

# Expand business services reach with software-defined infrastructure

Red Hat and Nuage Networks have partnered to create a comprehensive pre-integrated software-defined infrastructure solution, where each component of the solution, as shown in Figure 1, provides a key element in helping to create a high-performance, cost-effective, software-defined infrastructure for CSPs. This solution also delivers and manages business infrastructure and network connectivity from the datacenter to the branch office.

## Solution overview

Businesses are adapting to the new digital world. Within market constraints, they are being pressured to meet deadlines while ensuring that infrastructure investments are being wisely made, and most importantly, they are having to respond to rapidly changing customer consumption behaviour.

Given these pressures, digital disruption is top of mind for business executives. This is giving Communications Service Providers (CSPs) a new opportunity to relieve customers of having to manage an increasingly aging hardware infrastructure. This freedom allows business executives to concentrate resources on product and services innovation that create value for both customers and stakeholders.

To keep pace and benefit from this trend, CSPs are transforming their infrastructure to accommodate Network Functions Virtualization (NFV). NFV has become the path of choice for innovative CSPs that have chosen to deliver business services. Yet, to achieve efficiencies of providing business services and managing business infrastructure, CSPs need to adopt a software-defined infrastructure that includes compute, storage, and network management.

Once in place, the true value of a software-defined infrastructure approach for business services offers the following key benefits:

- Connectivity simplification
- Infrastructure consolidation
- Self-service and automation.

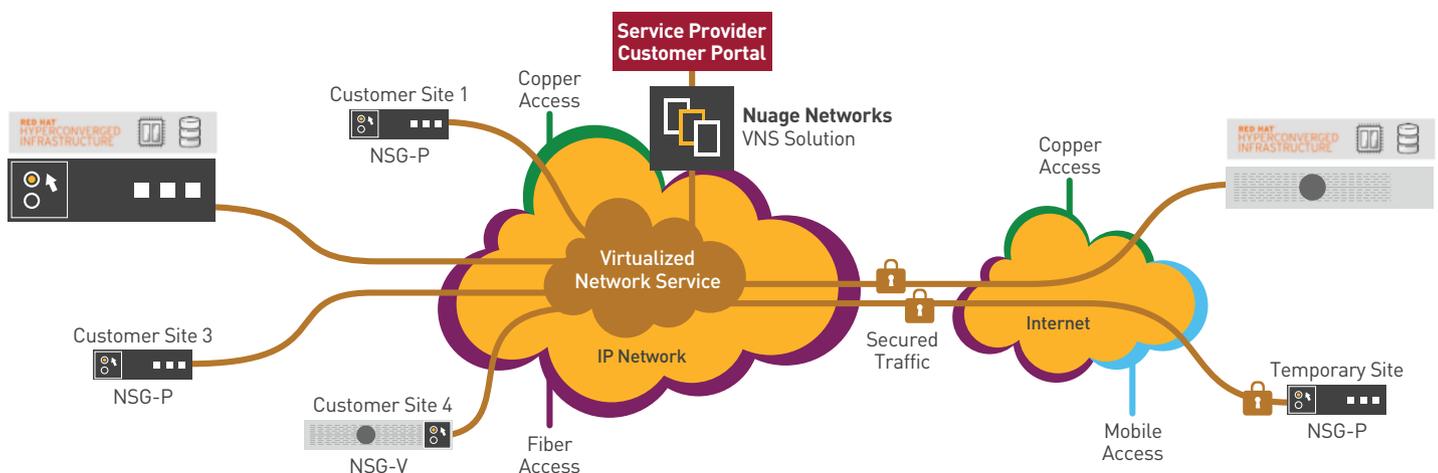
## Unconstrained WAN networking, from datacenter to branch

The Nuage Networks Virtualized Network Services (VNS) is built on the Virtualized Services Platform (VSP), and offers three key domains (or layers of network functionality) to deliver a new Software-Defined Wide Area Network (SD-WAN):

- **Service Management Plane:** The service management plane is a policy system that centrally administers the network templates and policies. This is part of the VSP and is called the Virtualized Services Directory (VSD). This layer provides the visibility and control of the network using an intuitive GUI. Templates can be created per branch type and are automatically implemented when the branch equipment is deployed. All the WAN's visibility and control aspects are managed using this WAN service management layer.
- **WAN Control Plane:** The WAN control plane layer contains the SDN-based controllers that manage the WAN's control plane. This is part of the VSP and is called the Virtualized Service Controller (VSC). Deployed in pairs, the controllers manage the network connections between the network endpoints.



FIGURE 1. A modern SDN-based enterprise WAN network topology



## About Red Hat

Red Hat is the world's leading provider of open source software solutions, using a community-powered approach to 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.

Learn more at [www.redhat.com](http://www.redhat.com)

## About Nuage Networks from Nokia

Nuage Networks: From French, meaning 'cloud'. Nuage Networks from Nokia brings a combination of technologies and networking expertise to the enterprise and telecommunications industries. The Silicon Valley-based business has applied new thinking to the problem of delivering massively scalable and highly programmable SDN solutions within and across the datacenter and out to the wide area network with the security and availability required by business-critical environments. Nuage Networks, backed by Nokia's IP/Optical Networks business, has the pedigree to serve the needs of the world's biggest clouds. The cloud has made promises — the mission of Nuage Networks is to help you realize them.

Discover more at [www.nuagenetworks.net](http://www.nuagenetworks.net)

- **WAN Data Plane:** The data plane of VNS is represented by the open compute Network Service Gateways (NSGs) that are deployed at remote branches and the datacenter connection point to provide enterprise-wide network control. NSG-P represents a physical device and has form factors to satisfy a broad range of throughput and interface requirements. The branch devices support a virtual deployment option called NSG-V that can run on any x86-based virtualized infrastructure. The service management layer provides virtual or physical management with data forwarding control provided by the WAN control plane.

## Hyper-converged infrastructure platform for remote and branch offices

Red Hat Hyper-converged Infrastructure (RHII) solves the problem of having to deploy storage separately from virtualization when resources are a factor. By using the same server hardware as both the hypervisor (host) and controller (storage), it reduces capital expenditures (CapEx), operating expenses (OpEx), and deployment time.

RHII is an ideal solution for remote branches or edge computing needs. Built on Red Hat Virtualization and Red Hat Gluster Storage, RHII provides simplified planning and procurement, streamlined deployment and management, as well as a single support stack for virtual compute and virtual storage resources.

With RHII, you can:

- Use servers as a clustered pool of integrated compute-plus-storage resources
- Easily virtualize business applications, maximizing resource utilization
- Manage integrated compute-plus-storage resources with a simplified skill set from a single management interface.

## Programmable infrastructure for the datacenter

Red Hat delivers everything you need to build a private cloud environment. Founded on industry-leading products and award-winning services, Red Hat's private cloud offerings incorporate principal open source technologies and industry best practices.

- **Red Hat OpenStack platform:** An open, production-ready cloud foundation that delivers performance, scalability, and security. Red Hat OpenStack Platform is co-engineered with Red Hat Enterprise Linux for enterprise functionality that increases performance and stability. An integrated director offers live system upgrades and updates, giving you access to new innovation.
- **Red Hat Ceph Storage:** An open, software-defined storage platform that unifies management and operations across containers, virtual machines, as well as private and public cloud resources running on standard servers and disks. Red Hat Ceph Storage provides block, object, and file storage in a flexible, self-healing, and self-managing platform with no single point of failure.
- **Red Hat Satellite:** A complete, life-cycle, and system management console that keeps infrastructure and workloads running efficiently, securely, and in compliance with standards and policies.

## Fully automated business infrastructure

**Red Hat Ansible Automation:** Software for automating provisioning, configuration, management, and deployment. Red Hat Ansible Engine offers the support for the Ansible automation engine, as well as hundreds of modules that enable users to automate all aspects of enterprise environments and processes. Red Hat Ansible Tower helps teams manage complex multi-tier deployments by adding control, knowledge, and delegation to Ansible-powered environments.

**Red Hat CloudForms:** A multi-cloud management platform that helps operations set up policy-controlled, self-service environments for software-defined infrastructure users. Detect and respond to environment changes by tracking activities, capturing events, and sensing configuration changes. Red Hat CloudForms provides automation, visibility, and control to simplify operations and protect investments.