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Research of Web Frameworks based on Recent Industry Trends

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ABSTRACT: Industries in earlier days used to make their product using Struts framework which was considered best framework of that time. But as the time evolves and the technology become more advanced need for more advanced framework arises which could be more secure and stable and also struts 1.x framework become obsolete. Newer Web frameworks came into the market which causes problems to industries to decide web framework to choose. Choosing a right web framework is of utmost importance for the business of the company. So we are doing comparison between different web framework and proposing which framework is better with respect to UI, security, stability and many other aspects.

KEYWORDS: User Experience, Web Services, Web Frameworks.

I. INTRODUCTION

User Experience (UX) has become the major reason for rejecting a system during end user tests or after going live. Users have high expectations, based on the frequent use of social media applications, and expect the same standard for their own business systems. Users expect an easy to use interface, fast interface response time, usage on a variety of different devices, easy login and offline availability. To be able to meet these expectations, software developers require short development cycles and full test coverage to support agile development cycles, seamless support for multiple platforms and devices, secure transactions and easy decoupling from backend systems. And during operations, systems managers, need to be prepared for the unpredictable timing and growth of the visitors of business applications. In some cases, the system and hosting platforms need to be able to support a burst in demand or the exponential growth of the user community without drastic changes to the application architecture. This also requires a productive development environment with massive scalability for both the number of developers and eventually the number of concurrent end users. Frameworks with an intrinsic agile capability to modify and expand the functionality with a very short time to market.

MVC framework is a well renowned framework and is used extensively in the industry currently. MVC emphasizes on splitting up the development into model, view and controllers where the model embodies the business logic, the view handles the user interface and the controller manages the co-ordination between model and view.

In this paper we have mainly analysed and discussed three web frameworks which are currently being used by the software companies for their business requirements. While comparing the frameworks we have analysed the issues or factors that matter the most for any framework to be successful and user friendly. The three frameworks which we have analysed are Spring, Struts, Rest plus angular framework.

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II. RELATED WORK

STRUTS :-

The Struts framework is an open-source framework for creating well-structured web based applications. The struts framework is based on the Model View Controller (MVC) paradigm which separate out all the three layers - Model (data of the application), View (presentation) and Controller (controlling the application flow). This makes struts different from conventional JSP applications as sometimes logic, flow and UI are mixed in a Java Server Page.

The struts framework is a complete web framework as it provides complete web form components, validators, error handling, internationalization and more. Struts framework provides its own Controller component. It integrates with other technologies for both Model and View components. Struts can integrate well with Java Server Pages (JSP), Java Server Faces (JSF), JSTL, Velocity templates and many other presentation technologies for View. For Model, Struts works great with data access technologies like JDBC, Hibernate, EJB and many more.

How Struts Work:-

When the framework's controller receives a request, it uses the configuration file, struts -config.xml to find out the correct routing information. Based on the information configured in the configuration file, it internally invokes an Action class. The Action class interacts with the Model (also called the business layer) to access or update the underlying data in database/ file. The framework includes ActionForm classes to transfer data between Model and View.

SPRING MVC :-

Spring Framework is an open source application framework and Inversion of Control container for the Java platform. The core features of the Spring Framework can be used by any Java application, but there are extensions for building web applications on top of the Java EE platform. Although the Spring Framework does not impose any specific programming model, it has become popular in the Java community as an alternative to, replacement for, or even addition to the Enterprise JavaBean (EJB) model.

Working of Spring MVC: -

1. First request will be received by DispatcherServlet.
2. DispatcherServlet will take the help of HandlerMapping and get to know the Controller class name associated with the given request.
3. So request transfer to the Controller, and then controller will process the request by executing appropriate methods and returns ModelAndView object (contains Model data and View name) back to the DispatcherServlet.
4. Now DispatcherServlet send the model object to the ViewResolver to get the actual view page.
5. Finally DispatcherServlet will pass the Model object to the View page to display the result.

Benefits of Spring MVC over Struts:-

1. Spring MVC provides business objects instead of form beans.
2. Spring MVC Supports built in validation and error handling very well, thereby reduces the job of the developer.

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3. Flexible mapping to controllers (not just to URL patterns).
4. It allows you to build application on top of spring letting you use one framework/configuration scheme in all tiers.
5. It is easy to use Aspect Oriented Programming (AOP) and other spring features in web tier.
6. It is Compatible with newer technologies and tools.

RESTFUL SERVICES :-

RESTful web services are built to work best on the Web. Representational State Transfer (REST) is an architectural style that specifies constraints, such as the uniform interface, that if applied to a web service induce desirable properties, such as performance, scalability, and modifiability, that enable services to work best on the Web. In the REST architectural style, data and functionality are considered resources and are accessed using Uniform Resource Identifiers (URIs), typically links on the Web. The resources are acted upon by using a set of simple, well-defined operations. The REST architectural style uses client/server architecture and with the help of connectionless HTTP Protocol. In the REST architecture style, clients and servers exchange representations of resources not the actual objects by using a standardized interface and protocol. Representation of resources may be in the form of XML or JSON.

RESTful Web Services utilize the features of the HTTP Protocol to provide the API of the Web Service. It uses the HTTP Request Types to indicate the type of operation: -

1. GET: Retrieve / Query of existing records.
2. POST: Creating new records.
3. DELETE: Removing records.
4. PUT: Updating existing records.

Using these 4 HTTP Request Types a RESTful API mimics the CRUD operations (Create, Read, Update & Delete). REST is stateless, each call to a RESTful Web Service is completely stand-alone, it has no knowledge of previous requests.

Rest Api is mostly used with AngularJS. Rest Api is used in back-end for handling all business logic while Angular Js is used as a front-end for calling business logic.

III. PROPOSED METHODOLOGY AND DISCUSSION

Choosing appropriate Web framework for web development is not an easy task as each of the framework have their pros & cons. Also selecting inappropriate framework can lead to 1)wasting of time studying its details, 2)failure to meet required time as developers are not used to it and also 3) spending time taking corrective actions to choose different framework. To avoid such problems some kind of comparative study plays important role.

Meanwhile, in the J2EE Web space, Spring MVC has gained steady adoption and Java developer attention. The highly popular Spring framework (with Spring MVC as its core component) is nicely designed, productive, and innovative, so many Struts users undoubtedly will find Spring MVC as a replacement framework for Struts more useful. Some of the main reasons to migrate from struts to spring:-

1. **Better Inheritance Structure:** - The Struts design is based on concrete inheritance, meaning that each custom action has to be in an inheritance hierarchy of the Struts Action component. Because Spring controllers are

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interfaces, any component can play the role of the controller. This gives application designers more flexibility in the design of components.[1]

2. **Flexible:-** At the framework component level, Struts requires use of Struts-specific objects, such as FormBeans (static or dynamic), Actions, Action Mappings, Action Forwards, and Request Processors. Spring MVC is more flexible, as all its major components are defined as interfaces.
3. **Struts Is a Web Framework Only:** - Struts addresses only the presentation aspects of application development. On the other hand, Spring MVC is an integral part of the Spring framework, which fully integrates Spring with the rest of the frameworks that manage business components as well as other aspects of Spring enterprise development.
4. **No action Forms:** - One of the biggest and the most positive differences in the Spring framework is that it has no specialized ActionForm objects. The framework supports binding of HTTP form values directly into POJOs (Plain Old Java Objects). This feature greatly simplifies application maintenance by limiting the number of classes to create and maintain.
5. **Future scope:** - Spring MVC is compatible with more tools and software and it has bright future, whereas popularity of struts has been steadily declining, while on the other hand Spring MVC is steadily attracting the attention of Java developers. Many large organizations (like IBM), which were working on Struts earlier are migrating to Spring MVC.[2]

IV.RESULT

We have analysed different web application frameworks and tried to find out their pros and cons. We also tried to find out which framework is suitable for some specific kind of applications with respect to scalability, flexibility of application. Spring MVC is considered as a best web framework based on different parameters.

V.CONCLUSION

We have explained different web frameworks and proposed the best web framework according to current trends.

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