Nokia Network Services Platform

Module: Network Functions Manager (NFM-P)

Analytics for IP Networks & Services (N&S)

Inventory, performance and utilization intelligence for the Nokia IP routing and switching portfolio

Analytics for IP Networks and Services (N&S) is an optional application of the Nokia Network Services Platform (NSP). It delivers accurate, timely, analysis from hardware inventory to Layer 2 and Layer 3 services by collecting, warehousing and aggregating event, performance and volumetric data.

First and foremost, N&S Analytics delivers the insight required to make effective business and network impacting decisions. Customers gain valuable insight immediately upon deployment without the need for extensive integration and test cycles. Use cases include detailed capacity planning, performance and QoE analysis, utilization and congestion KPIs, and customer and service uptime for compliance reporting.

The pre-packaged N&S reports and dashboards are integrated with the Nokia ION IP portfolio including the SR, SAR, SAS and select Omniswitch network element families. The NSP analytics application is also capable of supporting multi-vendor devices.

With the NSP, customers gain the ability to:

- Generate a wide range of report types out-of-the box using the pre-packaged samples.
- Create customized reports and dashboard views using self-service report and dashboard authoring capabilities.
- Access insightful analytics while using other NSP applications, for example examine latency history while troubleshooting service performance with the Service Supervision application.
- Enrich your existing web-based applications or workflows by embedding content rich charts and tables using the NSP Analytics application programming interface (API). Enhance the user experience by reducing the number of applications to be mastered.
- Schedule report execution and distribute report output in a wide variety of formats by e-mail.
- Create mash-ups from any accounting or SNMP statistic available to NSP, any data stored in the NSP databases, or any external data imported into the NSP Auxiliary database.
- Import custom reports created by professional services at any time. There is no need to wait for the next product release.

Figure 1. OAM PM Bins with Delay report
Key features

Insightful analytics
The NSP provides a wide variety of pre-packaged reports and dashboards, self-authoring report and dashboard capabilities — all of which can be used for business or operational purposes. For example, accounting reporting can be used for utilization volume trend analysis, performance reporting for operational audits on customer experience, and flow utilization reporting on “routes of interest” for network optimization and capacity planning.

Table 1 summarizes the N&S report types available.

**Table 1. NSP N&S report types and descriptions**

<table>
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<tr>
<th>Report type</th>
<th>Descriptions</th>
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<tr>
<td><strong>Inventory</strong></td>
<td>• NE asset utilization to the port level for a vast variety of NE types. &lt;br&gt;• Determine at a glance any under/over-utilized network assets and plan CAPEX expenditures accordingly. &lt;br&gt;• Plan upgrades, identify equipment nearing EOL and more by accessing release information, part numbers, manufacture dates, etc.</td>
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<tr>
<td><strong>Performance and QoE (OAM test)</strong></td>
<td>• Track and troubleshoot latency, jitter and packet loss at the NE or layer 2/layer 3 service levels with results from Y.1731 or MEF35 tests. &lt;br&gt;• Pinpoint the source of performance issues with multi-segments views. &lt;br&gt;• Measure and report on compliance to performance related service level agreements.</td>
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<td><strong>Utilization</strong></td>
<td>• Quickly identify the Top-N utilized ports (see figure 2) and SAPs in the network, and plan additional capacity as required. &lt;br&gt;• Explore service utilization to the forwarding class level and aggregate all services to the customer level for periodic reporting needs. Export report output to a customer self-service portal for premium customers. &lt;br&gt;• Provide SLA compliance reports to the SAP, service and/or aggregate customer level in minutes. Identify issues before they impact compliance.</td>
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Horizontally scalable architecture
The Nokia NSP supports a distributed and scalable architecture for secure data warehousing and remote archival and restoration of very high volumes of raw and aggregated statistics. It offers high performance for efficient, long-term analysis and optimal reporting visualization of current patterns and historical trends.

With data aggregation and reporting distributed across separate systems, service providers benefit from increased scalability and reliability to help them address the needs of the largest network architectures for all types of services. They gain maximum performance in aggregating and warehousing millions of raw statistics in short intervals. For example, the NSP aggregates raw statistics into hourly aggregates, then it uses the hourly data to compute daily aggregates, which are used to create monthly aggregates. Performance is further enhanced with the use of a highly specialized columnar store database optimized for analytics.

Report scheduling and execution can also scale from a single instance to a full server farm. This allows the number of simultaneous users and report generation requests to scale horizontally per business needs. Requests can be load-balanced amongst all available resources to ensure optimum quality of experience.

Northbound interfaces and OSS integration
The Nokia NSP allows for integration with third-party operations support system (OSS) for billing, performance, and service level agreement (SLA) management through its HTTP REST OSS interfaces, and Analytics API for report execution and embedding.

Flexible report authoring and customization
The NSP provides self-service reporting capabilities with unlimited reporting options. Simple to use drag & drop web-based tools are provided to create insightful reports and dashboards.

- The Ad hoc Report Design tool is used to create content-rich tabular or graphical custom reports in minutes using pre-packaged “Data Domains”. Data Domains are meta-data models that organize and categorize the data available in a logical, easy to use manner. Statistical and logical functions are available to extend and enrich the
data available in the Data Domains. Data mining across multiple dimensions of time, equipment, services, and performance can significantly increase efficiency and speed time to accurate, meaningful answers to key questions.

- The Dashboard Designer is used to create mashups from pre-packaged or custom reports created with Ad hoc Report Design. Dashboards are ideal for blending multiple related datasets into a coherent and complete depiction of current or historic data. For example, get a view of NE health by blending various charts and tables for card and port utilization, ports and SAPs with the highest throughput, latency measurements to neighboring NEs, etc. Visual elements can be enhanced by specifying thresholds which quickly draw attention to potential problem areas. Dashboard content can be updated manually, or automatically at a configured interval – a useful attribute for use in network operation centers.

Figure 2. Port Throughput report with prompts
NSP Analytics architecture

Nokia NSP generates reports based on physical inventory, application accounting data, SNMP statistics, OAM test results, flow-based data, service impacting events, operational state information as well as customer provided data (e.g. maintenance windows). The NSP also provides the means to configure all required policies to enable the collection and storage of the above data, scheduling of OAM tests, etc.

Additionally, the NSP will automatically aggregate statistics to hourly, daily, weekly and monthly levels and retain the data in the Auxiliary Database as per user configuration.

NSP Analytics functionality is enabled by these components:

- The NFM-P Server, which manages all components as well as collecting accounting and SNMP statistics for deployments with limited scale requirements.
- The Auxiliary Server, which collects accounting and SNMP statistics for deployments with large scale requirements. The Auxiliary Server supports geographic redundancy and is horizontally scalable.
- The NSP Flow Collector, which supports the collection and aggregation of Nokia system cflowd (i.e. IPFIX), as well as multi-vendor NetFlow v5 data. The NSP Flow Collector supports 1+1 redundancy and horizontal scale.
- The NSP Auxiliary Database, which warehouses the large volumes of current and aggregated historical statistics and raw data. It also stores customer provided data enabling content-rich reports tailored to specific needs. It is an analytics-optimized, cluster-based columnar store, enabling complex data processing with high performance, horizontal scale and high availability.
- The NSP Analytics Server, which is used to create, schedule and run reports and dashboards and to distribute them to a wide audience or to external systems. This server is horizontally scalable with load balancing capabilities to ensure greater performance, scale, and end user quality of experience.

Figure 3. NSP Analytics Architecture
Technical specifications

Operating environment and scalability
For up-to-date information about the operating environment and scalability, visit the NSP product page or consult your local Nokia representative for more information.