ORACLE | PeopleSoft.
PeopleSoft. | Enterprise

ORACLE REVISION 1.0

PEOPLESOFT ENTERPRISE GLOBAL PAYROLL 8.9 (FRANCE) USING ORACLE9*i* ON AN IBM SYSTEM p 570 POWER6 Processor Technology Server WITH A DS4800 TOTALSTORAGE SYSTEM

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 Global Payroll 8.9 (France)	
(English)	150,000 Payees	
	# Minutes to Process	45 minutes
	Payees per Hour	200,222 per hour
Référence d'exécution	PeopleSoft Enterprise Paie Globale 8.9 (France)	
(Français)	150.000 Salariés	
	Temps d'Exécution	45 minutes
	Salariés / heure	200.222 par heure

Note that the summary above includes the processing times for the 'identify,' 'calculate' and 'finalize' payroll processes.

BENCHMARK PROFILE

In April 2007, Oracle (PeopleSoft) and IBM conducted a benchmark in Beaverton, OR to measure the batch performance of the [Employee] Identification, [Payroll] Calculation, Finalize, Banking and Payslip processes in Oracle's PeopleSoft Enterprise Global Payroll 8.9 (France) with Oracle9*i*™ 9.2.0.6 on an 8-core IBM® System p™ 570 POWER6 processor-based server, running IBM AIX 5L™ for POWER V5.3 with the 5300-06 Technology Level. An IBM TotalStorage® DS4800 disk array was used for data storage.

The PeopleSoft Enterprise Global Payroll solution is part of Oracle's PeopleSoft Enterprise Human Capital Management family of applications. Global Payroll delivers efficiencies, improves control over all aspects of your worldwide payroll operations, allows best practices to be replicated across the enterprise, and increases visibility into individual country activities. A single rules-based engine and scalable platform with an ever growing list of country extensions enable you produce multinational payrolls that fully comply with local requirements.

This benchmark measured 'Global Payroll' application business process runtimes for a large database model. Testing was conducted in a controlled environment with no other applications running. The tuning changes included PeopleSoft support fixes (ICE Resolution Ids) #645140, #660245 and #660471. These will be generally available in a future update. **The goal of this Benchmark was to obtain reference performance results for Oracle's PeopleSoft Enterprise Global Payroll 8.9 (France).**

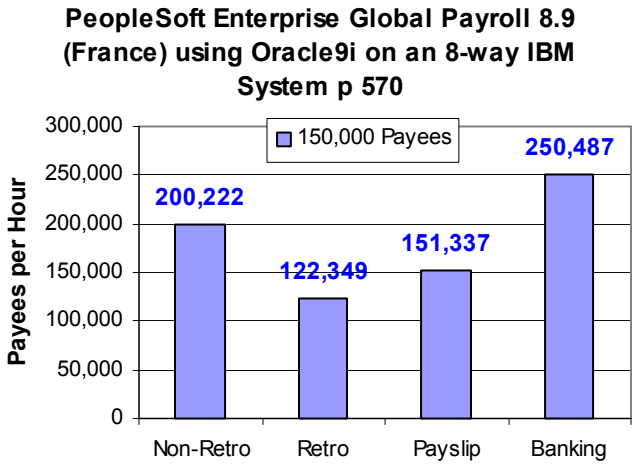

Figure 1: PeopleSoft Enterprise Global Payroll 8.9 (France) Processing Rates

The "Non-Retro' and 'Retro' throughput rates above include the Identification, Calculate and Finalize processes. The "Payslip' and 'Banking' processes include 'Retro' processing.

METHODOLOGY

PeopleSoft Enterprise Global Payroll 8.9 batch processes can be initiated from a browser. For this benchmark, all runs used a browser to initiate COBOL, Application Engine (AE) or SQR jobs.

The Identify, Calculation and Payslip processes were run as 32 concurrent processes—based upon the employee ID number ranges.

Business Process	Job Streams	Process Type
Identify	32	COBOL
Calculate	32	COBOL
Finalize	Single-Threaded	COBOL
Payslip	32	AE & SQR
Banking	Single-Threaded	App Engine & SQR

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 PeopleSoft Enterprise Global Payroll 8.9 processes tested are as follows:

[Employee] Identification: This test (COBOL) identifies eligible payees for the selected Calendar period. The process looks at the Calendar selection criteria and then compares this to the employee's pay system flag, pay group and status. When applicable, it also looks at Positive Input information as well as Retro Triggers. The Identification process can be run separately from the other two tasks, usually right before the first calculation is run.

[Payroll] Calculation: This process (COBOL) looks at identified payees and performs appropriate payroll and/or absence calculations 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 run, as well as the processing resources required. In this benchmark, Payroll Calculation was run only once, as though at the end of a payroll/absence period.

Finalize: (COBOL) Takes the information generated by Calculation and 'closes' the period. Finalize can only be run once, and therefore, must be run at the end of the pay period.

Payslip: (AE & SQR) Provides payroll information at the employee-level, allowing the employee to view their net pay.

Banking: (AE & SQR) Setup to prepare for the creation of a single entity for each payroll result that needs to be 'paid out,' in an interface table. The table keeps all of the information required to execute the payment (net payment and external deductions). This process generates a flat file for Electronic File Transfer purposes.

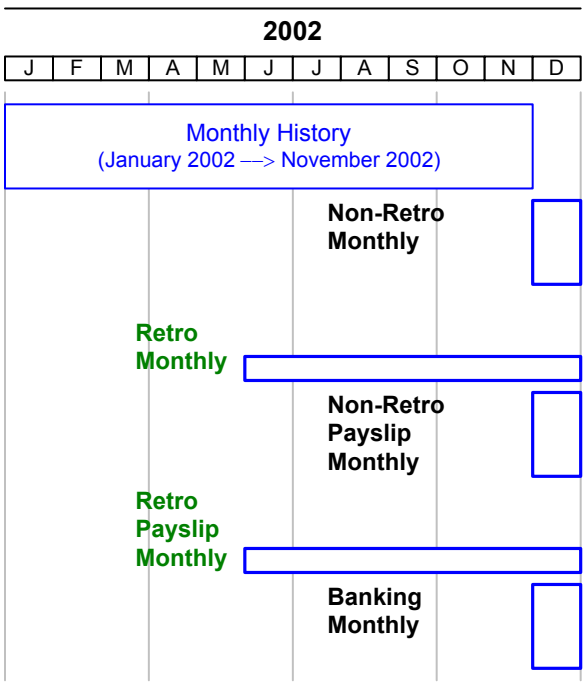

Figure 2: History and Execution Plan

Figure 2 summarizes the periods used in the creation of historical data and the corresponding execution periods. Eleven months of history were created and then the year-end payroll calculations were performed.

The monthly payroll with retroactivity and monthly pay-slip with retroactivity processes were the only processes involving more than a single (monthly) pay period. Other processes may take into account the results of retro calculations. In this case, 20% of the payees had their payroll recalculated for six previous periods.

BATCH RESULTS

The retro calculation involved 20% of the 'monthly' population having their payroll recalculated back through June. Thus, the 150,000-payee monthly [Retro] run processed 660,000 segments [((30,000 × 6) + (150,000 × 1)) × 2] rather than the base 150,000 employees.

	150,000 Payees
Active Payees	150,000
Total Segments (No Retro)	300,000
Total Segments (Including Retro)	660,000

Table 1: Payee and Retro Correspondence

Table 2 contains the actual runtimes, in minutes, for the Global Payroll processes.

150,000 Payees	Payroll – Not Including Retroactivity			Payroll - Including Retroactivity		
Process Tested	# Min. to Process	# Payees Processed per Hour	# Segments Processed per Hour	# Min. to Process	# Payees Processed per Hour	# Segments Processed per Hour
Payroll						
Identify	1.83	4,918,033	9,836,066	2.28	3,947,368	17,368,421
Calculate	42.62	211,168	422,337	69.23	130,001	572,006
Finalize	0.50	18,000,000	36,000,000	2.05	4,390,244	19,317,073
Payroll SubTotal:	44.95	200,222	400,445	73.56	122,349	538,336
Payslip						
Payslip Subtotal	18.28	492,341	984,683	59.47	151,337	665,882
Payroll + Payslip Totals	63.23	142,337	284,675	133.03	67,654	297,677
Banking						
Banking Prep	8.38	1,073,986	2,147,971	27.01	333,210	1,466,124
Banking FRANCE	3.15	2,857,143	5,714,286	6.40	1,406,250	6,187,500
EFT File	1.02	8,823,529	17,647,059	2.52	3,571,429	15,714,286
Banking SubTotal:	12.55	717,131	1,434,263	35.93	250,487	1,102,143
Payroll + Payslip + Banking Totals	75.78	118,765	237,530	168.96	53,267	234,375

Table 2: PeopleSoft Enterprise Global Payroll 8.9 Process Runtimes

The displayed runtimes for each multi-threaded process are based on the earliest start time and last finish time.

SERVER PERFORMANCE

Table 4 shows the average CPU utilization for each process. The value shown is the average across all 8 processors.

	150,000 Payees Non-Retro			
% Average CPU	**User**	**System**	**Idle**	**I/O wait**
Payroll				
Identify	42	3	39	16
Calculate	71	3	12	15
Finalize	5	1	93	1
Payslip	67	3	19	11
Banking				
Prep	10	1	89	1
FRANCE	10	<1	89	<1
EFT	6	2	92	<1
	150,000 Payees Retro			
% Average CPU	**User**	**System**	**Idle**	**I/O wait**
Payroll				
Identify	58	3	29	10
Calculate	74	2	12	10
Finalize	3	1	92	4
Payslip	38	3	30	28
Banking				
Prep	8	1	90	2
FRANCE	12	<1	88	<1
EFT	6	2	91	<1

Table 4: Average CPU Utilization

Single-threaded processes, like the Finalize and Banking processes generally engage but a single CPU.

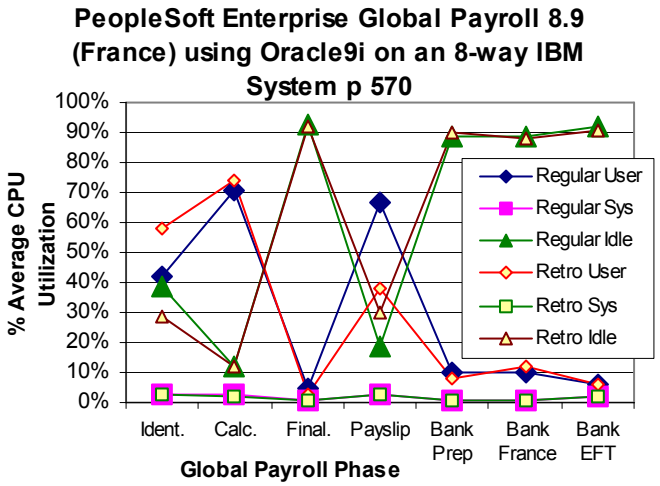

Figure 3: Average CPU by Processing Phase

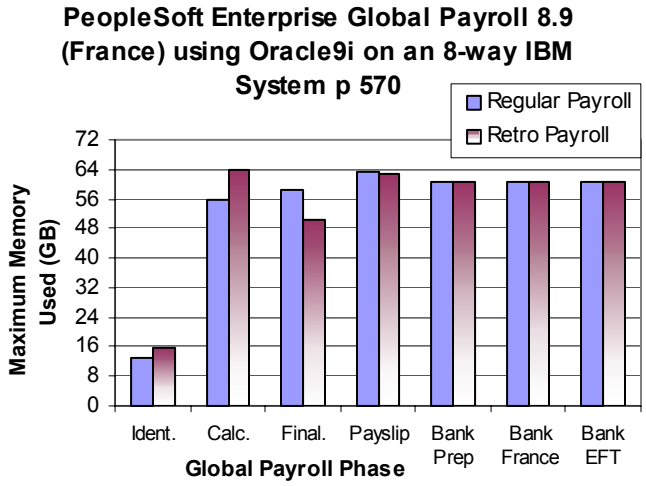

Figure 4: Maximum Memory Used by Processing Phase

Figure 4 demonstrates that the benchmark was executed in such a way as to use effectively all of the available memory (64 GB) in all but the first process.

I/O PERFORMANCE

An IBM TotalStorage® DS4800 with 84 × 36.4 GB disks set up in RAID 5 configuration (as 9 sets of 9 disks per 'hdisk') was used for the benchmark. I/O performance is crucial to batch performance and is summarized as follows:

		Reads KB per Sec	Writes KB per Sec	Total Disk KB per Sec
Pay ID	AVG	26,445.0	30,182.9	4,832.3
	Peak	60,877.7	66,224.9	8,041.5
Pay Calc	AVG	22,494.8	54,319.5	76,814.3
	Peak	69,095.4	113,875.5	152,934.7
Pay Final	AVG	25,912.9	7,704.5	33,617.3
	Peak	97,396.3	29,416.2	97,431.0
Payslip	AVG	17,250.4	52,774.4	70,024.8
	Peak	194,482.8	225,028.0	313,312.3
Bank Prep	AVG	716.1	2,363.8	3,079.8
	Peak	5,875.3	11,977.7	17,853.0
Bank FRAN	AVG	2,620.3	2,776.9	5,397.2
	Peak	26,769.1	9,704.1	29,047.3
Bank EFT	AVG	1,061.1	1,348.6	2,409.8
	Peak	5,304.1	1,907.0	7,042.2

Table 5: I/O Subsystem Metrics – Regular

		Reads KB per Sec	Writes KB per Sec	Total Disk KB per Sec
Pay ID	AVG	19,906.1	37,025.2	56,931.3
	Peak	59,985.9	97,847.4	113,231.3
Pay Calc	AVG	19,074.1	58,859.3	77,933.5
	Peak	94,390.5	142,423.3	170,518.2
Pay Final	AVG	5,944.2	4,376.6	10,320.8
	Peak	14,109.3	16,402.1	19,579.3
Payslip	AVG	48,085.0	28,734.7	76,820.6
	Peak	644,019.0	205,475.5	666,342.4
Bank Prep	AVG	1,315.6	2,911.2	4,226.8
	Peak	7,742.8	62,610.2	62,619.3
Bank FRAN	AVG	1,411.1	4,867.2	6,278.3
	Peak	26,924.0	40,059.7	66,983.7
Bank EFT	AVG	473.0	1,430.0	1,903.1
	Peak	4,728.2	5,812.4	10,540.6

Table 6: I/O Subsystem Metrics – Retro

CONFIGURATION PARAMETERS

Init.ora Parameter	Value
_optim_peek_user_binds	FALSE
background_dump_dest	/oracle/9.2/admin/hrps/bdump
compatible	9.2.0.6
control_files	/oracle/9.2/hrps_ora_control1.ctl
core_dump_dest	/oracle/9.2/admin/hrps/cdump
cursor_sharing	force
db_block_size	8192
db_cache_size	45,097,156,608
db_domain	
db_file_multiblock_read_count	32
db_files	1,021
db_name	HRPS
db_writer_processes	20
fast_start_mttr_target	300
filesystemio_options	setall
hash_area_size	10,485,760
instance_name	HRPS
java_pool_size	67,108,864
log_buffer	52,428,800
log_checkpoint_interval	1,215,752,192

Table 7a: init.ora Parameters

Init.ora Parameter	Value
log_parallelism	4
open_cursors	400
parallel_automatic_tuning	TRUE
parallel_max_servers	1,900
parallel_min_percent	5
parallel_min_servers	96
pga_aggregate_target	6,291,456,000
processes	2,280
resource_manager_plan	SYSTEM_PLAN
session_cached_cursors	250
sessions	2,513
sga_max_size	73,409,564,880
shared_pool_size	536,870,912
sort_area_size	524,288,000
timed_statistics	TRUE
undo_management	AUTO
undo_tablespace	PSRBS
user_dump_dest	/oracle/9.2/admin/hrps/udump
workarea_size_policy	AUTO

Table 7b: init.ora Parameters Continued

DATA COMPOSITION DESCRIPTION

History data for January 2002 through November 2002 was created prior to the timed benchmark runs (11 periods for monthly payees). This is shown graphically in Figure 2.

A payroll calendar was run for each month of this benchmark using individual Calendar Groups for each month.

The Retro calculation primarily involves the first three processes (ID, Calc, Finalize). 20% of the 'monthly employee' profiles have retro processing for the previous six months (June through November).

The employees were distributed over a single pay entity and a single pay group. There are 16 different monthly employee profiles. The distribution is as follows:

Pay Entities	Pay Entity 1 (1 Pay Group) Monthly
Payees (Population)	100%
Payees with Element Segmentation	2%
Payees with Period Segmentation	15%
Payees with Disability	7%
Payees with Dependents	60%
Absence	69%
Vacation	50%
Sickness	10%
Work Accident	1%
Maternity	2%
Un-Paid Leave	3%
Family Event Leave	3%
Payees Terminated in 1 Month	3%
Payees Hired in 1 Month	3%
Payees with Positive Input	25%
E & D Override	50%
Payees with Loan	5%
Payees with Garnishment	3%
Payees with Retro	20%
Average Number of Earnings Deductions Calculated	>40

Table 7: France Specific Setup

BENCHMARK ENVIRONMENT

HARDWARE CONFIGURATION

The IBM System p™ 570 (9117-MMA) POWER6 processor-based server was used as the database/batch server. It was equipped with the following:

- 8 × 4.7 GHz IBM POWER6™ processors (SMT Enabled), each with 32 Kilobytes of Level-1 Data Cache and 64 Kilobytes of Level-1 Instruction Cache, with an average of 0.95 Megabytes of Level-2 Cache, with an average of 18 Megabytes of Level 3 Cache
- 64 Gigabytes of Memory (all 64 GB used, see Figure 4)
- ~3713 Gigabytes of total Disk Space (18 × 36.4 GB + 84 × 36.4) (~550 GB used)
- 8 Disk Controllers (6 × SCSI, 2 × 1 Gbit Fibre Channel)
- One IBM TotalStorage DS4800

SOFTWARE VERSIONS

Oracle's PeopleSoft Enterprise Global Payroll (France extension) 8.9

Oracle's PeopleSoft Enterprise (PeopleTools) 8.45.06

Oracle9i™ 9.2.0.6 (64-bit)

IBM AIX 5L for POWER V5.3 with the 5300-06 Technology Level (64-bit) (on the Database server)

Micro Focus™ Server Express™ (COBOL) 4.0 w/SP 1

BEA Tuxedo® 8.142 with Jolt 8.1

SQR 8.45

ICE Tracking:

Resolution ID: 645140, Bundle Resolution: 637358

Resolution ID: 660245, Bundle Resolution: 637473

Resolution ID: 660471, Bundle Resolution: 637473

Oracle (PeopleSoft) Pleasanton
4500 Oracle Lane
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