

A NEAR REAL TIME SYSTEM TO DETERMINE A COST-EFFECTIVE IDD TRAFFIC ROUTING PLAN

MSC IN COMPUTER SCIENCE



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**MERENNAGE AROSHA ANTHONY
CHANDANA FERNANDO**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING,
UNIVERSITY OF MORATUWA,
SRI LANKA.
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MERENNAGE AROSHA ANTHONY CHANDANA FERNANDO

This dissertation was submitted to the Department of Computer Science and Engineering of the University of Moratuwa in partial fulfilment of the requirements for the Degree of MSc in Computer Science.

**Department of Computer Science and Engineering,
University of Moratuwa,
Sri Lanka.
December, 2007.**

I here by declare, that the work included in this dissertation in whole has not been submitted for any other academic qualification at any known institution to me.

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Merennage Arosha Anthony Chandana Fernando

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Dr. Sanath Jayasena. (Supervisor)



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ABSTRACT

International telecommunication has become a very important sector in the present day communication. IDD traffic is one of the main sources of revenue for national telecommunication service providers (Telcos). Hence, it has to be managed properly and driven effectively to gain maximum profit.

Telcos usually deal with multiple international operators (carriers) e.g. SingTel, Telstra, in order to use latter's networks for international traffic. These carriers offer different charging structures which vary with the time, volume and the destination.

Most Telcos incur high costs due to lack of a proper system to analyse and forecast an optimised IDD routing plan.

Therefore, a system which is capable of producing a cost-effective routing plan by analysing the current IDD usage pattern and the traffic cost would be much beneficial for all Telcos.

The objective of this research work is to find a suitable methodology for Telcos to produce a cost-effective routing plan for the IDD traffic in near real time.

In our approach, the main tasks are,

- Forecasting the IDD traffic pattern to each destination
- Determining the optimised routing plan.

Forecasting the future traffic was based on past traffic, current IDD traffic trend and the subscriber growth rate of Telcos.

A Genetic Algorithm (GA) was used to obtain the optimised routing plan. Dynamic behaviour of the problem domain was successfully addressed in the GA structure. The GA parameters, population size, number of generations and the GA operations (crossover, mutation and reproduction) ratio were determined experimentally.

Experimental results show that our solution is capable of producing a cost-effective routing plan in near-real-time which reduces the cost by 30% to 50% against the manual routing plan.

Our solution could be used by national Telcos to save significant costs in the international traffic and to pass some of that cost savings to their customers.

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LIST OF ABBREVIATIONS

BTCOM	-	British Telecom (<i>International Carrier</i>)
BVSNL	-	Baharat Sanchar Nigam Limited (<i>International Carrier</i>)
CCBS	-	Customer Care and Billing System
CDR	-	Call Detail Record
EXDB	-	Oracle 10g Express Edition
GA	-	Genetic Algorithms
GHz	-	Giga Hertz
IDD	-	International Direct Dialling
MB	-	Mega Bytes
MSC	-	Mobile Switching Centre
OSS	-	Operational Support System
PLSQL	-	Procedural Language/Structured Query Language (Oracle)
POI	-	Point of Interconnect
PSTN	-	Public Switch Telephone Network
QOS	-	Quality of Service
RIO	-	Reference Interconnection Offer
TRC	-	Telecom Regulatory Commission



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