Spring MVC

[redacted]

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HTTP Servlet (Review)
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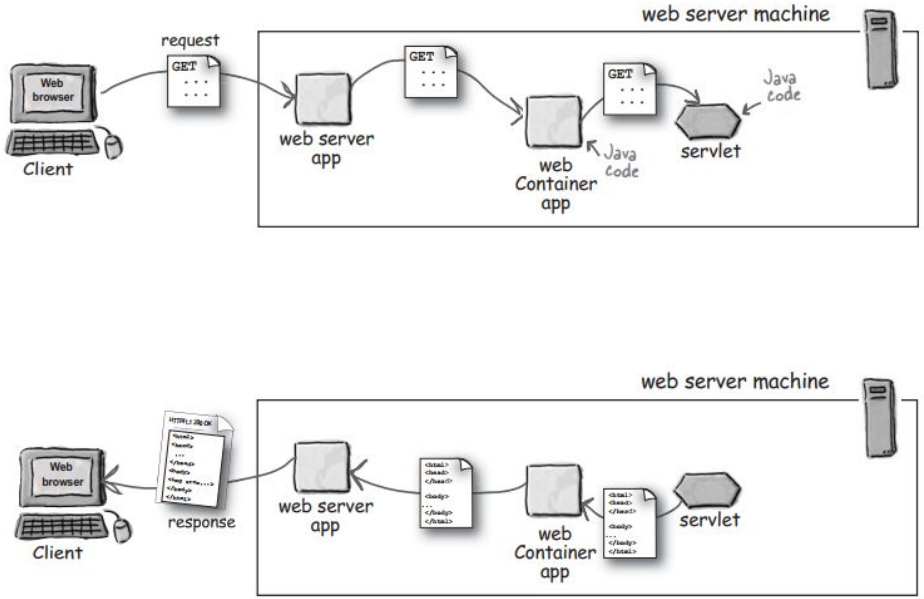
HTTP Servlets

- Are Java classes that run on Web Servers to dynamically process HTTP requests and construct HTTP responses.
- Deployed inside a Servlet Container which run on a Web Server.
- Tomcat is a popular Servlet Container.



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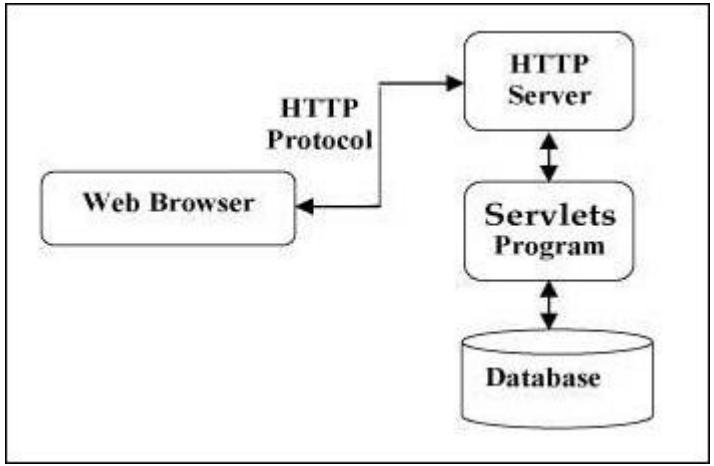
Servlets Architecture

- Servlets act as a middle layer between a Web browser and databases or applications on the Web Server.
- The following diagram shows the position of Servlets in a Web Application



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What is Spring MVC ?
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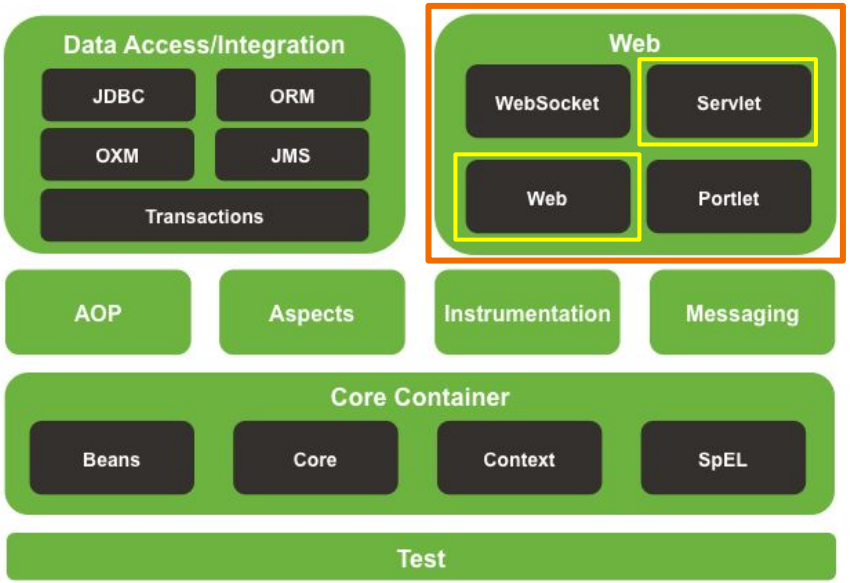
What is Spring MVC?

Modules of Spring Framework on the **Web** layer:

- **Web** module provides basic web-oriented integration features and the initialization of the IoC container using servlet listeners and a web application context.
- **Servlet** module contains Spring MVC implementation for web applications.



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What is Spring MVC ? (cont.)

- A web framework built on the Servlet API.
- Provides Model-View-Controller (MVC) architecture and ready components that can be used to develop flexible and loosely coupled web applications.
- Request-driven, designed around a central Servlet that dispatches requests to controllers - the **DispatcherServlet**.


MVC
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MVC (Model-View-Controller)

Introduced by **Trygve Reenskaug** at **Xerox Parc** in **1979**.

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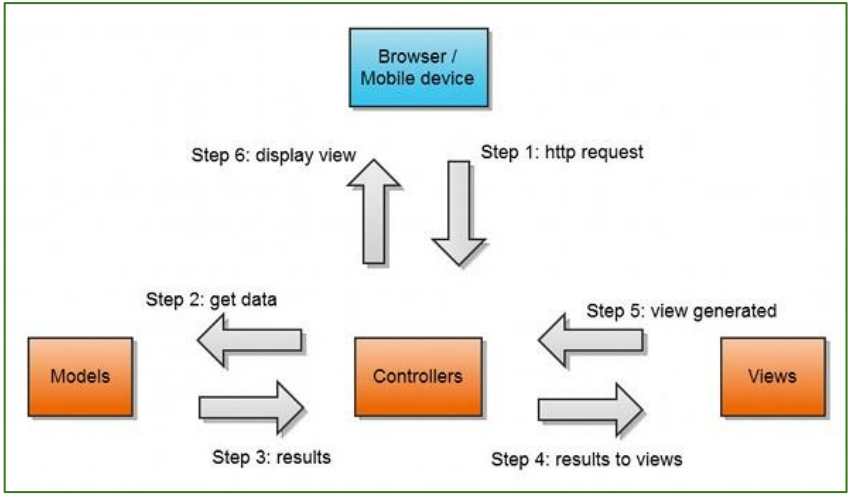
MVC (Model-View-Controller)

- An architectural pattern commonly used for developing user interfaces.
- An application is divided into 3 interconnected parts:
  - **Model** - Responsible for managing data of the application.
  - **View** - Responsible for displaying the model data to user.
  - **Controller** - Responsible for processing user requests and building an appropriate model and passes it to the view for rendering.



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Request Processing Workflow
in Spring MVC
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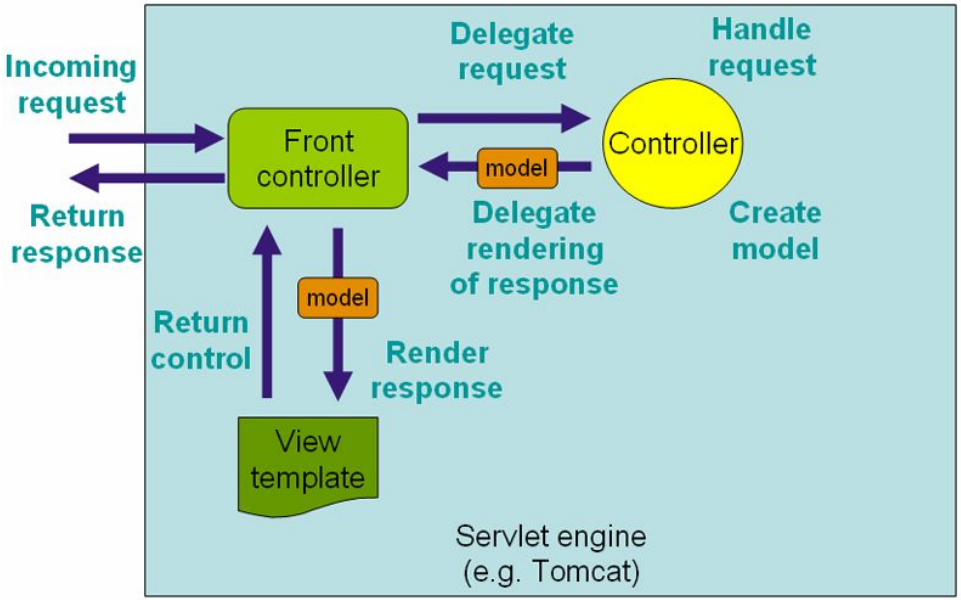
Request Processing Workflow (High Level)



The request processing workflow in Spring Web MVC (high level)

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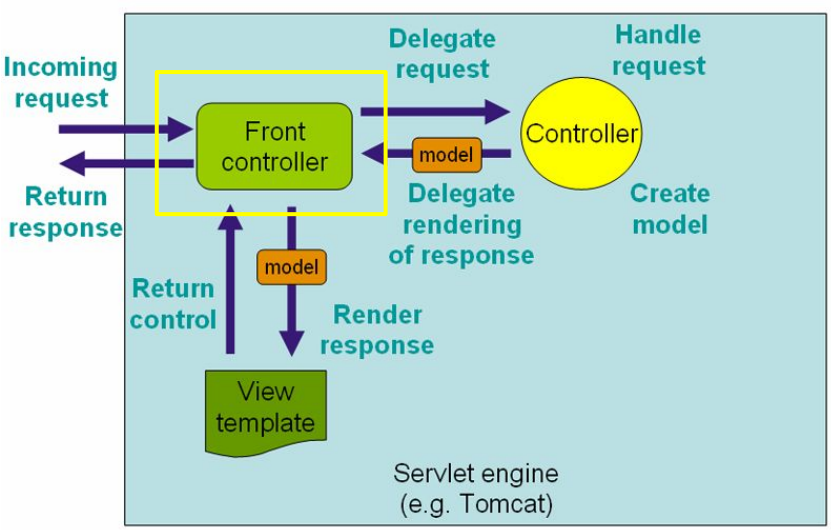
DispatcherServlet

- Spring MVC is designed around a central servlet named **DispatcherServlet**.
- DispatcherServlet acts as a central entry point to the Spring MVC application.
- Every request is handled by DispatcherServlet.
- DispatcherServlet is an expression of the **Front Controller** pattern.



The request processing workflow in Spring Web MVC (high level)

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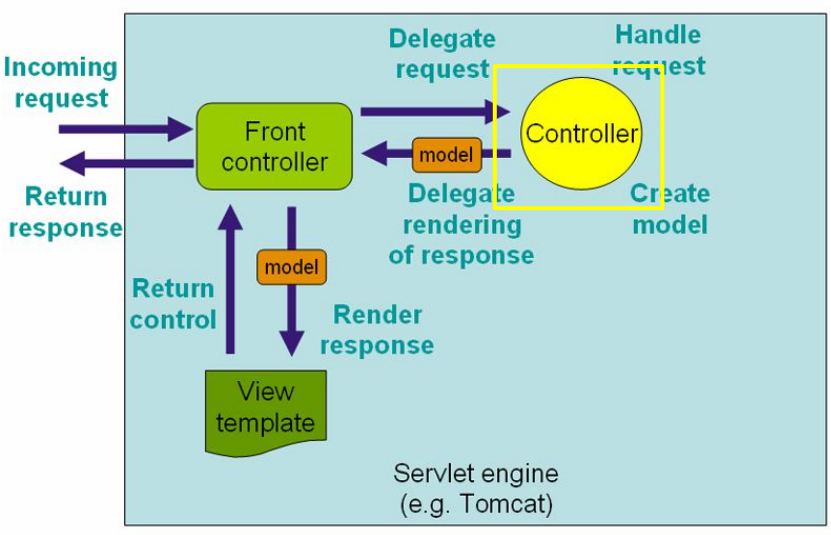
Controllers

- The Front Controller's job is to determine a suitable **handler** capable of performing the actual processing.
- **Handlers** are Spring MVC **Controllers**.
- The selected Controller interacts with the service layer; the relevant data are collected in a **model**.
- When the Controller has finished processing, the Front Controller determines which **view** to render.



The request processing workflow in Spring Web MVC (high level)

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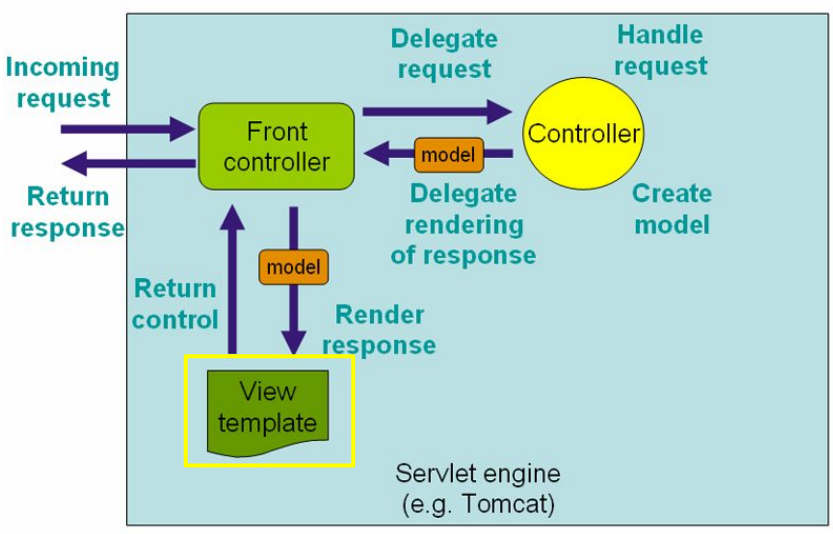
View

- When the Controller has finished processing, the Front Controller determines which **view** to render.
- The Front Controller passes the model to the view which is finally which is finally rendered on the browser.



The request processing workflow in Spring Web MVC (high level)

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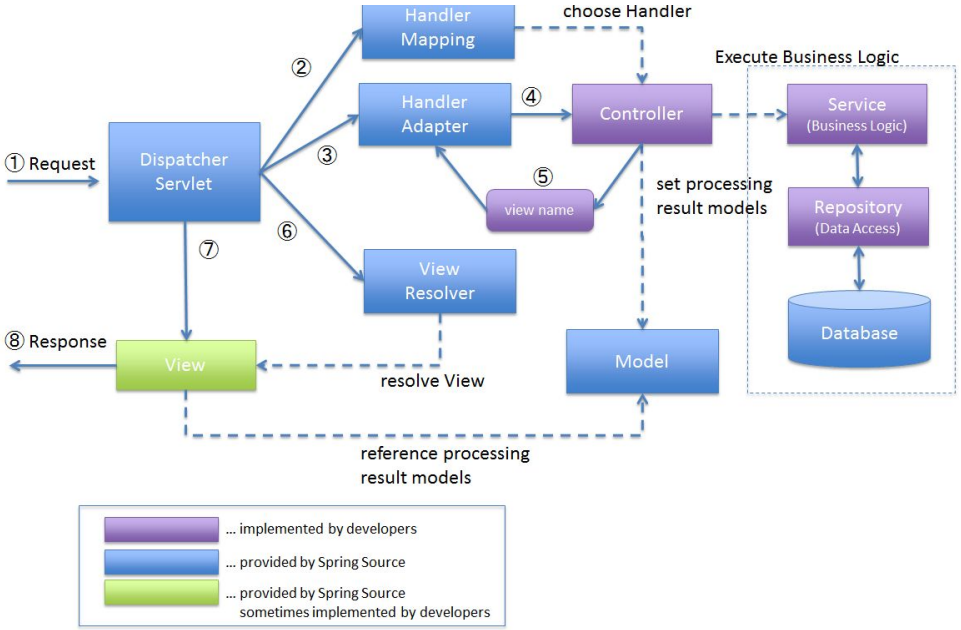
Request Processing Workflow (Details Level)

1. **DispatcherServlet** receives the request.
2. **DispatcherServlet** dispatches the task of selecting an appropriate controller to **HandlerMapping**. **HandlerMapping** selects the Controller which is mapped to the incoming request URL and returns the (selected **Handler**) and **Controller** to DispatcherServlet.
3. **DispatcherServlet** dispatches the task of executing of business logic of **Controller** to **HandlerAdapter**.
4. **HandlerAdapter** calls the business logic process of **Controller**.
5. **Controller** executes the business logic, sets the processing result in **Model** and returns the logical name of view to **HandlerAdapter**.
6. **DispatcherServlet** dispatches the task of resolving the **View** corresponding to the View name to **ViewResolver**. **ViewResolver** returns the **View** mapped to View name.
7. **DispatcherServlet** dispatches the rendering process to returned **View**.
8. **View** renders **Model** data and returns the response.



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Web Application Context
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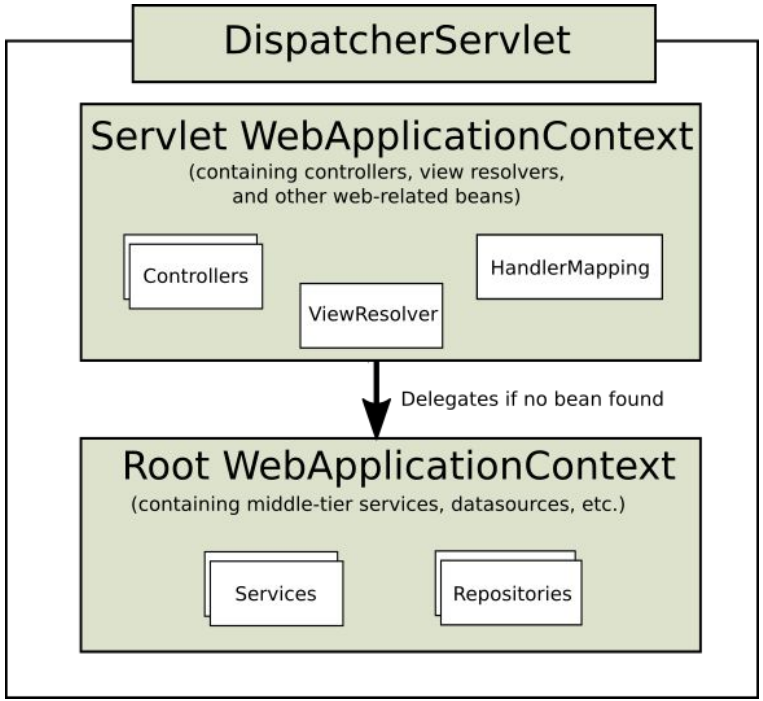
Web Application Context

- **DispatcherServlet** expects a **WebApplicationContext**, an extension of a plain **ApplicationContext**, for its own configuration.
- **WebApplicationContext** has a link to the **ServletContext** and **Servlet** it is associated with.
- The **root WebApplicationContext** typically contains infrastructure beans such as data **repositories** and business **services** which are inherited and could be overridden in the **Servlet WebApplicationContext**.
- Servlet WebApplicationContext contains web-related beans: such as controllers, handler mappings,...



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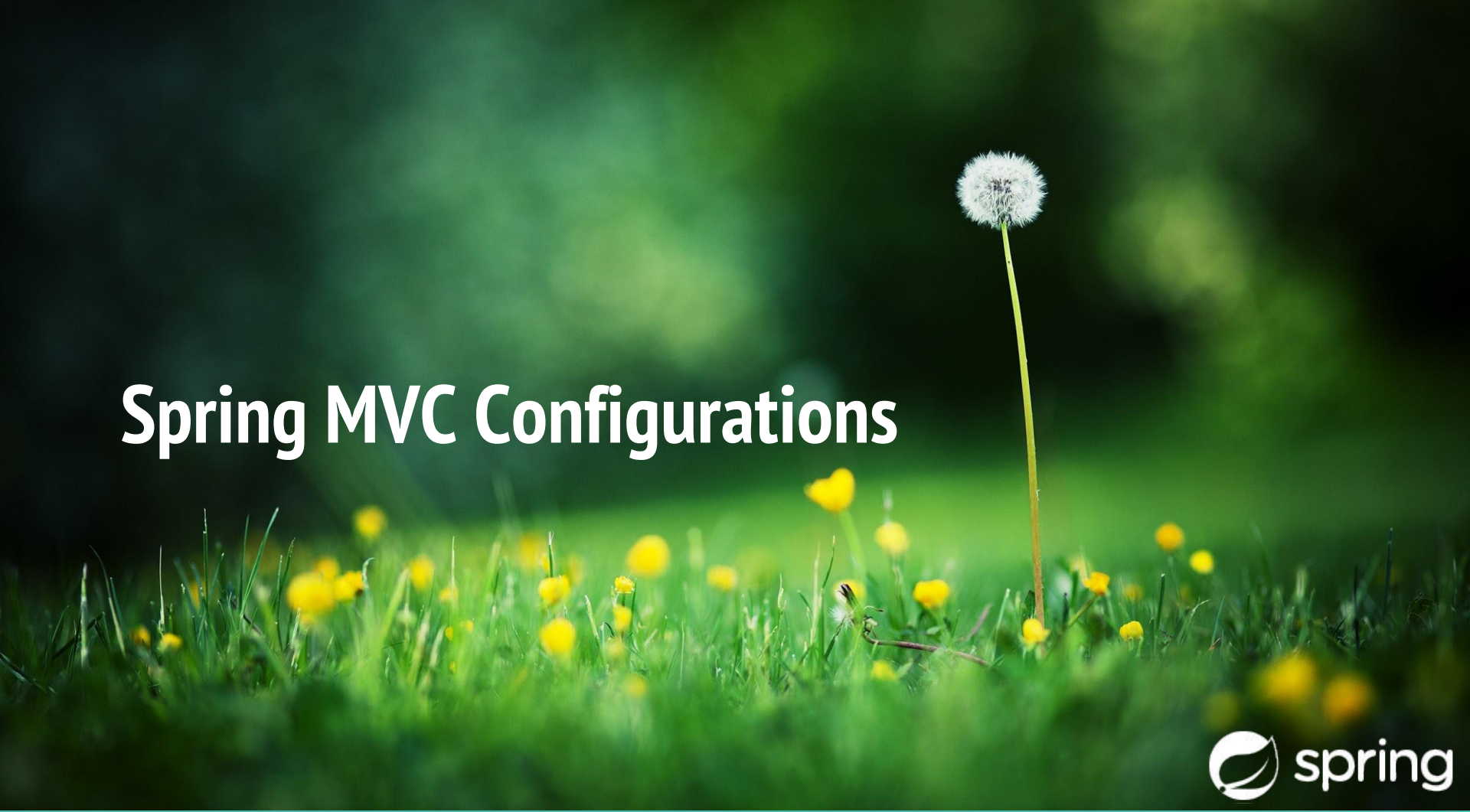
Spring MVC Configurations
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Spring MVC Configurations

Spring MVC supports 2 type of configurations:

- *XML Configuration*
- *Java-based Configuration*

Important annotations

Important annotations

Some important annotations which are used in a Spring MVC application.

- *@Controller* and *@RestController*
- *@RequestMapping*
  - @GetMapping, @PostMapping, @PutMapping and @DeleteMapping
- *@RequestParam*, *@PathVariable*
- *@RequestBody*
- *@ResponseBody*

Summary