

SUSE Enterprise Storage Implementation Guide for Commvault Data Platform

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Introduction

The objective of this document is to present a guide on implementing Commvault connectivity with SUSE Enterprise Storage as a backup target.

It is suggested that the document be read in its entirety, along with the supplemental appendix information before attempting the process.

The final outcome of use of this document should provide a working Commvault backup environment leveraging object or block storage provided by SUSE Enterprise Storage.

Target Audience

The target audience for this document is the IT staff responsible for implementing SUSE Enterprise Storage as a backup target for Commvault. Reasonable administrative knowledge of Linux and SUSE Enterprise Storage and operational knowledge of Commvault is assumed.

Business problem and business value

Businesses are confronted by ever expanding production storage environments that require timely backups. Coupled with the need for a short Recovery Time Objective (RTO) and concerns involving data durability of traditional media, the interest in disk-to-disk backup mechanisms continues to increase. Many of these requirements are dictated by external threats (such as ransomware or security breaches) or regulatory changes such as the upcoming deadline for General Data Protection Regulation (GDPR) in May 2018.

Business problem

The challenge of providing a valid backup and recovery service to IT is a multi-faceted issue. Ever expanding datacenter landscapes are filled with applications spread across multiple servers and operating systems. Combine this with the always-on requirements of a digital economy and the result is a need for fast backup, faster recovery, and application aware backup software. These issues are compounded by the external threats. When a virus or a ransomware hits an enterprise, the administrator must be able to recover the data quickly.

Another issue comes from the ever changing regulatory landscape such as the General Data Protection Regulation (GDPR) which is planned to go into effect in May 2018. This framework has significant implications to the private data of customers that is held by enterprises, and is accompanied by stiff penalties for those not following it. It enforces a security governance model, allows for customers to delete their data that's held by an enterprise within 72 hours and requires anonymization. Compliance with GDPR by using some of the traditional data protection solutions is almost impossible.

Business value

The solution outlined in this guide enables a customer to deploy a disk-to-disk target that is orchestrated via Commvault, Commvault takes care of any application awareness issues through their software agents and orchestrates the data movement. SUSE Enterprise Storage can be utilized as a target using the S3 object interface. The result is a high performing and flexible backup target with exabyte scalability.

SUSE Enterprise Storage delivers savings for a Commvault disk-to-disk backup solution with:

- Commodity hardware for minimal hardware cost
- Open source software, for minimal software cost and maximum flexibility
- A self-managing, self-healing architecture for minimal management cost
- A flexible, cluster-based design for graceful and inexpensive upgrade and innovative licensing model that avoids per-gigabyte storage charges, so you won't owe more for saving more data.
- With minimal acquisition cost, management cost, and upgrade cost, SUSE Enterprise Storage is the lowest-price solution for enterprise archive and backup implementations

Requirements

Enterprise backup environments require stability, long term data durability, scalability, and simple management.

Establishing these requirements enables the business to consistently meet their data protection needs and comply with data recovery requirements that can be mandated by operational needs or governmental regulations.

This guide requires that a functional SUSE Enterprise Storage cluster with one or more RADOS Object Gateways is already deployed. The process for deploying this environment can be found in the [SUSE Enterprise Storage Administration and Deployment Guide](#).

Software:

- SUSE Enterprise Storage 4 or greater
- Commvault v11sp6+

Functional requirements

A SUSE Enterprise Storage solution is:

- Simple to setup and deploy, within the documented guidelines of system hardware, networking and environmental prerequisites.
- Adaptable to the physical and logical constraints needed by the business, both initially and as needed over time for performance, security, and scalability concerns.
- Resilient to changes in physical infrastructure components, caused by failure or required maintenance.
- Capable of providing optimized object and block services to client access nodes, either directly or through gateway services.
- Able to have data protection configured to meet the customer's individual needs at a granular level

Architectural overview

This architecture assumes an understanding of SUSE Enterprise Storage as presented in the [SUSE Enterprise Storage Technical Overview](#) document available online which presents the concepts behind software defined storage and Ceph as well as a quick start guide (non-platform specific). It is also assumed that the reader has familiarity with the concepts and architecture of Commvault and cloud storage as described in the [Commvault Documentation](#).

There are two separately described architectures, the first utilizes the S3 object protocol. This protocol is widely utilized by both cloud and on-premise object storage offerings. The protocol uses http or https for the transport and is very tolerant of high latency connections.

The second solution architecture employs local block storage on a media agent. This architecture can be deployed with native RBD connected storage when the media agent is running on a system using SUSE Linux Enterprise Server 12 SP2 or greater. Alternatively, iSCSI attached storage may be utilized by a wider variety of media agent OS types.

Solution architecture – S3 object

An appropriately deployed solution contains a properly configured SUSE Enterprise Storage Cluster with multiple deployed RADOS Object Gateways using the *https* protocol. The solution also requires a properly deployed Commvault environment under using [Cloud as a Direct Storage Target](#). The SUSE Enterprise Storage target should ideally be load balanced with a highly-available front-end service. Choices range from DNS round robin (least desirable) to a highly-available cluster of two or more hardware load balancers (most desirable).

The use of Cloud as a Direct Storage Target as defined by Commvault, enables the Commvault server to communicate with server agents and direct them to move the data directly to the S3 archive. This eliminates the choke point of a proxy server, thus allowing the best usage of multiple SUSE Enterprise Storage object gateways. This is illustrated in Figure 1.

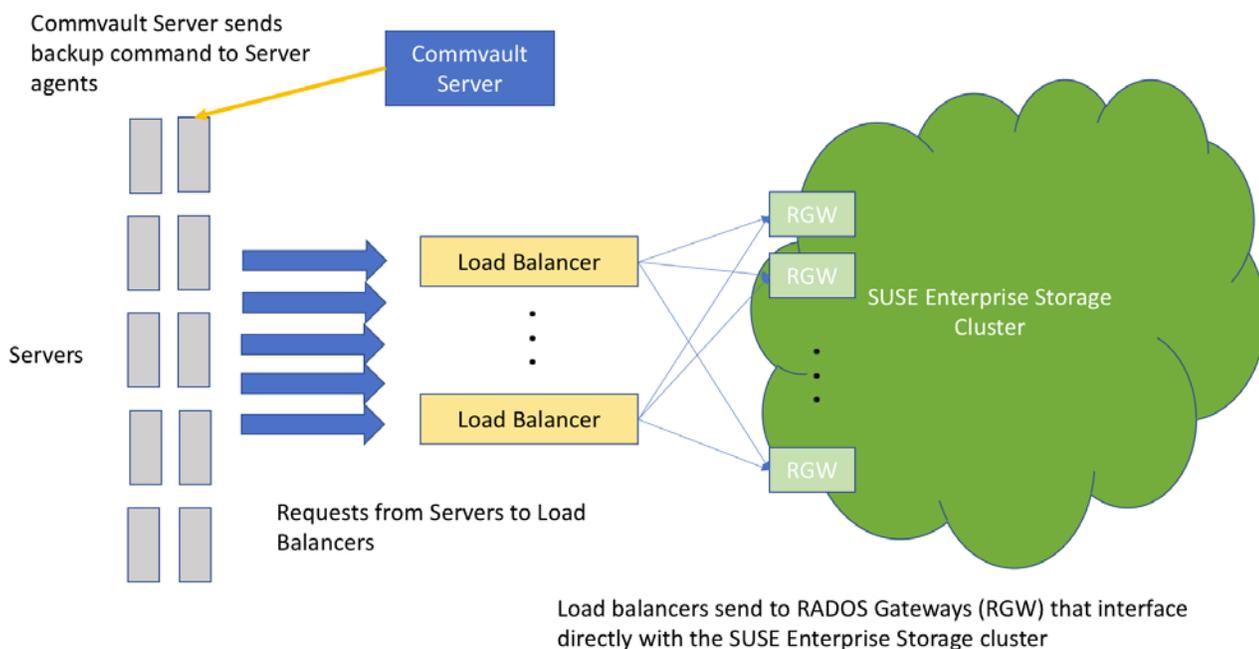


Figure 1

Solution Architecture - Block

SUSE Enterprise Storage can also be used as a Commvault Local Disk library. This entails attaching one or more iSCSI LUNs or RADOS Block Devices (RBD) to a media agent, thus appearing as a local disk to the media agent server. SUSE recommends using a Linux media agent running on SUSE Linux Enterprise Server 12 SP2 or greater and connecting the storage via RBD.

With either option for block storage, SUSE recommends utilizing SSD journal devices. While not required, these devices improve latency resulting in higher performance of write operations. This is especially true of smaller block writes of less than 64KB. This configuration must be done at the time of cluster node deployment and is described in the SUSE Enterprise Storage Deployment and Administration Guide under Profile Assignment

https://www.suse.com/documentation/ses-4/book_storage_admin/data/deepsea_pillar_salt_configuration.html

The RBD option has a performance advantage over the iSCSI option as the RBD protocol allows the media agents to talk directly to the cluster storage nodes. As each RBD client (media agent) is aware of all the cluster nodes, there is no need for multipathing software or configurations. This is illustrated in Figure 2.

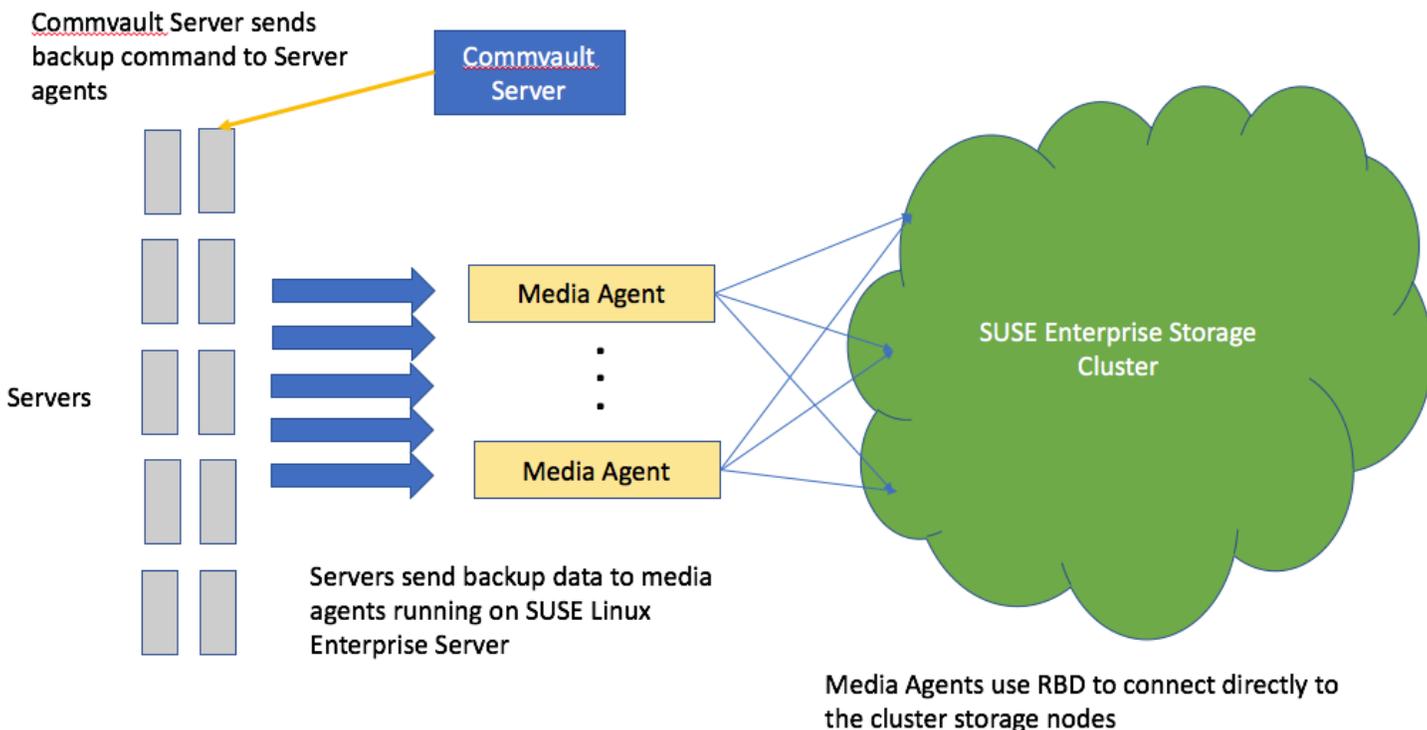


Figure 2

ISCSI must utilize ISCSI Gateways (IGW) to convert from ISCSI to the RBD protocol. While this process impacts performance, it enables the use of SUSE Enterprise Storage with Microsoft Windows media agents. It is recommended to configure ISCSI with multi-path software enabled with a policy of round-robin among two or more IGW nodes. This enables the best performance and availability available to ISCSI. An ISCSI scenario is described in Figure 3.

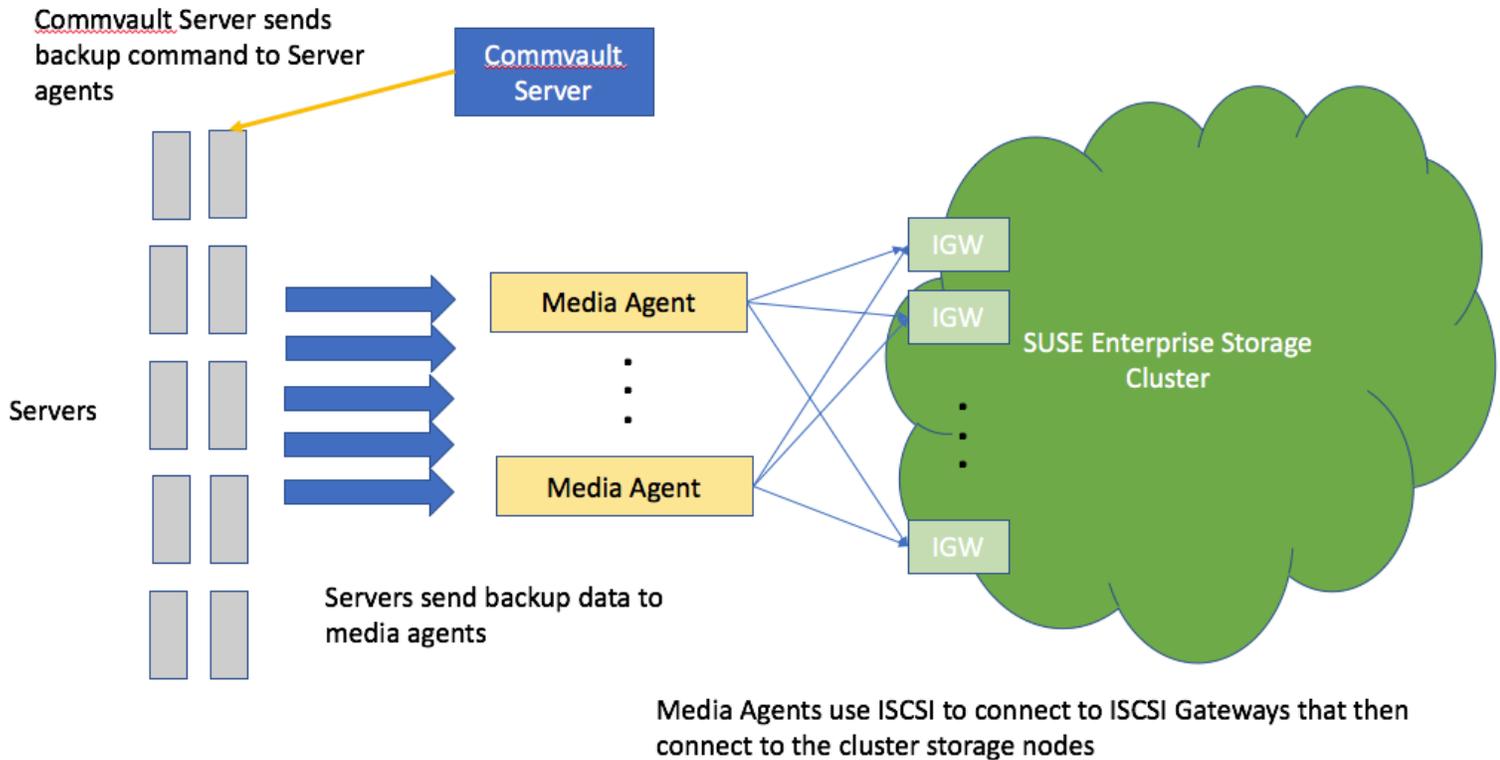


Figure 3

Pool Configuration

When configuring the SUSE Enterprise Storage cluster for use as a backup target, the data protection scheme is an important consideration. For block devices, such as RBD, it is necessary to utilize replication with a size of 3. This ensures that data is available, protected, and accurate in the event of a device failure.

When using S3 object storage, the usage of Erasure Coding (EC) is preferred to improve space efficiency. The sizing of the EC environment is dependent on the size of the cluster and protection requirements of the customer. In general, it is not recommended to use EC with a cluster of fewer than seven storage nodes. When using EC with SUSE Enterprise Storage, it is recommended that the data chunks + (2x erasure coding chunks) is less than or equal to the cluster node count. Expressed in a formula:

$$\text{data chunks } [k] + (\text{coding chunks } [m] * 2) \leq \text{cluster node count}$$

A cluster size of seven would thus allow for 3 data chunks + 2 erasure coding chunks + 2 spare nodes to allow for device failures. In a larger cluster, EC profiles of 8+3, 6+4, 9+3, etc are not uncommon.

Deployment

This section is a bridge document between SUSE Enterprise Storage and Commvault . The intent is to highlight the steps required to properly setup the Commvault environment to utilize SUSE Enterprise Storage.

SUSE Enterprise Storage Deployment and Configuration

Ensure to assign and deploy the RADOS Object Gateways (RGW) during the installation of SUSE Enterprise Storage as described in the [Administration and Deployment Guide](#). This entails defining the role in the POLICY.CFG file as described in the [Configuration and Customization](#) section.

After deployment, credentials need to be created for the S3 user. This information can be found in the [Managing RADOS Gateway Access](#) portion of the manual.

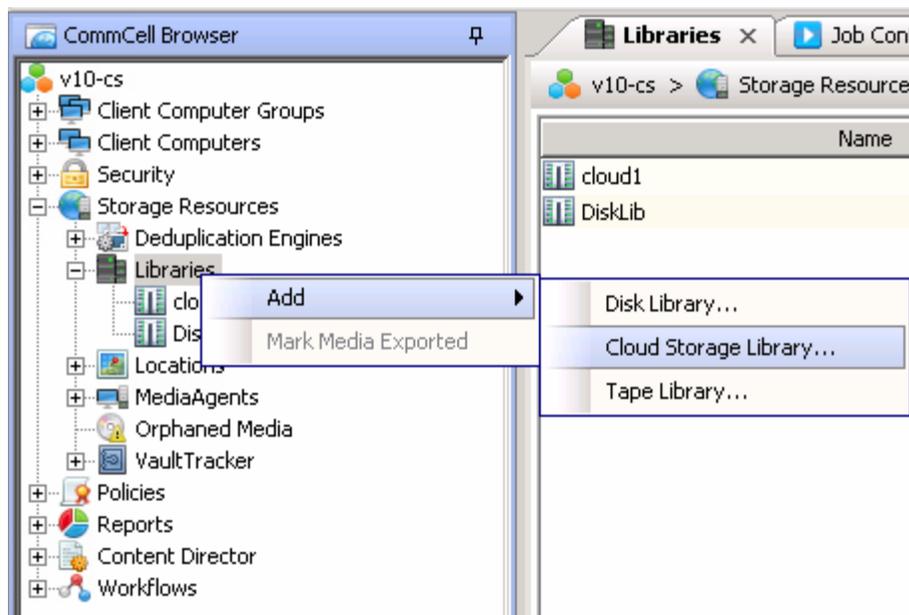
Commvault Configuration

What follows are procedures for deploying a disk based library for Commvault as a Cloud Storage Library or a Local Disk Library.

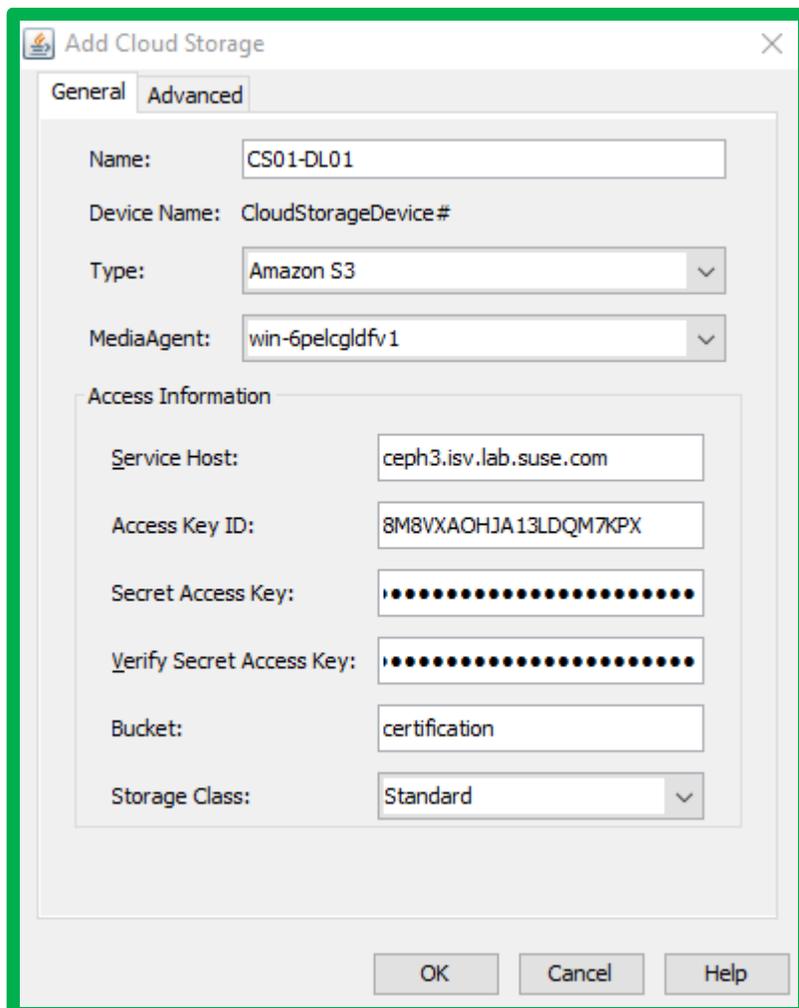
Configuration Procedure – Cloud Storage Library

Create a Cloud Storage Library. In this guide, we will refer to it as "CS01---DL01".

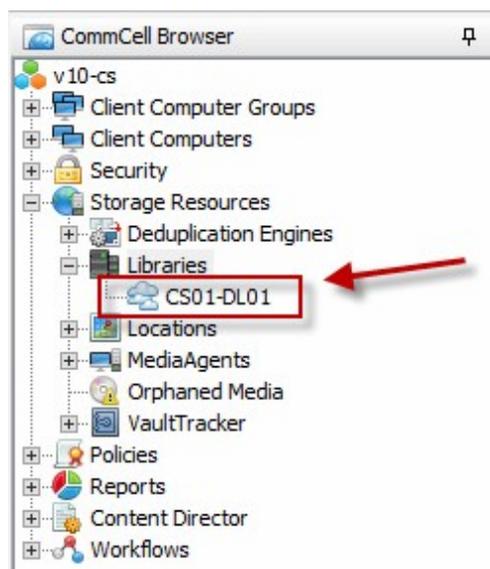
1. Within the CommCell Console, expand [Storage Resources] node from CommCell Browser.
2. Right---click [Libraries] and choose [Add] > [Cloud Storage Library].



3. After [Add Cloud Storage] dialog comes up, enter name of this Cloud Library (CS01---DL01), choose S3 Type, and select the MediaAgent that will control the CloudLibrary, define the Access Information and click [OK].



4. Confirm that Cloud Storage Library is added under [Library] node.



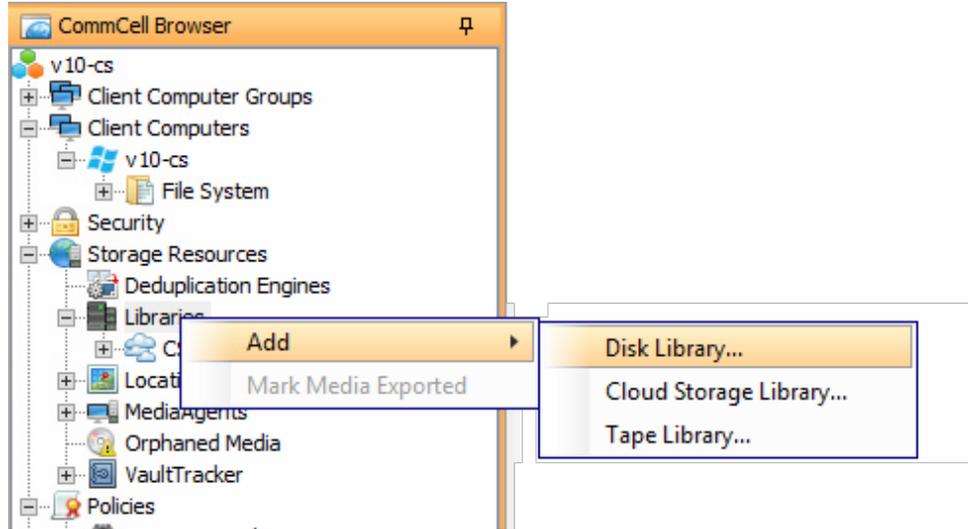
The screenshot shows the CommCell Browser interface. On the left is a navigation tree with the following items: win-plcmpcscng, Client Computer Groups, Client Computers, Security, Storage Resources, Deduplication Engines, Libraries, and CS01-DL01. The main pane shows a breadcrumb path: win-plcmpcscng > Storage Resources > Libraries >. Below the breadcrumb is a table with the following data:

Name	Status	Capacity	Free Space	Associated MediaAgents	Manufacturer	Model
CS01-DL01	Ready			win-6pelcgldfv1	Cloud	Amazon S3
ISCSI_DR	Ready	1,023.87 GB	1,022.73 GB	win-6pelcgldfv1	Disk	Disk

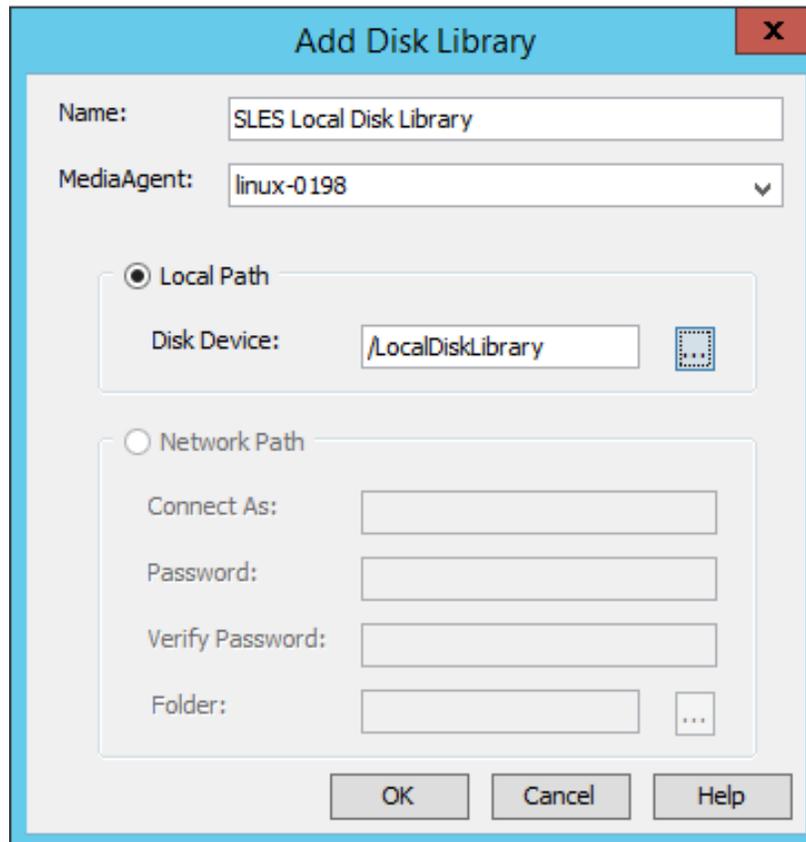
Configuration Procedure – Local Disk Library over RBD

Create a Disk Library locally on the Media Agent. In this guide, we will refer to it as “CS01---LocalDisk”

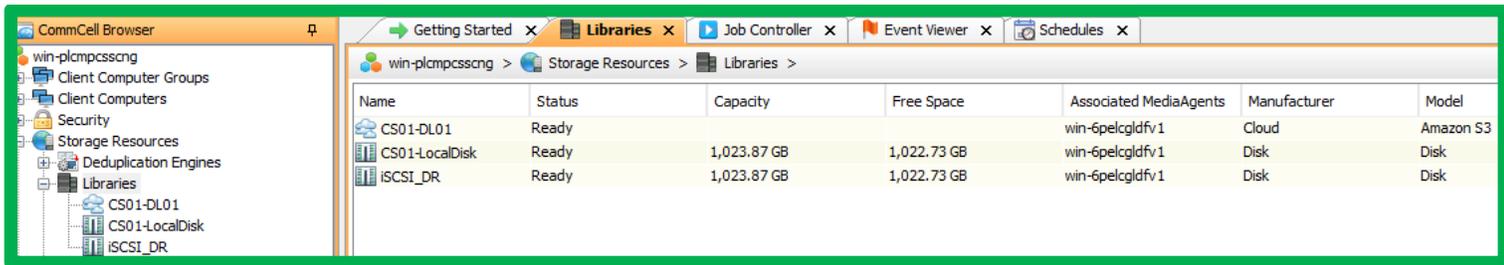
1. Within the CommCell Console, expand [Storage Resources] node from CommCell Browser.
2. Right-click [Libraries] and choose [Add] > [Disk Library].



3. After [Add Disk Library] dialog appears, type in the name of the Disk Library (SLES Local Disk Library), then browse to select a folder path using the “...” button next to [Disk Device]



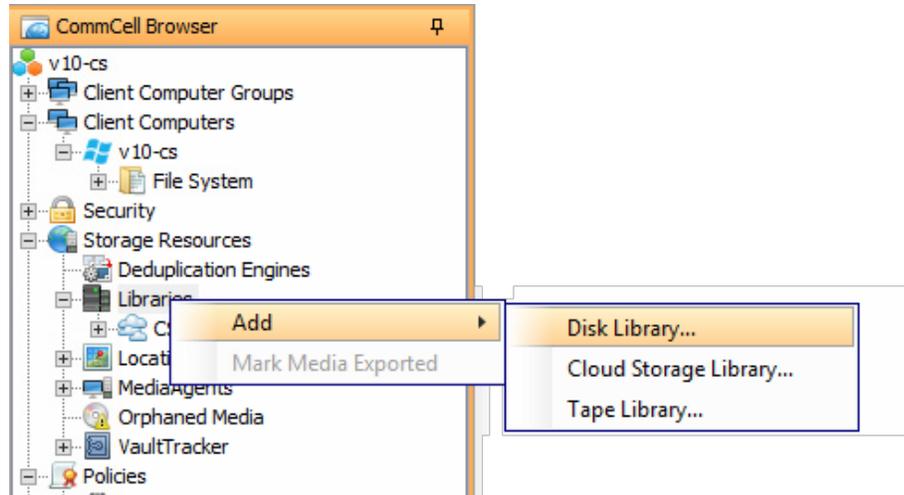
Click [OK] to finish creating the Disk Library



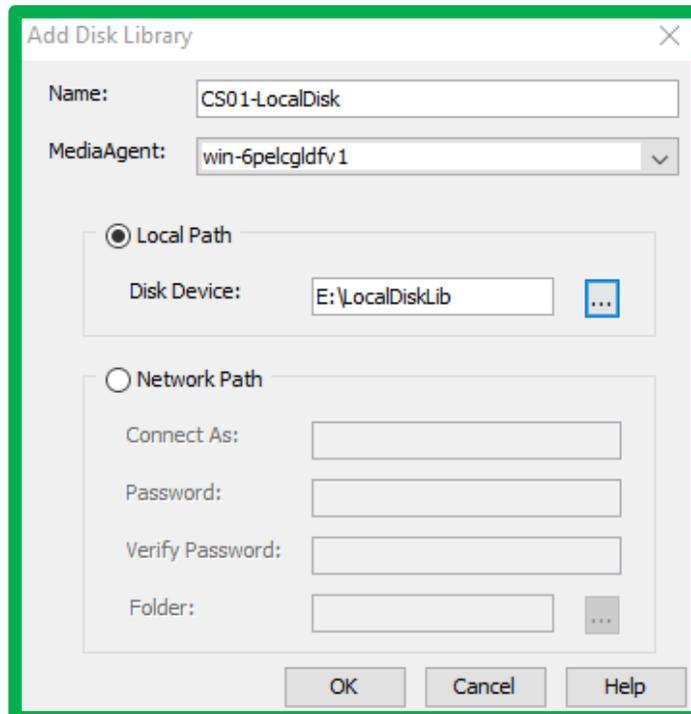
Configuration Procedure – Local Disk Library over ISCSI

Create a Disk Library locally on the Media Agent. In this guide, we will refer to it as “CS01---LocalDisk”

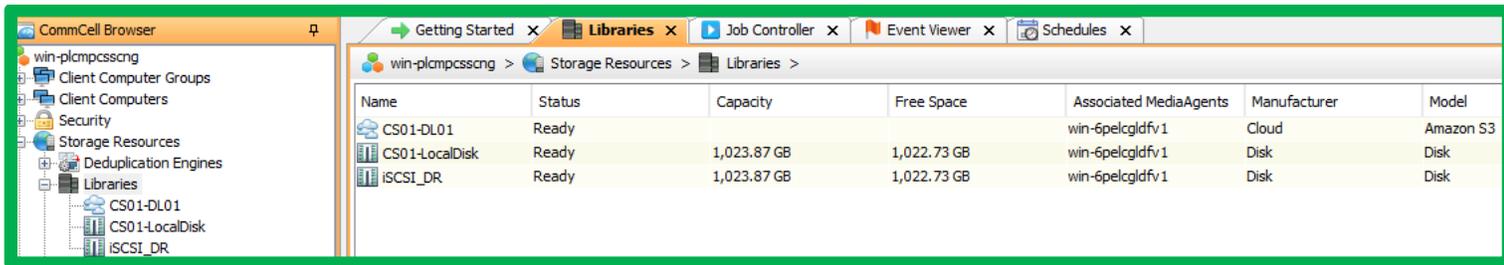
4. Create, export, and mount an ISCSI LUN as described in the SUSE Enterprise Storage 4 Administration & Deployment Guide (https://www.suse.com/documentation/ses-4/book_storage_admin/data/ceph_iscsi_iscsi.html)
5. Within the CommCell Console, expand [Storage Resources] node from CommCell Browser.
6. Right--click [Libraries] and choose [Add] > [Disk Library].



7. After [Add Disk Library] dialog appears, type in the name of the Disk Library (CS01---LocalDisk), then browse to select a folder path using the “...” button next to [Disk Device]



Click [OK] to finish creating the Disk Library



Deployment Considerations

Some final considerations before deploying your backup environment.

1. Block storage is a lower latency access method than object storage
2. Object storage works better over high latency connections
3. Either library type can be replicated to the public cloud using Commvault's internal copy facility

Resources:

- *SUSE Enterprise Storage Technical Overview*
https://www.suse.com/docrep/documents/1mdg7eq2kz/suse_enterprise_storage_technical_overview_wp.pdf
- *SUSE Enterprise Storage v4 - Administration and Deployment Guide*
https://www.suse.com/documentation/ses-4/book_storage_admin/data/book_storage_admin.html