

Modern Java Programming with Spring



- Trainer and Senior Consultant
 - Joined SpringSource in 2008
 - Already taught Spring in more than 20 countries
 - Core-Spring, Spring MVC, Spring with JPA/Hibernate...
- In charge of the Spring Petclinic sample app
- Active blogger on blog.springsource.com
- Blog: <http://blog.springsource.org/author/misvy/>
- Twitter: @michaelisvy



History

2004

Spring 1.0



...

SpringSource created (originally called Interface21)

2008

French division created

Spring 1.0??

我



2009

VMware acquires SpringSource

2013

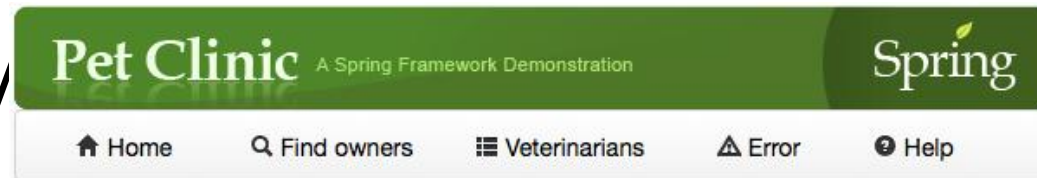
Many « new Emerging Products » at VMware:
CloudFoundry, GemFire, RabbitMQ ...

Topics

- Core Spring
- The Web layer

Spring Petclinic

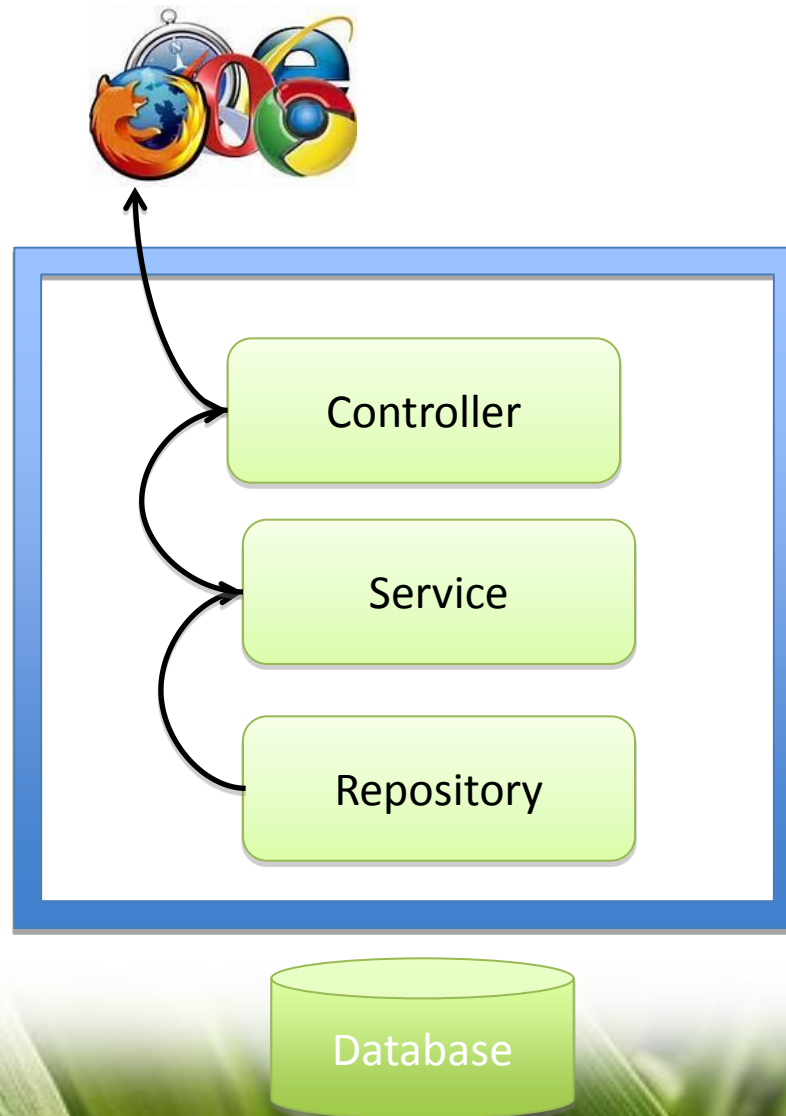
- Spring sample application
- Major update in March 2013
- <https://github.com/SpringSource/spring-petclinic>
- <http://spring-petclinic.com/>



Welcome



General architecture



Topics

- Core Spring
 - Database access
- The Web layer

10 years ago: Plain JDBC

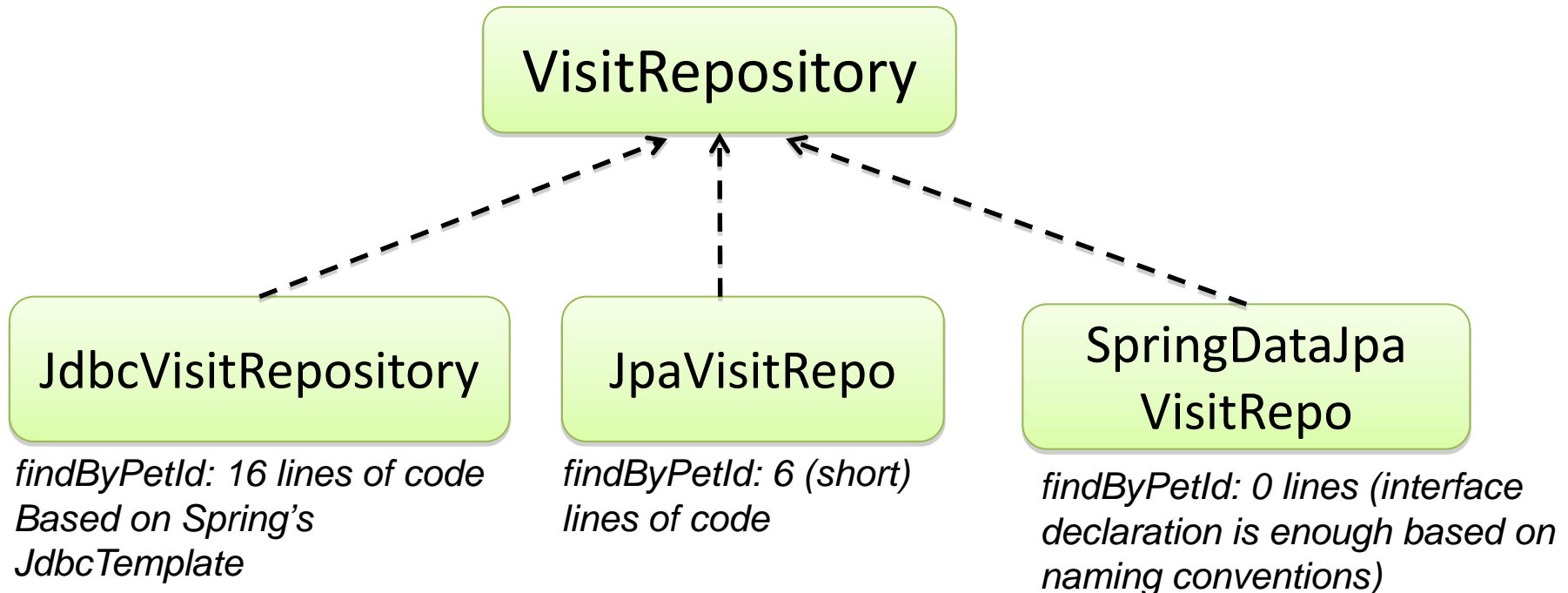
```
public List findByLastName(String lastName) {  
    List personList = new ArrayList();  
    Connection conn = null;  
    String sql = "select first_name, age from PERSON where last_name=?";  
    try {  
        DataSource dataSource = DataSourceUtils.getDataSource();  
        conn = dataSource.getConnection();  
        PreparedStatement ps = conn.prepareStatement(sql);  
        ps.setString(1, lastName);  
        ResultSet rs = ps.executeQuery();  
        while (rs.next()) {  
            String firstName = rs.getString("first_name");  
            int age = rs.getInt("age");  
            personList.add(new Person(firstName, lastName, age));  
        }  
    } catch (SQLException e) { /* ??? */ }  
    finally {  
        try {  
            conn.close();  
        } catch (SQLException e) { /* ??? */ }  
    }  
    return personList;  
}
```



很罗嗦！

Data Access in Spring Petclinic

- 3 possibilities



@Query

```
import org.springframework.data.repository.Repository;
import org.springframework.data.jpa.repository.Query;

public interface UserRepository extends Repository<User, Long> {

    <S extends User> save(S entity); // Definition as per CRUDRepository

    User findById(long i);           // Query determined from method name

    User findByNameIgnoreCase(String name); // Case insensitive search

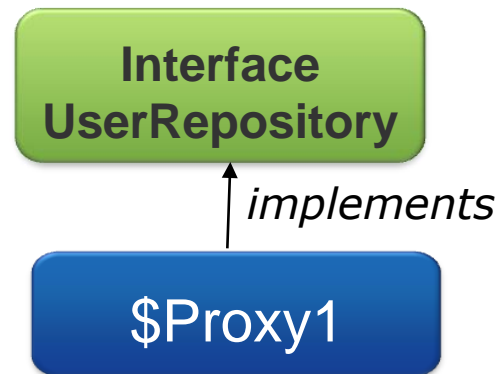
    @Query("select u from User u where u.emailAddress = ?1")
    User findByEmail(String email); // ?1 replaced by method param
}
```

Spring Data at runtime

- Before startup



After startup



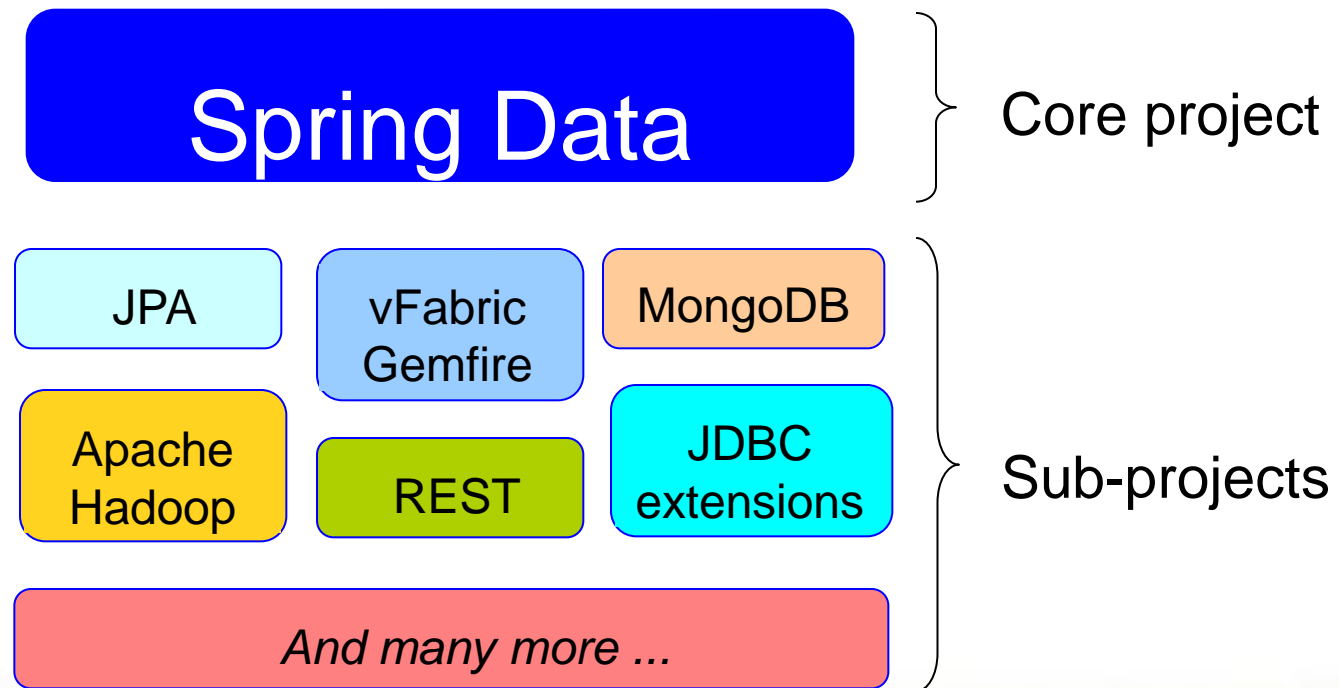
```
<jpa:repositories base-package="com.acme.repository"/>
```



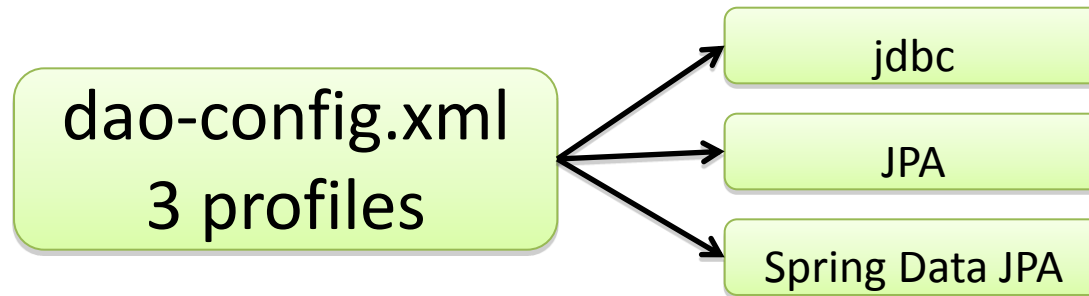
You can conveniently use Spring to inject a dependency of type `UserRepository`. Implementation will be generated at startup time.

Spring Data projects

- Syntax similar for all sub-projects



Bean profiles



Inside JUnit tests

```
@ContextConfiguration(locations = ...)
@RunWith(SpringJUnit4ClassRunner.class)

@ActiveProfiles("jdbc")
public class JdbcOwnerRepositoryTests
...{}
```

Inside web.xml

```
<context-param>
  <param-name>
    spring.profiles.active
  </param-name>
  <param-value>
    jdbc
  </param-value>
</context-param>
```



Transactions

- In the code:

```
public class RewardNetworkImpl implements RewardNetwork {  
    @Transactional  
    public RewardConfirmation rewardAccountFor(Dining d) {  
        // atomic unit-of-work  
    }  
}
```

```
<tx:annotation-driven/>
```

```
<bean id="transactionManager"  
    class="org.springframework.jdbc.datasource.DataSourceTransactionManager">  
    <property name="dataSource" ref="dataSource"/>  
</bean>
```

```
<jdbc:embedded-database id="dataSource"> ... </jdbc:embedded-database>
```

Caching

- The list of Veterinarians is cached using

```
@Cacheable(value = "vets")  
public Collection<Vet> findVets() throws  
DataAccessException { ... }
```

ClinicServiceImpl

```
<cache name="vets"  
timeToLiveSeconds="60"  
maxElementsInMemory="100" ... />
```

ehcache.xml

```
<!-- enables scanning for @Cacheable annotation -->  
<cache:annotation-driven/>  
  
<bean id="cacheManager" class="org...EhCacheCacheManager">  
  <property name="cacheManager" ref="ehcache"/>  
</bean>  
  
<bean id="ehcache" class="org...EhCacheManagerFactoryBean">  
  <property name="configLocation" value="classpath:ehcache.xml"/>  
</bean>
```

tools-config.xml

Topics







- Core Spring
- The Web layer

Why Spring MVC?

- InfoQ top 20 Web frameworks for the JVM

Spring MVC number 1

Total number of participants: 1223

Option	Adoption Ready	Importance	Votes	Details
Spring MVC	84%	81%	690	Heatmap 
Play	71%	78%	633	Heatmap 
Grails	77%	75%	603	Heatmap 
JSF	74%	63%	485	Heatmap 
Struts	80%	60%	461	Heatmap 
Wicket	73%	70%	355	Heatmap 

<http://www.infoq.com/research/jvm-web-frameworks>

How to use Spring MVC?

- Which way is more appropriate?

```
public class UserController  
    extends SimpleFormController {  
  
    public ModelAndView  
        onSubmit(Object command) { //... }  
  
}
```

A

Deprecated!!



```
@Controller  
public class UserController {  
  
    @RequestMapping(value="/users/",  
        method=RequestMethod.POST)  
    public ModelAndView createUser(User user)  
    { //... }  
  
}
```


B



View Layer

- Form tag library

JSP



```
<c:url value="/user.htm" var="formUrl" />
<form:form modelAttribute="user" action="${formUrl}">
  <label class="control-label">Enter your first name:</label>
  <form:input path="firstName"/>
  <form:errors path="firstName"/>

  ...
  <button type="submit">Save changes</button>
</form:form>
```

Bootstrap

Let's talk about CSS...



Why Bootstrap?

- So anybody can make a good web design



Let's talk about Bootstrap!

What is Bootstrap?

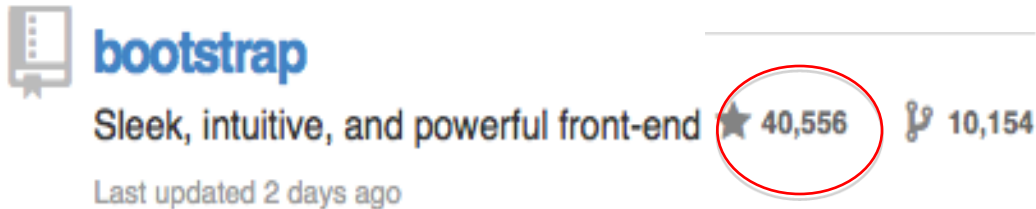


- Originally called “Twitter Bootstrap”
- Available from 2011
- Typography, forms, buttons, charts, navigation and other interface components
- Integrates well with jQuery

What is Bootstrap?

- Most popular project on github!

1



bootstrap
Sleek, intuitive, and powerful front-end
Last updated 2 days ago

★ 40,556 10,154

This is the first entry in the GitHub popular repository list. It features the Bootstrap logo, a description, the last update time, and star/fork counts. The star count is circled in red.

2

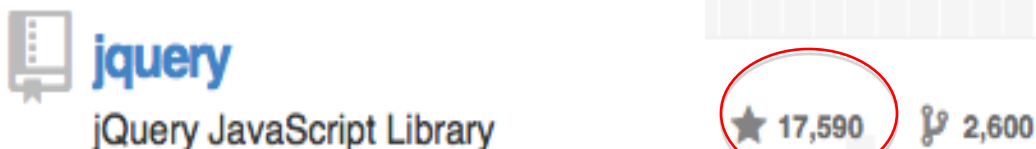


node
evented I/O for v8 javascript
Last updated 14 hours ago

★ 18,771 2,806

This is the second entry in the GitHub popular repository list. It features the Node.js logo, a description, the last update time, and star/fork counts. The star count is circled in red.

3



jquery
jQuery JavaScript Library

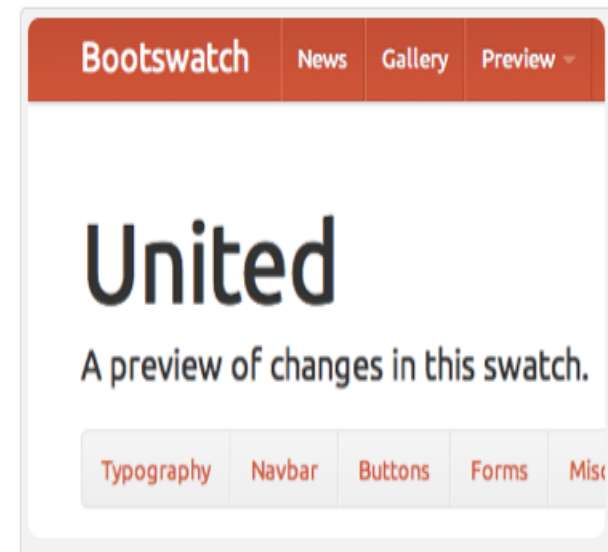
★ 17,590 2,600

This is the third entry in the GitHub popular repository list. It features the jQuery logo, a description, and star/fork counts. The star count is circled in red.



Bootstrap themes

- Hundreds of themes available
 - So your website does not look like all other websites!
 - Some are free and some are commercial



Avoiding JSP soup



HTML
Javascript
CSS
taglibs

JSP file

JSP custom tags

- Should be your best friend when working with JSPs!



- Can easily turn 100 into 10 lines of code!

Form fields: Without custom tags

Enter your last name:

Enter your age:



JSP

```
<div class="control-group" id="${lastName}">
  <label class="control-label">${lastNameLabel}</label>
  <div class="controls">
    <form:input path="${name}"/>
    <span class="help-inline">
      <form:errors path="${name}"/>
    </span>
  </div>
</div>
</div>
```

CSS div
Label
Form input

Error message (if any)

Using custom tags

inputField.tag

- First create a tag (or tagx) file

```
<%@ taglib prefix="form" uri="http://www.spring...org/tags/form" %>
<%@ attribute name="name" required="true" rtexprvalue="true" %>
<%@ attribute name="label" required="true" rtexprvalue="true" %>
<div class="control-group" id="${name}">
    <label class="control-label">${label}</label>
    <div class="controls">
        <form:input path="${name}"/>
        <span class="help-inline">
            <form:errors path="${name}"/>
        </span>
    </div>
</div>
</div>
```

Custom tags are part of Java EE

Using custom tags

- Custom tag call

Folder which contains
custom tags

```
<html xmlns:custom="urn:jsptagdir:/WEB-INF/tags/html" ...>
...
<custom:inputField name="firstName" label="Enter your first name:" />
<custom:inputField name="lastName" label="Enter your last name:" />
</html>
```

JSP file



No more JSP soup!



1 line of code
instead of 9!!

jQuery



jQuery inside Spring Petclinic

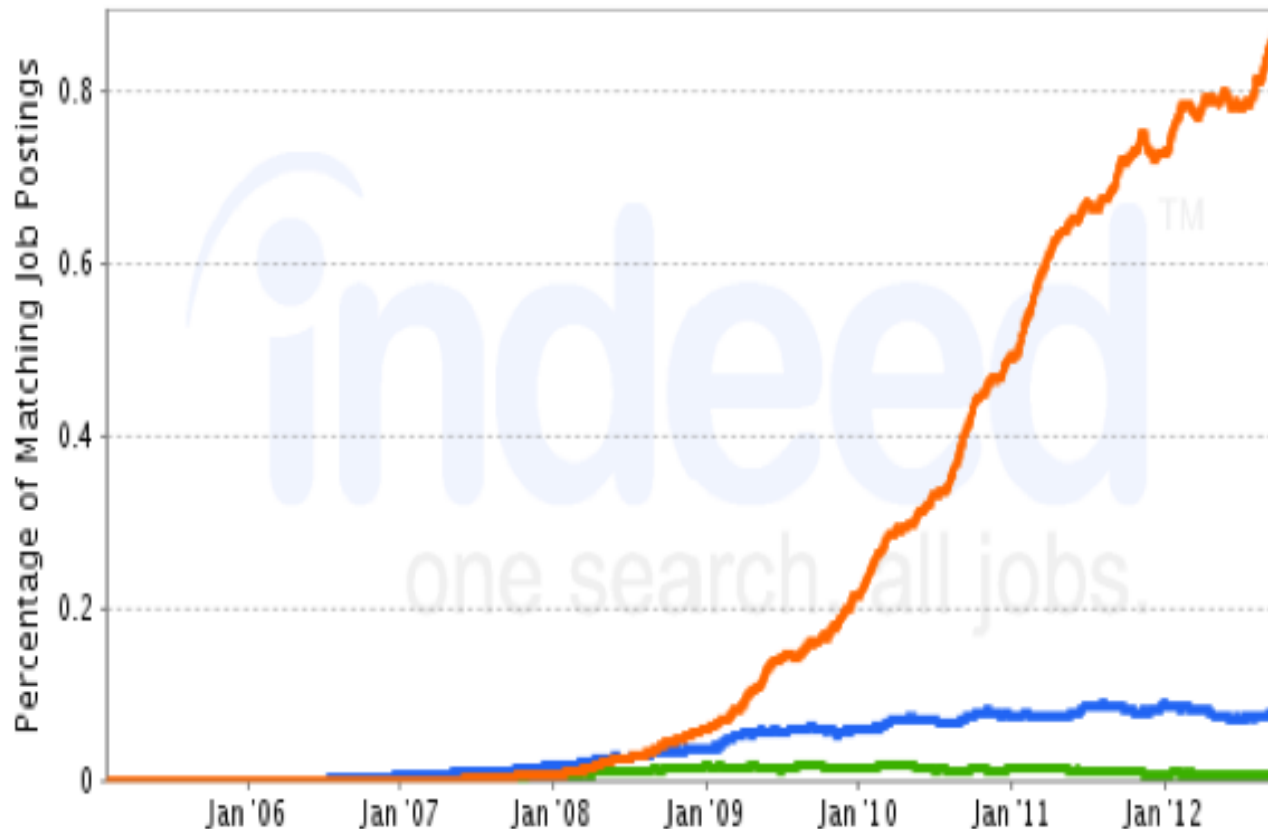
- Javascript framework
- Very simple core with thousands of plugins available
 - Datatable
 - jQuery UI (datepicker, form interaction...)

Why jQuery?

Scale: **Absolute** - [Relative](#)

Job Trends from Indeed.com

— jquery — dojo — scriptaculous



Datatables in Spring MVC

- Based on project Dandelion
 - [dandelion.github.com](https://github.com/dandelion/dandelion)
 - Twitter: @dandelion_proj

```
<datatables:table data="{userList}" id="dataTable" >
  <datatables:column title="First Name"
    property="firstName" sortable="true" />

  <datatables:column title="Last Name"
    property="lastName" sortable="true" />

</datatables:table>
```

JSP file

Dandelion is based on spring source jQuery Datatables and Bootstrap

- Click, sort, scroll, next/previous...
- Bootstrap theme
- PDF export...

Search:

PDF

Name ▲	Address ◆	City ◆	Telephone ◆	Pets ◆
Betty Davis	638 Cardinal Ave.	Sun Prairie	6085551749	Basil
Carlos Estaban	2335 Independence La.	Waunakee	6085555487	Lucky Sly
David Schroeder	2749 Blackhawk Trail	Madison	6085559435	Freddy
Eduardo Rodriguez	2693 Commerce St.	McFarland	6085558763	Jewel Rosy

Thymeleaf

- You can use Thymeleaf **instead of** JSPs!
- Great for html templating
- Flexible expression language
 - Based on Spring EL
- Can be used without an application server
 - Example: for email templating

Conclusion



- Data Access
 - Consider using Spring Data

- Web
 - Spring MVC: most popular Java Framework
 - Use custom tags!
 - Consider Thymeleaf instead of JSP
 - www.thymeleaf.org
 - Consider using Dandelion for Datatables
 - <http://dandelion.github.com/>

