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Hitachi Solution for the SAP HANA Appliance and TDI in a Scale-up Configuration using Hitachi Advanced Server HA840 G3 with Intel 4th Gen Xeon Scalable Processors

Reference Architecture Guide

MK-SL-289-03
November 2025

Feedback

Please send comments to doc.feedback@hitachivantara.com. Include the document title and number, including the revision level (for example, -07), and refer to specific sections and paragraphs whenever possible. All comments become the property of Hitachi Vantara LLC.

Thank you!

Revision history

Changes	Date
Support for SLES 15 SP7 and RHEL 9.6.	November 2025
▪ Support for SLES 15 SP6 and RHEL 9.4.	May 2025
▪ Support for RHEL 8.8.	December 2024

Reference Architecture Guide

Leverage this reference architecture guide to set up a Hitachi Solution for the SAP HANA Platform in a scale-up configuration. This will empower your business to unlock greater innovation, achieve business growth, and improve profitability.

The solution is built on the Hitachi Advanced Server HA840 G3 with 4 CPU sockets featuring Intel 4th Gen Xeon Scalable Processors, delivering the performance and scalability required for demanding SAP HANA workloads.

This document covers the following deployments:

- SAP HANA Appliance — with a SAP HANA Appliance deployment, the hardware vendor pre-assembles, pre-installs, and pre-configures the hardware and software, with the complete package certified by SAP.

- SAP HANA Tailored Data Center Integration (TDI) provides flexibility in deploying SAP HANA. Unlike pre-configured appliances, TDI lets you customize your environment using a selection of SAP-certified hardware, operating system, and optional hypervisor. For more details on SAP HANA TDI Phase 5 and a general overview, see the SAP HANA Tailored Data Center Integration — Overview document.

This SAP HANA infrastructure uses the following components:

Appliance:

- One Hitachi Advanced Server HA840 G3 (with 4 CPU sockets) with internal disks.

TDI:

- One Hitachi Advanced Server HA840 G3 (with 4 CPU sockets)

- External storage using a Hitachi Virtual Storage Platform such as VSP E1090

This configuration is validated with Hitachi Virtual Storage Platform E1090 (VSP E1090) for SAP HANA TDI deployments. However, your specific storage needs may vary. For assistance in choosing the right option and implementation services, consult your Hitachi Vantara account representative.

The following figure shows the topology of this solution using internal drives on Hitachi Advanced Server HA840 G3.

Hitachi Advanced Server HA840 G3

— 1 GbE Management Network (iLO)
— 25 GbE Client Network
— Additional 25GbE Network
▭▭ Intel E810-XXVDA2 10/25GbE 2p SFP28 Network Adapter
▭ HPE MR416i-p Gen11 RAID Controller
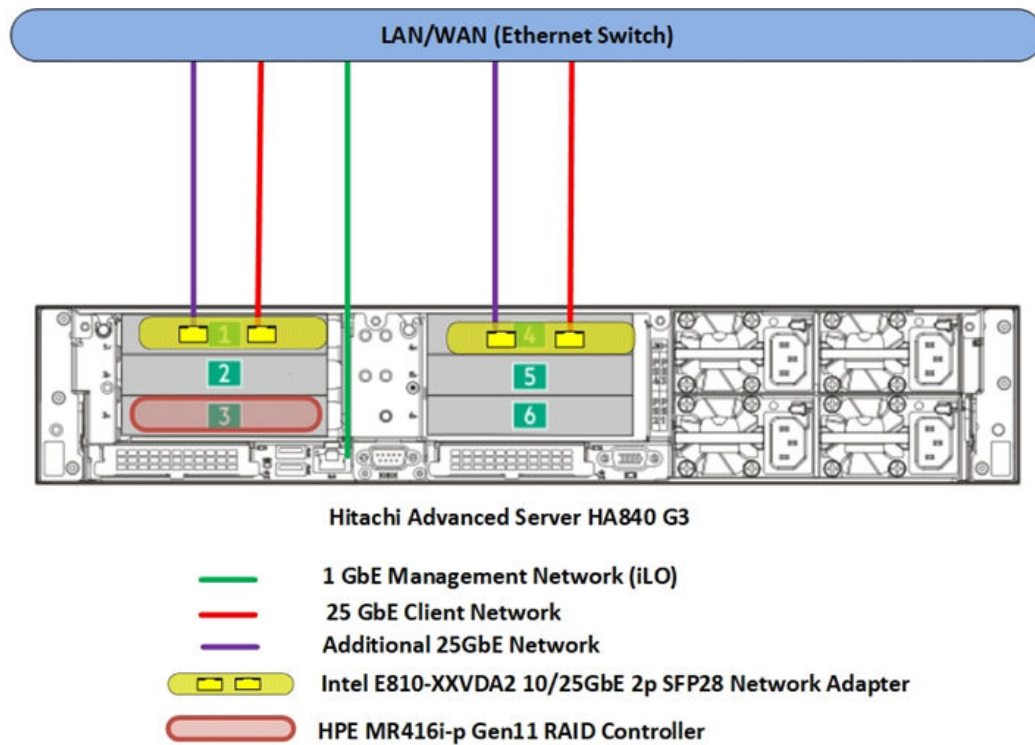
The following figure shows the topology of this solution using an external storage system, such as VSP E1090.

Hitachi Advanced Server HA840 G3

Hitachi Virtual Storage Platform E1090

— 1 GbE Management Network (iLO)
— 25 GbE Client Network
— Additional 25GbE Network
— 32 Gb Fibre Channel Connection
▭▭ Intel E810-XXVDA2 10/25GbE 2p SFP28 Network Adapter
▭▭ HPE SN1610E 32Gb 2p FC PCIe HBA
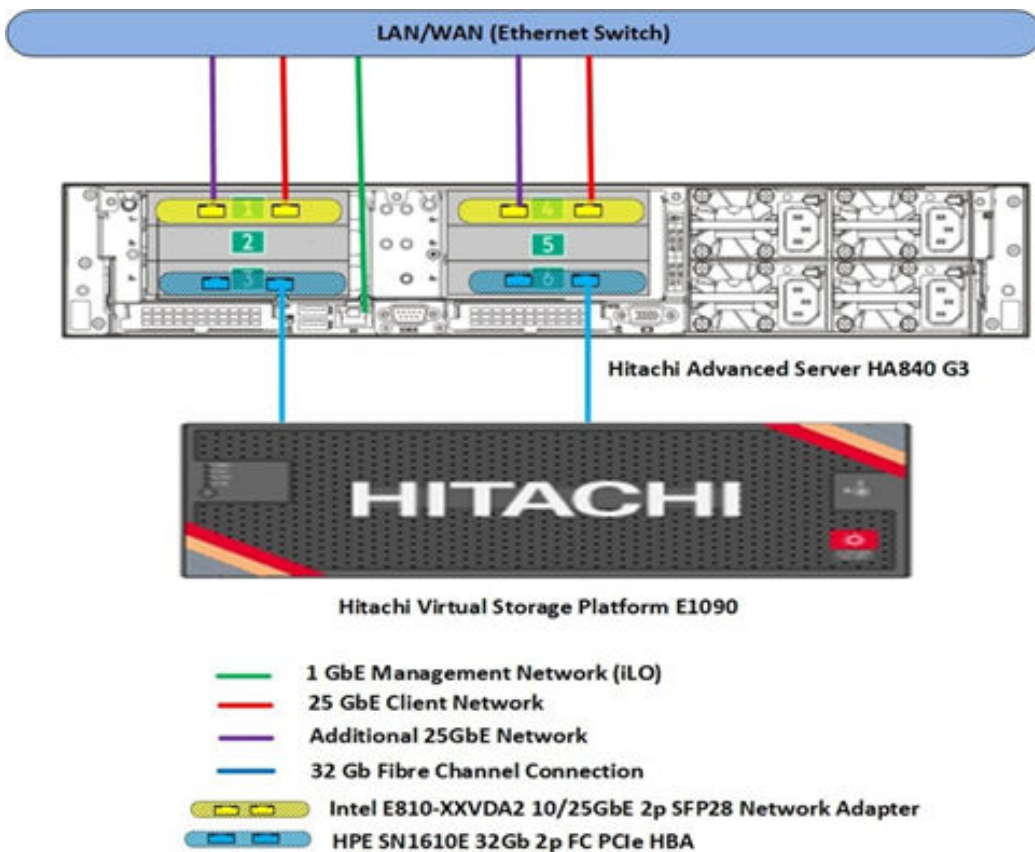
This system supports the configurations listed in the following table.

Table 1

Number of Sockets	RAM Size	Storage
CPU – Intel 4th Gen Xeon Scalable Processor with the following for Appliance: • 4 Intel Xeon Platinum 8490H Processor 60-core, 1.9GHz, 350W CPU – Intel 4th Gen Xeon Scalable Processor with any one of the following for TDI: • 4 Intel Xeon Platinum 8490H Processor 60-core, 1.9GHz, 350W • 4 Intel Xeon Platinum 8468H Processor 48-core, 2.1GHz, 330W • 4 Intel Xeon Platinum 8460H Processor 40-core, 2.2GHz, 330W • 4 Intel Xeon Platinum 8444H Processor 16-core, 2.9GHz, 270W • 4 Intel Xeon Gold 6434H Processor 8-core, 3.7GHz, 195W	• 512 GB with 32 × 16 GB RDIMMS • 1024 GB with 32 × 32 GB RDIMMS • 1024 GB with 64 × 16 GB RDIMMS • 2048 GB with 64 × 32 GB RDIMMS • 2048 GB with 32 × 64 GB RDIMMS • 4096 GB with 64 × 64 GB RDIMMS • 4096 GB with 32 × 128 GB RDIMMS • 8192 GB with 64 × 128 GB RDIMMS	Internal storage option: • Internal drives on Hitachi Advanced Server HA840 G3 External storage option: • Storage subsystem, such as Hitachi Virtual Storage Platform E1090

Hitachi Vantara offers a comprehensive solution for deploying SAP HANA on your infrastructure using the Appliance and TDI approach. This solution leverages best-in-class Hitachi Vantara server and storage components that integrate seamlessly with your existing environment to deliver optimal performance for your SAP HANA workloads.

This technical paper assumes that you are already familiar with the following:

• Storage area network (SAN) based storage systems

• General storage concepts

• Common IT storage practices

• SAP HANA

📄 **Note:** Testing of this configuration was in a lab environment. Many factors 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 otherwise matches your production environment before your production implementation of this solution.

Key solution elements

The key hardware and software components used in this reference architecture are the following. For detailed component information, see .

📄 **Note:** Do not change the layout of any of the components in this environment without consulting your Hitachi Vantara account representative. Changing this layout might require manual configuration of the network and/or using different components.

Hardware elements

The following table lists the hardware used to deploy the specific scale-up configuration of Hitachi Solution for SAP HANA for the different-sized solutions.

Hardware	Quantity	Configuration	Role	Implementation Type
Hitachi Advanced Server HA840 G3	1	CPU – Intel 4th Gen Xeon Scalable Processor with the following for Appliance: ▪ 4 Intel Xeon Platinum 8490H Processor 60- core, 1.9GHz, 350W	SAP HANA server	Appliance
		CPU–Intel 4th Gen Xeon Scalable		TDI

Hardware	Quantity	Configuration	Role	Implementation Type
		Processor with any one of the following for TDI: ▪ 4 Intel Xeon Platinum 8490H Processor 60 - core, 1.9GHz, 350W ▪ 4 Intel Xeon Platinum 8468H Processor 48- core, 2.1GHz, 330W ▪ 4 Intel Xeon Platinum 8460H Processor 40- core, 2.2GHz, 330W ▪ 4 Intel Xeon Platinum 8444H Processor 16- core, 2.9GHz, 270W ▪ 4 Intel Xeon Gold 6434H Processor 8- core, 3.7GHz, 195W		
		▪ 2 Liquid Cooling FIO Heat Sink Kits		All implementations
		For the memory per SAP HANA node, see the next table.		
PCIe Network cards	2	Intel E810-XXVDA2 10/25GbE2p SFP28 Network Adapters	For SAP HANA 10/25 GbE client network and additional 10/25 GbE network	All implementations
	2	Cisco SFP+ 3M Twin axial cables		
RAID controller	1	▪ MR416i-p Gen11 Controller ▪ 96W Smart Stg Li-ion Battery Kit	Manage RAID configuration for local disks	Appliance

Hardware	Quantity	Configuration	Role	Implementation Type
Storage drives	5	For =< 2048 GB RAM per HANA node: ▪ 5 × 3.84 TB SAS SSD internal hard drives	Internal disk drives for RAID5	
	9	For 3072 and 4096 GB RAM per HANA node: ▪ 9 × 3.84 TB SAS SSD internal hard drives		
	11	For 6144 and 8192 GB RAM per HANA node: ▪ 11 × 3.84 TB SAS SSD internal hard drives		
	1	For hot spare ▪ 1 × 3.84 TB SAS SSD internal hard drive		
HBA card	2	SN1610E 32 Gb 2p FC PCIe HBA	Connectivity to the external storage system	TDI
	2	32 Gbps SFP		
Hitachi Virtual Storage Platform E1090 (used by Engineering lab)	1	▪ CTL: 1 pair ▪ 32 Gbps 4-port CHB: 1 pair ▪ MPU: 1 pair ▪ Cache:1024 GB ▪ NVMe SSDs: • 17 × 1.9 TB for sizes up to 8192 GB	Block storage	
Cisco Nexus 92348 switch (optional)	1	48 × 1 GbE ports	Optional switch for the management network	All implementations

Hardware	Quantity	Configuration	Role	Implementation Type
Cisco Nexus 93180YC-FX/FX3 switch (optional)	2	48 × 25 GbE ports	Optional switches for client network or additional backup network	
Minkels Global Solutions Rack	1	1 standard rack	Optional rack for mounting server/ storage/ switches	
PDUs	6	Vertical PDUs	Optional PDUs for the solution	Appliance
	2			TDI

Supported memory configurations

Hitachi Advanced Server HA840 G3 HANA Scale-up supports the T-shirt size configurations as listed in the following table.

BW/4H and S/4	Scale-up Memory (GB)	Storage			
		16 GB	32 GB	64 GB	128 GB
BW/4H and S/4	512	4 × 8 × 16	NA	NA	NA
	1024	4 × 16 × 16	4 × 8 × 32	NA	NA
	2048	NA	4 × 16 × 32	4 × 8 × 64	NA
	3072	NA	NA	NA	NA
	4096	NA	NA	4 × 16 × 64	4 × 8 × 128
	6144	NA	NA	NA	NA
S/4	8192	NA	NA	NA	4 × 16 × 128

Software elements

The following table describes the software products used to deploy this solution.

Software	
Operating system	SUSE Linux Enterprise Server for SAP Applications

Software	
	Red Hat Enterprise Linux for SAP Solutions
Database	SAP HANA 2.0 SPS 07 or later

Solution design

The detailed design for the scale-up configuration of Hitachi Solution for the SAP HANA Platform for this reference solution includes the following:

Hitachi Advanced Server HA840 G3 configuration

The following figure shows the front and back view of HA840 G3 when using internal drives.

Hitachi Advanced Server HA840 G3 with Internal Disk drives(Front)

Hitachi Advanced Server HA840 G3 with RAID Controller (Back)

Intel E810-XXVDA2 10/25GbE 2p SFP28 Network Adapter

MR416i-p Gen11 Storage Controller card
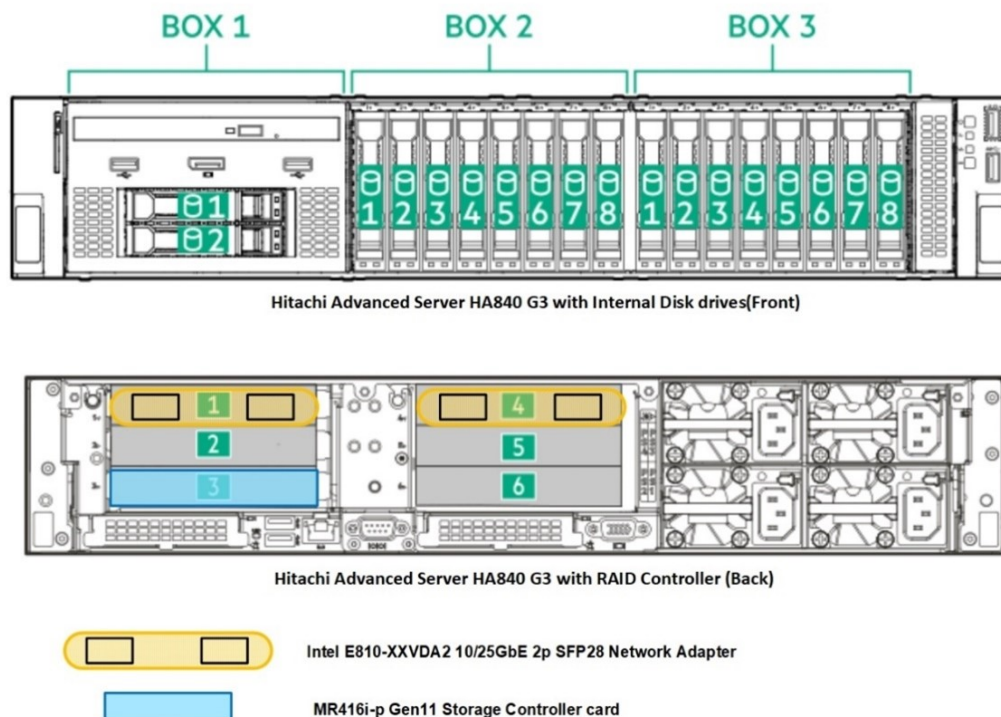
The following figure shows the front and rear views of HA840 G3 when using external storage.
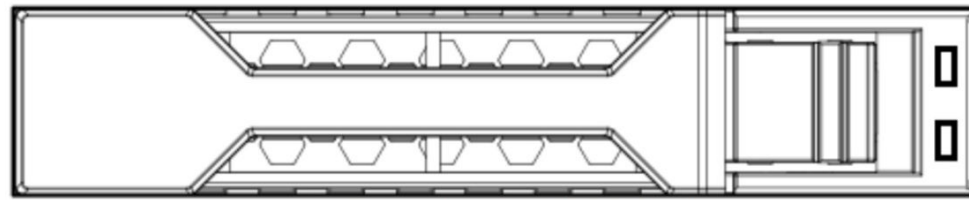
Hitachi Advanced Server HA840 G3 (front)
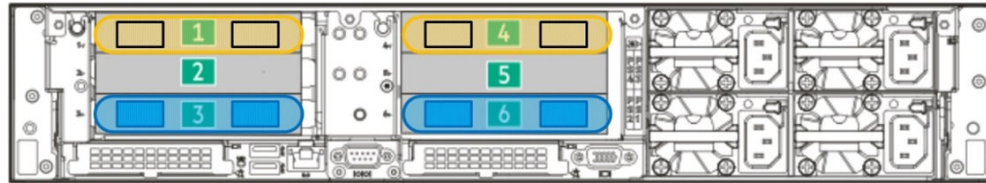
Hitachi Advanced Server HA840 G3 with HBA (rear)

Intel E810-XXVDA2 10/25GbE 2p SFP28 Network Adapter

HPE SN1610E 32Gb 2p FC PCIe HBA

This solution uses a single Hitachi Advanced Server HA840 G3 with the following components:

▪ 2 × 2-port 25 GbE each Intel E810-XXVDA2 PCIe network cards on Port1 of SLOT1 and SLOT4

▪ 1 × 1 GbE Management port for iLO

Components for the internal storage option:

▪ 1 × MR416i-p Gen11 24G RAID Controller PCIe card

   • 5 × 3.84 TB SAS SSD internal hard drives, supporting less than or equal to 2048 GB RAM per SAP HANA node

   • 9 × 3.84 TB SAS SSD internal hard drives, supporting 3072 GB and 4096 GB RAM per SAP HANA node

   • 11 × 3.84 TB SAS SSD internal hard drives, supporting 6144 GB and 8192 GB RAM per SAP HANA node

   • 1 × 3.84 TB SAS SSD internal hard drive used as a spare drive

Components for the external storage option:

▪ 2 × SN1610E 32Gb 2p FC PCIe HBA card

   • Port 1 of SN1610E 32Gb 2p FC PCIe HBA on Slot3

   • Port 1 of SN1610E 32Gb 2p FC PCIe HBA on Slot6

The following illustration shows details of Hitachi Advanced Server HA840 G3 front and rear views.

Primary Riser					Secondary Riser				
Slots #	Technology	Bus W	Connector W	Slot Form Factor	CPU	Slots #	Technology	Bus W	Connector W	Slot Form Factor	CPU
1	PCIe 5.0	X8	X16	Full-height, 3/4-length slot	CPU 1/2	4	PCIe 5.0	X8	X16	Full-height, 3/4-length slot	CPU 1/2
2	PCIe 5.0	X16	X16	Full-height, 3/4-length slot	CPU 1/2	5	PCIe 5.0	X16	X16	Full-height, 3/4-length slot	CPU 1/2
3	PCIe 5.0	X8	X16	Full-height, 3/4-length slot	CPU 1/2	6	PCIe 5.0	X8	X16	Full-height, 3/4-length slot	CPU 1/2

Hitachi Advanced Server HA840 G3 (Rear)

Hitachi Advanced Server HA840 G3 (Front)

Network architecture

Connect the 1 GbE management port (iLO) on Hitachi Advanced Server HA840 G3 to a Cisco Nexus 92348, or any other external 1 GbE switch for management connectivity.

Refer to the following table of PCIe network cards to make the following 25 GbE network connections for the client network setup of the SAP HANA node as an uplink network:

- Connect the following to Cisco Nexus 93180YC-FX/FX3 switches or to any other external switches:

  - Port 1 of dual port Intel E810-XXVDA2 2-port 25GbE Network Adapter on PCIe_Slot1

  - Port 1 of dual port Intel E810-XXVDA2 2-port 25GbE Network Adapter on PCIe_Slot4

- Bond the corresponding two ports *eth9901* and *eth9902* as *bond0* at the operating system level using active-active network bond mode with the following options:

```
mode=802.3ad miimon=100 xmit_hash_policy=2 lacp_rate=fast
```

This acts as the client network for the SAP HANA node.

If additional 25 GbE network connections are needed, connect Port 2 of both 25 GbE Intel E810-XXVDA2 PCIe cards to the Cisco Nexus 93180YC-FX/FX3 switches or to any other external switches.

PCIe Network Card	Port	Network Description
PCIe_Slot1#	1	Client network for the SAP HANA node.
	2	Free for use as an additional network for backup, SAP HANA system replication, or other purposes.
PCIe_Slot4#	1	Client network for the SAP HANA node.
	2	Free for use as an additional network for backup, SAP HANA system replication, or other purposes.
Slot#: Refer to the image of the HA840 G3 topology for a back view of the PCIe slots.		

> 📄 **Note:** The management network and the client network can be on the same network switch or a separate network switch, depending on the network environment.

Storage architecture configuration

This section describes the storage configurations for this environment.

- Internal storage option
- External storage option

Internal storage

Hitachi Advanced Server HA840 G3 with used Internal Disks and Hot spare drive (Front)

Hitachi Advanced Server HA840 G3 with RAID Controller (Back)

Intel E810-XXVDA2 10/25GbE 2p SFP28 Network Adapter

MR416i-p Gen11 Storage Controller card
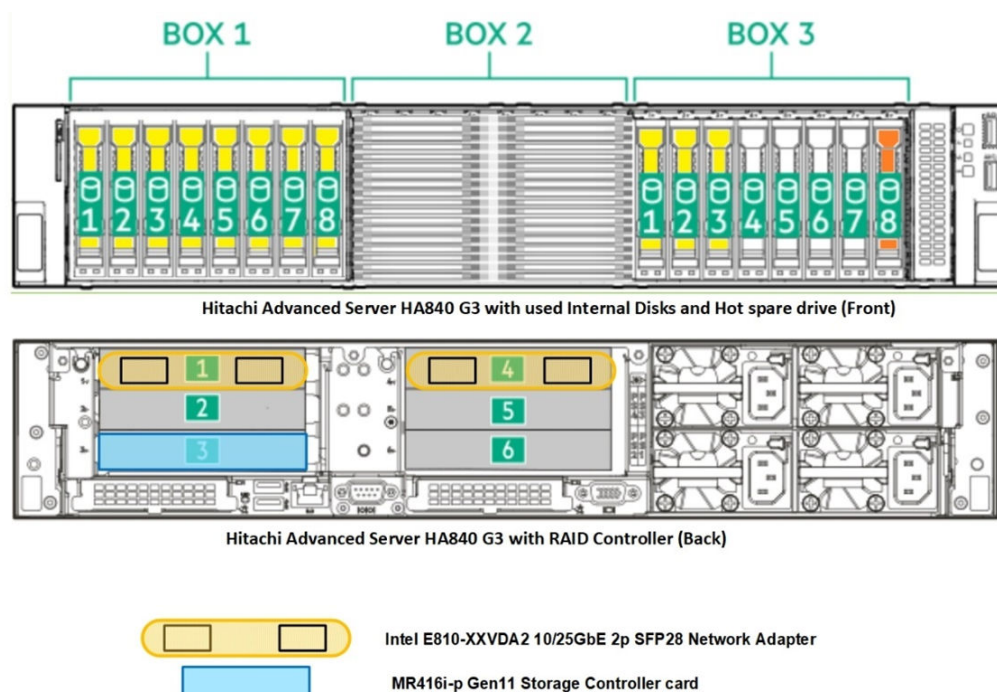
The following storage components are required to set up a scale-up configuration for SAP HANA using internal storage with Hitachi Advanced Server HA840 G3.

- One MR416i-p Gen11 RAID Controller PCIe card on Slot3

- 5 × 3.84 TB SAS SSD internal hard drives configured as RAID 5 (4D+1P), supporting less than or equal to 2048 GB RAM per SAP HANA node

- 9 × 3.84 TB SAS SSD internal hard drives configured as RAID 5 (8D+1P), supporting 3072 GB and 4096 GB RAM per SAP HANA node

- 11 × 3.84 TB SAS SSD internal hard drives configured as RAID 5 (10D+1P), supporting 6144 GB and 8192 GB RAM per SAP HANA node

- 1 × 3.84 TB SAS SSD internal hard drive used as a spare drive

Depending on the I/O and capacity requirements, storage sizing and configuration varies for the following components:

- Operating system volume (OS)

- SAP HANA shared volume (*/hana/shared*)

- SAP HANA log volume (*/hana/log*)

- SAP HANA data volume (*/hana/data*)

The following table lists the storage configurations for different memory sizes.

| Configuration		Supported SAP HANA Memory Size		
		=< 2048 GB	**2048 - 4096 GB**	**=< 8192 GB**
Parity Group		1 × RAID 5 (4D +1P) using 5 × 3.84 TB SAS SSD	1 × RAID-5 (8D +1P) using 9 × 3.84 TB SAS SSD	1 × RAID 5 (10D +1P) using 11 × 3.84 TB SAS SSD
Virtual Drives	Operating System	100 GB		
	HANA Shared	1 × memory (GB)	1 × memory (GB)	1 × memory (GB)
	HANA Log	600 GB		
	HANA Data	6144 GB	12288 GB	24576 GB
Spare drive		1 × 3.84 TB SAS SSD		

External storage

Hitachi Advanced Server HA840 G3

Hitachi Vantara Virtual Storage Platform

— 32 Gb Fibre Channel Connection
HPE SN1610E 32Gb 2p FC PCIe HBA
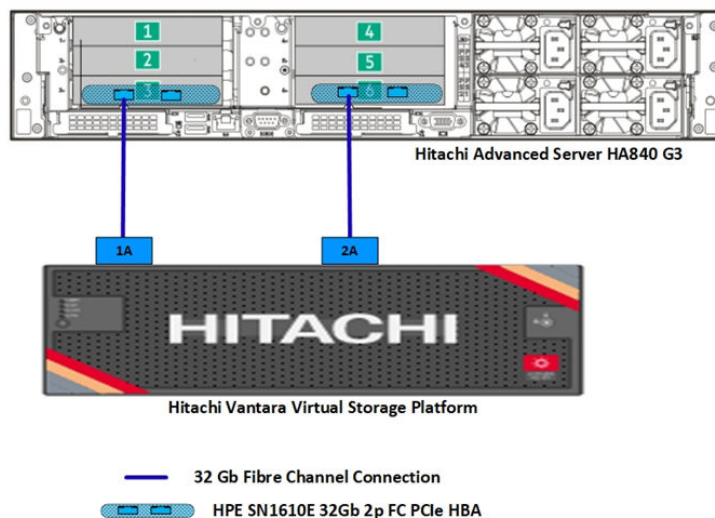
> **Note:** You can use a different Hitachi Vantara storage architecture to implement this reference architecture. Hitachi Virtual Storage Platform E1090 was used as external storage for validation testing of this environment. Contact your Hitachi Vantara account representative for details and implementation services to configure an environment using external storage.

The following storage components are required to implement a scale-up SAP HANA system with Hitachi Advanced Server HA840 G3 using external storage:

- 2 × SN1610E 32Gb 2p FC PCIe HBA cards
  - Port 1 of SN1610E 32Gb 2p FC PCIe HBA on Slot3
  - Port 1 of SN1610E 32Gb 2p FC PCIe HBA on Slot6
- 1 × Hitachi Virtual Storage Platform E1090 with the following:
  - Storage drive box trays (DBS/DBN)
  - Spare drives

The following are mandatory for the external storage option with a direct connection between the Hitachi Vantara Virtual Storage Platform and the SN1610E 32Gb HBA on Hitachi Advanced Server HA840 G3:

- Enable Host Mode Option 02, Host Mode Option 94, and Host Mode Option 109 for the corresponding storage port connected with the server.

  - Host Mode Option 109 — This option fixes a SAN boot issue when the system cannot find the Boot LUN after a restart.

  - Host Mode Option 94 — This option is mandatory for direct connection between the Hitachi Virtual Storage Platform and the SN1610E 32Gb HBA. If this mode is not set, then SAN storage cannot be identified from the SN1610E 32Gb HBA.

  - Host Mode Option 02 (Optional) — This option is used when the system uses test-unit-ready (TUR) for path_checker in the */etc/multipath.conf* file. This mode is typically used for a fencing technology.

- Host Group ID must be 00 for SAN boot.

An example configuration for port properties with Hitachi Virtual Storage Platform is listed in the following table.

For this setting	Use this value
Port Security	Disabled
Port Speed	32 Gbps
Fabric	OFF
Connection Type	P-to-P

The SAP HANA node requires the following storage layout:

- Operating system volume (OS).

- SAP HANA shared volume (*/hana/shared*) for HANA binaries and other configuration and trace files.

- SAP HANA log volume (*/hana/log*).

- SAP HANA data volume (*/hana/data*).

This reference architecture uses a dynamic provisioning pool design for the storage layout. This ensures maximum utilization and optimization at a lower cost.

For the storage layout, use two dynamic provisioning pools (HDP) with the specific parity groups as listed in the following table.

Dynamic Provisioning Pool Name	Purpose	Parity Group RAID Level and Disks
OS_SH_Data_Pool	Operating system LUN SAP HANA Shared LUN Data LUN	RAID 6 (6D+2P) on 1.92 TB NVMe SSD drives
Log_Pool	Log LUN	RAID 6 (6D+2P) on 1.92 TB NVMe SSD drives

Two pools are used to provide storage and throughput for all supported storage sizes:

- Create two dynamic provisioning pools for the SAP HANA systems on storage:
  - Use OS_SH_DT_Pool to provision the operating system volume, SAP HANA shared volume, and data volume.
  - Use Log_Pool to provision the log volume.
- Use thin provisioning to leverage the benefits of automatic performance optimization and storage space savings across pools of virtual capacity.

> **Note:** Storage from the listed pools can be used to provision additional SAP HANA systems.

The following table lists the minimum storage configuration following the *SAP HANA Tailored Data Center Integration on Hitachi Virtual Storage Platform E990 and E1090 with Hitachi Storage Virtualization Operating System Reference Architecture Guide* (https://docs.hitachivantara.com/v/u/en-us/application-optimized-solutions/mk-sl-197) for different memory sizes for HA840 G3 with VSP E1090 as an example.

	1024 GB to 8192 GB
P-VOLs	1 × RAID 6 (6D+2P) 8 × 1.92 TB NVMe SSD 4 × 2640 GB PVOL
VVOL - OS	OS: (1 × 100 GB)
VVOL - /hana/shared	/hana/shared: 1 × 1024 GB
VVOL - /hana/data	/hana/data: for 512 GB size: 4 × 128 GB for 1024 GB size: 4 × 256 GB for 2048 GB size: 4 × 512 GB for 4096 GB size: 4 × 1024 GB

	1024 GB to 8192 GB
	for 8192 GB size: 4 × 2048 GB
P-VOLs	1 × RAID 6 (6D+2P) 8 × 1.92 TB NVMe SSD 4 × 2640 GB PVOL
VVOL - /hana/log	/hana/log 4 × 128 GB

The following table lists the LUN path assignment used when validating this environment.

LUN ID	LDEV ID	LDEV Name
0000	00:02:00	HANA_OS
0001	00:02:01	HANA_SH
0002	00:02:02	HANA_LOG_1
0003	00:02:03	HANA_LOG_2
0004	00:02:04	HANA_LOG_3
0005	00:02:05	HANA_LOG_4
0006	00:02:06	HANA_DATA_1
0007	00:02:07	HANA_DATA_2
0008	00:02:08	HANA_DATA_3
0009	00:02:09	HANA_DATA_4

SAP HANA configuration

This section describes how to configure SAP HANA for this solution.

Filesystem

These volumes use the following file systems for implementation of this solution either with an internal or external storage system:

- Operating system volume
  - BTRFS Filesystem (Only for SLES) / XFS Filesystem
- SAP HANA shared volume

- SAP HANA data volume

- SAP HANA log volume

Device-Mapper Multipath

This solution uses Device-Mapper Multipath to combine the multiple connections originating from external storage systems.

SAP HANA software installation

After you configure the file systems for the SAP HANA data volume and log volume, install the latest SAP HANA 2.0 SPS 07 stack on the server.

Install the following SAP HANA software components on the server:

- SAP HANA database server

- SAP HANA client

- SAP host agent

Engineering validation

The test methodology for validating the appliance configuration using Hitachi Advanced Server HA840 G3 with 3.84 TB SAS SSD internal drives and SAP HANA TDI Enterprise Storage configuration with Hitachi Virtual Storage Platform E1090 used the following:

- For the Appliance solution, SAP HANA Hardware and Cloud Measurement Tool (HCMT) revision hcmt-077_0 was tested on the following volumes for SUSE Linux Enterprise Server for SAP Applications 15 SP5:

  - Data volume

  - Log volume

  - Shared volume

- For the TDI solution, SAP HANA Hardware and Cloud Measurement Tool (HCMT) revision hcmt-076_0 was tested on the following volumes for SUSE Linux Enterprise Server for SAP Applications 15 SP5:

  - Data volume

  - Log volume

  - Shared volume

- For the TDI solution, SAP HANA Hardware and Cloud Measurement Tool (HCMT) revision hcmt-083_0 was tested on the following volumes for SUSE Linux Enterprise Server for SAP Applications 15 SP6 and RedHat Enterprise Linux 9.4:

  - Data volume

  - Log volume

  - Shared volume

- For the Appliance solution, SAP HANA Hardware and Cloud Measurement Tool (HCMT) revision hcmt-088_0 was tested on the following volumes for SUSE Linux Enterprise Server for SAP Applications 15 SP7 and Red Hat Enterprise Linux 9.6:

  - Data volume

  - Log volume

  - Shared volume

For optimal use of the system with an SAP HANA database, use the parameters listed in the corresponding appendix for your operating system release. Follow SAP Note 2399079 to set up these parameters defined in *global.ini* for SAP HANA 2.0.

Sample global.ini file

This section provides the *global.ini* file used for the following operating systems.

SUSE Enterprise Linux Server for SAP Applications

This is a sample *global.ini* file that was configured and used for validating the environment for the Appliance and TDI solution with SUSE Linux Enterprise Server for SAP Applications 15 SP5, SP6, and SLES15 SP7.

```
[communication]
tcp_backlog = 2048

[database_initial_encryption]
backup_encryption = on
persistence_encryption = on
log_encryption = on

[fileio]
async_read_submit[log] = on
async_write_submit_active[log] = auto
async_write_submit_blocks[log] = all
min_submit_batch_size[log] = 16
max_submit_batch_size[log] = 64
max_parallel_io_requests[log] = 64
size_kernel_io_queue[log] = 512
async_read_submit[data] = on
async_write_submit_active[data] = auto
async_write_submit_blocks[data] = all
min_submit_batch_size[data] = 16
```

```
max_submit_batch_size[data] = 64
max_parallel_io_requests[data] = 64
size_kernel_io_queue[data] = 512

[multidb]
mode = multidb
database_isolation = low
singletenant = yes

[persistence]
basepath_datavolumes = /hana/data/HIT
basepath_logvolumes = /hana/log/HIT
```

RedHat Enterprise Linux Server for SAP Applications

This is a sample *global.ini* file that was configured and used for validating the environment for the Appliance and TDI solution with Red Hat Enterprise Linux 9.4 and 9.6.

```
# global.ini last modified 2025-03-24 06:03:52.186004 by hdbnameserver
[communication]
tcp_backlog = 2048
sslMinProtocolVersion=tls12

[database_initial_encryption]
backup_encryption = on
persistence_encryption = no
log_encryption = on

[fileio]
async_read_submit[log] = On
async_write_submit_active[log] = auto
async_write_submit_blocks[log] = all
min_submit_batch_size[log] = 16
max_submit_batch_size[log] = 64
max_parallel_io_requests[log] = 64
size_kernel_io_queue[log] = 512
async_read_submit[data] = on
async_write_submit_active[data] = auto
async_write_submit_blocks[data] = all
min_submit_batch_size[data] = 16
max_submit_batch_size[data] = 64
```

Product descriptions

These products are used in this solution.

Hitachi Advanced Server HA840 G3

The Hitachi Advanced Server HA840 G3 is a high-density, four-socket (4S) server with high performance, scalability, and reliability, all in a 2U chassis. Supporting the latest 4th Generation Intel Xeon Scalable Processors, the Hitachi Advanced Server HA840 G3 offers greater processing power, up to 8 TB of DDR5 memory, IO up to six PCIe Gen 5 slots, 2 OCP slots, plus the intelligence and simplicity of automated management with iLO 6.

The Hitachi Advanced Server HA840 G3 is the ideal server for business-critical workloads, in-memory databases, data analytics, virtualization, server consolidation, business processing, and general 4S data-intensive applications where data center space and the right performance are paramount.

Hitachi Virtual Storage Platform E1090

The Hitachi Virtual Storage Platform E1090 storage system is a high-performance, large-capacity data storage system. The VSP E1090 all-flash arrays (AFAs) support NVMe and SAS solid-state drives (SSDs). VSP E1090 hybrid models can be configured with both SSDs and hard disk drives (HDDs).

- The NVMe flash architecture delivers consistent, low-microsecond latency, which reduces the transaction costs of latency-critical applications and delivers predictable performance to optimize storage resources.

- The hybrid architecture allows for greater scalability and provides data-in-place migration support.

SAP HANA

SAP HANA converges database and application platform capabilities in-memory to transform transactions, analytics, text analysis, predictive and spatial processing so businesses can operate in real-time. This combines database, data processing, and application platform capabilities in a single in-memory platform. Also, the platform provides libraries for predictive, planning, text processing, spatial, and business analytics — all on the same architecture. This architecture comes from leading hardware partners of SAP, including Hitachi Vantara.

By eliminating the divide between transactions and analytics, SAP HANA allows you to answer any business question anywhere in real time.

As an SAP customer, you can download more information, including the following:

- SAP HANA Master Guide

  This is the central starting point for the technical implementation of SAP HANA. Use this guide for basic concepts and for planning.

- SAP HANA Server Installation and Update Guide

  This guide provides an overview of how to install and update an SAP HANA system with the SAP HANA lifecycle management tools.

- SAP HANA Administration Guide

  This guide explains how to configure, manage, maintain, and optimize your SAP HANA installation using SAP HANA administration tools.

SAP HANA hardware directory provides information about SAP HANA appliances certified by SAP hardware partners.

Operating system options for SAP HANA

The scale-up configuration of Hitachi Solution for the SAP HANA Platform can run on the following Linux operating system:

- SUSE Linux Enterprise Server (SLES) for SAP Applications

  Competes more effectively through improved uptime, better efficiency, and accelerated innovation using SUSE Linux Enterprise Server for SAP Applications. This is a versatile server operating system for efficiently deploying highly available enterprise-class IT services in mixed IT environments with performance and reduced risk.

  SUSE Linux Enterprise Server was the first Linux operating system to be certified for use with SAP HANA. It remains the operating system of choice for most SAP HANA customers.

- Red Hat Enterprise Linux (RHEL) for SAP HANA

  Using the stability and flexibility of Red Hat Enterprise Linux for SAP HANA, reallocate your resources towards meeting the next challenges instead of maintaining the status quo. Deliver meaningful business results by providing exceptional reliability and military-grade security. Use Enterprise Linux to tailor your infrastructure as markets shift and technologies evolve.

Changing the configuration settings is only supported along the guidelines of SAP and the operating system distributor and may otherwise cause significant performance problems. The following SAP Notes for SLES are a good starting point for information on this topic:

- 1944799- SAP HANA Guidelines for SLES Operating System Installation

- 2009879 - SAP HANA Guidelines for Red Hat Enterprise Linux (RHEL)

For more details, see "Updating and Patching the Operating System" by searching in the "View SAP HANA document" from Technical Information and Best Practices.

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