



esri Eastern Africa
THE SCIENCE OF WHERE™



For Sustainable Development



10TH UTILITIES GIS CONFERENCE

21st September 2023

Hotel Africana, Kampala, Uganda



esri Eastern Africa
THE SCIENCE OF WHERE™

Transforming Utility Sector Planning with ArcGIS

Biko Orlale
Snr. Industry Manager – Utilities





WELCOME

SEE
WHAT
OTHERS
CAN'T



AGENDA



- Esri Overview
- Understanding Utility Sector Challenges
- The Role of GIS in Utility Planning
- ArcGIS Overview
- Interactive Demonstration
- Benefits of ArcGIS in Utility Planning
- Case Studies

Geography Is the Science of Our World

. . . Providing Content and Context

. . . And a Common Reference System

Helping Us See . . . Complexity . . .

. . . Relationships, Patterns and Associations

. . . Bringing It All Together

Helping Us Understand . . .

. . . And Intelligently Respond



Your Work

Geospatial Infrastructure



Sharing Data, Apps
... and Geographic Knowledge

... At Scale

Creating a GeoNervous System

A System for Understanding . . . And Collaborative Action

Esri – Serving Our Users

Advancing Geospatial Infrastructure & The Science of Where

- Strong and Growing
- 400,000+ customers
- 75% of Fortune 500 companies
- Most national governments
- 20,000 cities; 50 U.S. states
- 7,000+ universities
- 30% of annual revenue reinvested into R&D
- ~4,000 employees

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



esri®

THE
SCIENCE
OF
WHERE™

... Working Together to Make a Difference

A dark blue world map with numerous small yellow dots representing utility customers. The dots are most densely packed in North America and Europe, with more scattered dots across South America, Africa, and Asia. At the bottom of the map, there is a network of blue lines and nodes, resembling a globe or a data network.

Global Utilities Customers

Esri works with over 6,000 organizations globally...

Customer Examples

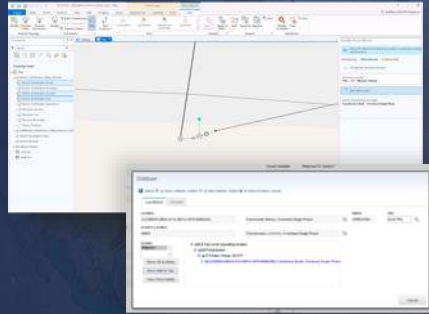


Electric and Gas Utilities

Power Consumption



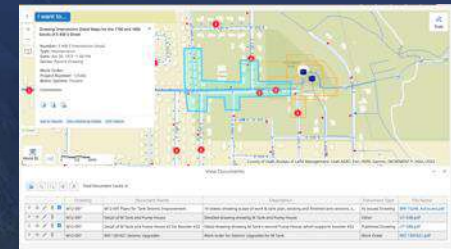
Integration with Enterprise Systems



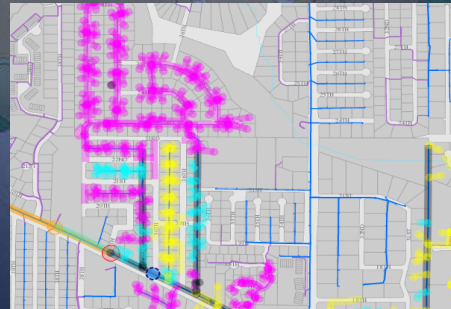
Call Before You Dig



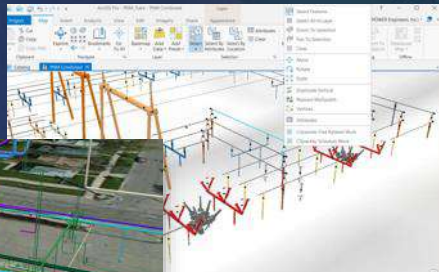
Asset Management Integration



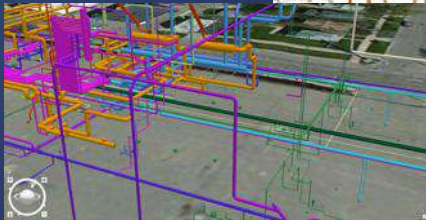
Electric Network Management



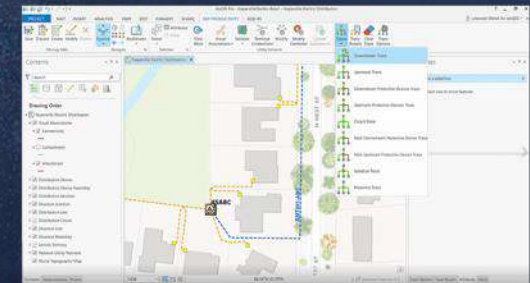
Asset Visualization



Inside Plant Visualization



Network Management



Electric Utilities

Equipment Failure Analytics

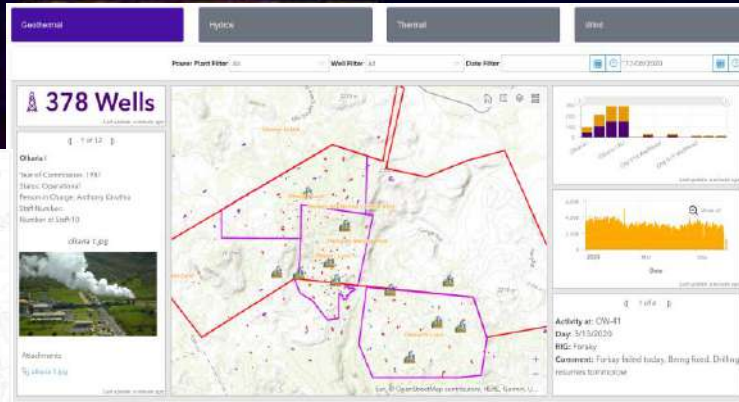


Claremont US

Asset Management



Asset Health Status



Powerco New Zealand

Technician Routing & Scheduling



SynerGIS Vienna

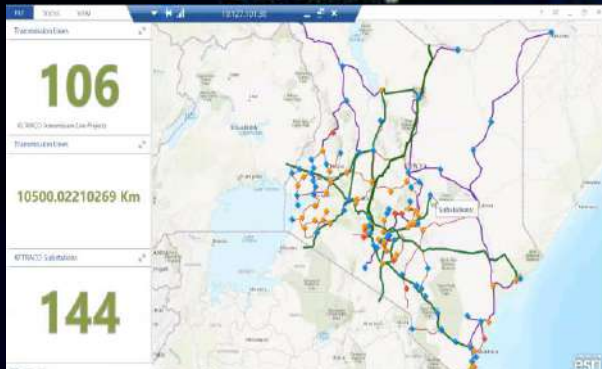
Workforce Management

Pole Inspection



Schneider Electric Florida

Transmission Line Routing



KETRACO, Kenya

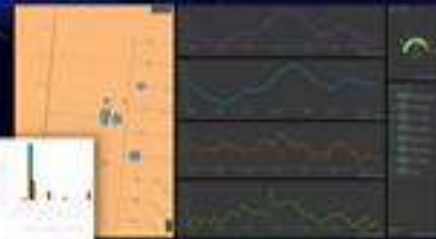
Design & Engineering

Project Management



Real-Time

Integrating IoT



Disruptive Technologies US

Network Management

Situational Awareness



PJMS US

Electric Network Design



Schneider Electric Florida

Water and Wastewater Management

Storm Water Conveyance



Real-Time Dashboard



Real-Time Object Recognition



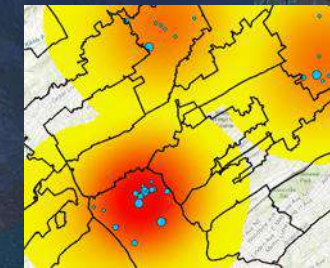
Augmented Reality



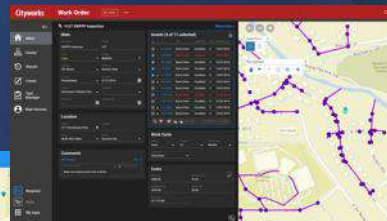
Pipe Burst Prediction



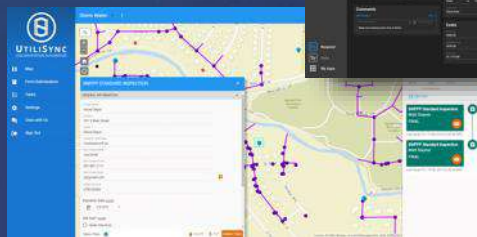
Leak Detection Heat Map



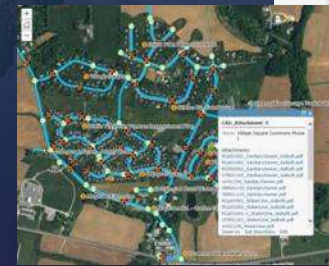
Work Order Management



Field Inspection



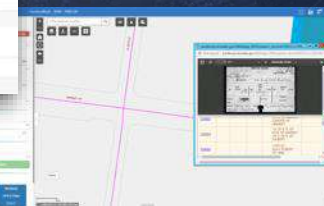
Water Network Management



Water Distribution Management



Water Asset Management



Fire Hydrant Vulnerability



Water Utilities

Digital Twin

TOTAL	INCOMING	ASSIGNED	IN PROGRESS	RE-ASSIGNED
3,110	13	2,025	795	29

NWSC Kampala Water, Uganda

Workforce Management

City of St. Albert
Canada

Smart Metering as a Service (SMaaS)

Operations Management

Athi Water Service Board

39

Athi Water Works Development Authority, Kenya

Asset Management

Network Model



GSE, WSSA, Beit Jala and Beit Sahour Bethlehem, Palestine

Asset Inventory



Applied Geographics Connecticut

ENWASCO COVID-19 KEY DATAS ANALYSIS

Average Consumption: 70.408

Average Consumption: 75.232

Average Water Consumption: 81.059



CivicMapper Pennsylvania

Water Consumption

Water Consumption

4.535 m³

Meters Operated: 9

26.54 m³

Embu Water and Sanitation Co, Kenya

Network Management

Water Main Leaks



Cityworks California

Network & Business System Integration



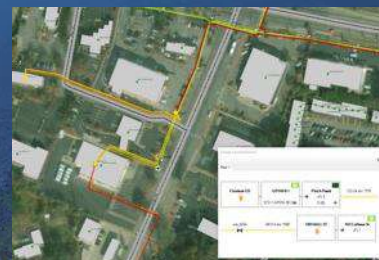
San Juan Water District California

Telecommunications

Field Data Collection



Network Management



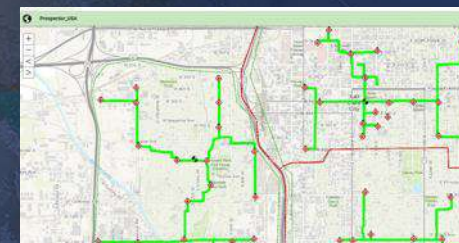
Fiber Network Management



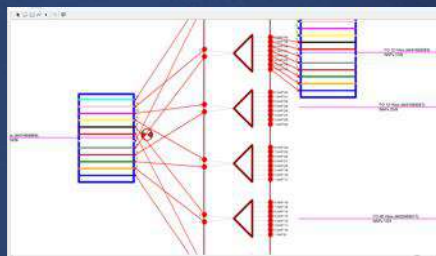
Network Assessment and Work Orders



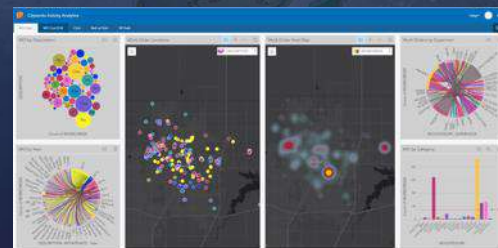
Proposed Network Routing



Fiber Strand Visualization



Work Order Management



HFC Network Rendering



Fiber Home Networks



Telecommunications and Cable

Operations Management



Asset Management

Dashboards



Situational Awareness

NextGen 911



RapidOS | GeoComm
California

Project Management Tracking



Muscatine Power and Water
US

Fiber Network Design



3-GIS
US

Design & Engineering

Fiber Management



Network Availability



GeoMarvel
Virginia

Planning

Wi-Fi Planning



Chicago

Expansion Planning



Patelligence
US

Disruptions and Challenges

Impacting the Utility Sector
Today

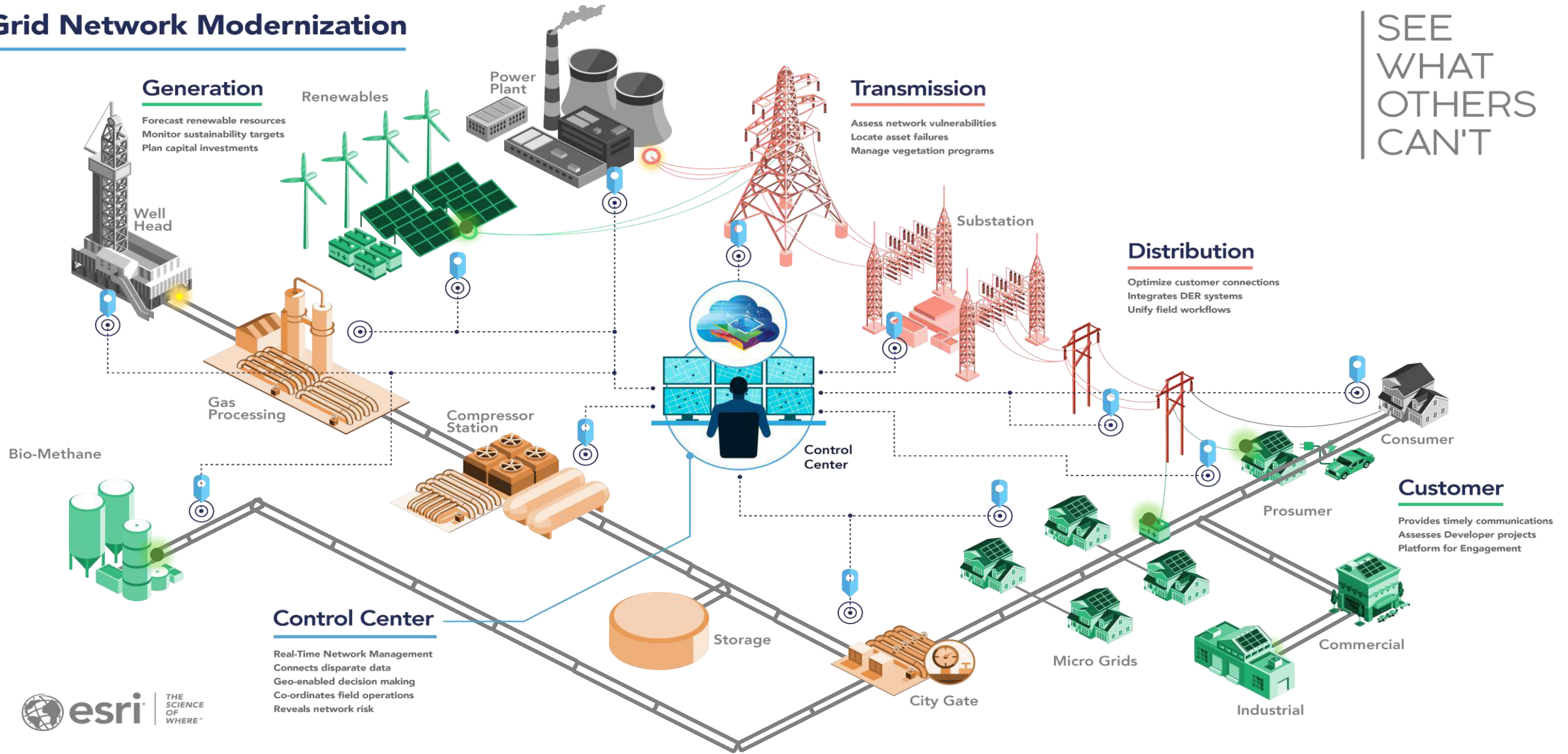


ArcGIS | Empowering Grid Modernization

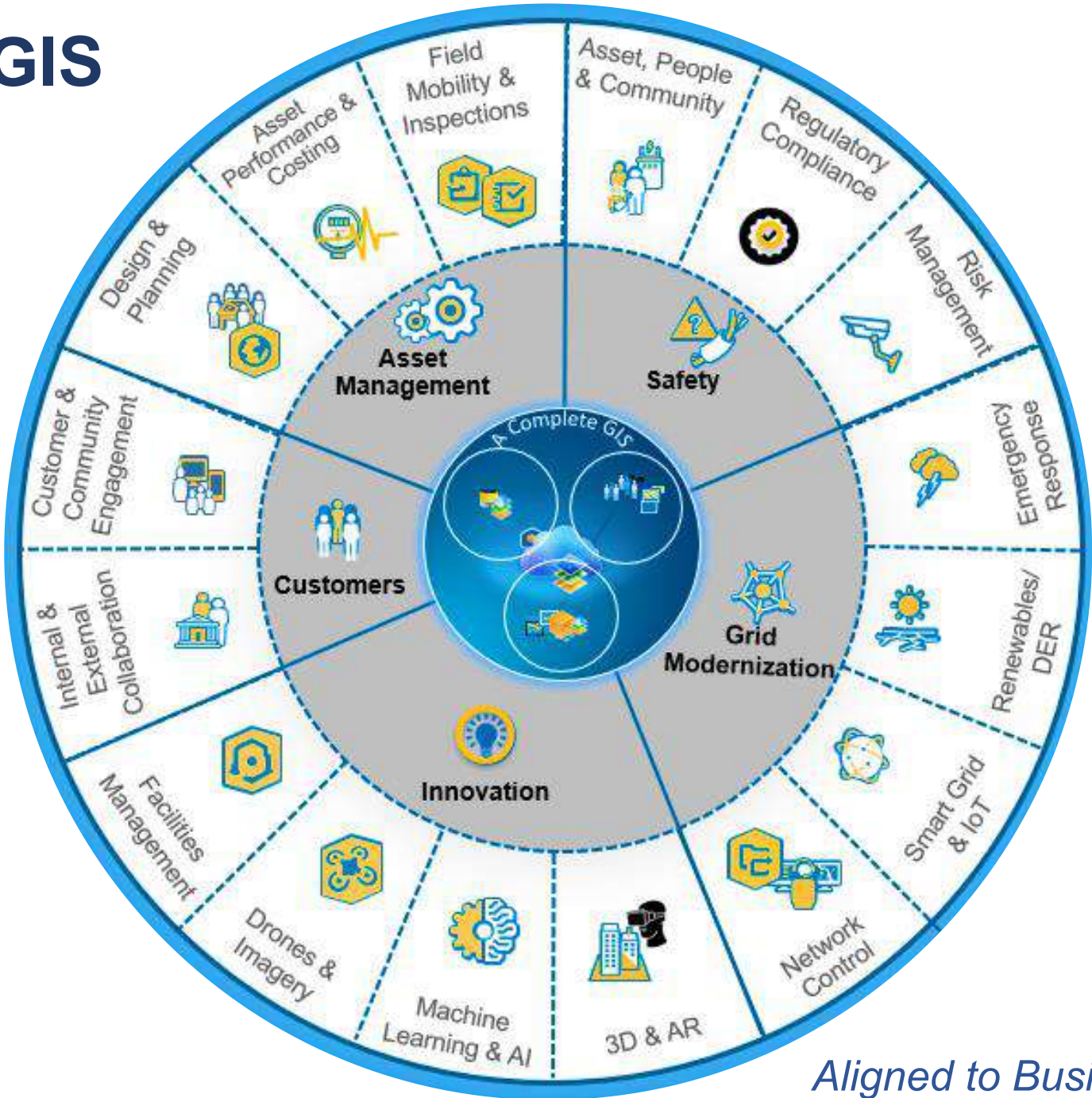
Traditional Grid

Modern Grid

Grid Network Modernization



ENTERPRISE GIS

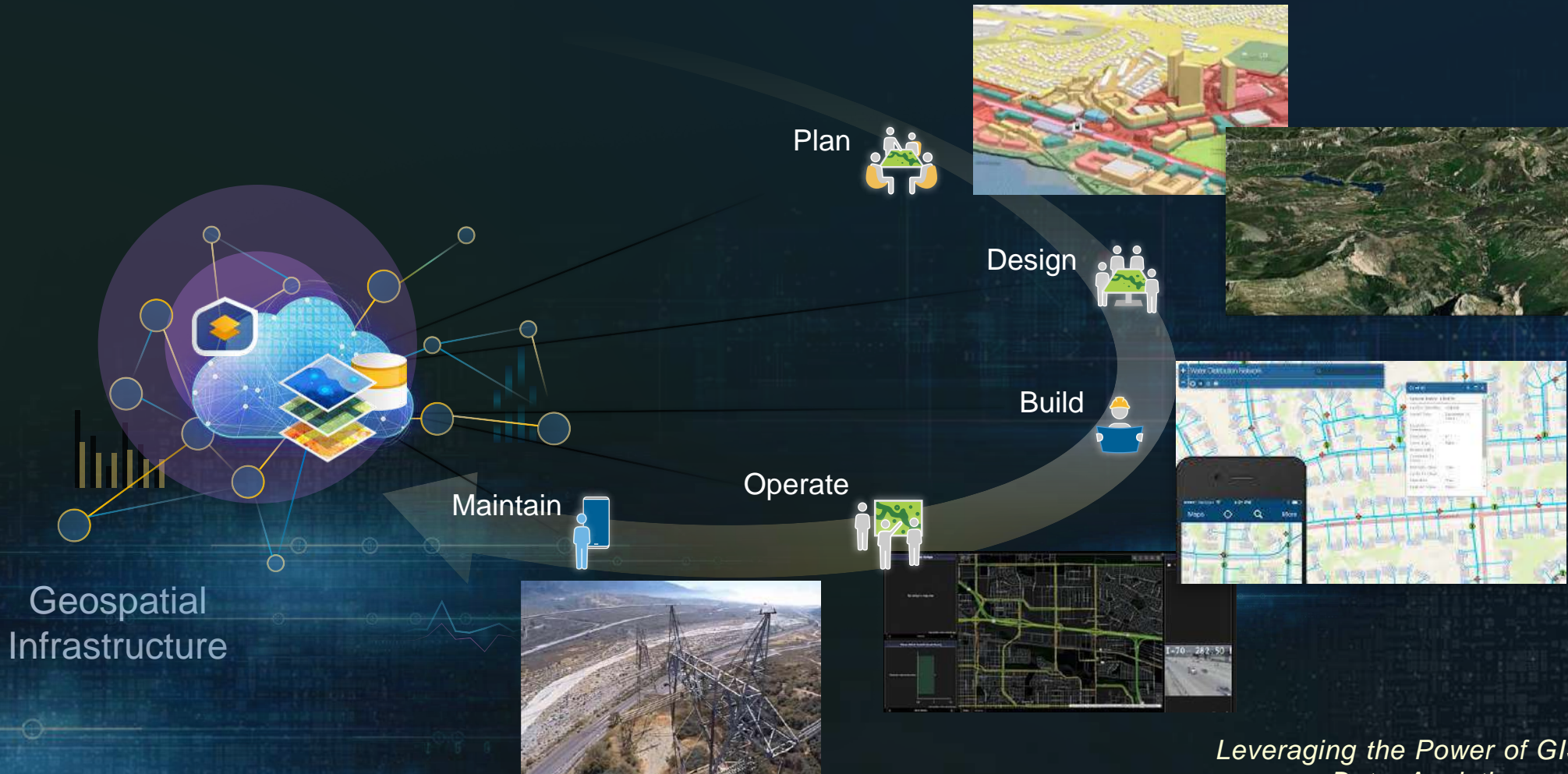


Aligned to Business Strategies.....



GIS Applications Are Transforming Infrastructure Management

Supporting Specialized Design and Engineering Workflows



*Leveraging the Power of GIS
Data, Analytics and Visualization*



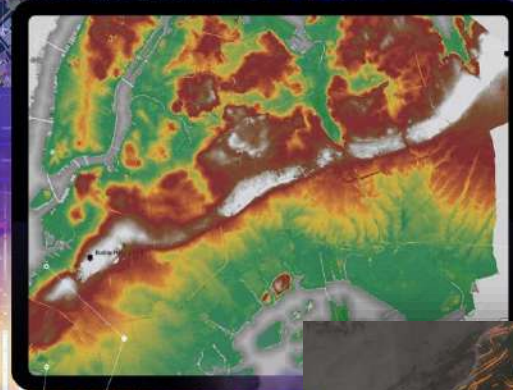
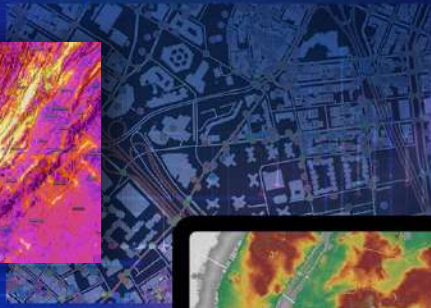
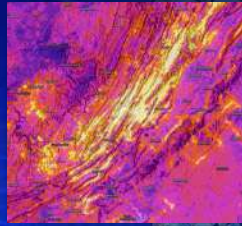
OUR VISION

Creating Useful Technology
Helping Our Users Be Successful

Products

Education

Support



The Geographic Approach

A Way of Thinking and Problem Solving
That Integrates Geographic Science & Information

An Inclusive and
Multidisciplinary Process

Holistic
Collaborative

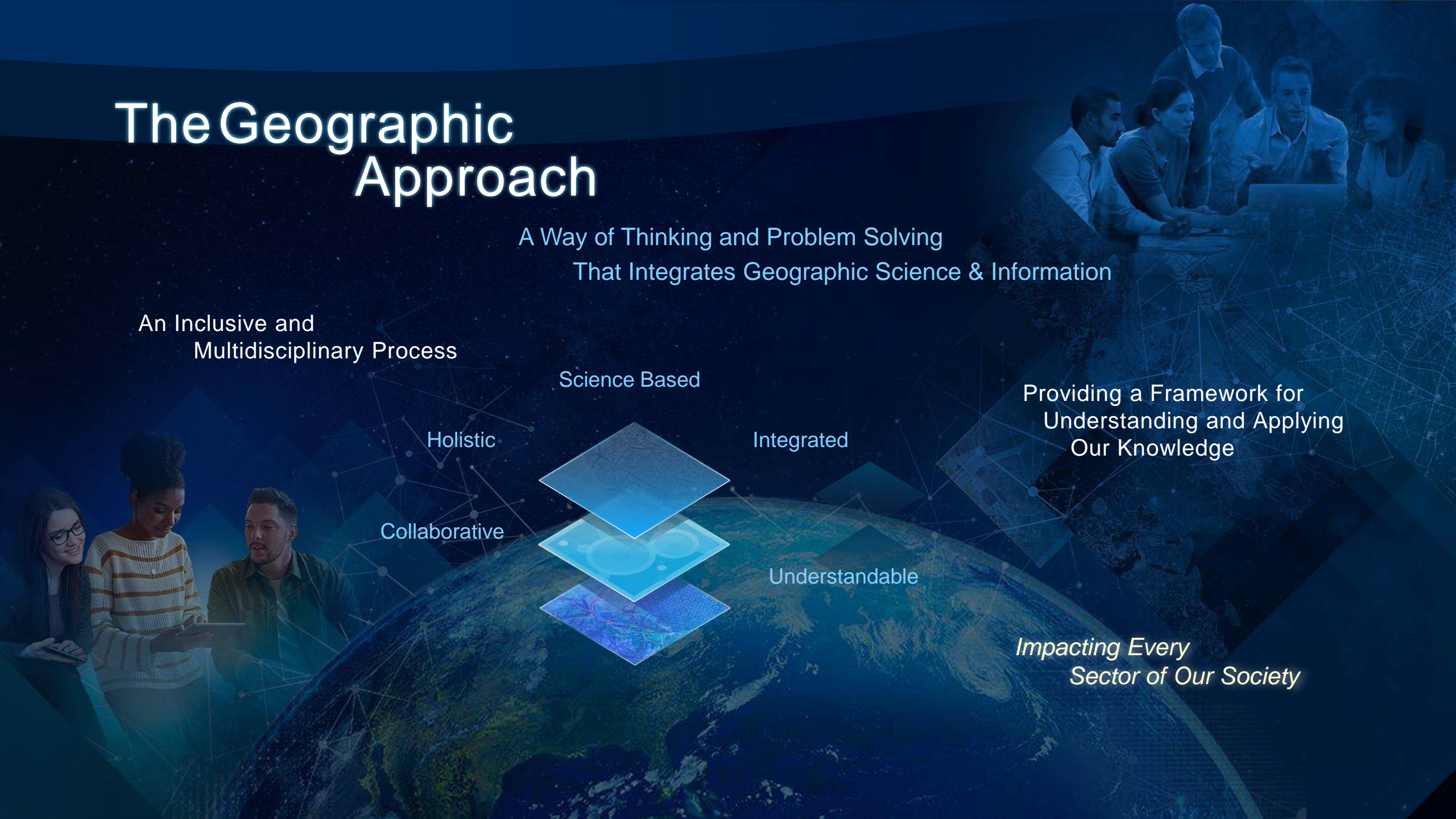
Science Based

Integrated

Providing a Framework for
Understanding and Applying
Our Knowledge

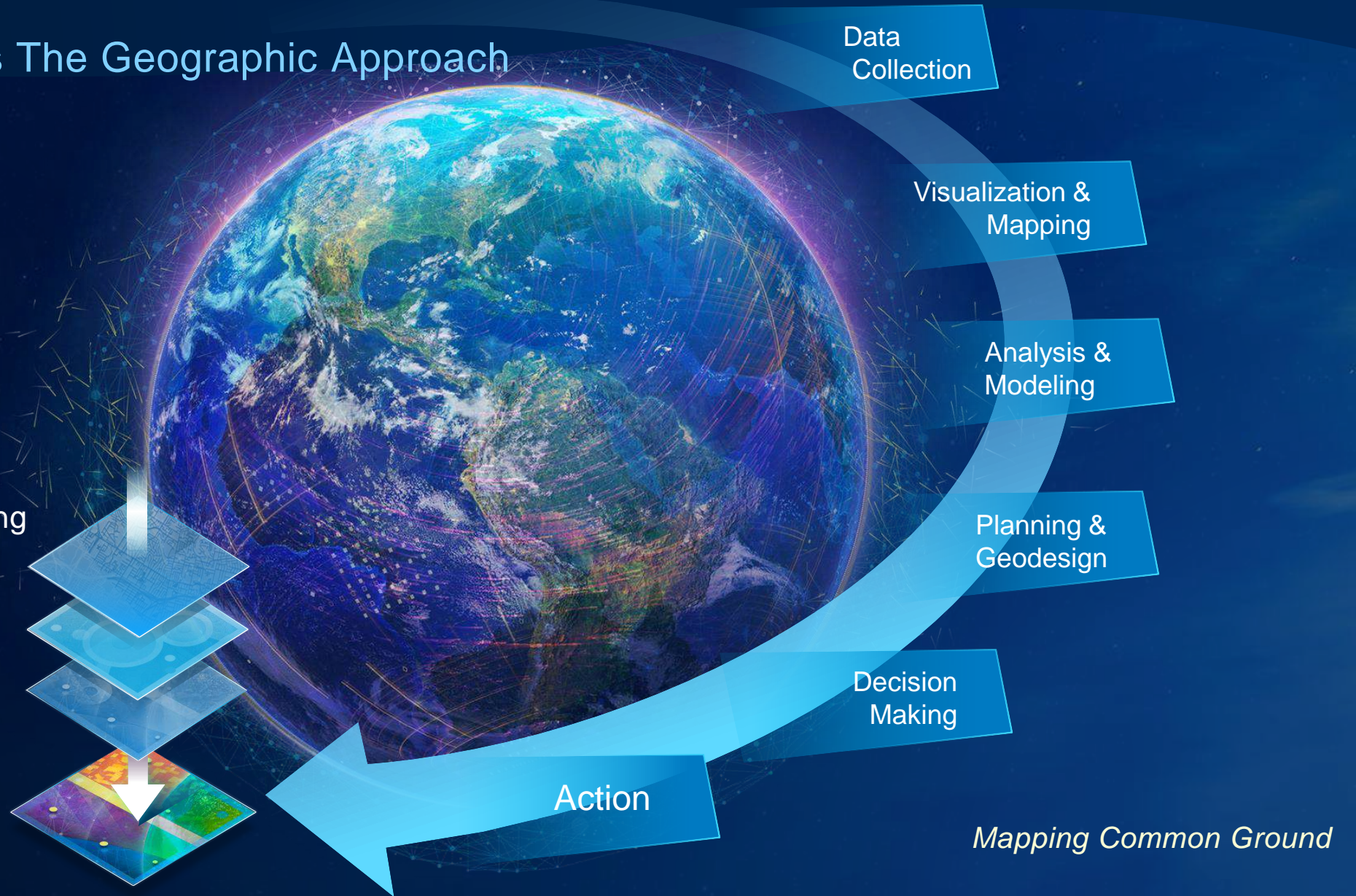
Understandable

*Impacting Every
Sector of Our Society*



GIS Enables The Geographic Approach

A Process for
Creating Understanding
& Facilitating
Collaboration



ArcGIS Vision

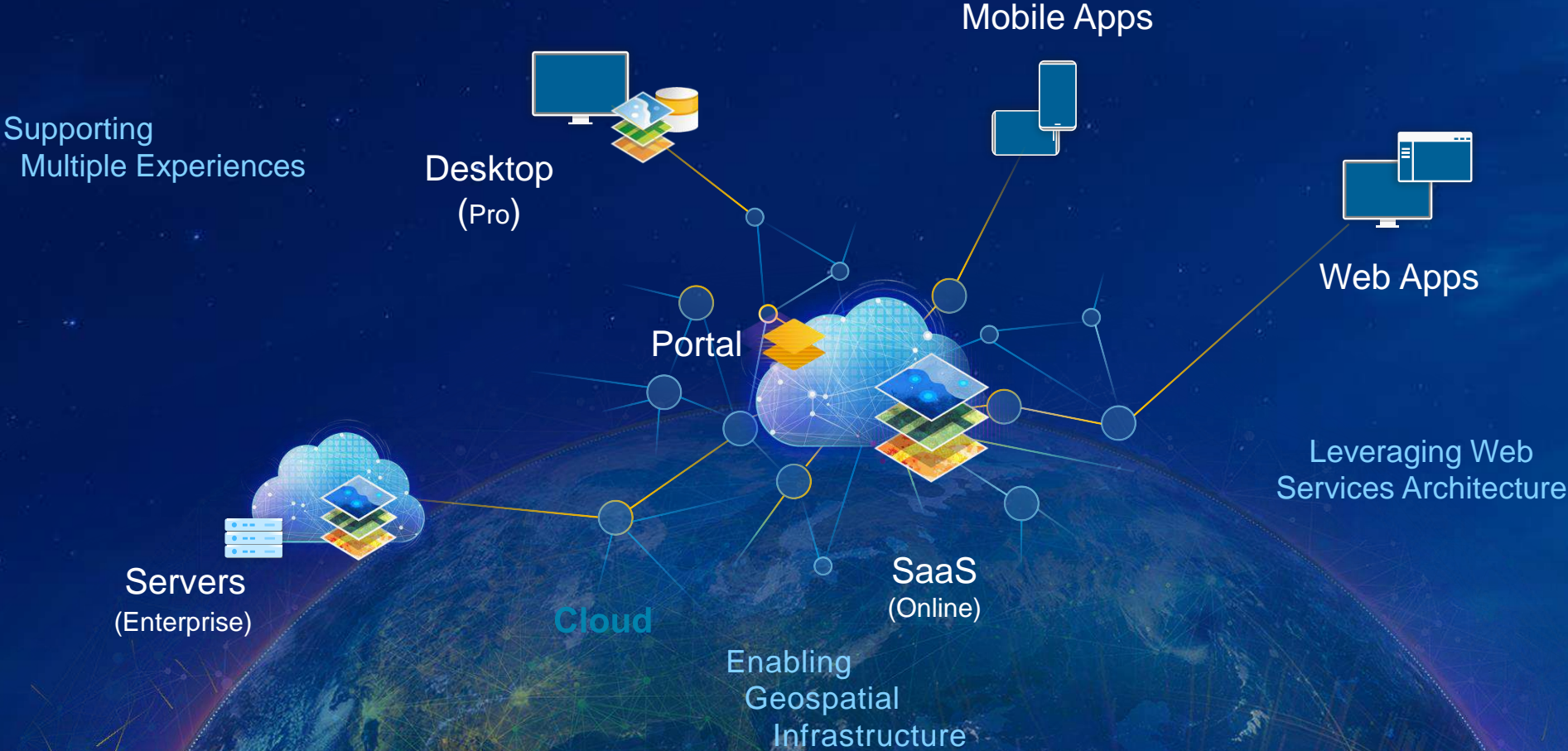
A Comprehensive Geospatial System – Supporting Multiple Communities



*Powering Personal Productivity . . .
and Enterprise Systems*

ArcGIS Is an Integrated Enterprise System

Many Implementation Patterns



Easily Integrated with Other Enterprise IT Systems

ArcGIS

Integrates and Manages All Types of Data



ArcGIS | A Complete GIS For Utilities



Aligned to how people and organizations want to work and collaborate using technology.



ArcGIS: A Complete GIS For Utilities

Empowers All Aspects of the Organization.



... Leveraging the Power of Location

ArcGIS: A Complete GIS For Utilities

A Transformational Step in Capability, Aligned to the Enterprise.



*A modern GIS Platform Enabling Utilities
... To Do Their Work Better*

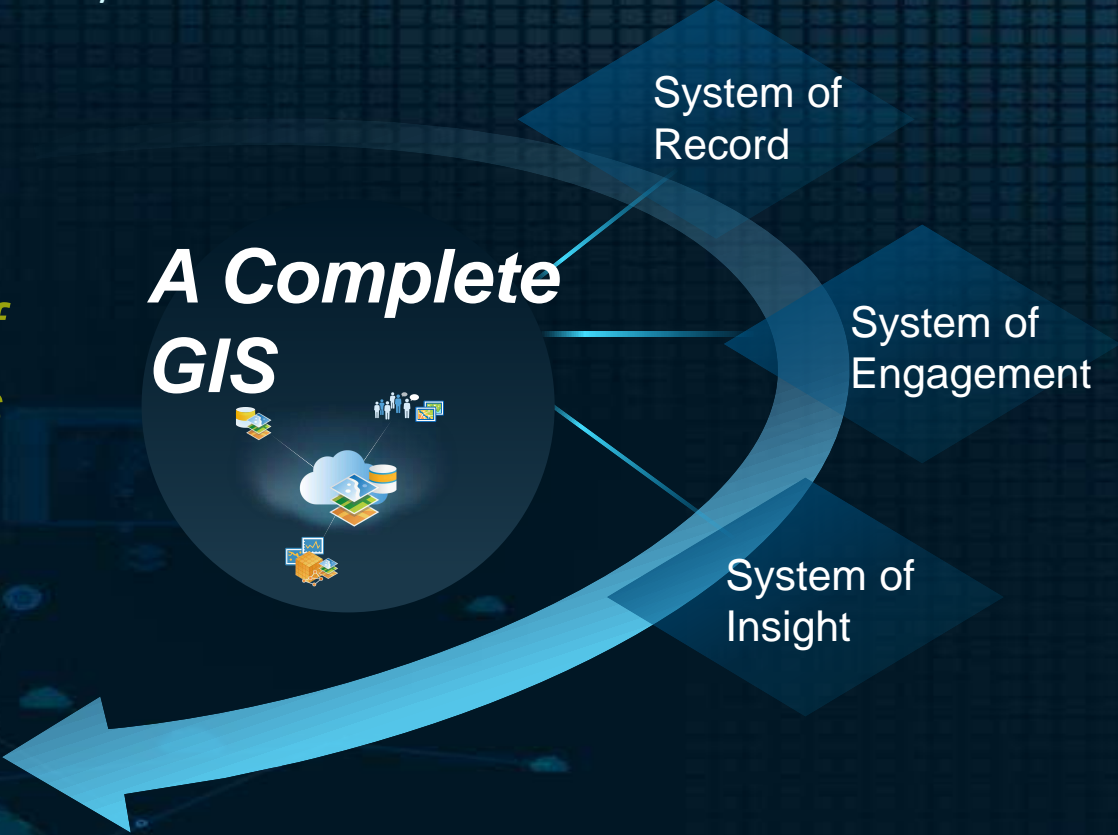
Utilities | A Complete GIS

Increase Productivity, Profitability and Predictability

esri.com/

A System of Systems

A Complete GIS



A Complete GIS

System of Record

- Unparalleled Data Model
- Modern Editing
- Flexible Connectivity Rules
- Scalable and Performant
- Complete Access to Millions of Data Services

System of Engagement

- Data Capture
- Real-time Operational Awareness
- Integrates All Types of Data
- Any device, Anytime, Anywhere
- Navigation and Tracking

System of Insight

- Out of Box Analysis Tools
- Spatial Business Intelligence
- Advanced Data Exploration
- 3-D Analytics
- Real-time BI Dashboards
- Integration of AI, AR and Machine Learning

ArcGIS Supports Field Operations

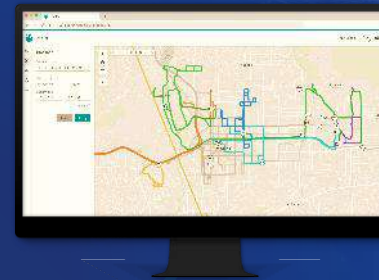
Supporting business processes and people across the enterprise

- ❖ Increase Safety
- ❖ Feed Accurate Data to ADMS
- ❖ Increase Information Security
- ❖ Improve Data Quality
- ❖ Facilitate Business Agility

Integration w/
Other Systems



Office Work



Field Work

Network Planning
& Management



Single Source of Truth

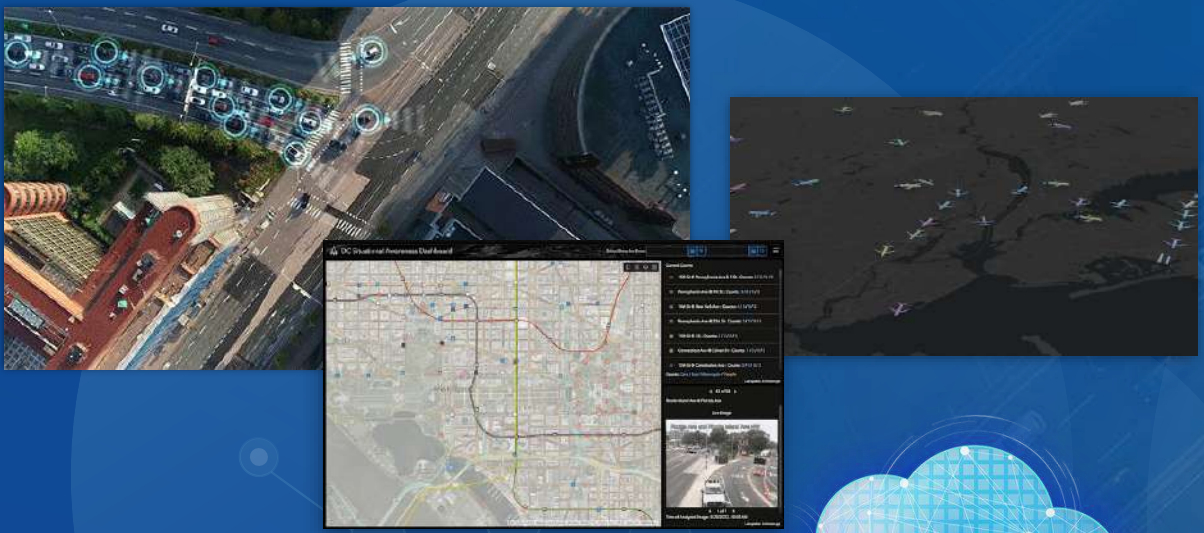
Analytics &
Data Science



Representing Design, As-Built and As-Operated States of Assets & Network

Real-Time Visualization and Analytics

Integrating Sensors & IoT with ArcGIS



GeoEvent Server

- Better Portal Integration
- Improved Usability
- App Performance

Velocity (SaaS)

- Dynamic Geofencing
- Expanded Capacity
- Extensible



Improving Operations & Decision-Making

Modeling the Complete Network



Generation



Transmission



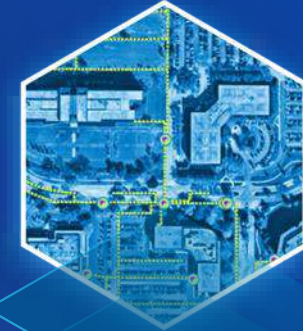
Distribution

End-to-End
Network Tiers



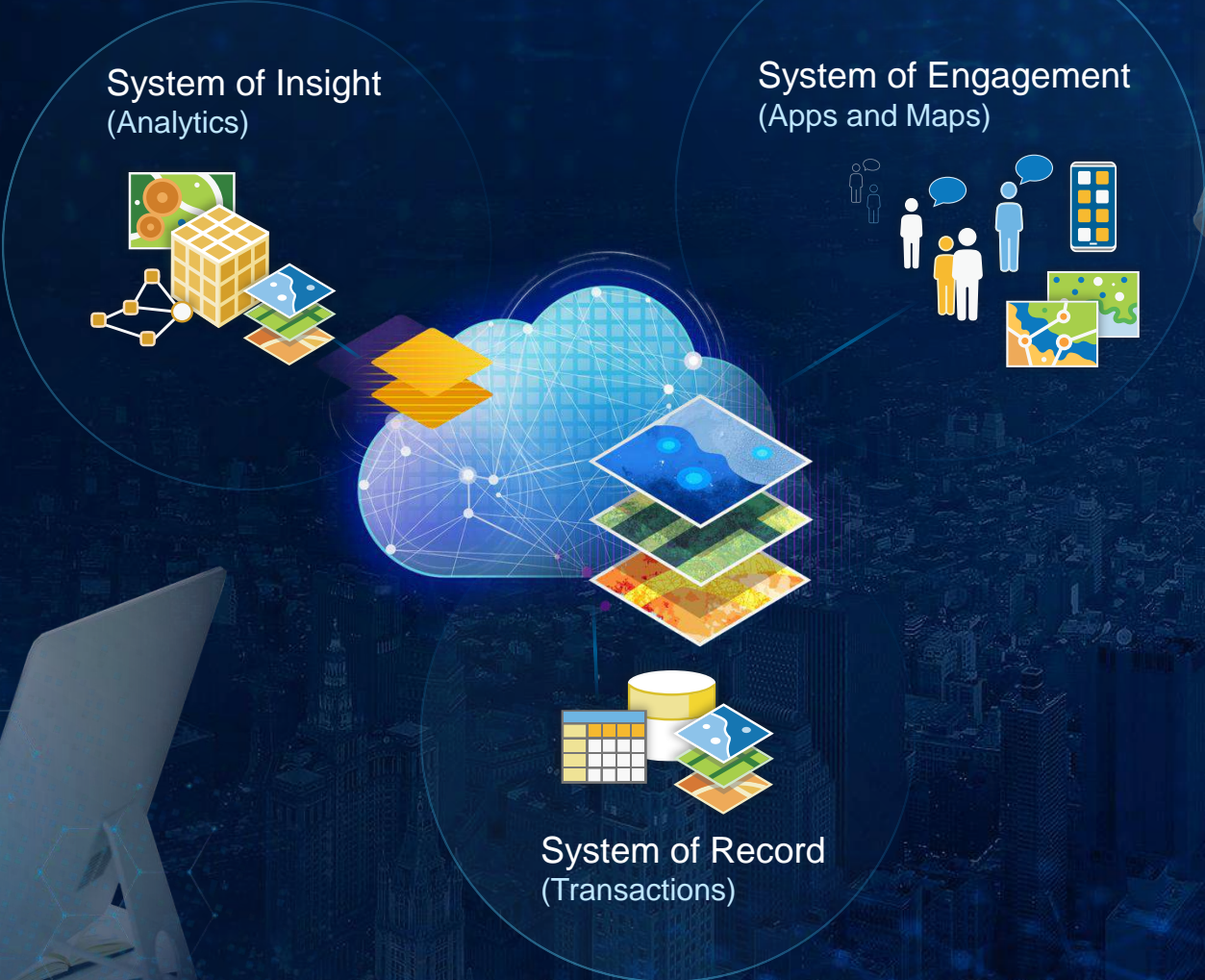
Network of Networks

Interactions Between
Domain Networks



ArcGIS

Supports Three Fundamental Types of Systems



ArcGIS: A Complete GIS For Utilities

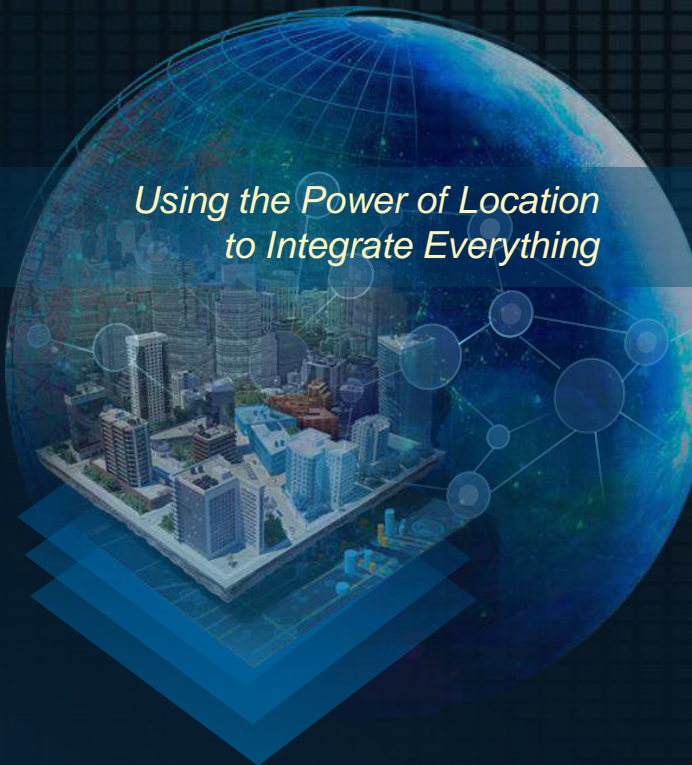
Enabling Digital Transformation across the Organization.



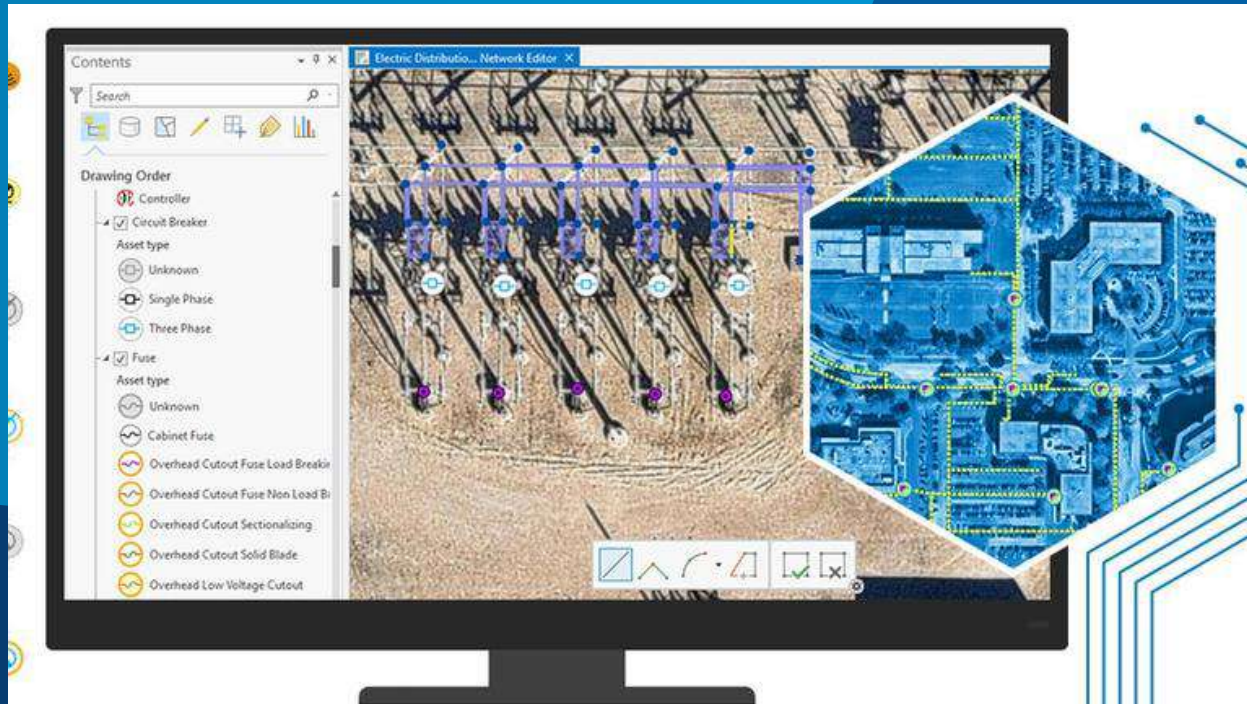
Enterprise GIS

A Complete GIS

Digital Transformation



Changing How Utilities . . .
. . . Do Their Work



Demo

Utility Sector Planning Using
ArcGIS

ArcGIS: A Complete GIS For Utilities

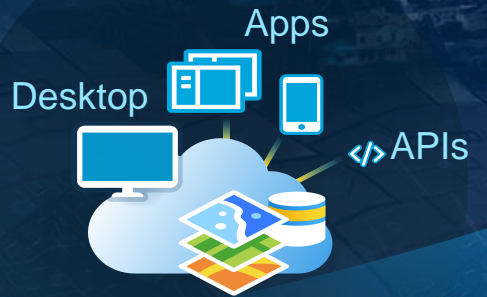
A Transformational Step in Capability, Aligned to the Enterprise.



*A modern GIS Platform Enabling Utilities
... To Do Their Work Better*

ArcGIS: A Complete GIS For Utilities

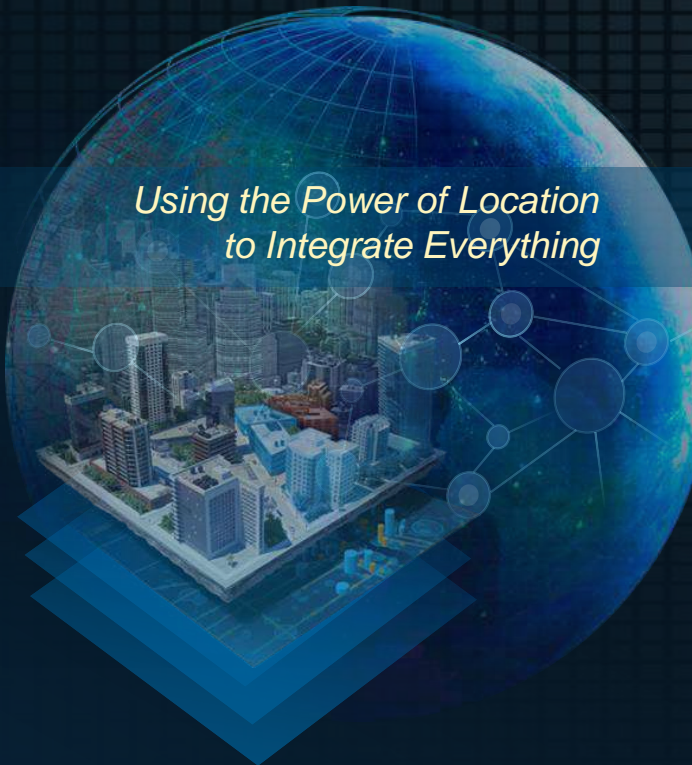
Enabling Digital Transformation across the Organization.



Enterprise GIS

A Complete GIS

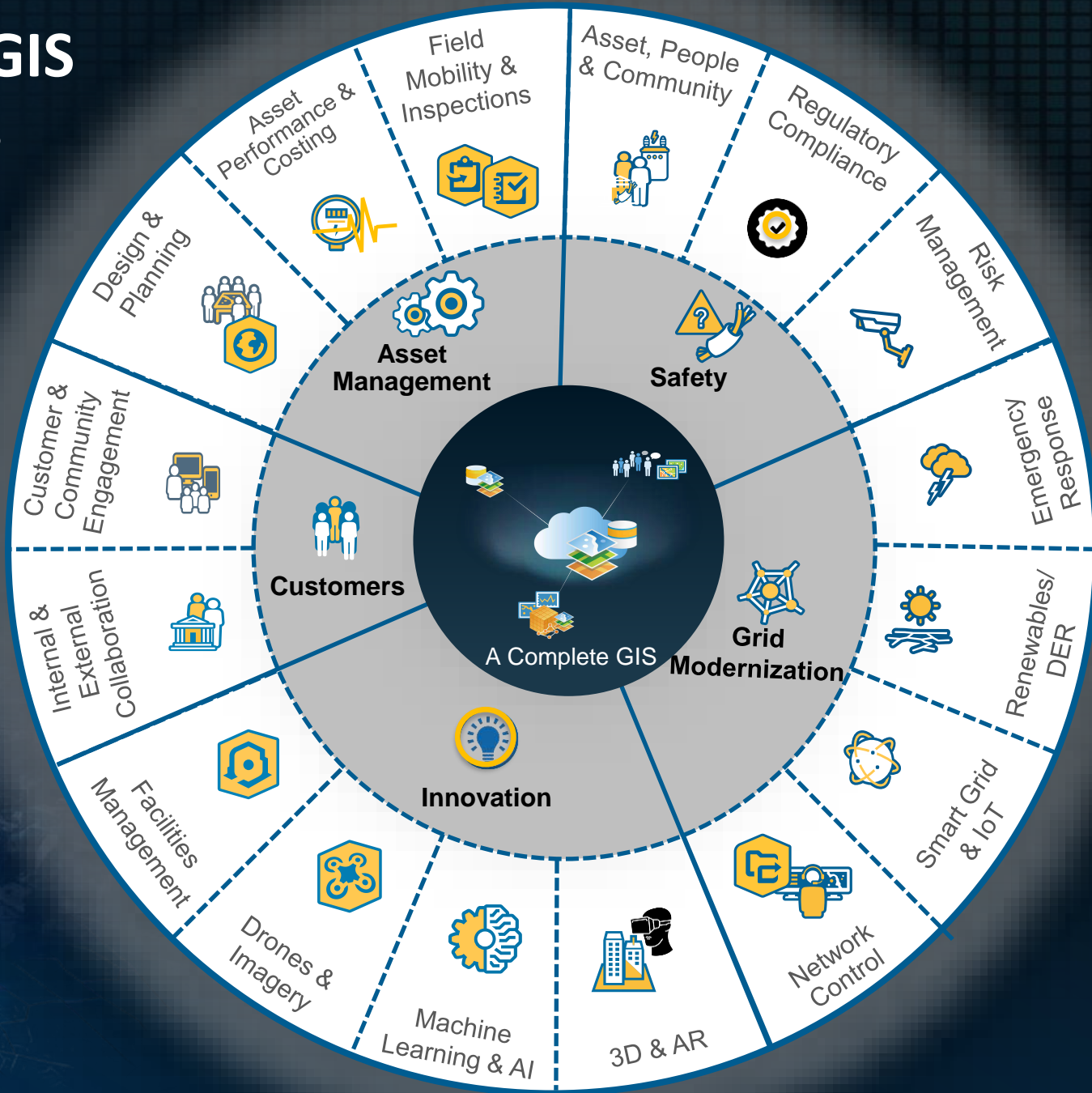
Digital Transformation



Changing How Utilities . . .
. . . Do Their Work

ArcGIS | A Complete GIS

Bringing Business Value to Utilities



Aligned to Business Strategies....

Electric

Telecommunications

Engineering

Operations

Mobile Workforce

Natural
Disasters

Logistics

Renewable Energy

Evolution to 5G

Environmental

Distribution

Transmission

Water

Gas

Customer Engagement

Environment

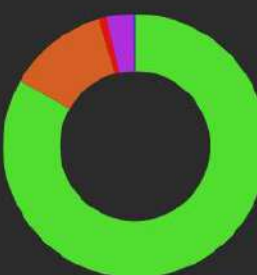
Case Studies



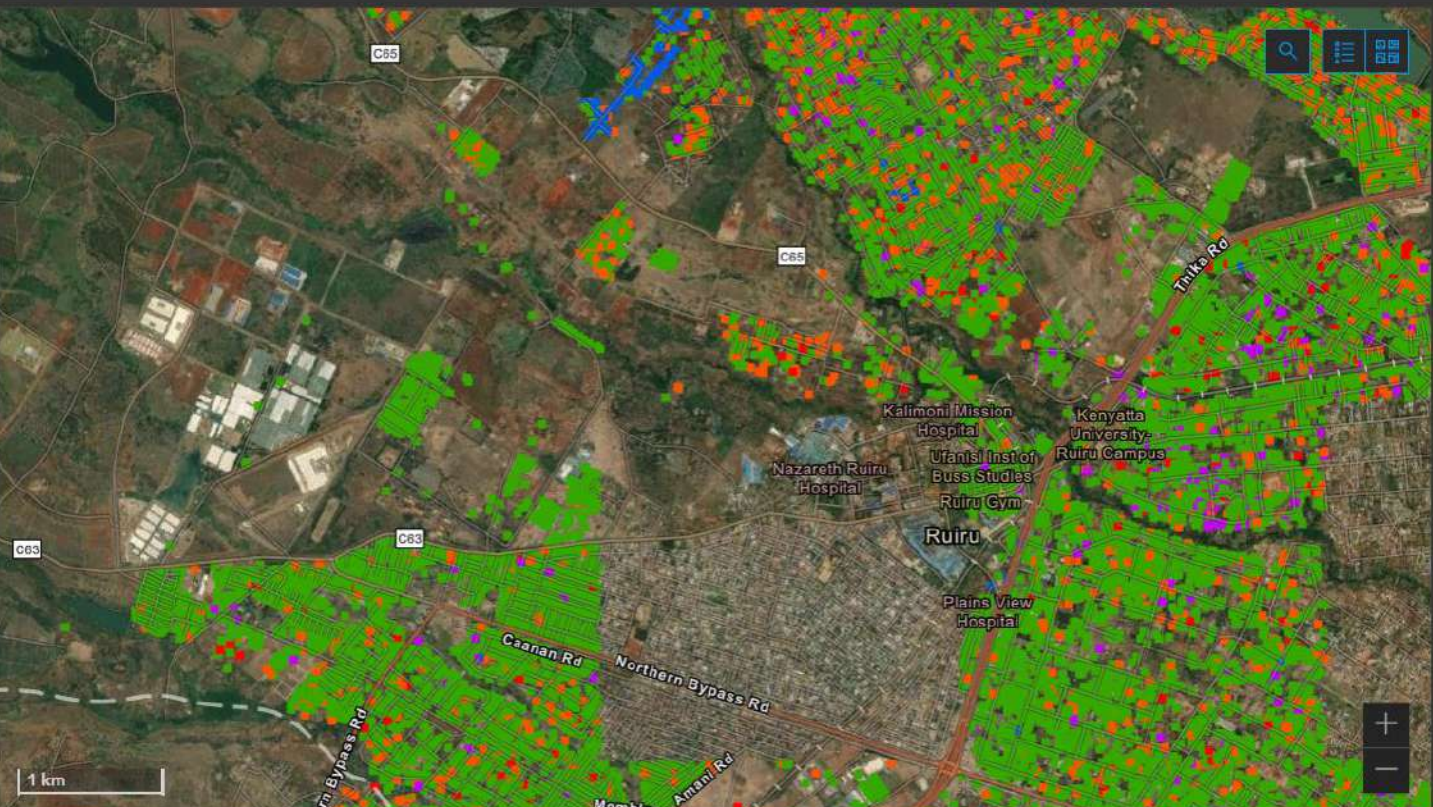
DATA COLLECTION TOOL FOR KENYA POWER

Kenya Power Data Collection Dashboard
Meter box ID: All
Meter ID: Loading...
Date Selector: 1/1/2023 - 7/24/2023
Select County: All Counties
☰

Normal 1,576,368	Disconnected 15,834	Bypassed 1,841	Faulty 15,630	Idle 15,177	Access Granted 488,847	Locked Premise 72,886	Access Denied 5,080	Pole Mounted 19,242	Streetlighting 1,457
----------------------------	-------------------------------	--------------------------	-------------------------	-----------------------	----------------------------------	---------------------------------	-------------------------------	-------------------------------	--------------------------------




- Access Granted 83.21%
- Locked Premise 12.41%
- Access Denied 0.86%
- Pole Mounted 3.28%



Maxar | Esri Eastern Africa, Esri, HERE, Garmin, Foursquare, METI/NASA, USGS

Meterboxes

587,512



- Kajiado 26,750
- Machakos 33,347
- Mombasa 43,561
- Nakuru 3,925
- Kisumu 43,347
- Kisii 24,707
- Uasin Gishu 35,265
- Kiambu 116,025

Meters

1,627,563

Data Collectors

602

Validated Meters
1,591,719

Unvalidated Meters
24

Field Revisit
34,874

616

INTEGRATED LOCATION INTELLIGENCE SYSTEM

KENYA ELECTRICITY TRANSMISSION COMPANY (KETRACO)

The screenshot displays the user interface of the Integrated Location Intelligence System. At the top, a navigation bar includes links for Home, Gallery, Map, Scene, Groups, My Content, and My Organization, along with a user profile icon and a search bar. The main content area features a large banner with the KETRACO logo and the title "Integrated Location Intelligence System". Below the banner, a section titled "FEATURED APPS" highlights four key applications: "Administrative Areas - Kenya/Africa" (represented by a map icon), "Business Development Planning" (represented by a stack of coins icon), "Crops Valuation Report" (represented by a field icon), and "Engineering Survey" (represented by a surveying instrument icon). At the bottom, three main service categories are listed: "Transmission", "Wavleaves", and "Distribution".

Home Gallery Map Scene Groups My Content My Organization Portal

KETRACO
KENYA ELECTRICITY TRANSMISSION COMPANY LIMITED
"Building a World Class, Safe, and Green"

Integrated Location Intelligence System

Leveraging the technology of Geographic Information Systems (GIS), users are afforded visualization, reporting and analytics capabilities for Wayleaves Management, Engineering Construction, and Environmental Management.

FEATURED APPS

- Administrative Areas - Kenya/Africa
- Business Development Planning
- Crops Valuation Report
- Engineering Survey

Transmission Wavleaves Distribution

Powering Your Digital Transformation

INTEGRATED RESOURCE MANAGEMENT SYSTEM

KENYA ELECTRICITY GENERATING PLC (KENGEN)



GIS PORTAL

provides a robust framework for asset and workforce management as well as tools for planning and analysis.



Executive Dashboard



Hydro



Wind



Thermal

Contact Us

Powering Your Digital Transformation

Hydros

To get started, select any date below to get a quick view of the dam level, power injected, and projected power.

01/01/2020



12/2021



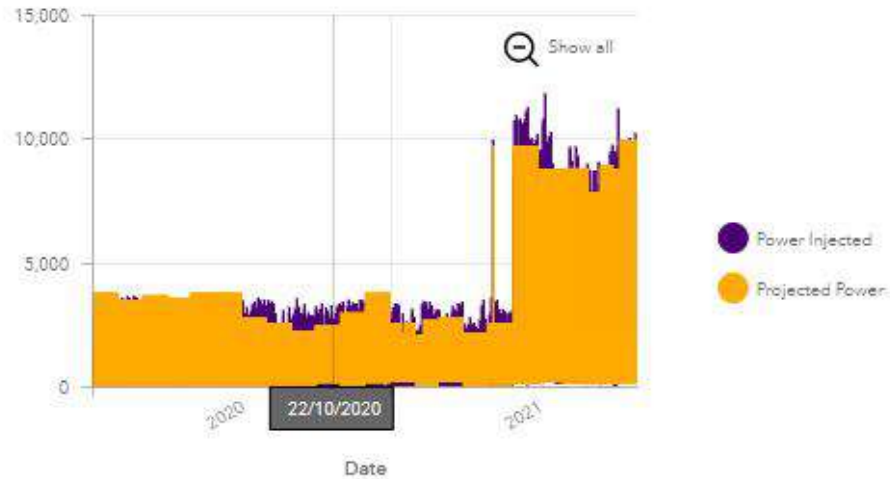
Power Stations Filter

All Stations



Energy For The Nation.

Power Output Chart



Projected injected vs Projected Power bar Chart

Effective Capacity
813.5MW

Last update: a minute ago

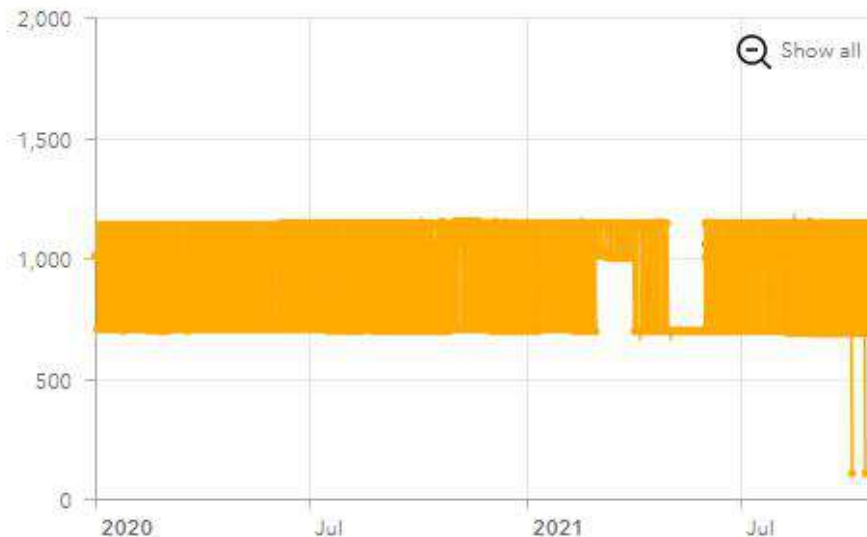
Installed Capacity
836.2MW

Last update: a minute ago



This interactive dashboard shows the power injected into the grid, the projected power out levels versus the daily dam levels.

Dam Levels





esri

THE
SCIENCE
OF
WHERE



borlale@esriea.com;
utilities@esriea.com