

## **A Business-to-Business Collaboration System That Promotes Data Utilization While Encrypting Information on the Blockchain**

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**Abstract :** To promote Industry 4.0 and Society 5.0 and so on, it is important to connect and share data so that every member can trust it. Blockchain (BC) technology is currently attracting attention as the most advanced tool and has been used in the financial field and so on. However, the data collaboration using BC has not progressed sufficiently among companies on the supply chain of manufacturing industry that handle sensitive data such as product quality, manufacturing conditions, etc. There are two main reasons why data utilization is not sufficiently advanced in the industrial supply chain. The first reason is that manufacturing information is top secret and a source for companies to generate profits. It is difficult to disclose data even between companies with transactions in the supply chain. In the blockchain mechanism such as Bitcoin using PKI (Public Key Infrastructure), in order to confirm the identity of the company that has sent the data, the plaintext must be shared between the companies. Another reason is that the merits (scenarios) of collaboration data between companies are not specifically specified in the industrial supply chain. For these problems this paper proposes a Business to Business (B2B) collaboration system using homomorphic encryption and BC technique. Using the proposed system, each company on the supply chain can exchange confidential information on encrypted data and utilize the data for their own business. In addition, this paper considers a scenario focusing on quality data, which was difficult to collaborate because it is a top secret. In this scenario, we show a implementation scheme and a benefit of concrete data collaboration by proposing a comparison protocol that can grasp the change in quality while hiding the numerical value of quality data.

**Keywords :** business to business data collaboration, industrial supply chain, blockchain, homomorphic encryption

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