Blockchain Based Accounts Payable Platform for Goods Trade

ABSTRACT

Goods trade is a supply chain transaction that involves shippers buying goods from suppliers and carriers providing goods transportation. Various business documents like purchase order, despatch advice, invoices, and receive advice get exchanged among the trade participants during any trade transaction. Similarly, various business processes like freight transport, invoice generation, goods receiving, invoice processing, and payment processing get executed by the participants in a trade transaction. Discrepancy during the execution of any of these processes leads to disputes between the participants involved, and the time consumed in resolving the disputes causes a delay in the process execution resulting in cost overhead for all the participants involved. Shippers are issued invoices from suppliers for the goods provided and from carriers for goods transportation. The shipper carries out goods receiving and invoice processing before proceeding to payment processing of bills for suppliers and carriers, where invoice processing includes tasks like processing claims and adjusting the payments. Goods receiving involves verification of received goods by Shipper’s receiving team. Processing claims and adjusting the payments are carried out by Shipper’s accounts payable team, which in turn is verified by the accounts receivable teams of suppliers and carriers. This paper presents a blockchain-based accounts payable system for shippers, which generates claims for deficiency in the goods received and accordingly adjusts the payment in the bills for suppliers and carriers. Primary motivations for these supply chain organizations to adopt blockchain-based accounts payable systems are to eliminate the process redundancies (accounts payable vs. accounts receivable), to reduce the number of disputes among the transacting participants, to reduce the dispute resolution time, and to accelerate the accounts payable processes via optimizations in the claims generation and blockchain-based dispute reconciliation.

**EXISTING SYSTEM**

* Organizations are innovating products to help digitize various processes (Figure 1) involved in the goods trade industry. TradeLens [5] is a solution to provide visibility into the current status of freight transport underpinned by blockchain technology. Producing blockchain-based e-invoices for the freight carriers as part of the invoice generation process got addressed in [6], [7].
* Several blockchain-based solutions exist related to financing during payment processing [8]–[11]. There are instances where the use of blockchain technology for accounts payable (receivable) got discussed [12]–[14]. Similarly, the possibility of carrying out matching (e.g., 3-way matching) of EDI documents on blockchain during invoice processing is also discussed [15]. However, all these proposals typically initiate invoice processing after the goods delivery to the shipper.
* The blockchain-based invoice processing system in our paper breaks down the claims generation into claims under different categories where claims under certain categories can be generated and issued before the goods delivery to the shipper. The advantages of this approach are two-fold: invoice processing gets accelerated since the dispute process can take place before the goods delivery to the shipper, and dispute reconciliation becomes easier since disputes are handled at the granularity of claims under a category resulting in faster dispute resolution. Hence, it is crucial to explore systems like the one proposed in this paper that enhance the effectiveness of blockchain-based accounts payable systems in invoice processing. Such a solution also helps organizations to build end to- end blockchain-based platforms providing visibility across the various processes of goods trade.

**Disadvantages**

* Payment processing not involves executing a payment method as per the terms captured in the service contracts between trade participants.
* In the existing system, the complexity of goods trade increases with the multiple en route handoffs between different parties involved in the goods movement process.

Proposed System

* In this paper, the system proposes a blockchain-based accounts payable system extending the TradeLens platform with capabilities to fulfill the needs of the supply chain network participants related to invoice processing (generation of CA and PAs) and dispute handling.
* Here are the key features of our blockchain-based accounts payable platform. CA is generated by a blockchain smart contract using the EDI documents PO, DA, RA, and supplier invoice. PAs for supplier and carriers are generated by a blockchain smart contract using supplier invoice, carrier invoices, and CA. And our system allows the shipper, supplier, and carriers to raise disputes on the generated claim advice and payment advices and reconcile before payment processing with audit trails. Moreover, our system lets the reconciled and approved CA and PAs be sent to the customer’s (shipper, supplier, or carrier) existing ERP systems via the API interfaces. Thus, our system is seamlessly integrated with the customer’s downstream applications. Our system allows email/SMS alert notifications to be generated as per user notification settings based on different triggers (e.g., CA is issued or dispute raised).

**Advantages**

* The system is fast and an effective due to presence of blockchain between supplier and shipper and shipper to end user.
* In the proposed system, matching EDI documents ensures that the shipper doesn’t pay for goods that are not received or overpay for goods received. The shipper is entitled to pay to the supplier for the quantity of the accepted goods at the agreed price as per the purchase order.

**SYSTEM REQUIREMENTS**

➢ **H/W System Configuration:-**

➢ Processor - Pentium –IV

➢ RAM - 4 GB (min)

➢ Hard Disk - 20 GB

➢ Key Board - Standard Windows Keyboard

➢ Mouse - Two or Three Button Mouse

➢ Monitor - SVGA

**Software Requirements:**

* Operating System - Windows XP
* Coding Language - Java/J2EE(JSP,Servlet)
* Front End - J2EE
* Back End - MySQL