

## **AC 2010-348: WEB ENABLED CONFERENCE MANAGEMENT SYSTEM**

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# Web Enabled Conference Management System

## Abstract

In recent years, with the improvement of internet technologies and hardware supports, we can find that internet have become an important part in our daily life. Thus with the enormous use of the networks, many real world activities are now handled as World Wide Web applications. Our focus in this paper is a complete conference management system, we observe that in the last few years, several web based conference management systems have been developed and are being used by many international conferences all over the world. However, some of these systems are not available for free to the academic community and some of them are restricted in terms of options and flexibility that they provide to the users. Some of the available systems do not support multiple tracks in the conference; some do not provide flexibility to the organizers to be innovative. We present an architecture, as well as a complete system of integrated tools to support planning, organization, management, and execution efforts during the organization and running of a new conference. This paper describes the Web Enabled Conference Management (WECM) System that handles all activities of real-world conferences by relinquishing much of manual control and activities to automatic mechanism. The Conference Management System is the front end to handle the processes of conference organization. It also provides many tools to different members of the conference organizing committee including conference administrator, conference chair, track chairs, program committee and authors, with varying level of access and control.

## Introduction

In recent years, with the improvement of internet technologies and hardware supports, we can find that internet have become an important part in our daily life. Thus with the enormous use of the networks, many real world activities are now handled as World Wide Web applications. Keeping in line with this latest trend we present a Web Enabled Conference Management (WECM) System. We understand that organizing a scientific conference requires careful planning and excellent organization and management skills. The process of organizing a conference consists of a number of activities, such as; putting together number of committees, formalizing and advertizing call for papers (CFP), collecting the papers, conducting a peer review of the papers and managing the registration process to name a few of the related activities. There are a number of conference management systems available in the market such as MyReview<sup>12</sup>, Start<sup>11</sup>, CyberChair<sup>4</sup>. However, these systems do not support one or more of the above described functionalities of the conference management. In addition, some of these open source system such as MyReview lacks the support for registration process and support during the conference organization. In addition, some of the available systems are not available for free to the academic community (OpenConf charges US\$250 per event + Installation, license, etc.<sup>7</sup>) and some of them (CMS-Plus<sup>2</sup>, ConfMaster<sup>3</sup>, ConfTool<sup>15</sup>) are restricted in terms of options and flexibility that they provide to the users. Some of the available systems (EasyChair<sup>5</sup> suitable for LNCS style conference only) do not support multiple

tracks in the conference. In general these systems do not provide flexibility to the organizers to be innovative. These limitations, therefore, serve as the motivation for developing a new Conference Management System that should manage in addition to the above mentioned tasks, setting up different tracks within a conference. The scope of the paper is to present a design of a system that resolves these issues in the existing conference management systems.

## Proposed System

The proposed WECM system is designed in such a way that it automates all the related work in organizing and managing a scientific conference and thus reduces the stress and other manual tasks for the organizers of the conference. Web Enabled Conference Management System (WECM) is a web based system which helps in maintaining and organizing scientific conferences for the program chair, the conference organizers, authors and also for the reviewers in their respective activities. The system enables interaction of all users/committee members in the corresponding roles by providing all its users their own account. Registered users of this system are assigned unique user id and password. The new system provides all the functionalities and supports features such as online submission of the papers, uploading and downloading papers, manage review process of the submitted papers, posting of the reviewers comments, to name a few of the activities. Following sections provide details of each of these and other conference management processes. All aspects of security are kept in mind while developing this system by maintaining data of users which will be part of the SQL query and must be preprocessed to get access to the system.

## Functional requirements

In WECM system we have classified and organized functional requirements by the roles (Conference administrator, Conference chair, Track chair, Program review committee member, authors and participants) that are performed by the people involved in the conference. All of the users of the system need to initially register with the system. The type of access that will be available to the user will depend upon the role of the users however; a role once created can also be altered later. In the following paragraphs details of the roles played by different users are explained in detail.

**Administrator:** Conference administrator has to define, configure, manage conference data, create and manage tracks, update the registration form, update various reminders templates, administrator user activities etc. The administrator is provided with the highest level of privileges because of the nature of the role for such a person. This person is not only responsible to maintain the conference webpage for the conference dates, paper submission deadlines, registration deadlines, conference fees etc. as well as assigning the roles to the track chair, reviewers, authors and the participants. Conference chair and/or organizing committee will decide the number of tracks and the track chairs and

administrator will then be adding them to the system and assign the respective roles such as track chair based on the information provided to him.

**Conference Chair:** The conference chair looks after all the registration process and decides, in consultation with the organizing committee, the deadlines for the papers, conference dates, registration fees, etc.. However, he can only access the system to view the data but does not have access or rights to manipulate or change any of the data in the system, these operations will be performed by the conference administrator as explained above.

**Track Chair:** The role of track chair (Also known as program committee chair for a single track conference) is to form a program review committee and manage the peer review process for all the papers submitted to the corresponding track. This process continues until camera ready copies of the accepted papers have been uploaded. It is the track chair who is responsible to assign the papers to the program committee member for peer review within the track. A single paper is generally assigned to more than one reviewer. The track chair is also responsible for sending all the reviewed papers back to the authors along with reviewers comments, notifying the authors about the accept or reject decision via email.

**Authors:** The role of the author is to use the system to upload their paper and wait for the response from the track or program committee chair. However, authors can check the status of their paper anytime by logging into their account. In case the paper is accepted then author can use the same account to register for the conference.

**Reviewers:** Once the program committee members are notified that papers have been assigned to them they can login to WECM and download papers assigned to them and later upload their comments when they have completed review of the papers. The reviewers have certain time period in which they have to complete the reviews of these papers. The link for uploading the review will automatically disappear after that period.

**Participant:** Participants or non authors who wish to attend the conference can use the system just for the conference registration and paying the corresponding conference registration fees.

### **Conference System Activities:**

**Conference Setup:** Conference administrator will be maintaining conference data like conference title, email information, conference URL, Draft paper submission deadline, Author notification deadline, Final paper submission deadline, Author registration deadline, Participant's deadline for registration, Call for papers.

**Account Activation:** The users who are registered with the system can access the system with their respective id and password. Each user is provided with their own workspace to

work on. The system sends the password back through email if the user forgets their password by any chance.

**Paper Submission:** The paper submission process includes uploading of paper to a particular track. During this process the author is also added to the author list. Submission of paper also validates all the related data such as paper format (for example pdf, or doc). After submitting the author receives notification email along with paper identification number.

**Paper Review process:** After the papers have been submitted by the authors and the deadline has passed the track chair of that particular track then assigns the papers to the reviewers for peer reviews. The reviewers will then upload their reviews to the system. The paper review process will remind reviewers about their tasks, and use the notification system to notify all of them about any other related issues. When all reviews are collected track chair(s) and conference chair will make a decision about papers being accepted or rejected for conference. Respective authors will receive a formal notification email about the final decision. The authors of the accepted papers need to submit the final camera ready copy of the paper.

## Use Case Diagram

The use case model in general helps identifying the system in terms of functionality and requirements. It defines the proposed functionality, helps in achieving the goals of the system and contains all the activities of the users and their interaction with the system. Therefore use case diagrams give a complete picture about the system or application functionality. It also identifies the requirements and describes a value which results with the user in operating the whole system. Figure #1 shows the use case diagram that describes activities of the WECM and role of each actors interacting and using the system. Actors are the users of the system which represents their different roles that they play while interacting. The relationships between the use cases and actors are also depicted.

## Sequence diagram

This diagram is a type of representation in Unified Modeling Language (UML). The UML 2.0 consists of thirteen different diagrams that are divided into 3 different categories namely interaction, behavior and structure diagrams<sup>10</sup>. Sequence diagram is one of the interaction diagrams that help in describing the behavior, data and how control flows among various modules within a particular system. These diagrams some times are also called as timing or event trace diagrams or event scenarios.

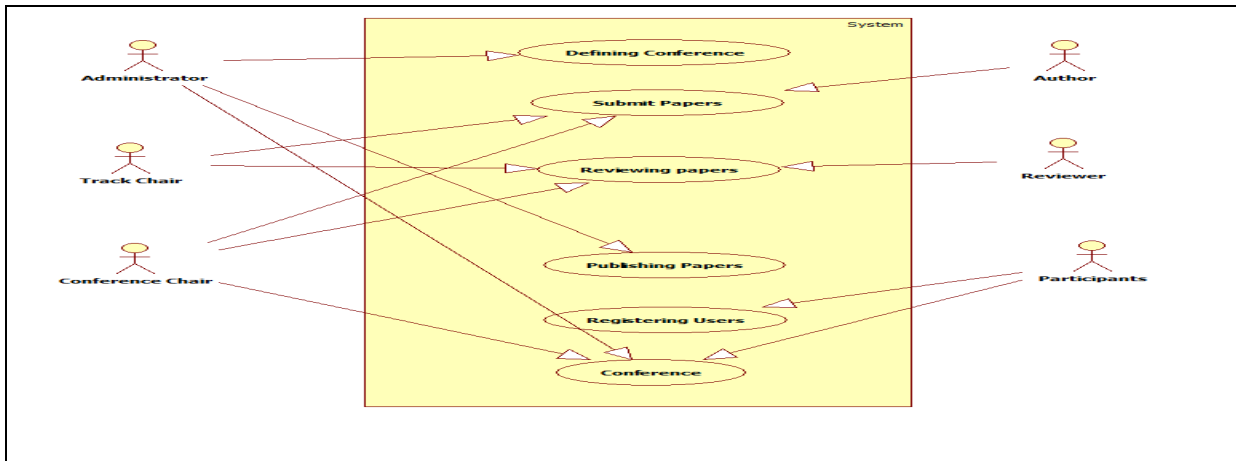


Figure #1: WECM Use Case Diagram

A sequence diagram is shown, using parallel vertical lines, in figure #2; also referred to as lifelines representing an object when it is underlined, else they represent a role. Sequence diagram also includes processes or objects, messages (which are in order in which they occur) and horizontal arrows. In simple words, sequence diagram is a graphical illustration of simple runtime scenarios. Interactions are displayed using messages in between the lifelines. These are represented using horizontal arrows, where as message is displayed on top. If any particular instance is not assigned any name it is then regarded as anonymous or unnamed instance. There are number of different configurations for arrows; Synchronous calls are represented with full head arrows, where as asynchronous calls are represented with solid arrows and stick heads, the return messages are shown with dashed arrows and stick heads, the processes that are executed as a result of a message are drawn as method call boxes or activation boxes.

## Tools Used

Personal Home Page (PHP), is a useful scripting language for creating personal web pages or applications and is also considered as a general purpose scripting language. It was introduced by Rasmus Lerdorf in 1995<sup>8,9</sup>. It is usually run a web server and it can also be embedded in HTML. PHP does not process statements that are outside its delimiters and send them directly to output where as executes statements which are within delimiters. Thus these delimiters are used to detach the PHP and HTML codes. A dynamic web page contents can be created by executing a runtime routine for the code written in PHP. However, the same can also be used for client side graphical user interface application as well as for scripting at the command line. This language provides great flexibility since many servers can be used for deploying it, number of operating system platforms and also for many database management systems running relational databases. It is also worth mentioning that it is freely available and intended for creating web pages that are dynamic and like many other scripting languages (MS Active Server Pages, Sun Microsystems' Java Server Pages) mainly focus on server side in addition to providing dynamic content to client from a web server. Users do not need any special

plug-in or browser because of the character of PHP. It is very easy to learn, understand and write code especially if a person has programming experience in HTML, C or Java.

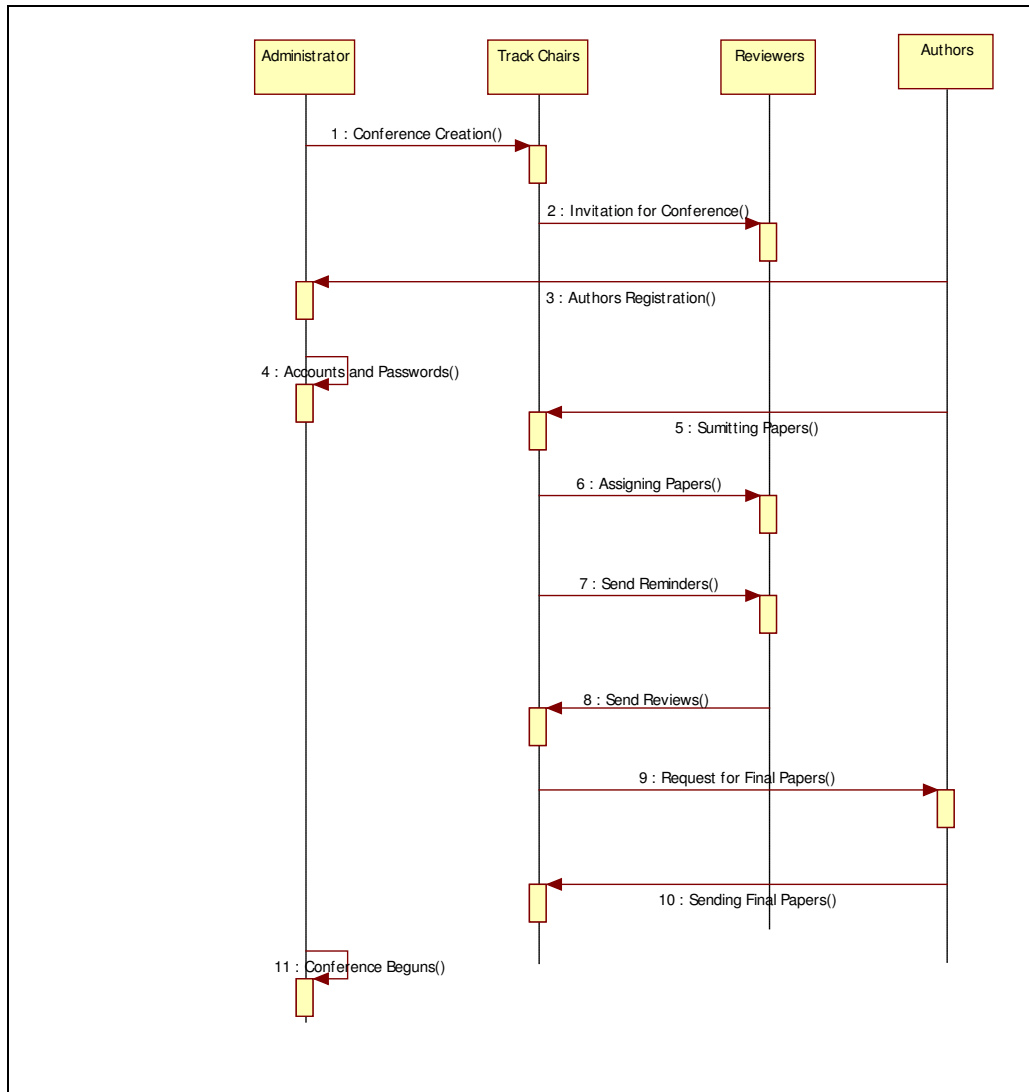


Figure #2: Sequence Diagram for WECM

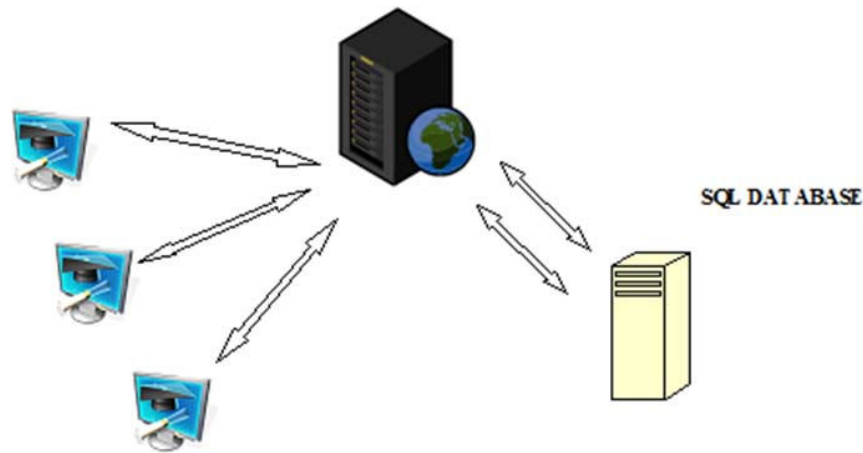
PHP is generally used as an Apache module written in C and it loads and execute faster. Since it does not occupy many of the system resources so, it does not affect other system processes. It guards against unwanted security risks because it offers security at many levels. The connect abilities of PHP gives us an additional advantages. It interfaces to a number of libraries (XML, encryption, etc.) because of its modular system of extensions. PHP can also be extended by user written extensions which are compiled into executable files. User, through PHP dynamic loading, can also create and load their executables.

In order to be able to interact directly with the database from the website we used My Structured Query Language (MySQL) for WECM system. It supports over 50 million tuples and is available under the GNU GPL (General Public License) for free download.

However, it can be customized according to individual needs under the terms of the license<sup>6</sup>. We used MySQL with PHP as a back end tool and it is interfaced with PHP for automating website. By deploying the system with PHP and MySQL we have many advantages like high performance, built in libraries, Extensibility, Lower cost etc.

## System Architecture

WECM system is designed around the concept of Client Server architecture. A client in this case is the user of such system or in some cases such systems themselves are called Clients. A machine called server is designed and used in such a way that the data is kept on one or more shared files. Generally there lot of clients that are using only a few servers.



**Figure #3: Three Layer Architecture**

The communication between client and a server is through a message sent as a request from the client side to the server side for the retrieval of the information. The information requested is then send back by the Server. In case of WECM a users can request for conference deadlines or can upload their paper, based on the priority the user will get system access. All such type of communications take place through a user friendly Graphical User Interface (GUI). Developing an application based on client server architecture requires three-tier architecture<sup>1,14</sup>. Each tier is a code that performs a specific function. Three different layers of architecture are Presentation layer, object layer and data base layers<sup>13</sup> each are developed and maintained as independent components.

**Presentation Layer:** This is the top most layer responsible for exhibiting out put on the clients system. It contains all the contents that are visible to the user such as, screen layouts and navigations. It is one of the most important layers which must be designed very carefully and adequately.

**Object Layer:** The vital component for most of the applications is the data. The data has to be transmitted to the presentation layer by some means. This layer is the core of the system whose function is to provide an interface or mapping for the requested



information in the form of data from the database and return it through the presentation layer to the user.

**Data Layer:** The data layer is an individual component, whose main function is to retrieve data or information from the database and return it to the object layer. Theoretically speaking instead of submitting the same query repeatedly this layer provides the capability to reuse the data from one query therefore a portion of an application may reuse the same query results.

## Functional Modules

This section provides the detail of various functional modules of the WECM system. The user will be redirected to the home page after entering the URL of the WECM system as shown in figure 4. Once the user is on the home page many options, in the form of tabs, are presented to the user for selection based on the role played such as, conference chair, track chair, a program committee member or a conference participant. For security reasons a separate URL is provided to the Conference Administrator for handling all the responsibilities for a conference, as mentioned in earlier section.



Figure #4: Home Page

The next functional module in the system is a login page, figure 5, where the users can login according to their profiles such as; the track chair can login into his account by clicking on to track chair option and so on. Once the respective option is clicked user is required to enter user ID and password that is assigned by the administrator. People using the system for the first time need to register and provide the required information to the system. In case the user forgets the password, upon request, the system can send the request, the system can send the password to the user's registered email address.

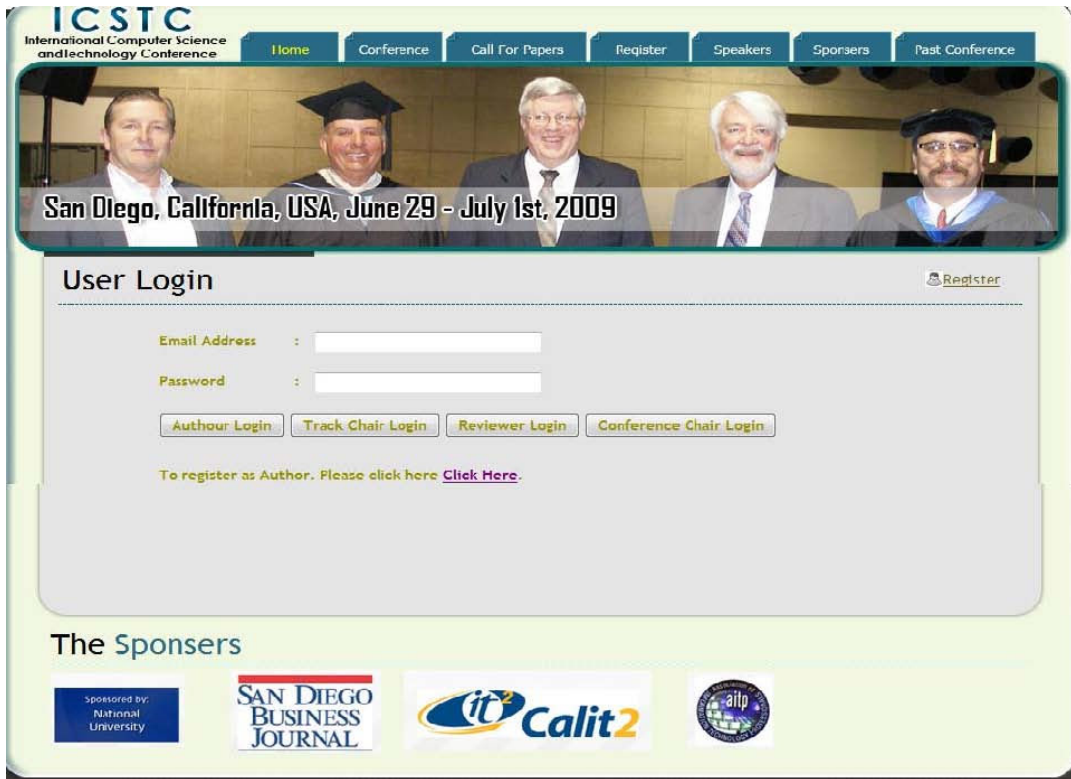


Figure #5: Login Page

Participant functional module deals with participants of the conference. For the participants, to register for the conference, they need to enter their respective personal details as shown in figure 6. The system will then request for the registration fee through PayPal.



Figure #6: Participant Login Page

This functional module handles activities of the authors. After the author has successfully registered with the system he/she can either upload his paper or can remove a previously uploaded paper, as shown in figure 7. The author needs to select one of the tracks of the conference depending on author's choice. However, this option will not be available for a conference with no special tracks. An automatic email message is sent to the track chair after successful uploading of the paper or program committee chair if there are no multiple tracks in the conference..



Figure #7: Author Activity Page

This functional module, figure 8, is for the program review committee member. Once the user logs in as a program review committee member a list of papers assigned by the track chair will be presented to the reviewer for download and review. Once the review of the papers is completed the user will use the same page to upload the respective reviews. An email is sent to the track chair once this operation is completed successfully.

In this functional module, figure 9, the track chair assigns the papers to the reviewers also known as the program committee members. A paper can be assigned to multiple reviewers at the same time. In addition track chair will also send the papers back to authors after the review process is over with the reviewer's comments and final decision about the paper.

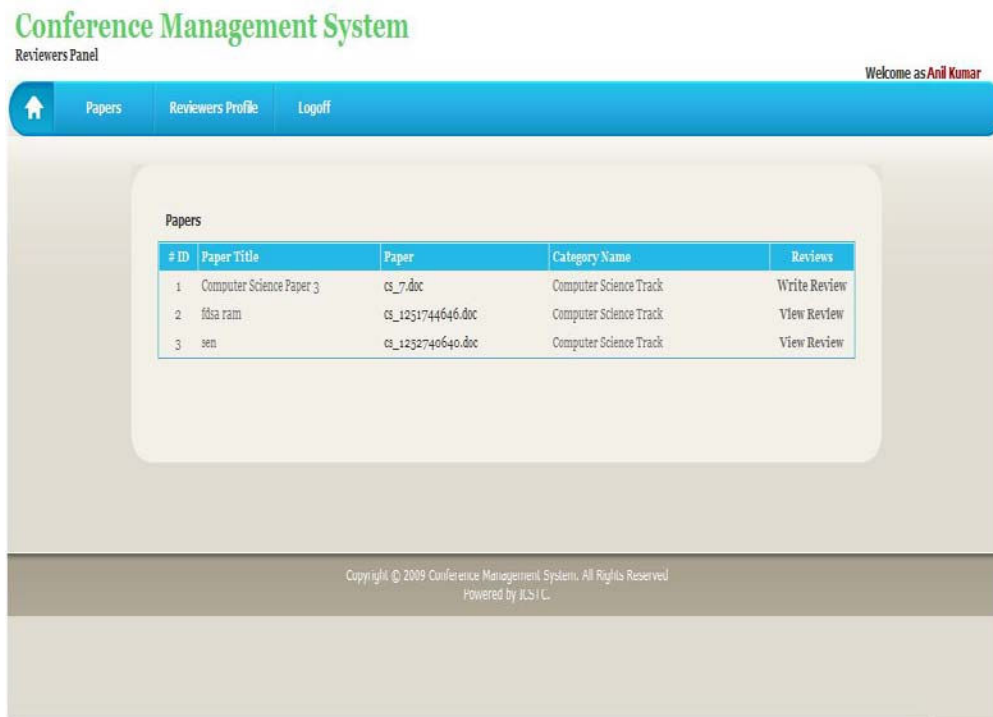


Figure #8: Reviewer Activity Page

For WECM administrator has to define and configure all conference data, create and manage special tracks, define the registration form, various reminders templates, does user administration, activates accounts etc. Administrator's role is ranked with the top most priority and is responsible for monitoring the whole system functions. This functional module, figure 10, is used to assign different roles for track chair, reviewers, authors and the participants. This module can also be used to add different tracks to the conference.

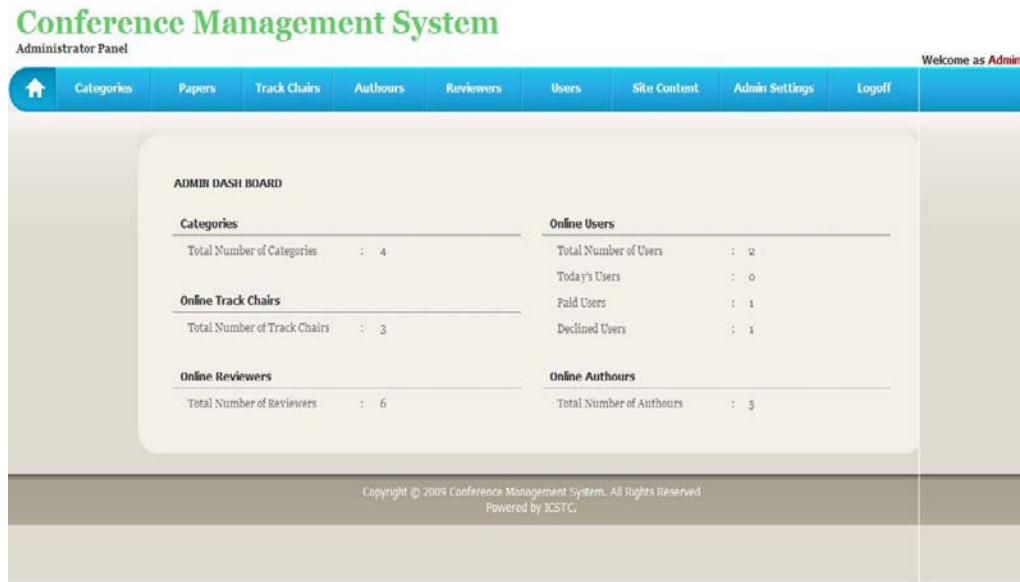


Figure #9: Track Chair Activity Page

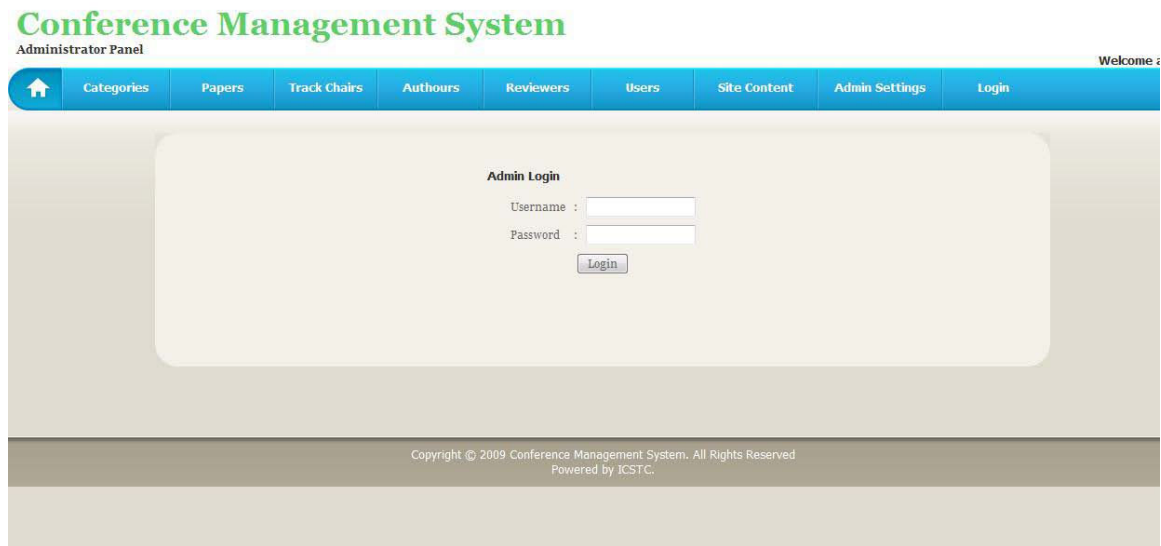


Figure #10: Administrator Login Page

## Conclusion

In this paper we have presented a platform that implements the idea of turning the system for conference management into a service. It is capable of providing several services to different persons involved in the conference such as: to authors: upload paper, to reviewers: download the paper and upload their reviews, to track chairs: adding reviewers, assigning papers to reviewers, sending email reminders, sending emails to authors, to administrator: add or remove a track, change dates, upload conference program, upload paper templates, etc. Compared to other conference management system WECM can be

preferred because of its simple structure and excellent scalability and is a modular software architecture based on web applications framework, uses Tomcat server/JSP container for application deployment, build by using PHP and MySQL for data storage and manipulation. We in this paper put forward the modularization thinking making each module independent comparatively and thus providing the flexibility for further expansion and modifications. This approach modularizes the system functions and transfers them to a lower level in application service layer. It improves the integration of the system and other service components, simplifies the system complexity and enhances its scalability. However, in future we would like to extend the system to add another set of modules to enable the support of virtual conferencing in the future academic society, and automatically generate conference proceedings.

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