Supporting the Second Convergence
Making Big Data Work for Transportation

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INTELLIGENT TRANSPORTATION SOCIETY OF MARYLAND
Annual Meeting
06 November 2014
ITS requires new intelligence and insight, greater connectivity and transparency

**DRIVERS OF CHANGE**

- **Population explosion**
  World population is growing and transportation providers will need to expand capacity to keep up.

- **Urbanization**
  As the number and size of cities grows, pressure on transportation systems to move people and materials between and within those cities grows.

- **Globalization**
  The growing interconnectedness of the world is driving inter-city and international growth in demand, with an expectation of improved service.

- **Technology**
  Technology now enables the capture and analysis of real-time information about the status, location and condition of everything.

**CHALLENGES**

- **Capacity and congestion**
  Meet the growing, changing demand efficiently, consistently and profitably.

- **Empowered customers**
  Deliver transportation choices and information in the manner that customers value.

- **Efficient, green operations**
  Reduce cost and dependency on scarce resources while reducing environmental impact.

- **Safety and security**
  Unobtrusively reduce exposure to security risks and increase the safety of operations, with less cost and impact on customers.

**STRATEGIC IMPERATIVES**

- **Enhance services to increase revenue and manage capacity**

- **Dramatically improve the end-to-end customer experience.**

- **Maximize the availability of assets and infrastructure.**

- **Improve operational efficiency and reduce environmental impact.**

- **Assure safety and security.**
The intersection of the ‘physical’ with the ‘digital’ represents the Second Convergence’ . . .

Measuring, Monitoring, Modeling and Managing

Feedback to user and data source - actions to change behavior

PHYSICAL DOMAIN

DIGITAL DOMAIN

Sensing
Metering

Real Time Data Integration

Real Time and Historical Data

Data Modeling and Analytics

Visualization and Decision Support (Traveler Advice, Network Response, etc.)

Data Collection
Data Integration

Comparison of historical data, with newly collected data

Data modeling and analytics to create insights from data to feed decision support and actions

Feedback to user and data source - actions to change behavior
Data supports both travelers and operators and reduces the capital and operating costs

**Smarter Transportation**

**Leverage** information to create visibility across transportation networks and improve operations

**Anticipate** commuter demand to optimize capacity and minimize congestion

**Coordinate** resources to assure safety and improve the traveler’s experience

Used intelligent video analytics to provide real-time traffic information to drivers, conduct traffic surveillance and improve city roads

“What used to be a time-consuming process is now accomplished automatically and in real time, allowing us to make smarter and more timely decisions that keep our city’s traffic flowing smoothly.”

Bucheon City Official, Korea
What problems can BIG Data solve?

- Traffic Operations
  - Offer visibility
  - Improve flow
  - Predict issues

- Transit Operations

- Congestion Management

- Schedule Management

- Better Informed Motorists

- Better Informed Commuters

- Real-Time and system-wide visibility of traffic & transit networks
- Improvement and optimization of the traffic flow by controlling traffic management system
- Historical performance insights of traffic & transit operations
- Proactive management of traffic congestions and transit schedule deviation issues through predictive insights
### Evolution and integration . . . from stovepipe to seamless

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<td>Integrated, centralized management</td>
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*Traditional* approach focuses more on **knowing** the transportation network status so clients can **react** to the situation.

*New* ITS capabilities focus on **anticipating** what is likely to happen so they can **predict** and **avoid** the likely congestion situations.

### Offers tremendous opportunity

- Increase revenues from transportation systems
- Help make city or broader region more competitive

### Delivers essential services with flexibility and efficiency

- Improve reputation of city or region’s services
- Improve safety and satisfaction of citizens
Traffic data is captured using technology options including loop detectors, radars, cell phone data, video analytics & data providing partners, and is transformed and fused as needed, before it is sent to the smarter transportation management solution.

The IBM software stores, analyzes and presents real-time visibility, historical patterns, predictive inferences, automatic detection & optimization recommendations on its dashboard.

Standard operating procedures & integration with system devices are implemented within the IBM software turning decision support into active traffic management.
Transportation—representative solution examples

- **Integrated operations**: System-wide visibility with near-real-time, high volume data integration, fusion. Improve situational awareness.
- **Congestion management**: Gain insights into patterns of traffic behavior, predict traffic congestion, execute optimization. Improve traffic flow, increase capacity of infrastructure.
- **Incident management**: Automatically detect incidents, engage citizens, initiate emergency operations. Faster incident response, improve citizen safety.
- **Smarter device control**: Support multi-device commands that combine current context and insights using business rules. Improve operator efficiency & meet operational objectives.
Highway Operations—Sample Functionality

Manage Real-Time Traffic Events

Automatic Clustering Based on Map Zoom Level

Define Custom Map Layers / Views

Click to Action: Map & List Adapt Instantly to Selections

IBM Smarter Transportation Management

Roles & Permissions

View Service Level, Event, and Device Details

Real-Time and Historical Reporting

Predicted Traffic Conditions 60 Minutes Out

Historical Analysis & Planning
Transit Operations—Sample Functionality

Intelligent Transportation

Roles & Permissions

Executive Dashboard for Transit Leadership

Predicted Vehicle Arrival Time Details in Tabular Representation

Historical Performance Reports

Situational Awareness: Real-Time Visualization of Vehicles, Events & Performance

Drop Down Selection of Content on Screen, By Routes, Lines, and Performance

Stop Perspective: View Details of Vehicle Arrival at a Stop with Mouse Over

Vehicle Perspective: View Details of Individual Vehicle with Mouse Over Interaction

Vehicle Perspective: View Details of Individual Vehicle with Mouse Over Interaction
Thank You

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