

ENTERPRISE 8.8 SCM ORDER-TO-CASH USING ORACLE9i ON AN IBM® p5 570 Server (10-WAY)

As a global leader in e-business applications, Oracle USA 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 USA 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 (English) | PeopleSoft 8.8 Order-to-Cash (Order Fulfillment) | |
| | Standard Data Volume Model | |
| | Order Processing | 100,000 lines – 50.7 minutes |
| | Order Lines/Hour | 118,200 per hour |
| Référence d'exécution (Français) | PeopleSoft 8.8, Gestion Commerciale | |
| | Norme modèle de données | |
| | Order Processing | 100.000 lignes – 50,7 minutes |
| | Lignes/heure | 118.200 par heure |
| Benchmark-Test (Deutsch) | PeopleSoft 8.8, Auftragsabwicklung | |
| | Datenbankmodell "Standard" | |
| | Order Processing | 100.000 Zeilen – 50,7 Minuten |
| | Zeilen/Stunde | 118.200 pro Stunde |
| Patrón de rendimiento (Español) | PeopleSoft 8.8, Ventas | |
| | Volumen Estándar de los datos | |
| | Order Processing | 100.000 líneas – 50,7 minutos |
| | Líneas/hora | 118.200 por hora |
| Benchmark (Português) | Gerenciamento de Ordens do PeopleSoft 8.8 | |
| | Volume Padrão dos dados | |
| | Order Processing | 100.000 linhas – 50,7 minutos |
| | Linhas/hora | 118.200 por a hora |

BENCHMARK PROFILE

In May 2005, Oracle USA (PeopleSoft) and IBM conducted a benchmark in Beaverton, OR to measure the batch and online performance of processes in Enterprise Order-to-Cash [‘Order Fulfillment’ -- Order Management, Inventory, and Billing] 8.8 with Oracle9i™ 9.2.0.5 on a 10-way IBM p5 570 server, running IBM AIX 5L™ V5.3. The single server logically hosted the database, application server and web server functions.

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 IBM/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.

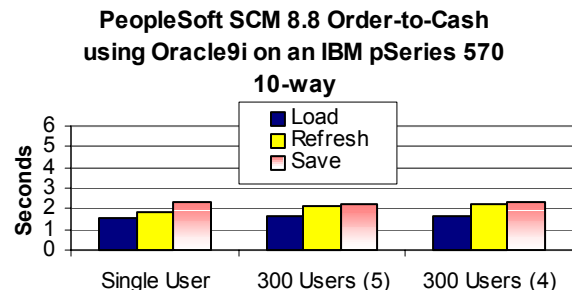


Figure 1: Response Times

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.

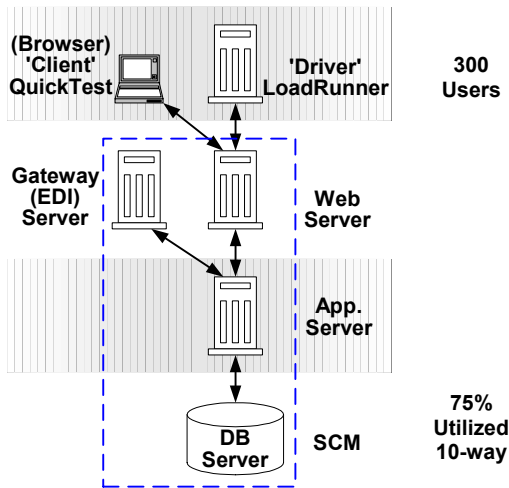


Figure 2: 4-Tier Configuration

This benchmark was run as a “Logical” 4-Tier configuration with all server instances running on a single 12-way box.

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.

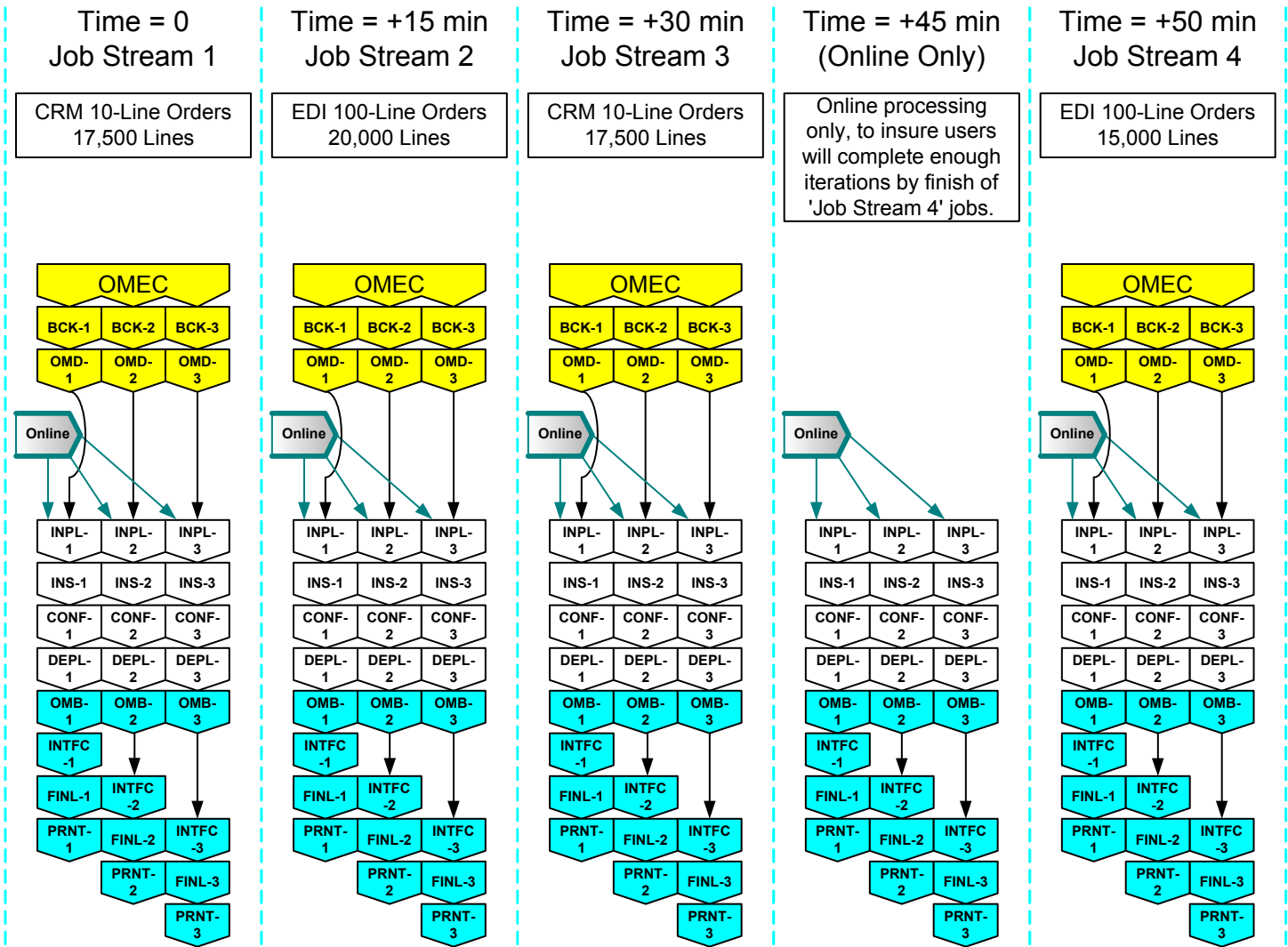


Figure 3: Job Stream Allocation and Timing for 5-Minute Paced Users

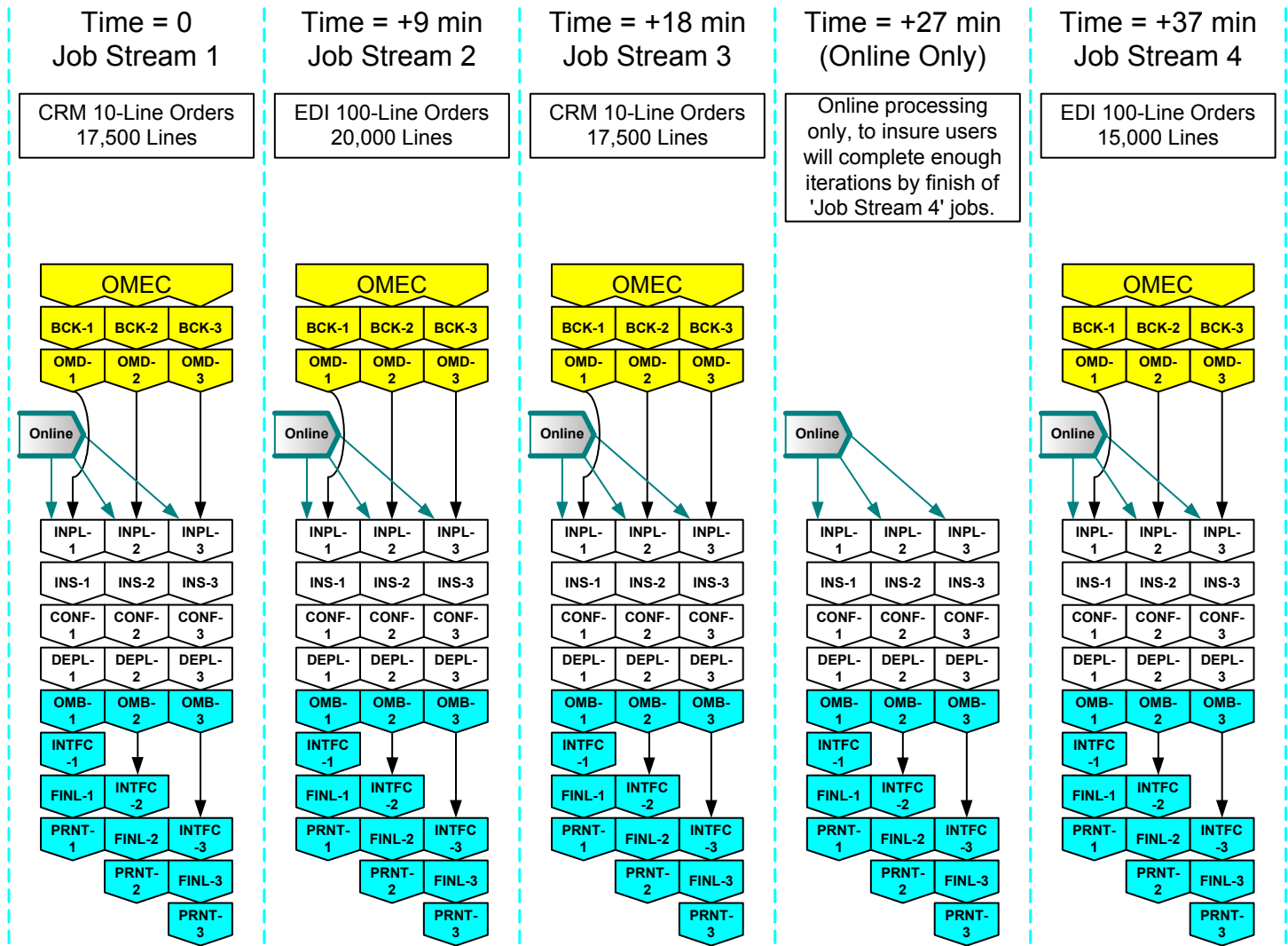


Figure 4: Job Stream Allocation and Timing for 4-Minute Paced Users

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 + 15 | T + 9 | | |
| Online Order Entry | | | ~7,500 | 7.5% |
| EDI | | | 20,000 | 20% |
| Job Stream 3 | T + 30 | T + 18 | | |
| Online Order Entry | | | ~7,500 | 7.5% |
| CRM Database | | | 17,500 | 17.5% |
| Job Stream 4 | T + 50 | T + 37 | | |
| 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 | 1.57 | 1.65 | 1.60 |
| Refresh | 1.81 | 2.16 | 2.21 |
| Save | 2.32 | 2.19 | 2.32 |
| Trans/min Est. | N/A | ~60 | ~75 |
| Order-to-Cash Batch | 100,000 Lines | 60.55 min | 50.75 min |
| Order Lines/Hour | N/A | 99,000 | 118,200 |

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 60.55 minutes, yielding an hourly throughput of 99,000 order lines (five-minute pacing). At the faster “four-minute” pacing, the batch jobs ran in about 50.75 minutes, yielding an hourly throughput of 118,200 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.

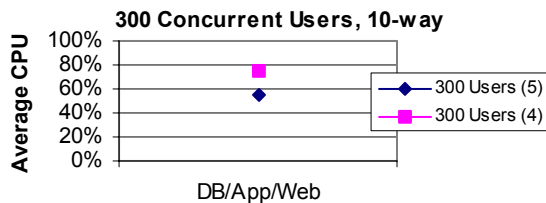


Figure 5: Average CPU Utilization

An 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.

| DB Server | Read MB/Sec | Write MB/Sec | Disk Transfer MB/Sec |
|-----------|-------------|--------------|----------------------|
| Average | 1.1 | 5.7 | 6.8 |
| Peak | 61.2 | 23.5 | 67.2 |

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/Application/Web Server:

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

- 10 × 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
- 24 Gigabytes of Memory (<20 GB used)
- ~3494 Gigabytes of total Disk Space (12 × 36.4 GB + 84 × 36.4) (~180 GB used)
- 6 Disk Controllers (4 × SCSI, 2 × 1 Gbit Fibre Channel DS4500)
- One IBM TotalStorage DS4500

Load Simulation Driver:

1 × IBM eServer™ 325 was used as the driver. It was equipped with the following:

- 2 × 2.0 Gigahertz AMD® Opteron™ 246 Processors, each with 1 Megabyte of Level-2 Cache
- 3 Gigabytes of Memory

Client PC:

1 × IBM xSeries™ 360 Blade was used as the client. It was equipped with the following:

- 2 × 3.6 GHz Pentium® III Xeon™ Processor, with 2 Megabytes of Level-2 Cache
- 8 Gigabytes of Memory

SOFTWARE VERSIONS

PeopleSoft Enterprise SCM 8.8

PeopleTools 8.44

Oracle9i™ 9.2.0.5

IBM AIX 5L V5.3 ML00 (64-bit) (on the Database server, App server and Web server)

Microsoft® Windows 2003 Advanced Server 5.0 (on the client and driver PC)

Mercury Interactive's LoadRunner® 7.8

Mercury Interactive's QuickTest® Professional 8.2

BEA Tuxedo® 8.1 RP89 with Jolt 8.1

BEA WebLogic Server™ 8.10 w/SP 1



Business Process



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