

**MASTER'S PROJECT (FALL 2011)**

TOPIC: *Modeling and Evaluating the Reliability of Web Service Applications in Cloud Computing Using Dynamic Fault Trees*

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ABSTRACT

Web service applications are typically implemented by composing distributed service components according to predefined process models in order to perform some specific tasks in cloud computing. Nonfunctional characteristics such as reliability, security and availability of a web service application and hence its service components play an important role in evaluating the system performance of the web service application. In this project, we consider the reliability of a web service application and propose a dynamic reliability model for composite web services using dynamic fault trees (DFT). We apply the divide and conquer technique to break down the problem of evaluating the reliability of a web service application into sub-problems of evaluating the reliability of its constitutive service components. In our model, we consider the reliability of both the software component and the hardware platform where the software component is deployed. The dynamic reliability of the atomic software components and the hardware platforms can be modeled by constant failure rates. Once the reliability of each constitutive service component is evaluated using the DFT analysis, the reliability of the web service application can be calculated based on the process model and the functional dependency among the constitutive components. We use a case study of an online payment system in e-commerce to demonstrate the feasibility of our approach.