

Agile Web Development with Web Framework

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Abstract—For meeting the requirement that Web application system can quickly go into service, quick response, and rapid adapt the change of Web application system, this paper proposes a new Web development method: Agile Web Development with Web Framework (AWDWF). This paper present AWDWF through researching the characteristic of Web Framework, Agile Web development process, as well as their integration. Furthermore ISO/IEC9126-quality model is used to make the quality analyze of AWDWF. The results show that it raises the efficiency of WEB development, at the same time ensures that the quality of development.

Keywords: Agile; Web Development; Web Framework

I. INTRODUCTION

With the period of web2.0 coming, web application has developed rapidly [1]. It reflects the trend of development for flexible dealing with the requirement, rapidly developing, and quickly receiving user feedback, in order to more quickly make adjustments [2]. The ability of flexibility becomes a key of the Web development [3]. At the same time, performance and the quality of Web applications are focused [4], so which need to find out the approach to balance the rapid development of Web application system and the quality assurance of Web application system. The Web application can not only quickly meet the requirement, but also can ensure the quality of Web application system.

This paper present Agile Web development based on Web framework through researching web Agile development process, the characteristic of Web framework, and their integration. It improves the efficiency of the web development, but also ensures the quality of Web development.

II. CHARACTERISTIC OF WEB FRAMEWORK

Web applications need solve the business logic of this system, also need to spend a lot of time on other public parts [5], for example, user registration / login, user password encryption, user management, page requests, data management, business objects management and so on. How to spend their main energy on the core business logic of system, and how to avoid program duplication and waste resources, to enhance the stability and efficiency of the system's operation, which has become common problems of software developers.

Is there a unified solution for these problems? Various Web frameworks can be the solution to the problems, and provide a suitable programming model for software developers.

Web framework provides an easy-to-use programming model to achieve MVC for software developers, great saving development time [6]. It brings an integrity high-quality solution for Web application system, helps to components and code reusability, to reduce the coupling between modules, and to improve the ability of the module cohesion, and to avoid duplication of programming and waste resources. It improves system stability and operational efficiency. A mature Web framework has the following characteristics at least:

- 1) Based the mature Web framework, software developer does not need directly contact with the bottom of API, just write some necessary code. It simplifies the developed process, and then improves system stability and operational efficiency.
- 2) Each mature Web framework has a very professional team to provide full-time work by offering the frame for free to reduce development cost.
- 3) Simplifying development model to easily separate the user interface and navigation from the business logic.
- 4) The distinct system structure can be provided by well-designed Web framework, and increased the cohesion of the system. Good structure makes it easier for other people to join the project.
- 5) An easy-to-use Web framework offers some of examples and documentation for users to optimal practice.
- 6) The code of mature Web framework often has been tested in various application environments, and then simplifies the software developers' code testing process.

III. AGILE WEB DEVELOPMENT WITH WEB FRAMEWORK (AWDWF)

A. Agile Development

The new situation of software development globalization, personalization, rapid, high-quality ask for agile requirement [7]. The presenter and practice of agile method convened in 2001. The result of this meeting was the formation of the Agile Alliance and the production of The Manifesto for Agile Software Development, described the general principles of agile development [8]:

- Individuals and interactions over processes and tools.
- Working software over comprehensive documentation.
- Customer collaboration over contract negotiation.
- Responding to change over following a plan.

In the Agile development principles, the human is the most important factor to success. Cooperation, communication and interaction ability is even more important than a single programming capability. At the same time, the success of project needs orderly and frequent customer feedback [9]. This is not dependent on the contract or the statement of work, but taking the customers and software development team to work closely together, as possible as to provide feedback. In the process of developing, the software without document is a disaster, but too much worse than too little documents. In addition, the ability of responding often determines the success or failure of a software project. When plans are made, it should be ensured that the plan is flexible and easy to adapt to the change of the business and technique.

B. Agile Web Development with Web Framework (AWDWF)

Traditional software engineering was formed to solve the software crisis during traditional software development process. With the growing requirement of Web application system, Web application has quickly developed [10]. In order to enhance the developed efficiency of the Web application system and lower development cost, to improve Web application system maintainability, and raise the Web application quality and reliability, the paper has proposed a Web Development Method that combined of Agile development idea and mature Web framework: the Agile Web development based on Web framework (AWDWF). AWDWF advocates that people is the most important factor during development process that is the communication among the development teams, and between the customer and development team. The successful project needs orderly and frequent customer feedback. As AWDWF used the mature Web framework of existing Web in the development process, the core business module is built in the existing Web framework. Rapidly building the prototype, we can react to fast-changing customer needs, and receive the timely feedback. Timely feedback, testing and evaluation would be throughout the entire development process.

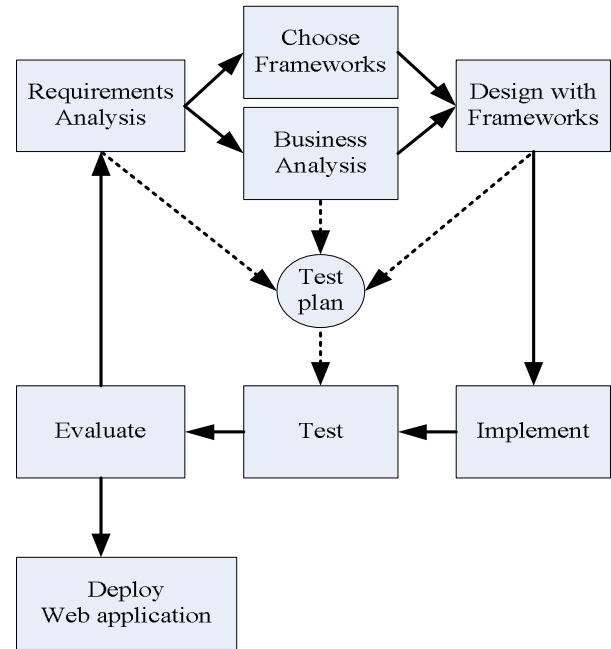


Figure 1. Agile Web Development with Web Framework Process

Figure 1 described the main process of AWDWF: Requirements Analysis, Business Analysis, Choose Frameworks, Design with Frameworks, Implement, Test, Evaluation, Deploy Web application. AWDWF is based on the Web framework. Therefore, as compared with the traditional development process, we have increased the Web framework choice of this part. The most of the Web application system is based on the MVC multi-level structure to develop. Analysts choose the Web framework for every layer according to requirement analysis and business analysis. So that can rapidly build a mold of the Web application system based on the existing Web framework, then customers could perceive the system as early as possible and customer feedback should be quickly gotten to rapidly respond the change. Because we have introduced a mature Web framework in the AWDWF development process, the development team would mainly spent on the core business logic, to avoid programming duplication and waste resources, improve the system's stability and efficiency, guarantee the quality of the Web application system.

Figure 1 shows, in AWDWF, iterative and incremental development also are important to the whole development. Many Web application system need to change some parts from the analyze beginning due to various reasons. Iterative and incremental development is the best way to settle this common problem. In each iteration, it has to consider on which problem should be highlighted, which sub-problem should be focused on, eventually, how to extend the scope of program by increment.

C. Team Collaboration and Communication

In AWDWF the Agile development method is used to emphasize the communication and collaboration among the people. Those include the communication among the development team and between the client and the development

team, as well as between the development team and virtual Web framework development teams. As Figure 2, in AWDWF, there are three main personnel: customer, Web developer, Web Framework developer. Customer and the developer of this system is bi-communication, and acquire feedback information each other. AWDWF can quickly react to customer feedback and show the changed system to the customers; because customers can quickly see the effects of their own feedback which change the confrontation between customers and developers to the happy cooperation, which will help the entire project development.

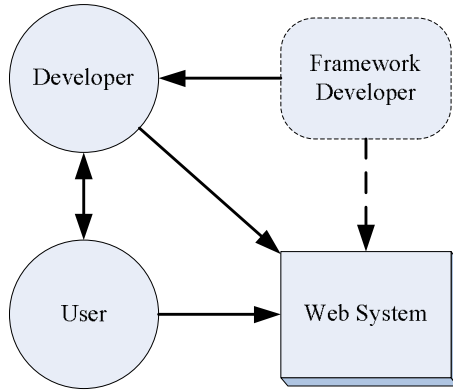


Figure 2. AWDWF Team-to-Team Communication

The developers of Web framework belong to the third part. The developers of the system just selected the Web framework of every part. When choosing the suitable Web framework, the first is to find out the necessary Web framework, understand the function of the Web framework, reliability, predictability etc., and further evaluate Web framework of the evaluation and decision-making. Firstly, the required standards Web framework is found out from the Web framework warehouse or the market of Web framework depended on the analysis results. Understanding the functionality, reliability, predictability and other characteristics, we think about Web adaptability, and consider the investment and risk amending the Web framework. After determining Web framework, the system developers sometimes need tailor and expand and test Web framework to ensure that the framework functions and Web Interface Specification realized. After the communication between system developer and the virtual Web framework developers, they will assemble and integrate the selected Web framework.

IV. AWDWF QUALITY ANALYSIS

Software quality is a composition of various factors. It is varied with the application and the quality requirements of user [11]. Therefore, it is necessary to discuss the various quality factors. McCall concert that software factors are a reflection of the software quality; software factors can be as the evaluation criteria; quantitative measuring factors can know the pros and cons software quality [12].

The quality factors of ISO/IEC9126-quality model are referred to make a quality analysis of AWDWF. It is shown in Table 1.

TABLE I. AWDWF QUALITY ASSESSMENT (BASED ON ISO/IEC9126-QUALITY MODEL)

Factors	AWDWF keywords
Functionality (Suitability , Accuracy , Interoperability , Security , Compliance)	Users involved in the whole development process; communication and timely feedback improve function factor.
Reliability(Maturity , Fault tolerance , Recoverability , Compliance)	Web framework has been tested in various application environments for improving the system's reliability.
Usability (Understandability , Learnability , Operability , Attractiveness, Compliance)	Users involved in the whole development process to get timely the habits of user's operation, improved the Web application system operability.
Efficiency (Time behavior , Resource utilization, Compliance)	Based on Web framework, developers only need to write some necessary code, in order to simplify the development difficulty and improve the efficiency of development.
Maintainability(Analyzability , Changeability, Stability, Testability, Compliance)	Based on Web framework, simplify development model, and easily separates the user interface and navigation from business logic.
Portability (Adaptability , Installability , Co-existence , Replaceability, Compliance)	Focused on the Web application system business logic, it can improve the cohesion and help to transplantation.

In AWDWF, the user involved in the whole development process, the communication and timely feedback enhance the Functionality. At the same time, users involved in the whole development process that developers could get timely the user's habits, improved the Web application system operability. AWDWF is the Web development based on the mature Web framework which had been tested on application environments. So it can simplify development model, easily separate the user interface and navigation from business logic which is good for transplantation. The developer can focused on the Web application system business and improve the cohesion. The developer just need to write some necessary code that simplifies the difficulty of development and helps maintaining and improving the efficiency of the development, at the same time, to ensure the system's reliability.

V. CONCLUSION

SWDWF is a rapid and high quality Web development method, combined the advantage of Agile Development and reused Web framework. It is an excellent Web development technique for the Web application system which require to quickly service, quick response, and rapidly adapt the change. AWDWF advocates that people is the most primary factor during Web development process. The change of requirement can be responded prompt, by involving clients in the development, mutually communicating among diverse roles, and frequently feedbacking the opinion of clients. The application of Web framework in SWDWF is a powerful complement of Agile Web development, which avoids duplication of programming and waste resources, improved the stability and efficiency of Web application system. Finally a quality analysis of SWDWF is made based on the six quality factors of ISO/IEC9126-quality model. The results show that

SWDWF improve the efficiency of Web development, at the same time, ensure that the quality of Web development.

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