White Paper

Cisco UCS Server with Intel Xeon Processor E5

Designing SAP HANA Entry-Level Systems

Contents

Introduction

Cisco and SAP are uniquely positioned to provide innovative, scalable, and highly secure end-to-end solutions to customers. These differentiated solutions reduce deployment risk, complexity, and total cost of ownership (TCO). They can transform the way people connect, communicate, and collaborate.

In fact, in a survey completed in March 2016, IDC found that SAP customers running the Cisco Unified Computing System™ (Cisco UCS®) platform experienced a 48 percent reduction in IT costs, resulting in an average ROI of 528 percent over five years and a break-even period of just 9 months on their Cisco UCS investment.

The Cisco UCS server platform, introduced in 2009, provides a new model for data center efficiency and agility. Cisco UCS has been designed with the performance and reliability to power memory-intensive, mission-critical applications, as well as virtualized workloads. With SAP Applications on Cisco UCS, you can help ensure that all these benefits are delivered to your organization.

The delivery models for SAP HANA have evolved from the first release to the most recent SAP HANA Support Package Stack (SPS). In the beginning, the appliance was the only available configuration. Today, SAP HANA is available in a variety of forms. SAP named this journey toward openness the SAP HANA Tailored Datacenter Integration (TDI) solution. This solution has evolved through four phases:

- Phase 1: Shared enterprise storage
- Phase 2: Shared enterprise networking
- Phase 3: Introduction of entry-level systems
- Phase 4: Support for IBM Power Systems

Every customer use case is different. For this reason, Cisco has been the main partner proponent of the SAP TDI deployment model for SAP HANA, providing customers with additional flexibility and enabling significant cost savings in integrating SAP HANA into customers' data centers. SAP HANA TDI delivers on its promise.

SAP HANA TDI on Intel® Xeon® processor E5 systems is an important milestone on the SAP HANA journey toward openness. The 2-socket, single-node system configurations range in size from 128 GB to 1.5 TB and extend the power of SAP HANA real-time business solutions to simple, high-value x86-based hardware.

Purpose of This Document

This document offers technical design guidance about implementing SAP HANA on Cisco UCS servers using Intel Xeon processor E5 CPUs. This document can guide a field engineer or a customer who is creating an SAP HANA entry-level system.

A detailed installation guide for SAP HANA TDI solutions on Cisco UCS can be found in the document SAP HANA TDI on Cisco UCS: Installation Options.

Business Needs

SAP's desire to guarantee the quality and supportability of its customers' SAP HANA deployments has led SAP to implement strict guidelines for its infrastructure technology. Meeting these guidelines helps ensure the best quality, but one side-effect is that the costs associated with these requirements can sometimes make SAP HANA implementations too expensive to justify.

The entry-level 2-socket single node (scale-up) SAP HANA configurations on Intel Xeon processor E5 CPUs, ranging in size from 128 GB to 1.5 TB, offer an excellent response to this dilemma. They provide the power of a SAP HANA real-time business solution on more cost-effective hardware.

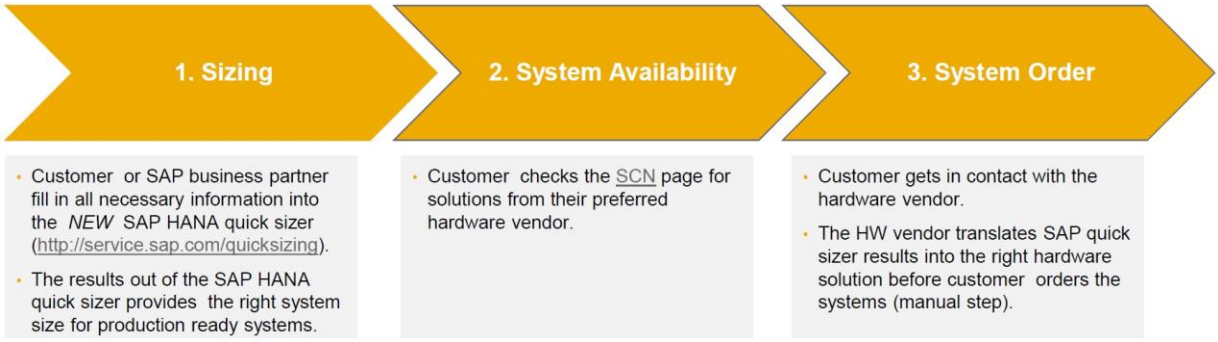
Overview

This document focuses on the third phase of SAP HANA TDI: SAP HANA entry-level systems on Intel Xeon processor E5 servers. Previous phases, especially shared enterprise storage, are also relevant for the solution design.

Note: This document doesn't provide any assistance in determining whether an SAP HANA appliance would be a better fit for your environment than an entry-level system.

SAP suggests a simple three-step process to procure an SAP HANA entry-level system, shown in Figure 1.

Figure 1. Simple Three-Step Process for Procuring SAP HANA Hardware



Source: SAP HANA TDI Overview, April 2016

Besides the size of the SAP HANA instance, two major questions significantly influence the solution design:

- Should the system be virtualized?
- What type of storage will be used: internal disks / SSDs or an external storage system?

The answer to these questions often depends on the organization's current circumstances, such as the use of an existing storage system that is certified for SAP HANA TDI or an existing VMware license agreement. In addition, the system size can influence whether the system should be virtualized. Virtualization of larger systems is less beneficial, and the use of internal storage makes some virtualization features impossible to use. Before a decision can be made, you need to outline all implications clearly. We recommend that you read this entire document before finally answering these two questions and perhaps reconsider aspects of the solution that you've already defined.

Note: This entire document focuses on systems in use in production environments. Nonproductive systems can have relaxed requirements; see SAP Note 2271345.

Requirements

This section briefly describes the hardware and software requirements defined by SAP to run an SAP HANA entry-level system. The design of a cost-effective solution that will meet these requirements is explained in later sections.

Note: In any case, the system must be certified and listed in the Certified SAP HANA Hardware Directory.

Computing

The CPU specifications must meet these requirements:

- Intel Xeon processor E5 2600 series v2, v3, or v4
- Two sockets
- Minimum of eight cores per CPU

Larger CPU caches are beneficial. A detailed BIOS configuration is described in a later section.

The main-memory configuration options are limited. SAP HANA is supported only if the memory configuration follows these rules:

- Homogenous symmetric assembly of DIMMs (no mixture of DIMM sizes or speeds)
- Maximum utilization of all available memory channels
- 1.5 TB maximum

Storage

As storage for SAP HANA entry-level systems, you can use internal disks, direct-attached arrays, or external storage systems. External storage systems must be certified and listed in the Certified SAP HANA Hardware Directory.

Table 1 provides approximate disk sizing guidelines.

Table 1. Disk Sizing Guidelines

Mount Point	Size	Comments
Operating system	100 GB	This includes swap and /usr/sap.
/hana/shared	RAM ≤ 1 TB: 1 x RAM RAM > 1 TB: 1 TB	
/hana/data	1.2 x RAM	Use if net disk space for data is unknown. If net disk space for data is known, use 1.2 x net disk space for data.
/hana/log	RAM ≤ 512 GB: ½ RAM RAM > 512 GB: 512 GB	You are recommended, but not required, to physically separate log and data.

Source: SAP HANA Storage Requirements, v2.7

Operating System

The supported operating systems for SAP HANA on an Intel Xeon processor E5 system are the same as on SAP HANA appliances:

- SUSE Linux Enterprise Server (SLES) for SAP Applications
- Red Hat Enterprise Linux (RHEL) for SAP HANA

The SAP HANA SPS release determines which OS minor release is supported (Table 2).

Table 2. SAP HANA SPS and OS Release Support Matrix

	SUSE						redhat			
OS / HANA SPS	SLES 11 SP1	SLES 11 SP2	SLES 11 SP3	SLES 11 SP4	SLES 12	SLES 12 SP1	RHEL 6.5	RHEL 6.6	RHEL 6.7	RHEL 7.2
SPS09	✓	✓	✓	✗	✗	✗	✓	✓	✗	✗
SPS10	✓	✓	✓	✓	✓	✗	✓	✓	✗	✗
SPS11	✗	✓	✓	✓	✓	✗	✓	✓	✓	✗
SPS12	✗	✗	✓	✓	✓	✓	✗	✗	✓	✓

Source: SAP Note 2235581, version 9

The support for the different generations of the Intel Xeon processor E5 family depends on the OS minor version (see Red Hat and SUSE support policies and release notes).

Sizing

Use the SAP Quick Sizer (SAP HANA version) to determine the size of the SAP HANA instance. The memory size of the server is the most important value to use in selecting the right infrastructure, so you must implement a sound sizing process.

Computing

The overall goal of sizing is to design a solution that delivers good response times. The simplified view of CPU sizing is that the bigger the SAP HANA instance, the greater the required computing power. But size alone is not the only important factor in the choice of CPU; utilization and expected workload are also important.

In the past, a fixed ratio of CPU to RAM helped ensure that large instances had enough computing power. With SAP HANA TDI, SAP is giving customers freedom of choice again, no longer requiring a static CPU-to-RAM ratio. This change offers both opportunity and risk. Whereas for SAP HANA systems with a low workload, a low-end CPU may be sufficient, the user experience may suffer if the same CPU is used on SAP HANA systems with a higher workload or with certain utilization patterns (for example, a high peak load).

Without strict guidance on the relationship between instance size and CPU size, only someone with deep SAP HANA experience and, more important, knowledge of the expected workload should choose a low-end CPU. For everyone else, it is safer to choose one of the better Intel Xeon processor E5 CPUs. The single computing unit (SCU) performance (see SAP Note 1501701) is less important than the number of cores, but the clock speed of the processor still affects system performance. Use Table 3 to estimate whether a particular processor is suitable for your SAP HANA workload.

Table 3. Processor Choice and SAP HANA Performance

Intel Xeon Processor Model	Cores (Threads)	Clock Rate		L3 Cache	Power	SAP HANA Performance
		Normal	Turbo			
2699 v4	22 (44)	2.2 GHz	3.6 GHz	55 MB	145 W	Best
2698 v4	20 (40)	2.2 GHz	3.6 GHz	50 MB	135 W	
2697 v4	18 (36)	2.3 GHz	3.6 GHz	45 MB	145 W	
2697A v4	16 (32)	2.6 GHz	3.6 GHz	40 MB	145 W	
2695 v4	18 (36)	2.1 GHz	3.3 GHz	45 MB	120 W	Good
2690 v4	14 (28)	2.6 GHz	3.5 GHz	35 MB	135 W	
2683 v4	16 (32)	2.1 GHz	3.0 GHz	40 MB	120 W	
2680 v4	14 (28)	2.4 GHz	3.3 GHz	35 MB	120 W	
2667 v4	8 (16)	3.2 GHz	3.6 GHz	25 MB	135 W	Fair
2660 v4	14 (28)	2.0 GHz	3.2 GHz	35 MB	105 W	
2658 v4	14 (28)	2.3 GHz	2.8 GHz	35 MB	105 W	
2650 v4	12 (24)	2.2 GHz	2.9 GHz	30 MB	105 W	

Storage

Unlike with traditional databases, the instance size also determines the size of the underlying storage. Table 4 lists the minimum space requirements per instance.

Table 4. Minimum Space Requirements per Instance

Mount	128 GB RAM	256 GB RAM	512 GB RAM	768 GB RAM	1 TB RAM	1.5 TB RAM
OS	100 GB	100 GB	100 GB	100 GB	100 GB	100 GB
/hana/shared	128 GB	256 GB	512 GB	768 GB	1024 GB	1024 GB
/hana/data	154 GB	308 GB	615 GB	922 GB	1229 GB	1844 GB
/hana/log	64 GB	128 GB	256 GB	512 GB	512 GB	512 GB
Total	**446 GB**	**791 GB**	**1482 GB**	**2302 GB**	**2865 GB**	**3480 GB**

The data space (/hana/data) is usually determined by the sizing process. If the net disk space for data is unknown, it should be calculated as 1.2 x RAM size.

In addition to the space requirement, you need to consider disk performance. The required performance also depends on the expected workload of the SAP HANA instance. With the Hardware Configuration Check Tool (HWCCT), you can perform a file system test to see if the I/O layer meets the SAP HANA TDI key performance indicator (KPI) requirements. If you want to use internal disks, you will need a minimum of 18 hard drives to pass this test. Note, though, that if you configure a solution with internal storage that passes the SAP HANA TDI KPI test, the achieved storage performance may exceed the needs of your SAP HANA system, leaving a lot of storage space unused. The large number of disks required for this configuration would also unnecessarily increase the price. As a conclusion, these factors could lead to a solution that is very inefficient for systems that do not need to meet the highest standards for I/O layer performance.

However, passing the HWCCT test is not required on certified hardware (see SAP HANA TDI FAQ). In a system with internal disks, we recommend that you use a minimum of 8 disks with at least 10,000 rpm and 12G SAS in RAID 5 for optimal redundancy and performance. By using cost-efficient 900 GB drives, this system would have about 6 TB of capacity, which is sufficient for a large 1.5 TB SAP HANA instance.

Virtualization

For a virtualized system, the decision to use an external storage system is very important. Some critical features, such as vMotion, can be used only if an external shared storage system is connected to the servers. The SAP HANA system application-based replication mechanism does not need shared storage.

According to SAP Note 2024433, a virtual machine should not share a physical CPU (socket) with another virtual machine. Therefore, two virtual machines are the maximum for a 2-socket server.

The size of a virtual machine depends on the VMware vSphere version. For vSphere 6.0, the following maximums apply:

- Virtual CPU (vCPU): 128
- Virtual RAM (vRAM): 4 TB

An overcommitment of resources should not be configured.

A system with internal disks cannot use disks with 4k sector size (see VMware KB 2091600).

For more information about virtualized SAP HANA systems on Cisco UCS, refer to the blog "SAP HANA TDI on Cisco UCS and VMware vSphere" on the SAP Community Network.

Configuration

Computing

Memory Population

Table 5 shows the recommended memory configuration for Cisco UCS C220 M4 and C240 M4 Rack Servers and B200 M4 Blade Servers with an Intel Xeon processor E5-2600 v4–based CPU.

Table 5. Recommended Memory Configuration

Total System Memory Size	CPU 1 DIMMs			CPU 2 DIMMs			DIMM Maximum Speed (MHz)	Total DIMMs
	Blue Slots Bank 1 (A1, B1, C1, and D1)	Black Slots Bank 2 (A2, B2, C2, and D2)	White Slots Bank 3 (A3, B3, C3, and D3)	Blue Slots Bank 1 (E1, F1, G1, and H1)	Black Slots Bank 2 (E2, F2, G2, and H2)	White Slots Bank 3 (E3, F3, G3, and H3)		
128 GB	4 x 16 GB	—	—	4 x 16 GB	—	—	2400	8
192 GB	4 x 16 GB	4 x 8 GB	—	4 x 16 GB	4 x 8 GB	—	2400	16
256 GB	4 x 16 GB	4 x 16 GB	—	4 x 16 GB	4 x 16 GB	—	2400	16
256 GB	4 x 32 GB	—	—	4 x 32 GB	—	—	2400	8
384 GB	4 x 16 GB	4 x 16 GB	4 x 16 GB	4 x 16 GB	4 x 16 GB	4 x 16 GB	2133	24
384 GB	4 x 32 GB	4 x 16 GB	—	4 x 32 GB	4 x 16 GB	—	2400	16
512 GB	4 x 32 GB	4 x 32 GB	—	4 x 32 GB	4 x 32 GB	—	2400	16
512 GB	4 x 64 GB	—	—	4 x 64 GB	—	—	2400	8
768 GB	4 x 32 GB	4 x 32 GB	4 x 32 GB	4 x 32 GB	4 x 32 GB	4 x 32 GB	2133	24
1024 GB	4 x 64 GB	4 x 64 GB	—	4 x 64 GB	4 x 64 GB	—	2400	16
1536 GB	4 x 64 GB	4 x 64 GB	4 x 64 GB	4 x 64 GB	4 x 64 GB	4 x 64 GB	2133	24

Light gray shading indicates suboptimal performance. It is beneficial to not populate the third channel (white slots), because doing so will reduce the speed of the DIMMs from 2400 MHz to 2133 MHz.

Dark gray shading indicates configurations that are technically possible but not supported for SAP HANA.

BIOS Settings

A Cisco UCS C-Series Rack Server can be operated in standalone mode and managed through the Cisco® Integrated Management Controller (CIMC), or it can be attached to a fabric interconnect and managed by Cisco UCS Manager. Cisco UCS B-Series Blade Servers are always managed by Cisco UCS Manager. The GUI and the command-line interface (CLI) slightly differ between the CIMC and Cisco UCS Manager, but both provide access to the same settings.

Depending on the CIMC or Cisco UCS Manager version, the names of the BIOS settings may differ. Table 6 provides recommended system configurations for Best Performance (no energy savings), Balanced Performance (a mix of good performance and some energy savings), and Virtualization (with all energy saving features enabled and controlled by the hypervisor).

Table 6. Recommended BIOS Settings

	Best Performance	Balanced Performance	Virtualization
Hyper-Threading	Enabled	Enabled	Enabled
Number of enabled cores	All	All	All
Execute Disable Bit	Enabled	Enabled	Enabled
Intel Virtualization Technology (VT)	Disabled	Disabled	Enabled
Intel VT for Directed I/O (VT-d)	Disabled	Disabled	Enabled
Intel VT-d Interrupt Remap	Disabled	Disabled	Enabled
Intel VT-d Coherency Support	Disabled	Disabled	Enabled
Intel VT-d ATS Support	Disabled	Disabled	Enabled
Intel VT-d DMA pass-through	Disabled	Disabled	Enabled
CPU Performance	Hpc	Hpc	Enterprise
Hardware Prefetcher	Enabled	Enabled	Enabled
Adjacent Cache Line Prefetcher	Enabled	Enabled	Enabled
Data Cache Unit (DCU) Streamer Prefetch	Enabled	Enabled	Enabled
DCU IP Prefetcher	Enabled	Enabled	Enabled
Direct Cache Access Support	Enabled	Enabled	Enabled
Power Technology	Disabled	Custom	Custom
Enhanced Intel SpeedStep Technology	Disabled	Enabled	Enabled
Intel Turbo Boost Technology	Enabled	Enabled	Enabled
Processor C State	Disabled	Disabled	Enabled
Processor C1E	Disabled	Disabled	Enabled
Processor C3 Report	Disabled	Disabled	Enabled
Processor C6 Report	Disabled	Disabled	Enabled
Processor C7 Report	Disabled	Disabled	Enabled
Frequency Floor Override	Enabled	Disabled	Disabled
P-State Coordination	Hw_all	Hw_all	Sw_any
Energy Performance	Performance	Balanced-performance	Balanced-performance
Extended APIC	Auto	Auto	Auto
Select Memory RAS	Maximum performance	Maximum performance	Maximum performance
DRAM Clock Throttling	Performance	Performance	Performance
Low Voltage DDR Mode	Performance mode	Performance mode	Performance mode
NUMA	Enabled	Enabled	Enabled

Memory Interleaving	Auto	Auto	Auto

Storage

A scale-up solution for SAP HANA on Intel Xeon processor E5 CPUs requires all data and processes to be located on the same server and capable of being accessed locally. No network communication with other SAP HANA nodes is required. This configuration provides the best performance for the SAP HANA database. Nearly all certified SAP HANA scale-up appliances are based on a standalone rack-mount server and use internal storage. If you use external storage, make sure that it is certified for SAP HANA TDI.

The storage performance for an analytics system is relevant for writing updates to the database, for starting the database, and for cases that require recovery. Nearly all read queries are answered out of the main memory. For a transactional system, the storage performance significantly affects overall SAP HANA performance. Every commit operation must be written to disk to make it persistent. If the storage is slow, the commit process is slow, and the end-user experience can be poor. There is no single rule for storage sizing for this option.

For a virtualized SAP HANA installation, remember that some hardware components are shared: for instance, network interfaces and host bus adapters (HBAs). If possible, you should use dedicated network adapters and HBAs for each virtualized SAP HANA system.

Internal Disks

Cisco UCS servers support different types of RAID. We recommend the use of the Cisco 12G SAS modular RAID controller, which supports RAID 0, 1, 5, 6, 10, 50, and 60. RAID 5 was used for the testing for this document; however, the customer can select the RAID level according to requirements specific to the business. Configurations with more than 16 disks may run better in RAID 50.

To achieve good read and write performance, you should build the RAID 5 disk group with at least eight hard drives. For good write performance (write-back policy), a 4 GB flash-based write cache (FBWC) together with a SuperCap power module (SCPM) is recommended.

Although the recommended approach is to physically separate /hana/data and /hana/log, these can also reside in the same RAID group. In many small setups with only few disks, the best option is to create one big RAID 5 group and store everything on it (OS, /hana/shared, /hana/data, and /hana/log). Table 7 shows recommended settings.

Table 7. Recommended Settings for a RAID 5 Disk Group Containing /hana/data and /hana/log

Parameter	Balanced Performance	Write-Performance	Read-Performance
Strip size	128 KB	64 KB	256 KB
Read policy	Read Ahead	Read Ahead	Read Ahead
Write policy	Write back with good backup battery unit (BBU)	Write back with good BBU	Write back with good BBU
I/O policy	Direct	Direct	Direct
Disk cache policy	Unchanged	Disabled	Enabled
Initialization state	Full initialization	Full initialization	Full initialization

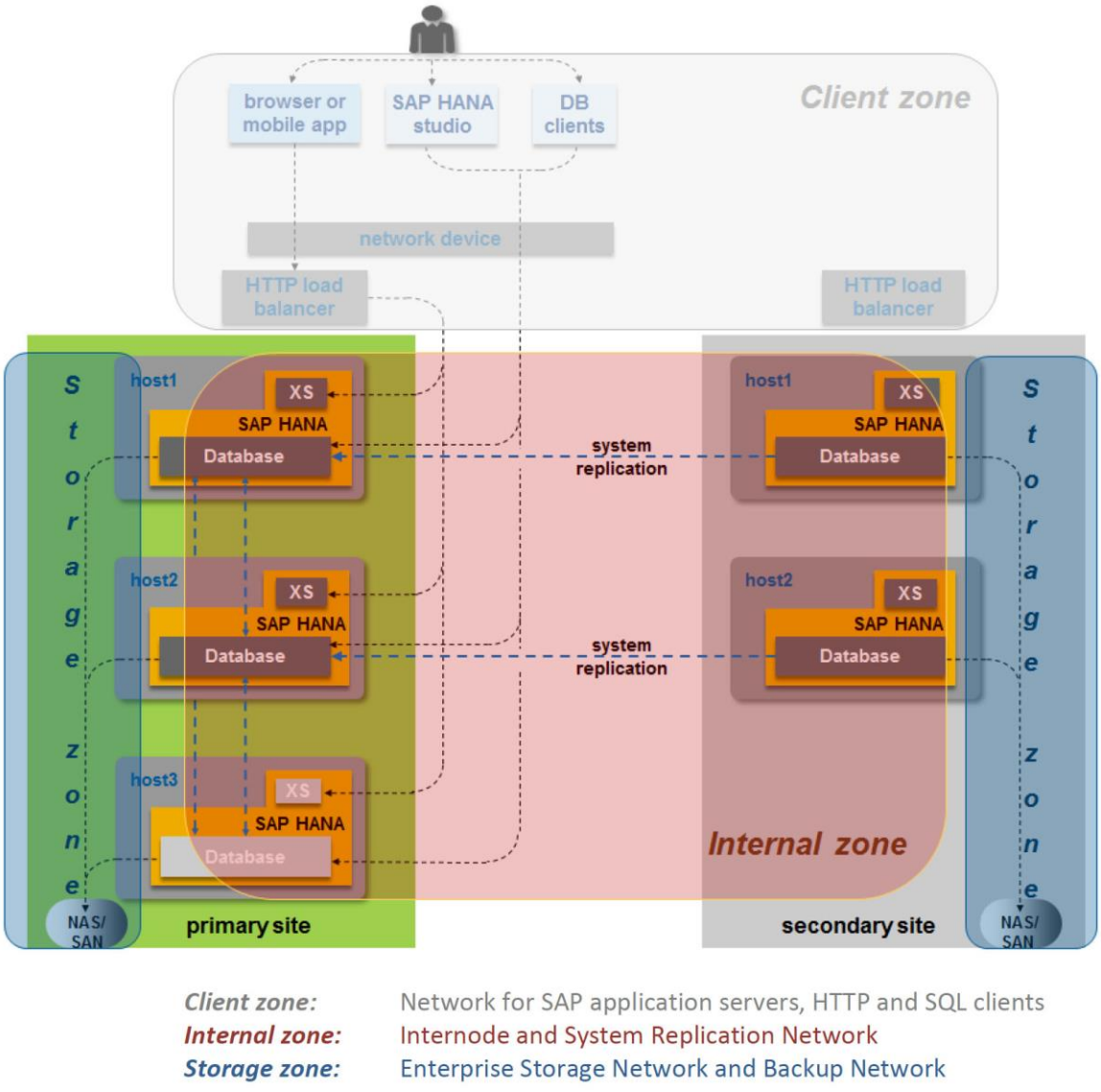
You can also use one or multiple SSD drives for caching. This option will improve read performance significantly. On RHEL, the supported approach is to use lvmcache. On SLES, use bcache.

Network

The network configuration of an SAP HANA database depends on the connections to outside destinations. SAP HANA has several types of network communication channels to support the various SAP HANA scenarios and configurations (Figure 2):

- **Client zone:** Channels used for external access to SAP HANA functions by end-user clients, administration clients, and application servers, and for data provisioning through SQL or HTTP
- **Internal zone:** Channels used for SAP HANA internal communication within the database or, in a distributed scenario, for communication between hosts
- **Storage zone:** Channels used for storage access (data persistence) and for backup and restore procedures

Figure 2. Network Communication Channels



Source: SAP HANA Network Requirements, v1.2

Table 8 lists the details for these network zones.

Table 8. Network Zones

Name	Use Case	Solutions	Bandwidth Requirements
Client Zone Networks			
Application server network	Communication between SAP application server and database	All	1 or 10 GbE
Client network	Communication between user or client application and database	All	1 or 10 GbE
Data source network	Data import and external data integration	Optional	1 or 10 GbE
Internal Zone Networks			
Internode network	Node-to-node communication within a scale-out configuration	Scale-out	10 GbE
System replication network	SAP HANA System Replication	Disaster Tolerance	tbd (10 GbE minimum)
Storage Zone Networks			
Backup network	Data backup	Optional	10 GbE *or* 8 Gb FC
Storage network	Communication between nodes and storage	Scale-out *or* TDI with external storage	10 GbE *or* 8 Gb FC
Infrastructure-Related Networks			
Administration network	Infrastructure and SAP HANA administration	Optional	1 GbE
Boot network	OS boot using PXE	Optional	1 GbE

The network requirements for an SAP HANA TDI scale-up system depend on the client and application access to the SAP HANA database. If you don't need system replication or a backup network, two 1 GbE connections can be sufficient to run an entry-level system with internal storage.

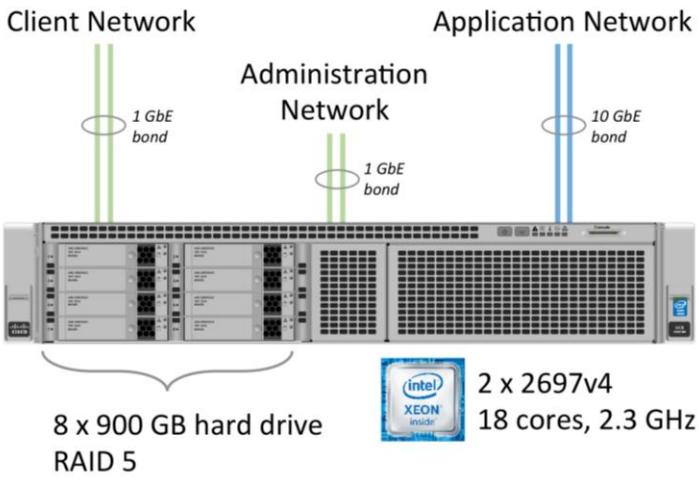
However, for high-availability purposes, we recommend the use of redundant network interfaces for 1 GbE, 10 GbE and 8 Gb FC. You need to configure NIC bonding / teaming for the Ethernet ports to achieve high availability for the network interface.

Solution Examples

Internal Storage

Figure 3 shows an internal storage solution.

Figure 3. Internal Storage Example

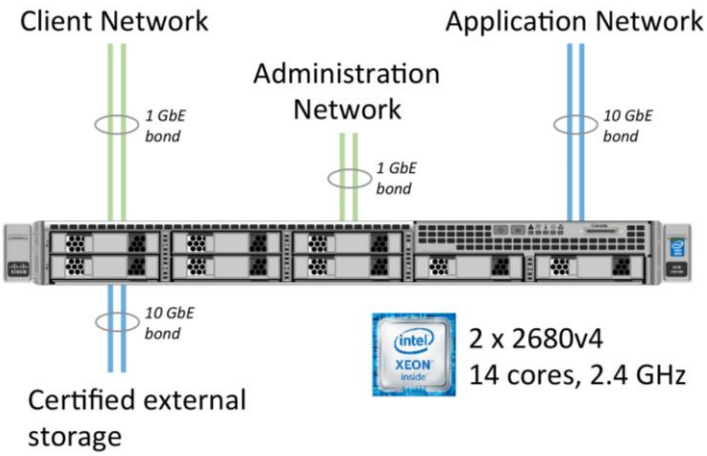


A solution with internal storage can be deployed only on rack-mount servers because the Cisco UCS blade servers have only two or four disk slots. The Cisco UCS C240 M4 comes in four models, allowing you to choose the number of internal disks: from 8 to 24. It has onboard network ports and supports up to two PCIe Cisco virtual interface cards (VICs) and one modular LAN-on-motherboard (mLOM) VIC, each with two 10 GbE ports, for a total of six 10 GbE ports.

External Storage

Figure 4 shows an external storage solution.

Figure 4. External Storage Example

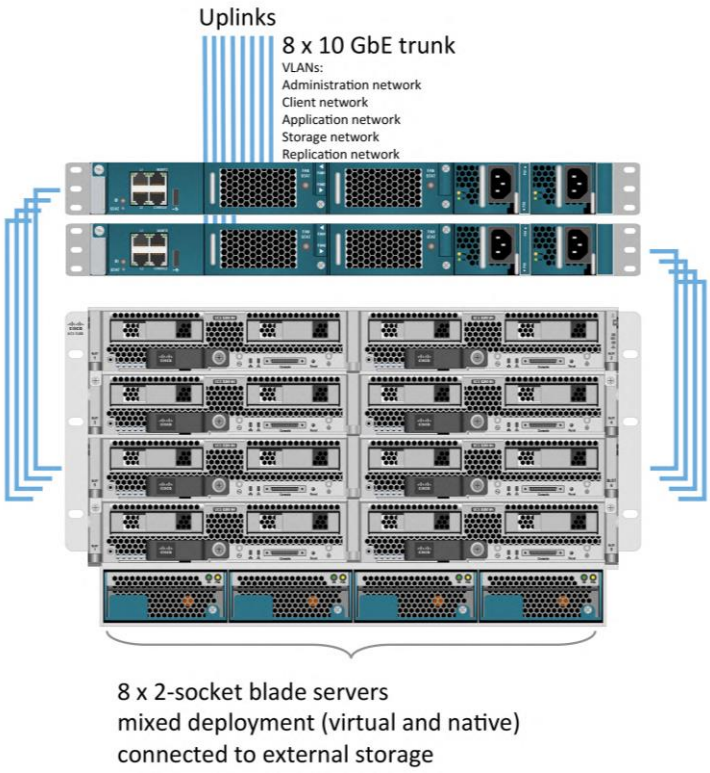


External storage solutions can be built with rack-mount and blade servers. These solutions allow you to access database files externally and to boot the servers from FC or Ethernet (iSCSI or PXE). The Cisco UCS C220 M4 server has eight disk slots, which can be left unpopulated. This solution would be a good choice for a slim (1 rack unit [1RU]) 2-socket server in a stateless environment.

Blade Servers

Figure 5 shows a solution for a larger environment.

Figure 5. Large Environment Example



For larger environments, blade servers with external storage provide the most flexible option. Blade servers also provide the greatest network and computing density per rack unit. Rack-mount servers can also be connected to the Cisco UCS fabric interconnects and therefore be part of the Cisco UCS domain. In such a setup, Cisco UCS Manager is the single point of administration.

For More Information

Certified SAP HANA Hardware Directory

Certified SAP HANA Hardware Directory: Entry-Level Systems

Certified SAP HANA Hardware Directory: Enterprise Storage

SAP HANA TDI Documentation

SAP HANA TDI: Overview

SAP HANA TDI: FAQ

SAP HANA TDI: Storage Requirements

SAP HANA TDI: Network Requirements

SAP Notes

SAP Note 2271345 - Cost-Optimized SAP HANA Hardware for Non-Production Usage

SAP Note 2024433 - Multiple SAP HANA VMs on VMware vSphere in production

SAP Note 1501701 - Single Computing Unit Performance and Sizing

SAP Note 1943937 - Hardware Configuration Check Tool - Central Note

SAP Note 2235581 - SAP HANA: Supported Operating Systems

Cisco UCS

SAP HANA TDI on Cisco UCS: Installation Options

Design Zone for SAP Applications (technical documentation)

Data Center Solutions for SAP (customer references)

Other Links

IDC white paper: The Business Value of Cisco UCS Integrated Infrastructure Solutions for Running SAP Workloads

SAP Community Network: SAP HANA TDI on Cisco UCS and VMware vSphere

Red Hat: Intel CPUs and Supported Red Hat Enterprise Linux (RHEL) Versions

SUSE: Release Notes for SUSE products

VMware Knowledge Base 2091600 - Support statement for 512e and 4K Native drives for VMware vSphere and VSAN

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