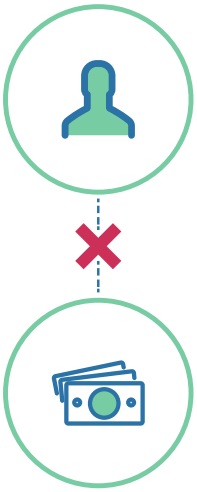
Kora: An infrastructure for inclusive, community-owned financial systems

Abstract

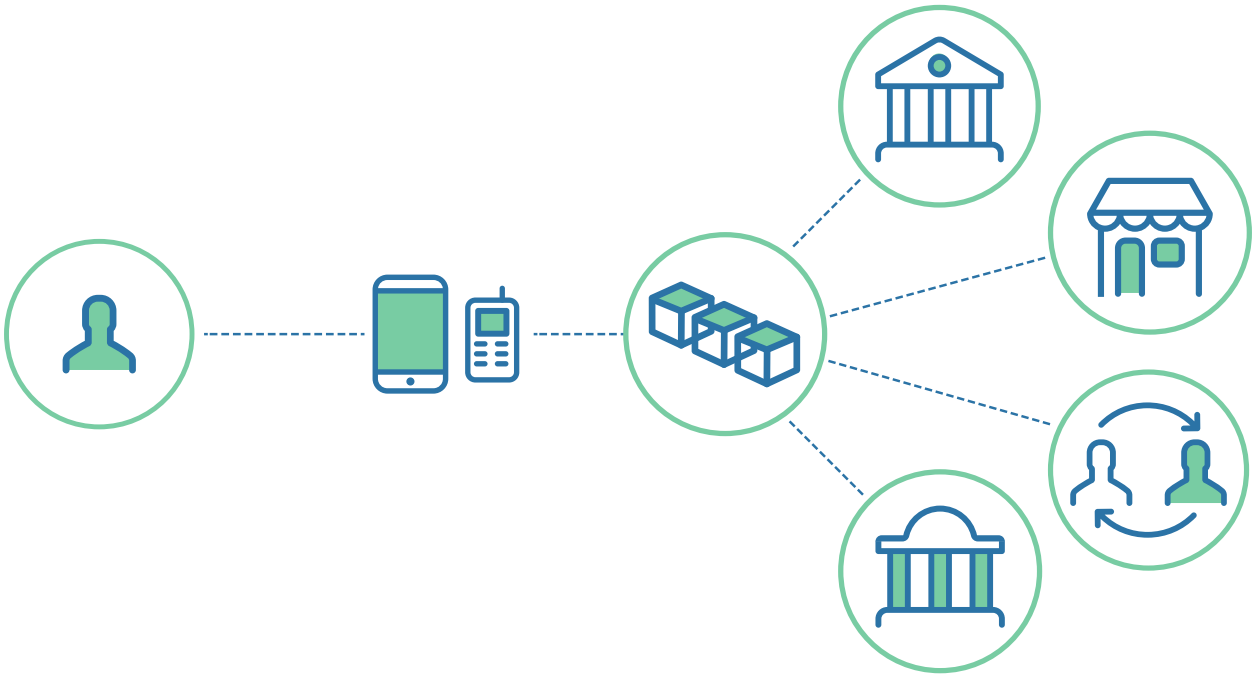
Kora is a popular musical instrument in the Western/Eastern region of Africa frequently played in songs of celebration or to pass a message of hope: www.youtube.com/watch?v=KYmL6kI0wkQ



Kora is a project of hope for billions of people who are underserved by the current financial system and are burdened by expensive and inconvenient access to financial services. They are excluded from better solutions due to high costs, lack of proper identity, poor access to banking locations, and mistrust or poor understanding of the banking system. Furthermore, many existing platforms have limited penetration due to reasons such as lack of access to infrastructure like electricity, expensive access to Internet, insufficient capital to afford a smartphone and a steep learning curve.

At Kora, we believe that technology should empower instead of displace existing communities and networks in order to reach the understanding and trust needed for massive adoption.

The Kora Network is built on four layers of infrastructure to provide a low cost, universal access financial services platform accessible via SMS/USSD on feature phones, or with internet access via mobile app, enabled by blockchain technology. This helps communities build self-sustaining, community-owned financial services ecosystems. By drastically reducing the cost and time required to provide financial services, and drawing a diverse set of stakeholders into an interoperable network, it unlocks the Long Tail of the global economy, benefiting populations most in need and enriching the global economy by unlocking the capital, intellect, and creativity of the underserved.



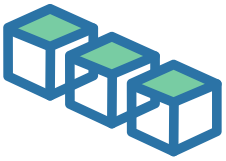
Problem

Financial services have been proven to help grow wealth. Unfortunately, for much of the world access is uneven and expensive. In many places formal banking is seen as something exclusively for the wealthy. Banks require high minimums and fees for opening and maintaining accounts. Due to the cost to serve and inability to prove identity, many financial institutions don't open branches in remote or low-income areas, requiring people to travel for hours to transfer money. People that own and utilize property but don't have a trusted record to prove it are unable to use it as collateral for loans, turning it into “dead capital”. This exclusion of billions of people from growing and accumulating their capital has disproportionately increased the gap between the rich and the poor, leading to constant agitation in various regions, social instability and indirectly causing political instability. This is both a humanitarian crisis and an economic crisis as a third of the world's potential for value creation is ostracized.

There are many groups working on this challenge, and each bring their own approach to the table while experiencing some shortfalls:
Banks have historically provided these services, and continue to account for the majority of financial services worldwide. However, the high cost to serve, low profitability, and lack of identity of the underserved makes them an unattractive market segment for traditional banks. As a result many banks choose to focus on market segments that already have some degree of wealth.

Local ad hoc networks have existed for centuries. People borrow from friends and family, ask others or hawalas to transmit money, and buy commodities as a more stable store of wealth when currency prices fluctuate. These ad hoc arrangements fill in gaps in day-to-day life, but can prove brittle, are unable to scale, and cannot be used as a form of credit history.

Mobile money businesses provide an excellent service and bring great value to people, but have struggled to expand past national borders due to being based on a single fiat currency. Additionally, they hoard data as a proprietary advantage instead of giving ownership back to the customer..



A number of **blockchain projects** have proven their ability to store and transmit value across national borders at enormous scale and low cost, but require a sophisticated understanding of the technology, access to smartphones and internet access. For an average unbanked person living on less than $2 a day, the requirement for a $50 smartphone, internet data at $10 per month and electric bills to keep the phone charged regularly (especially in areas with inconsistent infrastructure) are out of their scope.

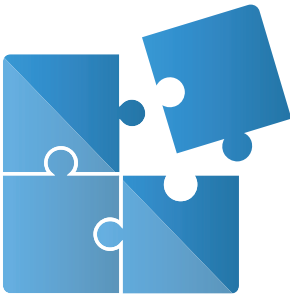
By learning from the past, we can build a better future. Summarizing the above, the components required for widescale, critical mass, sustainable adoption are:

Low cost:

Oftentimes the people with the least wealth are those who need financial services the most. No one should be excluded from the Kora Network because of their level of wealth.

Universal access:

Requiring a user, merchant, or agent to have internet access, a smartphone, or have a sophisticated understanding of technology or finance is a barrier that is implicitly tied to wealth. Everyone should be able to benefit from the Kora Network even if they don't have internet access or extensive education.



Engaging with existing communities:

Financial services providers have always existed within communities to provide much needed services. The Kora Network enables these providers and networks instead of replacing them.

The Kora Network pulls together multiple existing solutions along these principles to provide financial inclusion while avoiding many of the shortfalls previous attempts have faced.

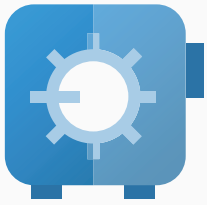
Building Blocks for Inclusive Financial Systems

The Kora Network is a public blockchain that provides the tools needed to build a self-sustaining, community-owned ecosystem for circulating and accumulating capital within a community. “Self-sustaining” is defined as the wealth in both the community as a whole and the majority of the community increasing, while “community-owned” is defined as the community itself providing most of the key roles when circulating capital. This includes the ability to validate identity, and to use that identity to store, transfer, or lend money, make payments, and to provide or access value-added services like lending, marketplaces, benefit distribution and digital education, even without internet access or a smartphone. Value is transferred electronically via the blockchain, and if needed, is converted from electronic to fiat through local agents. This builds a transaction or service history and proof of informal funds through friends and family that can be used to obtain loans from the Kora Foundation or 3rd party lending services connected to the Kora Network.

We are starting with four basic building blocks that to construct a fully functional financial systems:

IDENTITY:

Letting a user prove they are who they are, and that they did what they say they did.



SECURE STORAGE:

Letting a user protect their funds from being easily stolen or devalued.

MONEY TRANSFER:

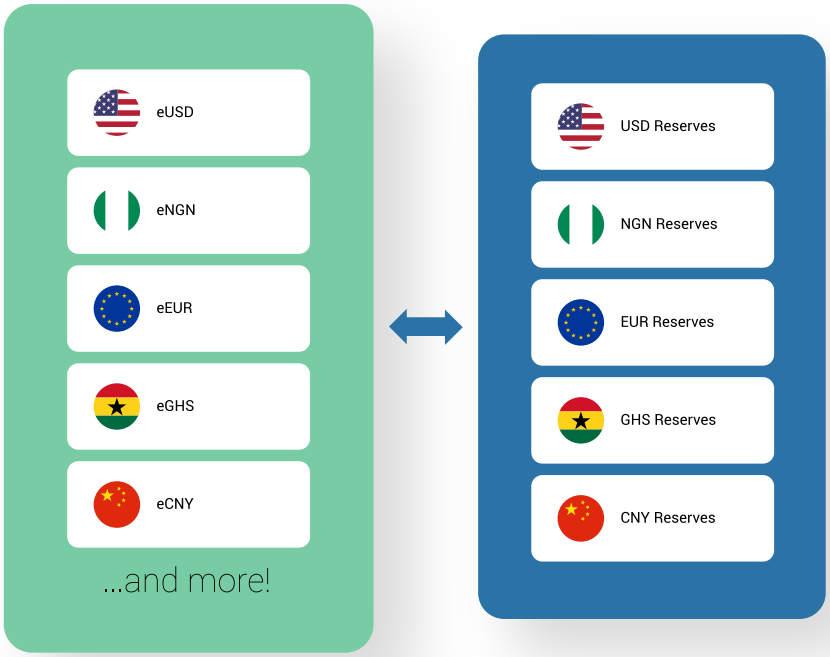
Transferring value from one entity to another, quickly and securely.

MARKETPLACES:

Creating venues for users to exchange money for goods, services and capital.

Kora is providing an equal opportunity for **everyone** to share in and contribute to the enormous wealth that is created globally by lowering the barrier to access by drastically reducing the cost to serve, and by helping individuals retain more of the value they create through radical transparency and access to financial services options.

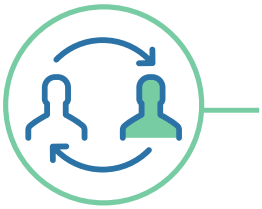
Anyone will be able to join the Kora Network as a **User**, and will be able to access all services available on the Network, as well as every other participant on the Network. However, certain Users may be unable to or simply prefer not to directly access the Network. Reasons for this vary from not having Internet access, to preferring not to have to run a full node or hold the native cryptocurrency needed for operations on the Network. Additionally, all users will still have to comply with the regulatory framework in their country of residence. For these use cases, we propose a role known as a **Provider**, who provides access to financial services on the Network, and is responsible for regulatory requirements. Providers can include both full-service banks and non-bank financial services providers, such as Mobile Money Operators or Money Transfer Operators.



The Kora Network will have a native cryptocurrency known as Kora Network Token (KNT), as well as the ability to support national currencies as an electronic, cryptographically secure token (eFiat). **The expectation is that most financial activity between users will be in eFiat instead of a decentralized cryptocurrency.** The reasoning is that many users, especially in rural areas, have a lower comfort level and greater mistrust of digital technology. This extends to digital currencies like Bitcoin. eFiat enables users to harness the benefits of digital currency while leveraging the trust people have in fiat currencies, dramatically increasing ease of use and therefore adoption. Additionally, using digital national digital currency will give greater clarity into the regulatory frameworks within which each financial system should be developed.

Providers on the Kora Network can issue branded tokens that are redeemable on a 1:1 basis for fiat currency from the Provider's reserves. Each participant in the network can choose which tokens they will accept. Credit risk for accepting these tokens, which are essentially IOUs backed by the provider, can be assessed on an individual basis. Providers can choose to regularly publish audits of their reserves, build their reputation by demonstrating continued solvency, or even cryptographically prove solvency by proving ownership of cryptocurrency reserves on other blockchains, with the assumption that these would increase confidence in their solvency and therefore adoption.

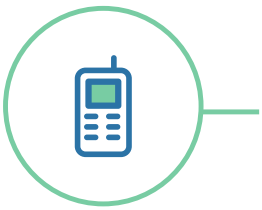
The use of eFiat helps us solve one of the biggest issues with money transfer: the "cash-in/cash-out" problem, or CICO. To provide a functioning service, money transfer operators need to ensure there is enough liquidity for users on either ends of the transaction. However, when there are significantly more users looking to be cashed-out than cashed-in, cash reserves at the cash-out point will eventually run down. The existing solution is to resolve this with a dedicated supply chain of cash. This incurs a significant overhead that is eventually passed on to the customer in the form of higher rates, as well as risk of robbery.



We introduce the role of an **Agent**, who are Users who choose to convert between eFiat and physical cash for a commission. Agents mirror an existing role in many financial networks of a "cash-out point", which is frequently a small business that continuously accumulates physical cash, such as a gas station or convenience store. In order to close the loop and make accumulating eFiat worthwhile to Agents, we increase the interoperability of eFiat through **Merchants**, which are simply other businesses that accept eFiat as a payment method. By introducing eFiat and a decentralized method of conversion between eFiat and cash, we solve the CICO problem by allowing physical cash to be continuously reused in the local community, while also providing the benefits of digital currency.

Universal Access and Identity

Considering Africa only, the 2017 Mobile Africa Study found an 80% penetration rate for mobile access, and 18% for internet access, with most internet traffic coming from smartphones.
Feature phones and SMS are still the dominant means of communication in most regions where the unbanked are domiciled due to their affordability and wide availability. They're also easy to operate, with simple interfaces, modest charging requirements, robust durability and long battery life. Furthermore, introducing financial services in a way that the unbanked are accustomed to will help overcome the initial mistrust that comes from a new solution and drive adoption.



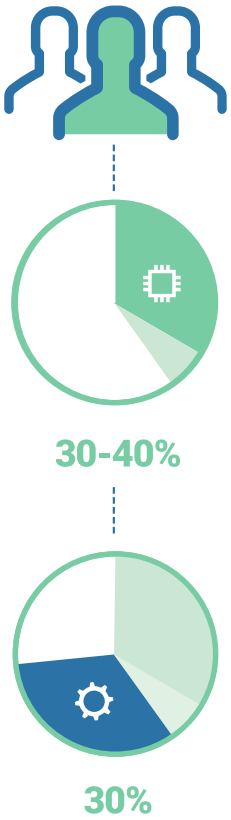
Kora will provide financial services on the cheapest $5 feature phones. Users access the service either through **texting a number maintained by Kora Network via SMS or inputting a shortcode and using USSD**. The user's transaction history is stored on the blockchain, and is consistent and accessible even if the user later upgrades to a smartphone. Kora also provides a smartphone app and a web application with greater functionality.

Historically, "thin-file" users who are unable to provide documentation to verify their activities have found identity to be a significant barrier to entry. Kora provides a hybrid on-boarding process on a tiered KYC ramp that allows users to join the network with whatever information they have, whether through government ID, referrals, biometrics or a combination. The user's transaction limits and access will increase as they add more documentation and prove themselves to be honest and credible actors. Each user will either need to connect their identity with a government-issued ID, or will need to be referred by a user who's already on the system. Each user will have a reputation score that is connected to their actions on the network, as well as the actions of the users they're connected to, including ones they transact with.

The actual "identity" of users in the sense of a unique identifier used to sign transactions committed by the user draws on the model pioneered by **uPort**, and is deployed as a set of proxy and model controllers. The proxy is used to receive attestations and sign transactions, and is essentially the user's **uPort** identity. The user sends transactions to the controller, which validates and forwards valid transactions to the proxy. In this way only the controller can be compromised - and even if it is, it can be recovered with a quorum of users. Keys to the controller contract are stored directly on the device if the user has a smartphone, and are split between the user and the Provider through Shamir's Secret Sharing if the user is using a feature phone.

Minimizing Cost and Radical Transparency

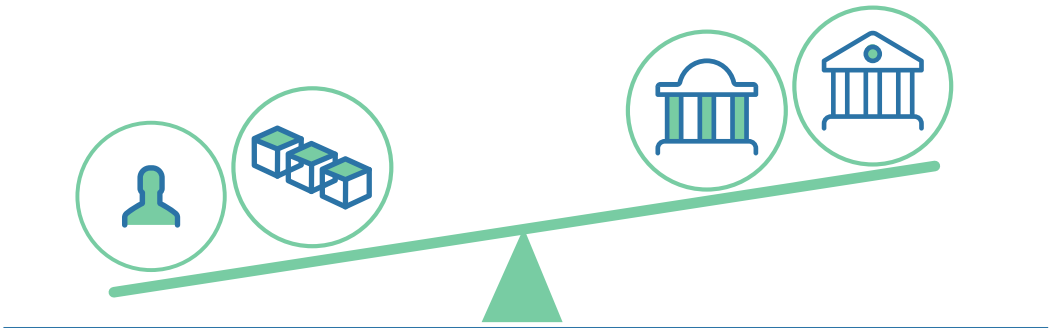
The Kora Network deconstructs and abstracts the infrastructure needed for financial services so that new Providers can easily provide financial services as needed for Users, without the huge cost of establishing and running a front-to-back financial institution. It makes launching a financial services business as cheap and easy as launching a new instance on AWS, with the prime benefit of driving down costs and increasing the variety of offerings for customers.



IT headcount usually makes up between 30-40% of staff at banks, with additional costs to license and integrate various forms of banking software. On the Kora Network, core financial services software is run on the decentralized stack, and new users can call on or fork and customize this software, allowing them to start providing one or more financial services to other users on the Kora Network at low cost and with high speed.

Operations headcount can make up another 30% of staff. This includes functions ranging from customer support and compliance to simple manual work while a system is being integrated. Financial services providers on the Kora Network can outsource these functions to dedicated providers, who provide automation that can be reused by their entire client base. This can be especially impactful for services like anti-fraud, where building models across all transactions on the network minimizes damage for everyone.

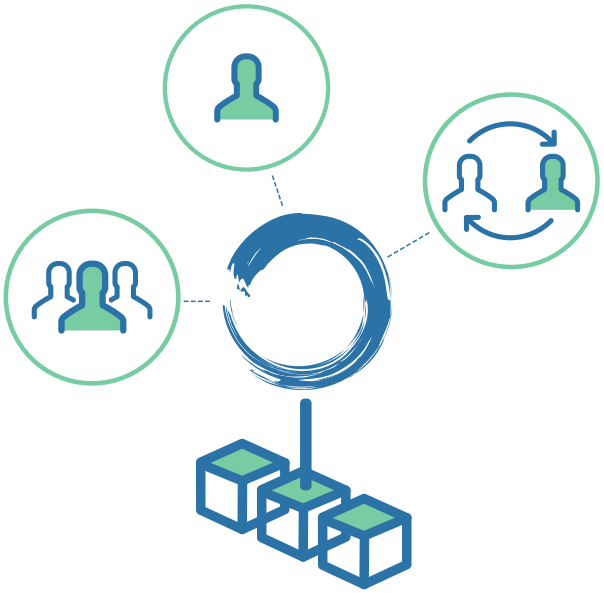
Historically, groups providing banking services are founded upon the bedrock of trust that they will keep your money safe. The huge cost involved in securing trust of assets that are perpetually under attack has allowed banks to monopolize and profit off the trust that society puts in them. With public blockchains, this trust resides embedded into the blockchain, instead of within a centralized party. This shifts the balance of power towards the User, as they can enjoy unprecedented price transparency as well as greater choice in how they want to allocate their assets, driving down cost by forcing financial services providers to compete for customers instead of monetizing their monopoly with rent-seeking activities.



The final result is that a variety of financial services providers, including traditional financial institutions, niche players like Money Transfer Operators or Mobile Money Operators, or newer blockchain-native forms that have yet to emerge can utilize the infrastructure for financial services at low cost, near-instantaneous time-to-market, to an existing and interoperable network and with minimal disruption to their existing business. This in turn lowers the bar for profitability needed to make servicing users sustainable, allowing historically underserved groups to access a wider and more transparent range of services than ever before.

Community Value Networks

A critical ingredient to success is to ensure incentives of financial services providers are aligned with the Users in the community. A major barrier to providing financial services to the many underserved people is that existing providers are incentivized to maximize their profits. In the face of low profitability due to the combination of prohibitive cost to install and operate a branch in rural areas with sparse populations and low cash savings, many existing providers have chosen to skip over these areas entirely. In the absence of formal options, informal options with the same incentive for profit-maximization can create predatory services for underserved groups, such as loan sharking.



The Kora Network align incentives by empowering community groups that are already providing ad hoc financial services, such as savings groups, cooperatives and trade unions. A **Community Value Network** (CVN) is an entity overlaid on top of these networks, which can become the focal point for providing financial services to the community. This includes attesting to identity, pooling capital for lending, infrastructure investment or bulk purchases, social assistance, financial education and other services.

CVNs are driven by **Delegates**, which are entities the Users in a CVN have chosen to manage their capital. The governance structure for establishing Delegates is flexible, ranging from being democratically elected and having full control over all pooled funds, to each user choosing how much capital to distribute to each Delegate and which permissions they have.

CVNs also provide an important function for identity, as even in the absence of official documentation it can provide a number of attestations from members in the community with more established identity. Each positive attestation strengthens the reputation and identity of the CVN as a whole, which also strengthens its ability to do further attestations while negative attestation gets penalized by reducing reputation.

The exact nature of each CVN varies and can be customized for each community. This flexibility allows CVNs to be utilized for a variety of use cases:

Farming cooperatives can use a CVN to ensure the proper use of funds when buying commodities, selling produce and distributing proceeds;

Savings groups can use a CVN to securely pool capital in eFiat and govern the use of that capital;

Churches can use a CVN to collect tithes and distribute aid throughout the community to those most in need;

National trade unions can set up CVNs both nationally and as local chapters to increase the transparency into their operations and helping to fight corruption.

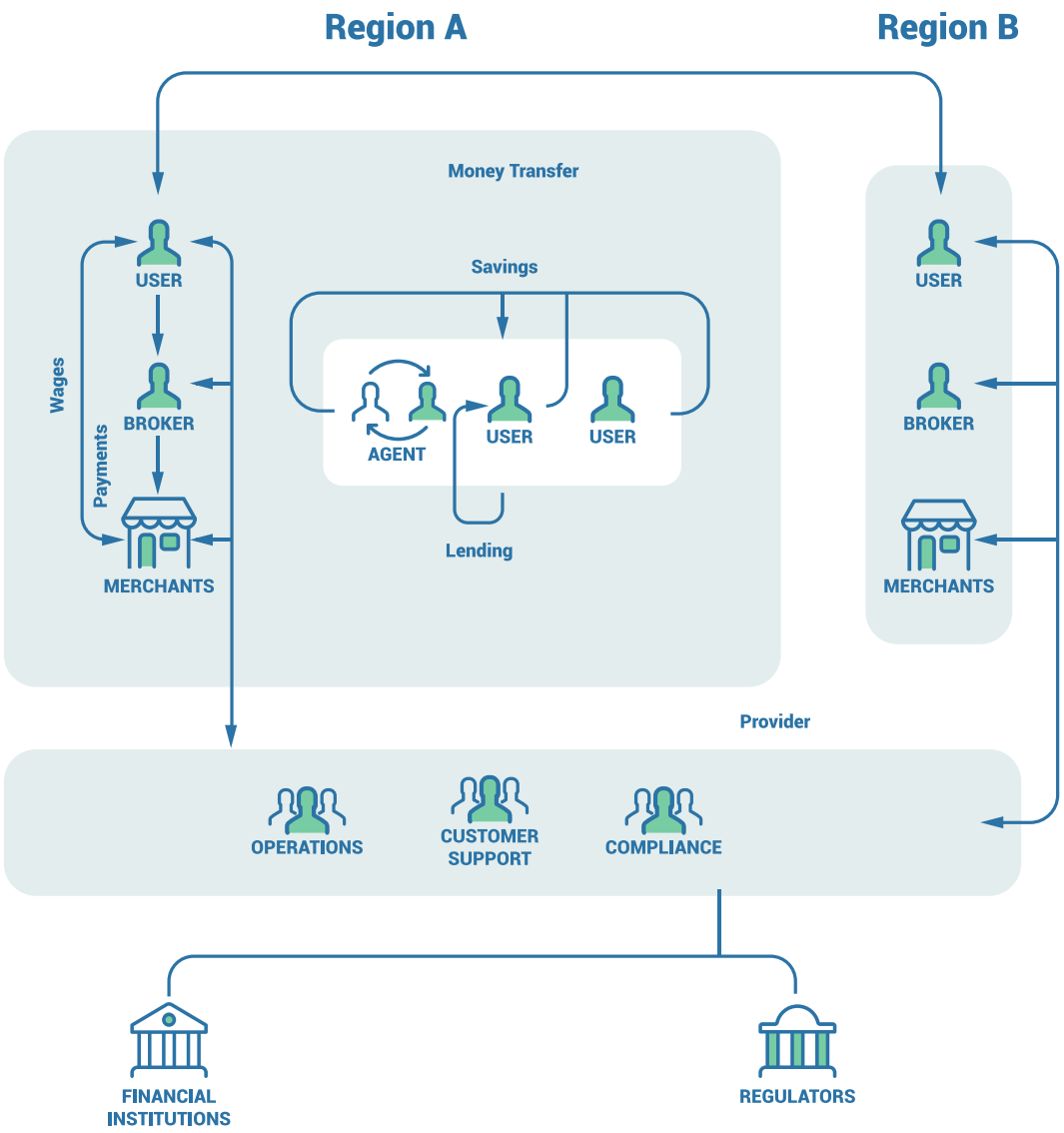
The Kora Ecosystem

In The Wide Lens: A New Strategy for Innovation by Ron Adner, he writes:

> Greatness on your part is not enough. You are no longer an autonomous innovator. You are now an actor within a broader innovation ecosystem. Success in a connected world requires that you manage your dependence. But before you can manage your dependence, you need to see it and understand it. Even the greatest companies can be blindsided by this shift."

Kora looks to empower instead of displace existing communities by introducing new tools to help build a self-sustaining financial ecosystem. We propose a design for a **Minimal Viable Ecosystem** that is designed to fulfill our definition of self-sustaining and community-owned.

Sustainability is facilitated through enabling two loops of capital circulation into the community. The first is an external loop, which injects capital into the system via family members sending money home or outside investment. The second is an internal loop, where the community pools capital into Community Value Networks, which can then be reinvested into the community through personal loans, improved infrastructure, or bulk purchases of commodities.



As the ecosystem in these communities mature, their financial resilience and ability to build wealth grows ever stronger. People in these communities will increasingly have access to a diverse range of financial services at low cost that build trust and circulate capital within the community. They will also be able to use the Kora Network as a gateway to value-added services like marketplaces, education, loans, insurance and healthcare. Kora will create equal opportunities for everyone to join the world's economy on their own terms, regardless of geographic region, gender, social class, or economic situation.

The Kora Network

The Kora Network draws on the model originally proposed by Ian Grigg in his paper “Financial Cryptography in 7 Layers”[1]. The use of blockchain technology allows us to streamline these layers into four:

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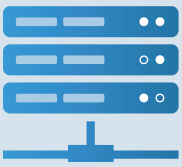

Protocol: This fundamental layer defines the basic rules which everyone on the network must abide by. Desirable traits such as immutability, Byzantine fault tolerance, scalability and ACID transactions can be engineered here for higher layers to use.

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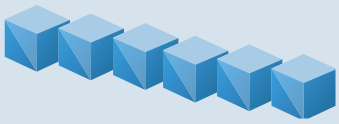


Data: This layer is where the immutable blockchain database resides, as defined by the protocol layer. This includes identities, attestations, transactions, account balances, token contracts, software stored as smart contracts and their state, and anything else that users choose to store on the blockchain.

03

Applications: This layer is where the data stored on the blockchain comes to life. Transaction processing, data feeds, blockchain monitoring and integrations with outside systems happen here. This is the transition layer between other pieces of software and the blockchain.

05

Access: This layer is how users access the Network, whether through a full node, smartphone, mobile phone access via a Provider, or anything else. This layer is completely off-chain.

Aside from these layers, which are rigorously defined in code, there exists a meta-layer of **Governance**.

1 http://iang.org/papers/fc7.html

We believe a key competitive advantage of decentralization is the potential for decentralized governance, as a platform that is incentivized to maximize value for all participants will result in a more equitable deal than a platform that is designed to enrich a centralized counterparty. Decentralizing governance is a complex task and area of active research. For this reason, in the initial stage the Kora Foundation will be a centralized counterparty that makes decisions on behalf of the Network, in consultation with every stakeholder in the Network.

The most important stakeholder group is the participants on the Network. For major decisions affecting the Network, participants will be polled, with voting power measured in principle through contribution to the Network. Initially this measure will be the amount of KNT utilized in a sliding window of time, including eFiat that has been converted to KNT. Other stakeholders include national governments, financial institutions, NGOs and other parties who are affected by the Kora Network, whose views will be circulated through regional forums and coordinators at the Kora Foundation.

These inputs will be made public and used by the Kora Foundation for making decisions on the Kora Network. While this is a long way from fully decentralized governance, it does introduce a feedback loop where unpopular or self-serving decisions from the Kora Network can be recognized by all stakeholders, and their decisions to deepen or reduce participation in the Network adjusted accordingly.

Network Architecture

The Kora Network is built on Ethermint, which implements the Ethereum Virtual Machine with Tendermint consensus. We chose Ethermint because supports the Ethereum development community, which is among the largest in the blockchain space, while also fulfilling each of the below vital network requirements:

- **Scalability:** Can process bank-scale transaction volume with reasonable latency.
- **Programmability:** The ability to build (mostly) arbitrary programs on top.
- **Resilience:** Should continue to function in a Byzantine environment.
- **Decentralized:** Network can be run in a decentralized manner.

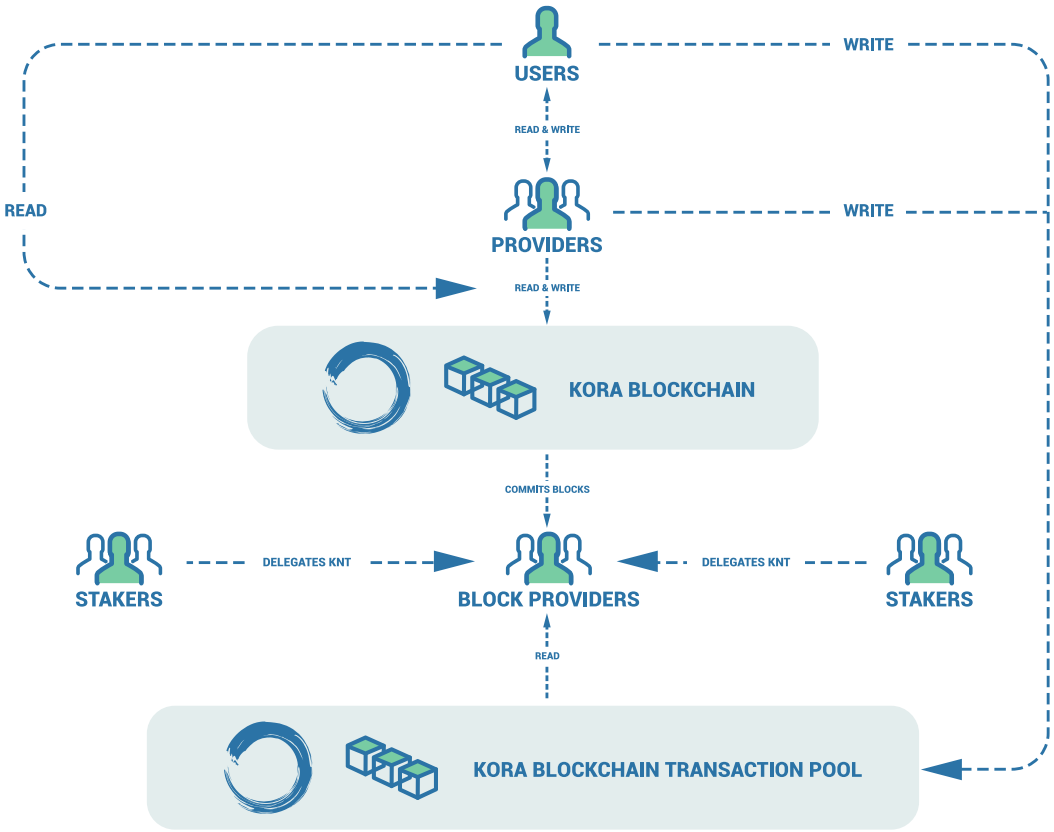
The actual network architecture owes a huge debt to the design of the Cosmos Network[2], as well as the Delegated Proof of Stake (DPoS) consensus algorithm originally proposed by Bitshares[3].

2 https://cosmos.network/

3 https://bitshares.org/

Providers read the blockchain and write to the transaction pool. Users can also read/write directly from the blockchain, so long as they are able to run a full node, meet regulatory requirements and have sufficient KNT to pay for transaction fees. Alternatively they can use a Provider to access the blockchain without holding KNT or running a node, but potentially with higher fees.

The Kora Network is secured with a modified version of DPoS, where users who have staked the native cryptocurrency Kora Network Token (KNT) delegate their stake to candidate block producers. Of these candidate block producers, the top n are selected to take turns selecting transactions to create, propose and vote on blocks that are added to the blockchain via Tendermint consensus[4]. Each block producer puts up collateral in KNT as well as having KNT delegated to them. If block producers act maliciously, their collateral is slashed, and users may delegate their stake somewhere else.



As block producers are selected by the community, the expectation is that they will compete to be selected by publishing their hardware and network specifications. Only the block producers with the best specifications and highest uptime will be selected. In this way we can reliably produce large blocks with significant amounts of transactions in a latency of 3-5 seconds, leading to the level of scalability required for the relevant use cases. Further scaling can be accomplished via sharding, as we spin off new blockchains with different sets of block producers to easily double our throughput. However, this will also come at the cost of security, so sharding must be done carefully and with ample testing.

Finally, Ethermint integrates natively with the Cosmos Network, which is building an “internet of blockchains” that connects disparate chains together in a decentralized manner. By integrating with Cosmos, we will be able to connect with Ethereum, Bitcoin, the Cosmos decentralized exchange and various other Cosmos “Zones”, making the Kora Network natively interoperable with other blockchains.

4 https://tendermint.com/

Kora Network Token (KNT)

KNT will be used as the staking mechanism for selecting block producers, as well as a single medium to pay for costs incurred by the Kora Network.

KNT must be staked by users as well as put up by candidate block producers as collateral in order to become a block producer. In return, block producers collect transaction fees as well as block rewards, which are split with users depending on KNT delegated. KNT preserves the gas and gas price mechanisms of Ethereum[5], as it has proven to be an effective solution to the halting problem. Block producers must package all valid transactions into a block, but can set minimum gas price. As the lower bound the gas price block producers can support is equal to the cost plus a profit margin, block producers that can minimize their cost to support the lowest possible gas price will generate higher per-block transaction fees for their stakers, incentivizing block producers to optimize their operations and lower their minimum gas price.

Another, more minor use of KNT is as a "bridge" currency between eFiat currency pairs and other decentralized currencies. For n currencies, maintaining bid/ask exchange rates between all currency pairs would require 2 * (n - 1) ^ 2 exchange rates. By simply maintaining exchange rates between each currency and KNT, we reduce this to 2 * n exchange rates. As KNT will be maintaining exchange rates with other cryptocurrencies, it can also serve as the "hub" where eFiat can connect with the cryptocurrencies needed to run the decentralized stack.

Some work by Paul Sztorc indicates that in order to secure a blockchain network, the "lost effort should always equal the value released"[6]. While Tendermint consensus does not require the "wasteful" burning of electricity that proof of work requires, it would be naive to assume a dedicated attacker would not hunt for other attack vectors. A more rigorous exploration of how to secure the network is a non-trivial topic and outside the scope of this paper, however it does indicate that all members in the Kora Network would benefit if the overall "value" of KNT (as defined as all issued KNT multiplied by price per token in USD) were maximized, while adjusting cost of accessing the network via the gas price.

5 https://ethereum.org/

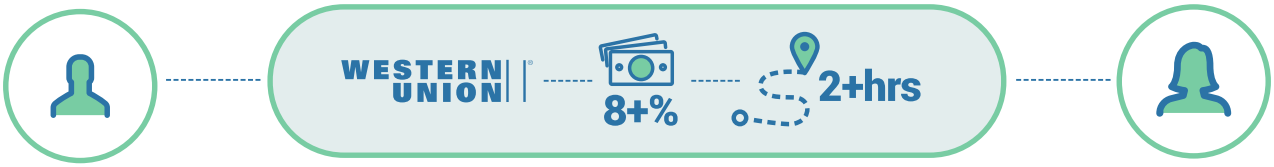
6 http://www.truthcoin.info/blog/pow-cheapest/

Unlocking the Long Tail

By providing low cost, universal access to financial services, the Kora Network unlocks the Long Tail of the global economy in the form of the the capital, intellect, and creativity of the underserved.

Money Transfer and Payments

Currently, if a user in London wants to send money back to their mom in a village in Malaysia, they have to go to a Western Union in London, which takes 8%+ fees. Then their mom has to go or send someone to travel 2-3 hours to the nearest place to pick up that cash.



At Kora, the user simply texts/USSD Kora to send that same cash from their mobile account. That cash can be deposited via bank transfer, crypto transfer, or converted at any local Kora agent, where the broker converts fiat currency from and to electronic cash. Their mom walks down to the local Kora agent at the convenience store and picks up the cash. The user pays the network fee, and pays the broker a small percentage to compensate them.

The user has saved on both transaction fees and the need to travel, and the capital is kept within the local community. Later this transaction history can be used as proof of funds if the mom has to take out a loan. To the owner of a local convenience store, who is already familiar with cashflow liquidity from managing their inventory and has long-running relationships with the majority of the community, Kora lets them receive electronic cash denominated in their national currency, and to convert it to and from fiat currency. This provides a valuable service to the community, a new revenue stream, and a way to utilize excess cash.

Furthermore, the user will also be able to make basic payments such as mobile airtime top-up, mobile data subscription, paying bills and paying merchants, as well as for 3rd party services such as for energy (**GRID+**), education, micro insurance and other use cases.

Lending and Loaning

Currently, if a user in Botswana wants to take out a loan from the bank or another lender to start a small or medium scale business, the user needs to provide multiple forms of ID, must be educated enough by the standards of the bank or lender, must provide previous statements of accounts for a minimum of one year, must provide valid business registrations from a centralised operator and signed referrals who have sufficient verified balances. They must also provide collateral worth more than the amount being loaned, and if they're acquiring property, it must be located in major cities where the land can be easily used as collateral in case of a loan default. **Essentially the user needs to prove that they don't need the loan in order to qualify for a loan.**

At Kora, the user simply signs up and transacts using Kora to build credit history, and either engages with existing Community Value Networks to obtain a loan in a peer-to-peer process, or obtains referral and attestation from the Community Value Network to quality for direct loans from the Kora Foundation as well as various other forms of loaning services from 3rd party integrations and ecosystem support like **SALT Lending**, **EtherLoan** and other interoperable Blockchain platforms.

On the flip side, users from the global economy or from the Community Value Networks who have accumulated enough capital in the community and want to become a lender to support social good or to make a profit can easily do so by registering to the Kora Lender Service. The Kora Network provides a marketplace of peer-to-peer lenders and loaners as an additional set of lenders that breed competition and ultimately produce the most cost-effective loans for the user.

Agriculture

Across Africa, farming and agricultural activities are predominantly conducted in the rural areas. These rural areas are characterised with a high density of unbanked people, and most transactions are cash-based through every step in the supply chain. Large corporations receive their agricultural supply and raw materials from local farmers for processing to finished goods, but the farmers are not paid until after 3 - 4 weeks of supplying. Because they have no bank account, their counterparties have to take time working out how to distribute cash to them.

Additionally, many large corporations receive supplies from child farmers within this region just to meet up with the demand of the processed goods.

Applications for loans by farmers are very difficult in the region because of the uncertainty of the nature of the business and, creating difficulties for the farmer in ensuring that his farm would yield the expected amount of harvest to repay the loan.

At Kora, the farmers will sign up on Kora and corporations would link every supplier of farm products to their Kora wallet. Supply of crops and payments of farmers by corporate market purchases would become seamless and the farmers get paid within minutes after products are supplied.

Through the farmers Community Value Network, each farmer builds his reputation by transacting with other stakeholders within and outside his network and builds a credit history and reputation. They can also seek attestation from the Community Value Network to verify that they are not using children for labour, and that they meet the standards for crop production and sales as defined by the community.

This identity automatically qualifies the farmer to access loans from the community, governments, agricultural organisations and NGO's as well as individual peer-to-peer lenders.
Through the integration of our 3rd party services like **Gnosis**, farmers can better predict, plan, and make smart business decisions through the help of machine learning and business intelligence. Farmers can also receive digital education on farming best practice for optimising production from digital education services on the Kora Ecosystem, and share the use of tractors or other machinery through the sharing economy.

When the time comes to sell their products, farmers can tap into a marketplace for producers and consumers built into the Kora Network, in order to match the farmer to consumers or potential organisations needing the farmers products across the world and give all parties access to optimal prices.

International Distribution of Funds

One of the greatest challenges of international aid is the massive corruption in the funds movement from NGO's in developed countries to people in need in developing countries.
For instance, an international aid organization funds a vaccination project for $1m by sending to the country in need. The chairman from the government arm confirms receipt of $1m but sends $900k to the Ministry of Health, the Secretary of the Ministry of Health takes some for himself and his cohorts and sends $750k to the deployment team, the deployment team project lead inflates the project and pockets $50k. At the end only $700k truly gets to the user in need. This is one of the main reasons international aid is inefficient for quick relief of victims in these regions.

For humanitarian missions, every user in the country that's affected can be given a humanitarian Kora account which enables the user to receive transactions with vouchers that allow them to access multiples services through SMS/USSD or mobile app.

The international aid organization would distribute funds directly to its users on the Kora Network via a smart contract that does not permit the funds to be transferred or spent anywhere else except accredited health care provision centres in the relief zone. The progress of the funds will be monitored with exact statistics of when, how, and where the user used the funds, hereby eliminating the need for 3rd party intermediaries in funds distribution as well as ensuring proper tracking and monitoring of funds since every transaction on Kora is on the Blockchain.

Pre-approved users in various plagued regions around the world could access the Kora Ecosystem which provides 3rd party international aid services such as **BitGive** and **Giveth** for other forms of funds distribution from private and institutional donations.

Conclusion

The success of the Kora Project will be a milestone in the long running quest to alleviate poverty for billions of people and to let everyone share in the wealth created globally. It will also be a landmark use of blockchain technology for social good to foster prosperity.
The success of this project could be the hope of financial freedom, empowerment, and wealth redistribution to the millions in deserted, economically unprofitable regions of the world.

Kora Roadmap

Idea and Research
September 2016

Seed Investment by Core Team
July 2017

Kora 1.0 MVP development begins -USSD,SMS and Mobile App
August 2017

Kora 1.0 launches on Ethereum testnet
September 2017

Private Contribution
November 2017

User testing launched in Africa
December 2017

Kora 1.0 launches on permissioned testnet
January 2018

Begin first beta
February 2018

First beta meets all milestones
July 2018

Launch Pilot in Africa
August 2018

Asia and global expansion
March 2019

Kora 2.0 launches
November 2019

Kora's short-term vision is to bring robust financial services to 100 million underserved people by 2025 via Kora 1.0 and Kora 2.0.

Kora 1.0 will be a fully operational financial service platform accessible via USSD or SMS by any mobile device with a SIM card, as well as a simple mobile app for users with smartphones and a web application.
Kora 1.0 aims to achieve the following milestones:

- Ability to access account balance
- Peer-to-peer transaction, both domestically and internationally
- Tracking and distribution of funds
- Local bill payments – phone top-up, utility payments, merchant payments
- Financial history, and
- Financial reputation

Users of Kora 1.0 who have a financial reputation but lack finances automatically qualify for a microloan which will enable them to afford a smartphone to access other services on the Kora platform.

Kora 2.0 will be an upgrade that brings additional services to the Kora platform. The highlight of Kora 2.0 is the ability to access cross border loans by individuals, farmers and SME's in underserved regions. Hence Kora will provide open access to the blue ocean of new enterprises to invest in.
Major features on Kora 2.0 are:

- Portable identity registration (biometric and key) on smartphones through the mobile app
- Access to microloans (Small and Medium scale Enterprises program)
- Cross-border remittance
- Integration of micro-insurance
- Integration of digital education
- Integration of Kora Marketplace
- Channel for international funds distribution and Tracking

Contact Us

info@kora.foundation
+1 551-444-8518
kora-network.slack.com