Software Engineering for Adaptive and Self-Managing Systems

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ABSTRACT
The objective of this workshop is to consolidate the interest in the software engineering community on autonomic, self-managing, self-healing, self-optimizing, self-configuring, and self-adaptive systems. The workshop will provide a forum for researchers to share new results, raise awareness of new adaptive concerns, and promote collaboration among the community. This workshop will be the first of several to assess progress and identify challenges in this important area.

Categories and Subject Descriptors
D.2.0 [Software Engineering]: General.

General Terms
Algorithms, Management, Design, Languages.

Keywords
Self-adaptive, self-management, self-healing, self-optimizing, autonomic.

1. STATEMENT
An increasingly important requirement for a software-based system is the ability to self-manage by adapting itself at run time to handle such things as changing user needs, system intrusions or faults, a changing operational environment, and resource variability. Such a system must configure and reconfigure itself, augment its functionality, continually optimize itself, protect itself, and recover itself, while keeping its complexity hidden from the user.

The topic of self-adaptive and self-managing systems has been studied by various communities, including software architectures, fault-tolerant computing, robotics, control systems, programming languages, and biologically-inspired computing. The goal of this workshop is to bring together researchers and practitioners from many of these diverse areas to discuss the fundamental principles, state of the art, and critical challenges of self-adaptive systems. Specifically, we intend to focus on the software engineering aspects, including the methods, architectures, algorithms, techniques, and tools that can be used to support dynamic adaptive behavior.

2. AIMS AND OBJECTIVES
The aim of the workshop is to bring together the different communities in software engineering to discuss the state of research and practice of self-adaptive, self-managing, self-healing, self-optimizing, self-configuring, and autonomic software.

Self-adaptation in self-managing systems represents a major new concern for software engineering. While in the past methods, tools, and notations have focused on the problem of preventing defects from occurring in our fielded systems, increasingly this is not enough. In addition, systems must take a much more aggressive role in handling and adapting to run time problems. A central concern then becomes the engineering mechanisms that can support self-adaptation. Too often today's systems achieve run time flexibility only by hard wiring in special-purpose, low-level code (like exceptions and time outs) that is difficult to change, reuse, or analyze.

The ICSE 2006 SEAMS workshop is a continuation of a number of successful workshops in the area of self-managing systems held at ICSE and FSE in recent years, including the FSE 2002 and 2004 Workshops on Self-Healing (Self-Managed) Systems (WOSS), ICSE 2005 Workshop on Design and Evolution of Autonomic Application Software (DEAS), and the ICSE 2002, 2003, 2004 and 2005 Workshops on Architecting Dependable Systems (WADS). The objective is to consolidate the interest in the software engineering community on autonomic, self-managing, self-healing, self-optimizing, self-configuring, and self-adaptive systems through this new integrated workshop. This will be the first of several workshops to assess progress and identify challenges in this important area.
3. TOPICS
This workshop will discuss systematic and disciplined approaches to building self-adaptive and self-managed systems, as well as allow further dissemination of the state-of-the-art methods and techniques for representing and evaluating these systems. It will cover all topics related to software engineering for self-adaptive and self-managed systems, including, but not limited to: programming, design and architectural language support for the self-adaptation of software (including exception handling, reflection, and aspect-orientation); algorithms for software self-adaptation; integration mechanisms for self-adaptive systems (including the dynamic synthesis of wrappers for legacy systems); formal notations for modeling and analysis of software self-adaptation, including sound cost-benefit analysis; architectural styles and architecture patterns for supporting self-adaptation; verification and validation of self-adaptive software; mechanisms to determine the runtime state of the system as a prerequisite to determining adaptation alternatives; adaptive components; constraint-based approaches to adaptation and self-organizing systems; decision making techniques for self-adaptive systems; assessing (at runtime) the success of an adaptation and mechanisms for recovering/rolling-back from poor choices; and run-time checks of architectural models.

The following application areas will be of particular interest: mobile computing; dependable computing; autonomous robotics; adaptable user interfaces; service-oriented architectures; autonomic computing.

4. COMMITTEES
4.1 ORGANIZING COMMITTEE
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4.2 PROGRAM COMMITTEE
Gordon Blair (University of Lancaster, UK), Cristina Gacek (University of Newcastle upon Tyne, UK) Mike Hinchey (NASA Goddard, USA), Marin Litoiu (IBM Toronto, Canada), Neno Medvidovic (University of Southern California, USA), John Mylopoulos (University of Toronto, Canada), Masoud Sadjadi (Florida International University, USA), Dennis Smith (SEI, USA), Roy Sterritt (University of Ulster, UK), Alexander Wolf (University of Lugano, Switzerland), Kenny Wong (University of Alberta, Canada).

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