Abstract

One of the major issues in component based software systems structuring and quality prediction is the interdependencies of system components. This paper proposes a novel technique for determining the strength of functional coupling in component based software systems. Authors propose Strength of Functional Dependency (SFD) metric, which is based upon two new metrics Operational Coupling complexity Index (OCI), and Instance Coupling complexity Index (ICI). It allows us to quantify the functional dependencies, formed by different kinds of operations and instances between these components. Compared to other existing dependency metrics, which are often based on number of operations or instance variables between the components only, authors consider operational complexity and instance variables complexity as a measure to how strong this dependency is and therefore promote a more systematic approach to the reasoning about modularity in component based software systems. This paper can be divided broadly into two parts. The first part quantifies interface operations and instance variables. The quantification is performed by considering the number of input, output parameters and their types. Based upon these factors of operations and instance variables, authors used analytical hierarchy approach (AHP) to assign weights to these factors and outcomes OCI, ICI and SFD. The second part shows the experimentation and validation of the proposed metrics. The advantages of the proposed method are discussed as well through a
case study in this paper.

References

Volume 33 Number 6 DOI: 10.1145/1449603.1449613.

Index Terms

Computer Science Software Systems

Keywords
Component based software system Metrics Component coupling Functional Dependency Operational complexity