



# **ANALYSIS ON QOS PARAMETERS TO PREDICT HTTP RESPONSE**

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**MASTER OF COMPUTER SCIENCE  
(INTERNETWORKING TECHNOLOGY)**

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**Faculty of Information and Communication Technology**

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**A dissertation submitted  
In fulfillment of the requirements for the degree of Master of Computer Science.  
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## DECLARATION

I declare that this dissertation entitle “Analysis on QOS Parameters to Predict HTTP Response” 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 : .....

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## **APPROVAL**

I hereby declare that I have read this dissertation and in my opinion this thesis is sufficient in terms of scope and quality for the award of Master of Computer Science. (Internetworking Technology)

Signature : .....

Supervisor Name : En. Zulkiflee Bin Muslim

Date : .....

## **DEDICATION**

First and foremost, I would like to thank ALLAH Almighty, for giving me excellence health, ideas and comfort environment so that I can complete this thesis as scheduled.

My greatest thank is to my parents (Hj. A.Rahman Kassim and Almarhumah Maimunah Binti Ahmed), my wife (Suhaizila Binti Sari), my sons and daughters (Muhammad Irfan Hakim, Nur Hanis Sofiya, Muhammad Irfan Hazim and Nur Aleesya Sofiya) and my siblings for their continuous understanding, motivation, encouragement and patience throughout my MSc journey.

I also dedicate this MSc thesis to my many friends who have supported me throughout the process. I will always appreciate all they have done for helping me to complete my thesis and develop my computing skills in internetworking.

## ABSTRACT

Current web service standards lack the best framework to predict the best possible QoS parameters to predict the best delivery service to guarantee packets being delivered to the destination and the order of the arriving packets through the HTTP. It is because of the proliferation of the same web service functionality, reliability and reputation on published information. However, it is not an easy task to propose the required QoS to users because of the dynamic nature of web services and web service features, uncertain with differences applications and web services of different QoS requirements. Therefore, the real live world web service label data uses to evaluate the focus parameters using classification machine learning algorithms to process the data. The specific objective of this research was to predict simple method of measuring response time and encounter performance bottlenecks due to the limitations of the underlying messaging and transport protocols for the web services. By improving QoS services will bring advantages and competitiveness of network service providers increase bandwidth and better speed performances desire with significant parameters for users. The findings of this research have a number of important implications for future practice.

## ABSTRAK

*Piawaian perkhidmatan web semasa, kekurangan rangka kerja yang terbaik untuk meramalkan parameter QoS yang terbaik untuk menjamin paket dihantar ke destinasi dan mengikut turutan paket yang sepatutnya melalui HTTP. Masalah ini disebabkan oleh percambahan fungsi perkhidmatan web yang serupa, kebolehpercayaan dan reputasi terbitan maklumat. Walaubagaimanapun, ia bukanlah satu tugas yang mudah untuk mencadangkan keperluan QoS yang diperlukan kepada pengguna, kerana sifat dinamik perkhidmatan web dan ciri-ciri perkhidmatan web, ketidakpastian perbezaan aplikasi dan perkhidmatan keperluan QoS yang berbeza. Kaedah pemprosesan data dilakukan dengan menggunakan label data perkhidmatan web yang sebenar untuk menilai parameter yang difokuskan melalui teknik klasifikasi pembelajaran mesin. Objektif khusus kajian ini adalah untuk meramalkan kaedah yang mudah untuk mengukur masa tindak balas dan kesesakan disebabkan oleh prestasi pesanan dan protocol pengangkutan asas untuk perkhidmatan web. Peningkatan perkhidmatan QoS akan membawa kebaikan dan daya saing kepada pembekal perkhidmatan rangkaian bagi meningkatkan jalur lebar dan kecekapan kelajuan yang lebih baik bagi kegunaan pengguna. Hasil kajian ini akan memberikan implikasi yang penting untuk amalan semasa dan kegunaan akan datang.*



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## TABLES OF CONTENTS

	<b>PAGE</b>
<b>DECLARATION</b>	
<b>APPROVAL</b>	
<b>DEDICATION</b>	
<b>ABSTRACT</b>	<b>i</b>
<b>ABSTRAK</b>	<b>ii</b>
<b>ACKNOWLEDGEMENT</b>	<b>iii</b>
<b>TABLES OF CONTENTS</b>	<b>iv</b>
<b>LIST OF TABLES</b>	<b>vii</b>
<b>LIST OF FIGURES</b>	<b>viii</b>
<b>LIST OF EQUATIONS</b>	<b>ix</b>
<b>LIST OF ABBREVIATIONS</b>	<b>x</b>
<b>CHAPTER</b>	
<b>1 INTRODUCTION</b>	<b>1</b>
1.1 Research Background	2
1.2 Research Problem	3
1.3 Research Question	4
1.4 Research Objective	4
1.5 Research Method	5
1.6 Research Contribution	5
1.7 Research Scope	5
1.8 Research Outcomes	6
1.9 Summary	6
<b>2 LITERATURE REVIEWS</b>	<b>8</b>
2.1 Introduction	8
2.2 Related Literature	8
2.3 Qos Taxonomy	13
2.4 Qos Metrics and Parameters	15
2.5 Evaluation element	17
2.6 Qos Requirements for Web Service	18

2.6.1	Response Time	20
2.6.2	Throughput	20
2.6.3	Performance	21
2.6.4	Availability	21
2.6.5	Accuracy	21
2.6.6	Security	21
2.7	QoS Dataset	22
2.8	Prediction Technique	23
2.9	Summary	24
3	RESEARCH METHODOLOGY	25
3.1	Introduction	25
3.2	General Research Methodology	26
3.3	Proposed Methodology	28
3.3.1	Clarify Research Question	29
3.3.2	Exploratory Study	29
3.3.3	Quantitative Technique	29
3.3.4	Experimental	30
3.4	Data Analysis and Processing	30
3.4.1	Data Collection	30
3.4.2	QoS Data of Failure Probability	31
3.4.3	QoS Data of Response Time and Throughput	31
3.4.4	QoS Data of Time-Aware Performance	31
3.5	Interpret Finding	32
3.5.1	Particle Swarm Optimization	32
3.5.2	Best First	33
3.5.3	Greedy Step Wise	33
3.5.4	Ranker	33
3.5.5	Support Vector Machine (SVM)	33
3.6	Prediction Model	33
3.7	Summary	34
4	ANALYSIS	35
4.1	Introduction	35
4.2	Data Preprocessing	35
4.2.1	Data Cleaning	36
4.2.2	Data Integration	38
4.2.3	Data Transformation	39

4.2.4	Data Reduction	40
4.2.5	Data Discretization	41
4.3	Data preparation and Representation	41
4.4	Data Mining Process	43
4.5	Classification	43
4.5.1	Classification on Public Real Web Service Dataset	45
4.5.2	Library Support Vector Machines (LIBSVM)	48
4.5.3	The Weka Data Mining Software	49
4.6	Knowledge Representation	51
4.7	Summary	54
5	RESULT AND DISCUSSION	55
5.1	Introduction	55
5.2	Experiments Result for Training Data	55
5.2.1	Attribute Analysis on Training Dataset.	55
5.3	Experiments Result for Testing Data	57
5.3.1	Classification Analysis on Testing Dataset.	63
5.4	Summary	65
6	CONCLUSION AND FURTHER DIRECTIONS	66
6.1	Introduction	66
6.2	Conclusion	66
6.3	Research Contribution	68
6.4	Research Limitation	68
6.5	Future Research	69
6.6	Summary	69
	REFERENCES	70
	APPENDICES	73

## LIST OF TABLES

<b>TABLE</b>	<b>TITLE</b>	<b>PAGE</b>
2.1	Summary of Literature Review	13
3.1	Summary of Method Use	26
4.1	Sample Data Cleaning Process	38
4.2	Sample Data Integration Process	39
4.3	Sample Transformation Cleaning Process	40
4.4	Enroll of the sample data use.	46
4.5	Web Service Description Language (WSDL) On Real-World Web Services	47
4.6	Parameters Use for Experiment.	48
5.1	PSO Attribute Analysis	56
5.2	Best First Attribute Analysis	56
5.3	Greedy Step Wise Attribute Analysis	57
5.4	Ranker Attribute Analysis	57
5.5	Parameters That Have Been Used For Experiments	64
5.6	Mean Value for the LibSVM Accuracy	65

## LIST OF FIGURES

<b>FIGURES</b>	<b>TITLE</b>	<b>PAGE</b>
2.1	A Taxonomy of QoS Parameters	15
2.2	Parametric dependencies (Nieto & Lopez, 2014)	16
3.1	General Research Methodology	28
4.1	Data Preprocessing Flow Chart	36
4.2	Data Preparation and Representation Flow	42
4.3	WEKA Explorer Attribute Plot Matrix.	52
4.4	Data Size and RTT	52
4.5	HTTP Code and WS ID	53
4.6	Data Size	53
4.7	Round Trip Time (RTT)	54
5.1	Result of Classifiers Function LibSVM for US	59
5.2	Result of Classifiers Function LibSVM for EU	60
5.3	Result of Classifiers Function LibSVM for Japan	61
5.4	Result of Classifiers Function LibSVM for Taiwan	62
5.5	Result of Classifiers Function LibSVM for Korea	63

## LIST OF EQUATIONS

<b>EQUATIONS</b>	<b>TITLE</b>	<b>PAGE</b>
Equation 1	QoS Data of Response Time and Throughput	31
Equation 2	QoS Data of Time-Aware Performance	32

## LIST OF ABBREVIATIONS

QoS	-	Quality of Service
RTT	-	Round Trip Time
PSO	-	Partical Swamp Optimization
SVM	-	Support Vector Machine
LibSVM	-	Library Support Vector Machine
ROC	-	Receiver Operating Characteristic
SLA	-	Service Level Agreement
VOIP	-	Voice over Internet Protocol
IPTV	-	Internet Protocol Television
IOT	-	Internet of Things
MAP	-	Markovian Arrival Processes
IntServ	-	Integrated Services
DiffServ	-	Differentiated Services



## **CHAPTER 1**

### **INTRODUCTION**

QoS for networks is a standard industry and a mechanism to ensure high quality performance for critical applications. Network administrators must ensure the use of existing resources QoS mechanisms efficiently without compromising the performance of their network requirements. Traditionally the concept of network quality, all network traffic is treated equally. Generally receive all network traffic with best effort regardless of reliability, delay, and other performance characteristics. Concept to determine the best quality for each individual and each application is different for each other. The concept of which is to ensure QoS demands of users and specific applications in which more critical will be given more attention and priority service.

With the rapid growth of the Internet, it required the network development scale well. The network interconnection device has been widely used to support this changing. The switch, router and other network interconnection device have become an important part of the network. The performance of network interconnection device will directly influence the network size, network stability and reliability, so it is necessary to accurately evaluate it. A good network performance test system is helpful to ensure the computer network can be normal, safe, efficient, rational use and operation. The network performance test instrument has become essential to evaluating performance of various types of network and network acceptance.

For the previous year, there are so many issues about the network performance through the web service on HTTP causes of lack and bottleneck affecting of the existing framework. Web services emerged as a concept to build a complex distributed systems in different organizations to suit different users and applications. Web services architecture enables loosely

coupled services, potentially implemented on different platforms, to communicate over the Internet using standard protocols. However, the work of the existing web service performance evaluation has not addressed the issue of performance from a customer perspective. The work of the existing has focused on evaluating web services from the perspective of the system administrator or designer. This chapter describes about the research background, research problem, research question, research objective, research method, research scope, research scope and expected research outcome. This sub chapter is followed by detail explanations and will be summarized in the last section.

## **1.1 Research Background**

Web service is a software application that has been designed to support the operation of the machine interaction over the internet relies on standard communication protocols and interfaces. This section introduces the basic concept and related terminology of QoS is to provide advantages to the administrator to control network resources and allow them to govern management perspective rather than a technical perspective. It nevertheless ensures appropriate mission-critical and sensitive applications that require priority to make way for the necessary applications in the network managements and applications.

The defined quality of service for network traffic in streaming media especially in Internet Protocol Television (IPTV), Voice over IP (VOIP), videoconferencing and safety-critical application such as remote surgery and so on. To implement QoS it can improve the user experience and cost savings existing efficient. Recently investigators have examined the effects of determine the QoS parameters between the service usability and utility. In this research, it will focus on a number of QoS requirements in web services like congestion affecting the performance of web services and also the approach provides a simple technique for evaluating the response time for web services. To deal with these lack issues (Baocai, Huirong, Pengbin, Liheng, & Mingli, 2010), build a common and flexible QoS ontology for Web services QoS

state information. Many researchers have come out with a few techniques which can be used for the satisfaction of users and network providers. In this research, by using the machine learning technique, a real label data set will be process using tools from data preprocessing, data classification, data clustering, and data visualization, (Zheng, Zhang, & Lyu, 2014). Data analysis techniques rely on the fact that the data is presented as a flat file or relation, where each data point is characterized by a permanent number of characteristics to generate a predictive model.

## **1.2 Research Problem**

The research problem in this research are to define the lack of the existing framework to predict the best possible QoS parameters to predict the best delivery through HTTP, define bottlenecks affecting performance of web services by data size and predict the a simple technique for evaluating the response time for web services for future use. According to (Zheng, Ma, Lyu, & King, 2013), approach for web service requests efficiently become unprecedentedly strong. Web service invocation to avoid expensive and time consuming, it proposes a collaborative approach to QoS forecast for web services to take advantage of Web services and use the experience of service users.

Rathore & Suman, (2012), the current standard service oriented architecture primarily dependent on the properties of the function. However, the lack of service registration mechanism to manage the real estate service does not work. QoS for web services allow users to have independence in their use of the service by aiming to experience good service performance. It is difficult to select the registration services to service users, which contains hundreds of similar websites, as the election was only based on the properties of functions. Therefore, need necessary mechanisms to manage the dynamic changes in the nature of QoS since QoS parameters are dynamic in nature.

Recently, with growing request of web services on the World Wide Web, which is used in the Internet of Things (IOT), there is increasing attentiveness in the study of effective web services feature assessment approach based on the forecast strategy to get the right quality-of-service values. However, it is clear that the quality of web services in significant changes in the network environment of uncertainty. The amendment imposes a very challenging hurdle for web service QoS forecast. Furthermost old web forecast service QoS executed using single set of fixed model parameters with the assistance of designers priori information, (Luo, Luo, & Chang, 2014).

### **1.3 Research Question**

Referring to the Research Problem in Section 1.3, three research questions are formed to represent the research problems which are:

- RQ1. How to predict the best possible QoS parameters?
- RQ2. How to analyses the significant parameters for QoS web services?
- RQ3. How to propose provides a simple technique for evaluating the response time for web services?

### **1.4 Research Objective**

Based on the research questions formulated in Section 1.4, the research objective has developed as follows:

- RO1. To predict the best possible QoS parameters through the HTTP.
- RO2. To analyses the best significant parameters for web services.
- RO3. To propose provides a simple technique for evaluating the response time for web services for future use.

## **1.5 Research Method**

Based on the research objective formulated in Section 1.5, the research method has developed as follows:

- RM1. Preprocessing the literature survey (LS) is used to obtain information about current approaches in predicting the best QoS parameters to predict the best delivery service to guarantee packets send to the destination via HTTP.
- RM2. Using the machine learning algorithm with the real label dataset on classification technique to analysis the significant parameters for QoS web services data.
- RM3. Interpret finding and propose model data to evaluate the accuracy of the simple technique for evaluating the response time for web services for future use.

## **1.6 Research Contribution**

Based on the research method formulated in Section 1.6, the research contribution has developed as follows:

- RC1. An enhancement prediction the best possible QoS parameters to the best delivery service to package that is sent to the destination and the order of the arriving packets via HTTP with the highest accuracy.
- RC2. Enhanced the machine learning algorithm using the real label dataset on classification technique to analysis the significant parameters to get the better speed performances desire with significant parameters for web services.
- RC3. Approach simple method to prove the outcome on proposes the QoS parameters to predict the HTTP response for future use.

## **1.7 Research Scope**

In order to achieve the objectives, this study will focus on issues such as stated below:

- RS1. To predict the best possible QoS parameters through the HTTP. The research study area will be gathered information using the QoS real label dataset freely available for research purpose.
- RS2. The focus parameters dataset contains failure probability, reaction time, throughput and performance conscious will evaluate using the machine learning algorithms on classification technique to analysis the significant parameters for QoS web services data.
- RS3. Simple approach method of measuring response time and encounter performance bottlenecks based on the result obtained from the statistical experiment.

## **1.8 Research Outcomes**

Based on the research, by seeing the pattern of data produced it can predict the best possible QoS parameters to the best delivery service to package that is sent to the destination and the order of the arriving packets via HTTP with the highest accuracy. This project provided an important opportunity to advance the understanding of evaluating the accuracy of the proposing a simple technique for evaluating the response time for web services for future.

However, more research on this topic needs to be undertaken before the association between enhanced bandwidth and better speed performance desire with significant parameters. Web services performance is more clearly understood and it will bring advantages and competitiveness of network service provider's increase their services for time being according the users satisfaction.

## **1.9 Summary**

In this chapter it is clearly stated the research problem and the intention to conduct the research studies on several web service QoS necessities, blockages disturbing the presentation of

web services, approach to provide quality service and a simple technique for evaluating the response time for web services

The next chapter will discuss on the literature about the review of taxonomy on QoS metrics, parameters and evaluation elements. It also includes the analysis of machine learning technique using the best attribute evaluates to process the data. The next chapter also includes the detail prediction technique for understanding of how to create a number of important implications for future practice to predict the best QoS parameters can be used and best performance result for the web service in the future.

## CHAPTER 2

### LITERATURE REVIEWS

#### 2.1 Introduction

This chapter will discuss on the literature about the review of QoS taxonomy and QoS metrics through the selected parameters. It also includes the evaluation element on how to analysis the data using classification machine learning prediction technique with best attribute evaluator to process the data.

The concept of quality are focused on the distribution to all network traffic with equally using the best effort without consider reliability, delays or performance characteristic of each other. With the growing presence and use of HTTP web services, web services request that the assessment of effective approaches to unprecedentedly strong. The QoS of the network's best effort today do not provide the performance necessary for a variety of interactive and multimedia applications that have demanded the delay and bandwidth requirements (Wydrowski & Zukerman, 2002). Web service invocation to avoid costly and time overriding, this study suggests cooperation QoS prediction methodology for web services to take advantage of Web services and use the experience of service users. Web services are self-described software applications intended to support interoperable machine-to-machine communication over a network via a regular interface and communication protocols.

#### 2.2 Related Literature

This section gives an overview of the research domain and the prior research studies that have been explored in regards to this research stream. It considers the demands, such as what analysis