



E-BUSINESS SUITE 11i (11.5.10) BENCHMARK - USING ORACLE10g ON HEWLETT-PACKARD PROLIANT SERVER BLADES

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

Online Workload		
Number of Users	Avg. Resp. (Sec)	90 th Percentile Response Time (Sec)
1,000 Concurrent Users	0.309	0.484
Batch Workload		
Order-to-Cash Batch	Time (Min)	Hourly Order Line Throughput
10,000 Order/Inv. Lines	16.0	37,500 Lines/Hour
Payroll Batch	Time (Min)	Hourly Employee Throughput
5,000 Employees	4.90	61,224 Empl./Hour

Note that the online users and the two batch workloads were running simultaneously and the hourly throughput numbers mentioned above are linear extrapolations. Many factors can influence performance and your results may differ.

BENCHMARK PROFILE

In March 2008, Oracle and Hewlett-Packard conducted a benchmark in Cupertino, CA to measure the online and batch performance of the Oracle (E-Business) Applications Standard Benchmark processes in an environment running Oracle E-Business Suite 11i (11.5.10) with Oracle10g™ (10.1.0.4) for Linux on an HP® ProLiant™ BL465c G5 Server Blade database server running two quad-core processors (8 cores total), running Red Hat® Enterprise Linux® Advanced Server release 4.0 Update 4.

Two 4-socket dual-core HP ProLiant BL685c server blades were used as application/web servers. One 4-socket dual-core HP ProLiant BL685c server blade was used as the Concurrent Manager server. A single HP Storage Works EVA6000 disk array was used for storage.

The benchmark measured the online user response times and the Order Management and Payroll batch business process hourly throughputs for a small database model. Testing was conducted in a controlled environment with online users and the two batch processes running concurrently. **The goal of this Benchmark was to obtain reference response times and throughputs for Oracle E-Business Suite 11i Benchmark on HP ProLiant servers.**

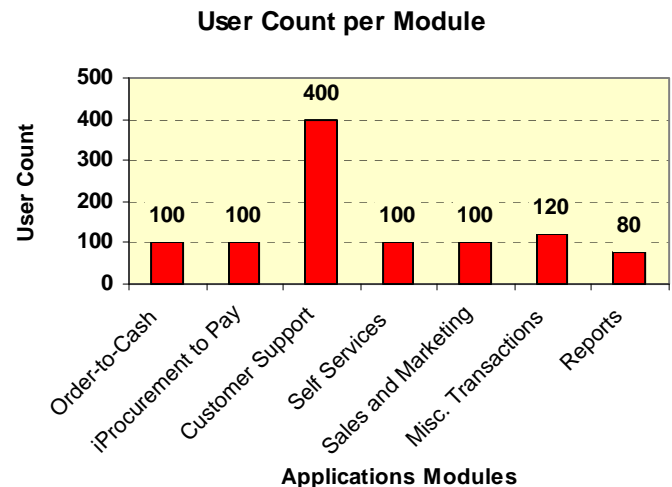


Figure 1: Oracle E-Business Suite Benchmark Concurrent User Distribution

BENCHMARK METHODOLOGY

E-Business Suite 11i Benchmark 11.5.10 online and batch processes can be initiated from a browser. For this benchmark, all runs used a browser to initiate the on-line user transactions and the batch processes were initiated as concurrent programs running simultaneously with the online users.

The batch workloads were run as standard concurrent processes via the concurrent manager.

Mercury Interactive’s LoadRunner® was used as the load driver, simulating concurrent users. It submitted transactions at an average rate of one every 2.5 – 15 minutes for each concurrent user.

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 configuration used for this benchmark run.

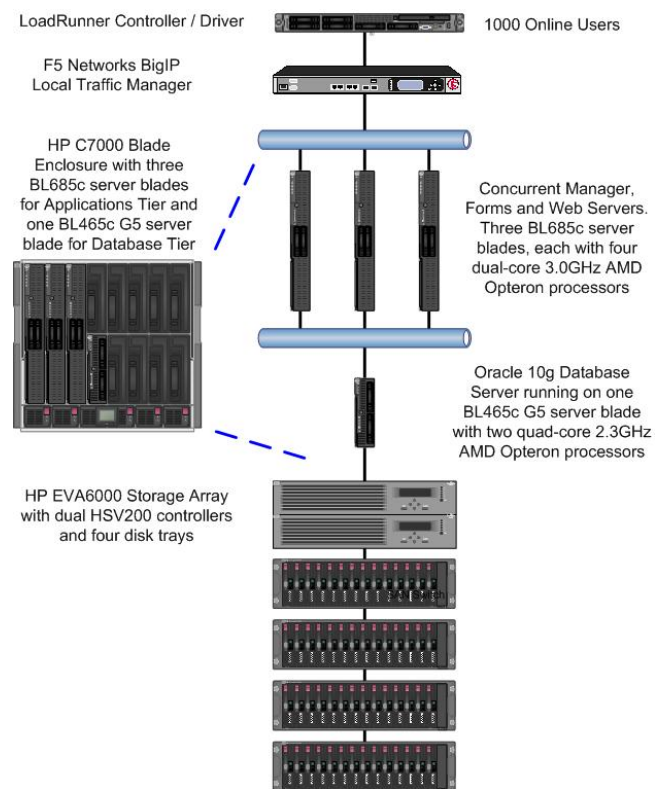


Figure 2: 3-Tier Configuration

This benchmark was run as a “Physical” 3-Tier configuration with discrete machines hosting all of the Database and Application server instances. The load across the multiple mid-tiers was balanced using an F5 Networks BIG-IP local traffic manager device.

BENCHMARK BUSINESS PROCESSES

The E-Business Suite benchmark consists of a mix of on-line transactions and batch processes running in parallel. The following table describes the on-line transactions included in the benchmark run.

Oracle Application Product Flow	% within App.	% Overall	Pacing in Min
Order to Cash (10%)			
Create & Book Order	40	4	5
Pick Release	20	2	2.5
Ship Confirm / ITS	20	2	2.5
Receivables - Invoice	20	2	2.5
Procurement to Pay (10%)			
Create & Query Requisition	20	2	3
Auto-create & Approve PO	20	2	3
View Purchase Order	20	2	3
Create Invoice	20	2	3
Invoice Inquiry	20	2	3
Customer Service (40%)			
Create Service Request	40	16	4
Update Service Request	40	16	4
Close Service Request	20	8	4
Self Service (10%)			
Create & Query Cash Exp.	20	2	6
Create & Query C. Card Exp.	20	2	6
Create Project Timecard	30	3	6
View Employee Payslip	30	3	6
Sales & Marketing (10%)			
Sales Lead to Proposal	40	4	3
Opportunity to Quote	20	2	10
Sales Opportunity to Order	20	2	10
Opportunity to Sales Forecast	20	2	7.5
Miscellaneous Trans. (12%)			
AR View Customer Transact.	16.7	2	7.5
AR Customer Summary	16.7	2	7.5
FA Create & Query Asset	16.7	2	7.5
GL Create Journal Entry	16.7	2	7.5
INV View Item Attributes	16.7	2	7.5
INV Insert Misc. Transactions	16.7	2	7.5
Reports (8%)			
AR – Aging Report	25	2	15
INV – Min/Max Inventory Rep.	25	2	15
OM – Order Summary Report	25	2	15
PO – Printed PO Report	25	2	15
		100%	

Table 1: Online Transaction Mix

Batch Order-to-Cash Processes

Business Process	Number of Threads Used
High Vol. Order Proc.	2
Pick Release	2
Shipping Confirmation	2
ITS	2
Auto Invoice	1
Revenue Recognition	2
GL	1

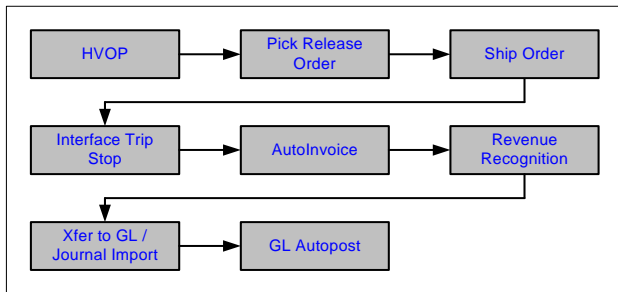


Figure 3: Order-to-Cash Process Flow

High Volume Order Processing (HVOP): The HVOP program processes orders by reading the rows from the Order Management Interface tables and converting the interface records into permanent order headers and their respective order lines. The orders are then booked and advanced to the shipping state.

Pick Release: Pick Release finds and release the eligible delivery lines that meet the release criteria, and creates move orders. The process of transacting move orders creates a reservation and determines the inventory source sub-inventory.

Ship Confirm: Ship Confirm is the process of confirming that items have shipped. When a delivery is ship-confirmed, Shipping Execution confirms that the delivery lines associated with the delivery have shipped.

Interface Trip Stop: The deliveries created in the previous step are then assigned to trips, which may involve multiple stops depending upon the shipping addresses of the deliveries. SRS has been modified to accept Organization code as a parameter and process the trip stops for the specified organization. Interface Trip Stop - SRS has also been enhanced to spawn multiple child processes to process trip stops in parallel. The parameter Stops per Batch is used to specify the number of stops to be processed by each thread of the Interface Trip Stop - SRS. Interface Trip Stop - SRS has also been enhanced to defer the Inventory Interface processes. In the E-Business Suite kit, this profile is set to Yes so that the Inventory Interface transactions are processed in the background by the Inventory transaction manager.

INV Material: The material transaction manager is configured to execute material transaction by periodic concurrent request submissions. The execution interval is set to 20 minutes.

Auto-Invoice: The Auto-Invoice process is used to import invoices, credit memos, debit memos, and on-account credits. 'Receivables' ensures that the data imported is accurate and valid.

Revenue Recognition: Revenue Recognition program generates the revenue distribution records for the invoices and credit memos that use Invoicing and Accounting Rules. Accounting rules were assigned to recognize revenue over a 12-months accounting period. The Revenue Recognition program will create distribution records for the invoices and credit memos that are created in Receivables and imported using Auto-Invoice.

Transfer to General Ledger & Journal Import: The General Ledger Interface program transfers Receivables transaction accounting distributions to the general ledger interface table (GL_INTERFACE) and creates either detailed or summarized journal batches. "Receivables" creates un-posted journal entries in general ledger and executes Journal Import from Oracle General Ledger. It posts journal batches in Oracle General Ledger to update account balances.

General Ledger Auto-post: This posts journal batches to update the account balances of the detail and summary accounts. It can post actual budget or encumbrance journal batches.

Batch Payroll Processes

Business Process	Number of Threads Used
Payroll Process	4
PrePayments	4
NACHA	4
Check Writer	4
Costing	4

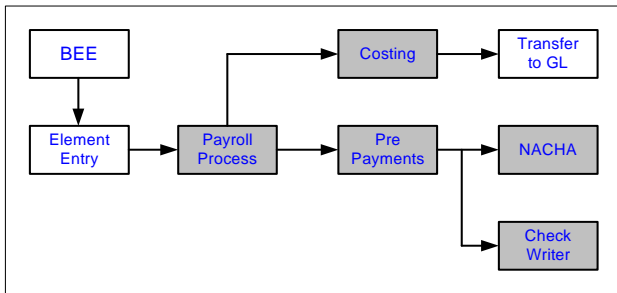


Figure 4: Payroll Process Flow

The Oracle E-Business Suite 11i Payroll processes tested are as follow:

Payroll Process: Identifies all employees to be processed and performs calculations required to complete the gross to net calculation including earnings, deductions, and taxes. The specific groups of employees processed can be controlled by multiple parameters to the payroll process including the ability for a user to define a rules based set of employees.

PrePayments: Distributes the net pay for each employee across the various payment methods (Direct Deposit, Check, or Cash). This can be run for a single payroll process or across multiple payroll processes.

NACHA: This is the US version of the Global Direct Deposit process which creates the bank interface file as per NACHA rules based on the rules in the Pre Payment process.

Check Writer: (Oracle Report Writer) This process allocates check numbers and creates/prints the payroll check and associated paper payslip.

Costing: This process associates the payroll transaction data with the General Ledger (GL) accounts in preparation for transfer of the data to GL. This process uses a sophisticated hierarchical rules based engine to determine the mapping of the HRMS data and payroll results to the GL accounts.

BENCHMARK RESULTS

Online Workload	Avg. Resp. (Sec)	90 th Percentile Response Time in Seconds
1,000 Concurrent Users	0.309	0.484
900 Concurrent Users	0.308	0.484
700 Concurrent Users	0.306	0.484

Table 2: Online Overall Response Times

Two checkpoints were completed during the measurement interval.

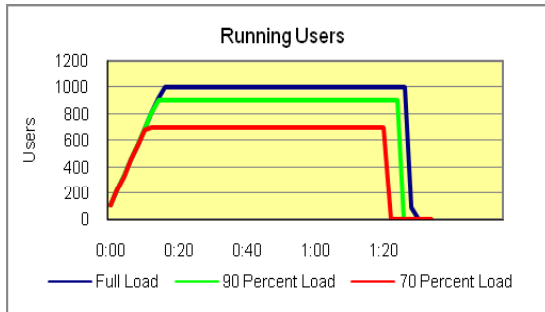


Figure 5: User Load Over Time

Batch Business Metrics	Achieved Output
Order to Cash	
Number of Order Lines Created/Booked	10,000
Number of Order Lines Picked	10,000
Number of Order Lines Ship Confirmed	10,000
Number of Order lines Interface Trip Stopped	10,000
Number of Invoice Headers Created	10,000
Number of Invoice Lines Created	20,000

Table 3a: Batch Transactions Completed (1,000 Users)

Online Business Metrics	Achieved Output
Order to Cash	
Number of Orders Created/Booked	2,467
Number of Orders Picked	2,395
Number of Orders Ship Confirmed	2,395
Number of Orders Interface Trip Stopped	2,270
Number of Invoice Headers Created	2,395
Number of Invoice Lines Created	4,790
Procurement to Pay	
Number of Requisitions Created	400
Number of Purchase Orders Created	1,994
Number of Purchase Orders Approved	1,994
Number of PO Invoices Created	400
Customer Support	
Number of Service Requests Created	2,399
Number of Service Requests Updated	2,406
Number of Service Requests Closed	1,198
Self-Service	
Number of Cash Expenses Created	400
Number of Credit Card Expenses Created	400
Number of Timecards Created	300
Sales & Marketing	
Number of Leads Converted to Proposal	799
Number of Leads Converted to Opportunities	800
Number of Opportunities Converted to Quotes	240
Number of Opportunities Converted to Orders	119
Miscellaneous Transactions	
Number of Fixed Assets Created	160
Number of GL Entries Created	1,590
Number of INV Miscellaneous Transactions Completed	800
Reports	
Number of GL Auto-posts	60
Number of AR Reports	80
Number of INV Reports	80
Number of OM Reports	80
Number of PO Reports	83

Table 3b: Online Transactions Completed (1,000 Users)

	700 Users		900 Users		1,000 Users	
	Avg.	90 th %	Avg.	90 th %	Avg.	90 th %
Order to Cash						
Cr./Book Order	0.99	1.14	1.02	1.17	1.03	1.20
Pick Release	0.45	0.48	0.46	0.49	0.46	0.48
Ship Confirm	0.23	0.23	0.23	0.24	0.23	0.21
AR Insert Inv.	0.43	0.48	0.41	0.46	0.40	0.43
Procurement to Pay						
Checkout req.	0.21	0.23	0.21	0.24	0.21	0.26
Submit Rq Data	0.19	0.21	0.19	0.21	0.19	0.21
Query Req.	0.09	0.10	0.10	0.10	0.10	0.11
Auto-create PO	0.21	0.21	0.21	0.21	0.21	0.21
Approve PO	0.30	0.43	0.32	0.43	0.32	0.43
View Purchase Order Find	0.25	0.29	0.24	0.29	0.24	0.29
Lines	0.42	0.43	0.42	0.43	0.42	0.43
Shipments	0.39	0.43	0.38	0.43	0.39	0.43
Distributions	0.63	0.67	0.62	0.66	0.63	0.66
Create AP Inv.	0.22	0.32	0.23	0.32	0.22	0.32
Inv. Distribution	0.26	0.30	0.27	0.32	0.27	0.30
View AP Invoice Find	0.21	0.21	0.21	0.21	0.21	0.21
Overview	0.95	0.98	0.95	0.98	0.95	0.98
Distributions	0.19	0.19	0.19	0.20	0.20	0.20
Customer Service						
Create Service Request	0.27	0.34	0.27	0.34	0.29	0.34
Update Service Request	0.25	0.40	0.27	0.40	0.27	0.40
Close Service Request	0.44	0.52	0.45	0.54	0.45	0.53
Self Service						
Create Cash Exp. Login	0.25	0.32	0.24	0.32	0.25	0.32
Submit Cash Exp.	0.43	0.45	0.40	0.43	0.43	0.48
Query Cash Exp.	0.18	0.21	0.19	0.23	0.21	0.23
Credit Card Expense Entry	0.15	0.15	0.14	0.15	0.15	0.16
Submit	0.42	0.49	0.43	0.49	0.42	0.49
Query Credit Card Expense	0.20	0.22	0.22	0.27	0.21	0.26
Create Project Timecard	0.12	0.13	0.12	0.14	0.12	0.13
View Employee Payslip	0.25	0.29	0.25	0.29	0.27	0.29

Table 4a: Detailed Online Transaction Response Times

	700 Users		900 Users		1,000 Users	
	Avg.	90 th %	Avg.	90 th %	Avg.	90 th %
Sales Marketing &						
Create Proposal	0.18	0.20	0.20	0.23	0.19	0.23
Create Quote	0.39	0.52	0.37	0.48	0.37	0.48
Update quote	0.22	0.32	0.24	0.34	0.22	0.32
Place Order	0.79	0.86	0.81	0.89	0.83	0.95
Query Forecast	0.15	0.17	0.14	0.16	0.15	0.18
Query Forecast Details	0.10	0.16	0.10	0.17	0.08	0.15
Submit Forecast	0.20	0.23	0.21	0.23	0.21	0.25
Update Forecast	0.12	0.18	0.12	0.19	0.12	0.19
Update Forecast Details	0.20	0.23	0.20	0.23	0.20	0.23
Miscellaneous Trans.						
AR Bill to Open	0.21	0.21	0.21	0.21	0.22	0.21
AR View Cust. Transact. Find	0.36	0.40	0.35	0.41	0.35	0.41
Aging	0.24	0.27	0.22	0.27	0.22	0.27
Acct. Summary	0.19	0.21	0.19	0.21	0.18	0.21
Acct. Details 1	0.20	0.21	0.19	0.21	0.18	0.21
Acct. Details 2	0.52	0.66	0.51	0.66	0.50	0.66
Line Items	0.43	0.49	0.41	0.49	0.40	0.49
Tax	0.19	0.21	0.18	0.21	0.18	0.21
Tr. Accounting	0.20	0.21	0.19	0.21	0.18	0.21
AR Cust. Sum. Open Address	0.21	0.21	0.21	0.21	0.21	0.21
Open 'Ship To'	0.21	0.21	0.22	0.21	0.22	0.21
FA Create	0.21	0.21	0.21	0.21	0.22	0.21
FA Query Asset	0.17	0.23	0.16	0.23	0.16	0.21
GL Create Journal Entry	0.21	0.34	0.21	0.35	0.21	0.35
GL Query J. E.	0.17	0.21	0.17	0.21	0.17	0.21
INV Insert	0.84	0.94	0.84	0.94	0.83	0.94
INV View Item Attributes	0.23	0.27	0.22	0.26	0.23	0.27
INV View Quant	0.21	0.21	0.21	0.21	0.21	0.21
Overall Avg.	0.31	0.48	0.31	0.48	0.31	0.48

Table 4b: Detailed Online Transaction Response Times

10,000 order lines were processed in this test. Tables 5-7 show the processing time in minutes.

10,000 Lines	Order	Time (Min)	Order Lines per Hour
HVOP		1.98	303,030
Pick Release		3.45	173,913
Ship Confirm		0.47	1,276,596
ITS		2.73	219,780
Auto Invoice		1.48	405,405
Revenue Recognition		1.82	329,670
General Ledger		4.07	147,420
Totals:		16.0	37,500

Table 5: Order-to-Cash Batch Performance (1,000 Users)

10,000 Lines	Order	Time (Min)	Order Lines per Hour
HVOP		1.93	310,881
Pick Release		3.40	176,471
Ship Confirm		0.50	1,200,000
ITS		2.63	228,137
Auto Invoice		1.48	405,405
Revenue Recognition		1.77	338,983
General Ledger		4.02	149,254
Totals:		15.73	38,144

Table 6: Order-to-Cash Batch Performance (900 Users)

10,000 Lines	Order	Time (Min)	Order Lines per Hour
HVOP		1.98	303,030
Pick Release		3.40	176,471
Ship Confirm		0.48	1,250,000
ITS		2.57	233,463
Auto Invoice		1.45	413,793
Revenue Recognition		1.70	352,941
General Ledger		4.05	148,148
Totals:		15.63	38,388

Table 7: Order-to-Cash Batch Performance (700 Users)

5,000 employees were processed for the semi-monthly payroll in this test. Tables 8-10 show the processing time in minutes.

5,000 Employees	Time (Min)	Employees per Hour
Payroll Process	4.02	74,627
PrePayments	0.30	1,000,000
NACHA	0.03	10,000,000
Check Writer	0.13	2,307,692
Costing	0.42	714,286
Totals:	4.90	61,224

Table 8: Payroll Batch Performance (1,000 Users)

5,000 Employees	Time (Min)	Employees per Hour
Payroll Process	4.02	74,627
PrePayments	0.28	1,071,429
NACHA	0.07	4,285,714
Check Writer	0.17	1,764,706
Costing	0.35	857,143
Totals:	4.89	61,350

Table 9: Payroll Batch Performance (900 Users)

5,000 Employees	Time (Min)	Employees per Hour
Payroll Process	3.98	75,377
PrePayments	0.28	1,071,429
NACHA	0.03	10,000,000
Check Writer	0.17	1,764,706
Costing	0.35	857,143
Totals:	4.81	62,370

Table 10: Payroll Batch Performance (700 Users)

SERVER PERFORMANCE

Figure 6 shows the average CPU utilization for each process. The value shown is the average across the 2 processors (8 cores) in the database server and the 4 processors (8 cores) in each application server.

**Oracle E-Business Suite Benchmark
11.5.10 using Oracle10g on HP ProLiant
& Blade Servers**

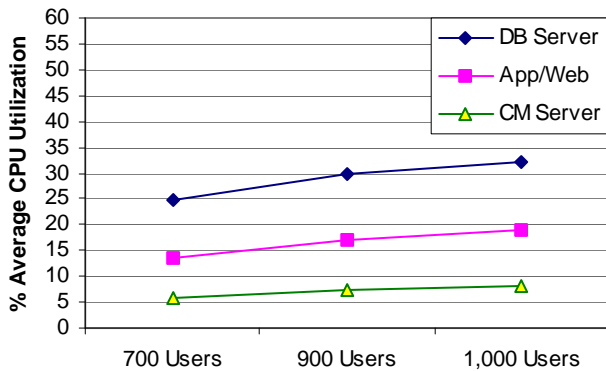


Figure 6: Average CPU Utilization

Each server scaled smoothly as users were added, keeping the batch load constant over the steady state period.

Online Workload	User	System	I/O Wait	Idle
DB 1,000 Users	28.37	1.81	1.99	67.83
DB 900 Users	26.17	1.63	1.97	70.23
DB 700 Users	21.50	1.25	1.85	75.40
App 1 1,000 Users	16.90	1.49	0.01	81.61
App 1 900 Users	15.66	1.34	0.01	82.99
App 1 700 Users	12.23	1.03	0.01	86.72
App 2 1,000 Users	17.76	1.54	0.01	80.69
App 2 900 Users	15.71	1.38	0.01	82.90
App 2 700 Users	12.61	1.05	0.01	86.33
CM 1,000 Users	7.71	0.23	0.03	92.02
CM 900 Users	7.05	0.20	0.03	92.72
CM 700 Users	5.70	0.17	0.03	94.10

Table 11: Average CPU Utilization

Online Workload	700 Users	900 Users	1,000 Users
DB Server (32 GB)	19.64	22.02	23.30
App/Web Svr. 1 (32 GB)	13.18	15.92	17.13
App/Web Svr. 2 (32 GB)	13.46	15.91	17.34
CM Server (32 GB)	4.07	4.11	4.11

Table 12: Average Memory Utilization (Gigabytes)

I/O PERFORMANCE

One HP Storage Works EVA6000 disk array was used for storage. I/O performance is crucial to batch performance and is summarized as follows:

1K Blocks	700 Users	900 Users	1,000 Users
Transfers/Sec Avg.	21.76	23.49	25.26
Peak	4,399	3,995	4,907
Writes/Sec Avg.	17.28	18.78	20.63
Peak	4,399	3,995	4,907
Reads/Sec Avg.	4.48	4.71	4.63
Peak	106.40	175.29	83.63
Blocks Written/Sec Avg.	386.76	411.90	417.88
Peak	36,738	33,175	40,867
Blocks Read/Sec Avg.	60.21	61.63	58.01
Peak	4,268	5,969	3,865
Avg. Service Time (ms)	2.19	2.16	2.19
Peak	17	27	32

Table 13: I/O Subsystem Metrics

DATA COMPOSITION DESCRIPTION

Major data components for the model under test are summarized in the following table.

Application	Business Objects	Small Model
TCA	Organizations	100,000
	Contacts	200,000
	Contact Points	200,000
	Accounts	100,000
	Account Sites	100,000
	Account Site Uses	200,000
Contracts	Contracts	20,000
Install Base	Instances	100,000
	Trackable Items	5
Items	Reserve - Items	100,000
HR	Managers	200
	Employees	5,000
	Payroll Users	5,000
	Users	5,000
	Credit Card Entries	5,000
	Supplier(s)	1,000
Assets	Asset Categories	100
General Ledger	GL Code Combinations	1,000
Sales & Marketing	Resources	3,601
	Resource Groups	400
	Resource Hierarchy Level(s)	4
	Sales Leads	100,000
	Campaigns	1
	Sales Territories	3,201

Table 14: Data Composition

PATCHES

The following patches were applied to the benchmark environment on top of Oracle Applications 11.5.10.

- 4529484: SUBMIT EXPENSE PERFORMANCE ISSUE
- 4058603: OIE.I ROLLUP PATCH #2
- 4282785: PERFORMANCE: SERVICE REQUEST CREATION IS SLOW FROM THE SRTAB FROM CC
- 4455883: POOR PERFORMANCE SEARCHING SEVICE REQUESTS
- 4564212: AR AGING 4 BUCKET REPORT IS DOING FULL TABLE SCAN
- 4345584: UNABLE TO ENTER A LINE IN SALES ORDER FORM
- 4605076: EXCESSIVE EXECUTIONS FOR SPECIFIC PACKAGE
- 4612749: BUG FIXES FOR CS: OCT-05 PATCH
- 4756197: TOO MANY EXECUTIONS OF SELECT A.PERZ_DATA_ID, A.PROFILE_NAME...IN UPDATE
- 4733725: BUG FIXES FOR CS: DEC 05 PATCH
- 5068932: INV: EXCESSIVE PROFILE AND LOGGING CALLS IN PICK RELEASE
- 4384590: BACKPORT FOR BUG# 4287370
- 4699535: HIGH BUFFER GET SQL IN WSHINTERFACE.
- 4346113: JAVA.LANG.ARRAYINDEXOUTOFBOUNDSEXCEPTION WHILE CREATING QUOTATION

APPLICATION SETTINGS

Database:

- The database initialization parameters were set according to the MetaLink document 216205.1 "Database Initialization Parameters and Configuration for Oracle Applications 11i".

Order Management:

- The profile option 'OM: Apply Automatic Attachments' was set to 'No'.
- Price adjustment event at booking. "Book Order" was disabled.
- The item identifier default type was changed to 'Internal Item Number'.
- The setup parameters "Enable Freight Ratings" and "Enable Ship Method" were set to No.
- Re-pricing was disabled at Book Order. 'Save Order Event' was disabled in the Pricing setup.
- The profile option ONT_BYPASS_NOTIFY_OC was created and set to "Y".

Inventory:

1. The pick release rules was set to "Autocreate Deliveries".
2. Except 'serviceable items', all other items used in the benchmark were set as 'Non Trackable' through the Item Master form.

Tech. Stack Configuration:

1. In the jserv.properties file the following changes were made:

```
wrapper.bin.parameters=-verbose:gc -Xmx2048M
-Xms2048M -XX:MaxPermSize=128M
-XX:NewRatio=2 -XX:+PrintGCTimeStamps
-XX:+UserTLAB -XX:UseLargePages
```

```
wrapper.bin.parameters=-DOXTAInPoolSize=1
wrapper.bin.parameters=-DOXTAOutThreads=1
wrapper.bin.parameters=-DOXTALogDebugMsg=false
wrapper.bin.parameters=-Djbo.323.compatible=true
wrapper.bin.parameters=-
DLONG_RUNNING_JVM=true
wrapper.bin.parameters=-Dpoolsize=100
wrapper.bin.parameters=-Dminpoolsize=10
wrapper.bin.parameters=-Dpoolincrement=10
wrapper.bin.parameters=-Dpooldelayincrement=3
```

2. In the jserv.conf file, the following change was made:

```
ApJservVMTimeout 90
```

3. In the zone.properties file, the following changes were made:

```
autoreload.classes=false
autoreload.file=false
```

4. In the httpd.conf file, the following changes were made:

```
Timeout 3600
MaxKeepAliveRequests 0
MaxClients 512
ServerSignature Off
ServerTokens Min
```

5. In the VIS_*.env files, the following change was made:

```
FORMS_60_TIMEOUT="60"
```

Sales & Marketing:

1. Update 'Launch On Date' to current date if 3 months passed after Campaign Schedule created.
2. The profile options ASO_CALCULATE_PRICE and ASO_CALCULATE_TAX were set to "Manual
3. The profile option ASO_USE_NETWORK_CONTAINER was set to 'No'.

Service:

1. Business event subscriptions were disabled.
2. For iSupport, the type of Alert bin was changed to Java.
Content Source Type : Java Object
Content Source Name:
oracle.apps.ibu.homepage.AlertBinRenderer

Receivables:

1. The scheduled "General Ledger Transfer" concurrent program was cancelled.

Payroll:

1. CHUNCK_SIZE was set to 20 in PAY_ACTION_PARAMETERS table.
2. Moved PAY_RUN_RESULTS, PAY_RUN_RESULT_VALUES table and index to the tablespace, locally managed, uniform size 20M.

APPLICATION TUNING

1. Two additional indexes were created on table RA_CUSTOMER_TRX_LINES_ALL on columns interface_line_attribute1 and interface_line_attribute6
2. The index INV.MTL_ITEM_CATEGORIES_N3 was modified to have the columns in the following order:
MTL_ITEM_CATEGORIES(CATEGORY_ID,CATEGORY_SET_ID,ORGANIZATION_ID)
3. The sequence cache size for the following indexes were set to 10000:

INV.MTL_SALES_ORDERS_S,
ONT.OE_MSG_ID_S,
ONT.OE_SALES_CREDITS_S,
MRP.MRP_AP_REFRESH_S,
MRP.MRP_ATP_SCHEDULE_TEMP_S,
WSH.WSH_DELIVERY_ASSIGNMENTS_S,
WSH.WSH_DELIVERY_DETAILS_S
4. The snapshot logs were dropped on the following tables:
INV.MTL_MATERIAL_TRANSACTIONS
INV.MTL_RESERVATIONS
INV.MTL_DEMAND
OSM.AS_SALES_LEADS
5. The retention time of the following queues was set to 0:
APPLSYS.WF_REPLAY_OUT
APPLSYS.WF_REPLAY_IN
APPLSYS.WF_IN
APPLSYS.WF_OUT
APPLSYS.WF_DEFERRED
APPLSYS.WF_NOTIFICATION_IN
APPLSYS.WF_NOTIFICATION_OUT
APPLSYS.WF_JAVA_DEFERRED
6. Statistics were re-collected for index HZ_RELATIONSHIPS_N6
7. The index AR.RA_CUST_TRX_LINE_GL_DIST_N2 was dropped.
8. RA_CUST_TRX_LINE_GL_DIST_ALL table and index were moved to the tablespace, locally managed, uniform size 20M

OS TUNING

The following lines were added to the /etc/security/limits.conf file:

```
* soft nfile 130000
* hard nfile 130000
* soft nproc 20000
* hard nproc 20000
oracle - memlock 100000000
```

The following kernel parameters were changed in the /etc/sysctl.conf file:

```
kernel.sem = 17010 32000 100 128
kernel.shmmax = 107374182400
kernel.shmall = 26214400
kernel.shmni = 16384
vm.nr_hugepages = 4097
fs.aio-max-nr = 2500000
```

BENCHMARK ENVIRONMENT

HARDWARE CONFIGURATION

1 × HP® ProLiant® BL465c G5 server blade was used as the database server. It was equipped with the following:

- 2 × 2.3 GHz AMD® Opteron™ Quad-Core Model 2356 processors (8 cores total), each with 2 MB of Level 2 cache and 2 MB of Level 3 cache
- 32 GB memory
- 2 × 72 GB internal disk drives attached to an integrated HP SmartArray E200i Controller
- 1 × HP Storage Works EVA6000 disk array attached to 1 QLogic QMH2462 4Gb Fibre Channel controller for data and logs
- Approximately 3.98 TB total disk space available for data and logs (56 × 72.8 GB)
- Approximately 240 GB of RAID 0 storage configured for this benchmark

Application Server(s):

2 × HP ProLiant® BL685c server blades were used as application and web servers. They were equipped with the following:


- 4 × 3.0 GHz AMD® Opteron™ Dual-Core Model 8222 processors (8 cores total), each with 1 MB Level 2 cache per core
- 32 GB memory
- 2 × 72 GB internal disk drives attached to an embedded HP SmartArray E200i Controller

CM/NFS Server:

1 × HP ProLiant® BL685c server blade was used as the CM/NFS server. It was equipped with the following:

- 4 × 3.0 GHz AMD® Opteron™ Dual-Core Model 8222 processors (8 cores total), each with 1 MB Level 2 cache per core
- 32 GB memory
- 2 × 72 GB internal disk drives attached to an embedded HP SmartArray E200i Controller

APPLICATION TRAFFIC MANAGEMENT DEVICES

	<p>1 × F5 BIG-IP Model 1500 Local Traffic Manager was used to distribute the LoadRunner traffic across the web and application servers.</p> <p>The F5 BIG-IP local traffic management system is specifically designed to manage local network traffic that comes into or goes out of a local area network (LAN). A commonly used feature of the F5 BIG-IP system is its ability to intercept and redirect incoming network traffic for the purpose of intelligently tuning and distributing the network load between servers for scalability. In addition to the basic ability to balance the load across network servers, other functions include managing specific types of application traffic, monitoring and optimizing server performance, and enhancing the network security. For more information on the F5 BIG-IP system, see http://www.f5.com/products/big-ip/</p>
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SOFTWARE VERSIONS

Oracle's E-Business Suite (E-Business Suite Kit) 11.5.10

Oracle10g™ 10.1.0.4 (64-bit)

Red Hat Enterprise Linux Advanced Server release 4.0 Update 4 (on the database server)

Red Hat Enterprise Linux Advanced Server release 4.0 Update 2 (on the application/web servers and CM server)

Mercury Interactive's LoadRunner® 8.0

Apache WebServer 1.3.19 with JServ 1.1.2

Java™ 2 Runtime Environment, Standard Edition (build 1.5.0_13-b05). Java HotSpot™ Client VM (build 1.5.0_13-b05, mixed mode)

F5 Networks BIG-IP LTM v9.2.2

Glossary and Acronyms:

ATP Available to Promise

BEE Batch Element Entries

HVOP High Volume Order Processing

OASB Oracle Applications Standard Benchmark

RAC Real Applications Clusters



Oracle

Applications Performance & Benchmarks

500 Oracle Parkway

Redwood Shores, California 94065

Tel 650/506-7000

Fax 650/506-7000

Email eBSkit_us@oracle.com

World Wide Web <http://www.oracle.com>

The results published in this report have been independently reviewed and audited by:



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