White Paper

SAP Migration from RISC/UNIX to the Cisco Unified Computing System

What You Will Learn

Rising capital and operational costs, uncertain upgrade roadmaps, and lack of performance and flexibility are some of the reasons why many organizations today are interested in migrating applications off legacy servers based on Reduced Instruction Set Computing (RISC) processors and UNIX operating systems. The shortcomings of RISC/UNIX solutions are being highlighted by the increasing need to quickly scale compute resources and to provide new options such as cloud computing. Once considered appropriate only for smaller applications, servers based on x86 processor architectures and open source software, such as Linux, are today the choice of thousands of companies for their enterprise-scale workloads. The processors from the Intel® Xeon® x86 family can now outperform a RISC CPU and the high performance, stability, flexibility, and widespread knowledge of Linux have made it a favorite among administrators and developers.

This white paper provides an overview of the market shift leading companies to migrate RISC/UNIX platforms to the premier x86/open source alternative: the Cisco Unified Computing System™ (Cisco UCS™). It also reports on Cisco IT's experience in migrating an SAP enterprise resource planning (ERP) system running HP-UX on Hewlett-Packard servers to Cisco® UCS running Red Hat Enterprise Linux.

Why Organizations Are Migrating their Compute Environments

One of the reasons behind the mass migration to the x86 server architecture now underway is the greatly reduced total cost of ownership (TCO) of x86 systems compared to the high acquisition, maintenance, environmental, and licensing costs of RISC/UNIX systems. RISC/UNIX systems have a larger footprint, increasing space requirements, and higher power and cooling costs, which are other components of TCO.

> "Every three years we renew our production landscape, reuse the freed systems for the QA and DEV environments, and so on. By replacing HP (both RISC and Itanium) with Cisco UCS, we were able to deploy additional systems for SAP migration testing. Doing that, we have been able to cope with new business requirements and to cut costs. Cisco UCS gave us the freedom to use the lock/unlock capability where it was needed. The Cisco UCS helped us to follow this new strategy very easily, and it has proven highly efficient."
>
> **— Chris Ellison, IT Manager, Cisco Service Provider Video Technology Group**

Better system performance is another reason that companies are abandoning RISC/UNIX platforms. Cisco UCS is backed by performance benchmarks that show a marked advantage of x86 systems. In addition, the future of RISC/UNIX products is uncertain, as it has been clouded by missed deadlines, changes in roadmaps, and dropped hardware and software support from HP and Oracle/Sun.

Other reasons for the shift in server preferences include the increase in mission-critical workloads, which demand cost-effective and efficient scalability not possible in RISC/UNIX servers; the high complexity of RISC/UNIX compared to x86; and the inability of RISC/UNIX workloads to scale across multiple small servers instead of adding more RISC/UNIX server clusters. Limitations in the ability to scale are a major shortcoming in providing on-demand, cloud-based services.

Legacy RISC platforms will not support customers with faster, better, more agile, highly flexible, and lower-cost features. To be able to both reduce TCO significantly and support customers in outperforming their competition, SAP users need to tightly integrate compute, network, and storage with the SAP application and database. The Cisco UCS provides a best-in-class foundation to deliver this environment.

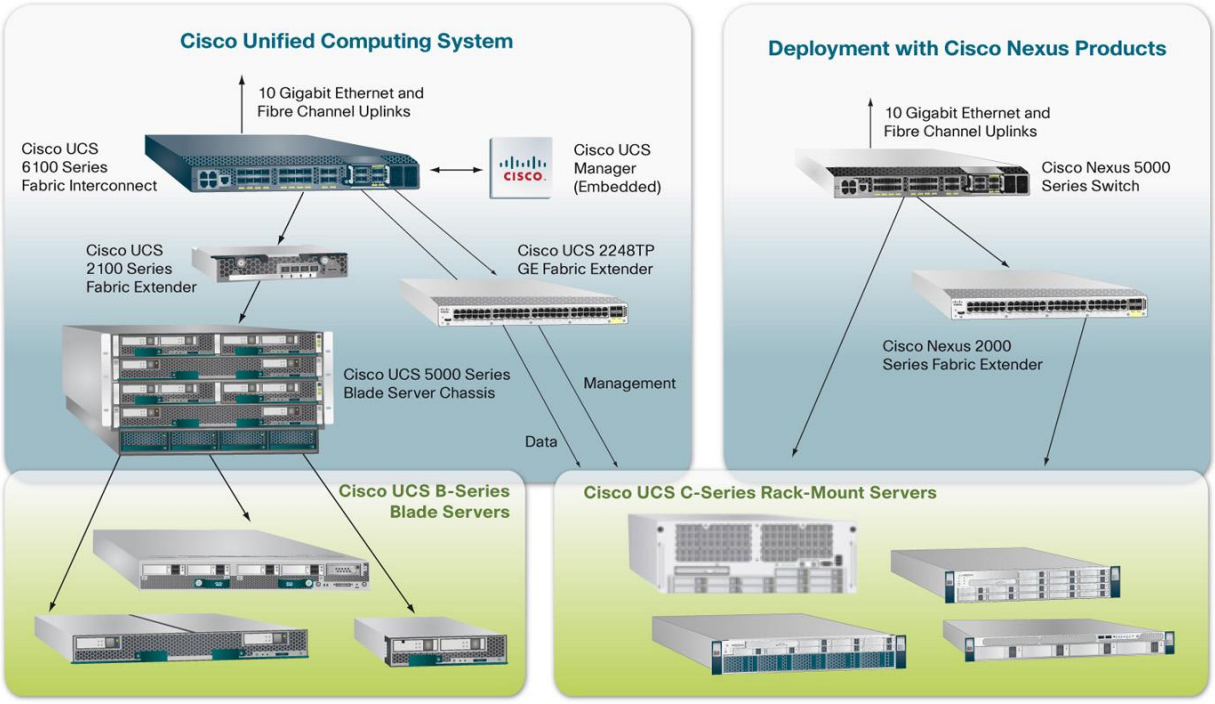
Why Cisco UCS Is the x86 Platform of Choice

With x86-based servers, open operating systems like Linux, and features such as virtualization, IT departments now expect servers and processors to be reliable, easy to manage and support, and power- and space-efficient. They want to consolidate physical and virtual servers, speed up application provisioning, and reduce complexity - and to do it all cost-effectively.

Cisco UCS (Figure 1) meets the goals of better, faster, and more cost-effective technology based on these factors:

- **Better:** Powered by the x86 Intel Xeon processor, Cisco UCS provides a self-integrating architecture with a unified fabric that carries network, storage, and computing interprocess communications over a single, high-bandwidth, low-latency Ethernet and Fibre Channel over Ethernet (FCoE) network connection. Cisco UCS is far easier to manage, easier to provision, and easier to scale than RISC/UNIX environments. Cisco Extended Memory technology can provide significantly more memory in a two-socket blade server, further reducing infrastructure and licensing costs for virtualized environments.
- **Faster:** In addition to its exceptionally fast performance benchmarks measuring application transactions, Cisco UCS service profiles and templates offer just-in-time application provisioning, reducing application deployment from days to minutes. With Cisco UCS Manager, management is centralized, enabling management of one or hundreds of servers and virtual machines as a single entity.
- **Cost-effective:** Reduced cabling, fewer Ethernet ports, and less physical rack space mean lower capital expenditures (CapEx). So does improved use of physical and virtual servers, which make it easy to quickly deploy servers and move workloads. Lower consumption of electricity and cooling, less expensive hardware-support contracts, and no onsite repair or installation all add up to lower operational expenditures (OpEx). The result is a far lower overall TCO as compared to RISC/UNIX systems.

Figure 1. Cisco UCS Components



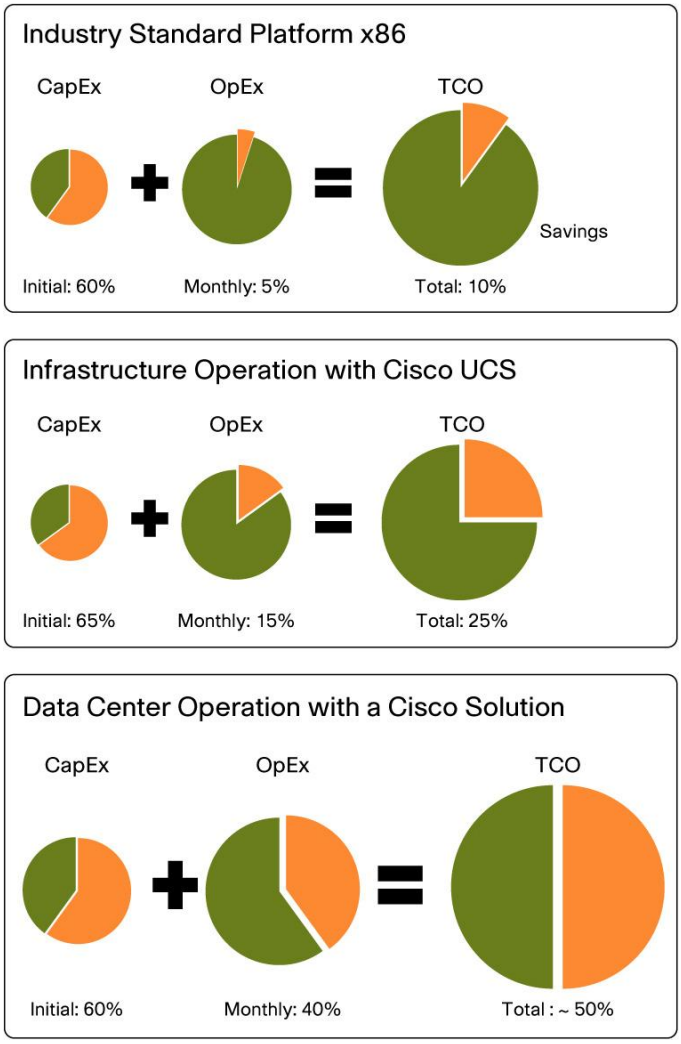
Using servers in blade or rack form factors, Cisco UCS integrates an industry-standard, x86-architecture with a unified fabric. The fabric carries IP, storage, and interprocess communications (IPC) with a single, high-bandwidth, low-latency Ethernet and FCoE network, eliminating up to two-thirds of network infrastructure at the rack level. Cisco Fabric Extender technology is used to eliminate blade server and hypervisor-resident switching, condensing three network layers into one. Cisco Fabric Extender technology treats physical servers and virtual machines alike, interconnecting them with exceptional visibility and control.

SAP Reference Architecture

Cisco, together with NetApp, VMware, and GOPA IT Consultants, designed the SAP applications built on NetApp's FlexPod™. FlexPod is a pretested data center solution built on a flexible, scalable, shared infrastructure based on Cisco UCS servers, Cisco Nexus® switches, and NetApp unified storage systems running the NetApp Data ONTAP data center operating system. This reference architecture allows customers to speed up SAP operations, including upgrades, migrations, and the introduction of new modules. It makes it far easier to accomplish these modifications at up to 50 percent below the cost of doing so in legacy RISC environments.

Figure 2 shows the savings possible by migrating from a RISC/UNIX server environment to an x86 platform (hardware only), savings possible from migrating to a Cisco UCS platform based on an x86 architecture on open source Linux (due to built-in management of network, compute, and storage resources and the fast and easy provisioning of servers through the use of service profiles), and additional savings that can be realized through adaption of operational models and processes like deploying SAP on Flexpod.

Figure 2. Migration Savings: RISC/UNIX to Cisco UCS/Linux



The migration to a Cisco UCS infrastructure or a solution built on a Cisco UCS stack also has a positive impact on application operations. Cisco UCS delivers fully integrated management from the network up to the compute nodes.

> "By choosing Cisco UCS, we have been able to manage our upgrade and migration projects to ECC 6.0 without affecting the core live SAP production."
>
> **— Chris Ellison, IT Manager, Cisco Service Provider Video Technology Group**

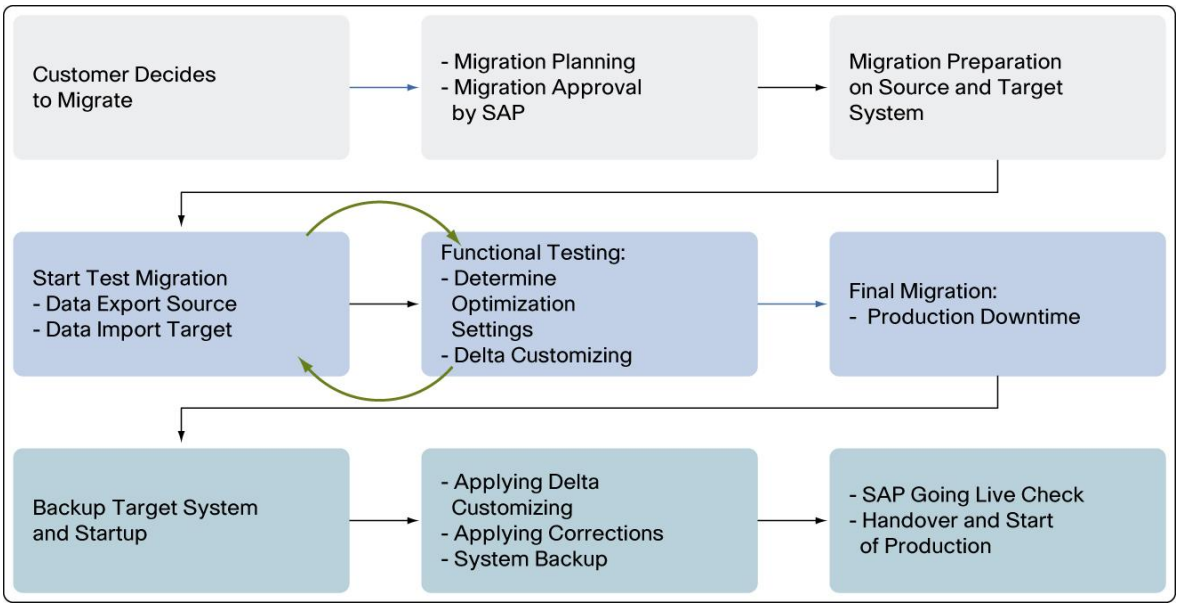
SAP Migration Options

SAP defines two main types of data migration options: homogeneous system copy and heterogeneous system migration.

- **Homogeneous system copy** involves moving a SAP system from one server to another without changing the operating system or database. This is typically used when a server is replaced in a technology refresh.
- **Heterogeneous system migration** involves moving a SAP system from one server to another server while changing the operating system, database, or both.

Figure 3 shows a process overview of a heterogeneous system migration. There are three main stages: pre-migration, migration, and post-migration.

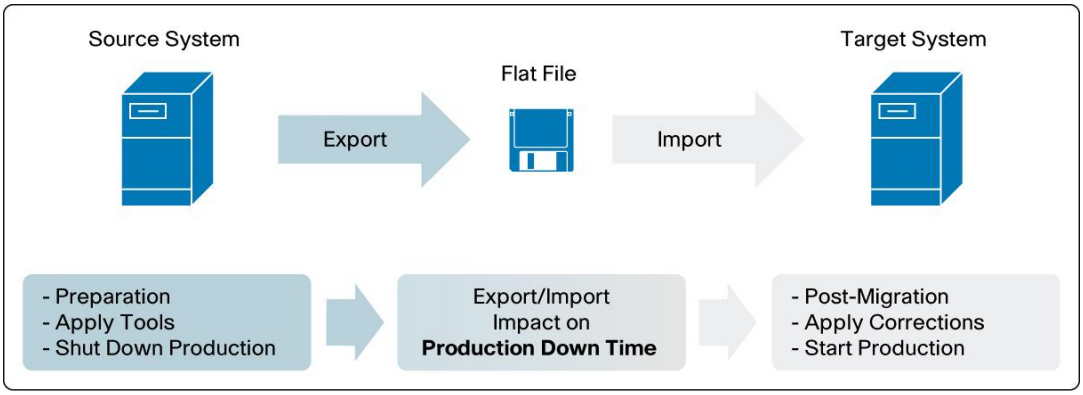
Figure 3. Stages of SAP Application Migration



A migration of SAP from a HP-UX environment to Cisco UCS on Linux can be performed using standardized SAP migration tools to help ensure that there is no data loss during the migration and that the Advanced Business Application Programming (ABAP) code transformation between the source and the target systems is done correctly. The main difference between the available methods is the downtime needed during the data unload and load phases. Choose the migration method based on each environment's maximum acceptable downtime.

Figure 4 illustrates the migration processes between the source and the target systems.

Figure 4. Generic SAP Migration Process



As Table 1 shows, there are three standard migration methods available from SAP as well as other vendor-specific alternatives. Each method has different effects on downtime, and has different hardware requirements and different levels of SAP support.

Table 1. SAP Standard and Partner-Supported Migration Methods

	Migration Method	Minimized Downtime	No Additional Hardware Needed	Level of Support by SAP
Standard	**Sequential Export/Import**			
	Parallel Export/Import			
	Distributed Monitor and Parallel Load			
Nonstandard	**SAP Incremental Migration**			
	Oracle to Oracle			
	T-Bone by SNP			

Cisco UCS Migration for a SAP Customer

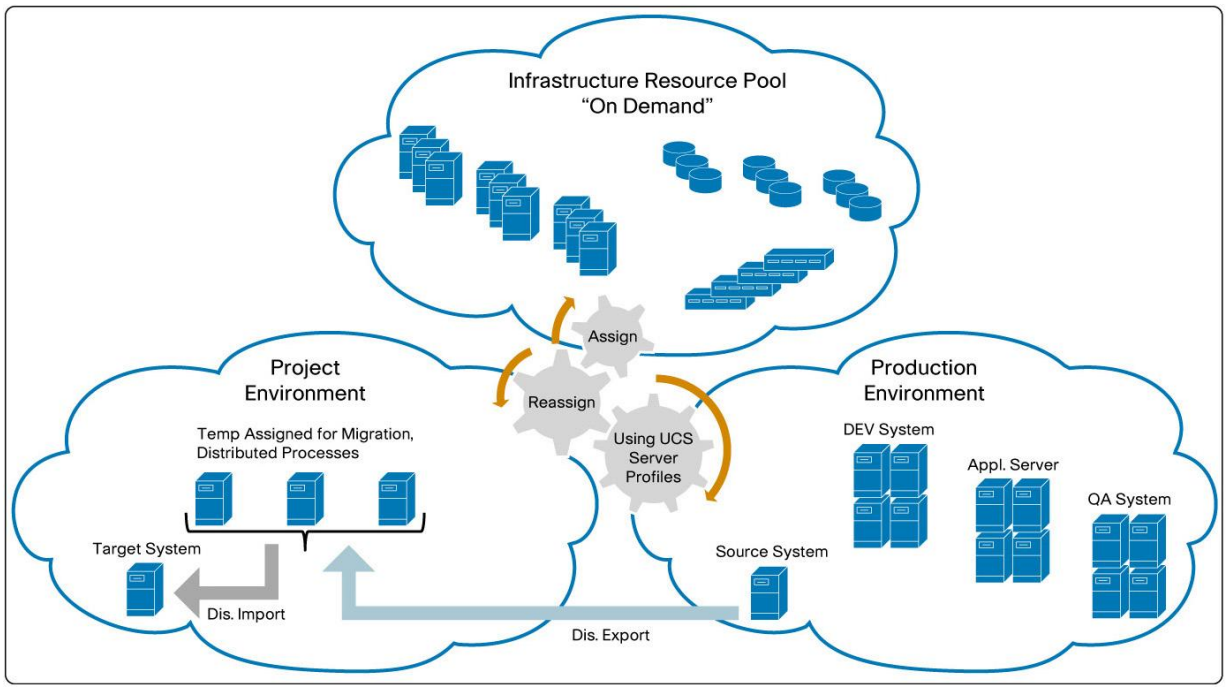
Cisco UCS brings additional value and unique advantages to SAP IT operations and SAP project environments. The standard SAP migration tools help to ensure the proper transfer of any bit and byte between source and target system. Customers must choose the right SAP migration method to minimize production downtime based on the maximum acceptable downtime window.

Whatever method that is chosen, it is crucial to provide the resources needed for the data unloading and loading phases. With the Cisco UCS, customers can assign and reassign resources on-demand nearly instantly in their SAP migration infrastructure.

> "Using the Cisco UCS features for the migration, the conversion to the new Cisco UCS servers was extremely smooth. We ran our migration project very efficiently by using SAP Distribution Monitor for a large database, separate unload/reload network segments, and jumbo frames. We also leveraged multiple parallel Cisco UCS data unload/reload servers and storage Business Continuance Volumes (BCVs), eliminating the need for long database restores."
>
> **— Vamshi Krishna, SAP Architect, Cisco Service Provider Video Technology Group**

Figure 5 shows a typical SAP migration project environment with Cisco UCS. The migration was performed using the SAP Distributed Monitor and Parallel Load method. The project team took advantage of Cisco UCS functions to provide the needed capacity during the unloading and loading phases, with no need to perform laborious configuration tasks.

Figure 5. SAP Operation and Migration Project Environment with Cisco UCS



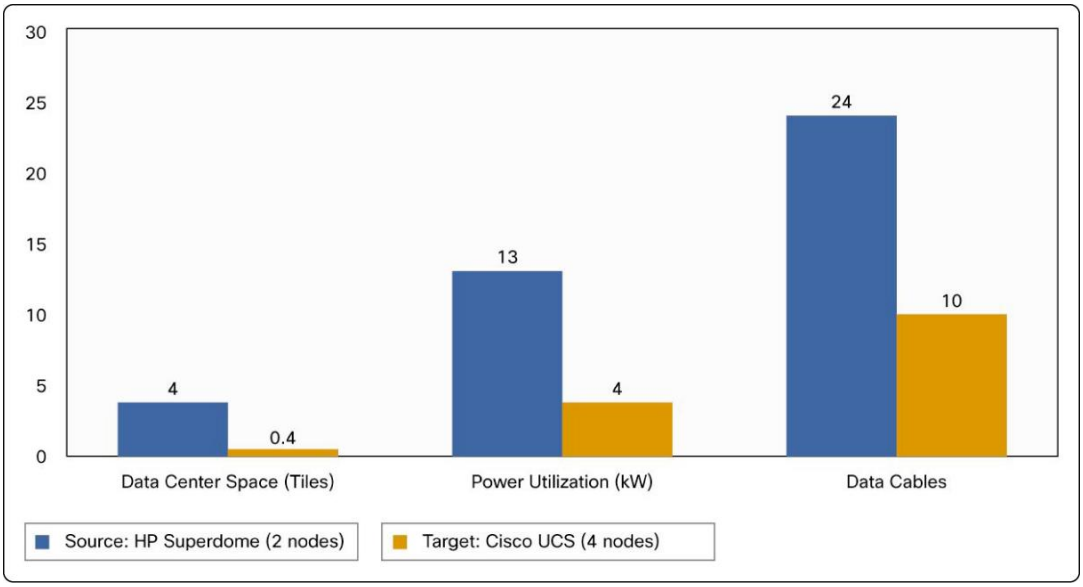
The Cisco Unified Computing System allows customers to assign and reassign infrastructure resources on-demand, when and where they are needed. This enables administrators to support their projects and day-by-day operations without laborious and time-consuming configuration tasks while providing additional capacity to their SAP environment.

Results and Experience of the SAP Migration at Cisco

Lower total cost of ownership, increased business agility, greater resilience, and a better user experience for increased productivity are all benefits Cisco IT has realized since the HP-UX to Cisco UCS/Linux migration.

Lower TCO (Figure 6) was achieved through reduced data center space, power, and cooling requirements; use of fewer than half the cables of the previous environment; lower licensing, support, and maintenance costs; and lower hardware costs because blade servers can be repurposed following the migration.

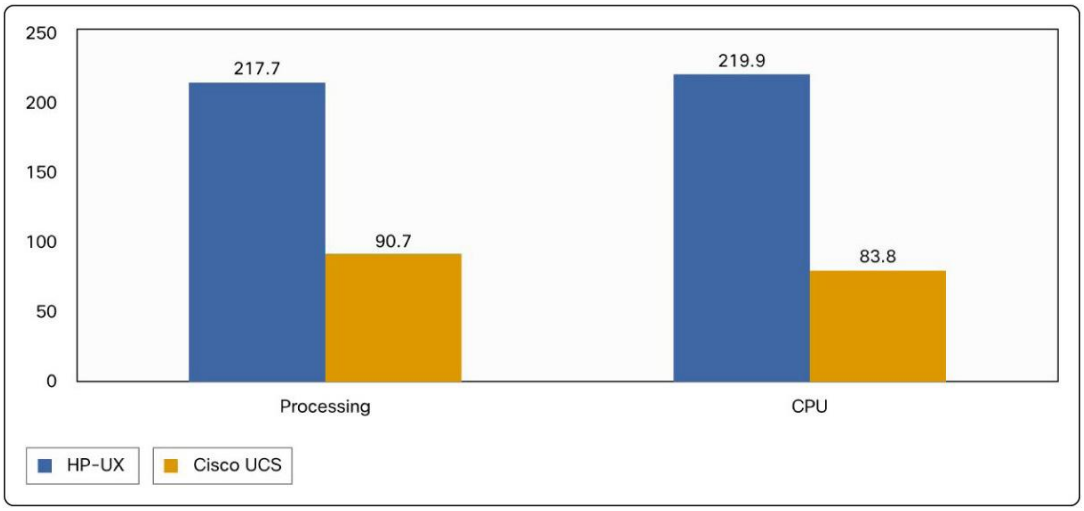
Figure 6. Lower TCO Following Migration



Business agility was increased through the dramatic reduction in the time it took to deploy the application server - from 6 to 8 weeks to 15 minutes. Resilience also increased: If a server fails, Cisco IT can provision any other available server in minutes by applying a Cisco UCS Manager service profile and then using VMware tools to move the application to another server. Previously, this provisioning required a call to the vendor to install a new part, a process which took hours or days to complete.

User experience was measured in faster application performance for SAP applications, as shown in Figure 7.

Figure 7. Figure 7 Measuring SAP Performance after Migration to Cisco UCS (in Milliseconds)



Enterprises contemplating migration of SAP from RISC platforms to Cisco UCS will find that the new environment will radically reduce the number of devices that require setup, management, power, cooling, and cabling. The Cisco UCS environment integrates server, network, storage, and I/O resources into a single converged system. Service delivery can be scaled quickly and easily to increase the business agility of the SAP solutions. Application availability and performance will improve dramatically in the Cisco UCS environment, which provides flexible and rapid provisioning of SAP servers on demand. All of these features add up to a greatly reduced total cost of ownership.

Major Benefits of Migrating from RISC/UNIX to Cisco UCS

- No downtime or loss of data
- No risk through planning and phased approach
- Faster response time with x86-based processors
- Reduced total cost of ownership of compute environment
- Decreased complexity and enhanced flexibility with virtualized and unified environment for scalable, on-demand services via the public or private cloud

The Cisco Advantage

Cisco's vision of the next-generation data center focuses on simplicity, speed, and reduced CapEx and OpEx. With Cisco UCS as the modular building block, companies can now more easily evolve their data centers to take advantage of the latest architectures for cloud computing and other innovations. Cisco UCS offers a variety of benefits beyond the RISC/UNIX-based server platforms of yesterday. These traditional systems were at one time the state of the art for mission-critical applications. Today, Cisco UCS provides an open-standard, cost-effective, simpler, high-performance alternative to improve IT responsiveness to rapidly changing business demands. Companies around the world are efficiently and securely migrating applications from RISC/UNIX platforms to Cisco UCS with no disruption to their computing environments.

For More Information

Migrate from RISC Servers to Cisco UCS http://www.cisco.com/en/US/partner/prod/ps10265/uc_risc.html

Case Study: Cisco IT Migrates SAP on HP Superdome to Cisco UCS
http://www.cisco.com/web/about/ciscoitatwork/data_center/docs/Cisco_IT_Case_Study_OracleMigrationtoUCS.pdf

Cisco UCS Services: Accelerate Your Transition to a Unified Computing Architecture
http://www.cisco.com/en/US/services/ps2961/ps10312/Unified_Computing_Services_Overview.pdf

Cisco UCS B440 M1 High-Performance Blade Server: World-Record Virtualization Performance
http://www.cisco.com/en/US/prod/collateral/ps10265/ps10280/LE_671311_PB_VMmark_B440.pdf

Cisco UCS C460 M1 High-Performance Rack-Mount Server: World-Record Virtualization Performance
http://www.cisco.com/en/US/solutions/collateral/ns340/ns517/ns224/ns955/ns971/c45-606742-00_VMmarkBrief_aag.pdf

Cisco UCS Delivers World-Record Application Server Performance
http://www.cisco.com/en/US/prod/collateral/ps10265/LE-212506_PB_jAppServer_B230.pdf

x86 Blades: Shrinking the Branch Office
http://www.cisco.com/en/US/partner/prod/collateral/modules/ps10598/white_paper_c11-613183_ps11273_Products_White_Paper.html

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.

Printed in USA C11-689670-01 04/12