anuta networks

NCX and Network Virtualization Function (NFV)

NFV Overview

Network functions virtualization (NFV) offers a new way to design, deploy and manage networking services. NFV decouples the network functions, such as network address translation (NAT), firewalling, intrusion detection and caching, to name a few, from proprietary hardware appliances so they can run in software.

NFV is designed to consolidate and deliver the networking components needed to support a fully virtualized infrastructure – including virtual servers, storage, and even other networks. NFV utilizes standard IT virtualization technologies that run on high-volume service, switch and storage hardware to virtualize network functions.

NFV Benefits

NFV virtualizes network services via software to enable operators to:

Reduce CapEx: reducing the need to purchase purpose-built hardware and supporting pay-as-you-grow models to eliminate wasteful overprovisioning.

Reduce OpEX: reducing space, power and cooling requirements of equipment and simplifying the roll out and management of network services.

Accelerate Time-to-Market: reducing the time to deploy new networking services to support changing business requirements, seize new market opportunities and improve return on investment of new services. Also lowers the risks associated with rolling out new services, allowing providers to easily trial and evolve services to determine what best meets the needs of customers.

Deliver Agility and Flexibility: quickly scale up or down services to address changing demands; support innovation by enabling services to be delivered via software on any industry-standard server hardware.

NFV Challenges

Service Definition and Orchestration: Ability to define new service models and on-boarding of new Network Service (NS) with multi-vendor VNFs on-demand.

Life Cycle Management: Life cycle management plays a significant role in elasticity. Managing the multi vendors' virtual appliances, scaling up and scaling down of the VNF, cloning the VNF and Disaster Recovery are the few key challenges for NFV's success.

Migration and Co-Existence with Physical Appliances: Virtualized network elements must coexist with legacy hardware while enabling an efficient migration path to fully virtualized network platforms.

NFV Management & Orchestration (MANO) using NCX

NFV Management and Orchestration (MANO) is the ETSI defined architecture for management and orchestration of all resources including computing, networking, storage, and virtual machines (VMs) resources.

NCX delivers the complete NFV MANO functionality and offers life cycle management - VNF instantiation, placement, image management, service definitions, provisioning, commissioning, and decommissioning.

Integration of vendor-neutral NFV Orchestration (NFVO) capabilities and the mapping of NFV framework with NCX are illustrated below:

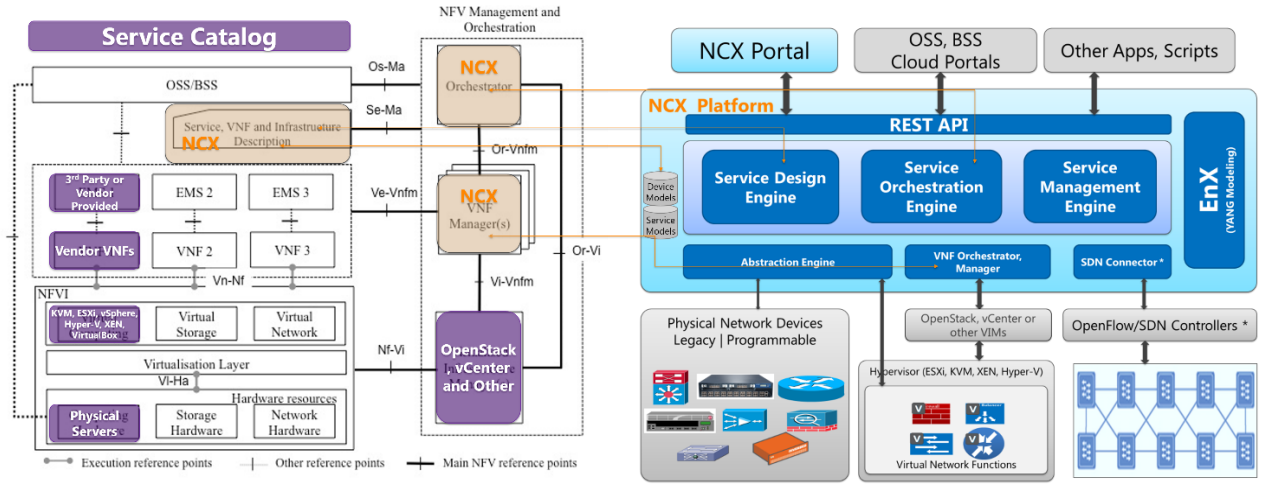

Figure 1 NFV MANO – Anuta NCX

NCX acts as the NFV Orchestrator and VNF Manager for leading L2-L7 virtual network functions from multiple vendor products such as Cisco CSR1000V, Cisco Nexus 1000V, Cisco XRV, VMware DVS, Citrix NetScaler VPX, F5 BIG-IP, Juniper vSRX, Juniper Firefly, Vyatta router, Firewall and Riverbed Steelhead WAN Optimization.

NCX provides a single management interface abstracting physical and virtual networks and services. The network administrator uses the NCX Service Designer to build the VNF forwarding graphs that are published to self-service catalogs. Based on the tenants' choice, NCX selects from a resource pool of L2-L7 VNFs to construct service chains as per the VNF forwarding graph and delivers the network service within minutes. NCX handles the various differences across these vendors using its model-driven abstraction technology.

In addition, NCX detects problems related to performance and availability that impact both physical and virtual network functions. Detected problems are mapped to the service instance and the tenant, helping quick isolation of the root cause of the problem.

Further, the entire NCX functionality is available via REST API for integration with existing OSS/BSS tools in the Service Provider environments.

NCX supports hybrid network service definition and orchestration containing both physical network appliances and VNFs in the service. With NCX, customers can easily migrate from physical network appliance with a VNF without changing the service definition. Similarly, customers can replace a VNF from one vendor with a VNF from a different vendor. All of these can be achieved without impacting any end-user experience thus allowing a smoother migration from today's inflexible networks to virtualized environments.

Virtual Appliance Life Cycle Management using NCX

Life cycle management also plays a role in elasticity. In principle, every virtualized network function could come with its own proprietary lifecycle management, but service providers and cloud providers would obviously benefit from a consistent approach across all VNFs. The use of tools for automated lifecycle management and convergence on one or a small set of compatible tools will provide significant benefits to both, service providers and vendors.

The following diagram highlights how NCX supports the Virtual Appliance life cycle management:

Figure 2 NCX VALM

Virtual Appliance Licensing

Managing the licenses of a huge number of virtual devices manually is an administrative overhead. Also, it is difficult for the administrator to keep track of new features that are added for each virtual appliance sourced from several vendors. NCX manages licensing for each virtual device instance of a network service for all supported vendor devices.

NCX pulls the appropriate licenses from a Central License Server during instantiation of each service. Alternatively, administrator can create a license pool using NCX to manage license manually.

Image Management

NCX supports upgrading and downgrading the virtual appliance images with minimal service impact. This will increase the overall service availability of the SP or cloud providers.

Dynamic Scaling

NCX supports dynamic deployment of VNF based on events such as End user action, Capacity thresholds, Network health event and HA event.

Patch Management

NCX upgrades and patches can be applied in a non-disruptive manner. Any service deployed and running whether it is physical, virtual or hybrid will not be impacted during an upgrade/patch to NCX. When the upgraded NCX VM is up and running again, service definitions and tenant offerings will remain intact and there is no need to redefine the services.

Supported NFV Use cases

Virtual CPE (vCPE): A virtual Customer Premise Equipment (vCPE) function enables service providers to offer their customers additional services and flexibility with reduced onsite CPE requirements, including associated complexity and cost. NCX will orchestrate the complete solution with all the required VNFs from different vendors with service chaining in a metro datacenter. A typical vCPE use case includes vRouter, vFW, vWAAS, and other Virtual Network functions.

Virtual MPLS Backbone Edge: This use case is about virtualizing the MPLS Core network elements such as vPE and vRR. NCX orchestrates the VNFs from various network vendors including Cisco, Juniper, Ericsson, and Vyatta.

Virtual Data Center: The complete DC workload with service chaining can be orchestrated using NCX. Typical VNFs include vRouter, vFW, vLBs and Compute FWs.

Summary

NCX delivers the complete NFV MANO functionality and offers life cycle management for leading L2-L7 virtual network functions from multiple vendor products. NCX supports hybrid network and orchestrates across physical devices and virtual network functions.

NCX enables service providers to embrace NFV and accelerate service delivery while reducing overall costs and aids SPs for smooth transition from physical infrastructure to NFV- based virtual infrastructure.