Introduction to the Blockchain Engineering Minitrack

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This is the second year of the "Blockchain Engineering" minitrack. This minitrack is a timely forum because the global interest in blockchain has rapidly increased beyond cryptocurrencies and "enterprise blockchain" is expected to become a mainstream in few years. Since the Bitcoin launch in 2008, the number of cryptocurrencies (altcoins) available over the Internet has been growing: as of Nov. 2019, there exist over 6,000 altcoins. Going beyond mechanisms for cryptocurrencies, such as Bitcoin and Ethereum, big corporations are setting up blockchain consortia such as Hyperledger, Enterprise Ethereum Alliance (EEA), and R3, to focus on broader implications of blockchain and to evolve blockchain into "enterprise grade" technology. Numerous startups are developing blockchain-enabled applications. In the meantime, major enterprises are eager to edge their technology toward production, as a result, many pilot projects in enterprises are also being rapidly developed.

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. The idea that distributed applications can also be run in a decentralized way (called Dapps- Decentralized applications) has opened the door to a large realm of possibilities in business applications. In addition, blockchain-based decentralized architectures of databases, operating systems, storage services, and machine learning are being rapidly proposed, such as BigChainDB, EOS, FileCoin, and AI-Coin, as an alternative solution to our current centralized server or cloud-based architectures.

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. Different from other minitracks that mainly focus on the use cases of blockchain technology, the main focus of this minitrack is on the design and engineering issues of enterprise blockchain systems. We are very excited to present three papers this year that advance the current practice.

The first paper is entitled **"Applying Software Quality Criteria to Blockchain Applications: A Criteria Catalog"** by Hauke Precht, Stefan Wunderlich, and Jorge Marx Gómez. This paper helps addressing a big challenge facing many companies when adopting enterprise blockchain systems: identifying the right blockchain technology for the respective use case. This paper demonstrates an approach based on a criteria catalog in order to help companies to choose the correct blockchain implementation. The criteria catalog is based on well-known software evaluation criteria, such as ISO 25010, capability maturity model (CMM), and quality of open source software (QualOSS).

The second paper is entitled **"Do Not Be Fooled: Toward a Holistic Comparison of Distributed Ledger Technology Designs"** by Florian Gräbe, Niclas Kannengießer, Sebastian Lins, and Ali Sunyaev. This paper provides a structured comparison of Distributed Ledger Technology (DLT) designs to support the selection, according to application requirements, of an appropriate DLT design that enables innovative inter-organizational collaboration via a shared and distributed infrastructure. It introduces ways to operationalize DLT characteristics and generate a process to compare different DLT designs according to their suitability in a use case.

The third paper is entitled **"Suspicious Transactions in Smart Spaces"** by Mayra Samaniego, Cristian Espana, and Ralph Deters. This research addresses issues in evaluating suspicious transactions in smart (IOT) spaces and proposes leveraging the characteristics of blockchain technology to manage them. It presents a blockchain-based system model with the novel idea of iContracts (interactive contracts) to enable contextual evaluation through proof-of-provenance to detect suspicious transactions in smart spaces.

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