Cisco Unified Computing System with EMC Storage for SAP HANA

Solution Description

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

interconnects, and extenders, that are integrated under the control of a common embedded management system. This approach results in far fewer system components and better manageability, operation efficiency, and flexibility than comparable data center platforms.

Cisco UCS is designed from the foundation 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 (VICs), even the number and type of I/O interfaces can be 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, and the system configures itself to match the model. This automation accelerates provisioning and workload migration with accurate and rapid scalability. The result is increased IT staff productivity, improved compliance, and reduced risk of failure due to inconsistent configurations.

Cisco Fabric Extender Technology (FEX Technology) reduces the number of system components that need to be purchased, configured, managed, and maintained by condensing three network layers into one. It 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 like physical networks, but have massive scalability. This approach represents a radical simplification compared to traditional systems, reducing capital and operating costs and increasing business agility, simplifying and accelerating deployment, and improving performance.

Cisco Nexus 5596UP

The Cisco Nexus® 5596 Switch is a two-rack-unit (2RU), 10 Gigabit Ethernet and Fibre Channel over Ethernet (FCoE) access-layer switch built to provide more than 500 Gbps of throughput with very low latency. It has 48 fixed 10 Gigabit Ethernet and FCoE ports that accept modules and cables, complying with the Enhanced Small Form-Factor Pluggable (SFP+) form factor. Three expansion module slots can be configured to support additional unified ports, 1/2/4/8-Gbps native Fibre Channel, and Ethernet and FCoE. 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 five N+1 redundant hot-pluggable fan modules provide highly reliable front-to-back cooling.

EMC VNX Storage

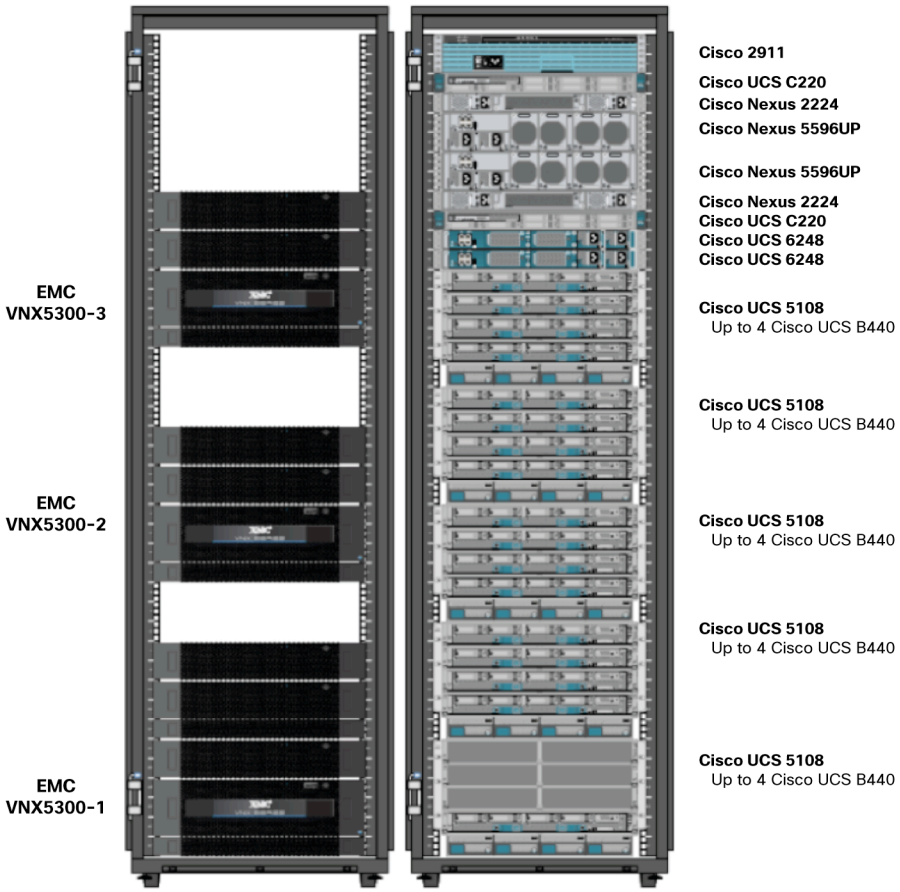
The EMC VNX family of storage systems represents EMC's next generation of unified storage, optimized for virtualized environments. The trend toward massive virtualization and consolidation of servers demands a new storage technology that is dynamic and scalable. The EMC VNX family offers several software and hardware features for optimally deploying mission-critical enterprise applications.

A main distinction of this new generation of platforms is support for both block- and file-based external storage access over a variety of access protocols, including Fibre Channel, Small Computer System Interface over IP (iSCSI), FCoE, Network File System (NFS), and Common Internet File System (CIFS) network-shared file access. Furthermore, data stored in one of these systems, whether accessed as a block- or file-based storage object, is managed uniformly through EMC Unisphere, a web-based interface window.

Product Description

Cisco Unified Computing System with EMC Storage for SAP HANA is a defined set of hardware and software that serves as an integrated infrastructure stack. The solution supports only the SAP HANA application stack based on EMC VNX storage, Cisco Nexus networking, and Cisco UCS in a single package (Figure 1).

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



System Specifications for Block

Table 1 summarizes the system specifications for this solution, Table 2 summarizes environmental data, Table 3 lists software and firmware versions, and Table 4 lists required network connections.

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

Table 1. System specifications for a 4 blade solution

Component	Details
Cisco Unified Computing System Components	
Cisco UCS 6248UP FI	
Cisco UCS B440M2 Blade Server	4
Number of CPUs	16 Intel® 2.4GHz E7-4870 CPU
Total CPU cores	160
Total RAM	2 TB
FCoE bandwidth (servers to fabric)	80Gbps: 8X 10 Gigabit Ethernet
Ethernet uplink bandwidth	80Gbps: 8X 10 Gigabit Ethernet
Fibre Channel uplink bandwidth (UCS to Fabric)	64Gbps: 8X 8 Gigabit Fibre Channel
Number of blade chassis	1 Cisco UCS 5108 per bundle
	1 additional Chassis for standby and spare
Fabric (2 Cisco Nexus® 5548UP Switches)–Port counts in use	
10 Gigabit Ethernet ports	80Gbps: 8X 10 Gigabit Ethernet
Fibre Channel ports	64Gbps: 8X 8 Gigabit Fibre Channel
EMC VNX5300 Storage Array	
Storage Processor Count	2
CPU/Cores per SP	1/4
Cache per SP / Total	8/16GB
I/O Module per SP	32 Gbps: 4X 8 Gigabit Fibre Channel
Datamover	2 (1 Active, 1 Standby)
Controlstation	1
CPU/Cores per DM	1/4
I/O Module to Network	10 Gbps
Protocols	NFS, FC
Disk Type	600GB 10k SAS
# Disks in Basic Unit (DPE)	25
# of DAEs	2
# Disks in DAE	25
# Disks Total	75
# of Standby Power Supplies	2

Table 2. Estimated environmental data for a 4 Node configuration

Equipment	Rack Units (RUs)	Typical Watts	Typical BTUs	Maximum Watts	Maximum BTUs	Weight
Cisco UCS System	8	3,580 (200 to 240 VAC)	12,230	4,889 (200 to 240 VAC)	16,670	384 lb (158 kg)
Cisco Nexus Devices	3	1,800 (200 to 240 VAC)	2,500	2,200 (200 to 240 VAC)	3,300	70 lb (32 kg)
Cisco UCS C220	1	180 (200 to 240 VAC)	600	264 (200 to 240 VAC)	904	35 lb (16.1 kg)
Cisco 2911 ISR	2	52 (200 to 240 VAC)	177	210 (200 to 240 VAC)	760	18 lb (8.2 kg)
EMC Devices	11	1,500 (200 to 240 VAC)	4,600	1,600 (200 to 240 VAC)	4,800	669 lb (303 kg)
Total Estimated	25	7,197 (200 to 240 VAC)	20,177	9,263 (200 to 240 VAC)	26,434	1175 lb (516.7 kg)

Note: The rack weight was not included in the calculations in Table 7.

Table 3. Software and Firmware Vsersions

Name	Given Version or above
UCSM	2.1.1a
SLES	SLES 11 SP2 or SLES for SAP Applications SP2
NX-OS	5.1(3)N2(1a)
VNX OE Block	5.32.000.5.201
VNX OE FILE	7.1.65-8
BIOS	B440.2.1.1.0.100520121706
SLES Kernel Patch Release	3.0.80-0.7-default

Table 4. Required Network Connections

Name	Given Version or above
Access Network (Production Network)	2x or 4x 10 GbE connected to Nexus 5500
Management Network	3* 100/1000 Mbit connected to the Management Server 2* 100/1000 Mbit connected to the Nexus 5500 mgmt 1* 100/1000 Mbit connected to the Cisco 2911
Storage Network for Backup	Optional connection only: 2* 1 GbE connected to each Storage or 2* 10 GbE connected to the Nexus 5500

Support Contracts

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

Table 5. Support Contracts

Company	Support Contract
EMC	EMC Premium Support 24x7x4** **Severity 1 issues (sev 2 = same day, sev 3/4 = NBD)
Cisco	Networking: SMARTnet 24x7x4 Servers: Unified Computing Support 24x7x4

For More Information

- Cisco UCS C220 M3 Rack Server:
  http://www.cisco.com/en/US/docs/unified_computing/ucs/c/hw/C220/install/ucsm-integration.html
- Cisco Nexus 5500 switch 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
- Cisco UCS 5108 Blade Server Chassis:
  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
- EMC VNX5300:
  http://www.emc.com/storage/vnx/vnx-series.htm
- 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

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