Nokia WaveSuite Health and Analytics

Release 22.02

The Nokia WaveSuite Health and Analytics (WS-HA) application leverages Nokia Bell Labs data science expertise to extract insights from optical networks, enabling network operators to automate operational tasks, maximize network performance, protect SLAs and lower network TCO.

Overview

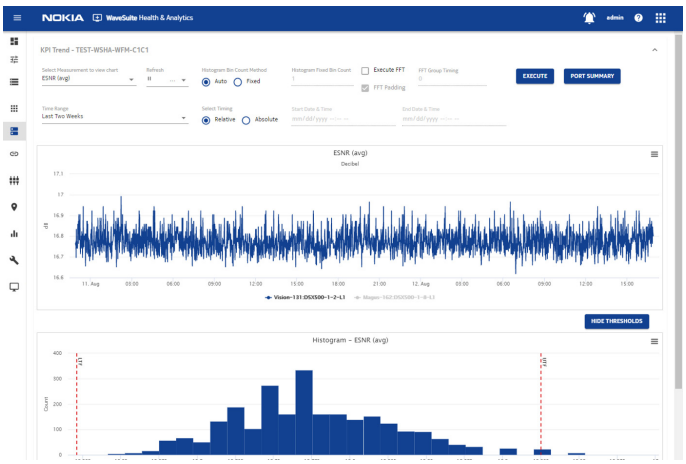
Businesses are putting in place data strategies to grow revenue and reduce costs via automation. From an optical network perspective, this means leveraging data science tools to extract insights from optical networks, to facilitate the automation of operational tasks, maximize network performance, protect SLAs and lower network TCO.

With built-in Nokia Bell Labs data science expertise, the Nokia WS-HA application helps optical network operators to:

- Securely and efficiently collect data from a variety of sources, to train AI and machine-learning algorithms to better automate the network
- Intuitively visualize data with at-a-glance user interfaces that depict information with the clarity required to automate
- Quickly analyze data using built-in Nokia Bell Labs data science algorithms and optical network expertise that enables efficient and safe automation
- Intelligently react to the network insights hidden in network data.

The WS-HA application enables optical network operators to use these insights to drive business outcomes via automation, including driving automation for:

- Optimizing network performance
- Detecting anomalies
- Detecting environmental signatures that threaten the network
- Performing proactive maintenance
- Protecting SLAs.



Standards-based interfaces to data lake environments actively monitor and analyze the history and impact of network configuration and topology changes over time. By analyzing network behavior between snapshots, WS-HA can isolate changes in network performance. It can also visualize and monitor network KPI past and current values.

To drive business outcomes, the WS-HA data monitoring capabilities can be used to trigger automation workflows that interface with:

- Other WaveSuite applications
- Nokia Network Services Platform (NSP) management and software-defined networking (SDN) control for IP and optical networks
- Nokia network planning software
- Nokia or other supplier workflow manager (Business Process Manager)
- Third-party software.

Features and benefits

Network Key Performance Indicators (KPIs) dashboard	Quickly assess your network performance, availability and power consumption: • Gain valuable network insights using a comprehensive set of network KPIs including: – Network margins aging coefficient measured in dB/year – Network and derived analog and digital KPIs using patented Nokia Bell Labs algorithms to more safely drive automation – WS-HA environment vital statistics
Real-time data display	At-a-glance data insight: • Active data visualization with superimposed threshold limits • Reporting of historical records of collected data series • Network groups to organize data • Network and environmental data source whitelisting • Network topology map views and inventory (external links, light paths and end-to-end connections)
Built-in Nokia Bell Labs data science and optical network expertise	Leverage Nokia Bell Labs innovation and insight to: • Visualize and analyze data immediately with user interfaces that depict information with the clarity required to automate • Leverage patented Nokia Bell Labs algorithms to safely automate the network
Automation activation triggers	Drive automation to reduce network TCO using triggers to activate: • Other WaveSuite applications • Nokia NSP management and SDN control for IP and optical networks • Nokia network planning software • Nokia or third-party workflow manager (BPM) workflows • Third-party software
Weather data collection	Collect and store weather-related data to enable the correlation of network KPIs with weather related events
Network power consumption analysis	Provide an enhanced view of network and network element (NE) power consumption to facilitate the move to greener networks: • Network power consumptions measured in KWh and KWh/Gbps
Built-in reporting	Easily extract network data insights from reports generated from dynamic or historical data
Optical time-domain reflectometer (OTDR) launch and interpretation	Automatically record OTDR scan fiber baseline information to monitor network trends and identify potential fault scenarios by correlating measurements with other external network factors

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Features and benefits

Open and secure	Realize your open network initiatives by leveraging standardized open interfaces to access all WaveSuite Health and Analytics functionality: • REST and RESTHook interfaces • Support for gNMI based on gRPC plugins • Support for project management (PM) bins using SFTP plugins • S3 and HDFS connectors for cloud storage • Allows for BRS restoration on a different deployment instance/configuration • External user management and authentication integration using Lightweight Directory Access Protocol (LDAP) Secure: • User registration role-based access control • Leverages Nokia guidelines for utilizing network and environmental data

Visualization capabilities

The WS-HA Visualize tool capabilities enable optical network operators to:

- Simplify and concisely present information and reports from a dashboard
- Integrate with external applications using a REST northbound interface (NBI)
- Configure data thresholding/filtering via REST API and GUI
- Display real-time data and information about threshold limit (low and high) crossing
- Visualize a connection and its associated connection information
- Report historical records of collected data series
- Monitor the application resource usage via REST API/GUI
- Monitor Network Elements (NEs) with the support of gNMI based on gRPC plugins and PM bins using Secure File Transfer Protocol (SFTP) plugins
- Monitor the network using network and environmental data source whitelisting
- Monitor NE power consumption
- Detect Q-drop, including generic outliers and event forecast
- Get causal, dynamic margin prescription with Electrical Signal-to-Noise Ratio (ESNR)
- Characterize network aging
- Perform network-wide margin and availability assessment.

Visualize capabilities also enable network operators to monitor various past and current network KPI values. Network operators can specify the data to be monitored. All information is formatted with network topology awareness to facilitate ease of analysis. Each monitored data item has support for:

- Historical evolution of the KPI and histogram distribution
- Average, median, maximum and minimum values
- Standard deviation, quartiles, TVSP (for Q2 factor) and FFT
- First and third quartile, lower and upper Tukey fence.

WS-HA also uses patented Nokia Bell Labs algorithms to create more reliable KPIs to drive automation.

In addition to the data values graphed on a GUI, the reporting capability enables reports to be generated using dynamic or historical data. Reports include support for:

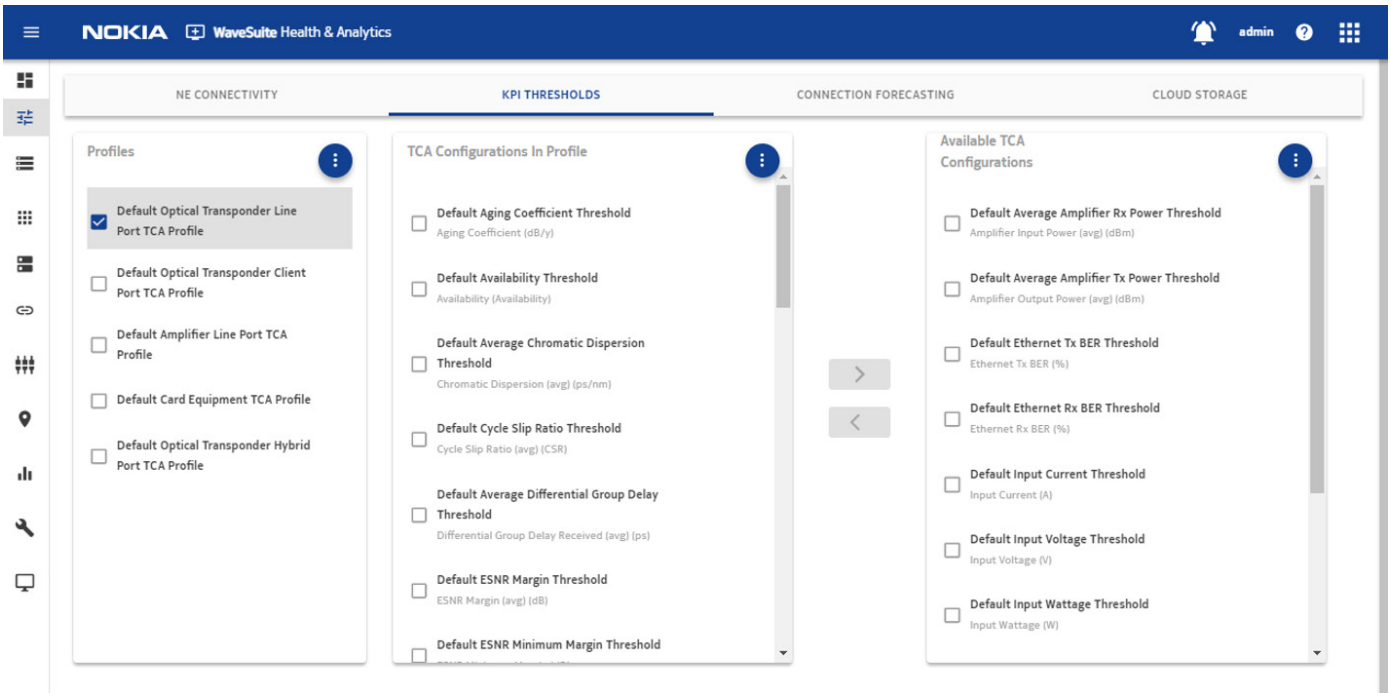
- Wavelength margin versus availability
- Stability reports
- Connection threshold crossing alert (TCA) reports.

Data values are retrieved from the REST API and they can be graphed from the GUI or exported into different formats for external analysis. Data can be archived using an S3 or HDFS cloud storage connector. It is possible to configure an internal near-real-time database retention period for 90 to 360 days.

The Visualize tool capabilities can also monitor and illustrate the impact of real-time streaming telemetry on the optical network data communications network (DCN). The Visualize tool can dynamically monitor the CPU and storage used by the data lake environment resources, and it provides the ability to set thresholds for related alarms and reports. The tool environment is designed to scale in and out, or up and down, to address demand.

Figure 1. Health and Analytics data visualization capabilities

Figure 2. Health and Analytics capabilities to trigger automation



Northbound interface

The WS-HA northbound interface provides a fully featured REST API for network operators who want to augment or develop their own data science environment.

Technical specifications

Nokia management and control software releases	Nokia WaveFabric equipment software releases				
NFM-T	1830 PSS	1830 PSI-M	1830 PSD	1830 ONE	WaveLite
21.12	12.0x, 13.0.4, 13.1, 14.0	5.0, 5.1, 6.0	3.0, 4.0	N/S	N/S
21.4	12.0x, 13.0.4, 13.01	5.0, 5.1	3.0	N/S	N/S
20.11	12.0x, 13.0.4	5.0	3.0	N/S	N/S
N/S – Not supported					

System requirements

- Web portal client: Supported browsers are Chrome and Firefox
- WaveSuite Server:
  - Operating system: RedHat Linux (RHEL) or CentOS 7.9
  - Virtual machine: 12-core, 32G-RAM, 2-T disk for 90 days retention

Order codes

The base subscription covers the Visualize tool capabilities. The annual subscription allows for the monitoring of Port Equivalent Units (PEUs), which are based on the sum of line port rates, with 100G as the baseline for PEU=1 (e.g., 1 PEU can support the monitoring of 10 x 10G lines).

Line port quantity	
PEUs	**APN**
50	3KC79775AAAA
500	3KC79820AAAA
1000	3KC79776AAAA
2000	3KC79777AAAA
5000	3KC79778AAAA
10000	3KC79779AAAA
20000	3KC79780AAAA
Unlimited	3KC79781AAAA

Related standards

- Data visualization, thresholding and filtering support via REST APIs
- Data collection via gRPC (gNMI)

Related materials

- Nokia WaveSuite Optimizer application
- Nokia WaveSuite Service Enablement application
- Nokia 1830 Photonic Service Switch (PSS)
- Nokia 1830 Photonic Service Interconnect (PSI-M)
- Nokia 1830 Photonic Service Demarcation (PSD)
- Nokia NSP Network Functions Manager for Transport (NFM-T) and Network Resource Controller for Transport (NRC-T)
- Nokia WavePrime professional services

Learn more

To learn more about how Nokia WaveSuite applications can help you get new value from optical networks, visit our Optical Networks web page.

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