Network functions virtualization with Red Hat

Organizations relying on Red Hat OpenStack Platform for private cloud realized benefits on delivering services with

59%

faster rollout of new applications.

And

53%

reduced infrastructure costs.[1]

Challenge

Data traffic is growing, and service providers must purchase and operate new infrastructure to meet these traffic demands—even though revenues are not growing at a comparable rate. Also, legacy communications infrastructures bring high costs, slow scaling, and inflexibility, impeding your ability to innovate, adapt quickly, and remain competitive. As a result, communications service providers (CSPs) need flexible new ways to:

- Create and deploy service offerings while controlling infrastructure costs.
- Decrease time to market for new services.
- Reduce the cost of network infrastructure.
- Increase automation across the networks.

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 in software running as virtual machines (VMs) on general-purpose, cloud-based infrastructure rather than dedicated physical hardware. By using a common 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, you reduce innovation risk. Quickly spin up a new service for market trial, and, if its business objectives are not realized, you can alter or decommission it just as fast. This increased infrastructure flexibility improves business agility.

Red Hat open source solutions for NFV

Open technologies are essential to creating industry 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 source, you can avoid vendor lock-in.

Building innovation through open source communities

With more than 25 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. In the Fortune Global 500, 100% of telecommunication companies rely on Red Hat.[2] Red Hat integrates key technologies from open source communities, including Linux® and OpenStack®, into its products. OpenStack is a key component in any NFV implementation for virtual infrastructure management. Red Hat is a top contributor to OpenStack and is a platinum member of the OpenStack Foundation, continually contributing to ongoing community innovation.

1 *IDC White Paper, sponsored by Red Hat. "Red Hat is Helping Organizations Optimize Private Cloud Service Delivery," May 2019.*

2 *Red Hat client data and Fortune Global 500 list for 2019.*

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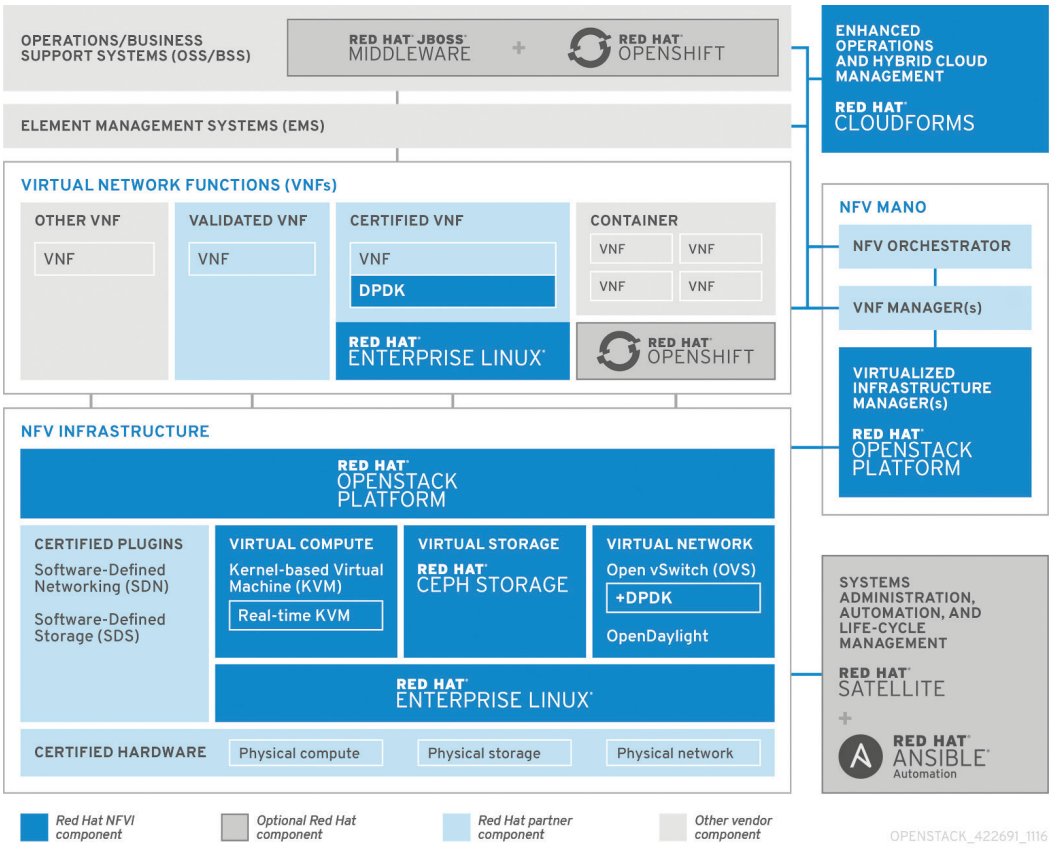
Delivering the core software stack for NFV

Red Hat provides an ideal platform for your NFV infrastructure, delivering the full core software stack needed for NFV, as shown in Figure 1. This comprehensive solution ensures better interoperability, stability, and security across your NFV environment.

- **Scalability.** Your NFV infrastructure must be able to scale quickly to meet growing demand for data and services. The OpenStack framework is designed specifically for scalability, and Red Hat® OpenStack Platform delivers it with security and stability.
- **Deployability.** Any NFV solution must be easily deployable, simply maintained, and well supported. Red Hat excels in delivering fully supported, commercially hardened open source solutions, integrated across the software stack with extensive consulting and training services available.
- **High availability.** Your network infrastructure needs to be capable of delivering services to your customers around the clock. Red Hat tests all of its products rigorously to better ensure reliability and interoperability with the rest of your environment.



Red Hat delivers the core software stack needed for your NFV infrastructure, and our partner ecosystem provides carrier-grade hardware, VNFs, and NFV management and orchestration tools.

- **Performance.** Virtualized functions must meet or exceed the performance of physical implementations. Red Hat OpenStack Platform uses the high-performance, Kernel-based Virtual Machine (KVM) hypervisor.
- **Security.** As security threats become more prevalent, an NFV infrastructure must incorporate strong data protection. Advanced security features like Security-Enhanced Linux (SELinux) and sVirt are built into Red Hat products.

Pushing NFV to the edge of the network with distributed compute nodes

Distributed compute nodes, a Red Hat OpenStack Platform capability, helps create an edge architecture that can scale while minimizing operational complexity. This benefit is achieved by managing edge deployments remotely using the same tools that manage the core OpenStack deployment. Distributed compute nodes help decrease costs through a smaller OpenStack footprint at the edge, requiring only compute services. A smaller footprint also offers a solution for space-constrained environments by using as few as one node at the network edge location.

Bolstering the stack with open, software-defined storage

In an NFV infrastructure, OpenStack requires an accompanying storage solution that can scale massively along with it. Red Hat Ceph® Storage offers an OpenStack-based NFV infrastructure with nearly limitless scale and affordability, using standard servers and disks. The solution is highly manageable and it minimizes downtime by distributing your data 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 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 of its services, and it offers user-driven, storage life-cycle management with application programming interface (API) coverage.

Enjoying the benefits of hyperconvergence

Designed with NFV environments in mind, Red Hat Hyperconverged Infrastructure for Cloud is a 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 offering, supported under a single, common life cycle, with a single, prescriptive installation experience based on Red Hat OpenStack Platform director. It provides major cost efficiencies via hardware standardization and a reduced configuration footprint, while delivering high availability.

Monitoring services in a connected world

As customers' demand for service reliability increases, Red Hat provides centralized management to monitor and manage your NFV environment. The service telemetry framework tools can assist by monitoring infrastructure with low latency, handling metrics and events at scale, and then facilitating the appropriate policies and processes to help keep services online and minimize outages.

Helping you build your NFV environment

Building an NFV architecture 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 Red Hat experience and industry best practices, you can build a more secure, more 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 certified 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.

Learn more

To learn how an NFV infrastructure based on the Red Hat stack can help you reduce costs, improve agility, and prepare for the future, contact your Red Hat sales representative or visit redhat.com/telco.

About Red Hat

Red Hat is the world's leading provider of enterprise open source software solutions, using a community-powered approach to deliver reliable and high-performing Linux, hybrid cloud, container, and Kubernetes technologies. Red Hat helps customers integrate new and existing IT applications, develop cloud-native applications, standardize on our industry-leading operating system, and automate, secure, and manage complex environments. Award-winning support, training, and consulting services make Red Hat a trusted adviser to the Fortune 500. As a strategic partner to cloud providers, system integrators, application vendors, customers, and open source communities, Red Hat can help organizations prepare for the digital future.

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