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Autonomic Communication

First International IFIP Workshop, WAC 2004
Berlin, Germany, October 18-19, 2004
Revised Selected Papers



Springer

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Preface

The first IFIP Workshop on Autonomic Communication (WAC 2004) was held 18–19 October 2004 in Berlin, Germany. The workshop was organized by Fraunhofer FOKUS with the help of partners of the EU-funded Autonomic Communication Coordination Action — IST-6475 (ACCA), and under technical sponsorship of IFIP WG6.6 — Management of Networks and Distributed Systems.

The purpose of this workshop was to discuss Autonomic Communication—a new communication paradigm to assist the design of the next-generation networks. WAC 2004 was explicitly focused on the principles that help to achieve purposeful behavior on top of self-organization (self-management, self-healing, self-awareness, etc.). The workshop intended to derive these common principles from submissions that study network element’s autonomic behavior exposed by innovative (cross-layer optimized, context-aware, and securely programmable) protocol stack (or its middleware emulations) in its interaction with numerous, often dynamic network groups and communities. The goals were to understand how autonomic behaviors are learned, influenced or changed, and how, in turn, these affect other elements, groups and the network. The highly interactive and exploratory nature of WAC 2004 defined its format — six main sessions grouped in three blocks, each block followed by a panel with all speakers of the previous block as panellists and session chairs as panel moderators.

The first panel aimed to highlight the main principles guiding research in algorithms, protocols and middleware; the second panel investigated grand challenges of network and service composition; the third panel had to answer the question “How Does the Autonomic Network Interact with the Knowledge Plane?”. Panel reports were compiled by panel moderators and conclude this volume.

The emphasis of the workshop was on the long-term research agenda with a broad interdisciplinary approach to explore concurrently multiple paradigm spaces. Along with regular sessions the workshop offered two invited talks. Prof. I. Chlamtac, IEEE and ACM Fellow, known for outstanding achievements in optical and mobile networking, shared his views on bio-inspired communication. Prof. A. Fradkov, IEEE Fellow and IFAC member, known for his fundamental works on non-linear and adaptive control, presented a novel network control paradigm based on a cyberphysical approach. Both talks are published in this volume in full length in the invited program section.

The motivating vision of autonomic communication is that of a self-organized Internet that will be able to sense its environment, to perceive its changes and to understand the meaning of these changes, thus facilitating new ways to perform network control, management, middle box communication, service creation, etc. This might be based on universal and fine-grained multiplexing of numerous policies, rules and events which, while autonomously performed, can facilitate the desired behavior of groups of network elements. In line with this vision papers were

solicited on topics including policy-based communication and policy multiplexing, group communication for the control and management plane, network evolvability design, self-organization for re-configurability, management of nomadicity, autonomic communication calculi and theoretical foundations of autonomic network control, mobile code and network programmability, generic network-level service composition at run-time, context handling, theoretical foundations of rule-based systems, security, immunity and resilience of autonomic communication, and its application to QoS, traffic engineering, routing, etc. The workshop received 45 submissions from all over the world; the TPC selected 18 papers constituting the main body of this volume.

WAC 2004 was the foundational event for the autonomic communication initiative and this volume is believed to be the first collective publication solely dedicated to the investigation into its principles. The initiative emerged from the series of brainstorming and consultation meetings started at the EU Commission premises in July 2003 and organized by the IST Programme Future and Emerging Technologies (FET) to address Communication Paradigms for 2020. WAC 2004 was followed by the foundation meeting of the ACF — Autonomic Communication Forum (<http://www.autonomic-communication-forum.org>), and by the publication of FP6 Call for Projects within the proactive initiative on Situated and Autonomic Communication. At the time of writing ACF had close to 200 members from industry and academia. WAC 2005 is being organized in Athens, Greece; WAC 2006 is planned for Paris, France.

To give the authors the opportunity to revise their papers based on the workshop discussions, to allow panel chairs to discuss and to prepare panel reports, and to allow invited speakers to publish their presentations as full papers, this LNCS volume was published as a postproceedings of the workshop.

Finally, it is a pleasure to record here our high appreciation of the efforts of many people in the successful launch of WAC: to all the authors who submitted, presented and revised their papers, or agreed to present their papers as posters, regretting that it was not possible to accept more papers for WAC 2004; to all the attendees for highly interactive participation in the discussions; to the Program Committee members and to all associated reviewers for thorough and motivated assessment of submissions; to partners in the Autonomic Communication Coordination Action for acting as promoters and helpers for WAC 2004; to the EU Commission FET officers for the continuous support of WAC and ACF; to IFIP TC6 members for accepting this foundational workshop, especially to IFIP WG6.6 for technical hosting of WAC; and last but not least, many warm thanks go to the employees of Fraunhofer FOKUS, who dedicated much effort in making the event professionally organized and socially enjoyable.

About This Book

This is the postproceedings of the 1st IFIP TC6 WG6.6 International Workshop on Autonomic Communication (WAC 2004); it includes 18 full papers presented at WAC 2004 and revised by the authors based on the workshop discussions, and full texts of the two invited talks and three panel reports.

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Table of Contents

Network Management

An Infrastructure-Based Approach to Support Dynamic Networks with Mobile Agents <i>Arndt Döhler, Christian Erfurth, Wilhelm Rossak</i>	1
Some Requirements for Autonomic Routing in Self-organizing Networks <i>Franck Legendre, Marcelo Dias de Amorim, Serge Fdida</i>	13
Policy Interoperability and Network Autonomics <i>Shane Magrath, Robin Braun, Fernando Cuervo</i>	25

Models and Protocols

Spatial Computing: An Emerging Paradigm for Autonomic Computing and Communication <i>Franco Zambonelli, Marco Mamei</i>	44
Self-deployment, Self-configuration: Critical Future Paradigms for Wireless Access Networks <i>Francis J. Mullany, Lester T.W. Ho, Louis G. Samuel, Holger Claussen</i>	58
Content Distribution Through Autonomic Content and Storage Management <i>Nikolaos Laoutaris, Antonios Panagakis, Ioannis Stavrakakis</i>	69

Network Composition

A Unified Framework for the Negotiation and Deployment of Network Services <i>Spyros Denazis, Lidia Yamamoto</i>	79
<i>TurfNet</i> : An Architecture for Dynamically Composable Networks <i>Stefan Schmid, Lars Eggert, Marcus Brunner, Jürgen Quittek</i>	94
A Systems Architecture for Sensor Networks Based on Hardware/Software Co-design <i>Andy Nisbet, Simon Dobson</i>	115

Negotiation and Deployment

Challenges in Communications Research Beyond the VICOM Project <i>F. Vatalaro, G. Cortese, F. Davide, A. Detti, M. Leo, P. Loreti, G. Riva</i>	127
A Framework for Self-organized Network Composition <i>Cornelia Kappler, Paulo Mendes, Christian Prehofer, Petteri Pöyhönen, Di Zhou</i>	139
Semantic-Based Policy Engineering for Autonomic Systems <i>David Lewis, Kevin Feeney, Kevin Carey, Thanassis Tiropanis, Simon Courtenage</i>	152

Immunity and Resilience

Dynamic Self-management of Autonomic Systems: The Reputation, Quality and Credibility (RQC) Scheme <i>Anurag Garg, Roberto Battiti, Gianni Costanzi</i>	165
E Pluribus Unum: Deduction, Abduction and Induction, the Reasoning Services for Access Control in Autonomic Communication <i>Hristo Koshutanski, Fabio Massacci</i>	179
A Metabolic Approach to Protocol Resilience <i>Christian Tschudin, Lidia Yamamoto</i>	191

Meaning, Context and Situated Behaviour

Putting Meaning into the Network: Some Semantic Issues for the Design of Autonomic Communication Systems <i>Simon Dobson</i>	207
Dynamic and Contextualised Behavioural Knowledge in Autonomic Communications <i>Roy Sterritt, Maurice Mulvenna, Agnieszka Lawrynowicz</i>	217
Towards Adaptable Ad Hoc Networks: The Routing Experience <i>Cesar A. Santivanez, Ioannis Stavrakakis</i>	229

Invited Programme

BIONETS: BIO-inspired NExt generaTion networks <i>Iacopo Carreras, Imrich Chlamtac, Hagen Woesner, Csaba Kiraly</i> ...	245
--	-----

Dynamics, Information and Control in Physical Systems <i>Alexander L. Fradkov</i>	253
--	-----

Panel Reports

Panel Report: “Main Principles to Guide R&D in Algorithms, Protocols and Middleware” <i>Ioannis Stavrakakis, Fabrizio Sestini</i>	269
---	-----

Panel Report: “Grand Challenges of Network and Service Composition” <i>Giuseppe Valetto, Fabrice Saffre</i>	271
--	-----

Panel Report: “How the Autonomic Network Interacts with the Knowledge Plane?” <i>David Lewis</i>	275
--	-----

Author Index	279
---------------------------	-----