Hands on Scala.js

Li Haoyi, PNWScala 14 Nov 2014

Hands on Scala.js: Agenda

- Intro to Scala.js
- Interactive Web Pages
- Cross-platform libraries
- Client-server integration
- Wrap Up

Intro to Scala.js

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Intro to Scala.js

- Who
- What
- Where
- When
- Why

Intro to Scala.js: Who

- Li Haoyi

  - I work at Dropbox
  - Come talk to me about legacy CoffeeScript code
  - ~10 commits in scala-js/scala-js

- @sjrd/@gzm0

  - Real authors
  - ~2000 commits in scala-js/scala-js

Intro to Scala.js: What

- Scala -> Javascript Compiler
  - Run Scala code in the web browser!
- Respectable Performance
  - 1-3x slower than raw JS, 10x slower than Scala-JVM
    - Probably still 5x faster than python
  - 150-400kb non-gzipped executables
    - Mostly Scala’s bloated collections library

Intro to Scala.js: What

```
def main() = {
  var x = 0
  while(x < 999){
    x = x + "2".toInt
  }
  println(x)
}
```

Intro to Scala.js: What

```
ScalaJS.c.LExample$.prototype.main__V = (function() {
  var x = 0;
  while ((x < 999)) {
    x = ((x + new ScalaJS.c.sci_StringOps().init___T(
      ScalaJS.m.s_Predef().augmentString__T__T("2")
    ).toInt__I()) | 0)
  };
  ScalaJS.m.s_Predef().println__O__V(x)
});
```

Intro to Scala.js: What

```
be.prototype.main=function(){
    for(var a=0;999>a;)
        a=a+(new de).g(S(L(),"2")).ne()|0;
    ee(); L();
    var b=F(fe); ge();
    a=(new he).g(w(a)); b=bc(0,J(q(b,[a])));
    ie(bc(L(),J(q(F(fe),[je(ke(ge().Vg),b)]))))
}
```

Intro to Scala.js: Where

- http://www.scala-js.org/
- https://github.com/scala-js/scala-js
- https://groups.google.com/forum/#!forum/scala-js
- http://www.scala-js-fiddle.com/

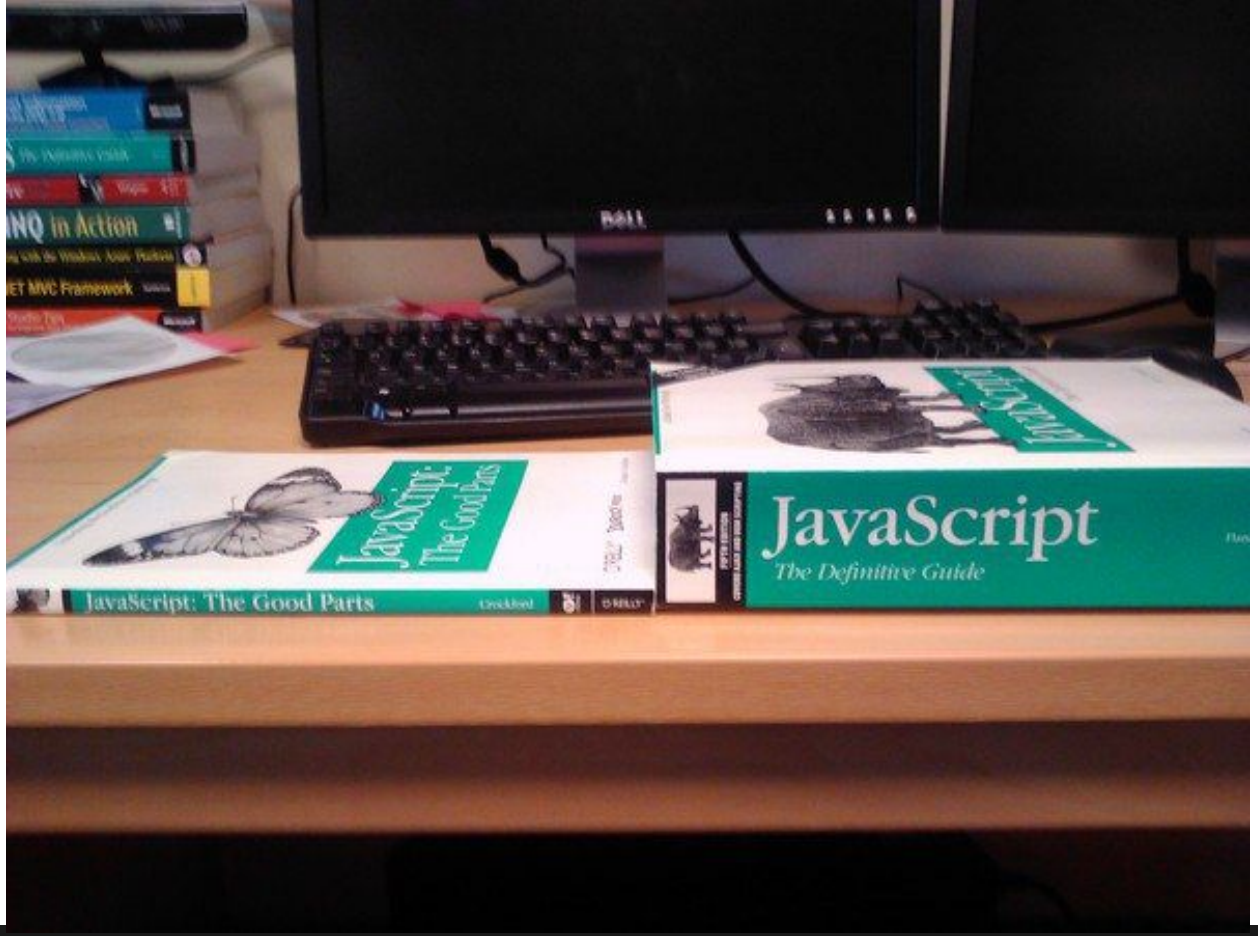
Intro to Scala.js: Where

- Scala.js extends the reach of your Scala
  - Play Websites
  - Node.js modules
  - Chrome Extensions
  - Autodesk Fusion plugins
  - Firefox OS?
- Not just the JVM!

Intro to Scala.js: When

- June 2013: Announced at Scaladays
- Sept 2013: I got involved in
- Dec 2013: v0.1 released at ScalaXchange
- Working towards v1.0 now

Intro to Scala.js: Why



Intro to Scala.js: Why

Intro to Scala.js: Why

CoffeeScript

Opal

Dart

TypeScript

clojure / clojurescript

WebSharper

elm

Google AtScript (docs.google.com)

submitted 2 days ago by gekorm

72 comments share

Emscripten: An LLVM-to-JavaScript Compiler

opa

Intro to Scala.js: Why

Intro to Scala.js: Why

- Javascript is =(
  - Rather verbose
  - *Too* flexible
  - Hard to write tools
  - Scary to refactor

- Scala is =)

Interactive Web Pages

- Intro to Scala.js
- **Interactive Web Pages**
- Cross-platform libraries
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Live Coding

Interactive Web Pages

https://github.com/lihaoyi/workbench-example-app

Web Page Takeaways

- Scala.js works
  - Conception
  - Debugging
  - Publishing
- HTML generation using Scalatags rocks
- Working directly with the DOM is *much* easier with types

Canvas Demos

- Retro Games
- Roll
- Ray Tracer

Cross-platform libraries

- Intro to Scala.js
- Interactive Web Pages
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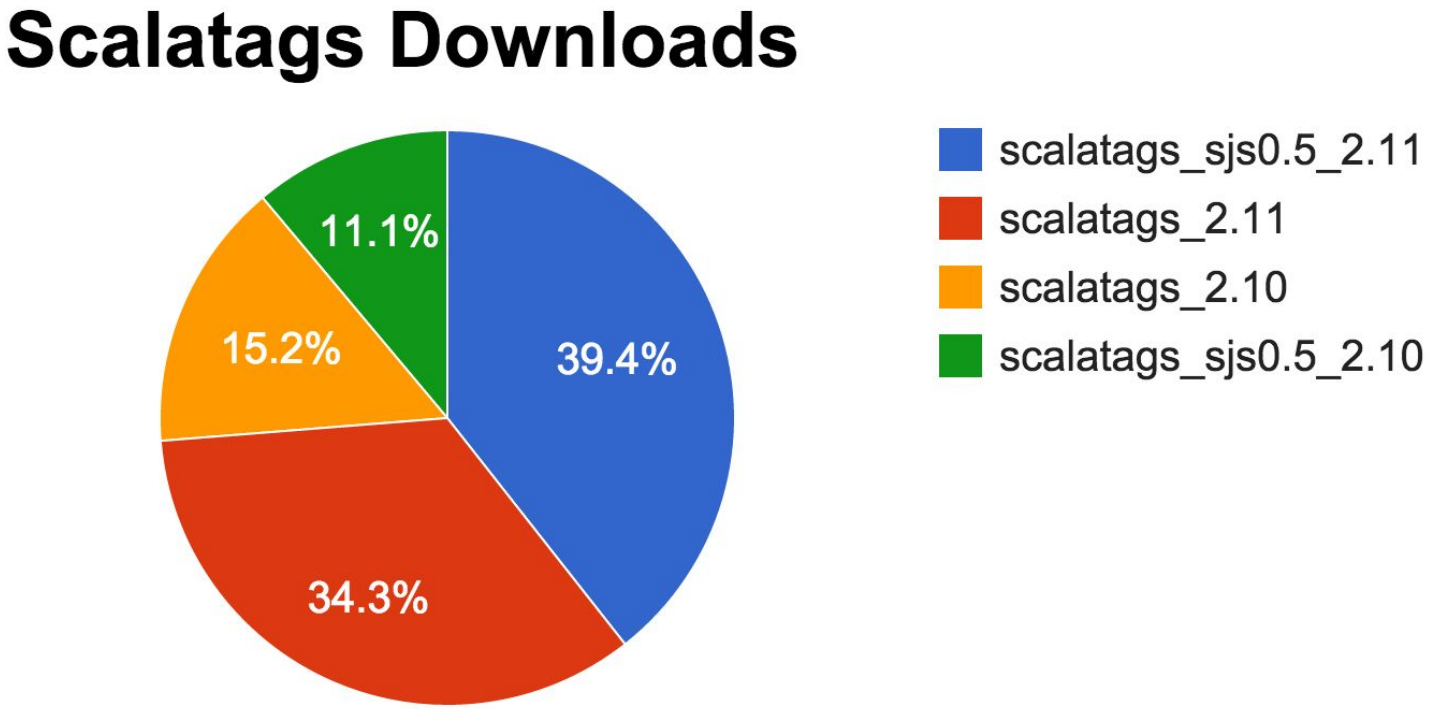
Cross-platform libraries



Cross-platform libraries

- Scalatags
  - HTML Generation
- uTest
  - Unit Testing
- uPickle
  - Serialization
- Scala.Rx
  - Change Propagation
- Scalaz
  - Hardcore FP
- Shapeless
  - Hardcore Genericity
- Monocle
  - Lenses
- Parboiled2
  - Parser Combinators

6 project/build.scala View

```
@@ -47,8 +47,10 @@ object build extends Build {

   private def gitHash = sys.process.Process("git rev-parse HEAD").lines_!.head

-  lazy val standardSettings: Seq[Sett] = Defaults.defaultSettings ++ sbtrelease.ReleasePlugin.releaseSettings ++ Seq[Sett
-    organization := "org.scalaz",
+  lazy val standardSettings: Seq[Sett] = Defaults.defaultSettings ++ sbtrelease.ReleasePlugin.releaseSettings ++
+                                         scala.scalajs.sbtplugin.ScalaJSPlugin.scalaJSBuildSettings ++
+                                         Seq[Sett](
+    organization := "com.github.japgolly.fork.scalaz",

     scalaVersion := "2.10.4",
     crossScalaVersions := Seq("2.9.3", "2.10.4", "2.11.2"),
```

2 project/plugins.sbt View

```
@@ -9,3 +9,5 @@ addSbtPlugin("com.typesafe.sbt" % "sbt-osgi" % "0.7.0")
 addSbtPlugin("com.eed3si9n" % "sbt-buildinfo" % "0.3.1")

 addSbtPlugin("com.eed3si9n" % "sbt-unidoc" % "0.3.1")
+
+addSbtPlugin("org.scala-lang.modules.scalajs" % "scalajs-sbt-plugin" % "0.5.3")
```

Can Use	Can’t Use
java.lang.*	j.l.Thread, j.l.Runtime
scala.*	s.c.parallel, s.tools.
Macros: upickle, async	Reflection: pickling, akka
Scala: Scalaz, Scalatags	Java: Scalatest, Scalate
XMLHttpRequest, DOM, WebGL, Canvas	Netty, Spray, Swing, OpenGL
IntelliJ, SBT	Yourkit, VisualVM

Live Coding

Cross-Platform Library

https://github.com/lihaoyi/utest-example-module

Library Takeaways

- Cross-platform libraries targeting JS/JVM work
- Code that works on both platforms can be shared
  - Even tests!
- Code specific/optimized to each platform can be provided separately

Client-Server Integration

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Live Coding

Client-Server Integration

https://github.com/spray/spray-template

Client-Server Takeaways

- Wiring Scala.js into any existing project is trivial
- Sharing code between Client/Server is Awesome
  - Constants, algorithms, data-structures, libraries, etc.
- Type-safety makes shared code amazing
- The whole setup actually works!

Wrap Up

- Intro to Scala.js
- Interactive Web Pages
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- **Wrap Up**

Scala.js works!

- Usable for all sorts of projects
- Experience is great
- Future is promising

Things that are Not Great

- Small community
  - It’s new, after all
- Scala compiler is slowwww, std lib bloated
  - Incremental compilation/DCE helps, but still...
- No big corporate backing
  - Just two guys and some extras
- Some rough edges
  - Arguably fewer than Javascript itself ^_^

The Future is Now

- Scala.js provides *multiple* web-dev holy-grails
  - Shared code between Client/Server
  - Checked interfaces between Client/Server
  - Sane, shared language between Client/Server
  - Whole-program-checked Client/Server
- Not the future, but *today*
  - Actually ~6 months ago

The Future is Now

```
javascript> ['10','10','10','10'].map(parseInt)
[10, NaN, 2, 3]

scalajs> List("10","10","10","10").map(parseInt)
List(10, 10, 10, 10)
```

Hands on Scala.js

Questions?