HP Application Life Cycle Management Benchmark

For ALM Practitioners

Benchmark Configuration and Results

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1. Introduction

1.1 Purpose and Scope

This document provides information gathered during the benchmark performed on HP ALM 11 SP1. This standardized benchmark is used for both internal release testing and reference for environment validation at customer deployment in the field.

It is divided into the following sections:

- Benchmark design – Provides a detailed description of the benchmark profile.
- Recommended environment results – Provides contextual data and results regarding the environment in which each benchmark scenario was performed. Test results for the ALM benchmark are provided for reference purposes as they are executed in the ALM performance lab.
- Scalability results - Determines the hardware needed to hold the ALM nodes according to the amount of active users in the load system, as defined.

This benchmark was run on multiple environment configurations, chosen for their prevalence in today's ALM customer installation base. The scenario results are not meant to serve as basis of extrapolating suitability of one configuration over another because of variables such as hardware, operating system, application server, DB type, and DB system parameters.

1.2 Audience

Benchmark is intended for:

Load Engineers – defining and configuring Environment and System Load Test.
System engineer – responsible for ALM system requirements and maintenance.
ALM administrators – maintaining ALM Quality Center server
Project Managers – manage the overall project including the release

1.3 Terminology

Vuser - Virtual user. Simulation of real users performing the actions on the product through LoadRunner scripts.

Transaction - A measurement of one or more user actions that has a tangible business value to the end-user.

Transaction Response Time - The time measured by a LoadRunner generator as the response time of the transaction. This is defined by LoadRunner as the time taken for all Web/OTA requests belonging to the transaction to return the responses. It is also called "*Transaction Latency*".

Active users - Connected users that execute activity at any given moment, but not necessarily concurrent).

Business Process - A business process represents a collection of discrete application transactions that are executed together in a sequence. Each LoadRunner script created for the benchmark represents a business process.

Hit / Server Request in Second - A single HTTP request sent to the Application Server.

OTA API - Open Test Architecture API is a COM library that enables you to interact with the Quality Center application without having to use the GUI front-end.

Event - A single iteration of a Business Process.

2. Executive Summary

2.1 Recommended Environments

ALM deployment has several recommended environments.
These recommended environments were tested and achieved satisfying average transaction response times, and good resource management on executions and load profile changes (CPU, memory and I/O resources).

A full Recommended Environments and configurations table can be reviewed here.

At the current stage, results of several recommended Environments have been published. The intense load on a number of configurations varies by the number of concurrent users, database and application server configurations. While configuration differs, all load executions share exactly the same hardware.

Table 1.4.1

Env #	Environment Configuration	Load For Recommended Env.
1	**App**: JBOSS on Win2008 SP2 **DB:** MSSQL 2008 SP2 (various memory configurations)	✓
2	**App**: JBOSS on Win2008 SP2 **DB:** Oracle 11G (various memory configurations)	✓

2.2 Sizing and Scalability

The environments described in Table 1.4.2, took part in the ALM scalability and sizing benchmark. Two ALM deployment environments were tested, where two nodes' clusters doubled the load of a single node environment. The DB size and DB server hardware were constant throughout the process. The changed parameters were the amount of VUsers, hits per second, the amount of ALM nodes, and DB Memory (dedicated) configuration on DB servers.

Table 1.4.2

Env #	Environment Configuration	Large Size Env. Nodes:1 VUsers: 254	Enterprise Size Env. Nodes:2 VUsers: 508
1	**App:** JBOSS 5.1 on Win2008 SP2 64bit **DB:** SQL 2008 SP2 **DB** with 4G dedicated (configured) memory	✓	✓
2	**App:** JBOSS 5.1 on Win2008 SP2 64bit **DB:** SQL 2008 SP2 **DB** with 8G dedicated (configured) memory	✓	✓
3	**App:** JBOSS 5.1 on Win2008 SP2 64bit **DB:** SQL 2008 SP2 **DB** with 32G dedicated (configured) memory	✓	✓
4	**App:** JBOSS 5.1 on Win2008 SP2 64bit **DB:** Oracle 11G **DB** with 8G dedicated (configured) memory	✓	✓
5	**App:** JBOSS 5.1 on Win2008 SP2 64bit **DB:** Oracle 11G **DB** with 16G dedicated (configured) memory	✓	✓

All tested environments, including the sizing scenarios, achieved a satisfying average transaction response time and good resources management of executions and load profile changes (CPU, memory and I/O resources).
The transactions' responses reflect the time consumed by OTA API, network, and server side. However it does not cover full end-to-end user experience.

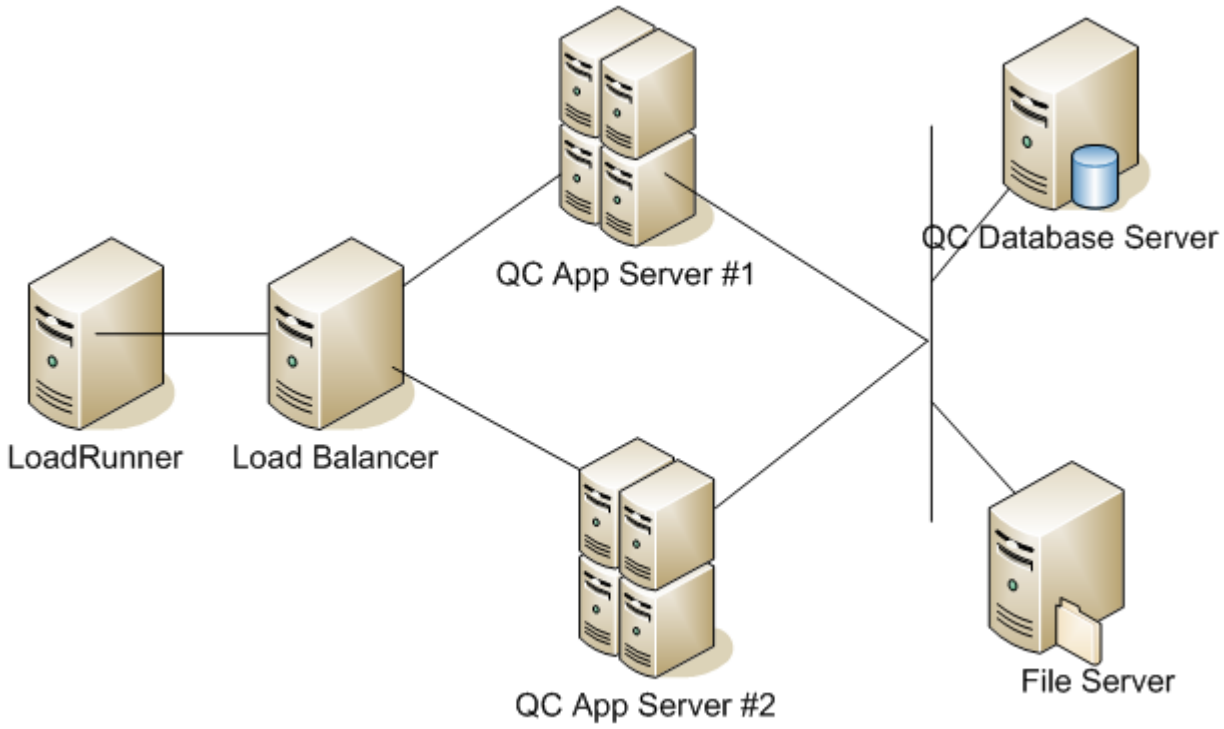
We found correlation between the average response time and the amount of dedicated memory configured on the DB server.

ALM can be both scaled up to a large number of users, and scaled out to run on multiple ALM servers with minimum impact on performance.
For complete results and details, see section *Profile* , *Results* and Sizing / Scalability.

3. Configuration

3.1 Lab Topology

The diagram below represents the lab topology of an Enterprise size environment. The large environment have the same diagram except for the fact that they have only one application server node and no load balancer.



3.2 Labs Specifications

Purpose	Type	CPU	RAM	Operating System	3dr Party Software
Windows Application Node 1	HP ProLiant BL460c G6	Intel Xeon E5540 2* 2.53GHz x64	16 GB	Win 2008 x64 SP2	JBOSS 5.1
Windows Application Node 2	HP ProLiant BL460c G6	Intel Xeon E5540 2* 2.53GHz x64	16 GB	Win 2008 x64 SP2	JBOSS 5.1
File Server	HP ProLiant DL380 G3	Intel Xeon 2*3.06GHz x86	4 GB	Win 2003 x32 SP2	
DB For MS SQL2008 SP1	HP ProLiant DL380 G6	Intel Xeon X5570 2* 2.93GHz x64	32 GB	Win 2003 x64 SP2	
DB For Oracle 11g	HP ProLiant DL380 G6	Intel Xeon X5570 2* 2.93GHz x64	32 GB	Win 2003 x64 SP2	

Network: Bandwidth between all lab components was 1 Gbps. All components were in the same VLAN (Latency < 1msec).

DB Storage used for MSSQL: Smart Array P410i using 6 Disks RAID 0. Independent Array accelerator enabled.

DB Storage used for Oracle: Smart Array P410i using 6 Disks RAID 0. Independent Array accelerator enabled.

3.3 Recommended Environment Configuration

HP Quality Center 11 deployment has several recommended environments as defined by the ALM product management.
The current document observes results of two such environments under different DB Memory Configuration and load levels.
Recommended environments were tested with a full load of 254/508 concurrent VUsers.

Large Load describes a scenario emulating approximately 500-750 concurrent real-life ALM users at peak time (based on a workload analysis of selected ALM customers) in terms of events per hour, throughput, and Hits per second.

Enterprise size load describes a scenario emulating up to 1500 concurrent real-life ALM users at peak time. For this kind of scenario, clusters of two identical ALM nodes were used. For MS SQL and Oracle, several memory configurations were executed.

The table below summarizes the configuration used for the recommended environment check:

#	Environment Configuration	Large Size Env. Nodes:1 VUsers: 254	Enterprise Size Env. Nodes:2 VUsers: 508
1	**App:** JBOSS 5.1 on Win2008 SP2 64bit **DB:** SQL 2008 SP2 **DB** with 4G dedicated (configured) memory	✓	✓
2	**App:** JBOSS 5.1 on Win2008 SP2 64bit **DB:** SQL 2008 SP2 **DB** with 8G dedicated (configured) memory	✓	✓
3	**App:** JBOSS 5.1 on Win2008 SP2 64bit **DB:** SQL 2008 SP2 **DB** with 32G dedicated (configured) memory	✓	✓
4	**App:** JBOSS 5.1 on Win2008 SP2 64bit **DB:** Oracle 11G **DB** with 8G dedicated (configured) memory	✓	✓
5	**App:** JBOSS 5.1 on Win2008 SP2 64bit **DB:** Oracle 11G **DB** with 16G dedicated (configured) memory	✓	✓

3.4 JVM Configuration

3.4.1 General

As part of the benchmark, and previous to all load executions, JVMs were tuned for optimal performance for planned load, ensuring the most accurate memory management on the ALM server side. JVM configuration was tuned to improve performance in the benchmark environment. Customers can use the JVM configuration with the initial ALM setup. However, it should be fine- tuned during the initial stages of deployment as JVM activity may vary depending on the environment configuration (operating system, topology, and hardware) and ALM usage.

In addition, several JVM vendors were benchmarked for the different environments, in order to execute the tests with suitable JVMs (according to the operating system, and the application server).

All benchmarked environments were tested with a 64-bit operating system JBoss Application Server - Version JBossAS-5.1.0.GA.

3.4.2 Used JVM options for JBOSS for java command line:

Configuring and tuning JVM for production might be a long process and it depends on various properties such as hardware, software type of load activities etc… Below presented a list of JVM options found as optimal for current load:

- -Xms4000m -Xmx4000m
- -XX:MaxPermSize=256M
- -XX:NewSize=412m (*optional*)
- -XX:MaxNewSize=412m (*optional*)
- -XX:+UseParallelOldGC
- -XX:+UseCompressedOops (*for 64bit only*)
- -XX:+HeapDumpOnOutOfMemoryError (*optional*)
- -Xloggc:<Path>\<FileName> -XX:+PrintGCDetails (*optional, for tuning/debug*)

JVM options command example:

SET JAVA_OPTS=%JAVA_OPTS% -XX:+UseParallelOldGC -XX:+UseCompressedOops -XX:+HeapDumpOnOutOfMemoryError

SET JAVA_OPTS=%JAVA_OPTS -Xms4000m -Xmx4000m -XX:MaxPermSize=256M -XX:NewSize=412m -XX:MaxNewSize=412m

4. Profile

4.1 Usage Profile Overview

As the usage profile may vary between ALM customers, the benchmark test profile aims to give a full picture of the product's performance by covering the main functionalities of common modules. The simulated usage profile (i.e. users' distribution among modules and number of events per hour per user) was based on a workload analysis of selected ALM customers, representing different deployment sizes and configurations.

The load profile used for this benchmark is based on the four main ALM modules**,** and most common and important business processes.
For this benchmark, a total of 55 transactions had their response time measured.

A single Vuser is generating on average approximately 125 (Large Environment, 1 ALM Node) server requests (hits) per hour. Based on our observations in the real world, a logged-in (real) ALM User on average is generating 20-40 requests per hour. We can assume that a Large Environment Load is simulating a system with at least 500-750 active ALM Users.

Benchmark tests included ALM new features and data.
Some of the new and/or existing features were not emulated explicitly or at all, as they ran periodically and not on a constant level (e.g. Cross Project analysis, sharing, and baseline). Since Smart Repository Feature was released and influenced all file related activity, appropriate business processes were added to the current benchmark.

Performance may vary according to usage profile. The parameters which impact the load level are the number of concurrent Vusers and the number of hits per second. These are reached by defining how many users will simulate each type of business process and at what frequency.

The table below summarizes the activity level on each module. To view the load profile details, refer to the "Tested Profile" table in the Appendix section.

Module Name	Large Environment		Enterprise Size	
	Events per hour for 1 Node	VUsers # for 1 Node	Events per hour for 2 Nodes Clusters	VUsers # for 2 Nodes Clusters
Defects	3460	113	6920	226
Global	960	20	1920	40
Requirements	1325	49	2650	98
Test Lab	155	12	310	24
Test Plan	923	47	1846	94
Operations w/ Files	176	13	352	26
Totals:	**6999**	**254**	**13998**	**508**

4.2 Data Profile

The benchmark Master DB consists of 10 large and 90 medium sized identical projects, on which all virtual users are running.
The volume and complexity of the large and medium projects were designed according to the DB analysis of selected Enterprise ALM customers.

4.3 Data Profile Structure

To validate the most accurate response time from benchmark testing, it is important to build ALM projects which contain real-world data and structure. The project structure is based on selected enterprise ALM customers.
To ensure real-world conditions, each ALM entity is tested using a specific profile.

To view the load profile details, refer to the "Data Profile by Entities" table in the Appendix section.

4.4 Data Profile Sizing

Regardless of the DB ALM project's structure, the transaction response time is also impacted by the DB volume. Large Master DB size is approximately 12-15GB's per ALM project (not including the file repository).

To view the DB details, refer to the “Data Profile by Table Size” table in the Appendix section.

4.5 Scripts

All participating scripts (except one, which was WEB protocol based) were coded using OTA API technology. LoadRunner was used as a load tool for all load executions.
Transactions’ responses reflect the time consumed by OTA API, network, and server side. However, it does not cover full end-to-end user experience.

5. Results

5.1 Transactions' response time distribution

All of the recommended environments presented here, achieved a satisfying average transaction response time and good resources management over executions and load profile changes (CPU, memory, and I/O resources).

The benchmark ran on multiple environment configurations chosen for their prevalence in today's ALM customer installation base. The scenario results are not meant to serve as basis of extrapolating suitability of one configuration over another because of various variables (for example, hardware, operating system, Application Server, DB type, or DB system parameters).

Total of transaction types for which their response time was measured: 55.

Notice that increasing database dedicated memory in certain cases can reduce transaction response time.

The average transaction response time is as follows:

Configuration	Transactions with average response time < 1 sec	Transactions with average response time 1-3 sec	Transactions with average response time 3-10 sec	Transactions with average response time >10 sec
SQL2008 4G 1 Node	69.09%	20.00%	9.09%	1.82%
SQL2008 8G 1 Node	90.91%	3.64%	3.64%	1.82%
SQL2008 8G 2 Node Cluster	89.09%	3.64%	5.45%	1.82%
SQL2008 32G 1 Node	90.91%	3.64%	5.45%	0.00%
SQL2008 32G 2 Node Cluster	90.91%	1.82%	5.45%	1.82%
Oracle11 8G 1 Node	87.27%	5.45%	5.45%	1.82%
Oracle11 8G 2 Node Cluster	78.18%	10.91%	9.09%	1.82%
Oracle11 16G 1 Node	89.09%	5.45%	3.64%	1.82%
Oracle11 16G 2 Node Cluster	85.45%	7.27%	5.45%	1.82%

5.2 System Resources Summary Table

Table below summarizes system resources measured during executions. Graphical representation of system resources behavior included in section Sizing / Scalability.

Configuration	# VUsers	Requests / Sec	Server	% CPU Utilization	% DB Disk Time	Average JVM Used Memory (Total allocated 4G)
SQL2008 4G 1 Node	254	10.555	App:	6.4		2.25G
			DB	8.3	190	
SQL2008 8G 1 Node	254	10.555	App:	6		2.26G
			DB	7.5	16	
SQL2008 8G 2 Node Cluster	508	21.11	App:	5.7		2.23G
			DB	15	95	
SQL2008 32G 1 Node	254	10.555	App:	7.5		2.3G
			DB	11.6	24	
SQL2008 32G 2 Node Cluster	508	21.11	App:	5.6		2.3G
			DB	17	35	
Oracle11 8G 1 Node	254	10.555	App:	5.2		2.2G
			DB	3.6	28.5	
Oracle11 8G 2 Node Cluster	508	21.11	App:	5.5		2.2G
			DB	7.2	320	
Oracle11 16G 1 Node	254	10.555	App:	6.6		2.35G
			DB	4.67	58	
Oracle11 16G 2 Node Cluster	508	21.11	App:	5.17		2.2G
			DB	6.78	98	

6. Sizing / Scalability

6.1 Sizing/Scalability Configuration

The environments described in the table below, took part in the ALM benchmark. Two ALM deployment environments participated, including large and enterprise size. The DB size and DB server hardware were constant throughout the process. However, during the process, database memory configuration had been changed (for scalability purposes) on both Oracle and MS SQL servers. Parameters such as the number of users, hits per second, and the amount of ALM nodes, changed as well.

DB Configuration was manipulated only by amount of memory:

- MS SQL - using the Maximum Server Memory option.
- Oracle 11G – using the Automatic Memory Management (AMM) feature.

There is no additional DB tuning made except changes in the amount of dedicated memory. Both DB servers, MS SQL and Oracle, executed from the same machine using the same I/O configuration/controller.

Results of this test provide customers with an option of mapping their deployment setup to one of the setups below. They can also get an idea of the number of ALM servers needed for deployment.

ALM nodes in each sizing category are identical. While testing all scenarios, a low level of CPU and memory utilization was maintained in order to take into consideration that the benchmark was performed on a lab environment and not a production environment. The load simulated for sizing and scalability was from a real-life environment at peak time (based on a workload analysis of selected ALM customers) in terms of events per hour, throughput, and hits per second.

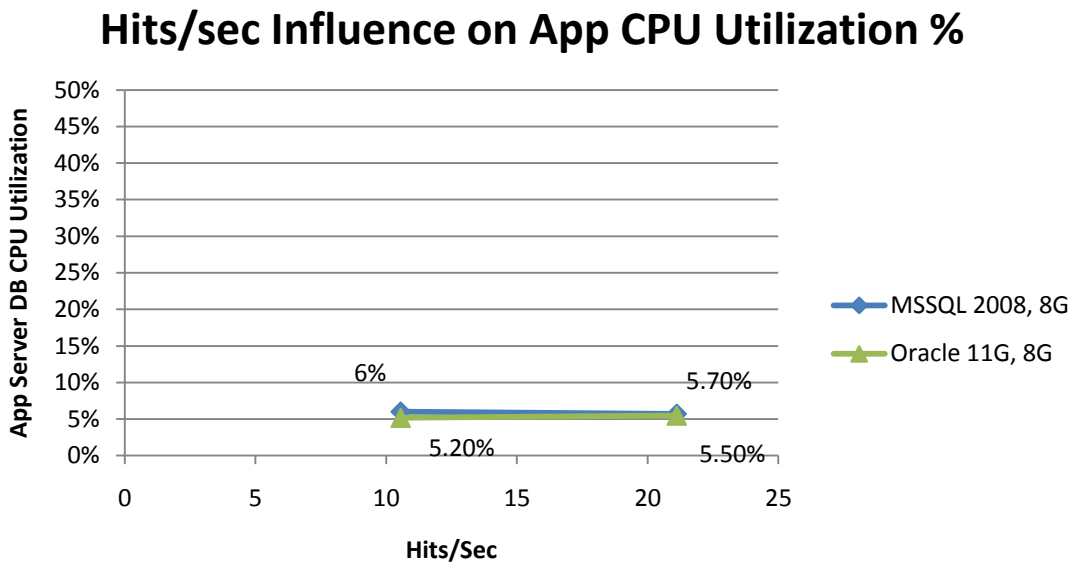
Scalability and sizing scenarios started out with 254 VUsers simulating 500-750 real concurrent users on a single node under different memory configurations (for MS SQL). Scenarios were then scaled up to 508 Vusers, who were simulating up to 1500 concurrent real users on a cluster of 2 nodes. Performance results were satisfactory on all tested scenarios.

#	Environment Configuration	Large Size Env. Nodes:1 VUsers: 254	Enterprise Size Env. Nodes:2 VUsers: 508
1	**App:** JBOSS 5.1 on Win2008 SP2 64bit **DB:** SQL 2008 SP2 **DB** with 4G dedicated (configured) memory	✓	✓
2	**App:** JBOSS 5.1 on Win2008 SP2 64bit **DB:** SQL 2008 SP2 **DB** with 8G dedicated (configured) memory	✓	✓
3	**App:** JBOSS 5.1 on Win2008 SP2 64bit **DB:** SQL 2008 SP2 **DB** with 32G dedicated (configured) memory	✓	✓
4	**App:** JBOSS 5.1 on Win2008 SP2 64bit **DB:** Oracle 11G **DB** with 8G dedicated (configured) memory	✓	✓
5	**App:** JBOSS 5.1 on Win2008 SP2 64bit **DB:** Oracle 11G **DB** with 16G dedicated (configured) memory	✓	✓

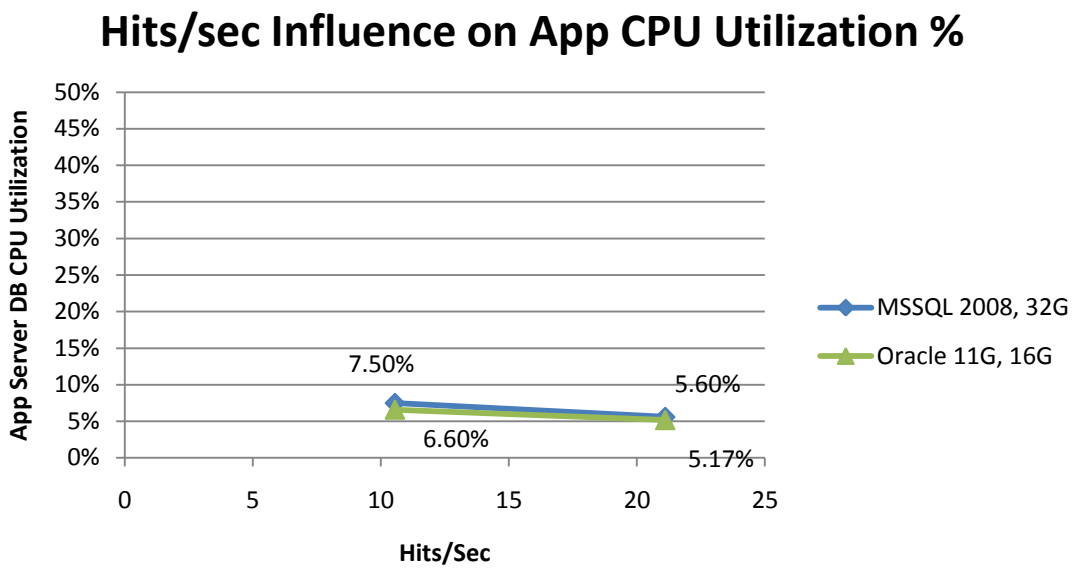
6.2 Graphs

All environments, including the different sizing scenarios, achieved a satisfying average transaction response time and good resources management of executions and load profile changes (CPU, memory and I/O resources).

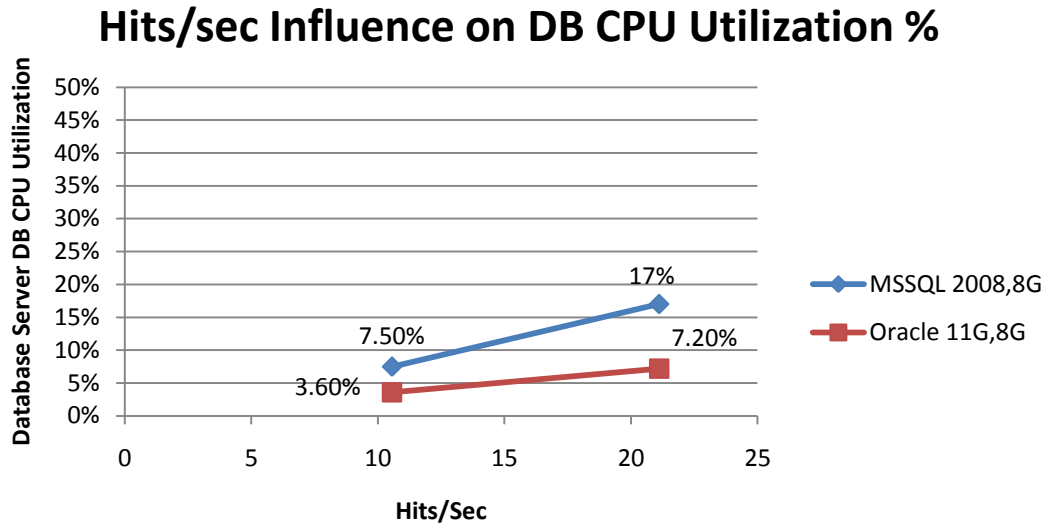
6.2.1 Application and Database Servers CPU Utilization. Hits/sec doubles from 10.55 to 21.11 hits/sec (by adding an Application server node), includes for both database memory configurations: 8G and 32G/16G:



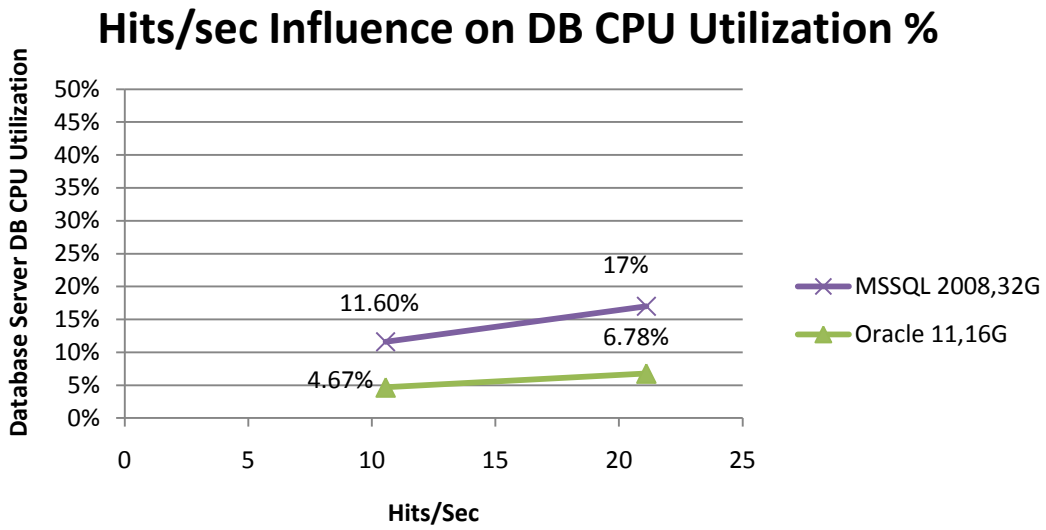
Application server CPU Utilization is not affected when increasing the load and adding additional App Server Node (both environments using a single node DB with 8G dedicated memory).



Application server CPU Utilization is not affected or slightly decreased when increasing the load and adding additional App Server Node (both environments using a single node DB with 32G/16G dedicated memory respectively).



Database server CPU Utilization is affected when load is increased (both MSSQL and Oracle configured for using 8G assigned memory).

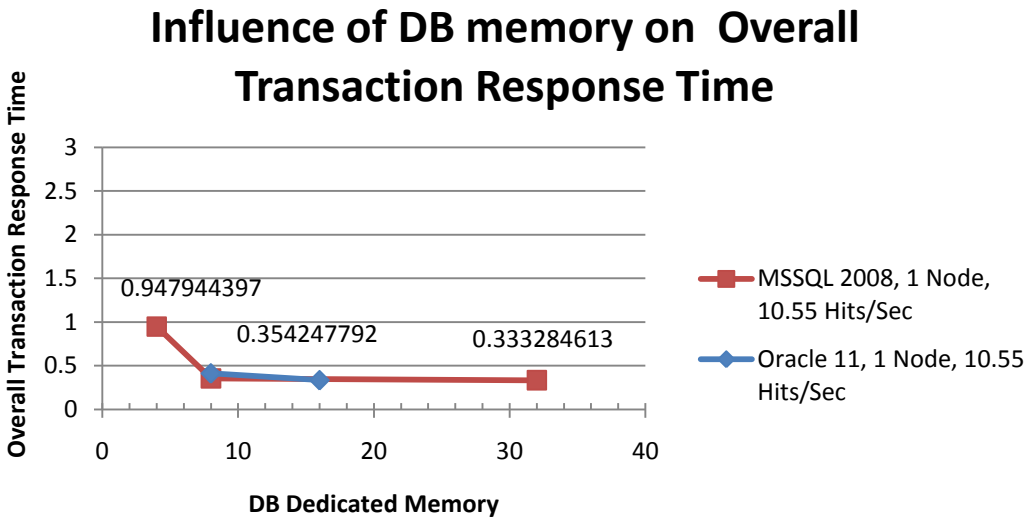


Database server CPU Utilization is affected when load is increased (both MSSQL and Oracle configured for using 32G/16G assigned memory respectively).

Comments:

**Amount of assigned Heap size for all executions is 4G.*
**Amount of dedicated memory on database is constant during load raise.*
**Current H/W and S/W Configuration was not infleunced much in terms of CPU Utiization from growing Hits/Sec.*
**Hits/Sec in all cased was doubled by adding a node (from using a Single node to 2 Node Cluster).*
**In unoffical tests on current enviroment, based on MSSQL 2008 16G with given load levels, we saw simlar behavior and perfomance as at MSSQL 2008 32G.*

6.2.2 Amount of DB dedicated memory influences overall transaction response time (OTRT).



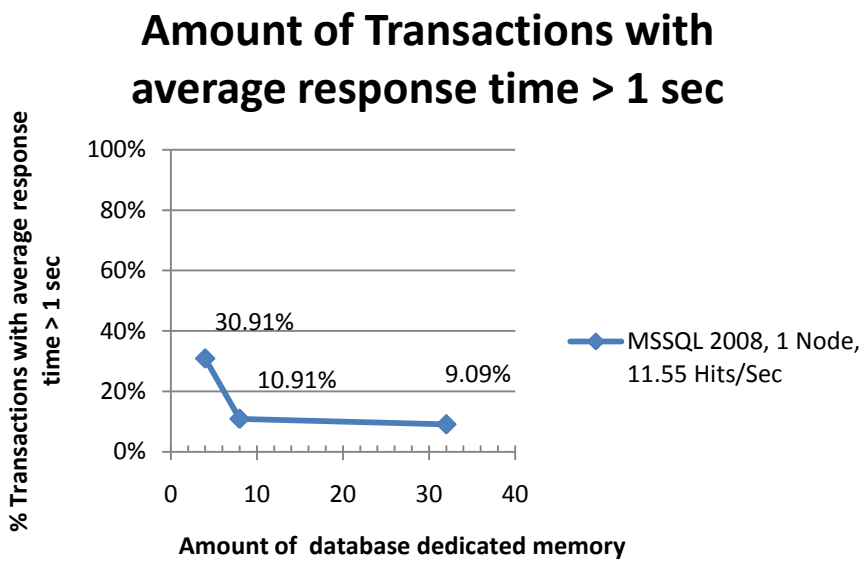
Under the mentioned load, transactions response time is decreasing (better performance) meaningfully when MSSQL memory rose from 4G to 8G. However, there is only a small improvement gained in the case of a raise from 8G to 32G (MSSQL) or from 8G to 16G (Oracle).

Comments:

**Dedicated memory for Oracle was increased from 8G to 16G.*

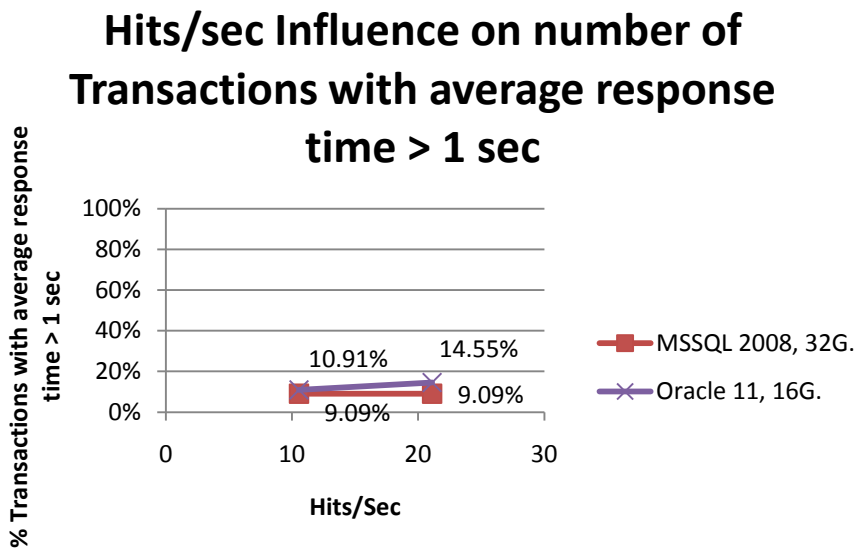
**Dedicated memory for MSSQL was increased from 4G,8G to 32G.*

6.2.3 Amount of DB dedicated memory influences amount of transactions (percentage from total transactions) with TRT greater than 1 sec:



Increasing database memory from 4G to 8G made a major impact on transaction response time.

6.2.4 Doubling Hits/sec parameter influence on amount of transactions (percentage from total transactions) with TRT greater than 1 sec:



Doubling the load but using the same database memory configuration might affect the overall performance.

Comments:

**Hits/sec was doubled from 11.55 to 21.15 by adding an additional node with identical load level (2 node cluster) without changing DB configuration.*

Appendix

I. Tested Profile

The following table details the load profile used per ALM module.

Module Name	Business Process Name	Large Environment Load			Enterprise Size Environment Load		
		Pacing	VUsers	# Events per Hour	Pacing	VUsers	# Events per Hour
Defects	Create / Delete	180	23	460	180	46	920
	Filters	71	27	1369	71	54	2738
	Multi Value Filter	104	12	415	104	24	831
	Group Grid	101	5	178	101	10	356
	Text Search	105	8	274	105	16	549
	Modify Defect	179	38	764	179	76	1528
Global	Login/Logout	75	20	960	75	40	1920
Requirements	Coverage Analysis	90	5	200	90	10	400
	Create / Delete	279	12	155	279	24	310
	Filter Hierarchy	90	9	360	90	18	720
	Expand Tree	87	11	455	87	22	910
	Update Requirement	279	12	155	279	24	310
Test Lab	Run Manual Test	279	12	155	279	24	310
Test Plan	Create / Delete	279	12	155	279	24	310
	Expand Subject	135	23	613	135	46	1227
	Update Test	279	12	155	279	24	310
Operations w/ Files	Download Multiple Files	320	4	45	320	8	90
	Physical Upload Multiple Files	310	1	12	310	2	23
	Logical Upload Multiple Files	310	3	35	310	6	70
	Physical Attachments (Download/Add/Rename/Delete)	215	1	17	215	2	33
	Logical Attachments (Download/Add/Rename/Delete)	215	4	67	215	8	134

II. Data Profile by Entities

The following table details the profile used for each ALM entity.

Module	Entity	Amount	Structure
Releases	Release Folders	36	1 Root Folder -> 5 F -> 2 F -> 10 Rel -> 10 Release Cycle
	Releases	200	
	Release Cycles	2000	
Requirements	Requirements	30692	1 Root Req -> 30 Req -> [2 Req (9-10 Levels)]
Business Components	Component Folder	107	1 Root Folder -> 100 F -> 50 Components -> 100 Steps
	Component	5210	
	Component Step	506000	
Test Plan	All Lists	41152	1 Root Folder -> 70 F
	Tests	185261	1 Root Folder -> 19 F -> [2 F, 4 Tests (9 Levels)] -> 5 Tests 1 Root Folder -> 50 F -> 20 Tests
	BP Test to Component	20210	1 Root Folder -> 50 F -> 20 Tests -> 20 Components
	BP Parameter	202100	1 Root Folder -> 50 F -> 20 Tests -> 20 Components -> 10 Params
Test Lab	Cycle Folder	2802	1 Root Folder -> 50 F -> 5 F -> 2 F -> 4 F -> 10 Tests Sets -> 20 Tests
	Cycle	20002	
	Run	400100	
Defects	Defects	60000	60000 Defects
ERI	Assets Relation	337656	1 Root Folder -> 10 Res Folder -> 2 Res Folder -> 5RF -> 5 RF -> 2 RF -> 9 Files (5 Lib,3 Object Rep, 1 Recovery scenario)
	Assets Repository items	414396	

III. Data Profile by Table Count

The following table details the profile used by DB table size.

Table Name	Records Count
ACTIONS	94
ALERT	45390
ALL_LISTS	41003
ANALYSIS_ITEM_FOLDERS	1
ANALYSIS_ITEM_RESULTS	0
ANALYSIS_ITEMS	5
ASSET_RELATIONS	358372
ASSET_REPOSITORY_ITEMS	415017
AUDIT_LOG	2283441
AUDIT_PROPERTIES	2672205
BASELINE_ROOTS	0
BASELINES	0
BL_ALL_LISTS	0
BL_ASSET_RELATIONS	0
BL_ASSET_REPOSITORY_ITEMS	0
BL_BP_ITER_PARAM	0
BL_BP_ITERATION	0
BL_BP_PARAM	0
BL_BPM_ELEMENTS	0
BL_BPM_LINKS	0
BL_BPM_MODEL_FOLDERS	0
BL_BPM_MODELS	0
BL_BPM_PATHS	0
BL_BPTEST_TO_COMPONENTS	0
BL_COMPONENT	0
BL_COMPONENT_FOLDER	0
BL_COMPONENT_MULTIVALUE	0
BL_COMPONENT_STEP	0
BL_COMPONENT_STEP_PARAMS	0
BL_CONFIGURATION_COVERAGE	0
BL_CRITERION_COVERAGE	0
BL_CROS_REF	0
BL_DELETED_ASSETS_INFO	0
BL_DESSTEPS	0
BL_FRAMEWORK_PARAM	0
BL_REQ	0

Table Name	Records Count
BL_REQ_COVER	0
BL_REQ_CYCLES	0
BL_REQ_MULTIVALUE	0
BL_REQ_RELEASES	0
BL_REQ_TRACE	0
BL_RESOURCE_FOLDERS	0
BL_RESOURCES	0
BL_RUNTIME_PARAM	0
BL_STEP_PARAMS	0
BL_TEST	0
BL_TEST_CONFIGS	0
BL_TEST_CRITERIA	0
BL_TEST_MULTIVALUE	0
BL_TEST_PARAMS	0
BL_USER_ASSETS	0
BP_ITER_PARAM	612790
BP_ITER_PARAM_VIRT	0
BP_ITERATION	100450
BP_PARAM	202100
BP_PARAM_VIRT	0
BP_STEP_PARAM	40400
BPM_ELEMENT_TYPES	146
BPM_ELEMENTS	0
BPM_GRAPH_RESULTS	0
BPM_LINKS	0
BPM_MODEL_FOLDERS	2
BPM_MODELS	0
BPM_PATHS	0
BPTA_CHANGE_STATUS	4
BPTEST_TO_COMPONENTS	20210
BUG	60000
BUG_MULTIVALUE	180000
BUG_TOKENS	3355050
CACHE	0
COMMON_SETTINGS	60175
COMPARISON_NODES	0

Table Name	Records Count
COMPARISONS	0
COMPONENT	5210
COMPONENT_FOLDER	107
COMPONENT_MULTIVALUE	0
COMPONENT_STEP	506000
COMPONENT_STEP_PARAMS	0
CONFIGURATION_COVERAGE	184149
CONTENT_DEFINITIONS	0
CONTENT_PARTS	0
CONTENT_ROOTS	0
CRITERION_COVERAGE	184149
CROS_REF	133180
CYCL_FOLD	2802
CYCLE	20002
CYCLE_MULTIVALUE	0
DASHBOARD_FOLDERS	0
DASHBOARD_PAGE_ITEMS	0
DASHBOARD_PAGES	0
DATACONST	27
DELETED_ASSETS_INFO	0
DESSTEPS	1331932
ENTITY_ATTRIBUTES	21
ENTITY_SUBTYPE_ATTRIBUTES	70
ENTITY_SUBTYPE_FIELDS	22
ENTITY_SUBTYPE_RELATIONS	60
ENTITY_SUBTYPES	68
EVENT_LOG	0
EXTENSIONS	2
FAVORITE_FOLDERS	10
FAVORITES	0
FRAMEWORK_PARAM	52100
GROUPS	5
HIST_ASSET_RELATIONS	1689050
HIST_ASSET_REPOSITORY_ITEMS	2072925
HIST_BP_ITER_PARAM	0
HIST_BP_ITERATION	0
HIST_BP_PARAM	0
HIST_BPM_ELEMENTS	0
HIST_BPM_MODELS	0
HIST_BPM_PATHS	0
HIST_BPTEST_TO_COMPONENTS	0

Table Name	Records Count
HIST_COMPONENT	0
HIST_COMPONENT_STEP	0
HIST_COMPONENT_STEP_PARAMS	0
HIST_CROS_REF	345000
HIST_DESSTEPS	6659660
HIST_FRAMEWORK_PARAM	0
HIST_REQ	153450
HIST_RESOURCES	220
HIST_RUNTIME_PARAM	0
HIST_STEP_PARAMS	1056300
HIST_TEST	922261
HIST_TEST_CONFIGS	922261
HIST_TEST_CRITERIA	922261
HIST_TEST_PARAMS	528150
HIST_USER_ASSETS	537425
HOST_GROUP	0
HOST_IN_GROUP	0
HOSTS	0
LIB_MULTIVALUE	0
LIBRARIES	0
LIBRARY_CLOSURE	0
LIBRARY_FOLDERS	1
LIBRARY_MAPPINGS	0
LIBRARY_PARTS_DEFS	0
LIBRARY_USED_BY	0
LINK	40999
LINKED_TEMPLATE_ITEMS	0
LISTS	10042
LOCKS	0
MAILCOND	2
MAPPING_UPGRADE_LOG	0
MODULES	9
POLICY_ENFORCEMENT_STATUS	1
PUBLIC_ENTITY_KEYS	0
QPM_KPI_BREAKDOWN_RESULTS	0
QPM_KPI_BREAKDOWN_TYPES	13
QPM_KPI_CALCULATION_RESULTS	0
QPM_KPI_CALCULATIONS	0
QPM_KPI_DEN_DRILLDOWN	0
QPM_KPI_DEN_DRILLDOWN_EXT1	0
QPM_KPI_DEN_DRILLDOWN_EXT2	0

Table Name	Records Count
QPM_KPI_DEN_DRILLDOWN_EXT3	0
QPM_KPI_DEN_DRILLDOWN_PERS	0
QPM_KPI_MILESTONE_SCOPEITEM	0
QPM_KPI_NUM_DRILLDOWN	0
QPM_KPI_NUM_DRILLDOWN_EXT1	0
QPM_KPI_NUM_DRILLDOWN_EXT2	0
QPM_KPI_NUM_DRILLDOWN_EXT3	0
QPM_KPI_NUM_DRILLDOWN_PERS	0
QPM_KPI_TYPES	11
QPM_KPIS	0
QPM_MILESTONE_SCOPEITEM	0
QPM_MILESTONES	0
QPM_SCOPE_ITEM	0
QPM_THRESHOLD_VALUES	0
RBT_CUSTOMIZATION	4
RBT_CUSTOMIZATION_ANSWERS	36
RBT_CUSTOMIZATION_QUESTIONS	12
RELEASE_CYCLES	2000
RELEASE_FOLDERS	36
RELEASE_MULTIVALUE	0
RELEASECYCLE_MULTIVALUE	0
RELEASEFOLDER_MULTIVALUE	0
RELEASES	200
REPORT_PROJECT_TEMPLATES	55
REPORT_TO_RPT_LINKS	0
REPORT_USER_TEMPLATES	0
REQ	30692
REQ_COVER	245529
REQ_CYCLES	122760
REQ_MULTIVALUE	0
REQ_RELEASES	30690
REQ_TRACE	6000
REQ_TYPE	8
REQ_TYPE_FIELD	398
REQ_TYPE_HIER_RULES	8
RESOURCE_FOLDERS	1632
RESOURCES	9220
RESULTS	0
RULES	6
RUN	400100
RUN_CRITERIA	400100

Table Name	Records Count
RUN_ITERATIONS	0
RUN_MULTIVALUE	0
RUNTIME_PARAM	0
SEQUENCES	134
SITE_ACTIONS	0
SITE_ENTITIES	0
SITE_FIELD	0
SMART_REPOSITORY_LOGICAL_FILE	20588116
SMART_REPOSITORY_PHYSICAL_FILE	3861894
STEP	2980262
STEP_PARAMS	264819
SYSTEM_FIELD	1526
SYSTRANSLATE	0
TABLES	110
TASK_LOG_TYPE	3
TASK_STATE	6
TASKS	0
TASKS_LOG	0
TEMPORARY_DATA_FOOTPRINT	0
TEST	185301
TEST_CONFIGS	185301
TEST_CRITERIA	205511
TEST_MULTIVALUE	0
TEST_PARAMS	105672
TEST_VC_INFO	0
TESTCYCL	400020
TESTCYCL_MULTIVALUE	0
TO_ALERT	0
TOKENS	1156
TRAN_RULES	9
USER_ASSETS	107597
USERS	3002
VC_ASSET_RELATIONS	0
VC_ASSET_REPOSITORY_ITEMS	0
VC_BP_ITER_PARAM	0
VC_BP_ITERATION	0
VC_BP_PARAM	0
VC_BPM_ELEMENTS	0
VC_BPM_MODELS	0
VC_BPM_PATHS	0
VC_BPTEST_TO_COMPONENTS	0

Table Name	Records Count
VC_COMPONENT	0
VC_COMPONENT_MULTIVALUE	0
VC_COMPONENT_STEP	0
VC_COMPONENT_STEP_PARAMS	0
VC_CROS_REF	0
VC_DELETED_ASSETS_INFO	0
VC_DESSTEPS	0
VC_FRAMEWORK_PARAM	0
VC_REQ	0
VC_REQ_MULTIVALUE	0
VC_RESOURCES	0
VC_RUNTIME_PARAM	0
VC_STEP_PARAMS	0
VC_TEST	0
VC_TEST_CONFIGS	0
VC_TEST_CRITERIA	0
VC_TEST_MULTIVALUE	0
VC_TEST_PARAMS	0
VC_USER_ASSETS	0
VER_CTRL	0