THE GR8 TECHNOLOGIES

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Groovy

- a new(ish) programming language for the JVM
- an agile, dynamic programming language like Python, PERL and Ruby
- completely interoperable with conventional Java

all the power and maturity of Java and the JVM, with *much greater* ease-of-use and productivity

The Question

"What cool new tools/apps, etc. are being created using Groovy?"

Wrong Question

Better Question

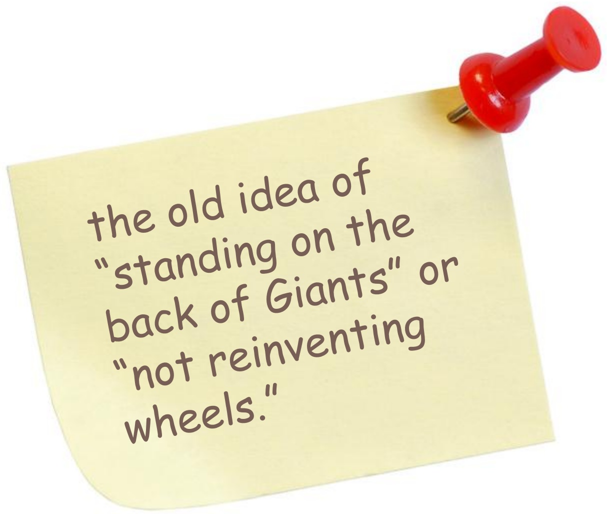
"How is all the cool stuff that **already exists** being made cooler with Groovy?"

The Answer

- all these companies, products and users are benefitting from the Gr8 technologies
  - Spring, Seam, IntelliJ, Eclipse, JDeveloper/ADF, SoapUI, Selenium, Jenkins, Freemind, Confluence, OpenOffice…
  - eHarmony, European Patent Office, Wired.com, Vodafone, Sky, Suncorp, Mincom, Atlassian, Thoughtworks, Canoo,…
    - me!

The Gr8 Technologies

- a complete, powerful ecosystem
  - Grails
  - Griffon
  - Gant
  - Gradle
  - GPars
  - Geb
  - Betamax
  - Spock
  - …many more


the old idea of "standing on the back of Giants" or "not reinventing wheels."

A Better Java...

```
import java.util.List;
import java.util.ArrayList;

class Erase {
    private List filterLongerThan(List strings, int length) {
        List result = new ArrayList();
        for (int i = 0; i < strings.size(); i++) {
            String s = (String) strings.get(i);
            if (s.length() <= length) {
                result.add(s);
            }
        }
        return result;
    }
    public static void main(String[] args) {
        List names = new ArrayList();
        names.add("Ted"); names.add("Fred");
        names.add("Jed"); names.add("Ned");
        System.out.println(names);
        Erase e = new Erase();
        List shortNames = e.filterLongerThan(names, 3);
        System.out.println(shortNames.size());
        for (int i = 0; i < shortNames.size(); i++) {
            String s = (String) shortNames.get(i);
            System.out.println(s);
        }
    }
}
```

This code is valid Java and valid Groovy

Based on an example by Jim Weirich & Ted Leung

...A Better Java...

```java
import java.util.List;
import java.util.ArrayList;

class Erase {
    private List filterLongerThan(List strings, int length) {
        List result = new ArrayList();
        for (int i = 0; i < strings.size(); i++) {
            String s = (String) strings.get(i);
            if (s.length() <= length) {
                result.add(s);
            }
        }
        return result;
    }
    public static void main(String[] args) {
        List names = new ArrayList();
        names.add("Ted"); names.add("Fred");
        names.add("Jed"); names.add("Ned");
        System.out.println(names);
        Erase e = new Erase();
        List shortNames = e.filterLongerThan(names, 3);
        System.out.println(shortNames.size());
        for (int i = 0; i < shortNames.size(); i++) {
            String s = (String) shortNames.get(i);
            System.out.println(s);
        }
    }
}
```

Do the semicolons add anything? And shouldn't we us more modern list notation? Why not import common libraries?

...A Better Java...

```
class Erase {
    private List filterLongerThan(List strings, int length) {
        List result = new ArrayList()
        for (String s in strings) {
            if (s.length() <= length) {
                result.add(s)
            }
        }
        return result
    }

    public static void main(String[] args) {
        List names = new ArrayList()
        names.add("Ted"); names.add("Fred")
        names.add("Jed"); names.add("Ned")
        System.out.println(names)
        Erase e = new Erase()
        List shortNames = e.filterLongerThan(names, 3)
        System.out.println(shortNames.size())
        for (String s in shortNames) {
            System.out.println(s)
        }
    }
}
```

...A Better Java...

```
class Erase {
    private List filterLongerThan(List strings, int length) {
        List result = new ArrayList()
        for (String s in strings) {
            if (s.length() <= length) {
                result.add(s)
            }
        }
        return result
    }

    public static void main(String[] args) {
        List names = new ArrayList()
        names.add("Ted"); names.add("Fred")
        names.add("Jed"); names.add("Ned")
        System.out.println(names)
        Erase e = new Erase()
        List shortNames = e.filterLongerThan(names, 3)
        System.out.println(shortNames.size())
        for (String s in shortNames) {
            System.out.println(s)
        }
    }
}
```

Do we need the static types? Must we always have a main method and class definition? How about improved consistency?

...A Better Java...

```
def filterLongerThan(strings, length) {
    def result = new ArrayList()
    for (s in strings) {
        if (s.size() <= length) {
            result.add(s)
        }
    }
    return result
}

names = new ArrayList()
names.add("Ted")
names.add("Fred")
names.add("Jed")
names.add("Ned")
System.out.println(names)
shortNames = filterLongerThan(names, 3)
System.out.println(shortNames.size())
for (s in shortNames) {
    System.out.println(s)
}
```

...A Better Java...

```
def filterLongerThan(strings, length) {
    def result = new ArrayList()
    for (s in strings) {
        if (s.size() <= length) {
            result.add(s)
        }
    }
    return result
}

names = new ArrayList()
names.add("Ted")
names.add("Fred")
names.add("Jed")
names.add("Ned")
System.out.println(names)
shortNames = filterLongerThan(names, 3)
System.out.println(shortNames.size())
for (s in shortNames) {
    System.out.println(s)
}
```

Shouldn't we have special notation for lists? And special facilities for list processing?

...A Better Java...

```
def filterLongerThan(strings, length) {
    return strings.findAll{ it.size() <= length }
}

names = ["Ted", "Fred", "Jed", "Ned"]
System.out.println(names)
shortNames = filterLongerThan(names, 3)
System.out.println(shortNames.size())
shortNames.each{ System.out.println(s) }
```

...A Better Java...

```
def filterLongerThan(strings, length) {
    return strings.findAll{ it.size() <= length }
}

names = ["Ted", "Fred", "Jed", "Ned"]
System.out.println(names)
shortNames = filterLongerThan(names, 3)
System.out.println(shortNames.size())
shortNames.each{ System.out.println(s) }
```

Is the method now needed?

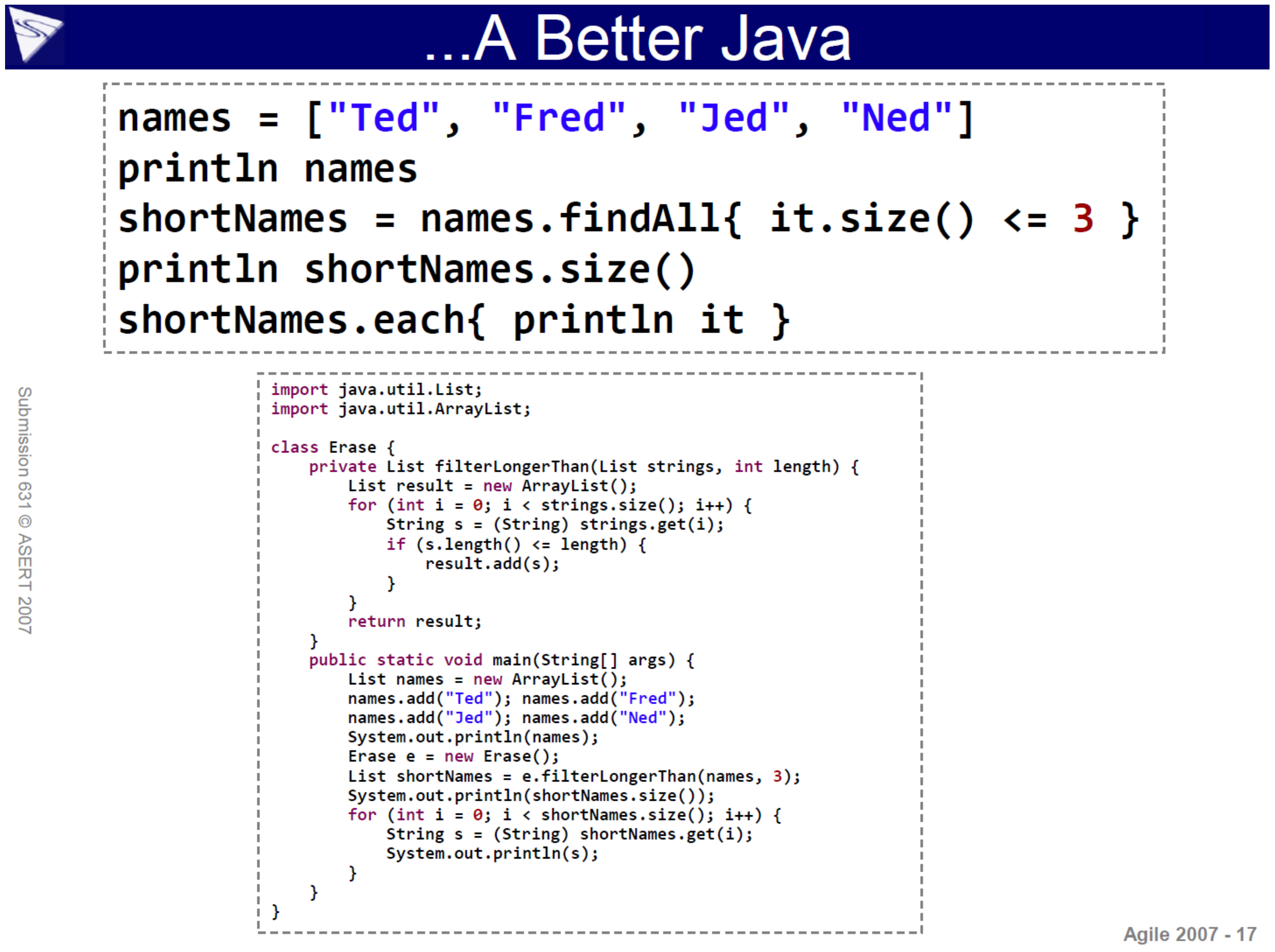
Easier ways to use common methods?

Are brackets required here?

...A Better Java...

```
names = ["Ted", "Fred", "Jed", "Ned"]
println names
shortNames = names.findAll{ it.size() <= 3 }
println shortNames.size()
shortNames.each{ println it }
```

```
["Ted", "Fred", "Jed", "Ned"]
3
Ted
Jed
Ned
```



...A Better Java

```
names = ["Ted", "Fred", "Jed", "Ned"]
println names
shortNames = names.findAll{ it.size() <= 3 }
println shortNames.size()
shortNames.each{ println it }
```

```
import java.util.List;
import java.util.ArrayList;

class Erase {
    private List filterLongerThan(List strings, int length) {
        List result = new ArrayList();
        for (int i = 0; i < strings.size(); i++) {
            String s = (String) strings.get(i);
            if (s.length() <= length) {
                result.add(s);
            }
        }
        return result;
    }
    public static void main(String[] args) {
        List names = new ArrayList();
        names.add("Ted"); names.add("Fred");
        names.add("Jed"); names.add("Ned");
        System.out.println(names);
        Erase e = new Erase();
        List shortNames = e.filterLongerThan(names, 3);
        System.out.println(shortNames.size());
        for (int i = 0; i < shortNames.size(); i++) {
            String s = (String) shortNames.get(i);
            System.out.println(s);
        }
    }
}
```

Many thanks to *maestro* Paul! http://www.asert.com.au

Aims

- put the FUN back into work!
- simplify developers lives
  - convention-over-configuration
  - become more ‘agile’
- make better tools
  - scripting
  - builders and slurpers
- make building tools easier
  - Domain-Specific Languages

Scripting

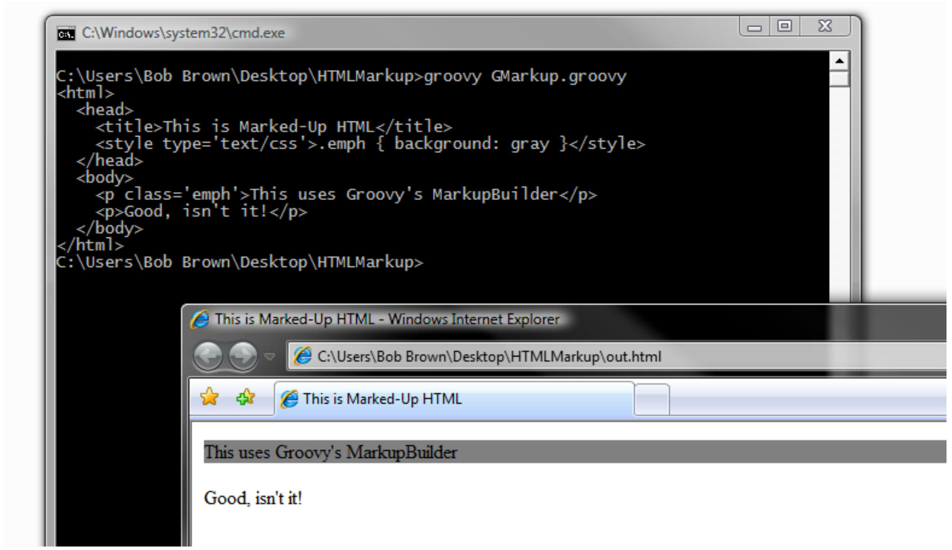
- no more need for shell scripts, PERL, etc.

```
final DIR = /C:\Users\Bob Brown\Desktop/

datPagesScanner = new AntBuilder().fileScanner {
    fileset(dir: DIR, includes: '*.dat')
}

new File("${DIR}/copy.txt").withWriter { file ->
  datPagesScanner.each { datFile ->
    datFile.eachLine { line ->
    if (line =~ /^[AEOIUaeiou].*/)
      file.writeLine(line)
    }
  }
}
```

Builders

- simplify creation of HTML, XML,…

```
import groovy.xml.MarkupBuilder

def builder = new MarkupBuilder ();
 builder.html {
    head {
      title "This is Marked-Up HTML"
      style type:'text/css', ".emph { background: gray }"
    }
    body {
      p 'class':'emph', "This uses Groovy's MarkupBuilder"
      p(/Good, isn't it!/)
    }
 }
```



C:\Windows\system32\cmd.exe

```
C:\Users\Bob Brown\Desktop\HTMLMarkup>groovy GMarkup.groovy
<html>
  <head>
    <title>This is Marked-Up HTML</title>
    <style type='text/css'>.emph { background: gray }</style>
  </head>
  <body>
    <p class='emph'>This uses Groovy's MarkupBuilder</p>
    <p>Good, isn't it!</p>
  </body>
</html>
C:\Users\Bob Brown\Desktop\HTMLMarkup>
```

This is Marked-Up HTML - Windows Internet Explorer
C:\Users\Bob Brown\Desktop\HTMLMarkup\out.html
This is Marked-Up HTML

This uses Groovy's MarkupBuilder

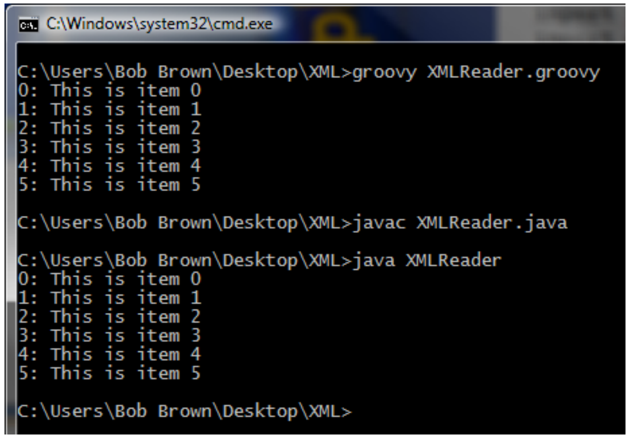
Good, isn't it!

Slurpers

- consume structured data

```
items = new XmlSlurper().parse(new File('items.xml'))

items?.'an-item'.each {
  println "${it.'@the-id'.text()}: ${it.text()}"
}
```

```
<?xml version="1.0" encoding="UTF-8"?>
<items>
  <an-item the-id="0">This is item 0</an-item>
  [...elided...]
</items>
```



```
C:\Users\Bob Brown\Desktop\XML>groovy XMLReader.groovy
0: This is item 0
1: This is item 1
2: This is item 2
3: This is item 3
4: This is item 4
5: This is item 5

C:\Users\Bob Brown\Desktop\XML>javac XMLReader.java

C:\Users\Bob Brown\Desktop\XML>java XMLReader
0: This is item 0
1: This is item 1
2: This is item 2
3: This is item 3
4: This is item 4
5: This is item 5

C:\Users\Bob Brown\Desktop\XML>
```

Slurpers…

- just compare…

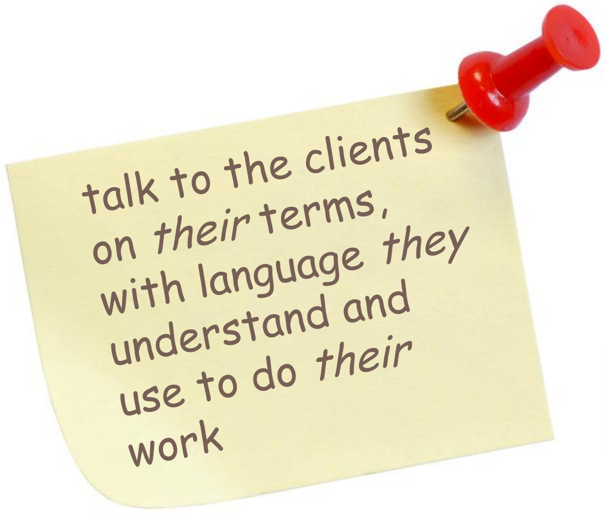
```
import java.io.*;
import javax.xml.parsers.*;
import org.w3c.dom.*;

public class XMLReader {
  public static void main(String argv[]) throws Exception {
    File file = new File("items.xml");
    DocumentBuilderFactory dbf = DocumentBuilderFactory.newInstance();
    DocumentBuilder db = dbf.newDocumentBuilder();
    Document doc = db.parse(file);
    doc.getDocumentElement().normalize();
    NodeList nodeLst = doc.getElementsByTagName("an-item");
    for (int s = 0; s < nodeLst.getLength(); s++) {
      Element anItem = (Element) nodeLst.item(s);
      System.out.println(anItem.getAttribute("the-id") + ": " +
                 anItem.getChildNodes().item(0).getNodeValue());
    }
  }
}
```

“Nothing Makes You Want Groovy More Than XML…”
—http://kousenit.wordpress.com/2008/03/12/nothing-makes-you-want-groovy-more-than-xml/

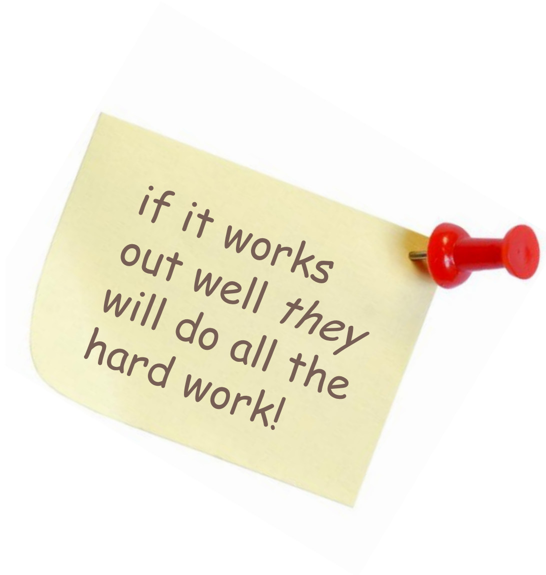
Domain Specific Languages

- 'little languages' for well-defined purposes

```
presentation('Gr8 Technologies') {
  used 'laptop-nanite' duration 1.2.hours
  printed 52.pages on 'hp-printer'
  presented 1.hour date '29/11/2011' at 'Macau University'
}
```



talk to the clients on *their* terms, with language *they* understand and use to do *their* work



if it works out well *they* will do all the hard work!

Domain Specific Languages

- very simple to implement!

```
[…elided…]

def presented(hours) {
   ['date': { date ->
     ['at': {  where ->
       // probably want to do more interesting work…maybe
       // insert into a database or send an email…
       println "presented $hours hour(s) on $date at $where"
     }]
   }]
}

def used(equipment) {
  ['duration': { dur ->
    println "used $equipment for $dur hour(s)"
  }]
}

def printed(pages) {
  ['on': { equipment ->
    println "$pages page(s) were printed on '$equipment'"
  }]
}
```

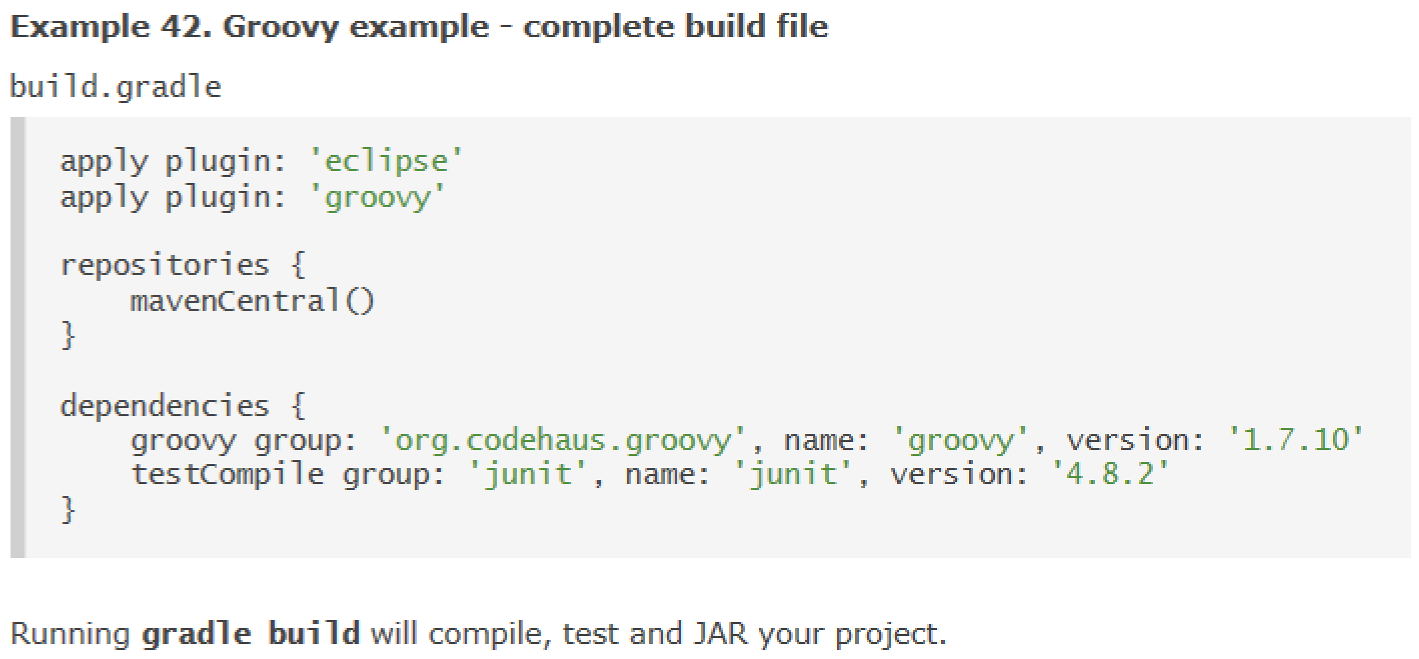
Gant

- scripting Ant tasks using Groovy
  - no XML!

```
includeTargets << gant.targets.Clean
cleanPattern << ['**/*.class', '**/*~', '**/*.bak', '**/*.OLD']
cleanDirectory << 'build'

taskdef (name: 'groovyc', classname: 'org.codehaus.groovy.ant.Groovyc')

ant.path(id: 'runtimeClasspath') {
  pathelement(location: 'build')
  pathelement(location: 'C:/DEVTOOLS/gant-1.8.1/lib/groovy-all-1.6.5.jar')
}

target(name: 'default') {
  ant.mkdir(dir: 'build')
  groovyc (srcdir: 'src', destdir: 'build', verbose: false)
  java(classname: 'HelloWorld', fork:true, dir: 'build',
       classpathref: 'runtimeClasspath') {
    arg(line: 'FRED')
  }
}
```

Gradle

- more convention, less configuration
  - no more “classpath hell”
    - no more “Maven hell”, either



Example 42. Groovy example - complete build file

build.gradle

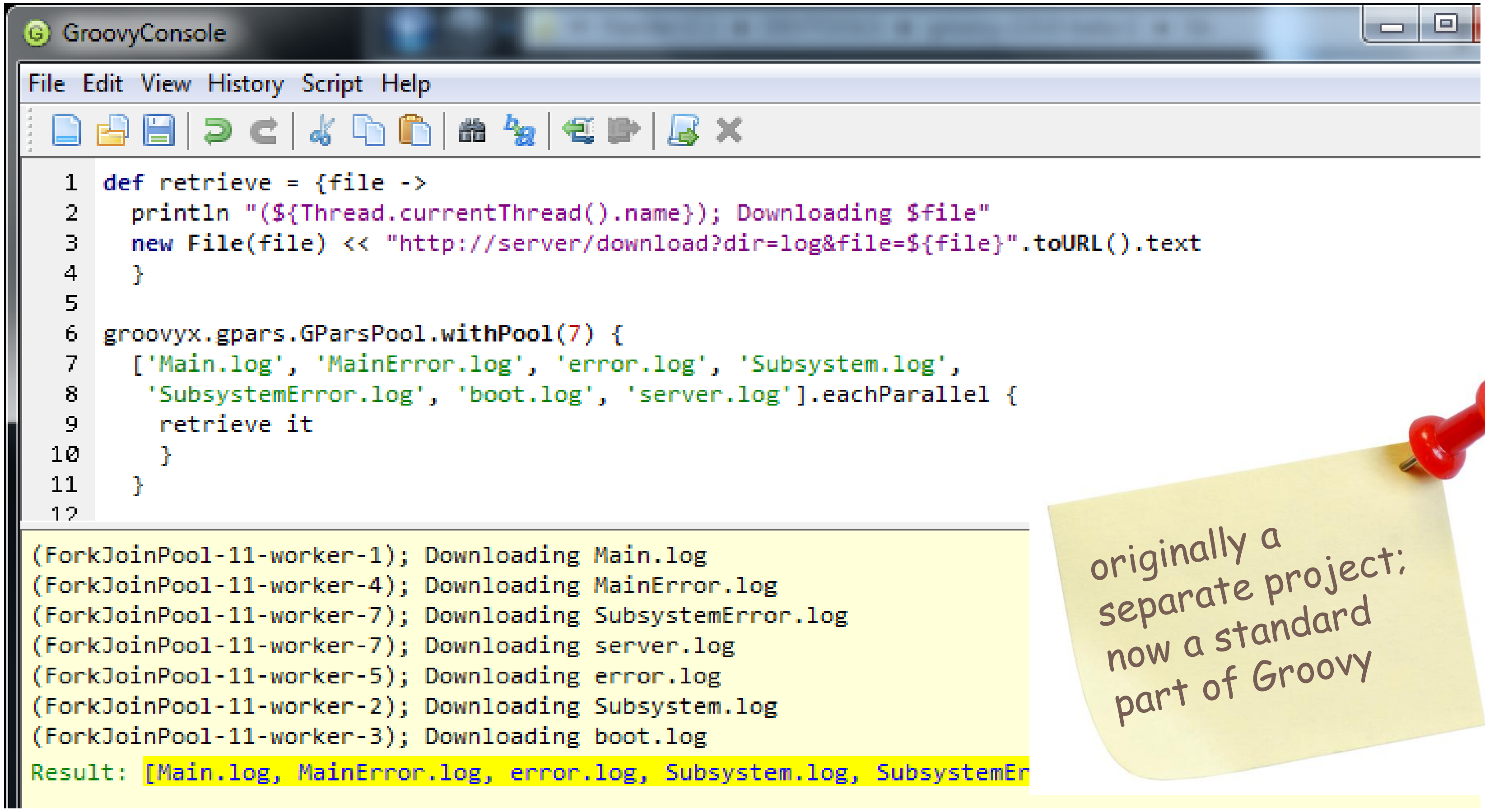
```
apply plugin: 'eclipse'
apply plugin: 'groovy'

repositories {
    mavenCentral()
}

dependencies {
    groovy group: 'org.codehaus.groovy', name: 'groovy', version: '1.7.10'
    testCompile group: 'junit', name: 'junit', version: '4.8.2'
}
```

Running **gradle build** will compile, test and JAR your project.

http://prezi.com/ypobbs_ikvtj/gradle-a-better-way-to-build/

GPars

- parallel programing made *easy(er)*



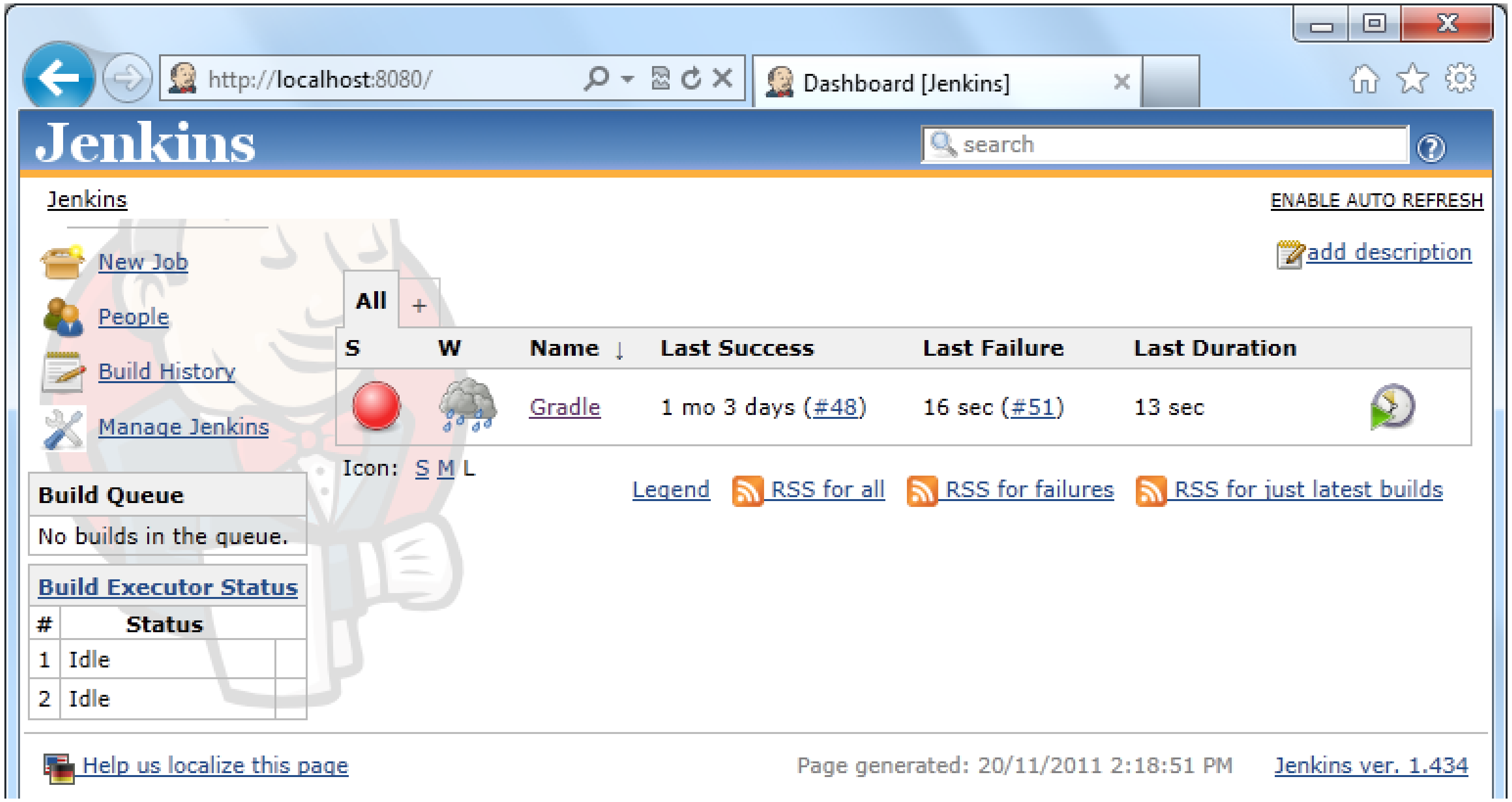
```
def retrieve = {file ->
  println "(${Thread.currentThread().name}); Downloading $file"
  new File(file) << "http://server/download?dir=log&file=${file}".toURL().text
  }

groovyx.gpars.GParsPool.withPool(7) {
  ['Main.log', 'MainError.log', 'error.log', 'Subsystem.log',
   'SubsystemError.log', 'boot.log', 'server.log'].eachParallel {
    retrieve it
    }
  }
```

```
(ForkJoinPool-11-worker-1); Downloading Main.log
(ForkJoinPool-11-worker-4); Downloading MainError.log
(ForkJoinPool-11-worker-7); Downloading SubsystemError.log
(ForkJoinPool-11-worker-7); Downloading server.log
(ForkJoinPool-11-worker-5); Downloading error.log
(ForkJoinPool-11-worker-2); Downloading Subsystem.log
(ForkJoinPool-11-worker-3); Downloading boot.log
Result: [Main.log, MainError.log, error.log, Subsystem.log, SubsystemEr
```

originally a separate project; now a standard part of Groovy

Jenkins

- continuous integration server
  - very groovy, baby!



S	W	Name ↓	Last Success	Last Failure	Last Duration
🔴		Gradle	1 mo 3 days (#48)	16 sec (#51)	13 sec

Icon: S M L

Legend RSS for all RSS for failures RSS for just latest builds

Build Queue
No builds in the queue.

Build Executor Status

#	Status
1	Idle
2	Idle

Help us localize this page

Page generated: 20/11/2011 2:18:51 PM   Jenkins ver. 1.434

Grails

- enterprise-grade web framework

"...Grails is supported by proven technologies.

Hibernate, a de facto standard in the software industry, provides the basis for the object-relational mapping (ORM) in Grails.

The Spring Framework supplies the core of the Grails Model-View-Controller (MVC) architecture and enables powerful dependency injection.

SiteMesh brings flexible and effective layout management to Grails.

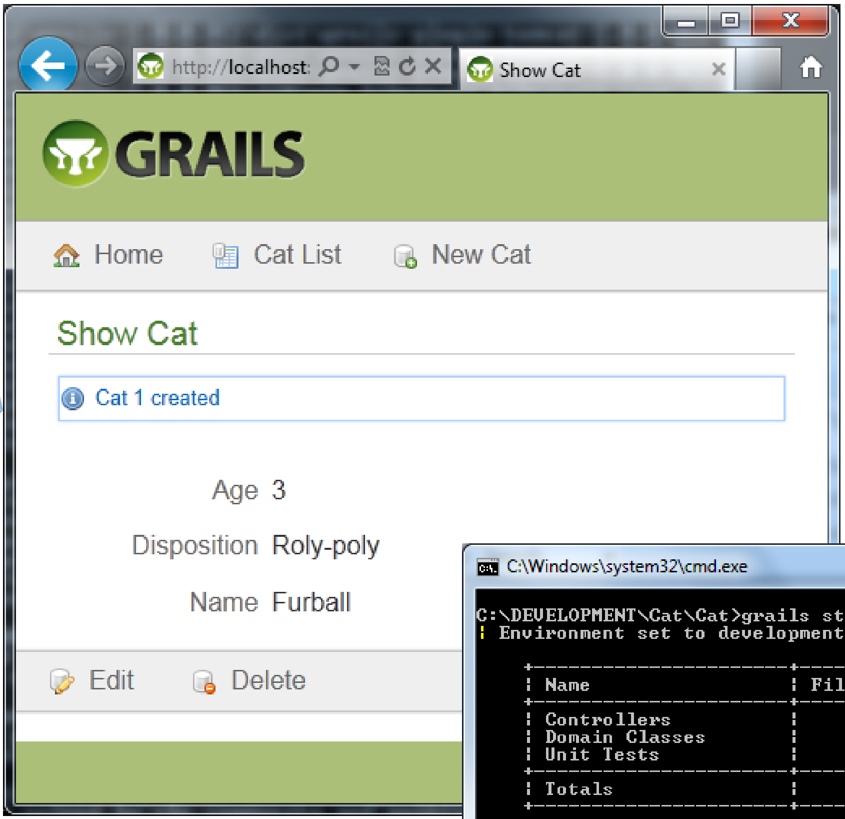
And, let's not forget Java. Because of Groovy's excellent Java integration, Grails applications not only have direct access to the multitude of Java libraries, but also to the enterprise services (distributed transactions, messaging, etc.) provided by JEE..."

—http://www.infoq.com/minibooks/grails

Grails...

- a full CRUD HTML5 webapp
  - *minimal* effort

```
// persistent domain class
class Cat {
  String name
  short age
  String disposition
}


// controller class
class CatController {
    static scaffold = true
}
```



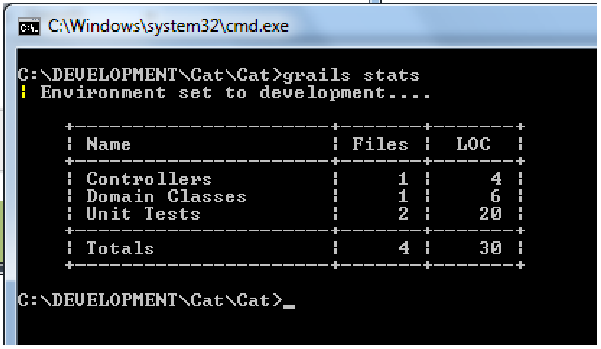
Show Cat

Cat 1 created

Age 3

Disposition Roly-poly

Name Furball



C:\Windows\system32\cmd.exe

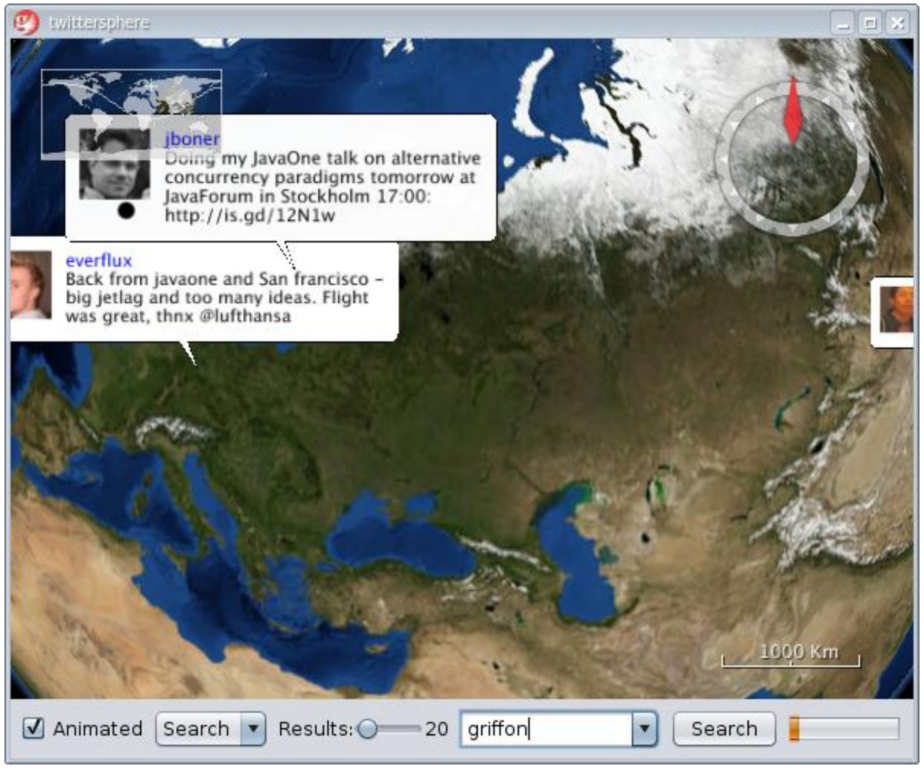
```
C:\DEVELOPMENT\Cat\Cat>grails stats
| Environment set to development....

    +----------------------------------+-------+-------+
    | Name                             | Files |  LOC  |
    +----------------------------------+-------+-------+
    | Controllers                      |     1 |     4 |
    | Domain Classes                   |     1 |     6 |
    | Unit Tests                       |     2 |    20 |
    +----------------------------------+-------+-------+
    | Totals                           |     4 |    30 |
    +----------------------------------+-------+-------+

C:\DEVELOPMENT\Cat\Cat>_
```

Griffon

- grails-like rich Swing client framework
  - standardised build system ‘inspired’ by Grails
    - ‘…by “inspired” I mean “taking large chunks of Grails code to bootstrap the codebase…”’
  - a structure that supports/rewards MVC
    - and enables easy thread-handling
      - one of the biggest hurdles for Swing developers
  - Groovy goodness: builders, @Bindable annotation, metaclass method injection, scripts, etc.
  - declarative layout of GUI code in the view
  - plugins
  - automatic packaging and signing for WebStart, Applet, and traditional application deployment
    - from the **SAME** source

Griffon…

- twittersphere
  - created as a technology demonstration for JavaOne 2009
  - won the Script Bowl
    - against Jython, Clojure, Scala and JRuby
  - mashup with NASA World Wind
    - locates twitterers on an animated world map
    - in real-time!
    - only 681 LOC!



jboner
Doing my JavaOne talk on alternative concurrency paradigms tomorrow at JavaForum in Stockholm 17:00: http://is.gd/12N1w

everflux
Back from javaone and San francisco - big jetlag and too many ideas. Flight was great, thnx @lufthansa

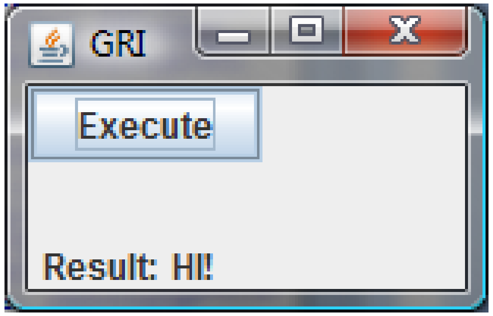
griffon

Griffon...

```
application(title:'GRI',
            pack:true,
            locationByPlatform:true) {
  borderLayout()
  hbox(constraints:NORTH) {
    button("Execute", actionPerformed:controller.&executeScript)
  }
  hbox(constraints:SOUTH) {
    hstrut(5)
    label("Result:")
    hstrut(5)
    label(text:bind {model.greeting})
  }
}
```

```
import groovy.beans.Bindable

class GRIModel {
  @Bindable def greeting = ""
}
```

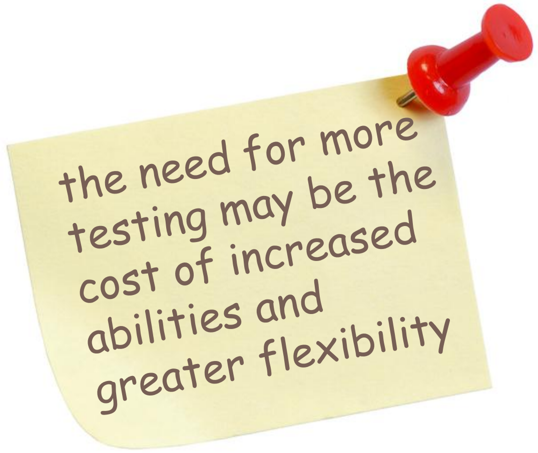
```
import java.awt.event.ActionEvent

class GRIController {
    def model
    def view

  def executeScript(ActionEvent evt = null) {
    doOutside {
          model.greeting = 'HI!'
    }
  }
}
```



Result: HI!

Testing

- dynamic languages don’t have the help of a strong type system
  - typos, etc. not uncovered until run-time*
- increased testing **required**
  - but testing is *always* required so not a problem?



the need for more testing may be the cost of increased abilities and greater flexibility

* but good IDEs can help quite a lot…many errors can be surfaced at *edit-time*

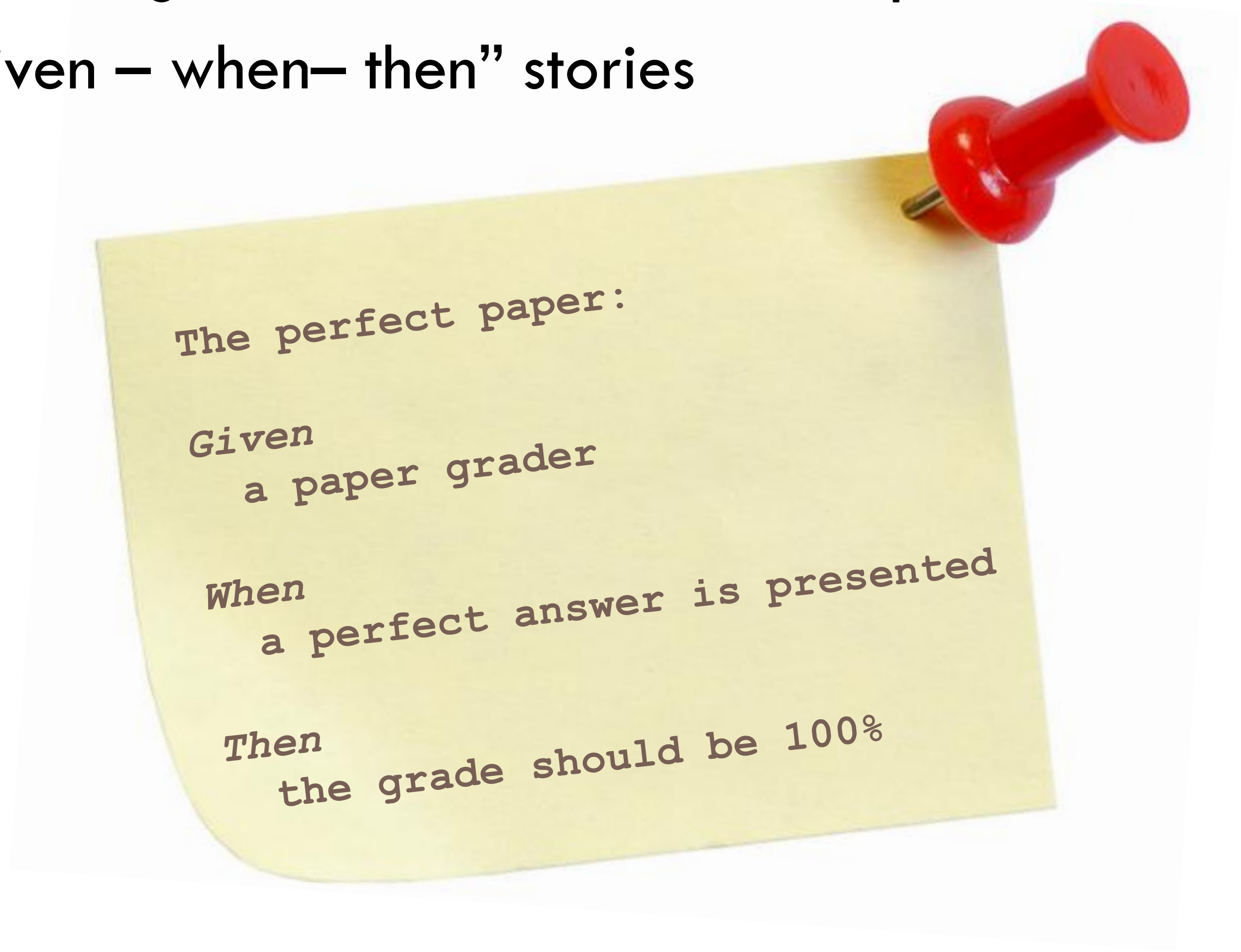
Testing…

```
class Grader {
    def expectedAnswers
    def graderFileReader

    def grade(String s) {
        def candidateAnswers = graderFileReader.readGradesListFromFile(s)
        grade(candidateAnswers)
    }

    def grade(List candidateAnswers) {
        if (expectedAnswers?.size() != candidateAnswers?.size())
            -1.0
        else {
            def count = 0
            expectedAnswers.eachWithIndex {o,index ->
                if (o == candidateAnswers[index]) count ++
            }
            count / expectedAnswers.size()
        }
    }
}
class GraderFileReader {
    def readGradesListFromFile(name) {
        def f = new File(name)
        if (!f.exists())
          throw new Exception("File $name does not exist.")
        def txt = f.text
        txt?.split(',') as List
    }
}
```

Spock

spock
the enterprise ready specification framework

- unit testing framework based on specifications
  - “given – when– then” stories



The perfect paper:

Given
  a paper grader

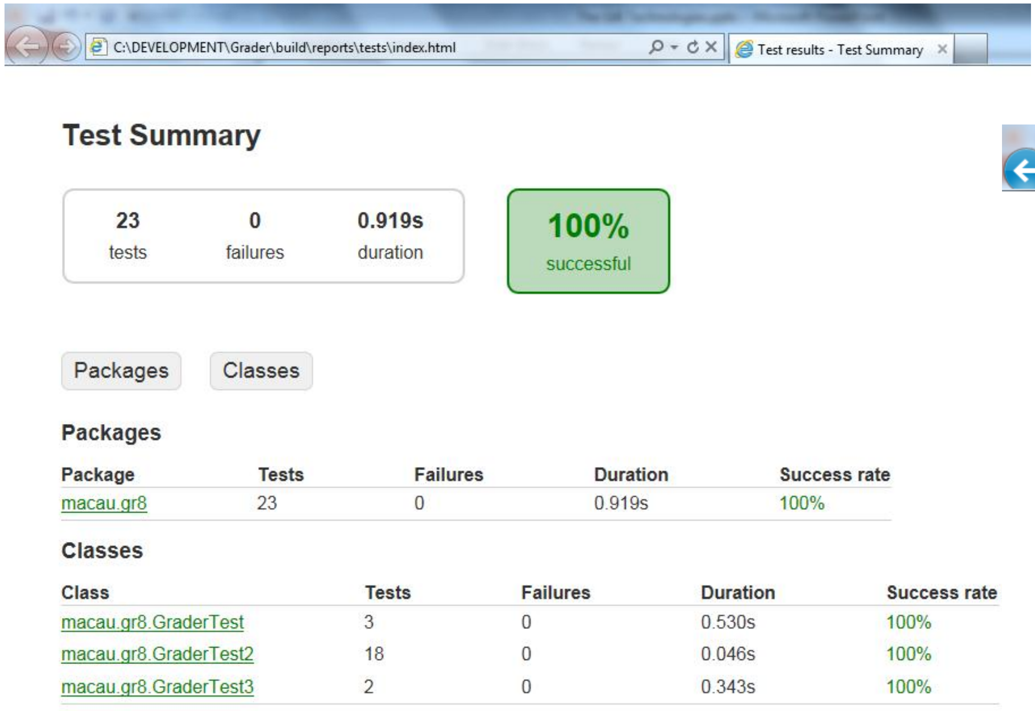
When
  a perfect answer is presented

Then
  the grade should be 100%

Spock…

```
public class GraderSpecification extends Specification {
    def grader

    def "The perfect paper"() {
        when: "A perfect answer is presented"
          def result = grader.grade(['a','b','c'])
        then: "The grade should be 100%"
          result == 1.0
    }

    def "The worst paper"() {
        when: "No answers are given"
          def result = grader.grade([])
        then: "An error should be indicated"
          result == -1.0
    }

    def "A poor paper"() {
        when: “A fairly poor paper is presented"
          def result = grader.grade(['a','c','b'])
        then: "The grade should be 33%"
          result closeTo(0.33D, 0.01D)
    }

    def setup()  { grader = new Grader(expectedAnswers: ['a','b','c']) }
    def cleanup() { grader = null }
}
```

Spock


C:\DEVELOPMENT\Grader\build\reports\tests\index.html

Test results - Test Summary

Test Summary

23 tests | 0 failures | 0.919s duration | 100% successful

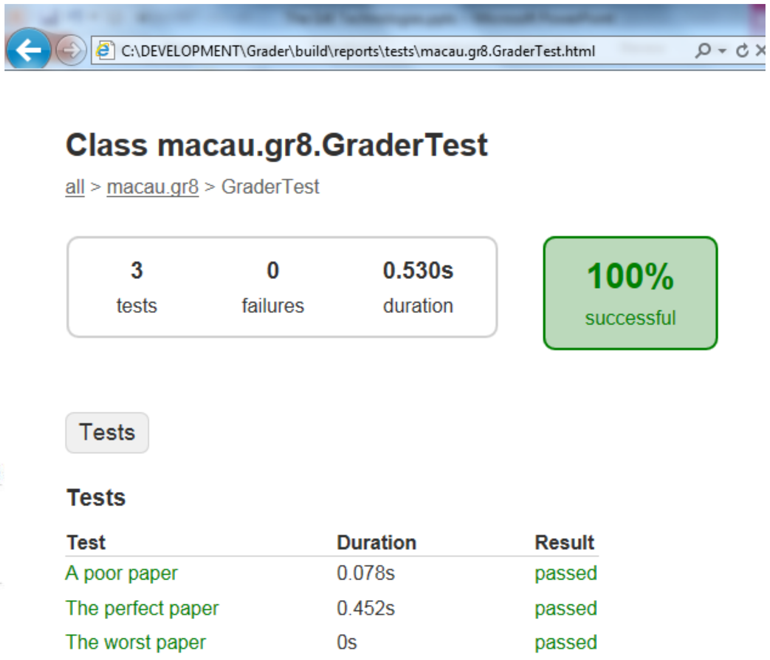
Packages | Classes

Packages

Package	Tests	Failures	Duration	Success rate
macau.gr8	23	0	0.919s	100%

Classes

Class	Tests	Failures	Duration	Success rate
macau.gr8.GraderTest	3	0	0.530s	100%
macau.gr8.GraderTest2	18	0	0.046s	100%
macau.gr8.GraderTest3	2	0	0.343s	100%


C:\DEVELOPMENT\Grader\build\reports\tests\macau.gr8.GraderTest.html

Class macau.gr8.GraderTest

all > macau.gr8 > GraderTest

3 tests | 0 failures | 0.530s duration | 100% successful

Tests

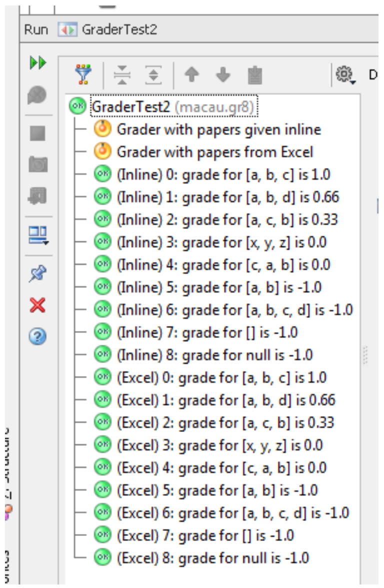
Tests

Test	Duration	Result
A poor paper	0.078s	passed
The perfect paper	0.452s	passed
The worst paper	0s	passed

Spock…

- table-driven parameterised testing

```
public class GraderSpecification2 extends Specification {
    @AutoCleanup(quiet = true)
    def grader = new Grader(expectedAnswers: ['a', 'b', 'c'])

    @Unroll("(Inline) #iterationCount: grade for #paper is #res")
    def "Grader with papers given inline"() {
        expect: "Grade an individual paper"
            that grader.grade(paper), closeTo(res, 0.01D)

        where: "With the following papers"
            paper                | res
            ['a', 'b', 'c']      | 1.0D
            ['a', 'b', 'd']      | 0.66D
            ['a', 'c', 'b']      | 0.33D
            ['x', 'y', 'z']      | 0.0D
            ['c', 'a', 'b']      | 0.0D
            ['a', 'b']           | -1.0D
            ['a', 'b', 'c', 'd'] | -1.0D
            []                   | -1.0D
            null                 | -1.0D
    }
}
```



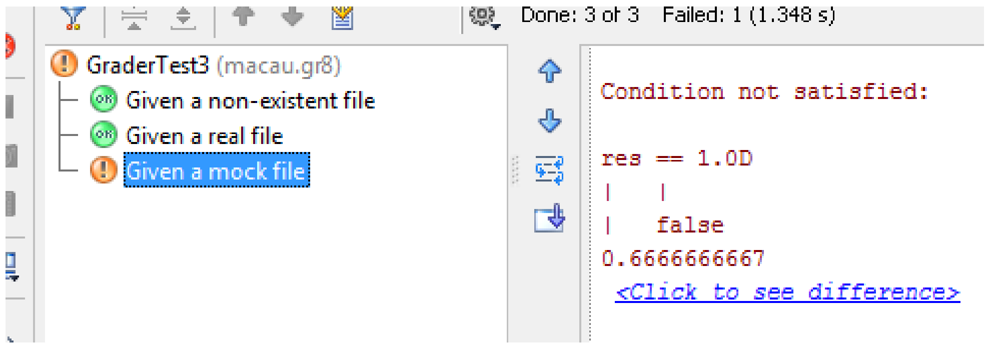
```
Run  GraderTest2
GraderTest2 (macau.gr8)
  Grader with papers given inline
  Grader with papers from Excel
  (Inline) 0: grade for [a, b, c] is 1.0
  (Inline) 1: grade for [a, b, d] is 0.66
  (Inline) 2: grade for [a, c, b] is 0.33
  (Inline) 3: grade for [x, y, z] is 0.0
  (Inline) 4: grade for [c, a, b] is 0.0
  (Inline) 5: grade for [a, b] is -1.0
  (Inline) 6: grade for [a, b, c, d] is -1.0
  (Inline) 7: grade for [] is -1.0
  (Inline) 8: grade for null is -1.0
  (Excel) 0: grade for [a, b, c] is 1.0
  (Excel) 1: grade for [a, b, d] is 0.66
  (Excel) 2: grade for [a, c, b] is 0.33
  (Excel) 3: grade for [x, y, z] is 0.0
  (Excel) 4: grade for [c, a, b] is 0.0
  (Excel) 5: grade for [a, b] is -1.0
  (Excel) 6: grade for [a, b, c, d] is -1.0
  (Excel) 7: grade for [] is -1.0
  (Excel) 8: grade for null is -1.0
```

"Green is Good"

Spock…

- mocking and expectations

```
class GraderSpecification3 extends Specification {
    @AutoCleanup(quiet = true)
    def grader = new Grader(expectedAnswers: ['a','b','c'])

    def "Given a mock file"() {
        setup: "Establish the grader with a mocked GraderFileReader"
          def graderFileReader = Mock(GraderFileReader)
          grader.graderFileReader = graderFileReader
          1 * graderFileReader.readGradesListFromFile(_) >> ['a','b','c']
          0 * _._

        when: "Grade a paper's answers from a given file"
          def res = grader.grade('rsrc/100pct.txt')

        then: "Ensure expected behaviour"
          res == 1.0D
    }
}
```



Done: 3 of 3   Failed: 1 (1.348 s)

- GraderTest3 (macau.gr8)
  - Given a non-existent file
  - Given a real file
  - Given a mock file

```
Condition not satisfied:

res == 1.0D
|    |
|    false
0.6666666667
 <Click to see difference>
```

Geb

Geb *(pronounced "jeb")*

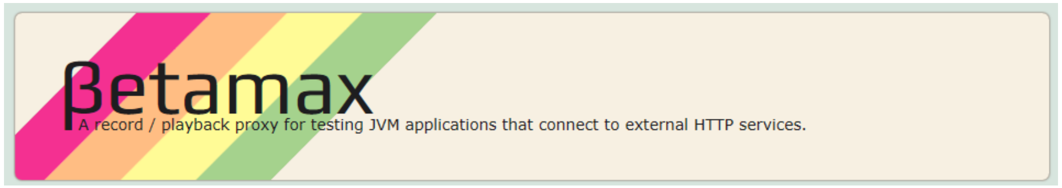
very groovy browser automation… web testing, screen scraping and more

- functional testing for the web
- An easy-to-use Domain Specific Language
  - no nasty C or XML like competing tools

Geb…

```
import geb.*

Browser.drive {
  go "http://www.google.com/"
  assert title == "Google"

  $("input", name: "q").value("wikipedia")
  $("input", value: "Google Search").click()

  assert title.endsWith("Google Search")

  def firstResultLink = $("li.g", 0).find("a.l")
  assert firstResultLink.text() == "Wikipedia, the free encyclopedia"
}
```

Betamax


Betamax
A record / playback proxy for testing JVM applications that connect to external HTTP services.

- test proxy/framework
  - first time, record; then replay
- breaks dependencies between teams/systems during test/development
- functional mocking
- regression testing

Betamax…

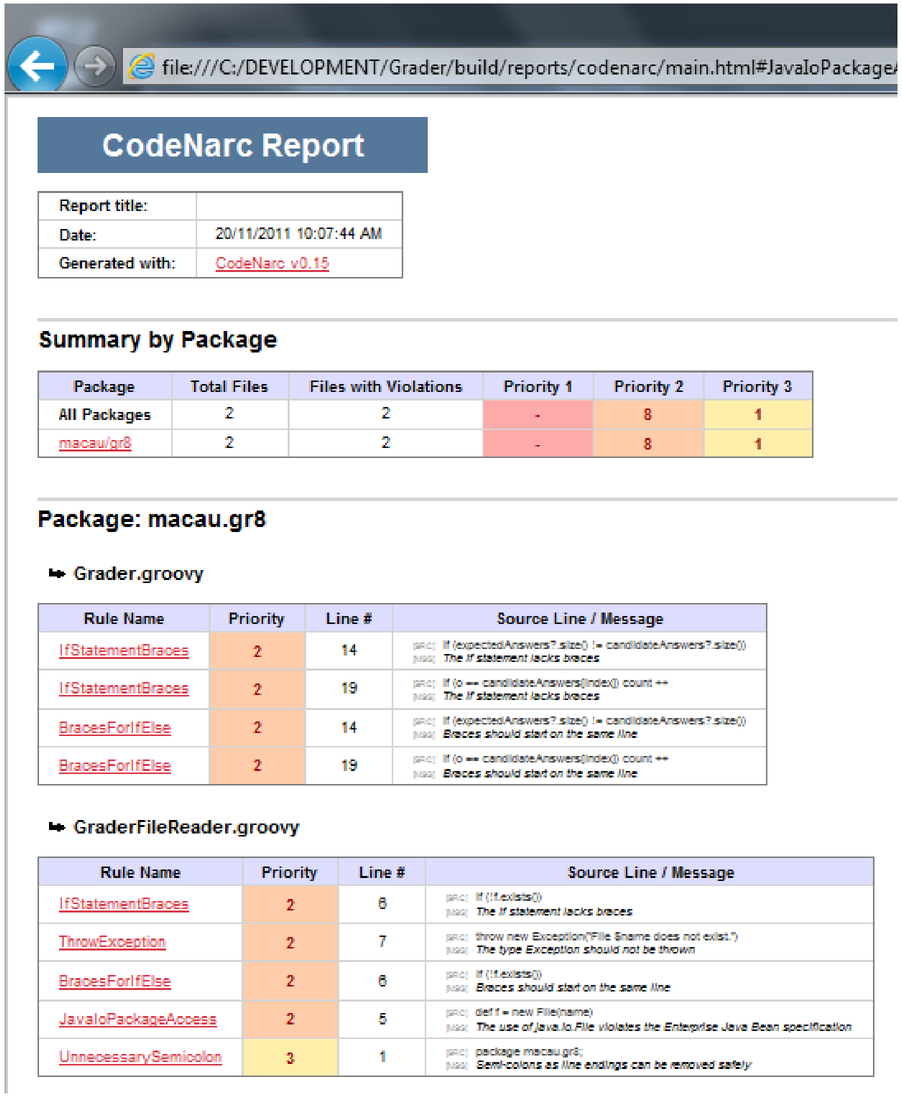
```
import geb.spock.GebSpec
import betamax.*
import org.junit.*
import spock.lang.*

class TransentiaSpec extends GebSpec {
    @Rule recorder = new Recorder()

    @Betamax(tape="transentia.betamax.tape")
    def "go to Transentia home page"() {
        setup:
            browser.driver.setProxy("localhost", 5555)
        when:
            go "http://www.transentia.com.au/"
        then:
            title.startsWith('Transentia')
        and:
          // some basic content checks
          def about = $("div.about")
          def aboutTitle = about.find("h2.title")
          aboutTitle.text() == "About Transentia"
          aboutTitle.next().text().contains("Gr8")
    }
}
```

Spock, Geb and Betamax all working together…

CodeNarc

- code inspections
  - configurable command-line tool
    - for use with Jenkins/development teams
  - checking for common whoopsies, gotchas, etc.
    - inconsistencies, unneeded/dead code
  - checks subtle/uncommon issues
    - threading, memory, resource usage

CodeNarc…



file:///C:/DEVELOPMENT/Grader/build/reports/codenarc/main.html#JavaIoPackageA

CodeNarc Report

Report title:	
Date:	20/11/2011 10:07:44 AM
Generated with:	CodeNarc v0.15

Summary by Package

Package	Total Files	Files with Violations	Priority 1	Priority 2	Priority 3
All Packages	2	2	-	8	1
macau/gr8	2	2	-	8	1

Package: macau.gr8

➥ Grader.groovy

Rule Name	Priority	Line #	Source Line / Message
IfStatementBraces	2	14	[SRC] if (expectedAnswers?.size() != candidateAnswers?.size()) [MSG] *The if statement lacks braces*
IfStatementBraces	2	19	[SRC] if (o == candidateAnswers[index]) count ++ [MSG] *The if statement lacks braces*
BracesForIfElse	2	14	[SRC] if (expectedAnswers?.size() != candidateAnswers?.size()) [MSG] *Braces should start on the same line*
BracesForIfElse	2	19	[SRC] if (o == candidateAnswers[index]) count ++ [MSG] *Braces should start on the same line*

➥ GraderFileReader.groovy

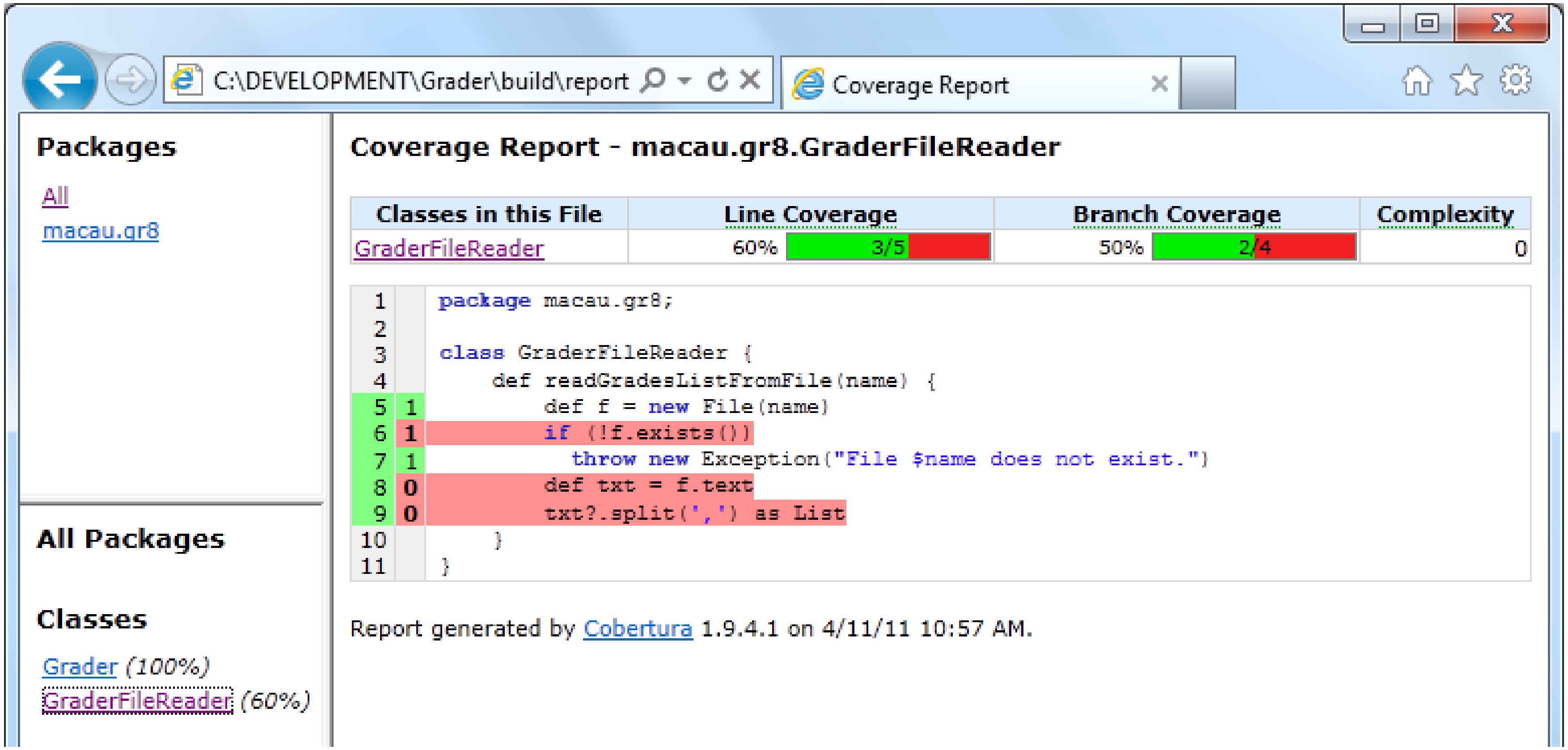
Rule Name	Priority	Line #	Source Line / Message
IfStatementBraces	2	6	[SRC] if (!f.exists()) [MSG] *The if statement lacks braces*
ThrowException	2	7	[SRC] throw new Exception("File $name does not exist.") [MSG] *The type Exception should not be thrown*
BracesForIfElse	2	6	[SRC] if (!f.exists()) [MSG] *Braces should start on the same line*
JavaIoPackageAccess	2	5	[SRC] def f = new File(name) [MSG] *The use of java.io.File violates the Enterprise Java Bean specification*
UnnecessarySemicolon	3	1	[SRC] package macau.gr8; [MSG] *Semi-colons as line endings can be removed safely*

```
ruleset {
    description 'A Sample Groovy RuleSet'
    AssignmentInConditional
    StaticCalendarField
    SynchronizedOnBoxedPrimitive
    ReturnsNullInsteadOfEmptyCollection
    SimpleDateFormatMissingLocale
    DuplicateNumberLiteral
    CatchIllegalMonitorStateException
    …
}
```

Cobertura

- code coverage testing
  - command-line tool
    - configurable
  - show what has been tested
  - guide what further tests need to be created

Cobertura



Packages

All
macau.gr8

All Packages

Classes

Grader *(100%)*
GraderFileReader *(60%)*

Coverage Report - macau.gr8.GraderFileReader

Classes in this File	Line Coverage	Branch Coverage	Complexity
GraderFileReader	60% 3/5	50% 2/4	0

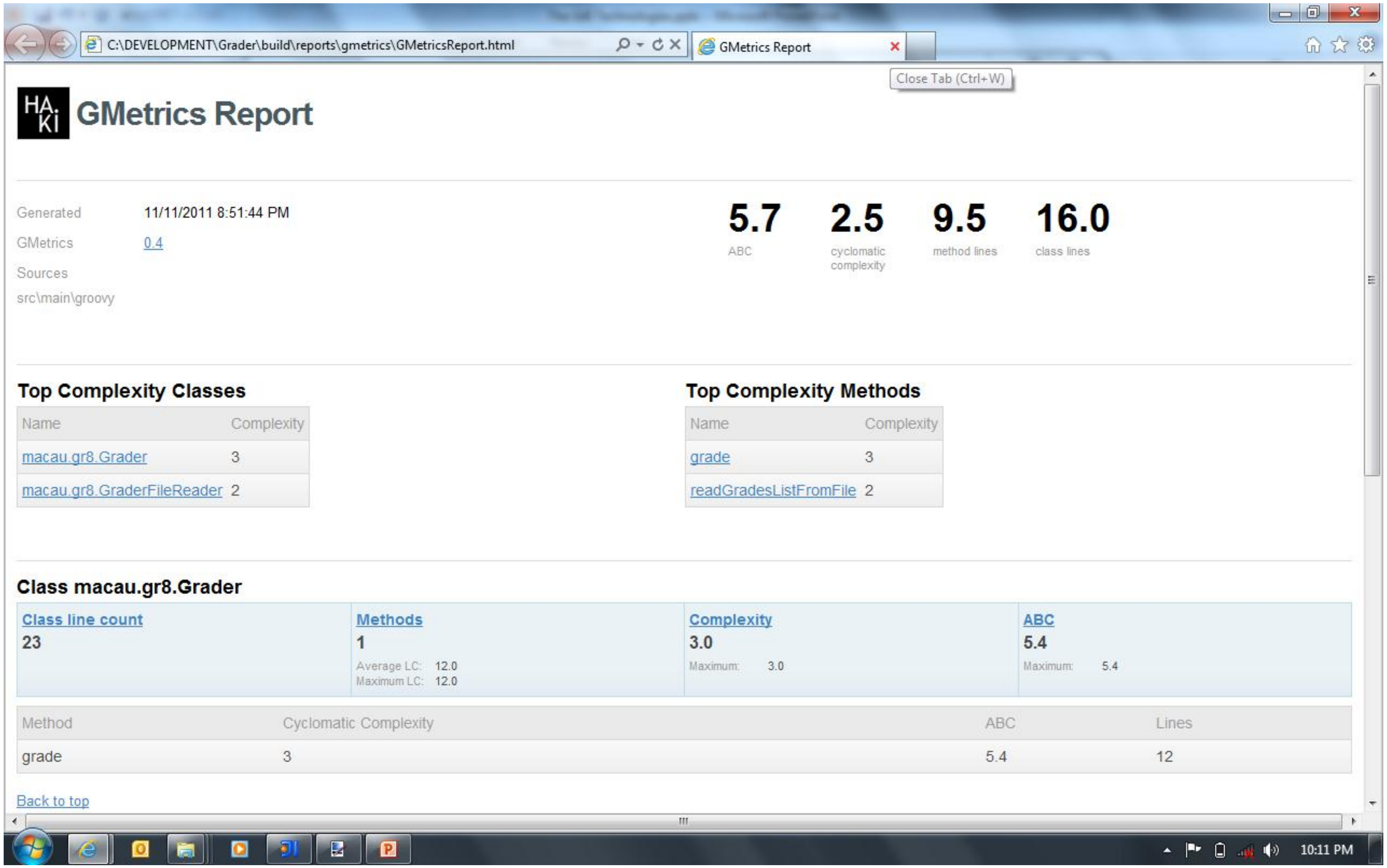
```
 1     package macau.gr8;
 2
 3     class GraderFileReader {
 4         def readGradesListFromFile(name) {
 5  1          def f = new File(name)
 6  1          if (!f.exists())
 7  1            throw new Exception("File $name does not exist.")
 8  0          def txt = f.text
 9  0          txt?.split(',') as List
10         }
11     }
```

Report generated by Cobertura 1.9.4.1 on 4/11/11 10:57 AM.

GMetrics

- code metrics
  - command-line tool
    - configurable
  - indicate how complex the code is
  - guide testing and refactoring

GMetrics



C:\DEVELOPMENT\Grader\build\reports\gmetrics\GMetricsReport.html

GMetrics Report

Close Tab (Ctrl+W)

GMetrics Report

Generated	11/11/2011 8:51:44 PM
GMetrics	0.4
Sources	
src\main\groovy	

5.7	2.5	9.5	16.0
ABC	cyclomatic complexity	method lines	class lines

Top Complexity Classes

Name	Complexity
macau.gr8.Grader	3
macau.gr8.GraderFileReader	2

Top Complexity Methods

Name	Complexity
grade	3
readGradesListFromFile	2

Class macau.gr8.Grader

Class line count	Methods	Complexity	ABC
23	1 Average LC: 12.0 Maximum LC: 12.0	3.0 Maximum: 3.0	5.4 Maximum: 5.4

Method	Cyclomatic Complexity	ABC	Lines
grade	3	5.4	12

Back to top

10:11 PM

Summary

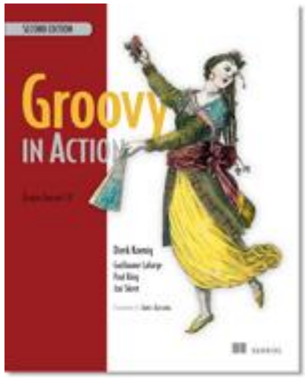
- *an agile and **dynamic language** for the **Java Virtual Machine***
- *builds upon the strengths of Java but has **additional power features** inspired by languages like Python, Ruby and Smalltalk*
- *makes **modern programming features** available to Java developers with **almost-zero learning curve***
- *supports **Domain-Specific Languages** and other compact syntax so your code becomes **easy to read and maintain***
- *makes writing shell and build scripts easy with its **powerful processing primitives**, OO abilities and an Ant DSL*
- *increases developer productivity by **reducing scaffolding** code when developing web, GUI, database or console applications*
- ***simplifies testing** by supporting unit testing and mocking out-of-the-box*
- *seamlessly **integrates with all existing Java objects and libraries***
- *compiles straight to Java bytecode so you can use it anywhere you can use Java*

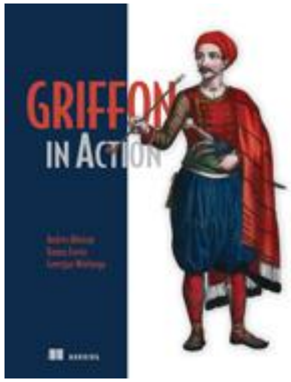
Summary

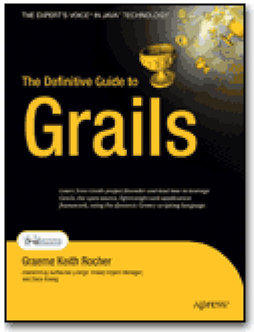
- …of the summary

Learn More

- Resources
  - user@groovy.codehaus.org
  - http://groovy.codehaus.org
  - http://gradle.org
  - http://griffon.codehaus.org
  - http://grails.codehaus.org
  - http://jenkins-ci.org
  - http://gant.codehaus.org
  - http://gmetrics.sourceforge.net
  - http://cobertura.sourceforge.net
  - http://easyb.org
  - http://jfugue.org
  - http://jscience.org
  - http://codenarc.sourceforge.net
  - http://code.google.com/p/spock
  - http://robfletcher.github.com/betamax
  - http://gebish.org
  - http://mrhaki.com
  - http://www.transentia.com.au
  - http://groovyblogs.org
  - http://groovymag.com







END

謝謝您們的聆聽

(questions?)