Development of a Mobile App for Pseudo Real-Time Peer-to-Peer Communication for Supply Chain Management
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Introduction

The management and visibility of supply chain events and transactions in pseudo real-time are critical for managing order volumes, consumer availability and complexity of events and transactions. Any delay in the communications between peers in the manufacturing process negatively impacts the profitability. Thus, the process of exchanging event and transaction details must be able to happen in pseudo real-time. The convenience and affordability of a mobile application makes it ideal for managing a massive system containing various types of peers, such as the supply chain. The framework is implemented for real-time data sharing using peer-to-peer communication in an Android mobile application. This proposed framework is called Hybrid Peer-to-Peer Physical Distribution (H3PD). The system is implemented using blockchain technology to ensure the security of supply chain activities. The H3PD framework allows for efficiency, affordability and availability to all members of the supply chain process. The architecture of H3PD contains peer-to-peer sub-networks utilized for the data exchange.

Methods

This app was implemented using Android Studio, the official integrated development environment for the Android platform. With the app, users can scan a barcode or order code to input or retrieve details about the order and begin tracking the order. Users can also determine who will have access to the order details when the order is created. Users can use the real time tracking capability of the app to locate the order as it is in the transport phase. Once the order is received by a peer in the supply chain, said peer confirms the order using the scanning method. At this time, all users following the order have the option of receiving an alert when the truckload reaches its destination. All of the peer-to-peer data exchange taking place in this application is secured using the blockchain method, which includes public and private ledgers. The private ledger hashes the order info while the public ledger hashes the tracking info. The SHA-256 hash method was implemented for this blockchain process.

Future Work

• Testing of the app on different devices with different screen sizes
• Allowing businesses and peers of the supply chain to test the mobile app and provide feedback
• Improving the user interface
• Implementing the capability for peers to communicate and send messages directly to other peers
• Improving the authorization method for access to order details

Supply Chain Flow

Suppliers -> Manufacturers -> Distributors -> Retailers -> Customers

Conclusion

• Allows peers in Supply Chain Networks to communicate in pseudo real-time regarding the transport phase of the supply chain.
• Implements a semi-public and private block chain ledger to ensure the security of all data being exchanged
• The next steps for this mobile application would allow for validation and improvements.

This research was made possible with the support of the Indiana University-Purdue University Indianapolis Department of Computer Information and Information Science, as well as through funding from the National Science Foundation and the United States Department of Defense. The author would like to thank their mentor Dr. Zina Ben Miled, as well as Dr. Feng Li, Dr. Eugenia Fernandez, and Sheila Walter for their support.