

BLOCKCHAIN TECHNOLOGY – THE SOLUTION TO ILLICIT PRODUCTS AND AGE VERIFICATION

Ed Carmines, Bryan Burd, Kevin Burd, Jason Carignan
Chemular Inc, Hudson MI, USA
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Abstract

According to the National Youth Tobacco Survey, 2.8 million U.S. youth reported using a commercial tobacco product in 2023. The most commonly used tobacco product in middle and high school aged students were e-cigarettes with 89% using flavored (i.e., menthol, mint, clove or spice, alcoholic drinks, candy, fruit, chocolate, or any other flavor other than tobacco) e-cigarettes. The FDA's PMTA authorization decisions are based on a public health standard that considers the risks and benefits of the product on the population. To date, the agency has not authorized any flavored e-cigarettes and has denied millions of applications due to lack of evidence demonstrating an added benefit to adult smokers that outweighs the substantial risk of youth initiation and use of flavored e-cigarette products. Blockchain technology offers an immutable way to identify products and users. IKE has developed a new patented technology incorporating blockchain technology into Bluetooth chips used in electronic devices and also incorporating the same technology in smartphone applications. The technology ensures that devices enabled with the technology cannot be copied and/or hacked and that the smartphone application will only function with identified individuals at any time. The combination of both attributes prevents illicit products and also underage use.

Why Age Verification

Underage use of e-cigarettes is considered an epidemic by some. It is clear that preventing youth access to the products will reduce initiation and prevent a lifelong addiction to nicotine. The first line of prevention is by age checking at point of sale. Figure 1 below shows as high as 1 in 5 attempts results in a successful purchases, as well as 2021 NYTS data shows over 31% of students state they “bought the products themselves.” Youth have also stated (Table 1) they often get their tobacco products from a friend (often the number one source according to NYTS data). Clearly, current methods of Age Verification, at the point of sale has not proven an effective tool to prevent youth access. What is needed is an approach that prevents youth from actually using a device. Technology provides a potential solution where the e-cigarette can only be activated by an age verified individual. This involves adding communication hardware to the e-cigarette in the form of Bluetooth chip and installing an application of the smartphone to verify the age of the individual. Essentially the smartphone app verifies the user is of legal age and then sends a signal to activate the e-cigarette. This approach has the potential to both ensure that only individuals of legal age can use the e-cigarette and to eliminate underage use.

Figure 1: Retailer Violation Rate 2020-2022

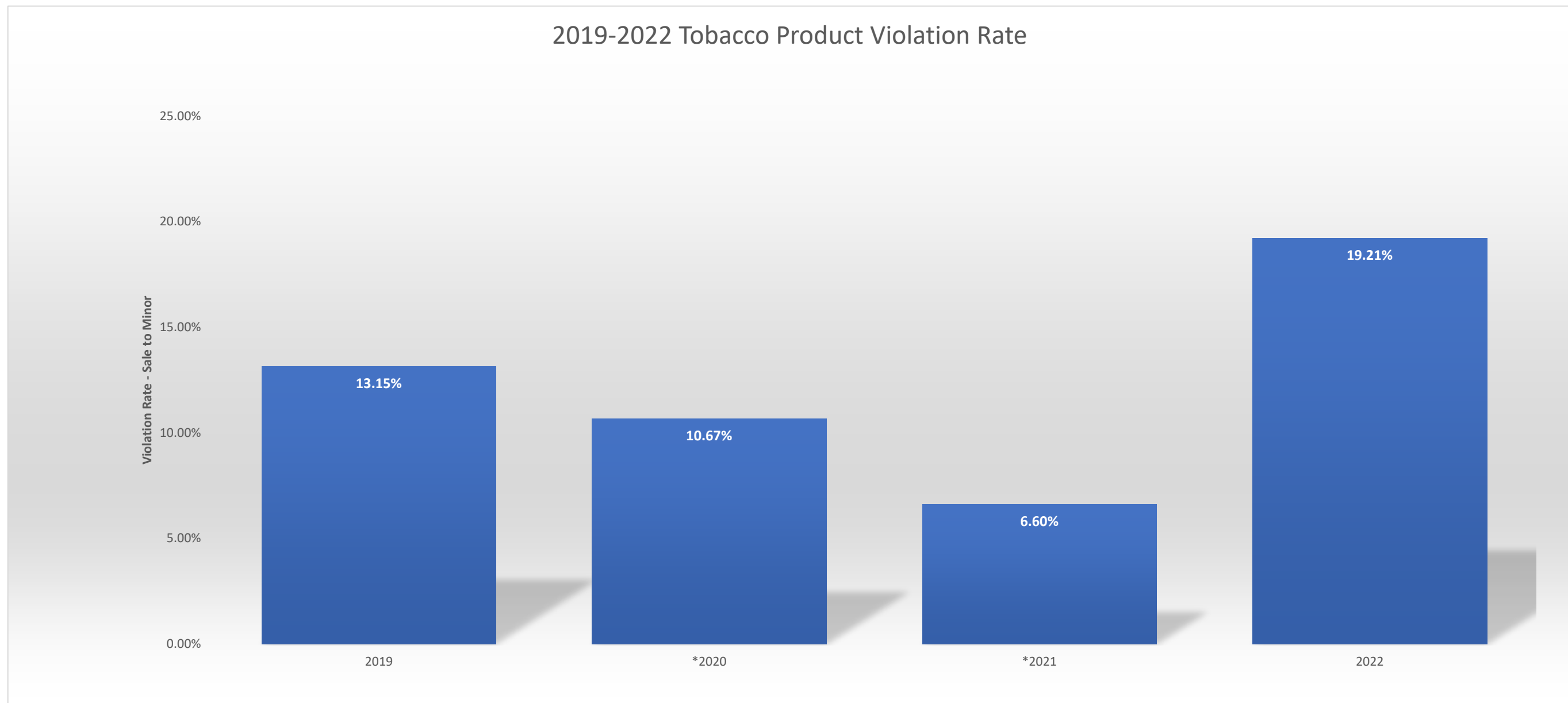


Table 1: NYTS Data 2021

How did you get your [tobacco product]?	E-cigarettes tobacco product % (95% CI)
I got them from a friend	32.3 (28.7–36.2)
I bought them myself	31.1 (27.4–35.0)
I had someone else buy them for me	28.7 (25.7–31.8)
Someone offered them to me	21.7 (19.2–24.4)
I asked someone to give me some	16.3 (13.8–19.2)
I got them from a family member	10.2 (8.2–12.6)
I took them from a store or another person	3.3 (2.4–4.6)
I got them in some other way	15.7 (13.1–18.6)

Age Verification Challenges

- The following are all major challenges to overcome in creating a complete Age-Gated System:
- Data integrity – ensuring that users are indeed over the legal age of 21.
 - Breeching the system – making sure that there are no “backdoors” or other areas that can be exploited to grant unapproved access.
 - Robust Feature Set – ensuring that age restrictions such as one-time authorization, or account sharing cannot be thwarted.
 - Speed of Use –spending excessive time activating their device will at best lead to unhappy customers, and at worst potentially push them back to cigarettes or other illicit products.
 - Availability – ensuring that the application is available on all major phone brands is paramount

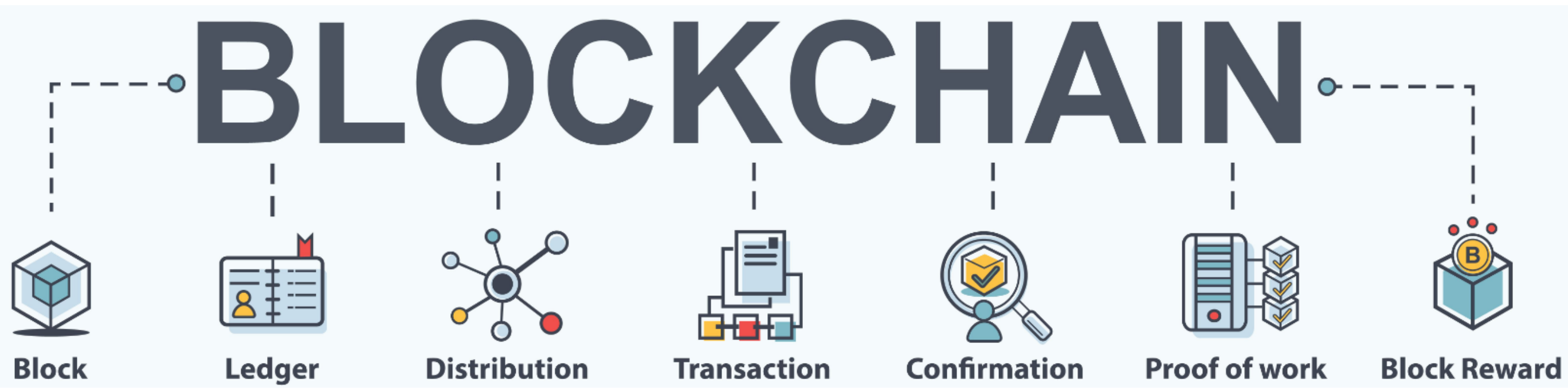
Hardware and Software Challenges

Technology has played an important role in the evolution of tobacco products, starting with the invention of the “modern day” e-cigarette in 2003 by Hon Lik. It should be of no surprise, the parts of an advanced system to block youth from using electronic tobacco products relies heavily on technology, and data security is at the heart of this system.

There are two key potential weaknesses in the age gating process. The first involves the Bluetooth chip in the e-cigarette that communicates with the smartphone. The smartphone needs to communicate with the e-cigarette turning it on. This communication needs to be secure. Bluetooth chips can be cloned and the electronic messages spoofed. The most likely place to breach the system would start with the replacement of the Bluetooth chip with a counterfeit chip or copying the communication between the e-cigarette and smartphone. In essence the e-cigarette could be tricked into turning on. Illicit manufacturers could use the cloned chip, claiming that their products were age-gated when in reality they aren’t or that they copied the chip from an authorized manufacturer. The second weakness is in the smartphone software itself. Inherent in the age verification process is the conclusion that the user is of age. Once the software has concluded this, the smartphone sends a signal to the e-cigarette turning it on. One can envision the cloning of the age verification process by users such that a copy of the process could be transferred to an underage individual's smartphone and a “copied” message would turn on the device. That is, the e-cigarette would believe that a valid user is turning on the device when in reality the e-cigarette is only getting a copy of another person’s activation information.

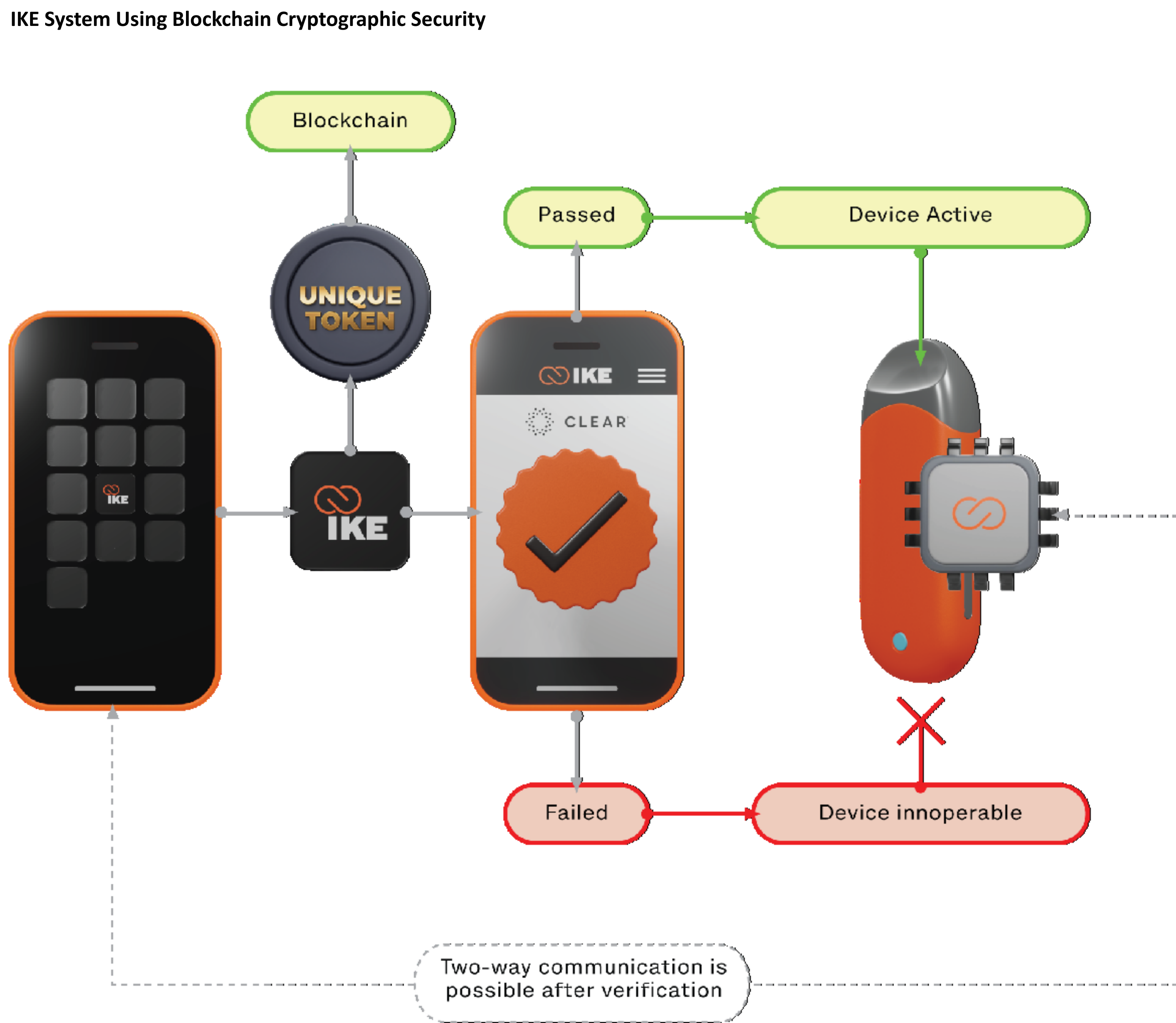
Blockchain Solution

The latest in advanced cryptographic security techniques is the blockchain, which makes it nearly impossible to alter or delete data without it being easily discovered. At the most basic level, data for age gating is used to determine if a person is over 21 or not, and to send a signal back and forth from the device to turn it on or off. It is critical to demonstrate that the system cannot be breached. Blockchain is a decentralized way to digitally secure the data, often referred to as “transactions” or “blocks.” One way to think of this, is by creating the “block” a digital token is assigned, and if altered in any way, the system will know it has been breached. The token is created by using information from the previously created “block” in the chain, also referred to as ledger. Unlike traditional databases, which are typically centralized and controlled by a single entity, the ledger is distributed across a network of computers (nodes), reducing the risk of a single point of failure and enhancing overall system resilience. The benefits of the blockchain include, streamlining the data protection process – mainly through automation, traceability and fraud.



IKE Technology Solution

The IKE technology solution uses the blockchain technology in two ways. In the first, blockchain information is imbedded in the bluetooth chip such that every chip becomes unique and identifiable. This ensures the device’s authenticity through the decentralized and immutable nature of blockchain technology as well makes it easy to validate, ensuring it is genuine and has not been tampered with. The second is imbedding blockchain information in the smartphone software such that the information cannot be copied and re-used. That is, the e-cigarette will only respond to unique information from the smartphone. In addition to these, state of the art cryptography features the IKE solution also offers a layered set of defenses against deep fakes such as presentation and injection attacks, including fraud detection, liveness detection, image inspection, screen detection, metadata detection, and more.



Conclusion

Implementation of age-gating technology has the potential to eliminate youth access to e-cigarettes. The technology needs to be secure and immutable. Inclusion of blockchain technology ensures that the e-cigarette can’t be tricked into turning on and that the smartphone can’t be tricked into sending incorrect information to the e-cigarette.

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