

# Disaster Recovery for IP Storage

## HIGHLIGHTS

- Moves more storage data between data centers to meet increasing disaster recovery objectives with industry-leading performance and scalability
- Encrypts storage data flows over distance without a performance penalty
- Provides load balancing and network resilience with Extension Trunking to increase Wide Area Network (WAN) utilization and protect against WAN link failures
- Consolidates Fibre Channel (FC), FICON, and IP storage traffic from heterogeneous devices for high-speed, high-availability, and secure transport between data centers
- Delivers holistic management over distance for greater control and insight
- Extends proactive monitoring between data centers to automatically detect WAN anomalies and avoid unplanned downtime

## Local Performance over Long Distance with Brocade IP Extension

IP storage is rapidly evolving to become a business-critical part of the data center infrastructure. With increasing amounts of data and the growing number of mixed workloads; disaster recovery solutions for IP storage are essential, yet recovery objectives remain difficult to achieve. The challenge is how to manage the amount of data that has to be replicated between data centers.

Existing solutions either cannot keep up, are not secure, or are not reliable enough for storage. IP storage arrays with native replication applications are not built to handle latency and packet loss. The Brocade® 7840 Extension Switch provides a purpose-built IP extension solution that delivers local performance at long distance—with strong encryption—for a comprehensive disaster recovery solution. It leverages Brocade WAN optimized TCP (WO-TCP) with TCP acceleration to help achieve the fastest replication speeds possible from IP storage devices and ensure in-order lossless transmission of IP extension data.

This enterprise-class solution enables storage and mainframe administrators to:

- Optimize and manage the use of WAN bandwidth
- Secure data over distance
- Minimize the impact of disruptions
- Maintain Service-Level Agreements (SLAs)

## IP Extension Technology Foundation

Brocade IP Extension technology is constructed on four foundational pillars: performance, security, availability, and operations. These pillars are paramount to every IT organization.

**Accelerated Performance:** Brocade IP extension solutions help to significantly increase the performance of IP storage applications across the WAN—even with encryption turned on. The more latency and packet loss between the data centers, the greater the gain. The Brocade 7840 boosts performance up to 50 times faster than native TCP/IP stacks, providing local performance over long distance. Such performance gains enable use cases that at one time were not feasible.

**Increased Security:** All data leaving the confines of a data center should be secured. The Brocade 7840 has a robust hardware-based IP security (IPsec) implementation, ensuring that security compliance requirements are met. A hardware-based IPsec implementation

encrypts data flows over distance without a performance penalty, allowing ultra-low added latency (5  $\mu$ s) and line rate operation for four 10 gigabit per second (Gbps) connections.

When using IPsec, there is no need for intermediate firewalls, which tend not to provide equivalent performance. Intermediate firewalls also affect throughput, increase complexity, add points of failure, increase Total Cost of Ownership (TCO), and reduce Return on Investment (ROI). The Brocade implementation of IPsec protects data from end to end and minimizes exposure to data breaches, to avoid unwanted publicity.

**Continuous Availability:** Extension Trunking combines multiple WAN connections into a single, logical, high-bandwidth trunk, providing active load balancing and network resilience to protect against WAN link failures. Those circuits can span multiple service providers and different data center LAN switches for redundancy. Extension Trunking shields end devices from IP network disruptions, making network path failures transparent to replication traffic. With Extension Trunking, you can protect your replication traffic from outage events.

**Operational Excellence:** Storage and mainframe administrators need to have visibility, monitoring, reporting, and diagnostic tools to help them increase operational excellence. Brocade provides features and functionality that help administrators more efficiently perform their jobs and maintain SLAs within their organizations. IP Extension enables consolidated flows from heterogeneous devices and multiple protocols. The

increased insight gained with a holistic view simplifies management across data centers. Custom browser-accessible dashboards for IP storage or combined FC and IP storage provide storage administrators with a centralized management tool to monitor the health and performance of their network. Brocade Fabric Vision™ technology extends proactive monitoring between data centers, to automatically detect WAN anomalies and avoid unplanned downtime. This simplifies troubleshooting: Administrators can quickly identify issues and ownership, resulting in quicker resolution. The Brocade 7840 provides a built-in traffic generator and WAN test tool to prevalidate and troubleshoot the physical infrastructure, streamlining deployments and preventing issues from arising.



Figure 1. Brocade 7840 Extension Switch.

### Benefits of a Single Managed Tunnel Between Data Centers

IP Extension can provide a significant benefit for a wide range of commonly used IP storage applications, such as IP based replication or data migration between data centers. The consolidation of these applications into a single managed tunnel between data centers across the WAN provides real benefits with visibility, acceleration, security, and prioritization of IP Extension flows, as well as bandwidth management and pooling.

**Visibility:** Making flows visible across the network requires a Brocade 7840 platform with Gen 5 technology, Brocade Fabric OS®, and Brocade Network Advisor. Knowing information about specific flows empowers storage and mainframe administrators by ensuring that relevant conversations with network administrators concerning nonoptimal or degraded application conditions are documented. Additionally, leveraging visibility and network tools helps resolve support tickets more quickly.

**Acceleration of IP Extension Flows:** Acceleration of flows across the WAN improves IP storage performance dramatically. Long distance increases latency and is prone to packet loss. Tested applications have demonstrated improvements of up to 50 times, due to the ability to handle latency and packet loss without performance degradation. This performance has nothing to do with compression; any compression achievable is in addition to flow acceleration. Flow acceleration is purely a function of enhanced protocol efficiency across the network.

**Security of IP Extension Flows:** IPsec secures data end to end, to ensure that flows leaving the confines of the local or remote data centers and connecting into a service provider are secure from eavesdropping and attack. The WAN infrastructure for a service provider in itself is not secure. The most common mistake is assuming that a “private” WAN connection is secure and cannot be eavesdropped or attacked. Data encryption services such as the IPsec on the Brocade 7840 prevent eavesdropping, altering, and outsider attacks of all kinds without impacting performance.

**Prioritization of IP Extension Flows:**

Prioritization of flows across the WAN using Quality of Service (QoS) can be achieved in various ways. The first and simplest method is to configure priorities on the Brocade 7840 and feed the prioritized flows into the IP network. When there is no contention for bandwidth, all available bandwidth can be utilized by a flow. The Brocade 7840 manages bandwidth when sending data to the WAN.

**Bandwidth Management and Pooling:**

Bandwidth management and bandwidth pooling form a feature set that provides aggregate bandwidth from multiple WAN connections (which could be from multiple service providers), including high availability, and management of that bandwidth. Bandwidth management and pooling use the exclusive Extension Trunking technology on the Brocade 7840 switch. Bandwidth is managed in such a way that if a data center LAN switch goes offline or encounters any disruption along the path, the bandwidth of the remaining paths adjusts to compensate for the offline path. With the proper design, bandwidth can be maintained during outages of various devices in the pathway. (See Figure 2.)

**Deployment Use Case**

A number of high-return use cases apply when deploying the Brocade 7840 Extension Switch for Data Center Interconnect (DCI) of IP storage applications, including the following.

**High-Performance Extension:** Similar to FCIP extension across the WAN, IP extension provides high performance, high availability, strong encryption, and operational excellence to IP-based storage flows. This is essentially the same performance that is expected locally, just over distance.

**Tape Replacement:** IP extension opens up opportunities to replace tape libraries and their associated offsite storage costs with NAS storage solutions that leverage practical and efficient replication across data centers, using the Brocade 7840 Extension Switch. High performance of NAS replication, data security, and high availability across distance with the Brocade 7840 enables this use case.

**Private Cloud Storage (PCS):** PCS is an architecture in which customers have arrays in data centers adjacent to leading cloud providers like Rackspace, Amazon, and Azure. Replication is performed from the customer's primary data center

to the remote site. Customers benefit from data replication to a secondary site without having to own and operate that disaster recovery facility. Moreover, VMs can be spun-up at the adjacent cloud provider that accesses their private cloud storage. These VMs can then be used to add interim capacity or for business continuance in the event of a disaster.

**Summary**

Enterprises continue to demand innovation in disaster recovery solutions to address their growing and dynamic data protection needs. Accelerated performance, increased security, maximized availability, and simplified management are all essential to addressing the challenges of IP storage traffic between data centers.

Brocade addresses IP storage disaster recovery challenges with an extension solution that, when a disaster occurs, helps you be prepared to achieve always-on business operations.

**About Brocade**

Brocade networking solutions help organizations achieve their critical business initiatives as they transition to a world where applications and information reside anywhere. Today, Brocade is extending its proven data center expertise across the entire network with open, virtual, and efficient solutions built for consolidation, virtualization, and cloud computing. Learn more at [www.brocade.com](http://www.brocade.com).

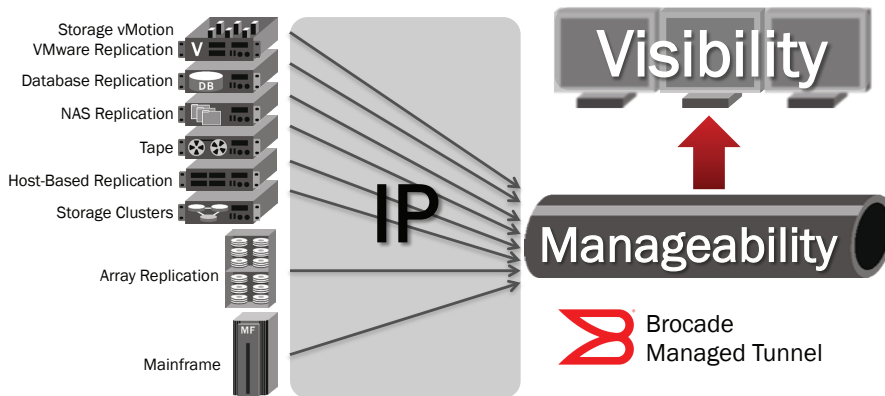


Figure 2. IP Storage handoff with Brocade IP Extension.

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