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Shift-Based Software Development:
A New Process for Offshore Development

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In offshore development, one of the most crucial issues is a time difference. This paper proposes a new software development process that takes advantage of the time difference. In order for the software development company to reduce the cost and to decrease the development period, the developers in each country work on a different part of the software, i.e., the development is independently operated in different countries to minimize the unproductive effect of the time difference. Our new development process makes it possible for developers in different countries to collaboratively work on the same piece of software. By employing this method can improve the quality and productivity.

Keywords; Offshore Development, Communication Management

1. Introduction

Productivity, performance and capabilities of the current hardware has advanced in the past 30 years. Software development has not evolved for the past 30 years. The software productivity will sluggishly be improved even after 30 years from now [1]. The offshore development is expected as a way to increase the productivity. One of the major reasons is to develop software products in a shorter period with lower cost, in particular for large scale, complex and release-timing-critical software, such as a mobile phone [2].

2. Overview of Offshore Development
2-1. Current Conditions

Currently, the major activities carried out as the offshore development tends to be limited to the detailed design, program coding and unit testing [3]. The main reason to focus on the above 3 operations is that the upstream process requires closer communication with the client company.

2-2. Issues of Offshore Development
2-2-1. Lack of quality

The quality criteria are different from country to country, and the programmer in a different country may not follow the coding convention. This may subsequently raise the development cost due to the fixing the bugs that are caused by the incompliance to the rules, poor readability and maintainability [5].

2-2-2. Communication Issue

One of the problems of overseas development is that offshore site may not be able to fully understand the specification and instructions due to lack of language skills [4]. The cost for creation and translation of the documents will be more expensive than developing them in Japan.

3. Overview of Shift-Based Software Development

We propose a shift-based software development method as a way to solve the problems above. This process solves the communication problem by employing a new translation tool.

3-1. Shift-Based Software Development

This process for takes advantage of the time difference of several countries (fig.1). This process assumes that one country, usually an onsite country, controls the overall quality, cost and schedule. Other countries develop software

on shift-based according to the instructions of the onsite country. In the example (fig.1), B and C countries develop software in a sequential manner. A is an onshore site while B and C are offshore sites. The onshore site determines the role of each country at the time of the inauguration of the project (fig.2).

3-2. Shift-based Software Development Application Range

The shift-base software development can be applied from the module design to the unit testing. Fig. 3 illustrates the applicable range of the shift-base software development.
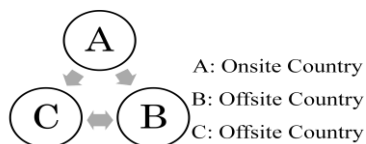
Fig.1 Shift-based software development
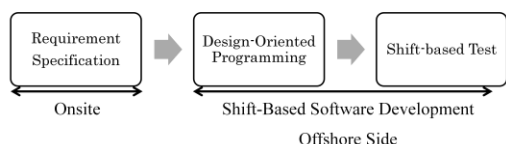
Fig.2 The Roles of each country

Fig.3 Shift-Based Software Development Application Range

4-1. Design Oriented Programming Method

The design oriented programming is that the module specification and coding are made simultaneously, i.e., a comment-oriented programming. In this method, a developer describes the details of software design (which are described in the module specification conventional process) as the comments in the source code. After that, the programmer writes a program according to the content of the comment.

5. The New Tools for Language Translation

The basic idea of this new language translation tool is to employ a smaller set of term dictionary to translate into simpler and easier words. The dictionary of this tool is limited, for example, 1,000 words. This tool is expected to generate easier English sentences so that an engineer who has poor English understandability can handle the English documents written by engineers in different countries.

6. Expected Effects

The proposed process is expected to increase the productivity by cooperative works. New language translation tool can eliminate the language barrier in software development. Software quality and maintainability will be improved due to the new approach.

7. Future Works

The future issues that we have to tackle are, we need to come out more detailed process for the shift-based development. We also have to consider 4 or more shift development, as well as to find better ways to test the software.

8. Conclusion

This paper describes a method for shift-based software development. We believe that this is one of the most suitable ways for offshore development.

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