ETSI
The Standards People

Network Functions Virtualization

What is NFV?

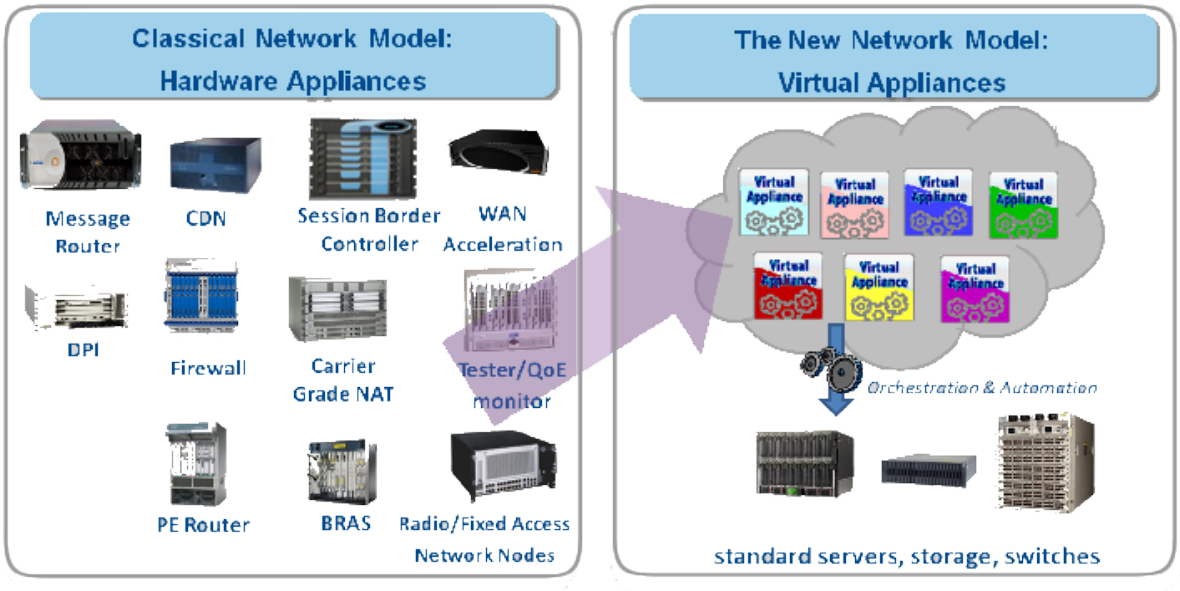
Telecoms networks contain an increasing variety of proprietary hardware appliances. To launch a new network service often requires yet another appliance and finding the space and power to accommodate these boxes is becoming increasingly difficult, in addition to the complexity of integrating and deploying these appliances in a network.

Moreover, hardware-based appliances rapidly reach end of life: technology lifecycles are becoming shorter as innovation accelerates, reducing the return on investment of deploying new services and constraining innovation in an increasingly network-centric world.

Network Functions Virtualization (NFV) aims to address these problems by evolving standard IT virtualization technology to consolidate many network equipment types onto industry standard high volume servers, switches and storage. It involves implementing network functions in software that can run on a range of industry standard server hardware, and that can be moved to, or instantiated in, various locations in the network as required, without the need to install new equipment. Network Functions Virtualization is highly complementary to Software Defined Networking (SDN). These topics are mutually beneficial but are not necessarily dependent on each other.

Benefits for network operators and their customers

- Reduced operator CAPEX and OPEX through reduced equipment costs and reduced power consumption
- Reduced time-to-market to deploy new network services
- Improved return on investment from new services
- Greater flexibility to scale up, scale down or evolve services
- Openness to the virtual appliance market and pure software entrants
- Opportunities to trial and deploy new innovative services at lower risk



Network Functions based on specialized hardware
One physical node per role. Physical install per site
Static. Hard to scale up & out

Network Functions are software-based
Multiple roles over same hardware. Remote operation
Dynamic. Extremely easy to scale
Scalable number of virtual machines

ETSI NFV Industry Specification Group

Seven of the world's leading telecoms network operators initiated ETSI Industry Specification Group (ISG) for NFV. These have been quickly joined by over 280 companies including network operators, telecoms equipment vendors, IT vendors and technology providers. ETSI has created the NFV ISG to define the requirements and architecture for the virtualization of network functions and to address their technical challenges.

These technical challenges include:

- Ensuring that virtualized network platforms will be simpler to operate than what exists today.
- Achieving high performance virtualized network functions which are portable among different hardware vendors, and different virtualization support systems.
- Achieving co-existence with legacy hardware-based network platforms whilst enabling an efficient migration path to fully virtualized network platforms.
- Management and orchestration of virtual network functions (particularly alongside legacy management systems) while ensuring security from attack and misconfiguration.
- Maintaining network stability and service levels without degradation during appliance load and relocation.
- Ensuring the appropriate level of resilience to hardware and software failures.
- Enabling the creation of virtual network appliances which will run, ideally without recompilation, on any hypervisor and hardware configuration, and integrate "on the fly" into the network operators' existing management and orchestration systems.
- Analyzing requirements for future technical specifications and standards in relevant standardization organization and groups to be identified or created at ETSI and other ad hoc standards development organizations.
- Minimizing energy consumption

Since its creation in 2013, NFV ISG has published over 119 documents. The first release delivered end 2014 defined high level use cases and requirements, proposed a unified terminology for virtualisation, defined an architectural framework, and described management and orchestration functions. Also included in this release were the infrastructures requirements for the compute, hypervisor and network domains. Other specifications covered best practices in security and resilience, performance and portability.

Release 2 outlines the necessary functional requirements in relation to a wide set of functional areas, such as management of virtualized resources, lifecycle management, network service fault/performance management, virtualized resource capacity management, etc…

Release 3 development is ongoing. It will build on top of the work already delivered and plans to include 23 new Features.

NFV ISG has also defined a framework for coordinating and promoting public demonstrations of Proof of Concept (PoC) demonstrations illustrating key aspects of NFV. The objective is to encourage the development of an open ecosystem by integrating components from different players. The PoC concept has proved to be very popular and the number of individual PoC demonstrators listed on the ETSI website has continued to grow.

For details about ETSI's current NFV activities, please visit:

www.etsi.org/nfv

Q2 2018

ETSI provides members with an open and inclusive environment to support the timely development, ratification and testing of globally applicable standards for ICT-enabled systems, applications and services across all sectors of industry and society. We are at the forefront of emerging technologies. We address the technical issues which will drive the economy of the future and improve life for the next generation. We are a not-for-profit body with more than 850 member organizations worldwide, drawn from 68 countries and five continents. Members comprise a diversified pool of large and small private companies, research entities, academia, government and public organizations. ETSI is one of only three bodies officially recognized by the EU as a European Standards Organization (ESO).

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