# STUDY CASE OF A COLLABORATION PORTAL FOR A INTERNATIONAL SCIENTIFIC PROJECT

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## Abstract

In this paper we present the results of the design, development and preliminary evaluation tests of a web-based collaboration portal aimed at supporting the teamwork of an international scientific collaboration.

In the academic research environment often people use very simple collaboration tools, usually chosen out of habit. In the case of international collaborative projects, in which people don't work physically in the same place for most of the time, these important tools are far from being effective and appropriate. For instance, a collaborative scientific project is made of teams of specialists from different research institutions and countries that need to share files, drawings, pictures, software etc. and document the progress of their work. The different tasks of the project are managed by work groups (WGs) of specialists that organize their work by scheduling meetings, workshops and by setting deadlines. Quite often a single researcher contributes to more than one work group.

The aim of our Portal is to offer a suite of web instruments fulfilling the above requirements without adding extra complexity to the procedures the scientists are familiar with.

## INTRODUCTION

In the present-day world of science, research projects are often carried out by large collaborations of different research institutions and universities. The need of specialists for each task of the project requires the contribution of top-quality scientists from different parts of the world working in collaboration across the different phases of the project development: design, operation and the analysis of results.

Sometime the collaboration is based on in-kind contribution from each partner requiring a constant interaction to ensure the perfect matching of the components.

Given these requirements, a continuous and effective communication among members of work groups, and a constant coordination of the latter, is crucial for the successful development of the tasks. At higher level, WGs leaders should continuously check the progress of their own group against each other to ensure a uniform development of the project.

Scientists, compared to many other professional communities, are certainly skilled and well trained in using computers and computer networks because of the important role these instruments have in their daily work.

As consequence of this familiarity, scientists spontaneously tend to profit from computer based communication and collaboration tools, selecting by themselves the solution they consider more appropriated.

This explains the tendency to develop solutions to their collaboration needs that simply implement the tools they are more familiar with: email especially, for communication and documents distribution, file servers, Internet shared agenda, polling services etc.

Experience teaches that, in spite of their familiarity with Internet technologies, or probably as a consequence of it, scientists are somehow reluctant to accept dedicated all-in-one project management solutions that might be selected and suggested by the management. Often, they are convinced that the collaboration instruments they currently use are sufficient or even more effective that the new one.

The above considerations suggested us to start the development of a web portal aimed to providing a "smooth" replacement of basic communication and collaboration tools with a centralized server.

## OVERVIEW OF TOOLS AND TECHNOLOGIES

The first task of our analysis process was the identification of the framework suited for our needs.

We ended up with three candidates representing a wider spectrum of technologies: Xoops, Joomla and Liferay. The first two are PHP frameworks; the latter is by now the only open source Java Portal. A deeper analysis showed that only Liferay would have fulfilled our user scheme. On the other hand this portal it's far from being simple, but its complexity can easily be hidden to the final user.

## THE COLLABORATION PORTAL

The Portal is meant to be a web-based integrated set of tools supporting a large collaborative project as a communication and documentation service. The two main goals of the Portal are prompt and effective information sharing and well ordered archiving. The Portal also contains additional services that support other aspects of the collaborative work, a calendar for instance, and by taking advantage of the Java portlet [1] "plugability", others can be added if need be.

### Users Management

As we already mentioned, the main reason for adopting Liferay was its powerful user management capability. In international, or large national scientific collaboration scientists from many different research organizations

contribute to the development and operation of a large device, experiment, facility by collaborating to the progress of the different activities dealing with the tasks of the project.

Work Groups, constituted by experts of different research organizations, are created around each task. Typically, scientists from each organization are distributed in many of the project's WGs and every single scientist might contribute to more than one WG. The collaborative Portal should take into account this organization for a targeted and effective deployment of it services (Fig.1).

In Liferay a user's profile can be defined in details and used to configure the services, roles, privileges and even the layout of the user's home page with the information and instruments relevant for role and responsibilities of that particular user. Users won't need to browse the whole Portal to find what they're looking for; sections that are not interesting, or forbidden, will be hidden.

This powerful management of users profile allows creating easily and effectively the different workspaces of the Portal. Work Groups homepage (Fig.2) are accessible only to members of that particular WG and links to these WG homepages are automatically available in the homepage of their members. Similarly, Institutions homepages are accessible only to users affiliated to that research organization.

As final result the Portal is automatically customized for each user according to its profile. Moreover, since users will find their own environment at the first login, learning effort will be very limited.

### Portal Workspaces

One of the main concepts and functional components of the Portal are the workspaces. Liferay allows for much flexibility in this aspect, the workgroups, the institutions, even single users can have their own separate workspace. The administrators can decide if the contents of a workspace need to be accessible for reading to all the registered users (i.e. all participants to the project) or only to members of that particular Workgroup.

The management of the Workgroups is dynamic. It means that the project structure doesn't need to be set a priori when the Portal is under development; the Workgroups can be added and removed any time when the Portal is running.

Although Liferay offers other powerful features, for our purposes we chose to use only part of its structure. For instance we didn't implement user's personal workspaces to simplify the interaction with the Portal and to focus user's attention to collaborative activities and services.

The access to the Portal is restricted. Nevertheless the Administrator can configure the workspaces in such way to make some information accessible to unregistered users.

### Applications and Tools

The Logbook and the Document Library are the core of the Portal's functionality. The Logbook, developed by customizing the original Blog portlet, is the main tool for sharing information and documenting the progress of the teamwork. The Document Library is the repository for both files uploaded by means of either the built-in interface or as attachments to Logbook entries. While editing Logbook entries, attachments can be assigned to a specific folder according to the topic, achieving a well-organized allocation of files in the repository, which can be accessed via either the Logbook's interface or a dedicated browsing page.

The Calendar allows management of events and deadlines; users can be reminded of relevant events through an automated email system. The Bookmarks tool allows highlighting important links in a side frame. The Activities portlet aggregates all the relevant recent activities, sorted by date, at a glance: new Logbook entries, recent uploaded documents and new Calendar events.

Search is enabled for all of the Portal's content, and is implemented with Lucene text-search library.

As already mentioned before, the main feature of the Portal is the integration of these simple, well-known tools into a fully functional application.

The inter-operation and the co-presence of these tools in a managed environment provide added value to this solution.

As an example, we present in more detail benefits offered by the Portal for some collaborative tasks as compared to the "standard solutions":
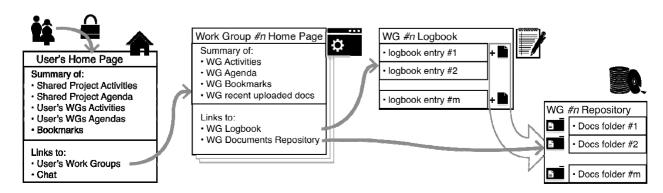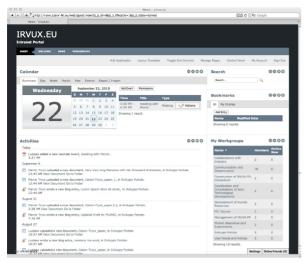


Figure 1: Basic navigation workflow

Figure 2: An example of user's home page.

## Documenting a work group activities

This duty is usually accomplished by sending email to all WG members and each user needs to organize its own mailing list in the mail browser and keep it up to date. A typical issue is tracking back the old messages in the search for particular information. That is usually not trivial, although some mail browsers allow threading by subject. The Logbook (Fig.3) approach is still simple but more effective: entries are available to all current members of the WG in a dedicated section of the Portal, sorted by date and stored for later browsing. An RSS service, available for this as well as for many other sections of the Portal, allows users to be promptly informed about relevant activities.

## Files distributing and archiving

The dedicated Documents Library is a more efficient replacement of a file server.



Figure 3: The Logbook page

A WG can choose a simple one-level folders structure, another might need a more complex multi-level tree-like file system for a structured archiving. The main way to add files to the Library is through the Logbook interface, but single files can be added through the dedicated Documents Library interface. Either way a message that a new file has been uploaded to the Portal will be added in the Recent Activities section in both user's and WGs' homepage. As well as the Logbook entries, all the files can be searched by title and by content in full-text mode, given it's a text-based file like txt, doc or pdf.

### Setting up a meeting, deadline, reminder etc.

Any kind of event relevant to the Project or WGs' life can easily be added through the Calendar's advanced interface. Many different event types can be managed: recurring events, multi-day events, etc. The events are time zoned by default, simplifying international users access. Furthermore, all the users potentially interested to the event will receive an automated remainder via email before it's beginning, with customizable advance time.

## FIRST ADOPTION

The European IRUVX[*] collaboration has been the first real-life adopter of the Portal. IRUVX project perfectly fits with the target of the Collaboration Portal: it's an international collaboration aimed to the development of an international consortium of FEL facilities; it addresses different tasks that are managed by working groups in a coordinated effort.

During the test period members of the collaboration involved in the evaluation actively helped us by debugging the Portal services and also suggested minor tweaks for usability. With this experience we ended up with a fine-tuned working Portal, confirmed by the good user satisfaction.

## CONCLUSION

The development of a web-based collaboration portal aimed at supporting the teamwork of an international scientific collaboration has been completed. The Portal has been under test for several months by an international scientific collaboration and results confirmed the effectiveness of the collaborative services it provides. Modularity of the framework allows to easily customize and expand the services to any particular user needs.

## REFERENCES

[1] http://www.liferay.com/.

[2] A. Abdelnur and S. Hepper, "JavaTM Portlet Specification v.1.0";
http://jcp.org/aboutJava/communityprocess/final/jsr168/