The Geographic Approach
GIS in Public Works

Agenda

- Challenges faced by Public Works Departments
- The Geographic Approach, GIS & ESRI
- Solutions for:
  - Asset Management
  - Planning and Operations
  - Mobile Workforce
  - Operational Awareness
- Questions and Discussion

Thousands of Public Works Organizations Use GIS Everyday …

Glendale, CA
No. 1 Public Works Department
of the Year
PW Magazine

…improving business operations using the “geographic approach”

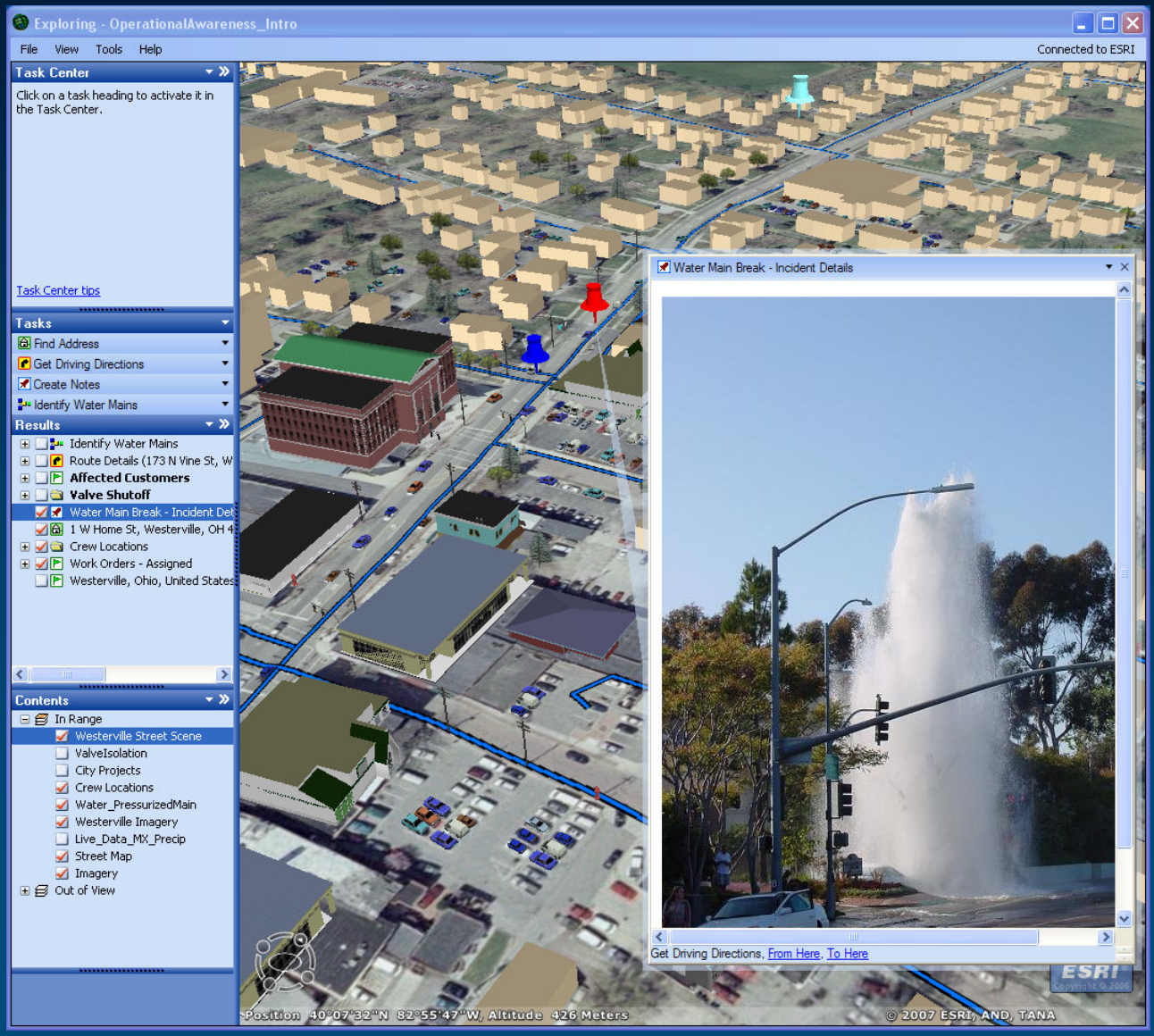
We All Have Our Own Stories…

Peter Foley / EPA

"Ticking time bomb under America's cities…"
ABC News

GIS is Invaluable in These Situations…

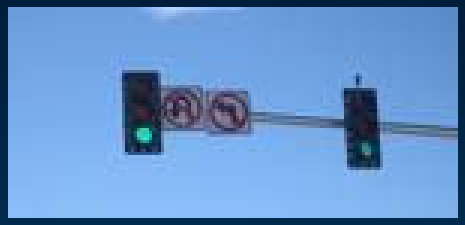
Providing Operational Awareness Before, During, and After an Event



GIS Provides a Platform to Organize Your Efforts…

- Asset Management
- Work Order Management
- Mobile Data Collection
- Capital Improvement Planning
- Executive Dashboard
- 311 Call Center Integration
- Work Force Management and Automation

Public Works Organizations Provide a Variety of Services…



Traffic Engineering

Sign Management

Bridge Inspection

Highway Maintenance

Sanitation

Utilities

Parks and Facilities

Snow Removal

Public Works Organizations Have to Contend With…

- Aging Assets
- Cost Containment
- Aging Workforce
- Increased Demand on Public Infrastructure
- Infrastructure Threats and Homeland Security Mandates
- Public awareness and anxiety

Compounded by Management and Organizational Challenges…

- Difficulty getting information about your assets
- No time for proactive maintenance
- Can’t get information into or out of the field
- No view into the operations of your organization

Public Works Organizations Need an Approach That Changes How We See Things

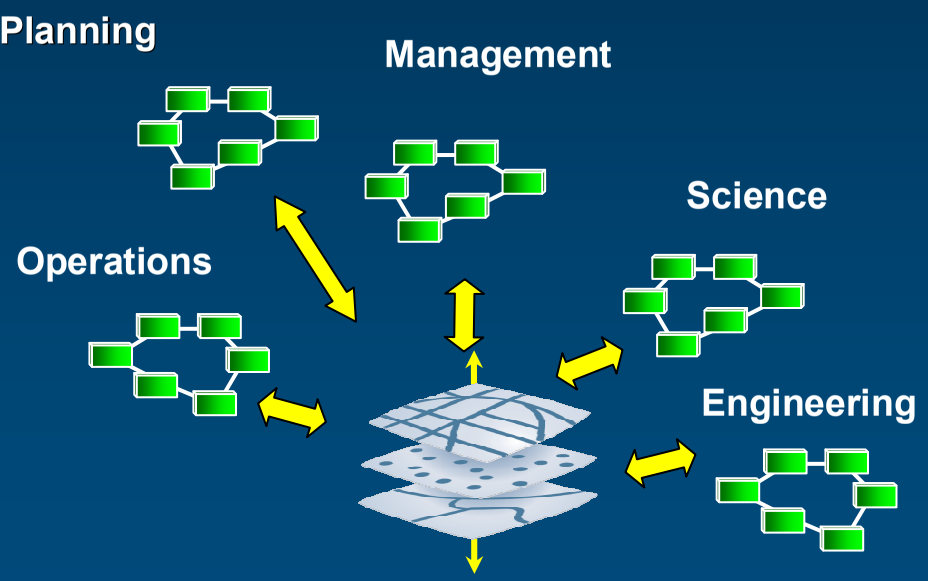
And the Way We Do Things

Geography is the Science of Our World

Helping Us See Our Work in a Different Way

As a Whole

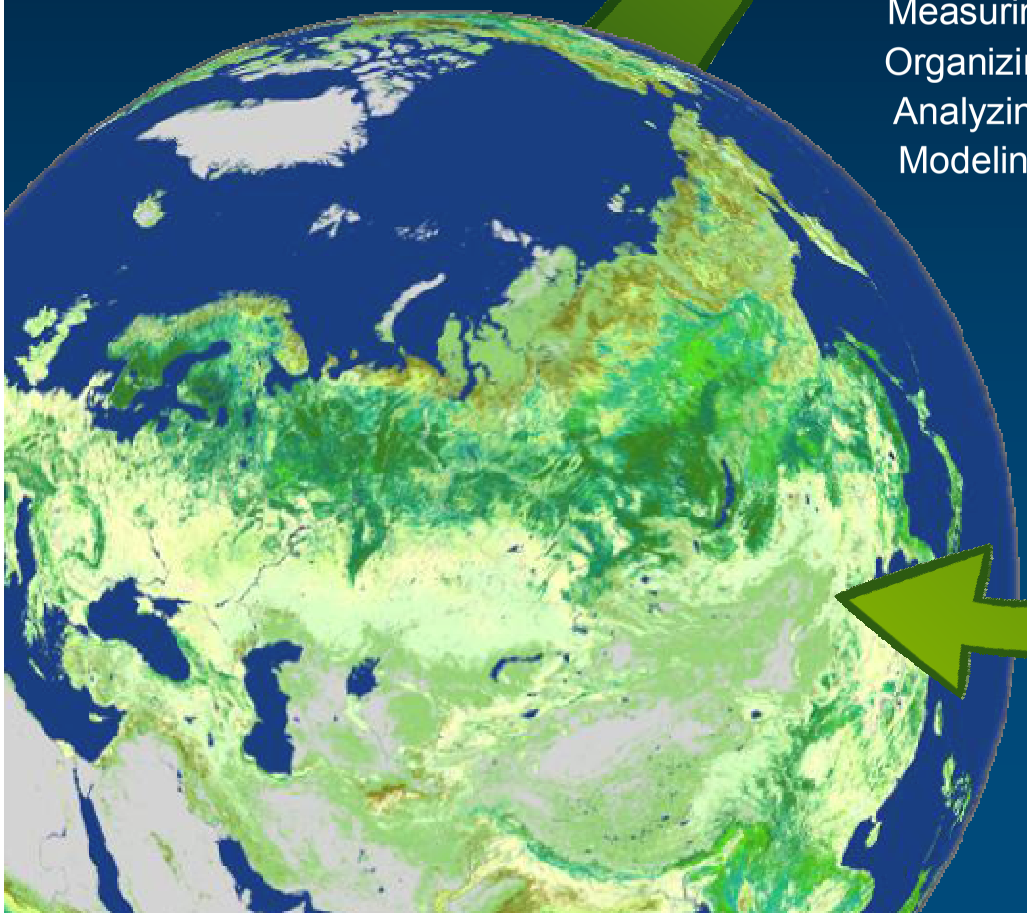
As a Network Of Interrelated Systems



. . . Providing a Context for Understanding

The Geographic Approach

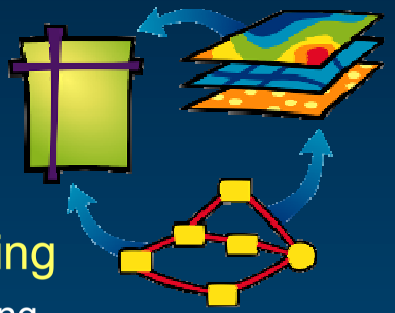
A Framework for Understanding and Managing Our Operations and Infrastructure



Creating

Measuring
Organizing
Analyzing
Modeling

Geographic Knowledge



Holistic
Comprehensive
Systematic
Analytic
Visual

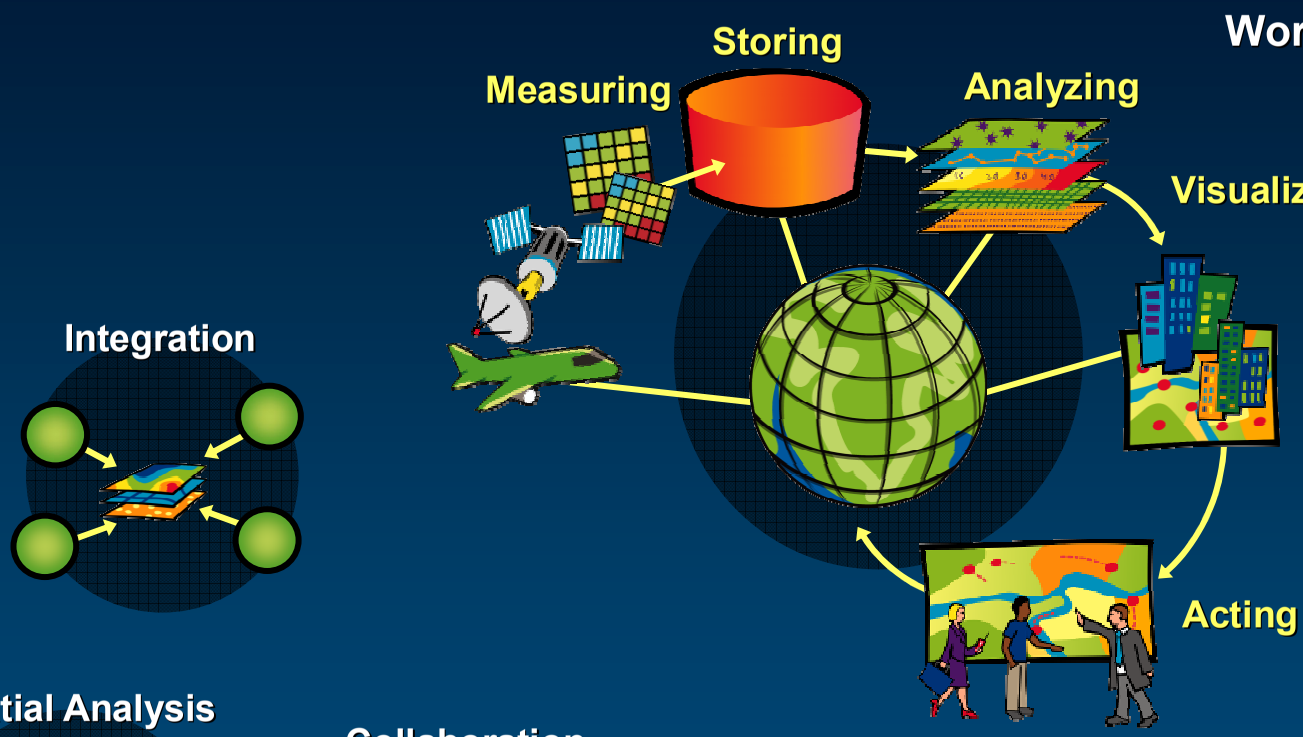
Applying

Planning
Designing
Deciding
Managing
Acting

Integrating Geography Into How We Behave

GIS Applies the Geographic Approach

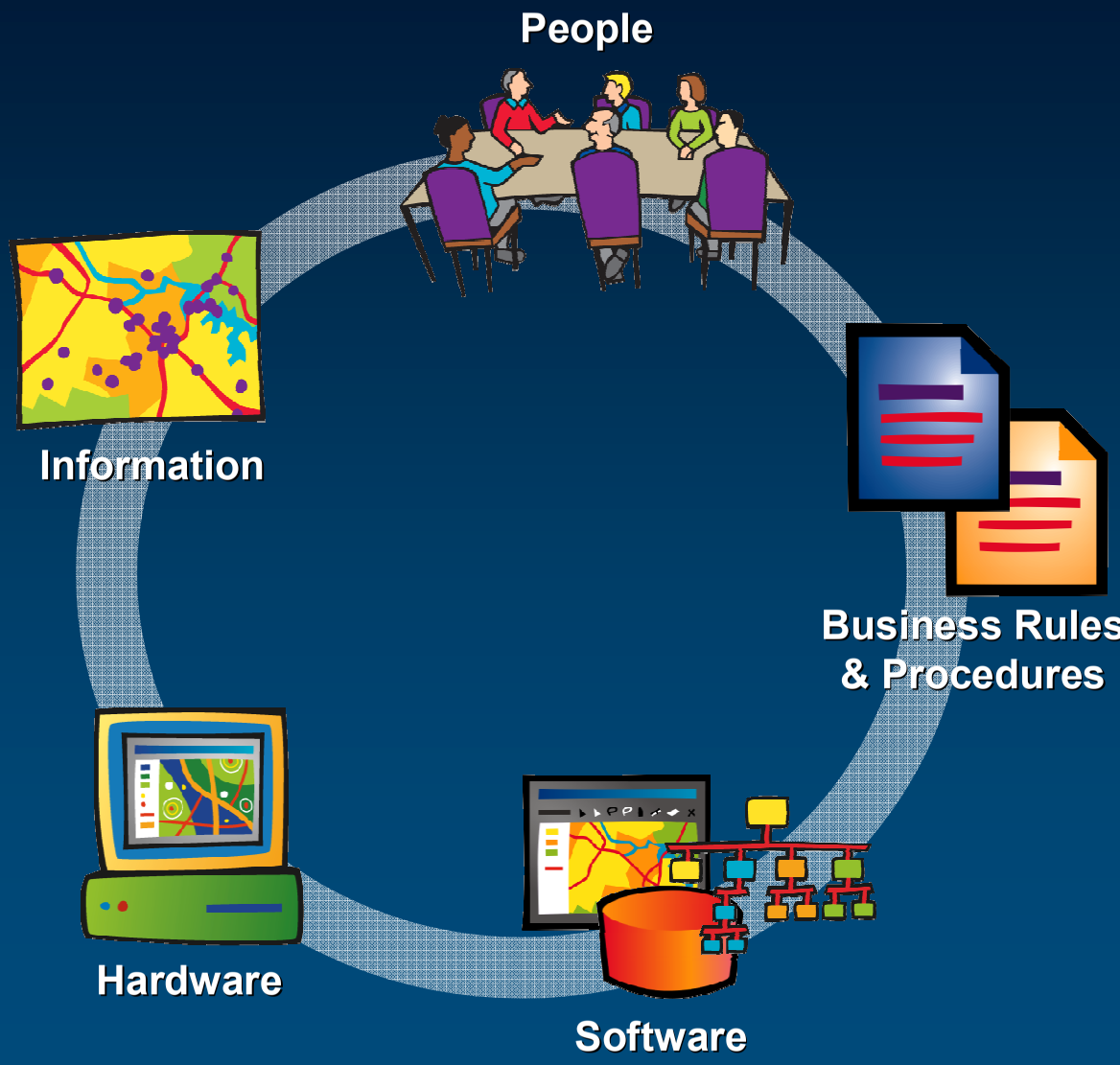
Providing Tools, Methods, and Workflows That Support Collaboration and Action



- Better Decisions
- Greater Efficiency (Money/Time/Resources)
- More Effective Communication

. . . Improving the Way We Do Things

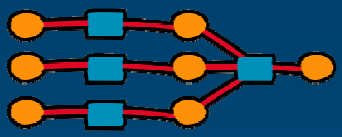
There are Five Key Elements in a GIS Solution



GIS Software Provides Four Essential Functions

Dissemination

Visualization



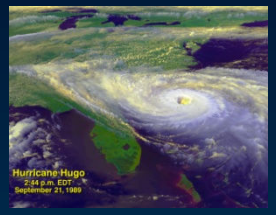
Spatial Analysis

Data Management

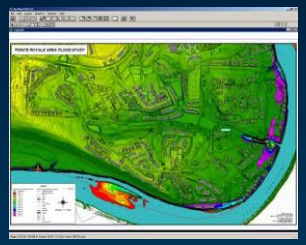
GIS Manages Information About your Assets and Operations

Water

Biosolids Management

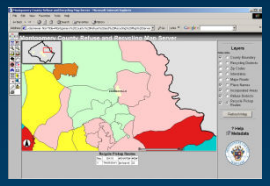


Emergency Plans

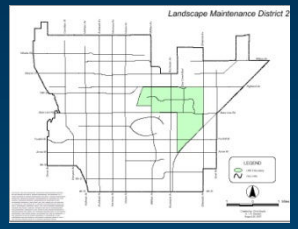


Storm Water

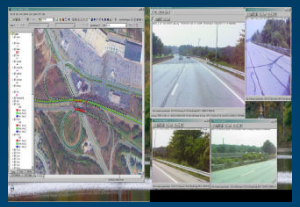
Vegetation Management



Sanitation/ Snow Routes



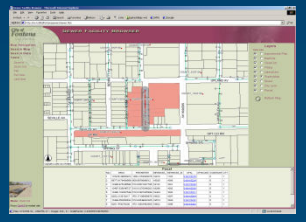
CAD Files



Pavement

Surveys

Landfill Leases

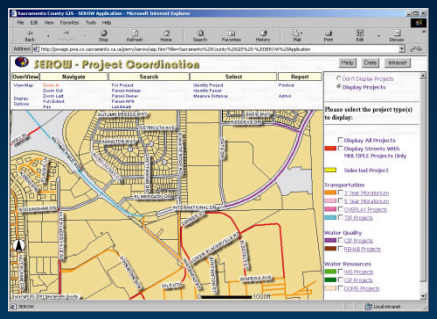


Sanitary Sewer

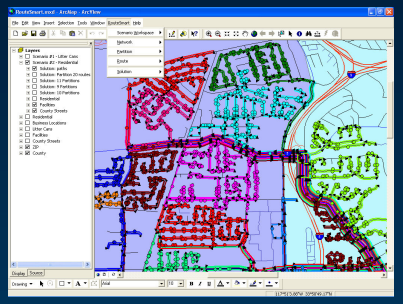
Comprehensive system for storing and managing information…

GIS Provides Analytical Capabilities

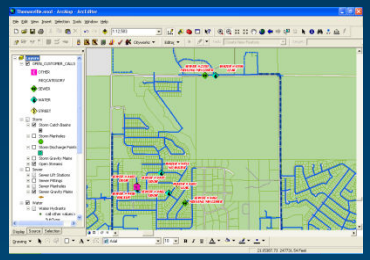
Capital Improvement Planning



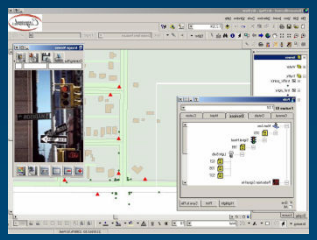
Work Scheduling



Inspection Optimization



Leak Analysis

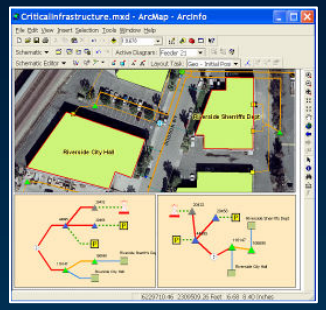


Traffic Analysis

Performance Measurement

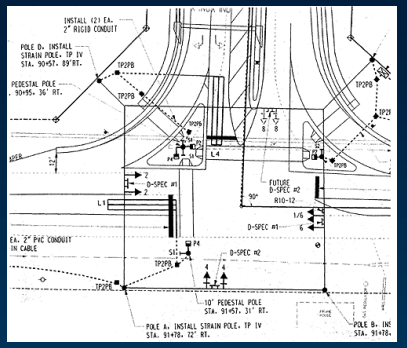
Tools and capabilities to improve your awareness and decision making…

Visualization in a Public Works Organization

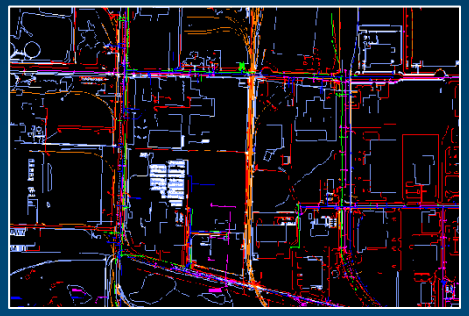


Schematics

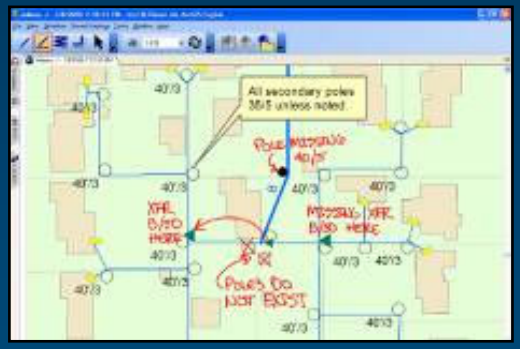
3D



Hardcopy Maps



CAD



Field Markups

Maps provide a way to assimilate information quickly and accurately…

GIS Allows You to Easily Disseminate Information

Our Focus Today

Demonstrate how GIS and the Geographic Approach will enable you to…

- Maintain accurate information about your infrastructure
- Use asset information for planning and operations
- Get information into and out of the field
- Provide operational awareness

Asset Management

Getting Information About Your Assets

Asset Management

Challenges:

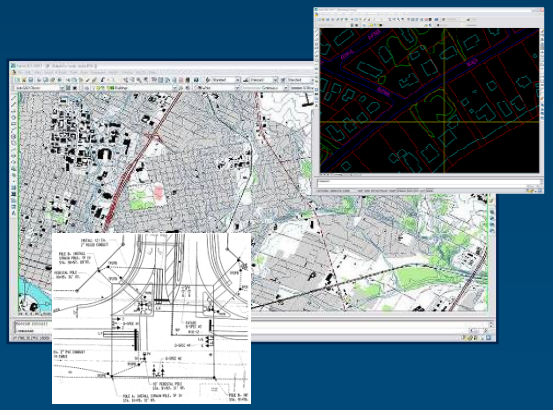
- Searching for accurate information about your assets
- Aligning planned work with current crew assignments
- Matching worker skill sets to project requirements
- Maintaining the same information in multiple places

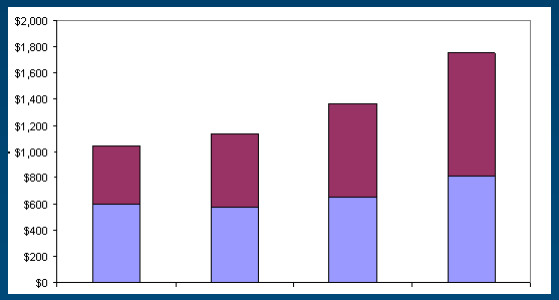
No interoperability between systems…

Asset Management

Impacts:

- Maintaining the same information in multiple places.
- Difficulty accessing and sharing information.
- Increased costs – labor, systems, workflows

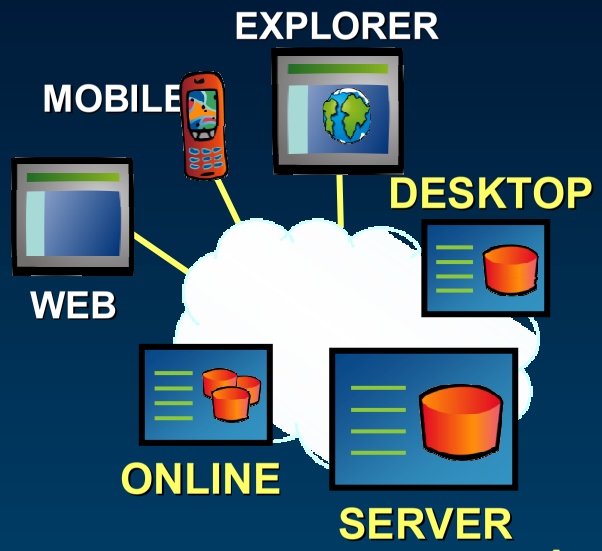


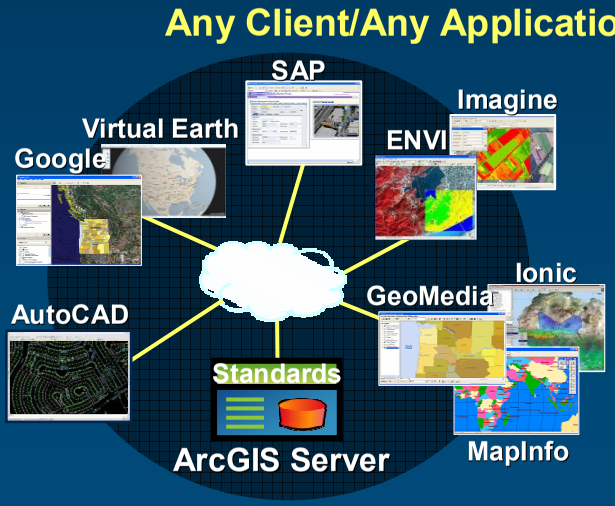


No interoperability between systems…

A Comprehensive System to Store and Manage Asset Information

- Easy to use
- Access to other data sources
- Share information with other applications
- Share information with other departments
- Accurate: Location, temporal, content
- Interoperable using industry standard protocols
- Foundation for partner solutions





Allowing you to visualize, manage, and analyze your assets

Demonstration - Asset Management

Planning and Operations

Timely Updates and Maintaining Accurate Information About Your Assets

Planning and Operations

Challenges:

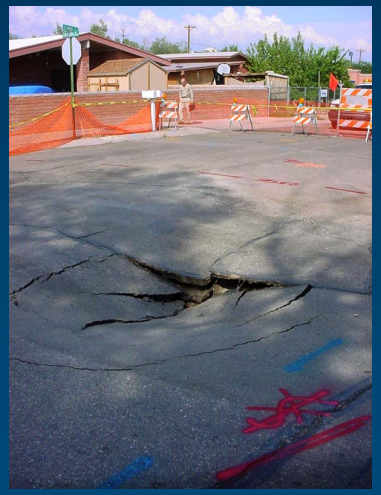
- Searching for accurate information about your assets
- Aligning planned work with current crew assignments
- Matching worker skill sets with schedules and project locations.

It's difficult to combine your planned and scheduled work…

Planning and Operations

Impacts:

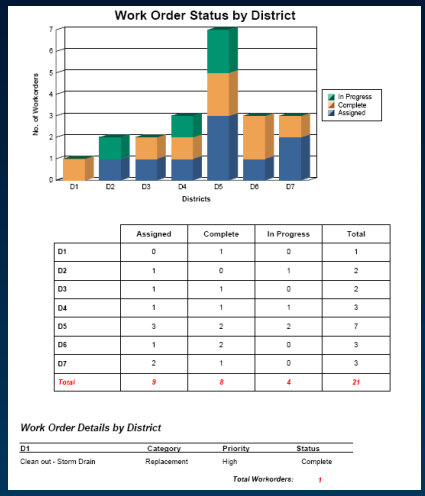
- Assets fail…resulting in the inability to ensure service continuity
- Increased repair costs, replacements, staff time
- Decrease in customer satisfaction



Need to align proactive and reactive work…

A Complete System for Planning and Operational Analysis

- See all planned & scheduled work
- Proactively schedule work
- Optimize your crew schedules & efforts
- Minimize costly repairs
- Coordinate with other departments

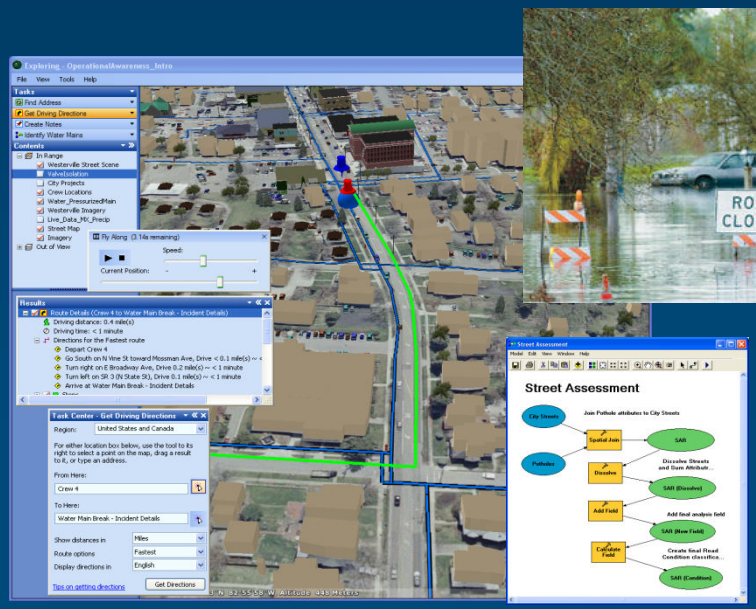


	Assigned	Complete	In Progress	Total
D1	0	1	0	1
D2	1	0	1	2
D3	1	1	0	2
D4	1	1	1	3
D5	3	2	2	7
D6	1	2	0	3
D7	2	1	0	3
Total	*9*	*8*	*4*	*21*

Work Order Details by District

D1	Category	Priority	Status
Clean out - Storm Drain	Replacement	High	Complete

Total Workorders: 1



Increasing time for proactive maintenance

Demonstration – Planning and Operations

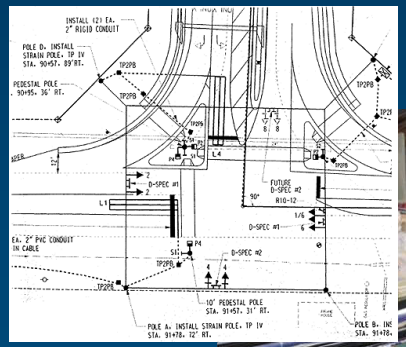
Mobile Workforce

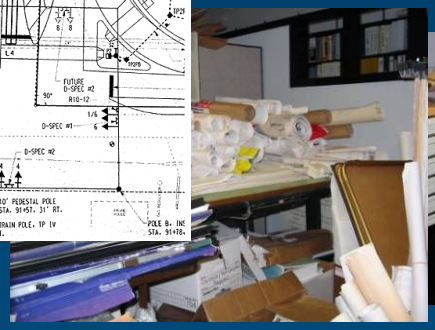
Getting Information Into and Out of the Field

Mobile Workforce

Challenges:

- Lack of a platform for sharing information
- Mobile workforce does not have a unified information source
- Current applications do not support our mobile workflow



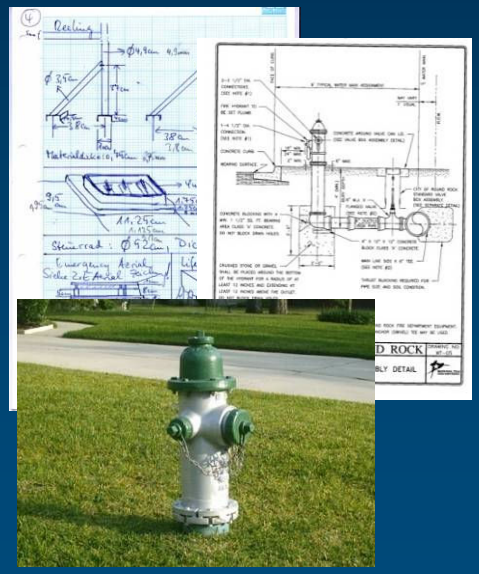


Accurate Asset information is not easily accessible by the mobile workforce

Mobile Workforce

Impacts:

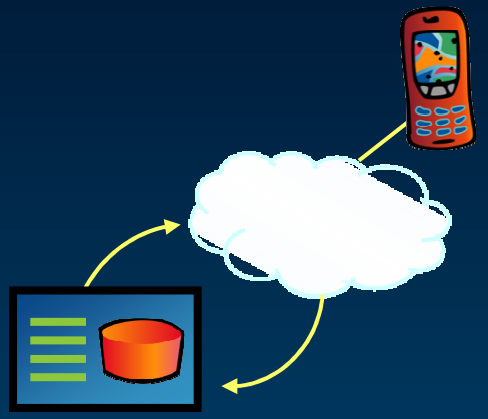
- Organizations do not have up-to-date asset information
- Operations aren't optimized for efficiency
- Difficulty managing your mobile workforce



No platform for communication and sharing information

A Platform for the Deployment of Mobile Workforce Applications

- Applications that match your field workflow
- Information available regardless of connectivity
- Match the right people & equipment to the right work
- Enable effective communication
- Accurate location information in the field



Visibility into mobile workforce activities

Demonstration – Mobile Workforce

Operational Awareness

A Complete View of Your Organization

Operational Awareness

Challenges:

- Multiple disconnected systems hold asset information
- Difficult to access and share information easily throughout the organization
- Difficult to get information into or out of the field
- Uncertainty about asset information accuracy

A single view into organizational activities and data is not available

Operational Awareness

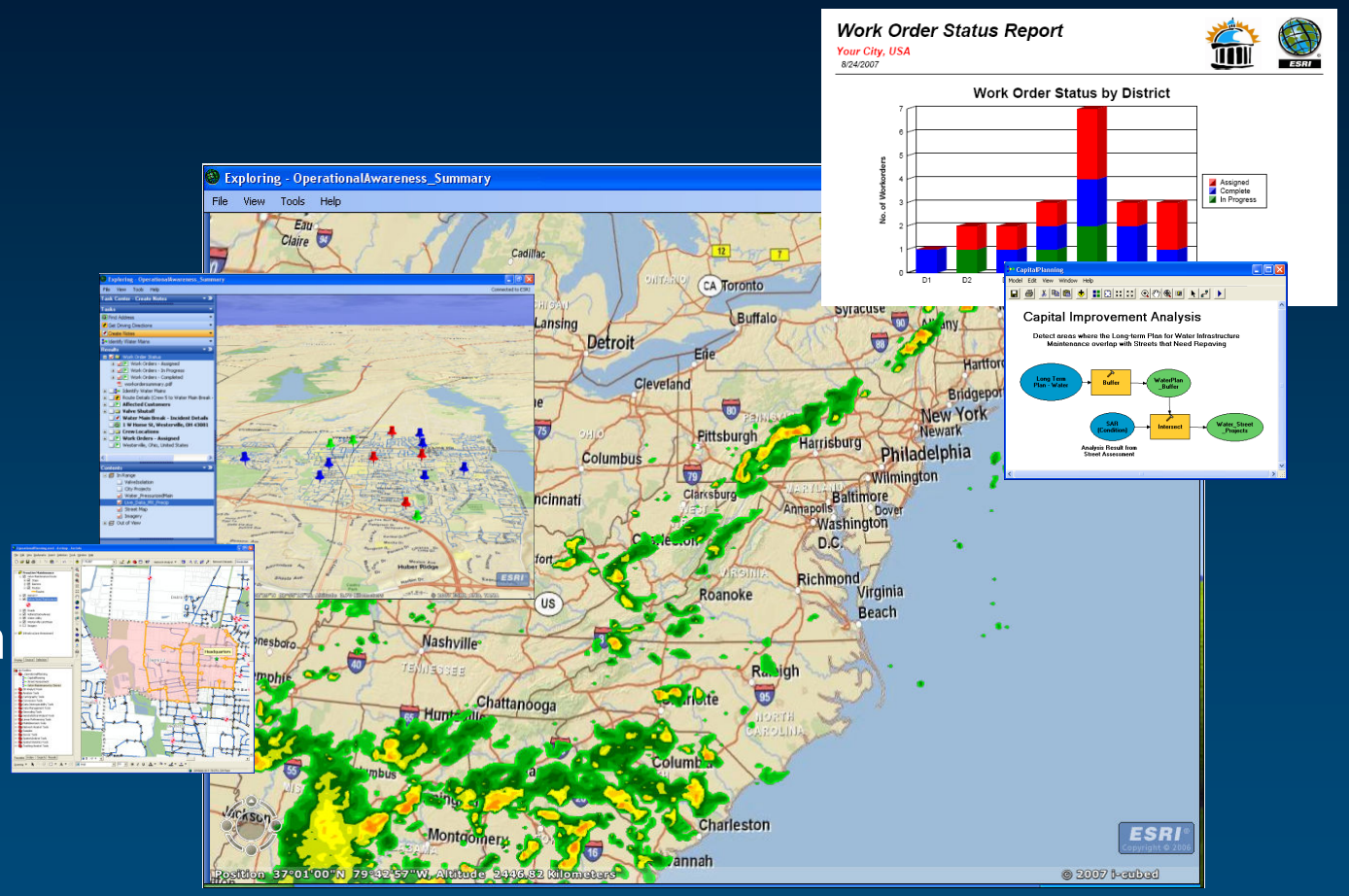
Impacts:

- Limited visibility into organization
- Difficult to measure performance
- Difficult to review and improve processes
- Difficult to proactively manage work
- Difficult to integrate and share information

GIS Provides Complete Operational Awareness

A Common Platform for Sharing Information

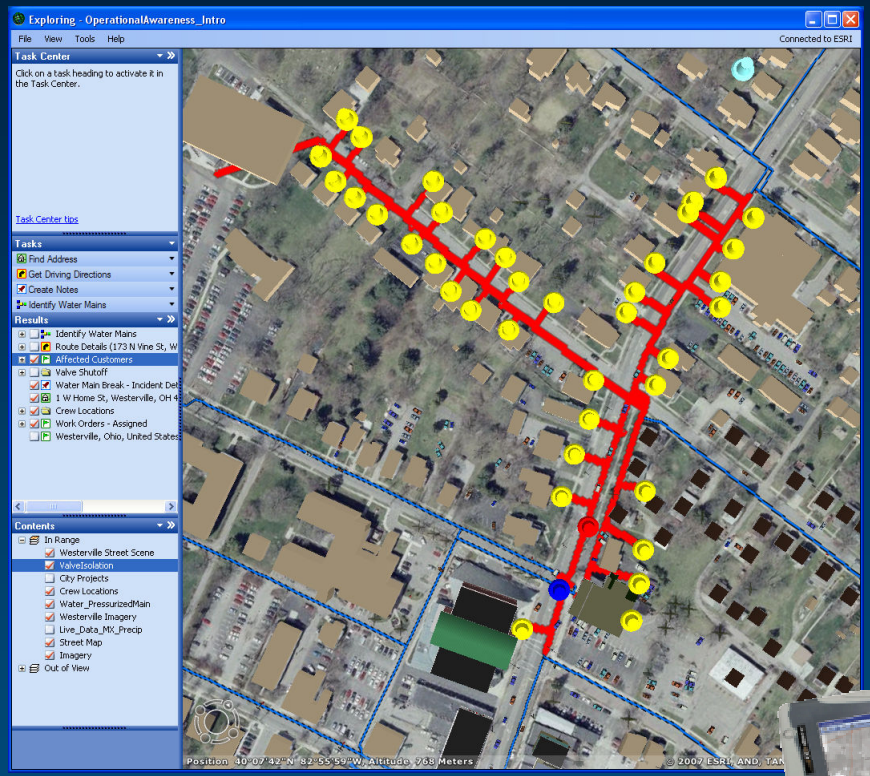
- Comprehensive system
- Supporting planning and operational analysis
- Sharing and receiving information from the field



Giving you visibility into your operations

Demonstration – Operational Awareness

The Geographic Approach in Public Works Changes the Way We See and Do Things



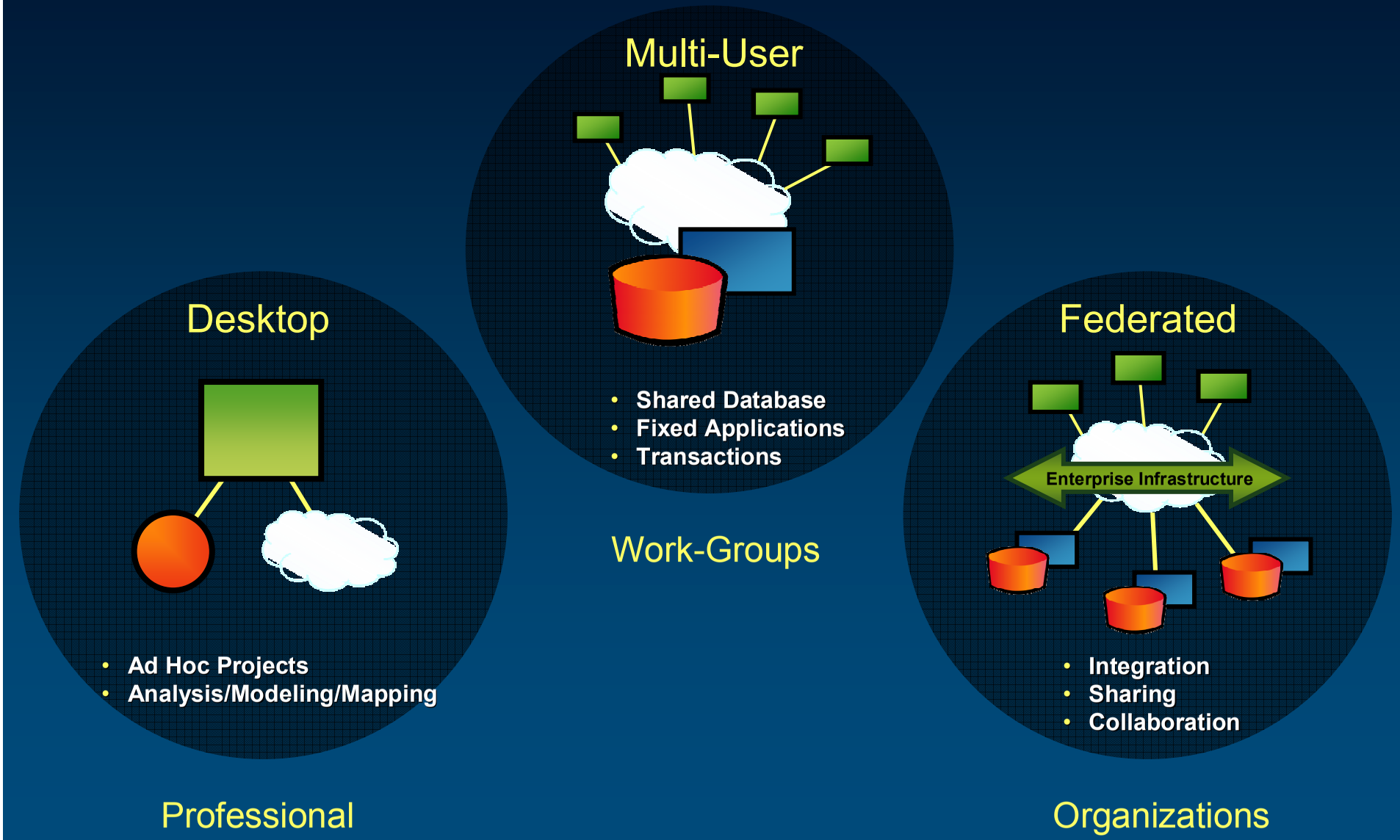
. . .Providing Complete Operational Awareness

GIS is Being Applied in Public Works Departments…

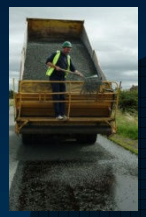
Across Many Cities, Counties, and Local Governments

Improving our Work . . .

GIS in Public Works Follows a Common Pattern



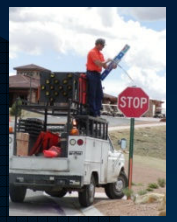
GIS Is Being Used to Build Public Works Information Systems…



Pavement Management

Bridge and Tunnel Inspection

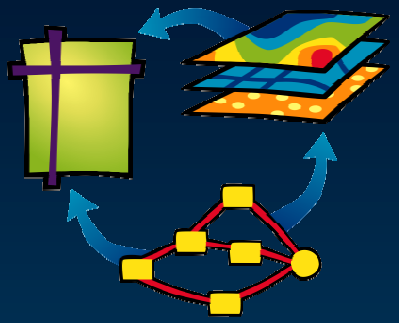
Sign Management



Sanitation Snow Routing

Debris Management

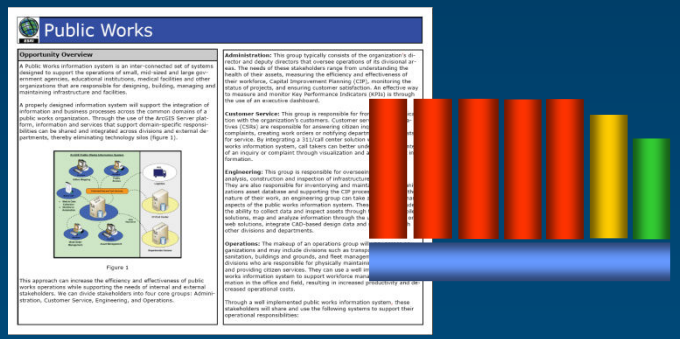
Take the Next Step



Visit the ESRI Project Center
www.esri.com/projectcenter

Talk to your peers

Work with an ESRI Partner



Contact ESRI

Questions

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Thank You