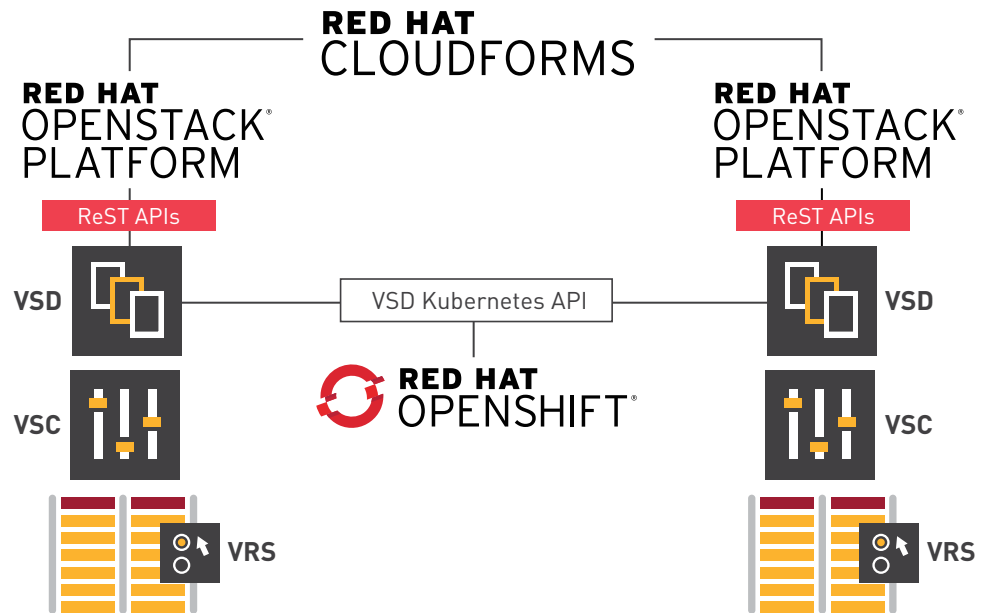


# Blueprint solution for advanced cloud services and security for next-generation enterprise clouds

## Blueprint solution implementation details

- High availability configuration of several server nodes that are connected logically using VLANs to form the underlay network
- All server operating systems run Red Hat Enterprise Linux® with KVM hypervisor.
- All solution components use the latest software releases.
- Nuage Networks VRS is deployed on all server nodes to establish data plane demarcation points to OpenStack instances and OpenShift containers.
- Several instances of VSD, VSC, and Elasticsearch® (i.e., open-source search engine) are implemented to enhance network management.
- OpenStack compute and controller, as well as OpenShift master and nodes are implemented, representing infrastructure and container services.
- VSP is used to create appropriate overlay VPN connections to interconnect OpenStack and OpenShift functions and to support a variety of application- and security-specific use cases.



**Nuage Networks™ and Red Hat® have collaborated to create a pre-integrated blueprint solution that will ensure cutting edge, SDN-enabled cloud services and security solutions to meet and exceed current and next-generation enterprise IT requirements. This blueprint solution was designed and established in a purpose-built, permanent lab environment to provide an innovative cloud services environment consistent with DevOps principles.**

## Solution overview

Figure above represents the blueprint solution setup. Within this pre-integrated and flexible environment a variety of use cases have been tested, including the delivery of applications that leverage a hybrid of containers and Virtual Machines (VMs), in addition to a range of hybrid cloud deployment and security scenarios.

Overview of blueprint solution components:

- Red Hat CloudForms Platform provides enterprise-grade, cloud management capabilities, including Nuage Networks as an authored software-defined networking (SDN) provider.

- Red Hat OpenStack® Platform, (including OSP Director), creates, deploys, scales, and manages a secure and reliable public or private OpenStack cloud.
- Red Hat OpenShift Container Platform provides comprehensive and flexible container management capabilities.
- Nuage Networks Virtualized Services Platform (VSP) includes Virtualized Services Directory (VSD), Virtualized Services Controller (VSC), and the Virtualized Routing and Switching (VRS) agents.

## Built-in SDN-based security with Virtualized Security Services

Nuage Networks Virtualized Security Services (VSS) leverage the power of SDN principles. With VSS, the enterprise can create specific per-application, automated security policies. VSS has four key dimensions: prediction, prevention, detection, and response.

- **Prediction:** By using traffic flow analytics for each application, enterprises can determine and visualize what service tiers and workloads (i.e., VM and containers) each application uses, as well as understand the traffic



## Business benefits

- Minimize integration and deployment issues by leveraging a validated solution blueprint ready for enterprise customer deployment.
- Build a more responsive and dynamic IT environment with a blueprint solution designed to support an enterprise DevOps environment.
- Offer proven scale and flexibility for enterprise cloud infrastructures across multiple hypervisors and bare metal servers.
- Provide advanced hybrid container capabilities — from native- to hypervisor-based — with proven scalability across container hosting environments.
- Benefit from integrated networking security capabilities from Nuage Networks that provide enterprise customers with policy-driven automated detection and resolution capabilities, critical for fluid container DevOps environments.

## 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.

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patterns between each of these tiers. This knowledge also lets the enterprise know how to segment the network for each application in order to ascertain what automated security policies should be applied.

- **Prevention:** By understanding and segmenting each application in advance, including its traffic patterns, service tiers, and supporting workloads, an enterprise can create and instantiate policies that isolate and secure application-specific traffic within its own secure logical domain.
- **Detection:** Within a cloud-based environment, continuous threat detection using flow analytics needs to be an ongoing part of security. VSS leverages traffic data from existing installed security measures and correlates this data with existing flow analytics to provide deeper contextual insights.
- **Response:** With VSS, enterprises can define and implement automated security policies that respond to suspicious application traffic flows in real-time. These policies include: triggering real-time alerts and steering suspicious traffic to an existing security information and event management (SIEM) system to provide more analysis. The traffic can also be directed to an IPS or Layer 7 FW to sanitize or quarantine it.

## Red Hat Cloud Computing Products

- **Red Hat CloudForms:** Red Hat® CloudForms® provides all the advanced capabilities enterprises need for efficiently managing open hybrid clouds, including a self-service catalog, policy-based governance, service orchestration, configuration and drift management, chargeback, showback and reporting, as well as IT operations management integration.

## 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 ground-breaking 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 at [www.nuagenetworks.net](http://www.nuagenetworks.net)

- **Red Hat OpenStack Platform:** Red Hat® OpenStack® Platform delivers an integrated and open foundation to deploy, scale, and secure a production-ready OpenStack cloud infrastructure, including compute, networking, and storage resources. It provides an enterprise-class cloud orchestration platform built on Red Hat Enterprise Linux, co-engineered and optimized with Red Hat OpenStack technology.
- **Red Hat OpenShift:** Red Hat® OpenShift® Enterprise delivers a container-based application platform based on Docker and powered by Red Hat Enterprise Linux. It provides a secure, efficient and portable way to develop, deploy, and run application services.

## Nuage Networks Virtualized Services Platform

Nuage Networks VSP is a comprehensive SDN and SD-WAN networking platform built for open hybrid clouds in highly dynamic application environments.

- **Virtualized Services Directory (VSD):** VSD is a policy, business logic, and analytics engine that supports the abstract definition of cloud-based network services.
- **Virtualized Services Controller (VSC):** VSC provides a robust control plane for the datacenter and SD-WAN network, maintaining a full per-tenant view of network and service topologies.
- **Virtual Routing and Switching (VRS):** The VRS module serves as the data plane element and as a virtual endpoint for network VPN services.