

Growr: an open, fair and sustainable micro-lending protocol on top of Bitcoin

Abstract. The challenge to provide cost-efficient access to financial services to the unbanked population globally is well-researched. As of 2021, there are still 1.4 billion people worldwide that do not have an account. Most of these unbanked are self-employed, micro-entrepreneurs, and smallholder farmers with financing needs and without much collateral who easily fall prey to moneylenders. Traditionally, microfinance institutions have been serving the poor and unbanked population, especially in developing countries, through unsecured productive microcredit and micro-savings products. However, their over-commercialization has led to opaque practices and questionable success in addressing these challenges. With the invention of Bitcoin, the world has witnessed the emergence of an open monetary network that has enabled an increasing number of financial use cases in a fully digital manner. Bitcoin and its second-layer Lightning network have emerged as a financial inclusion solution for unbanked communities. However, the Bitcoin ecosystem today does not offer unsecured microcredit due to the anonymous nature of its users who cannot assert their creditworthiness and do not possess digital assets to use as collateral. We propose a protocol that addresses these challenges: it helps micro-entrepreneurs from local communities build their self-sovereign credit record and connects them over Bitcoin and its layers to a global financial infrastructure, where they can access productive capital at a fair price, bringing real-world yield to the capital providers.

Protocol overview

Problem

Today, a quarter of the world's adult population does not have an account with a bank or another type of formal financial institution [1]. In some countries in the developing world, financial exclusion is as high as 90%. Most of the unbanked population does not have a typical "job"—they are smallholder farmers, micro-entrepreneurs or self-employed [2].

It is estimated that 487 million micro and small enterprises (MSEs) operate around the globe, with the highest concentrations in Africa and Asia. In low-income populations, they are critical to job creation and livelihoods. Out of them, about 300 million are informal. MSEs in emerging markets create an estimated US\$8 trillion in credit demand per year, with US\$4.9 trillion remaining unmet according to IFC – the so-called financing gap [3]. Informal sector MSEs make up 30 percent of that demand.

Traditional financial services actors are not economically incentivized to solve those problems. The distribution costs of banks to deliver their services to remote areas and informal populations have led to low adoption of their services in the developing world. Moreover, one of the main reasons for the high global financing gap is credit rationing due to information asymmetry [4].

Microfinance has emerged as a solution to the financial inclusion problem, providing the necessary financing to poor entrepreneurs in the form of microcredit. Originally operating mostly in the form of NGOs, the sector has progressively commercialized and its image as an agent of poverty alleviation has been tarnished through research [5] and public scandals due to the lack of transparency and other bad practices [6].

Local communities willing to develop their economic activities have limited access to financing beyond their savings groups. Local financing is usually available at very high rates from local informal monopolies such as moneylenders, reaching hundreds and even thousands of percent per year. Micro-enterprises that have access to formal financial institutions have their credit history locked within proprietary databases such as credit bureaus, which are often acting as blacklists. They are also at risk of discrimination or seizure of funds due to government corruption.

Bitcoin, its second-layer Lightning network and other projects are focused on democratizing access to savings, payments and remittances through the use of open-source protocols and software. They have emerged as a viable financial inclusion solution for unbanked communities [7]. At the same time, the typical decentralized finance protocols—including the ones that are part of the Bitcoin ecosystem such as Tropykus [8] or Sovryn Zero [9]—require over-collateralization, which is out of the reach of the unbanked. Due to the pseudonymous nature of the users of Bitcoin, there is currently no widely available solution to provide unsecured credit on the network or its upper layers.

Solution

Growr protocol is an open-source peer-to-peer protocol that enables access to fair financing. The protocol helps micro-entrepreneurs from local communities to receive instant productive loans based

on their self-sovereign credit record without the need for over-collateralization. In contrast to traditional microfinance, the protocol creates an open and global lending marketplace that connects borrowers to both traditional and decentralized capital providers, enforcing fair competition for pricing and fully transparent deployment of capital down to each micro-loan.

The prevalence of strong social ties in the Global South enables the creation of self-sovereign digital identities without undergoing formal KYC procedures. By leveraging the *web of trust* or similar concepts, these identities can be uniquely linked to each individual by relying on a network of credential issuers, instead of a single authority.

Creating self-sovereign digital identities without formal KYC procedures make it possible for each person to start building their own reputation and credit record, collecting soft and hard information in the form of credentials from their community, informal financial groups, and supply chain partners. This credit record is open and global in nature, so it enables the communities to combine their identities and attract directly external financing to develop their activities, without the need to go through local financial intermediaries. For example, supply chain partners can use this infrastructure to provide financing for goods and services.

When combined with digital assets that enable long-term capital accumulation without the risks of local hyper-inflationary currencies, these communities can transform into digital micro-banks that connect their members to the global financial system, breaking the limitations of the traditional systems. A digital capital market leveraging this identity and credit record infrastructure makes providing financing to communities more efficient and transparent than anything that is available today.

Capital providers participating in this market can apply flexible fine-grained investment criteria based on the available credentials. They utilize the community's reputation and guarantees from its supply chain partners to provide under-collateralized financing for micro-loans. As the community accumulates digital capital, it uses it as collateral to access even more financing at better rates. Liquidity providers have full visibility into how their capital is used, instead of needing to trust an intermediary.

The protocol aims to contribute to addressing the global financial inclusion problem by providing open access to basic financial services, which leads to the following benefits:

- Borrowers, represented by self-employed, micro-businesses, smallholder farmers and the communities of which they are members, are provided with access to fair productive micro-loans to grow their businesses. In addition, they receive help and promotion of financial health and good business practices.
- Suppliers and buyers that support the development of sustainable local economies have revenue growth, as well as easier and streamlined agreements with a cooperative instead of with each member individually.
- Originators and capital providers in the marketplace benefit from real-world yield generation opportunities on a global scale, and in addition, they get complete transparency of the impact of each unit of capital they invest.

Key Concepts

Decentralized identity

Decentralized identifiers and verifiable credentials

The protocol implements the W3C's standards (recommendations) for *Decentralized Identifiers* (DIDs) [14] and the *Verifiable Credentials Data Model* (VCs) [15].

The DID is a new type of identifier that enables verifiable, decentralized digital identity. DIDs are URIs that associate a DID subject (e.g., a person, organization, thing, data model, abstract entity, etc.) with a DID document allowing trustable interactions associated with that subject. DIDs have been designed so that they may be decoupled from centralized registries, identity providers, and certificate authorities. Specifically, while other parties might be used to help enable the discovery of information related to a DID, the design enables only the controller of a DID to prove control over it without requiring permission from any other party.

The VCs are global uniformed provable claims associated with the subject of the DID. They are cryptographically secure, privacy-respecting, tamper-evident and machine verifiable. They can be used to build universally verifiable presentations, which can also be cryptographically verified.

Verifiable credentials are provided by *credential issuers*—i.e., centralized or decentralized third parties—asserting certain facts about the DID owner. Verifiable credentials are consumed by *verifiers* using the concepts and data models for *presentation exchange*. Verifiers ensure that the credential presentation is signed with the subject's DID, it is signed by a trusted Issuer, it is not expired and it is not revoked.

Growr concept for Self-sovereign credit record

The prevalence of strong social ties in the Global South enables the creation of self-sovereign digital identities without undergoing formal KYC procedures. By leveraging the *web of trust* or similar concepts, these identities can be uniquely linked to each individual by relying on a network of credential issuers, instead of a single authority.

The Growr protocol relies on a new type of open and global decentralized identity built using DIDs and VCs that we call the *self-sovereign credit record (SSCR)*. The SSCR is intended to represent a borrower's unique global identity and financial record, storing various general-purpose and protocol-specific verifiable credentials based on the borrower's on-chain activity, trusted off-chain data, peer vouching, financial health metrics, and others.

The SSCR contains both hard information (facts such as credit score and history, debt-to-income ratio, bank account verification, and business financial indicators) and soft information (such as endorsement, community membership, and self-declared business plans) that are used in the credit risk assessment.

Lending and borrowing

A brief history of debt

The concept of lending and borrowing is probably as old as the Sumer civilization around 3500 BC [5]. However, this often brought social tension—a significant part of the farmers would become over-indebted and be forced to sell their kids into debt slavery. Due to this fact, jubilees (cancellations of all debts) were often initiated by the rulers.

After the advent of coinage, banking and lending money against interest emerged as a business activity. This however often led to usury, or lending money at unreasonably high rates of interest out of the formal institutions, which was naturally considered sinful by most religions and outlawed by many states throughout history. Still, this practice continues today around the world, especially in communities with high informality and without access to financial services [16].

In the Middle Ages, the notion of *interesse* (from which “interest” originally comes) began to be accepted as a non-usurious compensation for the profit a merchant would have made, had they placed it in some profitable investment.

Modern banking and financial inclusion

In modern banking, a loan is given to a borrower against interest and fees, which highly depend on the local context. Today, most countries have regulations on maximum interest rates. In Islamic banking where interest (*riba*) is forbidden, productive financing is provided through risk-sharing instruments.

However, even with regulated interest rates, the price of banking services is high, especially for almost 1.6 billion people around the world who live under the international poverty line of around \$2/day. This is mostly due to the cost of distribution, as banks traditionally rely on physical infrastructure, as well as due to information asymmetry, which limits the appetite of banks to lend to informal micro-enterprises and leads to credit rationing.

To assess borrower risk, banks use the services of credit bureaus—private companies or government agencies that collect data about borrowers from various sources. But people without prior credit history may find themselves trapped in a loophole as banks may not be willing to serve them at all. In the end, being poor becomes very expensive because the financially excluded easily fall prey to loan sharks with usurious conditions.

Informal financial groups

Informal or semi-formal community financial groups (such as rotating savings and credit associations, village savings and loan associations, savings and credit cooperative societies and many other varieties) have existed for hundreds and even possibly thousands of years. They remain the primary way to save and borrow for the population in the Global South that does not have access to formal financial institutions. However, these groups remain disconnected from the global financial system and suffer from bad practices and physical cash security.

Microfinance

Microfinance has emerged as an alternative to banking, as a large-scale, businesslike provision of financial services to the poor. Microfinance institutions (MFIs) usually lend money to large groups of

people in dense regions, in a minimally subsidized way. To monitor and manage multiple borrowers, MFIs rely on a combination of reputation, knowledge of the client, collateral, cosigners, and enforceable contracts.

Although it has its roots in the Middle Ages, microfinance was reinvented in a scalable model in the late 1970s. Witnessing extreme poverty and a deadly famine in his country Bangladesh, Professor Muhammad Yunus came up with the noble vision to provide microcredit—and later more financial services—to poor communities, in a fair and sustainable manner, and help them out of poverty [17].

However, over the last decades, there has been a significant deviation from this original purpose, with many MFIs changing their focus from social impact to profit and replicating the narrative but not the good practices. In some well-publicized cases, MFIs have contributed to increasing poverty rather than decreasing it.

Decentralized lending protocols

Since 2020, an increasing number of decentralized borrowing and lending protocols have been emerging fast in the decentralized finance (DeFi) space. They aim to fundamentally reinvent the financial infrastructure, enabling people to transact with each other globally, securely and in a permissionless manner.

While most of the activity in the space is outside of the Bitcoin ecosystem, projects such as Tropykus and Sovryn built on Bitcoin's side-chain Rootstock (RSK) are promising to bring decentralized lending to Bitcoin.

Decentralized finance protocols still target mostly advanced users and let them lend or borrow digital assets without going to a centralized intermediary. Users deposit digital assets into liquidity pools, which become funds that the protocol can lend out to other users. Decentralized finance protocols aim to automate lending and would not be willing to assess individual borrowers. That is why they require collateral. This means that the on-chain assets of the borrower are used to secure a loan. The borrower provides the asset to secure the loan, and if the borrower defaults on the loan, the lender can take possession of the asset and sell it to cover the loss. Moreover, they often require over-collateralization, i.e. the value of locked assets as collateral must significantly exceed the loan amount. Currently, decentralized finance usage is higher in developed markets and by institutional investors [18].

Growr concept for Open and transparent credit data

The Growr protocol approaches lending differently. The protocol aims at providing instant unsecured loans based on risk assessment and verifiable credentials, instead of requiring on-chain collateral. It provides an open credit record model, which also preserves the privacy of the borrowers through a self-sovereign identity, instead of relying on risk data locked within proprietary databases.

A large percentage of the global population remains with limited access to credit due to immigration, lack of credit history or due to negative reporting to credit bureaus in case of late bills—even when the invoice was never received by the debtor [19]. In contrast to the traditional credit bureaus, the protocol puts the users in control of their data by storing their credit record in “their own pocket” without dependence on any central authority or intermediary. This way, the protocol aims at enabling

borrowers to build a credit record based on alternative and relevant data sources, such as trusted organizations, financial health metrics, and peer vouching.

Borrowers collect credentials into their self-sovereign credit record, originators use these credentials to better assess creditworthiness, and trusted parties are incentivized by the protocol to provide the credentials.

The credit records are open and global in nature, so they enable communities to combine their identities. Digital capital providers leveraging this identity and credit record infrastructure can apply flexible fine-grained investment criteria based on the available credentials. They can utilize the community's reputation and guarantees from its supply chain partners to provide under-collateralized financing for micro-loans. As the community accumulates digital capital, it can use it as collateral to access even more financing at better rates.

Growr concept for Bitcoin as a capital rail

First, Bitcoin provides a sound monetary foundation. It is the perfect store of value for long-term capital accumulation, which cannot be inflated or seized by governments or adversaries. It's fully open and censorship-resistant in nature, which allows anyone to participate directly without the need to rely on intermediaries, creating a platform for building financial services outside of the traditional system.

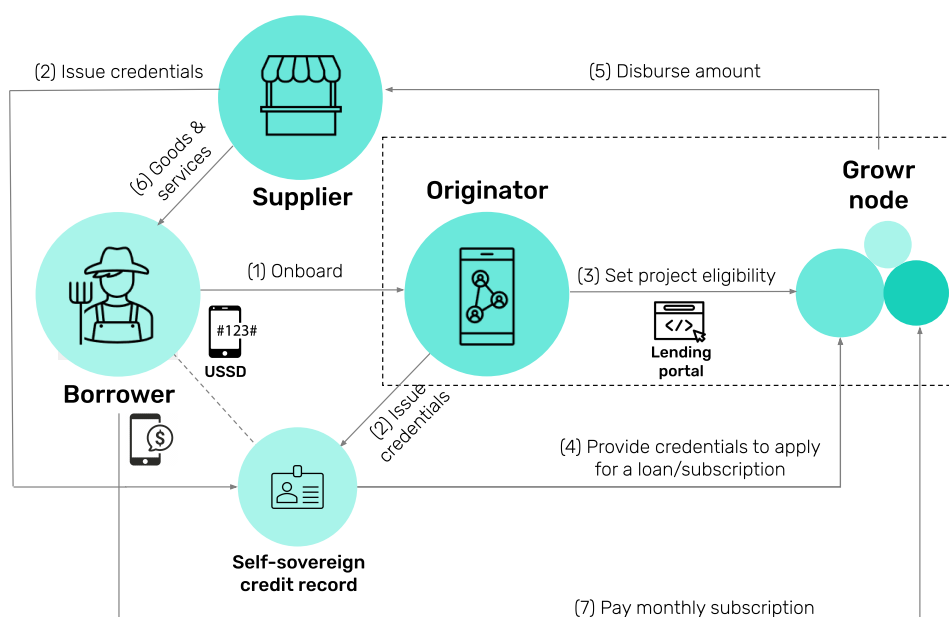
Second, the Lightning network enables low-cost instant and global transfer of value—in bitcoin or fiat-pegged digital assets. This way, capital from anywhere in the world can reach even the most distant community directly, avoiding unnecessary costs.

Third, solutions such as federated Chaumian mints enable the creation of local circular economies based on bitcoin, based on community custody of self-sovereign digital identities, bitcoin and other digital assets. Bitcoin mints connected to the Lightning network make it possible for informal financial groups to become digital micro-banks and empower their members with a full set of financial services.

Fourth, smart contracts on Bitcoin side-chains enable global digital capital infrastructure and automated pooling of funds by capital providers, matching their investment criteria to community projects.

Growr concept for Nostr as a social layer

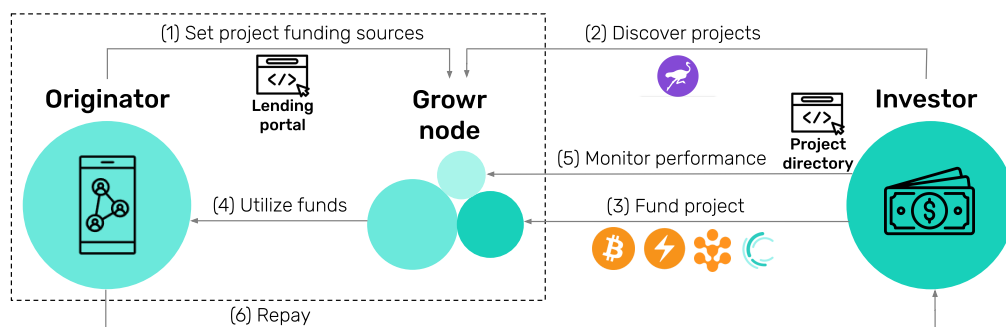
TBD



1. The *borrower* is onboarded on a platform, provided by an *originator* (such as a cooperative, guild, wholesale buyer, digital wallet, or another provider), where the borrower defines their funding needs.
2. One or more *trusted parties*, such as merchants of suppliers, provide credentials to the *borrower* to start building their self-sovereign credit record.
3. The *originator* creates a loan offer in the form of a project with details about the local activities and the financing needs of the *borrowers*.
4. *Borrowers* go through a simple application process to receive a loan after asserting their eligibility with their verifiable credentials.
5. The disbursed amount is received by the *borrowers* in the borrowing application or directly paid to a *third party*, such as a merchant or a supplier.
6. The *third party* provides the necessary goods and services to the *borrower* to achieve their goals.
7. Depending on their business activity and the agreed lending conditions, the *borrowers* repay their loans on a regular basis or as a bullet payment at the end of the season.

Funding

The diagram below presents a summary of the funding processes.



1. While creating the loan offer, the *originator* defines the project funding terms and available payment rails.
2. A *capital provider* reviews the projects with their predefined eligibility criteria and funding parameters, assesses the risk and confirms his investment intent.
3. The *capital provider* deploys funding to the project as a senior tranche via any of the possible payment rails.
4. The *originator* utilizes the provided capital and performs the actual lending activity to the *borrowers*.
5. The *capital provider* monitors the performance of their investment through Growr protocol that provides reporting of real-time events and full transparency into how the capital is deployed into borrower subscriptions.
6. According to the agreed funding terms, the *originator* repays back the senior tranche plus the generated yield.

Protocol participants

Borrowers

Borrowers, represented by self-employed, micro-businesses, and smallholder farmers, apply for productive loans from the marketplace, most often with the help of a local originator, and then repay the loan plus its price.

Originators

Originators facilitate access to the protocol by grouping several borrowers with similar needs and presenting project applications to the marketplace on their behalf. They publish offers to the loan marketplace by creating *projects* on behalf of the borrowers. The originators provide junior (first-loss) capital to finance the whole project or part of it. They can be:

- *Local cooperatives, guilds or other community organizations* that are formed by borrowers to gain better access to loans and to standardize their relationship with the rest of the participants in the ecosystem.
- *Bitcoin circular economies* using solutions such as Federated Chaumian mints [\[21\]](#), enabling access to micro-financing to their users.
- *Telcos, retailers and gig-economy platforms* that onboard and vet the users into their services and then facilitate their access to the protocol as an embedded financial service.
- *Digital wallets and fintech providers* that already offer financial services and that can expand to unsecured decentralized lending.

Trusted parties

Trusted parties assert facts about the borrowers in the form of verifiable credentials. They can be:

- The *originator*, issuing credentials for its members or users.
- *Merchants, buyers, unions, chambers or other local organizations* that serve the community or have knowledge of their members.
- *Independent third-party data providers* that can issue credentials related to the activity of the borrower and relevant to the risk assessment process, such as KYC/AML, account data, and on-chain activity.
- *Financial health providers* that publish educational materials and tools to help borrowers develop good financial habits and issue credentials that assert knowledge, skills, and accomplishments.

Capital providers

Capital providers allocate senior capital to the loan marketplace and delegate the actual lending activity to the originators in the form of senior tranches for the financed projects. They can be:

- Individual bitcoin investors.
- Large institutional investors or digital asset managers.
- Decentralized finance protocols.

Growr protocol

Growr protocol implements a global decentralized micro-lending marketplace as a P2P network of *Growr nodes*. Each *Growr node* represents a package of open-source components and a set of lending projects. It enables originators to publish projects with predefined conditions and eligibility criteria, and borrowers to apply and get financing using credentials from their self-sovereign credit record. It also enables capital providers to fund projects either by accessing the *Growr node* of an originator directly, or by running their own node.

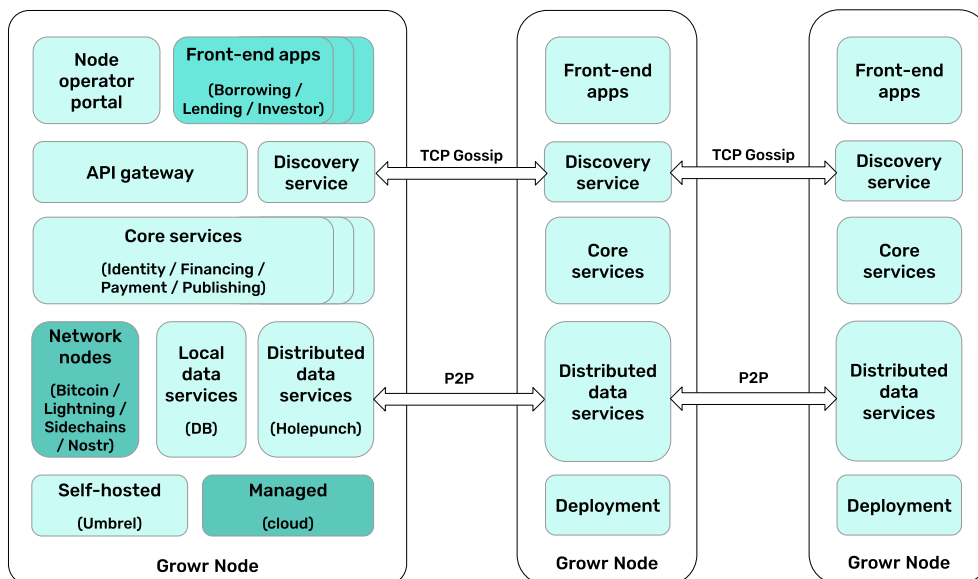
Participant incentives

Role	Tangible incentives	Intangible incentives
Borrower	Access to productive capital at a fair price. Optional “cash-back”-like rewards paid by the originator for positive behavior (e.g., on-time repayment). Opportunity to start saving in bitcoin (optional).	Build their self-sovereign credit record with the ability to use it for future financing needs.
Trusted party	One-time fee paid by the borrower upon VC issuing (optional). Financial health rewards paid by the originator after on-time loan repayment (optional).	Success and growth of the community.
Originator	Origination fee upon each loan disbursement. Interest margin (yield) from the borrowers. Access to global capital without intermediaries.	Success and growth of the community. Revenue growth for service providers. Access to more customers in the marketplace.
Capital provider	Real-world yield on the invested capital. Return on digital assets without selling them.	End-to-end transparency for the investments without intermediary counterparty risk. Bringing impact to local communities.
Growr node	Protocol fee for loan management infrastructure. Capital routing and exchange fees (optional).	

Protocol architecture

Overview

The following diagram provides a high-level overview of Growr functional architecture.



Growr protocol implements a global decentralized micro-lending marketplace as a P2P network of Growr nodes. Each *Growr node* represents a package of open-source components and a set of lending projects. It enables originators to publish projects with predefined conditions and eligibility criteria, and borrowers to apply and get financing using credentials from their self-sovereign credit record. It also enables capital providers to fund projects either by accessing the Growr node of an originator directly, or by running their own node.

Growr architecture provides the opportunity to pack the applications and services in few options, based on the deployment requirements and specifics. There are several deployment blueprints for the Growr node depending on the use cases, for example: self-hosted originator node, cloud-hosted originator node or cloud-hosted investor node. The backend services can be packed as a single docker image and can be included in different configurations to run all or few services per deployment target.

The Growr nodes communicate between each other in 2 ways. The first option is through a Discovery service, using the TCP Gossip transport protocol. The second option is through replication of the distributed data across the network, using Holepunch's Hyperbee and Hyperswarm protocols.

Front-end applications

At the top of the diagram are the front-facing applications. These apps and services are on top of FOSS protocol and services. They can be developed by Growr or other integrators per deployment. The node can be extended with different applications fitting the purpose.

- *Borrowing and Community front apps*: Set of applications that are used by the borrowers to operate their self-sovereign credit record and to apply for funding from different projects. Depending on the local environment and user base, those might be web, mobile or USSD applications.
- *Lending and Investor apps*: Applications used by originators and investors to create and fund projects, and to monitor their performance.
- *Impact portal*: An open-source standalone web application that can use aggregated data from the protocol to display a dashboard presenting the global impact of the marketplace.

The front-facing applications are connected to Growr node via an API layer, which is responsible for the authentication and authorisation of the users, as well as for the communication with the core services of the protocol.

Growr core services

The backend of Growr node consists of a group of services that are maintained as open-source software under an open license but can be extended following the community and product guidelines. All the services in these groups are deployed with proof that the running service has a well-known identity or a public key, and its code is identical to the source code in the Growr repositories.

Identity services

The Growr protocol's core identity services are:

- *SSCR agent service*: A custodial service that operates the self-sovereign credit record (SSCR) of the user with his permissions.
- *Credential issuing service*: Issues verifiable credentials based on data received or verified for given borrowers.
- *Credential verification service*: Verifies presentations of credentials in order to access funding.
- *User management service*: A service that is responsible for registration and management of the node applications' users.

To be trusted by all participants, the Credential issuing and the Credential verification services will have well-known DIDs and deployment addresses.

Financing services

The Growr protocol's core financing services are:

- *Project service*: Provides an API to create and manage lending projects. It reads and writes data to the *Project book*.
- *Loan service*: Controls the creation, utilization and repayment of loans. It reads and writes data to the *Loan book*.
- *Funding service*: Manages the funding and repayment operations. It reads and writes data to the *Funding book*.
- *Investor service*: Provides onboarding and contract management services for project investors.

Payment services

A set of services with payment management functions. They provide integration with supported payment rails such as Bitcoin network, Lightning Network channels and others.

Credit record storage

The *Credit record storage* provides decentralized storage of the self-sovereign credit record (SSCR) of the users. Each record represents a unique global decentralized identity and contains general-purpose and protocol-specific verifiable credentials. The credentials data is encrypted and accessible only by the identity owner.

Distributed data services

The Growr protocol's distributed data services are:

- *Project book*: Enables the creation of new projects with strictly defined eligibility criteria and a funding source.
- *Loan book*: Enables the creation of loans after an eligibility check of the borrower against a given project.
- *Funding book*: Contains history of funding operations.
- *Payment book*: Contains history of loan utilization, repayment and other related events. It supports the issuing of proof of positive credit history.
- *Read-only copies*: Contains aggregated data plus audit logs of the above services, sanitized from any personal-revealing data. It is publicly exposed to ensure transparency in the marketplace and to monitor its global impact.

To implement those operational data books, the Growr protocol leverages Holepunch's Hyperbee, an append-only B-tree based on Hypercore. The read-only copies are implemented as a Hyperswarm with published well-known Public Key and Topic.

Use cases

Microfinance

The global microfinance market amounted to \$124B in 2018 [\[23\]](#). 139.9 million borrowers benefited from the services of microfinance institutions, compared to only 98 million in 2009. Of these 139.9 million borrowers, 80% are women and 65% are rural borrowers. The main regions of microfinance are Latin America with \$48.3B, South Asia with \$36.8B, East Asia and Pacific with \$21.5B, and Africa with \$10.3B. In developing and emerging markets, a large segment of the population is still unbanked and more than 50% of the economy is informal. The majority of micro-businesses don't have a bank account or access to traditional financial services. They mostly rely on support from their friends and family or they go to loan sharks charging as high as 15-20% per month. Connecting this market to the Growr protocol that provides a global decentralized micro-lending marketplace will bring efficiency in capital allocation, fair conditions, and transparency of the impact. Using the protocol, unbanked micro-entrepreneurs can apply for productive unsecured micro-loans with their self-sovereign credit record.

Agriculture finance

Currently, smallholder farmers have difficulties accessing financing for their activities due to high informality and distance to servicing providers (banks, MFIs). The financing gap is higher in rural areas with agriculture remaining largely underserved. The farmers suffer from loan sharks charging high-interest rates, thus not having much left after each season for their long-term farm development. Smallholder farmers can access the Growr protocol and apply for unsecured micro-loans by forming cooperatives and receiving credentials from regional merchants that source inputs and wholesale buyers that deliver their production.

Lending to vulnerable social groups

Vulnerable populations such as victims of violence, and natural and man-made disasters, as well as micro-merchants from poor communities, are prime beneficiaries of the protocol. Such populations can rely on memberships within local associations, who can become both credential providers and funding donors. In addition to lending, donations can also benefit from a global and open protocol such as Growr, giving the donors complete transparency of the impact of each dollar they give.

Crowdfunding

The crowdfunding business model continues to grow fast globally. In addition to the established platforms for investment in startups and product R&D, impact finance providers such as Kiva are helping micro-businesses with loans for as little as \$25. Crowdfunding transition to distributed ledgers and Bitcoin is a matter of time, as the example of Kickstarter and Geyser Fund shows [\[24\]](#).

Islamic finance

Islamic finance forbids interest (riba) and therefore traditional interest-based lending is not applicable. The protocol may provide Sharia-compliant instruments instead, allowing borrowers to apply for funding based on risk-sharing.

Bitcoin-native unsecured lending

Bitcoin and its ecosystem have already demonstrated its great potential as a financial inclusion tool. The Growr protocol can be a complementary solution to Bitcoin-based circular economies and community custody solutions such as federated mints, by enabling groups of people to jointly apply and use credit from the decentralized marketplace. This will create a stronger incentive for more communities to join the Bitcoin inclusion movement.

Challenges

Regulatory compliance

Lending services are regulated everywhere in the world. DeFi protocols providing lending services have succeeded in achieving regulatory arbitrage. The Growr protocol will aim to strike a balance between covering regulation at the “last mile” of consumer financing depending on the jurisdiction and the locally residing stakeholders through which the protocol services are delivered, and the supranational decentralized space outside of the reach of traditional regulators.

Credit risk assessment

While we plan to leverage verifiable credentials from traditional credit bureaus, we envision a future with more decentralized credit risk assessment based on alternative data sources. This is mostly uncharted territory and may lead to lower yield for investors or even losses due to incorrect calculation of the cost of risk.

Fraud

We expect that such a protocol will be a high-interest target of fraudsters. We will work on developing the right anti-fraud measures including permanent blacklisting of users from accessing the protocol services.

Technology maturity

Some of the technologies described in this whitepaper are new and unproven at such a scale. We aim to leverage as much as possible the experience of other projects and to test different aspects of the technology stack via demo applications and pilots.

User experience

Setting up non-custodial Bitcoin, Lightning and self-sovereign identity wallets is still complicated for technically unsophisticated users. As part of the work on the Growr protocol, we will seek the most user-friendly implementations for accessing the protocol, including facilitating access through solutions such as self-sovereign identity agents, community custody and USSD interface.

Final notes

Work in progress

This Growr protocol's documentation is a work in progress, intended to present the high-level design of the protocol for public feedback. It should not be considered complete or final. Future revisions will address incomplete elements and currently unforeseen aspects and issues.

The present Growr documentation version is 0.7 from May 2023.

Feedback and contribution

We are developing the Growr protocol as an open-source project. Lending, and especially *decentralized micro-lending*, is a very complex topic and many aspects are yet to consider. We welcome your input on how to improve the protocol and support its development.

To provide your feedback, please submit an issue or a pull request in the [Growr documentation repo on GitHub](#), or send an email to info@growr.xyz.

Additional information

- Growr repos in [GitHub](#)
- Growr [official website](#)
- Growr on [Twitter](#)

References

- [1] "The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19". The World Bank. Source: <https://www.worldbank.org/en/publication/globalfindex>. Accessed in August 2022.
- [2] Ledgerwood, Joanna et al. (2013). "The New Microfinance Handbook: A Financial Market System Perspective". The World Bank.
- [3] International Finance Corporation. "MSME Finance Gap, Assessment of the Shortfalls and Opportunities in Financing Micro, Small and Medium Enterprises in Emerging Markets". 2017. Source: <https://www.smefinanceforum.org/data-sites/msme-finance-gap>. Accessed in August 2022.
- [4] Stiglitz, Joseph E., and Andrew Weiss. "Credit Rationing in Markets with Imperfect Information." The American Economic Review, vol. 71, no. 3, 1981, pp. 393–410. JSTOR, <http://www.jstor.org/stable/1802787>.
- [5] Roodman, David (2011). "Due Diligence: An Impertinent Inquiry into Microfinance". Center for Global Development.
- [6] Sinclair, Hugh (2012). "Confessions of a Microfinance Heretic". Berrett-Koehler Publishers.
- [7] Alfonsi, Sharyn (2022). "Bitcoin Beach: How a town in El Salvador became a testing ground for bitcoin". CBS News, 60 Minutes. Source: <https://www.cbsnews.com/news/bitcoin-beach-el-salvador-60-minutes-2022-04-10/>. Accessed in August 2022.
- [8]. Tovar, Mauricio et al. "Whitepaper Tropykus" [In Spanish]. Source: <https://tropykus.com>. Accessed in August 2022.
- [9] Sovryn. "Zero: Protocol for Zero-Interest Loans". Source: <https://wiki.sovryn.app/en/sovryn-dapp/subprotocols/zero-zusd>. Accessed in August 2022.
- [10] Wang, Lin and Luo (2018), "Blockchain, bank credit and SME financing". DOI: 10.1007/s11135-018-0806-6.
- [11] Cummins, Lynn, Bhaird and Rosati (2019), "Addressing Information Asymmetries in Online Peer-to-Peer Lending". DOI:10.1007/978-3-030-02330-0_2.
- [12] Consensys, "Blockchain for Decentralized Finance (DeFi)". Source: <https://consensys.net/blockchain-use-cases/decentralized-finance/>. Accessed in August 2022.
- [13] Lerner, Sergio Demian (2019). "RSK: Bitcoin Powered Smart Contracts". Source: <https://www.rsk.co/Whitepapers/RSK-White-Paper-Updated.pdf>. Accessed in August 2022.
- [14] World Wide Web Consortium (2022). "Decentralized Identifiers (DIDs) v1.0. W3C Recommendation, 19 July 2022". Source: <https://www.w3.org/TR/did-core/>. Accessed in August 2022.
- [15] World Wide Web Consortium (2022). "Verifiable Credentials Data Model v1.1. W3C Recommendation, 03 March 2022". Source: <https://www.w3.org/TR/vc-data-model/>. Accessed in

August 2022.

[16] La Prensa Grafica (2021). "Usurious interests increase uncontrollably after the quarantine in El Salvador" [In Spanish]. 10th Jan 2021. Source:

<https://www.laprensagrafica.com/elsalvador/Intereses-usureros-aumentan-sin-control-tras-la-cuarentena-20210110-0089.html>. Accessed in August 2022.

[17] Yunus, Muhammad (1998). "Banker to the Poor: Micro-Lending and the Battle Against World Poverty". PublicAffairs.

[18] Chainalysis (2021). "The 2021 Geography of Cryptocurrency Report".

[19] Founder's Field Guide podcast (2021). In the episode "David Velez: Building the Branchless Bank". 8th July 2021. Source: <https://www.joincolossus.com/episodes/16951337/velez-building-the-branchless-bank?tab=transcript>. Accessed in August 2022.

[20] Klapper, Leora, Annamaria Lusardi and Peter van Oudheusden (2014). "Financial Literacy Around the World: Insights from the Standard & Poor's Ratings Services Global Financial Literacy Survey". Source: <https://gflec.org/initiatives/sp-global-finlit-survey/>. Accessed in August 2022.

[21] Fedimint. Source: <https://fedimint.org>. Accessed in August 2022.

[22] RSK Network Statistics. Source: <https://stats.rsk.co>. Accessed in August 2022.

[23] Convergences: Microfinance Barometer 2019. Source: https://www.convergences.org/wp-content/uploads/2019/09/Microfinance-Barometer-2019_web-1.pdf. Accessed in August 2022.

[24] TechCrunch: Kickstarter plans to move its crowdfunding platform to the blockchain. Published on 08 Dec 2021. Source: <https://techcrunch.com/2021/12/08/kickstarter-plans-to-move-its-crowdfunding-platform-to-the-blockchain/>. Accessed in August 2022.