INCORPORATING NETWORK AND SERVICE QUALITY INTO QUALITY OF EXPERIENCE MEASUREMENT FOR NETWORK SERVICES

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This thesis is dedicated to my parents, sisters, and my love for their endless support and encouragement.

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ABSTRACT

Measuring the quality of IP network services that users are experiencing and maintaining their loyalty towards these services are the most important factors that service providers consider. The existing evaluation methods for calculating the Quality of Experience (QoE) are categorized into two groups named subjective and objective. The subjective approaches are expensive and time consuming. The focus of this study is on objective measurement of QoE for VoIP application, but the main problem with these approaches is that they do not consider all the network and service details in their calculation models. During conducting the research, different questions has been focused on, how QoE measurement can help service providers in their business, and how objective measurement of QoE can be conducted to cover all the factors which are needed to measure the best and the most accurate quality from the user's point of view. The results of this research are based on a survey which has been done in UTM main campus (Johor) between three engineering faculties, experimental results and information from literature. At the end of this study a new model for measuring the QoE of VoIP application is proposed and based on this model a managing and monitoring framework for QoE is presented. This framework has 6 phases where in each phase different attributes and parameters are measured and calculated and then are utilized in the proposed model to repot the final level of QoE.

ABSTRAK

Mengukur kualiti perkhidmatan rangkaian IP bahawa pengguna mengalami dan mempertahankan kesetiaan mereka terhadap perkhidmatan ini merupakan faktor yang paling penting bahawa pembekal perkhidmatan dipertimbangkan. Kaedah penilaian yang ada untuk menghitung Kualiti Experience (QoE) dikategorikan ke dalam dua kumpulan bernama subjektif dan objektif. Pendekatan subjektif adalah mahal dan memakan masa. Fokus kajian ini adalah pengukuran tujuan QoE untuk aplikasi VoIP, tetapi masalah utama dengan pendekatan ini adalah bahawa mereka tidak menganggap semua detail rangkaian dan perkhidmatan dalam model perhitungan mereka. Selama melakukan kajian soalan berbeza telah terfokus pada, bagaimana pengukuran QoE dapat membantu pembekal perkhidmatan dalam perniagaan mereka, dan bagaimana tujuan pengukuran QoE boleh dilakukan untuk menutup semua faktor yang diperlukan untuk mengukur kualiti terbaik dan paling tepat dari user sudut pandang. Hasil dari kajian ini didasarkan pada kajian yang telah dilakukan di kampus UTM utama (Johor) antara tiga fakulti teknik, keputusan eksperimen dan maklumat dari literatur. Pada akhir kajian ini model baru untuk mengukur QoE aplikasi VoIP dicadangkan dan berdasarkan model pengurusan dan rangka pemantauan untuk QoE disajikan. Rangka kerja ini mempunyai 6 fasa di mana dalam setiap fasa atribut yang berbeza dan parameter yang diukur dan dikira dan kemudian digunakan dalam model yang diajukan untuk merepoting peringkat akhir QoE.