

ORACLE E-BUSINESS SUITE APPLICATIONS R12.2.7 HUMAN RESOURCES ON LINE BENCHMARK - WITH ORACLE DATABASE 12.1.0.2 ON AN ORACLE 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 On Line Transaction Processing (OLTP) benchmark test was run on two 16-core servers.

Online Workload (3,000 Concurrent Users)		
Number of Users	Average Response (Sec)	90 th Percentile Response Time (Sec)
750 Users Cash Expense	0.47	0.54
750 Users Credit Expense	0.31	0.36
750 Users Submit Timecard	0.27	0.29
750 Users View Payslip (Search)	(0.44)	(0.50)
Net Weighted Averages	0.35	0.40
(Search)	(0.44)	(0.50)

Table 1: Human Resources Performance

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 12.2.x Application-Tier memory allocation starts with 2 GB per 180 'self-service' users with more for 'forms-based' transactions, as in this benchmark.

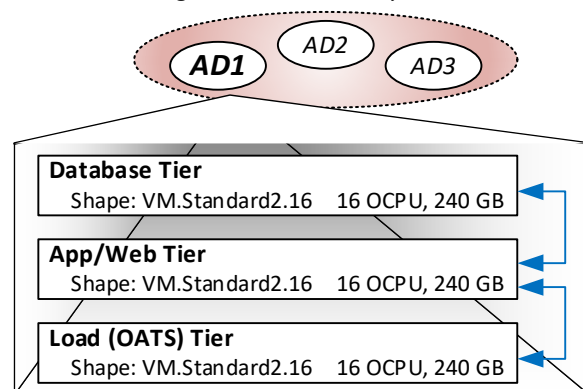
Notes times are Save/Update or (Search).

BENCHMARK PROFILE

In March 2020 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 HR 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 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 HR Self-Service 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, 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 12 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 6 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.

The complete Oracle 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
HR Self-Service	(3,000)	
Cash Expenses	750	6
Credit Expenses	750	6
Submit Time Card	750	6
View Payslip	750	6
	3,000	

Table 2: Online Transaction Mix




	VM.Standard2.16 App/Web Server 16-OCPU, (32 vCPU) 240 GB ~47% Utilized
	VM.Standard2.16 DB Server 16-OCPU, (32 vCPU) 240 GB ~32% Utilized
	Block Storage 2.4 TB

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.

HR Self-Service OLTP Processes

Cash Expenses: The user navigates to the “Expenses Home” and enters various travel and lodging expenses including airfare, car rental, hotel, entertainment, meals, etc. Finally, the user clicks on “Submit” to enter the completed expense report. The response time is to ‘save’ the entry.

Credit Card Expenses: The user navigates to the “Expenses Home” and enters various travel and lodging expenses including airfare, car rental, hotel, entertainment, meals, etc. Finally, the user clicks on “Submit” to enter the completed expense report. The response time is to ‘save’ the entry.

Create Timecard: The user navigates to the “Create Timecard” button and enters information about their project, the type(s) of tasks undertaken and the hours spent. Finally, the user clicks on “Submit” to enter the completed time card. The response time is to ‘save’ the entry.

View Payslip: The user navigates to the “Employee Self-Service” page and clicks on ‘Payslip.’ The response time is for the ‘retrieval’ of the search.

BENCHMARK RESULTS

Online Business Metrics	Achieved Output
Number of Cash Expenses Created	7,379
Number of Credit Expenses Created	7,326
Number of Timecards Created	7,477

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

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.

	3,000 Users	
	Avg. (Sec)	90 th % (Sec)
HR Self-Service		
Submit Cash Expenses	0.472	0.538
Submit Credit Card Expenses	0.314	0.359
Submit Project Timecard	0.267	0.293
View Emp. Payslip Search	0.439	0.498
Weighted Average Saves	0.35	0.40
Weighted Avg. Searches	0.439	0.498
Transactions/min	~500	

Table 4: 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 493 transactions per minute (~29,613 transactions per hour).

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.

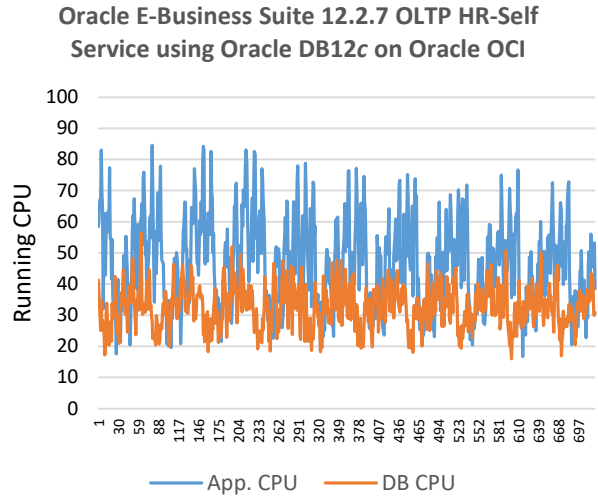


Figure 3: Running DB Server CPU Utilization

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	28.9	3.6	0.01	67.5
App/Web Server	44.2	2.8	0	53.0

Table 5: Average CPU Utilization Breakout

Total Memory Used By:	3,000 Users
Database Server	222 GB
App/Web Server	234 GB

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		3,000 Users
IO/Sec	Avg	675
	Peak	1,235
KB Written/Sec	Avg	13,142
	Peak	353,002
KB Read/Sec	Avg	112
	Peak	1,979

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 Combos	93,417

Table 8: Data Composition

PERFORMANCE INITIALIZATION

Database parameter settings:

n/a

Create indexes:

- drop index
APPLSYS.WF_ITEMS_N6;
create index
APPLSYS.WF_ITEMS_N6 on APPLSYS.WF_ITEMS
(OWNER_ROLE,ROOT_ACTIVITY,ITEM_TYPE);
- create index
inv.MTL_SYSTEM_ITEMS_B_tn18 on
inv.MTL_SYSTEM_ITEMS_B (upper(segment1));
- drop index
appls.fnd_descr_flex_col_usages_tn2;
create index
appls.fnd_descr_flex_col_usages_tn2 on
appls.fnd_descr_flex_column_usages(DESRIPTIVE_FLEXFIELD_NAME,DESRIPTIVE_FLEX_CONTEXT_CODE);
- create index
AP.AP_EXPENSE_REPORT_HEADERS_T on
AP.AP_EXPENSE_REPORT_HEADERS_ALL(EMPLOYEE_ID,WORKFLOW_APPROVED_FLAG);
exec fnd_stats.load_histogram_cols(action => 'INSERT',
appl_id => 200, tabname =>
'AP_EXPENSE_REPORT_HEADERS_ALL', colname =>
'WORKFLOW_APPROVED_FLAG');
exec
fnd_stats.gather_table_stats('AP','AP_EXPENSE_REPORT_HEADERS_ALL');
- create index
"APPS"."FND_DESCR_FLEX_COL_USAGES_T" ON
"APPLSYS"."FND_DESCR_FLEX_COLUMN_USAGES" ("DESRIPTIVE_FLEXFIELD_NAME",
"DESRIPTIVE_FLEX_CONTEXT_CODE");

Actions taken prior to run:

Apply patches: **29050734** **30134567**

Modify init.ora parameter open_cursor=5000

Enable 18 OACORE managed servers.

Actions taken prior to run (cont.):

Enable Weblogic Plugin for all managed Servers.

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

Per Doc ID 2084066.1 "apr_socket_connect call failed with error=730055' Error In "wlproxy.log" File When Using 'mod_wl_ohs," (make changes to two parms, a "post timeout" and "auto backlog" to fix Weblogic errors)

Post_timeout is changed to 120

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=1000

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

update \$INST_TOP/appl/admin/oacore_wls.properties file with

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

For SQLNET and TNSNAMES

add inbound_connect_timeout=900

BENCHMARK ENVIRONMENT

HARDWARE CONFIGURATION

DATABASE SERVER

A single VM instance of Oracle's Cloud Infrastructure version was used for this test. 1 × 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 (~222 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)

A single COMPUTE Instance of Oracle's Cloud Infrastructure 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 (~234 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 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 (~50 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 HR Flow
March 2020
Email eBSkit_us@oracle.com

Oracle Corporation
Worldwide Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
U.S.A.

Worldwide Inquiries:
Phone: +1.650.506.7000
+1.800.ORACLE1
Fax: +1.650.506.7200

oracle.com

Copyright © 2020, Oracle and/or its affiliates. All rights reserved. This document is provided for information purposes only and the contents hereof are subject to change without notice. This document is not warranted to be error-free, nor subject to any other warranties or conditions, whether expressed orally or implied in law, including implied warranties and conditions of merchantability or fitness for a particular purpose. We specifically disclaim any liability with respect to this document and no contractual obligations are formed either directly or indirectly by this document. This document may not be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without our prior written permission.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

AMD, Opteron, the AMD logo, and the AMD Opteron logo are trademarks or registered trademarks of Advanced Micro Devices. Intel and Intel Xeon are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. UNIX is a registered trademark licensed through X/Open Company, Ltd. 1010

Hardware and Software, Engineered to Work Together