

# Exploring the Transition Practices of Java Back-end Frameworks: A Survey

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## Abstract

Java has been a widely used programming language for a long time in various fields. Java and its libraries have been frequently updated for various reasons including bugs, change requests, performance and usability requirements and so on. Over the years, there have been many frameworks of Java that has been used millions of developers all around the world. Through the long time that Java has been around, developers have switched from one framework to another. Although a number of frameworks exists, no study has qualitatively explored the motivation, challenges and practises of adaptation and transition to newer frameworks from the developers' perspectives. The primary objective of this study is to understand and exploring the adaptation and transition practises in Java frameworks. On this goal we prepared a survey and sent the survey to java developers working in numerous sectors in our country. We got 51 responses from this survey. The results shed light on motivation behind developer's switching from one frameworks to another in depth.

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## Keywords

Java, Framework, Transition, Back-end Framework

## Introduction

Java is an object-oriented, free, open-source and platform-independent programming language. Java also has rich open source libraries, community support and documentation support. The first version of Java, called Java 1, was released on 23 January 1996. From that day it has been used to develop desktop and mobile applications. It has been used in embedded applications, web applications, enterprise applications, scientific applications, financial services applications, and so on. Within this period some needs, platforms, standards, and designs have changed, so Java and its libraries has been updated in compliance with these requirements. Since inception in 1996, Java standards, platforms, frameworks, and designs have changed as a result of usability requirement. Over the years, there has been more than hundred java based frameworks. Some popular Java frameworks of last 10 years includes Spring Boot, Spring MVC, Struts, Grails, etc. These frameworks have been used broadly by developers around the world. With new features and standards, developers widely transition from one framework to another.

In this study we focus on the transition practices of Java back-end frameworks. To do this, we prepared a preliminary survey and refined it by conversing with 2 Java back-end developers. Then we forwarded our finalized survey to various java developers working in our country. We targeted both software employees and freelancer to analyze their viewpoint. Our work examines five main research questions.

- 1) What are the motivating factor(s) behind switching from the past framework(s)?
- 2) What are the motivating factor(s) for switching to the current framework?
- 3) What are the motivating factors behind a possible plan of switching from the current framework?
- 4) Differences perceived between past and current framework.
- 5) Challenges faced while shifting from past to current framework.

## Research Methodology

Since the five research questions of this study are designed for understanding the transition practices of java back-end frameworks, we selected survey as our research instrument. The remainder of this section describes the survey design, the participant selection criteria, pilot testing, data collection, and data analysis.

### Survey

Our goal in designing the survey was to keep it as precise and short as possible. Our survey included questions to understand Java developer's reasons for shifting from one framework and reasons to shift to one framework, and challenges faced while switching, and to compare several technical features among previous and current framework. Table 1 lists each survey question included in this

paper. Other than our research questions we also included few demographic questions.

**Table 1. Survey Questions**

Sl.	Question	Answer Choices
Q1	Select your age group.	Age range groups starting from 18 years old
Q2	Select your gender.	Male, Female, Others
Q3	Select your employment nature.	Employment under a company, Freelancer, Both, None, Others
Q4	Select your development experience.	Range of years of work experience
Q5	How many employees does your company have?	Range of no. of employees
Q6	Please select Java backend framework(s) you worked with in the past.	A list of Java back-end frameworks
Q7	Please select Java backend framework(s) you are using currently.	A list of Java back-end frameworks
Q8	Please select Java backend framework(s) you are using currently.	A list of Java back-end frameworks
Q9	Factor(s) behind switching from the past framework(s)?	A list of reasons along with user provided input
Q10	Factor(s) behind switching to the current framework(s)?	A list of reasons along with user provided input
Q11	Is there any plan to switch from the current framework?	Yes, No
Q12	If the answer is yes, then what are the reason(s) for switching?	User text input
Q13	Is the answer is no, then what are the reason(s) for not switching?	User text input
Q14	What are the differences that were perceived between past and current framework?	A list of reasons along with user provided input
Q15	What are the challenges faced while shifting from past to current framework?	A list of reasons along with user provided input

## Participant Selection

To ensure valid results, we surveyed various sort of Java back-end developers. We included freelancers, employees under govt and private organization, etc. The experience of the developers also had a wide range starting from freshers to senior developer.

### Pilot Survey

First we prepared a pilot survey of preliminary questions. with this survey we went to 2 Java developers: one mid level and one senior level, to review the survey to ensure the questions were clear and complete. From their feedback closed end questions options were finalized.

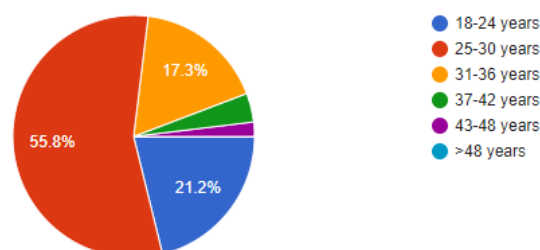
### Data Collection

We forwarded our finalized survey question to various types of groups of developers. One of the way was to contact employees of prominent private software companies. We also shared our survey in public Java based social networking groups for an wide range of participants. We were able to get 52 responses of our survey.

## Results and Discussion

### Demography

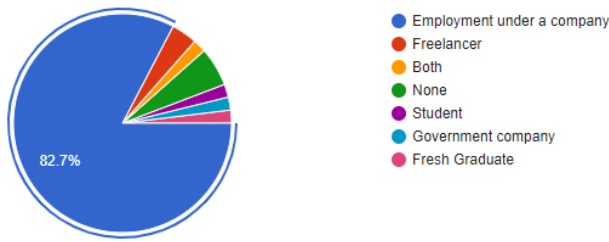
We analyzed various demographic analysis.



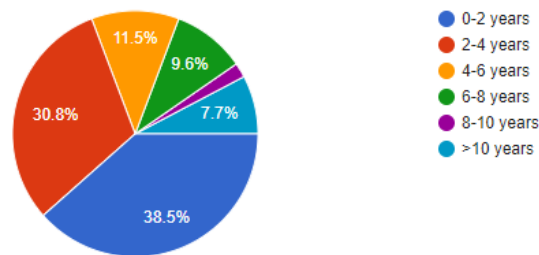
**Figure 1. Age group of participants**

### Previous and Current Work Experience with Java Frameworks

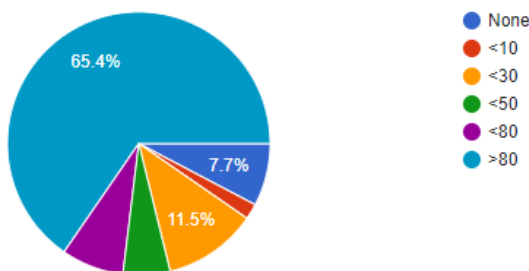
We asked the developers about the Java back-end frameworks they previously worked on and currently working



**Figure 2.** Employment nature

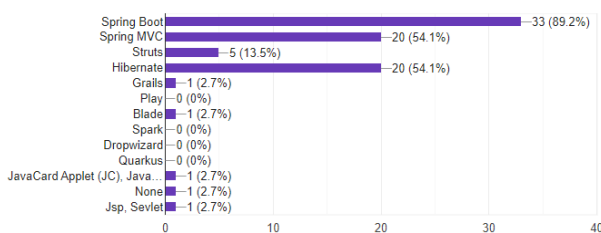


**Figure 3.** Experience

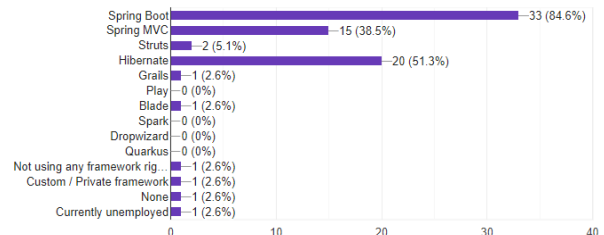


**Figure 4.** No of employee in company

with. Figure 5 shows the frameworks developers previously worked with. Figure 6 shows the list of frameworks developers are currently working with.



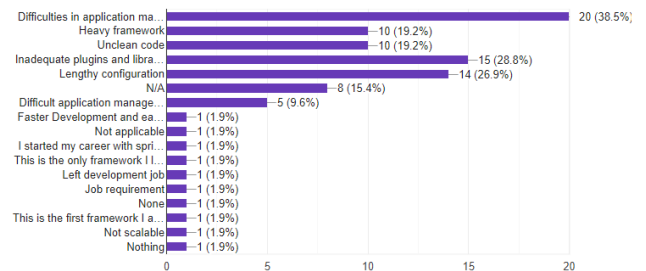
**Figure 5.** Previously worked on Frameworks



**Figure 6.** Current Frameworks

### Analyzing Factor(s) Behind Switching from the Past Framework(s)

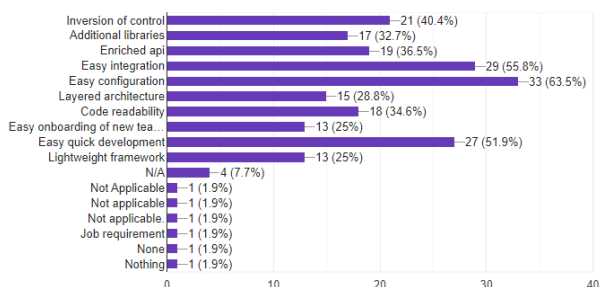
Various factors came in light as the reason behind switching from a Java back-end framework. 20 percent of the participants thinks that difficulties in application management is the main reason for the switch. Second prominent reason is insufficient library facilities. Figure 7 enlists factor(s) behind switching from the past framework(s).



**Figure 7.** Factor(s) behind switching from the past framework(s)

### Analyzing Factor(s) Behind Switching to the Current Framework(s)

We found many factors for switching to a current framework. Figure 8 enlists factor(s) behind switching to the current framework(s).



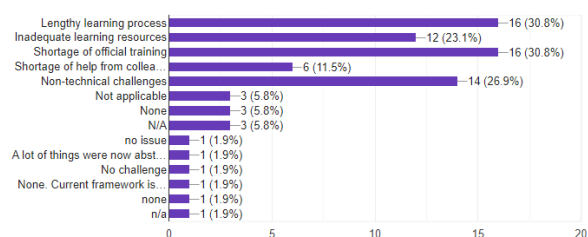
**Figure 8.** Factor(s) behind switching to the current framework(s)

## Analyzing Plan to Switch from the Current Framework

Almost 83 percent of the participant said that they do not wish to switch from the current framework. The main reason is that the current framework is easy to maintain and develop. Also easy learning and business requirement play key factor here.

## Challenges faced while shifting from past to current framework

Figure 9 enlists the challenges developers faced while shifting from past to current framework.



**Figure 9.** Challenges faced while shifting from past to current framework

## Conclusions

From our study we got an understanding of the transition of Java back-end frameworks. In our future work we plan to include qualitative analysis for better results. We also plan to increase our survey participants.