ConfBits: A Web Based Conference Management System

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ABSTRACT : *ConfBits is a Web-based Conference Management System (CMS) developed to aid effective organization and management of professional, academic and technical conferences. The web based application is an object-oriented and multi-conferences platform that is made up of four major actors which are authors, reviewers, administrators (otherwise known as Program Committee (PC) chair) and participants. Conference organizers in any Anglophone country can subscribe to the platform via the Internet to access and utilize the different features which include; abstract and full paper submissions, assignment of papers to reviewers, sending email notifications to authors and reviewers, participants management and conference program scheduling. The prototype of the platform is already deployed on the Internet and the trial Universal Resource Locator (URL) is www.cucms.com.ng. From our review of existing online CMSs, ConfBits (although still at a prototype stage) is the first of such system from a developing clime. We hope the platform will serve to bridge the hitherto wide digital divide between the developed and developing nations especially with respect to scholarly online content.*

KEYWORDS : *CMS, ConfBits, EDAS, UML, URL*

I.   INTRODUCTION

The management of conferences has posed to be of great importance. In the past, Conference organization was considered a tasking job because it involved a lot of paper work in getting details of every participant. In its earlier days, web based conference management systems only included a basic functionality such as the use of a conference web page where information and announcements regarding the conference are displayed. However with technological advancement, a number of commercial and scientific services have recently been offered for effective conference management. The ConfBits CMS developed in this work aims to solve organization, management and communication problems that are usually associated with conference planning through the use of web technology. The different actors can utilize the services on the platform at any time and from anywhere in the world as long as they have access to the Internet. They can repeat a process as many times as they desire depending on the unique requirements of a given conference. In the last few years, several Web-based CMSs have been developed and used by many international conferences[1]. They have implemented such functions as publishing conference information, handling paper submissions and management of reviews. These CMSs exploit the Internet infrastructure as the unifying medium to support conference-based processing of scientific documents and the various activities that have to be carried out by several participants that are scattered all over the world. Based on this, increasing numbers of   conferences are now managed electronically. Some well-known electronic and online CMSs include EasyChair[2], MACMS[3] , ConfTool[4] , OpenConf[5] , Confious[6] , ConfMaster[7] and EDAS[8].EDAS is the richest in terms of features and the most popular among academic and scientific community. According to the data provided by EDAS for June'06, the platform has roughly managed 70,000 papers across 660 conferences [9].

II.   NETWORK ARCHITECTURE AND SYSTEM DESIGN

System design is the process of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements. The network architecture for a robust deployment and access to ConfBits by different actors is shown in Fig. 1. This architecture guarantees ubiquitous links to the platform from any part of the world. Also, it caters sufficiently for intending users whose only means of Internet access is the 3G mobile network or personal modem which is the case in Nigeria and most African countries.
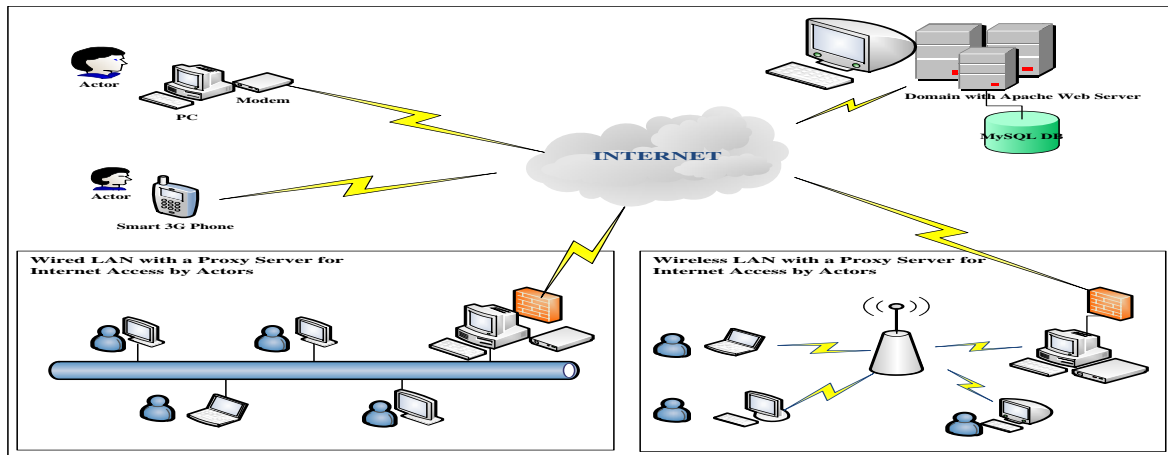
Fig. 1: Network Architecture for ConfBits CMS Deployment and Access

ConfBits contains about 27 Web pages which include the home, about, contacts, author, admin and several other pages. The Web pages were designed with proper consideration for user friendliness in look and navigation around the platform. A first user with good familiarity with the Windows operating system and web browsers can comfortably utilize the platform with little or no assistance.The different pages and their interconnections are shown in Fig. 2.However, in order to add functionalities such as registration, abstract submission, paper upload, assignment of reviewers to paper and tracking of papers by the author to the Web pages, we designed robust classes for the system. A class in software engineering is a template which defines the methods and variables for a given object. The class diagram which illustrates the different classes with their respective methods and variables in ConfBits are shown in Fig. 3.
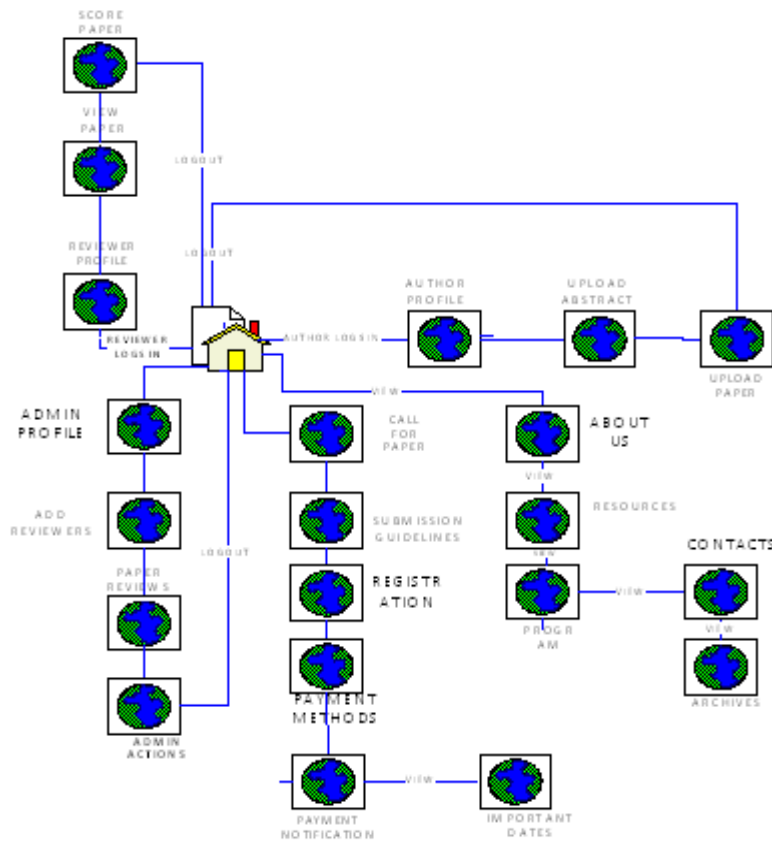

Fig. 2: ConfBits Web Pages with the Interconnections among them

As shown in Figure 3, the classes are AuthorProfile, Admin, Registration, ReviewerProfile and PaymentConfirmation. They do not serve any meaningful purpose until they are translated into codes that the computer can interpret to carry out specific operations. These classes were implemented with PHP which is one of the most popular Web application development tool. The codes with the Web pages were initially deployed to our in-house test Server which runs Apache Web server and later deployed online after proper tests and debugging. The in-house development and trial deployment set-up is shown in Fig. 4.
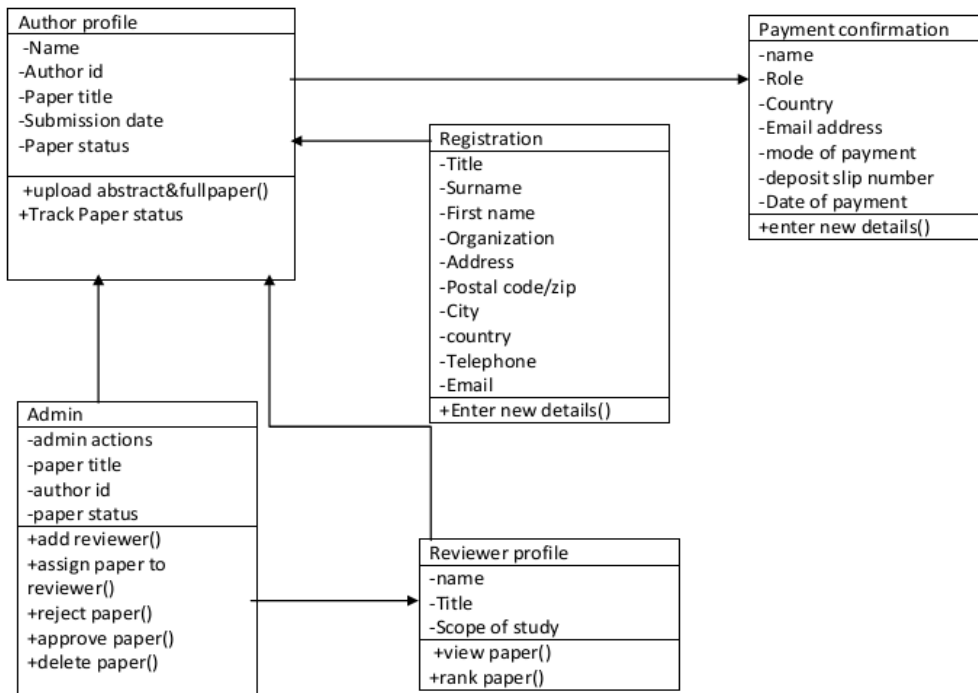

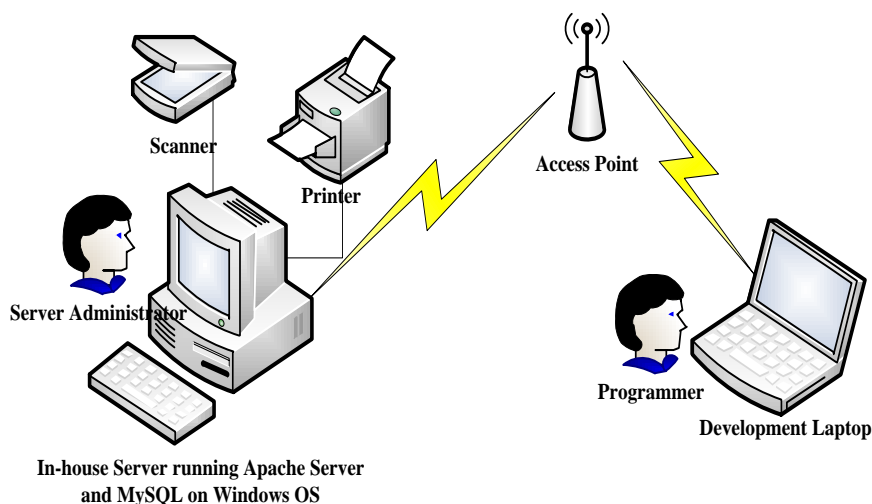**Fig. 3: Class diagram of ConfBits CMS**

Fig. 4: In-house Development and Deployment Set-up

A web-based application is incomplete without a well-structured database. Database (DB) design is the process of producing a detailed model of the data content of an application. The logical data model contains all

the needed logical and physical design choices and physical storage parameters needed to generate a design in a Data Definition Language (DDL), which can then be used to create a database. A fully attributed data model contains detailed attributes for each entity. We adopted MySQL Relational Database Management System (RDBMS) for the realization of the data back-end of ConfBits. Fig. 5 shows the complete components of the DB with the configuration parameters of the fields inside each specific table.
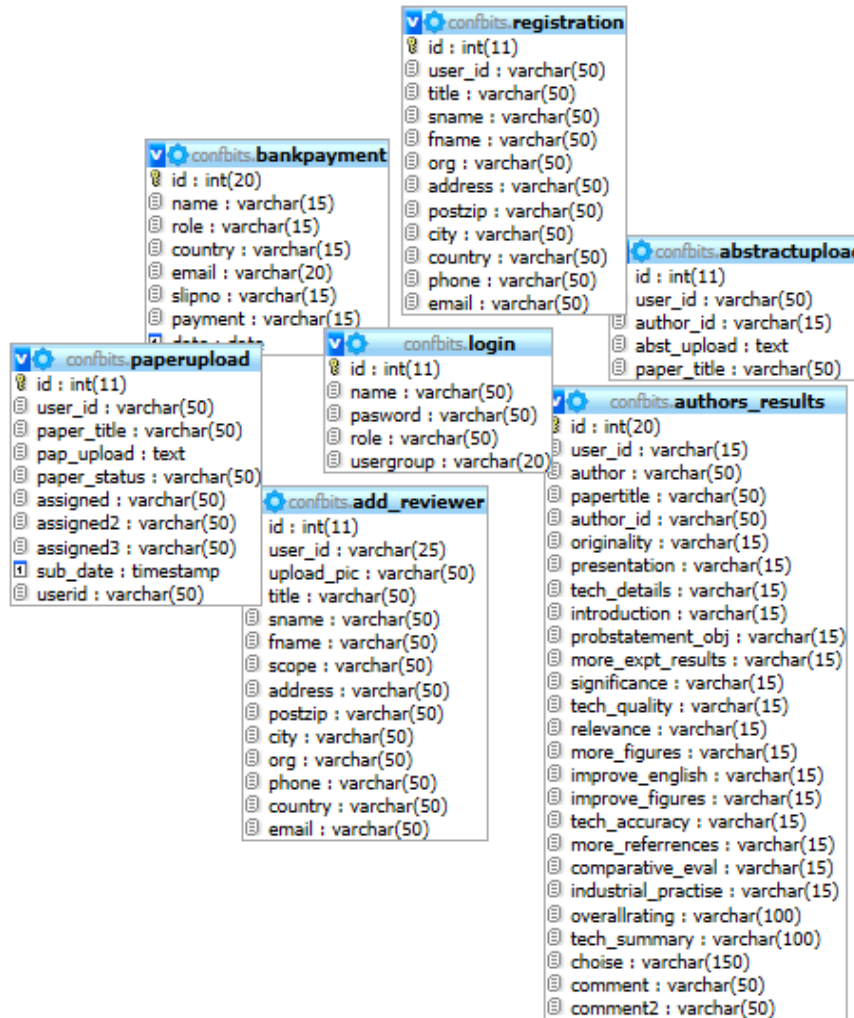

Fig. 5: ConfBits Database with the various Tables and their respective Field Parameters.

III. SYSTEM MODELING

In order to model the behavioral and structural dynamics of ConfBits, we adopted the Unified Modeling Language (UML). UML is a standardized, general-purpose modeling language in the field of software engineering. It includes a set of graphical notations to create visual models of object-oriented software-intensive systems [10]. For the description and communication of user requirements and functionality of a given software system, one can use UML's Use Case, Class, Component, Sequence and Activity diagrams [11]. This section documents the relevant UML diagrams for capturing the function and structure of ConfBits. Meanwhile, the Class diagram is already utilized in Section II for System design and it is shown in Fig. 3.

A. Use Case Diagram

These UML diagram is used to show the interaction between the system and the actors so as to capture and communicate the user requirements. Use Cases are the description of system functionalities written in an organized manner and their relationship with the actors. Actors can be defined as "something" that interacts with the system .The actors can be human user, some internal applications or may be some external applications. The system is the software developed and that is been modeled which in this case is ConfBits CMS. Fig. 6 shows the Use Case diagram for the system.
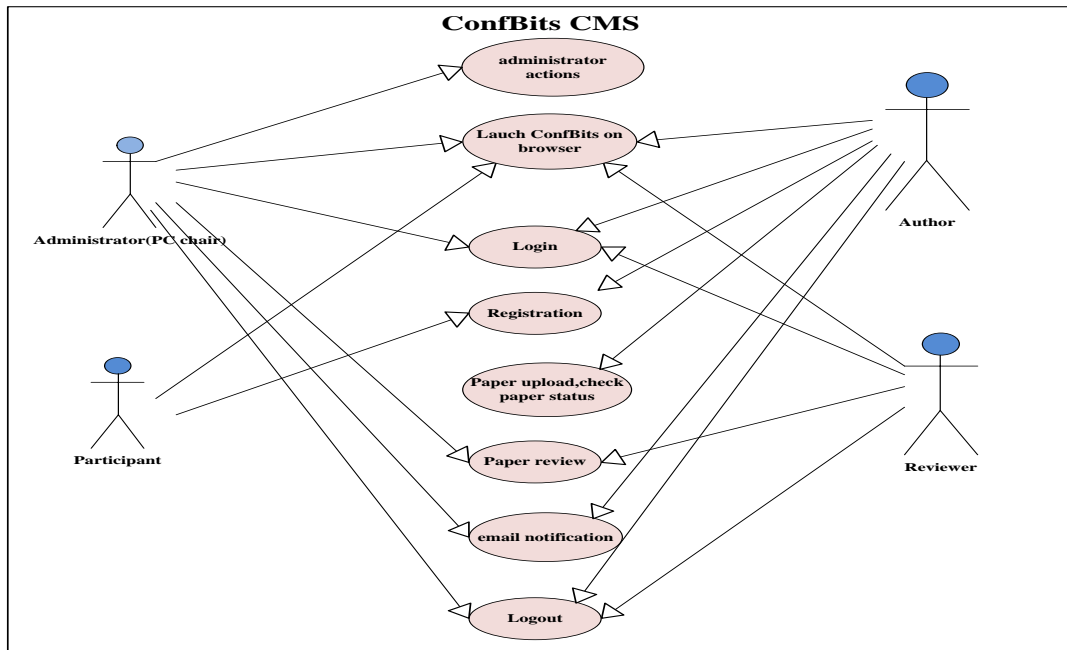
Fig. 6: ConfBits Use Case Diagram

B.   Sequence Diagrams

The sequence diagram captures the time sequence of message flow from one object to another. Sequence diagrams are often used to design the interactions between components of a system that need to work together to accomplish a task [12]. Figures 7,8 and 9 show the interaction of the author, reviewer and admin between the components of the system.
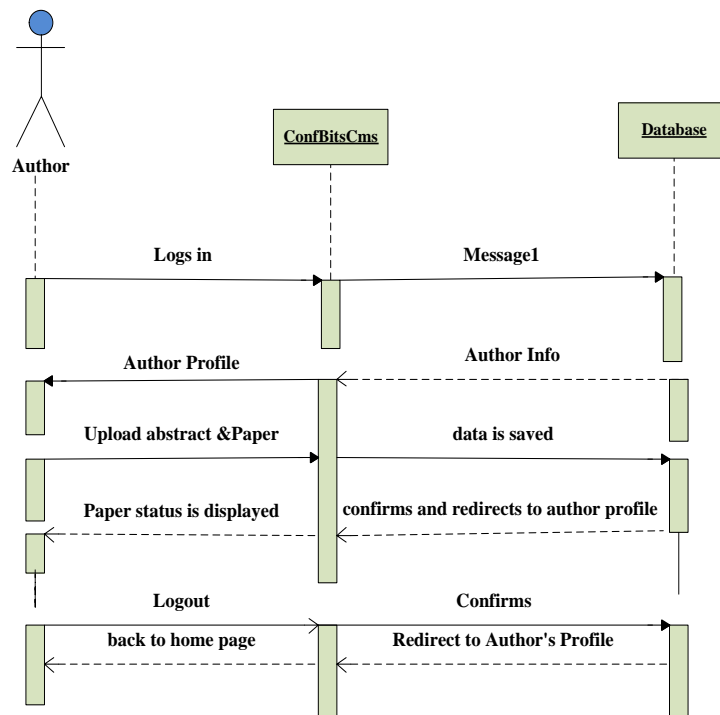

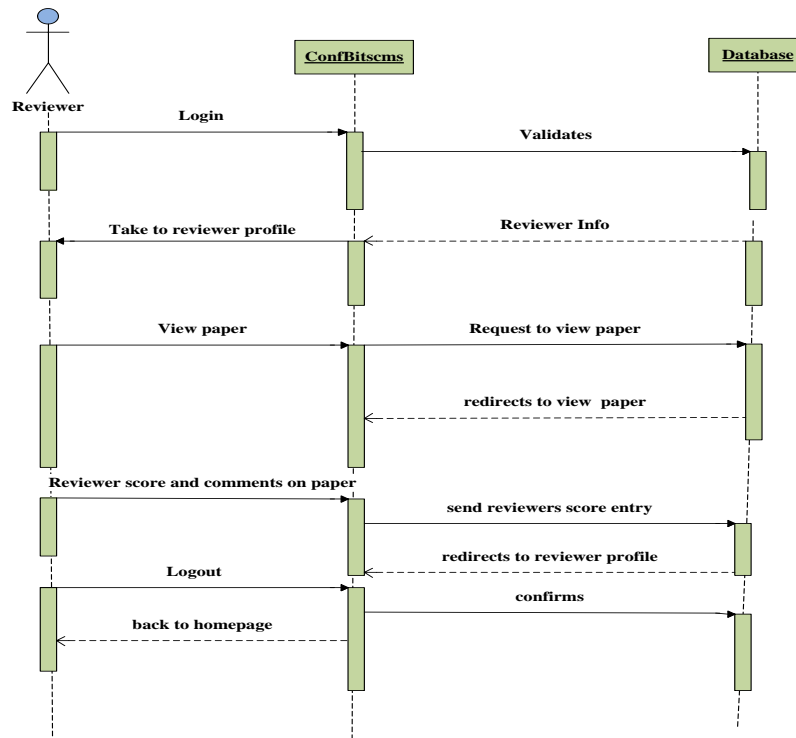**Fig. 7: Sequence Diagram showing Author interaction with the System**

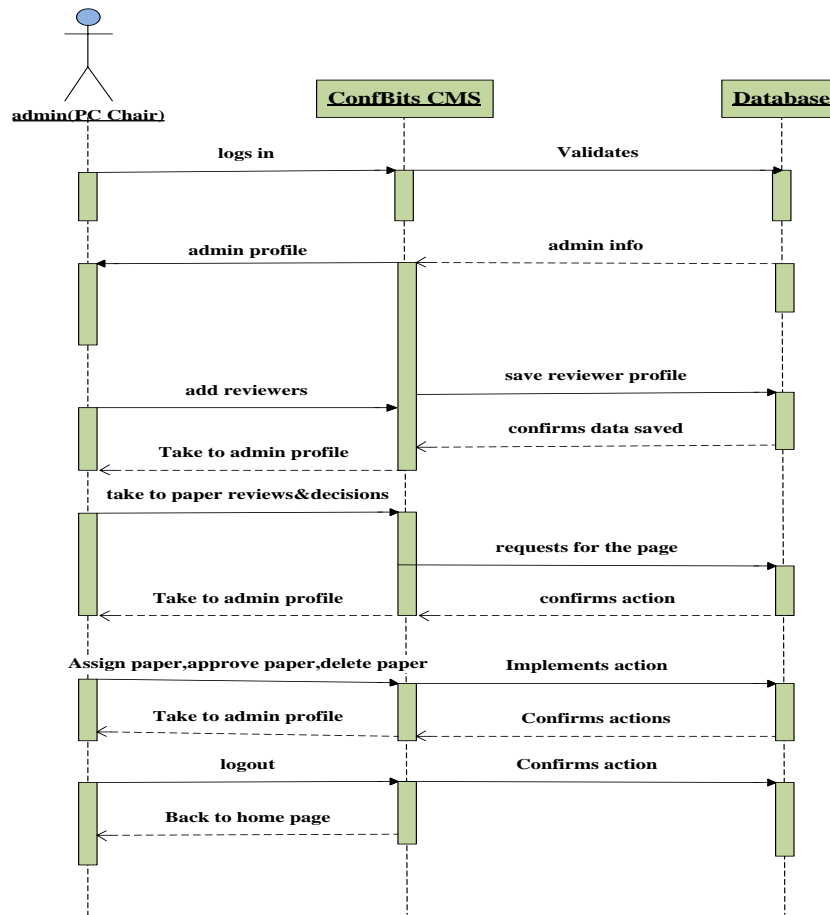**Fig. 8: Sequence Diagram showing Reviewer interaction with the System**

Fig. 9: Sequence Diagram showing the Admin (PC Chair) interaction with the System

C. **Activity Diagrams**

Activity diagram depicts the dynamic behavior of a system, the activities or workflow and responsibilities of elements that constitute a system. It is the object-oriented equivalent of flowcharts and data-flow diagram used in procedural development. It can be used to represent situations where parallel processing may occur in the execution of some activities. Also, activity diagram can be used to analyze a use case by describing what actions need to take place and when they should occur [13]. The activity diagrams that model the workflow by the major actors in ConfBits are shown in Figures 10, 11 and 12.
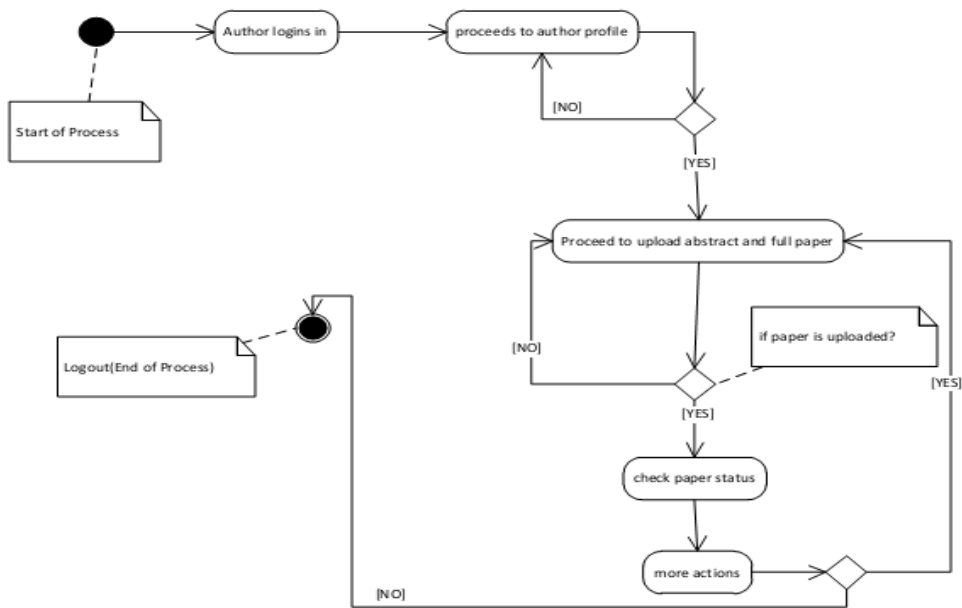

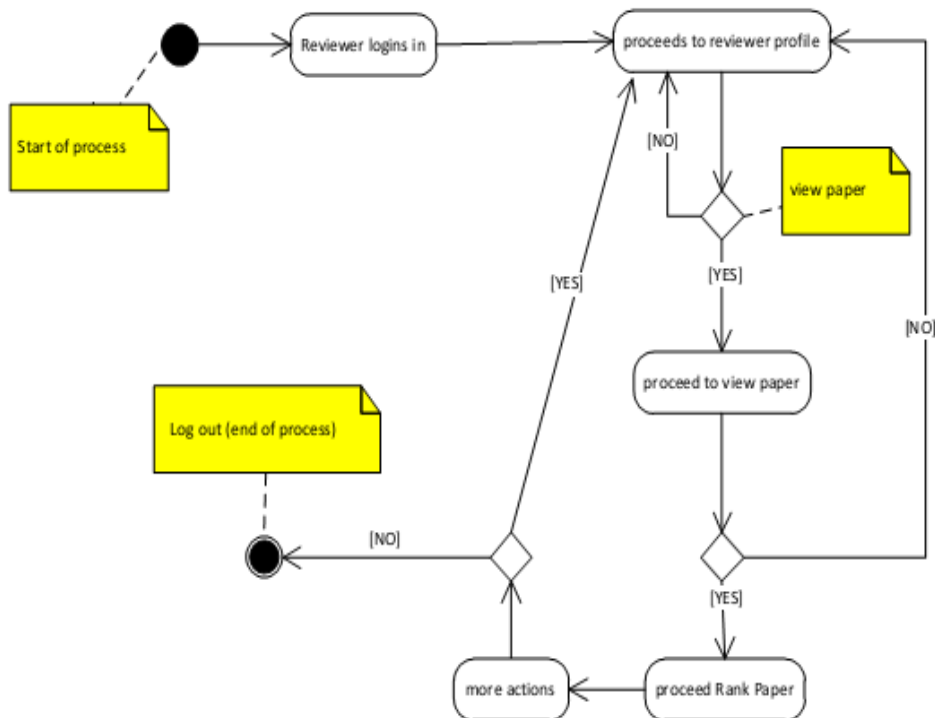**Fig. 10: Activity Diagram of the Author**

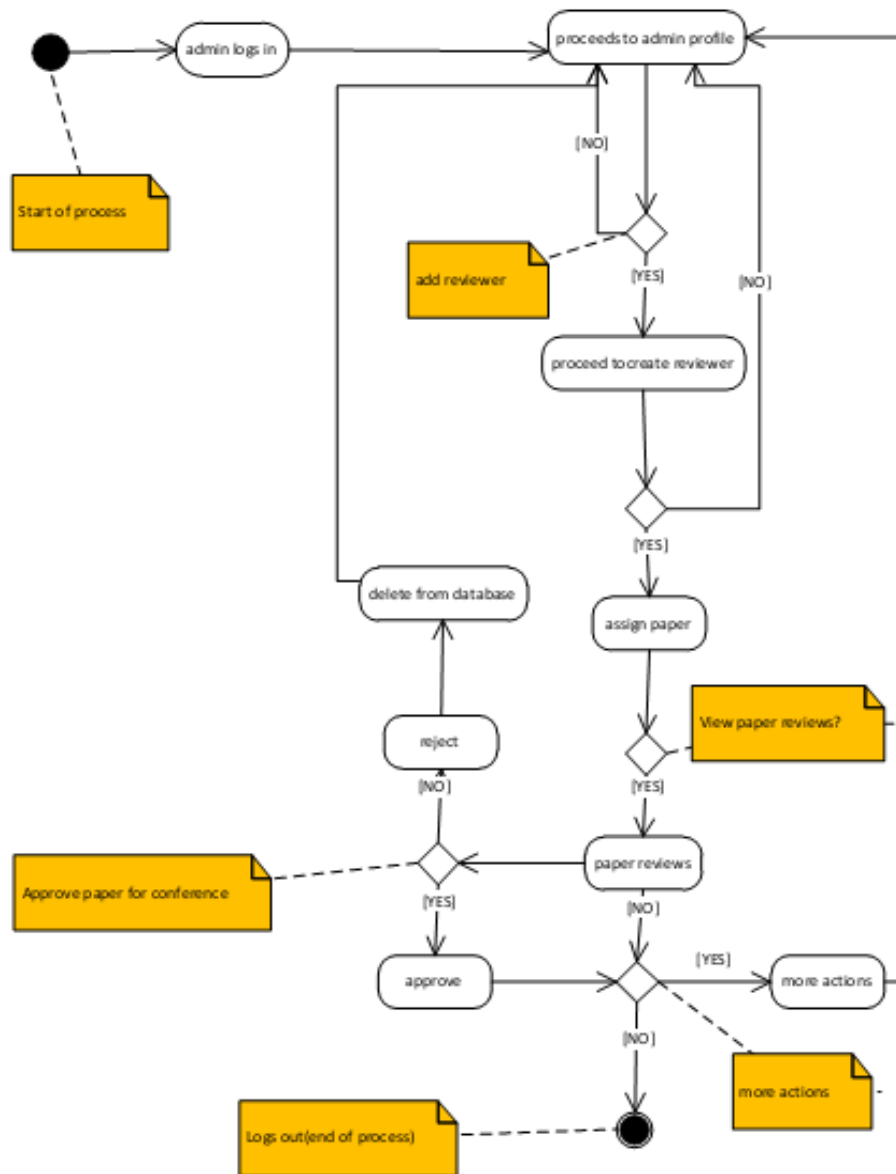**Fig. 11: Activity Diagram for the Reviewer**

Fig. 12: Activity Diagram for the Admin

IV.   IMPLEMENTATION AND TEST RESULTS

The designed and modeled ConfBits CMS was implemented using combination of tools. The classes were implemented with PHP, the Web pages were designed using relevant images, HTML and Cascaded Style Sheet (CSS) inside Adobe Dreamweaver CS6 while the database was implemented with MySQL using phpMyAdmin GUI tools. The prototype of the system is already available on the Internet and the trial URL is www.cucms.com.ng. We carried out portability test on different browsers such as Internet Explorer, Google Chrome and Mozilla Firefox and observed that there was no distortion in the page elements. This can be attributed to the properly coded CSS on all the Web pages. Some of the Web pages as they were rendered on
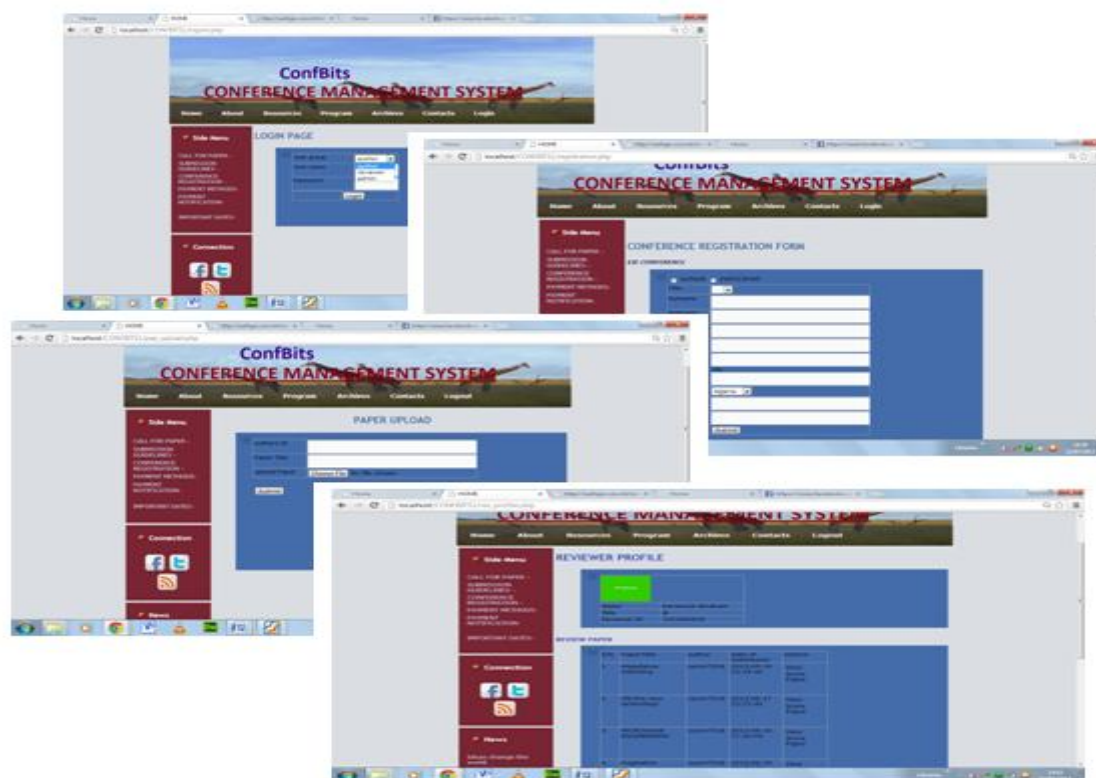
the Internet are shown in Fig. 13.

Fig. 13: Sample Web Pages of ConfBits CMS

V.   CONCLUSIONS AND FUTURE WORK

ConfBits is a Web-based CMS, developed based on relevant use cases derived from proper functional and user requirements analysis. The philosophical basis for the design and implementation of the platform is to engender the culture of upload of digital contents among professionals and academics in the developing countries. A lot of scholarly activities such as symposia, conferences, workshops and seminars take place in the developing clime on a regular basis but most of the knowledge from these events is archived on paper and offline. With ConfBits CMS, we hope this trend will be reversed and the developing worlds can truly participate not just as consumers in the information age but as providers of digital products and services. More features such as plagiarism tests, online payment by authors and participants, search and download of digital archive will be added to this platform in future upgrades.

REFERENCES

[1]   Yordan Kalmukov, Architecture of a Conference Management System Providing Advanced Paper Assignment Features, *International Journal of Computer Applications,* 34(3), November 2011.
[2]   EasyChair, available at: http://www.easychair.org, 2004-2013.
[3]   Microsoft's Academic Conference Management Service, available at: http://cmt.research.microsoft .com/cmt/, 2009.
[4]   ConfTool, available at: http://www.conftool.net/
[5]   OpenConf, available at: http://www.openconf.com/
[6]   Confious - The Conference Nous, available at:http://www.confious.com
[7]   ConfMaster, available at: http://www.confmaster.net/
[8]   EDAS, available at ehttp://edas.info
[9]   Madhur Jain, Tribhuwan K. Tewariand Sandeep K. Singh, Survey of Conference Management Systems, *International Journal of Computer Applications* 2(2), May 2010.
[10]   UML Tutorial, available at: http://www.sparxsystems.com/uml-tutorial.html
[11]   Developing Models for Software Design, available at: http://msdn.microsoft.com/en-us/library/vstudio/dd409436.aspx
[12]   Sequencediagram Elements, available
[13]   at:http://incomingproxy.ist.edu.gr/stfs_public/cs/bsc/L4/4FEN0120SR/LABS/Lab%207/Sequence%20Diagram%20Elements. pdf
[14]   Martin Fowler, Kendall Scott, UML Distilled (Addison-Wesley, 2000).