VXLAN With CloudVision®

Inside

VXLAN

A new networking technology developed by Arista and VMware that provides multitenant L2 networks over an IP based infrastructure. VXLAN combines the benefits of VLANs with all the stability and scaling of routed IP networks

CloudVision

An EOS®-based platform that provides services for:

- Exchange point for networkwide services.

- Provisioning and change management automation

- Multi-vendor controller integration

- VXLAN Control Services (VCS)

Why These Technologies

VXLAN isolates multiple workloads in the converged DC while running over IP to deliver unprecedented reliability and scalability. Converged virtual networks deliver more workloads across common infrastructure, thus reducing costs. The IP underlay is also more reliable than traditional L2 VLANs, reducing downtime costs.

VXLAN and CloudVision Empower Administrators to Deliver Scalable and Reliable Multi-Tenant Data Center Networks

Arista and VMware co-authored the Virtual eXtensible LAN (VXLAN) protocol to provide virtual overlay networks and extend the cost efficiency gains of virtualized servers (hypervisors) in the data center. VXLAN encapsulates network traffic of virtualized workloads in standard IP packets. As a result, multiple VXLAN virtual networks can run over the same physical infrastructure to reduce CAPEX. VXLAN runs over any standard IP network and benefits from the scaling, performance and reliability characteristics available in current IP data center networks. Standards based IP underlays are open and permit best of breed, cost efficient, multi-vendor DC environments. IP underlay networks are also more reliable, reducing costly network outages in a VXLAN data center infrastructure. VXLAN doesn't rely on dated spanning tree protocols, TRILL fabrics or 802.1Q vlan tagging mechanisms that offer limited reliability, fault isolation and scaling.

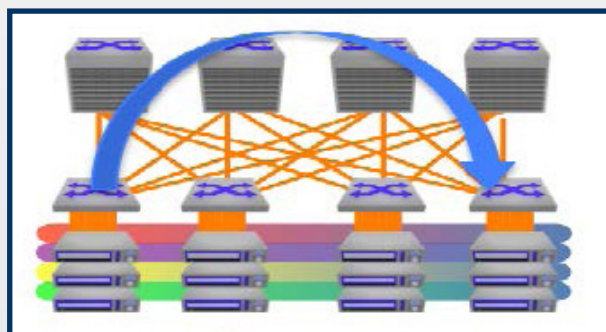VXLAN allows administrators to deploy up to 16.7 million

Figure 1: Scaling to thousands of virtual networks over an IP Infrastructure

unique layer 2 networks in the data center to support myriad independent applications, workflows, user groups or workloads.

Arista's CloudVision platform provides a set of services that simplifies monitoring, management and controller integration in the virtualized data center.

Scaling and reliability derive from the underlying IP network and the routing protocols that deliver multipath scaling, sub second failover recovery and multivendor support. VXLAN encapsulation gateways, also called virtual tunnel end-points (VTEPs) are available in software, as vSwitches in Linux and ESXi hypervisors, or in hardware, as VXLAN capable data center switches, to support fully virtualized or hybrid bare-metal/virtualized workloads. Administrators can alternately choose between inexpensive, hypervisor based, software VTEPS, or wirespeed, high performance hardware VTEPS that deliver excellent price performance for customer critical workflows.

CloudVision: Enhancing VXLAN Management, Orchestration and Monitoring

While VXLAN describes the means to define IP encapsulated virtual LANs, other elements like orchestration, visualization and some helper services like Broadcast, Unknown unicast and Multicast (BUM) resolution are implemented by network virtual services controllers. Network controllers coordinate virtual network provisioning with the virtual machines tasked to a business workload. There are several popular controllers like Neutron for OpenStack, or NSX for VMware, to name a few. While effective at supporting orchestration for their respective hypervisor solutions, they can't independently correlate physical to virtual network topology or coordinate virtual network provisioning among each other. This complicates virtual-physical network monitoring, visualization and support for diverse hypervisors in a heterogeneous data center.
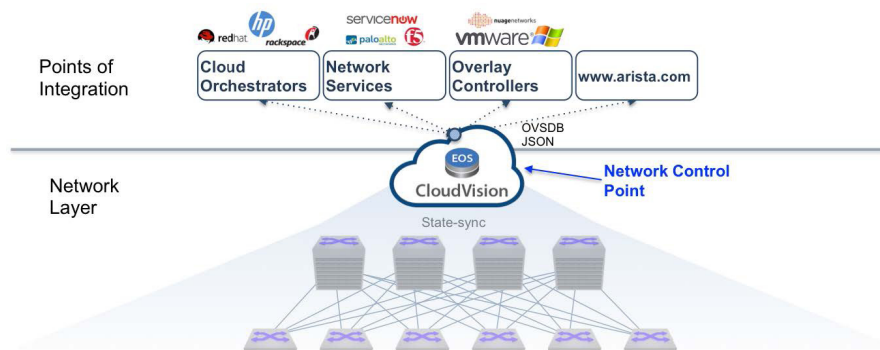

Figure 2: CloudVision provides APIs, information and tools for managing the virtualized Data Center

APIs to Streamline Integration and Simplify Administration

Among its many capabilities, Arista's CloudVision platform provides a set of services that simplifies monitoring, management and controller integration in the virtualized data center. CloudVision provides standard northward facing APIs supporting commercial or open source controllers. This ensures systems architects aren't locked into potentially costly "one size fits all" virtualization system. In addition to OVSDB services, CloudVision provides a RESTful, JSON based command line API that allows administrators to craft customized network management and provisioning tools. The easy to use, open API, reduces development costs of orchestration tools designed to improve productivity. CloudVision can communicate with multiple controllers simultaneously to accommodate heterogeneous data centers so a common infrastructure can economically serve more workloads.

CloudVision also provides a network services abstraction layer that decouples controllers from the physical data center infrastructure. This abstraction insulates controllers from infrastructure OS dependencies so administrators can remove switch OS and controller version dependencies and reduce costs associated with controller certification and network maintenance. Abstraction also improves controller scaling, with a single touch point to control all Arista switches in the data center. This reduces overall costs as more systems can be managed with fewer controller licenses.

Network State Services for Managing the Virtual and Physical Data Center

CloudVision uses SysDB APIs in EOS to collect and manipulate state in all Arista switches in the data center. Every configuration parameter, physical connection (LLDP), spanning tree or routing topology state or MAC table entry can be aggregated to CloudVision for access by management tools. This also applies to configuration and monitoring of VXLAN VTEPS in the data center. CloudVision learns the disposition of all Arista VTEPs: their physical topology, the virtual networks they're serving and the devices running on those virtual networks. Combining topology information, VTEP configuration and operational state allows controller and monitoring tools to easily manipulate and visualize network state. This helps improve and expand coverage of controllers and administration tools, making them more useful and cost effective.

CloudVision VXLAN Control Services (VCS) additionally provides configurable, automated, data plane BUM services for VTEPs in the data center. VCS complements orchestration platforms by providing mechanisms that ensure reachability of all devices running on dynamically configured virtual networks. VCS serves OpenStack deployments, providing an alternative to multicast based BUM learning. Administrators save maintenance and bring-up costs because VCS is easy to use and doesn't depend on complex IP multicast services. CloudVision VCS coexists with alternative BUM forwarding services. Productivity is enhanced because the network can support multiple hypervisor architectures simultaneously allowing more workloads to run in the same data center. CloudVision provides user commands and API primitives that help associate physical to virtual network topology. Administrators can use CloudVision to troubleshoot virtualized networks or can visualize virtual topologies using custom tools or commercial applications that leverage CloudVision's programming APIs. Enhanced physical to

virtual visualization improves monitoring and reduces troubleshooting time thus reducing costs incurred from network errors or outages.

A Reliable, Scalable Service Exchange for the Virtualized Data Center

CloudVision is a licensed feature set that is part of EOS. It can be deployed in different modes to provide the most economical means of providing an exchange point for network state. For smaller network deployments, CloudVision can be configured on any Arista switch in the data center. For larger installations requiring larger scaling, it can run as a virtual machine on common VMware or Linux based hypervisors. CloudVision supports three peer, majority rule, redundancy for high availability and network state consistency. High availability network services ensure reliable workload productivity to avoid costly outages.

Together, VXLAN and Arista CloudVision are the building blocks for the software defined virtualized data center

Summary

VXLAN + SDN = CloudVision

The adoption of VXLAN has revolutionized the virtualized data center. VXLAN improves network productivity by allowing tenant workloads to be deployed on any resource in the data center. VXLAN also improves network reliability and cost efficiency by replacing scale limited L2 architectures or proprietary fabrics with standards based IP routed underlays. VXLAN's ability to support workload deployments, anytime, anywhere, gives businesses a competitive edge when addressing customers' dynamically changing needs. VXLAN delivers these capabilities cost effectively: without forklift upgrades, network redesign or altering of tenant applications.

Arista's CloudVision platform provides management, monitoring and API services that streamline integration of various orchestration platforms and helps reduce bring-up costs. CloudVision and its VXLAN Control services (VCS) simultaneously support multiple virtualization architectures to help improve data center productivity and cost effectiveness. CloudVision's rich, standards based, APIs support a variety of commercial or customer developed monitoring systems to deliver enhanced physical and virtual network visualization that helps simplify troubleshooting and reduces network downtime. CloudVision enhances scaling of orchestration tools, supporting a larger management scope with fewer licenses to help contain licensing costs. Together, VXLAN and Arista CloudVision are the building blocks for the software defined virtualized data center; supporting more virtualization, better reliability, improved physical/virtual visualization with an open, standards based architecture.

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