



PEOPLESOFT 8.8 SCM ORDER-TO-CASH USING ORACLE9i ON A HEWLETT-PACKARD INTEGRITY SUPERDOME (ITANIUM)

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 8.8 Order-to-Cash (Order Fulfillment)	
	Standard Data Volume Model	
	Order Processing	100,000 lines - 53 minutes
	Order Lines/Hour	113,200 per hour
Référence d'exécution (Français)	PeopleSoft 8.8, Gestion Commerciale	
	Norme modèle de données	
	Order Processing	10.000 lignes – 53 minutes
	Lignes/heure	113.200 par heure
Benchmark-Test (Deutsch)	PeopleSoft 8.8, Auftragsabwicklung	
	Datenbankmodell "Standard"	
	Order Processing	100.000 Zeilen – 53 Minuten
	Zeilen/Stunde	113.200 pro Stunde
Patrón de rendimiento (Español)	PeopleSoft 8.8, Ventas	
	Volumen Estándar de los datos	
	Order Processing	100.000 líneas – 53 minutos
	Líneas/hora	113.200 por hora
Benchmark (Português)	Gerenciamento de Ordens do PeopleSoft 8.8	
	Volume Padrão dos dados	
	Order Processing	100.000 linhas – 53 minutos
	Linhas/hora	113.200 por a hora

The purpose of this test is to simulate the daily processes an average-sized customer goes through to capture orders, fulfill and bill orders entered into the PeopleSoft system. To test the order fulfillment process from Order Fulfillment to Cash Receipt, we included the process of entering orders *online* as well as via the *EDI channel* which includes orders coming in via a flat file. We also process orders from the CRM database, captured in that system by the Collaborative Selling suite.

The test measured processing times for online and background processes conducting high volume transactions throughout the day. The test measured activity for a 1–2 hour window and the results extrapolated to an 8-hour "typical" business day.

The testing was conducted in a controlled environment with no other applications running. The tuning changes (if any) were approved by PeopleSoft Development and will be generally available in a future update or release. **The goal of this benchmark was to show a scalable order-processing throughput for a selected number of orders, for PeopleSoft Order Fulfillment (Order Management, Inventory and Billing Batch) 8.8 on HP/Oracle.**

Figure 1 illustrates average response times for a single user and for 300 concurrent users entering their ten-line orders with concurrent background batch processing.

BENCHMARK PROFILE

In October 2004, PeopleSoft and Hewlett-Packard conducted a benchmark in Cupertino, CA to measure the batch and online performance of processes in PeopleSoft Order-to-Cash [‘Order Fulfillment’ -- Order Management, Inventory, and Billing] 8.8 with Oracle9i™ 9.2.0.4 on an 8-way partition (2 Cells) of a Hewlett-Packard HP Integrity SuperDome database server, running HP-UX 11.23. Another 8-way partition (2 Cells) of the SuperDome was used for the application server and a 4-way partition (1 Cell) was used for the web server.

PeopleSoft SCM 8.8 Order-to-Cash using Oracle9i on an HP SuperDome

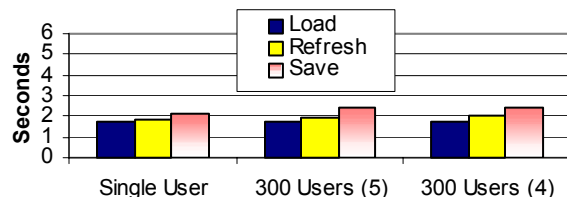


Figure 1: Response Times

METHODOLOGY

Mercury Interactive's LoadRunner® was used as the load driver for the online part of this benchmark, simulating concurrent users. It submitted a business process at an average rate of one every five minutes for each concurrent user. The test was also run with a four-minute pacing to verify software and server performance in a crunch situation.

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

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

Figure 2 shows the 4-tier benchmark configuration implemented for this test.

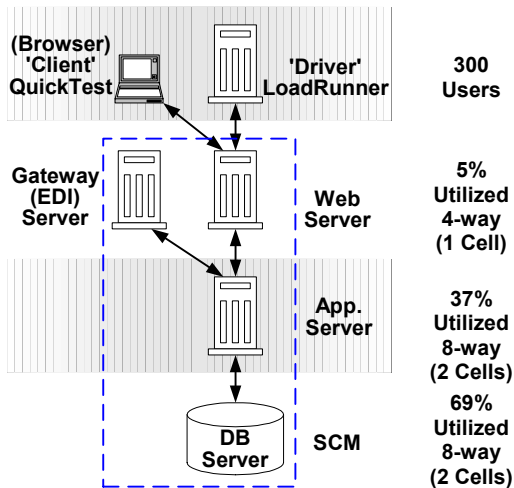


Figure 2: 4-Tier Configuration

This benchmark was run as a “Physical” 4-Tier configuration by utilizing a discrete partition for each tier. Twenty CPUs (5 × 4-CPU Cells) of the HP Integrity SuperDome were partitioned as two 8-ways and one 4-way server.

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.

BUSINESS PROCESSES

PeopleSoft defines a business process as a series of HTML pages that guide a user through a business transaction, such as an order entry.

The online business process tested was a ten-line order entry.

Order Entry: Enter a ten-line order.

The eleven PeopleSoft Order Fulfillment (Order-to-Cash) 8.8 batch business processes tested in this benchmark are as follows:

Order Management

Electronic Commerce (OMEC) [SQR]: Processes inbound EDI orders and generates queue entries for outbound EDI transactions.

Order Completion (OM_BACKGRND) [AE]: The Order Completion process is an Application Engine process that adds the default order schedule based on information at the order line level. In addition, it applies the buying agreement, sold to customer, ship to customer, bill to customer, order group to the header, lines, and schedules and completes order defaulting, order pricing, tax defaulting, and tax calculations.

Populate Demand (OMDEMAND) [AE]: Takes all new open order schedules and transfers them to Inventory's Demand table.

Inventory

Reservations (INPLDMND) [COBOL]: Takes all demand requests and reserves material in the Inventory Business Unit specified on the request.

Picking Plan (INS60000) [SQR]: Takes stock requests and creates a picking plan for the warehouse or distribution center.

Confirmation (INPBCONF) [COBOL]: Takes picked inventory and prepares items for shipping.

Depletion (INPDDEPL) [COBOL]: Decrements the on-hand balances for the Inventory Business Unit and transfers the quantity shipped to Costing.

Billing

Populate Billing (OMBILL) [SQR]: Takes all order schedules from the SHIP_INV_INF table with a Billing Status of “A” and inserts them into the Billing Table.

Billing Interface (BIIF0001) [AE]: Prepares and creates bills out of billing data passed from external sources.

Invoice Finalization (BIIVC000) [AE]: Takes all of the shipped orders and creates the invoices.

Print Invoices (BIIVCLN) [SQR]: Print Landscape Invoices.

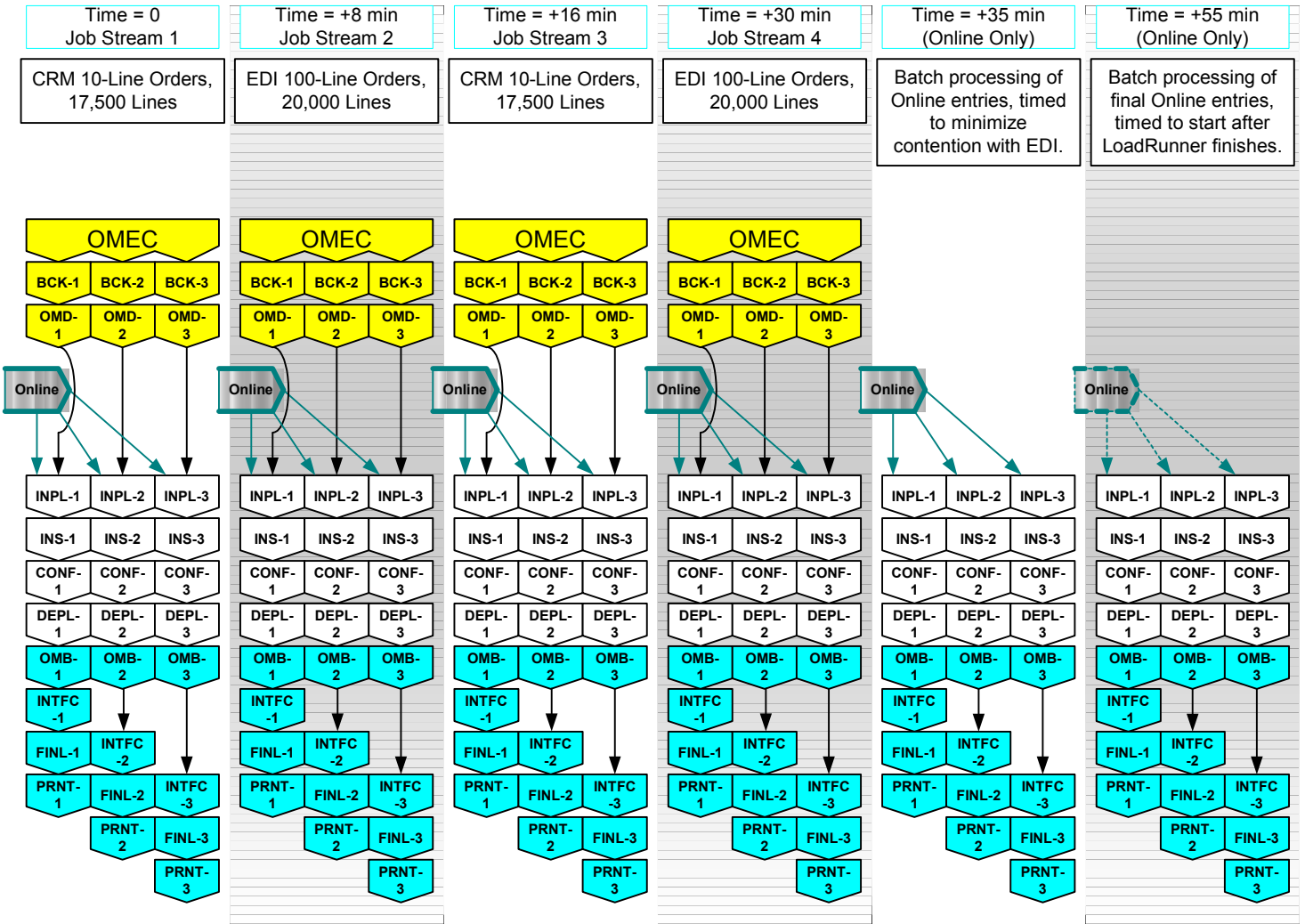


Figure 3: Job Stream Allocation and Timing for 5-Minute Paced Users

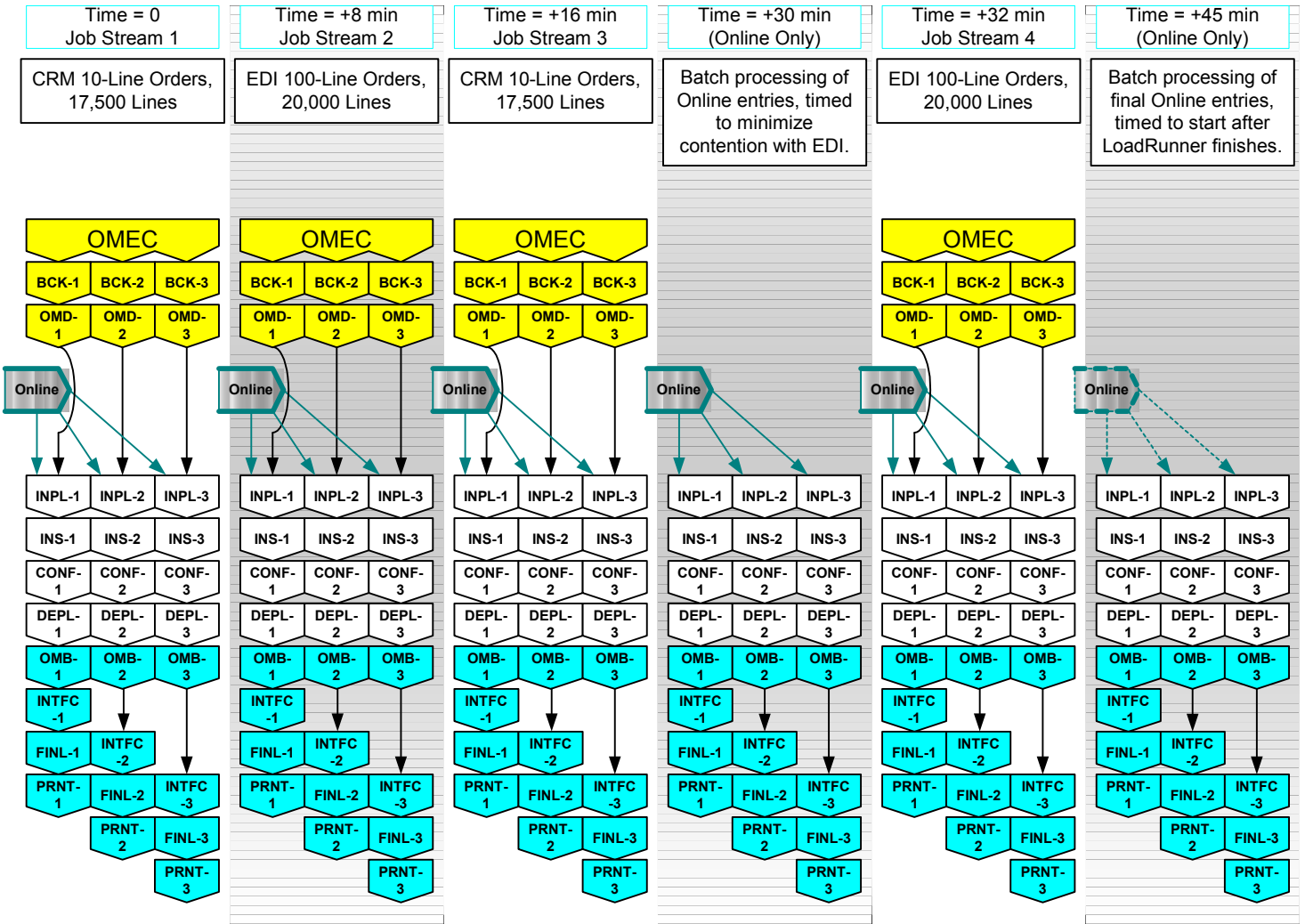


Figure 4: Job Stream Allocation and Timing for 4-Minute Paced Users

Figure 3, 4 and Table 1 show the execution strategy followed in this benchmark. All the CRM orders and ~57% of the EDI orders were pre-loaded into staging tables. During the execution of the benchmark, simulated online users entered orders and the remaining EDI orders were introduced. This optimized throughput for this benchmark.

Note that most processes were run in parallel within a job stream, e.g., all of the OM and Inventory processes, which were partitioned by business unit. Only the 'Billing Interface' processes had to be run 'one-at-a-time' to avoid contention.

The strategy and partitioning shown here worked well for the sample data on the test hardware. Customers will need to tailor this to their own production requirements.

Process	5 min	4 min	Lines	%
Job Stream 1	Time 0	Time 0		
Online Order Entry			~7,500	7.5%
CRM Database			17,500	17.5%
Job Stream 2	T + 8	T + 8		
Online Order Entry			~7,500	7.5%
EDI			20,000	20%
Job Stream 3	T + 16	T + 16		
Online Order Entry			~7,500	7.5%
CRM Database			17,500	17.5%
Job Stream 4	T + 30	T + 30		
Online Order Entry			~7,500	7.5%
EDI			15,000	15%
Total			100,000	100%

Table 1: Process Sequencing

ONLINE/BATCH PROCESS RESULTS

Table 2 shows the average retrieval (load), refresh and update (save) times, in seconds, for the online order entry.

Enter Sales Orders, 10-Line	Single User	300 Users (5 min)	300 Users (4 min)
Load	1.722 sec	1.706	1.738
Refresh	1.878 sec	1.979	2.002
Save	2.113 sec	2.377	2.402
Trans/min Est.	N/A	~60	~75
Order-to-Cash Batch	100,000 Lines	66 min	53 min
Order Lines/Hour	N/A	90,900	113,200

Table 2: Order Process Runtimes

The database and application servers were processing a total of 60 or 75 business processes per minute at the peak load of 300 concurrent users. The estimated transaction rate is calculated by dividing the total number of concurrent users by the average pacing rate.

The batch processes ran for about 66 minutes, yielding an hourly throughput of 90,900 order lines (five-minute pacing). At the faster “four-minute” pacing, the batch jobs ran in about 53 minutes, yielding an hourly throughput of 113,200 order lines. Note that care was taken to schedule the batch jobs in such a way as to minimize deadlock issues.

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

SERVER PERFORMANCE

Figure 5 summarizes the CPU utilization for each of the server instances.

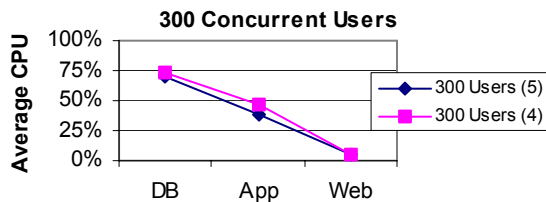


Figure 5: Average CPU Utilization

An HP SAN-Connected HP EVA 3000 disk array with 4 fibre-channel connections was used for data storage.

DB Server	Read MB/Sec	Write MB/Sec	Disk Transfer MB/Sec
Average	12.5	1.65	14.2
Peak	122.7	16.7	124.6

Table 3: I/O Performance

DATA COMPOSITION DESCRIPTION

The standard Small/Medium database was comprised of:

Database Requirements	Average	Value
Order Management BU	1	US001
Distribution Network	1	CORP
Inventory BU	3	3 Business Unit (US008,US010,US011).
Customers	300,000	
Customer Groups	10	Customers are grouped evenly into the 10 Customer Groups (30,000 per group)
Locations	1	1 Location per customer
Items	75,000	Clone of Item 10000
Products	75,000	Clone of Product 10000; stocked in INV BU US008,US010, US011
Product Groups	10	10 Product Groups. Products above are divided evenly into the 10 Product Groups (7500 per Product Group)
Price Sets	3000	Set up by Customer Group and Product Group
Price Breaks	9000	Three Price Breaks per Price Set
Price Rules	1	Default Rule
Price Lists	5	Create 5 Different Price Lists and attach them to Price Sets by Customer Groups. Each Customer would then be attached to a Price List via a Customer Group
History Order Headers	150,000	
History Lines	1,500,000	
History Order Schedules	1,500,000	
Shipping History Schedules	1,800,000	
Billing Invoice History	500,000	

Table 4: Data Composition Summary

PATCH/UPDATE COMPLIANCE

The execution of this benchmark generated several performance-specific issues that are addressed in ICE fixes. The fixes will be rolled out in service packs or patches.

Order Management

ICE Report ID 724154000 - PERF:OM_EC 8.8

ICE Report ID 724157000 - PERF:OM_BACKGRND 8.8

ICE Report ID 724166000 - PERF: OM_DEMAND - SCM 8.8

ICE Report ID 724167000 - PERF: OM_BILL 8.8 - SCM 8.8

Inventory

ICE Report ID 724173000 - PERF: IN_FULRSV - SCM 8.8

Billing

ICE Report ID 724267000 - PERF: BIIF0001 8.8 - Billing interface

ICE Report ID 724270000 - PERF: BIIVC000 8.8 - Bill Finalization

ICE Report ID 724273000 - PERF: BIIVCPN 8.8 - Invoice Printing

BENCHMARK ENVIRONMENT

HARDWARE CONFIGURATION

Database Server:

Two 4-CPU “Cells” of the Hewlett-Packard® Integrity SuperDome were used as the batch/database server. The partition was equipped with the following:

- 8 × 1.6 GHz Intel® Itanium®2 Processors, each with 32 Kilobytes of Level-1 Cache, 256 Kilobytes of Level-2 Cache, 9 Megabytes of Level-3 Cache
- 16 Gigabytes of Memory (<11 GB used)
- ~108 Gigabytes of internal SCSI Disk Space (2 × 36.4 GB + 2 × 18.2 GB)
- 1 SAN-Connected HP EVA 3000 disk array with 4 fibre-channel connections
- ~2 Terabytes of total Disk Space available (28 × 73 GB disk drives), approximately 256 GB of RAID 0/1 storage (512 GB raw capacity on the SAN) was used for this benchmark
- 4 × Hewlett-Packard® Tachyon™ Fibre Channel Host Bus Adapters connected via two HP 2Gb Fibre Channel 16B switches

Application Server(s):

Two 4-CPU “Cells” of the Hewlett-Packard® Integrity SuperDome were used as the application server. The partition was equipped with the following:

- 8 × 1.6 GHz Intel® Itanium®2 Processors, each with 32 Kilobytes of Level-1 Cache, 256 Kilobytes of Level-2 Cache, 9 Megabytes of Level-3 Cache
- 16 Gigabytes of Memory (<3 GB used)
- ~145 Gigabytes of total Disk Space (4 × 36.4 GB)
- 2 × SCSI Disk Controllers

Web Server/Gateway Server:

One 4-CPU “Cell” of the Hewlett-Packard® Integrity SuperDome was used as the web server and gateway (EDI) server. The partition 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, 9 Megabytes of Level-3 Cache
- 8 Gigabytes of Memory (<2 GB used)
- ~72 Gigabytes of total Disk Space (2 × 36.4 GB)
- 1 × SCSI Disk Controller

Load Simulation Driver:

1 × Hewlett-Packard® ProLiant® DL360 G4 was used as the driver. It was equipped with the following:

- 2 × 3.0 Gigahertz Intel® Xeon™ Processors, each with 512 Kilobytes of Level-2 Cache and 1 Megabyte of Level-3 Cache
- 4 Gigabytes of Memory

Client PC:

Hewlett-Packard® ProLiant® DL360 G4 with the following:

- 2 × 3.0 Gigahertz Intel® Xeon™ Processors, each with 512 Kilobytes of Level-2 Cache and 1 Megabyte of Level-3 Cache
- 4 Gigabytes of Memory

SOFTWARE VERSIONS

PeopleSoft Enterprise SCM 8.8

PeopleTools 8.45

Oracle9i™ 9.2.0.4 (with product patch 2617419)

Hewlett-Packard® HP-UX® 11.23 (on the Database server, Application server, Web server, and Gateway server)

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

Mercury Interactive's LoadRunner® 7.8

Mercury Interactive's QuickTest® Professional 6.5

BEA Tuxedo® 8.1 RP89 with Jolt 8.1

BEA WebLogic Server™ 8.10 w/SP 1

Business Process



PeopleSoft Worldwide Headquarters

4460 Hacienda Drive

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.peoplesoft.com>

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