Abstract

This workshop summary gives a brief overview of the workshop on “Architecting Dependable Systems” held in conjunction with DSN 2007. The main aim of this workshop is to promote cross-fertilization between the software architecture and dependability communities. We believe that both of them will benefit from clarifying approaches that have been previously tested and have succeeded as well as those that have been tried but have not yet been shown to be successful.

1. Introduction

This workshop will continue the initiative, which started five years ago, of bringing together the international communities of dependability and software architectures. The first workshop on Architecting Dependable Systems was organised during the International Conference on Software Engineering (ICSE) 2002. Since then six workshops were organised and three books were published [1]. This series of workshops have shown to be a fertile ground for both communities to clarify previous approaches, thus helping to promote new topical areas where the most promising research may lie, while avoiding the reinvention of the wheel.

The main focus of this series of workshops is to address at the architectural level the structuring, modelling, and analysis of dependable software systems. During DSN 2007 WADS the underlying theme will be Architecting Critical Infrastructures.

2. Architecting Dependable Systems

A major challenge lying ahead is how to build dependable systems from existing undependable components and systems that were not originally designed to interact with each other. These components and systems might not provide access to their internal designs and implementations, and they can evolve independently of the overall system. Based on these limitations, the delivery of correct service, and the justification of this ability, has to be obtained from the interfaces and interactions of these components and systems. Architectural representations of systems are effective in understanding broader system concerns by abstracting away from system details, hence the trend of addressing dependability at the architectural level, rather than late in the development process.

The reasoning about dependability at the architectural level can be addressed from different perspectives:

- Architectural description languages, or a combination of different notations, can be employed for modelling systems’ architectures in terms of their components and connectors, which might also include adaptors for preventing architectural mismatches.
- For the provision of assurances that indeed faults have been removed from the architectural representation, techniques like model checking and theorem provers are employed together with more traditional approaches, such as architectural inspections. Tests and fault injection are also performed to check whether the implementation fulfils the architectural specification.
- Since it is difficult to remove all the faults from a system, provisions have to be made at the architectural level to tolerate residual faults. Efforts for this are in the form of structuring rules, as well as incorporating existing fault-tolerance techniques into architectural abstractions.
- Architectural evaluation of systems should analyse the impact that architectural decisions might have when system failure. Architectural fault injection and stochastic modeling are some of the means that have been used and are being developed.
3. Workshop Objectives and Topics

The aim of the workshop is to bring together the communities of software architectures and dependability to discuss the state of research and practice when dealing with dependability issues at the architecture level. We are interested in submissions from both industry and academia on all topics related to software architectures for dependable systems. These include, but are not limited to:

- **Rigorous design**: architectural description languages; architectural patterns; formal development; architectural views; architectural support for evolution; integrators (wrappers) for dependability; representation of fault assumptions;
- **Verification & validation**: architectural inspection techniques; theorem proving; type checking; model checking; architecture-based fault injection; architecture-based conformance testing; simulation;
- **Fault tolerance**: redundancy and diversity at the architectural level; error confinement; architectural monitoring; dynamically adaptable architectures; exception handling; self-healing, self-repairing, self-stabilizing systems; support for adaptable fault tolerance;
- **System evaluation**: assurance based development; dependability modeling and analysis in software architectures; runtime checks of dependability models at the architectural level; tradeoff between dependability and cost;
- **Enabling technologies**: model driven architectures; component based development; aspect oriented development; middleware;
- **Application areas**: safety-critical systems; critical infrastructures; mobile systems; service oriented architectures; embedded systems.

4. Workshop Program

4.1. Keynote Speaker

Professor Wolfgang Emmerich will be our keynote speaker. He is the head of the Software Systems Engineering group (Department of Computer Science) at the University College London. He is well known for his work on middleware-based distributed software architectures, and will be talking about the Dependability of Web Service Architectures.

4.2. Architecting Critical Infrastructures

This year we are building on the theme of critical infrastructures. Nowadays, public health, economy, security and quality of life heavily depend on the resiliency of a number of critical infrastructures, including electrical power, telecommunications, transportation and many others. Therefore, addressing the current and future problems in these various critical infrastructure sectors is of paramount importance. With that in mind, a considerable amount of time will be devoted to this topic, with discussions being focused around that area.

For more program details please refer to the DSN 2007 WADS website [http://www.cs.kent.ac.uk/wads].

5. Committees

5.1 Workshop Organisers

Rogério de Lemos (UK), Felicita Di Giandomenico (Italy), Cristina Gacek (UK).

5.2 Programme Committee

Ivica Crnkovic (Sweden), Holger Giese (Germany), Swapna S. Gokhale (USA), Lars Grunske (Australia), Karama Kanoun (France), Istvan Majzik (Hungary), Eliane Martins (Brazil), Nenad Medvidovic (USA), Henry Muccini (Italy), Priya Narasimhan (USA), Roshanak Roshandel (USA), Rick Schlichting (USA), Elisabeth Strunk (USA), Paulo Verissimo (Portugal)

References