Blockchain Presentation

# Business Process

The business process I selected for my project is proof of delivery of physical products through a delivery service from seller to buyer through a delivery system.

My reasoning for selecting proof of delivery as my business process is that it is something that all of us have used at some point, so there is a relatable understanding with how it works. There is already enough work done related to delivery, which provides me with a better understanding of how it could be implemented into an application.

# Business Process Modelled into Blockchain Application

The smart contract I designed will comprise of three entities, the buyer, seller and delivery.

# Blockchain Application Benefits

Common issues with deliveries include late timing and arrival of deliveries, and if the courier leaves the package in a compromising position that could lead to damage or theft. This application could help alleviate these issues by holding each party accountable for their part of the delivery as well as provide the buyer with a greater projection of the ongoing journey of their package and the time it would take to arrive.

And so, if the delivery or package does not follow the agreed upon terms and conditions of the smart contract, then the entity that broke the agreement would need to make amends. This application should entice each entity to act with integrity and efficiency so that the deal will be satisfactory for all involved.

# Literature Review

The literature reviewed for this report are Blockchain-based solution for proof of delivery of physical assets by Hasan and Salah (2018b);   
Blockchain-based proof of delivery of physical assets with single and multiple transporters by Hasan and Salah (2018a);   
Proof of Delivery of Digital Assets Using Blockchain and Smart Contracts by Hasan and Salah (2018c);  
and finally, Trading real-world assets on blockchain by Notheisen, Cholewa, and Shanmugam (2017).

## Blockchain-based solution for proof of delivery of physical assets

The proposed solution by Hasan and Salah (2018b) involves five entities, a buyer, seller, transporter, arbitrator, and SC attestation authority. The solution uses collateral between the buyer, seller and transporter as a form of incentive, with the seller and transporter depositing collateral and the buyer depositing twice the item price.

If a dispute arises, a third-party arbitrator trusted by the three entities decides on a solution. And finally, the SC attestation authority reviews the terms and conditions of the smart contract to ensure that each entity is understanding and in agreement. During delivery, the buyer and transporter are provided a virtual key which they exchange once the delivery has been accomplished as a means of verifying that the delivery was successful, and the collateral is returned to each entity.

As this is my first blockchain application and will not be used in any official capacity, I will only have the buyer, seller and transporter entities so that it will be simpler to develop by only focusing on the three main entities.

## Blockchain-based proof of delivery of physical assets with single and multiple transporters

The solution proposed by Hasan and Salah (2018a) is largely similar to their previous solution although it differentiates with the inclusion of chain contracts that allow for multiple transporters to be involved in a transaction. A chain contract with only one transporter begins with the Proof of Delivery (POD) main contract and ends with the Buyer Transporter (BT) end of chain contract. If more than one transporter is involved, a courier service contract goes between each of the transporters.

With keeping my smart contract simple, there will only be a single transporter for each transaction.

## Proof of Delivery of Digital Assets Using Blockchain and Smart Contracts

The solution proposed by Hasan and Salah (2018c) takes a similar approach to their first solution although they apply the smart contract for the transaction of digital assets. The new entities associated with this solution are the owner who replaces the seller, file server replacing transporter and customer replacing buyer, while the arbitrator and SCAA remain and serve the same purpose. The file server stores the content that is to be streamed or downloaded by the customers. A difference between the delivery of physical and digital assets is that digital assets can be purchased by multiple customers while a physical asset can only be purchased by one buyer.

This solution is different to mine due to it being about digital assets while mine is about physical assets.

## Trading real-world assets on blockchain

The solution proposed by Notheisen, Cholewa, and Shanmugam (2017) is in a similar field of transactions between a buyer and seller but without a delivery system and only cars are offered for sale. The only entities involved in the transaction are the buyer and seller, there is no arbitrator to dispute any issues that may occur or the SCAA to review the smart contract. The buyer and seller are matched together through an online marketplace, then they meet in person to discuss the details of the transaction. After an agreement has been reached the exchange of funds is achieved through blockchain, however if the buyer does not offer the agreed upon amount then the seller can revoke the offer. Finally, the car is exchanged in person, however, if the car does not match the condition described the buyer can abort the transaction with their money reimbursed.

This solution differs from mine with their being no delivery system between the buyer and seller, and the item being transacted is a car which has more elements involved in its transaction such as the registration.

# Design

## Obligations



## Responses to Issues



## Flowchart



# Implementation Progress

# Project Timeline

# References

Hasan, H. R., & Salah, K. (2018a). Blockchain-Based Proof of Delivery of Physical Assets With Single and Multiple Transporters. *IEEE Access*, *6*, 46781–46793. https://doi.org/10.1109/ACCESS.2018.2866512

Hasan, H. R., & Salah, K. (2018b). *Blockchain-based Solution for Proof of Delivery of Physical Assets*. Presented at the International Conference on Blockchain, Seattle, USA.

Hasan, H. R., & Salah, K. (2018c). Proof of Delivery of Digital Assets Using Blockchain and Smart Contracts. *IEEE Access*, *6*, 65439–65448. https://doi.org/10.1109/ACCESS.2018.2876971

Notheisen, B., Cholewa, J. B., & Shanmugam, A. P. (2017). Trading Real-World Assets on Blockchain. *Business & Information Systems Engineering*, *59*(6), 425–440. https://doi.org/10.1007/s12599-017-0499-8