

White Paper

The Performance and Efficiency of 32Gb Fibre Channel

Accelerate Database Applications and Improve Server Efficiency in All-Flash Deployments

October 2020

Key Benefits

- **Accelerate Databases:** With up to an 80% increase in IOPS for typical database block sizes, the HPE® SN1600Q 32Gb Fibre Channel (FC) adapters, based on QLogic® FC technology from Marvell, are capable of hosting larger, more demanding databases, reducing time to query and providing faster business decisions when compared to 16Gb FC
- **Improve Server Efficiency:** Providing a 31% increase in utilization from existing server investments compared to 16Gb FC, HPE-branded 32Gb FC adapters from Marvell increase virtual machine (VM) density by allowing physical servers to host more VMs
- **Reduce Data Center Power and Cooling:** Build greener data centers with up to a 36% better power-to-performance ratio with 32Gb FC, moving more data per watt
- **Increase Asset Utilization:** The full offload, lossless and zerocopy capabilities of 32Gb FC free server CPU cycles from moving data versus alternative software-based block storage transports

Executive Summary

Enterprise organizations rely on their Fibre Channel SAN for fast, reliable access to critical applications and data. To keep up with growing business demands and exponential data growth, IT administrators deploy the latest servers, solid-state storage (SSS) devices, and storage network components to meet performance and service level agreement (SLA) objectives.

HPE SN1600Q 32Gb FC Adapters deliver up to 1.3 million IOPS and 12,000 MBps of throughput to fuel high performance in all-flash array (AFA) and high-density virtualized server environments.

HPE SN1600Q 32Gb FC adapters deliver significantly higher performance than 16Gb FC adapters at a favorable power profile, helping to accelerate databases, improve VM density, and build a greener data center.

This paper details the results of extensive performance and power analysis studies conducted by Marvell that clearly demonstrate that QLogic 32Gb technology resolves data center complexities by enabling a storage network infrastructure that supports peak performance of mission-critical business applications while delivering applicationaware services, and simplified management.

The Performance and Efficiency of 32Gb Fibre Channel

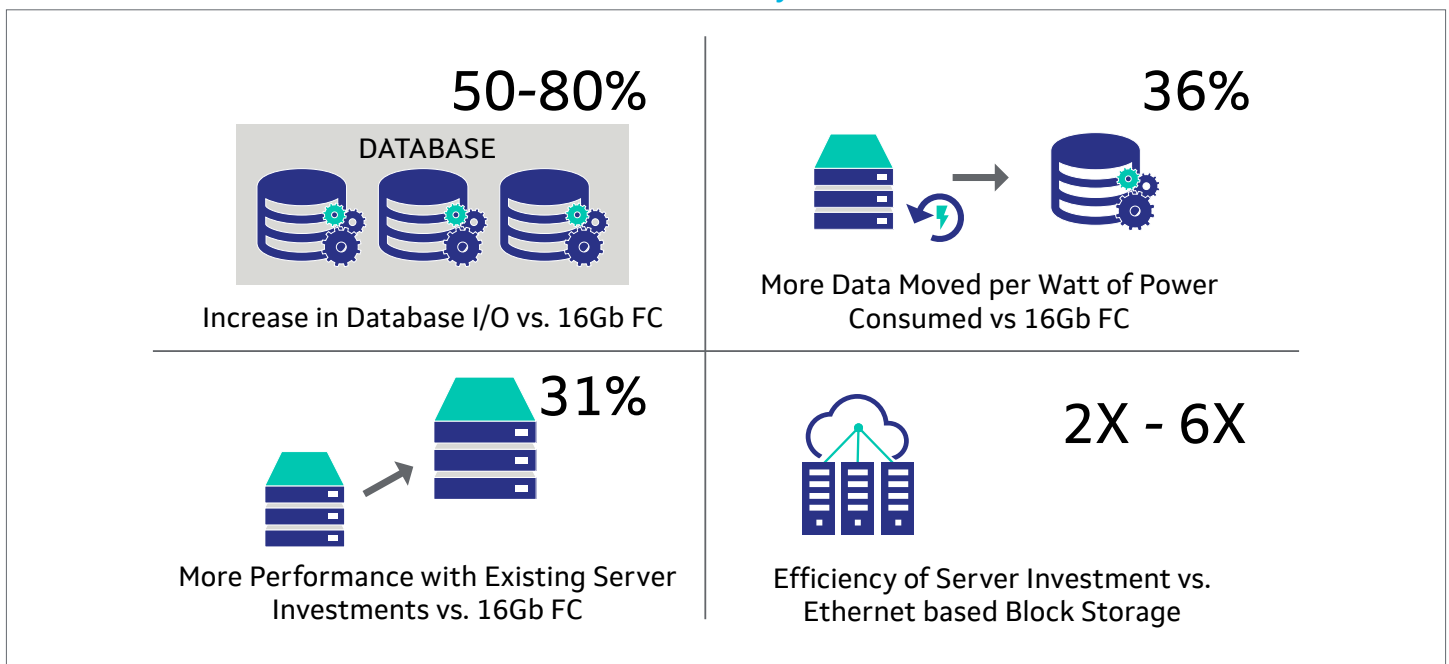


Figure 1. 32Gb FC – The Most Efficient Application Accelerator

Accelerate Transaction Processing Databases

IT requirements are changing! CIOs and IT administrators are demanding a high-performance, dynamic FC infrastructure that can support hosting larger, more demanding databases while reducing time to query and providing faster business decisions.

HPE SN1600Q 32Gb FC Adapters deliver 50-80% more IOPS for typical database block sizes (8KB) when compared with 16Gb FC.

Figure 2 illustrates how 32Gb FC can accelerate Oracle Database and SQL Server online transaction processing (OLTP) workloads when compared with 16Gb FC across both read and write operations at typical database block sizes of 8KB, which can increase I/O for a typical database by 50-80%.

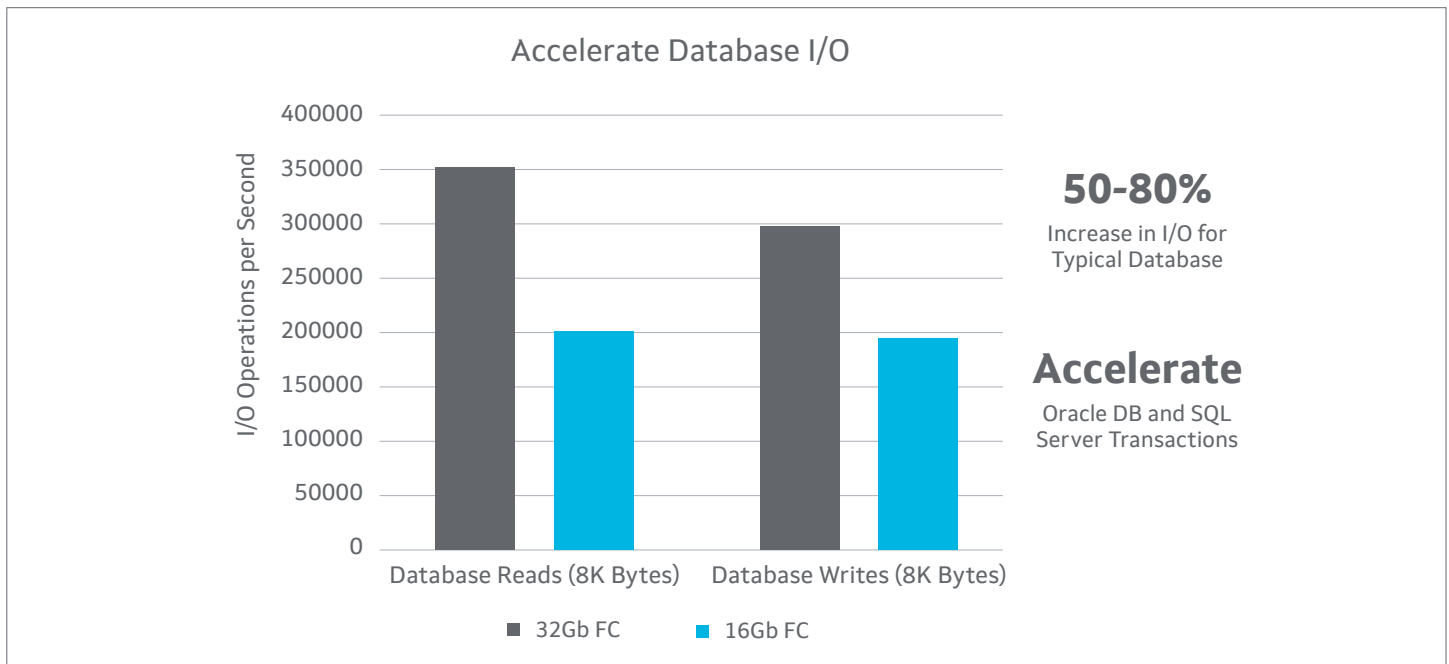


Figure 2. Databases Can Run Faster on 32Gb Fibre Channel

Improve Server Efficiency

Enterprises are under increasing pressure to expand IT services while maintaining low infrastructure and service costs. Evolving IT environments in both technology and application delivery make it imperative that IT administrators choose a storage infrastructure that can maximize the potential and return on investment (ROI) from their compute resources.

HPE SN1600Q 32 Gb FC Adapters deliver a high-performance connectivity option to AFAs that can help drive more performance from existing compute resources when compared with 16Gb FC. With the ability to move more data across the wire to high-speed external storage- without additional tax on critical CPU resources, it is virtually guaranteed that applications will continue to scale without a forklift upgrade to more powerful servers.

Figure 3 illustrates the performance results from Marvell performance analysis on how HPE SN1600Q 32Gb FC Adapters can process 31% more throughput on existing server investments when compared with 16Gb FC.

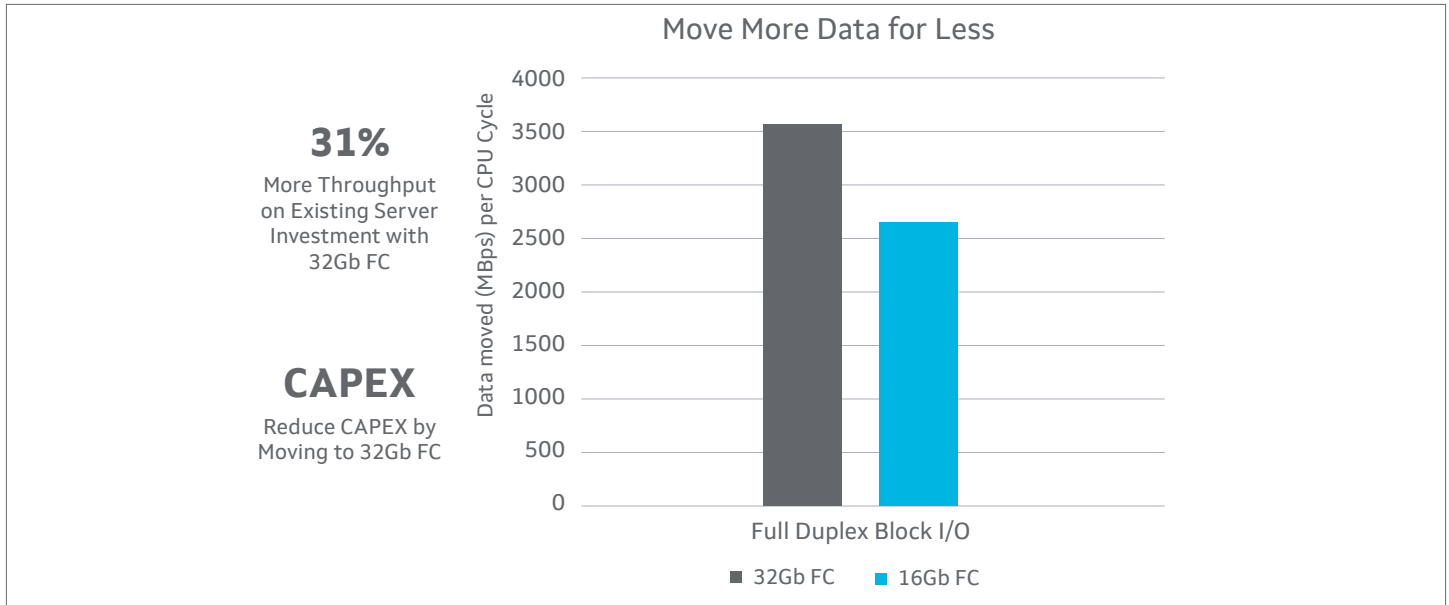


Figure 3. 32Gb FC – Most Efficient Use of Server CPU

More Throughput Per Watt, Greener Data Center

All around the globe, people are sharing more and more data every day, while also becoming more environmentally responsible. The significant increase in the amount of data means that more energy is required to power and cool the enterprise data center. Therefore, data centers play an important role in reducing the amount of energy used to run large infrastructure complexes.

QLogic StarPower™ technology, included in the HPE SN1600Q 32Gb FC adapters, is revolutionizing the power-to-performance ratio by delivering an extremely low power 32Gb FC adapter. HPE SN1600Q 32Gb FC adapters are capable of moving 36% more data per watt as compared to 16Gb FC adapters.

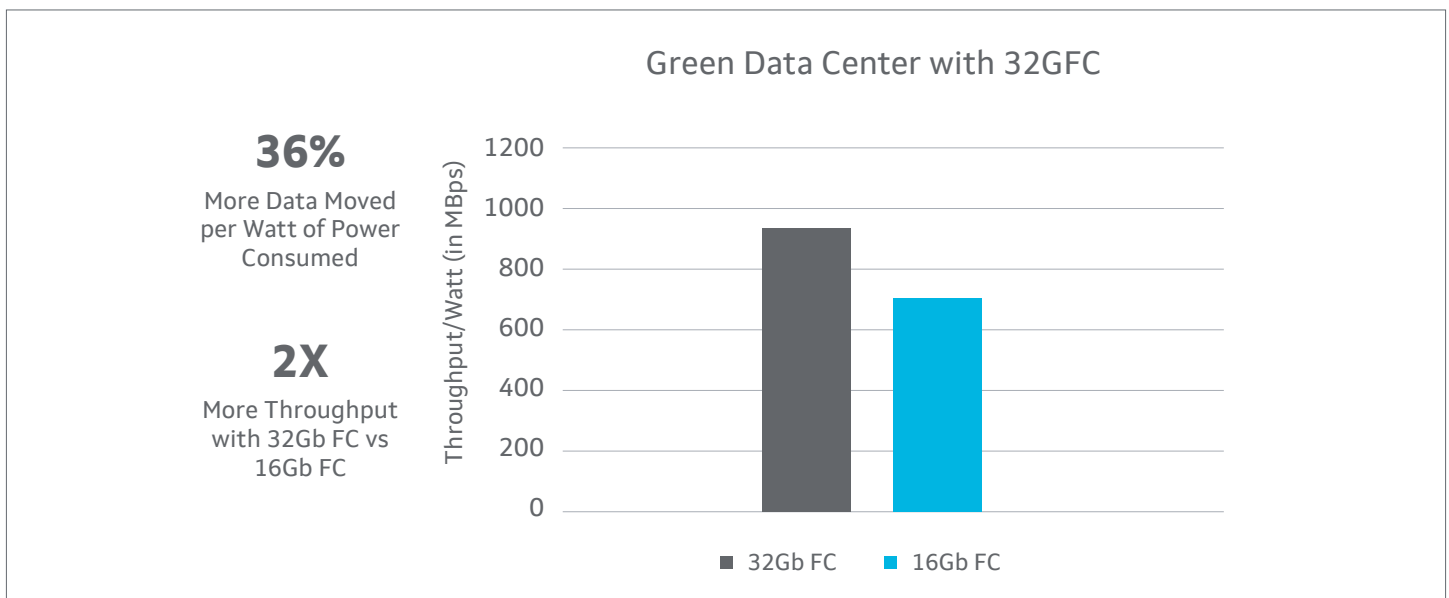


Figure 4 shows how 32Gb FC can move 36% more data per watt and two times more throughput when compared to 16Gb FC.



Comparison With Alternative Block Storage Transports

Enterprise IT data center decision makers have a wide choice of technologies and underlying protocols that they can leverage to connect servers to external block storage—Fibre Channel and iSCSI are often among the choices.

Software-based iSCSI initiators consume CPU cycles when handling I/O-intensive workloads, leaving little headroom for growing applications and virtual environments. Unlike software-based solutions, Fibre Channel is a fully offloaded, zero-copy, lossless transport mechanism that does not compete for CPU processing cycles with upper-layer applications such as e-mail or Web applications.

As shown in Figure 5, Marvell performed a head-to-head comparison of 32Gb FC with Intel XL710 40GbE software iSCSI, which shows a 2x-6x higher efficiency of Fibre Channel vs. software iSCSI.

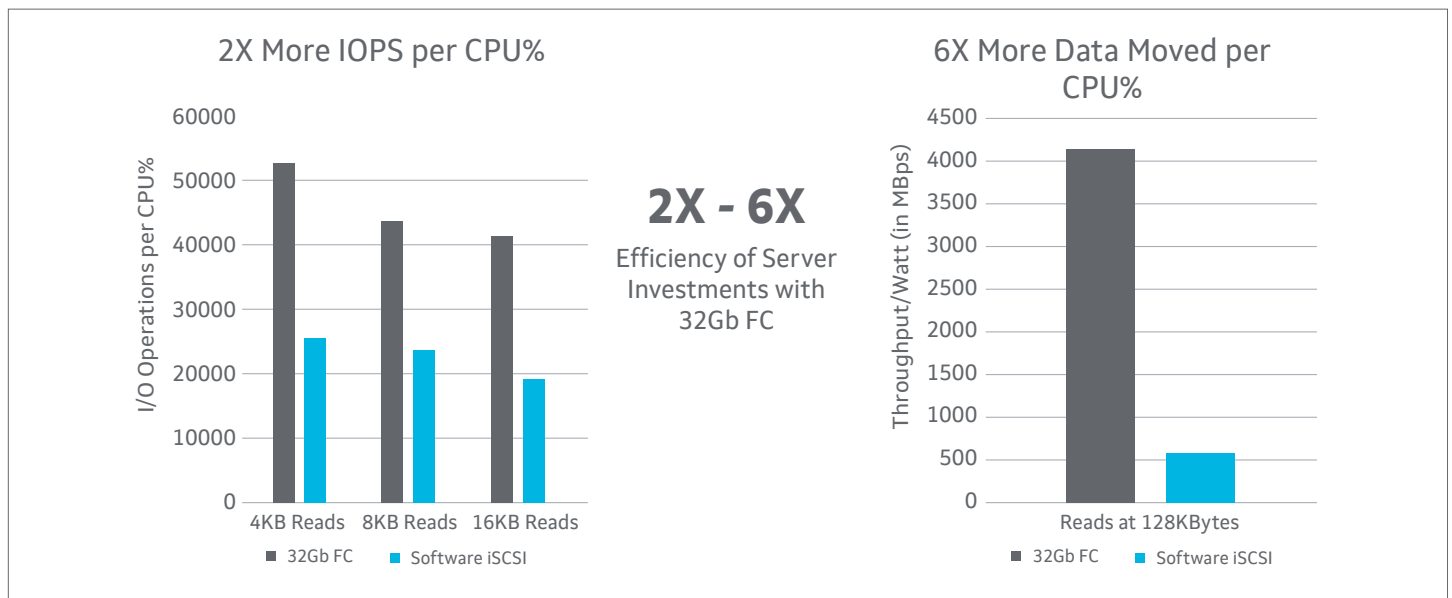


Figure 5. 100% Offloads – 100% of the Time – with 32Gb FC

Summary

HPE SN1600Q 32Gb FC Adapters resolve data center complexities by enabling a storage network infrastructure that supports peak performance of mission-critical business applications, enables efficient use of server resources, and delivers a highly efficient block storage transport mechanism. QLogic Fibre Channel from Marvell remains the clear choice of HPE customers wanting the most advanced and reliable Fibre Channel solution to drive enterprise applications.

Learn More

Marvell and HPE offer complete solutions for some of the most complex issues facing the data center.

Visit <https://www.marvell.com/hpe> to learn more about how Marvell and HPE are driving the road to innovation for Fibre Channel.



To deliver the data infrastructure technology that connects the world, we're building solutions on the most powerful foundation: our partnerships with our customers. Trusted by the world's leading technology companies for 25 years, we move, store, process and secure the world's data with semiconductor solutions designed for our customers' current needs and future ambitions. Through a process of deep collaboration and transparency, we're ultimately changing the way tomorrow's enterprise, cloud, automotive, and carrier architectures transform—for the better.

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