



Storage controller setup

NetApp Solutions

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Storage controller setup

[Previous: Time synchronization.](#)

This section describes the configuration of the NetApp storage system. You must complete the primary installation and setup according to the corresponding Data ONTAP setup and configuration guides.

Storage efficiency

Inline deduplication, cross-volume inline deduplication, inline compression, and inline compaction are supported with SAP HANA in an SSD configuration.

NetApp Volume Encryption

The use of NetApp Volume Encryption (NVE) is supported with SAP HANA.

Quality of service

QoS can be used to limit the storage throughput for specific SAP HANA systems or no- SAP applications on a shared-use controller. One use case would be to limit the throughput of development and test systems so that they cannot influence production systems in a mixed setup.

During the sizing process, you should determine the performance requirements of a nonproduction system. Development and test systems can be sized with lower performance values, typically in the range of 20% to 50% of a production-system KPI as defined by SAP.

Starting with ONTAP 9, QoS is configured on the storage volume level and uses maximum values for throughput (MBps) and the amount of I/O (IOPS).

Large write I/O has the biggest performance effect on the storage system. Therefore, the QoS throughput limit should be set to a percentage of the corresponding write SAP HANA storage performance KPI values in the data and log volumes.

NetApp FabricPool

NetApp FabricPool technology must not be used for active primary file systems in SAP HANA systems. This includes the file systems for the data and log area as well as the `/hana/shared` file system. Doing so results in unpredictable performance, especially during the startup of an SAP HANA system.

You can use the Snapshot-Only tiering policy along with FabricPool at a backup target such as SnapVault or SnapMirror destination.



Using FabricPool for tiering Snapshot copies at primary storage or using FabricPool at a backup target changes the required time for the restore and recovery of a database or other tasks such as creating system clones or repair systems. Take this into consideration for planning your overall lifecycle-management strategy, and check to make sure that your SLAs are still being met while using this function.

FabricPool is a good option for moving log backups to another storage tier. Moving backups affects the time needed to recover an SAP HANA database. Therefore, the option `tiering-minimum-cooling-days` should be set to a value that places log backups, which are routinely needed for recovery, on the local fast

storage tier.

Configure storage

The following overview summarizes the required storage configuration steps. Each step is covered in more detail in the subsequent sections. In this section, we assume that the storage hardware is set up and that the ONTAP software is already installed. Also, the connection of the storage FCP ports to the SAN fabric must already be in place.

1. Check the correct disk shelf configuration, as described in "[Disk shelf connection](#)."
2. Create and configure the required aggregates, as described in "[Aggregate configuration](#)."
3. Create a storage virtual machine (SVM), as described in "[Storage virtual machine configuration](#)."
4. Create logical interfaces (LIFs), as described in "[Logical interface configuration](#)."
5. Create a port set, as described in "[FCP port sets](#)."
6. Create initiator groups, volumes, and LUNs within the aggregates, as described in creating "[LUNs and volumes and mapping LUNs to initiator groups](#)."

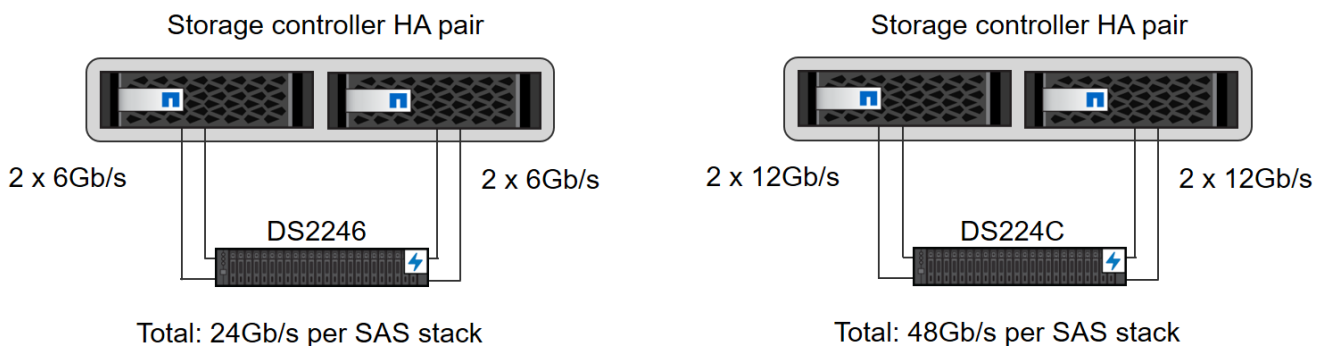
Disk shelf connection

SAS-based disk shelves

A maximum of one disk shelf can be connected to one SAS stack to provide the required performance for the SAP HANA hosts, as shown in the following figure. The disks within each shelf must be distributed equally between both controllers of the HA pair. ADPv2 is used with ONTAP 9 and the new DS224C disk shelves.

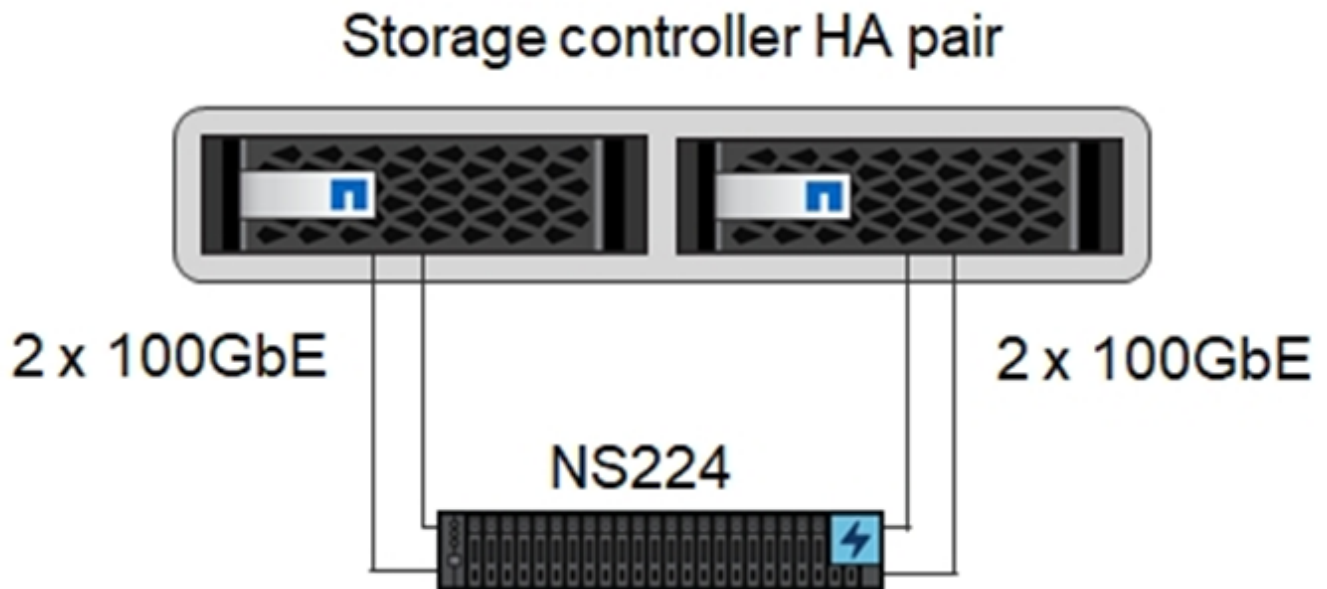


With the DS224C disk shelf, quad-path SAS cabling can also be used but is not required.



NVMe(100GbE)-based disk shelves

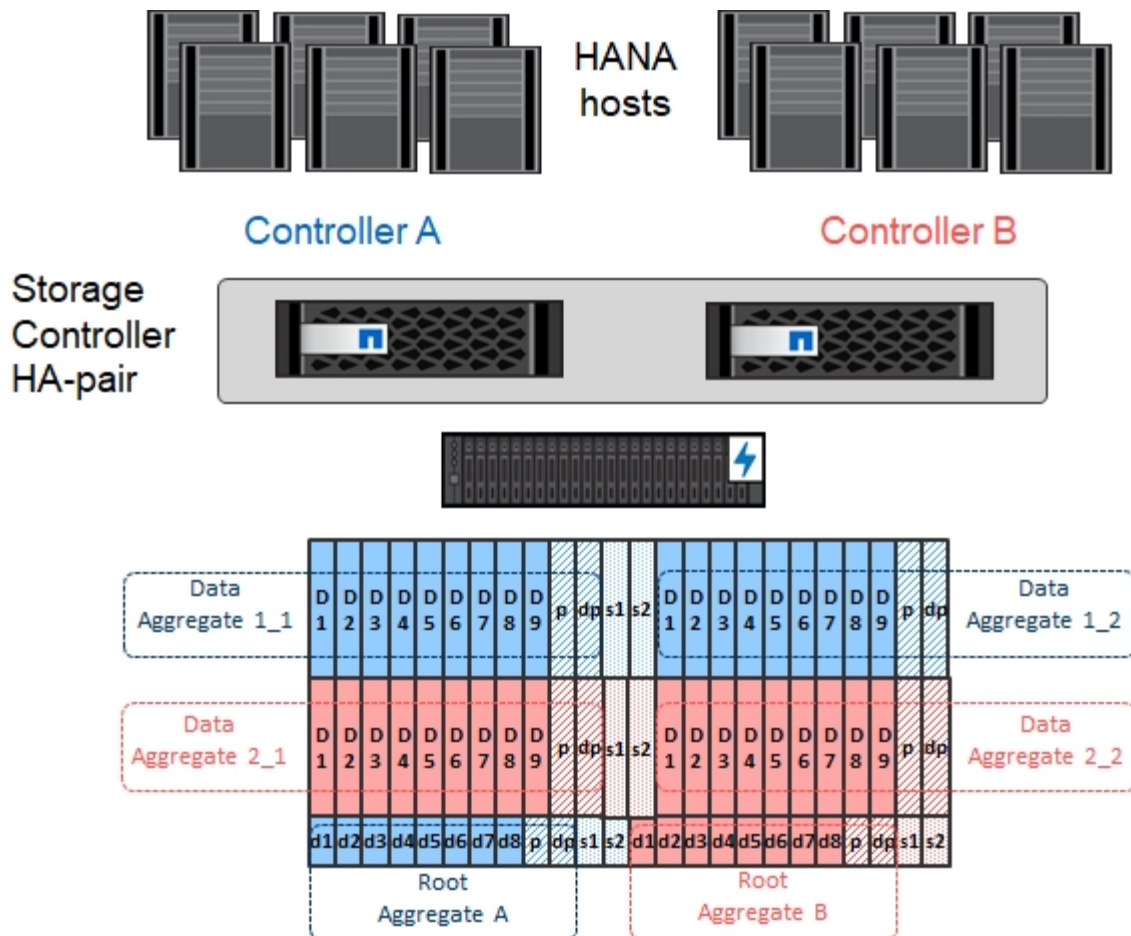
Each NS224 NVMe desk shelf is connected with two 100GbE ports per controller, as shown in the following figure. The disks within each shelf must be distributed equally to both controllers of the HA pair. ADPv2 is also used for the NS224 disk shelf.



Aggregate configuration

In general, you must configure two aggregates per controller, independent of which disk shelf or disk technology (SSD or HDD) is used. This step is necessary so that you can use all available controller resources. For AFF A200 series systems, one data aggregate is sufficient.

The following figure shows a configuration of 12 SAP HANA hosts running on a 12Gb SAS shelf configured with ADPv2. Six SAP HANA hosts are attached to each storage controller. Four separate aggregates, two at each storage controller, are configured. Each aggregate is configured with 11 disks with nine data and two parity disk partitions. For each controller, two spare partitions are available.



Storage virtual machine configuration

Multiple SAP landscapes with SAP HANA databases can use a single SVM. An SVM can also be assigned to each SAP landscape, if necessary, in case they are managed by different teams within a company.

If there is a QoS profile automatically created and assigned while creating a new SVM, remove this automatically created profile from the SVM to ensure the required performance for SAP HANA:

```
vserver modify -vserver <svm-name> -qos-policy-group none
```

Logical interface configuration

Within the storage cluster configuration, one network interface (LIF) must be created and assigned to a dedicated FCP port. If, for example, four FCP ports are required for performance reasons, four LIFs must be created. The following figure shows a screenshot of the eight LIFs (named `fc_*_*`) that were configured on the `hana` SVM.

OnCommand System Manager
Type: All
Search all Objects
+

Dashboard
Applications & Tiers
Storage
Network
Subnets
Network Interfaces
Ethernet Ports
Broadcast Domains
FC/FCoE and NVMe Adapters
IPspaces
Protection
Events & Jobs
Configuration

Network Interfaces

+ Create
Edit
Delete
Status
Migrate
Send to Home
Refresh

Interface Name	Storage V...	IP Address/WWPN	Current Port	Home Port	Data Protocol Ac...	Manage...	Subnet	Role	VIP LIF
fc_1_2b	hana	20:0a:00:a0:98:d9:9...	a700-marco-01:2b	Yes	fc	No	-NA-	Data	No
fc_1_3b	hana	20:0b:00:a0:98:d9:9...	a700-marco-01:3b	Yes	fc	No	-NA-	Data	No
fc_2_2b	hana	20:0c:00:a0:98:d9:94...	a700-marco-02:2b	Yes	fc	No	-NA-	Data	No
fc_2_3b	hana	20:0d:00:a0:98:d9:9...	a700-marco-02:3b	Yes	fc	No	-NA-	Data	No
hana-mgmt-lif	hana	10.63.150.246	a700-marco-02:e0M	Yes	none	Yes	-NA-	Data	No
hana_nfs_lif1	hana	192.168.175.100	a700-marco-02:a0a	Yes	nfs	Yes	-NA-	Data	No
hana_nfs_lif2	hana	192.168.175.101	a700-marco-02:a0a	Yes	nfs	No	-NA-	Data	No
hana_nfs_lif3	hana	192.168.175.110	a700-marco-02:a0a	Yes	nfs	No	-NA-	Data	No
hana_nfs_lif4	hana	192.168.175.111	a700-marco-02:a0a	Yes	nfs	No	-NA-	Data	No
backup-mgmt-lif	hana-backup	10.63.150.45	a700-marco-01:e0M	Yes	none	Yes	-NA-	Data	No

General Properties:
Network Address/WWPN: 192.168.175.100
Role: Data
IPspace: Default
Broadcast Domain: MTU9000
Netmask: 255.255.255.0
Gateway: -NA-
Administrative Status: Enabled
DDNS Status: Enabled

Failover Properties:
Home Port: a700-marco-02:a0a(NA)
Current Port: a700-marco-02:a0a(NA)
Failover Policy: system_defined
Failover Group: MTU9000
Failover State: Hosted on home port

During the SVM creation with ONTAP 9.8 System Manager, you can select all of the required physical FCP ports, and one LIF per physical port is created automatically.

ONTAP System Manager
Search actions, objects, and pages

DASHBOARD
STORAGE
Overview
Applications
Volumes
LUNs
Shares
Qtrees
Quotas
Storage VMs
Tiers
NETWORK
Overview
Ethernet Ports
FC Ports
EVENTS & JOBS
PROTECTION
HOSTS
SAN Initiator Groups
NFS Clients
CLUSTER
Overview
Settings
Disks

Add Storage VM
X

STORAGE VM NAME
hana_

Access Protocol
SMB/CIFS, NFS
ISCSI
FC

☒ Enable FC

CONFIGURE FC PORTS ⓘ

Nodes	2a	2b	2c	2d
wlebandit-3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
wlebandit-4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Storage VM Administration
☒ Manage administrator account

USER NAME
vsadmin

PASSWORD

CONFIRM PASSWORD

☒ Add a network interface for storage VM management.

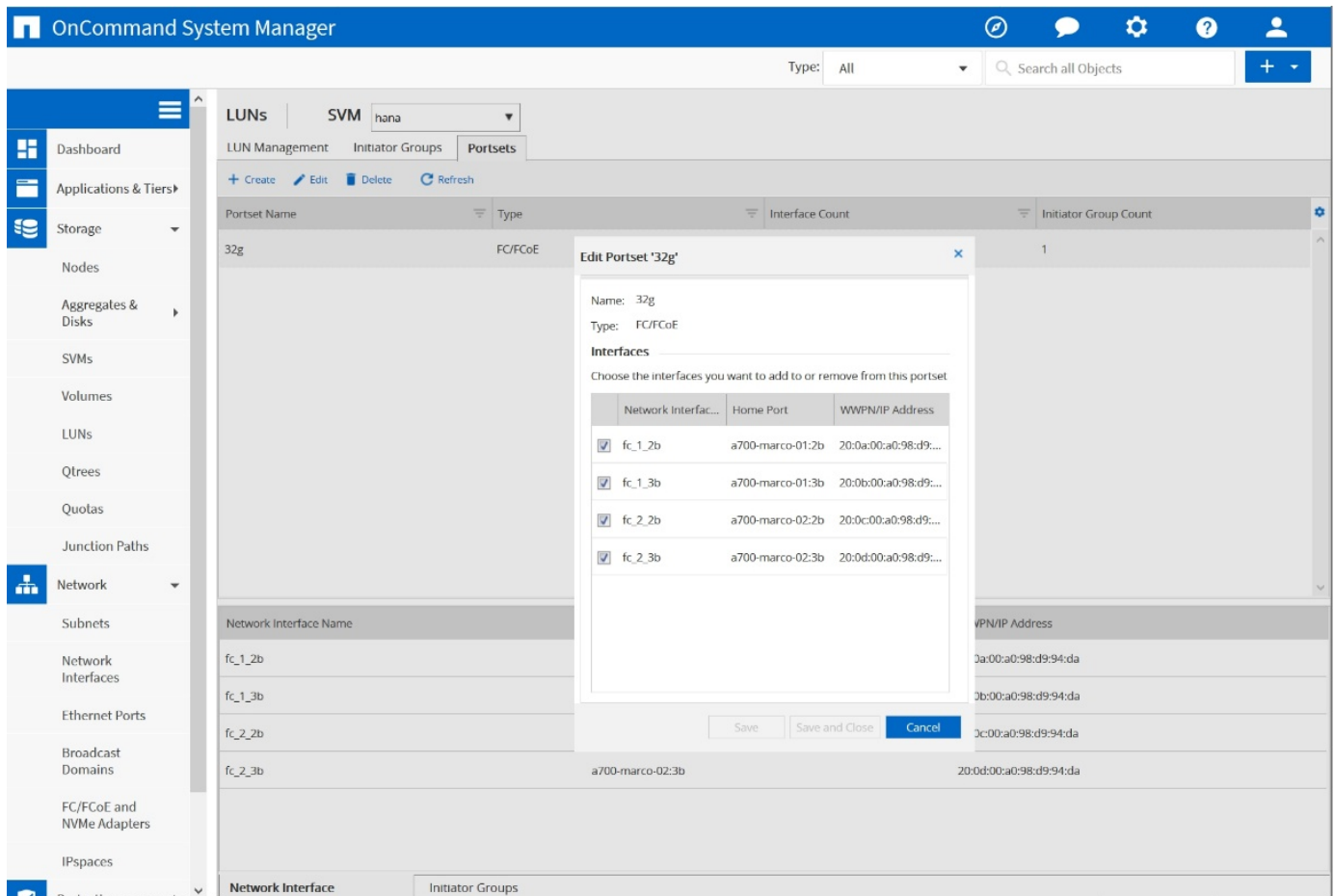
NODE
wlebandit-3

IP ADDRESS
10.63.167.168
SUBNET MASK
24
GATEWAY
Add optional gateway

Save
Cancel

FCP port sets

An FCP port set is used to define which LIFs are to be used by a specific initiator group. Typically, all LIFs created for the HANA systems are placed in the same port set. The following figure shows the configuration of a port set named 32g that includes the four LIFs that were already created.



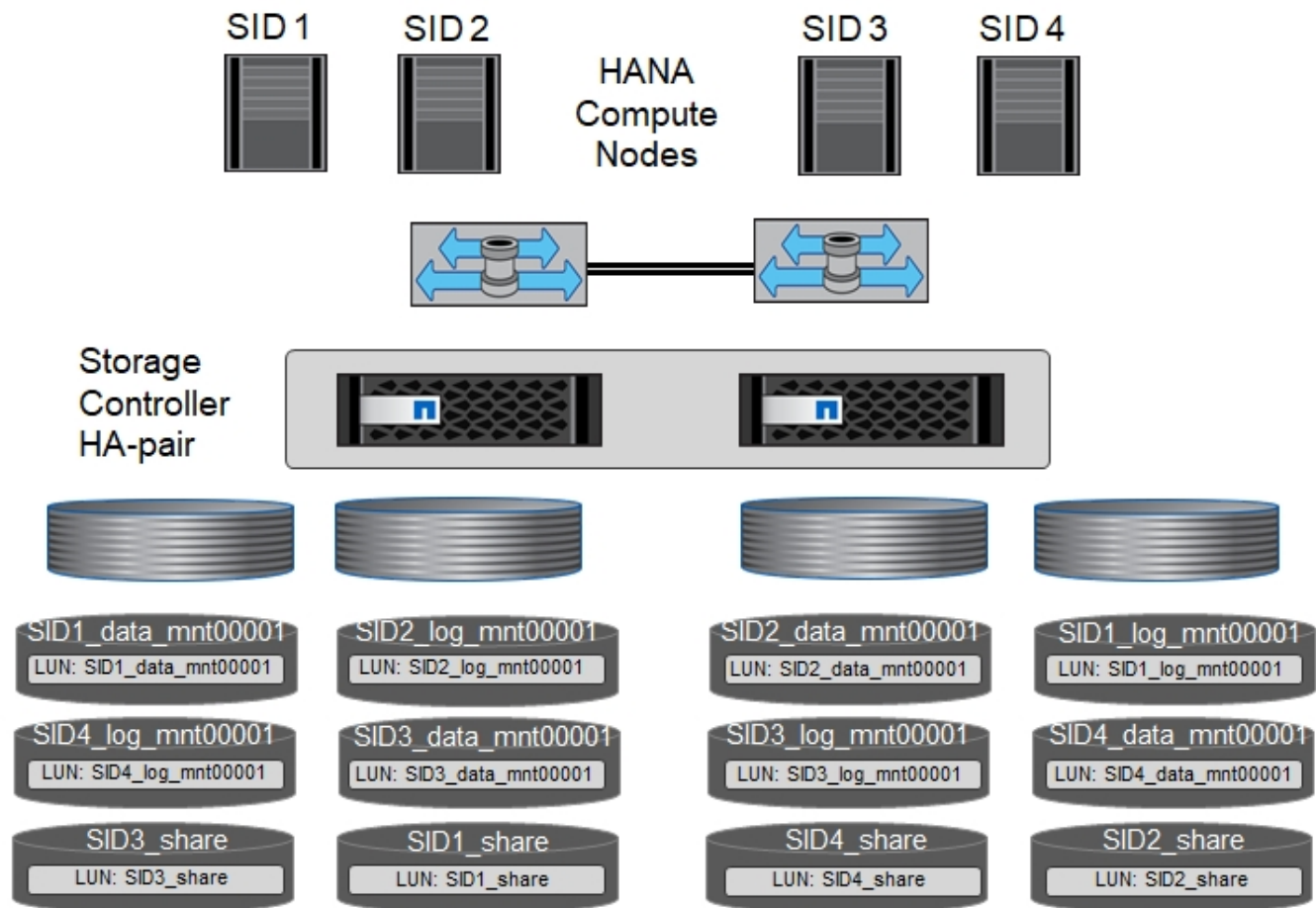
With ONTAP 9.8, a port set is not required, but it can be created and used through the command line.

Volume and LUN configuration for SAP HANA single-host systems

The following figure shows the volume configuration of four single-host SAP HANA systems. The data and log volumes of each SAP HANA system are distributed to different storage controllers. For example, volume `SID1_data_mnt00001` is configured on controller A, and volume `SID1_log_mnt00001` is configured on controller B. Within each volume, a single LUN is configured.



If only one storage controller of a HA pair is used for the SAP HANA systems, data volumes and log volumes can also be stored on the same storage controller.



For each SAP HANA host, a data volume, a log volume, and a volume for `/hana/shared` are configured. The following table shows an example configuration with four SAP HANA single-host systems.

Purpose	Aggregate 1 at Controller A	Aggregate 2 at Controller A	Aggregate 1 at Controller B	Aggregate 2 at Controller B
Data, log, and shared volumes for system SID1	Data volume: SID1_data_mnt00001	Shared volume: SID1_shared	–	Log volume: SID1_log_mnt00001
Data, log, and shared volumes for system SID2	–	Log volume: SID2_log_mnt00001	Data volume: SID2_data_mnt00001	Shared volume: SID2_shared
Data, log, and shared volumes for system SID3	Shared volume: SID3_shared	Data volume: SID3_data_mnt00001	Log volume: SID3_log_mnt00001	–
Data, log, and shared volumes for system SID4	Log volume: SID4_log_mnt00001	–	Shared volume: SID4_shared	Data volume: SID4_data_mnt00001

The following table shows an example of the mount point configuration for a single-host system.

LUN	Mount point at SAP HANA host	Note
SID1_data_mnt00001	/hana/data/SID1/mnt00001	Mounted using /etc/fstab entry

LUN	Mount point at SAP HANA host	Note
SID1_log_mnt00001	/hana/log/SID1/mnt00001	Mounted using /etc/fstab entry
SID1_shared	/hana/shared/SID1	Mounted using /etc/fstab entry



With the described configuration, the `/usr/sap/SID1` directory in which the default home directory of user SID1adm is stored, is on the local disk. In a disaster recovery setup with disk-based replication, NetApp recommends creating an additional LUN within the `SID1_shared` volume for the `/usr/sap/SID1` directory so that all file systems are on the central storage.

Volume and LUN configuration for SAP HANA single-host systems using Linux LVM

The Linux LVM can be used to increase performance and to address LUN size limitations. The different LUNs of an LVM volume group should be stored within a different aggregate and at a different controller. The following table shows an example for two LUNs per volume group.



It is not necessary to use LVM with multiple LUNs to fulfill the SAP HANA KPIs. A single LUN setup fulfills the required KPIs.

Purpose	Aggregate 1 at Controller A	Aggregate 2 at Controller A	Aggregate 1 at Controller B	Aggregate 2 at Controller B
Data, log, and shared volumes for LVM based system	Data volume: SID1_data_mnt00001	Shared volume: SID1_shared Log2 volume: SID1_log2_mnt00001	Data2 volume: SID1_data2_mnt00001	Log volume: SID1_log_mnt00001

At the SAP HANA host, volume groups and logical volumes need to be created and mounted, as indicated in the following table.

Logical volume/LUN	Mount point at SAP HANA host	Note
LV: SID1_data_mnt0000-vol	/hana/data/SID1/mnt00001	Mounted using /etc/fstab entry
LV: SID1_log_mnt00001-vol	/hana/log/SID1/mnt00001	Mounted using /etc/fstab entry
LUN: SID1_shared	/hana/shared/SID1	Mounted using /etc/fstab entry





With the described configuration, the `/usr/sap/SID1` directory in which the default home directory of user SID1adm is stored, is on the local disk. In a disaster recovery setup with disk-based replication, NetApp recommends creating an additional LUN within the `SID1_shared` volume for the `/usr/sap/SID1` directory so that all file systems are on the central storage.

Volume and LUN configuration for SAP HANA multiple-host systems

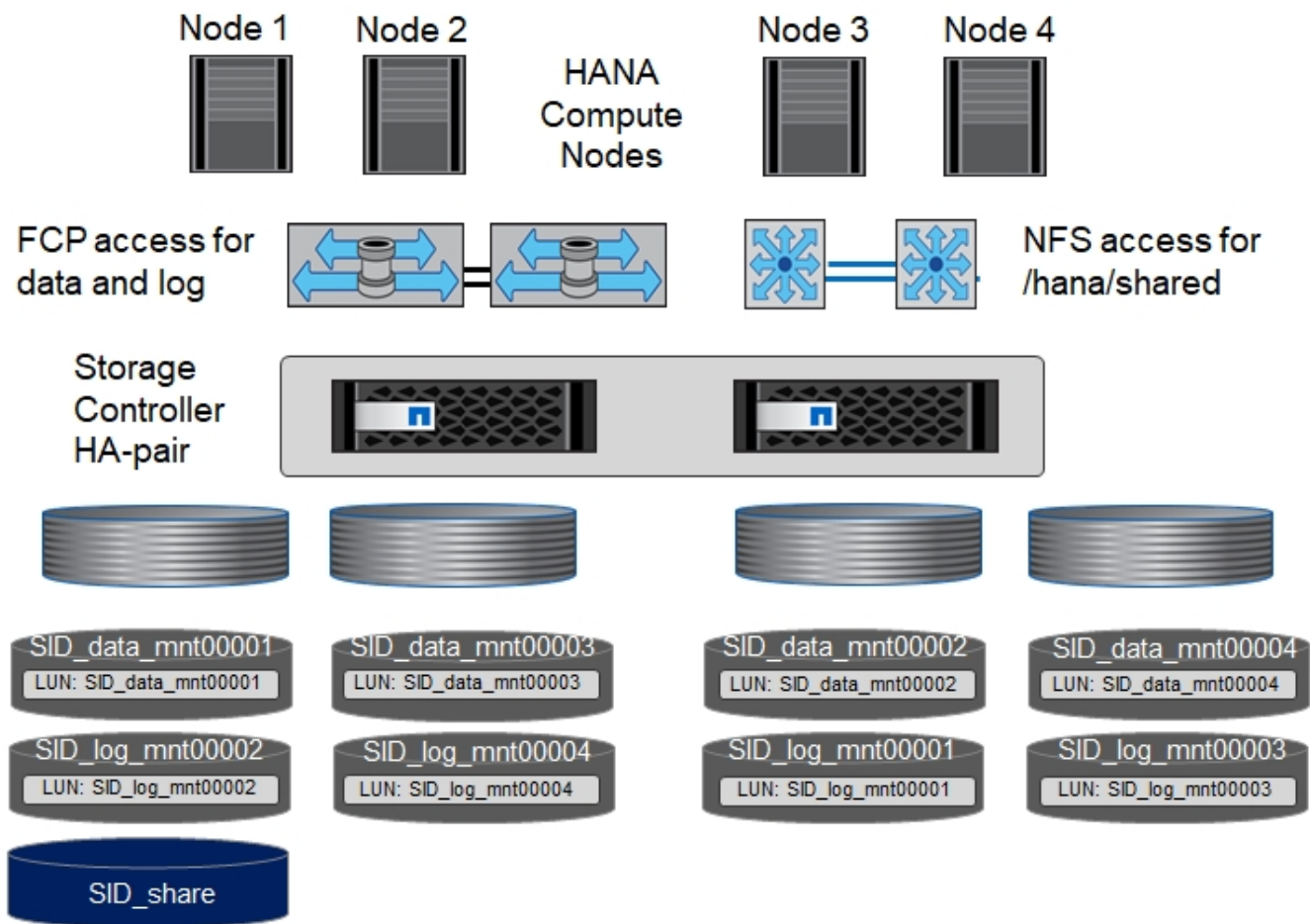
The following figure shows the volume configuration of a 4+1 multiple-host SAP HANA system. The data volumes and log volumes of each SAP HANA host are distributed to different storage controllers. For example, the volume `SID_data_mnt00001` is configured on controller A and the volume `SID_log_mnt00001` is configured on controller B. One LUN is configured within each volume.

The `/hana/shared` volume must be accessible by all HANA hosts and is therefore exported by using NFS. Even though there are no specific performance KPIs for the `/hana/shared` file system, NetApp recommends using a 10Gb Ethernet connection.

- 

If only one storage controller of an HA pair is used for the SAP HANA system, data and log volumes can also be stored on the same storage controller.
- 

NetApp ASA AFF systems do not support NFS as a protocol. NetApp recommends using an additional AFF or FAS system for the `/hana/shared` file system.



For each SAP HANA host, a data volume and a log volume are created. The `/hana/shared` volume is used by all hosts of the SAP HANA system. The following table shows an example configuration for a 4+1 multiple-host SAP HANA system.

Purpose	Aggregate 1 at Controller A	Aggregate 2 at Controller A	Aggregate 1 at Controller B	Aggregate 2 at Controller B
Data and log volumes for node 1	Data volume: SID_data_mnt00001	–	Log volume: SID_log_mnt00001	–
Data and log volumes for node 2	Log volume: SID_log_mnt00002	–	Data volume: SID_data_mnt00002	–
Data and log volumes for node 3	–	Data volume: SID_data_mnt00003	–	Log volume: SID_log_mnt00003
Data and log volumes for node 4	–	Log volume: SID_log_mnt00004	–	Data volume: SID_data_mnt00004
Shared volume for all hosts	Shared volume: SID_shared	–	–	–

The following table shows the configuration and the mount points of a multiple-host system with four active SAP HANA hosts.

LUN or volume	Mount point at SAP HANA host	Note
LUN: SID_data_mnt00001	/hana/data/SID/mnt00001	Mounted using storage connector
LUN: SID_log_mnt00001	/hana/log/SID/mnt00001	Mounted using storage connector
LUN: SID_data_mnt00002	/hana/data/SID/mnt00002	Mounted using storage connector
LUN: SID_log_mnt00002	/hana/log/SID/mnt00002	Mounted using storage connector
LUN: SID_data_mnt00003	/hana/data/SID/mnt00003	Mounted using storage connector
LUN: SID_log_mnt00003	/hana/log/SID/mnt00003	Mounted using storage connector
LUN: SID_data_mnt00004	/hana/data/SID/mnt00004	Mounted using storage connector
LUN: SID_log_mnt00004	/hana/log/SID/mnt00004	Mounted using storage connector
Volume: SID_shared	/hana/shared	Mounted at all hosts using NFS and /etc/fstab entry



With the described configuration, the `/usr/sap/SID` directory in which the default home directory of user SIDadm is stored, is on the local disk for each HANA host. In a disaster recovery setup with disk-based replication, NetApp recommends creating four additional subdirectories in the `SID_shared` volume for the `/usr/sap/SID` file system so that each database host has all its file systems on the central storage.

Volume and LUN configuration for SAP HANA multiple-host systems using Linux LVM

The Linux LVM can be used to increase performance and to address LUN size limitations. The different LUNs of an LVM volume group should be stored within a different aggregate and at a different controller.



It is not necessary to use LVM to combine several LUN to fulfill the SAP HANA KPIs. A single LUN setup fulfills the required KPIs.

The following table shows an example for two LUNs per volume group for a 2+1 SAP HANA multiple host system.

Purpose	Aggregate 1 at Controller A	Aggregate 2 at Controller A	Aggregate 1 at Controller B	Aggregate 2 at Controller B
Data and log volumes for node 1	Data volume: SID_data_mnt00001	Log2 volume: SID_log2_mnt00001	Log volume: SID_log_mnt00001	Data2 volume: SID_data2_mnt00001
Data and log volumes for node 2	Log2 volume: SID_log2_mnt00002	Data volume: SID_data_mnt00002	Data2 volume: SID_data2_mnt00002	Log volume: SID_log_mnt00002
Shared volume for all hosts	Shared volume: SID_shared	—	—	—

At the SAP HANA host, volume groups and logical volumes need to be created and mounted, as indicated in the following table.

Logical volume (LV) or volume	Mount point at SAP HANA host	Note
LV: SID_data_mnt00001-vol	/hana/data/SID/mnt00001	Mounted using storage connector
LV: SID_log_mnt00001-vol	/hana/log/SID/mnt00001	Mounted using storage connector
LV: SID_data_mnt00002-vol	/hana/data/SID/mnt00002	Mounted using storage connector
LV: SID_log_mnt00002-vol	/hana/log/SID/mnt00002	Mounted using storage connector
Volume: SID_shared	/hana/shared	Mounted at all hosts using NFS and /etc/fstab entry



With the described configuration, the `/usr/sap/SID` directory in which the default home directory of user SIDadm is stored, is on the local disk for each HANA host. In a disaster recovery setup with disk-based replication, NetApp recommends creating four additional subdirectories in the `SID_shared` volume for the `/usr/sap/SID` file system so that each database host has all its file systems on the central storage.

Volume options

The volume options listed in the following table must be verified and set on all SVMs.

Action	
Disable automatic Snapshot copies	<code>vol modify -vserver <vserver-name> -volume <volname> -snapshot-policy none</code>
Disable visibility of Snapshot directory	<code>vol modify -vserver <vserver-name> -volume <volname> -snapdir-access false</code>

Creating LUNs, volumes, and mapping LUNs to initiator groups

You can use NetApp ONTAP System Manager to create storage volumes and LUNs and map them to the servers.

NetApp offers an automated application wizard for SAP HANA within ONTAP System Manager 9.7 and earlier, which simplifies the volume and LUN provisioning process significantly. It creates and configures the volumes and LUNs automatically according to NetApp best practices for SAP HANA.

Using the `sanlun` tool, run the following command to obtain the worldwide port names (WWPNs) of each SAP HANA host:

```
stlrx300s8-6:~ # sanlun fcp show adapter
/sbin/udevadm
/sbin/udevadm
host0 ..... WWPN:2100000e1e163700
host1 ..... WWPN:2100000e1e163701
```



The `sanlun` tool is part of the NetApp Host Utilities and must be installed on each SAP HANA host. For more information, see the section "host_setup."

The following steps show the configuration of a 2+1 multiple-host HANA system with the SID SS3:

1. Start the Application Provisioning wizard for SAP HANA in System Manager and provide the required information. All initiators (WWPNs) from all hosts must be added.

ONTAP System Manager

Switch to the new experience

Type: All

Search all Objects

Dashboard

Applications & Tiers

Applications

Storage Tiers

Storage

Nodes

Aggregates & Disks

SVMs

Volumes

LUNs

NVMe

Qtrees

Quotas

Junction Paths

Network

Subnets

Network Interfaces

Ethernet Ports

Broadcast Domains

FC/FCoE and NVMe Adapters

IPspaces

Protection

Events & Jobs


Configuration

Application Provisioning

SVM hana

Enhanced

Basic



Template to provision storage for SAP HANA over SAN

Database Details

Database Name (SID) SS3

Active SAP HANA Nodes 2

Memory Size per HANA Node 2 TB

Data Disk Size per HANA Node 0 Byte

Initiator Details

Initiator Group Create New

Initiator Group Name SS3_HANA

Initiator OS Type Linux

Initiators (comma-separated) 00109b57951f,100000109b579520

FCP Portset portset_1

Host Access Configuration

Configure host access to volumes if number of Active SAP HANA nodes is > 1

Volume Export Configuration Create Custom Policy

Host IP Addresses (comma separated) 0.10.10.10.10.10.11.10.10.10.12

Provision Storage


2. Confirm that storage is successfully provisioned.

ONTAP System Manager


Switch to the new experience | Type: All | Search all Objects

Application Provisioning | SVM: hana

Enhanced | Basic



Template to provision storage for SAP HANA over SAN

 **SUCCESS:** You have successfully provisioned storage for SAP HANA Database SS3 in SVM hana.

Progress Messages

```

export policy ss3_policy created successfully.
Creating initiator group SS3_HANA.
Created initiator group SS3_HANA.
Adding initiator 100000109b57951f to group SS3_HANA.
Added initiator 100000109b57951f to group SS3_HANA.
Adding initiator 100000109b579520 to group SS3_HANA.
Added initiator 100000109b579520 to group SS3_HANA.
Added all initiators to initiator group SS3_HANA.
Search for hosting aggregate succeeded for spanned setup.
Network interface validation succeeded.
License validation succeeded.
Creating volume SS3_log_mnt00001...
Volume SS3_log_mnt00001 created successfully.
Creating volume SS3_data_mnt00002...
Volume SS3_data_mnt00002 created successfully.
Creating volume SS3_data_mnt00001...
Volume SS3_data_mnt00001 created successfully.
Creating volume SS3_log_mnt00002...
Volume SS3_log_mnt00002 created successfully.
Creating volume SS3_shared...

```

Lun	Volume	Aggregate	Size	Mapped To	Created For
SS3_data_mnt00002	SS3_data_mnt00002	aggr2_1	2.4 TB	SS3_HANA	SAP HANA Database
SS3_data_mnt00001	SS3_data_mnt00001	aggr1_1	2.4 TB	SS3_HANA	SAP HANA Database
SS3_log_mnt00001	SS3_log_mnt00001	aggr2_1	614.4 GB	SS3_HANA	SAP HANA Log
SS3_log_mnt00002	SS3_log_mnt00002	aggr1_1	614.4 GB	SS3_HANA	SAP HANA Log

Volume Name	Size	Aggregate Name	Local IP Address	Junction Path	Export Policy
SS3_shared	2 TB	aggr1_1	192.168.175.120, 192.168.175.121, 192.168.175.131	/SS3_shared	default

Done

Creating LUNs, volumes, and mapping LUNs to initiator groups using the CLI

This section shows an example configuration using the command line with ONTAP 9.8 for a 2+1 SAP HANA multiple host system with SID FC5 using LVM and two LUNs per LVM volume group:

1. Create all necessary volumes.

```
vol create -volume FC5_data_mnt00001 -aggregate aggr1_1 -size 1200g
-snapshot-policy none -foreground true -encrypt false -space-guarantee
none
vol create -volume FC5_log_mnt00002 -aggregate aggr2_1 -size 280g
-snapshot-policy none -foreground true -encrypt false -space-guarantee
none
vol create -volume FC5_log_mnt00001 -aggregate aggr1_2 -size 280g
-snapshot-policy none -foreground true -encrypt false -space-guarantee
none
vol create -volume FC5_data_mnt00002 -aggregate aggr2_2 -size 1200g
-snapshot-policy none -foreground true -encrypt false -space-guarantee
none
vol create -volume FC5_data2_mnt00001 -aggregate aggr1_2 -size 1200g
-snapshot-policy none -foreground true -encrypt false -space-guarantee
none
vol create -volume FC5_log2_mnt00002 -aggregate aggr2_2 -size 280g
-snapshot-policy none -foreground true -encrypt false -space-guarantee
none
vol create -volume FC5_log2_mnt00001 -aggregate aggr1_1 -size 280g
-snapshot-policy none -foreground true -encrypt false -space-guarantee
none
vol create -volume FC5_data2_mnt00002 -aggregate aggr2_1 -size 1200g
-snapshot-policy none -foreground true -encrypt false -space-guarantee
none
vol create -volume FC5_shared -aggregate aggr1_1 -size 512g -state
online -policy default -snapshot-policy none -junction-path /FC5_shared
-encrypt false -space-guarantee none
```

2. Create all LUNs.

```

lun create -path /vol/FC5_data_mnt00001/FC5_data_mnt00001 -size 1t
-ostype linux -space-reserve disabled -space-allocation disabled -class
regular
lun create -path /vol/FC5_data2_mnt00001/FC5_data2_mnt00001 -size 1t
-ostype linux -space-reserve disabled -space-allocation disabled -class
regular
lun create -path /vol/FC5_data_mnt00002/FC5_data_mnt00002 -size 1t
-ostype linux -space-reserve disabled -space-allocation disabled -class
regular
lun create -path /vol/FC5_data2_mnt00002/FC5_data2_mnt00002 -size 1t
-ostype linux -space-reserve disabled -space-allocation disabled -class
regular
lun create -path /vol/FC5_log_mnt00001/FC5_log_mnt00001 -size 260g
-ostype linux -space-reserve disabled -space-allocation disabled -class
regular
lun create -path /vol/FC5_log2_mnt00001/FC5_log2_mnt00001 -size 260g
-ostype linux -space-reserve disabled -space-allocation disabled -class
regular
lun create -path /vol/FC5_log_mnt00002/FC5_log_mnt00002 -size 260g
-ostype linux -space-reserve disabled -space-allocation disabled -class
regular
lun create -path /vol/FC5_log2_mnt00002/FC5_log2_mnt00002 -size 260g
-ostype linux -space-reserve disabled -space-allocation disabled -class
regular

```

3. Create the initiator group for all servers belonging to system FC5.

```

lun igroup create -igroup HANA-FC5 -protocol fcp -ostype linux
-initiator 10000090fadcc5fa,10000090fadcc5fb,
10000090fadcc5c1,10000090fadcc5c2, 10000090fadcc5c3,10000090fadcc5c4
-vserver hana

```

4. Map all LUNs to created initiator group.

```
lun map -path /vol/FC5_data_mnt00001/FC5_data_mnt00001 -igroup HANA-FC5
lun map -path /vol/FC5_data2_mnt00001/FC5_data2_mnt00001 -igroup HANA-FC5
lun map -path /vol/FC5_data_mnt00002/FC5_data_mnt00002 -igroup HANA-FC5
lun map -path /vol/FC5_data2_mnt00002/FC5_data2_mnt00002 -igroup HANA-FC5
lun map -path /vol/FC5_log_mnt00001/FC5_log_mnt00001 -igroup HANA-FC5
lun map -path /vol/FC5_log2_mnt00001/FC5_log2_mnt00001 -igroup HANA-FC5
lun map -path /vol/FC5_log_mnt00002/FC5_log_mnt00002 -igroup HANA-FC5
lun map -path /vol/FC5_log2_mnt00002/FC5_log2_mnt00002 -igroup HANA-FC5
```

Next: [SAP HANA storage connector API](#).

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