THE VIRTUAL PROBE: ASSURANCE & MONITORING IN THE NFV/SDN ERA

White paper
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Amdocs’ service assurance and customer experience monitoring solution is designed for operators who are migrating their networks to cloud-based virtual networks. In Virtual Network Functions (VNF) architectures, network traffic can no longer be effectively monitored on a physical interface and a virtual probe solution is required. Amdocs and RADCOM field-proven service assurance and customer experience solution allows operators to constantly monitor and troubleshoot their service performance on a virtualized network, providing the intelligence needed to improve users’ QoE, reduce network downtime, optimize network planning and reduce engineering and support costs.

Why service assurance going virtual is the only way forward
A probe based service assurance solution is critical in today’s telecom networks. Operators are using probes to monitor traffic, measure real-life customer experience and extract intelligence for multiple applications such as customer experience management, service assurance, network performance monitoring, network planning, marketing analytics, call tracing and troubleshooting and many more. All this network intelligence is used so that the operator can maintain a high network performance and provide customers with a high quality of experience.

Traditional service assurance solutions are facing new challenges with network elements such as Evolved Packet Core (EPC) transitioning to NFV and SDN:

• **Virtualization environment** – Virtualized IMS and EPC can’t be monitored effectively by legacy physical probes since they can’t monitor logical interfaces that use internal Virtual Machine-to-Virtual Machine (VM-to-VM) communication between functions, hosted on the same server.

• **Interoperability** – The virtual probe monitoring solution has to be able to support standard NFV architectures.

• **Hybrid** – As environments gradually transition from physical to virtual, the monitoring solution has to be able to monitor both legacy and virtualized elements.

• **Scale** – The size of networks is growing rapidly and service providers will soon need to monitor multi-terabit networks running multiple technologies, with a tremendous amount of events. At the same time, a system must be cost effective, with a small footprint.

**Customer value**

- Measures real Customer Experience analysis
- Ensures QoS for voice, data and mobility services
- Guarantees customer satisfaction by proactive troubleshooting
- Minimizes churn by enabling smarter customer care
- Protects revenue streams by improving VIP customer QoE
Legacy probe-based proprietary hardware requires a much longer cycle for operators to design, integrate and operate. Hardware-based appliances reach their end of life quicker, requiring the procurement cycle to be repeated. By using an NFV-based service assurance solution, operators can rapidly increase their network analytics capacity exactly when they need to – this enables them to align their network-monitoring processing capacity against their business needs in a timely manner, while keeping CAPEX and OPEX under control.

Figure 1: Only an NFV-based service assurance solution can monitor internal Virtual Machine-to-Virtual Machine communication.
Amdocs-RADCOM service assurance solution

A pre-integrated, partner-based solution that combines RADCOM’s VNF for vProbe (the MaveriQ virtual probe) with Amdocs Network Cloud Service Orchestrator (Amdocs NCSO), the Amdocs-RADCOM MaveriQ solution is an out-of-the-box solution that allows operators to constantly monitor and troubleshoot their service performance on a virtualized network. The same solution can also monitor the physical network to provide operators with an easy transition while maintaining constant customer experience monitoring.

The Amdocs and RADCOM MaveriQ solution is based on non-intrusive vProbes (non-intrusive probes don’t increase network traffic and measure the real-life experience of a subscriber). The probes are spread across the network; gather traffic data and measure Key Performance and Quality Indicators (KPIs/KQIs) that provide visibility into network performance and subscribers’ quality of experience (QoE). The probes send the data collected to a central database where the information can be accessed via a web-based GUI in both real-time and for historical data.

The MaveriQ solution resides on virtualization platforms designed for Terabit Networks and is able to analyse thousands of Gbps in real-time by utilizing technologies such as Big Data analytics engine, column-based database, massively parallel processing (MPP) and ultra-fast packet processing techniques.

Using the Amdocs NCSO as an NFV Orchestrator (NFVO) and VNF Manager (VNFM), operators can rapidly increase network analytics capacity when needed, by adding virtual probe instances on additional VMs, keeping CAPEX and OPEX under control. The RADCOM MaveriQ VM can be easily migrated by the NCSO between hosts, to enable increased redundancy or to eliminate application downtime during planned server maintenance.
Partnership key value

- **RADCOM VNF for vProbe (MaveriQ)** is fully integrated to Amdocs NFV Management & Orchestration (MANO), which allows functions such as onboarding, scaling and healing to be automated and controlled by Amdocs Network Cloud Service Orchestrator.

- A proven and tested service assurance solution - minimizes the risk associated with moving from proprietary appliance-based probes to cloud-based virtual probes allowing service providers to focus on building high value and differentiated end-customer services.

- The solution is an entirely software-based Virtual Network Function (VNF), and can be seamlessly deployed in NFV environments, with scaling elasticity and high availability.

- Seamless integration with third parties such as CRM and Fault management for real-time exchange of data feeds.

- Scalable, cost-effective solution with a small footprint. Operators can avoid upfront investments by expanding their deployments as their network grows.

The technology behind the MaveriQ solution

- **Supports Terabit networks and able to analyse thousands of Gbps in real-time**: The real-time analytics engine, real-time classification, real-time aggregations and specialized network interface module, packaged up in one probe that’s able to support all technologies, all make MaveriQ an ideal monitoring tool for Terabit networks.

- **Advanced real-time user analytics**: present in-depth statistics about parameters such as unique subscribers, release causes, type of traffic, devices, and services. These analytics enables operators to create precise value-added packages for their subscribers, and optimize their networks for superior customer experience.

- **Use Virtual Network Interface Card (vNIC) and Virtual Switch (vSwitch) capabilities** to non-intrusively monitor traffic on external network interfaces as well as internal VM-to-VM communication.

- **Presentation layer and reporting** enable end-to-end visibility of the network across technologies, while also providing the ability to drill down to the session level and see all details of the system.

- **Measurement methodologies**: A comprehensive array of service and network performance, and measurement methodologies to continuously analyse service performance and quality.

Figure 3: Amdocs NCSO as an NFVO and VNFM for RADCOM MaveriQ vProbe
An example of a use case: LTE (4G) assurance

Amdocs and RADCOM worked together to develop the virtual Probe LTE (4G) assurance solution for a large Tier-1 US operator. The joint solution enables high performance network analytics and quality-of-experience monitoring probes, including seamless integration with third-party systems such as CRM and Fault management.

What the operator needed:

• A set of reports and KPIs for network analysis and troubleshooting based on call-tracing capabilities and trending reports.
• Monitoring is a critical component in IMS and trying to carry this out effectively in a virtual environment is challenging since VMs (VNF and Probe) are dynamically moving and are scaling out/in.
• Operate a network and service performance software based virtual probes to work in unison with a business intelligence suite.
• To quickly provision monitor, troubleshooting, optimize and report all aspects of subscriber, network and launched services.

A description of the Solution:

• End-to-end, cross-network call tracing for real-time troubleshooting using Amdocs NCSO as NFV Orchestrator and VNF Manager.
• Seamless integration with third party software such as CRM and fault management to enable real-time exchange of data feeds.
• VM tracking (vProbe and vIMS), dynamic routing of traffic (vSwitch in DC), dynamic scaling of VMs and bandwidth, and integration with Vmware & Openstack and RADCOM’s MaveriQ.

In this use case, virtual probes were placed between network elements where traffic was passing through unimpeded, but at the same time, also copying that data, enabling the probe to listen. Our joint solution includes a presentation layer which provides reporting, session trace, full protocol decode, detailed network analysis and visualization, service impact, and customer service-level agreement (SLA) data provided via a graphic user interface.

This solution benefits network operators by providing the intelligence they need to improve users’ quality of experience, (including meeting those all-important SLAs), reduce network downtime, optimize network planning and reduce engineering and support costs.

Figure 4: vProbe LTE (4G) Assurance – end-to-end cross network call tracing for real-time troubleshooting
Monitoring Virtual and Physical Network Elements with vProbes

The MaveriQ virtual probe solution provides a comprehensive Service Assurance and Customer Experience Management (CEM) monitoring solution that can simultaneously monitor both virtual interfaces on cloud-based networks, and physical interfaces. Data collected from both physical and virtual probes can be analysed, stored and presented by a single central management and database solution which may be installed on either physical or virtual environment.

In an NFV environment, traditional monitoring equipment such as taps and splitters can still monitor the traffic that traverses physical network interfaces. However, taps or splitters cannot monitor logical interfaces that use internal Virtual Machine-to-Virtual Machine (VM-to-VM) communication between functions hosted on the same server. This example demonstrates the limitation of intelligence that can be extracted by legacy probes in an NFV environment.

To monitor virtual network elements, a new type of solution is required. The solution to effectively monitor traffic between virtual network elements is provided by the Virtual Probe Function (VPF). VPF can monitor all traffic in the Virtualization Platform; both external traffic on the Virtualization Platform’s physical interfaces, as well as VM-to-VM communications.

Although virtual probe and the traditional monitoring equipment can be mixed in the same network under a single management system, there are several advantages of monitoring traffic between Virtual Network Elements with virtual probes.

- vProbes has full visibility of all the interfaces, both physical and logical, so it can extract all the required information for customer experience management and service assurance applications.

- The vProbe itself is simply software residing on a VM, which can be deployed alongside any other virtualized application or network function on the same physical virtualization platform server. vProbe leverages virtualization platform software capabilities to be able to non-intrusively monitor physical and VM-to-VM communications in a seamless manner.

- Operators using vProbe to monitor virtual network functions reduce the CAPEX and OPEX associated with the monitoring solution by using standard off-the-shelf hardware rather than proprietary appliances. Moreover, the virtual probe solution removes the need for proprietary hardware, and costly network taps and aggregators.
At your side with specialized Support and Services.

With a depth of experience helping customers transform from traditional network to cloud-based network, Amdocs and RADCOM have also developed a comprehensive range of technical and business consultancy and advisory services that help manage the organizational and operational transformations associated with the introduction of vProbe cloud based architecture. These services also help organizations restructure functional areas such as service operation and support.

Summary

From the early days of the NFV, Network Analytics and QoE monitoring probes have been part of the network virtualization vision. A probe based service assurance and customer experience monitoring solution is critical to network operations, planning, engineering and marketing. Operators should consider modernizing their probe function from proprietary appliances to virtual machines in order to support the new NFV network architecture and use solutions that are able to monitor internal VM-to-VM interfaces as well as physical interfaces.

Amdocs and RADCOM’s innovative virtual Probe based on MaveriQ-VPF is one of the first solutions in the market to address the challenges of network analytics in the NFV/SDN era. The joint Amdocs-RADCOM MaveriQ solution offers an innovative service assurance and Customer Experience Management solution that addresses multiple service provider needs including customer experience monitoring, network performance monitoring and network troubleshooting in a single solution.

Contact your Amdocs representative to find out more.

About RADCOM

RADCOM provides service assurance and customer experience management solutions for leading telecom operators and communications service providers. RADCOM specializes in solutions for next-generation mobile and fixed networks, including LTE, VoLTE, IMS, VoIP, UMTS/GSM and mobile broadband. RADCOM’s comprehensive, carrier-grade solutions are designed for big data analytics on terabit networks, and are used to prevent service provider revenue leakage and to enhance customer care management. RADCOM’s products interact with policy management to provide self-optimizing network solutions. RADCOM’s shares are listed on the NASDAQ Capital Market under the symbol RDCM.

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