# Spring Framework

Laurent Prévost
WEBS

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Haute Ecole d'Ingénierie et de Gestion
du Canton de Vaud

# What is Spring Framework?

- It is a bunch development libraries: it provides various modules to develop software components.
- Unlike Java EE, it is **not** an execution platform: it **does not** provides an environment to deploy and bring these components “to live”.
- It is not exactly an entreprise platform, but it provides support for distributed transactions, security, integration, etc. **Same as J2EE.**
- Separation of concerns: "The developer takes care of the business logic. Spring modules take care of the systemic qualities”. **Same as J2EE.**

http://flickr.com/photos/decade_null/427124229/sizes/m/#cc_license

# Spring Framework

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- Spring Framework is not a single library. It's a bunch of libraries where you choose the ones you need (transitive dependencies are managed for you by tools like Maven).
- It brings the **Dependency Injection** also known as **Inversion of Control** (**IoC**)

  *"The question is, what aspect of control are [they] inverting?" Martin Fowler posed this question about **Inversion of Control (IoC)** on his site in 2004. Fowler suggested renaming the principle to make it more self-explanatory and came up wit**h Dependency Injection**.*

  http://martinfowler.com/articles/injection.html

- Provide various default implementations to solve problems without having to code them yourself. For example:
  - Spring Security offers Basic Authentication filter to allow your users to authenticate to your service via HTTP basic authentication.

# Architecture

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- Spring Framework modules are libraries like any other library. It means that you can add one or more to your classpath and develop your app like any others.
    - Spring Framework modules provide bindings and integrations with most of Java EE Specs:
        - JPA, JMS, ...
- Out of the box, Spring Framework cannot run on its own. The application developed with Spring Framework modules must be deployed in an application server.
    - the container is the **environment** in which we run components;
    - the container **provides services** (transactions, security, etc.) that a Spring Framework can use through the binding modules;
    - the different containers present in Java EE are also available for Spring Framework. In fact, as you develop an app for a container with Spring libraries, you choose which container you want to use.

# Spring Framework Modules

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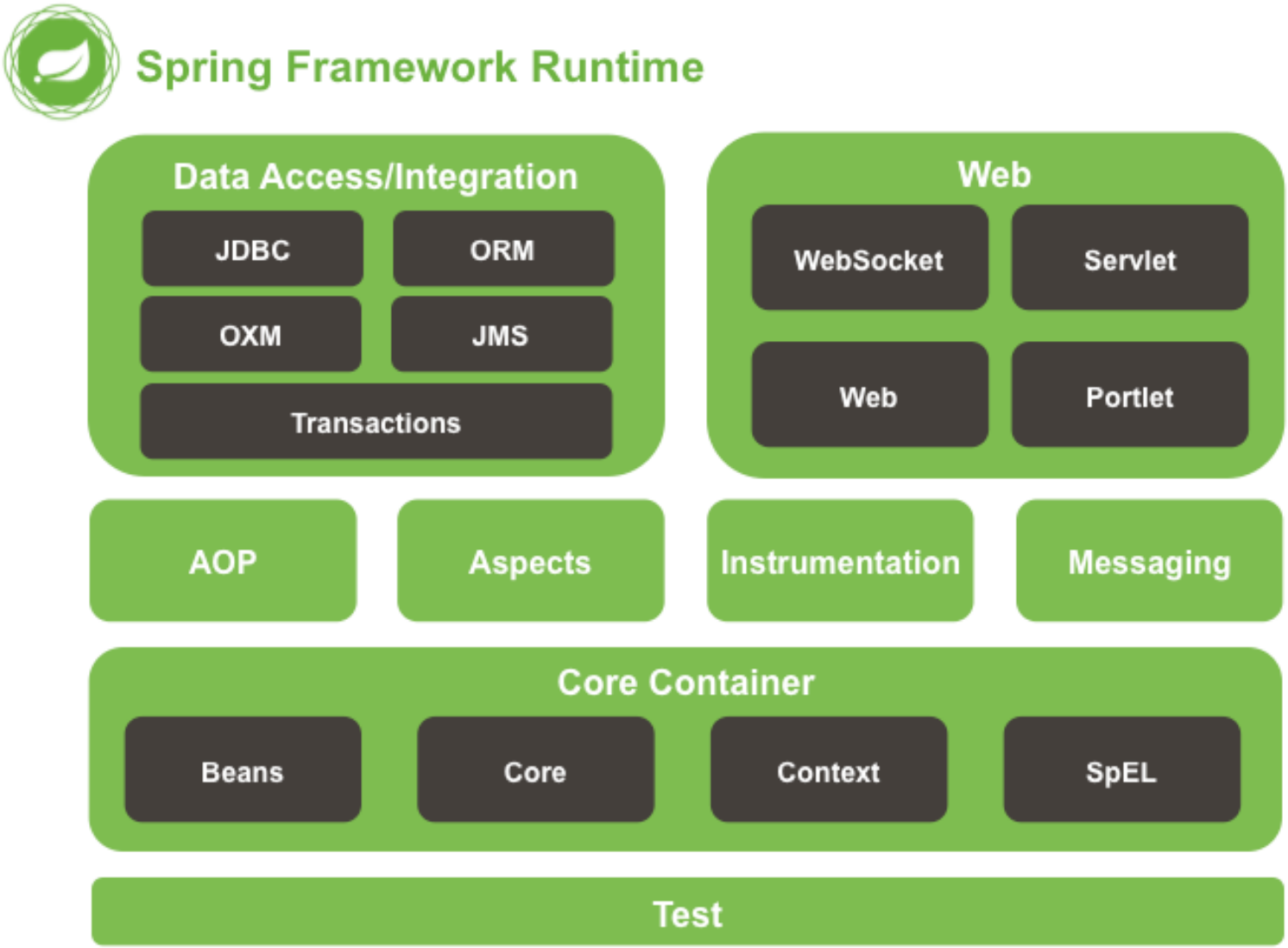


http://docs.spring.io/spring-framework/docs/current/spring-framework-reference/html/overview.html#overview-modules

# Spring Framework Modules

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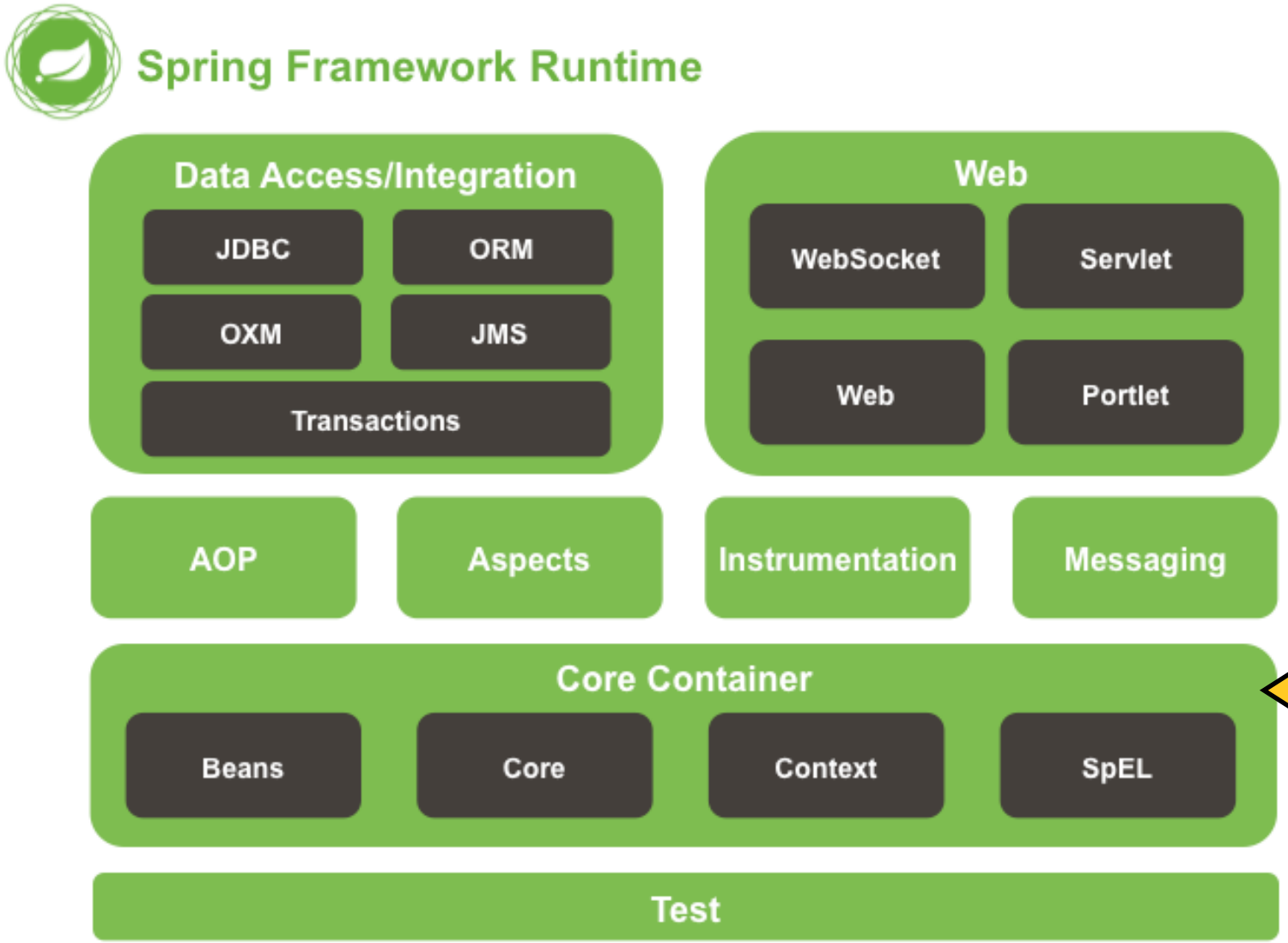


Main features that brings you **IoC** and **Dependency Injection**.

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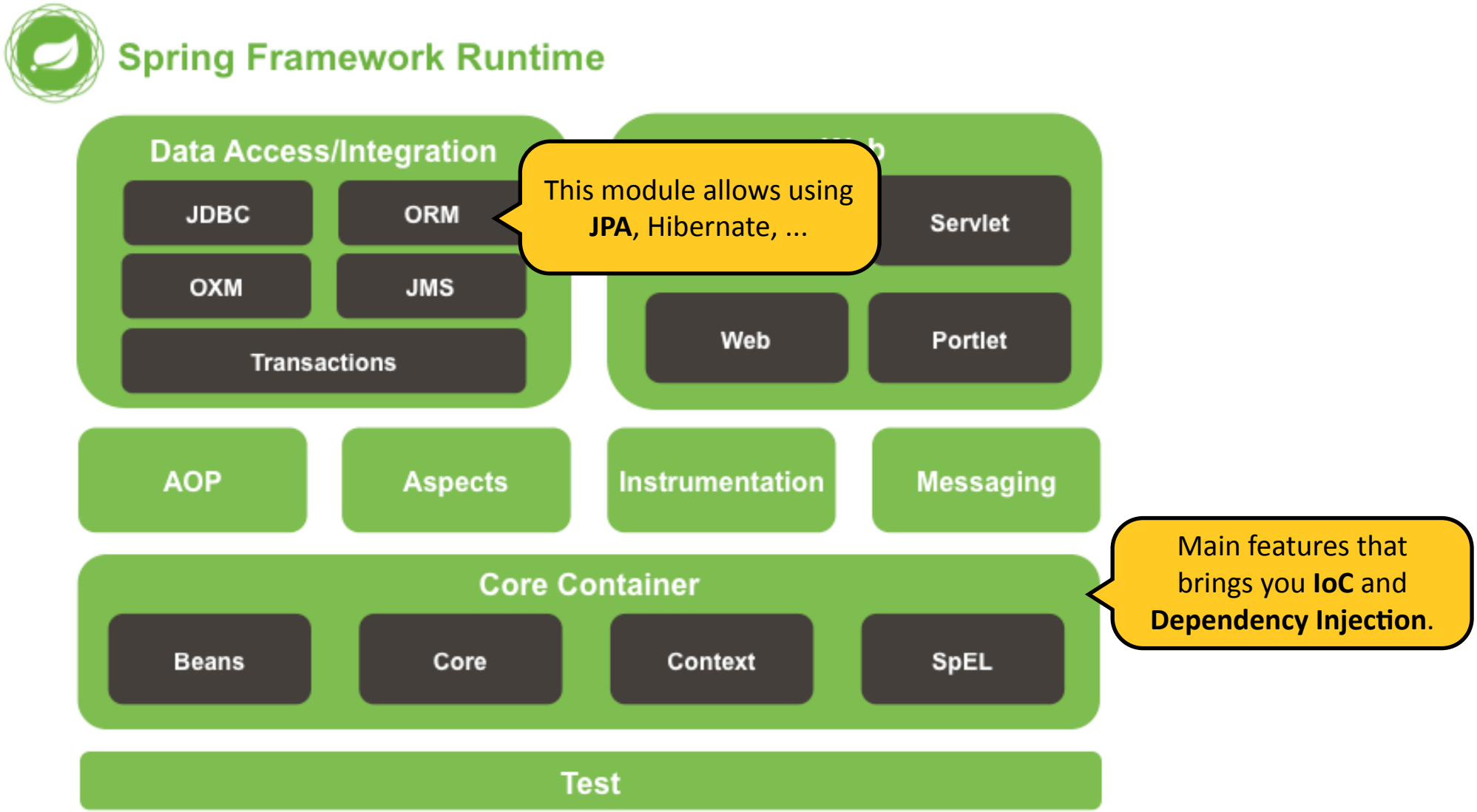


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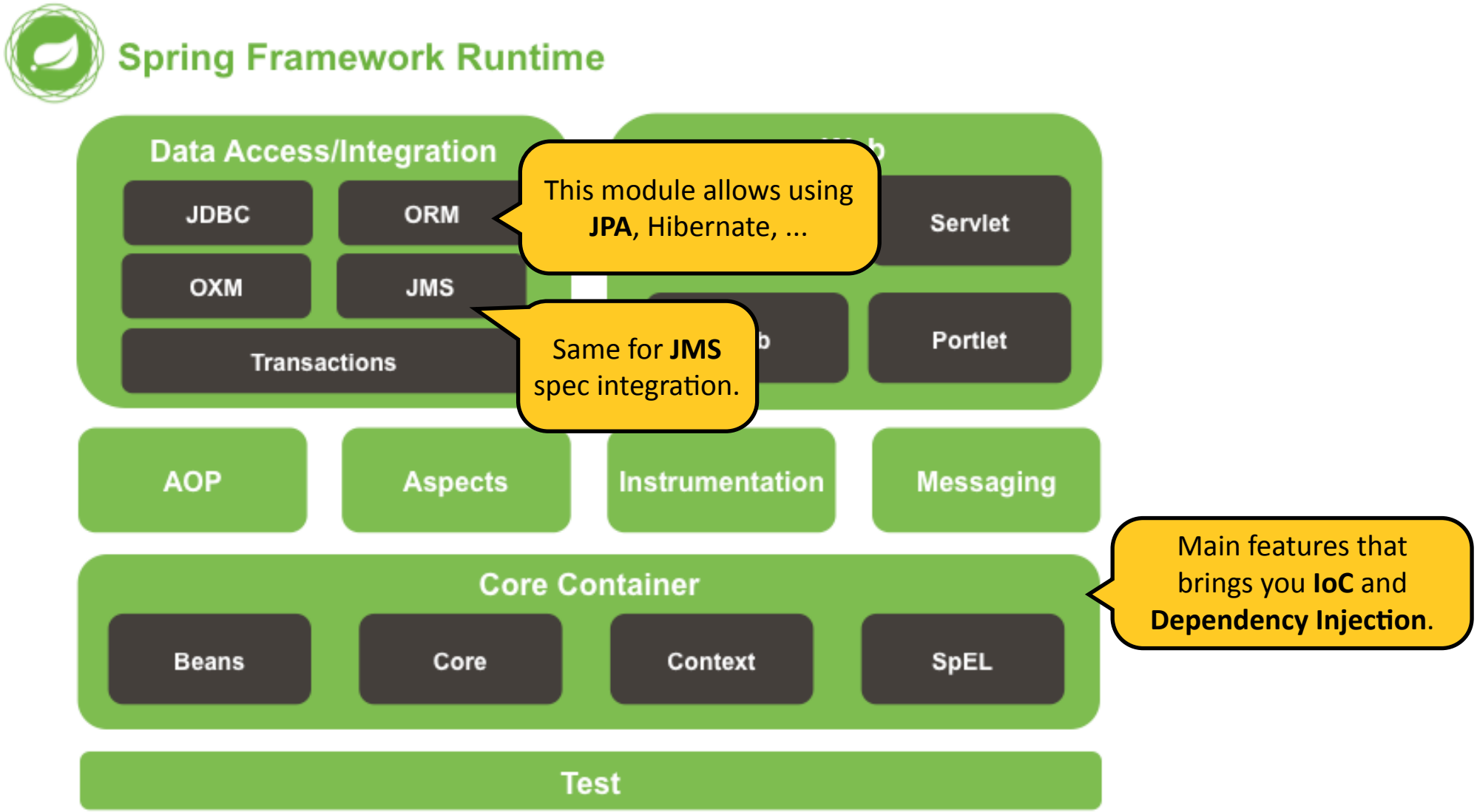


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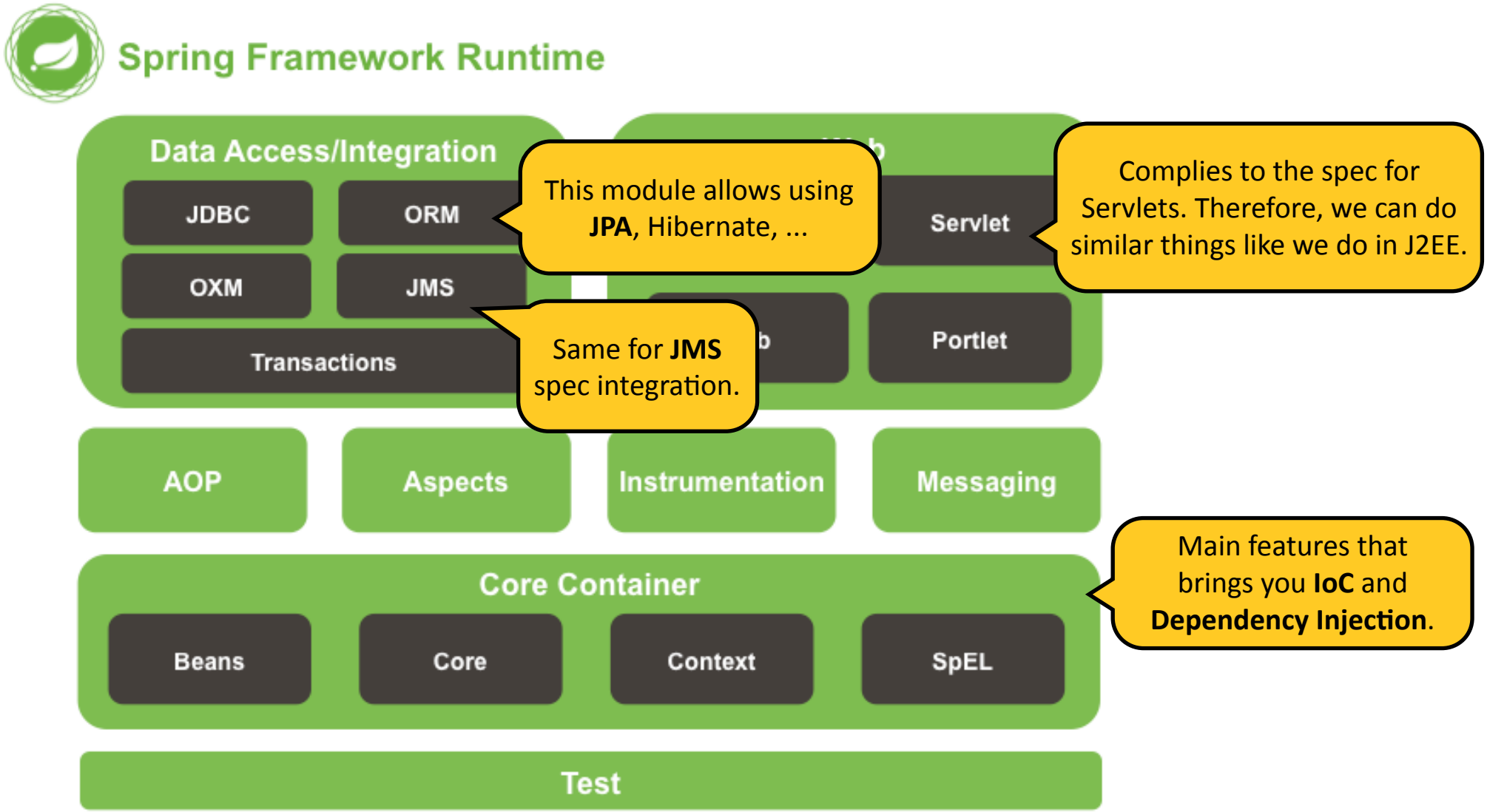


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# Spring Framework - Example of Integration

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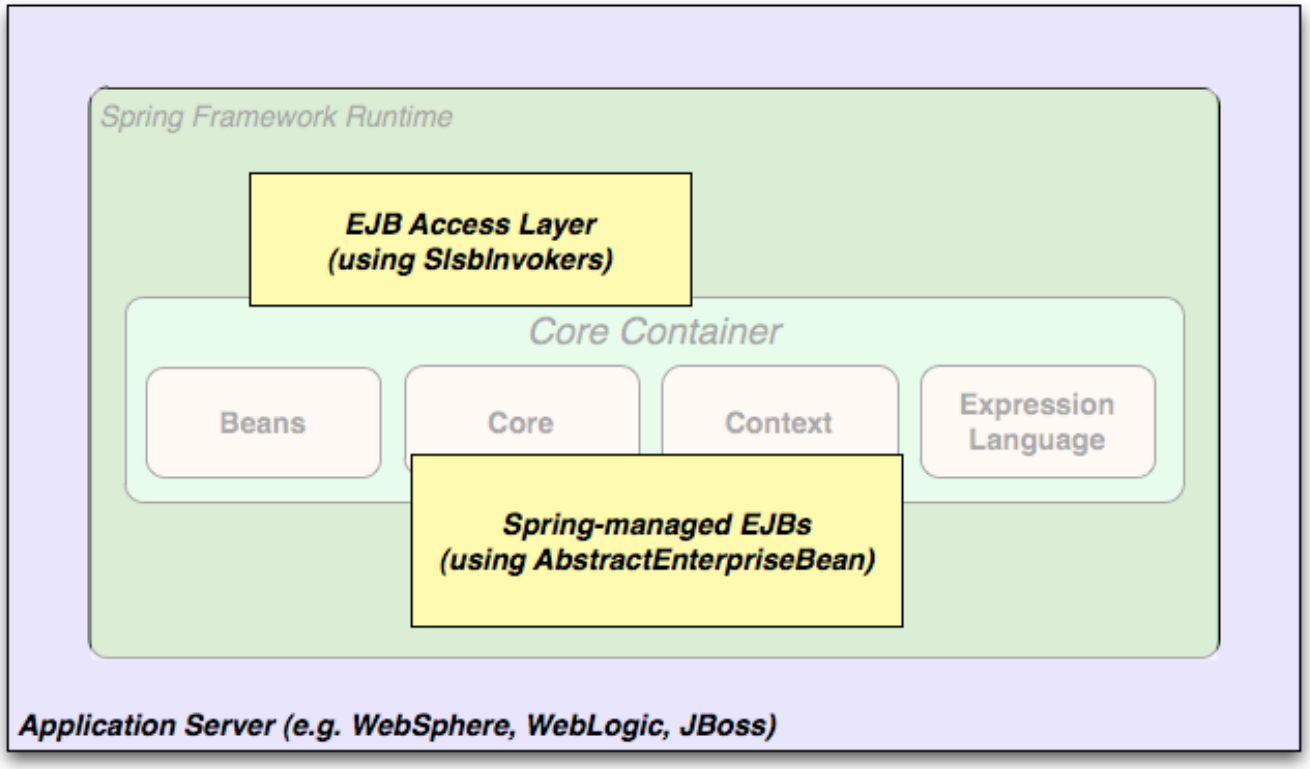

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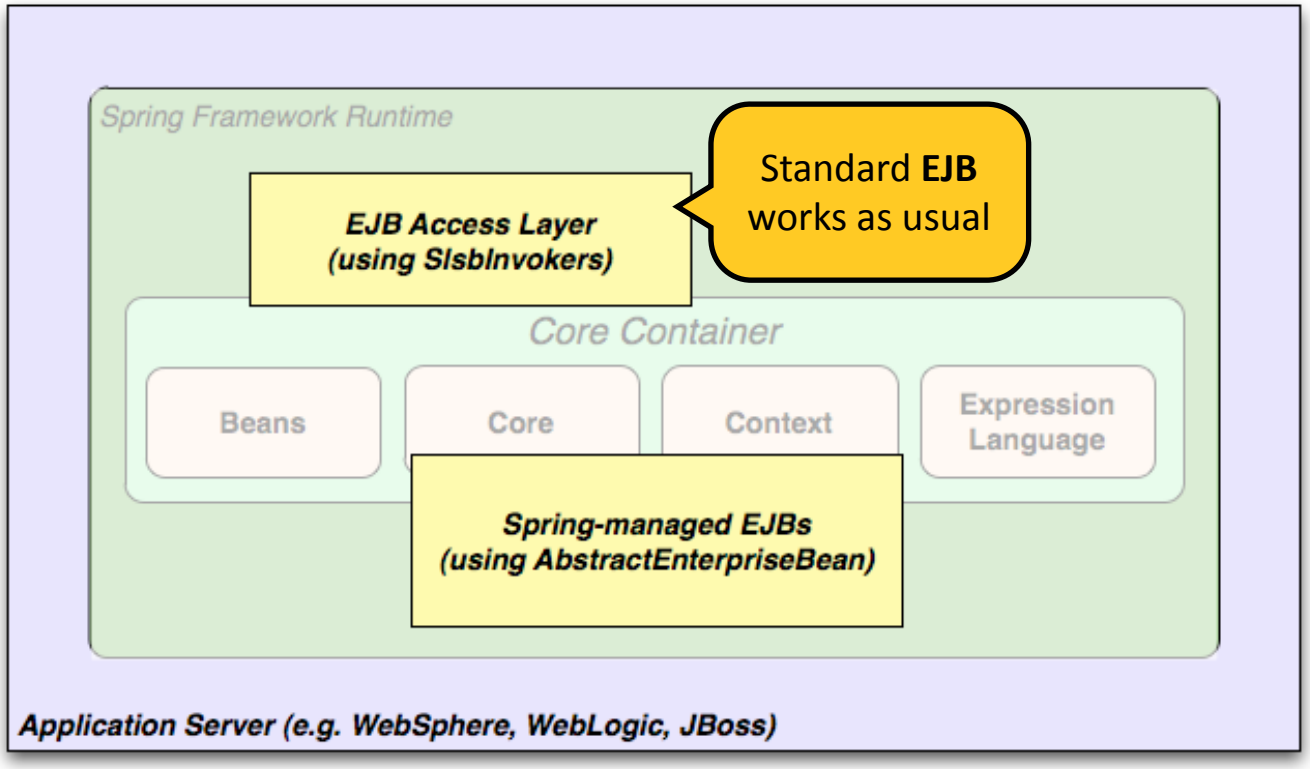

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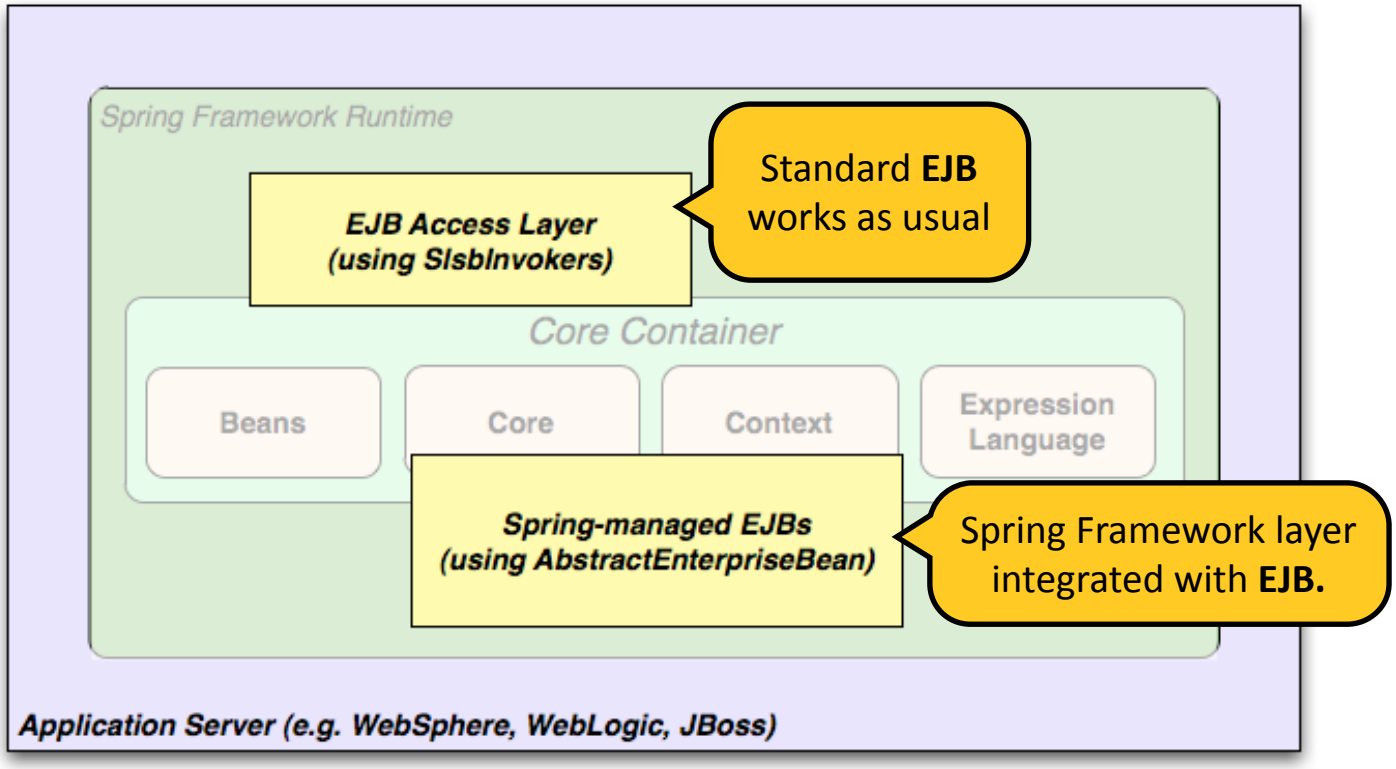

# IoC - Dependency Injection

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*In software engineering, **dependency injection** is a software **design pattern** that implements **inversion of control** for software libraries, where the caller **delegates** to an **external framework** the **control flow** of discovering and importing a service or software module.*

http://en.wikipedia.org/wiki/Dependency_injection

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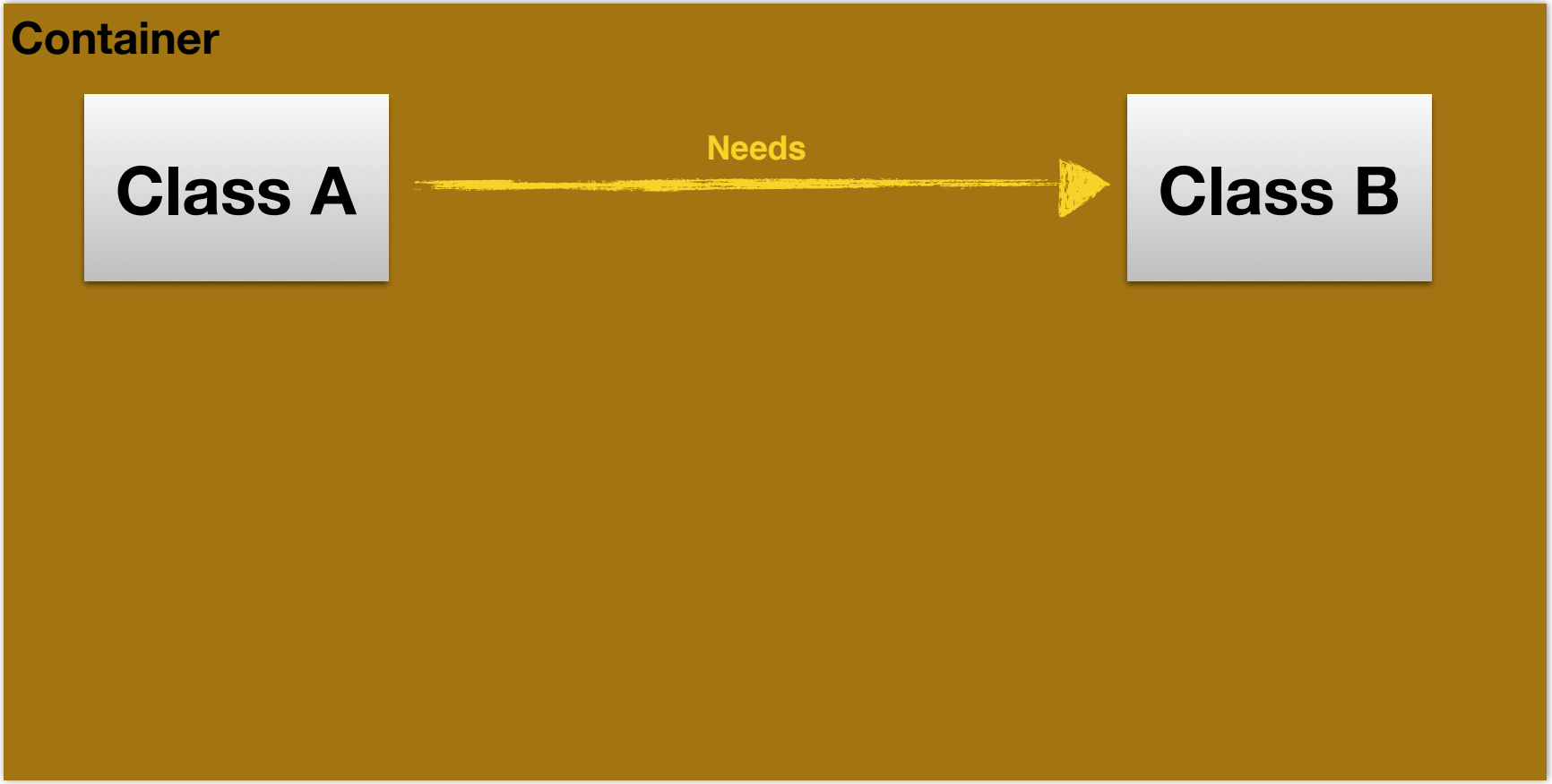

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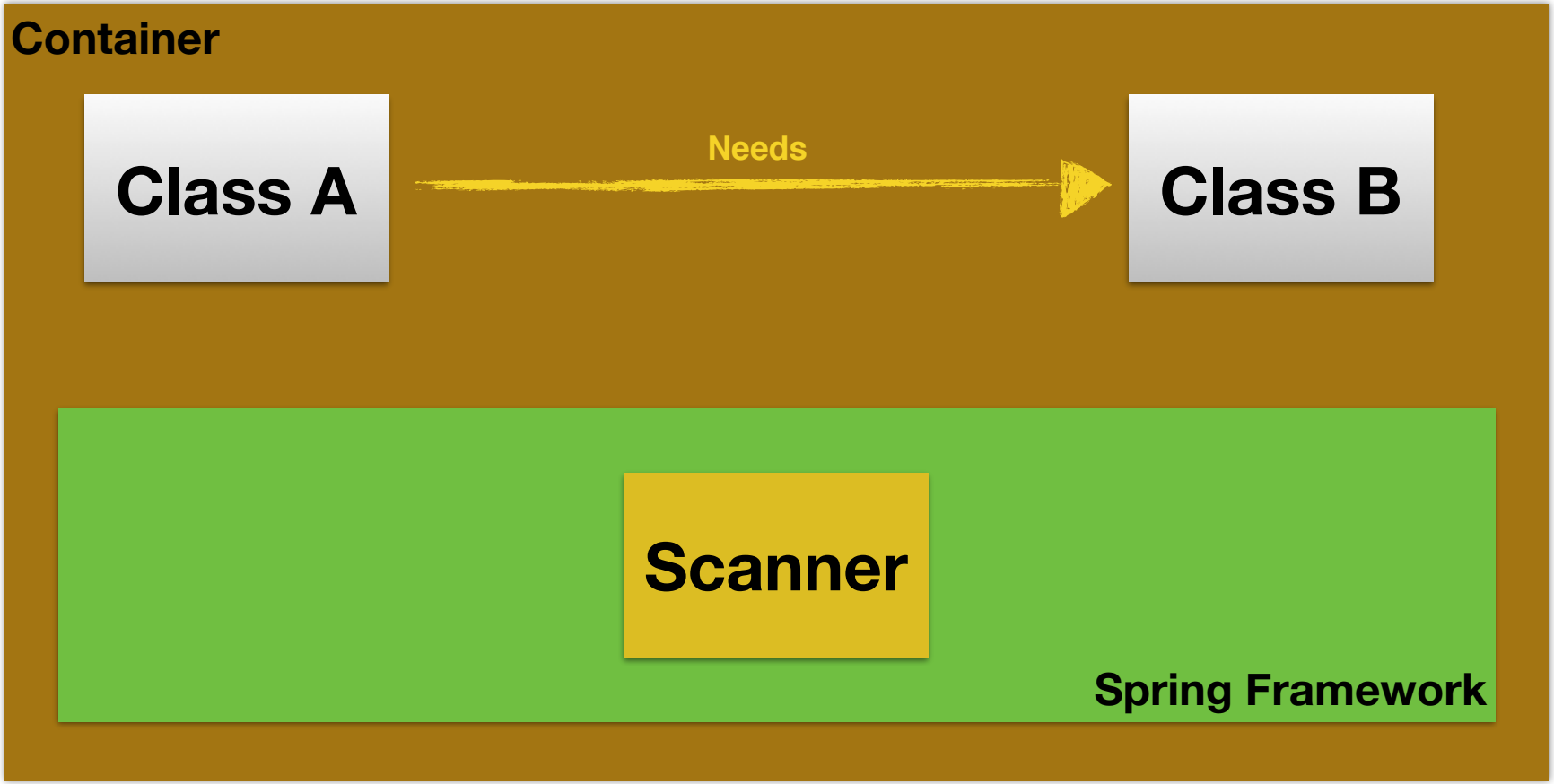

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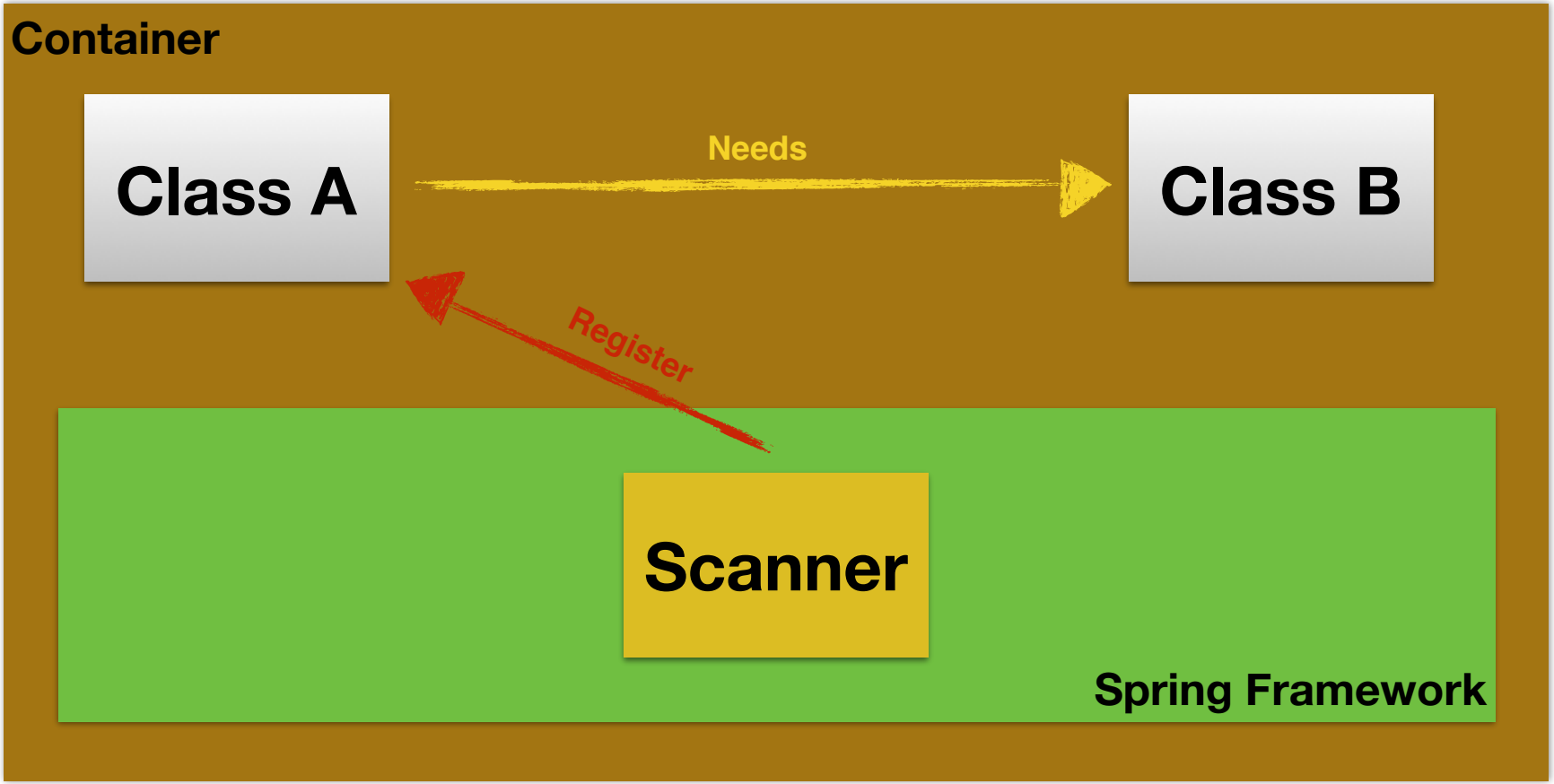

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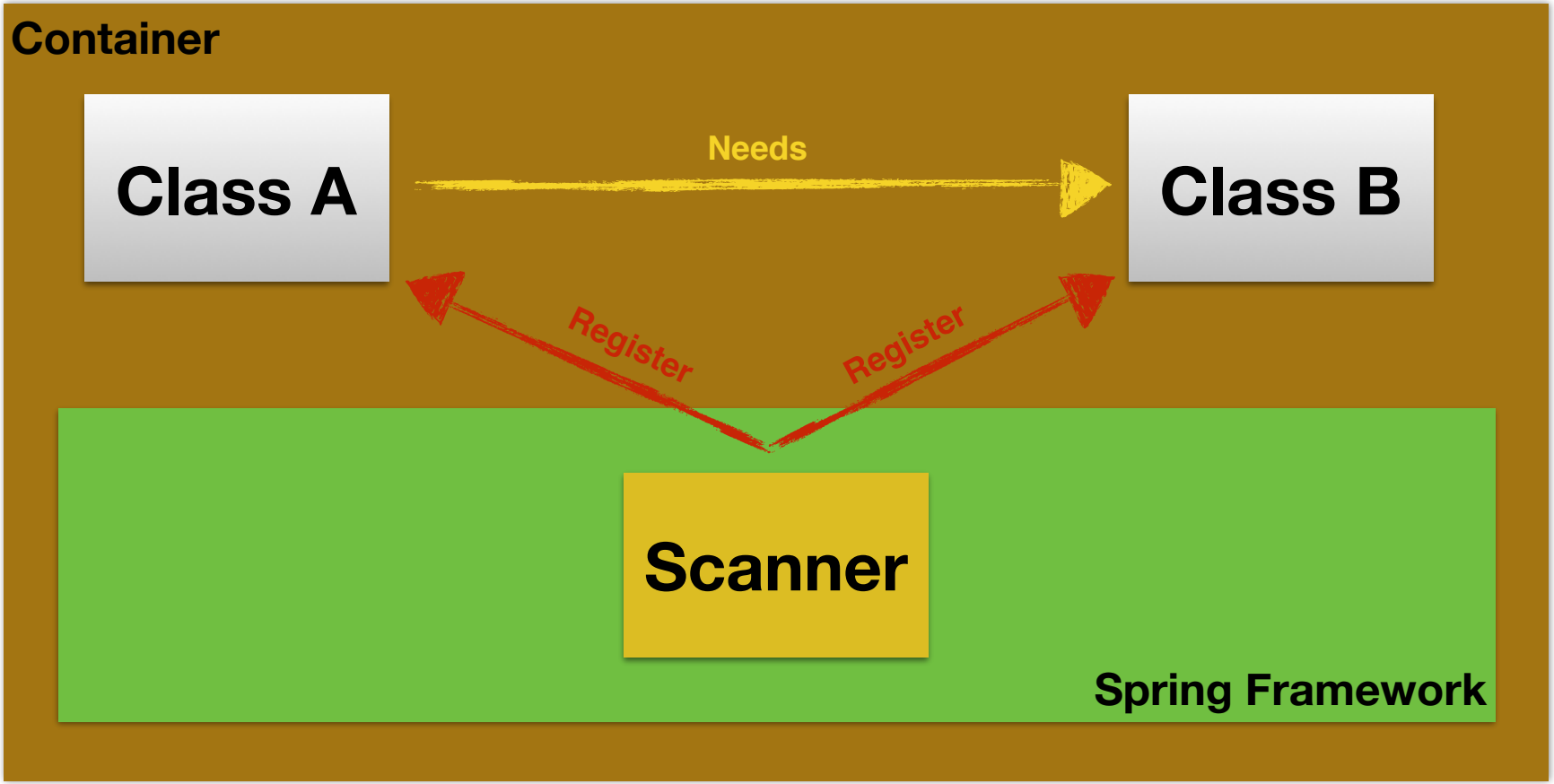

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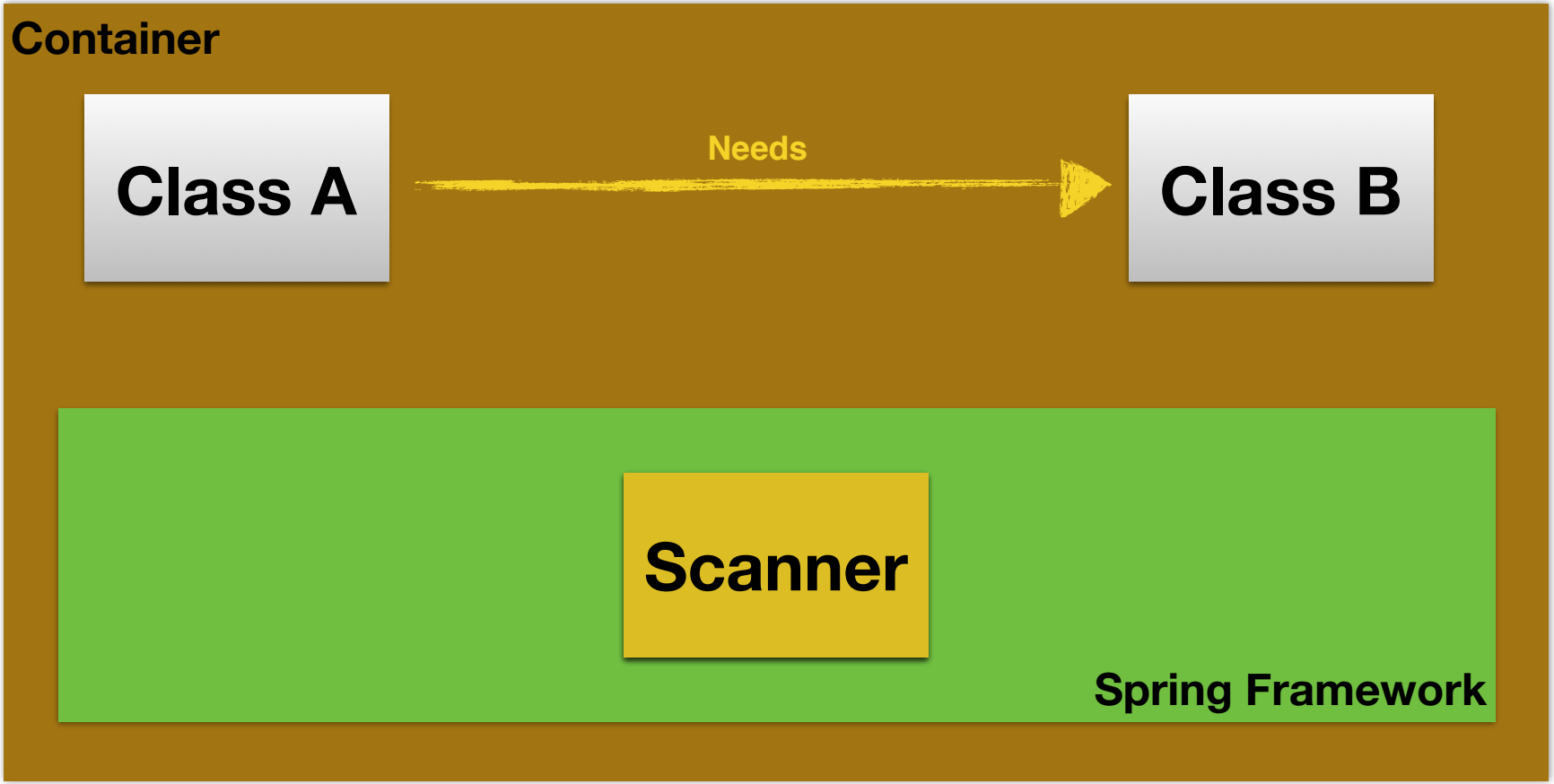

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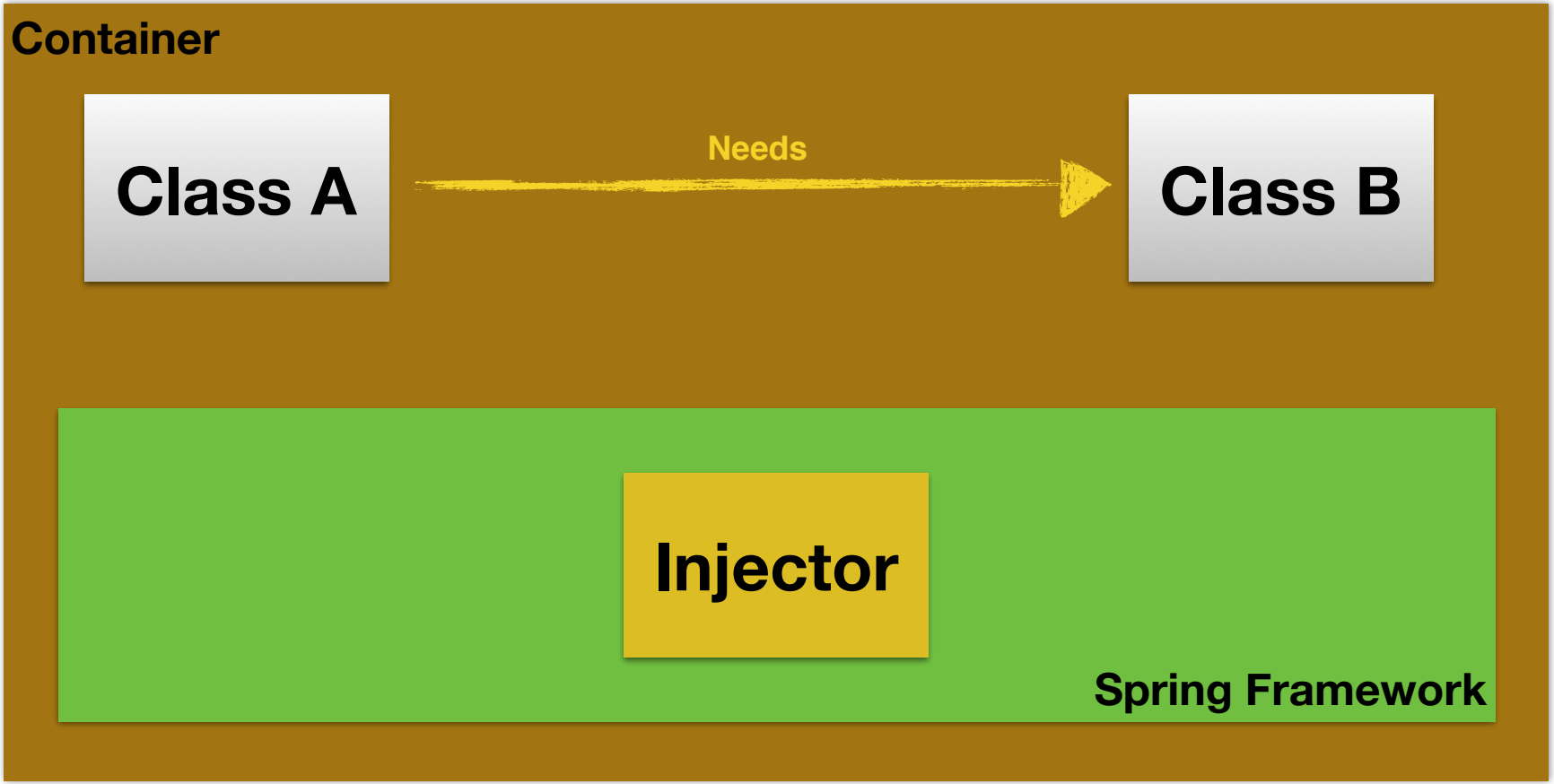

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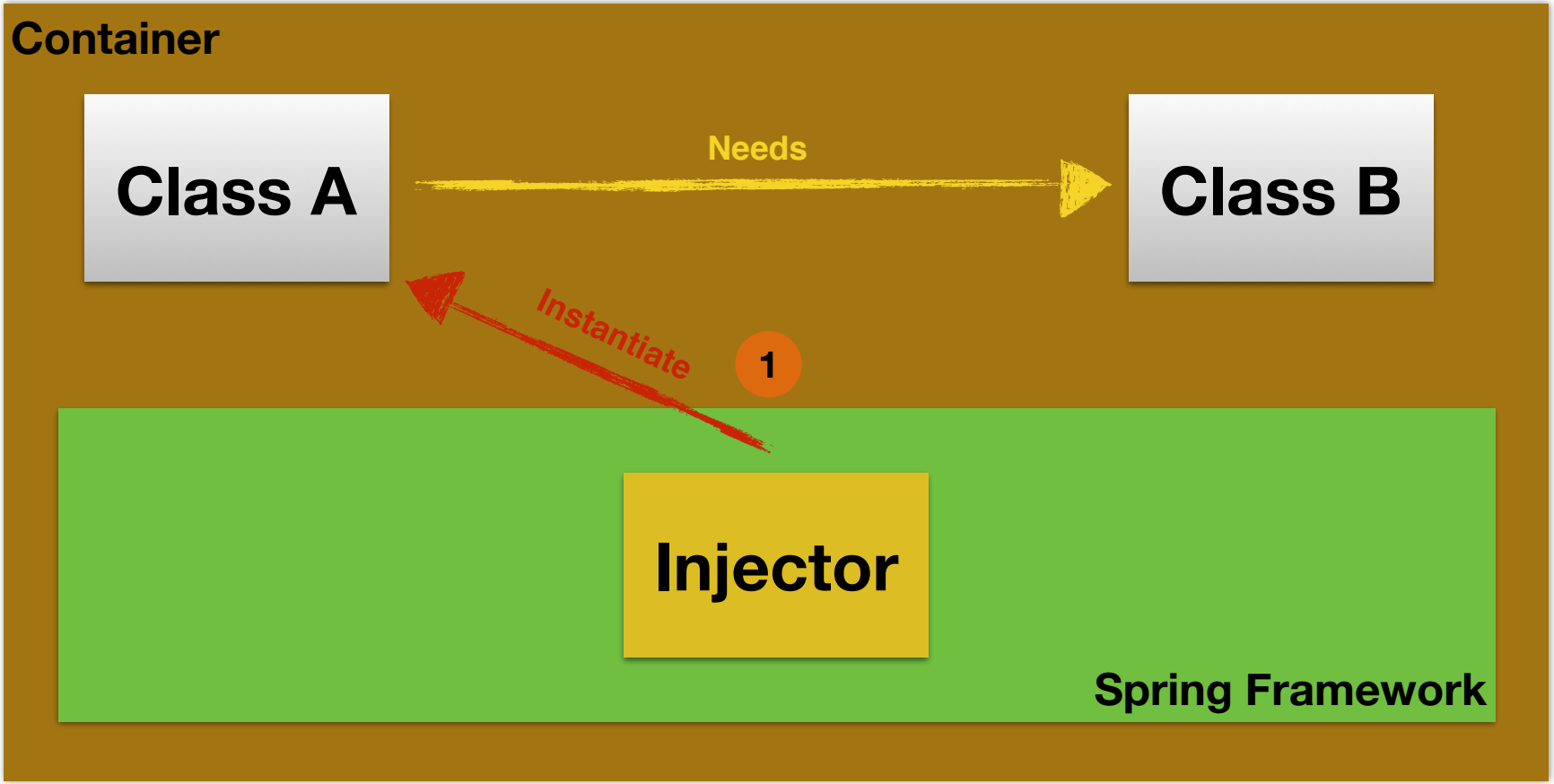

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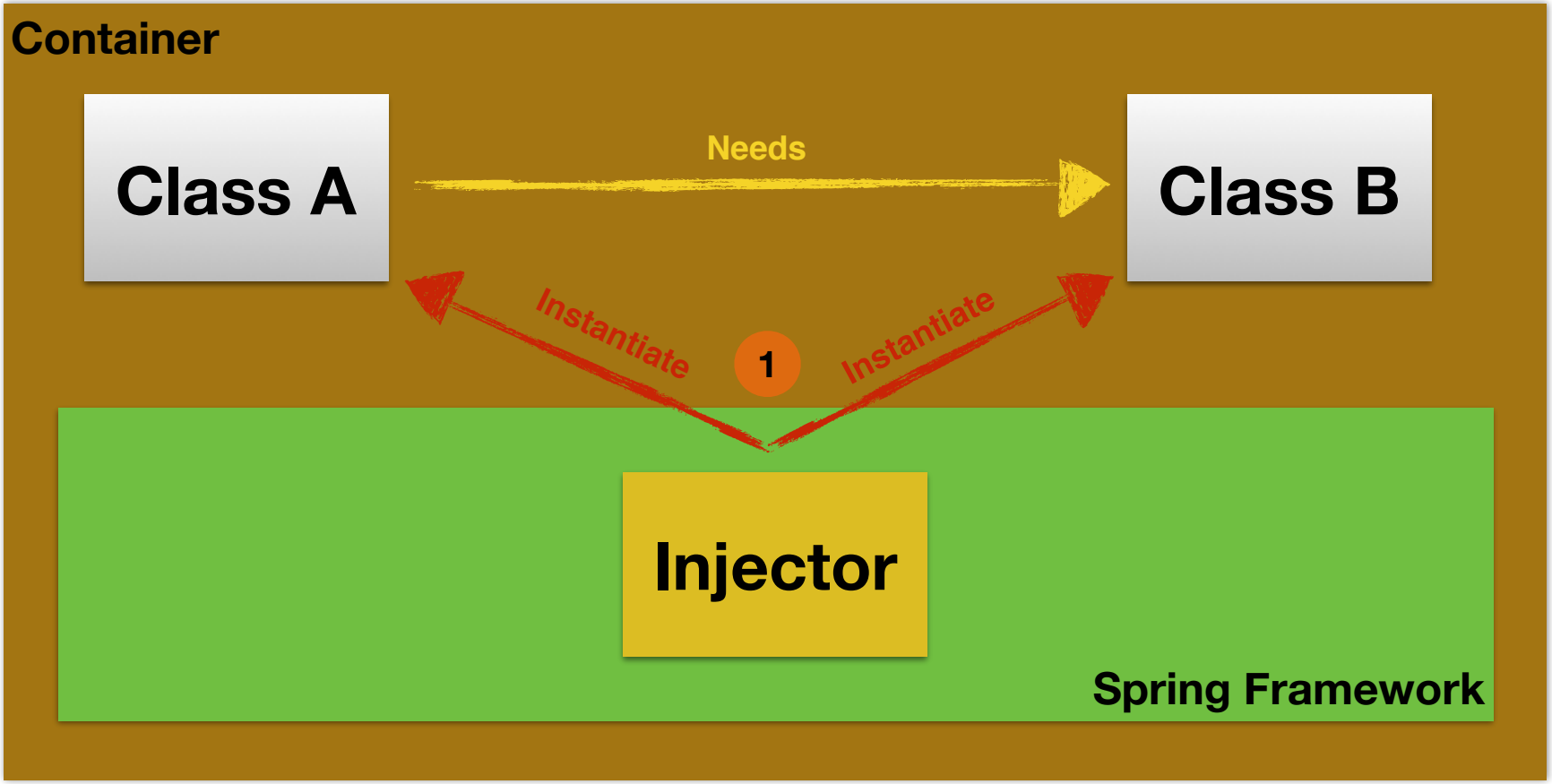

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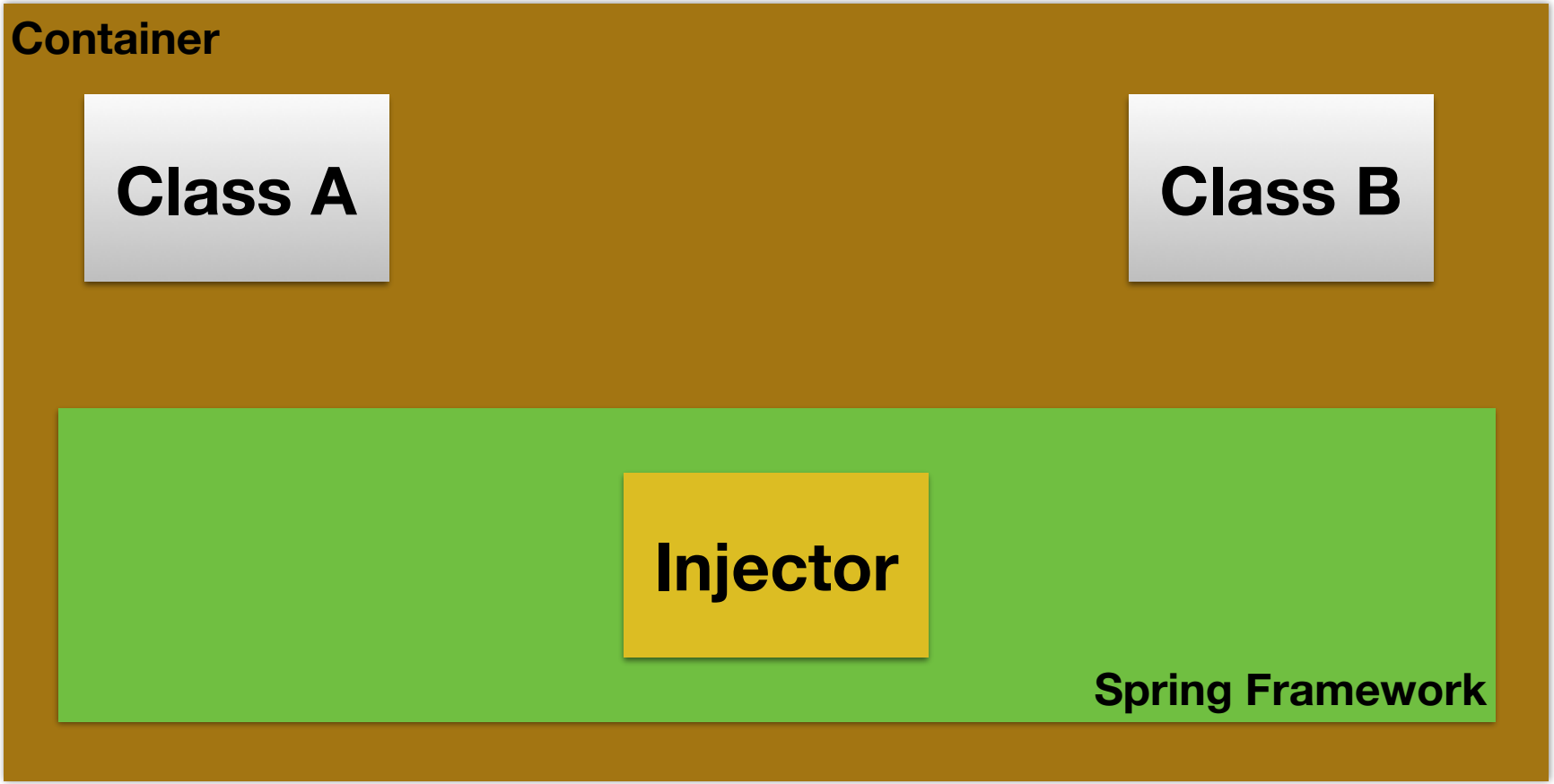

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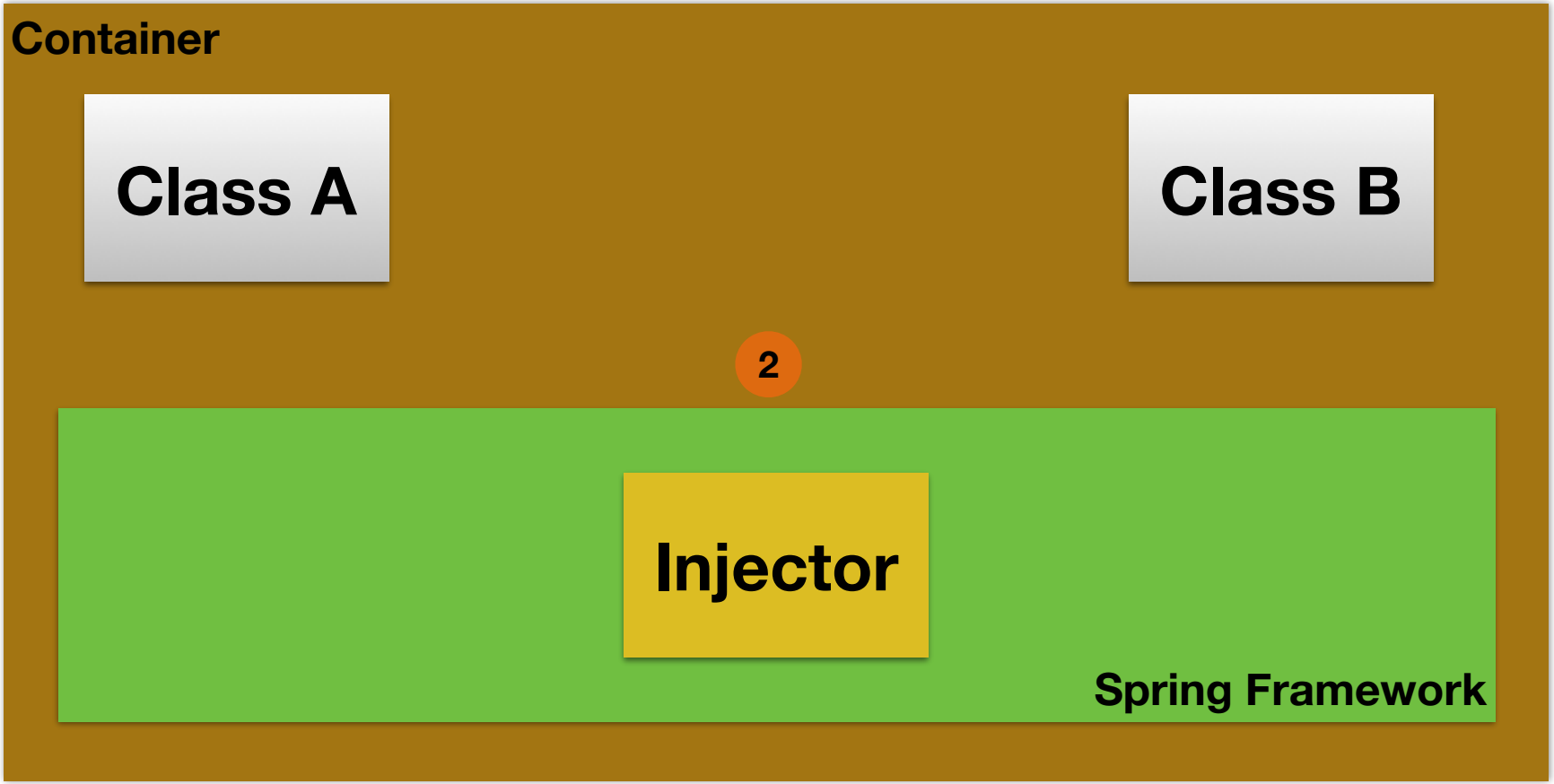

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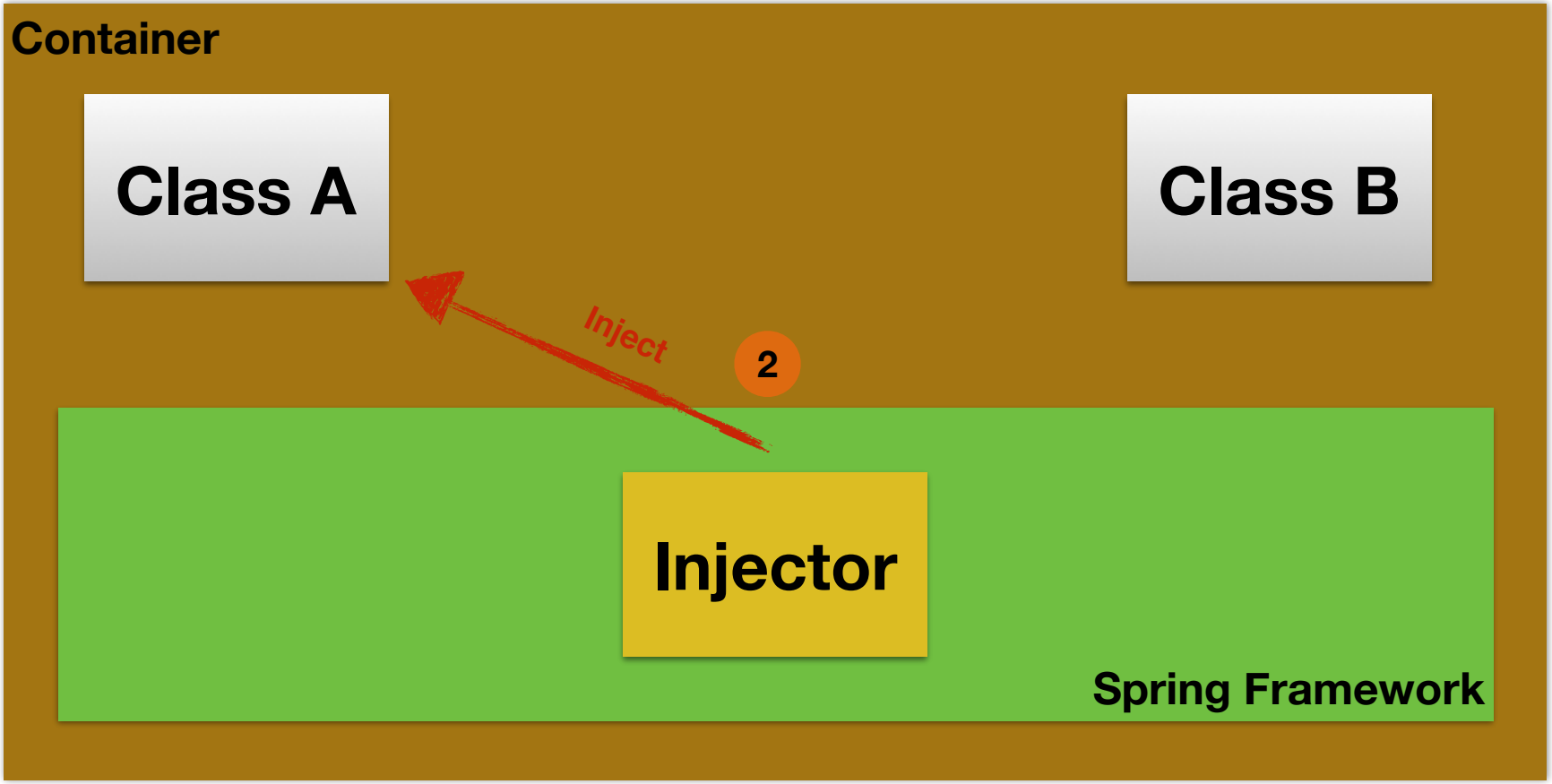

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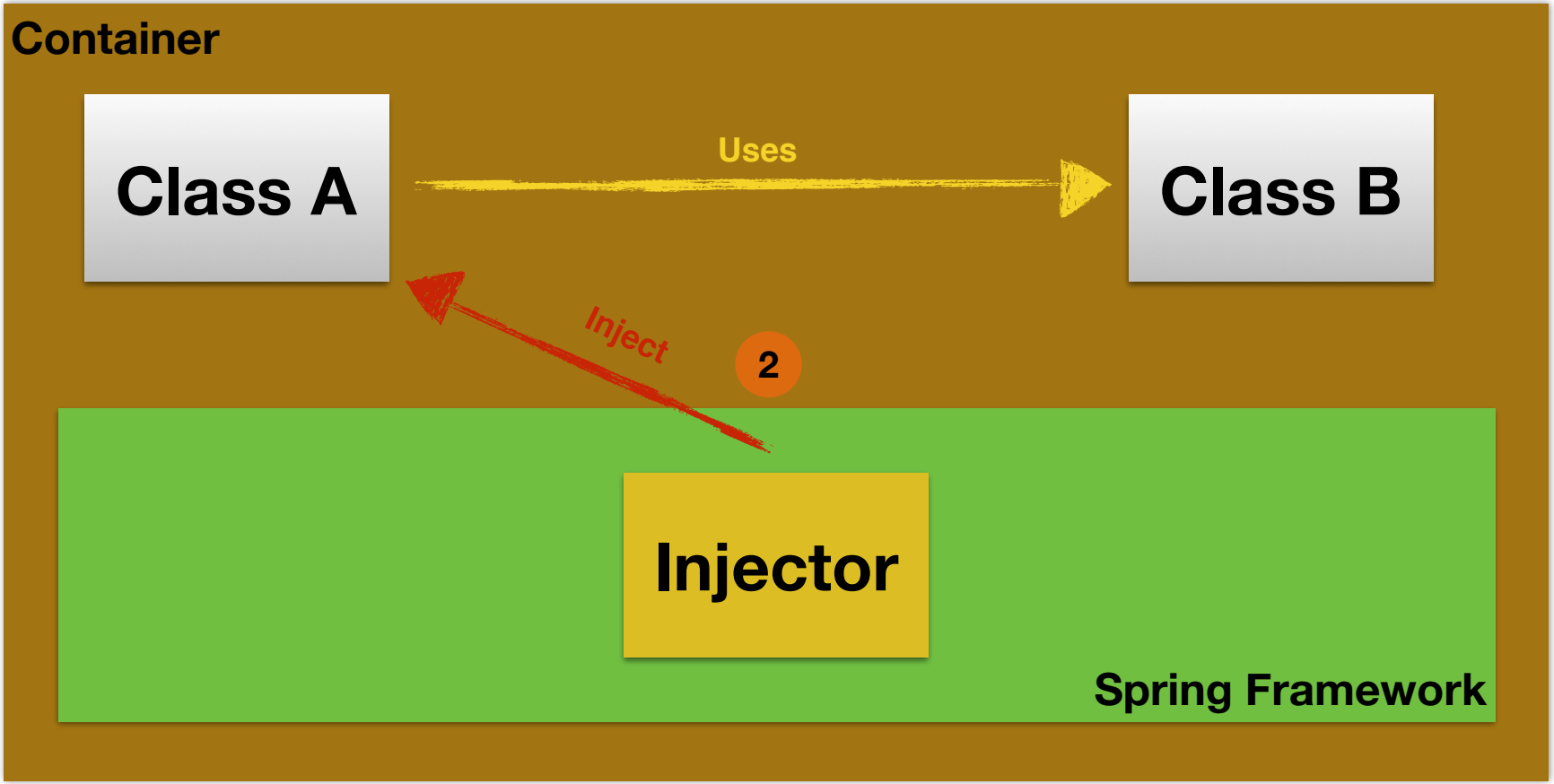

# Dependency Injection in code with SF

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```java
package ch.heigvd.ptl.sample.ioc.sf;

import org.springframework.stereotype.Service;

@Service
public class ServiceBImpl {
    public String world() {
        return "World!";
    }
}
```

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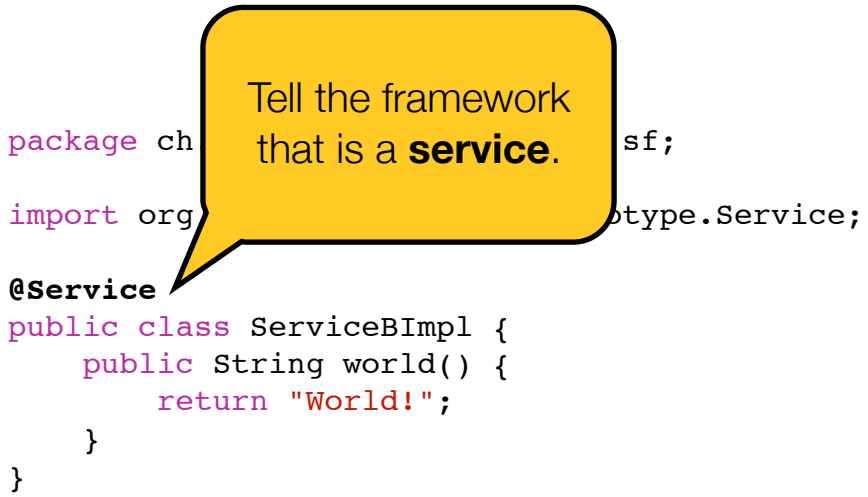

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```java
package ch.heigvd.ptl.sample.ioc.sf;

import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Service;

@Service
public class ServiceAImpl {
    @Autowired
    private ServiceBImpl serviceB;

    public String hello() {
        return "Hello " + serviceB.world();
    }
}
```

```java
package ch                                  sf;

import org                                  otype.Service;

@Service
public class ServiceBImpl {
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        return "World!";
    }
}
```

Tell the framework that is a **service**.

# Dependency Injection in code with SF

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Tell the framework that is also a **service**.

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Tell the framework that is also a **service**.

Tell the framework that Service A requires an instance of Service B.

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**serviceAImpl.hello();** → **Hello World!**

# Dependency Injection in code for Java EE

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```java
package ch.heigvd.ptl.sample.ioc.j2ee;

import javax.ejb.LocalBean;
import javax.ejb.Stateless;

@Stateless
@LocalBean
public class ServiceBImpl {
    public String world() {
        return "World!";
    }
}
```

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package ch.h                                    c.j2ee;

import javax
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@Stateless
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}
```

Tell the container that is a **local stateless** session bean.

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package ch.heigvd.ptl.sample.ioc.j2ee;

import javax.ejb.EJB;
import javax.ejb.LocalBean;
import javax.ejb.Stateless;

@Stateless
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public class ServiceAImpl {
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Tell the container that is a **local stateless** session bean.

**serviceAImpl.hello();** → **Hello World!**

# Why Spring Framework?

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- Java EE need new ideas to enrich his specs
- Developers love alternatives
- Spring Source became a reference for various tools and libraries like Spring Security.
- Offers enrichment to develop web applications or enterprise applications.
- Allow integration with Java EE technologies (JPA, JMS, ...) in addition of the libraries used in the app.
- Can be deployed in application servers.
- Big community behind the various libraries that compose the Spring Framework.

# Spring Framework vs. Java EE

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- Are they concurrent or complementary?
  - No answer like: “Yes” or “No”
  - In fact, they play well together but that really depends what you are building.
- It’s really common to use Java EE and one or more libraries from Spring Framework (Ex: Spring Security, Spring MVC, ...)
- Big difference:
  - Java EE is a full package where you choose a profile type to develop your apps;
  - Spring Framework, you pick the libs you need to build what you need and no more.