Reengineering Framework to Enhance the Performance of Existing Software

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***Abstract*— Reengineering meant to improve the quality of the legacy system. Continues maintenance and aging degrade the performance of the software system. Right approach and methodology must be adapted to perform reengineering. With Lack of right approach and methodology, reengineering itself will be costly and time-consuming. For the process of reengineering main concerns include when to reengineer, how to estimate cost, right approach for reengineering and how to validate software enhancement. This research paper proposed a framework to identify the need for reengineering, to estimate the cost of reengineering and to validate software quality improvement. Research work used the agile methodology to perform tasks of reengineering. Reengineering needs are identified using prediction based decision tree approach. Reengineering is applied using the agile Scrum methodology. Cost estimation is done using story point estimation. Performance analyses are done using complexity measures analysis of the internal design metrics and mean time to execute metric. Various automated tools used in research paper like CKJM ver1.9, Rapid Miner studio ver7.1, and Net beans7.3 framework.**

Keywords*— Reengineering; Maintenance; Decision Tree; Agile Methodology; Scrum

1. INTRODUCTION

The software reengineering plays a vital role to improve the quality of software. Many researchers [1, 2] proposed a framework for reengineering identification and reengineering cost estimation. But these frameworks are not able to handle the ever changing behavior of customer needs and requirements. These frameworks lack the flexibility to adopt the changes and as well as to estimate cost. Since a few decades, we have also seen changes in software development approach especially with the use of agility in software development. So need is to use the comprehensive plan to provide a new framework for software reengineering that is flexible as well as an interactive model to adopt the customer requirements and able to perform the realistic cost estimations. This paper proposed a framework to identify the need for reengineering, estimate cost of reengineering, uses an agile approach, reduce the maintenance cost of reengineered system and finally evaluate the performance of reengineering system. Research work in this paper is organized under different sections. Related work discussed in the Literature review section. Section 3 describes the research methodology used in this paper. Another section identifies whether the software is required to be reengineered or maintained. Reengineering agile model and estimations discussed in section 5 and 6. Performance evaluation is given in the last section..

2. LITERATURE REVIEW

The existence of a reengineering approach is not new. It has been observed that due to continuing changes in the existing software, software quality deteriorates [3] and reengineering must be performed to adapt the changing requirements of end-user. Researchers identified [4] the importance of reengineering and stated the importance of Information technology in software reengineering. Reengineering performs preventive maintenance for the software system [5]. Reengineering includes three important subtasks named reverse engineering, restructuring or alteration, and forward engineering. Reengineering tasks shown in Fig 1[6]. Researcher [7] also identified various benefits like better software quality, fewer maintenance efforts, ease of software testing and a better understanding of software. Sneed observed the impact of reengineering over maintenance [8]. Agile methodology has proven to be a successful approach to software development for the last few years [9, 10]. Agile is integrated with the field of reengineering by many researchers. Researcher proposed N-Process Model [11]. N-process model is N-shaped reengineering structure to perform various tasks of

reengineering. Tasks are mapped in N shaped structure. Other work gives the idea of service-oriented software reengineering [12]. Service-oriented computing paradigms applied to enhance the legacy systems. Work is also done to provide prototypes at initial stages of reengineering [13] .Researchers also worked on