Introduction to the Blockchain Engineering Minitrack

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This is the third year of the "Blockchain Engineering" minitrack. This minitrack is an important forum because the global interest in blockchain has rapidly increased beyond cryptocurrencies and "enterprise blockchain" has been making great strides in becoming a mainstream. The pandemic amplified this trend. Numerous startups are currently developing blockchain enabled enterprise applications for addressing supply chain and safety issues unique to the new reality of social distancing and contact tracing.

Blockchain indeed represents a paradigm shift from centralized computing to decentralized. The intense interests in blockchain center around the decentralized system's ability to provide transparency, security, (pseudo-) anonymity and data integrity without any third-party organization in control of the transactions; it thus can enable trustless transactions and disintermediated societies. This minitrack aims at providing a forum for addressing the challenges arising from the paradigm shift and the "**how to**" of engineering an enterprise blockchain system that can fundamentally change how business value is created, discovered, and realized. We are very excited to present four very interesting, timely and well-researched papers this year that answered our call to address current blockchain engineering challenges.

The first paper is entitled **"Towards an Implementation of Blockchain-based Collaboration Platforms in Supply Chain Networks: A Requirements Analysis"** by Lukas-Valentin Herm and Christian Janiesch. The paper discusses the requirements for blockchain-based supply chain networks (SCNs) based on the results of extensive literature review and expert interviews. This paper argues that blockchain, the so-called "trust machine", could solve the problem of lack of trust among unknown partners or competitors in many SCNs. It validates and prioritizes 45 requirements for a blockchain-based collaboration platform in SCNs to inform design and implementation.

The second paper is entitled "**Blockchain-based Micro-credentials: Design, Implementation, Evaluation and Adoption**," by Shohil Kishore, Johnny Chan, Udayangi Perera Muthupoltotage, Nick Young and David Sundaram. Utilizing a Design Science approach, the authors design, implement and evaluate a blockchain-based microcredential system. Qualitative evaluation reveals that such systems can decrease the overall cost and administrative workload. While issuers perceive the implementation as useful and low risk, the general knowledge regarding blockchain and its advantages, especially in the context of microcredential management, is insufficient. The paper discusses the challenges needing to be addressed for the wide adoption of blockchain systems.

The third paper is entitled "**The DLPS: A New Framework for Benchmarking Blockchains**," by Johannes Sedlmeir, Philipp Ross, André Luckow, Jannik Lockl, Daniel Miehle and Gilbert Fridgen.
The authors developed a new open-source framework, the Distributed Ledger Performance Scan (DLPS), for end-to-end performance characterizations of blockchains, addressing the need to transparently and automatically evaluate the performance of highly customizable configurations. This paper argues that it significantly improves existing DLT benchmarking solutions. The capabilities of the DLPS framework have been demonstrated through a series of experiments, providing a first comprehensive comparison of essential scalability properties of several commonly used enterprise blockchains.

The fourth paper is entitled "**A comparison and contrast of APKTool and Soot for injecting blockchain calls into Android applications,**" by Sean Sanders and Luke Ziarek. The injection of blockchain calls into an Android Application is an emerging and important tool for Android application developers as blockchain technology provides a way of securely storing sensitive data and distributing that data while providing immutability. This paper contributes the comparison of the APKTool and the Soot framework compilers for injecting blockchain calls for understanding the difficulties/complexity each tool introduces when implementing the injection of a blockchain call.

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