The Fourth Workshop on Hot Topics in Cloud Computing Performance (HotCloudPerf'21)

Benchmarking in the Cloud

Cristina L. Abad
cabad@fiec.espol.edu.ec
Escuela Superior
Politecnica del Litoral
Guayaquil, Ecuador

Nikolas Herbst
nikolas.herbst@uni-wuerzburg.de
University of Würzburg
Würzburg, Germany

Alexandru Uta
a.uta@liacs.leidenuniv.nl
Leiden University
Leiden, the Netherlands

Alexandru Iosup
a.iosup@vu.nl
VU Amsterdam
Amsterdam, the Netherlands

ABSTRACT

The HotCloudPerf workshop is a meeting venue for academics and practitioners, from experts to trainees, in the field of cloud computing performance. The workshop aims to engage this community, and to lead to the development of new methodological aspects for gaining deeper understanding not only of cloud performance, but also of cloud operation and behavior, through diverse quantitative evaluation tools, including benchmarks, metrics, and workload generators. The workshop focuses on novel cloud properties such as elasticity, performance isolation, dependability, and other non-functional system properties, in addition to classical performance-related metrics such as response time, throughput, scalability, and efficiency. The theme for the 2021 edition is "Benchmarking in the Cloud". HotCloudPerf 2021, co-located with the 12th ACM/SPEC International Conference on Performance Engineering (ICPE 2021), is held on April 19-20th, 2021.

CCS CONCEPTS

• **Computer systems organization** → **Cloud computing**; • **Networks** → *Cloud computing*.

KEYWORDS

cloud computing; performance; benchmarking

1 WORKSHOP THEME AND BACKGROUND

Cloud computing is emerging as one of the most profound changes in the way we build and use IT. The use of global services in public clouds is increasing, and the lucrative and rapidly growing global

cloud market already supports over 1 million IT-related jobs. However, it is currently challenging to make the IT services offered by public and private clouds performant (in an extended sense) and efficient. Emerging architectures, techniques, and real-world systems include hybrid deployment, serverless operation, everything as a service, complex workflows, auto-scaling and -tiering, etc. It is unclear to which extent traditional performance engineering, software engineering, and system design and analysis tools can help with understanding and engineering these emerging technologies. The community also needs practical tools and powerful methods to address hot topics in cloud computing performance.

Responding to this need, the HotCloudPerf workshop proposes a meeting venue for academics and practitioners, from experts to trainees, in the field of cloud computing performance. The workshop aims to engage this community, and to lead to the development of new methodological aspects for gaining deeper understanding not only of cloud performance, but also of cloud operation and behavior, through diverse quantitative evaluation tools, including benchmarks, metrics, and workload generators. The workshop focuses on novel cloud properties such as elasticity, performance isolation, dependability, and other non-functional system properties, in addition to classical performance-related metrics such as response time, throughput, scalability, and efficiency.

Each year, the workshop chooses a focus theme to explore; for 2021, the theme is "benchmarking in the cloud." Articles focusing on this topic are particularly encouraged for HotCloudPerf-2021.

2 WORKSHOP SCOPE AND TOPICS

In addition to the 2021 focus theme on "benchmarking in the cloud," the HotCloudPerf workshop welcomes articles related to its long-running topics, which include, but are not limited to:

(1) Empirical performance studies in cloud computing environments, applications, and systems, including observation, measurement, and surveys.
(2) Comparative performance studies and benchmarking of cloud environments, applications, and systems.
(3) Performance analysis using modeling and queueing theory for cloud environments, applications, and systems.
(4) Simulation-based studies for all aspects of cloud computing performance.
(5) Tuning and auto-tuning of systems operating in cloud environments, e.g., auto-scaling of resources and auto-tiering of data, optimized resource deployment.

(6) Software patterns and architectures for engineering cloud performance, e.g., serverless.

(7) Experience with and analysis of performance of cloud deployment models, including IaaS/PaaS/SaaS/FaaS.

(8) End-to-end performance engineering for pipelines and workflows in cloud environments, or of applications with nontrivial SLAs.

(9) Tools for monitoring and studying cloud computing performance.

(10) General and specific methods and methodologies for understanding and engineering cloud performance.

(11) Serverless computing platforms and microservices in cloud datacenters.

3 PROGRAM

After a thorough review process, HotCloudPerf 2021 features 7 full papers. Furthermore, we are proud to open the workshop with two keynote talks given by Marc Brooker and Guillaume Pierre.

Keynote Speaker: Marc Brooker. is a Senior Principal Engineer at Amazon Web Services. He has worked at AWS since 2008 on multiple services including EC2, EBS and IoT. Today, he focuses on AWS Lambda, including work on scaling and virtualization. Marc really enjoys reading COEs and post-mortems.

Keynote Speaker: Guillaume Pierre. is a Professor in Computer Science at the University of Rennes 1, France. Prior to this he spent 13 years at the VU University Amsterdam. His main interests are Fog computing, Cloud computing, and all other forms of large-scale distributed systems. He took part in several European and EIT Digital projects and acted as the lead designer of the ConPaaS platform-as-a-Service environment. He is currently the coordinator of the FogGuru H2020 Maria-Sklodowska project, and the leader of the Myriads research team at INRIA/IRISA.

4 PROGRAM COMMITTEE

Cristina L. Abad, ESPOL, Ecuador; Ahmed Ali-Edin, Chalmers | University of Gothenburg, Sweden; Marta Beltran, Universidad Rey Juan Carlos, Spain; Andre Bondi, Software Performance and Scalability Consulting LLC, USA; Marc Brooker, Amazon Web Services, USA; Lucy Cherkasova, ARM Research, USA; Dmitry Duplyakin, University of Utah, USA; Bogdan Ghit, Databricks, The Netherlands; Wilhelm Hasselbring, Kiel University, Germany; Nikolas Herbst, U. Würzburg, Germany; Alexandru Iosup, VU Amsterdam, The Netherlands; Alessandro Papadopoulos, Mälardalen University, Sweden; Joel Scheuner, Chalmers | University of Gothenburg, Sweden; Petr Tuma, Charles University, Czech Republic; Alexandru Uta, Leiden University, The Netherlands; Erwin van Eyk, VU Amsterdam, The Netherlands; Andre van Hoorn, University of Stuttgart, Germany; Chen Wang, IBM, USA.

5 ABOUT THE ORGANIZERS

Cristina L. Abad is associate professor at Escuela Superior Politecnica del Litoral, ESPOL, in Ecuador, where she leads the Distributed Systems Research Lab (DiSEL). She obtained MS and PhD in CS degrees from the University of Illinois at Urbana-Champaign, funded in part through Fulbright and Computer Science Excellence Fellowships. At ESPOL, she has received two Google Faculty Research Awards. Her main research interests lie at the intersection of distributed systems and performance engineering. Contact her at cabad@fiec.espol.edu.ec.

Nikolas Herbst is a research group leader at the chair of software engineering at the University of Würzburg. He received a PhD from the University of Würzburg in 2018 and serves as elected vice-chair of the SPEC Research Cloud Group. His research topics include predictive data analysis, elasticity in cloud computing, auto-scaling and resource management, performance evaluation of virtualized environments, autonomic and self-aware computing. Contact him at nikolas.herbst@uni-wuerzburg.de.

Alexandru Uta is an assistant professor in the computer systems group at LIACS, Leiden University, and an Amazon Visiting Academic. He received his PhD in 2017 from VU Amsterdam on topics related to distributed storage systems for scientific workloads. His research interests are in taming large-scale infrastructure—from designing reproducible experiments to understanding and evaluating performance, as well as designing efficient large-scale computer systems. His research was funded through industry and academic grants and was recently awarded the NWO Veni (early career) award. Contact him at a.uta@liacs.leidenuniv.nl.

Alexandru Iosup is full professor and University Research Chair at Vrije Universiteit Amsterdam, and member of the Young Royal Academy of Arts and Sciences of the Netherlands. He received his PhD in computer science from TU Delft, the Netherlands. He is the chair of the Massivizing Computer Systems research group at the VU and of the SPEC-RG Cloud group. His work in distributed systems and ecosystems has received prestigious recognition, including the 2016 Netherlands ICT Researcher of the Year, the 2015 Netherlands Higher-Education Teacher of the Year, and several SPEC community awards SPECtacular (last in 2017). He can be contacted at A.Iosup@vu.nl or @AIosup.

ACKNOWLEDGMENTS