



Financial Market Infrastructure

Levelling the Playing Field

Open Financial Market Infrastructure

Levelling the Playing Field

Handing cash from one person to another is a natural transaction in modern society. It is a transfer of wealth that requires no more than trust in an issuing authority, who promises value to both parties equally. Notwithstanding monitoring or reporting implications, this transfer of wealth is not considered a controlled activity in any jurisdiction in the world.

Peer to peer (P2P) transactions in a digital context are treated the same as cash by most of the world's regulatory bodies and financial institutions. In recent publications, the International Monetary Fund¹ (IMF), the Financial Action Task Force² (FATF), the Bank for International Settlements³ (BIS), the World Bank⁴ (WB), the European Central Bank⁵ (ECB) and the Organisation for Economic Co-operation and Development⁶ (OECD) have all reinforced the thesis that the core activity of digital P2P value transfer is not inherently a controlled activity, drawing parallels to cash transactions.

To be clear, this does not imply that radical decentralised finance is on the horizon. Far from it. These world bodies recognise that while the activity of value transfer is not controlled per se, the environment in which these activities take place should definitively be one that supports levels of oversight and compliance required of traditional finance (TradFi). This has led directly to the creation of a class of regulated entity responsible for virtual assets. Over 50 countries have created Virtual Asset Service Provider (VASP) legislation for this purpose.

The innovation of decentralised finance is transformational, but it is the convergence with conventional legal structures and traditional financial contracts that establishes trust and creates space for licensed digital asset service providers to deliver true peer-to-peer transaction capabilities.

A key innovation is tokenisation, representing assets digitally on a programmable platform. Tokenised assets fundamentally reshape financial transactions, increasing their speed and accuracy, while decreasing costs and risks. These new financial instruments are rapidly moving from pilot to deployment and are core to the transformation of finance.

Adding to tokenisation is the advent of the unified ledger. Unified ledgers provide a quantum leap over existing financial market infrastructure (FMI) by seamlessly integrating the multiple siloed systems for securities, payments, messaging, clearing and settlement. Furthermore, using tokenised money, unified ledgers automate the complex sequencing of transactions, opening the door to entirely new types of economic arrangements.

However, projects that utilise these capabilities have mostly been commercial bank led and principally woven into FMI directed at wholesale challenges, with an expectation that there may be trickle down to a retail level.

This paper describes an Open FMI (Open) that utilises the innovative capabilities of tokenisation and advanced ledgers, together with traditional legal and financial constructs to practically address more widespread systemic challenges. It describes universal access

¹ [The Rise of Digital Money, IMF, 2019](#)

² [Targeted Update: Implementation of Standards on Virtual Assets and VASPs, FATF, 2024](#)

³ [Central Bank Digital Currencies, BIS, Oct 2020](#)

⁴ [Distributed Ledger & Blockchain, World Bank 2017](#)

⁵ [Crypto Assets: Implications for Financial Stability, ECB, May 2019](#)

⁶ [Global Blockchain Policy Forum, OECD, 2019](#)

to affordable financial services for wholesale and retail transactions equally, serving micro customers with the same ease and speed as financial institutions. In practical terms, it describes how banks can clear and settle without correspondent banking; how fintechs and neobanks can be like the banks they depend on; how businesses and merchants can have direct access to financial services; and how any individual regardless of wealth can save, borrow, lend, transfer, remit or invest money without exploitation.

Rather than a paper on possibilities, this paper describes an operating infrastructure that empowers businesses to deliver financial market access to their customers, today.

1 TRUST

Trust in financial markets is complex. Traditionally, it comes from regulatory oversight and legal protections, supported by transparency, reputation, and reliable practices. Banks, exchanges, clearinghouses, and other financial intermediaries have been trusted by central regulatory authorities for many years to ensure the validity and integrity of market systems by acting honestly and for the benefit of all to safeguard assets, process transactions, and maintain records.

Distributed ledgers challenge the traditional model by sharing trust among a network of participants to validate and record transactions usually by anonymous consensus. This shift fundamentally redefines systemic trust. Rather than a central authority, it is embedded in the technology of a network to safeguard and process transactions through cryptographic technique, transparent protocols, and immutable records.

Distributed trust is not a new concept. From medieval guilds to credit unions and mutual companies, consensus between participants rather than through a central authority has deep historic precedence. However, the fundamental shift that accompanies many of the distributed ledger projects today is not just the lack of a central authority, but the absence of regulatory oversight and legal protections. Recent years are littered with failed projects that have cost participants vast amounts of money because of these absences.

However, there are basic, but significant nuances in the manner in which distributed ledgers are designed, constructed and function that are not fully understood by many. These nuances play a major role in defining the quality of trust that a ledger establishes.

Distributed ledgers can operate as either public or private networks, each of which can be either permissioned or permissionless. The structuring of these configurations caters to different needs and philosophies within digital and financial ecosystems, representing different levels of inherent trust.

Public and permissionless networks like Bitcoin and Ethereum exemplify the most open form of distributed ledger; trust in the crowd. Most networks require a level of KYC, but access is open to anyone, allowing users to participate in transaction validation and access the ledger without permission from a central authority. These networks are embraced by a staunch cryptocurrency community but have yet to find trust from the public at large. Institutions participate but institutions tend to trust peers over crowds.

Private and permissioned networks are favoured by traditional banks, financial institutions and other enterprises. These networks restrict access to a select group of participants who are granted permission to participate in the network. This controlled environment allows institutions to maintain oversight and compliance, ensuring that the network operates within designated proprietary frameworks and follows specific standards.

These networks are effectively digitised versions of moated conventional TradFi systems. It is an approach reminiscent of the early days of the automobile industry when Henry Ford disintermediated the horse. He famously quipped that if he had asked customers what they wanted, they would have said a faster horse. Private networks are faster horses.

Public and permissioned networks strike a balance between the decentralisation of public networks and the security of private networks. When combined with governance, this configuration becomes particularly well-suited to financial market infrastructure, where regulatory compliance, data integrity, and identity verification are paramount.

This type of network structure is not as common due to the demands of permissioned consensus architecture on a network. That is, participants that validate transactions in these networks are selected (permissioned) through a rigorous process that may include identity verification, reputation assessment, compliance checks, approval by governing bodies, and/or technical competence. As a result, trusted, permissioned network validators are usually highly regarded institutions.

Open shares the public, permissioned philosophy. However, more than rigorous screening Open mandates that each permissioned validator is a fully regulated, jurisdictionally relevant, Financial Services Provider (FSP). Without exception, the responsibility for maintaining regulatory standards and safeguarding financial network integrity should rest entirely with organisations that are best equipped to manage these critical functions. Open is the only network in the world, public or private, permissioned or permissionless, that specifically requires jurisdictionally regulated, trusted validators.

Moreover, Open requires every wallet to be onboarded via a fully regulated, permissioned validator. This means that every wallet, representing individuals and enterprises alike, must go through a validation process for multiple levels of transaction permission. Each wallet is immutably linked to the specific Key Individual (KI) at the onboarding, licensed, permissioned validator. That KI accepts responsibility for the activities of the user.

This unique characteristic gives regulators full transparency (and confidence) in the system, enabling a direct line to be drawn to an accountable person responsible for the Know Your Client (KYC), Anti-money Laundering (AML) Counter Terrorism Financing (CTF), FATF Travel Rule, as well as suspicious transaction reporting (STR), along with any other regulatory requirements, for every wallet and every transaction.

Further, Open proactively enforces compliance on all transactions. The verified KYC status of each wallet is encrypted in a KYC non-fungible permission token (NFT) that resides in every wallet. It indicates the KI as well as the level of compliance attained. This NFT, managed via a smart contract, is integral to every transaction. Transactions that lack an appropriate permission token are not just prohibited they are computationally impossible.

Open's trust architecture leverages the systemic rules and standards that exist in jurisdictional market regulation to ensure validity, integrity and honesty in safeguarding assets, processing transactions, and maintaining accurate publicly available records without centralised oversight. It maintains confidence in a system and its transactions through decentralised cryptography, protocols and immutability.

The fundamental shift from centralised to distributed trust is in no way blunted by this process. In fact, Open enables distributed trust by allowing the various participants to financial market infrastructure to perform their specific goals far more effectively. Regulators oversee the intermediaries that they are mandated to regulate with greater

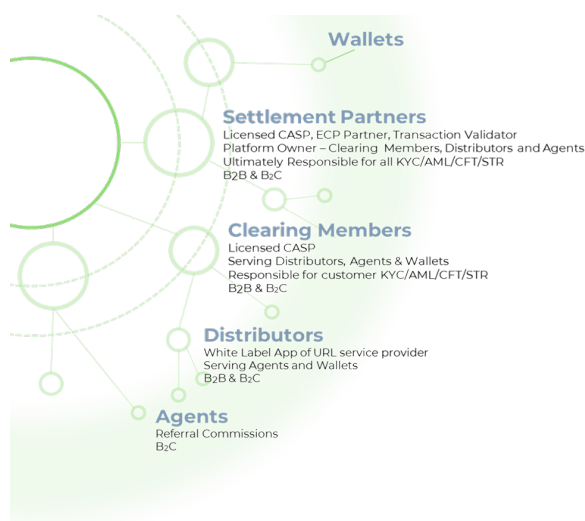
insight to more accurate and more timely data. Intermediaries are provided with better tools to automate their compliant interactions with users. And credentialed users know that every other participant is an equally credentialed counterparty. Trust is established.

2 ACCESS

Affordable access to capital is often perceived as an issue for the poor. In reality, it is a systemic problem shaped by regulatory biases and risk-averse policies disproportionately limiting the flow of capital to the entire structure of capital distribution. Access is as much an issue for the banks in Africa as it is for the individual on the street. It reduces access to global markets, impedes cross border trade, shifts flows to informal channels and ultimately negatively impacts widespread economic growth.

Most of the ambitious FMI projects of TradFi focus on wholesale clearing and settlement challenges on the basis that solving global wholesale issues will trickle down to solutions for affordable access throughout the economy. As an enabling infrastructure, Open is designed to directly address challenges across the full spectrum of market participants from spaza shops to regional banks and even to global market participants.

Open effectively operates as an interoperable platform of platforms. Each of the regulated permissioned validators plays a key role in maintaining order and integrity in the system but also serves as platform owner. As a platform owner, they can expand their reach to additional market participants who they incentivise to fulfil specific roles. Multiple regulated permissioned validators mean multiple platforms of interoperable participants.



Regulated permissioned validators fulfil the role of Settlement Partner (Partner) in Open. They are called Partners because they participate in legal partnerships that enable the tokenisation of money in Open. In addition to this function, they also serve a settlement function by participating in the consensus validation of transactions. As regulated entities, Partners onboard and are responsible for the compliance of every user on their platform with respect to regulatory enforcement requirements (KYC, AML, CTF, STR).

Partners are appropriately licensed and regulated FSPs, typically banks, asset managers, wealth managers, or Payment

Services Providers (PSP) with the capacity and willingness to validate transactions, take on compliance responsibilities and have a desire to actively extend their reach to a greater number of customers through regulated digital FMI. Partners attract users directly through products and services, but also by recruiting other entities to work with them to provide products and services.

Clearing Members (Members) are also fully regulated licensed entities that access Open through an economic relationship with a specific Partner. Members can also onboard users, taking on the responsibility for their conduct and compliance in the network. They are effectively minority owners in a Partners platform with an ability to issue tokens through their Partner but have no legal standing in the underlying issuance partnership. Members, made up of banks, FSPs and other appropriately licensed and regulated entities such as

Authorised Dealers (AD), Authorised Dealers in Foreign Exchange with Limited Authority (ADLA), International Money Transfer Operators (IMTO) or Crypto Asset Service Providers (CASP). They do not participate in consensus validation for network transactions, but they do own their relationship with customers and can extend their own influence in the network by recruiting distributors and agents to bring them users.

Distributors are providers of products and services directly to customers, either physical or virtual. Ranging from mobility to payroll, construction to investment, manufacturing to lending, these businesses benefit from financial market infrastructure that gives them access to high quality digital money, enhancing their product and service offering to their customers. They operate through direct economic relationships with either Partners or Members in the network who retain responsibility for compliance, monitoring and reporting. Distributors can also recruit agents to support their businesses.

Agents maintain an economic relationship with Partners, Members, or Distributors earning commission for bringing users into the network. They have no network responsibilities but have the trust of their customers. They are the thousands of spazas, kiosks, hair salons, cafes, gyms, repair shops, or any other small business or business group in the economy.

Every Open Partner creates a platform of Members, Distributors and Agents that reach users across the economy from businesses to individuals of all sizes. With multiple Partners, there are multiple platforms that enable users to transact peer-to-peer without having to rely on banking system transaction rails.

Multiple platforms operate on the same interconnected, interoperable infrastructure in a standardised, uniform manner. Open introduces this as a Regulated User Network (RUN). Citi and other institutions describe a Regulated Liability Network (RLN)⁷ emphasising regulated liabilities that serve as reserves in a network of select institutions. A RUN similarly requires that reserves against digital money are regulated instruments. However, as a more expansive user centric network, the Open RUN not only requires that all network validators are regulated, but that all user wallets are regulated and compliant.

Moreover, Open supports non-hosted compliant wallets. That is, each wallet is a smart contract that references a specific data safe that holds users value. Value in a wallet is not a segregated portion of a pooled FSP or Exchange account, but entirely unique to each user. Permissioned control, through signing authority, are issued by and can be held with a Partner. However, wallets in Open are portable. A user can claim the signing authority to a wallet and hold them or lodge them with another Partner, who accepts the KYC credentials of the user, without impacting the value held in the wallet. That level of flexibility and user control is unique in a digital money network.

Like the ledger, the whole of the network is a rethink from the ground up, designed to enable greater access to financial services. Banks that lack correspondent banking relationships have access to wholesale transactions. SMEs that cannot afford the fees of conventional systems, can reverse that constraint and earn money to provide digital services. Individuals that do not trust TradFi, can access services through service providers they trust, like their local spaza shop owner.

More than that, transactions between banks of any size have the same standing in the network, with the same protections and frictionless access as an individual's purchase of a loaf of bread, remittance to send money home or investment of savings into a hard currency.

⁷ [Regulated Liability Network, Nov 2022](#)

Open is not designed to solve the challenges of TradFi in hopes that benefits will trickle down to the rest of the economy. It is user-centric infrastructure that levels the playing field for all, providing direct access to digital money and all the benefits it brings. It is a regulated network of platforms, designed to empower every user across the economy.

3 MONEY

Money today exists in a dynamic hierarchy⁸ flowing from central banks to various levels of commercial banks and asset managers, through non-bank financial institutions and businesses to individuals. Each level's liabilities serve as assets for the level below, creating a complex, fluctuating web of cascading credit quality.

Tokenised money involves converting rights to the liabilities that exist on the hierarchy into digital tokens, with central banks at the apex. Central banks issue cash and coins, as rights to a liability of the government, i.e., to stand behind that currency. Retail Central Bank Digital Currency (rCBDC) is intended to be the digital equivalent. A majority of the world's central banks have run experiments with both retail and wholesale Central Bank Digital Currencies (wCBDC)⁹ to assess the potential of digital money. Several factors stifle their issuance by larger economies, including governance and monetary control.

Commercial banks also create money by issuing loans that exist as liabilities on their balance sheets. This form of money represents 90% of money in use today.¹⁰ Some of the larger banks are experimenting with tokenising these liabilities to create Deposit Tokens. While addressing real-world challenges, bank-led projects tend to treat tokenisation as an incremental improvement on outdated TradFi infrastructure in order to protect their hold on the global wholesale settlement industry, which is roughly \$53 trillion¹¹.

Stablecoins are relatively new, distributed ledger tokens, initially conceived as a safe haven for crypto trading markets. Stablecoins are typically tied directly or programmatically to a specific fiat currency. Spectacular failures have highlighted some of the transparency and regulatory challenges, but several stablecoin projects have matured into a form of tokenised money. The two largest, Tether (USDT) and Circle (USDC) actively appear in the movement of money through financial transactions systems, supporting PSPs, merchant acquirers and e-commerce.¹²

Tokenised funds are also appearing, creating a new and very interesting dynamic. BUIDL¹³ is a token that represents fractionalised ownership in a Blackrock fund made up of cash, repos and US treasury bills, effectively a Money Market Fund (MMF). Franklin Templeton is also a pioneer in the tokenisation of money market funds, launching their Onchain US Government Money Fund in tokenised form.¹⁴ Hamilton Lane has tokenised a short-term private credit fund that targets floating-rate, senior secured private loans;¹⁵ not the same quality as US treasuries, but high-quality liabilities. Tokenised funds and other Real World Assets (RWAs) are expected to explode to trillions of dollars this decade.¹⁶

⁸ [The Inherent Hierarchy of Money, Mehrling, 2012](#)

⁹ [CBD Tracker, Atlantic Council](#)

¹⁰ [Token Deposits, Oliver Wyman, 2023](#)

¹¹ [Wholesale Global Market Report 2024](#)

¹² [Digital Currency Comes to Visa's Settlement Platform, Visa, 2021](#)

¹³ BUIDL stands for "BlackRock US dollar Institutional Digital Liquidity"

¹⁴ [Franklin Onchain US Government Money Fund, Franklin Templeton, 2023](#)

¹⁵ [Tokenised SCOPE, Hamilton Lane, May 2023](#)

¹⁶ [From Ripples to Waves, McKinsey, 2024](#)

Interestingly, while BUIDL targets institutions with its \$5million minimum investment, it is being used as collateral for the issuance of smaller investment tokens. MMFs have often been used as collateral in financial markets as regulators often consider them as ‘cash equivalent’ management tools.¹⁷ They are abundant and accessible in multiple currencies, actively traded in most financial markets around the world, and yield returns similar to central bank short term paper. More importantly, as a cash equivalent instrument, liquidation is not necessarily required for settlement of obligations.

Tokenised MMFs as cash equivalent collateral is groundbreaking. The inherent quality of underlying investment pools suggests that tokenised MMFs should be seen as High Quality Liquid Assets (HQLAs) in and of themselves.¹⁸ As such, tokenised MMFs are one of, if not the closest assets to CBDCs available to the private market. They are closer in overall quality of money to CBDCs than any of the liabilities that back deposit tokens while providing greater transparency.

Open embraces this innovative collateral approach, using tokenised MMFs as common settlement instruments (Reserves) for issuing Open Money (eCurrency). The significance of this is profound. The hierarchy of cascading quality of money is dissolved if every individual has access to a safe, secure, digital equivalent of the highest form of money in an economy and can use it electronically in any denomination down to fractions of a unit to buy, sell, send, receive, borrow, lend, invest and save. It is even more profound that every financial institution constrained by limited access to correspondent banking suddenly has access to high-quality, regulated, tokenised hard-currency money. Moreover, with the hierarchy dissolved, every participant has access to the yield on reserves that underpin the money they hold. Beyond profound, this is compelling.

Stablecoin issuers, like those behind USDT and USDC, generate the majority of earnings by failing to share the billions that are generated every day from underlying reserves. Tether made over \$4billion in the first half of 2024, principally from return on reserves.¹⁹

Now, Open enables peer-to-peer digital transactions, giving Partners that issue eCurrency stablecoins access to yield on the reserves and an ability to share yield with their customers. Moreover, Open empowers any enterprise in a network to issue fully backed, regulated eCurrency through their Partner, creating interoperable, tailored, branded, return-bearing digital money. Adoption becomes more than just convenience, cost saving and security; it is a highly competitive, lucrative, differentiating proposition.

Customers are able to transact their digital money peer-to-peer with any Open wallet. Transactions are free and instant. Settlement between wallets issued by the same Partner is internal; Reserves remain on the account of the issuing Partner. Settlement between wallets issued by different Partners means that the claim to the underlying collateral, the Reserves, together with the returns they generate move to the Partner of the receiving wallet. In TradFi systems, this is a T+n netting process. In Open, Reserves transfer seamlessly, simultaneously and instantly with the transaction.

Every token that resides on Open can easily and frictionlessly be swapped for another token or off ramped into fiat or other transaction channels. Interfacing with traditional money requires licensing and regulatory enforcement. Open embeds this requirement across all of its token transactions. As a result, an Open wallet can be used to make purchases or withdraw cash at points of sale, ATMs or e-commerce sites.

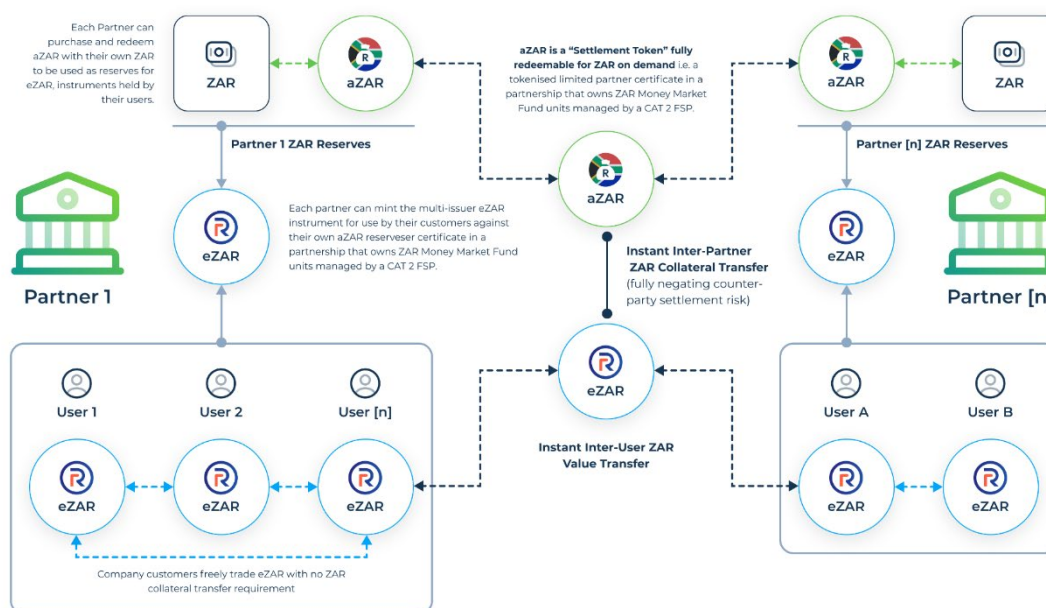
¹⁷ [Updating the Regime for Money Market Funds, FCA, Dec 2023](#)

¹⁸ [Collateral Opportunities, The Investment Association, March, 2024](#)

¹⁹ [Tether First Half Returns 2024, Tether.io](#)

The first eCurrency was originally introduced as a follow-on experiment by leading banks participating in Project Khokha 2, the South African Reserve Bank (SARB) CBDC project.²⁰ It is a South African Rand token, widely known as an eZAR. During Project Khokha, eZAR was backed by a CBDC. However, in 2023, the SARB decided not to move forward with the issuance of a CBDC, opening the door for the development of Open eZAR backed by a high quality Rand MMF, held in transparent, provable 1:1 parity with the Rand at all times.

Significantly, eZAR is one of very few stablecoin arrangements developed as part of a leading central bank CBDC project, in concert with the major banks, clearing houses and financial services providers in a jurisdiction, and implemented by private enterprise. The diagram describes existing eZAR transaction pathways. Note that Open is not the issuer of eZAR. Open is enabling infrastructure that empowers a network Partner to issue eCurrency (eTokens) like eZAR on behalf of any validated entity on the network.



Rand Settlement Tokens (aZAR) represent direct pass-through ownership in a rand money market fund through a tokenised limited partnership certificate. This tokenised HQLA acts as a cash equivalent instrument in place of a Rand CBDC. A Partner in the network is able to mint eZAR 1:1 against their aZAR reserves for use by platform members. Sharing the same money market fund, means that Partners form a collateral fund partnership, similar to SAMOS in South Africa, the domestic inter-bank settlement system, without bias to size or ownership in the system.

The Open eZAR stablecoin arrangement enables interoperability for stablecoins issued using other money market funds. That is, any bank, non-bank financial institution or even any non-network stablecoin issuer that adheres to the rules and standards of the eZAR stablecoin arrangement can participate in the network with access to all Open has to offer. Through a Partner, they can mint their own, branded, stablecoins against a aZAR or equivalently regulated and compliant tokenised Rand MMF partnership certificate.

To be clear, stablecoins that use the same MMF reserve are effectively the same instrument and are freely interchangeable. Those that use other MMFs as reserves are also fully interoperable. This means that standards compliant non-network product and services providers can offer innovative transaction solutions to Open customers. More than that,

²⁰ Block Markets Africa, the developer of Open, was implementation partner to Project Khokha 2

their Open tokens and the wallets that hold them are fully regulated and compliant. In this manner, Open delivers the closest thing to regulated digital CBDC.

In fact, the 2024 SARB Digital Payments Roadmap for South Africa presents 17 specific actions to accelerate the pace of adoption and use of digital payments in South Africa.²¹ Open provides the infrastructure for bonafide service providers to build products that contribute to fulfilling 13 of the roadmap actions on Open, immediately.

It is even more exciting to note that Open enables Partners to issue any fiat denomination of eCurrency by holding tokenised MMFs in that currency as Reserve. eUSD is available today in the same form and function as eZAR. Like eZAR, Partners can offer rewards to wallet holders on their balances in any other network currency, similar to and greater than most other forms of holding cash. What's more, Open automates compliance and reporting with respect to cross border implications to comply with jurisdictional regulations, including exchange controls, withholding taxes and reverse VAT. This means that Open wallets can easily and rapidly swap between eCurrency tokens.

Open enables multiple partners to issue tokenised assets through multiple enterprises across a regulated user network, and all of these tokens are fully interoperable.

4 INFRASTRUCTURE

Traditional Financial Market Infrastructure (FMI) consists of five separate but deeply intertwined systems - payments, central securities depositories, central counterparties, securities settlements, and trade repositories - each depending on the others to ensure that transactions are cleared, settled, and recorded accurately and efficiently. These systems have grown into each other, operating as a complex network connecting central banks, commercial banks, stock exchanges, clearinghouses, and governmental bodies to support the stability and integrity of financial systems.

Distributed Ledger Technology (DLT) offers transformative benefits to traditional clearing and settlement processes, often characterized by inefficiencies, delays, and high costs. By leveraging DLT, financial institutions and market participants have an ability to modernize systems for improved performance and reliability.

To that end, there are currently over 140 Central Bank projects, representing more than 90% of the world's economy, experimenting with digital currency in order to improve FMI through DLT. Global commercial banks like JPMorgan, HSBC, Credit Suisse, are exploring, and in some cases implementing, DLT solutions to create efficiencies, primarily in clearing and settlement for domestic and cross-border wholesale transactions.

Concurrently, messaging systems like SWIFT are working on ways to integrate with DLT platforms into their traditional systems. Many of the world's major stock exchanges see DLT as a highly efficient alternative to traditional systems, spurring on trade processors like Euroclear and Clearstream to use DLT to improve trading structure, securities settlement and custody. Even crypto has evolved beyond DeFi to plug traditional inefficiency gaps using stablecoins like USDT and USDC.

While these additions and enhancements to FMI may well contribute to greater resilience in the financial system,²² Henry Ford might recognise the faster horse ambitions driving

²¹ [Digital Payments Roadmap, SARB, Apr 2024](#)

²² [Digital Assets and DLT, WEF, 2021](#)

them. That is, most are trying to improve on existing systems in order to retain or acquire market position in a revamped traditional FMI status quo.

Open takes a different approach. The mandate from the SARB in the last phase of Project Khokha was to re-imagine financial market infrastructure from the ground up; explore the impact of decentralisation on FMI; launch a regulated distributed ledger; don't replicate existing models; and most importantly make it work for all. Open achieves that through the collaborative effort of dozens of institutions in South Africa and abroad.



Open consists of four deeply integrated operating layers, each contributing very specific technology, capabilities and functionality to the re-imagination of FMI. It is the innovative application of legal structures, financial instruments, evolving regulation and leading-edge technology that makes it pioneering. Fundamentally, Open is inclusive, designed to create affordable access to financial services for all, from banks to individuals.

NETWORK LAYER

At a base level, Open enables the consolidation of the five core financial systems into a single common ledger. The Bank for International Settlements (BIS) proposes a 'unified ledger' as a common programmable platform. They suggest that unified ledgers significantly enhance the efficiency and resilience of FMI, offering a more cohesive and streamlined infrastructure that aligns with the evolving demands of the digital economy.²³

A unified ledger creates seamless interactions, allowing for atomic settlement and real-time processing of every type of financial transaction. It leverages smart contracts to enable programmability and composability, expanding the universe of possible economic arrangements and transactions, eliminating messaging and reconciliations.

During Project Khokha 2.x, Open created an institutional calibre unified ledger as a public, permissioned RUN. This configuration is unique as it provides for decentralised trust in an environment that demands compliance and accountability. There are few networks in the world operating in this manner and none running a central bank project inspired, unified ledger. The closest are private networks, which are generally closed and institutional.

Open uses a sophisticated Directed Acyclic Graph (DAG) consensus mechanism that is ideal for permissioned configurations. This architecture has the ability to process complex interconnections in parallel. Moreover, the network is Ethereum Virtual Machine (EVM) compatible, that is, ledgering, transactional, and business logic processing is identical to that of Ethereum and other EVM blockchains.

Interestingly, most EVM networks require some form of Gas to confirm transactions. Open transactions do require transaction authority tokens, called Air. However, Air in Open is provided free for compliant transactions. Rather than incentivising validation through transaction fees, OpenRUN validators generate revenues like banks do, through yield

²³ [Blueprint for the Future Monetary System, BIS, June 2024](#)

sharing on reserves and providing value-added, fee-generating services, eliminating the need for mining or staking.

ASSET LAYER

Beyond technology and process, tokenisation requires trusted reserve assets. Liabilities of central or large commercial banks are generally the most suitable reserves for tokenised transactional assets. Yet, to date, no central bank has issued a wholesale CBDC for public use. Similarly, the number of active deposit token DLT systems is limited to single commercial bank private networks (JPM or Citi) or a collective handful of banks (Partior). Deep complexities for both CBDCs and deposit tokens inhibit both lines of digital currency from reaching maturity and gaining widespread use.

Again, Open takes a different approach. Constructed in conjunction with the SARB and major financial institutions in South Africa, eZAR was initially predicated on a South African CBDC. However, when the SARB unsurprisingly announced that a CBDC was not forthcoming, Open pivoted to tokenised money market funds, also backed by central and commercial bank liabilities, and the next best asset to a central bank reserve asset.

However, the manner in which Open brings MMFs into the network is innovative beyond tokenising MMFs. The usual approach would be to hold underlying MMFs in a reserve account and issue tokens against that reserve, providing a promise to repurchase those tokens at a future date. Uniquely, Open uses a Partnership structure to hold reserves.

A licensed, regulated General Partner (GP) to a Partnership appoints a third-party regulated asset manager to manage assets held via a regulated fund administrator. The GP is mandated to issue proportionate ownership aTokens to Limited Partners (LP). LPs in Open are the Settlement Partners. The GP is mandated and legally required to transparently maintain a 1:1 relationship between Reserves and aTokens.

Through the Partnership, LPs own a tokenised partnership agreement. This tokenised agreement is both a digital asset and a recognised legal right to value. It is not a security. It is not a holding in a collective investment scheme. It is not a custodial account, nor is it an asset held in trust. It is a legal right to a proportion of assets held in a partnership.

This structure is significant. Despite the creation of VASPs, few jurisdictions provide explicit court enforceable standing for digital assets. The Partnership reconstitutes an asset as a court enforceable right to value, in the form of a token. The GP does not re-purchase an asset. Redemption by an LP requires the GP to cause the asset manager to liquidate sufficient Reserves to satisfy the redemption and transfer the proceeds to the LP. Whereas failure to re-purchase a token may have civil implications for issuers, failure to redeem a valid partnership claim would have more serious criminal consequences.

Tokenising MMFs through a Partnership structure results in decentralised regulated high quality liquid settlement instruments consistent with trusted legal constructs. aTokens are the closest thing to wholesale CBDC. Like CBDC, these settlement instruments needn't be redeemed. Recipients hold aTokens, together with the yield they immediately accrue, for future use or redemption, much like banks currently do with government securities.

This asset layer forms a decentralised re-imagination of wholesale settlement enabling the near replication of clearing bank settlement functionality for banks and non-banks equally, without the costs, inefficiencies, risks or time lags. It also puts the manager of MMFs at the centre of the OpenFMI transaction engine.

SERVICES LAYER

If aTokens are a decentralised reimagining of regulated wholesale settlement, eTokens are fundamental building blocks that enable financial products and services to truly level the playing field for all.

Just as an MMF is a reserve asset for the issuance of an aToken, aTokens themselves act as reserve instruments against which a Partner can issue eTokens on a transparent 1:1 basis. eTokens thus become the equivalent of a retail CBDC. eZAR, the first eCurrency token, is a transparent, fully collateralised regulated store of value that generates yield and provides a means to instantly transfer value for the purchase of goods or services.

eCurrency transactions in Open are peer-to-peer net trades in a shared reserve pool. If an individual swaps an eZAR for a soft drink, value never leaves the reserve. It is simply transferred from buyer to merchant, much like the passing of currency. The same is true for a eUSD10million purchase of farm equipment or an eEUR100million transaction to settle a commodity trade. These are riskless, peer-to-peer, net transactions between parties, representing a proportionate change in ownership of a common Reserve. They are all instant, compliant, regulated transactions that do not require a bank or banking rails.

For non-bank financial institutions, this is a paradigm shift. Fintechs, for example, use existing and decentralised infrastructure to extend the reach of traditional banks through services that banks cannot provide profitably or by extending services to a stratum of the economy that is uneconomic for conventional banking.

The services layer enables licensed Fintechs to act like the banks they depend on. As Open participants, Fintechs are empowered with direct market access to digital financial services. At a basic level, fintechs can provide their customers with direct, highly competitive save and spend functionality; the very same services that create customer stickiness in the banking world.

Additional basic services like remittance, investment, lending or loyalty is available on the network or can be provided by value added service providers that participate in the network. In fact, as an EVM compatible network, Open supports dApps written in Solidity, the language of DeFi, empowering Fintechs to incorporate innovative DeFi services in a safe, secure and regulated environment. Through asynchronous settlement, atomic swaps and smart contracts, composability of services to meet Fintech needs follows naturally.

INTERFACE LAYER

Wallets in Open can be distributed, provisioned, funded and activated almost instantly and without cost. In fact, the act of sending money to a new user, provisions a unique, funded wallet for the recipient, who can activate and spend in minutes. But Open is not a wallet provider or even a wallet service.

The interface layer supports the preferred user experience (UX) of the Open customer; a licensed ecosystem FSP or a business associated with one. However, the manner in which Open interfaces with end users is an important and innovative key to the network.

The majority of e-money wallets that exist in the world are issued by a financial services institution of one type or another. The signing authority is usually held by the FSP on behalf of the User for safekeeping, in a manner similar to that in which banks maintain control and access of an individual's bank accounts. Assets are generally held by the FSP, usually in a bank account, and either pooled or segregated for the benefit of the User.

There are inherent risks to e-money wallets that include lack of control, vulnerabilities, access, and provider dependencies, including legal, regulatory and bankruptcy. Yet, the benefits of digital access to assets usually overwhelm these issues. Provider dependencies can be overcome by the use of non-custodial wallets whereby Users accept responsibility for control over signing authority, but the general e-money wallets risks remain.

Open again takes a different perspective by re-imagining transactional relationships. A wallet in the Open context is a smart contract that connects the User with the network through an ecosystem participant's UX, be it an app or a wallet. The Open smart contract is embedded into the chosen interface, referencing a unique non-custodial safe, where User assets are held in a separate, bankruptcy remote account. Transactions take place via the smart contract and are made available to the app or wallet of the provider.

Thus, the provider is only the FSP that introduces the User to the ecosystem. The User is associated with a smart contract that is provider portable, rendering provider vulnerabilities or control moot. And because Open is a public DLT, permissioned exclusively to regulated validators and fully KYC's compliant Users, vulnerabilities including loss of keys, incorrect addresses or fat finger transfers can all be rectified with little effort. In fact, even malicious actions can be tracked and traced either to a specific actor or to the Key Individual at the FSP that took responsibility for the actor to participate in the network.

5 VISION

Open proposes a vision for a future that enables regulated compliant peer-to-peer direct access to global financial markets for every individual and every business. This is an ambitious vision, likely shared by a large number of ambitious organisations trying to solve similar challenges. However, in many ways Open is unique.

Open is a multi-issuer, multi-asset platform of platforms, serving the needs of all business customers equally. It is the product of a central bank CBDC project, embedded with inputs and learnings from a substantial, international collaborative cohort. It is a public, permissioned network that requires licensed, regulated financial services entities as consensus validators, forming a convergence of trust between traditional and decentralised worlds. It embraces a collateral approach to the issuance of digital money through tokenised MMFs and allows for the sharing of returns on MMF reserves. Open delivers continuous, asynchronous real time net settlement of both high and low value transactions for large and small intermediaries and customers, equally.

Open is not a competitor to central or commercial banks, asset managers, schemes, insurance companies, or FSPs. Open is enabling infrastructure that empowers all market participants - traditional, alternative and decentralised - to actively engage in a technologically advanced level playing field with enforced regulatory compliance.

The BIS suggests in a paper on stablecoins that it's time for a 'Neil Armstrong moment'. Perhaps the first step, and the giant leap, is one that enables interconnected, equal and affordable access to all levels of the money hierarchy, to the benefit of all levels of the social and financial hierarchy. Open delivers that.