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IFIP – The International Federation for Information Processing

IFIP was founded in 1960 under the auspices of UNESCO, following the first World Computer Congress held in Paris the previous year. A federation for societies working in information processing, IFIP's aim is two-fold: to support information processing in the countries of its members and to encourage technology transfer to developing nations. As its mission statement clearly states:

> *IFIP is the global non-profit federation of societies of ICT professionals that aims at achieving a worldwide professional and socially responsible development and application of information and communication technologies.*

IFIP is a non-profit-making organization, run almost solely by 2500 volunteers. It operates through a number of technical committees and working groups, which organize events and publications. IFIP's events range from large international open conferences to working conferences and local seminars.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is generally smaller and occasionally by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is also rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

IFIP distinguishes three types of institutional membership: Country Representative Members, Members at Large, and Associate Members. The type of organization that can apply for membership is a wide variety and includes national or international societies of individual computer scientists/ICT professionals, associations or federations of such societies, government institutions/government related organizations, national or international research institutes or consortia, universities, academies of sciences, companies, national or international associations or federations of companies.

More information about this series at http://www.springer.com/series/6102

Ioannis Stamelos · Jesus M. Gonzalez-Barahoña
Iraklis Varlamis · Dimosthenis Anagnostopoulos (Eds.)

Open Source Systems: Enterprise Software and Solutions

14th IFIP WG 2.13 International Conference, OSS 2018
Athens, Greece, June 8–10, 2018
Proceedings

2 Springer

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General Chair's Message

I would like to welcome you to the proceedings of the 14th International Conference on Open Source Systems (OSS 2018) held in Athens during June 8–10, 2018. OSS 2018 was an emblematic international conference in the area of open source systems and I was much honored to serve this year as the general chair of this conference.

Apart from being an international forum where professionals from academia and industry gather to share research and discuss all aspects of FLOSS and new FLOSS initiatives, this year's OSS conference also focused on practical experiences, as open source enterprise software has reached a high level of popularity. An increasing number of organizations recognize the benefits that FLOSS offers, bringing open source software into their business.

I am also very proud of this year's program, which included an exceptional line-up of keynote speeches, by Tony Wasserman and Jörn Altman, and a collection of technical papers.

This conference would not have been possible without the contributions and efforts of many, not the least of whom are the program chairs (Iraklis Varlamis, Ioannis Stamelos, and Jesus Gonzalez-Barahoña), the Program Committee members, our local organizers (Konstantinos Tserpes, Dimitrios Michail, and George Dimitrakopoulos), the Greek Open Technologies Alliance (GFOSS) for supporting OSS 2018 and Mara Nikolaidi, the rector of Harokopio University of Athens. I would also like to thank Tony Wasserman for his valuable support throughout all conference organizing activities and most importantly, you, the members of the OSS community.

June 2018   Dimosthenis Anagnostopoulos

Program Chairs' Message

It is a great pleasure to welcome you to the proceedings of the 14th International Conference on Open Source Systems (OSS 2018). The range of papers published in *Open Source Systems: Open Source Enterprise Software and Solutions* cover a range of topics related to free, libre, and open source software (FLOSS), including: licensing, organizational and management issues; best practices and case studies; quality and reusability of projects, tools, and systems.

The OSS series of conferences aims to provide an international forum where a diverse community of professionals from academia, industry, and the public sector, as well as diverse FLOSS initiatives can come together to share research findings and practical experiences. The conference is also a forum to provide information and education to practitioners, identify directions for further research, and to be an ongoing platform for technology transfer, no matter which form of FLOSS is being pursued.

We are very pleased to have received 38 contributions (34 full and four short paper submissions) for the technical program, from which we included 14 full papers and one short paper (representing an acceptance rate of 41% for full papers). Every paper received on average three reviews by members of the Program Committee, and was carefully discussed by Program Committee members until a consensus was reached. Based on the reviews for each paper, one of the two program chairs initiated an online discussion among the reviewers in order to reach consensus. The two program chairs facilitated this process for the different papers. All decisions were based on the quality of the papers, which considered the reviews and the outcome of the discussions.

The program also included two keynotes (by Anthony Wasserman and Jörn Altmann), two tutorials and one "Working Session on Developing a FLOSS Body of Knowledge." We would like to give special thanks to all the people who allowed us to present such an outstanding program, and we would especially like to mention: the Program Committee members and additional reviewers; the community and publicity chairs; the session chairs; all the authors who submitted their papers to OSS 2018; the General Chair (Dimosthenis Anagnostopoulos), and the local organizers (Konstantinos Tserpes, Dimitrios Michail, and George Dimitrakopoulos). We are also grateful to the Greek Open Technologies Alliance (GFOSS) for supporting OSS 2018, the rector of Harokopio University of Athens, Maria Nikolaidi, for her valuable assistance and a number of other people without whom this conference would not have happened.

June 2018

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Ioannis Stamelos
Jesus M. Gonzalez-Barahoña
Iraklis Varlamis

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Preface

The 14 full and one short papers that were selected for presentation are organized thematically as follows:

Organizational Aspects of OSS Projects

The work of Eckert [1] draws parallels between OSS projects and organizations and explains with paradigms how the components of an organizational framework— people, organization, and assets— map to the respective elements of an OSS community.

Wen et al. [2] investigate a 30-month government–academia partnership in order to depict the differences in project management methods employed by the government and by academia and provide best practices that favor team management in collaborative works.

Ilin et al. [3] perform a study on founders, developers, and managers of 13 crowdfunding initiatives involving open source products to determine how communities, crowdfunding campaigns, and open source are associated. Their findings indicate common characteristics among the three, a family-like relationship between the community and the organizers, who perceive community as a success factor for their crowdfunding campaigns.

OSS Project Validity

Kritikos and Stamelos [4] propose an evaluation approach based on the adaptation of the City Resilience Framework to OSS with the aim of providing a strong theoretical basis for evaluating OSS projects.

Pinto et al. [5] study the subject of opening the software history and investigate the reasons behind removing the software history when open-sourcing and the challenges that developers face with the lack of availability of software history.

Chalal and Saini [6] propose and validate a commit message quality model, and use it to analyze seven OSS projects. Their analysis shows that when a small group of contributors is active at the same time in a project, this leads to high syntactic quality contributions.

Mining OSS Data

Kouzari et al. [7] perform an empirical process-mining research on the Koha open source integrated library system and find that the bug closure process followed in the project is very similar to the declared one but that variations do occur under specific circumstances. In this way, they highlight the importance of process mining in OSS

projects in order to investigate the processes followed and identify outliers helping to standardize and improve the processes and to enhance the collaboration among members of the community.

Ribeiro et al. [8] present Kiskadee, a system to support the usage of static analysis during software development by providing carefully ranked static analysis reports. The software runs multiple static analyzers on the source code and then classifies and ranks all the potential bugs by importance.

Caetano et al. [9] introduce an approach based on software issues to support decision-making regarding open source software development activities such as release planning and retrospectives. They form an issue dependency topology and apply a PageRank algorithm to suggest an importance ranking of the software issues, which can then be used by project leaders as an input to planning activities.

OSS in Public Administration

The work of Williams [10] presents how a FLOSS software, Open Source Internet Research Tool, OSIRT, has the opportunity to flourish in the sector of law enforcement, especially because of the cuts to budgets being made to law enforcement services.

Koloniaris et al. [11] record the current penetration and usage of free and open source software in the municipalities of Greece and compare its potential with the current state of computerization and the hardware level. They examine the possibility of improving the services provided to the citizens as well as the cost aspects from the use of OSS.

Vafopoulos et al. [12] propose a model conceptualization (Linked Open Economy, LOE) capable of exploiting the massive amount and variety of open economic data that are gradually becoming available by governments and open source communities. LOE will create a common ground to serve as a catalyst in providing more efficient answers in important economic activities.

OSS Governance

Harutyunyan et al. [13] present a study of ten companies with advanced FLOSS governance practices and conclude with a partial theory of FLOSS governance tool requirements by industry. By providing a detailed hierarchical list of these industry-relevant requirements, they offer a unique insight into industry understanding of FLOSS governance tools and their expectations, alongside existing tools and their features.

OSS Reusability

Routis et al. [14] present the ReWeee Platform, a collaborative community platform, developed exclusively with open source software. Using only OSS components, they manage to develop the platform writing less than 10% code and reusing more than 20 software components.

Kyriakou et al. [15] examine how Rust and Node.js and their respective tooling and package repositories can be used for discovering existing OSS implemented in C/C++. With an incremental methodology applied in a proof-of-concept situation, they show the potential increase in discoverability, code quality, and portability, along with viable performance degradation of portable binaries.

June 2018

Ioannis Stamelos
Jesus M. Gonzalez-Barahoña
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