Guide

PeopleSoft Migration Guide - From RISC/UNIX to the Cisco Unified Computing System

What You Will Learn

For years, Reduced Instruction Set Computing (RISC) processor-based servers running UNIX operating systems have been the chosen server and OS platforms for mission-critical business applications from SAP, Oracle, PeopleSoft, J.D. Edwards, and other vendors. Though expensive, the RISC/UNIX platform was the best choice because of its proven reliability and high performance. But now the technology of choice has changed as acquisition and maintenance costs for RISC/UNIX platforms have increased beyond the value they bring, and their performance has not kept up with industry trends.

A new generation of x86-based processors and server architectures provide a lower total cost of ownership and many innovations that simplify and accelerate deployment of enterprise-class applications running in bare metal, virtualized, and cloud computing environments. The Cisco Unified Computing System™ (Cisco UCS™), powered by a new generation of Intel® Xeon® processors, is becoming the premier computing environment for x86-based servers. Customers around the world are migrating business-critical, off-the-shelf, custom and vertical market, and enterprise infrastructure applications off RISC/UNIX platforms and onto Cisco® UCS running open standard operating systems such as Red Hat Enterprise Linux.

One such business-critical application that is widely deployed in the data center is the PeopleSoft's human resource management software. This white paper provides an overview of the market shift leading to this migration. It also includes a migration case study based on the experience of the University of Colorado's migration of their PeopleSoft Enterprise Resource Planning (ERP) system from Sun/Oracle servers based on the Scalable Processor Architecture (SPARC), which is a RISC variety, running Solaris, a UNIX variety, to the Cisco UCS running Red Hat Linux.

Why Migrate RISC/UNIX Platforms to x86 and Cisco UCS?

Many businesses are interested in migrating from RISC/UNIX servers to x86/Linux servers because they have come up against the real limits of their RISC/UNIX implementations. Specifically:

- Costs for RISC/UNIX maintenance and software licenses are increasing while IT department budgets are shrinking
- There is great uncertainty about the future of RISC/UNIX products, which have been clouded by missed deadlines, changes in roadmaps, and dropped hardware and software support from Hewlett Packard and Oracle/Sun
- Aging RISC/UNIX infrastructure doesn't provide the performance or the flexibility required to support the current requirements of businesses
- Cloud computing initiatives provide needed flexibility but nearly all are deployed on x86 architecture platforms because of the better technology and economic model they provide, as compared with expensive RISC/UNIX platforms
- Incremental performance improvements on RISC/UNIX platforms are available but at high premiums

The Cisco UCS is designed to help ensure the reliability, availability, and serviceability (RAS) that RISC customers expect. It is an innovative enterprise-class data center platform that delivers on the best of both RISC and x86 architectures. It combines industry-standard, x86-architecture servers with networking and storage access into a single converged system delivering unprecedented processing scale, resiliency, and flexibility.

The system is entirely programmable. It uses unified, model-based management to simplify and speed deployment of enterprise-class applications and services running in bare-metal, virtualized, and cloud-computing environments. Combined with a choice of Linux, Solaris for x86, or Windows operating systems, Cisco UCS delivers the hardware and application support required for the data center of today and tomorrow without vendor lock-in risk and high costs.

Case Study: University of Colorado IT Migrates from Sun SPARC/Solaris to Cisco UCS

Seeking to lower the total cost of ownership for their compute infrastructure, the University of Colorado decided to migrate their PeopleSoft applications from Sun Fire Enterprise 6900 Series servers to the Cisco UCS and Linux. Software components to be migrated included:

- PeopleSoft Human Resource Management System (HRMS) 8.9 on the Oracle 9i database
- PeopleSoft Campus Solutions 8.9 on the Oracle 10gb database
- PeopleSoft Financials 8.48 on the Oracle 9i database
- PeopleSoft Enterprise Portal
- PeopleSoft Customer Relationship Management (CRM) 9.0
- Microsoft Virtual Machine (MVM)

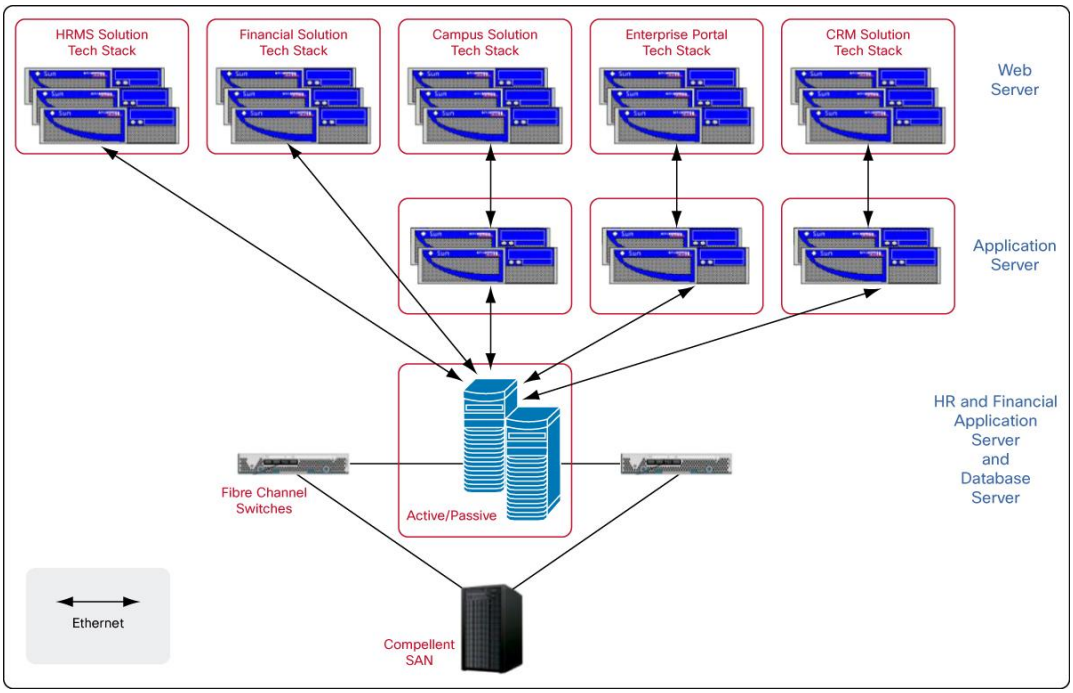
The most heavily used application is the PeopleSoft Campus solution, especially during the add-drop period at the beginning of each semester. PeopleSoft Financials is used moderately by back office employees and PeopleSoft HRMS and PeopleSoft CRM are lightly used.

The University of Colorado was particularly interested in Cisco UCS because of its focus on virtualization, ease of deploying cloud-based technologies, faster deployment capabilities, easier maintenance, and overall lower cost. The university wanted to more easily deploy and maintain their applications in the consolidated environment possible with the Cisco UCS.

A key decision prior to the migration was to deploy Oracle Real Application Clusters (RAC) to create a database grid that could scale horizontally and without any downtime for the addition of more Oracle RAC nodes. This approach allows PeopleSoft databases to scale as the business grows. With Oracle RAC and Cisco UCS, the university could manage multiple PeopleSoft application databases consolidated into a four-node Oracle RAC cluster.

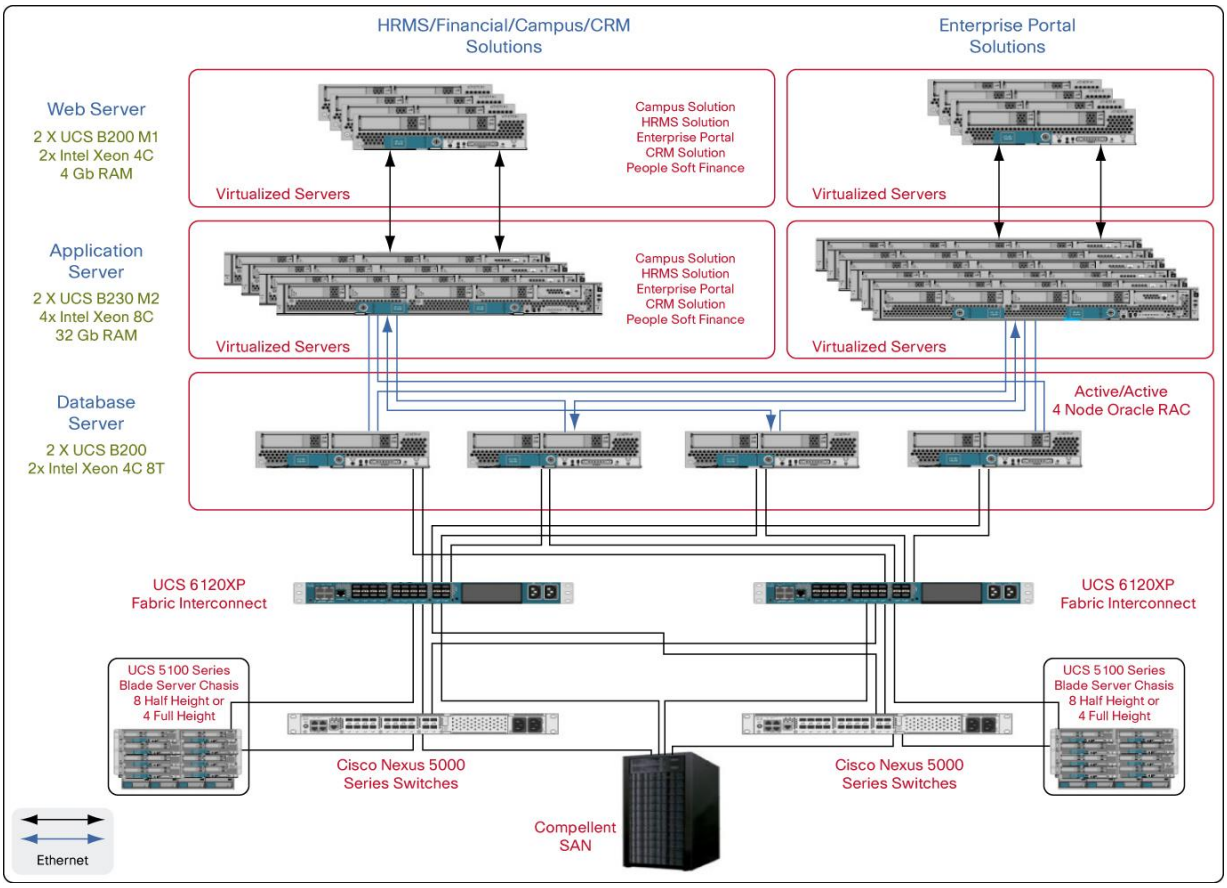
Another decision by the university as part of the migration was to change the two-tier architecture of the Web and applications servers from a single layer for some PeopleSoft applications to a three-tier setup. Some of the university's other applications were also running on the database server (Figure 1).

Figure 1. University of Colorado Legacy Two-tier Architecture



The new architecture featured a three-tier technology stack powered by Cisco UCS that provided the Web and application servers with their own tiers (Figure 2). Through virtualization of the Web and application tiers, the system can take advantage of the features available from Cisco UCS, making it easier to manage the applications and allocate resources and providing faster CPU power, expanded memory, and higher bandwidth. The university chose the Oracle WebLogic server and VMware for its virtualization technology.

Figure 2. New University of Colorado Compute Architecture with the Cisco UCS



The new infrastructure included:

- Six Cisco UCS B250 M2 blade servers with two-socket, six-core Intel Xeon processors run the PeopleSoft Internet Architecture (PIA) layer and the PeopleSoft application layer
- Four Cisco UCS B440 M1 blade servers with four-socket, eight-core Intel Xeon processors run the Oracle Service-oriented Architecture (SOA) layer for Oracle Service Bus (OSB) and Oracle Enterprise Service Bus (OESB)
- Ten two-port, 10-Gbps Cisco UCS M81KR virtual interface cards (VICs)
- Two Cisco Nexus 5548 Layer 3 switches that connect to Cisco UCS 6100 Series Fabric Interconnects for backup SAN traffic and network attached storage (NAS) devices
- Compellent SAN hosting the database, Web, and applications servers
- A10 load balancers

Gaining Familiarity with Cisco UCS, the Target Network Architecture

The University of Colorado deployed one of the PeopleSoft applications in their test and development environment hosted at a separate disaster recovery data center. The staff was able to familiarize themselves with the people, processes, and technologies associated with the open, highly scalable Cisco UCS solutions platform and other new solutions from Red Hat and VMware.

The network architecture chosen is a standard Cisco UCS configuration with little or no customization. It's a high-availability design with no single point of failure within the data center. The network provides a maximum I/O throughput of 80 Gbps per chassis for the fabric interconnect and external fabric. As a foundation for a clustered, consolidated, and virtualized architecture, the design provides the flexibility to add or remove Cisco UCS computing and I/O fabric components, both external and interconnected.

Database Migration

The University of Colorado went from an Active/Passive production database setup (where scaling is a manual process involving the addition of memory and processes to each server, which must be shut down and restarted following a buildout) to Oracle RAC. Oracle RAC allows database management systems (DBMS) to be scaled incrementally, using lower-cost, two-socket servers instead of more expensive four-socket servers. The four-node Oracle RAC database was deployed on two-socket Cisco UCS B200 M1 high-performance servers. The servers were configured to protect against physical node failures during the migration. Four servers were ultimately used in the network.

The Oracle RAC cluster is designed to function with more or fewer than four blades but in the event of an extended blade outage or if additional short-term computing power is needed, a Cisco UCS server profile from a failed server can be used to quickly configure an additional blade from the pool.

The university considered two different techniques for migrating their database to the Cisco UCS platform:

- **Import and Export:** This technique is more appropriate for smaller databases and involves importing data into the appropriate network tier based on performance characteristics and the data's relative significance. With larger databases, this technique presents more potential for error.
- **Transportable Tablespaces:** This feature from Oracle allows for export of a database's metadata. It provides an efficient and much faster way to move bulk data between databases as compared to Import and Export. Transporting a tablespace requires only the copying of data files from the source to the destination and then integrating the tablespace's metadata.

The Import/Export method was used to migrate the database. Steps included:

- Create the target database using Database Configuration Assistant (DBCA)
- From the source, do a full export of the database
- Copy (using FTP or SCP) the export file to the target in Bin mode
- Import the database into the target database
- Recompile all the invalid objects
- Convert the database to Automatic Storage Management (ASM) using Oracle Recovery Manager (RMAN)
- Rebuild queue tables and all spatial indexes
- Rebuild any materialized views

For very large databases, customers often use the Oracle Transportable Tablespaces feature for migrating from Solaris to Linux. To use this feature, follow the steps shown in Appendix A.

Web Server and Application Server Migration

The university decided to reinstall the Web server and application server because previously they had been installed on the same node and the new design split Web and applications onto different servers. There are not many tools available to migrate application code from Solaris to Red Hat Enterprise Linux. Since the university had done test runs and had a listing of all patches applied to the PeopleSoft application in the test and development environment, they decided to do a fresh install and reapply all of the patches, bringing the application to the current production patch level.

Storage and Validation

The university's existing Dell/Compellent SAN was used to connect to the Cisco UCS servers. iSCSI was deployed for the virtual machines and Fibre Channel was used for database storage.

Custom scripts were built to validate the migrated environment. During the test phase prior to the migration, the university spent nearly six months perfecting the testing of these scripts. The Simple Object Access Protocol (SOAP) test was also used for performance testing. The add-drops per hour were measured on the PeopleSoft Campus solution to get a good idea of the scalability of the new Cisco UCS environment and how it accommodated additional workloads.

Results

The University of Colorado chose Cisco UCS to gain greater resource utilization; consolidate data center infrastructure for a smaller power, space, and cooling footprint; and optimize organizational resources. Lowering total cost per ownership in the university's computing, network, and storage environments was another goal.

With Cisco UCS, the university has achieved all of these goals and more. Cisco UCS integrates a low-latency, lossless 10 Gigabit Ethernet unified network fabric with enterprise-class x86-architecture servers based on the Intel Xeon 5600 and 7500 series processors. These powerful new processors allow IT to curb the exponential proliferation of servers required to support new and expanding workloads by consolidating more of these workloads onto fewer physical hardware components. Cisco UCS takes advantage of the enhanced performance offered by Intel Xeon processors, together with expanded memory options and higher I/O capacity, to enable greater virtual machine scalability.

Key features of Cisco UCS that have proven their worth at the university include:

- **Elimination of hot spares:** In a typical data center, administrators are required to keep one hot spare server per blade. With UCS, customers can swap a failed blade server with a cold spare in minutes. This eliminates the cost of having multiple spares and the related software licenses required for hot spares.
- **Elimination of Active/Passive:** With Oracle RAC for PeopleSoft, all nodes are Active/Active. When a node fails in an Oracle RAC cluster, the other nodes continue processing and Oracle clients can be configured to seamlessly failover to surviving nodes.
- **Reduced downtime:** Despite service-level agreements (SLAs), downtime actually catches most organizations by surprise when they measure the actual loss from unforeseen interruptions and hidden costs that are hard to measure. With the Active/Active setup combined with the Cisco UCS cold spare capability across the tiers in a Cisco UCS environment, better uptime for PeopleSoft applications can be counted on and a much more predictable environment provided for system administrators.
- **Horizontal scalability:** Every tier in a Cisco UCS environment is horizontally scalable. Customers can buy only what they need today and add more nodes if they need faster processing in the future.

- **Reduced licensing cost:** Organizations are increasingly looking at not only their server sprawl but also at their software licensing sprawl. Reducing the cost of licensing across the tiers from the OS to the database has become a major goal, made possible by the Cisco UCS. Higher memory density in x86 systems such as Cisco UCS allows cheaper memory modules to fulfill application memory requirements for greater memory per core, enabling larger memory-resident workloads that translate to lower licensing costs.

In 2011, the new Cisco UCS compute environment at the University of Colorado was running approximately 140 virtual machines in production and 160 in development. Server consolidation with the Cisco UCS reduced the data center footprint from 5000 square feet to 200 square feet and eliminated 1000 separate cables. Shrinking the physical size of the data center and reducing power consumption by 90 percent has saved the university an estimated $600,000 per year. Other savings in operational time have resulted from the reduced amount of day-to-day maintenance required with the Cisco UCS.

The university's IT department has noted a 400 to 600 percent performance improvement with the Cisco UCS servers and their Intel Xeon processors operating in a unified network environment. The additional bandwidth combined with reduced latency and network hops have reduced the university's batch run times from hours to minutes.

Major Benefits of RISC/UNIX to Cisco UCS Migration

- No downtime or loss of data
- Low risk as a result of planning and a phased approach
- Faster response time with x86-based processors
- Reduced total cost of ownership of compute environment
- Decreased complexity and enhanced flexibility, with a 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 capital expenditures (CapEx) and operational expenditures (OpEx). With Cisco UCS as the modular building block, companies now can more easily evolve their data centers to take advantage of the latest architectures for cloud computing and other innovations. Cisco UCS offers a wide 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 the 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.

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.

Appendix A

The following is a step-by-step approach for using Oracle Transportable Tablespaces for migrating the database from Solaris to Linux.

- Determine if source (Solaris) and target platforms (Red Hat Linux) are supported
- Determine the Endian format of the source
- Determine the support for the target platform
- Install the Oracle Database 11g Release 2(11.2) Software
- Purge recycle bin
- Verify objects in the SYSTEM or SYSAUX tablespaces
- Create a directory for data pump use
- Perform self-containment check and resolve violations
- Create database shell on target system
- Verify that database options and components used in the source database are installed on the target database
- Create the target database from the structure of the source database
- Create metadata required for Transportable Tablespaces
- Remove user tablespaces from database
- Export the source database metadata
- Ready the source database for transport
- Export tablespaces from the source database
- Convert and make source data files available to the target database
- Copy data pump dump files to the target system
- Import tablespaces into the target database
- Make user tablespaces read/write on target database
- Import the source database metadata into target database
- Fix the sequence values
- Compile invalid objects

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