

Accelerate and Scale Oracle PeopleSoft Deployments with Cisco UCS

Solution Brief
September 2012



Highlights

Extensive Oracle PeopleSoft resources and experience:

- Cisco has considerable experience with Oracle PeopleSoft and offers extensive resources to help organizations migrate, deploy, and scale Oracle PeopleSoft on the Cisco Unified Computing System™ (Cisco UCS®).

Proven reference architecture for Oracle PeopleSoft on Cisco UCS:

- Cisco's reference architecture for Oracle PeopleSoft on Cisco UCS provides scalability, extensibility, and virtualization within the unified Cisco UCS management framework.

Scalable interactive and batch performance:

- Testing performed by Cisco reveals that Cisco UCS is an excellent platform for Oracle PeopleSoft, offering scalable transactional self-service performance along with high-performance batch processing.

Traditionally deployed on costly RISC processor-based UNIX systems, Oracle PeopleSoft is now highly successful on x86-architecture platforms such as the Cisco Unified Computing System™ (Cisco UCS®). Cisco offers a comprehensive reference architecture and support for Oracle PeopleSoft, providing an excellent infrastructure platform with a simplified migration path from proprietary systems.

Cisco's Comprehensive Approach to Oracle PeopleSoft

With a wide range of application modules, the Oracle PeopleSoft application suite has become vital for many organizations, especially in educational settings, bringing a focus on the selection of reliable and scalable infrastructure. Organizations need the capability to size their Oracle PeopleSoft installations to fit their needs, using one-, two-, three-, or four-tiered deployment models and expanding that infrastructure as their needs change, new Oracle PeopleSoft modules are added, or additional levels of virtualization are implemented. The importance of specific modules such as Oracle PeopleSoft Payroll emphasizes the need for responsive, secure, and highly available infrastructure that can scale to match demand.

Successful Oracle PeopleSoft deployments and migrations require more than just fast x86 hardware. A capable system vendor must also deeply understand

the needs of Oracle PeopleSoft in production environments while delivering IT infrastructure that can provide reliability, scalability, and agility in addition to dependable performance. With extensive experience in deploying Oracle PeopleSoft in myriad environments, Cisco provides comprehensive solutions that help ensure success for Oracle PeopleSoft deployments. In particular, Cisco understands the importance of making Oracle PeopleSoft run well on Cisco UCS and makes critical investments and resources available, including:

- **Reference architecture:** *The Cisco Validated Design for Oracle PeopleSoft HRMS 9.1 with Oracle 11g R2 Database on Cisco UCS B-Series Servers with EMC VNX Storage* provides a tested and detailed reference architecture.
- **Migration assistance:** *The PeopleSoft Migration Guide—From RISC/UNIX to the Cisco Unified Computing System* offers advice for those migrating their Oracle PeopleSoft deployment from other platforms.
- **Deployment assistance:** *The Cisco UCS Deployment Guide for Oracle PeopleSoft* provides deployment advice for Oracle PeopleSoft on Cisco UCS.
- **Performance testing:** Cisco conducts a range of performance tests to help ensure that Oracle PeopleSoft performs well on Cisco UCS, testing both interactive and batch performance.

This document describes the Cisco® reference architecture for deploying Oracle PeopleSoft on Cisco UCS, including architecture components and design considerations and both interactive transactional and batch processing performance results.

Cisco Unified Computing System

Cisco UCS presents a compelling platform for Oracle PeopleSoft because it offers a flexible infrastructure that is designed to work together as a unified system. Cisco UCS is the first data center platform that combines industry-standard x86 architecture servers with networking and storage access in a single converged system. The system is entirely programmable using unified, model-based management to simplify and accelerate deployment of enterprise-class applications and services running in bare-metal, virtualized, and cloud computing environments. The system's unified I/O infrastructure uses a unified fabric to support both network and storage I/O, and Cisco Fabric Extender Technology (FEX Technology) extends the fabric directly to servers and virtual machines for increased performance, security, and manageability.

These capabilities provide significant advantages in an Oracle PeopleSoft environment:

- **Unified fabric reduces the number of devices that must be powered, cooled, secured, and managed.**

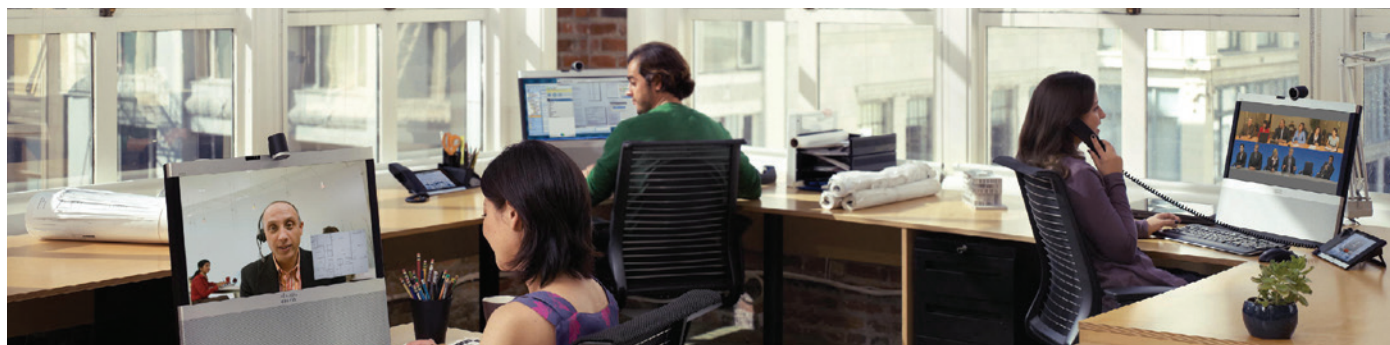
Greater Capacity and Scale

"Running Oracle PeopleSoft on UCS gives us more capacity to handle the peaks and valleys for connectivity. During open enrollment, we can see as many as 5000 concurrent connections per second."

—Sumon Acharjee; Director, Information and Communication Technology, Sheridan College

The system's unified fabric provides dramatic reductions in the number of network adapters, blade server switches, cables, and management touch points by passing all network traffic to parent fabric interconnects, in which the traffic can be prioritized, processed, and centrally managed. This approach improves performance, agility, and efficiency while dramatically reducing the number of devices that need to be powered, cooled, secured, and managed.

- **Cisco service profiles help reduce the application footprint.** Most organizations have development, test, quality assurance (QA), staging, and production infrastructure environments for critical applications. Often the staging and QA environments are not fully utilized. With Cisco service profiles, resources can be easily scaled up or down and shifted across environments, thus optimizing overall asset utilization.
- **Cisco UCS virtual interface cards (VICs) provide I/O bandwidth,**



load balancing, and converged adapters. Unique to Cisco UCS, Cisco VICs provide up to 160 Gbps of bandwidth, support a wide variety of I/O options, and can be flexibly configured to provide as many network interface cards (NICs) and host bus adapters (HBAs) as required using a single interface. More recent versions of the Cisco VICs provide a hardware PortChannel that load-balances traffic across multiple chassis uplinks.

The Oracle Real Application Clusters (RAC) database tier normally requires separation of public and private networks, and thus requires customers to purchase multiple I/O cards. The Cisco VIC combines these functions on a single card. Oracle RAC 10g R2 and 11g R2 are certified on Cisco UCS with the Cisco VIC, and it sets a new standard on the database tier.

- **Cisco UCS Manager provides a single point of management.** Embedded in the fabric interconnects, Cisco UCS Manager controls all Cisco UCS components

in a single redundant management domain, including all aspects of system configuration and operation, eliminating the need to use multiple separate element managers for each system component.

Reference Architecture and Components for Oracle PeopleSoft

Given the business importance of Oracle PeopleSoft applications, Cisco set out to define a reference architecture that provides performance, scalability, and flexibility, while avoiding single points of failure. In addition, the architecture had to support the substantial I/O performance required by Oracle PeopleSoft. The resulting Oracle PeopleSoft on Cisco UCS reference architecture (Figure 1) can be used to offer performance and scalability for numerous Oracle PeopleSoft modules and a broad range of needs.

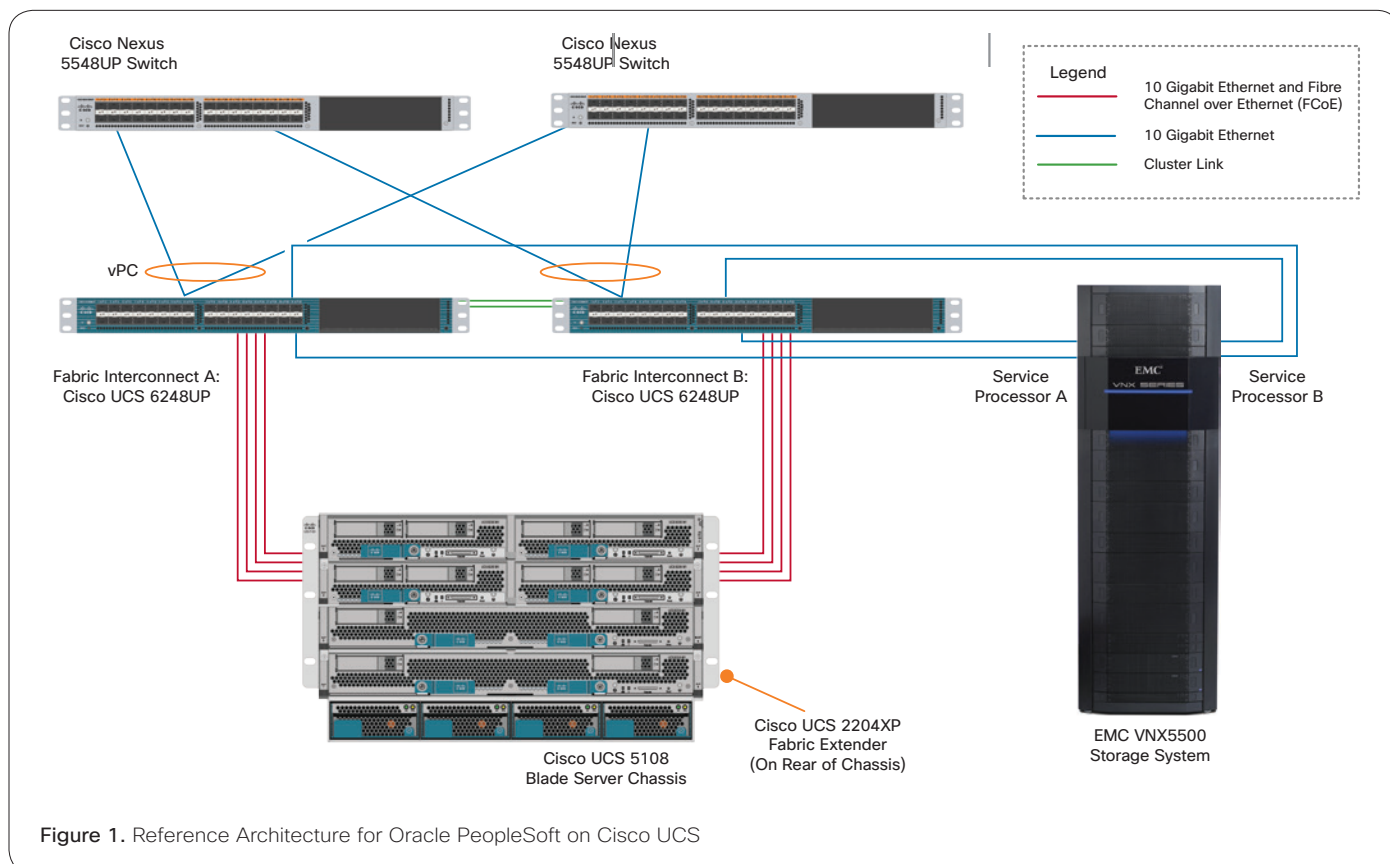
The reference architecture also supports a choice of deployment options for Oracle PeopleSoft applications. Scalability and

virtualization capabilities are designed in, allowing additional Oracle PeopleSoft modules to be added easily, with virtualized tiers as desired. The reference architecture combines the EMC VNX5500 storage system with Cisco Nexus® 5548 Switches and Cisco UCS 6248UP 48-Port Fabric Interconnects. The Cisco UCS 5108 Blade Chassis supports either eight half-height blades or four full-height blades.

Components of the reference architecture include:

- **EMC VNX5500:** Given the importance of I/O performance to Oracle PeopleSoft, the choice of storage is critical to success. The EMC VNX family of storage systems represents EMC's next generation of unified storage, optimized for virtualized environments. The EMC VNX5500 provides EMC FAST Cache technology, extending the cache available by up to 2 terabytes (TB) using flash drives. The EMC VNX5500 also supports EMC VNX FAST VP, providing automatic and transparent storage tiering.

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- **Cisco Nexus 5548 Switches:** Redundant Cisco Nexus 5548 Switches connect to two Cisco UCS 6248UP Fabric Interconnects, providing a two full 10-Gbps connections between the servers and the EMC VN5550 storage system. Dual redundant 10-Gbps connections to the EMC VN5550 use FCoE for storage connectivity.
- **Cisco UCS 6248UP 48-Port Fabric Interconnects:** The Cisco UCS 6248UP fabric interconnects create a unified network fabric throughout

Cisco UCS. In this case, the fabric interconnects connect directly to the Cisco UCS VICs on each Cisco UCS blade server. As is the case with other Cisco converged network adapters (CNAs), the Cisco UCS M81KR VIC encapsulates Fibre Channel traffic within the 10 Gigabit Ethernet packets for delivery to the fabric extender and the fabric interconnect and to the EMC VN5550 storage system.

- **Cisco UCS B200 M2 Blade Servers:** Used for both application and web

servers in the reference architecture, the Cisco UCS B200 M2 Blade Server is a half-width, 2-socket blade server. In the tests, Intel® Xeon® processor X5620 4-core CPUs were used as in the web servers, and Intel Xeon processor X5675 6-core CPUs were used in the application servers. Each server has a single mezzanine slot providing up to 20 Gbps of I/O throughput through the Cisco UCS M81KR VIC and up to 80 Gbps of I/O throughput with current Cisco VICs and fabric

interconnects. (**Note:** The Cisco UCS B200 M3 Blade Server is expected to provide even better performance and can be substituted for the Cisco UCS B200 M2 Blade Server if Intel Xeon processor E5 series performance is desired.)

- **Cisco UCS B230 M2 Blade Servers:** Used for database servers running Oracle RAC in the reference architecture, Cisco UCS B230 M2 Blade Servers are half-width, 2-socket blade servers with a memory capacity of up to 512 GB. As tested, these systems featured two Intel Xeon processor E7-2870 10-core 2.4-GHz processors.
- **Cisco UCS B250 M2 Extended Memory Blade Servers:** The Cisco UCS B250 M2 Extended Memory Blade Server can also be used to run Oracle RAC in the reference architecture. The Cisco UCS B250 M2 blade server is a full-width, 2-socket blade server with increased throughput and more than double the industry-standard memory of traditional 2-socket x86 servers. The server can support the Oracle RAC requirement of two HBAs for redundancy.

Design Considerations

Cisco's reference architecture for Oracle PeopleSoft provides considerable flexibility in terms of scalability and in the ways that Cisco UCS servers are deployed to meet individual needs.

Choice of Single- or Multiple-Tier Deployment Scenarios

Oracle PeopleSoft consists of web, application, and database components. From an infrastructure perspective, Oracle PeopleSoft can be deployed in one-, two-, three-, or four-tiered configurations. All these scenarios can be easily mapped to the Oracle PeopleSoft on Cisco UCS reference architecture as described here:

- **Single tier:** Web, application, and database servers are all deployed on a single physical server.
- **Two tiers:** Web and application servers are deployed on a single physical server, with the database hosted on separate servers.
- **Three tiers:** Web servers, application servers, and database servers are all hosted on different physical servers.
- **Four tiers:** A fourth tier can be added for a web server for Internet users, or some Oracle PeopleSoft users may use this server as a proxy server.

Scalable Architecture Using Cisco UCS Servers

Cisco has extensive experience deploying Oracle PeopleSoft on Cisco UCS in real-world scenarios. Cisco's reference architecture is designed to enable considerable sizing flexibility to allow a broad range of deployments to be addressed. Figure 2 illustrates sample sizing for small, medium, and large configurations that use the reference architecture, based on the sizing assumptions listed in Table 1.

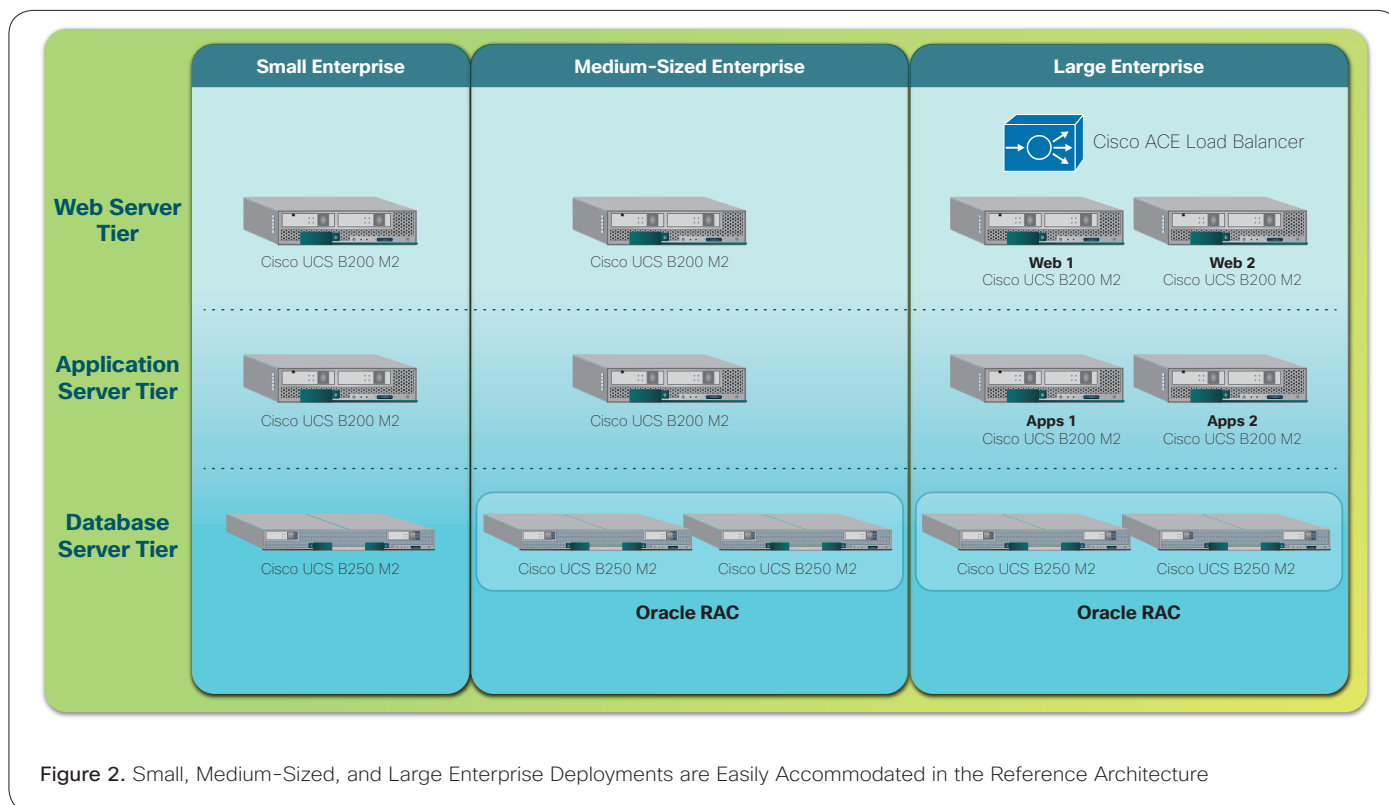
Table 1. Concurrent Users and Data Size Assumptions for Sizing Recommendations.

Configuration	Concurrent User Range
Small	500 users
Medium	2500 users
Large	> 2500 users

Note: These configurations are sized for interactive users only and do not pertain to batch processing applications such as Global Payroll and North American payroll. Also, concurrent users can vary widely depending on typical customer activity. Please contact a Cisco sales consultant for more in-depth sizing requirements and for sizing related to batch processing.

Response time for Oracle PeopleSoft depends greatly on CPU characteristics, memory configurations, bandwidth design, and storage layout. Servers at the various tiers are chosen carefully in the reference architecture to achieve the best response time and provide the best fit for specific requirements. In smaller configurations, depending on the workload, the web and application layers can be hosted on the same physical server.

- **Web tier:** Cisco UCS B200 M2 servers are used for web-tier servers, given the relatively modest demands for CPU power.
- **Application tier:** Cisco UCS B200 M2 servers with the latest CPUs and more memory are used for the application tier, because application



server processing makes large demands on CPU and memory.

- **Database tier:** Cisco UCS B250 M2 servers are used for database servers. These servers are full-width blades with dual mezzanine I/O cards, allowing I/O card redundancy.

Extensible Architecture for Virtualization

Organizations typically start with a single Oracle PeopleSoft application such as Oracle PeopleSoft Payroll, and eventually add other modules such as Oracle PeopleSoft Human

Resources Management System (HRMS), Financials and Supply Chain Management (FIN/SCM), Enterprise Portal, Campus Solution, Customer Relationship Management (CRM), Enterprise Learning Management (ELM), or Enterprise Performance Management (EPM).

Cisco's reference architecture for Oracle PeopleSoft is highly extensible to allow these application modules to be added easily, with Cisco UCS providing centralized management for the entire infrastructure. The entire

reference architecture is horizontally scalable to accommodate a broad range of needs and to provide additional high availability:

- Servers can be added at the web tier and load balanced with a Cisco Application Control Engine (ACE) HTTP load balancer.
- Servers can be added at the application tier to serve application demands.
- Configuration of Oracle RAC provides horizontal scalability of the database tier.

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Deployments with Cisco UCS

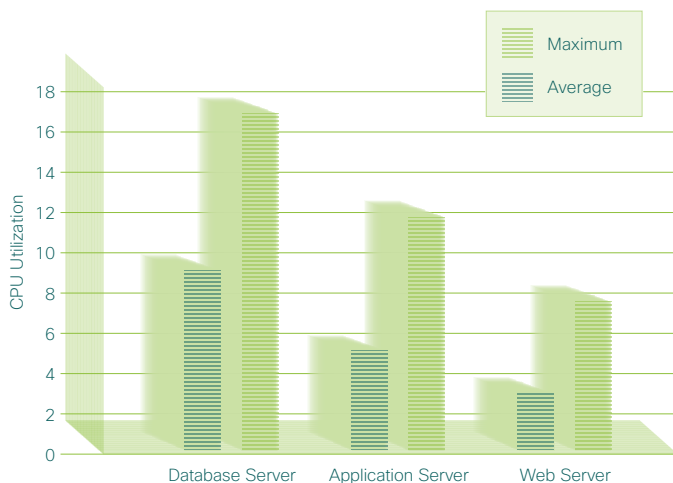


Figure 3. A Three-Tier, Three-Node Configuration Scaled Easily from 500 to 2500 Users for an Oracle PeopleSoft HRMS 9.1 Self-Service Workload

- Servers can be added for backup and recovery, Oracle Grid, external client logging, and proxy service.
- The web and application tiers of all these applications can also easily be virtualized within Cisco UCS, adding considerable flexibility.

Oracle PeopleSoft
Performance and Scalability

Cisco has performed extensive testing to validate that Oracle PeopleSoft performs well on Cisco UCS, including tests of both transactional and batch performance.

Oracle PeopleSoft Self-Service
Benchmark on Cisco UCS

Responsive interactive performance is essential for Oracle PeopleSoft. To verify responsiveness, a benchmark

and scalability study was performed by the Cisco Oracle Competency Center. The test was designed to measure the online performance of Oracle's PeopleSoft Enterprise HRMS 9.1 using Oracle Database 11g R2 on Red Hat Enterprise Linux 5.6. Testing validated that the three-tier, three-node Cisco UCS configuration scaled easily from 500 to 2500 concurrent users, with response times as shown in Table 2.

The workload was for a standard database composition model that represented a small to medium-sized profile. As shown in Figure 3, CPU utilization remained quite low, indicating substantial computational headroom for the workload.

Subsequently, the benchmark was scaled to test 5000 concurrent self-

Table 2. Response Times for 2500 Self-Service Users.

Category	Average Response Time
Search	0.42 second
Save	0.33 second

service users. For this testing, a large company database profile was custom built. For the larger test, a redundant Oracle PeopleSoft three-tier stack was constructed with two Cisco UCS B200 M2 servers acting as web servers, two Cisco UCS B200 M2 servers acting as application servers, and two Cisco UCS B230 M2 servers acting as database servers configured with Oracle RAC. As in the 2500-user test, response times remained low (Table 3). As shown in Figure 4, the configuration scaled easily, providing compelling response times while keeping overall CPU utilization percentages quite low.

Oracle PeopleSoft North American
Payroll on Cisco UCS

Batch performance is also important for Oracle PeopleSoft to support periodic activities such as payroll generation. To

Table 3. Response Times for 5000 Self-Service Users.

Category	Average Response Time
Search	0.43 second
Save	0.42 second

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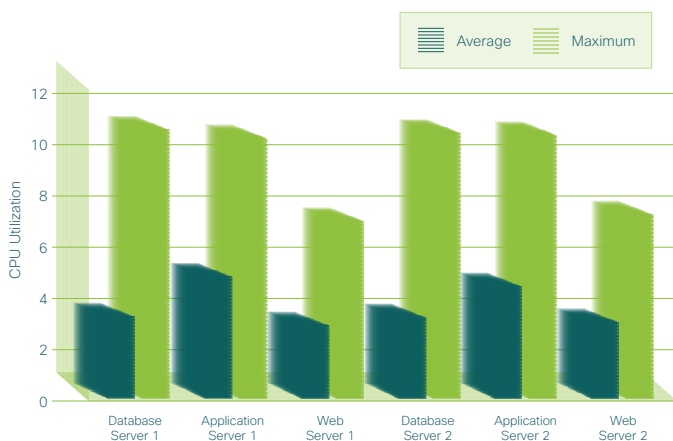


Figure 4. The Cisco Reference Architecture Scaled Easily to Support 5000 Self-Service Users

the test (Figure 5), indicating considerable processing headroom.

Conclusion

With extensive real-world experience and expertise, Cisco is dedicated to providing effective, scalable, and extensible infrastructure for Oracle PeopleSoft. With a proven reference architecture and compelling performance results for both interactive self-service and batch workloads, Cisco demonstrates that Cisco UCS can provide credible high-performance infrastructure for Oracle PeopleSoft. In addition, the reference architecture is designed to scale elegantly without arbitrary limitations.

evaluate Cisco UCS, Oracle PeopleSoft North American Payroll was run on a Cisco UCS configuration for 240,000 employees (a small to medium-sized organization), completing within 57 minutes. Three important payroll activities were tested:

- Paysheet creation
- Payroll calculation
- Payroll confirmation

In this case, payroll batch processing was run on the database server (rather than on a separate server) for best performance. The database server under test was Oracle RAC with two nodes (Cisco UCS B230 M2, two CPUs and 10 cores, 128 GB of RAM, with Cisco UCS M81KR VIC and EMC VNX5500 with PowerPath enabled). Despite the challenging workload, the

payroll run completed in 56.4 minutes, generating 255,319 payments per hour. CPU utilization remained low throughout

Cisco's approach lets organizations start small with a single application such as payroll and transparently

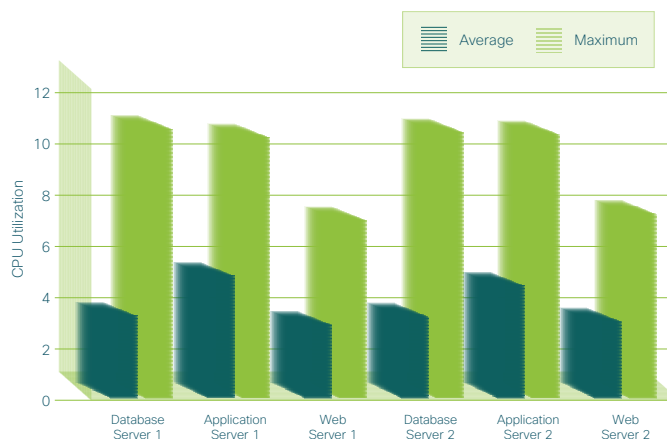


Figure 5. A Two-Node Cisco UCS Configuration Easily Handled Oracle PeopleSoft North American Payroll Processing for 240,000 Employees, with Low CPU Utilization

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add to their infrastructure, all while maintaining the efficiency and single point of management of Cisco UCS. Other Oracle PeopleSoft components can be added to the architecture, and components can be virtualized as required to meet each organization's unique needs.

For More Information

- For more information about deploying Oracle PeopleSoft on Cisco UCS, please visit http://www.cisco.com/en/US/solutions/ns340/ns414/ns742/ns743/ns751/landing_oracle.html.
- Oracle PeopleSoft on Cisco Unified Computing System and EMC VNX Storage (CVD): (http://www.cisco.com/en/US/docs/unified_computing/ucs/UCS_CVDs/ucs_oracle_psft.html)
- Cisco UCS Deployment Guide for Oracle PeopleSoft: (http://www.cisco.com/en/US/solutions/collateral/ns340/ns517/ns224/ns977/ns1141/guide_c07-704565.html)
- PeopleSoft Migration Guide—From RISC/UNIX to the Cisco Unified Computing System: (http://www.cisco.com/en/US/solutions/collateral/ns340/ns517/ns224/ns977/ns1141/guide_c11-689671_PS.pdf)
- Oracle PeopleSoft Payroll 9.0 for North America on Cisco Unified Computing System (white paper): (http://www.cisco.com/en/US/prod/collateral/ps10265/ps10280/whitepaper_c11-703869_ns1155_Networking_Solutions_White_Paper.html)



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