blueplanet
a division of Ciena

SOLUTION BRIEF

Preemptive Network Maintenance

Prevent network outages

Business challenges

Existing solutions for troubleshooting and resolving network issues were developed to support static networks and services and revolve around reactive processes based on scrutinizing events and alarms. As the network becomes increasingly complex and dynamic, such methods are simply not effective nor scalable. Operators' lack of insight into which of the multitude of alarms are truly critical, and the manual nature of determining the root cause of issues, presents several challenges:

- Major operational burden is incurred as a result of problems being caught after the damage has already spread across a significant part of the network
- Poor customer satisfaction results from prolonged outages due to the lengthy processes involved in finding the source of the problem
- High financial costs arise from having to maintain spare inventory of network elements and other resources required for dealing with emergencies

The overall problem is exacerbated by the fact that different troubleshooting skill sets and processes need to be applied across different vendor equipment.

The reactive processes imposed by lack of insight pose a significant risk to end-customers such as enterprises that rely on the network to run their operations, since business can be severely impacted from any resulting service disruption. Residential consumers, telecommuters, and others who frequently experience low service Quality of Experience (QoE) and rely on network connectivity for their important routines also suffer. These factors—which result in poor customer satisfaction, increased costs, and low overall staff productivity—ultimately impact the operators' ability to compete effectively.

BUSINESS IMPACT

- Reduces trouble-to-resolve workflow OPEX by up to 38 percent
- Lowers SLA penalties by drastically reducing the number of network outages
- Provides a solution payback period of less than one year

Providers clearly have an urgent need to drastically streamline their trouble-to-resolve workflows to achieve business growth. They must take a proactive approach to dealing with network issues with speed and scale across the entirety of their network. Fortunately, innovations in analytics and AI have emerged to address this need.

Blue Planet® Preemptive Network Maintenance

Blue Planet Preemptive Network Maintenance (PMN) is a Blue Planet Proactive Network Operations (PNO) solution that uses advanced analytics and Machine Learning (ML) to enable closed-loop automation for preventing unplanned Loss of Signal (LOS) network outages across Ethernet and optical domains. The solution is packaged for easy evaluation, rapid deployment, and minimal resource investment, helping providers realize key business outcomes quickly, without the inherent risk, delay, and costs associated with testing, qualifying, and implementing the standard product alternatives.

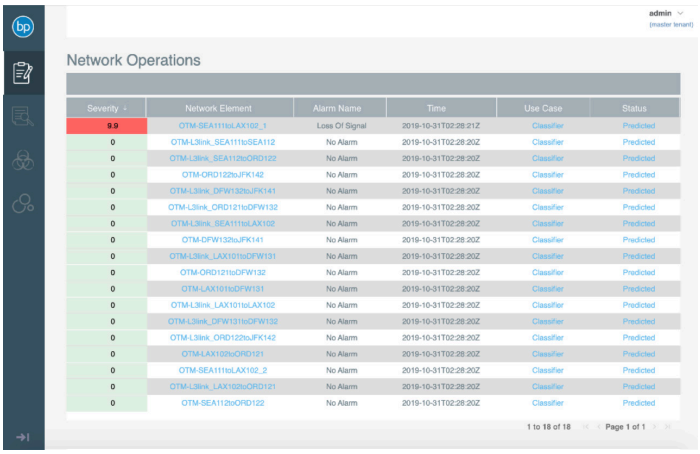

Figure 1. PNM's example dashboard-Prediction of LOS network outages

Blue Planet PMN is designed for network operators who have or plan to have their own data lakes and want to experience the powerful benefit of AI-driven closed-loop automation for network troubleshooting and resolution. It is also ideal for customers who want to leverage the benefits that can be derived from consolidating their data silos into a single data lake, which would enable them to gain intelligent insights more quickly and efficiently. The solution leverages a ML model based on a pre-defined set of known anomalies and their respective, prescribed actions for resolving them. Once deployed, the solution has been shown to predict—with 90 percent accuracy—up to 95 percent of LOS unplanned outages. Through continuous feedback from the operator, it also continues to improve in its accuracy and adapt to the provider's specific network environment. PMN can interface with a policy system and orchestration or network management system of the provider's choice to drive and take corrective action on the network. A highly visual user interface and policy ensures operators can maintain full control of any automation being programmed into the network.

Solution components and operations

The solution comprises three key product elements, which are all part of the Blue Planet Unified Assurance and Analytics (UAA) software suite: UAA platform, Network Health Predictor (NHP) application, and Network Operations Advisor (NOA) application. Optionally, service providers can choose the Blue Planet Multi-Domain Service Orchestration (MDSO) software. Their respective roles are outlined below.

Unified Assurance and Analytics platform

The UAA platform is designed for high-performance big data analytics and is responsible for the collection, processing, and storage of multisource data—supporting multi-domain and multi-layer physical and virtual networks. UAA collects data through various methods, including direct import via Kafka or by using Blue Planet UAA Resource Adapters (RAs) as a discovery layer that can integrate with the network via APIs such as TL1, SNMP, CLI, and NETCONF/YANG. The UAA platform works with industry-leading big data processing frameworks like Hadoop/Spark and NiFi and is capable of processing petabytes of data in near real time.

Network Health Predictor application

NHP is an AI-powered application that provides analytics to accurately pinpoint port-level network anomalies that cause LOS network outages. It uses a supervised ML model initially based on a predefined set of known anomalies. The model, which currently predicts up to 95 percent of unplanned network outages with 90 percent accuracy, is designed for continuous optimization based on Network Operations Center (NOC) feedback derived from actual outcomes (i.e. its actual predictive accuracy) as well as through its self-learning capabilities.

LEARN MORE
Blue Planet NHP

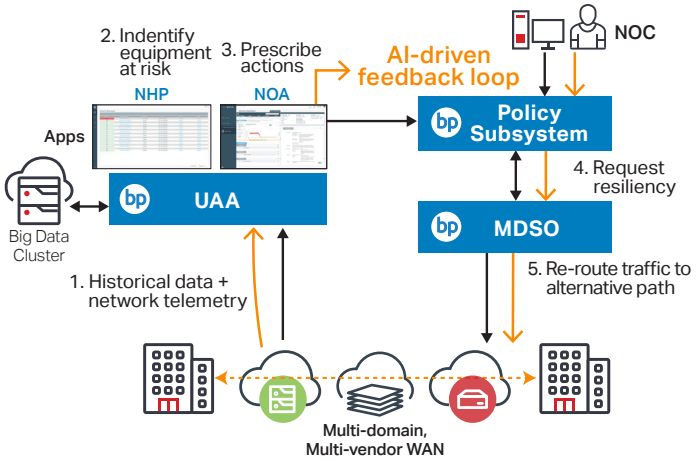

Figure 2. Closed-loop automation process for preventing network outages from happening through AI-assisted predictive and prescriptive analytics

Network Operations Advisor application

Once NHP predicts the anomaly, the NOA application performs root-cause analysis and accurately derives actions to correct them. This software acts as the enabler or activator for the closed-loop automation that the solution provides and uses a supervised ML model initially based on a predefined set of prescriptions. As with NHP's predictive capabilities, the NOA application is designed for continuous optimization in its prescriptive capabilities based on NOC feedback derived from actual outcomes (i.e. its actual accuracy in its prescription for fixing the issue) as well as through its self-learning capabilities.

As a whole, the solution communicates the most relevant information to ensure the most optimum prescriptions are provided, while giving the operator full control of the actual corrective action taken on the network. This is achieved by interfacing with a policy-driven orchestration system such as Blue Planet MDSO, that executes configurable actions after a defined condition is met. As the ML model becomes increasingly optimized, operators can incrementally and confidently begin to automate remedial actions without their own intervention. That is, the solution gives operators full control of how much autonomy is given to the network—enabling a gradual move from supervised to unsupervised ML methodologies.

These software components work together to enable a proactive approach to assurance operations for remediating service-disrupting issues:

1. **Real-time collection of telemetry data:** UAA platform collects and processes telemetry data from multiple sources across the network as well as external systems
2. **ML-assisted anomaly identification:** NHP application performs ML-assisted preemptive identification of outage-causing anomalies via supervised learning
3. **Prescriptive actions for remediation:** NOA performs ML-assisted root-cause analysis and then prescribes remediation actions to enable building resiliency across Ethernet and optical domains.
4. **Building resiliency:** Actionable system such as Blue Planet MDSO takes policy-driven, automated action to build resiliency

Blue Planet Services

Blue Planet Services are highly specialized to help facilitate all aspects of solution deployment, with the objective of fine-tuning the solution to meet customers' unique environment. They include:

- Integration of the solution with existing systems and tools from any vendor, including orchestration, domain controllers, and/or management systems. Blue Planet's team has also been trained specifically to integrate the solution with existing assurance systems and tools to make use of data that has already been collected by these systems.
- Integration of the solution with other Blue Planet software products to implement closed-loop automation.
- Continuous optimization of AI accuracies to aid in continuous improvements in the predictive and prescriptive capabilities of the solution. The team will help monitor its accuracy and assist with any fine-tuning that is needed. The team will also identify new anomalies for assessment and assist with providing contextual labels such as potential root cause and prescriptive actions.

Business outcomes

Providers are beginning to realize the importance of eliminating manual and time-consuming network operations and are moving toward a more automated way of running their businesses. Blue Planet PNM provides a closed-loop automation approach to accelerate and streamline the trouble-to-resolve process for Ethernet and optical networks, delivering real business value. The solution also helps service providers reduce OPEX, lower SLA penalties, and greatly improve customer experience. Furthermore, with specialized professional services supporting key system integration points and providing AI expertise and flexible deployment models, network providers can minimize project risks.

While the goal is to provide end-to-end automation to streamline many aspects of their trouble-to-resolve operations, Blue Planet understands that, when it comes to AI, customers need a well-balanced combination of both machine- and human-led control of the network. Blue Planet solutions are designed specifically for this purpose and provide this balance. With PNM, as the system gradually achieves increasing accuracy in both its predictive and prescriptive capabilities, operators can increasingly and incrementally let the network take action on its own. Such an approach helps facilitate the eventual adoption of intelligent, closed-loop automation into other aspects of their operations as providers gain more confidence and new use cases are developed, and lays a firm foundation toward achieving the self-healing and self-optimizing Adaptive Network™.

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