

# Building a Smarter Planet, City by City

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Smarter**Cities**

## The Reality of Global Integration

The world is connected

**ECONOMICALLY**

**SOCIALLY**

**TECHNOLOGICALLY**

- Climate change
- Energy geopolitics
- Global supply chains
- September 11<sup>th</sup>, 2001
- Financial crisis

## Global Integration is Most Obvious in Cities

In 2007, for the first time in history, the majority of the world's population lived in cities – 3.3 billion. By 2050, city dwellers are expected to make up 70 percent of the Earth's total population – 6.4 billion.



# Urbanization is Causing Unprecedented Challenges



**75%** Estimated energy consumption by cities of the world today

**80%** Estimated emission of greenhouse gases by cities of the world today



**\$41 trillion** Investment needed for infrastructure in developing countries by 2030

**20%** Portion of water lost within cities due to infrastructure leaks

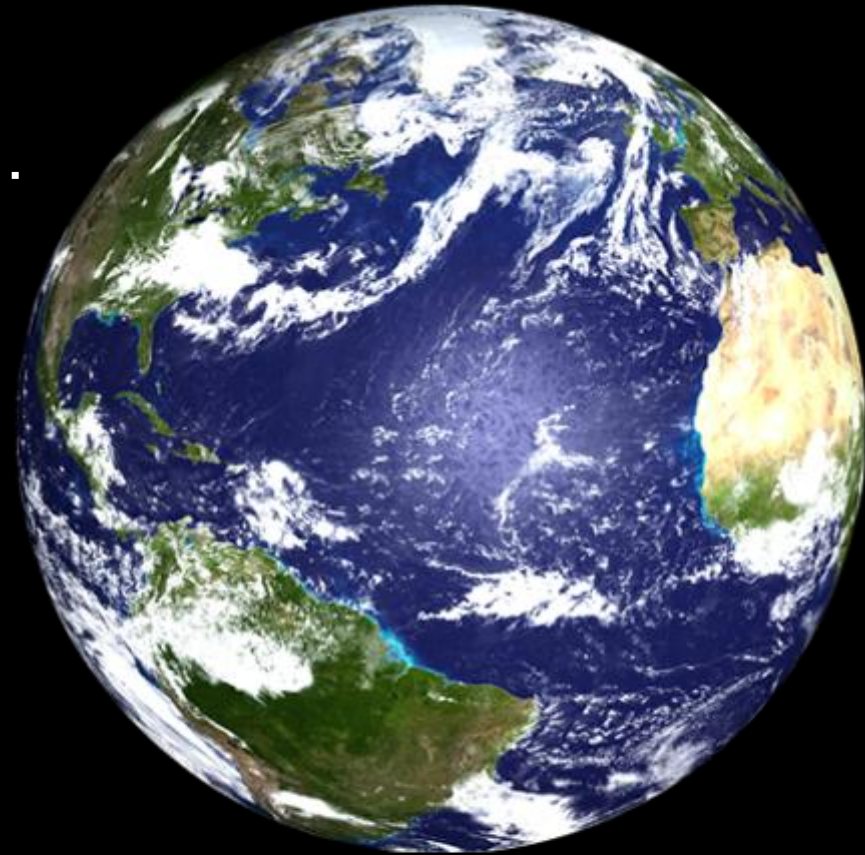


Cities – more than states, provinces or even nations – will increasingly be the crucible where the success or failure of our planet is determined.

We cannot continue down the  
**path that got us here...**

...we must find  
**new approaches**  
that are

**smarter**



*We must seek new insights, new capabilities*

## We Collect Data from Almost Everything *This is the Emergent Era of Big Data*

### 30 Billion

RFID tags  
embedded into our  
world and across  
entire ecosystems

### 1 Billion

Camera phones in  
existence able to  
document accidents,  
damage, and crimes

### 85%

of new automobiles  
will contain event data  
recorders collecting  
travel information



Instrumented



Interconnected



Intelligent



## The Principle of “Smart”

The physical and the digital worlds are converging, allowing us to be *intelligent* and *proactive*.

### Digital World

applications, workflows, models,  
analysis, optimization, ....

information integration

networks

sensors / actuators

### Physical World

buildings, roads, pipelines,  
grids, airports, ...



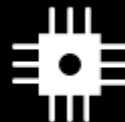
Virtually all things, processes and  
ways of working are becoming

**INTELLIGENT**



Our world is becoming

**INTERCONNECTED**



Our world is becoming

**INSTRUMENTED**

## SMART PUBLIC SAFETY

IBM is helping the city of Chicago fight crime by digitizing their law enforcement practices and deploying smarter surveillance systems ...

... even testing a system that uses audio sensors to direct cameras to locate gunshots, determine the caliber of gun fired and pinpoint its exact location – long before 9-1-1 is dialed.



## SMART TRANSPORTATION

IBM is working with Stockholm, Brisbane, London, Singapore, and dozens of other cities to deploy smarter transportation systems.

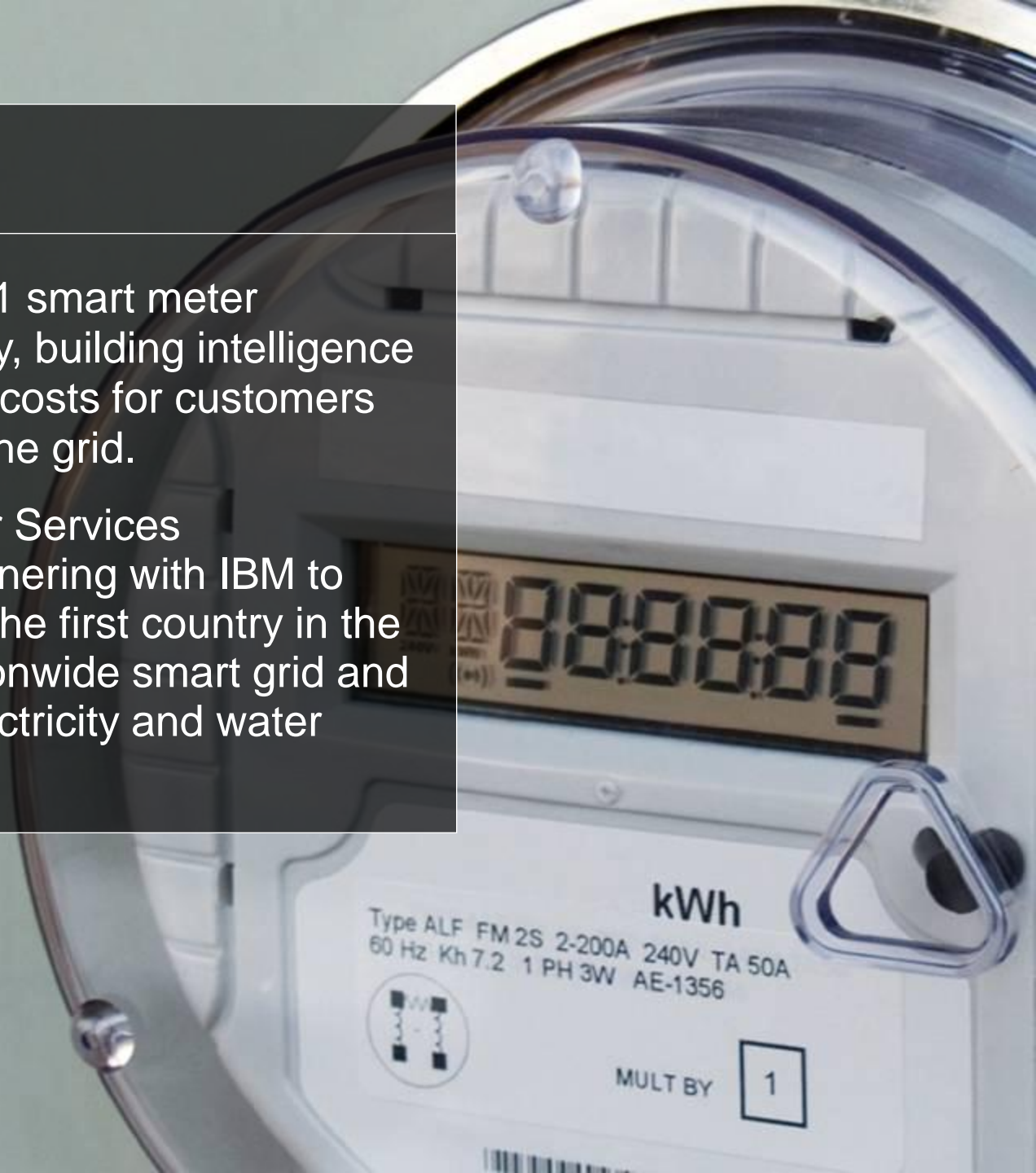
As one example, Stockholm has seen approximately 20 percent less traffic, a 12 percent drop in emissions and a reported 40,000 additional daily users of public transportation.



## SMART ENERGY

IBM leads 7 of the 11 smart meter deployments globally, building intelligence into utilities to lower costs for customers and better balance the grid.

Enemalta and Water Services Corporation are partnering with IBM to help Malta become the first country in the world to build a nationwide smart grid and a fully integrated electricity and water system.



We are applying insight from over 2,000 projects with cities of all sizes

Smart metering in **Malta** helps citizens pay only for the energy they use

Predictive analytics helped slash **Richmond's** crime rate by **40%** in one year

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

In **Delft**, developing enhanced flood prediction and protection systems for coastal areas and river deltas

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

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

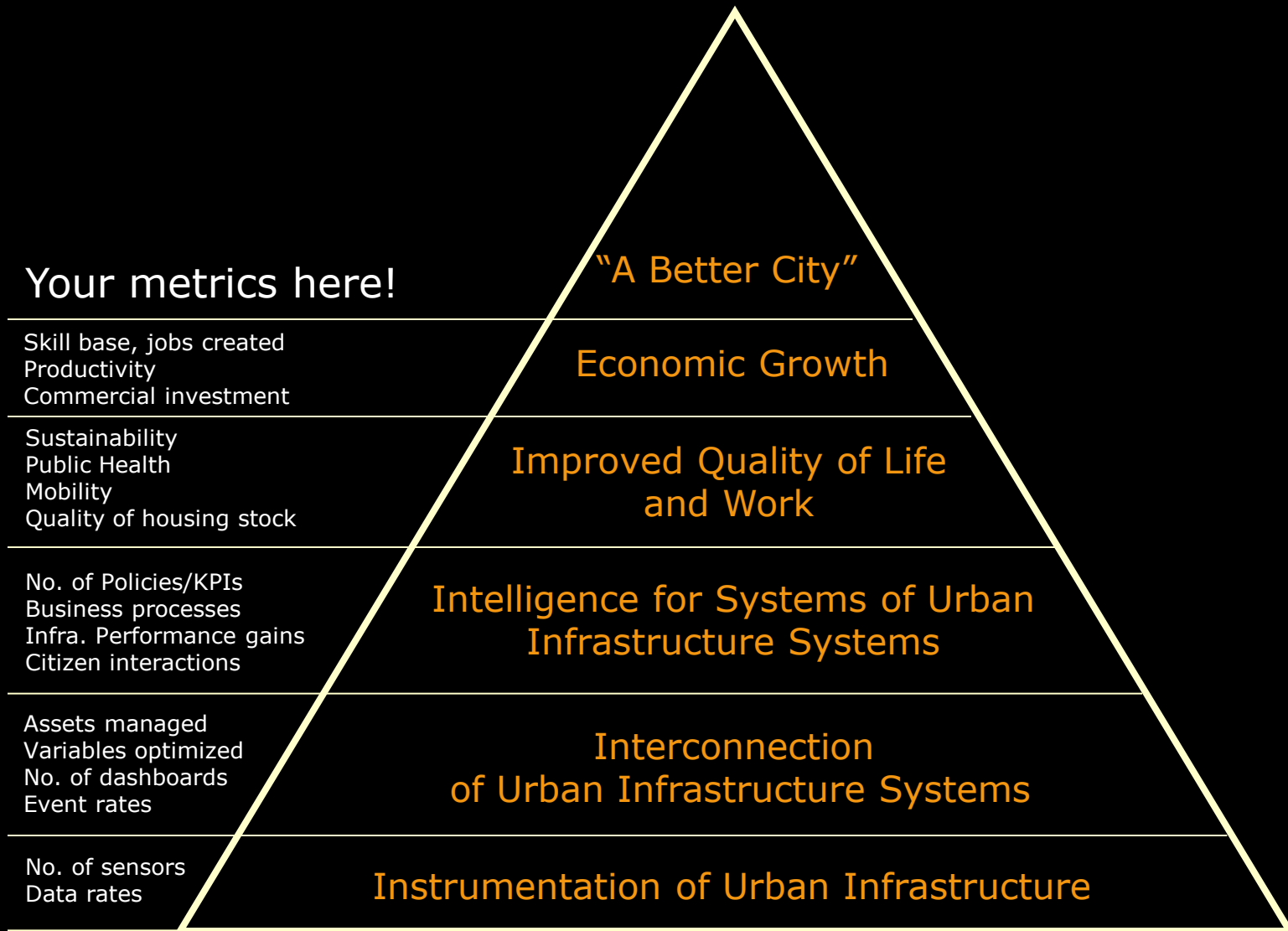
In downtown **Stockholm** smart traffic systems helped reduce gridlock by **20%**

Peak energy loads fell by **15%** when IBM helped homes in the Pacific Northwest talk straight to the grid

IBM helps **Amsterdam** Airport Schiphol move **20** million more bags every year with a smarter baggage system

*Patterns for Leveraging Information, Anticipating Problems, Coordinating Resources*

# Think about a Smarter City via Outcomes



Smarter cities are cities that drive sustainable economic growth by...

Leveraging information to make better decisions

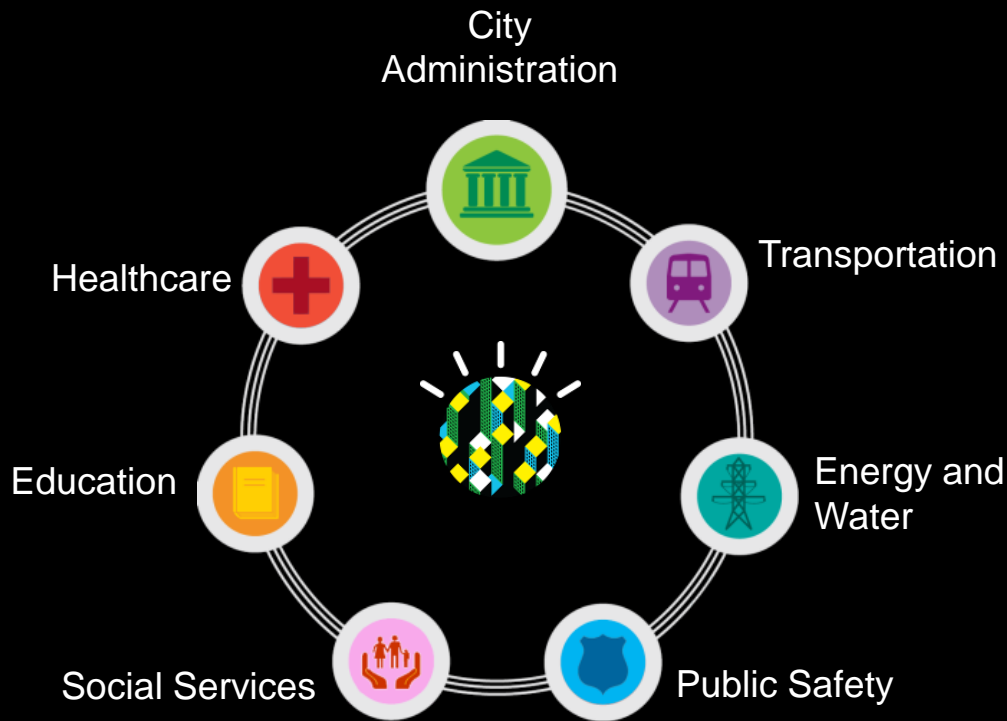
Anticipating problems to resolve them proactively



Coordinating resources to operate effectively

*...increasing the value cities generate for their citizens in a rapidly changing economic and urban world*

Singapore has made great progress with individual systems. The next step is to strive for a **System of Systems** approach.

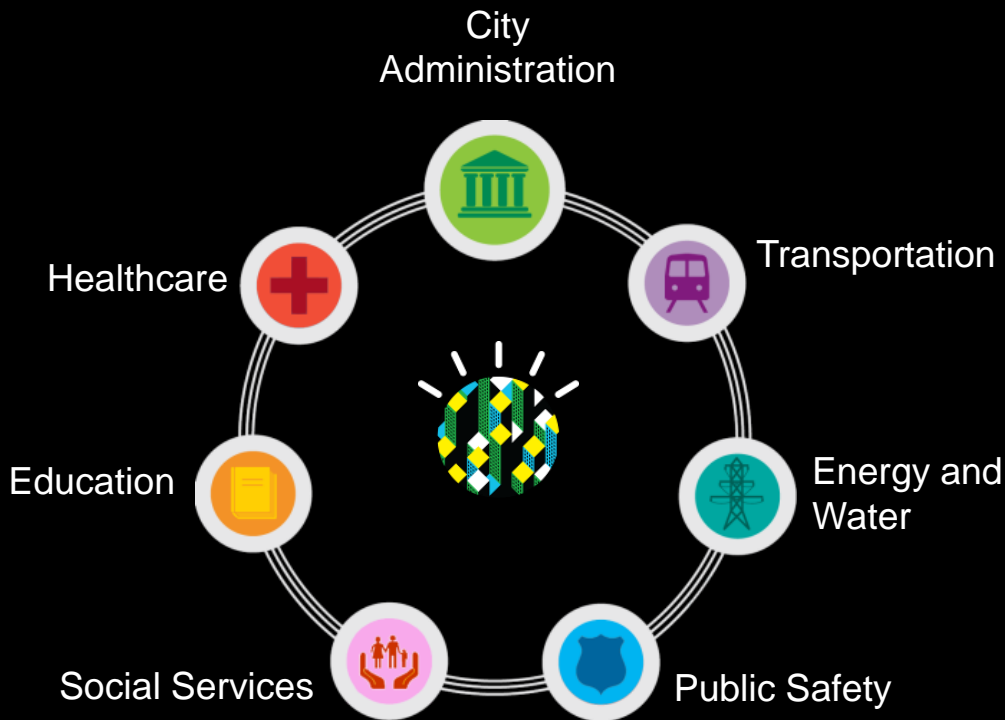


## Example Scenarios:

- Emergency Response
- Large Event Management
- Maintenance Services
- Budgeting / Capital Planning
- Shared Services – HR, Finance, etc.
- Zoning / Reconstruction / Long-term Planning

*Improve Outcomes for better Effectiveness and Efficiencies*

# Information, Management, Collaboration, and Modeling Enable a **System of Systems** Approach

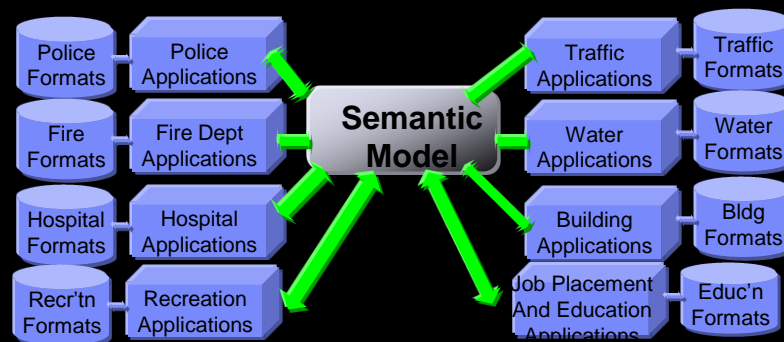


- **Integrated Information** – Common Operational Picture
- **Enterprise Management** – KPI's, Process Discipline, BI
- **Collaboration** – Government, Citizens, Businesses
- **Model Analytics** – What-If and Planning

## Integrated Information provides all agencies a *common operational picture*



Fully Integrated Data Presented On a Common Backplane...



...leveraging a common semantic model



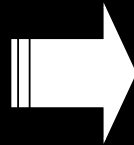
...built on a common platform that allow new developments to be accelerated

# Performance Management with KPI tracking and Business Insight provide the discipline of Enterprise Management

Executives

Agencies

Staff



Reports, Dashboards,  
Scorecards

Reports, Dashboards,  
Scorecards

Query, Trend Analysis,  
Statistical Analysis

Reports, Dashboards,  
Scorecards

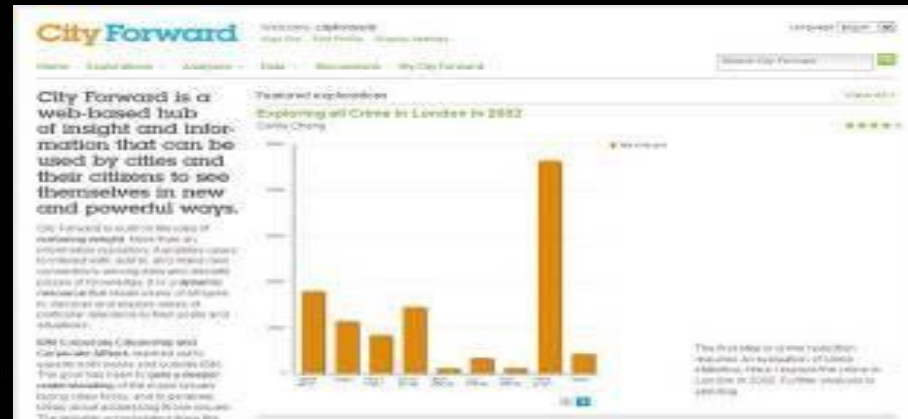
Query, Trend Analysis,  
Statistical Analysis

What-if Scenarios,  
Plans, Budgets, Forecasts

Predictive Analytics,  
Predictive Models

*Information Oriented Decision Making*

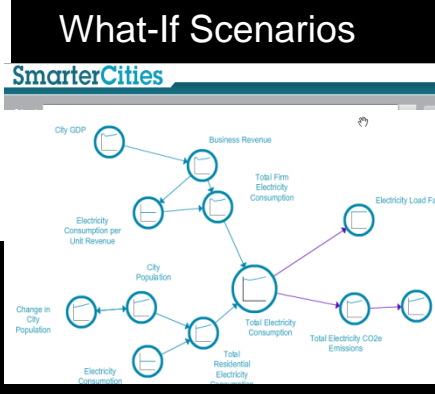
## Collaboration across government, citizens, and businesses keep the innovation and information flowing



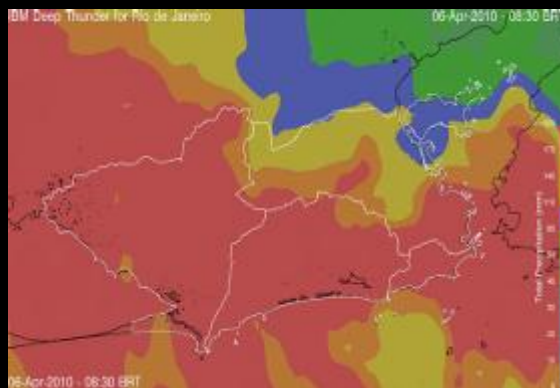
## Model Analytics provide the proactive capability to predict, prevent, and plan for the future



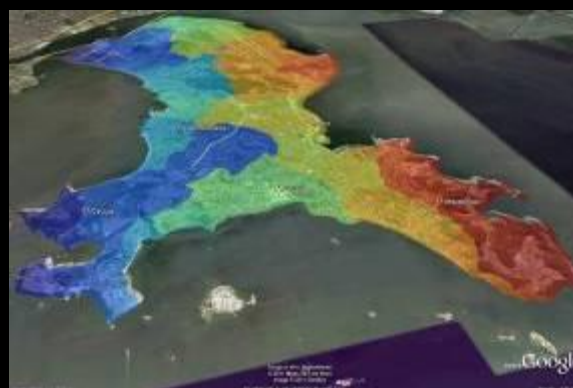
System Interdependencies



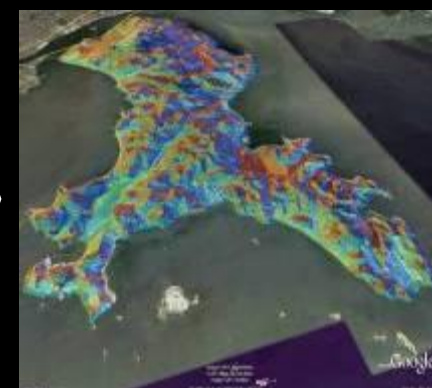
Impact Analyses



Weather Prediction



Precipitation Analysis



Flood Prediction

## Improving Outcomes to create a planet of Smarter Cities

- **System of Systems** is an end-to-end methodology
  - *Proven at multiple scales, multiple environments, multiple industries*
  - *Evolved from art to science to replicate and reduce risk*
- **100 years of experience** making the world work better through the use of technology
- **Passionate** to take cities to the next level of sophistication and prosperity



Over **2,000 city projects** leverage on IBM to help them transform into 21<sup>st</sup> century cities

Thank  
YOU