Introduction to Groovy

About the speaker

- Java developer since the early days
- Open source believer since 1997
- Member of the Groovy Dev team since 2007
- Co-founder of the Griffon project

Agenda

- What is Groovy
- From Java to Groovy
- Java-like Features
- Not-Java Features
- Unique Features
- Resources

What is Groovy

- Dynamic and agile language for the JVM
- Built upon the strenghts of the Java Language
- Brings modern features from Python, Ruby & Smalltalk
- Works perfectly with Java
- Supports DSLs and compact syntax
- Makes programming fun again

From Java to Groovy

HelloWorld.java

```java
public class HelloWorld {
   String name;

   public void setName(String name)
   { this.name = name; }
   public String getName(){ return name; }

   public String greet()
   { return "Hello "+ name; }

   public static void main(String[] args){
      HelloWorld helloWorld = new HelloWorld();
      helloWorld.setName("Groovy");
      System.out.println(helloWorld.greet());
   }
}
```

HelloWorld.groovy

```
public class HelloWorld {
   String name;

   public void setName(String name)
   { this.name = name; }
   public String getName(){ return name; }

   public String greet()
   { return "Hello "+ name; }

   public static void main(String[] args){
      HelloWorld helloWorld = new HelloWorld();
      helloWorld.setName("Groovy");
      System.out.println(helloWorld.greet());
   }
}
```

GroovierHelloWorld.groovy

```groovy
class HelloWorld {
   String name
   def greet() { "Hello $name" }
}

def helloWorld = new HelloWorld(name:"Groovy")
println helloWorld.greet()
```

But how?

- Remove noise
- Remove boilerplate code
- Introduce dynamic types
- Use variable interpolation
- Turbocharged POJOs
- Script support

HelloWorld.groovy

```
public class HelloWorld {
   String name;

   public void setName(String name)
   { this.name = name; }
   public String getName(){ return name; }

   public String greet()
   { return "Hello "+ name; }

   public static void main(String[] args){
      HelloWorld helloWorld = new HelloWorld();
      helloWorld.setName("Groovy");
      System.out.println(helloWorld.greet());
   }
}
```

Java-like Features

Close to home

Java-like Features

- A Java class is a Groovy and viceversa
- Full JDK5 support: annotations, generics, varargs, enums
- 98% of Java code is valid Groovy code
- Rename *.java to *.groovy and compile!

Varargs in action

```groovy
class Calculator {
   def addAllGroovy(Object[] args) {
      int total = 0
      for(i in args) { total += i }
      total
   }

   def addAllJava(int... args) {
      int total = 0
      for(int i : args) { total += i }
      total
   }
}

Calculator c = new Calculator()
assert c.addAllGroovy(1,2,3,4,5) == 15
assert c.addAllJava(1,2,3,4,5) == 15
```

Scott Davis' 1st Mantra

Groovy is Java & Java is Groovy

Not-Java Features

Exploring the Neighborhood

Assorted Goodies

- Default parameter values as in PHP
- Name parameters as in Ruby
- Operator overloading (through naming convention)
- Native syntax for Maps and Lists
- New types like Ranges and Closures (!!)
- Regexps are first-class citizens

Closures, Closure, Closures!

- Reusable blocks of code (think JavaScript functions)
- They substitute inner classes in almost all cases
- Can serve as proxies of single-method interfaces
- Default parameter named 'it' if not supplied

Examples of Closures

```groovy
greet1 = { name -> println "hello $name" }
greet1("Groovy")

greet2 = { println it }
greet2("Java")

iCanHaveTypedParametersToo = { int x, int y ->
   println "coordinates are ($x, $y)"
}
iCanHaveTypedParametersToo(42, 21)

myActionListener = { event ->
   // do something cool with event here
} as java.awt.event.ActionListener
```

Curried Closures

```
getSlope = { x, y, b = 0 ->
   println "x: $x, y: $y, b: $b"
   (y - b) / x
}

assert 1 == getSlope(2, 2)
getSlopeX = getSlope.curry(5)

assert 1 == getSlopeX(5)
assert 0 == getSlopeX(2.5, 2.5)
```

Native Syntax for Maps/Lists

```groovy
Map map = [:]
assert map instanceof java.util.Map
map["key1"] = "value1"
map.key2 = "value2"
println map
assert map.size() == 2
assert map.key1 == "value1"
assert map["key2"] == "value2"

List list = []
assert list instanceof java.util.List
list.add("One")
list << "Two"
println list
assert list.size() == 2
assert ["One", "Two"] == list
```

Iterators Everywhere

- You can use iterator methods with any object
- Iterators harness the power of closures
- Examples: each, collect, inject, every, any, find

Iterators in Action

```groovy
printIt = { println it }
// 3 ways to iterate from 1 to 5, there are more!
[1,2,3,4,5].each printIt
1.upto 5, printIt
(1..5).each printIt

// compare to a regular loop
for(i in [1,2,3,4,5]) printIt(i)

[1,2,3,4,5].eachWithIndex { v, i -> println "list[$i] => $v" }
```

Scott Davis' 2nd Mantra

Groovy is Java & Groovy is NOT Java

Unique Features

To infinite.. and beyond!

The 'as' keyword

```groovy
import javax.swing.table.DefaultTableCellRenderer as DTCR

def myActionListener = { event ->
   // do something cool with event
} as java.awt.event.ActionListener

def renderer = [
   getTableCellRendererComponent: { t, v, s, f, r , c ->
      // cool renderer code goes here
   }
] as DTCR

// note that this technique is like creating objects in
// JavaScript using JSON notation
```

New Operators

- ?: (elvis) – a refinement on the ternary operator
- ?. safe dereference – kiss NPEs goodbye!
- <=> (spaceship) – compare two values
- * (spread) – explodes contents of a list/array
- .* (spread-dot) – apply method on all list elements

Traversing Object graphs

- GPath is to objects what XPath is to XML
- ?. and *. come in handy in many situations
- Take advantage of Maps as POGOs
- Short syntax for property access a plus

Sample GPath Expressions

```groovy
class Person {
   String name
   int id

   String toString() {
      "name: $name, id: $id"
   }
}

def persons = [
   new Person(name: "Duke", id: 1),
   [name: "Tux", id: 2] as Person
]

println persons
assert [1, 2] == persons.id
assert ["Duke", "Tux"] == persons*.getName()
assert null == persons[2]?.name
assert "Duke" == persons[0].name ?: "Groovy"
assert "Groovy" == persons[2]?.name ?: "Groovy"
```

Metaprogramming

- Groovy does not support open classes like Ruby does
- Change a class' behavior at runtime
- Since 1.6 change them at buildtime too (AST xforms)
- Intercept method calls and property access

Category Example

```
class Pouncer {
   static pounce(Integer self) {
      def s = "Boing!"
      1.upto(self - 1) { s += " boing!" }
      s
   }
}

use(Pouncer) {
   assert 3.pounce() == "Boing! boing! boing!"
   println 4.pounce()
}
```

Metaclass Example

```
Integer.metaClass.pounce = {
   def s = "Boing!"
   1.upto(delegate - 1) { s += " boing!" }
   s
}

assert 3.pounce() == "Boing! boing! boing!"
println 4.pounce()
```

AST Transformations

```
import java.text.SimpleDateFormat
class Event {
   @Delegate Date when
   String title, url

   String toString() {
      "title: $title, url: $url
when: $when"
   }
}

df = new SimpleDateFormat("MM/dd/yyyy")
so2gx = new Event(title: "SpringOne2GX",
   url: "http://springone2gx.com",
   when: df.parse("10/19/2009"))
oredev = new Event(title: "Oredev",
   url: "http://oredev.org",
   when: df.parse("11/02/2009"))
println so2gx
println oredev
assert oredev.after(so2gx.when)
```

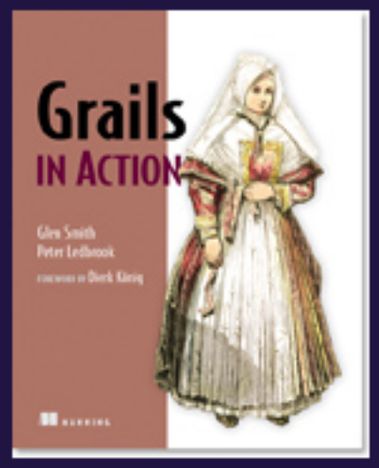
Groovy is what the Java language would look like had it be written in the 21st century

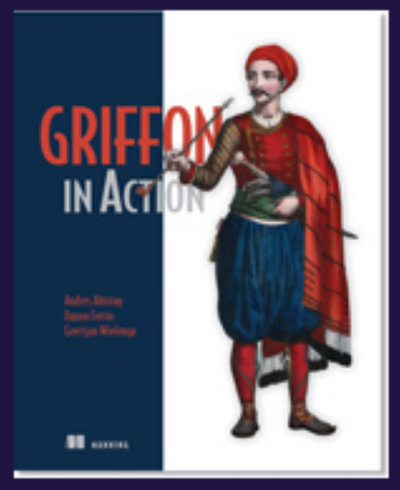
Resources

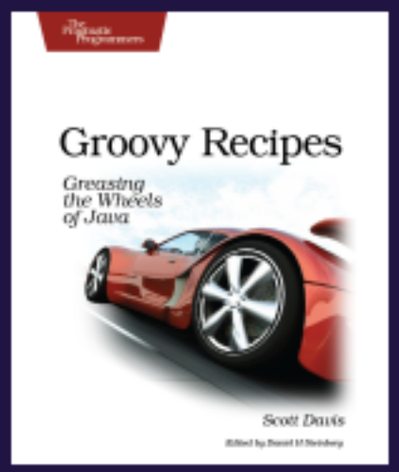
- http://groovy.codehaus.org
- http://groovyblogs.org
- http://groovy.dzone.org
- http://jroller.com/aalmiray
- @aalmiray

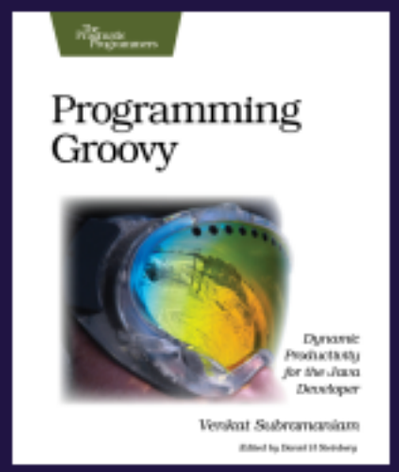
Books

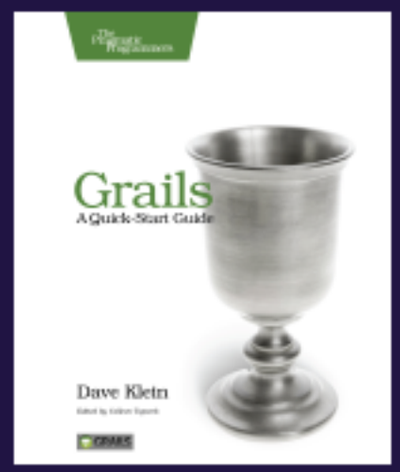

Groovy
IN ACTION


Grails
IN ACTION

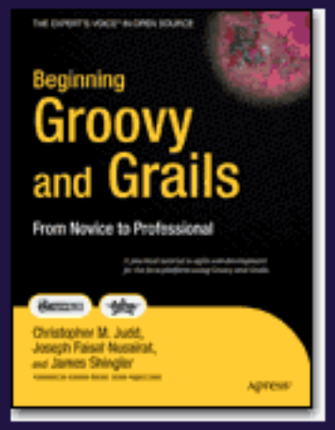

GRIFFON
IN ACTION


Groovy Recipes
Greasing the Wheels of Java
Scott Davis


Programming Groovy
Dynamic Productivity for the Java Developer
Venkat Subramaniam


Grails
A Quick-Start Guide
Dave Klein

More Books



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Q & A

Thank you!