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Automation Testing

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Introduction to Selenium



A Day in the Life of an Automation Test Engineer

Joel has decided to use an open-source tool that automates browsers for his projects.

To complete his project, he must learn about Selenium. It provides a single interface that lets you write test scripts in programming languages. It is used to verify that online applications, whether responsive, progressive or standard, are of the finest quality.

To achieve the above, he will learn a few concepts in this lesson that help him find a solution for the scenario.



Learning Objectives

By the end of this lesson, you will be able to:

- 🔗 Analyze Selenium automation tool
- 🔗 Summarize the brief history of Selenium
- 🔗 Differentiate the components of Selenium
- 🔗 Implement Selenium in the industry
- 🔗 Compare Selenium with other tools

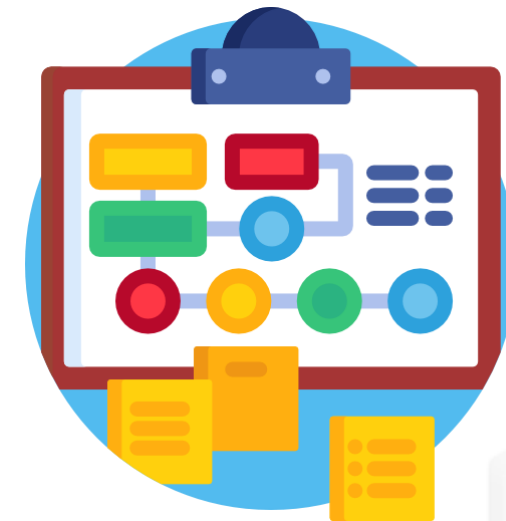


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Overview of Selenium

What Is Selenium?

Selenium automates browsers.



It is used to automate web applications for testing; however, it is not restricted to that. Tedious web-based administration tasks can also be automated, like filling up a timesheet, marking attendance, etc.

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Brief History of Selenium

History of Selenium

Selenium was developed by Jason Huggins, an engineer at ThoughtWorks, in 2004.



- He created a JavaScript program that would automatically control the browser's actions.
- He named this program the **JavaScriptTestRunner**.

History of Selenium



It was made open-source to help the community automate other web applications.



It was later named Selenium RC or Selenium 1. It provides multiple browser support and solves the same-origin policy issue.

Brief History of Selenium



- **Selenium Grid** was developed by Patrick Lightbody.
- It minimizes the test execution time by introducing a component in the Selenium server.
- It allows Selenium to send commands to a different machine on the same network.



Brief History of Selenium

Simon Stewart created **Selenium WebDriver** circa **2006** when browsers and web applications were becoming more powerful and more restrictive with JavaScript programs, like Selenium 1.



Selenium
WebDriver

It was the initial cross-platform testing framework that allowed OS-level control of the browser.

Brief History of Selenium

Development of Selenium 2

The Selenium Team decided in 2008 to combine WebDriver with Selenium RC to create Selenium 2, a powerful technology with WebDriver at its foundation.

Development of Selenium 3

When Selenium 3 was released in 2016, Selenium RC was eliminated, and WebDriver's architectural design was changed.

Development of Selenium 4

Selenium 4 was released in 2021, and with this version, Selenium WebDriver became W3C compliant. A standard that all browsers adhere to.

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Components of Selenium and Their features

Components of Selenium



Selenium IDE

Selenium IDE comes as an extension in the Chrome browser or a plugin in Firefox.

Selenium IDE is designed to record the interactions with the websites and maintain them as automation tests.

It can only automate simple scenarios.

It is usually used for prototype testing or to learn the syntax of Selenium WebDriver.

Features of Selenium IDE

1

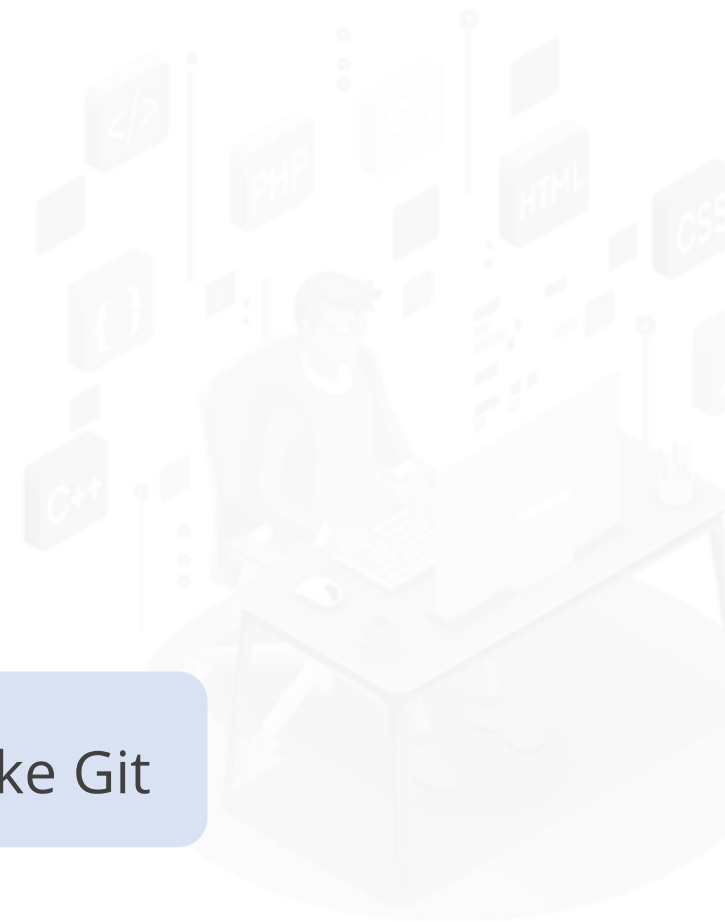
Record and playback tests

2

Organized tests into suites for easy management

3

Export test to learn the syntax and manage them through SCM tools like Git



Selenium WebDriver

Selenium WebDriver is the main component of the Selenium suite and is used across the industry to test web applications.

JUnit
TestNG

Maven
Gradle

LOG4J

 **Allure**


GitHub

Selenium WebDriver

The features are as follows:

01

Selenium is an open-source automation tool that is free to use by anyone. No cost is involved.

02

Selenium works with the most famous programming languages, like Java, Python, C#, Ruby and JavaScript.

Selenium WebDriver

03

Selenium is a platform-independent tool that supports all the operating systems, like Windows, Linux, and Mac.

04

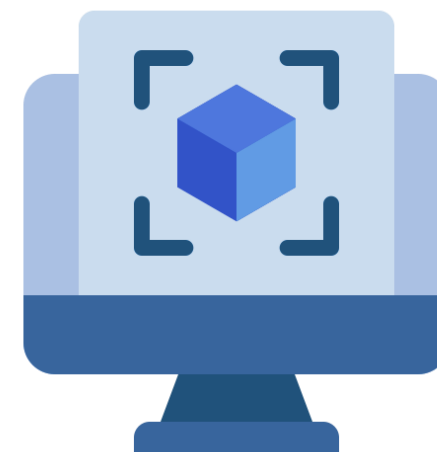
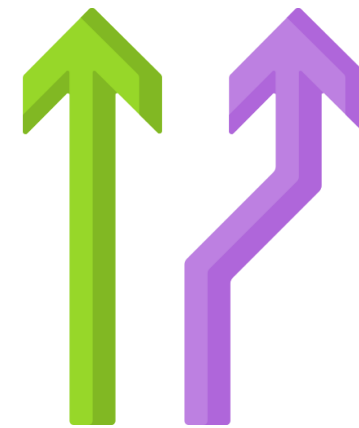
Selenium is a large community to help developers.

05

Selenium supports all the major vendors of the browsers, like Mozilla Firefox, Google Chrome, Opera, Safari, etc.

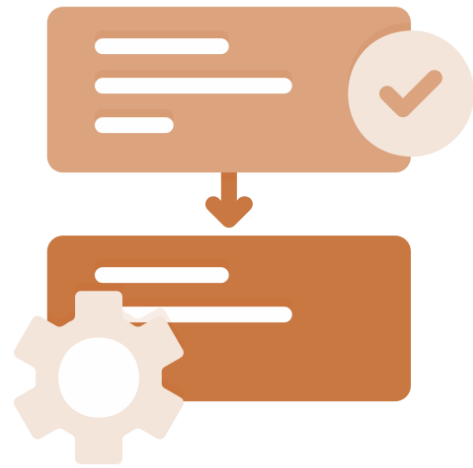
Selenium Grid

Selenium grid is used to scale tests by running scripts in parallel (simultaneously) on multiple browsers across multiple physical or virtual machines.



Selenium Grid

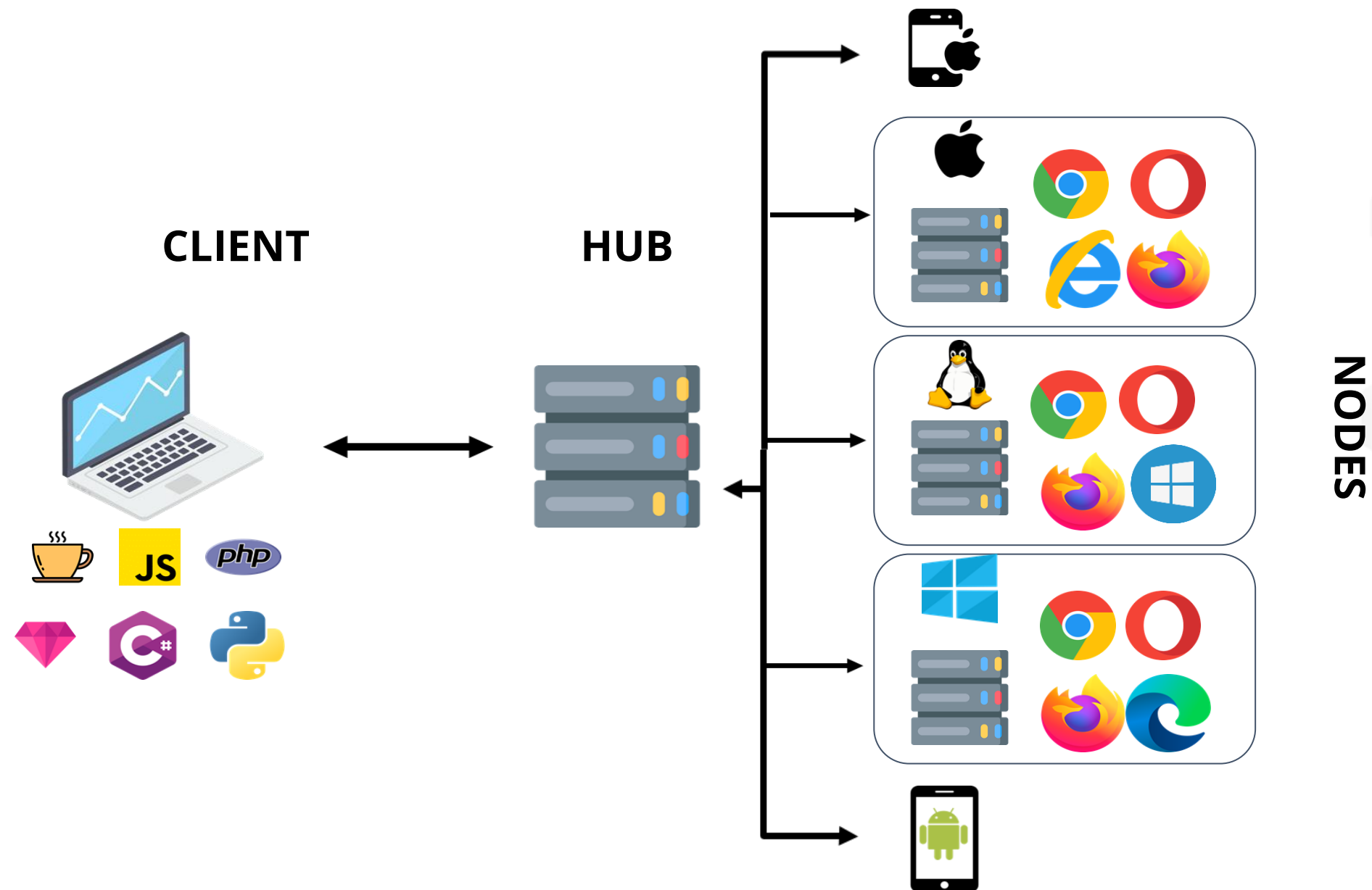
Parallel (or simultaneous) execution reduces the time of execution of test cases and therefore reduce the feedback time.



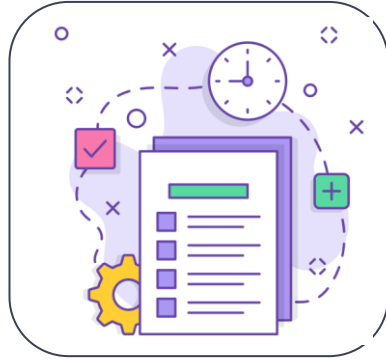
The grid consist of two servers, one hub, and multiple nodes. The hub controls the test execution on the nodes

Selenium Grid

Selenium Grid consists of a Hub and Nodes.



Features of Selenium Grid



Reduces the time of test execution.



Parallel execution on multiple nodes



Platform independent and supports all operating systems



Features of Selenium Grid



Language independent



Multiple browsers support



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How Is Selenium Being Used in the Industry?

How Is Selenium Being Used in the Industry?



- Selenium IDE is used for prototype testing or to learn syntax when people are new to Selenium and automation.
- It has many other testing tools available like **Katalon Studio**, **Robot Framework**, **etc.**, that use Selenium as its base library.

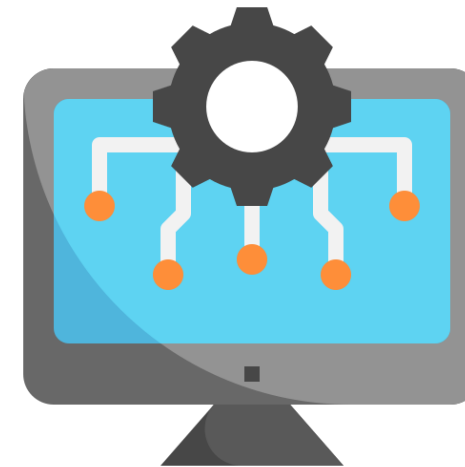
How Is Selenium Being Used in the Industry?



Selenium integrates easily with other tools like source code management tool like **Git**, build management tools like **Maven**, **Gradle**, testing tools like **Junit**, **TestNG**, reporting tools like **Extent Report** and **Allure Reporting** and many other such tools.

How Is Selenium Being Used in the Industry?

It allows recording and playback for web application testing and can execute numerous scripts across different browsers.



Comparison of Selenium With Other Tools

Comparing QA Automation Tools

	Price	Platform	Supported Languages	Applications	Coding Skills Required	Learning Curve
Selenium	Free	Windows/ Mac/ Linux	Java, Python, C#, PHP, JavaScript, Ruby, Perl	Web, mobile (with Appium)	Advanced Skills (OOP concepts)	Steep
Test Complete	\$5075 per year per user	Windows	VB, JavaScript, Jscript, C++, C#, Delphi, Angular, Ruby on Rails, PHP	Web, mobile, desktop	Minimum skills/ advanced skills for pro scripting	Simple
Tricentis Tosca	Custom, high (according to online discussions)	Windows	JavaScript	Web, mobile, desktop	Minimum skills/ advanced skills for pro scripting	Simple

Comparing QA Automation Tools

	Price	Platform	Supported Languages	Applications	Coding Skills Required	Learning Curve
Katalon Studio	\$1899 per year per user	Windows/ Mac	Java/ Groovy	Web, mobile	Minimum skills/ advanced skills for pro scripting	Simple
UFT	\$2500/ \$3500	Windows	VBScript/ JavaScript/ Java	Web, mobile, desktop	Minimum skills/ advanced skills for pro scripting	Moderate
Watir	Free	Windows	Ruby (Java/ .NET alternatively)	Web	Minimum skills	Simple
Cypress	Freemium	Windows/ Mac/ Linux	JavaScript	Web	Minimum skills/ advanced skills for pro scripting	Moderate

Key Takeaways

- Selenium is one of the most used test automation tool and has three major components, Selenium IDE, Selenium WebDriver, and Selenium Grid.
- Selenium IDE is a record and play tool and is majorly used for prototype testing or learning syntax.
- Selenium WebDriver is the most-used component of the Selenium suite and integrates well with other tools to form a powerful framework.
- Selenium grid is used for scaling tests, that is, to run tests in parallel on multiple machines to reduce execution time.



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Thank You

