

Arista Networks and F5 Solution Integration



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Overview

Enormous scale and the need for a highly available environment are challenges introduced respectively with cloud computing and massive virtualization of the data center environment. Today customers are evaluating how these trends in IT will impact their business goals. Arista Networks and F5 have partnered to develop new, integrated solutions that will help customers improve application scalability, efficiency and availability, ultimately supporting the goal of a dynamic data center. This brief gives a high-level overview of one particular integration between Arista and F5 products.

Agility and Efficiency Drive Costs

Organizations across every industry are becoming increasingly concerned about moving applications between data centers, within a cloud or across clouds. The goal is to accomplish this without increasing costs, impairing performance, or compromising service level agreements. This orchestration sequence needs to include the entire protocol stack to be effective. The end business goal is to increase application performance, resiliency and availability by monitoring and directing traffic to the most available resources.

Virtualization of the Infrastructure

Virtualization of compute resources provides an organization with many options for creating an agile service model at a lower cost. It enables the creation of pools of compute, storage, and networking resources within the data center. These pools are the foundation of the private cloud model. Orchestration via APIs allows IT organizations to automate services, reducing

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time to market and leveraging data center assets more efficiently. Automation provides flexibility and agility while allowing IT organizations to remain in control of their environments. Virtualization greatly enhances the efficiency of compute and storage resources by allowing application mobility, storage portability, and self-service provisioning while complicating management and operations.

Network Agility with F5

As the leader in application delivery networking, F5 helps enterprises dynamically monitor and control network traffic to ensure that applications and data remain fast, available, and secure.

F5® BIG-IP® Local Traffic Manager™ (LTM) is a network appliance that manages traffic to and from virtualized servers and desktops. By offloading processor-intensive activities like SSL encryption, caching, and compression, BIG-IP LTM reduces the CPU and memory load on servers, thereby increasing the capacity.

When organizations run multiple application instances on virtual machines across several data centers or clouds, BIG-IP Global Traffic Manager™ (GTM) maximizes application performance and availability by intelligently directing traffic to the best performing virtual machine, regardless of location.

F5 iControl® provides the programmatic interface for orchestration, automation, and dynamic control of the network. This web services-enabled open API is used to configure and manage BIG-IP devices and enables applications to control their own traffic. For example, using iControl, application developers can create solutions that bring servers online and offline dynamically, give priority to critical traffic during traffic bursts, filter out unwanted traffic, distribute server updates without disrupting service, manage applications from a single console, and so on. iControl integrates with virtualization platform management tools and APIs to help orchestrate automated provisioning and de-provisioning of virtual machines in both private and public cloud environments.

With iRules®, F5's powerful scripting language, developers can directly manipulate and manage IP application traffic by controlling and customizing how it is intercepted, inspected, transformed, and routed. iRules can be applied to any IP application or protocol and can be invoked using iControl to perform tasks that would ordinarily require changes to the application.

Arista Networks EOS Maximizes Efficiency and Availability

Performance, stability, and availability are business requirements for datacenter networking, where a single scalable fabric carries both network and storage traffic. Management processes must be scalable for successful deployment and operation, requiring a high degree of automation and integration to maximize efficiency in the customer's unique environment. The design and architecture of the network operating system provides the foundation for meeting these requirements.

Arista's EOS was designed from the ground up to provide the most robust foundation for the business needs of next-generation data center networks.

The 7150S' class-leading deterministic latency of 350ns is coupled with a set of advanced tools for monitoring and controlling mission critical environments and delivering hardware enabled features such as VXLAN.

EOS's advanced architecture delivers the following key benefits:

- High Availability
- Reduced Maintenance Windows
- Scalable Management Processes
- Improved Security

Arista's EOS software combined with next-generation hardware further enhances the efficiency and availability of the data center. These two elements are what deliver a very flexible and programmable platform such as the Arista 7150S data center switch. The Arista 7150S series represents the industry's leading ultra-low latency 1RU 1/10GbE layer 2/3/4 wire speed switch family, offering a unique combination of performance, advanced functionality and extensive onboard resources. The 7150S' class-leading deterministic latency of 350ns is coupled with a set of advanced tools for monitoring and controlling mission critical environments and delivering hardware enabled features such as VXLAN.

No one is likely to compromise resiliency over traffic flow optimization in a data center network. The approach that is well suited for most companies is to let the network layers do their job with standard protocols and to use SDCN to enhance the behavior for their specific use cases. Arista addresses these challenges through 4 pillars of the Software Defined Cloud Network (SDCN).

Pillar 1: Multi-path Active-Active Data Path leaf-spine scaling: Scaling Cloud networking across multiple chassis via MLAG (Multi-chassis Link Aggregation Groups) at L2 or ECMP (Equal Cost Multi Pathing) at L3 is a standards based and scalable approach for uncompromised cloud networking.

Pillar 2: Single-image L2/3 control plane: Arista EOS provides a modular, database centric, open network operating system with industry standard tools for configuration and management. EOS combined with hardware-optimized functions delivers the most scalable and available network operating system designed for advanced network operations.

Pillar 3: Network-wide Virtualization: By decoupling "the physical infrastructure" from applications, network-wide virtualization expands the ability to fully optimize and amortize compute and storage resources with bigger mobility and resource pools.

The need for larger mobility domains across a layer 3 network within these virtualized domains requires a tunneling approach and external APIs in which external controllers can define the forwarding path. Arista and other industry leaders are leading efforts in both VXLAN and NV-GRE to provide the tunneling mechanisms to achieve this necessary mobility. These technologies are providing the conceptual disaggregation of the physical network topology from virtual machine mobility.

Cloud networking requires an appropriate networking software foundation (such as Arista EOS) using well-defined and open controller APIs. This facilitates communication between the network switches centrally, and external controllers, thus allowing higher layer provisioning and automation systems to determine the mobility and forwarding domains of the applications within the cloud.

Pillar 4: Single Point of Management: Single Point of Management is about coordinating the configurations across multiple otherwise-independent switches. Arista's CloudVision™ is a good standards-based example of using standard messaging methods or APIs to provide the configuration and orchestration across multiple Arista devices.

What is clear is that cloud networking requires an appropriate networking software foundation (such as Arista EOS) using well-defined and open controller APIs. This facilitates communication between the network switches centrally, and external controllers, thus allowing higher layer provisioning and automation systems to determine the mobility and forwarding domains of the applications within the cloud. The network becomes far more harmonious with the cloud virtualization and resource optimization tools.

Implementing a Joint Solution with Arista and F5

Let's see how a joint solution between Arista and F5 will work in a customer scenario.

ACME Corporation is a \$10B financial service organization that has data centers in three locations: Phoenix, and a metro data center pair in Dallas and Ft. Worth. The company has achieved 70% server virtualization and has created their own private cloud in each data center to allow for the instant provisioning of new virtual machines and application servers through the use of a self-service portal accessible by any IT staff member or by the orchestration system.

ACME's quote system is accessed both by internal sales associates and by customers via the Internet. Due to the massive scale of the customer base, there are many times throughout the day where dramatic increases in traffic can impact the overall business application performance and degrade the user experience. ACME is reluctant to add permanent capacity due to high hardware and licensing costs associated with the application stack.

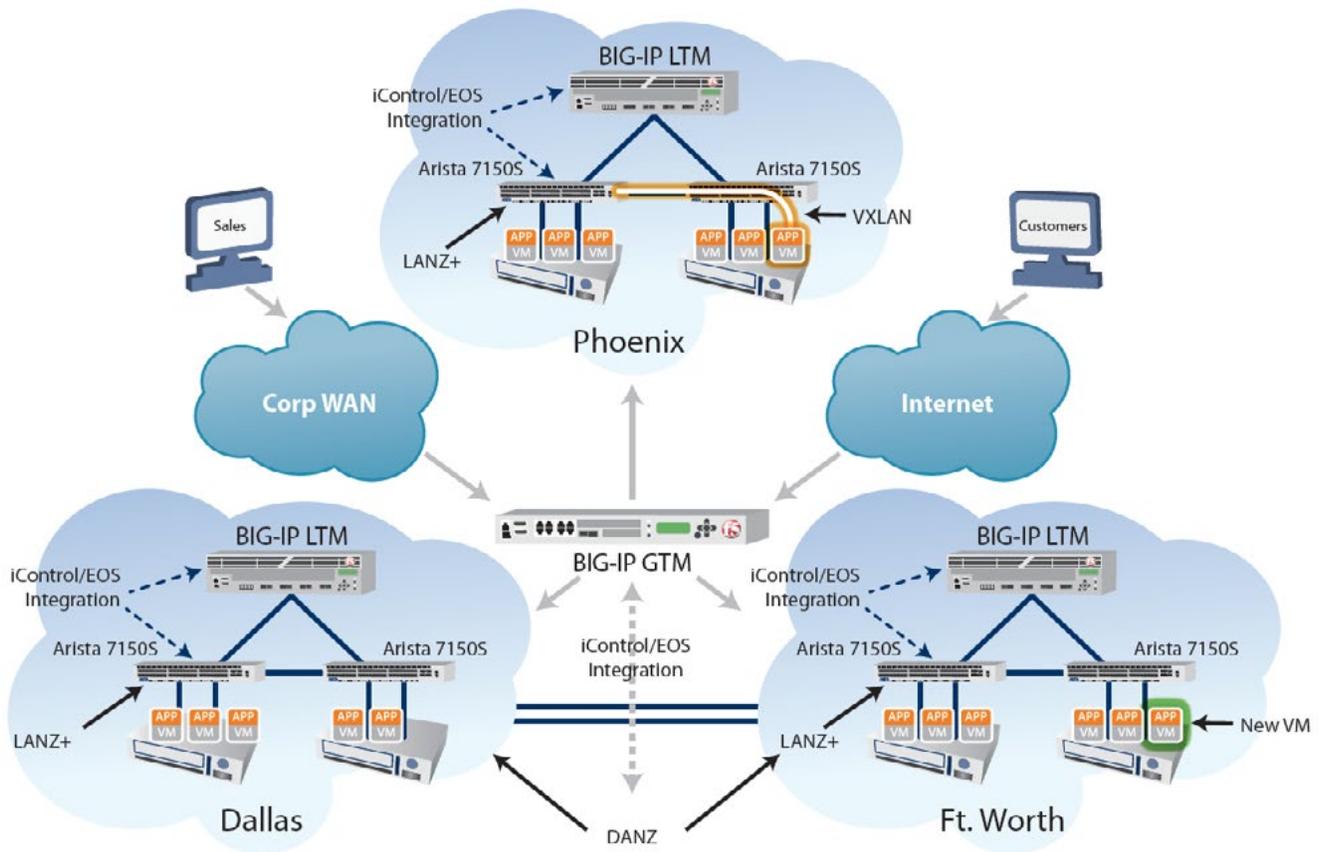
During peak traffic periods, user response time can degrade rapidly. ACME leverages diagnostic information from Arista's Latency Analyzer (LANZ+) to evaluate buffer statistics to determine when microbursts of network congestion are occurring. ACME also leverages the iControl API within BIG-IP LTM to evaluate the overall health of the applications including visibility into the physical and logical network infrastructure through integration with Arista's EOS.

As the network buffers begin to fill, EOS can signal iControl in order to more effectively balance the increased load across the pools of private cloud servers. This will prevent immediate degradation of the user experience. When the application demand is greater than the currently available servers, iControl can signal ACME's orchestration system to begin launching additional application instances in the private cloud.

The orchestration system will provision new application instances and if necessary move existing application instances to less-used virtual machines. In order to achieve seamless stateful movement of these virtual machines, the orchestration

system will leverage Arista's VXLAN to provide hardware virtual tunnel endpoints (VTEPs) within the Arista switches at the source host of the VM and its new destination host without needing to change its IP Address. This permits the transparent movement of the workload to a less utilized physical server improving the user experience.

EOS in conjunction with F5's iControl can also provide statistical micro-second utilization of the network interconnect between the Dallas and Fort Worth data centers. Utilizing Arista's Data analysis (DANZ) functionality, microburst congestion can be recognized between the data centers and the load balancing mix can be adjusted on the BIG-IP GTM to redirect traffic to utilize capacity in the Phoenix data center or even the public cloud based upon ACMEs business policy.



Working closely as technology partners, Arista Networks and F5 enable IT organizations to easily manage ADN policies and take advantage of the underlying layer 2/3/4 programmability and hardware abstraction within the network.

Conclusion

Working closely as technology partners, Arista Networks and F5 enable IT organizations to easily manage ADN policies and take advantage of the underlying layer 2/3/4 programmability and hardware abstraction within the network. This will lead to more efficient scale and greater programmability and availability of the infrastructure. F5 and Arista will enable mobility within the data center through technologies such as VXLAN. In addition, the F5/Arista partnership will create standard connections between F5's iControl and Arista's EOS to further enable visibility, agility, and availability of applications as they traverse the network. The net effect will be more efficient and available enterprise business applications.

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