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How AI-driven automation **transforms** mobile transport networks

Transport networks are undergoing a paradigm shift

Mobile network traffic continues to grow at an unprecedented rate, fuelled by expanded use of high and mid band spectrum, advanced MIMO deployments, AI-driven applications, and the exponential rise in connected devices. At the same time, customer expectations for performance, reliability, and quality of experience are rising sharply. Together, these trends are driving a step change in operational complexity across network and transport domains—well beyond the limits of traditional management and operational models.

Most mobile networks are still operated reactively, with visibility focused on individual devices or links and insights largely derived from averaged data. This results in slow and often inconclusive troubleshooting, leaving operators with a limited understanding of root causes and end-to-end service behaviour. Compounding this challenge, networks are typically managed in silos, with the Radio Access Network (RAN) and transport domains planned, optimized, and operated independently—an approach that is increasingly inefficient and difficult to scale.

Addressing these challenges requires a fundamental shift toward proactive, service-centric, and autonomous network operations. True mobile network automation depends on multi-domain data analysis and cross domain intelligence, treating RAN and transport as a single, cohesive system. By breaking down silos and enabling AI-driven, intent-based automation, operators can regain control over complexity and build networks that scale sustainably to meet future demands.

Key trends in 5G transport

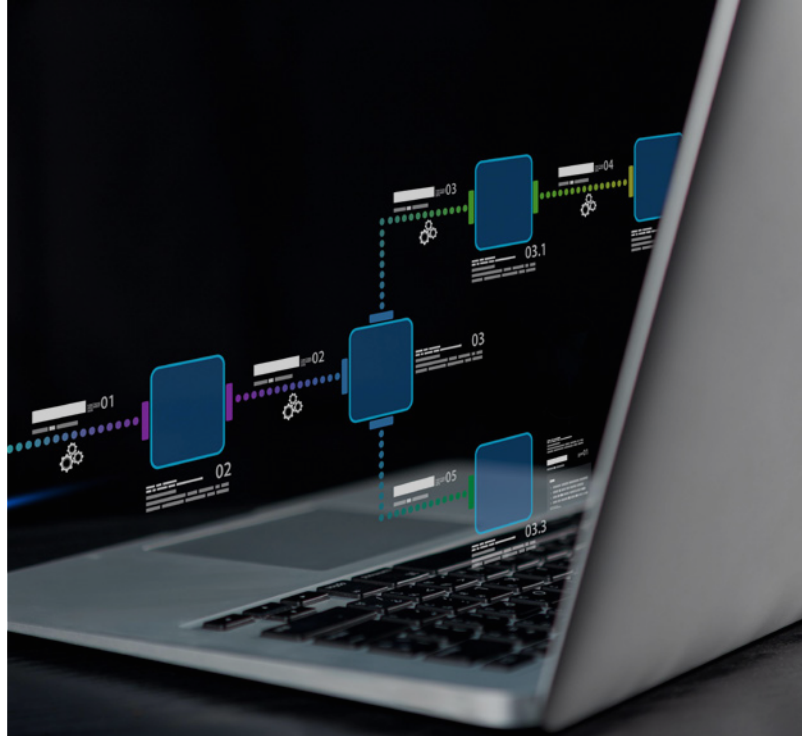
Several converging trends are reshaping 5G transport networks. Rapid increases in traffic capacity requirements, network densification, and persistent cost pressures are being amplified by the accelerating adoption of AI-driven applications. These applications introduce new performance demands and fundamentally alter traffic patterns, including a pronounced shift toward higher and more dynamic uplink usage. Together, these factors are placing a growing strain on mobile networks, requiring transport infrastructures that can scale efficiently while remaining flexible, resilient, and cost effective.

The ongoing shift toward centralized, open, and cloud-based RAN architectures is introducing new levels of complexity for 5G transport networks. These architectures impose significantly stricter requirements on observability, performance, and Service Level Agreements (SLAs) across front-, back- and sidehaul. As networks scale—with a growing number of nodes, links, and services—the operational burden continues to rise. Meeting these elevated expectations requires transport networks that are not only higher capacity but also more transparent, predictable, and operationally efficient.

As an example, in this environment, synchronization has become not only essential but also more vulnerable, with risks ranging from environmental factors and installation issues to GPS jamming and spoofing. Mitigating these synchronization risks requires a combination of resilient design and intelligent operations, including multi-source timing (GNSS, PTP), redundancy at critical network points, continuous synchronization monitoring, and proactive anomaly detection to quickly identify and isolate degraded and compromised timing sources before service is affected.

As a result, 5G backhaul and fronthaul networks are playing an increasingly critical role in ensuring reliable and high-performing RAN services. As such, transport networks need to match these new requirements on the RAN and avoid becoming bottlenecks. The industry now urgently requires AI-ready networks built to unleash the highest possible performance.

These trends put increasing pressure on communications service providers (CSPs) to deliver services more rapidly and with higher quality, while managing costs and energy consumption. This makes automation and increased network autonomy a must.



Automation delivers a service-centric and proactive revolution

Manual, network-centric configuration and element-based management are no longer sufficient for modern transport networks. Today's environments demand service-centric operations, supported by real-time, granular observability, predictive maintenance, intent-based networking, and advanced services such as network slicing.

AI-driven automation enables the shift from reactive operations to self-configuring, self-optimizing, and self-healing networks. By continuously analysing real-time, service-centric data across the transport domain, AI delivers faster and deeper insights than manual operations—accurately detecting anomalies, misconfigurations, and emerging risks while enabling closed-loop assurance and higher levels of network autonomy.

Beyond handling traffic growth and increasing complexity, automation delivers cost efficiency and faster time to market. Operational expenses (OPEX) are reduced, spectrum utilization improves, and energy consumption can be lowered by up to 25%. Advanced analytics significantly enhance root-cause analysis, reducing troubleshooting effort and on-site visits by up to 40%.

AI and Machine Learning (ML), and now also Agentic AI, effectively transform the transport network into a network-wide operating system. AI continuously correlates real-time data across domains to detect issues with higher precision than traditional tools. Agentic AI extends this capability by autonomously reasoning, recommending, and executing end-to-end actions—dramatically reducing operational complexity and time to resolution.

AI-driven automation also enables fully automated service and SLA provisioning, supported by intent-based policies and closed-loop optimization. Operators can allow AI to propose end-to-end actions across assurance, optimization, and remediation, and automatically apply them once approved. This accelerates the deployment of services, such as network slicing, while ensuring predictable outcomes at scale.

A key outcome is operational simplification. Self-managing network capabilities reduce manual intervention while improving reliability and performance. AI-based observability removes blind spots by exposing previously hidden synchronization and optical stability issues, thereby improving resilience and provisioning speed. The result is a simpler, more robust operational model that delivers low latency, minimal jitter, and high SLA compliance—critical for time-sensitive 5G services and differentiated customer experiences.

In summary, what was once a black box, becomes an observable, controllable network, supported by visualization, dashboards, and real-time insights where AI-driven automation enables smarter decisions, new service opportunities, network monetization, and sustainable revenue growth.

How AI-based automation solves today's challenges

As mentioned, AI and ML enable a fundamental shift from periodic, network-centric management to real-time, service-centric observability and closed-loop automation. Rather than collecting data every 15 minutes, operators gain continuous visibility across the entire transport domain, enabling predictive and proactive operations.

Agentic AI can autonomously troubleshoot issues end-to-end, translate business and customer intent into automated policies, and ensure consistent, high-quality service delivery. This marks a significant leap beyond traditional fault and performance management, enabling premium service tiers and clear market differentiation.

At the foundation, AI-based observability reveals critical yet previously invisible issues such as synchronization failures and optical link instabilities. Addressing these challenges improves network stability, accelerates service provisioning, and ensures predictable performance under dynamic load conditions.

Reliable synchronization, resilient optical performance, and predictive assurance are essential to maintaining low latency, minimal jitter, and reduced packet loss—key requirements for modern transport networks and time-sensitive 5G services. As a result, AI-driven automation is no longer an enhancement, but a strategic necessity.

Proof point: AI-powered management systems for network performance monitoring and planning

AI-based management systems can be applied to network performance monitoring, planning and SLA assurance by treating the RAN and its transport network as a single, cohesive entity. In this approach, the RAN performance is intrinsically linked to the underlying transport network. One example comes from a European operator facing backhaul capacity constraints and limitations in its microwave links. By integrating AI into its network management and enhancing its backhaul toolset, the operator introduced a predictive maintenance model that transforms raw data into actionable insights. These insights automatically generate tasks, enabling engineers to quickly pinpoint areas requiring attention. As a result, the CSP was able to almost completely eliminate issues impacting the RAN performance.

There are other use cases of AI-based management systems. These include identifying errors caused by weather conditions; locating faults, misconfigurations and root causes for complex, possibly network-wide issues; differentiating between various types of signal degradation; predicting equipment and link failures; detecting interference and unwanted radio signals (noise floor degradation); automated QoS optimizations; and helping engineers manage the scale of modern networks.

Engineers can be faced with millions of data points each month, creating volumes that are impossible to review effectively manually. In all these cases, AI-based management systems provide detailed visibility, helping engineers plan new links and services more effectively and choose parameters with greater confidence. Further, they help address vulnerabilities and schedule maintenance activities efficiently before these have a chance to impact service availability.

Ericsson Transport Automation Controller



[Ericsson Transport Automation Controller](#) sits at the heart of these trends and AI-driven transformations. As an automation and analytics platform, it allows CSPs to act proactively and stay ahead of potential challenges affecting 5G transport network performance. As such, it enables operators to take data-driven actions in their microwave, IP and optical networks when and where needed.

Built on open standards, the Ericsson Transport Automation Controller operates as a multi-domain transport automation solution, enabling seamless integration with third party transport nodes. It natively supports Ericsson's MINI-LINK 6000, Router 6000, and RAN Connect, as well as the full HPE–Juniper router portfolio.

A key capability is streamlined, intent-based service and SLA provisioning. Services are defined once using high-level intent, and automatically translated into end-to-end configurations, policies, and assurance rules across the transport network. This significantly accelerates service activation, reduces manual errors, and ensures that SLAs are continuously enforced and verified through closed-loop automation—rather than being managed by static thresholds and post-facto troubleshooting.

Advanced, built-in programmability is essential for closed-loop automation, enabling the network to not only observe conditions but also act on insights in real time. The controller continuously validates service behavior against defined intent and SLA commitments, autonomously optimizing performance and triggering remediation when deviations occur.

Other key features include AI-driven anomaly detection, root-cause analysis, predictive maintenance, real-time synchronization assurance, and AI-based network diagnostics—enabling faster issue resolution, higher service reliability, and predictable service outcomes at scale.

The transport automation controller performs actions that can be grouped into three key categories: observe, analyse, and act.



Observe

Ericsson Transport Automation Controller provides real-time visibility while collecting granular telemetry data from the network. Combined with a comprehensive understanding of network topology, resources, and services, this serves as the basis for leveraging AI/ML in subsequent phases.

Its interactive maps and configurable dashboards offer a straightforward and user-friendly experience through a single interface, allowing for example for synchronization monitoring and enhanced visibility of resilience, jamming, spoofing, visualization, and detection.



Analyse

The Ericsson Transport Automation Controller uses AI/ML to systematically analyse network data, with advanced algorithms processing large volumes of real-time information. This approach provides comprehensive visibility into service routes and eliminates uncertainty regarding which links or segments are carrying traffic and services. As a result, it enables a more accurate understanding of network activity and the underlying causes of any performance issues.

Furthermore, AI agents help detect misconfigurations, provide network audit assessments, and resolve configuration errors. Agentic AI-powered network diagnostic and advisory services enable a proactive, preventive, and service-centric approach, helping to master the invisible challenges in network environments.



Act

After the observation and analysis phases, transport network configurations can be automated and optimised to improve operational efficiency. Automated changes can be triggered by alarms, events, or detected topology or configuration changes within the network. For instance, the energy consumption of microwave links can be reduced by shutting down carriers when traffic is low, ensuring resources are used effectively and sustainably.

Another example is the IP layer, which can be rerouted to a low-congestion or low-latency path through the network based on current or predicted metrics.

Transport Automation Controller offers programmable northbound interfaces that connect the SDN controller to APIs, and Ericsson intends to extend this strategy to the southbound layer as well, enabling third-party SDN controllers to interface seamlessly with switches, routers, and other network elements. This approach facilitates multi-vendor interoperability while providing the flexibility and scalability required as networks continue to evolve.



Ericsson Transport Automation Controller for packet fronthaul

Packet fronthaul is driven by a fundamental architectural shift—replacing static, point-to-point mappings between radios and baseband resources with a dynamic, network type connectivity model. This evolution modernizes traditional RAN architectures and enables Centralized RAN and Open RAN implementations. By delivering greater efficiency, flexibility, scalability, and resilience, packet fronthaul serves as the critical bridge between the RAN and transport domains.


Moreover, by converging fronthaul onto standard Ethernet transport, it also prepares the network for future RAN evolution with flexibility to be optimized using AI-driven, closed-loop automation. Compared to backhaul, packet fronthaul imposes transport requirements that are orders of magnitude more stringent—across latency, capacity, jitter, packet loss, and synchronization accuracy. These extreme requirements fundamentally challenge traditional, reactive network management approaches, which were never designed to operate at this level of precision and responsiveness.

Packet fronthaul is therefore increasingly viewed as an inherent extension of the RAN itself, as the transport network must tightly interconnect geographically distributed radio units to centralized or cloud based basebands. This tight coupling places considerable pressure on the transport infrastructure—not only to meet strict SLAs for latency, availability, packet loss, and synchronization assurance, but also to maintain an accurate, real-time understanding of the fronthaul topology, its endpoints, and the quality of timing distribution across the network. Equally critical is the ability to rapidly detect, localize, and categorize anomalies as they emerge.

As fronthaul architectures become more dynamic and distributed, deep visibility into how sites, radios, and basebands are interconnected, how timing is propagated, and where degradations or failures occur becomes essential. In this environment, intelligent automation is no longer optional—it is a prerequisite for delivering resilient, high performance RAN operations at scale.

This is where the Ericsson Transport Automation Controller comes into play. Used for Ericsson and HPE-Juniper's backhaul, edge and core, it supports the latest AI/ML-powered features and provides a competitive advantage for mission-critical, ultra-time-sensitive networks that require uncompromised availability and performance.

In addition, the transport controller supports Ericsson's [RAN Connect](#) product, a high-capacity packet fronthaul and sidehaul solution that enables CSPs to optimise efficiency and scalability across their radio access networks.



Key takeaways and operational outcomes

The Ericsson Transport Automation Controller delivers significant advancements in network management by minimising complexity, maximising performance, increasing efficiency, and reducing costs.

Compared to traditional network management approaches, live network data demonstrates significant operational gains. There is a 40% reduction in site visits and up to a 50% decrease in outages on critical links. These benefits not only elevate the customer experience but also empower network operators to adopt a more proactive stance in operations.

Moreover, the transport controller accelerates mean time to repair by up to 60%, leading to considerable reductions in alarm frequency and enabling intelligent issue detection. In addition, CSPs can achieve a 25% reduction in energy consumption, resulting in fewer SLA violations and improved CAPEX savings.

The Ericsson Transport Automation Controller further minimises operational expenses by efficiently identifying network issues, speeding up resolution times, and optimising routes to ensure service assurance. Its support for a self-healing and self-optimising network contributes to superior performance and quality of service, offering clear market differentiation.

Looking ahead, the integration of Agentic AI engines enables troubleshooting and self-healing to occur up to 100 times faster, compressing resolution cycles from days to hours or even minutes. This capability is a critical milestone toward achieving fully autonomous networks.

Results indicate that AI-driven automation is instrumental in the rapid evolution from network-centric to service-centric and intent-based network management. This transformation ensures that mobile backhaul and packet fronthaul networks are transparent rather than opaque 'black boxes'. By seeing previously hidden elements, CSPs can unlock the full potential of 5G and prepare their networks for future demands.

Executive Comments

“Autonomous networks are defined by closed intelligence loops—where networks continuously observe, reason, and act with minimal human intervention. Ericsson Transport Automation Controller brings this vision to the transport layer, for both Ericsson and HPE-Juniper products, elevating it from reactive operations to a predictive, self-optimizing system. By acting on real time insights and automated control, transport networks can dynamically adapt to changing conditions, intent, and service requirements, while maintaining resilience, performance, and efficiency at scale.

“The transport controller represents a decisive step toward autonomous networks. By transforming vast amounts of transport data into actionable intelligence and automated control, it enables networks that continuously optimize themselves—aligned with operator intent, business priorities, and the ever evolving demands of digital services.”

Jari Augustin

Head of Transport Automation, Ericsson

“HPE Networking’s inclusion in the Ericsson Transport Automation Controller marks a significant milestone in our long standing collaboration with Ericsson. Building on more than 20 years of partnership, we are jointly extending automation and intelligence across routing, switching, and security—complementing Ericsson’s transport portfolio to support truly end-to-end network operations.

“Through Ericsson’s verification, management, and automation capabilities, customers can now experience the full benefits of the transport controller across microwave, fronthaul, access, and further into edge and core. This creates a unified automation layer that simplifies multi vendor environments and accelerates the move toward autonomous network operations.

“We are now placing the Ericsson Transport Automation Controller at the heart of our strategic focus—serving as the foundation for scalable automation, operational simplicity, and long term innovation.”

Fredrik Lindell

Head of Ericsson Alliance, HPE Networking



About Ericsson

Ericsson's high-performing networks provide connectivity for billions of people every day. For nearly 150 years, we've been pioneers in creating technology for communication. We offer mobile communication and connectivity solutions for service providers and enterprises. Together with our customers and partners, we make the digital world of tomorrow a reality.

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