HP NFV Systems Family

Industry-leading pre-integrated NFV infrastructure platform
**Simple. Open. Carrier grade.**

The HP NFV Systems family of solutions provides a complete foundation for communications service providers (CSPs) to host network functions in a network functions virtualization (NFV) environment. With HP, CSPs can confidently deploy NFV solutions based on a European Telecommunications Standards Institute (ETSI)-compliant architecture that is preconfigured 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 HP OpenNFV reference architecture and brings HP’s ETSI-based NFV reference architecture to your network in a tested and pre-integrated bundle that has been optimized for NFV workloads. HP NFV Systems is based on industry-leading technologies from HP Converged Infrastructure, HP Helion Cloud, HP Orchestration, and operations support systems to deliver end-to-end NFV solutions.

**Pre-integrated kits designed to grow with your business**

HP NFV Systems 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. HP NFV Systems kits are interoperable with third-party virtual network function (VNF) providers in the HP OpenNFV program, assuring a broad base of innovation and “best-in-class” solutioning possibilities.

**Pre-bundled, fully integrated, performance optimized**

HP NFV Systems offer an integrated solution for NFV infrastructure that gets you started on the NFV journey in a production environment now, then scales as your business grows with future releases.

- Each SKU is localized to country requirements
- Starter Kit and Control Node available in enclosure and rackmount versions
- Each bundle offered in NEBs/DC option
- Complete compute virtualization and management of virtual and physical infrastructure software stack is preinstalled at factory
- Available with Helion OpenStack Carrier Grade

**Table 1. HP NFV System**

<table>
<thead>
<tr>
<th>Proven architecture</th>
<th>Speed go-to-market and reduce deployment risk</th>
<th>• Solutions based on ETSI NFV architecture optimized for telco applications</th>
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<tr>
<td>Ease of deployment</td>
<td>Reduced CapEx</td>
<td>• Pre-integrated/pre-tested solutions</td>
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<td>Ease of maintenance</td>
<td>Reduced OpEx</td>
<td>• Solution-level SKUs for easy ordering</td>
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<td>Best-in-class industry solutions</td>
<td>Reliability</td>
<td>• Customized and ready to plug into the customer network</td>
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<td>Helion OpenStack Carrier Grade</td>
<td>Availability</td>
<td>• Solution-level lifecycle management</td>
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<td>Value-added integration</td>
<td>New revenue opportunities</td>
<td>• Premium support service from HP to meet telco-grade SLAs</td>
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<td>• HP Servers/Storage/Networking</td>
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<td>• Award-winning management suite: OneView and IMC</td>
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<td>• P Helion OpenStack carrier grade compute nodes</td>
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<td></td>
<td>• Enhanced real-time packet processing for VNFs in telco environments</td>
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<td></td>
<td></td>
<td>• Custom scripts that enhance interaction of various SW components and simplify management</td>
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<td>• Documentation of typical NFV use case scenarios</td>
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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. HP can provide all of these building blocks or selected subsystems and components according to the requirements of each customer. HP OpenNFV offers many options for CSPs depending on their choices at each layer. HP 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. The following figure shows the main HP offerings in OpenNFV, and highlights in orange the components that comprise HP NFV Systems.

Figure 1. HP OpenNFV foundation architecture, depicting HP NFV Systems v1.0 components

Figure 2. HP NFV Systems—integrated bundles

- All-in-one NFV Starter Kit comprises performance-optimized hardware and software solutions for typical NFV workloads
- Compute Plane and Control Plane hardware is based on HP Gen9 Servers, HPN ToR switches, and HP StoreVirtual appliance
- Bundled with HP PIM software—OneView, IMC, CMC, and HP VIM software—Helion OpenStack Carrier Grade
- Configuration ensures high performance, low latency, and high availability architecture required for NFV applications

- Control Kit runs the PIM (OneView, IMC, and CMC) and VIM software (Helion OpenStack Carrier Grade)
- Comprises HP Gen9 Rackmount Servers

- Compute Kits are optimized to run VNFs from third-party vendors
- Comprises HP Gen9 Rack or Blade servers (separate SKUs)
- Compute Kits are preloaded with Helion OpenStack Carrier Grade and OneView licenses

- These are optional kits that provide additional storage required for very specific VNF applications
- Storage Kits comprise StoreVirtual Appliances
**HP NFV Systems—preinstalled software**

Three essential bundles that comprise the foundation of your NFV infrastructure layer:

- **HP 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.

- **HP 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.

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

**HP NFV Systems—deployment models**

HP NFV Systems 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. HP NFV Systems 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**

HP NFV Systems 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 Helion OpenStack Carrier Grade are preinstalled.

*Figure 3. HA Control Plane*
**Multi-site deployment**

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

With orchestration provided by HP 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.

**Figure 4.** Management/Orchestration

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**HP in OpenStack**

**HP Helion OpenStack for Compute Virtualization and Cloud Management**

HP 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. HP 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. HP 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), HP has now extended HP Helion OpenStack to create the HP Helion OpenStack Carrier Grade. HP 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. HP Helion OpenStack Carrier Grade builds on the proven HP Helion OpenStack Enterprise edition to provide these carrier-grade enhancements. HP strives to reintegrate our enhancements into OpenStack through our large contributor community.
HP OpenNFV Services

HP 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 HP OpenNFV reference architecture comes with a single point of contact for project and solution support.

HP OpenNFV services are available at each layer of our architecture from NFV infrastructure Platform to management and orchestration.

Figure 5. HP OpenNFV services

HP OpenNFV Partner Program

HP 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.

HP 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 HP 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). HP can assure CSPs that their applications and their preferred partners can be validated on our platform as required.

NFV standards

HP 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 HP advantage

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

- Proven NFV infrastructure choice: HP brings you the industry-leading optimized infrastructure fully integrated and manageable as a single entity. HP Infrastructure has been sold to carriers in high volumes for decades.
- Choice and neutrality in your NFV architecture: HP offers an open NFV architecture, HP Open NFV Labs, and a partner program that is industry-neutral, but includes the partners you prefer.
- Confidence in your management and orchestration (MANO) choice: HP 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 HP NFV System v1.0, HP 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. HP 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 HP as your NFV supplier, you can be assured of the HP 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. HP 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 HP.

HP 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 Helion cloud offerings, our converged infrastructure, HP NFV Director, or virtualized network functions. These are capabilities that go across HP that we leverage to address NFV for our customers.

HP is in a unique position to lead in NFV. Not only does HP 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. HP is ready to help you on your NFV journey—creating a path to agility, innovation, and efficiency.

Learn more at hp.com/go/nfv