SELENIUM

Test automation tool

Agenda

- Automation Testing
- Why Selenium?
- Selenium Components
- Selenium IDE usage and commands
- Selenium RC usage and commands
- Selenium WD
- Test cases with Selenium WD
- Handling Windows Applications and other functionality using Selenium WD
- Junit and TestNG
- Selenium Grid

Automation testing

- Performing testing in software application /product with help of automation tools is automation testing

- Automation tools are divided into 3 types

  1 . Function testing tools . **eg**: Selenium, QTP , UFT , Silk test

  2 . Test Management tools . **eg**: Quality Center, Bugzilla, Jira , TFS , ALM etc

  3. Performance tools . **eg**: Load Runner , Jmeter , Silk Performer

Why Selenium?

- Functional and regression testing tool developed in 2004
- Selenium old name - JSFT (Java Script Functional Tester)
- Advantages
  - Open Source
  - Supports multi browsers , environments (OS), Languages
  - Supports mobile / android applications
  - Build in frameworks Junit and TestNg
  - Parallel test script execution
- Disadvantages
  - Only supports web based applications
  - Should have more technical knowledge , lack of technical support
  - Configuration and utilization is little complex compared to others

Selenium Components

Four different components or projects

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

Selenium IDE

(Integrated Development Environment)

Selenium IDE

- Record and Playback tool for web based applications
- addin/plugin for firefox and chrome browser
- Design and execute the scripts only in firefox/chrome browsers

What is Element ?

- Element is component in application.
- Element is also called as: Objects, controls , Components

What is Locator ?

What is Locator ?

- Identification of elements
- Locators is also called as Properties and Values , Attributes
- List of Locators :
  - ID Locator
  - Name Locator
  - Class Name Locator
  - Tag Name Locator
  - Link Text Locator
  - Partial Link Text
  - CSS Selector Locator
  - XPath Locator

FireBug add-in and IDE add-in

Fire bug: Used to see the list of locators of elements in firefox

https://addons.mozilla.org/en-US/firefox/collections/jbalogh/firebug_addons/

https://chrome.google.com/webstore/detail/firebug-lite-for-google-c/ehemiojjcpldeipjhjkepfdaohajpbdo?hl=en

Selenium IDE links:

https://chrome.google.com/webstore/detail/selenium-ide/mooikfkahbdckldjjndioackbalphokd?hl=en

https://addons.mozilla.org/en-US/firefox/addon/selenium-ide/

Selenium IDE Commands

Selenium IDE commands (Selenese) are of three types :

Actions : manipulate the state of the application like “click this link” and “select that option”. If an Action fails, or has an error, the execution of the current test is stops.

Accessors : examine the state of the application and store the results in variables, e.g. “Title”.

Assertions :

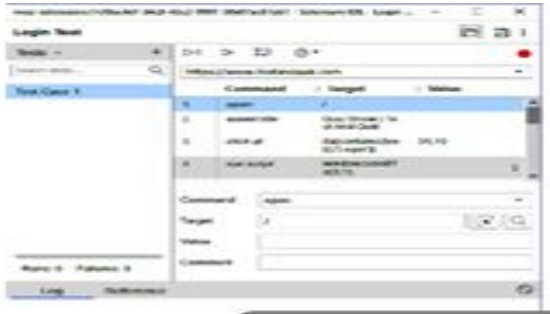
- verify that the of the application is same to what we are expecting.
- Assertions are three types: “assert”, “verify”, and ” waitFor”.
- When an “assert” fails, the test is aborted. When a “verify” fails, the test will continue execution, logging the failure.

Selenium Remote Control (RC)

Selenium RC

- Test tool that allows to write automated web application Ui test in any programing language against any HTTP website using any mainstream JavaScript -enabled browser
- Used to design and execute test scripts in different browsers
- Working with Selenium RC:
  - Need to configure selenium standalone server.jar file

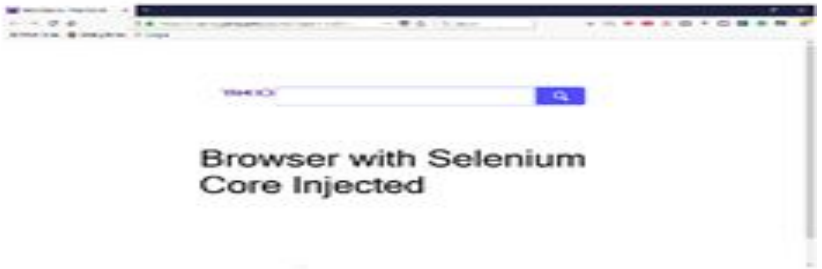
Architecture of Selenium RC



Selenium Commands:
Java, .NET, Python, etc.

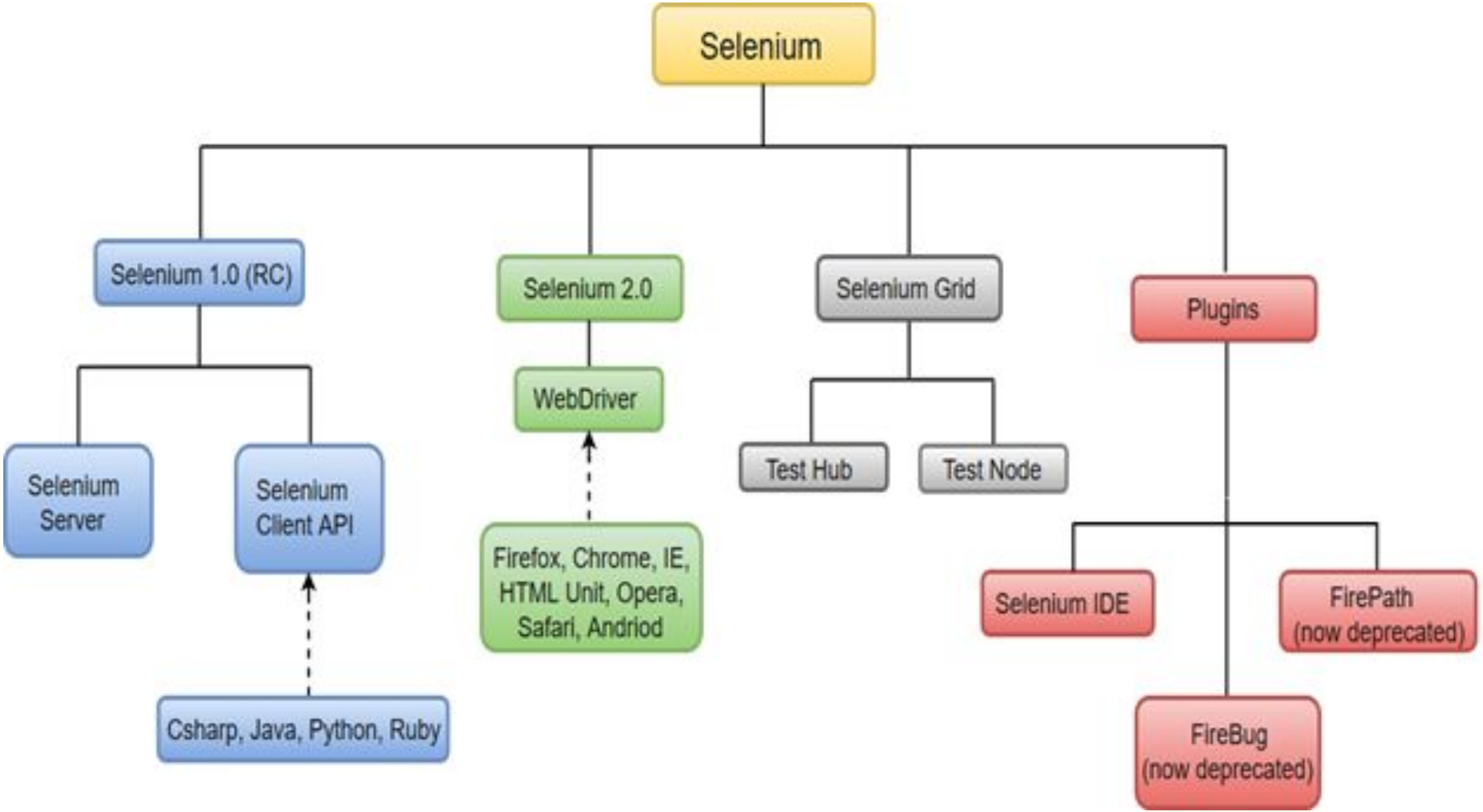
Selenium RC Server

Web Server



Browser with Selenium
Core Injected

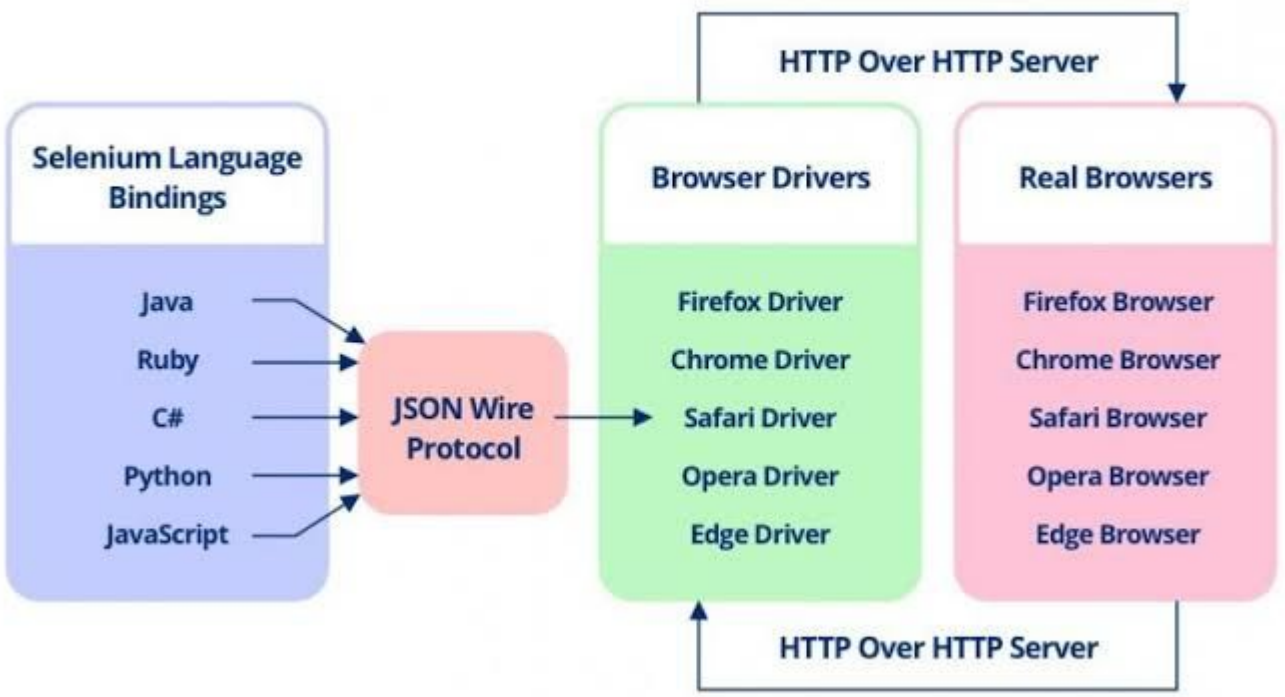
Selenium Webdriver


Selenium
Selenium 1.0 (RC)
Selenium 2.0
Selenium Grid
Plugins
Selenium Server
Selenium Client API
WebDriver
Test Hub
Test Node
Firefox, Chrome, IE, HTML Unit, Opera, Safari, Andriod
Selenium IDE
FirePath (now deprecated)
Csharp, Java, Python, Ruby
FireBug (now deprecated)

WebDriver- Architecture (Overview)

Web Server

Selenium WebDriver- Architecture



Basic components of WebDriver

There are four basic components of WebDriver Architecture:

1. **Selenium Language Bindings** - Selenium developers have built language bindings/Selenium Client Libraries in order to support multiple languages.
2. **JSON Wire Protocol** - JSON Wire Protocol provides a transport mechanism to transfer data between a server and a client
3. **Browser Drivers** - Selenium uses drivers, specific to each browser in order to establish a secure connection with the browser without revealing the internal logic of browser's functionality.
4. **Real Browsers** - Browsers supported by Selenium WebDriver are Internet Explorer, Mozilla Firefox, Google Chrome, Safari and Opera

Selenium WebDriver Vs Selenium RC

Selenium RC	Web driver
Works on almost all browsers. Does not work on latest version of Firefox/IE	Works on latest versions of almost all browsers - Firefox, IE(6,7,8), Opera, Chrome
No Record and run.	No Record and run.
Server is required to start.	No server required to start.
Core engine is JavaScript based.	Interacts natively with browser application.
It's a simple and small API.	Complex and a bit large API as compared to RC.
Fewer Objects oriented API.	Purely Object oriented API.
Cannot move mouse with it.	Can move mouse cursor.
Full xpaths have to be appended with 'xapth=\\' syntax.	No need to append 'xpath=\\'.
No Listeners.	Implementation of Listeners is provided.
Cannot test iphone/Android applications.	Can test iphone/Android applications.

Xpath and Firepath

Xpath : unique locator of the element in a html tree structure of application because more than one element in application might be having same name,id or Tag name but more than one element in application

Two types of Xpath:

1. **Absolute Xpath**: location of element from starting of html

   Eg: html/body/div[2]/div[8]/div[1]/div[2]/a[2]
2. **Relative Xpath**: anywhere in page based on unique locator of element

   Eg: //Tagname [@locator=''Value'']

Firepath : Identify Xpath in application using add-in fire path

FrameWorks

- Folder structure which contains folders, subfolders and files can be accessed across the project
- Two different types of frameworks
  - **Build in Frame work:** developed by specific vendors and designed for developers to perform unit testing. Two different types 1) **Junit**(Java unit) 2) **TestNg** (Next generation)
  - **User Defined Framework:** created by user and implemented to design test scripts. Four different types 1) Linear Framework 2) Data Driven Framework 3)Modular or Keyword Driver 4) Hybrid Framework

Junit

- Used by java developers to perform unit testing
- Need to configure junit.jar with eclipse for implementing
- **Annotation** : Predefined class which contains reusable lines if code and starts with ‘@’
- List of Annotations :
  - **@Before** - before executes every test
  - **@After** - after executes every test
  - **@BeforeClass** - before executes all the tests
  - **@AfterClass** - after executes all the tests
  - **@Test**- which contain the code
  - **@Ignore** - not to execute any specific test

TestNg

- Advanced of Junit with more annotations , assertions
- Can provide results in multiple formats like html,xml,etc.,
- Supports parameterization
- Install TestNg in eclipse (from official website or Eclipse Marketplace)
- List of Annotations :
  - **@BeforeSuite**
  - **@AfterSuite**
  - **@BeforeTest**
  - **@AfterTest**
  - **@BeforeClass**
  - **@AfterClass**
  - **@BeforeMethod, @AfterMethod, @Test, @Ignore**

User Defined Framework

Linear Framework : designed for “one test script in one class ” by hard coding the data directly in test scripts

Data Driven : designed for “one test script in one class by passing data from excel and export the output in excel”

Modular Keyword Driven : designed for “one test script in one method by passing data from excel and export the output in excel”

Hybrid Framework : combination of keyword and data driven

Selenium Grid

Selenium Grid

- Can execute test scripts parallely in different browsers and in different environments

Thank You