Case Study:
Kiva launches Africa’s first national decentralized ID system with Hyperledger Indy

Kiva
- Global non-profit founded in 2005 in San Francisco
- Uses crowd-funding to finance micro-loans
- Has facilitated $1.5+ billion in loans in 90+ countries
- Loan repayment rate of 95.7%

Goals
- Make it easy for the unbanked to get digital ID
- Let the informal sector share credit history with banks
- Help the unbanked open bank accounts and get loans

Approach
1. Solve a two-sided problem: ID and data
2. Find the gaps in the process
3. Work with stakeholders to build a network
4. Choose a platform for fast, cheap and secure ID exchange
5. Involve local communities in a test project

Results
- Africa’s first decentralized national ID system went live in 2019
- After Sierra Leone, will roll out to other countries
- eKYC can verify a customer ID in 5 seconds
- System requires only a thumbprint and national ID number
Around the world, 1.7 billion adults don’t have access to financial services—not even a basic savings account.¹

For the 1.7 billion unbanked adults around the world, access to financial services is extremely limited. Without even a basic savings account, economic opportunity is often limited to informal offerings such as local shopkeepers who extend credit to their customers, microfinance institutions that work to serve the last mile, and community savings and credit associations that are setup by individuals living in the same village.

There is vibrant economic activity in this informal sector: people start businesses, save for their children’s education and health emergencies, and are typically just as credit-worthy as customers that an urban financial institution serves. Unfortunately, this informal-sector economic activity usually does not propagate into the formal financial sector. When a small business owner who has a perfect credit history in the informal sector over her 10 years in business approaches a formal financial institution for the first time, hoping to secure a larger and cheaper facility to grow her family business, she is treated the same as a customer with zero credit history.

This data incompatibility between the informal and formal sector keeps vulnerable populations and low-income families trapped in a cycle of poverty.

While this is the state of the world today, it does not have to be our future. Kiva, a US-based nonprofit organization focused on financial inclusion, has built Kiva Protocol to help enable universal financial access. In 2019, Sierra Leone, a West African nation of about 7 million, launched the National Digital Identity Platform (NDIP) that used Kiva Protocol to enable fast, cheap, and secure identity verification for its citizens.

Kiva Protocol is built using Hyperledger Indy, Aries, and Ursa, and as implemented in Sierra Leone allows citizens to perform electronic Know Your Customer (eKYC) verifications in about 11 seconds, using just their national ID number and a fingerprint. With this verification, it is possible for the nation’s unbanked to open a savings account and move into the formally banked population.
Identity: the atomic unit of financial inclusion

Globally, there is a perception that unbanked populations are higher risk than banked populations when it comes to lending or even financial sector stability. From Kiva’s 15-year history lending US$1.5 billion in the un- and under-banked markets, they have found borrower default rates to be approximately 2% – nearly identical to US credit card default rates.

In the unbanked world, individuals borrow a few hundred to a few thousand dollars at a time, paying back over a relatively short time frame of 12-18 months. But despite excellent credit records, they are unable to receive even similar credit facilities at local banks. This is because the data from their informal transactions is essentially invisible: the banks either do not trust the data sources, or are otherwise unable to verify the provenance of the data.

“If we could enable verifiable data for unbanked populations, we’d be able to attract formal institutions to this market. We could set up a system that’s inclusive by design. And it all starts with verifiable digital identity.”
— Matthew Davie, Chief Strategy Officer, Kiva

In order to bridge the data disconnect, informal-sector data must be made available, interoperable, and verifiable to the formal sector.

Solving this challenge is not possible without solving for verifiable identity: financial institutions need to ensure they are seeing the complete set of financial history for the person they are considering transacting with. Without verifiable identity, it is not possible to ensure verifiable, complete, unique data sets for individuals, whether for credit history or any other use case.

“If we could enable verifiable data for unbanked populations, we’d be able to solve the data challenge and attract formal institutions to this market,” says Matthew Davie, Chief Strategy Officer at Kiva. “We could set up a system that’s inclusive by design. And it all starts with verifiable digital identity.”

Finding the gaps in the process

Around the world, financial institutions must perform electronic Know Your Customers (eKYC) checks to ensure their customers are who they say they are. This important identity verification is what enables all forms of compliance and consumer protection that are endemic to the regulated financial sector.
An eKYC check involves reviewing identity documentation and verifying that it’s authentic. In developed countries like the United States, this typically doesn’t take too long. But in the developing world, where there’s typically less infrastructure in place, the process can take much longer – sometimes even weeks. To complicate things further, many unbanked people don’t have access to the requisite ID documentation in the first place.

Imagine living in a remote village and for once having some extra money you want to put away as savings in a bank account.

If you possess the necessary ID documentation, you can walk three miles to the bank, provide them the documentation, and have the branch manager copy and/or scan your documents to send to headquarters. Then you have to wait days or often weeks for the KYC verification to complete, at which point you can walk the three miles to the bank again, open the account, and deposit the money.

For poor and vulnerable populations, the opportunity to possess extra cash that can become long-term or emergency savings is rare. In the days or weeks waiting for account opening, the cash may well be spent. Lack of on-demand banking services perpetuates a cycle of lower savings, less stable family and community economics, and poverty for these populations.

For hundreds of millions of people around the world, there’s a simple mapping:

No verifiable identity ➔ no verifiable financial history ➔ less opportunity to escape poverty.

“We need to eliminate paper documentation as much as possible,” says Davie. “And we need to make the KYC verification process fast, cheap, and secure for everyone.”

“We need to eliminate paper documentation as much as possible. And we need to make the KYC verification process fast, cheap, and secure for everyone.”

— Matthew Davie, Chief Strategy Officer, Kiva
Working with stakeholders to build a network

“The best way to overcome a multifaceted challenge like this is to convene the necessary stakeholders, align on the problem and desired outcome, and then build a solution together,” says Davie.

In considering the problem, Kiva deemed it necessary to look at national-scale systems and processes in order to solve the identity challenge for financial inclusion. The identity credentials used for KYC verification tend to be issued by the public sector and used by financial institutions in the private sector for account opening and customer due diligence. A public-private partnership model was developed to meet regulatory frameworks, consumer protection standards, and governance requirements at national scale, all while enabling population-scale financial inclusion efforts.

After reviewing its portfolio of 94 countries where it had direct experience with in-country micro-finance, Kiva found Sierra Leone as the best partner for its first implementation of Kiva Protocol. The country is one of the least developed in the world, and 80% of its citizens are unbanked.

But, importantly, there was stakeholder alignment in working towards national-scale inclusion efforts as well as positive recent developments. The Government of Sierra Leone (GoSL) had already worked to register its population for national identity cards. The country’s National Civil Registration Authority (NCRA) launched an ID registration process in 2017, which at by 2018 had achieved near-universal adult citizen coverage.

Kiva worked with the GoSL, the NCRA, the Bank of Sierra Leone (BSL), the United Nations Capital Development Fund and the United Nations Development Programme to create the National Digital Identity Platform (NDIP). The NDIP enables both formal and informal institutions to verify a customer’s national identity credentials using decentralized identity wallets.

Throughout the process, Kiva engaged government agencies, regulators, private companies, technical assistance providers, and target customers in Sierra Leone. This collaborative approach encouraged both the informal and formal sectors to join the network to use the NDIP to provide eKYC services to their new and existing customers.
Choosing a platform for fast, cheap, and secure ID credential exchange

When initially developing the concept and infrastructure for Kiva Protocol, the team at Kiva had a long list of priorities to consider:

- it must be fast, cheap, and secure;
- it must be interoperable with other systems;
- it must be enterprise-grade in order to achieve public-sector buy-in;
- it must enable integration by both informal and formal financial service providers; and
- it must be open source to eliminate vendor lock.

To find the right platform, Kiva assessed more than 20 software stacks, both centralized and decentralized. Blockchain and decentralized ledger technologies quickly emerged as good solutions for the developing world as they enable data provenance at the protocol level and stakeholders can act relatively independently to enable their various activities in the formal and informal sectors.

After deep consideration, Kiva decided to use Hyperledger’s stack for identity: Indy, Aries, Ursa. While all three projects are closely related, each has a distinct mandate:

- Hyperledger Indy is a distributed ledger purpose-built for decentralized ID with transferable, private, and secure credentials;
- Hyperledger Aries is infrastructure that supports interactions between peers and between blockchains and other DLTs; and
- Hyperledger Ursa is a modular, flexible library that enables developers to share time-tested and secure cryptography.

“We chose Hyperledger for a variety of reasons including open source technology, the identity-specific nature of Hyperledger Indy, and the community, which aligns well with Kiva’s values,” says Davie.

“Hyperledger Indy is by far the best open source decentralized identity platform out there,” says Davie. A 7 node Hyperledger Indy network is deployed in a distributed cloud environment. As it is often with new networks, there aren’t many organizations issuing credentials or depending on the data flows. The current system doesn’t need to be diffused amongst multiple organizations. As the system matures and adds issuers from other countries more departments and ministries will become involved in operating nodes.

Kiva Protocol integrates with the legacy IT of financial institutions, the databases of the civil ID agency, and the user-facing applications for digital financial services. There isn’t a lot
to say about that part of the system at this point. I expect we will have more to say there as the system moves adds issuers from other countries and more departments/ministries become involved in operating nodes.

One of Kiva’s goals is to hand off operation of the system to local IT firms. Empowering locals to manage Kiva Protocol will build resilience, rather than further reliance on international aid. Kiva is confident that local firms will get the support they need not just from Kiva, but also from Hyperledger’s open source community.

“Hyperledger Indy is by far the best open source decentralized identity platform out there. And the Hyperledger community aligns well with Kiva’s values.”
— Matthew Davie, Chief Strategy Officer, Kiva

Involving local communities in a test project

In January 2019, Kiva deployed a team to Freetown, the country’s capital and largest city.

From the beginning, Sierra Leone President Julius Maada Bio was enthusiastic about the project. The system is interoperable with legacy systems in that country, so the government did not have to invest in a new software stack, but could instead just focus on solving the challenge at hand: KYC verification for account opening.

In August 2019, Kiva launched the beta of Kiva Protocol with a public event opened by the president.

“I announce with pride that this is Africa’s first blockchain and decentralized national digital ID system,” said President Bio.

“Kiva Protocol is Africa’s first blockchain and decentralized national identity system.”
— Julius Maada Bio, President, Sierra Leona
During the event, Nancy Gbamoi from Port Loko took the stage to tell her story.

A single mother supporting an extended family of over 20 people, Gbamoi wanted to grow her business. But since she lacked formal ID documentation, she couldn’t open a bank account or apply for loans at her local bank.

Gbamoi then demonstrated how easy it is to use Kiva Protocol to verify ID through an eKYC process. What used to take two weeks now takes less than 11 seconds, and can be done with only a national ID number and a fingerprint.

Nancy is hopeful she can now get financing to start a business and build her family’s security.

“With my fingerprint, I will have access to loans,” says Gbamoi, “So I’m happy, because my fingerprints are always with me.”

“The live eKYC check requires only a national identity number and a fingerprint,” says Schan Duff, Vice President of Strategy at Kiva, while on stage with Nancy in Freetown for the event.

Expanding coverage to drive more inclusion

Since the launch of Kiva Protocol, Davie says global regulators have made significant progress in terms of how they are considering digital identity and eKYC verifications. He sees a global movement towards user-owned and -controlled data, better privacy, and more universal access.

This increasing demand for fast, cheap, and secure ID systems at scale aligns perfectly with the core thesis behind Kiva Protocol.

As of today, Kiva is focusing on building additional ecosystem applications and services to make it easier for all stakeholders to access and use Kiva Protocol. Much of this is being contributed upstream into the Hyperledger Indy and Aires projects, with the remaining components hosted in Kiva’s repository.
As well as supporting financial inclusion, Kiva spends time thinking about how to enable other sectors that rely on verifiable identity and are urgent for vulnerable populations, including education, health care, employment, housing, and social protection programs.

All of these can benefit from the fast, cheap, and secure foundation of digital ID that Kiva Protocol enables. Now Kiva is working to bring the system for financial inclusion that’s been showcased in Sierra Leone – using Hyperledger as its foundation – other countries.
Kiva launches Africa’s first national decentralized ID system with Hyperledger Indy

About Kiva

Kiva is a non-profit organization focused on expanding financial access for underserved populations around the world. Since 2005, Kiva has facilitated more than $1.5 billion in lending across 94 countries. Using kiva.org, lenders can help borrowers start or grow a business, providing them opportunity where there is often little. Kiva also works to address systemic issues that keep communities from accessing the financial services they need, through projects like Kiva Protocol.

Learn more about Kiva at kiva.global.

About Hyperledger

Hyperledger is an open source effort created to advance cross-industry blockchain technologies. It is a global collaboration including leaders in banking, finance, Internet of Things, manufacturing, supply chains, and technology. The Linux Foundation, the nonprofit organization enabling mass innovation through open source, hosts Hyperledger. The Linux Foundation also enables a worldwide developer community to work together and share ideas, infrastructure, and code. To learn more, visit https://www.hyperledger.org/