

**CONFSYS3: AN ONLINE ACADEMIC
CONFERENCE & EJOURNAL SYSTEM**

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A THESIS

IN

THE DEPARTMENT

OF

COMPUTER SCIENCE & SOFTWARE ENGINEERING

**PRESENTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS
FOR THE DEGREE OF MASTER OF COMPUTER SCIENCE AT
CONCORDIA UNIVERSITY
MONTREAL, QUEBEC, CANADA**

APRIL 2012

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CONCORDIA UNIVERSITY

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Entitled: ConfSys3: An Online Academic Conference & eJournal System

and submitted in partial fulfillment of the requirements for the degree of

Master of Computer Science

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ABSTRACT

ConfSys3: An Online Academic Conference System

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As an important component of Concordia INDEXING and DISCOVERING system (CINDI), Conference System (ConfSys) aims to provide useful functionalities and services to help both organizers and participants of any roles in an academic conference and eJournal. All processes of auction, debate, decision, final version upload and so on associated with such events and issues are supported and facilitated by ConfSys.

After more than ten years development and improvement upon practical academic conference management experience, the second generation of ConfSys (ConfSys2) not only possesses a lot of strong and applied features such as user-group management, privilege system, context sensitive help system and smart daemon and database maintenance mechanism, but also be able to support multi-series academic conference.

The experience with ConfSys2 pointed to some of its shortcoming which in turn pointed to the need for additional features that were needed in conference management and to incorporate the management of eJournal. This has resulted in the third generation of ConfSys – ConfSys3. In this version, we have focused on the flexibility, extensibility and customization. ConfSys3 is based on the same platform as its previous version -- Tomcat, java/jsp and MySQL. In addition to the interface improvement and many new useful features such as automatic email management, automated verification of uploaded files, incorporation of special features needed for eJournal management, introduction of

concurrent track feature and associate editor, and a major upgrade to make it possible for organizers to customize their conferences. Hence, ConfSys3 is extending the advantages of ConfSys for better configuration to address specific requirements fo supporting peer review based academic events in various domains.

Acknowledgements

I would like to express my gratitude to all the people who gave me any kind of help in finishing this thesis.

Beyond doubt, I would give my first thanks to Dr.Bipin.C.Desai who gave me the persistence support and encouragement in the completion of this thesis. He gave me the opportunity to join the CINDI group and provide consistence guidance.

I am also grateful to my parents and my girl friend Wen who always guided me in the difficult decisions and her unwavering support.

Finally, I would like to thanks my colleagues, Rui Chen a mentor in my master study, Min Huang who provided help with a lot in professional skills and Ming Lu who is a great partner for continuing with the ConfSys/CINDI work.

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List of Acronyms

AJAX	Asynchronous JavaScript and XML
API	Application Programming Interface
ASHG	Automatic Semantic Header Generator
B/S	Browser/Server
C3S2E	International C* Conference on Computer Science & Software Engineering
CAPTCHA	Completely Automated Public Turing test to tell Computers and Humans Apart
CINDI	Concordia INdexing and DIScovering system
CMS	Conference Management System
CMS	Content Management System
CSE	Computer Science and software Engineering
CSV	Comma-Separated Values
DFS	Document Filtering Subsystem
FCS	File Conversion Subsystem
GC	General Chair
HTML	Hyper Text Markup Language
IDEAS	International Database Engineering & Applications Symposium
JSP	Java Server Pages

JVM	Java Virtual Machine
PHP	Hypertext Preprocessor
PC	Program Committee

Chapter 1

Introduction

1.1 Overview

The objective of Concordia INdexing and DIsccovery System (CINDI) [1][2] is to become a repository of academic documents in any research area. It consists of many sub-systems with different functions: Conference System (ConfSys), CINDI Robot, gleaning sub-system includes File Conversion sub-system (FCS) and Document Filtering sub-system (DFS), Automatic Semantic Header Generator (ASHG), CINDI Registration and Upload sub-system, search sub-system and Annotation sub-system [3].

As an important part of CINDI system, ConfSys is an online academic conference system which has evolved over a number of releases over three generations [4]. It provides all the essential functions and services to support the different roles and operations in the process of academic conference, also an e-Journal system which could support all the functions in e-Journal management was embedded in ConfSys. ConfSys is based on open source platform and uses an environment consisting of Apache and Tomcat servers with the software based on Java, JSP, Java Servlet and uses MySQL as the database engine. The previous version of ConfSys (ConfSys2) supports roles in both academic conference and e-Journal management such as Admin, General Chair, General Editor, Editor, Program Chair, Program Committee, Reviewer, Author and co-author to

perform operations such as paper submission, paper auction, paper auto-allocation, paper review, blind debate, paper decision, auto session arrangement and session support.

ConfSys has supported several academic conferences for more than seven years and is continuing to evolve with the need to address the requirements of different meetings and users. In this evolving process, additional features and functions have been added to ConfSys; these include smart daemon, database maintenance, log system, multi-conference management, etc. In our opinion ConfSys2 is a capable and complex web-based academic conference system.

1.2 Problem Statement

ConfSys was initiated by Dr Bipin.C.Desai in 1999[5] and has evolved over the last several year, it is now a scalable, complex web system based on Java technology and MySQL. While its successive developers have introduced a number of excellent ideas and useful features to ConfSys, more and more challenges remained to integrate additional requirements that are made on it. With the wide use of web and electronic format document for academic publishing, ConfSys2 is expected to satisfy these additional requirements from both organizers and users.

Basically, two major challenges confronted by ConfSys2:

1. The balance between usability and functionality.

As software becomes more complex with enhanced features, it provides its users

more options and choices; this is a bonus for users familiar with the system. However it could confuse other users to the extent that such users cannot take advantage of these features. Therefore usability is a crucial aspect of any web-based system. Poor usability could jeopardize the utility of a system if it causes some users to give up on it. [6] From the feedback of users, the need to improve usability has emerged as a number one priority of ConfSys.

2. Ability to customize conference to accommodate specific needs, especially in non-Computer Science area.

As a result of the popularity of the internet, using electronic form of documents and online/web-based tool management has become a mainstream approach. More and more academic publishing is managed by online software. Increasing number of non-computer science conferences are now using online/web tools to facilitate its management and organization. This trend provide great opportunities for software such as ConfSys to strive for wider acceptance, it can address the new requirements for the new set of users. At the same time, in many disciplines, the conferences may have different processes, operations, rules and roles, the ability to customize conference became a critical issue for ConfSys. If a system has pre-defined processes to handle any event, it will narrow its scope. So that improved customization and extensibility is another important issue in the next generation of ConfSys.

1.3 Proposed Solution

For the first challenge – balance of usability and functionality, we have decided to not sacrifice functionality but focus on improving the usability. We believe that instead of limiting functionality, usability should complement functionality. It affects how and with what effectiveness a system is used, and even whether or not it is used at all [7]. To build a more intelligent help system is one choice, unfortunately we have seen that the majority of users do not read the context sensitive help pages provided in ConfSys2, as a result we focus on 3 ways to make the system easier to use:

1. Limit options for users in each period. These users include both conference organizers – such as Admin, General Chair, etc. who could use the management features – and other participants, such as casual users and authors who have access to only the basic functions. We try to limit the options for all these users. The major method to achieve this is to make the options -- such as buttons, links and features both time and role sensitive while differentiating the important and not so important features and functions and provide different ways to present different features.
2. Provide context guides and useful tips to induce users to access the correct functions or events in different period. To achieve this we try to put the most likely options that users need in the most noticeable positions and by highlighting useful messages. In other words, we try to predict the purpose of a logged in user based on the user's current role, then guide her/him to the right

track. And auto-email sending system has been introduced to encourage organizers/chairs to modify and check the system's reminders. Such reminders also give users useful information to let them know what they should do and how and when to do it.

3. Improve some interfaces of the ConfSys by using more intuitive graphs and layouts to make sure that users get the information they need easily. Many of these changes are made for managing the events, with additional features such as automatically executing routine functions to decrease the workload of the organizers. For example, processing uploaded files automatically to get information such as number of pages, whether fonts are embedded, page size and scan the file for content fields, and provide feedback to the file up loaders without any manual intervention and if necessary provide them guidelines to make necessary modifications in the upload file. A summary for each uploaded file is accessible to the organizers allowing them to make some decisions without manually processing the uploaded files.

For the second challenge: customization for different review requirements in different discipline, two approaches are used to address this issue.

1. Introduces a number of parameters allowing the organizers to turn on or turn off some system components or stages in the submission and review process. Since some components are basic in most academic conference and tightly-coupled with other system components, without configurability, it would be difficult to adapt the system

for non-traditional submission/review/debate/decision flow.

2. Modularize ConfSys: A number of modularization and refactoring tasks were required for the new version of the system called ConfSys3. This splits a sub-system into a number of modules and users could choose any possible combinations of these modules to accommodate a different review process. We have also introduced mechanism to make it possible to introduce new conference components and steps in the overall process.

1.4 Organization of the thesis

This thesis is organized as follows:

- Chapter 2 introduces some frequently used existing online academic conference systems, analyzes their advantages and disadvantages, discuss their special features and concepts. Then introduce ConfSys and Cindi System and compare ConfSys with the other conference systems.
- Chapter 3 presents how we addressed the first challenge: improve usability in ConfSys3 without reducing functionality of ConfSys2.
- Chapter 4 will introduce some new features and new concepts that are introduced in ConfSys3 to enhance usability and versatility of the system. Not only the implementation but also some logic changes and the reason for change will be presented in this chapter.
- Chapter 5 we present our approach to handle the second major challenge: ability of

conference customization.

- Chapter 6 gives our conclusion and discusses the future work.

Chapter 2

Existing Systems and Related Works

2.1 Related Works

Along with the maturation of internet technologies from both software and hardware aspect, most applications with requirements to share information and provide user communications turn increasingly to online solution. With the development of web techniques, innovation of new web application implementing scripts and frameworks such as JSP, PHP, AJAX, CSS, etc, web based solutions have gained a large portion of online application developments. With the improvement in internet hardware facility – including reliable high-speed steady networks and support for a large number of concurrent internet connections, web based applications have been adopted by software designers and users: [8][9]

1. Web applications are portable and increasingly compatible over various platforms. This is the most important advantages of web-based applications. We have many choices on operating systems at present, such as Windows, MacOS, Linux, etc. In “traditional” software development, making applications perform well on multiple platforms was an arduous task and required a lot of effort and software development resources. Furthermore, a big number of mobile devices introduced every year on evolving platforms, different APIs and environments make cross-platform development entail extensive design and programming

effort. Therefore, web-based Browser/Server (B/S) solution has become increasingly popular, most web-applications just need to focus on the server environment, which largely decreases the development cycle and budgets. Still, performance of web-based application may depend on the web browsers. Fortunately with emerging web standards, the developers could almost ignore or easily handle multiple browsers.

2. The web-based server application software needs a center site to handle traffic of thousands of concurrent users. There is no need to distribute the web-applications. All application logic is located on the server in contrast to traditional approach where there is a need to distribute our software to the users' machine first. Client side processing such as Javascript are increasingly standardized on most platform.
3. Easy to administrate. Since web server applications are normally located in the server side, most users would just be "naïve" users of the application and the maintenance and management tasks of the applications would be handled by the system administrators and software developers.
4. Immediate update in case of release of new versions. Web-application developers just need to update the server end software to provide all end users with the newest version.
5. Web applications are portable and can be accessed from anywhere. The users could access the web-application wherever there is a connection and a web

browser. Since the users don't need to install anything in the client system, they could use the application from any browser running on almost any platform from any part of the world.

6. Centralized data. Since the data of the web-application could be shared and maintained at the server site, it is easy to manage and handle the security issues.

A Conference Management System (CMS) is an application that supports the organization of most academic conferences. It helps the program chair(s), the conference organizers, the authors and the reviewers in their respective tasks [10]. A typical CMS normally supports at least 6 basic user roles: participant, Author, Reviewer, Program Committee, Program Chair and Administrator. Support of management functions for each basic stages of academic conference is also required. CMS requires intense user communications and immediate information sharing. Hence most CMS are web-based. We will discuss three well-known existing CMSs: ConfTool[11], EasyChair[12], OpenConf[13] and compare them with ConfSys2 from aspects such as: supported functions and workflow/processes and supported user roles. Following is a list of common requirements from the above perspectives aspects: [10]

- Support of paper submissions (PDF upload, collection of bibliographic metadata)
- Anonymizing submissions
- Collecting reviewers' topic preferences
- Collecting data to determine conflicts of interest
- Assigning reviewers to papers

- Disseminating submissions to reviewers
- Collecting reviews
- Monitoring review coverage
- Sharing reviews among the concerned program committee members
- Ensuring independence of reviews (ensuring that the reviewers cannot see other reviews for a submission before they have submitted their own)
- Providing a per-submission discussion forum for the reviewers
- Ranking reviews and setting acceptance threshold
- Anonymizing reviews
- Reporting reviewers' comments and program committee decision to authors
- Collecting final accepted versions of papers
- Registering attendees
- Publishing proceedings

2.1.1 ConfTool

As a widely used CMS which has supported more than 200 events, ConfTool is developed by Harald Weinreich since 2001 based on another popular combination of web application development techniques: Apache + PHP + MySQL, it could also run under Microsoft IIS server. There are two versions of ConfTool: VSIS ConfTool which is an open/shared system, the owner could offer free VSIS ConfTool license to the conference organizers who want to organize non-commercial conferences with less than 150

participants; another version could support commercial conferences without participant number limit, the cost depends on the size of the event.

In the supported user roles aspect, besides 6 most common roles in academic conference: Author, Normal User/Participant, Reviewer, Conference Admin, Conference Chair, Program Committee, ConfTool support roles like Co-Author, Presenter, Meta Reviewer, Conference Assistant and Front Desk user. Meta Reviewer could access all the reviews within particular conference; Conference Assistant has part of the functions of Conference Chair.

ConfTool could support major functions required to manage each step/process of an academic conference. Such as online submission of papers, bidding for reviews (paper auction), allocate paper to reviewers based on biddings and interests, submission and administration of reviews, mailing systems, participant registration management, fee payment management and administration of final uploads. One particular function supported by ConfTool is Program Committee (PC) online meeting.

One distinguishable feature of ConfTool is that it could support multiple languages, that means users of ConfTool could switch between different languages easily and fast. This is one aspect that ConfSys developers may consider in future work.

Another strong point of ConfTool is it provides some demo sites and plenty of guide documents to help users familiar with the system from both organizer and participant perspective.



Nouveau Compte	English	Deutsch	Español	Français
--------------------------------	-------------------------	-------------------------	-------------------------	--------------------------

Gestion de conférence ConfTool

Veuillez vous connecter pour pouvoir

- vous enregistrer en tant que **participant à la conférence**,
- **soumettre une contribution** ou
- **accéder aux documents en évaluation**.

Si vous ne l'avez pas déjà fait, créez maintenant votre compte personnel.

Connexion

C'est votre première visite ?

[Créer un nouveau compte](#)

Utilisateur déjà enregistré

Nom d'utilisateur: · [Identifiant oublié ?](#)

Mot de passe: · [Mot de passe oublié ?](#)

Figure 2.1 ConfTool Interface with Multi-Language Support

2.1.2 EasyChair

EasyChair is a free CMS developed by Andrei Voronkov since 2002, and was used in International conference on Logic for Programming Artificial Intelligence and Reasoning LPAR [14] in 2003 which was chaired by Voronkov himself. EasyChair is a more widely used CMS, as the author said “It is currently probably the most commonly used conference management system”.

Instead of installing and configuring a local copy of EasyChair, users of EasyChair just need to fill an application form to request using EasyChair for their conference. If the request is approved, instructions to initialize a new conference hosted at EasyChair

Server will be sent to the user, they just need to follow these instructions to setup their conferences, although the basic part of EasyChair is free, some "Premium services" such as helpdesk service require a fee payment.

The current version of EasyChair support following functions:

1. Program Committee Monitor and Management.
2. Interest management and interest conflict detect.
3. Paper submission;
4. Paper allocation based on interests of PC members;
5. Reviews management.
6. Reminder/email management.;
7. Discuss/debate between reviewers and authors.
8. Automatic preparation of conference proceedings

Three main groups defined in EasyChair are chairs, reviewers and authors. Chairs could access program committee management functions.

A remarkable feature of EasyChair is it could support multiple track conferences; this is also a new feature in Confsys3. This feature enables different PC groups to exist in one event.

In the latest version, EasyChair could customize the language in paper submission page to provide users different languages in the paper submission process. However the whole system doesn't support multi-language.

Disadvantage of EasyChair is its functionalities. Some functions like paper auction, fee

payment management, session management are not included in its basic version, although this makes its interface more easy to use.

2.1.3 OpenConf

Just as ConfTool, OpenConf is a CMS based on PHP + MySQL + Apache [15] [16] [17]. It was developed by Zakon Group [18]. Two editions of OpenConf are available online: Community Edition which is free and Professional Edition which will cost \$275 for license.

The functions and features supported by the Community Edition include Paper Submission Management, Paper Auto Allocation, Paper Review Management, Email Reminder, At-a-Glance Status Summary, UTF-8 Compliant, Submission CAPTCHA (Completely Automated Public Turing test to tell Computers and Humans Apart), upload file type check and it could also support multi-language.

The Professional Edition provides additional functions for users such as PC Debate, Paper Auction, Online Proceedings, Online Session Arrangement, Multiple Acceptance & Submission Types.

The interface of OpenConf is quite simple in spite of the basic features are easy to use; this and its local free copy is why thousands events all over the world have used OpenConf as CMS software.

Users could not only download OpenConf package and install it on their own servers but

also use the OpenConf host and pass the software configuration and maintenance work to the software provider, in this case, conference manager/organizer could focus on the organizing job without concern about the technical issues. However, this is not free.

Mult-Language support in author and review pages is a new feature in latest version of OpenConf (available from version 4.10), user could download translation files (PO file) from OpenConf web site to enable translation, in addition to English, eight PO files for other languages are available now and both the existing PO files and new PO files for additional language are provided by the developers and users of OpenConf. We could reasonable say that, Mult-Language support is gradually becoming a necessary feature for CMS that is widely used to host international conference, and to support local conferences in various parts of the world.

2.2 ConfSys2

In this section, the previous version of ConfSys – Confsys2 will be introduced in detail. We will discuss about its history, relation and effect to CINDI system, supported user roles, features and design logic.

2.2.1 History of CINDI System and ConfSys

Since ConfSys is a sub-system of CINDI System, so before describing ConfSys, its motherboard - CINDI System should be discussed.

The Concordia INdexing and DIScovery System (CINDI) was conceived by Dr. B.C.Desai in 1994 [19]. CINDI System is considered to be a system that allows users to search and access academic resources situated on the internet. It uses both the pull and push paradigm to acquire academic resources especially documents via the internet by implementing CINDI Robot System and CINDI Registration System, and it enables users to access acquired resources easily and speedily by providing a efficient indexing structure and building an expert system-based bibliographic system including a search system using standardized control definitions [3][19]. CINDI System, shown in figure 2.2 consists of a number of sub-systems to perform the different tasks:

- Conference System (ConfSys) is an advanced CMS which: helps academic conference organizers to manage their meetings and collect academic resources from selected conferences for the CINDI System. ConfSys could also be used as an online journal management software to enable editors to publish and manage their journals' submissions, review, debate and final version collection online. The actual publishing being handled by the CINDI system.
- CINDI Robot, using pull paradigm to collect academic resources such as papers, articles, etc., over the WWW.
- Gleaning sub-system includes a File Conversion sub-system (FCS) and a Document Filtering sub-system (DFS). These sub-systems process and filter the files of academic resources and convert non-standard file format (Latex, HTML, text, doc, RTF) to system standard file format (PDF).

- Automatic Semantic Header Generator (ASHG), automatically extracts the bibliographic metadata of the resources; this includes information regarding the title, abstract, author information, subject headings abstract and keywords.
- CINDI Registration and Upload sub-system, acquire academic documents using push paradigm. Here an user, wanting to contribute a resource sign up as author and submit her/his contribution as well as its bibliographic information.
- Search sub-system, provides an easy and fast way to access digital library documents to users and provide precise result by using combination of search criteria.
- Annotation sub-system, allow readers to share their comments of an item retrieved from the digital library of documents.

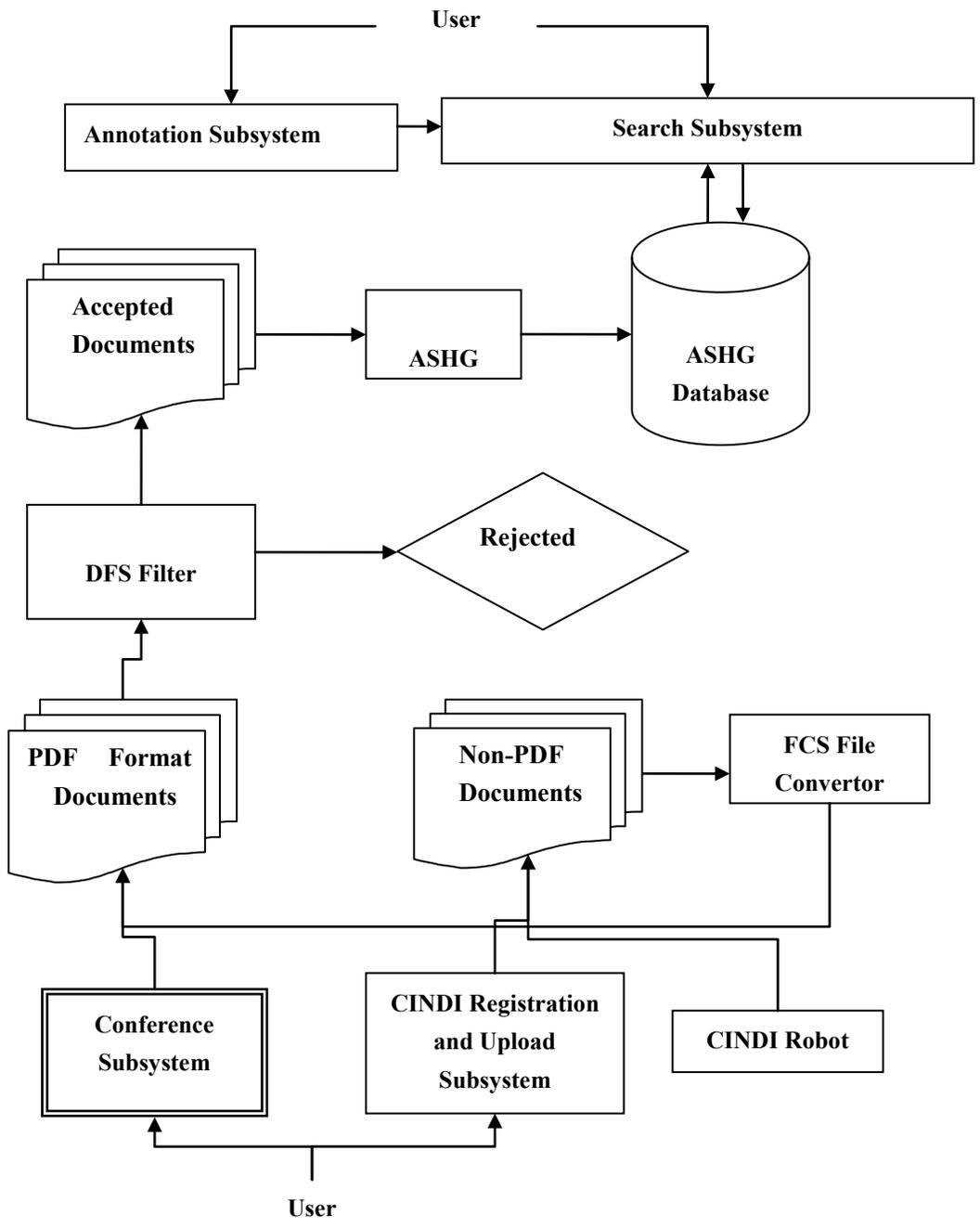


Figure 2.2 Sub-Systems in CINDI System

As an important component of CINDI System, ConfSys is a CMS to host academic

events and process academic documents acquired for the events to get the required information and corresponding copyright forms for the CINDI System. ConfSys was built by Dr.Desai in 1996 [4] on ODE (Object Database and Environment) [20]. It is used to host conference such as IDEAS [21] and C3S2E [22] since 1999 and continue evolving with practical conference organizing experiences. Since 2003 its platform has changed to JAVA/JSP + MySQL + Tomcat and based on classic Three Tier Web Application mode [23]. The current version in use is ConfSys2.

ConfSys also has the ability to working as a standalone CMS without a tight coupling with CINDI System, although in this way it will lose the publishing feature.

2.2.2 Features of ConfSys2

ConfSys2 is a complex CMS developed by many developers in Concordia University and including Min Huang [5] under the supervision of Dr. Bipin. C. Desai. It provides supports to most participant roles in different processes of academic conference. It also coordinates these processes to perform the management task and thus help in the management and holding of an academic event by taking over and automating all routine tasks.

Conference processes supported by ConfSys2 include: Call for Paper (CFP), Paper Submission, Paper Auction/Bidding Process, Automatic Paper Allocation followed by an optional manual tune up, Paper Review, Review Debate, Paper Decision, Registration,

Final Version Upload, Copyright form and Slides Upload, Session Arrangement and Session Support.

The major roles and their functions supported by ConfSys2 :

1. *Registered Users/Participants*: Users who sign-up for ConfSys are considered as registered users: once they complete their profile they are considered as normal users. Only normal users can be assigned one of the roles given below. A normal user could submit a paper during the CFP Period for any event and be able to access Conference news and session information published in the system.
2. *Administrator (Admin)*. Admin is in charge of the maintenance and security of entire system and could use any functions in the system. Some functions such as modify user profiles, reset user password, maintain system database, monitor system log and refresh/reset system menus/templates could only be accessed by the Administrator.
3. *General Chair (GC)*. GC could use all the management functions for a specific conference series. In ConfSys2, GC has the highest privileges. ConfSys2 provides the following functions to the GC: paper progress management, paper allocation management, user group management, paper auction review management, public message management, paper decision, optional registration management, and automatic-email-reminder sending management.
4. *Program Chair*. Program Chairs' responsibility is to manage specific events

under a conference series. They have the following functions: paper management, paper allocation management, paper decision, and public message management. Usually a Program Chair is assigned by the General Chair for specific event.

5. *Program Committee (PC)*: The main duty of PC members is reviewing the assigned papers and debating the reviews. The review result will be the basis for Program Chair or General Chair to make acceptance/rejection decisions for the papers. In ConfSys2, following functions are implemented for PC members: Paper Auction/Paper bidding, Papers Review, Blind Review Debate and re-assign a paper to another PC members or a normal user to review it.

6. *Reviewer*: Basically reviewer is a normal user to whom one or more papers has been assigned by a PC member or one of the chairs. She/he has the same functions as the PC members, but can't receive some reminders and information from the system.

7. *Authors*: All normal users are considered as authors by ConfSys and could submit one or more papers during the CFP time period. However only those users who have submitted at least one paper to an event managed by ConfSys2 would be able to access the paper management functions for the event. Such users could access paper management functions such as: edit submitted paper; add another author; change author type for existing authors; upload new version or copyright form for submitted paper. Authors could receive paper related reminders from

ConfSys2. Two sub-groups are defined for authors: Author with Accepted Paper and Author with Rejected Paper, these sub groups facilitate some management tasks. Once a paper is accepted or rejected, the authors of this paper will be put into corresponding sub group, extra reminders will sent to the right sub-group. For a paper, four author roles are defined: Contact Author, First Author, Author, Co-Author. Additional authors could be added by the user who originally submitted a paper. A Co-Author doesn't need to be ConfSys registered user and was introduced to complete the list of authors for a submission. ConfSys requires email address and name of a Co-Author. There is an optional feature which allows blind communication between an author and a reviewer. The GC may disable it for conferences, but it is mandatory for eJournals.

In addition to the above functions ConfSys2 has implemented some extra features:

- Daemon System to perform routine tasks such as send reminders, update DBLP[24] data to avoid conflicts in reviewer assigning and automatically allocate papers.
- Context Sensitive Help System to provide pertinent online help to users.
- Multiple Conference support could easily transfer settings in events series.
- Using HTTPS to secure user data during internet transmission.

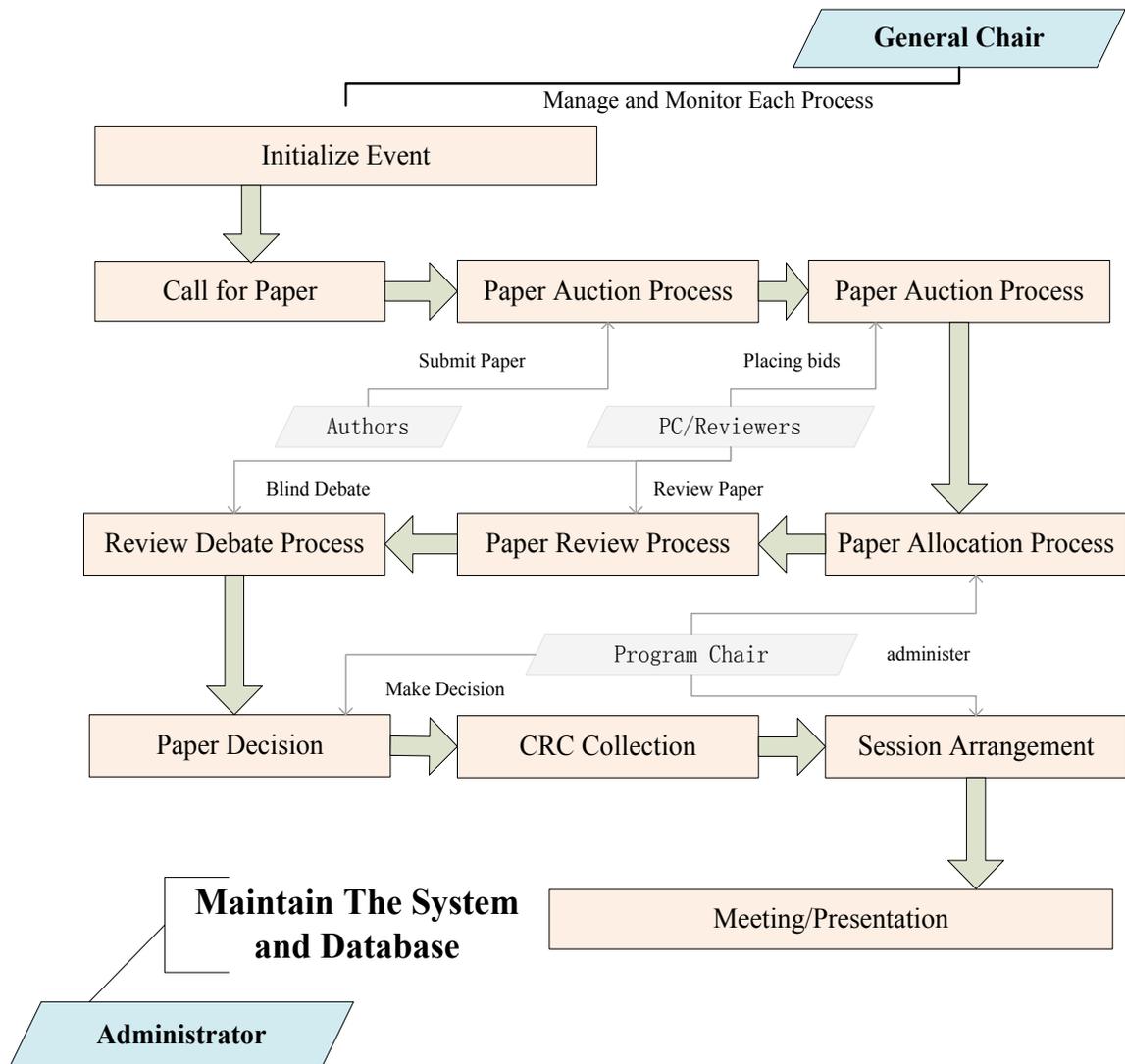


Figure 2.3 Processes and Basic Functions of ConfSys2

2.2.3 ConfSys2 versus other CMSs

From previous sections, we see that all CMS including ConfSys2 have some common features. They share the Browser/Server Mode and Three-Tier Web Application architecture; provide supports of common roles such as Chair, Author, Review etc. Meanwhile, the differences are also noticeable. They choose different web application

development technologies such as PHP, ASP and JSP and also choose different Database and Web Servers.

In table 2.2.3.1, we compare these CMSs with the functions using features list given in section 2.1.

Features and Functions	Conference Management System			
	ConfTool	EasyChair	OpenConf	ConfSys2
Paper submission/upload	✓	✓	✓	✓
Manual Paper Allocation	✓	✓	✓	✓
Paper Automatic allocation	✓	✓	✓	✓
Auto Reviewer Conflict Check			✓	✓
Paper Review	✓	✓	✓	✓
Monitoring review progress	✓	✓	✓	✓
Review Discussion	✓	✓	✓	✓
Blind Review Debate	✓			✓
Setting acceptance criteria based on review result	✓	✓	✓	✓
Anonymizing submissions	✓	✓	✓	✓
Anonymizing reviews	✓	✓	✓	✓
Review Feedback to Authors	✓	✓	✓	✓
Uploading final versions	✓	✓	✓	✓
Auto Session arrangement	✓	✓	✓	✓
Session support	✓	✓	✓	✓
Slide/Program package download	✓	✓		✓
Conference Registration	✓		✓	✓
Multiple Conference Management	✓	✓		✓
Multiple track management	✓	✓		
System maintenance management	✓	✓		✓
Group based role function management				✓
Auto Publishing Call for Paper Message				✓
Auto allocation match rate report				✓
Participant Registration (fee payment) management				✓
Conference news message management				✓
Combined Internal/External Email System				✓
Dynamic review options setting				✓
Event Customization				
Grace period for CFP				
Black-list User				

Table 2.1 Compare ConfSys2 with Other CMSs

From the above we could conclude that ConfSys2 already has numerous functions as a CMS. Although we could still add useful features such as multi-language support, CAPTCHA etc, at most time the functionality of ConfSys2 is an advantage when comparing with other CMSs, especially after integrate with CINDI System. But as stated in section 1.2, usability is a vital challenge for ConfSys2. Since ConfSys2 has more functions, its interface is more complex than CMSs such as OpenConf. Also, other CMSs could provide customization service which is missing in ConfSys2. Addition of customization would allow ConfSys to be more widely applicable.

These features are discussed in the following chapter.

Chapter 3

Addressing the Challenges

3.1 Overview

As discussed in previous Chapter, ConfSys2 is already a mature CMS with strong functionalities not found in other CMS. Nonetheless it still has plenty of room for improvements with new requirements from its wider usage from other disciplines. The objective of the latest version -- ConfSys3, a morph of ConfSys2 into a CMS what we believe would have excellent usability, flexibility, extensibility, large number of powerful functions and ease of customization.

As discussed in Chapter 1, there are two major challenges for ConfSys2: usability and customization. In this chapter, we will discuss some enhancements that have been made in ConfSys3 to improve the usability issues.

Usability is defined by International Organization for Standardization (ISO) as "The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use." [25] It is reflected by the time that users spend on using and learning a software. According to the framework suggested by usability consultant Jakob Nielsen and Computer Science professor Ben Shneiderman, usability is a part of "usefulness" and is composed of the following five aspects [26]:

- Learnability: How easy is it for users to accomplish basic tasks the first time they

encounter the product?

- Efficiency: Once users have learned the product, how quickly can they perform tasks?
- Memorability: When users return to the product after a period of not using it, how easily can they re-establish proficiency?
- Errors: How many errors do users make, the severity of these errors, and how easily can they recover from the errors?
- Satisfaction: How pleasant is it to use the product?

There are many methods to evaluate the usability of software, fortunately ConfSys2 has a large number of users and is used to host a number of events every year, therefore, we could simply use the inspection method by observing the users and analysing their feedbacks, unfortunately, the result is not quite positive.

While we are putting our effort on building more advanced features for ConfSys, taking into account the comments and queries received from users of recent events supported by ConfSys2, the most common one was the difficulty faced by some users to perform some tasks and queries about use some functions provided by the system. Most of these questions were come from normal participants of events.

Usability and functionality should be complementary characteristics of software, but often a large number of functions and constraints could impose a steep learning curve and create problems. Constraints imposed by ConfSys are not seen in other CMS and may cause users familiar with other CMS systems to adapt to ConfSys or difficulties in

understanding the purpose of each function. There is an additional issue between usability and functionality in our system; for example when we provide some new features to one group of user, e.g. merge events such as workshops with the main event to facilitate the tasks for the final phase of these events, some users may be confused when they are directed to the site where the workshop is merged with the main events. The other problem stems from the fact that many users don't access the context sensible help pages to get useful information when they have difficulty in using ConfSys. ConfSys2 now is a complex system with novel functionalities, but there is still much room for improvement in both functionality and usability. However, it is a mistake to suppose that design features intended to enhance usability are niceties to be provided at the designer's whim, and that if a trade-off is to be made it should be made in favor of functionality while sacrificing usability. There is increasing evidence that the effective functionality of a system depends on its usability. [7]

In ConfSys3 our main objectives is to improve users' experience when using the system while providing increased functionalities. In this chapter, our main focus is on the work to improve usability by enhancing interface for the normal users. We will also discuss some functions and features aimed at improving usability for the event organizers managers and system administrator. This chapter presents our enhancements of existing features of ConfSys2; we will introduce new concepts and functions introduced in ConfSys3 in the next chapter.

3.2 Usability Drawbacks and Enhancements

We could categorize the negative feedbacks for ConfSys2 into two major categories:

1. Some functions seem to be difficult to find for some novice users. For example some users told us that they can't find the button to submit/register papers, or review an allocated paper. Commonly, cause of this problem is that ConfSys is a concurrent multi-event system and users do not realize that they should change to the correct event to access its functions.
2. To perform some operations or gather some required information using ConfSys2 in the view of some users, consume too much time or need too many steps. For example a program chair must make sure the final versions that have been uploaded by the authors are within the page limits imposed by the publishers of the event; the PDF file for the paper has been produced on the correct paper size (e.g., U.S letter size) and the file has embed all necessary fonts for access correctly by all readers. These tasks would require the program chair to manually verify all final versions, a time consuming task. If the final version does not meet such requirements, the organizer is required to communicate with the authors to ask them upload a revised version of their paper file. Another cause for delays.

Feedback of the first category above indicates that users may need to spend too much time to learn to use our system; it also indicates that the interface of ConfSys needs to be

more intuitive.

Feedbacks of second category relate to the efficiency issues. It shows the opportunity to improve, combine and automate a number of tasks and provide interface for some users to easily access required information. In general, the challenge here is to provide the same functions in better ways.

We have used four major methods to improve usability based on users' feedbacks:

1. Provide more concise and precise messages to inform users to perform a function or the next step.
2. Reduce the number of options in a specific time period; these options include buttons, menus and choices in pull down menus; this would allow users to complete the task quickly.
3. Perform some tasks automatically. This will effectively reduce the workload for some users and improve the response.
4. Provide a better interface to represent information, like using intuitive graphs, fonts and making necessary categorization and summarization.

We elaborate on these in the following sections.

3.2.1 Intelligent User Navigator

As discussed above, in ConfSys2 we found that some users may have problems to find buttons or menus to trigger functions they want to perform. In most cases, this is not

because they don't have enough privilege to perform this function, but because they switched into the incorrect event or tried to do the operation at the wrong time period. Since all functions in ConfSys are associated with an event and accessible only during a precise time window, this is a common problem. Hence it is not sufficient to improve the interface of some functions; we need to provide a better guide to the user.

In ConfSys2, we already built a context-sensitive help system, that is, we offer different help contents for different pages. Users could access suitable help messages by simple clicking on the [Online Help] button as illustrated in Figure 3.1.

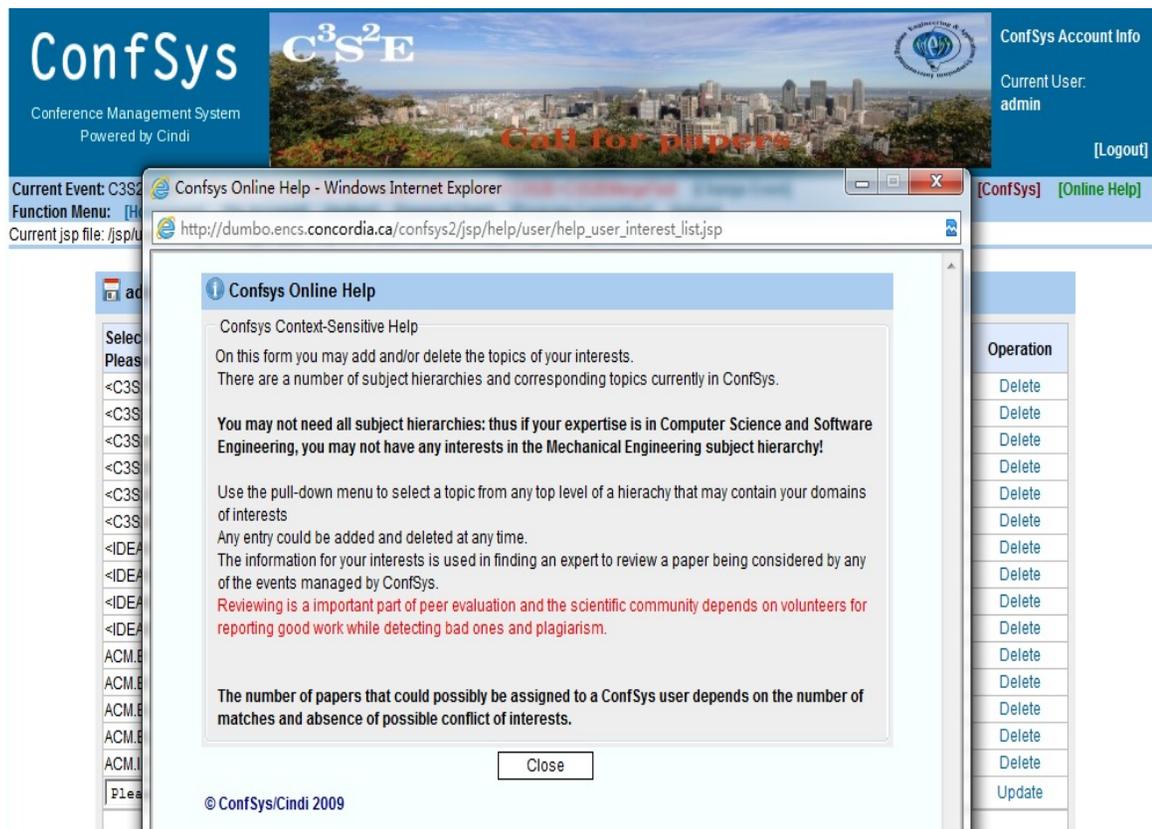


Figure 3.1 Context Sensitive Help of ConfSys2

However, from our practical experiences, we found that a great number of users don't

read these help pages even when they encounter problems while using the system. A majority of users having used other CMSs, expect similar operations and seem unwilling to spend the time to explore and get familiar with the system. We have received many queries and comments but not one about the shortcoming of our context sensitive help pages.

ConfSys2 is a CMS that runs as a single Tomcat instance and support multiple series and multiple events. Unlike ConfSys where each event had its own sign-up, user ID and password, in ConfSys2, all past events for conference and journal series are accessible by using a single user ID and password. In order to support multiple conference series, user functions that could be accessed in each event are determined by the groups that a user belongs to. Each event has its own groups and group membership. For example, a Program Chair of IDEAS'11 may not have the privilege to access the "Paper Decision" function in IDEAS'12 if he/she is not a Program Chair of IDEAS'12. Also, every event follows a fixed process and user functions are only available during a specific time period. Hence, to access a specific function provided by ConfSys, a user must be in the correct event environment at the correct time period. Security constraints dictate no function could be accessible at a random time and without choosing the correct environment.

We have concluded that it is not possible to make the interface as simple as that of a single event based CMS, but we try to guide the users to the appropriate event.

Our solution has three steps:

1. Check the status of the users for each event and show the most possible event links or buttons and display these prominently.
2. Record the last environment for each user, so that on the next log-in the system restores this environment.
3. Display and highlight necessary navigation information prominently.

For example, some users may not be able to navigate to the correct event on first log-in. Therefore as shown in figure 3.2, at the top of the current news frame, ConfSys lists all possible past and current events and provide information about the user's role in these events. When one of these events is chosen, the system will switch the environment to this event and store this choice for the next login.

The screenshot displays the ConfSys homepage with the following sections:

- Header:** ConfSys Conference Management System Powered by Cindi. C³S²E logo. University of Concordia logo. ConfSys Account Info: Current User: admin, [Logout].
- Navigation:** Current Event: Test-Conference>2007p - Pl. note: this event is now merged with the event Test-Conference>2007 [Change Event]. Function Menu: [Homepage] [My Account] [Author] [General Chair] [Program Committee] [Admin].
- Upcoming Dates:** [Milestones]
 - CFP due date 2012-02-04
 - Call for paper deadline is 2012-02-04
 - Paper Auction Start 2012-02-02
 - Paper Auction will Start at 2012-02-02
- Events:**
 - Test-Conference>2007p
 - From 2011-04-13 to 2012-04-13
 - Test-Conference>2008
 - From 2011-04-09 to 2012-04-09
 - Test-Conference>2009
 - From 2011-04-09 to 2012-04-09
 - Test-Conference>2010
 - From 2011-04-09 to 2012-04-09
 - Journal-Test>Issue09
 - From 2011-04-09 to 2012-04-09
- Other Information:**
- Conference News:**
 - To navigate to any event listed here, click on the event name.
 - Your Current Events:
 - Test-Conference>2009
 - Test-Conference>2010
 - Journal-Test>Issue09
 - Journal-Test>Issue10
 - Journal-Test>Issue11
 - Test-Conference>2011
 - Your Past Events:
 - Test-Conference>2007p - Pl. note: this event is now merged with the event Test-Conference>2007
 - Test-Conference>2008
 - Journal-Test
 - Test-Conference
 - For events not shown above, use the [Change Event] button to navigate to the event
 - Test-Conference>2007 (1970-01-02)
 - Test-Conference>2007 is from 2011-04-09 to 2012-04-09.
 - Call for paper session is from 2011-04-09 to 2012-01-31.
 - The event Url is: <http://localhost/ConfSys2/servlet/WebPanel?op=chconf&confid=11>
 - The program committee members are listed here.
- Useful Links:**
 - C3S2E Archive
 - IDEAS Archive
 - Search Engine
- Sponsors:**
 - acm
 - Phi
 - Concordia University
 - ConfSys.org
 - Your logo here!

Figure 3.2 Guide Users in Homepage

We intend to display the users' roles for each event, but due to the large amount of server resources required to do this for each of the hundreds of concurrent users, we have not enabled it currently. ConfSys now displays the information about the upcoming milestones to notify of the stage of the currently chosen event as illustrated in Figure 3.3.

Milestones	
Start of submission:	2012-02-15
Deadline for submission:	2012-02-19
Start of Auction:	2012-02-19
End of Auction:	2012-02-20
Start of Review:	2012-02-27
End of Review:	2012-03-07
Debate start:	2012-03-07
Debate end:	2012-03-09
Decision date:	2012-03-11
Upload of Final Version of paper - start:	2012-03-12
Upload of Final Version of paper - deadline:	2012-03-08
Uplaoding of presnetation slides - start:	2012-03-08
Upload of Final Version of paper - deadline:	2012-03-07
First day of meeting:	2012-03-08
Last day of meeting:	2012-03-09

Figure 3.3 Milestone Notice

3.2.2 Limit Options for Users

Another way to make ConfSys easy to use is to reduce the options for users in a specific environment. Research shows that for a web application, if a user has more than 15

options in items as drop-down list, it will result in a poor user experience [27]. When a user faces too many choices and contents in a single page, it may be hard to decide where to click in a short time. Unnecessary buttons may also confuse the users.

Our solution includes two aspects:

1. Aggregate options. In add author function, when a user has submitted a new paper and wants to enter the co-authors, instead of adding all co-authors at once, we provide a mechanism to insert each co-authors in a step by step manner. Since we have found that not all co-authors have signed up for ConfSys and completed their profiles etc. we categorize authors into two main types: first we offer a choice of either a co-author who is already a normal user of ConfSys or one who has not yet signed up as illustrated in Figure 3.4a and 3.4b. Once choice is made, text boxes to enter the details of the new author corresponding to two categories would be shown as illustrated in Figure 3.5a and 3.5b. If the new author is new ConfSys User, the system will require the country information of this new author first, once the country is selected, ConfSys will give a form to require further information for this author, the organization drop down list will contain organizations corresponds to country of the new author. In this way the submitting author follows the system instruction to complete the required form fields for each co-author. The reason for collecting this information for co-authors is to enable a more secure resolution for the auction and automatic allocation process.

Author List (An author must be a registered user of confsys, and the profile must be properly set)		
1	Contact Author	Kunsheng Zhao (Qingdao University of Science and Technology, China) Delete
Add A New Author : -- Please select new author type --		
ConfSys Policy: Existing ConfSys User New ConfSys User		

Figure 3.4a Add Authors Steps 1 (Existing ConfSys User)

Author List (An author must be a registered user of confsys, and the profile must be properly set)		
1	Contact Author	kunsheng zhao (Concordia University, Canada) Delete
Change Author Type : New ConfSys User Country of New User: ----- Select Country ----- Add		
<p>Note: New User:coauthor entered here does not have all privileges until s/he complete her/his profile and interests. ConfSys will send an email to this person.</p>		

Figure 3.4b Add Authors Steps 1 (New ConfSys User)

Author List (An author must be a registered user of confsys, and the profile must be properly set)		
1	Contact Author	Kunsheng Zhao (Qingdao University of Science and Technology, China) Delete
Change Author Type : Existing ConfSys User Add		
Add New Author: Email user1@user1.com FirstName User1 Author Type: Author		
<p>Paper Subjects List</p> <ul style="list-style-type: none"> Author First Author Contact Author 		

Figure 3.5a Add Authors Steps 2 (Existing ConfSys User)

Author List (An author must be a registered user of confsys, and the profile must be properly set)		
1	Contact Author	kunsheng zhao (Concordia University, Canada) Delete
Change Author Type : New ConfSys User Add		
Add CoAuthor(New ConfSys User): Email: user1@user1.com Author Type: New User:coauthor		
FirstName: author MiddleName: LastName: author		
Organization: Concordia University		
<p>Note: New User:coauthor entered here does not have all privileges until s/he complete her/his profile and interests. ConfSys will send an email to this person.</p>		

Figure 3.5b Add Authors Steps 2 (New ConfSys User)

2. Make buttons and contents context sensitive. This means some buttons will be displayed only when needed. We try to predict the most appropriate contents that

user needs to see, and show this part to users; however if needed the user could choose to see additional details. For example, Figure 3.6 shows the paper progress monitor page for the program chair, it has three possible configurations chosen by a pull down menu – Reviewer Reviewing Progress, Paper Uploading Progress and Paper Auction Progress. Consider the various status of the papers for an event, once the CFP is over, the program chair needs to monitor the paper auction process during the auction period; the review progress during the review period; and once the decision is made, would want to see the final version and copyright form upload progress. Since only one of these could be the current stage, ConfSys automatically shows the pertinent data. For an event that has multiple tracks, the program chair can choose all the papers or those pertaining to a given track.

Id	Paper Title	Versions Uploaded	FinalVersion Uploaded	CopyRight Form Uploaded	Slide Uploaded	FinalVersion File Info	Decision	Registered
8	admin paper2 Author: Kunsheng Zhao	1	✓	✓	✓	20 pages 595.32 x 842.04 pts (A4) (FE)	Poster	Yes
7	admin paper1 Author: Kunsheng Zhao , tester1 tester1 , First M Last	1	✓	✓	✓	1 pages 1279.5 x 790.5 pts	Short	Yes
6	Zks-Test Paper III Author: zks k s , newuser2 newuser2	1	✓	✓	✓	1 pages 612 x 792 pts (letter)	Short	Yes

Figure 3.6 Paper Uploading Progress

3.2.3 ConfSys Built-in Tasks

One of the drawbacks of ConfSys2 is that it requires a lot of efforts to perform some operations. An example mentioned earlier is to inspect the Final Version of papers to verify if they satisfy the requirements of publisher or CINDI digital library. Thus the Program Chair needs to know the numbers of pages, the size of pages and to ensure that the fonts used in the papers are embedded in the PDF file. As shown in Figures 3.6, we have automated this function in ConfSys3, and the content of this page is automatically updated when an author uploads the final version of an accepted paper. If the number of pages in the uploaded PDF file for the paper exceeds the limit or if the file format produced is not in the required size the information about it would be displayed in red color. The page limit could be set in the event configuration.

If ConfSys is configured to collect the copyright forms required by the publishers and hence would require authors to upload the copyright form. This form needs to be inspected, unfortunately, manually. However, instead of communicating problems with the author by manually sending an email, we have the system automatically send an email to the author when the form does not have the required permission and/or signature. Also if a copyright form has not been verified, it will be shown using a yellow tick, and once verified, it will be shown in red if there are problems else in green.

ConfSys2 has an auction period where program committee members indicate their preference for papers they would like to review. However, our experience shows that a large majority of these members do not participate in the auction. When the system does an automatic allocation, there may be a need to complement this procedure by a manual

adjustment. In this task, with hundreds of papers and a large program committee, the task is daunting. This task has been simplified in ConfSys3 and illustrated in Figure 3.7. Here the system analyzes the topic of the papers under consideration for manual allocation. It shows all the current reviewers assigned and suggests additional reviewers who have a match in their expertise and the topic of the paper with no conflict of interest.

Paper Allocation Detail Information
Back to Paper Allocation

Reviewer tester1 tester1 (University of Burundi, Burundi) has been removed from this paper.

Maximum Paper Number for Each PC is : 8. Maximum PC Number for Each Paper is : 4.

Paper Information

Paper Title	Test Paper Title 1
Paper Abstract	Test Paper Abstract 1
Author	[Contact Author] FirstName M LastName (Concordia University, Canada) [First Author] Test Author 2 (Concordia University, Canada) [Author] Test Author 3 (Concordia University, Canada) [Author] tester1 tester1 (University of Burundi, Burundi)
Paper Subjects	[<C3S2E>.06] C3S2E::Bioinformatics [<C3S2E>.07] C3S2E::Compiler theory [<C3S2E>.17] C3S2E::Cryptography

Allocated Reviewers

Id	Reviewer Info	Download Date	Mark	Operation
1	(Bid High)newuser2 newuser2 (Adam Mickiewicz University of Poznan, Poland)	-	-	Delete

Reviewers: 1. zks k s (University of Health Sciences Antigua, Antigua and Barbuda) Allocated Papers: 2

PCs: --- MATCH of the expertise of PC memeber and topics of paper and NO possible conflicts of interest. ---

--- MATCH of the expertise of PC memeber and topics of paper and NO possible conflicts of interest. ---

1. zks k s (University of Health Sciences Antigua, Antigua and Barbuda) Allocated Papers: 2

--- MATCH of the expertise of PC memeber and topics of paper BUT possible conflicts of interest. ---

1. General Chair (Concordia University, Canada) Allocated Papers: 0

--- NO match between expertise of PC memeber and topics of paper AND possible conflicts of interest. ---

1. Peter Steve (Constellation Software Inc., Canada) Allocated Papers: 0

---NO match between expertise of PC memeber and topics of paper however NO possible conflicts of interest! ---

1. W K (University of Health Sciences Antigua, Antigua and Barbuda) Allocated Papers: 0

1. C3S2E::Algorithms

Allocate
Allocate

Copyright © 2009 CINDI SYSTEM

Figure 3.7 Intuitive Prompt in Paper Allocation Page

In the allocation page showed in Figure 3.7, we are using two criteria to match the papers and Program Committees (PCs)/Reviewers automatically:

1. Match between PCs' expertise and topics of the Paper.

2. If there is conflict of interest between PCs/Reviewers and current paper.

To establish a conflict of interest, we check the information provided by the user, as well as the bibliographic information such as the one provided by the online DBLP data.

After finishing above tasks, ConfSys3 will display the different types of matches of PCs and Reviews with different color:

- Using green color for the Program Committees (PC)/Reviewers that match the topics of this paper with their expertise and no conflicts between this PC/Reviewer and any author of the paper.
- Blue for those PCs that match the topics of the paper but there could be a conflict of interest.
- Red to indicate the existence of a conflict of interest and no match between PC's expertise and any topic of this paper.
- Black indicates no conflict of interest but no match between PC's expertise and any topic of this paper exists.

This information generated by the system makes the task of manual tune up of the allocation process much easier.

3.2.4 Interface and Information Presentation Improvement

As mentioned in previous sections, we need to use some better ways to represent

information more efficiently and intuitively to the users for the interfaces of some functions. In ConfSys3 different methods are used to achieve this purpose.

The first one is using intuitive colors and graphs. As illustrated in Figure 3.6 and Figure 3.7 we use different colors and simple graphs to represent the information about possible candidates for review and status of PDF files.

Another way is to provide brief summaries of useful information. For example in paper management page, the Program Chair is often concerned about the numbers of papers in different categories, and numbers of authors with accepted or rejected papers. So we automatically make a brief summary and display these in the proper position. For example, Figure 3.8 display the summary information for the papers in an event in the paper management page; this summary include the number of authors, number of papers/displayed papers, number of authors with accepted paper and number of authors with rejected paper.

Conference Paper List		
15	items / page	<input type="text"/> <input type="button" value="Search"/> <input type="button" value="Show all papers"/>
Page 1 of 2 1 2		
Information for accepted papers: To see information for all submitted papers press 'Show all papers'		
Number of Authors: 40 Displayed/Total papers: 15/20 Number of Authors with accepted paper: 27 Number of Authors with rejected paper: 13		
90	Title: ABCD Authors: Kunsheng Zhao	Status: Decision made Decision: Demo
89	Title: author0274 Paper-1 Authors: author0274 author0274	Status: Decision made Decision: Full
88	Title: author0274 Paper-0 Authors: author0274 author0274	Status: Decision made Decision: Full
87	Title: author0273 Paper-1 Authors: author0273 author0273	Status: Decision made Decision: Full
86	Title: author0273 Paper-0 Authors: author0273 author0273	Status: Decision made Decision: Full
85	Title: author0272 Paper-1 Authors: author0272 author0272	Status: Decision made Decision: Full
84	Title: author0272 Paper-0 Authors: author0272 author0272 Authors: user126 user126 , user143 user143 , user133 user133	Status: Decision made Decision: Full
81	Title: author0270 Paper-1 Authors: author0270 author0270	Status: Decision made Decision: Invited

Figure 3.8 Brief Summaries in Paper Management

In addition to the above, in ConfSys3 we provide functions to help users glean information from the system more easily. As shown in Figure 3.9, in paper decision page, we provide Program Chair a function to get the authors with multiple submissions and highlight the papers with the same author.

Paper Decision							
Please click on paper title to see detail information.							
		Choose paper type: All	Search		Choose track: Show all papers		
Id	Paper Title	Reviewers	Lowest Score	Highest Score	Weighted Score	Controversial	Decision
58	test submission	3(4)	3.0	9.5	6.9	Yes	Invited
52	author0141 Paper-1	2(2)	5.5	8.5	6.7	-	
64	A Redesigned Web-based Multi-Conference	2(4)	1.0	10.0	5.5	Yes	
34	author0132 Paper-1	2(2)	1.0	7.5	4.9	Yes	
71	My new paper	0(3)	-	-	-	-	
46	author0138 Paper-1	0(2)	-	-	-	-	
45	author0138 Paper-0	0(2)	-	-	-	-	
44	author0137 Paper-1	0(2)	-	-	-	-	
41	author0136 Paper-0	0(2)	-	-	-	-	
38	author0134 Paper-1	0(2)	-	-	-	-	
37	author0134 Paper-0	0(2)	-	-	-	-	

Authors with multiple submissions: 12. author0138 author0138

Highlight papers of selected author

Figure 3.9 Highlight Multiple Submission Function

3.2.5 Major Internal Mechanism Improvement

Two internal mechanisms have been improved to avoid problems to handle large number of concurrent Paper users and different web browsers.

1. Force client browsers to refresh the HTML header cache every time.

Since different users may use different web browsers to access ConfSys, the cache mechanisms and cache setting are different between web browsers or different version of the same browser. Sometimes, this could cause problems.

For example, when an user is using Internet Explorer (IE, version 5 and later), there are four options in cache setting that is related to how to update local cache: [28]

- **Every visit to the page:** When you return to a page you viewed previously, Internet Explorer should check to see whether the page has changed since you last viewed it. If the page has changed, Internet Explorer downloads and

displays the new page and stores it in the Temporary Internet Files. Note that selecting this option can slow down browsing between pages you have already viewed.

- **Every time you start Internet Explorer:** When you view a Web site that you have visited before in the same Internet Explorer session, Internet Explorer uses the cached temporary Internet files instead of downloading the page. If you press F5 or click Refresh, Internet Explorer re-downloads the page.
- **Automatically** (Internet Explorer 5 and later only): This is the same as the previous setting, but with a logic algorithm to understand the habits of Web page behavior. This setting specifies that when you return to a page you viewed previously, Internet Explorer should not check to see whether the page has changed since you last viewed it.

If you select this setting, Internet Explorer checks for new content only when you return to a page that you viewed in an earlier session of Internet Explorer or on an earlier day. Over time, if Internet Explorer determines that images on the page are changing infrequently, it checks for newer images even less frequently.

- **Never:** With this Option, Internet Explorer does not check the Web server for newer content.

Different users may have different settings, but sometimes IE will not update the local caches even if the pages have been changed and “automatically” option was selected in cache setting. This may occur when the requested page was not changed but the variable

in the user session which is stored in the sever side has been changed, such as current working event, current stages of the current event, etc, therefore, the users may be directed to another page. This will result in some users getting an error response. One of the recorded problems is when a user has changed the ConfSys event, and then selects the Event Configuration function for the changed event; he/she may get the configuration page for previous event rather than the changed event.

To solve this problem, we put some extra code in all our java servlets to change the response HTML header sent to the browser to force it to update the page content from the server every time. We set the “Cache Control” attribute of the response header with values no-cache, no-store and must-revalidate and set the “Expire” attribute in the date header of response to 0.

2. Enforce stricter rules for sharing database connections.

We have added many background auto-execute tasks that need to access ConfSys database; tasks such as analyzing users roles and status, summarize paper and author information. Furthermore the smart daemon of ConfSys2 also performs many jobs such as send reminders, update DBLP data, record user logs in the background. Hence sometimes when there're a large number of users logged in, and some of them are performing some complex operations concurrently, our MySQL Database may report too many connections exception, and reject some users' request as shown in Figure 3.10.



Figure 3.10 Too Many Connections Error

We're using Java/Servlet to build our system and Object-Oriented Programming (OOP) is our programming paradigm. When we create some objects such as UserSet or PaperSet, it needs a connection to the database. A database connector has already been built in ConfSys using the singleton pattern to control the database connection; we could use this connector as a constructor parameter to avoid the need for a new connection each time when we create objects such as PaperSet. After an in-depth investigation the whole system we found that in some servlets or jsp pages, the default constructors without parameter for these objects are used. Due to the characteristics of garbage collection mechanism of Java Virtual Machine (JVM), the operation is performed by a daemon thread called Garbage Collector. Developers cannot force Garbage collection in Java, it will only trigger if JVM thinks it needs a garbage collection based on Java heap size [29]. This means that even if we no longer use some objects, they will exist in the server memory for an uncontrollable time period, and the database connection they use will not be released.

The solution is to remove the default construction to force classes that need a

database connection to use the Database Connector as constructor parameter and also check the whole system to remove any database connection establishment outside Database Connector.

3.2.6 Other Enhancements

A number of other enhancements have been made to improve user experiences without the need to introduce new features.

Some of these enhancements are listed below:

- Improve the paper review interface to make the meaning of each comment and some field more explicit.
- Improve system timeout mechanism to avoid losing user input data.
- Adjust smart daemon to reduce system resource consumption.
- Allow sort content by field values in some management pages, for example allow sort papers by weight in both ascending and descending order in paper management page.
- In fee payment, check currency type automatically and allow users to select items combination to make payment.
- Allow authors to select multiple topics when submitting a paper.
- Allow authors using any character in paper titles, including escape character in HTML or MySQL database.

3.3 Conclusion of the Enhancements

In this Chapter we discussed the major drawbacks in ConfSys2: the main one being providing a easy learning and using curve for users. Particularly, when a CMS such as ConfSys has a large number of functions, mechanism to find, access and perform these functions easily and efficiently is an important issue for improving system usability. The approach used to address this issue also is introduced in this chapter. This approach, while providing users a better interface and navigation aid, also simplified some tasks.

Most of these refactoring works described in the chapter are enhancements for existing functions in ConfSys2, in the next chapter we introduce some new functions for the new version: named ConfSys3.

Chapter 4

New Features and Concepts in ConfSys3

An important aspect that determines a product's acceptability is usefulness, which measures whether the actual uses of a product can achieve the goals that the designers intend them to achieve. The concept of usefulness breaks down further into utility and usability. Although these terms are related, they are not exactly same:

- Usability is a measure of how easy it is to use a product to perform prescribed tasks. This is distinct from the related concepts of utility and likeability.
- Utility refers to the ability of the product to perform a task or tasks. The more tasks the product is designed to perform, the more utility it has. [30]

In Chapter 3 we have discussed the improvements that have been made in ConfSys3 to enhance existing functions or interfaces of ConfSys2 to achieve the goal of improving usability for users.

As mentioned in Chapter 2, although ConfSys2 is a complex CMS with a lot of functions, there is still plenty of room for utility improvements. Hence we have also introduced some new features and concepts in the new version, Most of these are targeted for conference organizers and managers. This chapter describes how we refactored ConfSys2 to integrate these new features and concepts in ConfSys3.

4.1 New Features in ConfSys3

In this section, some major new features in ConfSys3 will be presented. These new features and underlying functions were needed based on the new requirements of a wider class of users and the practical experience of hosting many academic conferences in past few years.

4.1.1 Auto-Sending Email Management

In ConfSys2, the system sends a great number of reminders and notices automatically. According to the categories of these notices, we use two different ways to decide when to send them.

1. Action-triggered email messages. When a user initiate a task, the system response could be immediate and could involve sending an email message to the user as an acknowledgement which could include a guide for the completing the task. For example, when a decision has been made for a paper in an event, the system would send an email message to all authors of the paper to notify them of both the decision and what files they should upload for their paper. Some of these features were part of ConfSys2. However, there was a need to refactor and modularize the entire sub-system.
2. Date-triggered messages. This category of auto-email sending operations are also triggered by a number of management events and function such as start of auction period, paper allocation and start of review period, controversial reviews

for papers at the start of the debate process and so on. For example, when the auction date is reached, the system will send a notice to all the reviewers and program committee members to notify them they could place their bids for papers for the event. Some of message in this category are sent more than once if required and the interval between two postings depends on the “window” for the period in question. For example, at the start of the review period, an initial email is sent. The system monitors the action of the reviewers and it would send a reminder email to the reviewers who have not downloaded all the papers assigned to them after one week from the start of the review period. The frequency of such email would increase as the review period approached the end. These messages are sent by a ConfSys daemon.

In ConfSys2, we’re using system templates to store contents of these auto-sending messages, and the system log was used to monitor such emails.

With larger functionalities and more complexity, the organizers depended on a large number of system emails sent out by system automatically. With this we discovered a number of drawbacks of the current mail management method:

- For some events, the organizers don’t want to send the reminder email messages. Unfortunately, this can’t be achieved without re-writing of some of the code in ConfSys2.
- The system template only stores the contents of some of these messages and some notices were hard-coded in the system, so it is difficult to change the content, title

and description for these messages.

- It is difficult to get enough information about these messages from the system logs.
- When we have a big number of system emails, it's difficult for the organizers to remember/monitor all these messages.
- It is difficult to add new system emails.

Therefore, we need a function to monitor and modify all the system emails.

The refactoring of the system for ConfSys3, required the implementation of an auto-email sending management feature to monitor and modify all emails that are sent by the system automatically as shown in the Figure 4.11:



Conference Management System
Powered by Cindi



Call for papers



ConfSys Account Info
Current User:
admin
[\[Logout\]](#)

Current Event: IDEAS>IDEAS09 [\[Change Event\]](#) [\[ConfSys\]](#)

Function Menu: [\[Homepage\]](#) [\[My Account\]](#) [\[Author\]](#) [\[General Chair\]](#) [\[Admin\]](#)

Current jsp file: /jsp/conference/conference_sendmail_list.jsp, help file is /jsp/help/conference/help_conference_sendmail_list.jsp (Not available)

Conference Auto Sending Mail List

ID	Name	Description	status
1	Auction Reminder	The email sent to reviewers to remind them of the start of auction.	Enabled
2	Review Reminder(CONF)	The email sent to reviewers to remind them of the start of review.	Enabled
3	Review Reminder(Journal)	The email sent to reviewers to remind them of the start of review.	Enabled
4	Tardy Review Reminder	The email sent to tardy reviewers to remind them of the approach of review deadline.	Enabled
5	Tardy Review Reminder(Journal)	The email sent to tardy reviewers to remind them of the approach of review deadline.	Enabled
6	Decision Reminder	The email sent to authors to notify them of the decision of their paper(s).	Enabled
7	Decision reminder for accepted paper (CONF)	The email sent to authors of accepted paper.	Enabled
8	Decision reminder for accepted paper (Journal)	The email sent to authors of accepted paper.	Enabled
9	Controversial reviews reminder(CONF)	The email sent during the debate period to reviewers of a paper found to be controversial	Enabled
10	Controversial reviews reminder(JRNL)	The email sent during the debate period to reviewers of a paper found to be controversial	Enabled
11	Reminder: Download for Review (CONF)	The reminder email sent to reviewers who have not downloaded papers assigned to him/her after one week. TO BE REPEATED EACH WEEK!	Enabled
12	Reminder: Download for Review(JRNL)	The reminder email sent to reviewers who have not downloaded papers assigned to him/her after one week. TO BE REPEATED EACH WEEK!	Enabled
13	Payment not confirmed(CONF)	The reminder e mail sent users whose payment is not confirmed after two days.	Enabled
14	Payment not confirmed(JRNL)	The reminder e mail sent users whose payment is not confirmed after two days.	Enabled
15	Late registration reminder(CONF)	The reminder email sent to authors whose paper was accepted ago but didn't upload final version. SENT AFTER EACH WEEK!	Enabled
16	Late registration reminder(JRNL)	The reminder email sent to authors whose paper was accepted ago but didn't upload final version. SENT AFTER EACH WEEK!	Enabled
17	Blacklisted user submission(CONF)	Send to GCs when blacklist user requests to submit a new paper	Enabled
18	Blacklisted user submission(JRNL)	Send to GCs when blacklist user requests to submit a new paper	Enabled
19	Submission with blacklist author (CONF)	Send to GC when a user submits a paper with blacklist author(s).	Enabled
20	Submission with blacklist author(JRNL)	Send to GC when a user submits a paper with blacklist author(s).	Enabled
21	Problem found in final version(CONF)	Email to be sent to authors when their final version has been set as being in a 'problem' status by GC.	Enabled
22	Problem found in final version(JRNL)	Email to be sent to authors when their final version has been set as being in a 'problem' status by GC.	Enabled
23	Problem found in copyright form(CONF)	Email to be sent to authors when their copyright form has been set to a 'problem' status by GC.	Enabled
24	Problem found in copyright form(JRNL)	Email to be sent to authors when their copyright form has been set to a 'problem' status by GC.	Enabled
25	Paper Detail Change Request	Email to be sent to GC when authors want to change the detail of his/her paper after submission deadline.	Enabled
26	Co:Author Registration Notice(CONF)	Email to be sent to the person who has been registered as Co-author	Enabled
27	Co:Author Registration Notice(JRNL)	Email to be sent to the person who has been registered as Co-author	Enabled
28	Add As Author Notice(CONF)	Email to be sent to users who are added as co:author.	Enabled
29	Add As Author Notice(JRNL)	Email to be sent to users who are added as co:author.	Enabled
30	Paper Reject Notice(CONF)	The mail sent to the author when his/her paper is considered not acceptable before the review process.	Enabled
31	Paper Reject Notice(JRNL)	The mail sent to the author when his/her paper is considered not acceptable before the review process.	Enabled
32	New review comment notice (CONF)	The mail sent to remainder reviewers of a paper when a new discussion comment is added.	Enabled
33	New review comment notice (JRNL)	The mail sent to remainder reviewers of a paper when a new discussion comment is added.	Enabled
34	Controversial paper notice(CONF)	The mail sent to reviewers of a paper if the review scores are found controversial.	Enabled
35	Controversial paper notice(JRNL)	The mail sent to reviewers of a paper if the review scores are found controversial.	Enabled
36	Discussion added for controversial paper(CONF)	The mail sent sent to the existing reviewers of a already controversial paper, when a late reviewer submits a review which should be examined by them.	Enabled
37	Discussion added for controversial paper(JRNL)	The mail sent sent to the existing reviewers of a already controversial paper, when a late reviewer submits a review which should be examined by them.	Enabled

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Figure 4.1 Auto Email Sending Management

This function provides an interface to monitor and modify all system emails, it also supports a feature to disable/enable any of these system messages in a specific event and

add new email templates and the associated trigger information.

To implement this function, we first examined all system email that were sent by Confsys2, then stored them in a new database table 'sendmail' in ConfSys's main database. Eight fields are created in 'sendmail' table to enable conference organizers to customize their system emails easily:

- mailid: The id of the email.
- mail_name: Name of the email which must be unique in the system, usually used as identifier when system sends the email.
- description: Describes the purpose of this email and when it would be sent.
- subject: Title of this email as it would appear in the Subject field.
- content: Content of this email as it would appear in the body of the message..
- type: Email type, could be predefined, user created etc.
- send_date: The date/milestone that would trigger sending of the email.
- to: The email recipient.

Another table 'conf_mail' has been added to the ConfSys's main database to store the relation of system emails and events, to provide the enable/disable auto-sending email function for specific events.

As shown in Figure 4.2, the conference organizers could easily add another message to be sent automatically by the system. Since some system emails would be sent a number of times at varying intervals or triggered by some special actions, for these auto-sending emails the system requires the information about the name, subject, type, description and

content that could be filled in by the organizers. The system could incorporate such new emails using functions in refactored MailSender class. Furthermore the organizers could easily modify the title, description and content of any message at anytime.

The screenshot shows the ConfSys web application interface. At the top left, the logo 'ConfSys' is displayed with the tagline 'Conference Management System Powered by Cindi'. To the right, there is a 'Call for papers/participation' banner. In the top right corner, there is a 'ConfSys User Login' section with fields for 'UserName:' and 'Password:', and buttons for '[Login]' and '[New User]'. Below the banner, there is a navigation bar with links for 'Current Event: Confsys [Change Event]', 'Function Menu: [Homepage]', and '[ConfSys] [Forgotten Password]'. At the bottom of the navigation bar, there is a message: 'Current jsp file: /jsp/conference/conference_sendmail_add.jsp, help file is /jsp/help/conference/help_conference_sendmail_add.jsp (Not available)'. The main content area is titled 'Add Sending Mail :' and contains a form with the following fields: 'Mail Name' (text input), 'Mail Type' (dropdown menu with 'User Created(date)' selected), 'Mail Description' (text area), 'Mail Subject' (text input), and 'Mail Content' (text area). At the bottom of the form, there are two buttons: 'Add Template' and 'Reset'. A 'Back To List' button is located in the top right corner of the form area.

Figure 4.2 Add Auto-sending Email

4.1.2 Event Merge Function

ConSys2 provides strong functionalities to support any number of conference series, each series having any number of events. Users could easily switch between events and conference series.

In some situation, organizers of a conference series could schedule more than one concurrent collocated event. For administrative convenience, the organizers may need to merge two or more of such events. For example, in the C3S2E series, event C3S2E'11p

was set up for graduate students' posters while scheduling C3S2E11 for regular papers. These two events would be published together and share the meeting sessions. Once the final decisions for the submissions were made, the organizers need a function to merge these two events to share subsequent steps. This merge operation consisted of merging of papers, authors, chairs, PCs, reviewers etc. while unifying the subsequent phases. If the organizers have to perform this operation manually, it would involve many error-prone operations.

In ConfSys3, we provided an event merge function as shown in Figure 4.3. The administrator just needs to choose two events that need to be merged under the same conference series, then click on the 'Merge Terms' button, the system would merge the chosen events into one, the name of the event would be the one designated as the principal event (the one chosen as the "into", e.g. C3S2E`11) and the users of the merged event (chosen as the Merge Term, e.g. C3S2E`11P) would be directed automatically to the merged event.

ConfSys
Conference Management System
Powered by Cindi

C³S²E

Call for papers

ConfSys Account Info
Current User: admin
[Logout]

Current Event: Test-Conference [Change Event] [ConfSys]
Function Menu: [Homepage] [My Account] [Author] [General Chair] [Reviewer] [Admin]
Current jsp file: /jsp/conference/term_list.jsp, help file is /jsp/help/conference/help_term_list.jsp (Not available)

Conference Configure: Term List

Terms in conference: Test-Conference

Please select a term to set its configuration.

Merge Terms | Term3 | into | Term4 | | Add A New Term

Term Title	Start Date	End Date
Test Track Description: test track	2011-11-28	2012-11-28
Term4 Description: Term4 of C3S2E	2011-10-18	2012-10-18
Term3 Description: Test of CConfSys2.5	2011-10-06	2012-10-06
Test2 Description: Test2	2011-10-06	2012-10-06
TermA Description: TermA	2011-08-08	2012-08-08

Figure 4.3 Merge Terms/Events

Once this operation is performed, the papers and groups of users in these two events will be merged and the new event will keep the subsequent milestones of the second event. The name of the new event is also the name of the second (“into”) event, but some highlighted message will be added at the end. As discussed in previous chapter, ConfSys ‘remembers’ the working environment of the user, so if the users had last been in the event (or events, since many events could be merged) that was (were) merged, when they login next time, their working environment will be automatically switched to the second event and a news message about event merge would be displayed on the homepage.

4.1.3 Multiple Track Support

As described in previous section, in ConfSys2, there are two classes of conferences:

- Conference: is a series of events, managed by a General Chair, one conference could have many events/terms, as discussed in section 4.1.2.
- Event/Term: A specific event has its own Program Chair, PC members, reviewer group, authors, papers, milestones etc.

Some events may contain many smaller units such as workshops, poster sessions and seminars; each such unit could have processes such as call for papers, review papers and accept papers individually, and the accepted papers may be put into a merged event.

ConfSys3 allow the administrator to merge a number of concurrent, collocated events under the same conference series.

In ConfSys3, we provide another mechanism to support very large events with specialized session by the use of tracks to represent smaller units of the event and provide a suit of functions to support tracks for the event. The organizers could create tracks under an event and assign a track chair for each track. Once a track is created, the tracks could be edited for changes such as chair, name, description and start/end date or delete or add tracks using the track configuration page shown in Figure 4.4.

The screenshot shows a web-based configuration form for a track. The title bar reads 'Track Configure: Track 1'. The form is titled 'Config Track:' and contains the following elements:

- Track Name:** A text input field containing 'Track 1'.
- Track Description:** A large text area containing 'track1'.
- Start Date:** A date input field containing '2011-11-28'.
- End Date:** A date input field containing '2012-11-28'.
- Email of Track Chair:** A text input field containing 'zhaokunsheng@gmail.com'.
- Search Chair:** A text input field next to the email field.
- Buttons:** 'Delete this track' and 'Back to track list' are located at the top right. 'Update track' and 'Cancel' are located at the bottom center.

Figure 4.4 Track Configuration

A track could have its own PC members and a track chair. The authors may submit papers to a track or to the main event. Users could change the track of their papers until the start of the review.

The organizers may also change the track for a paper. Papers submitted to specific tracks could be assigned for review by the Program Chair or the Track Chair and would be reviewed by the members of the track Program committee. The recommendation for acceptance for the track papers would be made by the track chair. The Program Chair, in consultation with the track chair, would commit the decisions to the system.

In ConfSys3, we have added a track chair menu. Track chairs could only access the management function for their tracks and could only make decision for papers in their tracks. Track chairs could also create a group of PC members to review papers that are submitted to their tracks.

The paper auto-allocation function is modified to allow the system to auto-allocate

papers that are submitted to a specific track correctly. This new paper allocation function could auto-allocate track papers to the PC members of the track Figure 4.5a and 4.5b shows the differences in paper allocation management between GC and Track Chair.

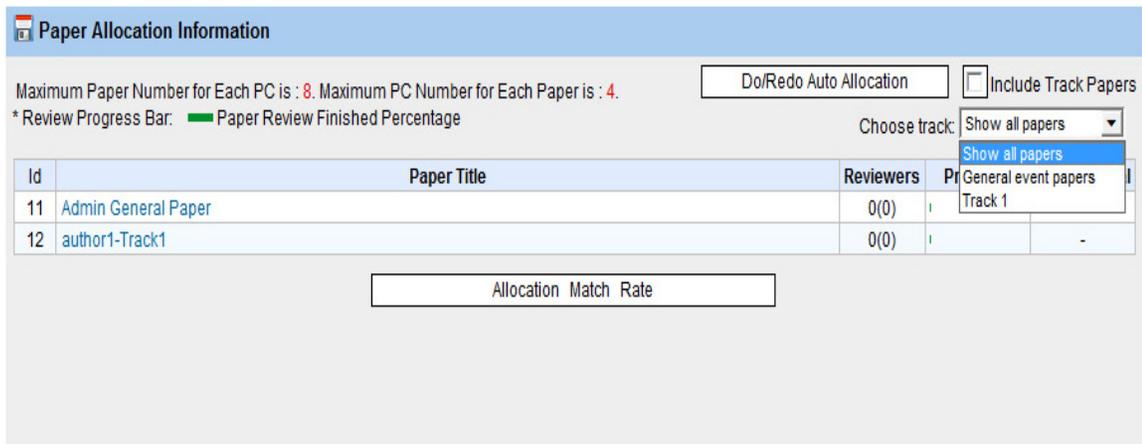


Figure 4.5a Enhanced Paper Allocation Function (GC)

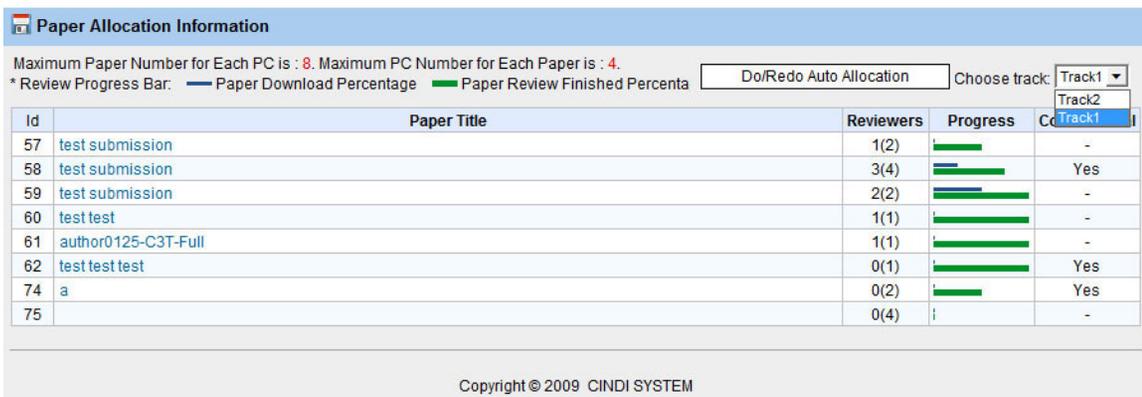


Figure 4.5b Enhanced Paper Allocation Function (Track Chair)

Adding the track feature required making changes to the interface and the underlying functionalities to provide features to display papers by tracks to allow Program Chair to manage track papers and main event papers easily. Once a final recommendation for a

paper is made by the track chair, the decision will be shown to the Program Chair who would either accept the decision or interact, via the system with the track chair of the parent event. The Program Chair would then make and commit the decision.

Figure 4.6 shows the paper decision page that is used in ConfSys3 to display the recommendation of the track chair for a paper by preceding the decisions with a '(TC)' in blue.

ConfSys Account Info
Current User: admin
[Logout]

Current Event: conf2012>2012 Term1 [Change Event] [ConfSys]
Function Menu: [Homepage] [My Account] [Author] [General Chair] [Reviewer] [Admin]
Current.jsp file: /jsp/conference/paper/paper_decision.jsp, help file is /jsp/help/conference/paper/help_paper_decision.jsp (Not available)

Paper Decision

Please click on paper title to see detail information. | Choose paper type: All | Search | Choose track: Show all papers

Id	Paper Title	Reviewers	Lowest Score	Highest Score	Weighted Score	Controversial	Decision
16	Track1-admin	0(0)	-	-	-	-	(TC)Full
15	General paper	0(20)	-	-	-	-	Full

Authors with multiple submissions: 1. kunsheng zhao | Highlight papers of selected author

Figure 4.6 Decisions of Track Chair and Program Chair

4.1.4 Easy User Search

In ConfSys2, we use the email address of a user as her/his unique identifier. Hence ConfSys users especially the chairs often need to specify a user by his/her email address, For example when the Program Chair assigns the track chairs or the session chairs, she/he must do so using their email addresses of these candidate as recorded in the

system. Thus the exact email addresses are needed to perform this kind of operations.

Obviously, this is not very convenient and will be time consuming.

In ConfSys3, we added a handy search function in those pages that need the input of user's email address. Using this feature, it is required to input any substring that could match part of any fields in the user table. The fields used in this partial match include: last name, middle name, first name, email address, organization etc. When the chair submits a substring, we use AJAX techniques to list the information of all the matching users without the need to refresh the whole page. The chair could examine the list and simply click on the one and let the system automatically input the user's email address as shown as figure 4.7. In addition to saving time and effort, this function avoids possible typing and memory errors.

Track Configure: Track 1

Config Track: Delete this track Back to track list

Track Name: Track 1

Track Description: track1

Start Date: 2011-11-28

End Date: 2012-11-28

Email of Track Chair: zhaokunsheng@gmail.com | Search Chair: zhao

No.	User Name	Name	Email	Organization	Status
1	admin	kunsheng zhao	ku_zhao@encs.concordia.ca	Concordia University,Canada	normal
2	author1	Zhao Sheng Kun	zhaokunsheng@gmail.com	Concordia University,Canada	normal

Update track Cancel

Figure 4.7 Handy Search Function for Chairs

Some types of search may require substantial system resources such as processor time slots, database connections and network traffic. For example, in the paper manual

allocation page, when the Program Chair performs the search function for eligible external reviewers, ConfSys needs to match the interests of all the ConfSys users with the topics of all the papers in this event and check whether any author of the papers has conflicts of interests with the potential reviewer. This operation requires checking a large user relation table that contains, for example, both the contents of DBLP [31] data and ConfSys auto-generated user relation entries. If the number of users is quite large, it will take several minutes to complete this search and reduce the response of the server during this period.

In ConfSys3, in order to improve the efficiency of this resource consuming search process, we created a temporary table to store the last search results, and allow the Program Chair to assign external reviewers based on the last most recent result for external reviewer search, thus avoiding unnecessary duplicate searches, as shown in Figure 4.8. If a significant change is made in the profiles of ConfSys' users, the Program Chair could execute a new external reviewer search to update the temporary search result table.

Paper Allocation Detail Information
Back to Paper Allocation

Maximum Paper Number for Each PC is : 8. Maximum PC Number for Each Paper is : 4.

Paper Information

Paper Title	Timed Abstract Mobile Synchronizing Petri Nets
Paper Abstract	In this paper we are interested in the modeling of mobile systems evolving under temporal constraints. We present a new formalism called Timed Abstract Mobile Synchronizing Petri Nets. This formalism is obtained by retaining the structure of Abstract Mobile Synchronizing Petri Nets AMSPNs and by redefining their functioning. We adopt the temporal semantics of Interval Timed Colored Petri Nets ITCPNs. The proposed formalism allows to model in a very simple and intuitive way mobile systems where time appears as a quantifiable and continuous parameter.
Author	[Contact Author] Taous MADI (Universite des Sciences et de la Technologie Houari Boumediene, Algeria) [Co:Author] Malika loualalen (Universite des Sciences et de la Technologie Houari Boumediene, Algeria)
Paper Subjects	[<C3S2E>.25] C3S2E::Formal methods

Allocated Reviewers

Id	Reviewer Info	Download Date	Mark	Operation
Reviewers:	24. Joey Paquet (Concordia University, Canada) Allocated Papers: 0			Allocate Allocate
PCs:	--- MATCH of the expertise of PC memeber and topics of paper and NO possible conflicts of interest. ---			
<input type="text" value="Search all eligible external reviewers"/> [show last search result]				
<input type="text" value="1. Gillian Dobbie (University of Auckland, New Zealand(Aotearoa))"/>				
<input type="button" value="Assign to selected external reviewers"/>				
Reviewing Papers:				
Reviewer's Interests: <ol style="list-style-type: none"> 1. C3S2E::Data Models 2. C3S2E::Data mining 3. C3S2E::Data warehousing <li style="color: red;">4. C3S2E::Formal methods 5. C3S2E::Mathematical logic 6. C3S2E::Semantic Web 				

Figure 4.8 External Reviewer Search with Last Result Storage

4.1.5 Multi-Event News Management

In ConfSys2, the Program Chairs could add, modify and remove public news which is displayed on the homepage by using public message management function. This public message management feature allows Chairs to set the contents, layouts, priorities and start/end dates for the news items and has sufficient functions for news management for a single event. The new challenge for ConfSys3 is in situations where it hosts more than

one event at the same time and in cases when the Chair needs to add the same message to multiple events. In ConfSys2 the General Chair could only add messages for the current event. If the same message is to be published for a number of concurrent events, it would require a lot of repetitious work to manage such public messages. To address this problem, in ConfSys3, we added a multiple event management feature for publishing a new public message.

In our new message management function, if the working environment of current Chair is a root conference which may contains many events, this user could manage public messages for all the sub-events without switching events. Figure 4.9 shows the add message page of public news management feature in ConfSys3, we have used JQuery to show a list of all available events in the System. Then the Chair just needs to select suitable events where the message would be published. If no event is selected, this function will perform as in the ConfSys2: publish the message only for the current event.

Add a new public message

Public Message

Conference: IDEAS>IDEAS'12

Message Type: News

Message Title:

Message Content: **B** *I* U **H1** **H2** **H3**      

[Preview]

Show Date Start: 2012-02-16

Show Date End: 2012-03-16

Priority: Normal

Add News to Conference:

- IDEAS>IDEAS'12
- C3S2E>C3S2E'12
- IDEAS>IDEAS11, IDEAS11D
- C3S2E>C3S2E11,C3S2E11P
- C3S2E>C3S2E'10P
- IDEAS>IDEAS'10
- C3S2E>C3S2E'10
- C3S2E
- IDEAS

If no above conference be selected, news will be added to current conference.

Figure 4.9 Add Public Message to Multiple Event

4.2 New concepts ConfSys3

In addition to the new functions discussed above, a number of new concepts are introduced to ConfSys3. Most of these concepts are developed from our experience of using ConfSys2 to host a number of events for a number of academic conferences.

In some situations the major user roles defined in ConfSys2 were not enough for

conference management or they didn't cover all categories of users in some events. To address this, we have added three new user types which will be discussed in the following sections.

4.2.1 Co-Author

In ConfSys2, we had three types of authors:

- *Contact Author*: The author who submitted the paper, Contact Author will receive all the ConfSys messages related to the paper, each paper must have at least one contact author. The author submitting a paper is considered as the contact author.
- *First Author*: First author of the paper. This author's name would be given first in the lists produced by the system.
- *Author*: Authors except contact author and first author.

Each paper could have many authors and submitting author could add other authors of the paper in ConfSys2, however all these three types of authors must be normal users of ConfSys. This means that if an author of a paper didn't sign-up and complete the profiles in the system, the submitting author would not be able to add this author for the paper. Obviously, there could be some possibility that not all authors of a paper have signed up and have the normal user status. This was a common complaint from users of ConfSys2; especially when a co-author was former student or colleague and the submitting author had lost contact by the time the paper was submitted.

For this problem, we have added a new author type in ConfSys3 called co-author. This

type of author doesn't need to be a normal user when the submitting author adds her/him to the author list of a paper in ConfSys3. In the process of adding a co-author, the submitting author just needs to provide his/her email address, his/her name, country and organization. ConfSys3 will automatically add an user account for this person as a co-author user type and send her/him an email notification about the paper submission. A link will be included in this notification to ask this co-author to complete her/his profile in ConfSys3. If all required information is completed, the co-author will become a normal user of ConfSys3 and could access all the functions for authors. If she/he doesn't login to update the profile, ConfSys3 will still keep his/her name and email address in database, and associate the person with the paper. However, this co-authors can't access any functions in ConfSys.

4.2.2 Invited Papers/Authors

It is usual to have keynote and invited talks for many academic meetings. In case of invited papers, such papers usually are not subjected to the usual review process. This kind of authors and papers often are added after the CFP deadline. In ConfSys2, the authors are not allowed to modify the meta-information for their papers after the start of the reviews. To allow author some additional time, we have introduced the concept of grace period that could allow authors to update the uploaded file for their paper before the review start date provided they have completed the meta-information for their submission before the CFP deadline.

However as a courtesy to the authors of keynote and invited papers the paper and the meta-information update deadline is until the Final Version Upload date. Therefore in ConfSys3, we have added another author type called invited authors. If the Program Chair put an author in invited author group, he/she could update his/her paper even during the review period, and the Program Chair could accept invited paper until the Final Version Upload deadline.

4.2.3 Blacklist Users

Over the years, our experience with ConfSys has shown that the system must be able to block access to users who use unprofessional practices. Practice such as submitting previously published work of others, submitting plagiarized work, multiple submissions of a paper to other meetings, etc. Hence the General Chairs and Admin need a function to manage the users' privilege, especially activate and deactivate a user. In ConfSys3, we have added another user role called blacklist users. If a user has been put in to blacklist group by Admin or General Chair, a set of limitations will be imposed on users with this role.

- He/she can't access all the functions associated with paper submission.
- All the messages from ConfSys are blocked for this user.
- If a submitting author not in the blacklist group tries to add a blacklist user as an author when submitting a paper, this add author operation will not be accepted by the system, and an email will be sent to General Chair automatically to ask whether to

accept this submission or author as co-author.

In most situations, the chairs may want to block these users from submitting another paper rather than remove them from ConfSys, Any user placed in the blacklisted user could be reinstated to have a normal status at any time by the Administrator.

Adding these groups enhances the user management features of ConfSys2.

4.3 Embed eJournal System

Online journals, also known as electronic journals or e-journals, are scholarly journals that are managed and published on the Web with open access to all online users. With the explosion of the Web and the substantial increase of online users, online journal systems have been gaining increasing attention as a more affordable and convenient means for the delivery of content. There have been some known online journal publishing systems in the literature, such as the Digital Publishing System (DPubS) [32] developed by Cornell University and the Open Journal Systems (OJS) [33] implemented by Simon Fraser University. Yet electronic publishers' needs differ from system to system and depend on the development environment.

In ConfSys3, we have enhanced ConfSys2 by completing an embedded eJournal sub-system. Thus ConfSys3 could be used to manage online academic journals. Due to the similarity of the processes and roles of CMS and eJournal system, our eJournal sub-system has reused a lot of ConfSys Resources to support different roles in different online journal management stages.

In this section, we present the embed eJournal system in ConfSys3. It provides essential functions to facilitate different user roles at every step of academic journal publishing process, some of these roles and steps are similar to the ones in a CMS, such as paper uploading, paper allocation to proper reviewers, online paper evaluation and blind debating among reviewers with controversial ratings, deadline management, blind interaction between the authors and the reviewers for clarifications, issue publishing, and an optional online fee payment.

4.3.1 Processes and Roles of Online Academic Journal Management

In this section, we discuss the major processes and key user roles in the embed eJournal system.

There are six major processes in the task of online journal management, including paper collection, paper allocation, paper review, paper decision, Camera Ready Copy (CRC) collection, and issue publishing. The interactions among these processes are illustrated in Figure 4.10.

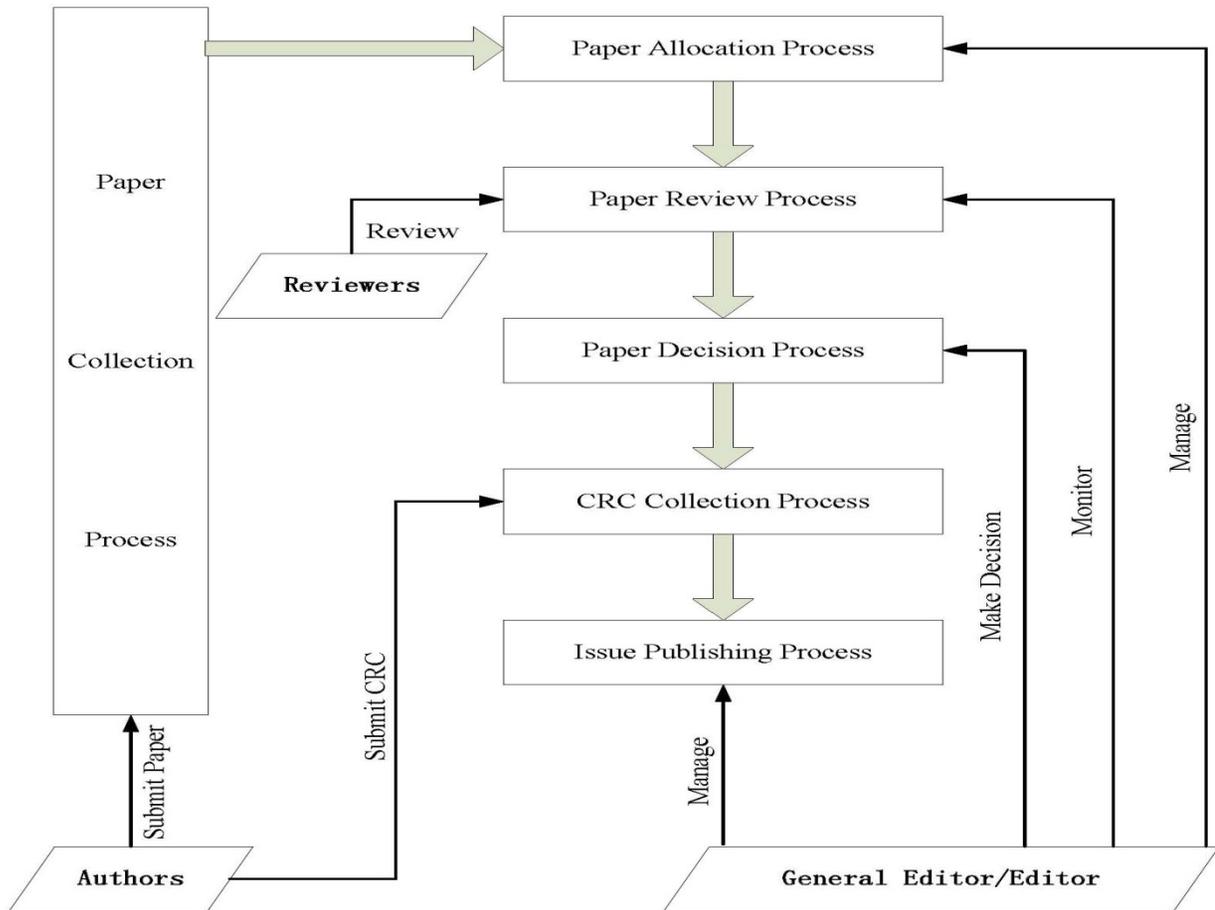


Figure 4.10 Processes of Online Journal Management

These major processes in online journal management are fulfilled by different user roles.

The major roles are required in the eJournal system and their responsibilities are similar to those in a CMS: these major roles include:

- Administrator who configures and set up the system.
- General Editor is granted all management privileges for specific journal and all its issues, this is similar to the role that a General Chair has in a CMS.
- Editors have partial management privileges for specific issues, including paper management, paper allocation management, paper decision, and public message

management; this role is similar to the role played by a program chair in a CMS.

- Review Board: members of this board are the reviewers who are responsible for evaluating the papers assigned to them, rating the papers, and making necessary comments based on which the general editor and editors make decisions. The corresponding role in a CMS is that of the program committee.
- Authors are registered users who have submitted at least one article to the eJournal system.
- Registered Users refer to the registered users who do not fall into any aforementioned user role.
- Casual User: who didn't register in our system, but casually access our system for a search.

4.3.2 Adapt ConfSys to Support eJournal Management

As discussed in previous section, ConfSys3 already has most functions and features which are common to those required in an eJournal. Most features in ConfSys could be adapted for the eJournal management; these features include auto paper allocation, auto-mail management, smart daemon etc. We could treat a Journal as a Conference, and the issues as terms. However there are some differences between a conference management and eJournal management.

1. The paper collection process for both includes user sign-up and paper uploading.

However, the one for eJournal is different from a CMS since there is no deadline for

- academic journals (special issues, slated to appear as a specified date, may be considered as an exception), every eligible author (registered user) can upload papers for the journals supported by the system at their convenience.
2. Each paper has its own deadlines, reviewers will review papers and debate based on this deadline. The editor would make a decision once these steps are completed for a paper. The final upload would begin once a paper is accepted.
 3. All papers that are still in the review or debate hence neither accepted nor rejected or those for which the final version upload is not could be considered for the next issue after a pre-established decision deadline for an issue.
 4. The publishing process, which does not call for a physical or virtual meeting and associated session management, nonetheless requires functions to generate and edit an eJournal issue.

Hence, in order to provide support for eJournal, some adaption is necessary. Some of these include:

1. The milestones for CFP are removed. Authors could submit papers anytime they want. An allocation deadline would be flexible controlled by the general editor; thus it could be from being at a fixed interval to the one where each valid paper has its own allocation date.
2. The number of issues per year for a given eJournal could be modified by the general editor, for example, a eJournal could be quarterly and would be published four times a year. The initialization of a subsequent issue would need to be auto-generated at the

end of the appropriate period for the current issue. This could be the allocation milestone or the decision milestone, or any other date chosen by the general editor of the journal.

3. In the decision process for an issue, papers whose final versions are not uploaded by a deadline date would be candidate for the subsequent issue. After Final version upload (CRC) there is no need for a meeting or session, this being replaced by an issue publishing feature to manage the publishing of eJournals. This feature could share some of the functions of e-Proceedings features in Conference Management.

Another noticeable issue is that, the embed eJournal system could share the customization feature which will be discussed in next chapter; this could allow eJournal System to be applicable for online journals in any academic domain.

4.4 Conclusion of New Functions and Concepts

In this chapter we discussed some major new functions and concepts that are introduced in ConfSys3, these functions and concepts enhance the multiple conference track support and complete the conference management function. We also discussed an embed eJournal system to provide support for eJournal management.

While implementing these new functions and concepts, we tried to improve the usability of users. For example, for the track feature, the authors will not notice that there are some new concepts/options in our system if no tracks are created for an event. When an event has tracks, except for an addition drop down menu to allow the authors to select a track, the interface for submitting a paper remains unchanged.

Now we using the criteria stated in section 2.3 to compare ConfSys3 with Other CMS in table 4.1:

Features and Functions	Conference Management System	
	ConfSys2	ConfSys3
Paper submission/upload	✓	✓E
Manual Paper Allocation	✓	✓
Paper Automatic allocation	✓	✓
Auto Reviewer Conflict Check	✓	✓
Paper Review	✓	✓
Monitoring review progress	✓	✓E
Review Discussion	✓	✓
Blind Review Debate	✓	✓
Setting acceptance criteria based on review result	✓	✓E
Anonymizing submissions	✓	✓
Anonymizing reviews	✓	✓
Review Feedback to Authors	✓	✓
Uploading final versions	✓	✓E
Auto Session arrangement	✓	✓E
Session support	✓	✓
Slide/Program package download	✓	✓E
Conference Registration	✓	✓E
Multiple Conference Management	✓	✓
Multiple track management		✓N
System maintenance management	✓	✓
Group based role function management	✓	✓E
Auto Publishing Call for Paper Message	✓	✓E
Auto allocation match rate report	✓	✓E
Participant Registration (fee payment) management	✓	✓E
Conference news message management	✓	✓E
Combined Internal/External Email System	✓	✓E
Dynamic review options setting	✓	✓E
Event Customization		✓N
Grace period for CFP		✓N
Black-list User		✓N
eJournal Support		✓N
✓E = Enhanced feature ✓N = New feature		

Table 5.1 Compare ConfSys2 with ConfSys3

We will discuss another major enhancement introduced in ConfSys3 - event customization in the next chapter. Also give the details of the basic support for eJournal already implemented in ConfSys3.

Chapter 5

Customization in ConfSys3

5.1 Overview of Event Customization

As discussed in Chapter 2, a major challenge for ConfSys is the ability of conference customization which could largely widen the usage of ConfSys in various academic areas. Most academic events have a number of well-established processes and roles, but not all events in all discipline must have the same sequence of processes. Some events may bypass one or more processes, others may have special steps and sometimes the same process may be performed differently in different event series.

In order to adapt ConfSys to suit academic conferences in different domains, we have introduced event customization in ConfSys3. Thus instead of having to configure and run a dedicated ConfSys servers for non-conventional sequence of processes for different events we propose to run a single configurable server and allow the event organizers to choose the number and sequence of processes for each such event to meet the convention used in their discipline.

The major approach to achieve this goal is via using a configuration controller to disable/enable predefined processes and customize some features. An example is if an event that doesn't need the paper auction process, hence the organizer could disable this process when creating the event. Another approach used to implement event

customization feature is by using careful refactorization using modularized component, using implementation features to reduce coupling between components. We have thus made it possible to continue using this approach for future component development. The configuration controller approach for event customization is to use the control flow where it is possible to turn on or off the features and processes that we want to customize. This chapter describes configuration controller and our approach to refactoring in the following sections.

5.2 Configuration Controller

ConfSys is a successful and proven complex system that has been developed for several years and has a set of excellent features and structures. Making major changes in such a complex system would involve reprogramming which would consume a huge amount of time which could be unnecessary if refactoring via appropriate modularization is possible. So we decided to keep most of the existing features and functions while implementing the event customization feature using a configuration controller. In order to achieve this goal, we need to consider the following questions carefully:

- What is a process/component in ConfSys?
- How it works and how it interacts with other components?
- What components in our system could be customized?
- How to customize it?

We will discuss these questions and give our response in the following sections.

5.2.1 Components in ConfSys

There are two categories of components in our system the processes/steps and the features. We discuss these in this section.

The processes/steps: In ConfSys at a specific time period, the system allow different kind of users to access some specific functions and would perform some operations to record the input of the users. An academic event such as holding meeting or publishing an issue of an academic journal consists of a number of processes in a specific order.

From the developer's perspective, a process includes the milestones to position it in a sequence of event, the interfaces presented to users including the accessible menus and functions for each group of users in this process, the tasks performed by the system during this period, the effect of these tasks and functions if they have been performed and its relations to other components and subsequent interfaces and choices to be presented. To customize the existing processes we must take into account these aspects.

Another category of component in ConfSys is its features. This is much simpler than the previous one. We just need to consider when and where users could access these features, their consequences and how to record them. Fortunately, we need not consider all the features of existing ConfSys2 for event customization; this is because many of these do not affect the event customization. Only those features that the process as of the event would need be considered for event customization; examples are auction, debate, final version upload, copyright form upload, etc.

5.2.2 Customizable Components in ConfSys

Once we have developed the concept of a component implementation for the developers of ConfSys, we need to find out what components could be optional and hence subject to customization for different events. To answer of this question, we list all processes of a typical event which are supported. In ConfSys by re-examining Figure 2.3 and the milestones listed in Figure 3.3, these processes are list below:

1. CFP Process: In a Call for Paper process users could submit their papers to ConfSys. For most academic events, this process cannot be disabled, but it could be customized. For example, some events don't require full papers but only an (extended) abstract. Also, different events may have different copyright form requirements at the time of paper submission for review. Hence there is a need for customization in this process for some events.
2. Paper Auction Process: In this process, reviewers and Program Committee members could place their bids for papers. This process could be an optional process.
3. Paper Review Process: Reviewers and Program Committee members could access paper review function in this process. Since Program Chair could make decision by some other standards, it could be optional.
4. Paper Debate Process: Reviewers and Program Committee members could access blind debate functions for paper reviews. Also, most journals do not use

this process (even though we feel they should). Hence this process could be an optional process and requires being customizable.

5. Paper Decision Process: for most academic events, this process can't be disabled or customized.
6. Final Version Upload Process: This could be an optional process. This may be the case for some workshops etc. which does not require the publication of proceedings.
7. Registration Process: Authors and attendants to a meeting may be required to make a fee payment or it may be optional. However, the registration should be separated from the fee payment and the later could be optional. During registration, there could be a need for the registrants to indicate the sessions that they would attend. This would be required if the capacity of sessions are limited.
8. Session Arrangement and Meeting Management Process: This session could also be optional. If this process was disabled, the slide upload function will also be disabled.

There is an ordering and dependence among these processes. For example if we turn off the paper review process, we will not need the preceding paper auction and the following paper debate processes. As indicated above in addition to customizing the processes listed above, some features could also be optional to customize a particular event.

Examples of these features include:

- Upload Cindi Copyright/Publisher Form

- Paper Auto Allocation
- Slide Upload

From the above, we can see that there are 12 options that are candidate for customization, and a number of options are related. An example of the dependence among the type of submission (abstract of full paper), auction and debate: if the Paper Auto Allocation was enabled, the Paper Review Process must be enabled.

To support customization for an event, we have thus provided an interface for the organizers to choose the process required and refactor the supporting software to implement this customization. The interface is presented in Figure 5.1. The refactoring techniques are given in the following Section.

Figure 5.1 Customized Features Adding a Term

5.2.3 Refactor Existing Components

Since we already have a large number of components which are high coupled in ConfSys2, in order to implement the event customization feature more efficiently, we need to do some refactoring of these existing components.

As discussed above, we are using Object Oriented Programming Paradigm in ConfSys.

In the system, there are three levels of objects:

1. Atomic Object: in this level, an object cannot have smaller units. These objects such as User, Paper, Review and Auction etc. are provide basic functions for the basic roles in the system.
2. Set Object: we have many objects in the system to represent a collection of a specific type of atomic object. These set objects include UserSet, PaperSet, AuctionSet etc. They could represent a collection of objects in a specific event or share some common attributes.
3. Controller Object: These objects are servlets and in charge of process control. For example PaperControl could provide the functions such as processSubmitNewPaper(), processUpdatePaper(), processAddAuthor(), etc.

For a feature or process in ConfSys, it needs many atomic level objects and set level objects to work together in the functions provided by controller object. To ease the implementation of event customization, two major refactor techniques are used in Set and Controller level for event customization:

1. Add parameter in functions of controller level objects. Since the controller level objects directly provide the functions of each component in ConfSys, hence if we want to customize the components, we need to customize these functions in the controller level objects. To achieve this, we add some parameters to these functions. For example, in processSubmitNewPaper() function of PaperControl class, we add parameters such as 'cindi_cpform', 'exd_abstract' to customize the function. Boolean parameter 'cindi_cpform' could determine whether it is

required to upload the Copyright Form for Cindi System in the submit new paper process, and 'exd_abstract' could determine whether to enable full paper upload or just require the upload of an abstract. These parameters are determined when the Admin create the event.

2. Add functions to set level objects. In some processes, some combinations of atomic object function call are used repeatedly. For example, we check the current active events for a specific user in many situations. Many atomic objects are involved to achieve this feature such as User, Conference, Term, etc. To avoid duplicated code, we have implemented some functions for this type of features in the set level Object.

We will discuss how we achieve the event customization in next section.

5.2.4 Controller Configuration for Event Customization

In the previous sections we discussed the processes in a typical CMS which should be able to be customized. In this section, we discuss how to implement this process customization feature by using a configuration controller and refactoring.

Some on these customization options are easy to introduce: for example, to implement the switch for the option Request CINDI Copyright Form, we only need to add some flow control statements in the codes for corresponding to the modules that support the interface for paper submission, paper progress management and paper edit thus enabling the refactored ConfSys to respond to this configuration.

However, to implement options such as disable/enable Paper Review Process require more extensive refactoring. As discussed in the previous chapter, several aspects must be considered while implementing this configuration option. It involves, in addition to removing the item corresponding to the review option from the menu items for specific user groups, we have to handle the follow up events. One thing we need to consider is the deadlines associated with the milestones corresponding to the Paper Review. This includes the milestones Review Start Date and Review End Date. These in turn are associated closely with other milestones and the associated processes in the system. An example of this is the grace period for CFP process, wherein the authors could access functions such as update paper information, upload new versions, add authors etc. Therefore, if the configuration calls for disabling the Paper Review Process it would require removing the milestones associated with it; this would create some problems if the refactoring of this part of the system is not carefully done,

One approach to this refactoring involves replacing other milestones for the removed milestones. For example, we could use Paper Decision Start Date to replace Review Start Date in ConfSys if the Paper Review Process is disabled. Here, we also need to consider the effect of removing a milestone/date and not replacing it with another removed milestone. To guarantee that errors would not occur, we need to make sure that at least one milestone that would remain in the reconfiguration will replace the removed milestone. So milestone such as the one for Paper Decision or a remote future or past date such as 2999/12/31 or 1970/01/01 could be used in such replacing process.

Remove Paper Reviews also will affect some other features such as Progress Monitor Features and a number of auto-reminders messages sent by the system's Smart Daemon. Consequently, these features need also be revised. If there is no review, then there would be no debate and hence the Paper Decision Page will also be changed, as shown in Figures 5.2 and 5.3.

Id	Paper Title	Reviewers	Lowest Score	Highest Score	Weighted Score	Controversial	Decision
92	Paper2	1(1)	9.5	9.5	9.5	-	Poster
91	paper1	1(1)	7.5	7.5	7.5	-	Full
93	Paper3	1(1)	4.0	4.0	4.0	-	

Authors with multiple submissions: 1. user0005 user0005 Highlight papers of selected author

Figure 5.2a Paper Decision Page When Paper Review is Enabled

Id	Paper Title	Decision
92	Paper2	Poster
91	paper1	Full
93	Paper3	

Authors with multiple submissions: 1. user0005 user0005 Highlight papers of selected author

Figure 5.2b Paper Decision Page When Paper Review is Disabled

Also, if we disable some features such as slide upload and copyright form upload in paper submission process, the interface of paper uploading monitor will be changed as shown in Figure 5.3a and 5.3b

Conference Paper Upload Progress							
Progress Views: Paper Uploading Progress View All Papers Choose track: Show all papers							
Id	Paper Title	Versions Uploaded	FinalVersion Uploaded	CopyRight Form Uploaded	Slide Uploaded	FinalVersion File Info	Decision
69	The Big Paper Author: author0117 author0117	1	✓	✓	-	16 pages 612 x 792 pts (letter)	Full
65	T1-p3 Author: author0112 author0112	0	-	-	-	-	Short

Figure 5.3a Paper Upload Monitor Page When Copyright Form and Slide Uploading are Enabled

Conference Paper Upload Progress				
Progress Views: Paper Uploading Progress View All Papers Choose track: Show all papers				
Id	Paper Title	FinalVersion Uploaded	FinalVersion File Info	Decision
69	The Big Paper Author: author0117 author0117	✓	16 pages 612 x 792 pts (letter)	Full
65	T1-p3 Author: author0112 author0112	-	-	Short

Figure 5.3b Paper Upload Monitor Page When Copyright Form and Slide Uploading are Disabled

The above are some examples of refactoring and re-modularization which reflect the reality that when we remove a process that is highly coupled with other components, all these components need to be considered.

5.3 Modularized Components

- In previous section, we introduced the tasks to enable customization with the existing components in ConfSys. It's not easy to make the existing components customizable since we need to put flow control statements in all the necessary places. For special

event configuration that has not been supported by ConfSys, to enable adding of new features and its customization, we plan to adopt an implementation approach which reduces the coupling between these processes.

7. To address this issue, three aspects of process components implementation in ConfSys3 will be considered:

1. **Dynamic Milestones.** To reduce the coupling, instead of using fixed milestones in the form of specific associated data to determine a specific time period, we order the milestones and determine the period between them. Then if one milestone is changed the others could be adjusted automatically.
2. **Dynamic Menu Items.** Once we allow the organizers of an event to configure the processes, the interface including the menu items presented to the users must be configurable, a process component must indicate the special menu items for it, and the system will build menu system corresponding to the configuration of the processes for the specific event.
3. **Dynamic Management Pages.** For example, in some pages, the result of some processes are used in some table fields, so we need to make these fields displayed dynamically and store them in the database and determine if they should be displayed based on the configuration of the event.

However, it is not possible to treat coupling as something to always avoid. Even when a program is modularized, these modules will need to communicate in some way [34]. The ultimate purpose of software modularization is to increase software productivity and

quality, and to ease software maintenance. [35].

5.4 Conclusion of Event Customization in Confsys3

Introducing customization to event management is an important upgrade in ConfSys3.

We have used configuration controller approach for the existing ConfSys CMS components and adopt modularized implementation method for new components.

Addition of this feature would allow the organizers to use ConfSys3 to easily customize it to support most academic events in various domains.

Chapter 6

Future Work

As a result of the updates, refactorization and configuration features added to the system has enhanced the usability and introduced new functionalities in ConfSys3 and made it one of the best CMS with both tremendous functionalities and excellent usability. However, there is still room for improvement. Some addition works is required to complete all the features required for eJournal support including publishing the issues using CINDI system.

1. Publishing of eProceedings and eJournals:

Since ConfSys and CINDI system glean a large numbers of documents in electronic format and could host both academic events and online journals, hence we need a feature to publish the eProceedings to distribute the production of these meetings and journals to all types of users in a unified format.

This could also provide chairs the functions that could easily manage the eProceedings and eJouranls, enable customization of these e-Publications for different events and issues. This work has already been started by my colleagues and using iText library as implementation technology.

2. More Intelligent help system.

ConfSys3 now provides context help pages to the users, but many users are reluctant

use this when using the system, so we need a more intelligent help system, that not only context sensitive to current page and time period, but also to the cursor area, to give user the real-time tips.

3. Multi-Language Support

With increasing globalization, software systems are expected to support many languages as discussed in Chapter 2. When hosting an international conference, multi-language support could facilitate some important processes for some non-English users. So in next step, ConfSys may consider to put effort in multi-language support.

4. CMS for CMS

Now there's an excellent solution for customize web applications and it could also facilitate the implementation of multi-language, that is using another CMS (Content Management System) inside Conference. Content Management System could allow web application interfaces without changing the code, so it's a good tool for customization and uniform management.

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Appendix A

Database Structure of ConfSys3

