26th International Conference on Software, Telecommunications and Computer Networks



26th International Conference on Software, Telecommunications and Computer Networks - SoftCOM 2018 September, 13 – 15, 2018, Supetar, Island of Brac, Croatia

SYMPOSIUM INFORMATION

Proceedings of the 9th Symposium on Green Networking and Computing (SGNC 2018) COMMITTEE

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IEEE Technical Committee on Green Communications & Computing

Technicaly cosponsored by:





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MESSAGE FROM THE SYMPOSIUM ORGANIZERS

Foreword

Communication and computing systems have increasing environmental footprint due to the significant amounts of greenhouse gas emission and energy consumption. To address such problems and create a sustainable environment, green communications and computing solutions should be designed with new methodologies, tools, algorithms, energy models, platforms, and systems to support next-generation communication and computing infrastructures. These proceedings gather works on all aspects of enabling technologies for green networking and computing presented during the ninth in a row Symposium organized on this topic. The 9th Symposium on green networking and computing (SGNC 2018) was organized in the frame of the 26th International Conference on Software, Telecommunications and Computer Networks (SoftCOM 2018). The SGNC 2018 symposium was held in the attractive ambiance of the Bluesun Resort Velaris, Supetar (Island of Brac), Croatia, September 13 to 15, 2018. The SoftCOM 2018 Conference is organized by the University of Split, FESB and Croatian Communications and Information Society (CCIS) under the auspices of the Ministry of Science, Education and Sports. The Conference was technically co-sponsored by the IEEE Communications Society (ComSoc). Organizers of the 8th Symposium on green networking and computing (SGNC 2018) are the University of Split, FESB and Politecnico di Milano University, Department of electronics, informatics and bioengineering (DEIB). The SGNC 2018 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 9th SGNC 2018 symposium, three accepted papers have been presented in the technical program of the first part of the SGNC 2018 symposium (SYM1/I). Additionally, three accepted papers were presented in the technical program of the second part of the SGNC 2018 symposium (SYM2/II). In total, six papers were accepted and presented, covering different topics from energy-efficient algorithms for Ethernet link aggregation in software-defined networks to the energy-efficient clustering algorithm for the wireless sensor networks. Additionally, during the conference business forum, one presentation held by an expert from company Nokia, Croatia was organized, on the topic related to how power efficiency is tailoring Nokia's technology.



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.



Josip Lorincz, PhD

Antonio Capone, PhD

Symposium Co-chairs

PROCEEDINGS INFORMATION

Proceedings of the 9th Symposium on green networking and computing 2018 International Conference on Software, Telecommunications and Computer Networks (*SoftCOM* 2018)

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Additional copies requests (proceedings CD and paper) and all technical inquiries should be addressed to: Josip Lorincz, Ph. D. FESB, University of Split *SofTCOM* conference - Symposium on Green Networking and Computing (SGNC) R. Boškovića 32 21000 Split Croatia Tel. +385 21 305 665 Fax: +385 21 305 667

Email: josip.lerinc@fesb.hr, softcom@fesb.hr Web SGNC 2018: <u>http://www.josip-lorincz.com/Portals/0/2018_CfP_Green%20net_lorincz_capone.pdf</u> <u>http://softcom2018.fesb.unist.hr/wp-content/uploads/2018/06/2018_CfP_Green-net_lorincz_capone.pdf</u> <u>http://softcom2018.fesb.unist.hr/</u>

INTERNATIONAL SYMPOSIUM COMMITTEE

Symposium co-chairs: Antonio Capone (capone @elet.polimi.it) DEIB, Politecnico di Milano, Italy

and

Josip Lorincz (josip.lerinc@fesb.hr) FESB, University of Split, Croatia

Committee members:

Marco Ajmone Marsan, *Institute IMDEA Networks, Spain* Fawaz Al-Hazemi, Korea Advanced Institute of Science and Technology (KAIST), South Korea Luca Chiaraviglio, *University of RomeTor Vegata, Italy* Ken Christensen, *University of South Florida, USA* Jaafar Elmirghani, Uiversity of Leeds, UK Paolo Monti, *KTH Royal Institute of Technology, Sweden* Jinsong Wu, *Universidad de Chile, Chile* Haijun Zhang, *University of British Columbia, Canada*

SYMPOSIUM PROGRAM

SYM 1/I - Symposium on green networking and computing I

Session chair: Josip Lorincz, Ph. D., FESB, University of Split, Croatia September 15, 2018, 09:30 – 11:00, Conference room Šolta, (Bluesun Resort Velaris, Supetar – Island of Brac, Croatia)

SYM 1/II - Symposium on green networking and computing II

Session chair: Josip Lorincz, Ph. D., FESB, University of Split, Croatia September 15, 2018, 11:30 – 13:00, Conference room Šolta, (Bluesun Resort Velaris, Supetar – Island of Brac, Croatia)

Business forum:

How power efficiency is tailoring Nokia's technology

Presenter: Mr. Vedran Ivaniš, Nokia, d.o.o., Croatia September 13, 2018, 11:30 – 13:00, Conference room Hvar, (Bluesun Resort Velaris, Supetar – Island of Brac, Croatia)



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)

□ SeDuCe: a Testbed for Research on Thermal and Power Management in Datacenters Jonathan Pastor (IMT Atlantique, France); Jean-Marc Menaud (IMT-A & INRIA & LS2N, France)

QoS-aware Energy-Efficient Algorithms for Ethernet Link Aggregates in Software-Defined Networks

Pablo Fondo Ferreiro (University of Vigo, Spain); Miguel Rodríguez Pérez and Manuel Fernández Veiga (Universidade de Vigo, Spain)

□ Decentralised Multi-Agent based Demand Response for Smart Grid with Inclusion of Green Data Centre

Rasoul Rahmani, Irene Moser, Antonio L Cricenti and Hediyeh Karimi (Swinburne University of Technology, Australia)

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)

Big Data Challenges and Trade-offs in Energy Efficient Internet of Things systems Jelena Čulić Gambiroža and Toni Mastelić (Ericsson Nikola Tesla, Croatia)

□ A Fuzzy-logic Based Energy-efficient Clustering Algorithm for the Wireless Sensor Networks

Quan Wang, Deyu Lin and Pengfei Yang (Xidian University, P.R. China); Zhiqiang Zhang (University of Leeds, United Kingdom (Great Britain))

□ Misdetection Probability Analyses of OFDM Signals in Energy Detection Cognitive Radio Systems

Josip Lorincz and Dinko Begušić (University of Split, Croatia); Ivana Ramljak (Elektroprenos-Elektroprijenos BiH, a.d. Banja Luka, BiH)

Business forum



Vedran Ivaniš, Nokia d.o.o., Croatia Thursday, September 13, 2018, 11:30 - 13:00 (Conference room Hvar)

How power efficiency is tailoring Nokia's technology *Abstract:*

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 of Radio equipment. We in Nokia are now turning to the other parts of the of the Infrastructure, Data Centers and Networks to demonstrate the same principles and ensure same innovation paths in ICT industry.

Biography: Vedran Ivaniš is experienced Account Manager in Nokia Solution 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. t current role, in Nokia, he is motivating Customers for digital transformation projects and initiatives based on newly available technologies and products.

Authors

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The City of Split





The county of Split and Dalmatia







Zračna luka Split-Kaštela