

# NETWORK FUNCTIONS VIRTUALIZATION WITH RED HAT

TECHNOLOGY OVERVIEW

## INTRODUCTION

Data traffic is growing at an unprecedented rate. However, revenues associated with the increase in traffic are not growing at a comparable rate—but the associated costs are. To compound the problem, legacy communications infrastructures simply cannot keep up. Innovation is risky, and high costs, slow scaling, and inflexible environments all impede your ability to quickly adapt to fast-changing market conditions and stay ahead of the competition. As a result, communications service providers (CSPs) need new ways to increase service offerings while reducing infrastructure costs.

## NETWORK FUNCTIONS VIRTUALIZATION IMPROVES AGILITY

Virtualizing your network infrastructure can alleviate many of the challenges of legacy environments. Network functions virtualization (NFV) implements network functions as virtual machines (VMs) on a general-purpose, cloud-based infrastructure, rather than as dedicated physical hardware. By using a single infrastructure for all of your virtual network functions (VNFs), you can drastically reduce capital expenses (CapEx) and operating expenses (OpEx) through increased system utilization and streamlined administration. A massively scalable cloud framework lets you dynamically expand your infrastructure to meet demand. And, because you can create and deploy new network functions and services virtually, innovation is not as risky—you can quickly spin up a new service to test its market opportunity, and if that opportunity is not realized, you can decommission it just as fast. This approach delivers increased infrastructure flexibility and improved business agility.

## RED HAT OPEN TECHNOLOGIES FOR NFV

Open technologies are essential for industry organizations trying to create standards for NFV implementation. These technologies promote better interoperability and faster innovation so CSPs can take advantage of the latest advances easily and quickly. Open source communities encourage new ways of thinking and solving challenges. And, with an infrastructure based on open technologies, you can avoid vendor lock-in and maintain a higher level of flexibility.

## BUILDING INNOVATION THROUGH OPEN SOURCE COMMUNITIES

With more than 20 years of leadership in the open source community, Red Hat delivers technologies that are trusted for their stability, security, and interoperability in information and communication technologies (ICT) environments. These technologies are trusted by 100% of telecommunications service providers in the Fortune Global 500.<sup>1</sup>

Red Hat integrates key technologies from open source communities, including OpenStack® and Linux®, into its products. The company continues to encourage innovation through ongoing contributions to communities that are developing technologies needed for NFV, including:

- **Open Platform for NFV (OPNFV).** Red Hat is a founding member of OPNFV, a project to create a carrier-grade, integrated, open source reference platform. Built by industry leaders, this platform will promote consistency, performance, and interoperability throughout the NFV stack.



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<sup>1</sup> Red Hat client data and Fortune Global 500 list, June 2017

- **OpenDaylight.** Red Hat also contributes to the OpenDaylight project. OpenDaylight aims to develop an open platform to enable software-defined networking (SDN) and create a solid foundation for NFV implementations of any size and scale.
- **OpenStack.** OpenStack is a key component in any NFV implementation. Red Hat is a top contributor to OpenStack and is a Platinum member of the OpenStack Foundation.

### DELIVERING THE ENTIRE CORE SOFTWARE STACK FOR NFV

Red Hat provides an ideal platform for your NFV infrastructure, delivering all of the core software stack needed for NFV. This comprehensive solution ensures better interoperability, stability, and security across your NFV environment. As shown in Figure 1, each layer of the Red Hat® stack delivers key features for your NFV environment. With this integrated software stack, Red Hat delivers the scalability, deployability, availability, performance, and security needed for effective NFV implementations.

- **Scalability.** Your NFV infrastructure must be able to scale quickly to meet fast-growing demand for data and services. The OpenStack framework is designed specifically for scalability, and Red Hat OpenStack Platform delivers this scalability in a stable and secure solution.
- **Deployability.** Any NFV solution must be easily deployable, simply maintained, and well supported. Red Hat excels in making open technologies consumable through commercial hardening, integration across the software stack, consulting and training services, and full support.
- **High availability.** Your network infrastructure needs to be capable of delivering services to your customers around the clock. Every Red Hat product is subjected to intense testing protocols that ensure reliability and interoperability with the rest of your environment.
- **Performance.** For an NFV solution to be effective, its virtualized functions must meet or exceed the performance of physical implementations. Red Hat's virtualization technologies are based on the high-performance, Kernel-based Virtual Machine (KVM) hypervisor, the most popular choice for OpenStack and cloud deployments.
- **Security.** As security threats become more prevalent, an NFV infrastructure must ensure data protection. Advanced security features like Security-Enhanced Linux (SELinux) and sVirt are built into Red Hat products. In fact, many highly security conscious organizations, including the U.S. National Security Agency, rely on Red Hat.

### BOLSTERING THE STACK WITH OPEN, SOFTWARE-DEFINED STORAGE

In an NFV infrastructure, OpenStack and its accompanying storage must also be deployable on a massive scale. Red Hat Ceph® Storage offers an OpenStack-based NFV infrastructure with limitless scale and affordability on standard servers and disks, with high manageability and minimal downtime. Data is distributed dynamically with no single point of failure.

Red Hat Ceph Storage is a production-ready implementation of Ceph, the open source software-defined storage platform overwhelmingly preferred by OpenStack users<sup>2</sup> that manages data on a distributed computer cluster and provides interfaces for object-, block-, and file-level storage. Red Hat Ceph Storage is integrated with Red Hat OpenStack Platform and all its services, including Nova, Cinder, Manila, Glance, Keystone, Ceilometer, and Swift, and offers user-driven, storage life-cycle management with 100% application programming interface (API) coverage. Users can

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<sup>2</sup> OpenStack User Survey, October 2015, April 2016, April 2017. [www.openstack.org](http://www.openstack.org)

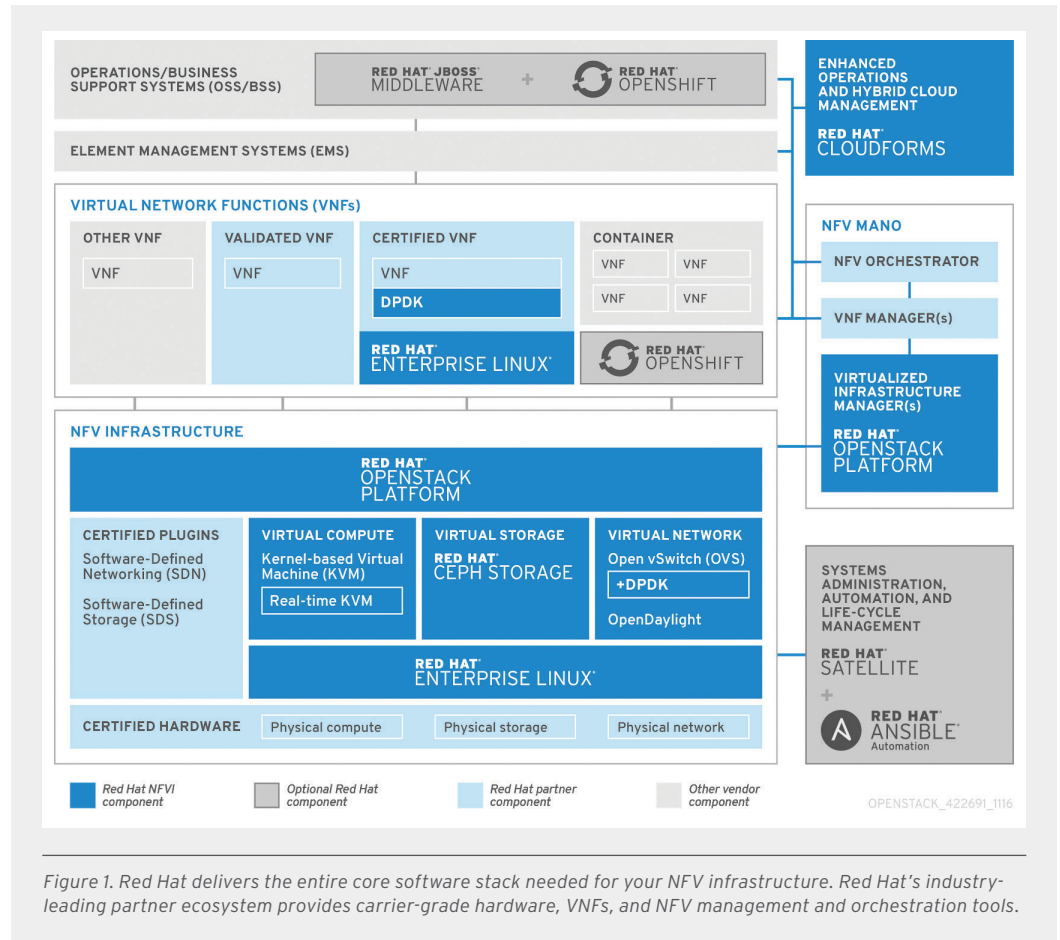


Figure 1. Red Hat delivers the entire core software stack needed for your NFV infrastructure. Red Hat's industry-leading partner ecosystem provides carrier-grade hardware, VNFs, and NFV management and orchestration tools.

instantly provision hundreds of virtual machines from a single snapshot and execute backups just as quickly. The product is accessible via Amazon S3 and native API protocols, and supports multisite replication for disaster recovery and archiving.

### ENJOYING THE BENEFITS OF HYPERCONVERGENCE

Designed with NFV environments in mind, Red Hat Hyperconverged Infrastructure for Cloud is a hyperconverged solution for colocating and running Ceph Storage and OpenStack compute functions on the same host. It combines Red Hat OpenStack Platform and Red Hat Ceph Storage in a single SKU, supported under a single, common life cycle, with a single, prescriptive installation experience based on Red Hat OpenStack Platform director. It delivers major cost efficiencies via reduced pricing, hardware standardization, and a decreased configuration footprint in which six nodes rather than nine are required for high availability.

## HELPING YOU BUILD YOUR NFV ENVIRONMENT

Building an NFV architecture from nothing can be a daunting task. Red Hat provides professional services to help you plan, design, implement, operate, and optimize large-scale, OpenStack-based NFV deployments. With services based on industry best practices, you can build a secure, stable NFV environment faster and learn how to operate it as efficiently and effectively as possible.

## CREATING A COMPREHENSIVE ECOSYSTEM OF NFV PARTNERS

One of the main benefits of using open technologies is flexibility and interoperability. To ensure that you have access to the hardware, VNFs, and NFV management and orchestration tools you need, Red Hat is creating a large ecosystem of expert NFV partners. With these innovative leaders, Red Hat is building a comprehensive community that includes all parts of the NFV solution, including management and orchestration platforms, VNFs, and infrastructure add-ons to enhance the performance and functionality of your NFV environment.

## CONCLUSION

Network functions virtualization is revolutionizing the way communications companies operate and deliver services. As an open technology leader, Red Hat provides a scalable, high-performance, reliable, and secure platform for your NFV infrastructure. With a fully integrated software and storage stack, large partner ecosystem, and support and services, Red Hat lets you confidently take advantage of all NFV has to offer. Contact your Red Hat sales representative to learn how an NFV infrastructure based on the Red Hat stack can help you reduce costs, improve agility, and prepare for the future.



## ABOUT RED HAT

Red Hat is the world's leading provider of open source software solutions, using a community-powered approach to provide reliable and high-performing cloud, Linux, middleware, storage, and virtualization technologies. Red Hat also offers award-winning support, training, and consulting services. As a connective hub in a global network of enterprises, partners, and open source communities, Red Hat helps create relevant, innovative technologies that liberate resources for growth and prepare customers for the future of IT.



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**NORTH AMERICA**  
1 888 REDHAT1

**EUROPE, MIDDLE EAST,  
AND AFRICA**  
00800 7334 2835  
europe@redhat.com

**ASIA PACIFIC**  
+65 6490 4200  
apac@redhat.com

**LATIN AMERICA**  
+54 11 4329 7300  
info-latam@redhat.com

redhat.com  
#F11349\_0618

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