



# Solid flash to the future



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THE TRANSITION FROM the reliance on rotating disk to integrating solid-state storage within the enterprise data center has widespread effects for enterprise IT. Data center administrators who are looking for ways to tackle the energy drain represented by hard drives are examining flash storage as a way to achieve green computing objectives. Businesses with I/O-intensive applications have also found flash storage to be effective and economical. As a result, enterprise storage providers, chip-makers, and server manufacturers have all entered the flash storage market and its one big party.

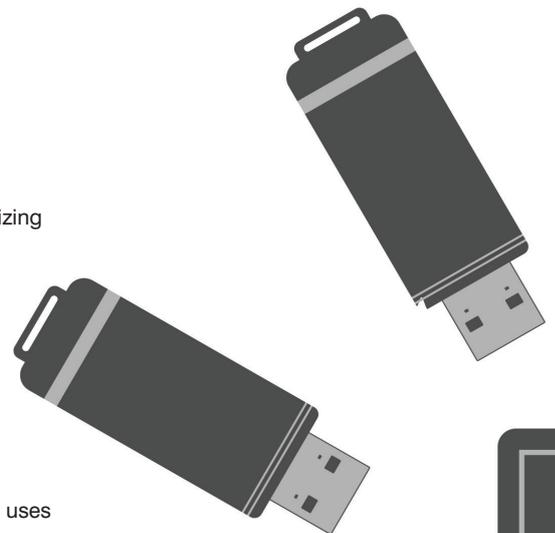
Furthermore, as this transition occurs and the cost per unit of solid-state storage capacity ultimately decreases, enterprise IT will appreciate that solid-state storage technology benefits many aspects of enterprise IT. The true value of flash storage is not determined on a cost per TB calculation alone and most, if not all, enterprise applications can benefit from integrating with flash storage.

Most folks know by now that a solid-state drive (SSD), also called a flash drive, is a

type of storage device that is revolutionizing how consumers use computers. These storage devices are transforming businesses globally. SSDs use a special kind of memory chip with erasable, writeable sections that can hold data even when powered off. Think of them as a much larger relative of the trusted memory stick.

Similar to standard hard drives, an SSD uses a special area on its chips for cache memory. Cache memory can increase processing speeds by holding data that is needed repeatedly and frequently. With the data close at hand in the cache, it does not need to be retrieved from the main storage area each time it is needed.

SSDs either use cache that is volatile, which is referred to as synchronous dynamic random access memory (SDRAM), or they use non-volatile cache. Similar to computer RAM, SDRAM needs a power source to retain data whereas non-volatile cache retains data even without power. Most flash storage systems are comprised of a memory unit and an access controller where the memory unit is used to store data and the



access controller manages and controls the storage space on the memory unit.

An SSD has many benefits and advantages over a hard disk drive. For one, since there are no electromechanical parts, seek time doesn't exist, making the drive very fast. In fact, they are incredibly fast and highly reliable when properly engineered. SSDs characteristically consume about 1/5 of the power and read more than 100x faster than traditional mechanical hard disk drives.

An investment in solid-state storage drives typically increases levels of application performance resulting in more revenue generating transactions for businesses

that in turn results in an immediate return on the flash investment. The total cost of ownership for solid-state storage vs. disk is also reduced with lower operational costs. Enterprise IT administrators typically run disk storage arrays at 40-50%, which results in operational and budgetary inefficiencies.

Multiple disk arrays such as this are nowadays being replaced by single arrays composed entirely of flash storage media, which is referred to the all-flash array. This type of solution boasts solid performance gains in addition to overall efficiency. However, we must keep in mind that an investment in flash storage should result in much more than just accelerating enterprise applications. It should also preserve, if not better, existing data protection and business continuance procedures. It should also exhibit a capability to be scaled upward in capacity and performance without interference to application users.

Flash-based storage is no longer a completely new concept on the market. However, it's still a relatively young sector for many organizations that must continue to discover the benefits of flash. These organizations are researching if and how flash fits into their environments.

For vendors, it is a perfect time to bring their all-flash or hybrid products on the market and be ready to capture the opportunity as adoption of flash storage and, in particular, all-flash arrays, spreads from the early-adopter stage to mainstream. Within my role in the SNIA Solid State Storage Initiative, I come across many different implementations of flash storage and the pro's and con's of each. One particular type is an all-flash array that tends to get a lot of attention from both sides of the spectrum.

Deployment of all-flash delivers obviously flash benefits, but this approach also involves the risks associated with the deployment of a new system. It's no surprise that adoption of all-flash arrays comes in stages. Some

analysts believe that the market for all-flash arrays is about to jump to its new stage. Currently, a typical scenario for an all-flash deployment involves a single performance-demanding workload. But the situation is changing as end users gain knowledge and understanding with all-flash arrays as they prove their capabilities. The next stage for both new and experienced all-flash users is adoption of all-flash arrays for mixed workload environments.

This prospect and opportunity then spreads into multi-tiered environments as well. There are companies out there that truly benefit and gain advantage from the breadth of their product portfolios. This then typically supports a variety of storage media and cloud-based storage with integrated data migration tools, enabling dynamic movement of data between tiers. For many users, the maturity of the product portfolio is critical in choosing a storage product but this isn't always necessarily the case either.

As the all-flash array market continues to advance and evolve, so will the abundance of all-flash array product functionality. Current all-flash array vendors are working hard to add features to their storage platforms, which means that it is foreseeable that more mature flash-involved companies will face stronger competition from all-flash array vendors and products.

However, broad presence does play a big part in the market so that shouldn't be taken lightly either. Flash-based storage is among a number of technologies that are influencing and changing datacenters.

The industry is still considered being in the beginning stages of the flash adoption journey and, as with any technology, choosing the right partner that will provide robust and resilient support along the way is imperative for long-term success.

As end users start experiencing the benefits of all-flash storage solutions, they should definitely look at the entire ecosystem of product features and data services a vendor can provide.

For more information about the Storage Networking Industry Association and its Solid State Storage Initiative please visit [www.snia.org/forums/ssi](http://www.snia.org/forums/ssi)

