

2023 IEEE International Conference on Cloud Computing Technology and Science (CloudCom 2023)

**Naples, Italy
4-6 December 2023**



**IEEE Catalog Number: CFP23CLU-POD
ISBN: 979-8-3503-3983-3**

**Copyright © 2023 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP23CLU-POD
ISBN (Print-On-Demand):	979-8-3503-3983-3
ISBN (Online):	979-8-3503-3982-6
ISSN:	2330-2194

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

2023 IEEE International Conference on Cloud Computing Technology and Science (CloudCom) **CloudCom 2023**

Table of Contents

Message from General Co-Chairs	xi
Message from Program Chairs	xii
Message from SCC Workshop Chairs	xiii
Message from IaC Workshop Chairs	xiv
Organizing Committee	xv
Program Committee	xvi
Steering Committee	xix
SCC Workshop Committee	xx
IAC Workshop Committee	xxi
Reviewers	xxii

Main Conference

Bridging the Chasm Between Ideal and Realistic Federated Learning: A Measurements Study	1
<i>Hend K. Gedawy (Carnegie Mellon University), Khaled A. Harras (Carnegie Mellon University), Temoor Tanveer (Carnegie Mellon University), and Thang Bui (Carnegie Mellon University)</i>	
SAGE - A Tool for Optimal Deployments in Kubernetes Clusters	10
<i>Vlad-Ioan Luca (West University of Timisoara, Romania) and Mădălina Eraşcu (West University of Timisoara, Romania)</i>	
Introducing TinyKVM for High-Performance CDN Edge Services	18
<i>Alf-André Walla (University of Oslo (UiO), Norway) and Paal E. Engelstad (University of Oslo (UiO), Norway)</i>	
Inverse Response Time Ratio Scheduler: Optimizing Throughput and Response Time for Serverless Computing	26
<i>Mina Morcos (Boston University) and Ibrahim Matta (Boston University)</i>	
GSLAC: GPU Software Level Access Control for Information Isolation on Cloud Platforms	34
<i>Chia-Chang Li (National Tsing Hua University, Taiwan), Po-Cheng Wu (National Tsing Hua University, Taiwan), and Che-Rung Lee (National Tsing Hua University, Taiwan)</i>	
A Load Balancing Algorithm For Long-Life Green Edge Systems	42
<i>Roberto Beraldi (Sapienza University of Rome, Italy) and Gabriele Proietti Mattia (Sapienza University of Rome, Italy)</i>	

Enhancing Mobile Privacy and Security: A Face Skin Patch-Based Anti-Spoofing Approach	52
<i>Qiushi Guo (AI Lab, China Merchants Bank), Yifan Chen (AI Lab, China Merchants Bank), and Shisha Liao (AI Lab, China Merchants Bank)</i>	
A Blockchain-Based Online Trading Platform: TrustTrade	58
<i>Guang Yang (Western Norway University of Applied Sciences, Norway), Lorena-Alina Alexandru (Western Norway University of Applied Sciences, Norway), and Marius Storheim (Western Norway University of Applied Sciences, Norway)</i>	
Enabling 5G QoS Configuration Capabilities for IoT Applications on Container Orchestration Platform	63
<i>Yu Liu (Ericsson Research, Sweden) and Aitor Hernandez Herranz (Ericsson Research, Sweden)</i>	
CloudScent: A Model for Code Smell Analysis in Open-Source Cloud	69
<i>Raj Narendra Shah (California State University, USA), Sameer Ahmed Mohamed (California State University, USA), Asif Imran (California State University, USA), and Tevfik Kosar (University at Buffalo, USA)</i>	
Recommendation Engine for Optimal Spark Delta Tables Partitioning	76
<i>Rui Esteves (University of Stavanger, Norway), Håvard Moe Jacobsen (University of Stavanger, Norway), and Ola André Flotve (University of Stavanger, Norway)</i>	
A Lightweight Routing Layer using a Reliable Link-Layer Protocol	82
<i>Qianfeng Shen (University of Toronto, Canada) and Paul Chow (University of Toronto, Canada)</i>	
A Flexible Trust Manager for Remote Attestation in Heterogeneous Critical Infrastructures	91
<i>Enrico Bravi (Politecnico di Torino, Italy), Diana Gratiela Berbecaru (Politecnico di Torino, Italy), and Antonio Lioy (Politecnico di Torino, Italy)</i>	
MScheduler: Leveraging Spot Instances for High-Performance Reservoir Simulation in the Cloud	99
<i>Felipe A. Portella (Petróleo Brasileiro S.A. (PETROBRAS), Brazil; Barcelona Supercomputing Center (BSC), Spain; Universitat Politècnica de Catalunya (UPC), Spain), Paulo J. B. Estrela (Petróleo Brasileiro S.A. (PETROBRAS), Brazil), Renzo Q. Malini (Petróleo Brasileiro S.A. (PETROBRAS), Brazil), Luan Teylo (Institut National de Recherche en Informatique et en Automatique (Inria), France; Universidade Federal Fluminense (UFF), Brazil), Josep L. Berral (Universitat Politècnica de Catalunya (UPC), Spain; Barcelona Supercomputing Center (BSC), Spain), and Lúcia M. A. Drummond (Universidade Federal Fluminense (UFF), Brazil)</i>	
Depot: Dependency-Eager Platform of Transformations	107
<i>Kerem Celik (UCSB Computer Science Department, USA), Samridhi Maheshwari (UCSB Computer Science Department, USA), Shereen ElSayed (UCSB Computer Science Department, USA), Markus Mock (HAW Landshut, Germany), Chandra Krintz (UCSB Computer Science Department, USA), and Rich Wolski (UCSB Computer Science Department, USA)</i>	

Experimental Analysis of Microservices Architectures for Hosting Cloud-Based Massive Multiplayer Online Role-Playing Game (MMORPG)	115
<i>Marlon H. Schweigert (Graduate Program in Applied Computing (PPGCAP) – Santa Catarina State University (UDESC), Brazil), Diego E.G.C. de Oliveira (Graduate Program in Applied Computing (PPGCAP) – Santa Catarina State University (UDESC), Brazil), Guilherme P. Koslovski (Graduate Program in Applied Computing (PPGCAP) – Santa Catarina State University (UDESC), Brazil), Maurício A. Pillon (Graduate Program in Applied Computing (PPGCAP) – Santa Catarina State University (UDESC), Brazil), and Charles C. Miers (Graduate Program in Applied Computing (PPGCAP) – Santa Catarina State University (UDESC), Brazil)</i>	
Can Software Containerisation Fit The Car On-Board Systems ?	123
<i>David Fernández Blanco (Univ Lyon, INSA LYON, Inria, CITI, France; STELLANTIS, France), Frédéric Le Mouël (Univ Lyon, INSA LYON, Inria, CITI, France), Trista Lin (STELLANTIS, France), and Amir Rekik (STELLANTIS, France)</i>	
Cost-Optimized Scheduling for Microservices in Kubernetes	131
<i>Sugunakumar Arunan (University of Moratuwa, Sri Lanka), Gayashan Amarasinghe (University of Moratuwa, Sri Lanka), and Indika Perera (University of Moratuwa, Sri Lanka)</i>	
Lightweight Cloud Application Sandboxing	139
<i>Marco Abbadini (Università degli Studi di Bergamo, Italy), Michele Beretta (Università degli Studi di Bergamo, Italy), Dario Facchinetti (Università degli Studi di Bergamo, Italy), Gianluca Oldani (Università degli Studi di Bergamo, Italy), Matthew Rossi (Università degli Studi di Bergamo, Italy), and Stefano Paraboschi (Università degli Studi di Bergamo, Italy)</i>	
Energy-Efficient Offloading in Edge Slicing with Non-Linear Power Functions	147
<i>Jiahe Xu (City University of Hong Kong, P.R. China), Jing Fu (RMIT University, Australia), Jingjin Wu (BNU-HKBU United International College, P.R. China), and Moshe Zukerman (City University of Hong Kong, P.R. China)</i>	
Performance Analysis of the Raft Consensus Algorithm on Hyperledger Fabric and Ethereum on Cloud	155
<i>João H. F. Battisti (Santa Catarina State University (UDESC), Brazil), Vitor E. Batista (Santa Catarina State University (UDESC), Brazil), Guilherme P. Koslovski (Santa Catarina State University (UDESC), Brazil), Maurício A. Pillon (Santa Catarina State University (UDESC), Brazil), Charles C. Miers (Santa Catarina State University (UDESC), Brazil), Marco A. Marques (Universidade de São Paulo (USP), Brazil), Marcos Simplicio (Universidade de São Paulo (USP), Brazil), and Diego Kreutz (Federal University of Pampa (Unipampa), Brazil)</i>	
Energy-Aware Streaming Analytics Job Scheduling for Edge Computing	161
<i>Demetris Trihinas (University of Nicosia), Moysis Symeonides (University of Cyprus), Joanna Georgiou (University of Cyprus), George Pallis (University of Cyprus), and Marios D. Dikaiakos (University of Cyprus)</i>	

Triad: Trusted Timestamps in Untrusted Environments	169
<i>Gabriel Fernandez (TU-Dresden, Germany), Andrey Brito (UFCEG, Brazil), and Christof Fetzer (TU-Dresden, Germany)</i>	
Enhanced Runtime-Adaptable Routing for Serverless Functions Based on Performance and Cost Tradeoffs in Hybrid Cloud Settings	177
<i>Georgios Fatouros (University of Piraeus, Greece), Georgios Kousiouris (Harokopio University, Greece), Georgios Makridis (University of Piraeus, Greece), John Soldatos (Innov-Acts Ltd, Cyprus), Michael Filippakis (University of Piraeus, Greece), and Dimosthenis Kyriazis (University of Piraeus, Greece)</i>	
The Flaw Within: Identifying CVSS Score Discrepancies in the NVD	185
<i>Siqi Zhang (The Hong Kong Polytechnic University, China), Minjie Cai (The Hong Kong Polytechnic University, China), Mengyuan Zhang (The Hong Kong Polytechnic University, China), Lianying Zhao (Carleton University, Canada), and Xavier de Carné de Carnavalet (The Hong Kong Polytechnic University, China)</i>	
Addressing Serverless Computing Vendor Lock-In through Cloud Service Abstraction	193
<i>Di Mo (University of Washington, USA), Robert Cordingley (University of Washington, USA), Donald Chinn (University of Washington, USA), and Wes Lloyd (University of Washington, USA)</i>	
Peer-to-Peer Approach for Edge Computing Services	200
<i>Muhammad Anjum Malik (Fachhochschule Dortmund, Germany), Tobias Pleuger (Fachhochschule Dortmund, Germany), and Stephan Recker (Fachhochschule Dortmund, Germany)</i>	
Traditional vs Federated Learning with Deep Autoencoders: a Study in IoT Intrusion Detection	208
<i>Marta Catillo (Università degli Studi del Sannio, Italy), Antonio Pecchia (Università degli Studi del Sannio, Italy), and Umberto Villano (Università degli Studi del Sannio, Italy)</i>	
Decentralized Authentication in Microservice Architectures with SSI and DID in Blockchain	216
<i>Biagio Boi (University of Salerno, Italy) and Christian Esposito (University of Salerno, Italy)</i>	
PuppetStack: A tool for building high-availability private cloud infrastructures	224
<i>Fabrizio Messina (University of Catania, Italy), Miriana Russo (University of Catania, Italy), Corrado Santoro (University of Catania, Italy), Federico Fausto Santoro (University of Catania, Italy), and Salvatore Riccobene (University of Catania, Italy)</i>	
Semi-Automatic PenTest Methodology Based on Threat-Model: The IoT Brick Case Study	232
<i>Gennaro Pio Rimoli (University of Salerno), Daniele Granata (University of Campania Luigi Vanvitelli), and Massimo Ficco (University of Salerno)</i>	
HCooop: A Cooperative and Hybrid Resource Scheduling for Heterogeneous Jobs in Clouds	238
<i>Jinwei Liu (Florida A&M University, USA), Rui Gong (Mercer University, USA), Wei Dai (Purdue University Northwest, USA), Wei Zheng (Jackson State University, USA), Ying Mao (Fordham University, USA), Wei Zhou (Florida A&M University, USA), and Feng Deng (Beijing Information Science & Technology University, China)</i>	

Undoing CRDT Operations Automatically	246
<i>Provakar Mondal (Virginia Tech, USA) and Eli Tilevich (Virginia Tech, USA)</i>	
Enabling Trusted TEE-as-a-Service Models with Privacy Preserving Automata	252
<i>Bala Subramanyan (Credora Inc., UK), Arne Holum (Credora Inc., USA), Giovanni Mazzeo (University of Naples 'Parthenope', Italy), Matt Ficke (Credora Inc., USA), and Darshan Vaydia (Credora Inc., USA)</i>	
OS μ S: An Open-Source Microservice Prototyping Platform	261
<i>Lamees M. Al Qassem (Khalifa University, UAE), Thanos Stouraitis (Khalifa University, UAE), Ernesto Damiani (Khalifa University, UAE), and Ibrahim M. Elfadel (Khalifa University, UAE)</i>	

Workshop SCC

Testing Techniques to Assess Impact and Cascading Effects	269
<i>Valeria Valdés Ríos (Montimage EURL, France), Ana Rosa Cavalli (Montimage EURL; Institut Politechnique, Telecom SudParis, France), Fatiha Zaidi (Université Paris-Saclay, CNRS, ENS Paris-Saclay, Laboratoire Méthodes Formelles, France), and Wissam Mallouli (Montimage EURL, France)</i>	
Ensuring End-to-End Security in Computing Continuum Exploiting Physical Unclonable Functions	273
<i>Mario Barbareschi (University of Naples Federico II, Italy), Valentina Casola (University of Naples Federico II, Italy), and Daniele Lombardi (University of Naples Federico II, Italy)</i>	
An Evaluation of Transformer Models for Early Intrusion Detection in Cloud Continuum	279
<i>Md Mahbub Islam (Åbo Akademi University, Finland), Tanwir Ahmad (Åbo Akademi University, Finland), and Dragos Truscan (Åbo Akademi University, Finland)</i>	
5G SUCI Catcher: Attack and Detection	285
<i>Lorens Barraud (Thales SIX GTS, France), Francesco Caccavale (Montimage, France), Jean-Baptiste Peyrat (Thales SIX GTS, France), Wissam Mallouli (Montimage, France), Véronique Capdevielle (Thales SIX GTS, France), Hicham Khalife (Ericsson, France), and Ana Rosa Cavalli (Montimage, France)</i>	
Towards Trustworthy Artificial Intelligence: Security Risk Assessment Methodology for Artificial Intelligence Systems	291
<i>Eider Iturbe (TECNALIA, Basque Research and Technology Alliance (BRTA), Spain; University of the Basque Country, Spain), Erkuden Rios (TECNALIA, Basque Research and Technology Alliance (BRTA), Spain), and Nerea Toledo (University of the Basque Country, Spain)</i>	
Towards Smarter Security Orchestration and Automatic Response for CPS and IoT	298
<i>Phu Nguyen (SINTEF, Norway), Rustem Dautov (SINTEF, Norway), Hui Song (SINTEF, Norway), Angel Rego (TECNALIA, Spain), Eider Iturbe (TECNALIA, Spain), Erkuden Rios (TECNALIA, Spain), Diego Sagasti (TECNALIA, Spain), Gonzalo Nicolas (TECNALIA, Spain), Valeria Valdés (Montimage EURL, France), Wissam Mallouli (Montimage EURL, France), Ana Cavalli (Montimage EURL, France), and Nicolas Ferry (Université Côte d'Azur, France)</i>	

Design and Implementation of Web3-Based E-Commerce Cryptocurrency Payment System	303
<i>Seung-Seok Lee (Chonnam National University, Republic of Korea) and Sang-Joon Lee (Chonnam National University, Republic of Korea)</i>	
Surveying Cyber Threat Intelligence and Collaboration: A Concise Analysis of Current Landscape and Trends	309
<i>Panagiotis Radoglou-Grammatikis (University of Western Macedonia, Greece; K3Y Ltd, Bulgaria), Elisavet Kioseoglou (University of Western Macedonia, Greece), Dimitrios Asimopoulos (MetaMind Innovations P.C., Greece), Miltiadis Siavvas (Centre for Research and Technology Hellas/Information Technologies Institute, Greece), Ioannis Nanos (Sidroco Holdings Ltd, Cyprus), Thomas Lagkas (International Hellenic University, Greece), Vasileios Argyriou (Kingston University London, UK), Konstantinos E. Psannis (University of Macedonia, Greece), Soririos Goudos (Aristotle University of Thessaloniki, Greece), and Panagiotis Sarigiannidis (University of Western Macedonia, Greece)</i>	
Detecting Security Requirements in GitHub Issues - Novel Dataset and SmallBERT-Based Model... 315	
<i>Polina Minina (SOFTEAM, France), Andrey Sadovykh (SOFTEAM, France), and Vladimir Ivanov (SOFTEAM, France)</i>	
Software Bill of Materials in Critical Infrastructure	319
<i>Lars Andreassen Jaatun (NTNU, Norway), Silje Marie Sørlien (NTNU, Norway), Ravishankar Borgaonkar (SINTEF Digital, Norway), Steve Taylor (University of Southampton, UK), and Martin Gilje Jaatun (SINTEF Digital, Norway; University of Stavanger, Norway)</i>	

Workshop IAC

Increasing Robustness of Blockchain Peer-to-Peer Networks with Alternative Peer Initialization	325
<i>Bernadet Klein Wassink (University of Amsterdam, Netherlands) and Zhiming Zhao (University of Amsterdam, Netherlands)</i>	
Decoding NFT Market Dynamics with Data	333
<i>Smruti Inamdar (VU/ University of Amsterdam, Netherlands) and Zhiming Zhao (University of Amsterdam, LifeWatch VLIC, the Netherlands)</i>	
Flexible and Secure Code Deployment in Federated Learning using Large Language Models: Prompt Engineering to Enhance Malicious Code Detection	341
<i>Jungwon Seo (University of Stavanger, Norway), Nan Zhang (University of Stavanger, Norway), and Chunming Rong (University of Stavanger, Norway)</i>	
Author Index	351