

**REDUNDANT-FREE WEB SERVICES COMPOSITION WITH USER  
REQUIREMENTS CONSIDERATION**

**AMIRHOSSEIN SAFI**

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Faculty of Computing  
Universiti Teknologi Malaysia

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I declare that this dissertation entitled “*Redundant-free Web Services Composition with user requirements consideration*” is the result of my own research except as cited in the references. The dissertation has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature :  
Name : Amirhossein Safi  
Date : January 29, 2013

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

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## 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 mengenangkan 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 lebihan 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 lebihan harga jaringan perkhidmatan daripada jumlah harga komponen perkhidmatan dalam perkhidmatan komposit.

## TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	<b>DECLARATION</b>	ii
	<b>DEDICATION</b>	iii
	<b>ACKNOWLEDGEMENT</b>	iv
	<b>ABSTRACT</b>	v
	<b>ABSTRAK</b>	vi
	<b>TABLE OF CONTENTS</b>	vii
	<b>LIST OF TABLES</b>	x
	<b>LIST OF FIGURES</b>	xi
	<b>LIST OF ABBREVIATIONS</b>	xii
	<b>LIST OF APPENDICES</b>	xiii
<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
1.1	Overview	1
1.1.1	Web Services in SOA	1
1.1.2	Web Service Composition	4
1.2	Problem Background	4
1.3	Problem Statement	6
1.4	Research Question	7
1.5	Research Aim	7
1.6	Objectives	8
<b>2</b>	<b>LITERATURE REVIEW</b>	<b>9</b>
2.1	Introduction	9
2.2	Web Services Composition Methods	11
2.2.1	QoS Criteria	13
2.2.2	Workflow Model	15
2.3	Web Service Implementation Methods	16
2.3.1	Non Evolutionary Algorithms	17

2.3.2	Evolutionary Algorithms	20
2.4	Summary	22
<b>3</b>	<b>RESEARCH METHODOLOGY</b>	<b>23</b>
3.1	Overview	23
3.2	Theoretical base including primary study	26
3.3	Modeling web services composition method	28
3.4	Implementation of Web Service Composition	28
3.4.1	Normalization	28
3.4.1.1	Quantitative Attributes	29
3.4.1.2	Qualitative Attributes	31
3.5	Comparison and Evaluation	31
3.6	Interactive Pricing Composite Service	32
<b>4</b>	<b>METHODS AND THE IMPLEMENTATION</b>	<b>33</b>
4.1	Introduction	33
4.2	Workflow Management System	33
4.3	QoS Aggregation Function	35
4.3.1	Optimal QoS of composite services	36
4.3.2	Design QoS Aggregation Scheme	37
4.3.3	Constant QoS Values	39
4.4	Graph Model	40
4.5	Composition Graph Data Structure	42
4.6	Redundant Service Eliminator	43
4.7	Data Structures in proposed algorithms	46
4.8	Implementation Overview	47
4.9	Summary	52
<b>5</b>	<b>EXPERIMENTAL EVALUATION</b>	<b>53</b>
5.1	Overview	53
5.2	Essential Data for Analysis	53
5.3	Efficiency Analyze	54
5.3.1	Dataset Frequency Distribution	54
5.3.2	Composition Time	55
5.3.3	Comparison with previous work	56
5.3.4	Redundant Service Eliminator Analysis	58
5.4	Summary	60

<b>6</b>	<b>CONCLUSIONS AND FUTURE WORK</b>	<b>61</b>
6.1	Summary	61
6.2	Contributions	62
6.3	Future Work	62
 <b>REFERENCES</b>		 <b>64</b>
Appendices A – B		<b>68 – 70</b>