# ʃESKELL
### Systems, LLC

SOFTWARE-DEFINED STORAGE:

# A SMART, ECONOMICAL APPROACH TO DATA GROWTH AND INFORMATION SECURITY FOR THE FEDERAL GOVERNMENT

**Russell T. Schneider, Storage Systems Program Director**

**Russell T. Schneider, Storage Systems Program Director**

## EXECUTIVE SUMMARY

Federal government agencies and departments face an uphill battle managing data growth while operating within tight budget constraints. Keeping ahead of growth with traditional monolithic storage systems has become expensive, complex, and difficult to manage.

Alternatively, software-defined storage offers a fresh and vastly more economical approach. Instead of being mired in costly, time-consuming storage migrations every few years, federal government agencies are turning to software-defined storage to incrementally scale inexpensive x86-based commodity servers and storage and centrally manage their entire infrastructures.

This white paper explains the advantages of software-defined storage over monolithic storage. It highlights opportunities to improve performance, scalability, and agility, as well as strengthen security and data protection. It also shows how software-defined storage achieves these benefits while simplifying storage administration. In addition, the paper provides best practices gleaned from Jeskell's real-world experience deploying and managing software-defined storage solutions. By following these recommendations, government organizations will gain the insights necessary to help ensure a smooth and successful transformation, quickly realizing the benefits of software-defined storage.

## INTRODUCTION

Imagine if every time you bought a new PC you had to learn a whole new operating system, buy and learn all new applications, create a new user ID, set up your preferences, and transfer your old files. Sounds like a nightmare, right? So why would you want to do that with your enterprise storage?

Conventional wisdom dictates that when you outgrow your existing storage, you replace it with the next generation to access the latest capabilities. But like with the PC example, you would have to learn a new graphical user interface (GUI), configure new zones and network connections, set up policies, migrate the old data, and on and on. Adding to the complexity is that medium-to-large government organizations typically manage multiple generations of storage environments. Each environment has its own GUI, specifications, capabilities, and specialized operating and maintenance procedures.

This all-too-real scenario is extremely costly, inefficient, inflexible, and difficult to scale. It creates daunting challenges for managing security, ensuring data integrity and availability, and maintaining compliance. And these challenges compound exponentially as data continues to grow at a relentless pace.

Enterprise storage does not have to be this way. Instead of forklifting a new monolithic storage system with all the latest bells and whistles, why not get the next-generation of storage capabilities in a simple software update that runs across any storage in your environment?

This is the basic concept of software-defined storage. It's a smart, flexible way to handle storage growth and gain the most advanced storage capabilities while keeping storage administration simple and efficient.

## TRANSFORMING STORAGE WITH SOFTWARE

With software-defined storage, hardware becomes less significant. Software creates all the storage functionality, giving the freedom to use any inexpensive x86-based commodity servers and storage from quality vendors. (Figure 1) This provides important advantages over monolithic storage, including improved scalability, lower cost, stronger security, and simpler administration. In addition, commoditized hardware is advancing rapidly, and the latest generations can be implemented at a low cost every 2 to 3 years.

## SCALE PERFORMANCE AND CAPACITY WITH EASE

Software-defined storage enables government organizations to scale performance and capacity with virtually no limitations. For more performance, simply add servers with faster processors and proportionally smaller disk drives. To increase capacity, choose servers with less CPU power and bigger disk drives. It's that simple.

Whether you have four or four-dozen physical devices, there's still a single software-defined storage image running across them all. A software feature called concurrent upgrade automatically distributes data across all available devices once they are added.

In software-defined storage, you also gain greater agility. Because data is spread across disk drives on multiple servers, it's easy to replace servers or perform maintenance without disrupting production operations. Simply move data off the server being replaced or repaired, and redistribute data again when the server is back online.

## GAIN MORE CAPABILITIES IN A SIMPLER ENVIRONMENT

Software-defined storage simplifies your storage environment, offering substantial savings in money and time. Commodity hardware at the physical layer is a fraction of the cost of monolithic systems. In addition, expensive, time-draining data migrations to upgrade monolithic storage systems are a thing of the past. Nor do you need to repurchase the latest generation of expensive storage systems every few years.
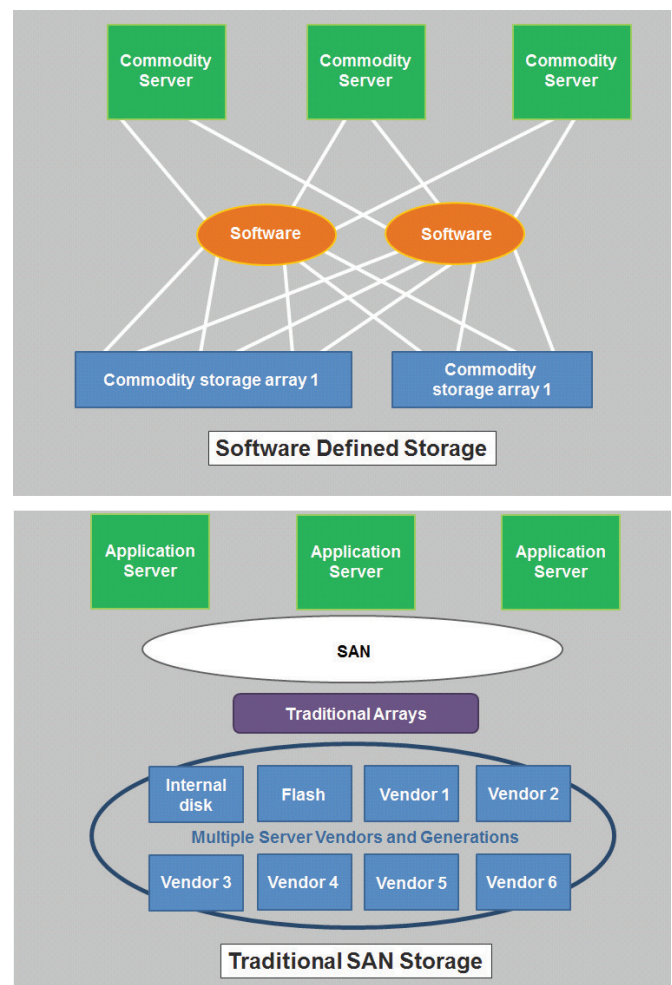


Figure 1 – Typical Software-Defined Storage Configuration vs. Traditional Storage Configuration

You also eliminate time needed for training staff when a new system is introduced. From the administrators' perspective, nothing changes since they continue using the same GUI to manage both new and existing capacity.

With software-defined storage, it's easy to keep up with the latest storage enhancements since updates are automatic and occur without interrupting production operations. This is compared to the days, weeks or even months involved with rolling out the latest generation of a storage infrastructure. In addition, storage vendors have released remarkable new software-based functionality in recent years. Encryption, real-time compression, data migration, replication, and secure erasure are just a few examples. For example, with real-time compression, you double the capacity of your existing storage and address your data growth issues without purchasing new hardware. And more functionality is on the way.

## STRONGER SECURITY THROUGHOUT THE DATA LIFECYCLE

Data security is of utmost importance in the federal government. Software-defined storage offers significant advantages for protecting private, sensitive information — both active and inactive. For example, the traditional approach to cryptographic erasure of unused data involves taking storage servers offline for two or three days to overwrite disk space and employ the DoD 5220.22-M data sanitization method. This can be extremely disruptive, especially if you're erasing a small volume of test data that may contain personally identifiable information.

Through software, you can encrypt data volume-by-volume, each with its own encryption master key. Then, when the data is no longer needed, you can cryptographically erase it with a simple software command that shreds the key in seconds.

## SIMPLER AND MORE COST-EFFECTIVE STORAGE ADMINISTRATION

With traditional monolithic storage, each environment must be managed individually. In a software-defined storage environment, no matter how many individual servers and disks you may have, all are managed as one storage system. Based on Jeskell's experience with customers, this approach can reduce storage administration time up to 60 to 80 percent.

Another way software-defined storage simplifies administration is by automatically placing data on the appropriate storage tier at each stage of the data lifecycle. This helps reduce the cost to maintain storage over time.

As data ages, software-defined storage automatically moves it from fast, expensive tiers (in-memory, cache, flash) to higher capacity, lower-cost tiers (spinning disk of various speeds), to inexpensive yet highly secure physical media (tape). This hierarchical storage management (HSM) increases cost efficiency and data access, which is especially important as data continues to grow.

By storing rarely used data on tape, you further reduce storage costs and protect data from hackers because it is physically offline.

While restoring data from tape was traditionally a tedious, manual process, software-defined storage enables you to access data on tape as easily as if it were on a local PC.

## BEST PRACTICE RECOMMENDATIONS

The best practices described in this section come from Jeskell's 25 years of experience providing systems integration, storage implementations, data migrations, encryption, and other expert engagement services to our federal government customers. Putting these recommendations into practice will help ensure a smooth and successful transition and allow users to quickly reap the benefits of software-defined storage.

### 1) Accelerate adoption with a pre-integrated solution

Most government organizations should implement a pre-integrated software-defined storage solution rather than build one from scratch. This will save time and minimize potential problems. There are a number of pre-integrated solutions providing a complete stack of servers, switches, disk, and software that can be deployed in three to six weeks. By comparison, a similar piecemeal approach can take three to six months to implement. Plus, pre-integrated solutions have

been fully tested, eliminating interoperability issues that may arise when integrating software-defined storage with your existing server, network switch, and storage environments.

### 2) Extend value through external virtualization

Choose software-defined storage that features external virtualization. This extends the software-driven environment to your existing and newly acquired storage regardless of vendor. You not only gain the latest storage capabilities across your storage infrastructure, but you also simplify administration.

For example, if the new software-defined storage solution includes advanced features such as encryption, replication, secure erasure, and real-time compression, external virtualization provides all of your storage systems with these same capabilities even if they did not have them before. For example, with real-time compression, you double the capacity of your existing storage capacity and solve the data growth conundrum — and all without purchasing new hardware. Also, if you previously managed multiple generations of storage as individual solutions, external virtualization enables you to manage them as a single storage pool.

"...Instead of forklifting a new monolithic storage system with all the latest bells and whistles, why not get the next-generation of storage capabilities in a simple software update that runs across any storage in your environment?

This is the basic concept of software-defined storage. It's a smart, flexible way to handle storage growth and gain the most advanced storage capabilities while keeping storage administration simple and efficient."

### 3) Enable continuous operations across multiple sites

To maximize data protection, software-defined storage solutions should be deployed across multiple geographically separated sites in a private or hybrid cloud. (Figure 2) This approach, called geo-dispersion, is distinct from traditional replication-based disaster recovery, which still requires considerable effort to recover data and reestablish operations at a remote site following an outage.

### 4) Improve results by engaging storage experts

Work with an outside storage expert to guide solution selection and implementation when you first deploy software-defined storage and any time you change or expand the solution.

The reason is simple: storage experts are immersed in all aspects of the technology and bring both the knowledge and experience to do the job right the first time.

IT organizations within government organizations typically perform installations or upgrades only every few years. That means they have to learn the solution and work through all the details every time to ensure a high-quality configuration and data integrity. Dedicated storage experts already have deep knowledge of software-defined storage solutions. Because they perform installations and upgrades all the time, storage experts can eliminate the time and frustration that often accompanies any new technology adoption. It's the best way to ensure you get the optimal solution tailored to your needs, and one that is installed and configured correctly.
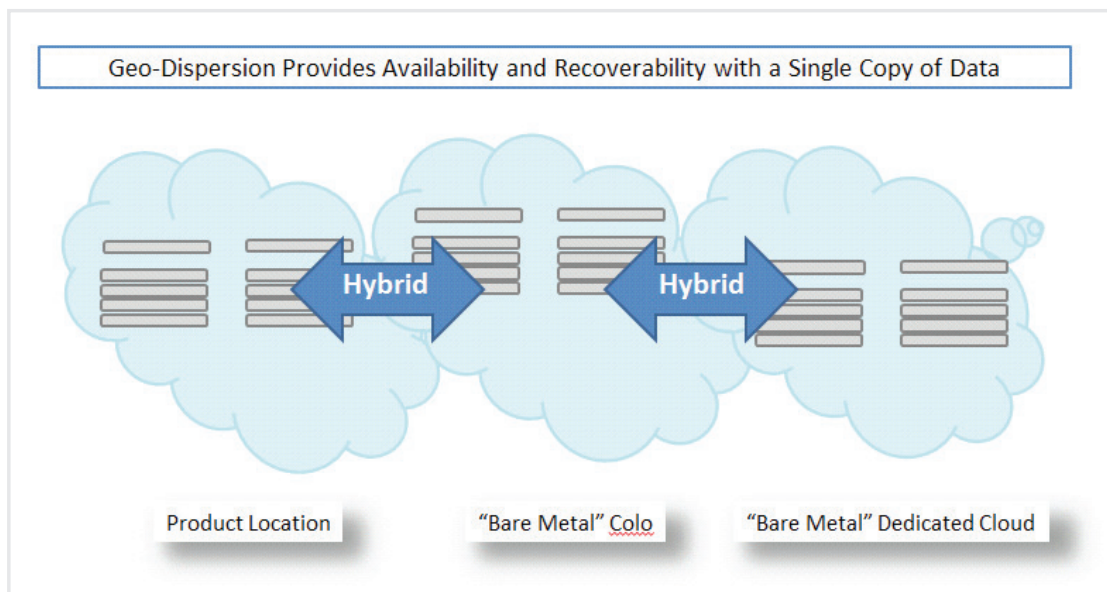


Figure 2 - Multi-Site Software-Defined Storage Configuration

## CONCLUSION

As the federal government continues to grapple with exponential data growth that shows no sign of slowing, software-defined storage offers an easy to manage, cost-effective, and infinitely scalable solution. Software-defined storage is a profound departure from traditional monolithic storage environments.

By liberating storage hardware from storage configuration and management, you can deploy inexpensive x86- based commodity servers and disk systems to continually expand capacity and performance. Also importantly, you retain software-based user controls that stay consistent regardless of the underlying physical infrastructure. This dramatically simplifies the entire storage environment, lowers total cost of ownership, and saves countless hours of staff time.

With software-defined storage, you gain unprecedented flexibility to adopt the latest storage functionality without forklift migrations. Hardware is no longer the focus since all storage functionality resides in software. Instead of waiting for a next-generation storage solution, then spending weeks or months on configurations and learning a whole new user interface, you access the newest, most advanced capabilities with a relatively simple software update.

No matter how many servers or disk subsystems you deploy across your organization, software-defined storage allows you manage everything as one big storage environment. This keeps administration simple and consistent, regardless of how many devices or sites your storage environment encompasses. To efficiently handle data growth while ensuring performance, agility, security, and high availability with low administrative overhead, software-defined storage is the ideal solution for the federal government.

DOES YOUR AGENCY HAVE QUESTIONS ABOUT
# SOFTWARE DEFINED STORAGE?

Contact Jeskell today for a free consultation.
**info@jeskell.com** or **1-877-JESKELL**

6201 Chevy Chase Drive Laurel, MD 20707