



RHINO

Test Plan

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# Introduction

## Purpose

The purpose of this Test Plan is to gather the information necessary to plan and control the test effort for performance testing RHINO website. It describes the approach to testing the software, and will be the top-level plan used by QCs to direct the performance test effort.

This Performance Test Plan for RHINO supports the following objectives:

* Identifies the items that should be targeted by the performance tests and exclusions.
* Scope, resources and schedules of performance testing activities.
* Outlines the performance testing approach that will be used.
* Risk assessment.
* List the deliverable elements of the performance test activities.

## Glossary

| Term | Description |
| --- | --- |
| PM | Project Manager |
| QAO | Quality Assurance Officer |
| SQC | Senior Quality Controller |
| Test Case (TC) | A set of input values, execution preconditions, expected results and execution post conditions, developed for a particular objective or test condition, such as to exercise a particular program path or to verify compliance with a specific requirement |
| Test Schedule | A list of activities, tasks or events of the test process, identifying their intended start and finish dates and/or times, and interdependencies. |

## Project Context and Background information

Rhino is the software to help owners of small businesses easily manage their work with:

* Clients’ contacts
* Sales proposals
* Projects
* Tasks
* Invoices
* Payment
* Administrative configurations like user management, project types, expense types, system settings, system appearance, etc.

Supported sectors in this application include:

* Construction
* Professional, Scientific & Technical Services:
* Administration & Support Services

## Document Scope

### In Scope

The performance tests will be performed to validate that Rhino system meet the maximum performance standards established for this project. The performance testing is based on the fixed software and defined database. The following functions will be measured for performance:

* Home
* Login
* Add contact
* Add sale proposal
* Add invoice for contact
* Add invoice for Sale proposal
* Add invoice for Empty project
* Add invoice for Project with Task
* Add invoice for Project with Timesheet and Expense
* Add reminder
* Add note
* Add Expense
* Add Timesheet
* Approve Timesheet
* Approve Expense

### Out of Scope

The following requirements are not in scope of testing phase: The performance testing effort outlined in this document will not cover the following:

* Measure the render time on device/browser. As the application is designed with a simple UI so render time should not impact.
* Any function is out of the Scope.
* Performance testing any changes to Rhino system that are planned.
* Improve performance.

## Constraints

In this project, there are the following constraints:

* Development is delayed. It will affect the progress of the testing.
* More defects are found which require more time to verify and fix.
* Test types which are not mentioned in the test plan will not be tested.

## Risk List

List of risks may affect the design, development or implementation of performance testing

| Risk | Mitigation Strategy | Contingency (Risk is realized) |
| --- | --- | --- |
| Test data proves to be inadequate. | A Developer (Nam) will ensure a full set of suitable test data is available.  QC will indicate what is required and will verify the suitability of test data. | Redefine test data  Review Test Plan and modify |
| Build delivery is late from development team. QC team can:   * Miss and slip test plan due to late build delivery from developer team. * Not complete tasks on test plan. | QC should:   * Follow and remind Development leader to prepare build for QC team on time as build delivery plan. * Raise this risk to PM to have better solution to satisfy the delivery plan. | QC must re-plan the Test Plan according with real case of late build delivery. |
| Difference time zone, RHINO server may be downed while loading test. | * Informs RHINO agent. | If RHINO agent can solve the issue immediately, QC will resume the testing, otherwise, the testing will be delayed to next day or till the issue is solved. |

## Assumptions

1. The performance testing will be done on real environment; difference environments will return difference test results.
2. For loading 2,500 simultaneous users, it will be generated by BlazeMeter service and the RHINO must be published on the internet.
3. Testing team must have permission to monitor the hardware usage of the load test servers while testing.
4. This load testing measure performance of the application while 2,500 simultaneous users accessing to the application, it does not measure the render time on device/browser. As the application is designed with a simple UI so render time should not impact.
5. NashTech we will review the results, diagnose the potential root cause and agree with Eugene on the functions needing to be enhanced before we proceed with any changes.
6. Not any function will be updated while a round of the performance test is running. If this happens, the running round must be stopped and restart again, extra cost will be extended.
7. The performance testing is based on the fixed software and defined database. Additional function added while testing will cause to re-plan and re-schedule.
8. During implementing the automated scripts, if a function could not be applied automation because of technical issue, NashTech will discuss with RHINO to replace another solution if any, otherwise then it will be excluded from the test with informing to RHINO
9. While executing the performance testing, NashTech may have question relates to the business or issue that need confirmation from RHINO, if the answer from RHINO lately affect to the testing progress, then NashTech will re-schedule.
10. RHINO will provide related document such as use case, specification, test case before NashTech start planning. And provide the environment before executing test.
11. Offshore staff will work normal Vietnam working hour.
12. The NashTech process for performance and load test is:

**1. Plan test**

**2. Scripting/ Scenario**

**3. Run test**

**4. Collect statistics**

**5. Analyse result**

**6. Amend system**

RHINO will provide the server’s statistic to NashTech to analyse in order to find root cause of low performance. Improve performance will be out of scope of the testing.

# Test Approach

## Test type - Load Test

The following tests will be run:

* Load Test - is performed to determine a system's behaviour under both normal and anticipated peak load conditions. It helps to identify the bottlenecks and determine which element is causing degradation.
* A loading test of 2.500 authenticated users using the application will be conducted to verify that Rhino website’s response time for each user’s click can meet expectation. We will use scripts to simulate user behaviour for up to 2500 virtual users, to measure response times of the system under various load conditions to identify the application’s breaking point, assuming that the breaking point occurs below the peak load condition.
* The acceptable response time is defined in section 5.

## Test Scenarios

The load testing start with N=100 virtual users then ram up to 2.500 users.

With RHINO system, we need to divide these users to below groups:

| Groups | Functions | Percentage (%) |
| --- | --- | --- |
| Normal users | Home | 80% |
| Login |
| Add contact |
| Add sale proposal |
| Add Timesheet |
| Add Expense |
| Add reminder |
| Add note |
| Admin users | Home | 20% |
| Login |
| Approve Timesheet |
| Approve Expense |
| Add invoice for contact |
| Add invoice for Sale proposal |
| Add invoice for Empty project |
| Add invoice for Project with Task |
| Add invoice for Project with Timesheet and Expense |

So, with this classification, we can simulate a reality working where a large number of users accessing to the system.

With this instant, once we increase or reduce the number of simultaneous users for next attempt, the rate will be applied through the testing round.

| No | Deliverable | Effort (hours) |
| --- | --- | --- |
| 1 | Preparation. | Make sure the testing scripts have been implemented. RHINO websites is accessible. Nobody access to the site.  Testing team must have permission to monitor the hardware usage of the test servers while testing.  Testing team must have Blazemeter license. |
| 2 | Generates and load 2.500 users (ram up from 100) send requests to defined functions within 12 hours. | Simulate 2.500 simultaneous users accessing to defined functions to determine if the system still handle the load with the expected performance. |
| 3 | Complete running the script and return a test result | Returns an approximately loading time for all functions which have been run. Or any error message returned while testing running. Analyse and point out where the bottleneck or root causes of the performance issues. |

## General Testing Activities

* Project knowledge training
* Plan the performance test.
* Setup the test environment (Both sides of RHINO and NashTech).
* Implement performance test script
* Execute performance test
* Report test result.

## Test Schedule

High level Test schedule:

| No | Deliverable | Effort (hours) | Resource | Start Date | End Date | Note |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | Training/self-study business requirement and practise | 12 | SQC | 23-Feb-17 | 24-Feb-17 |  |
| 2 | Setup local test environments | 8 | SQC | 24-Feb-17 | 27-Feb-17 | Setup at local testing side, excluding setup test servers which will be done at client side |
| 3 | Create test strategy/test plan document | 12 | SQC | 27-Feb-17 | 28-Feb-17 | Create, review, approve |
| 4 | Test data preparation | 26 | Nam | 6-Mar-17 | 10-Mar-17 | 30 Tenants, 2500/3000 users, 300000 timesheets, 300000 expenses, 3000 projects, 6000 tasks, 3000 Sale proposals, 6000 lines, 3000 contacts. |
| 5 | Create test case | 4.8 | SQC | 1-Mar-17 | 1-Mar-17 | Test happy case only |
| 6 | Implement performance test script | 60 | SQC | 2-Mar-17 | 13-Mar-17 | Support by Tester Leader |
| 7 | Execute Load Test | 15 | SQC | 14-Mar-17 | 15-Mar-17 | 6 rounds with each 2 hours (constraint of tool, does not allow to run 1 round 12 hours), Monitor hardware usage, Collect report between loads. |
| 8 | Analyse, report | 2 | SQC | 16-Mar-17 | 16-Mar-17 | First test report available |
|  | Total (hours) | 147.8 |  |  |  |  |
|  | Total (days) | 18.5 |  |  |  |  |

If hit a bottle neck and need to do enhancements, the recurring effort will be for re-testing is 3.4 days (Testing only, effort to do enhancements from developer team is not included in this estimation).

| No | Deliverable | Effort (hours) | Resource | Start Date | End Date | Note |
| --- | --- | --- | --- | --- | --- | --- |
| 9 | Investigate bottleneck | 8 | Developer & SQC | 17-Mar-17 | 17-Mar-17 | Both developer and tester take part in to this task (each takes 4 hours). |
| 10 | Restore DB and run script to create test data | 2 | SQC | 20-Mar-17 | 20-Mar-17 | Reuse script |
| 11 | Execute Load Test (retest) | 15 | SQC | 20-Mar-17 | 22-Mar-17 | 6 rounds with each 2 hours (constraint of tool, does not allow to run 1 round 12 hours), Monitor hardware usage, Collect report between loads. |
| 12 | Analyse, report | 2 | SQC | 22-Mar-17 | 22-Mar-17 | Second test report available after fixing issues |
|  | Total (hours) | 27 |  |  |  |  |
|  | Total (days) | 3.4 |  |  |  |  |

## Load Testing Process, Status Reporting, Test Report

This section details the load testing process that will be followed for all performance tests conducted as described in this test plan.

The tester will execute all created scripts. These scripts will be generated and executed against the system in 6 rounds with each 2 hours.

We will monitor hardware usage, collect report between loads. We will execute these scripts again, after subsequent hardware, software, or other fixes are introduced.

Test team will baseline load as follows:

We will test Rhino website and report back on the following metrics:

* Response Time each transaction hitting the Web site.
* Any web or database server errors as reported in the data log.
* Failed Web Transactions

There will be Status Reports being sent detailing:

* Performance tests run
* Performance Errors and status
* Number of Bugs Entered
* Status Summary

The Test Report will include summary bug counts, overall performance assessment, and test project summary items.

## Bug Reporting and Regression Instructions

### Bug Reporting:

* Run all load tests and the test result log is generated: view the summary and the details of test result in GUI of Jmeter.
* Analyze the test result: which error occurs and the cause of the error
* Export the test result into JTL, CSV file, PDF or print the report

### Regression:

* If client decide to do enhancements for a bottleneck and need to do retest for the fixing, tester will do regression test. This will be a Change Request (CR).

# Resources

## Human Resources

This table shows the staffing assumptions for the project.

| Role | Resource Recommended | Responsibilities / Comments |
| --- | --- | --- |
| QC Lead | 1 | Responsible for all testing activities which mentioned in this document including the following:   * Review the Test plan * Review test cases/ test script prepared by QC. * Support QC in solving technical issues. |
| SQC | 1 | * Create test plan * Create Test cases/Test scripts * Implement performance test script * Execute Load Test * Analyze the results * Investigate bottleneck and diagnose the potential root cause * Prepare Test result report. * Report the testing progress to PM and QCM |
| DEV Team Lead |  | * Test data preparation * Investigate the bottleneck and follow up to make sure that the bug is fixed. |
| Project Management |  | * Provide the documents and monitoring the project progress. * Review/Approve the test plan, test case, test report, second summary report. |
| QC Manager |  | * Handles escalations from senior management and the test team * Approve second summary report. |

## Environment

This section presents the non-human resources required for the Test Plan.

### Testing Environment

* + - 1. Hardware / Operating system

Client has not mentioned about the hardware requirement. According to the current plan, the Performance QC team needs to have the following machines.

| Hardware | Operating System | Description |
| --- | --- | --- |
| 1 Test PC | Standard Harvey Nash system | It is using for implementing test script |
| 1 Web servers | RHE-IRE-APP-LT1 Windows Server 2012 R2 Standard 64-bit  Hardware: CPU Xeon E5-2676 v3 2.4GHz  Memory: 8.00 GB RAM | It is using for hosting the web server.  Testing team must have permission to monitor the hardware usage of the test servers while testing |
| 1 DB Server | RHN-IRE-SQL-LT1 Windows Server 2012 R2 Standard 64-bit  Hardware: CPU Xeon E5-2676 v3 2.4GHz  Memory: 8.00 GB RAM | It is using for hosting the database.  Testing team must have permission to monitor the hardware usage of the test servers while testing |

\*The Servers setup and the load generation will be at RHINO environment. Test server environment separated from production server.

3.2.1.2 Support Tools

Here is list of software which is using in the project.

| Item Name | Description |
| --- | --- |
| Jmeter 3.1 | Supports implement test script. |
| Blazemeter service with license | Supports load generator. Popular license limits 5 load engines, each load engines can generate maximum 500 authenticated users. |

# Deliverables

Here is the list of deliverables in performance testing phase.

| No | Deliverable | Date | Responsibility | Delivered to |
| --- | --- | --- | --- | --- |
| 1 | Test plan | Feb 28th, 2017 | SQC | PM, QCM |
| 2 | Test scripts | Mar 13rd, 2017 | SQC | PM, QCL |
| 3 | First test report | Mar 16th, 2017 | SQC | PM, QCM |
| 4 | Second test report (after fixing issues) | Mar 22th, 2017 | SQC | PM, QCM |

# Acceptance Criteria

| No | Requirement |
| --- | --- |
| 1 | Invoice function: all response time for user’s click must be less than or equal 10 seconds.  Other functions: all response time for user’s click must be less than or equal 3 seconds. |
| 2 | Server base on section 3.2 |

# Suspension / Exit Criteria

## Suspension Criteria

If any defects are found which seriously impact the test progress, the test team may choose to

Suspend testing. Criteria that will justify test suspension are:

* Hardware/software is not available at the times indicated in the project schedule.
* Source code contains one or more critical defects, which seriously prevents or limits testing progress.
* Assigned test resources are not available when needed by the test team.

## Resumption Criteria

If testing is suspended, resumption will only occur when the problem(s) that caused the suspension has been resolved. When a critical defect is the cause of the suspension, the “FIX” must be verified by the test department before testing is resumed.

## Exit Criteria

Testing will be considered complete when the following conditions have been met:

* All test scripts have executed.

# Reference and Related Documents

| No. | Document | Comments | Version |
| --- | --- | --- | --- |
| 1 | PerformanceTest Proposal For Rhino\_v1.0x |  | 1.0 |
| 2 | Rhino Load Test Plan | Option 1 |  |