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Software Technology Exchange Workshop
STOCKHOLM 18-19 OCTOBER 2017

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Swedsoft welcomes you to
Software Technology Exchange Workshop (STEW)

Transfer of results from academic research into real products and into industrial ways-of-working is one of the key challenges for both academic institutions and companies. Many companies today are unaware of the existing research and academia lacks in understanding of industrial problems. Swedsoft wants to bridge this gap between industry and academia.

The Software Technology Exchange Workshop (STEW) is organized by Swedsoft to facilitate knowledge exchange and dissemination of academic results into the industry. STEW is a forum for researchers and industry representatives to meet and learn about recent, industry-relevant research in the domain of software development including software technology, software systems engineering and leadership. The workshop also promotes networking among academic and industrial attendees. This year the focus will be on Best of Swedish industry-academia joint research in software intensive system 2016-2017.

Welcome to STEW 2017!

Stefan Andersson
Chairman of the board
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#STEW2017

QUESTIONS?

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Wednesday October 18th

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Patric Palm, co-founder of Favro and Hansoft

11:15   Moderated discussion

11:30   Lunch

12:45   Software Technology for Self-Adaptive Systems
Professor Danny Weyns, Linnaeus University

13:20   Artificial Intelligence in smart sustainable societies
Associate Professor Anne Håkansson, KTH

13:55   Visual GUI Testing - From Academic Concept to Industrial Use
PhD Emil Alégroth, Blekinge Institute of Technology

14:30   Coffee

15:15   What happens when offshore teams are on-boarded in complex evolving software-intensive products?
Professor Darja Smite, Blekinge Institute of Technology and Lars-Ola Damm, Ericsson

15:50   Optimizing waste and opportunity losses in requirements decision making and increasing decision agility
Assistant Professor Krzysztof Wnuk, BTH and Carl-Eric Mols, Head of Open Source Operations, Sony Mobile

16:25   Panel Discussion
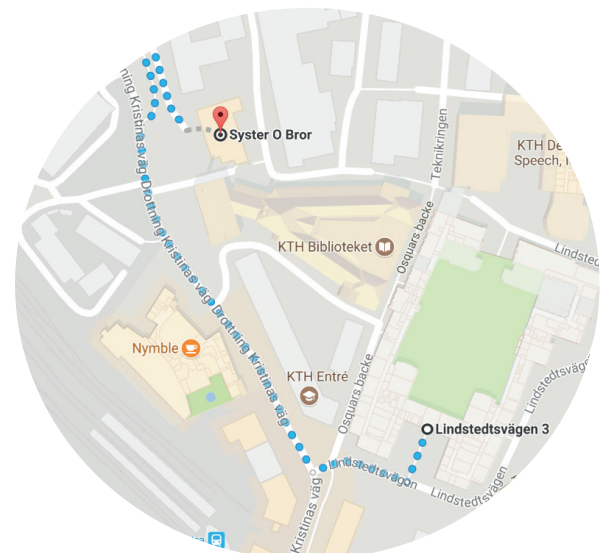
17:00   Conference ends day one.

18:00   Dinner
At restaurant Syster o Bror, Drottning Kristinas väg 24.

Dinner sponsor

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Software Technology Exchange Workshop, STEW.

Teknikföretagen

PROGRAM

Thursday October 19th

08:30   Coffee

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       Jonn Lantz, Technical Expert continuous integration, Volvo Cars

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       Researcher Sahar Tahvili, RISE SICS

11:35   Virtualized Embedded Systems for Testing and Development
       Professor Karl Meinke, KTH

12:10   Lunch

13:15   ”No More Bosses? From hierarchies towards empowerment in large-scale software development
       Associate professor Helena Holmström Olsson, Malmö University

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14:20   The Evolution of Continuous Experimentation in Software Product Development
       PhD Researcher Aleksander Fabijan, Malmö University

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15:30   Connected Energy - Securely collecting transformer data from secondary substations
       Dr Emmanuel Frecon, RISE SICS

16:05   Modelware is the new software - Information system for managing a LARP event using a model driven platform
       R&D Manager Tomas Jonsson, Genicore AB

16:40   Panel Discussion

17:00   Conference ends.

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A CHALMERS
AREA OF ADVANCE

ABSTRACTS

Here you can find the abstracts to the presentations that you will hear over the next two days. We hope the following days will inspire you, let you obtain fresh knowledge and interesting new contacts. If you want to help us spread the word about STEW or if you get an idea, have a question or even a revelation - please use

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Wednesday October 18th

Opening speech: Agile Organisations, not just Agile Software Development
Patric Palm, co-founder of Favro and Hansoft

Agile software development emerged to battle uncertainties and rapid change in software projects. Today agile is the norm in the software industry. It's no longer about agile or not, but how good you are at being agile at scale. But rapid change is no exclusive challenge to software development anymore. The world in general today is more fast moving and organisations need to adapt. To address these challenges agile management practices are now crossing over to marketing, sales, executive management and even government.

Patric Palm has as co-founder of Favro and Hansoft been in the center of the agile movement for more than 10 years. In this session he will share his perspectives on how agile is now spreading to organisations of all kinds and why you should care. He will also share some strategies for implementing agile successfully organisation wide.

Software Technology for Self-Adaptive Systems
Professor Danny Weyns, Linnaeus University

Modern systems - e.g., Cyber-Physical Systems and the Internet of Things - operate under highly dynamic conditions so traditional stability assumptions made on systems' design are no longer valid. Uncertainties at design time may lead to bad decisions, resulting in poor quality or failures at runtime. When uncertainty is the rule rather than the exception, managing it becomes a crucial factor for the dependability and sustainability of systems.

Software Technology for Self-Adaptive Systems (SoTSAS), a Synergy project funded by the Knowledge Foundation, deals with uncertainty by delaying decisions to runtime and by continuously reconsidering them when the goals and environment are known or even change. SoTSAS applies the principles of self-adaptation, i.e., the system itself takes over the responsibility to automatically and continuously monitor and optimize its behaviors to assure its quality.

SoTSAS aims at bridging the gap between research and practice and providing engineers with readily available self-adaptation technology to manage uncertainty. SoTSAS consolidates the knowledge about self-adaptive systems engineering from three different domains: Smart Grids, Telecommunication systems, and Production automation control. This knowledge is packaged as reusable Theories, Architectures, Processes, Platforms, Algorithms, and Services for engineering self-adaptive systems.

Artificial Intelligence in smart sustainable societies
Associate Professor Anne Håkansson, KTH

Computer systems execute repetitive tasks with good precision. With recent advances in Artificial Intelligence, computer systems have gained the ability to learn, improve and make decisions in ways that enable the systems to perform complex tasks that can provide smart sustainable societies.

To build smart sustainable societies, AI strategies and algorithms are incorporated in applications using billions of devices, things and objects. These can be used to learn and aggregate patterns observed in the environment, and provide new innovative solutions in the society, with a holistic view for sustainable societies.

This talk presents the work with Volatile Multiple Smart Systems, VoLM2s. Volatile Multi Smart Systems is multiple connected systems that are only connected in some situations and/or for some purposes. Volatile means that the situation decides the incorporated smart systems and data and information exchange are lost when the smart systems are out of the communication sphere. The Volatile Multi Smart Systems are necessary to be able to provide Future Smart Cities and Smart Societies with heterogeneous smart systems, things and objects.

Visual GUI Testing - From Academic Concept to Industrial Use
PhD Emil Alégroth, Blekinge Institute of Technology

The talk will be divided into three parts:

1. A narrative description of the academic results from industry that has lead to the conclusion that VGT is applicable and feasible in practice, including areas of use. (Dr. Emil Alégroth, BTH)

2. A live tool demonstration of the VGT tool EyeAutomate that showcases its flexibility and applicability in practice for a variety of different applications (Michel Nass, Auqtus)

3. Conclusions about VGT and a discussion of what role automated GUI-based testing will play in the near future in the context of continuous ways-of-working such as continuous integration, delivery and deployment.

What happens when offshore teams are on-boarded in complex evolving software-intensive products?

Professor Darja Smite, Blekinge Institute of Technology
Lars-Ola Damm, Ericsson

Motivated by tremendous salary differences many software companies, large and small, have jumped on the bandwagon of offshoring. However, in contrast to many other industries that are heavily reliant on physical capital, software development is a highly knowledge intensive business. The importance of skilled and experienced developers is especially high when dealing with complex evolving software-intensive products, for which the learning curve of newly on-boarded developers may take up to 5 years.

In this presentation, we will share quantitative results regarding the performance impacts, and a number of hidden cost drivers associated with offshore teams on-boarded in legacy products. In addition, we will present an approach for calculating the bottom-line hourly costs by capturing the hidden costs, and the productivity differences, and share the results of cost-saving calculations from two different companies, DutchCo and SwedCo, both offshoring their development to India. Our results demonstrate that the bottom-line costs are much higher than the salary-based hourly rates. Finally, we will discuss the implications of our findings for Swedish companies, such as Ericsson, and their offshoring strategies. The results of our work on cost calculations in offshoring have been published in such prominent industry oriented venues as IEEE Software, and have been in the spotlight of national press, such as Dagens Industri and Ingenjören. We believe that our results can be useful for other software companies wanting to calculate offshoring business cases.

ABSTRACTS

Optimizing waste and opportunity losses in requirements decision making and increasing decision agility

Assistant Professor Krzysztof Wnuk, BTH and Carl-Eric Mols, Head of Open Source Operations, Sony Mobile

Current software release planning methods appear to greatly ignore three potentially dangerous phenomena: over-scoping, under-scoping, and scope creep and generate waste. Features that are planned but later dismissed (over-scoping) might eat up resources but ultimately do not contribute any value to the release. Including too little in a release (under-scoping) implies missed opportunities. Uncontrolled additions to the scope (scope creep) imply misdirected analysis and implementation efforts. Studies show that over 80% of the features originally planned for a release are dismissed before final release, 30% of them in the last 25% of the timeline before delivery. The potential threat and wasted resources is immense.

This talk will focus on our recent research efforts of identifying decision patterns (archetypes) that uncover decision characteristics and their associated decision behavior. Based on the identified archetypes and associated decision pattern suggestions the talk shows how in simple terms avoid waste in requirements definition, analysis and decision making. We run the model against over 10000 features from Sony Mobile and discovered some interesting patterns and opportunities for waste reduction. The results provide direct input for companies how to improve requirement definitions, analysis and decision making and provide waste optimization suggestions.

ABSTRACTS

KEYNOTE: Volvo Cars in the digital & autonomous world
Jonn Lantz, Technical expert continuous integration, Volvo cars

Volvo Cars is quickly transforming from a mechanical car maker to a modern software and "cyber physical" company. This fundamental change of the product, which is not only a product of strategic decisions or innovations but more a consequence of the global digitalization, is changing the principles for R&D. All these new features, services and mechatronic devices are digitally controlled in a system of over 100 embedded computers in a single vehicle. However, the car still has four wheels and is able to drive fast in public environments. When this is done autonomous we commercialize advanced robotics features which were just recently considered as science fiction. Simultaneously, the core of the product, the powertrain, is successively replaced with electric machines. Hence, the company has to create completely new departments and domains, and reduce some old ones. Obviously, this is an interesting environment for academic collaboration – from various physics domains for specific functions to research in AI, Machine Learning or software engineering and agile methods to develop software-mechanics.

More Efficient Testing and a Higher Quality Software Product - How to Achieve Both?
Researcher Sahar Tahvili, RISE SICS

One of the methods for evaluating the quality of software products is testing. Software product quality has traditionally been attributed to lack of bugs in the products. However, with changing times, this perspective on quality does not explain any more the competitive edge of software companies in the IT market today with respect to the delivery of high quality products and satisfaction of the customers. On-time delivery and the product cost have been recognized as game changer parameters in the competitive market. Since the software testing process is a time consuming and costly process, optimizing testing life cycle in the narrower sense concerns both quality and efficiency. Scheduling testing activities optimally has the potential to increase the probability of detecting bugs under limited time and resources available for testing, thereby contributing to a higher quality and efficiency. Further, prioritizing various part of a system under test provides benefits when it comes to time to market for the new software products. In this talk, we present a part of our research projects in the field of software testing at RISE SICS Västerås. Our research results also include the application and evaluation of our proposed solutions on industrial case studies in the domain of safety critical systems.

Virtualized Embedded Systems for Testing and Development
Professor Karl Meinke, KTH

In the automotive industry, realistic tests of distributed electronic systems, including embedded software, are today executed using hardware-in-the-loop testing. However, the necessary hardware rigs are a limited resource. Both testing and software development could be simplified by working with a virtualised emulation environment. This can give testers the possibility to execute massively parallel test suites, using less expensive multicore technology. We report on the final outcomes of the joint 3-year VINNOVA-FFI project VIRTUES between Scania CV AB and KTH-CSC school.

"No More Bosses? From hierarchies towards empowerment in large-scale software development
Associate professor Helena Holmström Olsson, Malmö University

Organizations are increasingly adopting alternative organizational models to circumvent the challenges of traditional hierarchical organizations. In these models, organizations have leaders instead of the traditional boss and teams operate using self-management and peer-to-peer advice processes. Although the adoption of these models has primarily been seen in smaller companies and startups, examples of long-established organizations that have adopted these models to restructure themselves are starting to appear. In this presentation, we explore how seven large software-intensive companies in the embedded systems domain are currently adopting principles of non-hierarchical organizations in order to increase team empowerment. Based on our empirical findings, we provide recommendations for how to manage this transformation and we develop a model that outlines the five steps that companies typically take when transforming from hierarchical towards more empowered organizations.

The Evolution of Continuous Experimentation in Software Product Development

PhD Researcher Aleksander Fabijan, Malmö University

Software development companies are increasingly aiming to become data-driven by trying to continuously experiment with the products used by their customers. Although familiar with the competitive edge that the A/B testing technology delivers, they seldom succeed in evolving and adopting the methodology at scale. Based on an exhaustive and collaborative case study research in a large software -intense company with highly developed experimentation culture (Microsoft), we present the evolution process of moving from ad-hoc customer data analysis towards continuous controlled experimentation at scale. Our main contribution is the "Experimentation Evolution Model" in which we detail three phases of evolution: technical, organizational and business evolution. With our contribution, we aim to provide guidance to practitioners on how to develop and scale continuous controlled experimentation in software organizations with the purpose of becoming data-driven at scale.

Connected Energy - Securely collecting transformer data from secondary substations

Dr Emmanuel Frecon, RISE SICS

The Connected Energy project aims at establishing a cost-effective mobile-based pilot architecture for measurement in substations around Sweden. There are between 40,000 and 50,000 substations at each of the three major distributors. The project has used the temperature of transformers as an example of a measurement that can be performed, with the goal of transferring lessons learnt to sensors more strongly connected to DSO's needs.

The software architecture is based on AppIoT, a modern cloud platform for IoT from Ericsson, hosted on Microsoft Azure. In substations, the technical solution is based on a gateway for mobile communications, a gateway for the pilot logic and BLE sensors. The core of the substation logic is built on top of two open source applications: "concocter", a flexible software watchdog to ensure stability of the solution and "biot", a highly-flexible and network-aware information pipe for the IoT.

The monitoring of a civilisation critical infrastructure poses specific demands on the system, especially when the infrastructure is spread across the country. The project's results cover motifs such as physical safety, physical and data security, longevity of batteries, mobile coverage.

Modelware is the new software - Information system for managing a LARP event using a model driven platform
R&D Manager, Tomas Jonsson, Genicore AB

The use of models to increase productivity and quality in development of software intensive products has been advocated for a long time. The ultimate goal is to move directly from models to deployable runtime systems, eliminating manual phases when transforming models to executables. Accordingly, models will be the new software. With such approaches, productivity in development of software intensive products can increase more than 10 times having disruptive consequences for current software industry.

Projekt Lazarus is a 5-day LARP (Live Action Role Play) event with approximately 600 participants. Projekt Lazarus is a once a year recurring LARP event and organisers had so far been using Google Forms, Excel, Word and Gmail to manage and communicate all data of participants, and additionally hundreds of post-it notes on a floor to arrange and assign intrigue stories to participants.

A model driven tailor-made information system was developed and deployed in 2016. CoreWEB, a multi perspective WEB-based model driven environment, intended for prototyping and education, was used for development and deployment. The runtime system provided information to 600 users in 17 different roles through 15 form-based and graphic views.

CoreWEB is based on Core Enterprise Architecture Framework, which is used as the foundation for model driven MIS (Management Information Systems) at FMV (Swedish Defence Material Administration).

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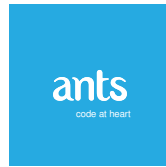letters**

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SWEDSOFT'S EVENTS

Swedsoft - Upcoming events

Seminarium och höstmöte
(Seminar and autumn meeting)
November 23rd
Volvo, Gothenburg

Seminarium och vårmöte
(Seminar and spring meeting)
April 25th 2018
Linnaeus University, Växjö

Software Technology Exchange Workshop 2018
October 17th -18th 2017
Malmö University, Malmö

More will soon be announced on Swedsoft.se

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Malmö University, Malmö
October 17th -18th, 2018

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Our goal is to make Sweden a center for innovation

of software intensive systems and through this,

contributing to increased welfare and increased

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