How smart is smart?

Information and communications technology forms the backbone of a new-age city

Pragya Gupta

The government's proposal to develop 100 smart cities calls for technological solutions to build a global framework. Internationally, the concept of smart cities is not new. So what is a smart city and what makes it smart? If we visualise a smart city it would be one which makes life easier for its people – with smart urban planning (including financial planning and project management), smart infrastructure (transport, utilities, buildings, healthcare and education), smart security (disaster management and emergency response) and smart governance (strong and responsible local government and its economic independence).

Behind the smartness of these smart cities, however, lies the backbone of information and communications technology (ICT), which ensures information gathering and its communication in real time. GIS, cloud, big data, mobility and social communication are essential part of technology employed by smart cities. Also, smart cities are mutually beneficial for private and public sectors, with the former developing technological solutions around each component of a smart city and the latter overseeing implementation and regulation. Solution providers such as IBM, Microsoft, Cisco, Steria, CA Technologies and Esri bring their global experience to help build smart cities. Here's matching requirements with their solution providers.

SMART URBAN PLANNING

To develop a city, planning is an essential part of addressing a plethora of problems from infrastructure to security. ICT has tools that play an important role in smart planning.

GIS: A core component of any smart city, geographical information system (GIS) helps in conceptualising and planning of smart cities to execution and management. It enables design creation, simulation and evaluation. City planners use GIS technology to visualise these smart cities digitally.

Masdar City in the UAE capital Abu Dhabi, which was developed as the first carbon-neutral city, used GIS as a core component of its design. The city used Esri's GIS software in managing the overall spatial information necessary for designing, building, and operating the city. GIS integrates information such as transportation, vegetation, drainage, structures, boundaries, elevation, biodiversity, buildings and utilities; as well as terrain elevation, bathymetric (study and mapping of seafloor topography) data, and remotely sensed imagery. Enterprise GIS enables more than 100 organisations involved in developing Masdar City to access maps, data and analytic services, thus reducing problems of multiple data versions in circulation and building a common operating picture for all. GIS is used to find optimal locations for perimeter parking garages, along with effective road and rail transport routes in the city. Real estate plots were valued using routing GIS. GIS is also used in city governance, where it forms part of the city's sustainability performance feedback service, which will inform residents about their personal contribution towards overall city performance.

3D modeling: 3D modeling software helps planners with a real-life picture of what a city would look like. The technology can also show the impact of these developments, including carbon footprint and e-waste.

Planning software: GIS employs software (project management and financial planning software) support to collect relevant information such as soil data, geotechnical studies, environmental studies, and inventory and asset control during pre-development phase.

"ICT is at the heart of the smart city ecosystem from urban planning to creating healthy environment, ensuring safety of people, smart and efficient power distribution, ensuring 24/7 water supply, intelligent traffic and transportation management systems that use analytics to provide efficient solutions to ease commuting, automated building security and surveillance systems, requiring minimal human intervention, and Wi-Fi-powered open spaces and houses that ensure always-on, high-speed connectivity," says Agendra Kumar, president of GIS mapping software provider Esri India.

SMART INFRASTRUCTURE

Buildings

Buildings can be made smart with central repositories fitted with smart sensors and control systems that measure, sense and see the condition of practically everything in them.

Smarter buildings should lower maintenance and energy costs, and improve reliability and sustainability, for which they employ a combination of monitoring, asset management and advanced analytics along with energy optimisation technologies.

In Dubai, Schneider's integrated SCADA, building management system and security system serve buildings for 9,000 residents and improve water distribution system.

A fundamental part of smart cities is the civic infrastructure.

Shiv Kaushik, country manager, Cyan Technologies

Utilities

"A fundamental part of smart cities is the civic infrastructure. Smart infrastructure and utilities (electricity, water and cooking gas) are the essential building blocks for smart cities, complemented by smart buildings and smart government processes," says Shiv Kaushik, country manager, Cyan Technology Ltd.

Energy: India has a chronic problem of power scarcity and its theft. Introduction of technologies will help in efficient management of energy. Technologies like smart metering, cloud computing, and wireless connected sensor networks are key to smart energy management. Smart meters connect to utilities and communicate two ways through ICT. They monitor electricity consumption and keep consumers and utility providers informed about consumption, peak load hours, etc. It allows the service provider to shift load from industrial to domestic consumers or vice versa and helps them plan tariffs accordingly.

Puducherry has done a pilot of smart grid and smart meters and now private electricity providers in Mumbai and Bihar have also shown interest in deploying smart electricity meters. Essel Utilities in Bihar has opted for a smart metering solution developed by Cyan Technologies.

China has over 250 million smart meters installed, whereas Sweden has moved to 100 percent smart meters. Other countries have also rolled out ambitious smart metering projects. France is using Steria's IT system IssyGrid, which is the country's first district smart grid. Bureau of Energy Efficiency and IBM are working together to evolve smart grid projects.

Energy management software: Along with energy distribution, conservation of energy cannot be ignored. Bharti Infratel, Airtel's tower arm that runs about 33,000 out of 4,00,000 towers in India, uses IBM technologies to monitor diesel usage in these towers and also sends out a real-time alert when any tower goes down.

Water: Similar to smart grid, water distribution also needs smart water networks that automate process control and can process data in real time to yield information that can be put to work to save water and labour costs, optimise compliance and security, and assure good customer service. IBM, Hitachi, and Schneider Electric provide water management solutions to smart cities.

Transport

Integrated transport management solutions provide intelligent and web-enabled solutions for guided parking and volume-based traffic control system by leveraging data analytics to resolve traffic challenges and improve mobility. Solutions like predictive tools, smart card, advanced transportation solutions management, enabling asset and fleet management, parking management and toll and fare management can help control disordered traffic systems in the cities.

Helsinki Bus Transportation in Finland has partnered with Microsoft to analyse operational data to improve business decision-making and increase customer satisfaction. Using a data warehouse solution developed with CGI (formerly Logica) and Microsoft, Helsinki Bus is now able to track traffic data, driver performance and gas usage. What's more, within the first two years of implementation, the company has been able to recoup its investment, saving as much as 5 percent in fuel costs as well.

There has also been a 7-percent increase in customer satisfaction since its deployment.

Similarly, train management system also plays an important role in interconnected cities by adding quality of life for its citizens. Real-time data uses smart analytics to respond to information in real time – whether it is scheduling delays, abnormalities or passenger queries. IBM's solution has helped Konkan Railway get an insight to improve its train management system.

The world is technologically advancing and every transaction happens online, it is important to be secure in the online space which emphasises the need for a robust security system.

Prashant Chaudhary, CA Technologies

Healthcare

Access to timely, affordable and high-quality healthcare services is a key concern in the country. Many technology solution providers offer solutions to make healthcare services more accessible to patients.

Welfare Denmark had a problem of a large population of elderly patients

ICT is at the heart of smart city ecosystem from urban planning to creating infrastrucutre.

Agendra Kumar, president, ESRI

and a limited number of doctors. Working with Microsoft CityNext, they developed Virtual Rehabilitation – an interactive healthcare platform for Windows that supports movement, voice and gesture recognition. While patients do physical therapy exercise programmes in their own homes, physiotherapists use the Microsoft platform to communicate with them, supporting them from a distance throughout their recovery. Solutions like Virtual Rehabilitation show how cities can reduce healthcare costs, improve options and, most importantly, get better outcome for patients.

Education

"More citizens are demanding access to high-quality, diverse forms of education while cities struggle to provide affordable education that can foster employable population," says Arun Rajamani, head (public sector and education), Microsoft India.

Smart cities must have smart citizens where education plays an important role. Education in India has already started taking smart shape with ICT-based learning, including virtual classrooms and digital content.

SMART SECURITY

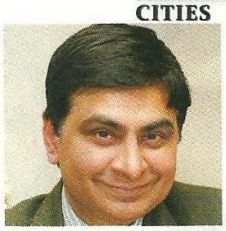
Integrated security and surveillance system: Safety will be an indispensible part of smart cities. India struggles with security infrastructure, from physical security to cyber security. To address the issue smart cities will need a digital video surveillance solution integrated with multiple security subsystems to monitor potential threats in real time. This system detects possible threats and alerts security personnel and also makes available videos of corresponding incident for further action and analysis. Similarly, systems are also available to correlate multiple incidents happening in a city and also help security personnel with foresight. Data analytics, wireless and video surveillance system will enable these systems. Centralised city operations with real-time monitoring of incidents enable public safety personnel to take quick coordinated actions required for public safety. Faster the response to emergency, sooner the situation will come under control.

In Palava city (Thane, Maharashtra), IBM is setting up technology-enabled procedures to effectively handle different types of emergencies. IBM will support a central hub to monitor and enable coordination between Palava city and agencies involved in public safety and emergency management.

Thailand's department of special investigation (DSI) adopted a big data solution based on the Microsoft platform and Apache Hadoop software to give investigating officers self-service business intelligence tools and data-management capabilities that helped DSI improve accuracy and shorten criminal case investigation time from two years to 15 days.

Cyber Security: "The world is technologically advancing and every transaction happens online, it is important to be secure in the online space which emphasises the need of robust security system," says Prashant Chaudhary, senior director, sales – state government, CA Technologies.

In a smart city all systems will be integrated and the failure of one system can bring down the whole system. Therefore, smart integrated cyber security solutions, including real-time monitoring of networks, data backup, data loss prevention, archiving and disaster recovery system, authentication and identification are needed to protect sensitive data and networks from attacks.



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Ramakrishna Sachdeva, Director-marketing, Steria

SMART GOVERNANCE

Smart city requires smart governance, the integration of planning, policy and information across all departments and services provided by the city and all its stakeholders. "In a smart city information flows will be managed through ICT automation and citizen engagement facilitated through ICT online systems, available 24/7. Companies in the smart city space will not only partner and converge to offer 'smart' capabilities but would also start converging with different participants in the ecosystem," says Sachdev Ramakrishna, director – marketing of Steria India Limited, which develops IT-based transformational solutions.

The smartness, however, will add a new challenge in city management, that is, e-waste. It is important to think well in advance about the management of e-waste. Companies like Attero Recycling and e-Parisaraa are working on technologies for e-waste management which can be evaluated and placed in the smart cities project. ■

pragya@governancenow.com