UNIVERSITY OF NAIROBI

SCHOOL OF COMPUTING AND INFORMATICS

Telecommunication Traffic Forecasting Model

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Declaration

I certify that all work presented in this report is my original work and has not been submitted for any other academic award at any other university. The work presented was carried out under the supervision of Mr. Andrew Mwaura of the University of Nairobi, School of Computing and Informatics. All the work in this Research Project is my own except where acknowledged in the text.

Signature ..... Date..... 31/10/2011

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This Research Project has been submitted in partial fulfilment of the requirements for the award of a Master of Science Degree in Computer Science of the University of Nairobi with my approval as the University Supervisor.

Signature..... Date..... 21/Nov/2011

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Abstract

A problem of limited resources at the International Switch existed and this led to congestion. Congestion occurred when the call load exceeded the capacity of available routes or trunks, or of common control equipment for example, call registers that temporarily store call data while the call is being processed. Congestion also occurred when the call load could not be handled in available real time. There were some identified calls drop rates of about 15% due to limited Bandwidth resources at the Switch and this posed challenges of lost revenue. Telecommunications system designers have studied the problem of system resource congestion for years. These same problems were evident at the switch where International Traffic got transited from all local operators to International operators.

We discuss the results of the study done on forecasting the Telecommunication Traffic from Kenya local operators to the International destinations through a common gateway, the International Switch (IGW). The idea was to determine the volumes of traffic each operator transit through the International Switch and to pick the operator giving maximum revenue to the company and to optimize the resources available at the International Switch based on the outcome of the prediction scenarios.

Success on data collection eventually led to the formulation of data cycles each cycle containing 7-days. The derived seasonal indices of the days in the cycle were found to be considerably applicable in the computations of the trend and seasonal forecasts. Forecasting was determined by developing a Linear Regression model and then fitting an observed dataset of four months (Jan-April) into the model with two independent variables namely duration and period being used as the key elements. Time series were used due to their intelligent nature of learning from additional data. An Artificial neural network forecasting model was also developed. The system could forecast the operator's traffic volumes based on the past historical trends and provide decision-making for the Carrier Connect team to implement.

The research reveals that in making predictions regarding Telecommunication Traffic, a Prediction Model can be developed and be implemented whose objective is to predict traffic volumes. The results also reveal that the Linear Regression model shows better optimal results than the Neural Network system in the Forecasting of Telecommunication traffic.