

LITHUANIAN COMPUTER SOCIETY

VILNIUS UNIVERSITY INSTITUTE OF DATA SCIENCE AND DIGITAL TECHNOLOGIES

LITHUANIAN ACADEMY OF SCIENCES



14th Conference on

DATA ANALYSIS METHODS for Software Systems

November 30 – December 2, 2023

Druskininkai, Lithuania, Hotel “Europa Royale”

<https://www.mii.lt/DAMSS>

VILNIUS UNIVERSITY PRESS

Vilnius, 2023

Co-Chairmen:

Prof. Gintautas Dzemyda (Vilnius University, Lithuanian Academy of Sciences)

Dr. Saulius Maskeliūnas (Lithuanian Computer Society)

Programme Committee:

Dr. Jolita Bernatavičienė (Lithuania)

Prof. Juris Borzovs (Latvia)

Prof. Robertas Damaševičius (Lithuania)

Prof. Janis Grundspenkis (Latvia)

Prof. Janusz Kacprzyk (Poland)

Prof. Ignacy Kaliszewski (Poland)

Prof. Bożena Kostek (Poland)

Prof. Tomas Krilavičius (Lithuania)

Prof. Olga Kurasova (Lithuania)

Assoc. Prof. Tatiana Tchemisova (Portugal)

Prof. Julius Žilinskas (Lithuania)

Organizing Committee:

Dr. Jolita Bernatavičienė

Prof. Olga Kurasova

Assoc. Prof. Viktor Medvedev

Laima Paliulionienė

Assoc. Prof. Martynas Sabaliauskas

Prof. Povilas Treigys

Contacts:

Dr. Jolita Bernatavičienė

jolita.bernataviciene@mif.vu.lt

Prof. Olga Kurasova

olga.kurasova@mif.vu.lt

Tel. +370 5 2109315

Copyright © 2023 Authors. Published by Vilnius University Press.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Licence, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

<https://doi.org/10.15388/DAMSS.14.2023>

ISBN 978-609-07-0985-6 (digital PDF)

© Vilnius University, 2023

Cluster-Based Classification of Consensus Protocols for Decentralized Ledger Technology

Marco Marcozzi, Ernestas Filatovas, Remigijus Paulavičius

Institute of Data Science and Digital Technologies
Vilnius University

marco.marcozzi@mif.vu.lt

The performance and security of any Distributed Ledger Technology (DLT) solution heavily depend on the consensus protocol used. The vast variety of consensus protocols in DLT have triggered debates on how to classify them. The conventional classification of consensus algorithms relies on family (Proof of Work, Proof of Stake, etc.) or other subjective criteria. However, these classifications often place protocols with significantly distinct characteristics and performance into the same category. To overcome this challenge, this research introduces a quantitative, cluster-based classification methodology to achieve an impartial grouping of analyzed consensus protocols across various platforms. The results presented show that, using separate approaches, clustering is consistent, and it effectively separates the protocols according to their family, i.e. Proof of Work from others. An extension to this work may lead to the development of an automated tool to classify consensus protocols by means of the collected data.

The research work of E. Filatovas has received funding from the Research Council of Lithuania (LMTLT), agreement No. S-MIP-21-53.