

# TUTORIAL PROPOSAL: ICWE'05

## Pragmatic Reuse: Building Web Application Product Lines

### Tutorial duration:

**long version 1 day (6 hours)**

**short version: ½ day (3 hours)** is possible, with fewer case studies and less hands-on exercises

### Speakers:

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**Keywords:** Web Application engineering; reuse and evolution; genericity; product lines

### Abstract

Web Applications (WA) are developed and maintained under tight schedules. After delivery, they are often changed. Much similarity across WAs creates reuse opportunities. This tutorial will show a practical way to exploit reuse potentials to meet the unique challenges of Web engineering. We'll start by showing the results of our study of 17 WAs in which we found much similarity across WA modules. Having understood similarity patterns in WAs and sources of those similarities, we'll review conventional design solutions and Web technologies (J2EE, .NET, ASP, JSP, PHP) that are commonly used in Web engineering. While these technologies can achieve reuse at a basic level, they do not provide mechanisms to fully exploit reuse opportunities that exist due to similarities at the analysis and design levels. We'll apply XVCL (<http://fxvcl.sourceforge.net>) to turn WAs built with conventional approaches, into a generic WA solution that offers dramatic productivity gains in WA development and maintenance. This part of the tutorial will be based on industrial application of XVCL to WA engineering. A generic WA forms a WA product line architecture from which we can rapidly develop new WAs and maintain the whole family of WAs in reuse-based, cost-effective way. Participants of the tutorial will gain hands on experience with XVCL method, and will be able to adopt productivity solutions presented in the tutorial in their Web engineering projects.

### Learning objectives

Attendees will learn to locate areas where there are reuse opportunities in Web Applications; they will learn techniques of how to turn those opportunities into productivity gains.

### Target audience

- ◆ Academic faculty, students and researchers with interest in Web engineering
- ◆ Software practitioners, Project Leaders, Analysts and Designers
- ◆ Managers responsible for software productivity and quality
- ◆ Managers responsible for software technology evaluation and adoption

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### **I. Introduction**

1. Need-oriented review of Web technologies
2. Assessment of reuse capabilities of Web technologies

### **II. Reuse opportunities in Web domain**

1. Analysis of similarities in 17 Web Applications
2. Sources of similarity patterns: intra-module, inter-module
3. Families of Web Applications (product lines)

### **III. Case studies in reuse**

1. Building generic, reusable solutions with conventional techniques
2. Limitations of conventional techniques in exploiting design level reuse opportunities
3. A Web Application Product Line Architecture built with conventional techniques

### **IV. Applying XVCL to enhance reusability of Web Applications**

1. XVCL briefing
2. Design of generic Web Application modules
3. Reuse across Web Applications
4. A Web Application Product Line Architecture built with conventional techniques + XVCL

### **V. Adopting XVCL in industrial projects**

1. A Web Application development lifecycle
2. Incremental adoption
3. SES Systems Pte Ltd experience: technology adoption and productivity gains

## **Facilities**

Projector, whiteboard

**About the speakers** [Link to complete CV](#)

**Stan Jarzabek** is an Associate Professor at the Department of Computer Science, School of Computing, National University of Singapore (NUS) and an adjunct Associate Professor at the Department of Electrical & Computer Engineering, University of Waterloo. He received his Master in Mathematics and Ph.D. in Computer Science from the Warsaw University. He spent 12 years of his professional career in industry. Stan is interested in domain analysis, architecture design and architecture implementation techniques for reusable and maintainable software. Stan has worked on product line approach to software reuse, component-based software engineering, static program analysis, reverse engineering, programming environments and compiler-compilers. He has published 80 papers in international journals and conference proceedings (his recent paper received the ACM SIGSOFT distinguished paper award). He has given courses for industry on software reuse and re-engineering. In 2000-02, he was a Principal Investigator in collaborative projects involving universities (NUS and the University of Waterloo) and companies in Singapore and Toronto. Stan joined NUS in 1992. In 1990-92, he was a Research Manager at CSA Research Pte. Ltd. (a company developing CASE tools). In 1984-89, he was an Assistant Professor at the McMaster University, Hamilton, Canada, doing research on software engineering. In 1998-99, he was on sabbatical leave from NUS, at the Fraunhofer Institute for Experimental Software Engineering, Germany and at the University of Waterloo, Canada.

**Damith C. Rajapakse** is a senior PhD student at the National University of Singapore whose thesis concerns reuse-based engineering of Web Applications. He conducted a survey of Web technologies, and analyzed their capabilities in the context of reuse. He also analyzed similarity patterns in 17 Web Applications, built with a range of technologies.