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REVISION 2.1

PEOPLESOFT ENTERPRISE PAYROLL 8.9 USING DB2 FOR Z/OS ON AN IBM® z990 2084-B16 with 313 Feature [6-way LPAR]

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 Enterprise Payroll (North American) 8.9	
	Large Volume Model	
(English)	Payroll	132,000 checks - 130.1 minutes
	Pay Checks/Hour	60,876 per hour
Référence d'exécution	PeopleSoft Paie (Nord-américain) 8.9	
	Grand modèle de données	
(Français)	Livre de paie	132.000 Chèques – 130,1 minutes
	Chèques/heure	60.876 par heure
Benchmark-Test	PeopleSoft Personalabrechnung (Nordamerikaner) 8.9	
	Datenbankmodell "Large"	
(Deutsch)		132.000 Schecks – 130,1 Minuten
	Schecks/Stunde	60.876 pro Stunde
Patrón de rendimiento	PeopleSoft Pago (Norteamericano) 8.9	
	Modelo con volumen superior de datos	
(Español)	Nomina de pago	132.000 Cheques – 130,1 minutos
	Cheques/hora	60.876 por hora
Benchmark	Pagamento (North-american) 8.9 do PeopleSoft	
	Modelo de Grande Volume	
(Português)		132.000 Cheques – 130,1 minutos
	Cheques/hora	60.876 por a hora

BENCHMARK PROFILE

In January 2006, Oracle (PeopleSoft) conducted a benchmark in Pleasanton, CA to measure the batch performance of the Paysheet Creation, Payroll Calculation and Payroll Confirmation processes in PeopleSoft Enterprise Payroll 8.9 (North American) using IBM DB2 for z/OS™ 8.1 on an IBM zSeries™ 990 model 2084-B16 with 313 Feature database server, running IBM® z/OS version 1.4. A 9 Terabyte (~2.8 TB available, <150 GB used) IBM TotalStorage® DS8300 was used for storage.

The benchmark measured three Payroll application business process runtimes for one database model representing a large organization. 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 Large-model results for Oracle (PeopleSoft) Enterprise Payroll 8.9 using DB2 for z/OS.**

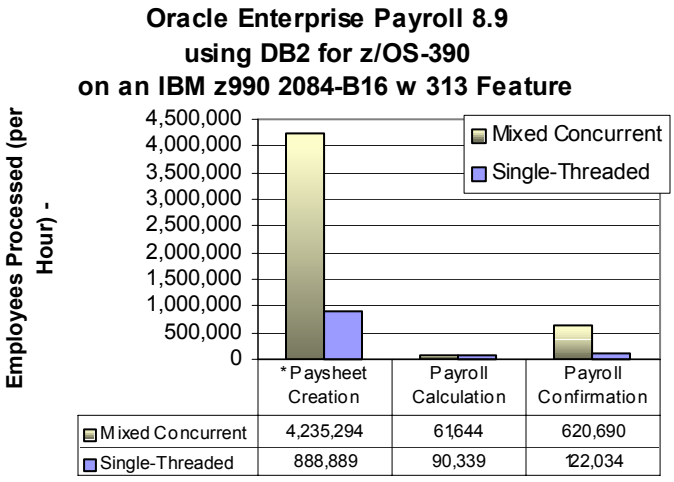

Figure 1: Enterprise Payroll 8.9 Processing Rates

* The Paysheet Creation process may be run separately, however, it was included with the other two processes for this benchmark.

METHODOLOGY

For this benchmark, all jobs were initiated on the server using Job Control Language (JCL).

This application was run as eight concurrent processes or as single-streamed processes.

Batch processes are background processes, requiring no operator intervention or interactivity. Results of these processes are automatically logged in the database. The runtimes are posted to the Process Request database table where they are stored for subsequent analysis.

BUSINESS PROCESSES

The three 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.

BATCH RESULTS

The tables below contain the actual runtimes, in minutes, for the Payroll processes. It also shows how many employees were processed and the total checks per hour.

Business Process	Jobs	Mixed Concurrent	Jobs	Single-Threaded
Paysheet Creation	8	1.7 min	1	8.1 min
Payroll Calculation	1*	116.8 min	1	79.7 min
Payroll Confirmation	8	11.6 min	1	59 min
Total Runtime		130.1 min		146.8 min

Employees Processed per Hour		
Total Checks	132,000	132,000
Checks per Hour	60,876	53,951
Total Employees	120,000	120,000
Employees per Hour	55,342	49,046

Table 1: PeopleSoft 8 Payroll Process Runtimes

* This is effectively eight sequential serial jobs corresponding to the 8 'run controls' set up for the processes run concurrently. When all processes were set up to run single-threaded, there was a single 'run control.' Note how this lessened the schedule/execution overhead for the Payroll Calculation execution time in the 'single-threaded' column.

Although there were 120,000 active employees, 132,000 checks were processed since one of the ten active profiles actually received two checks.

Eight concurrent processes were run for the 'Paysheet Creation' and the 'Payroll Confirmation' batch jobs shown in the "Mixed Concurrent" column of Table 1. The 'Payroll Calculation' process was run single-threaded. In the column labeled "Single-Threaded," all three payroll processes were run single-threaded.

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

SERVER PERFORMANCE

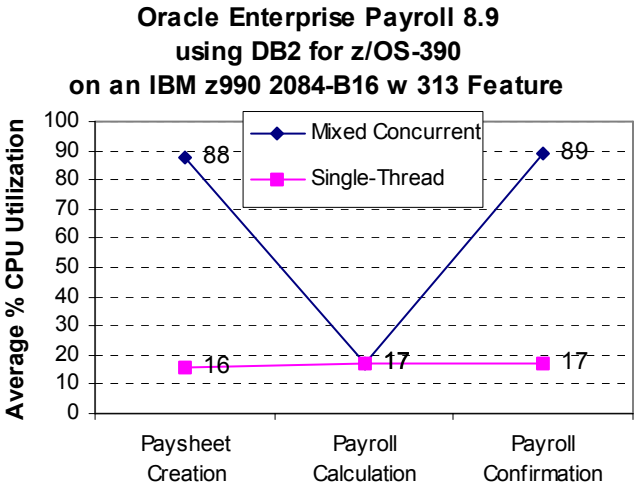

Figure 2: Average CPU Utilization

I/O PERFORMANCE

The 2.4 Terabyte (allocated) IBM TotalStorage DS8300 was used for storage. I/O performance is crucial to batch performance and is summarized as follows:

	Avg I/Os per Sec	Peak I/Os per Sec	Avg. I/O Response
Mixed Concurrent	445	488	0.7 msec
Single-Threaded	262	485	0.7 msec

Table 2: I/O Performance

DATA COMPOSITION DESCRIPTION

The database used in the benchmark contained six months history data. The following table shows the total number of employees, and the number of active employees for each model.

	Large Model
Total Employees	120,000
Total Checks	132,000
Total Checks without Consolidation†	180,000

Table 3: Database Composition

† Two employees would each get three checks due to their profiles (KU0207 & KU0208) while a third would get two (KU0202). The "Consolidation" functionality ("Single Check YES Vs. Single Check NO") takes care of this for the first two by combining their 'three' checks into a single one. This is possible because each of their 'three' positions is within the same pay group type. The employee who actually gets two checks has positions within two different pay group types.

The employees were distributed over four monthly, semi-monthly, bi-weekly and weekly pay groups with ten different employee profiles. Each of these was assigned to 32 pay groups. Hence, the benchmark could have been set up for up to 32 concurrent processes for the Paysheet and confirmation processes instead of the eight concurrent processes chosen for this test. The profiles are as follows:

Employee ID	Pay Group	Pay Freq.	Employee Type	Employee Status
KU0200	KU1	Weekly	Hourly	PT 20 Hrs
KU0201	KU2	Bi-Weekly	Hourly	FT
KU0202	KU4	Monthly	Salaried	PT 30 Hrs
	KU2	Bi-Weekly	Exc Hourly	PT 10 Hrs
KU0203	KU4	Monthly	Salaried	FT
KU0204	KU2	Bi-Weekly	Salaried	FT
KU0205	KU3	Semi-Mon.	Salaried	FT
KU0206	KU2	Bi-Weekly	Salaried	FT
KU0207	KU1	Weekly	Hourly	PT 20 Hrs
	KU1	Weekly	Hourly	PT 10 Hrs
	KU1	Weekly	Hourly	PT 10 Hrs
KU0208	KU1	Weekly	Salaried	PT 20 Hrs
	KU1	Weekly	Salaried	PT 10 Hrs
	KU1	Weekly	Salaried	PT 10 Hrs
KU0209	KU3	Semi-Mon.	Hourly	FT

Table 4: Employee Profiles for Seed Data

- Part-time, hourly paid weekly with Federal and California State tax, three general deductions and nine per pay period benefit deductions, one garnishment deduction and two direct deposits (KU0200).

- Full time, hourly, paid biweekly with federal and Ohio State and local tax deductions and nine per pay period benefit and two general deductions with Time and Labor. (KU0201)

- Two Part-time jobs, one salaried paid monthly and the other exception hourly paid biweekly, with federal and California State tax, four general deductions and eight per pay period benefit deductions with Absence Management (KU0202)

- Full-time salaried paid monthly with Federal and California and New York reciprocity tax, with six benefit deductions and no general deductions with Absence Management (KU0203)

- Full time, salaried paid biweekly with federal and Pennsylvania state and four local tax deductions and eight per pay period benefit deductions (KU0204)

- Full time, salaried paid semi-monthly, with federal and Michigan state and local tax deductions, six per pay period benefit deductions, with Time and Labor (KU0205)

- Full time, salaried paid semi-monthly, with federal and California state tax deductions, eight per pay period benefit deductions, two general deductions, and Time and Labor and Absence Management (KU0206)

- Three Part-time jobs, all hourly paid weekly, with federal and Tennessee State tax, three general deductions and eight per pay period benefit deductions and one direct deposit with Absence Management and Time and Labor (KU0207)

- Three Part-time jobs, all salaried paid weekly, with federal and Georgia State tax, one general deduction and eight per pay period benefit deductions with Absence Management and Time and Labor (KU0208)

- Full time, hourly paid semi-monthly, with federal and California state tax deductions, eight per pay period benefit deductions and no general deductions (KU0209)

The benchmarking payroll run is Dec 24th (KU2bi-weekly) or 31st (KU1weekly, KU3semi-monthly, KU4monthly) 2004. The database reflects ~6 months history in calendar year 2004.

Note that this 'Data Model' is different, and more complex, than that used for benchmarking Release 8.8.

I/O PERFORMANCE

The 2.4 Terabyte (allocated) IBM TotalStorage DS8300 Enterprise Storage Server (SHARK) was used for storage. I/O performance is crucial to batch performance and is summarized as follows:

	Avg I/Os per Sec	Peak I/Os per Sec	Avg. I/O Response
Concurrent	445	488	0.7 msec
Single-Threaded	262	485	0.7 msec

Table 3: I/O Performance

BENCHMARK ENVIRONMENT

HARDWARE CONFIGURATION

The IBM® zSeries 990 model 2084-B16 with 313 Feature was used as the database server. It was equipped with the following:

- 6 × IBM® z990 Gen1 Processors (13 Processors populated, but only 6 available for this testing) 4392 MIPS total for 13 engines, 2027 MIPS for 6 engines
- 32 Gigabytes of Memory (3 GB available for this test)

The IBM zSeries 990 was attached to:

- One IBM TotalStorage DS8300 with dual 4-way processors, 72.8 GB disk size, ~9 Terabytes of total Disk Space, with 2.8 Terabytes available (<150 GB used)

SOFTWARE VERSIONS

Oracle (PeopleSoft) Enterprise Payroll 8.9

Oracle (PeopleSoft) Enterprise PeopleTools 8.46.05b

IBM® DB2 for z/OS 8.1

IBM® z/OS version 1.4 (on the Database server)

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