Defining Software-Defined Storage – what benefits does it deliver?

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Software-Defined Storage (SDS) is one of the hottest topics in the IT industry and, as a technology, provides some significant advantages over traditional storage system designs. These advantages translate into substantial benefits that arguably have driven the interest in SDS products to begin with. But not all products labeled as "software-defined" come with all those benefits. For users it's important to understand what they're trying to get from SDS and which solutions can deliver it.

What SDS is and How it's Implemented

SDS is a storage technology that abstracts the storage services from the storage controller and allows them to be run on general-purpose server hardware, like any application. This enables a storage system to be 'built' without the need for expensive, purpose-built hardware to run the controller functions or even house the storage media. SDS has been widely promoted as a way to leverage the availability of inexpensive "commodity" server hardware, direct-attached drives and flash.

SDS has enjoyed a remarkable popularity, as evidenced by the number of products now available from storage vendors of all sizes. There are several approaches to implementation that make SDS solutions different, but they tend to be provided in one of two forms: as a pure software product or as software that's sold with specific hardware.

Software-only SDS

The software-only approach enables the customer to use various server hardware and storage components, either purchased for each implementation, or repurposed from existing equipment. This allows the customer to configure their storage system to their exact specifications, within the parameters of the SDS software. It also can be a very cost effective way to build a storage infrastructure.

The other approach is to sell the SDS software integrated into purpose-built hardware modules, as many existing storage vendors have done. These come in clustered "scale-out" designs with storage embedded into each networked server or traditional, "scale-up" designs comprised of dedicated controller and storage modules. While this implementation method can provide a more 'turnkey' solution, it doesn't offer the same number of options for the users that software-only approach does. At the same time software-only solutions can easily partner with hardware providers to offer a similar end-to-end solution.

Vendor-defined Storage

Traditional storage vendors have historically designed purpose-built storage hardware that's tightly integrated with their software. Over the years, they've evolved these systems to use more standardized hardware to drive down costs (their costs, not necessarily the customers'). Now, these legacy storage vendors, as well as many start-up storage companies, are continuing this evolution using SDS.

This technology makes it easier to incorporate new components or subsystems into their storage products, leveraging the component upgrade cycle. But these systems take much of the design options out of the users' hands, prompting the term "vendor-defined storage".

Why SDS is so popular

SDS has become a compelling topic for IT because of what it can do - the benefits it can deliver in the data center - not from the technology, per se. So while the particular implementation of the technology is interesting, it's not the whole story.

What SDS can deliver:

Empowerment
By providing the option to use third party hardware, users aren't tied to a single vendor for capacity upgrades. They also have the freedom to choose their hardware supplier for the initial system implementation.

Flexibility
By not restricting hardware to a single vendor, users can choose components that best fit their applications, such as flash storage for performance and large disk drives for capacity. This also makes it simple to configure or "define" the software services for individual workloads, instead of at the system level like traditional storage designs have done.

Innovation
The abstraction of storage services from the hardware and the standardization that this produces makes SDS storage systems better able to 'ride the hardware development curve', leveraging the upgrades in CPU power, drive capacity, even REST-enabled disk drives, that these manufacturers bring to market. SDS also provides the ability to do other things with storage systems, like hyper-convergence, and frees up the design to support more innovation as new technologies develop.

Economics
But the biggest benefit of SDS is probably in the area of cost. By enabling the use of commodity hardware, software-only SDS storage systems let these savings flow through to the end user. And, some even allow the user to leverage existing hardware, where appropriate, providing another opportunity to save money.

Software-only vs. Vendor-defined

While both of these approaches leverage SDS technology, they differ on how well they deliver the benefits listed above. Most of the vendor-defined solutions only allow customers to use the storage servers, media and components the vendor supplies and don't allow the reuse of existing equipment. While they may be using commodity hardware in their designs, they're not always passing those savings through to their customers.

Software-only SDS solutions, like those from Nexenta, support the use of any appropriate hardware, including existing systems and components. Since they only sell software, users can capture all the available hardware cost savings. They're also free to purchase the initial system, and future upgrades, from any vendor that offers appropriate hardware.

Vendor-defined solutions sold as pre-configured systems can simplify implementation, but can also effectively limit the options available to users. Software-only SDS systems support more hardware options and typically provide more software features and functionality as well. This can give users the flexibility to configure their SDS systems to best match individual workloads, and then reconfigure them when those workloads change.

However, both vendor-defined and software-only solutions are usually able to take advantage of component upgrade cycles, as described above, and many are starting to include hyper-converged options as well.

Conclusion

The point of this article isn't to argue semantics, but to emphasize the importance of understanding what you're buying. Software-Defined Storage has become a hot topic in the IT industry because it's enabling products that can do some powerful things. But potential users interested in SDS need to be sure that they're getting all the benefits they are after.

Other solutions, like 'vendor-defined storage' or SDS products that include proprietary hardware, can come up short on economics, flexibility and the freedom to use any appropriate hardware. Software-only solutions deliver all the benefits of SDS without restricting the user's ability to truly define their storage systems.