AMPLIAR – OPEN SOURCE SOA BASED MIDDLEWARE FRAMEWORK FOR CLASSIFIED BASED WEB DEVELOPMENT

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October 2016

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Dissertation submitted in partial fulfillment of the requirements for the B.Sc. Special Honors Degree in Information Technology (Specialized in Software Engineering)

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DECLARATION

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ABSTRACT

Online Classified Advertising has dominated over traditional newspaper advertising since the emergency of web technologies, and the enhancements in mobile devices has further projected the activities as well as number of contents (ads) now being advertised on classified advertising websites. This online tradition of advertising has improved the credibility of the advertisers and also improved the speed of transaction, where the traditional way had the interested buyer having to go through hundreds of magazine advertisements before making a sound decision on his / her purchase.

The "Ampliar" is open source SOA based middleware framework for classified based web development. Ampliar framework will helps to developers to develop classified web sites. The component "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 behavior 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 analyze 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. Each event consists with pre, actual and post event. By using those event categorization developers will be capable of analyzing the event by calling relevant event listener when it's needed. Then developer may use the existing web analytics library or can be configured or extended with external existing analytics libraries to analyze their classified web site statistically

ACKNOWLEDGEMENT

The special thanks goes to our supervisor, Mr. Nuwan Kodagoda and External Supervisor Mr. Tharindu Edirisinghe whose guidance, constant supervision as well as encouragement which support us in completion of this research.

We express our gratitude to Mr. Jayantha Amararachchi for providing final years students with the knowledge that is necessary for writing and presenting effective project progress reports. Our grateful thank goes to all the personnel of the Sri Lanka Institute of Information Technology who contributed essential information. We are highly indebted to our examiner Mr. Indraka Udayakumara whose contribution in simulating suggestions and knowledge, helped us to coordinate our research.

We would like to express our special thanks to our parents, for their support and encouragement which help us in completion of this research.

The completion of this research could not have been possible without the participation and assistance of so many people whose names may not all be enumerated. Their contributions are sincerely appreciated and gratefully acknowledged.

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LIST OF ABBREVATIONS

Acronyms	Definition
POI	Points of Interest
Web Application	Computer program that runs in a web browser
User	Someone who interacts with the mobile phone application
API	Application Programming Interface
CSV	Comma Separated Values

1. INTRODUCTION

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 analyzing the behavior of visitors to a website.

1.1. Background Context

The origin of classified base web development is classified advertising. Classified advertising is a form of advertising which is particularly common in newspapers, periodicals and online. Even today printed classified are exists although the online web format decreases the profitability of those printed media [1]. Online web format of classified service provides the wide range of features comparatively to printed media. Advertisement can be longer, searchable even some companies offer free advertising facilities. Due to this flexibility, online web format classified market has become heavily fragmented. Today international range, domestic range even hometown range online classified advertising companies provide their services. Furthermore, there is an increasing emphasis on developing specialized classified websites over general classified websites for vertical markets and niche markets [2].

The solid classified website is a valuable service for different perspectives. Find or sell a product or service, a great profitable business respectively to consumer and company perspectives. Building such site from the scratch is much more complex than its sounds where developers can get frustrated and eventually product might be failed or cost overrun. Since this is a very competitive marketing segment it's very important to build the application with possible minimum time with competitive features with other competitors.

The main goal of this project provides a solid feature-rich middleware framework for classified base web development. This middleware handles the complexity of different technology layers, that are involve in the development process.

Existing Frameworks for Classified Web Development

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.

1.2. Literature Survey

Since the Emergence of the Internet, classified ads have moved on from the old-fashioned way of newspapers to the internet, where the competition is now higher than ever for classified web sites. More than 20+ classified websites are created and used within Sri Lanka itself. These Classified websites generate a huge amount of profit merely from the ads displayed on their websites. New classified websites are still being created in Sri Lanka to potentially capture or part take in the existing online market. These websites require certain web technologies to be implemented in order to create a successful classified web applications for the end users. The continuous changes in existing technologies and arrivals of new modern technologies brings a burden to the developers of these classified websites.

A classified web developers have to face the problem of having to learn all the latest technologies from database all the way to authenticating the application needed to create a classified website. This learning curve [3] bring up the time required to build the classified website as well as the cost of the project. This raise in time required to bring the project to market and the increase in the cost that's brought with it is a down side the developer or the organization has to face when carrying on such projects

Table 1 : Literature Survey Summary

Feature	Yclas	Flynax	Oxy classifieds	Titan classifieds	Os class	Classi Press	Proposed Framework (Ampliar)
Web Analytics	Yes	No	No	No	No	No	Yes

1.3. Research Gap

The Research gap is defined as the area or topic for which missing or insufficient information limits the ability to reach a conclusion for a question. This research is directly adopted with the development online classified ad domain. When considering this domain not much other researches done in implementing or identifying the relationship between the developments ease and time to market the product. Although tools existing exists today in the market for developers to get started on developing classified websites, the tools available have limited support to new emerging technologies and thus making it hard for the developer to maintain or even adopt to new technologies. In the software development field reducing the development time is the secret of reducing the time to market and reducing the project development cost.

1.4. Research Problem

Developers face problems of having to learn new emerging technologies that come out and changes to existing technologies already implemented in their current web applications. This brings on a learning curve which increase the time that the developer takes to implement the changes or build a new version of the system. The main requirement of this research is to find solution to the defined below:

1.5. Research Objectives

1.5.1 Main Objective

Classified base web development involves complex technologies where developer required to spend time on out of the domain to learn those. This framework handle complexity of those technologies and let developer to more focus on domain and build feature rich classified web application. This framework will which decrease project development time and minimize the developer knowledge gap in wide range of technology stack of the web/mobile developer by having a developer friendly framework for development that integrates the core modules of development, authentication and analytics available in one framework.

Main objective of the “Ampliar” 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. For the developers who are in the field of classified web development, should be able to

1. Reduce developer burden, complexity and knowledge gap during the development process.
2. Reduce development time and cost of a classified base web development project.
3. Get sophisticated features as well as wide range of flexibility.

1.5.2 Specific Objectives

- Design and implement the core framework with the integration of other components and modules. Configurations including permissions, security, roles, routing, services libraries that gives the developer the tools they need for modern web development. This middleware framework will facilitate evolution, enhance the reusability and as well improve portability to new platforms. The framework includes other features such as routing and data type conversion, error detection and handling.
- Design and implement a component which supports multiple database manage systems (MySQL, MSSQL, Oracle etc.) and has the capability to extend the database abstraction layer based on the developer's preference. For an example, if the developer needs to connect his/her website to a different database management system apart from the DBMSs listed in the framework, he/she will be provided an easy way of customizing the connection.
- Design and implement the architecture component to extend federated authentication. By default, federated authentication supports Facebook, twitter, yahoo authentications. If developer needs to provide authentication from a different website, he/she will be provided a feature to add that authentication facility to the framework.
- Design and implement a component to use as a web analytic component to monitor and analyses the statistics of the website. Developer may give the opportunity to choose between existing analytical libraries and also, he/she will

be given the facility to develop an analytic library himself by following certain instructions.

2. METHODOLOGY

2.1 System 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, the research group propose a middleware framework that can handle the complexity of development process. 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 [4] the developer can use any front-end technologies to develop application front end

2.2 System Architecture

The solution follows modularized SOA approach. The research group identifies four main components, those are listed below.

- Framework Core module
- Extensible Database Abstraction
- Authentication Extension module
- Analytics Generator module

This is an open source framework. Each module in this framework can be extensible or even customizable according to the user's requirements. Figure 1 visualize the architecture of this middleware framework.

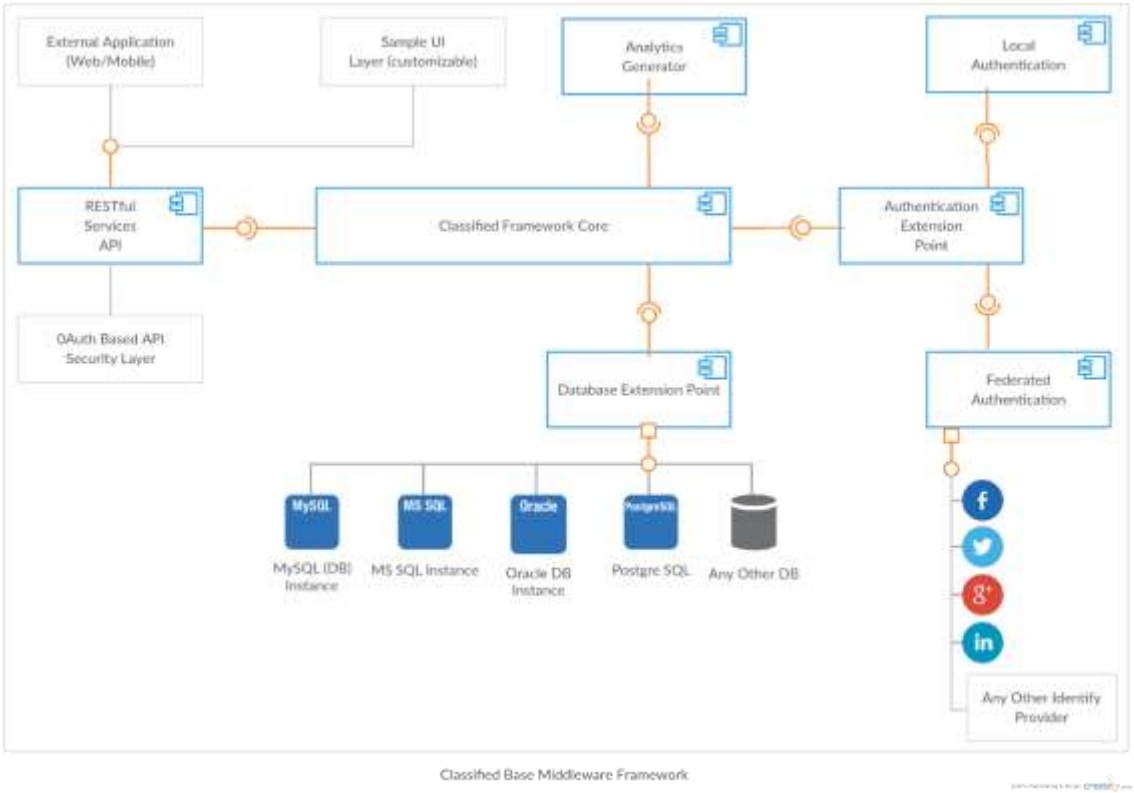

Figure 1 – Classified base Middleware Framework

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2.2.1 Analytics Generator Module

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 behavior of visitors to a website.

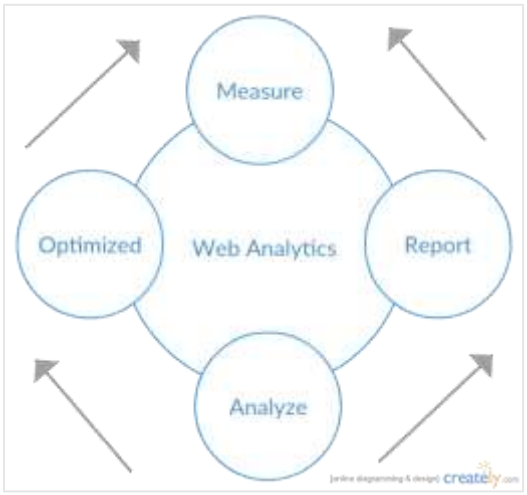

Figure 2 – Process of Web Analytics

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.

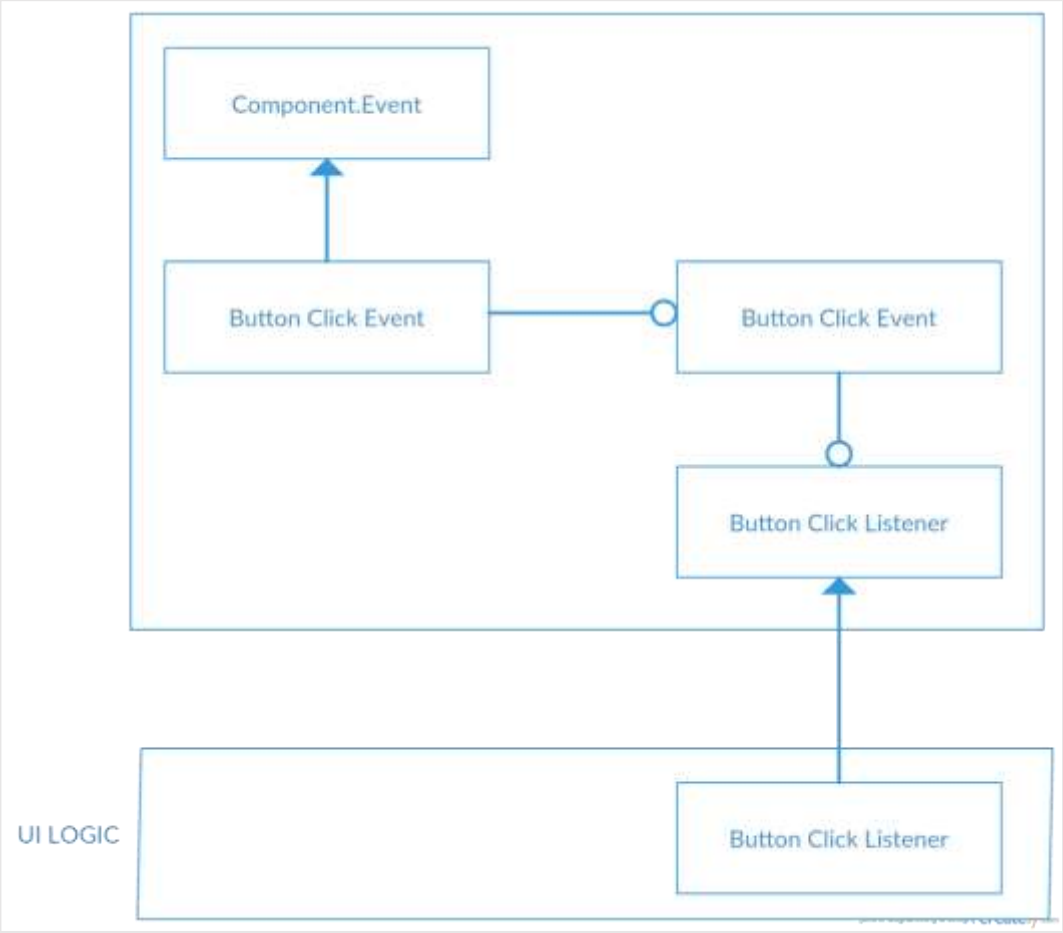

Figure 3 – Process of Button Click Event

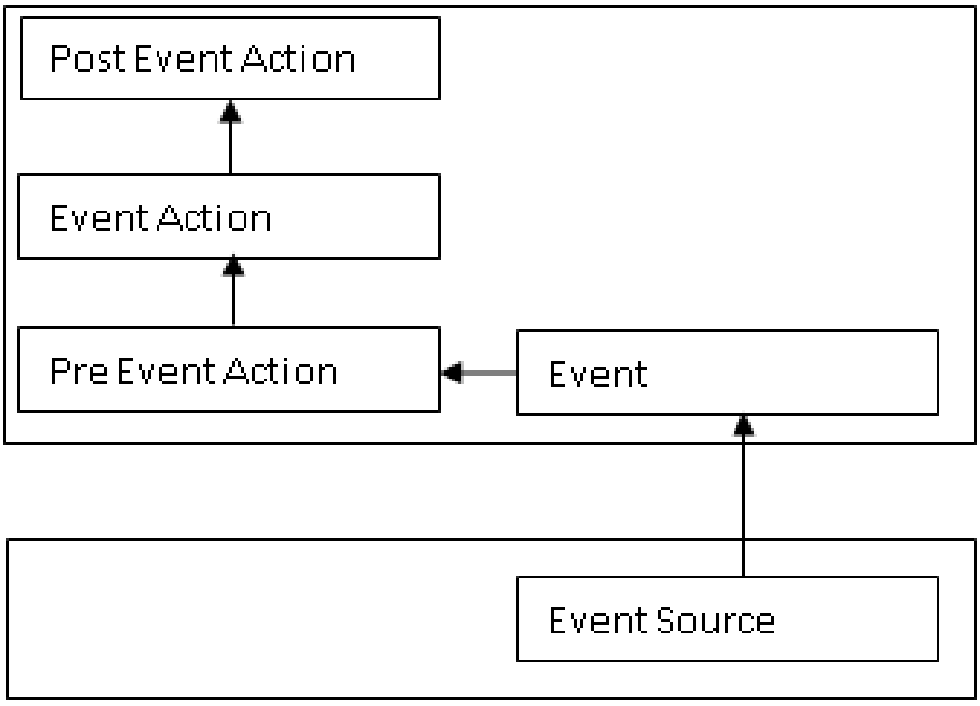

Figure 4 – Event Listener Architecture

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

2.3 Work Breakdown Structure

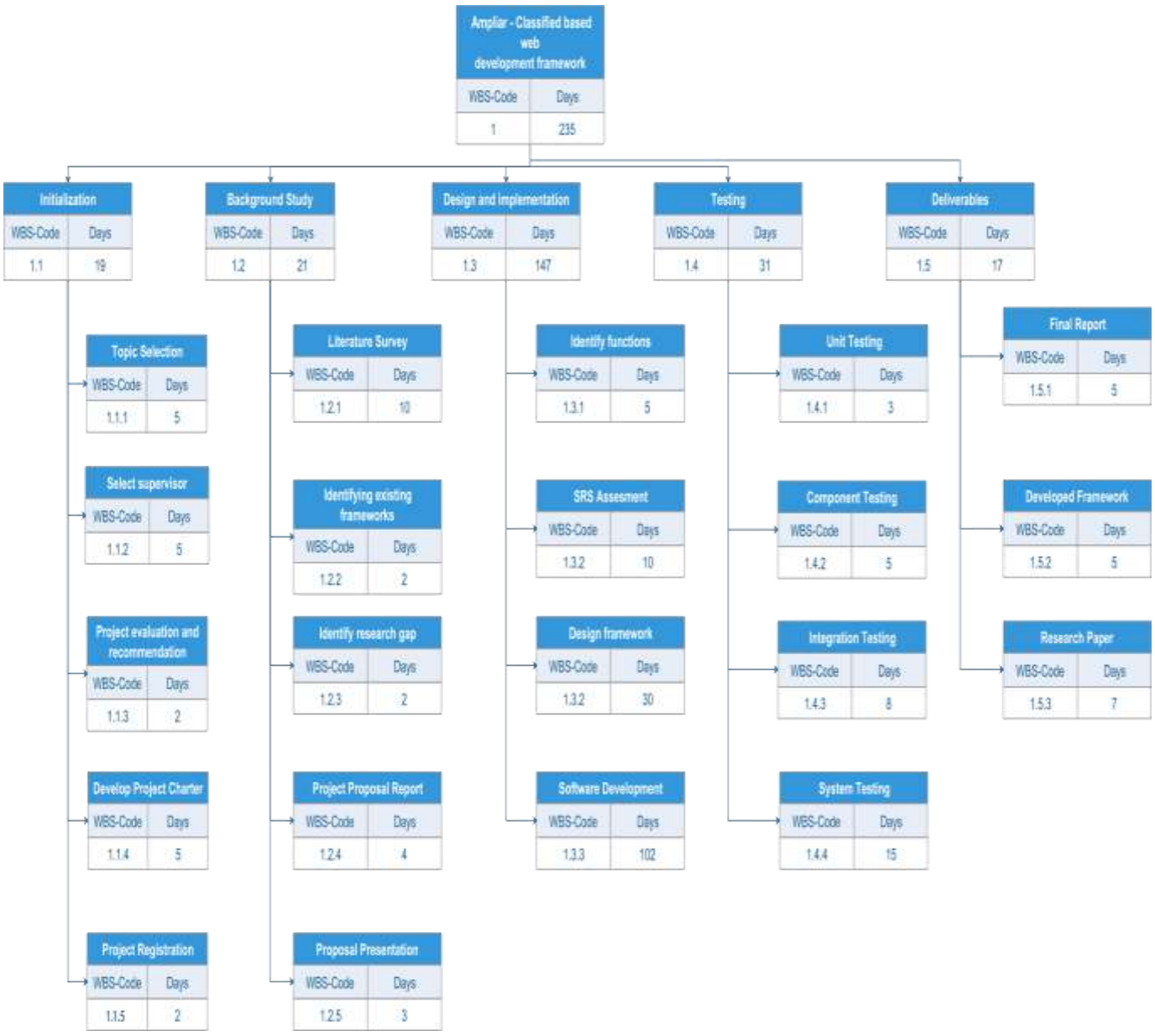

Figure 5 – Work Breakdown Structure

2.4 Gantt Chart

ID	Task Mode	Task Name	Duration	Start	Finish
1		**Classified middleware framework**	**210 days**	**6/2/2017**	**24/11/2017**
2		**Project Initialization**	**5 days**	**6/2/2017**	**10/2/2017**
3		Select supervisor	5 days	6/2/2017	10/2/2017
4		Select project topic	5 days	6/2/2017	10/2/2017
5		Project Pre-assesment	2 days	10/2/2017	13/2/2017
6		Project Charter	14 days	13/2/2017	2/3/2017
7		Project Registration	2 days	3/3/2017	6/3/2017
8		**Background Study**	**21 days**	**13/2/2017**	**13/3/2017**
9		Literature Survey	13 days	13/2/2017	1/3/2017
10		Existing framework re	13 days	14/2/2017	2/3/2017
11		Identify Research gap	8 days	2/3/2017	13/3/2017
12		Project Proposal Report	16 days	6/3/2017	27/3/2017
13		Proposal Presentation	6 days	27/3/2017	3/4/2017
14		**SRS Assesment**	**24 days**	**27/3/2017**	**28/4/2017**
15		Identify functions	10 days	27/3/2017	7/4/2017
16		DocumentPreparation	19 days	4/4/2017	28/4/2017
17		**Design and Implementat**	**112 days**	**28/4/2017**	**1/10/2017**
18		System architecture de	7 days	28/4/2017	8/5/2017
19		Software Developmen	106 days	8/5/2017	1/10/2017
20		Progress Presentation I	13 days	11/6/2017	27/6/2017
21		Progress Presentation II	6 days	1/9/2017	8/9/2017
22		**Testing**	**18 days**	**24/9/2017**	**17/10/2017**
23		Unit Testing	7 days	24/9/2017	30/9/2017
24		Integration Testing	6 days	1/10/2017	6/10/2017
25		System Testing	8 days	7/10/2017	17/10/2017
26		Final Report	18 days	25/10/2017	17/11/2017
27		Final presentation & VIV	18 days	1/11/2017	24/11/2017

Figure 6 – Gantt chart

2.5 Background Study

Understanding the likely target markets and customer preferences is critical to determining the mix of facilities and service, design and scale of the project. At the beginning of the research need to carry out feasibility study.

Under technical feasibility, need to select the best technologies that meets performance, requirements and feasible to users and researches also. Team have understood the complexity of the problem well. According to the further studies, in order to make this success team may have to use technologies such as Java (Web) JSP, Servlet, RESTful Web Services, API Security, Data Analysis and Prediction Based Behavior Analysis.

The economic feasibility studies evaluate the cost and benefits of projects before financial resources are allocated. In this it is realized that this project will do a huge benefit and service to a wide range of clients, community groups, commercial organizations and individual enterprises to make their work easier and accurate.

In operational feasibility, need to measure how well a proposed system solves the problems and take advantages of the opportunities identified during scope definition and how it satisfies the requirements that have identified in the requirements analysis phase. Also in here researchers evaluate ease of use of the system to the user. As per the plans there are only less number of interfaces to complete a single task and also user will not have to perform any complex tasks in this system.

2.6 Requirements Gathering

Each project requires a unique mix of models and tools. Below, few basic requirements gathering processes helped to get us started in the requirements elicitation and documentation process.

After selecting the research area, a very important step was to basically identifying the research problem. That means how team could identify the existing problems and weaknesses of available frameworks. A requirements analysis process encompasses activities conducted to determine the needs or conditions for a new or altered product. It commonly takes place after a request or the problem is identified. When doing the

requirement analysis, the team realized, that they will have to pay lot of effort and attention to get this succeed.

In order to collect the relevant information, requirements and functionalities the team used the following two techniques

- Conducting a survey

  Under this session the team could gather information from developers who are interesting in classified web developing.

- Interview

  In this session researchers could get many information from the developers who are in the classified web development field.

2.7 Design

System design is very important phase since the implementation of whole system depends on this. The team have used Unified Modeling Language (UML) for designing the system as followed object oriented methodology to create of the system. The next step was to draw use case diagrams [Appendix A] and the use case scenarios (Appendix B) that help developers to determine which features to implement and how gratefully resolve errors. The class diagram [Appendix C] was drawn which describes structure of a wen analytics component by showing the system's classes, their attributes, operation (or methods) and the relationship among the classes.

The goal of user interface design is to make the user's interaction as efficient as possible. The design process must balance technical functionality and visual elements. The team have given much consideration of selecting the colors, themes, templates of the interfaces. Detailed design will be conducted in this phase.

2.8 Testing and Implementation

2.8.1 Implementation

2.8.1.1 Web Analytics

This component facilitate the developer to 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 behavior of visitors to a website.

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.)
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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.

To follow this architecture, first need to create a class for each and every event. Then those created even classes should extends the listener abstract class and then those classes can implements the pre method and post method for the separate events. In the pre method specify the actions need to be happened before the actual event is take place. For an example when we consider an event like posting an advertisement, the actual event is post the advertisement to the web site. So before the customer is filling the posting advertisement details. Therefore the pre method can call in that time. Inside that pre method can validations of the form can be done. As well as the post method can call after the actual event is take place. Most of the in post method the details about the event such as userip, ad_id, ad_name, date, time, ad_ category can be recorded into a CSV file called "PostItemListener.csv" and it generating by the "PostItemListener.java" [Appendix D]

2.8.2 Testing

Software testing is an investigation conducted to provide stakeholders with information about the quality of the product or service under test. Software testing can also provide an objective, independent view of the software to allow the business to appreciate and understand the risks of software implementation. Test techniques include, but are not limited to the process of executing a program or application with the intent of finding software bugs (errors or other defects).

It involves the execution of a software component or system to evaluate one or more properties of interest.

2.8.2.1 Module Testing

Unit testing, also known as component or module testing, refers to tests that verify the functionality of a specific section of code, usually at the function level. The team are planning to carry out testing individual modules at the latter stages of the research project

2.8.2.2 Integration Testing

Integration testing works to expose defects in the interfaces and interaction between integrated components (modules). Progressively larger groups of tested software components corresponding to elements of the architectural design are integrated and tested until the software works as a system.

2.8.2.2 System Testing

System testing, or end-to-end testing, tests a completely integrated system to verify that it meets its requirements. The team intend to perform a system testing to ensure that have achieved all the objectives of our research up to the level of performance expected

2.9 Research Findings

During the research, team has identified that there were some classified web developing frameworks with lots of limitations and weaknesses which cause low usage. The team found that existing classified web developing frameworks are unable to provide open source, free, Extensible database abstraction, extensible federated authentication and web analytics facilitates for the developer within a same framework. “Ampliar” focusing more in to keep track of each user events .Most of the existing frameworks do not provide that facility. In those frameworks are not consider about the user interaction with the web site.

Ampliar provide lot of facilities in developer perspective. Therefore, This framework provide core framework, extensible database abstraction, extensible federated authentication and web analytics facilities in one framework which essentially needs of the classified web developers.

3. RESULTS AND DISCUSSION

3.1. Results

The following subsection provides evidence to the implementation results and the solutions provided for the identified research problems. User interfaces are required to analyze the user's interaction with the created web site. Following are the basic interfaces providing by the web analytics module.

Figure 7 – Visitors Analysis

Figure 8– Page Views Analysis

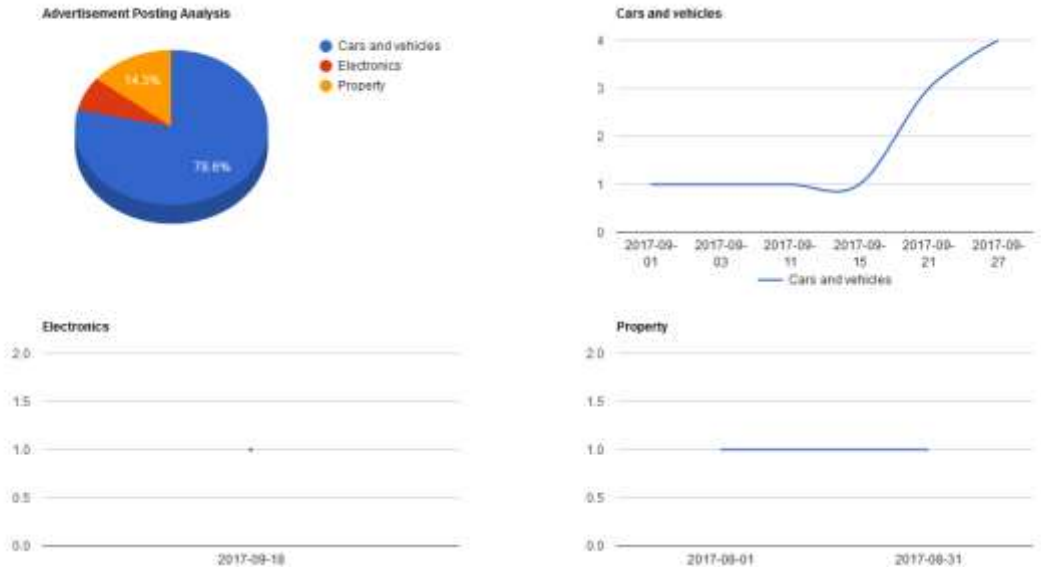


Figure 9– Advertisement Posting Analysis

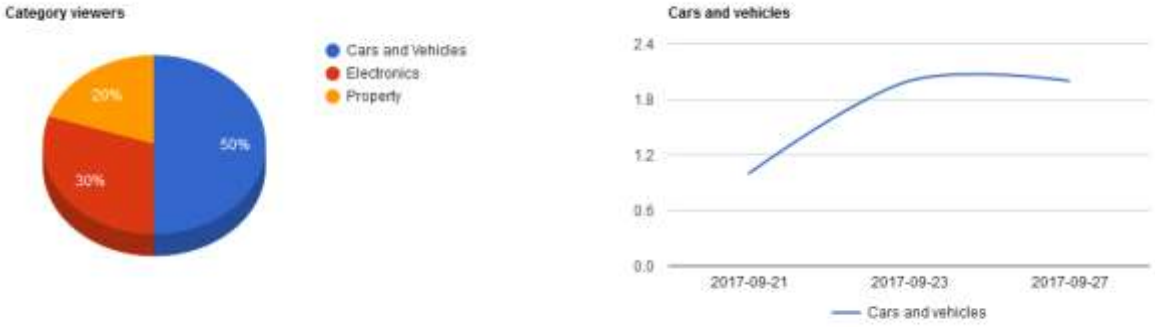


Figure 10– Advertisement Category Viewers

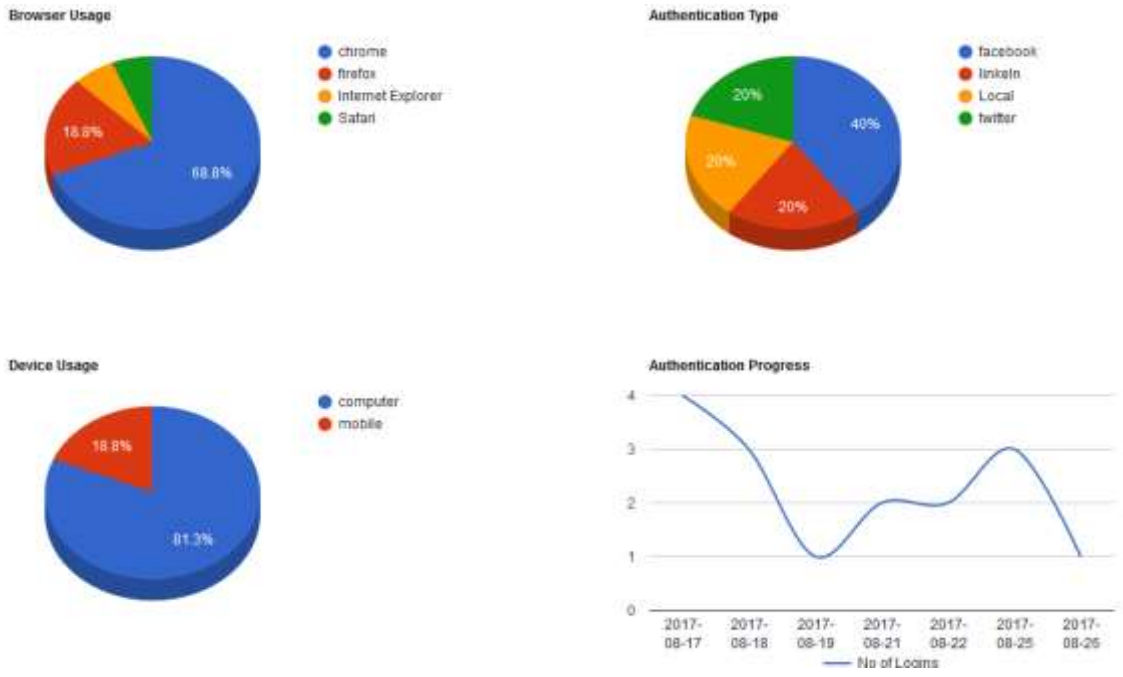


Figure 11– Authentication Analysis

3.2. Discussion

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.

4. COMMERCIALIZATION OF THE PRODUCT

4.1.Position of the Market

Online Classified Advertising has dominated over traditional newspaper advertising since the emergency of web technologies, and the enhancements in mobile devices has further projected the activities as well as number of contents (ads) now being advertised on classified advertising websites. This online tradition of advertising has improved the credibility of the advertisers and also improved the speed of transaction, where the traditional way had the interested buyer having to go through hundreds of magazine advertisements before making a sound decision on his / her purchase. This rapid growth in the classified industry has put many companies seeking to gain a share in this ever-growing market, which has lead to a number of new classified websites being created every year. This has also brought up huge competition between existing classified websites and new emerging ones, forcing the organization to update their web functionalities or even expand to new emerging technologies before the competitive rivals do. This time to adapt to the competition has directly affected these web businesses. Developers creating these web contents, have not only be able to make changes to their existing sites, but also to adapt to new technologies that is continuously changing. This raise in learning curve for the developer has direct effect on the time to bring the application or changes in to the domain. Our Middleware Framework focuses on reducing the learning curve the developer has to face when developing classified web site. It will support the developer by having a developer friendly API that will reduce the learning curve of the developer to building classified web sites. This Framework will support many of the technologies need to build a classified website from scratch. It will also allow the developer to integrate new technologies to the framework, requiring only minor changes. This will highly reduce the development time of classified web site which will also directly reduce the cost of bringing the application to market. This will also advance their chances to sustainability in a market where the time to adapt to technological changes has been a factor of survival in internet businesses.

4.2.Differentiation from the Competition

Classified web site is one of the most commonly listed interests of people, and it comes in all forms. Ampliar will be more suitable for the classified web developers to creating & analyzing the classified web sites without more effort. Because a lot of main functionalities are already implemented in the Ampliar framework itself.

And also the Ampliar will directly connect the preferred databases. Users of Ampliar will be able to create their own way of develop the same functionality again.

4.3.Marketing Plan

4.3.1. Need of the Product

Benefits for the Developer

- Developer can easily use the core framework to develop the major functionalities, he doesn't have to develop from the scratch.
- Developer has the opportunity to choose his preference database vendor since ampliar framework supports multiple database vendors.
- Developer can easily plug a custom data store to the website.
- Developer can choose a different identity provider (apart from popular) for federated authentication.
- Developer can use the in -built analytical engine to develop the analytics for the website.
- Reduce developer burden, complexity and knowledge gap during the development process.
- Reduce development time and cost of a classified base web development project.

The classified web developing framework providing for the classified web developing organizations to maintain and reduce their time to develop their online classified web sites. This Ampliar framework offers the basic details regarding the classified web development.

4.3.2. Marketing Strategy

4.3.3. Target Market

The selected marketing strategy will be based mainly on making the right services available to the right target customer. The team will ensure that the prices of the services take into consideration organizations' and peoples' budgets, and that these people know that the team exist, appreciate the value of the services, and how to contact the team. The marketing will convey the sense of quality in every picture, every promotion, and every publication. The intension of the team will be to target those developers looking for reduce the developer burden, complexity and knowledge gap during the development process.

Pre-Launch Marketing

- Social Media markeritng
- Referral marketing
- Blog

Can sell this framework for free with the self-hosting and we can give price ranges with hosting facility

5. CONCLUSION

Classified advertising is a form of advertising which is particularly common in newspapers, online and other periodicals which may be sold or distributed free of charge. Classified advertisements are much cheaper than larger display advertisements used by businesses [5] although display advertising is more widespread [6].

Advertisements in a newspaper are typically short, as they are charged for by the line, and are one newspaper column wide Publications printing news or other information often have sections of classified advertisements; there are also publications that contain only advertisements. The advertisements are grouped into categories or *classes* such as "for sale—telephones", "wanted—kitchen appliances", and "services—plumbing", hence the term "classified". Classified ads generally fall into two types: individuals advertising sales of their personal goods, and advertisements by local businesses. Some businesses use classified ads to hire new employees. One issue

with newspaper classified advertising are that it doesn't allow images [7] even though display ads, which do allow images, can be found in the classified section.

Internet classified ads do not typically use per-line pricing models, so they tend to be longer. They are also searchable, unlike printed material, tend to be local, and may foster a greater sense of urgency as a result of their daily structure and wider scope for audiences. Because of their self-regulatory nature and low cost structures, some companies offer free classifieds internationally. Other companies focus mainly on their local hometown region, while others blanket urban areas by using postal codes. Craigslist.org was one of the first online classified sites, and has grown to become the largest classified source, bringing in over 14 million unique visitors a month according to comScore Media Metrix. A growing number of sites and companies have begun to provide specialized classified marketplaces online, catering to niche market products and services, such include boats, pianos, pets, and adult services, amongst others. In many cases, these specialized services provide better and more targeted search capabilities than general search engines or general classified services can provide.

Now provide online advertising services and tools to assist members in designing online ads using professional ad templates and then automatically distributing the finished ads to the various online ad directories as part of their service.

Ampliar provide a feature to the developers to get an already implemented functions of a basic classified web site for improve their product. This generated considering the ratings given by the user for the attractions. Since the user gets an advertisement which will really suited for his taste. Then it will increased the statistics of the web site.

Classified base web development involves complex technologies where developer required to spend time on out of the domain to learn those. This framework handle complexity of those technologies and let developer to more focus on domain and build feature rich classified web application. This framework will which decrease project development time and minimize the developer knowledge gap in wide range of technology stack of the web/mobile developer by having a developer friendly framework for development that integrates the core modules of development, authentication and analytics available in one framework.

6. REFERENCES

[1] S. Diaz, "On the Internet, A Tangled Web Of Classified Ads," Washington Post, Friday August 2007. [Online]. Available: http://www.washingtonpost.com/wp-dyn/content/article/2007/08/30/AR2007083002046.html?hpid=sec-tech.

[2] "Classified advertising," wikipedia, [Online]. Available: https://en.wikipedia.org/wiki/Classified_advertising#cite_note-4.

[3] T. W. Lin and E. J. Blocher, Cost Management: A Strategic Emphasis, Tata McGraw-Hill Education, 2006.

[4] A. PUDER, K. ROMER and F. PILHOFER, DISTRIBUTED SYSTEMS ARCHITECTURE A Middleware Approach, Elsevier, 2006.

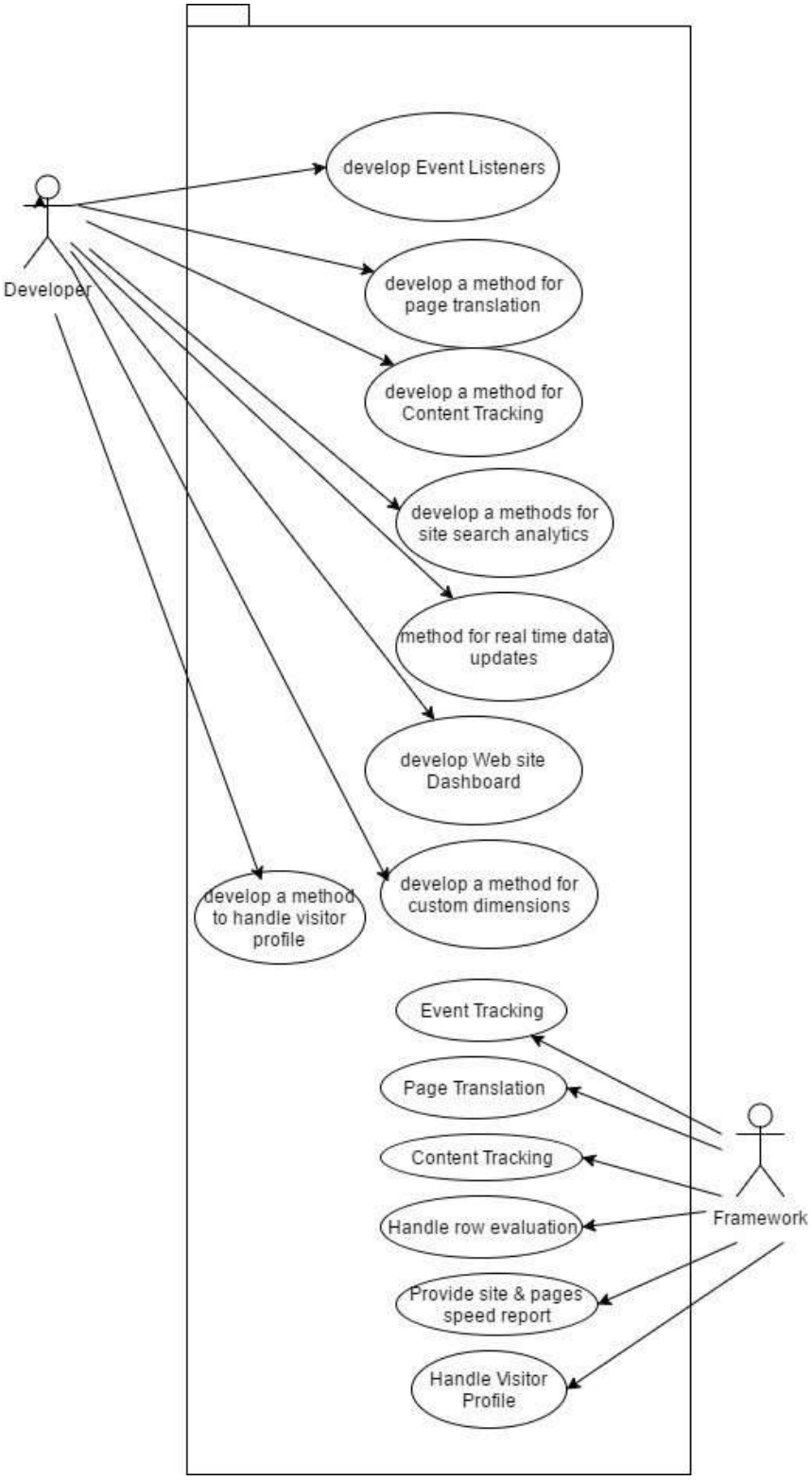
[5] Cohen, William A. (1996). Building a Mail Order Business: A Complete Manual for Success (4th ed.). New York: John Wiley & Sons. ISBN 9780471109464.

[6] Wells, William; Moriarty, Sandra; Burnett, John (2006). *Advertising: Principles and Practice* (7th ed.). New Jersey: Prentice Hall. p. 217. ISBN 9780131465602.

[7] 10 Tips for Unleashing the Power of Classified Ads". *Entrepreneur*. Retrieved 2016-01-29.

7. APPENDICES

Appendix – A: Use Case Diagram of Web Analytics component



Appendix – B: Use Case Scenarios of Web Analytics Module

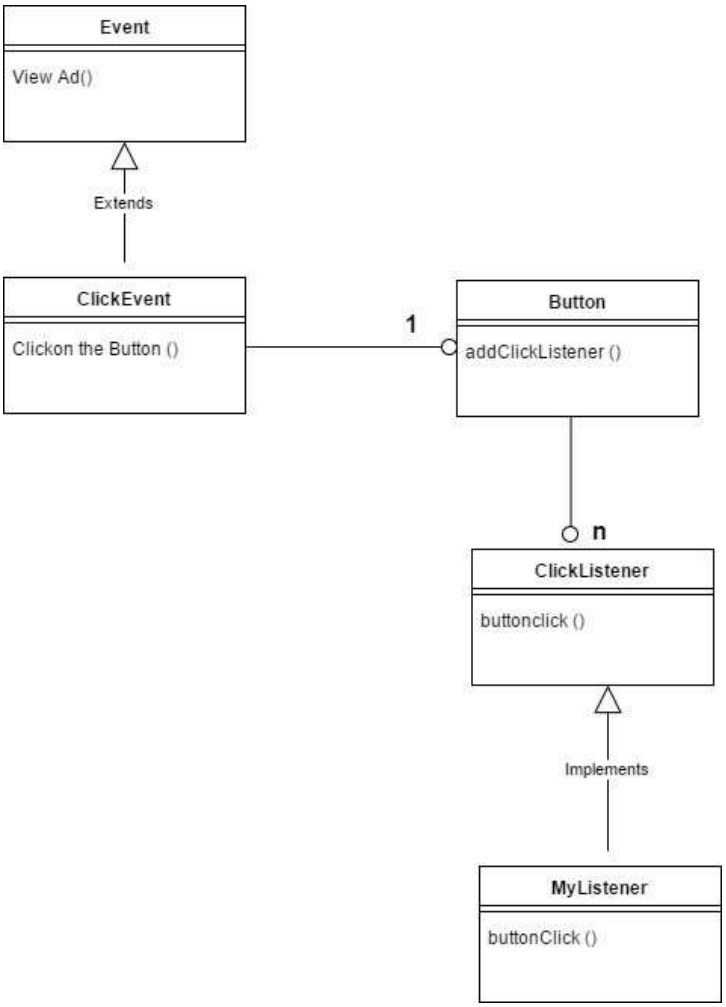
Use case No	01
Use Case	Event Tracking
Actors	Framework
Pre-Conditions	Should be an event
Flow of Event	Processing the Event
Post Conditions	Finishes the event

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

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

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

Appendix – C: Class Diagram of Web Analytics Module



Appendix – D: PostItemListener.java

```
package analytics;

import java.io.FileWriter;
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.Statement;
import javax.servlet.http.HttpServletRequest;

/**
 *
 * @author Kasuni
 */
public class PostItemListener implements Listener {

   @Override
   public boolean premethod(HttpServletRequest request) {

      try
      {

         boolean errorfound = false;

         String ad_name = request.getParameter("ad_name");
         String ad_price = request.getParameter("ad_price");
         String category = request.getParameter("category-select");
         String description = request.getParameter("description");
         String sub_category = request.getParameter("sub_category-select");

         if(ad_name.equals(""))
         {
```

```
            errorfound = true;
        }
        if(ad_price.equals(""))
        {
            errorfound = true;
        }
        if(description.equals(""))
        {
            errorfound = true;
        }

      return errorfound;
    }
    catch(Exception ex)
    {
        ex.printStackTrace();
        return false;
    }

}

@Override
public void postmethod(HttpServletRequest request) {

    int id=Integer.parseInt(request.getAttribute("ad_id").toString());
    String ad_name = request.getAttribute("ad_name").toString();
    String ip=request.getAttribute("ipaddress").toString();
    String date=request.getAttribute("eventdate").toString();
    String time=request.getAttribute("eventtime").toString();
    String category="Cars and vehicles";
```

```
                //Insert into CSV File


                String COMMA_DELIMITER = ",";
                String NEW_LINE_SEPERATOR = "\n";
                try{
 FileWriter fw = new
FileWriter("D:\\SLIIT\\Year04\\CDAP\\Analytics\\PostItemListener.csv",true);
                   fw.append(NEW_LINE_SEPERATOR);
                   fw.append((char) id);
                   fw.append(COMMA_DELIMITER);
                   fw.append(ad_name);
                   fw.append(COMMA_DELIMITER);
                   fw.append(ip);
                   fw.append(COMMA_DELIMITER);
                   fw.append(date);
                   fw.append(COMMA_DELIMITER);
                   fw.append(time);
                   fw.append(COMMA_DELIMITER);
                   fw.append(category);
                   fw.flush();
                   fw.close();
                }
                catch(Exception e){
                 e.printStackTrace();
                }

            }

}
```