

Closing the Autonomy Gap

How CSPs Can Move from AI Experiments
to Network Operations Transformation

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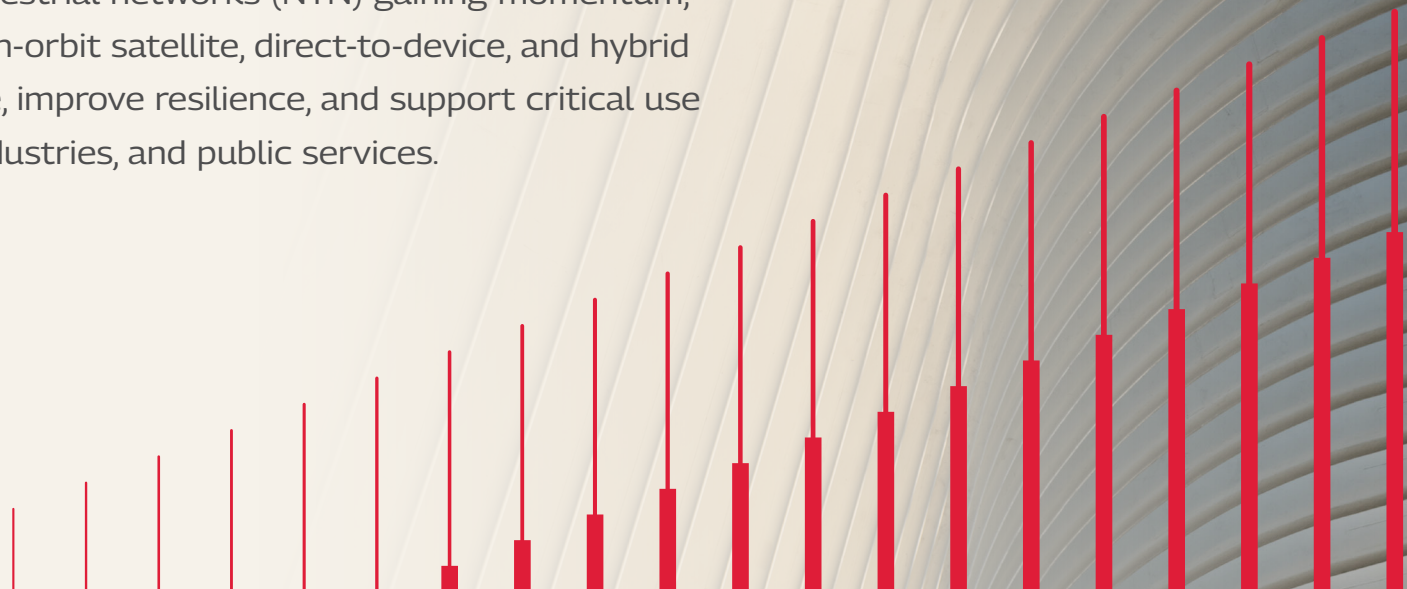
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Executive Summary

Modern communication service providers operate networks that are increasingly software-driven, cloud native, and open. Such networks are intended to offer new-age, faster services to customers, with a high degree of operational automation. However, the operation centers primarily rely on manual processes, skill-based functions, and fragmented tool use. With growing network complexity, a structural mismatch causes an autonomy gap. While executives want AI-driven processes, high resilience, and the swift realization of new revenue options, day-to-day operations remain ticket-driven, reactive, and functionally siloed.

This challenge is intensified as telecom infrastructure evolves. With 5G-advanced rollouts, early 6G research, AI-RAN concepts, and edge computing, intelligence is being integrated across the network while redefining telecom infrastructure. At the same time, the network boundary itself is expanding. With non-terrestrial networks (NTN) gaining momentum, CSPs are increasingly integrating low-earth-orbit satellite, direct-to-device, and hybrid SATCOM architectures to extend coverage, improve resilience, and support critical use cases across maritime, aviation, remote industries, and public services.



Why Autonomous Operations Matter Now?

As telecom networks become increasingly AI-native, operators face a shifting dilemma. While intelligence is being embedded across the network, CSPs continue to operate under intense cost pressure, a persistent autonomy gap, and the added operational burden of future expansions.

To remain future-ready and profitable, the industry must shift to an AI-native operating model that uses agentic AI. TM Forum has curated a comprehensive autonomous networks maturity framework that guides network operations in their transition towards fully autonomous networks. This evolution enables CSPs to embed autonomy directly into network operations, delivering measurable business outcomes across resilience, operational efficiency, service quality, and cost optimization.

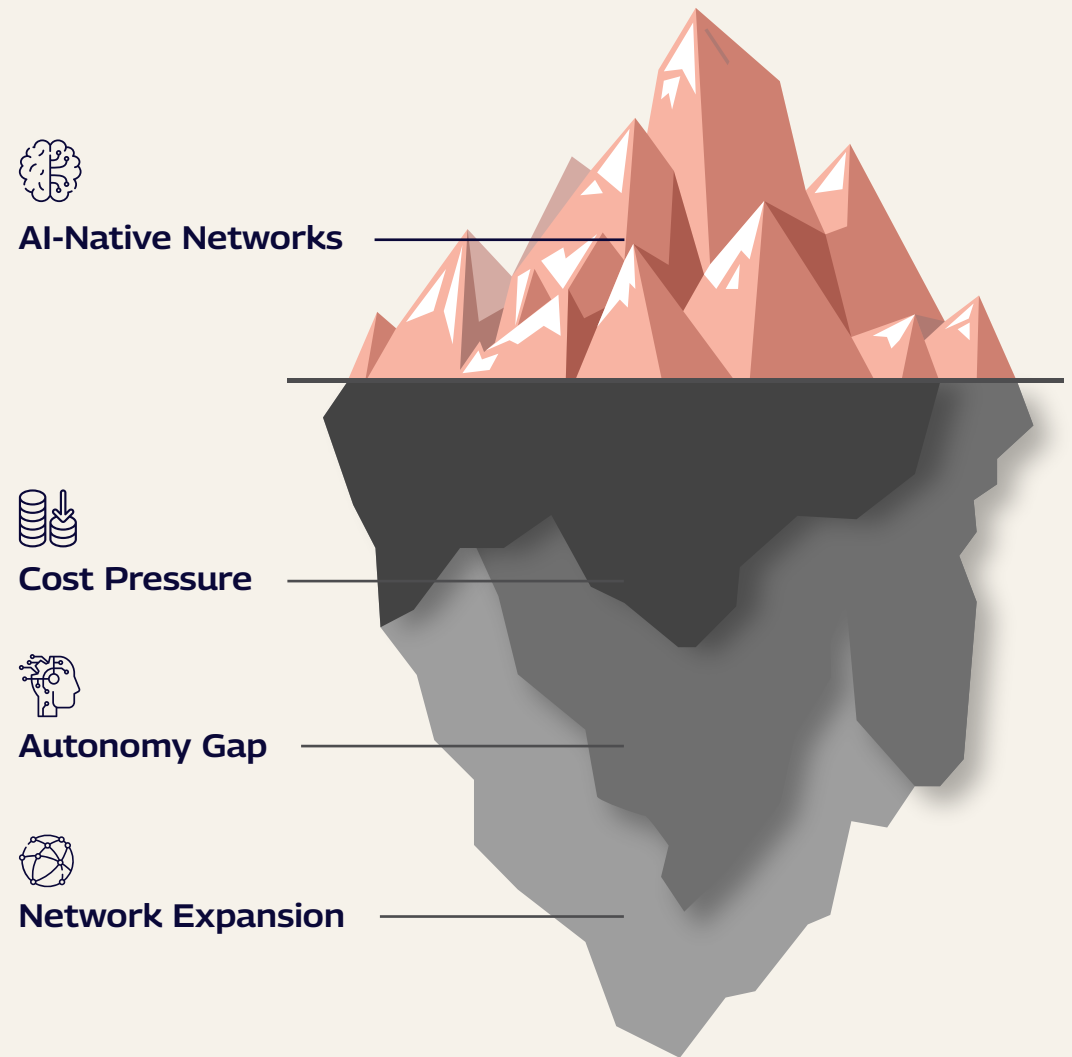


Figure 1: The critical telecom gap

Why AI and Autonomy Use-cases Struggle to Remain at Pilot?

Data demands continue to rise, while average revenue per user (ARPU) remains constrained in most markets. To stay competitive, operators aim for aggressive operational efficiency targets, with OpEx reduction goals often exceeding 40-50%. However, most find themselves stuck at Level 1 or Level 2 of the TM Forum's autonomous network levels (ANL).

Most operators are already adopting AI. Proofs of concept are in place for alarm correlation, anomaly detection, and GenAI-based knowledge assistants. Scripts and robotic process automation (RPA) are used to simplify NOC and SOC workflows. However, when leadership evaluates outcomes such as MTTR trends, truck rolls, operations team efficiency, or sustained improvements in customer experience, the impact is often more incremental than transformative. Core operational practices largely remain unchanged.



Here are the Typical Challenges

The root cause lies in what we describe as the autonomy gap, the disconnect between growing AI capability and the operating model required to apply it end-to-end. While many CSPs have deployed AI tools, the lack of telecom domain-level adoption and consistent benchmarking means these capabilities rarely translate into sustained operational change.

The cost impact of this gap is clearly visible in day-to-day operations. For example, field dispatches remain one of the most expensive aspects of network operations. When a technician must make multiple trips to resolve an issue that could be fixed in one visit, costs accrue across labor, travel time, scheduling overhead, and lost technician productivity. In a common scenario, an alarm triggers a ticket, which gets routed to the field team, which in turn uses a static SOP-based approach for troubleshooting, and sometimes, it may require a truck roll at the A and B ends. GenAI in such a scenario provides a dynamic SOP, which results in first-time right, i.e., faults resolved in a single visit.

The TM Forum's autonomous network framework defines a progression from Level 0 (manual) to Level 5 (fully autonomous) operations. Without rigorous benchmarking and telecom domain-level adoption, many AI initiatives struggle to achieve higher autonomy levels, limiting their long-term operational and business impact.

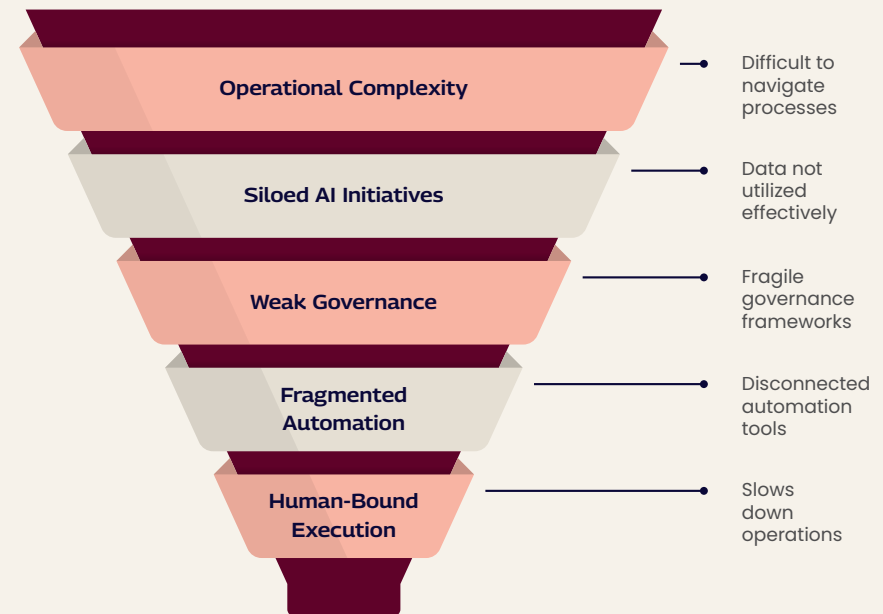


Figure 2: Operational challenge funnel

The Agentic Opportunity in Autonomous Operations



AI adoption for telecom operations in earlier days meant complex analytics that identified patterns, highlighted anomalies, and provided recommendations for humans to act on. Agentic AI goes a step further.

For network operations, an environment built on agentic AI is structurally different. An orchestrator agent can handle the end-to-end tasks of reading a dashboard, making decisions, opening the ticketing system, and triggering the resolution workflow by working with specialist agents.

This is not about replacing the existing operations team but optimizing and making it far more efficient. Agentic AI works best when embedded within the operations structure and not as a layer above it. In practice, this means NOC engineers work alongside agents who handle high-volume, pattern-based work such as alarm correlation, ticket creation, initial triage, ticket routing, knowledge retrieval, and runbook execution. The operations team can instead focus on complex faults, fallout management, supplier escalation, and continuous improvement of the AI agent's behavior.

The business use case for this model is compelling. Operators who have reached L4 autonomy in operations experience NOC and SOC process automation that exceeds 60%, end-to-end network availability improving towards four nines, and considerable reductions in field dispatch costs. Strategically, the leadership team's attention and the organization's capital can shift towards newer revenue-generating models enabled by 5G use cases, open APIs, and edge computing.



How Telcos Can Move from Pilots to Full Autonomy

The path to autonomous operations starts with an honest assessment of where the organization stands at present - technically, operationally, and culturally.

Assess Before You Build

The TM Forum autonomous operations maturity model (AOMM) provides a framework for this evaluation. It assesses the enterprise-wide operational maturity and highlights the actual gaps. In some cases, CSPs benchmark individual tools, products, functions, or pilots in isolation and consequently self-assess at higher autonomy levels. While a single functional-level assessment is possible, it does not represent the full operational maturity. Therefore, only an end-to-end assessment of all operations provides a holistic view of the current state and offers the opportunity to implement coordinated, synergistic improvements across all areas

Fill Gaps, Don't Add Layers

The usual and the worst outcome of an autonomous operations initiative is a more complex tool stack than what existed before. When a new capability is added, it should either replace an old capability or integrate tightly with what exists and complement it, not just add on to the existing stack.

How Telcos Can Move from Pilots to Full Autonomy

Establish Governance with Real Accountability

AI initiatives that lack clear ownership and accountability tend to pause post-pilots. To counter this, we recommend establishing a dedicated AI Council, a cross-functional body that will help prioritize use cases, define the roadmap, monitor ROI, and ensure alignment of AI initiatives with business objectives. This council helps transform the isolated AI initiatives into a coherent enterprise-wide program.

Define a Prioritized Roadmap

Use cases must be prioritized based on their importance and the readiness of the relevant environment. The first wave should target high-frequency, high-cost problems with good data quality and deterministic automation logic. Alarm correlation and suppression, ticket creation, ticket routing, and field dispatch optimization consistently deliver fast, measurable returns. Start with these to build confidence before moving to more complex closed-loop automation.

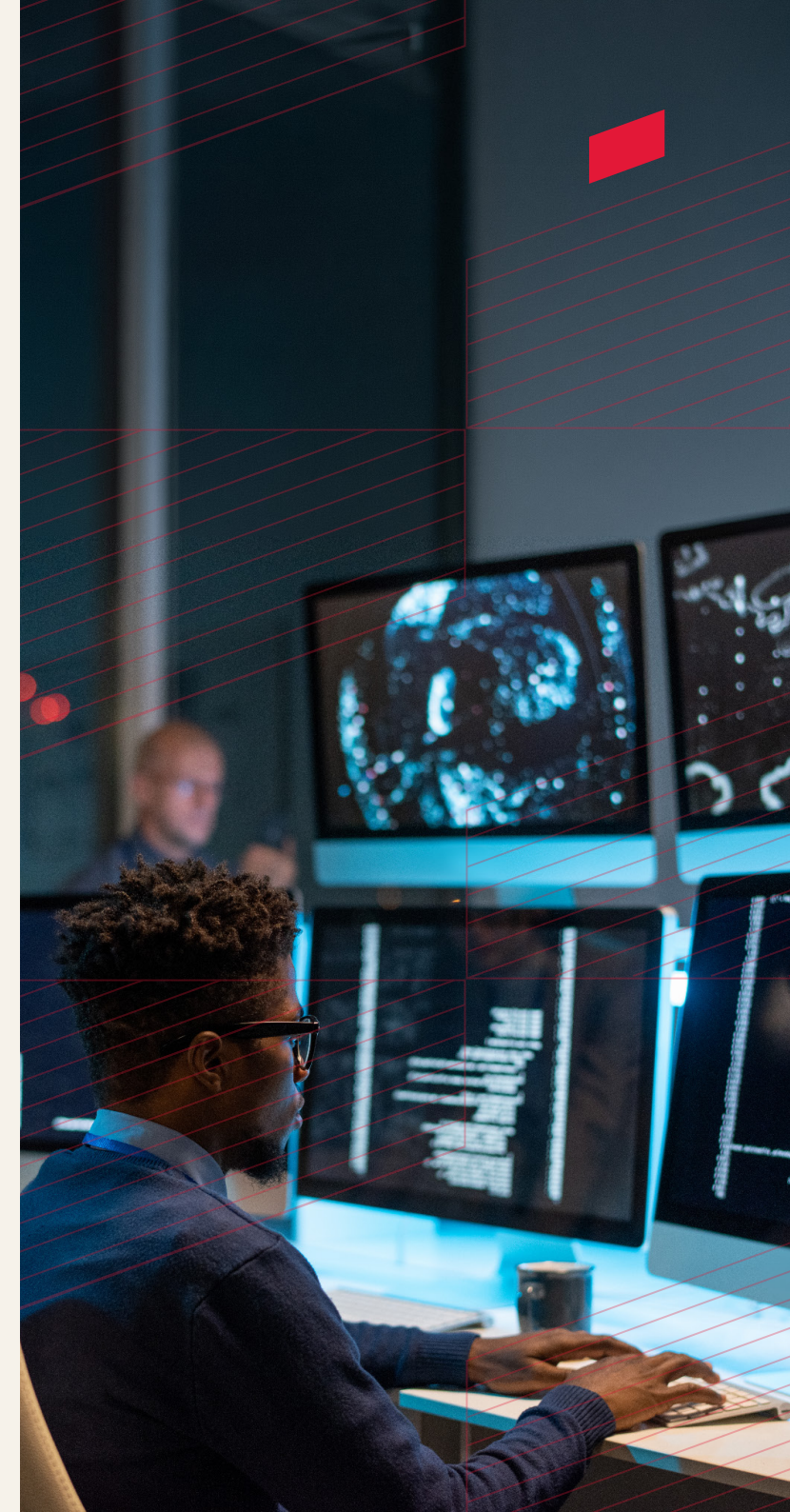
Work with Experienced Partners

The autonomous operations domain requires real-time telco operations experience, as generic AI and automation are insufficient to succeed in a telco environment. The integration challenges, data quality issues, decoding telco datasets, in-depth view of use cases, and operationalization requirements are problems that surface during deployment, not during design. Partners who have worked with a comparable operator will have a better understanding of these problems and experience of real-world use cases.

Measuring What Matters

Autonomous operational transformation succeeds when outcomes are measurable using operational and commercial metrics, not activity metrics or model accuracy scores. The following are some of the key metrics that we recommend operators track from day one:

Operational KPI	Baseline Range	Target with ANOP
Truck Roll Rate	1.5-2 visits/ fault	~ 1 visit/ fault
Network Availability Improvement	Baseline	Four Nines (99.99%)
NOC/ SOC Process Automation	Baseline	>60% Automation
ANL Maturity	Current baseline state	L4
OpEx Reduction	Baseline	> 40% over 3 years



Operational Autonomy in a Real-World European Network

The path to autonomous operations starts with an honest assessment of where the organization stands at present - technically, operationally, and culturally.

Six+ Years of Engagement, Managing End-to-end Network for a Tier-1 European Mobile Operator



Challenges

- Large multi-domain mobile and fixed network with rising alarm volumes
- Fragmented monitoring and manual RCA across RAN, transport, and core
- Reactive ticket-driven workflows extending repair and dispatch cycles
- Objective to progress beyond AN L1-L2 toward scalable operational autonomy



Approach

- Current assessment of automation maturity aligned with TM Forum automation operations maturity level
- Defined capability and use-case roadmap
- Deployed ANOP platform and integrated with existing EMS, NOC, and ITSM tools (no rip and replace)
- Step by step autonomous operations journey to TM Forum AN Level L4+ aligned

Operational Autonomy in a Real-World European Network



Outcomes

- Time to Repair improved ~86% → ~97%
- Alarm backlog reduced >30% → <10%
- Time to Dispatch improved ~28% → >80%
- Incident handling time reduced ~57%
- 400K+ alarms/month handled through automation at scale



AI and Autonomy Transformation

- Progressed from rules-based automation to AI and GenAI-assisted operations
- Shifted NOC teams from manual triage to supervising autonomous workflows
- Enabled closed-loop execution for correlation, RCA, and dispatch optimization
- Achieved characteristics of TM Forum AN Level ~3.2+, progressing towards L4+

Getting Started: A 120-Day On-Ramp

With a well-defined start, operators can generate measurable outcomes much earlier in their journey towards autonomy. There's no need to wait until the end of the program to realize the benefits; tangible outcomes can be achieved as early as the first quarter.

Phase	Weeks 1-12	Weeks 13-24
Assessment	• Maturity kit deployment • Baseline data audit • Use-case candidate scoring	• Gap analysis report • ROI model per use case • Governance structure design
Platform	• ANOP base deployment • Data pipeline integration	• Agent configuration • First use-case live • NOC team enablement, operations-level feedback
Governance	• Autonomous Ops Council formed • Executive sponsor confirmed	• First roadmap approved • ROI tracking in place • Quarterly review cadence established

Organizations achieve greater progress when senior leadership assumes ownership, governance is established before deployment, and the operations team is involved during the design phase.

Next Steps

If your organization is ready to move beyond pilots, the most effective starting point is gaining an honest, fact-based understanding of where your operations sit today on the autonomy curve. Autonomous Network Operations is a journey, and progress depends on the clarity of your existing baseline as much as your ambition.

Tech Mahindra's proven framework supports CSPs at every stage of the ANO journey. For organizations at an early stage, the journey begins with a TM Forum-aligned maturity assessment that establishes a trusted baseline, identifies gaps, and defines a prioritized roadmap backed by clear business cases, tailored to the operator's specific operational environment. For organizations already underway, the framework helps accelerate progress towards higher levels of autonomy by focusing on execution, integration, and measurable outcomes.

Across all stages, the approach enables CSPs to systematically evolve toward higher levels of autonomy, track progress, and link autonomy investments to operational efficiency, resilience, and ROI, ultimately shifting the business's focus from operational firefighting to innovation and new value streams.



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Vipul Rattan leads Multi-Tower Offerings and Strategic Growth for Large Deals at Tech Mahindra, driving integrated solutions and business value across industries and verticals. With 22+ years in IT and telecom, Vipul Rattan has led global sales, GTM strategy, offering development, and digital transformation at Tech Mahindra, Tata Communications, Gilead, and Oracle. At Tech Mahindra, he spearheads the creation of next-gen offerings and drives strategic sales and growth for large, multi-tower deals worldwide. His portfolio spans autonomous operations, digital reliability in the agentic AI era, GCCs, EdgePulse-Smart AI, Smarter Edge, and more. As an architect and global leader of Tech Mahindra's GCC strategy, he has positioned it as a flagship model. A strong advocate of ecosystem-led growth, he leverages partner and portco ecosystems to co-create differentiated solutions and drive sustained global business growth.



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Mohit Luthra specializes in connecting businesses to technology, leveraging his expertise in managing large solutioning deals. With a background at Jio, Intel, and Rakuten, he has deep experience in Telcos, Cloud Computing, Automation, and AI.

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Santosh brings over 30 years of experience in the telecom industry, spanning global presales, Autonomous Network Operations (ANO) assessments, and leadership across operations and large-scale transformation programs for both mobile and wireline networks. He is currently with Tech Mahindra and has previously held key roles at Nokia, Wipro, Reliance Communications, and Hughes Telecom, leading complex operations and transformation engagements across diverse markets.



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Ashish brings over 25 years of experience in consulting, solution architecture, and OSS transformation. He specializes in designing next-generation OSS solutions, enabling large-scale operations transformation, and delivering AIOps platforms to support Autonomous Network Operations (ANO) Level 3 and Level 4 maturity use cases in collaboration with hyperscalers.

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