

# ORACLE'S PEOPLESOFT HRMS 9.1 FP2 SELF-SERVICE USING ORACLE DB FOR ORACLE SOLARIS (UNICODE) ON AN ORACLE'S SPARC T4-4 AND T4-2 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 HRMS 9.1 FP2 Self-Service	
	Extra-Large Data Model	
	Average Response	Search 0.99 sec, Save 0.52 sec
	Concurrent Users	18,000

## BENCHMARK PROFILE

In October 2012, 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. The database server used Oracle11g™ R2 on a 4-way Eight-Core (32 cores in all – 256 vcpus) Oracle's SPARC T4-4 database server, running Solaris 11 11/11. The application server was a SPARC T4-4 server and ran Oracle Solaris 11 (11/11). The web server was run on Oracle's SPARC T4-2 server. Approximately 568 GB of storage (296 GB on Comstar/F5100 + 182 GB on F5100 + 90 GB redo logs on X4275) was allocated to the database instance.

The benchmark measured client response times for 6,000, 12,000 and 18,000 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 SPARC T4 Servers.**

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.

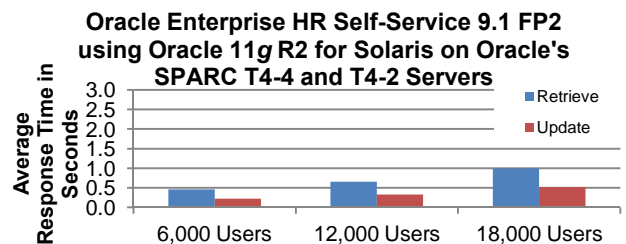


Figure 1: Average Response Times

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

## METHODOLOGY

Oracle® ATSTM 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 2 shows a typical 4-tier benchmark configuration.

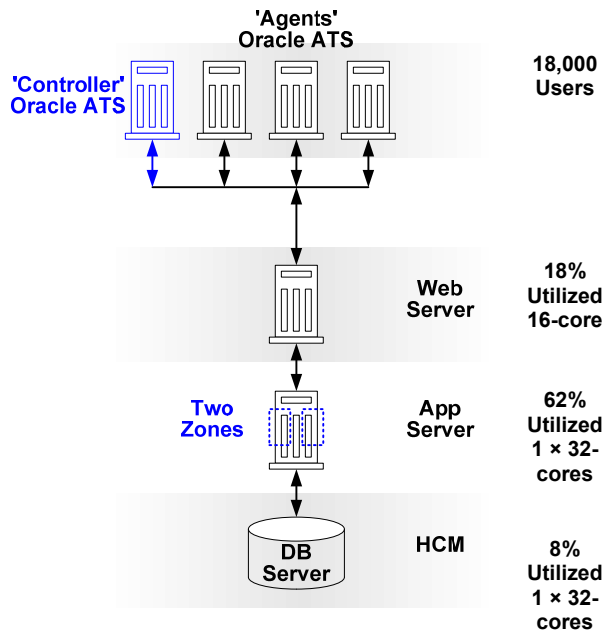


Figure 2: 4-Tier Configuration

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.

## ONLINE PROCESS RESULTS

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

HRMS Process	% within Group	% Overall	Pacing in Min
<b>Employee Self-Service (60%)</b>			
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
<b>Manager Self-Service (20%)</b>			
View Employee Info	50%	10%	5
Initiate Termination	20%	4%	5
Initiate Promotion	10%	2%	5
Initiate Employee Salary Change	20%	4%	5
<b>HR Administrator (20%)</b>			
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 3,600 business processes per minute at the peak load of 18,000 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.

Process		6,000 Users	12,000 Users	18,000 Users
Update Home Address	Search	0.41	0.61	0.93
	Save	0.61	0.89	1.48
Update Home Phone	Search	0.32	0.46	0.72
	Save	0.29	0.43	0.68
View Benefits Summary	View	0.38	0.54	0.84
Update Beneficiary	Search	0.40	0.57	0.88
	Save 1	0.04	0.06	0.11
	Save 2	0.08	0.11	0.19
	Edit/Calc	0.04	0.05	0.09
View Paycheck	Search	0.50	0.71	1.06
	View	0.45	0.64	0.98
Update Direct Deposit Info	Search	0.32	0.46	0.70
	Save	0.06	0.08	0.13
Employee Adds Profile Items	Search	0.27	0.40	0.61
	Save	0.66	0.94	1.50
	Submit	2.93	4.23	5.52
	Confirm	0.50	0.74	1.22
View Employee Info	Search	0.43	0.63	1.01
Initiate Termination	Search	0.41	0.62	0.98
	Save	0.07	0.11	0.17
	Confirm	0.08	0.11	0.17
Initiate Promotion	Search	0.44	0.65	1.05
	Save	0.39	0.56	0.89
Initiate Salary Change	Search	0.47	0.70	1.10
	Save	1.15	1.71	2.62
	Calc	0.08	0.11	0.20
Add a Person	Save	0.05	0.08	0.12
Hire a Person	Save 1	0.05	0.08	0.12
	Save 2	0.04	0.06	0.10
Add a Job	Search	0.35	0.49	0.73
	Save	0.12	0.19	0.31
* Average Search		0.46	0.65	0.99
* Average Save		0.22	0.33	0.52
Trans/min Est.		1,200	2,400	3,600

**Table 2: Employee/Manager Process Runtimes**

## 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.

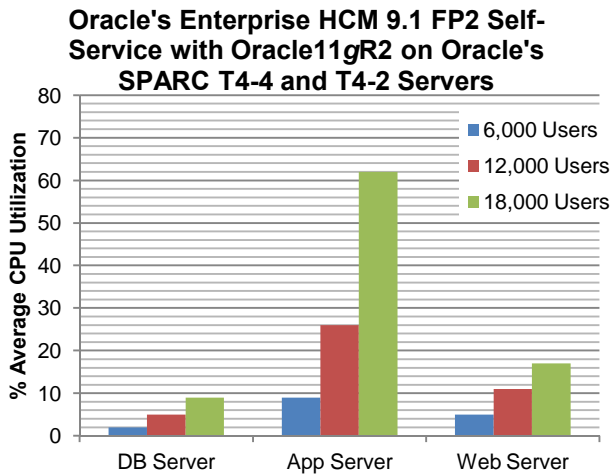


Figure 3: Average Server CPU Utilization

## I/O PERFORMANCE

The Oracle's Sun Server X2-4 Storage Server with attached Sun Storage F5100 Flash Array storage and a directly attached Oracle's Sun Storage F5100 Flash Array storage was used for storage of tables and indexes. An Oracle's Sun X4275 Storage Server was used for Redo log data. I/O performance is crucial to performance and is summarized as follows:

vUsers →	6,000	12,000	18,000
DB	Average	Average	Average
r/s	0.1	0.3	1.0
w/s	100	183	264
KB r/s	1.1	2	9
KB w/s	727	1,270	1,730
<b>App Server</b>			
r/s	37	56	508
w/s	217	206	739
KB r/s	324	529	20,186
KB w/s	3,251	3,337	12,753

Table 5: I/O Metrics

% CPU	User	System	I/O Wait	Idle
<b>DB Server</b>				
18,000 Users	6	2	0	91
12,000 Users	3	1	0	95
6,000 Users	2	1	0	98
<b>App Server</b>				
18,000 Users	55	7	0	38
12,000 Users	22	4	0	74
6,000 Users	8	2	0	91
<b>Web Server</b>				
18,000 Users	14	4	0	83
12,000 Users	9	2	0	89
6,000 Users	4	1	0	95

Table 3: Summary of CPU Utilization

## DATA COMPOSITION DESCRIPTION

The standard database was comprised of:

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

	6,000 Users	12,000 Users	18,000 Users
DB Server	117 GB	117 GB	117 GB
App Server	165 GB	191 GB	217 GB
Web Server	51 GB	52 GB	52 GB

Table 4: Average Memory Utilization

## BENCHMARK ENVIRONMENT

### HARDWARE CONFIGURATION

#### **Database Server:**

1 × Oracle's SPARC T4-4 server was used as the database server. It was equipped with the following:

- 4 × 3.0 GHz SPARC T4 Eight-Core processors (sockets), 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 4 Megabytes of Level-3 on-chip cache (32 cores total – 256 vcpus)
- 256 Gigabytes of Memory (~117 GB used at peak load)
- 1 × 600 GB SAS internal disk (Oracle 11gR2 software, UFS file system)
- 1 × 300 GB SAS internal disks (PeopleSoft tools, UFS file system)
- 1 × 300 GB SAS internal disks (OS disk installed on ZFS storage pool)

One of Oracle's Sun Server X2-4 Storage Server (4 × 2 GHz Xeon X7550, 128 GB mem) with 1 × 8 Gbit FiberChannel HBA, 4 × SAS HBA and with attached Oracle's Sun Storage F5100 Flash Array Storage systems with 80 Flash Modules (FMODs) was used. The F5100 was equipped with the following:

- 80 × 24 GB FMODs in sun Storage Flash Array F511 device (FM size is 24 GB, once formatted ~22.98 GB)
- Approximately 296 GB of database data storage out of ~900 GB (aggregate) from one ~1800 GB (mirrored) Oracle's Sun Storage F5100 Flash Array storage system was allocated as data storage to the database instance using Oracle Automatic Storage Management (ASM) for database files management.
- Oracle Solaris 11 11/11 X86 configured as COMSTAR Storage Server.

One of Oracle's Sun Storage F5100 Flash Array Storage system directly attached via 4 × SAS HBA interfaces to SPARC T4-4 was used. The F5100 was equipped with the following:

- 40 × 24 GB FMODs in sun Storage Flash Array F511 device
- Approximately 182 GB of database data storage out of ~450 GB (aggregate) from one ~900 GB (mirrored) Oracle's Sun Storage F5100 Flash Array storage system was allocated as data storage to the database instance using Oracle Automatic Storage Management (ASM) for database files management.

One of Oracle's Sun X4275 Storage Servers for Redo log data, equipped with:

- 1 × 2.53 GHz XEON E5540 and 6 GB memory
- 12 × 2 TB SAS disks with Niwot Raid controller
- 1 × 8 Gb FC HBA
- The X4275 was attached to the database instance on the SPARC T4-4 providing 3 × 30 GB mirrored (hardware RAID 1) redo Logs (total space used ~180 GB)
- Oracle Solaris 11 Express 2010.11 X86 configured as COMSTAR Storage Servers.

### **Application Server(s):**

1 × Oracle's SPARC T4-4 server was used as the application server. It was equipped with the following:

**2 zones are configured each with 5 PeopleSoft Application Server domains containing 40 PSAPPSRV processes.**

- 4 × 3.0 GHz SPARC T4 Eight-Core processors (sockets), 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 4 Megabytes of Level-3 on-chip cache (32 cores total – 256 vcpus)
- 512 Gigabytes of Memory (~217 GB used at peak load)
- 1 × 600 GB SAS internal disk (OS disk on ZFS pool)
- 4 × 300 GB SAS internal disks (OS disks for Oracle Solaris Zones, mirrored ZFS storage pool for each zone, 2 disks per zone)
- 2 × 300 GB internal SSD ( One disk for each Oracle Solaris Zone, mounted as UFS file system for application server cache)

### **Web Server(s):**

1 × Oracle's SPARC T4-2 server was used as the web server. It was equipped with the following:

- 2 × 2.85 GHz SPARC T4 Eight-Core processors (sockets), 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 4 Megabytes of Level-3 on-chip cache (16 cores total – 128 vcpus)
- 256 Gigabytes of Memory (~52 GB used at peak load)
- 1 × 300 GB SSD internal disk (OS disk installed on ZFS storage pool)
- 1 × 100 GB SSD internal disk (PeopleSoft Webservers logging, UFS file system)
- 2 × 300 GB SAS internal disks (WebLogic server, mirrored ZFS storage pool)
- 1 × 300 GB SAS internal disk (backup)

**30 Web Logic instances with 1 GB heap size are configured to handle the workload of 18,000 users.**

### **Load Simulation Driver(s):**

4 × Sun Blade X6240 servers were used as the load driver controller and drivers. They were equipped with the following:

- 1 × 2.3 Gigahertz AMD® Opteron™ 2356 Quad-Core Processors, each with 2 Megabytes of Level-2 Cache (4 cores total)
- 32 Gigabytes of Memory

**Oracle ATS is configured to spawn an agent for every 2,000 users.**

## 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 (11/11) (on the Database Server)

Oracle Solaris 11 (11/11) (on the App Server and Web Server)

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

Microsoft® Windows Server 2003 Enterprise Edition w/SP 2  
(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)



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