

An Open Source Software Forge for European Projects

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ABSTRACT

Open Source is an increasingly interesting vehicle for dissemination of project results within the R&D and ICT FP7 communities. PROSE, an FP7 ICT project, is promoting open source adoption by creating a software forge that provides project management, source code hosting, and development support for the ICT and European open source projects. In this paper we present the key requirements for a software forge resulting from a public consultation of projects in the European space, and the corresponding instantiation of an open source software forge, publicly available at opensourceprojects.eu. We also discuss the relevance of a centralized collaboration platform for European projects, and the value presented by such an approach as opposed to current source code repositories.

Categories and Subject Descriptors

K.6.3 [Software Management]: Software process – open source, repositories, version control, project management, development support.

Keywords

Software, forge, version control system, project management, FLOSS, open source, code management, survey, ICT, FP7.

1. INTRODUCTION

As Free/Libre Open Source Software (FLOSS) can be studied, adapted, modified, changed freely, and verified, it provides several key advantages for research environments, and it is gathering momentum within the 7th Framework Programme (FP7) Information and Communication Technologies (ICT) community. Open source is an increasing dissemination vehicle of project results, and a growing number of European projects are delivering FLOSS software as a result of their research and development process.

However, projects frequently fail to disseminate those results beyond the original contributors. Legal issues, lack of business drivers, incomplete documentation or a generalised lack of

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OSDOC'13, July 11-12, 2013, Lisbon, Portugal.

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knowledge about FLOSS are among the most common problems developers face, and be particularly deterring in large scale collaboration projects. Software becomes limited to project participants (e.g. FP7 project partners and consortiums), so the contribution potential becomes narrower, as well as the long-term use of the software.

To overcome these barriers, the FP7 PROSE¹ – Promoting Open Source in European Project [1] - consortium is deploying a platform for hosting ICT projects, along with information and training content on legal and business aspects. This is part of an effort to encourage the adoption of FLOSS, and simultaneously increase the success of projects' results. Through a common platform, projects have a central location for finding and sharing FLOSS within their respective communities, increasing re-use and collaboration between projects. To reduce the obstacles towards opening project results, the platform tools proposed by PROSE can support the entire development process. Therefore, it is possible to incorporate FLOSS into the core development model, providing a simple path towards open sourcing software, and in the process building a community that ensures software outlives projects' duration.

As the PROSE platform is specifically targeted at European stakeholders, specially projects and companies operating within the ICT area of the FP7, it is necessary to understand specific platform requirements to increase adoption throughout the target audience. In this paper we present how such requirements were collected through public consultation in the form of a survey, and how they are being used to deploy a platform for European stakeholders that can boost the success of FLOSS software in the targeted communities. Following this approach, we detail the deployment of the PROSE platform² and highlight the main features that were deemed important by the survey results presented in Sec. 2.

The remainder of this paper is organized as follows: In Sec. 2, we present the motivation for the PROSE platform, along with the main platform requirements stemming from a public consultation survey that guided the platform selection process. In Sec. 3 we show how these results are being used to set up and evolve the PROSE platform, addressing the ICT community needs, and in Sec. 4 we discuss how the PROSE platform can succeed where other efforts have failed. We conclude the paper in Sec 5, outlining the key ideas for the platform, and future steps.

¹ Promoting Open Source in European Projects – PROSE - is a Coordination Action funded by the European Commission under contract no. 318218 under the 7th Framework Programme.

² European Open Source Projects, <http://opensourceprojects.eu>

2. A Platform for European FLOSS

The main goal of PROSE is to foster the use of Open Source development models within ICT projects, as a way to improve project collaboration and impact. This goal can be broken down into several key aspects that aim to increase collaboration and (quality) assessment of open source projects by relying on the core features provided by FLOSS software projects. Accordingly, PROSE aims to:

1. Promote collaboration between projects, through the exchange of open results and expertise
2. Measure project health and growth through project metrics (such as numbers of issues, commits, forks)

standalone tools such as Google Groups are already widely used (as mailing lists), others like wikis and forums are usually integrated.

- What security or support features are needed? Secure access using HTTPS or SSH, live support or backup solutions.
- What metrics are significant to measure progress for a project? Commit counts, issue tracker data and other data sets collected around a project can be used to measure project progress over time. This is an important part of measuring quality and dissemination of results as open source software. This topic alone is already covered by existing European projects (e.g. FLOSSMETRICS [2] and

Source Code Hosting (G1)

Identify the primary tools for source code management and identify the main capabilities and limitations for individual projects hosted in the forge

Collaboration Tool (G2)

Establish the key collaboration mechanisms and recognize the associated collaboration models, that drive software development within EC ICT projects

Security and Support (G3)

Determine what technical capabilities the platform must provide in order to adequately support its' projects and ensure secure access to its users

Project Metrics and Statistics (G4)

Identify what software quality metrics can be built from the multitude of available data that accurately convey a measure of the quality of project's results

Figure 1 Goals for each survey question group

3. Measure project impact, even after the end of project
4. Provide support to projects for using open source in terms of technical, legal, and business models that suit their needs

Part of this work is accomplished through the creation of an online platform where European projects can publish their results as Open Source software. However, for creating a platform for FLOSS development, usually referred to as a software forge, or simply forge, that maximizes the benefits for projects within the ICT, there are several options, both open source and proprietary. To understand which is best suited for deployment, it is necessary to recognise the community requirements around a software forge and the key aspects that may lead to the open sourcing of project results.

As part of the process of gathering requirements for the platform we built a survey, specifically targeting the requirements of ICT projects. The purpose was to identify characteristics that significantly differentiate ICT projects from the typical open source projects, and that are acting as deterrents for hosting their results in existing forges. The survey was divided into four groups of questions, described in Figure 1. Each of these groups aimed primarily at identifying more clearly the following points:

- Which version control tools do projects expect? GIT seems to be the predominant solution in Open Source forges, but ICT projects also include people from diverse areas that might not be familiar with this tool.
- What collaboration tools (mailing lists, wiki, and forums) need to be integrated in the hosting platform? Some

OSSMETER [3]).

The majority of the questions were optional, allowing respondents to focus on the group they considered more relevant. The survey was disseminated mainly through ICT projects, gathering a total of 42 responses. While responses were anonymous, 25 of the participants willingly identified themselves as members of European universities, research laboratories and companies.

From the survey results we gathered a number of requirements. Here we emphasise the aspects that are more challenging within the context of PROSE, which are in fact those specifically relating to the use of Open Source in ICT projects.

By analysing the survey responses, privacy features (e.g. private repositories, or restricted content access) stood out as a key feature when choosing a platform: ICT projects operate over a mixed set of closed, and potentially open source, components where some results can be private/internal while others are public. This makes it very hard for such projects to live entirely inside an open source forge (and hosting in multiple locations might be seen as an operational nuisance). This is clearly visible in Figure 2, which highlights the need to support private projects. An overwhelming majority of approx. 76% of the responders indicated this as a requirement for adopting a

platform.

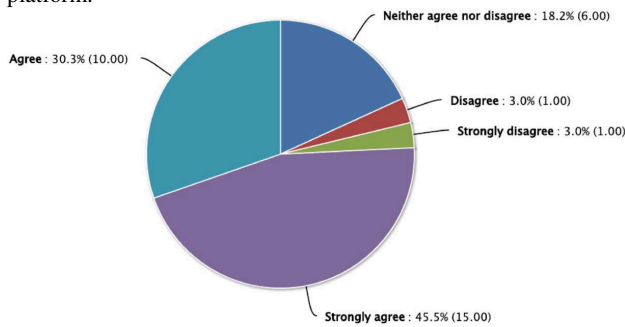


Figure 2 Survey: Support private projects

Another identified requirement deals with version control systems (VCS) for source code management: while the more recent Git³ is the preferred version control tool, Subversion⁴ still gathers significant support (see Figure 3). Interest in other VCS tools is marginal. The resulting conclusion is that to reach a wider audience both Git and Subversion should be supported under a platform for the surveyed audience.

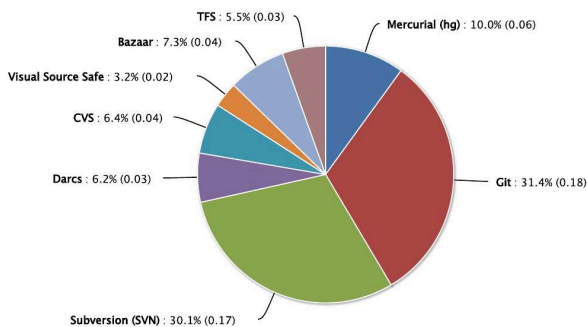


Figure 3 Survey: Importance of different Version Controls Software solutions (values < 0.05 express indifference or rejection by the majority of respondents)

A third feature that received significant consensus (Figure 4) was the ability to structure projects in parts, create sub-projects and enforce access control for each subproject. This seems to mimic the structured work model followed by ICT projects, which splits the work into independent work packages and tasks. A two level structure not very common in other forges.

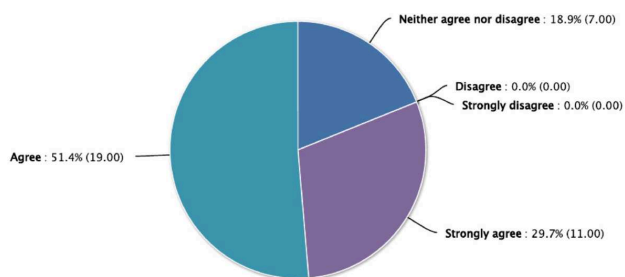


Figure 4 Survey: Support for subprojects

The need for software quality metrics was also identified. While popular source code hosting platforms such as SourceForge⁵, GitHub⁶, (or even Ohloh⁷, a tool to compare and analyze open source projects) tread into this path, this is still far from the kind of metrics we envision. Ideally, metrics should accurately reflect project success. In the context of EU ICT funded, this can be defined by progression, dissemination and cooperation. Most participants identify the number of downloads, as well as community ratings, as good dissemination metrics. The remaining can be obtained by activity and component (re)use. Interestingly, few participants considered integration with popular social networks important. From the point of view of collaboration, mailing lists, forums and wikis remain the most popular solutions. The combined feature set identified in the survey was used as the starting point for comparing and selecting a platform, as outlined in the following section.

The PROSE requirements survey is still online at the PROSE website [1], now available to the general public, and will continue to shape the future decisions on the platform.

3. Building a Platform for EU stakeholders

Analyzing the features provided by several existing platforms in light of the survey results, poses a series of challenges. The need for privacy features is what usually leads ICT projects to host their own infrastructure, and the lack of other features, makes it hard to find a solution that is readily up to the task. Also, it is necessary to select a platform that can provide all of the tools for project management and development, which includes software management and quality control (e.g. ticketing or bug services), along with file and application release.

All of the aforementioned aspects steered PROSE towards the Allura Forge platform [5]. Allura is an open source solution for building software forges, spawned from the SourceForge codebase as an incubated Apache Foundation project. Besides addressing most of the previously described requirements, Allura provides several differentiating factors, such as the possibility of running a self-hosted solution, allowing platform customisation, the support for multiple tools (especially VCS, supporting both Git and Subversion) and the possibility for the inclusion of external cutting-edge functionality, such as advanced metrics that may originate in other ICT projects and increase the collaboration defined through PROSE.

Additionally the close relationship to the (Allura-based) SourceForge ecosystem, with its high Alexa⁸ rank and several million users, is also an important contribution: we are currently establishing an ICT neighbourhood on Sourceforge to bridge the interests of both communities, increasing the impact of the PROSE platform and the visibility of ICT open source projects.

3.1 Features

Much like other source code hosting platforms Allura allows users to create individual projects. Each project can be public, private, or hold custom access controls based on user groups. For each

³ <http://git-scm.com>

⁴ <http://subversion.apache.org>

⁵ <http://sourceforge.net>

⁶ <http://github.com>

⁷ <http://ohloh.net>

⁸ Alexa (<http://alexa.com>) is a free, global analytics provider.

project there is a set of tools that can be enabled. Currently the following tools are available:

- Source Code hosting, using both Git and Subversion
- Issue tracker
- Wiki
- Threaded discussion Forums
- Blog
- Mail subscriptions, similar to per tool mailing lists

In addition projects can create their own subprojects, each with their own instances of these tools. Project managers can also enforce fine-grained access control (per project, subproject or event per tool). This enables flexible management options, like having multiple code repositories, or multiple issue trackers in the same project, for example one private tracker for security issues and a public one for regular issues. By itself, Allura already provides some metrics, for the issue tracker tool, or through the use of external analytics. In addition we are currently looking into integrating external tools.

3.2 Open platform for ICT Projects

The intent of PROSE is to align the results that ICT projects produce, in such a way that promotes project collaboration and dissemination. But this goal is faced with a number of challenges.

Traditionally ICT projects host their own infrastructure for these tools, and there are many solid reasons to do so. Either because of custom workflows, or to integrate with tools that public hosting cannot accommodate. Particularly for projects that are already in progress it is difficult to motivate a full switch to a new set of tools. However it is important to preserve past results into future projects and disseminate them inside and outside of the ICT community. As such there are a number of options for both new and ongoing projects, even if hosting within this platform is not a viable option.

From the perspective of the ICT community, it would be desirable that Open Source results from past projects could easily be found and jointly worked on a common location towards future goals. While projects already release their results as Open Source, there is no community awareness, and the connection to ICT is sometimes lost. When joint work between two different projects takes place there is usually the need to setup some common infrastructure when interchange of work can take place. These efforts are good opportunities to initiate Open Source projects than can benefit from a larger community.

4. Discussion

As highlighted earlier one of the main objectives of the project is to be an aggregating platform for managing European stakeholder open source projects. With guidance from target users, the instantiated PROSE platform, with its support for source code hosting, collaboration tools, security support and project metrics, gives the EC ICT community a support model for cooperation within the overall framework context. By providing a common platform and a workflow that ultimately leads projects to create FLOSS software, PROSE is promoting true FLOSS-based collaboration and open results. The platform can publish and share the produced software, making it easier for other EC ICT projects and partners to benefit from the FLOSS efforts that have already been delivered. It also facilitates the potential for the source code base to outgrow the original scope of the project,

leading to new business and research opportunities within European spaces.

While other forge platforms may offer similar features, PROSE is looking to meaningful differentiators. The most important differentiating factor is that PROSE aims towards providing a community rather than just a repository for open sourcing software. By enabling complete development process support (e.g. through private or access controlled project management tools), followed by information on legal and business aspects, PROSE can provide support for R&D experts taking their initial steps in FLOSS, a common profile in the ICT.

The other key differentiator focuses on software quality metrics, going beyond metrics that primarily focus on developer activity, with PROSE additionally looking to less tangible measures such as usability, code quality, documentation quality, reliability of service, testability, and social impact of the code base throughout a projects lifetime, and even beyond the end of the project. The self-hosted PROSE deployment provides the flexibility required to integrate ongoing efforts on quality metrics, either from the continuously growing Allura platform, or ongoing research efforts by projects such as Flossmetrics [2], Ossmeter [3] or Markos [4]. Such metrics are an important measurement for projects' activities. Not only in terms of internal project achievements, but also to measure interaction with other EU projects. Furthermore this allows the community to keep track of software that is a direct result of EU research projects, even after the projects that originally produced it have ended.

As the user base of contributing projects grows, there is also the possibility of experimenting with trending technologies. The testability metrics are of particular interest from a future research topic perspective. As more developers use behavioural driven development (BDD), where automated acceptance tests are bundled and run in conjunction with the continuous build server, a new set of software quality metrics will give external viewers insights on the effectiveness and efficiency of the software products being hosted on the PROSE platform.

5. Conclusion

In this paper we've presented the PROSE platform, highlighting the motivation towards providing a platform for FLOSS software, and the active role it can have in fulfilling the ultimate goal of promoting open source in European projects. We've highlighted the decision process, and the actual requirements collection based on a public consultation in the form of a survey, that took place targeting mostly the FP7 ICT community, the main target of the PROSE project. The key differentiating factors explored, are based on features that are hard to find in Open Source forges, but are key requirements in ICT projects. To circumvent this we are deploying our own platform for ICT projects, hosted at <http://opensourceprojects.eu>.

In the future we will continue to improve the platform by collecting user feedback through public consultations, and most importantly, integrating software and project metrics with the goal of providing information that builds confidence on the developed FLOSS software. By improving the quality of open source software and raising awareness to the key advantages of using FLOSS models, PROSE is increasing the value and impact of the results of research projects in the European space.

6. ACKNOWLEDGMENTS

We acknowledge the PROSE consortium participants who contributed to the PROSE platform, presented in this paper: Rui L. Aguiar and Carla Leite (IT Aveiro), Roberto Galoppini and Davide Galletti (Geeknet Media), and Timo Mustonen (MFG).

The work presented in this paper was partly funded by the European Commission through the PROSE FP7 project, under contract number FP7-ICT-2012-218318.

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