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Computer Networks

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Preface

Computer networks are one of the most important elements of our technical life, i.e., the technical means we use every day. A great number of devices around us communicate via computer networks and, moreover, all online services we use need to be connected to a network to operate properly. This applies to professional activities as well as private ones. Computer networks are part of the field of computer science and this is one of the most intensively developed branches with a very important impact on world economy. Research in computer networks has an influence on other branches of technical science and contributes to the development of completely new areas as well. Therefore, the domain of computer networks has become one of the most important fields of research.

The area of computer networks and the entire field of computer science are the subject of constant change. It is caused by the general development of IT technologies, by overall technical progress, and by the strong need for innovations in the sphere of how we communicate with each other, how we work, and how we perform our daily activities. This results in a very creative and interdisciplinary interaction between computer science technologies and other technical activities, and leads to perfect solutions. New methods, together with tools for designing and modeling computer networks, are regularly extended. Above all, the essential issue is that the scope of computer network applications is increased thanks to the results of new research and to new applications. Such solutions were not taken into consideration in the past few decades. Whereas the requirements of contemporary markets and the creative applications of existing network facilities stimulate the progress of scientific research, the extensive use of new solutions leads to numerous problems, both practical and theoretical, which need to verified, solved, and improved.

24th International Science Conference *Computer Networks*

This book collates the research work of scientists from numerous notable research centers. The chapters refer to the wide spectrum of important issues regarding the computer networks and communication domain. It is a collection of topics presented at the 24th edition of the International Conference on Computer Networks, which was held in Stonemout Castle, located near Lądek Zdrój, the famous health resort in southern Poland, during June 20–23, 2017. The conference, organized annually since 1994 by the Institute of Informatics of Silesian University of Technology together with the Institute of Theoretical and Applied Informatics in Gliwice, is the oldest event of its kind in Poland. The current edition was the 24th such event, and the international status of the conference was attained nine years ago, with the tenth international edition taking place in 2017. Just like previous events in the series, the conference took place under the auspices of the Polish section of IEEE (technical co-sponsor), and the conference partner was iNEER (International Network for Engineering Education and Research).

In 2017 the total number of submissions was 80. The presented papers were accepted after careful reviews made by at least three independent reviewers in a double-blind way. The acceptance level was below 45%, and thus the proceedings contains only 35 full papers. The chapters are organized thematically into several areas in the following tracks:

- Computer Networks
  This group of papers is the largest one. General issues of networks architecture, analyzing, modeling, and programming are covered in 16 papers. Topics on wireless systems and wireless sensor networks, fault-tolerant algorithms, security concerns, indoor localization issues, Internet technologies, and redundancy in industrial networks, among others, are included.
- Teleinformatics and Communications
  This section refers the general communications theory and related issues. It contains five papers related to interesting topics on overflow study in multi-tier cellular networks, the WebRTC technology, efficient calculation of radiation in wideband transmission systems, transmission range estimation for vehicular ad hoc networking, and usage of convolution algorithms for modeling network systems.
- New Technologies
  The chapter of new technologies used in the networking contains four papers which are connected with brand new areas of computer networks research, usage, and applications. There are topics on quantum direct communication, construction of firewall for SDNs and Qutrit Switch for quantum networks, and SLA life cycle management for cloud computing.
- Queueing Theory
  The domain of queueing theory is usually one of the most strongly represented areas at the Computer Network conference. This year, five papers are included, e.g., a paper on a performance model for studying distributed Web systems with usage of queueing Petri nets, a paper on the performance of fractional order PID controller as an AQM mechanism and the impact of traffic self-similarity on network utilization, a paper on applying a fluid limit approach methodology to find a sufficient and necessary stability condition for the Basic Collaboration system with feedback

allowed, a paper on the investigation of the Erlang service system with limited memory space under control of an AQM mechanism, and a paper on the investigation of queueing systems with demands of random space requirements and limited buffer space, in which queueing or sojourn time is limited by some constant value.

– Innovative Applications
  The five papers in this section refer to research in the area of innovative applications of computer networks theory and facilities. There are contributions on innovative usage of in-vehicle communication, indoor positioning systems based on magnetic fields, reactive auto scaling models in order to improve sensitivity on load changes in cloud infrastructure, management of dynamic network models and the optimization criterion in the example distributed system.

Each chapter includes highly stimulating studies that may interest a wide readership.

In conclusion, on behalf of the Program and Organizing Committee of the Computer Network Conference, we would like to express our gratitude to all authors for sharing their research results as well for their assistance in developing this volume, which we believe is a reliable reference in the computer networks domain.

We also want to thank the members of the Technical Program Committee for their participation in the reviewing process.

If you would like to help us make the conference more attractive and interesting, please send us your opinions and proposals at cn@polsl.pl.

April 2017

Piotr Gaj
Andrzej Kwiecień

Organization

CN 2017 was organized by the Institute of Informatics from the Faculty of Automatic Control, Electronics and Computer Science, Silesian University of Technology (SUT) and supported by the Committee of Informatics of the Polish Academy of Sciences (PAN), Section of Computer Network and Distributed Systems, in technical co-operation with the IEEE and consulting support of the iNEER organization.

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