

- What is Selenium ?

Selenium is a free (open source) automated testing framework used to validate web applications across different browsers and platforms. We can use multiple programming languages like Java, C#, Python, etc to create Selenium Test Scripts.

Testing done using the Selenium testing tool is usually referred to as Selenium Testing.

Primarily, Selenium was created by **Jason Huggins** in **2004**. An engineer at Thoughtworks, he was working on a web application that required frequent testing.

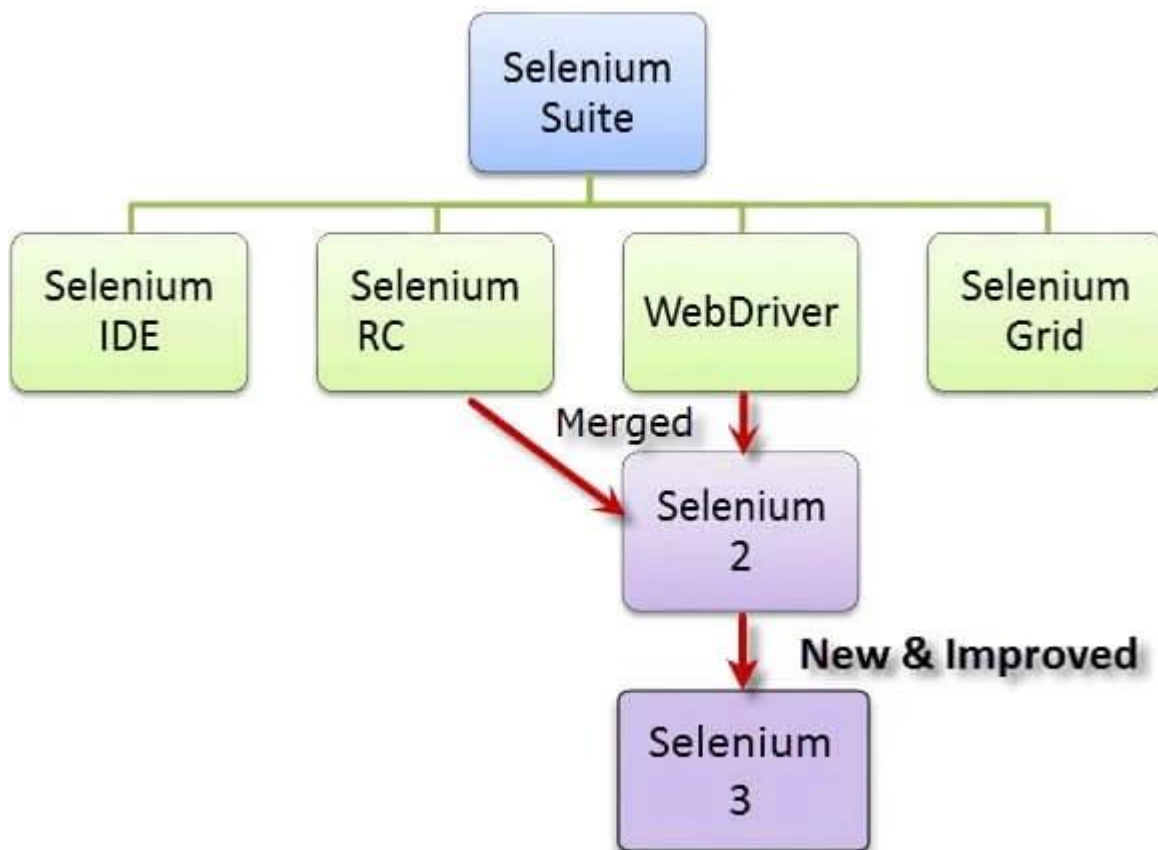
Having realized that their application's repetitious Manual Testing was becoming increasingly inefficient, he created a JavaScript program that would automatically control the browser's actions. He named this program the "**JavaScriptTestRunner**."



- **Selenium Tool Suite**

Selenium Software is not just a single tool but a suite of software, each piece catering to different Selenium QA testing needs of an organization. Here is the list of tools

1. Selenium Integrated Development Environment (IDE)
2. Selenium Remote Control (RC)
3. WebDriver
4. Selenium Grid



1. Selenium IDE

It is a **Firefox plugin** that we can install as easily as we can with other plugins. However, because of its simplicity, Selenium IDE should only be used as a prototyping tool (allow user to quickly develop screens, reports, and forms to give end users the “look and feel” of the information system).

- Advantages:

1. Very easy to use and install.
2. No programming experience is required, need some knowledge of HTML and DOM (Document Object Model).
3. Providing support for extensions.

- Disadvantages:

1. Available only in Firefox.
2. Designed only to create prototypes of tests.
3. Test execution is slow compared to selenium RC & WebDriver.

2. Selenium Remote Control (Selenium RC)

This is the first automated web testing tool that allows users to use a programming language they prefer.

Selenium RC was the flagship testing framework of the whole Selenium project for a long time. As of version 2.25.0, RC can support the following programming languages:

Java, C#, PHP, Python, Perl, Ruby.

Selenium RC is an important component in the Selenium test suite. It is a testing framework that enables a QA or developer to write test cases in any programming language to automate UI tests for web applications against any HTTP website.

- Advantages:

1. Supports data-driven testing
2. Can readily supports new browsers
3. Faster execution time than IDE
4. Supports looping and conditional operations

- Disadvantages:

1. Installations is more complicated than IDE
2. Must have programming knowledge
3. Need Selenium RC server to be running
4. Browser interactions is less realistic
5. Slower execution time than WebDriver
6. Inconsistent results & uses JavaScript

3. WebDriver

The WebDriver proves to be better than Selenium IDE and Selenium RC in many aspects. It implements a more modern and stable approach in automating the browser's actions.

WebDriver, unlike Selenium RC, does not rely on JavaScript for Selenium Automation Testing. It controls the browser by directly communicating with it.

Selenium WebDriver (Selenium 2) is the successor to Selenium RC and the most important component of Selenium Suite. Selenium WebDriver provides a programming interface to create and execute test cases. Test scripts are written to identify web elements on web pages and then desired actions are performed on them.

Selenium WebDriver performs much faster as compared to Selenium RC because it makes direct calls to the web browsers. RC on the other hand needs an RC server to interact with the web browser.

Since WebDriver directly calls the methods of different browsers, hence we have separate driver for each browser. Some of the most widely used web drivers include:

- Mozilla Firefox Driver
- Google Chrome Driver
- Safari Driver

WebDriver can support the following programming languages:
Java, C#, PHP, Python, Perl, Ruby.

- Advantages:
 1. Simpler installation than RC
 2. Communicates directly to the browser
 3. No need for a separate component such as the RC server
 4. Faster execution time than IDE & RC

- Disadvantages:

1. Installations is more complicated than IDE
2. Must have programming knowledge
3. Can not supports readily browser

4. Selenium Grid

Selenium Grid is a tool used together with Selenium RC to run parallel tests across different machines and different browsers all at the same time. Parallel execution means running multiple tests at once.

Features:

- Enables simultaneous running of tests in multiple browsers and environments.
 - Saves time enormously.
 - Utilizes the hub-and-nodes concept. The hub acts as a central source of Selenium commands to each node connected to it.
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- Advantages:
 1. Extensive Language Support
 2. Dedicated Framework Support
 3. Multi-Browser Support & Multi-Operating System Support
 4. Free and Open-Source

- **Summary**

The entire Selenium Software Testing Suite is comprised of four components:

1. **Selenium IDE**, a Firefox and chrome add-on that you can only use in creating relatively simple test cases and test suites.
2. **Selenium Remote Control**, also known as Selenium 1, is the first Selenium tool that allowed users to use programming languages in creating complex tests.
3. **WebDriver**, is the newer breakthrough that allows your test scripts to communicate directly to the browser, thereby controlling it from the OS level.
4. **Selenium Grid** is also used with Selenium RC to execute parallel tests across browsers and operating systems.
5. Selenium RC and WebDriver were merged to form Selenium 2.
6. Selenium is more advantageous than Microfocus UFT One in terms of costs and flexibility.