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

MSC IN COMPUTER SCIENCE

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COST-EFFECTIVE IDD TRAFFIC ROUTING PLAN

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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.

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Sri Lanka.
I hereby 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.

Merennage Arosha Anthony Chandana Fernando

Dr. Sanath Jayasena, (Supervisor)
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.
ACKNOWLEDGEMENT

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I would also like to thank my wife Shamalka, my kids Shenuka & Avindya, and my parents Milson & Asilda for tolerating me and sacrificing so much during the period of this research project and for encouraging me continuously.

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Further, I would like to thank Ms. Kusum Liyanage for providing valuable information pertaining to International Telecommunication Business Practices. (Interconnect settlement procedure and making agreements with international carriers)

In conclusion I wish to acknowledge my friends, Mr. Suranga Ratnapala for helping me during the prototype development. Mr. Sanjeewa Ratnayaka for helping me to acquire real test data from telecoms, together with Mr. Kassapa Jayasinghe for his assistance in drawing figures and illustrations for the dissertation.
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<tr>
<td>BVSNL</td>
<td>Baharat Sanchar Nigam Limited <em>(International Carrier)</em></td>
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<tr>
<td>CCBS</td>
<td>Customer Care and Billing System</td>
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<tr>
<td>CDR</td>
<td>Call Detail Record</td>
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<td>EXDB</td>
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<td>GHz</td>
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<td>IDD</td>
<td>International Direct Dialling</td>
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<td>MB</td>
<td>Mega Bytes</td>
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<td>MSC</td>
<td>Mobile Switching Centre</td>
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<tr>
<td>OSS</td>
<td>Operational Support System</td>
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<tr>
<td>PLSQL</td>
<td>Procedural Language/Structured Query Language <em>(Oracle)</em></td>
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<tr>
<td>POI</td>
<td>Point of Interconnect</td>
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<td>PSTN</td>
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