IMPROVING SERVICE REUSABILITY USING ENTERPRISE SERVICE BUS AND BUSINESS PROCESS EXECUTION LANGUAGE

AKO ABUBAKR JAAFAR

A project report submitted in partial fulfillment of the
requirements for the award of the degree of
Master of Science (Computer Science)

Faculty of Computer Science and Information Systems
University of Technology Malaysia

JANUARY, 2013

‘I declare that this dissertation entitled “**Improving Service Reusability Using Enterprise Service Bus and Business Process Execution Language**” is the result of my own research except as cited in the references. The dissertation has not been accepted for any degree and is not concurrently submitted in candidature of any other degree’.

Signature: .....

Name: AKO ABUBAKR JAAFAR

Date: 29 January 2013

TO MY PARENTS, WIFE AND FAMILY FOR THEIR LOVE AND SUPPORT

ACKNOWLEDGFEMENT

First of all, I would like to warmly express my utmost gratitude to Allah S.W.T for His blessing and given strength during the completion of this research.

I would like to express my sincere appreciation to my supervisor Associate Prof. Dr. Dayang Norhayati Abang Jawawi. She has been extremely helpful and offered great guidance throughout this research. Without her continual support and guidance, this research report would not have been the same as presented here.

Special thanks to my colleagues and friends for the collaboration in knowledge-sharing with each other. My sincere appreciation also extends to all of the lecturers and members in Faculty of Computer Science and Information System, UTM.

Last but not least, my heartfelt thanks go to all of my family members (my parents and my lovely wife), whose sacrifice, support, love, caring inspired me to overcome all the difficulties throughout my entire academic life.

ABSTRACT

Despite the ability of current technologies to integrate different applications together, it also makes integrating application and systems more complicated due to poor reusability and coupling in the present technologies. The integration solution of a traditional enterprise application usually focuses on Point to Point (P2P) integration. Generally, this type of integration creates tight coupling and complex integration. Service Oriented Architecture (SOA) based integration application is the most current solution which transforms IT systems into highly reusable and loosely coupled services. Web Services are the most prominent and experienced technology under the SOA's flag. But using Web Services in SOA-Based integration alone still provides P2P integration. The middleware Enterprise Service Bus (ESB) and orchestration language Business Process Execution Language (BPEL) together can provide loosely coupled and reusable integration. Web Services and ESB/BPEL have a different level of reusability. Consequently, this study attempts to investigate the reusability level of ESB/BPEL as compared to Web Services. The evaluation of ESB/BPEL and Point to Point Web Services (P2PWS) has been conducted using the Islamic Banking System integration case study. The implementation services were examined and evaluated using quality model metrics to exhibit the reusability level of ESB/BPEL and P2PWS. Besides the reusability level, the response time of the two approaches has been measured to illustrate architecture impact on performance. The result shows that the ESB/BPEL had a higher level of reusability but poor response time as compared to P2PWS.

ABSTRAK

Walaupun teknologi masa kini berupaya mengintegrasikan aplikasi yang berlainan, ia juga membuat integrasi aplikasi dan sistem lebih rumit disebabkan oleh kebolehgunaan semula yang kurang memuaskan dan gandingan dalam teknologi sekarang. Penyelesaian integrasi dalam aplikasi perusahaan biasa lazimnya tertumpu kepada integrasi titik ke titik (P2P). Secara amnya, integrasi sebegini membentuk gandingan yang ketat dan integrasi yang rumit. Aplikasi integrasi berdasarkan berorientasikan perkhidmatan seni bina (SOA) ialah penyelesaian yang paling terkini yang mengubah sistem IT menjadi perkhidmatan sistem guna semula yang tinggi dan hubungan gandingan yang longgar. Perkhidmatan Web adalah teknologi yang paling ketara dan paling lama digunakan dibawah bendera SOA. Tetapi menggunakan perkhidmatan Web di dalam integrasi berdasarkan SOA sahaja masih menyumbang kepada integrasi P2P. Perantaraan Bas Perkhidmatan Perusahaan (ESB) dan (BPEL) bersama-sama menyumbang kepada gandingan yang longgar dan integrasi penggunaan semula. Perkhidmatan Web dan ESB/BPEL mempunyai tahap kebolehgunaan semula yang berbeza. Oleh itu, kajian ini cuba untuk menyiasat tahap penggunaan semula ESB/BPEL berbanding dengan perkhidmatan Web. Penilaian ESB/BPEL dan (P2PWS) telah dikendalikan menggunakan kes kajian integrasi sistem perbankan Islam. Implementasi perkhidmatan-perkhidmatan telah dikaji dan dinilai menggunakan metrik model kualiti untuk menunjukkan tahap kebolehgunaan semula ESB/BPEL dan P2PWS. Selain daripada tahap kebolehgunaan semula, tempoh tindak balas kedua-dua pendekatan tersebut telah diukur untuk menggambarkan kesan reka bentuk ke atas pencapaian mereka. Keputusan menunjukkan bahawa ESB/BPEL mempunyai tahap tempoh tindak balas semula yang lebih tinggi tetapi , tempoh tindak balas yang kurang memuaskan berbanding dengan P2PWS.

TABLE OF CONTENTS