Network X 2026: optical innovations are changing investment opportunities for telecoms operators

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Michelle Lam

Analysys Mason attended Network X 2026 in Vienna, Austria, in October 2026. The show highlighted the wide range of new technologies that telecoms operators should consider when enhancing their optical networks to meet the demands of AI. In this article, we examine the key developments in IP and optical networks and assess the operational and commercial factors that will influence the adoption of these technologies.

Optical innovation, AI and quantum-safe networking are expanding technology, architecture and vendor choices

Optical transport is evolving rapidly as AI infrastructure drives demand for higher capacity, lower latency and more flexible connectivity. Advances in 800G and 1.6T coherent optics, along with expanded use of C+L-band spectrum, are widening the technology options available to operators.

At Network X 2026, vendor announcements illustrated how these developments are shaping architectures for AI data centre interconnect (DCI). For example, Huawei presented its vision for next-generation optical transport networks for AI data centre infrastructure, including 800G-to-2T DCI, optical cross-connections and pooled optical capacity. Ciena highlighted its RLS Hyper-Rail approach for emerging 'scale-across' AI architectures, which connect multiple data centre sites and require high-capacity, fibre-dense optical systems. In addition, Colt Technology Services announced the live hollow-core fibre proof of concept (PoC), which has led to around 30% lower latency than conventional fibre.

AI-enabled network automation is becoming an important counterpart to advances in optical capacity and architecture. Fibre sensing, fault detection, predictive maintenance and energy optimisation are promising AI use cases for improving operational efficiency. Türk Telekom's Hubble Projector, for one, demonstrated the move towards unified, multi-domain optical transport sensing and proactive quality assurance. ZTE and China Telecom Guangdong also showcased a high-fidelity digital-twin simulation platform for IP transport, illustrating how network changes can be evaluated in a simulated environment before implementation.

Quantum-safe networking was another topic of discussion at the event, touching on quantum-safe network security, quantum readiness, standards development and the potential integration of quantum technologies into future mobile and communications infrastructure. For IP networks, this means preparing routing, control and encryption systems for post-quantum cryptography (PQC), while ensuring that upgrades can be introduced without disrupting performance or interoperability. Optical networks will also need stronger protection at the physical and transport layers, with operators assessing where technologies such as quantum key distribution (QKD) can provide sufficient security benefits to justify added complexity and cost.

Operators may struggle to justify the necessary investments to unlock new business value due to economic pressures

While optical innovation presents a clear opportunity to deliver differentiated, enhanced networking services and unlock new revenue growth, operators must determine where investment will generate measurable returns. Many operators face pressure to control capex and operating costs, while demand for some AI-related connectivity services and associated revenue models remains uncertain. Operators need to carefully evaluate the total cost of ownership, including equipment, power, cooling, fibre availability, maintenance and upgrade cycles, and establish what customers will pay for, how demand will develop and whether returns will justify the required investment. Disaggregated optical and open line systems also give operators a bigger choice of suppliers and greater control over network design. However, operators are conscious that these systems require additional integration, interoperability testing and lifecycle management costs and complexity.

Even though AI-driven automation has proven to greatly reduce operating costs, trust and governance still form barriers to autonomous networks, especially to automating multi-vendor optical networks. Operators at Network X 2026 outlined how data sovereignty, security, skills shortages and accountability remain important considerations, particularly as agentic AI is introduced into network control. A number of safeguards can mitigate these concerns. For example, digital twins allow operators to test AI-recommended changes before applying them to live infrastructure. In addition, policy controls with human approvals limit what AI systems can alter for high-impact actions.

Quantum-safe networking requires a defence-in-depth strategy that secures every layer, from physical infrastructure and optical networks through to IPsec and MACsec. Telecoms operators must work with quantum specialists and cyber-security vendors to deliver operationally viable solutions tailored to the differing security requirements of government, enterprise and consumer markets. For example, PQC can be integrated into cryptographic protocols and software, while QKD may be relevant for selected links with stringent security requirements, subject to practical constraints in hardware, distance and cost. Hybrid key management approaches may be useful in selected environments, particularly where government or critical-infrastructure requirements demand additional safeguards.

ROI visibility and enhancement will depend on stronger industry collaboration and standards guidance

Stronger collaboration among operators, equipment vendors, software providers and standards organisations will be essential in improving ROI visibility and reducing integration costs and risks. Such enhancements will make business cases more robust and investment decisions easier to sequence. Standards are already in development: ITU-T's ION-2030 work addresses AI in optical networks and data centre interconnect, while ETSI is evolving TeraFlowSDN controllers to support agent-driven network control through MCP and A2A interfaces.

Ultimately, operators should prioritise investments with a credible path to capex or opex savings, service differentiation or new revenue, rather than simply for the sake of technology innovation. Using shared deployment evidence and common standards can improve confidence in returns and accelerate the realisation of business value.

Analysys Mason's *Network Automation and Orchestration*, *Service Design and Orchestration*, *NaaS Platforms and Infrastructure* and *Cloud and AI Infrastructure* research programmes collectively cover the technologies and requirements for supporting next-generation transport networks, from network and service orchestration and automation software to infrastructure. We monitor operators' progress in adopting these technologies and analyse the vendor landscape and evolving value chain. We also support clients in developing thought leadership research, including benchmarking studies, total cost of ownership (TCO) and ROI analysis, survey-based reports and competitive assessments. For more information on these reports, please contact Michelle Lam.