MODELING AND SIMULATION TOOLS FOR EMERGING TELECOMMUNICATION NETWORKS
MODELING AND SIMULATION TOOLS FOR EMERGING TELECOMMUNICATION NETWORKS

Needs, Trends, Challenges and Solutions

Edited by

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As Chairman of COST Action 285 and co-editor of this book I wish to express my sincere thanks to all the members of the Management Committee for their full and active participation in the studies embraced by the Action including the decision to sponsor this symposium in which they presented the results of their individual research in different aspects of modeling and simulation of communication networks. I would particularly like to mention here Prof Dr Axel Lehmann and Prof Dr Ercan Topuz who, as Deputy Chair and Technical Secretary respectively of the Action 285, made unique contributions to the organisation and success of the Symposium.

The symposium was very much enriched and gained much breadth and depth by the participation of many experts in the field from outside the Action Group, from the United States of America, and Europe who willingly accepted our invitation to attend and contribute to our deliberations. It would be invidious to single out names but I would like to mention Dr Arnold Bragg who played a very important role inside the Committee as well as in the preparation and conduct of the symposium. I owe them all many thanks and much gratitude.

Last but by no means least I would like to express my appreciation to the COST Office Scientific Secretariat for the administrative and financial support given to the Action and to Prof Dr Ulf Schmerl for making the facilities and staff of his Faculty of Informatics at the University of the German Federal Armed Forces in Munich, available for the symposium. Finally It gives me pleasure to acknowledge the support I received from Mr Zerhan Ener and Mr Semih Ener as well as from the staff of Springer Publishers in the production of this book.

Nejat Ince
PREFACE

The papers which appear in this book were written by their authors based on their presentations made at a symposium hosted by The Fakultaet für Informatik of Universitaet der Bunderswehr München on 8-9 September 2005. The symposium was organised under the eagis of COST Telecommunications Action 285 entitled:

Modeling and Simulation Tools for Research in Emerging Multiservice Telecommunications
Needs, Trends, Challenges, and Solutions

COST- the acronym for European COoperation in the field of Scientific and Technical research is the oldest and widest European intergovernmental network for cooperation in research. Established by the Ministerial Conference in November 1971, COST is presently used by the scientific communities of 35 European countries to cooperate in common research projects supported by national funds.

The funds provided by COST- less than 1% of the total value of the projects- supported the COST cooperation networks (COST Actions) through which, with only around 20 million Euro per year, more than 30,000 European scientists are involved in research having a total value which exceeds 2 billion Euro per year. This is the financial worth of the European added value which COST achieves.

A “bottom up approach” (the initiative of launching a COST Action comes from the European scientists themselves), “a la carte participation“ (only countries interested in the Action participate), “equality of access“ (participation is open also to the scientific communities of countries not belonging to the European Union) and “flexible structure“ (easy implementation and light management of the research initiatives) are the main characteristics of COST.

As precurser of advanced multidisciplinary research COST plays a very important role in the realisation of the European Research Area (ERA) anticipating and complementing the activities of the Framework
Programmes, constituting a "bridge" towards the scientific communities of emerging countries, increasing the mobility of researchers across Europe and fostering the establishment of "Network of Excellence" in many key scientific domains such as: Physics, Chemistry, Telecommunications and Information Science, Nanotechnologies, Meteorology, Environment, Medicine and Health, Forests, Agriculture and Social Sciences. It covers basic and more applied research and also addresses issues of pre-normative nature or societal importance.

Currently there are some twenty actions in the Telecommunications and Information Science and Technology area one of which is COST Action 285. The main objective of this action is to enhance existing tools and develop new modeling and simulation tools for research in emerging multiservice telecommunications networks in the areas of:

- Model Performance Improvements,
- Multilayer Traffic Modeling,
- The important issue of evaluation and validation of the new modeling tools.

The studies related to the above activities are carried out by members of the Action Group, with inputs from invited experts/scientists from academia and industry when deemed necessary, and are coordinated at the Management Committee Meetings (MCM) held two or three times a year. Members participate in other related projects and activities nationally and internationally (e.g. COST, IST, ITU, ETSI, ATM Forum) provide opportunities for formal/informal contacts and for dissemination of results.

The Management Committee for COST Action 285 consists of:

Chairman: Prof Dr Nejat Ince (TR)
Deputy Chairman: Prof Dr Axel Lehmann (D)
Technical Secretary: Prof Dr Ercan Topuz (TR)
Other Members: There are up to two representatives from Bulgaria, Denmark, France, Germany, Hungary, Ireland, Italy, Macedonia, Malta, Norway, Slovenia, Spain, Turkey, Switzerland, and The United Kingdom.

The Management Committee decided early in the year 2004 to invite external experts/scientists, specialising on the subjects of interest to Action 285, from other COST Actions, software houses, telecommunications companies, universities and government research institutions of not only the COST Countries but also of other continents. A letter of invitation was
sent out to known experts and institutions to participate in a symposium with the major aim of harnessing ideas and proposals for improved and new languages and tools to enable network designers, developers and operators to model and simulate networks and services of emerging and future telecommunications systems.

From the papers submitted for presentation at the symposium the text of twenty four of them were selected for inclusion in this book. The symposium presentations were made in four sessions as follows;

Session 1 : Multilayer Traffic and Multimedia Behaviour,
Session 2 : Quality of Simulations,
Session 3 : Accelerated Simulation Methods,
Session 4 : Verification, Validation and Credibility of Simulations.

The contributors and their coordinates are given in the list herewith attached.

The symposium covered a wide spectrum of subjects dealing coherently with nearly all the important aspects of simulation modeling and tools for the design and performance evaluation techniques and systems particularly the emerging ones.

It is hoped and expected that this book, which is the proceedings of the symposium, will be found useful as a reference work for practicing engineers and academic researchers.

Nejat Ince,
Ankara.
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