Cisco Application Networking for PeopleSoft Enterprise

Faster Downloads and Site Navigation, Less Bandwidth and Server Processing, and Greater Security and Availability for Global Deployments

HIGHLIGHTS

Business Benefits

– High Availability

– Optimize Performance

– Minimize Risk

– Reduce Total Cost of Ownership

Why Cisco?

– Complete integrated network architecture: application and Ethernet switching, security, WAN optimization, network management

– Market leading products: Cisco ACE Application Control Engine, Cisco Wide Area Application Services, Cisco Catalyst 6500 Series Switches

– Global lifecycle services leader: certified by J.D. Power & Associates Certified Technology Service & Support Program

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Overview

To address challenges associated with today's mission-critical enterprise application deployments, Cisco® offers Cisco Application Networking for PeopleSoft Enterprise, an enterprise network architecture, with best practices and implementation guidance that optimizes application availability, performance, and security and lowers application ownership costs (see Figure 1).

This document shows how the solution addresses the following business challenges for PeopleSoft deployments serving global users across challenging WAN links, through data center and WAN application optimization services from the Cisco Application Control Engine (ACE) and Wide Area Application Services (WAAS) Software products:

- Enterprise class high availability for mission critical applications
- Application response time over limited WAN connections
- Application, server, network, and service-oriented architecture (SOA) security
- Reduced capital and operational costs for applications, servers, and networking

Tests of this solution showed up to 7 times faster site navigation, 16 times faster resume transfers, and 93 percent reduction in bandwidth usage for PeopleSoft deployments when paired with Cisco application networking solutions for specific deployment scenarios (See Appendix A). Additional solution benefits include increased application security and availability and reduced server processing usage.

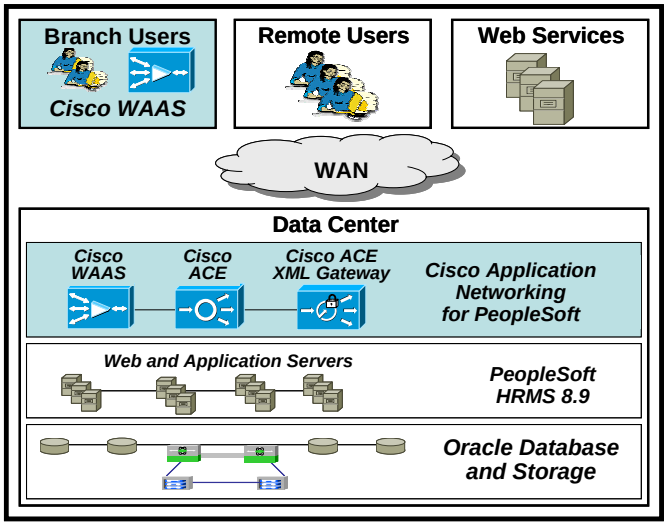
Business Challenge

In today's globally networked economy, where enterprise application availability, performance, and security are tightly linked to customer success and profits, application stakeholders are faced with new challenges.

As applications expand to handle new business processes and serve more geographically and organizationally dispersed user populations, service levels and costs are increasingly scrutinized. Further, increased complexity and stifled innovation can affect productivity and disappoint primary constituents.

To achieve expected service levels and costs in this demanding environment, enterprise applica-

Figure 1 Cisco Application Networking for PeopleSoft Enterprise



tion deployments are converging and are more likely to run in one location isolated from a second standby site, serve global users through Web browsers and standard Internet protocols, and use a SOA platform.

This new business environment and associated application architecture intensifies four major IT challenges, each of which can be addressed by a strong enterprise network architecture using Cisco Application Networking for PeopleSoft Enterprise.

- Application availability challenges: Increasing business dependence on fewer but larger applications deployed in a central location requires a more careful examination of application architecture, including single points of failure and product stability, to achieve recovery time objectives and recovery point objectives
- Application performance challenges: Limited WAN links and inefficient Internet standard protocols such as HTTP and Extensible Markup Language (XML) result in poor application performance and bandwidth utilization for global users. Further, increased demand on large applications in centralized data centers results in overload on servers that slows application response time
- Application security challenges: Significantly increased business risk results from application security breaches from malicious or innocent end users or SOA Web service requests that attack application, server, or operating system vulnerabilities
- Application ownership cost challenges: The increasing scope of application business logic and geographically and organizationally dispersed users, coupled with higher availability, performance, and security needs, requires a new approach to application support to keep costs in line with diminishing budgets

Given these significant challenges, it is increasingly important to turn to application-savvy infrastructure vendors, such as Cisco, with solutions that cost-effectively address today's business-level application and IT challenges and a commitment to rigorous feature and system quality testing, global and local-language support 24 hours a day, and a strong history of security expertise (see Table 1).

Equally important is an application infrastructure vendor that partners with leading application vendors, such as Oracle, to yield tested, documented, and validated joint architectures that optimize application availability, performance, and security and lower application ownership costs.

Table 1 Application-Savvy Infrastructure Vendor Requirements for Today's Enterprise Application Deployments

• Strong application optimization solutions • Lower application ownership costs • Rigorous feature and system quality testing • Global and local-language support 24 hours a day • Exceptional security history and experience • Strategic partnerships with application vendors

Business Benefits

Cisco Application Networking for PeopleSoft Enterprise offers optimized application availability, performance, security, and costs by providing application optimization services as follows:

- PeopleSoft application availability: Cisco ACE application optimization services for high availability:
  - Cross-data center load balancing: Efficiently routes end-user and Web services requests to the best available data center
  - Server load balancing: Efficiently routes end-user and Web services requests to the best available server
  - Application health monitoring: Continuously and intelligently monitors application and database availability
  - Network platform health monitoring: Helps ensure continuity of business operations through mirroring end user transaction states across pairs of network devices
- PeopleSoft application performance: Cisco ACE and WAAS application optimization services for high performance:
  - WAN optimization: Provides intelligent caching, compression, and protocol optimization that yields as much as 7 times faster site navigation, 16 times faster file attachment transfers, and 93 percent reduction in bandwidth usage (see Figures 5 and 6 and Appendix A later in this document)
  - Server offloading: Provides specialized hardware that offers greater processing efficiency for the application optimization services listed in Table 2, freeing up to 50 percent of application server processing and memory to focus on business logic computations (based on independent tests run by Cisco)

Table 2 Services Offloaded from Servers by the Solution

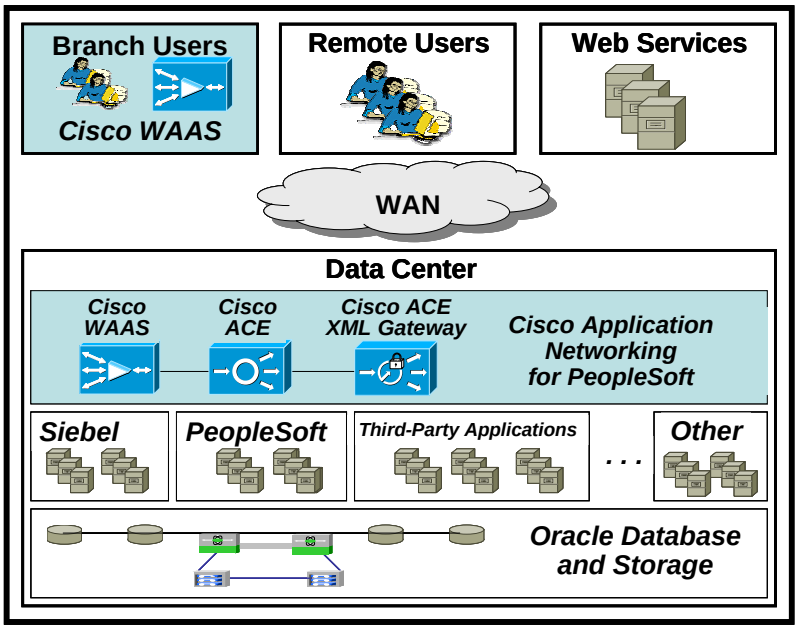
Service	Description
Cross-data center load balancing	Replaces Domain Name System (DNS) server and helps ensure high availability
Server load balancing	Provides advanced load balancing methods
Secure Sockets Layer (SSL) termination	Terminates 15,000 connections per second
TCP connection management	Significantly reduces TCP connections to server
Application health monitoring	Improves availability
Traffic compression	Provides scalable GNU zip function and minimizes bandwidth
Object caching	Reduces requests to server
XML schema validation	Performs 30,000 schema validations per second and improves security

- PeopleSoft application security: Cisco ACE application optimization services for optimized data security:
  - SSL termination: Efficiently encrypts and decrypts SSL-enabled traffic, facilitating the use of intrusion detection and prevention solutions before traffic reaches the servers, reducing server CPU usage, and centralizing certificate management
  - Security access control: Provides access control lists (ACLs) to protect client-to-server traffic from worms and intruders that attack vulnerable open server ports not used by the application
  - XML firewall: Examines SOA Web services requests for compliance with schemas and protects against identity, message-format, and denial-of-service (DoS) attacks
- PeopleSoft application ownership cost: Cisco Application Networking for PeopleSoft Enterprise reduces application capital and operational costs:
  - Server cost reduction: Offloading of the application optimization services listed in Table 2 from servers to cost-effective network devices frees up to 50 percent of server processing and memory needs to focus on business logic computation
  - Networking cost reduction: Virtualized application optimization services can be applied to multiple Oracle applications, including Oracle E-Business Suite, Siebel, PeopleSoft Enterprise, and Oracle Portal, as well to as other enterprise applications (see Figure 2).
  - Operating cost reduction: Application optimization services reduce operating costs as shown in Table 3.

Table 3 Operating Cost Reductions from Application Optimization Services

Cost Reduction	Description
WAN bandwidth usage	Up to 93% bandwidth cost savings
Server power, cooling, space, and administration	Up to 50% operational cost savings
Application deployment administration	Virtualization of application services

Figure 2 Virtualization of Application Optimization Services



Solutions

Cisco Application Networking for PeopleSoft Enterprise combines the Cisco ACE and WAAS platforms with the PeopleSoft Enterprise architecture to provide optimized availability, performance, security, and cost of ownership, while complimenting the existing features of PeopleSoft that ensure availability, performance and security.

PeopleSoft Enterprise with Cisco ACE

The PeopleSoft Enterprise architecture provides horizontal scalability by adding additional PeopleSoft application and web server instances as needed, which in turn creates the need for load balancing. Although server load balancing and SSL termination can be performed by standards-based servers, Cisco ACE offers higher performance and availability for these two application optimization services in addition to security access control, server health monitoring, and TCP connection management.

Virtualization within Cisco ACE allows a single active-active pair of Cisco ACE products to serve multiple Oracle applications such as Oracle E-Business Suite, Siebel, PeopleSoft Enterprise, and Oracle Portal as well as other enterprise applications. Further, if Cisco ACE is already deployed in the data center, additional virtualized contexts can be added to accommodate new Oracle applications without the need to order and configure additional equipment.

Additionally, Cisco ACE virtualized contexts can be created using Cisco ACE role-based access control (RBAC), which constrains the commands and actions for each context for unique application, database, security, and systems management administrators .Cisco ACE comes prepackaged with a number of predefined roles, but others can be customized as needed.

Cisco ACE provides server load balancing session persistence for PeopleSoft through the cookie sticky methodology. Further, if the application architecture requires, Cisco ACE can decrypt SSL traffic for intrusion detection and prevention and then re-encrypt traffic to the server with the same server savings as if the SSL-enabled traffic were decrypted at the Cisco ACE. Because the database is typically a clustered single instance, Cisco ACE is not used at that part of the architecture.

PeopleSoft Enterprise with Cisco WAAS

Completing any PeopleSoft Enterprise business transaction involves numerous components of the application architecture, including the client, Web server, PeopleSoft application servers, Oracle Database servers, storage, and networking.

Each transaction typically requires several operations that, when requested by a remote user, travel over the WAN and introduce network delay that slows end-user performance. When network delay is significant due to constrained or overburdened bandwidth, distance of users to servers, or a high number of operations to complete a transaction, end-user performance and bandwidth utilization improvements can be achieved through optimizations provided by Cisco WAAS such as data redundancy elimination (DRE), TCP flow optimization (TFO), and persistent Lempel-Ziv (LZ) compression.

When Cisco WAAS is deployed with PeopleSoft Enterprise, tests show significant round-trip time and bandwidth reduction, as discussed in the "Testing" section later in this document.

Figure 3 Data Center Application Optimization Services

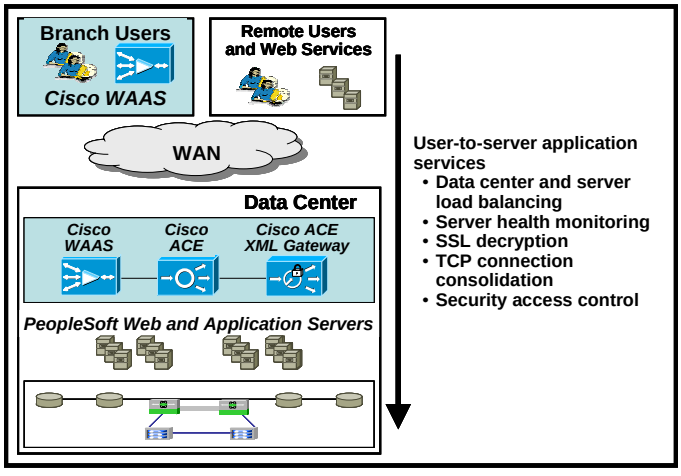
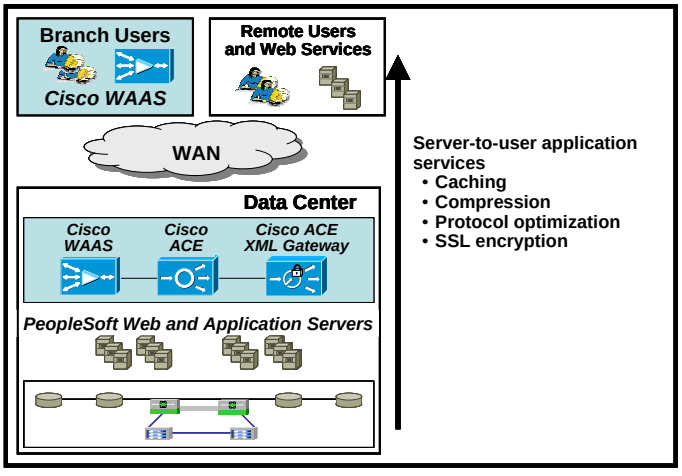


Figure 4 WAN Application Optimization Services



Solution Deployment

Cisco ACE, ACE XML Gateway, and WAAS reside in the data center and are arranged to provide application optimization services for multiple Oracle application deployments as well as other enterprise applications.

Because of their unique location, these solutions can take intelligent action on end-user traffic before it is routed to the PeopleSoft application servers, including load balancing, server health monitoring, SSL decryption, TCP connection management, and security access control (see Figure 3). Cisco Application Networking for PeopleSoft Enterprise provides these services cost effectively, freeing up to 50 percent of server processing and memory.

Cisco WAAS also resides in the branch office and is arranged to provide virtualized application optimization services for all application users in that location. Together with the data center Cisco WAAS deployment, the two offer a WAN optimization service through the use of intelligent caching, compression, and protocol optimization.

When the PeopleSoft application servers respond to end-user requests, the response is efficiently passed across the WAN, with minimal bandwidth usage and maximum throughput. Commonly accessed information is cached both at the Cisco WAAS solution in the branch and in the Cisco ACE solution in the data center, significantly reducing the burden on the servers and the WAN (see Figure 4).

The recommended best practices and implementation guidance for Cisco Application Networking for PeopleSoft Enterprise, including specific configurations for each Cisco network solution, can be found in the Cisco Application Networking for PeopleSoft Enterprise Deployment Guide at www.cisco.com/OptimizeMyApp.

The Cisco ACE solution can be deployed in the data center as a module in the Cisco Catalyst® 6500 Series Switches or as an appliance, and the Cisco WAAS can be deployed in the branch office as a module in a Cisco Integrated Services Router or as an appliance.

Testing

Cisco, in collaboration with the PeopleSoft product team at Oracle, conducted a series of function, load, and performance tests, which resulted in the Cisco Application Networking for PeopleSoft Enterprise architecture, best practices, and implementation guidance.

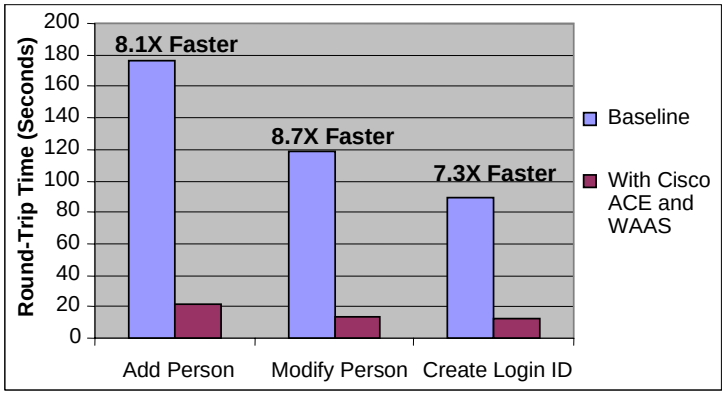
Cisco WAAS Performance Testing

A total of 18 test sequences were performed: nine user scenarios across two WAN links (see Table 4), both with and without Cisco WAAS, with HP LoadRunner used to simulate end-user transactions. Within the nine scenarios were three site navigation tests, and six resume upload and download tests. Summaries of the test results are shown in Table 5 and Figures 5 and 6. Explanation of test procedures is shown in Appendix A.

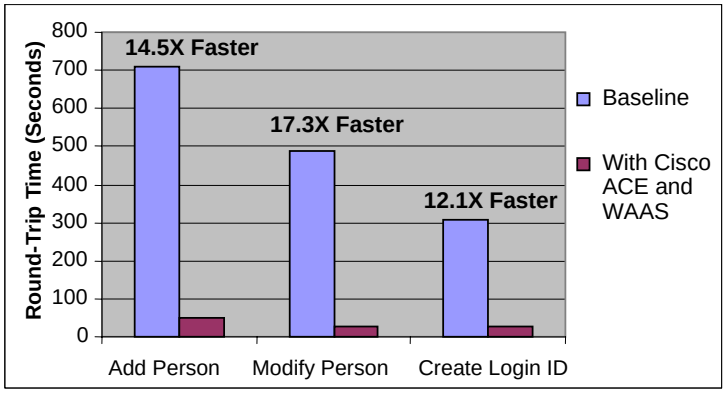
Table 4 Performance Testing WAN Scenarios

Description	WAN Speed	Delay (in Ms)	Packet Loss
Intra-continental	1.544 Mbps	100 ms	0.1%
Inter-continental	512 Kbps	200 ms	0.2%

Figure 5 Average Transaction Times Intracontinental



Intercontinental



In addition to round-trip time savings for each of the nine transactions tested, bandwidth usage for all transactions, across all WAN links, dropped by 93%.

Cisco ACE Function and Performance Testing

Cisco ACE function tests succeeded and the deployed configurations were documented for such tests, which included the following features: server load balancing with persistence, virtualization contexts, server health monitoring, SSL encryption and decryption, TCP connection management, and security access control. Server offload was determined to save 50 percent of server CPU and memory usage in independent tests conducted at Cisco.

All testing data herein is from lab testing only. Actual performance may vary depending on usage patterns, network bandwidth, application configuration, and other variables.

Statement of Cooperation

Cisco and Oracle cooperated in all phases of this joint project, including lab setup, solution testing, and solution overview and deployment guide documentation. Cisco and Oracle jointly validate that the lab setup and solution testing represents best efforts in creating a realistic customer deployment and accurate documentation of such deployment.

Figure 6 Performance Test Bandwidth Reduction

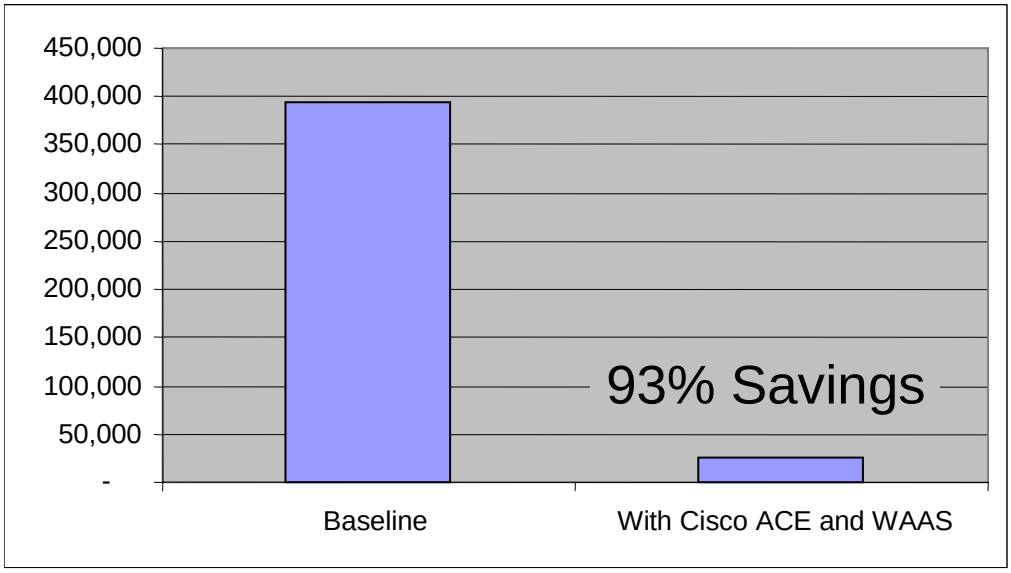


Table 5 Performance Testing User Scenarios and Summary Results

Scenario	Results
Add person	Without Cisco ACE and WAAS: This multiple-step transaction took more than 175 and 710 seconds on the intra- and intercontinental WAN links, respectively.
	With Cisco ACE and WAAS: Transaction times were lowered to approximately 22 and 49 seconds, respectively.
Modify person	Without Cisco ACE and WAAS: For this multiple-step transaction, round-trip times were approximately 118 seconds and 489 seconds over the two WAN links respectively
	With Cisco ACE and WAAS: Transaction times were lowered considerably to about 14 and 28 seconds respectively.
Create login ID	Without Cisco ACE and WAAS: This multiple-step transaction took more 90 and 306 seconds over the two WAN links respectively.
	With Cisco ACE and WAAS: Transaction times were reduced to approximately 12 and 25 seconds, respectively.
Upload resumes	Without Cisco ACE and WAAS: Upload times for the 500-KB, 1-MB, and 2-MB resumes took between 23 and 34 seconds for the intracontinental link and between 73 and 109 seconds for the intercontinental link.
	With Cisco ACE and WAAS: Upload times for these three resumes for the two WAN links dropped to between 10 and 13 seconds and between 4 and 15 seconds, respectively
Download resumes	Without Cisco ACE and WAAS: Download times for the 500-KB, 1-MB, and 2-MB resumes took between 3 and 4 seconds for the intracontinental link and between 11 and 13 seconds for the intercontinental link.
	With Cisco ACE and WAAS: Download times dropped to about 1 second for all files across all WAN links.

For More Information

Cisco product and solution literature

Cisco.com/go/applicationservices
Cisco.com/go/OptimizeMyApp
Cisco.com/go/ace
Cisco.com/go/waas

Oracle product literature

http://www.oracle.com/applications/product_information.html

Cisco and Oracle partnership

Cisco.com/go/oracle
Oracle.com/goto/cisco

To contact a Cisco salesperson or to obtain additional information, please email:

solutionsfororacle@external.cisco.com

Appendix A – Explanation of Test Procedures

Site navigation and download tests were conducted against PeopleSoft Enterprise HRMS 8.9. For site navigation tests, from the initial PeopleSoft screen, test users logged in, added person, modified person, created user ID, linked user ID to employee ID of added person, and logged out. Step included multiple sub-steps and data entry.

For download tests, from the initial PeopleSoft screen, test users logged in, navigated to Recruiting, Administration, and Load Resume screens, uploaded and downloaded 500 Kb document, uploaded and downloaded 1 MB document, uploaded and downloaded 2 MB document, and logged out. The three documents created in Microsoft Word. Files were compressed by PeopleSoft before crossing the WAN.

Tests included HP LoadRunner simulating 40 concurrent test users each performing above sequence in a loop for 30 minutes with no “think” or wait time. All test users had own user name and password. Browser cache was not cleared before or during tests. Round trip time was measured in seconds for each step within the two tests.

PeopleSoft Internet Architecture web client running on Microsoft Internet Explorer was used for test users.

In the application environment, two servers each contained HRMS 8.9, PeopleTools, 8.45, Windows Server 2003 Enterprise Edition, BEA WebLogic Server v 8.1 SP2 with a web server from BEA. One database server contained Oracle Database, Windows Server 2003 Enterprise Edition. All three servers contained one quad core Intel Xeon 1.6 GHz CPU with 4 GB RAM and a140 GB SCSI hard drive.

When Cisco ACE was not used, 20 test users were directed to each of the two HRMS 8.9 servers which never achieved higher than 25% CPU utilization for any tests.

PeopleSoft was configured for SSL offload per PeopleSoft Solution ID 200974014 in the PeopleTools Solution Library within the PeopleSoft Customer/Partner Connection. All other PeopleSoft configurations were set at default values.

Test tools used included Cisco Pagent, HP Mercury LoadRunner 9.0, and NetQoS SuperAgent.

In all tests where Cisco WAAS was not present, WAN utilization was close to 100 percent, and thus network congestion was an important factor in the measurements of such tests.