

# ORACLE'S PEOPLESOFT ENTERPRISE CAMPUS SOLUTIONS 9 USING MICROSOFT SQL SERVER 2005 ON HEWLETT-PACKARD BLADE SERVERS

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 Campus Solutions 9 Benchmark	QuickTest Client Timers		
	Single User	5,000 Users	6,000 Users
Average Logon	0.58 sec	0.64 sec	0.72 sec
Avg. Load Student Center	0.64 sec	1.00 sec	1.17 sec
Avg. Page Load	0.69 sec	0.86 sec	0.94 sec
Avg. Page Save	1.00 sec	1.61 sec	1.80 sec
Batch Throughput			
<b>10,000 Invoices</b>		32.4 min	34.05 min
Invoices Printed per Hour		18,518	17,621
<b>10,000 Transcripts</b>		21.96 min	23.6 min
Transcripts/Hour		27,297	25,423

## BENCHMARK PROFILE

In June 2007, Oracle conducted a benchmark in Pleasanton, CA to measure the comparative online and batch performance of selected processes in Oracle's PeopleSoft Enterprise Campus Solutions 9 with Microsoft® SQL Server™ 2005 Enterprise X64 Edition. A single 4-processor Hewlett-Packard® ProLiant™ DL580 G4 server was used for the database server, running Microsoft® Windows® Server 2003 R2 Enterprise Edition. Four 2-way HP ProLiant BL480c G1 Blade servers were used as Application Servers running Microsoft® Windows® Server 2003 R2 Enterprise Edition. A single BL460c G1 was used as the Web Server. An HP StorageWorks XP128 disk array was used for data storage.

This benchmark measured the online performance for a large database model.

Testing was conducted in a controlled environment with no other applications running. The tuning changes, if any, were approved by Oracle Enterprise Development and will be generally available in a future update. **The goal of this Benchmark was to obtain reference response times for Campus Solutions Release 9 using SQL Server on HP Blade servers.**

PeopleSoft Enterprise Campus Solutions 9.0 using Microsoft SQL Server 2005 on HP ProLiant Blades

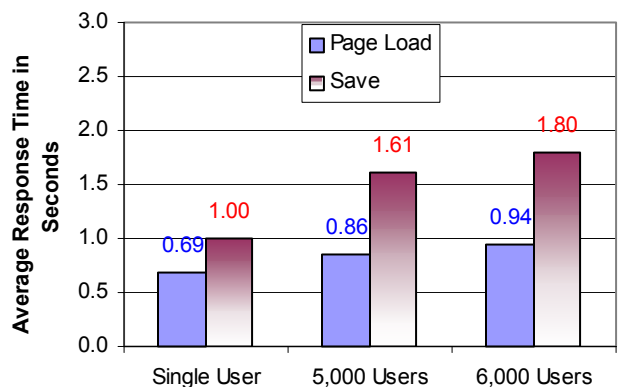


Figure 1: Oracle Enterprise Campus Solutions 9 Response Times

The weighted averages in Figure 1 correspond to the transaction proportions described in Table 1.

## ONLINE METHODOLOGY

Mercury Interactive LoadRunner® was used as the load driver, simulating concurrent users. It submitted a business transaction at an average rate of one every 10 minutes for each concurrent user to the application servers via the web servers.

Mercury Interactive 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. This benchmark was run using a physical 4-tier configuration; with the database server, the application server and the web server all being hosted on separate boxes. The Process Scheduler was also hosted on a separate server

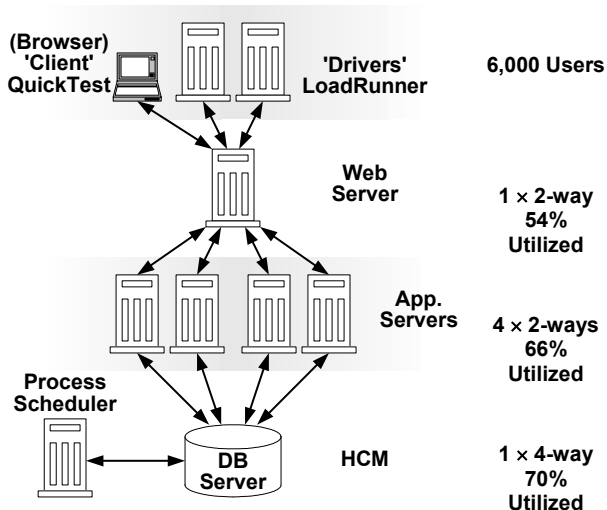


Figure 2: 4-Tier Configuration

Load times were measured from the time the user clicks a hyperlink or push button until the new HTML page has been rendered. Update times were measured from the time the user clicks the <SAVE> button until the new HTML page has been rendered.

Measurements were recorded on all of the servers when the user load was attained and the environment reached a steady state. The batch jobs were initiated about 25 minutes after LoadRunner started. QuickTest started about 35 minutes after LoadRunner.

## BUSINESS PROCESSES

Oracle (PeopleSoft) defines a business transaction as a series of HTML pages that guide a user through a business process, such as creating a new business case.

The eight PeopleSoft Enterprise Campus Solutions 9.0 self-service processes tested in this benchmark are as follows:

### CAMPUS SOLUTIONS

**Accept/Decline Awards:** - The student logs on and navigates to the Student Center page. They click on the “Accept/Decline Awards” link and accept, decline and reduce separate awards. The student completes the Accept/Decline Awards transaction and hits “Submit.”

**Calculate Tuition:** - The student logs on and navigates to the Student Center page. They click on the “Finances Section” link and navigate to the ‘Account Inquiry’ option. After viewing their balance, sign out.

**Drop Class:** - The student logs on and navigates to the Student Center page. They click on the “Drop a Class” link and enter the term and class id. The student completes the extensive enrollment options and hits “Save.”

**Enrollment Backpack:** - The student logs on and navigates to the Student Center page. They click on the “My Academic Requirements” link. The Academic Advisement engine runs to reassess degree progress data. The student reviews their degree progress data then sign out.

**Add Class:** - The student logs on and navigates to the Student Center page. They click on the “Add a Class” link and enter the term and class id for two separate classes. The student completes the extensive enrollment options and hits “Save.”

**Load Student Center:** - The student logs on and navigates to the Student Center page. They view some information then sign out.

**Make A Payment:** - The student logs on and navigates to the Student Center page. They click on the “Finances Section” link and navigate to the ‘Make a Payment’ option. Select ‘Pay by Credit Card’ and enter the credit card info and payment info. Hit “Save” and sign out.

**Schedule Planner Validation:** - The student logs on and navigates to the Student Center page. Navigate to the “Schedule Planner” page, enter the term and course numbers. Click to “Validate” the selected courses. Hit “Save” and sign out.

Process	% of Users	Avg. Pacing
Accept/Decline Awards	10%	10 min
Calculate Tuition	10%	10 min
Drop Class	10%	10 min
Enrollment Backpack	10%	10 min
Add Class	20%	10 min
Load Student Center	20%	10 min
Make a Payment	10%	10 min
Schedule Planner Validation	10%	10 min
Total	100%	

**Table 1: Business Process Mix**

Table 3 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

Table 2 shows the corresponding average QuickTest response times, in seconds, for each business process along with the overall averages.

Process	Single User	5,000 Users	6,000 Users
<b>Accept/Decline Awards</b>			
Logon	0.58	0.59	0.70
Load Student Center	0.57	0.82	1.12
Click Awards Link	0.58	0.63	0.59
(Awards) Page Load	0.55	0.60	0.58
Select Award 01	0.56	0.57	0.57
Submit Selection	0.61	0.62	0.62
Page (Selection) Save	1.06	1.33	1.43
<b>Calculate Tuition</b>			
Logon	0.57	0.60	0.89
Load Student Center	0.63	1.09	1.18
(Accounts) Page Load	1.61	2.66	3.25
<b>Drop Class</b>			
Logon	0.59	0.59	0.67
Load Student Center	0.63	0.91	1.16
Shopping Cart Page Ld.	0.62	1.01	1.02
Load Class Schedule	0.59	0.61	0.85
(Confirm Drop) Page Ld.	0.64	0.64	0.65
Page (Classes) Save	1.13	1.56	1.61
<b>Enrollment Backpack</b>			
Logon	0.59	0.58	0.68
(Require.) Page Load	1.58	2.87	3.34

**Table 2a: Business Process Response Times**

Process	Single User	5,000 Users	6,000 Users
<b>Add Class</b>			
Logon	0.58	0.65	0.67
Load Student Center	0.67	0.93	1.21
Load Shopping Cart	0.62	0.81	0.87
Load Preferences 01	0.59	0.59	0.60
Add Course 01 to Cart	0.63	0.63	0.65
Load Preferences 02	0.61	0.59	0.62
Add Course 02 to Cart	0.62	0.62	0.63
Load Related Class 01	0.59	0.60	0.62
Load Preferences 03	0.62	0.61	0.61
Add Course 03 to Cart	0.64	0.66	0.68
Load Preferences 04	0.61	0.60	0.61
Add Course 04 to Cart	0.62	0.74	0.85
Load Confirmation Page	0.64	1.13	1.16
Page (Classes) Save	0.86	1.76	2.01
<b>Load Student Center</b>			
Logon	0.58	0.74	0.71
Load Student Center	0.61	1.11	1.16
<b>Make Payment</b>			
Logon	0.59	0.65	0.78
Load Student Center	0.71	1.11	1.16
Page (Pay Details) Load	0.58	0.59	0.76
Page (Amount) Load	0.60	0.62	0.62
Load Confirmation Page	0.59	0.60	0.69
Page Save	1.11	1.62	1.93
<b>Schedule Planner Valid</b>			
Logon	0.58	0.60	0.71
Load Shopping Cart	0.58	0.75	1.09
Select Term	0.07	0.08	0.07
Load Class Sections 92	0.60	0.61	0.63
Load Pref. Page 92	0.64	0.63	0.63
Add Course 92 to Cart	0.65	0.65	0.73
Load Pref. Page 56	0.60	0.60	0.73
Add Course 56 to Cart	0.63	0.67	0.76
Load Pref. Page 12	0.61	0.59	0.61
Add Course 12 to Cart	0.61	0.63	0.84
Validate Shopping Cart	1.11	1.31	1.59
<b>Weighted</b>			
Weighted Logon	0.58	0.64	0.72
Weighted Load SC	0.64	1.00	1.17
Weighted Page Load	0.69	0.86	0.94
Weighted Page Save	1.00	1.61	1.80
<b>Transactions / minute</b>			
	n/a	500	600

**Table 2b: Business Process Response Times**

The database and application servers were processing a total of ~600 business processes per minute at the peak load of 6,000 concurrent users. The transaction rate is calculated by dividing the number of users by the corresponding pacing.

## BATCH PROCESS RESULTS

10,000 Invoices and 10,000 Transcripts were processed.

	Print Invoice	Transcripts
	Single Stream	4 Job Streams
<b>5,000 Users</b>	32.40	21.98
<b>6,000 Users</b>	34.05	23.60

Table 3: Batch Run Times in Minutes

## SERVER PERFORMANCE

PeopleSoft Enterprise Campus Solutions  
9.0 using SQL Server 2005 on HP  
ProLiant Blades

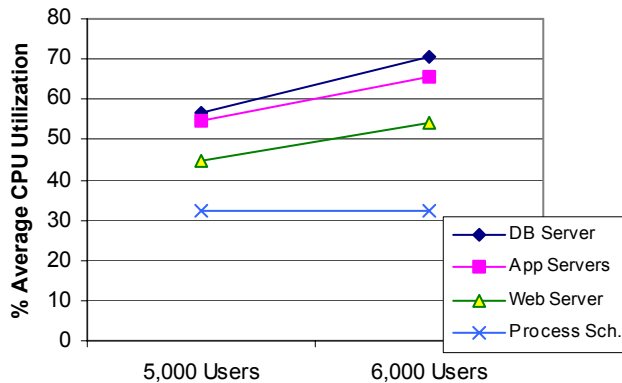


Figure 3: Average CPU Utilization

	5,000 Users	6,000 Users
<b>DB Server</b>	56.74%	70.37%
<b>App Servers</b>	54.70%	65.61%
<b>Web Server</b>	44.69%	54.11%
<b>Process Sched.</b>	32.07%	32.44%
<b>DB Server</b>	20.65 GB	21.26 GB
<b>App Servers</b>	1.87 GB	2.17 GB
<b>Web Server</b>	3.13 GB	3.13 GB
<b>Process Sched.</b>	1.39 GB	1.40 GB

Table 4: Average CPU and Memory Utilization

	5,000 Users	6,000 Users
<b>DB Reads/Sec</b>	22.86	23.47
<b>DB Writes/Sec</b>	202.44	237.27

Table 5: Average I/O Activity

## DATA COMPOSITION DESCRIPTION

Table 6 summarizes the structure of the target organization.

Data Model	Large
Person records	600,000
Enrolled students	100,000
Employees	10,000
Student Career records	500,000
Courses in Course Catalog	5,000
Classes in Schedule of Classes	150,000
Student Enrollment records	10,000,000
SF Accounts	2,000,000
Item Types	2500
ITEM_SF lines	15,000,000
FA Student Award Records	2,000,000

Table 6: Selected Data Composition

Note that the Large Data Model represents five year's worth of history data.

## BENCHMARK ENVIRONMENT

### HARDWARE CONFIGURATION

A Hewlett-Packard® ProLiant™ DL580 G4 ProLiant was used as the database server. It was equipped with the following:

- 4 × 3.4 GHz Intel® Xeon™ 7140M Dual-Core processors, each with 2 × 16 Kilobytes of Level-1 Cache, 2 × 1 Megabyte of Level 2 Cache and 4 Megabytes of Level-3 write-back cache per CPU
- 32 Gigabytes of Memory (~22 GB used at peak load)
- 1 SAN-Connected HP StorageWorks XP128 disk array with 2 Emulex 2GB PCI HBA fibre-channel connections
- ~1.9 Terabytes of total Disk Space available (28 × 73 GB + 8 × 73 GB internal disk drives), approximately 325 GB of RAID 0 storage used for this benchmark

### **Application Server(s):**

4 × HP ProLiant® BL480c G1 blade servers were used as the application servers. They were equipped with the following:

- 2 × 3.0 GHz Intel® Xeon™ 5160 Dual-Core processors, each with 64 Kilobytes of Level-1 Cache, 4 Megabytes of Level 2 Cache and 1 Megabyte of Level-3 write-back cache per CPU
- 12 Gigabytes of Memory
- ~288 GB of storage with an integrated SmartArray 5i Plus Controller

### **Web Server(s):**

1 × HP ProLiant® BL460c G1 blade server was used as the web server. It was equipped with the following:

- 2 × 3.0 GHz Intel® Xeon™ 5160 Dual-Core processors, each with 64 Kilobytes of Level-1 Cache, 4 Megabytes of Level 2 Cache and 1 Megabyte of Level-3 write-back cache per CPU
- 12 Gigabytes of Memory
- ~144 GB of storage with an integrated SmartArray 5i Plus Controller

### **QuickTest Client PC:**

HP Workstation xw6000 with the following:

- 2 × 2.8 GHz Intel® Pentium® IV Processor
- 2048 Megabytes of Memory

### **Load Simulation Driver(s):**

1 × Hewlett-Packard® NetServer® 1p1000r was used as the load driver controller. It was equipped with the following:

- 2 × 1 Gigahertz Pentium® III Xeon™ Processors, each with 1 Megabyte of Level-2 Cache
- 4 Gigabytes of Memory

1 × Hewlett-Packard® NetServer® 1p1000r was used as the load driver. It was equipped with the following:

- 2 × 1 Gigahertz Pentium® III Xeon™ Processors, each with 1 Megabyte of Level-2 Cache
- 4 Gigabytes of Memory

### **SOFTWARE VERSIONS**

Oracle's PeopleSoft Enterprise Campus Solutions 9

Oracle's PeopleSoft Enterprise (PeopleTools) 8.48.07

Microsoft SQL Server 2005 Enterprise X64 Edition w/SP 2

Microsoft® Windows® Server 2003 R2 Enterprise Edition w/SP 2 Build 3790 (64 bit) (on the database server)

Microsoft® Windows® Server 2003 R2 Enterprise Edition w/SP 1 Build 3790 (32 bit)(on the Application, Web and Process Scheduler servers)

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

Microsoft® Windows® XP Professional w/SP 2 (on the client)

Mercury Interactive LoadRunner® 8.0

Mercury Interactive QuickTest® Professional 6.5

BEA Tuxedo® 8.1 RP89 with Jolt 8.1

Microsoft Internet Explorer® 6.0

### **BEA WebLogic Server™ 8.10 w/SP 4**

Java version "1.4.2\_05"

Java(TM) 2 Runtime Environment, Standard Edition (build 1.4.2\_05-b04)

Java HotSpot(TM) Client VM (build 1.4.2\_05-b04, mixed mode)

ICE Tracking:

1692373001

Microsoft Support

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