Item Tracking and Supply Chain Provenance Using Blockchain

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Extended Abstract

Product counterfeiting and fraud are costly for the industry and potentially dangerous for customers, especially if medicine and food products are affected. These problems are wide-spread across many industries and supply chain processes. To address these challenges, Laava provides a novel type of tags for individual item tracking with unique features. The tags are designed in a way that makes counterfeiting harder, and has numerous advantages over barcodes and QR codes.

In this talk, Laava will outline the basic functionality of its solution and describe the blockchain-based components in some detail. This includes the following aspects. Laava registers new tags on creation in a specific smart contract on the Ethereum blockchain, and scans of the tags along the supply chain are registered as well. Events include updates to the tag status, e.g., created, in use, or invalid.

To detect fraudulent activities, Laava uses two complementary methods:

– Conformance checking, which compares the observed events against the normative model of the supply chain process for the item in question.
– A business rule engine, that checks if item-specific conditions have been violated.

If either method detects abnormal event sequences, it raises an alert. Depending on the configuration, the alert is either screened by a human expert for evaluation or automatically marks the tag as invalid. If a supply chain participant or customer scans the tag, they see the status.

This work is done in a project between Laava and Data61, CSIRO, using tools from Data61: CCaaS[1] for online conformance checking and Regerator[2] for generating the smart contract code.

References

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2. Tran, A.B., Xu, X., Weber, I., Staples, M., Rimba, P.: Regerator: a registry generator for blockchain. In: CAiSE Forum Track (demo). (June 2017)