

Juniper and Red Hat Integrate Contrail and VNFs with OpenStack and OpenShift

Juniper and Red Hat deliver software that controls your cloud with openness and automation

Challenge

When delivering cloud and NFV with OpenStack or OpenShift, the default networking can present many challenges, such as interoperability, scalability, performance, availability, upgrades and more. An open solution will future-proof you against disruption and lock-in while making use of existing equipment to avoid “rip and replace” expenditures.

Solution

Red Hat and Juniper Networks have worked together to deliver on the promise of cloud IaaS, PaaS and NFV with network automation seamlessly as part of an OpenStack or OpenShift deployment.

Benefits

- Reduces cost by enabling service providers and IT administrators to easily embrace open SDN and cloud technologies
- Removes the complexity of integrating networking technologies in OpenStack and OpenShift clouds
- Delivers future-proof open software for cloud and NFV
- Offers operational dependability with Red Hat-certified product and support quality



Juniper and Red Hat are mutual technology alliance partners. Together we have validated and certified several product integrations to improve the ease with which you can deploy and operate cloud solutions, from IaaS to PaaS to NFV. Juniper has joined the Red Hat OpenShift Commons and Hub communities, and has earned the Red Hat OpenShift Primed technical readiness designation.

Using Red Hat® OpenStack Platform and Red Hat OpenShift Container Platform with Juniper Networks® Contrail Networking, you will future-proof yourself for the cloud era with the leading open cloud orchestration and network automation for hybrid cloud and NFV. You will improve business agility with predictable security, high availability, high performance, automation, and elasticity.

SDN has the potential to provide the enterprise with numerous advantages, including the ability to enable scalable multitenancy and dynamic adjustments to networking based on APIs and the telemetry of network conditions. While SDN is a novel approach to networking, putting more sophistication in software, SDN deployment for the cloud does not need to be challenging or even require any upgrade of the physical network. Similar in significance to learning and deploying OpenStack, moving to an open and automated cloud network architecture can set cloud builders free from costly and proprietary technologies of the past and future.

The Challenge

Building cloud and NFV infrastructure, operators soon realize that the default OpenStack Neutron networking implementation delivers inadequate scale, performance, reliability, and richness of networking policy and features such as service chaining, analytics, visibility, and workflow automation. In choosing a superior OpenStack networking solution, they must future-proof against technology disruption and lock-in while making use of existing equipment to avoid “rip and replace” expenditures.

Networking challenges are equally present in Platform-as-a-Service (PaaS) systems that are accelerating software development and embracing efficient container-based infrastructure. As these platforms orchestrate applications in micro-service architectures, the infrastructure, especially the network, needs to enable multi-tenancy and micro-segmentation at cloud speed and scale. Moreover, in a hybrid cloud organization, the imperative for SDN is greater because the network needs to do this anywhere the PaaS is deployed.

Although SDN is a novel approach to networking and puts significant sophistication into software, SDN deployment for OpenStack or OpenShift need not be challenging nor require any upgrade or lock-in of the physical network.



The Juniper Networks Contrail Networking and Red Hat OpenStack Platform Solution

A testament to the leadership and openness of Red Hat and its open-source stewardship for OpenStack is RDO, a community of people using and deploying OpenStack on Red Hat Enterprise Linux, CentOS, Fedora, and distributions derived from these (such as Scientific Linux and others). The RDO community covers all things related to using OpenStack on Red Hat-based platforms. RDO is also an incubator and proving ground for features that are eventually incorporated into Red Hat's commercial offering—Red Hat OpenStack Platform.

Red Hat OpenStack Platform combines the product and benefits from Red Hat Enterprise Linux (RHEL) with OpenStack, the fastest growing cloud infrastructure platform. These are co-engineered to work seamlessly together. Because OpenStack is dependent on its underlying Linux operating system for everything from service operation and access, to hardware resources, to system performance, stability, and security, Red Hat OpenStack Platform delivers the next-generation core Infrastructure as a Service (IaaS) and secondary IaaS+ infrastructure for cloud.

Starting from Red Hat OpenStack Platform version 5, Juniper Networks® Contrail Networking integrates with Red Hat OpenStack Platform through OpenStack's Neutron networking API and plug-in interface. This integration has been Red Hat-certified and is co-installed and co-managed with ease using Red Hat OpenStack Platform Director. Together these integrations enable users to seamlessly instrument the Contrail Networking solution as part of their OpenStack deployment with the assurance that it is tested and supported by both vendors.

Contrail Networking, based on the open source OpenContrail project, is a pure software solution for cloud network automation comprised of a highly available controller and a kernel-embedded virtual router. It is interoperable by means of open protocols with physical network infrastructure. Contrail Networking is aimed at large enterprises and service providers that need to efficiently provide secure, high-performance, SLA-compliant cloud services and virtualized network functions to multiple tenants across multiple locations and hybrid cloud topologies, while making best practical use of existing equipment to avoid "rip and replace" expenditures.

In addition to the option to use Red Hat OpenStack Platform Director, in the OpenContrail community repositories, OpenStack users will find Ansible playbooks and other deployment automation scripts to use with Red Hat OpenStack Platform and other RDO deployments. Juniper also offers a full range of professional services to streamline the deployment of Contrail Networking on Red Hat platforms for those who want the easy-button for customized cloud.

Features and Benefits

- Red Hat has fully tested and certified this integration.
- Red Hat has fully tested and certified Juniper Networks vMX and vSRX as a virtual network function in this environment to provide virtual edge routing functions.
- Red Hat has fully tested and certified Juniper Networks vSRX as a virtual network function in this environment to provide virtual firewalling and security gateway functions.
- A high-performance virtual networking overlay solution on common physical network infrastructure seamlessly plugs into OpenStack's Neutron component. This enables scale-out growth to large multi-tenant clouds with per-tenant or per-application micro-segmentation in the form of a virtual-networking-as-a-service solution (inclusive of high availability), Load Balancer as a Service, security policy, network analytics, and more.
- An NFV policy framework streamlines interconnecting virtual network segments with chainable virtualized network functions (VNFs) and physical network appliances. Juniper has contributed this service chaining API, not only into the OpenContrail project, but also to the OpenStack project to extend the Neutron API and extend OpenStack Heat to support those Neutron extensions in Heat templates.
- An open, standards-based, BGP-federated virtual network gateway mechanism enables the extension of VPNs securely outside data centers to remote facilities and across hybrid clouds. It is widely interoperable with IP-VPN and Ethernet VPN (EVPN) physical and virtual routers and switches.
- An open API over and above Neutron offers additional networking workflows through an API-driven Web user interface and northbound APIs for deeper DevOps automation and NFV orchestration.
- An analytics engine offers out-of-the-box instrumentation, troubleshooting, telemetry, and visibility for network traffic and cloud performance analytics with APIs or Apache Kafka for exporting data to specialized big data analytics systems such as Hadoop and Spark.

Solution Components

Juniper Networks Contrail Networking: Contrail Networking, based on the open source OpenContrail project, is a software-defined networking cloud automation solution comprised of a highly available controller and a kernel-embedded virtual router. As leading cloud networking and service orchestration powered by open technology, Juniper's open solution for cloud and NFV improves business agility with security, availability, performance, automation, and elasticity.

Red Hat OpenStack Platform: Red Hat OpenStack Platform combines the product and benefits from Red Hat Enterprise Linux (RHEL) with OpenStack, the fastest-growing cloud infrastructure platform. These are co-engineered to work seamlessly together and deliver the next-generation core IaaS and secondary IaaS+ infrastructure for cloud.

The Juniper Networks Contrail Networking and Red Hat OpenShift Container Platform Solution

The Red Hat commitment to open source extends through its entire portfolio and participation in many projects beyond Linux and OpenStack. With the rise in adoption of open source container runtime and orchestration technologies like Docker and Kubernetes, Red Hat has contributed enormously upstream to those projects, and put those components to use in OpenShift Origin, the open source project and community for the Red Hat PaaS solution, offered as shared or dedicated public cloud services as Red Hat OpenShift Online and Red Hat OpenShift Dedicated respectively, or combining the product and benefits from RHEL with OpenShift as Red Hat OpenShift Container Platform which can be deployed in any enterprise data center or atop any public or private IaaS such as OpenStack.

Starting from Red Hat OpenShift Container Platform version 3.1, Juniper Networks® Contrail Networking integrates with OpenShift through Kubernetes plug-ins that automate the full lifecycle of virtual tenants, networks, and policies in sync with the lifecycle and workflow of the PaaS users and applications. As OpenShift orchestrates builds, deployments and services, the networks will adapt with it. Contrail will automatically create multi-tenancy and micro-segmentation administrative and network policy isolation to protect each build and deployment in its own virtual network, connecting them only as required based on dependencies between application micro-service deployments. Additionally, the Contrail vRouter, on all workload nodes and at the network gateway routers, takes over the task of load balancing traffic for the services. In deployments without Contrail Networking, this is handled by default with dedicated slower proxies, but with Contrail Networking, traffic to the elastic IP addresses of services is distributed to the deployments pods with the high performance and distributed scale of the Contrail vRouter.

Features and Benefits

- Red Hat awarded this integration the Red Hat OpenShift Primed technical readiness designation.
- Automatic tenant, virtual network and micro-segmentation network policy creation, deletion, and change in sync with OpenShift, enhancing network performance, and overall system scale and security.
- A high-performance virtual networking overlay solution on common physical network infrastructure or any IaaS stack seamlessly plugs into OpenShift. This enables scale-out growth to large multitenant clouds with per-tenant or per-application micro-segmentation in the form of a virtual-networking-as-a-service solution (inclusive of high availability), Load Balancer as a Service, security policy, network analytics, and more.

- An NFV policy framework streamlines internetworking virtual network segments with chainable virtualized network functions (VNFs) and physical network appliances. While OpenShift doesn't include management of waypoint network functions, this can be done through OpenStack and Contrail Networking for VNFs, or exclusively through Contrail for physical network appliances.
- An open, standards-based, BGP-federated virtual network gateway mechanism enables the extension of VPNs securely outside the PaaS environment to remote facilities and across hybrid clouds. It is widely interoperable with IP-VPN and Ethernet VPN (EVPN) physical and virtual routers and switches.
- Over and above automated networking workflows, an open northbound Contrail Networking API and API-driven Web user interface allow for fine-grained control and monitoring over the network and deeper DevOps automation.
- An analytics engine offers out-of-the-box instrumentation, troubleshooting, telemetry, and visibility for network traffic and cloud performance analytics with APIs or Apache Kafka for exporting data to specialized big data analytics systems such as Hadoop and Spark.

Solution Components

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Red Hat OpenShift Container Platform: Red Hat OpenShift Container Platform is a private PaaS application platform that helps organizations develop, deploy, and manage existing and container-based applications seamlessly across physical, virtual, and public cloud infrastructures. Built on proven open source technologies like Docker, Kubernetes and RHEL, OpenShift Container Platform helps application development and IT operations teams modernize applications, deliver new services, and accelerate development processes.

Summary—Juniper and Red Hat Deliver on the Promise of Hybrid Clouds with SDN

Moving to an open SDN architecture can set cloud builders free from costly and proprietary technologies. These joint solutions are future-proof, open, and reduce cost by enabling service providers and IT administrators to easily embrace open cloud network automation with OpenStack and OpenShift technologies in their environments. It removes the complexity of integrating SDN technologies. Moreover, it increases operational effectiveness and dependability with solid product and support quality from long-time trusted Linux, cloud computing and networking vendors.

“Organizations continue to make strategic decisions to adopt an open hybrid cloud because they want choice in vendors and the ability to leverage their existing infrastructure investments. Juniper’s Technology Alliance Partner Program embraces open environments, and we are looking forward to working with Juniper to expand options for organizations moving to the cloud through Red Hat’s OpenStack ecosystem and with Red Hat cloud Infrastructure,” said Radhesh Balakrishnan, General Manager of Virtualization at Red Hat.

Next Steps

If you would like to learn more about this joint solution, please contact your Juniper Networks representative for more information.

About Red Hat

Red Hat is the world’s leading provider of open source solutions, using a community-powered approach to provide reliable and high performing cloud, virtualization, storage, Linux, and middleware technologies. Red Hat also offers award-winning support, training, and consulting services. Red Hat is an S&P company with more than 80 offices spanning the globe, empowering its customers’ businesses.

About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at www.juniper.net.

Corporate and Sales Headquarters

Juniper Networks, Inc.
1133 Innovation Way
Sunnyvale, CA 94089 USA
Phone: 888.JUNIPER (888.586.4737)
or +1.408.745.2000
Fax: +1.408.745.2100
www.juniper.net

APAC and EMEA Headquarters

Juniper Networks International B.V.
Boeing Avenue 240
1119 PZ Schiphol-Rijk
Amsterdam, The Netherlands
Phone: +31.0.207.125.700
Fax: +31.0.207.125.701



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