

Avoiding Network Fires: How to Achieve Early Detection with VisionWorks

Introduction

Typically, communications service provider (CSP) network teams operate within siloed structures, where each team focuses on specific portions of the network. This compartmental approach, reinforced by point solutions that provide narrow, localized insights, makes it challenging to gain a holistic view of network performance. These tools, while effective for isolated troubleshooting, lack the capability to correlate data across the entire network, leaving gaps in understanding and response.

For a North American Tier 1 CSP operating in this environment, engineers were primarily concerned with ensuring their assigned areas were free of performance issues. When problems arose, their analysis was confined to the specific segment of the network they managed, often without visibility into how issues in other areas might be interconnected. This fragmented approach hindered proactive troubleshooting, delayed root-cause identification, and left the CSP vulnerable to customer-impacting, system-wide problems that went undetected until they escalated.

Additionally, resource constraints compounded these challenges. A reduced workforce and competing priorities, such as deploying 5G technologies while maintaining 4G performance, left teams stretched thin. Without solutions that could provide end-to-end visibility of the network and insight into the interconnected impact or relationships of issues across the network, teams could only deal with these issues after they escalated into outages.

Highlights

- **Optimized engineering resources:** Automating testing and troubleshooting allowed teams to concentrate on newly emerging and complex network challenges
- **Decreased war room meetings:** Early problem detection — up to eight hours before outages occurred — minimized costly, large scale network troubleshooting efforts
- **Accelerated, precise troubleshooting:** Holistic network monitoring with advanced correlation and insight enabled teams to shift to proactive and highly accurate issue resolution using fewer engineers
- **Increased subscriber satisfaction:** Fewer outages and faster problem resolution ensures greater network reliability and customer satisfaction

Establishing End-to-End Correlated Insight

In order to overcome these resource and priority concerns, the CSP implemented VisionWorks to provide end-to-end visibility to network performance. This gave them the ability to correlate data from different locations across the network to generate insight for quick problem isolation and remediation.

“Rather than just giving engineers data and errors, VisionWorks gives them actionable alerts,” said Patrick Leihy, principal systems engineer at Keysight. “VisionWorks can test the entire end-to-end network, confirm the problem, and then drill down to diagnose the exact location and cause. This detail along with the next steps that the team should take is provided in any alert. It allows the CSP to assign a few people to quickly resolve an issue, rather than 60 engineers to put out a network fire.”

In addition to ingesting and correlating multiple sources of data, the CSP partnered with Keysight experts to determine key triggers of major outages and build intelligent alarms in VisionWorks. These alarms detect multiple concurrent variables across network segments to give engineering and support teams time to respond and eliminate outages before they impact subscribers.

“After implementing VisionWorks, we sat down with the team and asked what their most common problems were,” said Leihy. “Upon understanding the conditions and the associated key performance indicators (KPIs) the teams looked for to signify problems, we built advanced KPIs and signatures so VisionWorks automated detection, testing, and reporting of these issues. This means the engineering team doesn’t have to manually monitor these issues anymore or conduct investigations.”

Freeing up engineering resources from testing and troubleshooting common issues paid dividends as their engineers were able to focus more on newly emerging and complex problems impacting the network. As new issues were detected, Keysight worked with the CSP to configure the solution to consolidate and analyze alerts and KPIs from multiple sources, enabling engineers to quickly diagnose root causes. This setup streamlines detection and diagnosis, providing earlier detection of new issues, and allows engineers to create signatures to automate future responses.

Identifying the Smoke to Prevent Future Network Fires

Recently, a significant multiday outage occurred that disrupted the services of millions of subscribers across the United States. The VisionWorks system was one of the first to detect the issue, identifying anomalies in network traffic caused by a malfunctioning network signaling component. Its unique capabilities proved pivotal in uncovering the root cause, enabling a swift and targeted response. In their investigation, engineers were able to uncover other KPIs that indicated the source of the network outage. As they looked deeper into interactions between different network nodes, it was discovered that certain KPIs, referred to by the support team as “the smoke,” started the night before the outage, eight hours before customer experience was impacted.

The team then constructed signatures to detect these KPIs and generated reports showing the anomalies occurring and impacting the network. These reports were shared with the engineering VP, who ordered all teams in the organization to use the report and signatures to identify locations and understand how pervasive the issues were that created the outage. The issue was widespread and the combination of Keysight expertise and shared VisionWorks holistic insight drove issue tracking, identification, and resolution. Today, VisionWorks can use these signatures to identify when KPIs reach a critical condition, and now just a few engineers can put out the smoke before it becomes a network fire requiring scores of people to respond.

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Conclusion

The CSP's implementation of VisionWorks marks a pivotal evolution in network operations, serving as the foundation for complete network control. By integrating data from a variety of network locations, VisionWorks provides complete end-to-end network visibility. This holistic approach correlates conditions across the network, rapidly identifies root causes, and addresses issues with precision. Beyond just detection, VisionWorks empowered the CSP to eliminate recurring problems through intelligent signature creation and active tracking, ensuring potential issues — the smoke — are identified and mitigated long before they escalate into full-blown network fires. This proactive strategy has redefined their ability to manage network complexity, ensure greater reliability, and deliver a better experience for their subscribers.

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