UMass Dartmouth
COLLEGE OF ENGINEERING

Computer and
Information Science
Department

MASTER'S THESIS (SPRING 2013)

TOPIC: ***Optimal Configuration for Dynamic Composite Services in Cloud Computing***

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ABSTRACT

In cloud computing, software as a service (SaaS) is becoming an increasingly prevalent developmental approach using web services and service-oriented architecture (SOA). However, standalone cloud services are typically not sufficient for fulfilling complex user requirements. In order to meet such requirements, existing services need to be composed into high-level ones using predefined process models, which specify the control flow of service components using various control structures such as serial, parallel, choice and loop. Since there could be many available cloud services deployed over the Internet that perform similar or identical functions, it becomes essential to develop a feasible method to select the most suitable one for each task defined in the process model based on multiple quality of service (QoS) parameters. In this thesis, we demonstrate a method to obtain an optimal solution for composite services using linear programming. Our goal is to maximize the overall quality of a composite service, while minimizing the risk of service failures. By analyzing the structure of composition and the degree of dependence between various components in a process model, we first design algorithms to calculate the aggregated values of nonfunctional characteristics of a composite service (e.g., service cost, service reliability and response time). Then based on QoS requirements, we develop a tool that can automatically generate an objective function in order to compute the optimal configuration for a process model using a linear programming solver. Finally, to demonstrate the feasibility of our approach, we adopt a healthcare cloud-based application, and show that our approach is efficient and effective for optimal configuration of dynamic composite services.

NOTE: All CIS graduate students are encouraged to attend. Open to the public.