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# Shared, secure, scalable ICT for smart cities

Use case

**Build a shared, secure, scalable, mission-critical broadband network to enable the development of smarter, safer and more sustainable cities.**

With 66 percent of the population expected to live in urban areas by 2050 (source: UN), cities must anticipate the social, demographic, economic, public service and environmental challenges caused by this evolution. To get the full benefits of the most advanced ICTs, cities need a network infrastructure that can securely carry people and sensor information, that is shared to maximize synergies and minimize costs, and that is open and can easily scale and evolve to meet future requirements.

Nokia can help you build a strong ICT foundation that will support the development, livability, and attractiveness of your city.

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# Challenges

According to United Nations, the world's population will grow by 14 percent by 2050. The share of this population living in urban areas will increase from 55 to 66 percent. This will place increased pressure on urban areas in terms of energy use, environmental protection, mobility, and citizen safety. With the advent of ubiquitous broadband, sensors and internet of things (IoT) applications and big data analytics, cities can develop 'smart city' plans to address these challenges. But smart cities need a connectivity infrastructure and IoT platforms to fully deliver on the promise of these advanced technologies. Unfortunately, creating that infrastructure can be a challenge for a variety of reasons, including:

- **Incomplete broadband connectivity:** Although cities are generally the first ones to benefit from broadband access, coverage and capacity is poor in many areas including indoor, deep indoor and public venues. Even in the biggest cities there are underserved areas. Additionally, most city broadband access infrastructures have primarily been designed to support people-to-people or applications-to-people communications. But the development of IoT services requires massive sensor, device, gateway and machine communications with very different types of connectivity requirements.
- **Aging legacy city network:** In some cities, each public service administration has its own network, which is supported by either leased circuits from a carrier or through its own copper or fiber. Typically, these networks support a complex mix of networking technologies, many of which are reaching obsolescence. Each of these networks may be managed separately and in many cases, are not ready to support cloud services or the IoT.
- **Siloed IoT platforms:** Many cities deploy one or more standalone applications based on their current needs, resources, and priorities. This offers a shorter path to deployment and a clear return on investment (ROI), but very often introduces infrastructure silos. It also prevents easy cross analysis of data among various IoT applications and limits new service efficiency. In the long run, it may affect application synergies, platform management costs and service scalability.
- **Vendor lock-in:** The absence of mature standards can lead to the risk of vendor lock-in and significant upfront investment in cases of early platform or infrastructure investments.

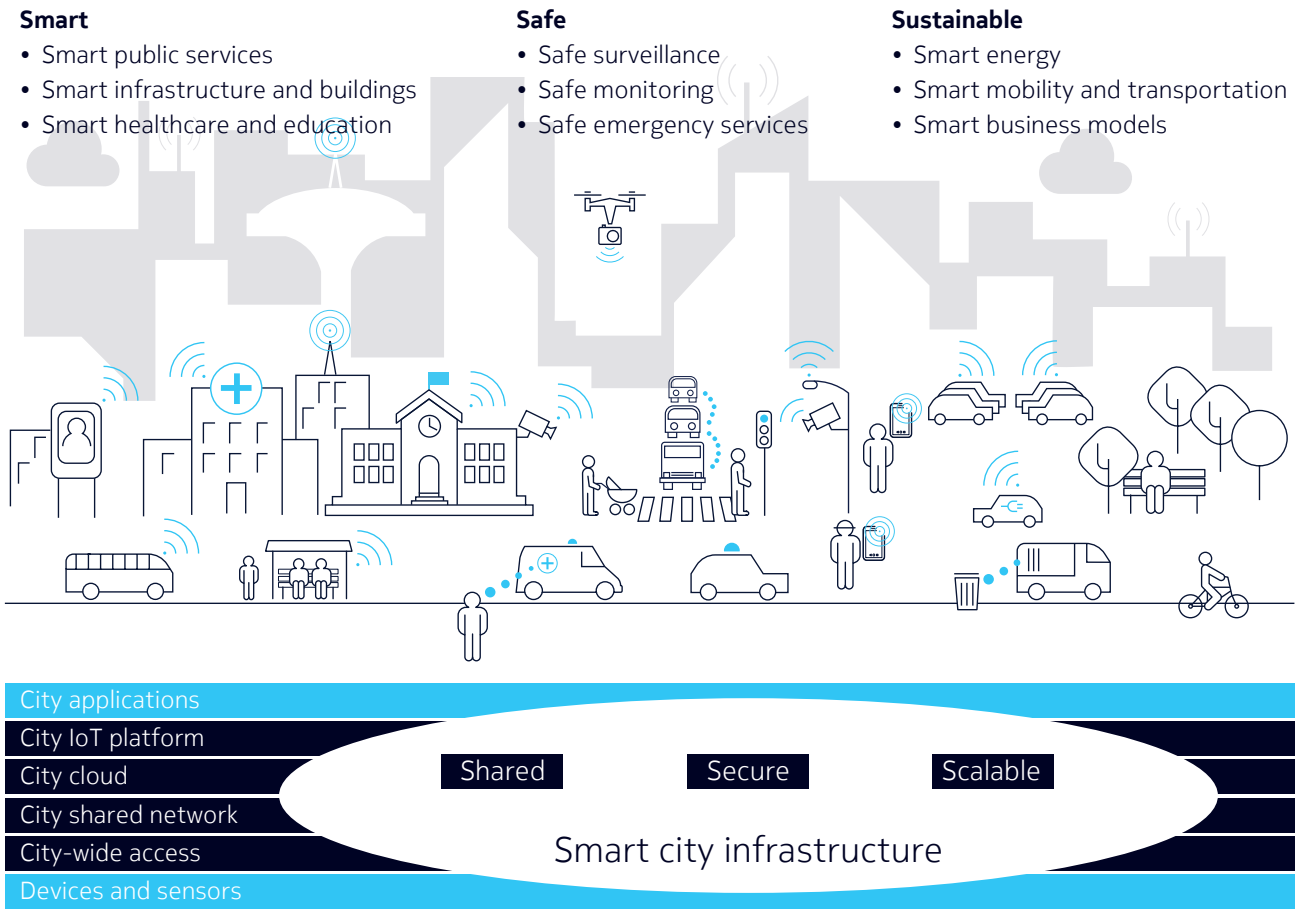
# How we help you

Nokia provides a holistic, standards-based approach to smart city communications infrastructures that simplifies development of new applications and protects investments. Our smart city framework is based on a horizontally layered architecture that includes:

- **City-wide connectivity:** Citizens and businesses want broadband wireless access both inside and outside public places. To connect city devices and sensors or gateways requires a mix of mission-critical, business or best effort broadband access, as well as wireless low power data access. With our broad and hi-performing portfolio of fixed and wireless broadband access, be it in licensed or unlicensed bands, we can provide a connectivity mix that optimally covers all needs.

- **A city-wide converged network:** By consolidating multiple communications networks to a single, converged, IP-based, multi-service network you can achieve greater operational efficiencies at lower cost. This single mission-critical network can connect data centers, government offices, public safety radio sites, public amenities such as libraries, public transit, and public safety vehicles to support a myriad of applications ranging from new cloud-based smart city applications, critical public LMR/LTE systems and legacy industrial supervisory control and data acquisition (SCADA) systems.
- **A city cloud:** Cloud computing supported by a more dynamic communications network offers a more agile and flexible framework to meet future citywide ICT needs. Its virtualized, software-defined network unleashes the power of the cloud and increases flexibility to connect sites, people and applications faster and more securely. Implementing a city cloud enables your public sector agencies to share information and resources, while achieving greater coherence and economies of scale, giving your citizens and employees secure online access to applications, services and data.
- **A city Internet of Things (IoT) platform:** Nokia's citywide IoT platform reduces operating costs and simplifies the collection, processing and management of big data by remotely managing up to millions of connected devices and sensors. It provides the necessary layers for connectivity management, application enablement and device management that is secure across all endpoints. It also enables the effective use of data and analytics that will create value for a city.

Figure 1. Nokia's approach to smart cities



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## Why our approach is different

- A horizontal approach, where the communications infrastructure and IoT platform are shared by all city agencies and administration teams to optimize total cost of ownership and to unlock the possibilities of inter-agency collaborations and cross-data analysis.
- An end-to-end communications solution, built on a best-of -breed, standards-based, broad network portfolio, which provides a one stop-shop for a smart city ICT foundation.
- Built on carrier and industry-grade equipment, our solution can easily scale when demand for smart city services grows.

## How you benefit

- Lower the total cost of ownership of your smart city ICT infrastructure, without any compromise on quality of service.
- Facilitate synergies between applications and provide flexibility for future deployments. Your investment is protected because all our solutions are standards-based and can easily scale as needed.
- Drive the local economy with IoT platforms and a network infrastructure that provides a citywide/regional/national environment with which to attract new business and engage in new business opportunities.

## Let us help you

A successful smart city must incorporate the six “s’s”: a shared, secure and scalable infrastructure that enables a smarter, safer and more sustainable city development. To achieve this vision Nokia invents and delivers smart broadband networks and platforms that connect sensors, machines, city administrations and citizens to cloud-based IoT applications.

For more information on our solutions for smart cities, visit https://networks.nokia.com/government/smart-city.

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## About Nokia

We create the technology to connect the world. Powered by the research and innovation of Nokia Bell Labs, we serve communications service providers, governments, large enterprises and consumers, with the industry's most complete, end-to-end portfolio of products, services and licensing.

From the enabling infrastructure for 5G and the Internet of Things, to emerging applications in virtual reality and digital health, we are shaping the future of technology to transform the human experience.

Connect with our sales team

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