Accelerating VMware NSX Traffic Across the WAN with Silver Peak

AeroData Customer Profile

AeroData, Inc. offers aircraft performance, runway analysis, and weight and balance data to the airline industry to support approximately 16,000 flights per day. Growing customer demand has prompted AeroData to develop a more efficient and flexible architecture as an alternative to their existing hardware-defined data centers. The resulting VMware NSX solution provides AeroData with a modern software defined network (SDN) solution, which has improved customer access to AeroData data centers and improved availability to 99.999%, while also reducing cost and minimizing management overhead.

AeroData provides critical flight data. Just five minutes of downtime can result in over 100 delayed flights. To deliver that degree of high availability, AeroData established data centers in three locations across Arizona and Colorado. In addition, AeroData has invested in multiple circuit providers (MPLS and Internet) to ensure continuous access to its data centers in the event of circuit failures. While data responsiveness is critical to its customers, AeroData also needs to ensure that the data is protected to meet federal guidelines.

AeroData Challenges

AeroData's rapid growth brought with it the challenge of meeting increasing customer demands and adhering to federal guidelines. Providing network redundancy across three data centers utilizing multiple network service providers (MPLS and Internet) was a daunting task. On top of that, the ability to offer VMware NSX based virtualized network redundancy created additional challenges due to the need to transport various types of traffic with varying packet sizes over the WAN.

AeroData also needed to move large virtual servers between data centers reliably and efficiently. Without the Silver Peak WAN optimization solution, migrating virtual servers between data centers took several hours, impacting overall network bandwidth and causing delays.

Silver Peak Solution

Silver Peak VX virtual WAN Optimization software provides four capabilities that enabled AeroData to improve its application availability:

- VX WAN Optimization software creates secure IPsec network tunnels that carry traffic between data centers simultaneously across both the Internet and MPLS WAN links, providing failover and redundancy across network service providers. In this active-active configuration, if a WAN circuit goes down, the Silver Peak VX devices instantly move sessions off the failed link and onto the remaining active link(s). This allows continuous network operations across the data centers without impacting the applications. Such failover is essentially hitless and transparent to both users and applications that utilize cross-datacenter circuits.

- Network traffic generated by VMware NSX VXLAN Tunnel Endpoints (VTEP) uses VXLAN encapsulation headers which produce frames that exceed the standard 1500 byte MTU limit for WAN services (VMware recommends a default MTU of 1572 bytes). Because Silver Peak VX manages its own IPsec tunnels across the WAN, it is able to transparently fragment

Building a Better WAN

and reassemble the NSX jumbo frames, enabling transport across standard Internet or MPLS WAN services. This capability has enabled AeroData to stretch networks between data centers without relying on traditional technologies such as bridging. Using this feature, AeroData achieved greater flexibility in its application deployment across three sites to maximize application availability.

- Silver Peak VX software performs sophisticated optimization across the Internet and MPLS links, including compression, deduplication and latency mitigation of all traffic traversing the WAN. Using Silver Peak WAN optimization, AeroData achieved a 78% reduction in bandwidth utilization between data centers, along with faster packet transfer. For example, a VMware vMotion of a virtual server from one data center to another, which previously took hours to finish, now

Accelerating VMware NSX Traffic Across the WAN with Silver Peak

requires less than an hour to complete due to the WAN optimization delivered by VX software.

• Silver Peak provided a Policy-Based Routing (PBR) capability that enabled AeroData to improve its network operations, while at the same time using a smaller number of hardware appliances. Without PBR, AeroData would have to purchase additional hardware equipment to service its needs.

VMware NSX and Silver Peak Design

Policy Based Routing for VTEP Traffic
AeroData and VMware Professional Services Organization engaged SPJ Solutions and Silver Peak to build an integrated solution with VMware NSX and Silver Peak VX software

The following diagram shows the high-level network design using VMware NSX and Silver Peak VX virtual WAN Optimization software.

ESXi – VMware's hypervisor that enables virtualization of servers.
vCenter – VMware's management product that allows managing virtual machines across multiple ESXi hypervisors.
NSX Manager – VMware's Network and Security management product that managed NSX components, such as Edge Services Gateway, Distributed Logical Router, Logical Switches and Distributed Firewall.
DVS – Distributed Virtual Switch, a component of vCenter, which offers switching capabilities to the virtual machines. Distributed Virtual Switches utilize physical network interface cards (NIC) to connect to a physical switch. Virtual machine traffic goes through the distributed virtual switch, which runs on ESXi hypervisor. When NSX is deployed into ESXi hosts, the distributed virtual switch transmits VXLAN traffic across ESXi hosts, offering virtual subnets across ESXi hosts.
Silver Peak Tunnel – A network path created between two data centers using backend circuits, i.e. MPLS and Internet. The VX virtual WAN Optimization software creates multiple tunnels to enable WAN circuit failover and redundancy. Tunnels are secured with AES-256 bit encryption to ensure data protection across Internet links. Note: For simplicity, the figure shows only a single WAN cloud "MPLS" with a single tunnel; the AeroData deployment also included Internet-based tunnels between the data centers.
NSX Cluster – A VMware cluster enabled to perform NSX operations such as logical switching, routing and firewalling. A cluster consists of multiple ESXi hypervisors running on physical servers. In a clustered configuration, the ESXi hypervisors work in sync to provide high availability to the virtual machines.
VTEP PG – A port group automatically created and configured on a Distributed Virtual Switch when it is configured for NSX. A port group enables segmentation of traffic across groups virtual machines while utilizing same physical NICs.
Silver Peak PG – A port group manually created and configured on a Distributed Virtual Switch for Silver Peak virtual machines. NOTE that this port group must be created on a separate distributed virtual switch that is not enabled for NSX. Essentially, VTEP PG and Silver Peak PG must be on separate distributed virtual switches.
Virtual Machines – The diagram also shows VM1, which represents any virtual machines running on NSX cluster and Silver Peak, which is a virtual machine provided by Silver Peak.
L2 Switch and Router – Represent physical appliances responsible for carrying traffic across the data centers.
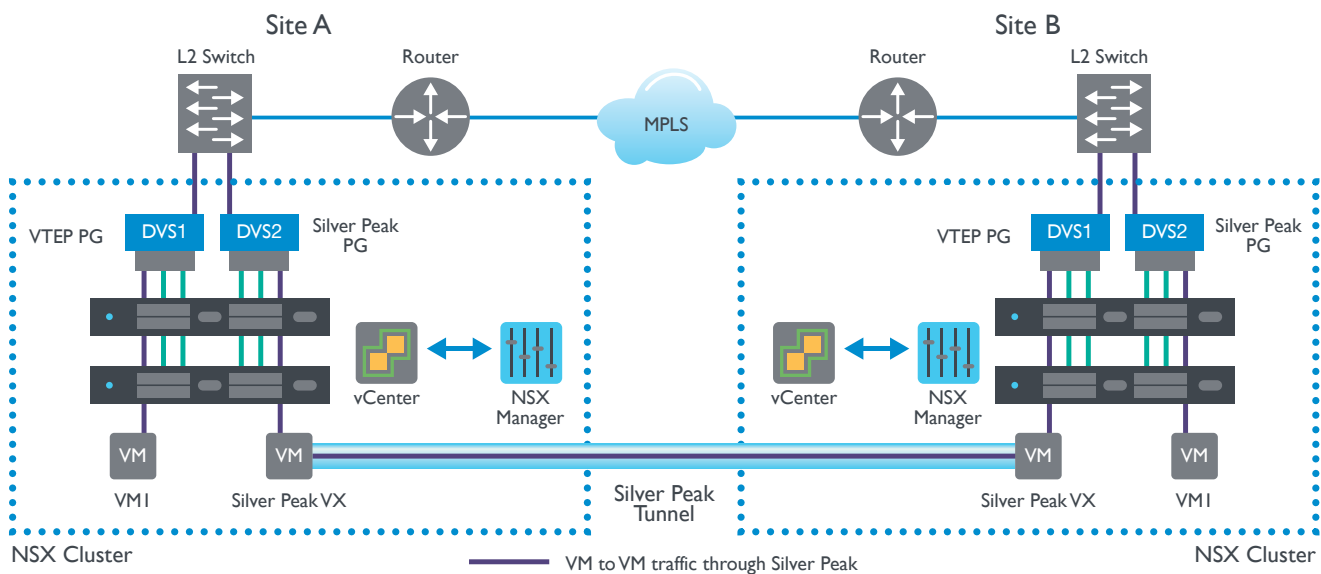
Accelerating VMware NSX Traffic Across the WAN with Silver Peak

WAN Acceleration

Virtual machines running on NSX virtual networks can be moved via vMotion from one data center to another across Silver Peak tunnels. The VX virtual WAN optimization software capabilities deliver as much as an 80% reduction in bandwidth usage. The following screenshot was captured from AeroData's live environment, which shows bandwidth reduction of 78.6%. This allowed vMotion to effectively access up to 5x more bandwidth than the raw capacity of the physical MPLS and Internet links. Multiple WAN services can be load-balanced (active-active) to leverage all available bandwidth, and the Silver Peak integrated WAN optimization software maximizes performance across the WAN.

Extending NSX Performance Securely Across the WAN

Silver Peak VX virtual WAN optimization software enable organizations like AeroData to extend VMware NSX performance between data centers. Using the Silver Peak WAN optimization software, AeroData achieved a 78% reduction in bandwidth between data centers, significantly faster vMotion completion times across the WAN and improved availability to 99.999%. Because the Silver Peak VX virtual WAN optimization software encrypts all paths across the WAN, the solution helps ensure that AeroData meets federal security guidelines. The ability to reliably incorporate broadband internet in the complement of transport services utilized reduced ongoing WAN bandwidth costs.

SPJ Solutions, VMware, and Silver Peak Partner to Meet AeroData's High Availability Challenge

AeroData's network modernization project was complex as it included integration of VMware NSX, Silver Peak, and several other products to provide 99.999% availability to its customers. SPJ Solutions, an IT SDN solutions company and delivery partner of VMware, provided architecture, planning, deployment, performance management, and support of AeroData's VMware NSX and Silver Peak environment. SPJ Solution's extensive experience with VMware and Silver Peak WAN Optimization products greatly contributed to the success of AeroData's high availability initiative.

888.598.7325 | www.silver-peak.com