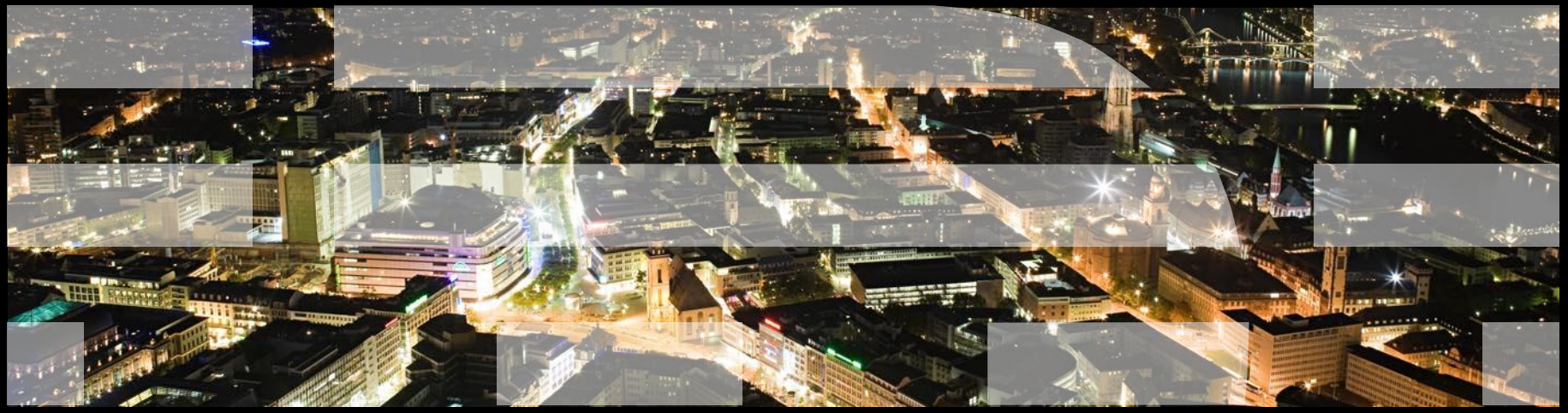
Smarter Cities

How cities can the lead way into a prosperous and sustainable future

Global Forum
Bucharest, October 20th 2009



benedikt.klotz@at.ibm.com

Public Sector Industry Leader
IBM SWG Central and Eastern Europe

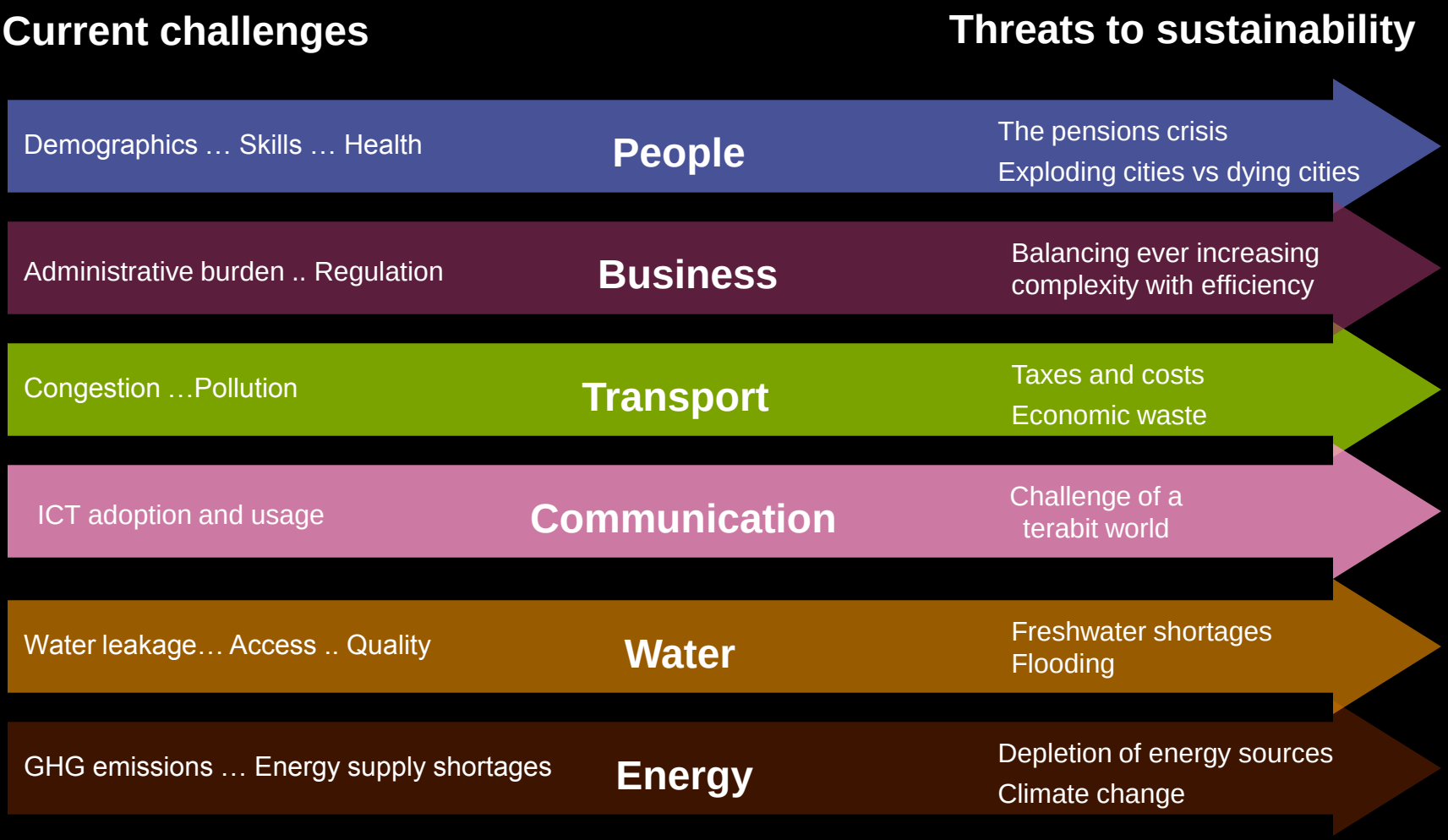
In 2007, for the first time in history, the majority of the world's population—3.3 billion people—lived in cities.

By 2050, city dwellers are expected to make up 70% of Earth's total population, or 6.4 billion people.

Time to act

Cities - more than states, provinces or even nations - will increasingly serve as the crucibles where the success or failure of our planet is determined.

Significant and interrelated challenges for cities put leadership under pressure to act



Source IBM IBVA - A Vision for Smarter Cities | April 2009

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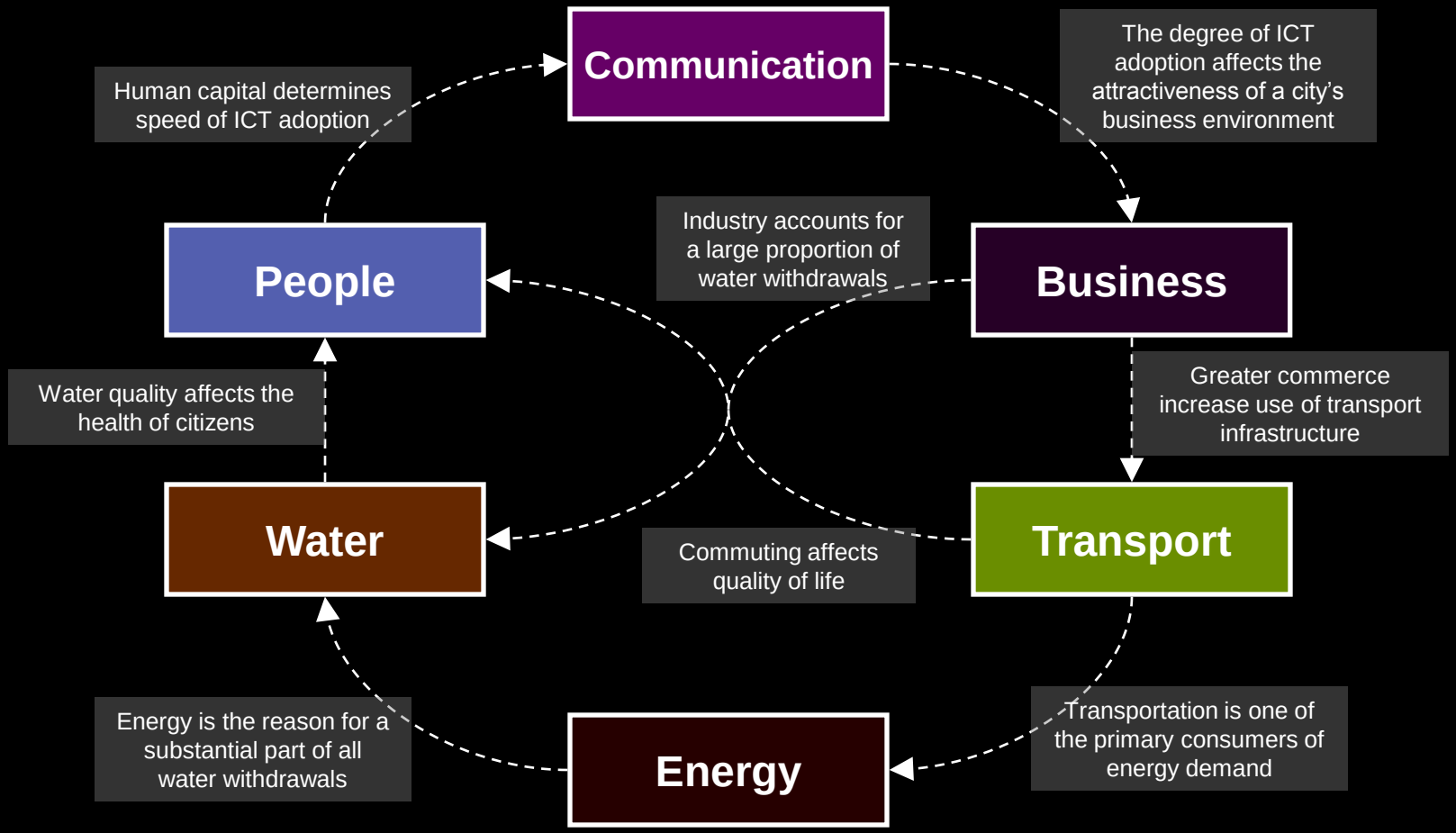

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Why intelligent cities? Why now?

SOCIAL/DEMOGRAPHIC

- At the end of 2008, 50% of the world population lived in a city
- Urban population will almost double between 2010-50 (to 6.4B!)
- 18 countries in the world with contracting populations (in 2050, 44)
- Asia will become 50% urban in next 15 years
- Rapid urbanization is creating high stresses for many Asian cities, in turn driving the construction of hundreds of new cities

TECHNOLOGICAL

- Convergence of pervasive digital networks, cheap sensors, cheap analytics
- There are over 4 billion mobile cellular subscribers in the world today (60% penetration)
- Location-based services and social networking continue to grow in capability and popularity
- IT has made it possible for global enterprises to operate anywhere in the world

ECONOMIC

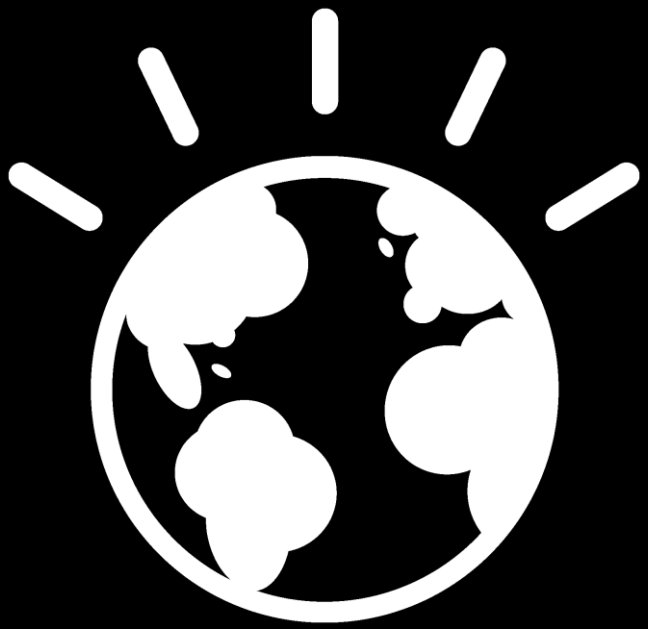
- The top 100 urban agglomerations currently account for 25% of worldwide GDP
- Developed world has underinvested in its cities; the developing world needs new urban infrastructure ($41T needed by 2030)
- Rise of "new" cities (MASDAR, New Songho City, GIFT, KAEC, etc.)
- Global financial crisis is spurring government stimulus, creating new jobs

ENVIRONMENTAL

- Drive for cities to cut carbon emissions and increase the energy they get from renewable sources
- There will be 1.2 billion cars on the road by 2015 (~1 car/6 people)
- 95% of the world's cities still dump raw sewage into their waters

Source: Various; IBM MI Analysis

Something meaningful is happening.



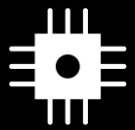
The world is
SMALLER.

The world is
FLATTER.

The world is about to get a whole lot
SMARTER.

Computational power is being put into things we wouldn't recognize as computers. Indeed, almost anything—any person, any object, any process or any service, for any organization, large or small—can become digitally aware and networked.

…because smart technology and intelligence is being infused our cities become more



Instrumented

- Smart Meters, distribution networks (electricity, water, gas)
- Building Management Systems
- Infrastructure sensors
- Traffic and transit sensors
- Public safety systems

Interconnected

- Heavily networked environments – fiber, wireless, buildings, open spaces, public environments
- Networked sensors, sensor platforms, concentrators
- Enterprise Service Bus
- City taxonomy

Intelligent

- Lots of data – how to get value from it?
- Real-time analysis of sensor data streams
- "Enterprise-view" visibility of the city in action
- Behavioral modeling of physical, natural, and people systems
- Cross-tower optimization of resource utilization

Smarter transportation

An opportunity to cut traffic by as much as 20%: Cities can infuse intelligence into their entire transportation system, improving drivers' commutes, giving better information to city planners, increasing the productivity of businesses and raising citizens' quality of life.

Smarter public safety

Because up to 45% of a city's budget goes to public safety: A smarter city uses advanced technologies and community-based approaches to anticipate and prevent—not just respond to—crimes and emergencies.

Smarter energy and utilities

An opportunity to reduce energy use by up to 15%: By providing real-time information about the flow of energy, an intelligent utility system helps citizens and utilities make smarter, more responsible choices about the way they buy, sell and manage electricity.

Smarter education

An opportunity to nurture our most valuable resource: Smarter cities take a systemic view of their education systems, evaluating students in multiple dimensions and equipping them to perform better both inside and outside traditional classroom environments.

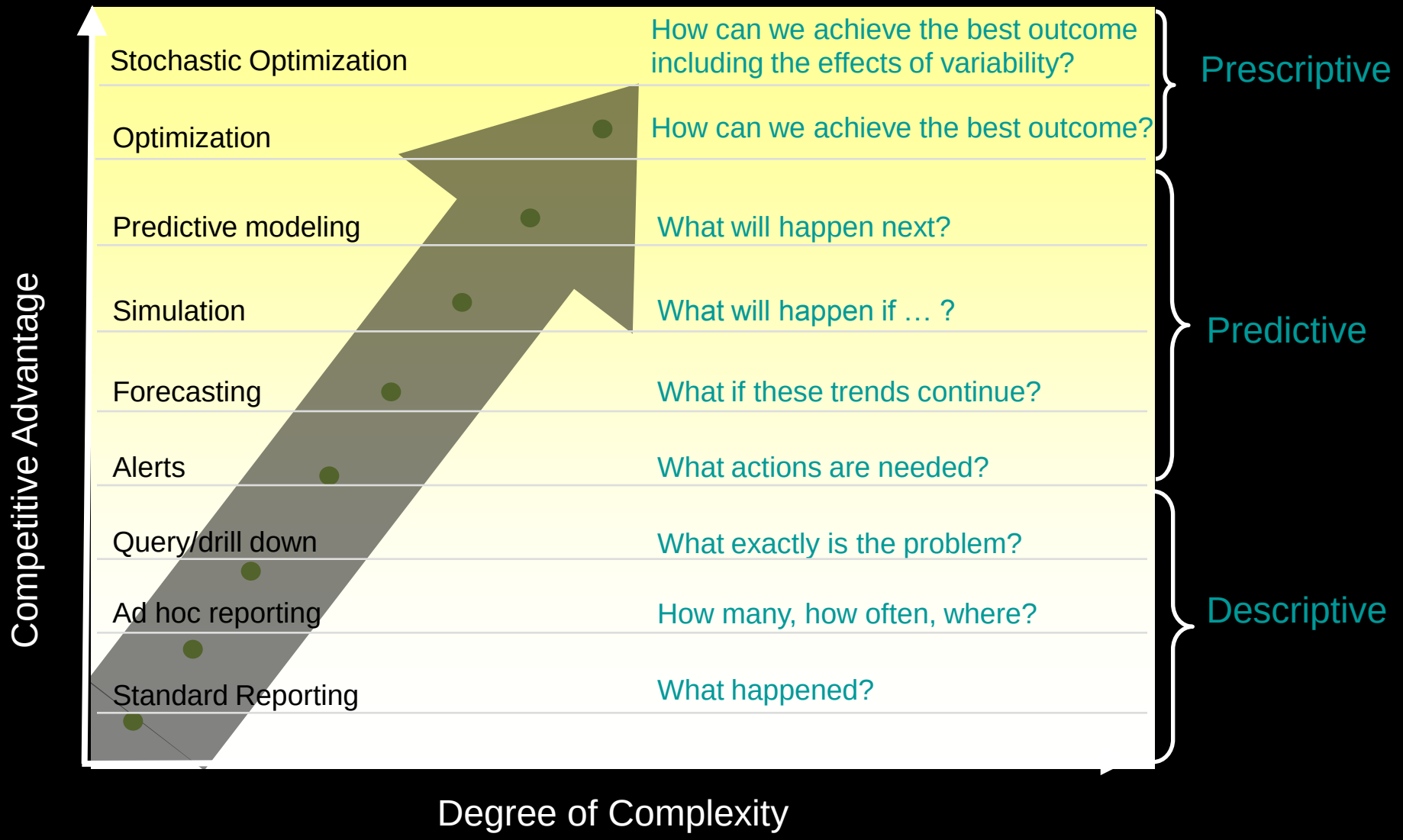
Smarter healthcare

An opportunity to lower the cost of therapy by as much as 90%: A smarter healthcare system forges partnerships and makes better use of data in order to deliver excellent care, predict and prevent disease and empower people to make smarter choices.

Smarter government services

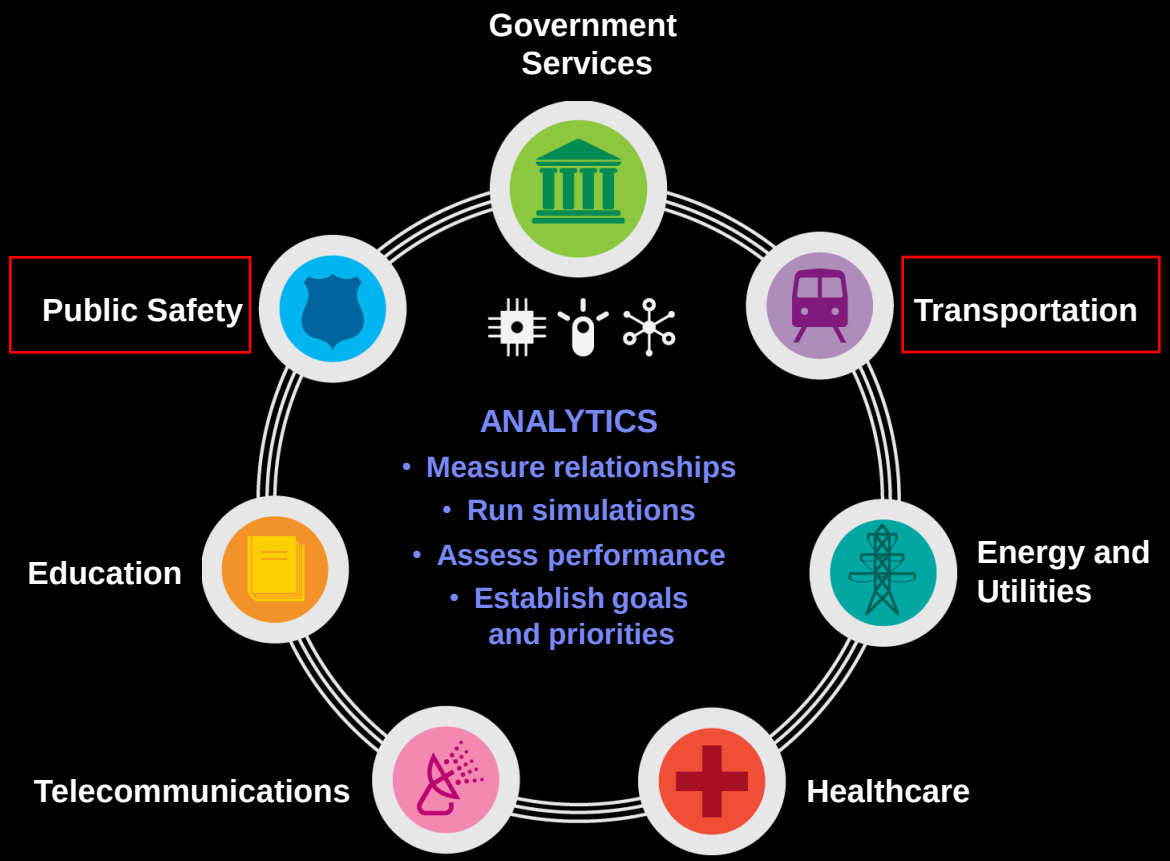
An opportunity to deliver needed services to all citizens: Increased information sharing and collaboration drives smarter decision-making across government agencies, service providers and other constituents.

Analytics Landscape



Based on: Competing on Analytics, Davenport and Harris, 2007

Advanced analytics can identify challenges and potential efficiency gains across all systems.



Smarter public safety: An opportunity to turn data into insight to protect citizens and communities

A smarter city uses advanced technologies and community-based approaches to anticipate and prevent—not just respond to—crimes and emergencies.

CRIME DATA AGGREGATION
Put decades worth of crime information at the fingertips of law enforcement officers at all times.

EMERGENCY MANAGEMENT INTEGRATION
Connect police, fire departments, ambulance services and other first responders so all are instantly alerted when an emergency takes places.

SMART SURVEILLANCE SYSTEMS
Use digital cameras to continuously monitor urban areas and automatically alert authorities when a suspicious event occurs or when a license plate, vehicle or other entity is recognized.

Smarter public safety: Client transformations

The **NYPD** **Crime Information Warehouse** gives officers mobile access to more than 120 million criminal complaints, arrests and 911 records, as well as 5 million criminal records, parole files and photographs—resulting in a 27% reduction in crime.

The **City of Madrid** has developed a new **Emergency Response Center**, which aggregates emergency call data and instantly alerts the proper authorities, including police, ambulance services and the fire brigade. The city has experienced a 25% reduction in response time as a result of the implementation.

Smarter public safety: Provide real-time information and improve situational awareness across the public safety spectrum

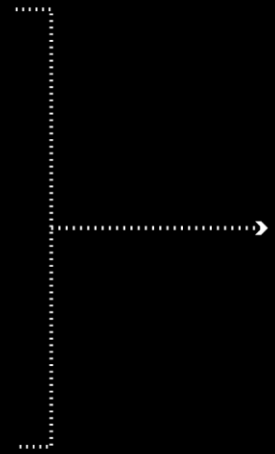
The Innovation:

The **crime information warehouse** links and analyzes data on virtually all crimes committed in an urban area. Crime fighters have access to this information anywhere, anytime.

Collect
crime data from a variety of sources.

Analyze
the data in real time.

Access
this data anywhere, anytime.



The Benefits:

- Map crime trends as they are developing
- Take proactive measures to prevent anticipated crimes
- Close cases more quickly and at higher rates
- Access reports immediately instead of in weeks or months

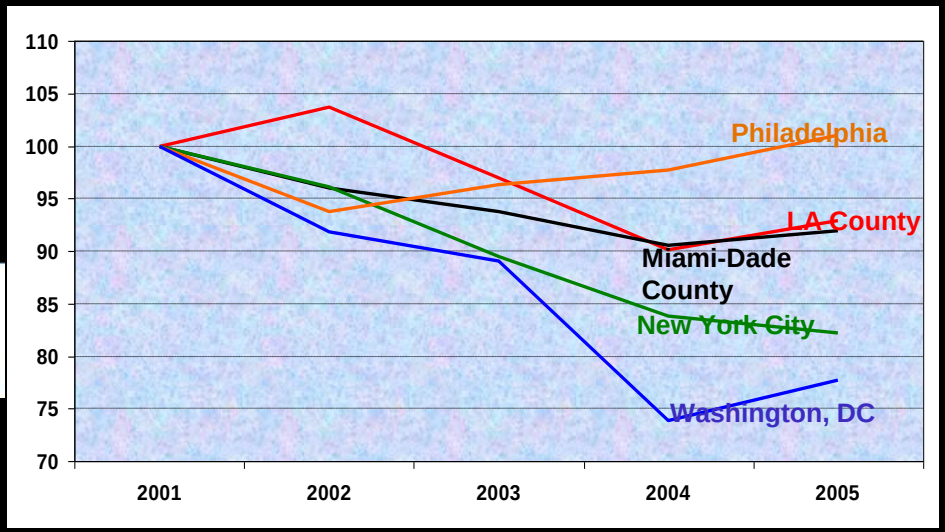
New York City Police Department (NYPD)

"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

New York City, 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.

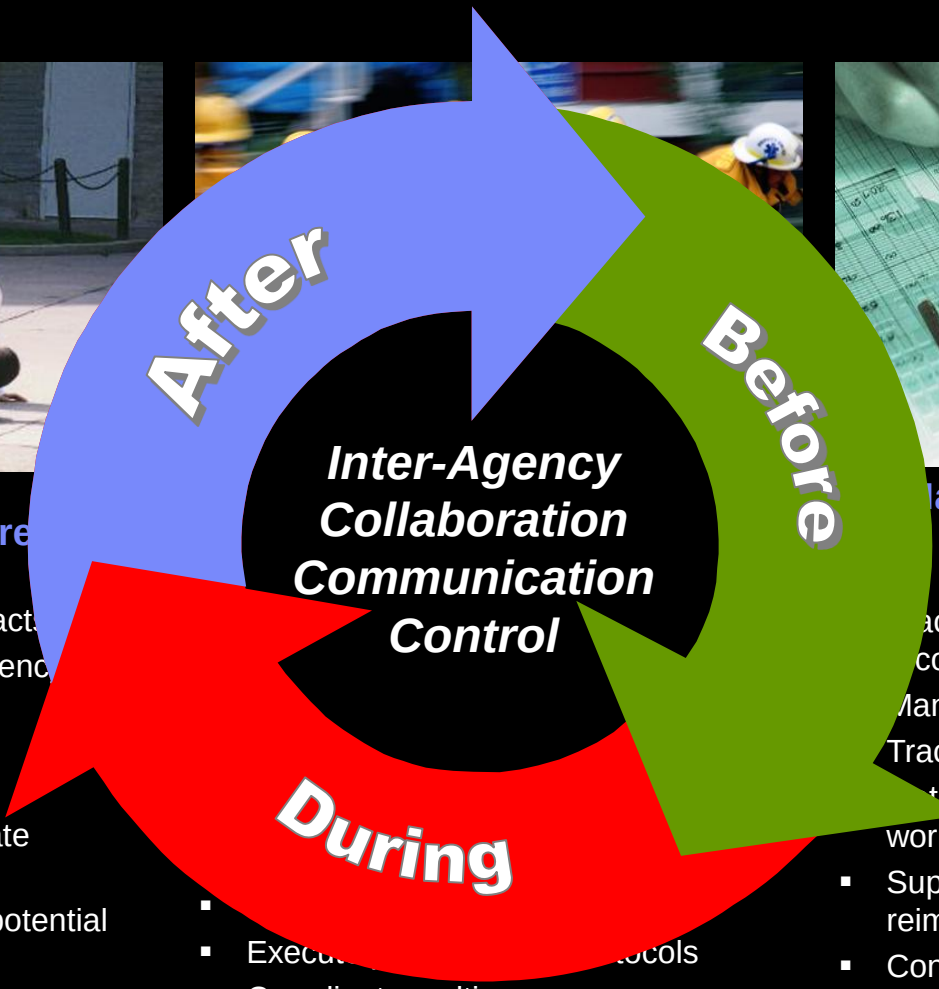
New York City is one of the few cities still reporting declines in violent crimes.

Normalized Violent Crime Statistics
2001 Levels = 100



Source: FBI Uniform Crime Reports, IBM Analysis

Virtual Emergency Response Center
For Every Stage of a Crisis



Plan, Train and Prepare

- Identify critical risks and impacts
- Create and distribute contingency plans, check lists, SOPs
- Identify and map critical infrastructure
- Develop and maintain accurate contact info
- Disseminate intelligence on potential threats
- Train and perform exercises
- Capture lessons learned

- Execute protocols
- Coordinate multi-agency response
- Request, deploy, track resources

Manage Recovery and Accountability

- Track, assess and manage recovery efforts
- Manage volunteers
- Track donations
- Get people back to their lives, work and family
- Support damage estimates and reimbursement requests
- Conduct after-action reviews
- Review and plan for future events

Gauteng Disaster Management Center

GERIS Gauteng Emergency Information Resource Services

South Africa

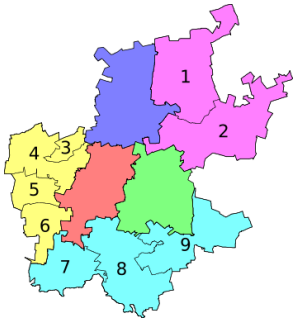
Business Challenge

The Gauteng Province is exposed to an array of hazards that can threaten livelihoods and damage critical infrastructures. The Province will also be hosting the 2010 FIFA World Cup Games.

The local government needed a real time Common Operating Picture and interoperability for its command center and officers in the field to prepare for emergencies and support emergency operations

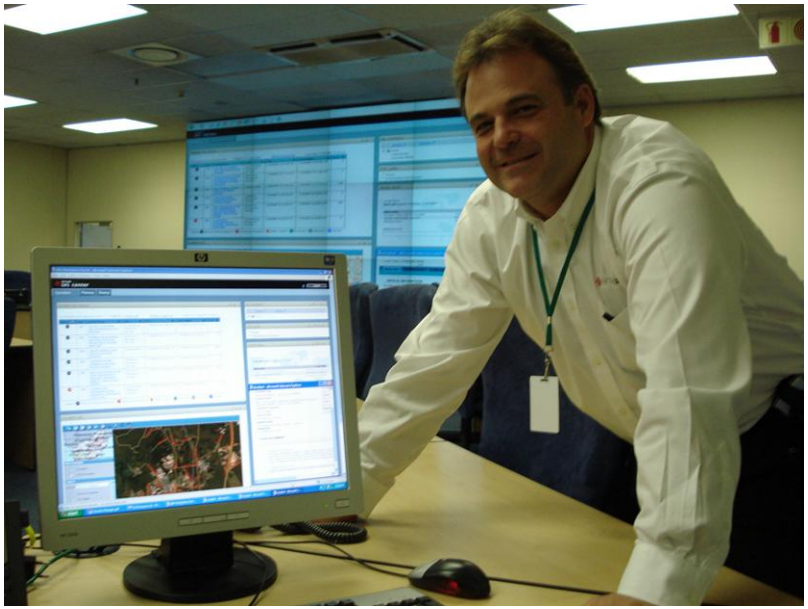
Project Overview

- **Industry:** Government
- **Solution:** I3 Framework – Virtual Operations Center (VOC) Solution **SBS Name:** Public Safety and Security
- **Key Business Processes:** Planning & Preparedness, Incident Management & Collaboration Enterprise Services for State and County Wide Governments
- **Location:** South Africa, Province of Gauteng
- **Facts:** Largest cities Johannesburg and Pretoria, Population 9,688,100
- **System Facts:** 200 concurrent users responsible for Government man-made and natural disaster management.

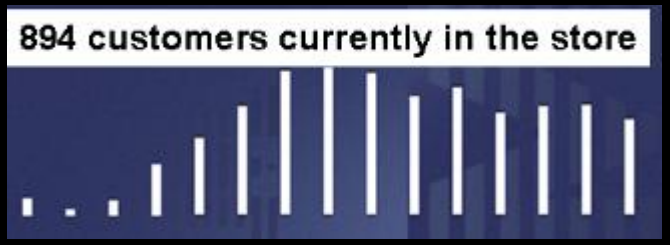


Benefits

- Deploy response capabilities
- Locate resources
- Improve planning capabilities
- Develop training scenarios
- Improve accuracy
- Provide timely decision support
- Develop contingency plans
- Manage field data in real time



Smart Surveillance Systems
Video Analytics Turns Cameras into information sources



Smart Surveillance

Real Time Alerts and Tracking Technology

Motion Detection

Tripwire

Object Removal

Abandoned Object

Smart Surveillance

Examples – Teal Time Alerts

Motion Detection

Tripwire

Object Removal

Camera Move

Smarter transportation: An opportunity to improve the transit experience, reduce congestion and encourage a modal shift among users

Cities can infuse intelligence into their entire transportation system, improving drivers' commutes, giving better information to city planners, increasing public transportation usage and the productivity of businesses, and raising citizens' quality of life.

ROAD USER CHARGING
Employ a dynamic toll system based on the flow of vehicles into and out of a city to reduce traffic.

ELECTRONIC FARE MANAGEMENT
Enable rail, bus and road customers to purchase fares via SMS or online and have the fare collected automatically.

TRANSPORTATION INFORMATION MANAGEMENT
Gain real-time traffic prediction and intelligent route planning capabilities.

Smarter transportation: Influence traffic patterns and increase use of public transportation

The Innovation:

A **smart toll system** uses cameras and sensors positioned throughout the city, along with a central computing system that processes vehicle identification data, to charge drivers varying rates depending on the time of day.

Embed
transponders in vehicles.

Record
license plate numbers, time of day and toll rates.

Process
data and charge drivers accordingly.

The Benefits:

- Less traffic
- Lower emissions
- Increased city revenue
- Greater use of public transit
- Increased roadway safety

Smarter transportation: Client transformations

Stockholm implemented an **intelligent toll system** in the city center, which resulted in 20% less traffic, 40% lower emissions and 40,000 additional users of the public transportation system.

To encourage citizens to use multiple modes of transportation and make it easier to align the cost of transit with its impact on the environment, the **Singapore Land Transport Authority** implemented **fare management** with smart cards that can be used to pay for buses, trains, taxis, road-use charging and parking.

City of Stockholm breaks gridlock with a smart road use management system

U.S. transportation system *annual impact* through congested roadways:

- Cost of congestion nears $200 billion
- 4.2 billion lost hours
- 11 billion liters of gasoline

What's smart?

- New, dynamic business model
- Congestion charging
- Real-time traffic prediction
- Technology to optically recognize cars in milliseconds
- Real-time congestion tolling

Smarter Business Outcomes

- 25 percent reduction in traffic
- 40,000 more citizens on public transportation
- Less noise pollution and lower carbon emissions

Stockholm Congestion Tax Project - Case Study

Clearly Measurable Results	**25% reduction in traffic entering cordon**
	15% reduction in CO_2 emissions
	$120M/yr in revenue to City of Stockholm; payback in 4 years
	Congestion charges will fund transit improvements

We’ve only just begun to uncover what is possible on a smarter planet.

- The world will continue to become smaller, flatter and smarter. We are moving into the age of the globally integrated and intelligent economy, society and planet.
- There’s no better time to start building a smarter government—one focused on lasting transformation in the industries and systems on which we all depend. And there’s no better time to invest in creating the kind of society we all desire.

Let's work together to drive real progress in our world.

Thank you.

IBM Solutions Portfolio for Cities

Public Safety
- Crime information warehouse
- Emergency response
- Digital surveillance

Intelligent Transportation
- Road user charging
- Fare management
- Transport info management

Government Services
- Citizen-centered design
- Integrated service delivery
- Permits and licenses
- Land registries

Energy & Utilities
- Smart grid
- Building efficiency assessments
- Water management

Telecommunications
- Broadband expansion

Healthcare
- E-medical records
- Home health services
- Payment systems

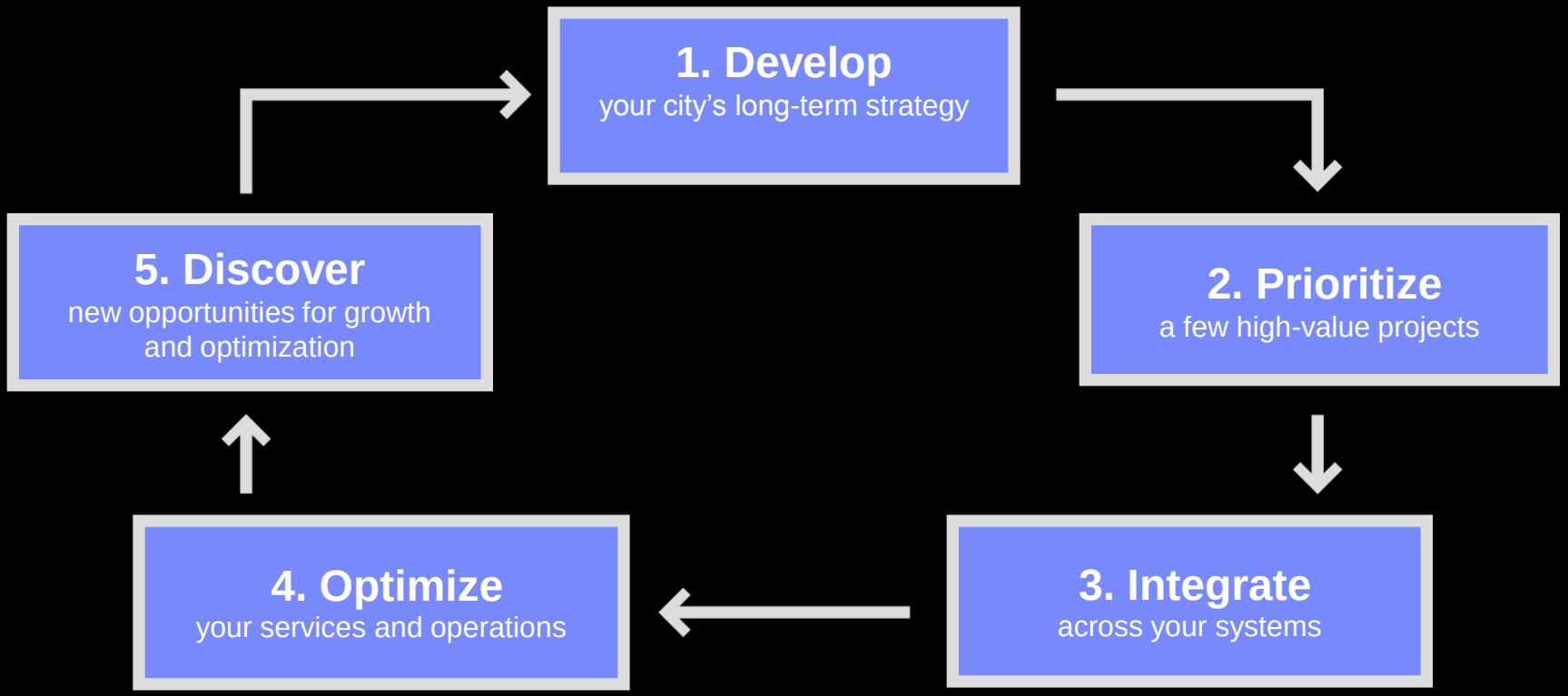
Education
- Smarter Classroom
- Smart Administration
- Innovation in Research

Government Accountability – Results orientation and Openness

Analytics
- Assessing overall health of the community vs. national indicators
- Establish goals and priorities

Municipal Dashboards
- Measuring progress against goals
- Identifying improvement areas

Smarter cities roadmap: Starting with your goals and a long-term strategy, select high-value projects that can be managed carefully to produce visible results.



- 80% of the world's transactions
- Over 95% of top Fortune 1000 companies
- 100% of Global 500 banks

Making IBM the recognized leader

Enabling our customers to make smarter decisions and take action faster