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PEOPLESOFT HRMS 8.9 SELF-SERVICE USING DB2 FOR Z/OS 8.1 ON AN IBM® z990 2084-C24 with 318 Feature [6-way LPAR] and IBM® eServer pSeries p690 Server (16-WAY) WITH A DS8300 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 HRMS 8.9 Self-Service	
	Standard Data Model	
(English)	Average Response	Search 1.35 sec, Save 1.01 sec
	Concurrent Users	4,000
Référence d'exécution	PeopleSoft Ressources Humaines 8.9	
	Norme modèle de données	
(Français)	temps de réponse	Search 1,35 sec, Save 1,01 sec
	Concourants Utilisateurs	4.000
Benchmark-Test	PeopleSoft Personalmanagementsystem 8.9	
	Datenbankmodell "Standard"	
(Deutsch)	Antwortzeit	Search 1,35 sec, Save 1,01 sec
	Gleichzeitige Benutzer	4.000
Patrón de rendimiento	PeopleSoft Recursos Humanos 8.9	
	Volumen Estándar de datos	
(Español)	tiempo de reacción	Search 1,35 sec, Save 1,01 sec
	Simultáneos Utilizadores	4.000
Benchmark	Gerenciamento de Recursos Humanos, PeopleSoft 8.9	
	Volume Padrão dos dados	
(Português)	tempo de resposta	Search 1,35 sec, Save 1,01 sec
	Simultâneos Usuários	4.000

BENCHMARK PROFILE

In November 2007, Oracle (PeopleSoft) conducted a benchmark in Pleasanton, CA to measure the online performance of Oracle's PeopleSoft Enterprise Human Resources Management System (HRMS) 8.9 using DB2 for the z/OS 8.1 CUM 0705 on a 6-way IBM z990 2084-C24 (with 318 Feature) server running IBM z/OS 1.8 RSU 0708. A 12-CPU logical-partition of an IBM eServer pSeries p690 running IBM AIX 5L V5.3 was used as the application server. A 4-way logical-partition of an IBM eServer pSeries p690 running IBM AIX 5L V5.3 was used as a web server. The IBM TotalStorage® DS8300 disk array was used for data storage.

The benchmark measured client response times for 4,000 concurrent users. The standard database composition model represents a medium-sized company profile. The testing was conducted in a controlled environment with no other applications running. The tuning changes involved ICE Resolution Id: 734685. This will be generally available in a future update. **The goal of this Benchmark was to obtain baseline results for PeopleSoft HRMS 8.9 self-service transactions with DB2 for z/OS on IBM z990 and pSeries Servers.**
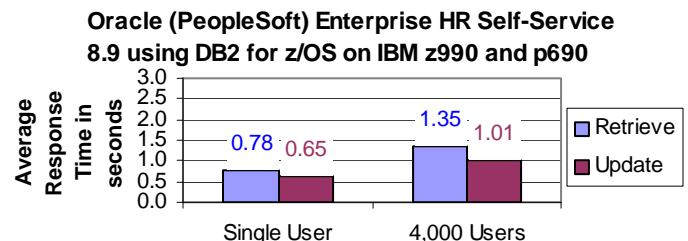

Figure 1: Average Response Times

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

METHODOLOGY

Mercury® LoadRunner® 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.

Mercury® QuickTest® Professional was used to automatically submit transactions and to record the benchmark measurements on the client PC.

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

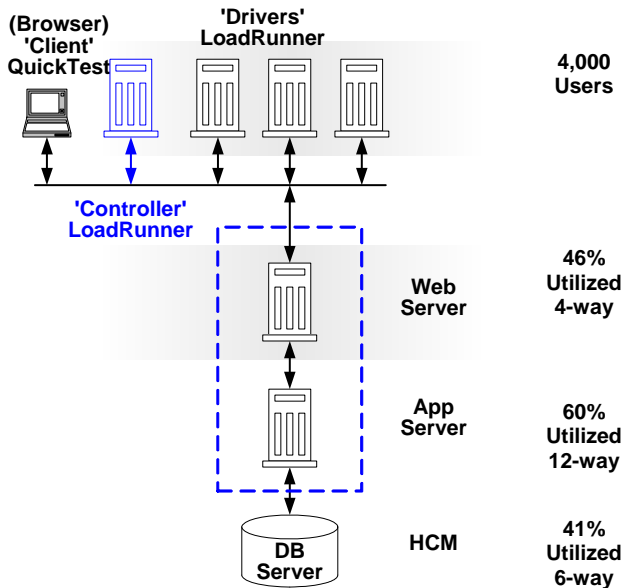Figure 2 shows a typical 4-tier benchmark configuration.

Figure 2: 4-Tier Configuration

The 16-way pSeries Server was partitioned into a 4-way Web server and a 12-way Application server.

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 thirteen PeopleSoft Enterprise 8.9 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.

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
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	80%	48%	5
Update Direct Deposit	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.

Process		Single User	4,000 Users
Update Home Address	Search	0.94	1.43
	Save	0.58	0.64
Update Home Phone	Search	0.04	0.05
	Save	0.08	0.21
View Benefits Sum	Search	0.56	0.62
Update Beneficiary	Search	1.22	2.15
	Save 1	0.11	0.33
	Save 2	0.57	0.96
	Edit/Calc	2.34	3.13
View Paycheck	Search	0.59	1.07
Update Direct Deposit Info	Search	1.92	2.20
	Save	0.11	0.31
View Employee Info	Search	1.25	2.29
Initiate Termination	Search	1.29	1.93
Initiate Promotion	Search	1.24	1.81
	Save	0.58	1.02
Initiate Salary Change	Search	2.38	2.91
	Save	0.56	1.57
	Calc	0.57	0.57
Add a Person	Save	0.59	0.65
Hire a Person	Save 1	0.53	0.59
	Save 2	1.14	1.81
Add a Job	Search	0.11	0.69
	Save	0.68	1.00
* Average Search		0.78	1.35
* Average Save		0.65	1.01
Trans/min Est.			800

Table 2: Employee/Manager Process Runtimes

The database and application servers were processing a total of 800 business processes per minute at the peak load of 4,000 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.

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.
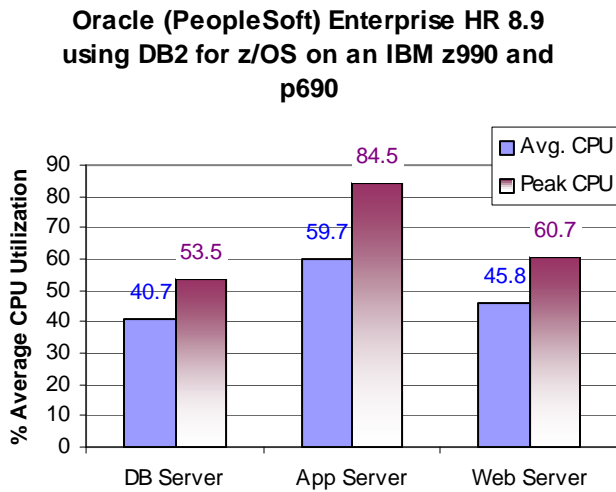

Oracle (PeopleSoft) Enterprise HR 8.9 using DB2 for z/OS on an IBM z990 and p690

Figure 3: Average Server CPU Utilization

% CPU	Avg.	Max.
DB Server	40.66	53.5
App Server		
User	51.7	70.8
System	8.0	13.7
I/O Wait	0.7	1.0
Idle	39.5	43.3
Web Server		
User	37.05	42.5
System	8.76	18.2
I/O Wait	1.19	2.5
Idle	53.0	56.2

Table 3: 4,000-User CPU Utilization

Partner IBM estimates that each user averaged about 0.206 MIPS on the z990.

	DB Server (9 GB)	App Server (32 GB)	Web Server (12 GB)
User Memory	~0.3 GB	15.7 GB	5 GB
Cache Memory		11.7 GB	0.8 GB

Table 4: Memory Utilization

I/O PERFORMANCE

An IBM TotalStorage® DS8300 with ~9 TB (2.8 TB allocated) set up in RAID 5 configuration was used for the benchmark. I/O performance is crucial to performance and is summarized as follows:

	Avg. I/Os per Sec	Peak I/Os per Sec	Avg. Response Time
DB Server	543	656	0.466 ms

Table 5: I/O Metrics

DATA COMPOSITION DESCRIPTION

The standard database was comprised of:

- 100,000 Employees (10 per Department)
- 20,000 Managers
- 1,000 Department Table Entries

BENCHMARK ENVIRONMENT

HARDWARE CONFIGURATION

Database Server:

The IBM zSeries 990, model 2084-C24 with 318 Feature was used as the database server. It was equipped with the following:

- $6 \times$ 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 (9 GB available for this test, ~270 MB used on average)

The IBM zSeries 990 was attached to:

- One IBM TotalStorage DS8300 Enterprise Storage Server, 2107-922, 72.8 GB disk size, ~9 Terabytes of total Disk Space, with 2.8 Terabytes available (<150 GB used)

Application Server(s):

The IBM eServer pSeries p690 (7040-681) server was used. Within the server, a logical-partition was allocated as the application server. It was equipped with the following:

- 12×1.9 GHz POWER4® Processors, each with 32 Kilobytes of Level-1 Data Cache and 64 Kilobytes of Level-1 Instruction Cache, 1.44 Megabytes of Level-2 Cache, with an average of 16 Megabytes of Level 3 Cache
- ~32 Gigabytes of Memory
- ~72 Gigabytes of total Disk Space (4×18.2 GB)
- $1 \times$ SCSI Internal Disk Controller

Web Server(s):

The IBM eServer pSeries p690 (7040-681) server was used. Within the server, a logical-partition was allocated as the web server. It was equipped with the following:

- 4 × 1.9 GHz POWER4® Processors, each with 32 Kilobytes of Level-1 Data Cache and 64 Kilobytes of Level-1 Instruction Cache, 1.44 Megabytes of Level-2 Cache, with an average of 16 Megabytes of Level 3 Cache
- ~12 Gigabytes of Memory
- ~72 Gigabytes of total Disk Space (4 × 18.2 GB)
- 1 × SCSI Internal Disk Controller

Load Simulation Driver(s):

2 × IBM xSeries 335 2-ways were used as drivers.

- 2 × 3.06 GHz Intel® Xeon™ Processors, each with 512 Kilobytes of Level-3 Cache (Note that HyperThreading™ was used to make this box look, and act, like a 4-way)
- 3.87 Gigabytes of Memory

1 × IBM xSeries 335 4-way was used as a driver. It was equipped with the following:

- 4 × 3.06 GHz Intel® Xeon™ Processors, each with 512 Kilobytes of Level-3 Cache (Note that HyperThreading™ was used to make this box look, and act, like a 4-way)
- 3.67 Gigabytes of Memory

Load Driver Controller:

1 × IBM xSeries 335 2-way was used as a controller. It was equipped with the following:

- 2 × 3.06 GHz Intel® Xeon™ Processors, each with 512 Kilobytes of Level-3 Cache (Note that HyperThreading™ was used to make this box look, and act, like a 4-way)
- 3.87 Gigabytes of Memory

Client PC:

Hewlett-Packard® d530C workstation with the following:

- 1 × 2.66 Gigahertz Intel® Pentium® 4 Processor, with 512 kilobytes of Level-2 Cache
- 1 Gigabyte of Memory

SOFTWARE VERSIONS

Oracle's PeopleSoft HCM (HRMS) 8.9

Oracle's PeopleSoft Enterprise (PeopleTools) 8.48.09c

IBM DB2 for z/OS 8.1 CUM 0705

IBM z/OS version 1.8 RSU 0708 (on the Database server)

IBM DB2 Connect (64-bit) DB2 Version 8.1.1.96 s050811 u803920 with FixPak 10

IBM AIX 5L V5.3.0.21 ML03 (64-bit) (on the App Server and Web Server)

Microsoft® Windows 2000 Advanced Server 5.0 Build 2195 (on the Driver Controller)

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

Microsoft® Windows XP™ (on the QTP Client)

Hewlett-Packard LoadRunner® 8.0

Hewlett-Packard QuickTest® Professional 6.5

BEA Tuxedo® 8.1 rp 192 (64-bit) with Jolt 8.1 with Java 1.4.2

IBM WebSphere™ Application Server 5.1.1.12 cf120637.02 (09/11/2006)

IBM WebSphere SDK 1.4.2.5 JDK pj9ap32142-20060428 (04/28/2006)

Java™ 2 Runtime Environment, Standard Edition (build 1.4.2)

Classic VM (build 1.4.2, J2RE 1.4.2 IBM AIX 5L for PowerPC (64 bit JVM) build caix64142-20050929 (SR3) (JIT enabled: jitc))

ICE Tracking:

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