

Building a Blockchain-based Internet of Things

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Abstract : Today's Internet of Things (IoT) comprises more than a billion intelligent devices, connected via wired/wireless communications. The expected proliferation of hundreds of billions more places us at the threshold of a transformation sweeping across the communications industry. Yet, we found that the IoT architecture and solutions that currently work for billions of devices won't necessarily scale to tomorrow's hundreds of billions of devices because of high cost, lack of privacy, not future-proof, lack of functional value and broken business models. As the IoT scales exponentially, decentralized networks have the potential to reduce infrastructure and maintenance costs to manufacturers. Decentralization also promises increased robustness by removing single points of failure that could exist in traditional centralized networks. By shifting the power in the network from the center to the edges, devices gain greater autonomy and can become points of transactions and economic value creation for owners and users. To validate the underlying technology vision, IBM jointly developed with Samsung Electronics the autonomous decentralized peer-to-peer proof-of-concept (PoC). The primary objective of this PoC was to establish a foundation on which to demonstrate several capabilities that are fundamental to building a decentralized IoT. Though many commercial systems in the future will exist as hybrid centralized-decentralized models, the PoC demonstrated a fully distributed proof. The PoC (a) validated the future vision for decentralized systems to extensively augment today's centralized solutions, (b) demonstrated foundational IoT tasks without the use of centralized control, (c) proved that empowered devices can engage autonomously in marketplace transactions. The PoC opens the door for the communications and electronics industry to further explore the challenges and opportunities of potential hybrid models that can address the complexity and variety of requirements posed by the internet that continues to scale. Contents: (a) The new approach for an IoT that will be secure and scalable, (b) The three foundational technologies that are key for the future IoT, (c) The related business models and user experiences, (d) How such an IoT will create an 'Economy of Things', (e) The role of users, devices, and industries in the IoT future, (f) The winners in the IoT economy.

Keywords : IoT, internet, wired, wireless

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