Enabling the human possibilities of smart, safe and sustainable cities

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Urbanization is putting increased pressure on cities

2%
of Earth's land taken up by cities

55%
of all people live in cities

70%
of the global population will live in cities by 2050

41
mega-cities of at least 10 million inhabitants by 2030

76%
of global energy use and carbon emissions are from cities

$1 trillion
estimated cost of air pollution in OECD countries due to road transport emissions

+15% average crime rate when population of a city doubles

65%
of global GDP growth generated by 600 largest cities by 2025

"Managing urban areas has become one of the most important development challenges of the 21st century. Our success or failure in building sustainable cities will be a major factor in the success of the post-2015 UN development agenda."

John Wilmoth
Director, UN DESA Population Division

Sources: UN DESA, Intergovernmental Panel on Climate Change, IDC, Organisation for Economic Co-operation and Development, McKinsey Global Institute

Smart technologies enable new possibilities for cities

3X
growth of average broadband speed since 2012

2.5 trillion
bytes of data created every day

100TB
of data uploaded to Facebook every day

48 hours
of video uploaded to YouTube every minute

9.7 billion
connected things will be used by smart cities by 2020

3 connected devices per head by 2020

75%
of global population will be connected to ICT services by 2030

$1.6 trillion
in economic impact per year will be due to city IoT applications in 2025

In the new connected world, where everyone and everything becomes connected through data from billions of sensors everywhere, there is a renewed opportunity to enhance the way people live and work each day - to make the world more productive, smart, safe and sustainable.

Sources: GeSi, Gartner, McKinsey Global Institute, GSMA

In an ultra-urbanized future, how will cities provide the best quality of life?

By being:

SMART

Smart applications improve people's quality of life, engagement, bolster innovation and social and economic development, and make cities more attractive places to live, visit and do business.

SAFE

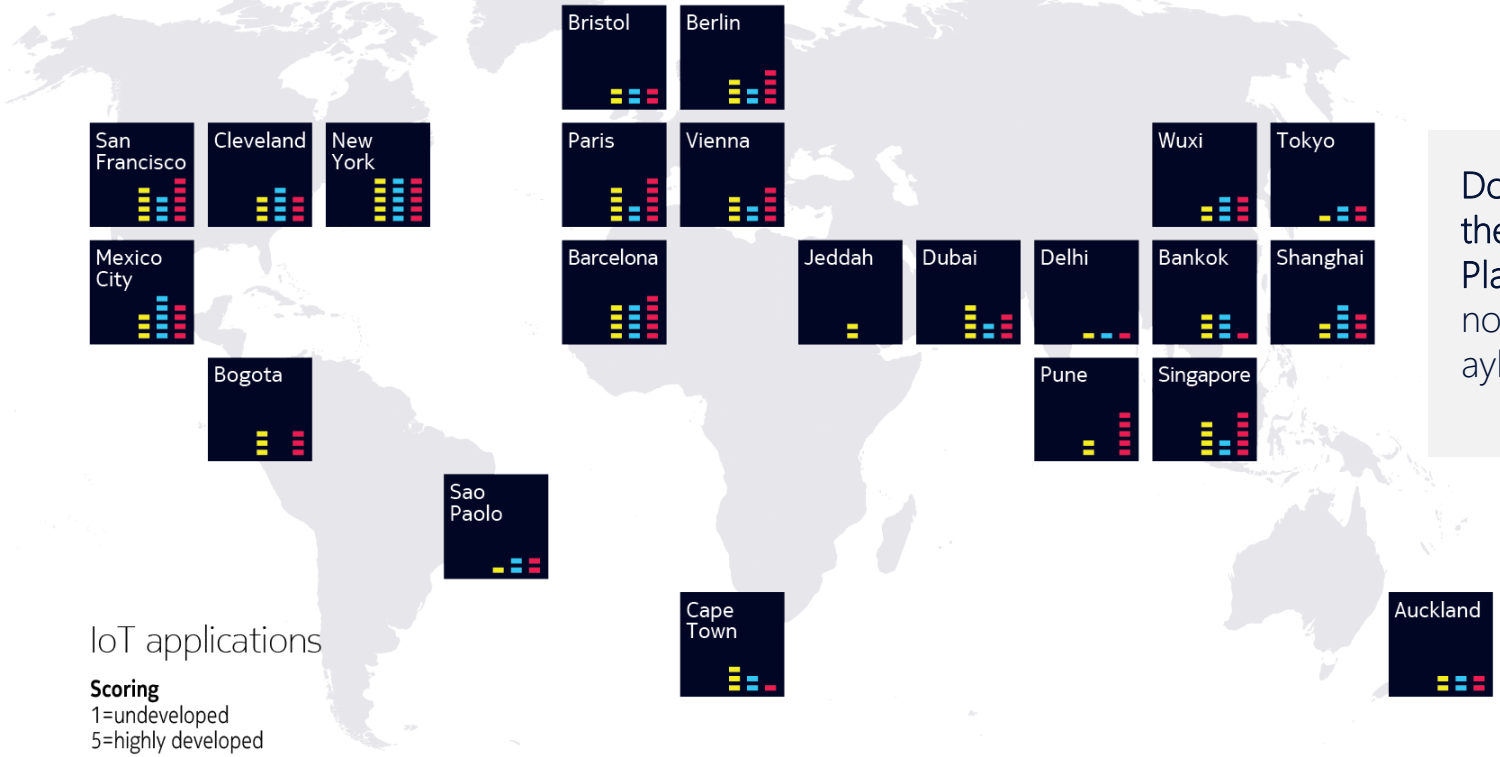
Safe applications improve quality of life by preventing or minimizing the risks and impact of adverse events, including crime, accidents, pollution and natural disasters.

SUSTAINABLE

Sustainable applications reduce environmental impact (including energy consumption and carbon emissions) of municipal operations, local business activities and people's everyday lives.

How are cities becoming smarter, safer and more sustainable?

Partnering with industry analyst to share insights from 22 smart cities



Download the Smart City Playbook at nokia.ly/smartcityplaybook

Key findings from the Smart City Playbook

Best practices for city planners

Cities need rules, policies and governance to get the most benefit from data assets

- Cities must be transparent about how people's data is collected — and how it will be used
- Clear rules and business models must define and encourage data sharing and third-party contributions — and address the monetization of data resources

Building the right relationships with ICT vendors is critical

- While vendors can be an important source of funding, cities must be careful to avoid vendor lock-in, which ties them to a proprietary system that limits future choice
- Some cities are proceeding on parallel tracks with several vendors to ensure future inter-operability

Cities need to make the benefits of their initiatives visible to citizens

- Citizens are more likely to support initiatives they can see over those that are visible only to the city's financial manager
- Many cities are using platforms that not only publish data but also allow citizens to co-create and suggest ideas for smart city applications

Procurement departments need to be better educated on smart technologies

- Smart technologies don't fit well with cities that make purchasing decisions solely on cost and can be difficult to deploy for those with limited technical knowledge

Smart city initiatives should form part of programs to revitalize cities

- Proposing smart city solutions within a framework of technology-led urban regeneration may enable access to wider sources of internal and external funding

Coordination of smart city initiatives requires forethought and leadership

- To break down departmental silos and take advantage of synergies between datasets, smart initiatives should be run by cross-departmental teams or coordinated by a central agency

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Open collaboration is the cornerstone of smart, safe and sustainable cities

Share data and infrastructure for increased synergy and efficiency

PUBLIC

Tap into private sector financial resources

PRIVATE

Engaged citizens & the research community for people-centered transformation

PEOPLE

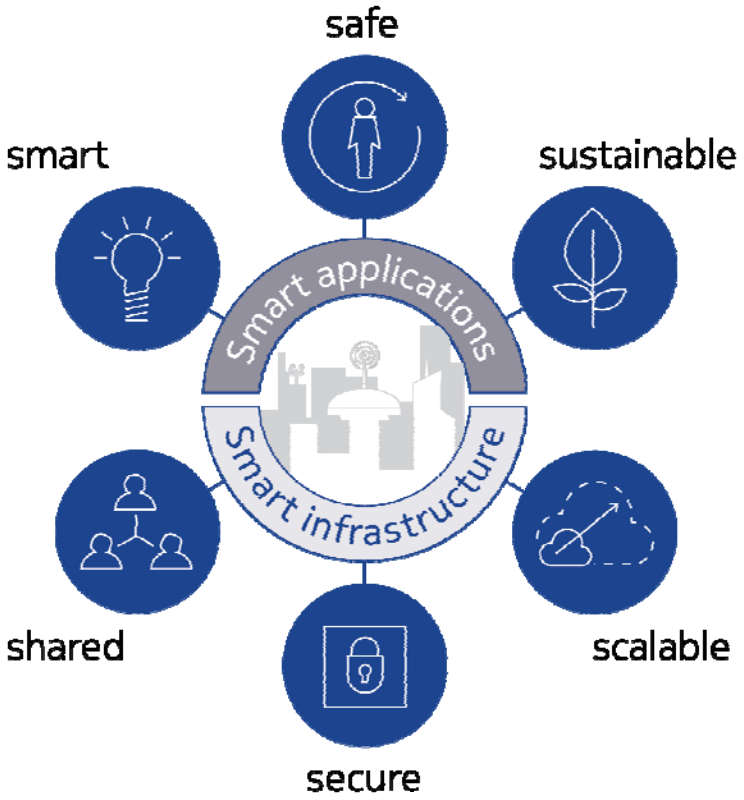
Access to broad expertise while stimulating the local digital economy

PARTNERSHIP

Creating smart, safe and sustainable cities with the Internet of Things

Advanced IoT technology that ensures the best use of urban assets and data is what creates a smart, safe and sustainable environment for cities.

This requires a shareable, secure and scalable platform that combines everything from the network to the devices and applications that make up the Internet of Things.

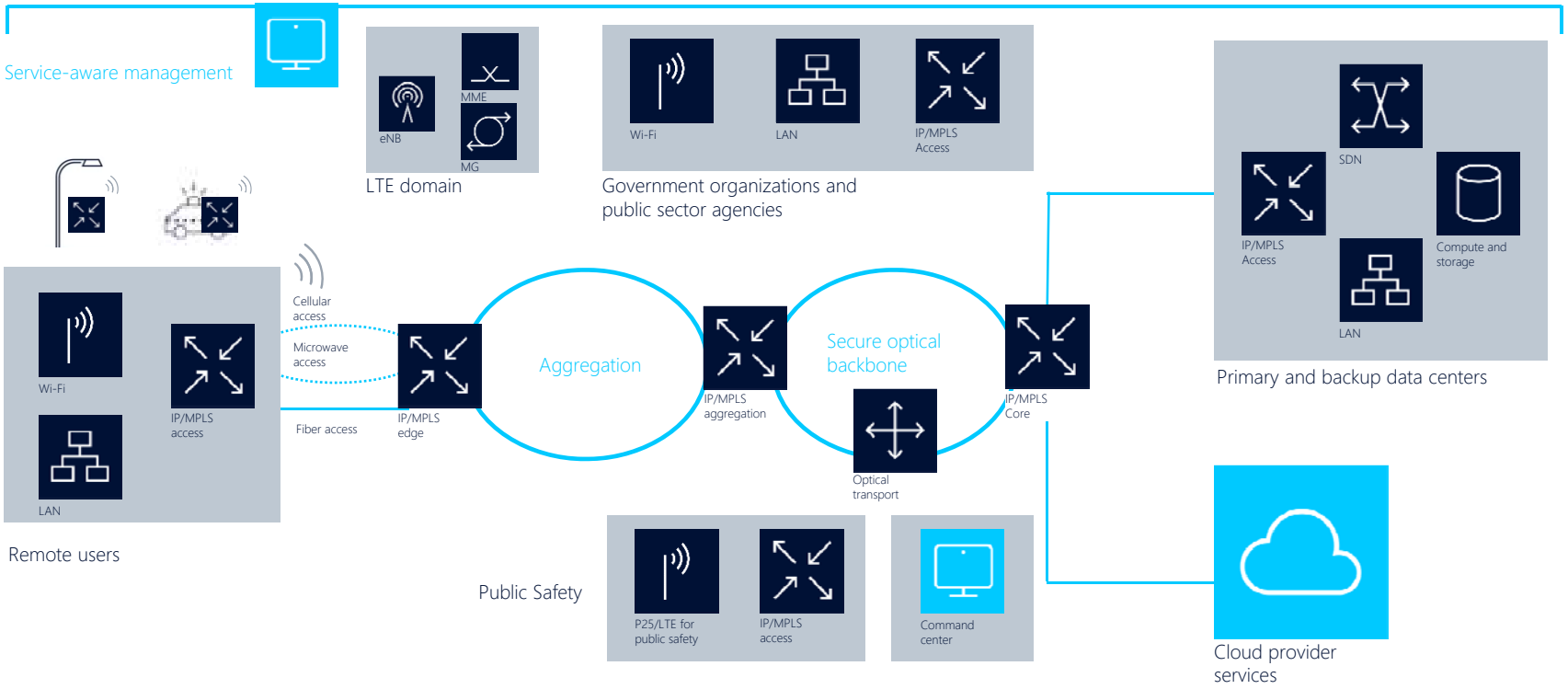


The building blocks of smart, safe and sustainable cities

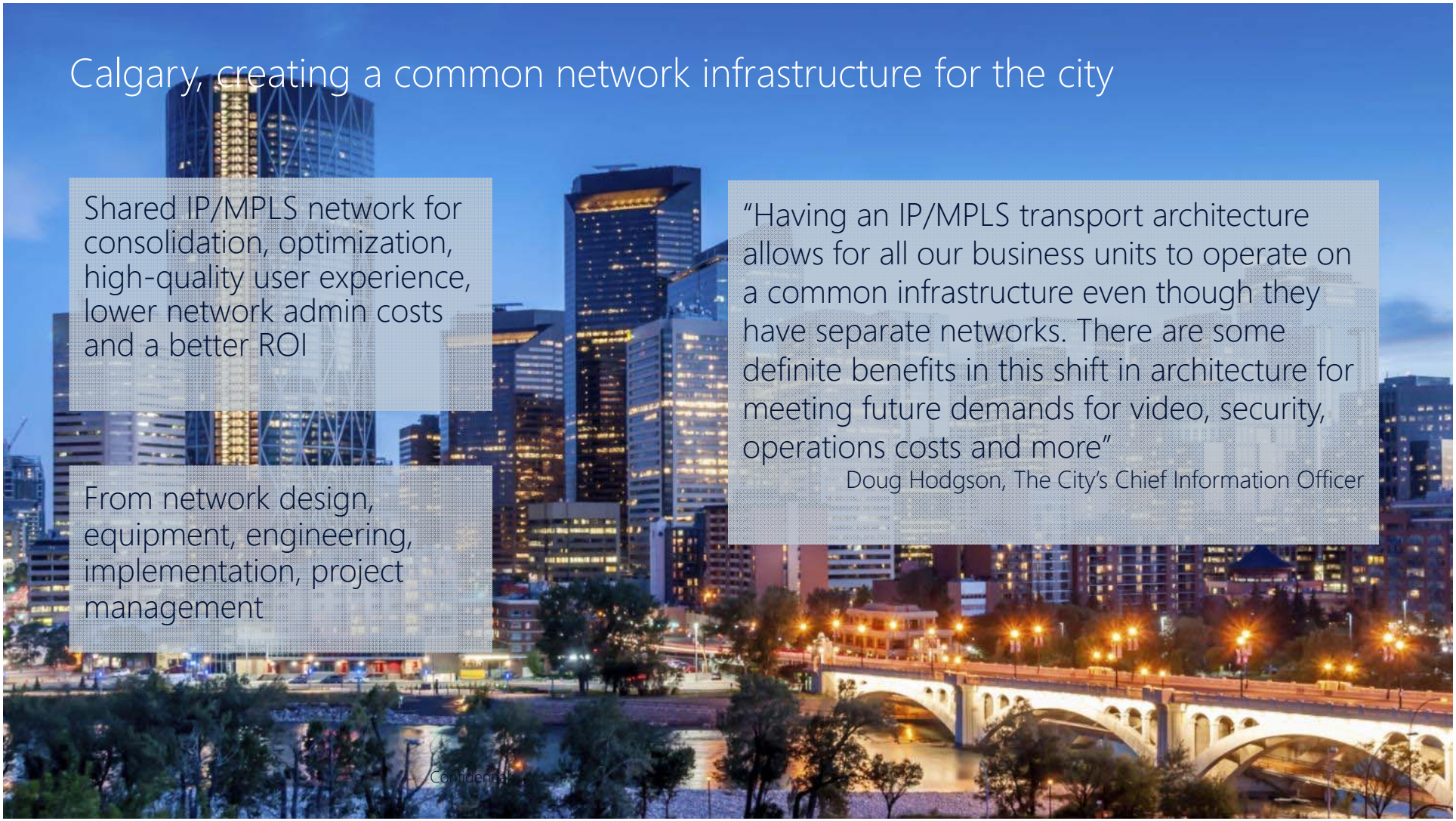
Shared, secure and scalable technologies

City shared network

A converged IP-based network for greater efficiencies and lower costs



Calgary, creating a common network infrastructure for the city



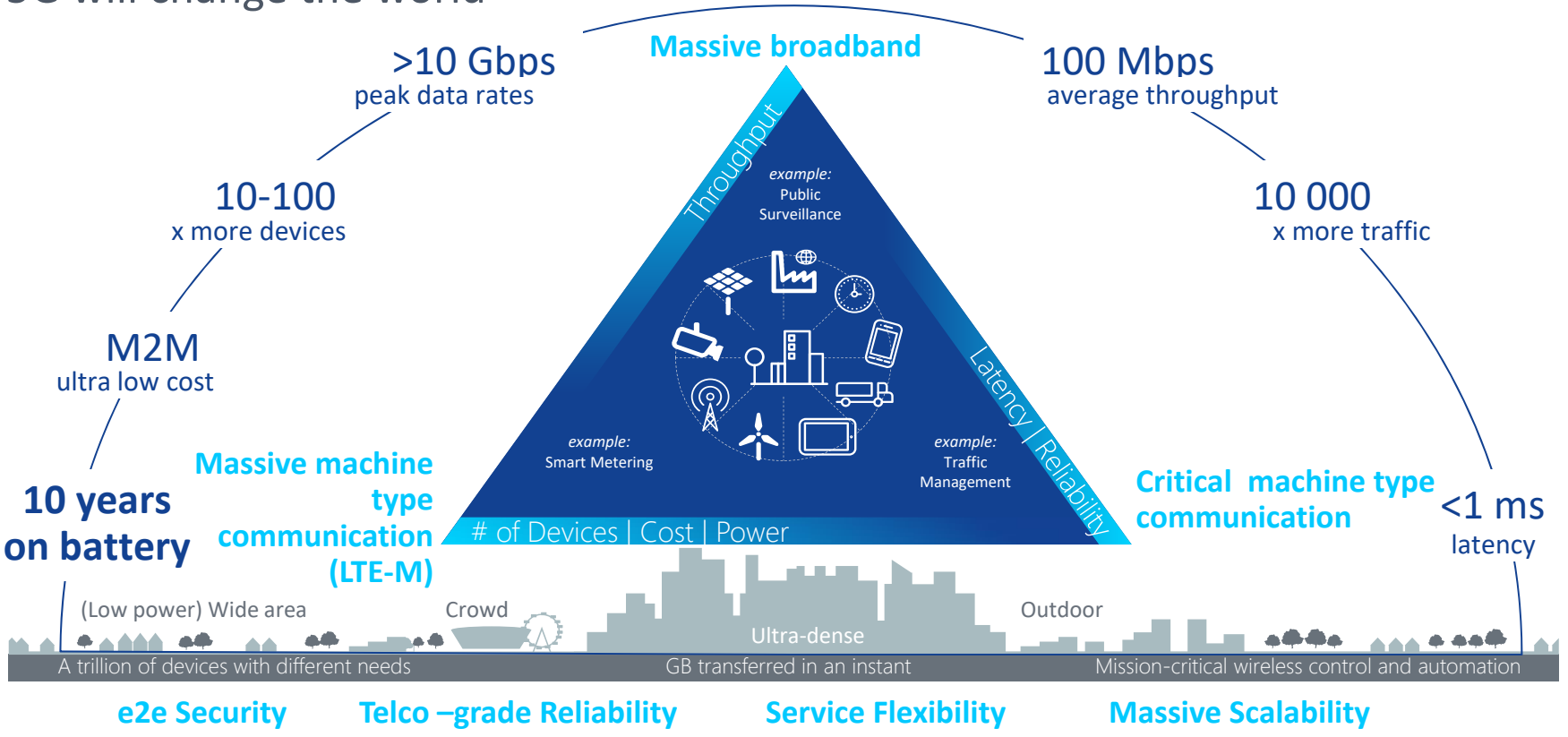
Shared IP/MPLS network for consolidation, optimization, high-quality user experience, lower network admin costs and a better ROI

From network design, equipment, engineering, implementation, project management

"Having an IP/MPLS transport architecture allows for all our business units to operate on a common infrastructure even though they have separate networks. There are some definite benefits in this shift in architecture for meeting future demands for video, security, operations costs and more"

Doug Hodgson, The City's Chief Information Officer

City-wide connectivity
5G will change the world



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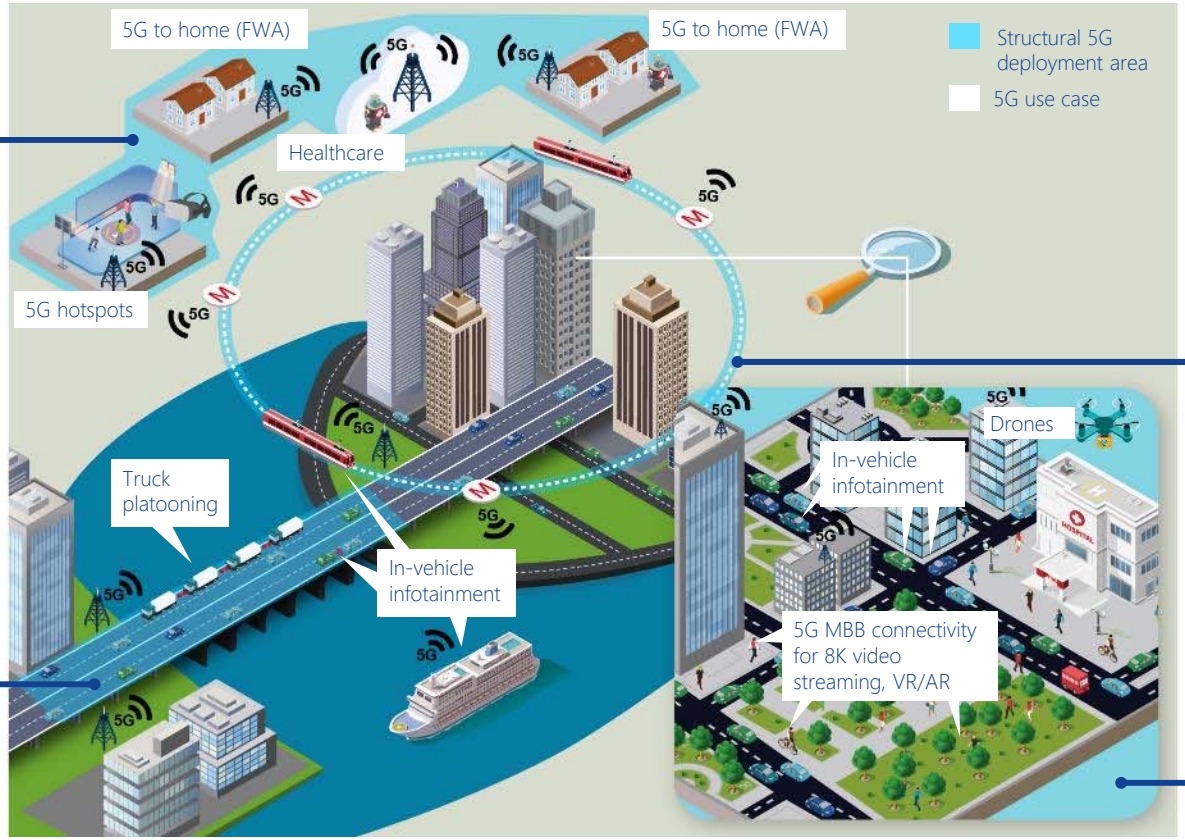
5G early market use cases in Urban Area

Separate use cases, e.g., 5G hotspots, 5G to home, healthcare

Highway use cases, e.g., in-vehicle infotainment, truck platooning



Public transport use cases, e.g., train & boat infotainment

Dense city area use cases, e.g., Mobile broadband; in-vehicle infotainment; 5G hotspots

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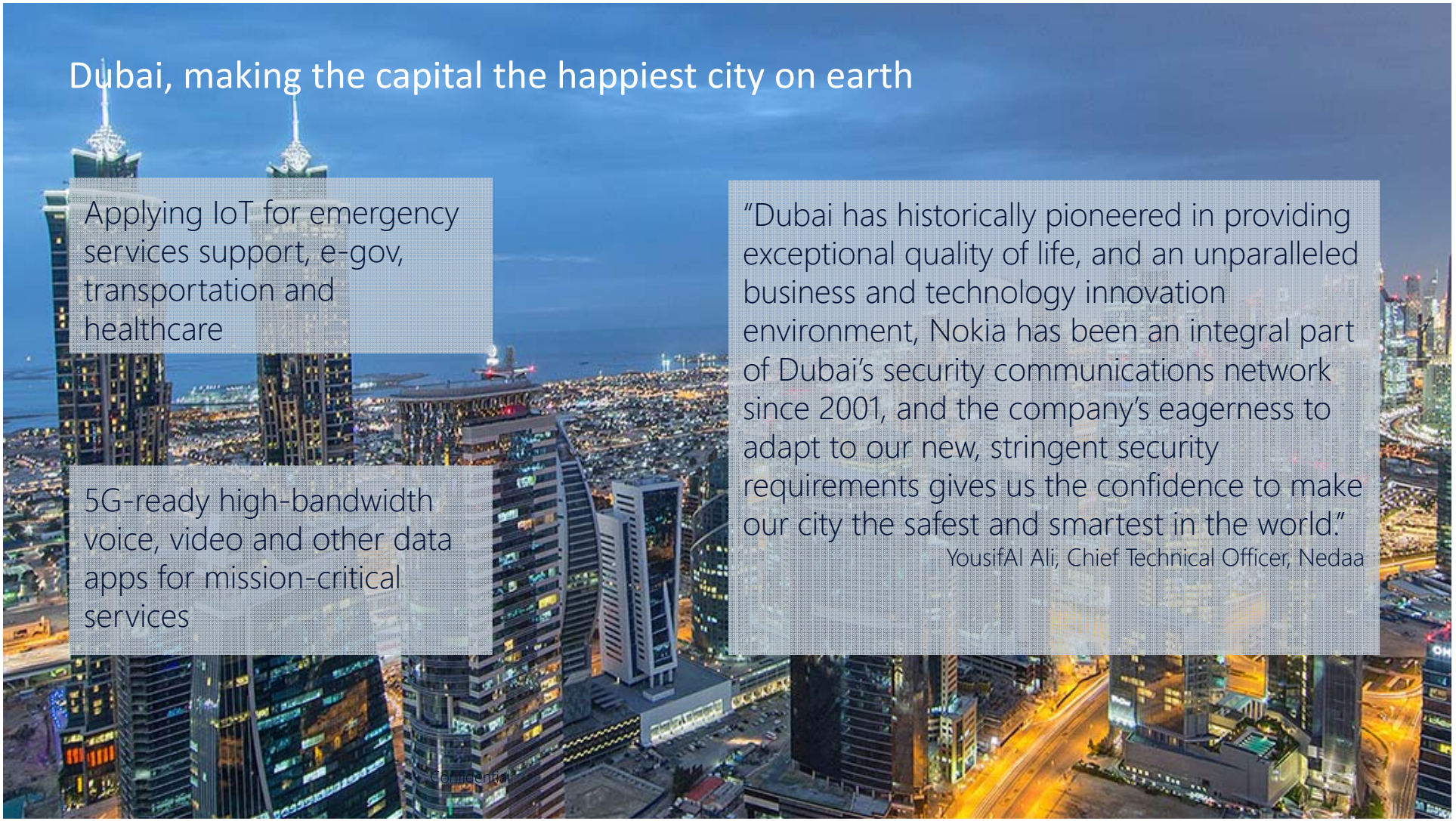
Dubai, making the capital the happiest city on earth



Applying IoT for emergency services support, e-gov, transportation and healthcare

5G-ready high-bandwidth voice, video and other data apps for mission-critical services

"Dubai has historically pioneered in providing exceptional quality of life, and an unparalleled business and technology innovation environment, Nokia has been an integral part of Dubai's security communications network since 2001, and the company's eagerness to adapt to our new, stringent security requirements gives us the confidence to make our city the safest and smartest in the world."

YousifAl Ali, Chief Technical Officer, Nedaa

KEY POINTS

Smart City projects are very complex and require expertise in many different fields to succeed: funds, urban planning, architects, transport, energy, telecoms… They also require cooperation between public and private sector in order to embrace all the dimensions: financing, public interest and technologies

The implementation of the necessary layers related to ICT services (for example, communication infrastructure, IT and applications layers) is usually determined by drivers behind the project and those who initiate it.

Along with the many stakeholders involved in a Smart City development, each project is also motivated by a variety of drivers:

- Construct or invent a new economic model (the economic driver)
- Reduce energy consumption (the eco-sustainability driver)
- Improve the quality of life in a city environment (the social driver)

Smart Cities present a viable business opportunity to the ecosystem — for instance, utilities, real estate companies and public sector — active in today's projects. a variety of business models and approaches to provide, supply, operate and manage the Smart City services can be developed.

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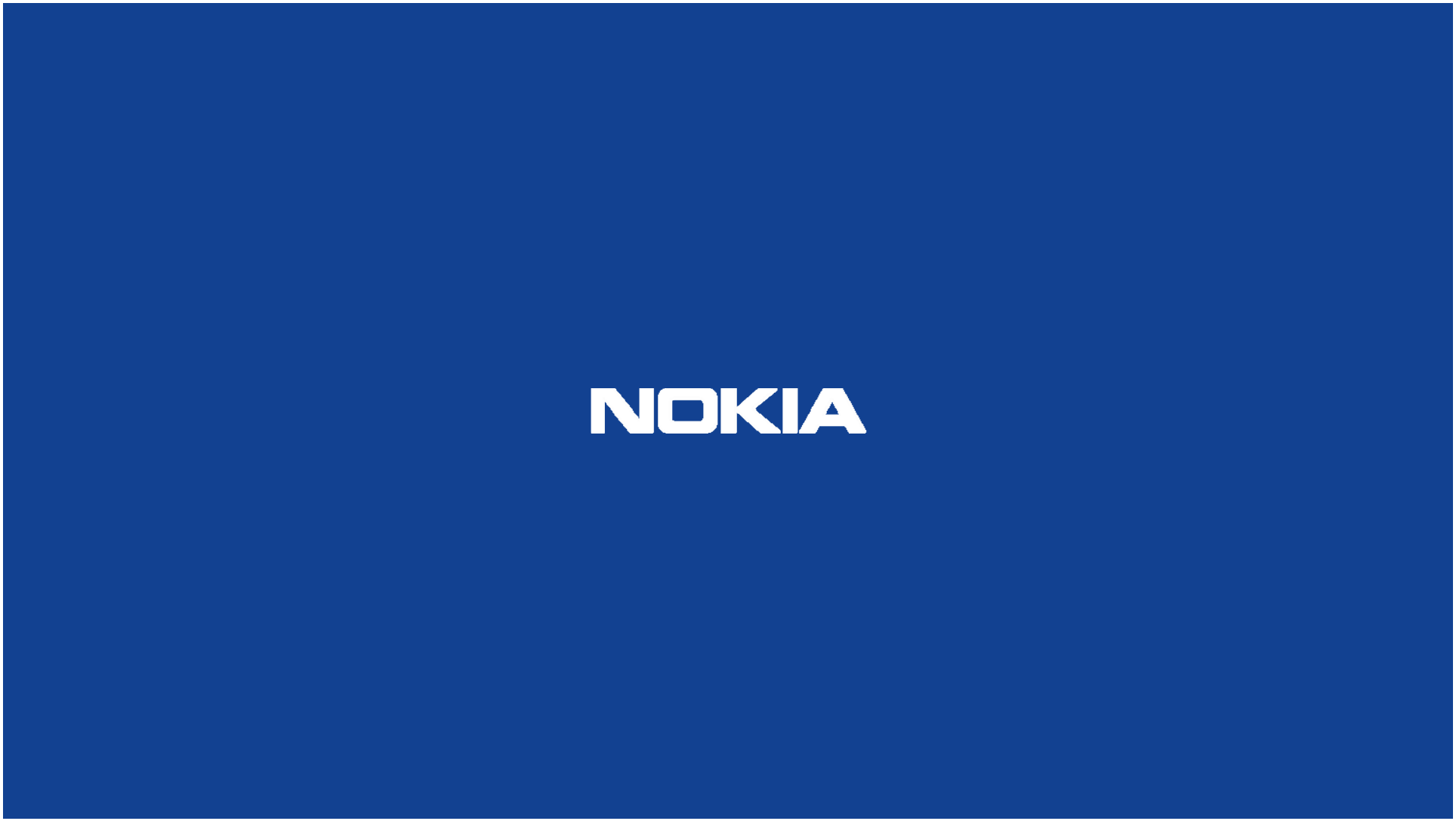
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