Workshop Preview of the 3rd International Workshop on Mobile Development Lifecycle (MobileDeLi 2015)

Aharon Abadi

IBM Research - Haifa
Mount Carmel
Haifa 31905, Israel
aharona@il.ibm.com

Lori Flynn

CERT, Carnegie Mellon University
Pittsburgh, PA USA
lflynn@cert.org

Jeff Gray

University of Alabama
Tuscaloosa AL USA
gray@cs.ua.edu

Abstract

The goal of the MobileDeli 2015 workshop was to establish a vibrant research community of researchers and practitioners for sharing work and leading further research and development in the area of mobile software engineering. At the workshop, participants discussed how other technologies (e.g., DSLs, cloud computing) drive new capabilities in mobile software development. The workshop attendees examined the lifecycle of mobile software development and how it relates to the software engineering lifecycle. Working group discussions and activities also occurred where attendees explored and evaluated existing techniques, patterns, and best practices of mobile software development. Additional information about the workshop (e.g., photos, presentations, schedule) can be found at the MobileDeli workshop website: *http:// sysrun.haifa.il.ibm.com/hrl/mobiledeli2015*

Categories and Subject Descriptors D.2.3 Coding Tools and Techniques, D.2.4 Software/Program Verification, D.2.5 Testing and Debugging, D.2.11 Software Architectures, H.1.2 User/Machine Systems

General Terms Algorithms, Management, Performance, Design, Economics, Reliability, Experimentation, Security, Human Factors, Standardization, Languages, Verification.

Keywords *mobile computing, software engineering*

1. Introduction

Mobile application use and development is experiencing enormous growth. According to Gartner, by 2016 more than 200 billion total apps will have been downloaded. The mobile domain presents new challenges to software engineering. Mobile platforms are rapidly changing and include diverse capabilities such as GPS, cameras, multiple input modes (e.g., touch and keyboard), wireless communications on many frequencies and bandwidths, a variety of on-device memory and disk capacities, and various sensors (e.g., for motion, environment, and position). Applications must function on a wide range of platforms. Mobile applications must be elastic and

scale on demand according to the hardware's abilities. Many applications support and use third-party services, requiring application development to include effective security and authorization processes for those dataflows. Bring your own device (BYOD) policies offer new security challenges, including guarding against data leaks on behalf of both employer and employee data privacy.

Efficient development and optimization of secure mobile applications requires new tools and practices that relate to the complexity at hand, such as improved refactoring tools for hybrid applications using dynamic languages; polyglot development and applications; and testing techniques for applications that run on different devices. The MobileDeli workshop brought together researchers and practitioners who have an interest in discussing the challenges of mobile software development.

2. Workshop Focus and Topics

Mobile software engineering presents new challenges and directions. The development of mobile applications includes the following aspects that extend existing software engineering practices:

- *Software characteristics.* 1) Software is distributed on several platforms that link over a network. For example, one part of an application could be on a mobile phone browser, another part might be on the cloud, while both of them are reading data from legacy system data sources; 2) Mobile applications need to be elastic and scale on demand according to their environments' abilities. Functionalities need to be easily removed, added, or moved to or from the cloud; 3) Many hardware platforms exist for an application and the platforms are rapidly changing, including flexible capabilities such as GPS, sensors, and input modes. Development, however, should be for all platforms.

- *Architecture.* Mobile application development also includes several architectural challenges, such as how to support omni-channel communications and how to provide new application data updates from the server, e.g., notifications about new mail or software updates. Applications must be able to easily communicate with new systems. Traditional solutions enable software to be designed easily and modified to communicate with new environments. However, the environments with which applications need to communicate are changing rapidly. As a result, traditional solutions do not fit modern software and we cannot modify applications using traditional architectural approaches to support all evolution needs of mobile solutions.

- *Testing.* Another aspect of mobile application development concerns software testing. How can applications be tested on arbitrary and unknown hardware? How can we develop test-driven software without being able to run the test itself?

Among others, we observe the following five areas of interest: 1) *Management of the mobile applications; 2) Hybrid applications versus native applications; 3) User experience; 4) Power consumption; 5) Migrating to mobile; and 6) Mobile security.* From these observations, the range of topics discussed at MobileDeli included the following:

- Mobile development environments and tools
- Mobile testing
- Agile development for mobile applications
- Empirical studies and metrics
- Maintenance and evolution
- Mobile patterns, frameworks, and product lines
- Mobile software refactoring, restructuring, and renovation
- Mobile program transformation and optimization
- Practice and experience reports
- Management of mobile applications
- User experience of mobile applications
- Hybrid versus native applications
- Model-driven development for mobile
- Application security
- Mobile operating system and middleware security
- Secure application development methodologies
- Cloud support for mobile security
- Static and dynamic analysis of mobile applications
- Mobile optimization debugging techniques and tools Research challenges in mobile software engineering

3. MobileDeli 2015 Program Summary

MobileDeli 2015 received 17 submissions representing a combination of long and short papers, as well as extended abstracts. From the submissions, 15 invitations were sent for long and short presentations.

The morning keynote speaker for MobileDeli 2015 was Robert C. Seacord, an expert on secure coding and author of secure coding standards for C, C++, and Java who currently serves as the Principal Security Consultant for NCC Group. Robert's talk on Mobile Security outlined major sources of insecurity in the mobile ecosystem and described how secure coding practices and automation techniques can be applied to develop secure code for mobile platforms while not compromising other system properties such as performance or usability.

The afternoon session included a panel and a working group activity. The panel was titled "Mobile Security: Methods and Challenges During Development" with panelists Marco Pistoia, Patrick Tague, Jan S. Rellermeyer, and Garret Wassermann. During the afternoon working group activity, all participants brainstormed about challenges and ideas on using "Mobile Computing to Support Sustainability."

4. Program Committee

The organizers are grateful to the following Program Committee members who assisted with the paper review and program selection process:

- Bram Adams, MCIS, École Polytechnique de Montréal
- William G.J., Halfond University of Southern California
- Rajasekar Karthik, Oak Ridge National Laboratory
- Stephan Krusche, Technische Universität München
- Young-Woo Kwon, Utah State University
- Eric Larson, Seattle University
- Grace Lewis, Carnegie Mellon Software Engineering Institute
- Shuying Liang, School of Computing, University of Utah
- Iulian Neamtiu, University of California, Riverside
- Luigi Pomante, University of L'Aquila
- Mark Sherman, CERT
- Yu Sun, Cal Poly Pomona
- Weibin Sun, School of Computing, University of Utah
- Shingo Takada, Keio University
- Shmuel Tyszberowicz, The Academic College of Tel-Aviv Yaffo
- Violetta Vylegzhanina, Vanderbilt University
- Anthony Wasserman, Carnegie Mellon Silicon Valley
- Elizabeth Williams (Publicity Chair), University of Alabama