

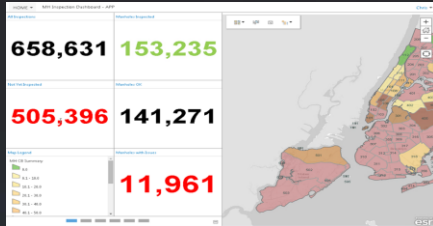
Integrating New York City Information Systems

Improving situational awareness for everyone



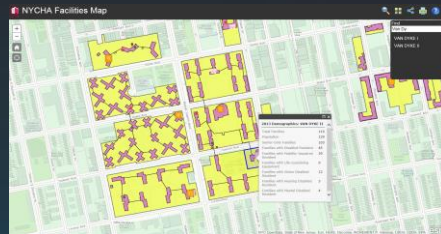
GIS is Delivering Value Across the City...

Asset Mgt and Inspections
Water Security, Green
Infrastructure



DEP

Facilities Management



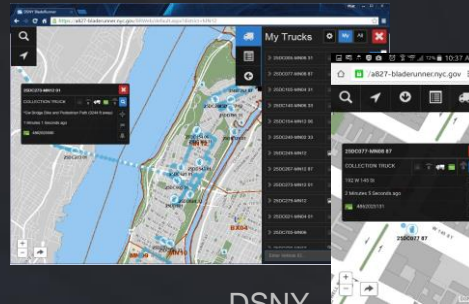
NYCHA

Emergency Management



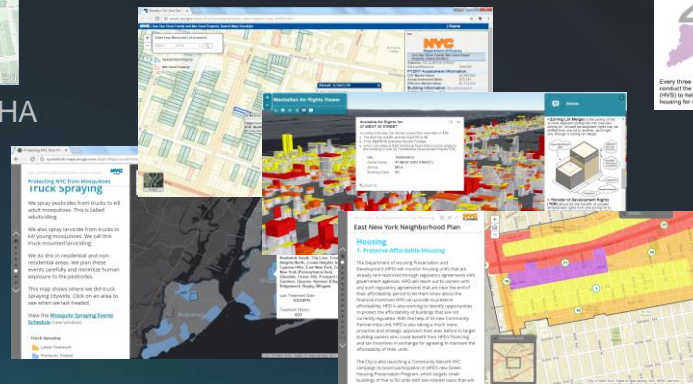
NYC EM

BladeRunner Fleet Mgt
Route Analysis



DSNY

Citizen Engagement



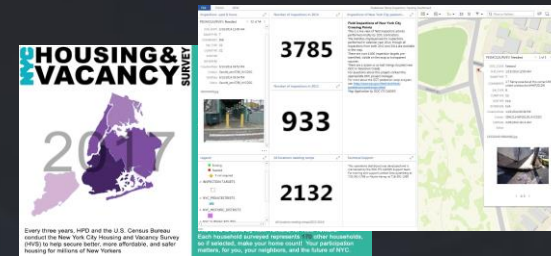
Finance, Health, Planning

Forestry Resource Mgt
Storm Mobile



Parks

Field Inspections



DOT, HPD

Crime Analysis



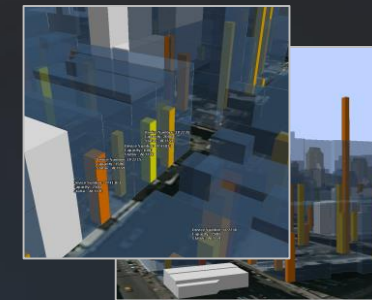
NYPD

Situational Awareness, IMT



FDNY

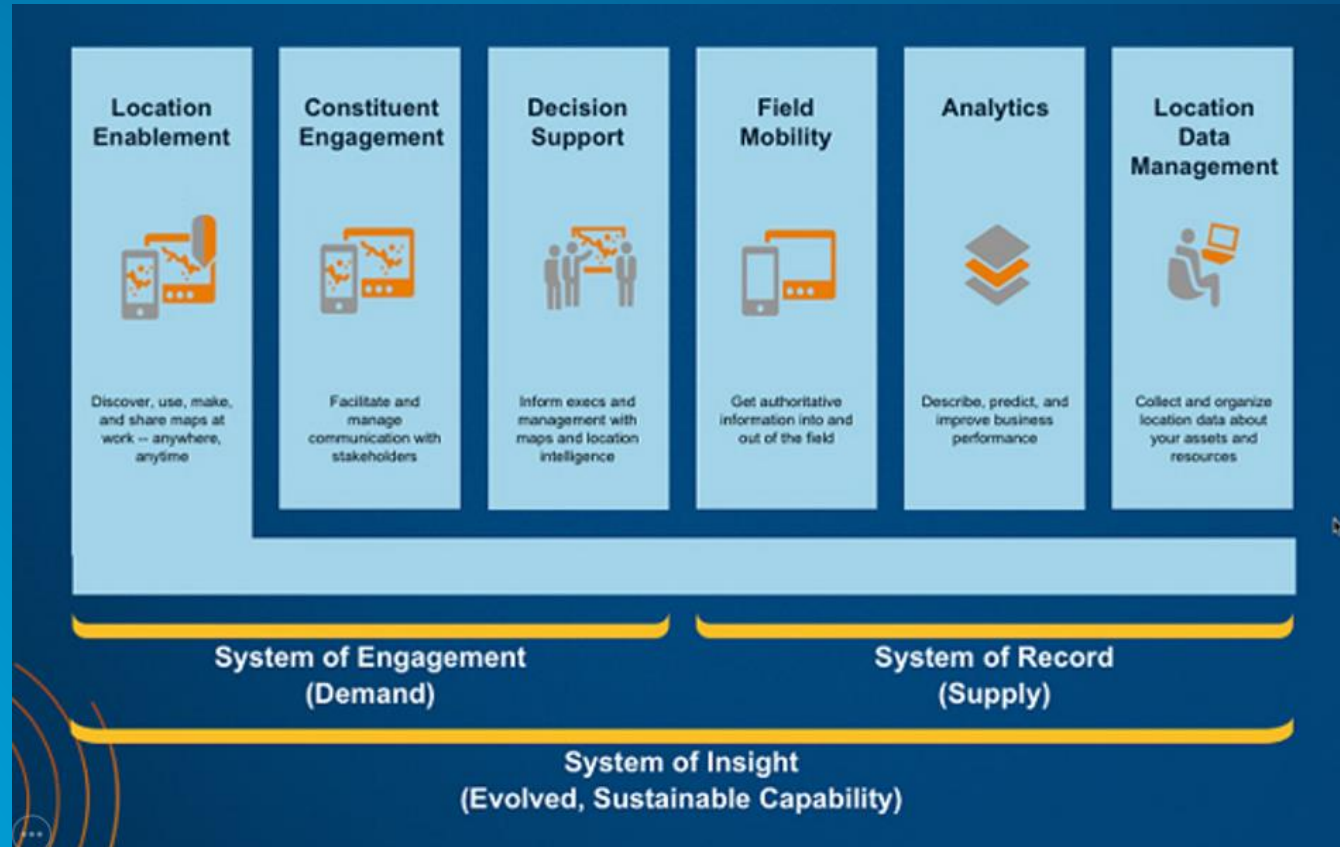
Elevator Work Orders



DOB

... Hundreds of Applications, Systems and Departments





GIS Integrates Everything

Connecting People, Processes, Things and Data About Them

Improving Efficiency,
Collaboration and
Communication

*System of
Engagement*

Helping Organizations
Understand . . .

*System of
Record*

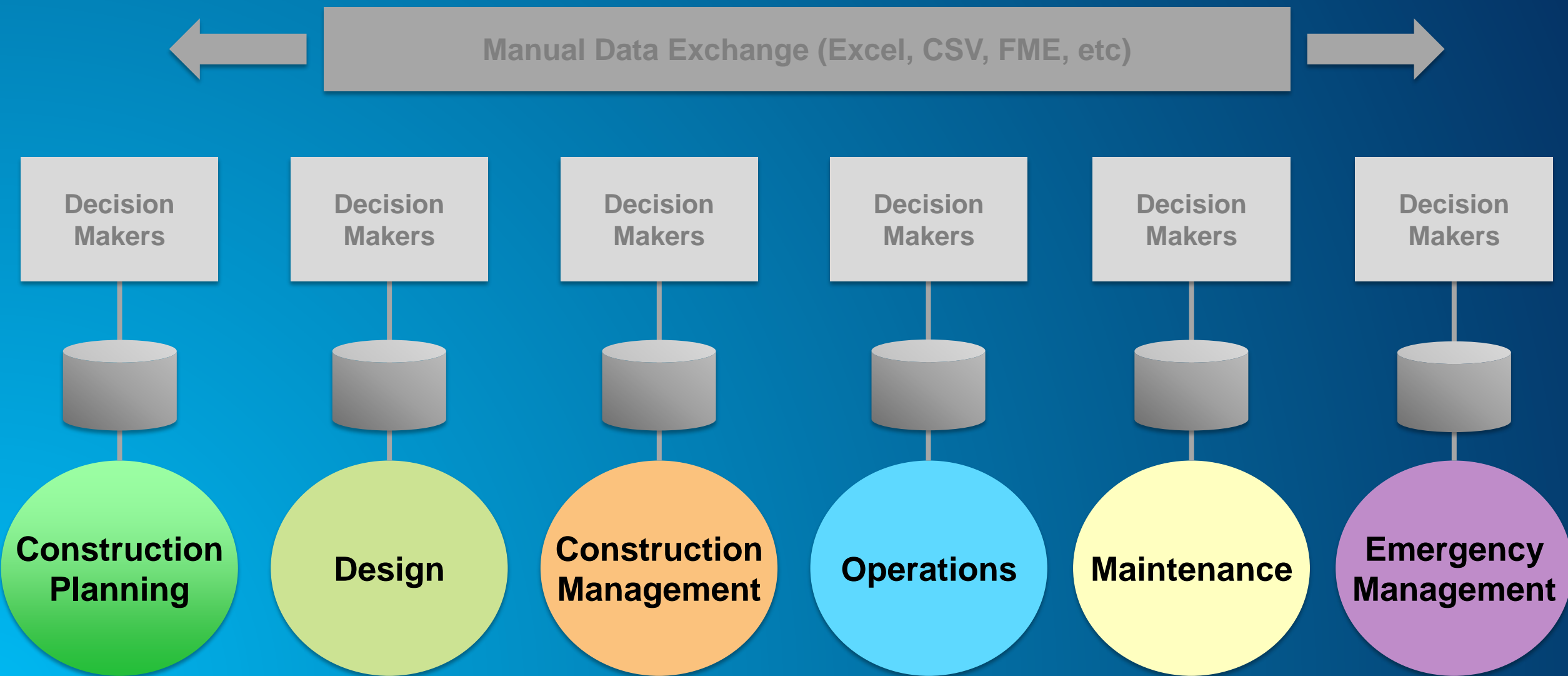
*System of
Insight*

Supports Multiple
Types of Systems

. . . And Be Aware, Alert,
and Responsive

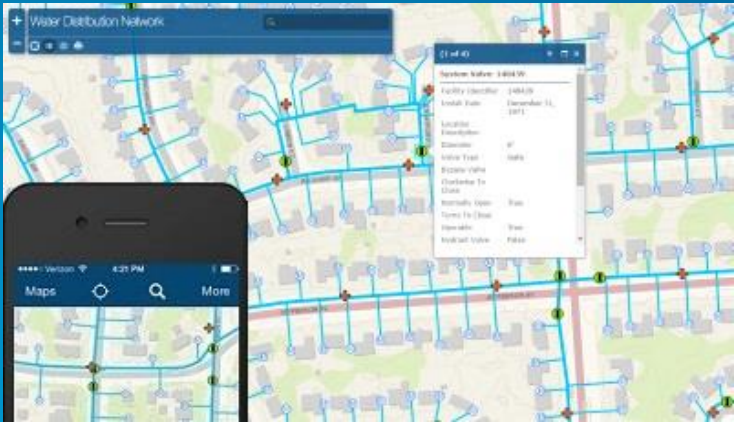


Infrastructure Data Life Stages Today

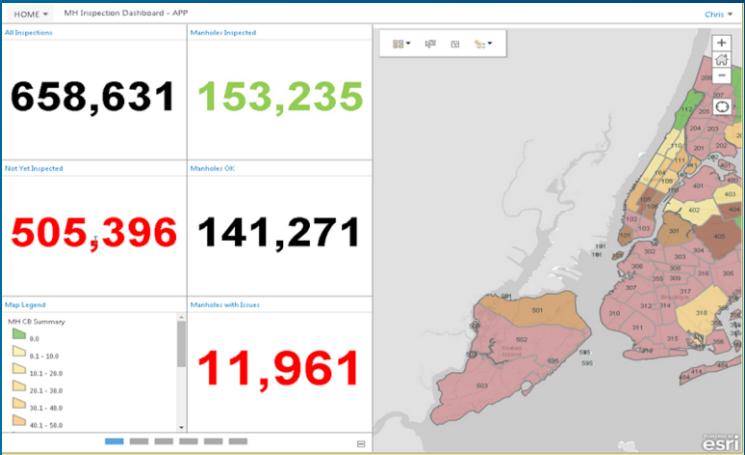


GIS “Smart” Networks

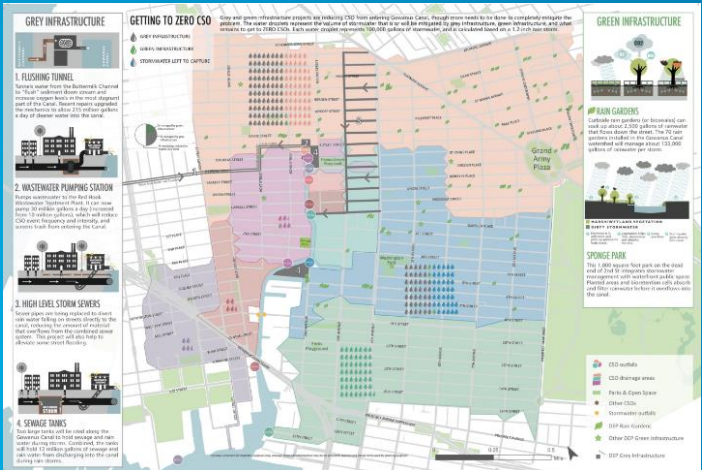
City of New York Department of Environmental Protection



Water Distribution and Sewer Flow
Intelligent Network Models



Inspections and
Work Order Management



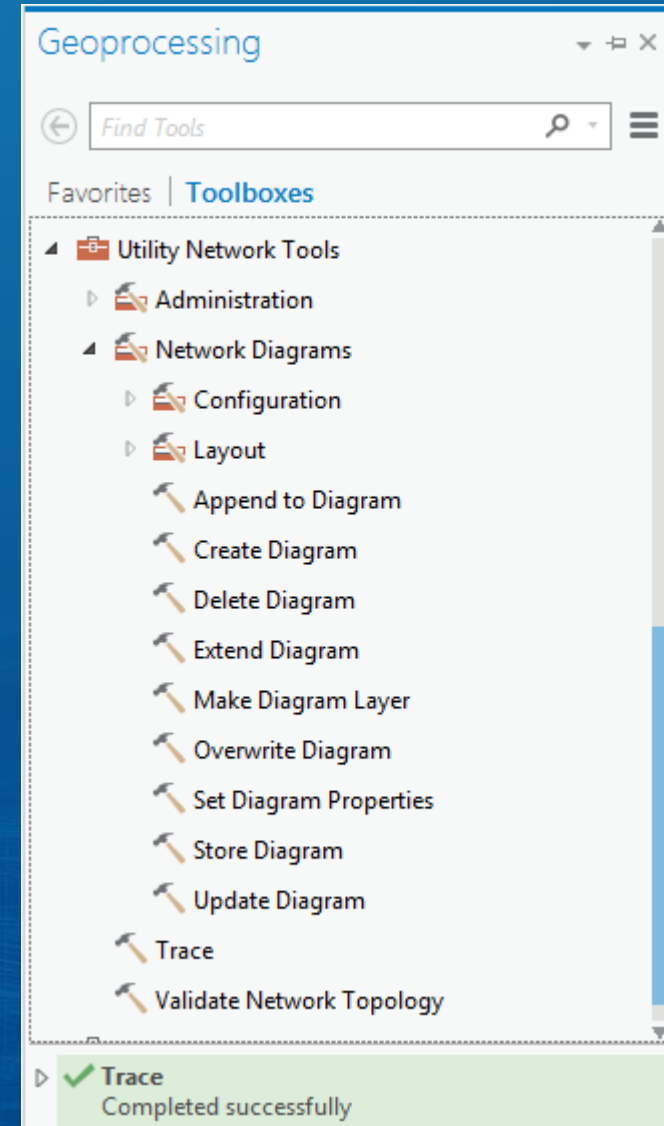
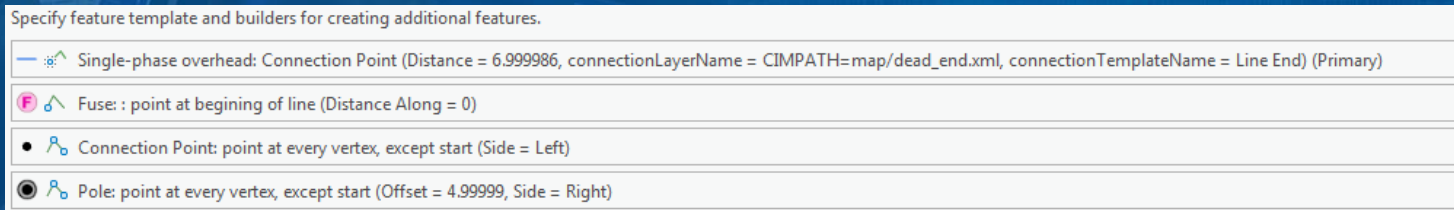
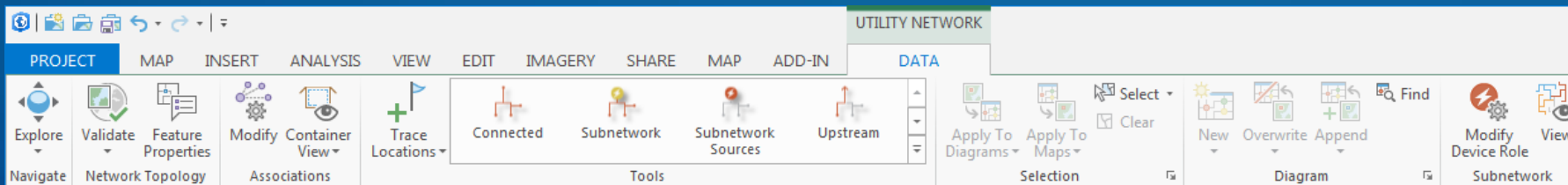
MS4's, CSO's, Sewersheds



Green Infrastructure
Project Life Cycles

GIS Network Management

- New **Utility Network** for the next 10-15 years
 - Electric, gas, water, storm water, sewer, telco, etc.

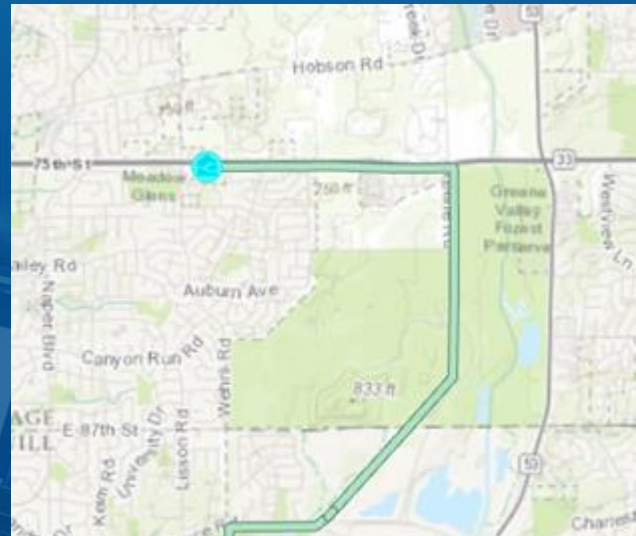


GIS Network Management

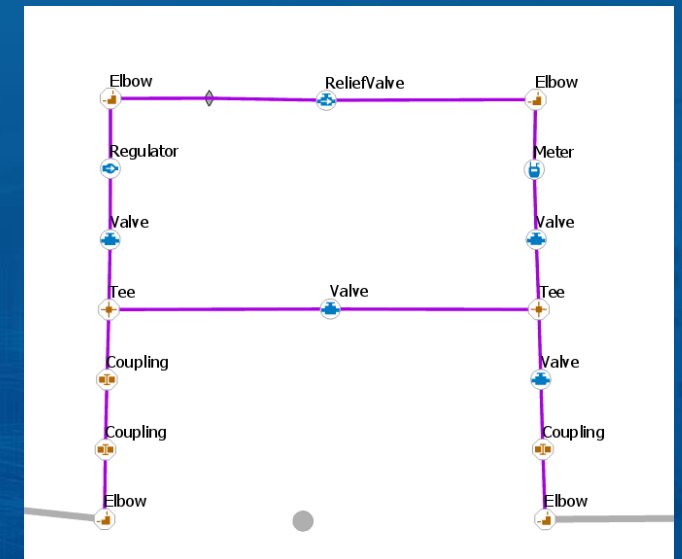
- Real world representation of what is on the ground
 - Accurately representing assets for enhancing analysis and modeling and for simplifying data export for other systems
 - Device Assembly – A container for multiple devices...



Multiple Devices



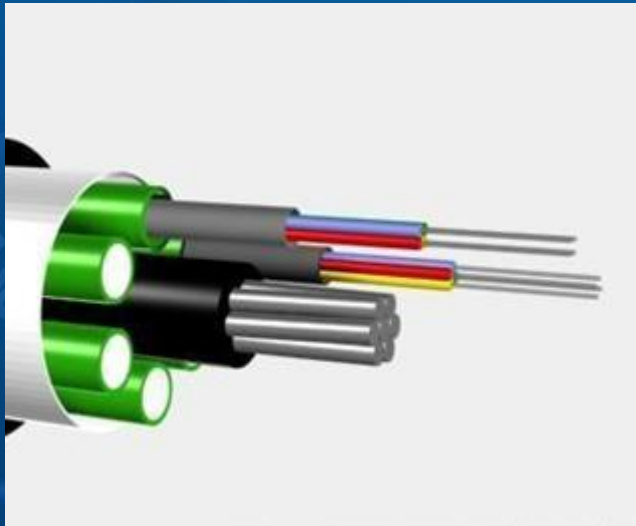
Single Device Assembly on the map



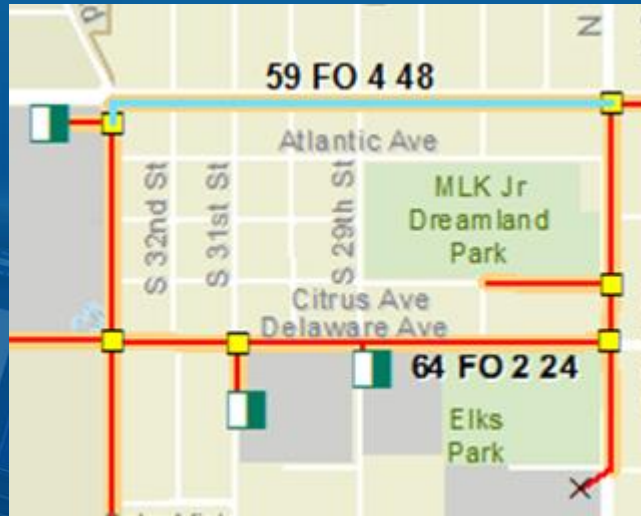
Device Assembly containing devices

GIS Network Management

- Real world representation of what is on the ground
 - Accurately representing assets for enhancing analysis and modeling and for simplifying data export for other systems
 - Linear containment – Trenches/Ducts contain wires...



Linear features containing lines



Structure Line on the map



Attributes																																																			
<div><div>Conduit</div><div><div>2</div><div>Underground Structure</div><div>Duct</div><div>1</div><div>Innerduct</div><div>1</div><div>Fiber Cable</div><div># 86</div><div># 88</div><div># 87</div><div>Copper Cable</div><div>Fiber Cable</div><div>Copper Cable</div><div>Copper Cable</div><div>Fiber Cable</div><div># 78</div><div># 93</div><div># 76</div><div># 77</div><div># 94</div><div># 95</div></div></div>	<table><tr><th>Property</th><th>Value</th></tr><tr><td>OBJECTID</td><td>2</td></tr><tr><td>Enabled</td><td>True</td></tr><tr><td>Creation User</td><td><Null></td></tr><tr><td>Date Created</td><td><Null></td></tr><tr><td>Date Modified</td><td><Null></td></tr><tr><td>Last User</td><td><Null></td></tr><tr><td>Work Order ID</td><td><Null></td></tr><tr><td>Project Number</td><td><Null></td></tr><tr><td>Project Name</td><td><Null></td></tr><tr><td>Common Language Locat...</td><td><Null></td></tr><tr><td>MANUFACTURER</td><td><Null></td></tr><tr><td>Part Number</td><td><Null></td></tr><tr><td>Calculated Length</td><td><Null></td></tr><tr><td>Measured Length</td><td><Null></td></tr><tr><td>Account Code</td><td><Null></td></tr><tr><td>Installation Date</td><td><Null></td></tr><tr><td>Item of Plant ID</td><td>{F44CA1CF-FB4B-48CA-B81E-8B89...</td></tr><tr><td>Material Cost</td><td><Null></td></tr><tr><td>DIAMETER</td><td><Null></td></tr><tr><td>COMMENTS</td><td><Null></td></tr><tr><td>Material</td><td><Null></td></tr><tr><td>Subtype Code</td><td>Trench</td></tr><tr><td>GLOBALID</td><td>{SD474684-7CD4-43A8-B30A-9D59...</td></tr><tr><td>SHAPE_Length</td><td>688.064</td></tr></table>	Property	Value	OBJECTID	2	Enabled	True	Creation User	<Null>	Date Created	<Null>	Date Modified	<Null>	Last User	<Null>	Work Order ID	<Null>	Project Number	<Null>	Project Name	<Null>	Common Language Locat...	<Null>	MANUFACTURER	<Null>	Part Number	<Null>	Calculated Length	<Null>	Measured Length	<Null>	Account Code	<Null>	Installation Date	<Null>	Item of Plant ID	{F44CA1CF-FB4B-48CA-B81E-8B89...	Material Cost	<Null>	DIAMETER	<Null>	COMMENTS	<Null>	Material	<Null>	Subtype Code	Trench	GLOBALID	{SD474684-7CD4-43A8-B30A-9D59...	SHAPE_Length	688.064
Property	Value																																																		
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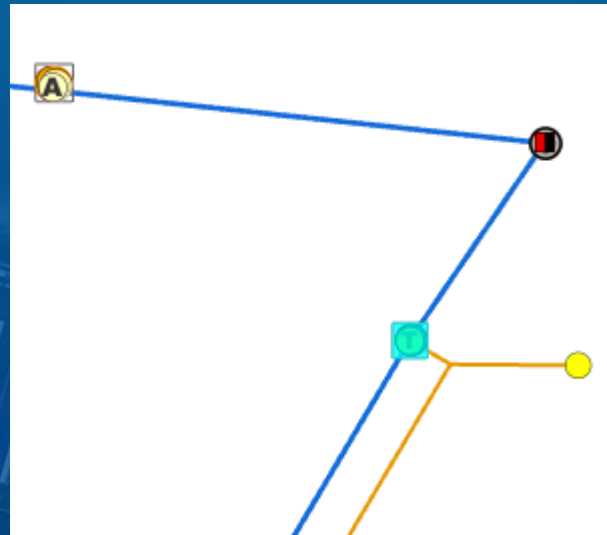
Structure Line containing Lines

GIS Network Management

- Real world representation of what is on the ground
 - Accurately representing assets for enhancing analysis and modeling and for simplifying data export for other systems
 - Terminals – modeling real world connections...



Device with terminals



Single Device on the map

Feature Properties

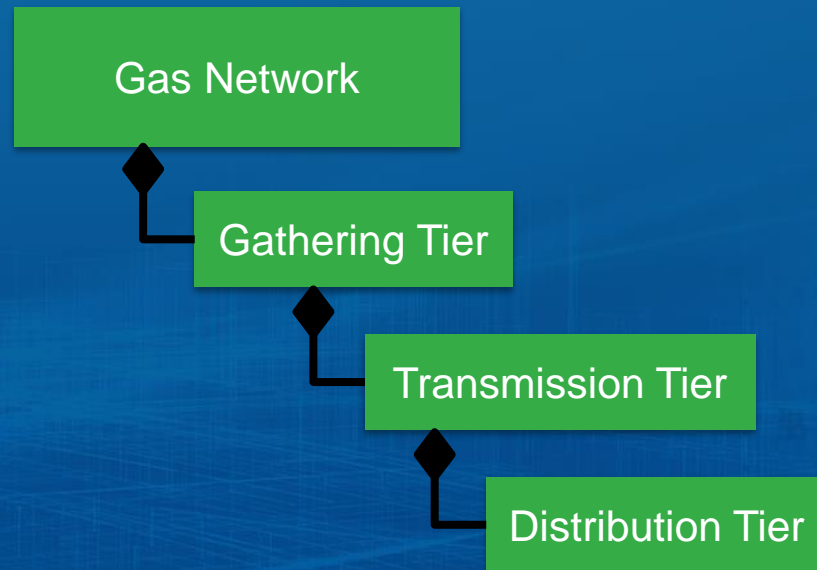
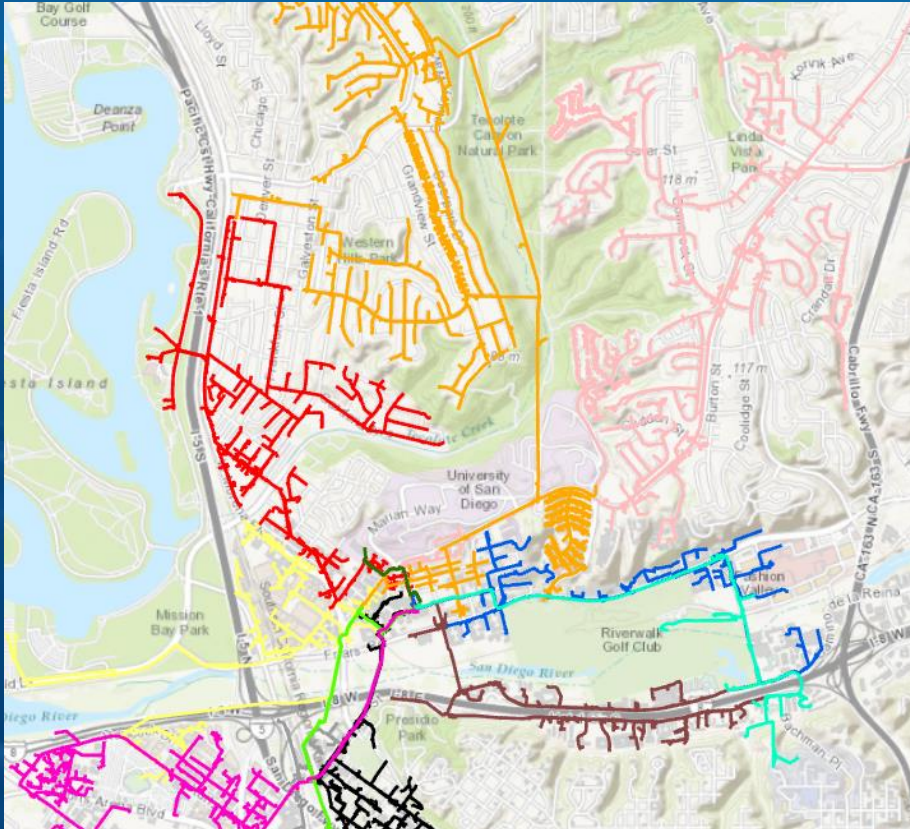
Features in gray are not in network topology.

- ▲ Junctions
 - ElectricDistributionDevice.Transformer.High
{CDAC3190-3403-492D-BA5F-BFF77379D27A}
 - ElectricDistributionDevice.Transformer.Low
{CDAC3190-3403-492D-BA5F-BFF77379D27A}
- ▲ Edges
 - ElectricDistributionDevice.Transformer.Terminal edge
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- ▲ Adjacent Junctions
 - ElectricDistributionDevice.Transformer.Low
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 - ElectricDistributionDevice.Fuse
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Single Device with multiple terminals

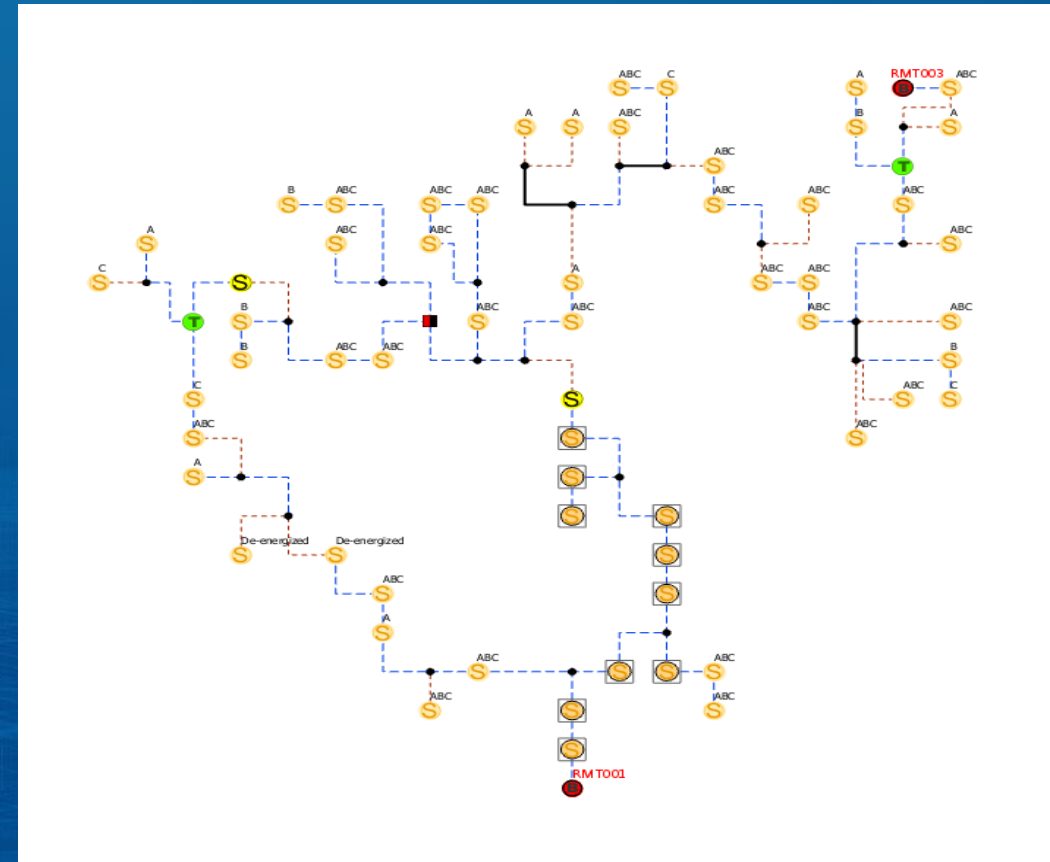
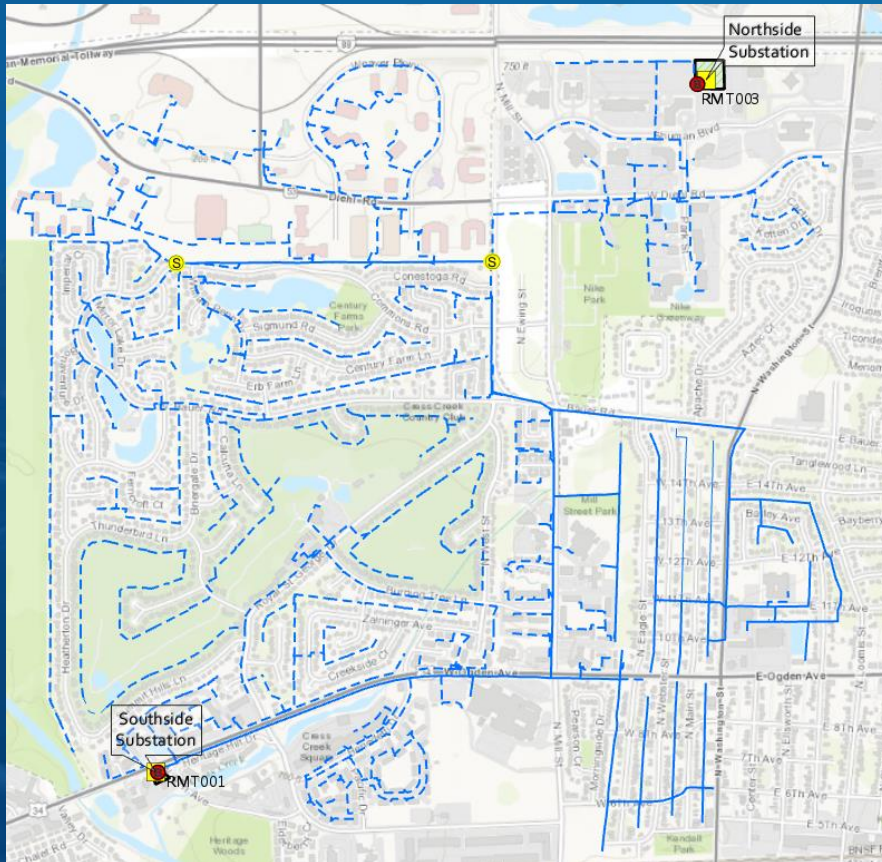
GIS Network Management

- **Subnetwork Management**
 - Representing a portion of the network, a “Pressure Zone” or “Circuit”



GIS Network Management

- Diagram capabilities integrated directly with the *Utility Network*



GIS Network Management

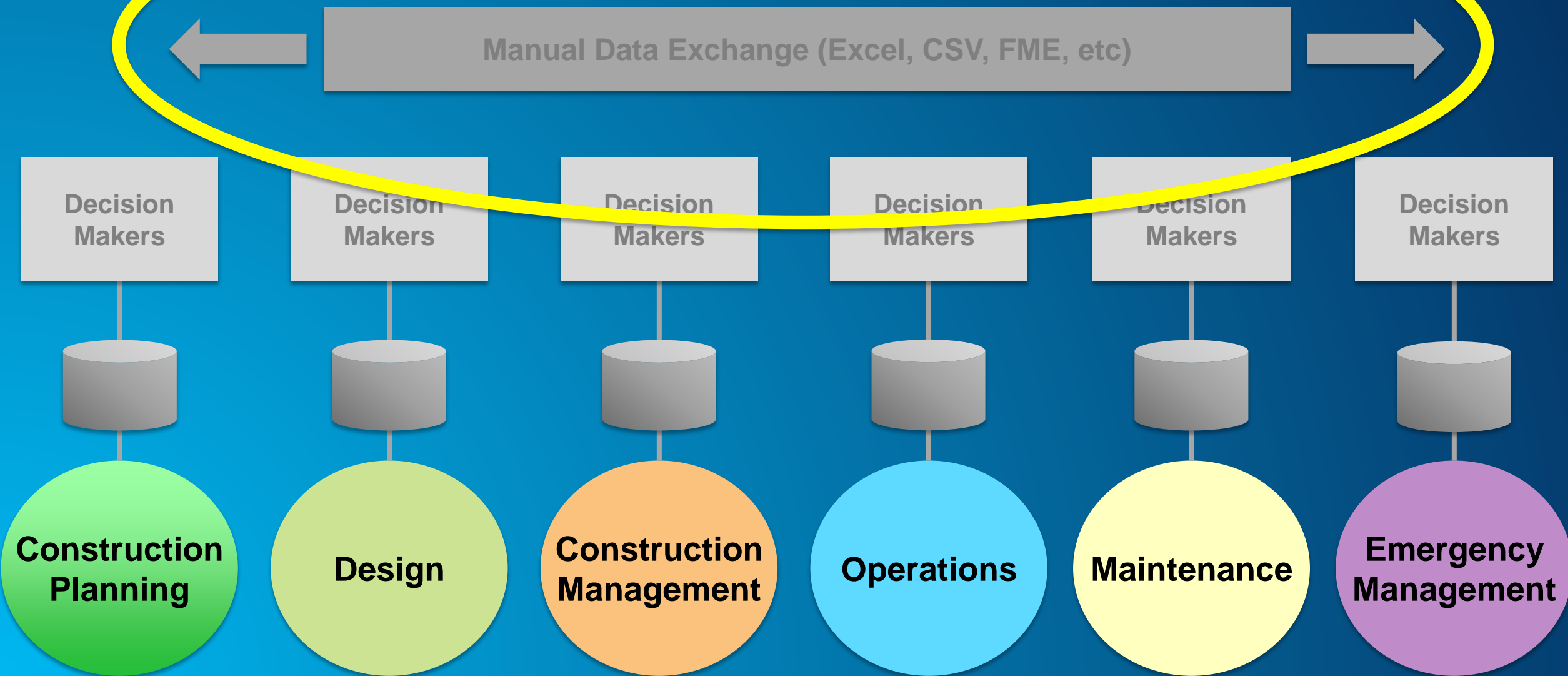
- **Provide utility customers with the ability to model, edit, and analyze complex networks of facility infrastructure using role-based apps**
- **Enable key modeling concepts to better support a true representation of what is on the ground, while fostering an easy exchange of network information with other mission-critical systems**
- **Support highly responsive editing and analysis capabilities**
- **Provide the capabilities of the network and the asset management solution wherever users want to work**
- **Whether users view and query data, execute analysis, or edit the network, the capabilities to perform these actions will work across the platform**
- **The technology is based on a services architecture**

GIS Network Management

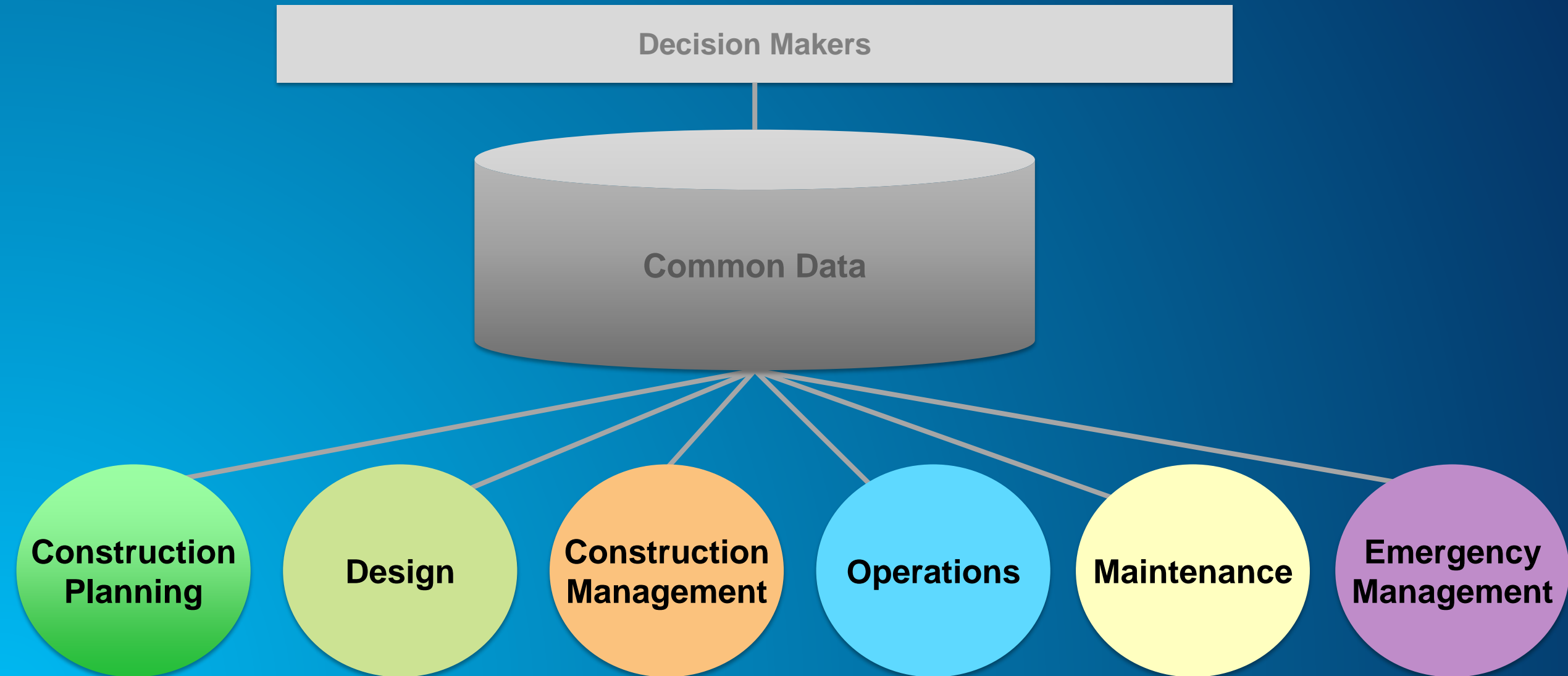
- ***Increasing ROI***

- Ensuring data quality and correctness
- Real world representation of what is underground
- Sophisticated analysis
- Subnetwork management
- Improved mapping and visualization techniques
- Expanded data exchange capabilities
- Increased performance
- Services based architecture for enabling the platform
- A strong foundation for our *customers* and *partners*

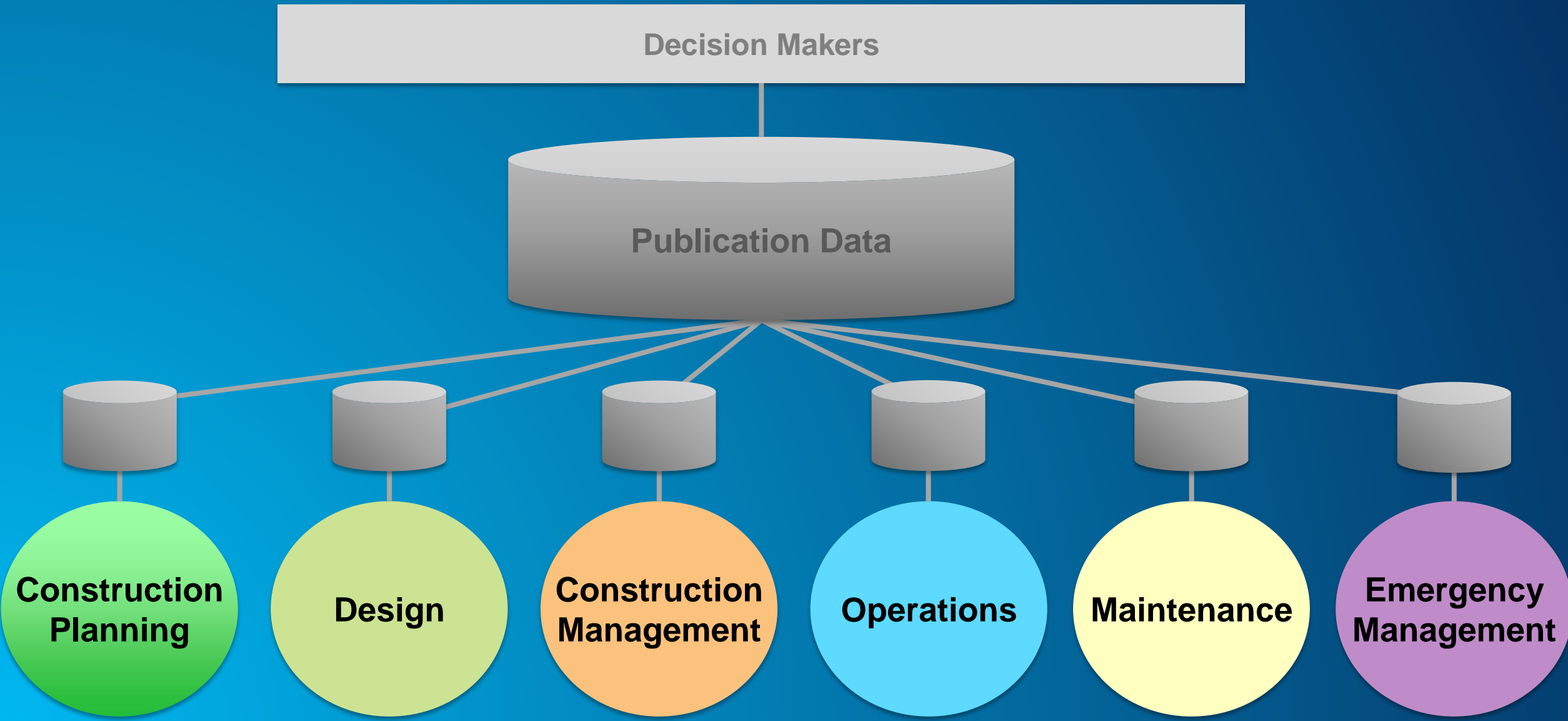
Infrastructure Data Life Stages Today



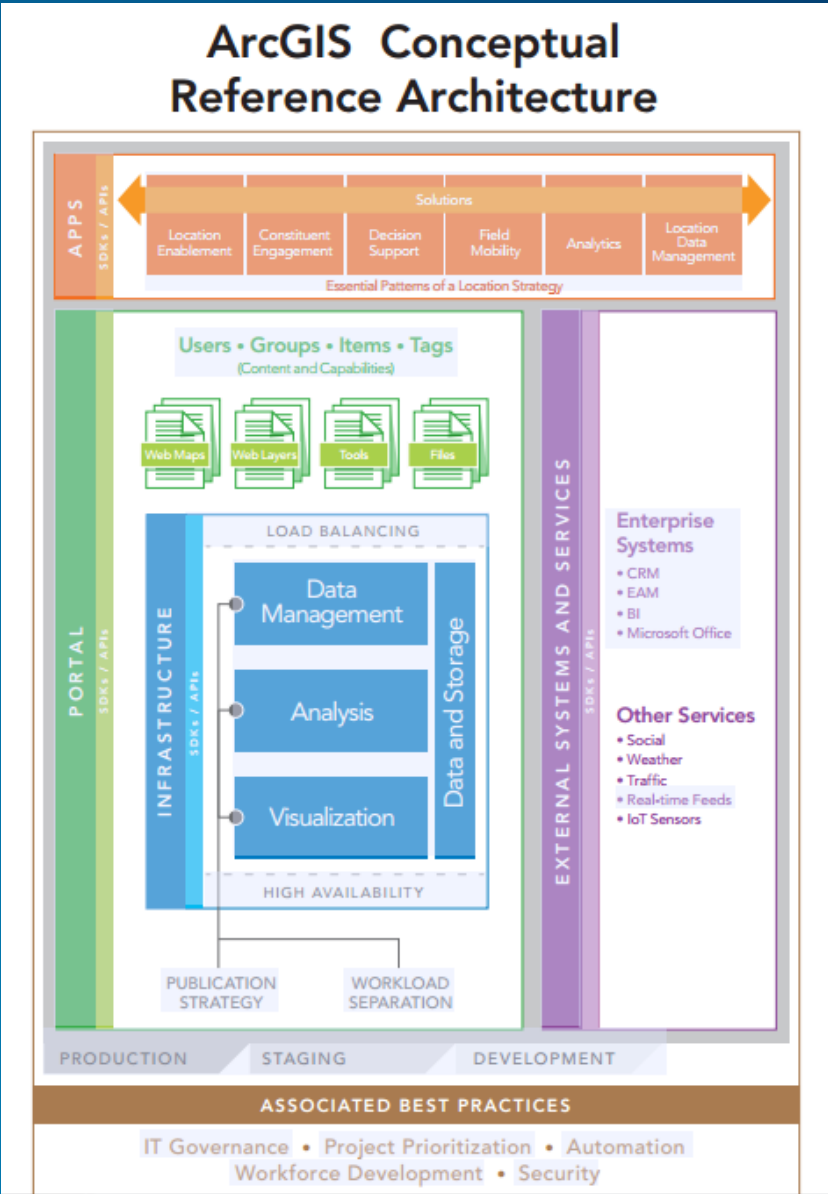
Infrastructure Data Life Stages Future 1



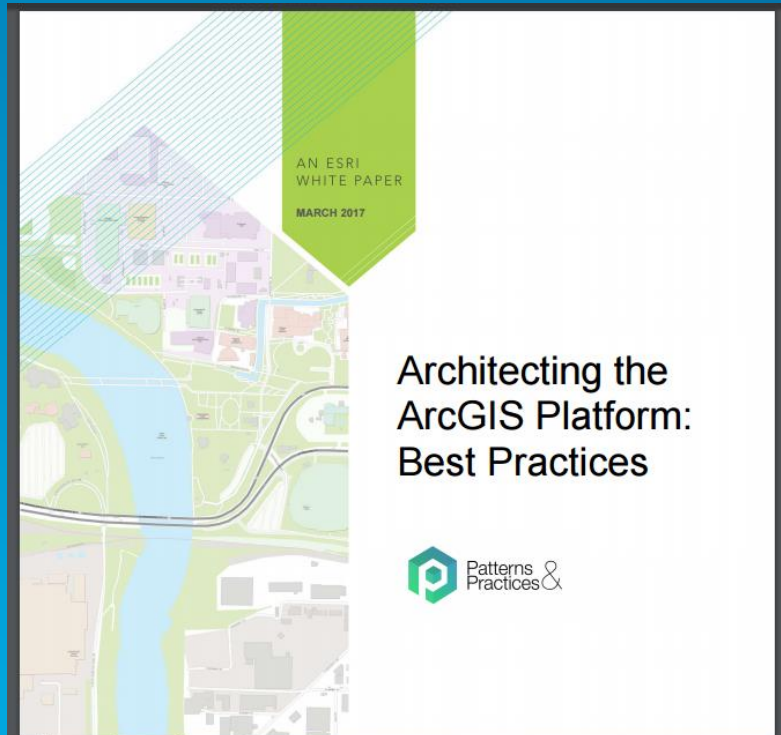
Infrastructure Data Life Stages Future 2



Publication Databases Are a GIS Best Practice



Publication Databases Are a GIS Best Practice



Publication Strategy: Geospatial Content Delivery

March 2017

Publication is the act of delivering content (data, services, and applications) to appropriate consumers in an appropriate manner. A geospatial content publication strategy is necessary for delivering content to consumers in a well performing, reliable, and secure manner.

Introduction

An effective geospatial content delivery strategy must address performance, reliability, and security. By addressing these three areas, organizations can make certain that content will be available and delivered in a manner that is suitable for consumers to use. This strategy should balance user expectations for performance and availability against security and load on the infrastructure. The intent is to mitigate risk while meeting audience needs and expectations.

Recommendations

One common publication need involves sharing internal information with people outside of the organization—for example, a city sharing land ownership information with the public. A typical strategy would involve creating a publication geodatabase (as a hosted service) deployed to a cloud environment, which is separated from internal systems. This strategy addresses the elements of performance, reliability, and security.

Performance is addressed by separating information consumers from operational or transactional systems. In the example of the city sharing land ownership information, the public consumes information from ArcGIS Online, which reserves the city's internal resources for transactional editing of the property boundaries. Separating consumers from transactional editing reduces resource contention, increasing the available resources for editors. Leveraging a cloud-hosted, software-as-a-service (SaaS) environment also provides a scalable, more elastic venue for consumers, so the available resources can grow in response to demand (for example, to support a suddenly popular map). In the city's example, performance is appropriately addressed for information curators and consumers.

Reliability is an important aspect of an information system. Reliability can be expressed as a service level agreement (SLA) or as an expectation of when the system will be available (for example, during work hours, or during a crisis). Organizations can address reliability by following many of the other best practices, such as high availability, load balancing, workload separation, and security. It can also be addressed by leveraging cloud capabilities. In the city's example, reliability is addressed for the public, because ArcGIS Online has a 99.9% SLA. There is a less strict SLA for editors, which does not warrant high availability. Organizations (in this case, the city) should implement appropriate infrastructure to support those less strict SLA requirements for their editors.

Security means exposing the right content to the right consumers, while still protecting the enterprise. In the city's example, consumers are allowed to view the published land ownership information, but they have no access to update the property boundaries. For reasons such as legality and cost, property boundaries should only be edited by authorized experts and maintained in a secure system of record. The example appropriately addresses geospatial content security on the consumer side, but internally, the land records department maintains lots of sensitive information, so a separate internal publication environment is appropriate for other departmental access. In this case, the city might also consider a separate internal publication environment for decision support, as shown in figure 1.

An effective geospatial content publication strategy will address performance, reliability, and security. The strategy should strive to deliver content that meets the needs and expectations of consumers, while protecting internal systems and data. Effective geospatial content delivery exposes appropriate information to the broader audience while minimizing the impact on operations.

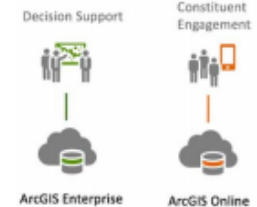
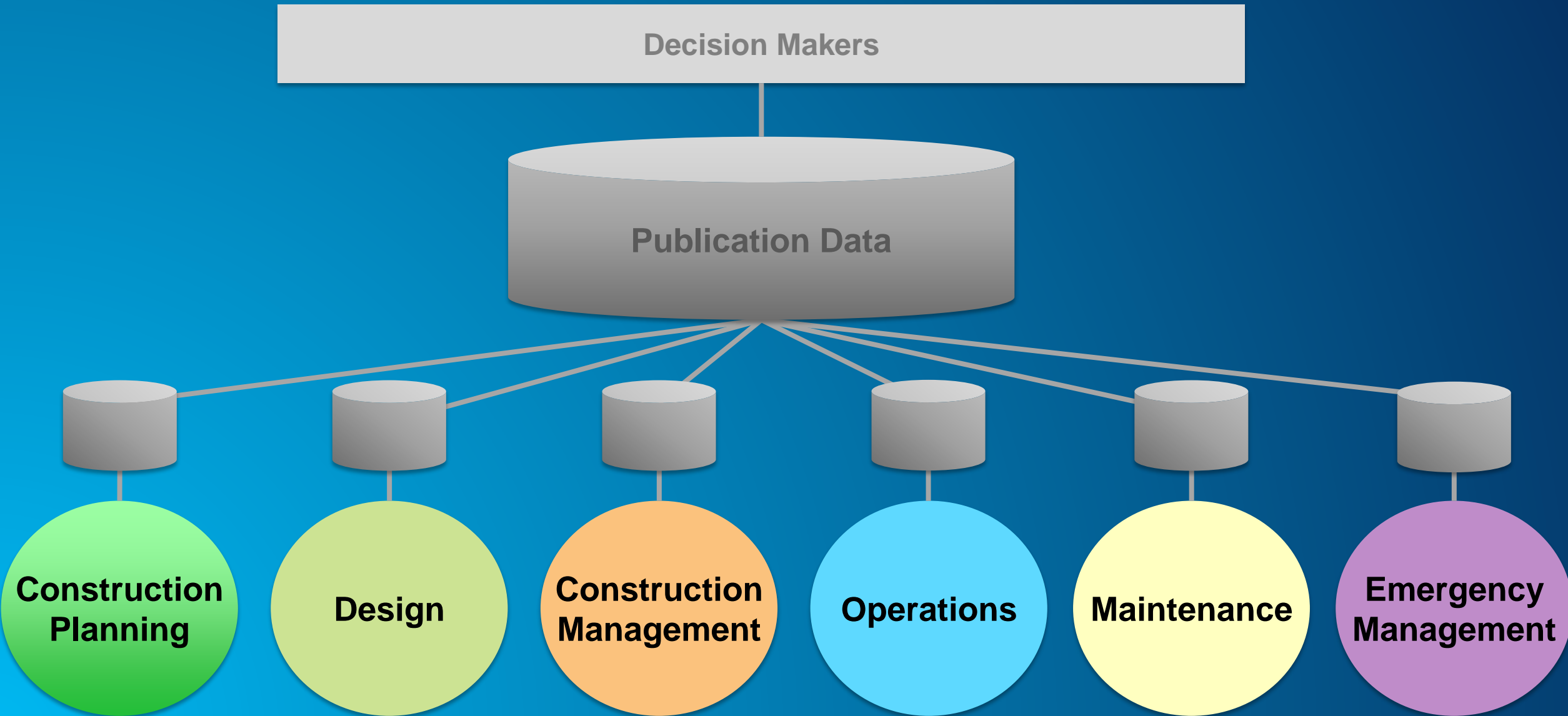


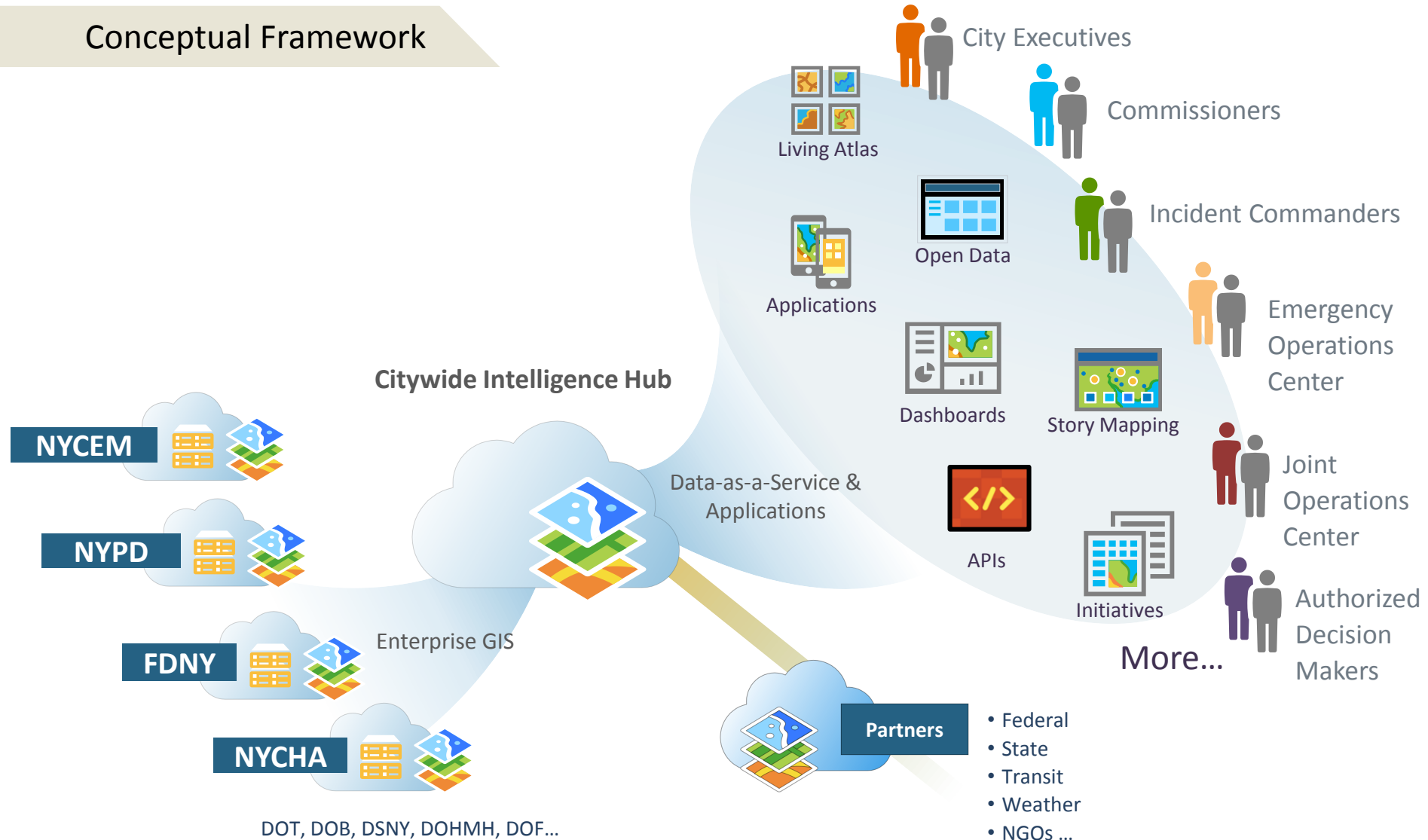
Figure 1: Publish content to the environment appropriate for the audience.

Infrastructure Data Life Stages Future 2

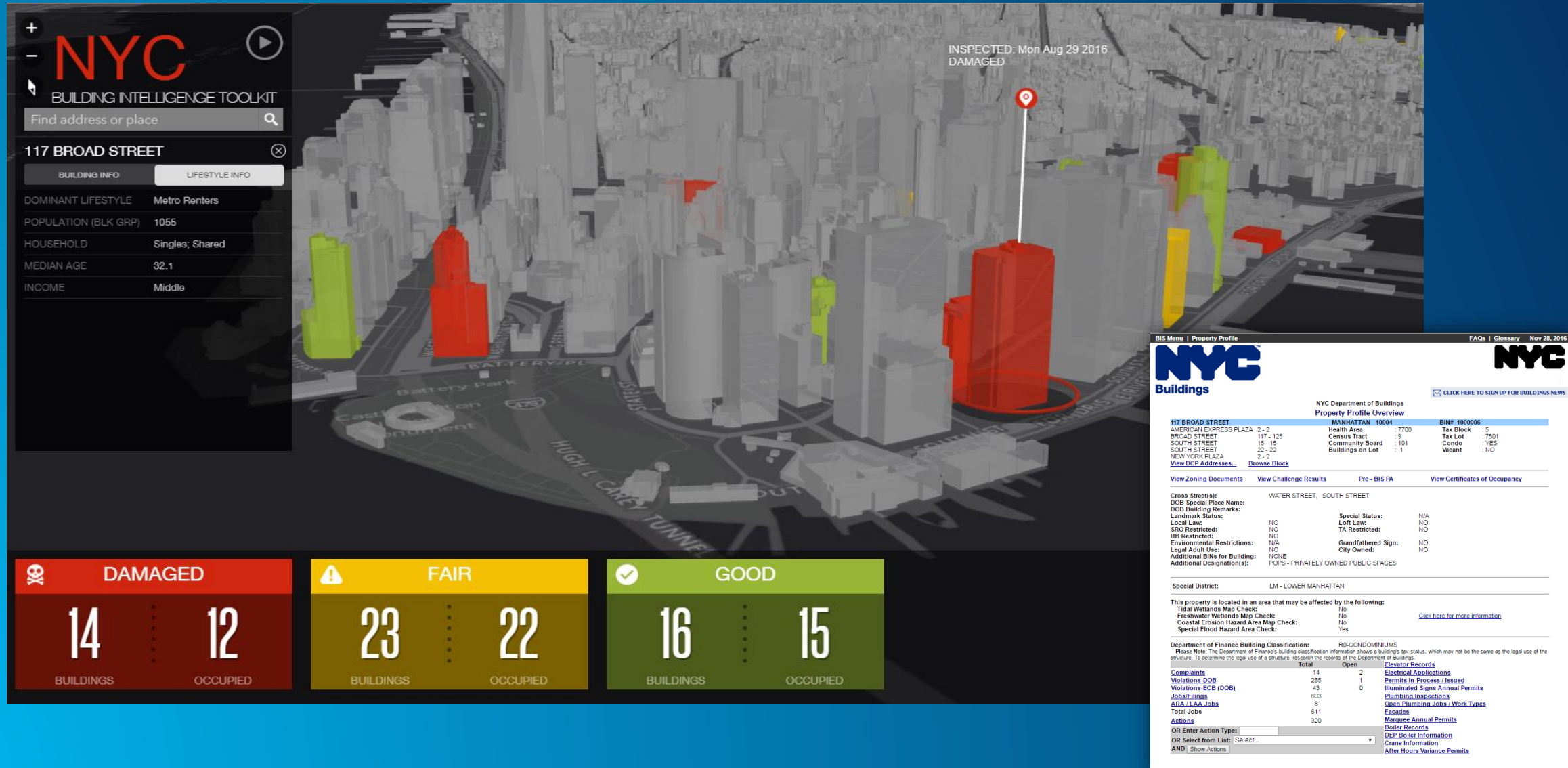


Citywide Intelligence Hub

Conceptual Framework

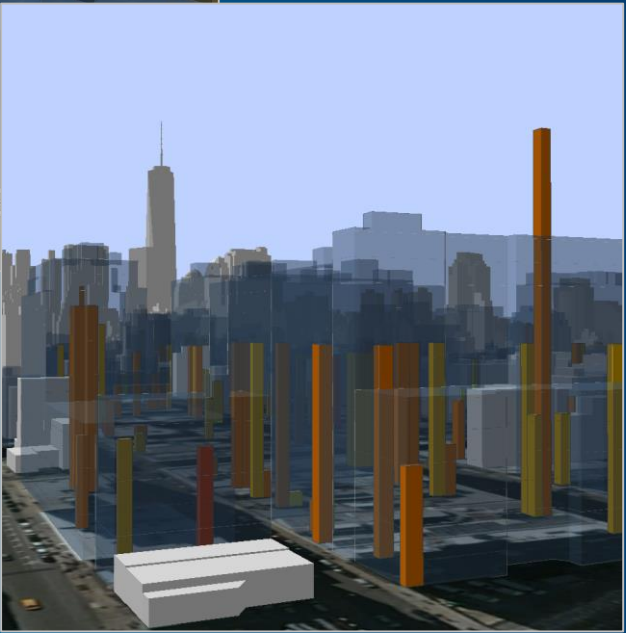
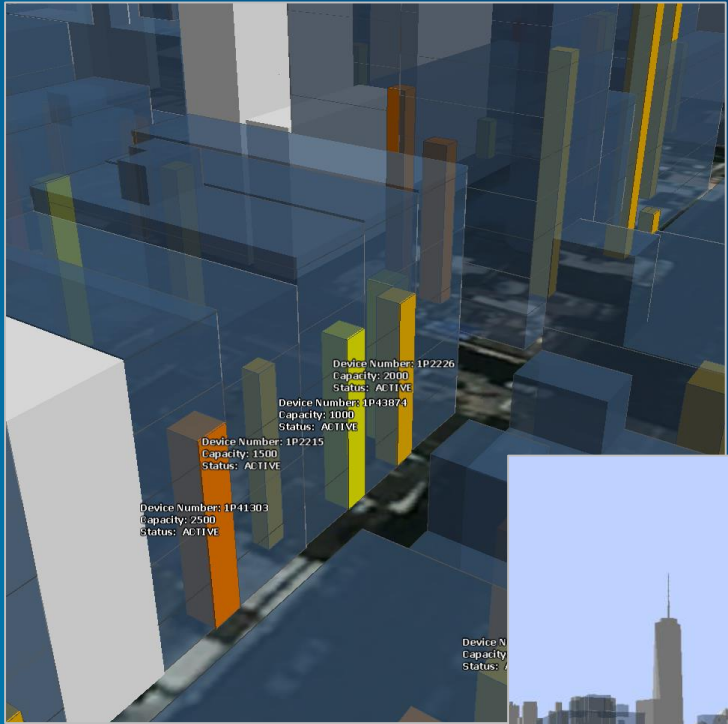
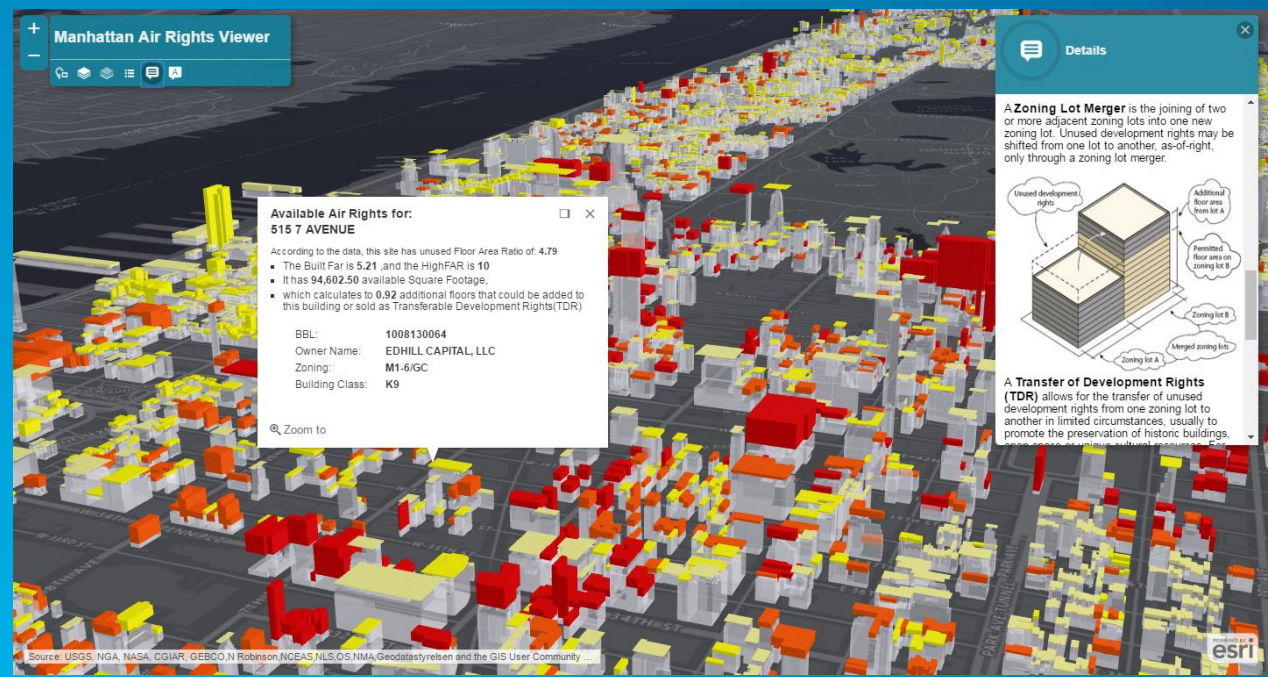


Building Intelligence Toolkit



Operationalizing Information Systems

GIS Delivering Information Products to Decision Makers



Citywide Intelligence Hub

Location as a Service

Business Operations

HUB Platform

Decision Makers

- Mayor's Office
- Commissioners
- Incident Commanders
- Emergency/Joint Operations Centers
- Citywide Analytics



NYC
Mayor's Office of Operations



NYC
Information Technology & Telecommunications











cyclomedia

Ground Level Imagery: CycloMedia

360°parallax-free and geometrically correct panoramic images taken at scale with superior position accuracy



Positioning Quality

- Excellent geo-reference (10cm on average)
- Ground control points through (optional) CycloPositioner 1.5T
- **Allows for optimal position accuracy**

Image Quality

- Natural, clear and bright colors
- 100 Mpx at 62dB
- **Excellent definition as a result of high resolution**

Metric Quality

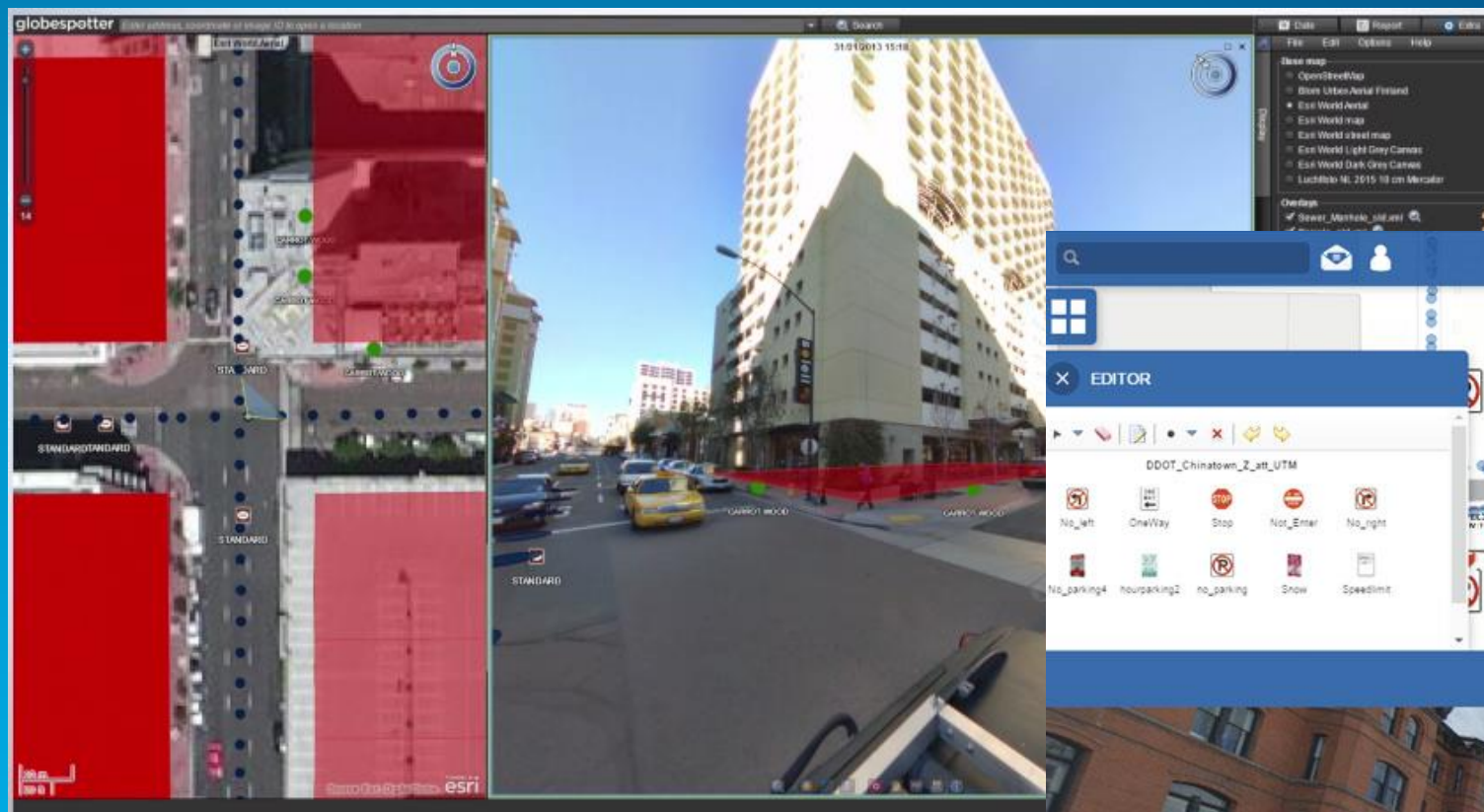
- Geometrically accurate per pixel
- Relative Measurement Accuracy – 2cm
- Full spherical 360° view - 180° vertically
- No visible seams or image gaps
- **Enables users to take precise measurements**

Meta Data

- X, Y, Z + orientation in required coordinate systems
- Includes ImageID
- **Allows users to evaluate data and determine 3D coordinates**

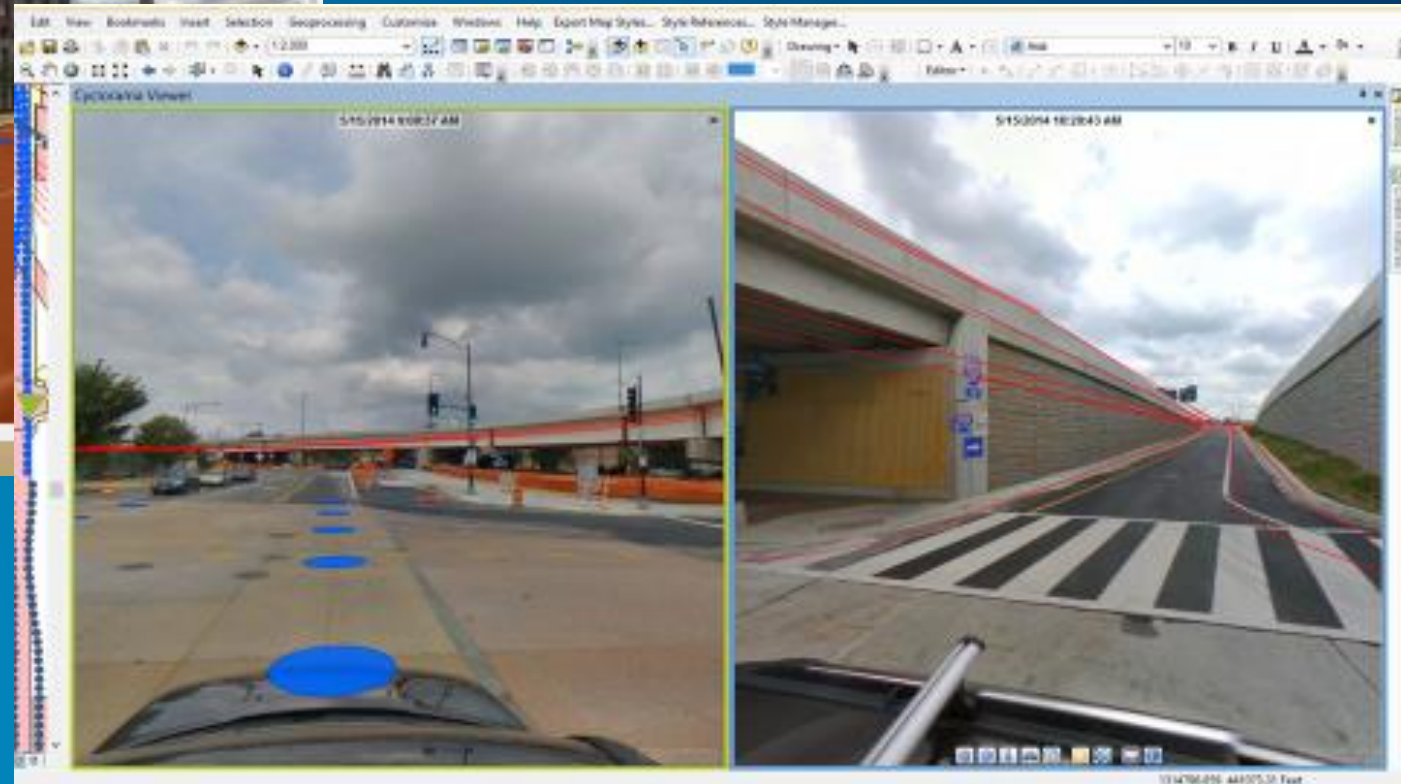
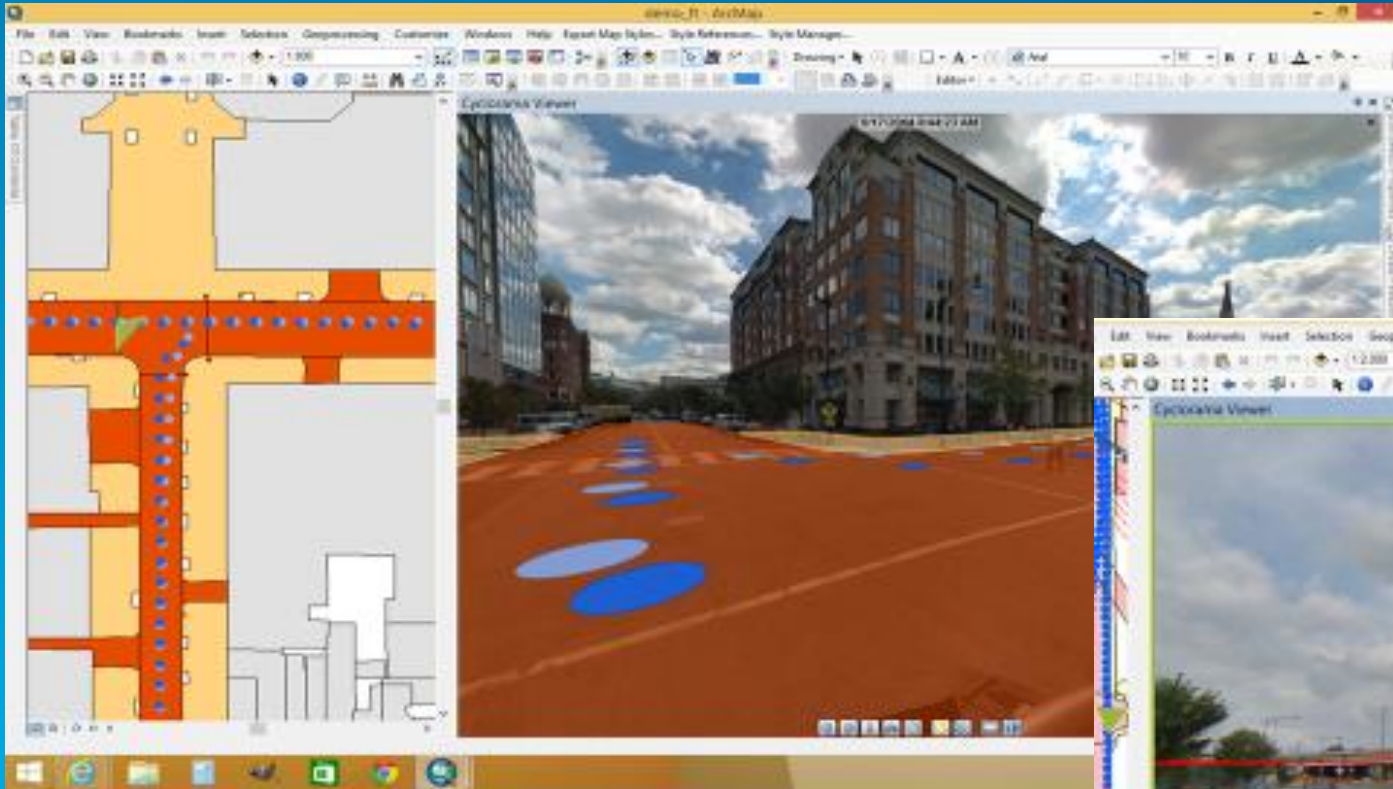
Unique Features

CycloMedia - GeoCycloramas



Imagery Updating As-Builts

- GIS Overlays X,Y & Z
- Mobile LiDAR Capture & Utilization
- Integration of existing data/historical images – “Content Collaboration”
- Feature/Asset Extraction
- Catastrophic event imagery delivery





GIS and Augmented Reality in Pipeline Field activities

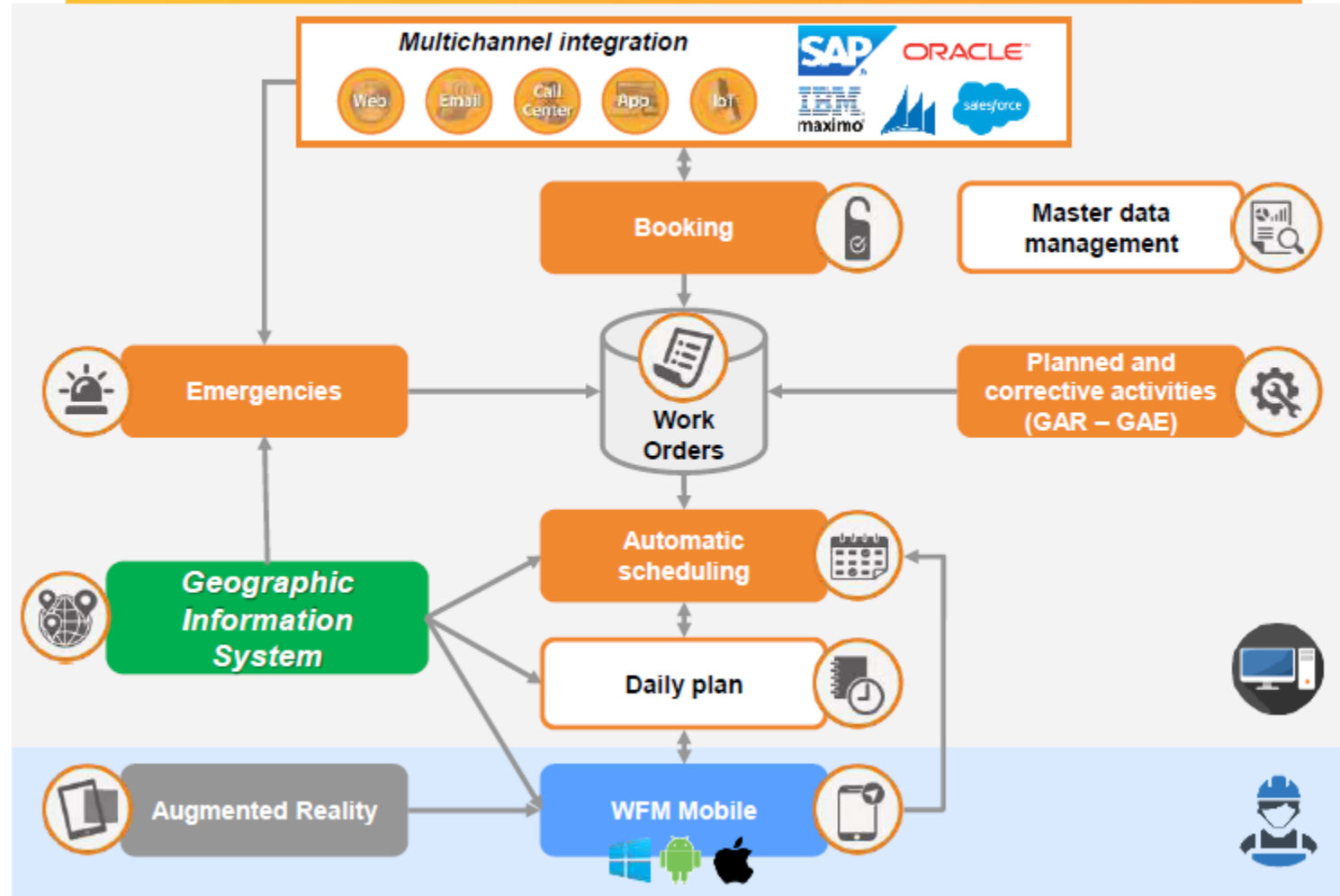
Salvatore Amaduzzi

November 2nd 2016



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Field Service Management application flow



Augmented Reality Module

Use of Augmented Reality in support of the operational processes performed on field by maintenance teams



- App integrated with Mobile WFM and enterprise GIS services
- Combined use of GPS, compass and accelerometer to overlay virtual objects onto the real world
- Representation and consultation of information on the assets (attributes, location, technical sheets, installation diagrams, etc.)
- Dynamic and parametric regulation of the displayable contents
- Tracking and orientation for reaching the plants located in arduous areas
- Support to pipeline control (check on the presence of interferences in the pipeline)

Augmented Reality for Field Service Management

Cross Platform support



Multi Device Integration



Esri services compliant



Augmented Reality for Field Service Management

Combination of
reality and virtual
reality

Interactive real
time execution of
the user's inputs

Alignment of real
and virtual objects

Automatic
identification of
plants/technical
objects



Security
equipments
verification



Indoor orientation
(emergency
procedures)



Localization of
underground
networks



Isolated plants
reachability (3D
orientation)



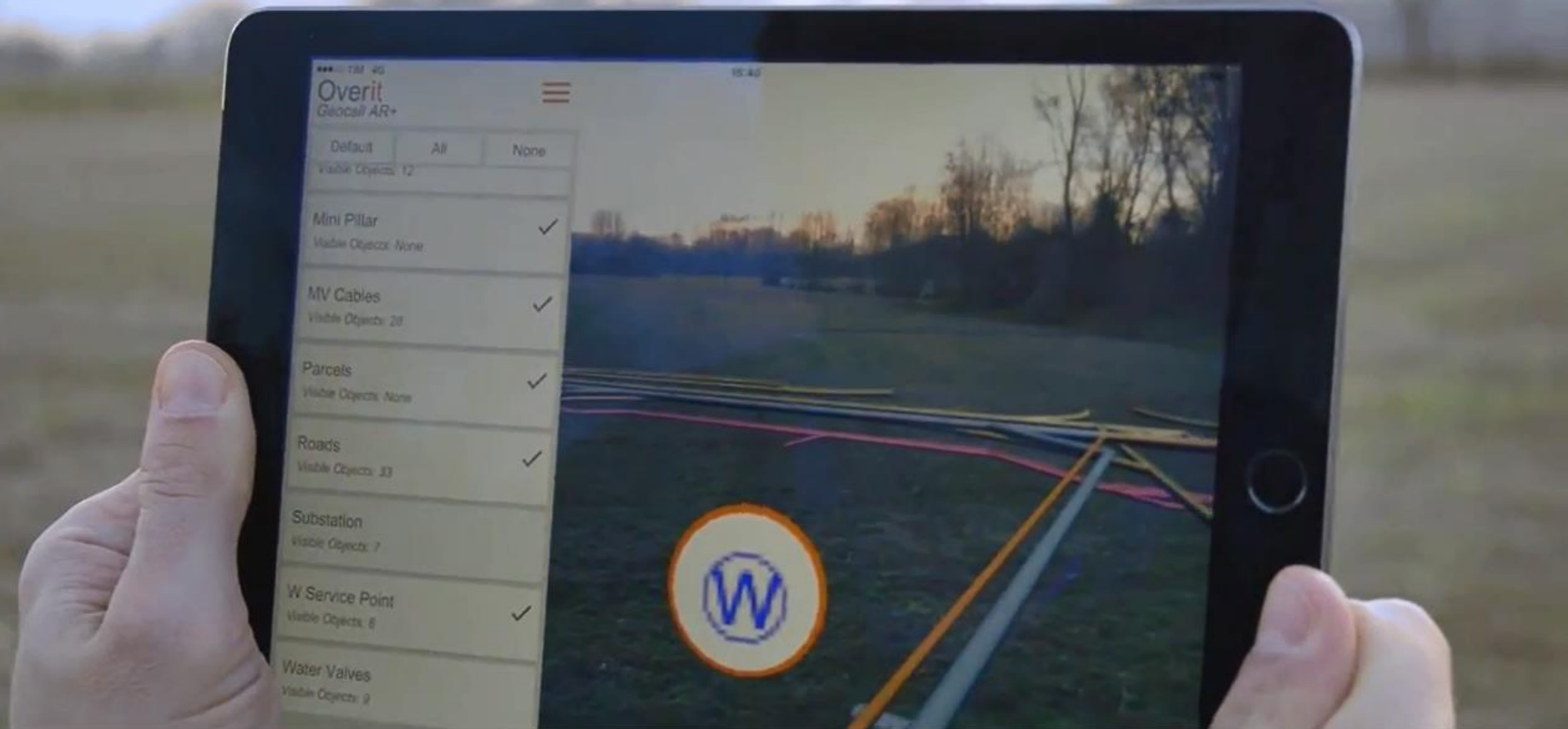
Guided interactive
maintenance
procedures



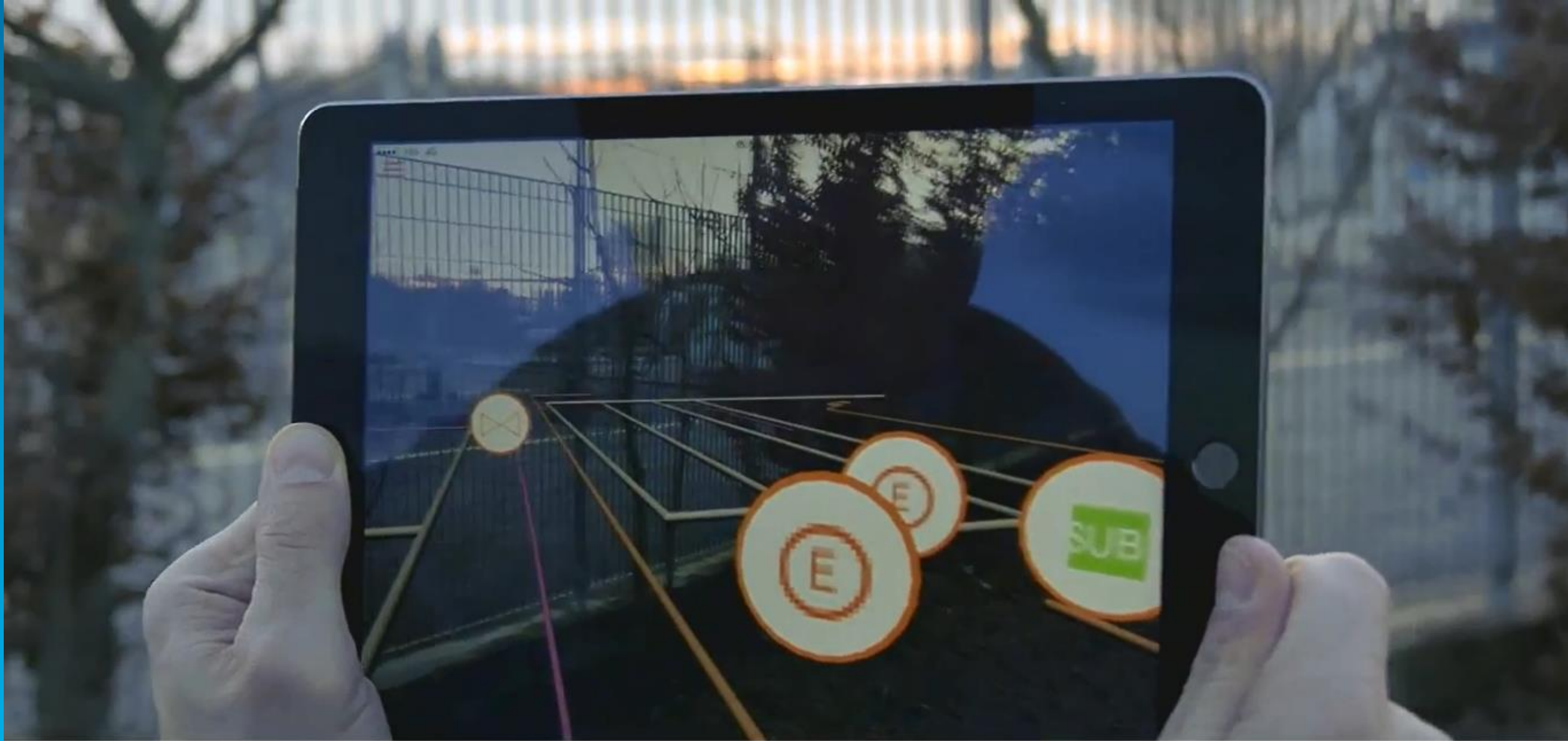
Increase in the perception of the working environment and
reduction in the complexity of the activities being carried out

Augmented Reality on smartglasses





The user can visualize all informative layers about underground networks and technical objects mapped



For each technical object identified,
quick access to its datasheet with the related master data

Meemim

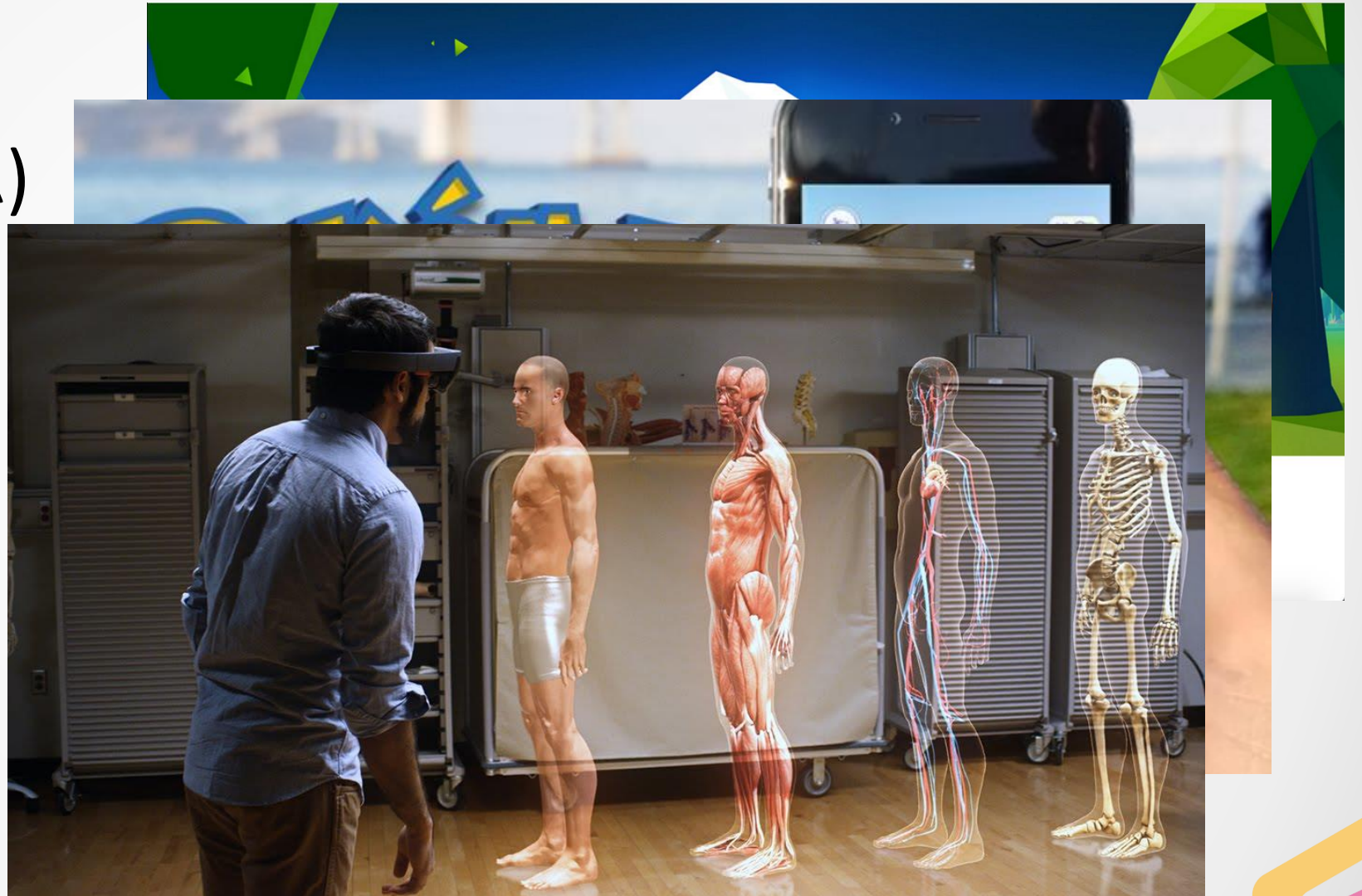
Visual GIS





Virtual, Augmented and Mixed Realities

- Virtual (VR)
- Augmented (AR)
- Mixed (MR)







Municipal/Utilities Technology

- HoloLens - unique opportunity
- Leverage existing investments
- Bring disparate data elements together
- Benefit from bi-directional integration with ESRI GIS



5 - Collaboration

- Combination of visualization plus live video feed





6 – As-Built Capture

- Hands-free capture of as-built vs. as-documented
- ESRI GIS update via bi-directional integration





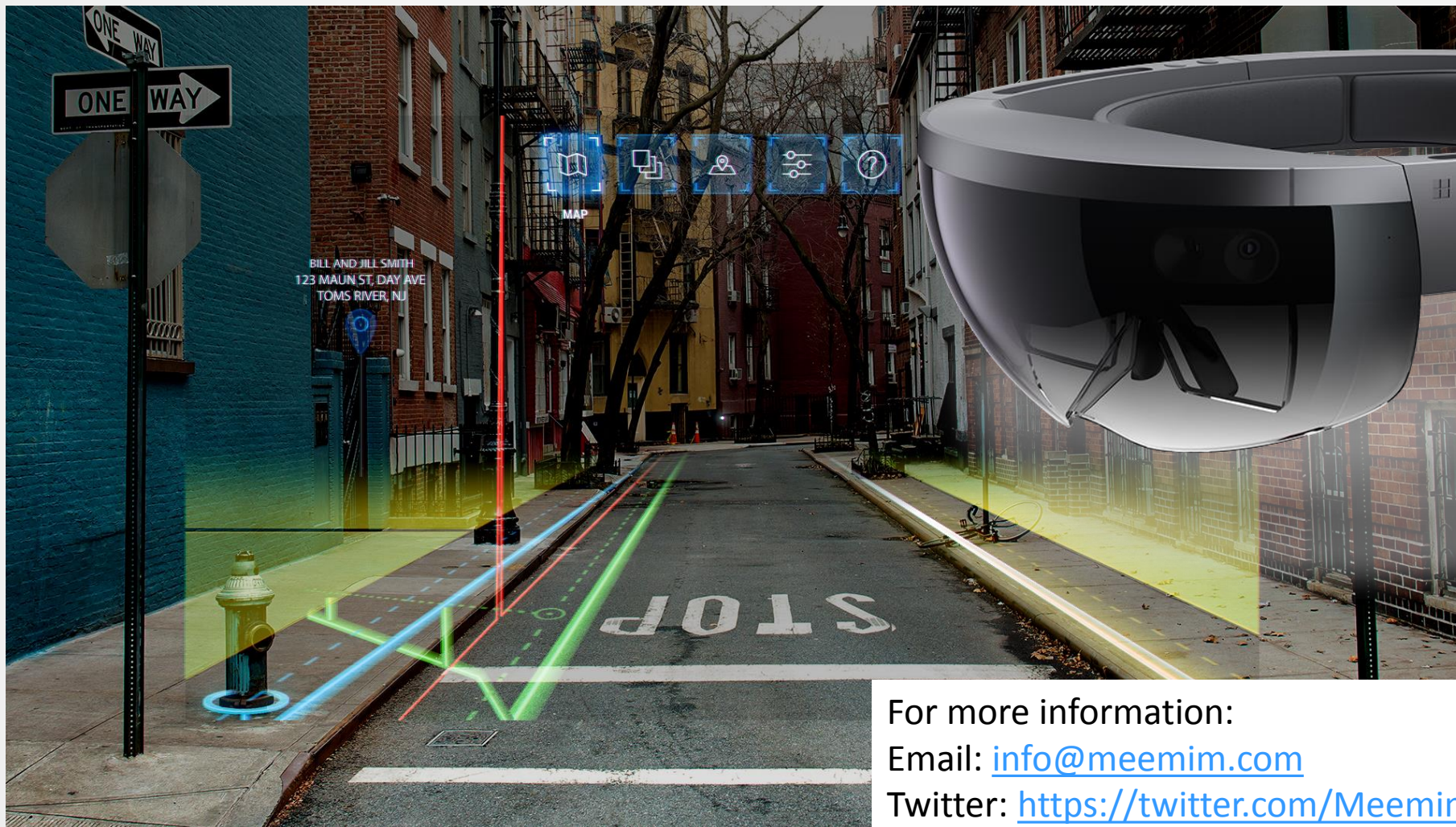
Solution Summary

- Infrastructure visualization
 - With data labels and visual aids
- Knowledge management integration
- Bird's eye view
- 2-way video communication
- Field-office collaboration
- Hand-free as-built capture and GIS updates





Meemim vGIS - The Future is Visual



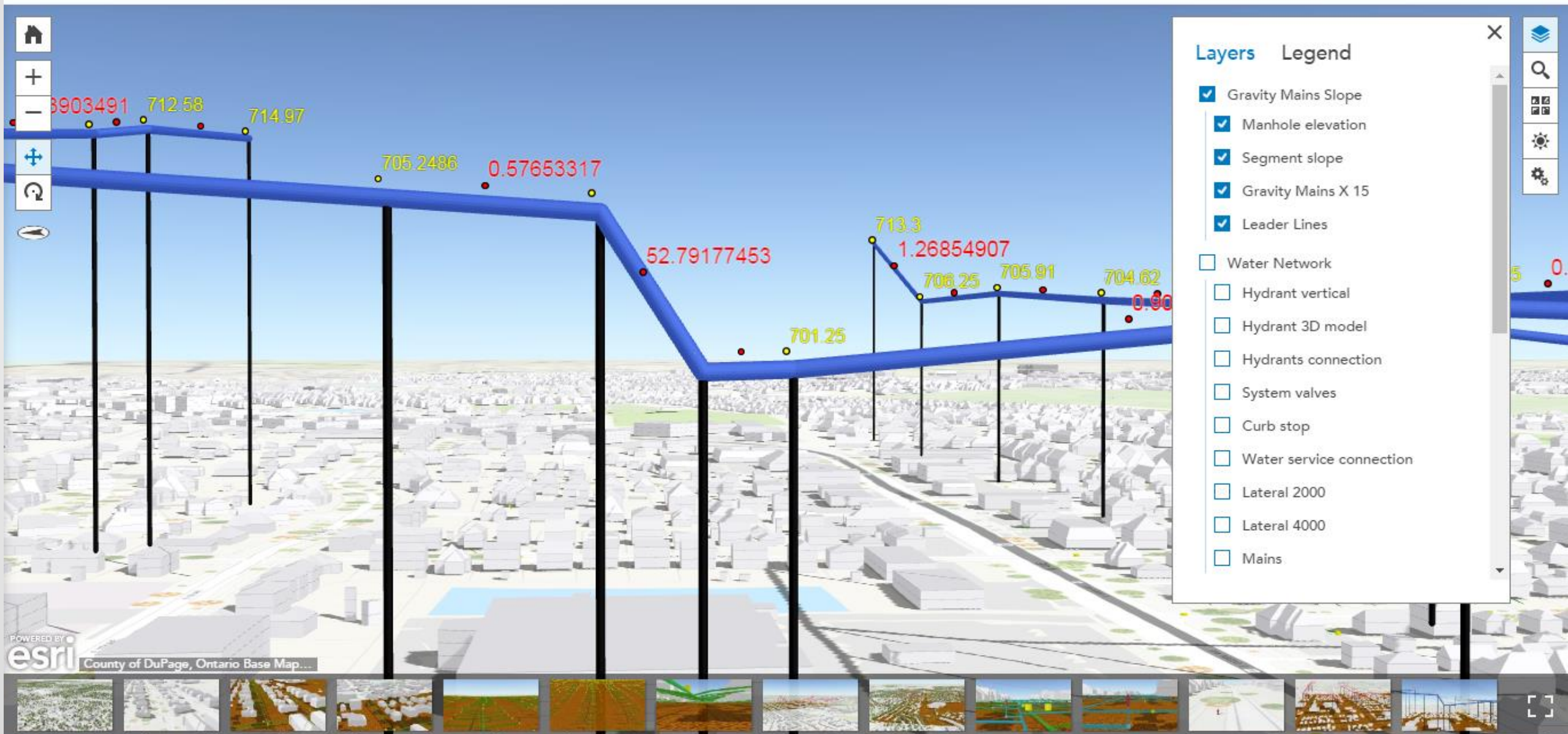
For more information:

Email: info@meemim.com

Twitter: https://twitter.com/Meemim_Inc

LinkedIn: <https://www.linkedin.com/company/meemim>

Web: www.Meemim.com

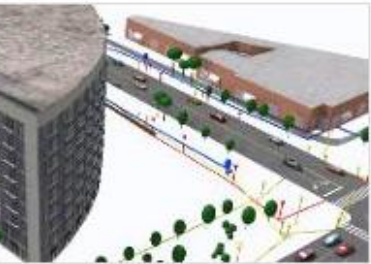


www.arcgis.com/home/item.html?id=378cf0e8b7d442db84a709e63d70659a

☆

3D Utilities

Overview



A CityEngine Webscene showing subsurface utilities in 3D.

by CityEngine

Last Modified: April 12, 2017

CityEngine Web Scene

View Application

Description

A CityEngine Webscene showing subsurface utilities and telecom networks.

Access and Use Constraints

No special restrictions or limitations on using the item.

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3D Utility Network

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3D Utility Network

Overview



3D Underground Utility Network

by CityEngine

Last Modified: March 30, 2017

360 VR Experience

Download

Description

An ArcGIS 360 VR Experience of a 3D Utility data set. Show water, gas, electrical, and telecom networks. Earth's surface and streets can be remove to be able to look under ground. Streets, Buildings, Vegetation procedurally generated with CityEngine.

Details

0 ratings, 14 downloads

Created: March 1, 2017

Size: 34 MB

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Integrating New York City Information Systems

Improving situational awareness for everyone

**Thank you
Enjoy the Workshop!**

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