

Quality Aspects in CBSE

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1. Introduction

Component-based software engineering (CBSE) has emerged to address the industrial needs such as faster in development, reduction in costs, and increased in quality. However there remain many challenges ahead to build a confidence in components adoption and reuse. How to we test component-based systems? How do we predict component quality? What are those key metrics that characterises components? How do we test when composing and integrating components? There has been interesting work done on integration testing strategies and interface testing. Can we generalise those techniques across different application areas?

The Ariane 5 disaster showed that not testing components in their new context may have disastrous consequences. I believe we can use some of those well established testing techniques for testing components but we need to have key strategies when selecting test cases as shown in some of the articles discussed in this session. Developers reusing a component need to do considerable unit and integration testing to ensure the software behaves properly in its new environment. There are key challenges ahead on integration testing strategies for components. Also on automated test strategies for testing components for different contexts.

We need to ensure security aspects and quality-of-service (QoS) when designing components for e-commerce and enterprise applications. This leads us to good specification techniques for components so

that we can clearly specify, test and assure its functionality and interfaces. Interface specification is the key to achieve and assure quality of software components. In such components we need to address the characteristics of security features within those components.

Quality aspects include life cycle activities of a component based development such as methods, process, testing, metrics, and quality measures. Products are composed rather than developed hence it may results in new products and features. Therefore product line approaches to components will play a key role. Testing is used to identify defects during construction and to assure that completed products possess the qualities specified for the products. Test-related activities are organized into a test process that is designed to take advantage of the economies of scope and scale that are present in a product line organization. These activities are sequenced and scheduled so that a test activity occurs immediately following the construction activity whose output the test is intended to validate.

Finally we also need to consider the issues of component certification and adaptation techniques. Process improvement issues (CMM) for CBSE based development lifecycle. It was predicted that component-based development will be at CMM maturity levels of 3 to 4. We need to make sure these are some of the criteria to be used when selecting or procuring components from third parties as well as to be used for in-house development.

