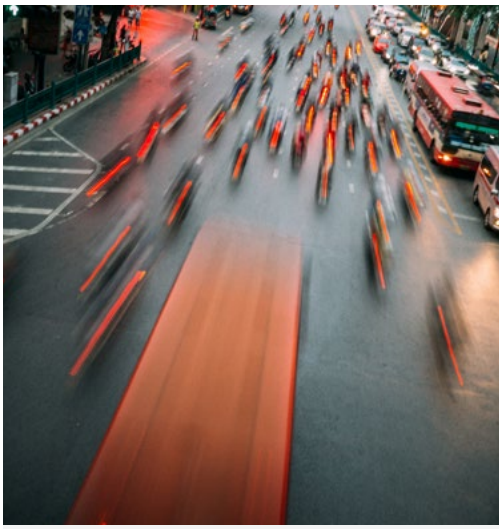
WHITE PAPER

Smart City Transportation Optimization Using Teradata Vantage

teradata.

Table of Contents



New data and analytic capabilities enable a deeper look at smart city transportation.

Efficient and effective transportation is a big-ticket item for major U.S. cities. Transportation capital and operating expenditures dominate budgets. Estimates show that the global smart city market could be worth as much as $2.5 trillion by 2026, with transportation a significant component, according to research firm Global Industry Analysts Inc.

In the U.S., transportation systems consume 26 percent of overall energy consumption, so it's vitally important to:

- Optimize transportation investments
- Align services closely with the needs of city visitors and citizens
- Maximize efficiency

The traditional approach to urban transportation performance management goes the easiest route—obtaining descriptive data within various, disconnected transportation organizations. This focuses on individual transportation modes instead addressing them as a whole unit.

For example, traditional bus and rail service performance and quality management focuses on the use and performance of buses and trains. Separately, traffic signal operation management is optimized by matching traffic signal timings to traffic flow.

These various mode-specific performance management tasks do a good job of providing insights into the operation of the individual transportation types. However, they do not reveal how each mode impacts overall service quality within the city.

Nor do they track the traveler from their origin point to their destination, but only from the entrance to the exit of that particular system.

Without considering the impacts of overall service or the entire traveler route, it doesn't matter how much money is invested into transportation services—the system will still be dysfunctional, with limited insights.

teradata.

Performance Management is More Than Just Measurements

The famous management expert Peter Drucker is credited with saying, "If you can't measure it, you can't manage it." How do you measure things like performance? With data.

Yet performance measurement, while necessary, isn't the whole story. Collecting vast volumes of data does not provide a complete solution to the optimization of urban transportation. Analytics that take the data and forecast the future—and also make recommendations—is key.

Teradata Vantage™ gives the kind of insights necessary to make a city's entire transportation system lean and efficient—creating a total Smart City solution that allows the exchange of data and analytics among the different transportation organizations.

Teradata Vantage monitors and manages the islands of transportation supply within a smart city, providing a solid foundation for optimizing the operational management of individual modes.

Vantage applies citywide analytics to show how the combined effects of the operation of each mode come together to provide a total picture of urban transportation supply.

Data Driven Transportation Investment in a Smart City

New possibilities exist for "data driven investment planning." This involves using a detailed understanding of the results of prior investments to guide future investments. It's a different approach from the typical index-linked budget development process.

Data driven transportation investment planning provides a deeper context to traffic signal management optimization as well as bus and rail service performance and quality.

This planning should be applied not just in these areas but across the entire Smart City transportation system—connecting all modes—to optimize transportation service.

Urban Accessibility Index

To assist with service optimization, an urban accessibility index can be used, acting as a focal point for planned investments and operational management for smart city transportation services.

An urban accessibility index measures the ease or difficulty of getting from one part of a smart city to another part based on these components:

1. Travel time between zones
2. Travel time reliability between zones
3. Cost of travel as a proportion of household income

The accessibility index takes into account the purpose of the trip and the available modes of travel. For example, accessibility to employment, healthcare, education, or retail can be measured and form components of the accessibility index.

The index can also consider a private vehicle, rideshare, and other transit modes, either individually or as a trip chain, from the initial starting point through the ultimate destination.

Urban Accessibility Data

One of the first tasks of urban accessibility analytics is to establish a transportation data repository within the Smart City.

While the data repository will ultimately capture all forms of transportation data and support many use cases and analytics, a preliminary data repository will contain these datasets to support the creation of the accessibility index.

Census tract data. A publicly available data source that can reveal information about households, such as total income, number of inhabitants, and geolocation of the home.

Mobility analytics data. Sourced on an anonymous basis from smartphones, the data establishes the initial origin and the ultimate destination for a large sample of trips within the smart city. The data also provides "breadcrumbs" that outline the journeys taken between the origin and the destination.

Transit data. This includes published schedules that contain transit frequencies and the geolocation of transit entry and exit points.

In a case of a bus service, scheduled bus frequencies and stop locations are obtained.

Teradata's Smart Data Management Enables Urban Accessibility Analytics

The best approach to big data and analytics for urban accessibility involves the use of smart data management (see figure). This is a purposeful and structured approach to the development of data management capabilities for a smart city. It is the only way to extract the maximum value from investments in data collection and data management.

Leveraging Teradata Vantage, smart data management moves cities in the most cost-effective way from data to information to insights to actionable strategies for smart city planning and operations.

Smart data management features include:

- A series of planned investments that deliver immediate and clear value while providing the business justification for further investments.
- A coordinated and coherent data stream from multiple sources, including sensors, other automated sources, and anecdotal data ingested into a single platform using advanced automation.
- The establishment and management of a centralized repository that enables data to be both shared and persisted.
- Support for multi-genre analytics that can be shared across the enterprise.
- A scalable approach that provides immediate value and benefits while delivering a framework that is easily expandable for future needs.
- Support for a data market approach that enables data to be valued from a public and private perspective, and provides data sharing.

Figure. Smart Data Management Approach

teradata.

Bringing Global Experience to Smart Cities

Talk with a Teradata expert to find out more about our approach to smart data management and how our urban accessibility analytics can be implemented in the most cost-effective and efficient manner possible while supporting the performance management needs for transportation services in the smart city. We bring our global experience in the practical application of analytics to the table and work with city agencies to deliver practical results.

We can help agencies evolve from standalone or narrowly focused smart city projects to tightly integrated business driven operations.

About Teradata

Teradata is the connected multi-cloud data platform company. Our enterprise analytics solve business challenges from start to scale. Only Teradata gives you the flexibility to handle the massive and mixed data workloads of the future, today. Learn more at **Teradata.com**

17095 Via Del Campo, San Diego, CA 92127 Teradata.com

teradata.