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Proceedings of the 10th Symposium on Green Networking and Computing (SGNC 2019)

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IEEE Technical Committee on Green Communications & Computing

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MESSAGE FROM THE SGNC 2019 SYMPOSIUM ORGANIZERS

Foreword

Although the contribution of information and communications technology's (ICTs) systems to global energy consumption and greenhouse gas (GHG) emissions cannot be completely eliminated, these contributions should be maximally reduced, in order to limit the exponential increase in energy consumption and GHG emission trends. To face this challenge, improved or completely new algorithms, tools, platforms, methodologies, paradigms, systems and energy models must be devised and practically implemented. These proceedings gather works on all aspects of enabling technologies for green networking and computing presented during the tenth in a row Symposium organized on this topic. The 10th Symposium on green networking and computing (SGNC 2019) was organized in the frame of the 27th International Conference on Software, Telecommunications and Computer Networks (SoftCOM 2019). The SGNC 2019 symposium was held in hotel Radisson Blu Resort in Split, Croatia, September 19 to 21, 2019. Organizers of the 10th Symposium on green networking and computing (SGNC 2019) are the University of Split, Faculty of electrical engineering, mechanical engineering and naval architecture (FESB), Croatia and Politecnico di Milano University, Department of electronics, informatics and bioengineering (DEIB), Italy. The SGNC 2019 symposium is organized in cooperation with the IEEE ComSoc Technical Committee on Green Communications and Computing (TCGCC) and Croatian ACM chapter (CRO ACM).

In the frame of 10th SGNC 2019 symposium, three accepted papers have been presented in the technical program of the first part of the SGNC 2019 symposium (SYM1/I). Additionally, three accepted papers were presented in the technical program of the second part of the SGNC 2019 symposium (SYM2/II). In total, six papers were accepted and presented, covering different topics related to the energy-efficient improvements of data centres, cognitive radios, mobile edge networks, ad-hoc networks multi-radio access networks and low voltage power distribution networks. Additionally, during the conference business forum, one presentation held by an expert from company Nokia, Croatia was organized, on the topic related to new approaches that improve the power efficiency of Nokia's equipment.

We hope that readers of these proceedings will find the articles and presentations informative and that they will enjoy reading this feature topic devoted to exciting fast-evolving field of green networking and computing. We would like to thank all the authors who submitted articles to this Symposium and to all presenters who give their presentations which significantly contribute to international affirmation of this Symposium. Finally, we express our gratitude to all reviewers for their comments and valuable feedback on the submitted articles.

Antonio Capone, PhD

Symposium Co-chairs

Josip Lorincz, PhD

PROCEEDINGS INFORMATION

Proceedings of the 10th Symposium on green networking and computing 2019 (SGNC 2019)
International Conference on Software, Telecommunications and Computer Networks (*SoftCOM* 2019)

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INTERNATIONAL SYMPOSIUM COMMITTEE

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Mario Pickavet, *Ghent University, Belgium*

Jinsong Wu, *Universidad de Chile, Chile*

SYMPOSIUM PROGRAM

SYM 1/I - Symposium on green networking and computing I
Session chair: *Josip Lorincz, Ph. D., FESB, University of Split, Croatia*
September 21, 2019, 08:30 – 10:00, Conference room Palma I, (Radisson Blu Resort, Split, Croatia)

SYM 1/II - Symposium on green networking and computing II
Session chair: *Josip Lorincz, Ph. D., FESB, University of Split, Croatia*
September 21, 2019, 10:30 – 12:00, Conference room Palma I, (Radisson Blu Resort, Split, Croatia)

Business forum:

Zero Emission – Nokia's Technology Portfolio
Presenter: *Mr. Vedran Ivaniš, Nokia, d.o.o., Croatia*
September 20, 2019, 09:00 – 10:30, Conference room Palma II, (Radisson Blu Resort, Split, Croatia)

Tracks

- *Symposium on Green Networking and Computing*
- *Business Forum*

Symposium on Green Networking and Computing

Symposium organizers: *Antonio Capone (Politecnico di Milano, Italy), Josip Lorincz (University of Split, Croatia)*
Symposium chair: *Josip Lorincz (University of Split, Croatia)*

- ***SYM1/I - Symposium on Green Networking and Computing I***
- ***SYM1/II - Symposium on Green Networking and Computing II***

SYM1/I - Symposium on Green Networking and Computing I

Symposium organizers: *Antonio Capone (Politecnico di Milano, Italy), Josip Lorincz (University of Split, Croatia)*
Symposium chair: *Josip Lorincz (University of Split, Croatia)*

- **Energy Optimal Partial Computation Offloading Framework for Mobile Devices in Multi-access Edge Computing**
  Sonali Chouhan (Indian Institute of Technology Guwahati, India)

- **Multi-Radio Access Network Assignment Using Dynamic Programming**
  Vianney Anis and Stephan Weiss (University of Strathclyde, United Kingdom (Great Britain))

- **Spectrum Allocation and Power Management using Markov Chains and Beamforming in Underlay Cognitive Radios**
  Sasank Gurajapu, Sarvesh Raj and Sonali Chouhan (Indian Institute of Technology Guwahati, India)

SYM1/II - Symposium on Green Networking and Computing II

Symposium organizers: *Antonio Capone (Politecnico di Milano, Italy), Josip Lorincz (University of Split, Croatia)*
Symposium chair: *Josip Lorincz (University of Split, Croatia)*

- **Optimized Energy Consumption in Linear Slotted Aloha Ad Hoc Networks with Equidistant Hops**
  Bruna Silva and Renato M. de Moraes (Federal University of Pernambuco (UFPE), Brazil)

- **Narrowband Powerline Communication Measurement and Analysis in the Low Voltage Distribution Network**
  Raja Alaya (University of Carthage & Tunisia Polytechnic School, Tunisia); Rabah Attia (Tunisia Polytechnic School, University of Carthage, Tunisia)

- **Reducing Data Center Power Losses through UPS Serial Consolidation**
  Fawaz AL-Hazemi (KAIST, Korea); Josip Lorincz (University of Split, Croatia); Alaelddin Fuad Yousif Mohammed (Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea, Korea); Fahad Salamh (Purdue University, USA)

Business forum

Vedran Ivaniš, *Nokia d.o.o., Croatia*

Friday, September 20, 2019, 09:00 - 10:30 (Conference room Palma II)

ZERO EMISSION - NOKIA'S TECHNOLOGY PORTFOLIO

Abstract:

We have seen that in today's world, power efficiency and green technologies are becoming more important in design of new technology products. Over the years, Nokia had invested a lot in optimizing power and building efficiency in whole ICT portfolio that started with radio equipment and spread in other infrastructure building blocks of ICT industry. Presentation will give insight on new Nokia's communication equipment products and incorporated solutions which contribute to reductions of greenhouse gas emissions and improve equipment energy-efficiency.

Biography: *Vedran Ivaniš is experienced Account Manager in Nokia Networks, supporting new and exciting cross technology solutions for Telecommunication Companies and Enterprises. Initially started as telecommunications expert in Sono and Siemens, but, in past fifteen years, managed to collect wide technology knowledge through innovative ICT Projects in Hewlett Packard, Huawei, Microsoft and Asseco. His current role in Nokia is focused on motivating customers to adopt Industry 4.0 and digital transformation projects built with the new technologies and products from Nokia.*

Authors

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Multi-Radio Access Network Assignment Using Dynamic Programming

The City of Split

The county of
Split and Dalmatia

Zračna luka Split-Kaštela