– Workshop proposal for SPLC 2013 –

First International Workshop on Multi Product Line Engineering (MultiPLE 2013)

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ABSTRACT

In an industrial context, software systems are rarely developed by a single organization. For software product lines, this means that various organizations collaborate to provide and integrate the assets used in a product line. It is not uncommon that these assets themselves are built as product lines, a practice which is referred to as *multi product lines*. This cross-organizational distribution of reusable assets leads to numerous challenges, such as inconsistent configuration, costly and time-consuming integration, diverging evolution speed and direction, and inadequate testing.

This workshop is aimed at discussing the challenges involved with the development and evolution of multi product lines and the assets used for their production.

1. MOTIVATION AND TOPICS

Software product line engineering is a paradigm for developing families of similar software products, through developing, maintaining and configuring reusable assets. In an industrial context, software systems are rarely developed by a single organization. For example, in the case of large-scale product families it is common practice that various suppliers and integrators collaborate throughout the development life cycle to provide and integrate the required subsystems and components. These components and subsystems themselves are often built as product lines (or as parts of product lines) and they are generally managed independently of each other, having their own specific requirements and stakeholders. In the literature, such "composite" product lines are most commonly referred to as *multi product lines* [4].

Multi product lines differ from single product lines in the sense that their assets are distributed across various organizations. The cross-organizational distribution of the reusable assets introduces several challenges, particularly inconsistent configuration of components and development artifacts, costly and time-consuming integration processes, and inadequate testing [4]. In addition, many of the product lines involved in a multi product line evolve in their own direction and at their own speed, especially since it is not uncommon that they are suppliers for more than one multi product line. Consequently, constant care needs to be taken to maintain the integrity of each of these composites [2].

Topics: This workshop focuses on addressing the specific challenges involved with managing the development and evolution of multi product lines and the assets that are used for their production. This includes the challenges that are related to the coordination and collaboration of organizations that produce product lines which contribute in forming larger multi product lines. The general topics of interest include, but are not limited to:

- scoping for multi product lines
- (cross-organizational) modeling of multi product lines
- MPL integration and interoperability management
- (cross-organizational) evolution of MPLs
- MPL certification, verification and validation
- industrial experiences & empirical studies on MPLs
- MPLs and software ecosystems
- non-technical issues surrounding MPLs

For more details we refer to the CFP in the appendix.

2. GOALS AND EXPECTED RESULTS

Goal: The main goal of the MultiPLE workshop is to identify and better understand the challenges that are involved with managing the engineering and evolution of multi product lines and the cross-organizational distribution of the assets that are used for their production.

We aim to reach this goal by bringing together practitioners and researchers from the (multi) product line engi-

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neering community with practitioners and researchers that have expertise on related engineering challenges, such as ultra-large-scale systems [5], software ecosystems [1], compositional product lines [2], and product populations [6].

Expected Results: We expect to gain a common understanding of the challenges and issues related to multi product line engineering, and identify potential and synergy among the aforementioned fields to address those challenges and issues. We aim to achieve this understanding by focusing on the following three outcomes:

1. characterize and model the identified challenges and issues in MPL engineering,
2. collect solutions and techniques from related fields and assess their potential to address the needs of multi product line engineering, and
3. propose a research agenda for managing cross-organizational development and evolution of multi product lines and the assets used for their production.

Dissemination of results: The materials produced and collected during the preparation and operation of the workshop will be archived on the workshop's webpage. Accepted papers will be published in the ACM Digital Library as part of the SPLC 2013 Workshop Proceedings. All accepted papers will be made available to registered participants so they can read them prior to the workshop. The organizers will synthesize the results in a workshop report that discusses the challenges brought forward, the progress made on the roadmap, and the open issues that still need to be addressed. This report will be made available from the workshop website and will be submitted to a suitable venue, such as ACM SIGSOFT Software Engineering Notes.

3. FORMAT

The workshop is scheduled to take one day. In order to build a research agenda to tackle the previously mentioned challenges, the workshop will have a strong focus on discussion and interaction.

Schedule: After opening, the workshop starts with an introduction game of 45 minutes. Next, we will have three focused sessions of 3 short presentations ("lightning talks") based on accepted position papers. Each talk will take 5-10 minutes, plus 1-2 minutes for clarification questions. At the end of each session there will be a longer (20 min) discussion to synthesize results and identify the "next steps". To minimize the overhead of changing speakers, we ask that all presentations will be given from the same laptop. A preliminary overview of the workshop schedule is in Table 1.

Table 1: Tentative schedule for MultiPLE 2013

09:00	Welcome and introduction game
10:00	Presentations and discussion 1
10:45	Coffee break
11:00	Presentations and discussion 2
11:45	Presentations and discussion 3
12:30	Lunch
13:30	Working session "challenges and issues"
14:30	Working session "solutions from related fields"
15:15	Coffee break
15:30	Working session "research agenda"
16:15	Short break
16:30	Wrap up: lessons learned and open issues
17:00	Workshop ends
18:00	Joint dinner/social session

To stimulate and drive discussion during the morning sessions, we plan to collect sheets with questions/comments from the presenters as well as the audience during the individual presentations. These sheets also serve as "paper trail" to keep track of all topics discussed and will be scanned and put on the workshop web-page.

We aim to have three working sessions in the afternoon to work towards our intended outcomes. For the first outcome, we will use card-sorting to drive the process; for the second outcome, we will use fishbowl panel discussions. The research agenda will be plenary discussed. The first session is scheduled to take 60 minutes, and the last two sessions will each take 45 minutes. The specific activities are described in more detail below.

The workshop will close with a "wrap-up" session where we will summarize the results and identify open issues. Finally, since we feel that an important part of a workshop is to bring the community together through informal discussions, we plan to invite all participants for a joint dinner or social event (at own expenses) in the evening after the workshop.

Workshop Activities: To address the first outcome, we will use a combination of *affinity mapping* and *card sorting* to collect and organize issues and challenges of multi product line engineering. Affinity mapping and card sorting are popular techniques for conceptualization and help to get a group of people to discuss and organize their collective knowledge [3]. Participants will be given index cards and are asked to write down issues and challenges, one per card. Next, participants will be asked to collectively organize the cards into piles that represent similar concepts. Participants are allowed to merge or redistribute piles and move single cards, and will be asked to come up with a single name to describe the challenge represented by each pile. A picture will be taken of each pile, and used to drive the research agenda discussions. The contents of the piles will also be archived on the workshop website.

To address the second outcome, the participants will discuss if and how solutions and techniques from related fields can potentially address the needs of multi product line engineering. In order to drive the discussion, the open "Fishbowl" technique will be used. This technique is a variant of a panel discussion, where the audience sits in concentric circles around a set of four or five chairs for the panelists in the innermost circle (the fishbowl). One of the panelist seats is initially kept empty. After the moderator introduces the topic, the panelists start discussing. The audience listens in on the discussion but does not participate. However any member of the audience can, at any time, join the fishbowl by taking the empty chair. When that occurs, one of the current panelists must leave the fishbowl so that there is again a free chair. This process repeats until the time runs out, after which the moderator summarizes the discussion.

To address the third outcome (the research agenda), we aim to have a plenary discussion that is driven by the various piles collected in the card sorting session.

4. PARTICIPANTS

Publicity: We will publicize the workshop via the known software engineering, software product line and software evolution emailing lists, Facebook groups and LinkedIn groups. We will register the workshop on CfP websites like eventseer,

researchr, wikicfp. In addition, the organizers will use their personal networks to publicize the workshop and we will ask our program committee to do the same.

We maintain a workshop website where we will collect material in preparation of the workshop, and archive the material produced and collected during the workshop for future reference. This website is available at:

https://sites.google.com/site/wMultiPLE2013/

The MultiPLE 2013 organizers can be contacted via email:

MultiPLE2013-organizers@googlegroups.com.

Participants: In the interest of keeping enough time for discussion, we aim to accept a maximum of 9 position papers. We estimate that the MultiPLE workshop will attract approximately 30 participants based on the overlap & interest that we see with the SPLC community. Participation is primarily based on authorship of accepted position papers and on invitation. We will open participation for other interested parties and select on basis of a short motivation letter. We are open to additional "walk-in" participation by SPLC attendants during the workshop itself, but initially aim at a more committed audience via the submission of position papers or requesting invitations via motivation letters.

Prospective participants are invited to submit a position paper of 2-4 pages describing work or ideas related to the workshop topic. Submissions should follow the ACM SIGS proceedings format and will be reviewed by at least three members of the program committee. Key decision criteria for paper/talk acceptance include relevance to the workshop's topics, originality and suitability for triggering discussion. EasyChair will be used to manage the submission review process. The accepted position papers will be published in the ACM Digital Library as part of the SPLC 2013 Workshop Proceedings.

Important dates for submission and notification (preliminary, depending on SPLC publication schedule):

Submission deadline:	May 27, 2013
Author notifications:	June 24, 2013
Camera-ready copies:	July 8th, 2013
Workshop date:	August 27th, 2013

The program committee consists of renowned experts in the field. The final list will be announced later, but the list of currently confirmed members includes: Jan Bosch, Goetz Botterweck, Rubby Casallas, De-Jiu Chen, Paul Clements, Deepak Dhungana, Christoph Elsner, Paul Grünbacher, Gerald Holl, Arnaud Hubaux, Christian Kästner, Ramtin Khosravi, Jens Krinke, Toacu Oliveira, Klaus Pohl, Xiao Qu, Mark-Oliver Reiser, Jean-Claude Royer, Klaus Schmid, Norbert Siegmund, Olav Spinczyk, Salvador Trujillo, and Liming Zhu. We refer to the CFP in the appendix for full details.

5. EQUIPMENT

The organizers would like to use the following equipment:

- data projector
- overhead projector, transparencies and sheet markers
- whiteboard or two flip charts and color markers
- a room that allows for tables to be re-arranged

6. ORGANIZERS

Leon Moonen is a senior research scientist at Simula Research Laboratory in Norway. His research is aimed at devising and improving techniques and tools for the exploration, assessment and evolution of large industrial software systems. It involves the combination of several subfields of software engineering, such as program comprehension, reverse engineering, program analysis, software visualization and empirical software engineering. Dr. Moonen has published over 90 scientific papers and serves on steering-, organizing-, and program committees of international conferences on software maintenance, reverse engineering, program understanding, and source code analysis and has (co-)organized several workshops in these areas. Dr. Moonen received his MSc (cum laude, Computer Science, 1996) and PhD (Computer Science, 2002) from the University of Amsterdam.

Razieh Behjati is a postdoctoral fellow at Simula Research Laboratory in Norway. She received her BSc (Software Engineering) and MSc (Artificial Intelligence) from University of Tehran, and her PhD from the University of Oslo. Her research experience includes modeling, analysis and verification of large scale embedded software systems. In the recent years, she has been working on software product lines, with a focus on industrial challenges in the field. Her research is aimed at addressing the needs of industry partners while taking into account their long-term vision. She has served as reviewer and coordinator for several international conferences and workshops in the field of software engineering.

Rick Rabiser is a senior researcher at the Christian Doppler Laboratory for Monitoring and Evolution of Very-Large-Scale Software Systems at Johannes Kepler University Linz, Austria. He received a PhD with distinction in Business Informatics in 2009 from Johannes Kepler University. His research interests include but are not limited to software evolution, software product line engineering, automated software engineering, requirements engineering, requirements monitoring, and usability and user interface design. Dr. Rabiser has published over 70 peer-reviewed papers; served in 20+ program committees and diverse conference and workshop organization committees, and reviewed articles for several international journals.

Mithun Acharya

Mithun Acharya is a Principal Scientist in the Industrial Software Systems group at the ABB Corporate Research in Raleigh, USA. He received his Ph.D. in Computer Science from North Carolina State University in 2009. His research primarily focuses on identifying and solving the key issues that arise in large-scale software development in the industry related to programmer productivity and software quality. His current research interests and publication focus span several areas of Automated Software Engineering including Configurable Systems and Software Product Lines, Software Analytics, Code Change Impact Analysis, and Automated Software Testing. Dr. Acharya has served on the program committees of various conferences and workshops including Mining Software Repositories (MSR) and India Software Engineering Conference (ISEC).

Bedir Tekinerdogan is an assistant professor at Bilkent University in Ankara, Turkey where he is leading the software engineering group. His research interests include software architecture design, aspect-oriented software development, model-driven software development and software product line engineering. Dr. Tekinerdogan received his MSc degree in Computer Science in 1994, and a PhD degree in Computer Science in 2000, both from the University of Twente, The Netherlands. He is the author of around 150 scientific publications on different topics in software engineering. Bedir has been the organizer of around 50 workshops and served on the program committees and organising committees for conferences and workshops related to aspect-oriented software development, software architecture design, global software development, service-oriented modeling, model-driven software development, and software product line engineering.

Kyo-Chul Kang is a professor at Pohang University of Science and Technology in Pohang, Korea. His research areas interests include software reuse and product line engineering, requirements engineering, and computer-aided software engineering. Dr. Kyo-Chul Kang received his Ph.D. from the University of Michigan (1982). Since then he was visiting professor at the University of Michigan and a member of technical staff at Bell Communications Research and AT&T Bell Laboratories before joining the Software Engineering Institute, Carnegie Mellon University as a senior member in 1987. He served as Director of the Software Engineering Center at Korea Information Technology Promotion Agency (KIPA) from 2001 to 2003. He served as General Chair for the 8th International Conference on Software Reuse (ICSR) held in Madrid, Spain in 2004, and also as General Chair for the 11th and 14th International Software Product Line Conference held, respectively, in Kyoto, Japan in September 2007 and in Jeju, Korea in September, 2010. He has served for many international conferences and workshops as a steering committee member or as a organizational/program committee member.

7. REFERENCES

[1] J. Bosch. From software product lines to software ecosystems. In *SPLC '09*, 2009.

[2] J. Bosch. Toward compositional software product lines. *IEEE Softw.*, 27(3), 2010.

[3] D. Gray, S. Brown, and J. Macanufo. *Gamestorming: A Playbook for Innovators, Rulebreakers, and Changemakers*. O'Reilly Media, 1 edition, July 2010.

[4] G. Holl, P. Grünbacher, and R. Rabiser. A systematic review and an expert survey on capabilities supporting multi product lines. *Inf. Softw. Technol.*, 54(8), 2012.

[5] L. Northrop et al. *Ultra-Large-Scale Systems. The Software Challenge of the Future*. Carnegie Mellon University, 2006.

[6] R. C. van Ommering. Beyond product families: Building a product population? In *IW-SAPF*, 2000.

– Call for Papers –

1st International Workshop on Multi Product Line Engineering (MultiPLE 2013)

held in conjunction with SPLC 2013, 26–30 August 2013, Tokyo, Japan

https://sites.google.com/site/wMultiPLE2013/

Motivation

A *multi product line* is a product line that integrates assets which themselves have been developed as product lines, or as parts of product lines, by independent teams or organizations. Multi product lines differ from single product lines in the sense that these assets are managed independently of each other, and have their own requirements and stakeholders. The cross-organizational distribution of reusable assets introduces several challenges, such as inconsistent configuration of components and development artifacts, costly and time-consuming integration processes, diverging evolution speed and direction, and inadequate testing.

The goal of this workshop is to identify and better understand the challenges that are involved with managing the development and evolution of multi product lines and distributing the assets used for their production across organizations. To this end, we aim at bringing together researchers, practitioners, and experts from various fields of software engineering to discuss practical challenges, investigate potential solutions, and establish a common research agenda on Multi Product Line Engineering.

Topics

We particularly encourage position papers and experience reports, which identify and structure open challenges and research questions. We are interested in all topics related to multi product line engineering, including but not limited to:

- scoping for multi product lines
  - domain requirements engineering for MPLs
- (cross-organizational) modeling of multi product lines
  - commonality and variability analysis
- MPL integration and interoperability management
  - product derivation & configuration management
  - asset management
  - transition strategies
- (cross-organizational) evolution of MPLs
  - model maintenance
  - change impact analysis
  - metrics and measurement
- MPL certification, verification and validation
- industrial experiences & empirical studies on MPLs
- MPLs and software ecosystems
  - MPLs in the open source world
- non-technical issues surrounding MPLs
  - economic and legal issues
  - organizational, managerial, and process issues
  - MPL training for organizations

Submission guidelines

We are looking for position papers and experience reports (2-4 pages) in ACM SIGS proceedings format. Submissions will be selected based on the relevance to the workshop topics and the suitability to trigger discussions. All submissions will be reviewed by at least three members of the program committee. Accepted papers will be published in the ACM Digital Library as part of the SPLC workshop proceedings. Papers should be submitted via Easychair at:

www.easychair.org/conferences/?conf=multiple2013

Important Dates

Submission deadline:	May 27, 2013
Author notifications:	June 24, 2013
Camera-ready copies:	July 8th, 2013
Workshop date:	August 27th, 2013

Workshop format

The MultiPLE workshop is a one-day event with strong focus on discussion and interaction. The workshop starts with an interactive introduction session, which is followed by three focused sessions containing short presentations ("lightning talks"). Each talk will be followed by time for clarification questions. The second half of each session is reserved for an open discussion on the focus area, not just about the papers that were presented. After lunch, we will have three working sessions that are built around interactive discussion techniques such as collaborative affinity diagramming and fishbowl panel discussions. These sessions are respectively aimed at building a common understanding of the challenges, discussing directions for potential solutions and establishing a common research agenda.

Contact Information

To contact the organizers, please send an email to:

MultiPLE2013-organizers@googlegroups.com

Organizing Committee

- Leon Moonen, Simula Research Laboratory, Norway
- Razieh Behjati, Simula Research Laboratory, Norway
- Rick Rabiser, Johannes Kepler University, Austria
- Mithun Acharya, ABB Corporate Research, USA
- Bedir Tekinerdogan, Bilkent University, Turkey
- Kyo-Chul Kang, POSTECH, Korea

Program Committee

- Jan Bosch, Chalmers University of Technology, Sweden
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- Rubby Casallas, Universidad de los Andes, Colombia
- De-Jiu Chen, KTH Royal Institute of Technology, Sweden
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- Deepak Dhungana, Siemens AG, Austria
- Christoph Elsner, Siemens AG, Germany
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