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# Economics of Grids, Clouds, Systems, and Services


18th International Conference, GECON 2021  
Virtual Event, September 21–23, 2021  
Proceedings


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ISSN 0302-9743

ISSN 1611-3349 (electronic)

Lecture Notes in Computer Science

ISBN 978-3-030-92915-2

ISBN 978-3-030-92916-9 (eBook)

<https://doi.org/10.1007/978-3-030-92916-9>

LNCS Sublibrary: SL5 – Computer Communication Networks and Telecommunications

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The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

# Preface

This volume constitutes the proceedings of the 18th International Conference on the Economics of Grids, Clouds, Systems, and Services (GECON 2021). GECON 2021 was held during September 21–23, 2021, virtually hosted by the Libera Università Maria SS. Assunta (LUMSA), Rome, Italy.

Every year since 2004, GECON has solicited novel work at the crossroads of economics and computer science with an aim to generate societal value through research. As such, the conference brings together an interdisciplinary community of scientists and practitioners with a strong mandate to maintain and cultivate the ties between them.

The objectives and content of the conference cannot be more relevant nowadays, considering the convergence between economics and digital technologies currently happening at full speed. One can safely state that computer science has become the vessel that enacts economies at all scales. Blockchains, artificial intelligence, the Internet of Things, cloud and edge computing, and whole classes of applications (e.g., fintech) bring about new ways to conduct business and move economies. GECON stands at the center of this convergence and fosters cross-fertilization of ideas and knowledge from both areas.

This year, we received 41 submissions in response to our call for papers. Each paper was peer-reviewed by at least four members of the international Program Committee (PC). Based on significance, novelty, and scientific quality, we selected seven full papers (17% acceptance rate), which are presented in this volume. Additionally, eight shorter work-in-progress papers, two extended abstracts presenting new idea papers, and five short work-in-progress papers presented in the workshop on “Trustworthy Services, Information Exchange and Content Handling in the Context of Blockchain” organized by Thanasis Papaioannou are included in the volume.

This volume has been structured following the seven sessions that comprised the conference program:

- Performance
- AI and Digital Economy
- Blockchains
- Clouds, Fogs
- Regulation, Compliance
- New Idea Papers
- Workshop on Trustworthy Services, Information Exchange and Content Handling in the Context of Blockchain

In addition to these topic sessions, this year’s GECON featured three keynotes, evenly distributed in the program, and a poster session using Gather.town.

The keynote speaker on the first day was Rosa M. Badia from the Barcelona Supercomputer Center. Rosa’s keynote “Dynamic and Intelligent Workflows with eFlows4HPC” presented the recently started project eFlows4HPC with the goal of

providing workflow software stack and an additional set of services to enable the integration of HPC simulations and modeling with big data analytics and machine learning in scientific and industrial applications. The project will demonstrate its advances through three application pillars with high industrial and social relevance: manufacturing, climate, and urgent computing for natural hazards; these applications will help to prove how the realization of forthcoming efficient HPC and data-centric applications can be developed with new workflow technologies.

The keynote speaker on the second day was Nicolas Stier-Moses, Director at Facebook Core Data Science. His keynote “Pacing Mechanisms for Ad Auctions” presented the role that budgets play in real-world sequential auction markets such as those implemented by internet-based companies. To maximize the value provided to auction participants, spending is smoothed across auctions so budgets are used for the best opportunities. Motivated by pacing mechanisms used in practice by online ad auction platforms, he discussed smoothing procedures that ensure that campaign daily budgets are consistent with maximum bids. Reinterpreting this process as a game between bidders, Nicolas introduced the notion of pacing equilibrium, and has studied properties such as existence, uniqueness, complexity, and efficiency, both for the case of second and first price auctions. In addition, he connected these equilibria to more general notions of market equilibria, and studied how compact representations of a market lead to more efficient approaches to compute approximate equilibria.

On the third day, the keynote speaker Orr Dunkelman presented “How Not to Fight COVID19 Using Technology: An Illustrative Guide”. The COVID-19 pandemic urged a great deal of emergency response. While many efforts were solely in the medical arena, e.g., developing vaccines and efficient treatments, there were also some technological efforts to reduce transmission or reduce the economic costs of the pandemic. Two of these solutions, namely digital contact tracing and vaccination passports (or in some cases, green passports for people who are considered “safe” to go around), are interesting not just from ethical perspectives but also from technological and legal viewpoints. In his talk, Orr presented these two solutions in depth, outlining how one can indeed use modern technology to reduce the case of infections in a pandemic. At the same time, he presented the impact of small design decisions on human rights, civil liberty, and trust in governments.

The conference also included a tutorial on “Energy Efficiency Methodologies in Cloud Computing”, presented by Karim Djemane, and a panel on Law and Computer Science Challenges, chaired by Orna Agmon Ben-Yehuda with the participation of the panelists Niva Elkin-Koren of the Tel-Aviv University Faculty of Law and Supreeth Shastri of the University of Iowa. As law and computer science develop, they pose new challenges to each other. These challenges were expressed in questions addressed by the panelists such as, Where must computer scientists stretch their abilities to provide law with adequate solutions? What legal developments are required to deal with new computer science achievements?

Any conference is the fruit of the work of many people, and GECON is no exception. In particular, we wish to thank the authors, whose papers made up the body of the conference, and the members of the Program Committee and the reviewers, who devoted their time to review the papers on a tight schedule. We wish to thank the invited speakers,

for bringing new viewpoints and inputs to the GECON community. Furthermore, we would like to thank Alfred Hofmann, Anna Kramer, and the whole team at Springer, which continues an established tradition of publishing GECON proceedings in its renowned LNCS series. Finally, we wish to thank the attendees, whose interest in the conference is the main driver for its organization.

September 2021

Jörn Altmann  
José Ángel Bañares  
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Karim Djemame  
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