

# IBM Smarter City Solutions

*Leadership and innovation for building smarter cities*



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## Overview

### Challenges

Cities today are confronting serious challenges that can affect their economies, competitiveness and ability to deliver core services to citizens. Cities are complex systems of systems, and the challenges they face often touch multiple agencies, including operations, transportation, water, public safety, energy, buildings, education, healthcare and social services. City leaders must address those challenges by fostering innovation, and creating new opportunities from the harsh realities of aging infrastructures, declining budgets, changing demographics and increasing threats.

City and regional governments need to:

- Accelerate crisis response and efficiently coordinate a myriad of human and physical resources
- Provide efficient, effective and safe transportation options
- Increase water quality and service
- Ensure public safety
- Offer ways for residents to take control of energy usage and reduce consumption
- Enhance the operational efficiency of buildings, reduce energy consumption and make sure facilities are reliable and available
- Create educational systems that help citizens develop the skills and knowledge for tomorrow's economy
- Help sustain the health and well-being of citizens
- Improve social services outcomes while increasing employee productivity and maintaining payment accuracy

**Solutions**

IBM® Smarter City Solutions draw from insights gained through more than 2,000 Smarter Cities™ engagements worldwide. These solutions can help cities of all sizes to identify priorities, apply best practices and deploy advanced technologies that help address pressing challenges. IBM Smarter City Solutions are based on a common model designed to help cities optimize individual departments while facilitating seamless cross-agency integration.

**Benefits**

IBM Smarter City Solutions can help increase the quality of services provided to citizens and businesses while enhancing the efficiency of city operations. With IBM solutions, cities can:

- Leverage information to make better decisions
- Anticipate problems to resolve them proactively
- Coordinate resources to operate effectively

**Introduction: Work smarter, not harder**

Across the globe, cities need new ways to sustain high service levels for citizens and businesses while improving efficiencies. They need to drive economic growth and create new opportunities while facilitating coordinated responses to crises, providing new transportation options, ensuring reliable delivery of energy and water, protecting residents from crime and improving the efficiency of buildings. At the same time, cities must educate residents for tomorrow’s challenges, help to sustain the health of citizens and achieve better outcomes for social services.

To accomplish these goals, cities cannot simply work harder. They must work smarter. A Smarter City knows how to collect information from a wide variety of sources, integrate information across departments and agencies, and then use that information to anticipate problems, coordinate services

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

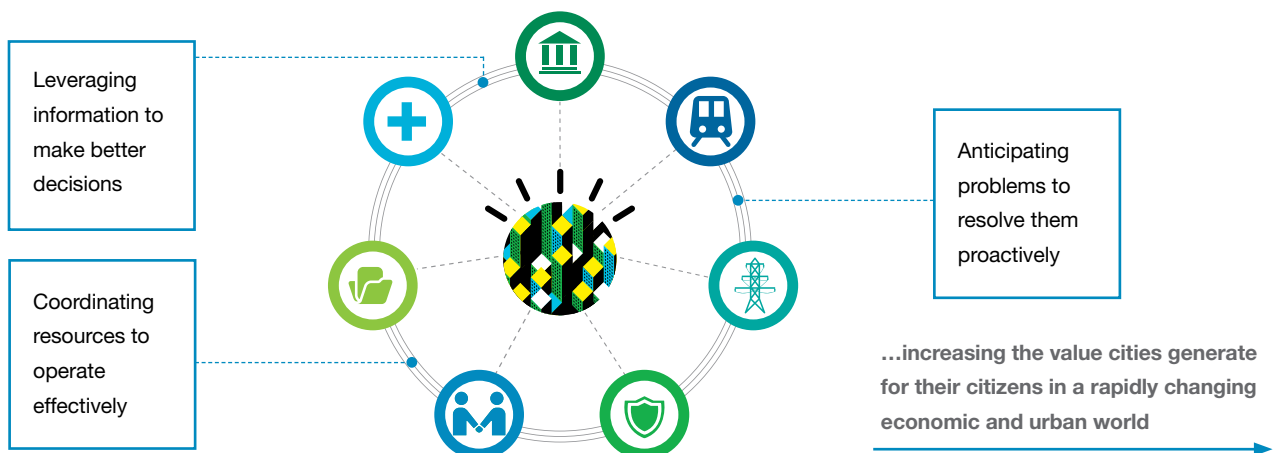


Figure 1: Smarter Cities drive sustainable economic growth.

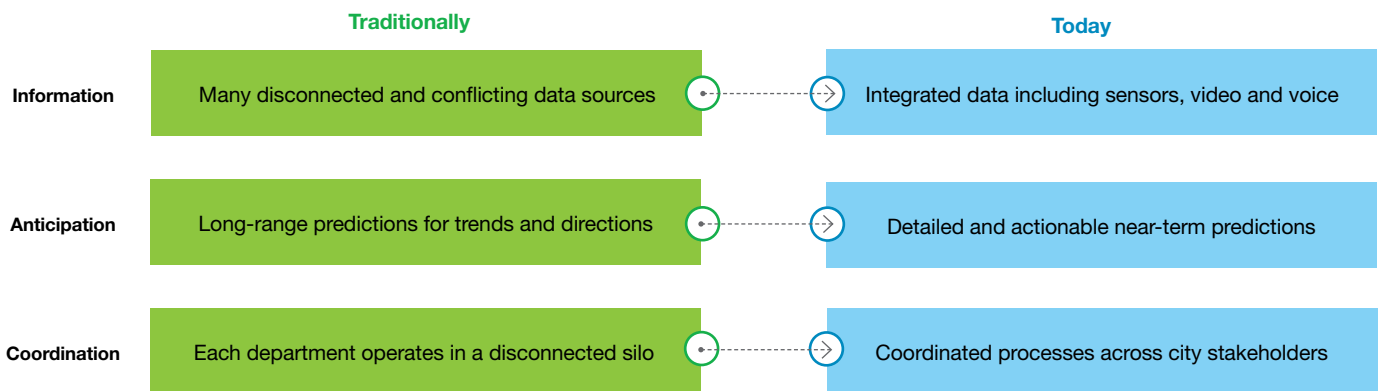


Figure 2: IBM Smarter City Solutions use advanced technologies to help cities capitalize on the power of information.

and drive sustainable economic growth. With IBM Smarter City Solutions, cities can transform their traditional approach to information management, adopting a smarter approach that helps provide the quality of services that residents require while optimizing resources.

### Manage a complex system of systems

A city is a system of systems, typically comprising complex bureaucracies with numerous agencies, departments, service-delivery channels and stakeholders across the public and private sectors. In the City of New York, for example, more than 300,000 people in almost 70 different agencies are tasked with delivering services to millions of citizens and visitors every day. In many cities, agencies are responsible for both the operation of key infrastructure components and the delivery of services. For example, a transit agency might be responsible for maintaining the subway infrastructure and delivering transportation services. IBM Smarter City Solutions are designed to help address the multiple challenges that face each agency.

### Identify priorities and maximize value

IBM provides strategic analysis capabilities to identify the most valuable actions a city should take toward becoming a Smarter City. IBM can help cities build a custom, top-down city strategy with new tools to:

- Determine top goals and objectives
- Understand the relationships among systems
- Compare the performance of cities to each other
- Evaluate operational maturity
- Develop actionable roadmaps

IBM offers new and enhanced Smarter City strategic analysis services, including:

- **Smarter Cities Assessment**—a service that measures key performance indicators (KPIs), benchmarks a city's capabilities against its peers, identifies important opportunities and provides a high-level roadmap.

- **Smarter Cities Maturity Model**—a service that identifies the levels of smart technology used in the city and defines concrete actions to enhance execution.
- **Systems Dynamics Modeling**—a service that can help facilitate systems thinking for city planning, shows the interconnection among city functions and simulates the impact of macro-level policy changes.
- **Smarter Cities Exploration Workshop**—a highly collaborative session that engages leaders from cities and IBM to explore near-term transformations and long-term vision.
- **Actionable Business Architecture for Smarter Cities**—a service that provides an integrated approach to city strategy, defining a city through 185 business components and identifying transformation initiatives.

### Apply global best practices

IBM Smarter City Solutions are based on insights drawn from more than 2,000 Smarter City engagements worldwide. By working with inspiring leaders to solve difficult challenges, IBM has developed repeatable best practices that can be applied to cities of all sizes.

Cities can select one or more IBM Smarter City Solutions that address immediate needs and then subsequently adopt additional solutions. One city might start with a water management solution while another might begin with a transportation solution. Built on a common infrastructure layer, these IBM solutions enable city personnel to operate one or multiple solutions regardless of which solution the city selects as a starting point.

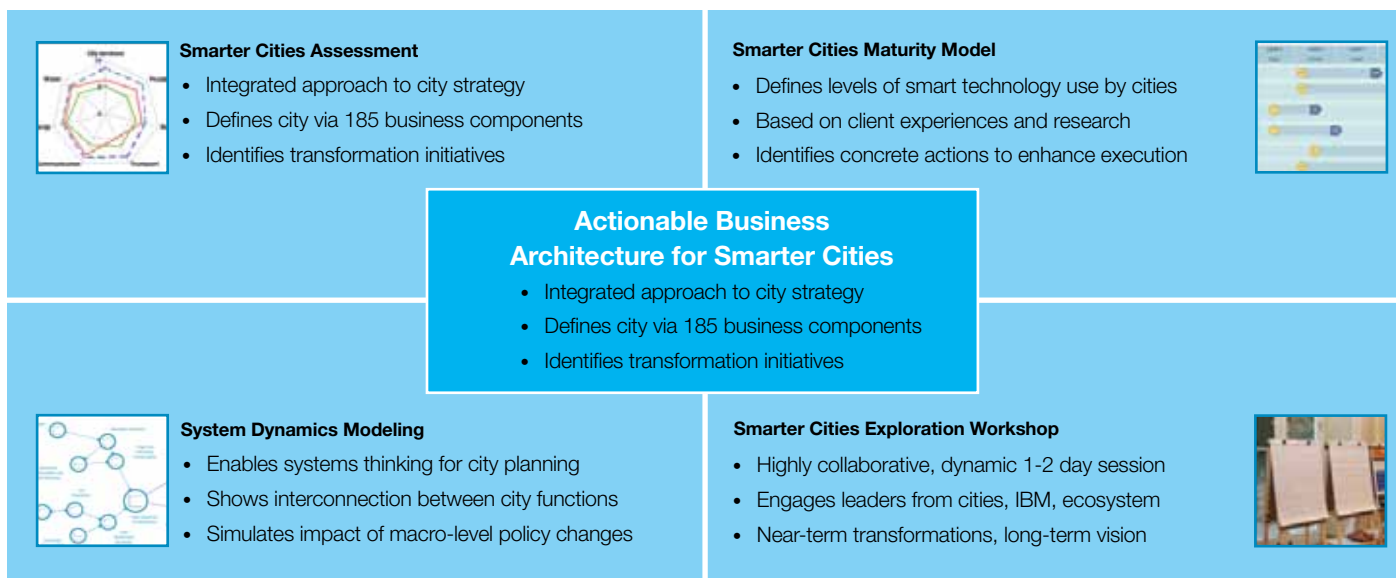


Figure 3: IBM offers a range of Smarter City strategic analysis services.

### Smarter City Management and Infrastructure

City leaders need to understand their current performance and generate strategies for driving more effective operations. They need to integrate and coordinate all city operations while delivering exceptional service to their citizens. IBM provides an extensive range of infrastructure, governance and management solutions to address individual agency needs as well as citywide operations. These solutions enable cities to work more effectively in delivering exceptional service to their citizens.

### Smarter Operations

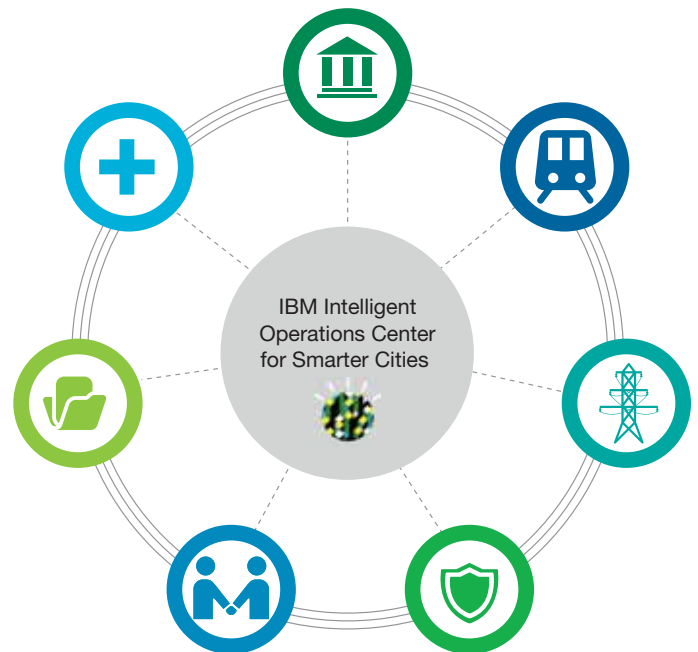
What if cities could improve services for their citizens without increasing costs?

Every day, cities around the globe face an increasing number of operational issues that affect the quality of services delivered to their citizens. To ensure public safety and provide water, electric, transportation and other services, cities need to access an ever-increasing amount of information, facilitate real-time communication and collaboration across city agencies, and address potential problems before they occur.

Unfortunately, many cities cannot achieve this level of increased efficiency. For these cities, critical information is stored in disparate systems across multiple, disconnected departments, hindering situational awareness and making it difficult for city officials to coordinate agency efforts. Without a single, integrated view of events, incidents or impending crises, and without the ability to rapidly share information, a city might be unable to deliver services in a sustainable fashion, protect citizens or drive economic growth for the future.

### We have integrated the most repeatable best practice patterns allowing leaders to:

- Leverage information across all city agencies and departments
- Anticipate problems and minimize the impact of disruptions
- Coordinate resources to respond to issues rapidly and effectively



*Figure 4:* IBM Intelligent Operations Center for Smarter Cities helps cities coordinate resources across all agencies to deliver exceptional service to their citizens.

IBM Intelligent Operations Center for Smarter Cities is designed to address these challenges. Incorporating best-of-breed solutions from across the IBM software portfolio, the Intelligent Operations Center solution offers integrated data visualization, real-time collaboration and deep analytics that can help city agencies prepare for situations, coordinate and manage response efforts, and enhance the ongoing efficiency of city operations. Executive dashboard capabilities give decision makers a real-time, unified view of operations so they can see who and what resources are needed and available. Cities can rapidly share information across agency lines to accelerate problem response and improve project coordination. By providing visibility into KPIs and trends, the solution also can help fine-tune current resource usage and support forward-looking planning activities.

The Intelligent Operations Center is part of the IBM Government Industry Framework, which provides a software platform and roadmap to implement IBM Smarter City Solutions. The Framework gives IBM clients access to

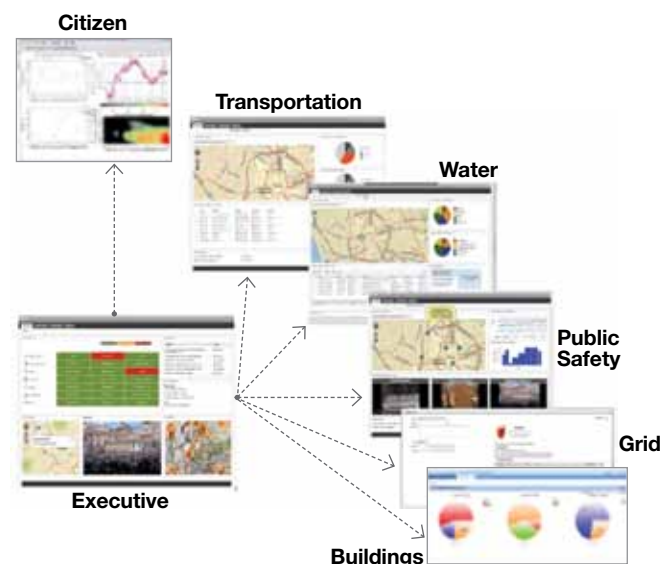


Figure 5: IBM Intelligent Operations Center for Smarter Cities can help personnel gain a centralized, comprehensive view of cross-agency operations.

pre-integrated software, hardware and industry-specific extensions delivered by world-class implementation services using best practices developed through previous Smarter Cities engagements. With this approach, cities can achieve a fast return on their investments, reduce risk and gain the flexibility to extend their solutions to address future needs.

#### Facilitate cross-agency integration

In the past, many individual city agencies focused only on their own operations, unable to share information with other agencies and departments. IBM Intelligent Operations Center for Smarter Cities is designed to help agencies and departments share a range of information, such as metrics, events and processes, and collaborate in real time. By sharing information across agencies, cities can better anticipate and respond to situations while also optimizing city resources.

#### Smarter Operations client

A major Latin American city needed better ways to respond to landslides, floods and other natural disasters that might threaten its six million residents. Working with IBM, the city implemented a solution that enables personnel to analyze weather, energy, building, transportation and water data in real time. The solution draws on information collected from multiple sensors, such as traffic cameras and rain meters, and provides near-real-time situational awareness in a single view. Enhanced communications capabilities enable city officials to share information across agencies and synchronize rescue efforts. Now the city can marshal its resources within hours, instead of days, to warn the public and provide a targeted emergency response to help save lives.

Cross-agency integration can help cities predict situations and react swiftly. Analytics applications can use shared information—which in the past might have been locked inside distinct agency systems—to identify specific issues and assess ad hoc trends. As a result, cities can respond faster to crises. In contrast, a city without cross-agency integration of information might take weeks, months or years to respond.

Cross-agency integration also can help cities identify trends. Many cities today have no prearranged way to understand how occurrences relate to one another other than through the collaboration of city workers. That process of information sharing is slow, subjective and unsystematic. IBM Intelligent Operations Center for Smarter Cities can help cities correlate information in real time across the city to make sense of occurrences and track trends.

Integrating information across agencies can help cities implement, optimize and enforce master plans that map to the actual operations of a city. It also can help intercept dangerous trends and prevent serious events from happening. Day-to-day rebalancing of resources can help cities improve efficiencies in operations and planning.



#### Public Safety

- Predict, monitor and mitigate crisis situations
- Coordinate multiagency responses
- Minimize impact of emergencies



#### Transportation

- Improve traffic management
- Optimize roadway capacity
- Enhance travel experience



#### Water Management

- Analyze water use and consumption patterns
- Predict asset failures to reduce costs
- Optimize work orders to improve service

Figure 6: IBM Intelligent Operations Center for Smarter Cities enables city leaders to apply global best practices across city agencies.



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## Smarter Transportation

What if cities could decrease traffic congestion and improve traffic flow without major transportation infrastructure projects?

Transportation is the vital means of connecting people, goods and services. The smooth operation of a transportation system can directly determine the level of economic activity and output of a given city. Consequently, it has the potential to affect both the quality of life for citizens and the economic vitality of a city.

Significant increases in urbanization over the last 50 years have placed an overwhelming burden on city transportation systems. Clogged roadways not only delay the delivery of goods and the movement of people, they also contribute to pollution as cars and trucks sit in traffic. In 2009, U.S. drivers wasted on average an estimated 34 hours sitting in traffic, up from 14 hours in 1982. The total amount of fuel wasted reached 3.9 billion gallons—equal to 130 days of flow in the Alaska Pipeline.<sup>1</sup> Currently, many transportation systems and infrastructures are strained by demand, and they continue to become even more burdened as the urban population grows and people demand an increasing level of service.

Traditionally, cities have attempted to solve transportation challenges by expanding the infrastructure—building more roads, tunnels and bridges. But for many cities today, poor financial conditions and land constraints make that approach impossible.

IBM Intelligent Transportation takes a smarter approach to transportation challenges by enabling cities to collect transportation data and create actionable intelligence from it. For example, cities can gather data on urban traffic and mobility patterns to help traffic management centers and provide recommendations for better road network management, tolling practices and public transit services.

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## Smarter Transportation client

The Singapore Land Transport Authority (LTA) plans the long-term transport needs of Singapore with the ultimate goal of ensuring a smooth and seamless journey for its citizens. Since 2006, the LTA has been working closely with IBM to anticipate and better manage the flow of traffic to prevent the buildup of congestion. The LTA conducted a pilot study with the IBM Traffic Prediction Tool solution to improve the flow of traffic and prevent the buildup of congestion. The IBM Traffic Prediction Tool is a patent-pending technology that predicts traffic speeds and flow using advanced statistical techniques.

During the pilot study, the Traffic Prediction Tool predicted traffic flows over preset durations (10, 15, 30, 45 and 60 minutes) with overall prediction results above the target accuracy of 85 percent. Predictive analytics in the Traffic Prediction Tool provide the LTA with a forecast of traffic conditions up to 60 minutes into the future.

With this information, the LTA can adjust signal settings and variable message signs to display travel advisories and help prevent traffic congestion before it occurs. The tool also offers transport planners a rich set of data on traffic patterns stored in vast data warehouses. The LTA can mine the data for trends and patterns while taking into account temporal and spatial relationships. Use of the Traffic Prediction Tool is part of the LTA's wider effort to employ innovation not just to improve its traffic management capabilities but also to enhance its business processes and customer satisfaction.

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Standards-based integration of traffic and road data capture systems allows a city to aggregate data from multiple devices that identify and measure traffic speed and volume on city roads. These devices can include cameras, radar systems and under-road loop detectors, as well as Internet information and new systems based on Bluetooth or cellular phone technology.

IBM transportation solutions address several transportation challenges:

- IBM Intelligent Transportation helps city traffic managers visualize and analyze traffic conditions so they can better manage incidents, increase performance, improve the commuter experience, reduce pollution and maximize the utilization of transportation assets. IBM Intelligent Transportation aggregates traffic and incident information across multiple geographies or locales and incorporates information captured through a diverse set of data input source types. It provides access to historical and real-time information about all traffic performance, conditions, configurations and incidents. The solution also enables personnel to visualize traffic volume, speed and incident data for road links on a geospatial map. Finally, it offers a standard information model to facilitate scalability and provide a foundation on which a variety of transportation applications can be easily built.
- The IBM Traffic Prediction Tool can help municipalities struggling with traffic congestion by producing accurate traffic predictions that can be used for improving transport operations and planning.
- The IBM Integrated Fare Management solution can help transportation system operators build a fare collection system that attracts more riders with conveniences and savings while helping the organization to cut operating costs.
- The IBM Road User Charging and Dynamic Tolling solution can reduce traffic congestion during peak periods by varying the fares charged to use roads according to the time of day, location and level of traffic congestion.
- The IBM Transportation Information Management solution enables transport authorities to integrate and analyze multimodal information in real time while developing tools to improve operational system efficiency and provide enhanced traveler information.

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## Smarter Water

What if cities could predict and prevent the disruption of water services?

Water is a critical resource for sustaining life and supporting industry. Yet the world is facing a water crisis: the global population is rising, and the available supply of fresh water is limited. Growing awareness of global climate issues among citizens and an increasing focus on health, safety, security and the environment in the media have brought the water crisis into sharp focus for cities. Cities need ways to ensure the availability and quality of water for residents while also working to balance the needs of industry and agriculture. They need to address failing water infrastructures and manage the overall complexity of water delivery and treatment.

IBM offers a range of water management solutions to improve operations, enhance efficiency, better manage the water infrastructure and improve the asset life cycle. For example, the IBM Asset Management solution can help cities design, build, procure, operate, maintain, modify and dispose of water utility assets over their life cycle. It also facilitates management of the inventory, supply chain and human resources associated with those assets, reducing costs, decreasing downtime and improving overall efficiency.

IBM intends to provide additional water management solutions to help water utilities and cities capitalize on advanced technologies to sustain water availability and reduce service disruptions. Deploying sensors will help organizations continuously track water quality and availability. Solutions will allow organizations to monitor the status of water

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## Smarter Water client

DC Water, located in Washington, DC, needed to modernize management of its massive water and sewer infrastructure, which includes hundreds of thousands of assets, ranging from water distribution pipes and valves to public fire hydrants and water meters. By implementing an IBM solution, the organization can now view the location and condition of assets on a detailed map, assessing asset history, total asset cost, number of problems in each area and water quality. Predictive analytics capabilities are helping to mitigate costly service interruptions and enabling the organization to potentially build a new rate model based on service demand. DC Water has reduced customer support calls by 36 percent through preventive maintenance and the use of automated meter readings while accelerating dispatch of emergency investigations.

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infrastructure assets, gain a holistic view of the water life cycle from source to wastewater, and use predictive analytics to anticipate and address potential problems such as leaks and failing assets.

IBM also offers analytics solutions to help cities and utilities develop full-cost pricing models, target conservation efforts and improve demand forecasting. These solutions can help organizations improve water efficiency and enhance water use management. They also can help cities better engage with citizens, providing them with a clear view of their water consumption and offering a variety of innovative tools and incentives to influence the demand for water.

### Smarter Public Safety

What if cities could enhance public safety by better anticipating threats and preventing emergency situations from occurring in the first place?

The first duty of a government is to protect its citizens. The question is how to fulfill that duty in a fast-paced, unpredictable urban environment. In recent years, forward-thinking city managers, police chiefs, fire chiefs and other officials have made great strides in improving public safety by implementing innovative technologies designed to reduce urban crime and accelerate emergency responses. But the challenges to public safety continue to grow.

IBM provides public safety solutions to help make urban public safety systems not just more connected and efficient, but smarter. These solutions enable cities to capitalize on some of the same technologies used by businesses, including autonomic sense-and-respond capabilities, analytics, visualization and computational modeling technologies. Cities also can bring together information buried in siloed repositories, stitching together millions of criminal complaints and national crime records along with billions of public records. Instead of waiting to respond to events, public safety departments can increasingly anticipate and prevent them.

IBM public safety solutions provide real-time information and situational awareness to help avert crimes and emergencies:

- IBM Crime Prediction and Prevention solutions apply strategic insight and analytic methods to help public safety organizations better understand criminal patterns, identify threats and deploy high-quality, goal-oriented responses with collaboration across law enforcement, corrections, judicial system and human services agencies.

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### Smarter Public Safety client

A major lakeshore recreation and exposition facility decided to increase safety by improving its video monitoring capabilities. The organization implemented a digital video surveillance solution from IBM. The solution uses high-resolution cameras in conjunction with other sensors to provide virtually complete monitoring of the environment. The organization also implemented strategically placed emergency call buttons. When the buttons are activated, audio and video stream into a new command center, where managers can use advanced analytics capabilities to identify suspicious activities and then alert security personnel or local law enforcement.

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- The IBM Smart Vision Suite uses digital video and sensors to alert public safety personnel to developing situations, support investigations and aid in the prosecution of crime.
  - IBM Emergency Management solutions help emergency management agencies follow established incident management processes, coordinate efforts, share information and request resources.
  - IBM Physical Security Services help organizations integrate, manage and maintain all existing physical security systems and assets while addressing increasingly sophisticated threats and reducing security overhead.

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## Smarter Energy

How can cities empower utilities consumers, enabling them to reduce energy consumption and cut costs?

Increasing attention to climate change, rising energy prices and the availability of new technologies are leading many consumers to take a more active role in how they consume energy. New smart grid technologies are changing the relationship between utilities and end users, giving both parties new tools they can use to help reduce consumption, costs and greenhouse gas emissions.

By building smart grids, utilities can help:

- Empower consumers by helping them better manage their energy usage with timely data about their consumption
- Deliver cleaner energy and reduce greenhouse gas emissions by incorporating more renewable energy and electric vehicles into the power grid, and by improving the efficiency of both current and future power generation
- Improve the reliability of the grid by managing the generation assets and the distribution grid through a more dynamic, automated, reliable and secure network

IBM currently offers a range of solutions for building smart grids and enhancing the efficiency of energy operations:

- IBM Power Generation Optimization solutions are designed to help power generation companies optimize operations at the plant and fleet levels, and expand supply.
- The IBM Intelligent Utility Network (IUN) solution addresses the energy value chain with solutions for smart metering, grid operations, utility network security and communication networks.

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## Smarter Energy client

On the island nation of Malta, electrically powered desalination plants provide more than half of the water supply. Those plants are increasingly important for the island, as rising sea levels threaten Malta's underground freshwater source. Powering those plants, however, presents a challenge: electricity in Malta is generated entirely by imported fossil fuel. To address energy and water challenges, the Maltese national power and water utilities are partnering with IBM. The country is poised to become the first in the world to build a nationwide smart grid and a fully integrated electricity and water system. Approximately 250,000 interactive meters will help the utilities monitor electricity usage in near-real time, set variable rates and reward customers who consume less energy and water. By analyzing data from the meters, the utilities can help lower costs, sustain efficient and sustainable consumption patterns, and cut greenhouse gas emissions. Addressing water and power issues together as a system will help citizens make smarter decisions about how and when they use precious resources.

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- The IBM Work and Asset Management solution helps utilities optimize their investments with capabilities to improve supply chain management, asset life-cycle management and mobile workforce management.
  - The IBM Customer Operations Transformation solution helps utilities develop more dynamic customer relationships, improve customer service and address operational cost challenges.

## Smarter Buildings

What if there were ways to reduce the energy and water resources that buildings consume?

Around the world, buildings are among the biggest consumers of resources, and often they use resources inefficiently. For example, buildings consume 42 percent of all electricity—up to 50 percent of which is wasted. In many cases, buildings could reduce water use by as much as 50 percent. These inefficiencies are costly for businesses and the environment. The U.S. Environmental Protection Agency (EPA) estimates that energy costs alone represent close to 30 percent of an office building's total operations costs. At the same time, buildings are the top contributors to global CO<sub>2</sub> emissions.<sup>2</sup>

The IBM Intelligent Building Management solution can help building owners and managers improve the efficiency of building operations to reduce resource consumption, cut costs and minimize emissions. The solution combines real-time systems monitoring with facilities and event management to help analyze and optimize operations. Building owners and managers can collect vital real-time energy and operational metrics, store them in a central warehouse for enterprise-wide analytics and view that data in a cohesive dashboard.

Real-time data gathering and analysis capabilities allow managers to address service issues proactively and to visualize energy, environmental and portfolio performance metrics for all the commercial square footage under management. The solution can improve management of heating, air conditioning and power consumption to lower costs and emissions. It also can help recognize security breaches, predict equipment maintenance issues and locate assets across the facility.

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## Smarter Buildings client

The IBM campus in Rochester, Minnesota, which comprises 3.2 million square feet and more than 35 interconnected buildings, is one of the most energy-efficient IBM locations in the world. Over the past 10 years, the facilities management team has consistently met its annual energy conservation goal, reducing energy use by 5 percent each year. By installing the IBM Intelligent Building Management solution combined with Johnson Controls software for some equipment, the team achieved additional savings, reducing energy used by that equipment by 8 percent.

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## Smarter Human Services

In many cities, demand for education, healthcare and social services is increasing. Individuals need personalized services that can help sustain their health and well-being today while preparing them for success in the future. Unfortunately, reductions in city revenues are making it more difficult than ever to deliver the services that citizens need. Cities need ways to provide these services while maximizing revenues by enforcing compliance with tax systems, detecting fraudulent claims for services and eliminating erroneous payments to citizens.

IBM offers a range of human services solutions in the areas of education, healthcare and social services that can help personalize services for individuals. With these solutions, cities can customize learning analysis for students and deliver healthcare that is tied to patients' unique needs. Social services agencies can gain a comprehensive view of clients to ensure optimum resource allocation while reducing fraud and waste to make the most out of social service dollars.

## Smarter Education

How do cities create educational systems that help citizens develop the skills and knowledge for tomorrow's economy?

Budget cuts have strained schools and higher education systems, yet the demand for knowledge workers with specialized skills is growing by 11 percent a year. Many of tomorrow's jobs will require lifelong training and a continuous updating of skills. Meanwhile, the field of education has grown increasingly complex as students pursue a variety of alternative learning paths.

Technology can help schools and education systems address these challenges. By replacing outdated infrastructure with new technology solutions—including cloud computing solutions, open-source systems, virtualization technologies and analytics solutions, schools and educational systems can capitalize on new functionality to efficiently train citizens for tomorrow's jobs.

By creating education for a Smarter City, leaders can:

- Foster student success and build the learning skills for employment throughout a citizen's lifetime
- Reduce costs and enhance the quality of administrative and student support services
- Accelerate innovation and discovery in academic research

IBM currently offers a range of solutions for Smarter Education:

- The IBM Education Performance Management System and IBM SPSS® Decision Management for Education provide powerful analytics tools for reporting, analyzing and predicting outcomes.

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## Smarter Education client

The State of North Carolina is using cloud computing and open-source software developed at North Carolina State University to make sure every student in the state's schools, colleges and universities can access the most advanced education content, software applications and IT resources. A first grader from a rural village can learn about geography through the same interactive 3-D animation and storytelling resources as his or her counterparts in a high-profile school district. A researcher at one college can access high-performance computing resources and tools at a university on the other side of the state. North Carolina hopes to lead the way in democratizing education for its own state and worldwide.

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- The IBM Enterprise Risk Management System for Higher Education solution helps to lower risk and costs associated with accidents and loss.
  - IBM SmartCloud for Education solutions leverage cloud-based services and tools to reduce costs and enhance services to schools, colleges and universities.
  - The IBM Cloud Academy connects K-12 schools and higher education institutions that are integrating cloud technologies into their infrastructures in a collaborative community to share best practices.

## Smarter Healthcare

How can cities contribute to good health and personal well-being?

In cities, people expect to find access to the best healthcare services, as well as a safe, healthy environment for their families to live, learn and grow. Yet as population demographics change and budgets shrink, many cities are finding it difficult to provide the services and environment that their citizens require. Increasing demand for services from aging and chronically ill individuals, for example, can hinder a city's ability to provide services to all citizens.

New technology solutions can help health authorities and city agencies deliver the right care, when and where it's needed, at lower costs while enabling patients to play more active roles in managing their care. By adopting new solutions, cities can:

- Make information about health and social services more readily available, including information that helps people to improve personal wellness
- Proactively manage health threats and emergencies, rapidly alerting the public, efficiently mobilizing resources and taking preventive measures
- Deliver more cost-effective, quality care at local hospitals
- Support collaboration among public and private hospitals and care providers

IBM currently offers a range of healthcare solutions that can help cities improve the delivery of healthcare services and enhance operational efficiencies:

- IBM Public Health solutions help organizations prepare for enhanced public health systems; collect, share and analyze information to prevent and manage health threats; and improve collaboration to facilitate better public health outcomes.

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## Smarter Healthcare client

The British Columbia Health Ministry is responsible for delivering quality, appropriate and timely health services to the citizens of its Western Canadian province while also monitoring the overall health of the population. The Ministry needed to build a public health management and surveillance system that incorporated bilingual components and could be integrated with other healthcare information systems across the province and the country.

Acting as the project coordinator for all Canadian provinces, the Ministry worked with IBM and the strategic federal investment partner Canada Health Infoway to launch Panorama—a modular, enterprise-level health surveillance and management solution. The new system will allow users to collect, share and analyze health information at the regional, provincial and national level—information that is critical for managing health problems such as SARS, H1N1 and other communicable diseases. The solution can detect potential disease outbreaks quickly, cutting response times for public health threats. It also can help prevent disease by keeping accurate immunization records and drive down costs by improving vaccine inventory management. Finally, the solution can help increase the productivity and effectiveness of public health workers by centralizing work management and consolidating client records.

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- The IBM Real-Time Asset Locator for Healthcare solution enables healthcare providers to track and monitor assets, patients and personnel to improve patient safety, increase productivity, reduce operational costs and ensure compliance.
  - The IBM Performance Analytics solution for healthcare is designed to improve financial, operational and clinical performance to reduce the cost of care, improve the quality of care and enhance efficiency.
  - The IBM Healthcare Portal helps citizens access health information and services, and enables them to connect to each other to exchange information.



## Smarter Social Services

How can social services organizations deliver better services and improve outcomes while increasing employee productivity and ensuring payment accuracy?

Social services organizations are under more pressure than ever. They need ways to integrate a tremendous amount of casework information, improve consistency of services and reduce fraud, all while accommodating shrinking budgets.

Fortunately, the tools are here for reducing the pressure facing these organizations. New solutions can help them use the data they already collect and integrate that data into an intelligent system that helps them improve services, prevent fraud and errors, and reduce costs. By providing a holistic view of their clients, these solutions can help caseworkers make sure that the right people have access to the right services when they need them. Likewise, social services clients can become active participants by accessing and tracking their own information.

A smarter approach to social services can lead to improved services to citizens, increased efficiency for government organizations and better outcomes for society. Smarter Social Services can be achieved by building a set of core capabilities that:

- Improve client access to social service program information and resources
- Create a data foundation across sources for producing a comprehensive view of the client
- Optimize service delivery through improved collaboration between clients, partners and workers
- Protect resources and public support by limiting fraud abuse and error
- Deliver targeted resources to the right clients at the right time through better strategic decision making
- Drive broad government outcomes that are more efficient and effective across programs and organizations

IBM currently offers a range of solutions for social services agencies:

## Smarter Social Services client

California's Alameda County Social Services agency needed to improve social program performance while reducing costs and meeting stiff regulatory requirements. Accomplishing those goals required a better understanding of individual case status and program performance. The agency needed to give caseworkers direct access to individual case information while also providing faster and better reporting capabilities.

The county engaged IBM to develop an integrated reporting system that came to be known as the Social Services Integrated Reporting System (SSIRS). Alameda County can now track benefit recipients and recognize the complex relationships between clients and programs that often arise. The system tells workers "who knows who" and how they're being served. For the first time, Alameda County has a complete understanding of each individual's situation, available all in one place.

- IBM solutions that produce a single view of the citizen can help agencies target services more effectively, achieve better outcomes, monitor performance and reduce costs and risks. Solutions for providing identity and access management and for delivering exceptional citizen services offer personalized self-service access to government services and information.
- IBM solutions for case management, social program integrity, eligibility determination, and budgeting, planning and forecasting focus on delivering superior citizen service to improve benefits and services while ensuring proper use of resources.
- IBM social services transformation solutions help agencies develop the strategic capabilities for more effective, more efficient and responsive service delivery. Intelligent business processing solutions provide a complete array of analytics capabilities related to an organization's performance evaluation, and enhancement and process improvement techniques. Collectively, these solutions help agencies develop an integrated approach to services designed to improve outcomes and optimize resources.

## Team with industry leaders

IBM Smarter City Solutions provide cross-agency capabilities using a variety of data streams and services already found in city environments today. IBM is teaming with the providers of those data streams and services, developing a robust ecosystem of IBM Business Partners committed to jointly delivering Smarter City Solutions. By providing domain experience and delivering best-in-class hardware, software and services, these IBM Business Partners are helping IBM deploy Smarter City Solutions in multiple regions around the globe.

## Deploy IBM Smarter City Solutions regardless of size

IBM offers a variety of deployment models for IBM Smarter City Solutions to enable cities of virtually any size and with any level of IT resources to capitalize on advanced technologies. Cities with robust IT capabilities or a strong interest in “behind-the-firewall” implementations can deploy these solutions on their premises. IBM helps make these deployments even easier today by offering readiness assessments and providing a broad array of infrastructure solutions. On their premises, cities can leverage IBM System Management Automation to manage services that are deployed on server architectures optimized to suit their use and dynamics, keeping their data and their resources within their control.

## Smarter Computing for the Smarter City

IBM can work with each city to create a sustainable and economically viable computing environment that can support the transformations to a Smarter City. This computing environment can help the city enter a new era of computing in which it can solve the IT conundrum of attaining efficiency while fostering innovation. IBM technologies for cloud computing, advanced analytics and high-performance computing can play vital roles in helping cities build Smarter Computing environments. The IBM Smarter Computing approach is built on a partnership with cities to set a shared agenda and achieve shared outcomes.

## Smarter Computing client

The City of Norfolk, the second-largest city in Virginia, needed to increase storage capacity to accommodate data growth while also supporting deployment of new services for citizens. With help from IBM, the city implemented a solution that could do both and facilitate rapid scaling to easily meet unanticipated needs. The city improved storage performance by 40 percent and cut power consumption in half while providing the storage foundation for new services, including automated parking systems and police in-car video surveillance.

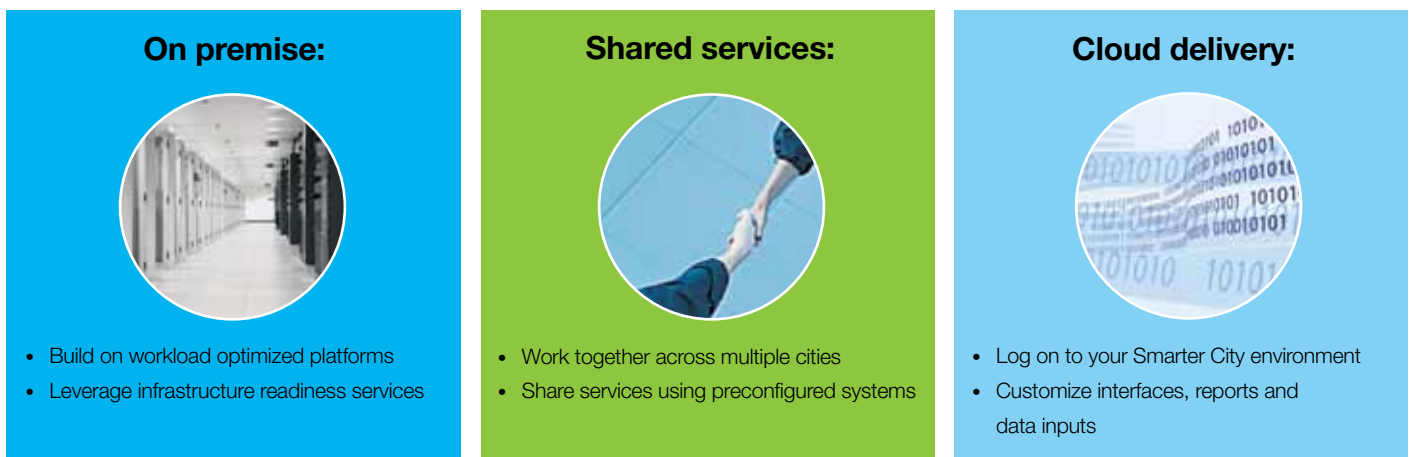


Figure 7: IBM offers multiple deployment options to accommodate cities of all sizes and with all levels of IT resources.

Cities also can choose to work with other cities to share services using preconfigured systems. IBM offers targeted consulting services to determine the right services to share and identify the systems designed explicitly for shared services environments.

For cities without the resources or skills for deploying and maintaining solutions on their premises, IBM intends to offer IBM software-as-a-service (SaaS) options that would reside on the IBM SmartCloud for many solutions. The IBM SmartCloud is an expansive, agile infrastructure as a service (IaaS). This delivery platform is designed to provide organizations with rapid access to enterprise-class virtual server environments that are well suited for dynamic workloads, applications and solutions. Deploying the IBM Smarter City Solutions on the IBM SmartCloud, hosted on IBM workload-optimized servers and storage, can help cities capitalize on the latest technology advances while controlling costs.

### **Build a Smarter Planet with Smarter Cities**

For 100 years, IBM has been working to make the world a better place by helping businesses and local governments in more than 170 countries deploy innovative solutions. IBM Smarter City Solutions continue that tradition, providing real solutions that can facilitate sustainable growth and offer a robust foundation for building a Smarter City. Moving forward, IBM intends to expand its Smarter City solution portfolio to fulfill the Smarter Planet vision. By making cities more instrumented, integrated and intelligent, IBM Smarter City Solutions can help city leaders meet and exceed citizen expectations through innovation.

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### **Work toward a Smarter Planet**

#### *Instrumented*

Sensor-based systems can extend visibility into the real world of operations, transportation, water, public safety, energy, buildings, education, healthcare and social services, providing new real-time sources of data that were previously unavailable to collect.

#### *Interconnected*

Event-processing software derives business-relevant events from the raw stream of sensor inputs, while integration middleware brings these events into the required business context, helping to generate new insights into the actual behavior of real-world, operational systems.

#### *Intelligent*

Using data collected and integrated from a range of systems, mathematical algorithms and statistical tools help provide deep insight into city events. City managers can perform outcome prediction, scenario modeling and simulations to help risk management and facilitate informed decision making.

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## For more information

To learn more about IBM Smarter City Solutions, please contact your IBM representative or IBM Business Partner, or visit:

[ibm.com/smartercities](http://ibm.com/smartercities)

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<sup>1</sup>From the Texas Transportation Institute at Texas A&M University, *2010 Urban Mobility Report*. See “Economic recovery bringing renewed congestion growth,” [http://mobility.tamu.edu/ums/media\\_information/press\\_release.stm](http://mobility.tamu.edu/ums/media_information/press_release.stm)

<sup>2</sup>Source: Energy Information Administration (2006), *Emissions of Greenhouse Gases in the United States*.



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