

Blockchain Technology in Watch Industry to Prevent Counterfeit Watches

¹ Yogesh Sharma; ² Aviral Bansal; ³ Vivek Saini; ⁴ Rajat Garg

^{1,2,3,4} Computer Science and Engineering Department, Maharaja Agrasen Institute of Technology
New Delhi, 110086, India

Abstract - The production and distribution of counterfeit watches is an increasingly worldwide issue, especially for consumers and Companies. Fake watch sales are approximated at \$1 billion per year. Swiss Customs Service, suggest that there are some 30 to 40 million counterfeit watches sold every year[4]. One of the reasons for watch counterfeiting is the imperfect supply chain system. Watches change ownership from manufacturers to wholesaler; distributor and then shopkeepers before it reach the customer. Information is not shared between systems in the current chain supply system, manufacturers don't know what happened to their products, Watches regulatory authority has no traceability of the product, recalls are expensive and complicated, and companies cannot follow-up customers. In this paper we explain how to use blockchain technology can add traceability, visibility and security to the Watches supply system. The proposed system will be used in Watch industry to track the Watches from its manufacturing until its delivery to customers. Blockchain technology will be used for storing transactions and only trusted parties will be permitted to join the network and push data to blockchain.

Keywords - Blockchain, Watch's counterfeiting

1. Introduction

Counterfeiting of watches became a major problem in the eighteenth century when competition between Britain and France started to become the leading producer of quality clocks and watches[3]. Luxury watches have often been more susceptible to counterfeiting compared to normal watches, due their brand enjoying the highest worldwide awareness and ubiquity of their design trademarks for e.g. Fake Rolex watches commonly sell anywhere from \$5 to upwards of \$1,000. According to Swiss Customs 40% of counterfeit watches come from China, but counterfeits are produced elsewhere, even in the US. According to EU estimates at least 54% of fakes seized in 2004 originated in China[2]. When all the watches are manufacture and a standard product is developed, the next big issue for manufacturers is to deliver the product to the intended customer and to ensure that the customer get the genuine product that is made by the authorized manufacturer, not by counterfeiter[6]. But the current Supply Chain Management (SCM) system of watch industry is outdated, and doesn't provide visibility and control for manufacturers and regulatory authority over watches distribution and it cannot withstand the 21st century cyber-security threats[4]. This situation of SCM leads to the production, distribution, and consumption of counterfeit watches. For the prevention of counterfeit watches, industry need an efficient supply chain system, and one of the best available solution to develop a perfect SCM system is the Blockchain technology. A Distributed ledger system

known as blockchain (firstly introduced by a pseudonym Satoshi Nakamoto in 2008) that has shown widespread adaptability in recent years and many market sectors seek ways of incorporating its abilities into their operations. Still, so far most of the focus has been on the financial services industry, except now projects in other service related areas, such as healthcare, energy and legitimate firms also started using this marvel. One aspect that has recently won attention is Supply Chain Security. Most of the product subject to a sensitive production process and widespread reputational issues are connected with the final product, the benefits of Blockchain are evident. Blockchain is the best fit in those scenarios where privacy protection and data security is the highest priority.

2. Purpose

While looking at the issues mentioned above, we realized that we need an updated supply chain system. The main Reason of the new system is to incorporate the features of blockchain technology and add traceability, and security to the supply chain, and to provide visibility to manufacturers and regulatory authority of the SCM system[4]. Blockchain technology is the best choice when we need data privacy and data accessibility both at the same time. Each time a product changes hands, the transaction can be documented to create a perennial history of a product, from manufacture to sale. This will exponentially lower time delays, costs, and human error that occur in transactions today[1]. The purpose

and features of the blockchain based SCM system for industry are summarized as given below:

♣ To Enlarge Trust and Transparency[7] – With manufacturer and customers being able to track watches throughout the supply chain, they will trust each other. Producers will be able to see that the products they want to deliver are safely received by the intended client. Customers will be able to see that the product he wants to buy is made by a legitimate manufacturer, and he got it in its original form

♣ Traceability – When the manufacturer had developed a product he will register it on the blockchain and here after the watches will be traced and authenticated at each stage of their journey. As the watch ownership change physically, its ownership will be transferred simultaneously on the blockchain network. Producers will be able to see the journey of their products at any of time, from manufacturing to packagers, and from packagers to distributors.

♣ More Security – Blockchain is considered as one of the most secured ledger systems on the planet. Blockchain have an unchangeable database and the information once stored on it, it cannot be deleted or modified. In the Suggested system, a permissioned blockchain will be used that is more secure then the public blockchain, in which only authorized participants will be granted privileges to push data to the blockchain.

2.1 Reason of Implementing Blockchain

The distributed network of computers that share a immutable ledger of transactions among the participants connected to the network without any central server is known as Block chain. It saves each transaction occurs in the network with a timestamp and eliminate the need of third party. Each node on the network maintains an individual copy of the ledger, and any minor change in the personnel ledger is replicated to the overall network, and every node on the network upgrade their ledger. If one node is failed or disconnected, it doesn't have any effect on the network. The first reason to use Blockchain technology in such a system SCM is its security. One the best option to provide 21st century cyber-security is Blockchain as no breach found in it. It is made in such a way to prevent any single person from modifying the data and transactions, resulting in increased trust and help to eliminate the biasness found in long established supply chain systems. Blockchain allows participants to anonymously exchange digital assets, where they don't need to know each other and trust each other or a third participant for their transaction. Therefore blockchain is the best option to transfer trust in a trust less world. One of the reasons we suggest blockchain for SCM system is that it's the best method to record or save the journey of a product across supply

chain[9]c. Each time the product change ownership, a new transactions will pushed to blockchain. Saving the history of a product make it easy to reveal its actual origin and milestones. This approach will bring more transparency[7] to transactions in the watch supply chain. One of the most important reasons of using blockchain in SCM system is the Smart contract. A code that contain the actual rights and obligation that include the conditions and term for the payment and delivery of goods and services agreed upon by all the signees is called Smart Contract and can be automatically executed. They can add greater intelligence and more power to blockchain. Smart Contract can be used to make state-of-the-art and cutting edge customized blockchain based systems.

3. Implementation

To include blockchain technology in watch industry supply chain system, we should first have to know how blockchain ledger works under the hood. Blockchain has already built-in identity, a cryptographically secure key pair, keys are used to assign each participant a unique activity on the network. A participant can be a person, device or an entity. The original identities of participants are hidden and secure, they are known by these keys. A key pair does not contains any clue about the participant, but additional information (e.g. name, contact or professional credentials) can be include with it, But the better way is to kept those extra information off-chain and merge them with on-chain data using their IDs. In the context of watch industry supply chain management, the participants will be the manufacturer, packager, distributor and shopkeeper etc. Every participants can be identified by their unique key pair on the network. Watches will be considered as the assets, with each of them having a unique key (or hash). The ID will be attached with watch in the form of QR Code.

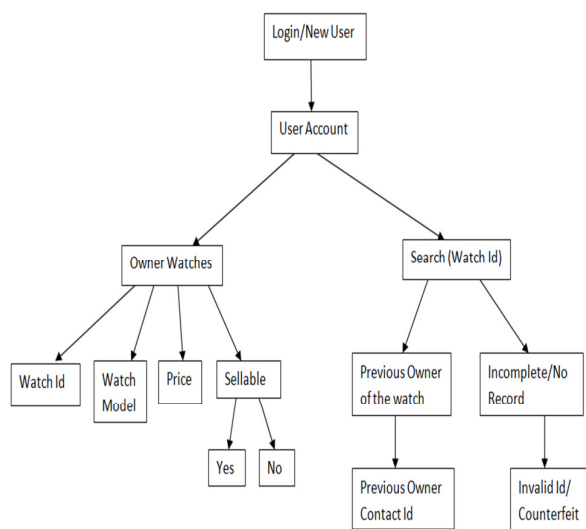
The selection of a unique blockchain network for storing transactions is also a important part, but before that, we should know the types of blockchain. Blockchain has two main types – Public blockchain and Permissioned (private) blockchain. In a permissioned blockchain network not everyone can write to blockchain, only those participants who has given access, can write or access information on the blockchain.

In the context of watch industry supply chain – the better way is to use a permissioned blockchain. The next step is to use a unique blockchain network to save the transactions record, but it totally depends on the developer's choice. Few types of blockchain networks are available in the market, e.g. Bitcoin Blockchain, that is the pioneer one, ethereum, Hyperledger or even

BigchainDB can also be used. But the one we recommend is permissioned Ethereum blockchain.

4. How It Works

Whenever we change any data on the blockchain, a transaction occurs. These transactions are stored in a block and every time we process a transaction, a group of transactions are stored in a block, a node puts it in the transaction pool. Transactions inside this block are zero confirmation. It's the task of miners to mine that block.



Now we explain the web application. Data is divided into two parts, watches and owners. Watches are stored in mapping where key is unique Id which is printed at back of a watch and this returns specific watch object. Similarly Owners are stored using mapping where key is address of account and it returns an object. We have created function that help us create new accounts, new watches and sell them to another account. The blockchain helps us because we have transparentized the supply chain as anyone on the network can see any watch's supply chain and buy it if both parties agrees on the deal. Seller has a list of watches owned and can mark them as sellable whenever he wants.

Now let's consider Shopkeeper needs some watches and he want to purchase it from a distributor. Using the web app, shopkeeper will first login to his account and then query for watch ID, to confirm its journey from manufacturer to the distributor. If the product is genuine, web app will show all of its history and if the watch is counterfeit wrong journey will be shown and user will understand that it did not come from actual manufacturer. Once shopkeeper is sure about the originality of the watch he will then purchase them.

Same as the customers will be able to track journey of watches.

5. Conclusions

In this paper, we proposed a further use case of blockchain technology in Watch industry. We pointed out the issues in current Watch industry supply chain management, and explained how blockchain can be used to trace the path of watch from manufacturer to current customer and add visibility to of watches supply chain which resolves the issue of counterfeiting. In this paper we explained the identity mechanism of blockchain and its advantage in shared manufacture product. We show all the possible techniques, blockchain types and third party solutions that can be used to implement a blockchain base supply chain for watch industries. At the end we explained the working of the suggested system with an example that will be able to explain how the system will be easily used by different participants.

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