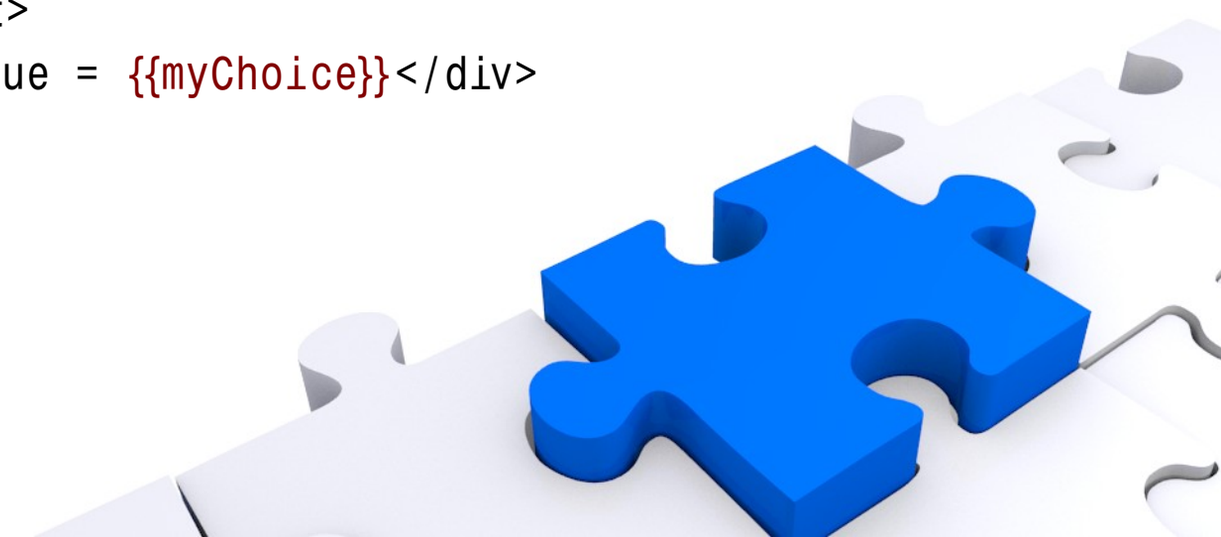
Providing Protractor to Java / .Net

Serguei Kouzmine
kouzmine_serguei@yahoo.com

Bare-bones Angular page

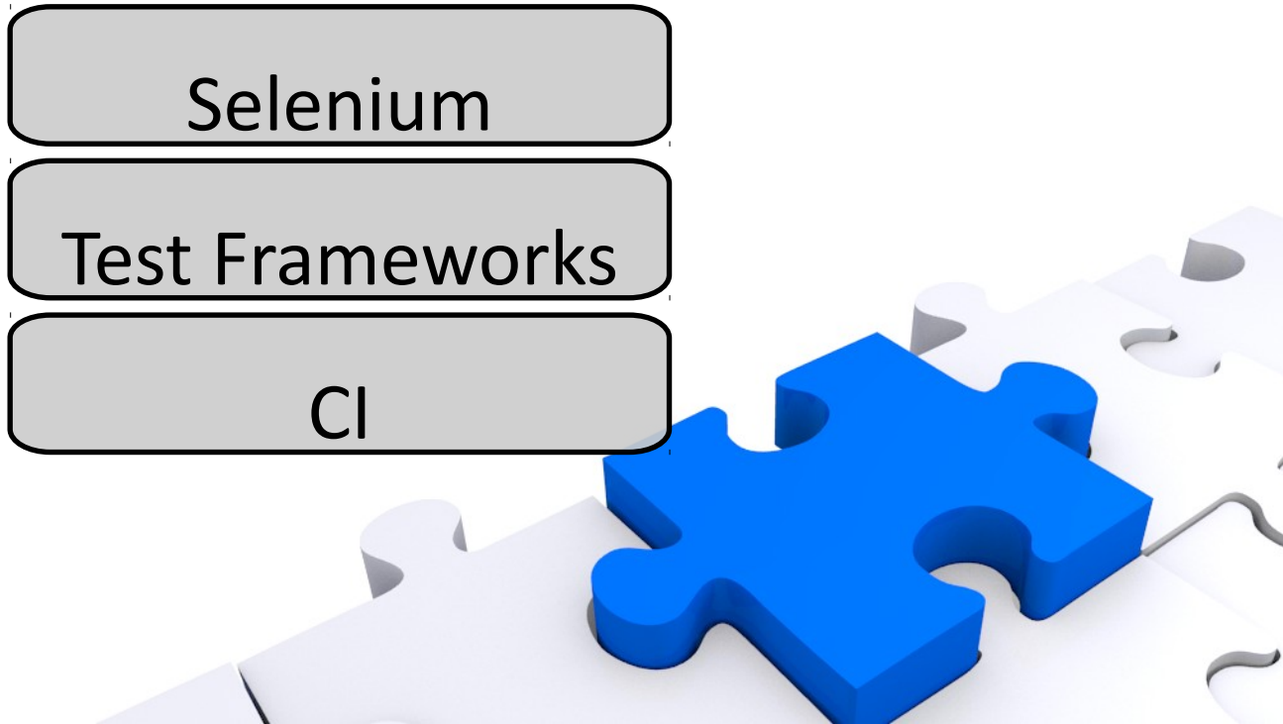
```
<html ng-app="myApp">
<head>
<script src="angular.js"></script>
<script type="text/javascript">
var app = angular.module('myApp', []);
app.controller('myCtrl',
function($scope){
$scope.myChoice = 1;
  $scope.options = [
{ name: 'one', value: 1},
{ name: 'two', value: 2},
]});
</script>
</head>
```

```
<body ng-controller = "myCtrl">
 <select ng-model = "myChoice">
    <option ng-repeat = "option in
options"
            value = "{{option.value}}"
            ng-selected =
"option.value ==
myChoice">{{option.name}}</option>
  </select>
  <div>Value = {{myChoice}}</div>
</body>
</html>
```

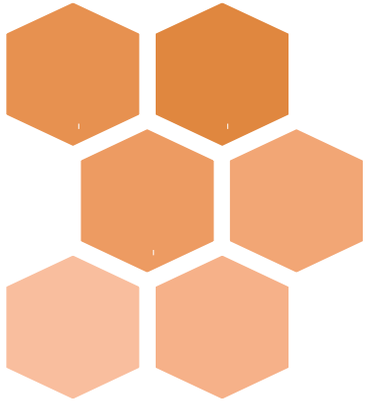


Integration with QA/CI

- Framework (module) layers offered for integrating Selenium Testing with CI by Java, .Net and Node.js offer similar functionality but are not easy to combine (examples exist)
- Angular MVC Clientside API were only available through Protractor

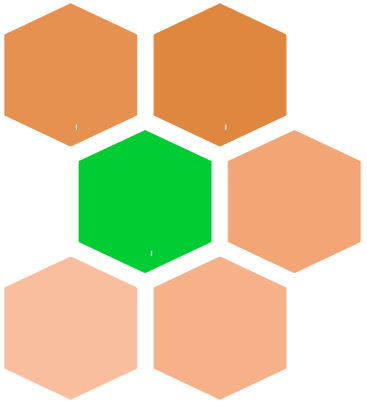


Adding Protractor Methods



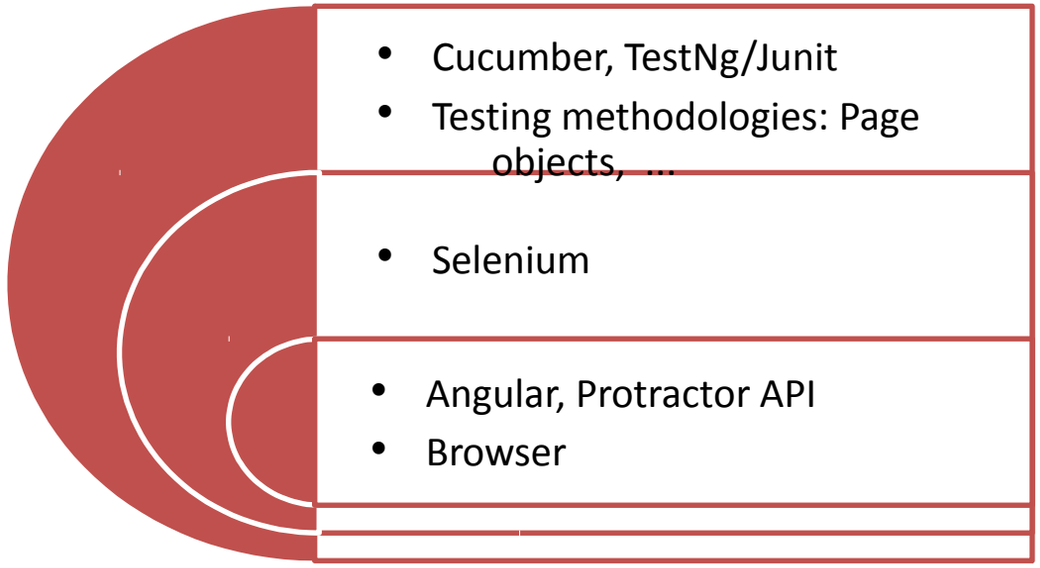
Java

Node.js



jProractor,
Protractor-net

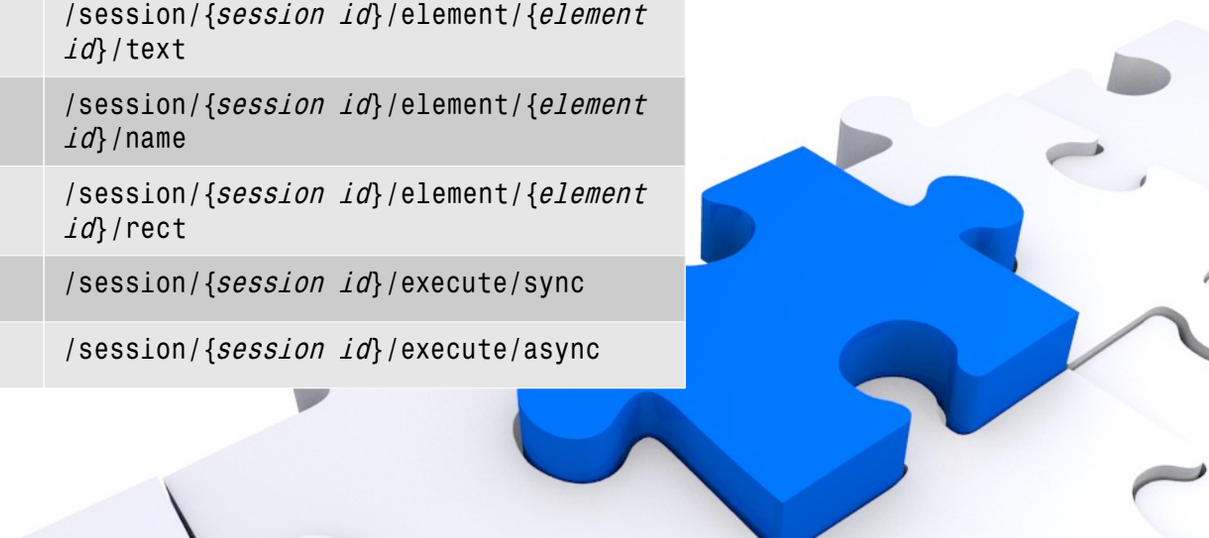
Tool Chain


• Cucumber, TestNg/Junit
• Testing methodologies: Page objects, ...
• Selenium
• Angular, Protractor API
• Browser

WebDriver Wire Protocol

Command	Method	URI Template
Find Element	POST	/session/{*session id*}/element
Find Element fron Another	POST	/session/{*session id*}/element/{element id}/element
Get Element Attribute	GET	/session/{*session id*}/element/{*element id*}/attribute/{*name*}
Get Element Property	GET	/session/{*session id*}/element/{*element id*}/property/{*name*}
Get Element CSS Value	GET	/session/{*session id*}/element/{*element id*}/css/{*property name*}
Get Element Text	GET	/session/{*session id*}/element/{*element id*}/text
Get Element Tag Nate	GET	/session/{*session id*}/element/{*element id*}/name
Get Element Rectangle position	GET	/session/{*session id*}/element/{*element id*}/rect
Execute Script	POST	/session/{*session id*}/execute/sync
Execute Async script	POST	/session/{*session id*}/execute/async

https://w3c.github.io/webdriver/webdriver-spec.html#dfn-command



Frequently Used Selenium API

- ByClassName, ByCssSelector, ById, ByLinkText, ByName, ByPartialLinkText, ByTagName, ByXPath (nested classes of By)
- ExpectedConditions
- WebElement.findElements
- Wait
- SendKeys
- Actions

Selenium Extended with Protractor API

- ByClassName, ByCssSelector, ById, ByLinkText, ByName, ByPartialLinkText, ByTagName, ByXPath (nested classes of By)
- NgBy (JavaScriptBy): binding, buttonText,cssContainingText, model, options, repeater, repeaterRows, repeaterElement, selectedOption, selectedRepeaterOption
- ExpectedConditions
- WebElement.findElements
- WebElement.evaluate
- Wait
- WebDriver.waitForAngular
- SendKeys
- Actions

`

Convenience

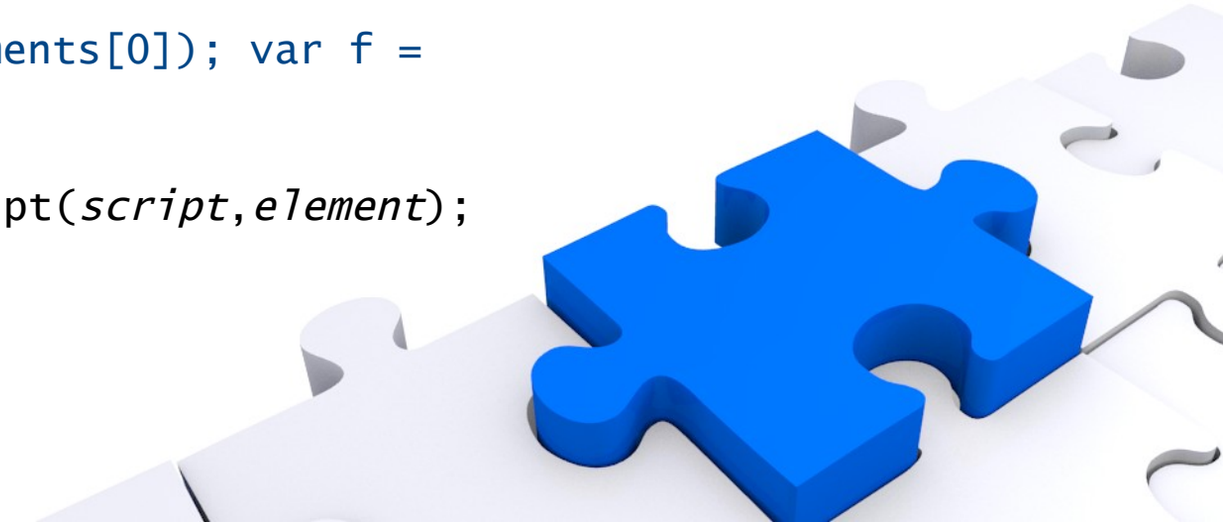
```
WebElement element =
driver.findElement(By.xpath("html/body/div[13]/ul/li[4]/select"));

WebElement element = driver.findElement(By.cssSelector("div#ud-root
div#outer div.panel div.slogan div.kid"));


(JavascriptExecutor)seleniumDriver.executeScript("arguments[0].style.borde
r='3px solid yellow'", element);


String script = "var e = angular.element(arguments[0]); var f =
e.scope().myFile; return f.some_property";

Object result =
(JavascriptExecutor)seleniumDriver.executeScript(script,element);
```



Convenience

```
NgWebElement selectedCar =
ngDriver.findElement(NgBy.model("selectedCar"));

WebElement customerName = customer.findElement(NgBy.binding("Name"));

List<WebElement> customers = ngDriver.findElements(NgBy.repeater("cust
in Customers"));

Object customerCountry = customer.evaluate("customer.Country");

NgWebElement cell = ngDriver.findElement(NgBy.repeaterElement("row in
rows", rowNum, "row.cellName"));
```

Clientsidescripts.js

```
var element = arguments[0];
var expression = arguments[1];
return angular.element(element).scope().$eval(expression);
```

https://github.com/angular/protractor/blob/master/lib/clientsidescripts.js#L623

Clientsidescripts.js

```
var findBindings = function(binding, exactMatch, using, rootSelector) {
    var root = document.querySelector(rootSelector || 'body');
    using = using || document;
    ...
    var bindings = using.getElementsByClassName('ng-binding');
    var matches = [];
    for (var i = 0; i < bindings.length; ++i) {
        var dataBinding = angular.element(bindings[i]).data('$binding');
...
            var bindingName = dataBinding.exp || dataBinding[0].exp || dataBinding;
matches.push(bindings[i]);
...
return matches; /* Return the whole array for webdriver.findElements. */
};
```

https://github.com/angular/protractor/blob/master/lib/clientsidescripts.js#L115

Java Plumbing

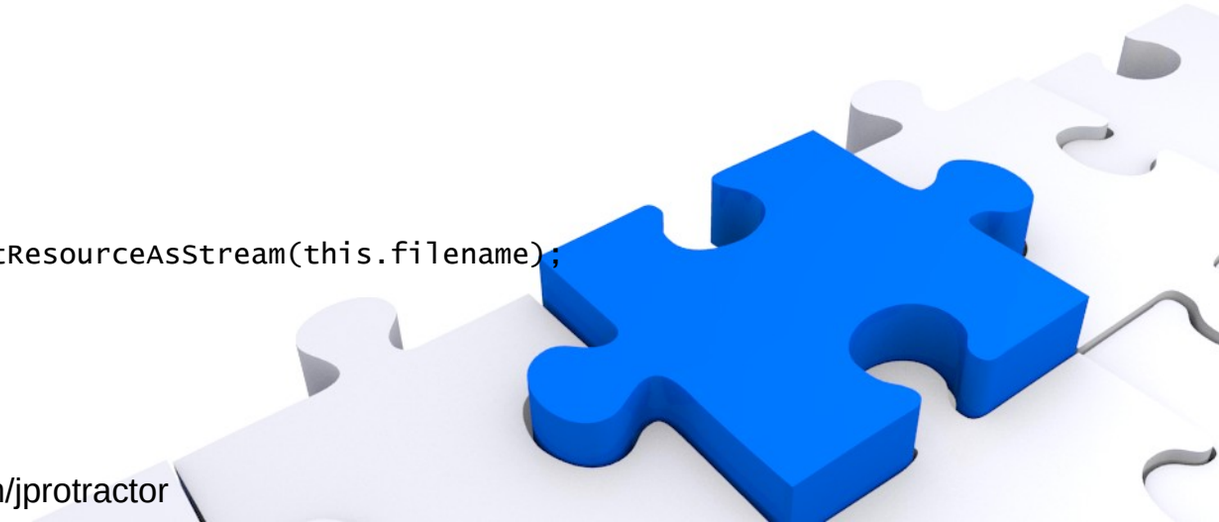
```
public final class JavaScriptBy extends By {
  public List<WebElement> findElements(final SearchContext context) {
    final Object[] scriptargs = new Object[this.args.length + 1];
    scriptargs[0] = this.root;
    System.arraycopy(this.args, 0, scriptargs, 1, this.args.length);
    return this.elements(context, scriptargs);
  }
private List<WebElement> elements( final SearchContext context,final Object[] args) {
    List<WebElement> elements = (List<WebElement>) this.executor(context)
      .executeScript(this.script.content(), args);
    return (elements == null) ? new ArrayList<WebElement>() : elements;
  }
}
```

https://github.com/sergueik/jProtractor/blob/master/src/main/java/com/jprotractor/JavaScriptBy.java

Java Plumbing , contd.

```
public static By model(final String model) {
  return new JavaScriptBy(new FindModel(), model);
}
public final class FindModel implements Script {
    public String content() {
        return new Loader("model").content();
    }
}
final class Loader {
    Loader(final String file) {
        this.filename = file + ".js";
    }
    String content() {
      final InputStream stream = Loader.class.getClassLoader().getResourceAsStream(this.filename);
      Final byte[] bytes = new byte[stream.available()];
      Stream.read(bytes);
      return new String(bytes, "UTF-8");
}
```

https://github.com/sergueik/jProtractor/tree/master/src/main/java/com/jprotractor



Questions, Demos

Resources

- https://github.com/angular/protractor
- https://github.com/caarlos0/jProtractor
- https://github.com/F1tZ81/Protractor-jvm
- https://github.com/henrrich/jpagefactory

- https://github.com/bbaia/protractor-net
- https://github.com/sergueik/protractor-net

Resources

- http://www.java2s.com/Tutorials/AngularJS/
- http://juliemr.github.io/protractor-demo/
- http://qualityshepherd.com/angular/friends/
- http://www.way2automation.com/angularjs-protractor/banking
- https://htmlpreview.github.io/?https://github.com/angular-ui/
- http://amitava82.github.io/angular-multiselect/
- http://www.codeproject.com/Articles/1066968/Developing-Protractor-tests-in-Csharp-or-Java