A new era of immersiveness between human, physical and digital worlds
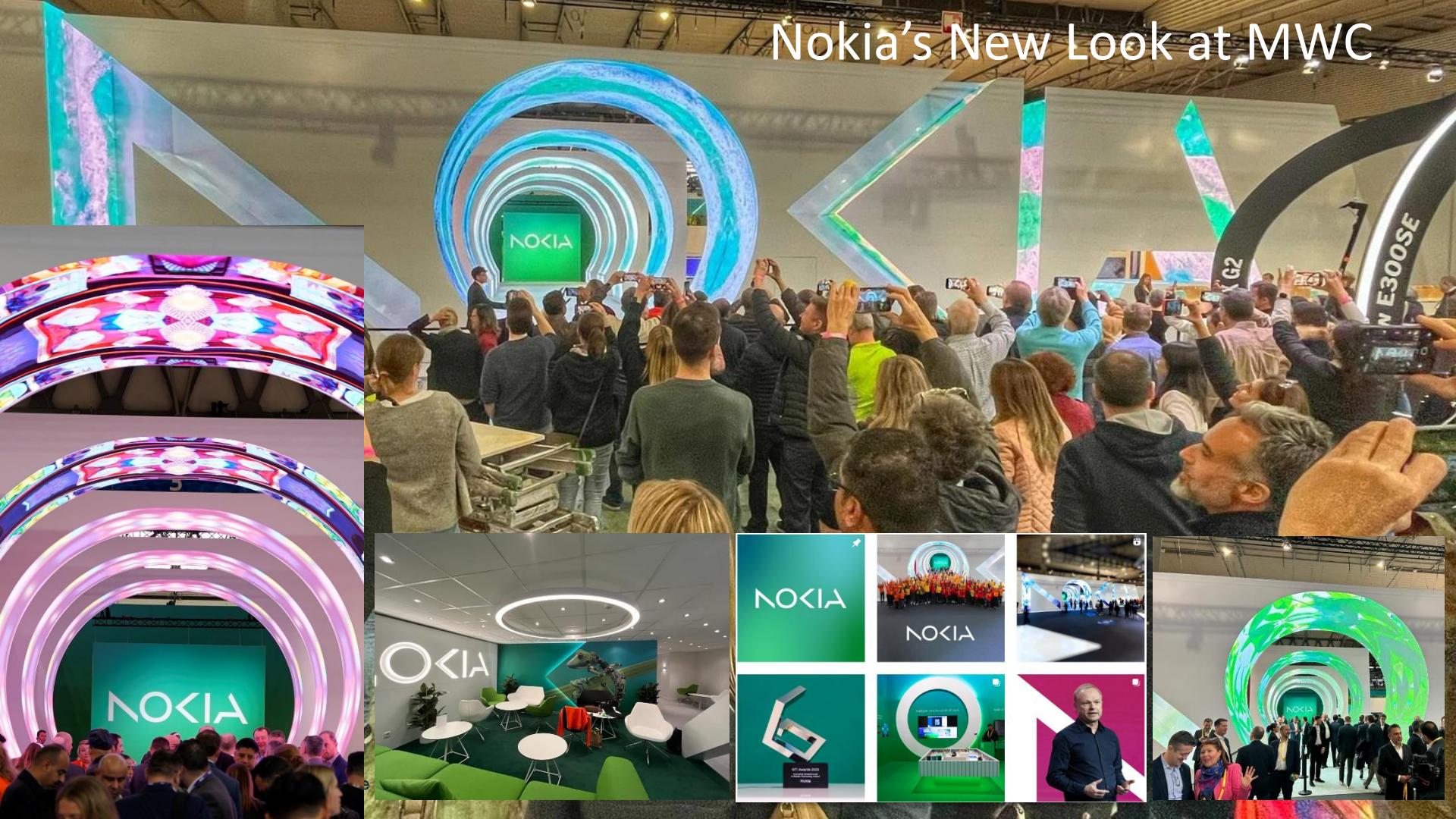
Jean-Luc Beylat, VP ecosystems Nokia,
Head of Bell Labs France
February 2023
Celtic Event , March 2023

Nokia's New Look at MWC

At Nokia, we create technology that helps the world act together

When the world's people, machines and devices are in sync with each other, we can realize the full potential of digital:

- Sustainable business growth
- Productivity in industry
- Inclusive digital access

NOKIA

Who we are today

A B2B technology innovation leader, realizing the potential of digital in every industry

Our brand promises

Future-ready performance

Impact at scale

Collaborative advantage

NOKIA

Creating new opportunity with customers

Service providers

Going beyond telecommunications

7bn+
Subscriptions supported by our mobile networks

500m+
Fixed broadband lines and ports shipped

Enterprise and government

Accelerating digital transformation

2.2k
Mission-critical customers

560+
Private wireless customers

Webscalers

Delivering the next generation of cloud

135%
YoY growth of our webscaler business

7
Partnerships and engagement with 7 critical hyperscalers

Technology licensees

Adopting cutting-edge technology

20k+
Patent families

4.5k+
Patent families declared essential to 5G

NOKIA

Delivering networks that sense, think and act across our best-of-breed portfolio

Network Infrastructure

- IP networks
- Fixed networks
- Optical networks
- Submarine networks

€9.0bn
net sales 2022

Mobile Networks

- Radio access networks
- Microwave radio links
- Related network management software and services

€10.7bn
net sales 2022

Cloud & Network Services

- Business applications
- Core networks
- Cloud and cognitive services
- Enterprise campus edge

€3.4bn
net sales 2022

Nokia Technologies

- Patent licensing
- Technology licensing
- Brand licensing

€1.6bn
net sales 2022

Nokia Bell Labs

- Core research
- Solutions research

€21bn+
invested in R&D across Nokia, including Nokia Bell Labs, over the past 5 years

NOKIA

Delivering collaborative advantage:

We bring together customer and partner ecosystems to create the digital services and applications of the future

NokiaPartners

Enabling opportunities to discover, build and go-to-market together to realize the potential of digital.

Network as Code

Opening up networks for innovation and collaboration.

Interoperability standards

Driving standards that turn technology innovation into business growth.

NOKIA

Collaborative advantage
Different ways companies partner with Nokia

DISCOVER Accelerate time to innovation
BUILD Accelerate time to solution
GO TO MARKET Accelerate time to value

We have a responsibility to develop technology to address the world's challenges

Pressure on the planet is increasing

Reducing carbon emissions and the use of scarce natural resources

Productivity is stalling

Bringing digitalization to the physical industries it has not yet reached

Inclusive access to opportunity remains stubbornly unequal

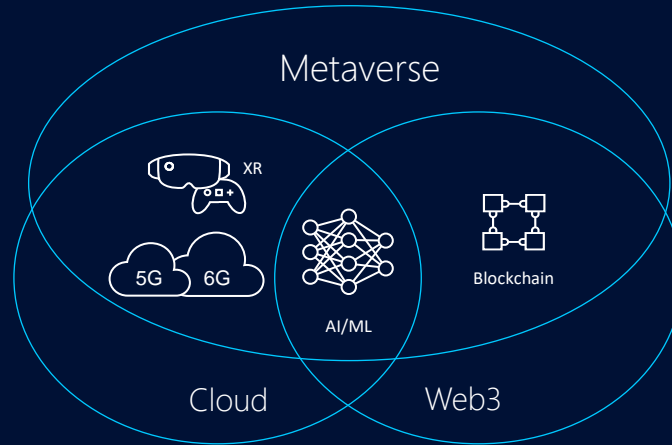Providing more inclusive access to work, healthcare and education

       Public

NOKIA

Key trends shaping the world of 2030
Driving requirements for the ecosystem and the network

Socioeconomic & geopolitical

Deglobalization	State-driven innovation
Cybersecurity	Sustainability

Technology

Metaverse

XR

5G 6G

AI/ML

Blockchain

Cloud

Web3

User needs

Industry-Enterprise-Consumer-Developer

Evolved experiences	Digital-first
Service-optimized connectivity	New purchasing priorities

           Public

NOKIA

We have a clear and definitive vision of the metaverse opportunities

Concepts of 'Human Augmentation' and 'Digital-Physical Fusion' frame this vision

Metaverse enablers

Human Augmentation

Digital-Physical Fusion

~ today

Handhelds
VR HMDs
Tethered AR glasses
Haptic-enabled remote control

Basic, organization-level digital twins
Smart sensor networks
Persistent virtual worlds & objects

Connected bio-medical implants Industrial exoskeletons
Ergonomic, untethered XR glasses
XR interoperability

Complex, enterprise-wide digital twins
Ecosystem interoperability
Interactive 3D digital twins
6G network sensing

~ 2030

**Nokia well ahead of the current 'meta-hype':
based on Nokia Bell Labs research over 5+ years**

Metaverse opportunities

Consumer Metaverse

Enterprise Metaverse
(IT-centric)

Industrial Metaverse
(OT-centric)

Public

NOKIA

Customer and service requirements for metaverse

… will be different than today's

Evolving customer requirements

Radar chart axes: Consumability, Flexible / Scalable, Intelligent and self-optimizing, Security, Time to Market

Legend:
- Government
- IT: enterprise
- OT: industry 4.0
- CSP, neutral host, wholesale access, cloud provider

….creating new service needs

Radar chart with axes: User-experienced rate (Mbps), Volumetric video, Immersive (AR/VR), Network energy efficiency, Localization (cm), Digital Twins, Remote collaboration, Latency (ms), Connection density (dev/km2), Bio Sensors, Reliability, Computer vision, Peak data rate (Gbps)

Scale values: 1000, 100, 10, 1000s, 10^{-5}, 10^{-7}, 10^6, 10^7, 10, 1

5G 6G

                 Public

NOKIA
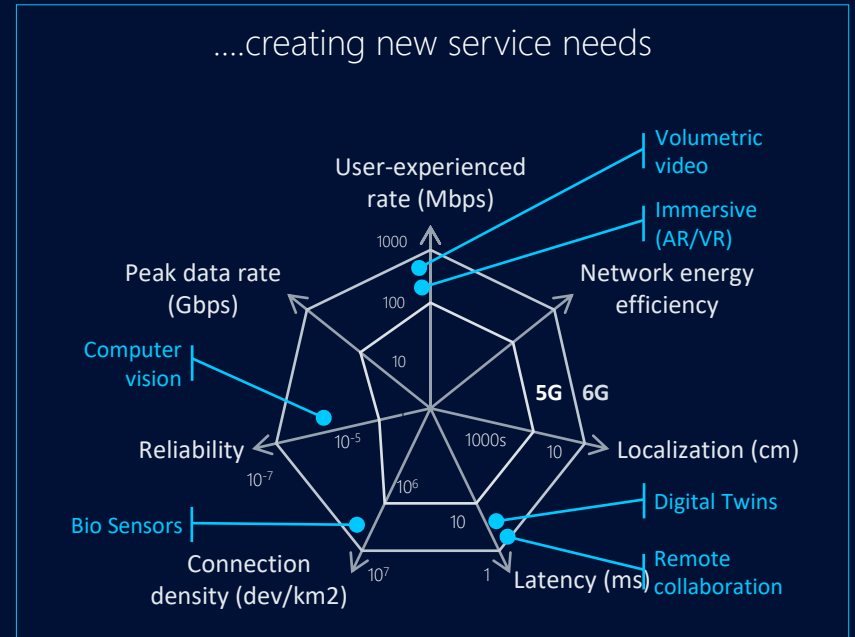
The network will be key to realizing those opportunities

… requiring transformed capabilities and versatile integrations

New network capabilities

Intent-based autonomy

Enhanced symmetrical capacity

Ubiquity & accessibility

Security & privacy focus

Sustainability & efficiency

Industry-specific optimization

Distributed, flexible service instantiation

Performance, resiliency & agility

Sensing, positioning and context

NOKIA
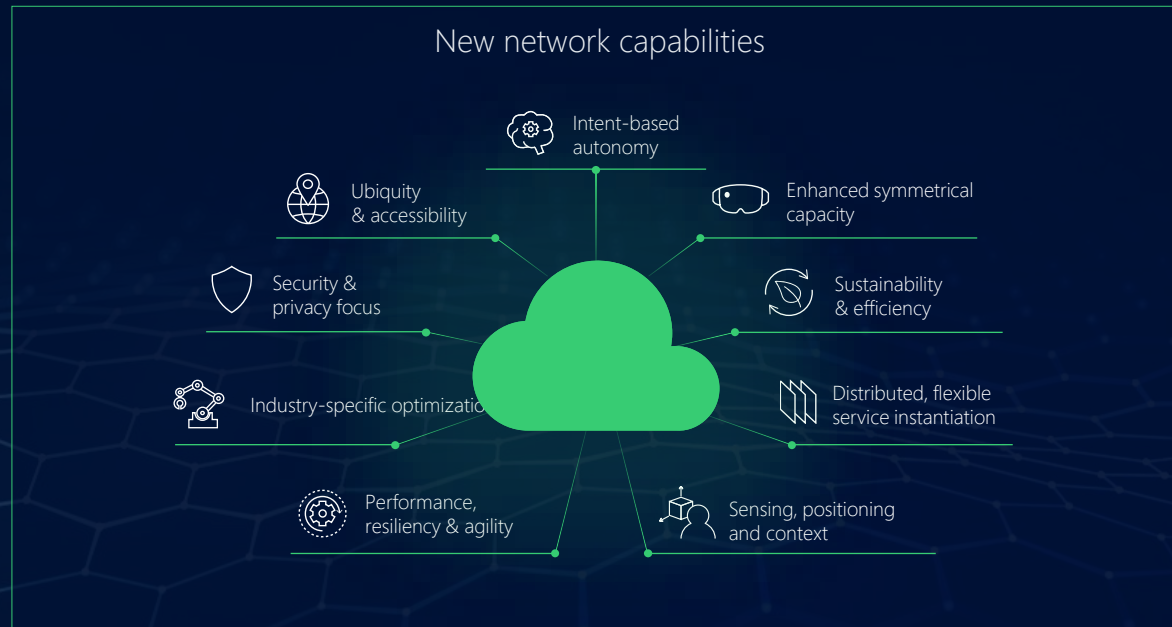
The technology we lead in:
Networks that sense, think and act

Making high performance connectivity more consumable and sustainable

A transformation in how networks are deployed

Opening up networks for innovation and collaboration, securely

A transformation in how networks are applied

NOKIA