

Software-Defined Storage Made Simple with SUSE and Dell



Increasing Value of Data Calls for a New Approach to Storage

Data is experienced unprecedented growth both in volume and complexity. As organizations find the need to store increasing volumes of structured and unstructured data—whether for compliance requirements or for running analytics—they're faced with equally skyrocketing storage needs.

Proprietary hardware-based storage is expensive and hard to manage, and quickly becomes less of an option as data volumes swell. And cloud storage, while less expensive up front, can be complicated with service tiering and can cost more in the long run if you need to get access to your data.

Today's enterprises are adopting another approach: software-defined storage (SDS). This system delivers a full suite of persistent storage services via an autonomous software stack that can run on an industry-standard, commodity hardware platform. The SDS solution enables more dynamic storage provisioning so it can better handle fluctuating workload needs. It also scales easily and quickly as needed, and allows you to affordably create disk-to-disk backups.

Now SDS is even easier to implement and manage, thanks to a combined solution from Dell and SUSE. With SUSE® Enterprise Storage on Dell PowerEdge servers, you get more value and fewer constraints in managing today's growing volume of data.

Target Audience

This paper is meant for architects of enterprise storage, as well as other IT professionals and managers who want to get a larger view of how a software-defined storage solution could help solve their storage challenges. This is not meant as a reference architecture or setup guide. For those in search of that kind of information, links to more technical documents are included throughout.

Dell and SUSE Deliver Affordable Storage That Fits Your Business

Dell and SUSE have collaborated for almost a decade to jointly develop Linux-based solutions that solve today's complex enterprise IT challenges. The SUSE Linux operating system is a key component of many Dell software and appliance-based solutions, and SUSE Linux Enterprise Server is validated on all Dell PowerEdge servers.

Together, Dell and SUSE have created a single, integrated storage solution based on Ceph, the most popular software-defined storage solution for OpenStack today. That means it's extensively scalable and provides industry-leading storage functionality. Ceph unifies block, object and file storage and manages it all as object storage behind the scenes—eliminating the need for storage tiering.

The solution is also affordable. SUSE Enterprise Storage offers a per-node licensing model, so you're not penalized for every gigabyte you store. And you can avoid the cost of expensive, inflexible appliances and instead invest in reliable Dell servers. Combine the savings and your overall price per gigabyte stored can potentially rival that of public cloud providers—including hardware costs.

Only Dell and SUSE can deliver the storage solution that gives you affordable, unlimited scalability; one-element storage for all types of data; and maximum ease, automation and control.

A perfect example of the solution's affordability is in the use case of disk-to-disk backup. You can see exactly how SUSE Enterprise Storage stacked up against other options in IT Brand Pulse's *TCO Case Study: Backing Up Mountains of Data to Disk*.

A Closer Look at the Components

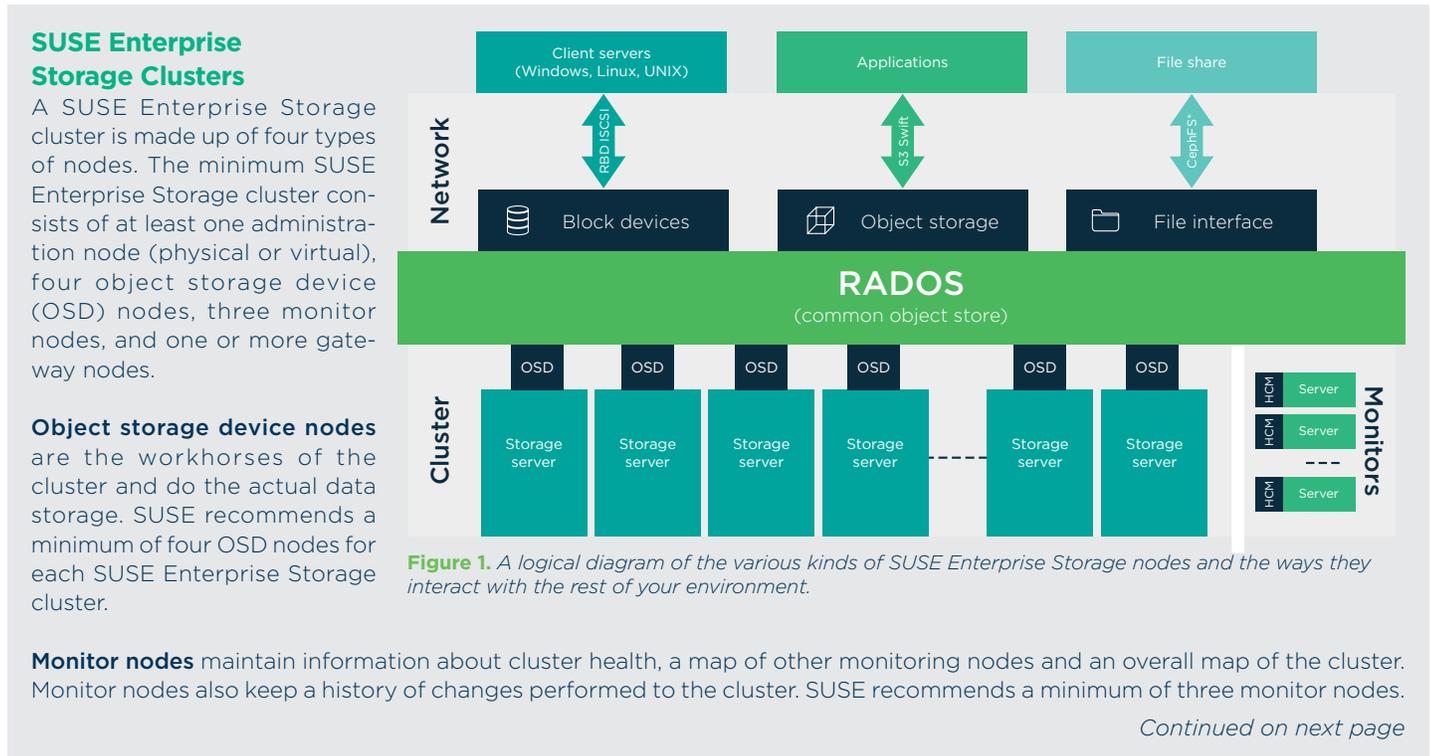
SUSE Enterprise Storage

SUSE Enterprise Storage is designed as a distributed storage cluster to provide unlimited scalability from tens of terabytes to petabytes (see sidebar for more information). You can easily add Dell hardware and extend SUSE Enterprise Storage at the rate your organization needs. Because it is self-managing, your IT burden does not grow faster than your storage—the system recognizes when you add hardware and automatically integrates it into the infrastructure and redistributes workloads as needed.

Thanks to Ceph technology, a single system administrator can manage up to 3-4 PB of data, six times more than an administrator in an equivalent block-storage environment. The solution can scale even further horizontally, with increasing performance results as it grows.

Ceph also comes with erasure coding, which lets you define settings for data protection. You can determine how many device failures your cluster can tolerate before considering the data compromised. The latest iteration of Ceph, available in SUSE Enterprise Storage 5, offers BlueStore, which doubles the write performance of previous releases and significantly reduces input and output latency. It can also help you free up capacity via data compression.

We also simplify deployment and management. SUSE Enterprise Storage uses DeepSea to provide easy installation and cluster setup and openATTIC helps you easily manage and monitor your SUSE Enterprise Storage cluster.



SUSE Enterprise Storage Clusters *continued*

Gateway nodes translate between your backup server and the SUSE Enterprise Storage cluster. If you have two different backup servers or archive applications, one using object storage and one using block storage, you would need two gateway nodes.

- For object storage (such as Amazon S3 and OpenStack Swift), use a Ceph RADOS Gateway.
- For block storage, SUSE uses iSCSI gateways that enable block and multipathing storage to heterogeneous clients like Windows and VMware vSphere.
- For file storage, use either Ceph Filesystem (CephFS) or NFS-Ganesha.

Admin nodes allow you to make changes to your Ceph cluster. They have the smallest requirements of any of the nodes and can be run as a virtual machine or on repurposed existing hardware, if desired.

You can deploy SUSE Enterprise Storage using DeepSea and Salt. Guidelines are available in the [SUSE Enterprise Storage documentation](#).

Dell PowerEdge Servers

Dell offers a full range of PowerEdge servers to fit your specific storage needs. The Dell PowerEdge R940 server platform is the latest model: a high-performance four-socket, three-unit rack server designed for reliability and scalability for mission-critical applications. It can scale to accommodate mixed workloads while maximizing the performance of your applications and managing server lifecycles.

The PowerEdge R940 supports 50 percent more Non-Volatile Memory Express (NVMe) drives than the R930, up to 48 dual inline memory modules (DIMMs, 12 of which can be NVDIMMs) and up to 6 TB of memory. It can make input/output bottlenecks a thing of the past and keep processor utilization at its peak. Proactive diagnostics and automated remediation can increase productivity by up to 90 percent.¹

The range of Dell servers can accommodate any size of data center and provide efficient growth and scalability without

“With SUSE Enterprise Storage, we have built a very high-performing and scalable storage landscape at a fraction of the cost than we would have been able to with traditional storage systems.”

SIMON NAUGHTON

Director of Infrastructure and Operations
Swinburne University of Technology

rip-and-replace costs. Dell technologies built into the servers, like the Dell OpenManage system management portfolio and the integrated Dell Remote Access Controller with Lifecycle Controller, automate and simplify many lifecycle management tasks.

A Solution for All the Ways You Store Data

SUSE Enterprise Storage on Dell hardware gives you a lot of options when it comes to how you want to use the solution. Here’s a look at several common workloads supported by the solution.

Disk-Based Backup

For disaster recovery purposes, most organizations have short and aggressive recovery time objectives (RTOs). Traditional tape backup is cost-efficient but it takes too long to retrieve data and get it back into action. That means that organizations in the past have had to invest in more expensive disaster recovery options. This often leads to duplication of effort, with a tape backup for most data and a disaster recovery backup for mission-critical data. Because of the lower cost of a SUSE Enterprise Storage solution, you have the option to store more data on-premises, and because a disk-to-disk backup solution is always on and offers rapid recovery of data, you no longer need another system. You can back up everything your organization needs while offering your end users a better RTO.

¹ “Resolving Server Problems with Dell ProSupport Plus and SupportAssist,” Principled Technologies lab testing report, September 2015.

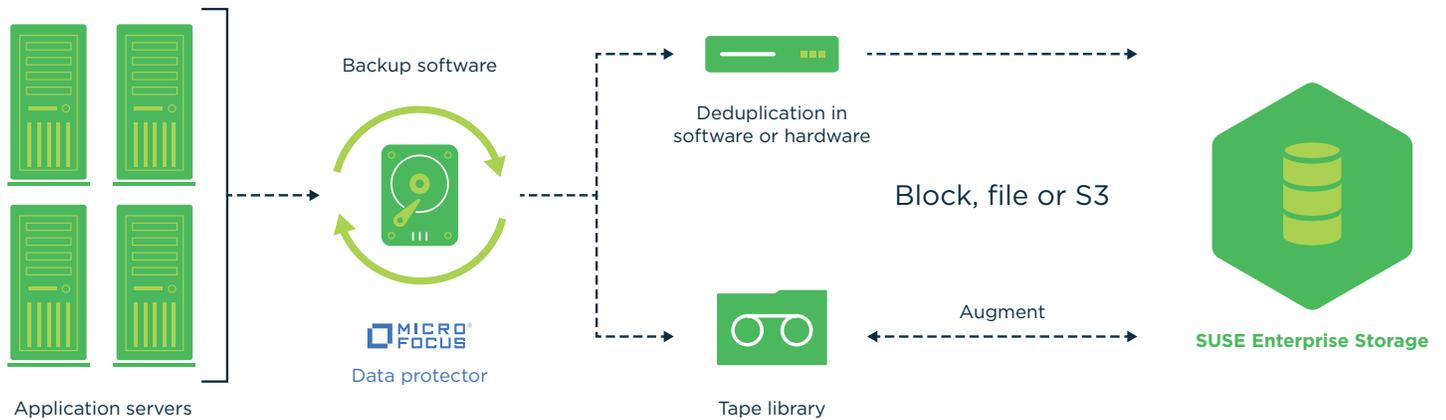


Figure 2. SUSE Storage Solution for Disk-Based Backup

Archiving

Enterprises have a lot of data that has to be stored for long periods of time. SUSE Enterprise Storage on Dell servers can act as a target for archiving systems that include Commvault, Veeam and proprietary in-house tools.

LARGE FILE ARCHIVING

Some enterprises, like those in video surveillance, healthcare or the media industry, need to store large numbers of potentially very large files. These video and content files also need to be available at all times. When data includes massive files such as video, sound and image archives; electronic medical records; or research data and simulations, SUSE Enterprise Storage on Dell servers can be an affordable way to accommodate that needed capacity and will continue to scale as needed.

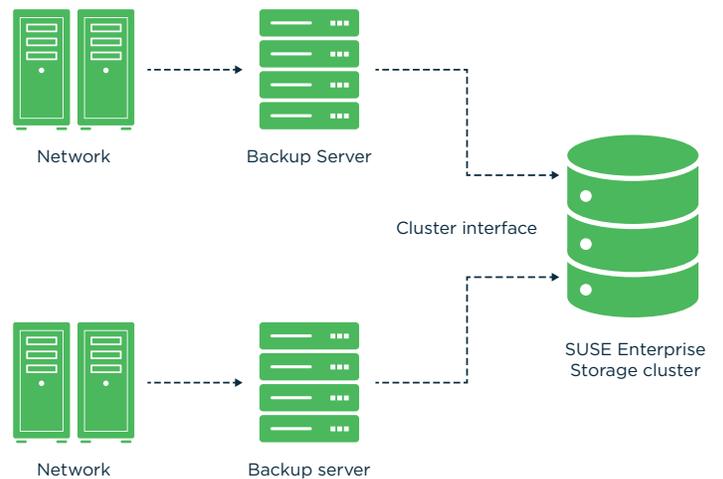


Figure 3. SUSE Storage Solution Large File Archiving

“SUSE Enterprise Storage helps IT be a better partner to research teams. We can deliver rapid, reliable storage, and guarantee the security and integrity of the data we store ... and we look forward to harnessing this platform to drive groundbreaking research for years to come.”

SIMON NAUGHTON

Director of Infrastructure and Operations
Swinburne University of Technology

SUSE Enterprise Storage 5 is based on the Ceph Luminous release and increases write performance by up to a factor of two. A more pervasive support of erasure coding boosts fault tolerance, while compression and much more powerful management capabilities increase efficiency.

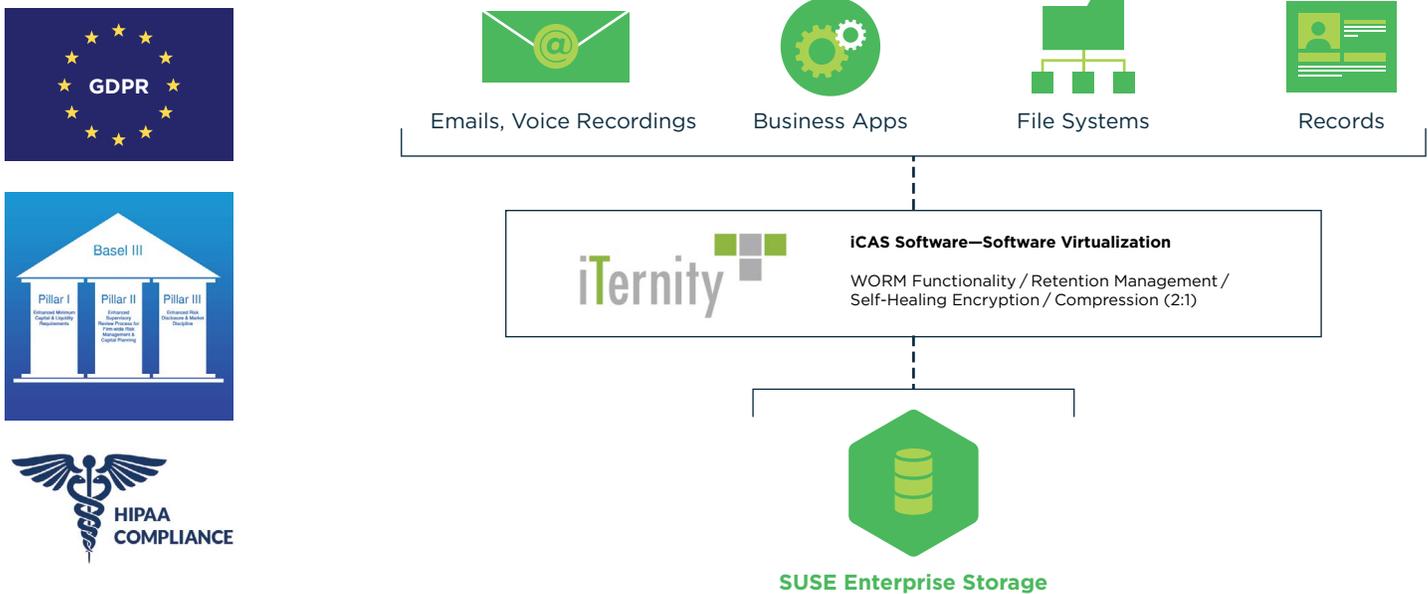


Figure 4. SUSE Storage Solution for Compliance Archiving

Compliance Archiving

To remain compliant with various regulations, you may have to store emails, legal documents and other files for specified periods of time. SUSE Enterprise Storage can act as a target for compliance archiving systems such as iTernity to meet these very specific requirements.

Shared Storage for OpenStack

OpenStack users greatly prefer Ceph over competitors as their storage driver for OpenStack cloud deployments.² That’s partly

² “OpenStack User Survey,” OpenStack Foundation, April 2016.



Success Story: Swinburne University of Technology, Melbourne, Australia

Challenge:

How to accommodate an ever-growing need for greater compute and storage resources without sacrificing performance and capacity—while sticking to a tight budget.

Solution:

SUSE Enterprise Storage on Dell PowerEdge servers. The university has set up the storage environment in a high-availability configuration, continuously replicating data between its main data center and its secondary site. Swinburne uses Commvault software to provide enterprise backup and recovery, using SUSE Enterprise Storage as its cloud-based target storage.

Results:

- Virtually unlimited scalability to keep pace with rising data storage needs
- Lower capital expenditures and ongoing infrastructure costs (on-premises storage at approximately half the cost of the equivalent public cloud providers’ service)

[View the complete success story.](#)

because it scales well with OpenStack and also because it unifies block, object and file storage into one integrated solution. OpenStack users often use a shared storage subsystem to enable quick, live instance migration between compute resources—and SUSE Enterprise Storage can provide additional scale options at petabyte levels.

Affordable, Scalable Storage Can Change the Game

Software-defined storage from SUSE and Dell can help you get more value out of your data by storing more, longer. With cost-effective storage that effortlessly scales as your business grows, you can save money with Dell hardware;

work more productively by simplifying management; and get more functionality out of the solution with the deep expertise and seamless support of industry-leading hardware and software partners.

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Additional contact information and office locations:
www.suse.com

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