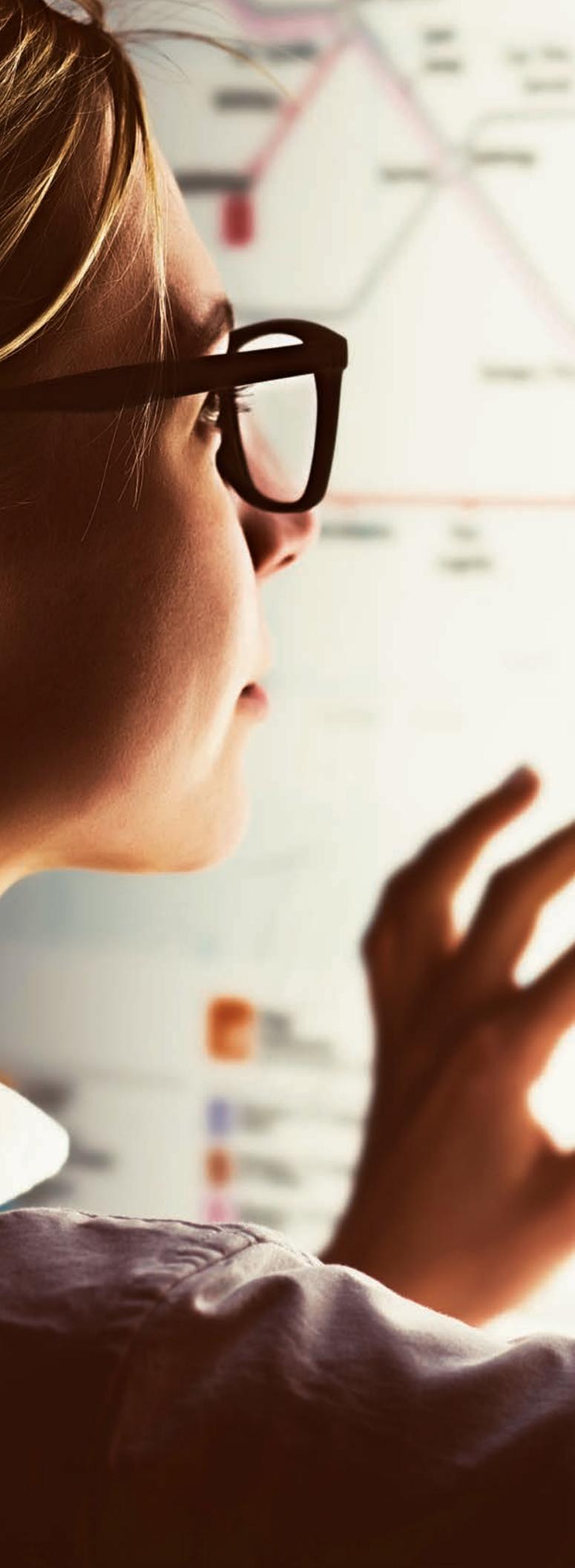




# UNLEASH THE POWER OF LOCATION TO EMPOWER YOUR ORGANIZATION

Discover a System of Engagement Rooted in GIS





## CHANGES IN TRANSPORTATION

There has never been a more challenging time in transportation than today. As the core business of many transportation organizations shifts from construction to preservation, transportation professionals must manage complex transportation systems with increasingly limited resources. Maintaining mobility, ensuring safety, and preserving existing infrastructure while satisfying ever-increasing performance expectations from the public are key challenges facing transportation professionals.

Many transportation organizations have turned to technology as a potential way of doing "more with less." This trend has been supported by the movement toward greater use of performance management analytics and data-driven decision-making. For some agencies, these twin factors became more than an operational imperative, as federal transportation legislation required both performance-based planning processes and plans that relied on defensible analyses.

At the same time, it has been clear that the public expects greater transparency from governmental agencies. In an era of greater scrutiny of public tax expenditures, transportation agencies often needed to do a better job of explaining to the public where and how[?] scarce tax dollars are being spent. Taken together, transportation agencies have come to recognize the need for more robust and accessible information systems to support increasingly complex management and decision support processes.

# EXPERIENCE AN EFFECTIVE DIGITAL TRANSFORMATION

Most agencies are engaged in some form of digital transformation. Each seeks to gain greater efficiencies and effectiveness with new technology that improves workflows and that allows them to put their data to work. It is hard to find a current government or information technology publication that does not contain a strong focus on digital transformation.

While much of the focus has been on the adoption of technology, a digital transformation is more usefully understood as the process by which organizations

leverage technology to more effectively improve their performance and better achieve their mission goals. Understood in this way, it involves redefining the interaction of people, process and technology, often with technology being the final piece of the equation.

A digital transformation is really a continuous process, rather than a one-time exercise. Successful organizations focus on continuous process improvements, and how technology can contribute to the success of their organization.



# ADDRESSING THE CONCERNS OF APPLYING A DIGITAL TRANSFORMATION

While most senior executives within transportation organizations may be convinced of the need for digital transformation, they are also aware of the potential for failure of such large initiatives.

While there are a number of reasons large technology projects can fail, several deserve highlighting. First, is the often unrealistic expectation that technology alone will solve all of an agency's problems. This view loses sight of the fact that digital transformation is a business transformation, and without a clear view of the underlying business problems, technology might simply exacerbate the problem. Business outcomes need to drive the digital transformation efforts and not the other way around.

The start of a successful digital transformation strategy is with a careful understanding of the problems to be solved, a thorough understanding of the existing workflows, and how those can be transformed, together with a clear plan for achieving the objectives.

At the same time, trying to tackle every business issue at once can be overwhelming. Successful initiatives are often based on solving a series of smaller problems, which can lead to more fundamental changes later.

A final key component revolves around management and setting the right culture for change and preparing employees for changing workflows and responsibilities. Management's leadership in establishing an organizational culture conducive to change and its willingness to drive that transformation have been hallmarks of successful initiatives to date.



# ENHANCING THE VALUE OF A SYSTEM OF ENGAGEMENT

While digital transformation has become a strong focus for organizations, there has been a simultaneous shift among IT professionals away from the large, complex software developments common a decade ago. There has been a general rediscovery of the advantages of off-the-shelf technologies and away from the large, multiyear custom development projects with their cost overruns; delays; and, ultimately, cancellations and failures.

Beyond the failures, there are four reasons for the shift:

- First, technology is moving at a much faster pace, and often, a large complex project can take up to five years or longer from conception to delivery. In the interim, the underlying technologies have changed, the environment that gave rise to the need has changed, and often the delivered product no longer meets the needs of the organization. Organizations want faster and more nimble application frameworks with a shorter time to delivery.
- A second key reason has to do with the burden of maintaining custom applications. Generally, large custom applications are designed to run on existing operating systems, linked to existing databases, and integrated with other applications within the organization. As changes and updates occur to any of those underlying systems, it becomes the responsibility of the IT department to update and keep the legacy custom application current. Multiply that scenario by a factor of 50 or more within large organizations, and you begin to get a sense of the unsustainability of that model. The push for interoperable off-the-shelf software packages with minimal customization has come from the senior IT community members themselves.
- Third, digital transformation is more successful in an organizational culture with an agile development process and a fail fast, fail quickly approach to risk. The term agile refers to an iterative process in which projects evolve through the collaboration of cross-functional teams. An agile approach allows organizations to gain quick value without significant upfront costs, which helps build stakeholder buy-in.
- Finally, there has been a shift in the way we think about software systems. Systems of record are the core business systems in our organizations that must be “correct” and integrated, so all data is consistent. Systems of engagement, on the other hand, are decentralized and encourage peer-to-peer interactions. Geoffrey Moore saw such systems as the future of IT, systems of engagement are not just about having information, they are about empowering everyone in an organization (and in that organization’s community) to access the information they need to be more effective.



# GIS AND A SYSTEM OF ENGAGEMENT

At Esri, we believe that geographic information system (GIS) technology provides the perfect framework for creating a system of engagement. We define a system of engagement as a system that manages and promotes user collaboration and interaction. It complements an organization's investment in a system of record by providing easy access to data as well as easy-to-use applications that encourage collaboration across the organization.

In that sense, the system is designed to enable everyone within an organization to access the information they need to more effectively carry out their daily tasks.

There are six key principles that make up Esri's approach to implementing a System of Engagement.

- 1 Create a single location for users (with appropriate permissions) to access authoritative data, using any device at any time.

This location is different from the large data warehouses that organizations often built several years ago. A core principle of Esri's system of engagement is that the ownership and stewardship of the data should remain with the group responsible for collecting and maintaining the data, but the data should be available from an easy-to-access site. Anyone should be able to get to the information they need with no more than three clicks from any device. In this way, organizations can support greater collaboration and more effective decision-making.

- 2 Build on your existing technology and data investments.

Most organizations already have a large number of technology investments and management systems that contain critical data and information. The problem is that the data is not shared across the organization in ways that can be used for more effective decision-making. GIS is perfectly suited to leveraging existing data systems. Because nearly all data has a location component, GIS can serve as the hub between different datasets to allow an organization to maximize the value of its data. The goal is not to build new,

A System of Engagement is a systematic approach to enabling everyone in the organization with the data, applications and location intelligence they need to better perform their daily tasks.



large, complex systems but to leverage the data that already exists and make it much more widely accessible. A fundamental notion is that data should be “unlocked” and made widely available based on user credentials.

### 3 Understand the possibilities for your data

When data is exposed and made available through user-focused, simple applications that facilitate the daily workflow of the various users, a system of engagement creates targeted information products. These are designed to provide the data, maps, and apps to individual business units, allowing them to bring the right information to their analysis and work. The various applications are often connected to other applications so larger workflows can be supported by a series of smaller, more focused applications.

The process begins with lengthy interviews of users and individual business units to understand their workflows and identify any inefficiencies or technology gaps; from there, tailored applications are designed. This way, the system of engagement is built to tackle the business needs and process improvements, and only after the completion of the discovery phase are any specific applications built.

### 4 Tailor applications to specific users

Another key concept is that the user applications should be designed for very specific workflows and the individual users. For example, field inspectors need an application that is simple to use and can efficiently collect the information in the field, then seamlessly upload the information to the corporate database. For field personnel, a simple configuration of Esri’s Survey123 for ArcGIS can help them collect the required information, including photos if needed.

Supervisors, on the other hand, do not need the field collection application but rather a dashboard that allows them to monitor progress. For them, a tailored application is configured that provides a real-time view of field progress and can generate any needed reports.

Based on similar implementations at several large transportation organizations, as many as 80 to 150 applications have been identified, all with similar levels of user-specific design and granularity. Each application is ranked based on two variables: the value to the organization and the level of effort required to develop it. From this application matrix, the high-value and simple-to-develop applications are targeted first, designed to deliver quick wins and build rapid and broad support for the overall project.



# DOTS IN ACTION

## 5 Build a sustainable technology environment that provides for continual innovation

Because the focus of a system of engagement is to empower everyone within an organization with the relevant data and information they need for their daily workflows, the system is designed to create a sustainable technology environment that allows continual innovation.

The design and build of the technology environment are driven entirely by user needs. Once staff have the information and targeted applications that support their daily workflows, the process becomes one of continual refinement and improvement. The system of engagement helps redefine the way in which people are connected to information, with the goal of increasing business efficiency and performance.

## 6 Implement off-the-shelf technology and rely on configuration as much as possible

With off-the-shelf technology, it is the responsibility of the vendors to ensure that each version of their software has backward and forward compatibility and interoperability with other platform technologies and does not need a significant rewrite to integrate with existing IT architectures. This represents huge savings to IT budgets, particularly as platforms increasingly move to the cloud.

Esri's system of engagement is designed to reduce the risk of failure—relying on configurable, off-the-shelf technology (the ArcGIS platform) as much as possible. Esri has a large number of prebuilt templates and applications designed to be quickly implemented using a simple configuration rather than custom coding. Covering everything from mobile workflows, operational awareness, and business dashboards to constituent engagement applications, these templates and applications are easily configured and implemented.

### Digital Success

For those organizations that have implemented a system of engagement, the process and resultant applications have become mission critical. When the vast majority of agency workflows are supported by targeted applications, and everyone—from the senior executives to the fieldworkers—comes to rely on their access to the information and user applications afforded by a system of engagement, it becomes equally (if not more) critical than an agency's system of record. In this way, the system of engagement is designed to help an agency make a smooth transition to a more information-enabled environment—one where innovation is a continual process and better decision-making is the rule.

"The SoE is breaking down data silos and providing a holistic view of the transportation network. Having the opportunity to look at all data, not just some, is inspiring new, creative, and cooperative problem-solving. By using the common language of geography, we're really getting down to the 'what, how, and where'. And, because we're continually enhancing content and bringing in additional data, we're enjoying unprecedented accuracy."

**Barbara Cohn**  
Chief Data Officer at Colorado Department of Transportation

"Road networks are becoming information networks, but more data doesn't necessarily make you smarter. It's about how you pull it together and visualize things. At the same time, it's important to acknowledge that opportunities for improvement could be missed if 'excess' data is discarded."

**Joshua Laippy**  
Chief Engineer at Colorado Department of Transportation

# IT STARTS WITH YOU

If your organization has yet to fully embrace GIS, it's time to arrange a preliminary assessment to see how ArcGIS can help your department of transportation be empowered. The System of Engagement is built to tackle the business needs, process improvements, and only after the discovery phase are any specific applications actually built.

The time is now, take the next steps with Esri.



For more information, visit  
[go.esri.com/system-of-engagement](http://go.esri.com/system-of-engagement).



Esri, the global market leader in geographic information system (GIS) software, offers the most powerful mapping and spatial analytics technology available.

Since 1969, Esri has helped customers unlock the full potential of data to improve operational and business results. Today, Esri software is deployed in more than 350,000 organizations including the world's largest cities, most national governments, 75 percent of Fortune 500 companies, and more than 7,000 colleges and universities. Esri engineers the most advanced solutions for digital transformation, the Internet of Things (IoT), and location analytics to inform the most authoritative maps in the world.

Visit us at [esri.com](http://esri.com).



## Contact Esri

380 New York Street  
Redlands, California 92373-8100 USA

1 800 447 9778  
T 909 793 2853  
F 909 793 5953  
[info@esri.com](mailto:info@esri.com)  
[esri.com](http://esri.com)

Offices worldwide  
[esri.com/locations](http://esri.com/locations)

Copyright © 2019 Esri. All rights reserved. Esri, the Esri globe logo, ArcGIS, @esri.com, and esri.com are trademarks, service marks, or registered marks of Esri in the United States, the European Community, or certain other jurisdictions. Other companies and products or services mentioned herein may be trademarks, service marks, or registered marks of their respective mark owners.