# Software Testing: Tools and Techniques

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**Abstract:** *Software testing tools are frequently used to ensure firmness, thoroughness, and performance in testing, and we can produce high-quality goods and shorten the testing period with their assistance. Tools come in a wide variety, and research has been done on them. In this report JMeter and Cypress, two different kinds of tools, will be discussed. A summary of both tools has been taken into account.*

**Keywords:** Software testing

## I. INTRODUCTION

Testing is the process of determining whether a certain system satisfies the requirements that were first established, or not. System problems can be prevented with the use of software testing. Additionally, it is used to evaluate the software's usability, interoperability, dependability, integrity, efficiency, security, capability, portability, maintainability, and other factors. [1] Software testing strives to accomplish particular objectives and adhere to prescriptive rules.

Testing Products that assist various test operations, including planning, requirement collecting, build development, test execution, defect recording, and test analysis, are referred to as tools in software testing. There are a tonne of software testing tools on the market, and with so many options, it can be challenging to choose the ideal testing solution[2].

Some of the testing-related tools include:

- Selenium
- APM
- Cucumber
- JMeter
- Cypress

Let's take a quick look at JMETER and CYPRESS, two of these tools. Cypress is primarily used for interface testing, whereas JMeter is primarily used for load bearing of a website. Both testing tools have advantages and disadvantages that vary depending on the task at hand.

## II. JMETER

The open source Apache JMeter application, which is made entirely of Java, is intended to load test functional functionality and track performance. Apache JMeter can be used to assess the performance of dynamic web applications as well as static resources.

The Apache Software Foundation created the cross-platform utility. JMeter generates statistics and displays the target server's performance in the form of graphs, tables, etc. by simulating the number of users sending requests to the target server. [3]

JMeter requires JDK 5 or higher and is made to handle a variety of test types, including load testing, functional testing, performance testing, regression testing, etc.[4]

### 2.1 Working of JMeter

The user sends a request to the server, as seen in the figure above. The request is subsequently forwarded to the proper server, and Jmeter simulates the quantity of users who will receive the server's response. The utility then transforms the amassed data into statistical data before returning to the target Server. After that, the procedure is finished, and a report is produced.

JMeter simulates a number of users to submit requests to a target server. Data is then gathered to create statistics and present the target server's performance metrics in a variety of formats.
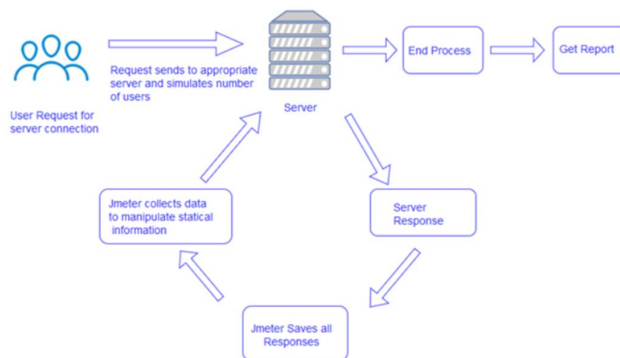
**Figure:** Workflow of JMeter[5]

## 2.2 Live Example of JMeter

Let's take a look at a login page for a website that contains a few validations. The success or failure of this page would be as follows.
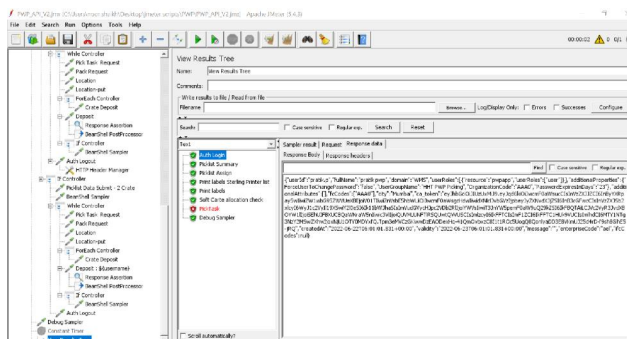
## 2.3 Login Success



**Figure:** Login Success in JMeter

When the server receives a request that is valid and includes the request body, it responds with the requested values and a token for the user to enable the creation of a session during which the user can do actions and which ends when the user logs out.
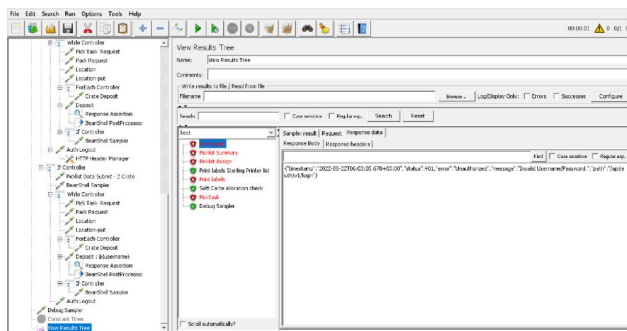
## 2.4 Login Failed



**Figure:** Login Fail in JMeter

When a request is sent to the server, if any of the parameters sent are invalid, the server will validate the request and send the reason for failure in response to the request received, preventing the creation of a session to allow the user to carry out further actions and failing the earlier requests sent.

## III. CYPRESS

Similar to selenium, but different, is cypress. Cypress is a free and open-source test automation tool that has a wide range of long-term applications. It mostly serves to automate front end test execution. This solution was primarily created to address problems that teams encounter when automating an application. Cypress facilitates the following:

- Configure tests.
- Execute tests.
- Identify errors (if any)

The functions of selenium and cypress are frequently contrasted. Cypress, however, has a unique architecture and set of features. Additionally, it fixes a few of the problems we had with Selenium. Cypress runs tests in the browser and is based on JavaScript. It aids in the development of tests such as -

- Unit tests.
- End to end tests.
- Integration tests.[6]

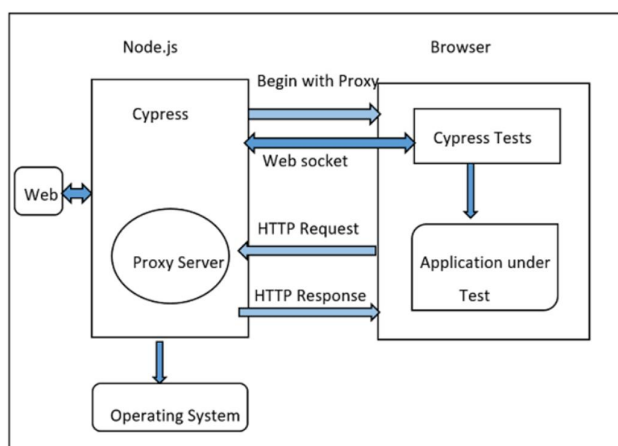### 3.1 Working of Cypress



**Fig.** Workflow of Cypress[7]

We can see that Cypress uses a Node.js server in the graphic above. Web sockets are used by the server to connect to the Test runner, which is a browser that starts with a proxy. The application (one iframe) and test code (another iframe) are then executed in the same event loop by Cypress using the browser as an instrument.

As a result, the Cypress code is now able to simulate and even alter the JavaScript object in real time. This is one of the main causes for expecting Cypress tests to run more quickly than comparable Selenium tests.

This makes it useful for tasks like video recording, screenshot taking, basic file system, and network-related functions. Cypress can therefore handle the tasks carried out at a real-world scale.[8]

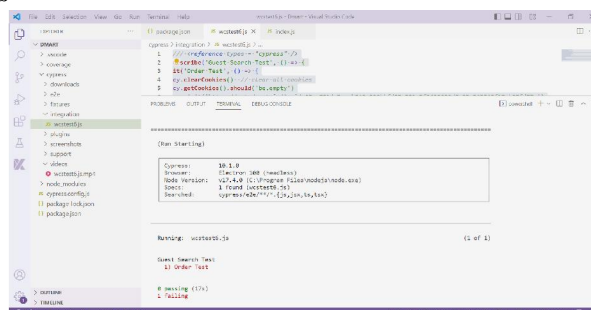### 3.2 Live Example of Cypress
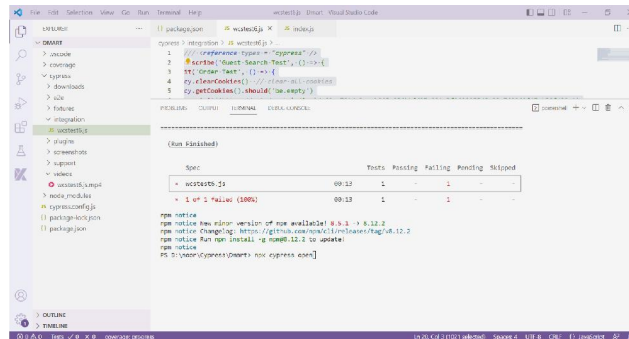


**Fig.** Order Test Failed

Fig. Continuation of (Fig. Order Test Failed)

Cypress is a lightweight programme that can complete tasks when launched from a terminal, which uses less disc space and gives us more time to complete the run (headless) The flow will be carried out and the logs returned when the written script is executed based on the Steps for Test written.

## IV. SUMMARY

Software testing is essential for delivering projects of the highest calibre. Jmeter and Cypress, two software testing tools, were discussed. Cypress is similar to or a substitute for Selenium, whereas Jmeter automates load and functionality testing. The main application of Cypress is for front end automated testing.

We also had a look at how Cypress and Jmeter operate. Additionally, we recorded live instances of login success and failure using Jmeter, as well as an order-empty test using Cypress.

## REFERENCES

[1] Software Testing Techniques : A Literature Review. Muhammad Abid Jamil, Muhammad Arif, Akhlaq Ahmad, 6th International Conference on Information and Communication Technology for The Muslim World, 2016. (PDF) Software Testing Techniques: A Literature Review (researchgate.net)

[2] Software Testing Tools. Software Testing Tools - javatpoint

[3] jmeter.apache.org Apache JMeter - Apache JMeter™

[4] www.tutorialspoint.com jMeter Tutorial (tutorialspoint.com)

[5] www.javatpoint.com, working-of-jmeter-work-flow-diagram.png (606×403) (javatpoint.com)

[6] www.tutorialspoint.com, Cypress - Introduction (tutorialspoint.com)

[7] www.tutorialspoint.com, cypress_architecture.jpg (560×406) (tutorialspoint.com)

[8] www.lambdatest.com, Introduction To Cypress Test Automation Framework (lambdatest.com)