

On the Radar: Spring Boot simplifies end-to-end development

Publication Date: 01 Aug 2016 | Product code: IT0022-000753

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Summary

Catalyst

The complexity of application development has exploded in recent years, yet the demands on developers to increase the velocity of delivery continue to build. There are continual challenges with handling mixed environments including cloud development, IoT, microservices architectures, and containerization as well as multiple application types including REST API, enterprise integration patterns, and a host of different back-end data stores and services (messaging and batch, synchronous and asynchronous). Switching between these workloads creates interdependencies and complexities that are often very challenging for enterprise developers. Against this background, some Java developers have adopted the Spring framework as an alternative to Java EE, and within this community, Pivotal's Spring Boot is growing in popularity. It offers developers accelerated productivity by providing a curated set of dependencies, and auto-configuring their development and runtime environments to mask the complexity of modern environments.

Key messages

- Dramatically improved developer velocity is offered through Spring Boot's simplified, curated application configurations (boilerplate configuration patterns).
- It is ideal for applications following the 12 factor (see 12factor.net) design principles, such as embedded servers and other software as a service, with self-contained dependencies using pre-defined "starter" configurations.
- Spring Boot is part of a movement in software development toward higher productivity and reduced "plumbing" workloads. It is suitable for beginners in Spring and can also accelerate projects for experienced Spring developers.
- Future releases will support Reactive Applications, HTTP/2, and Java 9, which is currently pre-GA (roadmap: Spring Boot 2.0)

Ovum view

Spring Boot is an open source toolset and platform designed to get Java developers up and running as quickly as possible, building complex microservices style applications with minimal upfront configuration. It is supported on Pivotal Cloud Foundry and aims to support developers whether they are part of a large organization along the path to microservices adoption, or a small team developing cloud-native, departmental apps. Because Pivotal curates and enhances the configurations in support of multiple and emerging mixed technologies, developers will never be left without a future path and can easily change supporting tools without major learning curves and wasted effort. Spring Boot is a valuable aid to helping organizations accelerate their digital transformation and competitive advantage by increasing development velocity. For Java developers already working with the Spring Framework, Spring Boot is a natural accelerator, and for Java developers who are not using Spring, Spring Boot provides an easy entry point into this cloud technology.

Recommendations for enterprises

Why put Pivotal's Spring Boot on your radar?

Pivotal provides an end-to-end development solution from desktop to PaaS. Spring Boot works in association with Spring Cloud Service Suite and Pivotal Cloud Foundry and is used widely across many industries. Regardless of organizational size and the complexity of mixed technologies used to deliver Java applications, Spring Boot is worth reviewing because it will make developers' lives easier as well as increasing development velocity and reducing testing and maintenance issues.

Highlights

Spring Boot provides auto-configuration of dependencies to simplify the development environment for Java programmers. It also provides a wide range of out-of-the-box non-functional features, such as embedded servers, security, metrics, health checks, and externalized configuration. The aim is to ensure that developers can not only build applications quickly but also operate them.

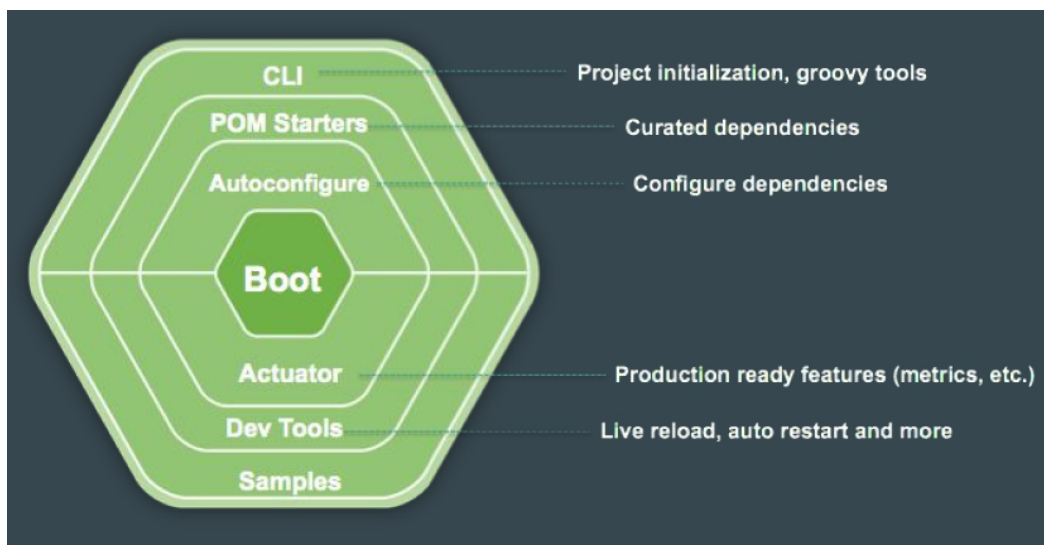
Pivotal also develops implementations for proven distributed system patterns as part of its Spring Cloud to simplify implementation setup and ensure best practice. Spring Boot automatically configures these distributed system patterns when Spring Cloud modules are detected.

Pivotal extends this support by providing Spring Cloud Service Suite in Pivotal Cloud Foundry. Spring Cloud Service Suite adds enterprise-grade features, such as security, and high-availability features for Spring Cloud. Spring Boot applications that run in Pivotal Cloud Foundry bind to services such as Centralized Configuration, Circuit Breaker, and Service Discovery. This approach covers the end-to-end "plumbing" that enables developers to focus on the application's business logic.

Architecture

Pivotal offers a range of Spring projects, including Spring IO, a platform for harmonizing APIs through a bill-of-materials approach, and Spring Framework, the foundation for building modern web applications. Spring Boot takes the process a step further by pulling together components from the Spring portfolio to help kick-start projects, supporting standard patterns such as circuit breakers for microservices architecture. For cloud applications, it configures Spring IO platform and Spring Cloud in an accessible way, all within a self-contained environment, including a lightweight application server. Twelve-factor design is a popular "recipe" for building modern web and cloud applications, and Spring Boot is designed to support its guidelines.

Figure 1: The key features of Spring Boot



Source: Pivotal

- **Auto-configuration:** The Spring Boot auto-configuration feature removes the boilerplate configuration code by automatically configuring dependencies into a running application based on classpath detection.
- **Starters:** Spring Boot provides a set of curated dependencies called POM Starters. Spring Boot understands how to configure these dependencies and also allows organizations to extend Spring Boot to configure custom dependencies. Starters enable developers to build modern cloud-native REST, WebSocket, Messaging, Reactive, Data, Integration, and Batch applications through a consistent development and configuration interface.
- **Actuator:** Actuator provides production-ready features such as health checks and metrics. These are exposed via REST endpoints within a Spring Boot application.
- **Dev Tools.** The tools are designed to shorten the development and testing cycles, and include an embedded LiveReload server to trigger a browser refresh when a resource is changed.

The tools also provide an automatic application restart feature that is triggered whenever files on the classpath change. The restart technology uses two classloaders. Classes that don't change (for example, those from third-party jars) are loaded into a base classloader. Classes that are under development are loaded into a restart classloader. When the application is restarted, the restart classloader is discarded and a new one is created. This approach means that application restarts are typically much faster than "cold starts" because the base classloader is already available and populated.

Background

Pivotal is a software and services company based in Palo Alto, California. It was established in 2012 as an offshoot from EMC and VMWare. Pivotal offerings include Pivotal Labs, Pivotal Cloud Foundry, Pivotal Big Data Suite, and Pivotal Data Science.

Funding originally came from EMC, VMWare, and GE. The company recently announced a series C round led by Ford and Microsoft as well as EMC and VMWare.

In 2014 Pivotal offered Cloud Foundry (the open source technology it developed that also functions as the core of its flagship product Pivotal Cloud Foundry) to The Linux Foundation to provide wider support.

Current position

The Spring Boot section of Pivotal currently has something over 60 staff and associates mainly in the US and Europe.

Because it is an open source project/technology there is no formal distribution channel, with many ISVs building products on it but not necessarily partnering with Pivotal to do so.

There are informal technology relationships with JUnit, JetBrains, Eclipse Foundation, Apache Software Foundation, and others.

Pivotal offers a range of open source project with commercial offerings. Spring Cloud Service Suite is a premium product that makes client-side and middleware components turnkey on Spring Cloud.

Spring Boot 1.4 was released in July 2016 and Pivotal Labs says it has already found significant take-up within large enterprises. The open source project has more than 281 people submitting code, and 8,500 commits to the project, and Pivotal is committed to moving it forward as part of its innovation activities on the Java platform.

Futures

Spring Boot 2.0 will focus on reactive applications support for asynchronous, non-blocking systems. Reactive programming is rising in popularity and is a programming approach based on asynchronous streams. Spring Boot 2.0 will continue to support non-reactive workloads because not every business workload can benefit from a reactive-based application approach. Pivotal believes that the choice of reactive and servlet-based (non-reactive) approaches will be unique in the industry, allowing developers to have further technology reach from the same technology stack. The Spring Boot 2.0 release is planned for the first quarter 2017 and will also include Jigsaw support and a new HTTP client and general support for HTTP/2.

Data sheet

Key facts

Table 1: Data sheet: Pivotal Spring Boot

Product name	Spring Boot	Product classification	Software development
Version number	1.4	Release date	July 2016
Industries covered	All	Number of employees	60 Pivotal employees contribute to Spring Boot
Relevant company sizes	All	Licensing options	Open source software
URL	http://pivotal.io/	Routes to market	download
Company headquarters	Palo Alto, CA, US		

Source: Pivotal Labs

Appendix

On the Radar

On the Radar is a series of research notes about vendors bringing innovative ideas, products, or business models to their markets. Although On the Radar vendors may not be ready for prime time, they bear watching for their potential impact on markets and could be suitable for certain enterprise and public sector IT organizations.

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