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Brocade Tape Pipelining with Oracle's StorageTek Virtual Storage Manager

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Executive Overview

Brocade's extension solutions allow FICON connectivity to be extended over long-distance IP networks. This provides disaster protection by enabling backup data to be located thousands of miles away. Combining Oracle's StorageTek Virtual Storage Manager 5 (VSM5) with Brocade's high-speed tape pipelining features helps mainframe customers meet their shorter recovery time objectives by dramatically reducing backup and restore times. High availability and disaster recovery solutions like backup and restore, data migration and electronic vaulting can involve replication across very long distance links; synchronous replication supports long distance by using channel extension and the Brocade extension products.

Introduction

The StorageTek Virtual Storage Manager 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, VSM5 supports FICON for high-speed connectivity between multiple virtual tape subsystems and Automated Cartridge Systems (ACS). Combining VSM5 with the high-speed tape pipelining features of the Brocade FICON extension solutions allows FICON connectivity to be extended over long-distance IP networks. This joint Oracle -Brocade solution helps customers meet shorter recovery time objectives by dramatically reducing backup and restore times. It also improves disaster protection by enabling backup data to be located thousands of miles away. Remote physical and virtual tape cartridges can benefit from read/write FICON acceleration, matching long-distance device performance to that of local tape access.

Brocade's FX8-24 Extension Blade, the industry's first 10 Gigabit Ethernet (GbE) SAN extension solution (also supports 1GE), accelerates and optimizes replication, backup, and migration over any distance using next-generation Fibre Channel (FC) and Fibre Channel over IP (FCIP) networking technology. Designed for the Brocade DCX Backbone family, Brocade FX8-24 blades combine class-leading performance and reliability, "pay-as-you-grow" scalability, and flexible deployment options to address the most demanding disaster recovery, compliance, and data mobility requirements.

The Brocade 7800 Extension Switch accelerates and optimizes replication, backup, and migration over any distance using next-generation FC and FCIP networking technology. Brocade 7800 switches combine class-leading performance and reliability, "pay-as-you-grow" scalability, and flexible deployment options to address the most demanding disaster recovery, compliance, and data mobility requirements.

Extending the FICON Channel with Write Pipelining

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 down-time 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. Offering 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 thousands of miles away in remote data centers. Using accelerated write technology, FICON extension solutions stream backup data across the network, delivering similar performance to local tape access. Although write pipelining functionality has existed for some time, some vendors have yet to offer the same benefits for read processing. As a result, retrieving data from FICON-attached devices at a remote data center is often a slow process.

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.

Brocade was the first vendor to offer products providing both read and write pipelining over the long-distance extended FICON channel. This functionality changes the dynamics of the enterprise data protection infrastructure. Combining the accelerated read/write capabilities of Brocade 7800 Extension Switch and the FX8-24 Extension Blade (for the DCX Backbone or DCX-4S Backbone) with market-leading virtual tape functionality from Oracle, remote channel-attached resources can now be written and read as fast as local devices.

Oracle's StorageTek Virtual Storage Manager

The StorageTek VSM5 is the market-leading virtual tape solution for large mainframe environments. Offering almost twice the throughput of the Oracle's mid-range VSM4 solution, and double the maximum effective capacity, the VSM5 delivers unmatched performance for the enterprise tape

infrastructure. With a high-speed virtual disk buffer and policy-driven migration to back-end physical tape devices, the VSM5 reduces backup time and speeds recovery.

The VSM5 addresses many of the most challenging problems facing the enterprise tape infrastructure. Offering 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), the VSM5 has the capacity and scalability to manage the largest data protection environments. Substituting virtual drives for physical, the VSM5 eliminates tape drive contention, allowing more backup jobs to run concurrently, resulting in a much shorter backup window.

Compression and volume stacking capabilities enable the VSM5 to optimize 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, the VSM5 can significantly lower capital and labor costs.

Long-Distance FICON Connectivity

The StorageTek VSM5 relies on FICON for high-speed connectivity between mainframe servers and downstream components of the enterprise data protection environment. Using the Brocade FICON extension products for communication between local and remote data centers, the VSM5 improves tape application performance, supports a wide variety of flexible disaster recovery configurations, and delivers bi-directional clustering for high availability.

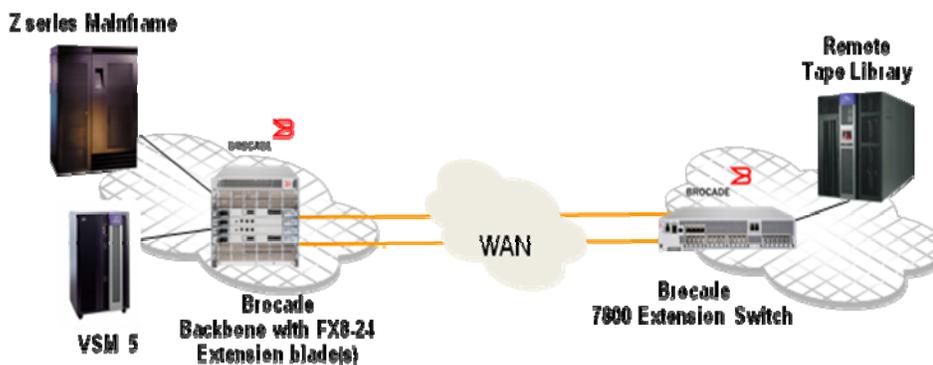


Figure 1. Example of VSM back-end FICON extension

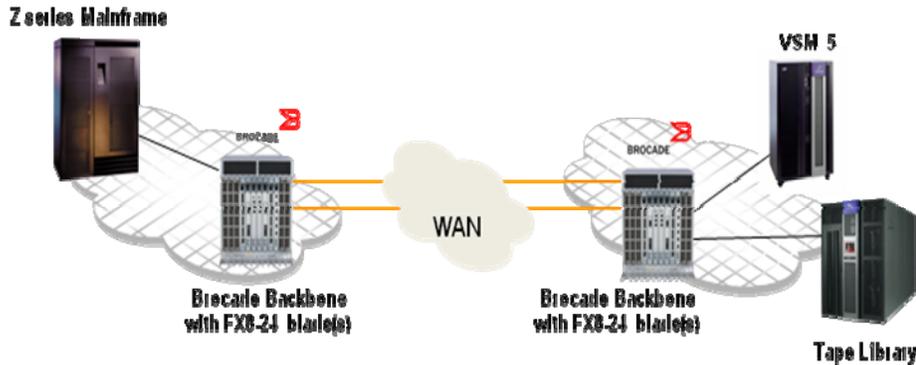


Figure 2. Example of VSM front-end FICON extension

Pipelined Tape Write and Read Processing

Brocade extension products provide accelerated write and read tape processing over long-distance FICON networks. By emulating the channel, control unit, and devices in the FICON channel, the Brocade 7800 Extension Switch and FX8-24 Extension Blade eliminate excess traffic and mimics long-distance protocol handshakes locally, to speed the streaming of tape data over the network.

With conventional FICON communications, data is moved across the 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.

The Brocade 7800 Extension Switch and FX8-24 Extension Blade emulate the FICON channel and control unit and adjust IU pacing so that the distance between the local and remote devices can be factored into the rate calculation. By setting IU pacing appropriately, the full bandwidth of the network is available to the FICON data stream and interruptions to the flow of information are eliminated. The Brocade FICON extension products also emulate each device, allowing FICON channel programs to run at local and remote ends of the network. This removes channel program handshakes from the wide area section of the network, speeding the communication process further.

Using innovative techniques to stream data across the extended network, the Brocade FICON tape pipelining enables improvements in data throughput of up to 200 percent and in overall backup and recovery performance by as much as 70 percent.

Brocade and Oracle: Supporting High-Performance Tape Vaulting Over Distance and Disaster Recovery

The long-distance FICON write and read acceleration capabilities of the Brocade FICON extension products 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 business continuity and long-term data protection solutions, such as remote tape vaulting, are possible.

Faster tape vaulting over distance allows companies to electronically transfer backup data to disaster recovery facilities rather than rely on physically transporting tape or on a courier service, thereby reducing the possibility of lost, damaged, or stolen tapes, and improving data security and availability. This architectural approach also allows companies to spread their storage infrastructure over multiple power grids and over greater distances, reducing the impact that any single data center outage or regional disaster might have on the entire network. High performance tape vaulting over distance allows customers to extend the affordability and reliability of tape to provide a robust and affordable business continuity solution for today's largest global companies.

Combining the StorageTek VSM5 with the high-speed extended FICON connectivity of the Brocade 7800 Extension Switch and FX8-24 Extension Blade products allows FICON-attached devices from any location to be treated as if they were local. As the market-leading vendor of FICON director solutions and with over 25 years experience delivering enterprise storage networking solutions, Brocade is the clear choice for mainframe IT environments deploying VSM5 systems in the tape infrastructure. Together, Oracle and Brocade deliver scalable performance and capacity to the enterprise data protection and networking infrastructures unmatched by any other vendors.



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Oracle Corporation
World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
U.S.A.

Worldwide Inquiries:
Phone: +1.650.506.7000
Fax: +1.650.506.7200
oracle.com



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