WELCOME

Laurent Leboucher	Orange
Anita Döhler	NGMN
Andrea Calvi	TIM
Bernard Bureau	TELUS
Saima Ansari	Deutsche Telekom
Eric Hardouin	Orange
Yuhong Huang	China Mobile

WE MAKE BETTER CONNECTIONS

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AGENDA

Welcome

Recap & Forecast

Q&A

Mission and Strategy

NGMN'S STRENGTHS

Operator-driven global alliance
with focus on requirements level

Global alliance
reflecting the entire value chain

Strategic Focus Topics **addressing** the **industry's main opportunities and challenges**

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Global Alliance

MEMBERS

1&1 · BT · 中国移动 China Mobile · 中華電信 Chunghwa Telecom · T · kpn · LIBERTY GLOBAL · MTN · orange

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CONTRIBUTORS

1FINITY · accenture · ANDREW an Amphenol company · Anritsu envision:ensure · Apple · 中信科移动 CICT Mobile · CISCO · Comba

DELL Technologies · ERICSSON · GALTRONICS CANADA · HUAWEI · interdigital · KEYSIGHT TECHNOLOGIES · LG Electronics

MAVENIR · ngvoice · NOKIA · NTT DATA · PROSE Connect the Everyday · vmware by Broadcom · ZTE

ADVISORS

ASTRI · EURECOM Sophia Antipolis · Fraunhofer · 工業技術研究院 Industrial Technology Research Institute · 財團法人資訊工業策進會 INSTITUTE FOR INFORMATION INDUSTRY · APL JOHNS HOPKINS APPLIED PHYSICS LABORATORY · KING'S College LONDON

Peking University · Technische Universität Braunschweig · TECHNISCHE UNIVERSITÄT DRESDEN · TNO innovation for life

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Strategic Focus Topics

ROUTE TO
DISAGGREGATION

GREEN FUTURE
NETWORKS

6G

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CHAIRMAN'S VISION

CHAIRMAN'S VISION-DRIVERS

A challenging moment for our industry: technology disruptions, operating model changes and geopolitical tensions

- Trust in the networks as a compass: resilience, security, and sustainability
- Need for interoperable networks and economies of scale, via worldwide standards

AI is coming with significant expectations, questions, big changes and business opportunity

- New AI services and devices: which impact on the traffic?
- Networks for AI: new service requirements and new opportunities to enable
- AI for networks: a clear source of efficiency for MNOs, to be harnessed

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CHAIRMAN'S VISION- WHAT IS REQUIRED?

Essential technical network transformations require the voice of leading operators

- AI everywhere

- Energy efficiency and CO_2 emissions reduction

- Move to cloud native

- 6G standardisation

Our industry needs to adapt to leverage the speed of software, cloud and AI innovation

- Value for end customers and operators to remain the focus: enable a demand-centric approach

- How to do it needs to be thought as an ecosystem, in close links with other organisations like GSMA and SDOs

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CHAIRMAN'S VISION- WHAT IS REQUIRED?

Addressing industry challenges

- Prevent ecosystem fragmentation through cooperation
- Provide clear requirements to drive global standards

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FRAMEWORK FOR NETWORK SIMPLIFICATION

ROUTE TO DISAGGREGATION
CLOUD NATIVE SOLUTIONS - AGENTIC AI-BASED OPERATING MODELS

GREEN FUTURE NETWORKS

6G / 6G & AI
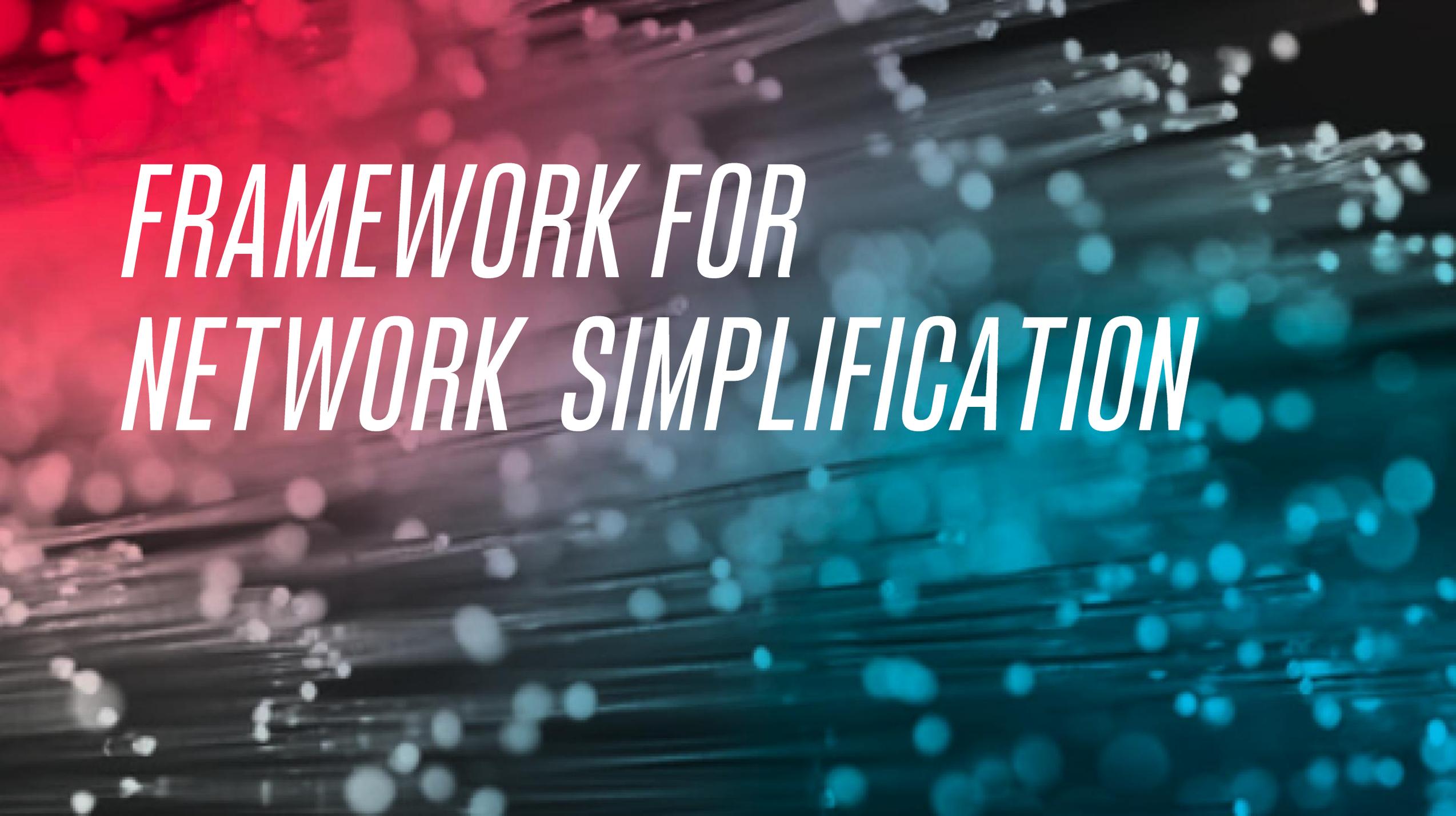
FRAMEWORK FOR NETWORK SIMPLIFICATION

Framework for Network Simplification

KEY MESSAGES AND BENEFITS

Key technology evolution trends to drive simplification

- Cloud native architecture

- Agentic/GenAI-driven operations

- Federated network services

Key challenges to unlock simplification benefits

- Complexity of virtualised/cloudified RAN

- Data readiness

- Availability of standardised APIs

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Framework for Network Simplification

NGMN's recommendations for prioritising network simplification technologies across MNO Domains, according to mobile network evolution stages.

3-STEP APPROACH

Map enablers to domains where they bring simplification benefits	→	Understand implementation challenges for each domain	→	Prioritise based on operator context, benefits and complexity

$	Reduce Total Cost of Ownership (TCO)	☺	Supports customer experience improvement
(person)	New service creation & network monetisation	(gears)	Reduces Network Operations[1] complexity
(leaf)	Supports the operator's sustainability agenda	H	High focus priority for operator
		M	Medium focus priority for operator
		L	Low focus priority for operator

Domain and Enabler Technology	Simplification Drivers					Operator 5G Network Evolution Stage		
	$	(person)	(leaf)	☺	(gears)	Advanced	Mid-Stage	Early Stage
RAN								
Legacy shutdown	*		*		*	H	M	L
OSS Simplification	*			*	*	H	M	M
Radio Hardware consolidation	*		*		*	M	M	H
RAN virtualisation or Open RAN	*	*	*	*	*	M	M	L
RAN slicing		*			*	H	M	L
AI Network planning	*		*		*	M	H	H
AI RAN Operations	*		*	*	*	H	M	H
AI RAN Optimisation	*		*	*	*	H	M	M
Digital Twin for RAN	*			*	*	M	L	N/A
Core								
Core Network Cloudification for 5G	*	*	*	*	*	N/A	H	H
Core HW consolidation	*		*		*	N/A	H	M
Core network orchestration & slicing		*		*		H	M	L
NWDAF for analytics	*			*	*	H	M	L
AI for Core Operations	*			*	*	H	M	L
Evolution to distributed core architecture	*	*		*	*	M	L	L
Transport								
Remove legacy transport technologies	*		*		*	M	M	M
Evolution to Software Defined Networking	*	*			*	M	M	L
Adoption of fibre technology	*	*	*	*	*	H	H	H
Transport network Orchestration &slicing		*		*		M	M	L
Service Creation								
Cross domain service orchestration		*			*	H	L	L
Deploy open standard APIs		*		*	*	H	L	L
Deploy translation function		*				H	L	L
AI service assurance		*		*	*	H	L	L
Organisational transformation with Agile		*			*	H	H	H

Table 1: Domain prioritisation and focus areas for operator in advanced, mid-stage and early-stage of 5G adoption

[1]Network Operations encompasses network planning, build and/or in-life operation activities

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ROUTE TO DISAGGREGATION

CLOUD NATIVE SOLUTIONS – AGENTIC AI-BASED OPERATING MODELS

- **Cloud-native maturity as enabler of AI readiness**

- Leveraging CNCF's CNMM "maturity levels" **NGMN defines five "AI adoption levels"** as a baseline for the introduction of AI in network operation

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Cloud Native Solutions – Agentic AI-based Operating Models

KEY MESSAGES

- Develop AI-ready teams for network operations

- Build cross-functional teams including AI/ML engineers

- Foster responsible AI literacy

- Integrate GenAI into cloud-native network workflows

- Integrate LLMOps gates

- Upgrade cloud-native platforms for GenAI

- Measure AI-driven network outcomes

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Cloud Native Solutions – Agentic AI-based Operating Models

Level 1 – Foundational (Rule-Based Automation)

Level 2 – Workflow (Dynamic with AI Assistance)

Level 3 – Partially Autonomous (Goal-Oriented AI Agents)

Level 4 – Fully Autonomous (Proactive AI with Closed-Loop Control)

Level 5 – Optimised Enterprise (Scalable, Governed Autonomy)

Key Dimensions of CNMM

People	Process
Technology	**Business Outcome**

Maturity Levels

0 - Legacy
1 - Initial
2 - Repeatable
3 - Defined
4 - Managed
5 - Optimised

Example for Level 1 - Foundational (Aware, Safe pilots)

Level 1

- **Purpose:** Establish safe exploration of GenAI with clear guardrails
- **CNMM** baseline: Level ≥2 across People/Process/Technology.
  - Basic cloud-native practices are implemented but inconsistently
  - Processes are reactive rather than proactive
- **People:** AI literacy, basic prompt engineering awareness; named owners for data, security, platform; initial training plan
- **Process**: Documented GenAI usage policy (PII, confidentiality, acceptable use), manual model approval, basic risk assessment
- **Technology**: Sandboxed pilots; private data access via RAG PoCs; no production GPUs required
- **Governance & Safety**: Model cards for pilots
- **Example of use cases:** AI-assisted documentation, code/release notes, meeting minutes,
- **Readiness gates to exit L1**: Written policy approved, model card template adopted

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GREEN FUTURE NETWORKS
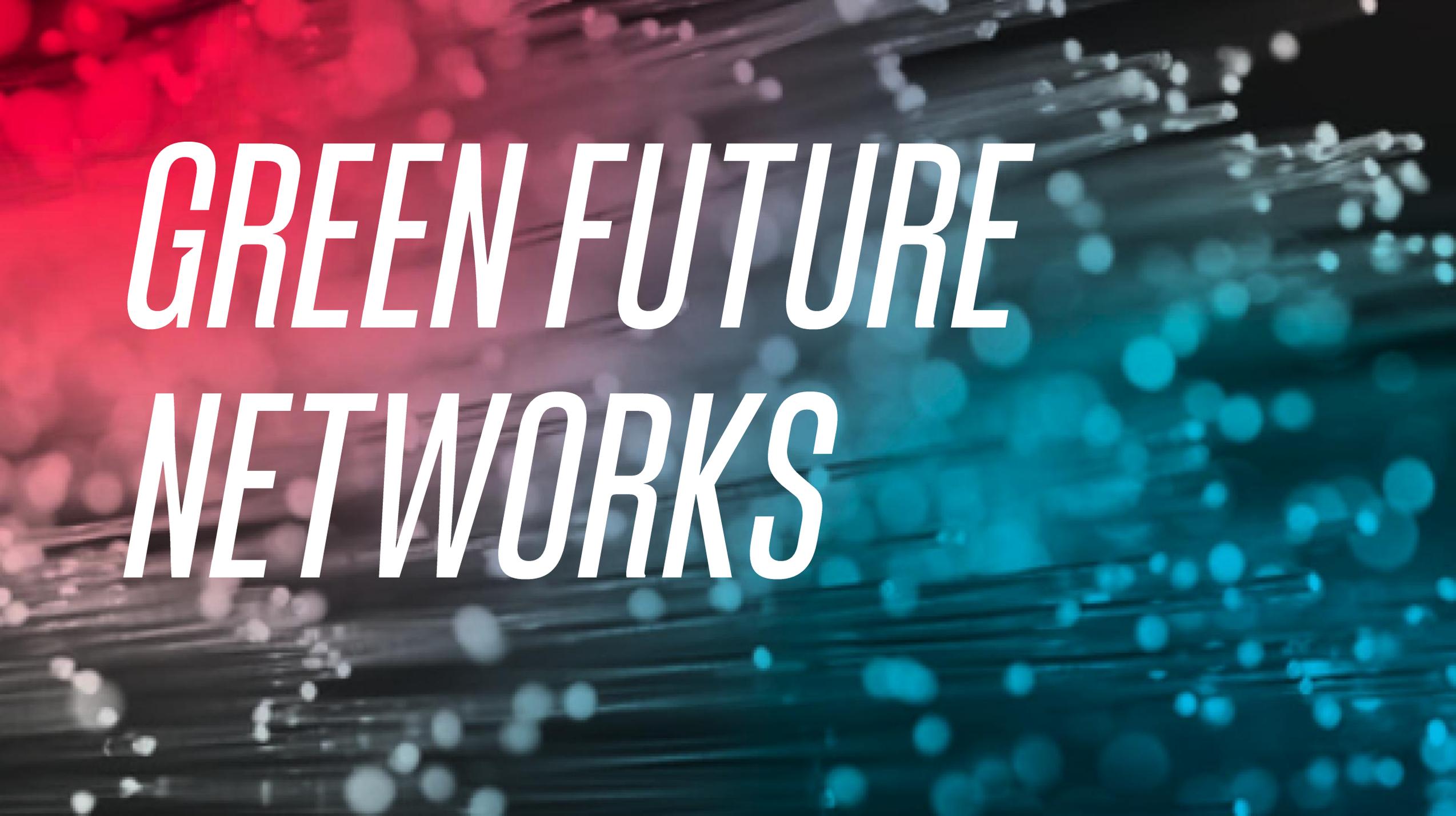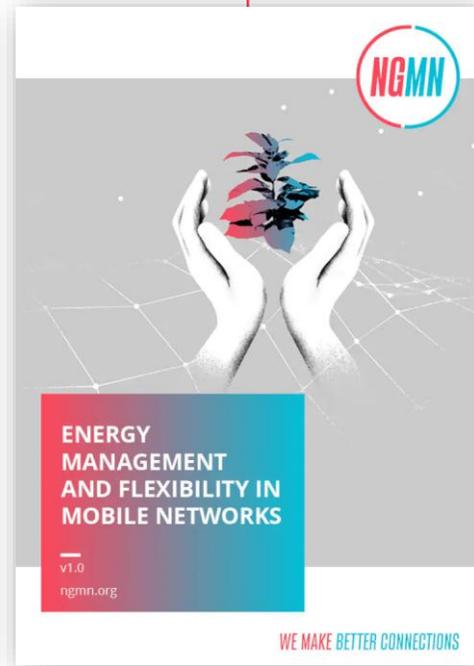
Green Future Networks Publications 2025

ENVIRONMENTAL SUSTAINABILITY AND REPORTING

May 2025

Actionable guidance to the industry to reduce carbon emissions through enhanced reporting and collaboration among value-chain partners.

NGMN

Link to publication

Environmental Sustainability and Reporting

MAIN DRIVERS

- **Lack of accurate** and actionable environmental sustainability **reporting - particularly for Scope 3 emissions -** limits the carbon emission reduction across the value chain
- Scope 3 emissions are dominating telecom carbon footprint

RECOMMENDATIONS

Improving the accuracy of sustainability reporting - especially for Scope 3 emissions by:

- **shifting from spend-based** estimates to primary emission factors
- **strengthening collaboration** across the value chain

Embedding sustainability into the core business decisions.

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ENERGY MANAGEMENT AND FLEXIBILITY IN MOBILE NETWORKS

July2025

Presents energy management strategies that take advantage of the opportunities from the energy market, allowing operators to reduce their operational costs and create new value-added services through energy flexibility initiatives.

NGMN

Link to publication

Energy Management and Flexibility in Mobile Networks

KEY MESSAGES AND RECOMMENDATIONS

- **NGMN identifies 3 energy management strategies** (Grid First, Site Level, Network Level)

- Planning for the **integration of Variable Renewable Energy** (VRE) when selecting energy management strategies

- **Energy management at site level** must consider available energy sources, traffic load, availability and cost of each energy source

- **AI-powered network management and automation**, considering trust and transparency of AI tools

- **Flexible energy management systems** capable of dealing with rapid external triggers and fulfilling regulatory requirements

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METERING IN RAN TRANSPORT NETWORKS

December 2025

Focuses on how energy consumption (EC) and energy efficiency (EE) can be accurately metered, monitored, and ultimately managed in mobile RAN transport networks.

NGMN

Link to publication

Metering in RAN Transport Networks

KEY MESSAGES

- **Transport network equipment is used in many industries -** consequently, **standardisation is distributed across several SDOs**

- Energy Metering in transport networks is **insufficiently covered in current standards**

- **Further standardisation is required**

- **Industry collaboration** within the ecosystem **is essential** to enable sustainable 5G and beyond

NEXT STEPS

- **NGMN is calling for Industry collaboration** to align definitions, data models and interfaces - a prerequisite for efficient energy observability and management

- **NGMN is in liaison with the relevant SDOs** to enable consistent, comparable, and actionable energy efficiency measurements that support the industry's sustainability and operational objectives

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Resilient Networks

MAIN DRIVERS

- Increasing **natural hazards** and **climate impacts** threatening network stability

- Energy **supply volatility** and **power failures** affecting operations

- Risk of local incidents escalating into **network-wide disruptions**

- **Networks primarily designed for standard operating conditions** beside growing network complexity

WHAT ARE WE DOING

- **Definition of resilience** in the context of telecommunication networks

- **Identifying risks** and related scenarios

- **Principles of resistance** to the identified risks

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Sustainable AI Telecom Networks

MAIN DRIVERS

- **AI becomes fundamental** to telecom networks

- **Current AI approach** with larger models, more compute is **not sustainable nor scalable**

- **AI adoption** affects energy consumption, water usage, operational costs and carbon footprint

- **Industry lacks clear metrics to measure AI energy** and environmental impact

- Existing AI initiatives do **not sufficiently address sustainability**

WHAT ARE WE DOING

- Focusing on **minimising environmental impact** and enhancing resource efficient AI solutions and models

- **Defining key AI use cases** and **defining metrics and measurement methods** to characterise AI energy consumption and energy efficiency from a whole life-cycle analysis (LCA) perspective

- **Guide the industry** towards more sustainable and effective AI usage and networks

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Cooling Strategy

MAIN DRIVERS

- Growth in traffic and data centres due to **emerging technologies**

- Increased energy consumption driven by **higher cooling requirements** in telecom infrastructure

- **Variability** in cooling needs

- **Assessment required** if current cooling approaches fit for sustainability goals

WHAT ARE WE DOING

- **Identify** the **common challenges** facing MNOs in terms of energy demands and cooling needs

- **Analyse** a set of suitable **cooling solutions**

- **Outline cooling strategies** to address a variety of environmental and climate conditions

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6G

NGMN 6G Publications – Guidance for Standardisation

2021   2022   2023   2024   2025   2026

6G Drivers and Vision
v1.0
www.ngmn.org

6G USE CASES AND ANALYSIS
v1.0
www.ngmn.org
WE MAKE BETTER CONNECTIONS

6G Requirements and Design Considerations
v1.0
www.ngmn.org
WE MAKE BETTER CONNECTIONS

6G Position Statement
An Operator View
v1.0
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WE MAKE BETTER CONNECTIONS

6G Trustworthiness Considerations
v1.0
www.ngmn.org
WE MAKE BETTER CONNECTIONS

ITU-R Framework for IMT-2030: Review and Future Direction
v1.0
www.ngmn.org
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NETWORK ARCHITECTURE EVOLUTION TOWARDS 6G
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6G KEY MESSAGES – An Operator View
v1.0
ngmn.org
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AI SURGE AND ITS IMPLICATIONS FOR 6G
V 1.0
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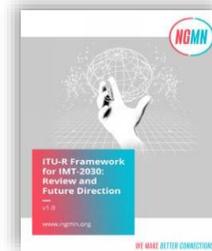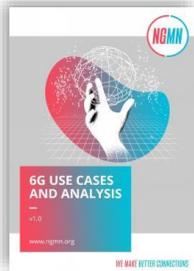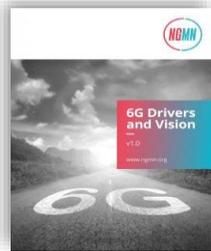
6G KEY MESSAGES - AN OPERATOR VIEW

June 2025

As 6G standardisation progresses at 3GPP, the NGMN Alliance presents a consolidated view of mobile network operators (MNO) highlighting a unified and strategic vision for future network generations.

NGMN

Link to publication

6G Key Messages – An Operator View

01 Harmonised global **standards for 6G** as graceful evolution of industry, fulfilling societal needs supporting a healthy eco-system

02 6G rollout should avoid mandatory hardware replacement. **New hardware deployment should be justified in new frequency bands.** Existing bands focus on software upgrades ensuring smooth transition to 6G

03 New technologies must demonstrate well-defined benefits justifying invest-ments within a techno-economic framework, **prioritising efficiencies in spectrum utilisation and energy consumption**

04 **Modularity, flexibility, and openness are the key drivers** for enhanced operational efficiency, simplification and facilitating network exposure to **support the development of market-aligned services**

05 **Migration strategies must foster simplicity**, enabling operators for faster deployment, guaranteeing a

seamless user experience, by provisioning **native voice support from day one**, ensuring the evolution of voice and **enriched services in an economically sustainable environment**

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AI SURGE AND ITS IMPLICATION FOR 6G

February 2026

NGMN

Latest Guidance to Standardisation

Areas of Study

- **Impact of AI traffic** on network
- Network **for AI**
- **AI for** network

Implications for **network architecture evolution**

Key Outputs

It highlights **recommended standardisation focus areas** to **support industry alignment**

Link to publication

AI Surge and its Implications for 6G

MAIN DRIVERS

- Rapid evolution of **large-scale AI models** is **driving a shift toward an "AI-native" era**

- Emergence **of AI agents—autonomous, collaborative, and self-learning entities**

- The **growth of AI and AI agents** presents both **opportunities and challenges** for mobile network operators

- **Networks** need **to introduce AI** features **for intent-driven programmability**, autonomous operation and **dynamic compute distribution across central and edge** domains

- To deliver differentiated connectivity, high reliability, energy efficiency and simplified operation

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AI SURGE AND ITS IMPLICATION FOR 6G

February 2026

NGMN

Main Message

Uncertainty of AI evolution and its impact on traffic, use cases, business models, and architecture making flexibility the cornerstone of 6G standardisation.

AI Surge and its Implications for 6G

01 Avoid premature assumptions on AI traffic growth

02 Flexibility must be a core 6G design principle

03 Standards must accommodate changing AI-driven traffic patterns

04 AI will reshape traffic characteristics

05 6G must evolve from 5G SBA, not reset architecture

06 Architecture evolution must be value-driven

07 Networks must evolve beyond connectivity

08 AI is both a workload and a native network capability

09 6G sensing enables distributed AI intelligence

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AI Surge and its Implications for 6G

Recommendations for Standardisation Priorities

- Standardise architecture, protocols and interfaces enabling efficient end-to-end support of AI functionalities, integrated across all domains

- Allow explicit demand of the actual needs of AI services

- Support adaptability to changing traffic patterns

- Standardise a framework for agent discovery, identity, policy and trust, enabling secure and interoperable agent-to-agent and agent-to-network interactions

- Functional and performance requirements for AI capabilities across the 6G system

- Reuse existing network architecture and interfaces as a basis, unless justified by value driven AI use cases and service scenarios

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6G GUIDANCE

WHAT TO EXPECT IN 2026

NGMN will continue operator-driven guidance for 6G standardisation

Immediate Next Step

6G Migration Strategies / Architecture Options planned to be released until Q3/2026

- 6G architecture options **to simplify networks and reduce complexity**
- **Prioritise migration strategies**

Key Outputs

Recommended Architecture Options

Recommended Migration Options

NGMN'S ROLE IN 2026

NGMN's role also in 2026

- Act as a platform for industry-wide alignment with a focus on AI and 6G

- Operator-driven input to 3GPP

- Deliver impactful recommendations from a diverse global membership

- Drive innovation, sustainability, and future-ready architectures

Industry collaboration and unity

- Unite operators, vendors, academia and the wider ecosystem

- Foster collaboration to shape the future of mobile networks

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Q&A

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Q&A

THANK YOU

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