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ORACLE REVISION 2.1

PEOPLESOFT PLANNING & BUDGETING 8.9 USING ORACLE10*g* ON HEWLETT-PACKARD INTEGRITY 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 Planning & Budgeting 8.9	
Batch	Data Staging 'Serial'	
2,321,280 Rows	**67.23 min**	**2,071,544 Rows per Hour**
	Data Staging 'Parallel'	
	42.75 min	**3,257,937 Rows per Hour**
	Full Model Recalculation	
	53.05 min	**2,625,387 Rows per Hour**
Online	Line Item Add	**19.3 sec**
450 Users	Position Add	**3.46 sec**
	Variance Analysis	**7.83 sec**

BENCHMARK PROFILE

In August 2005, Oracle (PeopleSoft) conducted a benchmark in Pleasanton, CA to measure the batch and online performance of the Data Staging, Model Recalculation and online entry and analysis processes in Oracle's PeopleSoft Planning and Budgeting 8.9 with Oracle10*g*™ 10.1.0.3. We used an 8-way partition of a Hewlett-Packard® Integrity™ rx8620 as the database server, running Hewlett-Packard® HP-UX 11i v2. A 4-way Integrity rx4640 application server and 2-way Integrity rx1620 web server also ran HP-UX 11i v2. An HP StorageWorks XP128 disk array was used for data storage.

The benchmark measured the batch and 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 performance results for Oracle's PeopleSoft Planning and Budgeting 8.9 on Oracle with HP Integrity servers.**

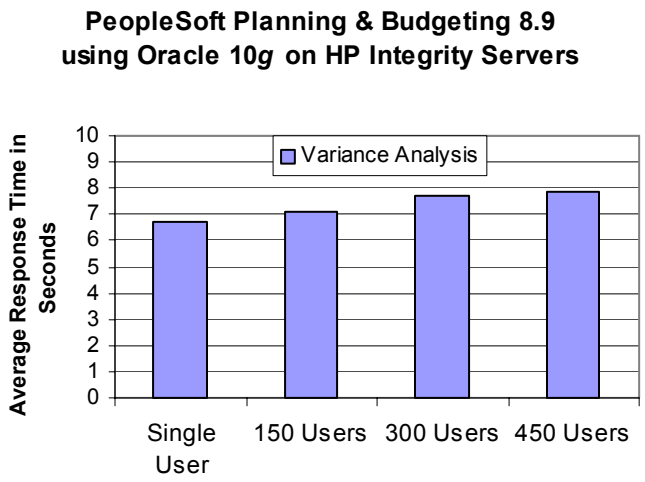

Figure 1: PeopleSoft Planning and Budgeting 8.9 Processing Rates

BATCH METHODOLOGY

PeopleSoft Planning and Budgeting 8.9 batch processes can be initiated from a browser. For this benchmark, all runs used a browser to initiate Application Engine (AE) jobs.
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 Planning & Budgeting 8.9 processes tested are as follows:

Data Staging: (AE) Data Staging uses the application engine process that places source data such as financial and employee position data - into the Budget tables to be accessed by the Planning & Budgeting application. The source data is transformed into the formats specified during the Planning & Budgeting setup including: dimension mapping and summarization levels; activity and scenario definitions; multi-currency budgeting; generating worklists and other setup definitions.

Model Recalculation: (AE) Model Recalculation is an application engine process that performs a recalculation of an entire scenario activity. Data from all line item planning centers and any related activities is loaded into the Analytical Calculation Engine (ACE), and recalculated. Calculation results are saved to the Budget tables.

BATCH RESULTS

The Data Staging processes can be run serially or all 'Activities' can be run in parallel (concurrently). For the purposes of this benchmark, we configured a model with a single Position Activity, and three line-item activities. These line-item activities represent Travel, Revenue and Expense budgets.

Data Staging – Serial Processes	Duration	Rows	Rows per Hour
Stage Position Activity	12.27 min	698,880	3,418,435
Stage Travel Activity	15.28 min	449,280	1,763,804
Stage Revenue Activity	20.63 min	673,920	1,959,703
Stage Expense Activity	19.05 min	499,200	1,572,283
Total	**67.23 min**	2,321,280	**2,071,544**
Data Staging – Parallel	**Duration**	**Rows**	**Rows per Hour**
	42.75 min	2,321,280	**3,257,937**
Full Model Recalculation	**Duration**	**Rows**	**Rows per Hour**
	53.05 min	2,321,280	**2,625,387**

Table 1: Batch Process Results

Note that the Large Data Model represents a year's worth of data. In this case, twelve rows for each line-item would be processed–corresponding to one for each month.

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 6 or 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 application server also hosted the Analytical Calculation Engine (ACE).

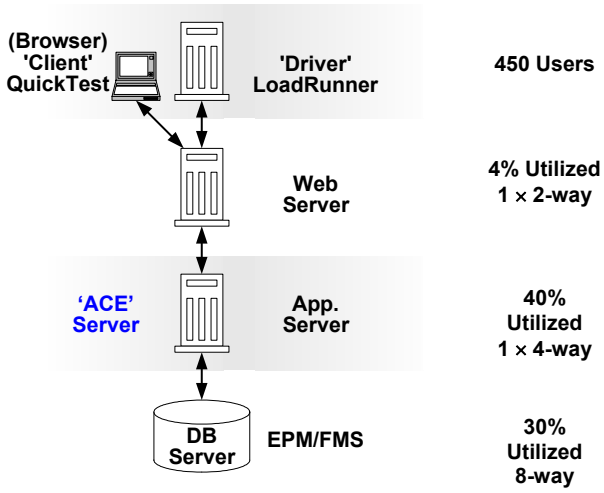

Figure 2: 4-Tier Configuration

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.

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 three PeopleSoft Planning & Budgeting 8.9 business processes tested in this benchmark are as follows:

PLANNING AND BUDGETING

Add Line Item: - Preparers can add new line-items to their Plans and Budgets using this transaction. Preparers will assign the proper dimension values as well as enter data values.

Add New Position: - Preparers can add new employee positions to their detail position Budgets using this transaction. Preparers will assign the proper dimension values and other values such as job code. The system will programmatically generate a new position number.

View Variance Analysis: - An analysis data grid layout that can enable any two scenarios, version or time periods to be compared for variance amounts and / or percentages.

Process	% of Users	Avg. Pacing
Add Line-Item	25%	6 min
Adding New Position	25%	6 min
View Variance Analysis	50%	10 min
Total	100%	

Table 2: Business Process Mix

Table 2 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 3 shows average response times, in seconds, for each business process. It also shows the approximate overall transaction rate.

Process	Single User	150 Users	300 Users	450 Users
Add Line Item				
Load Workspace page for Line Item	1.10	1.11	1.08	1.05
Edit PC for Line Item + Load Add Account Page	10.19	10.72	10.91	11.71
Add Account	3.33	3.48	3.42	3.51
Save	2.92	2.95	2.87	3.01
Add New Position				
Load Workspace page for Position	1.11	1.08	1.08	1.09
Edit PC for Position	0.57	0.46	0.54	0.54
Position Page	0.58	0.55	0.56	0.62
Save Position	0.70	0.65	0.60	0.62
Position Overview	0.56	0.56	0.58	0.58
View Variance Analysis				
Variance Analysis	6.71	7.13	7.69	7.83
Return to Search Page				
Return to Search Page	0.59	0.55	0.56	0.56
Transactions/minute	N/a	20	40	60

Table 3: Business Process Response Times

The database and application servers were processing a total of ~60 business processes per minute at the peak load of 450 concurrent users.

The transaction rate is calculated by dividing the number of users by the corresponding pacing.

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

SERVER PERFORMANCE

Data Staging – Serial Processes	Avg. CPU	Peak CPU
Stage Position Activity	16.3	26
Stage Travel Activity	17.6	24
Stage Revenue Activity	17.8	23
Stage Expense Activity	18	23
Data Staging – Parallel	30.9	62
Full Model Recalculation	24.9	45

Table 4: DB Server Batch CPU Utilization

Table 5 shows how the 4-way Application Server was configured along with the 'resident memory' and SWAP memory used. The use of SWAP memory for the 450-User run suggests that this machine would have benefited from another ~4 GB on top of the base 8GB (~25 MB RAM/User).

	150 Users	300 Users	450 Users
# App Server Proc. (PSAPPSRV)	8	8	8
# Analytical Server Processes (PSANALYTICSRV)	50	90	130
App Server (PSAPPSRV & PSANALYTICSRV) Memory Used	3.44 GB	5.69 GB	6.67 GB
App Server (PSAPPSRV & PSANALYTICSRV) Memory/User	23.5 MB	19.4 MB	15.2 MB
SWAP Used	0	0	3.2 GB
App Server (PSAPPSRV & PSANALYTICSRV) Memory + SWAP per User	23.5 MB	19.4 MB	22.5 MB

Table 5: Configuration and Memory Utilization

Table 6 details the observed CPU utilization for the database server and application server. See also Figure 3. The 2-way web server peaked at about 6% for 450 concurrent users.

	150 Users	300 Users	450 Users
Average DB CPU	9.3	17.8	29.7
Peak DB CPU	22	33	45
Average App Server CPU	12.7	24.5	40.1
Peak App Server CPU	36	45	68
Average PSAPPSRV's CPU	5	9.4	13.3
Peak PSAPPSRV's CPU	18	22.6	27.9
Average PSANALYTICSRV's CPU	8.1	13.7	20.8
Peak PSANALYTICSRV's CPU	17.7	25.6	36.5

Table 6: Online CPU Utilization

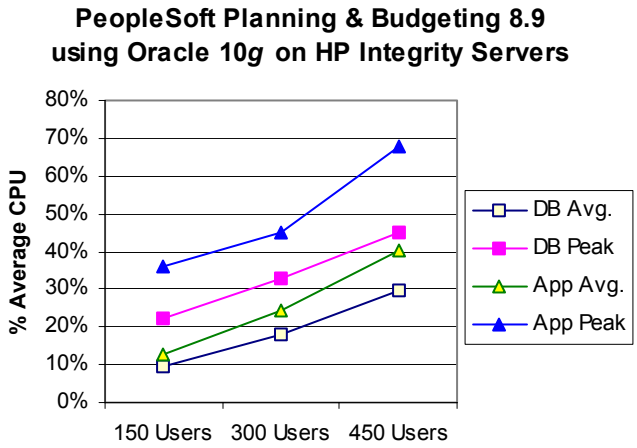

Figure 3: Average CPU Utilization

Figure 3 shows the overall average CPU utilization for the database and application/analytic servers.

DATA COMPOSITION DESCRIPTION

Table 7 summarizes the structure of the target organization.

Large Data Model	Position	Travel	Revenue	Expense
Operating Units	51	51	51	51
Planning Centers (Departments)	520	520	520	520
Accounts	7	14	8	51
Curriencies	1	1	1	1
Versions	3	3	3	3
Scenarios	1	1	1	1
Budget Periods per Scenario	12	12	12	12
Additional Dimensions		0	1	0
Employees	4,160			
Physical Rows	698,880	449,280	673,920	499,200

Table 7: Selected Data Composition

BENCHMARK ENVIRONMENT

HARDWARE CONFIGURATION

A Hewlett-Packard® Integrity™ rx8620 was used as the batch/database server. It was equipped with the following:

- 8 × 1.6 GHz Intel® Itanium®2 Processors, each with16 Kilobytes of Level-1 Cache, 256 Kilobytes of Level-2 Cache and 6 Megabytes of Level-3 Cache
- 16 Gigabytes of Memory
- 1 SAN-Connected HP StorageWorks XP128 disk array with 2 fibre-channel connections
- ~4.6 Terabytes of total Disk Space available (64 × 73 GB + 2 × 73 GB internal disk drives), approximately 230 GB of RAID 0+1 storage used for this benchmark
- 2 × Hewlett-Packard® Tachyon™ XL2 Fibre Channel Host Bus Adapters

Application Server(s):

A Hewlett-Packard® Integrity™ rx4640 was used as the application server. It was equipped with the following:

- 4 × 1.6 GHz Intel® Itanium®2 Processors, each with 32 Kilobytes of Level-1 Cache, 256 Kilobytes of Level-2 Cache, 6 Megabytes of Level-3 Cache
- 8 Gigabytes of Memory
- ~292 Gigabytes of total Disk Space (4 × 73 GB)

Web Server(s):

A Hewlett-Packard® Integrity™ rx1620 was used as the web server. It was equipped with the following:

- 2 × 1.3 GHz Intel® Itanium®2 Processors, each with 32 Kilobytes of Level-1 Cache, 256 Kilobytes of Level-2 Cache, 3 Megabytes of Level-3 Cache
- 4 Gigabytes of Memory
- ~146 Gigabytes of total Disk Space (2 × 73 GB)

Load Simulation Driver:

A Hewlett-Packard® ProLiant® 6400R was used as the driver. It was equipped with the following:

- 4 × 550 Megahertz Pentium® III Xeon™ Processors, each with 2 Megabytes of Level-2 Cache
- 2 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 Planning & Budgeting 8.9

Oracle's PeopleSoft Enterprise (PeopleTools) 8.46.05

Oracle10*g*™ 10.1.0.3 (64-bit) with PeopleSoft-required patches

Hewlett-Packard® HP-UX® 11i v.2 (11.23) (64-bit) (on the database server, application server and web server)

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

Microsoft® Windows® XP Advanced Server w/SP 1 (on the client)

Mercury Interactive's LoadRunner® 7.8

Mercury Interactive's QuickTest® Professional 6.0 Build 1170

BEA Tuxedo® 8.1 RP89 with Jolt 8.1

BEA WebLogic Server™ 8.10 w/SP 3

ICE/APRDs applied:

613457 See: Bundle 1

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