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Active and Programmable Networks

IFIP TC6 7th International Working Conference, IWAN 2005
Sophia Antipolis, France, November 21-23, 2005
Revised Papers

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Preface

This volume contains the proceedings of the 7th International Working Conference on Active and Programmable Networks (IWAN 2005) that was held during November 21–23, 2005, in Sophia Antipolis, Cote d’ Azur, France, jointly organized by Hitachi Europe and INRIA.

IWAN 2005 took place against a backdrop of questions about the viability and necessity of a conference that deals with an area perceived by many as having run its full course. The Organizing Committee, during the preparations of the conference, took these concerns seriously and reflected them in the theme of this year’s event, entitled “Re-incarnating Active Networking Research,” and expanding the scope of past calls for papers into topics that have emerged from active and programmable networks.

The result was a success because we received 72 submissions, a number that exceeded our expectations and in fact is one of the highest in the history of the conference. The distinguished Technical Program Committee set high standards for the final program; each one of the submitted papers received three peer reviews with detailed comments and suggestions for the authors. In total, 13 papers were accepted for the main program sessions with 9 papers accepted unconditionally and the remaining 4 papers being conditionally accepted with shepherding by selected Program Committee members. The Program Committee also noted that from the papers that were not selected a considerable number were also of high quality, therefore a small committee was formed to suggest which of these could be accepted as short papers, resulting in the final selection of an additional set of 13 short papers also included in these proceedings.

The full-length papers were organized, according to their content, into four sessions, “Programmable Networks and Heterogeneity,” “Network Architectural Frameworks,” “Node Architectures,” and “Services,” with the short papers providing the material for two further sessions. We have kept the same paper order and structure in this volume. With the aim of addressing the issues implied by the IWAN theme, we invited two distinguished keynote speakers who have been at the forefront of active and programmable networks research since the beginning: Ken Calvert of Kentucky University and Gísli Hjálmtýsson of Reykjavik University. In his talk “Reflections on the Development of Active and Programmable Networks,” Ken Calvert discussed the past and present of the field. Gísli Hjálmtýsson, speaking about “Architecture Challenges in Future Network Nodes,” addressed future directions. Finally, the program concluded with a panel “The Guises of Active Networking—Strategy or Destiny?” chaired by Lidia Yamamoto, where invited panellists evaluated the shortcomings and the impact of active networks on the computer networking field.

We thank the Technical Program Committee for their thorough work in reviewing, selecting and shepherding the papers. Special thanks go to Robin Braun of the University of Technology, Sydney and Jean-Patrick Gelas of INRIA, for their outstanding work as Publicity Chairs, Mikhail Smirnov for selecting and organizing a Tutorial Day with truly state-of-the-art tutorials, and last but not least the secretarial support of

Beatrice Dessus and colleagues of the Hitachi Sophia Antipolis Lab, and Danièle Herzog of INRIA and Jean-Christophe Mignot from the LIP Laboratory, the hidden heroes of every conference. Above all, we would like to thank all the authors who honored IWAN 2005 by submitting their work and the 55 participants of the conference; they are the ones who really made the conference a success.

November 2005

Spyros Denazis
Laurent Lefevre
Gary Minden
David Hutchison

Introduction

Active and programmable networking has, over the past several years, laid the foundations of providing an easy, but robust, introduction of new network services to devices such as routers and switches by adding dynamic programmability to network equipment. Network programmability and service deployment architectures are necessary to bring the right services to the customer at the right time and in the right location.

However, research focused exclusively on the field has been declining during the last couple of years and is currently carried out in the context of other emerging or more “fashionable” research areas instead. Under these circumstances, the 7th International Working Conference on Active Networks (IWAN 2005), through its call for papers and consequently its program, was called upon to explore whether active networking (AN) research can be re-incarnated within these new research fields. Such motivation was inspired by the fact that methods and technologies that have been explored in active and programmable networking research have helped to realize the trend toward various research initiatives including ad-hoc networks, autonomic networks and communications, overlays, sensor networks and content-aware distribution.

Furthermore, the issues that AN technology has tried to address find themselves at the center of any future research agenda that touches upon service and network operations at large, and in this respect AN will always be relevant. It is also our belief that many of the problems identified by the AN and programmable networks research agenda are far from being solved in a satisfactory, scalable and secure way and in this respect research in the new fields are likely to be haunted by the lack of appropriate solutions in the absence of embracing a programmable networking – if not an AN – approach.

Having reached such a stage, we included in our program two keynotes that covered the past, present and future of AN. These talks were chosen with two contrasting observations in mind. First, the lack of wide acceptance of AN derives at least partly from the inability to identify truly compelling example applications (not necessarily killer applications), and this is an aspect that should not be neglected by future researchers. But second, AN and programmable networks have been quite successful in helping define simple and expressive reference models and elegant solutions to persisting problems like security, QoS, and multicasting, but perhaps the lack of their adoption could be attributed to the fact that they have generally not been presented with a strong business model in mind.

A message conveyed by this year’s IWAN – which may be the last of its kind – is to bear in mind the likely utility of the technology developed by this community which goes beyond hype and buzzwords like active and programmable networks. And we should keep the essence of it in new research areas such as those already mentioned, including ad-hoc networks, autonomic networking and content-aware distribution.

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