

Next Generation Customer Experience based on Automatic VNF Management Powered by Network Intelligence

Ensure a high-quality user experience in your network by using predictive analytics for response times combined with other network indicators. Proactively and automatically improve the quality, performance and availability of your network services to enable them to run continuously within your defined SLA's.

Joint Solution

- ▶ Elastisys provides predictive analytics of service performance and dynamic resource allocation, based on detailed insights about VNF and network performance from the Qosmos Probe.
- ▶ The Enea Qosmos Probe provides detailed information in real time about VNF behavior, such as:
 - Bandwidth per application in / out of the VNF
 - Number of simultaneous connections per application
 - Response time per application
 - Network quality as seen by the VNF
 - Error codes at the protocol level

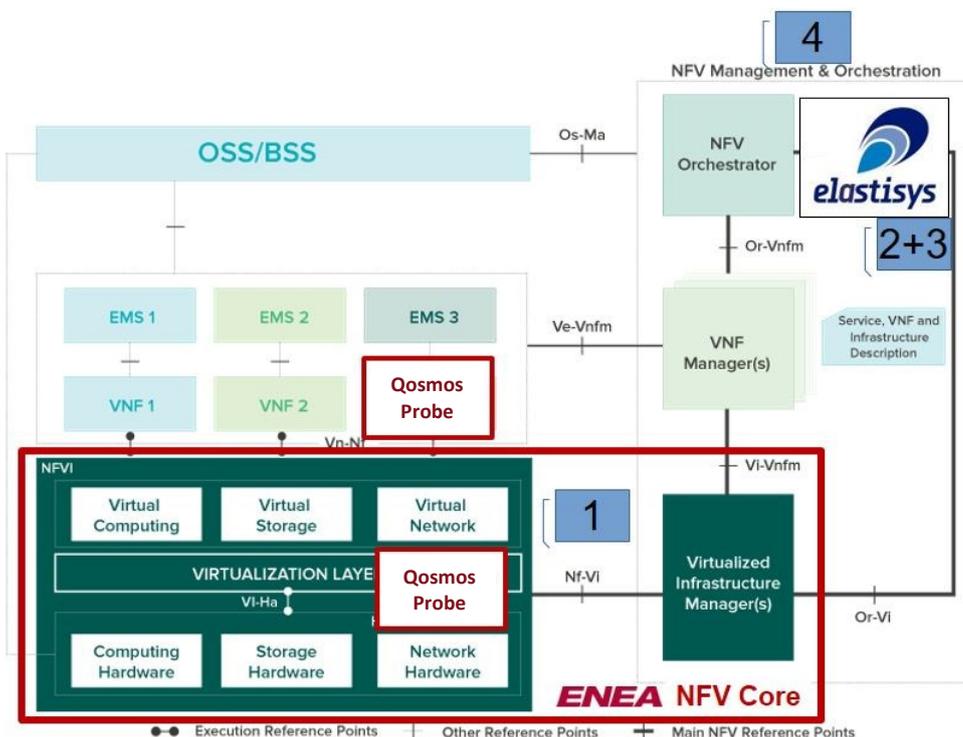
As a communication service provider, you want your business critical VNF services to run in a highly available manner, with high performance and within your customers' SLA. And you want to achieve that using as much intelligent automation as possible to tune and configure your services in real-time in response to changes in demand.

You also want to measure the performance of your services and control them in a way that is independent of the VNF vendor or type and with metrics that are highly correlated to actual user experience such as response time and network quality.

The Enea + Elastisys solution allows communication service providers to define SLA boundaries in terms of key network quality indicators and response time values, and then to automatically and proactively monitor and manage the service chains of VNFs. This ensures there is always enough compute, network and storage capacity to run services with the right level of quality.

Benefits include lower opex and capex by always running the exact amount of infrastructure required without over-provisioning; less manual work to locate and fix problems; and, ultimately, better customer experience thanks to higher service availability and performance even during heavy load periods.

Elastisys is a spin-off from Europe's leading research group in cloud management. It has built an intelligent orchestration software based on patented algorithms for predictive analytics and automation. Qosmos, the Network Intelligence division of Enea, has developed the Qosmos Probe, an industry leading software-based DPI solution that unlocks business critical insights from your network. Together we build solutions designed to help communication service providers increase their revenues by providing better customer experiences in their networks.



- ▶ 1: The Qosmos Probe provides detailed information about VNF behavior in real time
- ▶ 2: Each probe sends flow-based data to the Elastisys database
- ▶ 3: Elastisys performs predictive data analytics to take automated management decisions
- ▶ 4: Automatic life cycle management is done through the NFV Management and Orchestration interface

Key Use Cases

Real Time Evaluation of Scaling Decisions

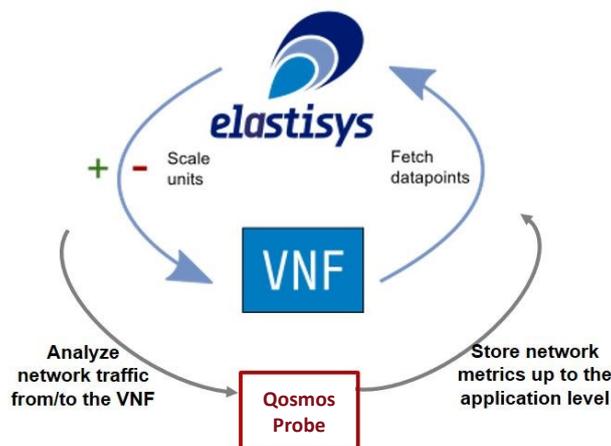
- Scaling decisions are usually made manually and based on hardware metrics only (ie: CPU or memory usage) when a given VNF reaches a defined threshold
- Thanks to real time evaluation of network indicators and time measurements combined with predictive analytics, the Enea + Elastisys solution ensures excellent network responsiveness to scaling decisions, which is key for a good user experience
- Example:
 - A web front-end VNF appears to be overloaded
 - The Elastisys system detects the overload and starts allocating more resources (ie: 10% more resources)
 - If this resource allocation reduces the VNF response time, the scaling decision was the appropriate answer, scaling up can continue until the response time complies with the defined SLA
 - If the resource allocation does not have any effect on the response time, an alert can be sent to the NFVI administrator for troubleshooting investigation

Advanced Diagnosis of VNF Issues

- When a VNF is not operating properly according to its expected SLA, there is a variety of reasons that may explain this malfunction:
 - Lack of HW resources
 - Bad network quality
 - Connectivity lost with another VNF acting as a server for the monitored VNF
- The Qosmos Probe provides indicators about network quality seen by each VNF and also provides full visibility on the dependencies between VNF's
- Besides taking automatic action where appropriate, the system can also communicate deeper performance-related issues through visualisation and logs

Idle VM Identification

- In a datacenter every instantiated VM consumes resources even if it does not deliver any service (Memory / Disk / CPU usage)
 - Network traffic generation (low level network services, OS or Applications updates)
- Detailed analysis of the network behavior of a virtual machine can identify a VM that is effectively delivering a service from a VM which should be decommissioned
- By decommissioning VMs, datacenter resources can be optimized leading to overall cost reductions
- An efficient decommissioning operation can be automated by the ENEA + Elastisys solution if a VM is idle for a long period of time, or an alert can be sent to the administrator if the period is not significant enough



- ▶ Elastisys provides predictive analytics of service performance and dynamic resource allocation, based on detailed insights about VNF and network performance from the Qosmos Probe.
- ▶ The Qosmos Probe provides detailed information about VNF behavior in real time, including:
 - ▶ Bandwidth per application in / out of the VNF
 - ▶ Number of simultaneous connections per application
 - ▶ Response time per application
 - ▶ Network quality as seen by the VNF
 - ▶ Error codes at the protocol level



Qosmos, a division of Enea, is the leader in IP traffic classification and network intelligence technology used in physical, SDN and NFV architectures. Qosmos ixEngine software development kit and components are embedded by vendors and integrators into their products sold to telcos, cloud service providers and enterprises. For more information: www.qosmos.com

Contacts : Sébastien Synold, ENEA Product Manager (sebastien.synold@enea.com) - Robert Winter, Elastisys CEO (robert.winter@elastisys.com)

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