

SEP Hybrid Backup & Disaster Recovery



SEP sesam Backup & Recovery to SUSE Enterprise Storage

Reference Architecture for using SUSE Enterprise Storage (SES) as an SEP sesam backup target



Table of Contents

1. SES Introduction and Overview	3
2. SEP sesam Overview	5
3. Solution Concepts	6
4. Additional Resources	8

1. SES Introduction and Overview

SUSE Enterprise Storage is a distributed storage solution designed for scalability, reliability and performance based on Ceph technology. Contrary to conventional systems which have allocation tables to store and fetch data, Ceph uses a pseudo-random data distribution function to store data, which reduces the number of look-ups required in storage. Data is stored on intelligent object storage devices (OSDs) using daemons, which automates data management tasks such as data distribution, data replication, failure detection and recovery. Ceph is both self-healing and self-managing, resulting in the reduction of administrative and budget overhead.

The SUSE Enterprise Storage cluster uses two mandatory types of nodes—monitors and OSD daemons:

Monitor

- Monitoring nodes maintain information about cluster health state, a map of other monitoring nodes and a CRUSH map.
- Monitor nodes also keep a history of changes performed to the cluster.

OSD Daemon

- An OSD daemon stores data and manages the data replication and rebalancing processes.
- Each OSD daemon handles one or more OSDs, which can be physical disks/partitions or logical volumes.
- OSD daemons also communicate with monitor nodes and provide them with the state of the other OSD daemons.

The SUSE Enterprise Storage cluster can use the following optional node types:

Metadata Server (MDS)

- The metadata servers store metadata for the Ceph file system. By using MDS you can execute basic file system commands such as is without overloading the cluster.

RADOS Gateway

- RADOS Gateway is an HTTP REST gateway for the RADOS object store. You can also use this node type when using the Ceph file system.

The SUSE Enterprise Storage environment has the following features:

Controlled, Scalable, Decentralized Placement of Replicated Data using CRUSH

- The system uses a unique map called CRUSH (Controlled Replication Under Scalable Hashing) to assign data to OSDs in an efficient manner. Data assignment offsets are generated as opposed to being looked up in tables. This does away with disk look-ups which come with conventional allocation table based systems, reducing the communication between the storage and the client. The client armed with the CRUSH map and the metadata such as object name and byte offset knows where it can find the data or which OSD it needs to place the data.
- CRUSH maintains a hierarchy of devices and the replica placement policy. As new devices are added, data from existing nodes is moved to the new device to improve distribution with regard to workload and resilience. As a part of the replica placement policy, it can add weights to the devices so some devices are more favored as opposed to others. This could be used to give more weights to Solid State Devices (SSDs) and lower weights to conventional rotational hard disks to get overall better performance.

- CRUSH is designed to optimally distribute data to make use of available devices efficiently. CRUSH supports different ways of data distribution such as the following:
 - n-way replication (mirroring)
 - RAID parity schemes
 - Erasure Coding
 - Hybrid approaches such as RAID-10

Reliable Autonomic Distributed Object Storage (RADOS)

- The intelligence in the OSD Daemons allows tasks such as data replication and migration for self-management and self-healing to happen automatically. By default, data written to SUSE Enterprise Storage is replicated within the OSDs. The level and type of replication is configurable. In case of failures, the CRUSH map is updated and data is written to new (replicated) OSDs.
- The intelligence of OSD Daemons enables the handling of data replication, data migration, failure detection and recovery. These tasks are automatically and autonomously managed. This also allows the creation of various pools for different sorts of I/O.

Replicated Monitor Servers

- The monitor servers keep track of all the devices in the system. They manage the CRUSH map, which is used to determine where the data needs to be placed. In case of failures of any of the OSDs, the CRUSH map is re-generated and re-distributed to the rest of the system. At a given time, it is recommended that a system contains multiple monitor servers to add redundancy and improve resiliency.

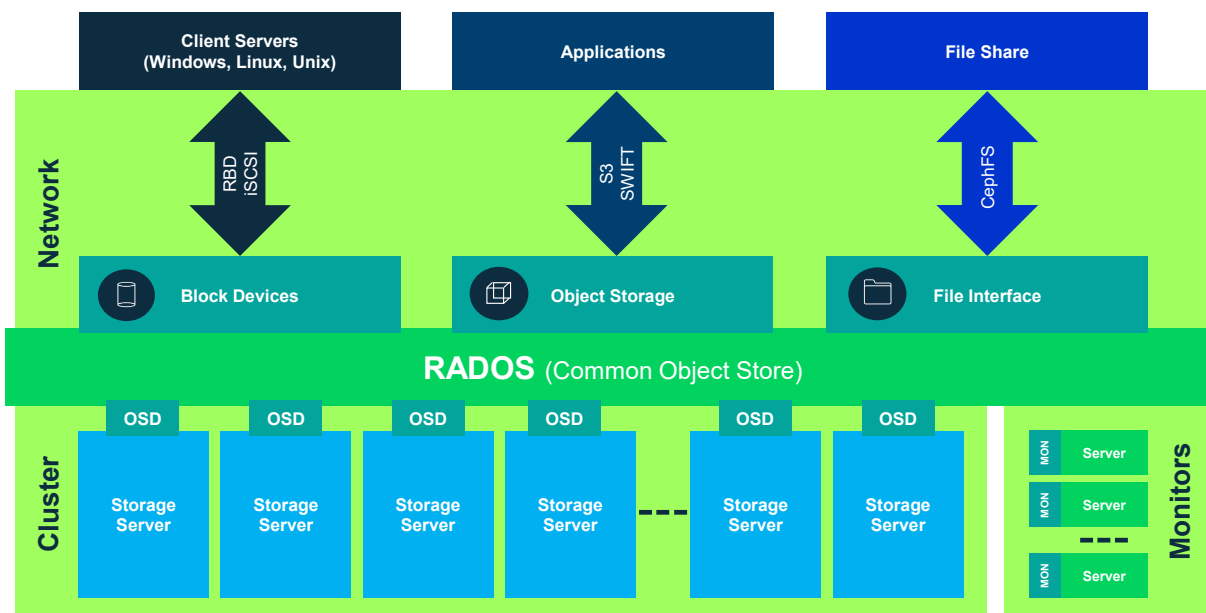
Configuration and management framework for your cluster - DeepSea

- DeepSea is a collection of Salt states, runners and modules for deploying and managing Ceph.

Currently the SUSE Enterprise Storage cluster can provide the following services:

- Object Storage Protocols (including S3 and Swift)
- File System Protocols (including CephFS and NFS)
- Block Devices (including RADOS Block device and iSCSI)

To access an SES system there are several interfaces available:



2. SEP sesam Overview

SEP sesam is a backup software solution with a highly-flexible client-server architecture for heterogeneous environments. SEP sesam supports with its agents a wide range of operating systems, hypervisors, databases and applications. While using all necessary APIs for performing consistent online backups, SEP sesam is certified for many databases and applications, for example, SAP, Oracle, SQL, MySQL, PostgreSQL, etc.



SEP sesam collects all the data from the SEP backup clients and can write to practically any kind of backup target, including disk and tape. SEP sesam supports all available interfaces and protocols, for example, nfs, CIFS, iSCSI, SAN, NDMP, and VTL. By using its patented multiplexing technology for practically an unlimited amount of parallel backups, SEP can easily fulfill demanding performance requirements.

Using an SEP Remote Device Server (RDS) as a so-called media server provides additional scalability and offers the ability to integrate many to all different types of infrastructure including branch offices, firewall networks, and so forth.

The integrated highly efficient SEP Si3 deduplication technology allows for significantly reduced disk storage and bandwidth through target-side and source-side deduplication as well as deduplication-based replication. This technology can also be used when using SES as a target. For the sake of efficiency, different deduplication technologies should of course not be mixed.

SEP sesam clients can be installed on any OS for which a SEP sesam client package exists, like Windows, Linux (SLES, RHEL, Ubuntu, Debian, CentOS, Oracle Linux), OES, UNIX (AIX, Solaris), MacOS and more. Many HW architectures are supported like x86-64, IBM zSeries (plus LinuxONE), and IBM Power, to name a few.

SEP sesam supported architectures and platforms

SEP sesam is a highly flexible and dynamic backup software solution which supports a wide variety of architectures and platforms like:

Supported architectures:

- 386
- x86-64
- IBM Power Systems & OpenPOWER
- IBM zSystems & IBM LinuxONE

Protected hypervisors:

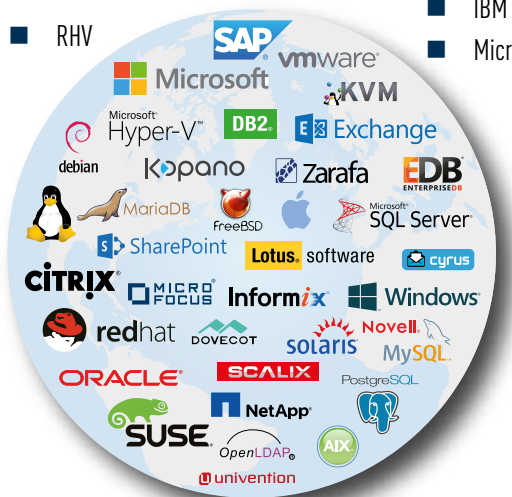
- KVM/QEMU
- VMware
- Hyper-V
- Citrix XenServer
- RHV

Protected databases:

- PostgreSQL
- Enterprise DB
- MariaDB
- MySQL
- Oracle
- SAP ASE
- SAP HANA
- MaxDB
- Informix
- IBM DB 2
- Microsoft SQL

Protected applications:

- SAP S/4 HANA
- SAP Netweaver
- IBM Domino Server
- Zarafa
- Kopano
- Scalix
- Atlassian Jira
- Dovecot IMAP
- Cyrus IMAP
- Courier IMAP
- openLDAP
- Microsoft Exchange
- Microsoft SharePoint
- Micro Focus GroupWise



3. Solution Concepts

SUSE Enterprise Storage (SES) is ideal as a storage solution for many applications and uses-cases, even simultaneously, for example, using SES for both production data and archive data. Of course, leveraging SES as a backup target for SEP sesam even further takes advantage of the multi-use capabilities of SES.

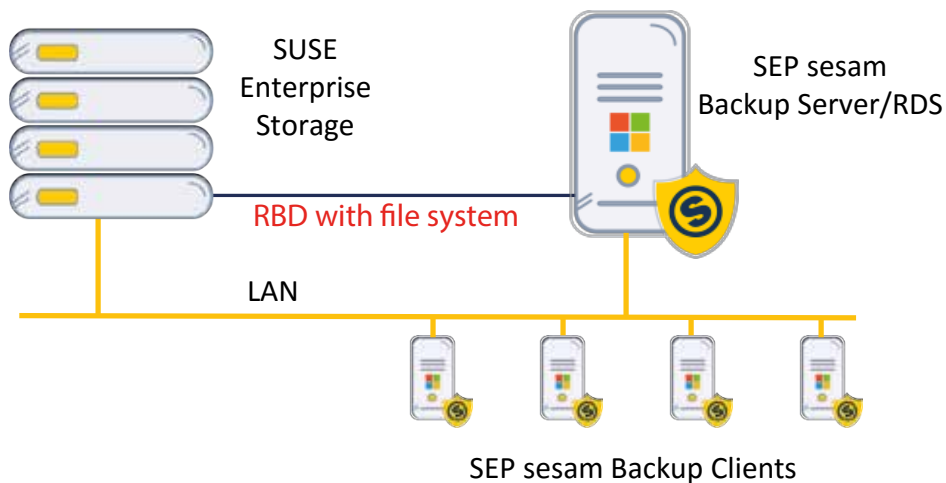
Benefits of using SES with SEP sesam:

- Enough space for any amount of backup data and very high growth rates
- Highly-secure second- or third- copy of your backup data
- Complete transparency with the backup software due to standard interfaces
- Migration to tape or alternative media possible for compliance reasons
- Easy application of SEP's efficient Si3 deduplication technology

To attach an SES system to an SEP sesam backup server (or an SEP sesam RDS server) you can use:

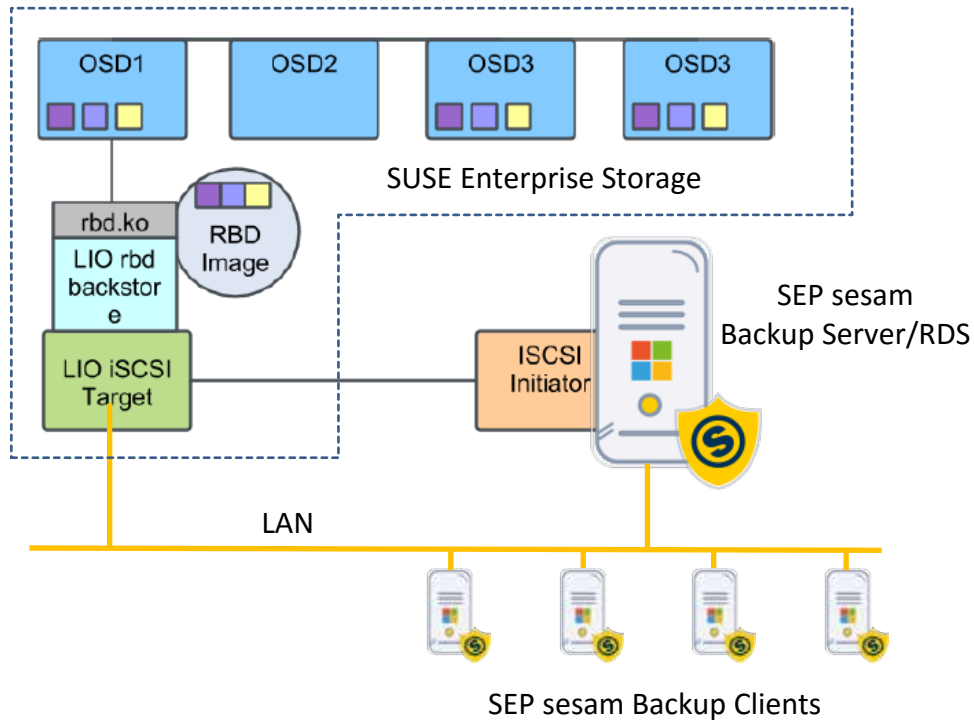
1. RBD (RADOS Block Device) with a file system

You will obtain the best performance when attaching SES directly as a block device with a file system configured on top of it. This could be any Linux file system (e.g. ext4, btrfs, or the like). The RBD is presented as a virtual block device mapped directly from the Ceph object store. Communication to the RBD could be via the library librbd or a Linux Kernel Module.



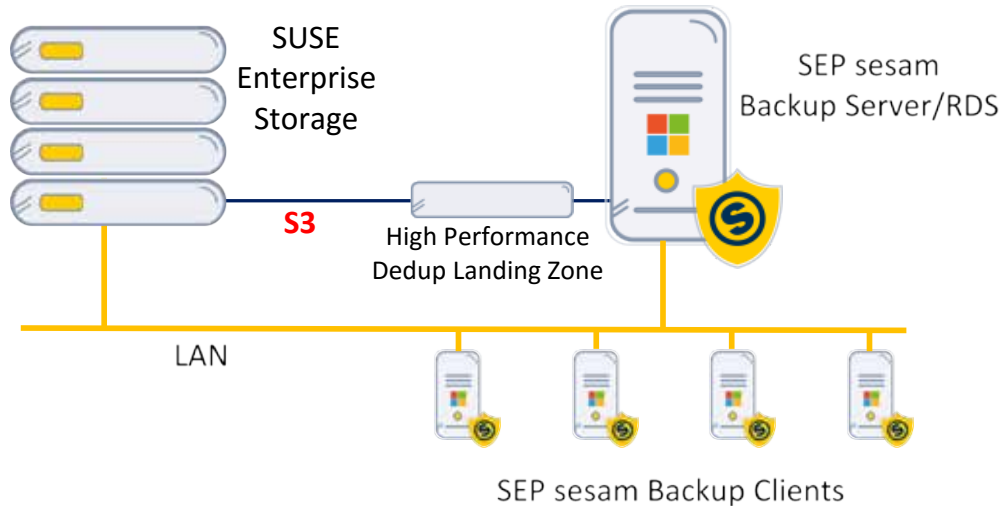
2. iSCSI

This is the most convenient LAN interface to be used as a backup target.



3. S3

This object interface provides a world-wide standard when using SES as a local object storage system for applications.



Note: since iSCSI has exhibited performance slightly below that of RBD, the current, preferred method of connecting SES is RBD.

4. Additional Resources

For more technical information on SEP sesam Backup and Bare Metal Recovery, please visit:

<http://wiki.sepsoftware.com/wiki>

Install the full version of SEP sesam today for a 30 day trial, which includes full support.

<https://www.sepsoftware.com/download>

SEP's support matrix lists a market leading variety of virtualization platforms, operating systems, databases and applications that can be successfully backed up and restored.

<https://www.sepsoftware.com/supportmatrix>



Headquarters (EMEA):

SEP AG
Konrad-Zuse-Strasse 5
83607 Holzkirchen, Germany
Phone: +49 8024 46331 0
Fax: +49 8024 46331 666
Email: info@sep.de

SEP USA:

1630 30th Street
Suite A #265
Boulder, CO 80301, USA
Phone: (+1) 303.449.0100
Fax: (+1) 877.611.1211
Email: info@sepusa.com

All brand names and product names are registered trademarks and trademarks of their respective owners.

© SEP AG. All rights reserved. SEPsasam_Backup_SAPHANA_SUSELES_190225