

# Role of browsers in performance testing

Due to my internship, I have already gained some experience with various testing tools. Since almost all of these projects involved the testing of a web application, tools such as Selenium, which is a driver that can automatically control modern browsers such as Chrome or Firefox, were used. A distinction must be made between functional tests, which check the application for errors in its function, and performance tests, which test the application in terms of performance and stability. However, in this thesis, I will focus on performance tests.

At the turn of the millennium, more and more applications were offered in the form of websites. This also led to a high demand for web testing. At the beginning, browser simulations were used in the performance testing, which simulated a browser on Simulate network levels while functional tests use automated clients. Thus performance tests only had to deal with the transmission of data, which meant that every individual instance could get by with a minimum of resources. Due to the different The approach to performance and functional testing also differed in the technologies. For example, the two tools Silk Performer (Performance Test) and Silk Test (functional test) developed by the same company, then Segue Software, but differ greatly in their codebase.

The usage of technologies such as WebRTC and HTTP 2.0 has made browsers much more complex since then, which means that a pure network simulation is practically only able to simulate them accurately with a lot of effort. As different browsers interpret different functions slightly differently, a type of CrossBrowser-Testing is often used in which a test run is repeated with several selected browsers.

However, unlike a simulation of a browser at network level, a browser requires significantly more resources due to the large number of functions it supports. It is therefore necessary to weigh up the increased resource requirements and other limitations against the advantages of a load test with real browser instances. This will be examined in detail in the course of the work.

Another change that has taken place in recent years is the increasing popularity of mobile devices and the declining popularity of desktop computers. Depending on the application, web tests will in future have to focus not only on cross-browser testing but also on testing websites on differently configured smartphones. However, this will become even more complex due to different operating systems, Apple and Android. Especially in the case of Android, due to very different versions of Android and device configurations, it will be necessary to carry out more tests. This is further complicated by an increasing use of JavaScript and other scripting languages

In my work, I will examine which technologies have been used in recent years and which new technologies are on the rise, especially in the open-source community. I will also look at what

has changed in the testing process and how manufacturers and users of performance testing software have governed it.

In summary, the paper should contain:

- new technologies/products using new solutions in web performance test software (esp open-source ones)
- how they differ from current approaches
- how distributors and buyers of such test software are reacting to it
- what role browsers play in it

A special focus should be on cloud testing and tools using it and it should be mentioned as one of the solutions / the future of testing esp in combination with fast and flexible rentable web servers such as AWS.