Sri Lanka Institute of Information Technology

Ampliar – Open Source SOA Based Middleware Framework for Classified Based Web Development

Project ID: 17-072

Software Requirement Specification (SRS)

B.Sc. Special (Honors) Degree in Information Technology

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Web Analytics

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DECLARATION

I declare that this is my own work and this SRS does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or Institute of higher learning and to the best of our knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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1 Introduction

1.1 Purpose

Software Requirement Specification (SRS) is to specify all the requirements of the project. SRS is to let developers know about the features to be built. The purpose of this SRS document is to outline the requirements and present a detailed description of the process needed for **Web Analytics** component of the developing framework. The document contains the necessary requirements of the component, as well as the process to create and discover them. It will explain the functional and non-functional requirements, purpose and features of the component, the interfaces of the component, design constraints, project approach, what the system will do, the constraints under which it must operate and how the system will interact with other external applications. The information is organized in such a way that the developers will not only understand the boundaries within which they need to work, but also what functionality needs to be developed and in what order. This document will guide researchers, developers who would involve in maintaining the existing system, enhancing the system in future and who are interested in implementing this kind of similar application.

1.2 Scope

The "Ampliar" is open source SOA based middleware framework for classified based web development. The team targeting to develop a framework that will helps to developers to develop classified web sites.

The component **Web Analytics** is designed to measurement, collection, analyzing and reporting of web data for purpose of understanding and optimizing web usage. It mainly focuses on the process of analysing the behaviour of visitors to a website. This will be based on web log data mining. The main objective is to design and implement the web analytic component to monitor and analyse the statistics of the website. Developer may get the opportunity to choose between existing analytical libraries and also will be given the facility to develop an analytic engine by himself. The analytics component is focusing on the events handle by the user. It follows a listener architecture to develop the analytics event listener concept which can create listener for the events happening in the web site.

1.3 Definitions, Acronyms, and Abbreviations

Term	Definition
SRS	Software Requirement Specification
Web Application	Computer program that runs in a web browser

Table 1.3.1 Definitions, Acronyms, and Abbreviations

1.4 Overview

According to marketing statistics as well as new trends, classified web development extends from generic developments to specialized developments. This increase the number of classified base development projects. As discussed, this development process takes the huge amount of time and effort. It's important to have a solution to boost this development process meanwhile reduce the effort. To resolve this problem, propose a middleware framework that can handle the complexity of development process.

The main goal is to develop an open source middleware framework for classified base web development. This framework should minimize the workload and the learning curve which a developer has to face throughout the development phase of classified websites. (target of the project)

2 Overall Descriptions

Web analytics is measurement, collection, analysis and reporting of web data for purpose of understanding and optimizing web usage. It mainly focuses on the process of analyzing the behaviour of visitors to a website.

Figure 2.1 Web Analytics Process

This will be based on web log data mining. Every web server keeps a log of page requests that can include visitor ip address, date and time of the request, request page, and referrer. This component will monitor and analyze the statistics of the website. Web analytics basically happens by considering the following metrics:

- Visitor Type – who is accessing the web site (returning, unique, etc.)
- Visit Length – The total amount of time a visitor spends on the web site
- Demographics and System Statistics – The Physical Location and information of the system used to access the website
- Internal search information – Information on keywords and results pages viewed using a search engine embedded in the website
- Visitor Path – The route a visitor uses to navigate through the Website
- Top pages – The pages that receives the most traffic

Through this component developer may get the opportunity to choose between existing analytical libraries and also will be given the facility to develop an analytic engine by himself. Can used the available web analytics engine based on the requirement of the developer. Such as Google analytics, spring metrics, Woopra, Clicky, Mint, Chartbeat and etc.

The analytics component is mainly focusing on the events handle by the user. It follows a listener architecture to develop the analytics generator. Each event consists with pre, actual and post event. Therefore, this component totally based on Event Listener Concept which can create listener for the events happening in the web site separately. By using those event categorization developers will be capable of analyzing the event by calling relevant event listener when it’s needed.

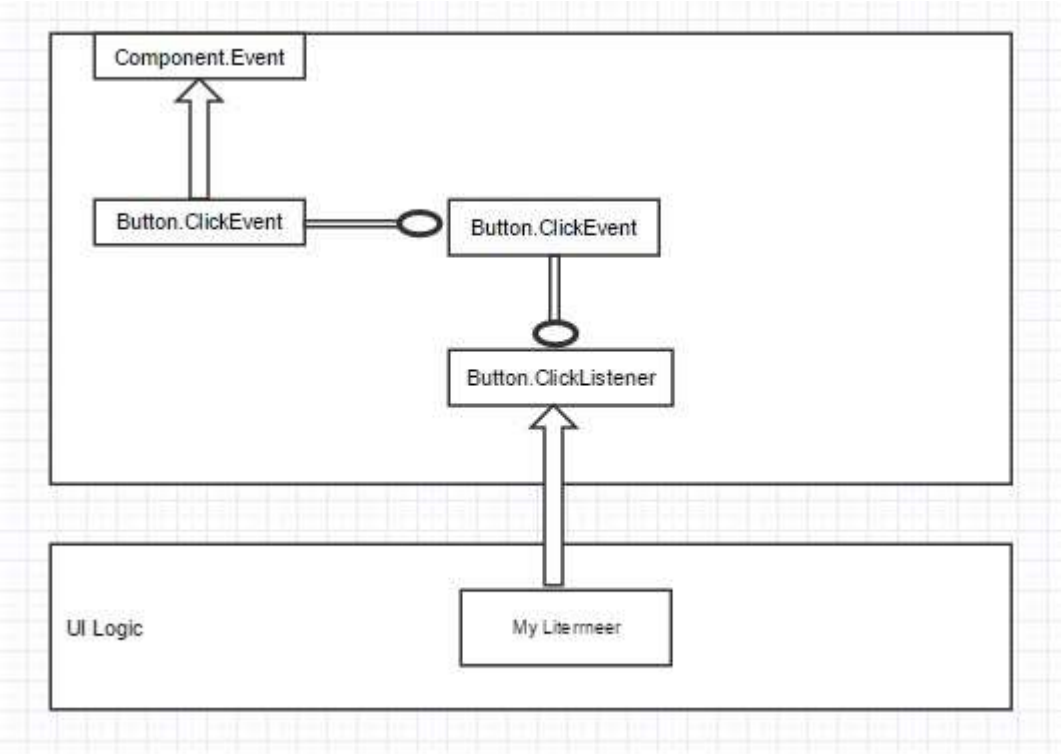

Figure 2.2 Listener Architecture

2.1 Product perspective

There are a number of related researches and products that are already available to help analyzing the web sites. That means there are many existing web analytics tools which can use to analyze the classified web sites by developers. But most of them are not connected with the developing framework, developer can only use the analytics engine which was created by the framework itself. But in this proposed framework, developer may get the opportunity to choose between existing analytical libraries and also will be given the facility to develop an analytic engine by himself.

OpenClassifieds (Open source classified web sites developing framework)

OpenClassified is an open source classified web sites developing framework which was widely popular among web site developers. Now its market as Yclas framework. When using Yclas platform to create a classifieds websites. This has everything need for a realestate classifieds, automobile.jobs, dating or any other classifieds application. OpenClassified is having feature to keep track of website traffic and sales which is

somewhat similar to the web analytics. That feature provides Site Statistics (Get multiple statistics on classified website such as number of visits, ads, users, etc.), Sales per ad (sales statistics of the products that have sold), Public ads statistics (Show statistics of ads on the website), Statistics filter (filter the statistics to have a better overview) and Charter statistics (display your statistics using charts on the admin panel). But, it doesn't provide any facility for the developer to develop an analytic engine by himself.

Flynax (Classified Software)

Flynax is software framework is a PHP script developed based on the MVC architecture representing a unique CMS, which supports a plugin system, graphical templates (SMART template engine) and language system. Flynax uses MySQL as the database server and also different javascript libraries for making the user interface dynamic. And try to keep pace with the latest technologies and web trends adding new and wanted things to every update. Flynax offers an impressive list of admin and user features that give freedom and enough flexibility to start a custom project targeting a particular product or a large marketplace with multiple listing types and categories from back end without getting into the code. However, this Flynax is not providing any web analyzing feature for the creating web sites. But this software framework is one of the framework available in now a days to develop classified web sites.

Feature	**Yclas (OpenClassifieds) Framework**	**Flynax**	**Ampliar Proposed Framework**
Web Analytics	√ **(Yes)**	X (No)	√ **(Yes)**

Table 2.1.1 Comparison of Similar Frameworks

2.1.1 System interfaces

Proposed framework is classified web sites developing framework which more focused for business organizations. This middleware framework positioned between the application UI and the Database engine. Middleware exposes core functionality of classified application as RESTful web services, this conceals the complexity of development process. Since the middleware is an independent layer, the developer can use any front-end technologies to develop application front end. It Interacts with Google
API. Because it will add more functionality to the creating web sites

2.1.2 User interfaces

The user interface (UI) comprises the logical face between software product and its users. Therefore, it has basically a one user group. Developer who is using this ampliar framework to create analysis of the website. It can be change according the requirement of the developer. Needed functions can be created by the developer himself. And also the developer will get the suggestions based on their preferences.

2.1.3 Hardware interfaces

As this system is mainly based on developing a framework for the classified web based development doesn't need many specific hardware components for development. The needed hardware components are mentioned below

- Desktop PC/ Laptop
- To connect to the internet router, modem, dongle or any other device for the connectivity

2.1.4 Software interfaces

- Web Browsers for example Google Chrome, Mozilla Firefox, Internet Explorer, etc.
- Java (Web) JSP
- SQL (supportability for major vendors. MySQL, MSSQL, Oracle, PostgreSQL, IBM DB2)
- GIT for source code management
- Apache Jmeter for performance testing
- Apache Maven

- Jenkins for continuous integration/delivery

2.1.5 Communication interfaces

- Modem inside hand-held device will provide the access to internet when needed.
- Most of the communications will be handled over HTTP via an internet connection and the API services

2.1.6 Memory constraints

- Web server should have minimum of 4GB RAM since some functions should be perform at real-time.

2.1.7 Operations

- **Event Tracking** (measure any interaction by users on the websites)
- **Page Translation** (View what visitors did before, and after viewing specific page)
- **Content Tracking** (measure impressions and clicks and CTR for image banners, text banners and any element on the web pages)
- **Site Search Analytics** (track searches done on your internal search engine)
- **Real Time Data Updates** (Watch real time flow of visits to your website. Get a detailed view of your visitors, pages they have visited and goals they have triggered)
- **All Website Dashboard** (Best way to get an overview of what is happening on all your websites at once)
- **Row Evaluation** (Current & past metric data for any row in any report)
- **Analytics for Ecommerce** (Understand and improve your online business thanks to advanced Ecommerce analytics features)
- **Goal Conversion Tracking** (Track Goals and identify whether you are meeting your current business objectives)

- **Custom Dimensions** (Assign any custom data to your visitors or actions (like pages, events, etc.) and then visualize the reports of how many visits, conversions, page views, etc. there were for each Custom Dimension.)
- **Custom Variables** (similar to Custom Dimensions: custom name-value pair that you can assign to your visitors (or page views) using the JavaScript Tracking API, and then visualize the reports of how many visits, conversions, etc. for each custom variable)
- **Site Speed and Pages Speed Reports** (Keeps track of how fast your website delivers content to your visitors)
- **Visitor Profile** (helps you understand each visitors' individual behavior by summarizing and listing all their visits)

2.1.8 Site adaptation requirements

 Web browser need to be JavaScript enable web browsers in order to run the web application.

2.2 Product functions

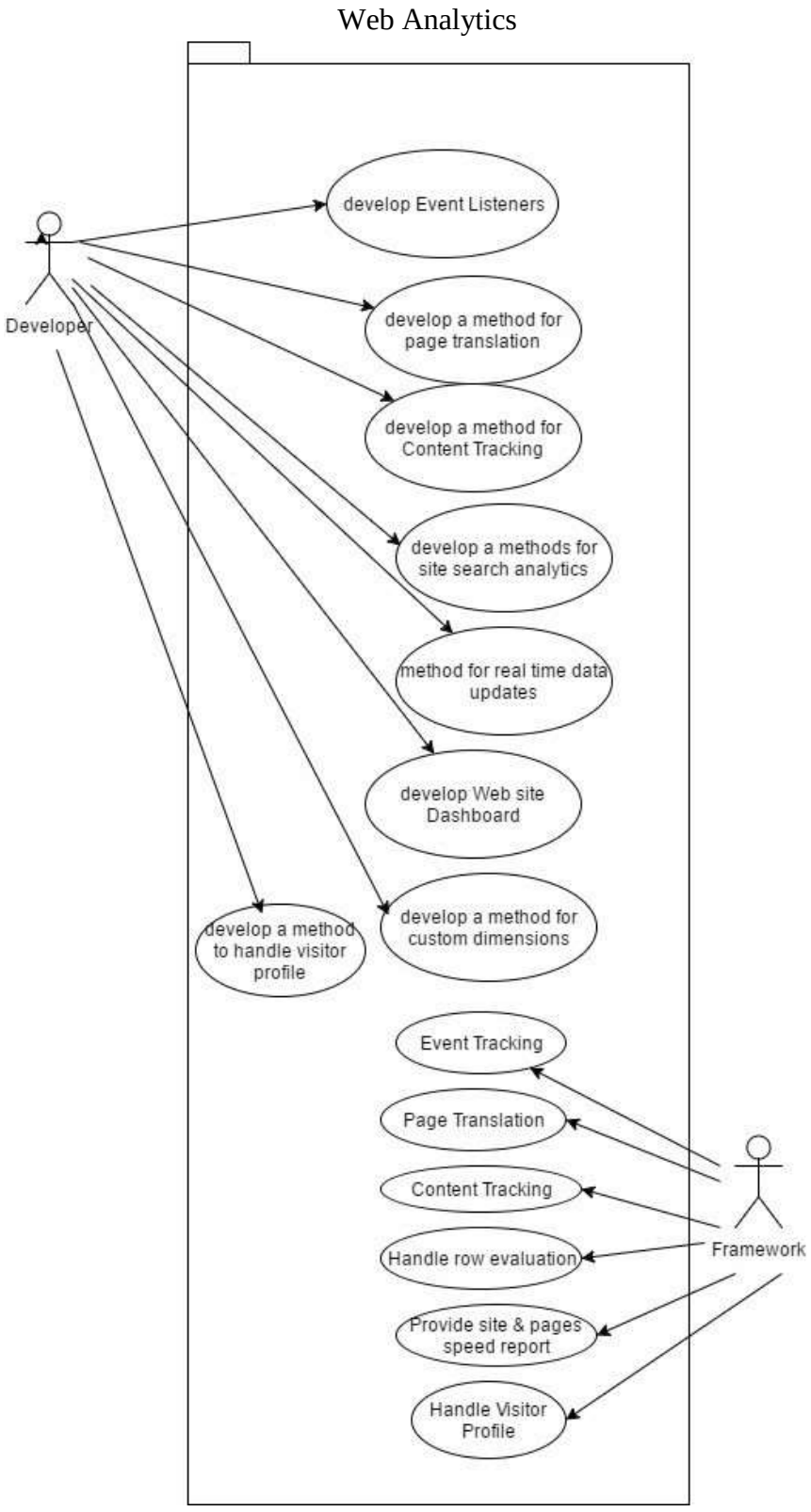

Figure 2.2.1 Use case Diagram

Use case No	01
Use Case	Event Tracking
Actors	Framework
Pre-Conditions	Should be an event
Flow of Event	Processing the Event
Post Conditions	Finishes the event

Table 2.2.1 Use Case 01

Use case No	02
Use Case	Page Translation
Actors	Framework
Pre-Conditions	What did before come to the page
Flow of Event	Went through page by page
Post Conditions	What did after use the page

Table 2.2.2 Use Case 02

Use case No	03
Use Case	Develop a methods to Handle Visitors
Actors	Developer
Pre-Conditions	Develop event listener
Flow of Event	Develop a Visitor class Create methods to handle the visitor
Post Conditions	Calling the created method in necessary events

Table 2.2.3 Use Case 03

Use case No	04
Use Case	Provide site & pages speed report
Actors	Framework
Pre-Conditions	User done some events in the website
Flow of Event	User click on view ad button The sever searching the result for the request Display the requested details
Post Conditions	Output the report

Table 2.2.4 Use Case 04

2.3 User characteristics

Software Professional (Developer)

Software Developers are the brains behind the design, installation, testing and maintenance of software systems. Therefore, they have good knowledge about IT field and familiar with software systems also. Then framework needs more technical help than the user friendliness.

2.4 Constraints

- need to have the internet connection
- Server should be able to handle multiple requests at a time
- System accessibility constraint must be implemented for system users granting and prohibiting access for various functionalities in the system according to privilege levels.
- System server must be up and running 24/7
- The response should be generated within minimum time constraint
- The server should be able to perform its normal operations without exceeding 2GB of RAM

2.5 Assumptions and dependencies

Assumptions

- No data will be lost/corrupted during the communication between server and the web application
- The connection between the server and the web devices doesn't disconnect during operations
- WiFi enabled when the web application is running.

Dependencies

- There should be a device (laptop or desktop) with a web browser to run the developing website.

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2.6 Apportioning of requirements

This components is mainly focuses on analyzing the behaviour of the user with web site. . In order to deal with classified web ads, there should be a platform for the web application users. The main dashboard of the web application can be developed at the same time. The web analytical part only requires the analysis of user behaviour and the user activity log of the web application.

3 Specific requirements

3.1 External interface requirements

3.1.1 User interfaces

The user interface (UI) comprises the logical face between software product and its users. Therefore, it has basically a one user group. Developer who is using this ampliar framework to create analysis of the website. It can be change according the requirement of the developer. Needed functions can be created by the developer himself. And also the developer will get the suggestions based on their preferences.

3.1.2 Hardware interfaces

- For the server side there should be a server space with minimum 1GB. As well as the python should be available in the server.
- Development team must have a computer that has 1.6GHz processing power in order to do this project. Minimum 10GB of disk space and 5400 RPM hard disk drive also can consider as hardware requirements.
- In order to run the web application development team requires a web browser as well as an internet connection (WIFI router)

3.1.3 Software interfaces

Name	Version	Purpose
Python	2.7	Used to create the backend (web services)
Java (Web) JSP, Servlets		To deploy and run JavaServer Pages
API Security		Basic Authentication and OAuth token based authorization
Git	2.7.4	Used for version controlling
Apache Jmeter		for performance testing
Jenkins		for continuous integration/delivery testing

Table 3.1.3.1 Software interfaces

3.1.4 Communication interfaces

The communication between the different parts of the component is important because they share functionalities on each other. The communication among web application will be established over the internet. Most of the communications will be handled over HTTP via an internet connection and the API services. The location details will be gathers via APIs However, the communication is handled by the underlying operating systems for the web application.

- Internet: Modem / Router / Dongle
- Web hosting Server

3.2 Classes Diagram

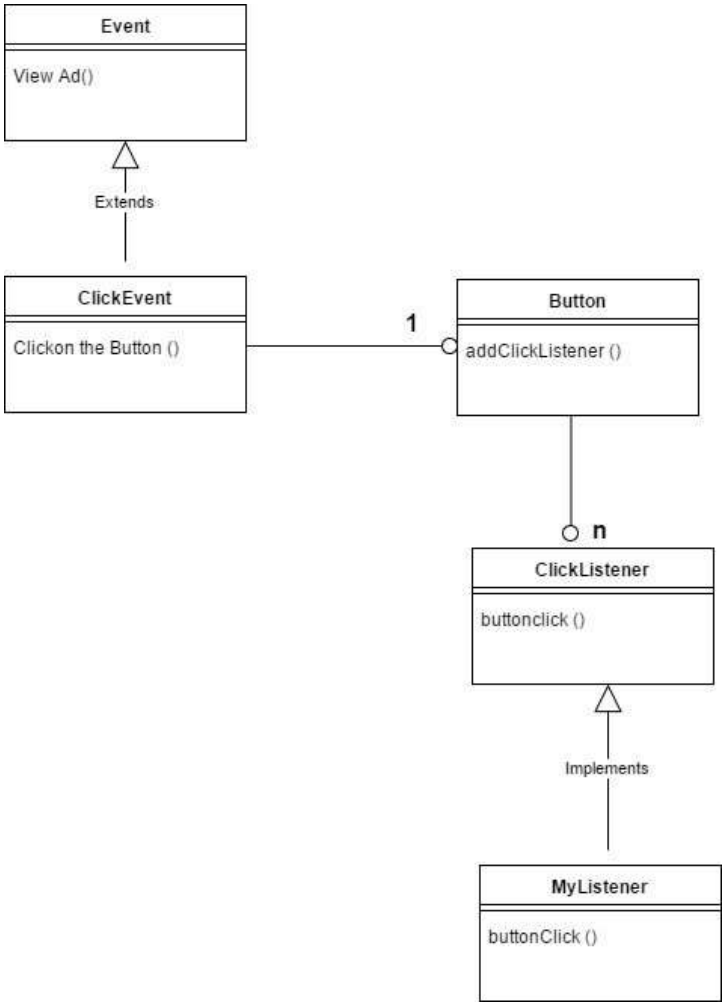

Figure 3.2.1 Class Diagram

3.3 Performance requirements

- Delay between request/response web application and drone should be less than 1 second. Server should be able to handle up to 10 user interactions in a given time.
- Server should not exceed 50% processor usage and 3Gb RAM usage during normal operations

3.4 Design constraints

In designing this framework we have to consider about web application designing. There is a large variety of audience for the web application and may be they are not fond of complex interfaces. Thus all the interface designs have to be simple as well as attractive. Using bright and more colours will drag away user friendliness; therefore interfaces must be light coloured.

3.5 Software system attributes

3.5.1 Reliability

Reliability is one of most important attribute of measuring web site quality. It is the probability of failure-free software operation for a time period. Software failures may be due to errors, ambiguities or misinterpretation of the specification that the software is supposed to satisfy, carelessness or incompetence in writing code, inadequate testing, incorrect or unexpected usage of the software or some other undesired problems. Other than that, there should be more reliability with the web servers to provide the best services. As well as when some system failure occurs there should be a way to maintain the reliability by providing the automated backup system.

3.5.2 Availability

Availability is the other most important attribute, which should have with the system. Mainly there must be ability to multiple users and the user levels to use the system whenever they need. Therefore, this type of decision support system should have high availability. Otherwise, it will lose the interest and importance of the decision support system.

3.5.3 Security

Security is the other major attribute, which should be there with any software solution. In here mainly to maintain good security condition, it should be provided various access levels as privileges. According to the authentication that each user will be obtained from the

system, they can work with the system with their limitations. It will cause high security of the system.

- The development team must consider about the security of the user's data. Because all the users provide their private data to the system. There for the database security must be on a higher place.
- The system must use HTTPS protocol to the website. It will give more secure data transaction by considering to other protocols.

3.5.4 Maintainability

Maintainability is another important attribute which cause to provide a best performed system. That means the proposed system can be maintained easily if there is some modification without happening any damage or interrupt to other system functionalities. As well as modifications can be done through the low cost solutions. It is also a somewhat important feature to having high maintainable system

3.6 Other requirements

System Recovery

There should be a proper way of maintaining the backing up and restoring process if something goes wrong with the system. Usually the hosting service automatically taking the backups. For more safety, system administrators must collect the backups of the system as far as they can.

Extensibility

Framework should be able to accept new features and customization. Extensions can be any adding new features/functions or modify existing functionalities.

4 Supporting information

4.1 Appendices

There are no appendices in the current document.

4.2 References

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