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Abstraction of Functional Modules from a Legacy 'C' Program using Program Slicing

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Abstract: The present computation industry is growing very fast. Lot of improvements have taken place, as a result of which high speed computation with inbuilt parallel computation is the emerging technology for many of the parallel or multicore processors. Thus this technology is replacing the earlier technologies of sequential computation, leaving very little scope for the sequentially executing programs and their supporting software systems. These systems can neither utilize the modern computing resources nor scale upto their demands. Also, in contrary to the modern computational systems, the sequential executing legacy software systems are the systems which are a result of continuous developmental work of many developers embedding valuable mission critical functionalities. These systems have thus become the major working resources of the organizations but lack the capacity to adopt to the advanced hardware computation domains. Hence it is difficult for the organizations to disown these legacy systems or to maintain them. Thus a framework is required for bridging the gap between the advanced computation systems and the legacy systems. This paper proposes a methodology for abstraction of functionalities from the legacy 'C' program using the technique of program slicing.

Keywords: Reengineering; Legacy Software System; Functionality; Program Slicing; Functional dependency; Computation Systems

I. INTRODUCTION

Legacy software system is the computing software system using programming language and also running application programs on a hardware domain, which are obsolete and restrict the systems from communicating with the current technologies. The legacy systems thus do not have the efficiency to allow for growth. Further, the legacy system can cause many problems, such as very high maintenance costs, they work with technologies that prevents integration between legacy and other systems and limited security. All these problems become more prominent, than the convenience of continuing the use of legacy systems.

But these legacy systems remain in use only because of their reliability, i.e. the systems continue to meet the needs they were earlier designed for. Hence it becomes difficult for organizations to abandon these legacy systems, which are required by the organizations to remain in business.

Enormous amount of such legacy software systems is prevailing in the software industries. Preserving these legacy systems may be by choice or necessity for the organizations as many of them are dependent on these for the execution of their mission critical application. Major reason for the organizations to still continue with legacy system is that it is steadily entrenched in company operations embedding decisive functionalities, and also the insight that, these system embodies a significant investment, and would be expensive to replace, further any change or enhancement can be expensive, time consuming, difficult to operate. But it is also required to ensure that mission critical legacy systems do become a major risk within the organization with the technology getting old, requiring specialized knowledge & skills to maintain them. It is therefore difficult for the legacy software systems to support increased throughput and efficient capacity and thus the growth of the company. As the industry grows, it demands the adaption to changing technology. Thus with the industry evolving constantly, the software must keep up with the advancing hardware computational technology, else the industry will have to settle operational business to the legacy system, slowly reducing the ability to growth.

The Computing hardware on the other hand is fast developing, on one end there are high performing single core processors with very high processing capabilities with increased transistor density. But at the same time this industry is facing serious problems due to the inability of the processors to scale.

The processor manufactures are also looking to increase the processing capabilities with multicore architectures and parallel programming models. In contrast to single core processing, the multiprocessing or multicore processing, prevent dependability on the software developer and controls task allocation using distributed approach for improved performance gains. With this insight into both legacy systems and advanced computation systems, it is required for the software developers to develop a framework which is capable of