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Economics of Grids, Clouds, Systems, and Services

8th International Workshop, GECON 2011
Paphos, Cyprus, December 5, 2011
Revised Selected Papers

Springer

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Preface

You are holding the proceedings of the 8th International Workshop on the Economics of Grids, Clouds, Systems, and Services. This workshop brings together the research and practitioner communities active in the area of economics and computer science to address the emerging interest in infrastructure, platform, and software services. This includes the operation and structure of the service market, the alignment of cost, revenue, and quality-related objectives, and the creation of innovative business models and value chains.

This year again we received a number of high-quality paper submissions. Each submission was reviewed at least three times by an international Program Committee. Our final program consisted of five highly interactive and thought-provoking sessions (two of which were work-in-progress sessions):

- Session A: Market Mechanisms and Negotiation
- Session B: Cost Models, Charging, and Trading Platforms
- Session C: Resource Allocation, Scheduling, and Admission Control
- Session D: Work in Progress: Risk Assessment and Economics of Cloud Services
- Session E: Work in Progress: Cost-Aware Adoption of Cloud Services

As the five session titles suggest, the workshop brings together contributions from economics, resource allocation, resource management, and risk assessment. In total, there were 14 contributions (consisting of nine full papers and five work-in-progress papers) selected from 27 submitted papers. The acceptance rate of full papers is 33%.

The first paper in Session A by Haque et al. entitled "An Inspiration for Solving Grid Resource Management Problem Using Multiple Economic Models" compares a number of currently used economic models in grid computing, such as commodity markets, continuous double auctions, English auctions, contract-net protocols, and bargaining, in order to identify the settings in which one economic model out performs another. A quantitative experimental evaluation is undertaken to support this comparison—in particular to identify when to switch between such models and when to use a combination of them. The contribution "Concurrent Negotiations in Cloud-Based Systems" by Siebenhaar et al. addresses the lack of quality-of-service guarantees available within existing cloud systems. It proposes an automated negotiation approach that considers both the individual business objectives and strategies of the negotiation partners along with the dependencies between the different services and service tiers within a cloud system. The last contribution in this session from Roovers et al. entitled "A Reverse Auction-Based Market for IaaS Cloud Resources" investigates the creation of an open market for IaaS resources and proposes a continuous reverse auction along with a bidding language. It thereby specifically takes into account the current pricing schemes of real-world cloud resource providers.

Session B starts with a paper by Mohammad Mahdi Kashef and Jörn Altmann entitled "A Cost Model for Running Hybrid Clouds," which identifies a usage-based cost model for running a cloud environment consisting of both public and private (data center based) clouds. The author argues that although cloud computing promises to reduce the cost of IT through lower capital and operational expenses, providing a clear specification of these costs is often lacking in the existing literature. The subsequent contribution by Stefanov et al. entitled "How to Do Successful Chargeback for Cloud Services" utilizes experience of field experts from IBM. It provides factors that identify how to allocate IT service costs to business users based on their service consumption and how to facilitate the transition to a cloud environment. The authors argue that it is often difficult to pinpoint the actual costs incurred through service provisioning and address this limitation in their work. The final contribution in this session from Menychtas et al. entitled "A Marketplace Framework for Trading Cloud-Based Services" proposes a cloud marketplace platform for the development and trading of XaaS products. It provides a single point of access for consumers interested in services and provides specialist support for sellers wishing to make their services available through the platform.

Session C starts with a contribution from Macias and Guitart entitled "Client Classification Policies for SLA Negotiation and Allocation in Shared Cloud Datacenters," focusing on how user types (internal vs. external, preferential vs. standard) could be used by providers during SLA negotiations. Experiments are used to compare two such negotiation strategies: price discrimination and client-aware overselling of resources. In their paper "Budget-Deadline Constrained Workflow Planning for Admission Control in Market-Oriented Environments," Zheng and Sakellariou focus on workflow planning and execution, taking into account the deadline and budget constraints of users submitting workflows. The proposed heuristic also takes account of the existing load on the resources that must enact the workflow. Finally, Li et al. in their paper entitled "Virtual Machine Placement for Predictable and Time-Constrained Peak Loads" discuss how virtual machines should be placed on servers within a data center in order to deal with peaks in workload and make the execution time of tasks more predictable. They discuss the trade-off between computation time and the quality of solutions provided by a binary integer program and three approximations that increase the scale at which this NP complete problem can be solved.

The final two sessions constitute the "Work-In-Progress" papers—primarily focusing on work that is at an early stage of maturity, but likely to make significant contributions to the community. The first of these, Session D, focuses on risk assessment and economic models associated with cloud service provision. Petri et al. in their contribution "Risk Assessment in Service Provider Communities" discuss the notion of financial risk from the perspective of various stakeholders involved in cloud-based service provisioning. Künsemöller and Karl in their paper entitled "A Game-Theoretical Approach to the Benefits of Cloud Computing" identify characteristics of beneficiaries in an infrastructure-as-a-service market and the potential actions they could take to gain financial benefit.

Session E includes three contributions focusing on cost efficiency. The paper by Sengupta and Annervaz entitled "Planning for Optimal Multi-Site Data Placement for Disaster Recovery" discusses strategies for backup of critical business data across (a large number of) multiple data centers (in different geographical locations). The approach takes into account criteria such as cost of storage and network, protection level against site failures, as well as business and operational parameters such as recovery point and time objectives. Their approach uses data-encoding techniques that can facilitate recovery from multiple data center failures. Shi et al. in their contribution "Saga: A Cost-Efficient File System Based on Cloud Storage Service" describe a cost-efficient file system that provides a POSIX interface on top of Amazon S3. Cost reduction is achieved by minimizing the storage space used through "store-one-copy" and "copy-on-write" strategies and by minimizing the number of requests through a distinction of objects loaded by write and read requests in the cache replacement algorithm. The final contribution of this session from Stephen McGough entitled "Developing a Cost-Effective Virtual Cluster on the Cloud" discusses how an entire cluster computing environment could be run on a cloud system, taking into account various usage policies and execution costs.

We would like to thank the reviewers and Program Committee members for completing their reviews on time, and giving useful and valuable feedback to the authors. We would also like to extend our thanks to the organizers of ICSOC for hosting our workshop alongside their conference this year. Furthermore, we would like to express our gratitude toward Alfred Hofmann from Springer for his support in publishing the proceedings of GECON 2011.

December 2011

Kurt Vanmechelen
Jörn Altmann
Omer F. Rana

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GECON 2011 was organized by the Technology Management, Economics, and Policy Program, Seoul National University, the School of Computer Science, Cardiff University, and the University of Antwerp in collaboration with ICSOC 2011.

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