Software Requirements Specification

For

OPTIMIZED MOODLE LEARNING MANAGEMENT SYSTEM WITH POLICY ENFORCEMENT

Version 1.0

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GROUP 2 - OPTIMIZING MOODLE LMS TO IMPROVE USER RESPONSE TIME

SUMMER INTERNSHIP 2013

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18TH JUNE 2013
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1. Introduction

1.1 Purpose

The purpose of this section is to provide the reader with a general, background information and an insight into the web application of “Optimized Moodle Learning Management System” and is to specify the requirements for policy enforcement framework for moodle.

1.2 Document Conventions

Acronyms and Abbreviations:

a. LMS: Learning Management System
b. SRS: Software Requirements Specification
c. UC: Use Case
d. SDD : Software Design Description
e. Policy: A proposed or adopted course or principle of action
f. Context: Defines the circumstance, such as time and location in which the policy is valid

1.3 Intended Audience and Reading Suggestions

The intended audience for the Optimized Moodle LMS is the web designers, Academicians and the Education Industry comprising of Institute Heads, students and faculty who are currently using or are interested to use the Moodle LMS.

Developer: If the developer wants to read, change, modify or add new requirements into the existing system, he/she must first consult this document, update the requirements in an appropriate manner and pass the information correctly to the other phases of the development process.

User: The user of this program reviews the specifications presented in this document determines if the software has all the suitable requirements and whether the software developer has implemented all of them.
1.4 Project Scope

Optimized Moodle LMS is a very useful web application for education industry. This application supports each and every feature of Moodle LMS but it significantly reduces the average user response time for each activity. Numerous Optimization Techniques have been applied to optimize the Moodle LMS.

Policy enforcement deals with users security and privacy concerns, by allowing them to define policy rules.

The main goals are:

- To restrict the usage of resources
- To prevent privilege escalation attack
- To provide fine-grained access control

When integrated with moodle, these policy enforcements can help the teacher/admin to block some apps, such as wikipedia during a quiz/test.

1.5 References

Appendix A: Glossary
This citation is used as a model of reference:
[IEEE Std 830-1998]

2. Overall Description

2.1 Product Perspective

Moodle (acronym for Modular Object-Oriented Dynamic Learning Environment) is a free source e-learning software platform, also known as a Learning Management System, or Virtual Learning Environment (VLE). As of June 2013 it had a user base of 83,008 registered and verified sites, serving 70,696,570 users in 7.5+ million courses with 1.2+ million teachers.

This section considers an idea of a policy enforcement framework for Moodle in Aakash tablet.

Some of the use-cases explaining why a policy enforcement framework is required are as follows:

- When moodle is being used for conducting quizzes or exams in schools, only the quiz or exam related apps should get open. Any request to start any of the remaining apps should be blocked.
• During school-time, students can open a limited set of apps.

• List of allowed apps would be defined by schools (teachers). For example, students should not be able to open social networking apps (like Facebook, Twitter) or gaming apps (like Angry Birds, Temple Run) during school-time (say, 9:00am to 3:30pm) while a quiz is being conducted on moodle.

**Context Attributes**

The policy framework allows also allows users to define context-aware policies. All the policy frameworks have implemented policies based on time and location. If the system time and location matches with the context attributes, then the policy is valid. Otherwise it is invalid and the next policy is considered.

2.2 **Product Features**

• This web application is optimized using the following techniques:
  
  - Use of Image Maps
  - Changing Hardware Configuration to SSD
  - Removing Irrelevant Data Displayed During Quiz Activity
  - Use of far future headers

• The web application has a user friendly interface and is easy to use.

  The main features of policy framework are:

  2.2.1 Rearrange priority

  The policy priority can be altered easily by using drag and drop facility to sort the policies.

  2.2.2 Add more context

  A policy can have more than one context. There is an option to add more context for the policy.

  2.2.3 Edit policy

  The policy attributes can be modified by the teacher.
2.3 User Classes and Characteristics

- **Web Designers**
  
  A web designer is someone who engages in web design. Web design encompasses many different skills and disciplines in the production and maintenance of websites. The web designers can employ the techniques discussed in this document to optimize their websites.

- **Education Community**
  
  This application is of great use to the education community who are currently using or are interested in using Moodle LMS.
  
  - **Physical Actors:**
    
    Student: The student is the one who login to moodle and then gets himself/herself enrolled in a course and take part in a quiz

  - **Teacher:** The teacher is the one who enforce policy on certain application while a quiz is being conducted

2.4 Operating Environment

OE-1: The Optimized Moodle LMS shall operate with the any web browser.

OE-2: The Optimized Moodle LMS shall operate on Windows 7 and Ubuntu 12.10 operating system.

OE-3: The Optimized Moodle LMS is free of cost and can be accessed by any user.

2.5 Design and Implementation Constraints

CO-1: The system shall be developed using FireBug, HttpFox and IMacros extension for Firefox.

CO-2: The software shall be tested using Apache JMeter.

2.6 User Documentation

UD-1: The system shall provide an online link to the learning resources available on the Moodle Docs for the understanding of the user.
2.7 Assumptions and Dependencies

AS-1: The server used for Optimized Moodle LMS is Apache 2.22.
AS-2: The database used for Optimized Moodle LMS is MySQL 5.5.31.
AS-3: The Moodle Version 2.5 is used to develop the system.
DE-1: The operation of the Optimized Moodle LMS depends on the number of concurrent users and the activities accessed.

3. System Features

3.1.1 Login Page

3.1.2 Description and Priority

Provide the user with a page to login to Optimized Moodle LMS.
Priority = 9

3.1.3 Stimulus/Response Sequences

Stimulus: User clicks on Login Link.
Response: Login Page is displayed
Stimulus: User Enters Username and Password
Response: Username and Password are validated from MySQL Database.
Stimulus: User Clicks on Login Button
Response: Home Page is displayed if Username and Password is correct else Error Message is displayed.

3.1.3 Functional Requirements

REQ-1: The user shall be able to view and click on Login Link.
REQ-2: The user shall be able to enter the username and password
REQ-3: The database shall be able to validate username and password.
3.2 View Course

3.2.1 Description and Priority

Provide the user with a page to view courses and to view activities associated with each course.
Priority = 9

3.2.2 Stimulus/Response Sequences

Stimulus: User clicks on Courses Link
Response: Courses are displayed
Stimulus: User Clicks on a particular course
Response: The course page and associated activities are displayed.

3.2.3 Functional Requirements

REQ-1: The user shall be able to view and click on the Courses Link.
REQ-2: The user shall be able to view the activities associated with each course.
3.3 Attempt Quiz Activity

3.3.1 Description and Priority

The user shall be able to attempt the quiz activity.
Priority = 9

3.3.2 Stimulus/Response Sequences

Stimulus: User clicks on Quiz Activity
Response: The quiz is displayed.

Stimulus: User clicks on Next
Response: The subsequent quiz page is displayed.

Stimulus: User clicks on Finish Quiz
Response: The quiz result is displayed.

3.1.3 Functional Requirements

REQ-1: The user shall be able to view and answer the quiz questions.
3.4 Participate in Chat Activity

3.4.1 Description and Priority

The user shall be able to participate in chat activity.

Priority = 9

3.4.2 Stimulus/Response Sequences

Stimulus: User clicks on Chat Activity
Response: Chat Room is displayed.
Stimulus: User posts messages.
Response: Message is displayed.

3.1.3 Functional Requirements

REQ-1: The user shall be able to view chat room and post messages.
3.5 View News Forum

3.5.1 Description and Priority

The User shall be able to view news forum.

Priority = 9

3.5.2 Stimulus/Response Sequences

Stimulus: User clicks on News Forum

Response: News Forum Page is displayed.

3.1.3 Functional Requirements

REQ-1: The system shall be able to view news forum.
3.6 View User Profile

3.6.1 Description and Priority

The User shall be able to view User Profile.

Priority = 9

3.6.2 Stimulus/Response Sequences

Stimulus: User clicks on Settings -> User Profile
Response: User Profile page is displayed.

3.1.3 Functional Requirements

REQ-1: The user shall be able to view user profile
3.7 Logout

3.7.1 Description and Priority

The user shall be able to Logout.

Priority = 9

3.7.2 Stimulus/Response Sequences

Stimulus: User clicks on Logout link

Response: User is logged out and index page is displayed.

3.1.3 Functional Requirements

REQ-1: The user shall be able to logout from the System.
4. External Interface Requirements

4.1 User Interfaces

UI-1: The system shall provide all functionalities and activities supported by Moodle LMS

UI-2: The pages shall permit complete navigation and item selection.

UI-3: Provide User interface to create a policy

UI-4: Provide User interface to add a context

UI-5: Provide User interface to edit policy

4.2 Hardware Interfaces

HI-1: Processor 1GHz or faster
HI-2: RAM 1GB (32bit) or 2GB (64bit)
HI-3: Hard disk space 16GB (32bit) or 20GB (64bit)

4.3 Software Interfaces

Apache Server 2.2 and MySQL 5.5.31 and PHP 5.4.6 must be installed

4.4 Communications Interfaces

CI-1: The Optimized Moodle LMS shall use MySQL Database named “Moodle”

CI-2: The Optimized Moodle LMS shall be able to send emails to the users.

CI-3: The Optimized Moodle LMS uses PHP 5.4.6 to generate Moodle pages.
5. Other Nonfunctional Requirements

5.1 Performance Requirements

PE-1: Responses to queries shall take no longer than 3 milliseconds to load onto the screen after the user submits the query for 1 user.

PE-2: The system shall display confirmation messages to users within 4 milliseconds after the user submits information to the system.

PE-3: The system should generate policy with an accuracy of 99%.

5.2 Safety Requirements

Consistency: Checking the fact that all clients must be attached to one server, so there is an appropriate control of the information.

5.3 Security Requirements

SE-1: The files generated by the user are only accessible by the admin and application should store these files in MySQL database and must no share them.

SE-2: The policy framework should be accessible only by teachers.

5.4 Software Quality Attributes

Availability-1: The Optimized Moodle LMS shall be available to users all the time.

Availability-2: Checking that the system always has something to function and always pop up error messages in case of component failure.

Efficiency-1: The Optimized Moodle LMS shall generate the correct pages with an accuracy of 99%.

Efficiency-2: Checking that the system provides the right tools to support all its features.

6. Other Requirements

All the requirements have been specified
Appendix A: Glossary

Definitions:

a. **Moodle**: Moodle (acronym for Modular Object-Oriented Dynamic Learning Environment) is a free source e-learning software platform, also known as a Learning Management System, or Virtual Learning Environment (VLE).

b. **Apache JMeter**: The Apache JMeter™ desktop application is open source software, a 100% pure Java application designed to load test functional behavior and measure performance. It was originally designed for testing Web Applications but has since expanded to other test functions.

c. **Web Application**: A web application is an application that is accessed by users over a network such as the Internet or an intranet.

d. **Web Design**: Web design encompasses many different skills and disciplines in the production and maintenance of websites.

e. **Web Designer**: A web designer is someone who engages in web design.

f. **Web Optimization**: Website optimization is a phrase that describes the procedures used to optimize – or to design from scratch