JUNIPER PARAGON AUTOMATION—CLOSED-LOOP REMEDIATION

Enhance customer experiences with proactive, automated problem detection, analysis, and resolution, even before end-users are impacted.

Challenge

The global economy increasingly relies on dependable, excellent connectivity, while networks are becoming exponentially more complex. Automated closed-loop remediation is an important enabler in managing this complexity, but it needs to be simple to use, cost-efficient, and future-proof.

Solution

Juniper Paragon Automation enables closed-loop remediation by automating the detection and remediation of network outages and other problems in the transport network. It leverages active and passive network observability to eliminate network blind spots, autonomously solving problems and preventing poor customer experience.

Benefits

- *Eliminate human error with autonomous networking*
- *Differentiate through better SLA guarantees and more reliable connectivity*
- *React in real time to customer experience anomalies*
- *Manage multivendor networks seamlessly*

Solution Brief

Global network traffic has been growing exponentially for years, but today, trusted, reliable network connectivity is mission critical, alongside the expectations of end users. Connectivity quality is increasingly the deciding factor for customer acquisition and loyalty, and new enterprise business acquisition.

With new network services like multiplayer gaming, multimedia conferencing, electric vehicle charging, live broadcasting, and remote interactive classes, customers expect a flawless experience. That means you need no less than a flawless transport network, which is possible through an autonomous network enabled by Juniper® Paragon Automation.

Building autonomous networking solutions for closed-loop automation has proven prohibitively costly, complex, and lengthy. The result is typically difficult to operate and maintain, heavily reliant on highly expert staff, expensive, and not scalable. With closed-loop remediation, enabled by Paragon Automation, Juniper has taken 30 years of expertise with the world's largest, most demanding networks, and made it simple to use, powerful, and easy to deploy.

The Challenge

Three key challenges stand in the way of successfully implementing closed-loop remediation in the transport network: lack of end-to-end visibility; manual and error-prone network operations; and ineffective DIY network automation systems.

You can't act on what you can't see. End-to-end visibility is vital to detecting and resolving transport network issues. When your network experiences an outage, potentially millions of customers, and millions in revenue, are directly impacted. But the fact is that today, 60% of network problems are not detected by network operations teams. That means most of the time, you'll learn about outages from irate customers, after the damage is done. The root cause of this is that communication service providers still monitor customer experience by approximation, based on network resource performance, providing an incomplete, inaccurate view of customer experience, with blind spots everywhere.

Too often, network operations today is an exercise in damage mitigation: not proactive but reactive. It can take hours, sometimes days, to locate and fix a major outage. Only by combining active assurance to monitor user-plane traffic on the network, with network telemetry data, will you gain full end-to-end visibility of customer experience.

With flexibility comes complexity. Today's transport networks are programmable to such an extent that the range of configurations, both active in the network and available to your operations team, is so great as to render network optimization through manual operations alone impossible. And yet today, still 75% of networking activities are manual. That leads to sub-optimal configurations, errors, slow response times, and ultimately unreliable networks.

Network automation systems are difficult to get right. They take months, or even years, to build. The fact is that 70% of DIY network automation projects fail. Closed-loop remediation is a casualty of this, as it relies on modern network automation technology. With Juniper Paragon, Juniper has integrated the latest technology building blocks for closed-loop remediation so you don't have to, and made it easy to deploy and simple to use.

Closed-Loop Remediation with Juniper Paragon Automation

Closed-loop remediation removes the dependency on highly skilled staff and manual operations, so you can avoid long outages and fix problems in minutes, in most cases without the end user even noticing. It continuously monitors your transport network, detects issues, identifies problematic network elements, and automatically re-computes and re-routes all network traffic around them, in a matter of seconds.

To speed mean time to repair, closed-loop remediation with Paragon Automation provides your operations teams with simple-to-navigate and color-coded dashboards and reports, to guide them through the root-cause identification process, right down to the most granular level. Misconfigurations, misbehaving processes, power outages, failed software updates, overheating; wherever the problem is, your team is empowered to quickly identify and fix it.

When the problem is resolved, closed-loop remediation through Paragon Automation automatically triggers another re-computation and re-routing, so that traffic can again pass through the now fully operational network elements.

Features and Benefits

Paragon Automation makes closed-loop remediation elegantly simple and efficient. It automates the detection and remediation of network outages and other problems in the transport network while leveraging active and passive network visibility to eliminate network blind spots, autonomously solve problems and prevent poor customer experience.

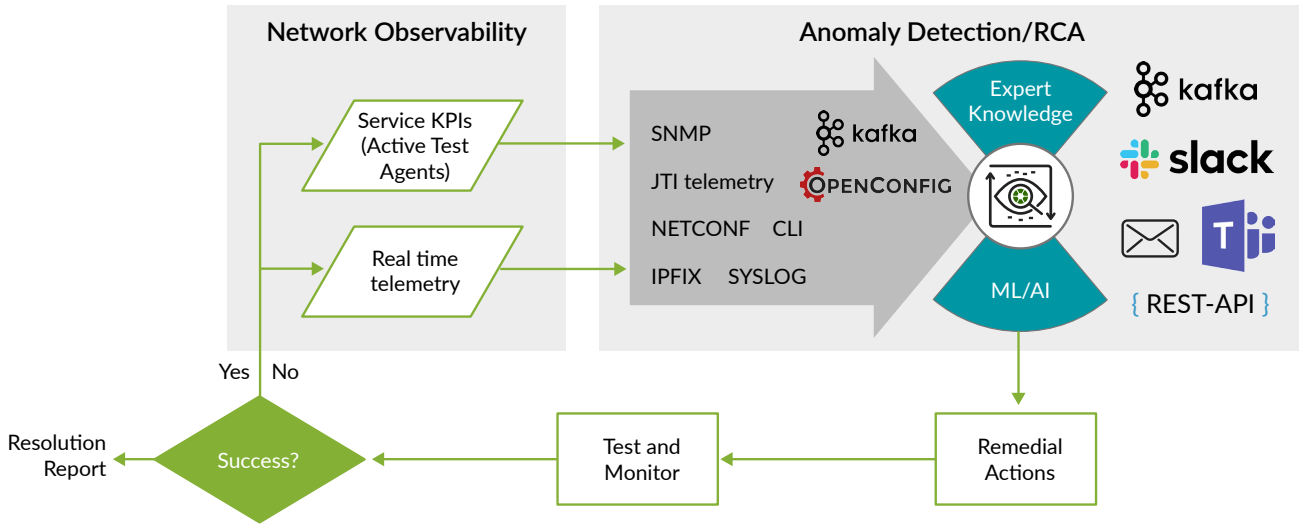

Figure 1: An overview of the processes and capabilities involved in closed-loop-remediation

Table 1: Features and benefits of closed-loop remediation, enabled by Paragon Automation

Feature	Benefit
Real-time, end-to-end network visibility based on device telemetry and active performance metrics. Active performance is measured by sending synthetic traffic on the data plane, from Layer 2-7, to simulate end-user sessions, for continuous end-to-end and per-segment monitoring of customer experience KPIs like delay, jitter, and throughput.	Eliminates blind spots by detecting user-plane performance degradations, not just network resource problems. Proactively detects service quality degradations and SLA violations, to resolve issues before customers are impacted.
Highly flexible data source integration and analytics, with "bring-your-own ingest," multivendor KPI normalization, Machine Learning-based root-cause analysis algorithms and predictive anomaly detection. System-agnostic and user-configurable analytics "Playbooks" support flexible triggering of automation flows, notifications, and other actions with peripheral systems.	Accelerates time-to-value and maximize ROI by quickly establishing interoperability with third-party data sources, enabling visibility across a broad set of stakeholders, and enhancing detection time and accuracy.
Powerful SLA-driven path computation engine (PCE) that leverages the "active stateful PCE" concept as defined by IETF RFC 5440, supports dynamic topology discovery, and provides automated global optimization of end-to-end network paths, Label Switched Paths LSPs).	Maintains service integrity during network outages by quickly re-calculating all paths for optimal SLA performance. Enhances network reliability with automated Shared Risk Link Groups (SRLGs) creation.
Multivendor support with open programmability based on standardized OpenConfig and Yet Another Next Generation (YANG) models.	Implements closed-loop remediation in multivendor networks.
Multiple routing protocols, including RSVP and Segment Routing protocols such as SR-MPLS and SRv6, are supported.	Future-proofs your closed-loop remediation capability as your routing infrastructure evolves.

Solution Components

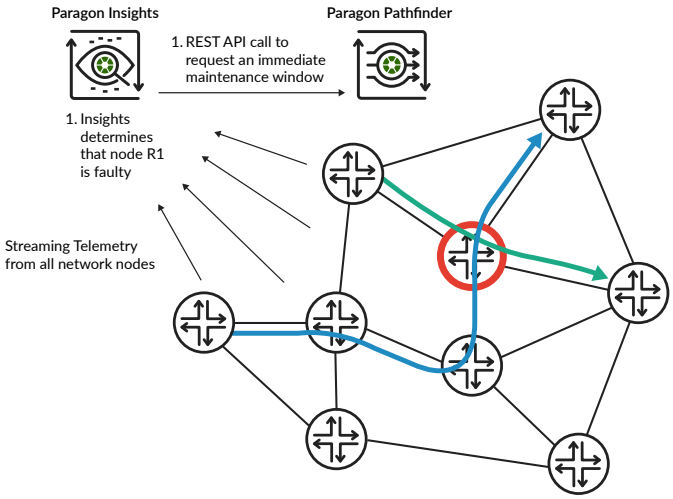

Figure 2: Paragon Automation powers closed-loop remediation

Closed-loop remediation is powered by the Paragon portfolio. The Paragon Platform provides a consistent user interface that integrates streaming telemetry and user-plane active testing and monitoring, AI-powered analytics and automation, and real-time path computation. The combination of Paragon Automation, Active Assurance, and the Paragon Platform enable these closed-loop remediation requirements:

Streaming telemetry analytics and automation: Provides real-time resource telemetry data, such as CPU utilization, throughput, jitter, latency, and availability. Triggers remedial action in response to dynamic threshold crossings, anomalies, and other user-definable events. Examples include triggering maintenance events, rollbacks, reconfigurations, and performance optimizations.

Real-time path computation: Provides a powerful IETF-compliant path computation element, which calculates and deploys optimized end-to-end traffic paths in the transport network to completely avoid problematic routers when triggered by an outage, or a precursor anomaly or event. The multivendor, cross-domain path computation engine supports optimization policies including latency, bandwidth, packet-loss, Traffic Engineering (TE) metrics, and disjoint paths. Other key capabilities include automation of Shared Risk Link Groups (SRLG) path diversity, and bandwidth calendaring.

Active assurance for data-plane testing and monitoring: Provides active data-plane KPI monitoring and on-demand measurements, by deploying software-based test agents across routers in your network, as well as in third-party domains, such as cloud service providers. Alongside streaming telemetry, it provides enhanced, real-time network observability and forms the basis for remediation based on perceived customer experience. It complements telemetry data by providing visibility of customer-impacting issues where telemetry data alone may not. It also enables proactive monitoring: measuring performance using synthetic traffic, to simulate network usage even if there is no live traffic.

Based on the cloud-native architecture of Paragon Automation, closed-loop remediation allows you to quickly support new devices as your network expands. Paragon Automation is infinitely flexible. It can be rapidly configured to cater to your specific network requirements, such as managing specific enterprise SLAs or policies, from a single, intuitive user interface.

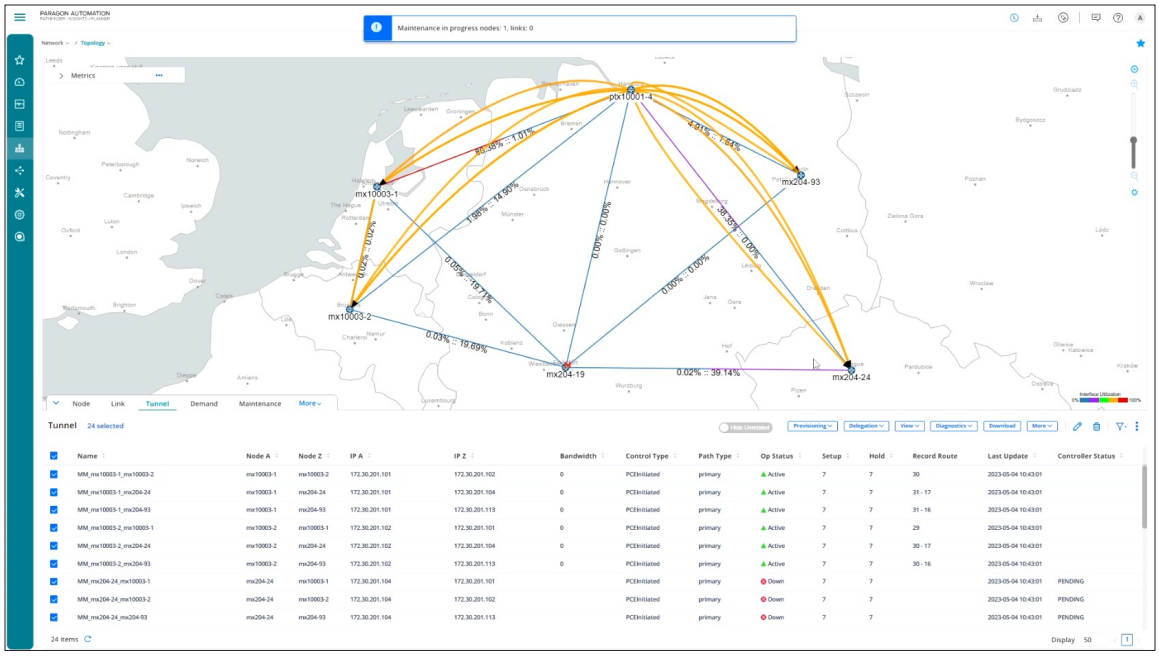

Figure 3: Closed-loop remediation re-routes all traffic around a problematic node.

Summary–Better experiences, without the complexity

Taking the first steps to truly autonomous networking does not have to be difficult. Join Juniper's growing list of Tier-1 customers taking advantage of 30 years of experience and best practice from leading network operators around the world. Free up your highly skilled experts through automation, so they can focus on creating value, not endlessly fighting fires. Empower more staff with a simple and intuitive user interface, so you can grow your business without compromising on network excellence.

Closed-loop remediation, enabled by Paragon Automation, is proven to significantly enhance network performance and reliability while reducing costs and reliance on skilled staff. Ask us for a demo today.

Next Steps

- Read this blog post on automated fault detection and remediation
- Contact your Juniper account representative to schedule a demo today!

About Juniper Networks

At Juniper Networks, we are dedicated to dramatically simplifying network operations and driving superior experiences for end users. Our solutions deliver industry-leading insight, automation, security and AI to drive real business results. We believe that powering connections will bring us closer together while empowering us all to solve the world's greatest challenges of well-being, sustainability and equality.

Juniper Networks | Driven by Experience™

APAC and EMEA Headquarters
Juniper Networks International B.V.
Boeing Avenue 240
1119 PZ Schiphol-Rijk
Amsterdam, The Netherlands
Phone: +31.207.125.700
Fax: +31.207.125.701

Corporate and Sales Headquarters
Juniper Networks, Inc.
1133 Innovation Way
Sunnyvale, CA 94089 USA
Phone: 888.JUNIPER (888.586.4737)
or +1.408.745.2000 | Fax: +1.408.745.2100
www.juniper.net

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