

Scalable SAP HANA Solutions Based on Cisco UCS C460 M4 Rack Servers

Solution Brief
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With Intelligent Intel Xeon Processors

Highlights

Integrate with Your Existing Data Center

- Our SAP HANA appliances help you get up and running quickly and easily.
- We also can integrate SAP HANA into your data center infrastructure using SAP HANA Tailored Datacenter Integration (TDI) so that you can use your existing management processes as well as network and storage resources.
- Our architectural approach is based on proven industry standards that avoid proprietary file systems and storage subsystems.

Scalable and Predictable Performance

- A single Cisco UCS® C460 M4 Rack Server can support single-node SAP Business Suite on HANA installations with from 128 GB to 3 terabytes (TB) of memory.
- You can use the same standard nodes for scale-up and scale-out solutions.
- You can expand your business warehouse on SAP HANA solutions dynamically by using Cisco UCS service profiles.

Integration with Enterprise Applications

- The integrated architecture of the Cisco Unified Computing System™ (Cisco UCS) enables you to host SAP HANA and other SAP applications in the same infrastructure as non-SAP business solutions. This capability radically simplifies management, data center services, and data movement between applications.

Reduced Risk

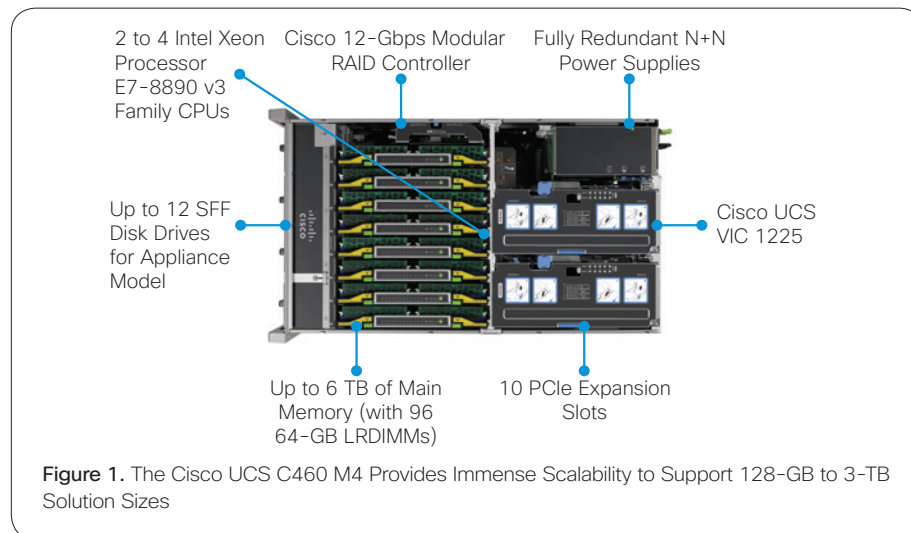
- The pretested and validated solution accelerates the time to value for customers and reduces risk and deployment challenges.

You need to deploy multiple SAP HANA environments quickly and easily. We deliver solutions that work as standalone appliances or integrate with your existing infrastructure—all with the Cisco UCS® C460 M4 Rack Server and Intel® Xeon® processors.



Works with the Data Center You Have Today

Cisco® solutions for SAP HANA are designed to interoperate with the data center you have today. Using industry-standard architecture and recognized best practices, no special IT processes are needed to incorporate or maintain Cisco solutions in your data center. Cisco solutions are designed to support data center readiness requirements, including high availability, reliability, and business continuance. Unlike other vendors, we give you the option of deploying prepackaged appliances that use standard disk drives and file systems, or integrating your SAP HANA solutions into your existing data center networking and storage architecture using the SAP Tailored Datacenter Integration (TDI) model. Whatever you choose as your deployment model, we help you get the multiple SAP HANA environments you need up and running quickly, easily, and with little risk.



This document describes solutions based on the Cisco UCS C460 M4 Rack Server (Figure 1). These solutions allow you to start with a SAP HANA memory footprint as small as 128 GB and scale to up to a footprint of 3 terabytes (TB) and even higher in a clustered configuration. Having claimed more than 100 world records on industry-standard benchmarks, the Cisco Unified Computing System™ (Cisco UCS) offers more than flexibility, efficiency, scalability, and low total cost of ownership (TCO): it also delivers the performance you need. Cisco uses a building-block approach that makes it easy to start small and scale your SAP HANA deployments as your business needs change.

Start Small and Grow as Business Needs Change

Figure 2 summarizes our solutions for SAP HANA based on the Cisco UCS C460 M4 Rack Server:

- If you don't expect to need more than 1.5 TB of memory per server, start small and scale from 128 GB to 1.5 TB using low-cost 16-GB DIMMs.
- If you expect to need 512 MB to 3 TB of memory, use our configurations based on high-density 32-GB DIMMs.
- If you want to create an analytical solution, use either memory configuration and cluster up to 16 servers for up to 24 GB of memory capacity using the appliance model. Using SAP HANA TDI, we can help



Figure 2. Configuration Options Offer Flexibility and Scale

you cluster up to 40 1.5-TB servers for up to 60 TB of memory capacity to support your largest SAP HANA requirements.

Whether you choose the appliance or the SAP HANA TDI deployment model, our solutions can be included as part of Cisco UCS. With Cisco UCS, you can



maintain all of your applications on the same unified fabric with high-speed, low-latency, deterministic networking to accelerate the flow of intelligence to business applications and meet SAP's networking requirements.

Cisco UCS

Cisco UCS is a single unified system that includes computing, networking, and storage access. Its model-based management is integrated into the system. With Cisco UCS Manager, you can apply predefined Cisco UCS service profiles to any server and bring it into immediate compliance with the configuration required to optimally run your SAP applications.

Cisco SingleConnect Technology

Cisco SingleConnect technology provides an exceptionally easy, intelligent, and efficient way to connect and manage computing resources in the data center. With the Cisco UCS fabric interconnects and Cisco VICs, you can have three networks—IP, storage, and management—running on a single set of cables and a single set of I/O adapters. Since Cisco UCS is form

factor agnostic, you can run both blade and rack servers in the same system.

Programmable Infrastructure

Cisco UCS programmability provides an outstanding, stateless, foundational platform for your SAP and your other data center applications.

Whether or not you choose to integrate your SAP solutions with Cisco UCS, our solutions are built with the following components (Table 1):

- **Cisco UCS C460 M4 Rack Server** is a 4-socket server based on the Intel Xeon processor E7 v3 family, with three CPU speeds to choose from to meet your performance requirements. This superior-performance server is designed for enterprise and mission-critical workloads, large-scale virtualization, and database applications and can scale to 6 TB of memory (with 96 x 64-GB LRDIMMs).

When used as an SAP HANA appliance, the server is configured with 12 small form-factor (SFF) drives for flexible, scalable local storage to support the SAP HANA

persistence layer. Ten PCI Express (PCIe) card slots give the server outstanding I/O bandwidth. For SAP HANA capacities of less than 1 TB, you can populate the server with just two Intel Xeon processor E7-8890 v3 family CPUs. For capacities of 1 TB and greater, your configuration requires four processors.

When used in SAP HANA TDI deployments, the server connects to your existing network and uses your shared storage to support the SAP HANA persistence layer.

- **Cisco UCS Virtual Interface Card (VIC)1225** provides LAN, SAN, and management network connectivity through a 2-port converged network adapter (CNA) that delivers up to 20 Gbps of aggregate bandwidth. By using a single adapter to support production data, storage, and management networks, you can reduce both capital expenditures (CapEx) and operating expenses (OpEx) because you need to purchase, configure, manage, maintain, power, and cool fewer interfaces, cables, and upstream switch ports.

Storage Options

When deploying with the appliance model, use the Cisco 12-Gbps SAS modular RAID controller with 12 local disks. Unlike other vendors, we do not use proprietary storage solutions or impose the use of nonstandard file systems with our appliance-model solutions. When deploying with SAP HANA TDI, you don't need internal drives. Instead, we help you connect to your existing network and shared storage.

Bare-Metal or Virtualized Deployment

The Cisco Solution for SAP HANA supports your choice of operating system: Red Hat Enterprise Linux for SAP (RHEL4SAP) or Suse Linux Enterprise Server for SAP (SLES4SAP).

The solution is designed to run on a bare-metal server or in a virtualized environment on VMware vSphere 5 (VMware vSphere 6 when available) or SAP HANA multiple-container systems. These options give you the flexibility to run production environments on bare-metal servers while supporting your test and development environments as virtual machines.

Flexible Scaling with Investment Protection

Regardless of which Cisco Solution for SAP HANA you start with, you have a range of choices for expanding your solution, all of which protect your initial investment by never requiring you to remove an existing server or throw

Table 1. Scale Up and Out Solutions with the Cisco UCS C460 M4 Rack Server

Solution Options		Scale Up and Out Solutions Using 16-GB DIMMs for Capacity of 128 GB to 1.5 TB	Scale Up and Out Solutions Using 32-GB DIMMs for Capacity of 1 to 3 TB
Workload		<ul style="list-style-type: none"> All SAP HANA workloads, analytics, or transactional processing, with data set sizes up to 1.5 TB 	<ul style="list-style-type: none"> Suite for SAP HANA data set sizes of 512 GB to 3 TB
Computing		Cisco UCS C460 M4 Rack Server with: <ul style="list-style-type: none"> 2 Intel Xeon processors E7-8880 v3 at 2.3 GHz (default), or E7-8890 v3 at 2.5 GHz, or E7-8880L v3 at 2.0 GHz (2 more processors needed to support 1 and 1.5-TB configurations) 2 Cisco UCS VIC 1225 cards 	Cisco UCS C460 M4 Rack Server with: <ul style="list-style-type: none"> 4 Intel Xeon processors E7-8880 v3 at 2.3 GHz (default), or E7-8890 v3 at 2.5 GHz, or E7-8880L v3 at 2.0 GHz 2 Cisco UCS VIC 1225 cards
Memory Capacity	128 GB	<ul style="list-style-type: none"> 8 x 16-GB DIMMs 	
	256 GB	<ul style="list-style-type: none"> 16 x 16-GB DIMMs 	
	384 GB	<ul style="list-style-type: none"> 24 x 16-GB DIMMs 	
	512 GB	<ul style="list-style-type: none"> 32 x 16-GB DIMMs 	<ul style="list-style-type: none"> 16 x 32-GB DIMMs
	768 GB	<ul style="list-style-type: none"> 48 x 16-GB DIMMs 	
	1 TB	<ul style="list-style-type: none"> 64 x 16-GB DIMMs, add 2 CPUs 	<ul style="list-style-type: none"> 32 x 32-GB DIMMs
	1.5 TB	<ul style="list-style-type: none"> 96 x 16-GB DIMMs 	<ul style="list-style-type: none"> 48 x 32-GB DIMMs
	2 TB		<ul style="list-style-type: none"> 64 x 32-GB DIMMs
	3 TB		<ul style="list-style-type: none"> 96 x 32-GB DIMMs
Appliance Deployment		<ul style="list-style-type: none"> 12 x 1.2-TB 10K-rpm SAS drives 1 Cisco 12-Gbps SAS modular RAID controller with 4 GB of Flash-Backed Write Cache (FBWC) 	
SAP HANA TDI Deployment		<ul style="list-style-type: none"> Use Cisco UCS Integrated Infrastructure or existing enterprise networking and storage systems 	

away memory. Cisco solutions using Cisco UCS C460 M4 servers can be deployed as appliances with internal disk storage or using SAP HANA TDI using shared storage resources. Both approaches provide excellent scalability (Figure 2)

- If you choose to use a Cisco UCS C460 M4 server with low-cost 16-GB DIMMs, you can scale memory capacity from 128 GB to 1.5 TB in a single server. If you need more than 1.5 TB of capacity, you can deploy a cluster of up to 40 1.5-TB servers for up to 60 GB in total memory capacity.
- If you choose to use a Cisco UCS C460 M4 server with 32-GB DIMMs, you can scale from 512 GB to 3 TB of memory capacity in a single server. If you wish to scale beyond 3 TB of memory capacity, you can use 1.5-TB servers in a cluster of up to 40 servers.

Customize with SAP HANA TDI

SAP HANA TDI allows you to complete your solution using our certified server configurations with your own enterprise storage and networking components that have been certified by SAP. SAP HANA TDI also allows you to scale beyond the 16-server certification level

for appliances to accommodate up to 40 servers in a single scale-out solution using SAP HANA TDI.

Cisco Support

The Cisco hardware is supported by your choice of nonproduction, production, and business-critical levels of Cisco SMARTnet™ Service.

Additional Cisco Solution Support helps you quickly resolve issues by adding a solution-level perspective to the underlying device-level service contracts. Cisco Solution Support gives you a single point of contact to help you manage, troubleshoot, and resolve the issues that may arise in complex, multivendor systems across a variety of Cisco and third-party products.

Easy Ordering

Cisco partners make it easy to purchase a Cisco Solution for SAP HANA, with simplified ordering and onsite installation services available.

The program makes it easy to quickly deploy a small but powerful, SAP HANA environment in your enterprise and to scale it quickly without the expense or risk entailed in designing and building your own custom solution.

For More Information

Learn more about Cisco Solutions for SAP HANA at <http://www.cisco.com/go/sap>.

For more information about the Cisco Unified Computing System, visit <http://www.cisco.com/go/ucs>.

Note: Solution power consumption varies with the specific server and storage configurations ordered. Please contact your sales representative or your product solutions specialist to determine the exact power requirements for your configuration.



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