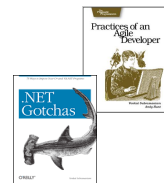


Agile Web Development with Grails

```
spkr.name = 'Venkat Subramaniam'  
spkr.company = 'Agile Developer, Inc.'  
spkr.credentials = %w{Programmer Trainer Author}  
spkr.blog = 'agiledeveloper.com/blog'  
spkr.email = 'venkats@agiledeveloper.com'
```



Abstract

- Agile development is all about developing code and seeking feedback from your users to make sure you're developing what's relevant. When they suggest changes, those must be affordable and reliable. Grails, along with its facility to develop test driven, is a killer combination for rapidly developing web applications. In this ZePo (Zero PowerPoint) presentation, we will take a test driven approach to developing a small but fully functional web application in Grails. We will cover the fundamental features of Grails along with utilizing other capabilities like Ajax. At the end of this presentation, you will not only be confident, but eager to roll your own web application using Grails.

Agenda

- What's Grails?
- Principles
- Fundamentals
- A Quick App
- Phase I
- Unit Testing
- Functional Testing
- Phase II
- Templating
- Ajaxing
- Conclusion

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What's Grails?

- Open Source Web Framework
- Inspired by Rails, but not a port
- Uses Groovy and Java
- Built for JVM
- Rapid Development of CRUD Applications
 - But you can leverage Java strengths
- This presentation based on Grail 0.6

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Grails Principles

- DRY
- Convention Over Configuration
 - A bit of a problem when you're new
 - Once you get used to it, you're in Paradise
- Keep it Simple
- Leverage Java Platform

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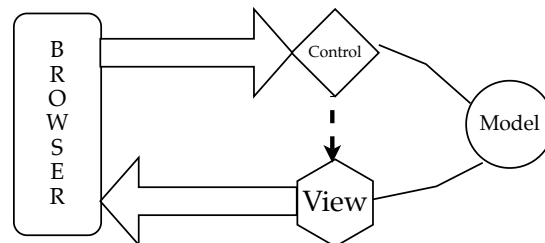
Agenda

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Grails MVC

- Grails built on concept of MVC
- It does not merely recommend that you use MVC
 - It tells you to do so, then follows you home, and sits next to you to make sure you do



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Build and Learn

- A Contacts Application
- Add name, email, phone, state of residence
- Edit, list, ...

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grails Generator

```
Terminal - bash - 49x28
> grails help

Welcome to Grails 0.6 - http://grails.org/
Licensed under Apache Standard License 2.0
Grails home is set to: /usr/local/bin/grails-0.6

Base Directory: /Users/venkats/workarea/examples
Environment set to development
Note: No plugin scripts found
Running script /usr/local/bin/grails-0.6/scripts/
Help.groovy

Usage (optionals marked with *):
grails [environment]* [target] [arguments]*

Examples:
grails dev run-app
grails create-app books

Available Targets (type grails help
'target-name' for more info):
grails bootstrap
grails bug-report
grails clean
grails compile
grails console
grails create-app
grails create-app-abb
grails console
grails compile
```

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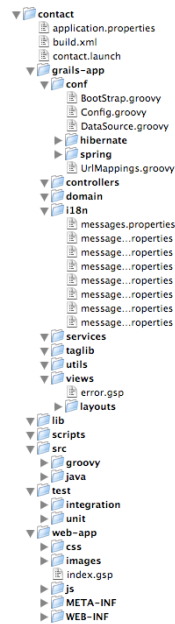
Create App

```
Terminal -- bash -- 49x28
> grails create-app contact

Welcome to Grails 0.6 - http://grails.org/
Licensed under Apache Standard License 2.0
Grails home is set to: /usr/local/bin/grails-0.6

Base Directory: /Users/venkats/workarea/examples
Environment set to development
Note: No plugin scripts found
Running script /usr/local/bin/grails-0.6/scripts/
CreateApp.groovy
Caching script CreateApp_groovy to dir /Users/venkats/.grails/0.6/scriptCache
Caching script Clean_groovy to dir /Users/venkats/.grails/0.6/scriptCache
Caching script Package_groovy to dir /Users/venkats/.grails/0.6/scriptCache
Caching script Compile_groovy to dir /Users/venkats/.grails/0.6/scriptCache
Caching script GetDependencies_groovy to dir /Users/venkats/.grails/0.6/scriptCache
Caching script InstallIvy_groovy to dir /Users/venkats/.grails/0.6/scriptCache
Caching script PackagePlugins_groovy to dir /Users/venkats/.grails/0.6/scriptCache
Overriding previous definition of reference to groovyJarSet
[mkdir] Created dir: /Users/venkats/workarea/
```

Directory Structure



Code Generation

- Grails script generates quite a bit of stuff for you
 - Mostly html
 - Code is mostly synthesized rather than being generated

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Three Configurations

- Creates three configurations
 - Production
 - Development
 - Testing

```
1 dataSource {
2   pooled = false
3   driverClassName = "org.hsqldb.jdbcDriver"
4   username = "sa"
5   password = ""
6 }
7 // environment specific settings
8 environments {
9   development {
10    dataSource {
11      dbCreate = "create-drop" // one of 'create', 'create-drop', 'update'
12      url = "jdbc:hsqldb:mem:devDB"
13    }
14  }
15  test {
16    dataSource {
17      dbCreate = "update"
18      url = "jdbc:hsqldb:mem:testDb"
19    }
20  }
21  production {
22    dataSource {
23      dbCreate = "update"
24      url = "jdbc:hsqldb:file:prodDb;shutdown=true"
25    }
26  }
27 }
```

```
1 class BootStrap {
2
3   def init = { servletContext ->
4   }
5   def destroy = {
6   }
7 }
```

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Create Domain class

```
> pwd
/Users/venkats/workarea/examples/contact
>

Welcome to Grails 0.6 - http://grails.org/
Licensed under Apache Standard License 2.0
Grails home is set to: /usr/local/bin/grails-0.6

Base Directory: /Users/venkats/workarea/examples/
contact
Environment set to development
Note: No plugin scripts found
Running script /usr/local/bin/grails-0.6/scripts/
CreateDomainClass.groovy
Caching script CreateDomainClass.groovy to dir /U
sers/venkats/.grails/0.6/scriptCache
Caching script CreateIntegrationTest.groovy to di
r /Users/venkats/.grails/0.6/scriptCache
[copy] Copying 1 file to /Users/venkats/work
area/examples/contact/grails-app/domain
Created for State
[copy] Copying 1 file to /Users/venkats/work
area/examples/contact/test/integration
Created Tests for State
□
```

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Generated Code



```
x State.groovy
1 class State {
2 }
3

x StateTests.groovy
1 class StateTests extends GroovyTestCase {
2
3 void testSomething() {
4
5 }
6 }
7
```

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Editing Domain Class

```
class State
{
    String twoLetterCode
}
```

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Generating Controller and Views

```
> grails generate-all State

Welcome to Grails 0.6 - http://grails.org/
Licensed under Apache Standard License 2.0
Grails home is set to: /usr/local/bin/grails-0.6

Base Directory: /Users/venkats/workarea/examples/contact
Environment set to development
Note: No plugin scripts found
Running script /usr/local/bin/grails-0.6/scripts/GenerateAll.groovy
Caching script GenerateAll.groovy to dir /Users/venkats/.grails/0.6/scriptCache
[mkdir] Created dir: /Users/venkats/.grails/0.6/projects/contact/classes
Compiling 5 source files to /Users/venkats/.grails/0.6/projects/contact/classes
[mkdir] Created dir: /Users/venkats/workarea/examples/contact/web-app/WEB-INF/grails-app/i18n
[copy] Copying 8 files to /Users/venkats/workarea/examples/contact/web-app/WEB-INF/grails-app/i18n
[copy] Copying 1 file to /Users/venkats/workarea/examples/contact/web-app/WEB-INF/spring
[copy] Copying 1 file to /Users/venkats/.grails/0.6/projects/contact/classes
[copy] Copying 1 file to /Users/venkats/.grails/0.6/projects/contact/classes
Generating views for domain class State ...
Generating controller for domain class State ...
Finished generation for domain class State
```

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Controller

```
class StateController {
  def index = { redirect(action:list,params:params) }

  // the delete, save and update actions only accept POST requests
  def allowedMethods = [delete:'POST', save:'POST', update:'POST']

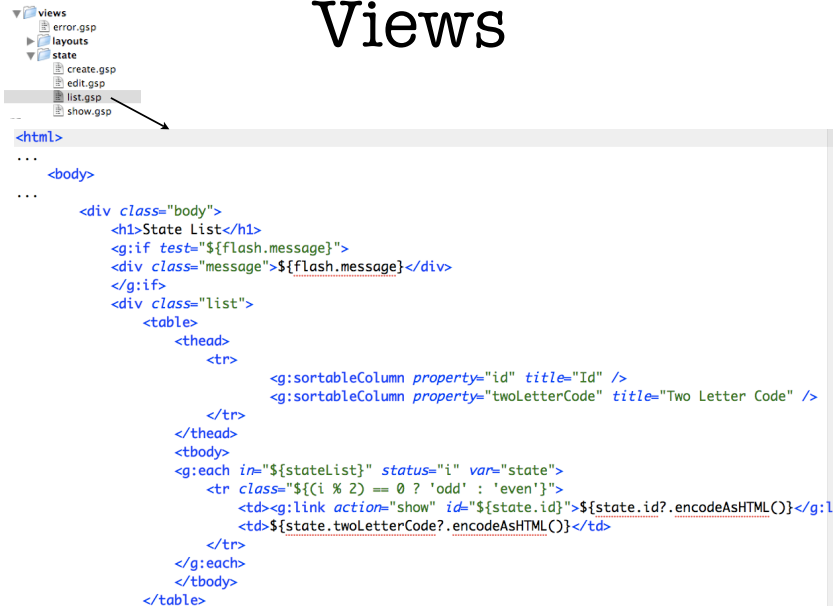
  def list = {
    if(!params.max)params.max = 10
    [ stateList: State.list( params ) ]
  }

  def show = {
    [ state : State.get( params.id ) ]
  }

  def delete = {
    def state = State.get( params.id )
    if(state) {
      state.delete()
      flash.message = "State ${params.id} deleted."
    }
  }
}
```

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Views



```
<html>
...
<body>
...
<div class="body">
  <h1>State List</h1>
  <g:if test="{flash.message}">
    <div class="message">{flash.message}</div>
  </g:if>
  <div class="list">
    <table>
      <thead>
        <tr>
          <th>
            <g:sortableColumn property="id" title="Id" />
            <g:sortableColumn property="twoLetterCode" title="Two Letter Code" />
          </th>
        </tr>
      </thead>
      <tbody>
        <g:each in="{stateList}" status="i" var="state">
          <tr class="{(i % 2) == 0 ? 'odd' : 'even'}">
            <td><g:link action="show" id="{state.id}">{state.id?.encodeAsHTML()}</g:link>
            <td>{state.twoLetterCode?.encodeAsHTML()}</td>
          </tr>
        </g:each>
      </tbody>
    </table>
  </div>
</div>
...
</body>
</html>
```

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A Quick Test Drive

```
> grails run-app
```

```
Welcome to Grails 0.6 - http://grails.org/  
Licensed under Apache Standard License 2.0  
Grails home is set to: /usr/local/bin/grails-0.6
```

```
Base Directory: /Users/venkats/workarea/examples/contact  
Environment set to development  
Note: No plugin scripts found
```

```
Running script /usr/local/bin/grails-0.6/scripts/RunApp.groovy  
Caching script RunApp.groovy to dir /Users/venkats/.grails/0.6/  
[mkdir] Created dir: /Users/venkats/workarea/examples/conta
```

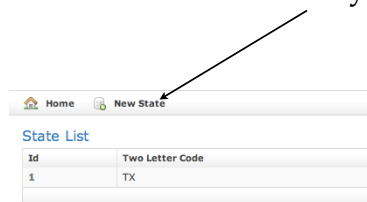
```
Compiling 1 source file  
Running Grails application  
2007-10-10 11:25
```



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A Quick Test Drive...

Created New State by clicking on this link



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Test Driven Development

- A way to design an application
- Helps find problems quickly
- As system evolves, let us know if we meet the expectations
- Serves as a valuable form of documentation
- Safety net for refactoring
- Write Positive, Negative, and Exception tests
- In Grails 0.6, these are generated under Integration Tests (from a pure definition point of view, they are since you may talk to DB?)

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Test First Domain Logic

```
class StateTests extends GroovyTestCase {  
  
class State  
{  
    String twoLetterCode  
}  
  
void testStateCodeTwoLetters()  
{  
    State state = new State(TwoLetterCode: 'Texas')  
    assertFalse state.validate()  
}  
}
```

>grails test-app

Welcome to Grails 0.6 - http://grails.org/
Licensed under Apache Standard License 2.0
Grails home is set to: /usr/local/bin/grails-0.6

Base Directory: /Users/venkats/workarea/examples/contact

Note: no plugin scripts found
Running script /usr/local/bin/grails-0.6/scripts/TestApp.groovy
Compiling 1 source files to /Users/venkats/.grails/0.6/projects/contact/classes
Compiling 2 source files to /Users/venkats/workarea/examples/contact/test/classes
No tests found in test/unit to execute ...

[junitreport] Transform time: 1162ms
Tests failed: 0 errors, 1 failures, 0 compilation errors. View reports in /Users/venkats/
workarea/examples/contact/test/reports

27

Code Next Domain Logic

```
class State  
{  
    String twoLetterCode  
  
    static constraints = {  
        twoLetterCode(size: 2..2)  
    }  
}
```

```
>grails test-app  
...  
Running test StateTests...  
testStateCodeTwoLetters...SUCCESS  
Integration Tests Completed in 1291ms  
...
```

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After Two More Tests...

```
class StateTests extends GroovyTestCase {  
  
    void testStateCodeTwoLetters()  
    {  
        def state = new State(twoLetterCode: 'Texas')  
        assertFalse state.validate()  
    }  
  
    void testStateCodeNotEmpty()  
    {  
        def state = new State(twoLetterCode: Integration Tests Completed in 1463ms)  
        assertFalse state.validate()  
    }  
  
    void testStateCodeUnique()  
    {  
        def state = new State(twoLetterCode: 'TX')  
        state.save()  
  
        def anotherState = new State(twoLetterCode: 'TX')  
        assertFalse anotherState.validate()  
    }  
  
    class State  
    {  
        String twoLetterCode  
  
        static constraints = {  
            twoLetterCode(size: 2..2, blank: false, unique: true)  
        }  
    }  
}
```

Running test StateTests...
testStateCodeTwoLetters...SUCCESS
testStateCodeNotEmpty...SUCCESS
testStateCodeUnique...SUCCESS

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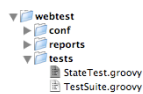
Integration Testing

- Functional Testing or Integration Testing is automated testing of functionality
- Very helpful when done in addition to unit testing
- Grails uses Canoo for this

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Generate Web Test

```
>grails generate-webtest State
...
Running script /usr/local/bin/grails-0.6/scripts/GenerateWebtest.groovy
[mkdir] Created dir: /usr/local/bin/grails-0.6/downloads
[get] Getting: http://webtest.canoo.com/webtest/build.zip
[get] To: /usr/local/bin/grails-0.6/downloads/webtest.zip
.....
[get] last modified = Thu Oct 11 03:33:30 MDT 2007
[unzip] Expanding: /usr/local/bin/grails-0.6/downloads/webtest.zip into /usr/local/bin/grails-0.6/downloads/webtest
[copy] Copying 3 files to /Users/venkats/workarea/examples/contact
[copy] Copying 1 file to /Users/venkats/workarea/examples/contact/webtest/tests
Web Test generated at webtest/tests/StateTest.groovy
```



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Generated Web Test

```
StateTest.groovy
1 class StateTest extends grails.util.WebTest {
2
3     // Unlike unit tests, functional tests are often sequence dependent.
4     // Specify that sequence here.
5     void suite() {
6         testStateListNewDelete()
7         // add tests for more operations here
8     }
9
10    def testStateListNewDelete() {
11        webtest('State basic operations: view list, create new entry, view, edit, delete, view'){
12            invoke(url:'state')
13            verifyText(text:'Home')
14
15            verifyListPage(0)
16
17            clickLink(label:'New State')
18            verifyText(text:'Create State')
19            clickButton(label:'Create')
20            verifyText(text:'Show State', description:'Detail page')
21            clickLink(label:'List', description:'Back to list view')
22
23            verifyListPage(1)
24
25            aroup(description:'edit the one element') f
```

33

Running Generated Tests

Got an error, so downloaded latest version of log4j
and copied log4j-1.2.15.jar to grails install lib directory

```
>grails run-webtest
...
Environment set to test
...
Running Grails application..
...
WebTest complete
...
Server stopped
```

34

Viewing Test Results

> open webtest/reports/WebTestResults.html

The screenshot shows a web browser window displaying test results. The main content area is titled 'webtest' and 'The contact Project - Test Result'. It features a 'Result Summary' section with a table of WebTests and Steps. A 'Text Scenario Overview' table is also visible. Below these is a 'Create State' form with a 'Two Letter Code:' input field and a 'Create' button. A red arrow points from the 'Create State' form to the 'Steps' table in the 'Result Summary' section.

WebTests	#	%	Graph	Secs	#	%	Graph	Histogram
✓	0	0		0-1	2	67		
✗	1	100		1-3	1	33		
Sum	1	100		3-5	0	0		

Steps	#	%	Graph	Duration	%	Timing profile	Falling step
✓	6	48		5-10	0	0	
✗	1	8		10-30	0	0	
○	6	48		>30	0	0	
Sum	13	100		Sum	3	100	
							Avg 1144 ms

#	Result	Name	# Steps	Duration	%	Timing profile	Falling step
1	✗	State basic operations: view list, create new entry, view, edit, delete, view	8 / 30	3533	100		verifyText Detail page

Grails
Home State List

Create State

- Property [twoLetterCode] of class [class State] cannot be blank

Two Letter Code:

Create

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Fixing the Test for Validation Error

```
def testStateListNewDelete() {
    webtest('State basic operations: view list, create new entry, view, edit, delete, view'){
        invoke(url:'state')
        verifyText(text:'Home')

        verifyListPage(0)

        clickLink(label:'New State')
        verifyText(text:'Create State')
        setInputField(name:'twoLetterCode', value:'CO')
        clickButton(label:'Create')
        verifyText(text:'Show State', description:'Detail page')
        clickLink(label:'List', description:'Back to list view')

        verifyListPage(1)
    }
}
```

The screenshot shows a web browser window displaying test results. The main content area is titled 'webtest' and 'The contact Project - Test Result'. It features a 'Result Summary' section with a table of WebTests and Steps. A 'Steps' table is also visible. A red arrow points from the 'Steps' table to the 'verifyText' line in the code block above.

WebTests	#	%	Graph
✓	0	0	
✗	1	100	
Sum	1	100	

Steps	#	%	Graph
✓	6	64	
✗	1	7	
○	4	29	
Sum	14	100	

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Building Second Domain Class

- We will continue to build the next Domain class— Person
- Steps similar to what we've done earlier
 - Create Domain Class
 - Generate Controller and Views

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Person Class

> grails create-domain-class Person

```
class Person
{
    String name
    String email
    String phoneNumber
    State residenceState

    def belongsTo = State
}
```

Edit generated class

39

Test Driving

> grails generate-all Person

Home Person List

Create Person

Email:

Name:

Phone Number:

Residence State:

Create

Where's our State?
Was in the in-memory database
Missing State won't give confidence to our customer

40

Bootstrap Data

```
1 class Bootstrap {
2
3     def init = { servletContext ->
4         new State(twoLetterCode: 'TX').save()
5         new State(twoLetterCode: 'GA').save()
6         new State(twoLetterCode: 'CA').save()
7         new State(twoLetterCode: 'MA').save()
8         new State(twoLetterCode: 'CO').save()
9         new State(twoLetterCode: 'IL').save()
10    }
11    def destroy = {
12    }
13 }
```

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Restart grails

Create Person

Email:

Name:

Phone Number:

Residence State:

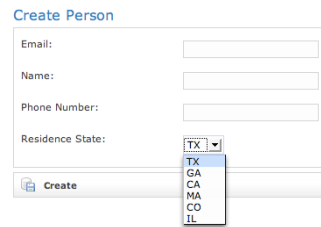
???

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A Quick Fix

```
<g:select optionKey="id" from="${State.list()}"
         name='residenceState.id' value="${person?.residenceState?.id}" optionValue="twoLetterCode"></g>
</td></tr>
```

Add optionValue element
to the select element in create.gsp



The screenshot shows a web form titled "Create Person". It contains four input fields: "Email:", "Name:", "Phone Number:", and "Residence State:". The "Residence State:" field is a dropdown menu with a list of state abbreviations: TX, GA, CA, MA, CO, and IL. Below the form is a "Create" button.

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Templates

- Reusable fragments
- File naming convention starts with _
- You can render as a bean or collection
 - bean results in one expansion
 - collection results in one expansion per element of collection

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Templates

```
1 <html>
2 <head>
3 <meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
4 <meta name="layout" content="main" />
5 <title>Create Person</title>
6 </head>
7 <body>
8 <div class="nav">
9 <span class="menuItem"><a class="home" href="#">Home</a>
10 <span class="menuItem"><a class="list" href="#">List</a>
11 </div>
12 <div class="body">
13 <h1>Create Person</h1>
14 <g:if test="${flash.message}">
15 <div class="message">${flash.message}</div>
16 </g:if>
17 <g:hasErrors bean="${person}">
18 <div class="errors">
19 <g:renderErrors bean="${person}" as="list" />
20 </div>
21 </g:hasErrors>
22 <g:render template="addperson" bean="new Person()" />
23 </div>
24 </body>
25 </html>
```

Content moved to _addperson.gsp and referred here

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Ajaxing Frameworks

- Very easy to integrate with Ajax frameworks
 - Ships with Prototype
 - You may use other frameworks as well

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Ajaxing Create

```
list.gsp
<html>
  <head>
    <meta http-equiv="Content-Type" content="text/html; charset=L
    <meta name="layout" content="main" />
    <title>Person List</title>
  </head>
  <body>
    <div class="nav">
      <span class="menuButton"><a class="home" href="{createLi
      <span class="menuButton"><g:link class="create" action="c
    </div>
    <div class="body">
      <h1>Person List</h1>
      <g:if test="{flash.message}">
      <div class="message">{flash.message}</div>
      </g:if>
      <div class="list">
        <g:render template="listpeople" bean="personList" />
      </div>
      <div class="paginateButtons">
        <g:paginate total="{Person.count()}" />
      </div>
      <g:render template="addperson" bean="new Person()" />
    </div>
  </body>
</html>
```

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Ajaxing Create...

```
x_listpeople.gsp
1 <table id="peopletable">
2   <thead>
3     <tr>
4
5       <g:sortableColumn property="id" title="Id" />
6
7       <g:sortableColumn property="email" title="Email" />
8
9       <g:sortableColumn property="name" title="Name" />
10
11      <g:sortableColumn property="phoneNumber" title="Phone
12
13      <th>Residence State</th>
14
15    </tr>
16  </thead>
17  <tbody>
18    <g:render template="listperson" collection="{personList}" />
19  </tbody>
20 </table>
```

50

Ajaxing Create...

```
x_listperson.gsp
1 <tr>
2
3 <% person = it %>
4
5 <td><g:link action="show" id="{person.id}">${person.id?.encodeAsHTML()}</g:link></td>
6
7 <td>${person.email?.encodeAsHTML()}</td>
8
9 <td>${person.name?.encodeAsHTML()}</td>
10
11 <td>${person.phoneNumber?.encodeAsHTML()}</td>
12
13 <td>${person.residenceState?.encodeAsHTML()}</td>
14
15 </tr>
```

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Ajaxing Create...

```
#_addPerson.gsp
1 <g:javascript library="prototype" />
2 <g:javascript library="scriptaculous" />
3 <g:javascript library="effects" />
4
5 <g:formRemote url="[controller: 'person', action:'save']" name="createperson" method="post"
6 update="list" onComplete="new Effect.Pulsate(\$(peopletable).rows[\$(peopletable).rows.length - 1])">
7 <div class="dialog">
8 <table>
9 <tbody>
10
11 <tr class="prop"><td valign="top" class="name"><label for="email">Email:</label></td>
```

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Ajaxing Create...

```
x PersonController.groovy
65
66 □   def save = {
67     def person = new Person()
68     person.properties = params
69 □   if(person.save()) {
70     flash.message = "Person ${person.id} created."
71     //redirect(action:show,id:person.id)
72     redirect(action:list)
73 □   }
74 □   else {
75     render(view: 'create',model:[person:person])
76 □   }
77 □ }
78
79 □ }
```

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Agenda

- What's Grails?
- Principles
- Fundamentals
- A Quick App
- Phase I
- Unit Testing
- Functional Testing
- Phase II
- Templating
- Ajaxing
- Conclusion

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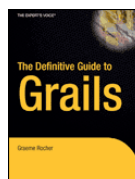
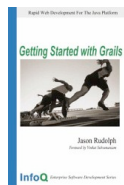
Quiz Time



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References

- <http://grails.codehaus.org>
- <http://grails.codehaus.org/Download>
- <http://groovy.codehaus.org>
- <http://groovy.codehaus.org/Download>
- <http://aboutgroovy.com>



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Thank You!

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