

Integrated operations center  
Actionable intelligence for smart cities

NOKIA





# Cities are under growing pressure

## A smarter approach is needed

By 2050, more than two-thirds of the world's population will live in cities.

This exponential growth will place significant stress on city operations and existing infrastructure. Cities will need to develop a strong technology foundation to deliver on the promise of being the engines of tomorrow's economy while providing the best quality of life for citizens.

**2%**

Share of land surface occupied by cities

**70%**

% of people living in urban areas in **2050** vs **55%** in **2020**<sup>1</sup>

**9.75B**

world population in **2050** vs **8.5B** in **2030**<sup>1</sup>

<sup>1</sup> Source: UN DESA, Intergovernmental Panel on Climate Change, IDC, Organisation for Economic Co-operation and Development, McKinsey Global Institute, Gartner Prepare to Monetize Data From the Internet of Things

# Hyper-connecting everyone to everything

In the last decade, there are many cities that have experimented with smart-city point solutions and pilot projects but are not seeing the hoped-for efficiencies. Not only does this disjointed environment increase operational complexity, it also fails to address city needs at a holistic level.

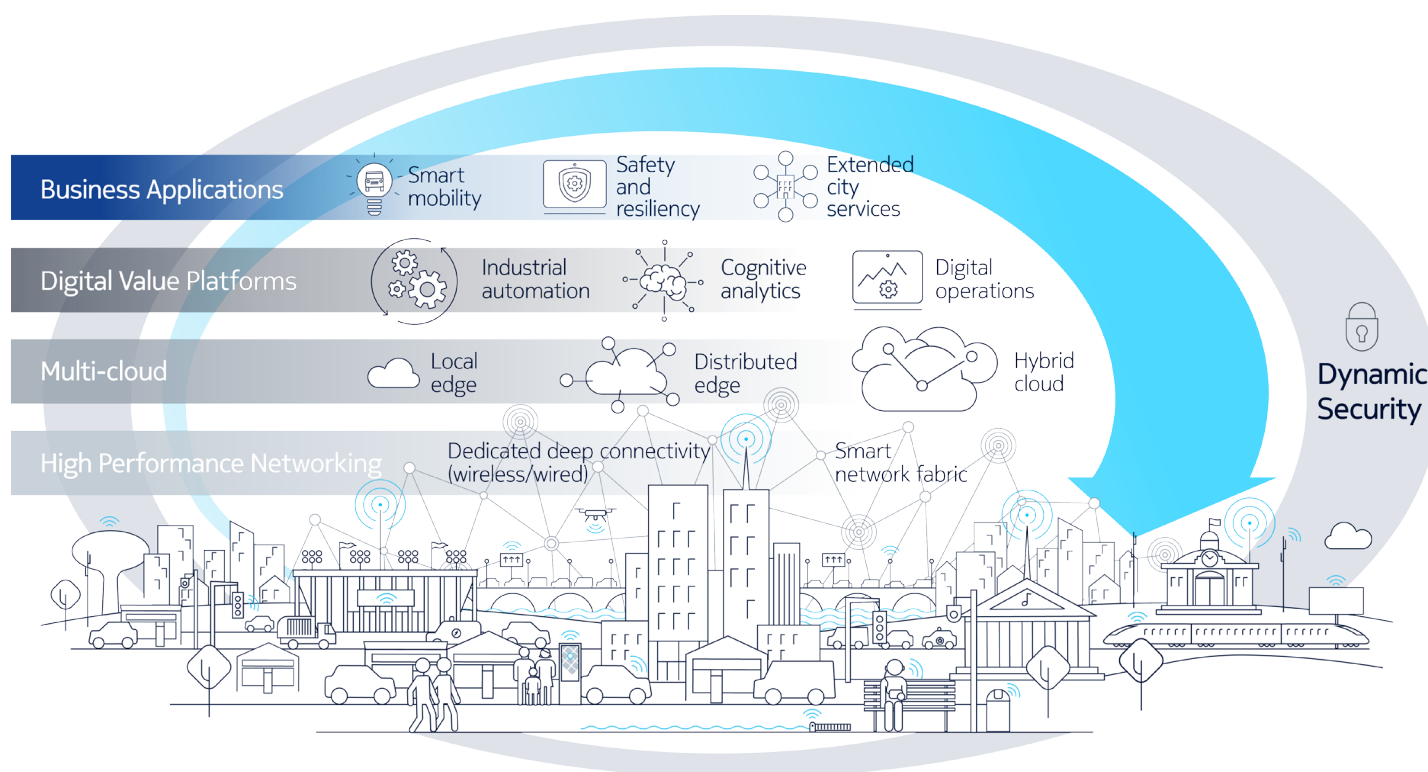
By adopting a long term one city holistic platform strategy, cities can ensure the interworking of all systems, processes and activities. This eliminates information and operational silos, aids collaboration between city agencies, ensures sustainable use of limited resources and brings greater efficiency in delivering city services for a better quality of life. All of this, while creating an environment of robust economic growth.



# The city as a conscious connected collective intelligence

The Nokia Future X for Smart Cities architecture is of a connected, digital platform that supports and fosters new applications and services for greater productivity, richer experiences and enhanced quality of life. This enables the city to operate as a conscious connected collective intelligence.

Nokia Integrated Operations Center (IOC) lies at the core of Nokia Future X for Smart Cities and enables unified agile delivery of smart city services for improved efficiency and a better quality of life while creating the technology foundation for a sustainable future. The IOC is an actionable intelligence platform, orchestrating operations from events to contextual actions based on data-driven analytics insights and actioned through automated workflows.



Nokia Future X for Smart Cities supports new applications and services

# Managing a unified digital cityscape powered by the Internet of Things

A safe, well-functioning city depends on a wide range of communication, control, operational dispatch and monitoring systems. Typically, these systems function independently as point solutions, having been provided by different suppliers at different times, creating a patchwork of uncoordinated operations and information siloes.

As the smart city evolves, managing the rapidly rising numbers of independently functioning assets and coordinating operations becomes highly complex. This results in different challenges including poor operational efficiency, interworking issues and vulnerabilities arising out of disparate security standards.

IOC uses a centralized platform to aggregate separate sources of information, including the expanding flow of real-time video and sensor data. This streamlines operational

processes, creates deeper situational awareness and addresses the system interoperability challenge. A single pane of glass view enables unified city asset management and monitoring. Automated workflows generate contextual actions based on events and insights, with little or no requirement for human intervention.

A custom integration layer contains application adaptors to support legacy and new applications, platforms, analytics engines and systems regardless of vendor. Where existing adaptors are not available, Nokia Integration Platform experts can rapidly create custom adaptors to ensure seamless interoperability.



A unified digital cityscape powered by the Internet of Things

# Actionable intelligence maximizes smart city possibilities

IOC combines multiple analytics capabilities (video, mobility and predictive analytics) to evaluate the best outcomes in a holistic environment. For example, video analytics can be used for a variety of scenarios related to traffic management and public safety.

Mobility Analytics driven by the Nokia AVA platform derives patterns of crowd movement based on anonymized network location data. This can be used to support urban planning, retail, travel and tourism related uses cases.

Predictive analytics developed by Nokia can be used for predictive waste management, flood event prediction and a variety of predictive maintenance use cases.

Events generated by IoT sensors across the cityscape are contextually analyzed. Instead of

set thresholds, the IOC uses analytics to dynamically determine the best course of action. Custom automated workflows shorten the response time for actions like dispatching personnel, actuator state changes and information broadcasts, without the need for human intervention.



From event to action – end to end workflow with multi-agency dispatch actions



# Nokia is leading smart cities developments around the globe

As smart city initiatives are introduced around the world, Nokia is at the forefront of many developments. Nokia recently worked with Vietnam's Viettel to demonstrate the power of the IOC as an actionable intelligence platform orchestrating multiple end-to-end smart city applications and use cases in a live city environment.

The solution was used to efficiently manage smart city applications including traffic monitoring, public safety, pollution detection and water quality monitoring. Supported by Nokia's proven technology expertise and system integration capabilities, IOC enables authorities to provide a better quality of life for Hanoi's citizens by implementing a seamless IoT cityscape powered by connectivity, automation and analytics.

Some other developments around the world include:

- **Singapore:** Nokia has worked with M1 Singapore to develop a city-wide NB-IoT connectivity network. Additionally, M1 is leveraging Nokia IMPACT to boost its capabilities to provide innovative IoT urban solutions.
- **Dubai:** Nokia is working with Nedaa, which provides telecommunication services to specialized governmental, semi-governmental and private institutions, to implement a 5G ready mission critical broadband network to deliver next generation security and smart city services.
- **Bristol, UK:** Nokia is a partner in the Open Programmable City led by Bristol City Council and the University of Bristol to research and develop initiatives that contribute to the creation of a smart city.
- **Tampere, Finland:** Nokia is a key partner of the Smart Tampere initiative bringing smart city services to one of Finland's largest municipalities.
- **Chattanooga, USA:** Nokia has demonstrated 4K video streaming across the city's metropolitan network for local live event streaming and interactive digital signage.
- **Jeddah, Saudi Arabia:** Operator Zain KSA and Nokia are collaborating on a major initiative that is transforming Jeddah, one of

the Kingdom's largest cities, into a model for smart cities everywhere.

- **India:** Nokia has been chosen by BSNL, India's state-owned operator to deploy digital infrastructure like Smart Poles to create smarter, safer and more sustainable cities.



[www.youtube.com/watch?v=xrnzu219Erw](https://www.youtube.com/watch?v=xrnzu219Erw)



Example of traffic monitoring using video analytics and Nokia Integrated Operations Center

# Helping you achieve your smart city goals

Nokia Technical Consulting experts work with city authorities to adapt the IOC to meet city needs. Existing assets including cameras, meters and legacy subsystems are rapidly integrated through Nokia's custom integration layer and interwork seamlessly with the latest smart city innovations. This reduces upfront investment while extending the useful life of legacy assets.

The IOC also accelerates the delivery of new smart city services taking advantage of pre-integrated applications. These include smart video solutions, smart lighting, smart parking, environment monitoring and smart waste management. New applications can be quickly developed leveraging Nokia's integration layer API library.

Our new cloud-hosted IOC model enables rapid deployment of smart city proofs of concept in a live city

environment with minimal investment. This enables city authorities to quickly determine whether their smart city strategy fulfils its goals with minimal disruption and financial risk. This can be scaled towards a full-scale deployment in a private/hybrid/public cloud model.

**Contact us** to visit our co-creation facilities in Irving (USA), Reading (UK), Munich (Germany) and Singapore, discuss with our experts and experience first-hand how Nokia Integrated Operations Center can help you achieve your smart city goals.

<https://www.nokia.com/networks/industries/smart-city/#contact>







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