

Summary

Traceability is the ability to trace the origin, processing history, and the distribution of products in a Supply chain. In order to implement a complete traceability system, it is crucial to establish a chain of custody. Chain of Custody is typically defined as a sequence of procedures that validates the ownership and control of products along the supply chain. In the current global marketplace supply chains can span a huge number of countries, cross many borders and require interoperation of a multitude of organizations. This vastness of supply chains impacts business competitiveness since it adds complexity and can difficult securing traceability (ability to trace product attributes), chain of custody (chronological sequence of control) and transparency. In this work it is proposed that assurance of chain of custody is a complete approach for organizations to be able to demonstrate traceability, provenance (proof of origin) and product integrity and compliance. Blockchain technology with its attributes of decentralization, transparency and immutability has been touted to revolutionize several industries, and most recently has been proposed for supply chain management (SCM). The present study reviews the published literature to find the aspects that influence the problem and then follows the Design Science Research Methodology to analyze the requirements and propose a solution to a more complete traceability in SCMs. The results of this thesis were architectural artifacts, including an Ethereum SC (Smart Contract) and a certificate-based authentication system. These deliverables would allow implementation of a supply chain system over the Ethereum Blockchain that can provide decentralized and trustful assurance of the provenance, chain of custody and traceability functionalities for the participants and consumers.

KEYWORDS: Chain of Custody; Provenance; Traceability; Supply Chain; Blockchain; Ethereum, Smart contracts; Certificates; Design Science Research.