



Smarter City Moscow

Smarter transportation for an adaptive and resilient city

Eric-Mark Huitema,

- IBM smarter transportation and public safety Director Europe and CEE.
- Member of the global ITS board

Huitema@nl.IBM.com

BUILDING A SMARTER PLANET





Congestion is the daily pain of European cities.

The costs of traffic congestion are enormous.

In the EU, the total costs of road congestion have been estimated at around **120 billion Euro** or some **2% of GDP**..

Reducing the congestion problems would reduce both the individual and the external costs of transport.

Source: ec.europa.eu/research/

2 billion / 7 billion

It took all of history for human population to reach 2 billion, and only one generation to more than triple to nearly 7 billion.

476 cities over 1 million

In 2010 there are 476 urban areas with at least 1 million people. That's an increase of 573% from 1950 when there were 83. Over half the world's population now lives in urban areas.

BECAUSE WE WANT IT FOR THE FUTURE.

IBM

How?

The world is becoming **INSTRUMENTED**

Smart sensors on road, in cars, Connected cars everywhere



The world is becoming **INTERCONNECTED**

Linking information on road, in cars and railways, throughout the supply chain – *“the internet of things”*



The world is becoming **INTELLIGENT**

Cars talking to each other, sensors talking to each other, we can predict where traffic jams are, **before** and **while** you drive

Cars avoiding accidents, Preventive maintenance, interaction with the environment, schools, signs, events, and POI info.



Road usage charging: eliminating traffic jams



Hello, nxp014 Log On Time: Monday 28 Sep 2009 15:39:42

Home | Log Off | Scheme | Help

Bill Details

Journey List

Zone Summary

Road Type Summary

Account Owner: nxp014

Account Type: Personal Account

#	Journey ID	Start Time	Start Location	End Time	End Location	Distance (Km)	Amount (€)
		09/26/09	Eindhoven	09/26/09	Eindhoven	1.82	1.82
		28/09 16:00	Veldhoven, Peter Zuidlaan			14.054	1.47

Eindhoven – GNSS based kilometer pricing (could be Glonass?):
 70% of drivers changed behavior
 Overall result >16% lowered usage

Stockholm : traffic jams are reduced, government revenue increased
 Stockholm showed 22% reduction in traffic

London: reduced cost of operational system with 20 % and improved user and customer satisfaction

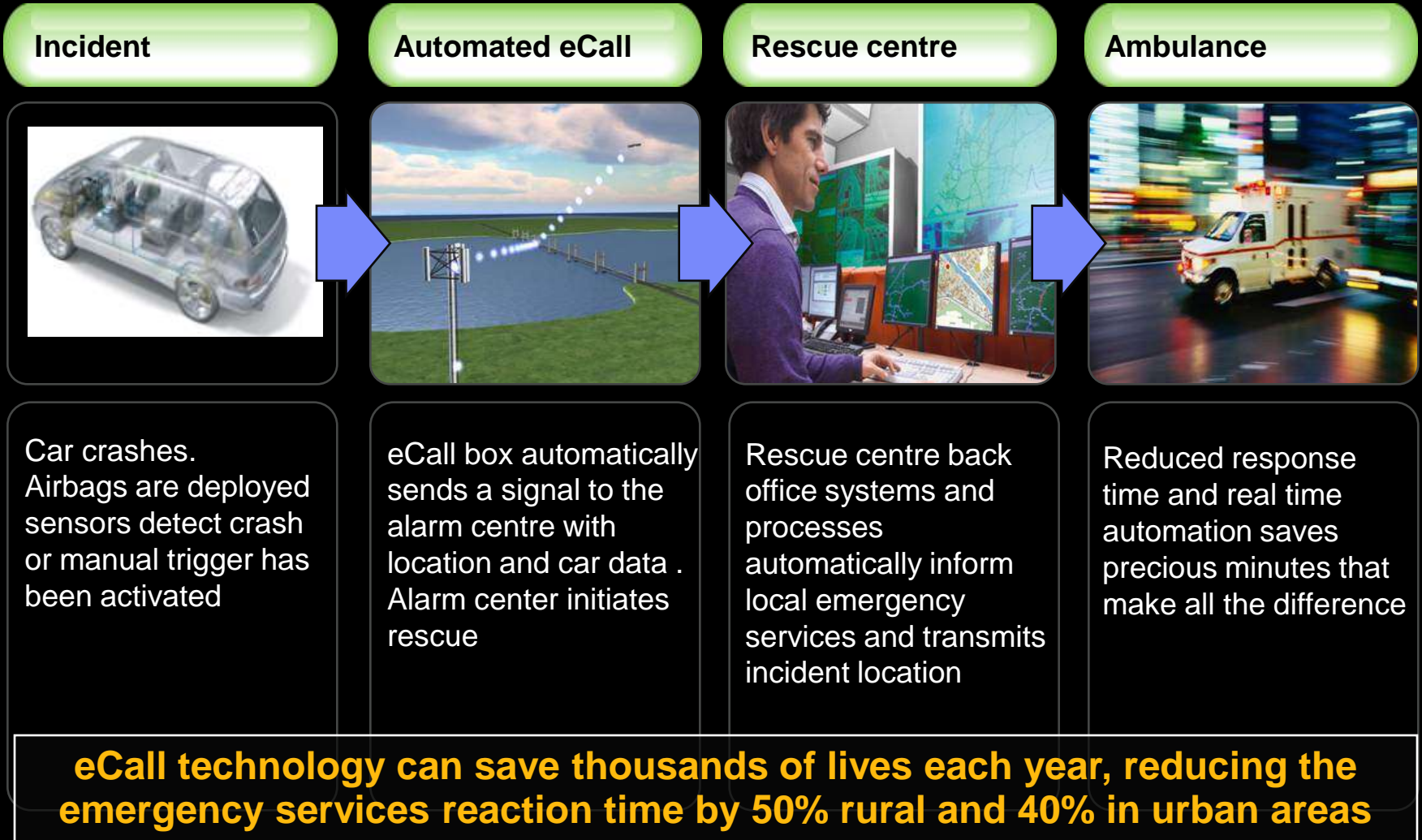
Global Impact: Next GNSS showcase will be implemented Singapore
 global interest for implementations. Glonass possibilities

Tariff per km / € cent	08.00 - 09.00 17.00 - 18.00	Normal
City / local roads	20	12
Circular roads	10	5
		3
		2

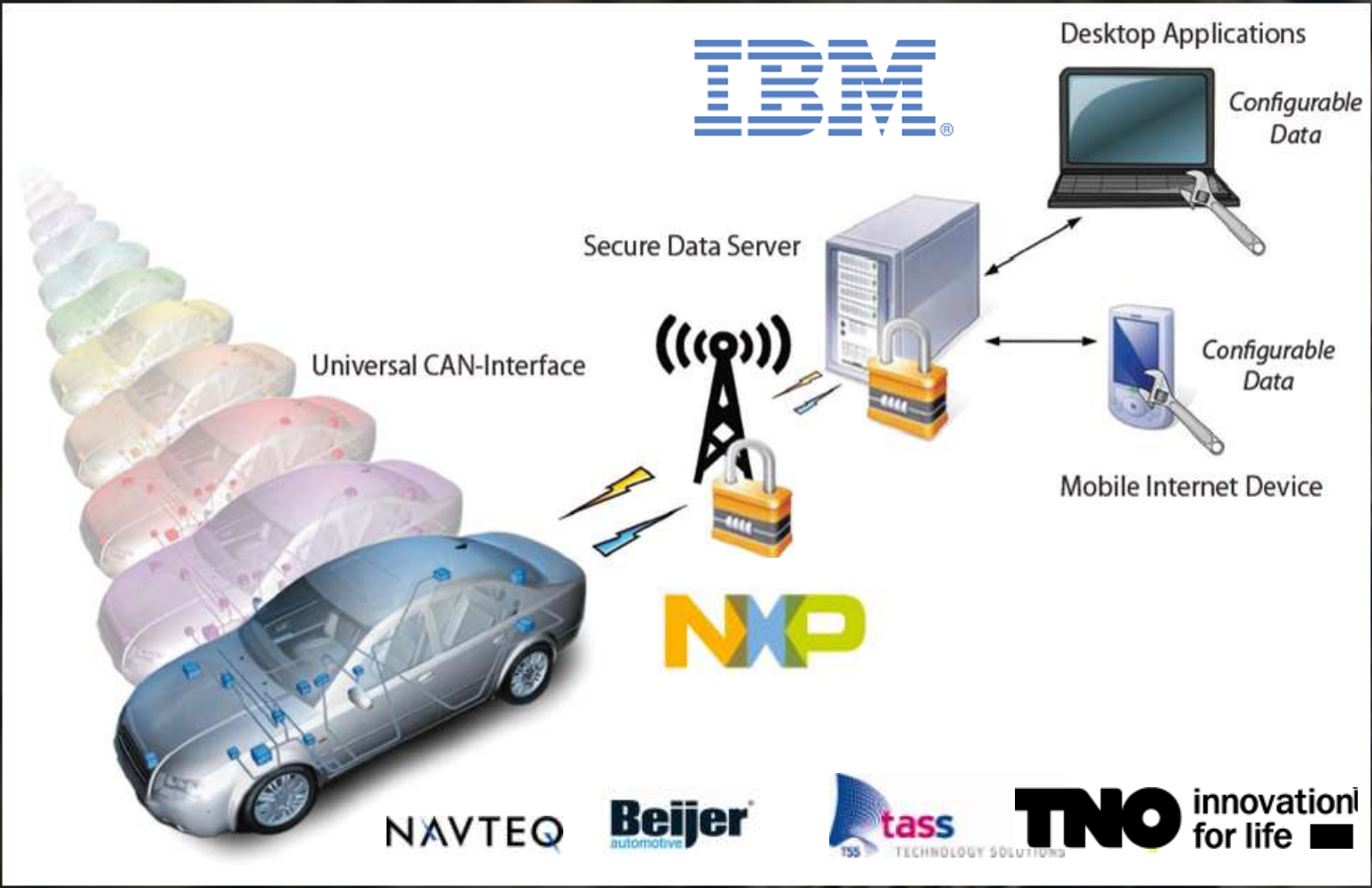


Russian Glonass based legislation leads to Emergency Call – eCall

Building a smarter planet: smarter transportation

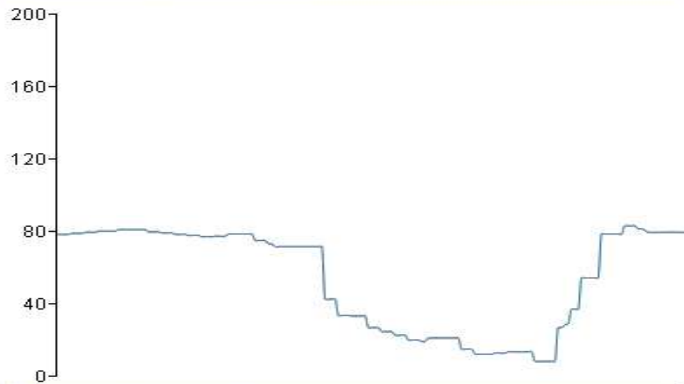


Next: SMART-In-Car, Using the car management system



SMART-In-Car : real time car generated data

Graph, watching: Speed [close]



Map [enable autozoom]



Configured signals [edit]

Last receive 14-6-2011 12:53:23

	Airconditioning	ON
	Brake	OFF
<input type="checkbox"/>	BrakeForce	
	Clutch	OFF
	CruiseControl	ON
	DriverDoor	OFF
	DriverSeatbelt	ON
<input type="checkbox"/>	EngineStart	OFF
	GPS	51.4959 5.8865
	Ignition	ON
	RPM	



Making a Smarter Cities Solution work: IBM Intelligent Operations Center (IOC) using sensor information

Building a smarter planet: smarter transportation



Bringing Services to Governments and to the People

Implementing Smarter Transportation

Data Integration	Road User Charging
Traffic Prediction	Asset Management
Route optimization	Integrated Fare Mgmt
Bus Arrival Prediction	Multi-modal Mgmt
Planning and Simulation	Revenue Management
	Fleet Optimization

Analytics

- Predictive Systems
- Modeling & Simulation
- City Archives

Intelligent Operations Center

Event Rules *Semantic Models* *Workflows*

Operations

- City-wide Dashboard
- Geo spatial mapping
- Data modeling & integration
- Cross-Agency Collaboration
- Situational Awareness
- Domain Analytics
- Event & KPI Management
- Incident Management
- Consequence Management

Visualization

- Dashboards
- Alerts
- Reports/Analysis

- Alerts
- KPI's
- Directives

Standards Based Interfaces

SMART In-Car

Data Integration

sensor technology



Traffic scenario planning with Traffic Prediction Tool (TPT)

Building a smarter planet: smarter transportation



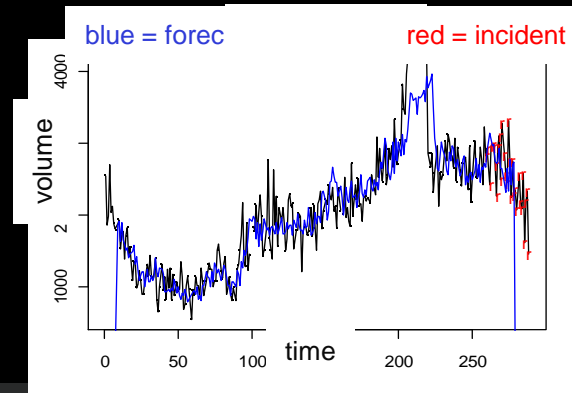
**TPT accurately forecasts future traffic conditions
30 minutes in advance with high accuracy**

Issue: "real-time" is too late

Little automated use is made of the **gigabytes of real-time traffic data** today; often, by the time it is received, it is **no longer representative** of the actual traffic

IBM Innovation: forecast the future

IBM's TPT provides a layer of **intelligence** by using sensor data in sophisticated algorithms that **create relevant insights** from the raw data

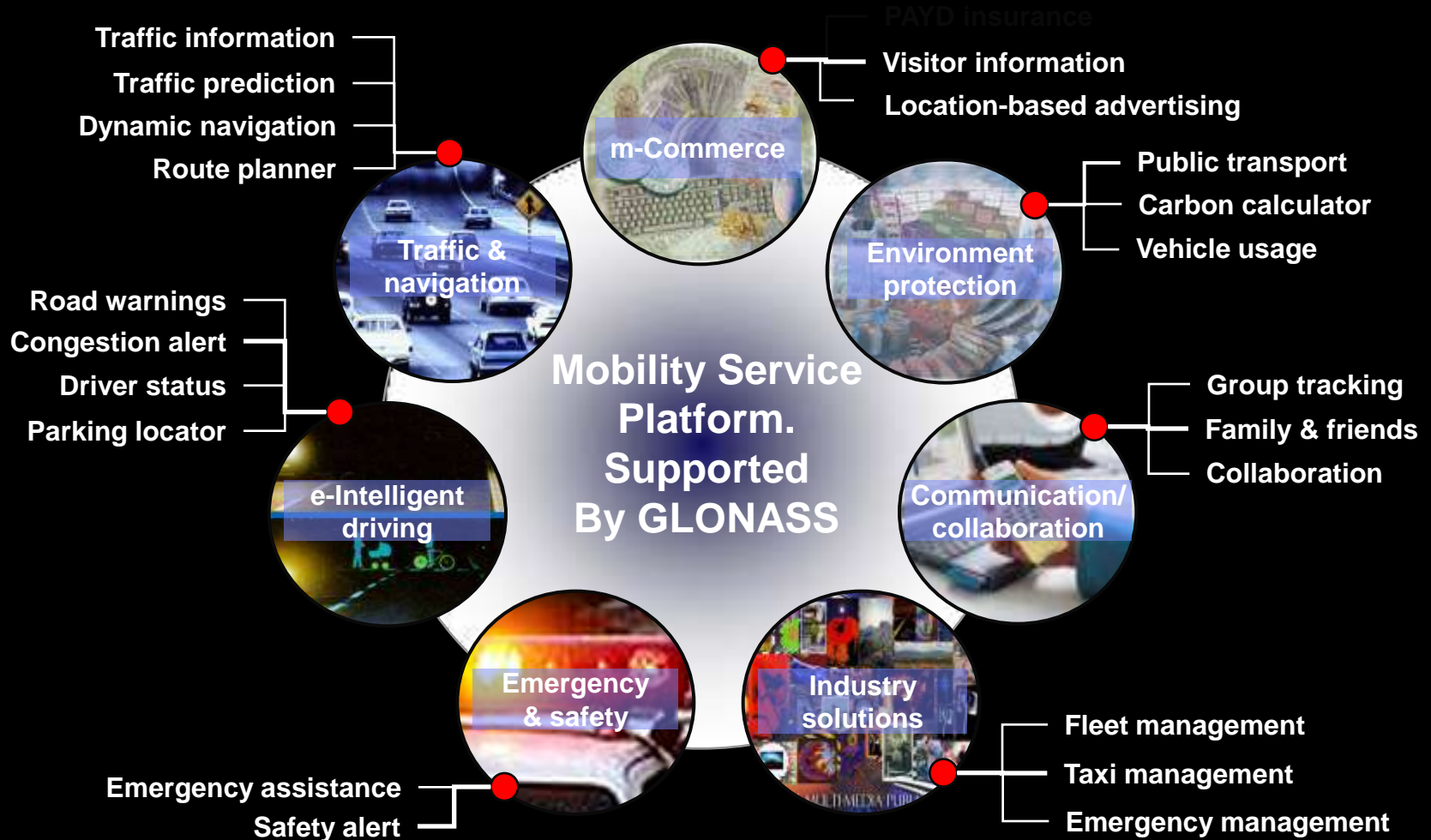


Applications Areas

- **Traffic Operations / traffic management centers**
- **Traffic Planning** (i.e. traffic signal timing, ramp metering, etc.)
- **Advanced Traveler Information** (route planning, travel time estimation, bus arrival prediction, etc.)
- **Dynamic Electronic Road Pricing and Congestion-Based Toll Setting**

GLONASS / GNSS technology's enable many potential value-added services

Building a smarter planet: smarter transportation



Solving parking “search” problem on street and off street.

Building a smarter planet: smarter transportation



PARKER™ APPLICATION

- Find open parking spaces on the street, and in nearby garages
- View parking policy, pricing, and payment information
- Rate and comment on the quality of spaces or nearby locations
- Drop a pin where you park then get directions back to your car
- Remember your favorite spots
- Pay for parking by phone

GLONASS based solutions:

Road Pricing, eCall, IOC and In-Car enable Public Safety

Building a smarter planet: smarter transportation



Intelligent Operation centers (IOC's) - references

- 1) Rio de Janeiro, Olympics IOC – ensuring safety, predicting and managing Traffic and Flooding.
- 2) Chicago, Smart Vision Suite was able to avoid a terrorist attack with two stolen lorries
- 3) Memphis Police Department (CRUSH, Crime Reduction Using Statistical History) reducing crime by 27%
- 4) Madrid, one IOC for Fire brigade, police, traffic managers reduced reaction time by 25%
- 5) NYC, Real Time Crime Center, Traffic and Crime Information Warehouse.
Helping New York City fighting traffic, crime and terrorism.

After market

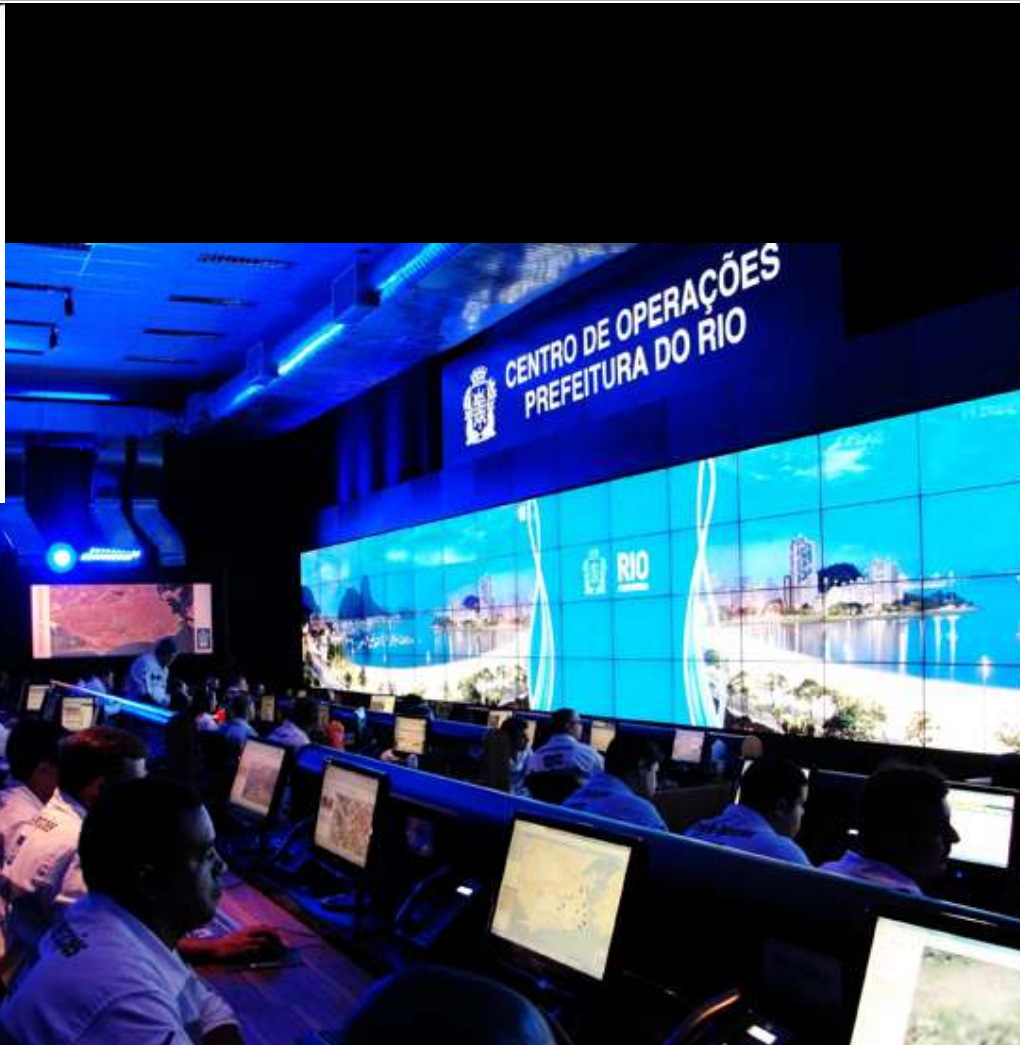
Car OEM Market

RIO city command centre – ensuring resilience and safety

Building a smarter planet: smarter transportation



<http://www.youtube.com/watch?v=BxEZRetuLA8&feature=related>



Joint Traffic Management Center - NYC Port Authority

Building a smarter planet: smarter transportation



New York City, crime case closings are 25% higher than the national average, **partly due to the new analytic tools available to investigators.** In addition, crime has dropped 20% since 2002 in spite of a decrease of 3,000 officers.

“The NYPD’s innovative policing strategies depend on our ability to gather, share and act on information. IBM—its people, partners and technology—have helped us redefine how information can be used to fight crime.”
James Onalfo, Chief Architect and CIO, NYPD



Problem 1:

Viewing cameras does not deliver. Not effective and costly

Building a smarter planet: smarter transportation



■ Limited Effectiveness

- Inherent inefficiency in 'Human eye' surveillance (Studies show with just 2 cams, in 22+ min, 95% drop)
- Security systems are reactive, not proactive, typical response is after an event has already occurred
- Large amounts of surveillance video data hardly ever used
- No consolidated view of activity and security threats at the enterprise level
- Limited data-sharing and integration between stakeholders
- Poor compliance and audit of approved security processes



■ High Costs

- High cost of staff to monitor CCTV feeds, retrieving, managing and storing video content with limited value
- High cost of proprietary hardware, maintenance and support

■ Low Value for Investment

- Labor costs are increasing without impact on security
- Often seen purely as a cost without clear expectations



Problem 2:

Events and Alerts can be seen, but combinations are not made

Building a smarter planet: smarter transportation



Not all video events need to be responded to but can still yield significant information

Events

- Information about everything that happens in a scene
- Indexes the video for search
- Support Activity Analysis
- Forms the basis for Alert detection



Alerts

- Monitor scene for specific pre-defined activities and alert the user immediately



Advance Traffic Information :

- Quantity of traffic through a location
- Speed of traffic through a location
- Type of traffic through a location
- Status of location: free, congested,...
- Direction Of Traffic

Automated triggers: solve costly and ineffective viewing problems

Building a smarter planet: smarter transportation



- CCTV cameras are highly advanced sensors , they can see changes in the field of view



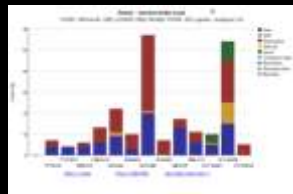
Event: Junction Congested



Event: Junction Free flowing

Insight : Congestion has eased

Profile of
junction congestion



KPI on
Congestion

Analytics:

Converting data to information and into insight

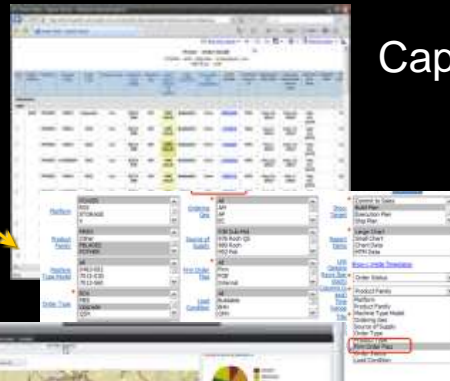
Building a smarter planet: smarter transportation



Video Analytics



Event Captured, video analytics / image stored locally



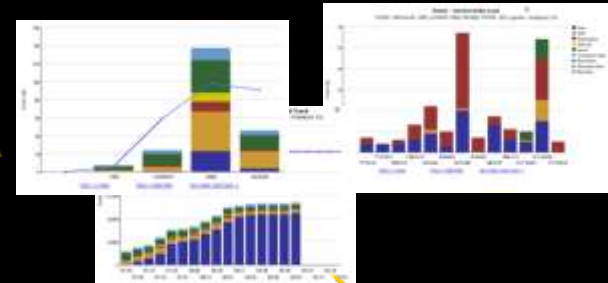
Captured data converted to CAP

CAP stored, and processed



Charting, Geo Spatial

Data Processing



Data Analytics

Insight

IOC

	NO DATA	DATA
...
...
...
...
...
...
...
...
...
...

Analyzing the situation:

Video Capture -> Data Processing -> Insight -> Playback (Video / Charting)

Building a smarter planet: smarter transportation

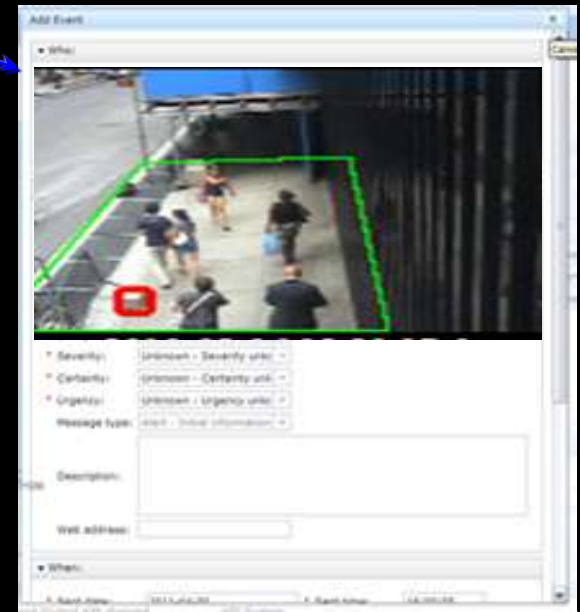


Store and Playback from IOC as event or trend deemed significant



Select On Demand based on significance

All events stored and enabled alerts displayed



IBM Smarter Traffic and Public Safety solutions in the news:



ABC news covering Chicago video analytics

http://abclocal.go.com/wls/story?section=news/special_segments&id=7294108



NY Time Square incident, commissioner talking about analytics

<http://wcbstv.com/video/?id=141569@wcbstv.com>



Italian press conference by the Minister of Interior selection of our technology to improve public safety in Italian Cities

<http://www.youtube.com/watch?v=OwqXeCn6Q>

<http://video.sky.it/?bclid=53147617001&bctid=73661324001#video>



Solving key Challenges of Today's Society

Building a smarter planet: smarter transportation



**Ensure
safety**



**Enhance
mobility**



Environmental care



**Customer Mgmt.
& Billing**

**Emergency Call
Anti terrorism**

Intelligent Traffic Management

**Hybrid-/
Electric Vehicles**

IBM Intelligent operation center (IOC + SVS)



Smarter City Moscow

Thank you for thinking
about the smarter city

Eric-Mark Huitema,
IBM smarter transportation and public safety,
Director Europe and CEE

Huitema@nl.ibm.com