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# An Investigation into Telecommunications Billing System Testing Processes

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## Abstract

Testing is an important part of the software development process, since it ultimately determines the quality of the product or service that the end user is provided. As error correction costs increase exponentially with time, it is important to resolve software defects as early as possible. The same applies to telecommunications billing software, where the level of competitiveness demands that the testing process be both accurate and efficient. The investigation undertaken aimed to evaluate and improve the testing process of a company that develops telecommunications billing software, Nokia Siemens Networks (NSN). The methodology used to perform the study involved the use of the Goal Question Metric (GQM) approach, which has been used extensively for process measurement and improvement. A research model was developed which derived process goals from the key research questions, ensuring that the research questions could be answered from the goal results. Four goals were determined using this method. These goals were to improve defect detection accuracy, defect correction accuracy, defect detection efficiency and defect correction efficiency. This led to 14 questions and 95 metrics in total. Defect detection accuracy was found to be insufficient, defect correction accuracy was determined to be satisfactory, defect detection efficiency was a key goal, and it was found to be unsatisfactory, while defect correction efficiency was acceptable, however there were many cases where error resolution was slow. Several specific proposals for improvement are suggested, as well as general process improvement suggestions. The process can be improved overall by using the agile Scrum approach. Scrum's cross-functional teams coupled with development testing through Test-driven Development will ensure that detection accuracy and efficiency are improved. The study found that because the process is more traditional than agile and separates testing and development, it is not well suited to the size of the projects and their timelines. In order to meet the needs of the industry and release quality services competitively, a more agile approach needs to be taken. The research conducted provides a contribution to a field where research is scarce, and provides evidence of the insufficiency of traditional development processes in small telecommunications projects, while motivating the use of agile methodologies to meet organisational goals.