Neštandardné využitia technológie blokových reťazcov

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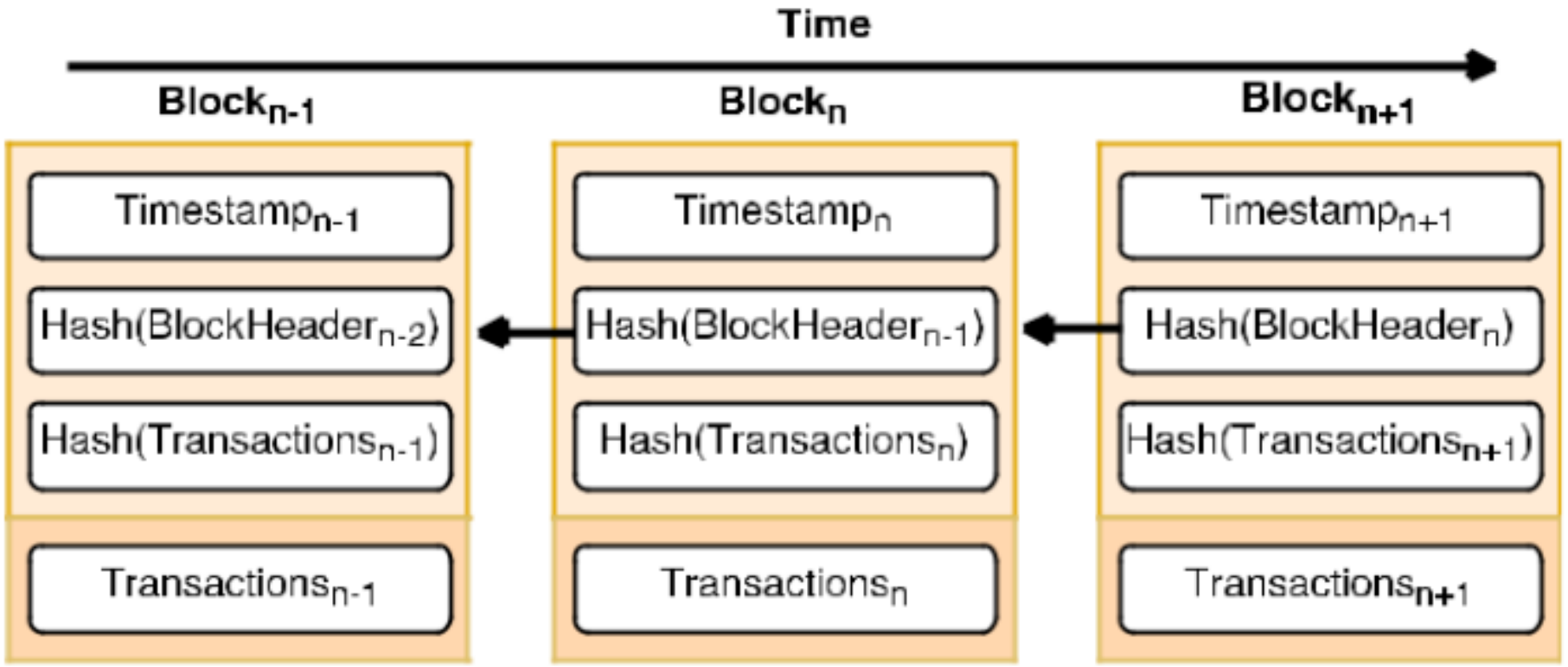
Ciele a motivácia

Prehľadne a dôsledne popísať mechanizmus blokových reťazcov v realizácii kryptomien.

Zvážiť možnosti využitia týchto techník na zabezpečenie distribuovanej dôvery v prostredí IoT.

Navrhnúť konkrétnu implementáciu vo zvolenej oblasti.

Blockchain



Timestamp$_n$: Timestamp of block *n*

Transactions$_n$: All transactions in block *n*

Hash(x) : Hash function, *sha256(sha256(x))* for Bitcoin

Blockchain

Consensus algorithm/ blockchains	Number of transactions per second	Confirmation latency	Features
Proof-of-Work (PoW)/ Bitcoin, Ethereum	Tens	6–60 min	High security Low throughput Low scalability
Proof-of-Stake (PoS)/ Peercoin	Tens	10–60 min	High security Low throughput Low scalability
Byzantine fault tolerance (BFT)/Hyperledger	Thousands	1–60 s	Low security High throughput High scalability
Delegated Proof-of-Stake (DPoS)/EOS	Thousands	<1 s	Low security High throughput High scalability
Proof-of-Formulation (PoF)/FLETA	More than 10,000	<1 s	High security High throughput High scalability

Cryptographic Digital Signature:

- Kryptografia verejného kľúča
- Vytvorenie transakcie súkromným kľúčom

Distributed Ledger:

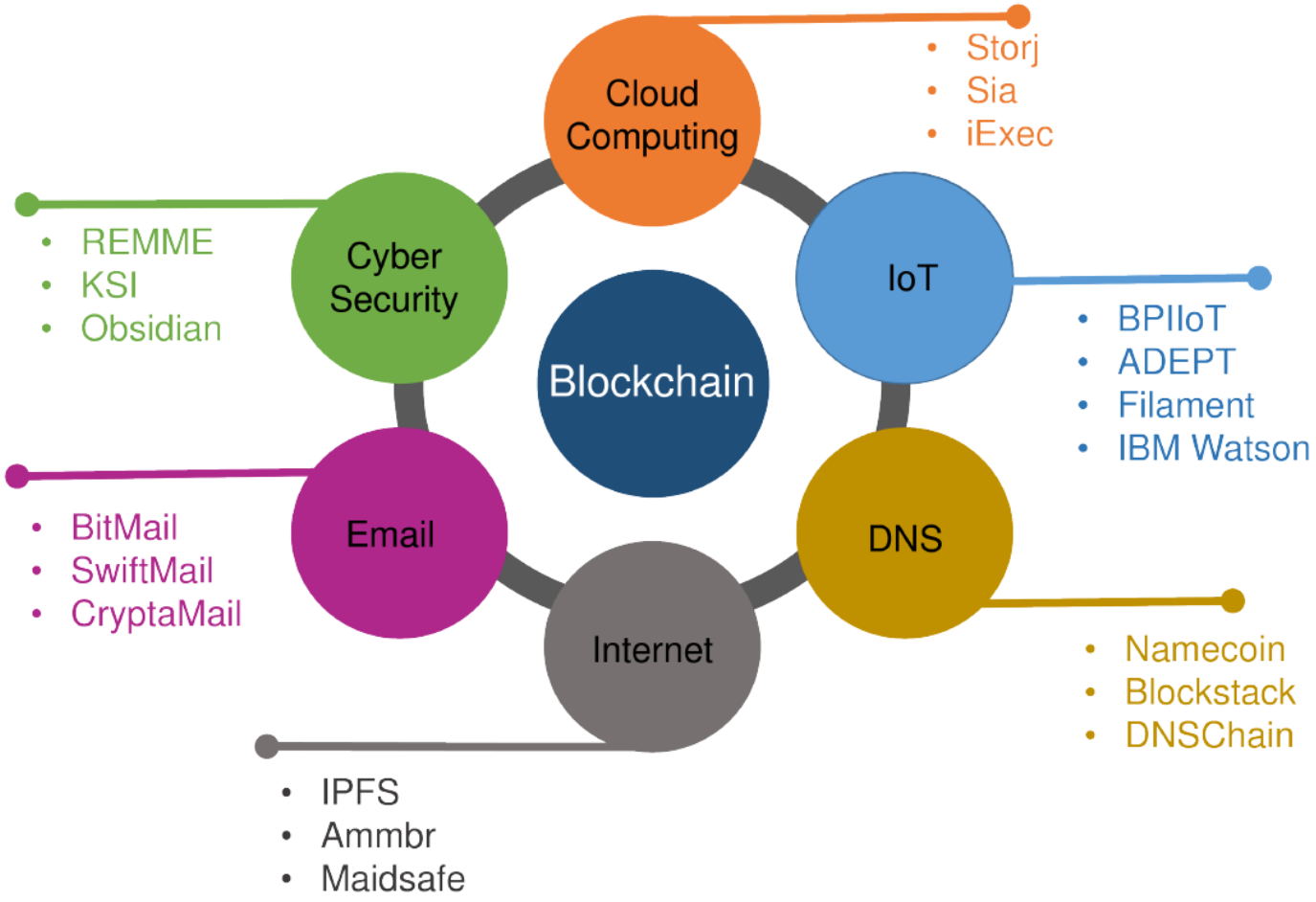
- Uloženie transakcii
- Používa konsenzusové algoritmy
- Nemenné

Consensus algorithm:

- Žiadna centrálna autorita
- P2P Model

Výzvy v oblasti IoT

- Obmedzené zdroje
- Požiadavky na šírku pásma
- Transakčné poplatky
- Latencia
- ...



Analýza dostupných riešení

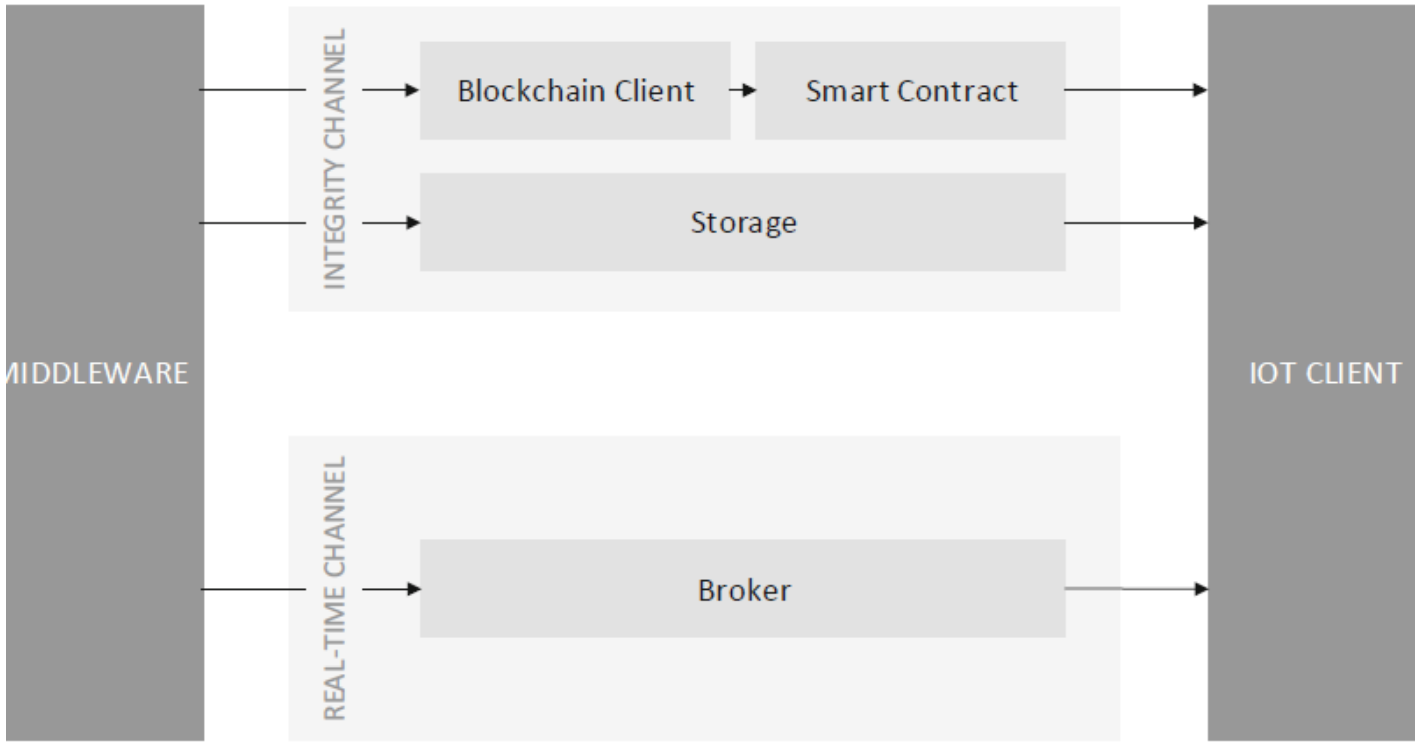


Fig. 1. Architecture overview

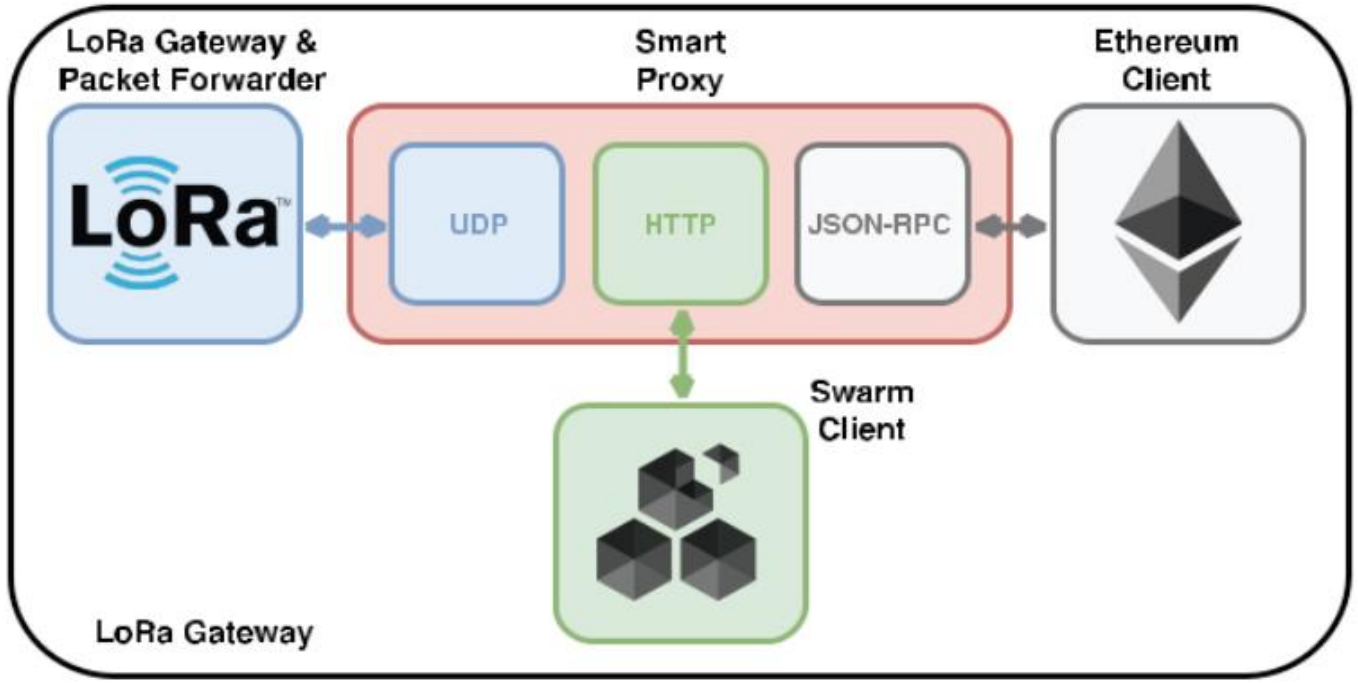
IPFS-Based Data Distribution for the IoT

(Simon Krejci, Marten Sigwart, and Stefan Schulte)

- Middleware, ktorý sa pripája k zariadeniam IoT a využíva blockchain na distribúciu dát IoT s garanciou integrity.
- Middleware ponúka, distribuované dáta v reálnom čase cez druhý kanál.
- Implementácia pomocou blockchainu Ethereum a systému InterPlanetary File System (IPFS).

https://link.springer.com/chapter/10.1007%2F978-3-030-44769-4_14 str. 177-191

Analýza dostupných riešení



Designing a blockchain-based IoT infrastructure with Ethereum, Swarm and LoRa (Kazım Rıfat Özyılmaz Arda Yurdakul)

- Úložisko Swarm
- Sieťová technológia LoRa
- Blockchainová platforma Ethereum
- Neefektívnosť

Zdroje

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Ďakujem za pozornosť