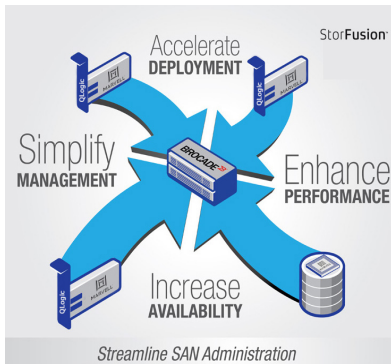# Marvell and Brocade Technology Alliance Drives 16GFC and 32GFC Fibre Channel to New Levels

Leveraging Advanced Brocade Fabric Capabilities with Marvell StorFusion

KEY BENEFITS

- Maximizes uptime and performance with new end-to-end diagnostic capabilities to help organizations address problems before they impact operations.

- Accelerates and streamlines SAN deployment by pre-provisioning and validating IT infrastructure to accelerate deployment and simplify support.

- Rapidly scales server virtualization without compromising service level agreements (SLAs) by extending quality of service (QoS) from the fabric to the host.

- Fabric wide awareness and decisive action to mitigate SAN Congestion due enabling consistent application performance and preventing downtime.

Marvell StorFusion™ from Marvell and Brocade Fabric Vision® Combine to Maximize the Potential of Your Storage Network.

Introduction

Marvell StorFusion is a suite of new features designed to enhance diagnostic and troubleshooting capabilities, quicken SAN (Storage Area Network) deployment, and improve QoS. New features were developed in conjunction with Brocade® to maximize the industry's leading Fibre Channel (FC) SAN fabric and are fully integrated with Marvell management tools, including the QConvergeConsole (QCC) graphical user interface (GUI), command line interface (CLI), and VMware vCenter plug-in and integration with Brocade SANnav.

Consistent Application performance with End to End Congestion Management

Modern SANs are observing unprecedented data growth in several different vectors. 16GFC and 32GFC upgrades are added to original 4GFC and 8GFC investments to form diverse heterogenous SANs. Mission critical applications that rely on SANs are expected to run at full capacity and capability 24x7, 365 days a year, while increasingly being accelerated by flash storage technology. Meanwhile modern and legacy applications are consolidated to increase utilization while new workloads & VMs are added to improve CapEx & OpEx. These conditions have the potential to create congestion in the SAN, which can significantly impact application performance. SAN Congestion typically occurs and quickly spreads when older, slower FC endpoints cannot accept frames at the rate generated by the source, referred to as oversubscription or slow-drain. It is critical that SAN congestion is timely detected, other components are made aware, and decisive action is taken to isolate the problem.

Implementing industry standard Fabric Performance Impact Notifications (FPINs), Marvell's QLogic Enhanced 32GFC Series Adapters' USCM Technology works both independently and in coordination with Brocade and other FC fabrics to avoid SAN congestion by enabling congestion detection, notification, and avoidance. QLogic 2770 Series HBAs can poll the status of buffer credits at various configurable intervals to detect credit starvation, notify and get notified by upstream and downstream switches of congestion points and facilitate decisive actions such as transmit throttling, multi-path failover, load balancing, or flow quarantining. As a fallback mechanism, the QLogic Enhanced 32GFC Series HBAs are also capable of receiving FC primitive signaling in cases when due to heavy congestion, the FPIN notifications cannot be delivered.

Improved Total Cost Of Ownership (TCO) And Reliability With Advanced Link Diagnostics Suite

Marvell StorFusion from Marvell seamlessly integrates with Brocade FC switches to ensure optical and signal integrity from the server to the storage array by leveraging Brocade ClearLink™ Diagnostic Port (D_Port). Marvell StorFusion extends Brocade Fabric Vision® technology, allowing organizations to ensure end-to-end optical and signal integrity for 16GFC and 32GFC optics and cables, simplifying deployment and support of high-performance fabrics.

Advanced ClearLink diagnostics perform the following tests and report results at both ends of the link with Marvell Enhanced 16GFC and 32GFC adapters and Brocade Gen 5 (16GFC) and Gen 6 (32GFC) switches:

- Electrical loopback
- Optical loopback
- Measures link distance and latency

Additional detailed information on advanced link diagnosis leveraging Brocade Clear-Link can be found in this technical brief: [Enhanced Reliability and Diagnostics for Marvell Enhanced Gen 5 (16Gb) and Gen 6 (32Gb) Fibre Channel Adapters.](#)

Marvell StorFusion from Marvell supports additional Enhanced 16GFC and 32GFC diagnostic features, such as link cable beaconing (LCB) and read diagnostic parameters (RDP). LCB enables administrators to visually identify both ends of a physical link. In a large data center with hundreds of ports and cables to manage, a simple command turns on port LED beacons on both ends of a link cable connection. Administrators can use LCB to quickly identify connection peer ports without tracing the cable.

RDP provides optics and media diagnostics. From any point in the fabric, an administrator can use RDP to easily discover and diagnose link-related errors and degrading conditions on any N_Port-to-F_Port link.

The suite of advanced diagnostics tools is further enhanced by capabilitiesthat provide powerful visual connectivity and path analysis:

- FC Ping, which validates configurations by enabling users to ping an FC N_port or end device
- FC Traceroute, which ensures correct switch and multi-path configurations
- Fabric Device Management Interface (FDMI), which gives rapid access to hardware configuration and counters

With ClearLink diagnostics, LCB, RDP, FC Ping, FC Traceroute and FDMI, administrators are empowered to:

- Detect faults in FC SAN physical infrastructure during pre-production
- Assist with troubleshooting problems in production environments
- Ensure application uptime and performance
- Significantly reduce overall operational expenses for managing a FC SAN infrastructure

Accelerated And Streamlined SAN Deployment And Orchestration With Software-Defined Dynamic Fabric Provisioning

Accelerate deployment and simplify support by running ClearLink Diagnostics end-to-end to validate the infrastructure and avoid costly issues. In addition to ClearLink, dynamic fabric provisioning with Marvell StorFusion and Enhanced 16GFC and 32GFC adapters help enterprises quickly and easily meet growing business demands. For maximum efficiency, these adapters now acquire port World Wide Name (WWN) addresses from the pre-configured Brocade fabric, saving time and eliminating possible errors from the manual process.

Deploying these features will:

- Eliminate fabric reconfiguration when adding or replacing servers
- Increase business agility while lowering capital expenditures (CAPEX) and operational expenditures (OPEX) by eliminating manual tasks
- Minimize time-consuming, costly operational interdependency between server and SAN administration
- Reduce or eliminate the need for modifying zoning and Logical Unit Number (LUN) masking

Additional detailed information on fabric pre-provisioning can be found in this technical brief: <u>Automating and Simplifying SAN Provisioning for Marvell Enhanced Gen 5 (16Gb) and Gen 6 (32Gb) Fibre Channel Adapters.</u>

Performance SLA Enforcement With VM-Level Qos And Automatic Error Recovery

Storage fabrics have the most stringent performance requirements of any network technology. They must have low latency and guaranteed delivery while supporting growing workloads and accommodating bursts in application data flows without disrupting applications.Extending QoS from the fabric to the host helps users of Marvell FC adapters to rapidly scale their virtual environments and increase optimization and efficiency without compromising SLAs.

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Configuring Marvell Enhanced 16GFC and Gen 32GFC Adapters and Marvell StorFusion with Brocade FC switches allows for the following advantages:

- Enables end-to-end priority classification of FC traffic per application or VM (N_Port ID Virtualization (NPIV)-based)
- Works in conjunction with the QoS class-specific control (CS_CTL) feature on Brocade switches and supported targets

- Enables Marvell an FC users to rapidly scale server virtualization without compromising SLAs

- Provides benefits for physical environments while facilitating a smooth transition to virtual server deployments

Additional detailed information on end-to-end SAN traffic prioritization can be found in this technical brief: Improved Performance and QoS for Marvell Enhanced Gen 5 (16Gb) and Gen 6 (32Gb) Fibre Channel Adapters.

Marvell StorFusion also ensures higher resiliency and performance with automatic forward error correction (FEC) and buffer-to-buffer credit recovery (BB-CR). FEC improves performance and link integrity to support higher end-to-end data rates by automatically recovering from transmission errors. FEC automatically detects and recovers from bit errors, which results in higher availability and performance.

BB-CR enhances performance and resiliency by automatically recovering buffer credits, which can be lost on long distance and lossy connections with the potential to stall I/O or degrade performance.

To deploy these powerful, new Marvell StorFusion features in your Enhanced 16GFC and 32GFC SAN environment, install the latest drivers and firmware from: https://www.marvell.com/support/fibre-channel-adapters.html

Marvell StorFusion with Enhanced	
Brocade ClearLink (D_Port)	Assesses the health and fabric components
Fabric Device Management Interface (FDMI) Enhancements	Simplifies change management
FC Ping	Allows users to ping a Fibre Channel N_port or end device
FC Traceroute	Obtains the path information between two F_Ports from the Fabric Configuration Server
Read Diagnostics Parameters (RDP)	Enables one-click identification of network and media issues
Link Cable Beaconing (LCB)	Simplifies cable identification and eliminates human errors
Fabric-based Boot LUN Discovery (F-BLD)	Accelerates deployment
Fabric-assigned Port WWN (FA-WWN)	Provides scalability and faster ROI
QoS Class-specific Control (CS_CTL)	Ties per-frame QoS to virtual machines
Forward Error Correction (FEC)	Improves network resiliency and performance
Buffer-to-buffer credit recovery (BB-CR)	Enhances performance with automatic buffer credit recovery from buffer credit loss
Universal SAN Congestion Mitigation	Enables consistent application performance by congestion detection, notification, and avoidance