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ISSUE #15

Using virtualisation to provide assurance to virtualised networks means building something akin to a sensor network operating within NFV and 5G networks as part of the fabric. This creates an embedded monitoring and sensing capability that provides feedback to the brains of the network.
A Fifth (Generation) Sense.

the fifth sense



One theme emerging during 2016, as operators and vendors begin to rollout out NFV implementations, is the requirement to do something about collecting and managing network data within a network composed of, or partly composed of, virtualised network functions.

The vision is broadly this — to use virtualisation upon itself. In other words use virtualisation techniques to move data capture from centralised physical appliances to a distributed, virtualised instrumentation of the network that can intelligently provide information flows to where they are required. The idea is to embed data capture, flow monitoring, performance and service assurance within the fabric of the network itself. This shifts monitoring from being external to the network, probing and inspecting and reporting, to being something integral to the network. This integral assurance capability acts like a sensor network, working out what is

happening in the network in real time, based on state info from devices, network elements

and functions. Decisions as to what to do with this information — say to discard it as superfluous or instead to escalate it to orchestrators and controllers to act upon — are taken in a structured way within the network.

That is the vision. How to get there is more problematic.

Balaji Ethirajulu, Director Product Marketing at Ericsson, says that in the legacy world, service assurance played a role to manage the network, identify root cause of a problem, provide performance reports and also take some proactive action. But, the role of service or requirements of service assurance will be different for NFV, SDN and hybrid networks. More than ever, service assurance will play a key role or act as a catalyst for the NFV and SDN.

That's because automation, network agility and service agility are the cornerstones of NFV, and this will only be achievable if service assurance can match those demands. To do that will require network analytics to play a key role by providing proactive and predictive actionable intelligence. Service assurance can help close the loop to enable the automation, network agility and service agility, enable policy decisions to be applied by using actionable intelligence from network analytics. Similarly, assurance and analytics information can be used by the orchestrator to manage the service and network resources efficiently both in legacy and virtual networks.

For example, network assets can

be optimised, moved around or scaled up/down based on the proactive and predictive information and thus providing the network agility. And based on services need at a certain time, VNFs can be scaled up/down or new VNFs can be created.

Ethirajulu, writes, "Open source projects such as OpenDaylight and OpenStack (Ceilometer) need to enhance their performance and assurance information that takes into account the network functions that will run on top of NFVI. Both ODL and OpenStack are upstreaming into OPNFV. So, OPNFV with the projects such as SFQM (Software Fastpath service Quality Metrics) is moving in the right direction in the area of service assurance of NFV. To provide end-to-end service assurance of hybrid networks, service assurance solutions will rely on legacy network information (performance counters, alarms, events etc), NFV (OpenStack) and SDN (ODL) as inputs for its decision making."

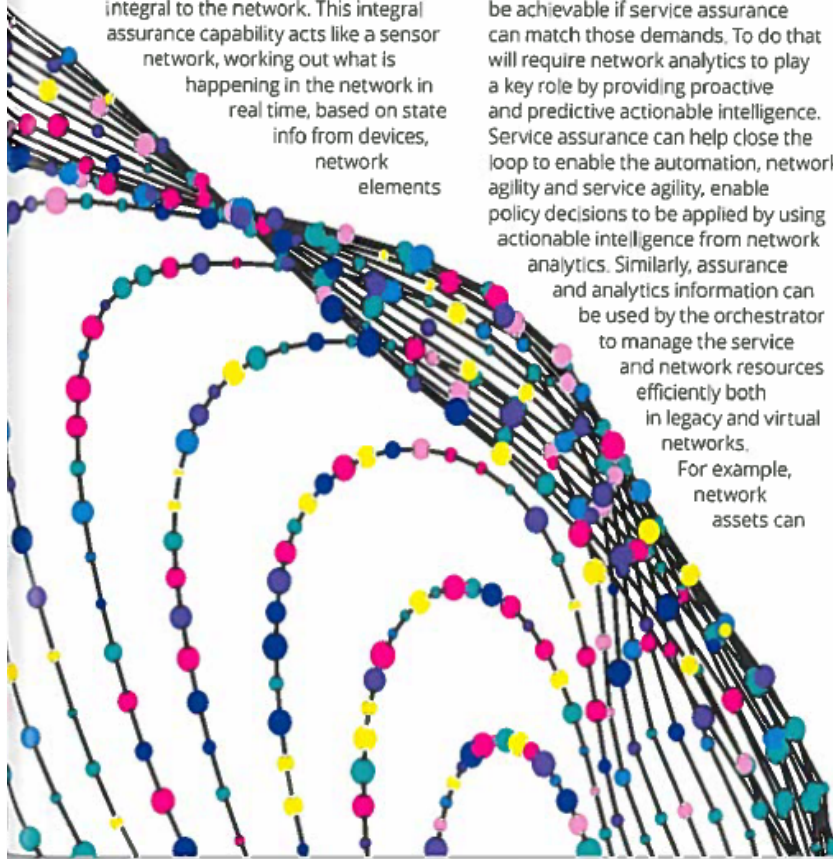
NFV transformation will also push the probes into virtualised environments as virtual probes.

NO GOD BOX

NetScout Director of Product Management John English said in early 2016 that the key focus for the company will be providing assurance, instrumentation and analytics that can make sense of the amount of information coming from the network. The company's virtual probes, based on COTS hardware, will be able to support "new, top-down modern workflow approaches" that curate data where it is collected and flow data that is essential, but retain the ability to go deep into forensic session analytics where required.

"You can't move everything to the God Box," English said, encapsulating the problem.

Also addressing the issue was Spirent, ▶



FEATURE NFV ASSURANCE

“You can’t move everything to the God Box.”

another company that is assembling its assets in a bid to provide a living, breathing view of service and network performance.

Spirent’s Ross Cassan adds that customers are complaining of the number of probes they are supporting in the network, and of data overload — something that will only get worse as IoT connectivity takes off and video volumes increase.

Spirent’s approach is taking automated “active testing” from the lab to the network, an approach described by Cassan as a “better methodology” that can create a picture in real time for business units, if necessary feeding into the orchestration platform in a network. There’s still a requirement for probing capacity in the network, but Spirent thinks there is scope to automate test methodologies such as walk/drive testing, deploying virtual tests as VNFs that instrument the network upon any interface.

“It’s about going up the stack from L2-4, testing through to the real service,” he added. “You can do what was only available in the lab in the network.”

Procera’s Cam Cullen said that the advantage of virtual probes is that they can be placed into the network where needed, then moved or scaled up and down as required.

Cullen said that Procera has worked hard to provide feature parity between hardware and software probes, with no performance impact. That is not the case for other companies, he implied, which still have some hardware dependencies and need for acceleration.

As for what to do with the data you capture, the company was showing a GUI that allowed an operator to view

a network in terms of its fitness for purpose per a certain application. So by using the DPI capability and knowing what application flows there are, it can build up a picture if latencies might be affecting a certain gaming app, or throughputs impacting on video experience. It gives operators a view of the actual likely customer experience per app, rather than just a red/green light on a network KPI.

Also thinking hard about how to capture and deliver information across the network for performance management and assurance is Accedian, which has introduced its new FlowBROKER product. At core here is a separation of the analysis from the data tap, so that a more distributed means of access to network data can be deployed, but data can flow through the network.

Accedian has been able to demonstrate some of this thinking in the field. An Asian operator with a 100,000 LTE base station network is carrying out live testing and monitoring of its network using virtualised instrumentation from Accedian.

The operator, who TMN is unable to name, is using virtual probes from Accedian to send test packets into a network that has more than a quarter of a million endpoints, generating 20 billion metrics per day to feed into its big data analytics systems. Metrics being monitored include delay variation, packet loss, MoS scores. The operator is using the feeds for ongoing analysis,

“The big change is that we are not just saying we are all-software but that we can offer software live in that service provider environment, allowing our customers to spin up and down resources for instrumentation to grow with traffic load as they want to.”



and to assure backhaul links when new parts of the network are brought online. Accedian has claimed the deployment is the first such fully virtualised assurance solution in a live commercial network. Some service measurements — such as on VoLTE — are made 50-60 times a second, with KPI reports every minute, according to Henrik Nydell, Senior Product Manager at Accedian Networks. A single virtual probe instance can instrument around 4,000 base station connections, Nydell said, by being plugged into the network at the aggregation layer. Accedian's SkyLight Director then orchestrates those probes, setting up automated measurements on the network. If the virtual instance is sited deeper in the network, at a central location, then Small Form factor Pluggable (SFP) agents provide the feed from the network elements to the centralised cloud instance.

The deployment shows the ability of virtual test agents to scale and flex to service providers' needs, Nydell said. However, he added that new measurement protocols will be required in virtualised infrastructures expected to underpin 5G and mass IoT networks. IETF test standards for networks — such as Two-Way Active Measurement Protocol (TWAMP) RFC5357 — will need to be upgraded to ensure that standards that work for 4G work well in 5G.

"For 5G virtualisation will be key, but you can't really put a probe in the cloud. 5G will be a living entity. Not only users will move around but services

will too as operators spin up new servers and instances dynamically. Things will be floating around and you cannot see that at the network level, so that instrumentation capability will need to be built-in. For IoT the responsibility for monitoring the KPIs will need to be built inside the app itself."

Nydell added that one example where more work is required is time stamping in virtual architectures. He said that Accedian is amongst those working with Linux groups to find a way to provide accurate time sampling for server hardware supporting virtualised architectures.

To return to NetScout, as we said, it has been on a mission to transform itself into a company aligned with the strategic transformation of networks from hardware-specific appliance to virtualised instances running on COTS hardware.

On a results call in May, CEO Anil Singhal said: "Supporting customers with their virtualisation and cloud-based infrastructure initiatives is just one area where ASI tips the scales in our favour... NetScout ASI technology will play an important role in positioning us to win this technology turn and even potentially accelerate this transition for our customers as we have been able to do multiple times during the last two decades."

That means that its aim of introducing

new data analytics capabilities, and the ability for operators to customise the service intelligence they are offering, is allied to its ability to deploy its instrumentation software in virtualised form.

Product manager Phil Gray says, "If you have been in the tools business for any length of time you will know that people want to deploy tools in exactly the same way as the services environment, so virtual appliances and software is the only model that

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follows the desire customers have to deploy services that way. NFV-SDN are real and our expectation is our tools need to go same way.

"The big change is that we are not just saying we are all-software but that we can offer software live in that service provider environment, allowing our customers to spin up and down resources for instrumentation to grow with traffic load as they want to. We never had a reliance on custom hardware, never made a card with acceleration or anything, so it's very easy for us to do."



Is enabling service assurance within NFV given enough priority?

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