

Bluestone Technologies

B-ID : Proof of Health and Immunisation Consensus Protocol

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Abstract: Assessing future pandemic risks will require advanced technological solutions to quickly analyse and transmit data to create sound public health policies. As a result of the COVID-19 pandemic, easily accessible and credible data have become a pillar to the implementation of effective global health policies. Bluestone Technologies, developers of the B-ID, a self-sovereign digital identity platform that combines blockchain technology and proprietary artificial intelligence tools to issue verifiable health credentials using a “Proof of Health” (POH) and “Proof Of Immunisation” (POI) consensus mechanism.

Indexed terms: B-ID, Proof of Health (POH), Artificial Intelligence (AI), Distributed Ledger Technology (DLT), Blockchain, Proof of Immunisation (POI), Quick Response Code (QR code), end user, Zero Knowledge Proof Infrastructure (ZKPI)

1.Introduction

Bluestone Technologies is a technology company incorporated in the Commonwealth of The Bahamas with a primary focus on leveraging cutting edge technology to provide advanced digital infrastructure to developing countries throughout North America.

As misinformation surrounding the COVID-19 virus and vaccine continue to spread, along with news reports of fraudulent COVID-19 test results, Bluestone has developed B-ID; a self-sovereign digital identity platform using blockchain technology and proprietary Artificial Intelligence tools [1]. As a result of misinformation and continued negligence, Bluestone pivoted the B-ID technology to issue verifiable COVID-19 credentials to general users on an immutable distributed ledger issued by accredited medical labs.

The B-ID mobile app currently enables end users to register, locate the nearest local testing centre, book and pay for a variety of COVID-19 test and receive results directly to the app. Upon receiving a negative test result, users are at liberty to “Roam Free” and securely, share their results peer to peer, with employers and other providers via a QR code. End users that receive positive COVID-19 test results, are then prompted to quarantine and adhere to national health guidelines. Accredited medical providers administering test results are provided with a custom backend dashboard permitting them to view data analytics regarding the amount of users booked for testing, test results issued, COVID-19 positive or negative users in addition to issuing users their test result status once they’ve been processed.

The B-ID mobile app notification systems alert end users to complete a daily symptom checker that transfers the information directly to their medical provider and employer. As a result, Bluestone has

leveraged B-ID, to implement their “Proof of Health” (POH) consensus mechanism as a digital health passport feature.

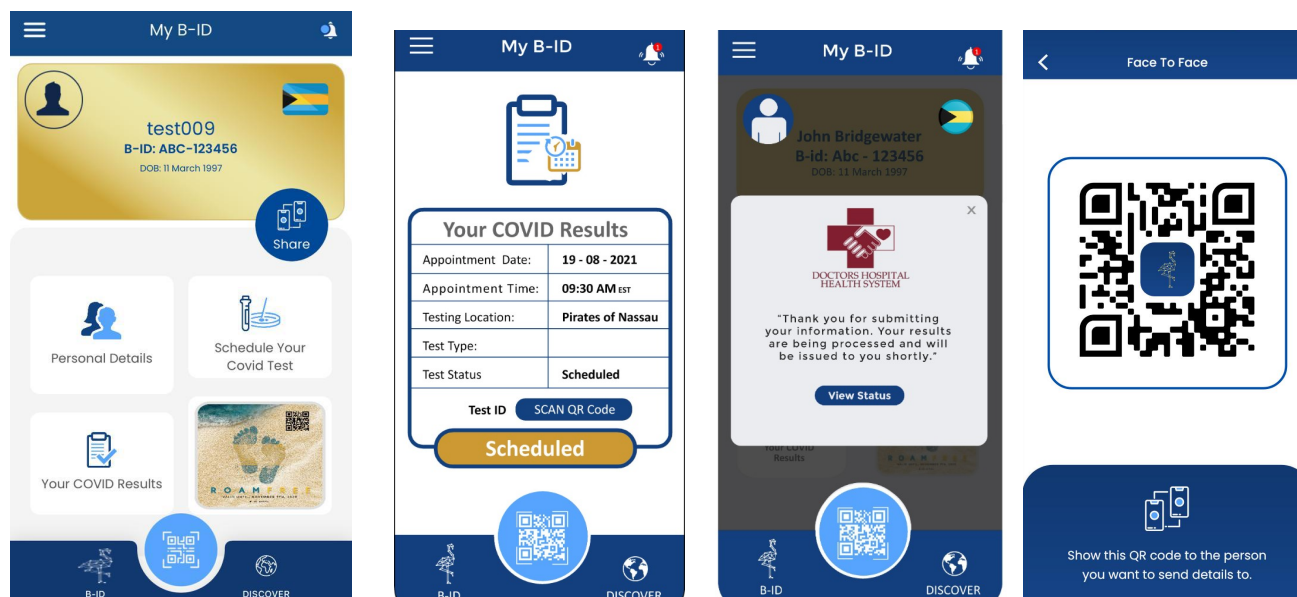


Image 1a, 1b, 1c, 1d; various screens within the B-ID platform. 1a; home screen, 1b; successful scheduled test, 1c; successful test application, 1d; share results.

2. Methodology

Privacy and Verification

As a privacy centered platform, B-ID gives users complete control over their data. B-ID leverages the integration of the open source technology of the IBM Hyperledger Indy infrastructure to provide a secure, anonymous self-sovereign digital identifier for users to maintain control of their data. This provision uses Zero Knowledge Proof encryption as the backbone to our data security protocols.

Bluestone will continue to upgrade the B-ID platform to ensure the utmost security and privacy for user data, while maintaining transparency at the governmental level. As it relates to immunisation of users and the issuance of vaccines, Bluestone has begun the update to its’ “Proof of Health” (POH) consensus mechanism to now include; “Proof of Immunisation” (POI). Separate to the core functionalities of the POH mechanism, the implementation of this update will include the ability for the vaccines to be seamlessly logged by pharmaceutical manufacturers. Such implementation will establish the baseline for an inventory management system, continuously monitored by participating parties during cross-border transportation until inventory arrives at the distribution clinics to be easily verified once administered to the end user.

Traditionally vaccines took a minimum of four (4) years to be market ready and leading COVID-19 vaccines have taken an unprecedented developmental period of 8 months [2].

Thus, proper records are imperative in ensuring that each step from the manufacturing lab to the end users are carefully logged and monitored with the highest level of security in mind. In addition to providing an immutable inventory management system for enterprises and government agencies

involved in the logistical management of the vaccine distribution, the POI update provides a secured digital immunisation card for end users who can also discreetly relay potential side effects of the vaccine directly to relevant POI participants such as; pharmaceutical labs, governments and administering clinics.

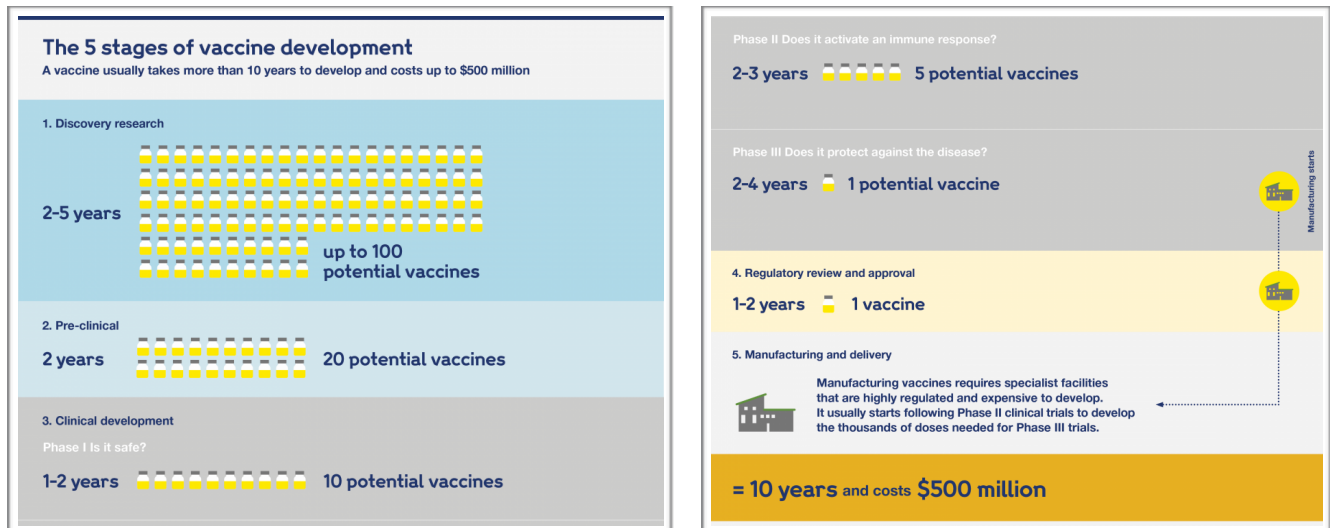


Image 2a & 2b; The 5 stages of typical vaccine development.

2.2 Managing Logistical complications of vaccine delivery

Blockchain technology is regarded as one of the most advanced encryption methods in the world today and is trusted by large global legacy corporations and entities to streamline their business processes. Given its characteristics of immutability, transparency, decentralisation and security, it made the perfect backbone for B-ID's POI supply chain/inventory management feature for the various COVID-19 vaccines, interoperability between manufacturers, distributors, government agencies and protectors to ensure end users personal identifying information were securely anonymised within the B-ID platform[3].

Bluestone has incorporated its' proprietary identity verification software using advanced Artificial Intelligence algorithms to verify the biometric and employer credentials of both employees with authority to access the POI update and government issued ID documents of end users receiving the vaccine. With the combination of both Bluestone's AI tools and blockchain infrastructure, the B-ID becomes a secured, user-friendly and unyielding means of transmitting the logistical data of the vaccines from start to finish.

2.3 B-ID and Pharmaceutical manufactures

The logistics of the COVID-19 vaccine begin with leading Pharmaceutical manufactures. After manufacturing, vaccines must be placed in a specialised thermal shipping container capable of storing thousands of dosages in a single container [4]. With access to the B-ID POI update, each pharmaceutical manufacturer will have the ability to bulk upload each dosage identifier which will then be recorded on-chain to populate the inventory management system, thus generating a QR code to be placed on each thermal shipping container.

2.4 B-ID and transporters

Certified vaccine transporters transmit the vaccines from pharmaceutical labs to the designated distribution centres. Those accessing the B-ID POI update will be able to set up employee profiles making them capable of scanning each QR code placed on the vaccine thermal shipping containers to verify the pick-up of the containers. Once the pick-up is logged, POI update participants will receive a notification that the containers are on route.

2.5 B-ID and Distribution Centres

Approved distribution centres accessing the POI update will be able to create employee profiles allowing them to scan the QR code on the vaccine thermal containers when arriving at the distribution site from the transporters. Once each thermal container is scanned, the update is broadcasted to POI update participants to verify the transmission of the containers that have reached their intended designations.

2.6 B-ID and distribution clinics

The COVID-19 vaccine will be funded and distributed by the public sector (United States)[5]. The Medical facilities administering the vaccine to end users will have their own interface where they will be able to create profiles for persons with clearance to scan the QR code on the thermal scanner thus then broadcasting update participants receipt of the vaccines. Clinics will be provided a dashboard where they can view the amount of vaccines allocated to them, the amount of vaccines in total circulation and end users booked for immunisation. In special cases regarding vaccines from Pfizer, clinics will also receive tailored reminders on replenishing the dry ice and information on how to store and access the vaccines.

3. Results

B-ID and end users

End users receiving the vaccine are able to book their appointments directly from the B-ID general user facing app. End users can also view their vaccine status, which vaccine has been administered to them and the amount of dosages received. End users that need to receive more than one dosage will receive push notifications reminding them of their second appointment which can be scheduled by the physician at the distribution clinic or, auto set depending on the parameters set out by the manufacturer. Once immunised, end users will receive an in-app digital immunisation certificate which then can be shared peer to peer or, with third party via QR code. End users will be capable of viewing who they shared their results with and revoke viewership access at any time.

Once immunised, end users will receive daily health check notifications regarding possible side effects from the vaccine. This information will be transmitted to POI update participants such as pharmaceutical manufactures, governments and administrating clinics for continuous health monitoring of immunised users.

3.1 Scaling B-ID post vaccinations

Trusted Traveler's programs and sharing with third party

End users who've receive their immunisation stamp, can use the results to share with Airlines, Cruise Lines, Hotels and other entities requiring POI. Bluestone intends to make available Application Programming Interfaces (APIs) that will allow airlines and other businesses to seamlessly accept immunisation results during the booking process. An initial targeted approach to known Trusted Traveler's Programs such as Global Entry, NEXUS, SENTRI and others are prime platforms that will benefit directly from such integration; truly creating new "Global Citizens".

Proof: Image 3A displays one of B-ID's core functionalities of screening health symptoms before testing. Notwithstanding the ability to book a test directly through B-ID, users can screen their symptoms daily before or after testing to keep a log of daily health statuses. Once users have received a vaccine as displayed by Image3B, they will be able to use the daily check up symptom checker to relay potential side post receiving the vaccine.

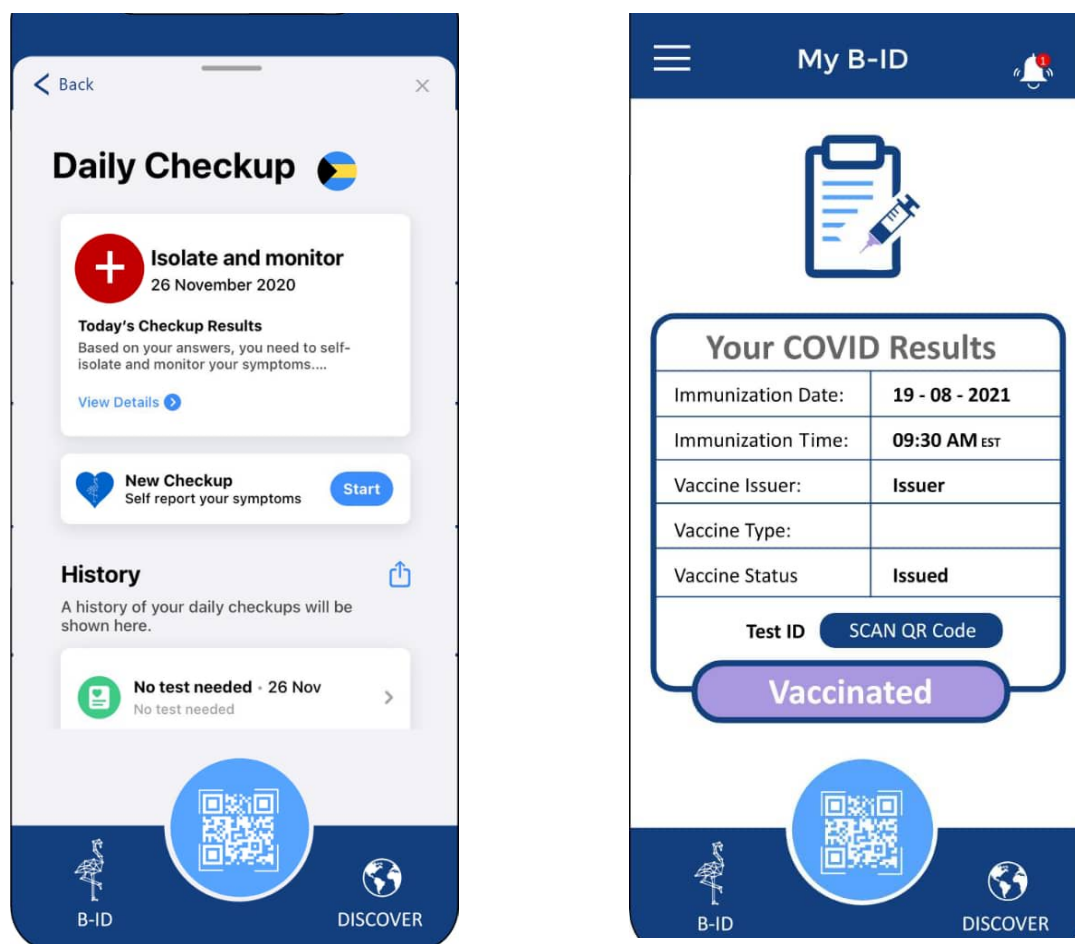


Image 3a; B-ID daily symptom checker 3b; B-ID COVID-19 successful results receipt

4. Conclusion:

As a result of the POI update, B-ID will become one of the most secure, trusted platforms to not only transmit the vaccine to supply chain stakeholders but also, securing the privacy of the end user's data.

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