RichFaces – Testing on Mobile Devices

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Why Are We Doing This?

- canalys.com

487.7 mil

414.6 mil
Testing a Java Web Application

1. Build archive
2. Start a container
3. Deploy archive
4. Open web browser
5. Run tests (continuously)
6. Review test results
RichRates

- github.com/qa/richrates
- richrates-ppitonak.rhcloud.com
# Daily Exchange Rates

These reference exchange rates are being published by European Central Bank, usually at 14:15 CET on days when the payment system TARGET is open.

**Date:** Mar 3, 2010

**Wednesday, March 3, 2010**

<table>
<thead>
<tr>
<th>Currency</th>
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<th>Exchange Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNY</td>
<td>Chinese Yuan Renminbi</td>
<td>8.3111</td>
</tr>
<tr>
<td>JPY</td>
<td>Japan Yen</td>
<td>121.1</td>
</tr>
<tr>
<td>LVL</td>
<td>Latvian Lats</td>
<td>0.7993</td>
</tr>
<tr>
<td>CZK</td>
<td>Czech Koruna</td>
<td>25.765</td>
</tr>
<tr>
<td>RON</td>
<td>Romanian Lei</td>
<td>4.1905</td>
</tr>
<tr>
<td>MXN</td>
<td>Mexican Peso</td>
<td>17.3653</td>
</tr>
<tr>
<td>CAD</td>
<td>Canadian Dollar</td>
<td>1.4997</td>
</tr>
<tr>
<td>ZAR</td>
<td>South African Rand</td>
<td>10.2804</td>
</tr>
<tr>
<td>AUD</td>
<td>Australian Dollar</td>
<td>1.5116</td>
</tr>
<tr>
<td>NZD</td>
<td>New Zealand Dollar</td>
<td>1.9767</td>
</tr>
<tr>
<td>GBP</td>
<td>British Pound</td>
<td>0.9857</td>
</tr>
<tr>
<td>NOK</td>
<td>Norwegian Kroner</td>
<td>8.0745</td>
</tr>
</tbody>
</table>

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<td>2.2552</td>
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<tr>
<td>Canadian Dollar (CAD)</td>
<td>1.3026</td>
</tr>
<tr>
<td>Swiss Franc (CHF)</td>
<td>1.2072</td>
</tr>
</tbody>
</table>
richrates-ppitonak.rhcloud.com
Project Structure

• Standard Maven structure
• testng.xml
• testng-ftest.xml
• testng-all.xml
Running Unit Tests

mvn clean package

testng.xml
Running Functional Tests

mvn clean package -P jbossas-managed-71,ftest

testng-ftest.xml
Running All Tests

mvn clean package -P jbossas-managed-71,all-tests
testng-all.xml
Sample Unit Test

public class UAgentInfoTest {
    @Test
    public void testIPad() {
        Assert.assertTrue(...);
    }
}

Sample Arquillian Test

```java
public class SkinBeanTest extends Arquillian {

    @Inject private SkinBean skinBean;

    @Deployment
    public static JavaArchive createTestArchive() {
        return ...;
    }

    @Test
    public void testDefaultSkin() {
        Assert.assertEquals(skinBean.getSkin(), "blueSky");
    }
}
```
Sample WebDriver Test

public class SampleTest extends Arquillian {
    @Drone public WebDriver driver;
    @ArquillianResource private URL deployedRoot;
    @Deployment
    public static WebArchive createTestArchive() {
        return ...;
    }
    @Test
    public void testDefaultSkin() {
        driver.get("http://devconf.cz");
        ...
    }
}
Deployment

```java
@Deployment(testable = false)
public static WebArchive createTestArchive() {
    WebArchive war = ShrinkWrap.createFromZipFile(WebArchive.class, new File("target/richrates.war"));
}
```

... or construct the WAR yourself :)

Deployment

@Deployment(testable = false)
public static WebArchive createTestArchive() {
    WebArchive war =
    ShrinkWrap.createFromZipFile(WebArchive.class, new File("target/richrates.war"));
}

... or construct the WAR yourself :)
Deployment 2

```java
@Deployment(testable = false)
public static WebArchive createTestArchive() {
    MavenDependencyResolver resolver = DependencyResolvers.use(MavenDependencyResolver.class).loadMetadataFromPom("pom.xml");
    WebArchive war = ShrinkWrap.create(WebArchive.class, "richrates.war");
    war.addPackage("org.richfaces.examples.richrates");
    war.addPackage("org.richfaces.examples.richrates.annotation");
    war.addPackages(true, "org.slf4j");
    war.merge(ShrinkWrap.create(ExplodedImporter.class, "tmp1.war").importDirectory("src/main/webapp").as(WebArchive.class));
    war.merge(ShrinkWrap.create(ExplodedImporter.class, "tmp2.war").importDirectory("src/main/resources").as(WebArchive.class), "WEB-INF/classes");
    war.addAsLibraries(resolver.artifact("org.richfaces.ui:richfaces-components-ui").resolveAsFiles());
    war.addAsLibraries(resolver.artifact("org.richfaces.core:richfaces-core-impl").resolveAsFiles());
    war.addAsLibraries(resolver.artifact("org.jdom:jdom").resolveAsFiles());
    war.addAsLibraries(resolver.artifact("joda-time:joda-time").resolveAsFiles());
    return war;
}
```
Arquillian.xml

<extension qualifier="webdriver">  
  <property name="implementationClass">org.openqa.selenium.firefox.FirefoxDriver</property>  
</extension>  

-Darquillian.browser.implmentation.class=...
Arquillian.xml

- Define your containers
- Maven profiles
Sample WebDriver Test

```java
public class SampleTest extends Arquillian {
    @Drone public WebDriver driver;
    @ArquillianResource private URL deployedRoot;
    @Deployment
    public static WebArchive createTestArchive() {
        return ...;
    }
    @Test
    public void testDefaultSkin() {
        driver.get("http://devconf.cz");
        ...
    }
}
```
Page Factory

```java
@Test
public void googleSearchTest {
    WebDriver driver = ...
    driver.get("http://www.google.com/");
    GoogleSearchPage page = PageFactory.initElements(driver,GoogleSearchPage.class);
    page.searchFor("Cheese");
}
```
Page Factory
public class CalculatorPage extends AbstractPage {
    @FindBy(id = "calculator:amount")
    private WebElement amountInput;
    @FindBy(xpath = "//div[contains(@class, 'result')]")
    private WebElement resultOutput;
    @FindBy(id = "calculator:calculateButton")
    private WebElement submitButton;
    ...
}
Mobile Web Testing

- Almost no changes in Arquillian config

- Android 1.x not supported
- Android 2.x – phones
- Android 3.x – tablets
- Android 4.x – phones and tablets

- Physical device vs. emulator
Physical Devices

- Windows – install USB drivers
- Linux – set up udev
- Mac OS X – no setup needed
Android Emulator

- Part of Android Software Development Kit
- Android 1.5 – 4.0.3

- `<sdk_path>/tools/android`
- Eclipse plugins
Emulators

- 2.2
  - Relatively fast
  - Works with selenium-server 2.6
- 2.3
  - Unreliable
- 3.x
  - Slow
- 4.x
  - Relatively fast
  - Works well with newest Selenium
Demo

Creating and launching a new emulator
Android-x86 Project

- www.android-x86.org
- Project porting Android to x86 platform
Demo

Launching Android in VirtualBox
AndroidDriver Config

<extension qualifier="webdriver">

<property name="implementationClass">
org.openqa.selenium.android.AndroidDriver
</property>

<property name="remoteAddress">
http://localhost:4444/wd/hub
</property>

</extension>
Emulator Configuration

- Install android-server.apk
- Launch WebDriver application in emulator
- platform-tools/adb forward tcp:4444 tcp:8080
- Use 10.0.2.2 for host's localhost
VirtualBox Configuration

- Set up network
- `platform-tools/adb connect <android_ip>`
- Install `android-server.apk`
- Launch WebDriver application in emulator
- `platform-tools/adb forward tcp:4444 tcp:8080`
- Tests need server IP address
Demo

Tests running with Firefox, Android emulator and Android-x86
Fast, Faster, Fastest

![Bar chart showing 4 tests execution time (s) for Firefox, Emulator, and Android x86. Firefox has a time of 33 seconds, Emulator has 67 seconds, and Android x86 has 36 seconds.](image)
Eclipse

- Plugins
  - Android
  - JBoss Tools
  - m2e
  - TestNG

- Supports both emulator and Android-x86
Demo

Running tests in Eclipse
Debugging

• You already know how :)
Demo

Debugging
Arquillian Android Extension

- github.com/kpiwko/arquillian-extension-android
- Hot news!

- Create emulator
- Start emulator
- Install Android server
- Start Android server
- Can connect to real device
Console Logging Listener

- Usual console log:
Console Logging Listener

- Our console log:


Console Logging Listener

- Register in pom.xml or in test class

```java
@Listeners(ConsoleStatusTestLister.class)
public abstract class AbstractWebDriverTest<P extends Page> extends Arquillian {
    ...
}
```
Screenshot on Failure

```java
@AfterMethod(alwaysRun = true, groups = "arquillian")
public void handleTestError(ITestResult result) {
    if (result.getStatus() == ITestResult.SUCCESS) {
        return;
    }
}
...

File scrFile = ((TakesScreenshot) driver).getScreenshotAs(OutputType.FILE);
    FileUtils.copyFile(scrFile, imageOutputFile);
}
```
Jenkins Android Plugin

- Run an Android emulator during build
  - Run existing emulator
  - Run emulator with properties
    - Android OS version: 2.1
    - Screen density: 160
    - Screen resolution: HVGA
    - Device locale: en_GB
      - en_AU
      - en_CA
      - en_GB
      - en_NZ
      - en_SG
      - en_US
Jenkins Android Plugin

- Run an Android emulator during build
  - Run existing emulator
    - AVD name: `emu_1.6_small`
    - Enter the name of an existing Android emulator configuration
  - Run emulator with properties
Mobile Browser Simulator

- JBoss Tools 3.3 M5
- Simulates mobile phones and tablets
- Perfect for layout testing
- Not for automation
Mobile Browser Simulator

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Conclusion

- Arquillian + Selenium 2
- Run from console and Eclipse
- How to create Android emulator
- Android-x86
- Emulator snapshots
- ID locators, Xpath locators, CSS locators
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jboss.org/richfaces

Q/A