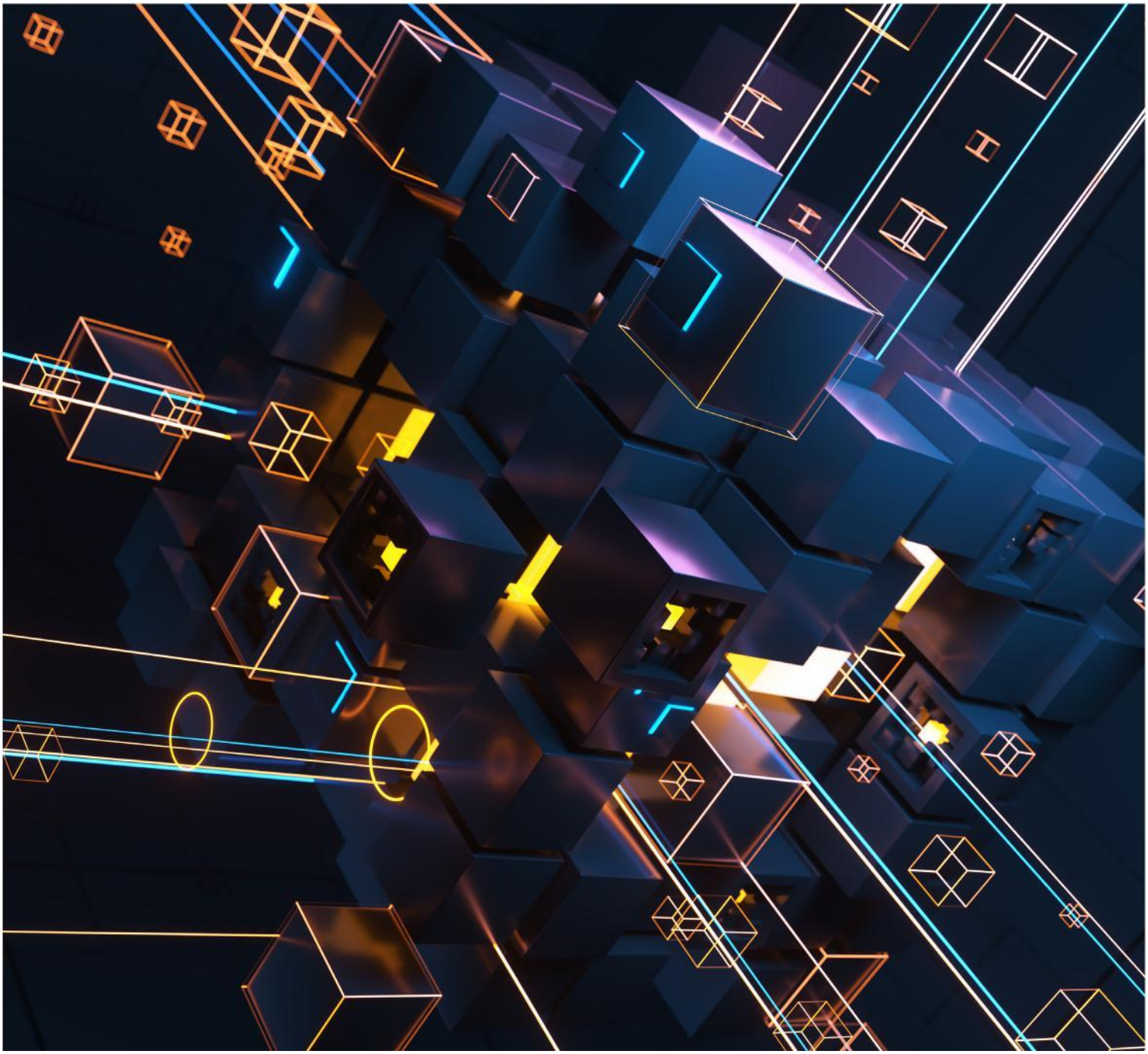
IS NOW THE TIME FOR SOFTWARE-DEFINED STORAGE?

Kingston TECHNOLOGY

Storage Switzerland, LLC



Software-Defined Storage (SDS) is the process of abstracting the storage software from the storage hardware. SDS, on paper, has an undeniable appeal. It should reduce costs by enabling organisations to separate the storage software purchase from the hardware purchase. With SDS, customers should be able to leverage commodity server and storage media pricing to create a far less expensive storage infrastructure.

Although the SDS concept has been available for decades, it has failed to live up to expectations. Both sides of the SDS equation are to blame. The software hasn't fully exploited the potential of being hardware independent. At the same time, the storage hardware didn't have the performance profiles to support it. Thanks to the advent of affordable, high-performance flash, powerful CPUs and high-speed networking, off-the-shelf hardware is now more than ready for SDS.

SDS READINESS

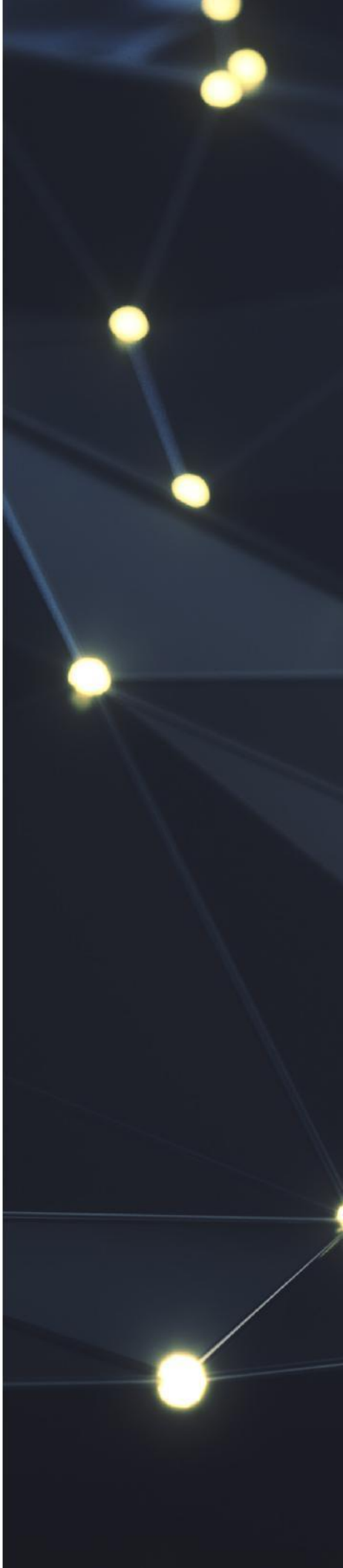
For the SDS concept to work, several components within the storage ecosystem must be true. SDS runs on standard Intel servers. Today, there are plenty of servers explicitly designed to be storage servers. A storage server typically has plenty of room for storage media and plenty of available slots for network interface cards to support storage IO. This type of server configuration is now commonplace. These servers also have the CPU horsepower that SDS requires to perform its functions.

Another critical component of the storage ecosystem is the storage medium, which has undergone a significant improvement thanks to the introduction and advancement of flash technology. When the data centre was mostly hard-disk drives (HDD), SDS software needed to carefully consider the features it delivered because of the latency of HDD. SATA SSDs helped alleviate the HDD bottleneck but still required the use of a performance-robbing SATA host controller. Today, NVMe SSDs provide high performance and very low latencies because a host controller is not required thanks to the direct connection to the CPU. SDS vendors can implement features such as deduplication, erasure coding and compression with almost no noticeable impact to the user.

Networking is another critical component of the storage ecosystem. All SDS solutions are most typically shared storage solutions, and much of the solution's return on investment (ROI) counts on the utilisation efficiencies of shared storage over direct-attached storage. Without a high-performance, low-latency network, those efficiencies are outweighed by the need for performance. The good news for SDS, and customers, is that modern networking technology can deliver IO performance that rivals direct-attached storage, making a shared storage solution ideal for many storage use cases.

A final factor is that each of these components is available from multiple hardware vendors. Customers are relatively free to shop between these vendors for the best technology and the best price. The competitive nature of SDS forces hardware vendors to innovate while being price competitive.

Kingston, for example, innovates on several fronts. It fines tune its drives for specific use cases – some of its SSDs target high-transaction workloads like databases and other more read-intensive workloads. The ability to customise drives to the use case enables Kingston to balance cost and performance to bring the most value to its customers. Kingston also engineers its drives to deliver consistent performance and high reliability through finely tuned firmware to deliver industry-leading Quality of Service (QoS).



HOW VENDORS IMPLEMENT SDS

SDS typically implements two primary form factors. The first is a dedicated server cluster that attaches to the storage hardware. The software provisions storage resources from these drives and provides storage features like snapshots, tiering and replication. Some vendors offer a configuration for virtual environments. The SDS software is virtualised and runs in a scale-out design across the virtual cluster, commonly called hyperconverged infrastructure (HCI). The SDS software can also be virtualised and run as a virtual machine, run on two nodes within the cluster, sharing storage capacity typically installed inside the node hosting it.

THE VALUE OF SDS

The most obvious value point of SDS is its ability to reduce hardware costs. There are other values that IT planners may overlook. The first is the reduction of management complexity. With SDS, the customer has the potential to have a single process to provision, manage and protect storage. They can learn one method instead of six or seven.

Another critical value point of SDS is its ability to future-proof the hardware infrastructure. Since the software is separate from the hardware, the customer can purchase new hardware technology as soon as it becomes available. If the SDS software supports the latest technology or the device is backward compatible, then the customer can connect it to their storage infrastructure and start using it. SDS customers can often enjoy the latest hardware advances months if not years before turnkey vendors implement it. Also, the turnkey vendor doesn't usually add the latest technological advances to old systems. They force the purchase of an entirely new system, including the software. In most cases, the SDS software can also automatically migrate data from the old hardware to the newly implemented hardware.

WHAT TO LOOK FOR IN SDS SOLUTIONS

Again, the essential advantage of SDS is that it provides the organisation greater freedom of choice when selecting hardware. That advantage can also be a challenge. The customer now has two points of decision: what software they should use and what hardware they should use.

When it comes to software, the IT planner should look for software that can cover as many of their use cases as possible. Many solutions can only solve one type of storage problem, for example, block IO but not file sharing. If the IT planner isn't careful, they can end up with an SDS solution for each use case. The SDS solution should also support multiple types of storage media and even a cloud instance. It should be able to move data between these different media types as well as migrate data to new storage as IT implements it into the infrastructure.

A final area to consider is pricing. How is the SDS vendor pricing the solution? Some vendors charge by the power of the storage system it runs on (number of cores), others will charge by capacity. In either case, the customer needs to make sure that the expense of the software doesn't overshadow the cost savings of the hardware.

THE HARDWARE STILL MATTERS

A common mistake when designing an SDS-based storage infrastructure is not to pay careful attention to hardware quality. The organisation still needs to ensure that it buys high-quality hardware from vendors that can support the product and afford to invest resources in continuing to innovate their solutions.

Kingston, for example, has a power-loss protection capability that leverages capacitors and firmware to make sure that all write operations complete even if an unexpected power loss occurs. Their drives also provide QoS to ensure predictability of latency (response time), and consistent IO performance while servicing balanced read and write workloads. They provide these capabilities and more while being very price competitive with the SSDs that are part of a turnkey solution.

CONCLUSION

There has never been a better time to look at a software-defined storage infrastructure. The hardware ecosystem, the server, network and storage media, all perform at much high levels than ever before. That excess in performance leaves plenty of room for software services. The IT planner, however, needs to make sure they use high-quality hardware. They also need to make sure that their software selection can fully exploit the performance potential of the equipment as well as support all the organisation's use cases.

Storage Switzerland is the leading storage analyst firm focused on the emerging storage categories of memory-based storage (Flash), Big Data, virtualisation and cloud computing.

The firm is widely recognised for its blogs, white papers and videos on current approaches such as all-flash arrays, deduplication, SSDs, software-defined storage, backup appliances and storage networking. The name "Storage Switzerland" indicates a pledge to provide neutral analysis of the storage marketplace, rather than focusing on a single vendor approach.

Kingston Technology is a world leader in memory products and technology solutions. With its global headquarters in Fountain Valley, California, Kingston employs more than 3,500 people worldwide. Regarded as one of the "Best Companies to Work for in America" by Fortune magazine, Kingston's tenets of respect, loyalty, flexibility and integrity create an exemplary corporate culture. Kingston believes that investing in employees is essential and that each individual employee is a vital part of the company's success.

Kingston serves an international network of distributors, resellers, retailers and OEM customers on six continents. The company also provides contract manufacturing and supply chain management services for semiconductor manufacturers and system OEMs.