

# NITRO Core

Assurance and Analytics





## NITRO Core

As mobile networks expand across LTE, 5G, IoT, and VoLTE/IMS, there is a growing need for comprehensive assurance solutions that address both the challenges and opportunities within these technologies. Leveraging rich insights from these networks is driving needs for advanced assurance and analytics capabilities – making this innovation timely and essential.

Mobile service providers face challenges across the 5G service lifecycle, including managing CapEx and OpEx, responding to massive traffic increases, digital transformation, and customer demands for high-quality, always-on mobile services.



VIAMI's enhanced assurance and analytics solution empowers mobile operators with comprehensive **support from 2G to 5G SA**, ensuring network and service reliability across technologies.



It provides **subscriber-centric insights** that unlock new revenue streams while respecting privacy regulations, aligning network operations with broader business goals.



Running on an **unified cloud-native platform**, it can equip both **RAN and Core** operations teams to work seamlessly, supporting optimal network performance and business outcomes.



Through **automated functions**, the solution boosts operational efficiency and prepares operators for a future of full network automation with a **Dark NOC**.

### Solution Highlights

- **Technology Support:** 2G to 5G SA, VoLTE/IMS
- **Network and Service Assurance:** Ensures the reliability of the network and the services running on it
- **Subscriber-Centric Insights:** Provides rich, open feeds of location-aware insights for informed decision-making and monetization, while adhering to subscriber privacy regulations, enabling new revenue streams
- **Improved Service Velocity and Revenue:** Enhances the speed of service delivery and increases revenue
- **Network Automation and Dark NOC:** Moves towards complete network automation and a Dark NOC
- **Unified Platform:** Utilizes a common platform/toolset for both RAN and Core engineers

# NITRO CORE ASSURANCE AND ANALYTICS SOLUTION

**NITRO Core by VIAVI** addresses mobile service provider challenges with an innovative approach to delivering analytics and assurance for modern mobile networks. It focuses on a subscriber-centric approach, providing service-focused, proactive, and unified workflows that deliver correlated, app-aware insights.



## Customer Benefits

<b>Enhanced Customer Experience</b>	Proactively resolves issues impacting customer experience with context-driven workflows for rapid, effective solutions
<b>Future-Ready Scalability</b>	Support growth from LTE to 5G with flexible, scalable, and virtualized solutions designed to meet increasing data demands
<b>Enhanced Decision-Making</b>	Provide open, efficient intelligence feeds and subscriber-centric insights for informed decision-making and new revenue streams
<b>Cost Efficiency</b>	Reduce total cost of ownership (TCO) through innovative assurance and analytics that streamline operational costs
<b>Network Monetization</b>	Unified assurance across all technologies enables effective network management, optimization, and monetization opportunities.
<b>Seamless Roaming Support</b>	Ensure smooth roaming experience for inbound and outbound traffic across all technologies, supporting continuous connectivity

### Solution Features

- **Unified Assurance Platform:** Converged applications supporting 5G and legacy technologies for consistent network management and optimization
- **Scalable and Virtualized Architecture:** Designed to scale with network demands and support third-party application optimization and analytics
- **Unified Suite of Applications:** Offers a context-driven workflow that displays data from both RAN and Core, enabling a cohesive view of network health
- **Proactive Problem Resolution:** Identifies and resolves issues impacting customer experience quickly using context-driven workflows
- **Automated Anomaly Detection:** Provides industry-leading detection and alerts for abnormal network conditions, integrated with VIAVI NITRO AIOPs for network-wide event correlation and root cause analysis
- **Integrated Agents and Software:** Combines agents and software to deliver comprehensive network management across multiple domains
- **Comprehensive Event Analysis:** Captures, locates, and analyzes mobile events across RAN and Core, delivering insights for optimized customer experience and network performance
- **KPI Generation:** Streamlines KPI generation, simplifying performance tracking and analysis
- **Open Intelligence Feeds:** Delivers actionable intelligence feeds for integration with operator analytics and third-party platforms



# TSA/TAA PROBES/AGENTS

NITRO Core probes/agents offer industry leading packet acquisition and analysis capability at a lower cost than traditional monitoring solutions.



## Key Features

- **High-Performance Probes/Agents:**
  - Traffic Storage Agents: Capture and store control plane signaling packets and user plane/voice quality records, generate KPIs, and provide feeds
  - Traffic Analysis Agents: Generate KPIs and provide feeds without packet/record storage
- **Flexible Architecture:** Microservices/Kubernetes container-based architecture supports flexible deployment scenarios and horizontal scaling across multiple servers
- **Patented User Plane Analytics:**
  - Industry-leading service classification (5,000+ services)
  - Patented RTP voice quality analysis to accelerate the deployment of VoLTE/VoNR services
  - Records augmented with subscriber, location, handset, APN/slice information
- **SMARTmetrics™ Feed:** Provides data for third-party applications/data lakes
- **5G SA Core Packet Visibility:** Virtualized probes, in conjunction with virtual packet brokers, provide packet visibility even with TLS encryption enabled

## SUBSCRIBER

- VIP IMSIs
- Customer Groups



## LOCATION

- Network Elements (SPGW, UPF, eNBs, gNBs, etc.)
- Region
- Technology



## HANDSET

- Handset
- Handset Groups



## APN/5G SLICE

- APN/DDN
- 5G Network Slice
- 5G Network Slice Type



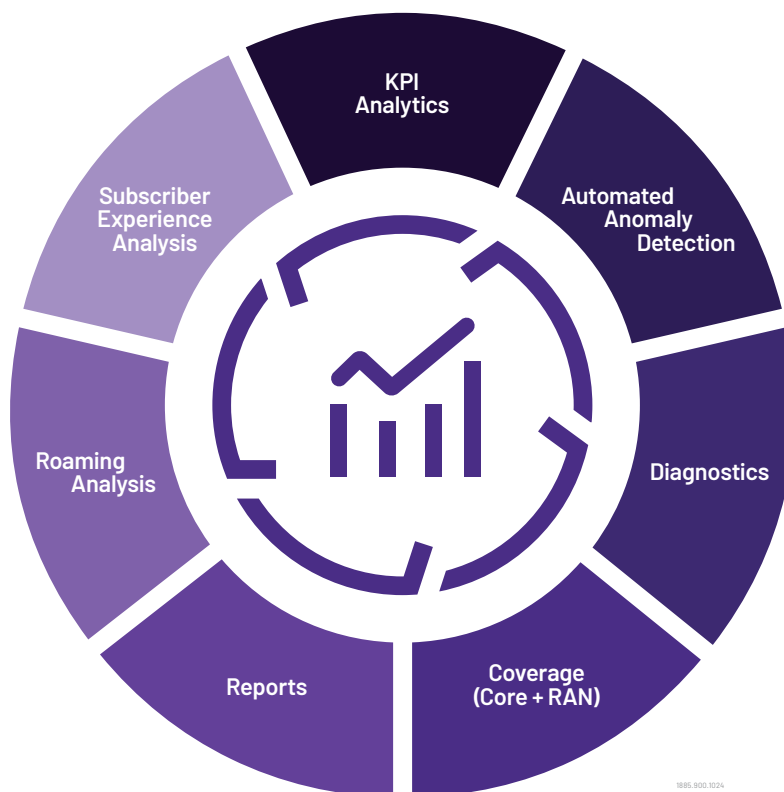
## SERVICES

- Service
- Service Category



# NITRO CORE APPLICATIONS

NITRO Core provides a suite of applications that can be used to assure your network and deliver intelligent insights.

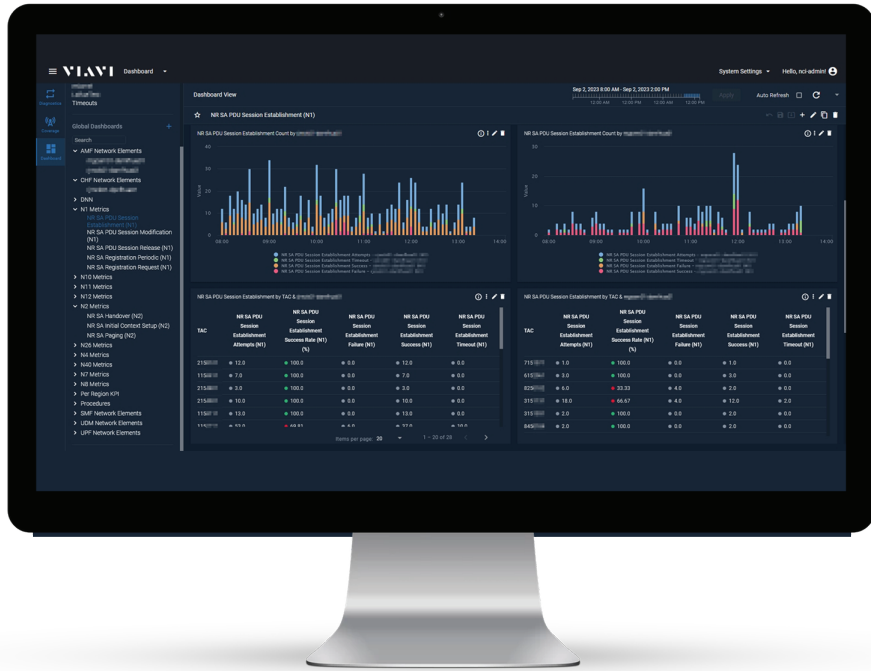


## Key Features

- **KPI Analytics:** KPI Dashboard and KPI Explorer applications provide extensive KPI coverage of network performance
- **Automated Anomaly Detection:** automatically detects problems in the network and can generate alerts northbound
- **Diagnostics:** Comprehensive signaling analysis for a subscriber or network element
- **Coverage:** Analyze Core and RAN performance overlaid on the same application
- **Roaming:** protect roaming revenue by monitoring the health of both inbound and outbound roamers
- **Subscriber Experience Analysis:** lightweight CEM-like application workflow for Customer Care, Operations, and Engineering representatives to troubleshoot reported problems
- **Reports:** Business intelligence dashboard and report creation tool

# KPI DASHBOARD APPLICATION

NITRO Core KPI Dashboard application provides overview of network health and key metrics in a single dashboard.

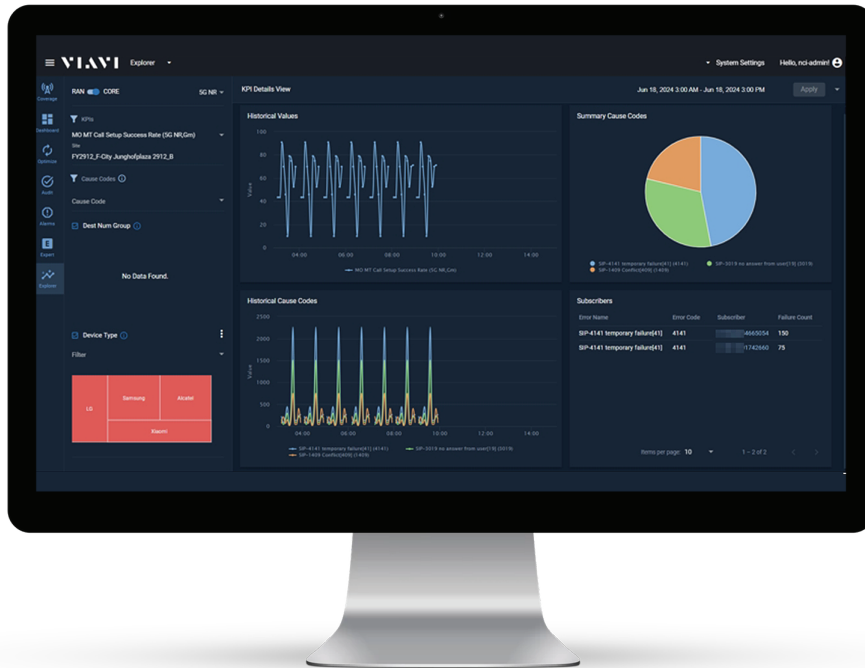


## Key Features

- **Ease of Use:** Provides an easy way to monitor the overall performance of network elements, devices, and customer groups in a single dashboard by showing key performance indicators
- **Reduced Manual Effort:** Eliminates the need for extensive manual data manipulation required by traditional tools
- **Unique Data Models:** Offers unique views of different network dimensions, including elements, subscriber groups, and devices with support for graphical and tabular charts
- **Detailed Troubleshooting:** Allows users to drill down from a high-level network view to relevant cause codes and impacted subscribers for detailed troubleshooting
- **Core and RAN:** Core and RAN KPIs can be plotted side by side on the same dashboard
- **Auto refresh:** Dashboard can be configured to auto refresh the display

# KPI EXPLORER APPLICATION

NITRO Core KPI Explorer application enables exploratory KPI analysis with drill down to impacted subscribers and detailed call flow analysis.



## Key Features

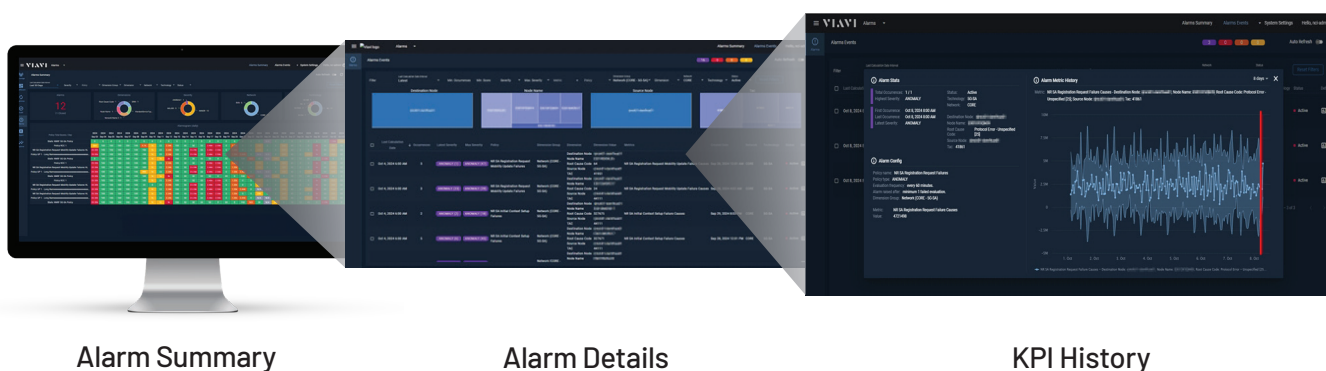
- **Ease of Use:** Provides an easy way to look at the performance of a given KPI network wide or pinned down to a specific network element
- **Event Analysis:** Adjusts the time frame to analyze pre- and post-events, such as network configuration changes or mass call events
- **Flexible Filtering:** Heat-map based filtering support for additional dimensions such as: device type, customer group, APN/DNN, Service, etc.
- **Root Cause Analysis:** Displays failure cause codes and impacted subscribers which can then be analyzed in detail using the Diagnostics application



# AUTOMATED ANOMALY DETECTION APPLICATION

For many years, network operations teams relied on monitoring key performance indicators (KPIs) in the Network Operations Center (NOC) to understand network and service performance. As networks evolved from 2G to 5G SA, they became more complex, offered more services, and provided faster data rates. These factors make it very difficult to manually monitor network performance, necessitating a new approach.

The NITRO Core Anomaly Detection engine utilizes the latest AI/ML technology to detect abnormal events in the network. Anomaly detection identifies data that deviates from expected patterns or behaviors, processing data quickly and efficiently to spot unusual events, changes, or shifts in datasets. This provides valuable insights into critical problems before they impact subscribers.

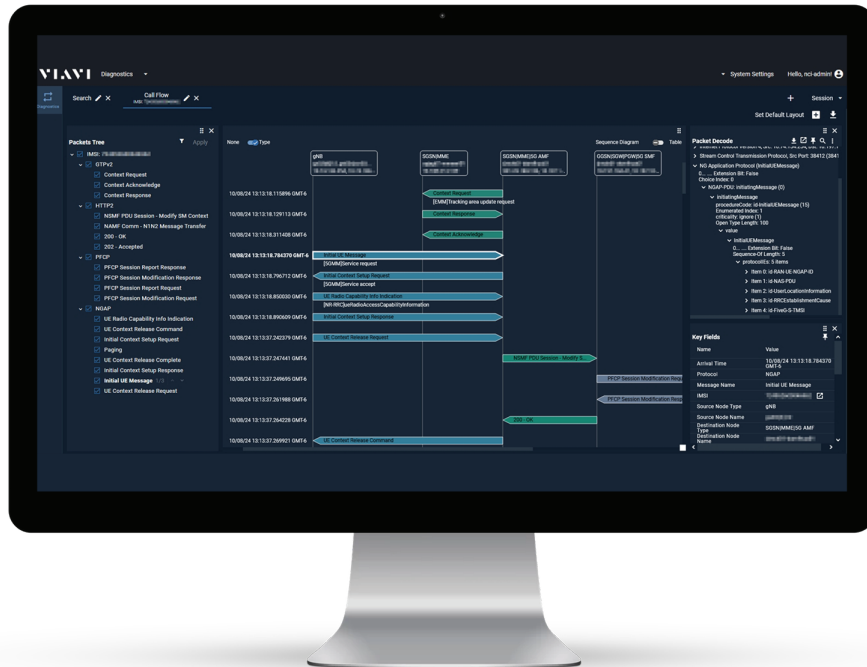


## Key Features

- **Scalable, High-Performance Architecture:** Cost-efficient and capable of handling large volumes of data
- **Advanced AI/ML Technology:** Reduces the number of false positives reported
- **Comprehensive Metrics Support:** Supports control plane, user plane, and RTP Voice Quality metrics/KPIs
- **Anomaly Analysis:** Full analysis within the NITRO Core application suite, with drilldown from detected anomalies to KPI trends, cause codes, and signaling for impacted subscribers
- **Northbound Integration:** Anomalies can be fed to:
  - Network Operations Center (via SNMP)
  - VIAMI NITRO AIOPs tool for network-wide event correlation and root cause analysis with other alarm sources

# DIAGNOSTICS APPLICATION

Built on top of VIAVI Session Trace, the NITRO Core Diagnostics application allows you to diagnose the deepest and most complex network and subscriber problems. It analyzes a subscriber's network and service interactions across multiple domains, tracing these interactions from near real-time to several weeks in the past, depending on customer-specific retention configurations.

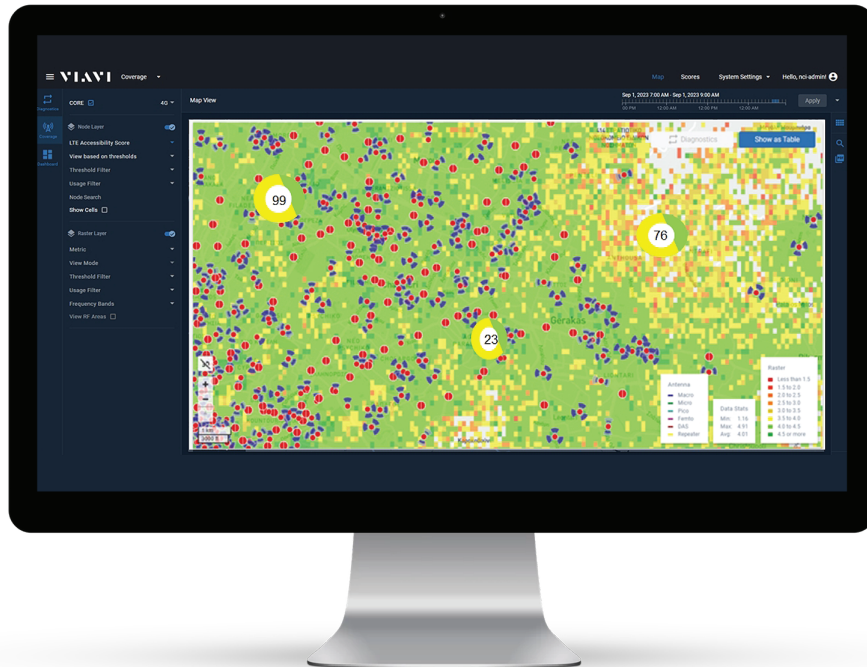


## Key Features

- **Historic or Near Real-Time:** Advanced Network Troubleshooting
- **Vendor Agnostic:** Compatible with network elements from any vendor
- **Comprehensive Correlation:** Correlates data across all supported network-wide interfaces
- **Advanced Search Criteria:** Search on various parameters including IMSI, IMEI, MSISDN, called/calling numbers, IPv4/IPv6 addresses, Diameter Realm/Host, message filters, network elements, point codes, services, TAC, time, and more
- **User-Friendly GUI:** Features an intuitive and easy-to-use graphical user interface
- **Failure Highlighting:** Highlights transactions with failures by cause codes
- **Protocol Color Coding:** Uses color coding for different protocols
- **Detailed Decoding:** Provides full message and raw decoding of signaling and services data
- **Sequence Diagram View:** Displays a sequence diagram view of session signaling
- **Tabular View:** Displays messages in a tabular format
- **Export:** Export in PCAP, Excel or CSV format

# COVERAGE APPLICATION

The NITRO Core Coverage is an unique application which combines RAN and Core quality monitoring data into a single summarized dashboard with easy-to-understand, actionable information. Coverage Assurance workflows enable non-expert users to identify areas of poor quality and triage the part of the network (RAN or Core) causing poor network performance.



## Key Features

- **Summarized Dashboard:** Provides a single view of RAN and Core quality monitoring data overlaid together
- **Configurable Scores:** Allows configuration and viewing of scores based on underlying RAN and Core KPIs, with weightings that control colors and scores
- **Customizable:** Fully configurable and customizable to enhance subscriber quality resolution efficiency
- **Cost Savings:** Offers significant operating expenditure savings for your business
- **Technology Support:** Supports 3G, LTE, and 5G NSA/SA technologies
- **Detailed Analysis:** Analyze the performance of low-performing cell sites by examining performance scores and the KPIs that contribute to these scores
- **Deep Dive Capabilities:** Drill down to KPI Explorer for next-level analysis of KPIs over time and perform root cause analysis with drill down to the Diagnostics application for detailed insights

# ROAMING APPLICATION

The NITRO Core Roaming application protects roaming revenue by monitoring the health of both inbound and outbound roamers.



Global View

Inbound and Outbound Breakdown

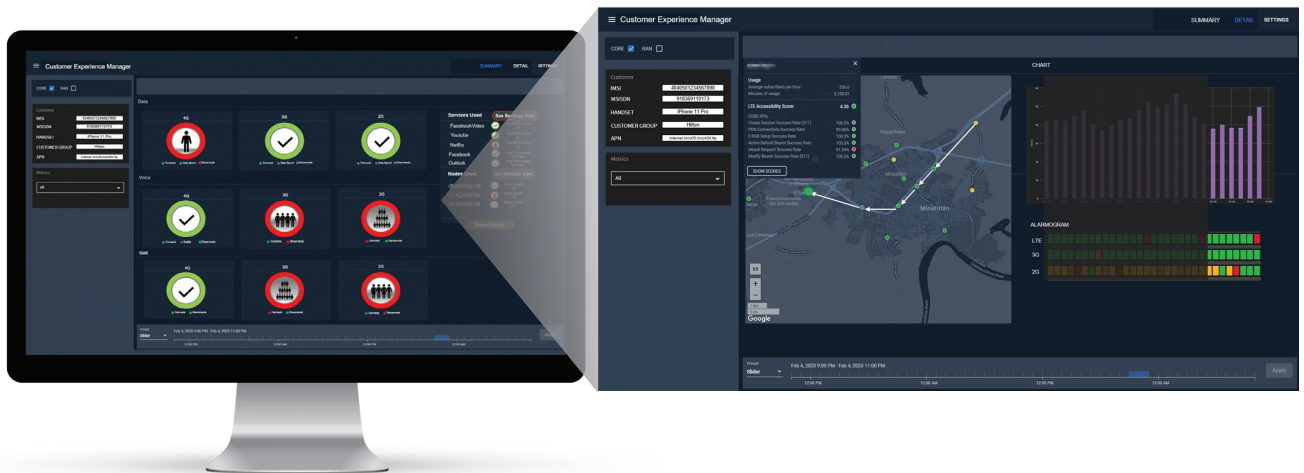
Measurement Results Explorer

## Key Features

- **Comprehensive Monitoring:** Assures the quality of experience for inbound and outbound roamers across over 650 roaming partners
- **Global Status View:** Provides a single-pane view of the overall global status of all underlying KPIs for roamers in near real-time (5-minute intervals)
- **Flexible Views:** Allows switching to regional, configurable customer group, or service group views
- **Threshold Settings:** Enables setting thresholds to control color behavior for easy monitoring
- **Detailed Analysis:** Analyzes data by point of interconnect, country, and network operator
- **Deep Dive Capabilities:** Offers drill-down to cause codes for failures and subscriber traces with message decode for in-depth analysis of all roaming voice and data services

# SUBSCRIBER EXPERIENCE ASSURANCE (SEA) APPLICATION

The NITRO Core SEA is a lightweight CEM like application workflow for Customer Care, Operations, and Engineering representatives to troubleshoot reported problems.



## Key Features

- **Target Users:** Designed for Customer Care, Operations, and Engineering representatives
- **On-Demand Queries:** Allows querying individual subscriber's quality of experience with KPI scoring and performance over time, including RAN, Core, and the subscriber's location journey during the analysis period
- **Quality Management:** Helps manage and improve subscriber quality of experience, moving towards automation with increased efficiency in CRM, Operations, and Engineering
- **Reduced Resolution Time:** Significantly lowers the mean time to resolution of subscriber experience issues
- **Economical CEM Solution:** Provides an affordable means of Customer Experience Management
- **Advanced Capabilities:** Can be leveraged by advanced operations and engineering teams for detailed diagnostics, including session trace and packet decode

# REPORTS

NITRO Core offers a robust business intelligence reporting solution designed for both frequent and ad-hoc management reporting needs. With customizable, fully configurable reports tailored by business unit or individual customer, organizations can enhance value and revenue from enterprise clients. Automated delivery and on-demand options ensure timely, relevant insights, with support available from the VIAVI Services team if needed.



## Key Features

- **Business Intelligence Reporting Solution:** Provides a powerful tool for business insights
- **Customizable Reports:** Allows customization by business unit or other organizational structures
- **Customer-Specific Reports:** Tailored reports can be created exclusively for each customer to enhance value and revenue from enterprise clients
- **Fully Configurable and Customizable:** Reports are flexible and can be modified according to specific needs
- **Automated Delivery and Ad-hoc Availability:** Reports can be set for automatic delivery or generated on-demand
- **User-Generated or Professional Support:** Reports can be created by users or with support from the AVE Services team through professional services



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