



CXO FOCUS

SMARTER CHOICE FOR THE SMART CITY: A PROCESSING HUB FOR ALL REAL-TIME DATA AT THE EDGE

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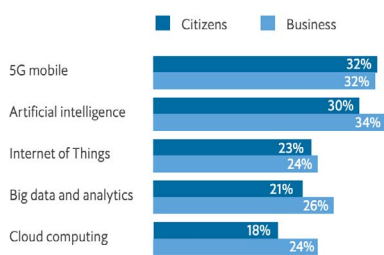
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What Citizens & Businesses Expect of Smart Cities

A new global study of smart cities commissioned by Nutanix “Accelerating Urban Intelligence – People, business, and the cities of tomorrow.” conducted by The Economist, included interviews with thousands of residents and business executives in 19 large cities around the world. Smart-city programs managed by municipal authorities often solicit feedback from residents and businesses to gauge the efficacy of the initiatives or services they develop. Rarely, however, do officials have a clear idea of the improvements constituents actually want smart-city initiatives to deliver. This study was designed to capture precisely this information. It is based on two surveys involving over 7,700 residents and business executives in 19 large cities around the world.

Figure 1: Tech-tastic cities
Emerging technologies considered most integral to the success of smart-city initiatives (top responses, average across 19 cities)



Source: The Economist Intelligence Unit

Thousands of cities are pursuing smart city strategies. These initiatives include environmental monitoring of air and water quality, smart meters for electrical usage, adaptive and intelligent traffic management, surveillance systems for public safety, and unified digital payments, just to name a few. The global smart cities market is expected to reach [US\\$237.6 billion](#) by 2025, with Smart City initiatives attracting technology investments of more than [\\$150 billion](#) by 2022. Gartner [predicts](#) that by 2023 the average CIO will be responsible for more than three times the endpoints they managed in 2018. And a [report](#) by Business Insider envisions that by 2025 there will be over 64 billion IoT device.

But a [study](#) led by the University of Glasgow and the Journal of Urban Technology analyzed over 5,500 cities globally and found only 0.5% as the world’s leading smart cities. As Kendra Smith argued in [Scientific American](#), “At the end of the day, most so-called smart cities are just cities with a few or several standout smart projects.”

With all of the rosy predictions, why have many smart cities stalled? How can these initiatives move forward with confidence and efficient and affordable solutions?

High Hopes, Low Adoption

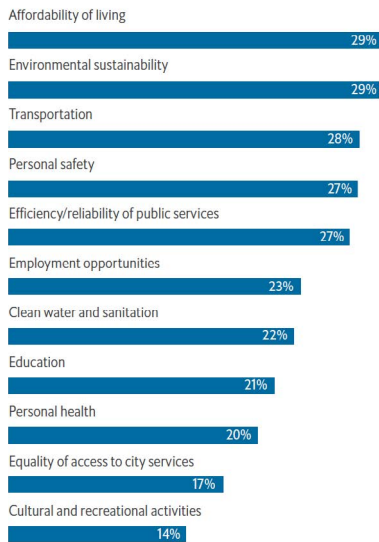
While the digitally optimized smart city is an aspiration of municipalities around the world, cities large and small are grappling with how to effectively and economically process oceans of data streaming in through edge sensors. Most cities now process it all in the cloud, leading to a host of business and IT challenges, from bandwidth congestion and processing delays to security vulnerabilities. Perhaps the biggest problem, one that is getting worse, is the high cost of moving data from the edge to a central server in order for the device to know that a function needs to be executed. In addition to the costs of transmitting lots of data back and forth, organizations reportedly waste an estimated \$62 billion a year paying for extra data storage capacity that they don’t need, according one [study](#).

Now, however, there are compelling solutions emerging that use a combination of cloud computing and artificial intelligence techniques. They are making it possible to move more processing of sensor data from the cloud closer to the edge. That, in turn, is bringing the smart city within reach of tens of thousands more municipalities. This mini revolution at the edge will empower more cities to deploy more real-time, intelligent, efficient, multi-cloud, and affordable municipal applications and use cases than ever before.



Figure 2: What's in it for me?

The main benefits citizens want from smart-city initiatives (average across 19 cities)



Source: The Economist Intelligence Unit

Figure 3: Beyond the bottom line

The main benefits businesses want from smart-city initiatives (average across 19 cities)



Source: The Economist Intelligence Unit

Understanding the Barriers to Entry

The acceleration of IoT is most visible in the accelerating quantities of data collected. [Research](#) by Cisco predicts that 850 million zettabytes of data will be generated by people, machines, and things in 2021 alone — three times what was generated in 2016. This spike will only continue. A huge and growing percentage of that data — perhaps more than 90% — will be generated at the network edge.

Edge computing connected to local appliances that are themselves connected to sensors sounds like a solid architecture. But this design — relying on massive amounts of data to be processed between cloud and edge — is rife with problems. These include high costs, complexity, and performance issues.

There are diverse types of sensors, communications protocols, and physical interfaces that are hard to operationalize, especially as they scale. Applications run on a range of devices with different types of CPUs, GPUs, ASICs, FPGAs, and add-on cards from various vendors. Next-generation cloud-native applications require A.I. and machine learning, with the extensive processing and bidirectional communication that goes along with them. Real-time smart city applications like traffic management, unified payment platforms, environmental monitoring, data-driven inspections, and smart security systems cannot tolerate latency. Additionally, developers, data scientists, and operations personnel need to be able to work together on these applications with a common interface.

It's no wonder cities have only deployed a small number of these applications.

A New Model to Simplify IoT and Edge Computing

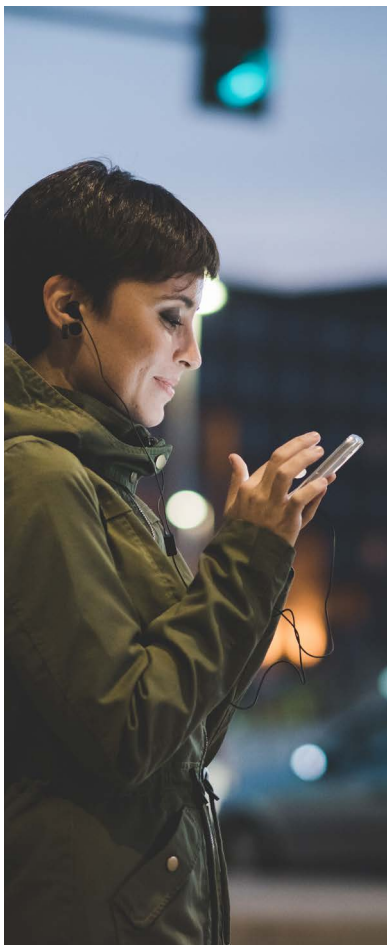
The solution to these daunting operational challenges is to move more processing to edge devices, converging the edge and cloud into one seamless data processing platform. Compute for sensor data streams is handled locally and in real-time with open dataflows and services. Filtered and transformed data is allowed to flow securely to different clouds of choice using native services. Available as a platform-as-a-service (PaaS) environment, this infrastructure can easily scale to handle all of a smart city's IoT applications.

Easy-to-use developer APIs, reusable data streams, and a pluggable machine learning architecture enables rapid development and global deployment of modern smart



Nutanix Xi IoT Solution Components

- Hardware options (Low-power platforms to Xeon CPUs with GPUs for image processing; bare-metal, ruggedized hardware, or virtual machine options)
- Developer and operator interfaces
- Simplified deployment of containerized apps or low-code functions
- Support for different artificial intelligence frameworks and runtime environments
- Ecosystem hardware, software, and services partners for cloud connectivity, vision AI and analytics, edge deployment and management, and device connectivity software



city applications. Multiple frameworks can be built into the runtime, enabling custom runtime environments and the integration of machine learning models from anywhere.

Nutanix Xi IoT

Xi IoT is a transformational intelligent edge and IoT platform for smart cities that can deliver tremendous costs savings and enhanced network efficiency. It's a single, seamless data processing platform for smart cities that eliminates complexity, accelerates deployments, scales for large metro areas, and frees smart city developers to focus on the business logic powering IoT applications and services.

Xi IoT offers several advantages over traditional proxy gateway solutions, including:

- Real-time data processing at the edge for real-time, actionable insights
- No-code methods for migrating filtered insights to your preferred clouds
- Easy configuration, setup, and management for thousands of edge locations from a centralized SaaS infrastructure and application lifecycle management.

How does it enhance your smart city network?

Xi IoT enables easy ingest and analysis of new and existing data streams, letting you fully exploit the value of your data. Focus on business logic and applications and the insights brought to you by the intelligent edge. Here are some examples of how Xi IoT enables smarter smart city solutions:

- Unified digital payments - Design and deploy smart, multi-step payment journeys that reduce the need to repeatedly present payment instruments and identity documentation at each step of the journey.
- Real-time Environment Monitoring - Leverage air and water quality data from IoT sensors to help monitor pollution levels and share recommendations with authorities and citizens.
- Adaptive Traffic Management - Use video analytics and Traffic Signal Priority (TSP) tools to collect valuable data, speed up foot traffic insights, improve incident reporting, and enable preventive maintenance and quick review of incidence footage.
- Smart Surveillance - Deploy IoT-powered gateway security systems and multi-factor authentication for restricted access for crowd monitoring. Warn authorities in case of threshold violations.
- Smart metering and smart grids - Continually monitor energy consumption in cities through data generated by IoT-enabled electric meters and power grids.



Summary

The insights from the intelligent edge are waiting to be discovered and turned into opportunities. Data from the city will play a huge role in years to come. The list of benefits includes lower utility costs, improved air and water quality, new jobs, reduced service interruptions, lower crime rates, and more efficient public transportation.

It's time to fully exploit the value of smart city data by freeing cities from the arduous and expensive challenge of deploying an intelligent smart city network architecture. In a step away from rigid, complex, expensive point solutions, Nutanix Xi IoT provides cities with a single centralized PaaS that moves inferencing for real-time applications closer to the edge. The Nutanix Xi IoT infrastructure can be used for all smart city applications and integrates with all of a city's cloud and software vendors of choice. It scales to accommodate multiple data pipelines. Existing analytics apps and functions can be used to crunch the data — or choose a Nutanix ecosystem partner to provide analytics and A.I. and machine learning solutions to address a city's specific objectives.

[Find out more](#) about Nutanix Xi IoT today.





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