



ADVANCED
INFORMATION
SYSTEMS

e-Business
Section

Automated Smoke Testing on the JVM with Geb

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1st Developers@CERN Forum

Agenda

*Functional
Web Testing*



Geb



*Integration
with CI Tools*



Smoke Testing
EDH with Geb

Agenda

**Functional
Web Testing**



Geb



*Integration
with CI Tools*



Smoke Testing
EDH with Geb

Functional Testing

- Type of **black-box** testing
 - Ignores the specifics of the underlying software component under test
- Asserts that providing certain inputs results in certain outputs
- Contrasts with white-box testing (e.g. unit testing)

Functional Web Testing

- When developing for the web, **unit testing only goes so far**
 - Unable to test for JavaScript errors in a particular version of a particular browser
 - Unable to identify client-side regressions
 - Unable to test breaking changes in a REST API consumed on the client-side

Functional Web Testing

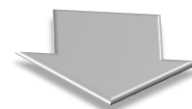
- Functional web test usually means **programmatically controlling** a web **browser** to simulate the **actions** of a user on a web page
- All application layers are tested at the same time
- Language agnostic

Agenda

*Functional
Web Testing*



Geb



*Integration
with CI Tools*

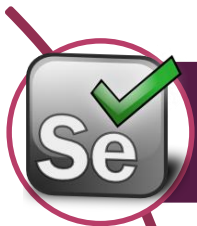


Smoke Testing
EDH with Geb

What is Geb?

- **Browser automation solution**
- Written in Groovy
- Uses
 - Functional/Web/Acceptance **Testing**
 - Scripting
 - Screen scraping
- Current version is 0.12.2
 - But just like winter, version 1.0 is coming!

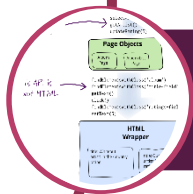
What's so great about Geb?



Power of **Selenium WebDriver**



Elegance of **jQuery**



Robustness of **Page Object** modelling



Expressiveness of **Groovy**


Power of elenium WebDriver

- Code -> Driving -> Browser
- De-facto **standard** in the test automation world
- **Cross-browser** support



WebDriver Example

```
public class Example {  
    public static void main(String[] args) {  
        WebDriver driver = new FirefoxDriver();  
        // Go to Google  
        driver.get("http://www.google.com");  
  
        // Find the text input element by its name  
        WebElement element = driver.findElement(By.name("q"));  
  
        // Enter something to search for  
        element.sendKeys("CERN");  
  
        // Now submit the form.  
        element.submit();  
  
        // Check the title of the page  
        System.out.println("Page title is: " + driver.getTitle());  
  
        driver.quit();  
    }  
}
```



WebDriver Example Async

```
public class Example {
    public static void main(String[] args) {
        WebDriver driver = new FirefoxDriver();

        driver.get("http://www.google.com");

        WebElement element = driver.findElement(By.name("q"));

        element.sendKeys("CERN");

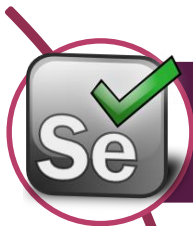
        element.submit();

        // Poll until async request is complete
        (new WebDriverWait(driver, 10)).until(new ExpectedCondition<Boolean>()) {
            public Boolean apply(WebDriver d) {
                return d.getTitle().toLowerCase().startsWith("CERN");
            }
        });

        System.out.println("Page title is: " + driver.getTitle());

        driver.quit();
    }
}
```

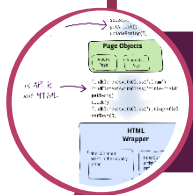
What's so great about Geb?



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Elegance of **jQuery**



Robustness of **Page Object** modelling



Expressiveness of **Groovy**



Geb Example



```
Browser.drive("http://www.google.com") {  
  def element = $("input", name: "q")  
  element << "CERN"  
  element << Keys.ENTER  
  
  waitFor { title.startsWith("CERN") }  
  
  def firstResultLink = $("li.g", 0).find("a.1")  
  assert firstResultLink.text() == "CERN | Accelerating science"  
}
```

*With less code, comes less
responsability.*

Functional Testing with Geb

- Integration with tests frameworks
 - JUnit
 - **Spock**
 - TestNG

Web Testing CERN SSO Login

CERN Single Sign-On

Sign in with a CERN account, a Federation account or a public service account

Sign in with your CERN account

Reminder: you have agreed to comply with the [CERN computing rules](#)


Use credentials

Username or Email address	Password	Sign in
<input type="text" value="asfas"/>	<input type="password"/>	

☐ Remember Username or Email Address [Need password help ?](#)


Invalid Username or Password.

Use one-click authentication



[Sign in using your current Windows/Kerberos credentials \[autologon\]](#)

Use your current authentication token. You need Internet Explorer on CERN Windows or Firefox on SLC (Firefox help here).




[Sign in using your Certificate \[autologon\]](#)

Use a EuGridPMA trusted certificate. Don't forget to first map your Certificate to your CERN Account.

Use strong two factor authentication [\[show\]](#)


Sign in with a public service account



[Facebook, Google, Live, etc.](#)

Authenticate using an external account provider such as Facebook, Google, Live, Yahoo, Orange.

Sign in with your organization or institution account

Go

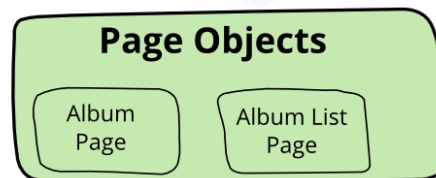
CERN SSO Login Spec

```
class CernSsoLoginSpec extends GebSpec {  
  def "should redisplay form with an error when password is bad"() {  
    when:  
      go "https://login.cern.ch"  
  
    then:  
      $("#site-name").text() == "CERN Single Sign-On"  
  
    when:  
      $("#txtFormsLogin").value("username")  
      $("#txtFormsPassword").value("badpassword")  
      $("#btnFormsLogin").click()  
  
    then:  
      $("#site-name").text() == "CERN Single Sign-On"  
      $("#lblFormsError").text() == "Invalid username or password"  
  }  
}
```

Page Object Pattern

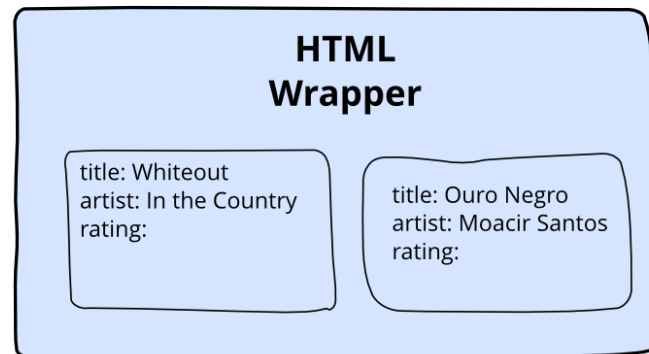
this API is about
the application

`selectAlbumWithTitle()`
`getArtist()`
`updateRating(5)`



this API is
about HTML

`findElementsWithClass('album')`
`findElementsWithClass('title-field')`
`getText()`
`click()`
`findElementsWithClass('ratings-field')`
`setText(5)`



<http://martinfowler.com/bliki/PageObject.html>

LoginPage

```
class LoginPage extends Page {  
  
    static url = "https://login.cern.ch"  
  
    static at = { $("#site-name").text() == "CERN Single Sign-On" }  
  
    static content = {  
        username { $("#txtFormsLogin") }  
        password { $("#txtFormsPassword") }  
        signIn { $("#btnFormsLogin") }  
        errorMessage { $("#lblFormsError") }  
    }  
  
    private login(usr, pwd) {  
        username = usr  
        password = pwd  
        signIn.click()  
    }  
}
```

Login Spec with Page Objects

```
class CernSsoLoginSpec extends GebSpec {  
  def "should redisplay form with an error when password is bad"() {  
    when:  
    to LoginPage  
  
    when:  
    login("username", "badpassword")  
  
    then:  
    at LoginPage  
    errorMessage == "Invalid username or password"  
  }  
}
```

Agenda

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Geb

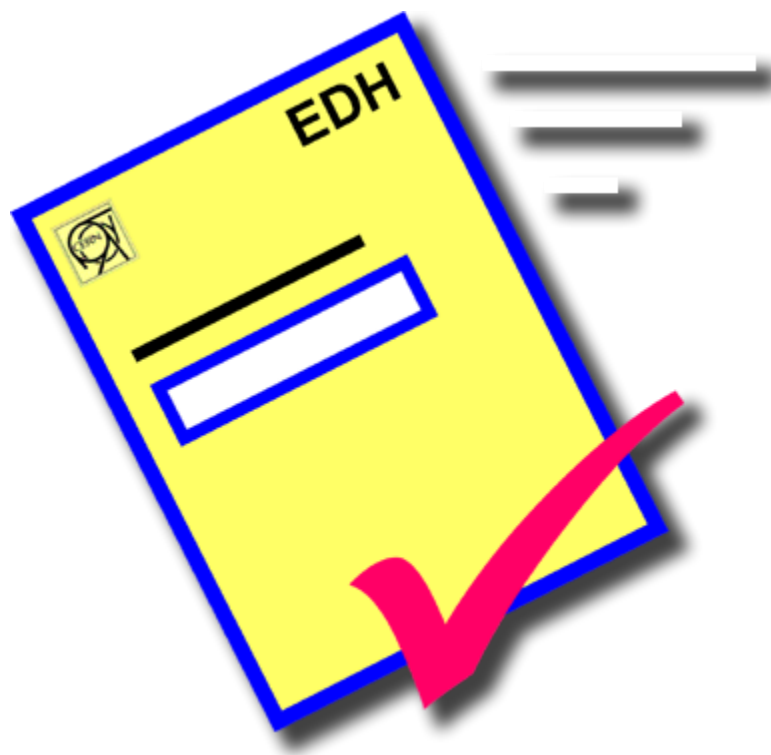


*Integration
with CI Tools*



**Smoke Testing
EDH with Geb**

Electronic Document Handling



Electronic Document Handling

- Over **60** official procedures
 - Safety, procurement, finance, HR, etc.
- Over **360k** documents per year
- Over **750k** electronic signatures
- Developed in-house (**1992**), Web (**1998**)
- Over **1 million** lines of Java code

Smoke Testing



EDH has experienced a technical problem

You may have lost data since your last save!

- Try pressing **refresh** on your browser
- If the problem persists, please fill in a request [here](#)

Error Details (You can include these details with inquiries to our support team, they may aid us in answering you)

```
EXCEPTION: java.rmi.RemoteException: Cannot forward to JSP; nested exception is:
            javax.servlet.ServletException: cern.base.ObjectNotFoundException: Person not found
for id:697029 with validity date: 2014-10-22 16:12:20.0
HOST: edh.cern.ch
TIME: 29.9.2015 - 9:54:55
```

Smoke Testing EDH (1/3)

- Integration with CERN Single Sign-On

```
class EdhBaseSpec extends GebReportingSpec
{
  def "should be redirected to login page and then brought back"() {
    when: "I access EDH Desktop for the first time"
    via DesktopPage

    then: "I'm redirected to CERN SSO-Login"
    at LoginPage

    then: "I login with a service account"
    login()

    then: "I'm redirected back to EDH"
    at DesktopPage
  }
}
```

Smoke Testing EDH (2/3)

- Assert that every link/document on EDH Desktop can be opened

CERN Home > GS Department

Welcome Joao Pedro CARLOS GOMES DA SILVA

EDH

Home | Tasks | Search | News | Settings | Whats New | Statistics | About | Help | Logout

You have 1 doc to sign

Absences	Administration	Claims	HR & Training
<ul style="list-style-type: none"> • Absence Cancellation • Absence Overview • Absence Request • Absence Transactions • List of Absences • Overtime Request • Overtime Summary • Participation in Saved Leave Scheme • Personal Schedule 	<ul style="list-style-type: none"> • EDH Admin • Home Leave Selector • Leave Admin • Management of Intersection Codes • Reroute Document 	<ul style="list-style-type: none"> • Candidate Claim • Home Leave (All) • Installation • Language Fees Claim • Official Travel • Request For External Funds (RFF) • School Fees • Students Claim • Subsistence • Sundry Expenditure • Third Party Payment 	<ul style="list-style-type: none"> • Appraisal Report (MARS) • CHIS Declaration of Health Insurance Situation Spouse/Partner • Change of Family And Personal Situation • Declaration of Situation of Dependent Children • Declaration of situation of dependent children Overview • Emergency Contacts • External Training Request • Induction Interview (Fellows) • Induction Interview (Staff) • Local Address Change • MARS Overview • Mid/End Probation Summary • PAF Summary • Request for Opening a Staff Post • Staff Selection Memo • Termination Sheet • Termination Sheet Overview • Training Catalogue • Users' Check List

Logistics	Other Services	Purchasing	Safety
<ul style="list-style-type: none"> • Accelerator Material Storage • Repair of standard equipment • Shipping Request (Arrival) • Shipping Request (Expedition) • Transport Request (CERN Site) 	<ul style="list-style-type: none"> • Access Request • Car Driving Authorisation • Epool Catalogue • Epool Rental Request • GSM Subscription Request / Modification • Knowledge Transfer contract (pilot version) • Mission Order / Authorisation of Journey CERN-Place of Residence • Phone Request • Submission and Approval of EU Projects 	<ul style="list-style-type: none"> • Catalogue - Bossard • Catalogue - CERN Stores • Catalogue - Distrelec • Catalogue - Famell • Catalogue - Lyreco • Catalogue - Radiospares • Catalogue - SFS • DAI Pool Overview • Demand for Temporary Labour (DTEMP) • Departmental Request (DR) • Electronic Invoice 	<ul style="list-style-type: none"> • ADI summary (pilot for hardware commissioning) • AOC Overview • AOC Task Overview • Declaration of Occupational Accident • Disable/Enable Alarm (IS37) • Fire Permit • IS37 Overview • Identification of Occupational Hazards (OHS) • Internal Accident Report • Work Request (AOC/IS39)

Smoke Testing EDH (3/3)

- Assert that random documents can be opened

Stored Searches Store Report Hide Form Reset Form

Search Details

Type:
Status:
Code(s):
Amount:
Output format:

All

Please type to narrow search...

All

ADI - Notice of Intervention

AET - Avis d'Execution de Travaux

Absence Request

Accelerator Material Storage

Access Request

All claims

Agenda

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**Integration
with CI Tools**



Smoke Testing
EDH with Geb

Geb and CI Tools

- Geb produces JUnit tests results in XML format
 - Easy to integrate with most CI Tools

JUnit Parser configuration

Task description

☐ Disable this task

Specify custom results directories

Where does the build place generated test results?

this is a comma separated list of test result directories. You can also use Ant style patterns such as `*/test-reports/*.xml`

► **Advanced options**

Save

Cancel

Running Geb on a CI Server

- **Problem**

- CI servers are headless
- There is no display output for the browser to launch in

- **Solution**

- Headless browser (e.g. PhantomJS)
- Virtual framebuffers (e.g. Xvfb)
 - Launch the browser virtually
 - Emulate a graphical display

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Thank you.

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