ORACLE'S PEOPLESOFT HRMS 9.1 FP2 SELF-SERVICE USING ORACLE DB FOR ORACLE SOLARIS (UNICODE) ON AN ORACLE'S SPARC M7-8 Server with TDE

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 HRMS 9.1 FP2 Self-Service	
	Extra-Large Data Model	
	Average Response	Search 0.52 sec, Save 0.31 sec
	Concurrent Users	40,000

BENCHMARK PROFILE

In January 2016, Oracle (PeopleSoft) conducted a benchmark in Burlington, MA to measure the online performance of Oracle's PeopleSoft Enterprise Human Resources Management System (HRMS) 9.1 on Oracle's SPARC M7-8 Server configured with one Oracle VM Server for SPARC (logical domain) LDom of 2 chips. The logical domain was configured with (12 cores) for database Oracle Solaris zone (referred to simply as zone hereafter), (18 cores + 18 cores) for Application zones and (14 cores) for the Web zone. The remaining 2 cores were dedicated to network and disk interrupt handling. The database domain was configured with Oracle11*g*™ R2 database running Solaris 11.3. The application and web tiers were configured with 2 zones for PeopleSoft Application Server and one zone for Weblogic server respectively running Oracle Solaris 11.3. Approximately 600 GB of storage (12 TB DB data on 1 × Oracle ZFS Storage ZS3-2 Appliance) and 200 GB of storage (6.4 TB redo logs on 1 × Oracle Server X5-2L) was allocated to the database instance. Note that the benchmark was run with Oracle Advanced Security Transparent Data Encryption (TDE) active. TDE uses Oracle's SPARC M7 processor's 'software in silicon' cryptography instructions for efficiency.
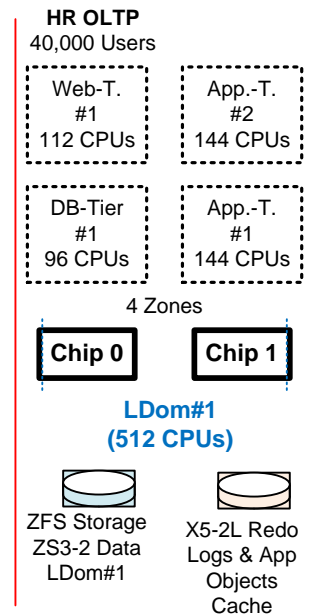

Figure 1: Virtualization Resource Apportionment

The benchmark measured client response times for 40,000 concurrent users. The standard database composition model represents an extra-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 HRMS 9.1 FP2 self-service transactions with Oracle Database for Solaris on Oracle's SPARC M7 Servers with TDE.**

This report summarizing OLTP processing in HCM 9.1 FP2 on this particular hardware and software environment is one of three. Two complementary reports cover stand-alone batch and concurrent batch/OLTP results on this same environment for further performance analysis.
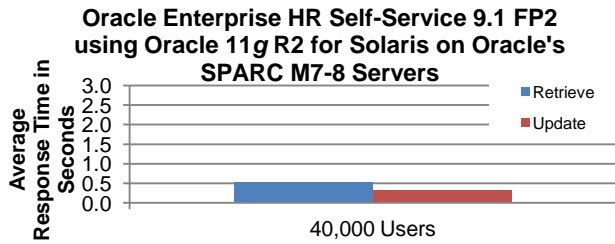
Oracle Enterprise HR Self-Service 9.1 FP2 using Oracle 11g R2 for Solaris on Oracle's SPARC M7-8 Servers

Figure 2: Average Response Times

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

METHODOLOGY

Oracle® ATS™ was used as the load driver, simulating concurrent users. It submitted a business process at an average rate of one every five minutes for each concurrent user.

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

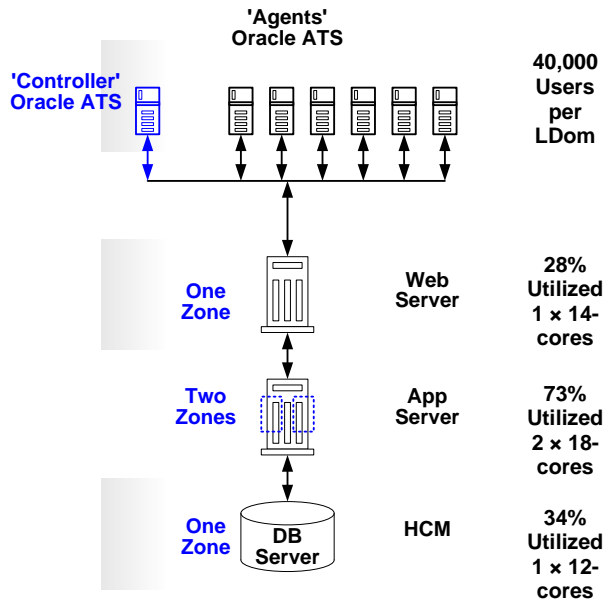Figure 3 shows a typical 4-tier benchmark configuration.

Figure 3: 4-Tier Configuration (Each LDom)

Load (search/retrieval) 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 (save) times were measured from the time the user clicks the <SAVE> button until the system has released the page.

BUSINESS PROCESSES

Oracle (PeopleSoft) defines a business transaction as a series of HTML pages that guide a user through a particular scenario, such as promoting an employee.

The fourteen PeopleSoft Enterprise 9.1 HRMS business processes tested in this benchmark are as follows:

EMPLOYEE SELF-SERVICE
eProfile

Update Home Address: Update address in Personal Data section.

Update Home Phone: Update phone number in Personal Data section.

eBenefits

View Benefits Summary: View overall benefits enrollment data.

Benefits Change Life: View benefits and alter the beneficiaries' allocations in the Basic Life Plan.

ePay

View Paycheck: View current paycheck information.

Update Direct Deposit Info: Add a direct deposit directive.

Employee Adds Profile Items: Add competencies to personnel profile.

MANAGER SELF-SERVICE
eDevelopment

View Employee Info: View job and personal information.

eProfile

Initiate Termination: Initiate a termination by recording an effective date and reason for termination.

Initiate Promotion: Initiate a promotion by entering a new job title and salary.

eCompensation

Initiate Employee Salary Change: Process a salary change for a single employee.

HR ADMINISTRATION

Add a Person: Add a person and their biographical details.

Hire a Person: Enter the specified job data and work location, followed by the payroll and compensation details.

Add a Job: Add job details to an existing employee.

HRMS Process	% within Group	% Overall	Pacing in Min
Employee Self-Service (60%)			
Update Home Address	3%	1.8%	5
Update Phone Numbers	3%	1.8%	5
View Benefits Summary	10%	6%	5
Update Beneficiary	2%	1.2%	5
View Paycheck	78%	46.8%	5
Update Direct Deposit	2%	1.2%	5
Employee Adds Profile Items	2%	1.2%	5
Manager Self-Service (20%)			
View Employee Info	50%	10%	5
Initiate Termination	20%	4%	5
Initiate Promotion	10%	2%	5
Initiate Employee Salary Change	20%	4%	5
HR Administrator (20%)			
Add a Person	20%	4%	5
Hire a Person	40%	8%	5
Add a Job Row	40%	8%	5
Total		100%	5

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.

The database and application servers were processing a total of 8,000 business processes per minute at the peak load of 40,000 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.

ONLINE PROCESS RESULTS

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

Process		40,000 Users LDom1
Update Home Address	Search	0.496
	Save	0.772
Update Home Phone	Search	0.38
	Save	0.355
View Benefits Summary	View	0.489
Update Beneficiary	Search	0.461
	Save 1	0.061
	Save 2	0.096
	Edit/ Calc	0.05
View Paycheck	Search	0.525
	View	0.499
Update Direct Deposit Info	Search	0.378
	Save	0.074
Employee Adds Profile Items	Search	0.312
	Save	0.858
	Submit	2.95
	Confirm	0.734
View Employee Info	Search	0.578
Initiate Termination	Search	0.529
	Save	0.055
	Confirm	0.03
Initiate Promotion	Search	0.587
	Save	0.546
Initiate Salary Change	Search	0.616
	Save	1.359
	Calc	0.249
Add a Person	Save	0.073
	Confirm	0.151
Hire a Person	Save 1	0.073
	Save 2	0.061
	Confirm	0.359
Add a Job	Search	0.442
	Save	0.363
	Confirm	0.129
* Average Search		0.519
* Average Save		0.309
Trans/min Est.		8,000

Table 2: Employee/Manager Process Runtimes

SERVER PERFORMANCE

Figure 4 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.
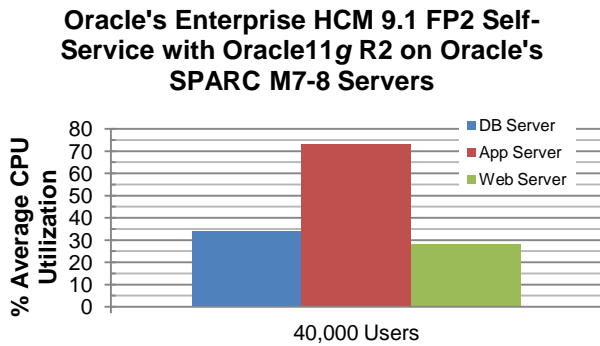
Oracle's Enterprise HCM 9.1 FP2 Self-Service with Oracle11*g* R2 on Oracle's SPARC M7-8 Servers

Figure 4: Average Server CPU Utilization

% CPU	User	System	I/O Wait	Idle
DB Server	28	6	0	66
App Server	66	7	0	27
Web Server	23	5	0	72

Table 3: Summary of CPU Utilization

	LDom1
DB Server	358 GB
App Server	311 GB
Web Server	49 GB

Table 4: Average Memory Utilization

I/O PERFORMANCE

An Oracle ZFS Storage ZS3-2 Appliance was used for storage of tables and indexes. An Oracle Server X5-2L with NVMe was used for storage of redo logs. I/O performance is crucial to performance and is summarized as follows:

vUsers →	LDom1
DB	Average
r/s	129
w/s	424
MB r/s	3.08
MB w/s	3.76
Service Time (ms)	0.77
DB Redo	
w/s	696
MB w/s	4.17
Service Time (ms)	0.0
App Cache	
r/s	3,283
w/s	1,982
MB r/s	93.30
MB w/s	32.63
Service Time (ms)	0.36

Table 5: I/O Metrics

DATA COMPOSITION DESCRIPTION

The standard database was comprised of:

- 500,480 Employees (8 per Department)
- 62,560 Managers
- 62,560 Department Table Entries

BENCHMARK ENVIRONMENT

HARDWARE CONFIGURATION (SPARC M7-8)

Database Server:

1 × Oracle Solaris Zone with 12 cores on an Oracle's SPARC M7-8 server was used as a database server. It was equipped with the following:

- 1 × 4.13 GHz SPARC™ M7 Thirty-Two Core processors each with 16 Kilobytes of Instruction and 16 Kilobytes of Data Level-1 on core cache, 128 Kilobytes of shared Instruction and Data Level-2 cache per core, and 48 Megabytes of Level-3 on-chip cache (32 cores total – 256 vcpus/threads)
- 1024 Gigabytes of Memory (~358 GB used at peak load)

An Oracle ZFS Storage ZS3-2 Appliance was used for Database data storage. The storage server was equipped with the following:

- 40 × 300 GB 10K RPM SAS-2 HDD
- 8 × Write Flash Accelerator SSD
- 2 × Read Flash Accelerator SSD 1.6 TB SAS

One Oracle Server X5-2L was used for redo log files.
- 2 × 2.4 GHz Intel Xeon E5-2630 v3 Eight-Core processors
- 32 Gigabytes of Memory
- 4 × 1.6 TB NVMe SSD

Application Server(s):

2 × Oracle Solaris Zones with 36 cores total on an Oracle's SPARC M7-8 server were used as the application servers. They were equipped with the following:

- 1 × 4.13 GHz SPARC™ M7 Thirty-Two Core processors each with 16 Kilobytes of Instruction and 16 Kilobytes of Data Level-1 on core cache, 128 Kilobytes of shared Instruction and Data Level-2 cache per core, and 48 Megabytes of Level-3 on-chip cache (32 cores total – 256 vcpus/threads)
- 1024 Gigabytes of Memory (~311 GB used at peak load)

In the application tier, 5 PeopleSoft domains with 350 application servers (70 per each domain) were hosted in the two separate Oracle Solaris Zones for a total of 10 domains with 700 application server processes.

One Oracle Server X5-2L was used for App. objects cache.
- 2 × 2.4 GHz Intel Xeon E5-2630 v3 Eight-Core processors
- 32 Gigabytes of Memory
- 4 × 1.6 TB NVMe SSD

Web Server(s):

1 × Oracle Solaris Zone with 14 cores on an Oracle's SPARC M7-8 server was used as the web server. It was equipped with the following:

   (1 zone was configured with 32 Web Logic instances with 1 GB heap size.)

- 1 × 4.13 GHz SPARC™ M7 Thirty-Two Core processors each with 16 Kilobytes of Instruction and 16 Kilobytes of Data Level-1 on core cache, 128 Kilobytes of shared Instruction and Data Level-2 cache per core, and 48 Megabytes of Level-3 on-chip cache (32 cores total – 256 vcpus/threads)
- 1024 Gigabytes of Memory (~49 GB used at peak load)

Load Simulation Driver(s):

1 × Oracle Server X3-2 server was used as the load driver controller. It was equipped with the following:

- 2 × 2.9 GHz Intel Xeon E5-2690 Eight-Core processors, each with 2 × 6 Megabytes of Level-2 on-chip cache (16 cores total)
- 128 Gigabytes of Memory

6 × Oracle Server X3-2 servers were used as the load drivers. They were equipped with the following:

- 2 × 2.9 GHz Intel Xeon E5-2690 Eight-Core processors, each with 2 × 6 Megabytes of Level-2 on-chip cache (16 cores total)
- 128 Gigabytes of Memory

SOFTWARE VERSIONS

Oracle's PeopleSoft HRMS and Campus Solutions 9.10.00.000 with FP 2

Oracle's PeopleSoft Enterprise (PeopleTools) 8.52.03

Oracle Database 11g 11.2.0.3.0 (64-bit)

Oracle Solaris 11.3 (on the Database Server)

Oracle Solaris 11.3 (on the App Server and Web Server)

Java Platform, Std. Edition Development Kit 6 with Update 32

Microsoft® Windows Server 2008 R2 Enterprise Edition (on the Controller and Drivers)

Oracle ATS Load Test software 9.20.0370

Oracle (BEA) Tuxedo® 10.3.0.0 Patch Level 043 (64-bit)

Oracle WebLogic Server™ 11g (10.3.5)

ORACLE | PeopleSoft.

Oracle (PeopleSoft) Pleasanton
5815 Owens Drive
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

ORACLE®

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Oracle Corporation
World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
U.S.A.

Worldwide Inquiries:
Phone: +1.650.506.7000
Fax: +1.650.506.7200

oracle.com

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