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Long-Distance Read and Write Tape Pipelining with Sun StorageTek™ Virtual Storage Manager® System and McDATA UltraNet™ Channel Extension Solutions

Solution Synopsis

The Sun StorageTek™ Virtual Storage Manager® 5 (VSM 5) system is the industry's leading virtual tape solution for large-scale mainframe data protection infrastructures. In addition to unmatched scalability, cost control, and availability, VSM 5 supports FICON, for high-speed connectivity between multiple virtual tape subsystems and automated cartridge systems (ACS). Combining VSM 5 with the high-speed tape pipelining features of the McDATA UltraNet channel extension solutions allows FICON connectivity to be extended over long-distance IP networks. This joint Sun McDATA solution is ground-breaking. For the first time, remote physical and virtual FICON tape cartridges can benefit from write and read acceleration, matching long-distance device performance to that of local tape access.

Extending the FICON Channel

For most enterprise applications, backup and recovery processes continue to play a significant role as the first line of defense against data loss during a system outage or disaster. With downtime at the largest organizations frequently measured in hundreds of thousands of dollars per minute, speed of access to backup data is critical, no matter where the data is located.

Virtual tape solutions have become an essential component of the enterprise IT environment. Providing a consistent front-end to the physical tape infrastructure and a high-speed disk cache for fast backup processing, virtual tape solutions offer substantial scalability, availability, and cost advantages over physical tape. For restore processes, disk access can help to address the need for faster application recovery. If backup data exists on disk, restore processing eliminates the mount and locate delays associated with accessing tape and benefits from fast disk transfer speeds. However, if the data needed for a recovery has been migrated offsite, either to another virtual tape device or to physical tape, access can be considerably slower.

FICON extension technology is commonly used with virtual tape solutions for access to channel-attached devices located thousand of miles away in remote data centers. With accelerated write technology, FICON extension solutions can stream backup data across the wide area network. Although this write pipelining functionality has existed for some time, vendors have yet to offer the same benefits for read processing. As a result, jobs that read data from remotely located FICON-attached devices are often much slower than those that write the data.

High-Speed Read Pipelining

The need for fast access to information held at remote data centers is not just a problem for enterprise business continuity. For industries subject to government and corporate data retention regulations that stipulate acceptable forms of long-term storage, speed of access to archived data is often a compliance issue.

Although, up until now, long-distance FICON acceleration has been limited to write processing, one vendor has been working diligently to overcome this restriction. Now, with the introduction of the latest release of the UltraNet™ platform, McDATA is the first vendor to offer read pipelining over the long-distance extended FICON channel.

This new functionality changes the dynamics of the enterprise data protection infrastructure. Combining the accelerated read and write capabilities of UltraNet platform with market-leading virtual tape functionality from Sun Microsystems, remote channel-attached resources can now be written and read as fast as the network capacity allows.

THE SUN STORAGETEK™ VIRTUAL STORAGE MANAGER AND MCDATA ULTRANET™ PLATFORM

The Sun StorageTek™ VSM 5 is the market-leading virtual tape solution for large mainframe environments, offering almost twice the throughput of the Sun VSM 4 solution, and double the maximum effective capacity. With a high-speed virtual disk buffer and policy-driven migration to back-end physical tape devices, VSM 5 reduces backup and recovery time, delivering unmatched performance for the enterprise tape infrastructure.

VSM 5 addresses many of the most challenging problems facing the data protection environment. Providing a single point of control for up to 256 virtual tape storage subsystems (VTSS), each of which supports up to 256 virtual tape drives (VTD) and an unlimited number of virtual tape volumes (VTV), VSM 5 has the capacity and scalability to manage the largest tape infrastructures. Substituting virtual drives for physical, VSM 5 eliminates tape contention, allowing more backup jobs to run concurrently, resulting in a much shorter backup window.

Using compression and volume stacking technology, VSM 5 optimizes physical tape media usage, enabling dramatic consolidation of existing tape infrastructure components. With a smaller footprint to manage in the data center and significant automation through user-defined policies, VSM 5 substantially lowers capital and labor costs.

Long-Distance FICON Connectivity

VSM 5 relies on FICON for high-speed connectivity between mainframe servers and downstream components of the enterprise data protection environment. Using the McDATA UltraNet FICON extension platform for communication between local and remote data centers, VSM 5 improves tape application performance, supports a wide variety of flexible disaster recovery configurations, and delivers bi-directional clustering for high-availability.
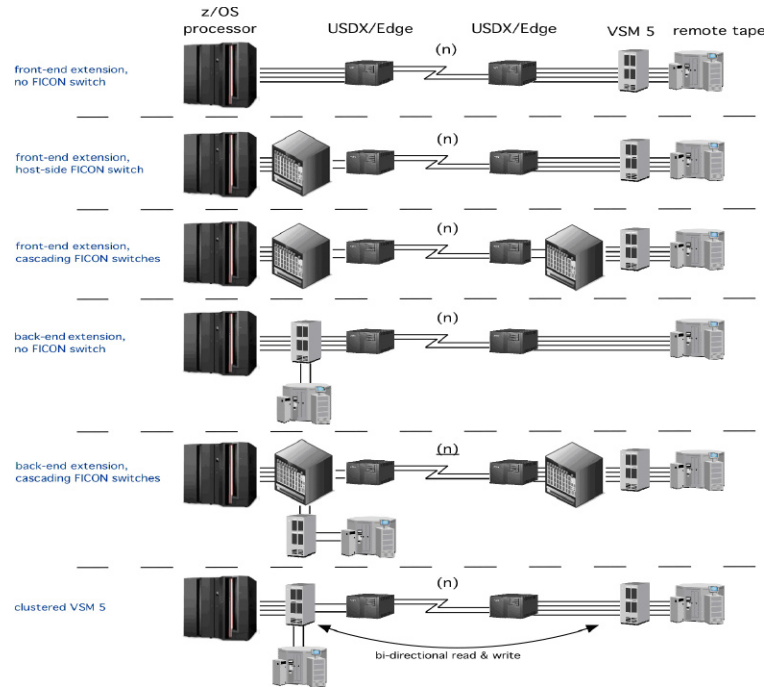
Figure 1. Example configurations of McDATA UltraNet platform and Sun VSM 5.

Pipelined Tape Write and Read Processing

McDATA is the only storage networking vendor to offer accelerated write and read tape processing over long-distance FICON networks. By emulating FICON channel, control unit, and devices, the UltraNet platform eliminates excess traffic and mimics long-distance protocol handshakes locally, to speed the streaming of tape data over the network.
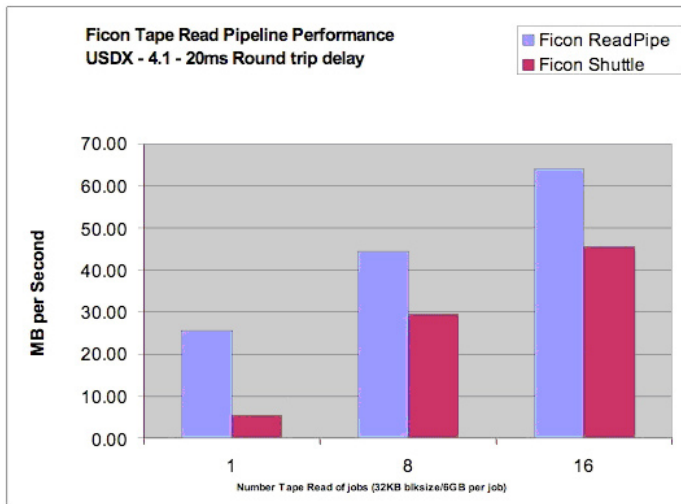

Figure 2. McDATA UltraNet read pipelining increases extended FICON throughput, delivering scalable performance.

With conventional communications, data is moved across the FICON channel using a logical flow control method called Information Unit (IU) pacing. IU pacing controls how much data is sent to a remote device before the device sends an acknowledgement that the data was received. As the distance between the local and remote devices grows, data takes longer to travel across the network and the time between a send and an acknowledgment increases. This process limits the carrying capacity of the network, regardless of how much bandwidth is actually available.

Using store and forward techniques common to other McDATA extension solutions, the UltraNet platform emulates read and write communication sequences and channel program handshakes in the long-distance FICON network. These processes eliminate the impact of IU pacing on device performance and exclude unnecessary control traffic from the network. The sophisticated emulation capabilities of the UltraNet platform remove the limits on long-distance FICON connectivity, allowing full use of available network bandwidth for streaming data between local and remote data centers.
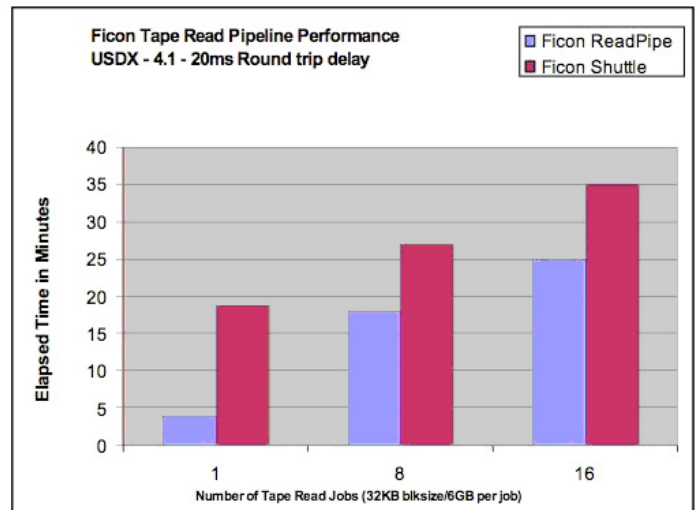

Figure 3. McDATA UltraNet read pipelining reduces recovery job elapsed time.

McDATA and Sun: Supporting High-Performance Long-Distance Tape Infrastructures

The long-distance FICON write and read acceleration capabilities of the McDATA UltraNet platform are blurring the distinction between local and remote storage devices in the enterprise IT infrastructure. With access to archived information no longer limited by distance, more flexible responses to business continuity and the long-term storage of data are possible.

The Sun StorageTek™ VSM 5 system delivers the ultimate in data protection infrastructure performance and flexibility. Providing a single point of control and a consistent interface to physical resources existing almost anywhere, VSM 5 gives administrators the means to manage a diverse tape environment, with the performance and capacity to scale to meet future needs.

Combining VSM 5 with the high-speed extended FICON connectivity of the McDATA UltraNet platform allows FICON-attached devices from any location to be treated as if they were local. As the market-leading vendor of FICON director solutions, with over 25 years experience delivering enterprise storage networking solutions, McDATA is the clear choice for mainframe IT environments deploying VSM 5 systems in the tape infrastructure. Together, Sun and McDATA deliver scalable performance and capacity to the enterprise data protection and networking infrastructures unmatched by any other vendors.

[Body Head 1] Solution Benefits Summary

DBA requirement	Benefits
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