Abstract

Maintenances of Enterprise Information System (EIS) have often occurred for changes of business situation or Information and Communication Technology (ICT), and their investment is about 2/3 of per annum amount investment of all software developments. This means importance of the EIS maintenances socially. Many of the EIS maintenances need renewal of their development concept to realize new additional social or business value through enhancing and extending EIS faculties and performance. But definition of new development concepts for EIS maintenances depends on heuristic idea generation method currently, because there are no practical methods to define them in current software development field. So the definition process of them depends on the definition engineer and maintenance project status. Then specialists are needed to define them, and large load and long period is needed to define them in many cases. The purpose of this research is to propose a consistent definition method for new development concepts of EIS maintenances named SPC (Systematic Process of Conceptualization), and to reduce load and period to define new development concepts based on SPC. Especially for system integration business, SPC solves the following current 5 problems to define new development concepts. 1) There are no practical processes to define them for software developers. 2) There are no practical tools for gathering business related information for software developers who are not always familiar with customers' business status. 3) There are no tools to analyze the gathered information systematically. 4) There are no validation tools for results of the information analysis. 5) There are no suitable representation forms of new development concepts to propose to customers and provide to lower software development phases effectively. In SPC we regard such EIS maintenances as troubleshooting of software system to solve business problems based on changes of business or ICT. We applied the first 3 troubleshooting subtasks, formulate problem description subtask, generate causes subtask and test subtask to a process of new development concept definition, and got consistent SPC process. This is a solution for the first problem, and this process includes activities of 4 solutions of other problems organically. SPC provides guideline of business information gathering as a tool for the second problem. For the third problem, SPC introduces current reality tree which is one of the tools of TOC (Theory of Constraints) as an analysis tool for the gathered information. To validate results of the analysis, SPC provides a tool named expectation and problem solution correspondence table as solution of the forth problem. Results of the analysis and the validation are core information of new development concept, and SPC provides representation forms consisted of 3 components as a solution of the fifth problem. Applying SPC to real EIS maintenance projects, we use total number of customers and developers meeting during new development concept definition as a load metrics of the definition. Because such meetings are useful, but large load and long period are needed for both customers and developers to prepare data before them, hold them, and readjust analysis results after them. Then we confirmed total number reduction of the meeting without bad influences to quality of defined new development concepts by SPC, so we confirmed completion of purpose of this research, because the number reduction of the meetings means reduction of load and period to define new development concept based on SPC.

Key words: Enterprise Information System, Maintenance, Conceptualization, Requirement Engineering, Theory of Constraints, Software Evolution