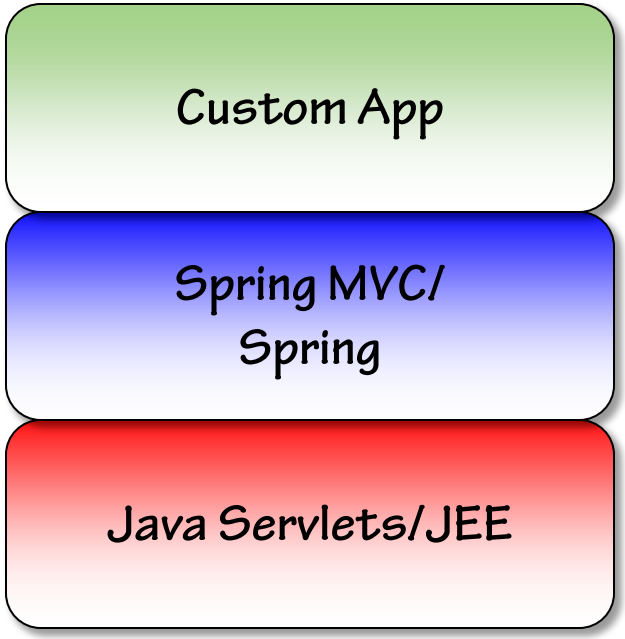
What is Spring MVC?

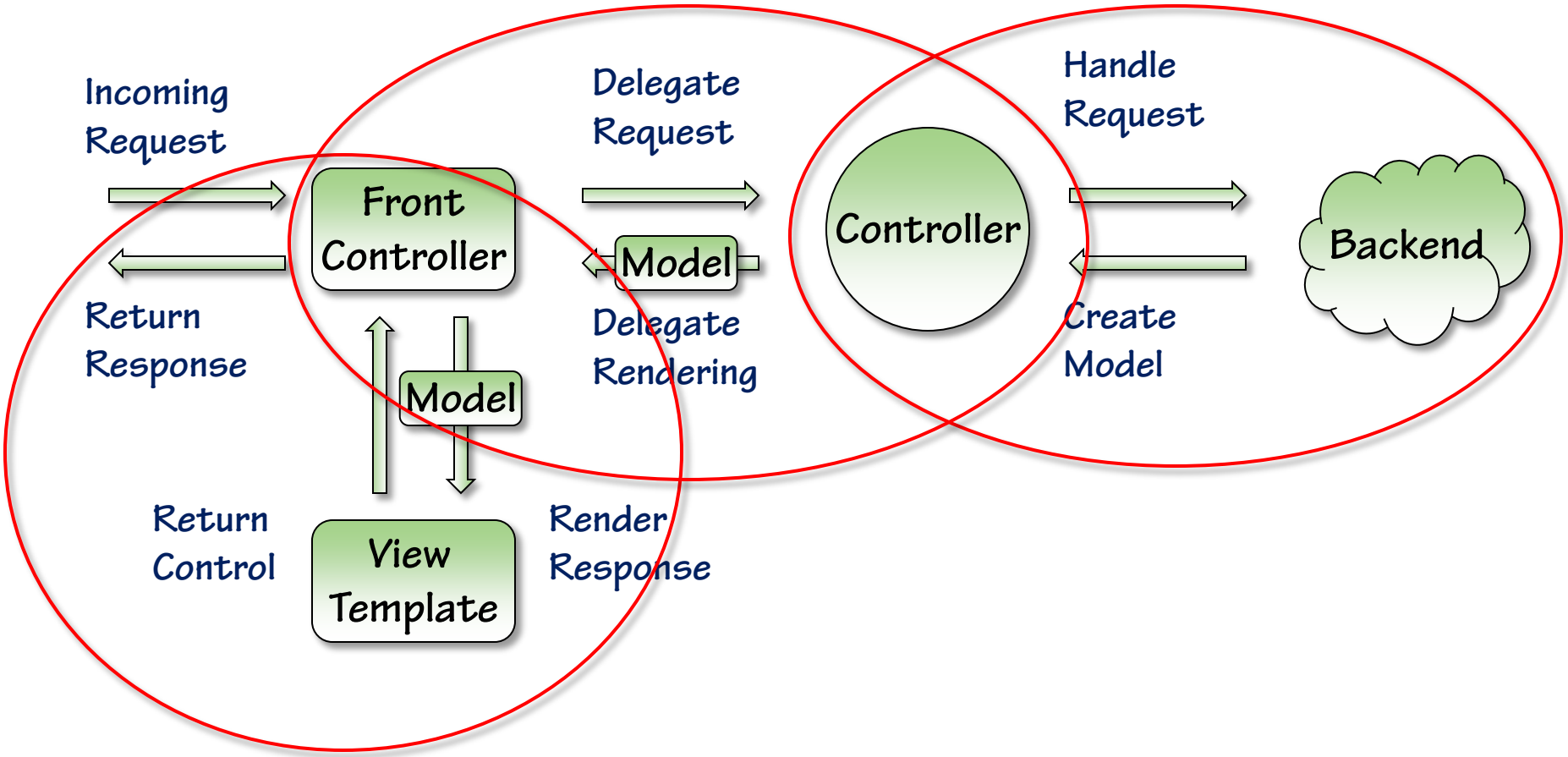
What is Spring MVC?

- **A web framework built around the principles of Spring**
- **POJO based and Interface driven**
- **Based on a Dispatcher Servlet / Front Controller pattern**
  - MVC stands for Model-View-Controller
- **Very lightweight and unobtrusive compared to other frameworks**
- **Built from the shortcomings of Struts 1**
- **Support for:**
  - Themes
  - Locales/i18n
  - Restful services
  - Annotation based configuration
  - Seamless integration with other Spring Services/Beans

Architecture



Request / Response Lifecycle



- DispatcherServlet – The entry / configuration point for the Application
- Controller – Command pattern object that handles the request and determines which view to route to
- RequestMapping – The url and request type that a method is tied to
- ViewResolver – Used to locate JSP pages or whatever view we are using
- Servlet-config – Configuration file per DispatcherServlet
- POJO – Plain Old Java Object
- Bean – A Spring configured POJO

Java

Maven

maven

Spring STS

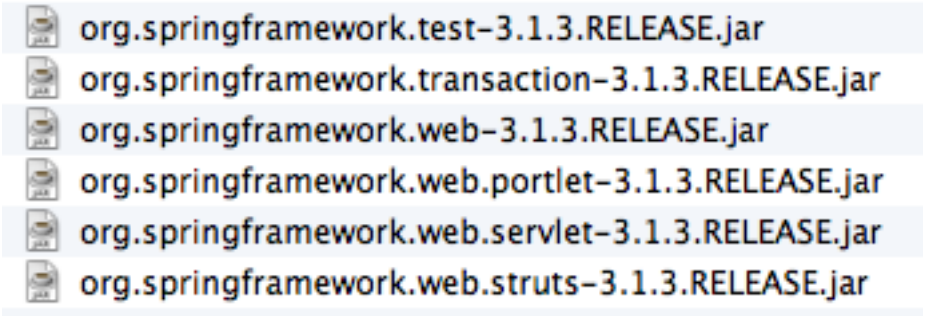
springsource
TOOLSUITE

Tomcat

Apache Tomcat

Getting Spring MVC

- **Spring Framework:**
  - http://www.springsource.org/spring-framework
  - Can't download just the web resources
  - 21 different jars that it downloads

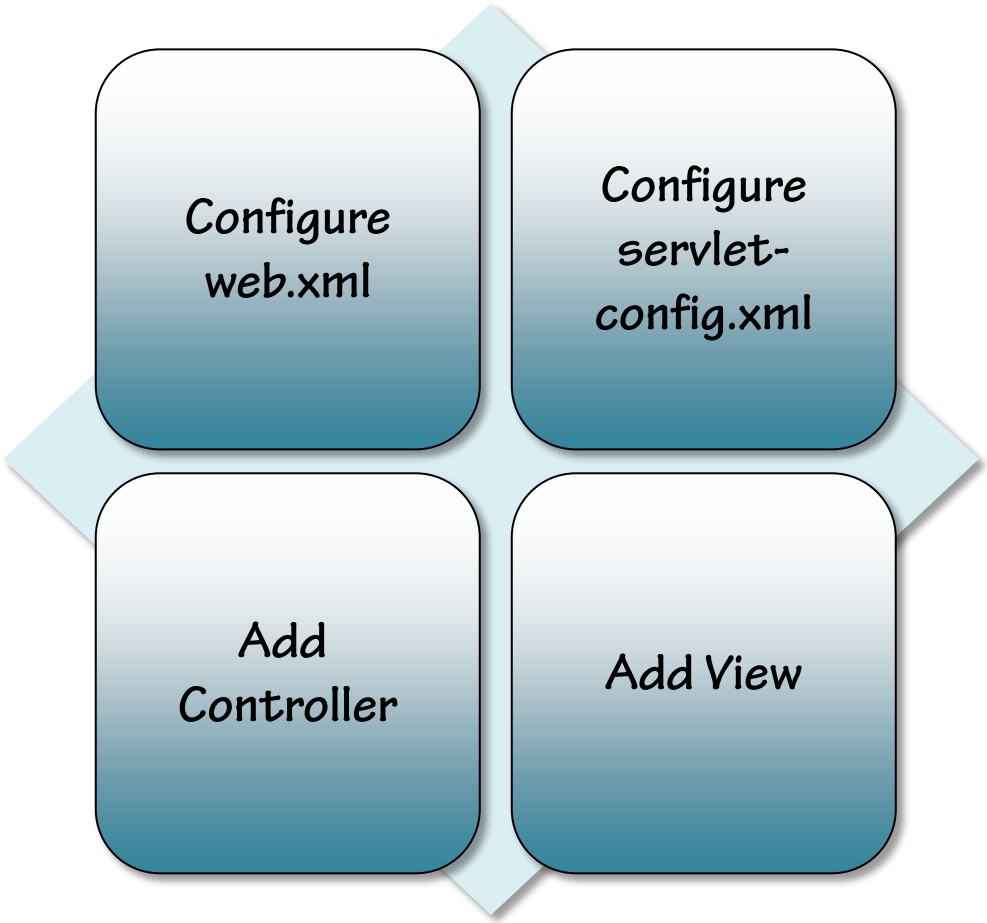


Maven

- **Using Maven we only need three dependencies**
- **Dependencies:**
  - spring-webmvc
  - servlet-api
  - jstl

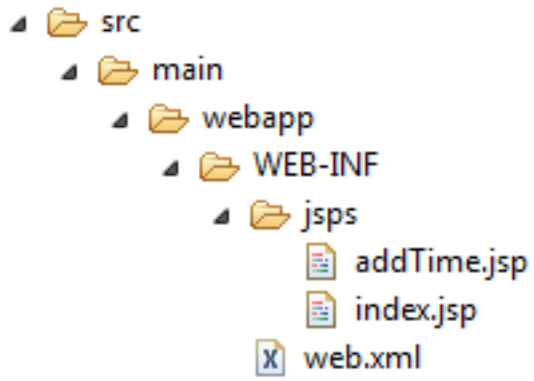
```
<dependency>
    <groupId>org.springframework</groupId>
    <artifactId>spring-webmvc</artifactId>
    <version>3.1.2.RELEASE</version>
</dependency>

<dependency>
    <groupId>javax.servlet</groupId>
    <artifactId>servlet-api</artifactId>
    <version>2.5</version>
    <scope>provided</scope>
</dependency>

<dependency>
    <groupId>javax.servlet</groupId>
    <artifactId>jstl</artifactId>
    <version>1.2</version>
    <scope>provided</scope>
</dependency>
```

Spring MVC Configuration




STANDARDS

Views



InternalResourceViewResolver

addTime.jsp = http://localhost:8080/fitness/addTime

Controllers

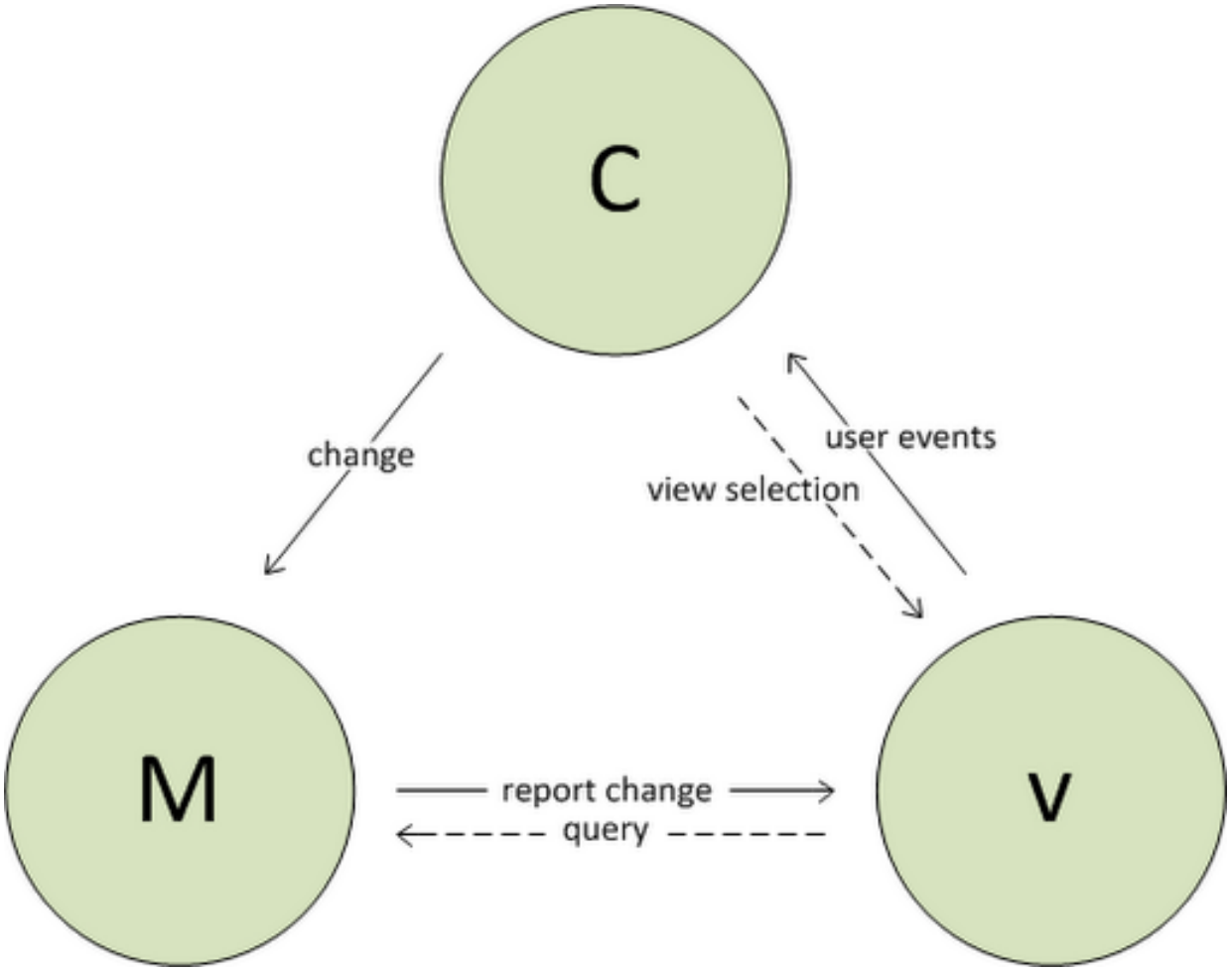
- **Annotation Based**
  - @Controller
- **Named whatever you want**
  - Typically named around business domain
- **Path set using annotation**
  - @RequestMapping
- **TimeController.java**

Namespace

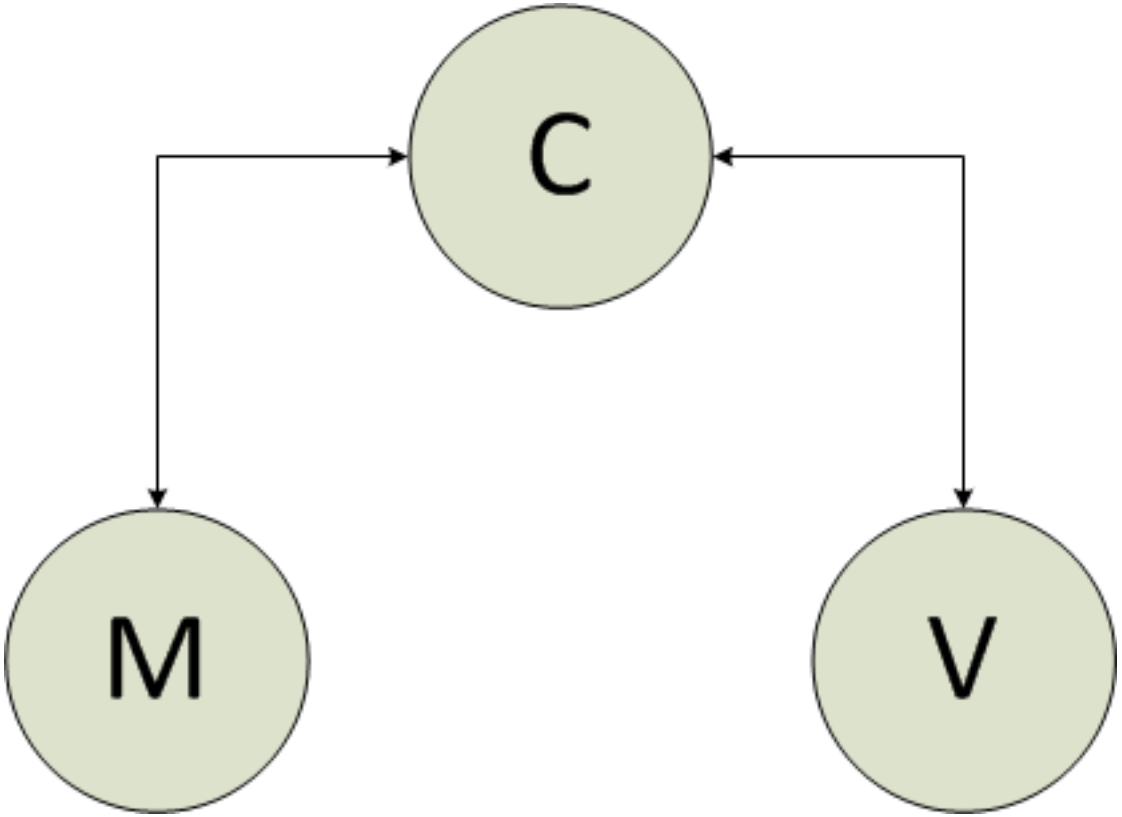
```
<beans xmlns="http://www.springframework.org/schema/beans"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:p="http://www.springframework.org/schema/p"
    xmlns:aop="http://www.springframework.org/schema/aop"
    xmlns:context="http://www.springframework.org/schema/context"
    xmlns:jee="http://www.springframework.org/schema/jee"
    xmlns:tx="http://www.springframework.org/schema/tx"
    xmlns:mvc="http://www.springframework.org/schema/mvc"
    xsi:schemaLocation="
    http://www.springframework.org/schema/aop http://www.springframework.org/schema/aop/spring-aop-3.0.5.xsd
    http://www.springframework.org/schema/beans http://www.springframework.org/schema/beans/spring-beans-3.0.xsd
    http://www.springframework.org/schema/context http://www.springframework.org/schema/context/spring-context-3.0.xsd
    http://www.springframework.org/schema/jee http://www.springframework.org/schema/jee/spring-jee-3.0.xsd
    http://www.springframework.org/schema/tx http://www.springframework.org/schema/tx/spring-tx-3.0.xsd
    http://www.springframework.org/schema/task http://www.springframework.org/schema/task/spring-task.xsd
    http://www.springframework.org/schema/mvc http://www.springframework.org/schema/mvc/spring-mvc-3.0.xsd">
```

```
<mvc:annotation-driven />
<context:component-scan base-package="com.training.controller"/>

<bean class="org.springframework.web.servlet.view.BeanNameViewResolver"/>
```

MVC

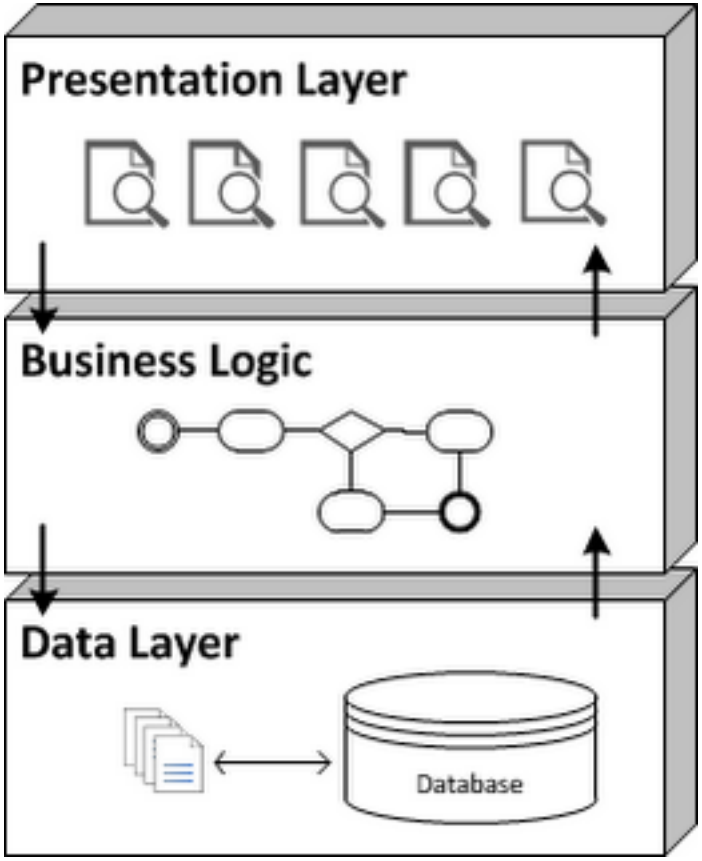


MVC Web

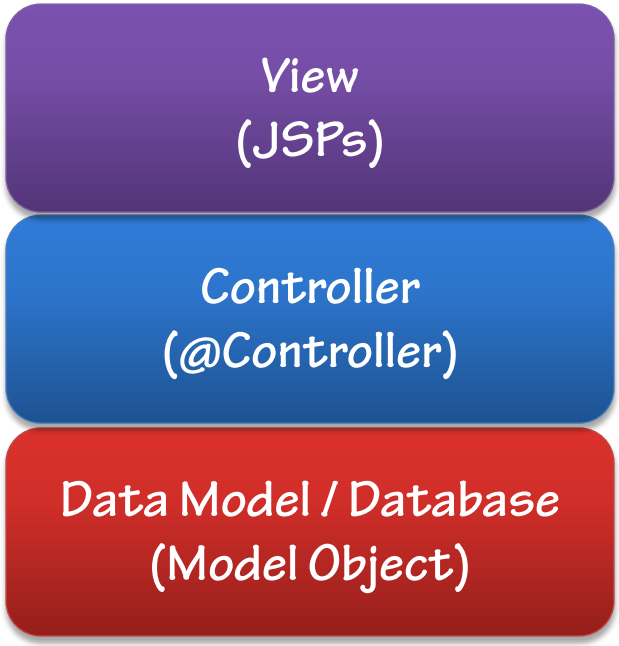


Tiered Architectures

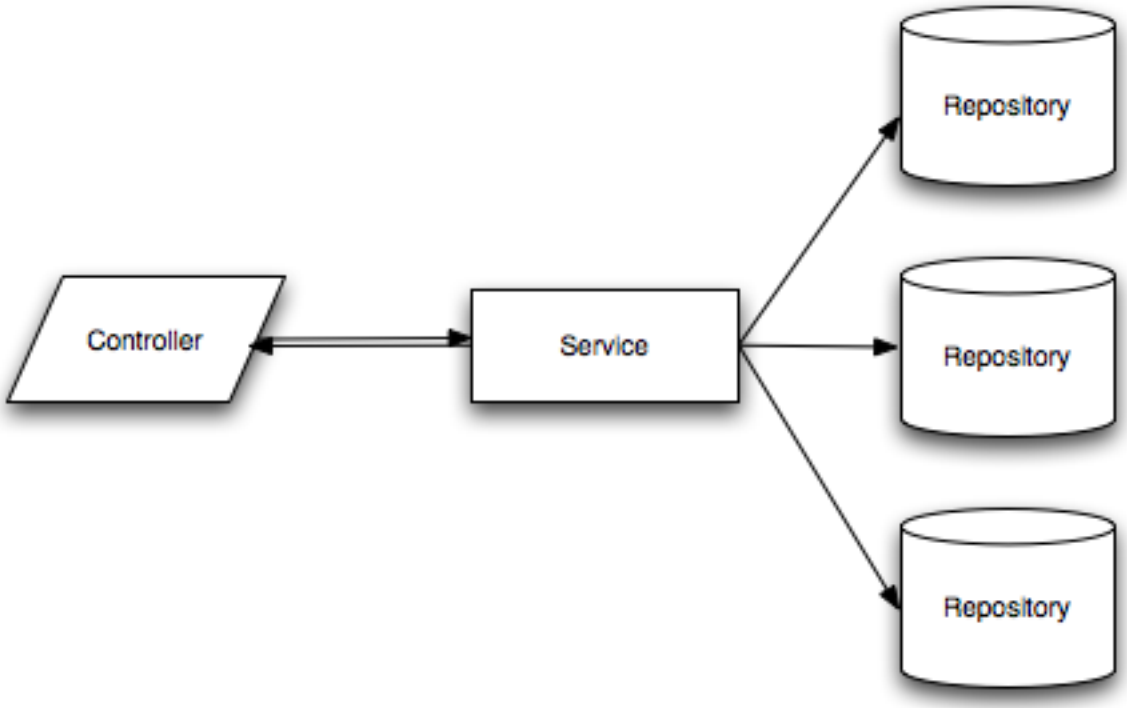
- Separation of concerns
- Reusable layers
- Maintenance



Layers

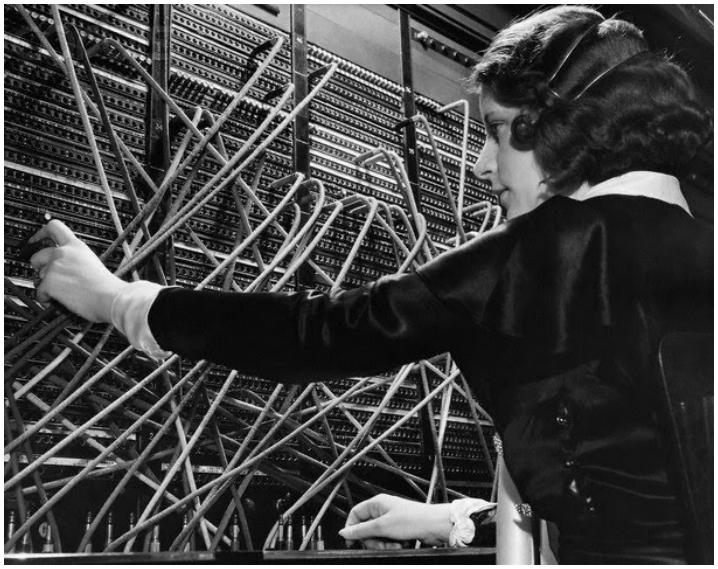

View
(JSPs)
Controller
(@Controller)
Data Model / Database
(Model Object)

Components



Controller

- Handles incoming requests and building the response
- Business logic should not be handled here
- Works with the Service and Repository tier for business logic and data gathering
- Annotated with @Controller
- Handles Exceptions and routes the view accordingly



Service

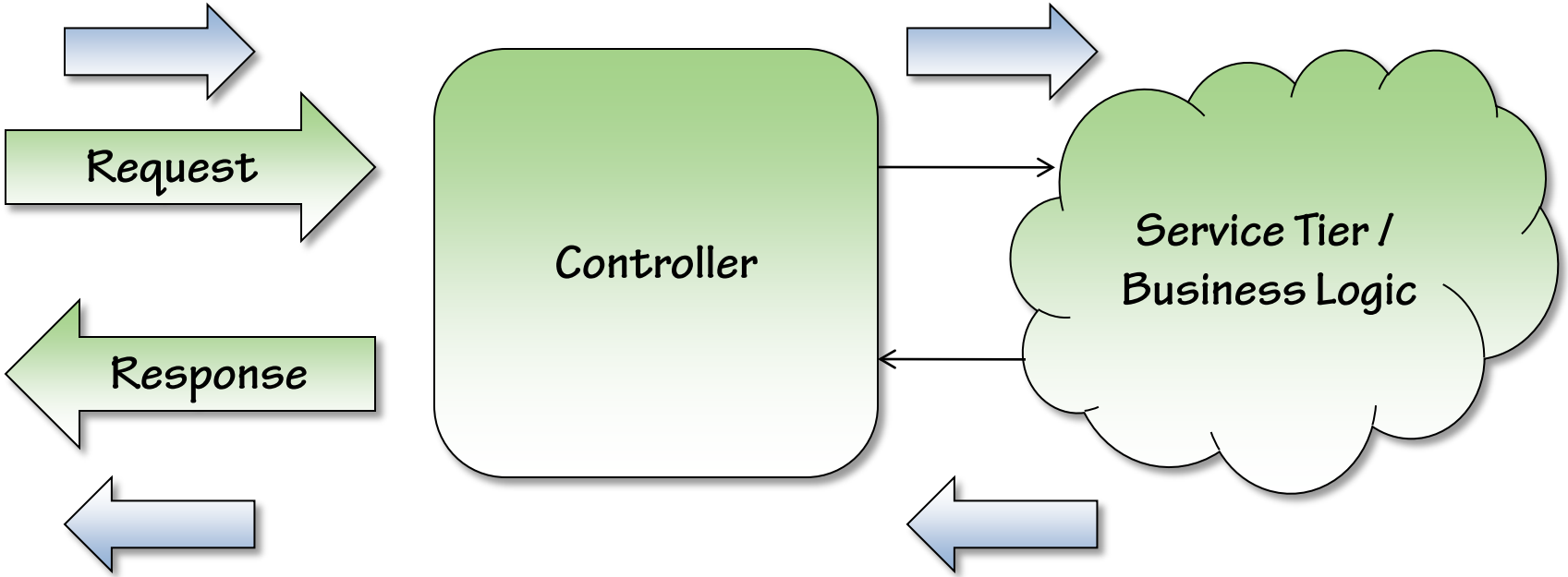
- Annotated with @Service
- The Service tier describes the verbs (actions) of a system
- Where the business logic resides
- Ensures that the business object is in a valid state
- Where transactions often begin (two phase commits)
- Often has the same methods as the Repository, but different focus

Repository

- Annotated with @Repository
- The Repository tier describes the nouns (data) of a system
- Focused on persisting and interacting with the database
- One-to-one mapping with an Object
- Often a one-to-one mapping with a database table

What is a Controller?

What is a Controller?



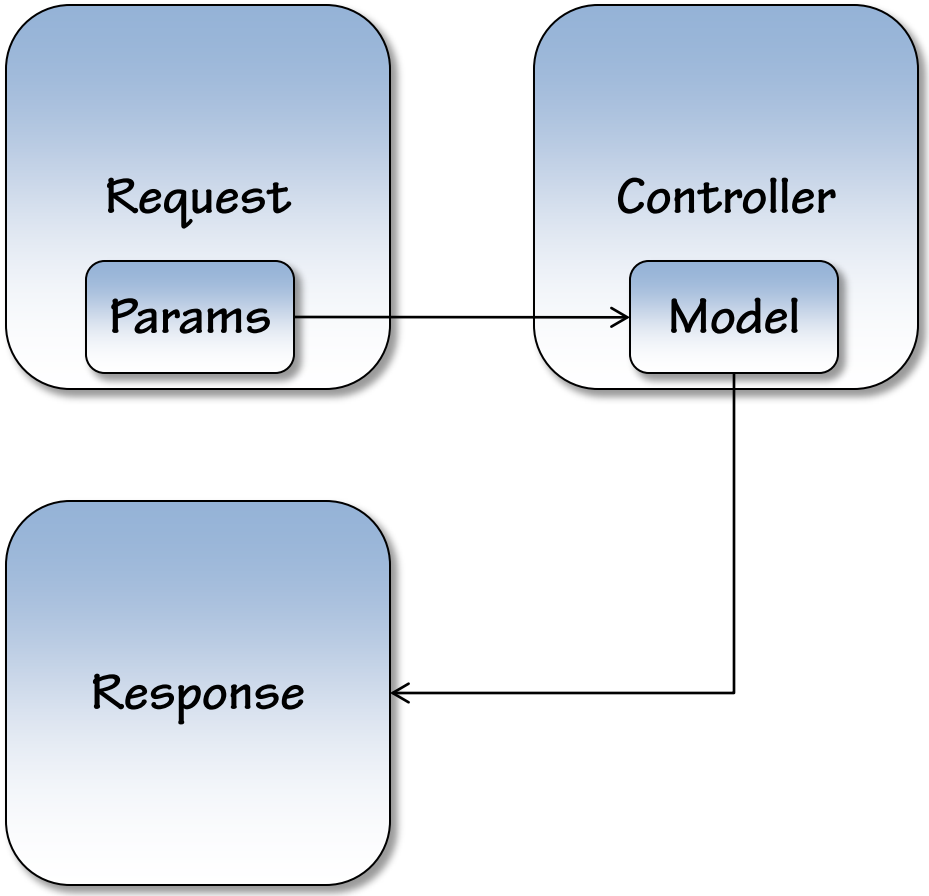
Responsibilities

- Interpret user input and transform to input to a model
- Provide access to business logic
- Determines view based off of logic
- Interprets Exceptions from the business logic / service tier

@Controller

```
@Controller
public class HelloController {

    @RequestMapping(value ="/greeting")
    public String sayHello (Model model) {
```

Passing Params

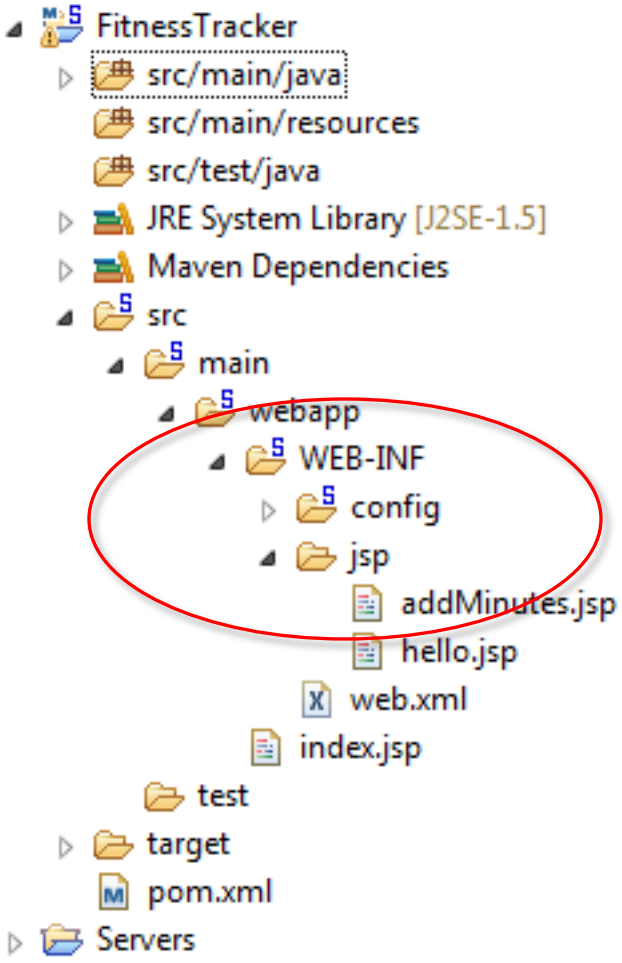


@ModelAttribute

- Used with an HTTP GET
- Used with an HTTP POST
- Works with POJOs
- Can be validated with a Binding Result

Views

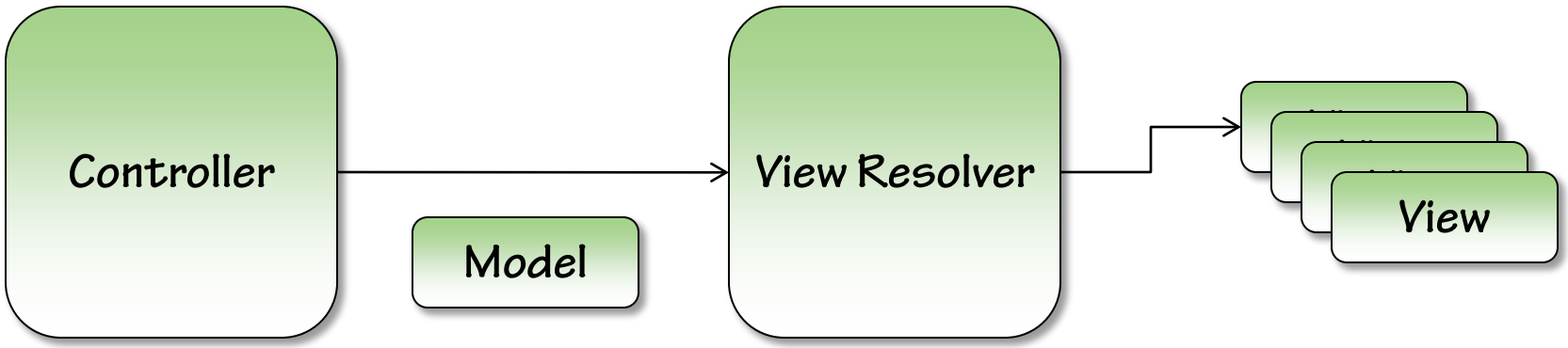
Conventions



Resolving a View

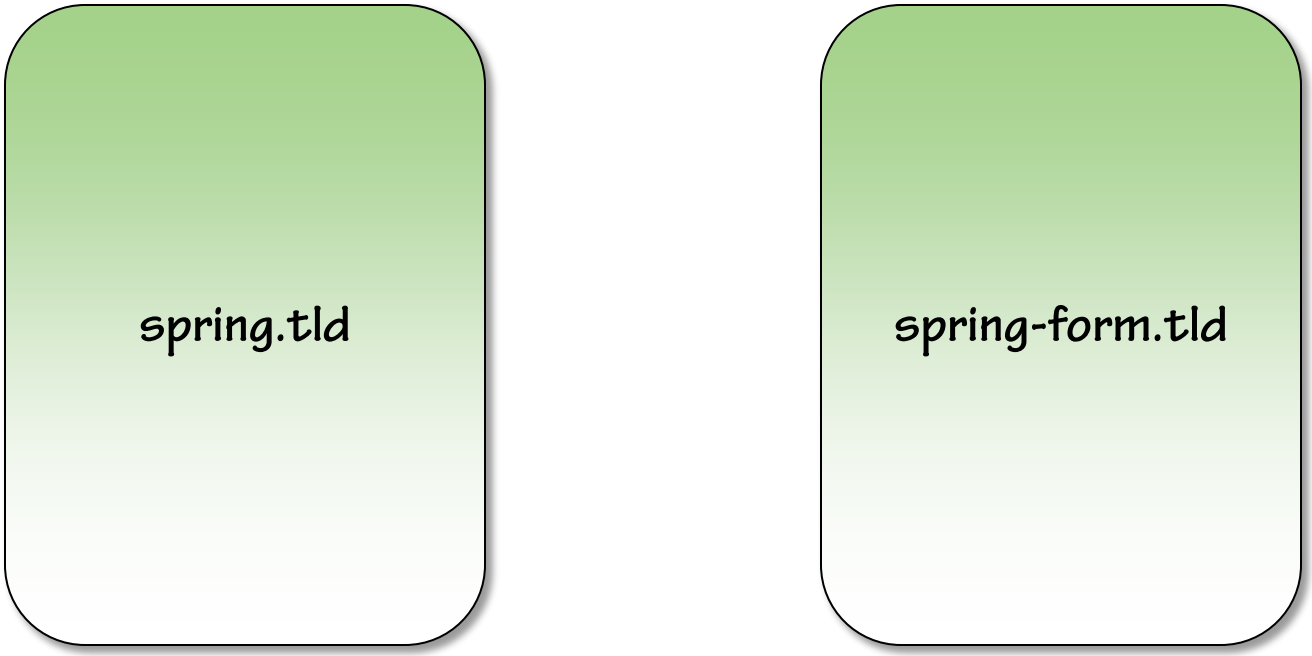
```
@Controller
public class MinutesController {

    @RequestMapping(value = "/addMinutes")
    public String addMinutes(@ModelAttribute ("exercise") Exercise exercise) {

        System.out.println("exercise: " + exercise.getMinutes());

        return "addMinutes";
    }

}
```

Resolving a View



View Resolvers (some)

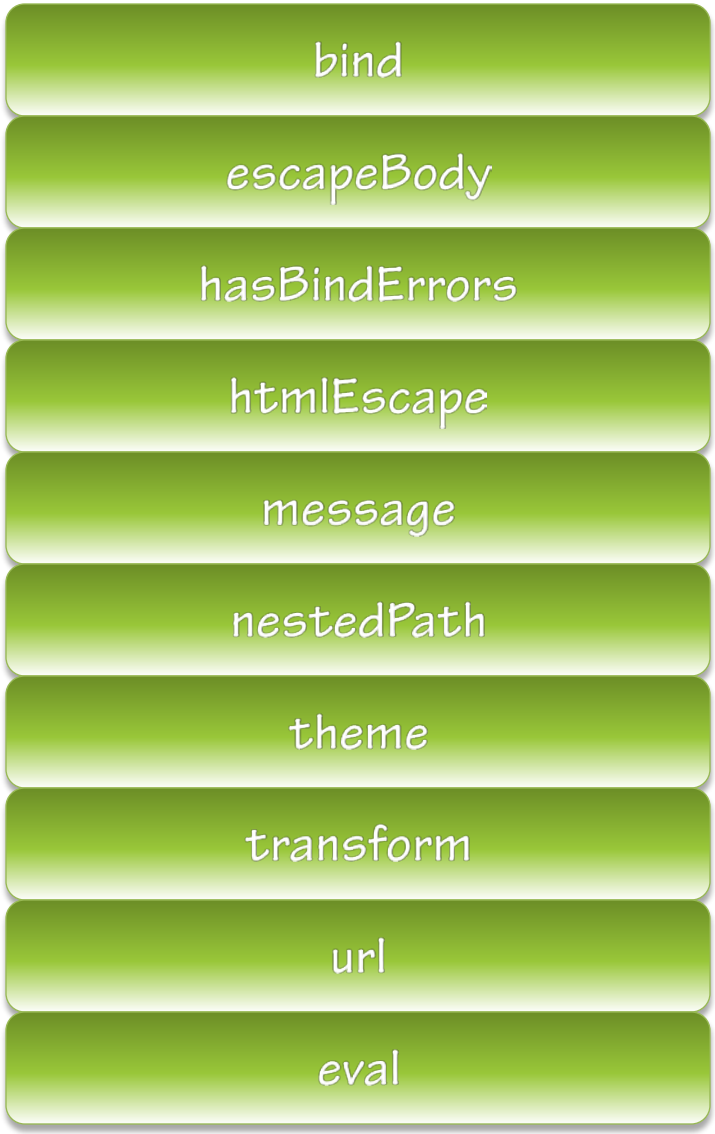
Spring Tag Libraries



http://static.springsource.org/spring/docs/current/spring-framework-reference/html/spring.tld.html

http://static.springsource.org/spring/docs/current/spring-framework-reference/html/spring-form.tld.html

spring.tld


bind
escapeBody
hasBindErrors
htmlEscape
message
nestedPath
theme
transform
url
eval

Interceptors

- Registered and part of the request lifecycle
- Have the ability to pre-handle and post-handle web requests
- Callback methods used to override or change values
- Commonly used for Locale Changing

```
<bean class="org.springframework.web.servlet.i18n.LocaleChangeInterceptor">
    <property name="paramName" value="language" />
</bean>
```

spring-form.tld (some)

- checkbox
- checkboxes
- errors
- form
- hidden
- input
- label
- option
- password
- select

Validation

Tags

- All of the form tags have an error class associated with them
- There is a specific errors tag for displaying validation errors

```
<form:form>
      <table>
          <tr>
              <td>First Name:</td>
              <td><form:input path="firstName" /></td>
              <%-- Show errors for firstName field --%>
              <td><form:errors path="firstName" /></td>
          </tr>

          <tr>
              <td>Last Name:</td>
              <td><form:input path="lastName" /></td>
              <%-- Show errors for lastName field --%>
              <td><form:errors path="lastName"  /></td>
          </tr>
          <tr>
              <td colspan="3">
                  <input type="submit" value="Save Changes" />
              </td>
          </tr>
      </table>
  </form:form>
```

Validator Interface

- Validator Interface
- ValidationUtils class
- BindingResult class
- SimpleFormController

JSR-303

- Standard for validation
- Annotation based
- Hibernate Validator
- POJO based

REST

Verbs

- What does CRUD stand for?
- POST
- GET
- PUT
- DELETE

ContentNegotiatingViewResolver

- **Accepts**
  - XML
  - JSON
  - HTML
- **Mutliple View Resolvers**
- **Additional JARs needed for the Marshaller**

web.xml

- Dispatcher Servlet needs to open allow access for various request types.
- HTML
- PDFs
- JSON
- XML