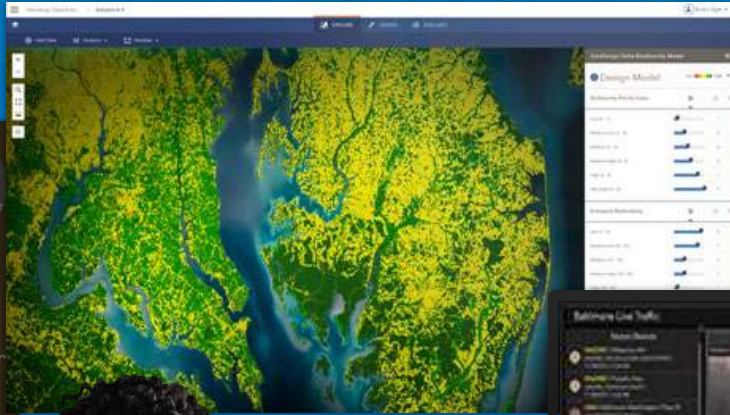
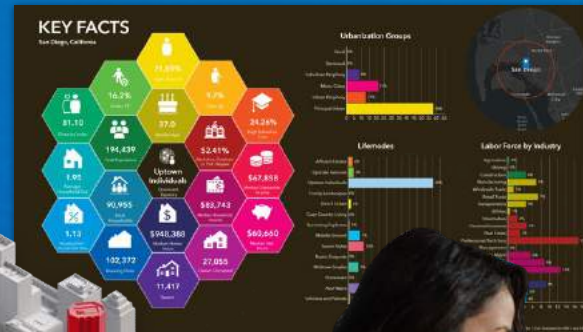
Supporting Industry Workflows

GeoPlanner
Landscape-Scale Planning

Business Analyst
Business Intelligence

Urban
Urban Planning

Mission
Planning &
Situational Awareness



CityEngine
3D Procedural
Modeling



ArcGIS Developer

APIs and SDKs for Automating, Extending & Creating Apps

New & Improved

- Python Productivity Tools
- More Offline Workflows
- Services
 - Places (POIs)
 - Basemap Styles
 - Data Hosting

Extending

*SOIs & SOEs
Custom Data Feeds
Webhooks*

Automating

*Scripts &
Notebooks*

Python API

Enterprise SDK

Pro SDK

*Add-Ins
Configurations*

JavaScript
SDK

Web Apps

Open-Source
APIs

Native
SDKs

Device Apps

Game Engine
SDKs

Location Services
(PaaS)

*Embedded
Services*

Creating

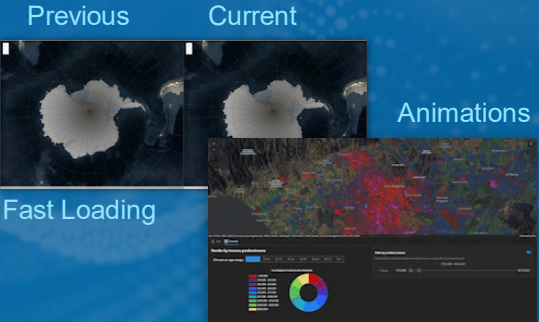


Available as Part of ArcGIS . . .
. . . And Independently for App Developers

ArcGIS Maps SDK for JavaScript

Enabling Powerful and High-Performance Web Apps

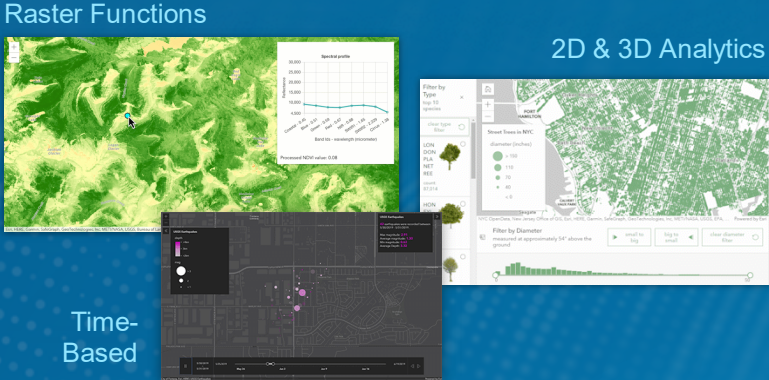
Fast Performance



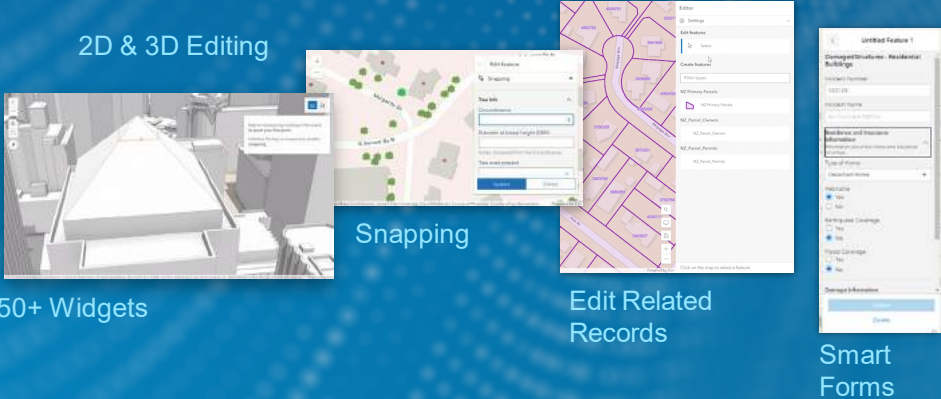
3D Apps



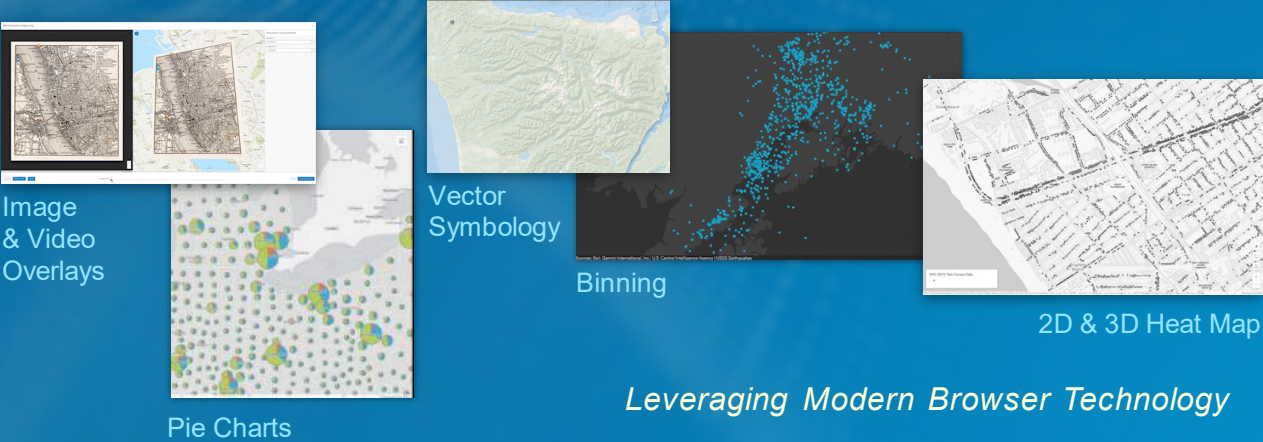
Client-Side Analysis



50+ Widgets and Workflows



Data-Driven Visualization



Leveraging Modern Browser Technology



Services

Esri Services is a global network of GIS experts who provide support, training and consulting, to maximize the impact of location intelligence in your mission.



Services

Available through flexible engagements

Support

Access expert troubleshooting and established solutions to resolve technical issues, improve efficiency, and learn best practices.

Training

Equip individuals and teams with the GIS and Esri technology skills they need to efficiently perform workflows and deliver location intelligence.

Consulting

Gain real-world knowledge and best practices from subject matter experts, teaming together to develop and deploy technologies and strategies.

PROFESSIONAL DEVELOPMENT

COMPREHENSIVE SKILLS TRAINING



Progressive Learning Programs

Tutorials

MOOCs

100s of Free Courses

Learning Plans

650K+ User Trainings

Technical Certification

Web Courses

Instructor-Led Courses

Workforce Development



New MOOCs

Helping Users Stay Current and Grow Their Careers

SUPPORTING USERS



Esri Press

- User Groups
- Esri Community
- Blogs
- ArcNews
- Personal Use License
- Webinars

Technical Support

- Documentation & Web Resources

- NGO / NPO Program
- ArcUser

- Young Professionals Network


- Podcasts

Professional Services

GIS Day
November 15, 2023



*Sharing Best Practices
and Supporting the GIS Community*



Sustainable
Development

Climate Change
Global Health

Esri
Conservation
Program

Education

Social Impact at Esri

Esri Nonprofit
Program

Esri Disaster
Response
Program
(DRP)

COVID-19
Humanitarian

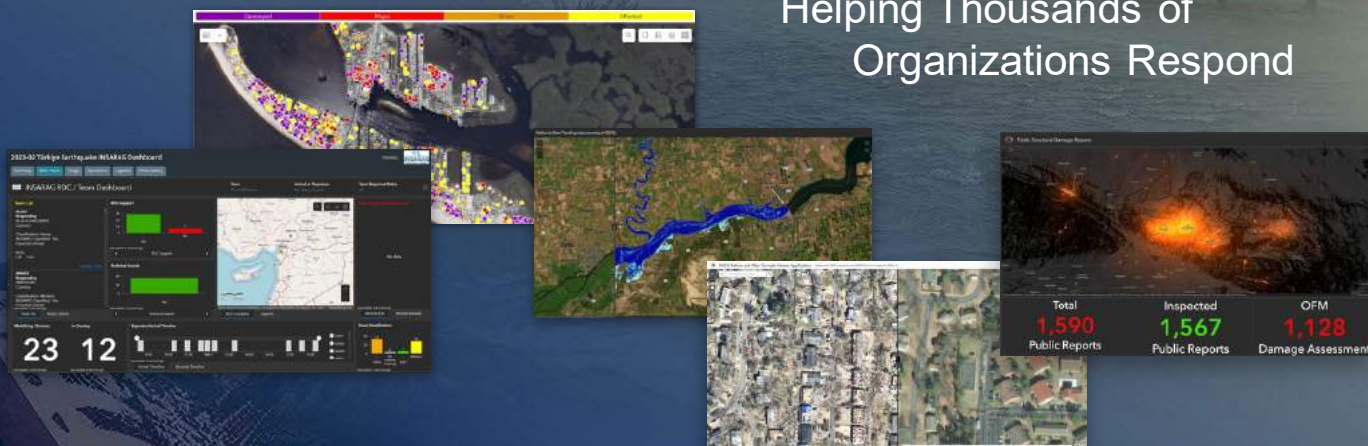
Social Equity

We are committed to helping organizations maximize their impact for people, planet, prosperity, and peace. Our special programs and initiatives are designed to help our users apply GIS for good around the world.

DISASTER RESPONSE

Supporting Users Globally in Times of Crisis

Helping Thousands of Organizations Respond



Partnered with

- Users
- GISCorps
- American Red Cross
- FEMA
- HOT
- MapAction
- Esri Partners

Mobilizing & Coordinating Resources Across Esri



EDUCATION

Building the Next Generation



Helping Students & Teachers Everywhere

Acquire Geospatial Literacy and Develop GIS Skills



Partnering with the National Geographic Society



Schools Program

GeoInquiries

Free ArcGIS Online

CTE

New Lessons & Tutorials

GeoMentors

Higher Ed Program

ArcGIS for Institutions, Departments and Students



CONSERVATION

Understanding & Protecting Nature

Supporting 7,000+ Organizations



Esri Maritime Modernization Program

- Hydrographic offices from UN designated Least Developed Countries (LDCs) and Small-Island Developing States (SIDS)*
- Estimated 70 – 80 countries
- A full list and map of eligible countries is available on the program landing page:
• (www.esri.com/en-us/lg/industry/government/maritime-modernization-program)

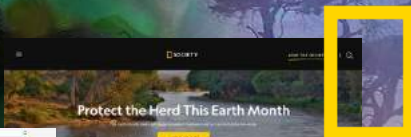


SPECIAL RELATIONSHIPS

ENRICHING OUR USER COMMUNITY . . .



- JANE GOODALL INSTITUTE UNICEF HALO TRUST WORLD WILDLIFE FUND
- GICHD AFRICAN PEOPLE AND WILDLIFE NATIONAL TRUST FOR HISTORIC PRESERVATION
- BILL & MELINDA GATES FOUNDATION WORLD FOOD PROGRAMME NAACP
- NATIONAL AUDUBON SOCIETY AMERICAN RED CROSS OPEN SPACE INSTITUTE
- CIESIN PATAGONIA GOVERNMENT ALLIANCE ON RACE AND EQUITY (GARE) W.K. KELLOGG FOUNDATION
- USAID IOM NATURESERVE WATERKEEPER ALLIANCE IUCN WINROCK INTERNATIONAL
- UNEP SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
- PARTNERSHIP FOR A NATIONAL TRAILS SYSTEM FAO HABITAT FOR HUMANITY
- NATIONAL CENTER FOR MISSING AND EXPLOITED CHILDREN (NCMEC) AFRICAN PARKS
- INTER-AMERICAN DEVELOPMENT BANK AMERICAN CANCER SOCIETY FEEDING AMERICA
- WORLD HEALTH ORGANIZATION SURFRIDER FOUNDATION FIELD MUSEUM
- AMERICAN PRAIRIE RESERVE E.O. WILSON BIODIVERSITY FOUNDATION UN GGIM
- DIRECT RELIEF CONSERVATION INTERNATIONAL WORLD VISION WORLD BANK
- NETHOPE TEAM RUBICON THE NATURE CONSERVANCY THE HENRY FORD
- UNOSAT ONE TREE PLANTED INSARAG WORLD RESOURCES INSTITUTE UNHCR
- NATIONAL GEOGRAPHIC SOCIETY YMCA OF THE USA DEMOCRACY LABS UN-HABITAT
- TRUST FOR PUBLIC LANDS UN PEACE OPERATIONS WOODWELL CLIMATE RESEARCH CENTER
- CATHOLIC RELIEF SERVICES LINCOLN INSTITUTE CGIAR TOMPKINS CONSERVATION
- UNIDOSUS AFRICAN WILDLIFE FOUNDATION



NGO / NPO Programs

. . . SUPPORTING THOUSANDS OF ORGANIZATIONS



Thank you



esri Eastern Africa
THE SCIENCE OF WHERE™

