Alepo In The Virtualized Core Network

Introduction

Network Functions Virtualization has dominated the conversation in the communications industry in recent years. In network planning discussions, proof of concepts and lab evaluations, and soon-to-launch projects, operators are looking at their networks and businesses through the lens of this major technology disruptor. A report released by Technology Business Research estimates that investment in NFV and software-defined networking (SDN) will grow at a CAGR of 94.3% by 2022 to over $168 billion.[1]

It isn't difficult to understand why network operators are so invested in the exploration and evaluation of network functions virtualization. It is a paradigm shift in how network operators design, build, manage, and monetize their networks and data centers. When the cost to operate a carrier data center threatens to overtake network profitability, NFV provides a glimmer of hope, showing great potential for outcomes that will afford network operators the leverage they need to drive innovation and profits in today's data-driven world. These outcomes include-

Significant savings in CAPEX and OPEX	Rapid service innovation and time to market	A truly flexible and agile network architecture

While the industry keeps a watchful eye for the early commercial NFV deployments, many of the underlying principles of network functions virtualization have existed in enterprise IT and cloud computing for many years. Similarly, Alepo has been deploying its core network elements as virtualized network functions (VNFs) in Tier 1 operator production networks for many years, and today, Alepo is established as an experienced and successful technology provider in this space. A pure software player, Alepo has the core skills, proven experience, and know-how to deploy industry-leading core network functions, including AAA, OCS, PCRF, and HSS, in a virtualized or private cloud network environment.

The following paper describes the Alepo products and solutions available in a virtualized or private cloud network environment, as well as the key features and benefits of virtualization. For additional information, please visit www.alepo.com and contact your Alepo representative today.

Network Functions Virtualization Overview

In simple terms, network functions virtualization is the process of decoupling software-based network functions from the underlying hardware infrastructure. Instead of running each network function or node on dedicated hardware, functions are run on virtualized machines (VMs), and physical resources are distributed across virtual machines. Spanning the network environment, virtualization is possible on most network functions: switches, routers, firewalls, load balancers, CDNs, IMS, EPC nodes, DPIs and traffic managers, and policy functions like AAA and PCRF.
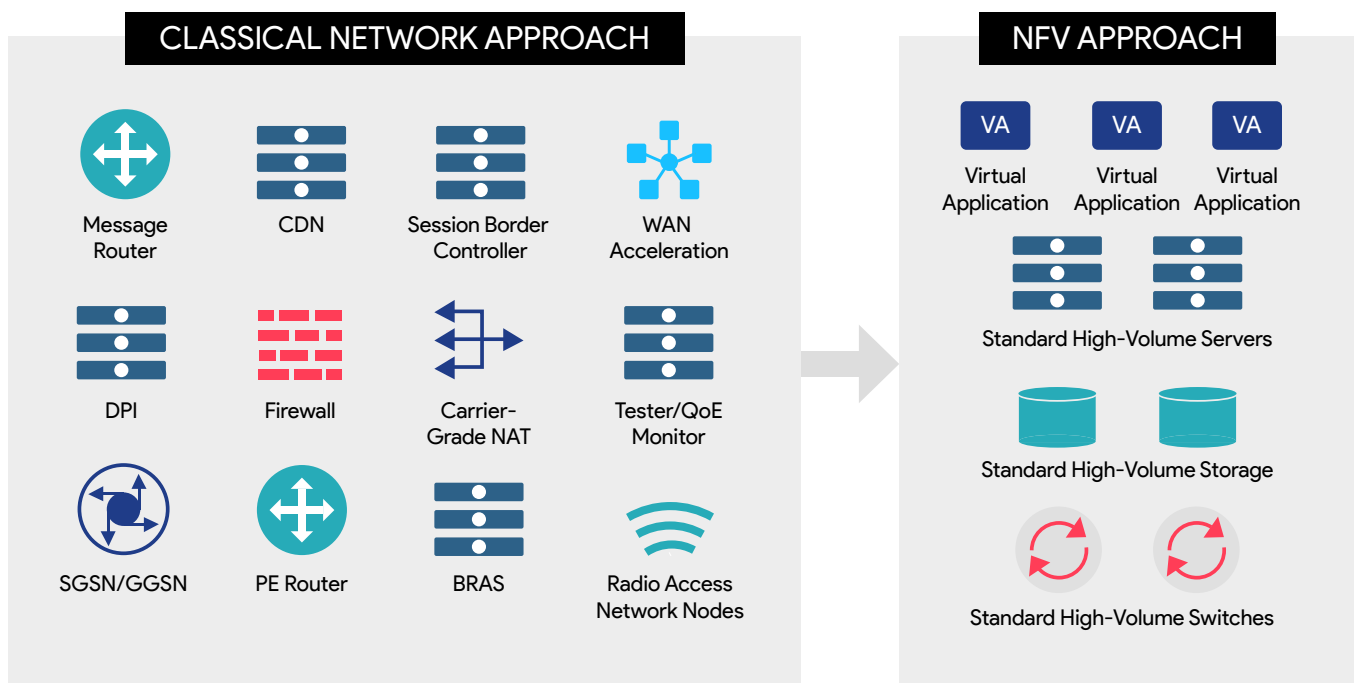
Virtualization boasts significant operator benefits related to how their networks are designed, built, managed, and monetized. The following benefits have been the key drivers for operators to pursue network functions virtualization.

NFV Origins

While virtualization principles have prevailed in IT for many years, NFV started as a telecommunications industry initiative in 2012. Led by a group of forward-thinking network operators, today the ETSI NFV specifications group directs much of the activity and progress of this initiative.

Reduce Capex

By abstracting network functions (software applications) from the physical hardware (e.g., servers, switches), operators are able to run those services on standard commercial off-the-shelf (COTS) hardware instead of proprietary hardware. This affords operators greater flexibility and selection of low-cost commodity hardware, which can significantly reduce CAPEX for new services as well as simplify the planning and rollout of those new services.

CLASSICAL NETWORK APPROACH

Message Router

CDN

Session Border Controller

WAN Acceleration

DPI

Firewall

Carrier-Grade NAT

Tester/QoE Monitor

SGSN/GGSN

PE Router

BRAS

Radio Access Network Nodes

NFV APPROACH

VA — Virtual Application

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Standard High-Volume Servers

Standard High-Volume Storage
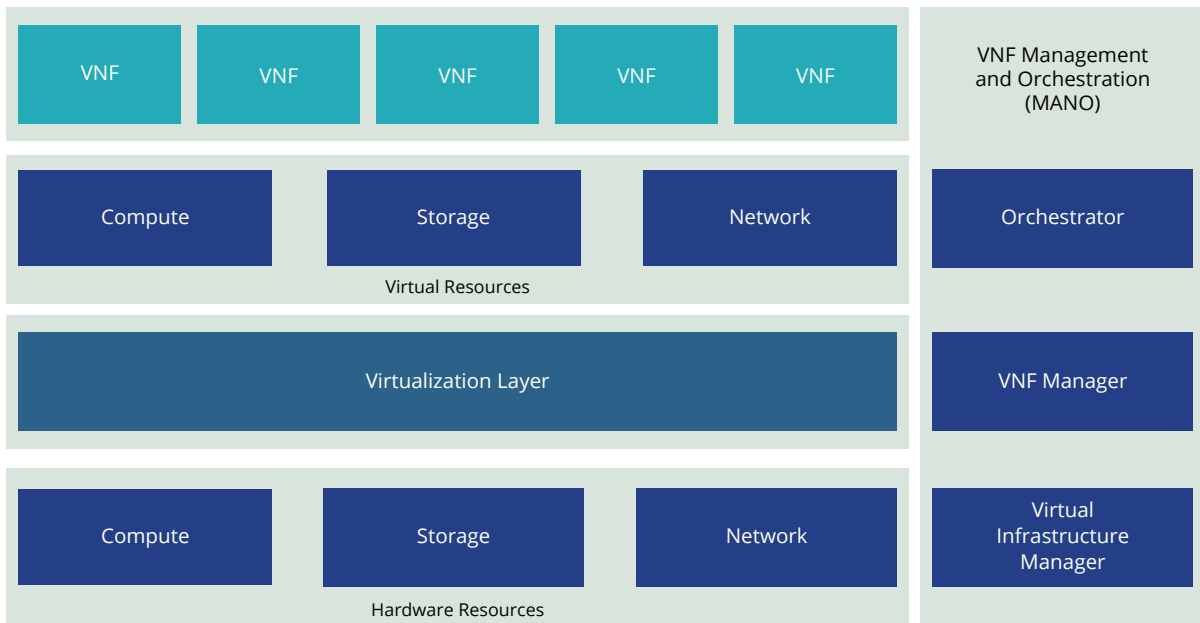
Standard High-Volume Switches

Reduce Opex

When network functions are virtualized, they can be readily provisioned and co-located on standard, high-volume servers. This enables operators to better distribute their available network resources (e.g., CPU, storage) and optimize the use of their data centers. In doing so, operators can reduce the OPEX required to power, cool, and manage data centers and NOCs.

Rapid Service Innovation And Time

When the introduction of new network services requires proprietary or dedicated hardware, the scope, cost justification, and time to deployment can balloon quickly. Virtualization, on the other hand, lends itself to rapid and nimble service innovation by making the introduction of new services as simple as installing and configuring software and connecting it to its network touchpoints. Virtualization makes it possible for operators to trial new services in staging and small market environments, fine-tuning services before they are launched across the operator's markets.

A Truly Flexible, Agile Architecture

Virtualization allows network operators to quickly provision and allocates network resources and services according to the operator's real-time needs. Services can readily be scaled up and down across the data center, creating a truly flexible network architecture.

VNF	VNF	VNF	VNF	VNF	VNF Management and Orchestration (MANO)
Compute	Storage		Network		Orchestrator
Virtual Resources					
Virtualization Layer					VNF Manager
Compute	Storage		Network		Virtual Infrastructure Manager
Hardware Resources					

Alepo Success Stories

For network operators that have already begun to or plan to deploy core network infrastructure in a virtualized, partially virtualized, or private cloud environment, Alepo can readily provide its industry-leading core solutions as virtualized network functions, including –

- Policy and Charging Rules Function (PCRF)

- Online Charging System (OCS)

- Home Subscriber Server (HSS)

- Carrier AAA Infrastructure (AAA)

- WiFi Offload and Monetization Platform

Alepo has been deploying its core network elements as virtualized network functions (VNFs) in Tier 1 operator production networks for many years. Alepo's network products perform highly on standard x86 COTS hardware, giving operators the freedom to choose the most cost-effective hardware. Alepo supports most leading hypervisor products, including vSphere (VMWare), Hyper-V (Microsoft), and Xenserver (Amazon). In addition, Alepo products employ modern, RESTful APIs, making them open and highly interoperable components.

The Alepo Advantage

When mobile and fixed network operators' partner with Alepo to deploy virtualized core network functions, they gain the assurance of a pure software player with no vested interest in the hardware infrastructure the operator selects. Alepo works with each operator client to properly size and source the most efficient and cost-effective hardware for

the project. Because Alepo's products are built to be open, flexible, and standards-compliant, operators are assured of vendor-neutral, best-of-breeds network environments.

With many proven years of experience in the telco IT and core network environment, Alepo has established itself as an experienced and proven technology vendor in this space. Alepo has a talented and skilled team of architects, solution designers, system integrators, and subject matter experts to ensure a rapid and successful deployment in any network environment. Experts in "All Things Data," Alepo helps operators worldwide to create roadmaps towards flat, all-IP network environments that promote rapid service innovation, data monetization, and ROI.

Saudi Telecom boosts core performance with Alepo virtualized AAA and PCRF

*Alepo worked with the Middle East's largest telco, Saudi Telecom, to replace its legacy infrastructure with **Alepo's AAA and PCRF Lite solutions**. Alepo deployed scalable, high-performing applications on virtualized machines in STC's private cloud environment. In doing so, STC was able to maintain an overall total cost of ownership without sacrificing speed or agility. As a result of the upgrade to Alepo's virtualized AAA and PCRF, STC **tripled its** AAA performance capacity, saw a **100-fold boost** in API response time, and increased subscriber capacity from 3 to 10 million. Read the full case study at www.alepo.com.*

Client: Leading South Asian Operator

Project Overview

Alepo deployed its virtualized AAA (vAAA) to deliver an uninterrupted experience to its growing subscriber base and be future-ready to support 5G.

Operator Requirements

- Replace the legacy AAA with vAAA compatible with the operator's third-party Network Functions Virtualization Infrastructure (NFVi)

- Migrate enterprise GPON, fiber, and LTE services seamlessly to the vAAA

- Ensure the vAAA collects information from the LTE access network to identify coverage gaps and provide business intelligence (BI) capabilities

Solution Highlights

- **Customized vAAA supporting unique authentication requirements**; enterprise and GPON/fiber subscribers; accounting for LTE traffic

- **Virtualized deployment** with Alepo's Virtual Network Functions Manager to manage the virtual instances and auto-scaling

- **Seamless migration** of enterprise GPON, fiber, LTE services to vAAA with zero downtime and zero complaints

- **vAAA collects info from the LTE access network** to identify and close coverage gaps, troubleshoot, improve BI for promotions, and pinpoint revenue leaks

Project Outcomes

- Seamlessly migrating its enterprise, GPON/fiber, LTE services to Alepo's vAAA with no downtime helped the operator deliver services without any network disruptions.

- The improved BI capabilities enabled the operator to quickly launch targeted promotions and lower TTM, resulting in increased revenue. In addition, Alepo's solution also helped identify revenue leaks, further contributing to increased revenue margins.

- Alepo vAAA instantly identified low-coverage LTE network areas and helped troubleshoot, enabling the operator to deliver a sophisticated customer experience.

Client: Tier-1 Middle East Operator

Project Overview

Alepo migrated the legacy AAA to its scalable convergent cloud-native vAAA, virtualizing the core network and ensuring the operator's future readiness for 5G, IoT, and related services.

Operator Requirements

- Migrate the legacy services to an NFVi-compliant AAA in the new virtualized core network
- Offer next-generation plans and improve the digital customer experience
- Streamline all types of requests from a single point for quick turnaround
- Allow customers to purchase additional bandwidth in real-time

Solution Highlights

- Smooth migration from the legacy network to Alepo AAA that runs on the operator's NFV infrastructure
- Implementation of a 360-degree customer care portal to streamline all types of requests using a single system
- Improved connectivity with near-instant authentication enhancing customer experience
- Launch of multiple innovative plans such as WiFi roaming passes

Project Outcomes

- Increased connectivity, security, and scalability using Alepo's AAA platform
- Faster response to customer requests using the 360-degree customer care portal
- Higher revenue margins with the launch of innovative data plans
- Capability to allow customers to buy additional bandwidth in real-time