### 中文摘要

本論文著眼於 All-IP 網路中的預算分配。我們定義網路的服務品質只 與各使用者使用網路頻寬的要求有關,提出一種使管理者能以統計上百分 比來估計網路服務品質的方法。這個方法包含路徑選擇以及頻寬分配二個 階段。為了展現這種方法的可行性,我們列舉一些數據來分別比較以最大 滿意度和最小成本為目標的不同分配結果,作為使用這個方法的參考。

關鍵字: All-IP 網路、資源分配



#### Abstract

In this thesis, we focus on budget allocation for All-IP networks. We propose a method which assists managers to estimate the quality of service on networks. The quality of service on networks is defined by satisfaction functions that are simply written in terms of bandwidth required by the users on the network. We present a two-phase approach which includes a path selection and a scheme for bandwidth allocation. In order to illustrate an easy implementation of this approach, we also develop the **Maximum Satisfaction Method** and the **Minimum Cost Method**. Numerical examples are given to show the effectiveness of our approach.

Keywords: All-IP Networks, Resource Allocation

### Contents

Abstract (in Chinese) I							
Abstra	act······	II					
<b>1. Introduction</b>							
2. The	2. The Maximum Satisfaction Method7						
2.1	The Tv	vo Phases: MBM and BRAM ······7					
2.2	Example 1 of MBM Model······12						
2.3	Examp	le 1 of BRAM Model with $w_1 = w_2 = w_3 \cdots 15$					
	2.3.1	Calculate the satisfaction by the expected number of					
		connections					
	2.3.2	Simulation of example 1 with the same weights 17					
2.4	Examp	le 1 of BRAM model with different weights 18					
	2.4.1	Calculate the satisfaction by the expected number of					
		connections 18					
	2.4.2	Simulation of example 1 with different weights 19					
2.5	Example 2 with MBM Model 19						
	2.5.1	Three classes have different weights					
	2.5.2	Simulation of example 2 22					
2.6	The Ap	oplication on another All-IP Network					
	2.6.1	Calculate the satisfaction with the expected number of					
		connections ······ 26					
	2.6.2	Simulation					
<b>3.</b> The	3. The Minimum Cost Method						
3.1	A Simulation Algorithm Applied on All-IP Networks						

B	Bibliography					
5.	Con	clusion	55			
	4.2	Anothe	er Network			
	4.1	Compa	arison by examples			
	Cos	t Metho	od			
4.	4. Comparison of Maximum Satisfaction Method with the Minimum					
	3.4	The Ap	pplication on another All-IP Network			
	3.3	Examp	ble 2 of MCM Model······ 40			
		3.2.3	Three classes with different weights			
		3.2.2	Example 1 of MCM with $w_1 = w_2 = w_3 \cdots 38$			
		3.2.1	Example 1 of MCM model			
	3.2	The M	inimum Cost Method			
		3.1.2	The simulation process			
		3.1.1	A Statistical inference process of our study			

## List of Tables

2.1	Three different classes of sessions 13
2.2	The optimal solution15
2.3	The relation between $M$ and the value of the satisfaction function 17
2.4	The bandwidth requirement and average number of connections 20
2.5	The optimal solution
2.6	The bandwidth requirement and average number of connections
2.7	The optimal solution
3.1	The relation between bandwidth and $Q\%$ of total bandwidth
	requirement ····································
3.2	The optimal solution
3.3	The relation between bandwidth and $Q\%$ of total bandwidth
	requirement ······ 41
3.4	The optimal solution
3.5	The relation between bandwidth and $Q\%$ of total bandwidth
	requirement ······ 45
3.6	The optimal solution
4.1	The bandwidth requirement and average number of connections
4.2	Comparison of MSM with MCM 50
4.3	The bandwidth requirement and average number of connections
4.4	Comparison of MSM with MCM 53

# **List of Figures**

1.1	The structure of the study6
2.1	MSM
2.2	A sample network
2.3	A sample network ······23
3.1	The statistical inference process of our study
3.2	The structure of our study
3.3	MCM algorithm

