

Cisco UCS with EMC Storage for SAP HANA Scale-out Solution

Solution Brief
July 2014



Highlights

Scale on Demand

- The Cisco® and EMC® solution makes it easy to add more compute and storage building blocks as demand rises.

Deploy Infrastructure Faster

- Built-in automation enables configurations to be deployed quickly, easily, and accurately.

Handle Big Data

- Cisco Unified Computing System™ (Cisco UCS®), combined with EMC® VNX5400 storage systems, provides persistent storage for SAP HANA and real-time data consumption for business warehousing.

Accelerate SAP HANA Performance

- Scale-out capabilities, combined with high-performance EMC storage and the balanced resources of Cisco UCS, enable users to get more performance from their SAP HANA implementations.

Deliver High Availability

- The capability to distribute data processing enables SAP HANA implementations to scale beyond a single server and remove single points of failure that negatively effect timely results.

Simplify Management

- End-to-end management provides visibility and enables the monitoring and automated remediation of physical servers, storage, and network devices.

You need fast insight into your data. The Cisco UCS with EMC Storage for SAP HANA scale-out solution helps you make real-time decisions at the speed of thought.

Organizations in every industry are generating and using more data than ever before, from customer transactions and supplier delivery considerations to real-time user consumption statistics. Without scalable infrastructure that can store, process, and analyze big data sets in real time, companies are unable to use this information to best advantage. The Cisco Unified Computing System™ (Cisco UCS®) with EMC® Storage for SAP HANA Scale-out solution makes it easier for companies to harness information and make better business decisions that let them stay ahead of the competition.

SAP HANA: Delivering Instant Insight into Operations

SAP HANA provides a flexible, cost-effective approach for analyzing detailed data in real time—literally at the speed of thought. Efficient processing and analysis of massive amounts of data is made possible by combining SAP's intelligent use of in-memory technology, columnar database design, data compression, and massive parallel processing into an integrated solution. Using the multipurpose, in-memory SAP HANA database, organizations can gain instant insight into business operations, respond quickly to changing priorities, and dramatically reduce the cost associated with running multiple data warehouses and operation and analytical systems.

Cisco UCS and EMC Storage for SAP HANA Scale-out Solution

Extracting deep insight from stored information within limited time frames becomes harder as data volumes grow. SAP HANA delivers scale-out solutions that enable application data centers to run big data, growth-oriented applications and analytics by rapidly scaling to many nodes in high-performance, highly available

configurations. In fact, SAP intends to move all SAP business applications to SAP HANA so that businesses can reap the benefits of innovation across the enterprise.

Taking advantage of this innovative software requires an equally ingenious and scalable deployment infrastructure. The Cisco UCS with EMC Storage for SAP HANA Scale-out solution combines the innovative Cisco UCS platform with EMC® VNX™ series unified storage to deliver high-performance, scalable infrastructure that is assembled and tested with the SAP HANA software installed (Figure 1).

Cisco Unified Computing System

Cisco UCS is the first data center platform that integrates industry-standard, x86-architecture Intel® Xeon® processor-based servers with networking and storage access into a unified system. Server, networking, storage, and intelligent management resources work together in a self-aware and self-integrating system. This design delivers greater computing density and network simplicity in a smaller footprint that reduces operating costs.

Transcending the boundaries of traditional blade chassis and racks, Cisco UCS creates a physically distributed, centrally managed system that supports the solution's blade servers to deliver scalability and performance. A unified fabric supported by a single, distributed virtual switch interconnects all server resources. The system represents a radical simplification compared to traditional architectures, resulting in lower capital and operating costs.

EMC VNX Series Unified Storage

Designed with simplicity in mind, the EMC VNX family of storage systems combines powerful and flexible hardware with advanced efficiency, management, and protection software to meet the stringent demands of SAP HANA deployments. Using a unified storage architecture, EMC VNX series storage systems deliver what SAP HANA deployments need: multiprotocol, multipurpose support in a single system that scales from entry-level solutions to high-performance, high-capacity configurations to satisfy large-scale SAP HANA deployment requirements

Within the solution, EMC VNX5400 unified storage systems provide the persistent storage needed by SAP HANA. The multiprotocol capability of EMC VNX5400 storage systems

enables them to service a wide range of SAP HANA requirements. For example, the PXE-boot file systems as well as the SAP installation directory are accessed through a high-speed IP connection using the NFS protocol. The SAP HANA persistent storage layer is created on Fibre Channel-attached block storage with data on an ext3 and logs on an xfs file system.

Deliver Business Advantages

The Cisco UCS and EMC Storage for SAP HANA Scale-out solution delivers a wide range of benefits to organizations.

Deploy SAP HANA Services Faster

The Cisco UCS and EMC Storage for SAP HANA Scale-out solution automates configuration. The solution can be deployed quickly,

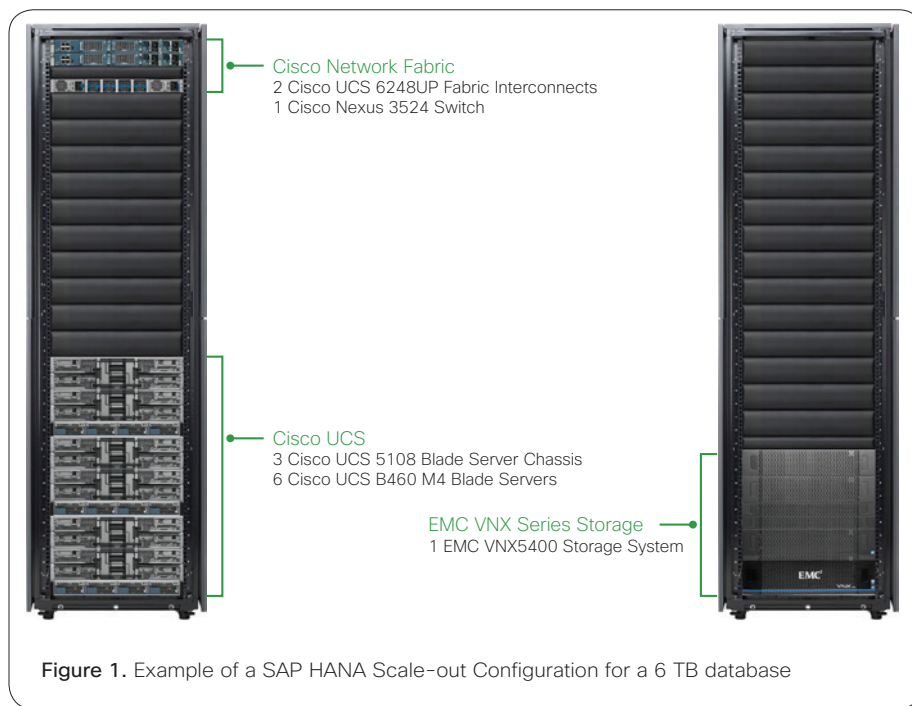


Figure 1. Example of a SAP HANA Scale-out Configuration for a 6 TB database

and configurations can be replicated easily and accurately. Abstracting server identity, personality, and I/O connectivity from the hardware enables SAP HANA server characteristics to be applied automatically as new systems are added to support increased demand. Every aspect of a server's configuration—from firmware revisions and BIOS settings to network profiles—can be assigned through the system's open, documented, standards-based XML API or Cisco UCS Manager GUI.

Cisco UCS adapts to support bare-metal operating system and application stacks much like hypervisors support virtual machines. For SAP HANA installations, this capability means greater resource utilization through a reduced need for hot spares. New servers can be deployed, or existing servers upgraded, simply by applying a Cisco service profile to the target resource and rebooting to launch the new server.

Scale on Demand

Using a building-block approach, the Cisco UCS and EMC Storage for SAP HANA Scale-out solution enables application data centers to start with the computing and storage infrastructure needed today and scale easily by adding more computing and storage blocks as demand rises. Because the building blocks integrate as part of the unified system, they do not require additional supporting infrastructure or expert knowledge. The system simply, quickly, and cost effectively presents more computing power to SAP HANA applications.

Handle Big Data

The more data a business can access and process, the easier it is to narrow customer focus and tailor products and services. Delivering fast response requires massive memory when large data sets are involved. To make the most of available memory, SAP HANA compresses data to fit more information into less space. Today, Cisco UCS delivers more than enough memory capacity to support SAP HANA performance. With Cisco's history of delivering technology to support high memory densities, companies can be assured that as SAP HANA instances grow to use more memory, Cisco UCS servers will support increased demand.

Deliver High Availability

Business continuity in the event of an outage, whether caused by infrastructure failure or unforeseen external events, is essential. The Cisco solution supports clustered configurations to deliver constant access to business-critical information. All active computing nodes in the solution access data and log devices using the SAP HANA Storage Connector API for Block. By distributing data processing, the solution can scale beyond a single server and eliminate the server as a single point of failure.

Within the solution, nodes can be failed over automatically within a distributed SAP HANA database. If a node fails, the database on a standby server can be started and made active in the configuration. The shared, external EMC VNX5400 unified storage system is used to move the in-memory content of the failed SAP HANA node to the standby node. The standby node

accesses the persistent storage layer of the failed node on the SAP Storage Connector API for Block. Corresponding data is read into memory, and SAP HANA log files are applied, if necessary, to help ensure that the system reflects the latest, consistent state.

SAP HANA writes in-memory data to disk at regular intervals (typically every five minutes), and captures all database transactions since the last save point in log files, to help ensure consistency. As data sets grow, making sure that this data reaches the disk before the next write operation occurs is essential. EMC VNX series storage systems deliver high performance and throughput to keep pace with SAP HANA transactions.

Support Business Continuance

Disaster tolerance capabilities allow a remote system to assume the workload of a production system in the event of a catastrophic failure, without losing committed changes to the database. Within the solution, local and remote consistency pairs ensure all storage devices are synchronized as changes are made to the production system. Because data is replicated synchronously, less time is needed to get the remote system operational.

Accelerate SAP HANA Performance

Analytic and business intelligence systems must be able to deliver results quickly for important business decisions to be made in a timely way. The Cisco UCS and EMC Storage for SAP HANA Scale-out solution enables application data centers to use more servers and distribute data-loading and analysis tasks to take advantage of massively

parallel processing. The balanced resources of Cisco UCS, combined with the enhanced throughput of the block-level storage API, help ensure that application data centers get better performance from their SAP HANA implementations.

Simplify Management

The unified infrastructure inherent in the Cisco UCS and EMC Storage for SAP HANA Scale-out solution dramatically reduces the number of physical components required. It effectively uses limited space, power, and cooling by deploying less infrastructure to perform the same, or even more, work. For example, the unified fabric built into Cisco UCS results in fewer network interface cards (NICs), host bus adapters (HBAs), cables, and upstream switch ports, and eliminates the need for parallel Fibre Channel or management networks.

Traditional blade server chassis-resident switches are replaced by low-cost, low-power, zero-management fabric extenders that enable the entire system to scale across multiple blade chassis and rack servers without adding management points. All hardware and software components are managed through the unified, embedded Cisco UCS Manager to improve operation efficiency with transparent scaling.

Prepare for the Future

Even though SAP HANA is already very popular, it continues to advance. The Cisco UCS and EMC Storage for SAP HANA Scale-out solution provides a robust architectural foundation for upcoming SAP HANA features. For example, Cisco UCS already provides robust virtualization capabilities and more memory capacity and I/O bandwidth than SAP HANA uses today. In addition, proven remote replication, disaster recovery, and backup solutions can be performed with SAP HANA Studio connected to the EMC Data Domain as a logical mount point for the data and log.

Trust Cisco and EMC

For more than 15 years, Cisco and EMC have collaborated to deliver solutions that transform IT. By combining EMC's expertise in storing, protecting, and managing vast amounts of data with the power and flexibility of Cisco UCS, Cisco and EMC are reshaping the IT landscape. With 20,000 joint customers and 16 joint solution centers, Cisco and EMC understand customer challenges, share a common vision, and have a deep technology alignment that enables them to help customers implement the right solution at the lowest total cost of ownership (TCO) through extensive collaboration, testing, and validation.

Conclusion

With every business decision seemingly critical, companies around the world look to SAP applications for better insight into operations. Now the Cisco UCS and EMC Storage for SAP HANA Scale-out solution delivers a powerful new tool for decision making. With the capability to add more high-performance computing and storage resources as data and user demand grows, application data centers can scale and deliver the right information at the right time.

For More Information

- To learn more about SAP enterprise applications on Cisco UCS, visit www.cisco.com/go/sap.
- To learn more about Cisco UCS, visit <http://www.cisco.com/go/ucs> or contact your local account representative.
- To learn more about EMC solutions for SAP, visit <http://www.emc.com/sapsolutions>.
- To learn more about EMC VNX series storage systems, visit <http://www.emc.com/storage/vnx/vnx-series.htm>.
- To learn more about the EMC online community, visit https://community.emc.com/community/connect/everything_sap.



Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.