

Workshop on Software Engineering for Cloud Computing (SECloud 2011)

Chris A. Mattmann^{1,2}

Nenad Medvidovic²

T. S. Mohan³

Owen O'Malley⁴

¹Jet Propulsion Laboratory
California Institute of Technology
Pasadena, CA 91109, USA

mattmann@jpl.nasa.gov

³Ecom Research Labs
Infosys Technologies
Bangalore, India

Subramanian_Mohan@infosys.com

²Computer Science Department
Univ. of Southern California
Los Angeles, CA 90089, USA

nenom@usc.edu

⁴Grid Computing Group
Yahoo!
Sunnyvale, CA, 94089, USA

oom@yahoo-inc.com

ABSTRACT

Cloud computing is emerging as more than simply a technology platform but a software engineering paradigm for the future. Hordes of cloud computing technologies, techniques, and integration approaches are widely being adopted, taught at the university level, and expected as key skills in the job market. The principles and practices of the software engineering and software architecture community can serve to help guide this emerging domain. The fundamental goal of the ICSE 2011 Software Engineering for Cloud Workshop is to bring together the diverse communities of cloud computing and of software engineering and architecture research with the hopes of sharing and disseminating key tribal knowledge between these rich areas. We expect as the workshop output a set of identified key software engineering challenges and important issues in the domain of cloud computing, specifically focused on how software engineering practice and research can play a role in shaping the next five years of research and practice for clouds. Furthermore, we expect to share “war stories”, best practices and lessons learned between leaders in the software engineering and cloud computing communities.

Categories and Subject Descriptors

D.2.11 Software Architectures [Domain-Specific Architectures]

General Terms

Measurement, Performance, Design

Keywords

Cloud Computing, Software Engineering, SECloud

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, to republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

ICSE'11, May 21–28, 2011, Waikiki, Honolulu, HI, USA
Copyright 2011 ACM 978-1-4503-0445-0/11/05 ...\$10.00

1. INTRODUCTION

Cloud Computing has engendered a disruptive change in the requirements, architecture, implementation and evolution methodologies for software – in short, it has challenged our thinking as software engineering (SE) researchers and practitioners in ways that we as a community are still scrambling to find out.

Whether you are interested in Infrastructure-as-a-Service (IaaS) such as Amazon Web Services, or AWS; platform-as-a-service (PaaS) including Google App Engine or Azure; software-as-a-service (SaaS) e.g., salesforce.com; or in frameworks that enable the above like Apache Hadoop or Microsoft's Dryad, we feel that the time is ripe to rethink SE foundations in light of the cloud.

This workshop will focus on identifying the SE for cloud “grand challenges” that lay before us. We will debate existing notions of SE for the construction of cloud services and for their deployment. We will evangelize success stories and how they were arrived at. We anticipate as outcomes the definition of a long-term concrete SE research agenda for cloud, and the sharing of existing SE for cloud “tribal knowledge” that can be applied in the short-term.

2. WORKSHOP GOALS

We will define concrete set of 5-10 SE for cloud “research challenge” areas that can serve as a summoning call to the SE research and practitioner communities. This would be a natural extension to the 2009 ICSE workshop on cloud computing that focused more on specific examples of programming languages and services than explicitly recording the challenge areas, and targeting their dissemination to the broader community as we will detail below.

The research challenge areas will be elucidated based on input from the solicited papers. We will explicitly ask authors of papers submitted to the workshop to reserve a section in their submitted papers for identifying their suggested challenge areas. These areas will be thoroughly vetted during the workshop and collected in a summary report prepared by the conveners of the workshop. This report will be circulated amongst: (1) SE-focused NSF Program Managers; (2) The open source cloud computing software

community; and (3) The broader software engineering communities including government (e.g., the NASA Earth Science Data Systems community), academia (e.g., graduate software engineering courses) and industry (e.g., the open source communities at Apache and elsewhere).

3. SELECTION PROCESS

Each paper will be reviewed by at least 2 members of the Program Committee, and be provided with detailed ICSE-like reviews similar to those obtained by submitting to the main conference research track. It is our goal to inform authors who submit to the workshop and help construct the best SE for cloud papers that would be of use to the community.

4. PROGRAM COMMITTEE

- Andrew F. Hart, NASA JPL, United States, ahart@jpl.nasa.gov
- Ben Reed, Yahoo, United States, breed@yahoo-inc.com
- Craig Lee, Aerospace Corp, United States, lee@aero.org
- Daniel J. Crichton, NASA JPL, United States, crichton@jpl.nasa.gov
- David M. Woollard, Project WBS, United States, woollard@gmail.com
- Dennis Kubes, Bit.ly, United States, dennis@igfoo.com
- Eric Dashofy, Aerospace Corporation, United States, edashofy@antconcepts.com
- Jacek Becla, Stanford National Accelerator Lab, United States, becla@slac.stanford.edu
- Justin Erenkrantz, Project WBS/Apache, United States, justin@erenkrantz.com
- Luca Cinquini, NASA JPL, United States, luca.cinquini@jpl.nasa.gov
- Mohanakrishna, Infosys, India, mohanakrishna_BG@infosys.com
- Nabor Mendonca, University of Fortaleza, Brazil, nabor@unifor.br
- Sanjay Radia, Yahoo, United States, sradia@yahoo-inc.com
- Schahram Dustdar, TU Wien, dustdar@infosys.tuwien.ac.at
- Srinivas Padmanabhuni, Infosys, India, Srinivas_p@infosys.com
- Stefan Tai, Karlsruhe Institute of Technology, Germany, stefan.tai@kit.edu
- YN Srikant, Indian Institute of Science, Bangalore India, yns@csa.iisc.ernet.in

5. WORKSHOP STRUCTURE

In preparation for the workshop we will collect and trim down the solicited challenge areas (recall, we will require the authors of submitted papers to reserve a section in each workshop paper to provide the authors' cloud challenges), and then charge the workshop attendees with the finalized set of areas at the procession of the workshop.

During the first half of the workshop, a 30-minute keynote presentation identifying current SE for cloud "best practices" will serve to invigorate the audience with an understanding of the current state of the art. Attendees will be asked to engage follow-on presenters of between 5-6 accepted papers (given 10 minutes a

piece, with 5 minutes reserved for questions) with the challenge areas in mind, using them to drive questions, identification of future work, and current technology, methodology, and architectural "gap areas". The workshop chairs will collect this input during the first half of the program schedule.

The second half of the workshop will convene after lunch with a 30-minute keynote presentation focused on a cloud case study in one of the relevant "big data" cloud domains, such as earth/planetary science, cancer research, industry, analytics, or finance. This keynote presentation will identify relevant user needs and expectations for software solutions that leverage the cloud for a particular scientific purpose. Again, a series of 5-6 accepted paper presentations will follow the keynote, with the members of the audience expected to engage the speaker. The workshop chairs will be actively recording the discussion during this time.

We will have two 15-minute breaks, one during the first half of the workshop, and the other during the second half, during which workshop participants and accepted paper authors can come together for interactive demo sessions and Q&A.

Finally, we will close out the workshop with a 1-hour session during which the workshop conveners will directly engage the audience, focusing on: (1) Defining a set of 5-10 concrete SE challenge areas; (2) Identifying next steps for engaging U.S. and international funding areas in these areas (including identifying relevant upcoming solicitations and calls); and (3) Defining a set of one-two "community" projects that workshop participants could collaborate on, the results of which would feed into a second incarnation of the workshop at a future ICSE or SE related conference.

We will solicit our two relevant keynote speakers from the following potential domain areas: (1) Apache/Hadoop as well as other internal departments within Yahoo! that are cloud relevant; (2) Google; (3) Amazon; and (4) Microsoft on Azure. In addition, we will focus on engaging a few representatives from U.S. funding agencies including NSF, NASA, DOE and NOAA who may be interested in attending the workshop and discussing relevance to upcoming solicitations.

6. WORKSHOP OUTPUTS

We will accept research paper contributions with a maximum page length of 7 pages in the ICSE 2011 paper formatting guidelines. We will also solicit research demonstrations to be presented during the two 15 minute breakout sessions. Research demonstrations will be limited to 1 page of workshop proceedings space.

We will also seek an arrangement with an appropriate SE-focused IEEE journal (such as IEEE Transactions on Software Engineering or IEEE Software) to publish a special issue focused on cloud computing and software engineering within 6 months after the conclusion of the workshop.

Additionally, we will prepare a workshop report identifying key SE challenges and upcoming issues for cloud. The report will be submitted to ACM SIGSOFT Software Engineering Notes and circulated amongst the broader software engineering community.