

ORACLE'S PEOPLESOFT HRMS 9.1 FP2 PAYROLL USING ORACLE DB FOR ORACLE SOLARIS (UNICODE) ON AN ORACLE'S SPARC M7-8

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

PeopleSoft Enterprise Payroll (North American) 9.1 FP2		
Extra-Large Data Model		
	128 Job Streams	128 Job Streams
	LDom1	LDom2
500,480 Employees 500,480 Payments		
Minutes	13.06	12.85
Payments/Hour	2,299,296	2,336,872
Net	1 M Employees	4.6 M Pay/Hr

The benchmark measured five Payroll application business process runtimes for one database model representing an extra-large organization. A single execution strategy was executed to model the preferred customer option. Testing was conducted in a controlled environment with no other applications running. The tuning changes, (if any) were approved by PeopleSoft Development and will be generally available in a future release or update. **The goal of this benchmark was to obtain baseline Extra-Large-model results for Oracle (PeopleSoft) Enterprise Payroll 9.1 FP2 using Oracle on a SPARC M7-8 server.**

This report summarizing batch processing in HCM 9.1 FP2 on this particular hardware and software environment is one of three. Two complementary reports cover stand-alone OLTP and concurrent batch/OLTP results on this same environment for further performance analysis.

BENCHMARK PROFILE

In September 2015, Oracle conducted a benchmark in Burlington, MA in collaboration with Oracle (PeopleSoft) to measure the batch performance of the Paysheet Creation, Payroll Calculation and Payroll Confirmation processes in PeopleSoft Enterprise Payroll 9.1 FP2 (North American) using Oracle11g™ R2. The database server used Oracle11g™ R2 on a Thirty-Two Core Oracle's SPARC M7-8 server, running Solaris 11.3. Approximately 600 GB of storage(12 TB DB on 2 × Oracle ZFS Storage ZS3-2 Appliances) 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 concurrently on twin environments as the workload was easily handled by a single chip from each of two Oracle VM Server for SPARC logical domains (LDoms).

Oracle Enterprise Payroll 9.1 FP2
Using Oracle11g for Solaris on a
SPARC M7-8

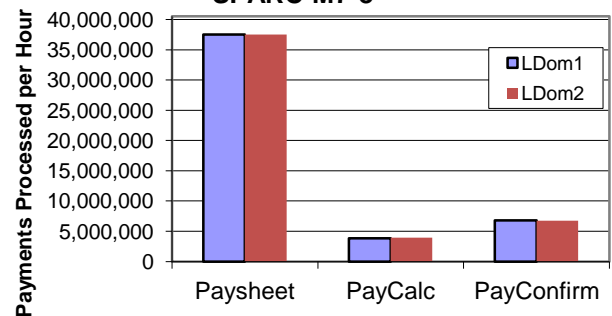


Figure 1: Enterprise Payroll 9.1 FP2 Payments/Hour

METHODOLOGY

For this benchmark, all jobs were initiated on the server from a browser.

This application was run as one hundred twenty-eight concurrent processes.

Batch processes are background processes, requiring no operator intervention or interactivity. Results of these processes are automatically logged in the database.

BUSINESS PROCESSES

The five Payroll processes tested are as follows:

Paysheet Creation: Generates payroll data worksheets for employees, consisting of standard payroll information for each employee for the given pay cycle. The Paysheet process can be run separately from the other two tasks, usually before the end of the pay period.

Payroll Calculation: Looks at Paysheets and calculates checks for those employees. Payroll Calculation can be run any number of times throughout the pay period. The first run will do most of the processing, while each successive run updates only the calculated totals of changed items. This iterative design minimizes the time required to calculate a payroll, as well as the processing resources required. In this benchmark, Payroll Calculation was run only once, as though at the end of a pay period.

Payroll Confirmation: Takes the information generated by Payroll Calculation and updates the employees' balances with the calculated amounts. The system assigns check numbers at this time and creates direct deposit records. Confirm can only be run once, and therefore, must be run at the end of the pay period.

Print Advice Forms: This process takes the information generated by Payroll Calculation and Confirmation and produces an Advice for each employee to report Earnings, Taxes, Deductions, net pay and bank accounts where Net Pay were sent.

Create Direct Deposit File: This process takes the information generated by Payroll Calculation and Confirmation and produces an electronic transmittal file used to transfer payroll funds directly into an employee's bank account.

BATCH PROCESS STRATEGIES

The figure below summarizes the execution strategy that was undertaken for this benchmark. The runs did not use the 'Single-Check' option but did use multiple job streams.

Single Check-No
128 Job Streams



Figure 2: Batch Job Stream Execution

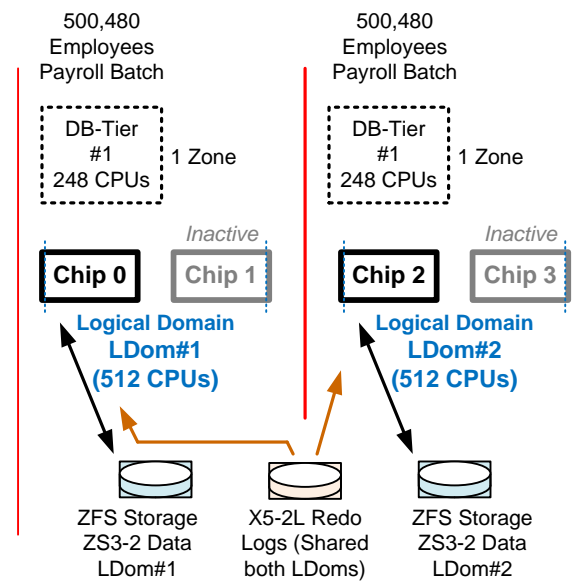


Figure 3: Virtualization Resource Apportionment

BATCH RESULTS

The table below contains the actual runtimes, in minutes, for the Payroll processes. It also shows how many employees were processed and the number of checks and advices produced.

	LDom1	LDom2
Job Streams	128	128
Single Check	No	No
Employees	500,480	500,480
Jobs	500,480	500,480
PayCheck	0	0
PayAdvice	500,480	500,480
Payments	500,480	500,480
Paysheet	0.8	0.8
PayCalc	7.83	7.6
PayConfirm	4.43	4.45
Total Minutes	13.06	12.85
Total Hours	0.22	0.21
Print Advice	3.07	3.07
Direct Deposit	0.32	0.32
Total Minutes	3.39	3.39

Table 1: PeopleSoft 9.1 FP2 Payroll Process Runtimes

	LDom1	LDom2
Job Streams	128	128
Single Check	No	No
Paysheet	37,536,000	37,536,000
PayCalc	3,835,095	3,951,157
PayConfirm	6,778,510	6,748,044
Net per Hour	2,299,296	2,336,872
Print Advice	9,781,368	9,781,368
Direct Deposit	93,840,000	93,840,000

Table 2: PeopleSoft 9.1 FP2 Payroll Process Throughputs

The throughputs above are linear extrapolations only. For Paysheet, PayCalc and PayConfirm the throughputs are payments per hour. For Print Advice and Direct Deposit, throughputs are Print Advice per hour. Performance may vary on other hardware and software platforms and with other data composition models.

SERVER PERFORMANCE

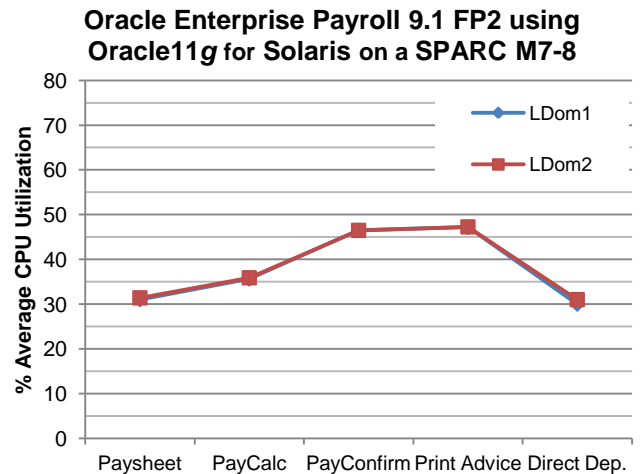


Figure 4: Average CPU Utilization

Note that even the 128-Thread run only used half of the 248 vCPUs available on each server. Other processing could have been carried out concurrently. Also notice that the final process, the 'Direct Deposit' action is very brief, so that there were few CPU data points to average.

	LDom	User	System	Idle
Paysheet	LDom1	26.6	4.4	69
	LDom2	26.2	4.4	68.6
PayCalc	LDom1	32.02	3.7	64.37
	LDom2	32.15	3.67	64.11
PayConfirm	LDom1	40.04	6.57	53.48
	LDom2	39.87	6.65	53.52
Print Advice	LDom1	39.68	7.32	52.79
	LDom2	39.53	7.58	52.74
Direct Dep.	LDom1	22	8	70
	LDom2	22	9	69

Table 3: Average CPU Utilization

I/O PERFORMANCE

Two Oracle ZFS Storage ZS3-2 Appliances were used for storage of tables and indexes. An Oracle Server X5-2L was used for storage of redo logs. I/O performance is crucial to batch performance.

LDom1					
DB Data	Pay sheet	Pay Calc	Pay Confirm	Print Advice	Direct Deposit
Reads/S	1,348	1,773	1,021	1	105
Writes/S	5	225	33	422	1
MB R./S	17.06	20.28	12.64	0.02	1.50
MB W./S	4.11	15.90	4.81	11.69	0.01
Time ms	1.46	1.99	3.42	0.66	1.20
Redo					
Writes/S	490	91	221	5	26
MB W./S	82.23	22.62	62.71	0.12	0.40
Time ms	1.20	1.75	2.65	0.25	0.20
LDom2					
DB Data	Pay sheet	Pay Calc	Pay Confirm	Print Advice	Direct Deposit
Reads/S	1,229	1,763	1,030	2	4
Writes/S	4	222	25	426	1
MB R./S	17.35	20.19	12.76	0.04	0.05
MB W./S	4.11	15.88	4.48	11.80	0.006
Time ms	1.54	1.86	3.75	0.48	1.50
Redo					
Writes/S	459	94	224	6	75
MB W./S	82.23	22.61	62.69	0.13	0.36
Time ms	1.30	1.65	2.54	0.25	0.20

Table 4: I/O Performance

Employee Profiles

- Part-time, hourly paid weekly with one additional pay, with Federal and California State tax, two general deductions and eight per pay period benefit deductions, one garnishment (KU0200).
- One Part-time salaried and paid monthly with one additional pay, with Federal and California State tax, one general deduction, three garnishments and seven per pay period benefit deductions with Absence Management (KU0202 ER0).
- One Part-time exception hourly paid bi-weekly with one additional pay, with Federal and California State tax, one general deduction, three garnishments and seven per pay period benefit deductions with Absence Management (KU0202 ER1).
- Full-time salaried paid monthly with Federal, New Jersey and New York State tax and New Jersey local tax, with five benefit deductions and no general deductions with Absence Management (KU0203).

DATA COMPOSITION DESCRIPTION

There are 500,480 active employees and each employee has eleven months of payroll history. Within the active employee population, there are a total of 500,480 Jobs from which the active employees receive compensation. In this benchmark there are a total of 500,480 payments.

The employees were distributed over four monthly, semi-monthly, bi-weekly and weekly pay groups. Each of these four pay groups was assigned to 32 pay groups for a total of 128 pay groups. With further sub-divisions, the benchmark was set up for 128 concurrent processes for the Paysheet, PayCalc and PayConfirm processes for this test. The employee profiles are as follows:

Employee ID	Pay Group	Pay Freq.	Employee Type	Employee Status
KU0200	PB1	Weekly	Hourly	PT 20 Hrs
KU0202, ER0	PB4	Monthly	Salaried	PT 30 Hrs
KU0202, ER1	PB2	Bi-Weekly	Exc Hourly	PT 10 Hrs
KU0203	PB4	Monthly	Salaried	FT
KU0204	PB2	Bi-Weekly	Salaried	FT
KU0205	PB3	Semi-Mon.	Salaried	FT
KU0208, ER0	PB1	Weekly	Salaried	PT 20 Hrs
KU0209	PB3	Semi-Mon.	Hourly	FT

Table 5: Employee Profiles for Seed Data

- Full time, salaried paid biweekly with Federal and Pennsylvania State tax and seven per pay period benefit deductions (KU0204).
- Full time, salaried paid semi-monthly with one additional pay, with Federal and Michigan State tax, five per pay period benefit deductions, with Time and Labor (KU0205).
- One Part-time salaried paid weekly with one additional pay, with Federal and Georgia State tax, seven per pay period benefit deductions and one general deduction with Absence Management and Time and Labor (KU0208 ER0).
- Full time, hourly paid semi-monthly with one additional pay, with Federal and California State tax, seven per pay period benefit deductions and no general deductions (KU0209)

The benchmarking payroll Pay_End_Dt is Dec 9th (PB1 weekly), Dec 16th (PB2 bi-weekly), Dec 15th (PB3 semi-monthly), or Dec 31st (PB4 monthly). The database reflects ~11 months history in calendar year 2006.

Note that this 'Data Model' has been revised from that used for Release 9.1. Direct comparison between this result and results published for earlier releases is impossible.

BENCHMARK ENVIRONMENT

HARDWARE CONFIGURATION

Database Server: (One per LDom)

One half of a SPARC M7-8 server was divided into two logical domains (2 × 2 chips each). One chip from each domain (a zone of 31 cores) was assigned to be one of the twin database servers. The other chip was not utilized in this test. Each 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 (~421 GB used at peak load)
- 2 × Oracle ZFS Storage ZS3-2 Appliances, each with 40 × 300 GB 10K RPM SAS-2 HDD, 8 × Write Flash Accelerator SSD and 2 × Read Flash Accelerator SSD 1.6TB SAS for LDom1 and LDom2 Database data files
- 1 × Oracle Server X5-2L (2 × Intel Xeon Processor E5-2630 v3, 32 GB memory, 4 x 1.6 TB NVMe SSD) LDom1 and LDom2 for Database redo logs

SOFTWARE VERSIONS

Oracle's PeopleSoft HRMS and Campus Solutions 9.10.00.000 with FP2

Oracle's PeopleSoft Enterprise (PeopleTools) 8.52.03

Oracle 11g 11.2.0.3.0 (64-bit)

Oracle Solaris 11.3

Oracle Java SE 6u32

Oracle Tuxedo 10.3.0.0 (64-bit) Patch Level 043

Oracle WebLogic Server 11g (10.3.5)



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