A SOA governance pattern based approach with change impact analysis for maintenance of service oriented applications

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Software maintenance has been recognized as the most challenge and costly phase in the software life cycle. Software systems always change over time not only for error correction, performance improvement but also new requirements to remain the competitive strategies among organizations.

A software system is generally designed as a set of logically related components. When a component changes, it might affect to other components in the system. Therefore, we need to manage what components will be impacted if a proposed change is made.

Nowadays, service oriented architecture (SOA) is adopted by many businesses. SOA enhances the agility and the reuse of applications in the real world. In SOA, business applications automate business processes by a set of services. When a business process changes, it might affect to its corresponding services and versa. Therefore we need methods to specify the impact of a proposed change.

Existing approaches for change impact analysis usually focus only at the source code level. This thesis proposes an approach to the design level. In this thesis, we will present a model for business processes and services. Based on the relationship between business processes and services, the

model is divided into two layers: Business processes layer and services layer. We proposed four change types of requests:

(1) Operation Abstraction

(2) Operation Decomposition

(3) Service Abstraction

(4) Service Decomposition

We also show the effectiveness with case studies on a virtual travel agency system as an example. It contains many business processes and services, including 'booking transportation', 'booking accommodation', 'pay an invoice',etc. We assumed the cases which:

(1) A customer requires more than one services

(2) A customer requires more than one operation simultaneously for comparing the results.

Two SOA patterns are detected and tried to be applied as the result of change impact analysis form the change of requests.