DATA CENTER

Silver Peak NX Appliances and the Brocade 7500 Extension Switch

Silver Peak NX appliances complement the Brocade 7500 by overcoming common WAN challenges that can adversely impact distance strategies in the data center.

BROCADE

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THE ROLE OF WAN ACCELERATION IN DISTANCE EXTENSION

The Brocade® 7500 Extension Switch is a leading Fibre Channel (FC) switching and routing solution for remote storage and Storage Area Network (SAN) connectivity. It integrates best-in-class capabilities, such as Fibre Channel Routing, Storage-Optimized TCP, hardware-based compression, write and read acceleration for disk and tape, IP Security (IPSec) encryption, and Adaptive Networking services to deliver a high-performance, highly reliable, secure distance extension solution. This makes the Brocade 7500 strategic across a variety of IT initiatives, including business continuance, site mirroring, replication, and data migration across virtually unlimited distances.

Silver Peak NX appliances complement the Brocade 7500 by overcoming common Wide Area Network (WAN) challenges that can adversely impact the strategic tasks associated with distance extension. More specifically, Silver Peak overcomes bandwidth, latency, and packet-loss problems across the WAN to maximize data throughput and enhance the performance and reliability of data replication and disaster recovery—all of which ensures fast access to storage devices.

THE BENEFITS OF A SILVER PEAK-BROCADE SOLUTION

The Brocade 7500 uses advanced networking technologies, data management techniques, protocol intelligence, and hardware assistance to accelerate disk and tape operations over distance. It features 16 FC ports and two 1 Gigabit Ethernet (GbE) ports, delivering high performance to run storage applications at line-rate speed with either protocol. The Brocade 7500 meets the advanced requirements of:

- Delivers the following to enterprise data centers: consolidation, data mobility, business continuity/disaster recovery, and new regulatory and business mandates
- Combines FCIP extension with Fibre Channel switching and routing to provide local and remote storage and SAN connectivity, while isolating SAN fabrics and IP WAN networks
- Optimizes application performance with features such as Fast Write, Brocade accelerator for FICON (including emulation and read/write Tape Pipelining), and hardware-based compression
- Maximizes bandwidth utilization with Adaptive Networking services, including Quality of Service (QoS) and traffic isolation, trunking, and network load balancing
- Enables secure connections across IP WANs through IPSec encryption
- Interoperates with Brocade switches, routers, and the Brocade DCX® Backbone, enabling new levels of SAN scalability, performance, and investment protection

Used in diverse SAN extension use cases, the platform delivers a unique feature set to mitigate distance latency effects and optimize performance, even when faced with challenging WAN environments:

- Primary data center SANs connected to secondary data center SANs and/or disaster recovery SANs over WAN, while isolating each SAN from WAN disturbances and outages in other SANs
- Hardware-based compression for efficient use of limited bandwidth
- Extensive port buffering capabilities for high-latency and high-packet-loss environments
- Storage-optimized TCP optimizes the congestion control and lost or out-of-order packets recovery to maximize throughout of storage applications
- Scalable fan-in of multiple distant SANs—eight virtual FCIP tunnels per port enable the most cost-effective use of expensive GbE ports at a central disaster recovery site
- Write and read acceleration for disk and tape (FastWrite and Tape Pipelining) for both Open Systems and FICON over IP or native FC WANs. These acceleration technologies maximize performance of

synchronous and asynchronous replication and tape backup applications and minimize throughput degradation due to long-distance latency

Silver Peak complements the Brocade 7500 with the following WAN optimization capabilities:

Network Integrity. Silver Peak provides a variety of real-time optimization techniques to "clean up" the WAN for better effective throughput. Forward Error Correction (FEC) rebuilds lost packets on the far end of a WAN connection, and Packet Order Correction (POC) ensures that all packets are delivered in the order they were sent. Both of these Network Integrity features address packet delivery errors without requiring costly re-transmissions, resulting in maximum SAN performance across Multiprotocol Label Switching (MPLS), IP Virtual Private Networks (VPNs), and other shared WAN environments.

Advanced QoS services can prioritize traffic and guarantee that necessary bandwidth requirements are met. Silver Peak can honor existing traffic management policies created as part of the Brocade 7500 Adaptive Networking services or create new tags that leverage up to 10 different QoS classes within Silver Peak devices. This makes Silver Peak a perfect complement to the QoS policy capabilities in Fabric OS® (FOS) running on the Brocade 7600.

Network Memory. Silver Peak uses disk-based deduplication to eliminate the transfer of duplicate information sent across the WAN during the replication process. By working at the byte level, Silver Peak typically delivers an additional 60 to 90 percent more virtual bandwidth for data replication and remote SAN access. This is in addition to the compression capabilities offered natively in the Brocade 7500 which provide maximum performance and bandwidth savings. (NOTE: the best results are achieved when compression is disabled in the FCIP device upstream of the Silver Peak appliances. This enables Silver Peak's compression and data reduction capabilities to reach their maximum potential and enables larger Maximum Transmit Rates (MTR) on the Brocade 7500 for greater end-to-end throughput.)

The Silver Peak solution has the advantage of performing compression and deduplication on all IP traffic traversing the WAN (storage + other business applications). With visibility into all the traffic going into and out of a single office, Silver Peak delivers optimal performance when SAN traffic shares the WAN with other enterprise applications.

Network Acceleration. TCP acceleration helps to overcome latency between source and target locations. By adjusting the TCP window size and performing selective acknowledgements, Silver Peak Network Acceleration techniques mitigate the impact of latency on long-distance replication. Network Acceleration works on all TCP traffic going across the WAN, not just on SAN traffic. Therefore, it is often required even when the Brocade Optimized TCP functionality is used. In addition, Network Acceleration works in conjunction with Silver Peak Network Integrity technology. As a result, it is recommended that they are used together when WAN connections are experiencing both high latency and packet loss.

Data protection. Silver Peak has the option of performing real-time IPSec between appliances to protect data sent across the WAN. In addition, wirespeed AES encryption is used to protect all data stored on Silver Peak devices.

The Brocade 7500 has its own native IPSec encryption capabilities. However, if at all possible you should not enable encryption upstream of a WAN optimization device. Upstream encryption prevents the WAN optimization devices from having full visibility into payload information, which minimizes their ability to utilize any of the optimization techniques described above.

Visibility. Silver Peak provides real-time and historical analysis of WAN performance, including detailed reports on bandwidth, latency, and packet loss. With Silver Peak, IT administrators can monitor the performance of all IP traffic traversing the WAN and export key information to third-party systems using Netflow. This makes Silver Peak management tools an effective complement to Brocade SAN analysis capabilities.

DEPLOYMENT

Silver Peak NX appliances seamlessly integrate into Brocade environments. They are placed in each customer site participating in the replication process, sitting between the Brocade 7500 Extension Switch and the WAN router, as shown in Figure 1. Deployment can be in line, whereby Silver Peak NX appliances are inserted between the WAN router and the FCIP device. Or Silver Peak appliances can be deployed out of path, whereby traffic redirection techniques such as Web Cache Communication Protocol (WCCP), Policy-Based Routing (PBR), and Virtual Redundancy Router Protocol (VRRP) are used to forward traffic from the router to the appliance.

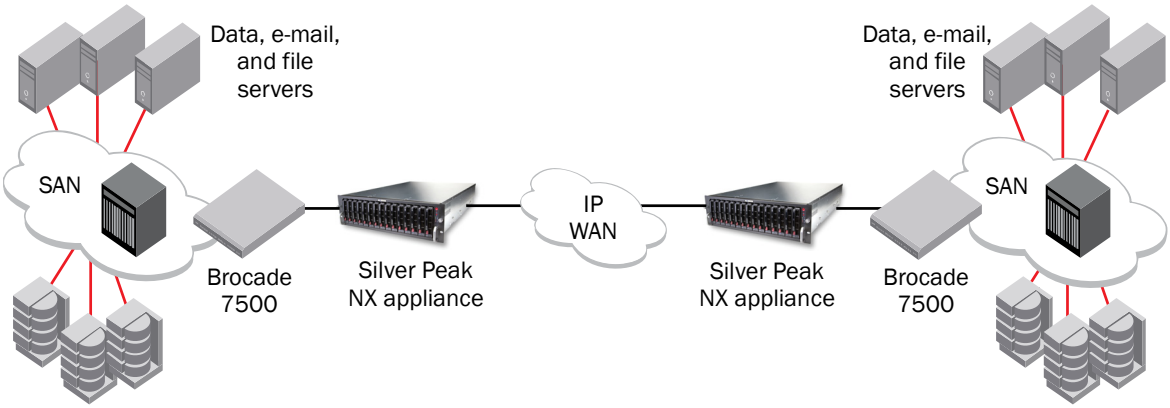

Figure 1. Distance extension solution with Brocade and Silver Peak

Brocade Data Center Ready

Silver Peak NX appliances have completed the Brocade Data Center Ready certification. This means that the Silver Peak solution has been extensively tested and verified by Brocade for compatibility with Brocade-based Storage SAN infrastructure, according to the testing requirements of the Brocade Data Center Ready Program (visit http://www.brocade.com/compatibility).

Brocade Data Center Ready

Why Brocade?

Brocade has a long history of market leadership in remote storage networking. It has a robust product portfolio to meet the needs of enterprises of all sizes. Its widely respected services and support help customers ensure success in deploying data center solutions. Businesses worldwide recognize Brocade as a leader in SAN infrastructure and data protection solutions. As a result, Brocade has more deployments than any other SAN vendor.

The Brocade 7500 Extension Switch offers the following unique advantages.

- Superior performance for both FC routing and FCIP:
  - Industry's most resilient and robust extension solution for mainframe and open systems business continuance and global data mobility
  - Industry-leading performance for disk write and tape read and write over any distance
  - Greatest flexibility for placement of FICON and FC resources anywhere in the world

- SAN investment optimization and protection:
  - Fully compatible with existing Brocade storage network implementations, leveraging both the hardware and the knowledge investment.
  - Implements the same valuable Brocade Advanced Fabric Services to extend the benefits end-to-end over long distance
  - FC routing and Brocade Advanced Zoning to permit only authorized devices and applications to access data, thereby increasing security and control
  - Adaptive Networking with QoS for SAN performance optimization
  - Same familiar Brocade Fabric OS and SAN management tools to operate and manage distance extended SAN network for simplified administration

Why Silver Peak?

Silver Peak provides a variety of WAN optimization techniques to optimize and accelerate all asynchronous data replications across the WAN. In Brocade environments in particular, Silver Peak offers the following unique advantages:

- The best performance across the WAN (maximum throughput, minimum latency) on all IP-based backup and replication solutions, including the EMC RecoverPoint family, Symmetrix Remote Data Facility (SRDF)/A and /AR, and MirrorView; NetApp SnapVault and SnapMirror; Compellent, Double-Take, and others
- The only WAN optimization vendor to correct lost and out-of-order packets in real time
- A full product portfolio, scaling from 2 Mbit/sec to 1 Gbit/sec WAN throughput
- Real-time IPSec encryption for all data sent across the WAN

This translates into the following advantages for Silver Peak and Brocade customers:

- Improved Recovery Point Objective (RPO) and Recovery Time Objective (RTO)
- Reduced WAN bandwidth costs
- Better replication performance
- Farther distances between disaster recovery facilities