HPE NFV
System Family
Industry-leading pre-integrated NFV infrastructure platform

Hewlett Packard Enterprise
Simple. Open. Carrier grade.

The HPE NFV System Family of solutions provides a complete foundation for communications service providers (CSPs) to host network functions in a network functions virtualization (NFV) environment. With Hewlett Packard Enterprise, CSPs can confidently deploy NFV solutions based on a European Telecommunications Standards Institute (ETSI)-compliant architecture that is pre-configured and optimized for telco applications. The solution design is open, simple to deploy, simple to operate, and simple to support.

The solution provides the benefits of an OpenStack®-based carrier-grade cloud built on industry standard hardware that provides control and management at all layers. These features ensure an open NFV environment that is also high performing, highly reliable, and comprehensive.

The solution is based on the HPE OpenNFV reference architecture and brings Hewlett Packard Enterprise ETSI-based NFV reference architecture to your network in a tested and pre-integrated bundle that has been optimized for NFV workloads. HPE NFV System is based on industry-leading technologies from HPE Converged Infrastructure, HPE Helion Cloud, HPE Orchestration, and operations support systems to deliver end-to-end NFV solutions.

Pre-integrated kits designed to grow with your business

HPE NFV System is offered in “right-sized” bundles of completely tested and pre-integrated hardware and software that allow CSPs to start their NFV journey as small as needed and scale up as demand grows. HPE NFV System kits are interoperable with third-party virtual network function (VNF) providers in the HPE OpenNFV program, assuring a broad base of innovation and “best-in-class” solutioning possibilities.
An open solution based on industry architecture

Using the ETSI reference architecture as a starting point, we have identified a set of key building blocks for an NFV solution. Hewlett Packard Enterprise can provide all of these building blocks or selected subsystems and components according to the requirements of each customer. HPE OpenNFV offers many options for CSPs depending on their choices at each layer. Hewlett Packard Enterprise is fully committed to openness at all layers of our NFV architecture to ensure that customers can pick and choose subsystems and components that are relevant for them. Figure 1 shows the main Hewlett Packard Enterprise offerings in OpenNFV, and highlights in orange the components that comprise HPE NFV System.

Table 1: HPE NFV System

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<th>Feature</th>
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| Proven architecture            | Speed go-to-market and reduce deployment risk  
• Solutions based on ETSI NFV architecture optimized for telco applications  
• Eliminates the burden of identifying the right mix of HW and SW to build NFV telco cloud—based on Hewlett Packard Enterprise extensive experience with NFV PoCs |
| Ease of deployment             | Reduced CAPEX  
• Pre-integrated/Pre-tested solutions  
• Solution-level SKUs for easy ordering  
• Customized and ready to plug into the customer network |
| Ease of maintenance            | Reduced OPEX  
• Solution-level lifecycle management  
• Premium support service from Hewlett Packard Enterprise to meet telco-grade SLAs |
| Best-in-class industry solutions | Reliability  
• HPE Servers/Storage/Networking  
• Award-winning management suite: OneView and IMC |
| HPE Helion OpenStack Carrier Grade | Availability  
• HPE Helion OpenStack carrier grade compute nodes  
• Enhanced real-time packet processing for VNFs in telco environments |
| Value-added integration        | New revenue opportunities  
• Custom scripts that enhance interaction of various SW components and simplify management  
• Documentation of typical NFV use case scenarios |

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Figure 1: HPE OpenNFV foundation architecture, depicting HPE NFV System v1.0 components
Three essential bundles that comprise the foundation of your NFV infrastructure layer:

- **HPE OneView**—management software that works across servers, storage, and networking with a new approach—designed for people, not the device. Eliminate complexity with automation simplicity.

- **HPE IMC**—a comprehensive wired and wireless network management tool supporting the FCAPS model, providing for end-to-end business management of IT, scalability of system architecture, and accommodation of new technology and infrastructure.

- **HPE Helion OpenStack Carrier Grade**—delivers a common architecture across private, public, and hybrid clouds to support cloud-native infrastructure services.
HPE NFV System—deployment models

HPE NFV System offer total flexibility while providing extreme scalability for deployments of any NFV solution. CSPs can begin with a “starter kit” to prove-in services, then scale as uptake occurs. HPE NFV System are designed to grow with your business, providing infrastructure that seamlessly integrates with your network.

Existing resource and service lifecycles need to be modified to embrace CSP functions that are interconnected and running on virtualized physical IT infrastructure.

**Single-site deployment**

HPE NFV System can provide an integrated NFV infrastructure layer for a complete NFV solution at a single site. Integrated control plane, compute resources, networking, and storage can be combined at a single site for NFV services. The solution is completely integrated, pretested, and optimized. Crucial software for physical infrastructure management and virtual infrastructure management and HPE Helion OpenStack Carrier Grade are pre-installed.

**Multi-site deployment**

HPE NFV System can scale to support large networks that comprise multiple sites. HPE NFV Director may be deployed to provide orchestration. The global data centers may be federated at the SDN controller layer, but need not be. Hewlett Packard Enterprise can provide an end-to-end management solution utilizing our widely deployed software solutions such as SiteScope, OneView, and IMC.

With orchestration provided by HPE NFV Director, the NFV infrastructure can be shared in an automated way, and zero-touch or near-zero touch activation can be supported. These features ensure that the agility, OPEX, and even CAPEX benefits of NFV can be realized since the automation provides real-time reactivity, reduced human intervention, and more efficient resource usage.
Hewlett Packard Enterprise in OpenStack

HPE Helion OpenStack for compute virtualization and cloud management
Hewlett Packard Enterprise chose OpenStack technology because it offers an innovative, modular architecture that communicates a set of simple, well-defined open RESTful APIs and is massively scalable with no hardware dependencies. Hewlett Packard Enterprise is a major contributor in code, resources, training, commercial deployments, and funding to pave the way for enterprises to have confidence in choosing an open cloud environment. HPE Helion OpenStack—a commercial distribution built on OpenStack technology—provides an enterprise-grade cloud platform with the openness, flexibility, and additional IP to help you build, manage, and consume app-centric hybrid clouds.

In NFV, for network virtualization and cloud management (known as virtual infrastructure management, or VIM, in the ETSI reference architecture), Hewlett Packard Enterprise has now extended HPE Helion OpenStack to create the HPE Helion OpenStack Carrier Grade. HPE Helion OpenStack Carrier Grade provides open source-based cloud management, hypervisor, operating system and virtual switching, with the performance and service availability CSPs expect. Now CSPs can build their NFV cloud with the confidence that it will be open, reliable, high performing, and will take advantage of the developments the open source community will bring. HPE Helion OpenStack Carrier Grade builds on the proven HPE Helion OpenStack Enterprise edition to provide these carrier-grade enhancements. Hewlett Packard Enterprise strives to re-integrate our enhancements into OpenStack through our large contributor community.

HPE OpenNFV Services
HPE OpenNFV Services offers a proven way to navigate the NFV transformation of your network functions. Our services’ team is ready to support you at all stages of your NFV transformation, including a complete lifecycle of services from consulting to implementation as well as managed services.
The HPE OpenNFV reference architecture comes with a single point of contact for project and solution support. HPE OpenNFV services are available at each layer of our architecture from NFV infrastructure Platform to management and orchestration.

HPE OpenNFV Partner Program

Hewlett Packard Enterprise supports partner relationships with industry players across the NFV spectrum to reduce risk and maximize innovation in NFV deployments. This creates a partner ecosystem that includes original equipment manufacturers (OEMs), ISVs, NEPs, and CSPs. The partner program includes testing on our NFV platform, access to software development kits (SDKs), APIs, training, and integration resources to help partners get applications tested and ready for CSPs.

Hewlett Packard Enterprise has built a set of OpenNFV Partner labs that provide testing and validation on our NFV reference architecture around the world. Crucially for CSPs, these companies do not have to be Hewlett Packard Enterprise program partners. Our lab will be open to all companies that wish to validate their applications (subject to resource limitations and funding of necessary resources). Hewlett Packard Enterprise can assure CSPs that their applications and their preferred partners can be validated on our platform as required.

NFV standards

Hewlett Packard Enterprise is actively involved in many standards organizations—as a board member, as a committee chair, or making significant contributions to the following: Alliance for Telecommunications Industry Solutions (ATIS), CloudEthernet Forum, European Telecommunications Standards Institute (ETSI), Open Networking Foundation (ONF), TM Forum, OASIS, Open Data Center Alliance (ODCA), Internet Engineering Task Force (IETF), and OPNFV. We are also a top contributor and user of NFV/SDN open source initiatives like OpenStack and Open Daylight.

The Hewlett Packard Enterprise advantage

Hewlett Packard Enterprise is one of the few companies in the world with both vast IT capability and a long pedigree in the communications industry. With Hewlett Packard Enterprise as your NFV supplier, you can have:

- Proven NFV infrastructure choice: Hewlett Packard Enterprise brings you the industry-leading optimized infrastructure fully integrated and manageable as a single entity. HPE Infrastructure has been sold to carriers in high volumes for decades.
• Choice and neutrality in your NFV architecture: Hewlett Packard Enterprise offers an open NFV architecture, HPE OpenNFV Labs, and a partner program that is industry-neutral, but includes the partners you prefer.

• Confidence in your management and orchestration (MANO) choice: Hewlett Packard Enterprise brings our established operations support systems and IT service management systems to the heart of our NFV management and orchestration.

• Leadership in IT, SDN, and NFV-related standards, ensuring your NFV components implement the latest standards.

With HPE NFV System v1.0, Hewlett Packard Enterprise has leveraged the experience of dozens of NFV proof of concepts and provided a complete, tested, carrier grade platform that is simple to deploy, manage, and operate. HPE NFV System v1.0 adheres to the open architecture for NFV developed by ETSI, thereby ensuring interoperability with a wide array of solutions and choices for the future.

If you choose Hewlett Packard Enterprise as your NFV supplier, you can be assured of the Hewlett Packard Enterprise expertise and knowledge of network and IT domains around the world. For the transition to NFV, CSPs need a partner that is a confident IT player, understands CSP networks, and will work well in conjunction with the relevant internal CSP departments. Hewlett Packard Enterprise is a top IT solution provider with extensive expertise in the communications industry. We are already working closely with many CSPs’ IT and network departments. It is also likely that the purchasing department has a relationship with Hewlett Packard Enterprise.

Hewlett Packard Enterprise is committed to NFV. With executive committee support and an NFV business unit, we are leveraging our strong and broad portfolio from across the company. We offer end-to-end capabilities, whether it is our HPE Helion cloud offerings, our converged infrastructure, HPE NFV Director, or virtualized network functions. These are capabilities that go across Hewlett Packard Enterprise that we leverage to address NFV for our customers.

Hewlett Packard Enterprise is in a unique position to lead in NFV. Not only does Hewlett Packard Enterprise lead in all the critical technologies required to deploy NFV, but it also brings the deep domain expertise in IT and the communications industry that customers need and expect. Hewlett Packard Enterprise is ready to help you on your NFV journey—creating a path to agility, innovation, and efficiency.

Learn more at hpe.com/csp/nfv