

APPLICATION DELIVERY IN HIGH-PERFORMANCE DATA CENTERS

A10 Networks and Arista Offer Joint Industry-Leading Application Networking Solutions for Large Compute Environments

Challenge:

- Applications driving demand for higher capacity across networks
- Need higher bandwidth uplinks and lower latencies

Solution:

- Tested and verified A10 Networks and Arista Virtual Extensible LAN (VXLAN) interoperability solution
- Fully interoperable high capacity 100GbE connectivity for handling large amounts of data traffic

Benefits:

- Scalable, next-generation and integrated solution for high-performance data centers
- Offering dynamic workload placement in data centers
- Programmatic capabilities for provisioning and automation

Explosive data growth is driving demand for capacity across networks. To address this increase in bandwidth, network operators, service providers, universities and other organizations around the world are evaluating high bandwidth 100GbE options and network virtualization technologies to consolidate links and drive OPEX and CAPEX savings. In the context of this high demand, the maturity of 100GbE technologies is enabling mainstream deployments, as standards are ratified and price points are becoming more compelling.

A10 Networks and Arista offer joint industry-leading application networking solutions for large data center and high-performance computing environments. These complementary solutions address emerging trends for application performance, virtualization, security and programmability, with best-of-breed data center switching and application delivery controllers (ADCs).

The Challenge

There are a number of primary drivers for high-bandwidth 100GbE links and network virtualization.

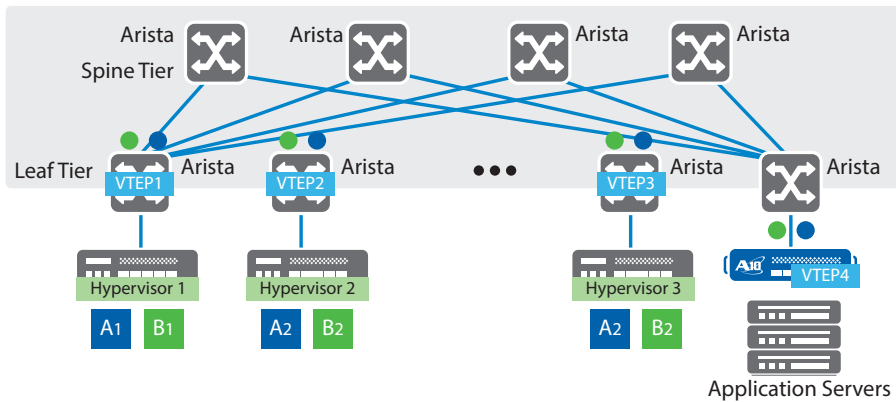
These include:

- Increased density of virtual machines (VMs) per server, creating increased east-west traffic in the data center
- Consolidation of multiple lower capacity links to save operational expenses
- 10GbE and 40GbE enabled servers driving the adoption of 100GbE capable top-of-rack (ToR) switches
- Flexible workload placement of virtual resources for network scalability
- Future-proofing the network and avoiding fork lift upgrades at a later time

The trends related to high-resolution video, big data, high-frequency trading and other applications are also driving enormous amounts of traffic and requiring higher bandwidth links in today's data centers. In addition to higher speeds, latency and jitter are also very important for certain applications, like high-frequency trading and the Financial Information Exchange (FIX) protocol commonly used in the financial services industry. Together, A10 and Arista can deliver an interoperable, compact and cost-effective end-to-end 100GbE solution with network virtualization today.

The A10 Networks-Arista Cloud Data Center Solution

As more and more data centers are moving towards a software-defined data center model, there is a need to scale beyond the traditional limitation of legacy VLANs. Dynamically changing workloads and business demands necessitate higher levels of infrastructure utilization. Interoperability and seamless administration and provisioning of virtual machines across VLANs have become a requirement to connect different clusters or data center



- Leaf switches – Arista 7000 family of switches are deployed at the ToR connecting application servers.
- Spine switches – Arista 7000 family of switches are deployed at the core.
- A10 Thunder ADC is connected to ToR switches providing application and security services.

Figure 1: A10 Arista – Spine / Leaf “IP Fabric” Architecture

environments. VLAN assignments are typically not shared across clusters, and there is a need to place and manage VMs across clusters, especially to keep up with real life scenarios that trigger high demands for application availability.

Virtual Extensible LAN (VXLAN) is a new standard in virtual networking to overcome the traditional limitation of 4096 (4k) VLANs. It helps networks to dynamically scale up to 16 million virtual networks and allows Layer 2 networks to extend over Layer 3 boundaries. VXLAN is an overlay protocol encapsulating Layer 2 Ethernet frames in L3 UDP packets. It allows for workload placement regardless of physical location and IP subnets and supports scaling of applications without additional physical resources.

The combined A10 and Arista solution offers interoperability to work seamlessly across the network. Arista switches can originate and A10 Networks® Thunder® ADC line of Application Delivery Controllers can terminate a VXLAN tunnel typically in front of a server farm to provide application delivery services. Fully interoperable 100GbE connections between A10 Thunder ADCs and Arista ToR switches allow for consolidation of multiple low bandwidth links providing a simpler, scalable architecture.

Both A10 Networks Advanced Core Operating System (ACOS®) and Arista’s EOS® Extensible Operating System offer open standards based programmability for management and control of cloud and virtualized environments.

Programmability is a huge advantage for network operators to deploy and manage dynamic workloads because it makes it possible to set up and tear down configurations quickly.

Features and Benefits

A10 Networks and Arista Networks deliver interoperable next-generation innovative 100GbE and VXLAN solutions enabling both performance and flexibility for a competitive edge. These provide:

- A scalable solution for high-performance data centers at a budget friendly price point

- Network virtualization features without compromising on throughput or latency to provide superior performance and value at an economical cost
- Essential integration and programmatic capabilities for flexible workload placement and to meet the high demand for application availability

Solution Components

This joint solution shown in Figure 1 uses an A10 Thunder ADC and Arista Leaf-Spine “IP Fabric” architecture. The network core is an IP fabric laid out in a leaf-spine architecture running equal-cost multipath (ECMP) between the two tiers.

VXLAN Deployment Scenarios

The following deployment scenarios describe examples of the joint solution combining Arista switches and the A10 Thunder line of Application Delivery Controllers.

- When using the VXLAN feature on the A10 Thunder ADC, it can serve as a hardware Virtual Tunnel Endpoint (VTEP) in addition to providing L4-7 services. The Arista cloud architecture provides a high-speed, low latency underlay fabric with the necessary intelligence to route the tunneled traffic with the appropriate services and network segmentation.
- When using the VXLAN feature on both the Thunder ADC and the Arista ToR switch, both devices serve as hardware Virtual Tunnel Endpoint (VTEP) and the two tunnel endpoints communicate using unicast and VXLAN encapsulation between them. Both VTEPs support using unicast as a transport, removing the need for multicast to be enabled in the underlay network. The A10 Thunder ADC can provide L4-7 services to the application servers connected to it.
- The Thunder ADC positioned after a tunnel endpoint connects to an Arista VTEP via 100GbE or 40GbE, which encapsulates the traffic in VXLAN to be sent to the other Arista VTEPs. The connections between the Thunder ADC and the Arista VTEP switch will use 802.1Q trunking.

In addition to the VXLAN features and 100GbE interoperability, Thunder ADC adds other high-value services after the tunnel termination, such as Server Load Balancing, RAM Caching, HTTP compression, etc. Security-related features like SSL Insight, SSL offloading, Web Application Firewall (WAF) and Application Access Management (AAM) enhance the joint solutions to provide additional benefits apart from high-performance and low latency features.

Summary – Cost-Effective Next-Generation Solutions without Compromise

The combination of A10 Thunder ADC and Arista 7000 series switches provides a scalable solution for high-performance data centers. It offers network virtualization features without compromising on throughput or latency to provide superior performance and value at an economical cost. It also offers essential integration and programmatic capabilities for flexible workload placement and to meet the high demand for application availability.

A10 Networks and Arista Networks deliver interoperable next-generation innovative 100GbE and VXLAN solutions enabling both performance and flexibility for a competitive edge. Both companies' products create reliable, high-performance and low latency networks for the support of demanding network requirements, at a budget friendly price point, which means that companies do not have to compromise on functionality.

About Arista Networks

Arista Networks was founded to deliver software driven cloud networking solutions for large data center and computing environments. Arista offers a broad portfolio of Gigabit Ethernet solutions including 1/10/40 and 100GbE switches that redefine network architectures, bring extensibility to networking and dramatically change the price/performance of data center networks. At the core of Arista's platform is EOS (Extensible Operating System), an advanced network operating system, designed to build software driven cloud networks. EOS provides a single image consistency across hardware platforms and a modern core architecture enabling in-service upgrades and application extensibility.

About A10 Networks

A10 Networks is a leader in application networking, providing a range of high-performance application networking solutions that help organizations ensure that their data center applications and networks remain highly available, accelerated and secure. Founded in 2004, A10 Networks is based in San Jose, California, and serves customers globally with offices worldwide. For more information, visit:

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To learn more about the A10 Thunder Application Service Gateways and how it can enhance your business, contact A10 Networks at: www.a10networks.com/contact or call to talk to an A10 sales representative.