

Unlimited Data Storage and Simple Management from Cisco and SUSE

Grow Your Storage— Not Your IT Workload

Across industries, continents and business models, the story is the same: Data is growing fast. By 2020, the average Internet user could be creating 1.5 GB of traffic per day. Connected airplanes could generate up to 5 TB daily, and a smart factory might produce a full petabyte of data every day.¹ It's time to prepare your enterprise for its share of that information.

Yesterday's storage solutions just aren't built to scale fast enough to handle this amount of data—nor are they built to easily handle so many different sources and kinds of data, from unstructured files to block and object stores. To keep up, you need a whole new kind of storage.

You need software-defined storage (SDS), a solution that delivers a full suite of persistent storage services via software running on an industry-standard hardware platform. Whether you're looking for archival storage, disaster recovery, storage for mission-critical SAP environments, or other use cases, SDS offers unmatched capabilities.

Now, Cisco and SUSE have partnered to give you all the benefits of SDS while focusing on ensuring that the solution is easy to manage. You get an affordable data storage solution that can scale with your enterprise and won't add to your IT workload as data volumes explode.

Over Two Decades of Collaborative Solutions

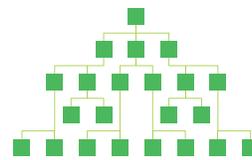
Together SUSE and Cisco give you an enterprise-ready version of the open source, SDS solution Ceph that can unify file, block and object storage in one solution.

Block Storage



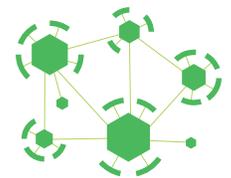
RBD, iSCSI

File Storage



CephFS, NFS

Object Storage



S3, SWIFT

Figure 1.

The solution is composed of SUSE® Enterprise Storage, which runs on Cisco Unified Computing System (UCS) hardware, and Cisco UCS Manager. This combination of software, industry-standard servers and management tools make it easy to add and manage nodes to grow your storage capacity.

Perhaps best of all, SUSE Enterprise Storage is priced by node rather than by capacity, so you can scale your storage without per-gigabyte software pricing weighing you down. In fact, in a

¹ Source: Intel,

[five-year total-cost-of-ownership study](#), IT Brand Pulse found that SUSE Enterprise Storage outperformed every one of its competitors.

These benefits come about through the way Cisco and SUSE work together. The two companies have been partnering for more than 20 years.

That partnership includes multiple solutions that you can combine with your SDS infrastructure, including those for SAP HANA and OpenStack cloud. In fact, SUSE is Cisco's preferred SAP partner, one reason SUSE Enterprise Storage on Cisco UCS is an ideal storage solution for SAP environments.

Close Integration for a Better Solution

SUSE Enterprise Storage doesn't just run on top of Cisco UCS servers. The SUSE and Cisco pieces of the solution are closely integrated to provide you with more value. The entire solution is Cisco tested and validated, and a reference architecture is available at www.suse.com/docrep/documents/6t9dhp39h/suse_enterprise_storage_reference_architecture_for_cisco_ucs_wp.pdf.

The integration and complementary toolsets in SUSE Enterprise Storage and Cisco UCS Manager create lower maintenance overhead and easy scalability. UCS Manager helps you manage the infrastructure layer, while openATTIC—which is part of SUSE Enterprise Storage—gives you tools to manage the solution layer. Combined, you get a complete storage management toolset that makes it easy to handle enormous data growth without enormous growth on your internal teams.

SUSE Linux Enterprise Server, which is a part of SUSE Enterprise Storage, is certified on Cisco UCS servers and integrated with Cisco's UCS Manager to help create a single, streamlined system. Let's take a look at the individual components of the solution and how they contribute to this integrated whole.

Solution Components

SUSE Enterprise Storage

SUSE Enterprise Storage is based on Ceph, an industry-leading SDS solution and the most popular among OpenStack users. It allows you to deploy a unified block, object and file storage environment to reduce the capital and operational costs of storage infrastructure.

SUSE Enterprise Storage Clusters

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 server (physical or virtual), four object storage device (OSD) nodes, three monitor nodes and one or more gateway nodes.

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

Monitor 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

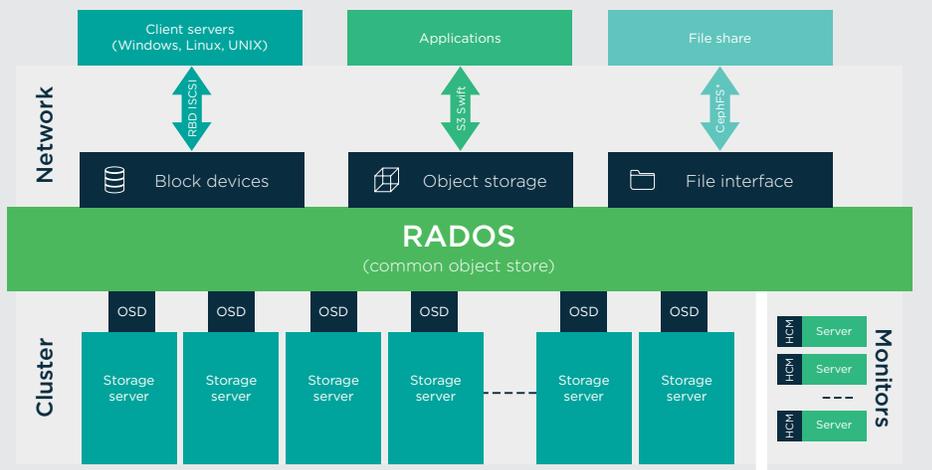


Figure 2. A logical diagram of the various kinds of SUSE Enterprise Storage nodes and the ways they interact with the rest of your environment.

cluster. SUSE recommends a minimum of three monitor nodes.

Continued on next page

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.

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

With Ceph, 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.

It is designed as a distributed storage cluster to provide unlimited scalability from terabytes to petabytes (see sidebar for more information). You can easily add Cisco hardware and extend SUSE Enterprise Storage at the rate your organization needs.

SUSE Enterprise Storage can also help make your storage solution easy to manage by reducing the need for IT staff and driving down total cost of ownership. It is self-managing and self-healing, meaning it can automatically rebalance data without manual intervention.

Ceph also comes with erasure coding, which lets you determine how many device failures your cluster can tolerate before you consider 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.

Cisco UCS Servers

Cisco UCS is a state-of-the-art data center platform that unites computing, network, storage access and virtualization into a single cohesive system. The Cisco UCS S-Series offers options for spinning disk, solid-state drive (SSD), Non-Volatile Memory Express (NVMe) or a combination to help you scale to petabytes in order to address various use case and performance needs. Multi-generational system design helps protect your investment, while a dual-server-node architecture using Intel Xeon Scalable processors strikes the right balance between compute and capacity.

We recommend using the storage-dense Cisco UCS S3260 and S3265 servers for your OSD nodes. You can use any of the many YES Certified Cisco UCS servers for the monitor, gateway and administration nodes in your cluster. A full list of YES Certified servers can be found at www.suse.com/yesearch/Search.jsp.

For SAP solutions, Cisco simplifies governance, risk management and compliance through application and policy-aware infrastructure with Cisco UCS and Cisco Application Centric Infrastructure (ACI).

Cisco UCS Manager

Cisco UCS Manager helps you automate routine infrastructure management tasks to increase agility, simplify daily operations, and reduce management and administration expenses. It enables server, fabric and storage provisioning, as well as device discovery, inventory, configuration, diagnostics, monitoring, fault detection, auditing and statistics collection.

UCS Manager can help your IT organization transition to DevOps by evolving existing staff, skills, tools and processes and making them more efficient. On average, UCS Manager users have been able to achieve an 83 percent reduction in provisioning time and 66 percent lower ongoing administrative and management costs.²

Storage for Any Business Requirement

You can use SUSE Enterprise Storage on Cisco UCS hardware to solve many of today's most difficult storage challenges. Here

² www.cisco.com/c/en/us/products/servers-unified-computing/ucs-manager/index.html

is a look at several common workloads that are supported by the solution:

Disaster Recovery or 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 RTOs. 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.

The affordability of SUSE Enterprise Storage, however, gives you 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.

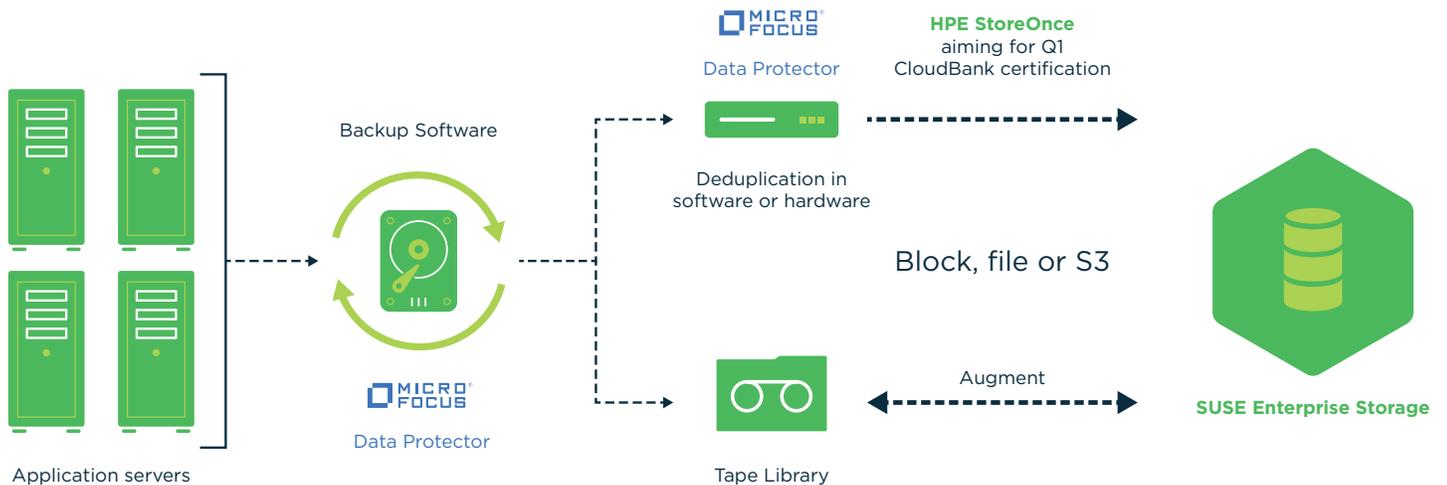


Figure 3. SUSE Storage Solution for Disk-Based Backup

Compliance Archiving

To remain compliant with various regulations, you may have to store emails, legal documents and other files for extended

periods of time. SUSE Enterprise Storage can act as a target for compliance archiving systems such as iTernity to meet these very specific requirements.

“For IT organizations undergoing digital transformation, SDS provides a good match for the capabilities needed—flexible IT agility; easier, more intuitive administration driven by the characteristics of autonomous storage management; and lower capital costs due to the use of commodity and off-the-shelf hardware.”

ERIC BURGNER
Research Director for Storage
IDC³

IDC forecasts that the worldwide SDS market will see a compound annual growth rate (CAGR) of 13.5 percent over the 2017–2021 forecast period, with revenues of nearly \$16.2 billion in 2021.⁴

3 “IDC Forecasts Software-Defined Storage Solutions to Generate Worldwide Revenues of Nearly \$16.2 Billion in 2021,” IDC press release, October 3, 2017.

4 Ibid.

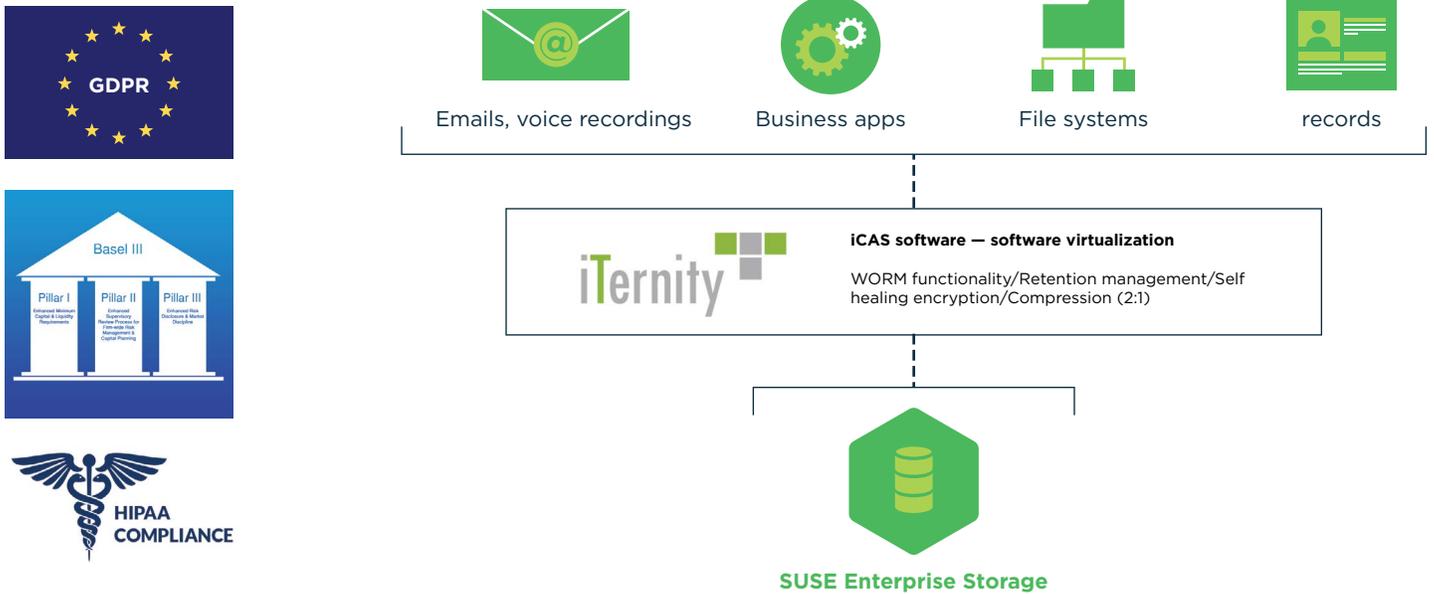


Figure 4. SUSE Storage Solution for Compliance Archiving

Audio/Video Streaming

Content and media businesses need to store a high volume of very large files. These video and content files also need to be available at all times. SUSE Enterprise Storage and Cisco offer affordable, scalable storage to support these requirements.

Data Archive and Bulk Storage

Enterprises often have a lot of data that has to be stored for long periods of time—such as old emails, logs, transaction histories, reports and more. SUSE Enterprise Storage on Cisco servers can

act as a target for archiving systems to provide an affordable way to handle all that data.

SUSE Enterprise Storage is priced by node rather than by capacity, so you can scale your storage without per-gigabyte software pricing weighing you down.

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

www.suse.com

