E-BUSINESS SUITE APPLICATIONS R12 (R12.1.3) ORDER MANAGEMENT (OLTP) BENCHMARK - USING ORACLE DATABASE 11g ON FUJITSU'S M10-4S SERVER RUNNING SOLARIS 11

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

This OLTP benchmark test was run on two 16-core servers.

Online Workload		
Number of Users	**Average Response (Sec)**	**90th Percentile Response Time (Sec)**
320 Users Order	0.87	0.94
160 Users Pick Release	0.05	0.06
160 Users Ship Confirm	0.08	0.09
160 Users AR Insert Manual Invoice	0.96	1.00
160 Users Order Summary Report	0.02	0.03
Net Weighted Averages	0.47	0.51

Many factors can influence performance and your results may differ. Notes times are Save/Update or (Search).

BENCHMARK PROFILE

In June 2014 Fujitsu® conducted a benchmark in Japan to measure the online (OLTP) performance of the Oracle E-Business Order Management business flow in an environment running Oracle E-Business Suite R12 (12.1.3) using the Oracle Database 11g with Oracle Solaris 11.1 operating system (OS) on a Fujitsu SPARC M10-4S™ (16-core) database server. A second 16-core M10-4S was used for the application-tier server. Moreover, one of Fujitsu's ETERNUS™ DX410 S2 systems was used for data storage (~264 GB).

The benchmark measured the Order to Cash OLTP business process response times for an Extra-Large database model. Testing was conducted in a controlled environment with no other applications running. **The goal of this Benchmark was to obtain reference online response times for the Oracle E-Business Suite R12 Benchmark, using Fujitsu's SPARC servers running Oracle Solaris 11 OS.**
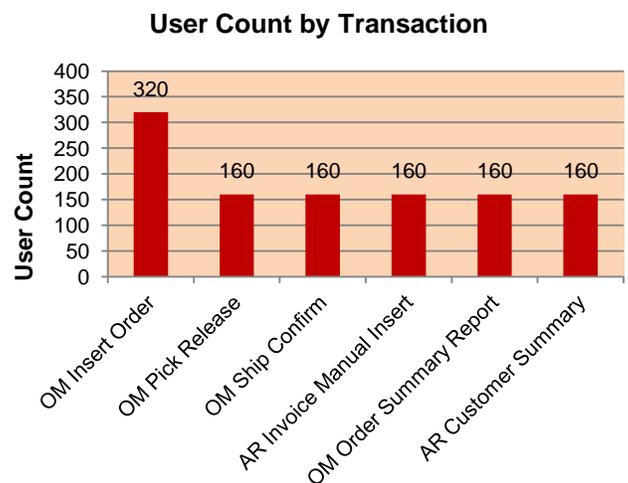

Figure 1: Oracle E-Business Suite Benchmark Concurrent User Distribution

BENCHMARK METHODOLOGY

E-Business Suite 12 Benchmark 12.1.3 online processes can be initiated from a browser. For this benchmark, all runs used a browser to initiate the on-line user transactions.

Oracle® OATS® was used as the load driver, simulating concurrent users. It submitted transactions at an average rate of one every 1.5 to 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. Note that the measured response times may be shorter than a live user would experience as client and browser latency is not simulated by this load test system.

Figure 2 shows the configuration used for this benchmark run. Figure 3 shows the logical domains and E-Business Suite environments.

	Fujitsu M10-4S App/Web Server 4-CPU, 64-core (128 Threads) 256 GB ~18% Utilized * Only 16 cores (32 Threads) were activated
	Fujitsu M10-4S DB Server 4-CPU, 64-core (128 Threads) 1 TB ~19% Utilized * Only 16 cores (32 Threads) were activated
	ETERNUS DX410 S2 Storage System

Figure 2: 3-Tier Configuration

This benchmark was run as a "Physical" 3-Tier configuration with discrete machines hosting the Database and Application/Web server instances.

The complete E-Business Suite benchmark consists of a mix of on-line transactions and batch processes running in parallel. This test utilized one flow of OLTP transactions. The following table describes the on-line transactions included in the benchmark run.

Oracle Application Product Flow	Users	Pacing in Min
Order to Cash	(1,120)	
Create & Book Order	320	3
Pick Release	160	1.5
Ship Confirm / ITS	160	1.5
Receivables - Invoice	160	1.5
AR Customer Summary	160	7.5
OM Order Summary Report	160	15
	1,120	

Table 1: Online Transaction Mix

Order to Cash OLTP Processes

Create & Book Order: The user navigates to the "Orders" page, enters customer information and creates a 5-line order. Finally, the user clicks on "Book Order" to enter the completed order. The response time is to 'save' the entry.

Pick Release: The user navigates to the "Shipping/Release Sales Orders" page and enters the order number and clicks on "Execute Now." Finally, the user clicks on "OK" to acknowledge that "Pick Release Only" has completed. The response time is to 'save' the entry.

Ship Confirm: The user navigates to the "Shipping/Transactions" page and enters "From Order Number" and "To Order Number" before clicking on "Find." Finally, the user clicks through the confirmation steps and then clicks on "OK" to acknowledge that "ship Confirm" has completed. The response time is to 'save' the entry.

Receivables – Insert Invoice: The user navigates to the "Transactions/Transactions" page and enters Source, Reference Number, and Line Item information. After entering 5 items, the user save the form. The response time is to 'save' the entry.

BENCHMARK RESULTS

Online Business Metrics		Achieved Output
Number of Order Lines Created		28,752
Number of Invoice Lines Created		109,520
Number of Order Summary Reports		632

Table 2: Online Transactions Completed (1,120 Users)

R12 Application changes, data model additions and test methodology improvements render direct comparison to previous Oracle E-Business release 11.5.10 and 11.5.9 results invalid.

	1,120 Users	
	Avg. (Sec)	90th% (Sec)
Order to Cash		
Insert Order	0.871	0.936
Pick Release	0.050	0.056
Ship Confirm	0.084	0.091
Insert Manual Invoice	0.957	1.004
OM Order Summary Report	0.019	0.026
Weighted Average Saves	0.475	0.508
Transactions/min	~450	

Table 3: Detailed Online Transaction Response Times

The transaction rate is estimated by dividing the number of running users by the average pacing. The OATS output suggested that the realized rate was closer to 400 transactions per minute.

SERVER PERFORMANCE

Figure 3 shows the Steady-State CPU for the database server.

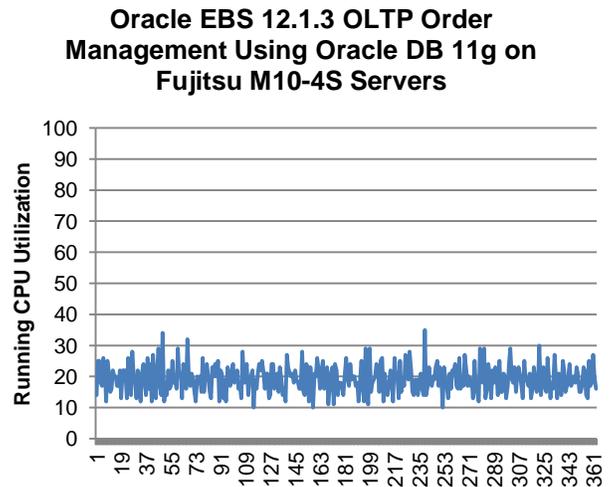**Oracle EBS 12.1.3 OLTP Order Management Using Oracle DB 11g on Fujitsu M10-4S Servers**

Figure 3: Running DB Server CPU Utilization

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

Online Workload		% User	% System	% I/O Wait	% Idle
Database Server		17.7	1.6	0	80.7
App/Web Server		16.5	1.8	0	81.8

Table 4: Average CPU Utilization Breakout

Total Memory Used By:	1,120 Users
Database Server	684 GB
App/Web Server	70 GB

Table 5: Average Memory Utilization Breakout

I/O PERFORMANCE

A Fujitsu ETERNUS DX410 S2 was used for storage. The batch workload requires optimal I/O performance.

I/O Performance		1,120 Users
Writes/Sec	Avg	15.3
	Peak	131.3
Reads/Sec	Avg	0.3
	Peak	7.5
KB Written/Sec	Avg	1,020
	Peak	8,756
KB Read/Sec	Avg	37.0
	Peak	1,600
Avg Service Time (ms)	Avg	0.5
	Peak	22.4

Table 6: Average I/O Utilization Breakout

DATA COMPOSITION DESCRIPTION

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

Application	Business Objects	Extra-Large Model
TCA	Organizations	1,100,000
	Contacts	4,900,000
	Contact Points	3,700,000
	Accounts	1,100,000
	Account Sites	1,090,000
	Account Site Uses	2,180,000
Contracts	Contracts	222,000
Install Base	Instances	1,300,000
	Trackable Items	5
HR	Managers	800
	Employees	250,000
	Payroll Users	250,000
	Users	20,000
	Credit Card Entries	4,000,000
	Supplier(s)	10,000
Assets	Asset Categories	984
General Ledger	GL Code Combos	93,417

Table 7: Data Composition

PATCHES

The following patches were applied to the benchmark environment on top of Oracle E-Business Applications R12 (12.1.2 and 12.1.3).

applied 9858539
applied 9583541
applied 9581788
applied 9406217
applied 9369504
applied 9281404
applied 9239089
applied 9204440
applied 8919491
applied 8919489
applied 8502056
applied 8360494
applied 8300196
applied 7580744
applied 7303033
applied 7303032
applied 7281456
applied 7195389
applied 7140405
applied 7121788
applied 7016961
applied 6400501
applied 5651245
applied 5394728
applied 3559326
applied 13723427
applied 12960302
applied 12942119
applied 11683193

TUNING

```
Drop index applsys.wf_notifications_n1;
create index applsys.wf_notifications_n1 on applsys.wf_notifications
(recipient_role, status, message_type);
```

```
exec fnd_stats.gather_table_stats('APPLSYS','WF_ITEMS',
PERCENT=>100, degree=>128);
exec fnd_stats.gather_table_stats('APPLSYS','WF_NOTIFICATIONS',
PERCENT=>35, degree=>128);
```

```
Delete aso.aso_order_feedback_t;
alter table aso.aso_order_feedback_t move;
exec
fnd_stats.gather_table_stats('ASO','ASO_ORDER_FEEDBACK_T');
```

```
exec fnd_stats.gather_table_stats
('APPLSYS','FND_CURRENCIES',100,cascade=>TRUE);
exec fnd_stats.gather_schema_stats (schemaname =>
'HR',estimate_percent => 100,degree => 32);
```

```
update fnd_concurrent_programs
set enable_trace = 'N'
where enable_trace = 'Y' ;
```

```
update pa_projects set completion_date = completion_date+365;
update pa_tasks set completion_date = completion_date + 365;
commit;
```

```
update pa_projects_all
  set completion_date = completion_date+365;
select project_id, name, segment1, completion_date from
pa_projects_all
  where project_id = 2779;
commit;
update pa_tasks set completion_date = '30-DEC-13' where task_id in (
  select task_id from pa_tasks a,pa_projects_all b where
a.project_id=b.project_id and b.completion_date = '30-DEC-13');
commit;
```

```
Drop index inv.mtl_system_items_b_tn3;
create index inv.mtl_system_items_b_tn3 on inv.mtl_system_items_b
(organization_id, upper(segment1), customer_order_enabled_flag );
```

```
exec fnd_stats.gather_table_stats('APPLSYS','WF_ITEMS',
PERCENT=>100);
```

```
create index AR.RA_CUSTOMER_TRX_N30 on
AR.RA_CUSTOMER_TRX_ALL(CUST_TRX_TYPE_ID,
BATCH_SOURCE_ID, ORG_ID)
tablespace APPS_TS_TX_IDX;
```

BENCHMARK ENVIRONMENT

HARDWARE CONFIGURATION

DATABASE SERVER

A Fujitsu M10-4S server was used as the database server. Only 16 cores (32 threads) were activated by the Fujitsu M10 CPU Core-Activation key. It was equipped with the following:

- 4×3.7 GHz SPARC64™ X+ Sixteen-Core processors each with 64 Kilobytes of Instruction and 64 Kilobytes of Data Level-1 on core cache, and 24 Megabytes of Level-2 on-chip cache (64 cores total – 128 vcpus/threads)
- 1024 Gigabytes of Memory (~685 GB used at peak load)
- $1 \times$ PCI Express 2-Port 8Gbps FC HBA
- 1×600 GB SAS Internal Drive

One Fujitsu's ETERNUS DX410 S2 was used for storage. The storage system was equipped with the following:

- ~3.3 Terabytes of total disk space available. Approximately 264 GB was used for the database from the 656 GB of storage allocated to the database instance.
- 1×7 RAID 0+1 Volumes

APPLICATION/WEB SERVER(S)

A Fujitsu M10-4S server was used as the application-tier server. Only 16 cores (32 threads) were activated by the Fujitsu M10 CPU Core-Activation key. It was equipped with the following:

- 4×3.7 GHz SPARC64™ X+ Sixteen-Core processors each with 64 Kilobytes of Instruction and 64 Kilobytes of Data Level-1 on core cache, and 24 Megabytes of Level-2 on-chip cache (64 cores total – 128 vcpus/threads)
- 256 Gigabytes of Memory
- $1 \times$ PCI Express 2-Port 8Gbps FC HBA
- 1×600 GB SAS Internal Drive

LOAD DRIVER SERVER(S)

Three of Fujitsu's PRIMERGY TX200 S7 servers were used as load drivers. They were equipped with the following:

- 2 × 2.93 GHz Intel Xeon 5570 Quad-Core processors, each with 8 Megabytes of on-chip cache (8 cores total)

- 24 Gigabytes of Memory

SOFTWARE VERSIONS

Oracle's E-Business Suite (E-Business Suite Kit) R12.1.3

Oracle11*g* 11.2.0.3.0 (64-bit)

Oracle Solaris 11.1 on the database servers

Oracle Solaris 11.1 on the app/web servers

Microsoft® Windows® Server 2008 R2 Standard SP1 (64-bit) on the OATS controller and drivers

Oracle® Application Test Suite 9.3.1 (OATS)

Glossary and Acronyms:

OASB   Oracle Applications Standard Benchmark

OATS   Oracle Application Test Suite

OLTP   On Line Transaction Processing

RAC   **R**eal **A**pplications **C**lusters

ORACLE®

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:

INFO SIZING