

Smarter Cities:



Capitalizing on new insights, creating system-wide efficiencies,
collaborating in new ways

Cate Richards

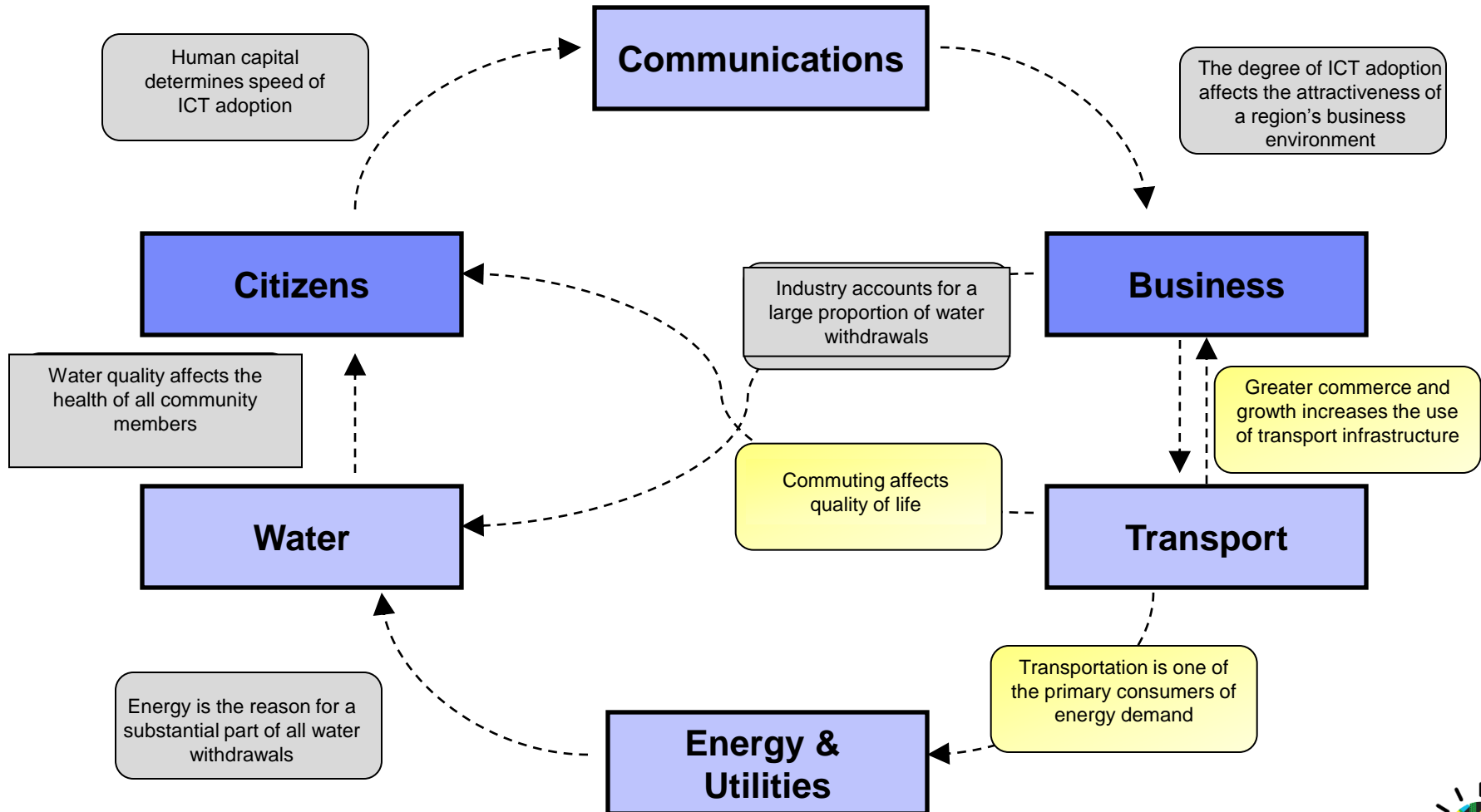
NA Leader Public Sector Industry Solutions

Smarter Cities

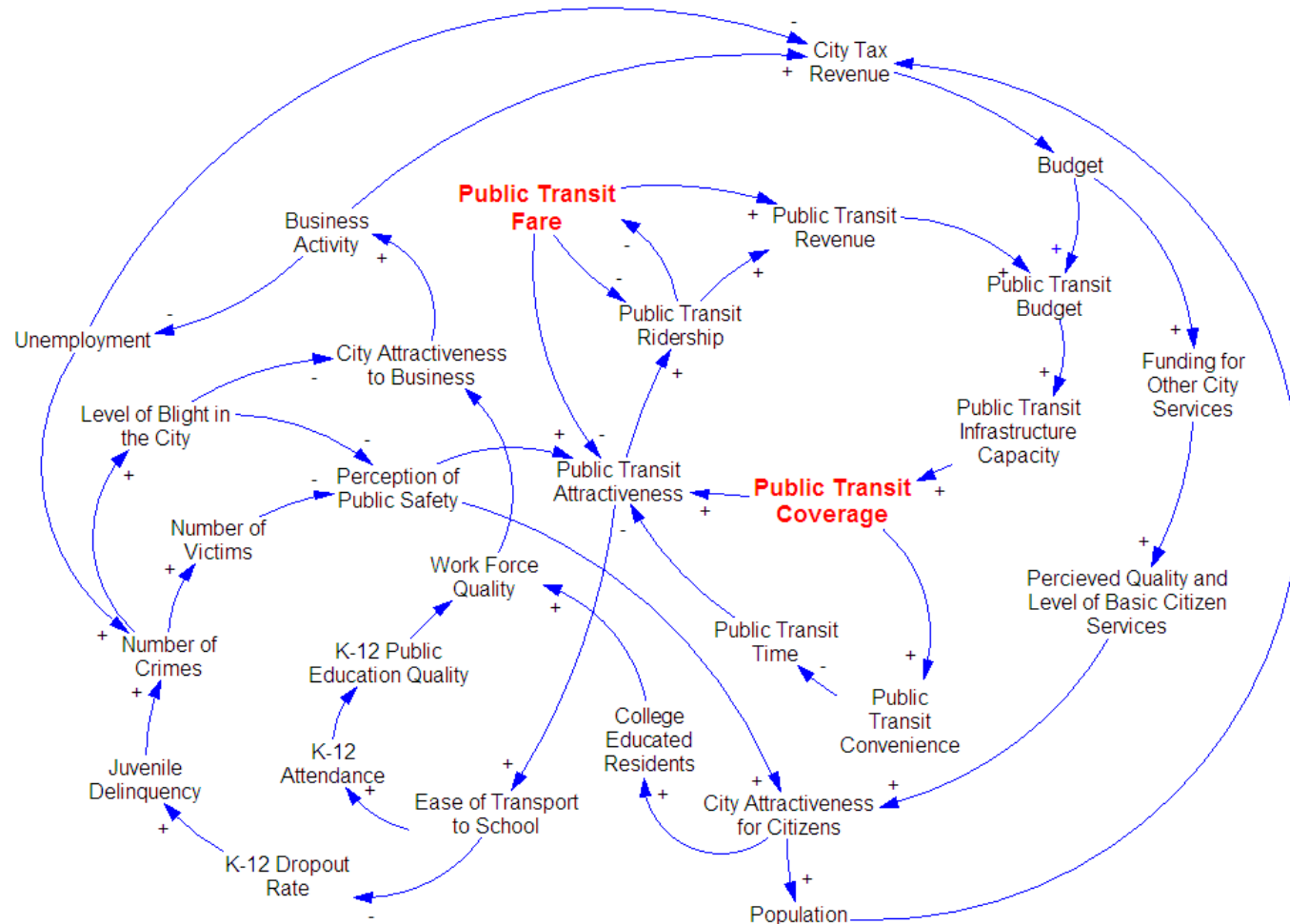
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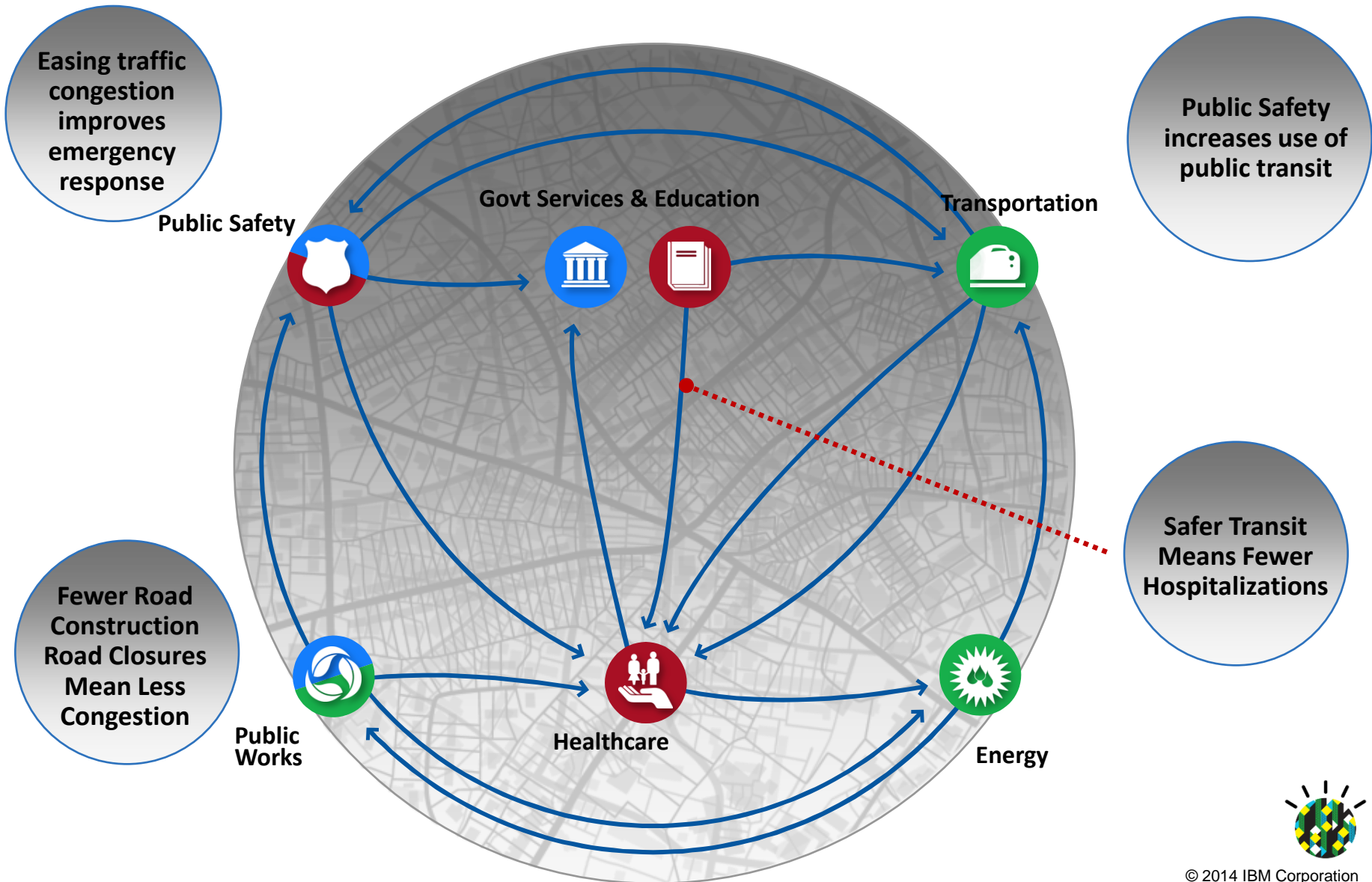
A city is a “system of systems” with separate and interconnected challenges...



As we drill down into specific areas, we can see the effects/consequences that an action (or inaction) in one area has across the various systems...

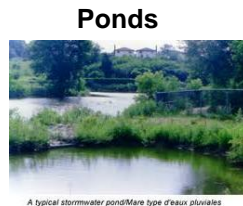
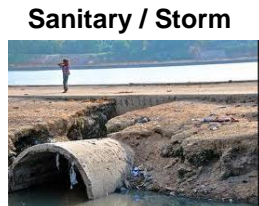
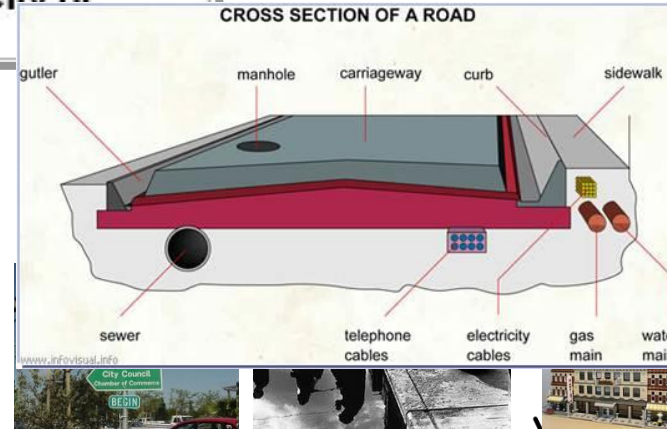
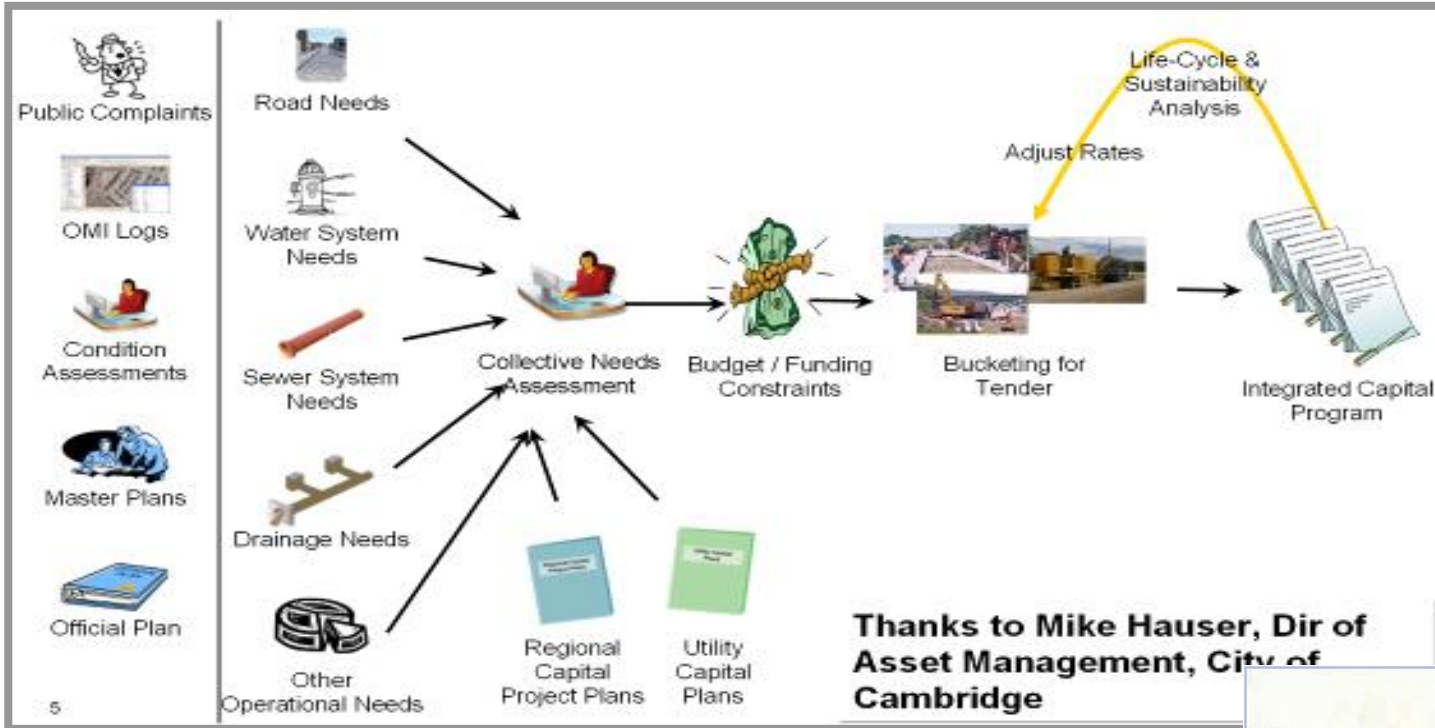


...the connections drive budget, revenue, safety and citizen satisfaction



Smarter Cities Introduction Example

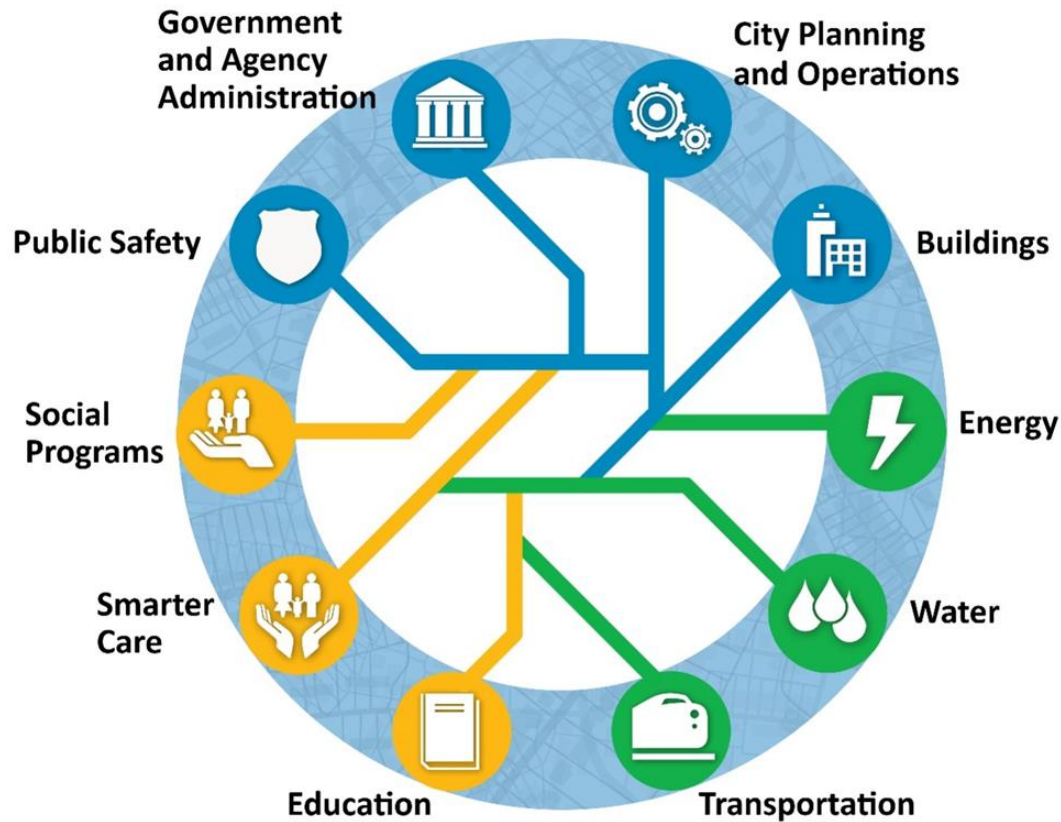
City in Canada Reduces Infrastructure Planning time from 6 months to 3 weeks and creates a more cost efficient plan which will save significant money in execution.



Industry Solutions Research



Smarter Cities help leaders **get started in the aspect** of the city they choose



Planning and Management

Lead with vision and deep insight to improve efficiency, collaboration and response for government, public safety and city operations

Infrastructure

Build resilient, sustainable infrastructure to increase efficiency, sustainability and proactively plan for energy, water and transportation

People

Enable individuals' health and productivity to deliver better outcomes and reduced costs in social programs, health and education



The future of cities and citizen services will be unlike the past; cloud will impact citizen experiences and operational efficiencies

Future of Citizen Services

MOBILE “BEACONS”

- Cities and businesses will be able, via mobile “Beacons”, to tailor their communications with citizens via smart mobile devices based on geo location

CITIZEN ANALYTICS SOLUTIONS

- Cities and businesses will be able to use data associated with citizens to create a custom experience for each citizen

COMPREHENSIVE VIEWS OF SUPPLY CHAIN

- Cities and business operations, using data and analytics, will be able to get a holistic view of their supply chain where they can optimize inefficiencies as well as present new services and capabilities where they are needed when they are needed

MOBILE PAYMENTS

- Citizens will be able to scan service requirement indicators, food, beverages & merchandise via their mobile phone and pay using a credit card or e-folio without having to wait in line

COGNITIVE

- Thinking and learning machines that can talk to people



Source: IBM's 'Digital Reinvention' white paper, <http://www.retailcustomerexperience.com/blogs/five-disruptive-retail-trends-to-watch-for/>



The Connected City/County Example



Challenge: Disconnected programs for parks, businesses, and marketing lead to underutilized resources and lost revenue opportunities.

Solution Description: Mobile application connects users to parks, businesses, events, and transit in a single application. County builds partnerships, sponsorships, and other revenue generating opportunities for increased economic vitality.

Data collected from city and private sector operations...



Park Foundation Program Information



Businesses (Restaurants, Bars, Nightclubs, other POI's)



County-sponsored events

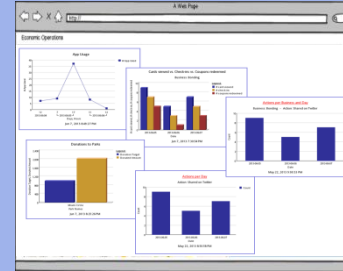


Transit schedules, arrival information, etc

Data is integrated, analyzed and visualized...

Economic Vitality

End user sees destination information and how to get there. Can share information via twitter and facebook, and receive incentives for businesses, transit, events, etc.



County and businesses can see coupon and application usage

Smarter decisions are made...



Citizens/Tourists: Attend events, connect with city and businesses, get great deals!

Businesses: \$\$ from wash across city, view redeemed coupons



Parks: Highly attended, well-sponsored events (with add'l tax and membership revenue)

Transit: Increased ridership and revenue, coordination of transit with user needs

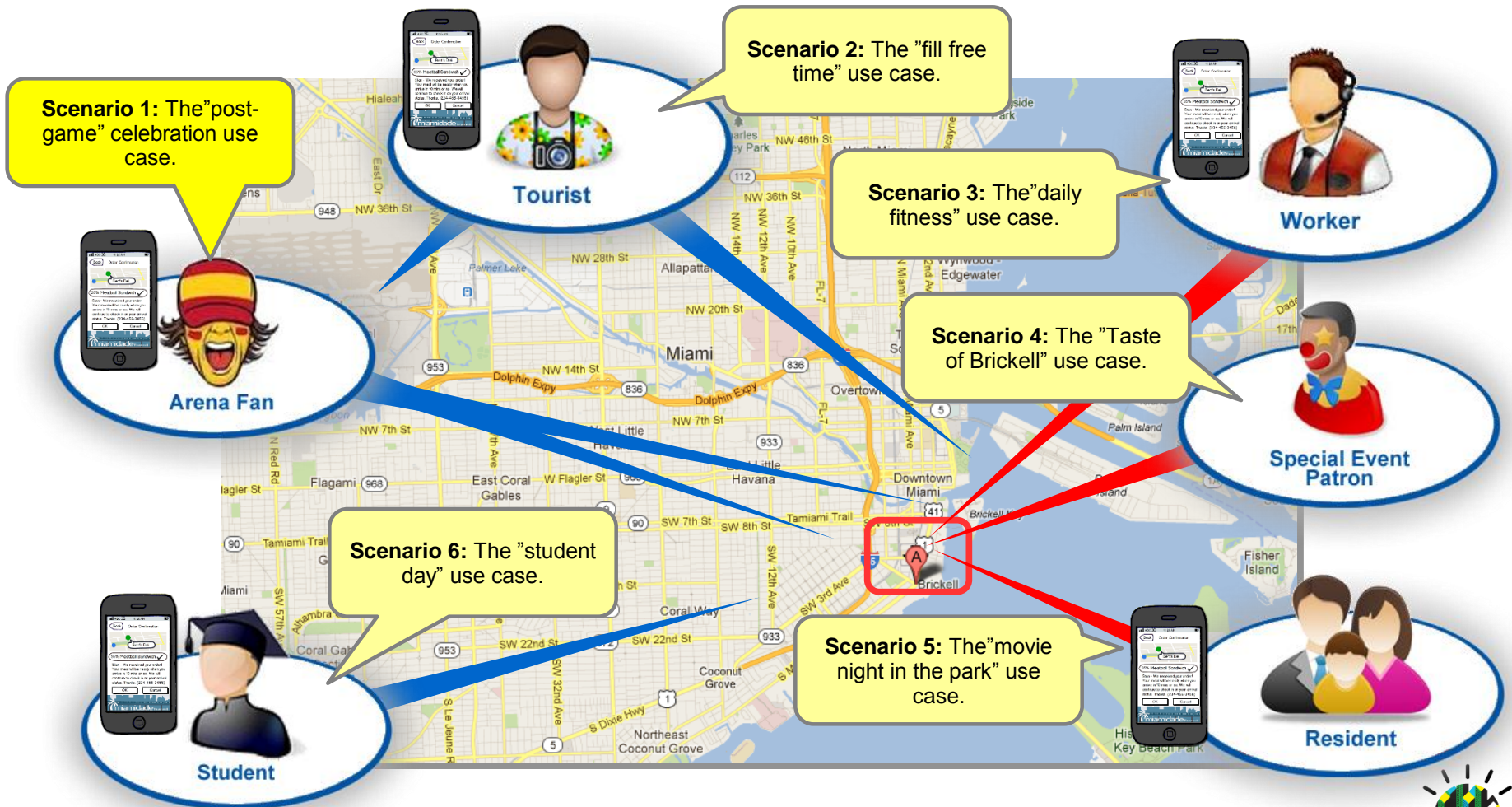


The Connected City/County –Citizen View

— Don't start out intending to go to Brickell
— Already in Brickell area



Draw all of these personas to transit-oriented parks to create enjoyable experiences that promote health and well being and bring revenue potential to Brickell area businesses.



These personas monitor and manage the economic operations that is driven by the end user personas.

Transit Supervisor

Transit delivers people to destinations and provides incentives....



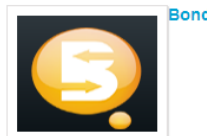
People enjoy parks...



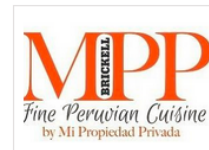
People spend money at nearby businesses



Tapas Xperience –
Brickell Miami
★★★★★



Trisransi opens
'Bonding' in Brickell
Miami



MPP Brickell – Brickell
Miami

Park Director

Downtown District Authority

Business Owner

Is rider-ship up?

Is revenue up so I can build and maintain transit operations?

Will riders recommend transit to others?

Are people riding transit to come to the parks?

Are people coming to the parks?

Are businesses investing in the program so I can generate revenue to maintain the parks?

How much revenue is coming from transit-based discounts?

Is the campaign working?

Are more businesses signing up for the program?

Miami Dade Parks uses KPI analyses, geospatial maps and auto alerts to detect, identify and repair leaks quickly, dramatically cutting costs

>USD1 million

estimated savings related to water costs and proactive leak detection

>95%

reduced lag time for locating leaks, from weeks to hours

40 meters

delivering near-real-time water intelligence from 13 parks

Solution Components

- IBM® Intelligent Operations for Water
- IBM Software Services
- IBM Business Partner Sensus
- IBM Business Partner Esri



Business Challenge: This park system, the third-largest in the United States, was using roughly 360 million gallons of water per year at a cost of about USD5 million. Officials correctly suspected that some of the cost was due to leaks and water waste resulting from an aging infrastructure. Finding the exact location of a leak, however, and diagnosing the problem was extremely labor-intensive and costly.

The Smarter Solution: The department deployed a solution that tracks and monitors water use by collecting hourly consumption data from smart water meters. If, when analyzing data against key performance indicators (KPIs), the system detects a consumption spike or irregularity, it issues an alert so that operators can drill down to the meter level, investigate causes and dispatch repair crews quickly.

This is a real game-changer...not only from the standpoint of savings and diagnosing problems more efficiently but also because the savings can be put toward developing the system and taking care of other needs in the community.



Minneapolis improves citizen services, doing more with less by knocking down interagency silos

95% improvement

in police investigation times, reducing the process from four hours to just minutes

Reduces conflicts

in city operations by coordinating scheduled events, road construction and more

Boosts satisfaction

among citizens by enabling more responsive municipal services



Business Challenge: To improve the quality and responsiveness of citizen services, the city needed to support better collaboration and coordination among its various departments and provide the shared data they need to do their jobs.

The Smarter Solution: A First-of-a-Kind central planning tool bridges the gaps between police, regulatory services and public works departments by combining their data. The solution provides analytical models and geospatial mapping capabilities to support integrated planning, helping the city predict the location and timing of criminal activity, traffic jams and other disruptive events while forecasting the impact of special events, construction, road closures and weather conditions.

“This system is a teacher. The city is gaining all kinds of insights about day-to-day operations and emergency situations that were never before possible—simply because the data is now available.”
—Chief information officer (CIO)



Solution Components

- IBM® Intelligent City Planning and Operations
- IBM Research
- IBM Business Partner Environmental Systems Research Institute, Inc. (Esri)

The Sustainable City – Connecting Assets & Insight



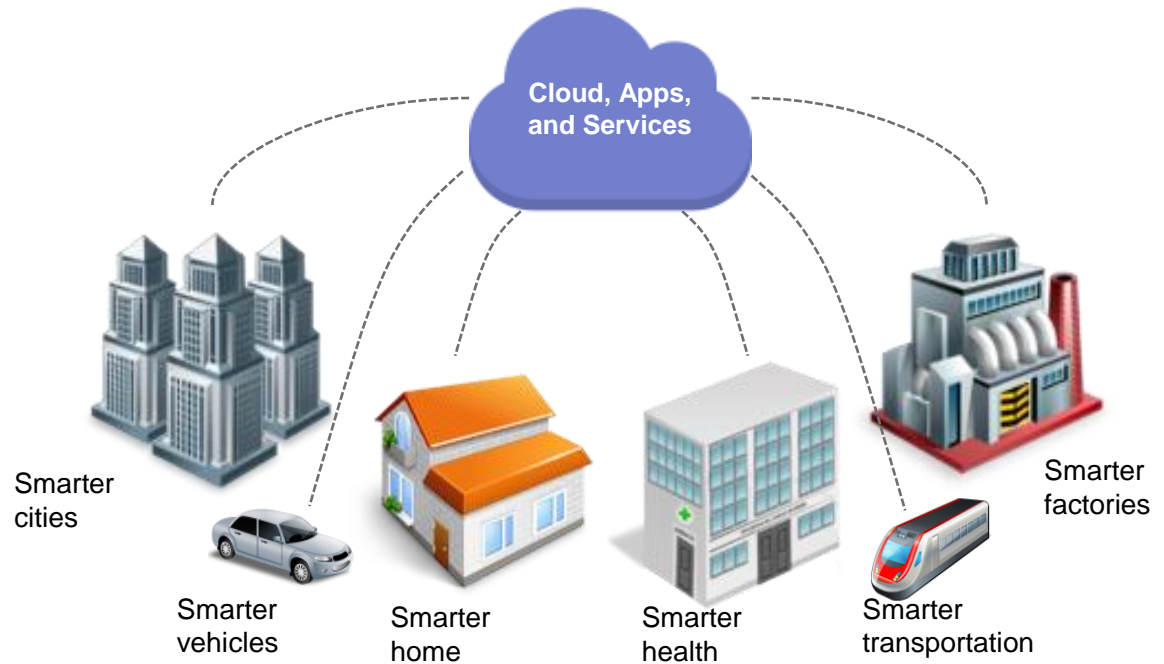
Every function in government maintains assets paid for by the citizens.

Internet of Things digitizes our world, providing us with prolific amounts of data and new delivery models that allow governments to engage in new value creation

Data

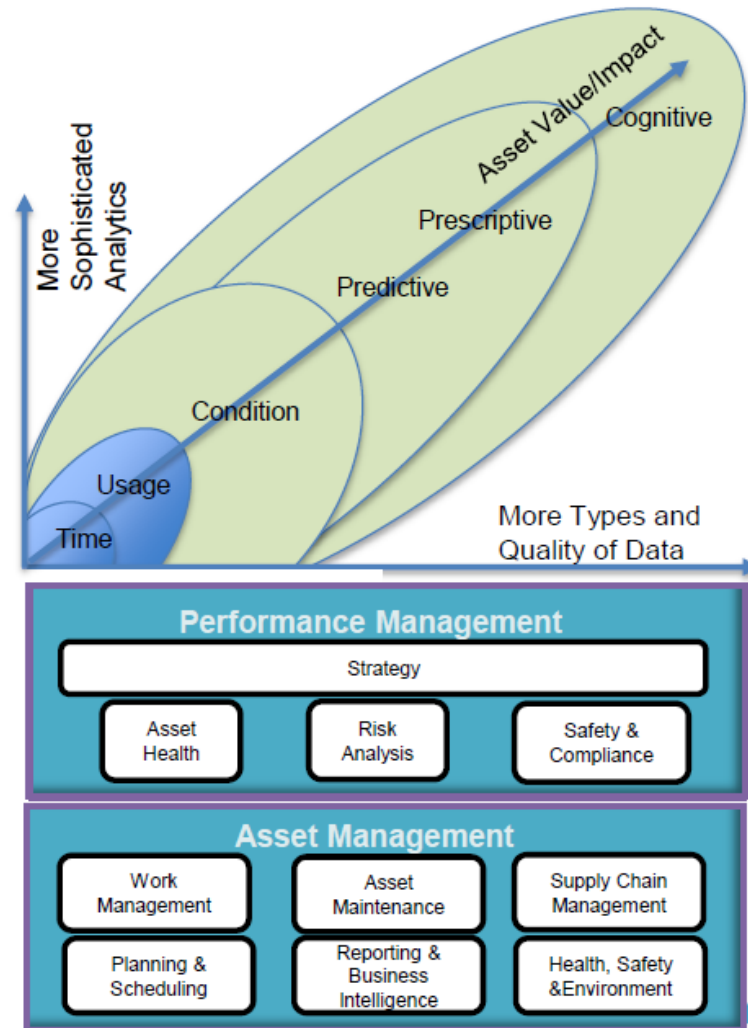
Cloud

Engagement



Asset Management Next Generation – Where We Are Today

Encompasses Asset Management capabilities, Maintenance Strategy, and Analytics –wrapped in an industry context



Performance Management

Combines asset data with other operational and additional data to set asset specific strategies that improve both maintenance performance and business performance.

Asset Management

Customers implement a set of activities to best manage their assets throughout their lifecycle

Clients will use a variety of analytic services to execute Next Gen strategy

- Customers will progressively apply more sophisticated analytics to different types of higher quality data
- As they do so, the value delivered by assets will increase, permeating through more facets of their business, and will **become increasingly essential**
- Key data sources includes maintenance, real-time sensor, external (weather, economic, etc), internal (financial, skills, etc), unstructured, and more

Advances in Analytics, Cloud and Internet of Things (IoT) capabilities further disrupts the definition of Smarter Assets

Accelerating Advancements in Technology...

Are transforming every part of government...



Advanced Analytics



Product Lifecycle Mgmt



Cloud Computing



Pervasive Connectivity



Embedded Sensors



Improving Operations and Lowering Costs

- Predictive maintenance
- Analyze and reduce risk
- Procurement automation



Creating New Products and Business Models

- Smarter, safer cars & roads
- Health and fitness
- Home and building automation



Driving Engagement and Citizen Experience

- Smarter, more profitable transit
- Engaged events and venues
- Apps that link the digital and physical world around a program



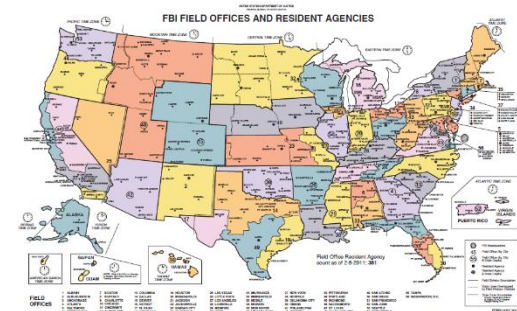
Case Study: Federal Bureau of Investigation (FBI)



The FBI Asset Management program has been publicly lauded by the FBI CFO as one the most successful transformations in the recent history of the bureau

FBI's Asset Management Challenge

- **600,000 assets, 380 US locations, 62 Legal Attaché offices** - FBI faced with the fiduciary, regulatory, and operational responsibility to manage approximately 600,000 assets across many asset classes and over 380 locations in the USA.
- **User frustration** in managing assets due to high levels of administrative burden on missions resources (special agents), including a particularly intensive and cumbersome annual inventory process.
- **Multiple disparate and redundant systems involved in asset management:** fixed assets, property assets, fleet assets, weapons. Non accountable assets tracked locally on spreadsheets.
- **Significant on-going expenditures** in supporting and maintaining multiple antiquated asset management technologies and systems.
- **Frequent time consuming data calls** on asset investments and performance across multiple FBI missions.



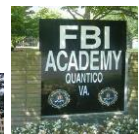
Fleet



IT Equipment



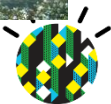
Real Property



Weapons



Operational "Tools"



The Future is Happening Now: Bringing it All Together

Example:

Combining weather, analytics, and the Internet of Things to deliver better outcomes

Analyzing weather data and energy consumption can **keep the lights on**. Energy and utility companies say weather causes **70%** of power outages.*

ibm.com/ibmandweather

By combining weather forecasts with analytics, your insurance company could **text you a warning** before hail hits your area. Insurance companies pay **\$1 billion** in claims every year for vehicles damaged by hail.*

ibm.com/ibmandweather

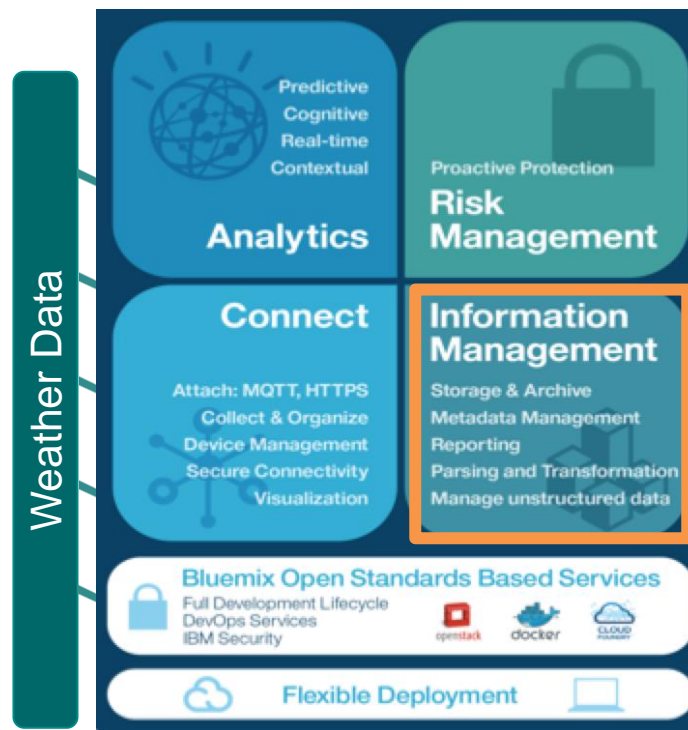
Weather affects more than what we wear or what we do. Businesses lose **\$500 billion** every year in the U.S. because of weather.*

ibm.com/ibmandweather

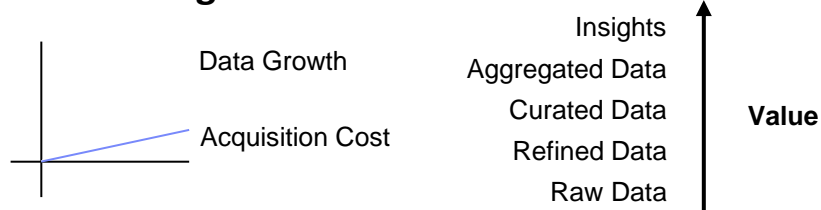
Insight: Most accurate forecasts in all regions and all times

Scale: 26 Billion customer forecasts per day (3.5B Google queries). 250,000/sec across 2.2 billion unique locations

Mobile: Consumer products, over 150 million users, #1 on all platforms

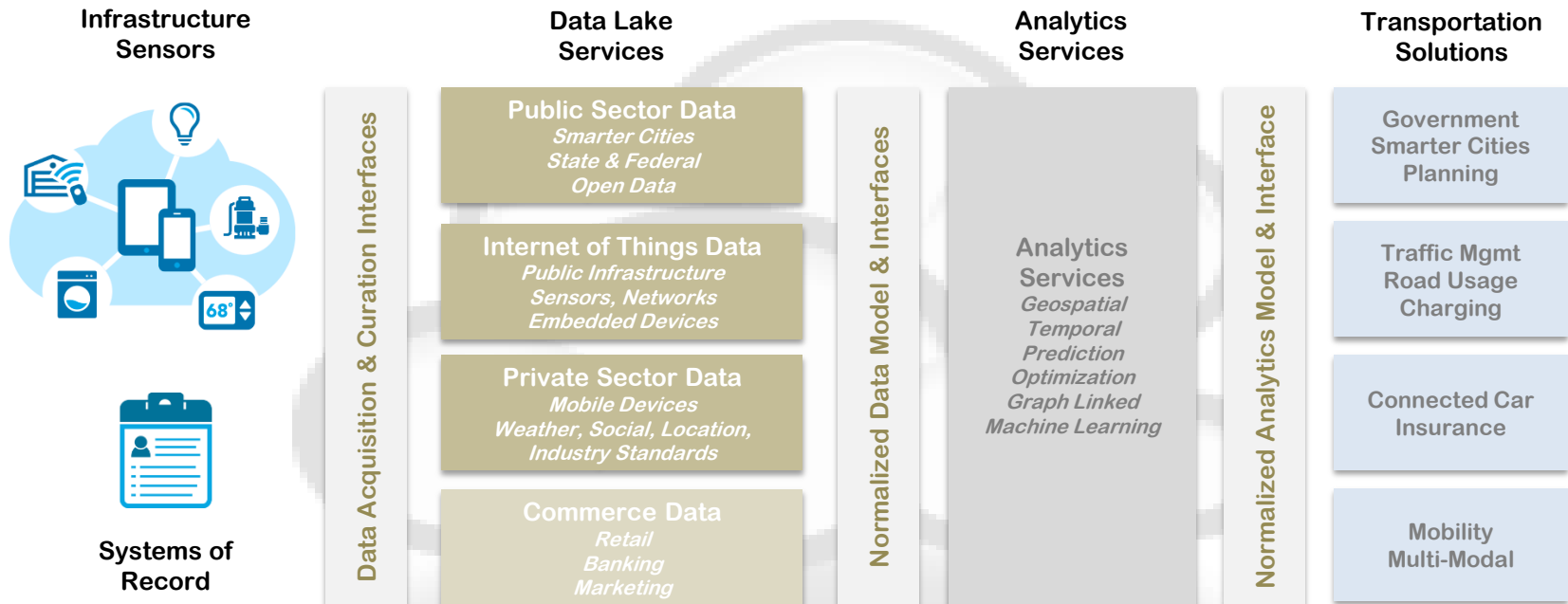


Addressing The Cost of Data....



Recommendation: Build a Clear Architecture of the Solution Components

Multiple vendors will create complexity without clear component boundaries and interfaces.



Three disruptive forces are forcing government industry to focus on three key areas ...

Increased demand for services and citizen expectations

Placing greater pressures and demands on and expectations for public resources and services requiring organizations to operate smarter and more efficiently

Increased complexity

Challenging decision making capabilities in navigating complex operating and information environments and increasing the need for enhanced innovation capacity to drive operational improvements

Stagnant economic growth and resource constraints

Challenging organizations to do more with less and requiring them to better leverage existing resources and expertise while reducing instances of fraud and error



Engage

Provide expert assistance and extend capabilities of human experts by leveraging deep insights from vast amounts of information



Discover

Provide ability to digest vast amounts of data to identify new avenues, navigate complexity, and implement new ideas



Decide

Provide personalized, contextual, evidence-backed recommendations to support decision making at all levels



Cognitive is helping public organizations to provide better service, discover insights and make effective decisions



Engage



Deakin university's online student engagement advisor is reimagining the way of engaging with students, and providing them improved service¹



Discover



Baylor College of Medicine is applying cognitive computing to accelerate research and make discoveries with greater precision²



Decide



MD Anderson Cancer Center leverages cognitive features to help oncologists develop more personalized care for their patients³



"Olli, can you take me downtown?"

Meet the first cognitive self-driving vehicle

Watson IoT

#MeetOlli #WatsonIoT



#meetolli: See and hear Olli in action - the first cognitive, self driving vehicle! @localmotors #WatsonIoT
<https://youtu.be/K564rXrIZbc>

Now driving at National Harbor! The first cognitive, self-driving vehicle! @localmotors @WatsonIoT #meetolli
<http://www.ibm.com/press/us/en/pressrelease/49957.wss>

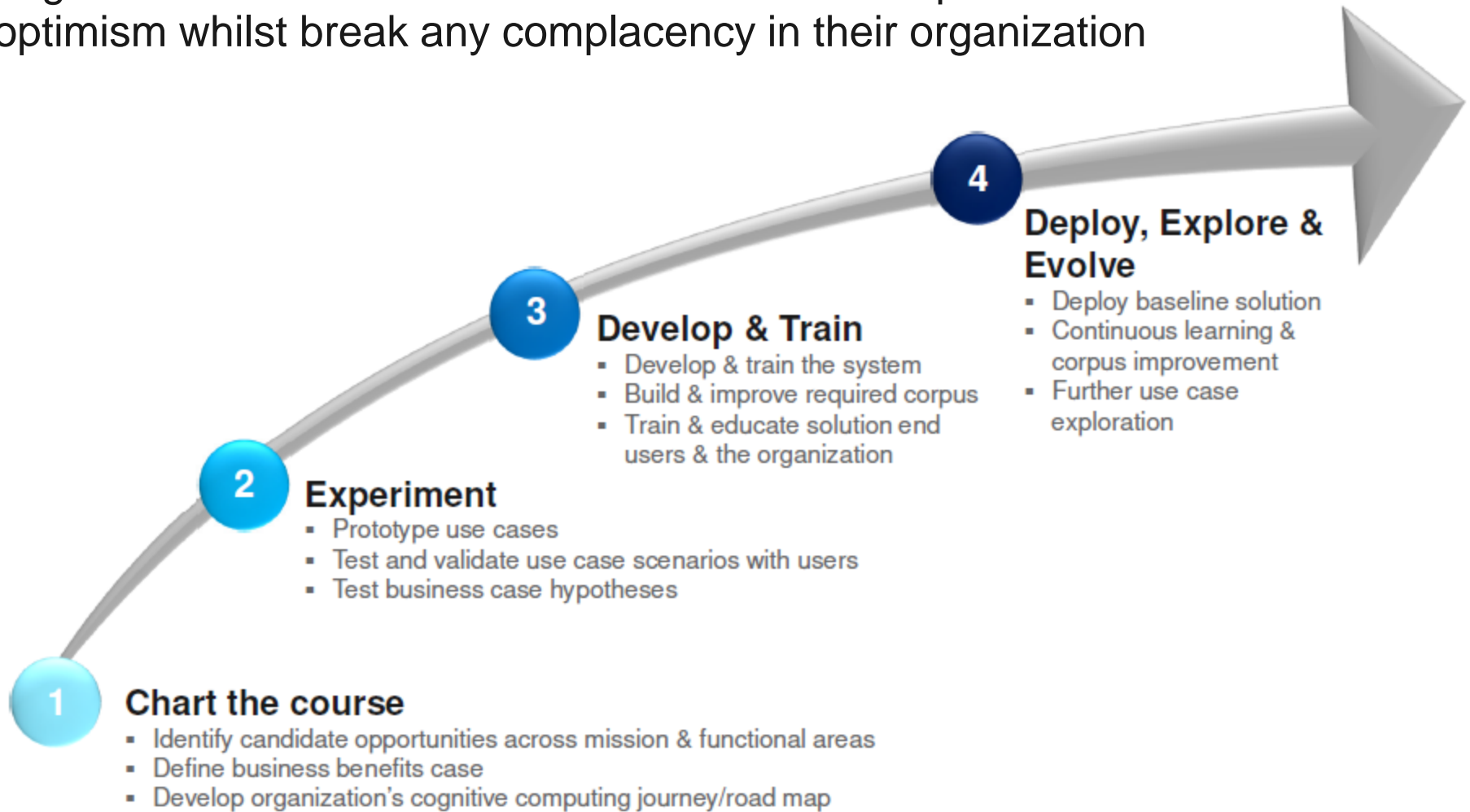
#meetolli: @LocalMotors debuts first self-driving vehicle to tap @IBMWatson <http://www.ibm.com/internet-of-things/industry/iot-automotive/> #WatsonIoT

30+ #autonomous sensors and 4 @IBMWatson APIs allow Olli to offer personalized interactions. <http://meetolli.auto> #meetolli

#WatsonIoT blog: "Getting Onboard the Future of Transportation Today" by @harrietgreen1
<http://asmarterplanet.com/blogs/think/2016/06/16/ibm-olli/> #meetolli



Organizations should follow a structured road map that nurtures optimism whilst break any complacency in their organization



New Jersey Turnpike authority manages the roadway from a unified interface, speeding reaction times & improving traffic flow

Boosts productivity

by enabling the same number of operators to control and manage more devices

Helps prevent

secondary accidents by allowing operators to take fast, proactive measures to warn motorists

Eases congestion

by enhancing awareness and giving operators more and faster control of signs

>96% accuracy

for 30-minute-out traffic predictions in early live tests



Business challenge: Secondary accidents, typically rear-end collisions, are a primary concern for highway operators. Warning motorists in advance of stopped or slowing traffic can help avert tragedy and congestion—assuming operators have the ability to react. This US turnpike authority, overwhelmed with managing too many disparate traffic screens and devices, was increasingly challenged to maintain traffic flow, alleviate congestion and warn drivers of trouble ahead.

The smarter solution: The authority deployed a system that centralizes and analyzes traffic data, giving operators a unified interface for controlling 900 signs and a holistic view by which to monitor traffic events and conditions. Traffic speeds are visually represented on a central matrix board, helping operators recognize and proactively warn motorists of bottlenecks. In the future, when the solution detects congestion, it will automatically trigger alerts and provide recommendations for remedial action.

Operators can change multiple signs and warn motorists with unprecedented speed and efficiency, giving drivers enough time to find alternate routes.



Carnegie Mellon University will apply cloud-based analytics to building data to improve facilities management on its smart campus

<https://www.youtube.com/watch?v=bDnt6uCzzEI>

USD2 million

reduction expected in annual mechanical operations costs

Promotes

innovation by facilitating changes to the cloud-hosted software

Replaces

reactive, calendar-based maintenance with proactive, condition-based processes

Solution components

- SoftLayer®
- IBM® TRIRIGA®
- IBM Maximo® Asset Management
- IBM Global Business Services® – Business Consulting Services
- IBM Global Technology Services® – Cloud Services
- IBM Business Partner SkyFoundry



Business challenge: Building-automation systems are excellent sources of raw data, but when that data lacks integration, it defies comprehensive analysis and yields little functional insight. As a leading US building sciences and engineering university, Carnegie Mellon University (CMU) wanted to implement a visionary, interconnected building-management system across its campuses.

The smarter solution: CMU is unlocking the deeper intelligence from its building-asset data with a unified facilities-management solution. Cloud-based analytics software can help identify anomalies, provide likely solutions and prioritize work orders based on an issue's criticality and cost impact. The solution can also incorporate and analyze both institutional knowledge and previous maintenance records to better predict and avoid system or equipment failures.

“Making our smart campus vision a reality requires a new way of thinking about, using, and gaining value from building-asset data.”

—Dr. Don Coffelt, associate vice president, facilities management



A Canadian city delivers predictive modeling, advanced analytics and a unified view of city operations

USD 100,000 savings

Anticipated per year in staff time spent on capital plan forecasting

90% reduction

in reporting time from hours to minutes

Reduced costs

expected related to project coordination, operations, and capital expenditures

Solution Components

- IBM Maximo® Asset Management
- IBM SPSS®
- IBM Cognos
- IBM Maximo
- IBM WebSphere® ILOG®
- IBM DB2®
- IBM InfoSphere®
- IBM Tivoli®
- IBM® System x®3850 M2 running hypervisor - VMware
- IBM Business Partner Esri Canada, Ltd – ArcGIS server technology
- IBM Business Partner The Createch Group



Business Challenge: The city had collected volumes of data but could not exploit it to its full advantage. Agencies were operating autonomously and in reactive mode instead of proactively planning, prioritizing and synchronizing projects with each other. To ensure the quality of service experienced by citizens and keep the city running, each agency had to be highly tuned, functioning at maximum efficiency and operating with other agencies in a well-coordinated fashion.

The Smarter Solution: The city deployed a First-of-a-Kind project that combines asset management innovations, predictive modeling, and geospatial and business analytics to help the city improve planning, operations and services across its municipal departments. Through a sophisticated network of sensors, digital closed-circuit television robots and geographic information system technology, the city collects and aggregates a wealth of data about its roads, water and other key infrastructure elements. This affords officials an unprecedented, holistic and unified view of city operations.

