White Paper

SUSE Enterprise Storage

Affordable Storage for Mountains of Data with SUSE and Supermicro

Taming Out-of-Control Data Growth

It doesn't require another exponential curve on a chart to tell you what anyone in charge of enterprise data storage already knows: Keeping up is going to be hard. Experts expect the size of the digital universe to double every two years.[1] Is your enterprise ready for its share of that data?

It can be, with software-defined storage. Traditional, on-premises solutions are expensive to manage and don't scale easily. And cloud storage, while attractively priced on entry, can become cost-prohibitive when accessing data at near real time or in high volume.

That's why SUSE and Supermicro have teamed up to offer you a software-defined storage solution that provides cost-effective, infinitely scalable data storage. With SUSE® Enterprise Storage and hardware from Supermicro, you can keep up with mountains of data without breaking the bank.

A Better Storage Solution

SUSE Enterprise Storage is an enterprise-ready version of the open source, software-defined storage solution Ceph. It unifies file, block and object storage in one solution that allows you to use cost-effective x86 hardware rather than expensive branded disk arrays.

Supermicro servers offer quality performance at a price below most competitors. By taking advantage of Supermicro's wide portfolio of hardware choices—including the greenest and most energy-efficient x86 servers on the market[2]—you can build the perfect solution for your data center while controlling your energy demands.

When considering today's data volumes, the system's scalability may be its most important feature. You can scale your storage without per-gigabyte software pricing weighing you down. SUSE Enterprise Storage is priced by node rather than capacity. And Supermicro's flexibility and willingness to provide just the configuration you require means you can design or expand those nodes to your precise specifications.

When you do, SUSE Enterprise Storage easily integrates new hardware as you scale, reducing the burden on your IT staff. The solution is self-managing and self-healing to reduce management tasks and costs. You can install and set up clusters easily using DeepSea and monitor and manage them with openATTIC. Software-defined storage also allows you to update your storage software and your hardware separately, to take advantage of new innovations in either area.

Because it is based on the latest Ceph release, SUSE Enterprise Storage offers:

- *Up to double the write performance of previous releases, coupled with significant reductions in I/O latency through the use of BlueStore*

1 *"The Exponential Growth of Data," Inside Big Data, Feb. 16, 2017.* **https://insidebigdata.com/2017/02/16/the-exponential-growth-of-data/**
2 **www.supermicro.com/about/greencomputing/**

- *Reduced data storage overhead through BlueStore-enabled data compression*
- *Increased disk space efficiency through erasure coding for block devices and Ceph File System (CephFS) data*

All that means a better chance to tackle serious storage challenges. For backup and archive demands, the SUSE and Supermicro solution lets you access your data much faster than you would be able to on tape while avoiding the high costs of branded appliances and disk arrays. You can also avoid compliance and bandwidth issues involved in keeping backups in the public cloud. SUSE Enterprise Storage is certified with a variety of backup and archive software.

The solution can also help you build efficient and cost-effective data lakes for high-performance computing (HPC) systems. The solution's energy efficiency and ease of management help keep the costs of your HPC system down and let your experts focus on running your HPC workloads, not on keeping up infrastructure.

Optional Supermicro services for rack integration, onsite support and onsite integration can further streamline the implementation process and ensure the quickest path to a cost-effective software-defined storage solution.

Anatomy of a SUSE Enterprise Storage Cluster

A SUSE Enterprise Storage cluster is made up of four types of nodes. The minimum SUSE Enterprise Storage cluster consists of at least one administration (admin) node (physical or virtual), four object storage device (OSD) nodes, three monitor nodes, and one or more gateway nodes when required for protocol support.

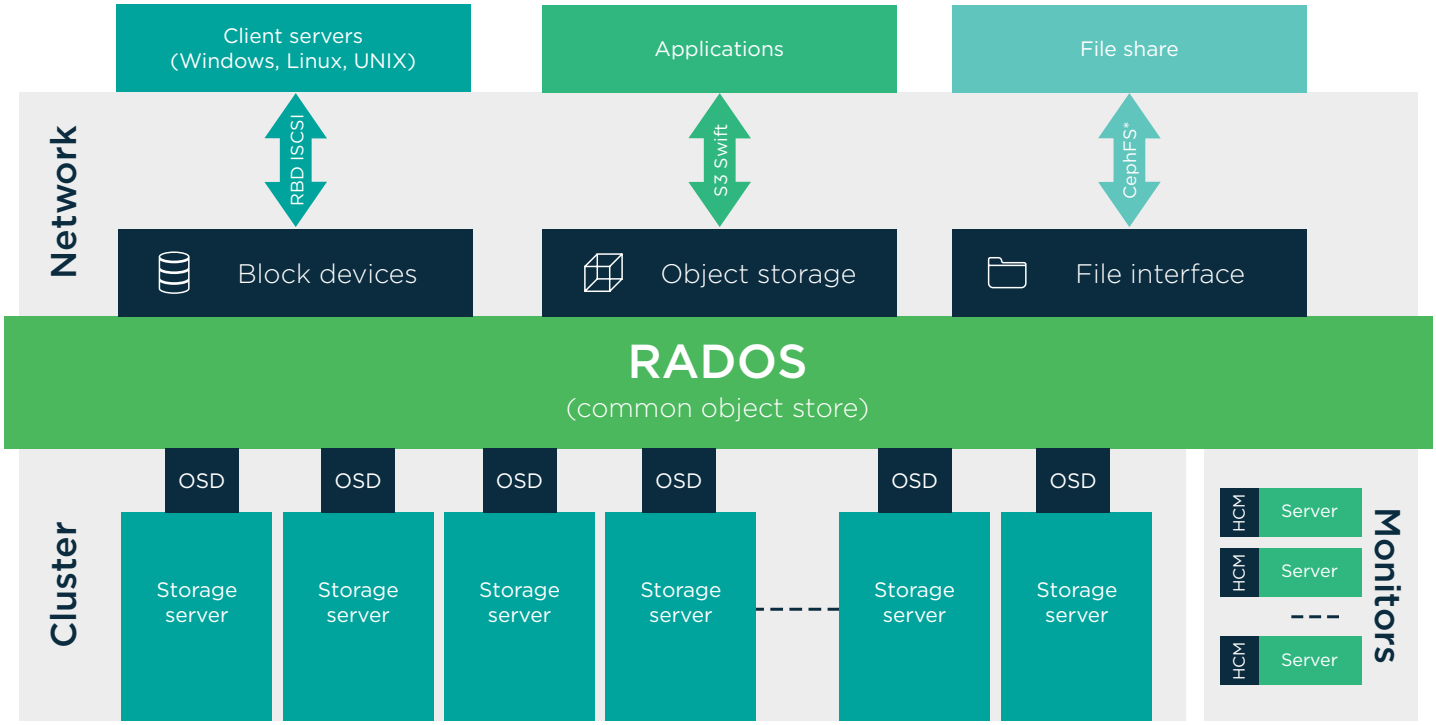

Figure 1. *A logical diagram of the various kinds of SUSE Enterprise Storage nodes and the ways they interact with the rest of your environment.*

Admin Node
This node allows you to make changes to your Ceph cluster and is the default location to run the web graphical user interface. It has the smallest requirements of any of the nodes. You can run it as a virtual machine or on repurposed existing hardware, if desired.

Object Storage Device Nodes
OSD nodes are the workhorses of the cluster and do the actual data storage. SUSE recommends a minimum of four OSDs for each SUSE Enterprise Storage cluster.

Monitor Nodes
These nodes maintain information about cluster health, a map of other monitoring nodes and an overall map of the cluster. Monitor nodes also keep a history of changes performed to the cluster. SUSE recommends a minimum of three monitor nodes.

Gateway Nodes
These nodes translate between your application servers and the SUSE Enterprise Storage cluster. If you have two different application servers, one using S3 object storage and one using ISCSI block storage, you would need two gateway nodes.

- *For object storage (such as S3 and Swift), use a Ceph RADOS Gateway.*
- *For block storage, SUSE uses iSCSI gateways that provide active-active multi-pathed storage to heterogeneous clients like Windows and VMware vSphere.*
- *For file storage, you can use an NFS-Ganesha gateway or you can use Ceph Filesystem (CephFS), which does not require a gateway but instead a metadata server (MDS) node to provide metadata to clients.*

Supermicro offers a variety of SUSE YES-certified servers as building blocks for our cluster. The SYS-5019P-DCFN makes an ideal admin, monitor or gateway node. Or you can combine some of your admin, monitor and gateway nodes in a single blade server by using the SYS-6029TP-DCFN to fit four hot-pluggable systems (nodes) in a 2U form factor.

For your OSD nodes, Supermicro servers such as the SYS-6029U-DCSO, SYS-6029U-DCSO-AF and SSG-6049P-DCLO work well and offer a mix of form factors, all-Flash and storage-optimized designs.

You can review a complete reference configuration here: www.supermicro.com/solutions/SUSE_ceph.cfm, including additional certified server options and tables to help you select the right servers for high-performance, block, archiving or cold-storage use cases.

You can deploy SUSE Enterprise Storage using DeepSea and Salt. Guidelines are available in the SUSE Enterprise Storage documentation.

Use Cases to Match Your Storage Challenge
Here's a look at several common workloads supported by the combined SUSE and Supermicro solution.

Disk-Based Backup
For disaster recovery purposes, most organizations have short and aggressive recovery-time objectives (RTOs). There's little chance that tape backup can meet such an RTO. 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 and Supermicro 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.

Get cost-effective, infinitely scalable data storage with SUSE Enterprise Storage and Supermicro servers.

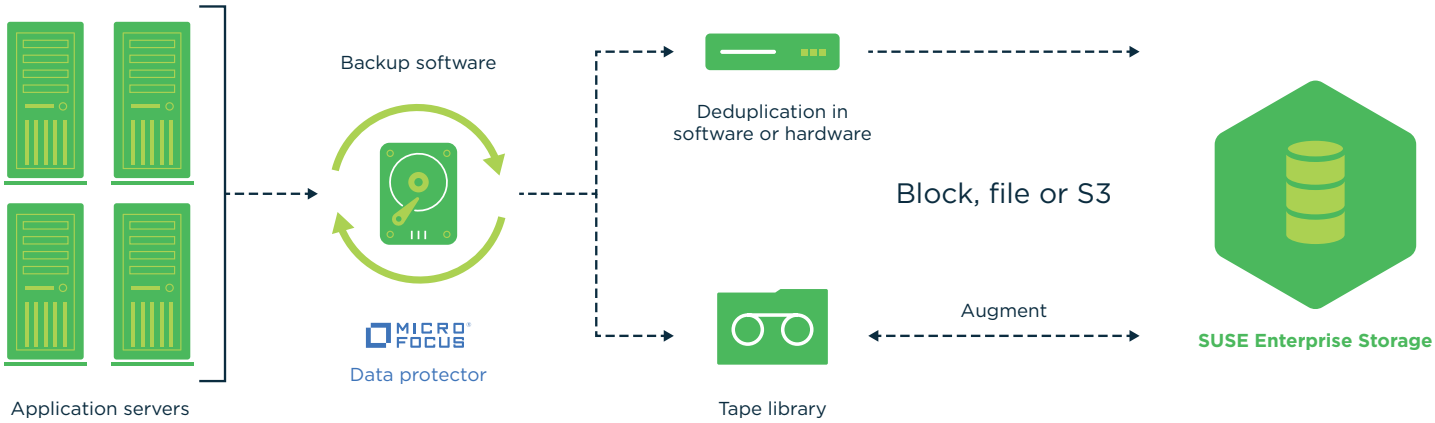

Figure 2. *SUSE Storage Solution for Disk-Based Backup*

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.

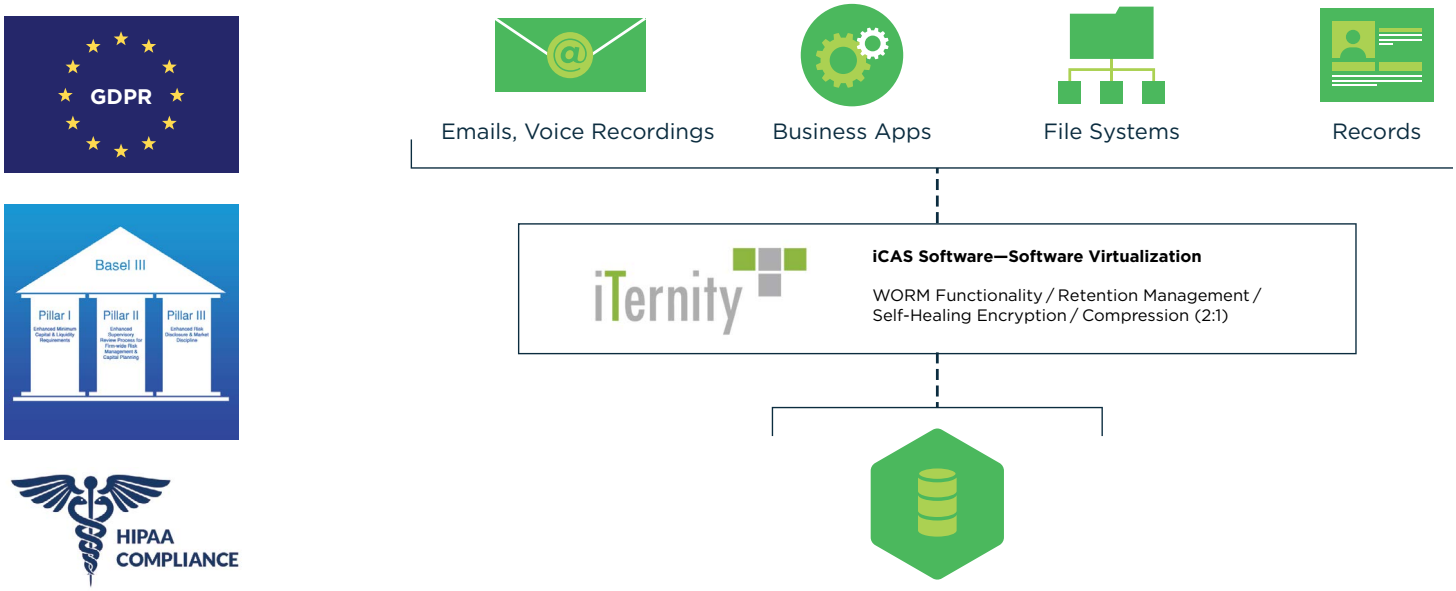

Figure 3. *SUSE Storage Solution for Compliance Archiving*

High-Performance Computing (HPC) Storage

The Supermicro and SUSE solution is ideal for home directories or archival storage in HPC systems, which often demand a constant, bidirectional flow of data from storage. The solution works with leading HPC storage management software. Also, because most HPC systems are Linux-based, a Linux-based storage solution will fit well into those environments.

"Day-to-day administration is much easier with SUSE Enterprise Storage, as we can complete regular maintenance work without interrupting students or teaching staff. We also no longer need to work evenings or weekends, so our technicians are much happier!"

EMILE BIJK
Head of Network and Information Systems
Hogeschool voor de Kunsten Utrecht (HKU)

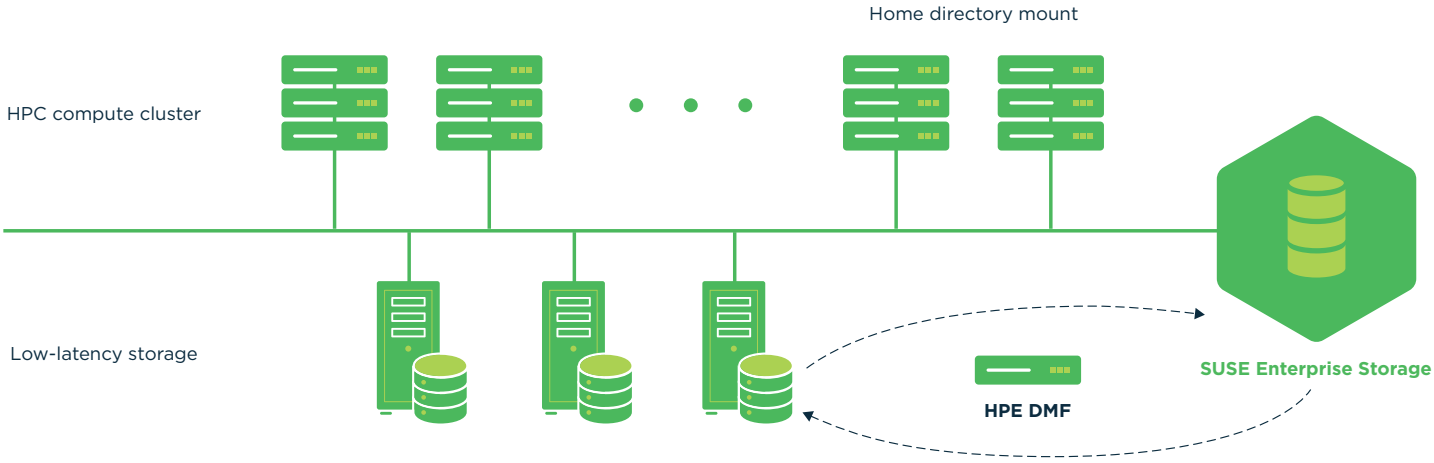

Figure 4. *SUSE Enterprise Storage*

Answering Demand with Collaboration

SUSE and Supermicro recently launched their global partnership to respond to industry demand for converged solutions. The partnership will provide innovative new enterprise IT solutions based on Supermicro hardware and a variety of SUSE offerings including SUSE OpenStack Cloud, SUSE Enterprise Storage, SUSE Linux Enterprise Server for SAP Applications and embedded Linux.

By bringing together enterprise leaders in their respective fields, the partnership can provide:

- **Support**—*With more than 25 years of experience, SUSE and Supermicro will deliver the support you need.*
- **Consulting**—*SUSE experts and partners will help you to implement software-defined enterprise storage solutions more quickly and efficiently.*
- **Training**—*Whether you prefer scheduled learning with a live, experienced instructor who can answer your questions, or you need an eLearning solution so you can learn on the go, SUSE has the training for you. See all your options at* **www.suse.com/services/training/**.

Choose a better way to tackle your enterprise IT challenges—including rapid data growth—by teaming up with SUSE and Supermicro.

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

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