

# Cisco Unified Computing System with NetApp Storage for SAP HANA

## Introduction

### SAP HANA

The SAP High-Performance Analytic Appliance (HANA) is a new non-intrusive hardware and software solution that provides real-time access for SAP business applications and integration of analytics into business processes based on an innovative in-memory computing architecture. This in-memory technology enables the processing of massive quantities of real-time data in the main memory of a server to provide immediate results from analysis and transactions.

Cisco has developed a full portfolio of SAP HANA solutions based on the Cisco Unified Computing System™ (Cisco UCS®). The portfolio ranges from small-scale solutions supporting 128 GB of memory to large-scale solutions supporting up to 8 terabytes (TB) of usable memory with 16 nodes, validated as of March 2012. Depending on the compression factors, validated Cisco® appliance solutions can support databases of up to 56 TB. With a single Cisco UCS platform, a SAP HANA appliance can be scaled to 48 computing nodes, with 24 TB of memory or 192 TB of uncompressed data (validated on request).

### Cisco Unified Computing System

The Cisco Unified Computing System (Cisco UCS) includes a set of preintegrated data center components that comprises blade servers, adapters, fabric interconnects, and extenders that are integrated under a common, embedded management system. This approach results in far fewer system components and much better manageability, operational efficiencies, and flexibility than comparable data center platforms.

Cisco UCS is designed from the ground up to be programmable and self-integrating. A server's entire hardware stack, ranging from server firmware and settings to network profiles, is configured through model-based management. With Cisco virtual interface cards, even the number and type of I/O interfaces is programmed dynamically, making every server ready to power any workload at any time.

With model-based management, administrators manipulate a model of a desired system configuration and associate a model's service profile with hardware resources. The system then configures itself to match the model. This automation speeds provisioning and workload migration with accurate and rapid scalability. The result is increased IT staff productivity, improved compliance, and reduced risk of failures due to inconsistent configurations.

Cisco Fabric Extender technology reduces the number of system components to purchase, configure, manage, and maintain by condensing three network layers into one. This technology eliminates both blade server and hypervisor-based switches by connecting fabric interconnect ports directly to individual blade servers and virtual machines. Virtual networks are now managed exactly as physical networks are, but with massive scalability. This represents a radical simplification over traditional systems, reducing capital and operating costs while increasing business agility, simplifying and speeding deployment, and improving performance.

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### Cisco Nexus 5548 Switch

The Cisco Nexus<sup>®</sup> 5548 Switch is a 1 rack unit (1RU), 10 Gigabit Ethernet, Fibre Channel over Ethernet (FCoE) access-layer switch built to provide more than 500 gigabits per second (Gbps) throughput with very low latency. It has 20 fixed 10 Gigabit Ethernet/FCoE ports that accept modules and cables meeting the Small Form-Factor Pluggable Plus (SFP+) form factor. One expansion module slot can be configured to support up to six additional 10 Gigabit Ethernet/FCoE ports, up to eight Fibre Channel ports, or a combination of both. The switch has a single serial console port and a single out-of-band 10/100/1000-Mbps Ethernet management port. Two N+1 redundant, hot-pluggable power supplies and fiveN+1 redundant, hot-pluggable fan modules provide highly reliable front-to-back cooling.

### NetApp FAS3240 Storage System

The NetApp<sup>®</sup> FAS3240 storage system offers an efficient and flexible storage architecture that delivers performance and high-end availability. These midrange systems help lower costs by delivering industry-leading storage efficiency through the NetApp unified storage architecture, which runs on Data ONTAP<sup>®</sup>. You can support today's business applications, whether in virtualized or traditional environments, while being ready for your future storage requirements.

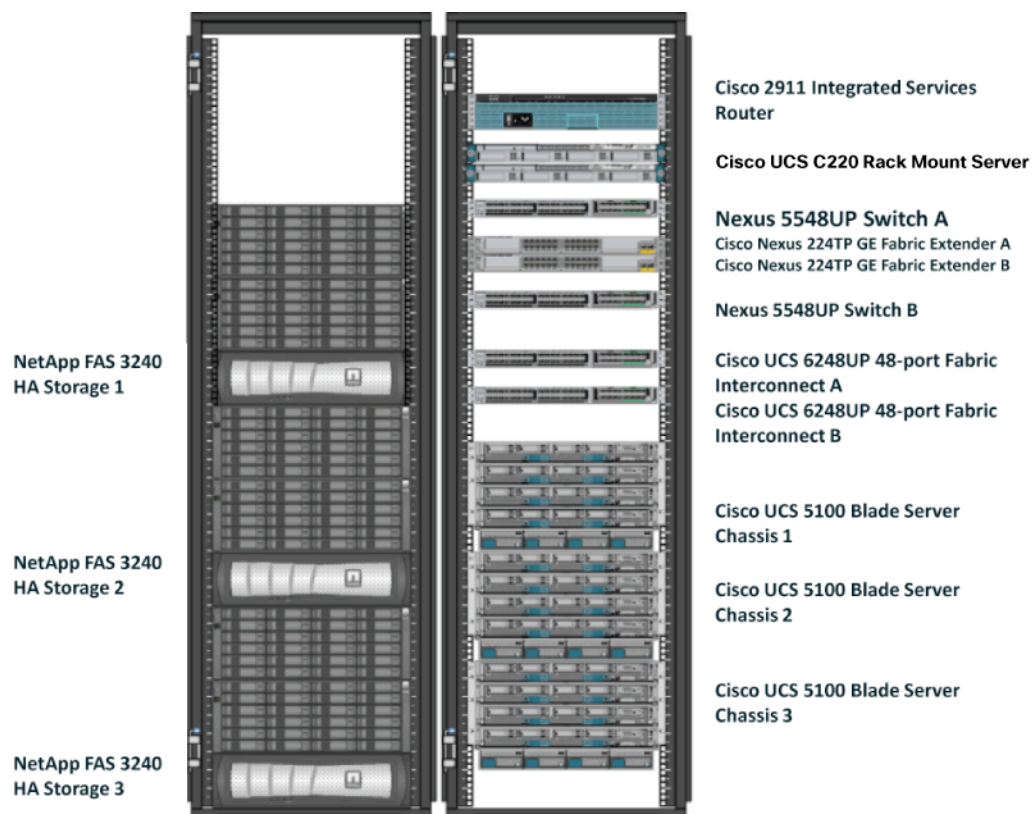
The FAS3240 benefits customers by:

- Increasing flexibility to support ever-growing storage requirements and changing business demands
- Improving data availability to keep the business operating efficiently
- Enhancing storage efficiency to get more out of your IT infrastructure investments

### Product Overview

Cisco Unified Computing System with NetApp Storage for SAP HANA (Figure 1) is a defined set of hardware and software that serves as an integrated infrastructure stack. The solution supports only the SAP HANA<sup>™</sup> application stack based on NetApp FAS storage, the Cisco Nexus switch platform, and the Cisco Unified Computing System in a single package.

**Figure 1.** Cisco Unified Computing System with NetApp Storage for SAP HANA



## System Specifications

Table 1 summarizes the system specifications for this solution.

**Note:** Cable lengths specified in this document are for this exact configuration.

**Table 1.** System Specifications for a Four-Blade-Server Solution

| Component                                                          | Details                                                                   |
|--------------------------------------------------------------------|---------------------------------------------------------------------------|
| <b>Cisco Unified Computing System Components</b>                   |                                                                           |
| Cisco UCS 6248UP Fabric Interconnect                               | 2                                                                         |
| Cisco UCS B440M2 Blade Server                                      | 4                                                                         |
| Number of CPUs                                                     | 16 Intel 2.4-GHz E7-4870 CPU                                              |
| Total CPU cores                                                    | 160                                                                       |
| Total RAM                                                          | 2 TB                                                                      |
| Ethernet uplink bandwidth                                          | 80 Gbps: 8 x 10 Gigabit Ethernet                                          |
| Number of blade chassis                                            | 1 Cisco UCS 5108 per bundle<br>1 additional chassis for standby and spare |
| <b>Fabric (Two Cisco Nexus 5548UP Switches)—Port counts in use</b> |                                                                           |
| 10 Gigabit Ethernet ports                                          | 80 Gbps: 8 x 10 Gigabit Ethernet                                          |
| <b>NetApp FAS 3240 Storage Array</b>                               |                                                                           |
| RAM                                                                | 16 GB                                                                     |
| NVRAM                                                              | 2 GB                                                                      |
| Number of SAS drives                                               | 48 with 600 GB each                                                       |
| Number of disk shelves                                             | 2                                                                         |
| Total storage                                                      | 84 TB                                                                     |
| 10 Gigabit Ethernet bandwidth                                      | 40 Gbps: 4 x 10 Gigabit Ethernet                                          |
| Fibre Channel bandwidth                                            | 16 Gbps: 4 x 4 Gbps                                                       |
| Flash Cache (PAM II)                                               | 1024 GB: 2 x 512-GB cards                                                 |

## Environmental Data

Table 2 lists estimated environmental data for a four-node configuration.

**Note:** The rack weight was not included in the calculations in Table 2.

**Table 2.** Estimated Environmental Data for a Four-Node Configuration

| Equipment                             | Rack Units (RUs) | Typical Watts         | Typical BTUs | Maximum Watts         | Maximum BTUs | Weight            |
|---------------------------------------|------------------|-----------------------|--------------|-----------------------|--------------|-------------------|
| <b>Cisco Unified Computing System</b> | 8                | 3580 (200 to 240 VAC) | 12,230       | 4889 (200 to 240 VAC) | 16,670       | 384 lb (158 kg)   |
| <b>Cisco Nexus Switches</b>           | 4                | 1800 (200 to 240 VAC) | 2500         | 2200 (200 to 240 VAC) | 3300         | 70 lb (32 kg)     |
| <b>Cisco UCS C200</b>                 | 1                | 265 (200 to 240 VAC)  | 600          | 364 (200 to 240 VAC)  | 904          | 34 lb (15.5 kg)   |
| <b>Cisco 2911 ISR</b>                 | 2                | 52 (200 to 240 VAC)   | 177          | 210 (200 to 240 VAC)  | 760          | 18 lb (8.2 kg)    |
| <b>NetApp Devices</b>                 | 11               | 1550 (200 to 240 VAC) | 5300         | 1800 (200 to 240 VAC) | 6100         | 379 lb (136 kg)   |
| <b>Total Estimated</b>                | 25               | 7247 (200 to 240 VAC) | 20,807       | 9463 (200 to 240 VAC) | 27,734       | 885 lb (349.7 kg) |

## Software and Firmware Versions

Table 3 lists software and firmware versions.

**Table 3.** Software and Firmware Versions

| Name                                | Minimum Version of Later   |
|-------------------------------------|----------------------------|
| Cisco UCS Manager                   | 2.0(1s)                    |
| SuSE Linux Enterprise Server (SLES) | SLES 11 SP1                |
| Cisco NX-OS                         | 5.1(3)N1(1a)               |
| BIOS                                | B440.2.0.1c.0.100520111754 |
| SLES Kernel Patch Release           | 2.6.32.54-0.3-default      |
| NetApp DATA ONTAP                   | 8.1                        |

## Network Connections

Table 4 lists the required network connections.

**Table 4.** Required Network Connections

| Name                                | Given Version or above                                                                                                                                                 |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Access Network (Production Network) | 2 x or 4 x 10 Gigabit Ethernet connected to Cisco Nexus 5500 Platform                                                                                                  |
| Management Network                  | 3 x 100/1000 Mbit connected to the management server<br>2 x 100/1000 Mbit connected to the Cisco Nexus 5500 mgmt0<br>1 x 100/1000 Mbit connected to the Cisco 2911 ISR |
| Storage Network for Backup          | Optional connection only:<br>2 x 1 Gigabit Ethernet connected to each storage device or<br>2 x 10 Gigabit Ethernet connected to the Cisco Nexus 5500 Switch            |

## Support Contracts

All components in the solution are covered by a support contract with each vendor (see Table 5).

**Table 5.** Support Contracts

| Company | Support Contract                                                                                                                                                                                                                                                                                                                |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NetApp  | SupportEdge Premium for NetApp systems                                                                                                                                                                                                                                                                                          |
| Cisco   | Networking: Cisco SMARTnet® Service 24 hours a day, 7 days a week, for 3 years (24x7x4)<br>Servers: Cisco Unified Computing Support Service 24 hours a day, 7 days a week, for 3 years (24x7x4)<br>Software: ISV1 Support Service for SLES, for 3 years<br>Appliance: Cisco Allied Service (CAS) for SAP Appliance, for 3 years |

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## Additional Information

Cisco UCS C220 M3 High-Density Rack-Mount Server

[http://www.cisco.com/en/US/docs/unified\\_computing/ucs/c/hw/C220/install/ucsm-integration.html](http://www.cisco.com/en/US/docs/unified_computing/ucs/c/hw/C220/install/ucsm-integration.html)

Cisco Nexus 5500 Platform

<http://www.cisco.com/en/US/docs/switches/datacenter/nexus5000/hw/installation/guide/overview5500.html>

Cisco Nexus 2000 Series Fabric Extenders

<http://www.cisco.com/en/US/docs/switches/datacenter/nexus2000/hw/installation/guide/overviewN7K.html>

Cisco UCS 6200 Series Fabric Interconnects

[http://www.cisco.com/en/US/partner/docs/unified\\_computing/ucs/hw/6200/install/install.html](http://www.cisco.com/en/US/partner/docs/unified_computing/ucs/hw/6200/install/install.html)

Cisco UCS 5108 Server Chassis

[http://www.cisco.com/en/US/partner/docs/unified\\_computing/ucs/hw/chassis/install/ucs5108\\_install.html](http://www.cisco.com/en/US/partner/docs/unified_computing/ucs/hw/chassis/install/ucs5108_install.html)

Cisco UCS B440 M2 High-Performance Blade Server

[http://www.cisco.com/en/US/partner/docs/unified\\_computing/ucs/hw/chassis/install/quadblade.html](http://www.cisco.com/en/US/partner/docs/unified_computing/ucs/hw/chassis/install/quadblade.html)

NetApp FAS3240

<http://www.netapp.com/us/products/storage-systems/fas3200/fas3200.html>

SAP High-Performance Analytic Appliance on the Cisco Unified Computing System

[http://www.cisco.com/en/US/solutions/collateral/ns340/ns517/ns224/ns944/solution\\_overview\\_c22-707642.html](http://www.cisco.com/en/US/solutions/collateral/ns340/ns517/ns224/ns944/solution_overview_c22-707642.html)



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