Marvell® Optimized Storage I/O for HPE Virtual Server Environments

HPE® and Marvell® provide Fibre Channel technology for HPE ProLiant® and HPE Synergy Servers and HPE storage connectivity optimized for virtual server environments.

Introduction

Most IT organizations are looking at or have already virtualized their server environments for a variety of reasons. What impact does this virtualization have on their storage environments with respect to I/O requirements? Have these customers considered how to optimize storage networking to get the most out of their virtual server environments?

This document outlines how HPE® and Marvell QLogic Fibre Channel technology provide storage networking solutions that are ideal for virtual server environments, and how these solutions can improve performance and scalability, simplify management, and reduce costs.

The Keys to Storage Networking in a Virtualized Environment

Virtualizing servers greatly reduces the quantity of server platforms required for system administrators to manage and provides greater flexibility for application deployment and management. At the same time, virtualization increases demands both an I/O and the storage network. If the storage network is not optimized to work in conjunction with the virtual server environment, bottlenecks can occur, inefficiencies can be created, and management nightmares can result.

HPE and Marvell recognize that the storage-network needs to enhance the virtual server environment. The storage network needs to be flexible, scalable, and easy to manage, as well as have the ability to provide high performance connectivity between the servers and shared storage. HPE's robust portfolio of Marvell QLogic-based adapters and Fibre Channel (FC) SAN solutions delivers all of these characteristics and more.

HPE's 16GFC, 32GFC and 64GFC Adapters from Marvell are ideal for servers running VMware®, Microsoft® Hyper-V®, Linux® KVM, or Citrix® Xen® operating system (OS) environments. All Marvell QLogic FC Adapters from Marvell support N_Port ID virtualization (NPIV), which enables each Host Bus Adapter (HBA) to register multiple virtual world port names (WWPNs) with the FC switch fabric. This capability allows storage administrators to associate specific LUNs with one or more virtual machines (VMs).

Implementation

The following suggested implementation leverages HPE's industry-leading server and storage platforms connected by means of HPE and Marvell Fibre Channel infrastructure to provide customers with a high-performance, cost-effective, efficient, and scalable virtual server environment.

Key elements in the implementation include:

HPE ProLiant Servers – Based on Intel® processors, these state-of-the-art servers provide high performance and intelligence that reduce IT administration and simplify deployment and server management. HPE- ProLiant® Gen10 and Gen10 Plus servers feature embedded automation and intelligence that cut life-cycle operations tasks, facilities overhead, and downtime costs. The SN1100Q, SN1610Q, SN1700Q and 5830C HBAs also support FC-NVMe storage connectivity. This makes them ideal to deploy today for connecting next-generation storage arrays in the future.

HPE Storage Systems – HPE offers a variety of scalable storage systems, including the Nimble Storage Arrays, Modular Storage Arrays (MSAs), Alletra and Primera Storage Systems, and HPE StoreOnce™ Backup solutions. Each provides high performance and scalability and can be ideal for supporting virtual server environments of different sizes. The MSA and Nimble arrays are ideal for small- to mid-sized environments, while the HPE Alletra and HPE Primera arrays provides the scalability and flexibility that customers need from the mid-size to large-scale storage environments. HPE offers StoreOnce Backup solutions to provide scalable data protection for customers of all sizes.

HPE and Marvell Infrastructure

Since 1997, HPE, and Marvell QLogic have been collaborating on best-of-breed storage networking solutions, including adapters and mezzanine cards for HPE servers, FC switches for SAN, and ASICs and adapters that are used as target devices in HPE storage offerings. All HPE and QLogic 16GFC Enhanced, 32GFC and 64GFC Adapters from Marvell support virtually every FC-based storage platform including the HPE MSA, Nimble, HPE Alletra, HPE Primera, and XP storage solutions, as well as all the FC-based disk-to-disk Store-Once Backup and Virtual Tape Library solutions from HPE.

For virtual server environments, HPE offers a variety of storage networking components from Cavium that are optimized to work across multiple servers and workloads. These include:

- FC HBAs and Mezzanine Adapters – Based on Marvell QLogic technology, these PCIe and mezza- nine adapters provide high-performance FC connectivity for HPE ProLiant Apollo and HPE Synergy servers to HPE and third-party FC shared storage solutions. Using a dual-port configuration provides more native bandwidth and predictable per-port performance per adapter to leverage across the virtual server environment. These Fibre Channel Adapters from HPE are optimized for virtual environments and power, and full port-isolation design provides the highest reliability and availability for HPE customers. Along with the ability to create virtual FC connections for VMs using NPIV, dual-port isolation insures reliable, scalable connectivity on a per-port basis for virtualized server environments.
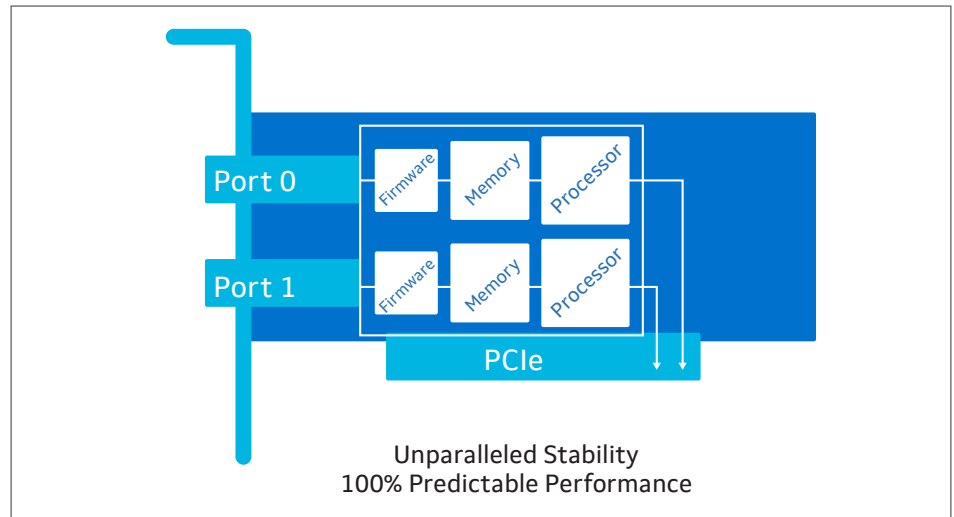
Figure 1. The Benefits of Port Isolation

- Marvell QLogic StorFusion™ is a suite of 16GFC, 32GFC and 64GFC features leveraging the Cisco and Brocade 16GFC, 32GFC and 64GFC Fabrics designed to address the needs of IT organizations that require reliability, security, and guaranteed network performance. Leveraging the quality of service (QoS) and virtual machine ID (VM-ID) capabilities provided by StorFusion™ enables SAN administrators to assign mission-critical workloads a higher priority than less time-sensitive storage traffic. Prioritizing SAN traffic can optimize performance between the host and target.

Benefits from HPE/Marvell Virtualization

The Marvell QLogic-based adapters from HPE include the SN1100Q 16Gb FC Adapters, the SN1610Q 32Gb FC Adapters and SN1700Q 64GFC Adatpers for HPE ProLiant servers, HPE Synergy® 5830C 32Gb FC HBAs. Each of these provide better VM scalability and higher throughput than other available options. The improvement is due to the unique design of the Marvell QLogic ASIC and associated FC stack management. By using the dual-port FC HBAs and mezzanine adapters, the administrator has more bandwidth per PCIe® slot to allocate across the VMs. Marvell recommends two adapters to ensure high availability, but having dual ports provides more flexibility and granular control of how the FC ports are assigned to individual VMs.

Optimized for virtual environments, the HPE 16GFC, 32GFC and 64GFC Adapters from Marvell QLogic provide the ability to virtualize request and response queues for each guest OS and VM and provide a priority-level setting to eliminate FC I/O bottlenecks.

All HPE-branded Marvell QLogic 16GFC, 32GFC and 64GFC HBAs support HPE Smart SAN for 3PAR and HPE Network Orchestrator SAN management software. These adapters are optimized to support advanced diagnostics which allows the HPE storage administrator to run diagnostics from the HPE array management utility or in a virtual machine.

All HPE-branded Marvell QLogic FC Adapters support NPIV as well, which allows each VM specific access control to SAN storage through dedicated virtual WWPNs.
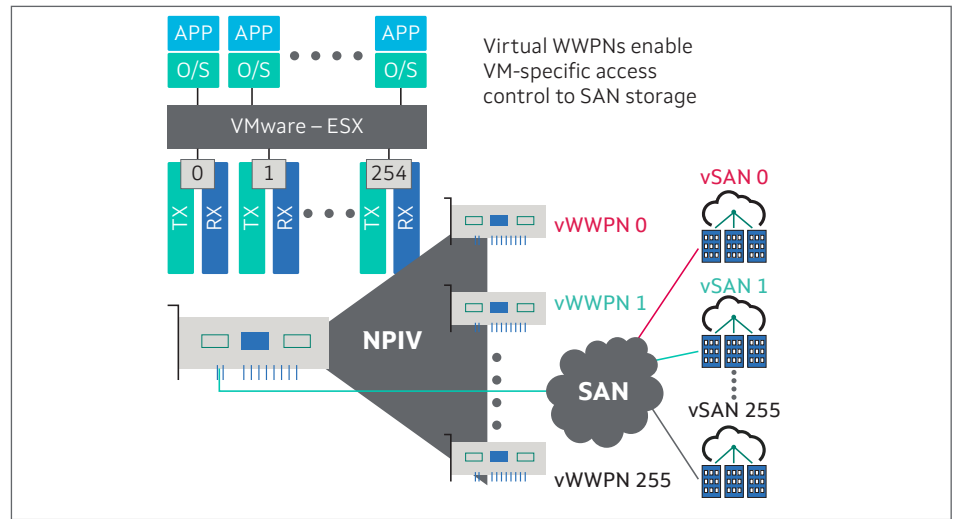

Figure 2. NPIV Support

These adapters provide both scalability and security for all VM connections to shared storage through the SAN. Marvell also provides a QLogic VMware® plug-in that allows administrators to map and manage HPE/ QLogic HBAs from the vCenter® control console.

Adapter management is simplified with Marvell QConvergeConsole® (QCC) CLI, which provides a single management utility for managing adapters across multiple heterogeneous servers from a single interface, saving administrators time and effort.

HPE/QLogic Components

HPE MODEL	DESCRIPTION	PART NUMBER
HPE SN1700Q 64Gb 1-port FC HBA	Single-port 64Gb Host Bus Adapter for HPE Gen11 ProLiant servers	R7N86A
HPE SN1700Q 64Gb 2-port FC HBA	Dual-port 64Gb Host Bus Adapter for HPE ProLiant Gen11 servers	R7N87A
HPE SN1610Q 32Gb 1-port FC HBA	Single-port Enhanced 32Gb Host Bus Adapter for ProLiant Gen10 and Gen10 Plus servers	R2E08A
HPE SN1610Q 32Gb 2-port FC HBA	Dual-port 32Gb Host Bus Adapter for HPE ProLiant Gen10, Gen10 Plus and Gen11 servers	R2E09A
HPE Synergy 5830C 32Gb FC HBA	Dual-port 32Gb Host Bus Adapter for HPE Synergy Gen10 and Gen10 Plus servers	777456-B21
HPE SN1100Q 16Gb 1-port 16Gb FC HBA	Single-port 16Gb Host Bus Adapter for HPE ProLiant Gen10 and Gen10 Plus servers	P9D93A
HPE SN1100Q 2-port 16Gb FC HBA	Dual-port 16Gb Host Bus Adapter for HPE ProLiant Gen10 and Gen10 Plus servers	P9D94A

Summary

In a virtualized server environment, it is important not to just look at the server or storage pieces of the equation. I/O plays a critical role in server virtualization. HPE and Marvell have a compelling portfolio of storage networking components that optimize the server-to-storage connectivity in virtual server environments.

HPE and Marvell deliver storage networking solutions, including FC adapters and mezzanine adapters in conjunction with HPE-branded B-series and C-series 16GFC, 32GFC and 64GFC SANs deliver full featured capabilities for virtualized environments. Together, we provide HPE customers looking to virtualize their servers with the ability to harness the power of the HPE ProLiant servers and connect them to the industry-leading portfolio of storage products from HPE in a way that provides the best performance, scalability, management, and flexibility.

For more information on all these solutions, check out: https://www.marvell.com/HPE/

Or contact the HPE team at Marvell QLogic by sending e-mail to:
hpesolutions@marvell.com