CURRENT STATE OF NFV

Ericsson and Intel are very active members in OPNFV in order to industrialize Network Functions Virtualization (NFV) based on open source technologies. Read this brief interview with Susan James, Head of Product Line NFVi at Ericsson, and Michael Lynch, Product Line Manager, Telco Infrastructure at Intel, to get an OPNFV update from the two companies.

Susan James
Head of Product Line NFVi at Ericsson

Michael Lynch
Product Line Manager, Telco Core and Edge Infrastructure at Intel

What is your opinion of the current state of NFV/SDN maturity in the industry?

Susan James: We clearly see that NFV is moving from the PoC and trial phase to real commercial deployments. Operators are now starting deployments with Media Delivery Network, virtual EPC and virtual IMS as the leading applications. Some examples of live deployments where Ericsson is involved with providing infrastructure is Softbank, DOCOMO and Digicel. The industry is ready for industrialized NFV to be implemented and operators can re-focus their investments from native to virtual implementations.

Michael Lynch: The industry has achieved very significant milestones in the last year, with more contracts being awarded and initial NFV deployments now beginning to roll out. From a telecoms perspective, we are starting to see "islands of virtualization" at the edge of the network (e.g. vCPE), and in the Core Network (e.g. vEPC and vIMS). Although having said that, in terms of industry maturity, we have not yet fully crossed the "NFV Chasm", where we see pervasive, scaled adoption of NFV/SDN in the network.

What are the key barriers we see currently for NFV to scale out in a consistent and "industrialized" way?

Susan James: Networking is one of the elements that needs to be right. We see many examples of installations where some are problematic and others are fine with essentially the same elements. It is the networking that makes this big difference.

Michael Lynch: In Intel, we have characterized the main technical challenges into three main pillars: Performance (including networking), Security and Service Assurance. In the broader sense we also have to consider the maturity of open source solutions, and the business challenges relating to NFV/SDN transformation, such as more robust business cases with clear ROI/TCO benefits for operators.

What are Ericsson and Intel doing in the NFV/SDN domain and in communities like OPNFV to address these barriers?

Susan James: We're collaborating in a number of projects to increase interoperability. All the way from Pharos, to define and supply the OPNFV community with the hardware and labs needed, up through Fuel, our installer of choice, to Yardstick, defining what tests need to be performed on an infrastructure to make sure it can host OPNFV. Besides these projects we're also discussing what is needed in the performance measurement area and how we should approach containers and containerization in a good way.

Michael Lynch: On the performance aspect, we've made great strides with software based packet processing in the past few years (e.g. Data Plane Development Kit - DPDK) and this is a critical technology underpinning most if not all NFV deployments. While technologies like DPDK and FD.IO will continue to evolve, the industry needs to think smarter concerning where software can be bolstered in a seamless and transparent way by hardware acceleration capabilities, like FPGA.

We need to think of the NFVi more holistically – not just as "plumbing" that can be built out component by component. To that end, pervasive Platform Service Assurance (incl. Telemetry) needs to be part of the NFVi as an enabler for scaled automation of NFV deployments and true network and service agility.

On the question of open source maturity, while there is a natural desire for faster progress, the reality is that to make open source NFV building blocks "carrier grade" requires a huge investment of effort and resources. For example, in OpenStack there are a number of feature gaps that must be bridged and upstreamed in order for it to be fully ready for NFV deployments. From OpenStack scalability to the specific networking support OpenStack needs to implement.

That's why a community like OPNFV is so important – it brings the entire industry together to work in unison to firstly understand the requirements and then to influence and implement solutions in the applicable upstream projects. In OPNFV, Ericsson and Intel collaborate successfully across a number of projects, including Pharos (test bed infrastructure), Yardstick (Infrastructure verification), Fuel (Installer infrastructure), Doctor (Fault Management) and SFC (Service Function Chaining).

But it's not just these bi-lateral collaborations that are important. The collective "influence power" of many companies will always result in better outcomes than individual, siloed efforts.

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You've talked about the importance of Platform Service Assurance earlier, what exactly is Intel doing in this area, can you elaborate?

Michael Lynch: In order to realize the full vision of NFV & SDN, i.e. the service development velocity and monetization potential afforded by a highly automated and scalable network infrastructure, It's apparent that the same service levels, manageability and robustness that comes as part and parcel of legacy network platforms, must also be built into the Standard High Volume Server (SHV) platforms underpinning Virtual Network Function (VNF) deployments.

To date, NFV & SDN has been focused on proving that telecoms workloads can be virtualized, performant and deployable on SHV servers. But in order to scale to an "industrialized" level, we need to provide comprehensive platform service assurance capabilities in SHV servers, which can be leveraged and consumed effectively by management and orchestration systems as well as business management and analytics systems. To achieve this, platform service assurance needs to support 2 key vectors: Provisioning and Monitoring/ Telemetry.

Platform Provisioning means providing existing business management systems the ability to provision SHV platforms – comprising of compute, storage and networking resources - over standard open interfaces like NETCONF , Radius/AAA and CLI/SSH, and leveraging features such as Intel Enhanced Platform Awareness (EPA).

Platform Monitoring enables pro-active and reactive event and fault reporting, which can support enforcement of policy or corrective actions by management systems in keeping with desired service levels. In many cases, this will require real-time event notifications and corrective actions. Blades, CPUs, Cores, Ports, Links, Virtual Switches, NICs, Hypervisors, Accelerators – are all examples of monitored entities.

Related to this, **Platform Telemetry** is the means by which we can collect and expose meaningful metrics, statistics and events related to monitored NFVi components, so that management, orchestration and analytics systems can make intelligent policy decisions related to the operation of the network and provision of services. Local agents, MIBs and Open APIs like SNMP, Collectd, Syslog, Netflow, as well as Openstack components like Ceilometer and Congress can all play an important role here.

In the Service Assurance domain within OPNFV, there are projects like Software Fastpath Quality Metrics (SFQM) and Fault Management (Doctor) – which are starting to address Platform Service Assurance requirements. Intel plans to expand our efforts here in collaboration with Ericsson and the wider community.

How would Ericsson consume this work, when available in open source?

Susan James: That work will be instrumental to give us the needed data in order to be able to take informed decisions in the VIM and management/orchestration layers. Telemetry will provide those layers with the needed visibility into what is happening in the hardware layer, and that information can be used in preventive actions (e.g. to move a VM out of a server where the rate failure of disk blocks is increasing), corrective actions, and last, optimization actions for example consolidating VMs into a smaller set of servers while still maintaining the SLAs for the running services.

How do you see the next 12 months in NFV/SDN evolving, what can we expect to see available in the industry?

Susan James: We have reached a point where the technology is ready for live operation and right now we are looking into the advanced use-cases that will be enabled by the NFV/SDN technology. Those are end-to-end use-cases, going from capacity planning, through automated scaling and provisioning of services, orchestrated auto-healing in case of faults, optimization of workload placement, and decommissioning. We foresee ETSI and OPNFV taking the lead to respectively continue defining and creating the reference implementation of how those advanced use-cases shall be implemented. As mentioned previously, one of the barriers we see today when bringing NFVi into operation is networking. SDN will bring about the level of automation and programmability needed in the network level.

We foresee that the race to continue optimizing the data path for NFV applications will continue in the coming year. The limitations of SR-IOV will be overcome by moving the switching layer into the NICs.

Michael Lynch: The next 12 months are very important for the industry. Much progress has been made, and we foresee a significant increase in the number of NFV deployments worldwide. Nevertheless, as mentioned previously some important technical and business challenges remain to be overcome before we can begin to see true NFV/SDN “industrialization”.

With focused and collaborative efforts among key players in the industry we have the opportunity to work together to address many of these issues and ensure that solutions find their way into commercially supported products offered by the industry supply chain (NEPs, OSVs, ISVs).

OPNFV

OPNFV is an open source project focusing on accelerating the adoption of network functions virtualization (NFV). This open source project is different in the sense it brings together the work of various organizations, from other open source communities, such as OpenStack, OpenDaylight and Open vSwitch, and service providers to standardization bodies, to create and open and carrier grade platform for NFV.

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