Stress Testing: White Paper

The Imperative Software Application Test

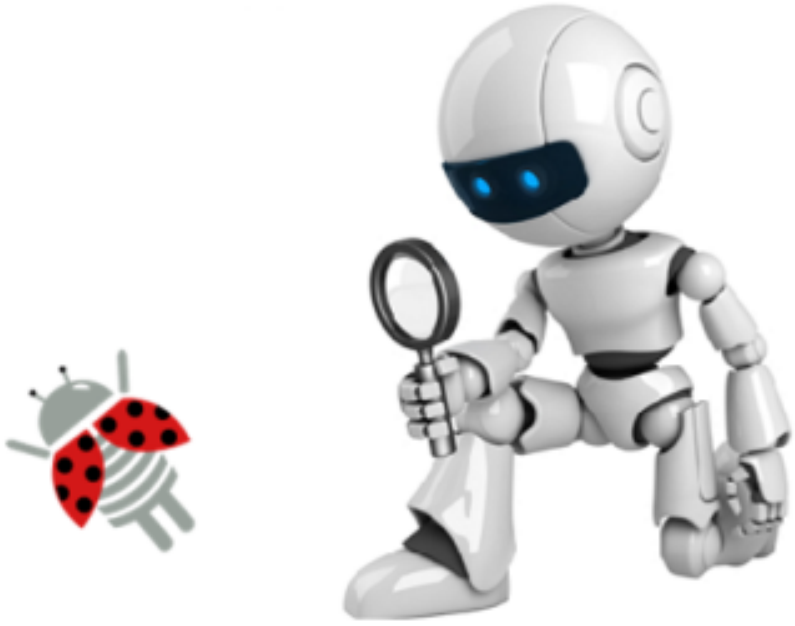
(https://cdn.theatlantic.com/assets/media/img/mt/2015/03/shutterstock_66314143/lead_large.jpg?1430145622)

Robert Scott Lake
Marymount University
July 2, 2016

Table of Contents

1. Abstract

This white paper is intended to explain the importance of stress testing in providing quality software. It describes what stress tests generally consist of and why they are run. Stress tests should be one of the goto tools in a software tester's arsenal to uncover bugs and defects that are difficult to find in other tests.



(http://www.tesific.com/img/test-automation.jpg)

2. Why Test Software?

We make dreams come true through the software applications we make, whether it is in bringing people closer together with social media and telecommunications or providing business applications that streamline production making individuals and team more productive, which increase revenues and profit margins. Software testing is the greatest tool in a software development company's arsenal to provide clients with quality applications that work, period.

Through each stage of application development software developers plan, program and test their creations through white box test such as program inspections, walkthroughs, and reviews. Then on to higher-order test to ensure that the application performs the way the end user expects it to. These black box tests include function, system, acceptance and instillation testing. Each one plays an important part of quality assurance.

(http://cdn.ttgtmedia.com/visuals/searchSoftwareQuality/testing_bestpractices/softwarequality_article_019.jpg)

Function testing compares what the program does to the client's requested specifications and determines if any discrepancies are present. System testing is performed on a program as a whole to ascertain if it fails to meet its objectives. Some of the different tests that fall into the system-testing category are facility, volume, performance, storage, usability, security, configuration, security and stress tests. All of these test play a part in determining the overall quality of a software application; however many of these, on their own, give only a portion of the quality picture in their area of report. One system test that gives important and valuable information on how an application most likely behaves in the real world and can expose software bugs and defects many other tests cannot provide is the stress test.

3. What Is Stress Testing and How Does It Work?

(http://www.searchengineplan.com/artwork/searchbot.jpg)

"Stress testing is a software testing activity that determines the robustness of software by testing beyond the limits of normal operation. Stress testing is particularly important for "mission critical" software, but is used for all types of software [applications]" (Stress Testing (software) 2016).

The design of stress tests depends on the type of software application that is tested. For a website or web application, the stress test would flood the application with data, connections, database calls, and so on until it crashes. An operating system may be tested through opening and operating multiple software applications, multiple print jobs, and various read/write processes, and perhaps take away system recourses, among other things to see how it behaves until it crashes. The system/application crash may be unremarkable; however, the results of how a system or application crashed, the cause(s) of the crash and most

importantly how graceful the application or system recovers from crashes. This is where some of the greatest information can be obtained from a stress test.

4. Stress Testing and Advantages

There is little time to pursue all avenues of testing that can be performed on software and many times customers use software in conditions software engineers did not intend or imagine the software to be used. In real world environments users have multiple applications open, each allocating memory space and other system resources, many could have multiple data incoming and outgoing data streams, and file access coupled with other user inputs and commands executing at various times or all at once could over whelm an application or system.

Stress testing can reveal a variety of software bug that are difficult to uncover using other testing methodologies. Some of these bugs stress testing may uncover are memory leaks, concurrency and synchronization. Memory leaks are difficult to uncover through normal testing and require many operations repeated over time to observe how memory is consumed and significant enough that it will cause a problem. Through running a stress test, many of the code paths will be run together for the first time a whole application. This can uncover concurrency and synchronization bugs such as deadlocks and thread leaks that could not be uncovered before. (What Is Stress Testing? - Definition from WhatIs.com n.d.).

Stress testing seems quite simple at its core. Depending on the type of application that is to be tested determines how the test is to be designed and executed. For web applications, organizations need to determine a reasonable amount of web traffic they expect to receive. Test at that level then send spikes of access request to see how the system responds. In mobile app stress testing, the tester would see how the app preforms when multiple applications are running, all resident in the memory and all requesting for information from the system GPS location, radio frequency streams or high speed data access. On top of this the tester would see how the app would respond to the user taking a voice call or two or with music playing in the background.

5. Lastly...

Software testing is an important and integral part of the software development life cycle and gives a company the ability to deliver quality software to clients. Stress testing is one method that has a high return on investment exposing. This type of testing puts strain on a software application, which can uncover bugs and defects that are difficult or impossible to test in other way.

6. Works Cited

Stress Testing (software)
2016 Wikipedia, the Free Encyclopedia.
https://en.wikipedia.org/w/index.php?title=Stress_testing_(software)&oldid=716156671, accessed June 19, 2016.

What Is Stress Testing? - Definition from WhatIs.com
N.d. SearchSoftwareQuality.
http://searchsoftwarequality.techtarget.com/definition/stress-testing, accessed June 18, 2016.

http://www.swisscom.ch/its/dam/documents/whitepapers/wp_performance-testing_de.pdf
A white paper on performance testing that provides a sample to base writings. It delves into brief and detail on all the different performance tests.

http://origsoft.com/wp-content/uploads/2014/07/anarchy_in_the_qa_wp.pdf
This is an example of a current white paper in a slightly different format. It deals with conflicts in software testing automation.

Marymount Honor Pledge

I agree to uphold the principles of honor set forth by this community in the Marymount University mission statement and the Academic Integrity Code and Community Conduct Code, to defend these principles against abuse or misuse, and to abide by the regulation of Marymount University.

Word Count: 904