NumoData IPMon:
Deliver superior digital experiences through autonomous network assurance

The state of service assurance
Network operations are becoming one of the biggest cost burdens in telecom. The World Economic Forum estimates that CSPs operating costs already consume 65–70% of revenue, and that network operations alone will account for 50% of total OpEx by 2027. As 5G, cloud-native cores, and multi-vendor environments expand the network surface, monitoring and troubleshooting are becoming significantly more complex. Yet many operations teams are still stuck in a reactive, "fix-when-broken" model: dispatching technicians, replacing equipment, deploying truck rolls, and resolving incidents after customers are already impacted.

The end result?
Millions spent on preventable OpEx, customers churn; brand trust erodes, and operational efficiency suffers.

Most operators are stuck in a "closed loop" of reactive firefighting.

Service activation failures:
Half-done turnups trigger mistrust, repeat calls, and unnecessary truck rolls.

Unpredictable performance:
Inconsistent peak and troughs break experiences and SLAs.

Broken digital journeys:
Slow, frustrating experiences drive users to churn and switch providers.

Temporary resolutions:
Expanding multi-domain networks makes it harder to pinpoint faults, stretching resolution times, and overloading teams.

Capacity bottlenecks:
Multidevice homes, 5G slices and private networks stall as limited bandwidth strands them at critical moments.

Complex change management:
Networks are in constant flux. Any planned change can trigger operational disruption and customer pain.

Without the right tools, operations and engineering teams become trapped in a reactive loop, with no time left for proactive optimization, automation, and innovation.

The answer? NumoData IPMon.
IPMon is a cloud-native active service assurance solution that helps operators validate services from day one, continuously monitor real customer experience, and pinpoint issues before they become churn, truck rolls, or SLA breaches. Powered by distributed test agents, intelligent anomaly detection, advanced analytics, and AI-driven automations, it gives operations and engineering teams end-to-end visibility and the ability to close the loop from the core to the customer's edge.

IPMon is AI-ready
IPMon goes above and beyond traditional monitoring by turning active tests into rich, structured signals that downstream AI can understand and act on. It continuously monitors, tags, correlates, and prioritizes anomalies, so downstream AI systems and automation platforms receive prioritized, and reliable insights instead of confusing noise. With built-in analytics, anomaly detection, and agentic AI, IPMon becomes both a high-quality data source and an enabler for AI-driven, closed-loop operations.

IPMon technical specifications

Architecture

Tests and measurements	
Verifiers	**Microverifiers:** A lightweight, active test agent designed for deployment in Kubernetes & non-Kubernetes environment, containerized edge environments, CPE, and customer adjacent locations. **Physical verifiers:** Commercial-off-the-shelf based physical verifiers assure endpoints for hybrid deployments, migration and hardware-based monitoring use cases. **Virtual verifier:** Software-based verifiers with the functionality of a physical verifier. Deployable on supported virtualized platforms for flexible in-network assurance without dedicated hardware dependency.
Supported tests by layer	**Transport and Ethernet assurance:** TWAMP, STAMP, Y.1731, Y.1564, RFC 2544, RFC 6349, Ethernet reflector, TCP/UDP echo. Loopback and throughput testing **IP and service assurance:** Ping, traceroute, DNS, DHCP, PPPoE, LDAP, HTTP/HTTPS, HTTP/2, QUIC, speed test, OTT, and WebRTC **Voice, IMS, and 5G assurance:** SIP, VoLTE, Diameter, 5G NIT, segmented 5G monitoring and active test scenarios over GTP.

Tests and measurements	
Measurable KPIs	**Performance KPIs:** Latency, one-way and round-trip. Delay, jitter, packet loss, availability, and throughput. **Service activation KPIs:** Delay, delay variation, frame loss, rate compliance, out-of-sequence and burst performance. **Path level KPIs:** Traceroute, hop analysis, and segmented transport visibility. **Application level KPIs:** Measured across DNS, HTTPs, OTT, WebRTC, and speed-test-aligned service validation.
Configuration management and control	**QoE and QoS KPIs:** Indicators across broadband, mobile, FWA, 5G and private networks. IPMon centrally defines and pushes test policies to all verifier types, then continuously collects results and feeds them into analytics, SLA validation, anomaly detection, and troubleshooting workflows. Can be integrated well within the operator ecosystem.
Supported platforms	**Public cloud:** Amazon Web Services, Google Cloud Platform, Microsoft Azure, Red Hat OpenShift, Rafay-managed environments. **Private cloud:** Supports private clouds with a Kubernetes-based or bare metal environment **Customer premises equipment (CPE):** IPMon supports active testing on CPE/RG devices **Android:** Extends active testing on Android smartphones.
Operational analytics	**Reporting types** **KPI visualization and dashboards:** Centralized and customizable dashboards for service, transport, application, and customer experience indicators **Trend analysis:** Historical and real-time views of KPI evolution, threshold drift and persistent degradation patterns **Multi-dimensional analysis:** Correlation of results across service, geography, site, device, customer segment and technology domain.

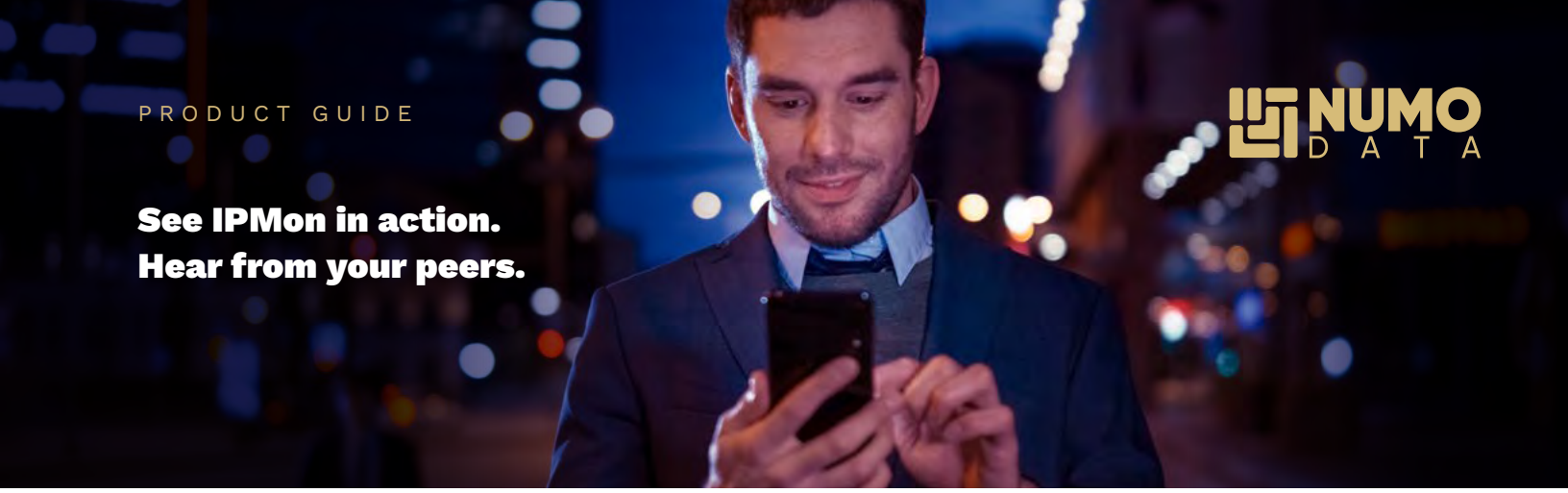
Tests and measurements	
Operational analytics	**SLA validation and reporting:** Alignment of measured KPIs to pass/warn/fail thresholds and customer or service-level commitments **Forecasting and clustering:** Pattern recognition workflows for capacity and trend analysis, clustering and post-change comparisons **Use case specific dashboards:** Dedicated dashboards for service turnups, RG assurance, transport latency, OTT visibility, and similar operations **Data aggregation and slicing:** Flexible filtering, grouping, and drill down across services, locations, devices, and customer segments to crunch numbers and reveal patterns
Anomaly detection	**Rule-driven anomaly detection:** Detects issues based on configurable metric rules **Adaptive and contextual alerting:** Adjusts alerts using context, condition and historical patterns **Tagging and case enrichment:** Labels and enriches anomalies with useful metadata **Correlation and grouping:** Groups related anomalies into fewer, richer cases **Workflow-ready outputs:** Sends alerts to external tools and workflows for action **Insight to action:** IPMon translates anomaly information into guided next steps to drive rapid issue resolution
Integration capabilities	**Northbound integrations** • REST API integration for centralized management, reporting, provisioning, and data exchange. • Converts data into actionable recommendations and triggers that integrate with external systems, enabling end-to-end operational automation. • Compatible with third party performance management (PM), Fault management (FM), Element management (EM), and infrastructure data

Tests and measurements	
Integration capabilities	**Southbound integrations** • REST API integration for centralized management, reporting, provisioning, and data exchange. • Interoperates with standards-based loopback devices, third party endpoints, and compliant responder equipment wherever supported. • Correlation with external data sources with and related analytics workflows
Security and access	• SSO-based central user access • Authentication through Active Directory, Lightweight Directory Access Protocol (LDAP), LDAPS and federation • Role-based user and rights management for operational personas • User logs and audit visibility **IPMon follows modern security best practices, including container image scanning, encryption of data in transit and at rest, and secure handling of certificates.**
Standards and compliance	Transport and activation standards: **TWAMP, STAMP, Y.1731, Y.1564, RFC 2544, and RFC 6349** Service and application standards: **HTTP/S HTTP/2, QUIC, DNS, DHCP, PPPoE, LDAP, SIP, VoLTE, Diameter, and 5G NIT** Complies with industry standard tools and technologies
Scale and performance characteristics	• Proven at scale with 24 million tests per hour • Combination of tests/configurations per verifier and up to 10Gpbs per verifier. • 100% network and device visibility • 80% Mean Time to Resolve (MTTR) • 75% more accurate root cause analysis • $50M USD saved in OpEx *These are the general benchmarks observed across real-world IPMon customer deployments.

How does NumoData IPMon differentiate itself?

Built on decades of service assurance expertise, with live deployments in tier-1/tier2 CSPs across the broadband, mobile, and private 5G.

Dimension	NumoData Ontology	Market alternatives
Test agent deployment	Microverifiers, virtual, and physical test agents that are lightweight and cost-effective give teams the freedom to place tests in the cloud, core, RAN, edge, and CPE, and even mobile phones without ripping and replacing existing infrastructure.	Limited virtual test agents confined to a few network domains with heavy reliance on physical probes that demand parallel stacks or disruptive replacements. Most alternatives only support specific test types or partial segments of the network, rather than true end-to-end coverage
One-way active measurement	Universal virtual sync provides highly accurate one-way delay measurement using active probes and virtual clocks to measure delay and jitter at scale.	Basic round-trip tests; one-way metrics require complex timing or are approximated and cannot be done at scale.
Experiential assurance	Active tests over GTP tunneling protocol and segmented 5G paths tell operators what customers are experiencing, not just if the network is “up”.	Lack of or limited understanding of user experience. Unable to dig into slices and segment- level validation.
Application-level insight	A rich catalog of over 140 test types from basic connectivity to advanced voice, video, gaming, and VPN assurance that are vendor and domain independent.	Primarily focused on transport level KPIs, with limited test coverage and dependence on specific vendors or domains.
Analytics and AI readiness	Goes beyond raw metrics and turns active tests into AI-ready signals for anomaly detection, downstream analytics and autonomous operations	Raw metrics are simply handed off to external tools, covering only a small fraction of the closed loop autonomy story.
Integration-first	Streams alerts and metrics into OSS, analytics and automation platforms via a breadth of integrations with existing toolchains	Traditional tools often become another silo or integrate only via basic SNMP or batch exports, which limits AIOps and broader real world use cases.
Topology aware root cause isolation	With network context and understanding delivered by NumoData Ontology, IPMon can align anomalies with topology so root cause isolation follows real network relationships rather than just a list of alarms	Traditional monitoring typically works per domain or per device, forcing teams to manually stitch together topology and make decisions based on uncertain assumptions.
Self-learning networks	Anomaly detection combined with advanced operational analytics can learn network behavior over time to improve network performance dynamically.	Legacy systems rely on static thresholds and hand-crafted rules, so they either miss complex issues or flood teams with false positives, limiting performance and trust.
Trust	Proven rapid deployment model with predictable time-to-value, agile rollouts, and reliable scaling across Tier-1 and Tier-2 networks worldwide.	Long, resource-intensive projects that demand large-scale deployments, costly customizations, and slow, risky paths to value.



PRODUCT GUIDE

See IPMon in action. Hear from your peers.

Tier-1 CSP in the US

100% | 24/7 | 80% | 75%

The operator achieved 100% network and device visibility for its on demand 5G private networks with 75% more accurate root cause analysis and 80% faster Mean Time to Resolve (MTTR).

Tier-1 CSP in the US

50% | 30% | 50M+ USD

A renowned tier-1 CSP in the US achieved 50% faster issue detection and 30% faster resolution at the broadband gateway, cutting unnecessary truck rolls and avoiding over $50M USD in OpEX while significantly improving NPS.

Turn network intelligence into powerful customer experiences

Discover how NumoData IPMon enhances visibility, identifies patterns, captures anomalies, pinpoints right root causes and unifies reporting that takes you into proactive closed loop autonomous assurance.

Schedule a meeting »

About NumoData

NumoData is a global software company delivering AI-powered network intelligence, AIOps, and analytics for CSPs and enterprises. We are a trusted partner that helps your organization augment existing systems with generative AI, predictive analytics, advanced autonomy, and end-to-end monitoring across mobile, broadband, and private 5G, enabling superior operations and customer experiences.