

Tailored Datacenter Integration Implementation of Multiple SAP HANA Scale-up HSW Appliances on Hitachi Virtual Storage Platform G400 and G600

Reference Architecture Guide

By Abhishek Dhanuka

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Tailored Datacenter Integration Implementation of Multiple SAP HANA Scale-up HSW Appliances on Hitachi Virtual Storage Platform G400 and G600

Reference Architecture Guide

This reference architecture guide describes the recommended tailored datacenter integration storage design of Hitachi Virtual Storage Platform G400 and G600 for use with multiple scale-up SAP HANA appliances.

Testing showed that the storage design for this solution from Hitachi Data Systems meets the TDI KPI requirements from SAP. Intellectual property limitations prevent listing test results.

Using the Hitachi Virtual Storage Platform family of enterprise storage products from Hitachi Data Systems for SAP HANA, including Hitachi Virtual Storage Platform G400 and G600, has the following benefits:

- Increased performance when loading data into SAP HANA
- Scalable deployments of SAP HANA
- Disaster recovery with minimal performance impact to the production instance

The consolidated approach for the Scale-Up appliances provides the following benefits:

- Reduces hardware and operational costs
- Optimizes time-to-value for existing hardware
- Shortens implementation cycles

A maximum of eight scale-up systems with different memory sizes and operating systems can be configured with Hitachi Virtual Storage Platform G600 which can meet TDI KPIs; whereas a maximum of six scale-up systems can be configured on Hitachi Virtual Storage Platform G400 which can meet TDI KPIs.

The storage system is built with the RAID groups, disk storage, and Virtual Storage Platform G400 or G600 components. See Table 1 on page 2, Table 2 on page 2, and Table 3 on page 3 for the detailed information. Each column shows you the total number of components.

Table 1. Drives and RAID Groups for Up to 2TB

<i>SAP HANA Appliances</i>	<i>VSP G600 or VSP G400</i>	<i>Operating System and HANA Share Drives, RAID Groups</i>	<i>Log Volume Drives, RAID Groups</i>	<i>Data Volume Drives, RAID Groups</i>
1	1 VSP G400	8 × 600 GB 10k RPM SAS drives in 1 group configured as RAID-6 (6D+2P)	8 × 600 GB 10k SAS drives in 1 groups configured as RAID-6 (6D+2P)	16 × 600 GB 10k SAS drives in 2 groups configured as RAID-6 (6D+2P)
2	1 VSP G400	16 × 600 GB 10k RPM SAS drives in 2 group configured as RAID-6 (6D+2P)	16 × 600 GB 10k SAS drives in 2 groups configured as RAID-6 (6D+2P)	32 × 600 GB 10k SAS drives in 4 groups configured as RAID-6 (6D+2P)
4	1 VSP G400	32 × 600 GB 10k RPM SAS drives in 4 group configured as RAID-6 (6D+2P)	32 × 600 GB 10k SAS drives in 4 groups configured as RAID-6 (6D+2P)	64 × 600 GB 10k SAS drives in 8 groups configured as RAID-6 (6D+2P)
6	1 VSP G400	48 × 600 GB 10k RPM SAS drives in 6 group configured as RAID-6 (6D+2P)	48 × 600 GB 10k SAS drives in 6 groups configured as RAID-6 (6D+2P)	96 × 600 GB 10k SAS drives in 12 groups configured as RAID-6 (6D+2P)
8	1 VSP G600 only	64 × 600 GB 10k RPM SAS drives in 6 group configured as RAID-6 (6D+2P)	64 × 600 GB 10k SAS drives in 6 groups configured as RAID-6 (6D+2P)	128 × 600 GB 10k SAS drives in 12 groups configured as RAID-6 (6D+2P)

Table 2. Disk Storage

<i>SAP HANA Appliances</i>	<i>Operating System LUNs</i>	<i>HANA Share</i>	<i>Log LUNs</i>	<i>Data LUNs</i>
1	1 × 100 GB	1 × 3000 GB	4 × 150 GB	8 × 750 GB
2	2 × 100 GB	2 × 3000 GB	8 × 150 GB	16 × 750 GB
4	4 × 100 GB	4 × 3000 GB	16 × 150 GB	32 × 750 GB
6	6 × 100 GB	6 × 3000 GB	24 × 150 GB	48 × 750 GB
8	8 × 100 GB	8 × 3000 GB	32 × 150 GB	64 × 750 GB

Table 3. Hitachi Virtual Storage Platform G600/G400 Components

<i>Component</i>	<i>VSP G600</i>	<i>VSP G400</i>
Cache	256 GB	128 GB
DKA (BED)	2 pairs	2 pairs
CHA (FED)	4 pairs	4 pairs

This technical paper assumes you have familiarity with the following:

- Storage area network (SAN) based storage systems
- Network attached storage (NAS) systems
- General storage concepts
- General network knowledge
- SAP HANA platform
- Common IT storage practices

Note — Testing of this configuration was performed in a lab environment. Many things affect production environments beyond prediction or duplication in a lab environment. Follow the recommended practice of conducting proof-of-concept testing for acceptable results in a non-production, isolated test environment that matches your production environment before your production implementation of this solution.

Solution Overview

This document provides an example configuration of the storage layout for up to eight scale-up systems, each containing 1.5 TB of main memory on a Hitachi Virtual Storage Platform G600, tested in the Hitachi Data System lab environment.

This configuration uses the following Hitachi storage component:

- **Hitachi Virtual Storage Platform G600** — Storage virtualization system designed to manage storage assets more efficiently

Figure 1 shows the server to storage configuration for this solution.

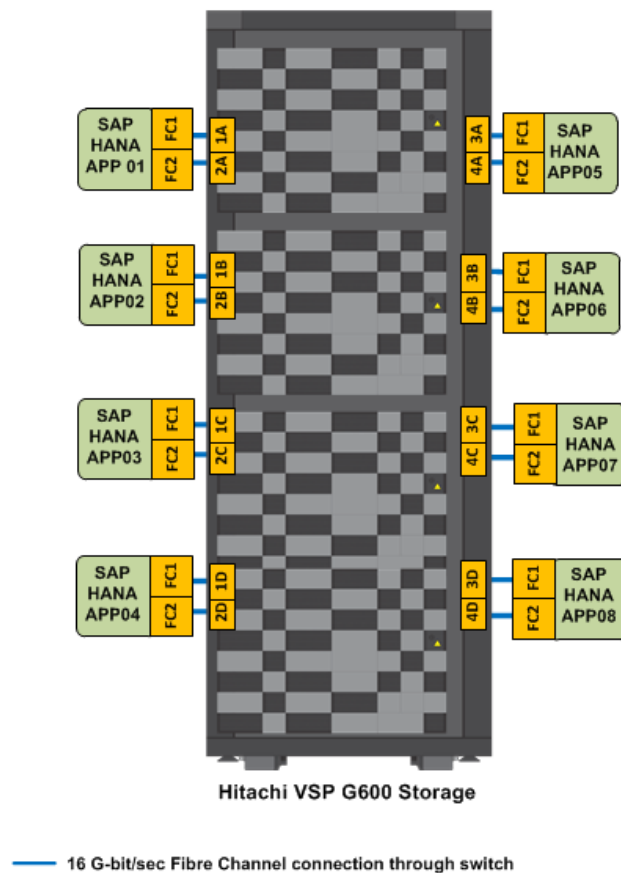


Figure 1

Key Solution Elements

These are the key hardware and software elements used in this reference architecture.

Hardware Elements

Table 4 describes the hardware used to deploy the solution.

Table 4. Hardware Elements

<i>Hardware</i>	<i>Quantity</i>	<i>Configuration</i>	<i>Role</i>
Hitachi Virtual Storage Platform G600	1	<ul style="list-style-type: none"> ■ Single frame 	Block storage for SAP HANA nodes
SAP HANA server	8	<ul style="list-style-type: none"> ■ Blade chassis certified for SAP HANA with 1.5 TB SAP HANA nodes. 	SAP HANA servers with 1.5 TB of main memory

Hitachi Virtual Storage Platform G600

The [Hitachi Virtual Storage Platform family](#) systems are based on industry-leading enterprise storage technology. With flash-optimized performance, these systems provide advanced capabilities previously available only in high-end storage arrays. With the Virtual Storage Platform family, you can build a high performance, software-defined infrastructure to transform data into valuable information.

Hitachi Storage Virtualization Operating System provides storage virtualization, high availability, superior performance, and advanced data protection for all models in the Virtual Storage Platform family. This proven, mature software provides common features to consolidate assets, reclaim space, extend life, and reduce migration effort. New management software improves ease of use to save time and reduce complexity. The infrastructure of Storage Virtualization Operating System creates a management framework for improved IT response to business demands.

Virtual Storage Platform G600 supports [Oracle Real Application Clusters](#) and [VMware Metro Storage Cluster](#).

The operating system LUNs, SAP HANA share LUNs, data LUNs, and log LUNs reside on this storage device.

This solution uses a single frame Virtual Storage Platform G600 for eight scale-up SAP HANA systems.

SAP HANA server

The SAP HANA server refers to the exact same bill of materials as the certified SAP HANA appliance from any certified SAP HANA hardware vendor but without the storage.

View a list of certified configurations on [SAP Certified Appliance Hardware for SAP HANA](#).

Software Elements

Table 5 describes the software products used to deploy the solution.

Table 5. Software Elements

<i>Software</i>	<i>Version</i>
SUSE Linux Enterprise Server for SAP Applications	11 SP3
Red Hat Enterprise Server	6.5
SAP HANA platform	1.0 SPS09, Rev. 91 or later
Hitachi Storage Navigator Modular 2	Microcode dependent
Hitachi Command Suite	8.0.0-04

Solution Design

This is the detailed solution design for the multiple SAP HANA scale-up consolidation with Hitachi Virtual Storage Platform G600. It includes the following:

- “Fibre Channel SAN Architecture” on page 7
- “Storage Architecture” on page 8
- “SAP HANA Configuration” on page 14

Fibre Channel SAN Architecture

Each SAP HANA node needs connection to two dedicated 16 Gb/sec Fibre Channel ports. For an eight appliance configuration, the Fibre Channel SAN architecture has Fibre Channel cables connecting the Fibre Channel ports on the SAP HANA nodes to the designated Hitachi Virtual Storage Platform G600 target port directly or through a SAN switch. Consider best practices of the SAN switch provider when designing or implementing the Fibre Channel zones.

Table 6 shows the storage port mapping for direct attached storage.

Table 6. Storage Port Mapping

<i>SAP HANA Appliance</i>	<i>Fibre Channel Port</i>	<i>VSP G600 Ports</i>
Appliance 01	Port 0	1A
Appliance 01	Port 1	2A
Appliance 02	Port 0	1B
Appliance 02	Port 1	2B
Appliance 03	Port 0	1C
Appliance 03	Port 1	2C
Appliance 04	Port 0	1D
Appliance 04	Port 1	2D
Appliance 05	Port 0	3A
Appliance 05	Port 1	4A
Appliance 06	Port 0	3B
Appliance 06	Port 1	4B
Appliance 07	Port 0	3C
Appliance 07	Port 1	4C
Appliance 08	Port 0	3D
Appliance 08	Port 1	4D

When using a SAN with Fibre Channel switches between the SAP HANA servers and Hitachi Virtual Storage Platform G600, the port properties are in Table 7.

Table 7. Port Properties for Fibre Channel Switches

<i>Property</i>	<i>Value</i>
Port Attribute	Target
Port Security	Enabled
Port Speed	Auto (16 Gbps)
Fabric	ON
Connection Type	P-to-P

When using a direct connection between the SAP HANA servers and Hitachi Virtual Storage Platform G600, the port properties are in Table 8.

Table 8. Port Properties for Direct Connection

<i>Property</i>	<i>Value</i>
Port Attribute	Target
Port Security	Disable
Port Speed	Auto (16 Gbps)
Fabric	Off
Connection Type	FC-AL

Storage Architecture

The central storage system for the multiple scale-up SAP HANA systems is Hitachi Virtual Storage Platform G600. Several usage aspects divide the space provided by Virtual Storage Platform G600, as follows:

- OS LUN provisioning for SAP HANA Appliance
- SAP HANA Shared LUN provisioning for the SAP HANA binaries and other configuration files.
- Log device provisioning for SAP HANA database
- Data device provisioning for SAP HANA database

Figure 2 on page 10 shows the RAID group configuration for the Virtual Storage Platform G600 architecture used in a solution, with eight SAP HANA scale-up systems up to 2 TB.

Provision the parity groups in Figure 2 on page 10 as follows.

■ **Operating System LUN and SAP HANA Shared LUN**

A single parity group configured as RAID-6 (6D + 2P) on 600 GB drives provisions the operating system LUN and SAP HANA shared LUN for the SAP HANA appliance on Virtual Storage Platform G600 per system.

- From this parity group, create two LDEVs with the following capacity each:
 - 100 GB
 - 3000 GB
- Map each LDEV exclusively to the corresponding SAP HANA appliance as follows:
 - LUN number 000
 - LUN number 001
- The installation of SUSE Linux Enterprise Server or Red Hat Enterprise Server for SAP Applications resides on the operating system LUN.

■ **SAP HANA log Volumes**

For the SAP HANA log volumes for each system, first create a parity group configured as RAID-6 (6D+2P) on 8 × 600 GB drives.

- Create four LDEVs of 150 GB each.
- Assign the four LDEVs as a log volume to each SAP HANA appliance at the port with the specified host LUN ID.

■ **SAP HANA data Volumes**

For the SAP HANA data volumes for each system, create two parity groups, each configured as RAID-6 (6D+2P) on 16 × 600 GB drives.

- Create four LDEVs with a capacity of 750 GB per parity group. Table 9 on page 10 shows the parity groups and LDEVs created for data volumes.
 - Assign the eight LDEVs for use as data volumes to each SAP HANA appliance, as shown in Table 9.
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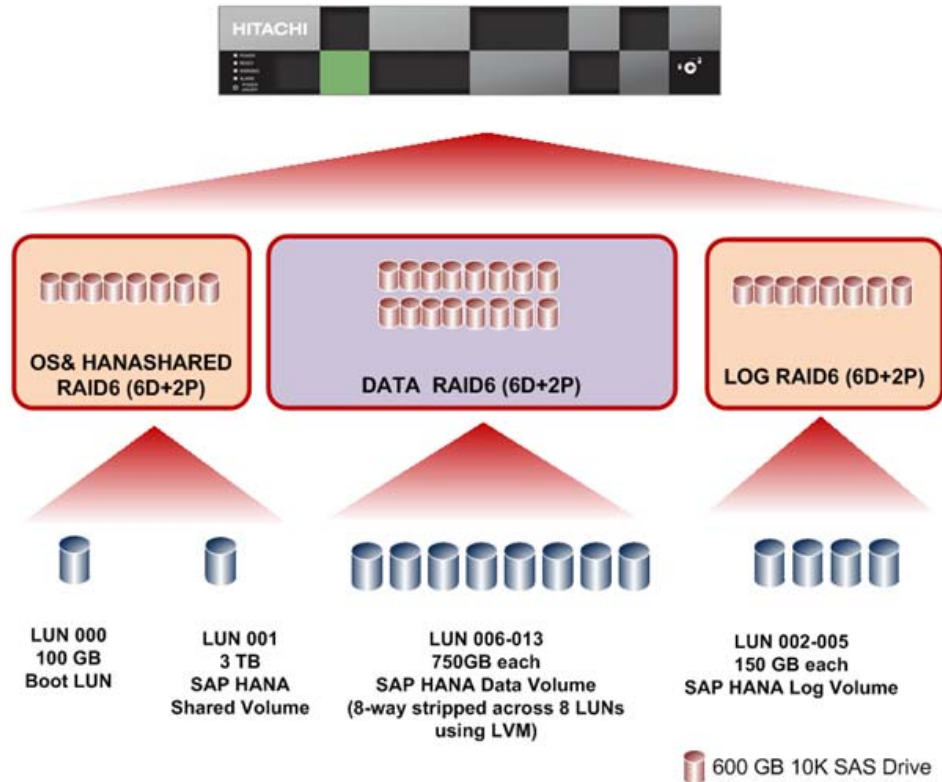


Figure 2

Table 9 lists shows the parity groups and LDEV assignment for boot volumes, Hitachi NAS Platform volumes, SAP HANA log volumes, and SAP HANA data volumes.

Table 9. Parity Groups and LDEV Assignment for Operating System, SAP HANA Shared, SAP HANA Log Volumes and SAP HANA Data Volumes

Parity Group ID	Parity Group RAID Level and disks	LDEV ID	LDEV Name	LDEV Size
1	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:01:00	OS_SU1	100 GB
		00:01:01	SHARE_SU1	3000 GB
2	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:01:02	LOG_SU1_01	150 GB
		00:01:03	LOG_SU1_02	150 GB
		00:01:04	LOG_SU1_03	150 GB
		00:01:05	LOG_SU1_04	150 GB
3	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:01:06	DATA_SU1_01	750 GB
		00:01:07	DATA_SU1_02	750 GB
		00:01:08	DATA_SU1_03	750 GB
		00:01:09	DATA_SU1_04	750 GB

Table 9. Parity Groups and LDEV Assignment for Operating System, SAP HANA Shared, SAP HANA Log Volumes and SAP HANA Data Volumes (Continued)

<i>Parity Group ID</i>	<i>Parity Group RAID Level and disks</i>	<i>LDEV ID</i>	<i>LDEV Name</i>	<i>LDEV Size</i>
4	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:01:0A	DATA_SU1_05	750 GB
		00:01:0B	DATA_SU1_06	750 GB
		00:01:0C	DATA_SU1_07	750 GB
		00:01:0D	DATA_SU1_08	750 GB
5	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:02:00	OS_SU2	100 GB
		00:02:01	SHARE_SU2	3000 GB
6	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:02:02	LOG_SU2_02	150 GB
		00:02:03	LOG_SU2_02	150 GB
		00:02:04	LOG_SU2_03	150 GB
		00:02:05	LOG_SU2_04	150 GB
7	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:02:06	DATA_SU2_01	750 GB
		00:02:07	DATA_SU2_02	750 GB
		00:02:08	DATA_SU2_03	750 GB
		00:02:09	DATA_SU2_04	750 GB
8	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:02:0A	DATA_SU2_05	750 GB
		00:02:0B	DATA_SU2_06	750 GB
		00:02:0C	DATA_SU2_07	750 GB
		00:02:0D	DATA_SU2_08	750 GB
9	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:03:00	OS_SU3	100 GB
		00:03:01	SHARE_SU3	3000 GB
10	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:03:02	LOG_SU3_01	150 GB
		00:03:03	LOG_SU3_02	150 GB
		00:03:04	LOG_SU3_03	150 GB
		00:03:05	LOG_SU3_04	150 GB
11	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:03:06	DATA_SU3_01	750 GB
		00:03:07	DATA_SU3_02	750 GB
		00:03:08	DATA_SU3_03	750 GB
		00:03:09	DATA_SU3_04	750 GB
12	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:03:0A	DATA_SU3_05	750 GB
		00:03:0B	DATA_SU3_06	750 GB
		00:03:0C	DATA_SU3_07	750 GB
		00:03:0D	DATA_SU3_08	750 GB
13	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:04:00	OS_SU4	100 GB
		00:04:01	SHARE_SU4	3000 GB

Table 9. Parity Groups and LDEV Assignment for Operating System, SAP HANA Shared, SAP HANA Log Volumes and SAP HANA Data Volumes (Continued)

<i>Parity Group ID</i>	<i>Parity Group RAID Level and disks</i>	<i>LDEV ID</i>	<i>LDEV Name</i>	<i>LDEV Size</i>
14	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:04:02	LOG_SU4_01	150 GB
		00:04:03	LOG_SU4_02	150 GB
		00:04:04	LOG_SU4_03	150 GB
		00:04:05	LOG_SU4_04	150 GB
15	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:04:06	DATA_SU4_01	750 GB
		00:04:07	DATA_SU4_02	750 GB
		00:04:08	DATA_SU4_03	750 GB
		00:04:09	DATA_SU4_04	750 GB
16	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:04:0A	DATA_SU4_05	750 GB
		00:04:0B	DATA_SU4_06	750 GB
		00:04:0C	DATA_SU4_07	750 GB
		00:04:0D	DATA_SU4_08	750 GB
17	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:05:00	OS_SU5	100 GB
		00:05:01	SHARE_SU5	3000 GB
18	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:05:02	LOG_SU5_01	150 GB
		00:05:03	LOG_SU5_02	150 GB
		00:05:04	LOG_SU5_03	150 GB
		00:05:05	LOG_SU5_04	150 GB
19	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:05:06	DATA_SU5_01	750 GB
		00:05:07	DATA_SU5_02	750 GB
		00:05:08	DATA_SU5_03	750 GB
		00:05:09	DATA_SU5_04	750 GB
20	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:05:0A	DATA_SU5_05	750 GB
		00:05:0B	DATA_SU5_06	750 GB
		00:05:0C	DATA_SU5_07	750 GB
		00:05:0D	DATA_SU5_08	750 GB
21	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:06:00	OS_SU6	100 GB
		00:06:01	SHARE_SU6	3000 GB
22	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:06:02	LOG_SU6_01	150 GB
		00:01:03	LOG_SU6_02	150 GB
		00:06:04	LOG_SU6_03	150 GB
		00:06:05	LOG_SU6_04	150 GB
23	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:06:06	DATA_SU6_01	750 GB
		00:06:07	DATA_SU6_02	750 GB
		00:06:08	DATA_SU6_03	750 GB
		00:06:09	DATA_SU6_04	750 GB

Table 9. Parity Groups and LDEV Assignment for Operating System, SAP HANA Shared, SAP HANA Log Volumes and SAP HANA Data Volumes (Continued)

<i>Parity Group ID</i>	<i>Parity Group RAID Level and disks</i>	<i>LDEV ID</i>	<i>LDEV Name</i>	<i>LDEV Size</i>
24	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:06:0A	DATA_SU6_05	750 GB
		00:06:0B	DATA_SU6_06	750 GB
		00:06:0C	DATA_SU6_07	750 GB
		00:06:0D	DATA_SU6_08	750 GB
26	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:07:00	OS_SU7	100 GB
		00:07:01	SHARE_SU7	3000 GB
27	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:07:02	LOG_SU7_01	150 GB
		00:07:03	LOG_SU7_02	150 GB
		00:07:04	LOG_SU7_03	150 GB
		00:07:05	LOG_SU7_04	150 GB
28	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:07:06	DATA_SU7_01	750 GB
		00:07:07	DATA_SU7_02	750 GB
		00:07:08	DATA_SU7_03	750 GB
		00:07:09	DATA_SU7_04	750 GB
29	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:07:0A	DATA_SU7_05	750 GB
		00:07:0B	DATA_SU7_06	750 GB
		00:07:0C	DATA_SU7_07	750 GB
		00:07:0D	DATA_SU7_08	750 GB
30	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:08:00	OS_SU8	100 GB
		00:08:01	SHARE_SU8	3000 GB
31	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:08:02	LOG_SU8_01	150 GB
		00:08:03	LOG_SU8_02	150 GB
		00:08:04	LOG_SU8_03	150 GB
		00:08:05	LOG_SU8_04	150 GB
32	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:08:06	DATA_SU8_01	750 GB
		00:08:07	DATA_SU8_02	750 GB
		00:08:08	DATA_SU8_03	750 GB
		00:08:09	DATA_SU8_04	750 GB
33	RAID-6 (6D+2P) on 600 GB 10k RPM SAS	00:08:0A	DATA_SU8_05	750 GB
		00:08:0B	DATA_SU8_06	750 GB
		00:08:0C	DATA_SU8_07	750 GB
		00:08:0D	DATA_SU8_08	750 GB

While mapping the LUN path assignment for each appliance, add the LUNs in the following order:

1. Map the operating system LUN and then the HANA shared LUN for the specific SAP HANA appliance.
2. Map the log volume and data volume of each SAP HANA node.

Table 10 shows an example configuration of the LUN path assignment for Appliance 01.

Table 10. Example LUN Path Assignment for Appliance 1

<i>LUN ID</i>	<i>LDEV ID</i>	<i>LDEV Name</i>
000	00:01:00	OS_SU1
001	00:01:01	SHARE_SU1
002	00:01:02	LOG_SU1_01
003	00:01:03	LOG_SU1_02
004	00:01:04	LOG_SU1_03
005	00:01:05	LOG_SU1_04
006	00:01:06	DATA_SU1_01
007	00:01:07	DATA_SU1_02
008	00:01:08	DATA_SU1_03
009	00:01:09	DATA_SU1_04
010	00:01:0A	DATA_SU1_05
011	00:01:0B	DATA_SU1_06
012	00:01:0C	DATA_SU1_07
013	00:01:0D	DATA_SU1_08

SAP HANA Configuration

This explains the SAP HANA configuration.

SAN Operating System LUN Configuration

This scale-up SAP HANA configuration requires SAN boot. It uses one 100 GB LUN on Hitachi Virtual Storage Platform G600 for the operating system boot volume for the SAP HANA appliance.

The Hitachi FIVE-FX Fibre Channel ports in Table 7 on page 8 have the 100 GB operating system LUN configured as the primary boot device. The operating system LUN holds partitions for SUSE Linux for SAP Applications version 11 SP3 or Red Hat Linux for SAP HANA 6.5 on the boot LUN, **/usr/sap/** and the Linux swap space.

Activate Device-Mapper Multipath

This reference architecture uses Device-mapper Multipath, a component of the native Linux operating system.

Using Device-mapper Multipath allows the configuration of multiple I/O paths between the server blades and Hitachi Unified Storage VM. Multipathing aggregates all physical I/O paths into a single logical path. The LUNs are always available unless all four paths fail.

Device-mapper Multipath is used for the following I/O paths:

- OS LUN
- SAP HANA data volume LUN
- SAP HANA log volume LUN
- SAP HANA shared volume LUN

SAP HANA Data Volume Configuration

The Logical Volume Manager configures the SAP HANA persistent storage volumes

With eight 750 GB SAP HANA data volume LUNs, Logical Volume Manager creates a single 8-way striped volume on which the file system is created to store the SAP HANA Data volume per appliance. The striped volume acts as the persistent layer for the SAP HANA server.

Table 11 on page 16 contains the following settings used to optimize performance:

- Striped volume creation
- XFS file system creation
- Mount for data volume

SAP HANA Log Volumes Configuration

This reference architecture uses logical volume manager to configure the SAP HANA log volumes.

With the four 150 GB SAP HANA log volume LUNs, logical volume manager creates a single 4-way striped volume on which the XFS file system is created to store the SAP HANA log volume per appliance.

Table 11 on page 16 contains the following settings used to optimize performance:

- Striped volume creation
 - XFS file system creation
 - Mount for log volume
-

Table 11. XFS File System Creation and Mounted Options for Data and Log Volumes

<i>Option</i>	<i>Data Volume</i>	<i>Log Volume</i>
Logical volume stripe type	8-way striped	4-way striped
Logical volume extents	Using 100% of the free space	Using 100% of the free space
LVM stripe size	512	512
XFS stripe unit	1024	1024
XFS stripe width	12288	6144
Write barrier support	Disabled	Disabled
64-bit inode support	Enabled	Enabled

SAP HANA Shared Volume

This reference architecture uses 3 TB LUNs for the SAP HANA shared volume per appliance. Logical Volume Manager creates a single striped volume on which the file system is created to store the SAP HANA binaries, configuration, and trace files.

There are various types of striped volume that can be created for different size environments. Contact your sales representative to discuss the available options.

SAP HANA Appliance Software Installation

After configuring the file system for the SAP HANA data volume and log volume, the latest SAP HANA SPS stack is installed and upgraded on the SAP HANA server.

The following SAP HANA software components are installed on the HANA server node:

- SAP HANA database
- SAP HANA client
- SAP Host Agent
- LM structure

For More Information

Hitachi Data Systems Global Services offers experienced storage consultants, proven methodologies and a comprehensive services portfolio to assist you in implementing Hitachi products and solutions in your environment. For more information, see the Hitachi Data Systems [Global Services](#) website.

Live and recorded product demonstrations are available for many Hitachi products. To schedule a live demonstration, contact a sales representative. To view a recorded demonstration, see the Hitachi Data Systems Corporate [Resources](#) website. Click the **Product Demos** tab for a list of available recorded demonstrations.

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Corporate Headquarters

2845 Lafayette Street, Santa Clara, California 95050-2627 USA

www.HDS.com

Regional Contact Information

Americas: +1 408 970 1000 or info@HDS.com

Europe, Middle East and Africa: +44 (0) 1753 618000 or info.emea@HDS.com

Asia-Pacific: +852 3189 7900 or hds.marketing.apac@HDS.com

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