Urban Mobility India 2011

The IBM Smarter Cities Solutions:
Opportunities for Intelligent Transportation

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Innovative leaders are creating opportunities while doing more with less

We are applying insights from 2,500+ projects of all sizes

Intelligent Asset Tracking allowed **Richmond's** crime rate by **40%** in one year

Data analytics helped cut crime **35%** in NYC

UK Border Agency ha the information required to inform passengers o their decisions even before they arrive at their borders

In downtown **Stockholm** smart traffic systems helped reduce gridlock by **20%**

In Taiwan, **99%** of smarter trains run on time

Miami-Dade County Public Schools have **increased academic achievement** across the board

Smart asset management helping **Guangzhou Metro** double its capacity to 4 million passengers per day

Analytically driven tax audit selection and collections now saves **New York** taxpayers **$370 million** a year

Patterns for Leveraging Information, Anticipating Problems, Coordinating Resources

Smarter cities are cities that drive sustainable economic growth by…

Leveraging information to make better decisions

Anticipating problems to resolve them proactively

Coordinating resources to operate effectively

… starting with knowing and reacting to anticipating and avoiding

IBM's Suite of Intelligent Transportation Solutions

Drivers of change	Intelligent Transportation Solutions	
Population explosion	▪ Traffic modeling and prediction ▪ Road user charging ▪ Fleet optimization ▪ Asset monitoring	▪ Route and schedule optimization ▪ Enterprise asset management ▪ Integrated fare management
Urbanization	▪ Multichannel self-service ▪ Ticketing/payment systems ▪ Broadband in Public Transit	▪ Reservation systems ▪ Risk management ▪ Customer operations
System inefficiencies	▪ Asset management ▪ Resource optimization	▪ Condition monitoring ▪ Enterprise application systems
Reliability & Security	▪ Digital video surveillance ▪ Identity and access management	▪ Data and application security ▪ Network, server and endpoint security

While transportation issues are an increasing challenge throughout the world, specific priorities and solutions vary by region.

North America

The private car is the key mode of transport in most cities. Issues include significant funding challenges for new infrastructure, maintenance of existing infrastructure and achieving quality service levels.

Western Europe

Most European cities already have expansive roads and public transport infrastructures. Many cities and countries are seriously considering congestion charging.

Asia Pacific

Regional innovations include advanced traffic and bus management systems, integrated fare systems and traveler information.

Emerging markets

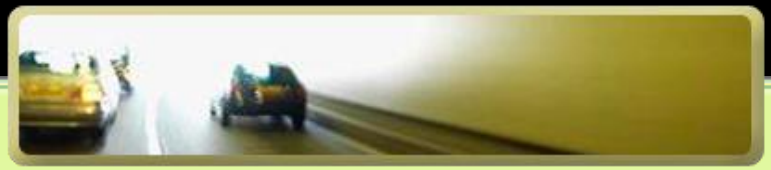
Increasing urbanization (especially in the mega cities) has resulted in worsening congestion, which has had adverse economic and health impacts. Funding and safety are major issues. Most cities are focused on developing their transport.

A maturity model approach and global benchmarking to prioritize city transportation initiatives

	Level 1 Silo'ed	**Level 2** Coordinated modes	**Level 3** Partially integrated	**Level 4** Multimodal integration	**Level 5** Multimodal optimized
Governance ▪Strategic planning ▪Performance management ▪Demand management	Single mode planning with little coordination between various transport providers	A transport vision is articulated, with single overarching regulator but with limited planning and management powers	Integrated multimodal transport authority, with coordinated demand management measures	Integrated corridor-based multimodal planning, with dynamic demand management schemes	Integrated regional multimodal planning, and continuous, systemwide performance measures with dynamic pricing
Transport network optimization ▪Data collection, integration and analysis ▪Network operational responsiveness ▪Incident management	Limited data collection and integration with ad hoc analysis and incident response and manual incident response by individual modes	Data collection for major routes; periodic data collection and analysis, with network and incident response mostly by individual modes	Real-time collection of multiple data source, with high-level analysis and automated network and incident response systems	Real-time multimodal coverage for most corridors, with detailed real-time data analysis and automated pre-planned multimodal incident response	Systemwide real-time multimodal data collection; integration and analysis, with dynamic network optimization and incident response
Integrated transport services ▪Customer management ▪Payment systems ▪Traveller information	Minimal; mostly cash collection and limited, static traveller information	Customer accounts by mode; mostly cash collection and static trip planning with limited real-time alerts	Electronic payments, with multichannel trip planning and account-based alert subscription	Multimodal integrated transport card, with on journey, multimodal information services	Single customer transport account; location-based multimodal proactive trip advisory

How are innovative public transport agencies responding to these issues and challenges?

Improving operational efficiency while reducing environmental impact



Stockholm, Sweden has implemented a congestion based road charging system. As part of the project, 18 roadside control points located at Stockholm city entrances and exits were set up to identify and charge vehicles depending on the time of day—higher during peak times, lower during off peak hours.

Singapore Land Transport Authority created and implemented an infrastructure to integrate ticketing systems. The solution can process up to two million transactions a day, with built-in scalability to meet future needs and provide add-on services. A smart card helped enable seamless travel and transfers across operators and transport modes, and helped ensure faster, more convenient transactions.

How are innovative public transport agencies responding to these issues and challenges?

Reducing Operating Expenses, Increasing Safety and Reliability of Operations

Taiwan National Railway improved its ability to diagnose train equipment health—reducing the potential for derailment—by generating and monitoring alarms in real-time. This helped operators eliminate potential safety hazards before they could cause larger issues and enabled business users to manage rules.

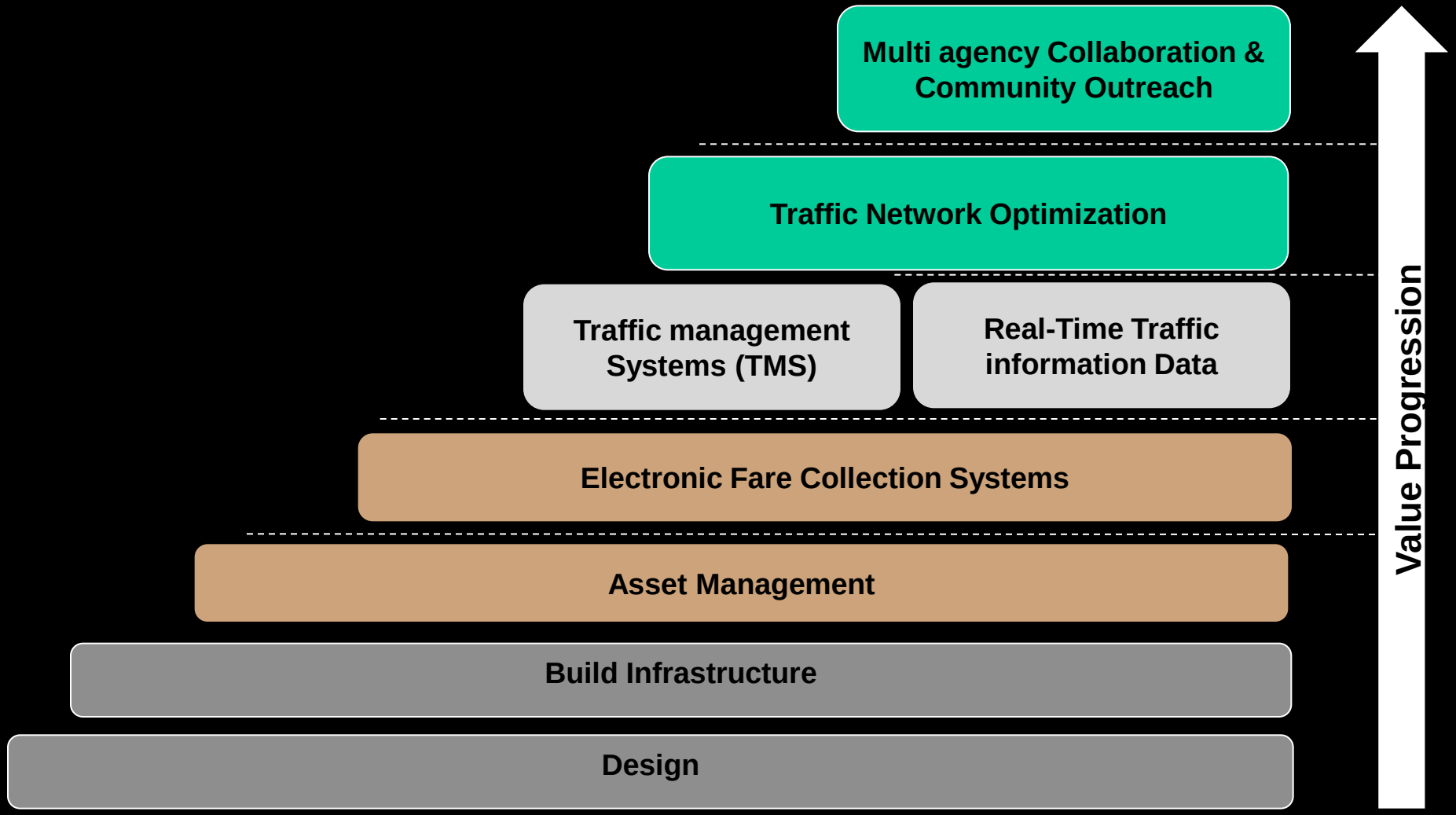
Guangzhaou Metro increased safety and reliability of the Guangzhou Metro network through predictive maintenance capabilities; extended life of fixed asset investments; improved process efficiency by virtue of asset management and ERP process integration

How are public transport agencies responding to these issues and challenges? (continued)

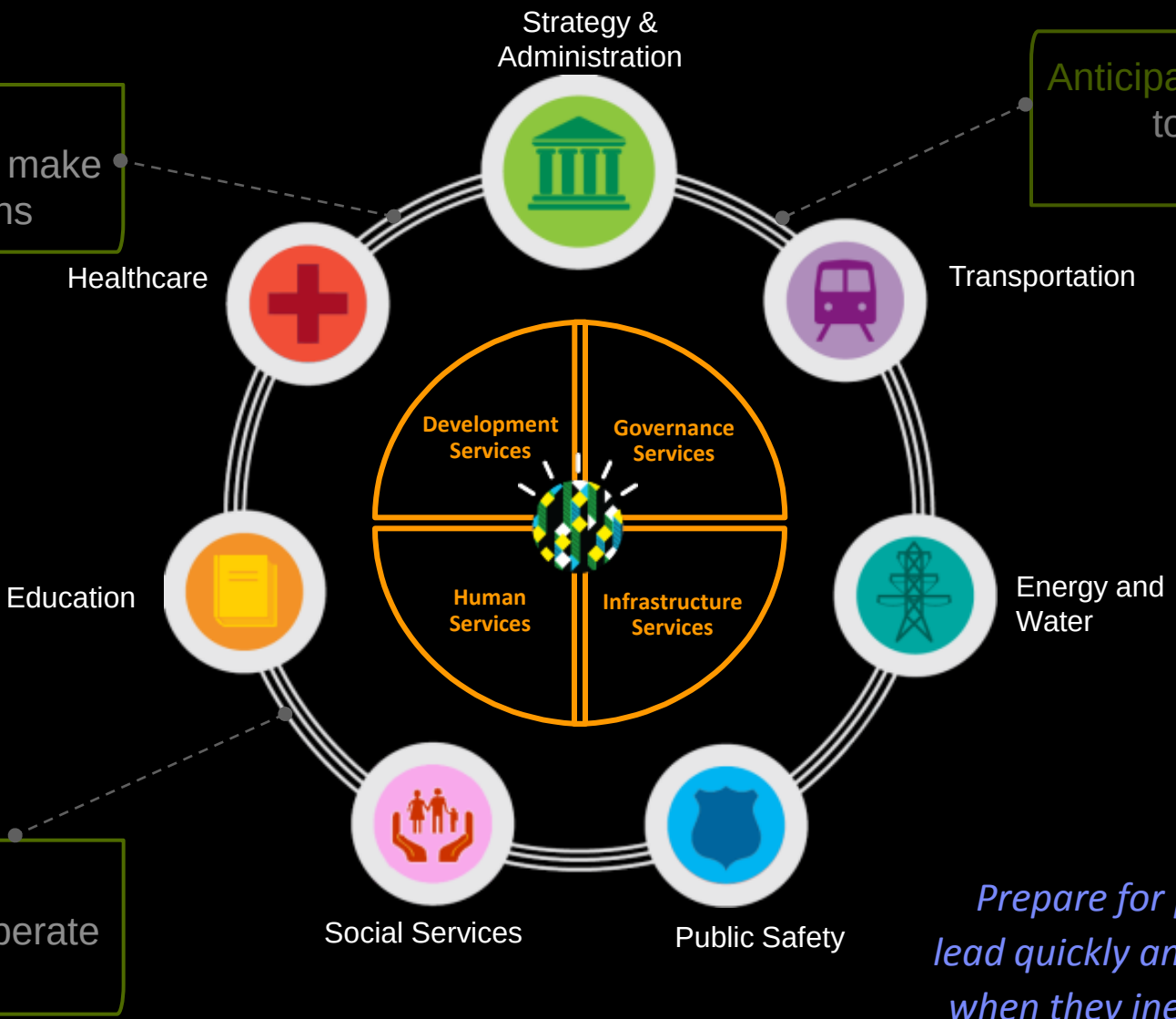
Reduce Traffic Congestion and Increase Safety

Finnish Transportation Agency combined its knowledge of commuters' travel patterns with real-time data on traffic conditions to recommend fastest routes and avoid congestion. This helped speed journeys, reduce congestion and cut exhaust emissions. Drivers no longer have to stop to pay tolls, which helped reduce congestion, increase safety and enhance network reliability.

Intelligent Roadways Value Progression



The smartest governments take a holistic view of all key services



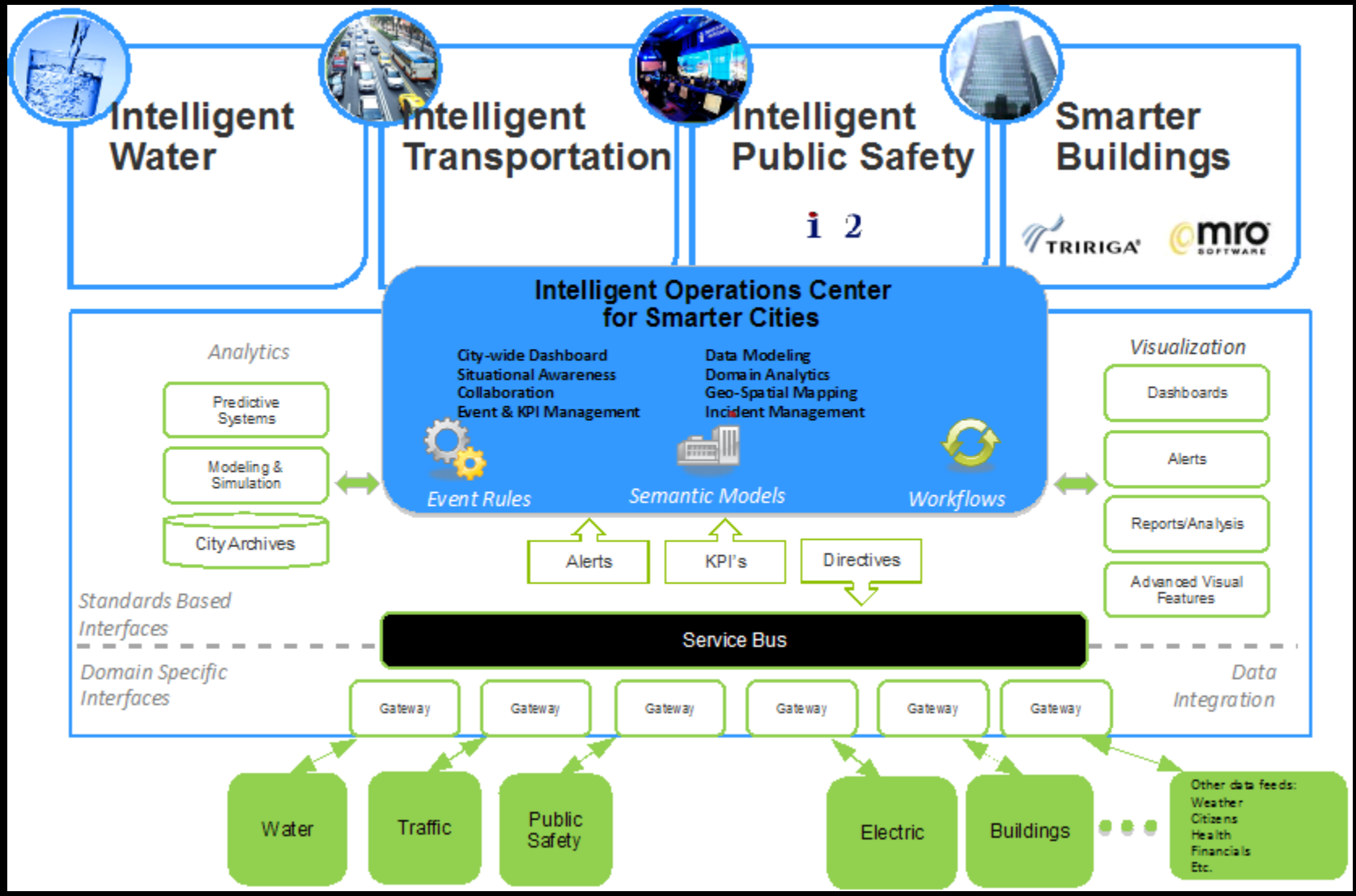
Leveraging information to make better decisions

Anticipating problems to resolve them proactively

Coordinating resources to operate effectively

Prepare for problems to lead quickly and effectively when they inevitably arise

IBM's "System of Systems" Solution Offerings built from best practices



i2 Overview Summary

IBM has acquired i2, a leading provider of intelligence analysis and investigation solutions for defense, government agencies and commercial enterprises

- ***Pervasive in market with over 4500 clients***
  - More than 350,000 users in 150 countries
  - Used by 8 of the top 10 largest companies, 12 of top 20 banks, 25 of the 28 NATO member countries, 4 of top 5 US law enforcement agencies
- ***More than two decades of industry leadership***
  - Founded in 1990
  - Headquartered in Cambridge, UK with offices in McLean, VA and Tucson, AZ
  - Approximately 350 employees

Representative Customers

Technology and Business Innovations to Leverage

- Envision the city as an integrated system of systems
- Leverage new data, to gain new insights to drive new innovation
- Use predictive analytics to get into anticipate and avoid mode from know and react.
- Cloud Delivery Model (capex to opex for technology and business process capabilities)
- Adopt industry standards based systems to allow integration and lower long term costs
- SLA-driven Managed Services (capex to opex for operational services)