A Modeling based Architectural Framework for Multi-Tenant SaaS Web Application Development

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Degree of Master of Science

Department of Computer Science and Engineering

University of Moratuwa
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Declaration

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Tharaka de Alwis Date

The above candidate has carried out research for the Masters thesis under my supervision.

Dr. Chandana Gamage Date
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Abstract

In the era of cloud computing, Software as a Service (SaaS) has been coined as the next generation of web application software solutions. In this model software needs to allow multiple users organizations (tenants) to use the same application instance in a highly reliable and secure manner. Users will be given access to the application on a subscription basis and the application is customized according to their needs by changing user interfaces, work-flow and business processes. SaaS gives end user organizations an opportunity to engage in business without making a significant investment on buying expensive hardware or software. The end users' customized solution is hosted over the Internet giving them the opportunity to access the application as a utility service, on-demand basis.

From a functional perspective SaaS web applications require the capabilities of customization and configurability to support the evolution of the product. Since multiple end user organizations make use of the application, high attention towards security, scalability, performance and availability is mandatory from an architectural perspective. This makes SaaS application development, deployment, migration and maintenance extremely challenging and sometimes considered as an engineering nightmare. The research community has come up with different frameworks and modeling approaches to develop SaaS applications. Yet there are very few architectural tools to model SaaS solutions to help architects develop practically feasible SaaS solutions.

Our intention from the project was to identify the challenges in SaaS application development, maintenance and migration. We propose a modeling based SaaS framework with a set of tools and an effective methodology to develop the SaaS solutions efficiently while meeting the critical SaaS architectural requirements. The authors have come up with a framework to develop SaaS applications using third party web application frameworks and UML 2.0 based Profile named SaaSML. Using the proposed modeling based SaaS framework approach, Software Architects will be able to easily build SaaS web applications and address the challenges of SaaS application development life cycle.

Keywords: Multi-Tenant SaaS web application, SaaS Framework, Software Architecture tools, UML and XML based modeling tool

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