

Performance Testing : An Overview

By Prasann Nadgir

Overview

This paper introduces Performance testing and describes how to perform Performance testing, and tools and techniques relevant to Performance testing. It follows traditional Performance testing techniques. It assumes the reader to be familiar with general concepts of software testing.

What is Performance Testing?

Performance testing is the process of determining the speed or effectiveness of a computer, network, software program or device. This process can involve quantitative tests done in a lab, such as measuring the response time or the number of MIPS (millions of instructions per second) at which a system functions. Qualitative attributes such as reliability, scalability and interoperability may also be evaluated. Performance testing is often done in conjunction with stress testing.

Performance testing can verify that a system meets the specifications claimed by its manufacturer or vendor.

How to perform Performance Testing

The common Performance testing process includes the following steps

1. Analyze the performance requirements.
2. Development of test strategy and define all the testing activities.
3. Development of a detailed test plan based on the strategy.
4. Setup the test environment for test case execution.
5. Execution of test cases and reporting.

The following sections discuss inputs, activities, and deliverable outputs in detail.

Inputs

- Performance test tools like Loadrunner/SilkPerformer.
- Test environment similar to production environment.

Analysis of Performance Requirements.

- In detail, what is the performance test scope? What subsystems, interfaces, components, etc are in and out of scope for this test?
- For the user interfaces (UI's) involved, how many concurrent users are expected for each (specify peak vs. nominal)?
- What does the target system (hardware) look like (specify all server and network appliance configurations)?
- What is the Application Workload Mix of each application component? (for

example : 20% login, 40% search, 30% item select, 10% checkout).

- What is the System Workload Mix? [Multiple workloads may be simulated in a single performance test] (for example: 30% Workload A, 20% Workload B, 50% Workload C)
- What are the time requirements for any/all backend batch processes (specify peak vs. nominal)?

Test Strategy

Test strategy is normally a management activity. A test manager is responsible for developing and managing a test strategy.

The purpose of a test strategy is to clearly define the major activities, decisions, and challenges in the Performance testing effort. This includes defining testing scope, techniques, metrics, environment setup, and skill requirements.

Test Plan

The test plan is manifestation of the test strategy and organizes the testing process including test areas covered, technique implementation, test case and data selection, results validation, cycles, and entry and exit criteria based on metrics. In general, the test plan should incorporate both a high-level outline of which areas are to be tested and what methodologies are to be used and a general description of test cases, including prerequisites, setup, execution, and a

description of what to look for in the test results. The high-level outline is useful for administration, planning, and reporting, while the more detailed descriptions are meant to make the test process go smoothly.

Test plan provide following few benefits:

1. Written record of what is to be done.
2. Test plans provide a way to measure progress.
3. A test plan allows the priorities the testing.

Test Case Development

Test case is a collection of step by step instruction to test a functionality, including prerequisites, test inputs, expected results. The testing team is responsible for development of test cases.

Test Environment

Before performing any testing it is essential to setup an effective test environment. The test environment generally consists of a single computer for small applications, but for enterprise-level software systems, the test environment is much more complex, and the software is usually closely coupled to the environment.

It is necessary for effective testing, the testers to have more control over the environment. This is because the tester must be able to examine and manipulate software/environment interactions at a

greater level of detail.

Test Execution

Test engineers will be responsible for execution and reporting the status.

Advantages of Performance testing are:

1. Identifying the performance-critical points in your architecture
2. Assistance with isolating and addressing reliability issues
3. Application tuning

Performance testing types

Load testing

Load testing is the process of creating demand on a system or device and measuring its response.

Stress testing

Stress testing is a form of testing that is used to determine the stability of a given system or entity. It involves testing beyond normal operational capacity, often to a breaking point, in order to observe the results.

SOAK testing

Soak testing is running a system at high levels of load for prolonged periods of time.

Skills and Training

To perform Performance testing it is essential for the tester to understand the complete analysis of the application including the hardware/software resources, production environment, network bandwidth etc.

About the Author:

PRASANN NADGIR leads Hisolve India operations. Hisolve is a global consulting and technology service provider in testing services and in other areas. Prasann Nadgir has decades of experience in software testing and worked at several leading multi national companies. He can be reached at pnadgir@hisolve.com.