Solution Brief

Extreme BGP-EVPN Network Virtualization and Data Center Interconnect

Network provisioning and maintenance can be tedious and time-consuming, especially when networks are experiencing rapid, large, and unpredictable increases in usage. Network virtualization simplifies these and other administrative tasks to ensure optimization of workload mobility, scalability, and security. Using this approach, all network servers and services are considered one pool of resources, which may be used without regard to the physical components.

The BGP-EVPN Network Virtualization is a controller-less architecture that simplifies data center operations by leveraging open, standards-based protocols to abstract network control plane, data plane, and automation functions from the underlying physical platforms. As an integral part of the Extreme open data center design stack, Extreme BGP-EVPN Network Virtualization builds upon underlying infrastructure platforms, fabrics, and automation to deliver simplified and secure network operations.

Extreme leverages the BGP-EVPN protocol to introduce control plane learning behind remote data plane VXLAN Tunnel Endpoints (VTEPs). A unified control plane for both Layer 2 and Layer 3 forwarding provides integrated bridging and routing in VXLAN overlay networks by distributing end-host reachability information among VTEPs. This means the network administrator can easily move workloads within and across data centers using the functionality of the existing network without having to add costly external controllers.

Open-Standards Network Virtualization Overlay for Workload Agility and Security

Extreme provides integrated bridging and routing between data center server racks in VXLAN overlay networks by distributing end-host reachability information through BGP-EVPN control plane signaling across VTEPs. In this way, administrators can easily and securely scale their data center networks by extending Layer 2 and Layer 3 reachability across intra-data center racks in a multitenant network, allowing overlapping VLANs and IP subnets between tenants. Because Extreme leverages open standards to enable this network virtualization functionality, there is no need for an expensive, dedicated external controller.

Using BGP-EVPN as a control plane protocol in a controller-less overlay architecture results in efficient MAC address learning. BGP-EVPN is a signaling protocol that introduces control plane learning for end hosts behind remote VTEPs within an IP fabric (see Figure 1). A unified control plane is provided for both Layer 2 and Layer 3 forwarding in a VXLAN overlay network. The underlay BGP protocol brings efficiency, simplicity, and scalability. BGP-EVPN provides many benefits, including the control plane distribution of Address Resolution Protocol (ARP), ND and MAC databases, VRF routing, multi-homing support, fast convergence, automatic discovery

of remote VTEPs, and the auto-derivation of RD and RT communities. In addition, BGP-EVPN minimizes network flooding and supports both eBGP and iBGP.

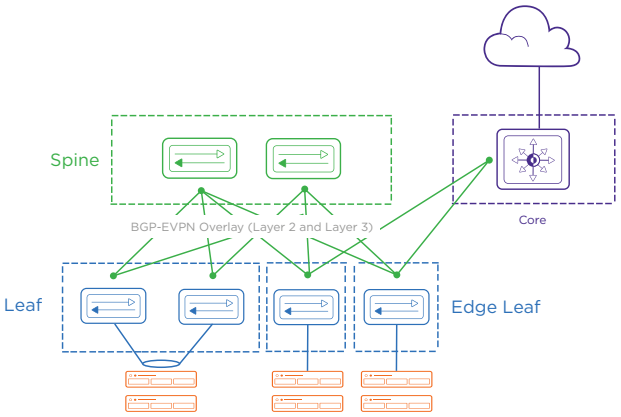

Figure 1: Extreme leverages BGP-EVPN and VXLAN open standards to enable controller-less network virtualization overlays to extend Layer 2 and Layer 3 reachability, ensuring easy and secure scalability.

Simplified Data Center Interconnect

Extreme extends integrated bridging and routing across data centers in VXLAN overlay networks through BGP-EVPN-enabled data center edge leaf gateways (see Figure 2).

This enables scalable Layer 2 and Layer 3 services over EVPN-VXLAN for virtualized data centers with control-plane signaling of MAC/IP mobility for Virtual Machines (VMs) that move between data centers. Local data center gateways at each data center site optimize routing, ensuring that external traffic is sent to the closest exit. Integrated Layer 2 switching and Layer 3 routing over the same interface or VLAN enable flexible service delivery to VMs. The border leaf pair in each data center enables the interconnect functionality independent of the underlay used in each data center. This use case illustrates a simplified approach to Data Center Interconnect (DCI) for multivendor and multifabric underlay data center networks.

High-Scale and High-Performance VXLAN Bridging and Routing

As virtual private network connections spread, VPN performance joins security and interoperability as a primary administrative concern. Extreme BGP EVPN-VXLAN overlay networks, enabled on Extreme SLX® and Extreme VDX® platforms, provide high-scale VXLAN bridging and routing over 1 Gbps, 10 Gbps, 25 Gbps, 40 Gbps, and 100 Gbps ports. High performance is assured with support for non-disruptive Routing In and Out of Tunnels (RIOT).

Transition from Legacy to Tunneling

As enterprises and service providers look to simplify administration and reduce the costs of tunneling services, they are embracing BGP-EVPN VXLAN overlays over traditional legacy VPN services. The Extreme SLX platforms support Layer 2 VPN services with BGP-EVPN VXLAN overlays as well as MPLS VPLS and VLL pseudowire services.

This unique ability to support both legacy and newer tunnel technologies on a single device helps organizations make a smooth transition to BGP-EVPN VXLAN overlays.

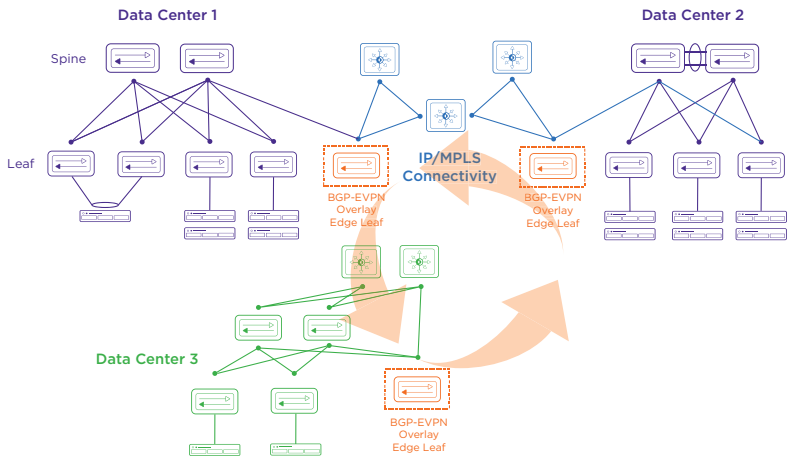

Figure 2: Extreme BGP-EVPN-enabled border leaf switches simplify DCI for Layer 2 and Layer 3 traffic.

Extreme networks

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