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Blocks and Chains

*Introduction to Bitcoin,
Cryptocurrencies, and
their Consensus
Mechanisms*

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*SYNTHESIS LECTURES ON
INFORMATION SECURITY, PRIVACY, AND TRUST*

Eliu Bertino & Ravi Sandhu, Series Editors

Aljosha Judmayer and

Blocks and Chains: Introduction to Bitcoin, Cryptocurrencies, and Their
Consensus Mechanisms (Synthesis Lectures on Information Security,
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The new field of cryptographic currencies and consensus ledgers, frequently referred to as blockchains, is receiving increasing interest from various different communities. Also the original Bitcoin paper which initiated the hype was published on-line without the prior peer review. This publication aims to help expand close this gap and presents a well-structured summary of this broad field from a technical viewpoint. This was one reason that, for a long time, the only resources obtainable have been the Bitcoin supply code, blog and forum posts, e-mail lists, and other online publications. These communities have become diverse and the like include: technical aficionados, activist groups, researchers from various disciplines, start ups, huge enterprises, public authorities, banks, financial regulators, business males, investors, and in addition criminals. Following the initial publication spirit of the Bitcoin paper, a whole lot of development in this field provides repeatedly come from the community itself by means of online publications and on the web conversations instead of established peer-examined scientific publishing. On the other hand, this has led to deficits in systematization and a gap between practice and the theoretical knowledge of this fresh field. On the main one part, this spirit of fast free software development, combined with the business aspects of cryptographic currencies, as well as the interests of today's time-to-marketplace focused industry, produced a flood of publications, whitepapers, and prototypes. The scientific community adapted fairly slowly to the emerging and fast-shifting field of cryptographic currencies and consensus ledgers. The archetype for modern cryptographic currencies and consensus ledgers can be Bitcoin and its underlying Nakamoto consensus. Consequently we describe the internal workings of this protocol in great details and discuss its relations to various other derived systems.



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