DRIVE NEW SERVICES AND GROWTH WITH NOKIA CLOUD PACKET CORE ON VMWARE vCLOUD NFV

Embrace the Cloud to Deliver Innovative Broadband and IoT/MTC Services

As organizations (cloud service providers [CSPs], enterprises, verticals, and governments) look for new ways to lower costs, accelerate time-to-market for differentiated services, expand business productivity and collaboration applications, and prepare their networks for the 5G era, they are drawn to the agility, scalability, and cost advantages of the cloud in conjunction with new network technologies. Nokia and VMware® are working together to help organizations easily make this transition. Specifically, by running the Nokia Cloud Packet Core (CPC) on VMware vCloud® NFV™, an industry-proven multi-vendor common platform, organizations can automate and accelerate the delivery of innovative services to drive new opportunities for business growth, revenue potential, and productivity enhancement—all while laying the foundation for 5G.

Capitalize on Mobile Broadband, IoT/MTC, and 5G Opportunities

Tremendous possibilities exist with the continued growth of mobile broadband, and with new services tied to the Internet of Things (IoT), Machine Type Communications (MTC), and 5G on the horizon. But to take advantage of these opportunities, the packet core must be able to connect to a greater variety of devices and deliver a broader range of services over an array of standards-based access technologies, including wireless licensed, unlicensed, and shared spectrum, and fixed access technologies.

Nokia has found a way to meet these requirements with the Nokia CPC—a flexible, multi-access cloud-native packet core that delivers the web scale, agility, reliability, and high performance needed for a diverse set of services. Nokia's CPC takes full advantage of a cloud environment—namely, the incredible flexibility, agility, and resiliency of VMware's vCloud NFV common platform—while still retaining the features and field reliability of bare-metal deployment.

By combining the Nokia CPC with the VMware vCloud NFV platform, organizations gain a powerful joint solution that allows them to confidently embrace and successfully act on the future of telecommunications.

Nokia Cloud Packet Core

Diverse mobile broadband, IoT/MTC, and 5G service requirements will need to be delivered across a wide range of wireless and fixed technologies that can be used individually or together to realize the delivery of a converged service experience and personalization.

The Nokia CPC is offered in a range of configuration options, supporting the wide array of functions required in the packet core. These network functions can be deployed as separate instances or in combination, providing maximum configuration flexibility. CPC elements can be deployed as virtualized network functions (VNFs) or as physical network functions (PNFs) within a common management system to support a consistent operations model across hybrid deployments, while also enabling a seamless transition to NFV and software-defined networking (SDN).

JOINT NOKIA AND VMWARE OFFERING DELIVERS DISTINCT ADVANTAGES

- Software disaggregation, moving beyond control and user plane separation[1]
- Stateless CPC functional elements with "state-efficient" processing together with a common data layer[1]
- Distributed and centralized deployment to support service and application requirements[1]
- Network slicing for service management and monetization[1]
- Cloud agile operations, allowing the automation and lifecycle management of individual CPC elements[1]
- Stability and resiliency, using one of the most widely deployed NFV platforms in the market
- Platform flexibility and agility to support today's virtual network function (VNF) needs and future technology evolutions (without a forklift change)
- Secure multi-tenancy with a common platform that ensures tenant isolation, preserving the integrity of VNFs and end users
- Lower costs with increased efficiency and platform agility
- On-demand capacity sizing for greater agility in service deployment
- Proven performance with hundreds of millions of mobile subscribers serviced by multi-vendor VNFs running over vCloud NFV
- Field-proven packet core software, deployed in over 140 4G/LTE networks

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[1] Cloud-native attributes.

Nokia's CPC is composed of the following elements:

Cloud Mobility Manager: The Nokia Cloud Mobility Manager (CMM), built on a cloud-native architecture, provides the web-scale and state-efficient design needed to meet the growing control plane demands of broadband evolution, IoT/MTC, and the transition to 5G. Deployed as either a standalone 4G Mobility Management Entity (MME) or combined MME/Serving GPRS Support Node (SGSN) in 2G/3G/4G networks, the CMM uses field-proven application software to ensure feature and service consistency between cloud and physical network function implementations. CMM runs on a wide variety of IT computing hardware and virtualized operating environments. The CMM delivers the scalability, flexibility, high availability, and performance to meet growing network signaling loads for consumer mobile and IoT/MTC services.

Cloud Mobile Gateway: The Nokia Cloud Mobile Gateway (CMG) has been built from the ground up on the principles and design requirements of cloud networking and web scale. It, too, runs on a wide range of standard IT computing hardware and virtualized operating environments. The CMG performs a wide variety of gateway functions, including SGW, PGW GGSN, HA, ePDG, TWAG, and enhanced TDF/Service Steering Gateway. Its high-performance, elastic, and state-efficient design addresses the growth of mobile broadband and the delivery of new IoT/MTC services, and provides an evolutionary path to 5G. These network functions can be deployed as separate instances or in combination, providing maximum configuration flexibility. The CMG control plane is highly resilient and delivers bearer and system level management with the reliability that is expected in the packet core network. The data and forwarding plane uses a distributed processing architecture that takes advantage of the NFV's dynamic scale and flexibility.
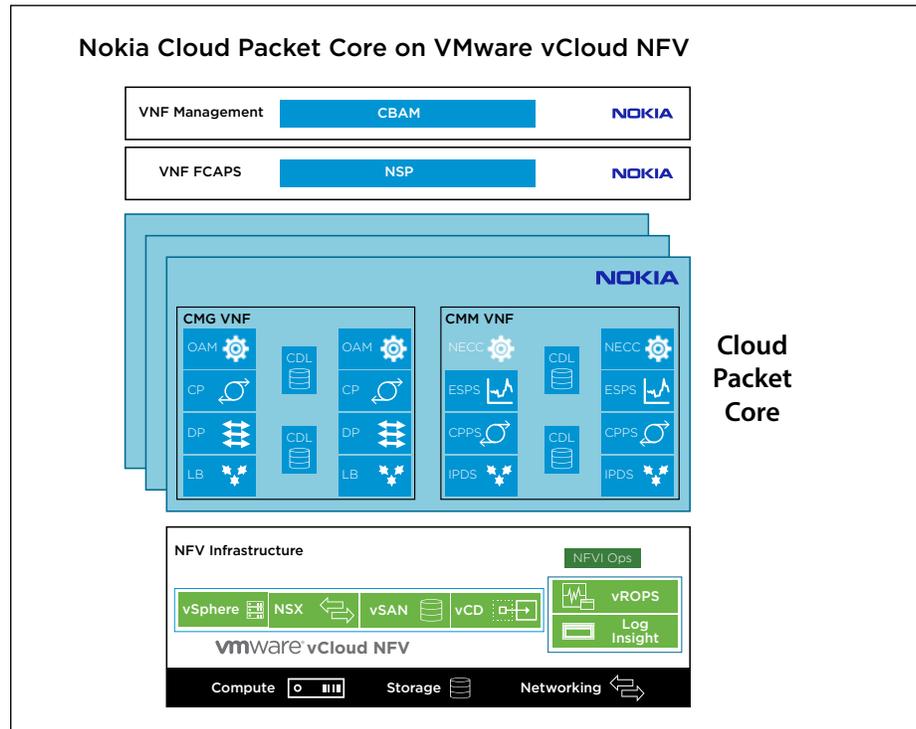

Figure 1. Nokia Cloud Packet Core on VMware vCloud NFV

Operating the Nokia CPC over VMware vCloud NFV enables organizations to achieve near bare-metal capacity in a virtualized environment without resorting to restrictive performance enhancement functions. With VMware virtualization, the Nokia CMM and CMG can provide better scaling and improved host utilization with minimal hypervisor overhead. VMware vCloud NFV also delivers balanced performance with scaling and dynamic resource scheduling. The VMware solution has the elasticity needed to scale up or down, based on services or capacity demand. It also provides the security assurance many organizations are looking for with tenant isolation that maintains end-user integrity when connecting to the packet core.

Automate and Accelerate Services with VMware vCloud NFV

VMware vCloud NFV is a modular, horizontal, common NFV infrastructure platform built on proven virtualization technologies for compute, storage, and networking, along with integrated dual multi-tenant Virtual Infrastructure Managers (VIMs). This solution enables cloud-centralized operations and management across the deployed topologies, and delivers an integrated set of NFV service delivery, operations, and management capabilities. It augments the Nokia CPC through:

Services Management Automation: vCloud NFV provides flexible, automated VNF onboarding and full-service lifecycle management through multi-VIM capabilities, greatly accelerating new service onboarding and expanding customers with faster time-to-market (TTM). With VMware vCloud Director® (VCD) or VMware Integrated OpenStack (VIO)—a full OpenStack implementation—organizations can automate the process of deploying VNFs and NFVI resources, including the configuration and provisioning of compute, storage, and networking resources. With policy-based provisioning, vCloud NFV simplifies the resource allocation for VNFs, giving organizations a multi-tenant, robust VIM that automates and accelerates service deployment.

Carrier-Grade Performance and Availability: vCloud NFV provides proven carrier-class performance, extending control and data plane separated cluster design. Workloads can take advantage of the high-performance fabric with built-in dynamic high availability and scalability to meet application demands. Service Level Agreement (SLA) guarantees are met through resource isolation, reservations, and dynamic workload placements with DRS and VMware vSphere® vMotion® technologies. The platform can be scaled from a branch office virtual PoP to a large centralized data center to achieve micro-data center and multi-tenant network sliced designs.

Integrated Operations Management: vCloud NFV is a fully integrated, single pane of glass cloud solution that ensures and restores service levels using near real-time operation monitoring, analytics, automation, and remediation. The solution provides an overall integrated and correlated view across service, access, network, and virtual and physical tiers, with issue isolation and recommendations for RightScale Cloud Appliance (RCA). Northbound triggering closes the loop with service and resource orchestration remediation and network management systems/operations support systems (NMS/OSS) notifications. The solution can be extended with custom data feeds, and third-party domain and technology expert analytics systems.

COMPONENTS OF THE VMWARE vCLOUD NFV PLATFORM

• VMware vSphere

• VMware vSphere® with Operations Management™ and VMware vRealize® Operations Insight™

• VMware Virtual SAN™

• VMWare vCloud Director for Service Providers

• VMware Integrated OpenStack

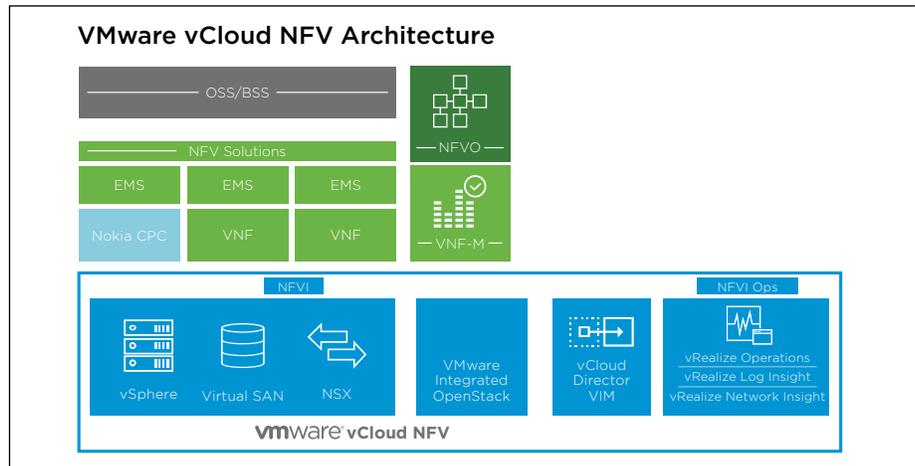• VMware NSX®

• VMware Site Recovery Manager™

Figure 2. VMware vCloud NFV Architecture

Nokia CPC and VMware vCloud NFV—A Winning Combination

Nokia and VMware are committed to building solutions that help organizations (CSPs, enterprises, verticals, and governments) embrace and profit from mobile broadband, IoT/MTC, and 5G opportunities. Nokia's approach to this opportunity is a flexible, multiple-access, cloud-native packet core that uses cloud technologies to provide the required flexibility, performance, web scalability, reliability, efficiency, and improved operations that organizations demand. This is why Nokia is working with VMware—to ensure the rapid innovation and agile delivery of new services that capitalize on these market and business opportunities.

Similarly, VMware has extensive experience in the telecommunications industry, delivering NFV-based service platforms that transform operator businesses through significant reductions in cost and increases in service agility. The maturity of VMware's integrated virtualization platform—along with associated operational support capabilities and resource management—enables organizations to rapidly adopt new ways of deploying service infrastructure.

Nokia's Cloud Mobility Manager (CMM) and Cloud Mobile Gateway (CMG) VNFs, which together form Nokia's Cloud Packet Core (CPC), have achieved VMware Ready for NFV certification. The VMware Ready certification provides organizations with the confidence that Nokia's CPC solution will deploy, run, and interoperate with the VMware vCloud NFV platform. Details of the Nokia CMM and CMG VMware Ready for NFV solutions are available on the VMware Solution Exchange (https://solutionexchange.vmware.com/network-function-virtualization).

Together, we bring to market a solution that is truly best-in-breed—a solution that combines a strong application from a company that's been in business for over a hundred years with one of the most widely deployed and proven virtualization platforms in the industry. Through these efforts, we're enabling organizations to capitalize on the exciting opportunities that exist today and confidently embrace a new era of telecommunications where they are empowered to succeed.