

**Design and Implementation of a Single Sign-on Solution**

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by

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## **DISCLAIMER**

This thesis is being submitted as partial and final fulfillment of the cooperative work experience requirements of Kettering University needed to obtain a Bachelor of Science in Computer Science.

The conclusions and opinions expressed in this thesis are those of the writer and do not necessarily represent the position of Kettering University or my employer, or any of its directors, officers, agents, or employees with respect to the matters discussed.

## **PREFACE**

This thesis represents the capstone of my five years combined academic work at Kettering University and job experience at Mika Systems, Inc. Academic experience in Computer Science, proved to be valuable assets while I developed this thesis and addressed the problem it concerns. Although this thesis represents the compilation of my own efforts, I would like to acknowledge and extend my sincere gratitude to the following persons for their valuable time and assistance, without whom the completion of this thesis would not have been possible:

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## I. INTRODUCTION

### **Problem Topic**

As Sallie Mae Home Loans grows as a company, their computer networks must also expand to meet the needs of their employees and customers. Their recent rapid growth has led to requiring several different usernames and passwords from each user. This increase in complexity has caused a general decrease in productivity among the information technology staff and the loan officers they provide service to.

### **Background**

Within the past year, Sallie Mae Home Loans (SMHL) acquired offices in both Arizona, and Massachusetts greatly expanding the number of loan officers who needed access to their applications. This increased the amount of services that the information technology group needed to provide as well as the technical support load. Unfortunately, not all computer systems are designed to easily interoperate. Integrating the authentication of these disparate applications with one central database presented a great challenge for SMHL's IT staff so they requested that Mika Systems design a single sign-on solution for their network.

### **Criteria and Parameter Restrictions**

In order for the project to be considered a technical success users must be able to log in to their workstation with a SecurID keyfob and automatically be able to access multiple

computer systems and applications. Specifically, they must be able to access the corporate Contact Resource Management (CRM) application, Microsoft Windows data shares, and Open-Xchange Groupware. Secondly, the administration of the system must be centralized and easy to maintain. Finally, a preferred solution would only duplicate a user's data in a minimum of locations, or in one central Oracle database.

## **Methodology**

The process used for the development of this software borrows heavily from the Waterfall Model of software engineering. The steps of this model are:

1. Requirements
2. Specification
3. Planning
4. Design
5. Implementation
6. Integration
7. Maintenance

The preceding seven steps are divided into four stages. The first stage, "Analysis," encompasses the gathering of requirements and creation of a simple specification by the software engineer. A number of possible solutions will be considered in this stage and the software engineer will discuss the options with the customer to determine the best option to pursue. The second stage, "Design," contains the next two steps in the waterfall model. In the design stage, the software engineer takes the specification created in the analysis stage and creates a methodology to solve the problem. Next the third stage, "Implementation," contains the implementation and integration. One very important part of this stage

is continuous testing of code and software. Finally, the code is placed into maintenance. Maintenance is generally for solving any problems that might crop up during the life of the solution, such as hardware upgrades or related software upgrades.

The waterfall model and the four stages are not monolithic and will almost always be deviated from in some way. A developer may have to revisit the design and planning stages at any time during the development cycle. For example, problems might arise in the implementation stage that cannot be solved in a cost efficient way and a revision to the design may need necessary. This pattern also tends to restart when new features are requested.

### **Primary Purpose**

This thesis presents the results of investigating potential single sign-on solutions.

### **Overview**

Chapter II contains an analysis of the requirements devised by MIKA Systems, Sallie Mae Home Loans, and the author. Next, Chapter III contains design and related information for the project. Chapter IV discusses the implementation, testing, and integration of the final solution. Finally, Chapter V contains conclusions , recommendations and possible future developments.



## II. REQUIREMENTS AND ANALYSIS

### Overview

### **III. DESIGN AND SPECIFICATION**

#### **Overview**

## **IV. IMPLEMENTATION, INTEGRATION, AND TESTING**

### **Overview**

## **V. CONCLUSIONS AND RECOMMENDATIONS**

**Conclusions**

**RECOMMENDATIONS**

**Future Development**