DEVELOPMENT OF A SERVER SWITCHING MODEL FOR INTERNET PERFORMANCE IMPROVEMENT

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ABSTRACT

This study developed a model and an algorithm for simulating the automatic server switching Internet connectivity. It also evaluated the performance of the developed model. This was with a view to eliminating the roll back problems associated with current Standby Replacement scheme and thereby providing uninterrupted Internet services.

A non-intrusive server switching Internet system connectivity la, as designed using Markovian a.nd Stationarity processes to identify and absorb faults impairing the Internet services performance. System failure was measured discretely, or "counted", together with stationarity ruses using Markovian processes. The Markovian and Stationarity processes were used to develop the algorithm for the simulation program that implemented the server switching process. A simple architecture based on Basic Fault-Tolerant architecture was developed for the server switching. This was simulated using Microsoft Visual Basic version 6.0. The performance of the system was tested on Series, Triplicated Modular Redundancy and Standby Replacement schemes. The performance evaluation of the developed algorithm was carried out by written codes for the implementation of the algorithm in Microsoft Visual Basic version 6.0.

The results showed that the model of a single connection is characterized by three non-negative parameters: *the transition rate* λ_j from *state 0* to state 1, the transition rate μ_j; from state 1 to state 0, and the transfer rate Bw_j; when in state 1. The algorithm defined $O_j(t)$ the total time spent by the network connection from proxy server S_j to the client in state active *(i.e.* $X_j(t) = 1$) during, the interval [0, *t*] which represented the operational time distribution of the Markov process X over the interval [0,t]. Also, the results showed that server switching Internet connectivity had Internet performance improvement of 5.96% over the existing single

server model of Internet connectivity. Markovian and Stationarity rules enabled automatic switching over from faulty server to the next immediate viable spare. Similarly, the rollback problem associated with Standby Replacement scheme during system down time was removed by deployment and redeployment of faulty server. The developed model exhibited 99.98% system availability with 0.019% deviation from the expected standard (99.999%) while the existing Standby Replacement scheme had 99.68 system availability with 0.319% deviation.

The study concluded that the developed automatic server switching technique provided increased system availability for Internet users.