



What is NFV?

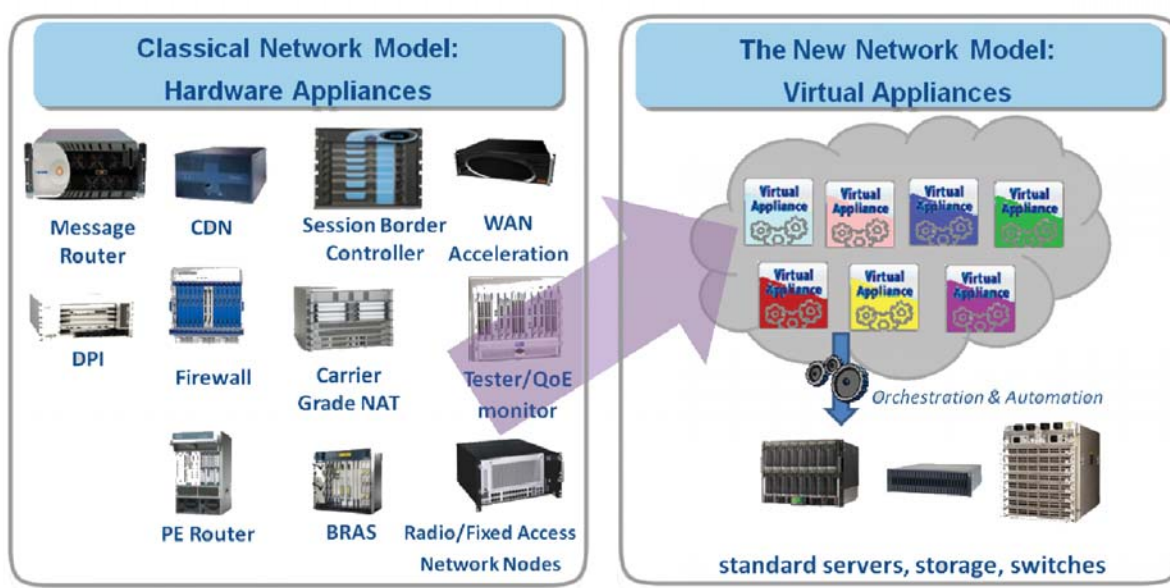
Telecoms networks contain an increasing variety of proprietary hardware appliances. To launch a new network service often requires yet another appliance and finding the space and power to accommodate these boxes is becoming increasingly difficult, in addition to the complexity of integrating and deploying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

Moreover, hardware-based appliances rapidly reach end of life: hardware 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 dependent on each other. Network functions can be virtualized and deployed without an SDN being required and vice-versa.

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 appliances which are portable between different hardware vendors, and with different hypervisors.
- Achieving co-existence with legacy hardware-based network platforms whilst enabling an efficient migration path to fully virtualized network platforms which re-use network operator BSS and OSS.
- Management and orchestration of virtual network appliances (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 45 documents. The first release delivered end 2014 defined high level use cases and requirements, proposed a unified terminology for virtualisation, sketched 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 security and resilience, performance and portability, best practices. The second release, finalized by end 2016, leverages the results of the previous release. It specifies requirements, information models, data models and interface protocols to enable interoperable implementations of the NFV Architectural Framework.

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 and planned for delivery in June 2017. It will build on top of the work already delivered and plans to include 14 new Features.

NFV ISG has also defined a framework for coordinating and promoting public demonstrations of Proof of Concept (PoC) platforms 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

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ETSI produces globally-applicable standards for Information and Communications Technologies (ICT), including fixed, mobile, radio, aeronautical, broadcast and internet technologies and is officially recognized by the European Union as a European Standards Organization. ETSI is an independent, not-for-profit association whose more than 800 member companies and organizations, drawn from 66 countries, determine its work programme and participate directly in its work.

For further information, please visit: www.etsi.org

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