Analysis and Performance Issue of Java and Its Framework and Impacts on Web Application

Preprint · February 2019

DOI: 10.13140/RG.2.2.11281.48489

1 author:

Amir Ansari
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Name: Amir Ansari
Software Engineer
Email: amiransari.my@gmail.com

Abstract

Java is Object oriented programming language which is more popular among the developers and there can be developed small or big standalone, web or Mobile applications based on choosing java technology. For example, to build standalone or mobile application programmer used the concepts of core java like Applet, Multithreading, Polymorphism etc. but for web application some additional technologies will also be required like Servlet, JSP etc. To develop a web application using servlet, JSP and core java methods takes more time and money and if there is any modification required in application in future there will be needed to change many lines of code and some new issue occurred. To overcome these problems many big software companies developing new tools and framework which can reduce the programmer' work and cost of the project. There are already few popular java frameworks available using this any application can be developed in less time without wasting huge amount on it. The framework like Spring, Hibernate, Spring Boot, Struts and EJB etc. and each framework has many modules which can be used based on project requirements. The study and analysis will be required before using these frameworks.

Keywords

Object Oriented, Java, Servlet, JSP, Spring, Hibernate, Spring Boot, Struts and EJB framework, Restful etc.

Table of Contents

CHAPTER 1 INTRODUCTION 4

CHAPTER 2 LITERATURE REVIEW.....5

1.1 Study and Analysis about the Framework……6

1.2 Comparison between Frameworks……6

1.3 Fast and Reliable……6

1.4 Secure……6

CHAPTER 3 RESEARCH OBJECTIVES AND APPROACH 6

CHAPTER 4 CURRENT WORK AND PRELIMINARY RESULTS 7

CHAPTER 5 WORK PLAN AND IMPLICATIONS 7

CHAPTER 6 CONCLUSIONS……7

REFERENCES……7

CHAPTER 1

INTRODUCTION

The object- oriented programming methodology is based on Objects which may contain data, field or attributes. The main concepts of the object- oriented design a program using class and objects. There is also similar methodology which is called pure object-oriented programming, but few features are different. There are seven conditions should be true for pure object-oriented programming below:

1. Inheritance
2. Encapsulation/Data Hiding
3. Polymorphism
4. Abstraction
5. All predefined types are objects
6. All operations are performed by sending messages to objects
7. All user defined types are objects

The Java does not support #5 condition, so Java is an object- oriented programming language not pure object-oriented programming. There are many technologies and framework which used object-oriented concepts and build a powerful web or Mobile Application.

- **Java**: Java is high level, robust, object-oriented and secure programming language or a platform. It is platform independent so can be run any hardware or software environment.
- **Servlet**: The Servlet technology is also based on Java and this one used to create a web application and run on the server. There are many advantages and disadvantages to use this technology.
- **JSP**: This is also same technology Servlet to create web application, but it provides more functionality such as expression language, JSTL, etc.

The combination of above three technologies were used to create any standalone or web applications but it took more time and cost because previously there are not so many tools available like today. Now there are many advance framework and technologies available which can overcome issues and research continue. There are some powerful frameworks which will discuss below, and it is widely used.

1. **Spring Framework:** This is a Java technology latest framework which is lightweight, and it provides support to its previous framework such as Struts, Hibernate, Tapestry, EJB, JSF etc. The Spring framework has several modules such as IOC, AOP, DAO, Context, ORM, WEB MVC etc.

2. **Hibernate Framework:** This is also another more powerful framework which has solved many problems which occurred establishing java connection with database. It is an open source, lightweight, ORM (Object Relational Mapping) tool.

3. **Spring Boot:** The Spring provides basic and advance concepts of the Spring Framework. This tool used convention over configuration so there is no need XML configuration like Spring framework. It is mostly used standalone spring-based application and to create restful webservices.

4. **Struts Framework:** The Struts2 is used to develop MVC (Model View Controller) based fast and feasible web application. Struts 2 is the combination of webwork framework of open symphony and struts 1.
5. **EJB (Enterprise Java Bean):** It is to create to scalable, robust and secured enterprise applications in java. Unlike RMI, middleware services such as security, transaction management etc.

CHAPTER 2
LITERATURE REVIEW

The framework is tool which makes people's work easy because there many inbuilt functions available in form of jars and once jars are included the extra work will not be required for developers. The Software can be developed in many ways but the there are some characteristics about the software development like how fast and feasible in each platform. (Yongchang Ren, 2011) stated that there is always a huge problem for software development process and sometime Software quality is unreliable, and maintenance is also poor and during software testing need to spend a lot money and time. So, framework is better option to reduce the risk and save the time and money. According to (Jingjun Zhang, 2011) that most of the Java Web systems have adopted several open-source frameworks and it helps in many ways such as clarify the program logic and program structure and reduce the development intensity of programmers and it always conflict if you use OSGi.

(Edwin, 2014) explain that Software Frameworks, Architectural and Design Patterns has reduced the time and cost of the development and improved the quality, reliability and reduced the complexity in process management, There are several java frameworks available which can be used based on the requirements of the project and spring is one of them.(Singh, 2015) stated that Spring provides Aspect Oriented programming and solve the separation of concerns at a much bigger level and also allow programmer to add the features like transactions, security etc. (Ankur Bawiskar, 2012) also explained about the Spring framework that "Spring is a powerful framework for building enterprise applications, and it can be easily integrated with struts and hibernate frameworks due to lightweight feature.

(Praveen Gupta, Spring Web MVC Framework for rapid open source J2EE application development: a case study, 2010) stated that there is a huge demand of the framework in software industry and so every day we get a new and advance framework. Spring is a good framework compare to other frameworks due to its characteristics and Spring Boot is extended version of Spring Framework.
Framework can be used various ways and different fields such as E-commerce application, (Neha Munsi, 2014) said that Spring and Hibernate frameworks can be combined to make an efficient E-commerce application the struts framework with an efficient MVC can help in developing the presentation tier spring can handle business logic and hibernate will take care database respectively. In fuzzy operations frameworks can also be used stated by (Silvia Maria Fonseca Silveira Massruhá) and explain that in this operation persistency layer involves so open source such as Spring, Struts, hibernate were very important because they brought flexibility for the future updates.

There are many works already done in different frame work such as PHP based MVC design model which is proposed Wei Cui and explain that might be an effective separation of data access, logic processing process control, and display and improved the software quality. (Iqbal H. Sarker, 2014).
There are many other theories also available which tell the develop an application in one platform and use it another one of them is given by (Saxena, 2015), stated that how enterprise application which is based on Struts, Spring and Hibernate Custom Validation can be incorporated with the .NET and PHP framework. There is always one question occurred when use framework which will be best to develop an application, single or Multiple framework (Praveen Gupta, 2010) stated that Multiple framework architecture works better as compare to any single framework architecture because the development of the large scale applications can improve the performance of the Large Database application in terms handling number of requests.

1.1 Study and Analysis about the Framework: There are many theories available which explain about the frameworks and its advantageous and disadvantageous so it is necessary to study and do some analysis before working on any project using framework some time choosing wrong framework it can affect many problems in future.

1.2 Comparison between Frameworks: There are several frameworks available and they are good in their domain and choosing a correct framework is also a big task. There are many differences based on framework such as the difference between Spring and Hibernate is, Spring is good to develop enterprise application and hibernate can be used to establish connection using JDBC. The spring can be combining any framework like Hibernate, Struts etc. Spring can combine Hibernate, Struts or any other framework because of its light weight.

1.3 Fast and Reliable: Multiframework is a best option in comparison to Single framework so developers can used multiframework and inherit the property from individual framework to build fast and reliable enterprise application and if there are any changes will be required in future it will take less time to modify the code.

1.4 Secure: This type of framework is more secure because it inherits the property of Java which is also more secure language and platform independent.

CHAPTER 3
RESEARCH OBJECTIVES AND APPROACH

The objective of this paper is to study and analyze the individual Java framework such as Spring, Hibernate, structs etc. and find the advantageous and disadvantageous from each one and how it affect the individual application to choosing wrong framework and also the way to selecting single and multi-frameworks.

CHAPTER 4

CURRENT WORK AND PRELIMINARY RESULTS

I have already studied many frameworks such Spring, Hibernate, Spring Boot framework etc. I have developed some enterprise web application using multi framework. The application is very fast in comparison to simple J2EE application and can do any changes quickly without affecting other classes. I tried to use three technologies together Spring, Hibernate and Spring boot to develop school management application.

CHAPTER 5

WORK PLAN AND IMPLICATIONS

The plan of this paper is to develop some web application using single and multi-framework concepts and do some analyses that how it is different with simple J2EE application and which framework is good for a project and try to make faster or improve the framework. This paper' work is totally based on study and improvement of the framework and how can do some changes if needed.

CHAPTER 6

CONCLUSIONS

To Sum up, the overall idea about this paper is based on java framework' analysis and how it playing and essential role in developers 'life and the way to choose best framework to work with single or multi framework in same application and do some research in framework because they are open source and can do some modification if needed.

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