Luxury Goods on Blockchain

Georg Krause, Blockchain Systems Pte Ltd

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Abstract

The risk of counterfeit products increases with the product price and the relation between sales revenue and production cost. Luxury goods are often at risk. For the consumer it is often not possible to detect a counterfeit product before purchase. In such cases there are multiple losers, the customer, the seller or shop and the brand itself. Today's technology allows easy product copying, but provides also high-tech protection. This article describe a solution based on a new type of blockchain. Traditional blockchains are heavy vehicles, when it comes to electricity consumption, network complexity, required knowledge and cost. In contrast the new Back-Stepn blockchain provides everything a product manufacturer or brand owner needs to have at lower complexity and cost. We explain in this article how it works and pin point the benefits for all involved parties, except for the bad guys. For this use case we show how exclusive drinks like Whiskies can be protected and promoted.

1 Why do we need protection?

It is obvious that counterfeit products create huge damage. The loss of revenue for the distillery is one side of the medal. Add here the loss of trust of the customer, in the seller and in the brand when a counterfeit product is detected. Customer relations are damaged. On the other side when a customer can be assured that his Whisky is original, the enjoyment is much greater. This will create a much tighter relation to the brand. There are two hand full of marketing advantages that the distillery can use when counterfeit products are stopped. The protection we recommend is based on a new type of blockchain, which can be scaled to the needs of the distillery.

2 Blockchain as a mirror of the product flow

At the distillery all data of the products are available. Good products have their age. At the time of origin, nobody dreamed about blockchains. But the data are available. Now each existing bottle gets it's "birth certificate" This is a record, which describes the product in the required detail, including serial numbers of bottles. This certificate is then digitally signed (a cryptographic process) and

placed into the blockchain. From now on these data cannot be modified. Any modification is detectable by everybody who has read access to the blockchain. This includes the customer. Actually it is a part of the app in the smart phone. Whenever that Whiskey bottle is now moved the blockchain will receive a new entry. Key partners in the supply chain have an app that allows them to report physical transfer of the bottles to the distillery's blockchain . At the distillery all supply chain steps are checked. Are the bottles with that certificate number really in the blockchain? If double numbers are detected an alarm is raised and the sale of that bottle is stopped. Now it's time for criminal investigation, long before a customer sees the bottle. When the bottle is at the reseller, a blockchain record is created again. At sales time another record is created with the app of the reseller and sent to the distillery. This record is again checked and implemented then in the blockchain at the distillery.

When a Whiskey is presented to a new customer the seller has an app where he can show the customer the life story of the bottle he presents. If the customer has already the app, he sees everything on his own smart phone. When the deal is agreed and the bottle is verified to be authentic the end customer record is created in the blockchain. From that point onwards no further entries to the blockchain regarding this Whiskey bottle are possible. This prevents "second hand" business being supported by the distillery. The customer is of course able to pass the bottle to a new owner, either as a gift or for money. He can show that he is the legitimate owner of the bottle.

All communication between the partners in the supply chain, which end up in a new block are encrypted. When recorded in the chain, the data are not encrypted any more. The distillery knows exactly where their bottles are and can use that information for supply management.

3 Customer as Winner

One of the biggest winner is the customer. Imagine a customer can view the key production data of his Whiskey before he buys. He will have an assurance that his desired product is original. After buying, he can proof that he is the legitimate and proud owner of the exclusive Whisky. If the bottle is not in the blockchain he will just not buy. Original product for good money. Even after years he can find his Whisky in the blockchain. It is the customers decision, if he wants to be anonymous in the chain or visible with his full identity. Of course it is recommended to limit access to customers and other selected people, not to the full public. This builds a closed user group. The blockchain record is also the customers receipt. He can proof after years what he paid. There is no discussion about the product value when it comes to insurances.

Customers can see when their product was distilled, the unique bottle serial number, the whole supply chain up to his preferred reseller. All these data are transparent. These transparency creates trust. He needs an app on his own smart phone. And of course he can proof that his product is original. A digital certificate of origin will be in the blockchain for each bottle and verifiable on

his smart phone.

4 Shop as Winner

The shop or reseller benefits from the blockchain application. He can assure his customer that he cares. No counterfeit products are possible. He can search for past deals, even if they are years ago in the blockchain and use this information for customer relation and marketing purpose. If each customer has its "Whisky Lover" ID, resellers can treat travelling customers well. The Singapore customer is found in the blockchain and the shop in San Francisco knows what the favourite product of this customer is. The "Whisky Lover" ID is a digital certificate uniquely identifying a customer and can be issued by a distillery or an association where multiple distilleries are members.

5 Distillery as Winner

The advantages for the distillery are obvious. First, counterfeit products will disappear from the market. The brand has an excellent marketing argument, caring about their customers with transparency and trust. Further the brand gets an easy insight into the product flow. All this will help to reinforce the brand's standing.

Figure 1: Enjoy!

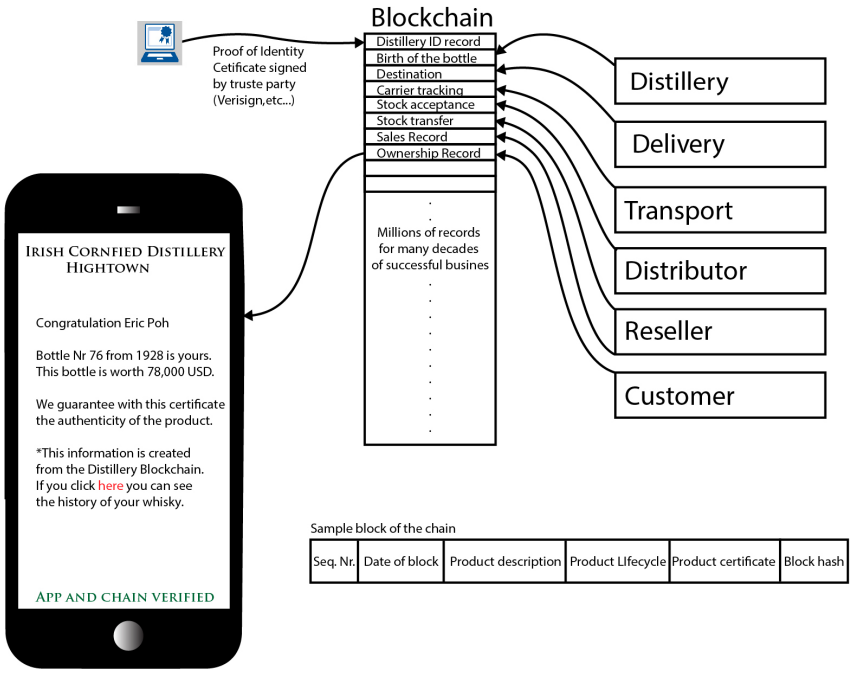

Figure 2: Blockchain Flow

6 Which Blockchain?

As seen so far the the apps are important. They feed the blockchain. The apps in the supply chain cannot put records directly into the chain, but deliver records to a server application, which provides authentication and plausibility checks. For example, duplicate serial numbers need can be detected before they are put into the chain. As a blockchain is a trusted ledger, which cannot be manipulated it must use reliable storage units. High availability servers are available. Anyway, because hardware may fail a redundant installation is recommended. Preferable at 2 different locations. Which blockchain technology should be used? It is not recommended to use a Bitcoin type blockchain. The time between 2 blocks is too long and the energy required will become a major cost factor. A short response time (2 to 3) seconds is required, otherwise the sales process is not smooth. Chains, which need thousands of nodes to become secure are not applicable for a distillery. Thanks, the new hardware based Back-Step blockchain meets the requirements of the application much better. Each server (2 or max 3) needs one hardware connected to the server. For the estimated volume of the luxury goods market a entry level chain with 1000 blocks per second should be more than enough. These are small USB devices with minimum power consumption.

Thanks to this invention, blockchain is now available for any size of businesses.

7 Cost of Blockchain

Nothing is for free, the Blockchain has a few price tags, most are initial manpower and a little equipment. There is a learning curve for the involved parties. The IT department or provider needs some resources, a place in the server rack needs to be found. Small things, but important. Roll-out plan, test case, fallback and disaster recovery must be understood and possibly exercised. The cost of an entry back-step blockchain hardware itself is in the range of 2000 USD, multiplied by 2 or 3, dependent on your availability requirements. This is a one time investment. Yes you need also some storage space where your chain and some copies are stored. Finally there is a license cost of 1 cent for each block for the blockchain manufacturer. Yes, you need to have apps for the distributors, the final reseller and the customer. An application for the distillery site is required. The integration into the existing IT can be easy or medium complex, dependent on the requirements of the different departments inside the distillery. The transparency of the product flow to the end user will definitely create some appetite in the marketing department. Therefore, a relatively simple interfaces is needed, to let departments analyse and use the read only data from the blockchain. There is little, but still some maintenance required.

8 Security - Possible Attacks

How does the protection against attacks work? Manipulating the chain itself is not possible. This is already shown in other papers. How about copying the whole chain onto a set of new computers and buying a fresh set of BSB hardware. This clone attack can easily be detected. Each chain when initialized has an first block the so called genesis block. Inside this block is a serial number of the blockchain and an identity record, which is a signed certificate of the chain owner. This process is similar to signing new software drivers, that they can be installed on a let's say Windows 10 operating system. The certificate chain is verified by the apps in the shops and the end users devices. These things may sound complicated for someone who's main business is distilling prime whisky, but for IT consultants this is daily business.

9 Conclusion

Yes, after some initial effort the BSB secures and enhances the business for high end products and others. Trustful, transparent history of products create win-win situations. Whiskey is an example of the fusion between tradition and high technology. Successful distilleries become high-tech companies. Of course, the first distillery using this new technology is the biggest winner.

10 Acknowledgements

Many thanks to Mr. Eric Poh, Singapore for providing me some insight into the high end Whisky business.