Hewlett Packard Enterprise

Enhance OpenStack networking with HPE Distributed Cloud Networking

Contents

Technical white paper

Helion OpenStack® 2.0 is HPE's enterprise data center distribution of OpenStack software, the leading open source cloud management system. HPE Helion OpenStack is a scalable, extensible platform designed to deliver cloud automation while adhering tightly to OpenStack software API and interoperability standards. It enables you to configure an open cloud platform with the confidence that you're backed by the industry-leading support and experience of a trusted IT partner.

Enhancing OpenStack networking

OpenStack Neutron is the networking component of the OpenStack architecture, letting users provision virtual network resources, including security and Layer 4–7 services, in the same way they would orchestrate compute and storage resource pools. Much like software-defined networking (SDN) solutions, OpenStack Neutron manages virtual overlay networks that abstract the physical network, making any cloud deployment independent of the physical infrastructure, and able to deploy easily on-premises or at cloud service providers.

For large cloud environments—with many virtual networks, tenants, and applications—Neutron's native Linux® Layer 3 routing capability must be enhanced. HPE enhances the scale and resiliency of Neutron networking in HPE Helion OpenStack through an HPE Distributed Cloud Networking (DCN) solution, which includes:

- **Consistent networking**—Across OpenStack software versions and distributions, all major hypervisor vendors and virtualization technologies, including Docker, bare metal, or non-virtualized endpoints

- **Performance**—To thousands of nodes and millions of virtual machines

- **Scale**—Fully distributed control plane for scalability and reliability within and across clouds. Federates across controllers and/or locations to unify multiple private and public clouds

- **Security**—Micro-segmentation through fine-grained ACLs applied at policy groups or application classes. Full network insertion capabilities for multiple third-party firewalls, load balancers, and security appliances

- **Advanced networking**—Full and complete Layer 2 and Layer 3 switching, routing, and network management capabilities based on the Service Router Operating System (SR OS), deployed in thousands of service providers globally

DCN and HPE Helion OpenStack make cloud-scale a reality

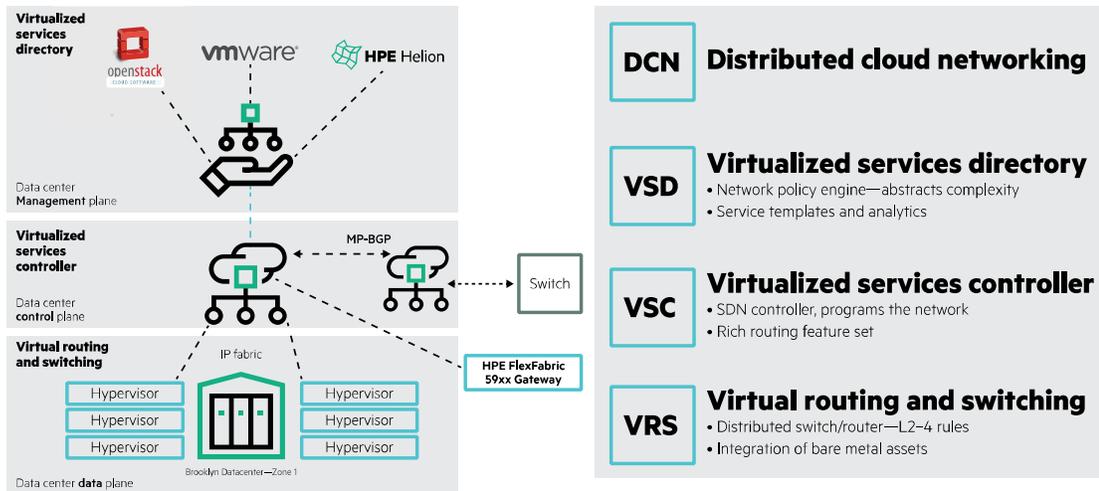### HPE Distributed Cloud Networking
Architecture/components

Figure 1. HPE Distributed Cloud Networking

The HPE DCN virtual switch, VRS, includes full Layer 3 routing capabilities, including VXLAN encapsulation and overlay network management. Moving the Layer 3 routing and VXLAN tunnel end points (VTEP) out to the network edge eliminates the centralized choke point problem faced in prior OpenStack deployments, and mirrors the network architecture of modern spine-leaf data center and cloud architectures.

DCN provides an SDN controller, VSC, that includes a centralized policy repository, with a distributed control plane, which allows for much greater scalability, without losing the agility offered by HPE Helion OpenStack orchestration and the simplicity of a single infrastructure-wide view of policies.

In addition to providing SDN automation services to the HPE Helion OpenStack network infrastructure, DCN provides configuration and provisioning for security nodes and application controllers, whether those devices are virtual appliances or physical devices, through a rapidly growing ecosystem of third-party solutions that can be managed under its SDN policy model. Integration with these third-party solutions includes configuration of network and security policies on the devices, as well as managing service insertion and chaining to configure the devices into the virtual application network and ensure workload portability across the cloud infrastructure. DCN even allows for service insertion policies to be visible and managed within the OpenStack environment.
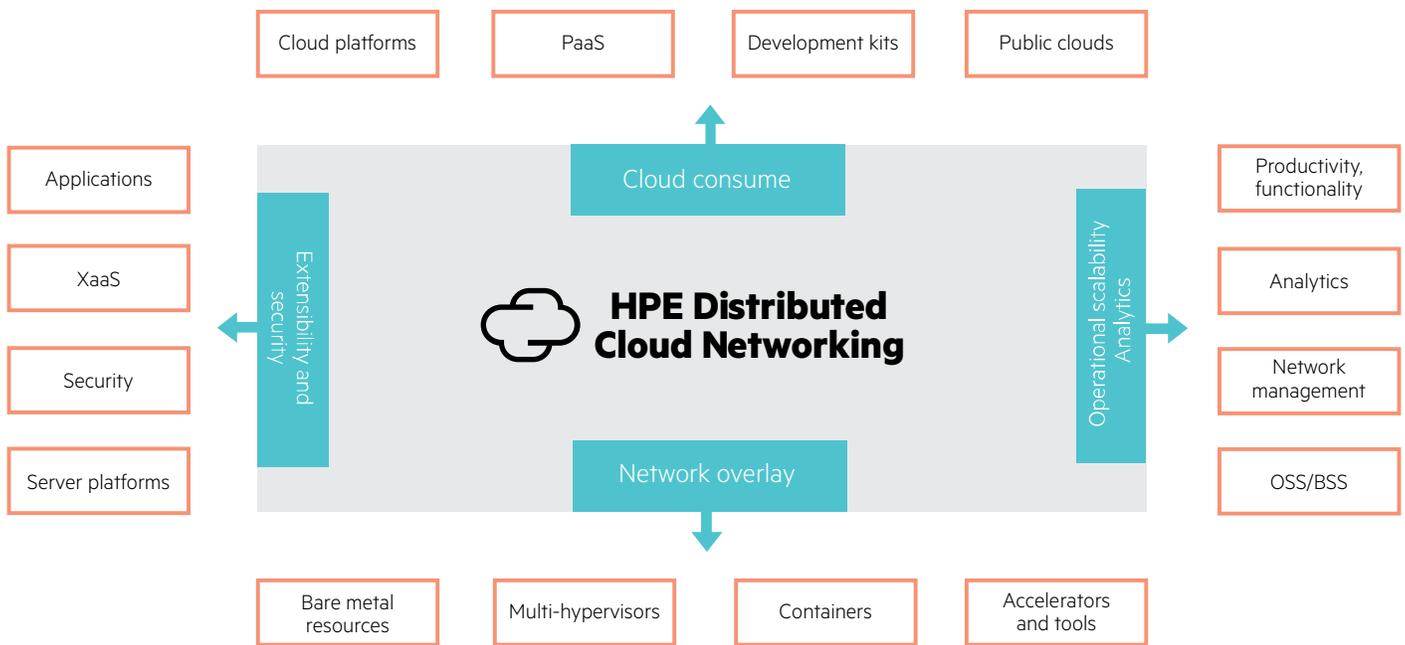

Figure 2. DCN provides the cloud networking infrastructure that spans application platforms, cloud management systems, and the physical infrastructure.

And with its sophisticated routing capabilities, DCN seamlessly provides a single SDN overlay infrastructure across multiple data center sites, or between on-premises and cloud-based applications, something the standard OpenStack Neutron distribution is not ready to handle. Augmenting DCN with the HPE Virtual Networking Services, an enterprise branch automation and provisioning solution over WAN (Wide Area Network), organizations can extend that same SDN policy model to the enterprise WAN, including branch offices and remote sites.

Summary

As momentum continues to build for HPE Helion OpenStack and customers achieve the benefits of open cloud management systems, DCN provides the scalable virtual networking infrastructure and policy automation throughout the network, with full visibility across virtual and physical environments. Enterprises and service providers can now plan to deploy at scale as they fully leverage both public and private cloud investments.

Learn more at
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