Enable Your Automated Web App Testing by WebDriver

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Agenda

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Background

- A web application is **any software that runs in a web browser**. It is created in a browser-supported programming language (such as the combination of JavaScript, HTML and CSS) and relies on a web browser to render the application.

- For a web runtime, **web application is a packaged app written in JavaScript, HTML, CSS and so on**.

- Crosswalk will be the default web runtime on Tizen.
Background

app.wgt

TV

IVI

Wearable

Mobile
Challenges

• Hard to apply image recognition or platform native UI automation solution to web application

• Multi-formity of web UI layout and elements requires a more convenient test design and development method

• Existing browser test automation techniques and tools have gap on support on web applications or web runtime
WebDriver

- [http://www.w3.org/TR/webdriver/](http://www.w3.org/TR/webdriver/): The WebDriver API is defined by a wire protocol and a set of interfaces to **discover and manipulate DOM elements on a page**, and to **control the behavior** of the containing browser from a **separate controlling process**

- Most popular instance of WebDriver specification is **selenium2.0**: Chrome, Firefox, IE, Opera, ......

- More and more framework involve WebDriver to implement Web UI automation, e.g. Watir WebDriver
WebDriver Support in Browsers

Selenium 2.0 WebDriver API Bindings

Local End

Remote End

Java
Python
Ruby
C#
Node.js

......

URL Navigation
Controlling Windows
Elements Handling
Screenshots
Executing Javascript
......

JSON over HTTP Wire Protocol

XDriver

JSON over HTTP

......

URL Navigation
Controlling Windows
Elements Handling
Screenshots
Executing Javascript
......
WebDriver Support in Web Runtime

Crosswalk on Android

Selenium 2.0 ⇄ Xwalkdriver ⇄ Crosswalk APP
Host PC

Crosswalk on Ubuntu

Selenium 2.0 ⇄ Xwalkdriver ⇄ Crosswalk APP
Host PC

Crosswalk on Tizen

Selenium 2.0 ⇄ Xwalkdriver ⇄ Crosswalk APP
Host PC

Tizen Device

Android Device

How to enable Crosswalk WebDriver on Tizen?
>> https://crosswalk-project.org/#wiki
BDD

Behavior-driven Development

• **An agile software development technique** that encourages **collaboration between developers, QA and non-technical or business participants** in a software project.

• Our solution implements **BDD principles** to allow users to use tests written in a **ubiquitous language style** to validate the web applications and web platform and offers a **convenient and efficient way to develop, manage, execute the test cases**, and easy to combine with **high level test framework**
BDD Based Test

**Feature:** Calculator Demo Test

**Scenario:** Check if $7 \times 8 = 56$?

When launch "calculator-test"

And I press "7"

And I press "*"

And I press "8"

And I press "="

Then I should see "56"
### Architecture

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<th>BDD Test Cases</th>
<th>“behave”</th>
<th>ATIP</th>
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#### Selenium 2.0

- **Crosswalk APPs On Tizen**
- **Crosswalk APPs on Android**
- **Browsers on multiple platform e.g. chrome/firefox**

#### XDriver

- Android Native APIs (e.g. UiAutomator)
- Tizen Native APIs

- Android APPs and System
- Tizen APPs and system

- **“behave”** — Use a open source Python based BDD instance as the default BDD tool for application test automation

- **“ATIP” (Application Test in Python)** — Develop a “behave” binding library as the bridge between application and “behave”, and use WebDriver to implement detailed BDD steps for web application
Example

BDD test cases *.feature file

Feature: Web Storage Test
Scenario: storage load page times
  When I go to "test.html"
  And I press "clear_button"
  And I reload
  Then I should see "viewed this page 1 time(s)."
  And I reload
  And I reload
  And I reload
  And I reload
  Then I should see "viewed this page 5 time(s)."

ATIP steps

@step(u'I go to "{url}"')
def i_visit_url(context, url):
    assert context.app.switch_url(url, True)

@step(u'I reload')
def reload(context):
    assert context.app.reload()

@step(u'I press "{key}"')
def i_press(context, key):
    assert context.app.press_element_by_key(key)

ATIP low level implementations

def switch_url(self, url, with_prefix=True):
    if with_prefix:
        url = urljoin(self.url_prefix, url)
    try:
        self.__driver.get(url)
    except Exception as e:
        print "Failed to visit %s: %s" % (url, e)
    return False

Selenium2.0 WebDriver APIs
WebDriver Based Behavior Driven Test

Feature: Calculator Demo Test
Scenario: Check if 7*8=56?
   When launch "calculator-test"
      And I press "seven"
      And I press "mult"
      And I press "eight"
      And I press "equals"
   Then I should see "56"
Summary

• Used by Crosswalk web tests automation and sample applications test automation: https://github.com/crosswalk-project/crosswalk-test-suite

• Easy to be extended to any web application, browsers, web runtime with WebDriver support.
Next Steps

- Support more pre-defined scenarios in ATIP
- Native and Hybrid application support in ATIP
- Multiple-application support in ATIP
- Support both BDD steps and Python APIs
- Adapt to W3C WebDriver specification update
Reference

- https://github.com/crosswalk-project/crosswalk-test-suite/wiki/WebDriver-Based-Behavior-Driven-Test
- https://github.com/crosswalk-project/crosswalk-test-suite
- http://docs.seleniumhq.org/projects/
- http://pythonhosted.org/behave/