Open Hybrid Clouds built with Nuage Networks and Red Hat

Extracting maximum value from cloud investments

Enterprises today must keep pace with rapid-fire innovation and dynamic markets. To maintain your competitive position, you are undoubtedly looking into cloud technologies, which promise responsiveness, flexibility and low costs.

You have several options for how you integrate cloud technologies into your business environment. For some enterprises, the ideal solution is a public cloud, used to deliver cost-effective shared services such as Infrastructure as a Service (IaaS) and Software as a Service (SaaS). Other enterprises may opt for a private cloud for mission critical workloads — to ensure resources are always available from any location and to adhere to internal security requirements, for example. In many cases, a hybrid cloud that blends privately-managed services with those from a third party will be the best fit. Whatever infrastructure option you choose, Nuage Networks and Red Hat have the capabilities to meet your key requirements.

You need your cloud to help you:
- Launch and scale new services quickly so you can capture new business opportunities
- Optimize datacenter performance so you get the most from your investments
- Be more nimble and adaptable to business and technology changes

Your cloud must also integrate smoothly with existing IT systems to simplify operations and keep your costs low.

For cloud technologies to be most effective, they need to be supported by a cloud-aware infrastructure. While applications can be turned up very quickly, many network infrastructures are bogged down by legacy requirements and simply can't respond at "cloud speed".

Nuage Networks and Red Hat have partnered to ensure that you have a flexible, open and responsive cloud infrastructure that will help realize all the cloud has to offer your business. Combining a proven infrastructure for open hybrid clouds with a complete network virtualization platform, your cloud will deliver to your requirements.
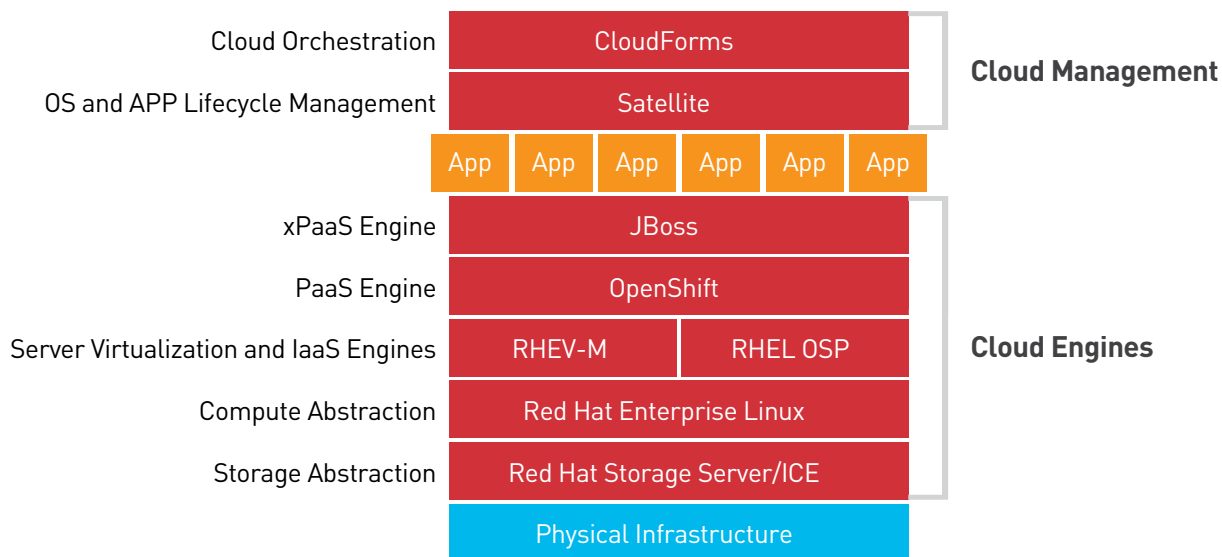
Red Hat Enterprise Linux OpenStack Platform: The industry standard for OpenStack clouds

Red Hat® Enterprise Linux® OpenStack® Platform delivers an integrated and open foundation to deploy, scale and secure a production-ready OpenStack cloud. It delivers an enterprise-class cloud platform

FIGURE 1. Integrated Nuage Networks and Red Hat solution for open hybrid clouds
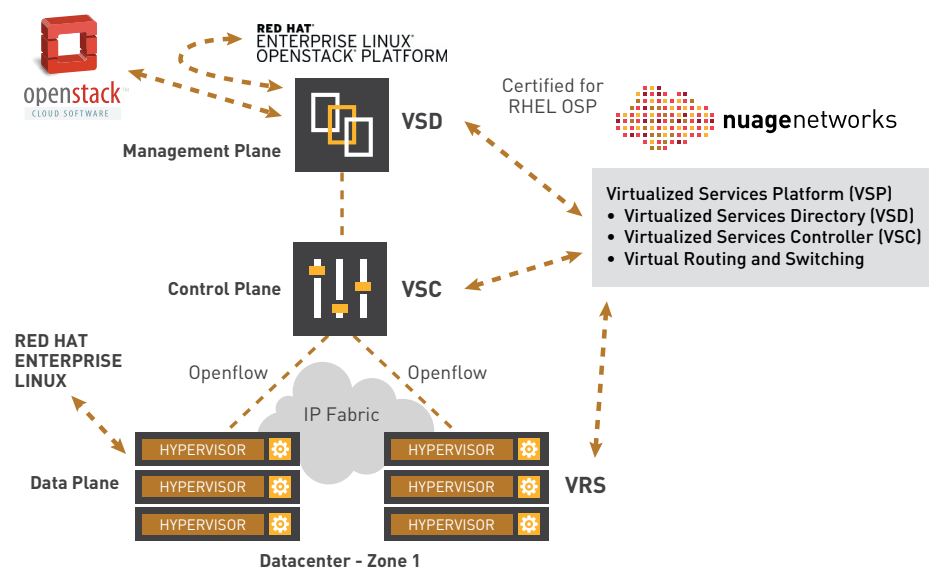
FIGURE 2. Red Hat open hybrid cloud

built on Red Hat Enterprise Linux, co-engineered and optimized with Red Hat OpenStack technology. This gives you the agility to scale and quickly meet customer demands without compromising on the availability, security, or performance of an open private or public cloud.

OpenStack depends on Linux to provide the operating environment for OpenStack services, access to hardware resources, and third-party drivers for integration with existing or new infrastructure components. Additionally, OpenStack is dependent on its underlying Linux to provide system-wide performance, scalability and data security, while often also providing an operating system for the guest applications running in these virtual environments.

Therefore, if your organization is considering an OpenStack deployment, choosing the right Linux offering is also important. Red Hat has pioneered the co-engineering of Linux and OpenStack together, recognizing the critical interdependencies between the two. Red Hat Enterprise Linux OpenStack

Platform delivers an integrated and optimized foundation designed to stand up to the rigors of a production-level OpenStack cloud.

With Red Hat Enterprise Linux OpenStack Platform, you can take advantage of the fast pace of innovation in the OpenStack project while maintaining a stable platform for production deployment. You can concentrate on developing your applications and meeting your business needs, while Red Hat maintains the OpenStack infrastructure and underlying Linux platform on which it depends.

Deploy OpenStack with Confidence
Each release of Red Hat Enterprise Linux OpenStack Platform aligns with the community release, including all core and incubating projects that are associated with each community release. For each upstream release, Red Hat performs a rigorous hardening, testing and bug fixing process to ensure production-ready supportability and maximum performance. Each commercial release of the OpenStack Platform is also optimized

with Red Hat Enterprise Linux. This ensures broad hardware and software compatibility and certification, so you can be confident about running mission-critical workloads on your network.

Red Hat offers a three-year production-phase life cycle — well beyond the six-month release cycle of unsupported community OpenStack. With Red Hat Enterprise Linux OpenStack Platform you can count on security fixes, performance enhancements and (when necessary) back-ported features from future releases, all without disrupting production environments.

Taking advantage of nearly twenty years of open source community leadership across Linux, security, networking and now OpenStack, Red Hat is participating in hundreds of critical open source projects that comprise Red Hat Enterprise Linux OpenStack Platform. The company has also assembled the largest certified OpenStack partner ecosystem for seamless integration with your existing and future datacenter investments.

Nuage Networks Virtualized Services Platform

Nuage Networks Virtualized Services Platform (VSP) is a comprehensive solution built for open hybrid clouds and is certified for inter-operation with Red Hat Enterprise Linux OpenStack Platform. Specifically, Nuage Networks VSP makes the network as readily consumable and flexible as an enterprise's virtualized compute resources, which is exactly what you need in highly dynamic application environments.

Nuage Networks VSP is a Software-Defined Networking (SDN) solution. It virtualizes any datacenter network infrastructure and automatically establishes connectivity between compute resources upon their creation. Leveraging programmable business logic and a powerful policy engine, the Nuage Networks VSP provides an open and highly responsive solution that scales to meet the stringent needs of massive multi-tenant datacenters. As a software-based solution, Nuage Networks VSP can be deployed over existing datacenter network fabrics, allowing enterprises to build Red Hat Enterprise Linux OpenStack Platform clouds with existing infrastructure.

Each of the three components of the Nuage Networks VSP performs a critical role in creating your flexible, highly efficient cloud environment.

Virtualized Services Directory

The Virtualized Services Directory (VSD) is a programmable policy and analytics engine. It provides a flexible and hierarchical network policy framework that enables IT administrators to define and enforce resource policies in a user-friendly manner. The VSD contains a

FIGURE 3. Nuage Networks Virtualized Services Platform components
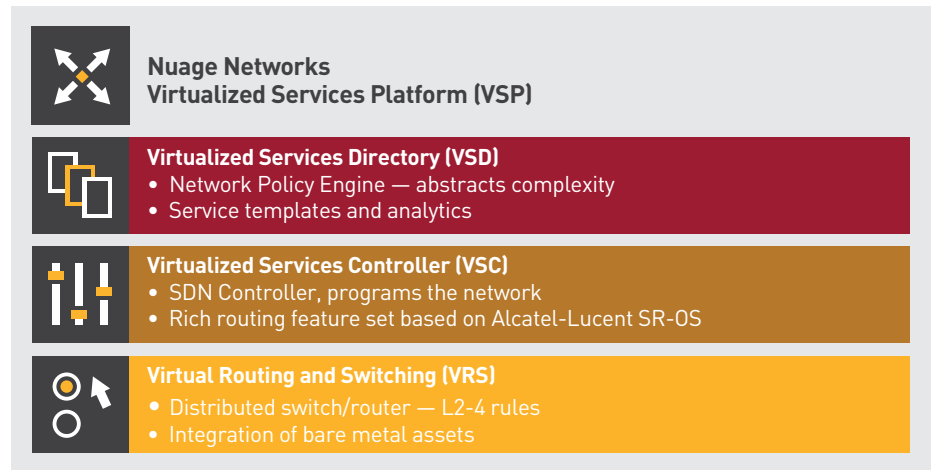
multi-tenanted service directory that supports role-based administration of users, compute and network resources. As shown in Figure 1, using northbound open and RESTful APIs, the VSD communicates via the Neutron plug-in with Red Hat Enterprise Linux OpenStack Platform.

For service assurance, the VSD allows the definition of sophisticated statistics rules such as collection frequencies, rolling averages and samples, as well as Threshold Crossing Alerts.

Virtualized Services Controller

The Virtualized Services Controller (VSC) is the industry's most powerful SDN controller. It functions as the robust network control plane for datacenters, maintaining a full view of per-tenant network and service topologies. Through the VSC, virtual routing and switching constructs are established to program the network forwarding plane using the OpenFlow™ protocol.

Virtual Routing and Switching

The Virtual Routing and Switching (VRS) component is based on Open vSwitch (OVS) and constitutes the network

forwarding plane. It encapsulates and de-encapsulates user traffic, enforcing Layer 2 to Layer 4 traffic policies as defined by the VSD. The VRS tracks virtual machine creation, migration and deletion events in order to dynamically adjust network connectivity.

Two industry leaders deliver one powerful solution

The Nuage Networks VSP allows enterprise administrators to outline their networking requirements in application terms, without being burdened by network implementation details. They can define security (firewall), load balancing and user access-right policies with network abstractions, instead of having to use tedious and error-prone IP address assignments. These policies are then used to dynamically govern network behavior on an as-needed basis within a Red Hat Enterprise Linux OpenStack Platform cloud, triggered by compute instance creation, migration or deletion.

By using an event-driven model with a policy pull approach, the VSP reserves network resources within the Red Hat

FIGURE 4. Nuage Networks and Red Hat integrated professional and consulting services
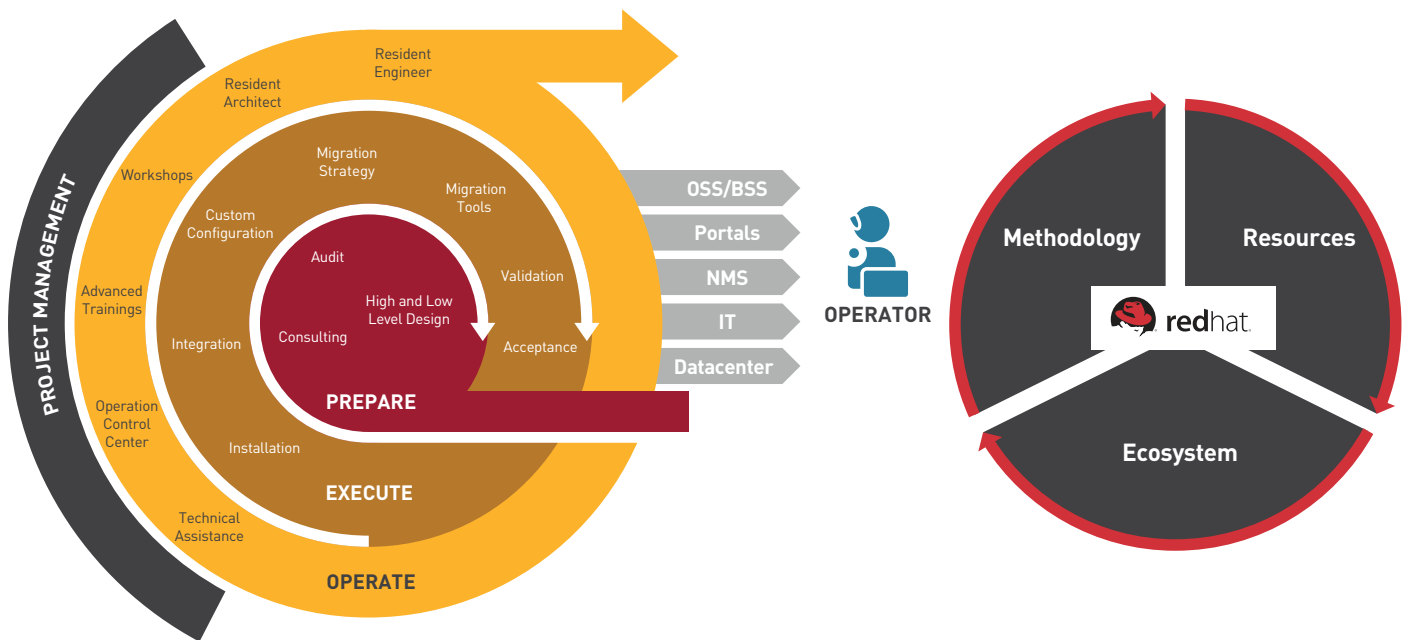
Enterprise Linux OpenStack Platform cloud as they are required, avoiding the need to maintain network topology details. This ensures that the demands of cloud-based applications and services can be met across thousands of users in an efficient and timely manner. To meet the needs of applications within a Red Hat Enterprise Linux OpenStack Platform cloud, the VSP deploys the full range of Layers 2-4 networking services on a per-tenant or per-application basis using overlay technologies.

Joint professional services to support cloud readiness

Nuage Networks and Red Hat also offer integrated professional services to ensure you get maximum benefit from your cloud solution. By calling on the experience of these two industry leaders, you can ease the transition to a virtualized datacenter and:

- Maximize the value to your business of adopting an SDN – OpenStack hybrid cloud solution
- Minimize the risk and business impact of implementing cloud technologies
- Improve efficiency with integrated business applications, IT infrastructure and datacenter networking

Get on board

Effective use of cloud technologies is rapidly becoming a significant market and competitive differentiator. To keep up with the dynamic pace of business today, you need the support of a cloud that is supported by a cloud-optimized infrastructure. You need an infrastructure that allows you to take advantage of all the virtues of the cloud — flexibility, adaptability, scalability, time-to-market — without burdening operations or putting your business at risk.

Nuage Networks VSP and Red Hat Enterprise Linux OpenStack Platform can deliver what you need.

About Nuage Networks

Nuage Networks strikes at the heart of the cloud networking challenge: Choreographing datacenter and wide-area networks to maximize responsiveness, utilization and visibility. Nuage Networks delivers a highly programmable infrastructure that bridges the gap between the application-centric view and the equally important network-centric view, realizing the full power of SDN. The Nuage Networks solution combines groundbreaking SDN and virtualization techniques with unmatched networking expertise to deliver a massively scalable solution that consistently spans datacenters and remote locations. Our solution enables enterprise IT to respond instantly and securely to the demands of users and applications anywhere.

Discover more about Nuage Networks and Red Hat SDN-based hybrid cloud solutions at http://www.nuagenetworks.net/partners/red-hat and follow us @nuagenetworks.