



# COLU LOCAL NETWORK (CLN)

LOCAL PAYMENT NETWORK



WHITE PAPER

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## 1. ABSTRACT

The Internet is making its way into every part of our lives. With the speed of adoption increasing, technical barriers are being lowered and we find our physical and digital lives beginning to integrate, creating a huge impact on millennials. They are the first digital-native generation to be born into this world and the largest generation in history—significantly larger than the baby-boomer generation, and are expected to be in control of 24 trillion dollars of the world's wealth by 2020.

They are more likely to live in cities, they own fewer cars, and they choose their brands based on values like ethical sourcing, social justice, and environmental effects. They are looking for meaning and often find it in making a positive impact on the community around them. As physical cash is being replaced by mobile payments, their activities, like shopping for groceries and settling with-friends become digital transactions that reflect their lives and are managed by banks, and credit and tech companies and are accessible only to large retailers.

A community-native currency for digital-native generations could make the digital economy equally accessible to everyone. A fresh approach to community banking would provide every community it's own local payment network, where transactions are verified P2P and intermediaries are removed, improving the cost and efficiency of digital payments and creating a liquid economy in which this new asset type could give participants more control over their wealth by reducing their dependence on centralized monetary institutions.

### 1.1 BACKGROUND

A community currency is a secondary medium of exchange, store of value, and unit of account. Historically, the demand for alternative payment channels is often seen embedded in sociocultural patterns, evident in the exchange of anything from wooden chips to babysitting vouchers. <sup>[1]</sup> Community currencies have attracted attention from academics and policy makers alike, due to their unique ability to produce and retain wealth within communities.<sup>[2]</sup> These currencies have the potential to increase overall profitability for local stakeholders and to facilitate countercyclical growth cycles and increased social welfare.<sup>[3]</sup> The consensus among consumers and researchers alike indicates a set of behavioral, cultural, and socially cohesive aspects of community currencies to be the primary growth drivers in both rural and urban economies. <sup>[4]</sup> The intuitive notion that community-native currencies are a source of local growth and prosperity has led several projects to attempt to establish

local payment systems. However, due to a lack of sufficient infrastructure, previous community currency initiatives have failed to provide a secure, liquid, and scalable environment for financial transactions.<sup>[5]</sup> While the macroeconomic consequences of issuing digital peer-to-peer currencies remain hypothetical, regulators are exploring opportunities in distributed financial solutions.<sup>[6]</sup> As the notion of digital currency manifests itself in private and regulatory institutions, the efficiency, resilience, and accessibility of disintermediated digital payment infrastructure is gaining momentum with a broader audience.

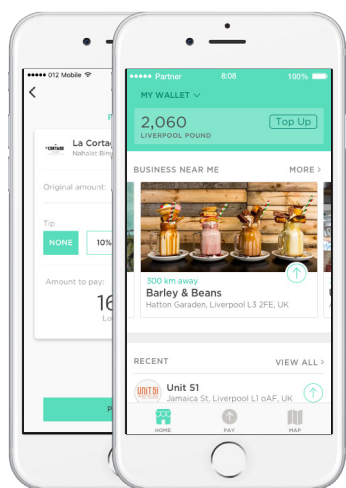
As a consequence of accelerating globalization, the diminishing frictions in cross-border commerce have incentivized corporate rent extraction through cost-externalization and the outsourcing of production. Encouraged by the continuation of open policies on multilateral trade, global supply chains have penetrated domestic markets, resulting in the incremental centralization of capital flows toward multinational organizations.<sup>[7]</sup> While the free movement of goods is imperative to open market, SMEs (small to medium size enterprises) get the short end of the stick, being unable to compete in their native markets. In particular, small businesses with less than 10 employees make up over 93 percent of all enterprise in the EU and account for around two-thirds of employment.<sup>[8]</sup> Yet, these small businesses often face difficulties accessing capital, with only 9 percent of lending in the UK allocated to SME's.<sup>[9]</sup> Local businesses face issues when entering the digital economy, as SMEs often pay the highest fees for payment processing, making for an uneven playing field for local initiatives.

The emergence of blockchain technology has significantly lowered the entry barrier for digital payment processing solutions. This radical innovation has enabled Colu to provide social payment solutions, empowering communities to build resilient and transparent economies. Colu is firmly rooted in an open-source developer community as a leading part of the [ColoredCoins](#) project, and is investing additional resources in open-source code with the latest release of [Bankbox](#). This commitment is reflected in the initial release of the Colu Local Wallet.

## 2. COLU - COMMUNITY CURRENCIES

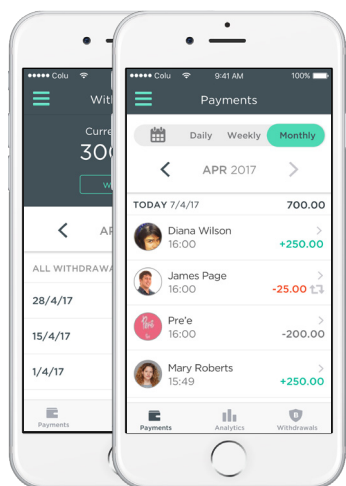
Colu has introduced new decentralized monetary system, allowing individuals and business owners to transact in their local economies without any friction. We believe in producing sustainable local growth by providing an added value and reduce fees for businesses. Enabling participants to create active local financial ecosystems empowers local entrepreneurship and creates a business-enabling environment at the local level.

The Colu Local Wallet, introduced to our four member communities since January 2017, gives users access to community currencies, intended to be the closest digital equivalent of physical cash, allowing them to connect and trade with their peers. Through the app, consumers can discover new shops, local to their community, and trade in the knowledge that their contribution constitutes a step toward sustainable local development. These initial experiences in community currencies have taught us the value of a strong focus on UX and upstream compatibility as the standardization of web-based payment systems improves.



### CONSUMER APP

Using Colu's digital wallet app, consumers can make purchases at participating businesses and transfer community currencies (pegged to fiat currency) to one another. Through the app, Colu provides economic incentives like special offers, discounts, and consumption-based rewards. In addition, consumers can use the app to discover new businesses and explore their local communities.

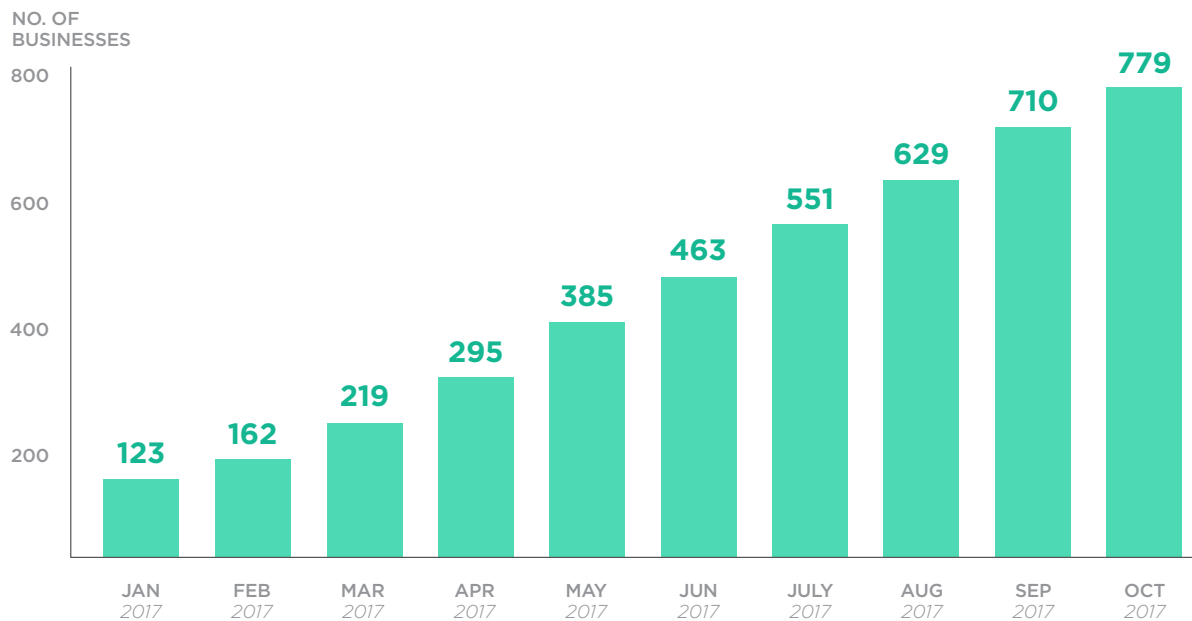


### BUSINESS APP

Colu's business app, allows business owners to accept payment in community currencies, and to use these funds to purchase directly from other participating businesses or to withdraw the funds, transferring them to their bank accounts. The business app provides BI, reporting and marketing tools.

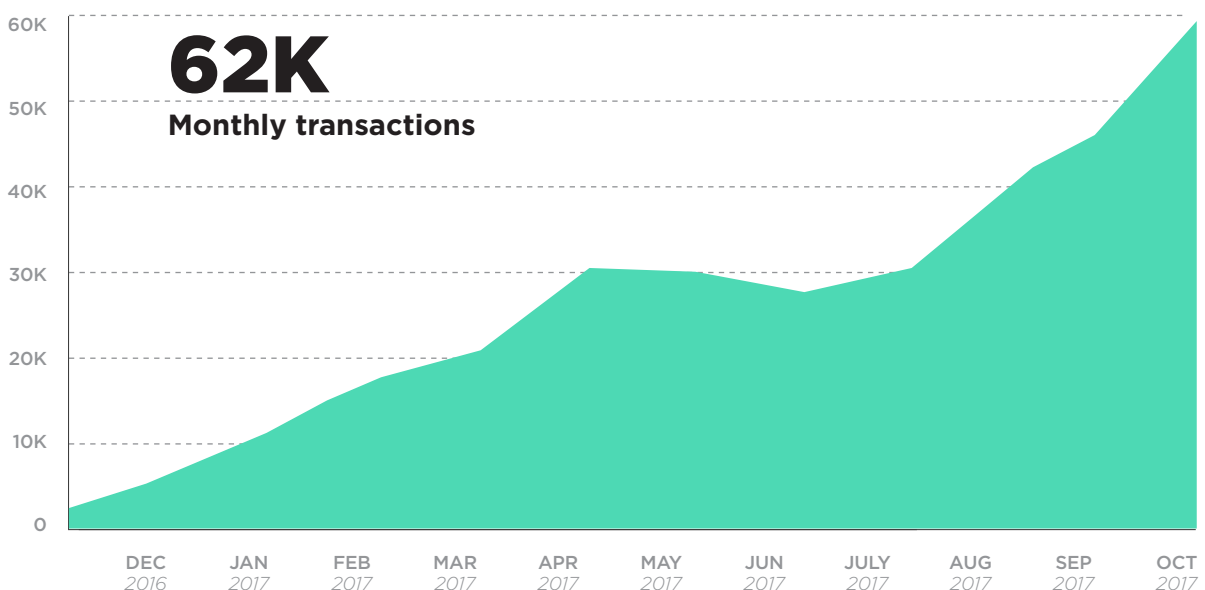
Colu's unique approach to building payment networks from the ground, by invoking the power of communities, has been proven to create long-term relationships with local businesses. This is reflected in a steady growth in partnerships with merchants that advocate for and accept payments using Colu's consumer and merchant apps, mentioned above.

### Businesses adoption



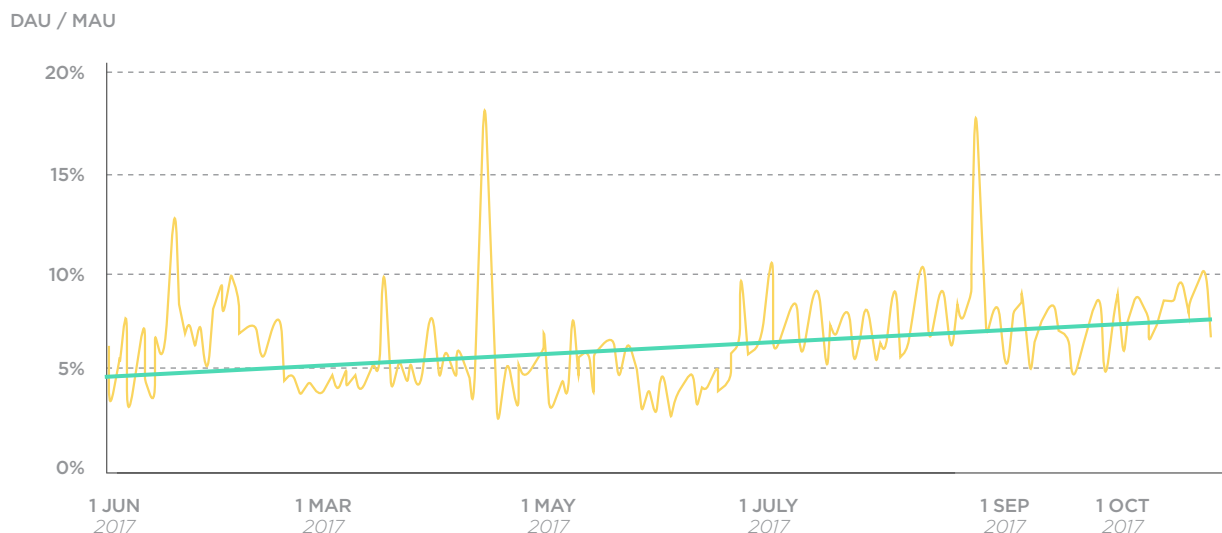
The intuitive appeal of shopping locally to support your community, combined with the economic incentive offered by local discounts, has produced a steady growth in monthly volume.

### Monthly transactions



The goal of creating a socially cohesive payment infrastructure driven by community engagement, suggests a potential for retention superior to digital payment industry standards, as users identify with the service as their way of supporting their communities.

## Engagement



Through the Colu Local Wallet, Colu has incentivised consumers to purchase locally, fostering growth at the local level. The socially cohesive element in community currencies not only improves welfare, it may also increase circulation and offer liquidity, even in the face of national fiscal instability. While the creation of community currencies has enabled communities to produce and retain surplus value, certain complications have arisen. Initial stakeholders struggle to provide liquidity for new community currencies. Even with a highly efficient and accessible payment infrastructure this makes bootstrapping new currencies a cumbersome task. Additionally, Colu's community currencies exist independently of each other without the ability to exchange currencies across ecosystems. While this essential aspect of community currencies promotes retention, users are restricted to holding only one balance in one community currency at a time. This hinders trade opportunities among stakeholders committed to supporting local economies. Simultaneously, the restrained size of the individual local network does not encourage fiscal stimulation through value-added services provided by internal or external partners.

Until today, Colu has maintained custodial responsibility for consumer funds, acting simultaneously as a financial gateway, community manager, and systems

administrator. Through the direct exchange of fiat to pegged crypto-fiat, the Local Wallet has enabled users to trade in community currencies issued by Colu, against a nominal fiat deposit.

The flourishing activities in Colu's four existing communities have demonstrated a strong interest from local merchants and consumers, expressed in the form of a steady growth pattern and strong retention capacity in the community currencies concerned. While the Local Wallet provides value for communities, scaling the current model would lead to the centralization of authority, as Colu would be required to act as the governing actor in all active ecosystems. However, it is not our intention to become a centralized community-management organization in order to enable local growth; rather, we believe that such bottom-up growth would benefit from a decentralised group of stakeholders that can take a variety of roles in the value chain and enable communities and consumers to work with their choice of service providers. Therefore, we are introducing the Colu Local Network (CLN) as a means of enabling the growth of decentralised local communities and network development of related services that will support organizations joining the CLN ecosystem and thus becoming part of the value chain of local communities; we also intend to ease their access by means of open-source and an open protocol for local communities.

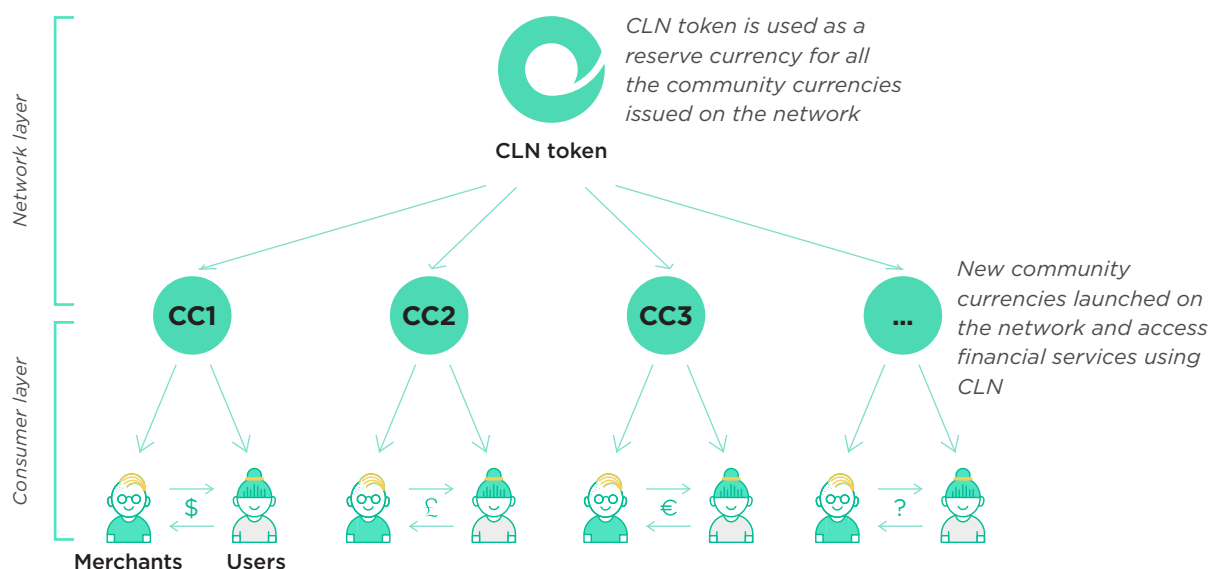


### 3. SCALING COMMUNITY CURRENCIES - PROPOSED CLN ARCHITECTURE

The CLN will empower local economies by connecting them to a global network of value, thanks to the inclusion of additional stakeholder roles. While operating primarily in the back-end, the CLN will be fungible, representing an index value of the community currencies issued on the network. The CLN could provide a medium for the payment of network and service fees, incentivizing financial institutions to act as gateway intermediaries to the distributed local payment infrastructure. This will provide access to external financial stimulus, furthering local consumption and circulation. The CLN's universal fungibility enables communities to bootstrap by providing new currencies in local markets and will provide the ability to develop access to instant liquidity. Then, new community currencies can be created against liquidity provided by the CLN, held at either financial institutions or with Community Administrators.

#### 3.1 THE CLN NETWORK STRUCTURE

The CLN will introduce a new financial architecture that will act as the backbone of local economies, providing liquidity and a reserve of value for new community currencies. By acting as a capital reserve, a decentralized medium of exchange, and a medium for the payment of network fees, the CLN will operate primarily as a back-end layer, facilitating the development of essential network services. Each individual local economy will issue a separate community currency, in parallel to each other. This will enable communities to retain and create value in their community currencies, while keeping a reserve of value and accessing valuable network services.



### 3.2 STAKEHOLDER ROLES AND GOVERNANCE IN THE CLN

The CLN consists of multiple stakeholders, each playing a fundamental role in establishing, developing on, and maintaining the network. The roles in the ecosystem are designed to incentivize the circulation of community currency through the distribution of custodial rights and the introduction of an open-source toolbox for the network development and integration of value-added banking services. Further community development on the CLN, will enable the different stakeholders to provide or receive the followings:

Role	Description
Gateways	Gateways accept fiat deposits and act as custodian for user funds flowing in and out of the network. A gateway can be any institution that acts as a custodian for funds, including financial institutions, etc. These institutions provide KYC and regulatory framework to the money circulated in the network as they act as entry points for fiat currencies. Gateways will be an essential part of the network and are rewarded in CLN for services provided.
Community Administrators	Community Administrators issue community currencies through the CLN, acting as custodians of community funds. This role can be taken by credit unions, merchant networks, local businesses, consumer clubs, and others that encourage local spending, lending, crowd-funding, and credit.
Merchants	Local merchants accept fiat payments for the services they provide. Merchants pay network fees in the community currencies to cover the operation of the network, and are rewarded in community currencies for transactions that take place on their terminals.
Consumers	Consumers pay at merchant terminals with fiat currency, as they do today. In our model, consumers will be rewarded with a percentage of their purchase returned in the community currency, which can then be used for purchasing locally.

The distribution of roles at various levels of responsibility in terms of custodial rights and system maintenance serves the purpose of incentivising a healthy ecosystem for the allocation and circulation of assets in disintermediated payment infrastructures. It also enforces the security and performance requirements of the network. A comprehensive distributed governance model is a prerequisite for scaling the CLN as more community currencies join.

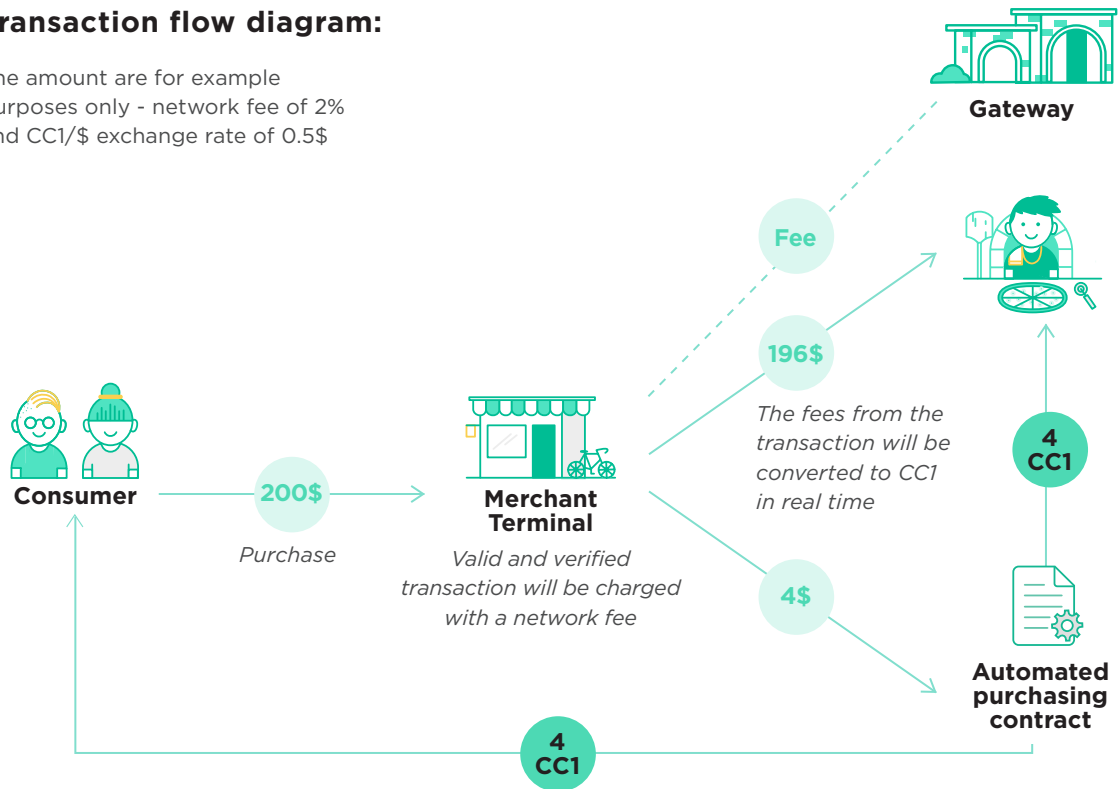
### **3.3 PROOF-OF-RECEIPT**

A Proof-of-Receipt mechanism that can validate transactions, subtracts transaction fees, and distributes community currencies among stakeholders. The transaction verification simultaneously grants authorities instant access to all transactions within the network, enabling real-time auditing of community currencies. Through the implementation of the PoR mechanism, merchant terminals will be able to handle fiat transactions that will enable in the back-end currency conversion, facilitating the seamless decentralized exchange of fiat to community currency. With each verified transaction, the merchant terminal produces a receipt containing essential payment details. The PoR function produces a hash of the receipt. The hash is processed as a transaction on the blockchain, effectively creating an immutable succession of all verified transactions in the CLN. Implementing an immutable storage of receipts specifically appeals to authorities or institutions with rigorous data policy requirements.

Enabling transparency through the PoR functionality allows straightforward KYC/AML compliance allowing regulators to pursue effortless audit of the CLN payment infrastructure to reduce the friction of bookkeeping for SMB's. This enables direct access to permanently consolidated numbers, as any verified transaction, in itself, is the settlement. The duty of ensuring compliance within the networks will be delegated among the relevant responsible stakeholders in the communities, eliminating bottlenecks for network growth. The PoR mechanism will efficiently convert and distribute community currency while collecting network fees and integrating payment of the network fee to the gateway that enables the transaction:

### Transaction flow diagram:

The amount are for example purposes only - network fee of 2% and CC1/\$ exchange rate of 0.5\$



With every consumer-to-merchant transaction, a network fee will be charged on the merchant side. The automated purchasing contract queries the network for a real-time quote on the CLN-versus-community-currency exchange rate, purchasing the responding amount from the allocated community pool. Through the automated acquisition contract powered by CLN, a certain percentage of the purchase value paid at merchant terminals is exchanged into the community currency and distributed between the merchant and the consumer. The exchange of a nominal network fee ensures an equitable and consistent distribution of the community currency, correlating the currency supply in circulation with the expansion of the network. The increased activity of local purchases taking place through merchant terminals will increase the demand for CLN exponentially with the expansion of the community currencies.

### **3.4 BOOTSTRAPPING A COMMUNITY CURRENCY**

Introducing the CLN enables stakeholders to bootstrap and maintain a self-sustainable distributed financial infrastructure in their community. The CLN thus solves the fundamental chicken/egg problematic, as engaged communities will be able launch currencies regardless of size, location, or transactional volume. The implication is a truly agnostic and distributed financial framework, facilitating a safe and transparent payment system, accessible to all.

#### **A process of local currency issuance is as follows:**

1. Initial stakeholders launching a new community currency. After a vetting process, the initial parties will be assigned Community Administrator status, enabling them to allocate the initially converted funds in the CLN. All compliance functions will be further decentralized to stakeholders as the network expands.
2. Backed by the liquidity provided in the initially allocated CLN, the Community Administrators will manage the initial distribution of funds in the community currency, air-dropping currency to strategically selected stakeholders from the merchant network.
3. A selected amount of the community currency will be kept in a smart contract, securing the fungibility and liquidity for the pair CLN/CC.
4. The Community Administrators will have access to tools that allow them to manage and allocate funds in a transparent and optimal way during their day-to-day operations. The community currency will be distributed through the PoR to all the consumers and merchants of the local community.
5. As the local community currency network expands, new gateways will integrate, utilizing the CLN Open-Source Toolkit. Through the CLN, external financial institutions will be able to offer value-added services, further stimulating local development and growth.

### **3.5 CLN FUTURE RESEARCH FOCUS**

With the release of the CLN token, developers and other stakeholders are invited to interact, experiment, and contribute to the continuous development of new infrastructural capabilities and local business models and financial services. The following are the main fields of research for the CLN Open-Source Community:

Project	Description
Open-Source Banking Tools	Interoperability with locally existing financial infrastructure is a primary concern in the financial industry. Access to value-added services is essential for the continuous development of community currencies. CLN community will build a set of open-source developer tools for accessing and operating on the network, utilizing the CLN. This will enable third-party actors to engage with the community and offer local banking options, as part of an ongoing dialogue with central banks and other external stakeholders.
Off-Chain Transactions	Scalability is a common challenge for all public blockchains. Efforts by the community to solve the issue has resulted in the emergence of off-chain protocols, the most advanced of which is the Lightning network. Different connectors to different blockchains will allow the CLN to create true interoperability by facilitating cross-blockchain transactions between different blockchains.
Key-Management Services	Private key management plays an essential role in the user retention strategy for any distributed payment service provider utilizing a PKI infrastructure. Testing different approaches for private key management will help solve one of the main obstacles to mainstream adoption.
Transparent Governance Models	To facilitate a transparent financial environment, users will be able to access financial benchmarking data on the economic performance of the community currency.
Tools for Regulators	To ensure full compliance and auditability from regulators and financial institutions, As part of the open-source developer tools, key metrics and usage info could be accessed by the public to transparently track the performance of the economy. Building on the PoR functionality, this will also enable the auditor to trace transaction trails end-to-end and the development of better compliance functionality.

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## 4. SUMMARY

The CLN allows communities to engage and consume locally via community currencies. The CLN creates a network of value to support local economies that are liquid and interconnected. The innovation would enable the creation of local ecosystems, lowering the barriers for gateways and Community Administrators to operate and facilitate local consumption and credit, etc.

The merchants and consumers in these economies will still be able to trade in fiat money, as they do today, and will be rewarded for their support in the local community by the Proof-of-Receipt mechanism. The Proof-of-Receipt mechanism further ensures an incentive model for the economy and makes auditing possible. Thanks to the CLN, the value and throughput of local communities can grow and revenue can be distributed to the real local stakeholders—namely, local businesses and consumers.

### 4.1 ACKNOWLEDGMENTS:

This is a collaborative effort of multiple individuals within the Colu team, and with reviews, comments and contributions from Colu's board members, advisors, and partners. This paper was written by Mark Smargon, Amos Meiri from Colu, Dr. Omri Ross and Johannes Jensen from Blockchain Labs and the University of Copenhagen. The paper was laid on the foundation and contributions from Eden Shochat, Tal Beja, Rotem Lev and Elad Shabi.

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