

NETWORK & SERVICE MONITORING

Solve customer experience issues fast and protect your revenues

NexusNETVIEW Service and Application Quality Monitoring

- ▶ Service and Application Monitoring for all Mobile, Fixed-Line, and Hybrid Networks
- ▶ Deep Packet Inspection used to generate critical user, business and operational insights
- ▶ Instant real-time data and analytics for optimal customer experience management and journey orchestration
- ▶ Realtime performance and quality monitoring for voice services (VoIP, VoLTE) across the network
- ▶ Instant, automatic visualization and reporting on roaming activity (end-to-end)
- ▶ IoT connectivity and security assurance
- ▶ 4.5G to 5G migration support and CUPS verification
- ▶ Reuse existing assets: Open Probe architecture allows for end-to-end, real-time integration of data from 3rd party probes

Monitor QoS in VoIP and VoLTE networks

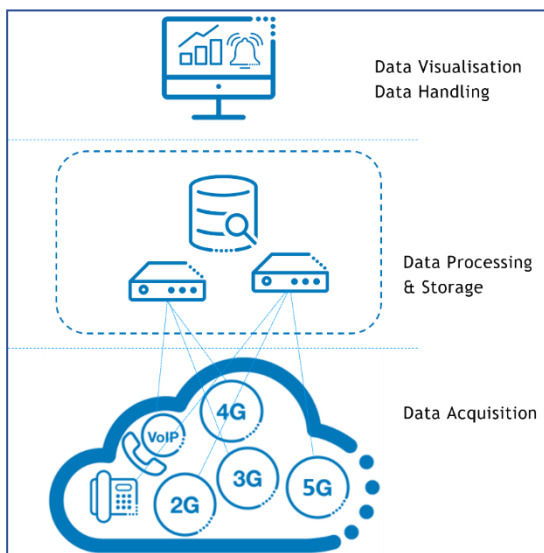
The NexusNETVIEW monitoring system allows service monitoring, VoIP quality assurance, customer experience management, troubleshooting and reporting for the complete variety of telecommunication networks fixed or mobile from 2G to 5G. Its scalability as well as the NFV support allow support of small telecommunication network as well as networks with 50 million subscribers and more.

Architecture

The monitoring system has a layered architecture to achieve maximum scalability of the system. Users can access the system via web interface with standard browsers.

The data acquisition layer consists of the different capturing probes installed throughout the monitored network. It performs capturing, decoding and realtime correlation of the network signaling messages to create call leg records and to store indexed raw data. The information collected and created in the data acquisition layer is used by the central data processing layer to create end to end data records stored in a central database.

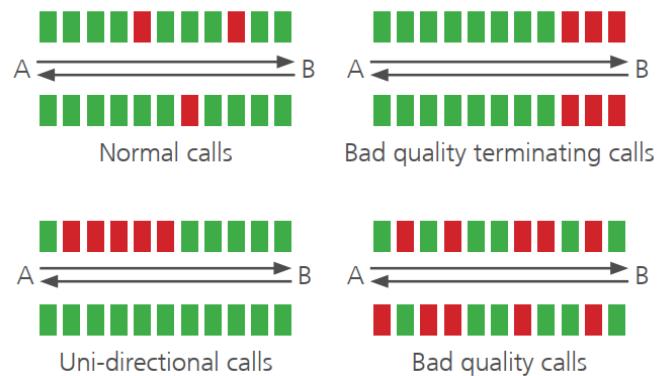
The modular architecture on all the different layers allows to perform horizontal and vertical scaling by adding physical or virtual servers of required type/role. This ensures quick and easy scalability to customer needs.



The data acquisition layer as well as the data processing and storage layer do both comprise a mediation part. 3rd party probes can thus be combined with NexusNETVIEW on the acquisition layer and on the data processing layer additional information from 3rd party systems or operator specific data used to enrich the captured information can be fed into the system.

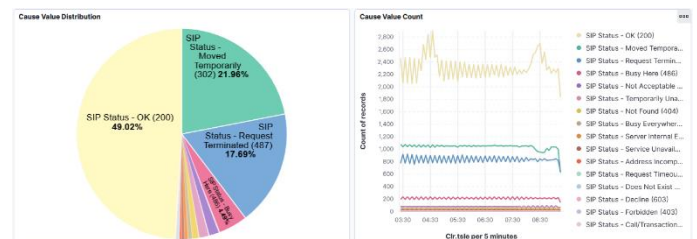
VoIP/VoLTE Quality Assurance

Voice quality is the "killer criteria" on VoIP and VoLTE networks. NexusNETVIEW provides visibility on voice quality performances by monitoring 100% of the calls, investigating the RTP streams and delivering Mean Opinion Scores (MOS) for all calls. Together with the voice service performance monitoring delivering call and session KPIs, NexusNETVIEW provides an Overall quality analysis for Voice over IP calls.



Flexible KPIs and Dashboards with drill down to messages

All the different KPIs and dashboards that are available for the different applications and services have one important thing in common: they can be flexibly adapted to customer needs and they provide the possibility to drill down to message details and related call flows with only two clicks. First click shows all the xDRs that contributed to that KPI, second shows the message details.

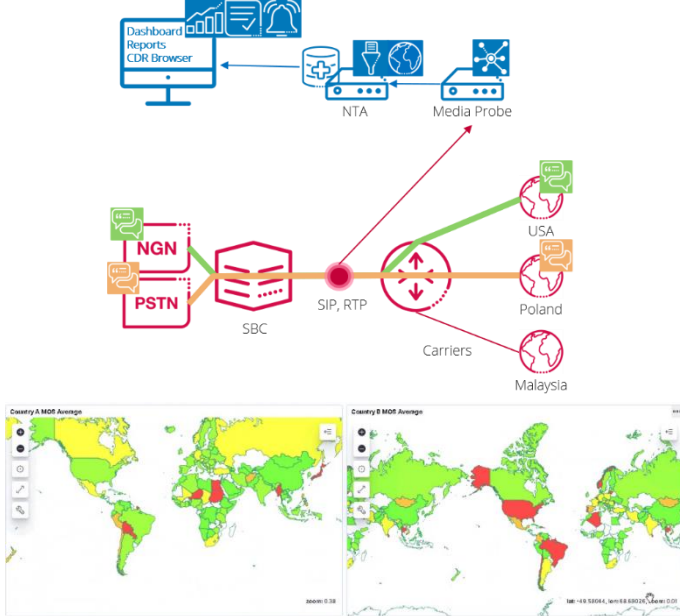


Filter settings applied for the dashboards are automatically used for the drill down.

Realtime Customer Experience Assurance

International Call Monitoring

For carrier networks it is important to ensure QoS according to the SLA contracts with their partners. Degradations introduced by the carrier network have to be minimized.



The Nexus solution with its different analytics tools and applications allows detecting voice related quality issues and provides all relevant KPIs with multiple dimensions and indicates trends.

Customer Care Solution

Knowing the issues subscribers are facing in the network as soon as possible is key to ensure proper customer experience. Drill down to customer activities and experiences, in history and in realtime, is an important part of this. Our Customer Care solution is providing necessary functionality to detect issues, drill down to the root causes and ensure customer loyalty.



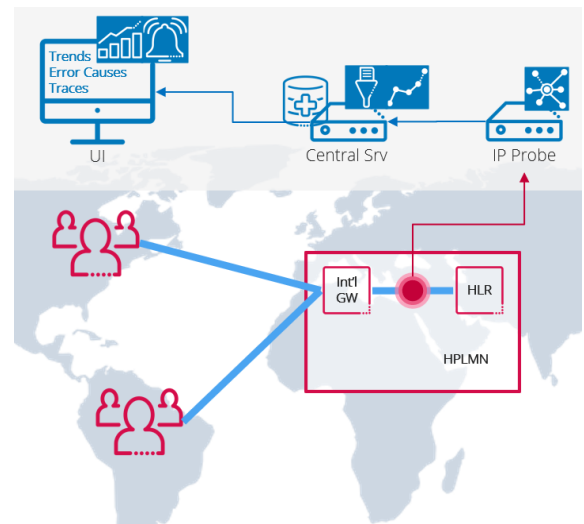
It allows looking into subscriber activities, shows service experiences for the different technologies and provides a customer experience index which can even be used as criteria for alarming.

Inbound & Outbound Roaming Analysis

All mobile operators need to ensure or improve the quality of national and international roaming.

Analysis of roaming relevant protocols like MAP, Camel or Diameter provide insight into a variety of possible problem. The Nexus Roaming Monitoring solution provides overall statistics to investigate parameters like

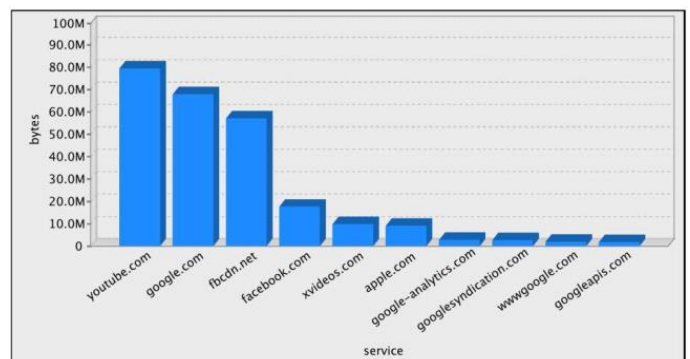
- ▶ Connectivity to roaming partners
- ▶ Country / Operator related statistics
- ▶ Registration delays / Steering of Roaming
- ▶ International Link Usage



This together with specific KPI based alarming allows detecting issues in time and to react accordingly.

Rank Service Usage to Optimize Service Offerings

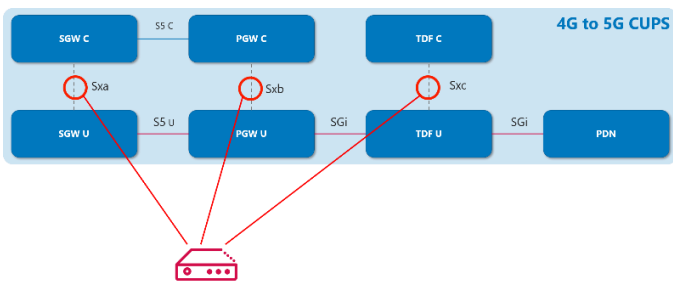
Different Services and applications have different bandwidth and latency requirements. When finetuning your packet network and data service platform resources, detailed service usage ranking and analysis results are crucial.



Migration Ready: 4.5G (LTE) to 5G

Ensuring proper CUPS implementation for to path to 5G

On the way to 5G the separation of control plane and userplane plays an essential role. It allows to handle control plane related things centralized and technologies requiring low latency analysis on userplane data like 5G connected cars for autonomous driving closer to the application where it is needed. One approach on the way to 5G is to use 4G core networks and separate the controlplane and userplane functions into separate gateways. Surveilling the newly introduced interfaces between these now separated gateways becomes therefore mandatory to ensure a smooth transition to 5G



Virtualization

The solution supports the virtualization of most of the system elements which provides great flexibility in deployment.

Advantages include:

- ▶ Optimized use of hardware resources
- ▶ Fast deployment of system extensions
- ▶ Easier re-dimensioning and re-allocation of resources to manage traffic growth or contraction (e.g. for legacy technologies)

As migration of telecommunications networks to virtualized and NFV infrastructure is considered, matching support from the monitoring system is crucial.

The system is designed to be platform agnostic, it can be installed in any combination of commercial off-the-shelf bare metal or virtual environment. It is also agnostic of the virtual infrastructure manager and can be operated on xen, VMware, OpenStack or virtual box.

Typical Server Configurations

In case that virtualization is not possible Nexus uses HP ProLiant servers for the NexusNETVIEW monitoring solution. Below the typical server configurations for the different functionalities needed are shown. Servers from other manufacturers meeting these characteristics can also be used.

NexusNETVIEW Probe Server

- ▶ HP ProLiant DL380 Gen10 – 24 SFF
- ▶ 2 x Intel Xeon 2.1 GHz 12 core CPU or higher
- ▶ min 64 GB RAM
- ▶ 2x300 GB SAS 12 15k hard drives for OS
- ▶ Up to 20 x 2.4 TB 10k SFF hard for Raw Data Storage
- ▶ 4 x Gigabit Ethernet Interface for communication

Capture Cards to support

- ▶ Gigabit Ethernet optical
- ▶ 10 Gigabit Ethernet
- ▶ 40 Gigabit Ethernet
- ▶ 100 Gigabit Ethernet

NexusNETVIEW GUI Server

- ▶ HP ProLiant DL380 Gen10 – 8 SFF
- ▶ 2 x Intel Xeon 2.1 GHz 12 core CPU or higher
- ▶ min 64 GB RAM
- ▶ 2x300 GB SAS 12 15k hard drives for OS
- ▶ Up to 6 x 2.4 TB 10k SFF for Database

NexusNETVIEW Central Server / Reporting Server

- ▶ HP ProLiant DL380 Gen10 – 24 SFF
- ▶ 2 x Intel Xeon 2.6 GHz 12 core CPU or higher with min.64 GB RAM
- ▶ 2x300 GB SAS 12 15k hard drives for OS
- ▶ SSDs for Reporting purposes
- ▶ Up to 20 x 2.4 TB 10k SFF hard for Raw Data Storage

Legacy Interface Converter

For non IP based interfaces Nexus is using interface converters to forward e.g. TDM based signaling via IP to the Nexus Probes.

E1/T1 to IP converter

- ▶ 19" chassis, 482mmx453mmx44mm, 4 kg
- ▶ Up to 32 E1 or T1 links supported

STM-1 to IP converter

- ▶ 19" chassis, 482mmx453mmx44mm, 4 kg
- ▶ Up to 4 STM-1 links supported

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