Research document

What is the most suitable java backend framework for my project?

**Introduction:**

When it comes to developing a web application or a software system, selecting the right backend framework is a crucial decision that can impact the success of the project. In the case of Java development, there are several backend frameworks available, each with its own strengths and weaknesses. This research document aims to help with choosing the most suitable Java backend framework for the project EazyWheelz. It will be built using the microservice architecture.

I am going to take a look at :

* Spring Boot
* Play framework
* Micronaut

**1.How do different Java backend frameworks compare in terms of**

**features?**

1. **Spring Boot** makes it easy to create stand-alone, production-grade Spring based Applications that you can "just run". Most Spring Boot applications need minimal Spring configuration.

Using Spring Boot, our application will use Tomcat by default. However, we can configure Spring Boot to use either Jetty or Undertow as well. Spring also offers a Dependency Injection library which makes the development process easier and faster. I have to mention that spring is currently the most used framework.

1. **Play**  is a direct competitor to Spring framework and designed to develop and deploy web applications more efficiently and also provides a better MVC framework. In terms of getting a web application up and running quickly, play is the best.
2. **Micronaut** is a JVM-based, full-stack microservices platform that helps you build modular, easily testable microservice applications. Micronaut’s features include fast startup time, low memory footprint, and support for distributed tracing and Graal VM native images. Micronaut is developed by the creators of the popular Java framework Spring Boot and offers many of the same features as Spring Boot. However, Micronaut is designed specifically for microservices, so it offers a few key advantages over Spring Boot.

Methods used:

* Community research : I went over some blogs and saw the opinion of other specialists.
* Literature study : I had to research the frameworks in order to understand their features and if they will be beneficial for my project.

**2. What is the team’s level of experience with Java backend**

**Frameworks?**

The team has no prior experience with any of the mentioned frameworks.

There should be a balance between complexity and functionality of the framework for this project( it should be scalable and suitable for microservice development but also the time spent learning it should be minimised).

**Spring Boot** helps create apps that aren't tied to a specific platform and that can run locally on a device without an internet connection or other installed services to be functional. Embedded servers—Spring Boot allows you to embed servers such as Tomcat, Jetty, or Undertow directly. Also it has a huge community support due to it’s popularity.

**Play framework -**  Play is simpler compared to Spring but idiomatic Play code also requires developers to learn reactive programming, something probably won’t do in Spring. The Play framework is also OK to use with Java, But Spring is even better.On other hand play framework forces Scala idioms onto java. That’s not really feasible. As a result of that, developers ended up with unreadable code blocks of horrible Java-Scala-abominations. Not only that, lot of Features just seem to be very Scala centric and the Java support is sub-par.

**Micronaut** is a relatively new framework that is designed specifically for building microservices. It is lightweight and fast and has some unique features that make it well-suited for this type of architecture.

Methods used:

* Community research : I went over some blogs and saw the opinion of other specialists.
* SWOT analysis : I researched the strengths and the weaknesses of each framework to see which one is the most suitable

Used methods:

Community research : I had to go around and read from forums and websites where people who use the frameworks that I am researching and I can get a better idea of what functionalities each has.

SWOT analysis – I had to know what each framework can do best, where it lacked and in what. I did this in order to figure out which was the best for my project.

**3. What are the most common use cases for each Java backend framework, and how do these align with the needs of the project?**

1. **Spring Boot** - Suited for a wide range of applications, including web applications, microservices, and enterprise applications.
2. **Play Framework** - Ideal for real-time applications that require low latency, such as chat applications and online gaming.
3. **Micronaut** - Ideal for developing serverless applications and microservices, as well as high-performance web applications.

Used methods:

Community research : I had to go around and read from forums and websites to see the usage of those frameworks in different projects.

**Conclusion:**

For this project the framework I chose is **Spring Boot**. It provides a lot of functionality, it is suitable for microservice applications and it is beginner friendly due to its big community.

**References:**

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