



Digital Operations Center

NOKIA

Digital Operations Center enables a new slice-based innovation ecosystem and new revenue opportunities by offering digital services to new industries.

\$4.3 trillion

KPMG estimates that 5G will permit operators to address a revenue opportunity of up to 4.3 trillion dollars.

“For CSPs that need to bring differentiated services to market in an agile, cost-effective way, Nokia provides Digital Operations Center that provides an automated platform to manage the lifecycle of 5G slice-based services. This enables CSPs to be agile and responsive to market demands while controlling their costs through automation. Nokia has been selected by Singtel to position NaaS services to industries.”

The possibilities of consumer value creation have been mostly exhausted. Where will the incremental revenue come from?

While we have almost exhausted the possibilities of consumer value creation, there is a huge and largely untapped business-to-business opportunity in the industry market.

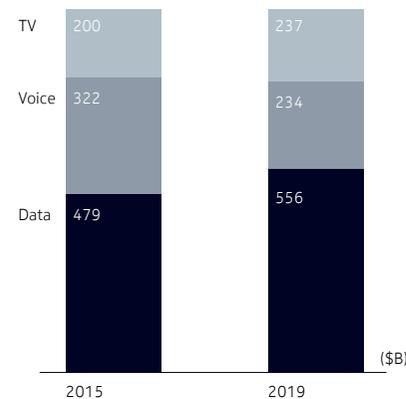
An analysis by Gartner shows that revenues in the consumer space have been mostly flatlining in the recent years. There might be variation in the mix of services that comprise the consumer revenues but overall, the average revenue per user (ARPU) has not increased much.

At the same time, forecasts from McKinsey, about the revenue potential for industrial Internet of Things and vertical markets show a huge opportunity. These vertical

markets include manufacturing, enterprise campuses, smart cities, transportation, logistics and health-care. The numbers here are staggering – even the conservative estimate is more than 3 trillion dollars – and the best-case forecast is almost 9 trillion.

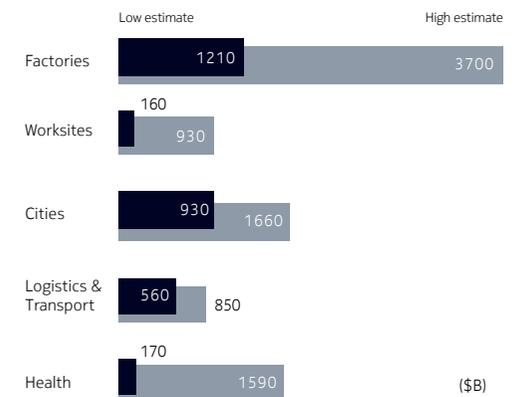
Connectivity is the core business of CSPs and a natural entry point to these markets. But there is also a chance to climb up the value chain – for example through the provision of edge computing, analytics and the creation and hosting of new services or applications for industrial markets. An opportunity that is estimated by KPMG to reach up to 4.3 trillion dollars.

Traditional consumer growth is limited



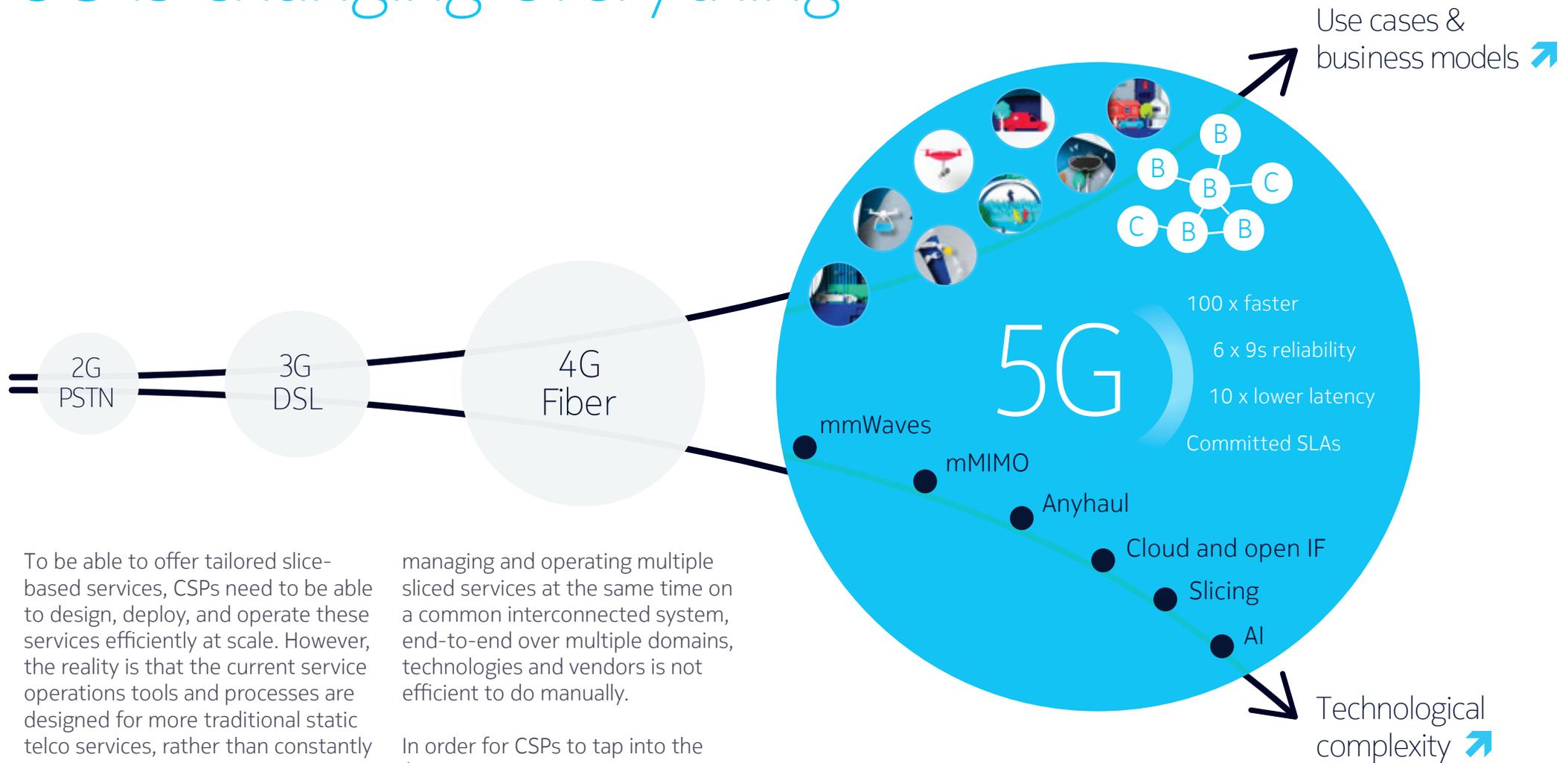
* Western Europe, Canada, USA, Japan, South Korea, Singapore, Australia, and New Zealand. Source: Gartner

Vertical market forecast (\$B, 2025)



Estimated 2025 value creation potential of the IoT
Source: McKinsey

5G is changing everything



To be able to offer tailored slice-based services, CSPs need to be able to design, deploy, and operate these services efficiently at scale. However, the reality is that the current service operations tools and processes are designed for more traditional static telco services, rather than constantly changing tailored sliced services.

To support the sliced services, networks themselves also need to evolve. As the networks become more dynamic and complex,

managing and operating multiple sliced services at the same time on a common interconnected system, end-to-end over multiple domains, technologies and vendors is not efficient to do manually.

In order for CSPs to tap into the \$4.3 trillion opportunity, their operations need to evolve to support managing sliced services on top of complex network, cost-efficiently at scale.

An aerial photograph of a city skyline during the golden hour of sunset. The sky is a deep orange, and the buildings are silhouetted against the light. The central focus is a tall, modern skyscraper with a distinctive arched top section. To its right, a cluster of older, multi-story brick buildings is visible. In the foreground, a modern building with a flat roof and large glass windows is prominent. The overall scene conveys a sense of urban density and modern infrastructure.

Nokia Digital Operations Center

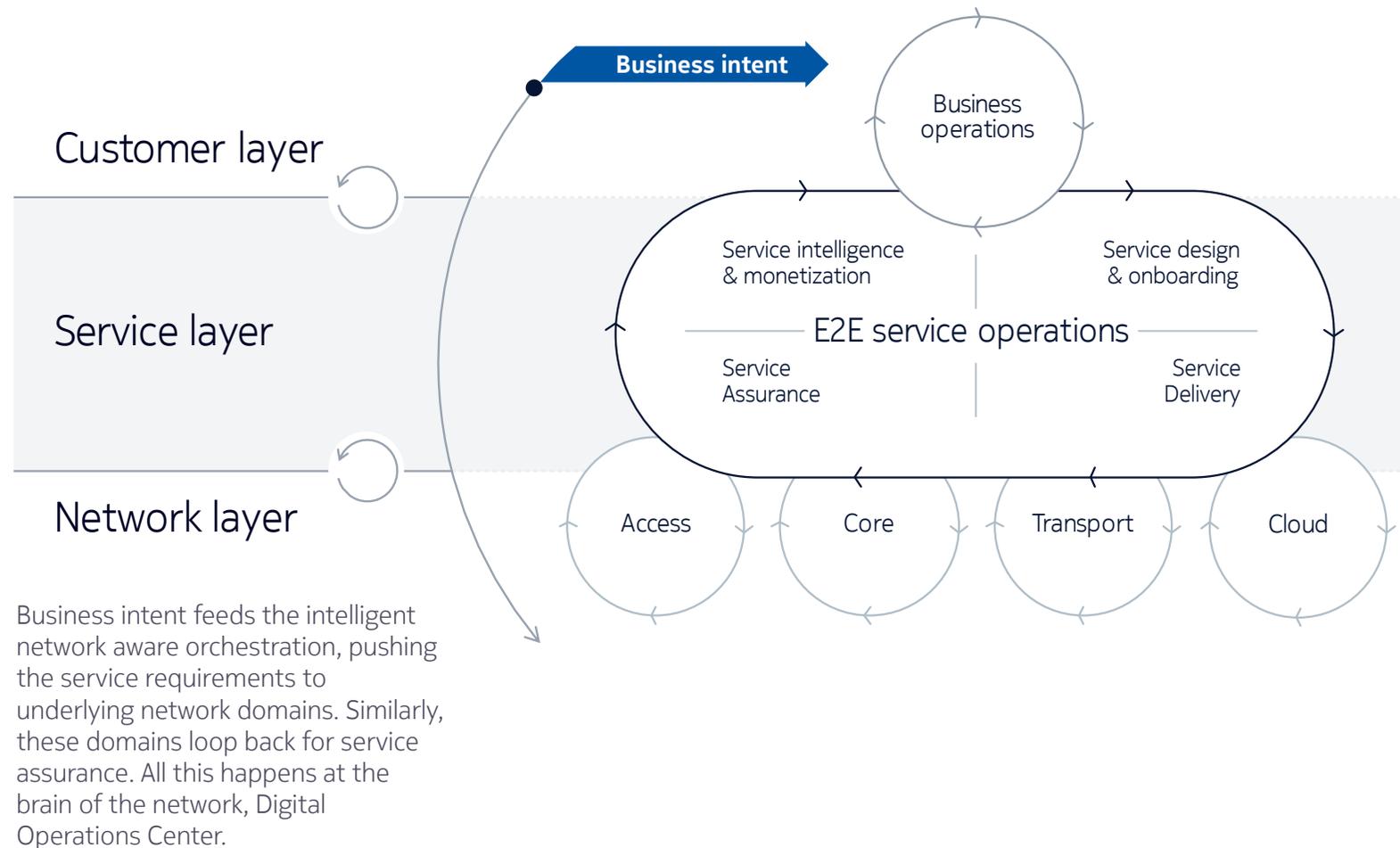
How to operate market-driven slice-based services cost-efficiently at scale

...in an environment where complexity of the business environment as well as the complexity of the networks themselves is growing.

Simplification from technology to business focus is required and we need to start automating based on business intent.

Yesterday's siloed and technology focused tools and processes cannot operate the dynamic network and services of the future.

An evolved digital operations model, where assurance and fulfillment have come together to a single unified platform forming common closed-loop automated process, solves the challenges with slice-based services operations at scale.

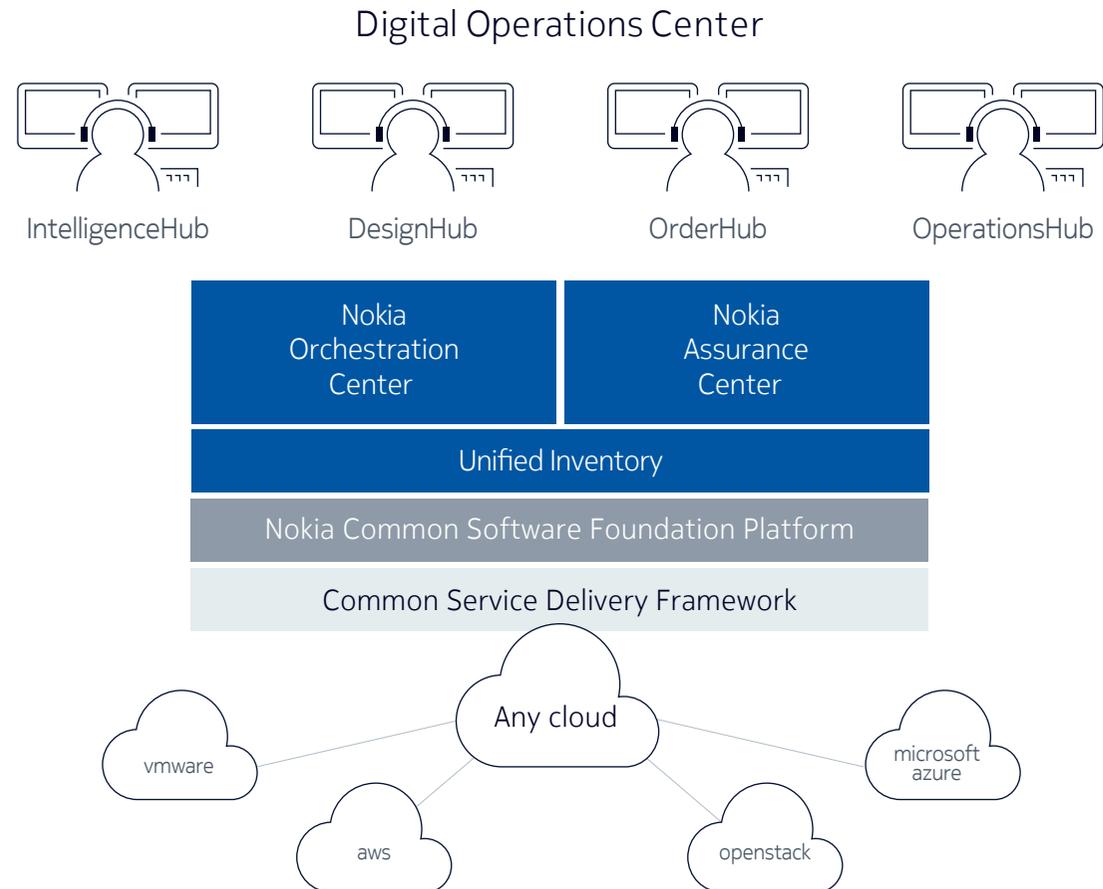


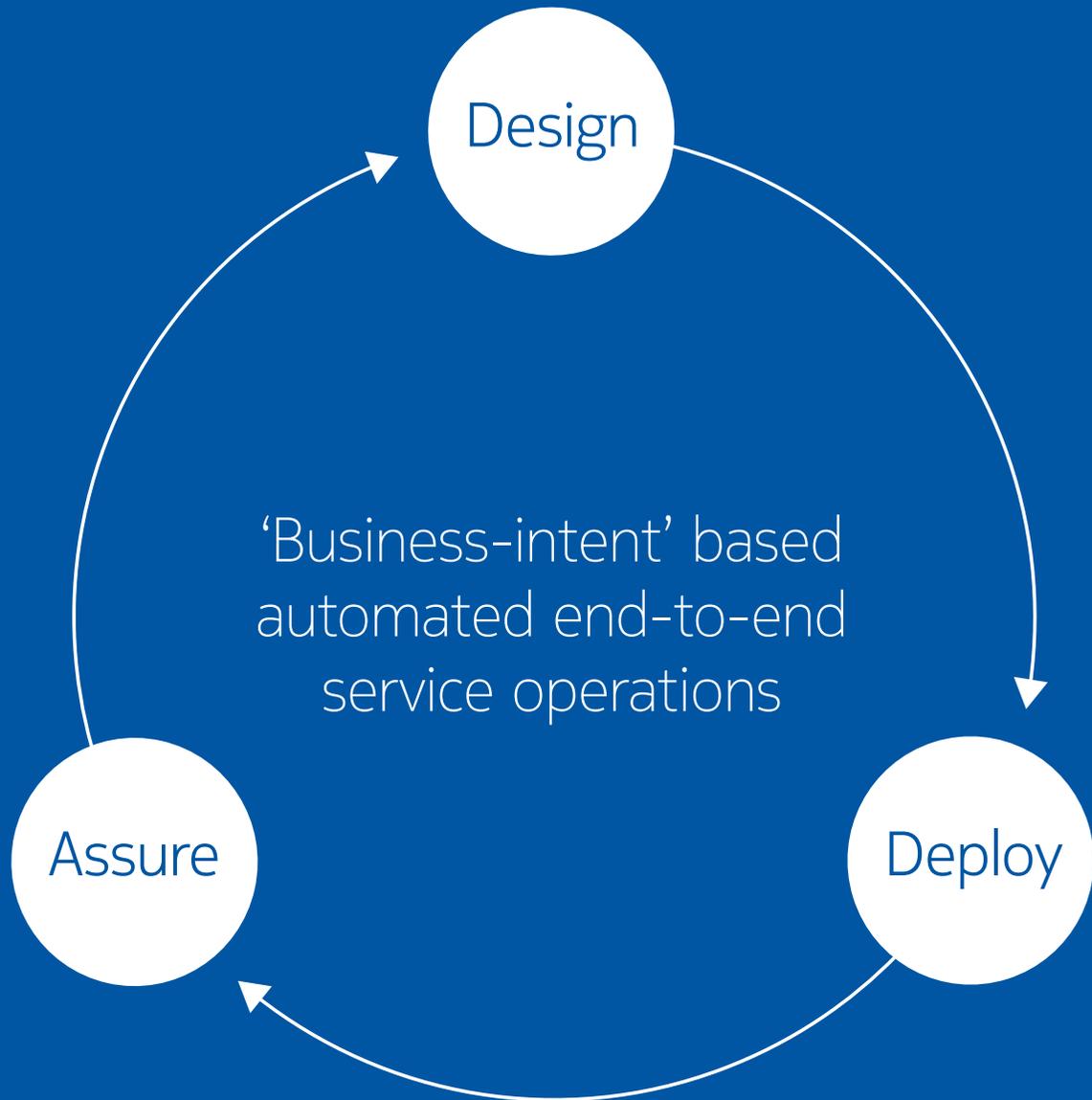
Nokia Digital Operations Center

Digital Operations Center provides a round-trip, closed-loop and fully automated process to design, deploy and operate network slices at scale across multi-vendor, multi-domain and multi-technology environments.

Digital Operations Center is built in a modular form that includes the Nokia Orchestration Center and the Nokia Assurance Center. Combined, the new solution gives CSPs the ability to deliver and oversee network slices at scale and speed through close-loop automation helping CSPs adhere to Service Level Agreements (SLAs) as they expand into vertical industries.

By closing the loop between traditionally separate fulfillment and assurance processes, CSPs can intelligently manage the full service lifecycle to drive the most optimized use of infrastructure resources, limit over-provisioning and automate service delivery and service optimization.





- Enable multi-domain end-to-end sliced services operations at scale
- Shorten time to value for new digital services
- Hide network complexity and improve efficiency with AI driven intelligent network-aware orchestration
- Control total cost of ownership with automated service operations

Tier 1 operator in APAC

Challenge

To establish a Network as a Service (NaaS) platform to deliver services to enterprises

Leveraging 5G network slicing to offer highly customizable services to enterprise vertical partners for a variety of use cases and applications.

How Nokia Helps

- The operator's NaaS platform is enabled by Nokia's digital operations and cloud management products
- The platform will automate the delivery of the customizable services that the operator will offer in their NaaS portfolio of services
- Examples of services being tested for the market trials will be specific needs for network speed, coverage areas, reliability, latency and security.

The Outcome

- Market trials will begin later this year
- The operator will be able to test market acceptance and market uptake of this capability to deliver customizable services to enterprises.

Tier 1 operator in EMEA

Challenge

Begin to introduce the benefits of network slicing on existing 4G LTE networks while building out and adding 5G capability

We need a way to support mobile UEs that may attach via 4G LTE or via new 5G radio based upon their location and mobility.

How Nokia Helps

- Successful trial of Nokia's unique capability to support UEs from either 4G or 5G serving areas
- Nokia provided E2E slicing across RAN, Transport and Core domains
- Nokia's patent-pending functionality is 3GPP and IETF compliant

The Outcome

- Network slicing based services can be introduced across 4G and 5G networks
- Business customers will see an advantage in differentiated capabilities, strong data security, high reliability and low latency.

5G VINNI

(5G Verticals INNOvation Infrastructure)

Challenge

Build an open large scale 5G end-to-end facility, with network slicing capabilities, that can:

1. Demonstrate that key 5G network KPIs can be met (capacity, reliability, Capex/Opex, speed, latency etc.)
2. Be validated, accessed and used by vertical industries to test use cases and validate 5G KPIs.

How Nokia Helps

- Provide user friendly zero-touch orchestration, operations and management systems for the 5G-VINNI facility
- Hybrid service orchestration in a multi-vendor, multi-technology environment.
- Utilizing, but not limited to, Nokia CloudBand in VNF MANO
- Next phase, to include 5G SA slicing functionality and automated network assurance.

The Outcome

"The 5G-VINNI project will explore valuable future solutions for the vertical industries. Being one of three large-scale test platforms for Europe, 5G-VINNI will help propel the development of 5G - the aim is to make it as easy as possible to utilize and test the platform and call on industry players in Europe to engage with the project."

Patrick Waldemar VP of Telenor Research

Nokia helps to improve agility, quality and save costs across the board



Customer experience

97% of potential **service impacts are known before** affecting customer

Lower OPEX of fixed line services **by 40%** over 4 years **while increasing customer satisfaction**

Reduced Fallout Rate from **20%** to less than **1%**



Resolution

90% reduction in **alarm management**

50% reduced mean time to resolve

Less human interaction leading to reduced errors and lower costs - **30%** of tickets are solved in close-loop



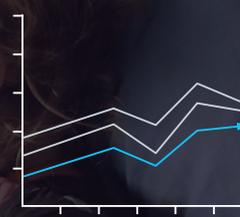
Leadtime

30% faster acceptance process due to improved test methods

Order processing from **10-15 mins to 10 seconds**

40% less time for provisioning

Service activation time from **2-3 days to 5 minutes**

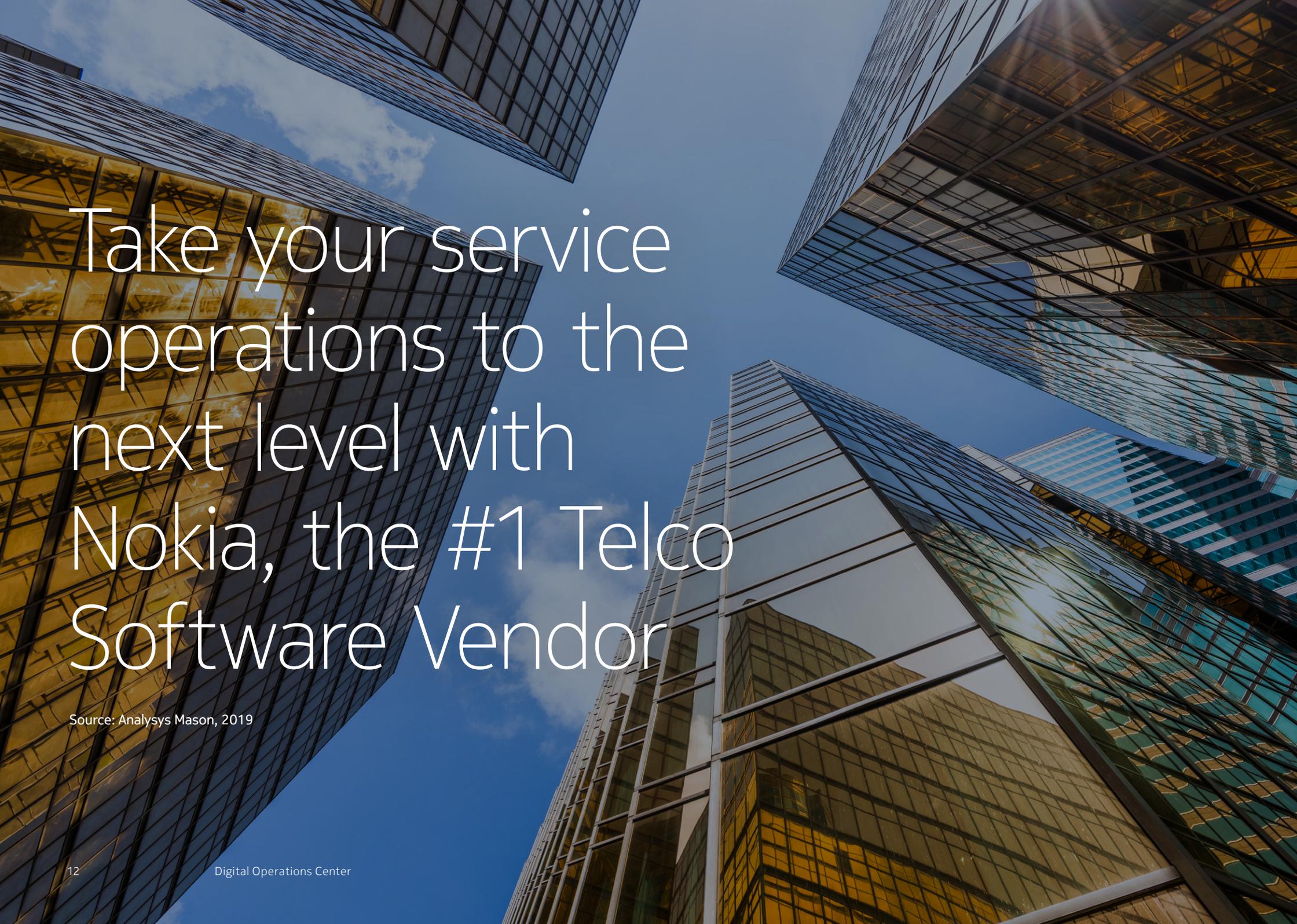


Productivity & profitability

85% reduction in improper field dispatches

40% reduction in call center, sales and operational **costs**

3x more effective **network utilization**



Take your service operations to the next level with Nokia, the #1 Telco Software Vendor

Source: Analysys Mason, 2019

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About Nokia

We create the technology to connect the world. Only Nokia offers a comprehensive portfolio of network equipment, software, services and licensing opportunities across the globe. With our commitment to innovation, driven by the award-winning Nokia Bell Labs, we are a leader in the development and deployment of 5G networks.

Our communications service provider customers support more than 6.4 billion subscriptions with our radio networks, and our enterprise customers have deployed over 1,300 industrial networks worldwide. Adhering to the highest ethical standards, we transform how people live, work and communicate. For our latest updates, please visit us online www.nokia.com and follow us on Twitter [@nokia](https://twitter.com/nokia).

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