Building Grails Applications with PostgreSQL

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PostgreSQL East - March 25, 2010

About Brent and Ken

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About Chariot Solutions

- Java and Open Source solutions provider
- Chariot Solutions Education Services
  - Groovy and Grails training and mentoring
- Chariot Solutions Consulting
  - Development and consulting services
- http://www.chariotsolutions.com

Goals

- Provide a basic overview of the Grails framework - with a dash of Groovy
- Review some of the features of Grails Object Relational Modeling (GORM)
- Demonstrate Grails with PostgreSQL

Introduction to Groovy

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GRAILS

Groovy

- A dynamic language built for the Java Virtual Machine
  - Compiles to native ByteCode
  - Can inherit Groovy classes from Java classes (and vice versa)
  - Native access to any Java library

Benefits of Groovy

- Adds "Convention over Configuration"
  - Groovy beans are VERY simple
  - Assumes methods are public, member variables are private
  - Constructors not required
  - Easy collections – Use the [ ] syntax for lists and maps

A Sampling of Groovy APIs

- xml – Powerful XML Parsing, Creation
- gsql – Simplified JDBC API
- Groovy Testing– simple testing API, mocking with closures, etc...
- Collections – lists, maps and ranges
- builders – a set of repetitive building tasks can be automated using various Groovy Builders
- Swing – the Groovy SwingBuilder makes UI easy. Also Griffon is a Groovy-based MVC framework for Swing (like Grails for Web)

Java Person Class

```
public class Person {
  private String firstName;
  private String lastName;
  private Date birthDate;

  public Person(String firstName,
        String lastName, Date birthDate) {
    ...
  }

  public void setFirstName() { ... }
  public String getFirstName() { ... }

  // etc...
}
```

Groovy Person Class

```
class Person {
  String lastName
  String firstName
  Date birthDate
}
```

Constructors and Lists

```
// Groovy provides constructors for free
def bob = new Person(firstName:'Bob', lastName:'Smith')
def sue = new Person(firstName:'Sue', lastName:'Jones',
                     birthDate:new Date('8/12/1974'))
```

```
// ArrayLists are simple
def persons = [ new Person(firstName:‘Bob’),
                           new Person(firstName:‘Sue’)]

persons += new Person(firstName:‘John’)
```

Groovy SQL Support

```
// Using JDBC

def sql = Sql.newInstance(url, usr, pwd, driver)
sql.execute("insert into table values ($foo, $bar)")
sql.execute("insert into table values (?,?)", [a,b])
sql.eachRow("select * from USER") {println it.name}
def list = sql.rows("select * from USER")
```

Introduction to Grails

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Grails Framework

- A web application framework
  - Three-tiered Model View Controller (MVC)
- Convention based
  - Sensible default configuration or use any of a number of simple DSLs
- Extendable with a rich set of plug-ins

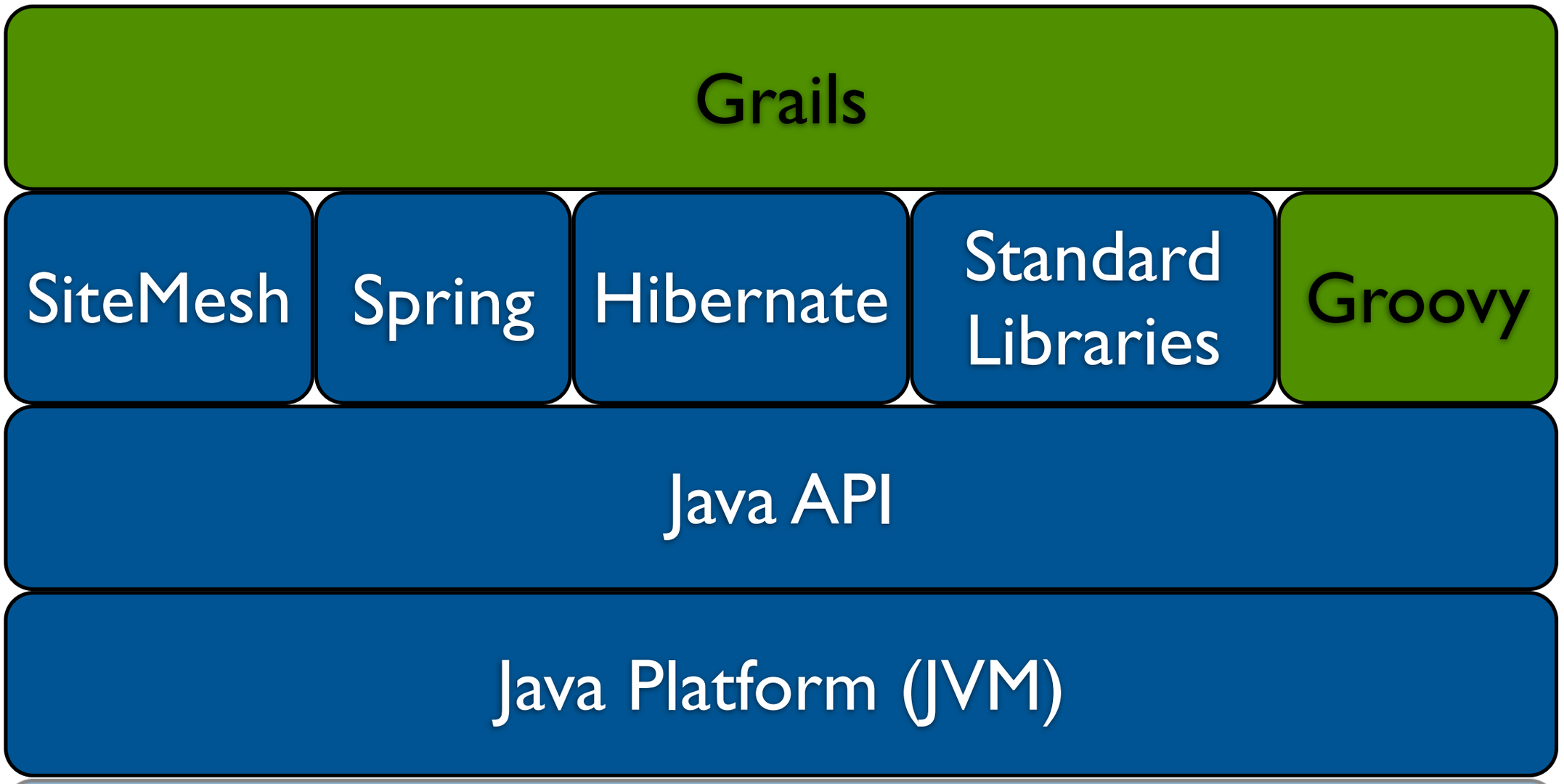
Grails Is Groovy

- Leverages the Groovy programing language
  - Groovy Services and Beans
- Configuration DSLs
  - Logging, data source configuration, dependency resolution, ...
- Web tier Groovy Server Pages (GSP)

Grails Is Java

- Framework backed by best of breed industry standards
  - Spring, Hibernate, SiteMesh, Web Flow, etc.
- Leverage any Java library, access from Groovy or Java classes
- Can be deployed as a Java web application (WAR) to any Servlet container

Grails Technology Stack



Key Grails Components

- Domain Class - A class representing an object in your domain (database table)
- Controller - A class that operates on URLs submitted to the web site
- View - A Groovy Server Page (GSP) designed to render the content based on a specific request

Domain Driven Design with Grails

- Focus on the complexities of the domain first
- Create domain objects and their relationships first
- Dynamically 'scaffold' controllers and views for each domain class, validate domain objects and relationships
- When ready, finish by generating or coding all views, controllers, and tests

Grails Scaffolding

- Dynamically generated views based on default templates
- No need to define a page before completing the data model

```
// Domain
class Person {
  String firstName
  String lastName
  Date birthDate
}
```

```
// Dynamic Scaffold Controller
class PersonController {
   def scaffold = true
}
```

More than a web framework...

- Eases development of every tier
  - Integrated Groovy build system
  - Integrated Groovy unit and integration test mechanism
  - Simple ORM based on Hibernate
  - Extensible plug-in system built on Spring
  - Also simplifies Web MVC

Grails Object Relational Mapping (GORM)

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GRAILS

GORM

- **G**rails **O**bject **R**elational **M**apping API
  - Uses domain classes written in Groovy
  - Injects methods into domain classes for load, save, update, and query data
  - Backed by Hibernate and Spring
  - Write Hibernate objects without all of the messy XML!

GORM Benefits

- Write your domain classes as POGOs
- Define validation via constraints
- Define relationships via simple belongsTo, hasMany mappings
- Easy to test framework, can use grails console or grails shell, even integration tests
- Finders make it easy to locate data

Grails Domain Classes

- Created with create-domain-class
- Simple Groovy Beans
  - Each member variable represents a column in a table
  - Implied version, primary key fields
  - Can define relationships with other domains, validation constraints

Connecting to PostgreSQL

- Grails defines database connections for various environments (Development, Test, Production)
- Steps to configure your database
  - Install your database driver
  - Modify grails-app/config/DataSource.groovy
  - Boot grails with grails run-app

Defining Constraints

- Checked automatically when saved or when validate() is called
- Tip: scaffold configuration follows constraint order for field order

```
class Customer {

    static constraints = {
      firstName(maxLength: 15, blank: false)
      lastName(maxLength: 20, blank: false)
      registrationDate(nullable: false)
      preferredCustomer(default: true)
      awardsBalance(range: 0.0..5000.0)
    }
    String firstName
    String lastName
    Date registrationDate
    Boolean preferredCustomer
    BigDecimal awardsBalance
}
```

Entity Relationships

- Grails supports all Hibernate relation mappings
  - One to One
  - One to Many
  - Many to Many
  - Parent/Child (Inheritence)

One to many relationship

- Customer 'owns' accounts (cascade deletes, updates, saves)

```
class Customer {

    String firstName
    String lastName
    ...

   static hasMany = [accounts:Account]
}
```

```
class Account {

 static belongsTo =
        [customer:Customer]

    String accountNumber
}
```

```
// arbitrary but working example... flush for testing only...
def customer = new Customer(firstName: "Dude", lastName: "WheresMyCar")
def account = new Account(accountNumber:"1234", customer:customer)
customer.accounts = [account]
def result = customer.save(flush:true)

def account2 = Account.findById(account.id)
println account2.customer

def customer2 = Customer.findById(customer.id)
println customer2.accounts
```

Physical DB Settings - mapping

- Changing the table, versioning on/off, column mappings, indexing, multi-column-index, etc...

```
class Person {
String firstName
String address
    static mapping = {
        table 'people'
        version false
        id column:'person_id'
        firstName column:'First_Name', index:'Name_Idx'
        address column:'Address', index:'Name_Idx, Address_Index'
    }
}
```

Stored Procedures

- Several approaches
  - Spring's JdbcTemplate
  - Spring's StoredProcedure class
  - Spring's SqlFunction
  - Groovy SQL
- Demonstration

Where to find the code

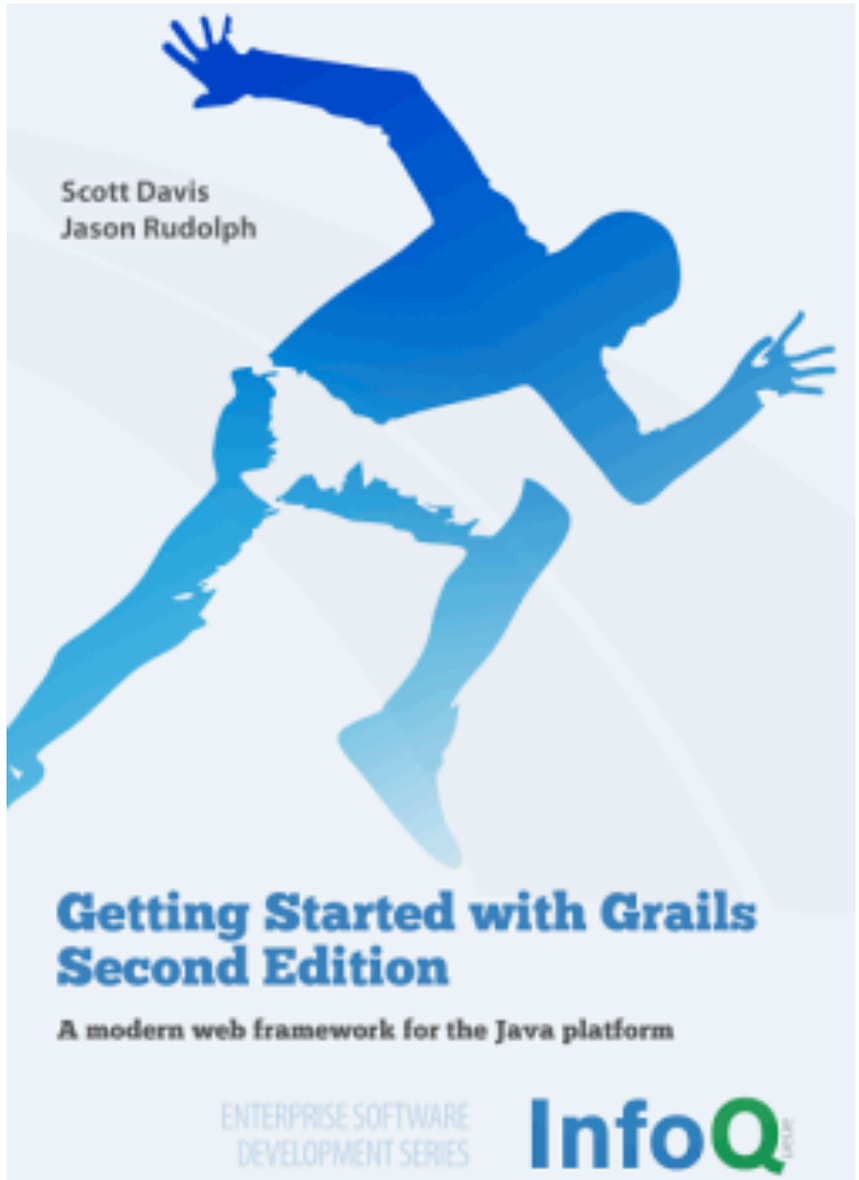
- Hit our GitHub repository (you can just ask to download the files)
- GitHub repo for our samples
  - github.com/krimple/Grails-Demos-PostgreSQL-East-2010.git

Groovy and Grails Resources

- Grails Web Site
  - http://www.grails.org
- Grails User Email List
  - http://n4.nabble.com/Grails-f1312388.html
- Groovy Web Site
  - http://groovy.codehaus.org/

Free InfoQ E-Book

- Getting Started with Grails, Second Edition
  - Scott Davis
  - Jason Rudolph
- http://www.infoq.com/minibooks/grails-getting-started



Regional User Groups

- Philadelphia Groovy and Grails User Group
  - http://phillygroovy.org
    - Meet-up April 8 as part of Philly ETE
- Philadelphia Spring User Group
  - http://phillyspring.ning.com/

Thank you!

Questions ... ?