Nutanix Xi IoT Solutions for Smart Cities

60% of the global population expected to live in cities by 2050 (United Nations)[1]

IoT in the Smart City market will reach CAGR of **22.5%** from 2018-23 (Markets and Markets Research)[2]

A study led by the University of Glasgow and the Journal of Urban Technology analyzed over 5,500 cities globally and listed only 0.5% as the world's leading smart cities.[3] Adoption of technologies such as IoT (Internet of Things) and AI (Artificial Intelligence) play a critical role in creating a "Smart City." But do cities have the right approach in place to ride the wave of disruptive digital transformation? The potential around smart cities is enormous, but it requires massive effort to deliver desired outcomes.

TECHNOLOGY FOR THE BETTERMENT OF ALL

Smart Cities lay emphasis on improved economic growth, operational efficiencies, and sustainability to improve residents' quality of life. Modern digital technologies are crucial enablers to achieve these outcomes. Citizen-government engagement can be achieved by keeping pace with technology innovations that fulfill

Smart Governance	Smart Healthcare	Smart Mobility	Smart Safety	Smart Utility Management
Unified digital payment	Real-time environment monitoring	Adaptive traffic management	Smart surveillance	Smart metering/ grids
Local citizen engagement	Telemedicine	Smart parking	Emergency response optimization	Waste collection optimization
Local e-career centres	Infectious disease surveillance	Predictive maintenance of infrastructure	Real-time crime mapping	Smart streetlights
Digital administrative services	Data-based population health interventions	Autonomous & Connected vehicles	Crowd management	Leakage detection and control
P2P accommodation platforms	Online care search and scheduling	Demand-based micro transit	Disaster early-warning systems	Dynamic electricity pricing

Legend (IOT Relevance): High | Medium | Low/ Negligible

IoT Mapping of Use-Cases Across Smart Cities

[1] *United Nations,* https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html

[2] *Markets and Markets Research, https://www.marketsandmarkets.com/PressReleases/iot-smart-cities.asp*

[3] *Report by University of Glasgow and the Journal of Urban Technology, https://www.gla.ac.uk/news/headline_637908_en.html*

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community expectations for highly personalized and smarter services. Digitally empowered Smart Cities overcome the traits of a typical city that works with various agencies and departments, usually with siloed IT systems, budgets, and initiatives. Technologies like mobility and IoT could form the crux of community experience improvements and ensure siloed initiatives are extended to be truly transformative. A planned digital ecosystem of a Smart City is a great opportunity to shape collaborative relationships among several stakeholders. Smart Cities are focusing efforts on areas like optimizing energy and water consumption, improving air quality and hygiene management, fortifying the health of aging infrastructure, and enhancing security. There lies an opportunity to examine huge volumes of data from multiple sensors to expand utilization, notify maintenance needs, prevent instances of false alarms, and ensure citizen satisfaction.

Industry reports suggest Smart City initiatives would attract technology investments of more than $150 billion by 2022 (IDC Worldwide Semi-annual Smart Cities Spending Guide).[4] IoT-based solutions enable innovative use cases to enlighten Smart Cities and seamlessly integrate various city management systems:

Unified Digital Payments - Enable 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 - IoT sensors transmit air and water quality data to help monitor level of pollution 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, enable preventive maintenance and quick review of incidence footage.

Smart Surveillance - IoT-powered gateway security systems and multi-factor authentication for restricted access ensure crowd monitoring and warn authorities in case of threshold violations.

Smart Metering/Grids - Authorities use IoT-enabled electric meters and power grids to constantly monitor the consumption of electricity.

MOVING TOWARD THE EDGE BUT OPERATING LIKE THE CLOUD

Various smart city components create substantial data streams that risk overloading networks. Significant IT and business challenges, such as bandwidth congestion, lack of scalability, processing delays, limited security, and regulatory compliance, can be difficult and expensive to handle. Edge computing offers a solution to Smart Cities that can help them reap the full benefits of becoming "smarter." The data received from sensors and other connected devices goes through automated analytical computation, instead of sending back to a centralized data store.

The Nutanix Xi IoT platform is a 100% software-defined solution that delivers local compute and ML for IoT edge devices into one seamless, delightful application platform to solve the mentioned challenges. Not to mention, it can:

- Eliminate complexity
- Accelerate deployments
- Deliver real-time computation of sensor data streams
- Provide filtered data flows securely to your cloud
- Analyze new and existing data streams

Xi IoT delivers AI-driven processing at the edge with a zero-touch software platform that powers real-time business insights and simplifies operations at planet scale. The business benefits can range from fast and efficient execution in constrained environments to identifying trends and insights to enhance planning for more forward-looking and future schemes.

[4] *IDC Worldwide Semi-annual Smart Cities Spending Guide, https://www.idc.com/getdoc.jsp?containerId=prUS44159418*

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XI IOT HIGHLIGHTS

Manage a Large Set of Structured and Unstructured Data Volumes: Use AI at the edge to intelligently process to IoT sensors and data from connected devices.

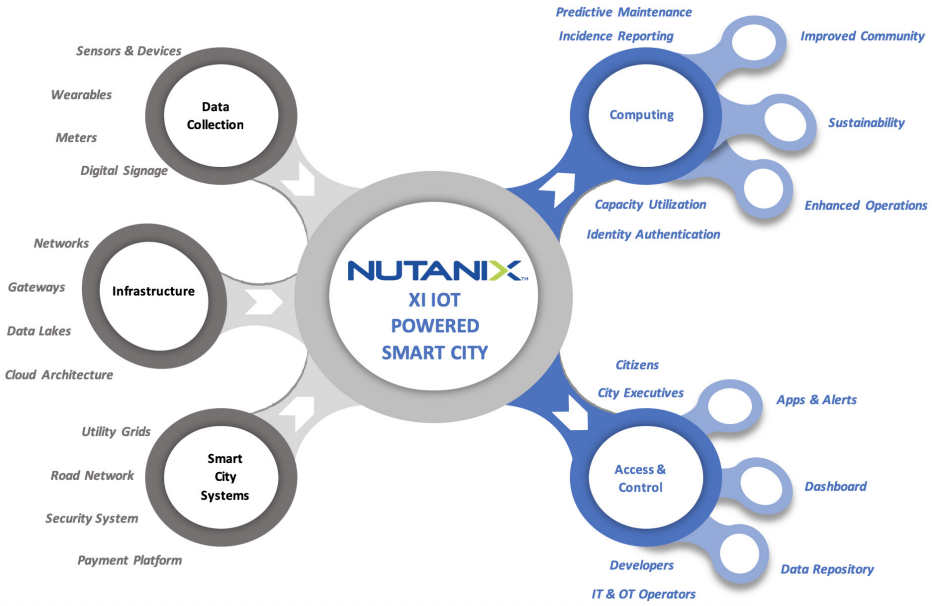
Secure Connections: With end-to-end security from the edge to the cloud, strengthen data security and citizen privacy.

Increase Reliability: Enjoy continuous operations even with unreliable low-bandwith links.

Lower Latency: Maintain fast response at the edge.

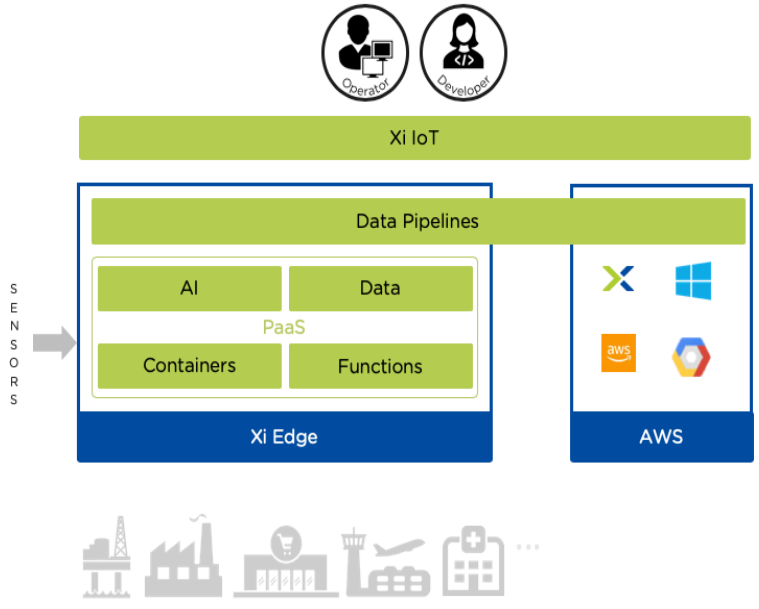
Freedom to Choose Your Cloud: Enjoy built-in cloud connectors with no manual API scripts.

Freedom to Select Sensors and Devices: Connect any sensors or devices using multiple protocols, MQTT, or IP-based systems, thereby improving interoperability.



XI IOT AND EDGE ARCHITECTURE

Nutanix Xi IoT is comprised of a SaaS infrastructure, an application lifecycle management plane, and Xi Edge software running on a variety of edge hardware. The SaaS management provides an end-to-end view that is centrally managed from the cloud through a user-friendly interface for application development and operations to easily deploy thousands of edge locations. You can deploy Xi Edge bare metal or as a virtual machine (VM) on shared or dedicated nodes.



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DRIVE IMPACT ACROSS THE BUSINESS

Xi IoT lets you fully exploit the potential value of your data by:

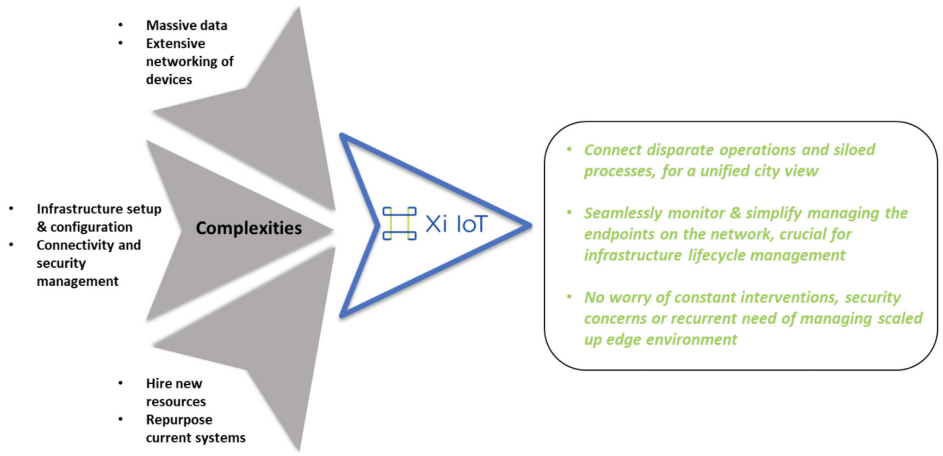
- freeing you to focus on business logic and applications
- monitoring connected systems granularly
- enabling proactive client communications
- delivering predictive asset management
- reducing service interruptions
- improving emergency response management & security
- saving millions annually on utility costs

Since compute is done at the edge, authorities can reduce sensitive data being leaked or creating a security risk.

SUCCESSFUL EDGE COMPUTING MANAGEMENT

Smart Cities run a high risk of becoming municipalities that struggle with putting ideas into reality. It is a challenge to manage hundreds or thousands of locations, as the city continues to scale it out at the edge. The distributed nature of edge computing can bring along added complexity, more sensors/machines, and a greater need for management. With Nutanix Xi IoT, Smart Cities actually become "Smarter."

As 21st century cities become increasingly dense, the communication ties between citizens and their government have become weaker, leading to a greater need for a coordinator. Nutanix-powered Smart Cities can fill this void and take on the role of the intermediary between citizens and city management. The Xi IoT platform has the potential to incorporate a whole city into a scalable solution.



TRANSFORM YOUR ORGANIZATION TODAY

Nutanix Xi IoT enables easy ingest and analysis of new and existing data streams that can transform your organization. Xi IoT lets you fully exploit the potential value of your data by freeing you to focus on business logic and applications for traffic management, unified payment platforms, environmental monitoring, data-driven inspections, and smart security systems. The insights from your intelligent edge can deliver an array of benefits, including reducing utility costs, creating new jobs, reducing service interruptions, and decreasing overall crime rates, all of which help you differentiate your brand, maximize revenue, and identify trends long before the competition.

Nutanix is committed to helping cities modernize their datacenters and edge infrastructure, so IT can shift its focus from maintenance and operations to driving innovation.

Schedule a customized technical briefing on the Nutanix Xi IoT Platform by connecting with your Nutanix representative or emailing us at iot@nutanix.com. Visit www.Nutanix.com/IoT for a free trial to get started today.

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