## [Course Overview](https://app.pluralsight.com/course-player?clipId=92c955c5-fb3a-4305-b2e7-015b063bb60e)

### [Course Overview](https://app.pluralsight.com/course-player?clipId=92c955c5-fb3a-4305-b2e7-015b063bb60e)

[Hi everyone.](https://app.pluralsight.com/course-player?clipId=92c955c5-fb3a-4305-b2e7-015b063bb60e&startTime=0) [My name's Dustin Schultz, and welcome to the course, Spring: The Big Picture.](https://app.pluralsight.com/course-player?clipId=92c955c5-fb3a-4305-b2e7-015b063bb60e&startTime=1.6034545454545457) [I've been writing and developing applications with](https://app.pluralsight.com/course-player?clipId=92c955c5-fb3a-4305-b2e7-015b063bb60e&startTime=10.133222222222221) [Spring for more than 10 years.](https://app.pluralsight.com/course-player?clipId=92c955c5-fb3a-4305-b2e7-015b063bb60e&startTime=12.596499999999999) [It's a great and fun technology to work with.](https://app.pluralsight.com/course-player?clipId=92c955c5-fb3a-4305-b2e7-015b063bb60e&startTime=15.058) [This course is a short introduction to Spring and provides a high-level,](https://app.pluralsight.com/course-player?clipId=92c955c5-fb3a-4305-b2e7-015b063bb60e&startTime=17.865) [ten-thousand-foot view of all things that are Spring.](https://app.pluralsight.com/course-player?clipId=92c955c5-fb3a-4305-b2e7-015b063bb60e&startTime=21.314666666666668) [Some of the major topics we'll cover in this course are,](https://app.pluralsight.com/course-player?clipId=92c955c5-fb3a-4305-b2e7-015b063bb60e&startTime=24.992) [what is Spring, what is the Spring Framework,](https://app.pluralsight.com/course-player?clipId=92c955c5-fb3a-4305-b2e7-015b063bb60e&startTime=28.088) [what is Spring Boot, and why would I want to use Spring?](https://app.pluralsight.com/course-player?clipId=92c955c5-fb3a-4305-b2e7-015b063bb60e&startTime=31.365999999999993) [By the end of this course, you'll have a broad understanding of Spring,](https://app.pluralsight.com/course-player?clipId=92c955c5-fb3a-4305-b2e7-015b063bb60e&startTime=34.92214285714284) [what it provides, and what it's used for.](https://app.pluralsight.com/course-player?clipId=92c955c5-fb3a-4305-b2e7-015b063bb60e&startTime=38.577600000000004) [I hope you'll join me on this journey at Pluralsight to learn Spring with the course, Spring: The Big Picture.](https://app.pluralsight.com/course-player?clipId=92c955c5-fb3a-4305-b2e7-015b063bb60e&startTime=40.79585714285713)

## [What Is Spring?](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2)

### [Introduction](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2)

[Hi.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=null) [I'm Dustin Schultz, and welcome to Spring: The Big Picture.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=0.5292727272727272) [Spring is one of the most popular, if not the most popular,](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=5.822) [technologies for Java development.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=10.482) [It's used by thousands and thousands of developers and companies worldwide,](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=12.225555555555552) [and the goal of this course is to provide you with a](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=17.923571428571428) [high‑level overview of Spring.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=22.288866666666667) [A ten‑thousand‑foot view if you will.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=23.663) [So what can you expect from this course?](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=26.284) [Let's talk about expectations.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=29.125333333333323) [Where possible,](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=30.546) [we're going to avoid the details and really try to keep things simple.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=31.228166666666667) [I'll give you just enough detail to help you learn and understand the content,](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=35.614749999999994) [but really nothing beyond that.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=40.97949999999999) [And this course is particularly short and is probably the exact](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=43.417) [opposite of what you would call a technology deep dive.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=47.341) [Our goal here is to cover breadth and not depth,](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=50.975) [and that means we're going to cover a range of topics,](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=54.220714285714315) [but we'll really only scratch the surface on each of the particular topics.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=57.326615384615394) [We will be seeing small, but easy code snippets,](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=61.5325) [and don't worry, it's not that big of a deal,](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=64.84628571428571) [but it would practically be impossible to describe the](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=68.387) [benefits and usefulness of Spring without them.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=72.04590909090906) [Again, if you don't know Java, or you don't regularly code,](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=74.66536363636367) [seriously don't worry.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=78.81237500000002) [I'll keep things very simple and walk you through](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=80) [step by step each of the examples.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=83.04649999999997) [Lastly, don't be surprised to see some hand waving.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=85.416) [And by that I mean, don't be surprised if I gloss over some details,](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=88.219) [or I'm intentionally vague in certain areas.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=92.557) [Remember, the goal of this course is to provide you with an overview of Spring.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=95.888) [We want to see the whole forest and not each of the individual trees.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=100.09) [The intended audience of this course is particularly large and broad,](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=105.96) [but generally falls into two categories,](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=109.656) [individuals working in a technical, but non‑development role,](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=112.12079999999997) [and individuals working in a development role who are unfamiliar with Spring.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=115.8097777777778) [So maybe you've heard of Spring or you've heard others talking](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=121.945) [about it and you've always wondered what it is,](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=124.9278333333334) [or maybe you're a developer and you're currently using a different](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=128.4063846153846) [technology stack and you need to learn Spring,](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=132.60972727272735) [or you're just generally curious what it is.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=135.54054545454545) [If any of those sound like you, then this course is for you. Alright, enough with the introductions, let's get started.](https://app.pluralsight.com/course-player?clipId=e8197f0f-d207-463f-aca4-7eeb975f30b2&startTime=138.47)

### [What Is Spring?](https://app.pluralsight.com/course-player?clipId=fdb7d227-f280-41f0-bf95-94f89a07e11b)

[Surely you're wondering what exactly is Spring,](https://app.pluralsight.com/course-player?clipId=fdb7d227-f280-41f0-bf95-94f89a07e11b&startTime=1.907) [and to be honest, the answer is a bit confusing.](https://app.pluralsight.com/course-player?clipId=fdb7d227-f280-41f0-bf95-94f89a07e11b&startTime=4.913181818181817) [In a technology context when someone says Spring,](https://app.pluralsight.com/course-player?clipId=fdb7d227-f280-41f0-bf95-94f89a07e11b&startTime=9.015) [you can be sure that they're definitely not talking about the season,](https://app.pluralsight.com/course-player?clipId=fdb7d227-f280-41f0-bf95-94f89a07e11b&startTime=12.016) [but they could be referring to one of a number of different things.](https://app.pluralsight.com/course-player?clipId=fdb7d227-f280-41f0-bf95-94f89a07e11b&startTime=15.908866666666666) [Spring could mean the Spring Framework, Spring Boot,](https://app.pluralsight.com/course-player?clipId=fdb7d227-f280-41f0-bf95-94f89a07e11b&startTime=21.16) [Spring Data, Spring Cloud, Spring Batch,](https://app.pluralsight.com/course-player?clipId=fdb7d227-f280-41f0-bf95-94f89a07e11b&startTime=24.090399999999992) [and a whole lot more; however, most often when people say Spring,](https://app.pluralsight.com/course-player?clipId=fdb7d227-f280-41f0-bf95-94f89a07e11b&startTime=26.714555555555556) [they're actually referring to the entire family of projects,](https://app.pluralsight.com/course-player?clipId=fdb7d227-f280-41f0-bf95-94f89a07e11b&startTime=31.74109999999999) [or the Spring ecosystem.](https://app.pluralsight.com/course-player?clipId=fdb7d227-f280-41f0-bf95-94f89a07e11b&startTime=35.97139999999998) [Let's take a closer look at what the Spring family, or Spring ecosystem, consists of.](https://app.pluralsight.com/course-player?clipId=fdb7d227-f280-41f0-bf95-94f89a07e11b&startTime=38.031)

### [Meet the Spring Family](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546)

[The Spring family all began with the creation of the Spring Framework,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=1.876) [which was built largely in response to the complexity of developing](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=6.279) [applications using Java's enterprise framework called J2EE,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=10.339) [it's now called Java EE,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=15.699) [and the Spring Framework aimed at removing the complexity and](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=17.74525) [helped to make things like web development and data access](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=21.7215) [easier for developers to implement.](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=25.576) [It also aimed at reducing boilerplate code,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=28.176) [and if you're not familiar with what that is,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=30.633583333333345) [it's repetitive code that's often needed as part of the logic,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=33.75269230769231) [but tends to clutter the application and draw focus away from the main logic.](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=37.7265) [The Spring Framework is still heavily used today,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=43.55109090909091) [and it's the foundation upon which everything else is built.](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=46.253) [The success of the Spring Framework led to the creation of several Spring](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=50.573) [projects that were built on top of the Spring Framework,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=54.771181818181816) [but tailored to specific needs or domains.](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=58.703) [For example,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=62.095) [the Spring Security project was created to remove the complexity](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=62.80772727272728) [and challenges with securing a Java application,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=66.507) [and another project, like the Spring Data project,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=69.951) [was created to further simplify data access in Java applications.](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=73.1786363636364) [The Spring Framework and Spring projects continued to evolve and thrive,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=78.314) [eventually resulting in the creation of a particularly](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=82.98588888888888) [impactful project called Spring Boot.](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=86.377) [Spring Boot was a real game changer.](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=88.877) [It provided a new and drastically faster way of](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=92.377) [building Spring-based applications.](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=96.0643) [Up until Spring Boot,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=97.57033333333334) [building a Spring-based application had always involved a lot of choice making,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=99.763) [configuration, and a cumbersome deployment model.](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=104.87225) [Spring Boot removed all of that by taking an opinionated view of](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=108.836) [building Spring-based applications including sensible defaults for](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=112.749) [library choices and configuration,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=116.542) [and adding smarts for auto-detecting and](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=118.6095) [auto-configuring other common configurations.](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=122.09666666666668) [It also massively simplified the deployment process and made running a](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=124.936) [Spring-based application as simple as running a single command.](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=128.755) [Lastly came the Spring Cloud project.](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=133.802) [Spring Cloud was built on top of Spring Boot and simplified the development of](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=135.84249999999994) [applications that make use of distributed architectures,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=141.29259999999996) [such as microservice architectures,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=144.519375) [and these type of architectures often have many](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=146.43789999999998) [common patterns that are implemented,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=150.38909999999996) [such as service discovery and distributed configuration,](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=152.5563333333333) [and Spring Cloud helped to make it easier for developers to](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=155.5458) [build applications that use those patterns.](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=160.67866666666666) [Now that we've been introduced to the Spring family, let's take a look at why we would want to use it.](https://app.pluralsight.com/course-player?clipId=8f8afce6-cac6-49c8-bcd0-c26dcdd03546&startTime=163.762)

### [Why Spring?](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0)

[So why Spring?](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=1.827) [And oftentimes you'll hear people asking, why would I want to use Spring?](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=3.0399999999999996) [And that's probably something you may be even thinking for yourself right now.](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=7.956666666666669) [And one of the common answers you'll hear is that](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=12.200333333333337) [it's a good alternative to Java EE, and while that was true in the beginning,](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=15.795500000000002) [today Spring is so much more than just an alternative to Java EE.](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=21.32328571428572) [In fact,](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=26.036999999999995) [it's actually complimentary to Java EE and makes use of several of the](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=26.815) [standard specifications like the Java Persistence API.](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=31.31) [The question of why you would want to use Spring is a completely valid and](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=35.814) [reasonable question that actually has a very simple answer,](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=40.099) [and that's that creating software can be hard,](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=44.5) [seriously, and Spring helps make it easier.](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=48.420000000000016) [You'll notice that regardless of the project within the Spring family,](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=50.775000000000006) [they all share a common theme,](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=54.777272727272724) [and that's to make developing Java applications easier.](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=57.342) [Let's talk about some other reasons why Spring is a good choice.](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=60.893) [First, Spring is really great at being flexible,](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=64.689) [modular, and especially backwards compatible.](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=68.52544444444439) [So Spring is far from an all‑or‑nothing type of choice.](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=70.8938) [In fact,](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=74.99681818181816) [you're given the freedom to pick and choose whichever parts of](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=75.63172727272723) [Spring make the most sense for your project.](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=79.2632857142857) [And what's really great about that is that you can be sure](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=81.989) [that the investment you're making with Spring won't be wasted](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=85.0935714285715) [when a new version is released.](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=88.39281818181816) [Spring also has a very large and active community,](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=90.63681818181817) [and in my opinion this is often one of the things that's overlooked](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=94.10984615384615) [and taken for granted when assessing technologies,](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=97.832375) [but it makes a huge difference.](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=101.139) [With Spring,](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=102.91315384615383) [you can be sure that there's a wealth of knowledge](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=103.50453846153844) [that already exists out there, and if you run into a problem,](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=106.862) [it's likely that someone else has already ran into that same problem,](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=110.66384615384614) [and they can probably help you through it.](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=114.11714285714284) [And lastly,](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=116.524) [what makes Spring a good choice is that it's](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=117.23783333333333) [continually innovating and evolving.](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=120.4500833333333) [Being an open‑source project but fully backed by a company called](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=122.29499999999999) [Pivotal allows Spring to remain healthy and alive,](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=127.44933333333331) [while at the same time pushing the bounds of enterprise Java development.](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=130.94061538461537) [It's not uncommon for Java's standards or specifications to be influenced or based on ideas that originated within Spring.](https://app.pluralsight.com/course-player?clipId=fecac44f-2a52-4fb0-ae76-375b23d7e1c0&startTime=136.24)

### [Summary](https://app.pluralsight.com/course-player?clipId=32179899-2a7f-4f88-8a1e-72e58f3b7ec1)

[In this module, we saw the what and why of Spring.](https://app.pluralsight.com/course-player?clipId=32179899-2a7f-4f88-8a1e-72e58f3b7ec1&startTime=1.878) [We got to understand what people mean when they say Spring and](https://app.pluralsight.com/course-player?clipId=32179899-2a7f-4f88-8a1e-72e58f3b7ec1&startTime=5.048) [how they're referring to the Spring family,](https://app.pluralsight.com/course-player?clipId=32179899-2a7f-4f88-8a1e-72e58f3b7ec1&startTime=9.050461538461539) [or the Spring ecosystem.](https://app.pluralsight.com/course-player?clipId=32179899-2a7f-4f88-8a1e-72e58f3b7ec1&startTime=12.165) [We also talked about why Spring was created in the first place and](https://app.pluralsight.com/course-player?clipId=32179899-2a7f-4f88-8a1e-72e58f3b7ec1&startTime=14.019) [how it evolved over time to where it's at today.](https://app.pluralsight.com/course-player?clipId=32179899-2a7f-4f88-8a1e-72e58f3b7ec1&startTime=17.740714285714287) [And lastly, we discussed why we would want to use Spring, mainly that Spring strives to make building Java applications easier.](https://app.pluralsight.com/course-player?clipId=32179899-2a7f-4f88-8a1e-72e58f3b7ec1&startTime=22.326)

## [Getting to Know Spring with Spring Boot](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb)

### [Spring Boot Makes Spring Both Quick and Easy](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb)

[Hi.](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=0) [My name's Dustin Schultz, and in this module of Spring: The Big Picture course,](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=0.4269230769230769) [we'll learn about one of the key projects in the](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=6.094666666666666) [Spring family called Spring Boot.](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=8.818) [We already had a very brief introduction to Spring Boot in the previous module,](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=11.97) [so we'll use this module to take a slightly deeper look at Spring Boot.](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=15.64225) [Again, remember that we're keeping things high level,](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=20.976) [so we don't want to be digging too deep here.](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=23.28800000000001) [We certainly won't be learning how to use Spring Boot](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=26.06123076923078) [or doing any sort of in-depth demos.](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=29.148300000000006) [Instead, we'll be focused on what Spring Boot is,](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=31.949) [and what it's about, and what it provides.](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=34.91276923076924) [We want to use Spring Boot as our first introduction to Spring](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=37.2896923076923) [and sort of get a flavor for what it's like.](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=40.85069230769231) [Learning any new technology can be both confusing and frustrating.](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=44.773) [It's really, really hard to know where to start,](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=49.627) [and you can quickly become overwhelmed.](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=53.01279999999998) [Thankfully, Spring Boot makes learning Spring both quick and easy.](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=55.27) [Developers can jump right in and get started without having to fully](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=60.706) [understand everything that's behind the scenes.](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=65.098) [Then as they get more advanced and knowledgeable,](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=68.018) [they can circle their way back and learn more about the details.](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=70.48999999999998) [I want to be absolutely clear though, easy does not mean lack of features.](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=75.179) [It's somewhat common for frameworks to boast about how](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=80.97) [great and easy their technology is,](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=83.87399999999997) [only to be disappointed when it's used in real-world](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=86.0349090909091) [scenarios and falls flat on its face.](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=89.6385) [Spring Boot on the other hand is fully-featured and is heavily utilized in production by many companies today.](https://app.pluralsight.com/course-player?clipId=8dcd8deb-e2ff-4822-ada1-b482355559cb&startTime=92.596)

### [Understanding Spring Boot's Key Features](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4)

[Remember that Spring Boot is a project within the larger Spring family,](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=1.84) [and it can be used to build both web applications and non-web applications.](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=5.737571428571428) [And also remember that Spring Boot is built on top of the Spring Framework.](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=11.92) [It has a number of key features that make it unique and easy to use.](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=18.027) [I'm going to briefly mention each of the most important features,](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=23.478) [and then we'll go into each in a bit more detail.](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=27.356) [First, and definitely one of the most notable features in Spring Boot,](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=30.686) [is auto-configurations.](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=34.838857142857144) [Spring Boot will automatically configure and set up an](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=36.15657142857143) [application based on its surrounding, as well as hints provided by the developer.](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=41.07449999999999) [Second, Spring Boot is standalone.](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=46.896) [You don't need to deploy the application into a web server,](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=48.7228181818182) [or a special environment, or anything like that.](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=53.19461538461539) [You literally just run the application with one command,](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=56.842) [just like you would any other application.](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=60.07749999999997) [And third, Spring Boot is opinionated,](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=63.680400000000006) [meaning that Spring Boot has a chosen way of doing things by default.](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=67.467) [And you're probably thinking, whoa, whoa,](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=72.782) [whoa, hold on, that doesn't sound like something I'd be interested in.](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=75.11666666666663) [Well, hold your judgment for now, as being opinionated can actually be a good thing.](https://app.pluralsight.com/course-player?clipId=5af675a4-d0ca-4327-b30f-7c36c7cbe1b4&startTime=79.136)

### [Intelligent Auto-configurations](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8)

[Let's talk about auto-configuration.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=1.818) [Auto-configuration is a feature of Spring Boot that provides a](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=3.9125) [best-guess configuration for an application,](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=8.873200000000002) [and as the documentation states,](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=11.234555555555556) [it attempts to automatically configure your Spring application](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=13.48733333333333) [based on the dependencies that you've added to it.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=17.526500000000002) [And it does this by being both contextually aware and smart.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=21.17715384615384) [Let's look at a real-life analogy.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=26.642) [If you were to hand someone a plate,](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=28.204769230769227) [it's completely reasonable and normal to assume that you](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=30.50254545454545) [might also hand them a fork and a knife,](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=34.77345454545455) [but if you hand someone a plate with a cookie on it,](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=37.84800000000002) [you're probably not going to be using that fork and knife.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=41.99237499999999) [So based on the context at hand, that is,](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=46.105) [whether or not the plate had a cookie on it,](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=48.65200000000001) [determined whether or not you needed to set up the](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=51.881428571428565) [plate with a fork and a knife.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=55.71) [Well, Spring Boot works a lot in the same way.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=58.307000000000016) [It saves the developer time by making use of context to best](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=62.017) [guess how an application should be set up.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=66.06100000000004) [So for instance,](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=68.795) [if Spring Boot notices that an application has a certain](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=69.825) [dependency that is related to a database,](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=74.23981818181815) [it can make a reasonable assumption that it should probably](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=77.119) [configure certain things to access that database,](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=80.542125) [and even more so if that dependency is for a very specific database,](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=84.659) [such as Oracle or MySQL,](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=89.953) [Spring Boot can make an even better assumption and probably set up](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=91.83716666666669) [features that may be specific to that certain database.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=97.04571428571428) [For the developer, setting up auto-configuration is extremely easy.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=101.673) [The developer only needs to add one annotation to their Spring Boot application.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=106.506) [That's the @EnableAutoConfiguration annotation.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=111.786) [And if you're not familiar with what annotations are,](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=115.568) [that's the thing with the @ symbol,](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=118.23875000000002) [think of them as additional metadata that's added to the code that can be](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=120.83233333333332) [read at runtime and you can use to make decisions upon.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=126.43182352941179) [Really though, don't worry about the code, it's not really the point.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=130.452) [The point here is that it's really, really easy to enable.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=133.733) [And likewise, configurations are also really easy to disable.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=138.417) [It's not sort of this all or nothing thing.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=143.099) [Spring Boot tries to make them as noninvasive as possible. So if they get in the way, they can easily be removed.](https://app.pluralsight.com/course-player?clipId=d97f2b1c-ad6c-4acc-aa79-c61dbaef76c8&startTime=146.114)

### [Standalone Applications That "Just Run"](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3)

[Next up, let's talk about the second key feature of Spring Boot,](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=1.908) [being standalone.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=6.449999999999998) [Spring Boot makes it easy to create standalone,](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=7.207) [production-grade, Spring-based applications that just run.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=10.753666666666666) [Now for someone who isn't intimately familiar with](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=13.718000000000004) [Java web application development, this may not seem like that big of a deal.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=17.895428571428575) [I mean, how hard could it be?](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=22.384) [You just double-click the application or you run a single command, right?](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=24.748833333333327) [Well, not exactly.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=28.53379999999999) [That's not how a typical Java web application is run.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=29.432) [To really understand how impactful it is for Spring Boot to be standalone,](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=33.085) [let's look at how a typical Java web application is run.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=37.232416666666666) [First, you package the application.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=42.121) [You can think of this as zipping up the directory of](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=43.54724999999999) [files that make up the application.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=46.89720000000001) [Then you have to choose a web server for the web application to run on,](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=48.927) [and there's several different choices,](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=52.80209090909091) [and each web server is going to offer many different unique features.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=54.77754545454546) [So some offer a lot of features, while others are more bare bones.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=58.891) [And once you've decided what server to use,](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=63.442) [you have to download and configure that web server.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=65.81923076923077) [And again, depending on the number of features that the web server has,](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=68.45881818181817) [this configuration step could be extremely involved or relatively simple.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=72.52345454545456) [You then deploy your application to the web server.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=77.01911111111113) [This usually means copying the application package to a specific directory](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=81.06550000000001) [or uploading it to the web server via a web browser.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=85.78190909090908) [And lastly, you start the web application server,](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=90.08799999999997) [which in turn starts your web application.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=93.00588888888888) [With Spring Boot applications being standalone, they simply just run.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=96.614) [Seriously.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=101.09) [All you have to do is package the application and run it with a single command,](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=101.47907692307693) [java -jar, and then the name of the package that's your application.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=107.4636923076923) [Spring Boot takes care of the rest by starting an embedded web server within](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=111.43909090909092) [your application and configures it with some sensible defaults, and then begins serving up your application.](https://app.pluralsight.com/course-player?clipId=8132190b-3076-4630-989e-681617a4b6c3&startTime=116.45060000000002)

### [An Opinionated View of Spring](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a)

[The last key feature we'll discuss is how Spring Boot takes an](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=1.787) [opinionated view of building Spring-based applications.](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=5.168) [As I mentioned earlier, don't think of this as a bad thing,](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=8.719) [like, you must do it this way, or you must do it that way,](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=12.582533333333327) [or else.](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=16.96655555555555) [When you're building Java applications, you have tons of choices,](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=17.561) [everything from the type of web framework,](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=22.472) [to the logging framework, to the collection framework,](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=24.67700000000001) [to the build tool you use and so on.](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=27.41730769230769) [If a developer is new to this space, the choices can be certainly overwhelming.](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=30.748) [And even if they're not new,](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=35.739) [they usually end up making the same choices based on](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=37.52007692307692) [established standards and popularity.](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=41.37700000000001) [Spring Boot helps remove this burden so that the developer](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=43.749) [can get up and running as fast as possible,](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=47.22361538461538) [which in turn means they spend more time focusing on](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=50.26123076923077) [writing code that actually solves a need.](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=54.0962) [And although Spring Boot is opinionated in its choices and setup,](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=57.613) [it's really more of a soft opinion because it makes it easy to](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=61.752) [override any of those pre-determined choices.](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=66.001) [To give you an example, let's open up a web browser and visit start.](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=69.505) [spring.](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=75.03412499999996) [io.](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=75.42906249999996) [This is a tool provided by Spring Boot called Spring Initializer,](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=75.824) [and Spring Initializer is a great example of how developers](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=79.815) [can take advantage of Spring Boot's opinionated setup and get](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=83.20833333333329) [started as quickly as possible.](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=87.35660000000001) [The developer simply tells it what type of functionality they need,](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=89.26990909090908) [such as web, or security, or JDBC databases,](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=93.89609090909092) [they click Generate project,](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=98.795) [and it automatically creates and downloads a](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=100.567) [fully-functional Spring Boot application.](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=103.85379999999999) [The developer can then unzip this and use it as an initial starting point for their application.](https://app.pluralsight.com/course-player?clipId=f9bed16b-4aca-43bb-aad4-4d59d98b618a&startTime=106.369)

### [Where Can I Learn More About Spring Boot?](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d)

[Since this is a very high-level course that doesn't go into any of the details,](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=1.83) [it's helpful to know where you can go to actually get those details.](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=5.728357142857143) [There's two highly-rated courses on Spring Boot at Pluralsight.](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=10.53) [The first one, Creating Your First Spring Boot Application,](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=14.556) [by Dan Bunker,](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=17.687) [is an introductory-to-intermediary course for someone](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=19.431666666666672) [who's already familiar with Java, but it's their first venture into Spring Boot.](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=22.921) [The second course is by myself,](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=27.762) [and it's called Spring Boot: Efficient Development,](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=29.534181818181814) [Configuration, and Deployment.](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=32.2206) [It's an intermediate course that's a followup to creating](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=34.035) [your first Spring Boot application.](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=37.76590909090908) [It goes beyond the basics of Spring Boot and teaches the learner](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=39.688) [how to write their own auto-configurations.](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=44.21300000000001) [It also uncovers the technology behind auto-configurations,](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=46.705) [teaches the learner how to make use of Spring Boot's](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=50.237) [external configuration management, and gets them started deploying their Spring Boot applications to the cloud.](https://app.pluralsight.com/course-player?clipId=71cdae66-5c74-47de-9301-be28d4cb1e5d&startTime=53.407000000000004)

### [Summary](https://app.pluralsight.com/course-player?clipId=bb6b3070-10fb-4f2e-8f7a-bc03fdeeea68)

[We've reached the end of this module, so let's recap what we've learned.](https://app.pluralsight.com/course-player?clipId=bb6b3070-10fb-4f2e-8f7a-bc03fdeeea68&startTime=1.995) [This module was all about Spring Boot.](https://app.pluralsight.com/course-player?clipId=bb6b3070-10fb-4f2e-8f7a-bc03fdeeea68&startTime=5.603) [You learned that Spring Boot makes getting started](https://app.pluralsight.com/course-player?clipId=bb6b3070-10fb-4f2e-8f7a-bc03fdeeea68&startTime=7.877416666666667) [with Spring both quick and easy.](https://app.pluralsight.com/course-player?clipId=bb6b3070-10fb-4f2e-8f7a-bc03fdeeea68&startTime=10.829666666666668) [Then we saw how Spring Boot uses intelligent auto-configurations to](https://app.pluralsight.com/course-player?clipId=bb6b3070-10fb-4f2e-8f7a-bc03fdeeea68&startTime=13.485) [automatically set up and configure an application.](https://app.pluralsight.com/course-player?clipId=bb6b3070-10fb-4f2e-8f7a-bc03fdeeea68&startTime=18.104) [Next we understood the standalone features of Spring Boot and how it](https://app.pluralsight.com/course-player?clipId=bb6b3070-10fb-4f2e-8f7a-bc03fdeeea68&startTime=21.68) [drastically reduces the time it takes to run an application.](https://app.pluralsight.com/course-player?clipId=bb6b3070-10fb-4f2e-8f7a-bc03fdeeea68&startTime=25.707) [And last,](https://app.pluralsight.com/course-player?clipId=bb6b3070-10fb-4f2e-8f7a-bc03fdeeea68&startTime=29.53) [we covered how Spring Boot is opinionated and uses this as an advantage so that developers can get started as quickly as possible.](https://app.pluralsight.com/course-player?clipId=bb6b3070-10fb-4f2e-8f7a-bc03fdeeea68&startTime=30.308307692307693)

## [Understanding Spring's Foundations: The Spring Framework](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3)

### [The Spring Framework Is a Software Framework](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3)

[Hi.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=0) [My name is Dustin Schultz, and in this module of Spring: The Big Picture course,](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=0.45725) [we'll get a high-level understanding of the foundations of Spring by](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=6.804454545454545) [getting more familiar with the Spring Framework.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=11.00418181818182) [As the name suggests, the Spring Framework is a software framework,](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=14.319) [and fundamentally, a software framework is a universal,](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=18.573) [reusable software environment that provides particular](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=23.074) [functionality as part of a larger software platform to](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=26.969714285714286) [facilitate development of software applications,](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=31.09827272727273) [products, and solutions.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=33.8166) [Wow, that was a bit of a mouthful.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=35.937) [Let's take a minute to break that down piece by piece and](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=37.688466666666656) [understand how it applies to the Spring Framework.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=41.38946153846155) [First, a software framework is a universal, reusable software environment.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=44.859) [So in other words,](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=49.845) [a software framework is a piece of software that can be](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=51.052384615384625) [universally used and reused and serves as the support upon](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=54.574666666666666) [which applications are built,](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=58.603) [and the Spring Framework very much meets this definition.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=60.37346153846155) [Second, a software framework provides particular functionality,](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=64.357) [and as this would suggest, it's pretty straightforward.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=68.115) [So for instance, in the case of the Spring Framework,](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=70.557) [the Spring Framework provides functionality for things](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=72.722) [like web development and data access.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=75.41466666666662) [Third, a software framework is part of a larger software platform.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=77.78181818181818) [Again, this is also pretty straightforward.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=82.42080000000001) [It's just saying that a software framework doesn't exist entirely on its own.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=85.185) [It's usually part of something else.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=89.882) [So for instance,](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=91.94533333333331) [like this Spring Framework is part of the larger software platform called Java.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=92.977) [And last,](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=98.307) [a software framework facilitates the development of software applications,](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=99.1022) [products, and solutions.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=102.7457) [In other words, it makes the development of applications easier,](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=104.1338) [just like the Spring Framework makes the development of applications easier.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=108.8211111111111) [Now that we understand the purpose of the Spring Framework,](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=114.082) [let's take a moment to understand how it began and where it fits in to the larger picture that is Spring.](https://app.pluralsight.com/course-player?clipId=1beb64bd-4860-4ca7-99c5-9c787e17c2a3&startTime=116.942)

### [This Is Where It All Began](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a)

[The Spring Framework is what started everything that is Spring today.](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=1.818) [It's where it all began.](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=5.666) [And remember that when we say Spring,](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=7.306416666666669) [we're usually referring to the Spring family or the Spring ecosystem.](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=9.603) [Enterprise Java development at the time was a rigid and complex process,](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=14.598) [this was around 2003, and the creator of the Spring Framework,](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=19.339) [Rod Johnson,](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=23.337) [set out to fix that by creating a framework that applications could](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=24.189333333333334) [build upon to really simplify the development process.](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=29.479799999999997) [The Spring Framework ended up being very successful in this aspect,](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=33.595) [and over time it sort of grew and evolved into what it is today,](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=37.317) [and what it is today is actually quite different](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=42.659) [than what it was when it started.](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=45.75725000000002) [In addition to simplifying Java development,](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=48.167) [it also became the foundation for which all Spring projects were built upon.](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=50.46380000000002) [For instance, like Spring Boot.](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=55.558) [Applications could then in turn utilize these projects,](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=57.68800000000001) [along with the Spring Framework, to even further simplify their development.](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=60.98124999999999) [Next,](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=65.771) [let's take a deeper look at what the Spring Framework consists of and what it provides.](https://app.pluralsight.com/course-player?clipId=09498b72-2347-4d7c-8729-b7422056821a&startTime=66.08316666666667)

### [The Six Key Areas of the Spring Framework](https://app.pluralsight.com/course-player?clipId=54f5df34-f9d4-4410-8beb-c1e17dce11e2)

[The Spring Framework utilizes a modular architecture,](https://app.pluralsight.com/course-player?clipId=54f5df34-f9d4-4410-8beb-c1e17dce11e2&startTime=1.856) [meaning that it's broken up into separate individual](https://app.pluralsight.com/course-player?clipId=54f5df34-f9d4-4410-8beb-c1e17dce11e2&startTime=4.682) [components that can be connected together.](https://app.pluralsight.com/course-player?clipId=54f5df34-f9d4-4410-8beb-c1e17dce11e2&startTime=8.179599999999999) [And each of those components is then responsible for](https://app.pluralsight.com/course-player?clipId=54f5df34-f9d4-4410-8beb-c1e17dce11e2&startTime=10.653636363636364) [providing a specific set of functionality,](https://app.pluralsight.com/course-player?clipId=54f5df34-f9d4-4410-8beb-c1e17dce11e2&startTime=14.5775) [and together as a whole, they make up the Spring Framework.](https://app.pluralsight.com/course-player?clipId=54f5df34-f9d4-4410-8beb-c1e17dce11e2&startTime=17.951) [The Spring Framework can be broken up into six different key areas,](https://app.pluralsight.com/course-player?clipId=54f5df34-f9d4-4410-8beb-c1e17dce11e2&startTime=21.921) [core, web, AOP, or aspect-oriented programming,](https://app.pluralsight.com/course-player?clipId=54f5df34-f9d4-4410-8beb-c1e17dce11e2&startTime=26.353) [data access, integration, and testing.](https://app.pluralsight.com/course-player?clipId=54f5df34-f9d4-4410-8beb-c1e17dce11e2&startTime=32.07774999999999) [For the remainder of the module,](https://app.pluralsight.com/course-player?clipId=54f5df34-f9d4-4410-8beb-c1e17dce11e2&startTime=35.42433333333334) [we'll take a look at each of these key areas and understand what they are, what they provide, and how they simplify Java development.](https://app.pluralsight.com/course-player?clipId=54f5df34-f9d4-4410-8beb-c1e17dce11e2&startTime=38.301)

### [Spring Core](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6)

[The Spring Framework's Core module, or Spring Core as it's often called,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=1.823) [is one of the most important, if not the most important pieces,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=5.485083333333334) [of the Spring Framework.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=9.584800000000001) [It serves as the foundational module upon which every other module is built.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=11.108) [Spring Core is responsible for providing a number of different functionalities,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=16.971) [such as internationalization support, validation support,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=20.7448) [data binding support, type conversion support,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=24.410999999999998) [and a whole lot more; however,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=27.9) [at the center of Spring Core is something called dependency injection.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=29.95246153846154) [The topic of dependency injection is well beyond the scope of this course,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=34.0638888888889) [but we should be able to get a rough understanding of its purpose.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=38.6358) [When software is developed using object-oriented programming,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=43.143) [developers create objects that represent or model particular things,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=46.51) [and objects typically don't exist by themselves.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=51.651) [There are usually several objects that make up an application,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=55.448) [and each of those objects may in turn have dependencies on other objects.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=58.869) [For instance, a developer might create a computer object to represent a computer,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=64.911) [and that computer object would likely have dependencies on other objects,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=70.2080909090909) [like a hard disk object, or one or more memory objects,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=75.2703846153846) [and dependency injection is about dealing with the way](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=80.217) [objects obtain those dependencies.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=85.08600000000001) [There's mainly two different choices for fulfilling object dependencies,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=87.386) [number one, the object can fulfill its own dependencies,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=91.07877777777777) [or number two,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=94.821) [the object can declare what it depends on and rely on](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=96.06899999999999) [something else to fulfill those dependencies.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=100.94166666666668) [Choice number one may seem like the easiest and best idea,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=104.031) [but it has some particularly bad limitations.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=107.36478571428572) [If an object is responsible for fulfilling its own dependencies,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=110.2672) [then the object and those dependencies become](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=114.71522222222222) [strongly dependent upon each other, or tightly coupled as it's called.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=117.63142857142857) [To relate this back to a real-life scenario,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=122.30069230769233) [choice number one would be like buying a computer where you](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=124.8825) [couldn't change or upgrade the memory.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=128.441) [When the computer was created, it created the memory as part of the computer.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=130.49899999999994) [In fact, many laptops are like this today.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=135.929) [The memory was created with the computer,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=138.254) [and if you wanted to change or upgrade the memory,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=140.58392307692313) [you'd have to buy a whole new computer.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=144.0656666666667) [Choice number two of declaring our dependencies is much more flexible.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=147.035) [The object and its dependencies are still coupled,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=151.907) [but they're considered to be loosely coupled because you can](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=155.56) [change one without having to change the other.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=158.91909090909098) [Again, to sort of relate this back to a real-life scenario,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=161.75453846153852) [choice number two is like buying a computer where you can change the memory.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=165.60408333333336) [Instead of creating the memory when the computer is made,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=170.826) [the computer and the memory are created separately](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=173.816) [and then later assembled together.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=177.38953846153842) [Choice number two is what we would call dependency injection,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=179.623) [and Spring Core is considered to be a dependency injection container.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=183.426) [You can utilize it to declare objects and their dependencies,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=188.405) [and Spring Core will create and manage and connect them all together,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=192.891) [and this results in less things for the developer to manage.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=197.908) [It's also not uncommon to hear Spring Core referred](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=202.112) [to as the glue of the application,](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=204.94699999999997) [as it's the thing that pieces together and manages many individual parts that form the application.](https://app.pluralsight.com/course-player?clipId=6c4515ea-5f0d-4fa9-9ec3-55cb0a6540a6&startTime=207.38054545454543)

### [Spring Web Overview](https://app.pluralsight.com/course-player?clipId=d9406e11-d4f0-4488-b13b-772a4f784f55)

[In this section and the following sections,](https://app.pluralsight.com/course-player?clipId=d9406e11-d4f0-4488-b13b-772a4f784f55&startTime=1.765) [we'll focus on how the Spring Framework makes it easier to develop](https://app.pluralsight.com/course-player?clipId=d9406e11-d4f0-4488-b13b-772a4f784f55&startTime=3.563416666666667) [services and applications that interact with the web.](https://app.pluralsight.com/course-player?clipId=d9406e11-d4f0-4488-b13b-772a4f784f55&startTime=7.897899999999998) [Web support within the Spring Framework is provided via the web module.](https://app.pluralsight.com/course-player?clipId=d9406e11-d4f0-4488-b13b-772a4f784f55&startTime=11.171) [And simply put, the web module, or Spring Web,](https://app.pluralsight.com/course-player?clipId=d9406e11-d4f0-4488-b13b-772a4f784f55&startTime=15.838) [is a framework for handling web requests.](https://app.pluralsight.com/course-player?clipId=d9406e11-d4f0-4488-b13b-772a4f784f55&startTime=18.948538461538465) [Web requests can be handled in one of two different ways,](https://app.pluralsight.com/course-player?clipId=d9406e11-d4f0-4488-b13b-772a4f784f55&startTime=21.356250000000003) [either via Spring Web MVC or via Spring Webflux. In the next sections, we'll take a slightly deeper look at each of these methods.](https://app.pluralsight.com/course-player?clipId=d9406e11-d4f0-4488-b13b-772a4f784f55&startTime=25.347999999999995)

### [Spring Web MVC](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2)

[In this section, we'll discuss Spring Web MVC,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=1.774) [and in order to understand what Spring Web MVC is,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=4.452666666666665) [we first need to understand what a servlet is.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=8.069200000000002) [The Java language introduced very basic support for interacting with the](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=11.485) [web via a built-in framework called the Servlet API,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=16.034399999999998) [and the Servlet API is named after the key component called a servlet.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=19.737) [And in simple terms,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=25.146) [a servlet is an object that receives a request and](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=26.83461538461539) [generates a response based on that request.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=31.0195) [Let's take a look at what a standard web request looks like using a Servlet API.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=33.718) [We start off with a request to the web server,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=38.789) [which is initially handled by the Servlet API,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=41.38899999999998) [and then passed on to the actual application logic,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=43.98816666666666) [or business logic as it's called.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=47.61099999999999) [The business logic is executed and produces some result,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=50.839) [and then those results are handed back to the](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=55.077) [Servlet API to generate a response.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=58.64520000000002) [Servlets are great, but they don't come without their challenges.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=61.024) [Specifically, the servlet API is considered to be somewhat of a low-level API,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=64.728) [meaning that it's more detailed and offers less way of abstracting complexity,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=69.43533333333333) [and this typically translates into something that is harder](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=75.33375) [to use and is ultimately less productive.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=80.29019999999998) [Because the Servlet API is so low level,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=83.828) [it's easy to develop application logic that lacks proper design principles.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=86.51599999999999) [Code can quickly become unorganized and hard to maintain.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=91.782) [Now that we have a high-level understanding of the Servlet API,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=96.843) [let's look at what a request looks like using the Spring Web MVC Framework.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=100.536) [The request starts off the same,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=105.285) [entering the web server and passing through the Servlet API; however,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=106.93450000000001) [instead of going directly to the business logic,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=110.31354545454545) [it's sent through to the Spring Web MVC Framework.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=113.32172727272727) [The business logic can then make use of Spring Web MVC,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=117.519) [generate a result, and pass control back to Spring Web MVC,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=121.413) [which in turn can pass control back to the Servlet API,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=125.837) [and ultimately generate a response.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=129.309) [The advantage of the Spring Web MVC Framework is that it provides a](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=132.496) [higher-level API for the developer to interact with,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=136.174) [and this results in easier usage and more productivity.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=139.5689090909091) [The higher-level API also has the added benefit of making it easier to](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=144.921) [develop code that follows proper design principles.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=149.196) [And you may have been wondering this whole time what](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=152.517) [exactly is the MVC in Spring Web MVC, well,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=155.62469230769238) [MVC stands for model-view-controller, and it's a design principle,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=161.25500000000005) [or a design pattern, that results in more organized and easier-to-maintain code.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=166.11084615384615) [If you want to learn more about Spring Web MVC,](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=172.935) [be sure to check out the Pluralsight course called Introduction to Spring MVC 4, by Bryan Hansen.](https://app.pluralsight.com/course-player?clipId=aaee9963-7a6c-4f22-bb8e-f943e928f4b2&startTime=175.07299999999992)

### [Spring Webflux](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a)

[Spring Webflux is another way of handling web requests](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=1.956) [supported by the Spring Framework.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=5.039727272727271) [And in order to understand its purpose,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=6.8245000000000005) [we first need to understand something called reactive programming.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=9.39) [Reactive programming is a declarative programming paradigm concerned](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=13.604) [with data streams and the propagation of change.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=17.403) [So in other words,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=21.13) [it's a way of programming that focuses on streams of data and how they change.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=22.572461538461543) [And the key idea behind reactive programming is that you](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=28.554) [react to change rather than wait for change.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=32.94709090909091) [As I mentioned before,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=36.15) [Spring's reactive web programming framework is call Spring Webflux,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=37.5524) [and its primary purpose is still to handle web requests,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=40.876) [but the way in which it handles them is different.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=44.889818181818185) [Specifically, web requests are executed asynchronously,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=48.428) [and they don't block or wait, and this results in better resource utilization.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=52.045333333333346) [To better understand, let's look at what a traditional,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=60.019) [or non-reactive request flow looks like.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=62.518) [As a web request progresses over time,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=64.86509090909092) [you can think of it as executing a series of steps,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=67.54453846153845) [and some of those steps may depend on external resources like loading a file](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=71.524) [from disk or making additional requests to other servers,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=76.86472727272727) [and since the requests must occur in order,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=81.152) [every time a step is waiting on something else,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=83.55015384615383) [the request is considered to be blocked.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=86.76500000000001) [And this is less than ideal because when the request is blocked,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=89.768) [computing resources are tied up and they can't be used to serve other requests.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=93.393) [To sort of relate this to a real-life concept,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=98.378) [the traditional flow is a lot like dialing a support number and](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=101.14723076923076) [having to wait until the next agent is available.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=104.60999999999997) [While you're on hold, you're basically tied up from doing anything else.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=107.37081818181818) [Now let's talk about the flow of a reactive request.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=111.745) [Just like the traditional flow,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=115.435) [you can think of the web request as progressing over time and executing a](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=116.61500000000002) [series of steps that may depend on external resources.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=120.69849999999998) [The difference comes with how the requests are executed.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=124.852) [Requests are executed asynchronously instead of synchronously,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=128.708) [and they don't block or wait.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=132.949) [This allows the valuable resources involved in the](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=135.4602727272728) [request handling to be released and reused.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=139.0425) [And you're probably wondering though, if it doesn't wait,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=142.518) [then how the heck does it work?](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=144.98775) [Well, instead of waiting,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=147.17561538461538) [the code simply asks to be notified when the operation is complete,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=148.54023076923076) [and continues executing other operations.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=153.72091666666674) [When it's observed that the operation is complete,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=156.203) [the code can continue executing those subsequent steps.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=158.3644545454545) [Again, relating this back to our real-life example,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=162.325) [the reactive flow is a lot like dialing a support number that](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=165.12354545454554) [allows you to put in your telephone number and receive a call](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=168.57840000000004) [back when the next agent is available.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=172.28523076923076) [Since you're not tied up on the phone waiting for that next available agent,](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=174.739) [you're free to do other things until your phone rings.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=178.26399999999998) [You can learn more about Spring Webflux with the Pluralsight course, Spring Webflux: Getting Started, by Esteban Herrera.](https://app.pluralsight.com/course-player?clipId=02373c77-5197-4d67-88cd-18506363173a&startTime=182.234)

### [Spring AOP](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911)

[In this section, we'll learn more about Spring AOP.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=1.806) [And in order to understand what it is, we first have to understand what AOP is.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=5.073) [AOP stands for aspect-oriented programming,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=11.166) [and it's a programming paradigm that aims to increase the modularity by](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=13.518777777777782) [allowing the separation of cross-cutting concerns.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=18.948200000000003) [Now, you may be a little confused with what exactly that means,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=21.601400000000005) [so let's break up this definition into three separate parts.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=26.139909090909097) [First, when we say it's a programming paradigm,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=29.55718181818181) [that simply means that it's just a way of programming or writing code,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=32.424090909090914) [and second, the definition says that it aims to increase modularity.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=37.30763636363638) [And in simple terms, this just means that it increases organization.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=42.26118181818183) [And third, it allows you to separate cross-cutting concerns,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=46.857272727272736) [or concerns that affect many parts of an application](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=51.154399999999995) [because they span multiple layers, or tiers,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=55.87527272727273) [of the application.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=59.51018181818183) [A classic example of a cross-cutting concern is security because security](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=61.068) [can't be contained to any one area of the application,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=66.15163636363636) [and instead it spans multiple parts of the application.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=70.508) [You can find it throughout various areas of the application.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=73.693) [So just to recap,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=77.559) [AOP is a way of programming that increases organization of](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=78.92800000000003) [code for concerns that span multiple layers,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=82.54636363636362) [or tiers, of an application.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=85.62763636363631) [Just to give you an idea, without AOP, solving concerns that are cross-cutting,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=88.035) [results in scattered and duplicated code across many parts of the application.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=92.537) [AOP is really beyond the scope of this course,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=98.914) [but let's quickly look at the benefits that Spring AOP provides,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=101.66730769230772) [and we'll finish with a concrete example.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=105.6415) [Spring AOP is an implementation of AOP within the Spring Framework,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=108.392) [and it mainly has two uses,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=113.609) [with the first being used to implement certain features](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=115.87376923076927) [within the Spring Framework itself,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=119.31840000000001) [and the second being a valuable tool for developers that need](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=121.32440000000003) [to solve problems that span multiple layers,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=125.99866666666662) [or tiers, of their application.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=129.1425) [It's sort of a nice tool to have in their toolbox.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=131.49) [As I mentioned before,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=135.319) [security is a great example of something that AOP can solve.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=136.76400000000004) [So let's look at a typical example of a piece of code that's only allowed to be](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=140.76239999999996) [executed by persons who are authorized and authenticated.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=147.5752307692308) [We first check if the user is authenticated and if they have the correct role,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=151.382) [for instance, like an administrator role,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=155.68345454545454) [and if they do, this sensitive operation is allowed to execute.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=157.81181818181818) [And if not, we raise an error, maybe log that failed attempt,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=162.388) [and redirect the user to a login page.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=166.838) [This same series of operations is likely to occur in](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=169.9087692307692) [many places throughout the application.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=173.98499999999999) [Basically anywhere there's a sensitive operation.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=176.142) [And instead of spreading this same logic throughout all of the application,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=179.027) [Spring AOP allows us to organize these operations into a single area that](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=182.9917) [can be applied to different parts of the application.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=189.61769230769232) [Now let's look at an example that utilizes Spring Security,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=193.172) [a project that we'll discuss further in a future module.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=196.467) [Spring Security utilizes the Spring Framework's AOP support](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=199.812) [behind the scenes to implement security.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=203.60800000000006) [In our example,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=206.32536363636368) [the sensitive method is annotated with the @PreAuthorize annotation,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=207.65163636363644) [and it has a condition to ensure that the user has](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=211.79772727272726) [the role of admin for instance.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=216.32054545454545) [And remember that annotations are just metadata that's added to the code.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=218.324) [And by adding this metadata,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=223.006) [Spring AOP can identify that this method requires security,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=225.20058333333336) [and apply the appropriate security logic.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=229.35774999999998) [The added benefit of this is that the logic within the](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=232.612) [sensitive operation becomes very clear,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=235.73233333333343) [and it's not cluttered with surrounding logic that's not directly related](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=238.11039999999997) [to what the logic is trying to accomplish just to ensure that the user is](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=242.99325000000005) [secured and authorized to execute this method.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=249.13766666666672) [It's just the sensitive operation.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=252.85287499999998) [If you want to learn more about Spring AOP,](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=255.956) [there's an excellent course on Pluralsight by Eberhard Wolff called Aspect Oriented Programming using Spring AOP and AspectJ.](https://app.pluralsight.com/course-player?clipId=52fcac99-8587-446c-a2af-ffa8b6831911&startTime=258.03499999999997)

### [Spring Data Access](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2)

[Whether it be storing it, retrieving it,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=1.76) [or both, almost every application interacts with data these days.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=3.9478888888888886) [Data is super important.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=7.721) [And the easier it is to develop applications that can interact with data,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=9.209999999999997) [the better.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=13.726) [And that's the job of the Spring Framework's Data Access module.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=14.412923076923077) [To get started, let's start off with an example.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=18.191) [On the left we have some example code that's used to fetch data from a](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=21.188) [database using the Java Database Connectivity API,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=25.533833333333334) [or JDBC as it's commonly referred to.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=28.738666666666667) [Now don't worry about the code.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=31.78266666666667) [The specifics really aren't important.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=34.208) [The important point to make here is that it requires a](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=35.71300000000001) [fair amount of code to retrieve data, and if you look a little bit closer,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=39.51092307692309) [you'll realize that there's really only a small area of](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=44.27400000000002) [the code that's important to the logic.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=47.62384615384616) [The rest of the surrounding code is required to use the API.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=50.314) [This code that's necessary to use the API,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=54.739) [but sort of causes clutter in our application is called boilerplate code.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=57.63376923076921) [And as you can imagine,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=63.34) [adding this same boilerplate code every time you needed to](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=65.13916666666665) [write or retrieve data becomes very tedious.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=69.38180000000001) [Let's take a look at what this same code looks like,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=73.404) [but using the Spring Framework's Data Access support.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=76.11471428571423) [As you can see, the code on the left is significantly reduced,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=80.225) [and not only is it reduced, it's much more clear as to the intent of this code.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=84.178) [We don't have to weed through the boilerplate code](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=89.448) [just to understand the purpose of it.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=92.03100000000005) [The Spring Framework's Data Access support also makes it](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=94.777) [super easy to use database transactions.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=97.63975) [Now, you may not be familiar with what a database transaction is,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=99.56074999999998) [so let me quickly explain.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=104.07012499999999) [A transaction is a general unit of work that must](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=106.752) [happen all together or not at all.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=110.51584615384608) [So a database transaction is a series of database](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=113.277) [operations that must happen all together,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=116.949) [or not at all.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=119.51820000000002) [And just to be clear, that doesn't necessarily mean that they all happen at once,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=121.231) [they just all happen or they don't happen at all.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=125.70161538461537) [A classic real-life example of a transaction is](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=129.697) [transferring money between two bank accounts.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=132.69619999999998) [You first have to subtract the amount from the first account,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=134.8406666666667) [say it's $50, and then you add that amount to the second account.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=138.708125) [And if the subtraction of the money succeeds,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=143.38) [but the addition fails, then the money's lost.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=146.43866666666656) [And likewise, if the subtraction fails, but the addition succeeds,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=149.79319999999998) [then somebody just got 50 bucks for free.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=154.23133333333334) [So as you can see, transferring money between two accounts must be transactional.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=157.632) [It must happen all together or not at all.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=162.725) [Let's take a look at another example.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=167.198) [Again using the JDBC API,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=169.9699999999999) [the following code on the left is a pretty standard example of executing](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=171.95) [a series of statements within a database transaction.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=176.64677777777777) [And just like with our previous example,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=180.349) [you'll notice there's a lot of boilerplate code here that sort of draws](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=182.4880833333334) [focus away from the main core intent of the code.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=186.72861538461544) [Let's see what this same code looks like using the](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=190.10823076923077) [transactional support in the Spring Framework.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=193.91500000000002) [Wow, that's a lot simpler.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=197.251) [You simply declare the method as transactional,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=199.1650909090909) [meaning that you want this method to execute within a transaction,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=201.88890909090907) [and the Spring Framework takes care of the rest.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=206.61319999999998) [Another small,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=210.71) [but interesting feature provided by the Data Access module is](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=211.3666) [something called exception translation.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=215.1566666666667) [And exceptions are events within a program that disrupt execution.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=217.484) [So for instance, if you tried to read data from a database and you got an error,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=222.553) [the Java code would throw an exception.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=226.9692222222222) [And the problem is,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=230.267) [different database vendors have different errors and different](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=231.69779999999997) [exceptions for the same class of errors.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=234.8417777777778) [So for instance, consider an example where you had problems with the data,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=238.334) [and when using MySQL,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=242.24972727272728) [a data integrity violation could return any one of the following codes,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=244.4086363636364) [such as 630, or 839, or 1557.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=251.12100000000004) [And that same data integrity violation in Oracle](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=255.174) [would return something like 1400, or 2292,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=258.87719999999996) [and the Data Access module of the Spring Framework helps by](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=262.2980000000001) [taking these database-specific error codes and translating them](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=268.37462500000004) [into a well-known set of exceptions.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=273.50699999999995) [So just to make this a bit more concrete,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=276.823) [looking at the different error codes from MySQL and Oracle,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=278.9947692307694) [you can see that the Spring Framework would translate those into](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=282.0180000000001) [something called a DataIntegrityViolationException.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=286.222875) [Last, but certainly not least,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=291.381) [Data Access support within the Spring Framework helps to make testing easier.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=292.900090909091) [Since the Spring Framework is managing the configuration and the](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=297.2893636363637) [set up of how an application accesses its data,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=301.367090909091) [it's very easy to switch out that configuration for testing.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=305.1016923076923) [So for instance, during testing it's common to utilize an embedded test database.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=309.794) [You certainly wouldn't want to be running your tests](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=314.908) [with important production data,](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=317.3232727272727) [and Spring's Data Access support helps to set up that](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=318.64216666666664) [embedded test database and ensure that your code is configured to point to that during tests.](https://app.pluralsight.com/course-player?clipId=e083bcdd-a5a3-417c-aa76-f83b3dbe13e2&startTime=322.553)

### [Spring Integration](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88)

[In this section,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=1.89) [we'll briefly take a look at the features that the Spring](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=2.6035384615384616) [Framework provides for integration.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=5.5518) [Now what exactly do I mean when I say integration?](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=7.831) [Well, applications don't live in isolation.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=10.328) [Applications often need to share data or work with other applications,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=13.17355555555556) [and integration is all about making different systems](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=18.561) [and applications work together.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=22.469666666666676) [So how exactly does the Spring Framework help?](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=24.424) [Well, one problem you need to solve is how one application can talk to another,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=27.303) [or communicate.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=33.441) [And this is a multi-sided problem.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=34.981) [So A) you have to figure out how do you expose operations to other systems,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=36.542285714285704) [and B) how do you invoke, or run, operations on other systems?](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=41.33784615384614) [There's certainly many different ways to expose operations to other systems,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=46.701) [such as RMI, or Remote Method Invocation,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=51.06616666666667) [or another way is via a messaging system,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=54.39233333333333) [and the Spring Framework supports both of these,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=57.61481818181817) [but one such popular way to expose operations is something called web services.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=60.37190909090909) [And web services are simply operations that are](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=66.17572727272726) [exposed and accessible via the web.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=69.815) [And the Spring Framework makes it easy to both expose and invoke web services.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=73.21) [Let's take a look at an example.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=78.225) [On the left we have a very simple example of a web service,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=80.659) [and this can be used to retrieve account information.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=83.896) [So you might think of this as being used in a banking](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=87.434) [application to look up your bank account.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=90.78799999999998) [And at the core of this web service are three annotations.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=93.0173125) [Remember that annotations are just metadata that's added to the code.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=96.692) [The first annotation is the @RestController annotation,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=100.773) [and it denotes that this code is going to be exposing operations](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=103.75079999999997) [using a style of web services called REST,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=107.7707142857143) [and the details of what REST is aren't really important,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=110.54175) [just know that rest is a way or style of implementing web services.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=114.72728571428571) [The second annotation, the @GetMapping annotation,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=120.516) [is used to denote the operation and the path that need](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=122.77499999999998) [to be used to invoke this operation.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=126.88699999999997) [And we can see that the path is just like any regular URL that we're used to](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=129.493) [seeing on the web with some additional added curly syntax.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=133.593) [And the curly braces are related to the third annotation,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=137.273) [and they simply indicate that this part of the path is a placeholder.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=141.587) [In our case, it's a placeholder for the account number,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=145.98) [and in other words,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=148.56076923076913) [it's the way that we tell the operation what](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=149.63041666666666) [account number we'd like to retrieve.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=152.28916666666655) [So even if you don't understand the code,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=154.25366666666662) [you can see that with these three simple annotations,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=157.001) [we've exposed a service that can be used to look up](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=159.6169999999999) [an account by its account number.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=162.90785714285718) [Now that we've seen how to expose an operation via a web service,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=164.722) [let's look at the other side of the problem and how the Spring Framework helps](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=168.633) [us to invoke our service from within another application.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=172.21681818181816) [Remember how we utilized REST to implement our web service?](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=176.392) [Well,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=179.658) [the Spring Framework provides support for](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=180.110625) [programmatically invoking our REST service,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=182.82637500000007) [and you utilize something called a RestTemplate.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=185.11572727272733) [And that RestTemplate abstracts away all the tedious](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=188.33) [details of interacting with a web service,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=192.1756000000001) [like opening a connection to the web service,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=194.41450000000006) [sending over the command, and handling the response from the web service.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=196.5956153846154) [In fact,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=201.307) [it's so easy to use that it'll only take us one line of code to call a web](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=201.80625) [service that looks up an account by its account number.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=206.37785714285718) [Using the RestTemplate, we can call the GetForObject method,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=209.07) [pass a few parameters,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=212.268) [one of which is the path to the web service with the](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=213.35200000000003) [account ID that we want to look up,](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=216.6162857142857) [and the RestTemplate will take care of the rest. No pun intended.](https://app.pluralsight.com/course-player?clipId=2cdaf81c-ab3e-4fa9-b591-898b2602af88&startTime=218.8334285714285)

### [Spring Testing](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b)

[Testing is an important part of developing software,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=1.798) [so it's no surprise that the Spring Framework](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=4.091818181818182) [strives to help in this area as well.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=6.611230769230771) [And there's many different levels at which software is tested,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=9.266) [and the Spring Framework focuses on two different areas,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=13) [on unit testing and integration testing.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=16.376) [Let's start by talking about unit testing.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=19.304) [Unit testing is a software development process in which the smallest](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=22.72) [testable parts of an application called units are individually and](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=26.414) [independently scrutinized for proper operation.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=30.876) [And explicit support for unit testing in the Spring](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=34.035) [Framework is actually minimal.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=37.77761538461538) [The Spring Framework support for testing largely comes as a](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=39.441) [side effect of using one of its key concepts,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=42.49554545454545) [and that's dependency injection.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=45.913000000000025) [And we talked about dependency injection in the section on Spring Core.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=47.469) [So just to quickly refresh your memory,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=51.136) [dependency injection is all about dealing with the way](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=53.878) [objects fulfill their dependencies.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=57.86499999999998) [So you're probably wondering how exactly does dependency](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=59.637) [injection help make testing easier?](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=62.88499999999999) [Well, remember that with unit testing,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=65.228) [the idea is to test the smallest unit of code possible,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=67.0856923076923) [and when the code that's being tested has no dependencies,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=70.37269230769233) [meaning that it doesn't depend on other code to do its work,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=73.16358333333334) [this is a fairly easy process; however,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=76.52946153846153) [when the code under test has dependencies,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=79.17869230769229) [it's important to be able to control how those](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=81.811) [dependencies behave in order to restrict the testing to](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=85.141) [just the code and not the dependencies.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=88.68625000000003) [If the code is written with dependency injection in mind,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=91.11745454545456) [the testing becomes a lot easier.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=94.36233333333332) [The developer is forced to declare what the code depends on,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=96.479) [and the code expects to be given those dependencies,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=100.087) [and the code doesn't necessarily care where they come from,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=102.68274999999997) [just the fact that something fulfills them.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=105.57800000000005) [So during testing,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=108.06370000000001) [dependent code can be replaced with code that behaves a certain way,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=109.38940000000002) [and this action of replacing pieces of code with](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=114.44699999999996) [controlled code is called mocking.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=118.61600000000001) [Now just to be absolutely clear, in unit testing,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=121.14) [we don't actually use dependency injection to inject](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=123.67349999999995) [dependencies into our unit tests,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=126.95949999999998) [but the way that the code is set up for dependency injection,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=129.401) [mainly that the code is forced to declare what it depends on,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=133.594) [that helps to make testing easier.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=137.461) [If you're confused or still not grasping the concept,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=139.52100000000002) [hopefully it'll make sense with an example.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=142.86169999999996) [Suppose you have a piece of code that grants people certain](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=145.85) [permissions based on their security clearance level,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=148.381) [and suppose that there's three different types of security clearance,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=150.94230000000007) [confidential, secret, and top secret.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=155.80512499999992) [Now I don't expect that you'll understand this piece of code,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=157.6880909090909) [so let's quickly walk through it.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=161.30439999999996) [If you notice the method, the getPermissions method,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=163.198) [is passed a parameter called the SecurityManager,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=166.31945454545453) [and the SecurityManager is responsible for getting the security clearance level.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=169.29650000000004) [And then we have a series of if/else if statements that just check what that](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=174.741) [level is and grant certain permissions based on that level.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=179.83483333333336) [When testing this piece of code, you want to be able to test every condition,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=184.149) [or what happens in every scenario, every if block,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=187.3249) [and luckily this code has been written with dependency injection in mind](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=192.067) [and declares that it depends on the SecurityManager.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=195.54600000000002) [During testing,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=199.082) [instead of using the real logic to determine what the](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=199.61283333333336) [user's current security clearance level is,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=202.267) [we can mock this dependency and control the way the SecurityManager behaves,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=204.32260000000002) [or in other words, we can control what security clearance level is returned.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=209.646) [So for instance, if we were writing a test here,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=213.75) [for our first test we could make it so that the SecurityManager](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=215.7146666666668) [that it uses always returns confidential,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=219.68075000000007) [and that would ensure that we enter that first if block.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=222.19908333333333) [And then for our second test,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=226.457) [we could make it always return secret and it would make](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=228.55838461538457) [sure that it enters that second if block,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=232.1092) [and so on.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=234.30759999999998) [If the SecurityManager had not been declared as a dependency,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=235.132) [this code would have been much harder to test because we wouldn't](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=238.149) [be able to as easily control the logic of the SecurityManager to](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=240.90623076923066) [test all of the various conditions.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=244.72623076923088) [As part of the support for unit testing,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=247.812) [the Spring Framework includes a number of prewritten](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=250.32399999999996) [mocks that can be used in testing,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=253.08654545454542) [and this ultimately makes testing easier and faster for a developer](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=255.723) [because it saves them from having to write their own mocks.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=259.8) [The second area of focus for testing within the Spring](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=263.9) [Framework is integration testing,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=266.37749999999994) [and integration testing is the phase in software testing in which](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=267.7188) [individual modules are combined and tested as a group.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=272.42975) [It occurs after unit testing.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=276.413) [And as the name suggests,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=277.98900000000003) [integration testing is focused on how various parts of a](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=279.565) [software application integrate together.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=283.07590909090885) [Integration tests allow you to run whole pieces of an](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=284.7556666666667) [application and test how they all work together and not just](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=288.84438461538457) [pieces of code in isolation like unit tests.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=292.8548) [Outside of explicit support for integration tests,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=296.014) [the Spring Framework plays an important role in integration testing,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=299.463) [as it could be used to piece together various parts](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=303.136) [of the application for testing.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=306.5219999999999) [In terms of explicit support,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=308.215) [the Spring Framework provides support for common integration testing scenarios,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=310.014) [like setting up and testing data access,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=313.9169999999999) [as well as other scenarios like setting up and testing whole parts of](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=316.75600000000003) [a web application to ensure they're functional.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=321.7468) [Another nice feature provided by the Spring Framework is](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=324.817) [the ability to clean up after tests.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=327.3615454545457) [And let me explain what I mean by that.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=329.45271428571436) [So when you're writing integration tests,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=332.199) [it's very common that you'll be changing the state of the](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=333.93190909090896) [application just by running the test.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=337.4425000000001) [For instance,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=339.509) [maybe you do some data access tests and you insert](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=340.1714615384616) [some new data into a database.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=343.48376923076944) [And if you leave that data in there after the test is complete,](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=345.2724999999999) [it could end up affecting how other tests run after it.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=349.37386666666663) [So the Spring Framework provides support for helping you clean up those tests after they run.](https://app.pluralsight.com/course-player?clipId=b956e09c-8b52-484f-a193-f734bfad162b&startTime=353.438)

### [Summary](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4)

[We've reached the end of this module,](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=1.906) [so let's take a moment to recap what we've learned.](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=3.3274999999999997) [We've covered a lot of content in this module.](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=5.995499999999999) [We first saw Spring Core and how it's the foundation of the Spring](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=9.735) [Framework and how it provides support for dependency injection,](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=13.193) [which is a key component of the Spring Framework.](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=17.431) [Then we got to see the web support within the Spring Framework,](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=20.376) [as we talked about Spring Web MVC and Spring Webflux.](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=22.997) [After that, we got to learn what AOP is,](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=27.771) [or aspect-oriented programming,](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=31.27854545454547) [and how Spring AOP can be used to solve cross-cutting concerns.](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=32.568) [We then learned all about the Spring Framework's Data Access](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=38.178) [module and how it removes a ton of boilerplate code and](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=41.60890909090911) [makes it easier to access data.](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=45.75512500000002) [And then after that,](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=48.037) [we took a brief look at the Spring Framework's integration features and how](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=49.03823076923077) [they help different applications and systems work together,](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=53.09855555555555) [and we finished out the module by learning about the Spring Framework support for unit and integration testing.](https://app.pluralsight.com/course-player?clipId=da90852f-f596-488b-9bf2-bf38b4d7f8c4&startTime=56.38372727272727)

## [Exploring Other Spring Projects](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc)

### [The Projects We'll Be Exploring](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc)

[Hi.](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc&startTime=0) [My name is Dustin Schultz, and in this module of Spring: The Big Picture course,](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc&startTime=0.4076666666666667) [we'll be taking a tour of several of the other Spring projects that exist,](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc&startTime=6.055142857142858) [understanding what they do and how they make development easier.](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc&startTime=10.344454545454544) [If you open up a browser and visit spring.](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc&startTime=15.193) [io/projects,](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc&startTime=19.408599999999993) [you'll be brought to a page that contains all the projects](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc&startTime=19.877) [that exist within the Spring family.](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc&startTime=22.47469230769232) [You can scroll through the projects and see what's available and](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc&startTime=24.160333333333337) [click into any of the projects for more details.](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc&startTime=27.63575) [There's over 20 different projects at the time of this recording,](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc&startTime=30.782) [and as nice as it would be to be able to explore all of these projects,](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc&startTime=34.115) [we'll only be focusing our tour on a subset of the most](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc&startTime=37.613692307692304) [popular and widely used projects.](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc&startTime=41.27) [The projects we'll be exploring in this module are Spring Data, Spring Cloud, and Spring Security.](https://app.pluralsight.com/course-player?clipId=11f3be2d-2069-4d0e-be03-c1148a7665dc&startTime=44.08)

### [Spring Data Project](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953)

[We'll start off by talking about the Spring Data project,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=1.923) [and you can visit the Spring Data project by visiting projects.](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=5.137) [spring.](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=9.592666666666666) [io/spring-data.](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=11.457333333333333) [Spring Data's mission is to provide a familiar and consistent](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=13.322) [programming model for data access while still retaining some of those](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=17.133) [special traits about the underlying data store,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=21.406) [and this means that regardless of the type of data that's being stored,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=24.027818181818184) [Spring Data utilizes sort of these common patterns across all data stores with](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=28.431) [the additional goal of ensuring that any of those unique traits that are](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=33.011333333333326) [specific to a specific data store are still available.](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=37.71150000000001) [You might be wondering how exactly is the Spring Data project](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=41.592) [different than the Spring Framework's Data Access support,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=44.857) [and that's a great question.](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=48.081) [The Spring Data project extends the data access](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=49.84058333333334) [capabilities provided by the Spring Framework,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=52.77442857142857) [whereas the Spring Framework is focused on one particular type of database,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=55.597) [particularly relational databases.](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=60.49925) [The Spring Data project adds new ways of interacting with relational databases,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=62.732) [as well as support from many different types of databases.](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=67.32063636363637) [Spring Data is actually an umbrella project,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=71.987) [meaning that it itself is not actually a project,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=74.69366666666669) [but a series of subprojects, specifically a subproject per supported data store.](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=78.36033333333334) [And if you scroll down in the main project page,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=84.203) [you can see all the various data stores that are supported.](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=86.23033333333328) [As you can see,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=89.03200000000001) [there's a lot of different submodules to support a lot of different data stores,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=90.22400000000002) [and there's the Main modules,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=94.865) [which are supported within the Spring Data umbrella,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=96.51454545454548) [and then there's the Community contribute modules that are written and](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=99.24799999999999) [maintained by others outside of the Spring Data team.](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=103.38224999999998) [One thing that's nice about all of the Spring project pages is that](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=106.737) [they show a quick example of using the technology.](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=110.098) [So if we scroll down to the bottom, we can see a section labeled Quick Start,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=113.073) [and without going into the details,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=116.96984615384616) [let me give you a quick overview of that this example is doing.](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=118.58938461538463) [This particular example is showing how you can create](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=123.244) [an object that holds some data, and in this case,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=126.15325000000001) [it's an Employee object, and then Spring Data helps make it easy to save,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=129.36745454545456) [and delete, and find any of that data,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=134.5716666666667) [all with built-in methods and little to no additional coding required.](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=137.58114285714288) [Spring Data, along with some other technologies,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=141.84399999999997) [like JPA, which is called the Java Persistence API,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=144.97840000000002) [does the hard work of taking the data that's stored](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=149.86) [in the object and translating it, or mapping it,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=152.24714285714282) [or converting it into something that can be stored into the target data store.](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=154.8879090909091) [If you're interested in learning more about Spring Data,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=160.532) [there's two Pluralsight courses that utilize Spring Data.](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=163.176) [The first course is the same technology that we saw in the demo,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=166.275) [and it's called, Getting Started with Spring Data JPA,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=169.85) [by Dan Bunker,](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=173.65924999999996) [and the second course is called Getting Started with Spring Data REST, and it's also by Dan Bunker.](https://app.pluralsight.com/course-player?clipId=221cb942-c780-46a1-9184-9d2f4f21b953&startTime=174.929)

### [Spring Cloud Project](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411)

[The next project we'll take a look at is called Spring Cloud,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=1.901) [and you can visit this Spring Cloud project page by visiting projects.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=5.038) [spring.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=10.010333333333334) [io/spring-cloud.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=11.920666666666667) [The Spring Cloud project is a project that's built on top of Spring Boot,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=13.831) [and it makes it easier to build distributed systems.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=17.904) [Now if you're not familiar with what a distributed system is,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=21.936) [a distributed system is just a number of different applications](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=24.69) [that are all linked together by a network.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=28.317272727272734) [And a common and popular example of a distributed](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=31.365) [system is a microservices architecture.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=34.76775000000002) [And again, you may or may not have heard of what a microservice is,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=36.57418181818181) [so let me explain.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=41.43788888888887) [A microservice is just a small application that's very well](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=42.909) [scoped to a single purpose or domain.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=46.6923333333333) [So for instance, if you have something like an account microservice,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=48.94525) [its only job is to deal with accounts in the system.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=52.55146666666668) [It knows how to create them, and retrieve them,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=56.708) [and edit them,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=59.43349999999999) [and a microservices architecture is just a bunch of microservices that](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=60.342) [are communicating with one another over a network.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=64.504) [When you implement something like a microservices architecture,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=67.977) [you end up running into a number of well-known](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=70.586) [problems that have well-known solutions.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=72.91100000000006) [And one example is,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=74.6584) [how does a microservice find or discover another](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=76.60319999999999) [microservice that it needs to do its own work?](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=80.18246153846155) [And this problem is called service discovery,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=83.86) [and it's exactly one of the things that the Spring](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=85.96641666666666) [Cloud project helps you implement.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=89.365) [If we scroll down and take a look at the example here,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=91.259) [we can see that there's one new interesting](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=93.19175) [annotation that we've never seen before.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=95.44879999999999) [And that's the @EnableDiscoveryClient annotation.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=97.868) [And by using Spring Cloud and adding this annotation to an application,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=101.555) [the application, or service as it's usually called,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=105.53444444444445) [cannot only find other services,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=109.674) [but it itself is also discoverable by other services.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=112.10899999999998) [Service discovery is just one of the many things that Spring Cloud](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=116.492) [helps with when building a distributed system,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=119.394) [and just like the Spring Data project,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=121.55254545454547) [the Spring Cloud project is not actually a project itself.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=124.019) [It's an umbrella project that contains a number of different subprojects,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=128.129) [and those subprojects can help you with things like](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=131.5363) [configuration and failures within a distributed system.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=135.13) [If you want to learn more about Spring Cloud,](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=139.122) [there's a great course on Pluralsight, authored by myself, called Spring Cloud Fundamentals.](https://app.pluralsight.com/course-player?clipId=58bccd71-c2fb-4348-a397-b5e52df18411&startTime=141.19476923076923)

### [Spring Security Project](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87)

[In this section, we'll take a quick tour of the Spring Security project.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=1.823) [You can visit the project page for Spring Security by visiting projects.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=6.018) [spring.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=11.151333333333334) [io/spring-security.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=12.993666666666668) [The Spring Security project is a framework for](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=14.836) [securing Spring-based applications.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=18.345818181818185) [It handles both authentication and authorization,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=19.662) [and it covers all the standard ways of handling security,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=22.00860000000001) [as well as the ability to meet any sort of custom needs if needed,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=25.71800000000001) [and it's not only for authentication and authorization.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=29.98484615384615) [The Spring Security project also has additional features that help to](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=32.7135) [protect your application against common attacks,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=37.752200000000016) [like cross-site scripting or click jacking,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=40.54174999999999) [and you don't really have to understand what those](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=43.508) [are to understand the benefits,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=45.653749999999995) [just know that Spring Security is also used to make](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=47.138999999999996) [applications that are developed with it,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=50.989) [more secure.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=53.839000000000006) [To see a quick example of how the Spring Security project is used,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=54.789) [let's click on the Getting Started link under the Additional Resources section,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=58.611) [and this will take us to a page that lists a number of different](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=62.47221428571429) [getting starting guides for Spring Security.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=66.32242857142857) [And we'll be looking at the Hello Spring Security with Boot example,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=68.737) [which uses Spring Security along with Spring Boot.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=73.478) [Once you're one the guide page,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=76.768) [locate the table of contents and click the section](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=78.26246153846157) [Creating your Spring Security configuration.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=81.04742857142858) [This is the main part of the application that](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=83.651) [demonstrates using Spring Security,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=86.50072727272726) [and will really give us a taste of what Spring Security is like.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=87.73233333333333) [If you scroll down a bit,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=91.528) [you'll see some code that configures the security in a web application.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=93.13600000000001) [As always, the details of the code aren't important,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=97.621) [but let me explain at a high level what some of the code is doing.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=100.41475000000001) [First, there's the @EnableWebSecurity annotation,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=104.73) [and this, as the name suggests,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=107.74499999999998) [sets up the application to be able to handle secure web requests.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=110.03623076923074) [Now let's focus on the configure method.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=113.6816) [The code is configuring what paths are allowed and](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=116.49) [what paths require authorization,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=120.081) [and it's also configuring the location of the login page for the application.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=121.6551) [And if you look at the code, it's very readable.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=126.23414285714287) [You can see that any request for the path /CSS or /index,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=129.197) [are always permitted,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=135.943) [but any requests for /user path require the user to be](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=137.3546666666667) [authenticated and authorized with the role of user.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=142.1614615384616) [This is a very real example of code that you might find in an](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=145.335) [application today using Spring Security,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=148.497) [and it shows you just how easy it is to allow certain paths](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=150.30245454545454) [of a web application to always be allowed,](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=154.92499999999995) [or other parts to require security.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=157.984) [You can learn more about Spring Security by watching this Spring Security Fundamentals course, by Bryan Hansen.](https://app.pluralsight.com/course-player?clipId=46ebf0b9-6d49-4a59-85c6-0b7029606a87&startTime=161.602)

### [Summary](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7)

[We're at the end of this module, so let's take a moment to recap what we learned.](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=1.9) [This was a particularly short module where we took a quick](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=6.151) [and high-level overview of some of the most popular and](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=9.113666666666667) [widely used Spring projects.](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=13.392846153846154) [We first talked about Spring Data.](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=15.175) [We saw how it helps you to access data with little or no code required,](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=16.963428571428576) [and we also explained how it's not the same as the Data Access](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=21.69838461538461) [support that exists within the Spring Framework,](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=26.019769230769235) [and instead it extends it to provide additional support](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=28.461) [for additional types of data stores.](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=32.637) [We then talked about Spring Cloud and saw that its purpose](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=34.8100909090909) [is to help build distributed systems.](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=39.218499999999985) [We talked about how microservices are a way of](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=41.816) [implementing a distributed system and how Spring Cloud](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=44.949636363636394) [helps by providing solutions and patterns,](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=48.29379999999999) [like service discovery,](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=51.04188888888889) [to these well-known problems that exist when you build distributed systems.](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=52.51622222222223) [We finished out the module by taking a look at the Spring Security project,](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=57.712) [and we saw how it can help you to easily secure an](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=61.07407692307692) [application with authentication and authorization.](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=64.663) [And we also saw that it not only helps you to implement security, but it also helps you to secure your application against common attacks.](https://app.pluralsight.com/course-player?clipId=1f459a10-7e35-4511-b889-6bd9e3ce3bc7&startTime=68.502)

## [Is Spring a Good Fit?](https://app.pluralsight.com/course-player?clipId=32aa052d-1763-4aff-bd3d-5438f687d4d8)

### [Is Spring a Good Fit for What I'm Doing?](https://app.pluralsight.com/course-player?clipId=32aa052d-1763-4aff-bd3d-5438f687d4d8)

[Hi.](https://app.pluralsight.com/course-player?clipId=32aa052d-1763-4aff-bd3d-5438f687d4d8&startTime=0) [My name's Dustin Schultz, and in this module of Spring: The Big Picture course,](https://app.pluralsight.com/course-player?clipId=32aa052d-1763-4aff-bd3d-5438f687d4d8&startTime=0.45109090909090904) [we'll be focusing on one very important question.](https://app.pluralsight.com/course-player?clipId=32aa052d-1763-4aff-bd3d-5438f687d4d8&startTime=6.797333333333334) [Is Spring a good fit for my project, my team,](https://app.pluralsight.com/course-player?clipId=32aa052d-1763-4aff-bd3d-5438f687d4d8&startTime=10.468) [my company, etc.? And in order to answer that question,](https://app.pluralsight.com/course-player?clipId=32aa052d-1763-4aff-bd3d-5438f687d4d8&startTime=15.202615384615388) [we'll go over a number of advantages and disadvantages to using Spring.](https://app.pluralsight.com/course-player?clipId=32aa052d-1763-4aff-bd3d-5438f687d4d8&startTime=18.538307692307704) [And also, let me be absolutely clear, I'm likely biased in my opinions on Spring,](https://app.pluralsight.com/course-player?clipId=32aa052d-1763-4aff-bd3d-5438f687d4d8&startTime=23.898) [whether I want to be or not, but I'm going to try my hardest to be as unbiased as possible.](https://app.pluralsight.com/course-player?clipId=32aa052d-1763-4aff-bd3d-5438f687d4d8&startTime=28.735666666666667)

### [The Advantages of Using Spring](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840)

[Let's go ahead and start off with some of the advantages of using Spring.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=1.921) [One of the first ones is that almost everything from Spring,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=5.982) [especially the core projects, is rock solid and well engineered.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=9.394) [Spring has strict engineering practices and is backed](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=13.646) [by a company that invests time, money, and resources into the project.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=16.38636363636364) [Spring has also stood the test of time.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=21.528) [It's been around for many years, and it's continued to evolve,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=23.420923076923067) [it's not a stale project, and it's also not the next shiny or new framework,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=26.908) [it's here to stay.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=33.02157142857144) [Spring has a huge community.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=34.699) [You can be pretty sure that if you run into a problem,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=36.09614285714284) [somebody else out there has probably already ran into the same problem.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=39.5615) [And if they haven't,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=43.10115384615385) [you can be pretty sure that there's someone out there that can help.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=44.01869230769232) [Spring is very well-liked by many developers,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=48.15099999999998) [and in a recent survey from a popular](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=50.907) [developer-oriented website called Stack Overflow,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=53.96940000000002) [Spring was part of the top most loved development frameworks,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=55.878545454545446) [and Spring also made the list as one of the most widely used frameworks.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=59.56316666666666) [With Spring,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=65.451) [there's a sufficiently large talent pool and hundreds of open](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=66.07972727272727) [positions asking for engineers with Spring skills.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=69.390625) [So whether you're a hiring manager looking to fill a position,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=72.762) [or a developer looking to learn a new skill,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=76.431) [Spring is very well used in the industry.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=79.32578571428576) [As I mentioned before, Spring has been around for a long time,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=81.98307692307692) [and the other benefit of that is that there's a wealth of](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=86.05528571428572) [knowledge that already exists out there,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=89.507) [from books, to articles, to videos,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=91.83619999999999) [you can be sure that there are available resources to learn Spring.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=94.23899999999999) [Spring is still very actively developed,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=99.339) [and since it's an open-source project,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=101.20827272727271) [you can look online and see how active the project is,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=103.08933333333334) [and it's very much alive.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=106.646) [Again, since Spring has been around for so long,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=108.42715384615381) [it has a lot of built-in IDE support.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=111.71588888888888) [Many of the popular IDEs, such as IntelliJ and Eclipse,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=115.227) [already have built-in support and plugins available for Spring.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=119.227) [And just in case you're not sure what an IDE is,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=123.316) [it stands for integrated development environment,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=126.05421428571421) [and it's the development environment in which you develop](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=128.3057142857143) [the code and having support for different technologies makes](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=132.35063636363637) [it easier to develop that code.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=136.24166666666667) [Spring also scales,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=139.131) [and what I mean by that is that Spring is responsible for powering many of the](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=140.26892307692307) [large and highly-trafficked applications that exist today.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=147.1633333333334) [It's proven that it can handle load and it can scale.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=149.97763636363635) [Now this is by no means a comprehensive list of all of the advantages of Spring,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=153.61219999999994) [but it should give you a good sense of why you might want to use Spring.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=158.95064285714284) [Now that we've seen the advantages,](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=163.37269230769232) [next let's take a look at some of the disadvantages, or drawbacks.](https://app.pluralsight.com/course-player?clipId=dfa4ef3e-dfc2-4c22-b9a1-d814039a3840&startTime=164.965)

### [The Disadvantages of Using Spring](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800)

[Everything has disadvantages, and Spring is no exception.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=1.953) [Let's take a look at some of the disadvantages of using Spring.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=6.038) [One of the most common disadvantages that you'll hear about](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=9.91) [Spring is that Spring is too magical.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=12.41) [You sort of add an annotation here or there and all of a](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=14.70615384615385) [sudden you magically have a fully-working app,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=19.052916666666658) [and this can certainly be a drawback because the reason that something happened,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=21.115) [or the reason that something worked is not always intuitive.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=25.182000000000002) [Spring can also have a steep learning curve,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=29.262) [as Spring has been around for a very long time,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=31.636769230769232) [learning everything there is to learn about it can be overwhelming.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=34.77138461538462) [Spring can also increase the size of your final deliverable,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=38.599500000000006) [and in most cases this isn't an issue to be concerned with,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=42.440583333333336) [but when it matters,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=45.79) [Spring can be considered to be a bit large and a bit bloated.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=46.929999999999986) [Another common disadvantage that you'll hear about](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=50.960454545454546) [Spring is that it's hard to debug,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=53.525) [and this is true in some senses as Spring hides a lot of details and it](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=55.905466666666655) [can be hard to troubleshoot when something goes wrong.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=60.97799999999997) [You may not even know where to start, or even what went wrong.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=63.47154545454545) [Spring also add some additional memory overhead to applications,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=67.42063636363633) [meaning that it takes more memory to run.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=71.03672727272729) [And in some cases, it's really quite minor,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=74.268) [and in other case, it's more pronounced.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=76.97146666666671) [And I should note though that this will be true of any framework.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=79.337) [The complexity of Spring has grown over time.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=83.575) [It started out as a way to reduce complexity,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=86.457) [and it largely accomplishes that, but over time Spring has become complex itself,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=89.32875000000004) [and in many ways this is why the Spring Boot project was born.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=95.471) [Spring is sort of configurable to a fault,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=100.451) [and this one falls in line with the complexity that we just talked about.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=102.83442857142856) [In Spring there's many knobs and dials you can turn,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=107.131) [and it's very configurable, and with this comes that additional added complexity.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=110.19869230769234) [Spring is big, and by that I mean it's not a small framework,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=116.204) [and it's not usually a good solution for problems where you](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=120.494) [need to write code to give you a quick result.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=123.53592307692311) [Spring was meant to build long-running applications that solve complex problems.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=126.31176923076924) [Some of the community projects from Spring can sort of be hit or miss.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=132.45) [Sometimes they're really great and sometimes they just fall short on features.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=136.643) [And just like I mentioned when we were talking about the advantages,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=141.601) [this is by no means a comprehensive list of all of the disadvantages of Spring,](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=144.492) [but it should give you a good idea of what are some of the drawbacks, or disadvantages.](https://app.pluralsight.com/course-player?clipId=c295fbb3-8124-45d0-9d57-f03bf96b5800&startTime=150.03575)

### [Making the Decision](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b)

[So now that we've see the advantages and disadvantages of using Spring,](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=1.885) [we're back to our original question, is Spring a good fit for my project,](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=6.00723076923077) [my team, my company, etc.? Well, unfortunately,](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=11.443999999999999) [I'm not going to directly answer that question for you](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=15.049) [because every scenario is different, and no matter how I answer it,](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=18.423166666666667) [I'll probably be wrong.](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=22.756666666666668) [And likewise,](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=24.482) [coming to that conclusion on your own will be much](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=25.143538461538462) [more meaningful and thoughtful.](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=28.451230769230776) [When it's your decision and someone asks you why you chose](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=29.9712) [Spring for your project or your team or company,](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=34.21492307692309) [you'll be in a great position to be able to back it up](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=37.52) [with well thought-out reasoning.](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=40.532533333333305) [I will say consider the pros and cons against your situation,](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=43.268) [as pros may not always be pros in different situations,](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=47.458) [and the same goes for cons.](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=50.77184615384614) [I would love to hear your comments in the discussion section](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=52.620769230769234) [on what conclusion you came to and why, or why you're considering using Spring. I try my best to read and reply to all of the comments.](https://app.pluralsight.com/course-player?clipId=81b5594a-2e16-4771-9154-1313d938092b&startTime=55.832499999999996)

### [Summary](https://app.pluralsight.com/course-player?clipId=dcbaddbc-6c80-4862-af6b-f57df4a8ef5b)

[In this module, we looked at answering the question, is Spring a good fit?](https://app.pluralsight.com/course-player?clipId=dcbaddbc-6c80-4862-af6b-f57df4a8ef5b&startTime=1.85) [And we talked about the advantages of Spring,](https://app.pluralsight.com/course-player?clipId=dcbaddbc-6c80-4862-af6b-f57df4a8ef5b&startTime=6.267) [like how most Spring projects are very stable and well engineered,](https://app.pluralsight.com/course-player?clipId=dcbaddbc-6c80-4862-af6b-f57df4a8ef5b&startTime=8.629) [or how Spring has been around for a long time,](https://app.pluralsight.com/course-player?clipId=dcbaddbc-6c80-4862-af6b-f57df4a8ef5b&startTime=12.181249999999995) [and it's easy to find learning resources on.](https://app.pluralsight.com/course-player?clipId=dcbaddbc-6c80-4862-af6b-f57df4a8ef5b&startTime=15.67) [And we also discussed the disadvantages of using Spring,](https://app.pluralsight.com/course-player?clipId=dcbaddbc-6c80-4862-af6b-f57df4a8ef5b&startTime=18.542) [like how it's hard to debug, or how sometimes it can be too magical,](https://app.pluralsight.com/course-player?clipId=dcbaddbc-6c80-4862-af6b-f57df4a8ef5b&startTime=21.488750000000014) [and it's not always intuitive why something worked or why something happened.](https://app.pluralsight.com/course-player?clipId=dcbaddbc-6c80-4862-af6b-f57df4a8ef5b&startTime=26.313142857142847) [And we finished out the module by discussing that there](https://app.pluralsight.com/course-player?clipId=dcbaddbc-6c80-4862-af6b-f57df4a8ef5b&startTime=31.313) [really isn't a clear-cut answer to our question and that](https://app.pluralsight.com/course-player?clipId=dcbaddbc-6c80-4862-af6b-f57df4a8ef5b&startTime=34.19383333333333) [every situation is different.](https://app.pluralsight.com/course-player?clipId=dcbaddbc-6c80-4862-af6b-f57df4a8ef5b&startTime=38.00866666666669) [We saw that we really have to weigh the pros and cons of our](https://app.pluralsight.com/course-player?clipId=dcbaddbc-6c80-4862-af6b-f57df4a8ef5b&startTime=39.628) [scenario because not every pro is a pro and not every con is a con depending on the situation.](https://app.pluralsight.com/course-player?clipId=dcbaddbc-6c80-4862-af6b-f57df4a8ef5b&startTime=42.68186666666668)