Assessing Blockchain Nodes on IoT Devices

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At the time of writing, blockchain technologies, also known as a distributed ledger, has gained massive momentum thanks to Bitcoin's cryptocurrency success these past few years. Unlike traditional database systems where transactions happen in a trusted environment, blockchain does not require third-party control of data. Moreover, it does not allow the update or deletion of data stored on the blockchain, thus preventing data tampering. Transactions are time-stamped, validated, kept, and synchronized in a decentralized manner among the participants of the blockchain network. With the incorporation of smart contracts, blockchains like Ethereum can go beyond the definition of just a digital distributed ledger, thus enabling decentralized apps.

Its wide range of applications has led many people to adopt this novel technology in various fields of industry such as finance, supply chain, healthcare, or the Internet of Things, to address mainly trust and security issues. In IoT, for example, which can be pictured as a network of connected embedded machines, devices come from various manufacturers worldwide with different law regulations regarding privacy and security, making it hard for IoT adopters to trust these partners. Although IoT helps contribute to automation and connectivity, the increase of IoT capabilities can lead to security issues.

In the context of the rise of blockchain and its promising technology, this work focuses on blockchain integration in IoT systems. More specifically, assessing blockchain nodes in permissioned or public Ethereum blockchain on low-powered IoT embedded devices like the Raspberry Pi and the EV3 Mindstorm. To this end, we collected performance-related metrics to analyze how well these nodes can run on such devices. Additionally, we designed a public blockchain-integrated IoT system using the RPI as an Ethereum node and the EV3 as a sensing device to demonstrate the feasibility of such a use case.

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