Spring Training

TechFerry Infotech Pvt. Ltd.
(http://www.techferry.com/)

Conversations

- Introduction to Spring
- Concepts: Annotations, MVC, IOC/DI, Auto wiring
- Spring Bean/Resource Management
- Spring MVC, Form Validations.
- Unit Testing
- Spring Security – Users, Roles, Permissions.
- Code Demo
  - CRUD using Spring, Hibernate, MySQL.
  - Spring security example.
  - REST/jQuery/Ajax example

Spring - Introduction

Exercise: What do we need in an enterprise application?

- Database Access, Connection Pools?
- Transactions?
- Security, Authentication, Authorization?
- Business Logic Objects?
- Workflow/Screen Flow?
- Messaging/emails?
- Service Bus?
- Concurrency/Scalability?

Can somebody wire all the needed components?
Do we have to learn everything before we can start?

Hello Spring

- Spring is potentially a one-stop shop, addressing most infrastructure concerns of typical web applications
    - so you focus only on your business logic.
- Spring is both comprehensive and modular
    - use just about any part of it in isolation, yet its architecture is internally consistent.
    - maximum value from your learning curve.

What is Spring?

- Open source and lightweight web-application framework
- Framework for wiring the entire application
- Collection of many different components
- Reduces code and speeds up development

Spring is essentially a technology dedicated to enabling you to build applications using POJOs.

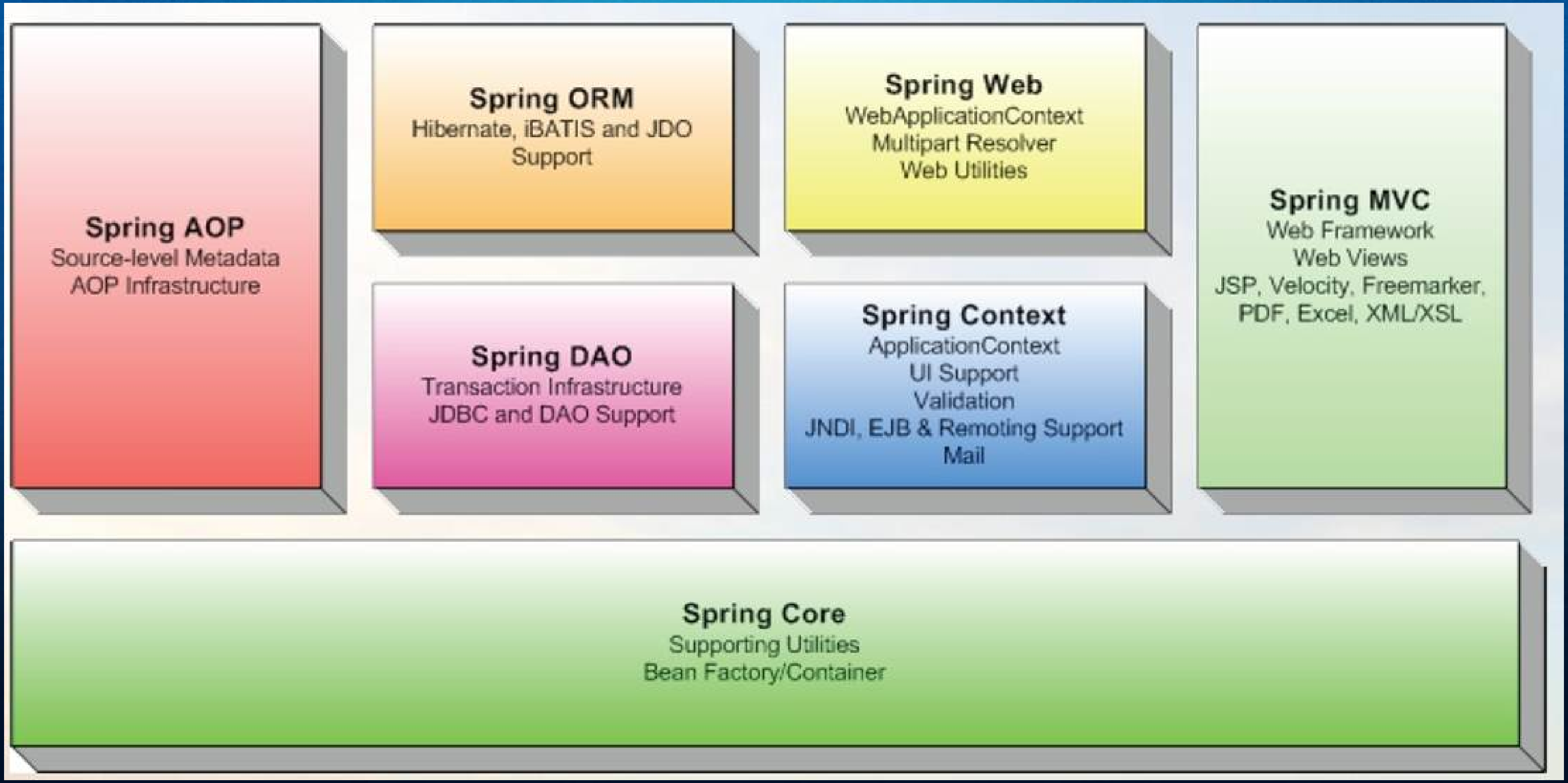
Why Spring?

- Spring Enables POJO Programming
    - Application code does not depend on spring API’s
- Dependency Injection and Inversion of Control simplifies coding
    - Promotes decoupling and re-usability

Features:

- Lightweight
- Inversion of Control (IoC)
- Aspect oriented (AOP)
- MVC Framework
- Transaction Management
- JDBC
- Ibatis / Hibernate

Spring Modules



What else Spring do?

Spring Web Flow
Spring Integration
Spring Web-Services
Spring MVC
Spring Security
Spring Batch
Spring Social
Spring Mobile

... and let it ever expand ...

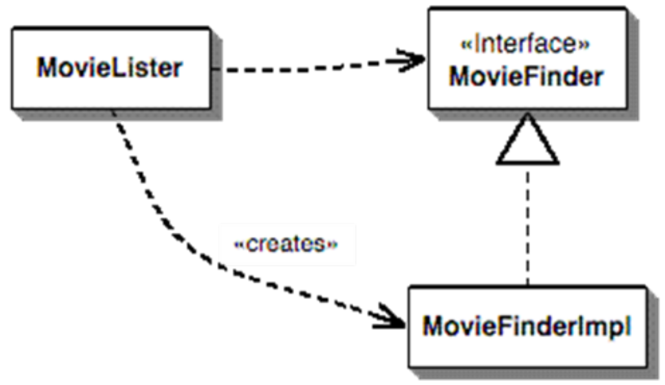
Inversion of Control/Dependency Injection

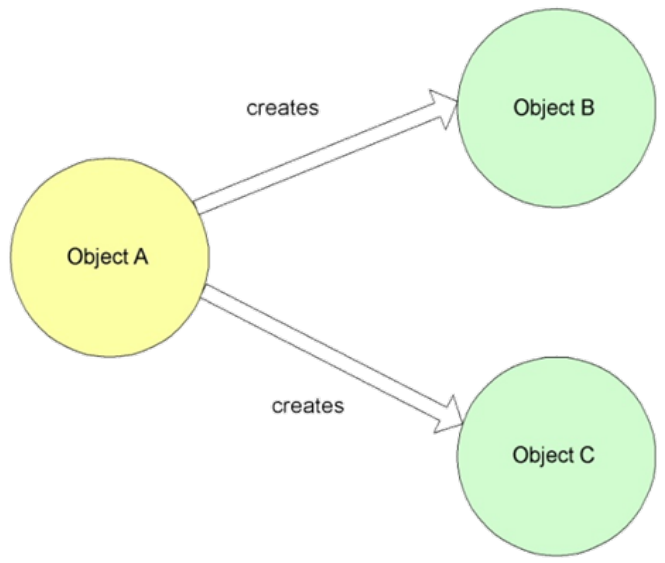
"Don't call me, I'll call you."

- IoC moves the responsibility for making things happen into the framework
- Eliminates lookup code from within the application
- Loose coupling, minimum effort and least intrusive mechanism

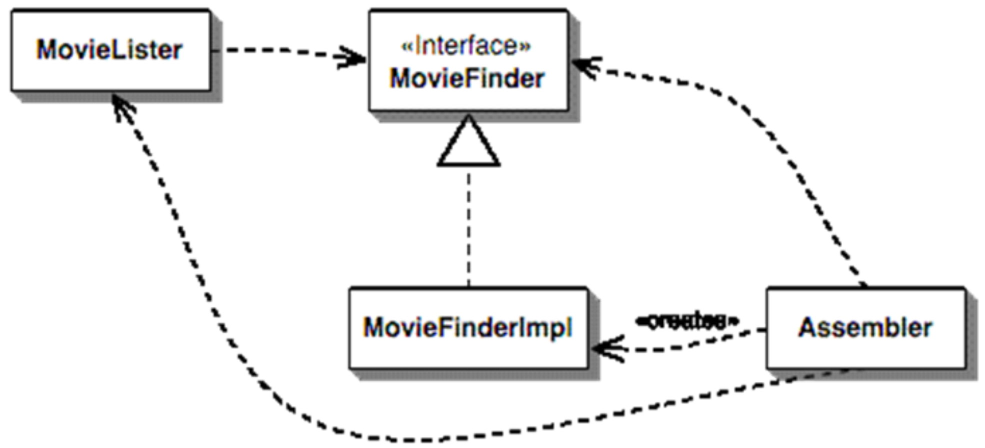
IOC/DI

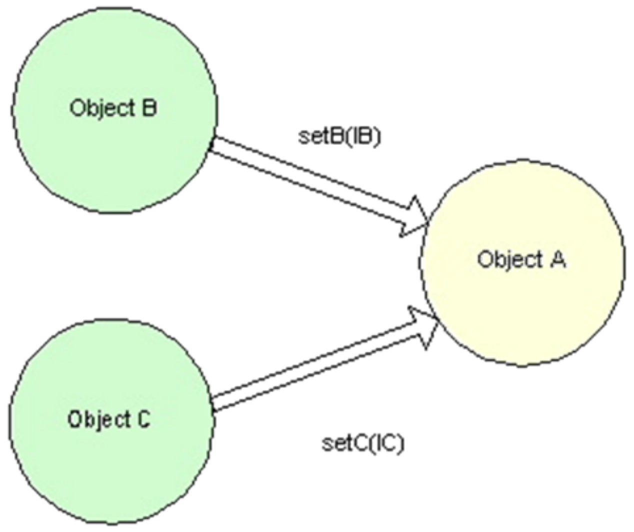
Non-IoC





IoC





IOC/DI

Non IOC Example:

```
class MovieLister...
  private MovieFinder finder;
  public MovieLister() {
    finder = new MovieFinderImpl();
  }
```

```
public interface MovieFinder {
  List findAll();
}
```

```
class MovieFinderImpl ... {
  public List findAll() {
    ...
  }
}
```

IOC/DI

IoC Example: DI exists in major two variants:

Setter Injection

```
public class MovieLister {
    private MovieFinder movieFinder;
    public void setMovieFinder(MovieFinder movieFinder) {
        this.movieFinder = movieFinder;
    }
}
```

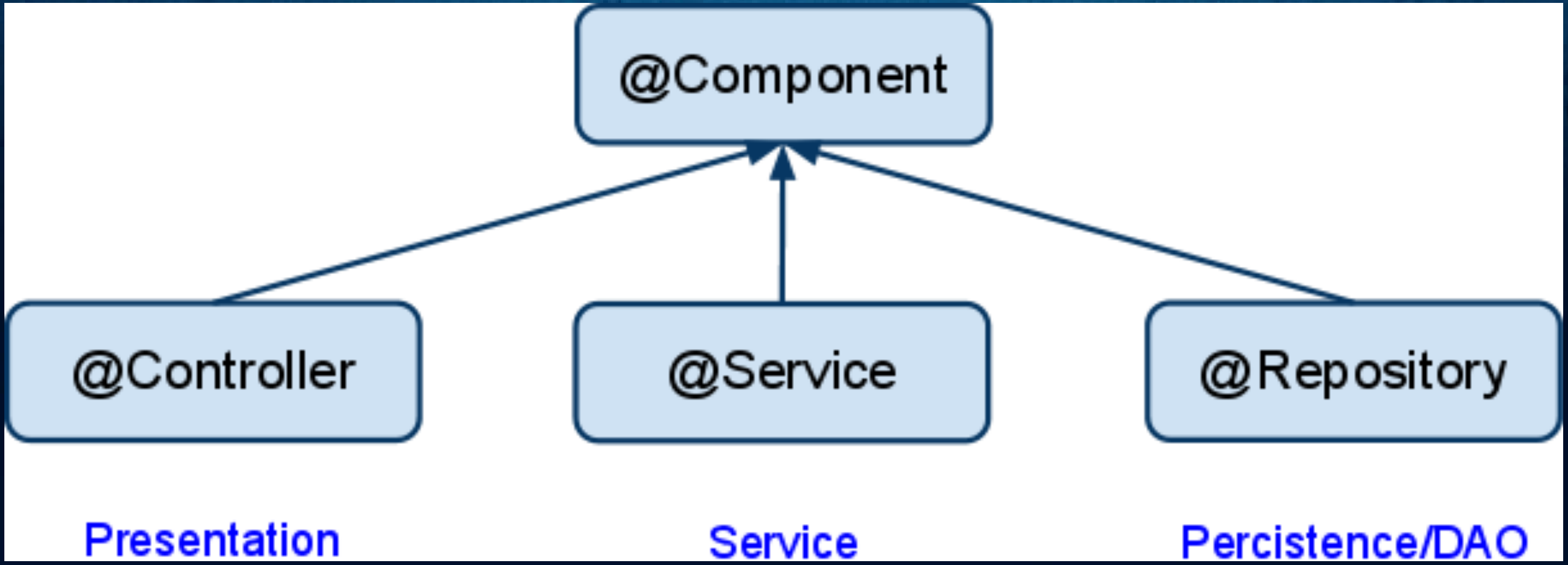
Constructor Injection

```
   public class MovieLister{
private MovieFinder movieFinder;
public MovieLister(MovieFinder movieFinder) {
    this.movieFinder = movieFinder;
}
   }
```

Spring Bean Management

Code Demo ....

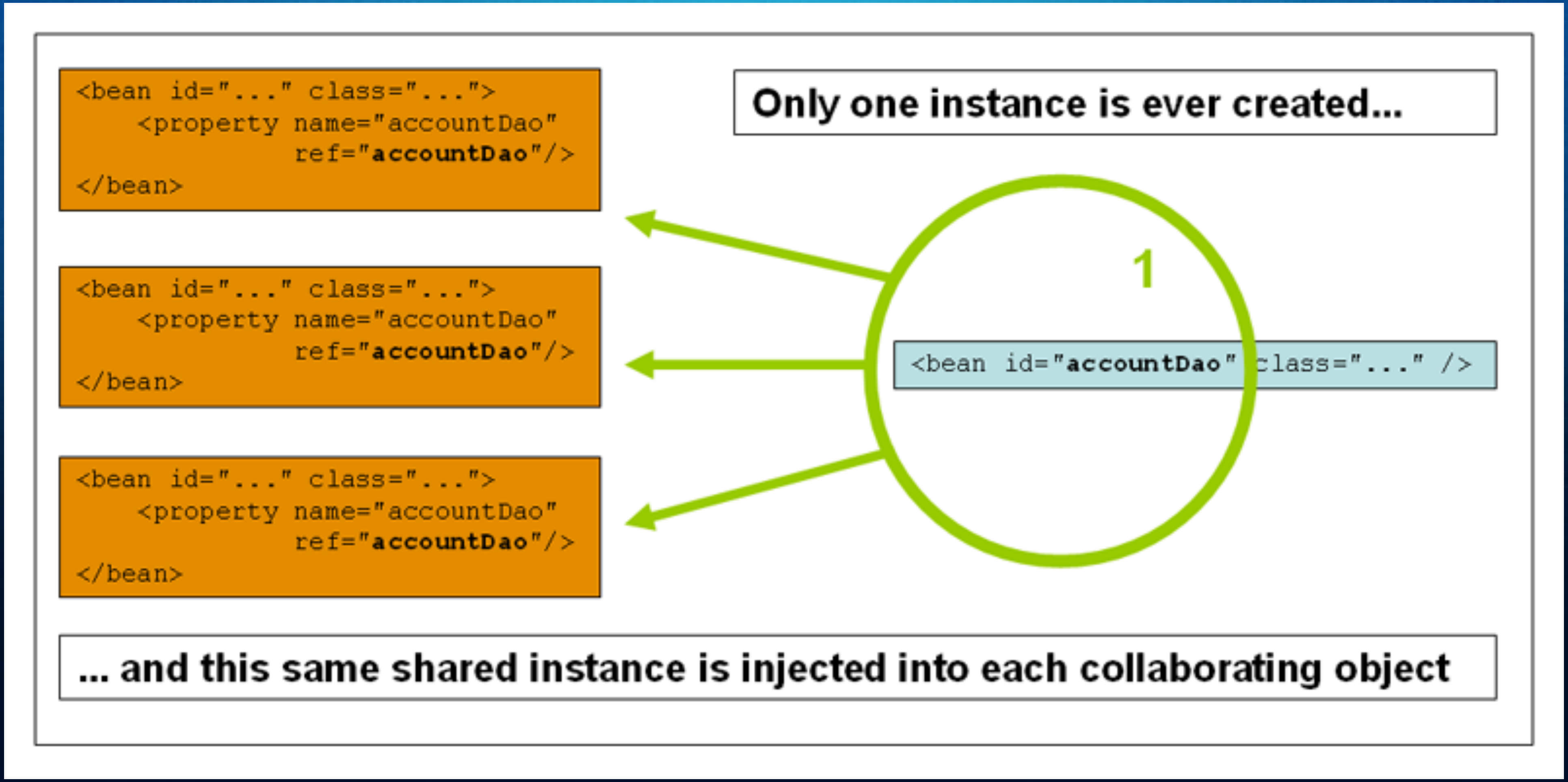
- Annotations: @Component, @Service, @Repository
- Annotation: @Autowire
- web.xml - Context loader listener to scan components
- <context:annotation-config />
  <context:component-scan base-package="..." />



Bean Scopes

singleton
Scopes a single bean definition to a single object instance per Spring IoC container.
prototype
Scopes a single bean definition to any number of object instances.
request
Scopes a single bean definition to the lifecycle of a single HTTP request.
session
Scopes a single bean definition to the lifecycle of a HTTP Session.
global session
Scopes a single bean definition to the lifecycle of a global HTTP Session. Typically only valid when used in a portlet context.

Singleton Bean



Only one instance is ever created...

```
<bean id="..." class="...">
    <property name="accountDao"
              ref="accountDao"/>
</bean>
```

```
<bean id="..." class="...">
    <property name="accountDao"
              ref="accountDao"/>
</bean>
```

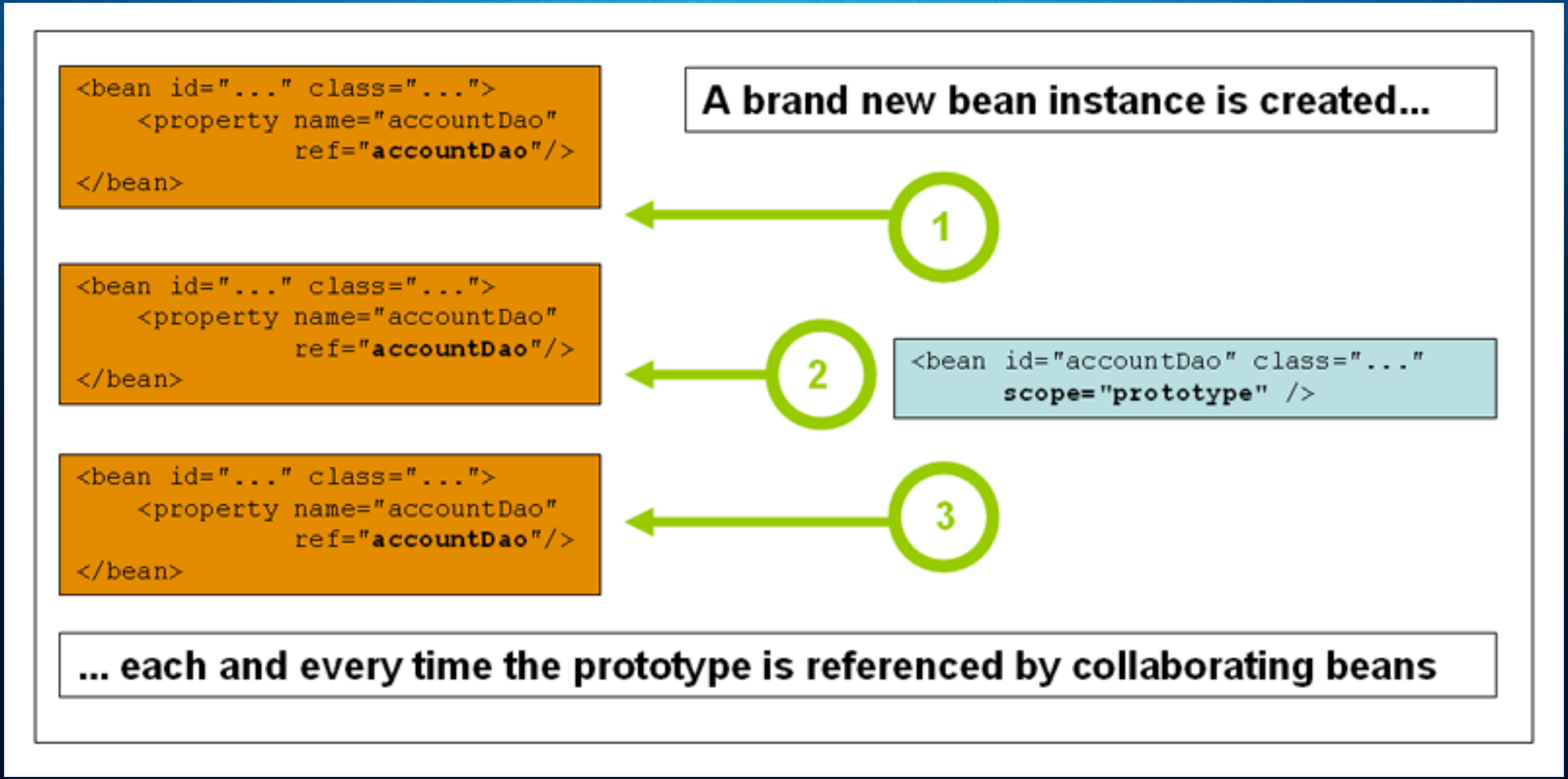
```
<bean id="..." class="...">
    <property name="accountDao"
              ref="accountDao"/>
</bean>
```

```
<bean id="accountDao" class="..." />
```

... and this same shared instance is injected into each collaborating object

Prototype Beans

- Use @Scope("prototype")
- *Caution: dependencies are resolved at instantiation time. It does NOT create* a new instance at runtime more than once.



```
<bean id="..." class="...">
    <property name="accountDao"
              ref="accountDao"/>
</bean>
```

```
<bean id="accountDao" class="..."
      scope="prototype" />
```

A brand new bean instance is created...
1
2
3
... each and every time the prototype is referenced by collaborating beans

Bean Scopes Contd..

- As a rule of thumb, you should use the prototype scope for all beans that are stateful, while the singleton scope should be used for stateless beans.
- RequestContextListener is needed in web.xml for request/session scopes.
- Annotation:@Scope("request") @Scope("prototype")

Homework:

- Singleton bean referring a prototype/request bean?
- @Qualifier, Method Injection.

Hate Homework?

- Stick to stateless beans. :)

Wiring Beans

no
No autowiring at all. Bean references must be defined via a ref element. This is the default.
byName
Autowiring by property name.
byType
Allows a property to be autowired if there is exactly one bean of the property type in the container. If there is more than one, a fatal exception is thrown.
constructor
This is analogous to *byType*, but applies to constructor arguments.
autodetect
Chooses *constructor* or *byType* through introspection of the bean class.

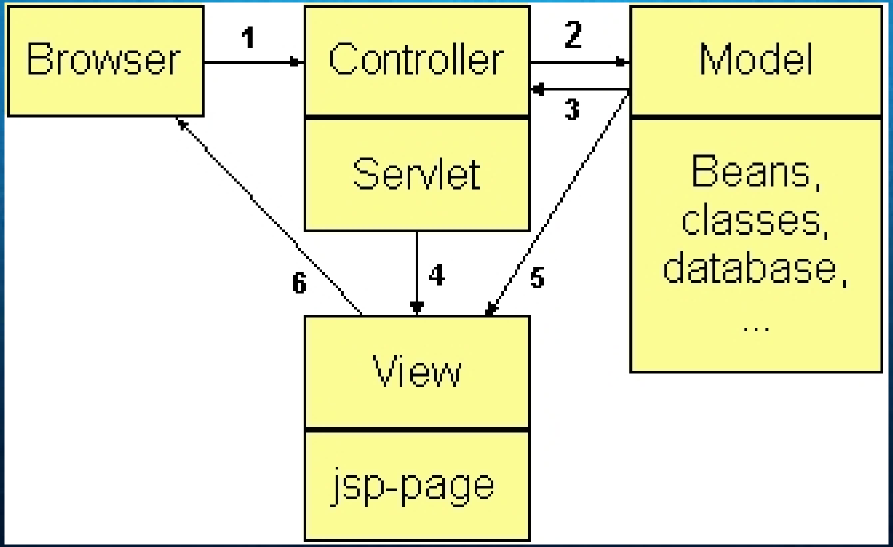
Homework :)

1. What wiring method is used with @Autowire annotation?
2. Other annotations you may find useful:
   - @Required
   - @Resource

Also review the Spring annotation article:
http://www.techferry.com/articles/spring-annotations.html

MVC - Model View Controller

- Better organization and code reuse.
- Separation of Concern
- Can support multiple views



Spring MVC

Code Demo ....

- Annotations: @Controller, @RequestMapping, @ModelAttribute, @PathVariable
- Spring DispatcherServlet config - just scan controllers
- web.xml - Context loader listener to scan other components
- ResourceBundleMessageSource and <spring:message> tag

Reference: http://static.springsource.org/spring/docs/3.0.x/spring-framework-reference/html/mvc.html

- @RequestMapping Details
- Handler method arguments and Return Types

Pre-populate Model and Session Objects

```
@Controller
@RequestMapping("/owners/{ownerId}/pets/{petId}/edit")
@SessionAttributes("pet")
public class EditPetForm {

    @ModelAttribute("types")
     public Collection<PetType> populatePetTypes() {
           return this.clinic.getPetTypes();
    }

    @RequestMapping(method = RequestMethod.POST)
    public String processSubmit(@ModelAttribute("pet") Pet pet, BindingResult result,
                                                          SessionStatus status) {
        new PetValidator().validate(pet, result);
        if (result.hasErrors()) {
             return "petForm";
        }else {
            this.clinic.storePet(pet);
            status.setComplete();
            return "redirect:owner.do?ownerId=" + pet.getOwner().getId();
        }
    }
}
```

Form Validation

Code Demo ...

- BindingResult
- Validator.validate()
- <form:errors> tag

Alternative: Hibernate Validator can also be used for annotation based validation.

```
public class PersonForm {
    @NotNull
    @Size(max=64)
    private String name;

    @Min(0)
    private int age;
}
```

```
@RequestMapping("/foo")
 public void processFoo(@Valid Foo foo) {
     /* ... */
   }
```

Unit Testing

@RunWith(SpringJUnit4ClassRunner.class)
@ContextConfiguration(locations = { "/spring-servlet-test.xml" })
@Test

Other useful Annotations:

@DirtiesContext
@ExpectedException(SomeBusinessException.class)
@Timed(millis=1000)
@NotTransactional

Spring Security

Code Demo ...

- <sec:authorize> tag
- Annotations: @PreAuthorize
- applicationContext-security.xml
- DB Schema: Users, Authorities

Thank you and Questions?