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Scaling Purpose, Not Just Technology: Navigating the New Era of Network Transformation

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The networks that powered digital connectivity over the past two decades were built to scale. As mobile broadband demand surged, service providers raced to expand infrastructure to deliver consistent, reliable performance. We've now entered a new era — one that demands more than capacity. Today, network transformation is not just about scaling technology — it's about scaling purpose.

We are at a critical inflection point. Networks are evolving to become more open, intelligent, and programmable. Their role has expanded beyond connecting people to enabling smart cities, autonomous factories, and immersive digital experiences. At the same time, the expectations placed on networks have never been higher. They must offer improved performance, more flexibility, lower energy use, and greater inclusivity — simultaneously.

This paradigm shift requires more than incremental upgrades. It calls for a systematic reimagining of how networks are designed, operated, and monetized. The transformation ahead is architectural, operational, and philosophical – driven by five core forces: AI, openness, programmability, sustainability, and equity.

To ensure the future network is trusted as critical infrastructure, the transformation integrates security by design across all five core forces. This holistic approach strengthens resilience and trust while supporting the progression from network infrastructure to critical infrastructure.

The Rise of AI-Native Networks

Artificial intelligence is no longer an optional add-on. It's becoming a foundational capability. Modern networks are multi-layered, multi-vendor, and increasingly complex. As 5G matures and connected devices and use cases multiply with differentiated connectivity requirements, the need for intent-driven automation becomes paramount. AI is fast becoming the network's brain, enabling real-time decision-making and adaptive operations.

With AI-powered automation, service providers can:

- Predict and preempt service degradation before users are impacted
- Optimize energy use based on traffic fluctuations

- Personalize user experiences at scale
- Accelerate root-cause analysis for network incidents

To realize this potential, networks must be designed as AI-native — embedding data collection, model training, and continuous feedback across the architecture. This enables faster service delivery, lower operational costs, and more sustainable performance.

In addition to this, AI-native network nodes with embedded AI will enable an enhancement of RAN (radio access network) performance. For example, AI predicts how to best handle the radio channel conditions traffic patterns and user demands, allowing the network to dynamically adjust radio link configurations achieving approximately 12 percent improved throughput for heavy users measured in field by CSP. AI predicts traffic patterns and cell usage. Based on these predictions, the network can activate or deactivate MIMO (multiple input, multiple output) functionalities in cells, optimizing energy consumption without compromising performance. Up to 14 percent of reduced energy consumption per radio site has been estimated.

Transforming with Intent

The telecom industry has always evolved — from voice to data, from 2G to 5G. But today's transformation is deeper. It's not just about boosting speed or capacity — it's about redefining the purpose of connectivity. To meet this moment, transformation must be intentional and principled – guided by service needs, openness, intelligence, adaptability, sustainability, and equity. The networks of tomorrow will be judged not just by what they deliver, but by what they enable.

Embracing Openness Through Multi-Vendor Architectures

Openness is another foundational element of modern network transformation.

For decades, telecom networks were built on tightly integrated, vendor-specific systems. While stable, this approach constrained innovation. Today, technologies like Open RAN and cloud-native architecture have broken that mold — disaggregating hardware and software to support best-of-breed solutions. Open RAN decouples hardware from software and standardizes interfaces, empowering operators to run network functions on general-purpose cloud hardware. This increases scalability and reduces total cost of ownership. It also fosters innovation by welcoming a broader set of players into the telecom ecosystem — from hyperscalers to startups.

In an open architecture, collaboration and security-by-design become essential. Solving the industry's biggest challenges will require joint efforts across technology providers, developers, governments, and academia.

Programmable Networks: Unlocking New Value

Networks must evolve from data transport infrastructure into platforms for innovation. Programmability empowers networks to dynamically adapt to application-specific needs — whether that's minimizing latency for real-time gaming, prioritizing emergency communications, or slicing bandwidth for enterprise use cases.

Programmable networks empower mobile operators to steer network behavior to achieve desired business outcomes, enable differentiated connectivity at scale, and progress towards autonomous networks. By exposing network capabilities to developers, operators can unlock a

new wave of context-aware, performance-sensitive applications. In this model, the network evolves from static infrastructure into a dynamic innovation platform.

Programmability is not only a technical evolution but a business enabler — creating new revenue streams, accelerating innovation, and delivering differentiated connectivity that evolves in sync with customer needs.

Designing for Sustainability

As global data usage continues to soar, so does the energy footprint of digital infrastructure.

Sustainability must be embedded in every layer of network design:

- Sustainability in the center of network planning
- Expand and modernize the existing network while scaling up 5G
- Use AI/ML and automation for intelligent operations to boost energy savings and secure user experience

When properly implemented, 5G networks deliver significantly more data per joule than past generations and dynamically scale energy use based on demand. 5G uses less signaling and delivers the same data at higher speeds, while being up to 10 times more energy efficient per gigabyte than 4G. As we look ahead to 6G, sustainability is not just a consideration—it's a core principle and a central design goal of IMT-2030, the framework established by the International Telecommunication Union (ITU) to guide 6G development. IMT-2030 aims to advance the UN Sustainable Development Goals (SDGs) through digital transformation by embedding environmental priorities—such as energy efficiency, emissions reduction, and circular economy—alongside societal goals like digital inclusion into the fabric of 6G technologies.

Bridging the Digital Divide

Despite the ubiquity of mobile technology, digital inequality remains. Rural and underserved communities in both developed and emerging markets still lack access to reliable, high-speed connectivity — creating real barriers in education, healthcare, and economic opportunity.

The next wave of network transformation offers a chance to close these gaps. AI-enabled planning, cloud-native deployment, and cost-efficient architectures can help extend coverage faster and more affordably.

Technology alone won't solve the problem. Bridging the digital divide requires public-private partnerships, policy innovation, and inclusive design. Equity must be an intentional outcome of transformation — not a coincidental one.

Future networks must drive progress, inclusion, and accelerate innovation. The journey ahead is not just about transforming networks. This is not just about transforming infrastructure. It's about transforming what networks make possible for everyone.