

ORACLE E-BUSINESS SUITE APPLICATIONS R12 (R12.2.7) ORDER MANAGEMENT (OLTP) BENCHMARK - USING ORACLE12c (12.1.0.2) ON ORACLE'S CLOUD INFRASTRUCTURE (1-NODE VM DB SYSTEM)

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 (2,000 Concurrent Users)			
Number of Users		Average Response (Sec)	90 th Percentile Response Time (Sec)
500 Users Insert Order		1.66	1.87
250 Users Pick Release		0.7	0.79
250 Users Ship Order		0.43	0.53
250 Users Insert Manual Invoice		1.17	1.36
250 Users View Customer Trans. Sales		1.27	1.52
Customer Trans. Tax		0.6	0.75
250 Users Order Summary Report		0.06	0.08
250 Users AR Customer Summary		n/a	n/a
Weighted Average			
		1.018	1.25

Table 1: Order Management Performance

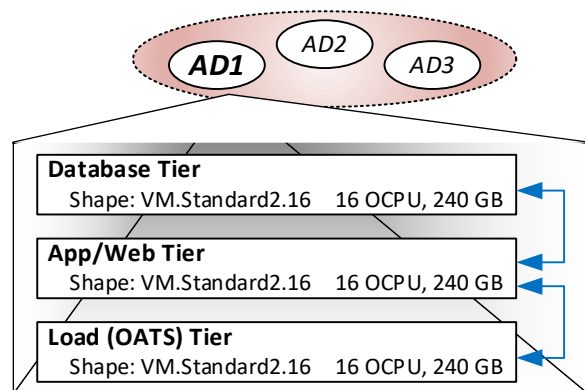
Note that 250 users ran an 'AR Customer Summary' transaction as a background load without timers. Many factors can influence performance and your results may differ. Any sizing should be validated with customer-specific pre-production testing. Oracle E-Business Suite 12.x Application-Tier memory allocation starts with 2 GB per 180 'self-service' users with more for 'forms-based' transactions, as in this benchmark.

BENCHMARK PROFILE

In May 2019 Oracle conducted a benchmark initiated from Pleasanton California using cloud resources located in Ashburn Virginia to measure the online (OLTP) performance of the Oracle E-Business Suite Order to Cash business flow in an environment running Oracle E-Business Suite R12 (12.2.7) using the Oracle Database 12c (12.1.0.2) running on Oracle's Cloud Infrastructure (OCI) VM Cloud 16.2.2 Database Service with Oracle® Linux® 6.9 (64-bit) OS. Moreover, the instance of 16 OCPU, 32 threads, 240 GB used the attached 2.4 TB of block storage for data storage and redo log storage.

The benchmark measured the Order to Cash OLTP business process response times for a 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, on an Oracle's Database Cloud Infrastructure (1-Node VM DB System).**

Ashburn Region with Availability Domains



(Note: all tiers deployed in same AD)

Figure 1: Oracle E-Business Suite Benchmark on Oracle Cloud Infrastructure

BENCHMARK METHODOLOGY

Oracle E-Business Suite R12 Benchmark 12.2.7 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 2 minutes 30 seconds, or 5 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.




	<p>VM.Standard2.16</p> <p>App/Web Server 16-OCPU, (32 vCPU) 240 GB ~55% Utilized</p>
	<p>VM.Standard2.16</p> <p>DB Server 16-OCPU, (32 vCPU) 240 GB ~42% Utilized</p>
	<p>Block Storage 2.4 TB</p>

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 on their respective OS images.

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

Oracle Application Product Flow	% Overall	Pacing in Min
Order to Cash (Order Management)		
Create & Book Order	25	5
Pick Release	12.5	2.5
Ship Confirm / ITS	12.5	2.5
Receivables – Invoice	12.5	2.5
Receivables – Customer Tran	12.5	2.5
Receivables – Customer Rep.	12.5	2.5
Order Summary Report	12.5	2.5
	100%	

Table 2: Online Transaction Mix

Order to Cash (Order Management) 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
Self-Service	
Number of Order Lines Created	28,725
Number of Invoice Lines Created	27,865
Number of Order Summary Reports	5,697

Table 3: Online Transactions Completed (2,000 Users)

	2,000 Users	
	Avg.	90 th %
Order Management (Order to Cash)		
500 Concurrent Users Insert Order	1.66	1.871
250 Concurrent Users Pick Release	0.699	0.792
250 Concurrent Users Ship Order	0.433	0.535
250 Concurrent Users Insert Manual Invoice	1.17	1.358
250 Users View Customer Trans. Sales	1.274	1.521
Customer Trans. Tax	0.602	0.746
250 Concurrent Users Order Summary Report	0.06	0.084
250 Concurrent Users Customer Summary	n/a	n/a
Weighted Average	1.08	1.25
Transactions/min	~646	

Table 4: Detailed Online Transaction Response Times

The transaction rate is estimated by dividing the number of running users by the average pacing.

Oracle E-Business Suite R12.2 application changes, data model additions and testing methodology improvements render a direct comparison to previous Oracle E-Business Suite release benchmarking results invalid.

SERVER PERFORMANCE

Figure 3 shows the running load on the Database and App/Web servers. The plot shown is the average across the processors in the Database server (a total of 16 cores) and the processors (16 cores) in the Application/Web server.

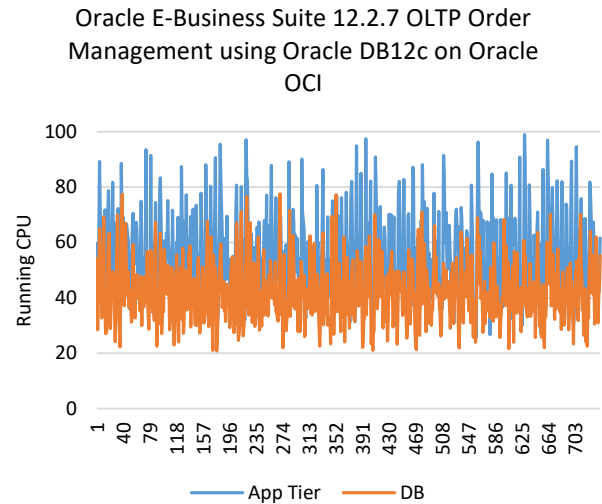


Figure 3: Monitored CPU Utilization

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	38.8	3.3	0.0	57.8
App/Web Server	51.6	3.8	0.0	44.6

Table 5: Average CPU Utilization Breakout (2,000 Users)

Average GB Used	2,000 Users
DB Server	234
App/Web	235

Table 6: Average Memory Utilization Breakout

I/O PERFORMANCE

Block storage memory Volumes were used for storage. The workload requires optimal I/O performance.

I/O Performance		2,000 Users
IO/Sec	Avg	262.3
	Peak	1,054
KB Written/Sec	Avg	7,567
	Peak	12,565
KB Read/Sec	Avg	169
	Peak	10,828

Table 7: 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 Combinations	93,417

Table 8: Data Composition

PERFORMANCE INITIALIZATION

Database parameter settings:

n/a

Create indexes:

1. Create index APPLSYS.WF_ITEMS_T ON APPLSYS.WF_ITEMS (OWNER_ROLE, ITEM_TYPE, ROOT_ACTIVITY, END_DATE);
2. Create index INV.MTL_SYSTEM_ITEMS_T ON INV.MTL_SYSTEM_ITEMS_B(upper(segment1),ORGANIZATION_ID);
3. Create index INV.MTL_RESERVATIONS_T ON INV.MTL_RESERVATIONS(inventory_item_id,primary_reservation_quantity,organization_id);
4. Create index APPLSYS.WF_ITEMS_T ON APPLSYS.WF_ITEMS(owner_role,item_type,root_activity,end_date);
5. Alter index INV.MTL_RESERVATIONS_T on INV.MTL_RESERVATIONS(INVENTORY_ITEM_ID, PRIMARY_RESERVATION_QUANTITY,ORGANIZATION_ID);

Actions taken prior to run:

Per Doc 2084066.1 , make changes to two parms, a “post timeout” and “auto backlog” to fix Weblogic errors

Post_timeout is changed

From Domain Structure (Left Panel in admin console) -> Environment -> Servers -> (select the server where you deploy your application on it) -> Protocols tab (from server setting)->HTTP -> (tic the option) change Post_timeout to 120

For accept backlog

From Domain Structure (Left Panel in admin console) -> Environment -> Servers -> (select the server where you deploy your application on it) -> Tuning (from server setting)-> change accept_backlog to 1000

Apply Patch 27340236

Actions taken prior to run (cont.):

kernel.sem = 250 32000 100 256

From Domain Structure (Left Panel in admin console) -> Environment -> Servers -> (select the server where you deploy your application on it) -> General tab (from server setting)-> Advance -> (tic the option) WebLogic Plug-In Enabled

Then restarted the server.

Updated \$INST_TOP/admin/appl/oacore_wls.properties to add this line

```
oracle.fnd.language.rule.lastsession=disable
```

BENCHMARK ENVIRONMENT

HARDWARE CONFIGURATION

DATABASE SERVER (*TIER*)

A single VM instance of Oracle's Cloud Infrastructure version 16.2.2 was used for this test. 1 x Oracle Linux Database Cloud Service – Virtual Machines, with Shape VM.Standard2.16 (16 OCPU as 32 vCPU) was used. It was equipped with the following:

- 16 OCPU (32vcpu) running on 2.0 GHz Intel® Xeon™ Platinum® 8167M
- 240 Gigabytes of Memory (~234 GB used at peak load)
- 2 × 1.2 TB Oracle block storage drives, for a total of 2.4 TB were used to host Linux and Oracle 12c Database software.

APPLICATION/WEB SERVER(S) (*TIER*)

A single COMPUTE Instance of Oracle's Cloud Infrastructure 16.2.2 was used for this test. 1 × Oracle Linux COMPUTE Instance with Shape VM.Standard2.16 was used as an application server and web server.

- 16 OCPU (32vcpu) running on 2.0 GHz Intel® Xeon™ Platinum® 8167M
- 240 Gigabytes of Memory (~235 GB used at peak load)
- One Oracle Cloud Infrastructure Block Storage Volume for a total of 155 GB was used to host Linux and the Application Tier software.

LOAD DRIVER SERVER(S)

A single COMPUTE Instance of Oracle's Cloud Infrastructure 16.2.2 was used for this test. 1 × Oracle Linux COMPUTE Instance with Shape VM.Standard2.16 was used to host the load controller and agents.

- 16 OCPU (32vcpu) running on 2.0 GHz Intel® Xeon™ Platinum® 8167M
- 240 Gigabytes of Memory (~38 GB used at peak load)
- One Oracle Cloud Infrastructure Block Storage Volume for a total of 155 GB was used to host Linux and the Application Test Suite Tier software.

SOFTWARE VERSIONS

Oracle's E-Business Suite (E-Business Suite Kit) R12.2.7

Oracle12c 12.1.0.2.0 (64-bit) [multi-tenant single CDB / PDB]

Oracle Linux 6.9 (64-bit) on the database server.

Oracle Linux 7.5 (64-bit) on the app-tier server.

Oracle Linux 7.6 (64-bit) on the ATS server.

Xen 4.3.1 OVM

Java HotSpot™ 64-bit server VM (build 25.161-b12), mixed mode on the database server

Java HotSpot™ 64-bit server VM (build 24.51-b03), mixed mode on the application-tier server

The following Java™ Standard Edition (SE) versions have all been used in the Oracle E-Business Suite Applications environment:

- Java 1.8.0_161-b12 database
- Java 1.7.0_51-b13 application-tier

Oracle® Application Test Suite 12.5.2.537 (OATS)

Glossary and Acronyms:

CDB / PDB Container DB / Provision DB

NVMe Non-Volatile Memory express

OASB Oracle Applications Standard Benchmark

OATS Oracle Application Test Suite

OCPU Oracle CPU (1 physical core, for 2 execution threads with Hyper threading enabled)

OLTP On Line Transaction Processing



Oracle is committed to developing practices and products that help protect the environment

Integrated Cloud Applications & Platform Services

Oracle E-Business Suite R12 OLTP OM Flow
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