Keep Transportation Moving with Analytics

Harness the Power of Big Data to Improve Safety, Efficiency, and User Experience

With continuing budget constraints, aging infrastructure, and challenges inherent in effectively moving people and things, agencies need smarter ways to use existing resources, reduce congestion and costs, protect the environment, and serve travelers better.

Transforming data into insights can help. While there is a shortage of funding for capital and operating expenditures for transportation agencies, there is no shortage of transportation data. The right data and analytics can deliver actionable, reliable insights to improve regional coordination and understand the mechanisms that drive demand and affect supply more clearly.

For operations, such insight provides the means to monitor status and impact strategies, user experience, and public sentiment. For design, it provides the learning from past experiences to determine effects and costs, and ways to help designers, planners, and operations work together. For maintenance, it impacts areas such as asset management, best time to intervene, service level policies, and funding.

Singapore Land Transport Authority

"Data-driven policy and planning decisions with fast turnaround are regarded as the critical success factors of the Planning for Land Transport Network (PLANET). Today, our expertise, knowledge, and experience are complemented by data-driven analytics on the different domains of land transportation. This enables LTA to achieve excellence in our endeavor to have a people-centered land transport system."

– Rosina Howe, Group Director of Innovation and Infocomm Technology, Singapore Land Transport Authority (LTA)

Flooded in Data, Pressed for Results

As transportation enters a results-driven era, more focus is being placed on data and metrics. Transportation performance management must influence policy decisions and determine how scarce resources are to be invested. Indeed, the U.S. federal surface transportation performance management legislation was designed to create impetus for performance-based and multi-modal, data-driven investment programs.

But this is just the beginning. Advances in sensors, telecommunications, and the connected vehicle are driving a new wave of data, including data from intelligent transportation systems, private sector data collectors, auto manufacturers, private transportation system providers, and more to come.

This data explosion is fueling a number of disruptive trends—from the sharing economy to new mobility enabled customer behaviors to services based on connected vehicles. These disruptive influences can represent both threats and opportunities.

Understanding, adapting to, and identifying opportunity in a rapidly shifting world brimming with data requires a move from being data averse to data hungry, and employing analytics on a scale never before seen. More data and views across multiple datasets lead to more effective analyses, which ultimately lead to better design, planning, and operations, while also saving internal resources to focus more on results.

Managing the Flood

This is the era of big data in transportation. Big data describes a collection of datasets so large and complex that they become difficult to process using traditional data processing applications. It also describes exponential growth and availability of traditional structured and newer types of unstructured data.

The era of big data comes upon transportation even as the industry struggles to manage data from an earlier era.

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In the past, data has been collected, but not necessarily effectively used or turned into actionable information because there has not been a single, integrated view of that data. Integrating data and breaking down functional silos is what is required to uncover innovative solutions and drive performance-based decision making.

Analytic capabilities have also fallen short. Many transportation agencies possess rich data stores, but face challenges making the data accessible. And there lies the conundrum: Accessibility is key to harnessing data today, and moving to predictive analytics tomorrow, facilitating a level of detail that gives rise to asking the right questions. Getting to the right questions requires integration across disparate systems and data types, and an ecosystem that makes it easy to use both old and new tools on traditional and new data. It may also require discovery analytics to allow new data to be quickly absorbed. Discovery analytics points to new trends or correlations in the data that leads to asking more or different questions.

By enabling access to their tremendous diversity of information, agencies can uncover new actionable opportunities. With the right data and analytics capabilities, the data itself begins to drive the questions that lead to better resource utilization, innovative solutions, or scientific transportation management. How valuable would it be if you could answer the following questions:

- How effective are our transportation investments?
- What is the relationship between quality of maintenance and safety?
- Why are there differences in pedestrian fatalities— even in similar environments?
- What are the effects of variable tolling on traffic and revenue?
- Do we understand public perception of transportation service delivery at any given time?

The Data Lake – a New Landscape

The good news for transportation officials is that big data technologies and big data analytics have proven effective across a wide variety of industries and applications.

Teradata has more than 35 years of experience across government and private industry, working with many of the world's most successful organizations, including those in the transportation ecosystem—public sector, automakers, railroads, and airlines alike. In fact, eight of the top 10 travel and transportation companies rely on Teradata for better understanding of their opportunities and their customers.

Teradata excels at enabling organizations to collect, interpret, and provide usable intelligence through data unification and advanced analytics. Teradata analytic solutions bring a wide range of dissimilar information together in a way that enables agencies to make more informed choices, become more data driven, and create a complete picture of the dynamics and factors contributing to the overall network effectiveness.

Our current solutions for data-driven companies across a wide range of industries leverage a unified data architecture that conjures up the image of a data lake. The data lake is a very large, easily accessible repository that holds massive volumes of structured and unstructured data. Teradata has extensive experience in creating competitive integrated analytic environments with disparate data.

A unified data lake helps solve the challenge of information silos by combining multiple sources in one place, and leaves the data in its raw form, without stripping details that could later be useful or required for analysis. The flexibility of preserving and maintaining access to all your raw data allows your transportation agency to unify your focus on managing data as an asset. In addition, it preserves your ability to turn it into actionable knowledge whenever the business case suggests.

Florida Regional Planning Agency Looks to Improve Traffic Flows and Safety

Teradata is working with a regional transportation planning agency in Florida to use data from a variety of sources, including INRIX traffic data, to analyze traffic patterns and measure speed variability on major roads and arterials to improve traffic flows. The same agency will also use the Teradata Aster Discovery Platform to identify and address the root causes of pedestrian fatalities. Standard reporting has only provided a retroactive view of the total number of fatalities. The discovery platform will allow the agency to analyze contextual data points related to each fatality, including location, weather patterns, time of day, police reports and forensic data, availability of safe walking areas or sidewalks, demographics, and more. The anticipated outcome is that the revelation of new insights and patterns will offer actionable steps the agency can take to reduce pedestrian fatalities.

TERADATA

The More You Know, the More You Can Do

Teradata's unique analytics solutions are for today's data-driven enterprises. Our Teradata® Unified Data Architecture™ (UDA), delivers complete, best-of-breed solutions that include data platforms, discovery platforms, integrated data warehouses, analytics, and marketing applications.

Teradata solutions are designed to deliver incremental value and leverage existing investments, scaling as needs expand, and as business case dictates. We enable iterative, on-the-fly data exploration, high-performance processing, and storage with our massively parallel processing (MPP) engine, offering a competitive total cost of ownership.

Teradata's industry leading, integrated solution consists of:

- **Data platforms** – Teradata data platforms are the most cost-effective way to capture, store, and refine all data, whether it is structured and relational or multi-structured and highly variable. We offer a flexible suite of products and services to integrate Apache™ Hadoop® into your enterprise architecture.

- **Data warehousing** – Integrated and shared data environments for a single view of relevant, consistent data and cross-functional analysis.

- **Analytics** – Teradata Aster® Discovery Platform offers an unmatched advantage by making it faster and easier for a wider group of users to generate powerful, high impact insights from big data. The use of standard SQL or one of over 100 packaged analytic techniques enable iterative exploration for new insights.

- **Professional services** – Best-practice advice from Teradata experts who have completed 35+ years of successful implementations, including proven data models and solution methodologies.

Learn more about how Teradata can help you use transportation analytics to do more with less. Please visit **Teradata.com/transportation.**
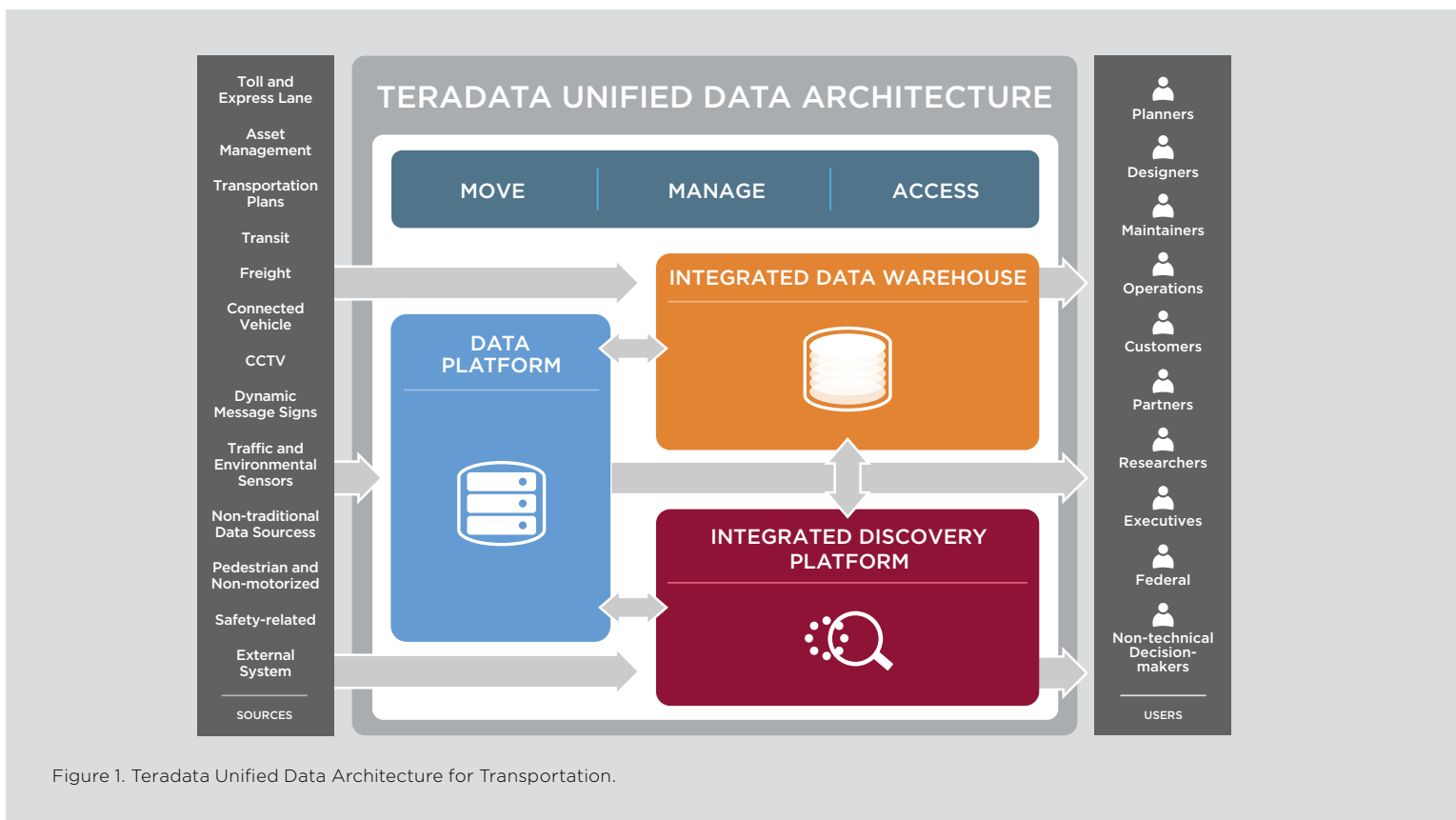

Figure 1. Teradata Unified Data Architecture for Transportation.