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Agenda

- Introduction to Automation testing and Selenium
- Selenium History
- Selenium browser and Environment Support
- Introduction to Selenium IDE
- Selenium Commands ï Selenese
- Selenium Commands : Types
- Selenium IDE : Advantages and Disadvantages
- Selenium Proœs and Conœs : Overview

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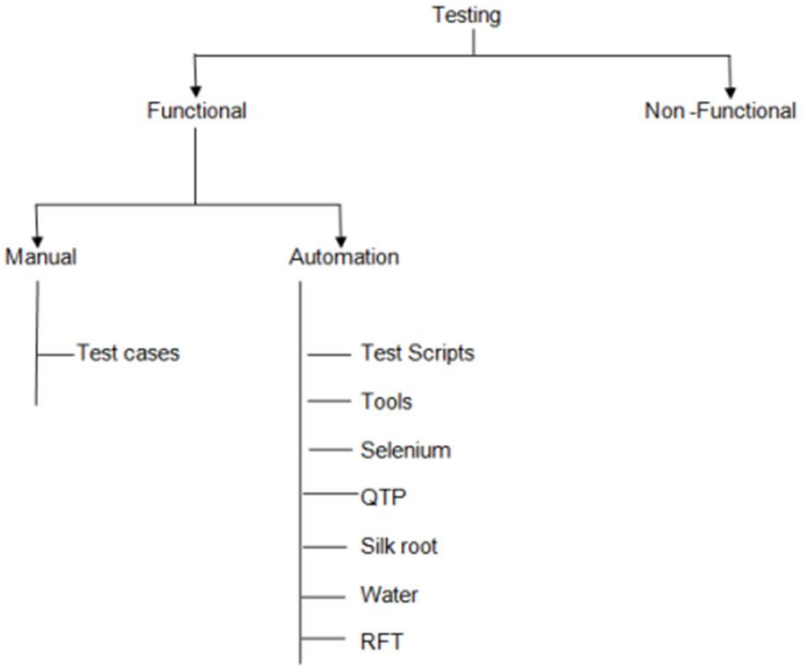
Test Automation

- Test automation is the use of software :
  - *To set test preconditions.*
  - *To control the execution of tests.*
  - *To compare the actual outcomes to predicted outcomes.*
  - *To report the Execution Status.*
- Commonly, test automation involves automating a manual process already in place that uses a formalized testing process.



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Why and When To Automate?

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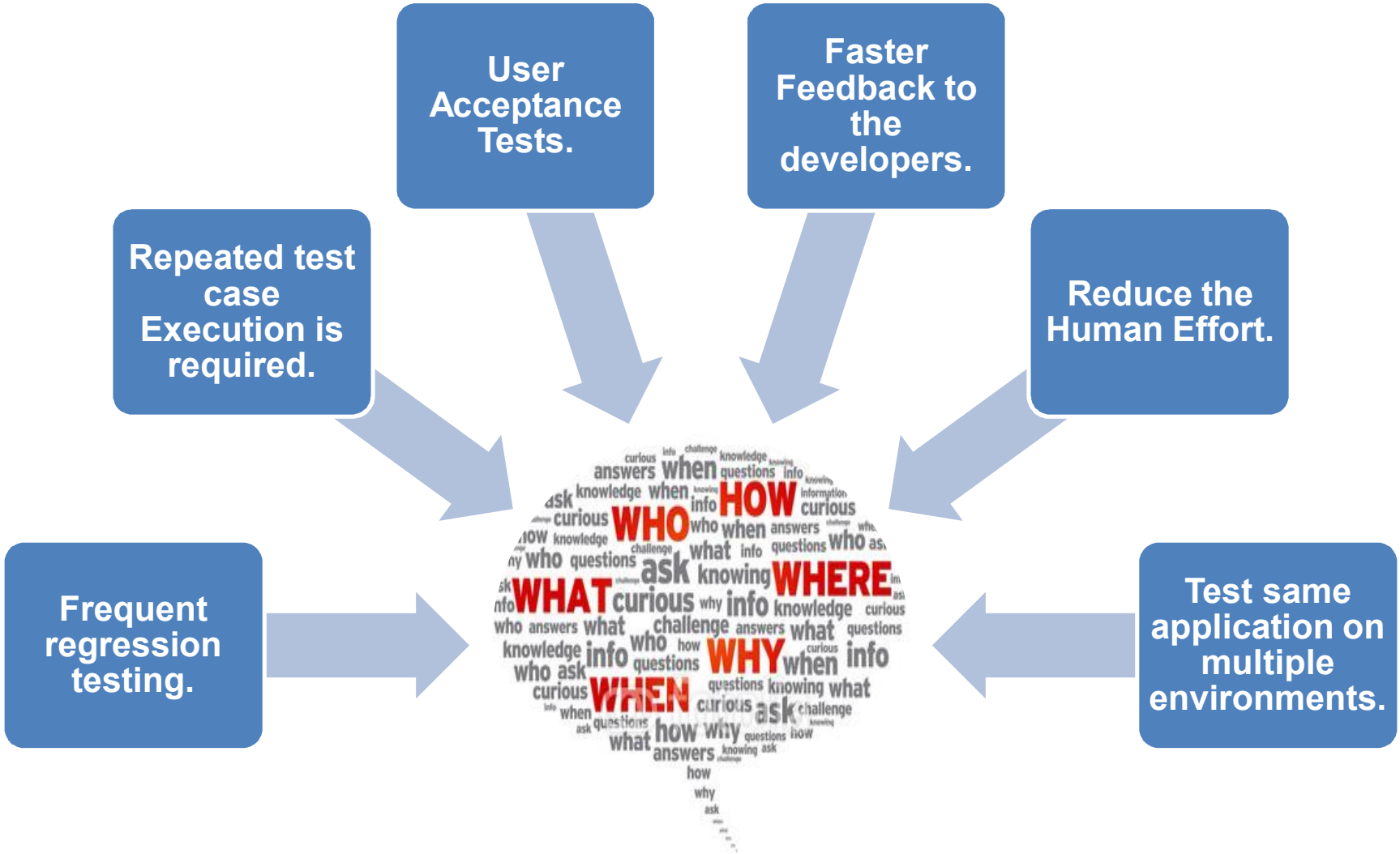

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Test Automation Tools

- Quick Test Professional By HP.
- Rational Functional Tester By Rational (IBM Company).
- Silk Test By Borland.
- Test Complete By Automated QA.
- QA Run (Compuware).
- Watir (Open Source).
- ***Selenium (Open Source).***
- Sahi (Open Source).

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Selenium : Introduction

- Selenium is a suite of testing automation tools used for Web-Base applications: *Selenium IDE, Selenium RC, Selenium WebDriver and Selenium Grid.*
- These tools provide a rich set of testing functions specifically geared to varied testing scenarios of all types of Web applications.
- The operations provided by these tools are highly flexible and afford many options for comparing UI elements to expected application behavior.
- *Selenium tests can be executed on multiple browser platforms.*

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Selenium : Introduction Cont..

- Selenium is an open-source(free) automation tool.
- Selenium is useful to automate web apps across many platforms.
- Selenium runs in many browsers and operating systems.
- Selenium can be controlled by many programming languages and testing frameworks.
- Selenium is a suite of tools; those are:
  - **Selenium IDE**
  - **Selenium Remote Control (RC)**
  - **WebDriver**
  - **Selenium Grid**

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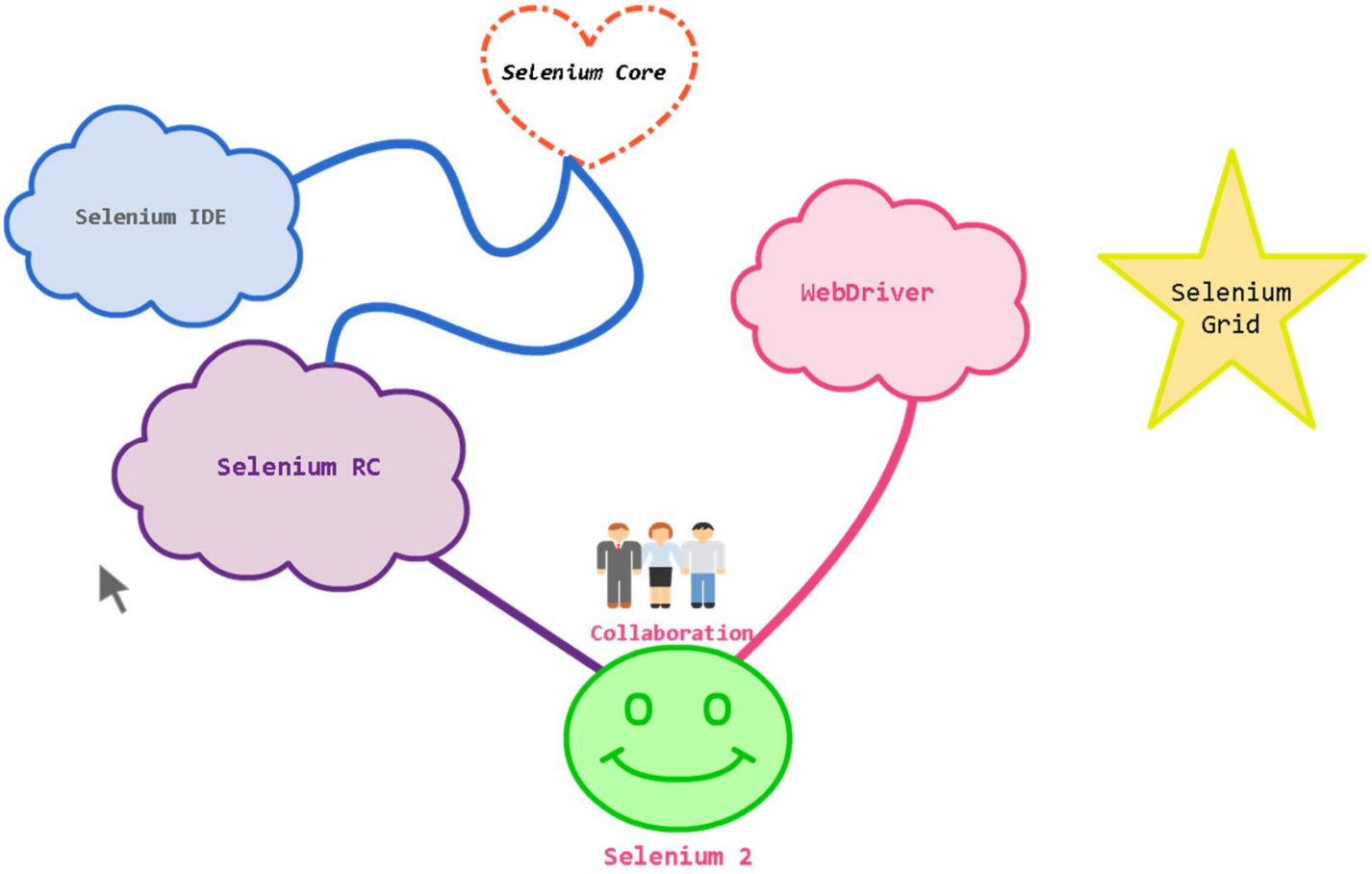
Selenium : World



The name Selenium comes from a joke made by Jason Huggins(Inventor of Selenium) in an email, mocking a competitor named Mercury(UFT now), saying that you can cure mercury poisoning by taking selenium supplements.

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Selenium : World Contd..

Selenium Projects

Selenium has many projects that combine to make a versatile testing system.

Selenium IDE

Selenium IDE is a Firefox add-on that makes it easy to record and playback tests in Firefox 2+. You can even use it generate code to run the tests with Selenium Remote Control.

Selenium Remote Control

Selenium Remote Control is a client/server system that allows you to control web browsers locally or on other computers, using almost any programming language and testing framework.

Selenium WebDriver

Selenium WebDriver can drive a browser natively either locally or on remote machines.

Selenium Grid

Selenium Grid takes Selenium Remote Control to another level by running tests on many servers at the same time, cutting down on the time it takes to test multiple browsers or operating systems.

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Selenium : Which tool to Use ?

Which part of Selenium is appropriate for me?

If you want to

- create quick bug reproduction scripts
- create scripts to aid in automation-aided exploratory testing

Then you want to use Selenium IDE; a Firefox add-on that will do simple record-and-playback of interactions with the browser

If you want to

- create robust, browser-based regression automation
- scale and distribute scripts across many environments

Then you want to use Selenium WebDriver; a collection of language specific bindings to drive a browser -- the way it is meant to be driven.

Selenium WebDriver is the successor of Selenium Remote Control which has been officially deprecated. The Selenium Server (used by both WebDriver and Remote Control) now also includes built-in grid capabilities.

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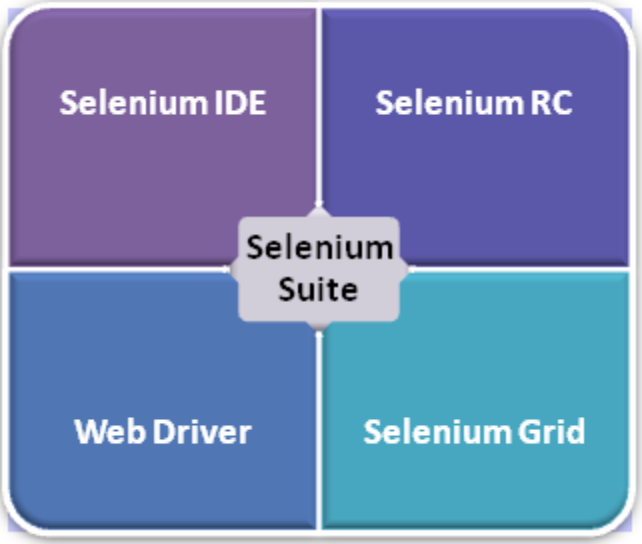
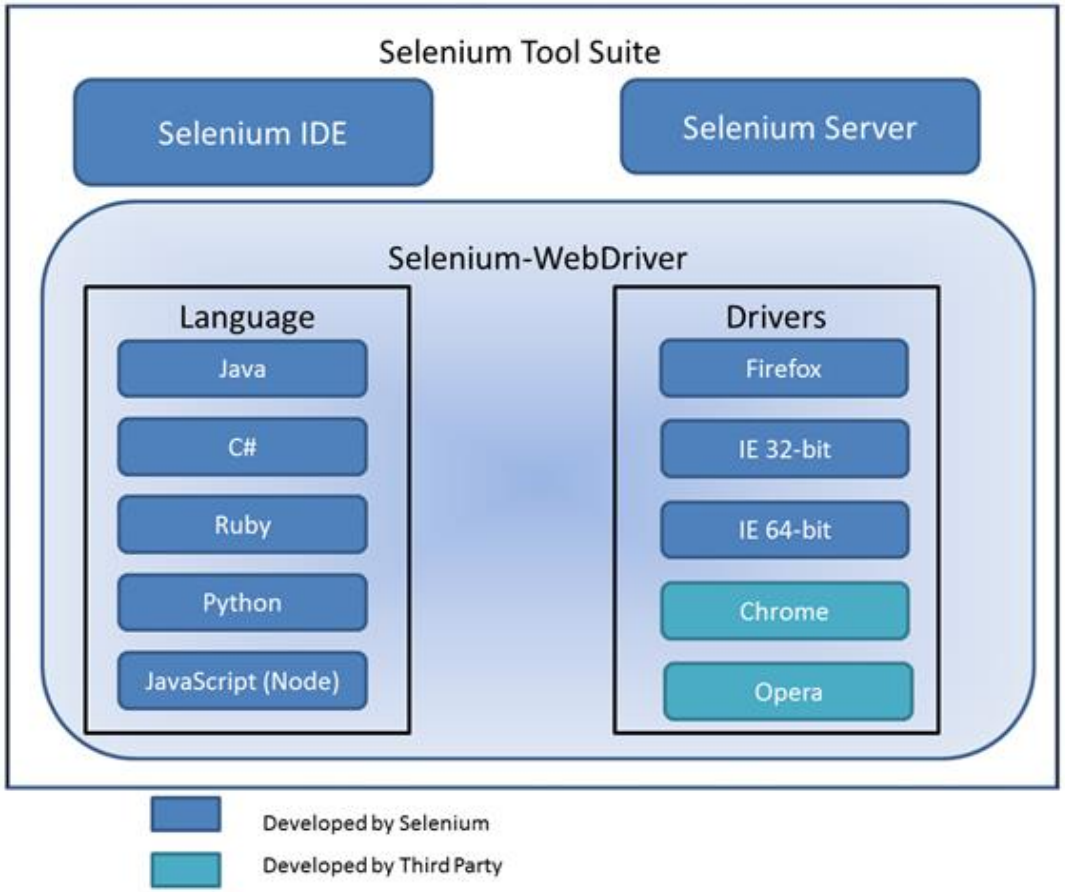
Selenium Suite





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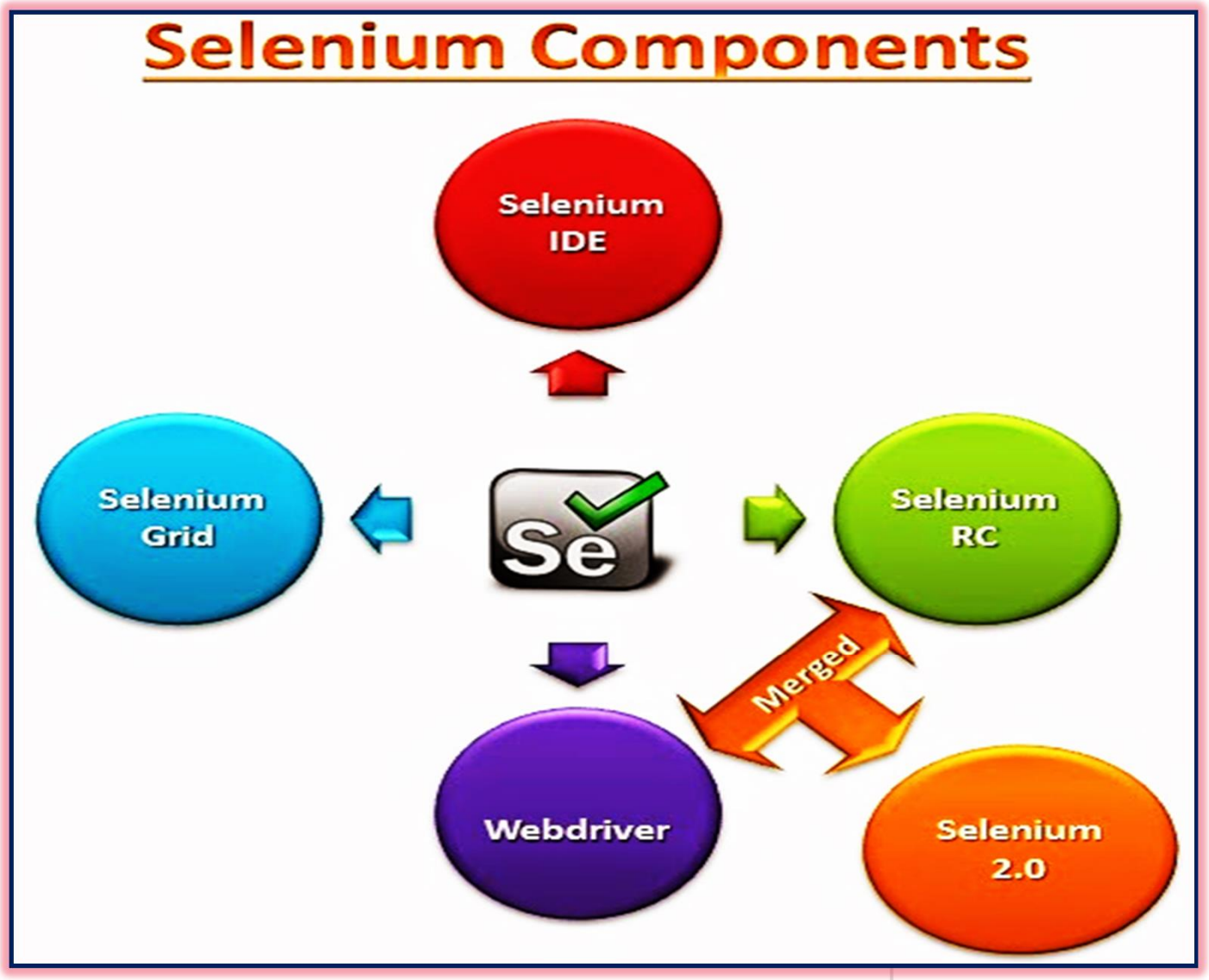
Selenium : Components



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Selenium Project : History

- **Selenium Core**
  - Developed by **Jason Huggins in 2004**.
  - It is a JavaScript program that would automatically control the browserôs actions.
  - He named this program as the ñ**JavaScriptTestRunner**.ò
  - He made **JavaScriptRunner** open-source which was later re-named as **Selenium Core**.
- **Selenium RC**
  - **Paul Hammant** created a server that will act as an HTTP proxy to ñtrickòthe browser into believing that Selenium Core and the web application being tested come from the same domain.
  - This system became known as the **Selenium Remote Control** or **Selenium 1**.

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Selenium Project : History Cont..

- **WebDriver**
  - In **2006 Simon Stewart** created the **WebDriver**.
  - In **2008**, Selenium Team merged **WebDriver** and **Selenium RC** to form a more powerful tool called **Selenium 2.**
- **Selenium IDE**
  - **Shinya Kasatani** of Japan created **Selenium IDE.**
  - It is a Firefox extension that can automate the browser through a record-and-playback feature to increase the speed in creating test cases.
  - He donated Selenium IDE to the Selenium Project in **2006**.
- **Selenium Grid**
  - Selenium Grid was developed by **Patrick Lightbody** to address the need of minimizing test execution times as much as possible.

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Selenium Vs QTP

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Å Advantages of Selenium over QTP.

Selenium	QTP
Open source, free to use, and free of charge.	Commercial.
Can run tests across different browsers.	Can only run tests in Internet Explorer, Firefox and Chrome.
Supports various operating systems.	Can only be used in Windows.
Supports mobile devices.	Supports mobile devise using 3rd party software.
Can execute tests while the browser is minimized.	Needs to have the application under test to be visible on the desktop.
Can execute tests in parallel.	Can only execute in parallel but using Quality Center which is again a paid product.

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QTP Vs Selenium

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Å Advantages of QTP over Selenium

QTP	Selenium
Can test both web and desktop applications.	*Can only test web applications.*
Comes with a built-in object repository.	*Has no built-in object repository.*
Automates faster than Selenium because it is a fully featured IDE.	*Automates at a slower rate because it does not have a native IDE and only third party IDE can be used for development.*
Data-driven testing is easier to perform because it has built-in global and local data tables.	*Data-driven testing is more cumbersome since you have to rely on the programming language's capabilities for setting values for your test data.*
Can access controls within the browser(such as the Favorites bar, Address bar, Back and Forward buttons, etc.)	*Cannot access elements outside of the web application under test.*
Has native capability to export test data into external formats.	*Has no native capability to export runtime data onto external formats.*
Test Reports are generated automatically.	*No native support to generate test /bug reports.*

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Selenium : Browser and Environment Support

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- Because of their architectural differences, Selenium IDE, Selenium RC, and WebDriver support different sets of browsers and operating environments.

	Selenium IDE	Selenium RC	WebDriver
Browser Support	Mozilla Firefox	Mozilla Firefox Internet Explorer Google Chrome Safari Opera Others	Internet Explorer versions 6 to 9, both 32 and 64-bit Firefox 3.0, 3.5, 3.6, 4.0, 5.0, 6, 7 and above (current version is 20.0.1) Google Chrome 12.0.712.0 and above (current version is 26.0.1410.64) Opera 11.5 and above (current version is 12.15) Android ï 2.3 and above for phones and tablets (devices & emulators) iOS 3+ for phones (devices & emulators) and 3.2+ for tablets (devices & emulators) HtmlUnit 2.9 and above (current version is 2.11)
Operating System	Windows Mac OS X Linux	Windows Mac OS X Linux Solaris	All operating systems where the browsers above can run.

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Selenium IDE : Introduction

- Selenium IDE is an integrated development environment for Selenium tests.
- It is *implemented as a Firefox extension, and allows you to record, edit, and replay the test in firefox*.
- Selenium IDE allows you to save tests as HTML, Java, Ruby scripts, or any other format.
- It allows you to automatically add assertions to all the pages.
- Allows you to add *selenese commands as and when required.*

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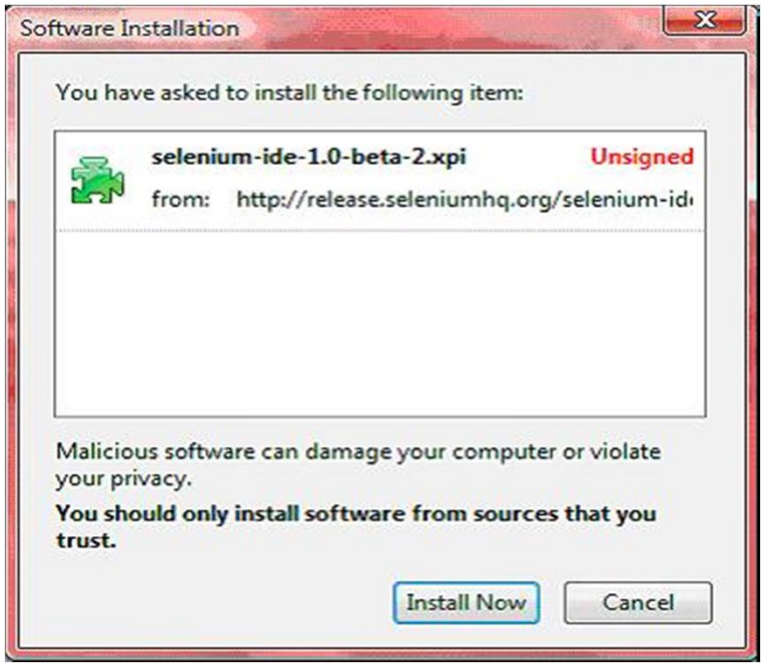
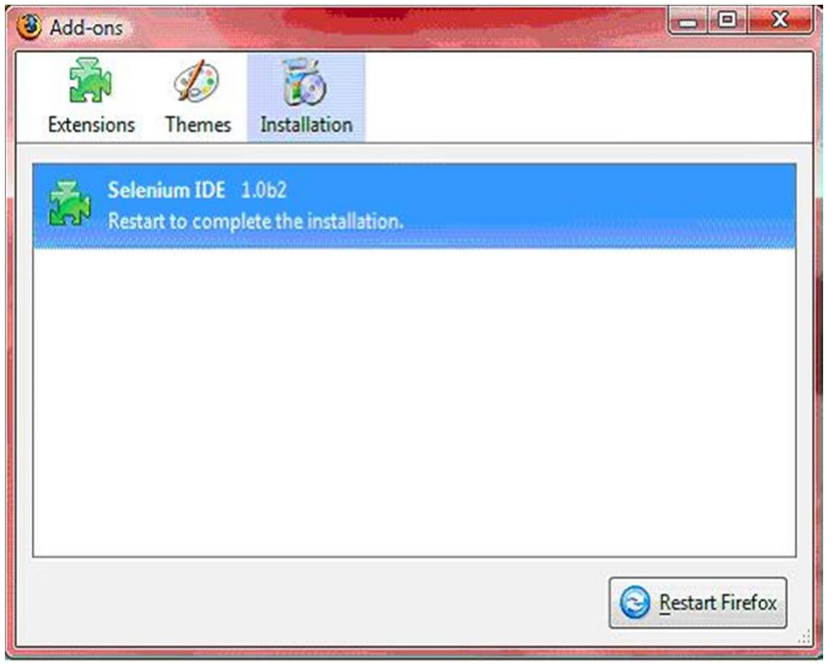
Selenium IDE Installation



Window A



Window B

- To run the Selenium-IDE, simply select it from the Firefox Tools menu.
- It opens as follows with an empty script-editing window and a menu for loading, or creating new test cases. (See Next Slide)

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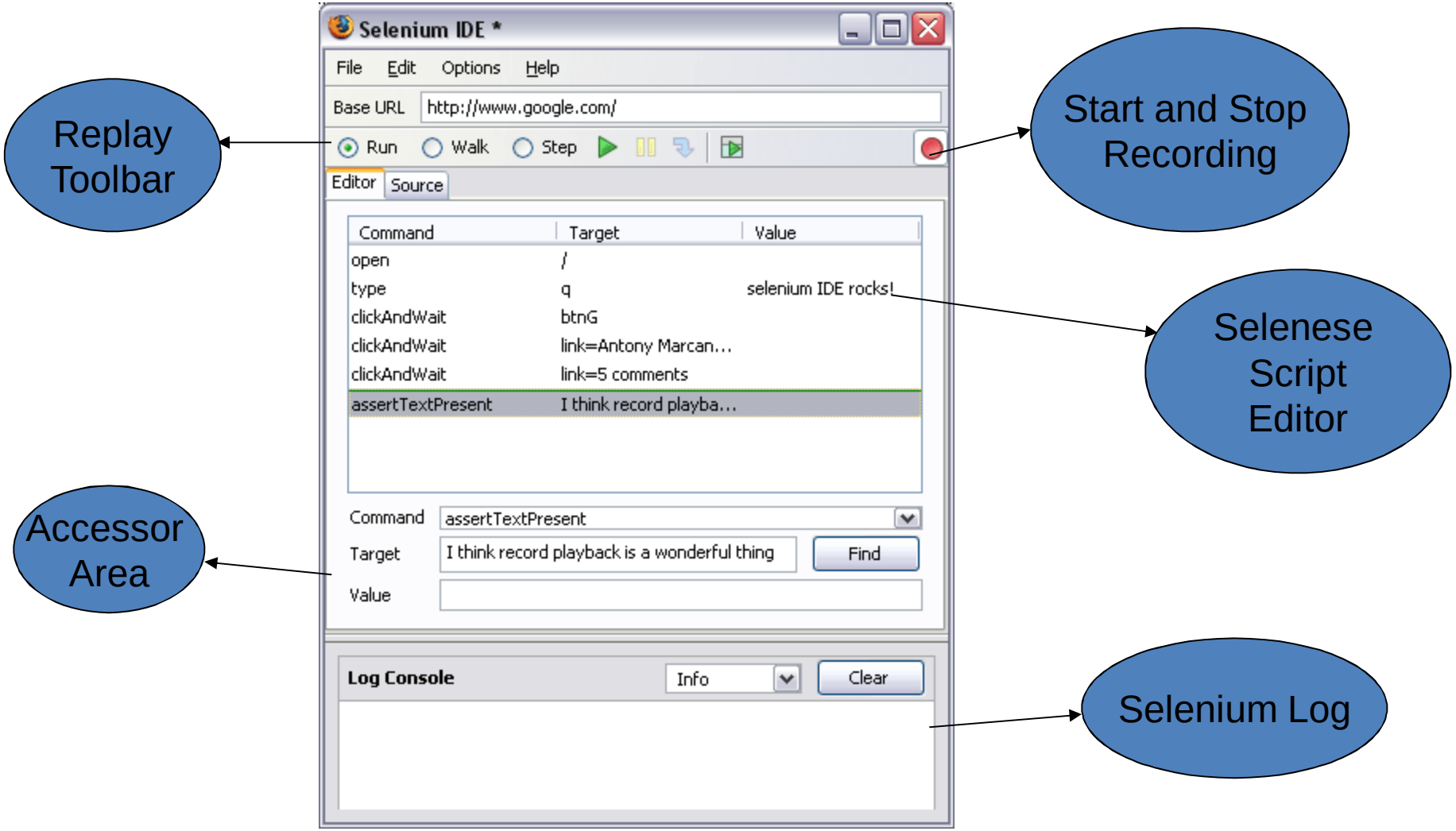
Selenium IDE – User Interface



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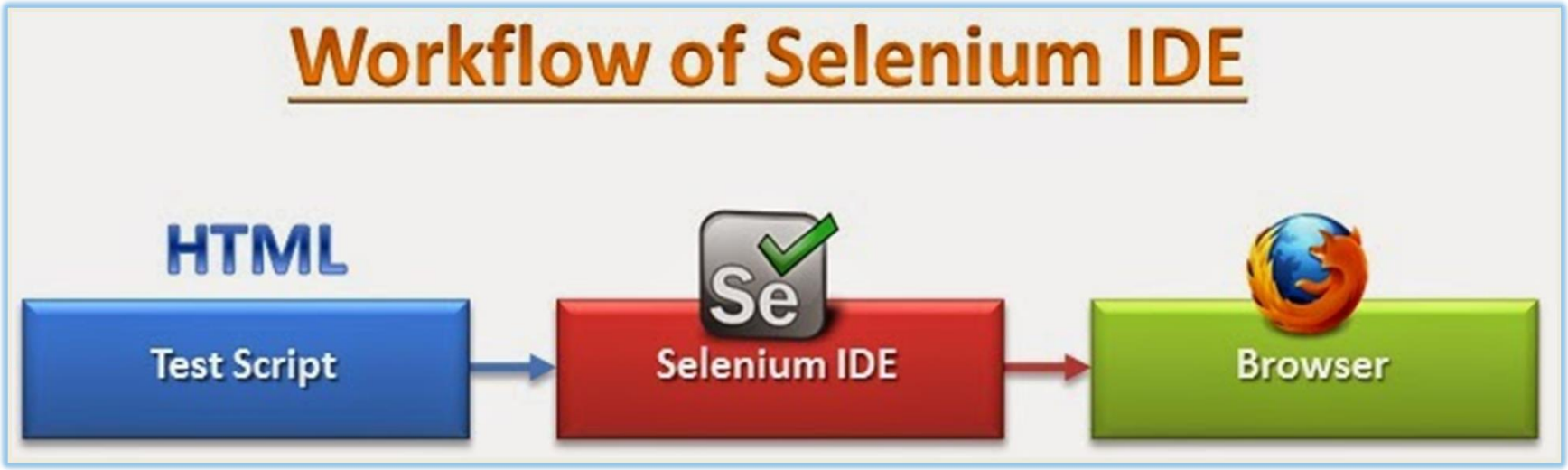
Selenium IDE : Workflow



- *Selenium IDE has direct interaction with Firefox browser while recording and executing the test script.*
- *Selenium IDE executes automation test script directly on browser using selenium core.*

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Selenium Commands – Selenese

- Selenese commands can have up to a maximum of two parameters: target and value.
- Parameters are not required all the time. It depends on how many the command will need.
- ***A HTML language to drive the elements in the browser.***

- Selenium commands come in three "flavors":

i. **Actions**

ii. **Accessors**

iii. **Assertions**

- **Actions:** are commands that generally manipulate the state of applications like Click, Select etc.
- **Accessors:** examine the state of application and store the results in variables. For example, storeTitle.
- **Assertions:** are like accessors but they verify the state of application conforms to what is expected. "Assert", "Verify", and "waitFor" are some examples of Assertion commands.

- **Difference between Assert and Verify commands:** both serve the same purpose but difference is that when "assert" fails, the test gets stopped. Whereas, in case of "verify" failure, test will remains executing while logging the failure.

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Selenese Commands – Assertions

- Assert ï If the expected value is matched it continues the next test steps,If not it aborts the test.
- Assert is used for the mandatory check.
- Note: While in a test suite it will abort the current test case and continue the next test case.
- Verify ï If the expected value is matched if continues the next test steps. If not the test execution will continue with the remaining steps.
- Verify is used for the optional check.

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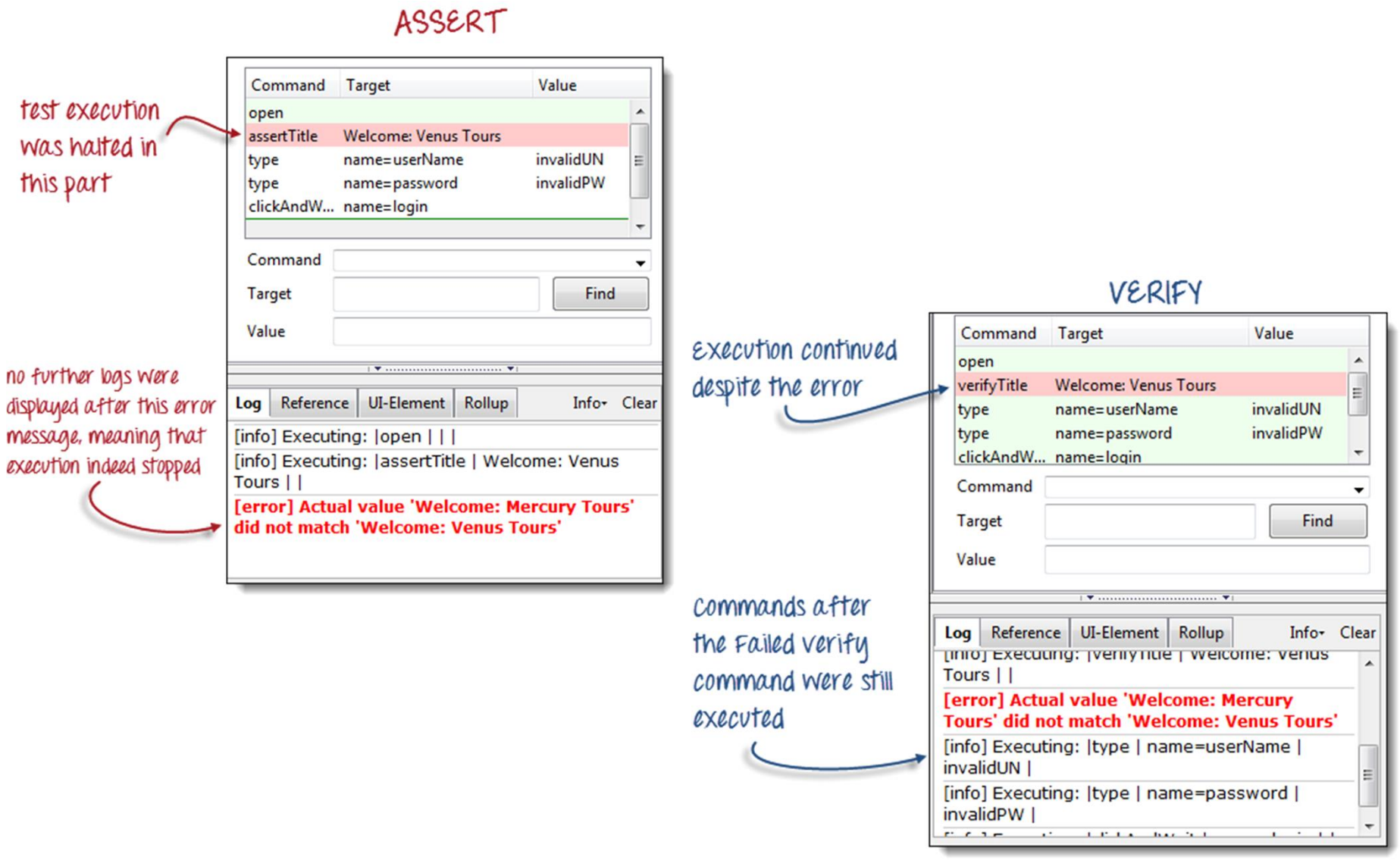
Selenese Commands – Assertions



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Selenium IDE – Selenium Commands

- Open - opens a page using a URL.
- click/clickAndWait - performs a click operation, and optionally waits for a new page to load.
- verifyTitle/assertTitle - verifies an expected page title.
- verifyTextPresent - verifies expected text is somewhere on the page.
- verifyElementPresent - verifies an expected UI element, as defined by its HTML tag, is present on the page.
- verifyText - verifies expected text and its corresponding HTML tag are present on the page.
- verifyTable - verifies a table's expected contents.
- waitForPageToLoad - pauses execution until an expected new page loads. Called automatically when clickAndWait is used.
- waitForElementPresent - pauses execution until an expected UI element, as defined by its HTML tag, is present on the page.

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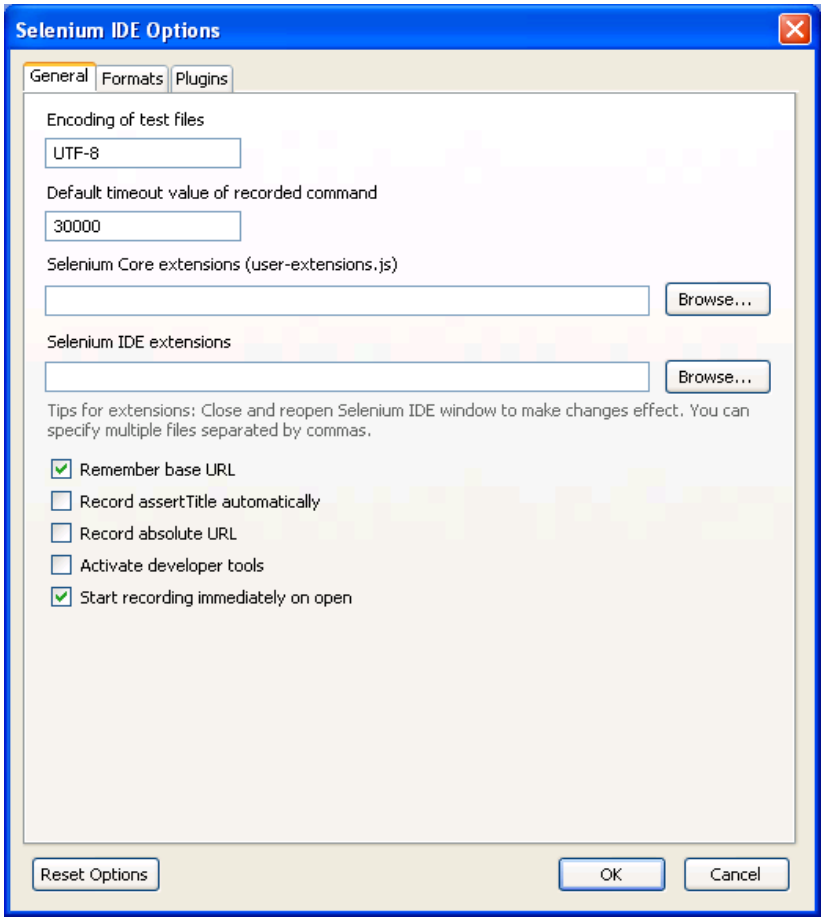
Selenium IDE Options

Selenium Options allow you to

- Set The Text Encoding Format
- Set the Default Page Time Out
- Set The Base URL recording option
- Adding Selenium Core and IDE Extension
- Add Automatic Page Title Assertions
- There are also other options under development



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Selenium IDE : Features and Limitations

- Easy-to-use Firefox plug-in.
- Easy record and playback.
- Intelligent field selection will use IDs, names, or XPath as needed.
- Autocomplete for all common Selenium commands.
- Debugging feature with step-by-step and breakpoints.
- Save tests as HTML, Ruby scripts, or any other format.
- Option to automatically assert the title of every page.
- Easy customization through plugins.

- Firefox only
- Can not Specify any condition Statement.
- Can not Specify any Looping Statement.
- Can not take external text data from External Resources such as XLS,XML or Database.
- Handing Exceptions is not in scope.

- Note:- To overcome the limitation of Selenium IDE we go for Selenium WebDriver.

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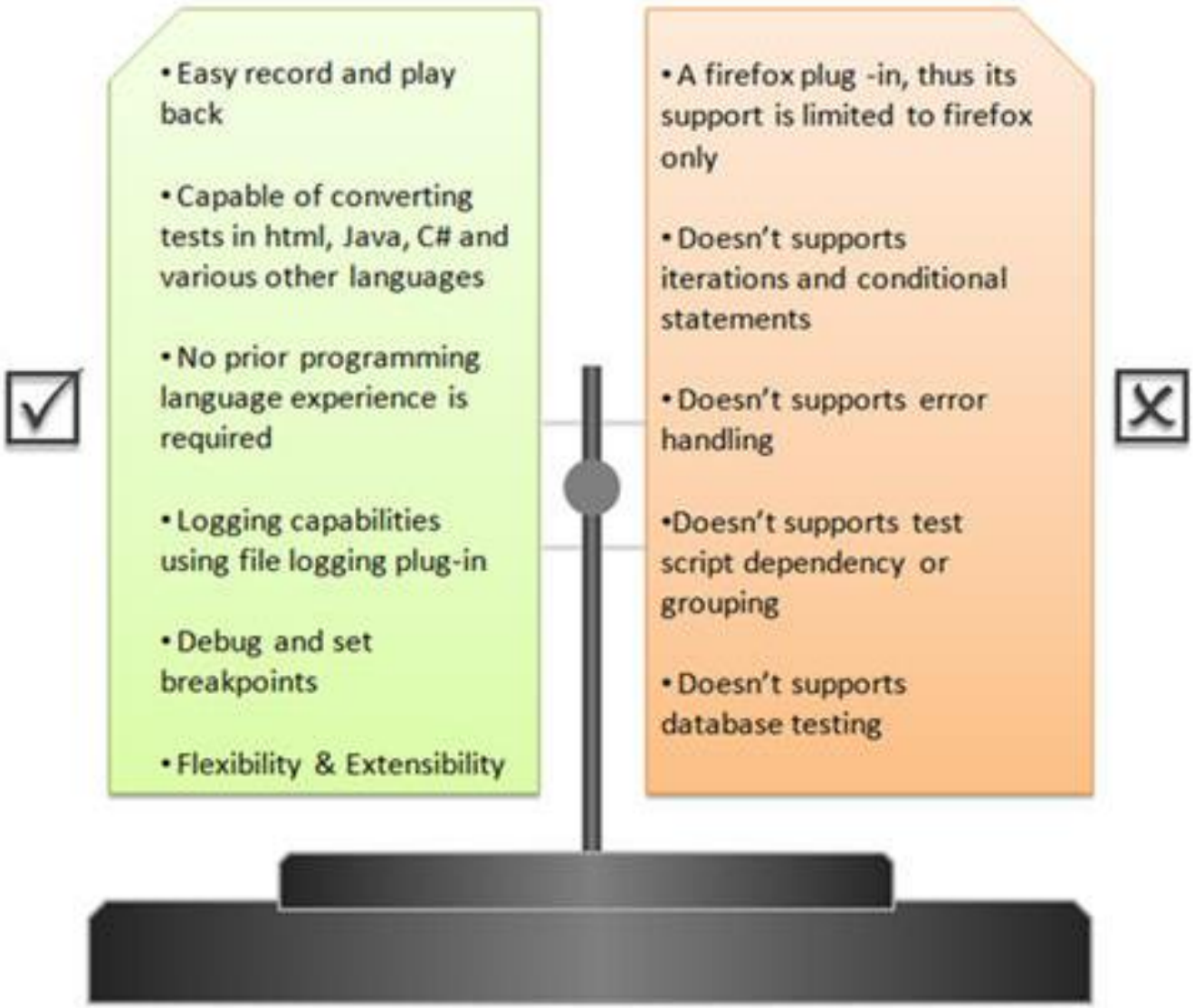
Selenium IDE Advantages & Disadvantages



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Selenium Pros and Cons

PROS

Very easy to use and install.

No programming experience is required, though knowledge of HTML and DOM are needed.

Can export tests to formats usable in Selenium RC and WebDriver.

Has built-in help and test results reporting module.

Provides support for extensions.

CONS

Available only in Firefox.

Designed only to create prototypes of tests.

No support for iteration and conditional operations.

Test execution is slow compared to that of Selenium RC and WebDriver.

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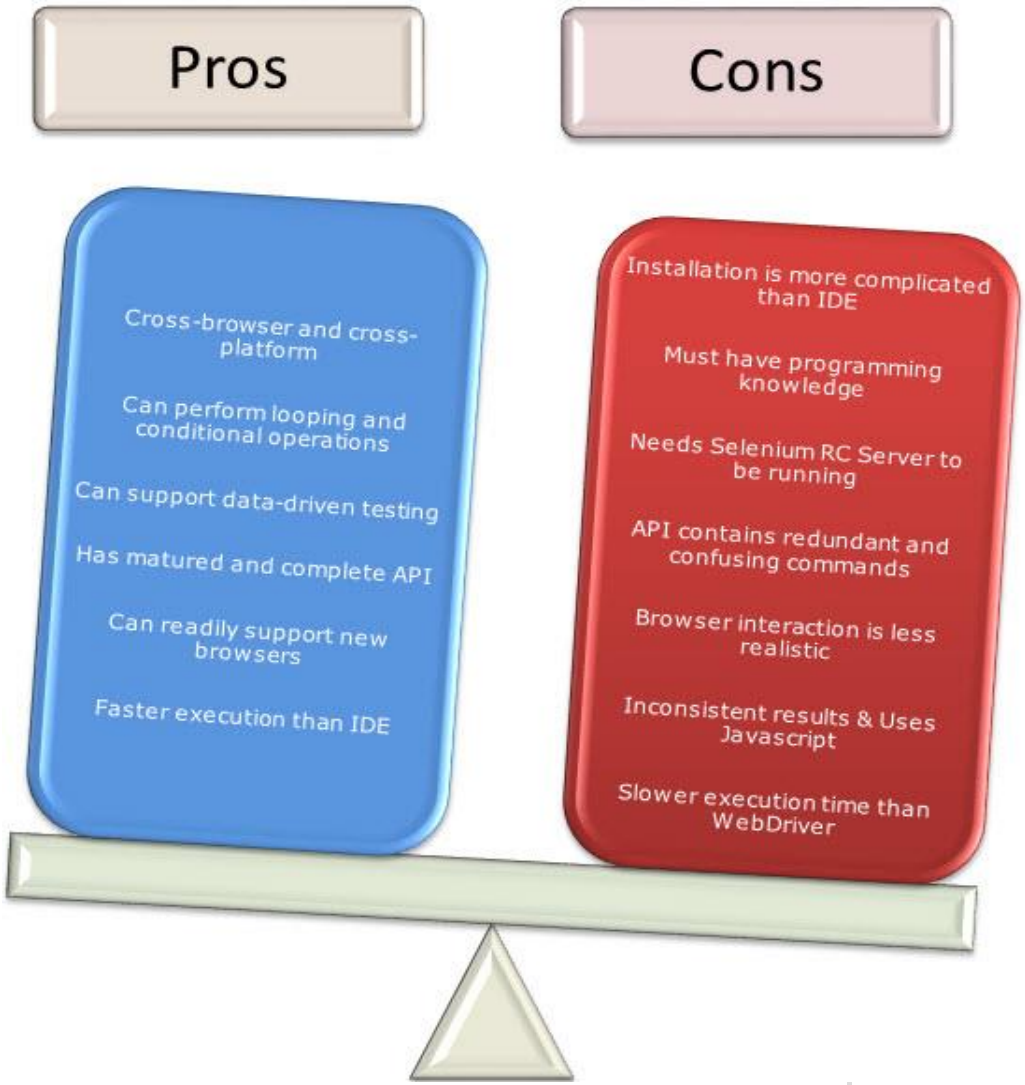
Selenium Pros and Cons Cont..



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- The entire Selenium Tool Suite is comprised of four components:
  - *Selenium IDE, Selenium Remote Control, also known as Selenium 1, WebDriver and Selenium Grid.*
- Selenium RC and WebDriver was merged to form Selenium 2.
- Selenium is more advantageous than QTP in terms of costs and flexibility.
- Test scripts can be created either by recording or typing the commands and parameters manually.
- When creating scripts manually, Firebug is used to get the locator.
- Table View displays a test script in tabular form while Source View displays it in HTML format.
- There are three types of commands:
  - Actions - directly interacts with page elements
  - Accessors - "reads" an element property and stores it in a variable
  - Assertions - compares an actual value with an expected one

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Useful Resources/References

- http://gojko.net
- http://www.openqa.org
- http://www.solutionsiq.com/agile2008/agile-2008-domain.php
- http://storytestiq.solutionsiq.com
- http://www.cubictest.com
- http://fitnesse.info/webtest

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Version History

Version History				
Version No	**Date**	**Created/ Changed by**	**Changes made**	**Reviewed by**
1	23-Jan-16	Saradhi Seshagiri	- Conversion to 2016 template - Adding the new contents	Prakash Goteti

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