

2020

Vaxtrac: A Digital Platform for Strong Vaccination Credentials



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ALLIED IDENTITY



SIGPA

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A glossary is found at the end for clarity.

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OVERVIEW

Vaxtrac, a Vaccination Management Credentialing, Validation & Tracking Platform, is designed to stop the spread of communicable diseases by improving the testing, vaccination, and credentialing process. This is done by enabling strong validation of the data, tracking movements of people (opt-in), and removing fraud from the system. The system makes exceedingly small changes to the healthcare workflows of testing and dispensing vaccinations and is designed for use in international travel producing significantly improved credentials. The benefits are realized by the issuing nation as well as their reciprocal partner nations.

Through the sophisticated use of secure silicon, big data, and cloud technology, the Vaxtrac Platform enables a real-time holistic view of population health around pathogen mechanisms. This data is critically important in measuring the efficacy of not just the vaccinations dispensed, but the effects of vector control against the backdrop of geographic realities and the movement of citizens. Problems such as COVID-19, SARS, and Zika are now a reality of the 21st century and this is the tool to help stop reinfections of stable populations.

Vaxtrac is based on NIST, ICAO, and HL7 standards and technology and IP from the founding corporations. Allied Identity, SICPA, Salamander Technologies, and ABCorp have built the modular Vaxtrac Platform to solve this multi-layered problem around vaccination data management.

Vaxtrac is designed to be backward compatible with most existing Electronic Health Record (EHR) systems and border crossing software installed today. The credentials use sophisticated blockchain signature technology to validate the data. The user is optionally tracked with the real-time Geographic Information System (GIS) from Salamander Technologies.

Benefits

- ▶ Vaxtrac ensures trust in the validity of a test or vaccination.
- ▶ Supports getting each country's economy back sooner and safer.
- ▶ Mitigates population risk from document fraud.
- ▶ Provides public health officials improved pathogen testing and vaccination data plus efficacy information. Policies can now be targeted based on real-time info with views of vaccinations and tests across disparate healthcare systems.
- ▶ Prevents super-spreader events with upgraded tools for border management.
- ▶ Reduces the potential spread of COVID-19 with better tools, lowering the mitigation costs e.g. quarantine expenses, advanced management of resources, etc.
- ▶ Increases throughput and speed of access points including cross-border traffic.
- ▶ Reduces liability for businesses with the ability to validate health credentials.
- ▶ Enables users to access their vaccination and test data everywhere with the MyVax App. Maintains visibility along with control of a family's vaccination and test records to carry them securely.
- ▶ Removes potential over-vaccination incidents.
- ▶ Increases revenue for pharma (which in turn, a portion can be spent on vaccination R&D).
- ▶ Vaxtrac travel documents are digitally bound to strong identities.

A 21ST CENTURY SOLUTION

Vaxtrac's overarching data architecture and workflows are modeled after the banking model of transaction management. The platform is composed of a series of scalable apps, servers, and cards. The *Travel and Vaccination Cards* securely communicate through the ISO 14443A standardized NFC interface. This interface is already present in today's installed hardware base.

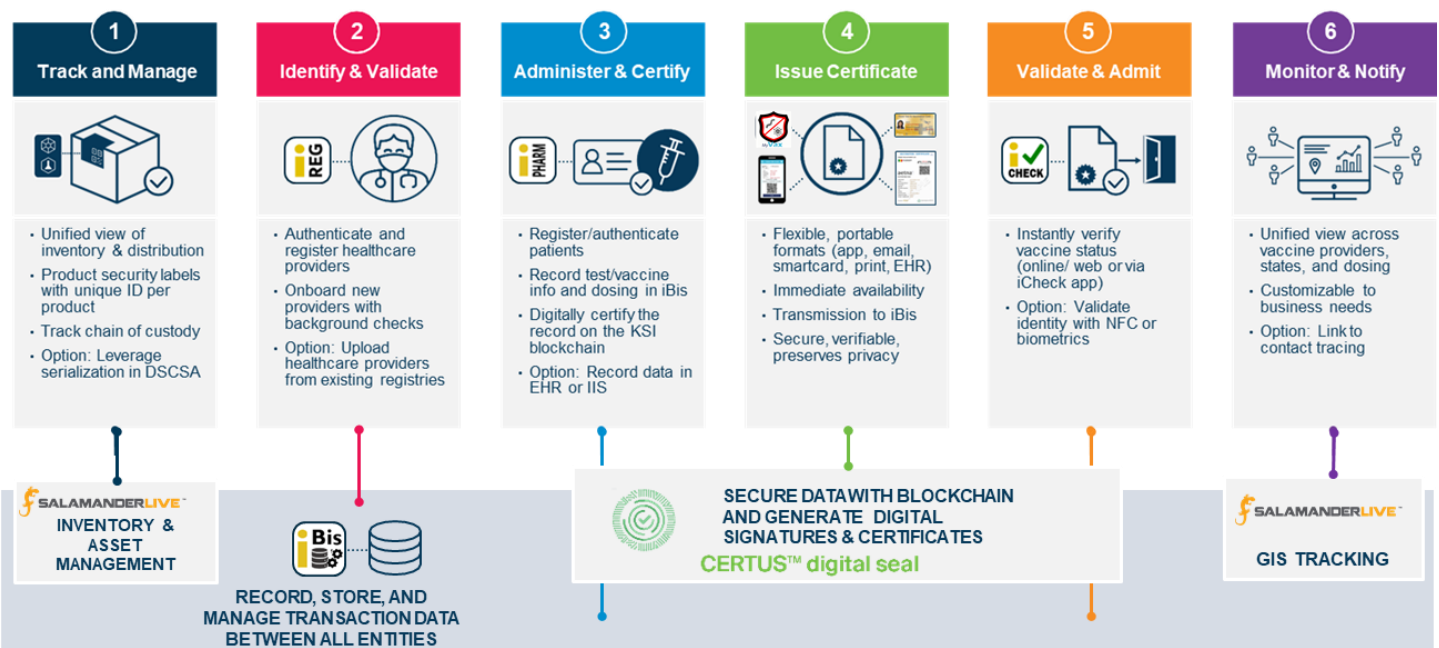
The heart of the system is a series of servers that are each optimized for their specific task and communicate through secured authenticated connections.

The complete model is based on the concept of Zero Trust. As defined by TechTarget:

“The zero trust model is a security model used by IT professionals that requires strict identity and device verification regardless of the user's location in relation to the network perimeter. The model is based on the assumption that all users, devices, and

transactions are already compromised, regardless of whether they're inside or outside of the firewall. By limiting which parties have privileged access to each segment of a network, or each machine in a secure organization, the number of opportunities for a hacker to gain access to secure content is greatly reduced. A network that implements the zero-trust model is referred to as a zero trust network.”

The primary server, iBis® from Allied Identity, runs on a RedHat/Centos operating system running a Postgres data engine which is optimized for transaction management. For a registry of over one million users, all requests are handled in under 0.4 seconds and can be optimized further with upgraded hardware. The SalamanderLive™ server is currently handling emergency responders from every state in the U.S. and the CERTUS™ Blockchain Server is the only certified blockchain transaction server for the EU.

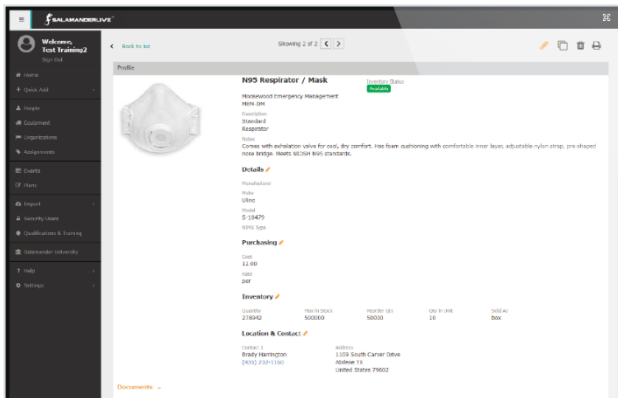


1) ASSET TRACKING

Asset tracking of vaccination and test assets requires a management tool that instills confidence that your assets are always accounted for.

The mature and proven asset tracking module implemented as part of the Vaxtrac Suite from Salamander Technologies enables management of your asset database from anywhere. SalamanderLive™ is currently deployed in every state in the U.S.

The system ensures that assets are issued, turned-in, and consumed with Salamander's interoperable INVENTORY APP. Assets are properly maintained and reported on from within the ASSET MANAGEMENT equipment database through SalamanderLive™.



Asset Import

Importing an existing equipment database is fast and easy with SalamanderLive™.

Reporting

Slice and dice your asset data however you need it: asset location, alert/maintenance status, physical scans, and more.

Asset Alerts

Set alerts as a reminder to complete tasks. Have specific employees subscribe to receive alerts to review any outstanding or overdue alerts in the

SalamanderLive™ dashboard. The module can mark alerts as completed in the event log.

Inventory App

Issue, return, and adjust assets within the INVENTORY APP to track the issuance and return of equipment as well as adjust on-the-fly. Know which people have been assigned assets and link the issuance of an asset to an event.

- Easily know where assets are at all times
- Associate issued equipment with an event
- Set up alerts to handle inspections, maintenance reminders, and view history in SalamanderLive™
- Easily update the status, quantity, image, and add comments on assets
- Run reports through SalamanderLive™

Inventory App from SalamanderLive™



SalamanderLive GIS platform

2) HEALTHCARE PROFESSIONAL (HCP) REGISTRATION AND VALIDATION

Many countries and states currently have HCP registries whereby most of the individuals within have been validated by a third-party/accreditation bureau.

Allied Identity has developed an App to supplement or replace, your current registration process, especially useful in today's pandemic based on the influx of volunteers and/or new help.

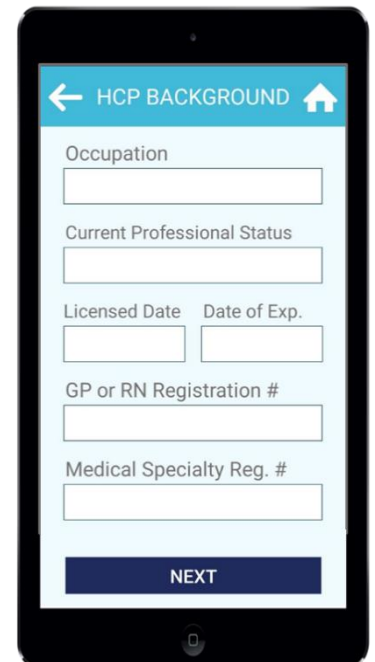
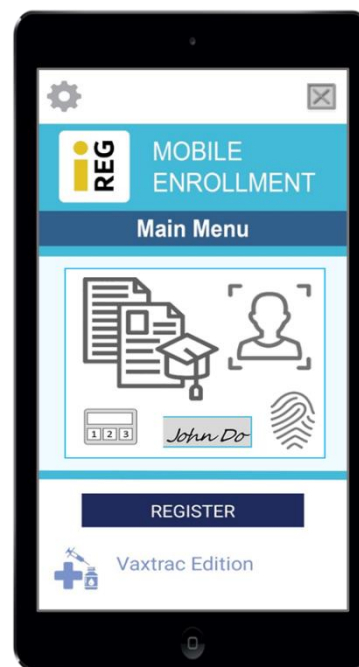
All travel and vaccination documents used globally require the signature of the person dispensing the test or vaccination. Many newer systems require biometrics including facial recognition and fingerprints as another validation vector.

The iReg mobile APP for Vaxtrac enables rapid acquisition of IDs from a mobile workforce, collecting a standardized data set required for most registries around the world.



The registry can provide any HR department an option to print employee badges after the third party/accreditation bureau has cleared the worker. The use of strong ID credentials can improve workflows and security.

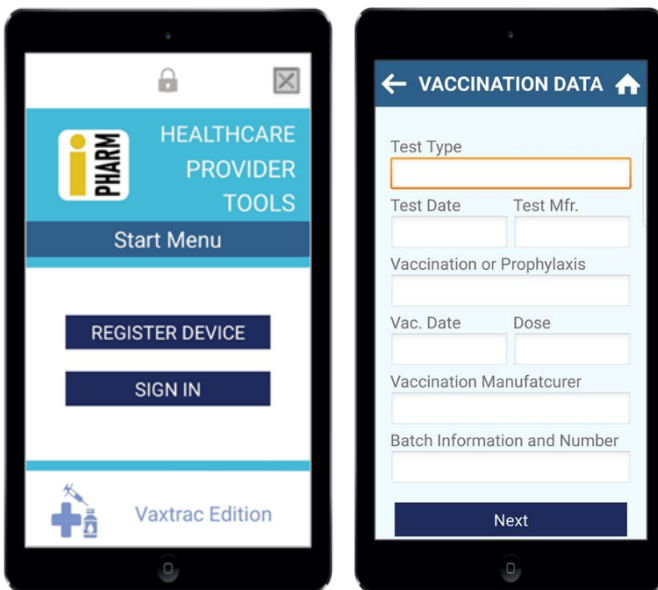
iReg for Vaxtrac



3) ADMINISTER AND CERTIFY

This step is to register individuals receiving the tests or vaccinations and record the subsequent dispensing of tests or vaccines. This is all accomplished effortlessly with the iPharm app, which is designed for fast, accurate workflows, starting with a registration of the device into the Zero Trust Network. After registration, any user tied to the healthcare provider's employment list can sign-in to the device by presenting their employee badge to the NFC reader on the back of the phone or tablet. If the employee does not have their badge, they simply select their provider from the list, enter their PIN and employee number, and are logged in.

iPharm App from Allied Identity

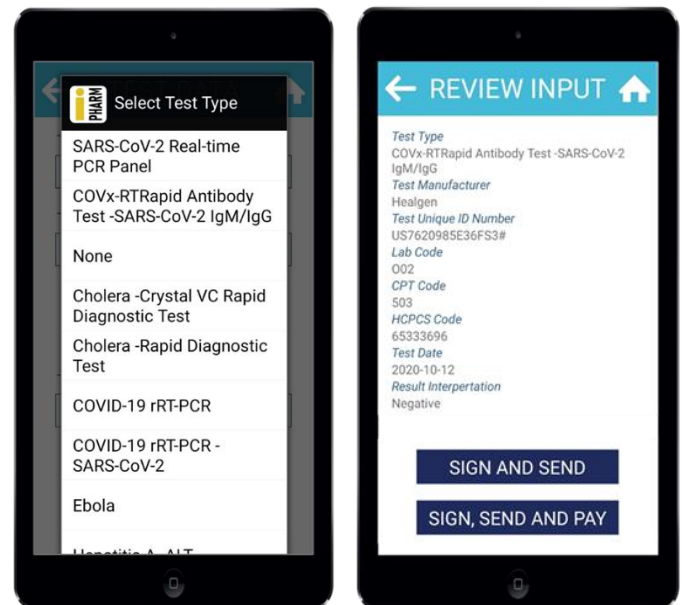


Registration

The registration of individuals is equally fast. The iPharm app can scan a national ID or a driver's license to populate the fields. Another option is web-based pre-enrollment that the user completes at their convenience. The pre-registration app generates a QR code which the individual presents and the system registers them in less than 2 minutes.

Dispensing

The administration of a test or dispensing of a vaccine is as quick as the registration of the healthcare worker. The vaccination and test fields are all pre-configured with pulldowns and the dates are set with a quick picker. This set-up lessens the load on the worker and guarantees data integrity, removing issues of unreliable transcriptions. After the transaction is recorded the healthcare worker is shown a summary screen to review before logging the transaction into the platform.



Dispensing

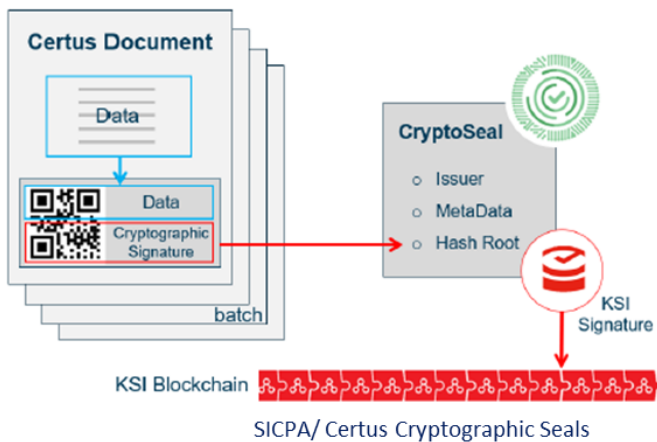
After the healthcare worker pushes the SIGN AND SEND button, the app securely connects to the iBis® and CERTUS® Servers generating a crypto seal from the KSI/CERTUS® Blockchain.

The transaction is now immutable and recorded with:

- Data Integrity
- Signing Time
- Signing Entity

The benefits of this technology compared to other PKI signing frameworks are that the CERTUS™ Crypto Seals:

- Signatures are independently verifiable by any 3rd party
- Do not expire, providing long-term forensic proof
- Overcome the technical limitation of other blockchain technologies (commitment time, scalability, etc.)



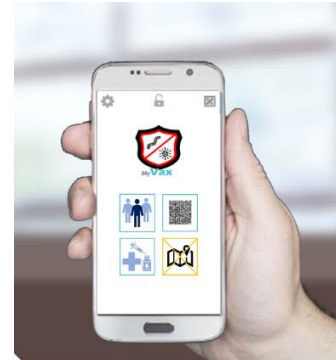
4) ISSUE CERTIFICATES

With the CERTUS™ Crypto Seal generated the platform creates a transaction certificate that is available in various formats including:

- 10-year life Travel Test and Vaccination Card
- PDF documents representing a single transaction
- MyVax app for carrying an individual or a family's test and vaccination records.



Secure Travel Cards from ABCorp



The MyVax app from Allied Identity has been designed for easy access to test and vaccination records with user-controlled security

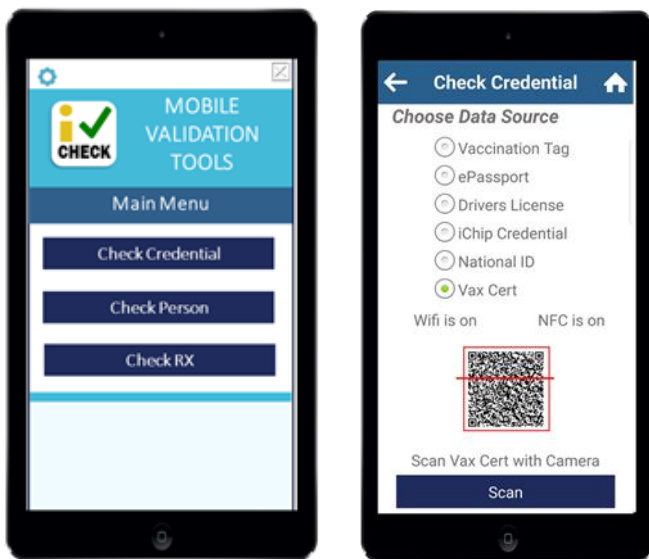
The platform ensures that this data is portable and not dependent on online systems for validation. Offline cached mode operations are designed into all Allied Identity apps, except for iReg for Vaxtrac which can capture megabytes of data per user making it unfeasible to store and forward large batches of registration data.

The Vaxtrac Platform provisions credentials that are bound to an identity from the start. The Travel Test and Vaccination Card is 100 percent ICAO 9303 compliant and readable with today's passport readers. This enables global views of which vaccinated passengers cross which borders without the problems and potential GDPR violations that come from advanced passenger screening systems.



5) VALIDATE & ADMIT

The process of inspecting and validating a credential or certificate is crucial in getting economies working again. By using the iCheck™ app or the CERTUS™ web-based validator, companies, and organizations that need to validate and admit persons into their facilities can do so with ease. The iCheck™ app can be modified for use in automating turnstiles as well as Windows-based systems.



Vaxtrac credentials and certificates offer more than a static validation of a test or vaccination because we use a unique immutable blockchain record to log the transaction. The certificate can also be revoked based on new science or warnings around a test or vaccination. This active management of records is communicated to the user with a variety of options. Direct SMS, email, or notifications to the MyVax app.

Strong Identity

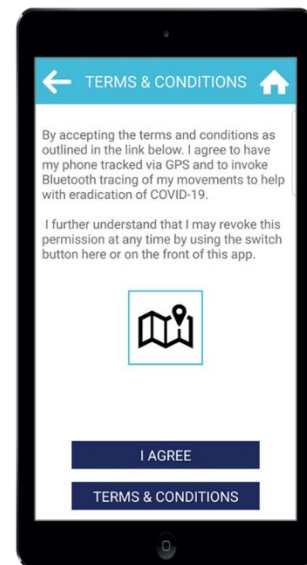
Absolute identity of the credential holder is provided in the permanent Vaxtrac credentials e.g. MyVax or the Travel Test and Vaccination Card. This identity is based on a previously vetted credential that is bound to the Vaxtrac credential such as a National ID or a Drivers' License. Other available options include the use of one or more biometric modalities that can be

set to control access to the data. The authenticity of the Vaxtrac credential is electronically signed and can be validated back to the source.

The Vaxtrac system is based on validated, recorded transactions signed by the issuer. This information is 3rd party certified. And there is complete adherence to the current infrastructure for cross border security with a usable ICAO compliant Machine-Readable Travel Document (MRTD) that is required for cross border travel in many countries.

6) MONITOR AND NOTIFICATION

Tracking and tracing of infected individuals can be strengthened when users opt in to tracing through the MyVax app.



Besides using the GIS component of Salamander Technologies, the app can be modified to utilize the open-source Bluetooth LE tools from Google and Apple. MyVax can also be tied to a Country or State/Province track and trace system e.g. MITRE's Sara Alert.

CONCLUSION

The Vaxtrac team has built a scalable, easy to implement, end-to-end solution that provides validated accessible data to all stakeholders.

It provides for user-controlled vaccination and test records that will assist in the short- and long-term management of pathogen control.

The system offers a wide variety of fraud-proof certificate types that do not require a population to have a cell phone to prove immunity and will work with current immigration and cross-border infrastructure and environments.

The system can help ensure the health of populations and economies alike without dependencies on legacy systems that may prove an impediment to success.

REFERENCES

TechTarget is a web-based publication that focuses on Healthcare IT.

GLOSSARY

Term	Definition
CentOS	CentOS is a Linux distribution that provides a free, community-supported computing platform functionally compatible with its upstream source, Red Hat Enterprise Linux
EHR	Electronic Health Record
GIS Tracking	A geographic information system is a framework that provides the ability to capture and analyze spatial and geographic data
HL7	Health Level Seven International is a set of standards, formats and definitions for exchanging and developing electronic health records
iBis	Integrated Biometric and Biographic Information System
ICAO 9303	International Civil Aviation Organization

ICD	International Statistical Classification of Diseases and Related Health Problems. The current working version is the 9th Revision.
iCheck	An Allied Identity app that allows you to validate vaccination data
iPharm	An Allied Identity app that manages the administration of vaccines and recipients
iReg	An Allied Identity app that on-boards healthcare workers into the Vaxtrac system
ISO14443a	An international organization and standard that defines contactless communication
MRTD	Machine Readable Travel Document as defined by ICAO for passports and travel cards
NFC	Near Field Communication - Contactless operation of cards and other devices
NIST	US National Institute of Standards and Technology
RedHat	Red Hat, Inc. is an American multinational software company that provides open source software products to enterprises

ABOUT THE COALITION

ABC Corp's roots trace back to American Banknote, a global and trusted provider



of secure products and solutions. The company's history is almost as old as America itself, dating back to 1795 when the recently established Bank of the United States called upon them with a critical mission: create a counterfeit-resistant currency for our young nation. American Banknote Corporation has grown into a global organization, employing people throughout the world. Their operations are across the Americas, Australasia, Europe, and Africa.

SICPA is a trusted security provider and adviser to governments, security banks, high-security printers, and industry – providing secured identification, traceability, and authentication materials and services. Every day, governments, companies, and millions of people rely on them to protect the integrity and value of their currency, personal identity, products, and brands. They are based in Switzerland and have 33 offices worldwide.



Salamander Technologies provides businesses, organizations, and emergency management agencies with the tools they need to manage small and large events as well as a day-to-day activity. Their platform & data suite offers unrivaled situational awareness, providing a common operational picture for everyone involved. Salamander combines three key functions into one integrated solution: TAG, TRACK, & REPORT. These



real-time resources can be made available at the scene from anywhere in the world. Salamander links physical with digital, providing information to assure everyone and all assets are accounted for. Deployed in every state in the US, over 1.1 million first responders and public health persons are on the system spanning 28 thousand Federal, State, Emergency services, and Health agencies. All of these are currently running on the Salamander Platform.

Built on decades of experience from our senior management, Allied Identity was founded to address the rapidly accelerating need for absolute identity in new and unique ways. The company was established with a



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mixture of existing technologies from our roots and brands that have been licensed from OrangeHook Corporation and additional, complementary companies and services. These include identity management, featuring the hyper-secure iBis integrated biometric and biographic data engine and the iChip® credential Operating System, plus a series of customizable mobile apps to facilitate highly scalable identity and validation deployments with our cloud SaaS business model.

The Allied Identity name reflects our principle approach, to take the best of people, ideas, and organizations and apply them to a singular focus of improving lives through absolute identity. We are both a software and hardware company that delivers our solutions across multiple computing environments with multiple technical partnerships.

Our vision is to make governments and other healthcare participants smarter by ensuring absolute identity, and by enabling transactions and data holistically and in real-time. This improves the efficiency of governments, quality of care, saves lives, and reduces costs.