DESIGNING A FOUR-TIER ARCHITECTURE FOR A WEB-BASED SIMULATON ENVIRONMENT

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DESIGNING A FOUR-TIER ARCHITECTURE FOR A WEB-BASED SIMULATON ENVIRONMENT

A thesis submitted to the Graduate School in partial fulfillment of the requirements for the degree Master of Science (Information Technology), Universiti Utara Malaysia

by

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ABSTRAK

Perkembangan teknologi masa kini yang berlaku dengan amat pantas telah mengakibatkan satu evolusi dalam teknologi simulasi. Kewujudan *Internet* dan *World Wide Web* memberi banyak kesan kepada aspek-aspek teknik simulasi yang dilakukan secara konvensional. Ini kerana, teknologi *Web* mempunyai potensi yang besar untuk mengubah cara bagaimana sesuatu model simulasi itu dibangunkan, didokumentasikan, dianalisa dan juga dilaksanakan. Pengaplikasian teknologi *Web* di dalam teknologi simulasi konvensional telah melahirkan satu konsep aplikasi baru, yang dikenali sebagai *Web-based simulation.* Salah satu manfaat yang boleh diambil dari kecanggihan teknologi *Web* adalah melakukan integrasi di antara aplikasi *Web-based simulation* dengan storan data. Antara kelebihan yang nyata apabila integrasi ini dilakukan adalah model-model simulasi boleh dibandingkan dengan mudah apabila input-input parameter yang berbeza digunakan. Ini kerana hasil keputusan untuk setiap model tersebut boleh disimpan di dalam storan data dan digunakan semula pada bila-bila masa. Projek yang dilakukan ini memberi pengkhususan kepada pendekatan yang boleh diambil untuk mengintegrasikan *Web-based simulation* dengan storan data. *Four-tiered architecture* adalah bentuk senibina yang dicadangkan untuk projek ini, dan beberapa teknik diambil kira dalam membina konsep tersebut, selain daripada ciri-ciri keselamatan yang boleh diambil.

Katakunci : simulasi, *Web-based simulation,* storan data, *tiered-architecture*

ABSTRACT

Vast and rapid technological innovations and advancement have created an evolution to the field of simulation. The birth of the Internet and the World Wide Web (WWW) has significantly influenced many aspects of conventional simulation techniques. In addition, the Web technologies have the potentials to alter the ways in which simulation models are developed, documented, analyzed and executed. The deployment of the Web technologies in the simulation application has given a new birth to the field, a concept known as Web-based simulation. One of the advantages that can be taken from the Web advent technologies is the integration of the Web-based simulation with databases. The most prominent advantage is simulation models using different input parameters can be easily compared as the results will be stored in the database server, and can also be retrieved anytime. In addition, it also enables information sharing across different groups for various decisions making based on the models created. The study conducted focuses on approaches that can be taken to integrate Web-based simulation with databases. A four-tier architecture is proposed as a resolution to the limitations of two and three-tier architecture. Several tools and techniques are taken into consideration in developing a conceptual framework for the environment in addition to security features that should be incorporated to ensure a secure link to the Internet and Web users.

Keywords : simulation, Web-based simulation, database, tiered-architecture.

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CHAPTER 1 : INTRODUCTION

The emergence of the World Wide Web (WWW) has produced very large impacts to many disciplines in which their approaches, techniques and philosophies have to be re-evaluated (Page and Opper, 1999). The WWW is the most powerful and popular portion of the Internet, and since its first publicly available in 1993, many organizations and individuals have taken full advantages of its potentials. Computer simulation field is not an exception to this phenomenon. In a simple explanation, a simulation is defined as an imitation of a real world process or system (Banks, 1999). A more precise definition of simulation as given by Shannon is ; "simulation is the process of designing a model of a real system and conducting experiments with this model for the purpose of either understanding the behavior of the system and/or evaluating various strategies for the operation of the system" (1992). Generally, simulation is used as a methodology to describe and analyze the behavior of a system, where the 'what if' questions are the keys to aid in designing the real system (Banks, 1999).

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