

JOURNAL OF TELECOMMUNICATIONS AND INFORMATION TECHNOLOGY

Preface

This issue of *Journal of Telecommunications and Information Technology* includes selected papers devoted to research in the ICT area carried out within the frame of Polish National Project PBZ MNiSW-02-11/2007: *Next Generation Services and Networks – technical, application and market aspects*.

This project was coordinated by the National Institute of Telecommunications and implemented in cooperation with 8 scientific centers: Warsaw University of Technology, Gdańsk University of Technology, Poznań University of Technology, Wrocław University of Technology, AGH University of Science and Technology (Cracow), Research and Academic Computer Network (NASK) and Military Institute of Telecommunications.

It covered diversified spectrum of research in 10 areas: **network architectures and protocols, wireless and mobile systems and their security, network development planning, traffic management – IT QoS, digital radio broadcasting networks, methods and tools for their design and trials, electromagnetic compatibility, measurements and monitoring, systems aiding regulatory decisions – knowledge mining, multimedia services and models for trading network transport resources.**

Examples of work include identification and analysis of evolution directions of NGN architectures and protocols, their design and development methods, traffic management mechanisms, creation of new algorithms, technologies and tools for implementing broadly defined multimedia services, development of technical means supporting introduction of products and services related to wireless/mobile systems and their security, design methods optimizing coverage of single digital (DRM) transmitters and broadcast networks, transmission properties and interference susceptibility of advanced wireless systems and networks in real electromagnetic environment, monitoring and diagnostics of time signals and development of group time standard, creation of innovative mechanisms for trading transport resources of telecommunication networks, in particular on auctions and exchanges to improve efficiency of resource utilization and competition for network resources, and development of tools supporting decision-making for regulation of telecom services markets.

The first five papers are related with **traffic management – IT QoS**. The first one titled *The IP QoS System* written by Wojciech Burakowski, Jarosław Śliwiński, Halina Tarasiuk, Andrzej Bęben, Ewa Szykiewicz, Piotr Pyda, and Jordi Mongay Batalla describes the IP QoS system that support a number of, so called, classes of services in the Internet. It is assumed that a user/an application requests from the network a specified service corresponding to

quality of packet transfer, and for doing it, the network allocates an adequate amount of resources if it has. In order to achieve this the network functionalities should be extended comparing to the best effort Internet. These new functionalities are related to signaling, resource provisioning, QoS mechanisms at packet, connection and dimensioning levels. The presented IP QoS system is based on the next generation networks (NGN) and differentiated services (DiffServ) architectures. In the next paper, *Performance Evaluation of Signalling in the IP QoS System* written by Halina Tarasiuk, Jarosław Śliwiński, Piotr Arabas, Przemysław Jaskóła, and Witold Góralski the trial results of the proposed signaling system of the IP QoS system based on NGN and DiffServ architectures, which allows sending a request from a user to the system for establishing new connection with predefined quality of service assurance, are presented. The experiments were performed to measure setup delay utilizing artificial call generator/analyzer. The different distributions of interarrival and call holding times based on the literature were assumed. The results show that the setup delay strongly depends on access time to network devices, however also on the assumed call.

The paper *On Dimensioning and Routing in the IP QoS System* by Witold Góralski, Piotr Pyda, Tomasz Dalecki, Jordi Mongay Batalla, Jarosław Śliwiński, and Waldemar Latoszek presents dimensioning and routing solutions in designed IP QoS system. The functional architecture as well as the description of the functions and methods implemented in the system are discussed.

The quality evaluation of the telecommunication services: VoIP (representing the RT interactive class) and VoD (representing the MM streaming class) is analyzed in the next paper titled *QoS Conditions for VoIP and VoD* by Przemysław Dymarski, Sławomir Kula, and Thanh Nguyen Huy. The objective methods and tools for perceived quality measurement are compared.

The platform for research on auction mechanisms being a distributed simulation framework providing means to carry out research on resource allocation efficiency mechanisms and user strategies is discussed in the paper *A Software Platform for Research on Auction Mechanisms* written by Mariusz Kamola, Ewa Niewiadomska-Szynkiewicz, Krzysztof Malinowski, Wojciech Stańczuk, and Piotr Pałka. Both kinds of algorithms examined are completely user-defined. In the presented approach interaction of algorithms is recorded and pre-defined measures for the final resource allocation are calculated. Moreover, underlying database design provides for efficient results lookup and comparison across different experiments, thus enabling research groupwork. A recognized, open and flexible information model is employed for experiment descriptions.

The next three papers deal with **network architectures and protocols**. The first one titled *The Realization of NGN Architecture for ASON/GMPLS Network* and written by Sylwester Kaczmarek, Magdalena Młynarczuk, Marcin Narloch, and Maciej Sac concerns ASON/GMPLS optical network as a NGN transport layer. In particular, the ASON/GMPLS architecture and its relation to the proposed ITU-T NGN architecture are described. The concept, functional structure and communication among architecture elements as well as the implementation of laboratory testbed are presented. The results of functional tests confirming proper software and testbed operation are stated. In the next one, *Multi Queue Approach for Network Services Implemented for Multi Core CPUs*, the usage of general purpose CPU providing network core functionality is analyzed by Marcin Hasse, Krzysztof Nowicki, and Józef Woźniak. For this purpose parameterized system model has been created, which represents general core networking needs. The problem of the testing in telecommunications and software engineering, is discussed in the next paper titled *Active – Passive: On Preconceptions of Testing* written by Krzysztof M. Brzeziński.

In the next paper related with wireless and mobile systems and their security, *Optimization of Call Admission Control for UTRAN*, Michał Wągrowski, Wiesław Ludwin paper addresses the traffic's grade of service indicators: call blocking and dropping rates as well as the optimization of their mutual relation, corresponding to the call admission control procedure configuration. The results of simulations presented opportunities for the CAC load threshold adaptation according to the traffic volume and user mobility changes observed in the mobile radio network.

The following five papers address some selected topics of multimedia services. In the first one, *Network-on-Multi-Chip (NoMC) with Monitoring and Debugging Support* written by Adam Łuczak, Marta Stępniewska, Jakub Siast, Marek Domanski, Olgierd Stankiewicz,

Maciej Kurc, and Jacek Konieczny, recent research on network-on-multi-chip are summarized. The proposed network architecture supports hierarchical addressing and multicast transition mode. Such an approach provides new debugging functionality hardly attainable in classical hardware testing methodology. In the next paper, *The Design of an Objective Metric and Construction of a Prototype System for Monitoring Perceived Quality (QoE) of Video Sequences*, Lucjan Janowski, Mikołaj Leszczuk, Zdzisław Papir, and Piotr Romaniak present different no reference (NR) objective metrics addressing the most important artefacts for raw (source) video sequences (noise, blur, exposure) and those introduced by compression (blocking, flickering) which can be used for assessing quality of experience. The validity of all metrics was verified under subjective tests. In the next paper, *Communication Platform for Evaluation of Transmitted Speech Quality* written by Andrzej Ciarkowski and Andrzej Czyżewski, a voice communication system designed and implemented is described. The purpose of the presented platform was to enable a series of experiments related to the quality assessment of algorithms used in the coding and transmitting of speech. The system is equipped with tools for recording signals at each stage of processing, making it possible to subject them to subjective assessments by listening tests or, objective evaluation employing PESQ or PSQM algorithms. The framework for testing video streaming techniques is presented in *Video Streaming Framework* by Andrzej Buchowicz, and Grzegorz Galiński. Short review of error resilience and concealments tools available for the H.264/AVC standard is given. The video streaming protocols and the H.264 payload format as well as experimental results are described.

The next paper *The Learning System by the Least Squares Support Vector Machine Method and its Application in Medicine* written by Paweł Szewczyk and Mikołaj Baszun, presents the possibility of using the Least Squares Support Vector Machine to the initial diagnosis of patients is presented. In order to find some optimal parameters making the work of the algorithm more detailed, the following techniques have been used: K-fold Cross Validation, Grid-Search, Particle Swarm Optimization. The result of the classification has been checked by some labels assigned by an expert.

Michał Karpowicz in his paper *Designing Auctions: A Historical Perspective* presents selected results carried out within the framework of **models for trading network transport resources**. In particular, some aspects of auction design is discussed.

Cezary Chudzian, Janusz Granat, Edward Klimasara, Jarosław Sobieszek, and Andrzej P. Wierzbicki in the paper related with **systems aiding regulatory decisions – knowledge mining** and titled *Personalized Knowledge Mining in Large Text Sets* discuss the concept of knowledge engineering, in particular ontological engineering. They present assumptions accepted as a basis for a group research on a radically personalized system of ontological knowledge mining, relying on the perspective of human centered computing and combining ontological concepts of the user with an ontology resulting from an automatic classification of a given set of textual data. Moreover, a pilot system PrOnto that supports research work in two aspects: searching for information interesting for a user according to her/his personalized ontological profile, and supporting research cooperation in a group of users (Virtual Research Community) according, e.g., to a comparison of such personalized ontological profiles is presented.

The next paper titled *New SEAMCAT Propagation Models: Irregular Terrain Model and ITU-R P. 1546-4* concerns **electromagnetic compatibility**. The authors, Dariusz Więcek and Dariusz Wypiór present in it implementation of the ITU-R P.1546-4 and ITM propagation models for SEAMCAT prepared and developed in the National Institute of Telecommunications, Poland. Results of their research encompasses methodology, implementation and verification of plug-ins into the SEAMCAT software.

Finally, in the next paper related with **digital radio broadcasting networks, methods and tools for their design and trials** and titled *Technical Aspects Outline for the Strategy of Launching Digital Broadcasting in Poland on Wave Bands Below 30 MHz* Andrzej Dusiński and Jacek Jarkowski discuss the state of art knowledge concerning the introduction of DRM in the world and prospects for its further development. It presents the possibility of introducing this system in Poland.

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