

Nuage Networks Virtualized Services Platform: Policy-Based Networking and Security for Red Hat OpenShift

Nuage Networks™ Virtualized Services Platform (VSP) brings SDN policy-based automation to Docker container environments running Red Hat OpenShift and Kubernetes by Google. The solution consolidates network and security policy requirements independent of the hypervisor or container format, the infrastructure, or the cloud management system. At the same time, it takes advantage of the Red Hat full cloud stack, including Kubernetes container cluster management.

Nuage Networks VSP expands on the native network virtualization capabilities in OpenShift and Kubernetes so you can:

- Simplify IT operations for developing, hosting, and scaling applications for the cloud.
- Accelerate provisioning of virtual networks between Kubernetes pods.
- Extend network service policies across the entire cloud environment to include granular security and microsegmentation policies.

OpenShift: Faster development and delivery for Docker apps

To help developers automate, monitor, and manage container-based applications and infrastructures, Red Hat developed the OpenShift Platform-as-a-Service (PaaS) solution.

With OpenShift, developers can quickly develop, host, and scale applications for the cloud. And they have the tools needed to accelerate application development, deployment, and long-term lifecycle maintenance operations across large teams.

Kubernetes: Scalable networking for Docker

Originally, Docker containers could only communicate between containers on the same host. Kubernetes was developed so that applications can be deployed across large pools of resources.

Kubernetes introduced the concept of a pod, a group of related containers that run on the same host. Each pod gets its own IP address and can communicate with other pods, while containers within a pod communicate using localhost networking. Kubernetes also supports an API to integrate more sophisticated networking and SDN services into the cloud environment.

Solution operation

Tight integration with OpenShift

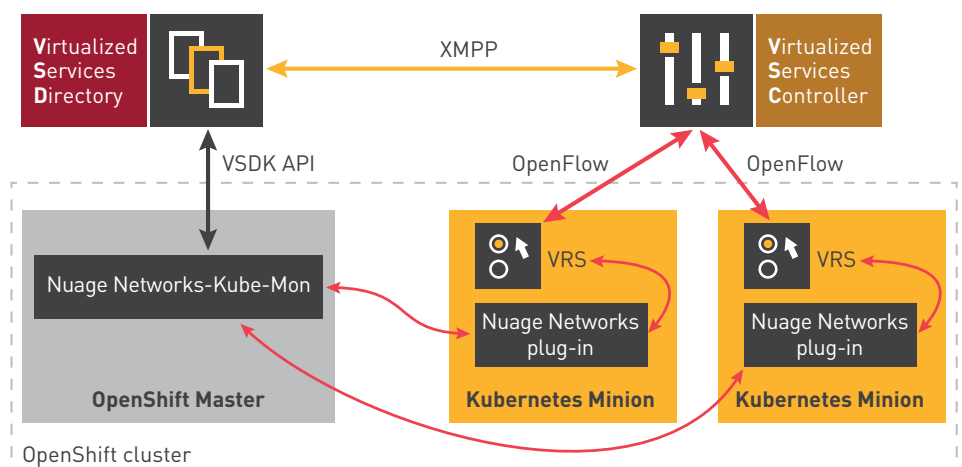
Nuage Networks VSP is tightly integrated with the OpenShift PaaS framework and application workflow. The workflow triggers events in the Nuage Networks system, similar to the way VM Orchestrator events trigger virtual network configurations between virtual machines.

Nuage Networks VSP provides a plug-in that runs on the OpenShift Master. The plug-in connects the OpenShift platform to the two main controller components in the solution — the Virtualized Services Controller (VSC) and the Virtualized Services Directory (VSD). The VSC and VSD maintain the higher-level network and security policies. They also configure the relevant network devices and virtual networks to automate the required connectivity.

OpenShift relies on Kubernetes to launch container pods and configure the localhost networking between containers. Nuage Networks VSP provides a network exec plug-in running on the OpenShift nodes, which are called Kubernetes Minions. The plug-in is invoked during pod lifecycle events, such as creation and destruction.

The Nuage Networks VSP plug-ins on the Kubernetes Minions and on the OpenShift Master communicate the policy configurations and lifecycle events between the controllers and the local Virtual Routing and Switching (VRS) elements.

FIGURE 1. Nuage Networks VSP, OpenShift and Kubernetes components



Bare metal, virtual machine and nested deployments

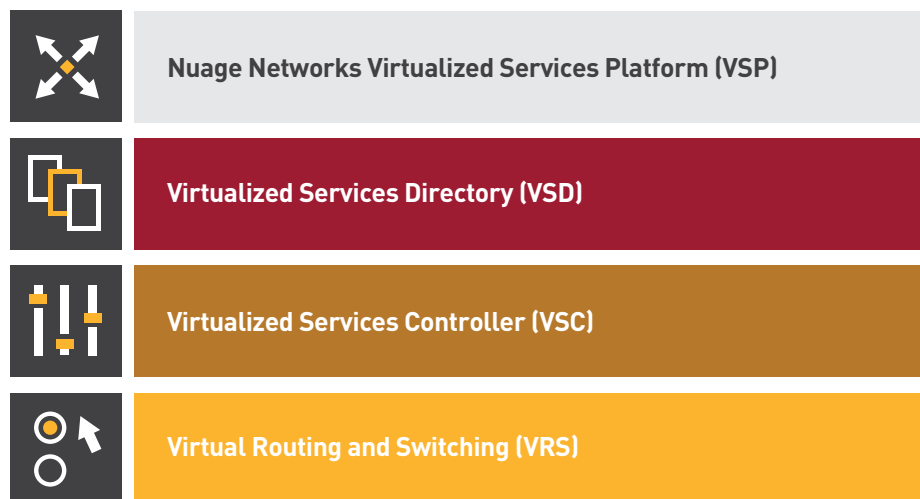
Nuage Networks VSP supports OpenShift installations for bare metal and VM deployments. The solution also works in nested environments, such as those where OpenShift runs on top of OpenStack. In this case, OpenStack generally delivers Infrastructure-as-a-Service (IaaS) capabilities, such as virtual server configuration, while OpenShift delivers PaaS for container application deployments and scale-out.

Security in multi-tenant cloud environments

While SDN has always delivered policy-based automation for network devices, applying the same techniques to multi-tenant cloud environments is a more urgent requirement. Compared to network policies, security policies are typically more complex, more application-specific, change more frequently, and encompass a wider range of devices from multiple vendors. As organizations evolve their datacenters to the cloud, security operations can be overwhelmed before network issues dictate an evolution to SDN.

Multi-tenant cloud environments also require microsegmentation — enforcing security policies at a very granular level between individual workloads and applications. Nuage Networks VSP brings these sophisticated security policies to OpenShift environments. Policies can be enforced between Kubernetes pods, or between pods and VM or bare metal workloads, in a consistent way to meet compliance objectives across all environments. Nuage Networks VSP also integrates with a large ecosystem of value-added security vendors, such as Palo Alto Networks, Fortinet, and others to enforce advanced security policies.

FIGURE 2. Nuage Networks VSP components



Cloud networking aligned with your needs

Nuage Networks VSP is designed around your needs for security, flexibility, and consistency in cloud networking environments:

- Apply granular security policies consistently across containers and virtual machines (VMs).
- Provide isolation between tenants and applications in a multi-tenant cloud environment.
- Quickly converge networking configurations during peak container activation and deactivation events.
- Simplify connectivity to external networks and gateways.
- Provide a common SDN policy environment across virtual and bare metal workloads.

For more information about Nuage Networks VSP, please visit:

<http://www.nuagenetworks.net/products/vsp/>