

Types of performance testing

There are two main performance testing methods: load testing and stress testing.

Load testing helps developers understand the behavior of a system under a specific load value. In the load testing process, an organization simulates the expected number of concurrent users and transactions over a duration of time to verify expected response times and locate bottlenecks. This type of test helps developers determine how many users an application or system can handle before that app or system goes live. Additionally, a developer can load test specific functionalities of an application, such as a checkout cart on a webpage. A team can include load testing as part of a continuous integration (CI) process, in which they immediately test changes to a code base through the use of automation tools, such as Jenkins.

Stress testing, which has two sub-categories called soak and spike testing, places a system under higher-than-expected traffic loads so developers can see how well it works above its expected capacity limits. Stress tests enable the software team to understand a workload's scalability. Stress tests put strain on hardware resources, such as CPUs, memory and hard disks and solid-state drives, to determine the potential breaking point of an application on these finite resources. System strain can also lead to slow data exchanges, memory shortages, data corruption and security issues. Stress tests can also show how long KPIs take to return to normal operational levels after an event. Stress tests can occur before or after a system goes live. A kind of production-environment stress test is called chaos engineering and there are specialized tools for it. An organization might also perform a stress test before a predictable major event, such as Black Friday on an e-commerce application, approximating the expected load using the same tools as load tests.

Soak testing, also called endurance testing, simulates a steady increase of end users over time to test systems' long-term sustainability. During the test, the test engineer monitors KPIs, such as memory usage, and checks for failures, such as memory shortages. Soak tests also analyze throughput and response times after sustained use to show if these metrics are consistent with their status at the beginning of a test.

Spike testing, another subset of stress testing, assesses the performance of a system under a sudden and significant increase of simulated end users. Spike tests help determine if a system can handle an abrupt, drastic workload increase over a short period of time, repeatedly. Similar to stress tests, an IT team typically performs spike tests before a large event in which a system will likely undergo higher than normal traffic volumes.

Performance testing tools

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An IT team can use a variety of performance testing tools, depending on its needs and preferences. These tools are examples of the options available.