Analysis of the Possibilities of Paid and Unpaid Systems for the Management of Academic Conferences

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Abstract
This article focuses on online systems for conference administration. The aim is to analyse the available systems for academic conferences administration. The theoretical part describes the process of conference organization, user roles and the process of adding articles. The current state of the use of conferencing systems was determined by analysing secondary sources. We analysed the most used conference management systems and compared their functionality. The research compares different systems, revealing the shortcomings of each system but also their strengths. It shows the differences in paid and unpaid conferencing systems and compares the functionality between the most used paid and unpaid systems. Each conference organiser has different requirements for the system. Based on the comparisons, we draw conclusions that show the advantages and disadvantages of each system.

Keywords: administration, conference, reviewer, conference system, conference administration.

JEL Classification: M000, O1

1. Introduction
A conference is a social gathering of scientists, experts, or members of a particular community, at which all of them inform each other about a particular issue. Most often this takes the form of presentations of papers from pre-defined thematic sections that correspond to the focus of the conference. For the exchange of information to take place as efficiently as possible, a well-managed conference organisation process is necessary. To some extent, the conference organisation can be supported by an information system with appropriate functionality. An information system can be understood that ensures the systematic collection, processing, storage and accessibility of information. It includes (Vorisek, 2006) the information base, technical and software resources, procedures, technologies, and personnel.

Conferences tend to recur at certain intervals, such as annually, and grow in popularity each year. The COVID-19 pandemic has become a key event that has changed our lives. Businesses had to change their daily operations and working from home has become the norm. (Stalmachova, Chinoracky & Strenitzerova, 2021). Conference management systems are of great benefit to organizers. As the number of participants and contributors grows, these systems help them with sending out mass emails, invitations to authors, reviewers, and administrators when needed. It also facilitates the process of uploading abstracts or articles into the system, assigning them to reviewers, and then evaluating and approving them.
The success of the conference is measured by the efficiency of information exchange and the achievement of the conference objectives. The quality of the conference organisation plays an important role in the success of the conference, influencing the subjective feelings that participants take away from the conference, related specifically to the “public” accessibility. (Mikusova, 2014). If there are no serious problems and the participants are provided with quality food and accommodation throughout the conference according to their wishes, this will have a positive effect on their subjective feelings. If the organisers include, for example, an interesting excursion in the conference programme, the participants may then remember the conference for a long time to come (Bohm, Vojtekova & Stofkova, 2017).

Every year, many conferences are organised around the world that deal with different topics. Many of them are organised on a regular basis, and the organisers strive to improve the quality every year. To maximize quality, it is therefore necessary to have several people involved in the organization. Recommendation for project teams is to not focus only on how to finalize the project to a successful end but to try to bring the project to its excellence. (Vartiak, 2015). The naming of individual people or groups varies from programme to programme, but in general they can be referred to as the conference chair (administrator), the conference vice-chair, the organising board, and the programme (scientific) board (Hudak & Madlenak, 2016).

At Slovak universities we can find several conferencing systems that are created by our own efforts. However, they mostly lack some of the important components of the compared conference systems, e.g., assigning reviewers and reviewing articles directly in the conference system. For example, at the FEM SPU in Nitra (FEM SUA in Nitra), the conference system is built under CMS Joomla and has the mentioned disadvantage, although there is overall satisfaction with it and it is used in many conferences and seminars organized by the faculty (e.g., UNINFOS when SUA in Nitra was organized, as well as in SIT seminars and ISD conferences). When using CMS, the User support is important. It means responsibility of the organization and operation of the IT infrastructure of each organization (Olahova, 2016).

The first references to web-based conference support systems date back to 1996, when several programmers who were also conference organisers started working independently on the development of these systems. These include EDAS Conference Manager (Schulzrine, 2013) (EDAS stands for Editor’s Assistant), which was developed from 1996 onwards by Henning Schulzrinne, professor and chair of the computer science department at Columbia University, with the help of several other authors. Until 2002, this system was used primarily to support the IEEE Infocom conference and several other conferences, and since 2002 it has been used to support hundreds of smaller and larger conferences.

Another early system is CyberChair (Van de Stadt, 1996), developed by Richard van de Stadt of the University of Twente between 1996 and 2000. It is a free system distributed under the GNU GPL license, which, like EDAS, has been used by hundreds of conferences. Its development was stopped in 2000 and only bugs are being fixed. The successor to this system is CyberChairPRO, but it is no longer freely distributed.

Several other similar systems were developed between 1997 and 2000, and dozens more were developed after 2000.

A web-based conferencing system is a service that offers conference organisers to create, organise and manage conferences. Mobile applications can do that for them, making traveling much simpler (Genzorova, Corejova & Stalmasekova, 2018). Furthermore, the system is a simple and efficient tool to collect many articles, papers, and abstracts, to assign them to different categories and then to assign them to individual users who review these papers using
review forms and rate them. Based on these reviews, the system allows the selection of papers to be accepted and subsequently presented at the conference. According to their activities and tasks, users of conference management systems are mainly divided into three basic user roles, namely contributor, reviewer, and administrator. Sometimes there are additional roles in the system, such as advocate (Van de Stadt, 1996). If a conferencing system allows for the simultaneous hosting of multiple conferences, an additional role is needed, namely system administrator, who manages these different conferences within the system.

Users of conferencing administration systems fall into several categories. The different categories differ from each other in several aspects (Eren, Pala & Yavuz, 2012).

The main difference between user roles is their authorization. These authorizations define users' powers to perform actions and changes in the system, access rights, and view certain data and information. The user role administrator has the most rights among all the basic roles of the system, he manages the entire conference, and therefore he needs to have powers that allow him to manage the conference and make changes to the system. The other roles have only the rights assigned to them by the conference administrator. This means that they can carry out the activities that the administrator assigns to them and their access to information is limited. (Spala, 1999).

Another difference between user roles is the intention with which users use the conferencing system. As a rule, a contributor does not need to meet any additional requirements, and thus any author of an article who submits that article to the mailing list can become a contributor. In contrast to this role, the role of reviewer requires that the user be selected by the conference organizer and subsequently invited into the system as a reviewer of papers (Spala, 1999). The last basic role of a conference management system is the role of administrator; this role is superior to both contributor and reviewer. The administrator has the most extensive authority and access to almost all information and data in the managed mailing list.

Each contribution may be in one of the following states during its lifecycle:

Post for assignment - A post enters this state when the post is uploaded to the system. The post has a completed title, the topic section it falls under, and is accompanied by a post file (most commonly in .doc or .pdf format). If one of the above information is not filled in or the paper is not attached, the system will not allow the paper to be uploaded.

The paper proposed for review - for each paper to be assigned has administrator has the option to select one of the pre-recommended reviewers and send him/her a proposal for assigning the paper. If he/she sends the proposal, then the paper is in this status. Suggestions for assigning the paper are displayed to the reviewer and can be accept or reject. If he accepts the paper, the paper will be put into the state Allocated paper. If he or she rejects the proposal, the paper is moved back to the Paper to be assigned along with the information that it has been rejected by that reviewer.

Assigned Paper - In this state, the paper is assigned to a reviewer and is waiting for the reviewer to complete the reviewer form and submit it. Once all fields of the form have been completed, the reviewer will be notified that the review has been completed and the result will be passed on for processing. In the form, the reviewer will evaluate the paper according to the specified criteria, to which he/she may add any comments and finally recommend the paper for acceptance, rejection, or revision.

Paper with review - this status of the paper indicates the reviewer's work is complete. An administrator wishing to decide whether to accept the paper will first view the reviewer's form,
which can be used to decide what to do next with the paper. He or she can take the reviewer's recommendations or decide otherwise. He is not obliged to follow the reviewer's assessment. He can add his additional comments for the author, as well as the reviewer, directly in the reviewer's form.

Paper for revision - the paper has been returned to the author by the administrator for revision. Once reworked and re-uploaded into the system, a new version of the paper will be created, which will start its new paper life cycle and reach the status of paper to be assigned.

Accepted Paper - The paper is accepted by the administrator on the recommendations of the reviewers and is included in the proceedings. The author can specify preferential conditions to his/her paper and present the paper at the conference.

Rejected Paper - The paper is rejected on the reviewer's recommendation (e.g., due to formal or content deficiencies) and the author cannot revise the paper.

Journal Contribution - only the best papers will be placed in this status. After the conference, they are included in the journal whose title corresponds to the name of the conference. This status will only be assigned if the paper is in the accepted paper status.

The process of working with the contribution can be seen in Figure 1.

![Figure 1: Steps in the review process in CyberChair system](image)

**2. Data and Methods**

Colleges and universities in Slovakia use the services of conferencing systems to organise their events. For example, at the Technical University of Košice, Faculty of Electrical Engineering and Computer Science, SCYR and Informatics scientific conferences are held. In the past they used the OpenConf conference system to organise these conferences, but now they are using the EasyChair system.
SCYR stands for Scientific Conference of Young Researchers, which means Scientific Conference of Young Researchers. In the past, this conference used an unpaid version of the OpenConf system, which they have replaced and are currently using the EasyChair conference system (Scyr, 2013).

The name of the Informatics Conference is behind the English name International Scientific Conference of Informatics. It is an international scientific conference that deals with informatics. It is organized by the Slovak Society of Applied Cybernetics, the Department of Informatics in Košice, the Union of Slovak Scientific and Technical Societies, Embraco and Lynx. Like the SCYR conference, it has in the past used the OpenConf system, which has also been replaced by the EasyChair conferencing system (Informatics, 2013).

The Deans Graduate Student Research Conference uses OCS software for conference administration. It aims at cultivating a shared and trusted digital environment (Kremenova & Gajdos, 2019).

The 2017 World Wide Web conference which took place in Australia 3-7 August 2017 was administered using the EasyChair system (www.easychair.org).

Conferences such as the China IEEE International Electrical and Energy Conference (CIEEC) 2019 Beijing, China, or the Texas EMS Conference 2019 Fort Worth, Texas, USA (www.openconf.com) were administered using the OpenConf system.

In the following, we review the 3 most popular systems for conference organization. We selected them based on the highest number of positive user ratings and comments.

The first of the systems is OpenConf, which is used to manage processes related to the organization of conferences. The system is implemented using the PHP (Hypertext Preprocessor) language and the system data is stored in a MySQL (My Structured Query Language) database. The system can be tested in an online demo version on the provider's website or by downloading and installing it on a local web server. The system is offered in three versions. The versions are called Community edition, Plus edition and Professional edition.

Conftool was developed on the campus of the University of Hamburg and, like the previous system, was developed using PHP and MYSQL technologies. Conftool is also offered on the provider's website (www.conftool.net) in two versions. This is the basic (limited) version, which is called VSIS Conftool, it is designed for non-commercial small-scale events with up to 150 participants. This version is offered without technical support and is intended for local installation only. In contrast, the second version, called Conftool Pro, is an extended version, with technical support, and its license price is based on the number of participants. The Conftool Pro version also includes a module for facilitating payments by conference attendees (e.g., PayPal, Skrill, Moneybookers, optional modules for credit card gateways, etc.) and allows for scheduling of the conference program, which are the main extra features that this system tries to differentiate itself from other competing systems.

EasyChair is the most widely used system for conference organization and program management (www.easychair.org), which allows:

- Managing papers, evaluating them and submitting them;
- automatic assignment of papers to reviewers based on their preferences;
- sending notification emails;
- displaying the results of reviews;
- online discussion;
creation of the conference programme;
creation of the conference proceedings.

The provider's website states that almost 72,000 conferences have been organized in EasyChair and over 3 million users have registered. This system focuses more on the management of program papers, which it has very well elaborated in all phases. Therefore, it is not a general system for conference administration, but rather a system for managing conference program papers. The system cannot be run locally, it is hosted on a server. Administration of the actual conference is free in the system; technical and user support can be obtained for a fee. The system includes some extra features, for example it can automatically generate articles in LNCS1 format. There is also 1 LNCS - there are full text (in PDF format) online versions of the proceedings, custom LaTeX1 stylesheets for the papers. It also offers 3 versions which are called EasyChair Free which is free, EasyChair Professional and Easy Chair Executive/Group which have more options but are chargeable.

In the research we further focused on comparing existing online conference administration systems, we analysed 10 different versions, 5 paid and 5 free. We compared the features of these systems more closely and focused on their shortcomings and strengths. By comparing the paid and unpaid versions, we wanted to highlight the functionality of each system.

Among the freely available systems we compared:
- EasyChair
- Conftool
- Openconf
- OCS
- Cyberchair

Of the paid systems available, we compared:
- EasyChair - Professional
- EasyChair - Executive/Group
- OpenConf - Plus Edition
- OpenConf - Professional Edition
- ConfTool Pro

3. Results and Discussion

From the analyses we have found that there is a sufficient number of conferencing systems, and it depends only on the requirements of the potential user which of them he chooses. When choosing, aspects such as the size of the conference and whether the organizer is willing to pay for a license play a major role.

For small conferences, an open-source version of the conferencing system is sufficient. For larger conferences with many participants, it is advisable to choose a paid version that provides easier and more automated management of individual processes and technical support. Another factor in the decision may be the hosting support on the provider's server. For example, the EasyChair system also offers hosting for its free version. In contrast, the OCS system does not offer hosting services and thus we must use our own server.

Choosing the right system for conference administration is individual for each user, it depends on the size of the conference and its type and on the special requirements of this user and thus we cannot say which system is the most suitable. In the following tables 1 and 2, the functions of the compared conferencing systems are listed.
This clear comparison of the features of the different systems can make it easier to choose the right system for a potential user.

**Table 1 Features of free conferencing systems**

| Features                  | EasyChair Free | OCS    | MyReview | OpenConf Community | ConfTool VS'S | CyberChair |
|---------------------------|----------------|--------|----------|--------------------|---------------|------------|
| Need for your own server  | X              | ✓      | X        | ✓                  |                | X          |
| Technical support         | X              | X      | X        | X                  | X             | ✓          |
| Online submissions        | ✓              | ✓      | X        | ✓                  | ✓             | ✓          |
| Option to choose your own topic | ✓          | ✓      | ✓        | ✓                  | ✓             | X          |
| Automatic assignment of reviewers | ✓        | X      | ✓        | ✓                  | ✓             | ✓          |
| Support for email communication | ✓        | ✓      | ✓        | ✓                  | ✓             | ✓          |
| Possibility of custom installation | X        | ✓      | X        | X                  | ✓             | X          |
| Conflict of interest detection | ✓        | X      | ✓        | ✓                  | ✓             | ✓          |
| Bidding phase            | ✓              | X      | X        | X                  | ✓             | ✓          |
| CVS export, XML, EXCEL, SQL | ✓+PDF      | ✓      | X        | ✓                  | ✓+PDF         | X          |
| Demo version             | ✓              | ✓      | ✓        | ✓                  | ✓             | ✓          |
| Slovak/Czech localization | X              | ✓      | X        | ✓                  | X             | X          |

The systems that are free have limited functionality and cannot be used to their full potential compared to the paid versions. However, if the user is satisfied with the basic functions for organizing a small conference, the open-source version meets his requirements, or he can try this version as a demo version and based on its functionality decide whether it is sufficient for his needs or he needs the paid version.

**Table 2 Features of paid conferencing systems**

| Features                  | EasyChair Professional | EasyChair Executive | OpenConf Plus Edition | OpenConf Professional | ConfroolPro |
|---------------------------|------------------------|---------------------|-----------------------|-----------------------|-------------|
| Custom hosting            | ✓                      | ✓                   | ✓                     | ✓                     | ✓           |
| Multilingual interface    | ✓                      | ✓                   | ✓                     | ✓                     | ✓           |
| Technical support         | ✓                      | ✓                   | ✓                     | ✓                     | ✓           |
| Import settings from other conferences | ✓ | ✓ | X | X | ✓ |
However, process automation must not be overestimated. Communication via a computer screen with the help of a form located in a web browser has its specific pitfalls. Probably the biggest such pitfall in terms of organising conferences is that electronic communication is impersonal, and it is often not possible to 100% verify the identity of the person with whom we are communicating. Despite all efforts to make any Internet activity as secure as possible, it will probably never be possible to eliminate the various security holes, both in the conferencing support systems themselves or the platforms on which they are run, and in the computers of all the parties involved. For example, an unauthorised person may gain access to a reviewer's credentials and send deliberately fraudulent paper reviews. In a worse case, such a person may be able to get directly into the server where the conference is hosted or into its administration environment. The issue of security is therefore critical for all parties involved and is closely related to their computer literacy. Another problem of electronic communication is also the removal of emotion and the non-verbal components of communication. However, in the case of conferences, where much of the information is of a scientific nature, this is not very significant.

4. Conclusion

There are many conferencing systems available today, but in many cases these systems only offer full support and functionality in paid versions. The freely available systems provide only partial functionality and have many shortcomings compared to the paid ones. Problems occur mostly in the limited payment system as well as in cases where the administrator wants to organize several conferences in one system. Another problem is that modifications such as customizing review forms for different groups of contributors are not possible. However, when organizing conferences with smaller numbers of people, the freely available versions of these systems are also sufficient.

At present, conference management systems are not widely used in Slovakia. Conference systems are mainly used by universities to organise scientific and professional conferences. Conference organisers in Slovakia largely prefer face-to-face meetings in hotels adapted for conferences and their organisation and management are not fully automated, basic information is published on the conference website.
Based on an analysis of the features of each system, we concluded that without specifying specific requirements for a conference system, it is not possible to determine which system is the best, nor is it possible to determine the best system from the categories of paid and unpaid. Each potential organiser has different requirements for the conferencing system.

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