BROCADE

Enabling OpenStack with Brocade

HIGHLIGHTS

- Visibility, extensibility, and adaptability for evolving data center OpenStack deployments
- Contributions and architectural enhancements to the core OpenStack framework, including OpenStack Tacker
- A consumable, supported path to orchestrating data centers, powered by Brocade

Enabling Cloud Networks with Brocade and OpenStack

Transitioning to the cloud provides many benefits, including greater economies of scale and the flexibility to adopt new applications quickly. Establishing and maintaining control over this dynamic environment as applications are provisioned and migrate, however, can be daunting. Many organizations are turning to cloud orchestration to overcome these issues. Commercial solutions can lead to feature lock-in and reduced flexibility, often inhibiting the infrastructure's ability to evolve as business needs change. An open solution, in contrast, not only supports business objectives, but also creates a foundation for ongoing flexibility and rapid innovation.

Cloud-Optimized Networking

OpenStack is a global collaboration of thousands of developers and cloud computing technologists dedicated to producing the leading open source cloud computing platform for public and private clouds. OpenStack solutions allow enterprises and service providers to ensure service quality and avoid many of the risks of cloud computing by minimizing capacity issues while simplifying administration.

Brocade delivers the benefits of open and interoperable cloud network architectures within the OpenStack framework. A member of the OpenStack alliance since 2011, Brocade has embraced this open source cloud platform in order to promote multivendor and system interoperability for cloud environments. Along with its partners, Brocade also spearheaded the formation of the group focused on Fibre Channel Storage Area Network (SAN) extensions to OpenStack. In addition, Brocade is working toward enhancing the networking subsystem of OpenStack to support Network Functions Virtualization (NFV) environments, as well as inter-data center multitenancy.

Brocade has optimized its networking portfolio for open cloud platforms by providing open Application Programming Interfaces (APIs) for business agility. By deploying Brocade® solutions using these APIs, network operators can benefit from vendor, customer, and third-party networking innovations.

These OpenStack integrations and community contributions by Brocade are key enablers as network operators transition to a cloud data center architecture.

Brocade Integrations with OpenStack

Organizations can easily operate Brocade networking devices in an OpenStack environment. Since the Kilo release, all Brocade networking platforms are OpenStack-enabled through the provision of plugins, available on StackForge at https://github.com/openstack/networking-brocade.

The Brocade Neutron Plugin provides a means to interface with OpenStack networks to orchestrate Brocade physical switches. In cloud environments where Virtual Machines (VMs) are hosted by physical servers, the VMs see a new virtual access layer provided by the host machine. This new access layer can be created via many mechanisms, such as Linux bridges or virtual switches. The policies of the virtual access layer (virtual network), when set, must now be coordinated with the policies that are set in the hardware switches. The Brocade Neutron Plugin helps to automatically coordinate this behavior, without any intervention from the administrator.

Data Center Fabric Orchestration

Brocade data center fabric technology, embedded in Brocade VDX® switches, enables IT organizations to provision fabrics that support cloud-optimized networking and greater IT agility. Often, data centers require VMs to connect within or between data centers. Using Virtual Extensible Local Area Network (VXLAN) with Brocade VCS® fabrics or IP fabrics greatly simplifies the creation of a scalable data center fabric. Brocade fabric plugins for OpenStack offload VXLAN encapsulation from software-based OVS to Brocade VDX switches, providing superior performance at high scale.

Inter-Data Center Multitenant Services

With the advent of cloud services that require massive computing resources on demand, the architectural model of data centers is drifting toward geographically distributed pools of shared resources. As a result, the cloud should be conceived as a multi-data center environment that offers orchestration of per-tenant resources brought together by a virtual (logical) network spanning multiple data centers.

The Brocade MLX® Edge VPN Plugin delivers unprecedented scale and performance, high reliability, and cost-saving operational efficiency for the world's most demanding service provider and enterprise networks. Multiprotocol Label Switching (MPLS) technology enables the deployment of Layer 2 and Layer 3 VPNs between data centers with Quality of Service (QoS) guarantees to provide inter-data center connectivity. With these capabilities, tenant VMs located in different data centers can communicate transparently and move seamlessly between data centers. To learn more, visit the Edge VPN page on StackForge at https://github.com/stackforge/networking-edge-vpn.

Fibre Channel Zone Management

The simplicity of Brocade SAN solutions enables massive scale without complexity, offering unmatched performance with the lowest Total Cost of Ownership (TCO) for mission-critical storage networks. Fibre Channel SAN support for OpenStack allows administrators to move applications requiring the performance, resiliency, and security of a Fibre Channel SAN to a cloud environment. To learn more, see http://www.brocade.com/en/possibilities/technology/san-fabric-technology.html.

Fibre Channel Zone Manager is a fabric-based service in SANs that groups host and storage nodes that need to communicate. Zoning ensures that nodes (for example, host or initiators, storage array or targets) can communicate only if they are members of the same zone. Previously, Fibre Channel SANs were either pre-zoned or open-zoned when block storage was provisioned in OpenStack. The Fibre Channel Zone Manager API allows SAN vendors to support automated SAN zoning at attach and detach entry points of volume operations. Moreover, since the Mitaka release, tracking zones has become easier with the use of friendly zone names, and virtual fabrics can be set up through Cinder. To learn more, read the Fibre Channel Zone Manager At-A-Glance.

VNF Management

Brocade VNF Manager is a new SDN application based on the OpenStack Tacker project. It addresses NFV management use cases by using standards-based architectures. The application serves as a generic Virtualized Network Function (VNF) manager that supports basic lifecycle management and health monitoring of VNFs, and implements closed-loop healing actions. This application is layered on top of the Brocade SDN Controller to integrate the orchestration and control aspects found in typical NFV and Software-Defined Networking (SDN) deployments. To learn more, see https://wiki.openstack.org/wiki/Tacker.

Traffic Management

A Brocade Virtual Application Delivery Controller (vADC) device driver is available for OpenStack Neutron Load Balancing as a Service (LBaaS), supporting the full range of functionality offered by the LBaaS API v2, since the Kilo release. The driver provides the capability to utilize a central, high-availability cluster of Virtual Traffic Managers (vTMs) to host LBaaS services.

The vADC device driver works in conjunction with the Brocade plugin driver that is included in the official OpenStack Neutron distribution (since the Kilo release). The device driver is available on GitHub at https://github.com/brocade-vadc/neutron-lbaas-device-driver, along with installation and configuration instructions.

Virtualization of Layer 3 through Layer 7 Network Services

The Brocade vRouter allows administrators to install routers wherever they need them in a virtualized environment. In a multitenant cloud service environment, the Brocade vRouter presents all the networking inside the tenant, so that adminstrators can design a more complex tenant with multiple subnets that are connected by a router. Since the virtual router lives in a VM, it has all the advantages and flexibility of a software product to move around and scale out as necessary. The Brocade vRouter is the leading technology for delivery of services at multiple points in the network, including routing, firewall, and VPN. To learn more, visit www.brocade.com/nfv.

The Brocade Neutron Layer 3 Plugin performs Brocade vRouter VM lifecycle management by utilizing the other component APIs to configure and instantiate the deployment of Brocade vRouter VNFs as VMs. Learn more at https://wiki.openstack.org/wiki/Brocade_Vyatta_L3_Plugin.

In addition to these basic setup capabilities, plugins are also available for instantiating firewall and Virtual Private Networking (VPN) services on the Brocade vRouter. The Brocade vRouter VPN Plugin provides a VPN as a Service (VPNaaS) solution by using the Brocade vRouter VM running as a Neutron router. The plugin implements the IP security (IPsec) site-to-site tunnel feature to connect tenant private networks to remote networks. The Brocade firewall device driver provides a Firewall as a Service (FWaaS) solution by also using the Brocade vRouter VM running as a Neutron router. The driver implements "perimeter firewall" functionality to filter traffic between tenant private networks and external networks. To learn more about extensions, visit https://wiki.openstack.org/wiki/Brocade_Vyatta_Firewall_driver and https://wiki.openstack.org/wiki/Neutron/VPNaaS/Brocade_Vyatta_VPNaaS_Plugin, respectively.

IPsec VPN

The Brocade vRouter VPN Plugin orchestrates site-to-site IPsec VPN tunnels between data centers. Cloud service providers can automate VPN tunnel creation between data centers to address cloud-bursting use cases. The plugin automates complex VPN configurations on the Brocade vRouters deployed in the sites. At the same time, tenants can deploy applications that securely access resources across data centers by using the VPN tunnels.

OpenDaylight Mechanism Driver for the Model-Driven Shared Access Layer (MD-SAL)

Using the Brocade SDN Controller Modular Layer 2 (ML2) Plugin, organizations can integrate the Brocade SDN Controller with OpenStack to create virtual Layer 2 networks for their tenant VMs. This integration with the ML2 Plugin also enables the Brocade SDN Controller to be the single point of management for all configuration, deployment, and management of multivendor network devices. To learn more, visit https://wiki.opendaylight.org/view/OpenDaylight_Controller:MD-SAL:L2_Switch.

Automating OpenStack End to End with Brocade Workflow Composer

As companies move to digitize their business, they need automation to enable business agility. Brocade Workflow Composer™ enables enterprise and cloud service providers to improve IT operations and drive greater business agility. Based on the StackStorm Open Source Project, the Brocade Workflow Composer automation platform provides DevOps-inspired network lifecycle and cross-domain automation of multivendor environments by using turnkey, customizable workflows and nearly 2,000 points of integration.

These points of integration include tools to automate the creation and consumption of OpenStack resources for end-to-end, event-driven automation in an OpenStack environment. For more information, visit www.brocade.com/bwc.

On-Premise Networks with "as a Service" Agility

The move to cloud computing is about more than the price of new technology—it is about being able to quickly and effortlessly adjust to evolving needs. Brocade Network Subscription was developed to allow organizations to acquire what they want, where they want, when they want it.

As a result, organizations now have a network acquisition model that provides the same level of flexibility and agility as a cloud-based network. They can define the network they require today and seamlessly adjust to any shifts at no cost, with no penalty, and on their terms. With Brocade Network Subscription, organizations could fund a significant percentage of their new Brocade network by simply transferring what they spend on monthly support services for legacy equipment. For more information, visit www.brocade.com/capital.

The Brocade and OpenStack Ecosystem

Recognizing that many enterprises and service providers prefer the peace of mind that comes with tested solutions, Brocade partners with several OpenStack distribution providers to ensure a full-service deployment experience for their cloud networks. Brocade works with these partners to ensure testing and certification of Brocade technology within their OpenStack distributions and to offer professional services and support options.

About Brocade

Brocade networking solutions help organizations achieve their critical business initiatives as they transition to a world where applications and information reside anywhere. Today, Brocade is extending its proven data center expertise across the entire network with open, virtual, and efficient solutions built for consolidation, virtualization, and cloud computing. Learn more at www.brocade.com.

For more information about Brocade solutions for OpenStack, including a detailed Compatibility Matrix, visit: www.brocade.com/OpenStack.

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