

# Nova

NETWORK, SERVICE AND SUBSCRIBER INSIGHTS



Real-time monitoring, analytics and troubleshooting solution for multi vendor mobile networks

SPEC SHEET

## KEY FEATURES

Brings unique business intelligence

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Reduces OPEX and CAPEX

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Optimizes end-to-end network performance and enhances service quality and subscriber satisfaction

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Gives operators the power to detect, geolocate, correlate, analyze, report and troubleshoot issues

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## NETWORK, SERVICE AND SUBSCRIBER INSIGHTS

Nova is a real-time monitoring, analytics and troubleshooting solution for multitechnology mobile networks (2G, 3G, 4G).

Nova reduces OPEX and CAPEX, optimizes end-to-end network performance and enhances service quality and subscriber satisfaction.

With unbiased visibility into network performance, handset behavior and service usage, Nova meets the requirements of multiple teams.



### NETWORK OPERATIONS

Optimize OPEX & CAPEX



### SERVICE OPERATION CENTER

Drive End-to-end service quality



### MARKETING

Extend customer lifetime value



### CUSTOMER CARE

Handle & solve customer complaints



### DATA MONETIZATION

Generate new revenue streams

Nova is a fully virtualized solution that integrates rich information from call traces, probes, CRM, billing, etc. to make the most of big data.

With Nova, operators can detect, correlate, analyze, report, geolocate and troubleshoot issues related to network performance, handset behavior and service usage.

## SOLUTION STRENGTHS

- › State-of-the-art, award-winning geolocation tool
- › Vendor-independent solution that provides unbiased visibility through key quality and performance indicators
- › End-to-end, from radio to core
- › Big data ready and data agnostic (call traces, probe data, CRM, billing, third party)
- › Fully virtualized
- › Award-winning NFV service assurance solution recognized at Network Virtualization Europe
- › Out-of-the box use cases including churn prediction, customer segmentation and advanced QoE metrics
- › Professional services backed by a strong expertise in telecom, data science and NFV

**By leveraging network big data, EXFO provides a holistic, real-time view of individual subscriber activity for insight into who is using what content, where, when and on which devices.**

NBI

#### NOVA Analytics

Multidimensional business intelligence (BI)

#### NOVA Alerter

Real-time supervision

#### NOVA Explorer

End-to-end in-depth troubleshooting

#### NOVA Care

Customer complaint handling

#### NOVA Geo

Automated & geolocated RF optimization



Services

### DATA ACQUISITION

[ Probe vProbe ] [ Call traces ] [ OSS counters ] [ CM parameters ] [ CRM ] x [ Billing ]

## VIRTUALIZED BIG DATA APPLICATIONS . . .

### NOVA Analytics

Nova Analytics is a business intelligence tool that leverages big data for multidimensional reporting and trend analysis.

### NOVA Alerter

Nova Alerter empowers supervision teams with real-time fault detection and alarms based on customer-centric quality indicators and KPI trend analysis.

### NOVA Explorer

Nova Explorer is a powerful application that helps troubleshoot the network in depth, from radio to core, identifies the root cause of customer complaints and investigates degradations across multi-technology networks.

### NOVA Care

With Nova Care, customer care departments can manage customer complaints efficiently, reduce average handling time (AHT), increase first call resolution (FCR) and limit ticket escalation.

### NOVA Geo

Nova Geo automates recurring and time-consuming optimization tasks through RF self-optimization algorithms and geolocation features. Nova Geo reduces drive-test campaigns by 80% and increases operational efficiency.

## . . . COMBINED WITH POWERFUL, VALUE-ADDED SERVICES



#### ONSITE OR REMOTE AUDITS

*EXFO professional services is recognized as a deeply engaged and trusted advisor by many of its customers, always ready to go the extra mile.*

EXFO's professional services team is composed of highly skilled experts and consultants specializing in network optimization and performance and in business and revenue assurance.

Our experts understand your organizational, technical and business challenges. They are committed to bringing you insights to enhance the value of our products and help you deliver a differentiated customer experience.

EXFO's experts work closely together with you to get a thorough understanding of your expectations and ensure that Nova is attuned to your needs and workflow.

They create customized solutions such as business-specific dashboards, queries and KPIs, integrating and correlating multiple sources of data (billing, CRM, OMC, call traces, etc.) into Nova to make the most of big data.

# NOVA Explorer

## END-TO-END IN-DEPTH TROUBLESHOOTING

Nova Explorer is a powerful application designed to troubleshoot the network end-to-end (from RAN to core), identify the root cause of customer complaints and detect degradations in multitechnology networks.

### Browse subscriber activity at network level

Gain instant visibility into network health by launching queries at xDR level across all technologies, various interfaces and different sites (cells, clusters, etc.).

Take advantage of powerful filtering and distribution features to swiftly narrow down your investigation and find the root cause.

Queries can be shared with colleagues to improve team efficiency. Data can be exported in CSV format.

### End-to-end message flowchart to pinpoint faulty equipment

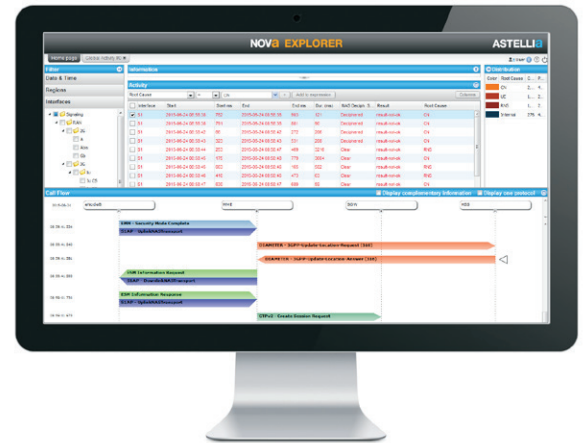
Get access to full end-to-end and multi-RAT message flows. Full protocol decoding and radio measurement graphs are displayed in the same window.

Flowchart windows can be exported in HTML format. These can be sent to vendor support teams to pinpoint malfunctioning equipment. Messages can be exported in pcap format.

### Multidimensional querying

Users will gain instant visibility into network health by launching queries at xDR level across all technologies, various interfaces and different sites (cells, clusters, etc.).

Reports can be shared with colleagues to improve team efficiency.



*Multi-interface flow chart, protocol decoding*

#### KEY FEATURES

- End-to-end call flow
- Multidimensional: subscribers, network element, device, service, cell, etc.
- Multitechno: 2G, 3G, 4G, RAN and core
- Multisource: probes, call traces, third party
- Detailed protocol decoding
- Access to detailed subscriber activity (search by IMSI, IMEI or MSISDN)
- Geolocated radio measurement charts during calls and data sessions

#### USE CASES

- Conduct in-depth investigations in a multitechnology network environment
- Identify weak network elements and poor radio conditions
- Troubleshoot root cause of issues
- Perform end-to-end network and service optimization

# NOVA Analytics

## MULTIDIMENSIONAL BUSINESS INTELLIGENCE

Nova Analytics is a business intelligence application that empowers you to make effective and informed decisions through multidimensional insights. Nova Analytics is designed to meet multiple needs within your organization including network optimization, customer value management, customer experience management and service quality management.

Nova Analytics lets you optimize network performance, deliver the highest quality of experience to subscribers, monetize your network data and generate new revenue streams. Nova Analytics helps you reveal and monitor unexpected customer patterns, network behavior or service usage by extracting business insight from a variety of data (i.e., probing, OMC, call traces, CRM, billing, etc.).

Nova Analytics comes with a **range of predefined and interconnected applications** to perform in-depth analyses.

### Service quality management (SQM)

SQM Analytics **monitors end-to-end service-quality indicators** from a user perspective, including from applications such as Facebook, YouTube, Instagram, VoLTE, VoIP, VoWifi, legacy voice and special operator services such as USSD. Thanks to the **embedded issue demarcation** algorithm, Nova Analytics can quickly pinpoint the most probable cause of service degradation to accelerate issue diagnosis and improve operational efficiency.



### Customer management

Nova Analytics, helps you gain a **better understanding of customer behavior**, obtain deep **insights into the services and applications** they use, **monitor QoE** and **detect potential churners**. Armed with this information, you can develop personalized and more effective communications and marketing campaigns to increase loyalty, upsell different packages and cross-sell services.

### Network performance management—RAN and core

Network analytics is designed to **manage network assets from RAN to core, ensure that resources are fully optimized** to best serve subscribers and maximize OPEX as well as CAPEX. Our solution provides KPI trend analysis and alarms and reports allowing you to create a high-quality, reliable network for your subscribers.



### Data mining for ad-hoc analysis

With Dashboard creator in Nova Analytics, you can agilely and autonomously mine all the data stored in the data lake to **create your specific and one-off dashboards**.

KEY FEATURES
Multidimensional data correlation
KPI trend analysis over time
KPI-based alarm triggering
Issue demarcation
Prioritization of operations based on the number of impacted subscribers
Advanced QoE indicators for YouTube, etc.

USE CASES
Identify network performance degradations
Monitor network upgrades and new service introduction
Benchmark equipment performance and vendors
Identify poorly performing handsets
Manage technology handovers like CSFB, SRVCC
Guarantee SLA fulfillment
Increase roaming activity
Create data plans adapted to customer usage

# NOVA Alerter

## REAL-TIME MONITORING AND SUPERVISION

Nova Alerter empowers you with real-time fault detection and triggers alarms based on customer-related quality indicators and KPI trend analyses. This is crucial for identifying equipment failures or unexpected behaviors of network elements or links (MSCs, SGSN, IN platforms, SMS center, HLR, etc.).

### Subscriber-aware network alarms

Nova Alerter monitors subscriber activity across the entire network. It helps you uncover quality issues that are undetectable with traditional network equipment-focused supervision systems. It provides basic procedure efficiency and more advanced QoS indicators that reflect the true customer experience. Nova Alerter also integrates web-based alarms and real-time counter trend graphs.

### Alarm prioritization

Nova Alerter prioritizes and categorizes alarms by severity level, which increases productivity, particularly during alarm floods. If a threshold value is breached, an alarm is triggered and shared through SNMP traps or emails. Alarms can also be exported in real-time to a third-party supervision tool through a northbound interface (NBI).



#### KEY FEATURES

- Real-time supervision and alarming
- Fully customizable: KPIs, alarms, thresholds
- KPI-based fault detection
- SNMP alarm
- Drill down to troubleshooting
- Highly flexible and powerful counter and alarm trigger definition

#### USE CASES

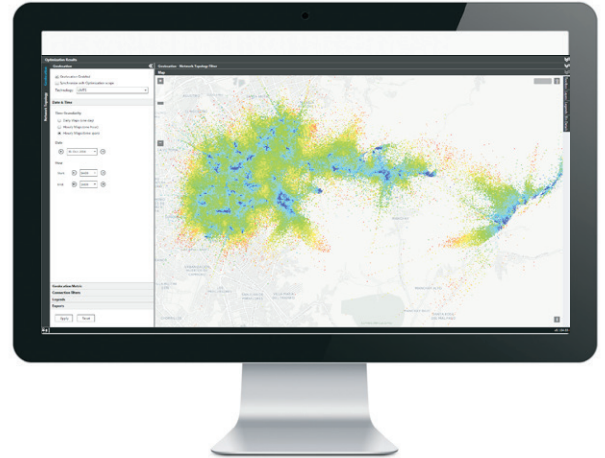
- Monitor live QoS issues
- Detect service degradation in real time
- Supervise network software upgrades
- Monitor return to service after network element reboot

# NOVA Geo

## AUTOMATED AND GEOLOCATED RF OPTIMIZATION

Nova Geo is a **multitechnology and multivendor radio optimization tool** that measures **RF coverage and network quality**. It facilitates daily radio optimization tasks by automating recurrent analyses and drastically reduces the number of drive tests.

EXFO's **fully virtualized** Nova Geo solution supports the most **advanced geolocation techniques** such as trilateration, fingerprinting and multilateration, thereby guaranteeing **first-rate accuracy** in locating devices across multitechnology networks (2G/3G/4G/LPWAN).



### Fast and massive performance maps

Nova Geo features state-of-the-art geolocation technology that leverages radio measurement data to produce 24x7 massive performance maps (i.e., RF coverage, traffic, quality, etc.), with coverage ranging from entire countries down to areas of **50 m<sup>2</sup>**. Nova Geo's advanced solution architecture makes it the fastest available tool for generating maps and making them available through the user interface.

### Machine learning algorithms

Nova Geo's classification algorithms distinguish **indoor/outdoor and static/mobility calls**. Combined with advanced location-aware algorithms, they precisely locate capacity hotspots, coverage holes, pilot pollution and VIP areas to target and prioritize network operations such as new site introduction, small-cell planning and parameter tuning.

### Powerful geo-analytics and advanced troubleshooting

Multiple map filtering options let users perform in-depth analyses based on user-defined geographical areas. By leveraging EXFO's probing solution, geolocation maps can be enriched with very valuable user plane information such as application usage and video quality.

With a simple click, users can drill down from user-defined geographical areas to individual call detail records (CDR), and benefit from improved troubleshooting efficiency.

### Geolocation goldmine capitalization

Nova Geo also offers the possibility of exporting geolocation data through a northbound interface (NBI) into operators' big data lake to implement additional use cases on top of the existing ones proposed by the solution.

### Respect for subscriber privacy

The solution embeds the most advanced security and privacy measures such as IMSI ciphering, IMSI masking and user profiles with different access rights to guarantee the privacy of each subscriber.

#### KEY FEATURES

- Dynamic geolocation
- Intelligent filtering: indoor/outdoor, mobile/static, service, area
- High mobility maps
- Issue detection
- Self-optimization algorithms

#### USE CASES

- Plan network densification and small cells
- Accelerate network rollout
- Perform targeted value-based optimization
- Automate recurring tasks
- Reduce costly drive tests by 80%
- Identify and troubleshoot RF weaknesses



# NOVA Care

## EFFICIENT CUSTOMER COMPLAINT HANDLING

Nova Care is designed for **customer service and technical support departments**. It provides on-demand subscriber experience assessment for fast customer complaint analysis. With a few simple tabs, Nova Care displays key metrics reflecting subscriber experience. This allows you to make a quick diagnosis and close the ticket or forward it to the proper technical team.

### Fast issue diagnosis

Thanks to real-time simplified diagnosis and clear information, you can easily **identify impacted services and root causes**, such as a malfunctioning device, poorly performing network equipment or coverage, equipment or transmission problems. You can then establish a dialogue with customers and show that you are aware of and understand their issues.

### Precise issue geolocation

When issues are detected, you can identify and **visualize the area (cell) where the problem occurred** and diagnose if the subscriber is the only one impacted or if it affects the entire cell. This is particularly useful to:

- › Check if the subscriber is experiencing an already known issue
- › Prioritize network operations based on the number of impacted subscribers

### One single tool for all customer support levels

Nova Care's user interface automatically adapts to web browser language and user profile:

- › Level 1 customer support has direct access to any customer's profile and is able to instantly measure the overall QoE and experience per service through high-level KPI dashboards and gauges. This greatly contributes to reducing the average handling time (AHT) and first call resolution rate (FCR)
- › Level 2–3–4 customer support: the solution provides an in-depth investigation with a direct link to Nova Explorer

### Integration into your ecosystem

Nova Care provides an easily customizable web API that can be integrated in your own customer care IT environment.



#### KEY FEATURES

Customer experience assessment (QoE)
First-level diagnosis (non-technical explanation)
Voice and data consumption level
Problem geolocation
Access to detailed subscriber activity (search by IMSI, IMEI or MSISDN)

#### USE CASES

Reduce ticket escalation and customer service OPEX
Spot outbound roamers without service continuity
Quickly identify and visualize poorly performing services and areas
Handle customer complaints efficiently by increasing first call resolution (FCR) and reducing average handling time (AHT)

# DATA

## COLLECTION

### Probing system

EXFO offers passive probes designed to monitor 2G, 3G and 4G network performance, service quality and customer experience. Probes let you access a whole set of KPIs and call data records (CDRs /xDRs) to identify and troubleshoot any problem affecting customer experience.

EXFO probes monitor multivendor mobile networks from radio access to core, and process both user plane (UP) and signaling control plane (CP) traffic, providing leading CP/UP enrichment.

EXFO's probing system offers vendor-independent, scalable, cost-effective deployment options so that mobile operator teams can:

- › Conduct 24/7 end-to-end monitoring and
- › Monitor data performance and analyze QoE

Virtualized probes can be embedded in virtual infrastructures (NFV). vProbes are fully MANO orchestrated (instantiation, healing, scale out and termination) and monitor NFV in real-time, predict issues and assess QoE. Our vProbes guarantee full visibility into subscriber activity, monitor every virtual interface connecting VNFs, raise alarms for performance degradations and troubleshoot issues.

### Flex – packet broker for mobile broadband monitoring

Designed as a UP probing companion, Flex is as a response to the challenges faced by operators, who need to balance their investment while data traffic is still surging. Flex intelligently load balances traffic across different probes to ensure monitoring stability by running on commercial-of-the-shelf hardware and reducing the hardware footprint by 40%. Flex can also be used to focus UP processing on specific targets (list of IMSI, part of the network, roamers, etc.), limiting probing investment to the most valuable traffic.

### Radio call trace system

EXFO analyzes multivendor, multitechnology radio in real time from call traces generated by network equipment (BTS, nodeB and eNodeB) for every call and data session from any subscribers anywhere on the mobile network. These rich call traces provide detailed information, including radio measurements and radio and network equipment behavior.

The combination of call traces and probe data (RAN + core) provides unique information about End-to-end geolocalized QoE and usage for voice as well as data services.

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