IBM Intelligent Transportation

Provides citywide traffic visibility to help alleviate congestion and rapidly respond to incidents

Highlights

- Provides real-time visibility and enables advanced analysis by consolidating traffic and road data capture systems
- Accelerates incident response by increasing situational awareness across the entire transportation network
- Improves citywide traffic planning and management even where infrastructure is constrained and expansion is not an option

Transportation is the vital means of connecting people, goods and services. The smooth operation of a transportation system can not only directly determine the level of economic activity and output of cities but also have a dramatic effect on citizen and commuter quality of life.

But with today's shrinking city budgets, there is often no funding available to rebuild or expand aging public transportation infrastructures. In larger cities, traffic infrastructures tend to operate at near or full capacity, making it crucial to find more immediate ways to optimize the efficiency of existing transportation assets.

Significant increases in urbanization over the last 50 years have placed an undue burden on city transportation systems. Clogged roadways not only delay the delivery of goods and the movement of people, they also contribute to pollution as cars and trucks sit in traffic. In 2009, U.S. drivers wasted on average an estimated 34 hours sitting in traffic, up from 14 hours in 1982. The total amount of fuel wasted reached 3.9 billion gallons—equal to 130 days of flow in the Alaska Pipeline.[1]

Many cities are still in the early stages of developing a unified transportation system, which is critical to driving economic vitality and supporting the needs of citizens. And with more cars on the road every day, the challenge of gaining citywide visibility into these complex transportation systems has rapidly become a top priority for city managers, operators and agency directors.

Steadily increasing traffic congestion also makes it difficult to accurately estimate arrival times of buses and other public transportation services. This creates challenges for dispatching and providing accurate information to public transit travelers. And when traffic incidents occur, the lack of automatic and immediately available guidance about conditions impedes operator ability to improve signal settings and alleviate gridlock.

IBM® Smarter City Solutions draw from insights gained through more than 2,000 Smarter Cities™ engagements worldwide. These solutions can help cities of all sizes to identify priorities, apply best practices and deploy advanced technologies that help address pressing challenges. IBM Smarter City Solutions are based on a common model designed to help cities optimize individual departments while facilitating seamless cross-departmental integration.

IBM Intelligent Transportation is a comprehensive solution for traffic management that collects data from disparate sources to achieve citywide visibility. It cost-effectively provides an overview of an entire transportation infrastructure by consolidating traffic and transportation event data across diverse capture systems.

IBM Intelligent Transportation provides real-time citywide visibility of traffic information

IBM Intelligent Transportation offers a comprehensive solution for traffic management by capturing data from disparate sources to achieve citywide visibility into transportation conditions. The solution provides a 360-degree view of the entire transportation infrastructure by integrating existing technologies into a single information model that enables advanced analysis and sharpened visibility of traffic incidents.

IBM Intelligent Transportation takes a smarter approach to transportation challenges by enabling cities to collect transportation data and create actionable intelligence from it. For example, cities can gather data on urban traffic and mobility patterns to help traffic management centers and provide recommendations for better road network management, tolling practices and public transit services.

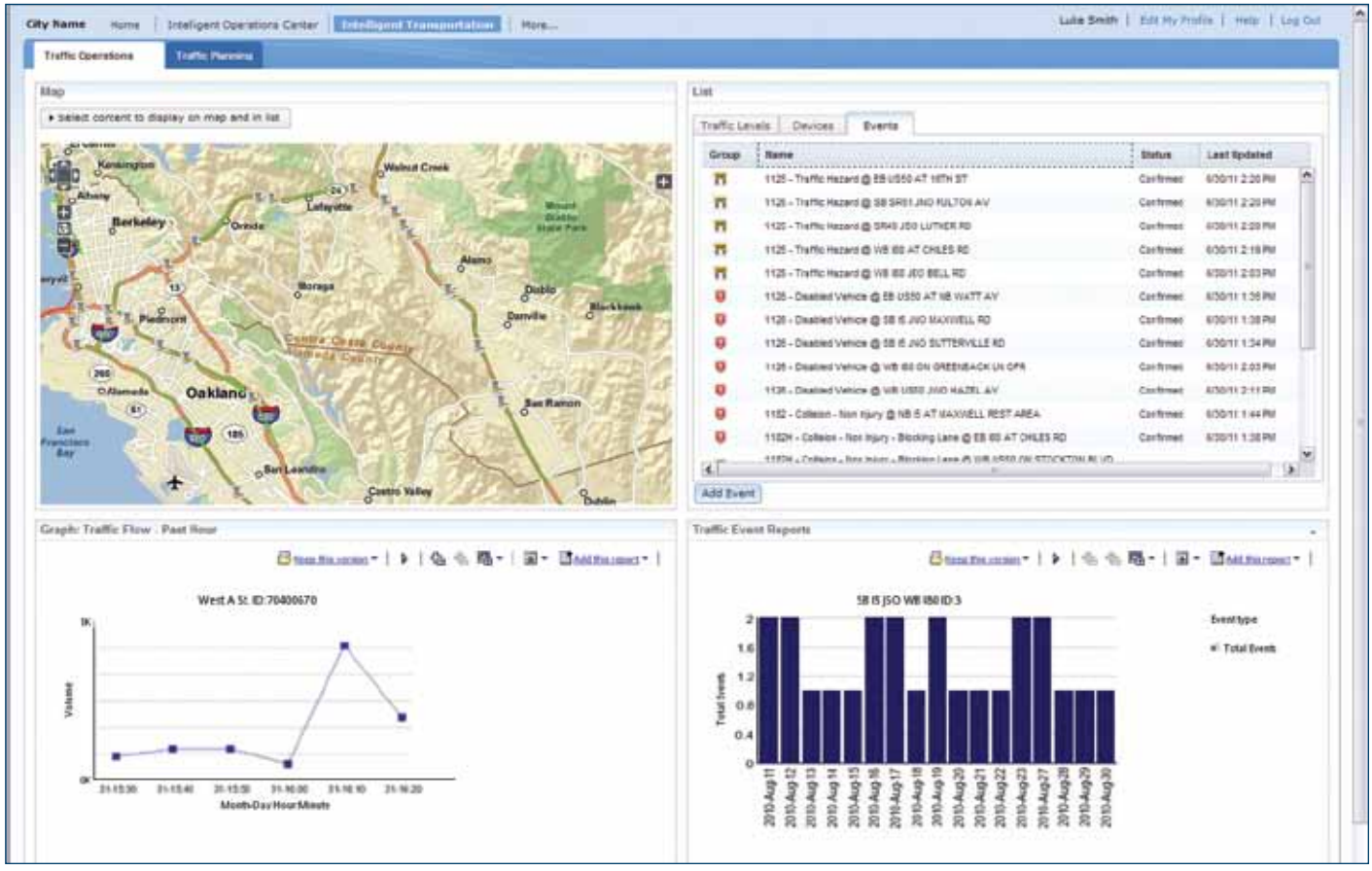

Figure 1: The Traffic Operations view is used to monitor and analyze the current traffic flow, events and performance of the traffic network. It provides a visual representation of current traffic data collected by sensors in the field of the geographical traffic region.

Standards-based integration of traffic and road data capture systems allows a city to aggregate data from multiple devices that identify and measure traffic speed and volume on city roads. These devices can include cameras, radar systems and under-road loop detectors, as well as Internet information and new systems based on Bluetooth or cellular phone technology.

Cities can avoid costly infrastructure upgrades

IBM Intelligent Transportation provides a cost-effective way to improve traffic management while avoiding the expense of rebuilding or expanding the transportation infrastructure. By maximizing existing assets and unifying legacy systems, the solution gives city managers increased control over traffic systems without causing budget overruns.

With so many moving parts and variables, traffic infrastructure conditions can change rapidly. IBM Intelligent Transportation allows cities to manage fluctuating conditions by increasing situational awareness across entire transportation networks. Centralized management enables cities to control traffic flow based on real-time monitoring data via sensors and cameras, and to collect event information across the urban area.

IBM Intelligent Transportation delivers real-time visibility into conditions via high-performance access to collected traffic event and operations data. Personnel gain on-demand access to volume, average speed, incident and configuration data, which is maintained in a canonical storage model. This model automatically standardizes data collected from different sources over a variety of formats. Operators gain the ability to understand and correlate information in a single view so they can assess the impact of accidents and road closures on traffic conditions.

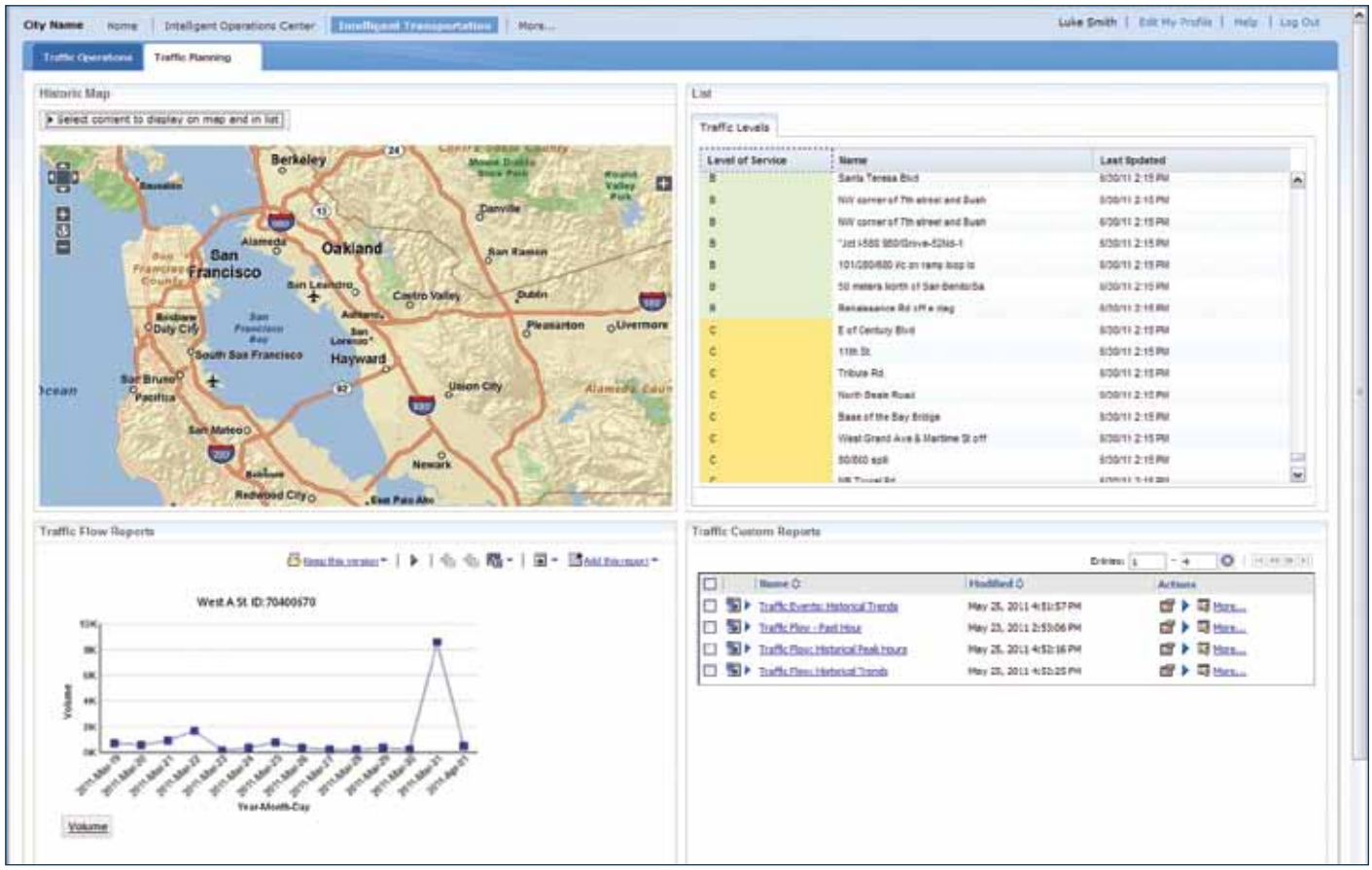

Figure 2: The Traffic Planning view shows summary reports of historical traffic flow and performance of the traffic network.

Cities of all sizes can leverage flexible deployment options

IBM offers a variety of deployment models to provide cities of all sizes and different levels of IT resources with the benefits of the solution. Cities with robust IT capabilities or a strong interest in "behind-the-firewall" implementations can deploy IBM Intelligent Transportation as an on-premise solution. IBM helps make these deployments even easier today by offering readiness assessments and providing a broad array of infrastructure solutions.

Cities also can choose to work with other cities to share services using preconfigured systems. IBM offers targeted consulting services to determine the right services to share and identify the systems designed explicitly for shared services environments.

For cities without the resources or skills for deploying and maintaining solutions on their premises, IBM offers a software-as-a-service (SaaS) option on the IBM SmartCloud. The IBM SmartCloud is an expansive, agile infrastructure as a service (IaaS). This delivery platform is designed to provide organizations with rapid access to enterprise-class virtual server environments that are well suited for dynamic workloads, applications and solutions. Deploying the IBM Intelligent Transportation solution on the IBM SmartCloud can help cities capitalize on the latest technology advances while controlling costs.

IBM Intelligent Transportation facilitates integration with legacy traffic management systems

IBM Intelligent Transportation can be integrated with legacy advanced traffic management systems from a wide variety of vendors. IBM Intelligent Transportation supports the Traffic Management Data Dictionary (TMDD) data format as a standards-based data-exchange interface.

Within legacy traffic management systems, personnel can search historical traffic data by links and by time interval, and conduct a high-level analysis of traffic patterns to improve information management in the transportation space. The solution also increases communication between departments, agencies and the public. IBM Intelligent Transportation offers functionality for planning alternate routes and enables traffic updates to the public by providing the data needed for supporting variable highway signage and 511 telephone services.

Smarter Transportation client

The Singapore Land Transport Authority (LTA) plans the long-term transport needs of Singapore with the ultimate goal of ensuring a smooth and seamless journey for its citizens. Since 2006, the LTA has been working closely with IBM to anticipate and better manage the flow of traffic to prevent the buildup of congestion. The LTA conducted a pilot study with the IBM Traffic Prediction Tool solution to improve the flow of traffic and prevent the buildup of congestion. The IBM Traffic Prediction Tool is a patent-pending technology that predicts traffic speeds and flow using advanced statistical techniques.

During the pilot study, the Traffic Prediction Tool predicted traffic flows over preset durations (10, 15, 30, 45 and 60 minutes) with overall prediction results above the target accuracy of 85 percent. Predictive analytics in the Traffic Prediction Tool provide the LTA with a forecast of traffic conditions up to 60 minutes into the future.

With this information, the LTA can adjust signal settings and variable message signs to display travel advisories and help prevent traffic congestion before it occurs. The tool also offers transport planners a rich set of data on traffic patterns stored in vast data warehouses. The LTA can mine the data for trends and patterns while taking into account temporal and spatial relationships. Use of the Traffic Prediction Tool is part of the LTA's wider effort to employ innovation not just to improve its traffic management capabilities but also to enhance its business processes and customer satisfaction.

Unified view of traffic data reduces emissions and boosts use of public transportation

IBM Intelligent Transportation provides a unified view of traffic data that can be a valuable tool in the hands of cities as they strive to cut emissions and increase public transportation ridership. By centralizing access to a wealth of traffic-related data, and enabling analysis of both historical traffic patterns and real-time data, IBM Intelligent Transportation presents an opportunity for cities not only to improve traffic congestion in the short term but also to address long-range policy goals. These goals frequently include reducing emissions and noise levels. Armed with reports that monitor traffic performance and patterns over time, agencies can make significant progress in cutting both emissions and noise.

Similarly, the IBM solution gives cities ways to capture, understand and influence driver behavior, which can assist with strategies to increase the use of public transportation. By improving the experience of public transportation as well as the public's access to information about it, cities stand to generate substantial new revenue while slowly decreasing carbon footprints.

IBM Intelligent Transportation unifies information from a wide variety of devices, regardless of vendor, in a standards-based format. As a result, cities can save money by avoiding the need to support disparate management systems. At the same time, city managers and operators can generate all-inclusive reports and correlate information to gain new insights and make better decisions.

Traffic system integration improves analysis and optimization

IBM Intelligent Transportation makes it possible to observe how incidents affect traffic over a specific time period and to compare real-time and historical information related to road segments on a specific geographic location. Cities can always maintain fast, on-demand access to richly detailed traffic information that can be sliced and diced according to shifting transportation priorities over time. The solution's high-availability advantage includes world-class redundancy and failover protection.

With IBM Intelligent Transportation, major cities gain advanced traffic analysis and optimization for better decision support to aid business owners of transportation management. By delivering traffic system integration, the IBM solution provides a comprehensive picture of what's coming down the road at any given time.

IBM helps build a Smarter Planet™ with Smarter Cities

For 100 years, IBM has been working to make the world a better place by helping businesses and local governments in more than 170 countries deploy innovative solutions. IBM Intelligent Transportation is just one of many IBM Smarter City Solutions that continue this tradition, providing real solutions that can facilitate sustainable growth and offer a robust foundation for building a smarter city. By making cities more instrumented, integrated and intelligent, IBM Smarter City Solutions can help city leaders meet and exceed citizen expectations through innovation.

Team with industry leaders

IBM Smarter City Solutions provide cross-agency capabilities using a variety of data streams and services already found in city environments today. IBM is teaming with the providers of those data streams and services, developing a robust ecosystem of IBM Business Partners committed to jointly delivering Smarter City Solutions. By providing domain experience and delivering best-in-class hardware, software and services, these IBM Business Partners are helping IBM deploy Smarter City Solutions in multiple regions around the globe.

For more information

To learn more about IBM Intelligent Transportation, visit:
ibm.com/software/industry/intelligent-transportation

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1 From the Texas Transportation Institute at Texas A&M University, 2010 Urban Mobility Report. See "Economic recovery bringing renewed congestion growth," http://mobility.tamu.edu/ums/media_information/press_release.stm

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