While processor and network speeds have been consistently increasing over time, hard disk technology has been unable to keep pace with increasing demands for both capacity and performance. As a result, modern data centers are looking to all-flash arrays as a solution to performance and capacity challenges. However, not all flash arrays are created equal and it is critical to understand the differences between those using an all-SSD design and those based on purpose-built architecture.

This article discusses the following:

- Limitations of an all-SSD architecture
- Why a purpose-built platform can deliver greater performance, density and reliability than an all-SSD design

SSDs for Enterprise Data Storage

SSDs encapsulate flash storage within a platform that can take advantage of existing disk architectures. This design offers benefits for the manufacturer, such as compatibility with existing platforms and a faster route to market. However, there are also several significant drawbacks to this design. Since SSDs use the legacy SAS connection, they are subject to additional latency inherent in that architecture. Further, flash array manufacturers using SSDs are limited by the management schemes of the flash controller within the SSD. This controller will handle flash-specific functions such as garbage collection and wear levelling, which when not managed as part of a larger system can have serious performance implications for an array.

Purpose-Built All-Flash Architecture

In contrast to SSDs, a purpose-built architecture can be designed to deliver the maximum performance that flash can provide. The flash can be designed to connect directly with the PCIe bus, removing the additional latency of first going through a SAS interface as an SSD must. Also, since the array vendor is able to design the array to connect directly to the discrete flash modules, management functions can be controlled to minimize the impact to performance. The manufacturer can also apply advanced data protection algorithms designed for their architecture, which in a flash environment, can deliver higher overall availability and efficiency than the traditional RAID levels used in SSD arrays.

It is true that SSD-based arrays can provide significant performance benefits over legacy, hard disk based storage. However, SSD solutions cannot meet the levels of sustained performance, consistent low latency and high availability that a purpose-built all-flash array can offer; these benefits are important for businesses dependent on predictable performance and always-on reliability.

Learn more on the power of all-flash storage in this downloadable white paper, titled, Flash Fabric Architecture.