Software Center

SOFTWARE CENTER ANNUAL REPORT | 2018

CHALMERS · UNIVERSITY OF GOTHENBURG · MÄLARDALEN UNIVERSITY SWEDEN · MALMÖ UNIVERSITY · LINKÖPING UNIVERSITY · VOLVO · VOLVO · SIEMENS

ERICSSON · JEPPESEN · GRUNDFOS · SAAB · qamcom · BOSCH · CEVT · AXIS COMMUNICATIONS

Content

Follow Software Center in social media

Follow us on
www.linkedin.com/company/software-center-sweden/

Twitter: @Software_Cntr

Blogs

Jan Bosch: http://janbosch.com/blog/
Metrics: http://metrics.blogg.gu.se/

Photos: Malin Rosqvist, Pontus Johansson, Lasse Fredriksson, Anneli Andersson. Photos from Volvo, Volvo Cars, Siemens.

Jan Bosch,
Director of Software Center
Department of Computer Science and Engineering,
Chalmers/University of Gothenburg

2018 – quite a year!

We have had quite a year 2018 with many successes and positive developments. To name just a few (and apologies for missing many other, equally important, things):

- We kicked off and grew the senior leaders, product management and systems engineering communities in response to the broadened scope of Software Center.
- We added CEVT as a new partner during this year and experience very strong interest from several other companies so I am hopeful that we will add new partners in 2019 as well.
- We experienced two very successful reporting workshops this year with attendance now growing to more than 150 participants and great closing keynotes by Luka Crnkovic (June) and Gerd Hoefner (December).
- The company-to-company knowledge exchange workshops keep going strong with a focus on SAFe and Open Source this year. Also the FUSA&CD workshop series keep running with a very successful one being held in Munich in September. For both, I would like to thank Frances Paulisch from Siemens.
- Miroslaw Staron and Wilhelm Meding organized a highly successful Metrics Day, hosted by Ericsson Gothenburg.
- Academically, we had licentiate defenses and PhD defenses (with Aleksander Fabijan receiving the Best Thesis Award at Malmö University) as well as promotions of faculty (e.g. Helena Holmström Olsson was promoted to Full Professor largely based on her research in Software Center). Also, Software Center had great exposure at the ICSE 2018 conference in Gothenburg as well as at SEAA 2018 and several other conferences.
- Finally, several Software Center researchers have started the first activities in the space of AI/ML/DL and I expect a significant doubling down on that topic in 2019.

The mission of Software Center is to improve the digitalization capability of the European Software-Intensive industry with an order of magnitude. Over the last 15 sprints we have broadened the scope of our research from core software engineering to focus on data, ecosystems, AI/ML/DL, product management, systems engineering and general management. The first research projects now have research activities specific for product managers as well as for other roles outside software.

The premise of Software Center has, since its inception, been that the partner companies will change and transform faster with us than without us and, consequently, decrease their risk of being disrupted in the ongoing digital transformation and improving their competitiveness. Although some feel that this is “old news”, I am of the opinion that we’ve only just started to scratch the surface of what will be a fundamental transformation of society, industry and companies.

The challenge of digital transformation will only accelerate in 2019 and I look forward to working with all of you during the next years and to jointly reinvent the European Software-Intensive Systems industry. We have a long and challenging journey ahead of us, but I can’t think of a better team to bring along for the ride. I feel blessed and grateful to work with so many talented, motivated, driving and simply wonderful people.

Thank you for an outstanding 2018! I look forward to work with you in 2019 as well! Onward and upward!

Themes and projects

Continuous Delivery

Theme leader:

Kristian Sandahl
Linköping University

The use of agile and flexible development methods has increased the demand for frequent integration and testing to maintain the quality of the resulting code. As a result, companies have gradually invested more in the organization and automation of continuous delivery capabilities. Nowadays, continuous delivery systems are complicated systems themselves and many co-workers are dependent on them in their daily work.

In the theme we are working to find solutions to minimize the feed-back from automated testing. This is done by investigating methods for test-case selection and automation of so called flaky tests. We are also doing case studies on how automated testing can be engineered in a large scale development organization with many stakeholders and test activities with different purposes. Implementing the continuous delivery environment is addressed both from the perspective of the system architecture as well as processes and attitudes among developers.

To operate and maintain continuous integration systems many stakeholders need information to monitor the progress, identify bottlenecks, perform troubleshooting, or verify that intended operations were actually carried out. Our long-term vision is to develop a suite of real-time data visualization tools that can be used all over a company to supply the stakeholders with the information they need in a convenient way.

We are also hosting two associated projects in the areas of modeling and analyzing collaborative autonomous systems, and human aspects of software engineering.

Projects

- Visualization of Continuous Integration: Azeem Ahmad, Linköping University
- Aspects of Automated Testing: Kristian Sandahl, Linköping University
- Enterprise Scale Continuous Integration and Delivery: Torvald Mårtensson, Saab Aeronautics
- Modeling and Analyzing Collaborating Machines: Marian Sirjani, Mälardalen University
- An Analysis of Team-based Development within an Activity Based Working Environment Robert Feldt, Chalmers

Continuous Architecture

Theme leader:

Jan Carlson
Mälardalen University

Development of high quality complex software systems, in particular in modern embedded and cyber-physical systems, requires careful attention to the software architecture and design. The overall scope of the Continuous Architecture theme is to identify and develop means to help companies improve their processes, methods and technologies related to software architecture, in order to support development of increasingly complex products and to react and adapt quicker to changed market needs.

Current research within the theme includes, for example:

- Identification, management and reduction of architectural debt
- Interoperability and model-driven development
- Combined safety and security analysis and argumentation
- Industrial IoT and Service-level Agreements

Projects

- Managing Architectural Technical Debt: Terese Besker, Chalmers | University of Gothenburg
- Managing Interoperability Concerns in Large Systems: Romina Spalazzese, Malmö University
- Closing the Safety-Security gap in software intensive systems: Kaj Hänninen, Mälardalen University
- Model-based development and continuous integration: Jan Carlson, Mälardalen University
- Improving the Design and Realization of Situational Aware Internet of Things Systems for Emergency Situations Handling: Romina Spalazzese, Malmö University

Metrics

Innovation and improvement in software development need effective and efficient measurement. In the age of continuous deployment and focus on speed, ecosystems and data, one of the cornerstones is the development of new metrics (data), processes (speed) and infrastructure (ecosystems) to support modern software development.

The metrics theme focuses on:

- Measurement, assessment and visualization of product and organizational performance
- Smart techniques for data management and decision support (e.g. machine learning)
- Infrastructure for continuous experimentation and simulation of organizational performance (e.g. metrics portfolio, self-healing)
- Optimization of measurement processes in modern software development enterprises (e.g. measurement program robustness assessment)
- Pro-active complexity reduction in large scale software development
- Prediction and assessment of impact of meta-model changes on product cost and quality

Projects

- Continuous Product and Organizational Performance: Miroslaw Staron, Chalmers | University of Gothenburg
- Longitudinal Measurement of Agility and Group Development: Lucas Gren, Chalmers | University of Gothenburg
- Quasar@Car - Quantifying meta-model changes: Miroslaw Staron, Chalmers | University of Gothenburg
- RAWFP - Resource Aware Functional Programming: Patrik Jansson, Chalmers | University of Gothenburg
- Size and Quality between Software Development Approaches: Regina Hebig, Chalmers | University of Gothenburg
- VISEE - Verification and Validation of ISO 26262 requirements at the complete EE system level: Rakesh Rana, Chalmers | University of Gothenburg

Theme leaders:

Miroslaw Staron, Chalmers

Wilhelm Meding, Ericsson

Customer Data- and Ecosystem-Driven Development

In this theme, we explore the shift towards continuous software engineering practices and the ways in which the increasing digitalisation of industries requires companies to adopt new ways-of-working.

We focus our research on methods, processes and tools that help software-intensive companies to accelerate the adoption of new development practices and we provide support for how to move beyond agile development and towards continuous deployment of software. We take a holistic approach in which we study both technical and organizational implications and we provide support for R&D teams as well as managers in software organizations.

In the different projects, we study the role of customer and product data as a means to digitally enhance existing products and services and as the basis for new innovations, we study how strategies for managing business and software ecosystems are becoming increasingly important to maximize value between stakeholders, we develop best practices to manage requirements and related knowledge in large-scale system development and we provide industrial partners with support for how to build an API strategy that involve both internal and external stakeholders.

Also, and in order to facilitate and accelerate knowledge sharing between companies in Software Center and other large research initiatives, we conduct research on self-experimentation in autonomous systems in collaboration with Wallenberg Autonomous Systems and Software Program (WASP).

Projects

- Accelerating Digitalization Through Data: Helena H. Olsson, Malmö University
- Strategic Ecosystem-Driven R&D Management: Helena H. Olsson, Malmö University
- Data-Driven Continuous Evolution of Autonomous Systems of Systems: David Issa Mattos, Chalmers
- API Strategies: Jennifer Horkoff
- Requirements Engineering for Large-Scale Agile System Development: Eric Knauss, Chalmers | University of Gothenburg
- HoliDev: Jan Bosch, Chalmers

Theme leader:

Helena H. Olsson, Malmö University

Organization

Director

Jan Bosch, Department of Computer Science and Engineering, Chalmers/University of Gothenburg

Steering Committee

Chair: Anders Caspár, Ericsson
Vice chair: Fredrik Wising, Saab AB
Linda Svedberg, Axis Communications AB
Robert Lagerstedt, Bosch AB
Axel Franke, Bosch AB
Stefan Carlsson, CEVT
Johan Karlsson, Chalmers
Ivica Crnkovic, Chalmers
Catrin Granbom, Ericsson AB
Mats Lindén, Ericsson AB
Allan Agerholm, Grundfos AB
Niels Jörgen Ström, Grundfos AB
Anders Forsman, Jeppesen AB
Peter Sutton, Jeppesen AB
Kristian Sandahl, Linköping University
Ola Leifler, Linköping University
Jan Carlsson, Mälardalen University
Hans Hansson, Mälardalen University
Helena Holmström Olsson, Malmö University
Andreas Jacobsson, Malmö University
Jonas Lindgren, Saab AB
Görel Wranne, Saab AB
Cornel Klein, Siemens AG
Frances Paulisch, Siemens AG
Anders Fridh, Tetra Pak AB
Miroslaw Staron, University of Gothenburg
Ted Kruse, Volvo AB
Anders Henriksson, Volvo AB
Hans Alminger, Volvo Cars
Kent Niesel, Volvo Cars

Task force

Ola Söder, Axis Communications AB
Axel Franke, Bosch AB
Robert Lagerstedt, Bosch AB
Staffan Lindgren, Bosch AB
Stefan Carlsson, CEVT
Catrin Granbom, Ericsson AB
Jonas Wigander, Ericsson AB
Niels Jörgen Ström, Grundfos AB
Anders Forsman, Jeppesen
Vilhem Bergman, Saab AB
Christoffer Höglund, Saab AB
Torvald Mårtensson, Saab AB
Sven Nilsson, Saab AB
Christoph Elsner, Siemens AG
Magnus Johansson, Tetra Pak
Johan Persson, Tetra Pak
Jens Svensson, AB Volvo
Anders Henriksson, Volvo AB
Joakim Ohlsson, Volvo AB
Jens Svensson, Volvo AB
Ruben Alexandersson, Volvo Cars
Jonn Lantz, Volvo Cars
Kent Niesel, Volvo Cars

Coordination Team

Jan Bosch, Chalmers
Malin Rosqvist, Chalmers
Miroslaw Staron, Chalmers/University of Gothenburg
Wilhelm Meding, Ericsson
Daniel Ståhl, Ericsson
Gert Frost, Grundfos
Anders Forsman, Jeppesen
Kristian Sandahl, Linköping University
Jan Carlsson, Mälardalen University
Helena Holmström Olsson, Malmö University
Peter Thorngren, Volvo


Linda Svedberg, *Axis Communcations*


Ola Söder, *Axis Communcations*


Axel Franke, *Bosch*


Robert Lagerstedt, *Bosch*


Stefan Carlsson, *CEVT*


Staffan Lindgren, *Bosch*


Jan Bosch, *Chalmers*


Ivica Crnkovic, *Chalmers*


Johan Karlsson, *Chalmers*


Malin Rosqvist, *Chalmers*


Miroslaw Staron, *Chalmers/ University of Gothenburg*

Organization

Anders Caspár,
Ericsson (Chair)

Catrin Granbom,
Ericsson

Mats Lindén,
Ericsson

Wilhelm Meding,
Ericsson

Daniel Ståhl,
Ericsson

Jonas Wigander,
Ericsson

Gert Frost,
Grundfos

Niels Jørgen Strøm,
Grundfos

Anders Forsman,
Jeppesen

Peter Sutton,
Jeppesen

Ola Leifler,
Linköping University

Kristian Sandahl,
Linköping University

Andreas Jacobsson,
Malmö University

Helena Holmström Olsson,
Malmö University

Jan Carlson,
Mälardalen University

Hans Hansson,
Mälardalen University

Jonas Lindgren,
Saab

Torvald Mårtensson,
Saab

Sven Nilsson,
Saab

Fredrik Wising,
Saab

Görel Wranne,
Saab

Christoph Elsner,
Siemens AG

Cornel Klein
Siemens AG

Frances Paulisch,
Siemens AG

Anders Fridh,
Tetra Pak

Anders Henriksson,
Volvo AB

Magnus Johansson,
Tetra Pak

Johan Persson,
Tetra Pak

Ted Kruse,
Volvo AB

Jens Svensson,
Volvo AB

Peter Thorngren,
Volvo AB

Ruben Alexandersson,
Volvo Cars

Hans Alminger,
Volvo Cars

Jonn Lantz,
Volvo Cars

Kent Niesel,
Volvo Cars

Reporting workshops

In Software Center, companies and universities work together to accelerate the adoption of novel approaches to software engineering. The reporting workshop takes place twice a year, in June and December. This one day event is open to everyone who is interested in learning more about results from research and cooperation within Software Center. The agenda ranges from key note presentations to in-depth sessions for themes and projects. The cooperation between academia and companies in Software Center creates the software engineering success stories that industry needs. A main feature at the Reporting workshop is the Exploration space; a project exhibition where researchers present latest findings from Software Center projects and collaborations. The reporting workshop typically attracts some 150 participants – next year hopefully even more!

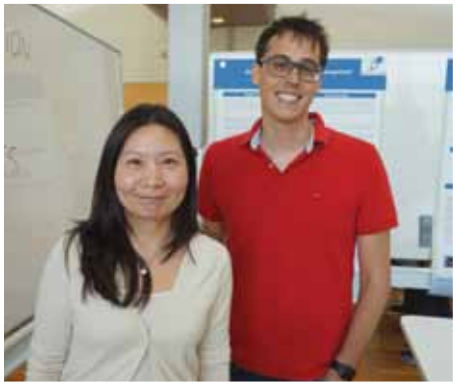
June workshop at Ericsson

The June workshop was hosted by Ericsson at Lindholmen, Gothenburg. Jonas Bjarne and Tommy Schönberg from Vinnova visited the workshop and gave a presentation about funding opportunities for European research collaboration within ICT and cyber security. Luka Crnkovic-Friis, CEO of Peltarion in Stockholm gave a keynote presentation with the title “How to be AI first”. At the end of the day discussions continued on the roof terrace of Radisson hotel.

December workshop at Volvo

The December workshop was hosted by Volvo at the group headquarters in Gothenburg. The Software Center senior leaders´ working group was represented by Roger Holmberg, Operational Product Owner at Ericsson, and Magnus Sundberg, CTO for Surface Radar at Saab, who shared their views on the impact of digitalization. Gerd Hoefner, Managing Director and President of Siemens Healthcare in Bangalore, India, gave a keynote on “What really matters in software engineering”. The day also included a separate meeting for the working group Product Management, and a launch of the working group Systems Engineering with a discussion on Systems engineering in the age of digitalization. Last but not least the participants were invited to a much appreciated lab and demo tour at Volvo.


ters in
ering




n Air 5G
unched in
is week


SAAB DIGITAL TRANSFORMATION

International conferences

ICST, the 11th IEEE Conference on Software Testing, Validation and Verification

ICST 2018 took place in Västerås, April 9-13, and was hosted by Software Center partner Mälardalen University with professor Hans Hansson as General chair. The ICST conference provides a common forum for researchers, scientists, engineers and practitioners throughout the world to present their latest research findings, ideas, developments and applications in the area of Software Testing, Verification and Validation. ICST 2018 included keynote addresses by eminent scientists as well as special, regular and poster sessions. In 2019 the ICST conference will be held in Xian, China.

ICSE; the 40th International Conference on Software Engineering

ICSE, the International Conference on Software Engineering, is the premier software engineering conference, providing a forum for researchers, practitioners and educators to present and discuss the most recent innovations, research, experiences, trends and concerns in the field of Software engineering. In 2018 ICSE will celebrate its 40th anniversary, and 50 years of Software engineering – 50 years of tremendously successful promotion of research, education and practices in software engineering. Ivica Crnkovic, professor and director at Area of Advance ICT at Chalmers University, was general chair of the ICSE´18, and several researchers and Software Center partner companies attended the conference which took place in Gothenburg, May 27 - June 3. ICSE 2019 takes place in Montréal, Canada.

SPLC: the 22nd International Systems and Software Product Line Conference

The 22nd International Systems and Software Product Line Conference, SPLC, took place September 10-14, in Gothenburg, with Jan Bosch as General chair.. SPLC is a premier forum where researchers, practitioners, and educators can present and discuss the most recent ideas, trends, experiences, and challenges in the area of software and system product lines engineering. Conference events include opportunities to hear industry leaders' real-world experiences and researchers' latest ideas, and to learn from both. In 2019 the conference will be held in Paris.

Euromicro DSD/SEAA Conference in Prague

Software Center was invited to organize a special session on Evidence Based and Experiment Driven Engineering at the SEAA (Software Engineering Advanced Applications) conference in Prague in August. The session attracted between 40 - 45 attendents and a number of strong presentations.

PhD and Licentiate defenses

Best PhD thesis ot the year: Data-Driven Software Development at Large Scale

In June 2018, Aleksander Fabijan from Software Center partner Malmö University successfully defended his PhD thesis on Data-Driven Software Development at Large Scale and was awarded with an award for the best PhD thesis of the year at Malmö University. The award was handed to Aleksander at the yearly ceremony and Aleksander got the opportunity to present his work for the management group at the university.

"Accurately learning what customers value is critical for the success of every company. Despite the extensive research on identifying customer preferences, only a handful of software companies succeed in becoming data-driven at a scale that they aim for. Benefiting from novel approaches such as experimentation on top of the traditional feedback collection is very challenging, yet tremendously impactful when performed correctly.

In this thesis, we explore how software companies evolve from data collectors with ad-hoc benefits, to trustworthy data-driven decision makers at scale. We base our work on a 3.5 year longitudinal multiple-case study research with companies working in both embedded systems domain (e.g. engineering connected vehicles, surveillance services) as well as in the online domain (e.g. developing search engines, mobile applications).

The contribution of this thesis is twofold. First, we present how software companies learn from customers. Second, we show how they adopt and evolve experimentation in order to improve their data-driven capabilities.

With our work, we wish to empower software companies to become data-driven at scale by using the experience of companies that succeeded in this. Ultimately this should lead to better software products and services."

More PhD and Licentiate defenses

Grischa Liebel, PhD: An Empirical Investigation of Using Models During Requirements Engineering in the Automotive Industry
Terese Besker, Licentiate: An Empirical Investigation of the Harmfulness of Architectural Technical Debt
Rashidah Kasauli, Licentiate: Requirements Engineering Challenges of Supporting Agile Teams in System Development
David Issa Mattos, Licentiate: Towards Automated Experiments in Software Intensive Systems)
Rebekka Wohlrab, Licentiate: Continuous Management of Artifacts and Traceability in Large-Scale Agile Systems Engineering

Welcome CEVT!

CEVT joined Software Center in 2018 and is represented in both Steering Committee and Task Force by Stefan Carlsson, Technical expert at CEVT. CEVT is located in the heart of the automotive cluster in Gothenburg with offices at Lindholmen Science Park and a at Innovatum in Trollhättan. CEVT is fully owned by the Geely Holding Group, a global automotive group that owns several international automotive brands, with operations spanning from research, development and design to production, sales and servicing. The consumer car brands within Geely Group include Geely Auto, Lynk & Co, Volvo Cars, Polestar, Proton, Lotus and Terrafugia.

Metrics Day 2018 – Metrics, Software Analytics and Machine Learning

Software Center organized the annual Metrics Day 2018 at Ericsson Lindholmen. The goal is to present hot and interesting topics in the area of software metrics, software analytics and machine learning. The metrics day provides a mix of industrial and academic presentations with the aim to disseminate the research results, discuss challenges to solve together and have fun!

Highlights

Team Impact Award

In 2018, Emerald Publishing introduced the Real Impact Awards to celebrate and recognize commitment to positive change in the real world. The result is the Real Impact Showcase Book which tells the stories of all award winners, supporting the communication of research for the wider benefit of policy and practice.

We are proud that the Team Impact Award 2018 was awarded Software Center researchers and partners: Miroslaw Staron, University of Gothenburg, Sweden and Miroslaw Ochodek, University of Gothenburg, Sweden (now Poznan University of Technology, Poland); and Wilhelm Meding and Martin Sjödin, Ericsson, Sweden.

www.emeraldpublishing.com/real-impact-awards/

Professor promotion

Helena H. Olsson was promoted to full professor at Malmö University in November 2018. Helena represents Malmö University in the Software Center Steering Committee and Coordination Team and is theme leader for Theme 4: Customer Data- and Ecosystem-Driven Development. Helena is involved in the following Software Center projects:

- Accelerating Digitalization Through Data
- Strategic Ecosystem-Driven R&D Management
- Data-Driven Continuous Evolution of Autonomous Systems of Systems
- HoliDev

STEW - Software Technology Exchange Workshop

STEW is a two-day conference, and the 2018 edition was hosted by Malmö University, Oct 17-18. The purpose of STEW is to encourage and promote cooperation between different industry sectors, between academia/institutes and companies, and with the public sector. STEW wants to make research and project results visible and stimulate new cooperation in the area of software technology. STEW is arranged by Swedsoft, with contributions from Software Center.

SWEDSOFT

New working group for product managers

Continuous deployment brings with it enormous opportunities in relation to how to learn from customers and from products. With frequent releases and fast feedback loops, data can be collected on a continuous basis in order to learn about product use and customer preferences. From a product management perspective, this allows for new ways-of-working that did not exist earlier. For example, data can help understand what features are used or not used, what features that bring the expected business revenue and what features should be prioritized for development and maintenance. In addition, data from customers and from products in the field brings new perspectives on decision-making as it helps an organization to move away from assumptions and opinions and instead take decisions based on what actually adds value to a customer.

The new Software Center product management working group has had its first meetings during 2018 and will continue to meet twice a year and focus on data driven decision-making and how to improve effectiveness of feature prioritization and development. The working group is open to all Software Center companies and allows for valuable knowledge exchange between participants and sharing of best practices across domains.


Photo from Volvo Cars

Senior leaders´ workshops – the impact of digitalization

Digitalization not just affects products and services. It requires a fundamental reinvention of the organization. In fact, we are moving towards a new business operating system focused on speed, data, ecosystems and empowerment. To address these changes Software Center engages in launching new networks and working groups. The senior leaders´ group has met two times during 2018 for a one day workshop with the intent of:

- Increasing awareness concerning the company- and industry-wide implications of digitalization
- Facilitating acceleration of the digitalization agenda at the Software Center member companies
- Improving support and create a knowledge exchange platform between the Software Center companies

In March the workshop was hosted by Robert Bosch in Lund, and the September workshop was hosted by Saab in Gothenburg. Next Senior leaders´ workshop will be held in March 2019, at the Bosch IoT Campus in Berlin, Germany.

Meetings

Meetings

- Steering committee meets 4 times per year. Once mid-sprint, once at end of sprint.
- Task force meets 2 times per year, one to two weeks before the end-of-sprint steering committee meeting.
- Coordination team meets once per month
- Every sprint, we organize a 1-day reporting workshop offering all interested parties at the SC companies an opportunity to learn about the ongoing research. This workshop is held one day before the task force meeting
- Once per year we organize a brokerage event where companies and researchers can pitch new projects and build engagement around these
- Theme, project specific meetings and intra-company meetings are held on a regular basis

Meeting schedule Sprint 14

- January 15: Coordination team meeting
- February 12: Coordination team meeting
- March 12: Coordination team meeting
- March 18, Senior leaders workshop at Robert Bosch, Lund
- March 26: Mid-sprint steering committee meeting
- March 27: Brokerage event
- April 16: Coordination team meeting
- May 21: Coordination team meeting
- May 25: Deadline for NEW project proposals
- June 1: Deadline Sprint 15 project proposals
- June 7: Reporting workshop for all companies and other interested parties
- June 8: Task force meeting for planning sprint 15
- June 11: Steering committee meeting
- June 18: Coordination team meeting

Meeting schedule Sprint 15

- August 20: Coordination team meeting
- August 20: General Assembly and strategy workshop
- September 17: Coordination team meeting
- September 18, Senior leaders workshop at Saab, Gothenburg
- October 1: Mid-sprint steering committee meeting
- October 15: Coordination team meeting
- November 9: Product management meeting
- November 12: Coordination team meeting
- November 23: Deadline for NEW project proposals
- November 30: Deadline Sprint 16 project proposals
- December 6: Reporting workshop for all companies and other interested parties
- December 6: Systems engineering meeting
- December 7: Task force meeting for planning sprint 16
- December 10: Coordination team meeting
- December 10: Steering committee meeting

Publications

Antinyan, V., Derehag, J., Sandberg, A. and Staron, M., 2018. Mythical Unit Test Coverage. IEEE Software, 35(3), pp.73-79.

Terese Besker, Antonio Martini, Jan Bosch: "Managing architectural technical debt: A unified model and systematic literature review". Journal of Systems and Software 135: 1-16 (2018)

Terese Besker, Antonio Martini, Jan Bosch: "Technical debt cripples software developer productivity: a longitudinal study on developers' daily software development work". TechDebt@ICSE 2018: 105-114

Terese Besker, Antonio Martini, Rumesh Edirisooriya Lokuge, Kelly Blincoe, Jan Bosch: "Embracing Technical Debt, from a Startup Company Perspective". ICSME 2018: 415-425

Terese Besker: "An Empirical Investigation of the Harmfulness of Architectural Technical Debt". Licentiate thesis, Chalmers University of Technology, 2018

Bosch, J., and Olsson H.H. (2018). Ecosystem Traps and Where to Find Them. Journal of Software Evolution and Process, Vol. 30, Issue 11.

Çalikli, G., Staron, M. and Meding, W., 2018, May. Measure early and decide fast: transforming quality management and measurement to continuous deployment. In Proceedings of the 2018 International Conference on Software and System Process (pp. 51-60). ACM.

Durisic, D., Luo, Y., Staron, M. and Dajsuren, Y., 2018, April. Message from the WASA 2018 Organizing Committee. In 2018 IEEE International Conference on Software Architecture Companion (ICSA-C) (pp. 115-115). IEEE.

A. Fabijan, P. Dmitriev, H. H. Olsson, and J. Bosch, "The (Un)Surprising Impact of Online Controlled Experimentation," IEEE Software

Fabijan, A., Dmitriev, P., McFarland, C., Vermeer, L., Holmström Olsson, H. and Bosch, J. 2018. Experimentation growth: Evolving trustworthy A/B testing capabilities in online software companies. Journal of Software: Evolution and Process. (Nov. 2018), e2113. DOI:https://doi.org/10.1002/smr.2113.

Fabijan, A., Dmitriev, P., Olsson, H.H. and Bosch, J. 2018. Effective Online Experiment Analysis at Large Scale. In Proceedings of the 2018 44rd Euromicro Conference on Software Engineering and Advanced Applications (SEAA) (Prague, Czechia., August 2018).

Fabijan, A., Dmitriev, P., Olsson, H.H. and Bosch, J. 2018. Online Controlled Experimentation at Scale: An Empirical Survey on the Current State of A/B Testing. In Proceedings of the 2018 44rd Euromicro Conference on Software Engineering and Advanced Applications (SEAA) (Prague, Czechia., August 2018).

Fabijan, A., Dmitriev, P., Olsson, H.H. and Bosch, J. 2018. The Experiment Lifecycle. To appear in IEEE Software. (November 2018).

Fabijan, A., Dmitriev P., Olsson, H.H, Bosch, J., Vermeer, L., Lewis, D. Three Key Checklists and Remedies for Trustworthy Analysis of Online Controlled Experiments at Scale. Accepted to IEEE International Conference on Software Engineering (ISCE'19), Software Engineering In Practice track. 25 May - 31 May 2019, Montreal, Canada.

Fabijan, A. Data-Driven Development at Large Scale, PhD Thesis, June 2018

Francisco G. de Oliveira Neto, Azeem Ahmad, Ola Leifler, Kristian Sandahl, and Eduard Enoiu. 2018. Improving continuous integration with similarity-based test case selection. In Proceedings of the 13th International Workshop on Automation of Software Test (AST '18). ACM, New York, NY, USA, 39-45. DOI: https://doi.org/10.1145/3194733.3194744"

Publications

S. Gupta, S. Bhardwaj, P. Dmitriev, U. Lucy, A. Fabijan, and P. Raff, "The Anatomy of a Large-Scale Online Experimentation Platform". In Proceedings of 2018 IEEE International Conference on Software Architecture, ICSA'18, Seattle, USA, 2018.

Halali, S., Staron, M., Ochodek, M. and Meding, W., 2019, January. Improving Defect Localization by Classifying the Affected Asset Using Machine Learning. In International Conference on Software Quality (pp. 106-122). Springer, Cham.

Horkoff, J.; Lindman, J.; Hammouda, I. & Knauss, E.: Experiences Applying e3 Value Modeling in a Cross-Company Study. In: Proceedings of 37th International Conference on Conceptual Modeling (ER 2018), 2018

Horkoff, J.; Lindmann, J.; Hammouda, I.; Knauss, E.; Debbiche, J.; Freiholtz, M.; Liao, P.; Mensah, S. & Strömberg, A.: Modeling Support for Strategic API Planning and Analysis. In: Proc. of Int. Conf. on Software Business (ICSOB), 2018

Robbert Jongeling; Jan Carlson; Antonio Cicchetti; Federico Ciccozzi "Continuous integration support in modeling tools". In International Workshop on Collaborative Modelling in MDE (COMMitMDE), 2018

Kasauli, R.; Knauss, E.; Kanagwa, B.; Nilsson, A. & Calikli, G.: Safety-Critical Systems and Agile Development: A Mapping Study. In: Proc. of Euromicro SEAA, 2018

Knauss, E.; Liebel, G.; Horkoff, J.; Wohlrab, R.; Kasauli, R.; Lange, F. & Gildert, P.: T-Reqs: Tool Support for Managing Requirements in Large-Scale Agile System Development. In: Proceedings of 26th IEEE International Requirements Engineering Conference (RE'18), Demo Track, Banff, Canada, 2018

Elena Lisova, Aida Causevic, Kaj Hänninen, Henrik Thane and Hans Hansson. "A Systematic Way to Incorporate Security in Safety Analysis". In Proceedings of the 3rd Workshop on Security and Dependability of Critical Embedded Real-Time Systems. 2018

Juho Lindman, Jennifer Horkoff, Imed Hammouda and Eric Knauss: Emerging Perspectives of API Strategy. In: IEEE Software, 2019

Antonio Martini, Terese Besker, Jan Bosch: "Technical Debt tracking: Current state of practice: A survey and multiple case study in 15 large organizations". Sci. Comput. Program. 163: 42-61 (2018)

A Martini: "Anacondebt: a tool to assess and track technical debt". In IEEE/ACM International Conference on Technical Debt (TechDebt), 55-56, 2018

A Martini, FA Fontana, A Biaggi, R Roveda: "Identifying and prioritizing architectural debt through architectural smells: A case study in a large software company" European Conference on Software Architecture, 320-335, 2018

A Martini, E Sikander, N Madlani: "A semi-automated framework for the identification and estimation of Architectural Technical Debt: A comparative case-study on the modularization of a software component", Information and Software Technology 93, 264-279, 2018

D. I. Mattos, P. Dmitriev, A. Fabijan, J. Bosch, and H. Holmström Olsson, "An Activity and Metric Model for Online Controlled Experiments," in in the Proceedings of the 19th International Conference on Product-Focused Software Process Improvement, 2018, pp. 182–198.

D. I. Mattos, E. Mårtensson, J. Bosch, and H. H. Olsson. Optimization Experiments in the Continuous Space the Limited Growth Optimistic Optimization Algorithm. (To appear in the Proceedings of the 10th Symposium on Search-Based Software Engineering, 2018, pp. 1–15).

D. I. Mattos, J. Bosch, and H. H. Olsson. Challenges and Strategies for Undertaking Continuous Experimentation to Embedded Systems: Industry and Research Perspectives. In Proceedings of the 19th International Conference on Agile Software Development, 2018, pp. 1–15.

D. I. Mattos, “Towards Automated Experiments in Software Intensive Systems,” Licentiate Thesis, Chalmers University of Technology, 2018.

D. I. Mattos, J. Bosch, H. H. Olsson, A. Dakkak, and K. Bergh, “Automated Optimization of Software Parameters in a Long Term Evolution Radio Base Station,” in IEEE 13th Annual International Systems Conference, 2019, pp. 1–8.”

Maro, S., Steghöfer, J.P. and Staron, M., 2018. Software traceability in the automotive domain: Challenges and solutions. Journal of Systems and Software, 141, pp.85-110.

Maro, S., Steghöfer, J.P., Hayes, J., Cleland-Huang, J. and Staron, M., 2018, August. Vetting automatically generated trace links: what information is useful to human analysts?. In 2018 IEEE 26th International Requirements Engineering Conference (RE) (pp. 52-63). IEEE.

T. Mårtensson, D. Ståhl, and J. Bosch, “Enable more frequent integration of software in industry projects”, Journal of Systems and Software 142, pp. 223-236, 2018.

Nadi, S., Hedström, J. and Staron, M., 2018, August. Using Self-Healing to Increase Robustness of Handling In-Browser Third-Party Content. In 2018 44th Euromicro Conference on Software Engineering and Advanced Applications (SEAA) (pp. 210-213). IEEE.

Olsson, H.H., and Bosch, J. (2018). Singing the Praise of Empowerment or Paying the Cost of Chaos. In Proceedings of the Euromicro Conference on Software Engineering and Advanced Applications (SEAA), August 29th – 31st, Prague, Czech Republic.

Rana, R., Lagercrantz, T. and Staron, M., 2018, April. Building an Effective Software Issues Scorecard: An Action Research Report from the Automotive Domain. In 2018 IEEE International Conference on Software Architecture Companion (ICSA-C) (pp. 136-143). IEEE.

D. Ståhl, and T. Mårtensson, Continuous practices: a strategic approach to accelerating the software production system, Lulu Press, 2018

Staron, M., Sahraoui, H., & Telea, A. (2018). Special section on Visual Analytics in Software Engineering.

Staron, M., Meding, W., Tichy, M., Bjurhede, J., Giese, H. and Söder, O., 2018. Industrial experiences from evolving measurement systems into self-healing systems for improved availability. Software: Practice and Experience, 48(3), pp.719-739.

Staron, M. and Meding, W., 2018. Examples of Measures in Measurement Systems. In Software Development Measurement Programs (pp. 165-201). Springer, Cham.

Staron, M., Meding, W., Söder, O. and Bäck, M., 2018. Measurement and Impact Factors of Speed of Reviews and Integration in Continuous Software Engineering. Foundations of Computing and Decision Sciences, 43(4), pp.281-303.

Staron, M. and Meding, W., 2018. Software Development Measurement Programs: Development, Management and Evolution. Springer.

Staron, M., 2019, January. Action Research in Software Engineering: Metrics’ Research Perspective (Invited Talk). In International Conference on Current Trends in Theory and Practice of Informatics (pp. 39-49). Springer, Cham.

Staron, M. and Meding, W., 2018. Tooling in Measurement Programs. In Software Development Measurement Programs (pp. 117-163). Springer, Cham.

Staron, M. and Meding, W., 2018. Maintaining and Evolving Measurement Programs. In Software Development Measurement Programs (pp. 225-250). Springer, Cham.

Publications

Staron, M. and Meding, W., 2018. Quality of Measurement Programs. In Software Development Measurement Programs (pp. 83-115). Springer, Cham.

Staron, M., Niesel, K. and Bauman, N., 2018. Milestone-Oriented Usage of Key Performance Indicators–An Industrial Case Study. e-Informatica Software Engineering Journal, 12(1).

Staron, M. and Meding, W., 2018. Fundamentals. In Software Development Measurement Programs (pp. 19-45). Springer, Cham.

Staron, M. and Meding, W., 2018. New Techniques. In Software Development Measurement Programs (pp. 203-224). Springer, Cham.

Staron, M. and Meding, W., 2018. Measurement Program. In Software Development Measurement Programs (pp. 47-82). Springer, Cham.

Van der Valk, R.; Pelliccione, P.; Lago, P.; Heldal, R.; Knauss, E. and Juul, J.: Transparency and Contracts: Continuous Integration and Delivery in the Automotive Ecosystem. Proceedings of 40th Int. Conference on Software Engineering (ICSE), SEIP Track, Gothenburg, Sweden, 2018

Wen, S., Nilsson, C. and Staron, M., 2018, May. Assessing the release readiness of engine control software. In Proceedings of the 1st International Workshop on Software Qualities and Their Dependencies (pp. 5-12). ACM.

Wohlrab, R.; Knauss, E.; Steghöfer, J.-P.; Maro, S.; Anjorin, A. and Pelliccione, P.: Collaborative Traceability Management: A Multiple Case Study from the Perspectives of Organization, Process, and Culture. In: Requirements Engineering (REEN), 2018

Researchers

Chalmers/ University of Gothenburg

Terese Besker
Jan Bosch
Gul Calikli
Ivica Crnkovic
Darko Durisic
Robert Feldt
Francisco Gomes
Lucas Gren
Imed Hammouda
Regina Hebig
Jennifer Horkoff
Patrik Jansson
Rashidah Kasauli
Eric Knauss
Per Lenberg
Juho Lindman
Lucy Lwakatare
Antonio Martini
David Issa Mattos
Aiswarya Raj Munappy
Torvald Mårtensson
Rakesh Rana
Patrizio Pelliccione
Miroslaw Staron
Jan-Philipp Steghöfer
Daniel Ståhl
Lars-Göran Wallgren
Rebekka Wohlrab

Linköping University

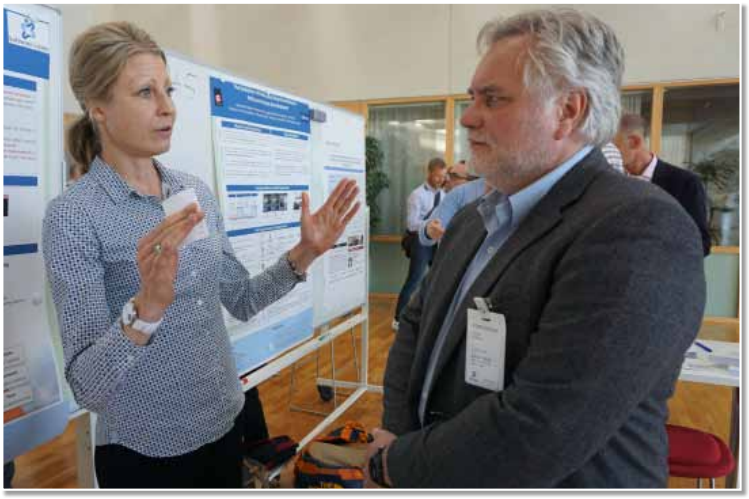
Azeem Ahmad
Ola Leifler
Kristian Sandahl

Malmö University

Aleksander Fabijan
Helena H. Olsson
Romina Spalazzese

Mälardalen University

Jan Carlson
Aida Causevic
Antonio Cicchetti
Federico Ciccozzi
Eduard Paul Enoiu
Robbert Jongeling
Hans Hansson
Kaj Hänninen
Elena Lisova
Marian Sirjani
Henrik Thane



2018

www.software-center.se

Software Center

Software Center is a research collaboration between 12 companies and 5 universities with the express intent of helping its partner organizations to survive and thrive in the digitalization transformation.

CHALMERS · UNIVERSITY OF GOTHENBURG · MÄLARDALEN UNIVERSITY SWEDEN · MALMÖ UNIVERSITY · LINKÖPING UNIVERSITY · VOLVO · VOLVO · SIEMENS · ERICSSON · JEPPESEN · GRUNDFOS · SAAB · qamcom · BOSCH · CEVT · AXIS COMMUNICATIONS

Software Center , Annual Report 2018, Malin Rosqvist, Helen Eriksson