Palamede: a Multi-Press Open Journal System

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Abstract— **The strong movement of Open Access journal is convincing many institutions to adopt an infrastructure for collecting and distributing open access journals. For this purpose, there exists popular open source software for electronic journal publishing and editorial management. Most of them are WEB based multi-language platforms capable of hosting several journals in a single press or editorial board environment. With the recent wave of Open Access and the aim of reaching critical mass, many institutions are thinking to adopt common solutions to aggregate the open access journals of multiple institutions/presses on the same infrastructure. This paper presents requirements and analysis for the development of multi-press platform, and its related implementation and validation performed expanding OJS (Open Journal System) as a multi-press and multi-journal platform. It involved a deep reengineering of the originally distributed OJS architecture. The proposed solution refers to Palamede project and that has produced the experimental portal (http://palamede.fupress.com), and which it has been validated by a test experimentation of three Italian University Presses: the Firenze University Press (FUP), the University of Parma and the Forum Editrice Press of the University of Udine.**

Keywords - **e-journal, open access journals, online publishing system, multi-press open journal, Open Journal System (OJS), peer-review editorial process.**

I. INTRODUCTION

T he strong movement of Open Access journal is convincing many institutions to adopt an infrastructure for collecting and distributing open access journals. For this purpose, there exists popular open source software for electronic journal publishing and editorial management.

There are many online-developed tools and frameworks designed for building open access digital repositories, working as digital assets and content management systems, and offering services for online content publishing. Among them:

- OPEN Journal System (OJS) developed as part of the research program of the Public Knowledge Project (PKP), started in the end of the 1990s at the University of British Columbia [1].
- DSpace project [3], developed by joint efforts of MIT and HP Labs in Cambridge University, is worthy to be mentioned for digital preservation activity.
- Fedora Repository [4] into the Duraspace [5] organization.
- EPrints [6] and the SHERPA [7] projects aim at addressing OAI-compliant and institutionally-based repositories to expand benefits of academic open access and dissemination.
- EScholarship of University of California [8] focused on academic dissemination and scholarly publishing services.
- Daedalus of the University of Glasgow [9] mainly focused on academic dissemination and scholarly publishing services.

Among the above presented solutions, OJS is an Open Source software (available under the GNU public license [2]), developed with the purpose of creating a WEB based solution, for multi-users and multi-language platform, which is able to support the whole editorial process, from authors' submissions to online publishing, indexing and archiving, including the peer-review editorial process. OJS has become one of the most widespread electronic journal publishing system within the web community, counting on over 8300 installations in the world, as reported on web site [1]. Further and more detailed information about the last updated OJS system version can be retrieved in [10]. Technical documentation is available at [11] and [12].

The aim of this paper is to present the work performed in Palamede project that is focused on realizing a multipress open journal management systems to host multiple presses and put in common a set of services. This approach should improve the flexibility and the quality of electronic journals publishing system, as well as to expand access to research.

The Palamede project involved *FRD - Fondazione Rinascimento Digitale* foundation [13] as financial partner, the *DISIT Lab* of the Department of Systems and Informatics of University of Florence [14] as technical partner, and editorial groups belonging to three Italian Universities: *Firenze University Press* [15] (University of Florence), *Università di Parma* (University of Parma [16]) and *Forum Editrice Universitaria Udinese* [17] (University of Udine). The starting activity of the project was focused into gathering and collecting requirements, suggestions from the University Presses. The main demanding aspect was found to be a commonly aimed goal of a unique aggregator of collected resources, which could be able,

though, to preserve the individual and functional identity of each press.

This paper presents requirements and analysis for the development of multi-press platform, and its related implementation and validation performed expanding. For this purpose, the team identified as starting point the above mentioned OJS solution, that, as the others, is only suitable to cope with only one press editor or institution.

The article is structure as follows. In Section II, the requirements are reported. Section III is devoted to the architecture and analysis. Section IV presents some design aspects and the validation performed. Conclusions are drawn in Section V.

II. REQUIREMENTS

In this section, the novel contribution to the presently distributed OJS implementation to allow it coping with multiple presses is presented. The presented solution aims at improving OJS in order to have more flexibility in the direction of providing support for managing multiple press and multi-journal front-end.

The achievement of such a goal is believed to provide many advantages for both editors and users. Among them:

- resources are collected under a unique aggregator, which can grant uniformity of behavior in document indexing and metadata harvesting (following the OAI-PMH standard [18], or other OAI compliant services, e.g. OAIster). Thus reducing the costs for content management for the institutions and provides advantages to the users that may access to multiple press journals on the same web portal;
- such a system offers facilities in committing thematic-based researches upon single journals, specific sets of journals or presses, or upon the whole set of published journals; by this way, the opportunity of cross-thematic approaches research is given;
- users are requested to register only once in the portal; then they have the possibility to subscribe all the presses and journals they are interested in. Otherwise, users should registered to all the different presses or journal sites they are interested to. This is also an evident advantage for the institutions managing the single presses since they may have a cross advertising among the users that are registered on the other presses.

OJS, currently released at version 2.3.4, presents the following main features [9]. The OJS:

- is a multi-language and multi-user platform, installed and controlled locally;
- offers an automated peer-review editorial process for submitted articles, with e-mail notification and commenting ability;
- manages submitted content, for each published journal, can be comprehensively managed and indexed by the editorial staff.

Moreover, OJS offers several other tools, plugins and utilities: a text string search engine; reading tools for published content; a payment module to accept journal fees and a complete online help support.

In OJS, a hierarchy of user roles is used to define editorial roles within the hosted journals. The administrator can perform basic activities as: manage the site graphical style and layout (which is fully configurable through the use of CSS style sheets), create new journals and enroll one or more journal managers.

On the other hand, the journal manager acts in a way similar to the web site manager for his own journal: he owns the permissions to handle the journal graphical layout; furthermore, he can create editorial groups and enroll users as one (or more) of the following roles: editor, section editor, layout editor, copyeditor, author, subscription manager, proofreader and reader. All of these member types have specific tasks in the editorial process; a detailed description of these functionalities is referred to [9].

Finally, the journal manager is in charge of defining the guidelines for the peer-review process, the journal archiving methods, the editorial policies and the methods of subscriptions and access.

A comprehensive overview of the workflow chart of the extended multi-press OJS is depicted in Figure 1, *in which are also presented our additions.*
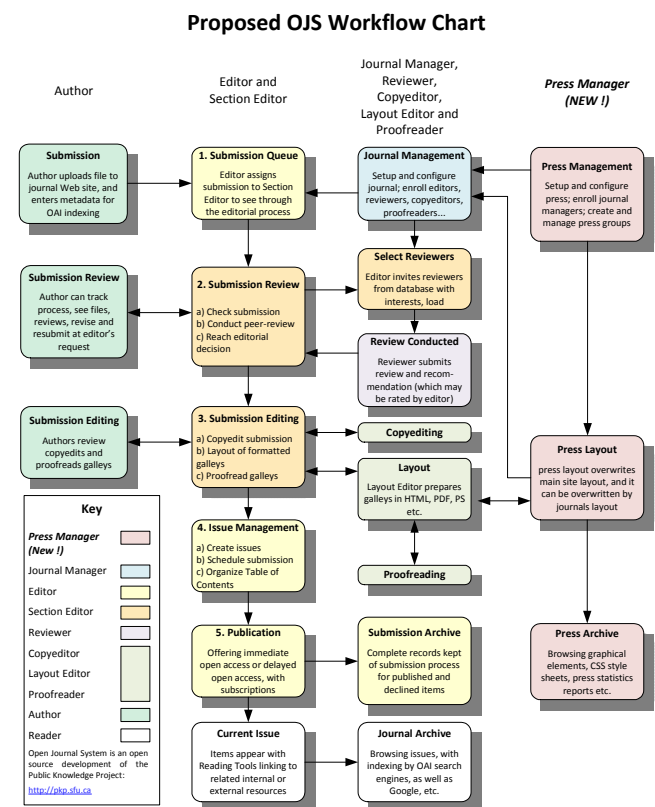

Figure 1. Functional architecture of extended OJS editorial workflow.

The PHP object-oriented architecture of OJS contains different type of classes which model, amongst other objects, both the editorial entities (journals, articles, issues etc...) and the roles of registered users (journal manager, editor, author, reader etc…). The operation of creating a

multi-press OJS involved a deep and structural reengineering of the original OJS architecture. All the characteristics and features, concerning the single journal management, have been maintained.

The main efforts of our work has been spent in performing a deeper analysis on the present mono-press version of the OJS to identify the minimum changes to satisfy the new requirements without degenerating the present OJS structured and concepts. The aim has been oriented to implement the new classes which are needed to create the new press entity (the most important ones are the Press class and the Press Manager class) and the appropriate modifications to the source code, where needed, in order to be correctly interfaced with the new objects. A more detailed overview of the novel architecture of the multi-press OJS system is presented in next section.

New Classes included in multi-press OJS	
Modules	**Classes**
PressAbout	PressAboutHandler
	PressEmailHandler
	PressFilesHandler
	PressManagerFunctionsHandler
	PressGroupHandler
	PressLanguagesHandler
	PressManagerHandler
PressManager	PressManagerJournalHandler
	PressPeopleHandler
	PressPluginHandler
	PressPluginManagementHandler
	PressManagerSettingsHandler
	PressSetupHandler
	PressStatisticsHandler
PressSearch	PressSearchHandler
PressUser	PressUserHandler
Admin_Form	PressSettingsForm
File	PressFileManager
	Press
Press	PressDAO
	PressSettingsDAO
	PressStatisticsDAO
	PressGroupForm
PressManager_Form	PressLanguageSettingsForm
	PressSettingsForm
	PressUserManagementForm
	PressSetupForm
PressManager_Form_Setup	PressSetupStep1Form
	PressSetupStep2Form
	PressSetupStep3Form
Template	TemplatePressManager

TABLE I. COMPREHENSIVE LIST OF NEW ADDED CLASSES IN THE EXTENDED MULTI-PRESS OJS SYSTEM. NEW CREATED MODULE NAMES ARE DISPLAYED, IN THE LEFT COLUMN, IN ITALIC STYLE.

III. SYSTEM ARCHITECTURE AND ANALYSIS

The native architecture of OJS is designed in a way such that the user interface, the data storage and management and the control structure are kept separated. This configuration recalls the Model-View-Controller (MVC) structure. Let us to illustrate the main details of the three sub-structures:

- **User interface** is set up through the use of Smarty Templates, which assemble HTML pages to be displayed to the users.
- **Control structure** is organized into three types of classes:
  - *Page Classes*, which receive users requests by the web browser, recall the suitable classes for requests processing, and finally call up the appropriate Smarty template to generate the response;
  - *Action Classes*, which are in charge of performing the processing of user requests;
  - *Model Classes*, which implement the objects representing the system various entities, e.g., journals, articles, issues, users and roles.
- **Data storage and management** is carried out by *Data Access Objects* (DAOs), which fulfill all interaction queries with the SQL database (MySQL and PostgreSQL databases are currently supported).

A inner back-end type of classes, the **Support Class**, provides core and other miscellaneous functionalities and utilities.

A. Design of the multipress OJS version

The design model of native OJS architecture has been maintained in the new multi-press OJS. The previous brief architectural description is useful to better identify and understand the new implementations and contributions described in this section.

Let us to analyze the modifications supplied, according to the formerly recalled MVC structure:

- **Control Structure** – The new created classes mainly belong to Page and Mode Class types. Actually, the most common sorts of tasks performed by Action Classes are related to specific user roles, e.g., sending e-mails and notifications, handling uploaded files etc.. A complete list of new built-up Page and Model Classes is presented in Table 1.
- **Data Storage and Management** – The database design have been modified to store information and data for the press as a new editorial entity. Consequently, two tables were added: presses and pressSettings, as well as the corresponding DAOs: PressDAO and PressSettingsDAO classes. In other tables, describing press related objects, a press identifier field has been added as a row. The relational structure of the new multi-press database is depicted in Figure 2.
- **User Interface** – The implementation of new classes in the Control Structure required the creation of new Smarty templates, in order to be correctly integrated with the user interface. A list of the templates added in the extended OJS system is shown in Table 2.

In addition to the implementation of new classes and templates, it is relevant to stress that most of the other source files composing the native OJS framework have been modified, in order to be appropriately interfaced within the novel multi-press architecture.

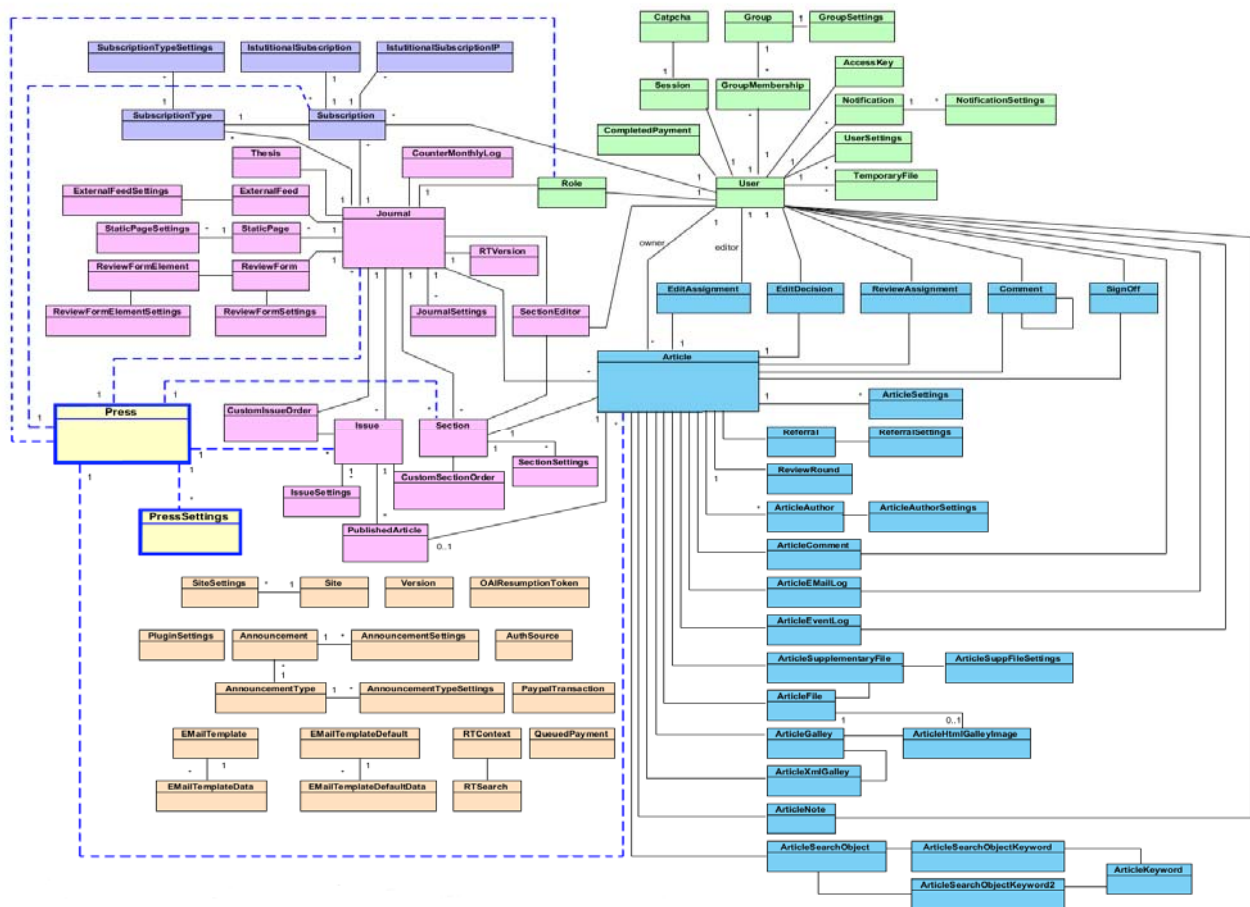## Multi-press OJS Database Relational Structure

Figure 2. Representation of the relational structure of the multi-press OJS Database. The new added tables (Press and PressSettings) and corresponding new built relations are in evidence.

In the following, a summary of the main additions, improvements and revisions which have been applied to the original OJS architecture in the reengineering procedure, is listed:

- Creation of new Classes, Smarty templates and Database objects concerning the Press editorial entity.
- Creation of Press manager Role, and definitions of its main functionalities:
  - Creation / Enrollment of Journal managers;
  - Creation Editing / Deletion of new journals;
  - Graphical layout management of the press (which may be replaced by different style elements at journal level);
  - Creation of user groups related to Press functionalities.
- Modification of Site Administrator role:
  - Creation / Editing / Deletion of new presses;
  - Creation / Enrollment of Press managers.
- Implementation of statistics at press level, monitoring number of registered users, number of published issues and articles.

functionalities.
- Addition of localization xml files for new created user interface entries.
- Modification of the OJS source code in order to correctly interface the original OJS features within the new multi-press architecture.

The Press Manager role has been designed assembling specific functionalities of both the Site Administrator and the Journal Manager: from the former he inherited the skill of customizing the general graphical layout of his own press, as well as creating, modifying and deleting new journals; from the latter the management of press registered users, user groups and statistic plugins, as well as the control of file browsing functionality within the press.

IV. APPLICATIONS AND RESULTS

The extended multi-press OJS framework has been used to realize an experimental web portal, which represents the main technical activity of the *Palamede* research project.

The outcome of this experimental stage of the project is available online [19]. Some illustrations of the new features of the web platform are presented in Figure 3. The application of multi-press OJS in the Palamede portal has been validated through an experimental activity carried out by the three University Presses taking part to the project (see Section II.A). The aims of this experimentation have been the creation of three public presses and four journals, as summarized in Table 3. Press managers have edited their own press layout and, for each Journal, at least one issue has been published.

The whole peer-review editorial review has been tested by new registered journal managers, editors, section editors, authors, reviewers and proofreaders. All users playing those roles have been qualified users already using the OJS and other open journal systems. Here follows a final numerical balance of fulfilled editorial actions in the experimental activity of *Palamede* portal:

- **4 Presses** have been created: three published by the involved University Presses and one created by the DISIT Lab for testing purposes, which has not been published;
- **5 Journals** have been created: four published by the University Presses (see Table 3) and one by DISIT for tests;
- A total of **4 issues**, among all the published journals, have been produced.

V. CONCLUSIONS AND FUTURE WORK

The goal of reengineering the original OJS framework and creating a new multi-press platform has been successfully accomplished. This result has been positively received within the University Presses and the partners taking part to the *Palamede Project* experimentation, and moreover within the PKP community: actually the presented work has been announced in the PKP development forum [20], and it received positive comments, with the perspective of evaluating (and possibly redistributing) the source code of a final, full functional version. Regarding this topic, some guide lines for short-term future work have been already planned. They mostly concern search methods improvement, since the aggregation of several presses, dealing with different research areas and topics, requires a more efficient search engine.

Future implementations can be grouped into the following main activities:

- semantic indexing for search engine optimization and fuzzy queries;
- production of statistics for queries;
- techniques for monitoring number of accesses, downloads etc.;
- alternative payment methods for subscription and journal fees (actually, OJS natively supports PayPal only).

TABLE II. BROWSER-LIKE TABLE LISTING ALL THE NEW SMARTY TEMPLATES (.TPL FILES) INCLUDED IN THE EXTENDED MULTI-PRESS OJS, GROUPED BY SYSTEM INSTALLATION FOLDERS. NEW CREATED FOLDER NAMES ARE DISPLAYED IN ITALIC STYLE.

New Smarty Templates included in multi-press OJS
(Browsed by OJS installation folder)

<OJS Install Folder>\Templates

About	
	indexPress.tpl
	press.tpl
	pressContact.tpl
	pressGroups.tpl
	pressHistory.tpl
	pressStatistics.tpl

Admin	
	presses.tpl
	pressJournals.tpl

Index	
	press.tpl

PressManager

PressEmails	pressEmails.tpl

PressFiles	index.tpl

PressGroups	pressGroupForm.tpl
	pressGroups.tpl
	pressMemerships.tpl
	selectPressUser.tpl

PressPeople	pressEnrollment.tpl
	pressEnrollSync.tpl
	pressUserProfile.tpl
	pressUserProfileForm.tpl
	searchPressUsers.tpl
	selectMergePressUser.tpl

PressPlugins	managePressPlugins.tpl
	pressPlugins.tpl

PressSetup	index.tpl
	pressSettingsSaved.tpl
	pressSetupHeader.tpl
	step1.tpl
	step2.tpl
	step3.tpl

PressStatistics	index.tpl
	pressReportGenerator.tpl
	pressStatistics.tpl

index.tpl
pressLanguageSettings.tpl

PressUser	index.tpl

Furthermore, the following longer-term future developments have been considered:

- acquisition of instruments in order to integrate the actual OJS framework with models for automatic management of different content types (including media) and metadata. A useful tool to achieve this purpose is represented by the AXMEDIS Content Processing Solutions (AXCP) [21]. AXMEDIS [22] is a large project developed by the DISIT Lab in its recent past activity, in collaboration with several important international partners;
- multi-platform distribution: PCs, mobile devices, PDAs, iPhone, iPad, Android etc.;
- solutions for social networking and distance learning.

TABLE III. SUMMARY OF PUBLISHED PRESSES AND JOURNALS IN THE EXPERIMENTAL ACTIVITY OF THE *PALAMEDE* PORTAL.

Presses	Journals
Università di Parma	• Papyrotheke
FORUM Editrice Universitaria Udinese	• Popolazione e Storia • Plurilinguismo. Contatti di Lingue e Culture
Firenze University Press	• Annali del Dipartimento di Filosofia

ACKNOWLEDGMENTS

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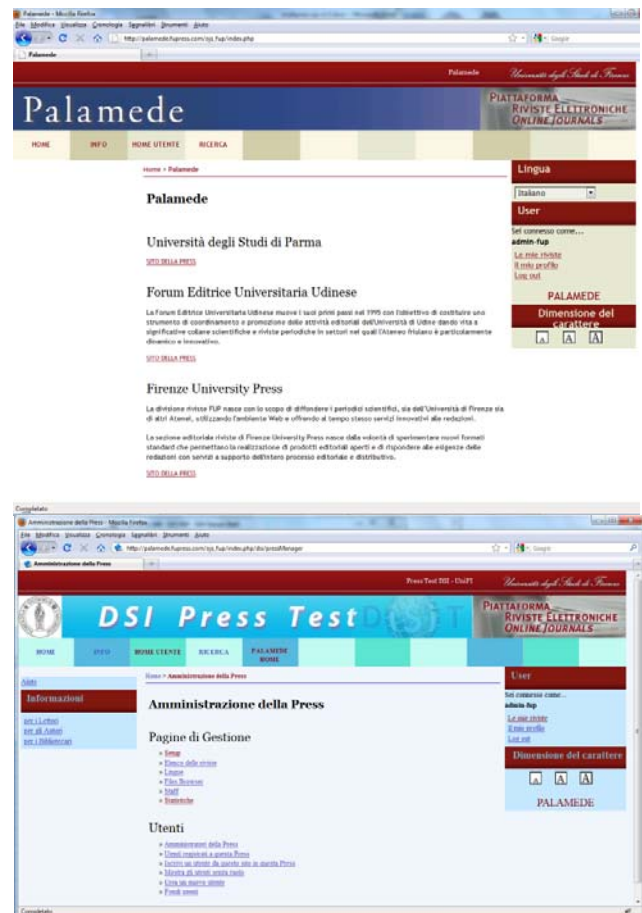[22] AXMEDIS Project – Automatic Production of Cross Media Content for Multi-Channel Distribution. [Online]. Available: http://www.axmedis.org/

Figure 4. Home page of the *Palamede* portal. Example of Press Management page and customized graphical layout: *DISIT-DSI Test Press*.