

SOLUTION BRIEF

AI-Powered Predictive Care: Turning Network Risks into Preventive Action

NOKIA



Nokia Predictive Hardware Analytics and Predictive Software Analytics help operators move from reactive troubleshooting to proactive, AI-assisted and increasingly autonomous network operations.

By combining Predictive Hardware Analytics and Predictive Software Analytics, multi-source operational data, GenAI-powered intelligence, and an Agentic AI framework, Nokia enables operators to predict risks, diagnose likely root causes, recommend the next best action, and support execution before issues affect customers.

The solution helps detect:

- Hardware risks up to 14 days in advance, with more than 85% confidence
- Software performance anomalies up to 3 days in advance, with up to 95% confidence

Crucially, the service goes beyond prediction by delivering customer-specific, tailored action recommendations, enabling operators to take the optimal action aligned with their business priorities, operational policies, and regulatory requirements.

Developed with Nokia Bell Labs expertise, the underlying GenAI models leverage a deep telco knowledge base, ensuring high accuracy, explainability, and continuous learning.

Patent awarded for the **Predict Hardware Analytics** solutions.



Hardware risk
prediction up to
14 days in advance
with **+85% confidence**

Software anomalies
prediction up to
3 days in advance
with **95% confidence**

The challenge

Network operations are becoming increasingly complex as operators manage multi-vendor, cloud-native, and highly distributed environments. Traditional operating models still rely on alarms, manual troubleshooting, fragmented data sources, and reactive maintenance. This creates a number of challenges:

- Service-impacting incidents often detected too late
- Root cause analysis is slow and manually intensive
- Hardware and software risks are analyzed separately
- Field interventions, emergency callouts, and spare-part decisions are often inefficient
- Operational teams lack a unified, customer-specific view of what action to take next

At the same time, operators must **improve service quality**, relentlessly **reduce operating costs**, and **increase automation** without losing control or compliance.



Nokia's Predictive Hardware and Software Analytics provides a unified, AI-native approach to proactive care.

The solution

The solution combines predictive analytics, Gen-AI powered data intelligence, and agentic decisioning to transform operations from separate prediction and troubleshooting workflows into a coordinated decision and prevention system.

This holistic solution is built on an extended, multi-source data foundation, integrating data from network management systems (e.g. Nokia MantaRay).



Configuration and change management data



Hardware telemetry, Black Box, lifecycle, and repair data



Performance counters and KPI data



Topology, inventory, and dependency data



Fault management and alarm data



Contextual data

A key strength of this approach is the incorporation of “ground truth” operational data - real network behaviors, historical incidents, and validated outcomes - ensuring that AI models are trained on accurate, real-world telco scenarios, significantly improving prediction quality and trustworthiness.

The solution's GenAI capabilities, developed with Nokia Bell Labs, leverage this rich data foundation to build telco-specific large language models (LLMs), enabling deeper context understanding, improved correlation, and more explainable insights.

How it works

At the core of the solution is an Agentic AI framework, where specialized AI agents continuously collaborate to:

- Detect anomalies and predict risks
- Correlate multi-source data and determine root causes
- Generate prioritized, context-aware recommendations
- Trigger workflows and automate or support execution

Unlike traditional analytics solutions, Nokia's service is designed as an action-driven system. It not only predicts what will happen, but also recommends what should be done, tailored to each operator's unique environment.

Specialized AI agents work together across the operational lifecycle:

Prediction agent - identifies hardware risks, software anomalies, and potential service-impacting events before they occur.

Root cause agent - correlates alarms, KPIs, logs, topology, configuration, repair history, and dependency data to identify the most likely cause.

Recommendation agent - generates prioritized next-best actions based on SLA impact, site criticality, cost, policy, field-force constraints, and operational history.

Decision agent - selects or supports the optimal action based on customer-specific rules, business priorities, and automation permissions.

Execution agent - triggers or supports workflows such as ticket creation, dispatch, rollback, spare-part planning, or preventive action.

Customer priority agent - adapts decision logic to each operator's environment, policies, regulatory constraints, and business objectives.

Key capabilities

Nokia's solution enables predictive and increasingly autonomous operations through a tightly integrated set of capabilities.

The service delivers cross-domain predictive intelligence, identifying hardware failures and software anomalies days or even weeks before impact, with high confidence. This allows operators to shift from reactive troubleshooting to proactive issue prevention.

Multi-source data intelligence combines network, service, topology, configuration, inventory, repair, and operational data across Nokia and third-party systems.

A GenAI-powered, multi-source data foundation enables the correlation of diverse data across

domains and operational layers, providing a unified, real-time view of network health.

The Agentic AI orchestration layer ensures that insights are dynamically transformed into actions, with AI agents collaborating in a continuous loop to support real-time decision-making and operational optimization.

A core differentiator is the context-aware recommendation engine, which provides tailored action items, not generic suggestions. These recommendations are aligned with:

- Operator business priorities (cost, performance, sustainability)
- SLA commitments

- Internal policies
- Regional and national regulatory requirements
- Network-specific configurations and operational constraints

The service is delivered as a co-created solution, working closely with customers to adapt models, data inputs, and decision logic to their specific environments, maximizing relevance, adoption, and business impact.

Finally, the solution enables closed-loop operational readiness, where predictions, decisions, and actions are continuously fed back into the system, allowing ongoing learning and performance improvement.

What we deliver

Nokia's solution enables predictive and increasingly autonomous operations through a tightly integrated set of capabilities.

Cross-domain predictive intelligence:

Identifies hardware failures and software anomalies days or even weeks before impact, helping operators shift from reactive troubleshooting to proactive issue prevention.

Multi-source data intelligence:

Combines network, service, topology, configuration, inventory, repair, black box and operational data across Nokia and third-party systems, providing a richer and more unified view of network health.

GenAI-powered contextual understanding:

GenAI capabilities help correlate diverse data across domains and operational layers, improving insight quality, explainability, and decision support.

Agentic AI orchestration:

Framework dynamically transforms insights into actions, with specialized agents collaborating in a continuous loop to support real-time decision-making and operational optimization.

Co-created service model:

Delivered in close collaboration with customers to adapt models, data inputs, and decision logic to their specific environments, maximizing relevance, adoption, and business impact.

Closed-loop operational readiness:

Predictions, decisions, actions, and outcomes are continuously fed back into the system, enabling ongoing learning and performance improvement. Depending on customer maturity and governance, actions can be recommended, approved, triggered, or automated.

Customer-specific recommendations:

Context-aware recommendation engine provides tailored action items, not generic suggestions. Recommendations are aligned with:

- Operator business priorities, including cost, performance, and sustainability
- SLA commitments
- Internal operational policies
- Regional and national regulatory requirements
- Network-specific configurations and operational constraints



Customer value

Nokia's Predictive Analytics services deliver measurable and sustainable business outcomes:

- Prevention of service-impacting incidents through early detection, minimizing site downtime and avoiding outages
- Accelerate root cause analysis across hardware and software domains
- Reduce manual troubleshooting and emergency interventions
- Optimized operations through tailored, actionable recommendations
- Reduced operational costs and manual effort through closed-loop automation
- Improved network availability and service performance
- Optimized field operations, spare-part management and maintenance activities
- Enables a practical path toward closed-loop automation

The solution also contributes directly to sustainability goals by enabling up to **30% reduction in site visits**, minimizing unnecessary site visits and reducing carbon emissions.

Differentiation

Nokia uniquely combines:

- Predictive horizon leadership:
 - Hardware: up to 14 days ahead, >85% confidence
 - Software: up to 3 days ahead, ~95% confidence
- Multi-vendor, multi-source data integration, including third-party systems
- GenAI models developed with Nokia Bell Labs, leveraging deep telco expertise
- Ground truth-driven AI models ensuring accuracy and trust
- Agentic AI framework enabling autonomous, collaborative decision-making
- Customer-specific, context-aware action recommendations (beyond prediction)
- Co-created service model tailored to each operator environment
- Closed-loop automation readiness from prediction to execution
- Strong contribution to sustainability targets (e.g. reduced truck rolls)



Summary

Nokia's Predictive Hardware and Software Analytics services redefine network operations by moving beyond predictive insights toward agentic decision intelligence.

By delivering both high-confidence predictions and tailored, customer-specific actions, powered by GenAI and Agentic AI, Nokia enables operators to transition from reactive troubleshooting to proactive, intelligent, and increasingly autonomous network operations.

The result is improved performance, reduced costs, and a more sustainable operational model - tailored to each customer's unique environment.

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