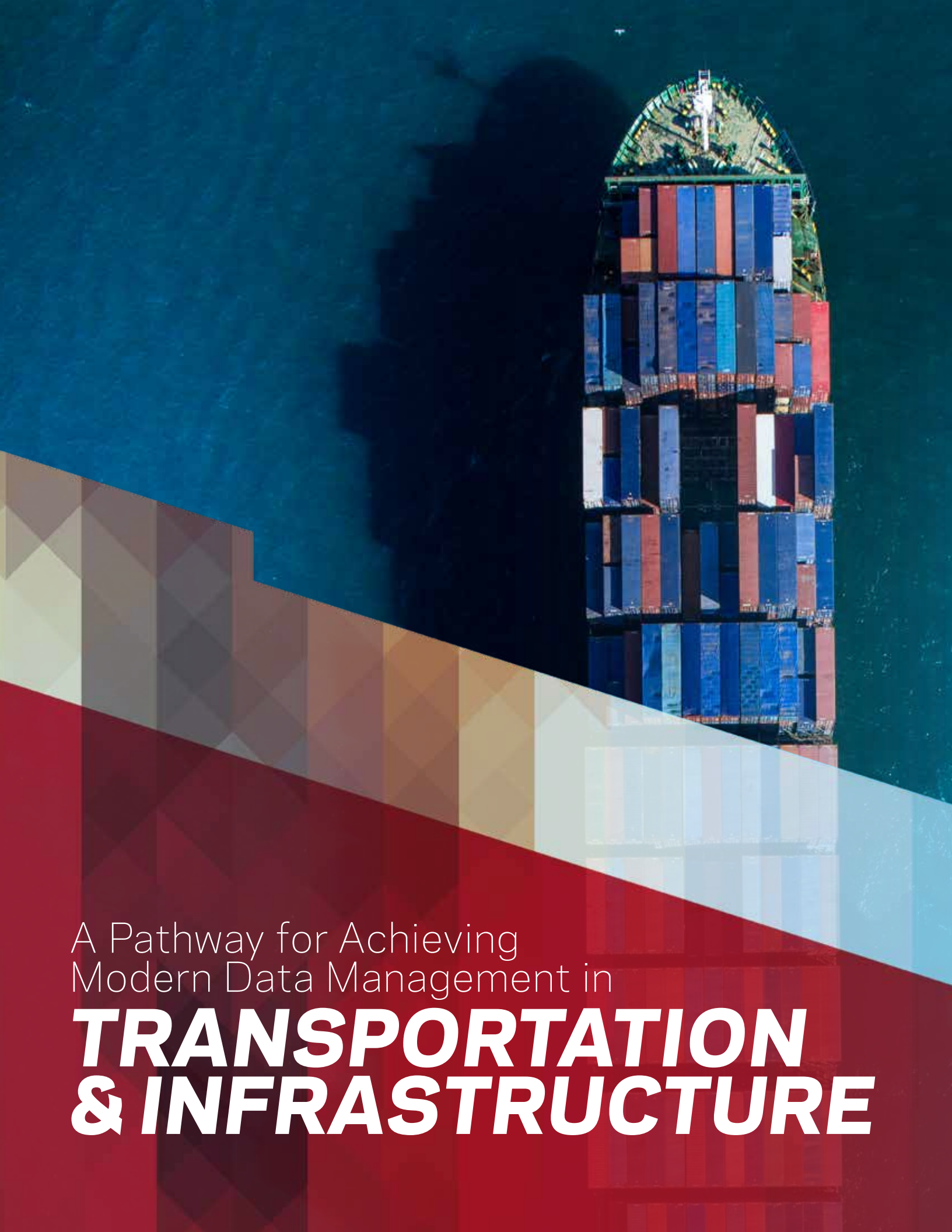

A Pathway for Achieving
Modern Data Management in

TRANSPORTATION & INFRASTRUCTURE

From bridges and roads to trains and tunnels, state and local governments spend billions of dollars each year[1] to maintain the country's transportation systems and infrastructure.

Even with these investments, the country's infrastructure is aging. Many bridges and roadways are in dire need of repair and traffic congestion causes long commutes in major urban corridors, leading to traffic safety issues.[2] With limited budgets, state and local governments must stretch their resources to address these challenges. However, there's another approach that could help them better tackle transportation and infrastructure needs: modern data management.

Center for Digital Government (CDG) research indicates transportation and infrastructure agencies must contend with data silos, lack of standardization and limited data sharing, issues officials with decades of experience in government say is common across most organizations.

"I used to joke that sometimes it was easier to get access to someone's first born than it was to get access to their data," says Doug Couto, who has held senior IT leadership positions in state government and at the Air Force Intelligence Agency.

Even with these barriers, there's an opportunity for state and local governments to advance their data management programs. CDG research indicates modern data management practices — which encompass data integration and the use of analytics and advanced technologies to draw insights from data — can enable transportation and infrastructure agencies to better leverage the data at their disposal to improve safety and modernize.

By adopting a modern data management strategy and transforming their approach to data, transportation and infrastructure agencies can potentially create better, safer communities for the constituents they serve.

THE CURRENT STATE OF DATA MANAGEMENT IN TRANSPORTATION AND INFRASTRUCTURE

CDG surveyed state and local IT officials in public safety, health and human services, finance and administration, and transportation and infrastructure to better understand how these organizations use data and how they can take advantage of advanced data management tools and technologies to derive more value from this asset.

The survey found public sector organizations have varying degrees of data maturity. Only 16 percent of public sector organizations say they're highly effective at maintaining good data quality, while 56 percent say they are only somewhat effective.

CDG research indicates transportation and infrastructure agencies face several hurdles to better manage and make use of their data. Forty-four percent of these organizations say integrating data from multiple systems is the top obstacle they face, while 43 percent say a lack of knowledge and skills within their organizations is the top barrier. For 41 percent of officials, cost and budgeting issues are the most pressing challenge.

Couto says data sprawl and the lack of interoperability are ongoing problems for transportation and infrastructure agencies because they often lead to duplicate data being housed across multiple systems, which compromises data integrity.

CDG research indicates government leaders understand what resources they need to overcome current barriers to optimize the use of data within their organizations, even if budget constraints and other challenges prevent them from progressing toward modern data management. Transportation and infrastructure officials surveyed said the most desired data management methods within their organizations include the ability to proactively monitor and evaluate data quality (45 percent), clean and standardize data (43 percent), and implement data management tools and software (40 percent).

With these tools and capabilities, transportation and infrastructure agencies can begin to overcome data complexity and make better sense of the data they already have, says Bruce Scheibe, director of sales engineering at Veritas, which provides multi-cloud data management, data protection and storage optimization solutions for state and local governments.

"The sheer amount of data sprawl is a huge challenge for government agencies. Organizations are keeping data because they don't know what's in the data, and then data, in general, just continues to grow exponentially," Scheibe says. "If you don't have a clear understanding about what's in that data, you have to keep it all. That can be incredibly expensive and can introduce an incredible amount of risk to your environment."

To reduce this risk and better protect and harness the data they collect, transportation and infrastructure agencies should embrace modern data management.

WHAT MODERN DATA MANAGEMENT LOOKS LIKE

Ineffective data management poses a security and operational risk to government agencies. CDG survey respondents indicate the top risks their organizations face when it comes to ineffective data management include reduced productivity and efficiency (64 percent) increased operating costs (44 percent) increased vulnerability to data security threats (28 percent) and rising customer dissatisfaction (22 percent). However, these agencies can implement a modern data management

strategy to reduce these risks. Scheibe says although many government organizations focus on consolidating data centers to reduce costs and streamline IT operations, modern data management extends beyond this.

"Modern data management, from my perspective, is about having a holistic view and the ability to know where your data is, what your data is and how to use this data to further your mission," Scheibe says.

Modern data management involves having a comprehensive view of:

- The types of data your organization collects
- Where that data is stored across your enterprise (including on premises or in the cloud)
- Who has access to it
- The relative value and life cycle of your organization's data
- How to leverage this data to gain visibility into program performance and effectiveness and improve efficiency and productivity

BENEFITS OF MODERN DATA MANAGEMENT

Transportation and infrastructure agencies collect an almost unfathomable amount of data. Organizations managing transportation-relevant data sets include toll road authorities; local sheriff's offices; state, local and federal departments of transportation; the Federal Transit Administration; and the Federal Highway Administration, among others. These entities must be aware of the growing data sets around traffic cameras, infrastructure projects, mobility data (and more), and how to cost effectively manage, maintain, recover and share all this data for further analysis.

Modern data management provides several benefits to these agencies and gives them the ability to:

Create intelligent transportation networks. Many cities are taking advantage of smart technologies that rely on sensor data from Internet of Things (IoT) devices to facilitate things like smart parking, increased energy efficiency in high-density areas, better road maintenance, and air and water quality monitoring. This data also can be beneficial to create more efficient public transportation routes and inclusive mobility systems for those who are differently-abled.

However, municipalities can't build these kinds of modern transportation systems if they aren't able to automate data collection and preparation, easily access data across systems, or apply AI or machine learning algorithms to this information to generate analytics and insights that improve decision-making.

Enhance safety. Modern data management also can help states and cities improve traffic and pedestrian safety. By making better sense of all the data they collect, transportation and infrastructure agencies can begin to take advantage of advanced data methods and tools like geographic information systems (GIS), construction management technologies, and predictive and prescriptive analytics. This will allow them to develop traffic and congestion management strategies that improve safety, such as pedestrian-only zones or dynamic speed limits that adjust based on real-time traffic, roadway and weather conditions.[3]

Advancing their data maturity also could enable transportation and infrastructure agencies to create operational efficiencies and cost savings in areas like toll road management, traffic imagery analysis, incident detection, traffic control and traffic signal timing. Efforts at the Iowa Department of Transportation (Iowa DOT) provide provide an example of the impact better data management can have on both traffic management and the local economy.

"The Iowa DOT did a lot of work with data around freight to the point where they created terminals on the interstate where trucks could modify routes because they discovered that a good number of trucks were going from Iowa to Chicago and then coming back empty," Couto says. "They used data to figure out how to put a load in both directions so truckers got paid for both ends of the drive rather than running empty to return to their home base."

Trucking is a huge driver of Iowa's economy. The state's efforts demonstrate that modern data management is as much an economic necessity as it is an operational one.

Improve capital planning. Modern data management also can help states and cities better manage their capital assets and prioritize infrastructure projects. With crumbling infrastructure in many parts of the country, using data to understand what roadway or bridge to prioritize for repair or a potentially harmful degradation in water or air quality is critically important to ensure communities are safe.

The data transportation and infrastructure agencies already have is valuable, but it could be much more impactful to these organizations' work with the help of advanced data management tools and technologies. With better data management, agencies can take all this raw, disparate information and transform it into actionable insights that drive better long-range capital planning and ensure they are putting public dollars to the best use.

MAXIMIZING THE USE OF DATA IN TRANSPORTATION & INFRASTRUCTURE

Data is a key strategic asset transportation and infrastructure agencies can leverage to advance their missions. Building an effective data management program takes time and the work is never really done, but as these agencies attempt to evolve into truly data-driven organizations, they should consider these tactical steps:

Develop a data management strategy. Transportation and infrastructure agencies should consider a holistic approach to data management that brings together business intelligence across departments and programs. This strategy must emerge from an enterprise vision for data management in which government leaders clearly outline the what and why of better data management; work with key stakeholders to figure out the how; and bring people, processes and technology together to achieve this long-term goal.

Leverage technology that provides availability, protection and insights. Agencies should consider working with a strategic technology partner that can offer a secure, cloud-driven enterprise data services platform that not only safely collects and stores data from disparate sources, but also provides artificial intelligence (AI) and machine learning capabilities that drive better data analysis, offer predictive analytics capabilities, and allow transportation and infrastructure agencies to access unified insights that enable them to make more informed, proactive decisions that enhance public safety.

Put data governance and security front and center. Data sprawl and complexity will continue to be challenges for agencies, which is why they need to establish robust data governance policies and cybersecurity practices. Once agencies outline these principles, they should put them into action by leveraging a secure enterprise data services platform that encompasses automated backup, recovery and threat detection capabilities.

Couto says more government organizations are creating chief data officers and data steward roles who serve as data managers for the enterprise to ensure data is secure and yet still available for anybody in the organization to use.

Deputizing someone to oversee this critical business area is one way state and local governments can evolve their data management processes.

CONCLUSION

While these are great starting points for transportation and infrastructure agencies to advance their data maturity, Scheibe says it will take time for government organizations to become more data-driven. However, this effort must begin with truly understanding the type of data the organization collects, where it is and who has access to it.

"Better data management starts with understanding what your data is," Scheibe says. "Once you understand that, you can make intelligent decisions about how to manage that data."

This paper was written and produced by the Center for Digital Government Content Studio, with information and input from Veritas and Carahsoft.

Endnotes:

1. What does America spend on infrastructure? Is the state of our infrastructure improving?, USA Facts, https://usafacts.org/state-of-the-union/transportation-infrastructure/
2. America's Infrastructure Report Card, ASCE, https://www.infrastructurereportcard.org/
3. Active Transportation and Demand Management, U.S. Department of Transportation, https://ops.fhwa.dot.gov/atdm/approaches/atm.htm

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