PEOPLESOFT ELM 9.0 SELF-SERVICE USING ORACLE10*g* USING HEWLETT-PACKARD ITANIUM 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 1.79 sec, Save 2.07 sec
	Concurrent Users	1,200
Référence d'exécution	PeopleSoft ELM 9.0 Self-Service	
	Norme modèle de données	
	temps de réponse	Search 1,79 sec, Save 2,07 sec
(Français)	Concourants Utilisateurs	1.200
Benchmark-Test	PeopleSoft ELM 9.0 Self-Service	
	Datenbankmodell "Standard"	
(Deutsch)	Antwortzeit	Search 1,79 sec, Save 2,07 sec
	Gleichzeitige Benutzer	1.200
Patrón de rendimiento	PeopleSoft ELM 9.0 Self-Service	
	Volumen Estándar de datos	
	tiempo de reacción	Search 1,79 sec, Save 2,07 sec
(Español)	Simultáneos Utilizadores	1.200
Benchmark	ELM 9.0 Self-Service do PeopleSoft	
	Volume Padrão dos dados	
	tempo de resposta	Search 1,79 sec, Save 2,07 sec
(Português)	Simultâneos Usuários	1.200

BENCHMARK PROFILE

In September 2006, Oracle (PeopleSoft) conducted a benchmark in Pleasanton, CA to measure the online performance of Oracle's (PeopleSoft) Enterprise Learning Management (ELM) 9.0 using Oracle10*g*™ 10.2.0.2 on a 4-way partition of a Hewlett-Packard® Integrity™ rx8620 database server, running Hewlett-Packard® HP-UX 11i v2. Additionally, an 8-way partition of the Hewlett-Packard® Integrity™ rx8620 was used as the application server, running Hewlett-Packard® HP-UX 11i v2.

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 HP Integrity servers.**

The figure below illustrates average load/search and update/save response times for 1,200 concurrent users.
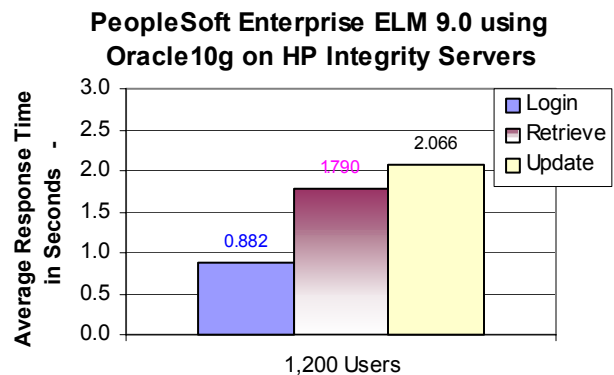

PeopleSoft Enterprise ELM 9.0 using Oracle10g on HP Integrity Servers

Figure 1: Average Response Times

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

METHODOLOGY

Mercury Interactive's 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.

Mercury Interactive's 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.
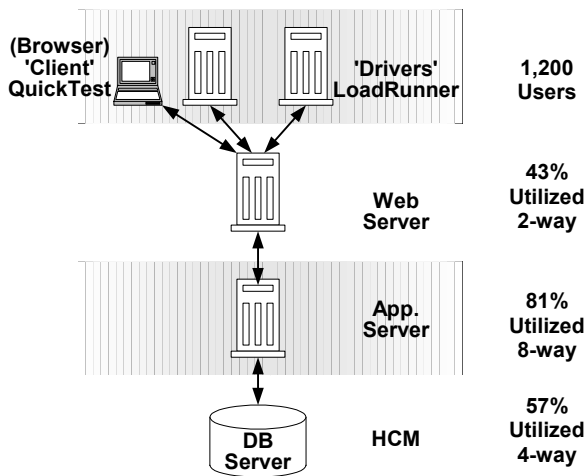
Figure 2 shows a typical 4-tier benchmark configuration.

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	0.957
	Click Browse Catalog	1.716
	Select Category	1.093
	Select Catalog Item	0.882
	View Details	0.631
Search Catalog	Login	0.886
	Search Catalog	2.533
	Click Advanced Search	1.065
	Search Catalog	4.167
	Select Catalog Item	0.929
Add Plan	Login	0.734
	Search Catalog	2.022
	Get Item Details	3.056
	Add to Plan	1.359
Enroll	Login	1.687
	Click Search Catalog	2.523
	Click Advanced Search	0.784
	Search Catalog	3.579
	Click Enroll	1.071
	Enroll	0.740
	Submit Enroll	3.120
Launch	Login	0.694
	Click All Learning	1.239
	Get Course Details	3.577
	Table of Contents	0.799
	Launch Course	1.930
Register	Login	0.984
	Click Search Catalog	2.202
	Search Program	0.871
	Submit Registration	2.573

Table 2a: Employee Process Runtimes

Note: the tabular results continue on the next page.

		1,200 Users
Manager Self-Service		
Approve Learning	Login	0.695
	Click Team Members	1.409
	Approve	1.507
Enroll Team Member	Login	0.887
	Click Team Learning	1.372
	Click Team Members	0.611
	Select Learner	0.605
	Click Search Catalog	3.595
	Search Catalog	3.564
	Click Enroll	0.609
	Submit Enrollment	2.376
Add Objective	Login	0.952
	Click Team Learning	1.120
	Click Team Members	0.757
	Select Team Member	0.566
	Click Add New Objective	1.858
	Search Objectives	1.739
	Add Objective	0.684
Review Team	Login	1.429
	Team Learning Default	1.617
	Team Learning Complete	1.002

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	1.103
	Mark Grades & Attendance	2.325
	Search Activity Code	1.522
	Get Roster	1.280
	Get Roster Details **1**	3.861
	Select All Learners **1**	0.880
	Set Attendance **1**	0.747
	Set Passing Grade **1**	0.714
	Save **1**	2.372
	Return to Previous Page	1.304
	Get Roster Details **2**	3.269
	Select All Learners **2**	0.925
	Set Attendance **2**	0.971
	Set Passing Grade **2**	0.636
	Save **2**	1.930
	Return to Previous Page	1.202
	Get Roster Details **3**	3.319
	Select All Learners **3**	0.823
	Set Attendance **3**	0.622
	Set Passing Grade **3**	0.625
	Save **3**	4.857
Back Office †		
	Login	0.668
	Learner Tasks	1.525
	Admin Activity Rosters	1.177
	Search Activity Code	1.483
	Get Roster	1.181
	Grades & Attendance	0.573
	Select All Learners	0.617
	Set Attendance	0.564
	Set Passing Grade	0.653
	Save	0.610
Average Login		**0.882**
Average Search		**1.790**
Average Save		**2.066**
Transactions per Minute		161

Table 2c: Instructor/Back Office Process Runtimes

† The corresponding Back Office batch process for 'Mass Enrollment' ran in four hours, 56 minutes and 20 seconds (4:56:20). This processed 118,814 rows (records) for a throughput of 24,056 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.
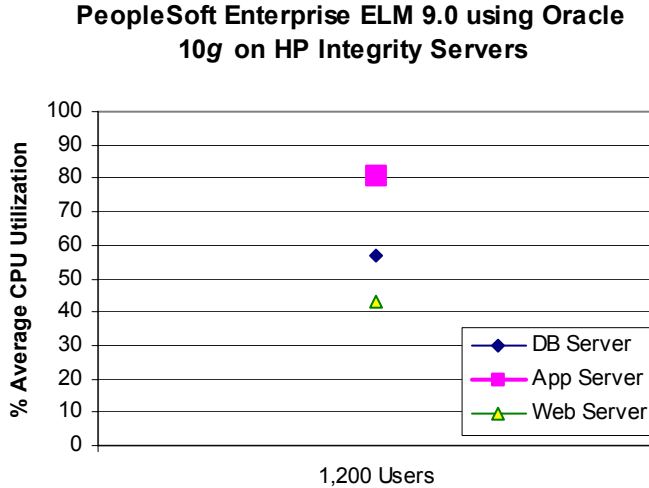
PeopleSoft Enterprise ELM 9.0 using Oracle 10*g* on HP Integrity Servers

Figure 3: Average Server CPU Utilization

	1,200 Users
DB Server	57%
Application Server	81%
Web Server	43%

Table 3: Average CPU Utilization

Table 4 summarizes the average I/O activity.

	1,200 Users		
	Reads + Writes / sec	512 Byte Blocks / sec	Avg. Service Time (ms)
DB Server	18	252	2.01
App. Server	469	18,479	1
Web Server	3	39	9.89

Table 4: Average I/O Activity

The I/O rate on the DB Server was split between 50% 'reads' and 50% 'writes.'

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:

A Hewlett-Packard® Integrity™ rx8620 was used as the database server. It was equipped with the following:

- 4 × 1.6 GHz Intel® Itanium®2 Processors, each with16 Kilobytes of Level-1 Cache, 256 Kilobytes of Level-2 Cache and 6 Megabytes of Level-3 Cache
- 8 Gigabytes of Memory (~7.1 GB used at peak load)
- 1 SAN-Connected HP StorageWorks XP128 disk array with 2 fibre-channel connections
- ~4.6 Terabytes of total Disk Space available (64 × 73 GB + 2 × 73 GB internal disk drives), approximately 325 GB of RAID 0+1 storage used for this benchmark
- 2 × Hewlett-Packard® Tachyon™ XL2 Fibre Channel Host Bus Adapters

Application Server(s):

1 × Hewlett-Packard® Integrity™ rx8620 server was used as the application server. It was equipped with the following:

- 8 × 1.6 GHz Intel® Itanium®2 Processors, each with16 Kilobytes of Level-1 Cache, 256 Kilobytes of Level-2 Cache and 6 Megabytes of Level-3 Cache
- 8 Gigabytes of Memory (~6.2 GB used at peak load)
- ~144 Gigabytes of total Disk Space (4 × 36 GB)
- 2 × Dual-channel Internal SCSI Disk Controllers

Web Server(s):

1 × Hewlett-Packard® Integrity™ rx1620® server was used as the web server. It was equipped with the following:

- 2 × 1.3 GHz Intel® Itanium®2 Processors, each with32 Kilobytes of Level-1 Cache, 256 Kilobytes of Level-2 Cache and 3 Megabytes of Level-3 Cache
- 8 Gigabytes of Memory (~2.6 GB used at peak load)
- ~72 Gigabytes of total Disk Space (2 × 36 GB)
- 2 × Internal SCSI Disk Controllers

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):

1 × Hewlett-Packard® ProLiant® DL380/G3 was used as the driver. It was equipped with the following:

- 4 × 3.2 Gigahertz Pentium® III Xeon™ Processors, each with 512 Kilobytes of Level-2 Cache
- 4 Gigabytes of Memory

SOFTWARE VERSIONS

Oracle's (PeopleSoft) Enterprise Learning Management 9.0

Oracle's (PeopleSoft) Enterprise PeopleTools 8.47.08

Oracle10g™ 10.2.0.2

Hewlett-Packard® HP-UX® 11i v.2 (11.23) (64-bit) (on the database server, application server and web server)

Microsoft® Windows Server 2003 Enterprise Edition (on the driver)

Microsoft Windows XP Professional 5.1.2600 w/SP 2 (on the client)

Mercury Interactive's LoadRunner® 8.1

Mercury Interactive's QuickTest® Professional 6.0

BEA Tuxedo® 8.1 with Jolt 1.2

BEA WebLogic Server™ 8.10 w/SP 4

App Server   java version "1.4.2.02"
Java(TM) 2 Runtime Environment, Standard Edition (build 1.4.2.02-040225-17:20)
Java HotSpot(TM) Server VM (build 1.4.2 1.4.2.02-040226-02:44-IA64N IA64, mixed mode)

Web Server   java version "1.4.2.09"
Java(TM) 2 Runtime Environment, Standard Edition (build 1.4.2.09-050713-03:34)
Java HotSpot(TM) Server VM (build 1.4.2 1.4.2.09-050713-09:59-IA64N IA64, mixed mode)

ICE Tracking:

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

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