SELENIUM
THE CURE FOR MERCURY POISONING

MICHAEL PALOTAS – HEAD OF QUALITY ENGINEERING EUROPE

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EBAY INC. FACTS

- Founded in 1995
- Based in San Jose, California
- 28000 employees worldwide
- >100 million active buyers and sellers worldwide
- 68 Billion USD transaction volume in 2011
- 2000 USD transaction volume every second
- >100 million downloads of eBay Inc's mobile apps
- Mobile transaction volume will double in 2012 to 10 billion USD
- 1.7 million items listed via mobile apps every week
- >10 Petabytes of data in Hadoop and Teradata clusters
- 2 billion page views every day
- 75 billion database calls every day

- Every 30 seconds, a woman's handbag is purchased on eBay Mobile.
- Every 2 minutes, a tablet is bought through eBay Mobile
- Every week, more than 8,000 cars and 340,000 car parts are sold through eBay's mobile apps.
- 7,493 tablets sold weekly from April – June;
  enough to cover the surface of 3 Olympic-sized pools.

WHO AM I?

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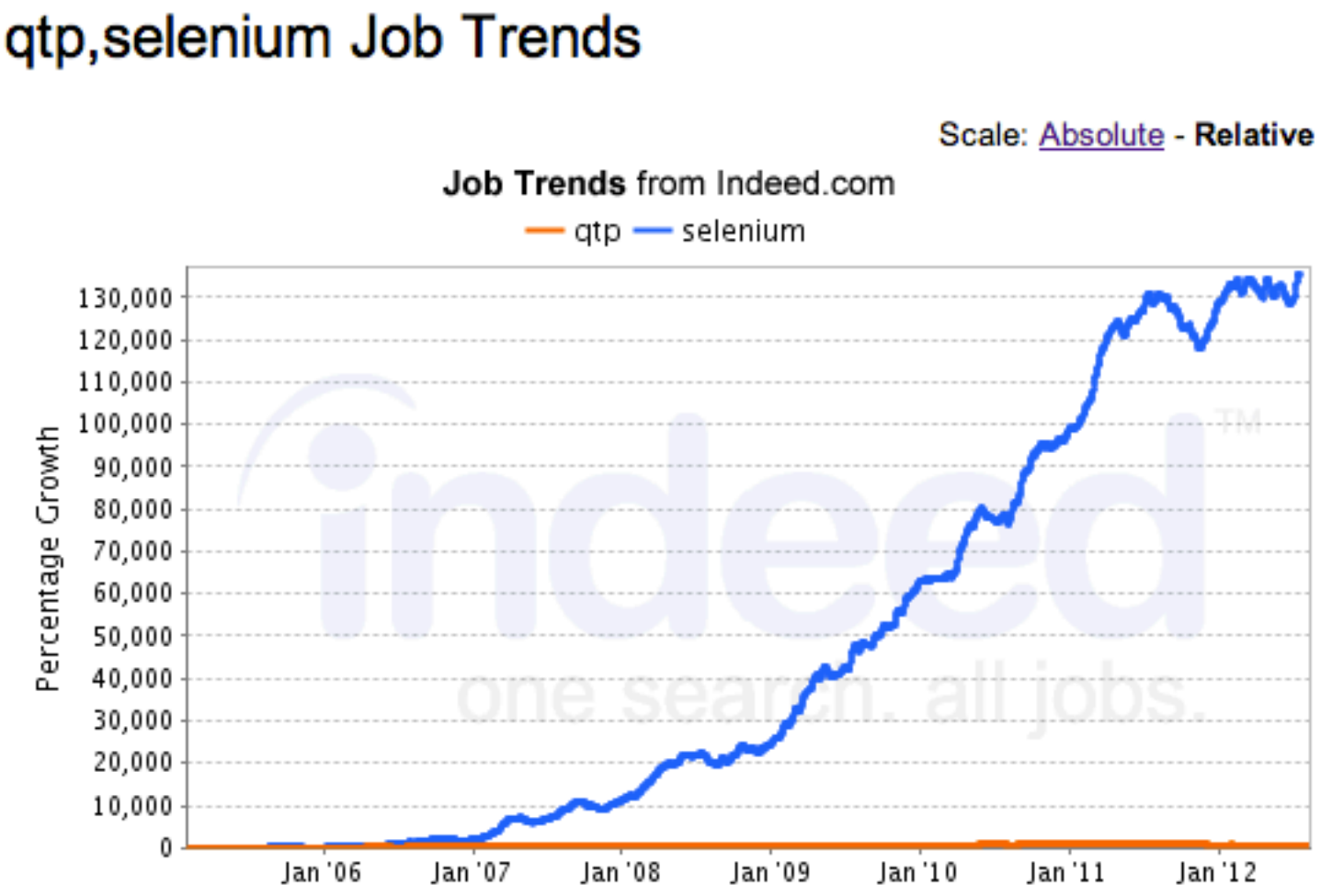
Selenium was so named because Huggins, dissatisfied with testing tools on the market, was seeking a name that would position the product as an alternative to Mercury Interactive QuickTest Professional commercial testing software. The name, Selenium, was selected because selenium mineral supplements serve as a cure for mercury poisoning, Huggins explained.

http://news.techworld.com/applications/3272444/open-source-selenium-web-app-test-suite-to-support-iphone-and-android/

SELENIUM VS. QTP JOB TRENDS



AUTOMATION IS GOOD…BUT

- Tools help, but tools don't test
- Manual testing is equally important
- Manual (exploratory) and automated testing complement each other

TEST AUTOMATION – WHY?

- NOT to replace people
- To save time and to reinvest that time into manual testing
- To get early and instant feedback
- Regression testing only
- Safety net

SELENIUM

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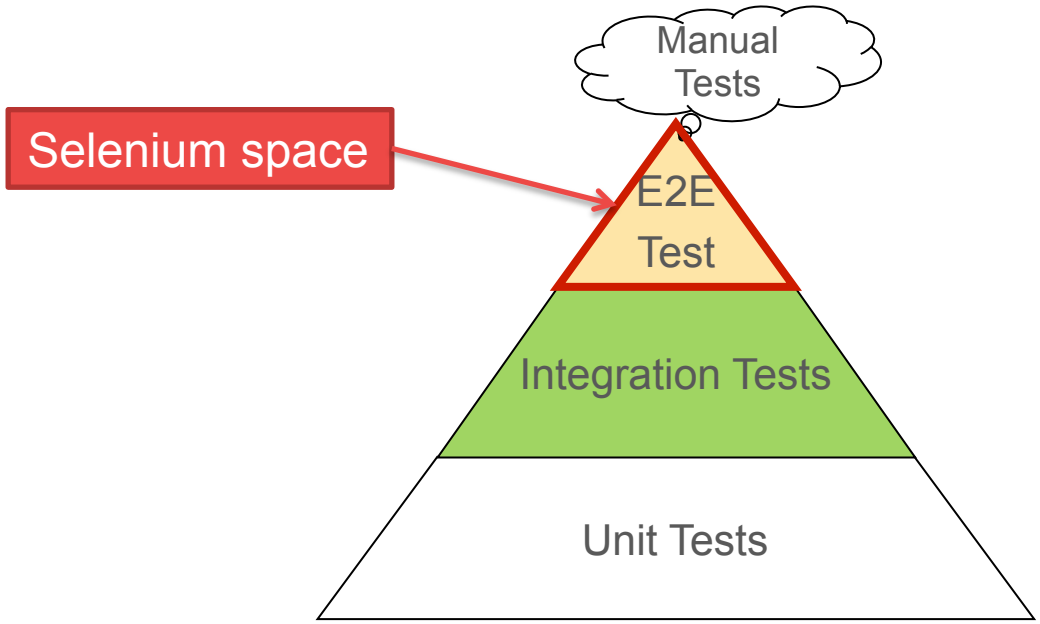
WHAT IS SELENIUM?

Selenium automates browsers…that's it

Selenium is becoming a W3C standard: http://www.w3.org/TR/webdriver

WHAT DO WE DO WITH SELENIUM?

End to End functional test automation



A LITTLE SELENIUM HISTORY AT EBAY

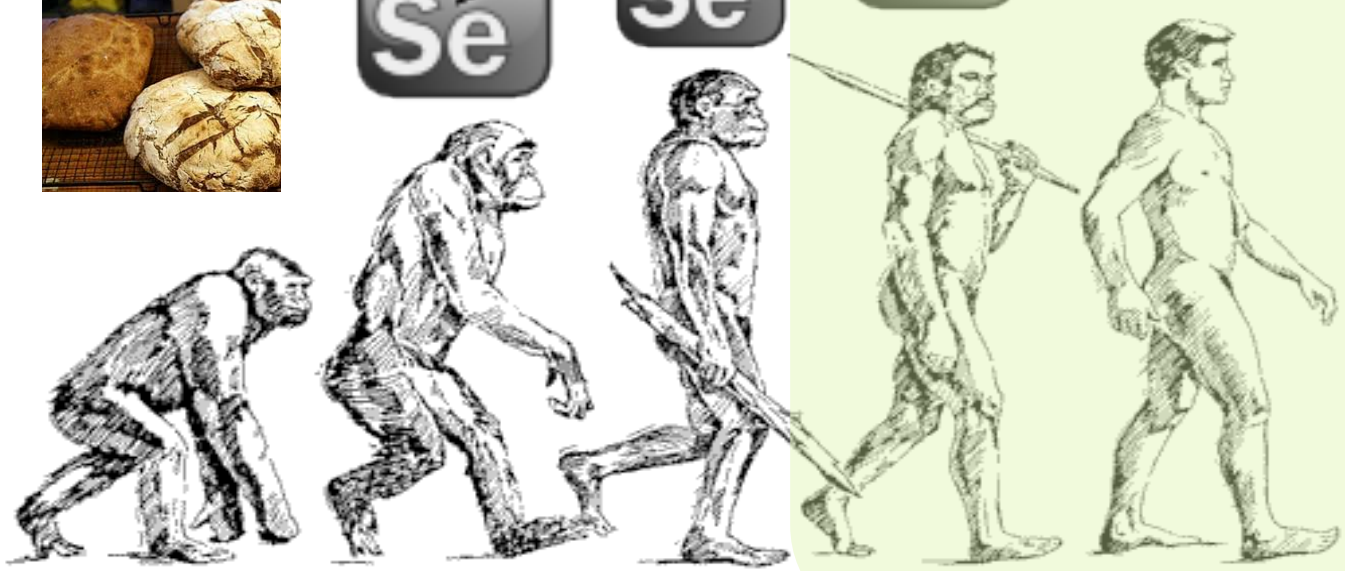
Home baked solution

Selenium IDE

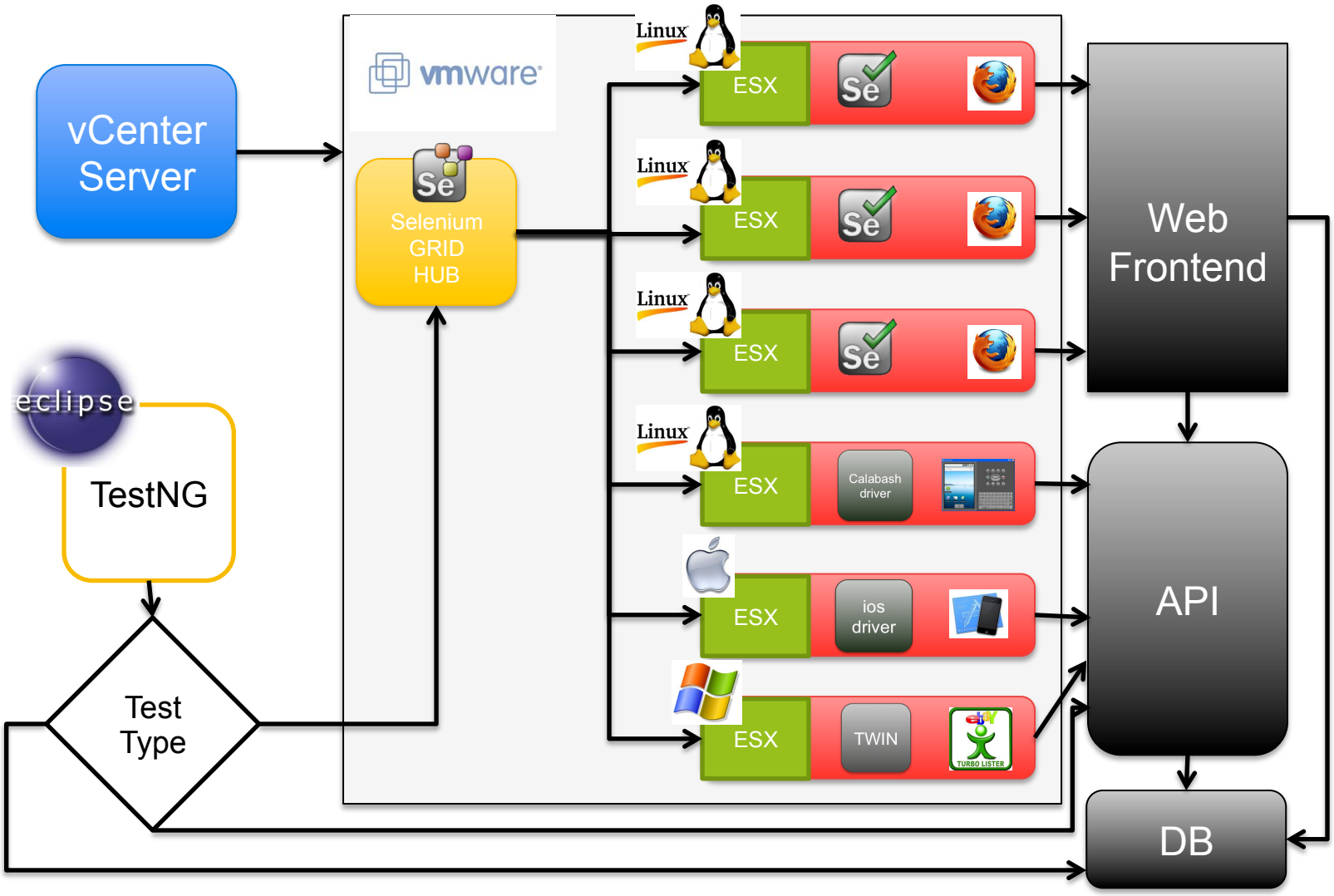
Selenium RC

Selenium2 / Webdriver

Selenium GRID

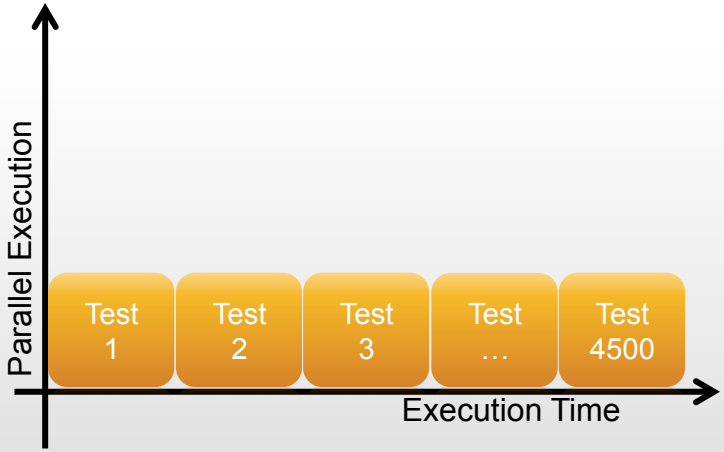


HIGH LEVEL INFRASTRUCTURE



SELENIUM GRID

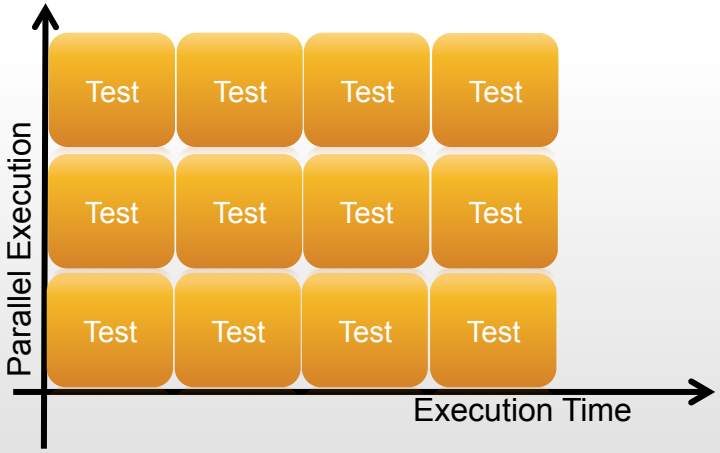
Sequential Execution



Execution time:
7000 minutes (~116 hours = ~5 days)

- 4500 end-to-end regression test cases
- 2-3 minutes execution time for each test

Parallel Execution



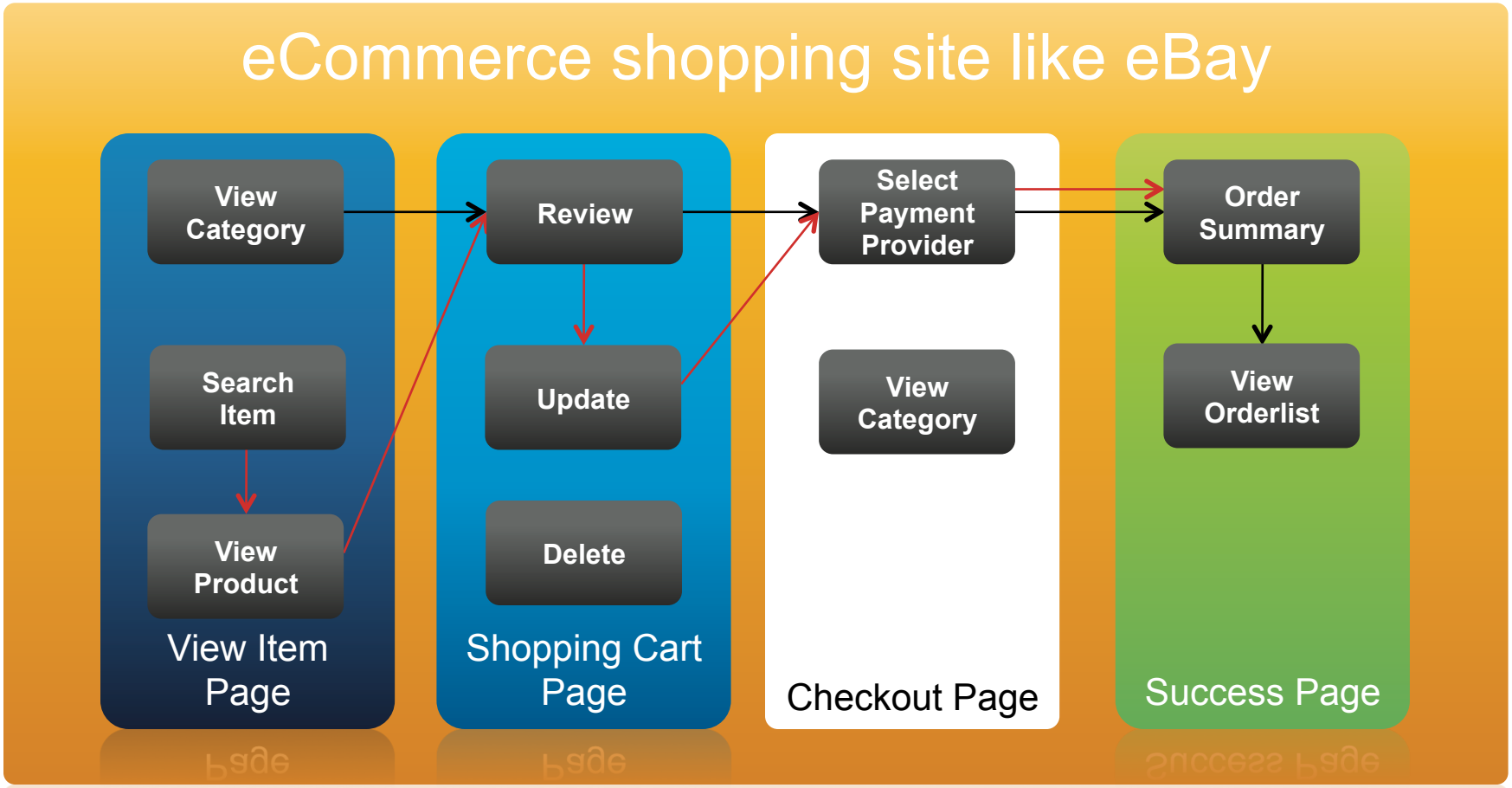
Execution time:
60 minutes

by using 150 Virtual Machines / Browsers using the Selenium GRID

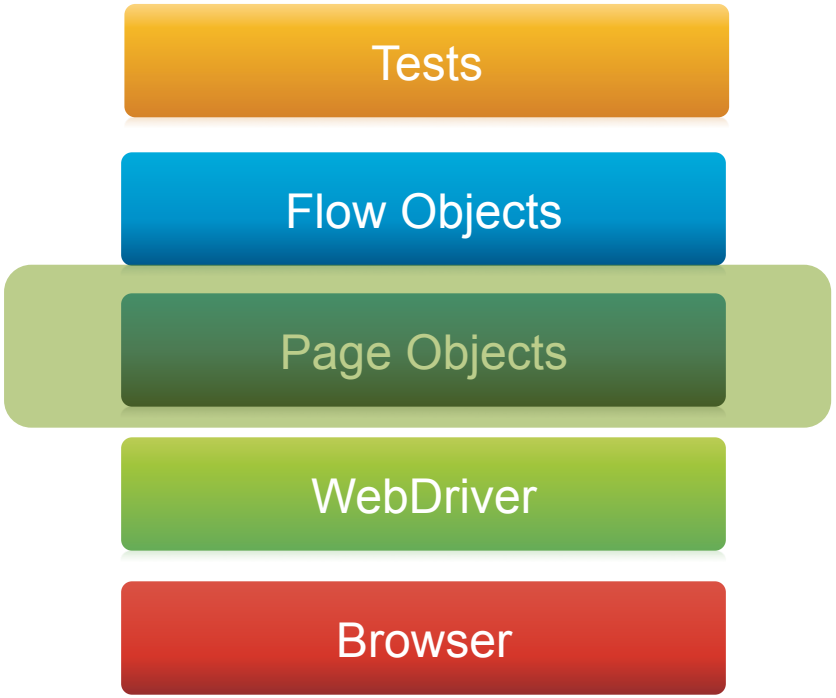
TestNG

- Data Provider
- Dependency management
- Groups
- Listeners + Reports

PAGES AND FLOWS



HIGH LEVEL TEST ARCHITECTURE



PAGE OBJECTS

- http://code.google.com/p/selenium/wiki/PageObjects
- Page objects model the pages and page interactions
- Reduce code duplication
- Reduce maintenance
- Easy international support
- Public methods represent the service of a page
- Can be a subsection of a page
- Don’t make assertions in page objects

PAGE OBJECT EXAMPLE

```
public class AboutYourselfSection {

        protected Site s;
        @FindBy(id = "firstname")
        protected WebElement firstName;
        @FindBy(id = "lastname")
        protected WebElement lastName;
        @FindBy(id = "address1")
        protected WebElement addressLine1;
        @FindBy(id = "address2")
        protected WebElement addressLine2;
        @FindBy(id = "city")
        protected WebElement city;

        @FindBy(id = "mlink")
        protected WebElement NLexpand;

        protected By stateSelect = By.id("state");

        @FindBy(id = "zip")
        protected WebElement zipCode;

        protected By phoneFields = By.xpath("//input[contains(@id,'day

        @FindBy(id = "email")
        protected WebElement email;
        @FindBy(id = "retype_email")
        protected WebElement email2;



        public void fillInUserData(User user) {
                firstName.click();
                firstName.sendKeys(user.getFirstName());
                lastName.sendKeys(user.getLastName());

                if (user.getSite() == Site.NL) {
                        // expand the address section. Lookup doesn't
                        // or in prod )
                        NLexpand.click();
                }
                addressLine1.sendKeys(user.getAddress1());

                if (user.getSite() != Site.UK && user.getSite() != Sit
                        addressLine2.sendKeys(user.getAddress2());
                }

                city.sendKeys(user.getCity());
```

```
        // extra strange fields
        if (s == Site.IT) {

                Select stateSelect = new Select(WebTestSession.webdriver().findElement(By.id("state")));
                stateSelect.selectByValue("BI");

                By pBy = By.id("ProvinceId");
                WebElement dp = WebTestSession.webdriver().findElement(pBy);
                Select provinceSelect = new Select(dp);
                provinceSelect.selectByValue("12");

                final By cityBy = By.id("CityId");
                WebElement city = new WebDriverWait(WebTestSession.webdriver(), 10).until(new ExpectedCondition<WebElement>(){
                        public WebElement apply(WebDriver driver){
                                WebElement c = driver.findElement(cityBy);
                                try{
                                        if(c.isEnabled()){
                                                return c;
                                        }
                                }catch(StaleElementReferenceException e){
                                }
                                return null;
                        }
                });

                Select citySelect = new Select(city);
                citySelect.selectByVisibleText("BIELLA");
                // or citySelect.selectByValue("1972");

                Select day = new Select(WebTestSession.webdriver().findElement(By.id("birthdate1")));
                Select month = new Select(WebTestSession.webdriver().findElement(By.id("birthdate2")));
                Select year = new Select(WebTestSession.webdriver().findElement(By.id("birthdate3")));

                day.selectByValue("" + user.getDOB().get(Calendar.DAY_OF_MONTH));
                String value = "" + ((user.getDOB().get(Calendar.MONTH)) + 1);
                month.selectByValue(value);
                year.selectByValue("" + user.getDOB().get(Calendar.YEAR));

                WebTestSession.webdriver().findElement(By.id("gender_M")).click();
                WebTestSession.webdriver().findElement(By.id("personalId")).sendKeys(((ITUser) (user)).getCodisce());

        } else if (s == Site.ES) {
                WebTestSession.webdriver().findElement(By.name("personalId")).sendKeys(((ESUser) user).getPersonalId().toString
                WebTestSession.webdriver().findElement(By.name("personalIdType")).sendKeys(((ESUser) user).getPersonalIdType())
        }

        email.sendKeys(user.getEmail());
        email2.sendKeys(user.getEmail());

}
```

MOBILE TESTING

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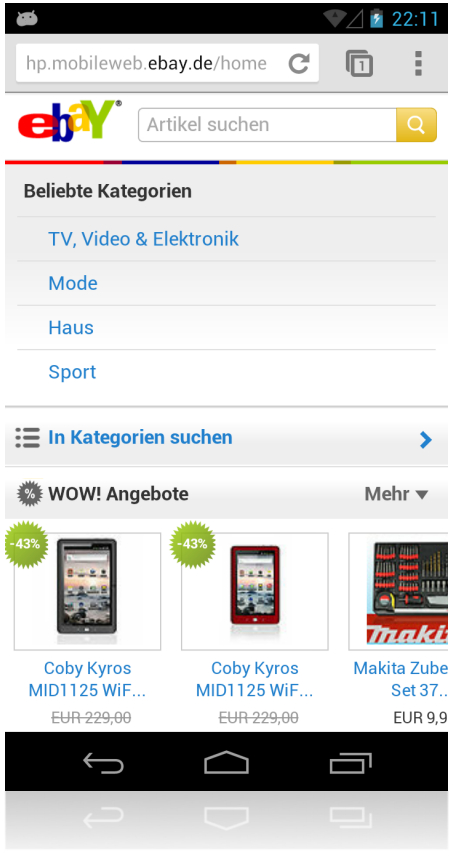
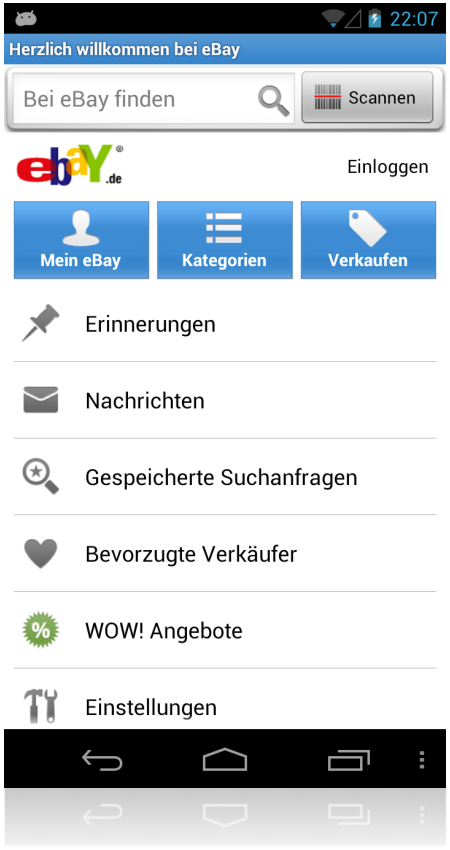
EBAY'S MOBILE PRODUCTS

Mobile Web



Android Native App



iOS Native App

MOBILE TEST AUTOMATION REQUIREMENTS

- Use load balancer features of Selenium GRID for parallel execution
- Manage multiple applications / versions / languages
- Native app should not need to be modified
- Native app runtime inspection support

MOBILE WEB TEST AUTOMATION

- We use Selenium AndroidDriver and iPhoneDriver
- Tests are written in JAVA and are similar to web tests
- Tests are only executed on emulators

MOBILE WEB TEST CASE

Tests

```
@Test
public void watchListTest() {
    WebDriver driver = new AndroidDriver();
    MobileUser user=new MobileUser("password", "android_mobile_buyer_de");
    String searchTearm="200002508027";
    new ItemWatchlistFlow().searchItemAndAddItemToWatchList(searchTearm,
      user, Site.DE, driver);
}
```

Flow Objects

```
public void searchItemAndAddItemToWatchList(String searchTearm, MobileUser user, Site site,
     WebDriver driver) {
   EbayMobileHomePage homepage = new EbayMobileHomePage(driver);
   homepage.open(site);
   MobileViewItemPage viewItemPage = homepage.search(searchTearm);
   Assert.assertEquals(viewItemPage.getItemId(), searchTearm);
   MobileSignInPage signInPage = viewItemPage.openSignInPage();
   signInPage.signIn(user);
   viewItemPage.addItemToWatchList();
}
```

Page Objects

```
public MobileViewItemPage search(String searchTearm) {
  By searchField=By.id("kw");
  driver.findElement(searchField).clear();
  driver.findElement(searchField).sendKeys(searchTearm);
  driver.findElement(By.cssSelector("input.searchButtonContainer")).click();

  return new MobileViewItemPage(driver);
}
```

ANDROID APP AUTOMATION

- We created the open source project **CALABASH-DRIVER**
- CALABASH-DRIVER integrates Calabash-Android into Selenium GRID
- CALABASH-DRIVER offers a Webdriver-like Java API for writing tests

ANDROID APP TEST CASE

Tests

```
@Test(description = "Test the sign in feature for the German site.")
@CalabashAndroidTest(appName = "eBayMobile:1.8.1.5", site = Site.DE, sdkVersion = "4.0.3")
public void signInDE() {
  new SignInFlow().acceptEulaAndSignInUser(AndroidAppTestConstants.EBAY_SELLER_USERNAME_KEY,
      AndroidAppTestConstants.EBAY_SELLER_PASSWORD_KEY);
}
```

Flow Objects

```
public void signIn(String userNameKey, String passwordKey) {
  EulaDialog eulaDialog = new EulaDialog(getSession().getDriver(), getSession().getSite());
  SpineMobileReporter.log("After App Start.");
  eulaDialog.selectListingSite();
  SpineMobileReporter.log("Home Dialog.");
  HomeDialog homeDialog = eulaDialog.acceptEula();
  SearchDialog searchDialog = homeDialog.openSearchDialog();
  searchDialog.searchItems("android_mobile_seller_de 8");

  homeDialog.openSignInDialog();
  homeDialog.signUserIn(userNameKey, passwordKey);
  SpineMobileReporter.log("After user login.");
}
```

Dialog Objects

```
public void signUserIn(String userNameKey, String passwordKey) {
  String username = getLocalisedString(userNameKey);
  driver.findTextField(By.id("user_name_autocomplete")).enterText(username);
  driver.findTextField(By.id("password_edittext")).enterText(getLocalisedString(passwordKey));
  driver.findButton(By.l10nElement("home.signin.button")).press();
  driver.waitForElement().waitForProgressCloses();
  driver.waitForTextIsPresent(username);
}
```

AUTOMATION OF IOS APPS

- We created the open source project **iOS-Driver**
- iOS-Driver integrates Apple's official tool "UI Automation" into Selenium GRID
- iOS-Driver offers a convenient Webdriver-like Java API for writing tests

iOS APP TEST CASE

Tests

```
@Test
@IOSTest(language = "fr", locale = "fr")
public void signInFR() throws Exception {
  signIn();
}
```

Flow Objects

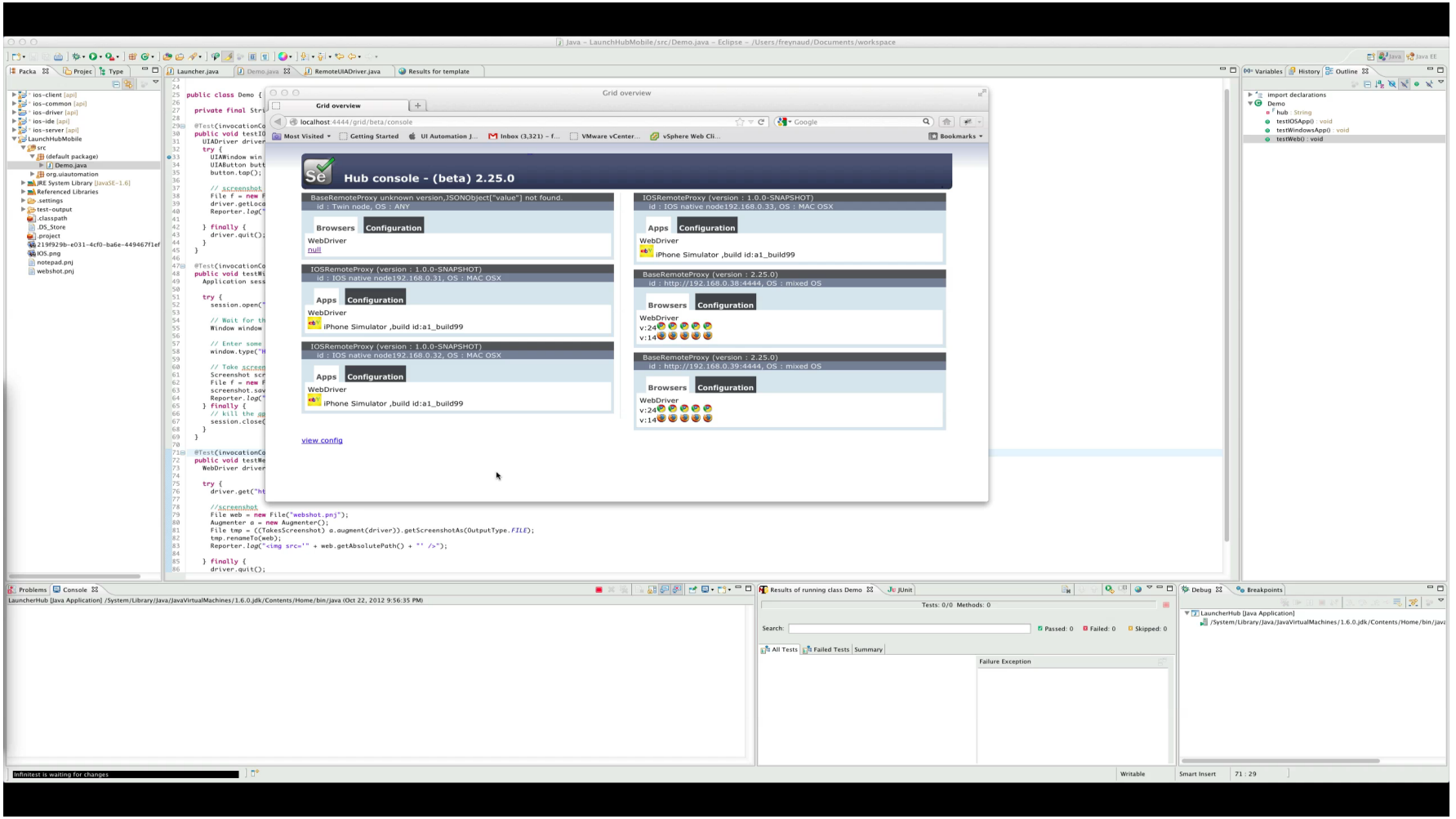
```
public void signIn() throws Exception {
    UserAgreementScreen ua = new UserAgreementScreen();
    ua.accept();

    HomeScreen home = new HomeScreen();
    home.sell();
    SignInScreen signIn = new SignInScreen();
    signIn.signIn("ios_seller_uk", "password");
}
```

Dialog Objects

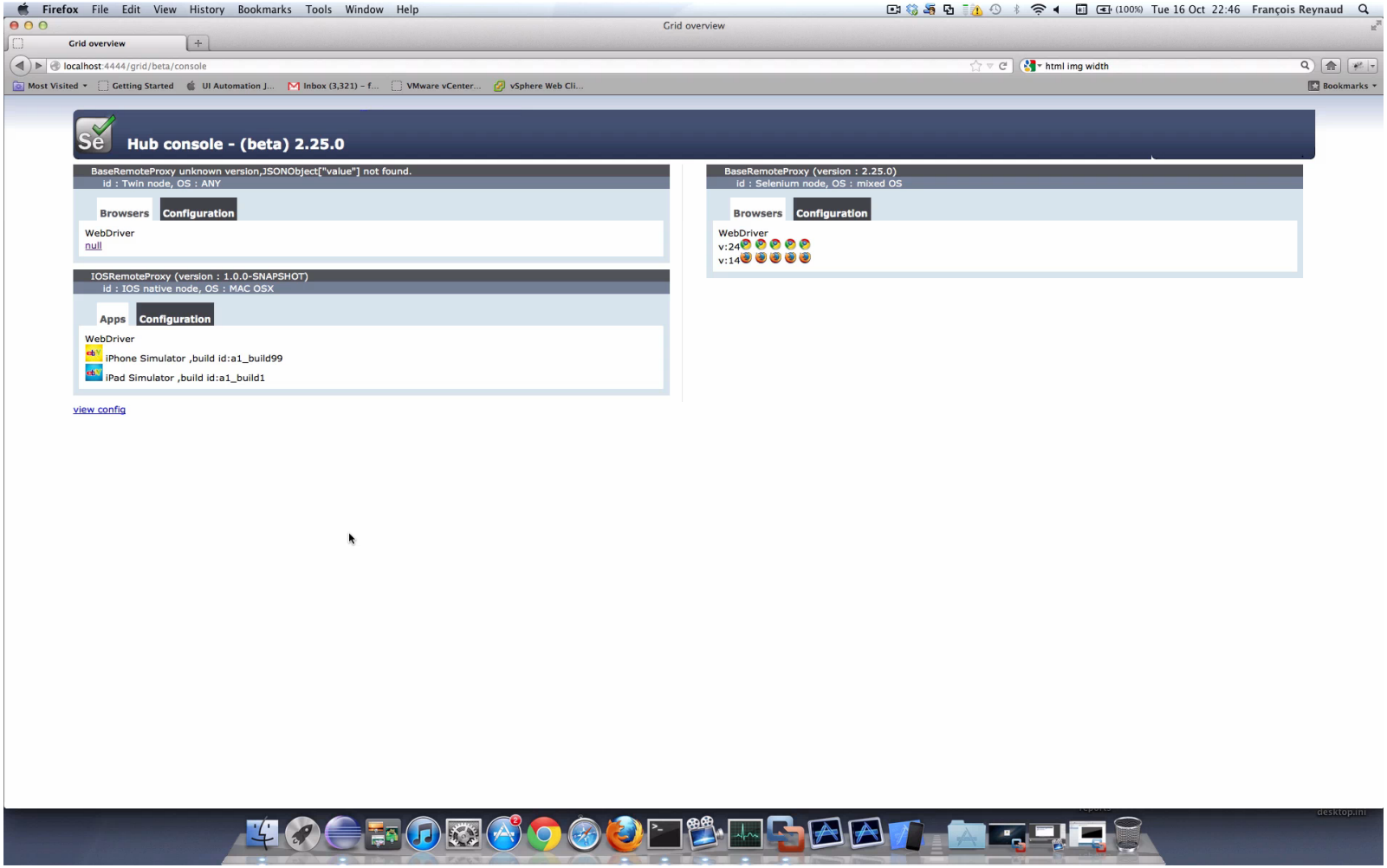
```
public void signIn(String userId, String password) {
  getUserId().setValue(userId);
  getPassword().setValue(password);
  getSignInButton().tap();
}

private UIATextField getUserId() {
  Criteria c = new TypeCriteria(UIATextField.class);
  return (UIATextField) win.findElement(c);
}
```

ANDROID VIDEO

WEB – IOS – WINDOWS INTEGRATION



IDE INTEGRATION



SUMMARY

- Use of open source tools enables innovation from within the organization
- World wide recognition for our work
- Zero attrition in 4 years!

- Solutions are integrated into the Selenium Grid which enables us to scale
- Same concept for automation of Web, Win32, mobile web, native apps
- Extremely low maintenance due to use of page object pattern
- Fast rampup for engineers due to similar approach

CHECK IT OUT ON GITHUB

- https://github.com/freynaud/ios-driver
- http://calabash-driver.github.com

THANK YOU!

COMMENTS?

WE ARE HIRING!

http://ebaycareers.com/

Or contact me: mpalotas@ebay.com

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