SolovatSoft

Load and Performance Test Plan
Sample

Title: *[include project's release name]*

Version:

Date:

Approval signatures

	Name	Signature	Date
Project Manager			
Development			
QA			
Product Development			

Document History

Date	Author	Changes
05/01/2004	QA Lead Name responsible for Test plan	Started the Test Plan

Contents

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1.0 Overview/Background

[Provide an overview of the application that will be tested, why it is being tested, the objectives of the test, and what types of load tests will actually take place. For example if you are conducting a performance test, a stress test, a volume test and a soak test provide definitions for each type of test.]

The website below contains comparison of different load testing tools:

http://www.sqatester.com/testertotester/sharexperience/downloads/Load_Test_Tools_Eval.pdf

For example: The application under test is a 3-tier enterprise system that will be deployed into production system to perform [list of activities]. The application will undergo a performance and benchmarking test before being deployed into production.

Descriptions for each type of test is provided below:

Performance:

Benchmarking:

The application under test is _____ has a _____ database, interfaces with these systems _____, has ___ interfaces and conversion programs, and has an expected number of ___ production end users. Give a brief description of what the application under test does or is used for and if it is an out of the box solution or a custom in house developed system.

The application is being tested because the company is (Select all that apply and describe):

a) Upgrading the application presentation layer (GUI)

b) Implementing changes in the back-end layer which may affect the product performance

c) More end users will be added to the production environment

d) New interface programs and batch jobs have been added to the application under test

e) A router/switch will be changed, added, deleted

f) The Network has been revamped or the application has inadequate responses from remote locations

g) The application under test will be hosted on a different server or reconfigured sever

h) The application under test will be running on a new shared production environment

i) The application under test has undergone changes form one release to the other or after a gap analysis

j) End users and customers have complained about the application's response times

ETC…

1.1 Concurrent production end users

[State here the total number of concurrent end users that need to be emulated. State if the application is already running in a production environment with the expected number of end users that need to be emulated or if the expected number of production end users will be emulated for the first time**.]**

1.2 What is tested and monitored for response times

[Describe here the business processes and response times that will be tested and monitored. For example order entry, invoicing, shipping will be tested and the response times to create a sales

order with 100 users will be monitored. It is not necessary to describe the test scripts here just a high level of overview of the business processes that will be tested and monitored**]**

2.0 Testing Strategy

2.1 Pre-conditions- Pre-Requisites

[List here any pre-conditions that are necessary for executing the load test or for the construction of the test scripts. For example a stable frozen environment is needed to create the test scripts, or access to historical response time data, or assistance from the subject matter experts to record the test scripts, or admin user access levels and privileges on machine X, or data needs to be refreshed, etc.]

2.2 Assumptions

[Describe any assumptions that were made in drafting this test plan or in the activities leading up to the execution of the load test. For example the length of time needed to run the test is ____ hours, or a sample size (i.e. number of users, length of time, etc) is necessary for successfully validating test results from multiple runs, confidence intervals (i.e. 90%, 95%) used for estimating the time to complete a business process (i.e. 2 ± 0.3 minutes for order fulfillment)]

2.3 Test Approach

[Describe exactly what the approach will be for executing, and planning the load test and the interpreting of the load test results. Be specific as to how the application will be tested and how data caching will be prevented. For instance the application will be tested at the GUI level, or at the protocol level. Also describe whether the load test results will need to be extrapolated or if the test environment is production-like. Also explain how the test results will be collected and analyzed.

Address whether the test will be executed with automated test tools or manually. If test tools will be used, describe each type of test tool used and any other software solution used during test.

Identify what are the sources of data for the test scripts and who will provide the data and where the data will be stored.

Describe what the rationale or criteria is for selecting business processes to participate in the load test.

Describe any requirements, functional specifications, expected business volumes or service line agreements that were used to create the test cases, and test scripts.

List and describe all the test scripts, where they are stored, who will execute the test scripts, and how they will be executed (in what mode batch, foreground, background, etc) for all test scripts participating in the load test.

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Provide a sequence for how the test scripts will be launched and describe each of the dependencies for executing the test scripts.

Mention any limitations or problems encountered during the load testing activities.

Describe the criteria for successful completion of the load test and how test results will be verified and validated.]

Approach

[How exactly the application will be tested.

For instance: Will the application be tested manually or with automated test tools? How will end users be emulated? Create a specific description of your testing approach.

Testing Tools description (i.e. Automated)

Example: Loadrunner™ will be used for generating load. Winrunner™ will be used to record and automate test scripts.

Test Data

Example: The human resources team (point of contact is _____) will provide all the necessary data   to test the online recruitment business process, and will provide a total of 100 records. The data is stored on the _____ shared drive and the data is stored in a tab-delimited file.

Business requirements

[This section shows the rationale for selecting an application workflow to participate in the load test. A created test script for load testing should trace to a requirement, service level agreement, or identified tasks from a task distribution diagram. Below I provide some examples of service level agreements, requirements, or identified tasks from a distribution diagram that might serve as the basis for selecting business processes.]

Examples: 1. There is a business requirement to create 100 reports per hour per account. The creation of a report per user account should take less than one minute with a maximum number of concurrent end users logged on.

2. The middleware engineer identified the creation of line items as critical since it is high on database input/output and because the creation of line item interfaces with other business processes and kicks off a batch input job.

Note: In order to create a task distribution diagram it is necessary to identify how many transactions occur for a given process and their frequency under a normal workday or under peak conditions with a specified number of concurrent users. Additionally the expected number of total annual transactions for a given process should be listed. For instance during the hours of 10:00 am through 1:00 pm under a normal work day 100 customer accounts are created per hour

per user account for a total of 33 user accounts creating customer accounts per hour. An analysis of this sort will help to analyze the company's throughput during certain hours of the day for a normal workday and a day with peak demand. Create a draft chart of transaction names, times, and count for a normal day and peak day.

Use specific descriptions with the definitions for business volumes. A low load for creating sales order is 30 per hour per user, 50 sales orders per hour per user is a medium load, and 100 sales per hour per user is a heavy load.

The following tests will be executed

[List and enumerate the number of test scripts that will participate in the load test and where the test scripts are stored. Also list the person who created the test script and the person responsible for executing the test script.]

Limitations

[This area is reserved for anything that impacted the load testing activities. For instance missing test data, no support from particular area Experts, etc]

Sequence

[Describe in what logical sequence the test scripts will be executed and any dependencies among the test scripts]

Areas to be monitored are:

[Describe here all the areas of the load test that will be monitored. Be specific in describing each area that will be monitored and with what tool the described area will be monitored. If monitoring parameters associated with CPU or Memory management list the specific parameters that will be monitored such as Swapping and with what tool the monitoring of the Swapping parameter will take place]

   Example of areas that should be monitored:
   1. Network segments
   1. Application under test
   2. Network routers
   3. Back end server, Database
   4. Application under test's modules
   5. Servers
      Etc…

3.0 Test Environment

3.1 Test Bed

[Describe in which test environment the load test will take place for both execution and test script creation. Describe whether the environment is a shared environment and its hours of availability for the load test. A description of the environment also should include whether the

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environment is production-like or if it is actually the production environment. If the test environment is substantially different from the production environment the differences should be explained here too.]

3.2 Network infrastructure

[Describe the network segments, routers, switches that will participate in the load test. Attach if available the network topology diagram here]

3.3 Hardware resources

[Describe here the machines that are available for the load test and will participate in the load test. Use the table below to fill out the machine names and their respective specifications. Describe the machine's name, its memory, processor, environment (i.e. Win 2000, win XP, linux, etc), whether the machine has the application that needs to be tested installed (AUT = Application under test), and the machine's location (what floor, what facility, what room, etc)]

Machine Name	Memory	Processor	Environment	AUT installed?	Location

3.4 Summary of Hardware Resources:

[List here summary of all available resources, total available memory, and total number of machines participating in the load test. Describe any servers and databases hosting the application under test]

Example: 15 Win computer running on Win XP with 25 Gigs of available ram

MS SQL Server (version X) back-end for the application under test wit0h 2 win200

servers that have the following specs: RAM, CPU, etc

4.0 Testing Time Frame

[Describe the time frame for conducting the load test, and attach a Gantt chart with activities and their expected duration. Also describe working hours for the load tests (i.e. first shift, third shift, etc). A schedule for load testing activities should include time allocation for: the creation of test scripts, planning the load test, re-executing the load tests if problems arise, pre-execution of the load test scripts in proof of concept scenarios to validate that the test scripts can be executed with a partial load of emulated end user, gathering collecting analyzing and interpreting of test results, etc.]

5.0 Test Risks

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[List all potential risks associated with the load test and any work-arounds available for overcoming the listed risks. As an example a risk could be having misleading results since the test bed environment and production environment are drastically different in size and performance degradation cannot be extrapolated linearly from one environment to the other. Another risk could be crashing the entire IT infrastructure or a shared production environment which could render the application under tests and other non application under tests inaccessible to all the project users and company customers for prolonged periods of time.
Place all your risks in this section and assign priority to the risks.]

5.1 Support Personnel –

[List the individuals participating during the load tests with their roles and level of support. Below is a matrix with suggested roles and level of participation during each test activity. For instance a QA manager during the planning activity might facilitate interaction with other groups and thus having a 'passive' role where the test engineer might have a more 'active' role such as gathering the test data for the planning activity. Also list a point of contact for the support personnel that have agreed to participate in the load test (i.e. name, location, phone, pager, team, etc). For support personnel providing stand-by or remote monitoring support ensure that they can be reached if problems arise during the test execution phase.(See next page for the matrix that should be filled out)]

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TEST ROLE	Testing Activity						
	Name	**Assessment**	**Analysis Of results, graphs, etc**	**Monitoring**	**Test Development**	**Planning**	**Reporting**
Product Manager							
QA manager							
Automation QA							
DBA							
Network engineer(s)							
Functional tester							
Application developer							

Matrix of tasks and roles

Levels of participation:
O- Activity Owner, R- Reviews, S- Signs-off and approves, A- active (i.e. creates test script), F- facilitates

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5.2 Proof of concept results – Trial Runs

[If any proof of concept tests with minimal load has been executed describe the tests here with the test results. Before jumping into a full blown load test it is highly recommended that initial tests be executed with an emulated end user load that is 25% of the expected total population of end users. The reader should be aware that for some applications the vendor might already have some benchmarked performance results.]

5.3 Risk Mitigation Strategy

[In this section describe any approaches that will help to mitigate the risk of executing a load test. For instance staggering the initial log-on of emulated end users every 20 seconds or so to avoid crashing the server with the various concurrent log-ons from the emulated end users. Another mitigation strategy would be to have all emergency support personnel on stand-by during the test execution for instance if a router is overloaded or the LAN is brought down, etc. List here any or all techniques used to avoid impacting other members from the project]

6.0 Peer Reviews

[List here any individuals who reviewed and approved this document or who made recommendations to update or modify this document]

Reviewer	Team	Date

6.1 Results

[Explain here what graphs and charts will be produced. Also explain who will analyze and interpret the load test results and review the results with the graphs from all participants monitoring the execution of the load tests. A load test where results are not correctly interpreted and analyzed is for all intents and purposes amounts to a wasted testing effort. Also describe here where the results will be stored once they are generated. Another key area to document in the results section is how results will be verified and validated through what mechanism or means (i.e. inspection, demonstration, test, analysis, etc). Also describe here how the application under test error messages or defects will be captured.]

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7.0 Recommendations/Suggestions

[Make here any recommendations that can improve or streamline the test requirements. For instance if the project only has intentions to undertake a volume and performance test, they might also want to include a stress and soak test. Show the rationale and value of the recommended steps.

Example: I worked as a consultant for a company that wanted to emulate only 2000 end users because that was the expected total population of end users in production. However load tests are hardly an exact science and does contain a relative margin of error, so to compensate for any potential margin of errors in the test results I recommended that 20% more end users be emulated.

If you have any experiences or insights from previous projects that might help your current project document them here**.]**

8.0 Load test preparation checklist

[Before initiating full-coverage load tests with a maximum load of users it is highly desirable that the load testing preparation checklist below be examined and verified]

Checklist

Criteria	Pass	Fail	N/A
Log-on users id from user not participating in the load tests have been deactivated			
Processes not affecting the outcome of the load test have been disabled (i.e. print jobs, etc)			
Network topology diagram has been reviewed and analyzed			
Data caching will be prevented with unique data records or by refreshing the Database			
2 Trail test have been successfully executed with loads representing 33% of the expected peak production loads			
Contingency and risk plans are in place if problems arise during the test execution phase			
Dummy user ids for the emulated end users with appropriate access levels have been created			
All monitoring tools and monitoring resources have been scheduled			
All areas that need to be monitored during the test have been identified			
Contact list with names and phone numbers has been drafted for support personnel (onsite and remote)			

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Load test strategy has been peer reviewed, accepted and signed off.			
Test lab and PCs are available and have been scheduled for the tests			
End users, customer, and project members have been notified in advance of the execution dates and hours for the load test			
Test scripts have appropriate naming conventions and have been saved in a shared and backed-up repository or test management tool			
Test environment has been frozen without the introduction of new changes for both the creation of test scripts and the execution of the load test.			
Hardware equipment has sufficient RAM to emulate the total expected number of production end users.			
Throughput emulation has been properly designed to have the number of emulated end users = to the total number of expected production users.			
Estimates of kilobytes of data sent per user across the LAN/WAN have been identified			
Application under test is stable and has been previously tested for functionality and contains the latest patches.			
The execution schedule allows for the completion of all the load tests with 3 weeks left before the deployment deadline.			
All service level agreements, response time requirements have been covered with test cases.			
The load test strategy includes the testing of the application under test at the GUI level to include response times from the client side of the application.			
An SME or functional expert has signed off the automated test script			
All recommendations and suggestions have been presented to the project's decision makers.			
Test scripts have been properly sequenced			
Confidence levels that will be used for the test results have been identified			
A shared repository exists to save all test results			