



UNIVERSITATEA DE ȘTIINȚE AGRONOMICE  
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# DAIRY TRACEABILITY MONITORING SYSTEM BASED ON BLOCKCHAIN TECHNOLOGY

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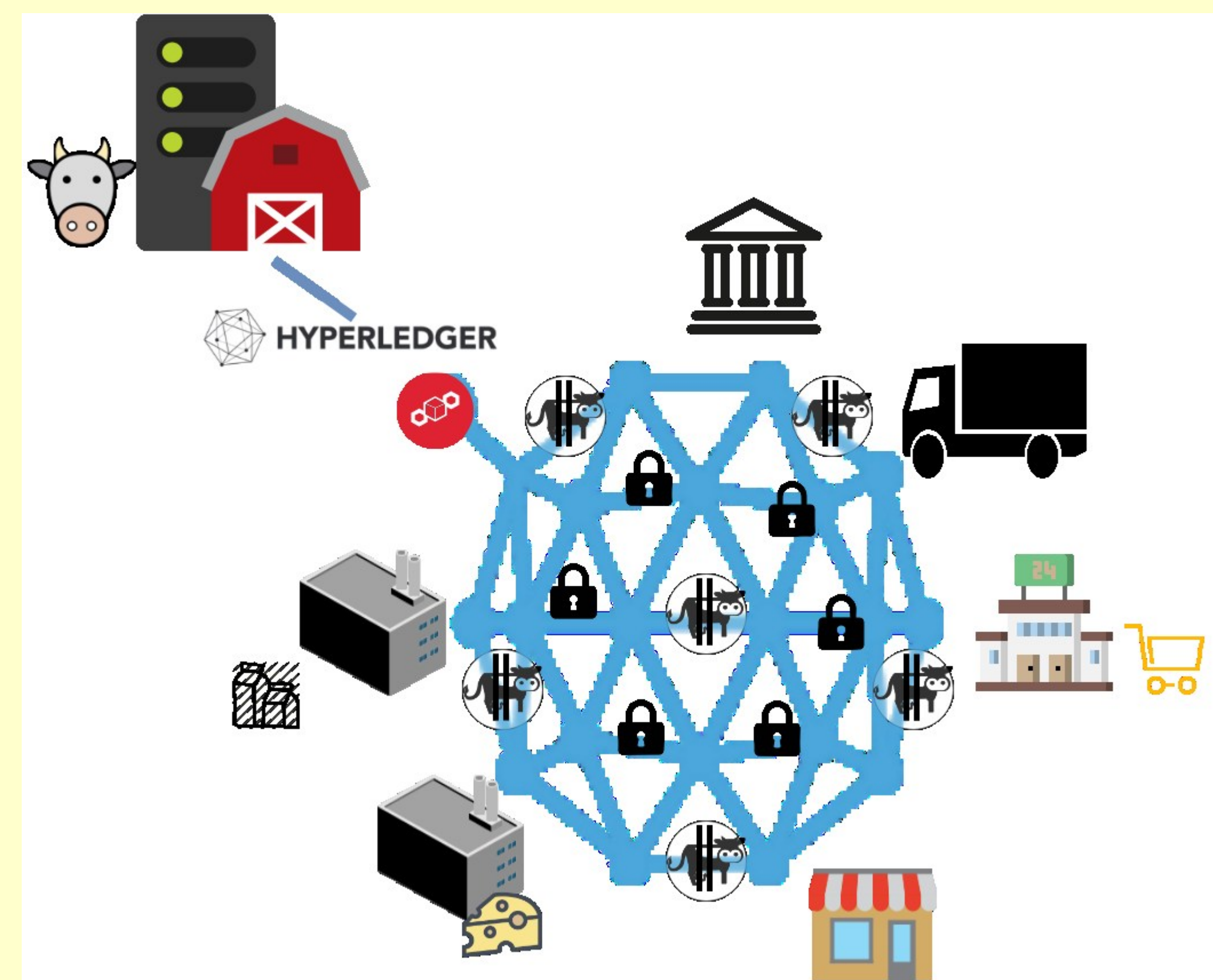
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The created monitoring system is based on the Blockchain technology that can establish the origin of the milk within seconds, providing the consumer with the guarantee of quality. Thus, lots of dairy products can be removed from distribution, leading to the reduction of food waste. All transactions can be viewed in real-time by processors and farmers. Also, with this technology, the farmer can manage all work on the supply of biological and feed material, production performance, treatments, manure management. Transaction history is not saved in one place, making it much harder to be illegally accessed and provide unpalatable information.

Blockchain technology makes it possible to identify the farms from where the cow milk was used in production, as well as the medical treatments or food rations that were used inside the farm. Using the radio-frequency identification (RFID) tags, it can be tracked the entire path traveled by the raw material.

The dynamic quick response (QR) code is then printed on the packaging. This QR code contains all the information issued by the RFID tags together with information that is gradually enriched by the different participants in the supply chain. This includes any treatment to which the milk was subjected and the specific characteristics of the product. These data, which cannot be modified, continue to be placed in blocks until the product reaches the store.

Consumers can scan the QR code on the packaging to get all the information about the product stored in the Blockchain blocks. In order to ensure maximum transparency, customers can also check data about the used Blockchain technology.



The proposed system uses Blockchain implemented based on the Hyperledger Fabric open source platform and the CouchDB database due to its representational state transfer (REST) application programming interface (API) done over a secure hypertext transfer protocol (HTTP).

The traceability platform is used to process, manage and control the transactions based on dairy products. The system consists of a distributed peer to peer network, where the peers of the Blockchain network are banks, transporters, dairy products processors, shops and supermarkets. The transactions are done based on a virtual currency or by bank transfer. All the peers have a ledger for collecting tokens regarding the transactions.

Every time a dairy product undergoes a new process, the origin farm of the milk gets the token into the personal ledger. The transfer information is saved inside the blockchain, containing information about the source which has its true name, the receiver that is anonymized, the token which is the transaction product and the product identifier. Based on the blockchain address, the dairy farm is able to view the transactions without administrative obstacles. The process of assigning tokens is done through Hyperledger Fabric.