

CONFSYS: Enhancements & Integration

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ABSTRACT

CONFSYS: Enhancements & Integration

Yuwei Feng

This thesis presents the design and implementation of a web-based conference management system (ConfSys). The objective of ConfSys is to provide a comprehensive system, flexible enough to be easily adaptable for the management of most academic conferences. ConfSys deals with most administrative functions for supporting the organization of academic conferences, such as: setting up the parameters for the conference (topics, deadlines, program committees), paper submission, reviewers' topics of interest, paper auction, paper allocation, paper review, slides for the presentation and camera-ready paper submission, conference registration, and session arrangement. In this thesis, we also present efficient algorithms for paper allocation, session arrangement, and a method to integrate ConfSys system with CINDI (Concordia Indexing and Discovery) digital library system to distribute the reviewed papers on the internet. ConfSys system is implemented using open source software on Linux platform. Technology used is based on Java Servlet, JSP (JavaServer Page), and JavaBeans programming languages, MySQL database server, Tomcat servlet engine, and Apache web server.

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1. Introduction

1.1 Problem statement and proposed solution

With the rapid development of modern technology, the international academic conferences and workshops are becoming increasingly popular to discuss current research, and to exchange information. Every year, many academic conferences and workshops are hosted in different countries. How to effectively manage the administrative task of organizing an international conference has become an important issue for the organizer.

A traditional conference preparation process includes: paper collection, paper review, paper decision, camera-ready copy collection, conference programs assignment, and participant registration. There are four main groups of actors in a typical academic conference: the authors, the program committee members (reviewers), the conference chair(s), and the conference participants. For authors, they must send their papers to the program chair before the submission deadline and get the decision from the chairs after the review process; then, prepare for participating in the conference. For program committee members (reviewers), they must indicate their topics of expertise, select papers for review in an auction, get the assigned papers from the chairs, review papers, discuss the review results with other reviewers if necessary, and submit their final review to the chairs. In managing an academic conference, the chair is required to deal with many administrative tasks during a typical review process such as: collect papers, collect reviewers' interests and expertise, interact with authors and paper reviewers, allocate papers to reviewers according to the papers' topics and reviewer's expertise and interests,

collect review results and make final decision of each paper. Furthermore, the program chair also needs to arrange the program and participants registration process. Participants (both authors and other interested participants) usually register for the conference in advance.

Since most of the work for the conference preparation are repetitious and time-consuming, a computer assisted system for the conference management is necessary. From the end of the last century, the rise of the Internet programming technique and the maturity of the Internet security make it possible to build a high performance and secure web-based system for conference management. Moreover, contacting authors, reviewers, and conference participants all over the world through Internet is also an efficient and convenient way to deal with conference preparation tasks for the organizers.

The main issues to be dealt with by a conference management system are:

- Collect papers from authors, and keep all up to date version of submitted papers before the paper submission deadline.
- Allow reviewers to record their preference for papers during an auction process.
- Allocate papers to reviewers to meet the preference of the reviewers while matching the papers' topics with the reviewers' expertise, and their preference while avoiding conflict of interests.
- Let reviewers download assigned papers, submit review results, and provide features to discuss with other reviewers the review for controversial papers on-line and anonymously.

- Let authors get decision and detailed feedbacks of their papers.
- Collect camera-ready copies of accepted papers from authors for publication.
- Arrange sessions of conference based on topics of papers.
- Manage conference registration process.
- Manage the process of conference preparation to run on time.

1.2 Organization of the thesis

The rest of the thesis is organized as follows: In chapter 2, we present a survey of conference management /support system, and analyze the advantages and disadvantages of a number of these systems. In chapter 3, we present the architecture of ConfSys system and the main technology used in developing the system. In this chapter, we also give a brief introduction of the main features of the system. In chapter 4, we introduce main functionalities of ConfSys. In Chapter 5, we present the implementation of the system. We give a detailed description of the design and improvement of paper allocation algorithm, and the algorithm for the session arrangement. Chapter 5 also gives our experience in using ConfSys for four real conferences hosted in 2003 and 2004. Finally, we provide conclusions and present some directions for future work in Chapter 6.

2. Survey of Conference Management/Support System

With the development of the network and computer technologies and the growth of World Wide Web (WWW), Internet has become the prevalent and convenient way for information exchange. A number of web-based conference management systems for automating the tedious and repetitious works for the preparation of the conference have been developed recently. Many of these systems have been reviewed in [4]. Most of these systems can deal with the basic requirements of the conference: paper submission, paper assignment, paper reviewing, sending acceptance emails to authors. Herein, we summarize the techniques and the features of the following three typical systems: ConfMaster [5], PaperDyne [6], and CyberChair [8].

2.1 ConfMaster

ConfMaster [5] developed from ConfMan, a conference management system designed and implemented mainly by Ketil Lund, Pål Halvorsen and Thomas Preuss from 1997 to 2000. ConfMan was based on MSQL and Lite. It was installed more than 200 times and probably used for more than 300 conferences. However, the technological basis of ConfMan has become outdated. In 2003, ConfMaster was released by Thomas Preuss. This system is based on widely used and freely available technology: Apache, PHP, and MySQL.

There are five kinds of users in ConfMaster: administrator, PC chairs, PC members, reviewers, and authors. The administrator is responsible for the installation, configuration and management of the ConfMaster system. PC chairs are nominated by administrator and in

charge of nominating PC members. PC members are divided into two groups: primary PC members and secondary PC members, and they can nominate reviewers, apply to review papers based on papers' keywords, and assign papers manually to reviewers. To make the final decision about the conference program, PC members may take part in the final PC meeting to discuss papers with the PC chair and other PC members and vote for the acceptance or rejection of a paper. The reviewing process is anonymous for the authors of the paper. After the final decision is made, authors are sent a notification of acceptance or rejection along with anonymous reviews. The system also provides conference registration functions for conference participants.

ConfMaster system provides a web interface for the administrator to configure most tables of the system and it also has an adaptable menu structure according to role and currently relevant tasks, and works with disabled cookies and disabled java script (except for the administrator and PC chair roles). All mails to authors are generated based on templates.

2.2 PaperDyne

PaperDyne [6] is a Java-based web application, which supports most phases of the preparation of a conference. PaperDyne has three kinds of users: authors, referees (reviewers), and program committee chairs (PCC). PCC is in charge of system email templates, topics, and phases setting. Managing conference participants and contributions, assigning contributions to each reviewer, and organizing PC meeting are also the main tasks of the PCC. The main duty of reviewers is to evaluate the submitted papers. Reviewers can update their profiles and withdraw from the conference through a web interface. Authors can submit

papers or camera-ready copies from author's web page, and check the paper's status and withdraw their papers. The status of each paper could be: accepted, rejected, or not decided.

PaperDyne provides a conflict management and a paper assignment solution. The number of reviewers for each paper can be set by PCC. Reviewers can bid for each submitted papers as follows: High bids, Low bids, Conflict, WantNot bids. PCC assigns contributions to reviewers manually according to the bids results. The paper will not be assigned to the referee who bid a "Conflict" to this paper. The event dates such as: End of paper registration, End of bidding, can be set by PCC. However, those dates are only for information purposes and shown in emails. PaperDyne does not perform any executions at these dates automatically. Switching between conference phases must be done by PCC manually through a web interface.

2.3 CyberChair

CyberChair [8], a web-based groupware application for conference management system, supports four kinds of users: authors, reviewers (program committee), the chair (program committee chair), and the maintainer. The followings are its major features: author uploads abstract, paper, and camera-ready version of paper via web, paper distribution based on reviewer's preferences and expertise, and conflict of reviews detection. The chair distributes papers and reviewer forms to all reviewers asking them to fill in the classification of papers on the reviewer form. The classifications are: A. Advocate/Accept; B. Accept, but could reject; C. Reject, but could accept; and D. Detractor. Review result shown to the chair is a coloring scheme. After a PC (program committee) meeting, the chair inform the maintainer

about accepted papers, so that the notifications can be sent to the authors.

CyberChair [7] is composed of a set of Common Gateway Interface (CGI) scripts, which are activated by the web forms that are used by the authors and reviewers. Other scripts are so-called administrative scripts, which are either started by the maintainer or automatically at regular intervals by the system (e.g. crontab on UNIX systems). The CGI scripts are written in the Python programming language. All data are stored in text files, and all conference phases are controlled by the maintainer manually by editing crontab files. For example, once the review phase is over, the maintainer must delete review task from the task list in a crontab file.

2.4 Summary

After reviewing many recent conference management systems, we found that most of those systems are developed using open source techniques and based on Linux platform. Some conference management systems use the Common Gateway Interface (CGI) technique for creating dynamic content. CGI script program can be written in Perl, Python, PHP, or some other programming languages. CyberChair uses Python as its scripting language; ConfMaster uses PHP as its scripting language; and, START[11] system uses Perl. CGI was one of the first practical techniques for creating dynamic content. With CGI, a web server passes certain requests to an external program [10]. However, when the server receives a request that accesses a CGI program, it must create a new process to run the CGI program and then pass it every bit of information that might be necessary to generate a response

(shown in Figure 2-1) via environment variables and standard input. Furthermore, a CGI program can not interact with the web server or take advantage of the server's abilities once it begins execution, because it is running in a separate process. PaperDyne system uses Java servlets and Java Server Page (JSP) to create dynamic content for a web page. Unlike CGI, servlets technique can handle multiple requests for one service by separate threads within the same servlets process. It makes the system efficient and scalable.

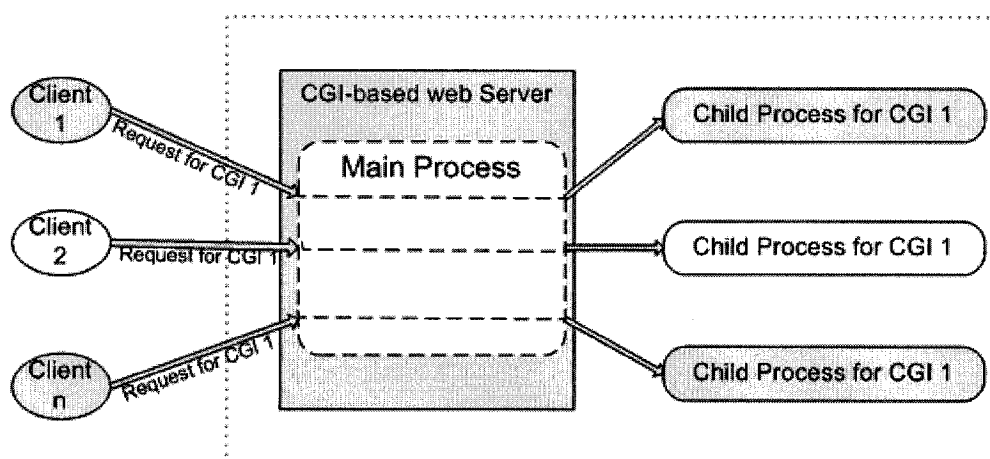


FIGURE 2-1 CGI LIFE CYCLE

Besides the technique used for programming, most of the existing conference management systems do not support an automatic paper allocation process. Although some of systems consider reviewers' interests during the allocation process, the chair needs to allocate papers manually. Most of conference management systems do not have a limitation on the number of papers allocated to each reviewer. None of those systems provides conference program arrangement function; the conference chair must sort all accepted papers by topics, and the number of papers on each topic, and arrange the program manually. Moreover, most systems do not support conference registration functions. Some conference

organizers must choose a separate conference registration system to do this job.

Based on the survey of conference management/support systems, we will present our conference management system, ConfSys, in the next chapter. It was developed using modern Java-based web application developing techniques and a MVC design pattern, based on open source web server and database server, and Linux platform. It supports all essential tasks we mentioned earlier, during conference preparation period.

3. ConfSys system

ConfSys (CONFeRence management SYStem) is a Java-based web application. The purpose of ConfSys is to manage and support the entire conference preparation process: from paper collection, paper review to program arrangement and conference registration. Moreover, ConfSys aims to build a system flexible enough to be adaptable for most academic conference, symposium, and workshop needs.

3.1 System architecture

ConfSys system adopts a three-tier client/server architecture, which includes: presentation tier (client tier), application tier (business logic tier), and data storage tier.

Figure 3-1 shows the logical view of the architecture used in ConfSys.

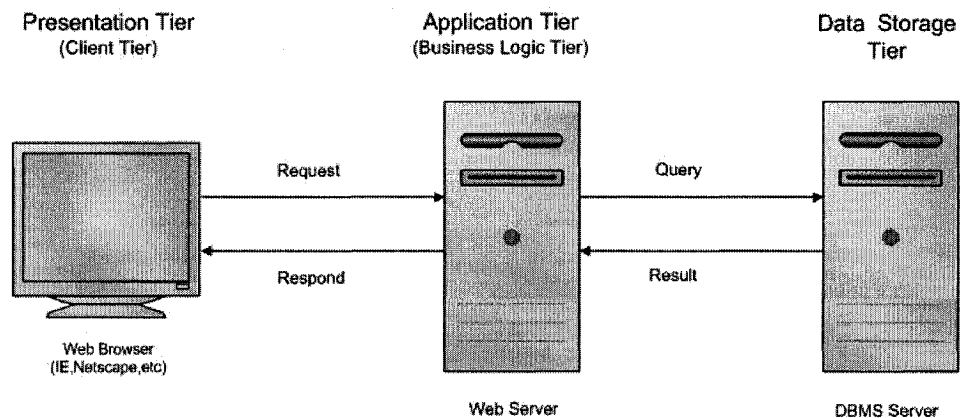


FIGURE 3-1 THREE TIER ARCHITECTURE

3.1.1 Advantage of the three-tier architecture

The reason we choose a three-tier architecture in our application is that it is a thin client solution, which makes the system secure, maintainable, and provides high performance. In the traditional two-tier application (Figure 3-2), the client side must install some software to run a big part of the application, and the server side is used to

store the data and manage some processing. The client machine needs high performance hardware configuration to run the client side applications. It is usually called a fat client in a two-tier architecture application.

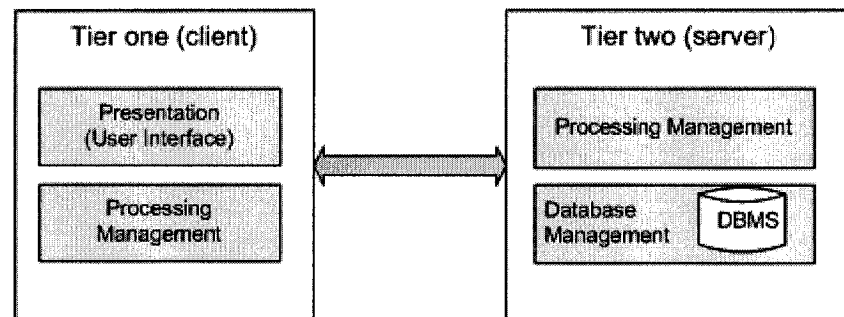


FIGURE 3-2 TWO TIER ARCHITECTURE LOGICAL VIEW

As opposed to the two-tier architecture, all processing management is centralized on the middle tier (application tier) in a three-tier architecture, and the client tier is a thin client. The user only needs a web browser in the client machine and the client machine needs a modest hardware configuration. In the three tier architecture, the entire business logic and data are processed on the server side. By reviewing the client's request, the server will manipulate the request, access data from the data server, and give client an appropriate response. The business logic tier is where the core application logic resides. Even though client side needs only a web browser, users can still use all the functions provided by the system via Internet. It is easier to upgrade the system to meet new requirements since all application and data repository are on the server side. Since there is no special software installed on the client machine, there is less maintenance work and system security at the client side.

3.1.2 Three-tier architecture in ConfSys

ConfSys is a server-side Java application based on Linux platform. Figure 3-3 is a detailed architecture diagram of ConfSys.

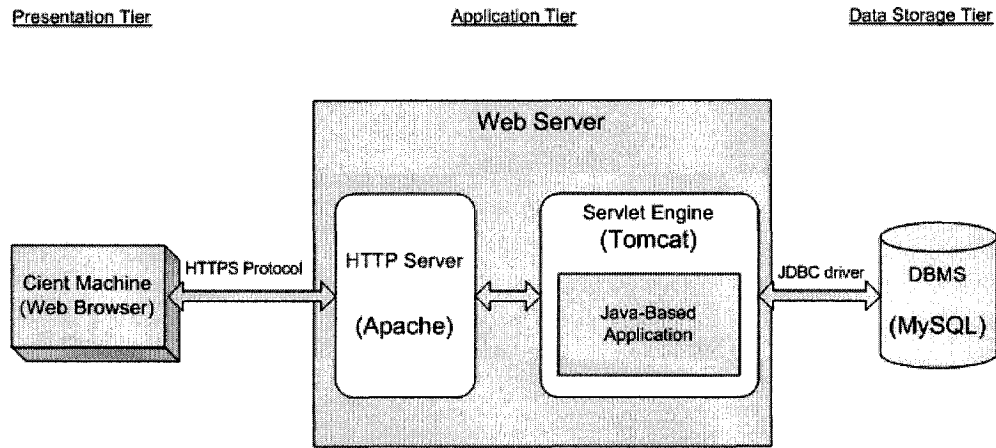


FIGURE 3-3 DETAILED ARCHITECTURE DIAGRAM OF CONF SYS

3.1.2.1 Presentation tier

The presentation tier provides the front-end to the user. Users can access the system via Internet using a web browser. A web browser (IE, Netscape, Mozilla, etc.) is the only tool needed on the client computer. Once a user sends a request to ConfSys, the server side will manipulate the request and send response back to the user via Internet. The response web pages sent to clients are a combination of HTML code, Cascading Style Sheets (CSS) code, and JavaScript code. HTML is a Web markup language for defining content structures and rendering a web page. JavaScript is commonly used for client-side validations. CSS is used to decorate web pages to make the system interface attractive and user-friendly. Even though some old versions of web browsers do not support CSS tags in the web page, the functions of the application will not be affected.

3.1.2.2 Application tier

The application tier implements the business logic of the applications. Though CGI is one of the most common server-side solutions used to develop web application, because of the disadvantages we discussed in Chapter 2, we use Java servlets, JSP, and JavaBean in the application tier for ConfSys.

Servlets [1] have some key advantages over other technologies when it comes to delivering dynamic content. Servlets are loaded into the core server to execute (Figure 3-4) and can handle separate threads within the same process; they run in a smaller footprint and use fewer resources than systems, such as traditional PHP, or Perl CGI. For the traditional approach, the server will startup and initialize the entire state of the CGI program to handle a new request. Moreover, when CGI script connects to the database, it will also generate a new database connection for each request. Servlets only create one database connection for simultaneous multiple-requests for each service. This feature of servlets makes it very well suited to the multi-requests jobs. Furthermore, servlets are Java objects and Java has a very rich core runtime library, and a vast amount of code has been written for the platform since it was introduced. These existing tools give the developer opportunities to access a large library of functionality to handle database access, emails, and other functions. Servlets are also highly reliable and scalable to large applications. Furthermore, one of the main advantages of Java is the “write once, run anywhere” (WORA) concept. Servlets runs inside a Java Virtual Machine, which make it platform independent, and it also inherits security features from Java and hence it is safe

and portable.

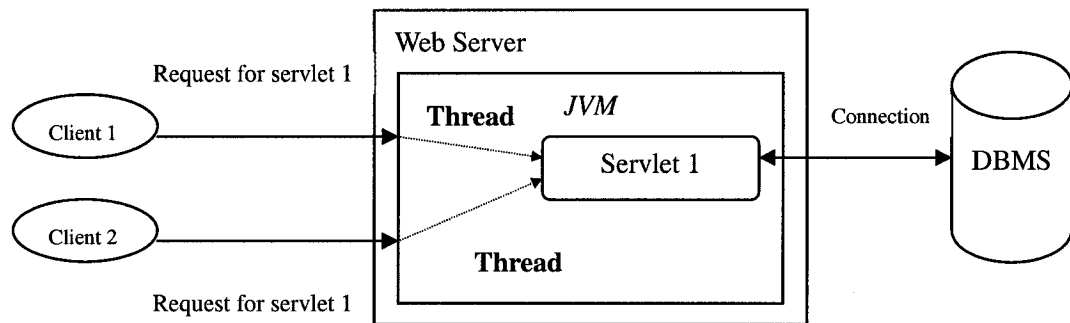


FIGURE 3-4 LIFE CYCLE OF SERVLET

However, if we only use servlets on the server side, we could need to code all HTML in them, which affects the readability of the source code; it also makes it difficult to modify HTML codes, which affects the maintainability of the source code. Any change of the presentation of the business tier requires modification, recompilation, and redeployment of the servlets. This approach is suitable for simple HTML, which needs no maintenance. To build more user-friendly interface and improve the readability and maintainability of the source code, we introduce JavaServer Page (JSP) into ConfSys.

JSP [12] is a simple but powerful servlet-based technology used to generate dynamic HTML on the server side. It is a direct extension of Java Servlets and provides a way to separate content generation from content presentation. A JSP file looks like a HTML document with some added tags containing Java code snippets. JSP also allows embedding JavaBeans within the file, which makes coding easy and powerful. When the server gets a request for a JSP file, it automatically creates, compiles, loads, and runs a special servlet to generate the dynamic content of the page. The first time accessing a JSP

page will take a short time to create and compile the back-ground servlet, but subsequent requests should be fast because the server can reuse the servlet in memory if the JSP file has not been changed.

Nowadays, there are many graphical visual web page design software, such as Macromedia Dreamweaver and FrontPage, which provides a graphic interface to edit JSP files and a preview function to view the HTML code. It saves time for coding the web page presentation part.

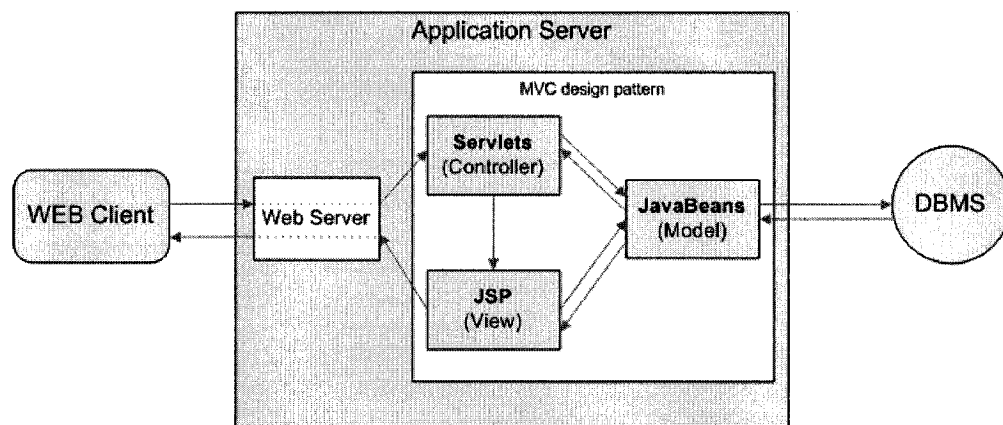


FIGURE 3-5 MVC ARCHITECTURE IN CONFSYS

JSP encourages MVC (model-view-controller) web applications. The MVC design pattern is a de-facto standard used in thousands of applications. The main idea behind this pattern is to separate business logic, presentation and program flow in a simple manner. ConfSys adopts MVC design pattern in the application server. JavaBeans is the model, which handles heavy database access processing; JSP is the view; which handles the presentation of the responses and doesn't require heavy Java coding; and, a servlet is the controller, which handles processing and order control (shown in Figure 3-5). Using this pattern, the presentation and business logic of the application are separated. We can also

easily improve the interfaces of ConfSys by editing JSP files without changing servlets and JavaBean codes.

In the application tier, the web server handles requests for static pages, images, and other documents, and passes the request to the servlets; servlet container handles the calls to servlets; servlets performs necessary transaction manipulations gets data through JavaBeans and forwards the result to the JSP view; JavaBeans exchange data with the database server and transfers the results to the JSP view or the servlets controller; the JSP view gets the data, generates dynamic content in the web page and sends the HTML results back to the web server. In this tier, we also use two open source softwares Apache and Tomcat, which are used widely in web-based applications. Apache works as a HTTP/HTTPS server, and Tomcat 4.0, which is the official Reference Implementation of the servlet 2.3 and JavaServer Page 1.2 API, works as the servlet engine (container) and JSP engine.

3.1.2.3 Data storage tier

The data storage tier manages the persistence of application information. In this tier, we use MySQL database, a popular and easy-to-use open source database server, as the data repository. MySQL is a very fast, multi-threaded, multi-user, and robust SQL (Structured Query Language) database server. MySQL Server is intended for mission-critical, heavy-load production systems as well as for embedding into mass-deployed software [11]. It is released under the GNU general public license. Users can download MySQL from their web site for free. According to [11], by September 2004,

with more than five million active installations, MySQL has quickly become the core of many high-volume, business-critical applications. Though it is powerful, MySQL continuously adds more new features without compromising the speed and stability. In MySQL, SQL functions are implemented using a highly optimized class library. Usually there is no memory allocation at all after query initialization. It is a “privilege and password” system that is very flexible and secure, and allows host-based verification. Passwords are secure because all password traffic is encrypted when you connect to a server. It can also handle large database that contains 50 million records and 60,000 tables. MySQL also provides a connector with Java application, which makes it easy to access MySQL database from a Java application. In addition, MySQL is available on more than twenty different platforms including major Linux distributions, Mac OS X, UNIX, and Microsoft Windows.

By using three-tier architecture, Apache as web server, Tomcat as servlet engine, and MySQL as data repository, the web-based server-side Java system we built is independent of the operating system. It is also easily to migrate ConfSys from Linux platform to Windows platforms.

3.1.3 Application security

In order to provide security in our system, the communication protocol used in ConfSys between presentation tier and application tier is HTTPS. HTTPS is quite simply HTTP over Secure Sockets Layer (SSL) [1]. SSL is a mechanism for encrypting communication between two endpoints on a network. The communication protocol is

ostensibly the same as HTTP, aside from the fact that the actual protocol name, and a different default port is used. In order to set up Tomcat to handle HTTPS connections, we use Apache to handle the actual HTTPS connection and let it proxy the servlets handling to Tomcat. This is also one of the safest and most efficient ways to set Tomcat handling HTTPS [1].

Besides the communication protocol used between the presentation and application tier, roles and rights concept is adopted in ConfSys, which means all users must get authorities (user ID and password) to access the system, and each user is in a given group which has well defined functionalities.

After a user logs into ConfSys, we use HttpSession to track the identity of the user. The servlets container (engine) creates a session when a user first visits our server. The user ID and password will be recorded through the HttpSession interface. Once the user finished all operations on ConfSys, he needs to logout from the ConfSys correctly which guarantees that the active session is closed. We also set the maximum allowed time between two consecutive user requests to participate in a session. After the expiry of this interval, the container invalidates the session automatically. If a user's request arrives after this interval, the request will result in a new session without user ID and password. By checking the session's context, ConfSys will request the user to re-log into ConfSys using his user ID and password.

3.2 Events flow

In Figure 3-6, we outline the flow of main events of ConfSys. The steps required for each group of users are shown.

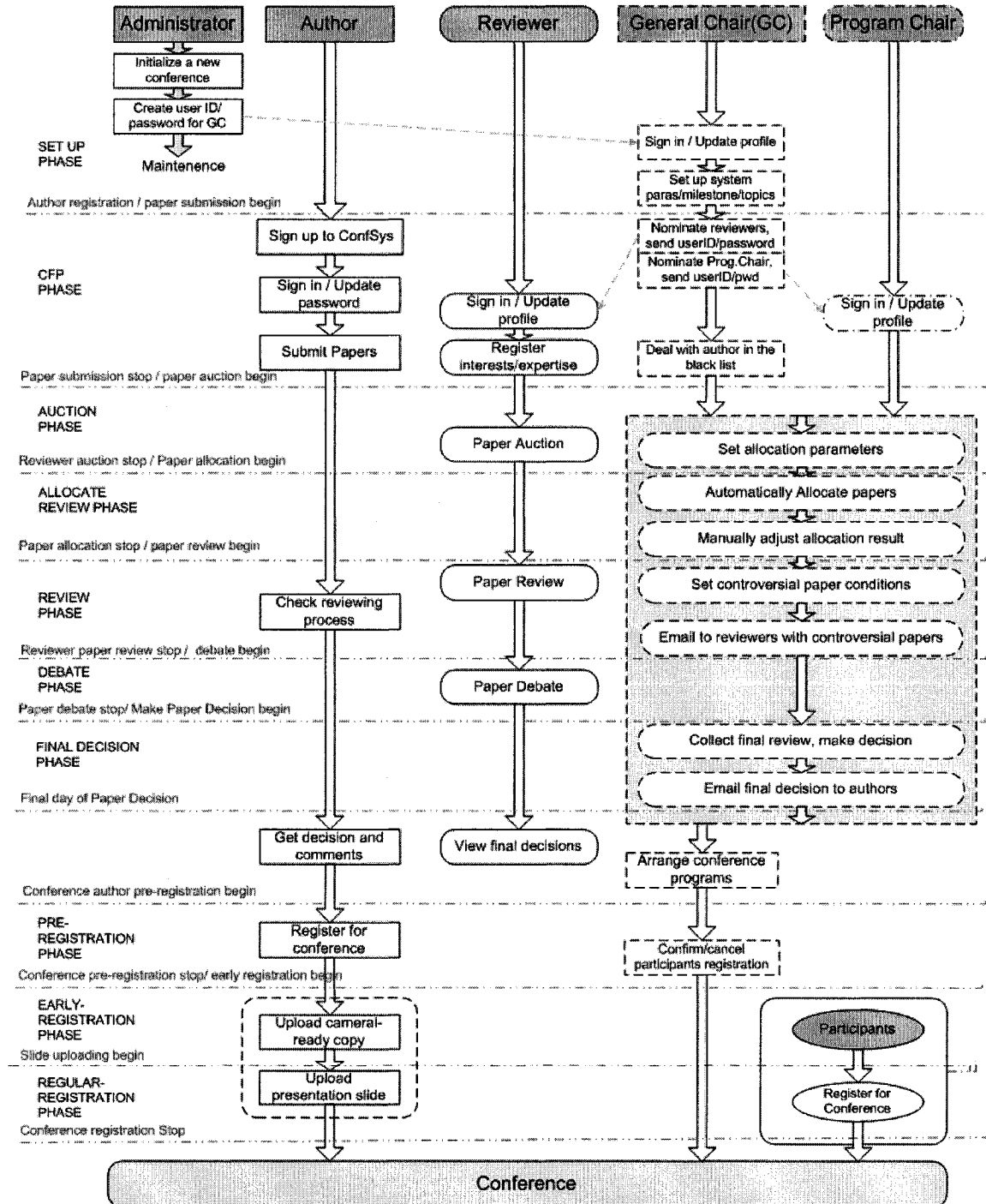


FIGURE 3-6 EVENT-FLOW OF CONFSYS

3.3 Main features of ConfSys

In the following, we describe the salient features of ConfSys.

3.3.1 Users of ConfSys

ConfSys is based on a secure roles and rights concept; each user of ConfSys has his/her own user ID and password, and all users must sign in using these to enter the system. Each group of users has a different authority to access the system, and allowed a limited set of operations suited for their role.

ConfSys system includes six types of users (as shown on Figure 3-6): administrator, authors, reviewers (Program Committee Members), program chairs, general chair, and conference participants.

The **administrator**'s main duties are: initializing ConfSys for a new conference; create a user for the general chair for the conference; set up system parameters; maintain black list for the whole system. Usually, there is one administrator for one instance of ConfSys running on a server (e.g. confsys.concordia.ca).

The largest user group of ConfSys is the **author**. Once the call for papers (CFP) of a conference is announced, the authors can sign up to ConfSys and get author ID and passwords from the system, and then log into the system. We use the term "author" for one of the co-authors of a paper who is considered as the contact author, and all correspondence regarding that paper would be sent to this person. Contact authors can submit papers before the submission deadline, and they can also check the progress of the

review process of their papers. Once the paper decision has been made, they can check detailed reviews and comments for their papers from the system. Authors with accepted papers should also upload the camera-ready copy and presentation slides for the conference using ConfSys system. Furthermore, all authors can register to participate in the conference through ConfSys.

Reviewers (Program Committee Members) are nominated by the general chair (in consultation with the program chair(s)), and the user ID and password are emailed to them. They can sign into ConfSys, and enter the main page of reviewers to update their personal profile and register their topics of interest for the conference. After the deadline for paper submission, the reviewers could indicate their preferences to review papers from a set which matches their expertise. After the program chair has allocated papers to the reviewers, they could download and review papers assigned to them. Reviewers with controversial papers will enter a blind debate process. They could view other reviewers' comments and discuss with them on-line via blind-emails to converge to the final scores for each paper.

A **general chair (GC)** is in charge of general management tasks during the conference preparation period. The main duties of the general chair are: set up conference milestones; set up conference topics; set up system parameters; nominate reviewers; edit email templates; set up conference registration parameters; manage conference registration process; and, arrange conference programs. GC can also help in the process of paper allocation, monitor reviewing process, and participate in the process of making

the final decision for each paper. One or more of these tasks are assigned to program chairs designated by the GC.

The **program chairs (PC)** are nominated by the general chair. They get user ID and passwords via email sent from the general chair. The main duties for program chairs are: set up allocation parameters; allocate papers automatically followed by a manual fine tuning; oversee that reviewers finish their tasks on time; set up controversial paper judging condition; make final decision of each paper. All management tasks of program chairs can be done by the general chair.

The last group of users in ConfSys is the conference **participant**. Anyone who wants to participate in the conference can register online through the system. After filling the registration form online, they can get a soft copy of their registration form (PDF format). They can cancel their registration before the general chair confirms their registration through ConfSys.

3.3.2 Phases in ConfSys

In ConfSys, system access is restricted according to the phase of conference organization. For example, after paper submission phase, the system will go into paper allocation phase, and then to the reviewing phase. The General chair of ConfSys must set up system milestones before authors can sign up. In ConfSys, there are 21 milestones:

- **Author registration start date:** the first date for author to sign up for ConfSys
- **Author registration stop date:** the last date for author to sign up for ConfSys
- **Author paper submission start date:** the first date for author to submit papers

- **Author paper submission stop date:** the last date for author to submit papers
- **Reviewer auction start date:** the first date for reviewers to bid for papers (reviewers must register their interests and expertise to ConfSys before this date)
- **Reviewer auction stop date:** the last date for reviewers to auction papers
- **Paper review start date:** the first date for reviewers to review allocated papers, and program chairs or the general chair must allocate papers between reviewer auction stop date and this date.
- **Paper review stop date:** the last date for reviewers to review papers.
- **Paper debate start date:** the first date for reviewers to debate controversial papers
- **Paper debate stop date:** the last date for reviewers debate controversial papers
- **Paper decision final day:** the date for making the final decision by the general chair or program chairs
- **Author Final version of paper submission start date:** the first date for cameral-ready copy submission.
- **Author Final version of paper submission stop date:** the last date for cameral-ready copy submission.
- **Author conference pre-registration start date:** the first date for author to register for the conference. If the authors register during author registration period, they will get some discount as per the established the discount rate.
- **Author conference pre-registration stop date:** the last day for author registration. If an author registers after this date, he/she will not get a discount.
- **Author slide upload start date:** the first day for presentation slide uploading: this is the material used during the presentation at the conference.
- **Author slide upload stop date:** the last day of presentation slide uploading.
- **Conference early registration start date:** the first date for an early registration. Conference participants, no matter he is an author or other participants, who register to the conference during this period can also get a discount of registration fee. Generally,

this discount is less than the discount given to authors registered during the author registration period.

- **Conference early registration stop date:** the last date for an early registration.
- **Conference regular registration start date:** the first date for a regular registration to the conference. Both authors and other participants can register in the regular registration period, but they pay the regular fees.
- **Conference regular registration stop date:** the last date for conference registration.

ConfSys can automatically check each phase during the access of the system by the users and automatically switch to the correct phase according to these milestones and the current system date.

3.3.3 System parameters

In order to make a flexible system, we have used more than 60 system parameters in ConfSys; this makes ConfSys easily adaptable for many conditions. Each parameter has its own update authority. In ConfSys, the system parameters can be updated by either the administrator, the general chair, or the program chairs. The administrator can set update authority for each parameter to decide who can update this parameter. Here, we introduce some typical parameters.

- **LOCK_FVP&SLD:** the interlock between final version paper uploading action and the presentation slide uploading action. If the value of this parameter is 1, the author must upload the final version of the accepted paper (camera-ready copy) first, then he (she) can upload the presentation slides. If the value is 0, the author can upload these in any order.

- **LOCK_REG&SLD**: the interlock between conference registration action and presentation slide uploading action. If the value of this parameter is 1, the author must register for the conference first, and then upload the presentation slide once the registration was confirmed by the general chair. If the value is 0, authors can upload their slide without registration.
- **LOCK_REG&FVP**: the interlock between conference registration action and final version paper uploading action. The situation is the same with LOCK_REG&SLD. The author can upload the final version of paper only with a confirmed registration if the value is 1.
- **PAPER_TYPE**: the file type of the papers submitted by authors. The general chair or program chairs can configure this parameter. If the value of this parameter is “.pdf,.ps,.doc”, the system can accept .PDF(.pdf), .PS(.ps),and .DOC(.doc) format files. There are also two parameters in ConfSys by which we can define the file types of the final version of papers and slides.
- **PAPER_SIZE**: the maximum file size (in bytes) for the submitted papers. This parameter defines the maximum size of the papers. There are also two parameters in ConfSys by which we can define the file sizes of the final version of papers and slides.
- **REG_P_0**: whether the system allows credit card payment type or not. If the value of this parameter is 1, the system allows participants to pay for the registration fee with credit cards. If the parameter value is 0, the system will not allow payment by

credit cards, and the system will not show credit card option in the payment types menu. We have additional parameters to define “draft”, “transfer”, and “cheque” payment types.

- **PAGE_FULL:** number of the pages for a FULL paper camera-ready copy. This value will be used in the notification email of acceptance to the authors of FULL paper.

The location for the following directories are assigned by the administrator.

- **DIR_PAPER:** the directory where all papers submitted by authors would be stored.
- **DIR_SLIDE:** the directory where all slides files submitted by authors of the accepted papers would be stored.
- **MAIL_FCC:** the directory which stores all email File-Carbon Copies. For all email sent to authors or reviewers through ConfSys, a copy would be kept in this directory. This parameter value is the name of the directory.
- **Online_CC_URL_A:** online credit card payment link for author registration. ConfSys provides online credit card payment type (e.g. PayPal) to participants. The administrator configures the online payment system and sets the URL of the payment link here.

Some other important values, such as: controversial paper judgment conditions, the first paper ID, conference fee payment types, URL for the reviewer’s home page, are also defined as system parameters. ConfSys uses these system parameters, and configuring

them is important task for the administrator and GC.

3.3.4 Email template

In ConfSys, email is the main tool to contact authors and reviewers. The templates of emails sent to authors (such as notification of paper acceptance, conference registration confirmation), and many contents of emails sent to reviewers (such as system sign in notification, and milestone reminder) are composed of fixed content with a number of variables to create dynamic content. Template is a general concept used to adapt for this type of email contents. The basic idea of email templates is to define fixed text with some variables at system configuration time by the administrator or the general chair. These variables will be replaced with appropriate values selected from the database at execution time.

Figure 3-7 is an example of the template of the paper auction milestone reminder email, which will be sent to reviewers before the paper auction's due date.

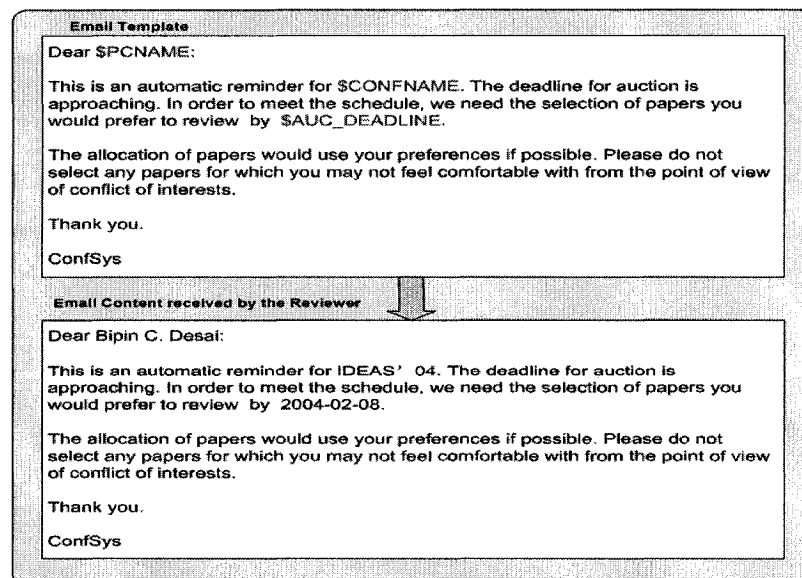


FIGURE 3-7 EXAMPLE OF EMAIL TEMPLATE

In the email template, there are three variables: \$PCNAME, \$CONFNAME, and \$AUC_DEADLINE, which present the name of the program committee member (reviewer), the name of the conference, and the paper auction deadline respectively. For each email sent, the reviewer's name is different, and the conference name and deadline are the same for a given conference. The appropriate data is selected from database and used to replace the variables in the template by the ConfSys mail-send server. The variables can be used in the template as shown on the template configuration web page. All variables begin with '\$' sign and followed by uppercase characters. Most of the already defined email templates can be used for the majority of conferences.

3.3.5 Automatic paper allocation and session arrangement

Compared with other conference management systems, ConfSys provides a unique automatic paper allocation function and an automatic session arrangement function to PCs. Automatic paper allocation is based on several factors such as: allocation parameters configured by the GC; result of the paper auction by the reviewers; papers' topics and reviewers' interests and expertise. Along with the paper allocation functions, ConfSys also provide a paper auction function to all reviewers, the results of which can help the automatic algorithm check the priority level of each paper for a reviewer, and also help the algorithm find the papers in conflict of interests. Automatic session arrangement is based on the number of sessions for each type of accepted papers (FULL, SHORT, or POSTER paper) and the papers' topics. Detailed information about these two automatic functions will be introduced in the chapter 5.

3.3.6 Black-list check

The other feature of ConfSys is that it has a black list of authors from previous conferences. The member of the black list defined here is as follows:

- The author who has submitted the same camera-ready copy of a paper to two conferences at the same time;
- The author who has an accepted paper, but never registered for the conference and participated;
- The author who has an accepted paper for a conference and registered, but didn't attend the conference without any notifications.
- The author with an accepted paper for a conference, registered, attended, but didn't give a presentation.

More conditions of the black list can be set up by the administrator. The list is maintained by the administrator. In a new conference preparation process, when an author submits a paper to ConfSys, it will automatically check if this author is in the black list. If so, the system will send an email to the general chair of the conference with the information about the author, the paper, and the reason why the author is in the black list. The general chair can evaluate the information provided to him and decide whether to keep this paper or not. If the general chair doesn't want to keep the paper, he can email the author and notify him about the situation and ask the author to withdraw the paper. The general chair can also remove the paper.

3.3.7 Automatic reminder email

In order to enforce that each phase of the conference is on time, ConfSys system automatically sends reminder email to authors and reviewers according to the milestone

for each phase. It can remind registered authors to submit paper before the due date for paper submission; remind authors of accepted papers to upload the final version of their papers; remind authors of accepted papers to register for the conference on time. It can also remind unregistered reviewers to register their personal profile and interests/expertise to ConfSys before auction start deadline; remind reviewers to do paper auction and review before paper auction deadline and paper review deadline; remind reviewers with controversial papers to do paper debate before DEBATE deadline. ConfSys system will also send weekly reminder email to the conference participants who have unconfirmed registration which are more than a multiple of seven days old. The date on which the system automatically sends emails depends on the milestone for each phase and the number of days ahead of the milestone (system parameters) defined by the general chair. All those reminder emails have standard templates, which can be edited by Program Chair and system administrator. Detailed implementation of this reminder will be introduced in section 5.3.

3.3.8 Integration with CINDI system

The Concordia Indexing and Discovery System (CINDI), a digital library which is proposed by Desai et al. [13], is to build a digital library system with user-friendly interface with which resource providers or contributors can “publish” their resources. ConfSys, as a sub-system of CINDI system, can have the submitted paper merge into the digital library of CINDI in order to provide the latest information for users. A system parameter, INTG_CONF_CINDI, can control whether ConfSys needs to Integrate with

CINDI system or not.

If the value of the parameter `INTG_CONF_CINDI` set to be 0, when the author submits his paper, he needs to type in all information needed (paper's title, abstract, topics, and coauthors' information) for a paper in the submission web page and uploads the paper file. ConfSys stores all these information in its own database. If the value of the parameter set to be 1, all the information of submitted papers stored in ConfSys database along with paper files will be transferred to the CINDI system, after the submission deadline date.

3.4 Third-party software in ConfSys

In order to enhance the functionality of ConfSys, we incorporated some open source third-party software in ConfSys.

3.4.1 MultipartRequest classes

Since authors submit papers through the web application, the information passes to the web server is not a simple HTML form. The content of request is in MIME (Multipurpose Internet Mail Extensions) type. To attach and detach the paper file through Internet, a third party component is used in ConfSys. We introduced two Java class called `MultipartRequest` and `MultipartRequestServlet` (version 1.18), which are provided by Jason Pell [16] as free software. The main functions of these two classes are parsing a Multipart form data input stream and writing out any files found, making available a hash table of other URL parameters. With these two classes, ConfSys can handle submitted papers in any formats easily.

3.4.2 PDF file generator

ConfSys can let authors and participants register for the conference through conference registration function. ConfSys provides an online registration form to the participants who can just fill it and submit it to the system chair via Internet. However, some participants want a hard copy of the registration form, and some of participants who want to pay the registration fee with a student discount need to fax the registration form with supervisor's signature to the general chair. So, we need a program to generate registration forms automatically and send it to the user. PDF is a good file format for web applications. The iText [15] classes are very useful for people who need to generate read-only, platform independent documents containing text, lists, tables and images. The library is especially useful in combination with Java technology-based Servlets. The look and feel of HTML is browser dependent and with iText and PDF we can control exactly how the look of our servlet's output. iText requires JDK 1.2 or later version. It's available for free under a multiple license: MPL and LGPL.

Using iText classes, we can generate and send a PDF registration form with all user data selected from database to the participant through the web browser when the participant sends a "print form" request to the server. If the client machine has installed a PDF reader, the file can be opened in the web browser directly; otherwise, the user can save it and print it later.

4. Functionalities for users of ConfSys

In ConfSys, users are divided into six groups: author, reviewer, participant, general chair, program chair, and administrator. In this chapter, we will introduce the main functions in ConfSys based on these six groups of users.

4.1 Author

Author is the largest user group in ConfSys. As a new user who is responsible for interacting with ConfSys and uploading various files for her paper(s), she must sign up with the ConfSys. Once she is signed-in with her choice of user name (user ID) and personal information needed by the system, a sign up confirmation email would be sent automatically to her along with a one-time password generated randomly by the system. The author can log into ConfSys with her ID and the one-time password. Figure 4-1-1 is the Home page for the author.

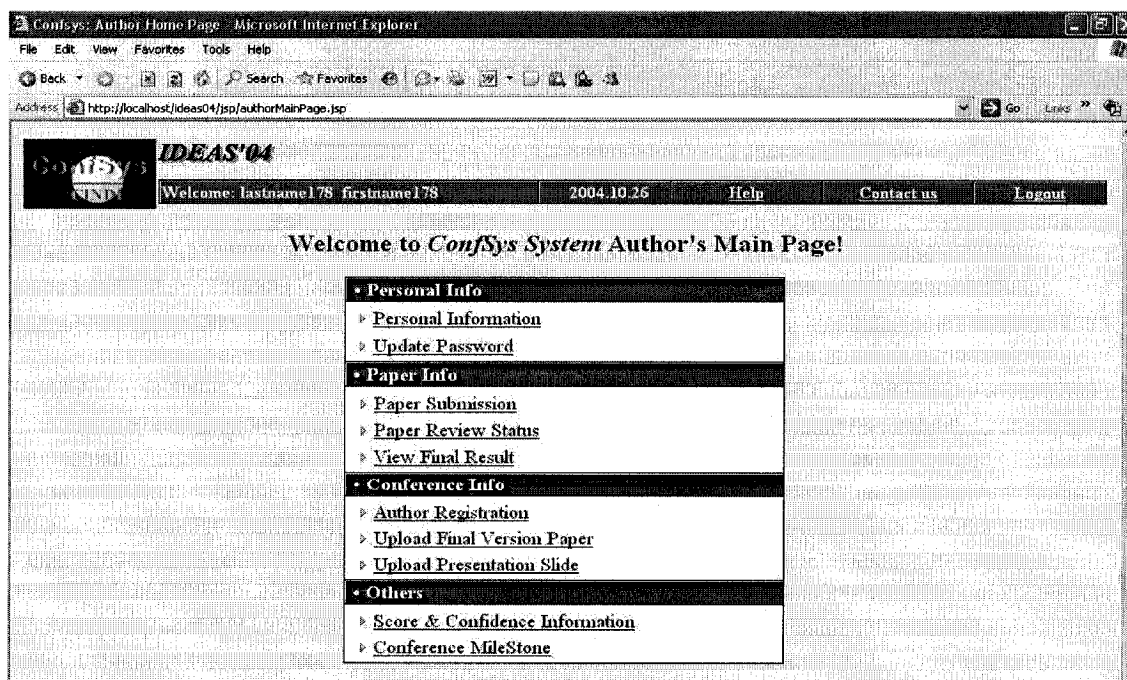


FIGURE 4-1-1 AUTHOR'S HOME PAGE

The main menu items are divided into four parts corresponding to the respective personal information, paper information, conference information, and others. An important message, which can be edited by the general chair or the administrator, is shown at the bottom of the web page.

4.1.1 Update password

After a new author signs up with ConfSys and returns to log in it with the one-time password, the system will inform her to change the system generated one-time password to a password of her choice.

Update Password

Please fill in your new password

new Password: (Must be six characters or more)

new Password: (re_type your password)

Please choose 3 questions, then answer them.

These questions would be used to reset your password in case you forget it. Please remember your answers.

question one: what's your favorite color?

answer: what's your favorite color?

question two: what's your pet's name?

answer: what's your mother's middle name?

question three: what is your brother's nickname?

answer: how many brother(s) do you have?

what is your sister's nickname?

what is your favourite sport personality?

what is the firstname of your favourite singer?

which is your favourite food?

which is your favourite drink?

which is your favourite season?

Submit Clear All

Home Page

FIGURE 4-1-2 AUTHOR UPDATE PASSWORD INTERFACE

When the author updates the one-time password, ConfSys requires her to choose three questions from the question lists and provide the answers. The system will record the chosen questions and answers in its database. In case she forgets the password, she can have a new

password emailed to her by choosing the forget password item in the ConfSys home page and by providing the correct answers to her set of questions.

4.1.2 Paper submission

An important function for any conference management system is to facilitate the paper submission process. In ConfSys, authors submitting papers via Internet has two kinds of modes, which is controlled by the system parameter “INTG_CINDI_CONFSYS”. If the value of this parameter is 0, that means we need not integrate ConfSys with CINDI system for this conference. The author just fills in all the information about the paper needed by ConfSys (as shown in Figure 4-1-3), and selects the file for the paper and submits it.

The screenshot shows a web browser window titled "paper upload - Maxthon". The address bar displays a URL: <https://confsys.concordia.ca/ideas04/js/paperRegister.jsp?filename=335e30&sercode=0&abstract=335e30&bid=>. The page content is titled "Paper Registration and File Upload".

Below the title, there are three main sections:

- Section 1:** "Please fill in the paper title and abstract(all fields are required)". It contains two text input fields: "Paper Title:" and "Paper Abstract:".
- Section 2:** "Please choose the topics for your paper:". It includes a note: "You may need to use the 'Ctrl' key to select multiple items for some Web browsers." Below this is a list box containing the following topics:
 - Access Methods and Data Structures
 - Active Databases
 - Data Mining and Knowledge Discovery
 - Data Models
 - Data Visualisation
 - Data Warehousing
 - Database and Agent Technology
 - Database Applications
 - Database Performance
 - Database Design and UML
- Section 3:** "Please attach a file by clicking 'Select File' button. If you selected the wrong file, press 'Undo Select' button to detach the selected file." It includes a "Help" link. Below this, a note states: "The papers to be uploaded should be in PDF format and must include all special fonts. If it is not possible to send PDF format, please send compressed(using one of zip, gzip or bzip2) PS format. The name of the file should be : NameofAuthor_IDEA04.PDF". At the bottom of this section is a text input field labeled "Attached File Name:" and two buttons: "Select File" and "Undo Select".

At the bottom of the form, there are three buttons: "Continue", "Reset", and "Help". Below these buttons is a link: "<< Back".

FIGURE 4-1-3 PAPER REGISTRATION AND FILE UPLOAD INTERFACE

If the value of INTG_CONF_CINDI parameter is 1, it requires the integration of

ConfSys with CINDI system. All uploaded papers' information would be integrated in the bibliographic database of the CINDI system when paper submission phase is over. ConfSys system collects all required information for papers and sends them to the CINDI system automatically along with papers' files.

After submitting a paper, the author can change the paper's basic information, such as: title, abstract, and topics, and the paper file, or even withdraw the submitted paper before the submission due date. The author can also change the co-authors' information through the web interface at anytime. After the due date for the paper submission, all submission related functions such as "New paper register/Upload file", "Withdraw paper", and "Update basic information of the Paper" will be disabled automatically by ConfSys.

4.1.3 Paper review status

During the paper-reviewing phase, authors can check the status of papers reviewing process through "Paper Review Status" function (Figure 4-1-4).

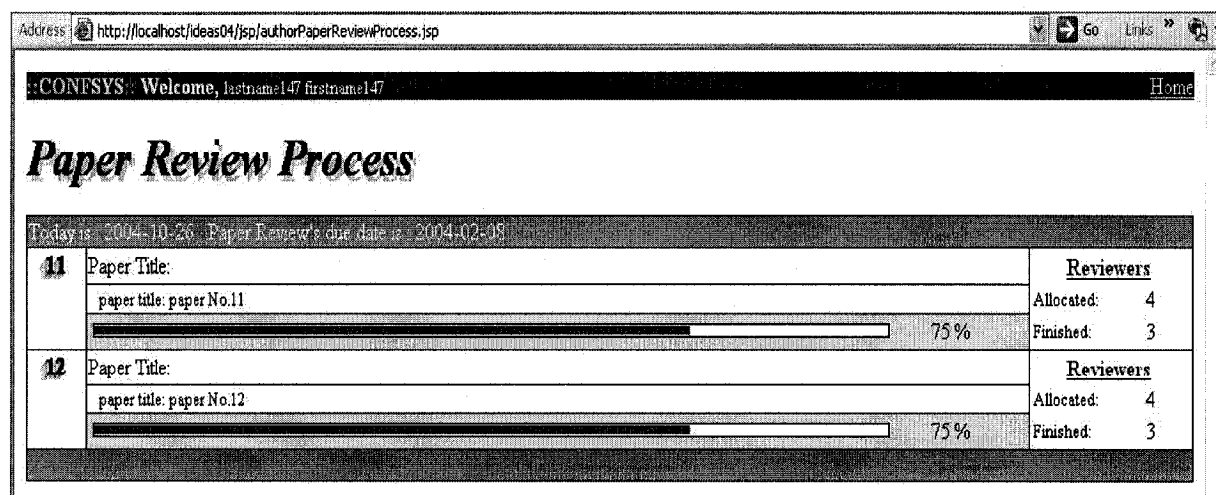


FIGURE 4-1-4 AUTHOR VIEW REVIEW PROCESS

Reviewing process is shown graphically on the web page. Until the final decision, the

authors can view only the total number of reviewers and the number of finished reviewers.

4.1.4 View review result

Once final decision for the submitted papers is made, the author will get a notification email for her paper(s) from the conference chair; she can check the decision (Figure 4-1-5) and detailed comments (Figure 4-1-6) through the interface provided by ConfSys. The decision of the paper could be: accepted as a FULL paper, accepted as a SHORT paper, accepted as a POSTER paper, or not accepted.

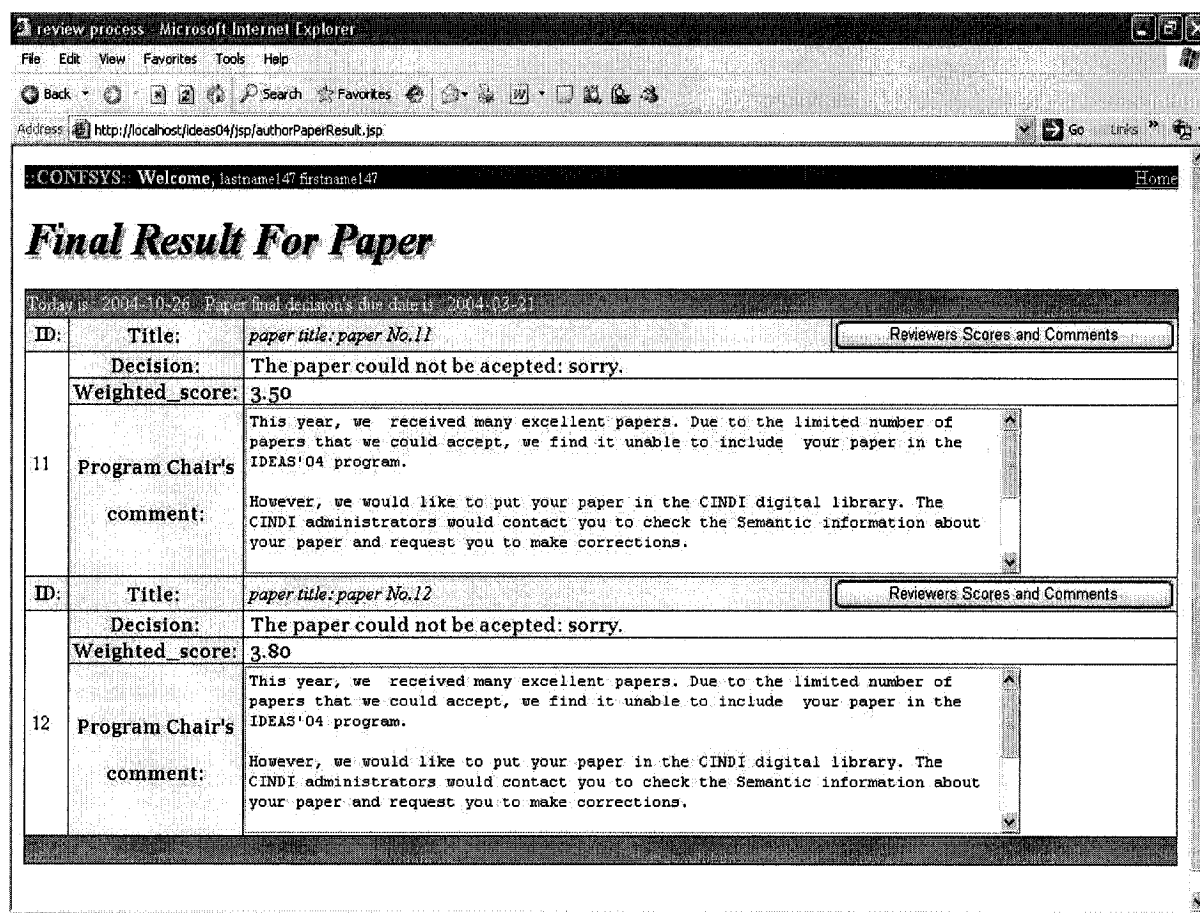


FIGURE 4-1-5 VIEW REVIEW RESULT

By clicking the button “Reviewers Scores and Comments”, the author can view the detailed scores and comments given by each reviewer in a pop-up window. If the paper was accepted, reviewers’ comments should be used in the preparation of the camera-ready copy.

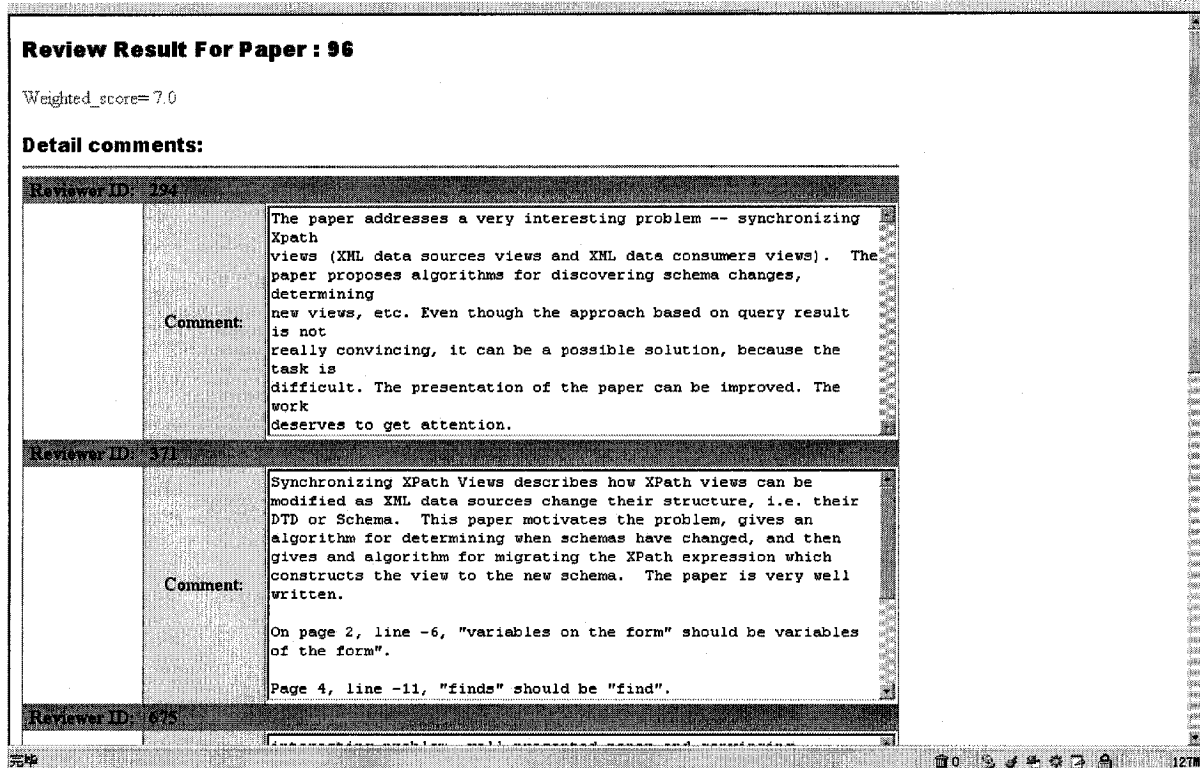


FIGURE 4-1-6 AUTHOR VIEW REVIEWERS' COMMENTS

4.1.5 Conference registration

The registration phases in ConfSys can be divided into three parts: the author registration phase (pre-registration), the early registration phase, and the regular registration phase. The registration fees for a paper in each phase are different. Only the authors who submitted at least one paper can register to the conference from author's main page. All accepted papers should be registered by at least one of its authors. The online registration for contact authors includes two steps. When the author registers through ConfSys, in step one, the author must choose the paper for which she wants to register. If she doesn't want to register for an accepted paper herself, she must indicate the co-author who will register for it (using the paper ID and his email address as a password).

In the step two, the author fills in a registration form including personal information and

payment information. Meal requirement and Hotel reservation are two optional choices for each conference. Whether these two options will be shown on the registration form or not depends on the values of associated system parameters. If an author registers for more than one paper at the same time, she will get a discount of the registration fee (discount rate is defined as a system parameter).

4.1.6 An invited papers-authors

ConfSys also supports invited papers from renowned authors; such papers will be accepted by the conference without a review process. The invited author is nominated by the general chair in consultation with the program chair(s). The user ID and password for invited authors are set up by the general chair, and sent to the author via email. The invited author can submit her paper through the web interface as a regular author, and, the submitted paper will be considered as a “camera-ready” copy. The main page of an invited author is similar to that of an author’s except for the “Paper Review Status” and “View Final Result” functions.

4.2 Reviewers

In ConfSys, all reviewers are nominated by the general chair in consultation with the program chair(s); the user IDs and passwords for them are set up by either the general chair or the program chair, and sent to them via email. After reviewers get their ID and password, they are able to sign in the system. Figure 4-2-1 shows the reviewer’s Home page. Reviewers can update personal profile, participate in the auction for papers, download allocated papers, fill in review for these papers in a on-line form, debate the controversial papers with other reviewers, and view the final decision for the paper. Following sections describe these

functionalities.

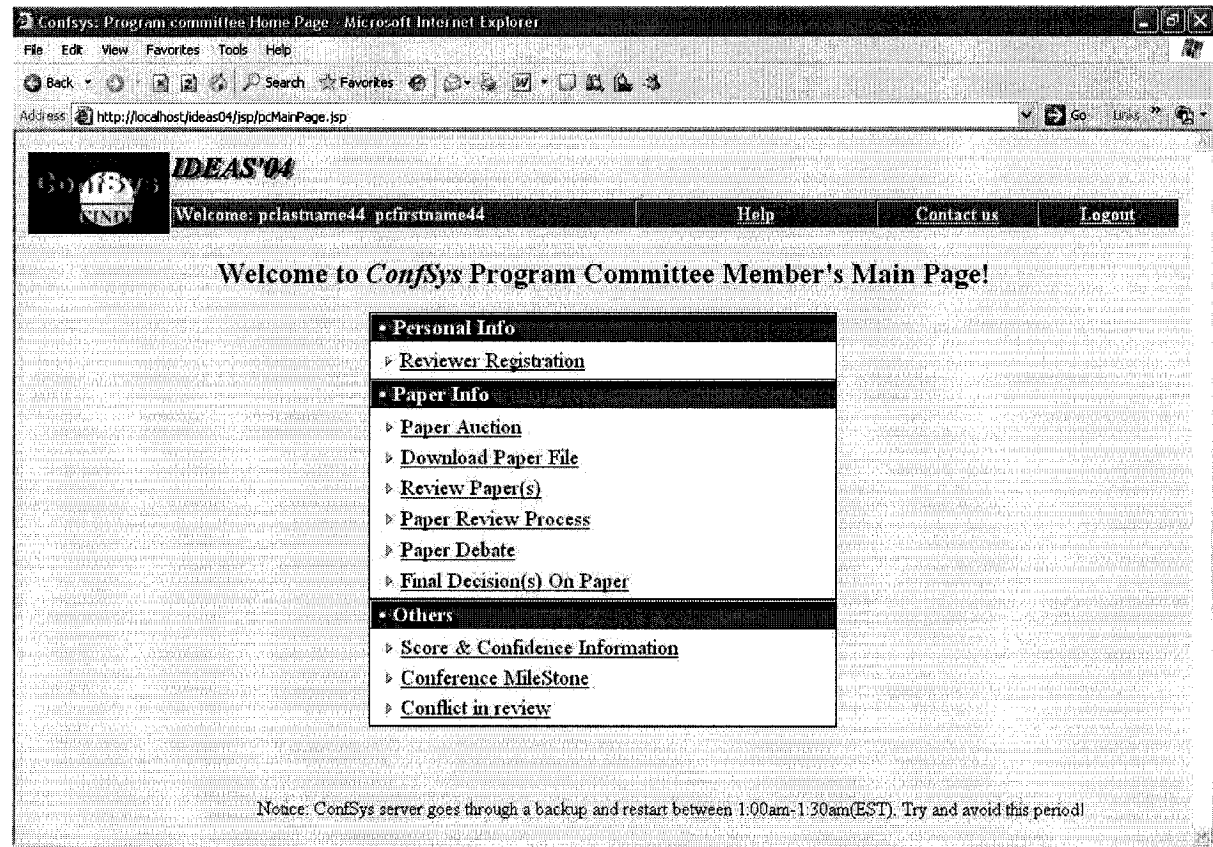


FIGURE 4-2-1 REVIEWER'S HOME PAGE

4.2.1 Paper auction

To best match the reviewers' expertise with the topics of the papers they would review, ConfSys provides a paper auction subsystem for reviewers. This subsystem allows the reviewers to bid on papers in their domain of expertise, and register the papers for which there may be a conflict of interests.

The number of papers offered to each reviewer for the auction process is designated by the program chair before the auction process starts. If the value of this parameter has been set to 20, each reviewer will get at least 20 papers to bid. First, the system will automatically choose the papers for which the topics match the reviewer's interests and show them in the

auction list. If the number of the paper chosen doesn't reach the value of the maximum number, the system will randomly select additional papers and add them to the list for the reviewers. To improve the allocation algorithm, all papers matching the interests of a reviewer would be shown in the list, even though the number of such papers maybe higher than the maximum number.

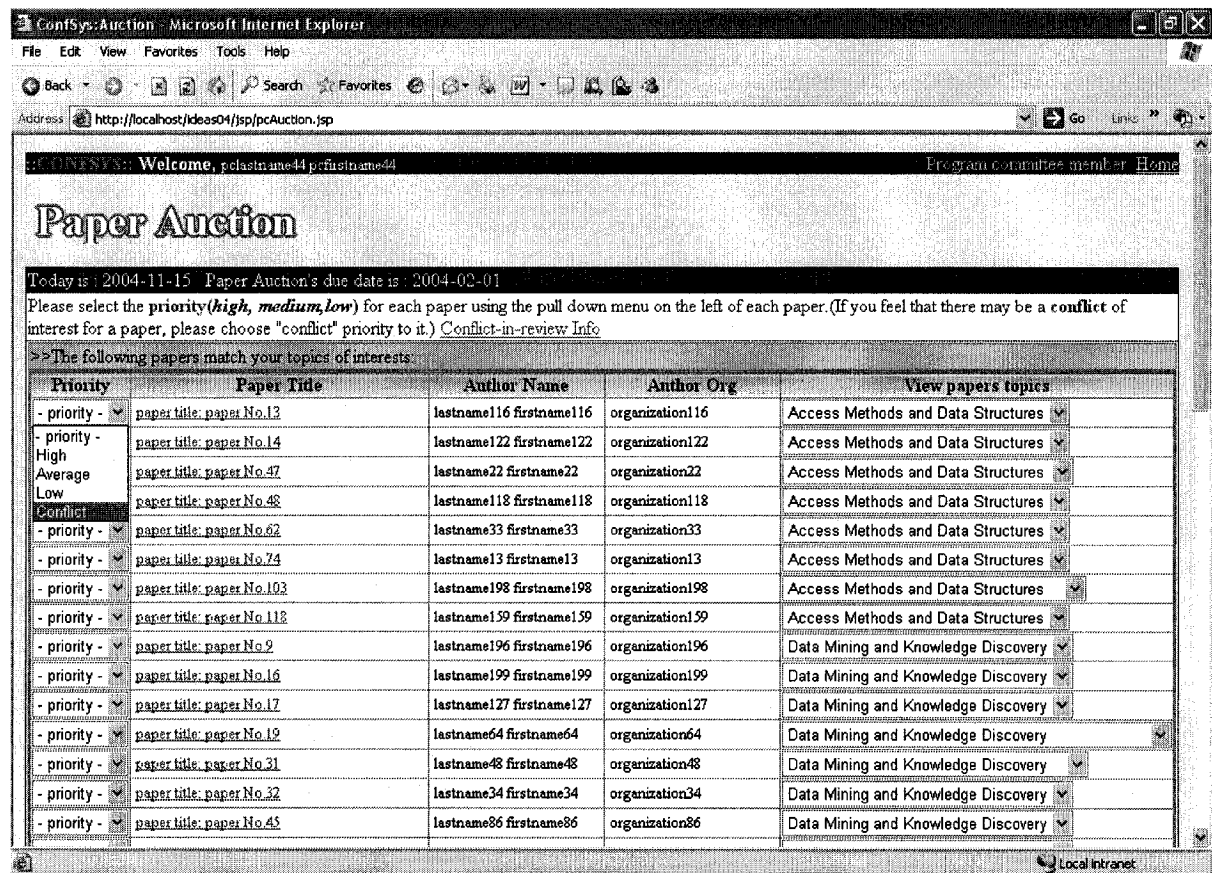


FIGURE 4-2-2 REVIEWERS PAPER AUCTION

The first time a reviewer accesses the auction function, the system selects a set of papers and shows them to the reviewer. The reviewer can bid on each paper in this set giving different priority levels to each: high, average, low, or conflict. If a reviewer is an author of a paper, or if the reviewer and one or more authors of a paper are from the same organization, or they were co-authors in the past, he should choose "conflict" for this paper. Papers for

which conflict is chosen by a reviewer would not be allocated to the reviewer during the automatic allocation procedure. If the reviewer has no interest in a paper at all, he can just leave the option menu empty. A reviewer may return later to the auction page to revise the choice of the auction before the end of the paper auction date. On this case, the information relating to the reviewer's previous auction selection is retrieved from the database and displayed.

4.2.2 Review paper

Once the paper allocation is over, reviewers can download the papers allocated to them through the "Download Paper File" function. Then, reviewers can review each paper. Review results of papers could be filled in a form through the web interface. First, the reviewer enters the "Review Paper(s)" function, and she must select the paper for which she wants to fill in the review result by choosing the radiobox for it as shown in Figure 4-2-3 [A].

Once a paper is selected and the "Review Now" button is pressed, the reviewer will enter the second web page to fill in and submit, or revise the review (Figure 4-2-3 [B]). The review result includes: score [0,10], confidence (0,3), comments to authors, and comments to the program chair.

If a paper was reviewed by a colleague, the reviewer also enters the colleague's brief information in the space provided. The information would be used to acknowledge the external reviewer's contribution.

Welcome, p.lastname44 p.firstname44 [Program committee member Home](#)

Paper Review

Today is : 2004-11-22 Paper Review's due date is : 2005-03-11

Security Note: The system automatically closes your connection after 5 minutes of inactivity. It is best to do the review off-line, prepare the comments using your Favourite editor (NotePad, Emacs, vi, etc) and return here to fill in the form using cut-paste.

Belows are all allocated papers for you. To fill in/update review result, please choose the paper first by clicking the radiobox beside the paper ID. Then, click the "Review Now" button enter the review form.

<input type="radio"/>	Paper ID	Paper Title	Author Name	Score [0-10]	Confidence [0-3]
<input type="radio"/>	9	paper title: paper No.9	lastname196 firstname196	5.5	2.5
<input type="radio"/>	31	paper title: paper No.31	lastname48 firstname48	5.0	2.5
<input type="radio"/>	46	paper title: paper No.46	lastname77 firstname77	6.0	3.0
<input type="radio"/>	48	paper title: paper No.48	lastname118 firstname118	6.0	2.8
<input type="radio"/>	50	paper title: paper No.50	lastname80 firstname80	6.0	2.8
<input type="radio"/>	106	paper title: paper No.106	lastname201 firstname201	5.0	3.0
<input type="radio"/>	113	paper title: paper No.113	lastname38 firstname38	6.0	2.5
<input type="radio"/>	116	paper title: paper No.116	lastname21 firstname21	6.0	2.0

[Review Now](#)

FIGURE 4-2-3[A] PAPER REVIEW INTERFACE

ConfSys **Paper Review** [Back>>>](#)
CINDI

Security Note: The system automatically closes your connection after 5 minutes of inactivity. It is best to do the review off-line, prepare the comments using your Favourite editor (NotePad, Emacs, vi, etc) and return here to fill in the form using cut-paste.

Please fill your review (items marked with * are required to be filled in)

Paper ID:	46
Title:	paper title: paper No.46
Author:	lastname77 firstname77
Abstract:	The Web has greatly facilitated access to information. However, information presented in HTML is mainly intended to be browsed by humans, and the problem of automatically extracting such
Score: *	6.0 [0-10] More info about score&confidence
Confidence: *	3.0 [0<confidence<=3]
Comment to author: *	So what is new that this paper is trying to tell us? There are many bibliographic projects and many of these are not even mentioned in the paper.
Comment to program chair (s):	

If this review was done by a colleague/student, please fill the following to include their contribution in the proceedings

☐ yes, review was done by an external reviewer ☒ no

Name: *	
Organization: *	
Email Address: *	

[Submit](#) [Reset](#)

FIGURE 4-2-3[B] PAPER REVIEW INTERFACE

4.2.3 Paper review process

In addition to the reviewing process indicator provided to authors, ConfSys also provides a graphic reviewing process indicator to all reviewers. They can monitor the review of the papers allocated to them.

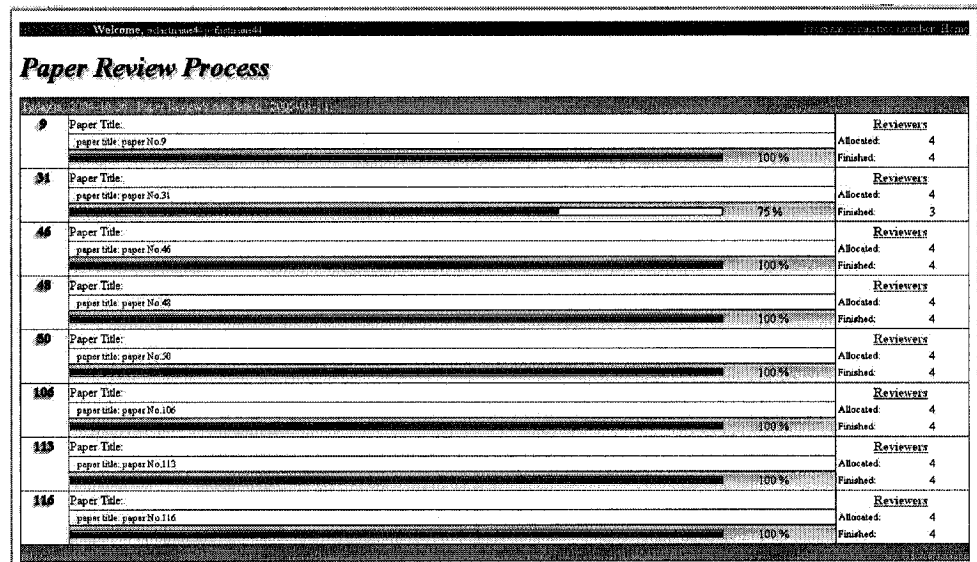


FIGURE 4-2-4 PAPER REVIEW PROCESS INTERFACE

4.2.4 Paper debate

Paper debate is a very important function provided by ConfSys. Since there is no guarantee that the reviewers would have similar opinion about a paper, a debate process for controversial papers is necessary during the paper reviewing process. Once the reviewers have finished their reviews, ConfSys can identify the papers for which the difference between the highest score and the lowest score is greater than a predefined value; this value is defined by the general chair to be "controversial" papers. The general chair can send emails to all reviewers of such controversial papers, and notify them of the dates of the debate process to be carried out using the function provided by ConfSys.

On the paper debate web page, no personal information about the reviewers is shown;

only the reviewers' user IDs, scores, confidences, and comments are displayed. If a reviewer of a paper has a different opinion on the paper in question with other reviewers, she can send a blind email through ConfSys to the other reviewers of the paper; all the emails for each paper are stored as an email log in the database and displayed on the debate web page for the paper. Reviewers can see this complete email log for a paper through the web interface. Figure 4-2-5 illustrates a webpage of anonymous emails sent together with the complete log.

4.2.5 View final result

Once the final decision has been made by the program chair, reviewers can view the final paper decision and other reviewers' score and comments through ConfSys.

Review Result For Paper : 51

Please see the emails logs below (if any) and use the form to send email to other reviewers of this paper.

Reviewer Id	Score	Confidence
100	5.5	1.5
143	8.0	2.7
441	7.0	1.0
888	2.5	2.0

Weighted_score = $(5.5 \times 1.5 + 8.0 \times 2.7 + 7.0 \times 1.0 + 2.5 \times 2.0) / (1.5 + 2.7 + 1.0 + 2.0) = 5.8$

Detail comments:

100	Reviewer:	100	score:	5.5	confidence:	1.5
	To author:	This paper proposed an extension to the vector space model (SVM) which considers the correlation among the query terms. Essentially, it gears the technique of association rules in the model in order to identify the correlation of terms. Then it comes to the experiments which show that the				
	To program chair(s):					
143	Reviewer:	143	score:	8.0	confidence:	2.7
	To author:	A very well written paper. Good explanation, good experiments and interesting results. Idea is to expands terms involved in a textual query to correlated terms. Similar expansion is performed for terms				
	To program chair(s):					
441	Reviewer:	441	score:	7.0	confidence:	1.0
	To author:	Although the ideas are clearly exposed in the paper, some minor changes in the English need to be done. To improve the paper, some comments about the used				
888	Reviewer:	888	score:	2.5	confidence:	2.0
	To author:	This is an interesting idea but, unfortunately, the paper is poor. Several issues are to be considered for the paper to be improved: * The issue of novelty: relaxing the orthogonality between term vectors has been already discussed in [5] while				
	To program chair(s):					

Send Email to Other Reviewers:

The following are the logs of previous emails: there would be no logs if no email were sent for this paper. You can initiate the debate by sending out the first email to the coreviewer for this paper.
If you want to reply to one of the emails, choose it by clicking the radio-button under "Reply" column, that email's content will be included in the email you send out. The email will go to the coreviewers and will be recorded in the log.
You can reply to any such emails sent out for you by ConfSys only through this page.

Email logs:

Email logs		
<input type="radio"/>	From:	reviewer 143
	Date:	[2004-03-15]04:42:57(Server time)
<input type="radio"/>	Content:	Thanks for the insightful review of reviewer 888. The authors acknowledge the previous work in [5], [14] and [15]. This is a very old area and good new work is not easy. Authors claim that rotation of the basis vectors based on term correlation is being done for the first time. If it is possible to give me a reference to a paper
<input type="radio"/>	I want to start a (new) thread of discussion.	

New email	
From:	Reviewer100
To:	Reviewer 143 441 888
Subject:	From Reviewer:100:about Paper Debate(paid=51)
Content:	

Send Email

Close

FIGURE 4-2-5 BLIND EMAILS OF PAPER DEBATE

4.3 Participants

Participants for a conference include contact authors, co-authors, and non-authors.

Contact authors can register for the conference from the author's home page. However, some contact authors may not be able to attend the conference; in this case they would have one of the co-authors participate and make the presentation. ConfSys provides a co-author registration function. Since co-authors do not have user IDs and passwords to access ConfSys, they must use the paper ID and the email address registered by contact authors to sign into ConfSys. Once signed-in, they will get the same registration form as that for the contact author. They can register during the author registration period and get the same discount.

For other participants who want to register for the conference, ConfSys provides another link. They do not need user ID and password to access the system, and can just enter the interface of the on-line registration form by clicking the link shown in the conference registration web page. If the early registration starts, they can fill in the registration form and submit it to the system. The next time when they return to the system to check the status of their registrations, they can sign in with their registered email address. For any participants, ConfSys provides a print form function and a cancellation function (Figure 4-3-1). In case the participant need a hard copy of the registration form, they can submit a print form request, and the system will generate a registration form with all user data in PDF format and send it to the participants. Participants can save it to the disk or print it out.

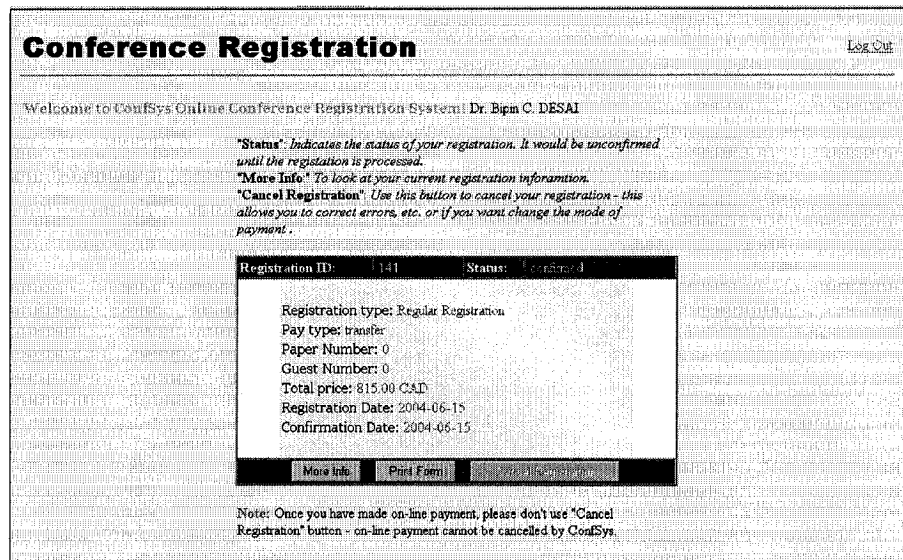


FIGURE 4-3-1 THE INTERFACE FOR CONFERENCE REGISTRATIONS

If participants change their mind or couldn't attend the conference or if they want to change their payment type, they can cancel the unconfirmed registration using cancellation function. However, if the participant pays the registration fee using on-line payment, such registration could not be cancelled by ConfSys. Also, if the registration is confirmed by the general chair, the participant can not cancel it and the function is automatically blocked by ConfSys (as shown in Figure 4-3-1).

Unlike author registration, there is no paper selection step for the non-author registration, and the number of items in the registration form for non-authors is smaller (there are no items for extra pages). Figure 4-3-2 is a registration form for the non-author participants.

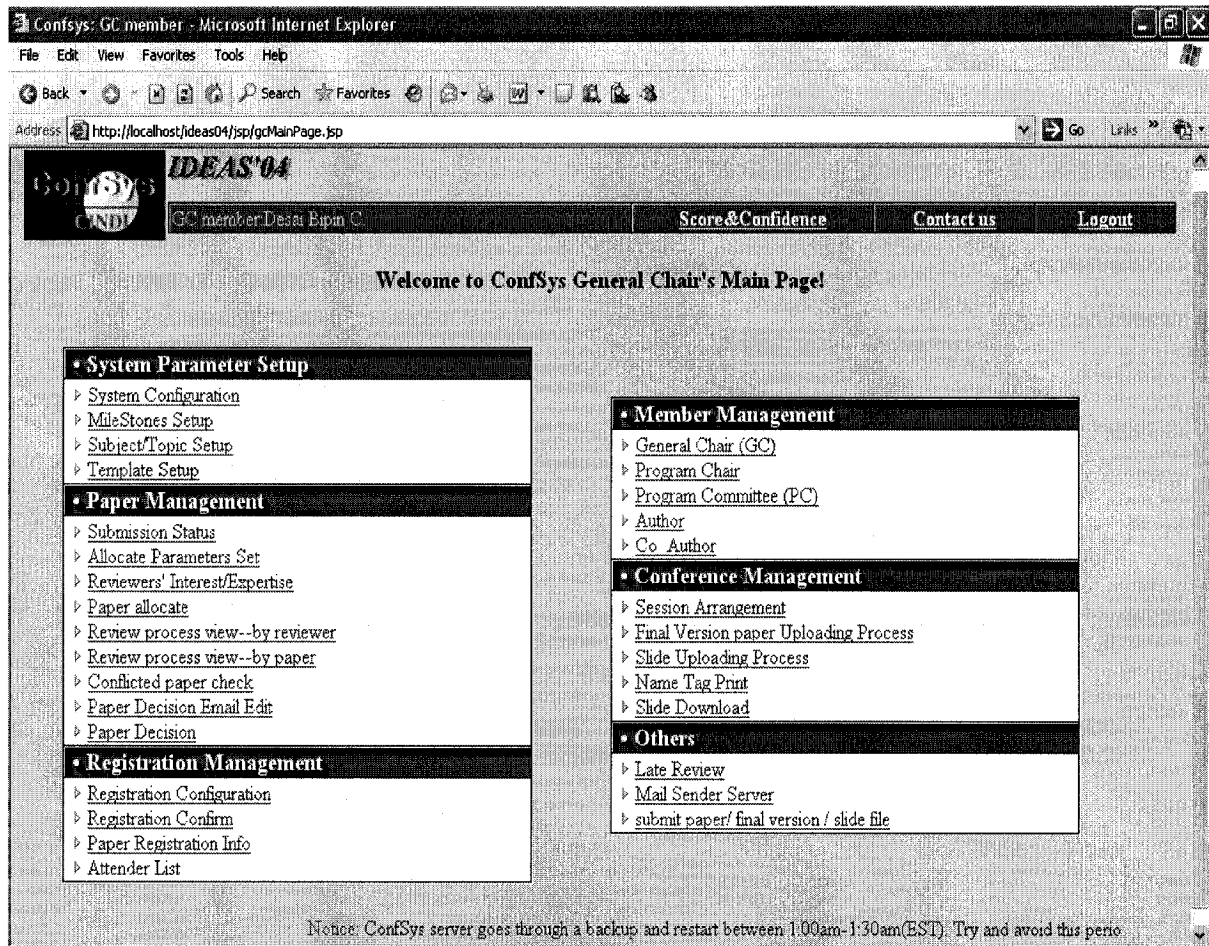


FIGURE 4-4-1 HOME PAGE OF GENERAL CHAIR

4.4.1 System Configuration

Once a conference has been set up by the administrator to be managed by ConfSys and a general chair was chosen, the GC must configure the system to tune it for the requirement of the managed conference. In ConfSys, the GC must configure some system parameters and system milestones, and enters topics for the conference to be managed. There are more than 60 system parameters in ConfSys, which should be configured by the GC or the administrator while setting up the managed conference. Only the parameters to be configured by the GC are shown on the system parameter set web page. Milestones control the phases of the conference in ConfSys. If the GC wants to extend the due date for the paper submission

phase, he could just change the date for this milestone. The paper submission function for authors automatically checks this date when it receives a “submit paper” request.

4.4.2 User management

In ConfSys, all program chairs, reviewers, and invited authors are initialized by the GC, and they cannot sign in ConfSys without a user ID and password emailed to them. The GC can also manage regular authors and their documents if required. Figure 4-4-2 is an interface for adding a new author. The main purpose of this interface is so that the GC can add a new invited author or an ordinary late author by designating the type of the author as the last items of the form.

ConfSys
CINDI **AUTHOR ADD**

Please fill in authors' information below (all items with * must be filled in).
A regular author is the author whose paper must be submitted on time and reviewed.
A invited author is the author whose paper would be accepted without review process.

Author ID:	<input type="text"/>	*(Max length: 10)
Password:	<input type="text"/>	*(Must be six characters or more)
Lastname:	<input type="text"/>	*
Firstname:	<input type="text"/>	*
Email:	<input type="text"/>	*
Organization:	<input type="text"/>	*
	(Eg: Company, Univeristy, Lab)	
Address:	<input type="text"/>	
Postal code:	<input type="text"/>	
City:	<input type="text"/>	
Province/State:	<input type="text"/>	
Country:	<input type="text"/>	*
Type:	<input checked="" type="radio"/> Regular Author <input type="radio"/> Invited Author	

FIGURE 4-4-2 NEW AN AUTHOR IN CONF SYS

4.4.3 Email and message template edit

ConfSys system provides many standard email templates and message templates; all these templates are composed of variables and fixed content. According to the value of variables, ConfSys system can generate personalized email contents and messages at execution time. Templates supported in ConfSys include:

- (1) Email template for the author of accepted FULL/SHORT/POSTER paper: the notification of acceptance email will be sent from the program chair after paper decision is made.
- (2) Email template for the author of NON-accepted paper: the notification of rejection email will be sent after paper decision is made.
- (3) Reminder email template for unregistered reviewers: the email is sent automatically by the ConfSys system before start date of paper auction to those reviewers who didn't register their topics of interests.
- (4) Reminder email template for unfinished reviewers: the email is sent automatically by the ConfSys system or manually by program chairs before due date for the review of assigned papers.
- (5) Reminder email template for reviewers who haven't participated in the auction process: the email is sent automatically by the ConfSys system or manually by program chair before the end date for the paper auction process.
- (6) Reminder email template for reviewers of controversial papers: the email is sent automatically by the ConfSys system or manually by program chair before paper debate deadline to the reviewer who need enter debate process for papers.
- (7) Email template for confirmed registration: the email is sent automatically to the conference participant by ConfSys system after general chair confirms the registration.
- (8) Email template for cancelled registration: the email is sent automatically to the conference participant by the system after general chair cancels a registration for which the payment has not been verified.

(9) Message templates shown on the registration web pages: The message template includes information of payments, such as: credit card, cheque, draft, online payment (eg: PayPal), etc. For different payment types and personal status (student or regular), information of payments shown on the web page is different.

The general chair for the conference can edit these templates. Figure 4-4-3 is an example web page for editing the notification of acceptance email template. The variables that could be used in a template are shown on the top of template; these variables would be replaced by the corresponding values from the database when the message is generated before being emailed.

ConfSys
CIND: **Email Content Edit-- Paper Decision**

Notice: There are two parameters, \$PAPERID (paper title) and \$PAPERID (paper id), which have different values for each paper. Please include those parameters in the email content when you edit it.

Other parameters:	name of the conference	\$PAGE_FULL	Page limitation of the FULL paper
\$LOCATION	conference location	\$PAGE_SHORT	Page limitation of the SHORT paper
\$DATES	conference holds on date	\$PAGE_POSTER	Page limitation of the POSTER paper
\$PUBLISHER	publisher name	\$XTRA_FULL	Extra page limitation of the FULL paper
\$CONFSYS_URL	ConfSys URL of this conference	\$XTRA_SHORT	Extra page limitation of the SHORT paper
\$PROG_CHR_NAMES	Program chair's name	\$XTRA_POSTER	Extra page limitation of the POSTER paper
\$FNL_DEADLINE	final version upload deadline		

ID: MAIL FULL

Description: email content of the FULL paper (sent to author) (max length=180)

Content:

Dear \$CONFNAME author:
 Congratulations!
 Your paper: \$PAPERID
 Assigned code (Paper ID): \$PAPERID
 has been accepted as a FULL paper for presentation at the \$CONFNAME, to be held in \$LOCATION, (\$DATES).
 The proceedings of the Symposium will be published by \$PUBLISHER. You will be contacted by our \$PUBLISHER editor who will send you information regarding the preparation of the camera ready copy of the paper and for uploading it and deadline (\$FNL_DEADLINE) for it.
 The page limit for your paper is \$PAGE_REG pages. You may include extra pages (maximum \$XTRA_REG); there is a charge for extra pages which would be communicated to you by \$PUBLISHER.
 The page limit for your paper is \$PAGE_SHORT pages. You may include extra pages

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FIGURE 4-4-3 EMAIL TEMPLATE EDIT

4.4.4 Paper allocation

Once paper auction is over, program chair can allocate papers manually or let ConfSys

system allocate them automatically followed by a manual tune up.

There are many factors we must consider during the automatic allocation process:

- The maximum number of papers for each reviewer
- The maximum number of assigned reviewers for each paper
- Reviewers' interests/expertise which were registered by reviewers before paper auction period
- Reviewers' auction results, wherein we records the priority or conflict of interest information about papers matching the reviewers' topics of interest.
- The relationship between reviewers and authors, (if the reviewer and the author are from the same organization, if the reviewer is an author of the paper, or if the reviewer has published papers with the author, we will not allocate this paper to this reviewer)

The first two parameters are designated by the GC before allocation (Figure 4-4-4).

AllocateParameter - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address http://localhost/ideas04/jsp/AllocateParameter.jsp Go Links

ConfSys
CINDI **Allocate Parameter Set**

(All parameters must be a positive number)

We have 47 PC members and 101 Papers.

Maximum number of papers for each reviewer: 11

Maximum number of reviewers for each paper: 4

Number of papers for each reviewer for the auction process: 20

Set Paras Reset

[Home Page](#)

FIGURE 4-4-4 ALLOCATE PARAMETER SET

If the program chair allocates papers manually, the system will only constrain the first two factors during the allocation procedure. When the program chair allocates a paper, the

system shows the list of reviewers having the same topics of interests as the paper's topics in red font color (Figure 4-4-5), the other interests are in blue. The system also shows the other reviewers who have been allocated the paper and the list of papers assigned to each reviewer. If the allocated paper number for a reviewer has reached the limit, the system will not allow the allocation of additional paper to the reviewer. If the number of assigned reviewers for a paper has reached the limit, the system will not allow the allocation of more reviewers for this paper. All these information shown on the web page is helpful for the program chair in deciding how to manually allocate papers or tune up an automatic allocation.

Manual Allocate

Paper Basic Information

Paper ID:	16	Title:	paper title: paper No.16
Author Name:	lastname199_firstname199	Org:	organization199
Subjects:	Data Mining and Knowledge Discovery		

Co-Author Information:

ID	Last Name	First Name	Org
No Co-author information founded!			

Program Committees (reviewers) in Allocation:

PCID	Last Name	First Name	Org
100	pclastname1	pcfirstname1	pc Organization1
441	pclastname24	pcfirstname24	pc Organization24
542	pclastname27	pcfirstname27	pc Organization27
647	pclastname29	pcfirstname29	pc Organization29

Maximum Paper Number for Each P.C. is : 11 . Maximum P.C. Number for Each Paper is: 4 .

Program Committees' Information

By clicking Check Box in Program Committee's field, this paper will be assigned to that PC

Allocate	PCID	P.C. Name	P.C. Org
<input checked="" type="checkbox"/>	100	pclastname1 pcfirstname1	pc Organization1
		Papers assigned: [Total Number] 10 [Paper ID] 16 ; 27 ; 31 ; 45 ; 50 ; 51 ; 60 ; 64 ; 87 ; 107 ;	
		P.C.'s Interest Fields: Data Mining and Knowledge Discovery ; Data Models ; Database Languages ; Information Grid ; Logic and Databases ; Peer-to-Peer Data Management ; Peer-to-Peer and Databases ; Semi-structured Databases and XML ;	
<input type="checkbox"/>	104	pclastname2 pcfirstname2	pc Organization2
		Papers assigned: [Total Number] 7 [Paper ID] 7 ; 11 ; 12 ; 23 ; 50 ; 52 ; 117 ;	
		P.C.'s Interest Fields: Databases as Components ; Information Grid ; Legacy Databases ; Multimedia Database Systems ; Optimisation and Performance ; Peer-to-Peer Data Management ; Peer-to-Peer and Databases ; Query Processing and Optimisation Real-Time DB Systems ; Spatial and Temporal Databases ; Query Processing and Optimisation ;	
<input type="checkbox"/>	107	pclastname3 pcfirstname3	pc Organization3
		Papers assigned: [Total Number] 10 [Paper ID] 20 ; 36 ; 56 ; 57 ; 59 ; 72 ; 77 ; 79 ; 83 ; 113 ;	
		P.C.'s Interest Fields: Data Models ; Database and Agent Technology ; Database Applications ; Databases and Electronic Commerce ; Distributed and Parallel Databases ; Information Grid ; Interoperability and Cooperative Systems ; Internet/Intranet Services and Databases ; Legacy Databases ; Mobile Computing and Database ; Peer-to-Peer Data Management ; Peer-to-Peer and Databases ; Semantic Web ; Semi-structured Databases and XML ; Web Search and Navigation ; Query Processing and Optimisation ; Workflow Systems and Databases ; Concurrency Control and Recovery ;	

FIGURE 4-4-5 PROGRAM CHAIR MANUALLY ALLOCATES PAPER

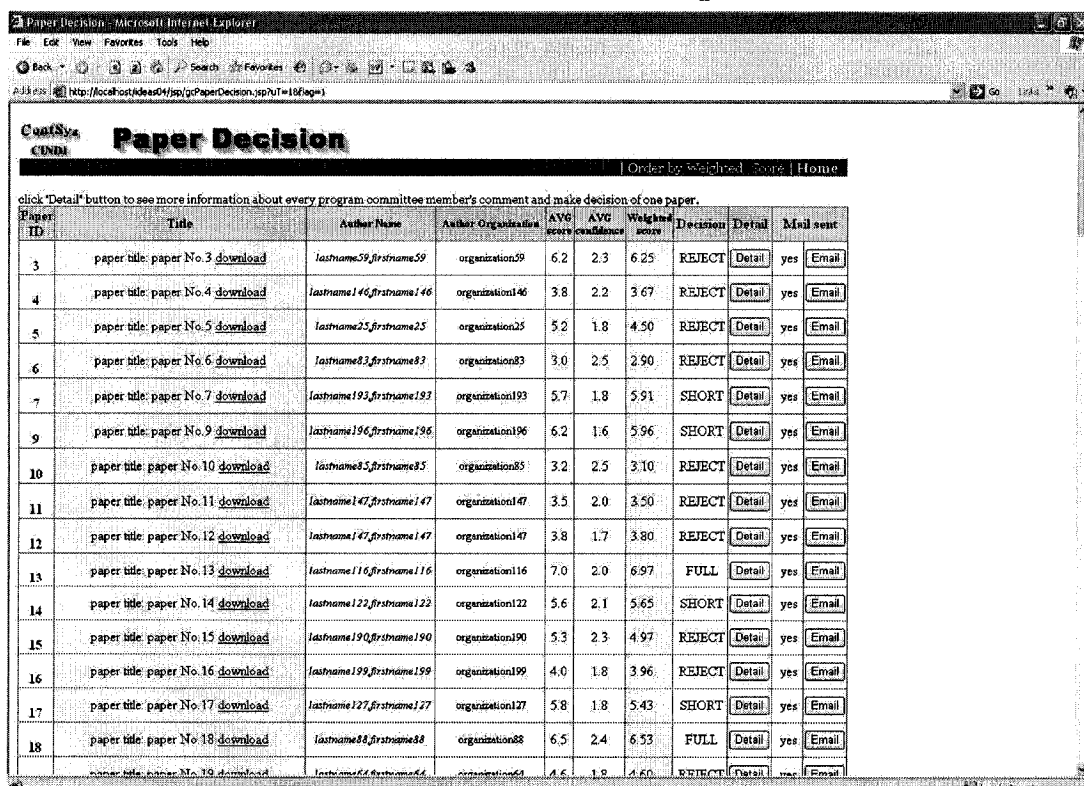
The program chair can also use the automatic allocation function. There are two kinds of

automatic allocation. One is the random allocation. In random allocation, the system will only consider the first two and the fifth factors. The other kind of automatic allocation considers all the five factors we mentioned above. Program chair can fine tune allocation result manually after automatic allocation.

4.4.5 Paper decision

After paper review and debate process, the program chairs need to make a final decision for each paper. ConfSys automatically calculates the weighted-scores of each paper according to the reviewers' score and confidence for each paper. Below is the formula used in calculating the weighed-score of a paper:

$$\text{Weighted score} = \frac{\sum \text{score}_n * \text{confidence}_n}{\sum \text{confidence}_n}$$



click "Detail" button to see more information about every program committee member's comment and make decision of one paper.

Paper ID	Title	Author Name	Author Organization	AVG score	AVG confidence	Weighted score	Decision	Detail	Mails sent
3	paper title: paper No.3 download	lastname59,firstname59	organization59	6.2	2.3	6.25	REJECT	Detail	yes Email
4	paper title: paper No.4 download	lastname146,firstname146	organization146	3.8	2.2	3.67	REJECT	Detail	yes Email
5	paper title: paper No.5 download	lastname25,firstname25	organization25	5.2	1.8	4.50	REJECT	Detail	yes Email
6	paper title: paper No.6 download	lastname83,firstname83	organization83	3.0	2.5	2.90	REJECT	Detail	yes Email
7	paper title: paper No.7 download	lastname193,firstname193	organization193	5.7	1.8	5.91	SHORT	Detail	yes Email
9	paper title: paper No.9 download	lastname196,firstname196	organization196	6.2	1.6	5.96	SHORT	Detail	yes Email
10	paper title: paper No.10 download	lastname85,firstname85	organization85	3.2	2.5	3.10	REJECT	Detail	yes Email
11	paper title: paper No.11 download	lastname147,firstname147	organization147	3.5	2.0	3.50	REJECT	Detail	yes Email
12	paper title: paper No.12 download	lastname147,firstname147	organization147	3.8	1.7	3.80	REJECT	Detail	yes Email
13	paper title: paper No.13 download	lastname116,firstname116	organization116	7.0	2.0	6.97	FULL	Detail	yes Email
14	paper title: paper No.14 download	lastname122,firstname122	organization122	5.6	2.1	5.65	SHORT	Detail	yes Email
15	paper title: paper No.15 download	lastname190,firstname190	organization190	5.3	2.3	4.97	REJECT	Detail	yes Email
16	paper title: paper No.16 download	lastname199,firstname199	organization199	4.0	1.8	3.96	REJECT	Detail	yes Email
17	paper title: paper No.17 download	lastname127,firstname127	organization127	5.8	1.8	5.43	SHORT	Detail	yes Email
18	paper title: paper No.18 download	lastname88,firstname88	organization88	6.5	2.4	6.53	FULL	Detail	yes Email
19	paper title: paper No.19 download	lastname64,firstname64	organization64	4.6	1.9	4.60	REJECT	Detail	yes Email

FIGURE 4-4-6 MAKE PAPER DECISION

The papers can be shown in the order of weighted-scores. The chair makes decisions taking into account the reviews, the debate information, and the final weighted-scores. The detail reviews and the log of the debate can be accessed for each paper by clicking the “Detail” button (Figure 4-4-6). After making decision for each paper, the chair can send individual emails to authors to notify them of the decision.

4.4.6 Session arrangement

After making the final decision for the papers, the general chair needs to arrange the program for the conference. The first job is the session arrangement. To arrange sessions, the general chair would specify: the number of days for the meeting, the total number of sessions of each type, and the number of papers per session. Then, the general chair needs to sort all papers by the topics and arrange the sessions. Usually, the papers in a session should be on related topics. A paper covering several topics could be presented in a session one of its topics. The number of papers in each session should be similar. ConfSys provides session management functions to the general chair which includes: create a new session, edit paper information of each session (distribute papers), update information of a session, delete a session, adjust session ID by date, generate program page, and auto arrange sessions.

To do the automatic session arrangement, some parameters are needed: the number of sessions, the number of sessions for FULL papers, the number of sessions for SHORT papers, the number of mixed sessions for FULL and SHORT mixed papers, the number of sessions for POSTER papers, the maximum number of papers for each FULL, SHORT, POSTER, and FULL&SHORT session. The algorithm can arrange sessions according to these parameters

and the papers' type and topics.

Every time the session arranging algorithm runs, the old session arrangement results will be deleted from the database. After arrangement, the results will be shown on the web page, allowing the program chair to input the session's name, date, location, and session chair's information. If the general chair needs to adjust the session after automatic arrangement, he can use "Edit Paper Info" function to do it. Figure 4-4-7 is an interface for the paper information edit. All the papers arranged in the session are shown on the top of the web page, and the general chair can delete any of these papers. All accepted papers are shown below grouped by the topics with papers already in this session being shown in red. The general chair can find all papers for each topic and all unscheduled papers easily. All checkbox beside the already arranged papers are disabled. The general chair can add any unarranged paper into the session being edited; examples of these are keynote talks which is usually the only presentation during a session. If the number of papers for a session is equal to the limit, the system will not allow the insertion of additional papers for it.

If the general chair wants to arrange session manually, he can just use "create a new session" to enter the basic information for an additional session, and then press the "Edit Paper Info." button to add papers to this session. He can add unassigned papers on one or more related topics to the session by clicking the checkbox beside the subject row.

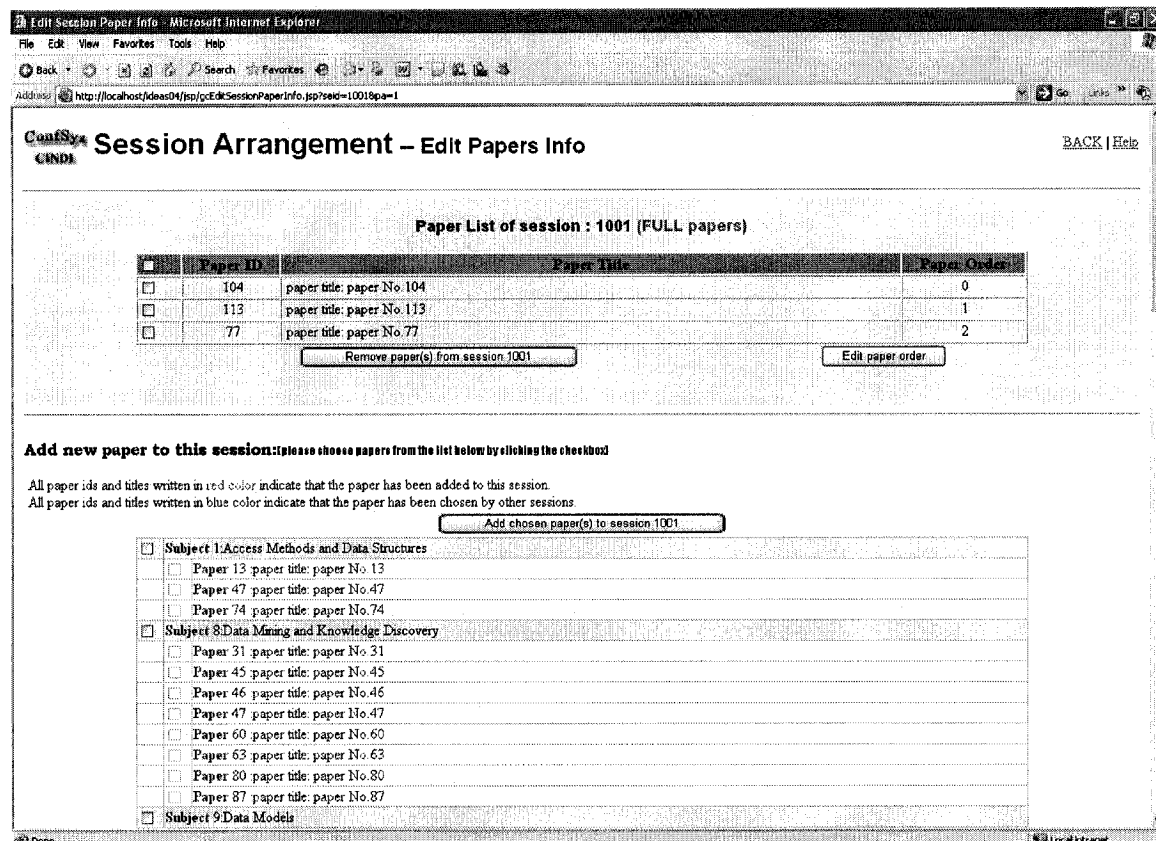


FIGURE 4-4-7 MANUALLY SESSION ARRANGEMENT

After arranging the session, the general chair can also generate a conference program web page using ConfSys.

4.4.7 Registration management

To manage conference registration, the general chair is required to configure the parameters, confirm the registration payment, and cancel registrations, which have not been paid.

A number of parameters should be assigned values before the online-registration starts in ConfSys. First of all, the format of the online registration form should be defined. Allowed payment types and currencies must be specified. The general chair should decide whether the conference provides meal choices and hotel reservation service or not. If the conference

provides meal type choice, the general chair also needs to set up the available meal types. Secondly, the general chair must set up the registration fees for the different registrations categories: pre-registration (mainly for authors), early registration and the regular registration, and for the regular participants and students. The other fees to be set up include: the fee for an extra black & white page, the fee for an extra color page, and the fee for a guest. Finally, the messages to be shown on the web page and printed registration form should be edited. ConfSys also support different currency type. Because there are many items of the registration fee for each currency, the general chair can set up the fee structure for one currency as the default currency and the fee for all items for this currency; then, for the other currency, the general chair only needs to input a exchange rate; the system will calculate a rounded fee for the new currency.

FIGURE 4-4-8 REGISTRATION CONFIGURATION

The general chair can view all registration information and monitor the status through the web. In ConfSys, there are three kinds of status for registration: unconfirmed, cancelled, and confirmed. The initialized value of the status for a new registration is “unconfirmed”. Once the registration fee is properly credited, the GC updates the status of the registration from “unconfirmed” to “confirmed”. Participants can withdraw their “unconfirmed” registration through ConfSys. The general chair can also cancel an unpaid registration. When the general chair cancels or confirms a registration, a confirmation/cancellation email will be sent to the participant automatically. Furthermore, all operations about the registration will be recorded in the log, and the general chair can check the log and write down the reason of cancellation in the log.

The registration status of each paper can be viewed via the screen “Paper Registration Info”. The list of participation is accessible via the “Attendee List”.

4.3.8 Meeting management

All authors with accepted papers need to upload the camera-ready copies and their slides for the presentation to the ConfSys server before the conference date. The type and size of the paper and slide file are restricted by four system parameters. The general chair can set up these parameters and they can also monitor the uploading process through the graphic indicator provided by ConfSys.

Once presentation slides and the introduction for the author who is to make presentation have been uploaded, the general chair can package all these and download the package from the ConfSys server to any client machine. During the packaging process, ConfSys will also

generate some HTML web pages of sessions for the conference, which includes information for each session, the introduction for the speaker of each paper, and the slide file link for each paper. The package is a zip file named *\$ConfName_sessionArrangement.zip*. When the general chair unzips this package, he can get a main index page of the conference program, a directory named *session* which stores a set of HTML files for the sessions (each session*.htm file is a web page for a session), and a directory named *slide* which contains all slide files. If the author didn't upload the slide before the deadline, the system will generate a default .ppt slide file (named by the paper ID number) for the paper when packaging. Once the general chair gets the slide file, he can replace the default file by the missing slide file.

4.4.9 Email send server

Besides the basic functions, ConfSys also provides some functions to assist the general chair. ConfSys Email Sender is a very convenient tool provided for the general chair. The main functions provided by the ConfSys email sender include:

Email Compose: the general chair can compose a new email and send it to a single person or a group of people. The chair can send email to any group predefined in ConfSys by choosing the group's name from the list. ConfSys sends emails to each member of the group one by one. After sending emails, the system also provides a web page to view the status for each email address.

Edit Email Groups: the general chair can define new email groups. Figure 4-4-10 shows the interface of creating a new email group. There are several predefined groups shown on the web page, such as: select all registered authors, select all authors with an

accepted paper, select all reviewers, and select all unregistered authors with accepted papers. If the general chair wants to create a group using the predefined condition, he can just input a name of this group and choose the radio box beside the condition; then click the “New Group” button to submit this task. After defining this group, the chair can use “Email Compose” function for creating and sending email to this group. He can also edit email addresses of this email group. If the chair doesn’t want to use the built in group, he can choose “other” option, and input a list of emails separated by comma in the text area below, assign it a name, and click “New Group” button to submit this task.

FIGURE 4-4-9 NEW EMAIL GROUP

Reviewer Registration Notice (Figure 4-4-10): This is one of the predefined email features for the GC. Using this function, the GC can send user IDs and passwords to reviewers after entering their name, user ID, and email. The GC can also send other email to reviewers using this function. The chair can choose to send email to only some of the

reviewers by highlighting the name. The user ID and password of each reviewer could be included in the email content if the check boxes ahead of them have been marked. It is easy to send password to the reviewers in case they forget their password using this function.

Author Password: This function is similar to the “Program Committee registration”. The email can be sent to a single, many or all authors simultaneously and the author’s ID and password could be included in the email content.

The screenshot shows a web browser window with the address `http://localhost/ideas04/jsp/gcMailSender.jsp`. The page title is "ConfSys System Mail Sender" with a "Go Home" link. Below the title is a navigation bar with tabs: "Compose", "Edit Email Groups", "PC Registration Notice", and "Author Password". The date "Tue Oct 26 20:57:28 EDT 2004" is displayed on the right. The main content area is titled "Registration Notice Mail" and contains a form with the following fields:

- From:** `bcdesai@confsys.concordia.ca`
- TO:** A list of reviewers with checkboxes for including their ID and password:
 - ☐ pclastname1 pcfirsrname1 (100)
 - ☐ pclastname2 pcfirsrname2 (104)
 - ☐ pclastname3 pcfirsrname3 (107)
 - ☐ pclastname4 pcfirsrname4 (126)
 - ☐ pclastname5 pcfirsrname5 (133)
 - ☐ pclastname6 pcfirsrname6 (143)
 - ☐ pclastname7 pcfirsrname7 (162)
 - ☐ pclastname8 pcfirsrname8 (200)
- CC:** `pcRegister:`
- Subject:** A text input field.
- Content:** A text area containing the text "Dear Program Committee member," and two checkboxes: ☒ PC ID-number and ☐ PC Password.

FIGURE 4-4-10 REGISTRATION NOTICE EMAIL TO REVIEWERS

4.4.10 Submit papers and slides

Sometimes, some authors cannot meet the deadline for paper submission or for final version uploading, or they want to provide the latest revised version of their papers after the deadline. Since ConfSys would not allow doing so after the deadline, they tend to send such late submission to the general chair by email. Since submitting a paper, a slide, or a final

version of paper is not only to copy the file to the corresponding directory but also to change many related data in the database, a function provided by ConfSys for submitting such late-papers and slides is necessary.

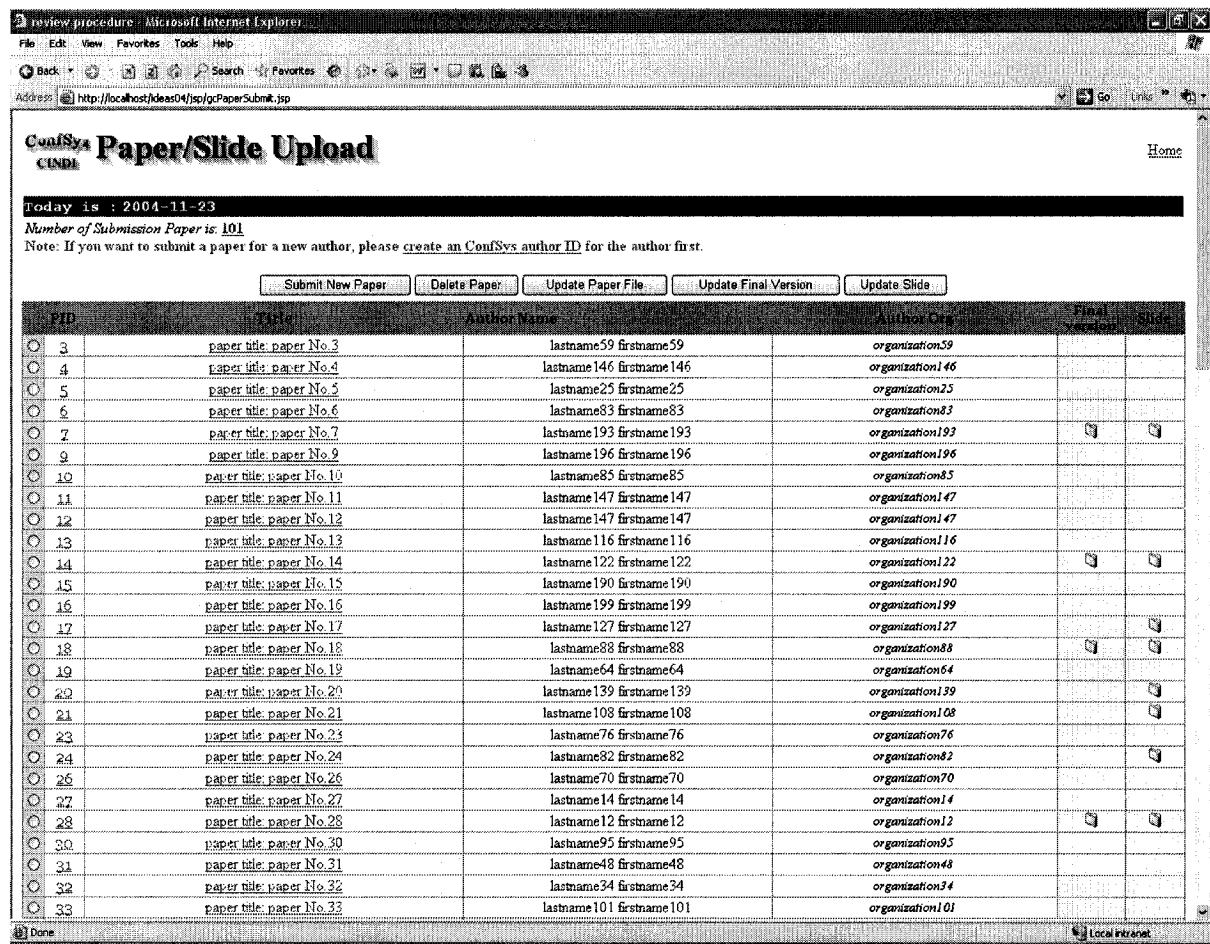


FIGURE 4-4-11 SUBMIT PAPERS AND SLIDES

Figure 4-4-11 is an interface for the general chair to submit papers, slides, and camera-ready copies on behalf of tardy authors. The general chair can also withdraw a paper, after investigation, submitted by an author whose name is in the black list.

4.5 Program chair

The program chairs are in charge of paper reviewing process and conference management. The main functions include: monitor paper submission status, set parameters

for paper allocation, allocate papers, monitor the review process, organize paper debate, make final decision, session arrangement, and monitor slide uploading process. Figure 4-5-1 is the home page of program chairs. These functions could also be performed by the GC and these functions have been described under section 4.4.

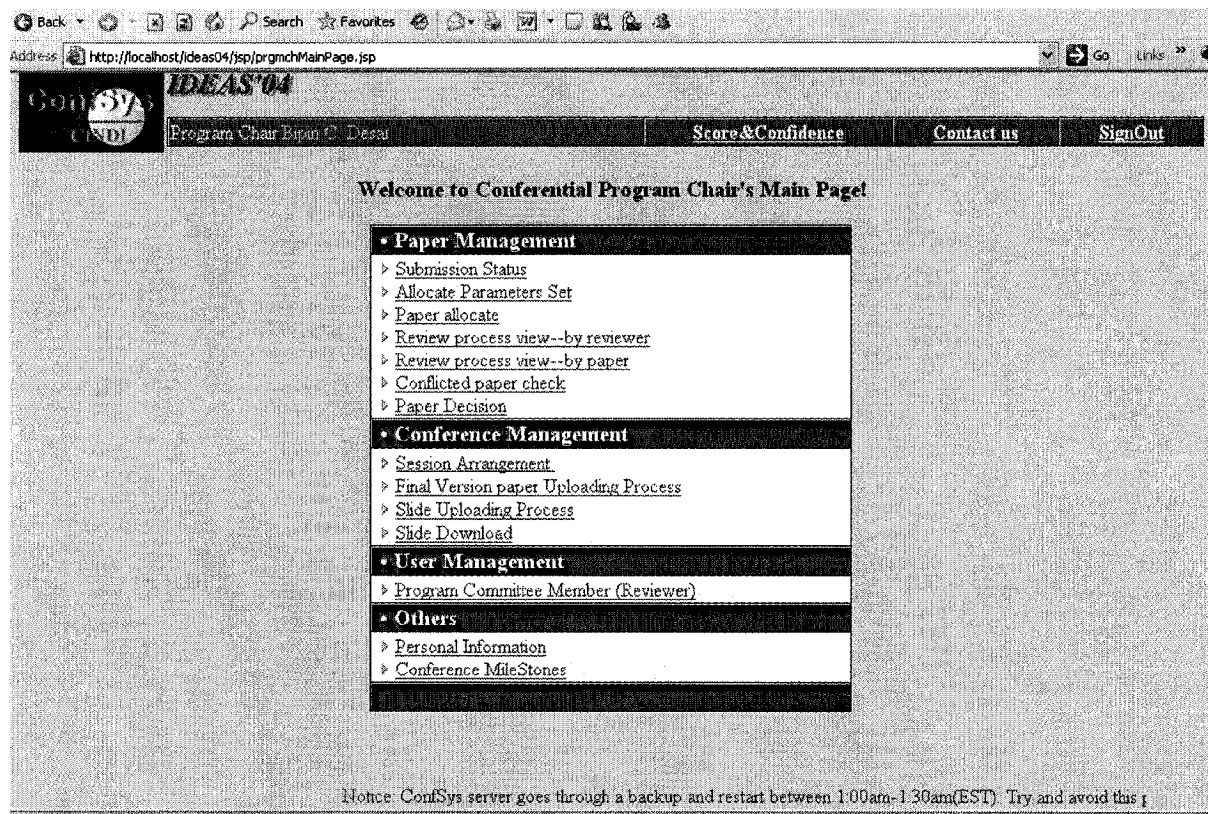


FIGURE 4-5-1 PROGRAM CHAIRS' HOME PAGE

4.6 The administrator

The ConfSys administrator is in charge of system initialization and black list maintenance. Figure 4-6-1 is the home page of the administrator. All conferences managed by ConfSys are listed on the home page of the administration.

4.6.1 Conference management

The administrator can create a new conference or delete a conference from ConfSys. She can also change the parameters, such as database access user name and password, of any

conference through “Update” function.

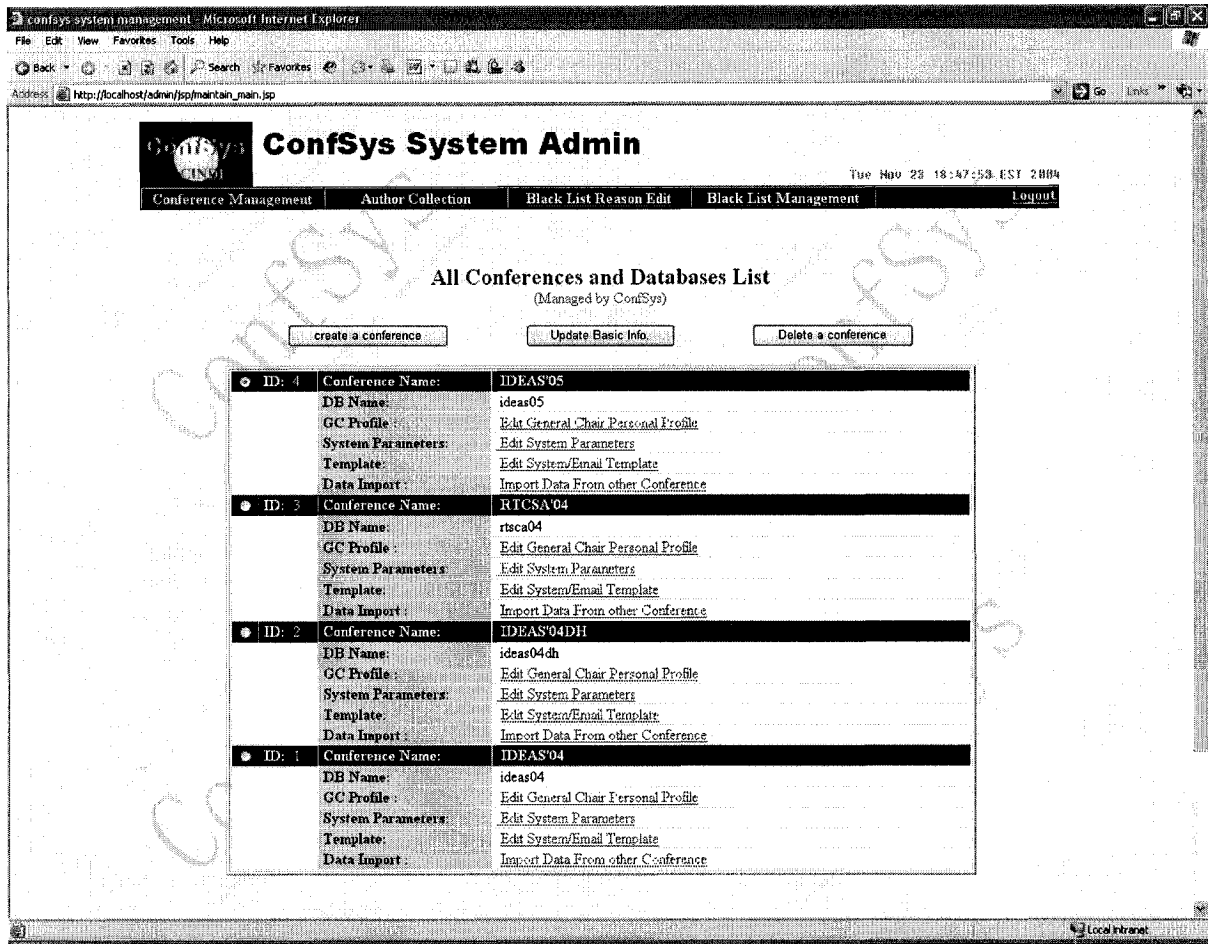


FIGURE 4-6-1 THE HOME PAGE OF THE ADMINISTRATOR

When the administrator creates a new conference application, a pre-created database with certain privileges and a directory for the new web application are needed. First, she inputs the database name, conference name, and the directory of the new application. (Figure 4-6-2) Then, the system will run a SHELL program to copy the servlets and JSP code to the target directory, recompile the database connection class for the new database access parameters to create a new application, and import a set of default database data to the database for the new conference.

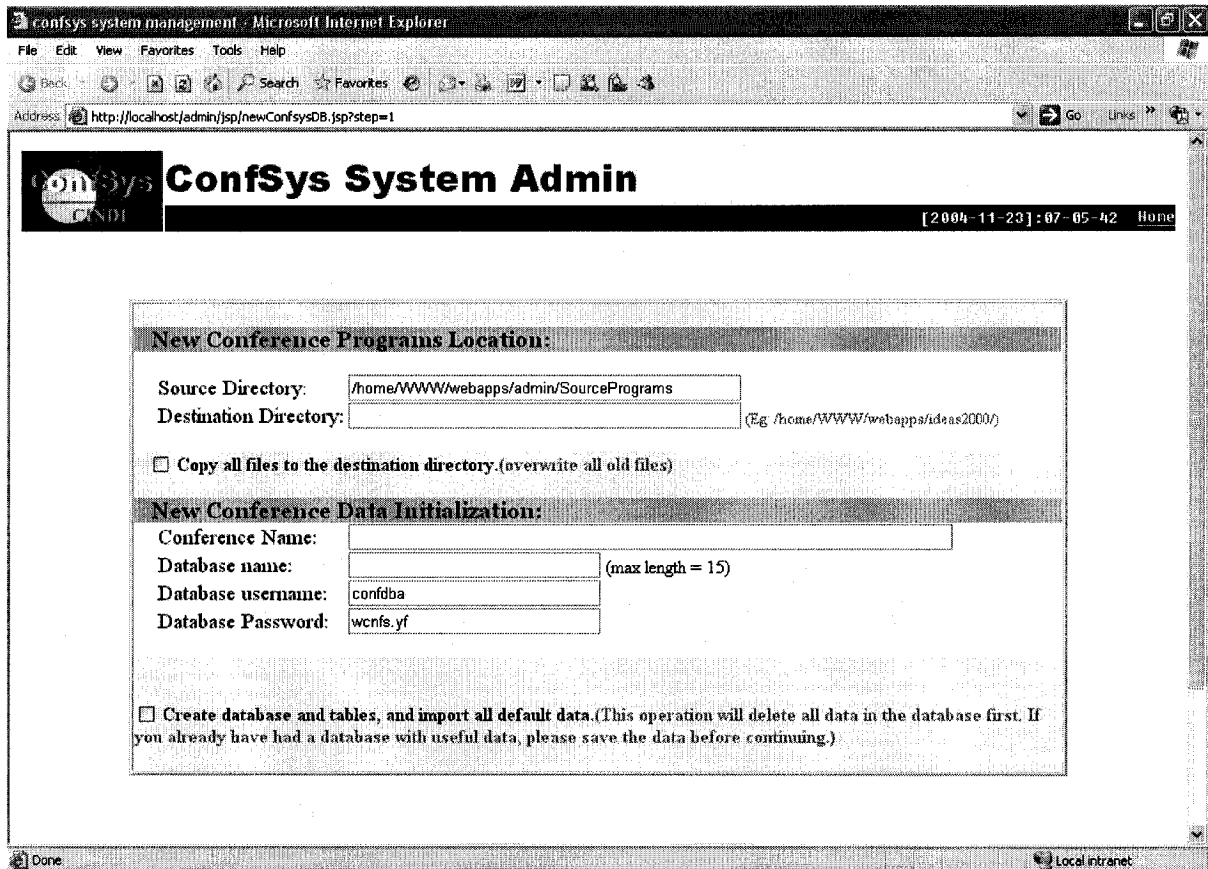


FIGURE 4-6-2 INTERFACE OF CREATING A NEW CONFERENCE

After initialization the new conference, she must initialize the incoming conference by creating a general chair for the conference, designating the system parameter values and update authorities (Figure 4-6-3). The update authority of each parameter includes three digits, which indicates the users who can update the system parameters in ConfSys. The first digit indicates the update authority for the administrator of each conference; the second digit indicates the update authority for the general chair; and the third digit is for the program chair. If the value of the update authority of a parameter is 010, it means that only the general chair can update this parameter. If necessary, the administration can also import authors, reviewers, and topics information from previous convocation of the conference series managed by ConfSys using the “Import data from other conferences” function.

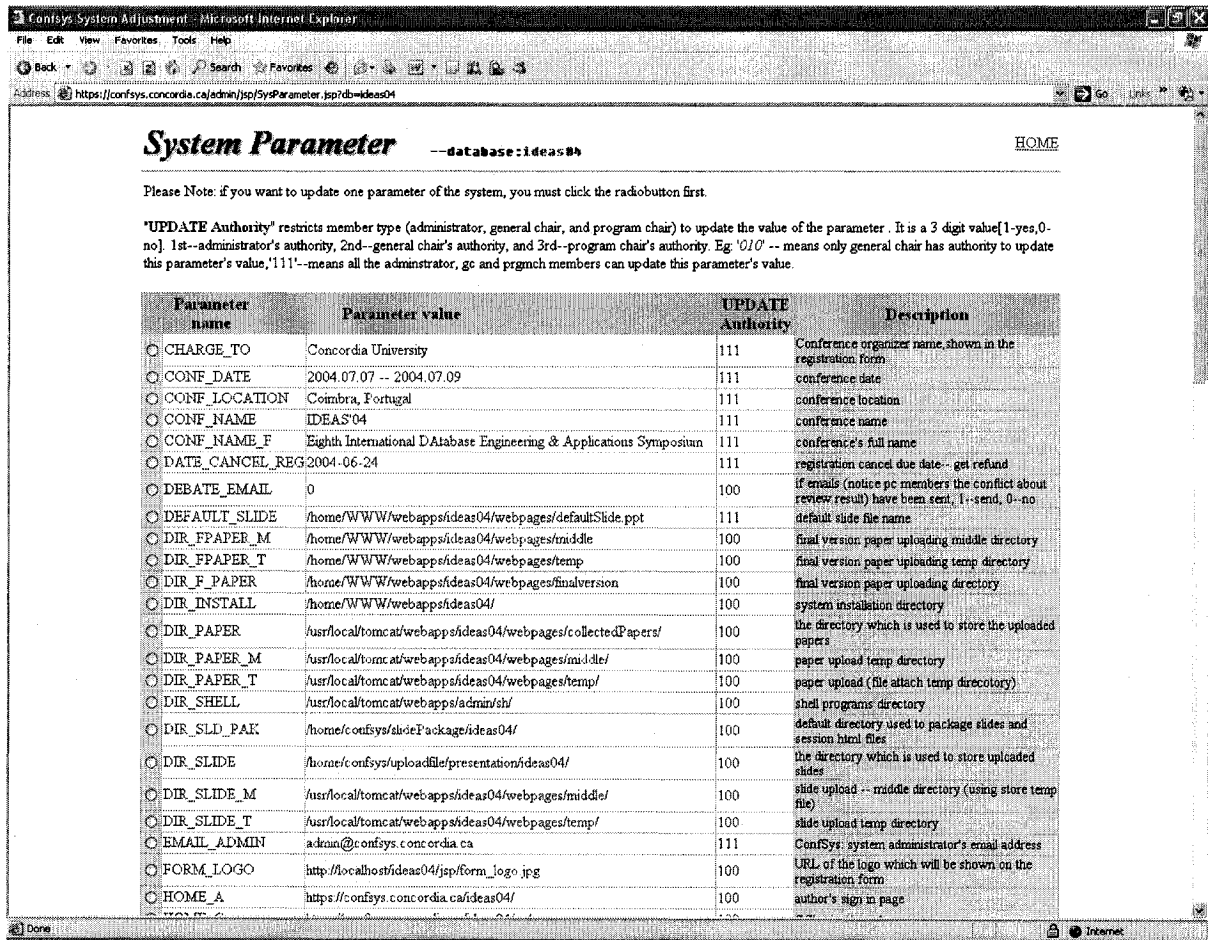


FIGURE 4-6-3 ADMINISTRATOR SYSTEM PARAMETER UPDATE

4.6.2 Black list management

Besides system initialization, the other duty for the administrator is the blacklist maintenance. To fulfill the maintenance task, she must collect all authors from different conferences managed by ConfSys (Figure 4-6-4) and define the judgment conditions for the black listed member. Then, she can append those authors who meet the black-list criteria to the list along with the information about the rational. Since ConfSys will not keep all data for the managed conferences for a long time, collecting authors' information together is necessary for the future conference management.

confsys system management - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://localhost/admin/jsp/blacklist_authorCollection.jsp

Confsys System Admin [2004-11-23]: 07-01-19| HOME

Author Information Collection

Collect/ Remove authors' information
(collect authors' information of the conference managed by Confsys system into one whole author list or remove authors' information of one conference from author list)

All Conferences list: IDEAS'05

Add all authors of selected conference to author list Remove collected authors of selected conference from the list

Summary of collected author information:
(By clicking the link under the conference name column, you can get all collected authors' information of this conference from the "collected authors' information" table shown below)

Conference Name	Number of Authors
IDEAS'04	211

Collected Authors' Information: [All]

Conference Name	Author Id	Name	Organization	Email	Country	Type
IDEAS'04	aID1	firstname1, lastname1	organization1	confsys_author1@confsys.concordia.ca		General
IDEAS'04	aID10	firstname10, lastname10	organization10	confsys_author10@confsys.concordia.ca		General
IDEAS'04	aID100	firstname100, lastname100	organization100	confsys_author100@confsys.concordia.ca		General
IDEAS'04	aID101	firstname101, lastname101	organization101	confsys_author101@confsys.concordia.ca	China	General
IDEAS'04	aID102	firstname102, lastname102	organization102	confsys_author102@confsys.concordia.ca		General
IDEAS'04	aID103	firstname103, lastname103	organization103	confsys_author103@confsys.concordia.ca		General
IDEAS'04	aID104	firstname104, lastname104	organization104	confsys_author104@confsys.concordia.ca	Germany	General
IDEAS'04	aID105	firstname105, lastname105	organization105	confsys_author105@confsys.concordia.ca	France	General
IDEAS'04	aID106	firstname106, lastname106	organization106	confsys_author106@confsys.concordia.ca		General
IDEAS'04	aID107	firstname107, lastname107	organization107	confsys_author107@confsys.concordia.ca	FRANCE	General
IDEAS'04	aID108	firstname108, lastname108	organization108	confsys_author108@confsys.concordia.ca	Canada	General
IDEAS'04	aID109	firstname109, lastname109	organization109	confsys_author109@confsys.concordia.ca		General
IDEAS'04	aID11	firstname11, lastname11	organization11	confsys_author11@confsys.concordia.ca	Italy	General
IDEAS'04	aID110	firstname110, lastname110	organization110	confsys_author110@confsys.concordia.ca		General

Done Local intranet

FIGURE 4-6-4 AUTHOR INFORMATION COLLECTION

Moreover, the administrator can update the information of a black list member and delete a member from the list.

5. Implementation, integration, and experience

In this chapter, we will introduce the implementation of automatic paper allocation, automatic session arrangement, automatic reminder email sending, and CINDI integration. Moreover, we will give our experience in using ConfSys system.

5.1 Implementation of automatic allocation of papers

In section 4.4.4, we have discussed five factors that may affect paper allocation. The maximum number of reviewers for each paper (LR) and the maximum number of papers for each reviewer (LP) are set up by the GC; reviewers have registered their interests before the paper allocation; and the reviewers' bids have been collected during the auction period. The last factor, relationship between the authors of a paper and the reviewer, needs to be judged by ConfSys system automatically. If the reviewer and any of authors of a paper are from the same organization, the reviewer is an author of the paper, or the reviewer and any of a paper's authors have published together before, we call this is a conflict. Whether the reviewer and the author are from the same organization or not can be checked from their personal profiles, and whether the reviewer is an author of the paper or not can also be checked from the co-authors' information. The most difficult task is to check if the reviewer and any of the authors were co-authors in the past. In order to address this problem, we incorporate the author information from DBLP [9] into our system.

DBLP server maintained by Prof. Michael Ley of University Trier in Germany provides bibliographic information such as article's title, and co-authors information, for major Computer Science journals and conference proceedings. DBLP has collected more than

545,000 articles by September 2004. Since all information stored by DBLP is in XML format and a separate file stores information for each article, we need a subsystem to retrieve useful information from the XML file and store them into a table of our MySQL database. This subsystem has been implemented in ConfSys [2]. Before each allocation for a conference, we download the up-to-date DBLP XML records and convert and store the required authors' information into our database.

The allocation algorithm attempts to assign most reviewers those papers that they have bid on with a high priority in the auction process. The algorithm used in ConfSys is simple to implement and considers all factors mentioned above, and, in most cases, requires very little or no manual fine-tuning by the program chair.

In a previous version of this algorithm[3], all constraints mentioned above have been enforced. It checks if the author and reviewer are from the same organization, if the number of allocated papers exceeds maximum limit, and it also checks if the author and the reviewer had published together in the past based on the information provided by DBLP. In this version [3], all papers were categorized into four groups based on the auction result: H group, V group, L group, and N group. The paper with at least one high priority bid is categorized into H group. The paper with at least one average priority bid and no high priority bid is categorized into V group. The paper with at least one low priority bid and no high or average bid is categorized into L group. And, the papers without any bid are categorized into N group. All papers in each group have been sorted based on their count of selection by reviewers. The papers are allocated in the order H group, V group, L group, and N group. For each group,

the algorithm allocates papers with the same strategy. For example, in H group, the algorithm sorts the paper by total number of “High” priorities assigned to the paper by reviewers in the auction process. At each step, the paper assigned maximum number of “High” priorities is allocated first. This order will not be changed during the allocation procedure. The algorithm also sorts reviewers for each paper based on the priority level they bid on the paper and the number of papers they selected at each priority level. Table 5.1 gives an example of the sorting of reviewers, who bided on paper_j, based on this criterion. There are seven reviewers who had a bid on this paper, and H, V, and L indicate priority level of their bids. The third to the fifth columns are the total number of papers they auctioned at the level they bided on this paper.

Reviewer ID	Auction Bid	Total High bids	Total Average bids	Total Low bids
R1	H	5		
R2	V		2	
R3	H	2		
R4	V		3	
R5	L			2
R6	L			4
R7	H	2		

Table 5-1 Reviewer Auction Result for Paper_j

If a reviewer selects fewer papers for the preference at a given priority level, this reviewer should be assigned paper earlier at this priority level. According to this sorting principle, the reviewers' order should be: R3, R7, R1, R2, R4, R5, R6. Each time a reviewer is assigned a paper, the total number of priorities at this level for this reviewer is incremented by 1. Thus, it attempts to give other reviewers a chance so that each reviewer is assigned almost the same number of papers to review.

For each assignment, the algorithm first checks the limit of the number of papers and the number of reviewers. If the number of reviewers for a paper or the number of papers for a reviewer is up to the limit, the algorithm will allocate the next paper or allocate the paper to the next reviewer in the sorting order. If the numbers of reviewers of a paper is not up to the maximum, it will check for conflicts. If the reviewer is eligible, the paper will be allocated to the reviewer. Otherwise, the algorithm will check the next reviewer's eligibility. If during an allocation pass, a paper couldn't be allocated to enough reviewers, the algorithm will check the reviewers without bid on this paper but with their topics of interests matching the paper's topics, and allocates it to one of these reviewers.

Although the previous version of this algorithm categorizes and sorts all papers and reviewers to assure that most papers are assigned and most reviewers get their preferred papers, there were some problems in this automatic allocation algorithm.

First of all, if a reviewer had bid 15 high priority for papers, and at the same time, those papers are selected by some other reviewer with just 2 or 3 high bids, there is a possibility that the first reviewer may not get his preferred papers since he could be disadvantaged in the reviewers' list for each paper, being lower than other reviewers who chose fewer papers, regardless of how many papers have been allocated to these other reviewers.

Secondly, the old algorithm is based on the concept that it's not reasonable to assign a paper to a reviewer automatically if the reviewer doesn't indicate preference for the paper's topic and the topic doesn't match any topics of interest of the reviewer [3]. If a reviewer didn't register his or her topics of interest before paper allocation, ConfSys will not allocate

any paper to such reviewer, and program chair need to allocate some papers to him or her manually. In some case, if no reviewers of the conference or workshop had registered their topics of interests and participated in the auction papers, the ConfSys's automatic allocation function could not work.

Thirdly, the previous algorithm only check the contact author, who signs up for ConfSys and submits this paper, and reviewer's relationship, it doesn't check the relationship between other co-authors and reviewers.

The last one is that the algorithm should run faster than before. In the seventh International Database Engineering and Application Symposium (IDEAS'03), ConfSys system, with the previous version of the allocation algorithm, used the automatic allocation function to allocate 75 papers to 48 reviewers. 42 reviewers had participated in the auction process and there were 250,000 records in DBLP table. It took about 10 minutes to complete the automatic allocation on a system with Athlon XP 1700 and 1G of memory. Compared with manual allocation, the speed of this automatic allocation is acceptable.

However, the algorithm needed to be improved to address the problems mentioned above. To solve these problems, we improved the algorithm in the current version of ConfSys.

First of all, we changed reviewers' sorting strategy. We use two factors, the total number of bids of the reviewers in each priority level and the number of allocated papers of that reviewer in each priority level, as the sorting keys instead of only using the first factor as in the previous version. We still allocate papers to reviewers in the order of high bids group,

average bids group, low bids group, and non-bid group. The reviewer who was assigned less papers at a given priority level and had bid smaller number of papers for that priority level should be assigned paper earlier. Table 5-2 gives an example of the allocation order of the reviewer. The fourth, sixth, and eighth columns are the total number of allocated papers of the reviewer at the three priority levels. According to our new sorting principle, the reviewers' allocation order should be: R7, R1, R3, R2, R4, R6, R5.

Reviewer ID	Auction bid	Number of papers auctioned at High bids	Number of papers allocated at High bids	Number of papers auctioned at Avg. bids	Number of papers allocated at avg. bids	Number of papers auctioned at Low bids	Number of papers allocated at Low bids
R1	H	5	0				
R2	V			2	0		
R3	H	2	1				
R4	V			3	1		
R5	L					2	1
R6	L					4	0
R7	H	2	0				

Table 5-2 Reviewer Auction Bid and Allocated Papers for a paper being allocated

Allocating papers using this algorithm, we not only give all reviewers a chance to be assigned almost the same number of paper to review, but also satisfy most reviewers' preference. It also means that we give a chance to the authors that their papers will be reviewed by the reviewers with matching interests.

Secondly, we add one part of codes to the new algorithm to check the conflict between the co-authors and the reviewers. The information of all co-authors and reviewers are retrieved from DBLP tables.

Thirdly, we enhance the original algorithm by adding a random allocation part. The random allocation still considers LP, LR, and constraints of the authors and reviewers. It

skips auction result, and reviewer's interests and papers' subjects matching part. The paper with lower number of assigned reviewers is allocated first, and the reviewer with smaller number of allocated papers has a high priority to be assigned first. We still enforce the requests that all reviewers have similar number of papers and all papers are reviewed by the required number of reviewers. This algorithm can address cases where reviewers do not register their topics of interest and do not participate in the paper auction processes.

Finally, we improved the speed of the algorithm. By testing the time for each part of the algorithm, we found that the DBLP data checking part is the biggest time consuming part. ConfSys's DBLP converter subsystem converts all XML file and stores useful information (ID, article's link, authors' names) in one table named dblp. Each record of this table is for one article, and that means we have 250,000 records in dblp table used for IDEAS'03. In the old version, each time it checked if a reviewer has published with the author, it selected data from dblp table once. The SQL statement used in the data selection also has some problems which can cause slower response. In additional, in the old version, the algorithm only checked the conflict between contact authors and reviewers, if it checked conflicts between all co-authors and reviewers, it would have taken even longer to do the allocation. Therefore, we need to not only reduce the number of dblp table access, but also improve the access time for each selection from the table.

In the improved version of the algorithm, we only check each reviewer's information and each co-authors' information from dblp table once before the allocation, and store them into hash table which use papers' ID and reviewers' ID as the key respectively. Each time,

when we need to check if a reviewer is eligible for a paper, we just search data from these hash tables of reviewers and papers. So, the total time for dblp table access is the sum of the number of reviewers and authors (including all co-authors). We also improve the database access by improving the SQL statement. In the previous algorithm, dblp query clause is:

```
select rowno from dblp where trim(upper(author)) like case1 or trim(upper(author)) like case2  
or trim(upper(author)) like case3 ;
```

Because the type of the author field in dblp table is blob, upper() and trim() function are useless for blob field in MySQL, and those two function also cost 20 percent query time for each query, we simplify the query clause as:

```
select rowno from dblp where author like case1 or author like case2 or author like case3 ;
```

And we also changed the DBLP converter and trim all authors' name and change them into upper case before inserting them into dblp table. Thus, we can reduce by another 20 percent the execution time for each query.

Table 5-3 is the pseudo code of paper allocation algorithm. Once paper_i was allocated to reviewer_j, both number of assigned reviewers for paper_i and number of assigned papers for reviewer_j increase by one.

<p>LP= the maximum number of assigned reviewers for each paper; LR = the maximum number of allocated papers for each reviewer; Initialize a Hash table of PcElements, using reviewer' id as a key; <i>// (PcElements include personal information of each reviewer and the published papers' information of each reviewer retrieved from dblp table)</i> Initialize a Hash table of PaperElements, using paper' id as key; <i>//(PaperElements include paper's basic information and the published papers' information of all co-authors retrieved from dblp table)</i></p> <p>for (pL=1;pL<=3;pL++){ <i>//pL: priority level, =1 high level; =2 average level; =3 low level</i> paperCandidates = get all papers with pL priority bids (sorted by the number of pL bids of each paper into descending order);</p>
--

```

for(int j=pL; j<=3; j++){
    for (int i=0; i< total number of paperCandidates; i++){
        if (the number of assigned reviewers for paperCandidatesi < LR){
            allocate paperCandidatesi to reviewers who bids this paper on j priority level;
        }else
            break;
    }
}
for (int i=0; i< total number of paperCandidates; i++){
    if (the number of assigned reviewers for paperCandidatesi < LR)
        allocate paperCandidatei to reviewers whose topics of interests match the paper's topics
}
}
// allocate paperCandidates to reviewers randomly;
while(true){

    get all paper Candidates; // get all papers for which the number of assigned reviewers is smaller than LR, sorted by

        the number of assigned reviewers in ascending order;

    if( the number of paper candidates ==0) break;
    else{

        get the first paper(P1) from the paper candidates;
        get all reviewer candidates; //the number of assigned papers of the reviewer is smaller than LP, sorted
            by the number of allocated papers in ascending order
        if( the number of reviewer candidates == 0 ) break;
        else{

            get a reviewer without conflict with this paper, which was allocated smaller number of papers
            and wasn't assigned to P1 before from the reviewer candidates;
            allocate P1 to the reviewer;

        }

    }

}
}

```

Table 5-3 Pseudo code of automatic paper allocation

After updating the algorithm, we test it using the data from IDEAS'03, IDEAS'04, and RTCSA'04 on a computer with Athlon XP 1700 with 1GB memory; the result is shown below in Table 5-4. The results indicate that the execution speed is improved in the new algorithm.

Conference Name	IDEAS'03 *	IDEAS'03	IDEAS'04	RTCSA'04
Number of Papers	77	77	101	129
Number of Authors	77 *	211	269	324
Number of Reviewers	48	48	47	34
Number of Topics	60	60	48	21
Number of DBLP Records	242,954	242,954	242,954	242,954
Num. of Auctioning Reviewers	42	42	23	23
Running Time	1m52s	3m33s	4m56s	5m18s

IDEAS03* comparing with the old algorithm (didn't check the conflict between reviewers and co-authors)

Table 5-4 Testing Result of the New Allocation Algorithm

Reviewer ID	Number of Auctioned Papers in each priority level			Number of allocated papers matching auction result			Total Number of Allocated Papers	Auction Match rate(%)	Interests Match rate(%)
	High	Avg.	Low	High	Avg.	Low			
107	16	4	2	10	0	0	10	100	100
162	16	17	39	8	0	2	10	100	100
200	5	3	0	4	3	0	10	70	100
201	6	15	20	4	5	1	10	100	100
221	4	4	20	4	1	5	10	100	100
241	3	2	15	3	2	5	10	100	50
252	9	9	11	7	1	1	9	100	100
283	15	11	15	6	2	2	10	100	100
337	3	2	0	3	2	0	6	83	No match
406	7	0	0	7	0	0	8	87	100
441	5	1	0	4	1	0	10	50	100
526	5	5	15	3	4	3	10	100	100
535	11	0	0	9	0	0	10	90	100
647	6	1	0	6	1	0	10	70	100
649	3	13	11	2	5	3	10	100	100
679	6	1	12	4	1	4	9	100	77
681	3	4	15	2	3	5	10	100	100
775	9	11	9	7	2	1	10	100	100
785	17	17	10	8	2	0	10	100	100
872	5	6	0	4	3	0	10	70	80
900	2	4	1	2	4	1	8	87	100
909	4	7	32	3	2	5	10	100	100
986	16	11	26	6	1	2	9	100	100

Table 5-5 Match rate of the automatic algorithm

In table 5-4, the second column (IDEAS'03*) is the same test case that was used in the old automatic allocation algorithm, which took more than 10 minutes to execute. However, the new version of the algorithm takes only 1 minute and 52 seconds to execute.

Using the new algorithm, we can also get a high match rate between the reviewer's auctioned papers and allocated papers, and a high match rate between the reviewers' interests and papers' topics/subjects. Table 5-5 is a match rate table of the auctioned papers and allocated papers for IDEAS'04. In IDEAS'04, there were 47 reviewers and 23 of them participated in the auction process. The first column of the table 5-5 is the program committee members (reviewers)'s ID. The ninth column is the match rate between the allocated papers and auctioned papers for each reviewer. The last column is the match rate between the allocated papers' topics and the reviewers' interests. In the Table 5-5, the interests match rate for the reviewer 337 is "no match", which means this reviewer didn't register any topics of interests to ConfSys. Since the algorithm is designed to allocate papers to reviewers automatically, the result of the real data indicates that using the new algorithm, we can get high speed and high match rate. Furthermore, the tables of match rate, shown on the web pages after automatic allocation, give program chairs good starting point for fine-tuning the allocation result.

5.2 Implementation of automatic arrangement of sessions

In section 4.4.6, we introduced the main function of session arrangement of ConfSys. In ConfSys, there are three kinds of accepted papers: FULL papers, SHORT papers, and POSTER papers, and there are four kinds of available sessions: session of FULL papers,

session of SHORT papers, session of FULL&SHORT mixed papers, and session of POSTER papers. Here, we will introduce the algorithm for automatic session arrangement.

To make sure the topics of each paper in a session are consistent, the algorithm tries to arrange all papers on one topic (subject) into a session. Since some papers have more than one topic, and a paper can be only assigned to one session, arranging all multi-topics papers in appropriate sessions to balance the number of papers in each session is the main goal of the automatic session-arranging algorithm.

Parameter	Value
How many sessions for "FULL" papers?	0
How many (maximum) papers in one "FULL" paper session?	0
How many sessions for "SHORT" papers?	0
How many (maximum) papers in one "SHORT" paper session?	0
How many sessions for "FULL & SHORT" papers?	0
How many (maximum) "FULL" papers in one "FULL & SHORT" paper session?	0
How many (maximum) "SHORT" papers in one "FULL & SHORT" paper session?	0
How many sessions for "POSTER" papers?	0
How many (maximum) papers in one "POSTER" paper session?	0

Buttons: Arrangement, Result, Close

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Copyright©ConfSys2003

FIGURE 5-2-1 PARAMETERS OF SESSION ARRANGEMENT

To automatically arrange sessions, the general chair needs to set up several parameters before arrangement. Figure 5-2-1 shows the parameters needed to be configured.

Since the procedure of arranging sessions for FULL papers, SHORT papers, and POSTER papers are similar, we use FULL paper session as an example.

In order to balance the number of papers in each session, determining which session has high priority to be arranged, and the papers on which topics should be assigned first need to be resolved in this algorithm. Here, we use a Hash table to store all sessions' information, session ID as the key, and use two temporary tables to store topics and papers' information, which are used in sorting the priority of papers and topics. One temporary table (table-1) is used to store all candidate papers for session arrangement. Before session arranging, the algorithm needs to find all FULL papers as candidates and store them into table-1. Once a paper is assigned to a session, it will be deleted from this table.

Field Name	Description
TID	Topic's ID
PaID	Paper's ID
PaTopic	The number of topics of the paper
PaperType	Type of paper, FULL, SHORT, POSTER

Table 5-6 Schema of temporary table-1

Another temporary table (table-2) is used to store the topics' information for choosing the next topic of the highest priority.

Field Name	Description
TID	Topic's ID
PaNumber	The number of paper candidates on this topic
PaMod	PaMod = the remainder of <i>the number of paper candidates on the topic</i> divided by <i>the paper capacities of the selected session</i>

Table 5-7 Schema of temporary table-2

Records of table-2 are selected from table-1, and all records in this table will be refreshed as some papers are assigned to a session and deleted from table-1. Table 5-8 gives a pseudo code snippet for FULL paper session arrangement.

```

Create two temporary tables for storing paper candidates and choosing the highest priority topic;
Get all paper candidates for FULL paper session;
While{
    Number of full sessions=0;
    for(i=0; i< number of sessions; i++){
        if (RemainSNumi >0)
            if (get a suitable topic id for sessioni){
                put all paper candidates on this topic into sessioni
                if(RemainSNumi == MaxNumOfPaper)
                    name the sessioni after the topic;
                delete assigned papers from the paper candidates list;
                continue;
            }
        }else
            Number of full sessions++;
    }
    if (all sessions are full) break;
    if(get sessionc ,of which the number of arranged paper is the smallest in all sessions){
        if(get topicc, the topic with the highest priority to be arranged){
            if(PaperCNumc < RemainSNumc)
                put all paper candidates on this topic into sessionc ;
            else
                put RemainSNumc paper candidates on this topic into sessionc;
            if(number of arranged papers== MaxNumOfPaper)
                name the sessionc after the topic
            else
                if (number of arranged papers> MaxNumOfPaper / 2)
                    name the sessionc after the topic, with a '*' at the end;
                delete assigned papers from the paper candidates list;
            }else
                break; //all sessions are full
        }else
            break;// no more paper candidate
    }
}
drop temporary tables;

```

Table 5-8 Pseudo code of session arrangement

MaxNumOfPaper is used to represent the maximum number of papers in a session, and **SessionNum** gives the number of FILLED sessions. When the number of assigned papers reaches the maximum number of papers for a session, we call this session a *filled session*. A

suitable topic candidate is the topic on which the number of papers is equal to the number of papers could be arranged into the selected session (**RemainSNum**); **PaperCNum_i** represents the number of paper candidates on the topic.

When we arrange sessions, the session with the smallest number of assigned papers should be arranged first. Then, we check if there is a suitable topic candidate for this session. If we find a suitable topic for the session, all the papers on the suitable topic candidate should be assigned to this session, and the session will be filled. If there is no suitable topic candidate, a topic with the highest priority will be picked from the remaining topics. In order to pick the topic with the highest priority, all remaining topics are divided into two groups: the first topics group includes all topics on which the number of papers is greater than **RemainSNum**(paper capacities of the selected session), and the second topics group includes all topics on which the number of papers is smaller than it. All topics in the first group have higher priorities to be assigned than the second ones. In the first group, all topics are sorted by the **PaMod** (the remainder of the number of paper candidates on the topic divided by **RemainSNum**) value and the number of papers (**PaNumber**) in an ascending order. For example, in table 5-9, if the **RemainSNum** is 6, the priority order is: Topic₁, Topic₃, Topic₄, and Topic₂, with Topic₁ having the highest priority. Hence, papers of topic₁ will be assigned first.

Topic ID	PaNumber	PaMod
1	12	MOD(12,6) = 0
2	8	MOD(8, 6) = 2
3	7	MOD(7, 6) = 1
4	13	MOD(13,6) = 1

Table 5-9 Topic sorting example for group one

In the second group, all topics are sorted by the **PaNumber** value in a descending order. For example, in table 5-10, if the **RemainSNum** is 6, the priority order is: topic₆, topic₅, and topic₇. If there is no topic in group one, the papers of topic₆ will be assigned first.

Topic ID	PaNumber	PaMod
5	4	4
6	5	5
7	2	2

Table 5-10 Topic sorting example for group two

And, the total priority order of those seven topics is: Topic₁, Topic₃, Topic₄, Topic₂, Topic₆, Topic₅, and Topic₇.

For a given topic, the paper with smaller number of topics has high priority to be arranged. All paper candidates on a topic are sorted by the number of total topics of each paper in an ascending order. For example, if *paper₁* has 2 topics (*topic₁* and *topic₃*) and *paper₂* has 3 topics (*topic₁*, *topic₄* and *topic₅*), when we assign papers on *topic₁*, *paper₁* has a higher priority to be assigned than *paper₂*.

Besides arranging papers, the algorithm can also name the arranged sessions, and all sessions are named using the rules given below:

- (1) If all papers of a session are on the same topic, we name the session after the topic.
- (2) If more than half of the papers in a session are on one topic, we name the session after the topic, with an asterisk (*) at the end.
- (3) If all papers of the session do not match condition (1) and (2), we leave the session's name empty. The general chair needs to name it during a manual tuning-up.

The algorithm stops when all sessions are full or there are no more papers available in

the temporary table.

Generally, arranging the session of FULL&SHORT mixed papers has a low priority in the session arrangement process, which means, we first arrange the FULL and SHORT papers into sessions of FULL papers and sessions of SHORT papers; after that, if we still have some remaining papers, we store them as paper candidates in table-1, and arrange them into the sessions of mixed papers.

5.3 Implementation of automatic milestones reminder

In order to keep all processes running on time during the conference preparation period, ConfSys provides an automatic reminder email sending functions. A Java program (ConfSysReminder.class) is used to execute the email-sending job. It can be automatically executed by a crontab task on Linux platform.

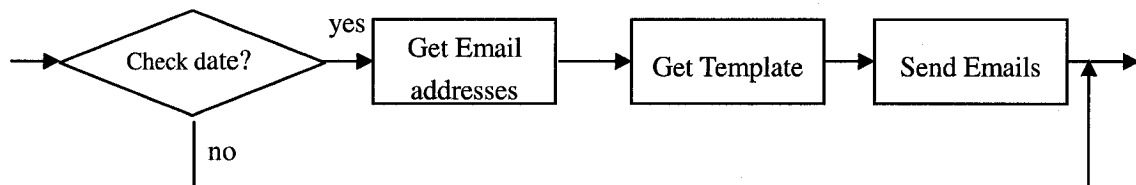


FIGURE 5-3-1 FLOW CHART OF THE REMINDER EMAIL SENDING

In ConfSys, more than ten types of reminder emails could be sent to users automatically. Figure 5-3-1 is the flow chart of sending one type of reminder emails. Here, we give an example of the procedure of sending paper review reminder emails to reviewers. First, the system checks the various milestones, and the value of the system parameter “REME_PCRV”, to determine the number of days to the deadline when the email should be

sent out. According to these two values and the current system date, the program can check if an email should be sent today. If so, the system will get all unfinished reviewers' information from the database, and then, get the email template for milestone reminder from the database. The system will use the reviewer's information, system parameters and milestones to substitute for the variables in the template to generate personized emails, and send them to the reviewers.

The frequency and time of the reminder emails checking depends on the mode set up in the crontab file. If the crontab file was set up as follows:

```
1 1 * * * root java /usr/local/tomcat/admin/WEB-INF/classes/ConfSysReminder.class /tmp/logs
```

The email sending program will run at 01:01 every day. The second parameter of the command line, “/tmp/logs”, is the name of the file in which the status of sent-out emails is stored.

5.4 Integration of ConfSys in CINDI

In order to enrich the digital library of CINDI system with the most recent development and research in the area covered by the conferences managed by ConfSys, the papers' information collected by ConfSys should be integrated with the bibliographic database of the CINDI.

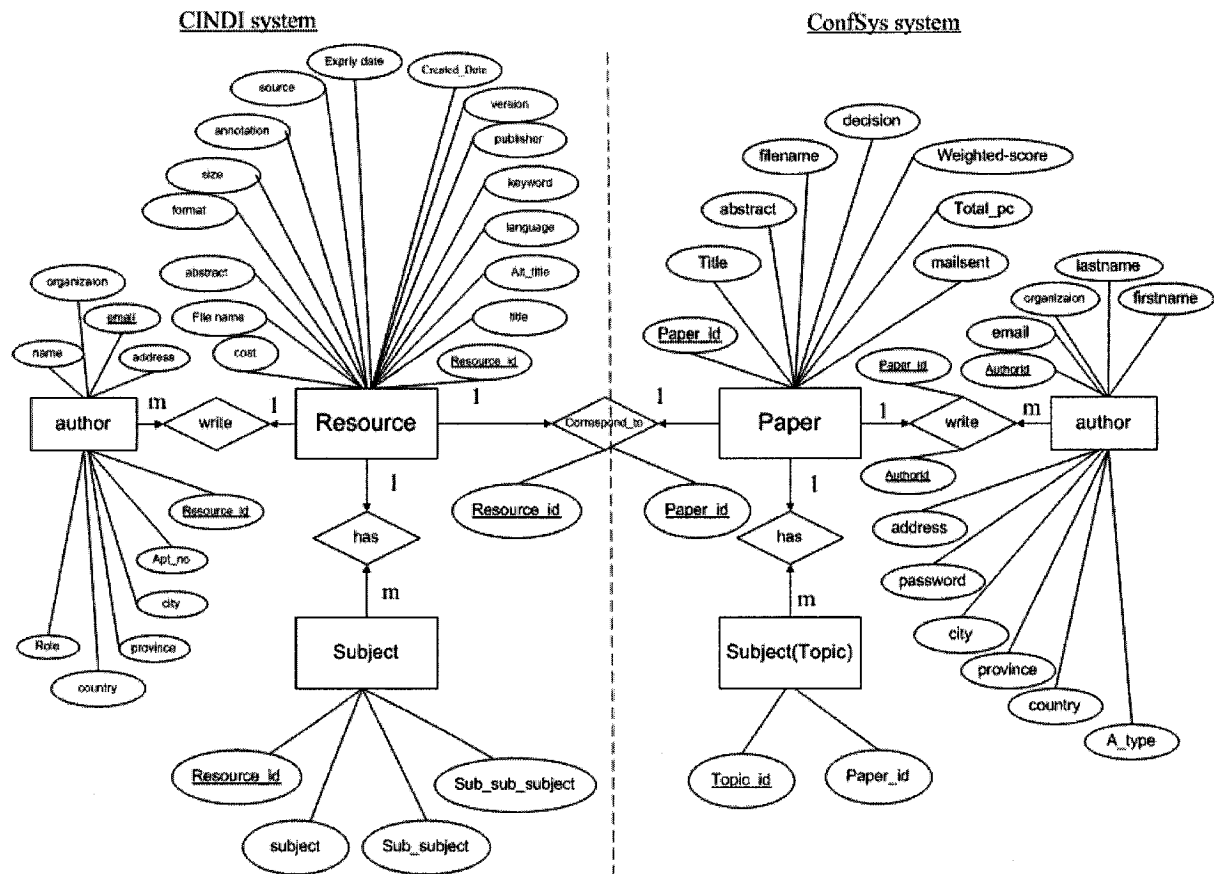


FIGURE 5-4-1 ER MODEL OF CONFSYS AND CINDI SYSTEM INTEGRATION

As shown in Figure 5-4-1, most of information of papers needed by CINDI system could be obtained directly from ConfSys. These include the name, email address, organization of author, and the title, abstract, file size, file name of paper. These are entered by the authors when they submit their papers or generated by ConfSys automatically. However, the subjects' information used in CINDI couldn't be directly inferred from these data by ConfSys because the hierarchy of subjects in ConfSys is different from CINDI's. In ConfSys, all subjects (topics) are at one level, but CINDI system has a three-level subject hierarchy (*subject*, *sub_subject*, *sub_sub_subject*) (shown in Figure 5-4-2). Furthermore, for a subject(topic) of ConfSys, there are one or many corresponding subjects in CINDI's subject

hierarchy.

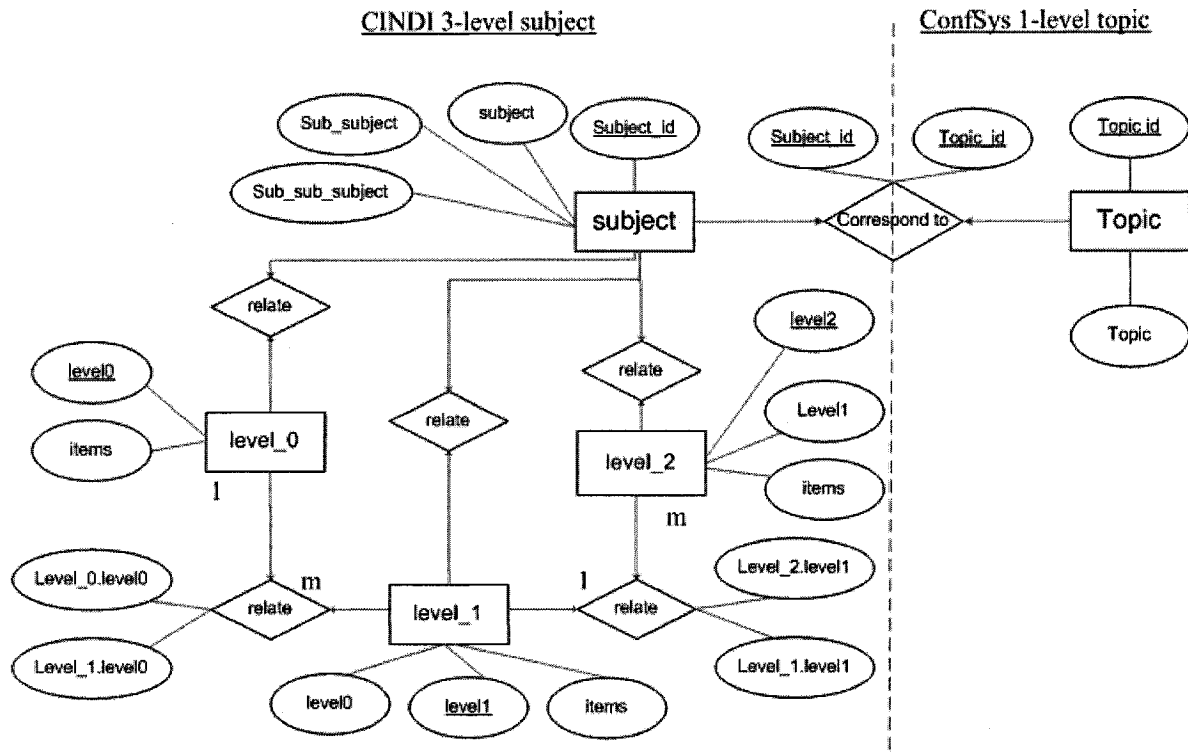


FIGURE 5-4-2 ER MODEL OF CINDI 3-LEVEL SUBJECT HIERARCHY

Since authors of ConfSys only register topics when they submit papers, we need a table (named *subject_confsys_cindi*) to record the relationship between the topic of ConfSys and the subject of the CINDI system. When the program chair sets up the topics for a conference during the “system set up” phase, they are required to set up the relationship between the topics and CINDI’s subject hierarchy.

Figure 5-4-3 is an interface for the program chair or GC to set up the subjects’ relationship between ConfSys and CINDI system. When they access the web page, ConfSys shows a list of 3-level subjects candidates from CINDI system for each topic. The program chair can select the related subjects from the candidates list and add them to the

subject_confsys_cindi table or delete all selected subjects from the table.

CINDI related subject information

Topic Name: **Access Methods and Data Structures**

All selected CINDI related subjects information are shown below:

Level 0	Level 1	Level 2
Computer Science	Operating systems	File access methods

[Delete All](#)

Subjects Candidates:

please choose related subjects by clicking the checkbox beside the subject and clicking "submit" button to submit this task. (62 candidates)

<input type="checkbox"/>	Level 0	Level 1	Level 2
<input type="checkbox"/>	Computer Science	Computer-communication networks	Local and wide-area network access schemes
<input type="checkbox"/>	Computer Science	Software engineering	Requirements/specifications: elicitation methods
<input type="checkbox"/>	Computer Science	Software engineering	Object-oriented design methods
<input type="checkbox"/>	Computer Science	Software engineering	Formal methods verification
<input type="checkbox"/>	Computer Science	Software engineering	Statistical software/program verification methods
<input type="checkbox"/>	Computer Science	Programming languages	Concurrent programming structures
<input type="checkbox"/>	Computer Science	Programming languages	Control structures in language constructs and features
<input type="checkbox"/>	Computer Science	Programming languages	Data types and structures
<input checked="" type="checkbox"/>	Computer Science	Operating systems	File access methods
<input type="checkbox"/>	Computer Science	Operating systems	Directory structures management
<input type="checkbox"/>	Computer Science	Operating systems	Security and protection: access controls
<input type="checkbox"/>	Computer Science	Data structures	Distributed data structures
<input type="checkbox"/>	Computer Science	Theory of computation by abstract devices	Random access bounded-action computation machines
<input type="checkbox"/>	Computer Science	Analysis of algorithms and problem complexity	Computations on nonnumerical discrete structures
<input type="checkbox"/>	Computer Science	Numerical analysis in mathematics of computing	Numerical linear algebra systems (direct and iterative methods)
<input type="checkbox"/>	Computer Science	Numerical analysis in mathematics of computing	Quadrature and numerical finite difference methods
<input type="checkbox"/>	Computer Science	Numerical analysis in mathematics of computing	Quadrature and numerical differentiation iterative methods
<input type="checkbox"/>	Computer Science	Numerical analysis in mathematics of computing	Roots of nonlinear continuation (homotopy) methods
<input type="checkbox"/>	Computer Science	Numerical analysis in mathematics of computing	Roots of nonlinear iterative methods

FIGURE 5-4-3 CINDI RELATED SUBJECT REGISTRATION

In order to find appropriate candidates, ConfSys needs to:

- Find a 2nd level subjects from CINDI system which matches, exactly, the topic's name, or
- Find a 3rd level subjects from CINDI system which matches, exactly, the topic's name.

If no candidates are found according to the conditions above, the system needs to:

- Find 2nd level subjects from CINDI system, which include topic's name as a substring, or
- Find 3rd level subjects from CINDI system, which include topic's name as a substring.

If there is still no candidate found, the system will parse the topic's name using empty space (' ') as a separator; and tries to find 3rd levels subjects from CINDI system, which can

match any of these tokens. When ConfSys tries to match each token of topic, some noise words are ignored, such as: articles (a, an, the), propositions (of, to, etc.), and others (system, systems).

These noise words are recorded in a table in ConfSys database, and could be edited by program chairs or GC.

Once paper submission is over, ConfSys transfers the papers' basic information (title, abstract, file size, file type, related subjects), authors' basic information (name, organization, email, address, city, province, country, postal code) and all paper files to the CINDI system.

5.5 Experience

ConfSys has gone through three versions since 2000 and it has been used by four conferences so far. Some experience has been collected during these four releases of v3.x: the first release of v3.1 was used in 2003 for IDEAS'03; the v3.2 was used for IDEAS04; the v3.3 for RTCSA'04 and v3.4 for IDEAS'04-DH. The latest version is v3.5.

When it was first used by IDEAS'03 (Seventh International Database Engineering & Application Symposium) in 2003, many bugs were found and fixed. The main problems found were the concurrency issue, auto-increment attribute, and international characters input [3]. All these problems were fixed before we used the system to host the conferences in 2004 (v3.2 or more).

- Concurrency

Since a conference usually has hundreds and even thousands of authors, and most of these authors tend to upload their files just before the deadline, the concurrency issue for

the system is very important for any conference management system. When an author submits a paper, three related tables should be changed, in the old version of MySQL, which used MyISAM type tables, which doesn't support transactions caused concurrency problem. With the use of program code for concurrency control, in the v3.0 and v3.1, some co-authors' information was inserted into the table with a wrong paper ID and some papers' information was inserted with a wrong file name. From v3.2, we use a system parameter and table locks to control the paper ID increment and put the id of the new paper into the http session, which is unique for a user connection, to keep all information about a paper submission to be recorded correctly. Therefore, we solved the concurrency problem without changing database type in ConfSys. We chose five concurrent users to live test the concurrency issue for v3.2 of ConfSys. All these users sent paper-submitting requests from one lab concurrently; four of them were able to submit their papers successfully and one failed with a correct response from ConfSys, which told him to do this operation later.

Starting from MySQL 4.0.5, InnoDB offers all four different transaction isolation levels described by the SQL standard [11]. Using the InnoDB database type is also a good approach to eliminate concurrency problem. In v3.5, we changed table type to InnoDB.

- User Interface

Since the only programming language used on the server side of version 3.1 of ConfSys was servlets, HTML codes for web page are all embedded in the java code. So, the interface of ConfSys was very plain. Some simple validations, which could be done by

JavaScript functions on the client side, were not included in the web page. Starting from v3.2, we use JSP to generate dynamic content of the web pages. Since JSP is a combination of Java and HTML code, there is only a small amount of Java codes embedded in a complex HTML page, making the design of a web page using JSP easier than using pure Java servlets codes. By using graphic web page design tools, a user-friendly interface of the JSP file can be easily designed and maintained. In the new version starting from v3.2 of ConfSys, the system provides many improved user-friendly interfaces.

With a number of new features, v3.2 to v3.4 of ConfSys system was used by three conferences in 2004: RTCSA'04 (10th international conference on Real-Time embedded Computing Systems and Applications) hosted at Concordia university for the PC in Sweden and accessed remotely from there, IDEAS'04 (Eighth International Database Engineering & Application Symposium) hosted at Concordia university for the PC in Coimbra, Portugal, and IDEAS'04DH (IDEAS'04 Digital Hospital Workshop). Through real-use in 2004, some new bugs were found and fixed in v3.5 of ConfSys. The lessons we learnt from 2004 are as follows:

- User Guide

In order to enhance the security of our application, we use auto session tracking to control users' access authorities. The session will expire after a period of non-action status. ConfSys provides an on-line review result form to reviewers. Some reviewers like to type in the comments while they are reading the paper, and it usually takes a long time to fill

in the review result. Because ConfSys didn't display the notice regarding session expiry on the related web pages, by the time the reviewers finished reviewing and were ready to submit the result, the session had already expired and the partial review was lost. The reviewers must sign in ConfSys again and retype all the comments; this was very annoying to many unwary reviewers. In v3.5, we post a notice on the review result filling-in web page and advise all reviewers to edit their comments with other tools first; then copy-paste the comments to ConfSys web page and submit it. Besides paper review's user interface, we also add more notices and guides to other user interfaces. A whole and detailed user guide has been written and posted on the ConfSys web site along with contextual help pages in release v3.5.

- Error Message

Since v3.4 we have some new functions in the latest version, the system is current in the final test state. The Java language uses exceptions to provide error-handling capabilities for its programs, but they do not have to catch or specify runtime exceptions. In our system, because some new codes are not tested enough, run-time errors occur in some special conditions. When the error occurs, Tomcat catches all those errors and sends a response web page with all exception information generated in the run-time to users. We need to do more tests on the system and pay more attentions to handle exceptions to avoid this kind of messages shown to the users. (Correction of these errors would be made before v4.0 is released in 2005.)

6. Conclusion and future work

6.1 Conclusion

The current version of ConfSys, a Java-based web application system, provides a secure, fully functional, and high-performance conference management system to the academic conference organizer. It provides convenient and versatile online functions to authors, paper reviewers, conference participants, the general chair, and program chairs to fulfill the conference preparation tasks. In order to facilitate the system administrator to monitor all conferences managed by ConfSys, a subsystem of administration has been designed and implemented. ConfSys has implemented most of the features required in an academic conference preparation. It can save hundreds of hours for the various chairs to manage the tasks and can also save time for the authors and reviewers in submitting papers and exchanging opinion about controversial papers among the reviewers. It provides a paperless system and thus is environment friendly.

ConfSys has the following advantages compared to other conference management systems:

- ConfSys can assure minimal development cost and good technical support because it was developed based on Linux platform by using current popular open source software, which has been declared stable and can fit all our functional and non-functional requirements.
- ConfSys is powerful. ConfSys is a Java-based three-tier web application, which adopts a MVC design pattern in the application tier, so it is possible to take full advantage of Java language, and it is easy to upgrade system services and reuse some third-party classes.

- ConfSys is portable. Since Java-based application is platform independent, Tomcat, Apache web server, and MySQL database server all support multiple-platforms, except for some SHELL programs used for the system initialization and packaging slide files, the whole system can be migrated to Windows platform easily.
- ConfSys is secure by employing the HTTPs protocol, adopting role-and-rights concept, and using session tracking technique.
- ConfSys is flexible enough to fit the different requirements of most academic conference. It has more than sixty system parameters, system milestones, and many email and message templates, which can be adapted by the GC and program chairs.
- ConfSys has efficient algorithms for paper allocation to reviewers and session arrangement. These paper allocation and automatic session arrangement system may be used with very minimal tune-up for most applications.
- ConfSys is a fully functional system. It provides support for all phases of the conference: from preparation, paper collection, paper review, debate support, paper decision, session arrangement, to participant registration, and presentation slide collection and download, at the conference site..
- ConfSys supports many file formats of the uploaded papers so that the author can use any preferred software to edit their papers.
- ConfSys provides graphic process indicators for authors, reviewers, and the conference chairs (the general chair and program chairs), which makes it easier to monitor the reviewing process, and paper submission process.

- ConfSys provides an auto-reminding function to the users, which assures that the conference preparation process runs on schedule.

In conclusion, ConfSys is a very powerful and effective system for the management of academic conferences.

6.2 Future work

The following additional features can be added to ConfSys:

- Automatic pagination

Since there are usually hundreds of sign-up authors, submitted papers, and registrations in a conference, the management web pages for the general chair or program chair should have an automatic pagination function. All records, which are shown in one web page so far, should be shown in separated web pages with a page index. And, the number of records shown on one page should be set up by the chairs.

- A demo system for ConfSys

A demo system for ConfSys should be built for those users who are looking for information on a conference management system. The demo system should provide all functions for authors, reviewers, the general chair, program chairs, and participants. The demo system must have some predefined reviewers, program chairs, and the general chair. If a person wants to demo the functions of reviewers, or conference chairs, he can use the default user ID and password to sign in the demo system. Authors and conference participants can sign-up to ConfSys freely.

- Improvement of the usability

In order to improve the usability of ConfSys, improvement of the user interfaces of ConfSys is necessary. First of all, the style of user interfaces for each set of users should be uniform. In ConfSys, we only provide detailed online-help for some functions, such as: paper submission, and slide uploading. Sometimes, the new users of ConfSys do not understand the whole process of paper collection and review of an online conference management system, so they send many messages to the administrator or the general chair asking for information. In order to improve the usability of ConfSys, more online-help, function illustration, and the notice of the operation steps should be added to the user interfaces. Additionally, some frequently asked questions (F.A.Q.) should be summarized and posted on the web site. Furthermore, a complete and detailed user guide should be edited and provided to users of ConfSys.

- Remote backup system

In order to improve the availability and reliability of ConfSys, a run-time remote backup system should be done in the future. Since the problem of the stability of the hardware and the system platform can cause the interruption of services provided by ConfSys, a run-time remote system backup is needed. The backup database should record all data change in the host server, and the backup server should keep all up-to-date versions of uploaded papers, slides, and camera-ready copies as well. If the host server crashes, the standby server should take over the whole conference management jobs without losing any user data. Therefore, users can get a high availability and reliable service from ConfSys.

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