Software Engineering

- Selenium : automated testing -

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Automated testing

(1) 빠른 테스트 시간
- Manual testing도 script 사용하는데?

(2) 더 정확한 테스트
- Test scenario (test case, result)에 좌우되지 않아야 함
- Scenario가 처음부터 정확히 잘 만들어질까?
- 구현된 모든 모듈/기능을 다 테스트할 수는 없을까?

(3) 테스팅의 숨은 적 – module dependency
- Automated build tool (e.g., Maven) to be integrated

(4) 사람 자원 절약
- Test engineer는 2nd class engineer?

(5) 자동화된 regression testing

(6) 시도 때도 없는 테스팅

(7) Testing integrated (with Jenkins)

(8) 밤잠 잘 필요 없는 테스팅
- Nightly testing

=> 질문 : 모든 테스트가 automation이 가능한가?

Selenium : automated testing tool

- Suites of testing s/w for web app
- Supports many languages
  - Java, C#, Php, Python, Ruby, Perl, JavaScript, (C/C++)
- Supports many OS's
  - Including iOS and Android as well as headless browser
- Supports major web browsers
  - firefox, chromium, edge, safari, opera
- Parallel test execution
- Supports testing frameworks
  - testNG, JUnit, NUnit, (xUnit)
- Web app testing 으로 충분한가?
  - Selendroid for android app
  - Appium for mobile app testing framework

Short points of Selenium (to be improved)

- Setup complexity
  - IDE integrated
  - 프로그래밍 숙련도에 좌우 -> 프로그래밍 숙련도 증가
- Support from the community
- No image comparison capability
  - Screenshot과 image는 capture 할 수 있으나 image 비교는 못함

Why the name Selenium?

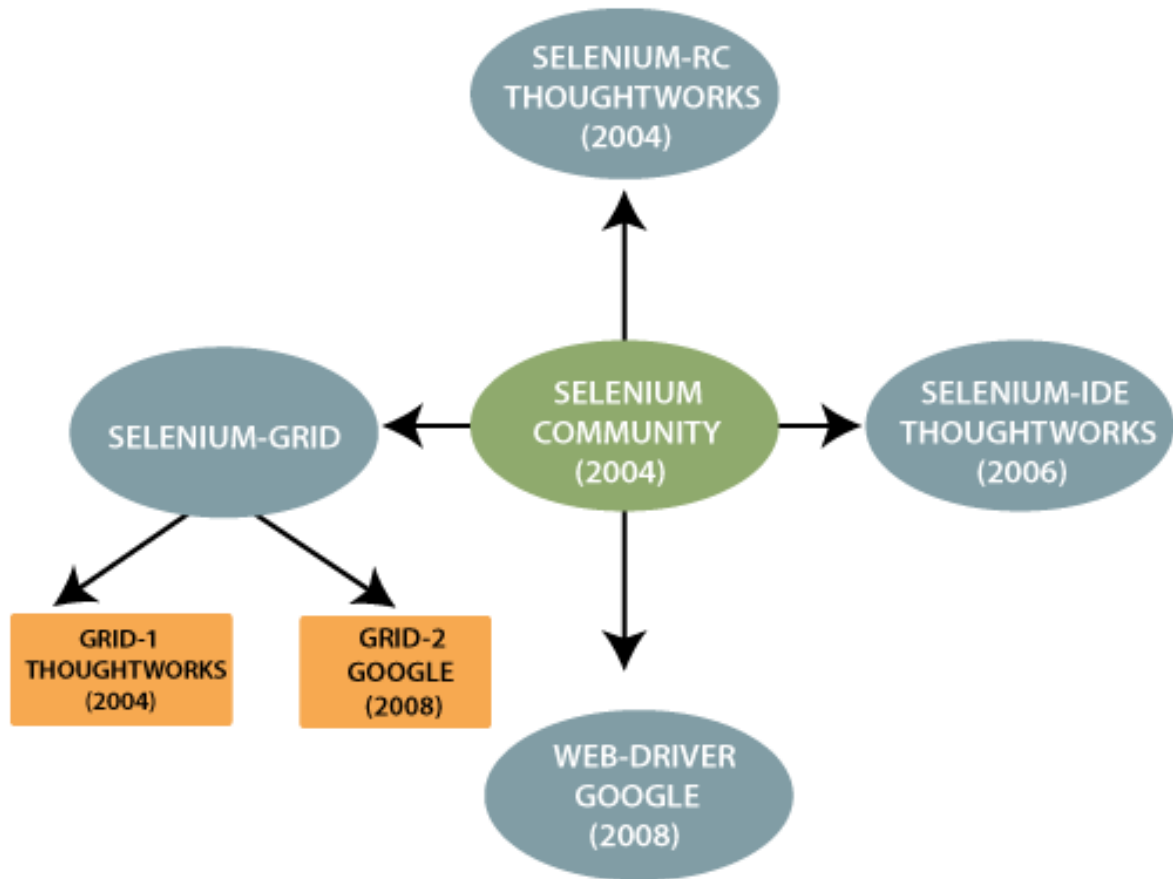| Features	QTP	IBM RFT	Selenium
License	Required	Required	Open Source
Cost	High	High	Less because it is open-source
Customer Support	Dedicated HP support	Dedicated IBM support	Open Source Community
Hardware resource consumption during script execution	High	High	Low
Coding experience	Not Much	Required	Should be very good along with technical capabilities of integrating the framework
Environment support	Only for Windows	Only for Windows	Windows, Linux, Solaris OS X (If browser & JVM or JavaScript support exists)
Language Support	VB Script	Java and C#	Java, C#, Ruby, Python, Perl, PHP, JavaScript

Some other testing suits

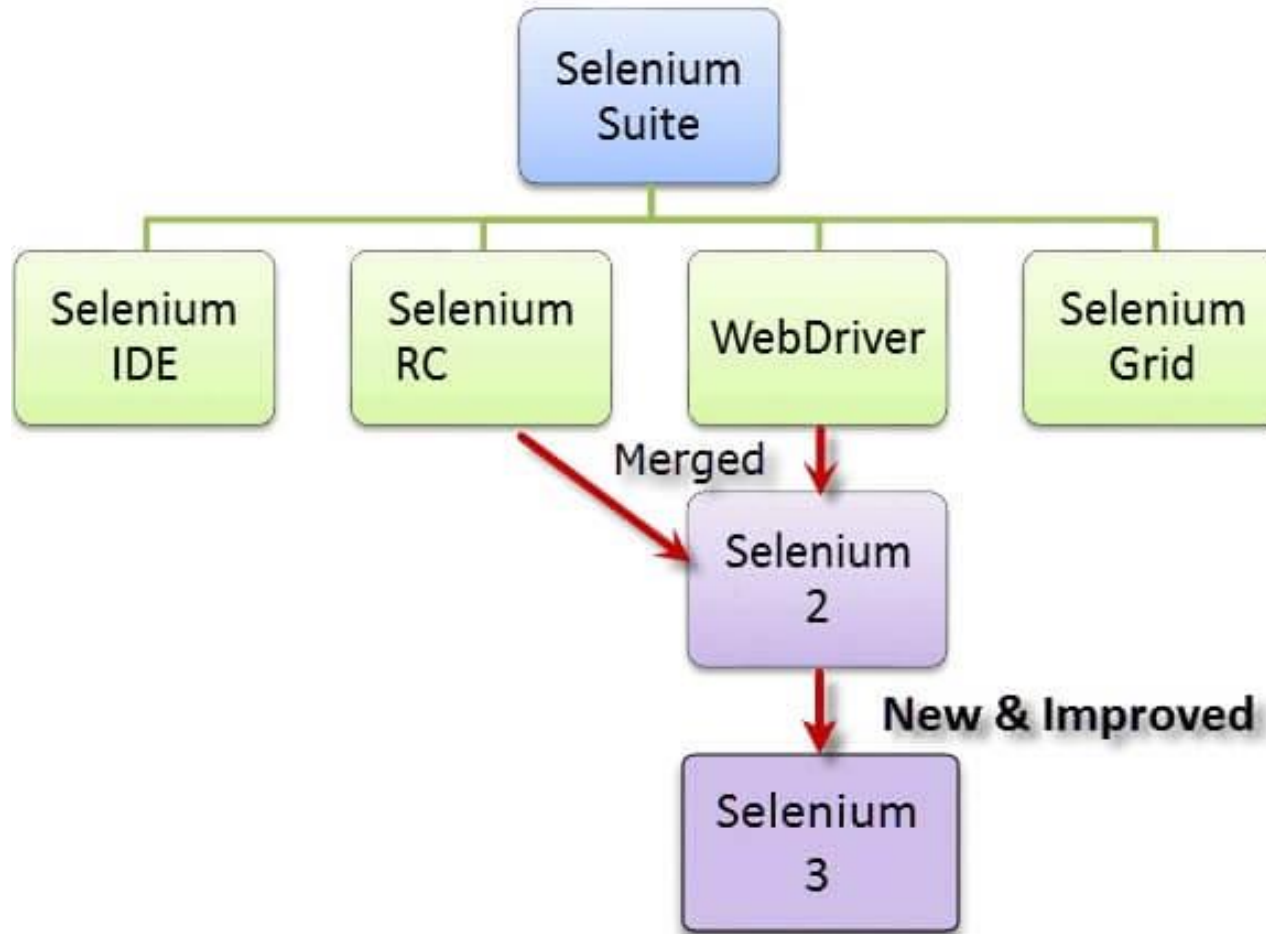| Product	Selenium	Katalon Studio	Unified Functional Testing	TestComplete	watir
Available since	2004	2015	1998	1999	2008
Application Under Test	Web apps	Web (UI & API), Mobile apps	Web (UI &API), Mobile, Desktop, Packaged apps	Web (UI &API), Mobile, Desktop apps	Web apps
Pricing	Free	Free	$$$$	$$	Free
Supported Platforms	Windows Linux OS X	Windows Linux OS X	Windows	Windows	Windows Linux OS X
Scripting languages	Java, C#, Perl, Python, JavaScript, Ruby, PHP	Java/Groovy	VBScript	JavaScript, Python, VBScript, JScript, Delphi, C++ and C#	Ruby
Programming skills	Advanced skills needed to integrate various tools	Not required. Recommended for advanced test scripts	Not required. Recommended for advanced test scripts	Not required. Recommended for advanced test scripts	Advanced skills needed to integrate various tools
Ease of Installation and Use	Require advanced skills to install and use	Easy to setup and use	Complex in installation. Need training to properly use the tool	Easy to setup. Need training to properly use the tool	Advanced skills needed to integrate various tools

Why Automated Web Browser Testing?

- (거의) 모든 app은 web 기반 service
- Server side program/service는 최종적으로 web browser가 UI
    - Server side program (PHP, Python, JSP 등등)의 unit test는 단순 테스트 -> 여러 모듈과의 integrated 테스트는 UI를 통한 테스트가 거의 유일한 방책이 자 반드시 거쳐야 하는 최종적인 integrated test
- Browser를 통한 automated testing 필요
- 왜 web app의 경우 automated testing이 가능하고 편리한가?
    - 클라이언트 사이드 (web browser) DOM (document object model, javascript) <- OO 기술의 기여
    - UI의 구조로부터 자연스럽게 POM (page object model) 도출 -> 테스트 시나 리오 구현 모듈로 제공 (webdriver)
        cf) Project Object Model (POM) of Maven tool
- DOM object locators

History of Selenium

SELENIUM-RC
THOUGHTWORKS
(2004)

SELENIUM
COMMUNITY
(2004)

SELENIUM-GRID

SELENIUM-IDE
THOUGHTWORKS
(2006)

GRID-1
THOUGHTWORKS
(2004)

GRID-2
GOOGLE
(2008)

WEB-DRIVER
GOOGLE
(2008)

Core Functional Testing

Business Process Testing

GUI Testing

E2E Testing

DB Testing

Cross Browser Testing

Usability Testing

Sanity Testing

Regression Testing

Selenium 4

Selenium 4   2021년 10월

Selenium 4

- W3C compliant
  - No more JSON wire protocol – direct comm. between selenium testing code and webdriver – faster comm.
- Relative Locators
- Better Window/Tab Management
- Improved Selenium Grid
- Upgraded Selenium IDE
- New APIs for Chrome DevTools Protocol
- 몇 가지 기능 지원 중단
- Action Class 수정

Selenium IDE

- 테스트 케이스를 생성하고 실행하는 firefox 용 pug-in으로 시작
- 브라우저 사용자의 모든 interaction을 기록하고 재생
  - Record/play tool
- Extension to many browsers
- https://www.selenium.dev/selenium-ide/
- https://microsoftedge.microsoft.com/addons/detail/selenium-ide/ajdpfmkffanmkhejnopjppegokpogffp
- https://chrome.google.com/webstore/detail/selenium-ide/mooikfkahbdckldjjndioackbalphokd

Selenium IDE : demo

- https://www.selenium.dev/selenium-ide/

1) Add selenium IDE extension to browser
2) Record a test case
3) Playback
4) Options
5) Command line runner