ORACLE | PeopleSoft.
PeopleSoft. | Enterprise

IBM®

PEOPLESOFT ELM 9.0 USING ORACLE10*g* ON IBM BLADECENTER® SERVERS

As a global leader in e-business applications, Oracle is committed to delivering high performance solutions that meet our customers' expectations. Business software must deliver rich functionality with robust performance. This performance must be maintained at volumes that are representative of customer environments.

Oracle benchmarks demonstrate our software's performance characteristics for a range of processing volumes in a specific configuration. Customers and prospects can use this information to determine the software, hardware, and network configurations necessary to support their processing volumes.

The primary objective of our benchmarking effort is to provide as many data points as possible to support this important decision.

SUMMARY OF RESULTS

Benchmark	PeopleSoft ELM 9.0 Self-Service	
	Standard Data Model	
(English)	Average Response	Search 1.23 sec, Save 1.80 sec
	Concurrent Users	1,200
Référence d'exécution	PeopleSoft ELM 9.0 Self-Service	
	Norme modèle de données	
(Français)	temps de réponse	Search 1,23 sec, Save 1,80 sec
	Concourants Utilisateurs	1.200
Benchmark-Test	PeopleSoft ELM 9.0 Self-Service	
	Datenbankmodell "Standard"	
(Deutsch)	Antwortzeit	Search 1,23 sec, Save 1,80 sec
	Gleichzeitige Benutzer	1.200
Patrón de rendimiento	PeopleSoft ELM 9.0 Self-Service	
	Volumen Estándar de datos	
(Español)	tiempo de reacción	Search 1,23 sec, Save 1,80 sec
	Simultáneos Utilizadores	1.200
Benchmark	ELM 9.0 Self-Service do PeopleSoft	
	Volume Padrão dos dados	
(Português)	tempo de resposta	Search 1,23 sec, Save 1,80 sec
	Simultâneos Usuários	1.200

BENCHMARK PROFILE

In November 2007, Oracle (PeopleSoft) and IBM conducted a benchmark in Pleasanton, CA to measure the online performance of Oracle's (PeopleSoft) Enterprise Learning Management (ELM) 9.0 using Oracle10*g*™ 10.2.0.3 on a 4-way AMD LS21 for IBM BladeCenter® database server, running Microsoft Windows Server 2003 Enterprise Edition with SP2. Additionally, an 8-way AMD LS41 for IBM BladeCenter® was used as the application server, running Microsoft Windows Server 2003 Enterprise Edition with SP2, and a 4-way AMD LS21 for IBM BladeCenter® was used as the web server, running Microsoft Windows Server 2003 Enterprise Edition with SP2.

The benchmark measured client response times for 1,200 concurrent users with 8 CPUs allocated to the application server. The standard database composition model represents a large-sized company profile. The testing was conducted in a controlled environment with no other applications running. **The goal of this Benchmark was to obtain baseline results for PeopleSoft ELM 9.0 self-service transactions with Oracle10*g* on IBM BladeCenter®.**
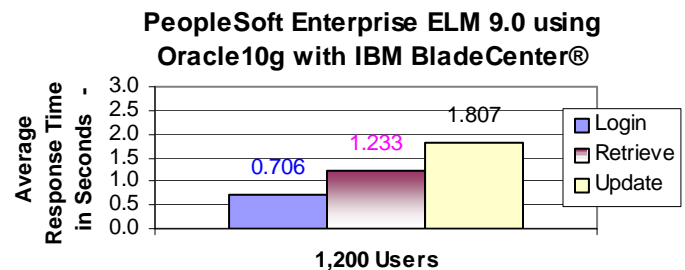

Figure 1: Average Response Times

* This average is weighted based on the business mix as reflected in Table 1: Business Process Mix.

METHODOLOGY

Hewlett-Packard® LoadRunner® was used as the load driver, simulating concurrent users. It submitted a business process at an average rate of one every 5-to-17.5 minutes for each concurrent user.

Hewlett-Packard QuickTest® Professional was used to automatically submit transactions and to record the benchmark measurements on the client PC.

Measurements were recorded when the user load was attained and the environment reached a steady state.

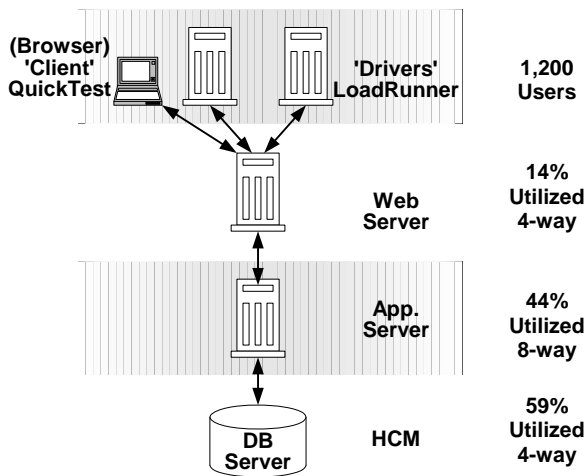Figure 2 shows a typical 4-tier benchmark configuration.

Figure 2: 4-Tier Configuration

Load times were measured from the time the user clicks the <OK> button until all the data for the entire business transaction has been retrieved.

Update times were measured from the time the user clicks the <SAVE> button until the system has released the page.

BUSINESS PROCESSES

PeopleSoft defines a business transaction as a series of HTML pages that guide a user through a business process, such as browsing a course catalog.

The thirteen PeopleSoft ELM 9 business processes tested in this benchmark are as follows:

LEARNER SELF-SERVICE

Browse Course Catalog: User logs in and navigates to a specified course in the course catalog via the browse feature.

Search Course Catalog: User logs in and navigates to a specified course in the course catalog utilizing the search feature.

Add Learning to Plan from Catalog: The user logs in and navigates to their learning plan. They navigate to a specified course, add it to their learning plan, and enroll in the course.

Enroll in Blended Activity: The user logs in and navigates to their learning plan. They navigate to a specified blended course, add it to their learning plan, and enroll in the course.

Launch Web-Based Content: User logs in and navigates to a specified course. The specified course is launched, then the user quits and logs out.

Register in Program: The user logs in and navigates to a specified program. Then, they register in the program.

MANAGER SELF-SERVICE

Approve Learning: The manager logs in and navigates to their Team Learning Home page. They approve a specified learner's pending selection.

Enroll Team Member: The manager logs in and navigates to their Team Learning Home page and then to a specified Team Member's Learning Plan. Next, the manager searches for a specified course and enrolls a Team Member. The enrollment is confirmed.

Review and Add Team Member's Objectives: The manager logs in and navigates to their Team Learning Home page. They add a specified Objective to a Team member's Learning Plan.

Review Team Learning History: The manager logs in and navigates to their Team Learning Home page and then to a specified Team Member's Learning History.

INSTRUCTOR SELF-SERVICE

Mark Grades and Attendance: The user logs in and navigates to the Learning Roster for a specified course. Then the user marks the grades and attendance for the enrolled learners.

BACK OFFICE/CALL CENTER

Process Enrollment Request: The user logs in and navigates to the Learning Roster for a specified course. Then the user updates the course status for a specified learner.

ONLINE PROCESS RESULTS

The table below shows average retrieval (search) and update (save) times, in seconds, for each business process.

Process by Role	Percent Within Role	Net Percent of Total	Average Pacing (Minutes)
Learner Self-Service 66% Overall			
Browse the Course Catalog	12%	7.9%	7 min
Search Catalog	46%	30.4%	7 min
Add Learning to Plan from Catalog	12%	7.9%	7 min
Enroll in Blended Activity	4%	2.6%	5 min
Launch Web-Based Content	24%	15.8%	7 min
Register in Program	2%	1.3%	9 min
Manager Self-Service 23% Overall			
Approve Learning	36%	8.3%	7 min
Enroll Team Member	10%	2.3%	9 min
Add Team Member's Objective	36%	8.3%	9 min
Review Team Learning History	18%	4.1%	5 min
Instructor Self-Service 5% Overall			
Mark Grades & Attendance	100%	5%	17.5 min
Back Office/Call Center 6% Overall			
Process Enrollment Request	100%	6%	15 min
Total		100%	

Table 1: Business Process Mix

The table above shows the proportions of the business processes used in the measurements of this benchmark. The proportions are intended to simulate a typical user scenario.

		1,200 Users
Learner Self-Service		
Browse Course Catalog	Login	0.732
	Click Browse Catalog	1.042
	Select Category	0.784
	Select Catalog Item	0.705
	View Details	0.700
Search Catalog	Login	0.672
	Search Catalog	1.214
	Click Advanced Search	0.652
	Search Catalog	1.679
	Select Catalog Item	0.647
Add Plan	Login	0.955
	Search Catalog	1.249
	Get Item Details	1.689
	Add to Plan	0.702
Enroll	Login	0.622
	Click Search Catalog	1.155
	Click Advanced Search	0.744
	Search Catalog	1.704
	Click Enroll	0.753
	Enroll	0.909
	Submit Enroll	1.156
Launch	Login	0.591
	Click All Learning	1.725
	Get Course Details	1.221
	Table of Contents	1.182
	Launch Course	1.022
Register	Login	0.704
	Click Search Catalog	1.168
	Search Program	0.627
	Submit Registration	0.631

Table 2a: Employee Process Runtimes

Note: the tabular results continue on the next page.

		1,200 Users
Manager Self-Service		
Approve Learning	Login	0.970
	Click Team Members	0.713
	Approve	1.646
Enroll Team Member	Login	1.308
	Click Team Learning	1.310
	Click Team Members	1.711
	Select Learner	1.213
	Click Search Catalog	1.369
	Search Catalog	0.621
	Click Enroll	0.674
	Submit Enrollment	1.782
Add Objective	Login	0.717
	Click Team Learning	0.620
	Click Team Members	0.646
	Select Team Member	1.104
	Click Add New Objective	0.585
	Search Objectives	1.195
	Add Objective	0.696
Review Team	Login	0.773
	Team Learning Default	2.028
	Team Learning Complete	1.925

Table 2b: Manager Process Runtimes

The database and application servers were processing a total of 161 business processes per minute at the peak load of 1,200 concurrent users. The estimated transaction rate is calculated by dividing the total number of concurrent users by the average pacing rate.

Performance may vary on other hardware and software platforms and with other data composition models.

		1,200 Users
Instructor		
	Login	0.630
	Mark Grades & Attendance	0.987
	Search Activity Code	1.373
	Get Roster	1.257
	Get Roster Details **1**	4.819
	Select All Learners **1**	0.847
	Set Attendance **1**	0.729
	Set Passing Grade **1**	0.757
	Save **1**	2.362
	Return to Previous Page	1.230
	Get Roster Details **2**	4.302
	Select All Learners **2**	0.814
	Set Attendance **2**	0.771
	Set Passing Grade **2**	0.750
	Save **2**	2.091
	Return to Previous Page	1.325
	Get Roster Details **3**	3.890
	Select All Learners **3**	0.818
	Set Attendance **3**	0.745
	Set Passing Grade **3**	0.780
	Save **3**	4.654
Back Office †		
	Login	0.931
	Learner Tasks	0.697
	Admin Activity Rosters	1.321
	Search Activity Code	1.377
	Get Roster	1.256
	Grades & Attendance	0.748
	Select All Learners	0.722
	Set Attendance	0.700
	Set Passing Grade	0.691
	Save	0.744
Average Login		**0.706**
Average Search		**1.233**
Average Save		**1.807**
Transactions per Minute		161

Table 2c: Instructor/Back Office Process Runtimes

† The corresponding Back Office batch process for 'Mass Enrollment' ran in 6 hours, 49 minutes and 44 seconds (6:49:44). This processed 118,814 rows (records) for a throughput of 17,430 records per hour.

SERVER PERFORMANCE

Figure 3 shows the average CPU utilization for each of the servers in this test. The CPU utilization is the average across all of the CPUs in each server.
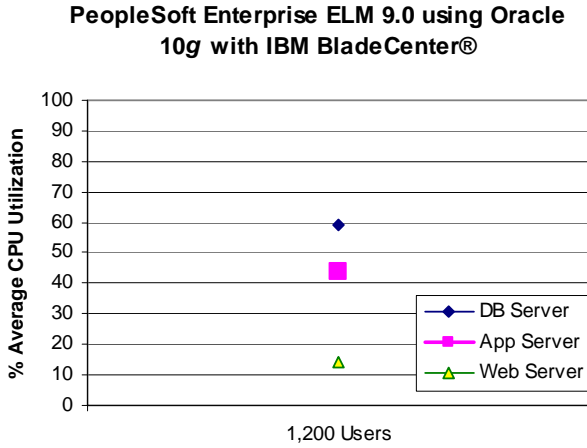
PeopleSoft Enterprise ELM 9.0 using Oracle 10*g* with IBM BladeCenter®

Figure 3: Average Server CPU Utilization

	1,200 Users
Application Server	44%
DB Server	59%
Web Server	14%

Table 3: Average CPU Utilization

Table 4 summarizes the average I/O activity during the 40 minutes of steady state.

	Average **Read** Bytes/Sec	Peak **Read** Bytes/Sec	Average **Write** Bytes/Sec	Peak **Write** Bytes/Sec
DB Server	14,199	6,418,834	194,921	475,585
App Server	73,662	288,948	184,991	358,275
Web Server	0	145,549	8,533	254,603

Table 4: Average I/O Activity

DATA COMPOSITION DESCRIPTION

The standard database was comprised of:

- 100,000 Employees
- 100 Course Catalog Categories
- 10,000 Catalog Items
- 20,000 Delivery Methods
- 620,000 Activities
- 1,000 Programs (10% of Catalog Items)
- 1.2 Million Session rows

History:

- 2.5 Million Enrollment transactions (current + history)

BENCHMARK ENVIRONMENT

HARDWARE CONFIGURATION

Database Server:

An AMD® Opteron™ LS21 for IBM BladeCenter® was used as the database server. It was equipped with the following:

- 2 Sockets of 2.20GHz AMD® Opteron™ 2218 Dual Core Processors with 1MB L2 Cache
- 8 Gigabytes of Memory (~4.59GB used at peak load)
- A DS4700 connected to a 4 nodes San Volume Controller using 2 fibre channel switches of the Blade center
- Approximately 325 GB of RAID 5 storage used for this benchmark
- 68.3 Gigabytes of total Disk Space (1 internal SAS disk)
- 2 × QLogic® 4 Gb SFF Fibre Channel Host Bus Adapters

Application Server(s):

An AMD® Opteron™ LS41 for IBM BladeCenter® was used as the application server. It was equipped with the following:

- 4 Sockets of 2.20GHz AMD® Opteron™ 2218 Dual Core Processors with 1MB L2 Cache
- 16 Gigabytes of Memory (~6.2 GB used at peak load)
- 136.6 Gigabytes of total Disk Space (2 internal SAS disks)

Web Server(s):

An AMD® Opteron™ LS21 for IBM BladeCenter® was used as the web server. It was equipped with the following:

- 2 Sockets of 2.20GHz AMD® Opteron™ 2218 Dual Core Processors with 1MB L2 Cache
- 8 Gigabytes of Memory (~6.2 GB used at peak load)
- 68.3 Gigabytes of total Disk Space (1 internal SAS disk)

Client PC:

Hewlett-Packard® d530C workstation with the following:

- 1 × 2.66 Gigahertz Intel® Pentium® 4 Processor, with 512 kilobytes of Level-2 Cache
- 1 Gigabyte of Memory

Load Simulation Driver(s):

An AMD® Opteron™ LS21 for IBM BladeCenter® was used as the driver. It was equipped with the following:

- 2 Sockets of 2.20GHz AMD® Opteron™ 2218 Dual Core Processors with 1MB L2 Cache
- 8 Gigabytes of Memory (~6.2 GB used at peak load)
- 68.3 Gigabytes of total Disk Space (1 internal SAS disk)

SOFTWARE VERSIONS

Oracle's (PeopleSoft) Enterprise Learning Management 9.0

Oracle's (PeopleSoft) Enterprise PeopleTools 8.48.07

Oracle10g™ 10.2.0.3

Microsoft® Windows Server 2003 Enterprise Edition w/SP 2 (on the database server, application server, web server, and LoadRunner driver)

Microsoft Windows XP Professional 2002 w/SP 2 (on the client)

HP LoadRunner® 8.0

HP QuickTest® Professional 9.1

BEA Tuxedo® 8.1 with Jolt 1.2

BEA WebLogic Server™ 8.10 w/SP 5

DB/App/Web Servers java version "1.4.2_08"
Java(TM) 2 Runtime Environment, Standard Edition (build 1.4.2_08_b03)
Java HotSpot(TM) Server VM (build 1.4.2_8_b03, mixed mode)

ICE Tracking:

> **1572169000 (Bundle 687017)**
> **1554033000 (Bundle 684969)**
> **1554023000 (Bundle 684969)**
> **1387215000 (Bundle 668895)**

ORACLE | PeopleSoft.

Oracle (PeopleSoft) Pleasanton
4500 Oracle Lane
P. O. Box 8018
Pleasanton, California 94588-8618
Tel 925/694-3000
Fax 925/694-3100
Email info@peoplesoft.com
World Wide Web http://www.oracle.com