

Cloud and Network Services Business update

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President, Cloud and Network Services

16 June 2022

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Agenda

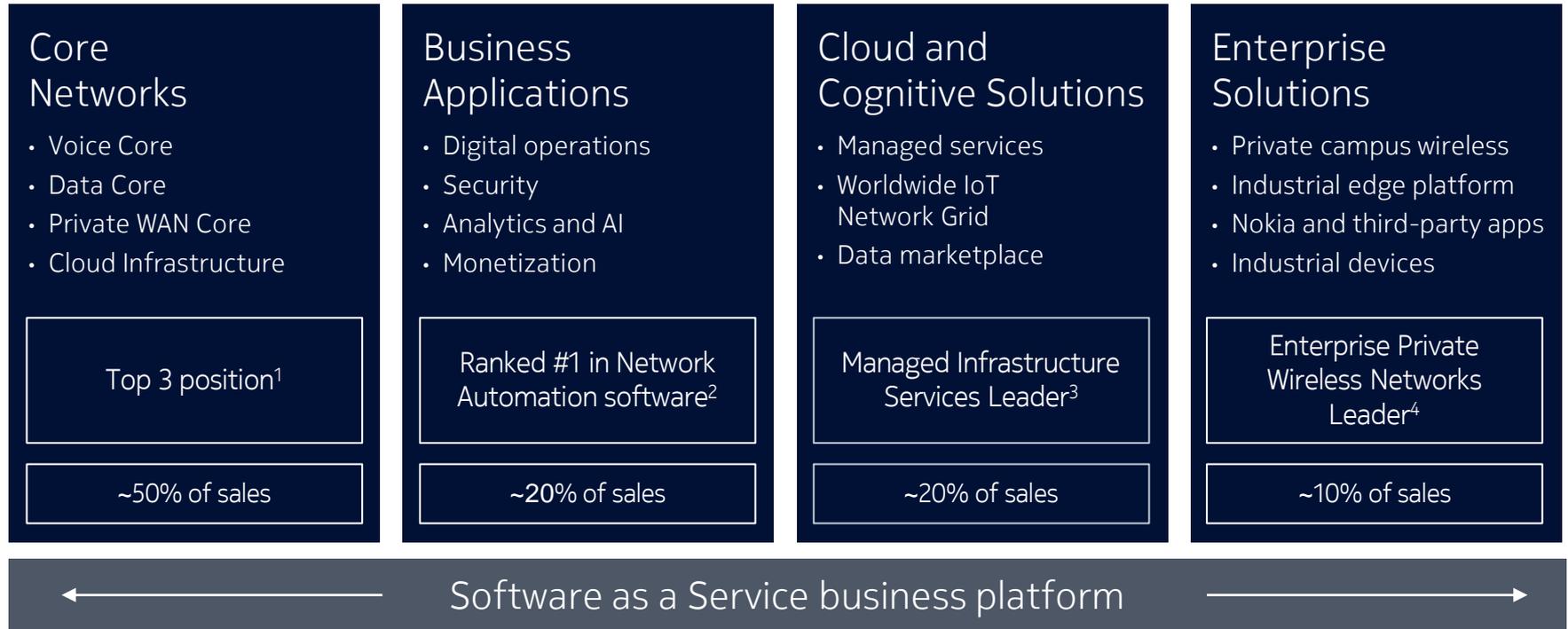
- Introducing CNS 5
- The changing landscape 9
- Accelerated value creation 15
- Customer success 25
- Closing thoughts 29
- Q&A 31

“Be open for
the future”

Introducing CNS

2021-22 business performance

Cloud and Network Services – organized for growth



Source: ¹ Nokia ² Appledore (July 2021) ³ GlobalData (March 2022) ⁴ GlobalData (June 2022)

Progress on 2021 CMD commitments

2021 focus



Grow faster than the market

✓ Gained share in all emerging growth areas

Lead in software, services and private wireless

✓ Recognition as leader in telecom software, managed infrastructure, and private wireless

Digitize and automate operations

✓ Launched SaaS platform in second half

Rebalance R&D investments

✓ Transitioned 76M EUR investment from existing portfolios to emerging portfolios¹

Reset Fixed costs

✓ +760 bps comparable operating margin improvement vs. 2020

¹ Calculated as existing portfolio savings + new emerging investments

2021 Strong performance continuing in Q1 2022

2021 performance

Net sales
vs FY 2020

+1%*

Comparable
operating margin

5.4%

2021 marketplace momentum

New 5G Core
customers
[2021 CSP+ENT]

57

New
Private wireless
customers
2021 +34% YoY

164

5G Stand Alone
Core on Public
Cloud

1st

SaaS
customer

1st

Q1 2022 results

Q1 2022
Net Sales

+5%*

Q1 2022

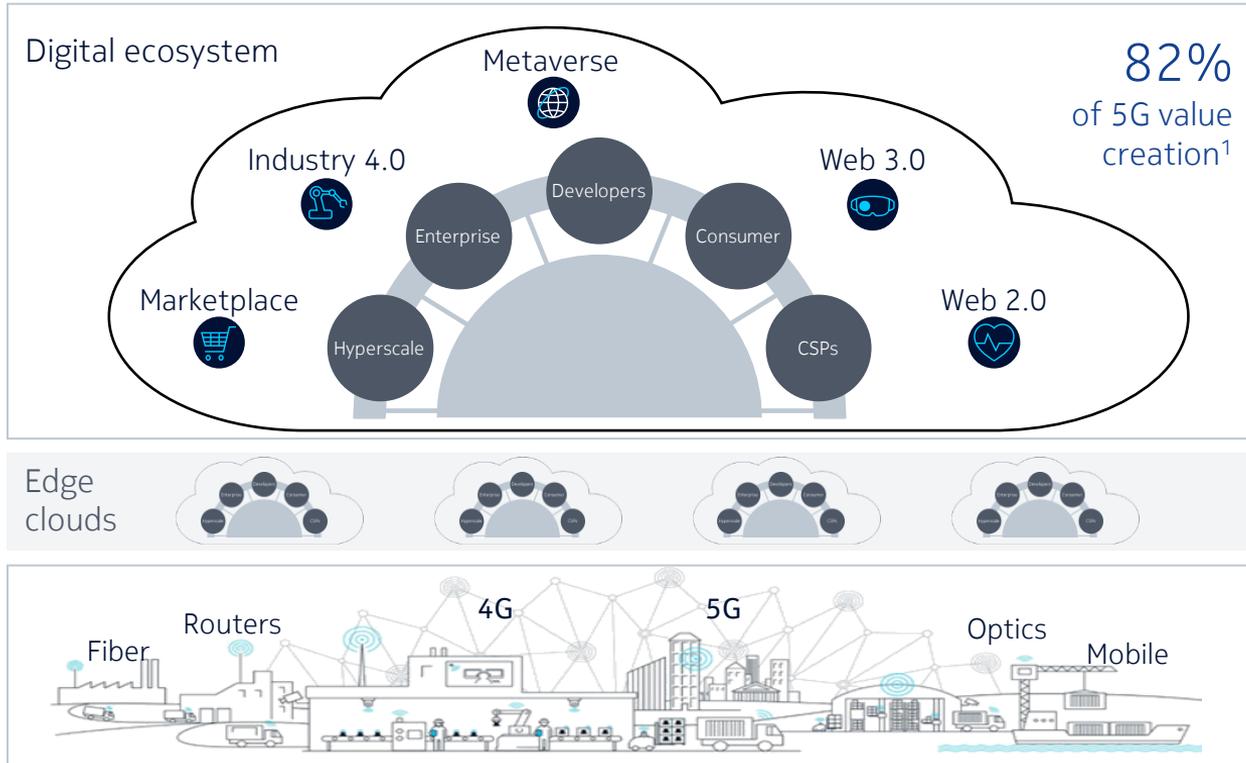
GM +38.6% +520bps

OM 2.7% +570bps

*Net sales at constant currency

The changing landscape

The emerging digital ecosystem

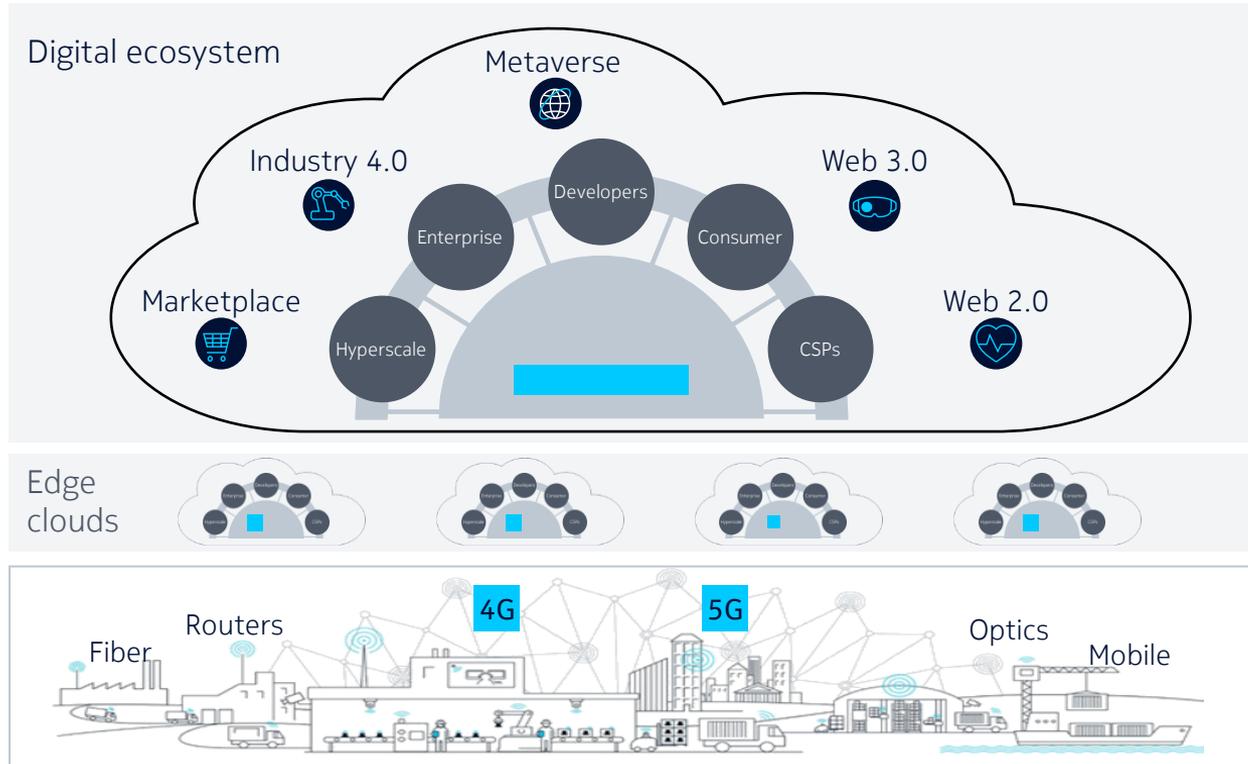


Note 1: Nokia analysis, Gartner 5G value data.

New value being created

- Service chains
- Edge clouds
- Cloud-native software
- Digital marketplaces
- Applications developer enablement
- Accelerated monetization

CNS – our role in the digital ecosystem



Note 1: A portion of the go-forward portfolio has transitioned to SaaS

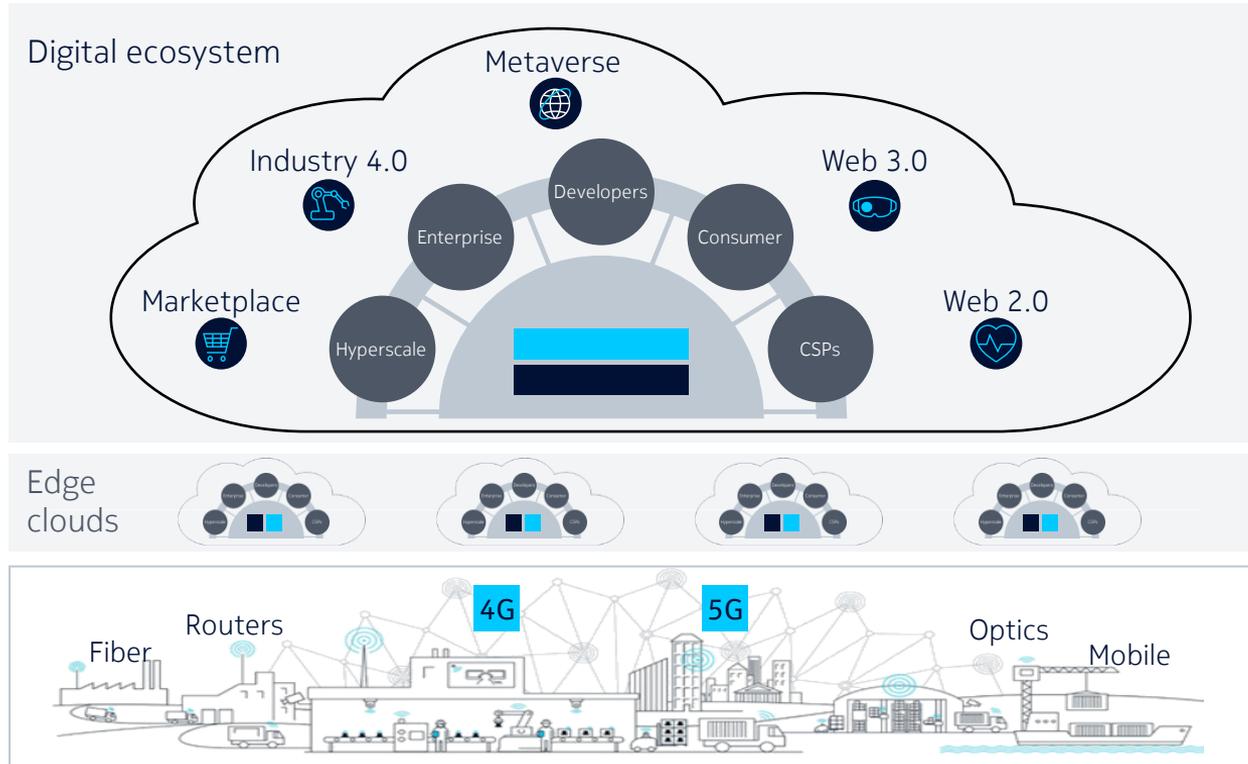
Core Networks develops cloud-native core 5G software for private, hybrid, or public clouds and is transitioning to SaaS

Business Applications uses AI/ML to automate network operations and security; available as SaaS¹

Cloud and Cognitive Services operates and optimizes networks (managed services) including network infrastructure

Enterprise Solutions delivers full edge cloud platform (I/P/SaaS) for private wireless and industrial automation

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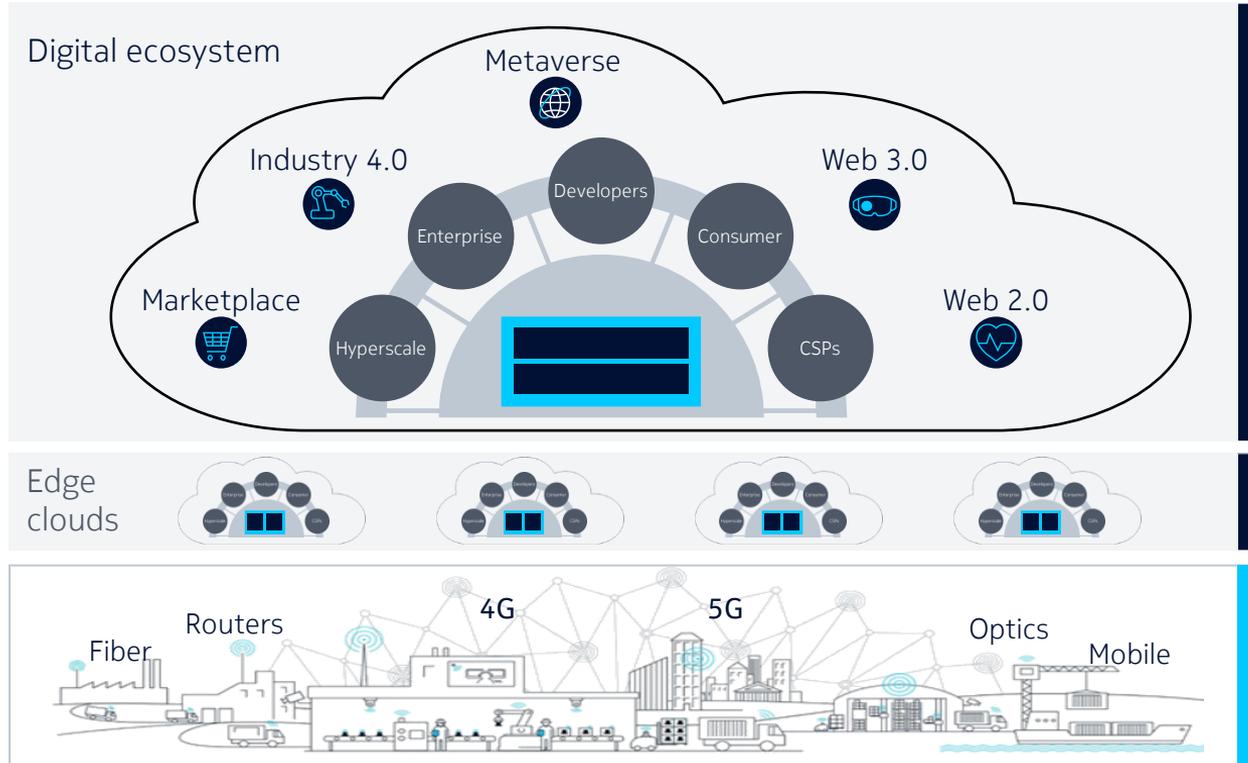
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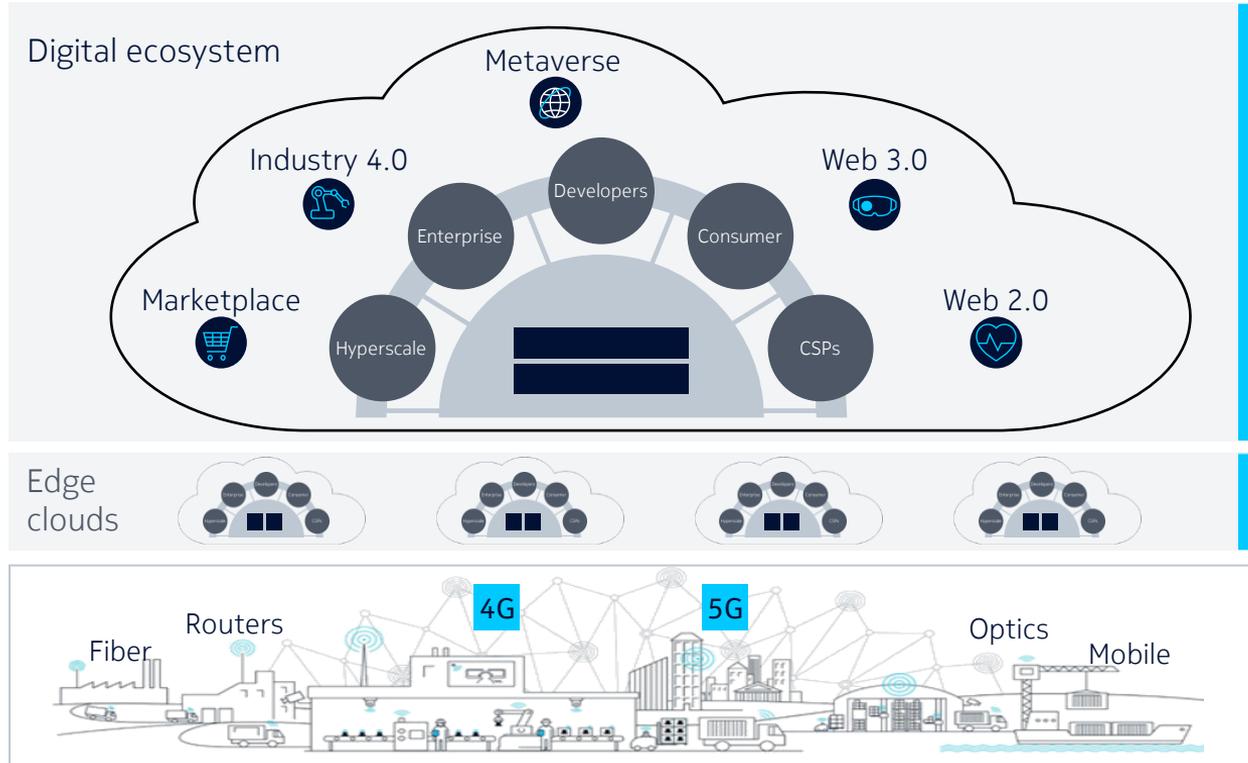
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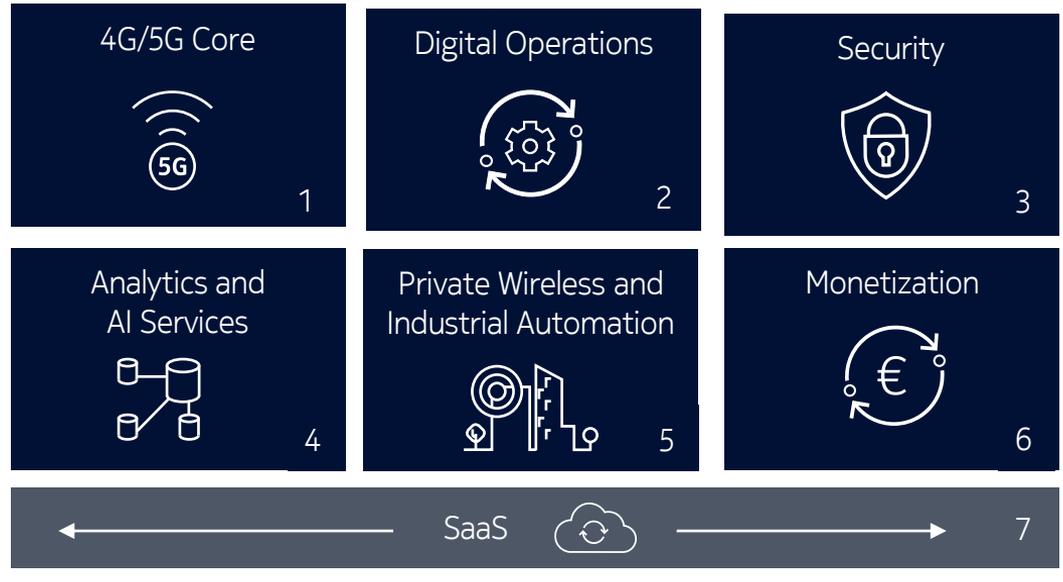
Accelerated value creation

Creating new opportunities for growth and value creation

Addressable market

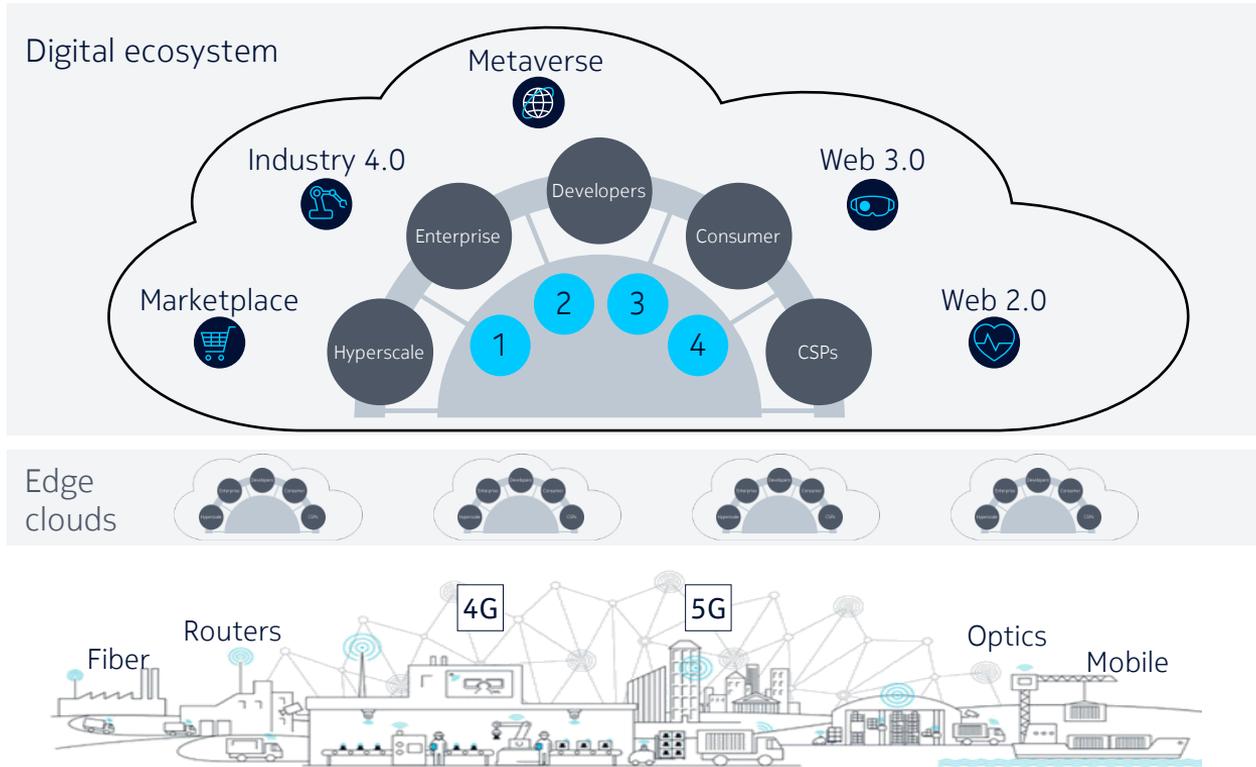


Growth market segments



*Figures constant currency

New digital economy drives continuous and disruptive change



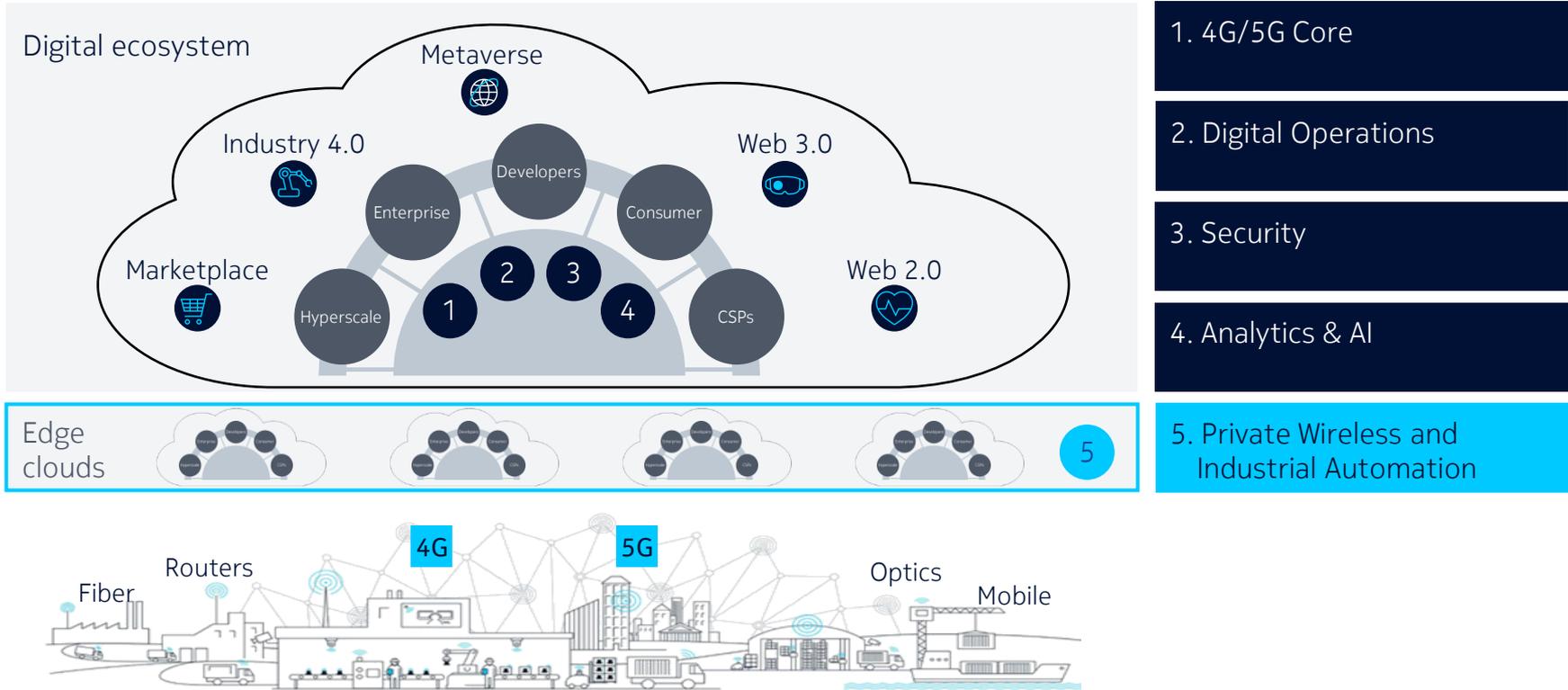
1. 4G/5G Core

2. Digital Operations

3. Security

4. Analytics & AI

Private wireless and automation at the edge drives significant value



Campus private wireless – blazing a trail and making a market

2020

Market maker

- ✓ 1st private wireless aaS, 5G SA launch
- ✓ Ecosystem development
- ✓ Asset-intensive industry take-up

2021

Recognized leader

- ✓ Mission Critical Industrial Edge (MXIE)
- ✓ Ecosystem expansion: CSP, GSI, Industrial partners
- ✓ Marketplace extension

2022

Ecosystem architect

- ✓ Portfolio expansion: MX Boost, industrial devices, Wi-Fi IT/OT
- ✓ Hyperscaler stack support
- ✓ Edge cloud take-up

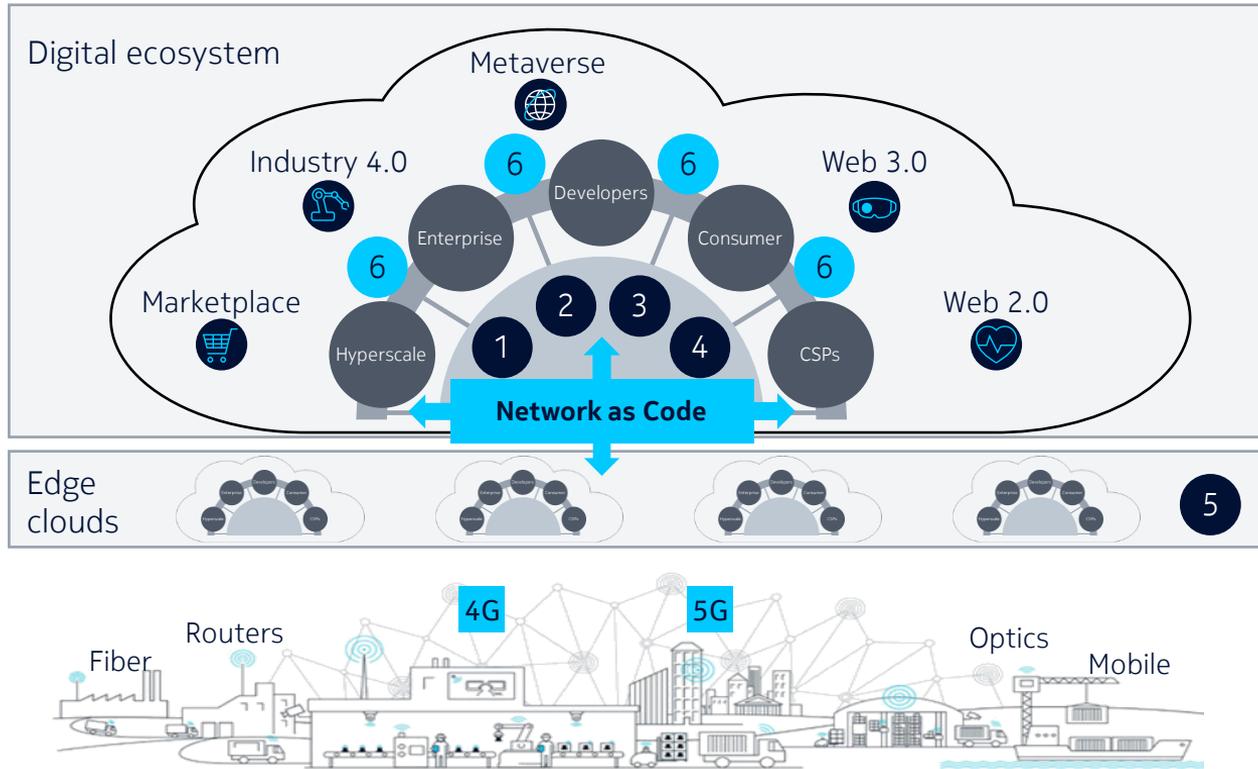


Taqtile Manifest instruction platform

- AR/MR workflow
- Real-time knowledge transfer, remote instruction to deskless workers
- Enabled on-prem with Nokia MXIE
- Improved latency data rate and responsive experience

450+ customers
150+ channel partners
Deep R&D
Industry specialisms

Enabling the digital developer to drive disruptive change



1. 4G/5G Core

2. Digital Operations

3. Security

4. Analytics & AI

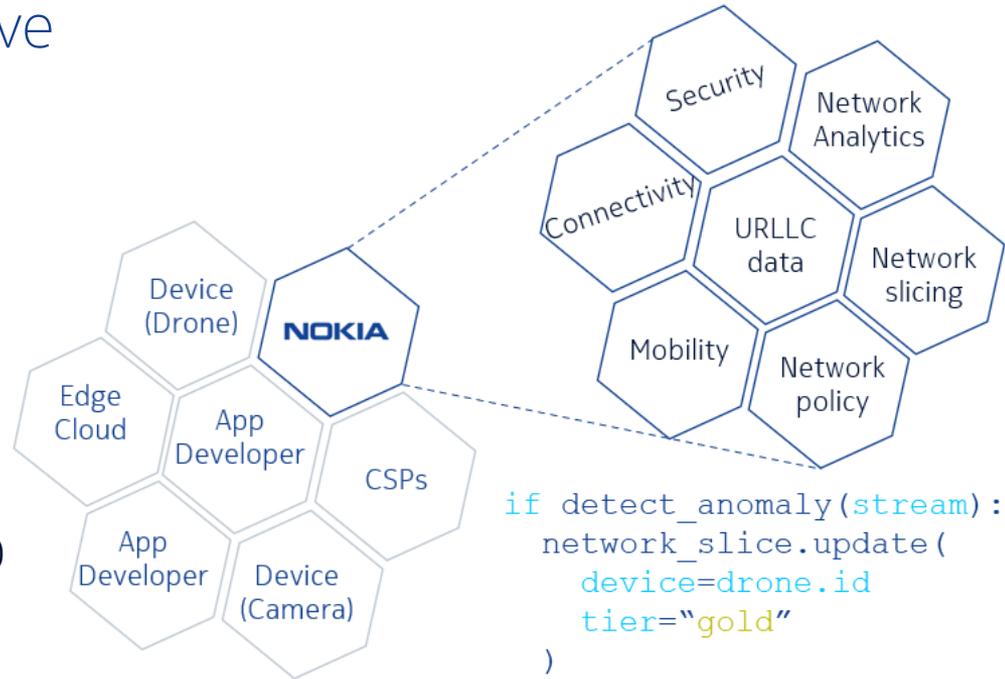
5. Private Wireless and Industrial Automation

6. Monetization

Monetization – a new imperative

Network as Code: empowering the digital developer

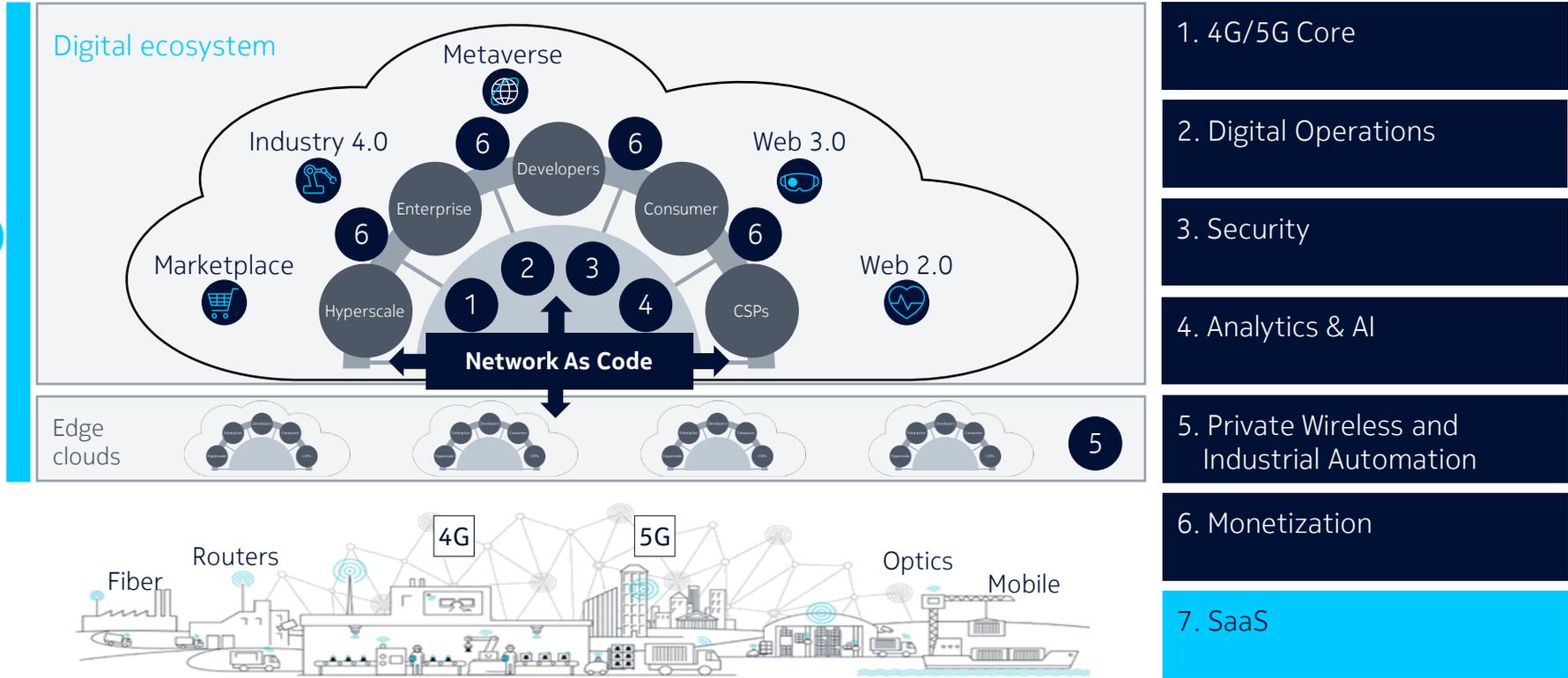
- Digital ecosystem integration
- Enabling the API economy
- Monetizing new capabilities through Network as Code
- Creating new service chains for Web 3.0



Drones use case – digital ecosystem in action

- Built on a service chain: mobile broadband network, cloud, hardware, applications software
- Deployments: visual inspection, security, public safety, transport, construction, mining, utilities
- Monetization opportunity: low latency charging, security, hosting, video analytics

Driving agility and business outcomes through SaaS disruption



Nokia's SaaS transition drives innovation

Complete



- ✓ SaaS Business and Technology platform
- ✓ Six new services across:
 - Cybersecurity
 - Analytics
 - Data Management
 - Device management for Home and SMB
- ✓ Three initial customers

2022-2023

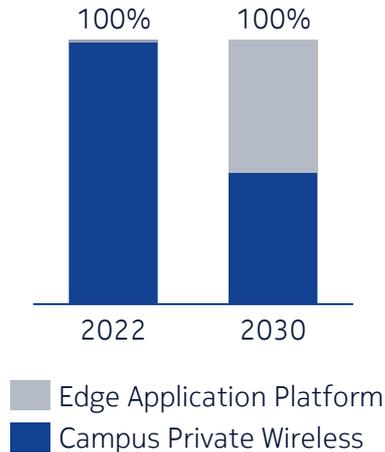
- Platform scaling
- Continued new service availability
 - Core Networks
 - Digital Operations
 - Monetization
- Customer and ARR growth



- Nokia Data Marketplace, delivered through Software-as-a-Service model, enabling a multi-party ecosystem
- Unlocks diverse person-centric use cases, applying federated AI in data management, exchange and blockchain
- Enables Equideum Health to launch new use-cases faster and achieve time-to-value quicker

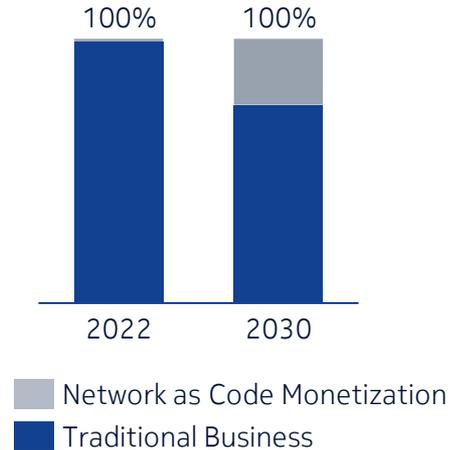
Longer term value creation

Campus edge opportunity



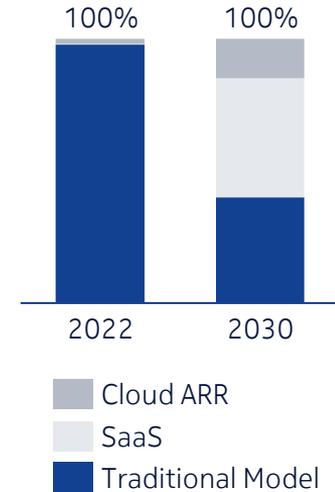
By the end of the decade about half of campus revenue will come from our edge platform (Mission Critical Industrial Edge)

New monetization opportunity



By the end of the decade about a quarter of CNS revenue will be generated through new monetization of the digital ecosystem

SaaS transition



By the end of the decade more than half of CNS revenue will be generated through as-a-service models

Note: Categories not fully mutually exclusive

Customer success

“What our
customers say”

CNS Customers



Customer value creation

First 5G Stand Alone Network deployed on Public Cloud (AWS)

- A competitive advantage over incumbent CSPs
- 5G customer experience from the start
- Significant cost realization
- Time-to-market advantage
- Service agility, cost optimization
- Dynamic on-demand network slices

“Running the Nokia 5G SA core on AWS will optimize our network operations to launch new software and services rapidly and efficiently, enabling the integration of countless innovative use cases for customers. This collaboration is an important step forward on our mission to deploy the United States’ first cloud-native, OpenRAN-based 5G network.”

Marc Rouanne,
Chief Network Officer,
DISH Wireless

dish wireless

Using AI to cut RAN energy consumption in half for KDDI

- Reduced power consumption
- Energy savings with minimum impact on the user experience
- Faster energy-saving results
- Fully multi-vendor: deployment possible in any KDDI base in Japan

“KDDI and Nokia are committed to reducing CO2 emissions utilizing technology and both companies intend to continue their efforts to research and develop solutions that reduce CO2 emissions beyond this trial.”

KDDI

KDDI

Closing thoughts

Closing thoughts

Maintaining
strong business
momentum and
trajectory

Leading across
technology,
marketplace, and
industry

Shaping the
digital ecosystem
based on Network
as Code

Making markets:
campus,
monetization,
SaaS

Moving from
reset to
accelerate

Q&A

NOKIA

Further information

4G/5G Core

4G/5G Core software



Core network software gives CSPs and enterprises the ability to delivery advanced 4G and 5G services.

It enables customers to deploy their network as software on any cloud: private, public, or hybrid.

Voice Core

Voice and multimedia network software including Voice over LTE and Wi-Fi

Cloud Packet Core

handles vast data for mobility management and connectivity to applications and internet

Subscriber Data Management

centralizes user data in a Unified Data Repository that hosts applications and ensures SDM security.

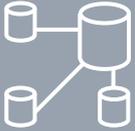
Policy and signaling

manages resources and services subscribers can use and controls signals between network functions and the core.

Paving the way to

- ✓ Cloud-native Voice Core (IMS)
- ✓ Core network SaaS
- ✓ 5G Advanced and 6G
- ✓ Network as Code for Voice Translation

Digital operations, Analytics and AI Services

<p>Digital operations</p> 	<p>Service orchestration, fulfilment and assurance</p>	<p>Digital operations center end-to-end digital service deployment, network slicing management</p>	<p>Paving the way to</p> <ul style="list-style-type: none">✓ Slice-based enterprise services✓ Zero touch network automation✓ Network as Code orchestration✓ Business intent driven operations✓ SaaS based operations
<p>Analytics & AI Services</p> 	<p>Leverage network insights for improved efficiency and performance</p>	<p>Anomaly detection detect and remediate network anomalies</p> <p>Energy efficiency data-driven AI energy solution for telcos</p>	<p>Paving the way to</p> <ul style="list-style-type: none">✓ AI Ops✓ Self healing networks✓ Sustainable networks✓ ESG reporting✓ SaaS based data exchange

Security, Monetization

<p>Security</p> 	<p>Secure the network, identity management</p>	<p>NetGuard Cybersecurity Dome detect, manage, contain, remediate threat</p> <p>iSIM Secure Connect M2M, consumer authentication, secure connectivity</p>	<p>Paving the way to</p> <ul style="list-style-type: none">✓ Dynamic threat intelligence✓ SaaS-based identity/digital trust✓ Self protected networks (AI/ML)✓ National security regulations
<p>Monetization</p> 	<p>Enable CSPs to monetize 5G investment, reduce time to deliver services</p>	<p>Converged charging combines online and off-line charging systems</p> <p>Customer engagement analytics complete view of customer satisfaction, revenue, device and network performance</p> <p>Mediation capture and processing of raw data for real-time decisions, actions</p>	<p>Paving the way to</p> <ul style="list-style-type: none">✓ Network API management✓ SaaS-based co-creation model✓ Network as Code monetization✓ New service chains for Web 3.0✓ Developer services

Private wireless and industrial automation

Private wireless and industrial automation



Nokia campus private wireless solutions enhance productivity and enable Industry 4.0 through the digitalization of industries, governments and cities.

Solutions comprise campus private wireless hardware and software, and ancillary industrial solutions leveraging private wireless.

Private wireless connectivity

Nokia Digital Automation Cloud – NDAC
Nokia Modular Private Wireless – MPW

MX Industrial Edge

edge computing solution enabling digital transformation of operational technology

MX Boost

aggregates connectivity paths at MXIE to boost throughput and ability to guarantee network performance

NDAC Wi-Fi

additional Wi-Fi capability to NDAC

Nokia industrial user equipment

NDAC-compatible wearables, video, digital twin software

Paving the way to

- ✓ Highest performance networking
- ✓ Edge application platform
- ✓ Marketplace for industrial apps
- ✓ Digital twins and threads
- ✓ Mission critical metaverse
- ✓ New disruptive business models