

PEOPLESOFT ELM 8.81 SELF-SERVICE USING DB2 FOR AIX ON AN IBM® p5 570 Server (8-WAY)

As the world's leading provider of application software for the Real-Time Enterprise, PeopleSoft delivers high performance solutions that exceed our customers' expectations. Business software must deliver rich functionality with robust performance maintained at volumes representative of customer environments.

PeopleSoft benchmarks demonstrate our software's performance characteristics for a range of processing volumes with a specific platform configuration. Customers and prospects can use this information while planning 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 (English)	PeopleSoft ELM 8.8 Self-Service	
	Standard Data Model	
	Average Response	Search 1.53 sec, Save 0.79 sec
	Concurrent Users	3,000
Référence d'exécution (Français)	PeopleSoft ELM 8.8 Self-Service	
	Norme modèle de données	
	temps de réponse	Search 1,53 sec, Save 0,79 sec
	Concourants Utilisateurs	3.000
Benchmark-Test (Deutsch)	PeopleSoft ELM 8.8 Self-Service	
	Datenbankmodell "Standard"	
	Antwortzeit	Search 1,53 sec, Save 0,79 sec
	Gleichzeitige Benutzer	3.000
Patrón de rendimiento (Español)	PeopleSoft ELM 8.8 Self-Service	
	Volumen Estándar de datos	
	tiempo de reacción	Search 1,53 sec, Save 0,79 sec
	Simultáneos Utilizadores	3.000
Benchmark (Português)	PeopleSoft ELM 8.8 Self-Service	
	Volume Padrão dos dados	
	tempo de resposta	Search 1,53 sec, Save 0,79 sec
	Simultâneos Usuários	3.000

The benchmark measured client response times for 1,000, 2,000, 2,600, 2,800 and 3,000 concurrent users. The standard database composition model represents a 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 ELM 8.8 self-service transactions with DB2 UDB for AIX.**

The figure below illustrates average load/search and update/save response times for 1,000, 2,000, 2,600, 2,800 and 3,000 concurrent users.

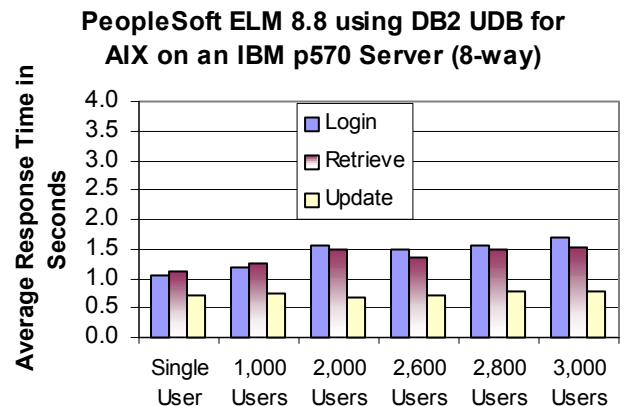


Figure 1: Average Response Times

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

BENCHMARK PROFILE

In September 2004, PeopleSoft and IBM conducted a benchmark in Beaverton, OR to measure the online performance of PeopleSoft Enterprise Learning Management (ELM) 8.81 using IBM® DB2® Universal Database Enterprise Server Edition Version 8.1.5 for AIX® on an 8-way IBM p5 570 database server, running IBM AIX 5L™ V5.3. An IBM TotalStorage® DS4500 was used for data storage.

Note that AIX V5.3 was not certified for PeopleTools 8.43 at the time this benchmark was run. The benchmark status will be updated to "Certified" when the appropriate PeopleTools/AIX version certification has been completed.

METHODOLOGY

Mercury Interactive's 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 Interactive's 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.

This test used a logical 4-tier configuration with a single host.

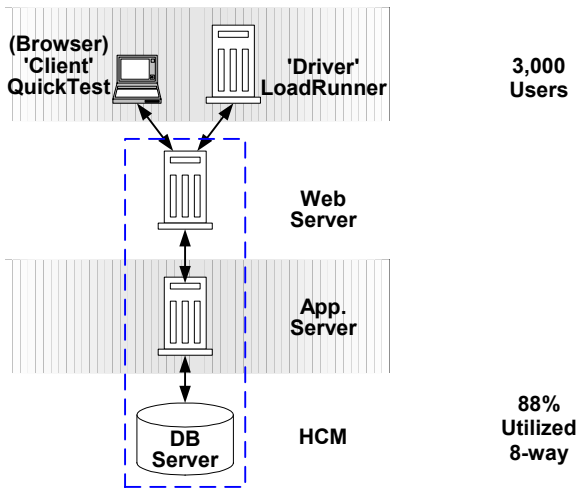


Figure 2: 4-Tier Configuration

Load 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 times were measured from the time the user clicks the <SAVE> button until the system has released the page.

BUSINESS PROCESSES

PeopleSoft defines a business transaction as a series of HTML pages that guide a user through a business process, such as browsing a course catalog.

The thirteen PeopleSoft ELM 8.8 business processes tested in this benchmark are as follows:

LEARNER SELF-SERVICE

Browse Course Catalog: User logs in and navigates to a specified course in the course catalog via the browse feature.

Search Course Catalog: User logs in and navigates to a specified course in the course catalog utilizing the search feature.

Add Learning to Plan from Catalog: The user logs in and navigates to their learning plan. They navigate to a specified course, add it to their learning plan, and enroll in the course.

Enroll in Blended Activity: The user logs in and navigates to their learning plan. They navigate to a specified blended course, add it to their learning plan, and enroll in the course.

Launch Web-Based Content: User logs in and navigates to a specified course. The specified course is launched, then the user quits and logs out.

Register in Program: The user logs in and navigates to a specified program. Then, they register in the program.

MANAGER SELF-SERVICE

Approve Learning: The manager logs in and navigates to their Team Learning Home page. They approve a specified learner's pending selection.

Add to Learner's Plan: The manager logs in and navigates to their Team Learning Home page and then to a specified Team Member's Learning Plan. Next, the manager searches for a specified course and adds it to the team members learning plan.

Enroll Team Member: The manager logs in and navigates to their Team Learning Home page and then to a specified Team Member's Learning Plan. Next, the manager searches for a specified course and enrolls a Team Member. The enrollment is confirmed.

Review and Add Team Member's Objectives: The manager logs in and navigates to their Team Learning Home page. They add a specified Objective to a Team member's Learning Plan.

Review Team Learning History: The manager logs in and navigates to their Team Learning Home page and then to a specified Team Member's Learning History.

INSTRUCTOR SELF-SERVICE

Mark Grades and Attendance: The user logs in and navigates to the Learning Roster for a specified course. Then the user marks the grades and attendance for the enrolled learners.

BACK OFFICE/CALL CENTER

Process Enrollment Request: The user logs in and navigates to the Learning Roster for a specified course. Then the user updates the course status for a specified learner.

Process by Role	Percent Within Role	Net Percent of Total	Average Pacing (Minutes)
Learner Self-Service 67% Overall			
Browse the Course Catalog	48%	32%	7 min
Search Catalog	12%	8%	7 min
Add Learning to Plan from Catalog	12%	8%	7 min
Enroll in Blended Activity	4.5%	3%	5 min
Launch Web-Based Content	22%	15%	5 min
Register in Program	1.5%	1%	9 min
Manager Self-Service 26% Overall			
Approve Learning	31%	8%	7 min
Add to Learner's Plan	15%	4%	9 min
Enroll Team Member	8%	2%	9 min
Add Team Member's Objective	31%	8%	9 min
Review Team Learning History	15%	4%	5 min
Instructor Self-Service 4% Overall			
Mark Grades & Attendance	100%	4%	17.5 min
Back Office/Call Center 3% Overall			
Process Enrollment Request	100%	3%	15 min
Total		100%	

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.

ONLINE PROCESS RESULTS

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

		Users					
		One	1,000	2,000	2,600	2,800	3,000
Learner Self-Service							
Browse Course Catalog	Login	1.014	1.132	1.503	1.448	1.509	1.642
	R1	0.672	0.724	1.127	0.793	0.972	0.965
	R2-1	0.795	0.767	0.736	0.799	0.767	0.783
	R2-3	0.688	0.688	0.630	0.677	0.674	0.731
Search Catalog	Login	0.988	1.069	1.628	1.514	1.411	1.528
	R1	0.967	1.035	1.637	1.262	1.536	1.443
	R2-1	1.785	1.769	2.092	1.967	2.026	2.090
	R2-2	0.802	0.814	0.774	0.898	0.818	0.844
	R2-3	0.679	0.686	0.651	0.682	0.677	0.738
Add Plan	Login	1.056	1.149	1.748	1.380	1.729	1.538
	R1	1.474	1.833	2.378	1.920	2.505	2.472
	R2	1.790	1.892	2.368	2.304	2.509	2.361
	U1	0.780	0.839	0.719	0.778	0.990	0.818
Enroll	Login	1.030	1.311	1.590	1.418	1.519	1.717
	R1	1.335	1.797	2.352	1.773	2.469	2.316
	R2	1.795	1.859	2.316	2.314	2.233	2.484
	U1	0.804	0.894	1.115	0.932	1.038	1.019
Launch	Login	1.155	1.352	1.533	1.524	1.630	2.019
	R1	1.825	2.340	2.597	2.321	2.658	2.667
	R2	0.736	0.740	0.877	0.698	0.863	1.227
	U1	0.198	0.161	0.153	0.175	0.174	0.177
Register	Login	1.009	1.116	1.453	1.517	1.517	1.578
	R1	1.689	1.691	2.443	2.203	2.411	2.476
	R2	1.521	1.464	1.885	1.927	1.849	2.123
	U1	0.759	0.816	0.771	0.760	0.783	0.861

Table 2a: Employee Process Runtimes

Note: the tabular results continue on the next page.

UNCERTIFIED

		Users					
		One	1,000	2,000	2,600	2,800	3,000
Manager Self-Service							
Approve Learning	Login	1.080	1.141	1.601	1.585	1.545	1.755
	R1	1.858	2.194	2.962	2.868	3.007	3.311
	U1	0.828	0.814	0.748	0.811	0.929	0.929
Add to Plan	Login	1.010	1.010	1.547	1.519	1.523	1.686
	R1	1.731	1.740	2.418	2.273	2.420	2.387
	R2	1.050	1.043	0.901	1.116	1.026	1.035
Enroll Team Member	U1	1.274	1.333	1.247	1.236	1.255	1.524
	Login	1.012	1.142	1.625	1.509	1.550	1.760
	R1	0.981	1.186	1.290	1.281	1.396	1.321
Add Objective	R2	1.760	1.845	2.417	2.281	2.280	2.302
	U1	0.809	0.819	0.983	0.880	1.056	1.160
	Login	1.005	1.278	1.587	1.483	1.578	1.649
Review Team	R1	1.630	2.122	2.524	2.332	2.507	2.554
	R2	0.745	0.745	0.672	0.727	0.729	0.736
	U1	0.747	0.719	0.625	0.727	0.731	0.786
Instructor Self-Service	Login	1.005	1.095	1.491	1.516	1.516	1.587
	R1	2.498	2.549	3.151	2.814	3.031	2.965
Instructor Self-Service							
	Login	1.035	1.078	1.524	1.526	1.563	1.580
	R1	2.151	2.319	2.420	2.420	2.472	2.502
	R2	1.233	2.450	2.983	2.946	2.847	3.050
	U3	1.549	1.608	1.467	1.561	1.580	1.623
Back Office / Call Center							
	Login	1.083	1.144	1.481	1.493	1.524	1.602
	R1	2.394	2.172	2.483	2.422	2.507	2.514
	R2	1.568	2.733	3.304	3.042	3.123	3.238
	U2	0.913	0.889	0.880	0.870	0.856	0.917
Average Login		1.044	1.171	1.558	1.484	1.550	1.691
Average Search		1.126	1.254	1.487	1.372	1.485	1.531
Average Save		0.725	0.731	0.689	0.719	0.781	0.795
Transactions per Minute		145	290	377	405	435	

Table 2b: Manager/Instructor Process Runtimes

The database and application servers were processing a total of 435 business processes per minute at the peak load of 3,000 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 the server in this test. The server hosted the database, application server and web server.

PeopleSoft ELM 8.8 using DB2 UDB for AIX on an IBM p570 Server (8-way)

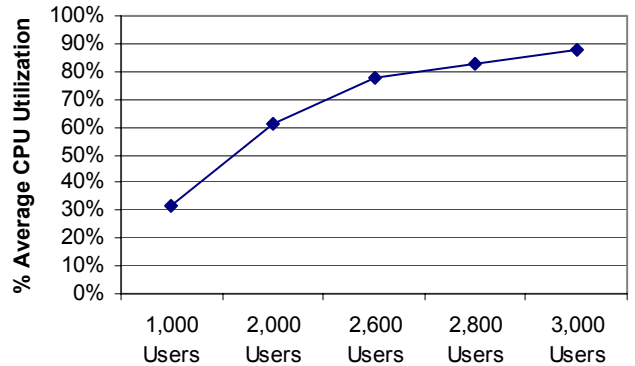


Figure 3: Average Server CPU Utilization

I/O PERFORMANCE

An IBM TotalStorage DS4500 with 84 × 36.4 GB disks set up in RAID 0 configuration (as 12 sets of 7 disks per 'hdisk') was used for the benchmark. I/O performance is crucial to system performance and is summarized in the following table.

	Average	Peak
Disk Read KiloBytes/Sec	589.3	3,950.7
Disk Write KiloBytes/Sec	316.8	952.8
I/O Operations/Sec	240.7	416.6

Table 3: I/O Performance

DATA COMPOSITION DESCRIPTION

The standard database was comprised of:

- 100,000 Employees
- 100 Course Catalog Categories
- 10,000 Catalog Items
- 1.2 Million Session rows

History:

- 20 Items per Learner
- 2.5 Million Enrollment transactions (current + historic)

BENCHMARK ENVIRONMENT

HARDWARE CONFIGURATION

Database Server/App. Server/Web Server:

The IBM p5 570 (9117-570) server was used as the database server, application server and web server. It was equipped with the following:

- 8 × 1.9 GHz IBM Power5™ processors, 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
- ~3931 Gigabytes of total Disk Space (24 × 36.4 GB + 84 × 36.4) (~180 GB used)
- 6 Disk Controllers (4 × SCSI, 2 × 1 Gbit Fibre Channel DS4500)
- One IBM TotalStorage DS4500

Client PC:

1 × IBM x360 was used as the client. It was equipped with the following:

- 4 × 1.5 GHz Intel® Xeon™ DP Processor, with 256 Kilobytes of Level-2 Cache
- 3.65 Gigabytes of Memory

Load Simulation Driver(s):

1 × IBM x255 Server was used as the driver. It was equipped with the following:

- 4 × 1.6 GHz Pentium® III Xeon™ Processors, each with 2 Megabytes of Level-2 Cache
- 4 Gigabytes of Memory

SOFTWARE VERSIONS

PeopleSoft ELM 8.81

PeopleTools 8.43.

IBM DB2 Universal Database Enterprise Server Edition Version 8.1.5 for AIX

IBM AIX 5L V5.3 ML00 (64-bit)

Microsoft® Windows® 2000 Advanced Server 5.0 Build 2195 w/SP 4 (on the driver and client)

Mercury Interactive's LoadRunner® 7.8 with Feature Pack 1

Mercury Interactive's QuickTest® Professional 6.0

BEA Tuxedo® 6.5 with Jolt 1.2

IBM WebSphere 4.0.3

ICE/APRDs:

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