Title: An Adaptability-driven Economic Model for Service Profitability

Speaker: Mr Ouh Eng Lieh
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Supervisor: Dr Stanislaw Jarzabek, Associate Professor, School of Computing
Dr Khoo Siau Cheng, Associate Professor, School of Computing

Abstract:

In today's rapidly changing IT and business environment, software adaptability is a critical weapon for survival. This is particularly true for web and mobile services that need serve many users, with varying requirements for a service. Inflexible, not well thought-out architectural design decisions can reduce upfront service engineering costs, but may also hinder options for future enhancements and profitability of a service.

The main subject of this thesis is adaptability of web services in view of constraints of architectural models and how adaptability, along with many other factors, affects service profitability. The main deliverable of the thesis is an economic model of service profitability that formally represents and ties together factors pertaining to service profitability, allowing service providers to better understand the trade-offs involved in decisions regarding service profitability, and also to do quantitative reasoning about service profitability. We propose a software tool based on this model to help service providers analyze cost-benefits of different service engineering and provisioning strategies.

The first part of our work shows that adaptability of services has profound impact on service profitability and long-term success. Adaptability is particularly difficult to achieve for mobile services that are expected to dominate computing on-the-go in the future. Therefore, in addition to the economic model, as a secondary theme of the thesis we experimentally studied strengths and limitations of static and dynamic adaptation techniques for mobile services. To get proper insights, we built an environment for static and dynamic adaptation strategies and applied it to a family of mobile apps for mood self-assessment. Here, the main deliverable is a construction-time app adaptation environment providing a remedy for limitations of runtime adaptation strategies. In the thesis, we demonstrate practicality of the proposed construction-time app adaptation strategy with an example of a family of mood self-assessment mobile service apps. For the same family of mobile service apps, we conducted a comparative study of static and dynamic adaptation techniques.
Unique contribution of the thesis is in addressing and formalizing the intimate relationship between adaptability and profitability of web services and relationship between adaptability and quality of mobile services, the topic that has not received attention so far in service research. Furthermore for web services, we considered adaptability in the context of other factors that collectively determine service profitability, trying to qualify and quantify the inter-play among those factors. This analysis led to an economic model of service profitability, to our best knowledge the first of that kind in service research. While we believe our proposed economic model of service profitability is useful in current form, there is ample room for extending it in future research.