WHITEPAPER

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How Flash Storage is Changing the Game

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What you will learn

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It's all about speed. Not only do your end users want it; they downright expect it. After years of companies relying on traditional disk storage, flash is answering the call to work faster and harder. It offers IT teams the promise of an immediate business impact and velocities never before possible. But with new technology comes important considerations.

- Is flash reliable?
- How exactly does it solve challenges with latency?
- Which applications are best suited to flash?
- What are its limitations?
- How do IT teams choose a vendor for flash storage?

This paper gives you an overview of the challenges and benefits that come with the latest flavors of flash storage. The paper also examines three types of flash and when to use them:

1. Server-side flash
2. Hybrid flash arrays
3. All-flash arrays

Finally, you'll get some pointers on how to choose a vendor for your flash storage, so you can guarantee your solution is enterprise-ready from day one.

Why flash

Flash is fast

Today's end users expect quick, easy access to data and applications. After all, latency can cost time and resources, so speed is valuable. Just imagine the business impact of a retail customer getting a response one second faster, or a physician shaving two minutes off the time it takes to update each patient's chart.

Traditionally, spinning disk has been the go-to technology for storage. But that's changing. Flash storage is up to 10 times faster. This gives enterprises the ability to dramatically improve the performance of high I/O applications, without having to tune the application. The business impact is immediate. Applications can now get the data they need faster, process it faster, and deliver meaningful results to end users in less time than ever before.

Growth in the enterprise

So why isn't flash in more enterprise IT storage systems? Until recently, the largest barriers to flash have been high costs and a lack of enterprise features. However, that's changing. Compression and deduplication make the cost of flash much more competitive, especially when deploying all-flash arrays.

New features have also made flash storage a better option for enterprises. In the past, reliability was a major concern with flash, which was prone to wearing out. Now, innovators in the market have brought the failure rates for flash storage systems below those for spinning disk. The designs are also more scalable, so flash can grow along with business needs. With the addition of high availability for mission-critical applications, today's flash can be counted on to run 24x7. Enterprise management features round out the capabilities of flash. Together, these developments may accelerate the adoption of flash over spinning disk, which could be similar to the migration from tape to disk, except with less disruption to IT operations.

When to consider flash

Understanding flash use cases

The best uses for flash are for applications in which speed is more important than capacity. In other words, a good reason for IT teams to seriously consider deploying flash storage is if the dollar for I/O per second (IOPS) is more important than the cost per GB.

Although it can offer advantages across the board, flash is particularly effective for certain applications, especially when deployed as an all-flash array. (See the sidebar, "Best uses for flash.") Another major consideration is architecture. IT teams have three main types of flash architecture to choose from:

- Server-side flash
- Hybrid flash arrays
- All-flash arrays

Server-side flash: Read-only acceleration

Server-side flash has gained a lot of traction in the last few years. It works by putting flash onto a PCIe card within a server, which allows for extremely fast access to data for applications inside a server.

Server-side flash may be an excellent solution for accelerating extreme applications. It's ideal for read-heavy workloads, and it eliminates the storage network. However, that's where its advantages taper off. Server-side flash is hard to share and protect. So, it works best when accenting network storage with server flash as a read cache.

In addition, server-side flash requires a lot of tuning. The software and API integration can be critical to ensuring the fastest possible speeds. And because it's locked down inside the server, it can't be shared with other applications.

Best uses for flash

With certain applications, it's critical to minimize latency. That means your cost per IOPS trumps the cost per GB. In these cases, all-flash arrays are best.

- High-performance databases, such as SAP or Oracle platforms
- Virtualized desktop infrastructure (VDI) that generates high I/O
- Very dense virtualization, where highly random I/O requires shared storage

When to consider flash (cont.)

Should you go S/GB or S/IOPS?

For mission-critical applications, speed may be a more important factor than cost per GB. Even so, compression and deduplication can help bend the cost curve toward flash.

- Compression can save 3-to-1 in compressible database solutions.
- Deduplication can save 5-to-1 or more for virtualization or VDI use cases.

Hybrid flash arrays: Getting the formula right

For some applications, hybrid flash can offer the best of both worlds. By definition, hybrid arrays are a combination of traditional spinning disk and flash technology. However, it's important to proceed with caution. Getting the best of both technologies requires heavy planning and just-right implementation.

Hybrid flash arrays are best used for traditional applications. IT teams – and CFOs – like them because they require a lower initial investment than all-flash arrays. When done properly, hybrid arrays speed up applications where needed, at a fraction of the cost of all-flash arrays. But for some, hybrid is a gamble. If the design or implementation isn't done right, you'll go right back to the slower performance you were trying to resolve in the first place.

Among both startups and well-established IT leaders, hybrid flash makes up the largest part of the flash storage market. However, hybrid flash may not be the most valuable solution for your applications.

All-flash arrays: Guaranteed performance, elegant design

To guarantee you'll get the most out of flash, take a serious look at all-flash arrays. While they require the largest capital expense upfront, they can also offer the most affordable cost per IOPS as you take into account compression and deduplication.

For many, all-flash arrays hit a sweet spot. As the price of flash comes down and enterprise features become standard, more IT teams will gravitate to the simplicity and elegance of all-flash. This architecture is best for traditional tier-1 applications, where performance is critical. It also offers a huge I/O boost for virtualization.

All-flash arrays ensure consistently high speeds across applications. They're an especially good fit for electronic medical records (EMR) systems, databases using Oracle or SAP platforms, customer relationship management software (CRMs), and other mission-critical applications.

Even though all-flash arrays are costly, they can offer the lowest cost per IOPS. Compression and deduplication help pack more power into flash by working with data in real time, as it comes in. In databases, compression works particularly well to free up space, in some cases offering a 3-to-1 compression ratio. Deduplication can save capacity in virtualized environments, achieving a 5-to-1, 10-to-1, or even higher deduplication ratio. As your need for capacity diminishes, so does your cost for storage.

Choosing a vendor

Choosing a vendor for flash arrays

In this market, it can be difficult to sort through the myriad vendors for flash. It seems that every storage provider, from major IT players to promising startups, has something to offer. Here are a few critical questions for IT teams to ask:

1. **Can this vendor deliver a complete solution set?**
   Make sure you research the company well enough to know it's going to stay viable in the competitive flash market. If not, you may not get the support you need in the future or the ability to scale up.
2. **Does the solution offer enterprise features?**
   Choosing a flash array without certain enterprise features could limit your ability to manage and grow your infrastructure. The solution should offer high availability, scalability, data protection features like snapshot and replication, and support for APIs, such as VMware® vSphere® Storage APIs – Array Integration (VAAI).
3. **Is the solution purpose-built or retrofitted?**
   Design and performance are key in flash solutions. The most effective all-flash solutions are built on an operating system that specifically addresses flash.
4. **Does the efficiency of this solution make it more price competitive?**
   What are its abilities to compress and deduplicate data to free up storage space? All-flash solutions should be strong players in this area.
5. **Who do I call if I have a problem?**
   Understand how the vendor plans to support you. Does the vendor offer data protection or replication? Make sure they can also help you handle upgrades as you grow.

When failure is not an option

Since flash is often used for mission-critical applications, make sure it won't fail on you. High availability means your system is always working, 24x7. It should be designed well enough so that if anything breaks, there's a backup available.

Think in worst-case scenarios. Ask the vendor if the system would survive if you were to rip out a node or lose a drive completely. Likewise, if a storm were to hit your data center, can you make a backup copy of your data without it impacting the application? If the answer is anything other than yes, you may need to consider another solution.

Conclusion

Expert guidance for choosing flash

With its undeniable benefits, flash is forcing enterprise IT teams to rethink storage entirely. Flash – particularly all-flash arrays – is extremely competitive in certain use cases, and compression and deduplication can also make storage more economical.

Traditional storage vendors, along with emerging all-flash vendors, are driving rapid change in this industry. A knowledgeable IT partner can help you sort through your options and explore whether it makes sense to complement or replace spinning disk systems with flash. At Datalink, our experts can help you find and fine-tune a solution that's right for your organization, while ensuring your flash array has all the enterprise features you need. After all, when the reputation of your business is at stake, you can't afford to go wrong.

About Datalink

For more than 25 years, we've helped our customers apply the right technology to drive their business growth. We're well positioned as advisors in flash technology. In fact, we've brought a wide range of flash solutions into our lab for testing to make sure they made good on their claims and continued to work well under various failure scenarios. Because we know them inside and out, we understand what each solution can offer you. We can show you side-by-side demos, explore the pros and cons of each option, and match you with the right solution.

We serve Fortune 500 companies and maintains top partnerships with IT leaders such as Intel®, NetApp®, HDS, EMC, Cisco®, Symantec™, and VMware. We're in more than 30 U.S. cities and offer more than 25 years of data center expertise. Learn more at www.datalink.com, or see what we can do for you by calling us at 800-448-6314.

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