Key Findings

• Customers facing increased application data requirements can now meet and exceed SLAs with NetApp flash storage and Gen 6 32GFC Infrastructure consisting of Emulex® Host Bus Adapters (HBAs) and switches from Brocade

• Using a 32GFC-equipped NetApp AFF8080 storage array along with Emulex LPe32002 HBAs and Brocade G620 switches reduced Microsoft SQL Server 2016 data warehouse workload query time by 70% compared to 8GFC and reduced it by 48% compared to 16GFC

• The NetApp all-flash array fully consumed the available 3,200MB/sec. throughput of the Gen 6 Fibre Channel network

• Advanced features developed by Brocade and Emulex accelerate deployment and simplify support

• ONTAP software extending into the Brocade switch fabric result in peak performance increases for database workloads

Executive Summary

Faster time to revenue and increased customer satisfaction are top priorities for today’s businesses. Improving business responsiveness is key to achieving these goals and IT administrators increasingly choose all-flash arrays to meet these needs. Using NetApp® All Flash FAS (AFF) systems for mission critical applications addresses enterprise storage requirements with high performance, superior flexibility, and best-in-class ONTAP® data management software. The AFF series delivers industry-leading performance and network connectivity with up to 7M IOPS per cluster while delivering sub-millisecond latency. The AFF/FAS 8000-series arrays are also the industry’s first storage arrays to offer Gen 6 32Gb Fibre Channel (FC) connectivity.

With the NetApp AFF array solving storage performance issues, the performance bottleneck has shifted to the network. AFF customers most frequently select Fibre Channel to meet their storage networking performance requirements with guaranteed reliability and the ability to scale to thousands of nodes. Some customers with legacy 8GFC networks are experiencing network bottlenecks that impact performance of their new powerful all-flash arrays. 32GFC-capable Fibre Channel switches from Brocade and Emulex-branded HBAs by Broadcom solve network bottlenecks by delivering the bandwidth, IOPs and latency demanded by NetApp all-flash arrays as well as providing a suite of enhanced diagnostics and troubleshooting features designed for the enterprise.

To illustrate how all-flash arrays can benefit from increased network performance, Microsoft SQL Server data warehousing application tests were conducted with NetApp AFF8080 all-flash arrays, Dell EMC® PowerEdge R730 servers, connected to three different generations of Fibre Channel products from Brocade and Emulex (32/16/8GFC).
The 32GFC end-to-end configuration reduced DSS query completion time by 70% compared to an 8GFC network, and reduced it by 48% compared to a 16GFC network.

Brocade Network Advisor shows the Dell PowerEdge R730 saturated the 32GFC link to the Brocade switch. The NetApp AFF was able to load balance the traffic and process the IOPs of the faster server and faster fabric. The NetApp AFF fully utilized the 32GFC link.

Figure 1. Decision Support Query Times: NetApp AFF8080, Emulex Gen 6 FC HBAs & Brocade Gen 6 FC Switch Accelerate Microsoft SQL Server 2016 Data Warehousing Queries.

Figure 2. Brocade Network Advisor Displays Network Port Utilization Data (Storage, Switch and Hosts).