

REDUNDANT-FREE WEB SERVICES COMPOSITION WITH USER  
REQUIREMENTS CONSIDERATION

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A dissertation submitted in partial fulfilment of the  
requirements for the award of the degree of  
Master of Science (Computer Science)

Faculty of Computing  
Universiti Teknologi Malaysia

JANUARY 2013

*Dedicated with much love and affection to my beloved family*

## **ACKNOWLEDGEMENT**

Foremost, I would like to express my sincere gratitude to my supervisor Assoc. Prof. Dr. Dayang Norhayati Abang Jawawi for the continuous support of my study and research, for her patience, motivation, enthusiasm, and immense knowledge. Her guidance helped me in all the time of research and writing of this thesis. I could not have imagined having a better advisor and mentor for my master study. My sincere thanks also goes to my parents, my sisters and only brother for supporting me spiritually throughout my life.

## ABSTRACT

Service Oriented Computing (SOC) has become a leading study in recent years. It is based on the concept of composing distributed applications within heterogeneous environments by discovering and invoking web services to perform some complex tasks when there is no existing web service to fulfill the user request. Service Oriented Architecture (SOA) is known as a solution to accomplish composing autonomous, platform-free web services. However, the composition of web services without considering their underlying functional and non-functional attributes assures that it can adversely affect the composition process by increasing overall cost and leads to slow performance. This dissertation puts forward an idea of composing a redundant-free web service by considering user requirements. Non-functional attributes of services are prioritized to rank web services by using QoS aggregation function that leads to obtain more service requester satisfaction. After designing redundant-free web services composition, a method for optimal web services composition with several QoS attributes is proposed. At the end of this dissertation, the effectiveness and efficiency of proposed method based on execution time and optimal web service selection are evaluated. The proposed method is a considerable modification of the Global QoS Composition (GQC). This can be shown in the execution time improvement, which has been improved approximately seventeen percent as compared to the GQC method. In addition, the overall cost of web services composition is decreased due to deducting redundant Web services' price from the sum of component services' price in a composite service.

## ABSTRAK

Pengkomputeran Berorientasikan Perkhidmatan (SOC) telah menjadi kajian utama pada tahun-tahun kebelakangan ini. Ia adalah berdasarkan kepada konsep aplikasi mengubah teragih dalam persekitaran heterogen dengan menerokai dan menggunakan perkhidmatan Web untuk melaksanakan beberapa tugas yang kompleks apabila tiada perkhidmatan Web yang sedia ada untuk memenuhi permintaan pengguna. Senibina Berasaskan Perkhidmatan (SOA) dikenali sebagai penyelesaian untuk mencapai autonomi gubalen, Perkhidmatan Web bebas platform. Walau bagaimanapun, pergubahan perkhidmatan Web tanpa mengambilkira atribut-atribut berfungsi dan bukan fungsi untuk memastikan bahawa ia boleh memberi kesan dalam proses penggubahan dengan peningkatan kos keseluruhan dan juga membawa kepada prestasi yang lembab. Disertasi ini mengenengahkan idea penggubahan perkhidmatan Web bebas lewah dengan mengambil kira keperluan pengguna. Atribut bukan fungsi bagi perkhidmatan adalah diutamakan untuk menyusun perkhidmatan Web dengan menggunakan fungsi pengagregatan QoS yang membawa kepada lebih kepuasan peminta perkhidmatan. Selepas mereka bentuk lebih komposisi perkhidmatan Web percuma, satu kaedah komposisi pekhidmatan jaringan percuma optima dicadangkan dengan beberapa atribut Qos. Di akhir disertasi ini, keberkesanan dan kecekapan kaedah yang dicadangkan berdasarkan masa dan pemilihan perkhidmatan Web yang optima dinilai. Kaedah yang dicadangkan adalah pertimbangan pengubahsuaian global komposit QoS. Ini dapat ditunjukkan dalam pelaksanaan peningkatan masa yang mana ia dapat ditingkatkan dalam anggaran tujuh belas peratus berbanding kaedah GQC. Di samping itu, kos keseluruhan komposisi perkhidmatan Web berkurang disebabkan oleh pengurangan lebih harga jaringan perkhidmatan daripada jumlah harga komponen perkhidmatan dalam perkhidmatan komposit.