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Empowering Interoperability on the XDX Side Chain with the XRPL

and Ethereum Virtual Machine (EVM) Ecosystem

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Updated 9th September 2023

Version 1.3

Abstract

This black paper introduces XDX, a crypto token issued on the XRPL by D.P.Monks Finance (DPMF) utilised currently on the XRPL via the 'RaDical-X NFT Exchange' and 'XION Gallery'. Preparing to advance onto the XDX sidechain (XDXs), a hyper-chain blockchain which will enhance the asset from a token into a crypto currency, fully interoperable with the XRP Ledger (XRPL) and Ethereum Virtual Machine (EVM). XDXs aims to revolutionise the digital asset landscape by providing seamless and efficient interoperable cross-chain transactions, enhanced scalability, a secure ecosystem for decentralised applications (dApps), and additional financial smart contract tools. This paper outlines the key features as to why this is necessary, technological advancements from the foundations of the new network, and future use cases of XDX, XRP and XRPL tokens with smart contract functionality additions currently not utilised on the XRPL, highlighting a role in driving the next wave of innovation as a branch with the XRPL and EVM blockchain ecosystem.

It is important to note that the XDXs hyper-chain is not to compete or rival current blockchains or protocols but provide opportunity and interoperability with already existing chains. Utilising functionality in a seamlessly connecting way, bridging current and future innovation.

1. XDX The Native Cryptocurrency

1.1 Introduction:

The XRP Ledger has established itself as a leading blockchain network, renowned for its speed, scalability, and security. However, as the demand for decentralised applications utilising smart contracts and cross-chain interoperability grows, the need for an efficient side chain solution becomes evident. The XDX sidechain, to be built in line with XLS38d emerges as the answer, offering enhanced functionality and expanding the possibilities additionally within the XRPL ecosystem.

1.2 XDX The Native Cryptocurrency:

XDX will serve as the native cryptocurrency on the XDX side chain, allowing users to engage in fast, lowcost transactions while benefiting from the security, reliability, and interoperability of the XRPL and

EVM smart contract functionality. With a fixed supply and an 'all new' transacting model known as the 'Deflationary Economic Utility Exchange' (DEUX), XDX provides a stable and valuable medium of exchange within the XDXs network and external blockchain ecosystem.

1.3 XDX Side Chain Interoperability and Scalability:

The XDX side chain operates in parallel to the XRPL with additional functionality to add EVM smart contracts, enabling seamless interoperability between chains. By leveraging the unique features of the XRPL, such as the efficient consensus algorithm and the Decentralised Exchange (DEX), the XDX side chain will achieve enhanced interoperability, scalability, fast transaction speeds, and increased throughput built alongside the XLS38d development protocol.

1.4 Security and Consensus Mechanism:

To ensure the utmost security, the XDX side chain adopts a robust consensus mechanism based on a Byzantine Fault Tolerant (BFT) protocol. This mechanism guarantees the integrity and immutability of transactions, making the XDX sidechain an ideal platform for financial applications, asset tokenisation, and smart contracts.

1.5 Use Cases and Applications:

The XDX sidechain opens a world of possibilities utilising EVM smart contracts for developers and businesses within and outside the XRPL ecosystem. Its interoperability allows for seamless integration with new and existing dApps, enabling cross-chain asset transfers, decentralised finance (DeFi) solutions, and innovative financial instruments.

1.6 Roadmap and Future Developments:

This black paper presents an overview of the XDX sidechains project's phases and roadmap, highlighting upcoming milestones and development plans. The team at DPMF is committed to continuous improvement, exploring new features, and expanding the ecosystem through strategic partnerships and collaborations.

1.7 Conclusion:

The XDX sidechain represents a significant leap forward in the evolution of the XRPL and blockchain ecosystem. By leveraging the XDX side chain's interoperability, scalability, and security, users can unlock a new era of interoperable decentralised applications, cross-chain transactions, and financial innovation. With its robust infrastructure and forward-thinking approach, XDX and the XDX sidechain is poised to revolutionise the digital asset landscape and drive the future of blockchain technology.

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2. PROBLEM STATEMENTS

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2.1 Problem Statement 1: Energy consumption with blockchain technology:

a) The energy consumption associated with blockchain technology, specifically in the case of Ethereum and XRPL, poses challenges and concerns that need to be addressed with adoption to improve.

b) Both Ethereum and XRPL utilise different consensus mechanisms, namely Proof of Stake (PoS) for Ethereum and Consensus Protocol for the XRP Ledger (formerly known as Ripple Consensus Algorithm). These mechanisms have implications for energy consumption, which has become an interesting topic for blockchain network green energy efficiency and sustainability falling in line with climate change internationally.

c) For Ethereum, the previous PoW (Proof of Work) consensus did require a substantial amount of computational power and energy consumption through mining. As the network grew and more transactions processed, the energy requirements increased significantly. Which led to Ethereum upgrading the network from POW to POS (Proof of Stake) which drastically improved the energy consumption.

d) Similarly, while XRPL utilises a consensus mechanism that is more energy-efficient compared to PoW and PoS protocols, it still requires a desired amount of energy from a central source to operate. As the XRPL gains popularity and adoption, the energy consumption associated with its consensus protocol becomes a crucial issue to address along with maintaining sustainability.

e) The energy consumption of both Ethereum and XRPL blockchain networks raises concerns about their long-term sustainability with expansion and environmental impact due to how the energy is sourced. It also poses challenges in the long term of scalability, cost-effectiveness, and wider adoption of blockchain technology with energy prices increasing internationally.

f) Therefore, finding solutions to reduce and improve the energy consumption and cost of the XRPL, Ethereum network and XDX sidechain is crucial through research and development, while maintaining security and efficiency is essential. This problem statement highlights the need for innovative approaches such as, upgrading to more energy-efficient network supporting hardware, exploring alternative technologies to mitigate the environmental impact and enhancement of the overall sustainability of XRPL, Ethereum and XDX blockchain networks with more natural green energy efficient resources.

2.2 Problem Statement 2: The unbanked of the world:

a) The lack of financial inclusion among the unbanked population in many foreign countries poses a significant challenge to the global economy. Despite advancements in technology and financial services, a substantial number of individuals in these countries remain excluded from accessing formal/non-custodial, self-banking systems.

b) There are many contributing factors towards this such as economic, social, and infrastructural barriers. Though with today's technology we can bridge the gap utilising existing technology and make a more inclusive, but also innovative decentralised financial

ecosystem. To do this would require an efficient, interoperable, fast adopting network with a non-custodial capability for both chains in one wallet.

2.3 Problem Statement 3: Blockchain interoperability between the XRPL and Ethereum.

a) The lack of interoperability between the XRP Ledger (XRPL) and the Ethereum Virtual Machine (EVM) poses a significant challenge for developers and users in the blockchain ecosystem relating to smart contract functionality. The EVM serves as the computation engine for Ethereum, managing the state of the blockchain and facilitating smart contract functionality. However, the inability to seamlessly transfer assets and execute smart contracts between the EVM and XRPL limits the potential for collaboration, innovation, and the overall growth of the blockchain industry.

b) Developers currently face technical barriers when attempting to establish a bridge between the XRPL and EVM. The differences in underlying protocols, consensus mechanisms, and smart contract languages create significant hurdles that impede the efficient transfer of digital assets and the execution of cross-chain transactions. This lack of interoperability restricts the ability to leverage the strengths of both networks and hinders the development of decentralised applications that require seamless integration between the XRPL and EVM.

c) Additionally, the absence of interoperability between the XRPL and EVM limits users' developments, options, and flexibility. Users who hold assets on the Ethereum network may find it challenging or costly to transfer those assets to the XRPL, and vice versa. This restriction hampers liquidity, usability, and accessibility of blockchain-based financial services, hindering the overall user experience.

d) Addressing the interoperability challenge between the XRPL and EVM is crucial to unlock the full potential of blockchain technology. Enabling seamless asset transfers and smart contract execution between these platforms would foster collaboration, encourage cross-platform innovation, and provide users with greater flexibility and choice. Therefore, utilising the protocol solution XLS38 is paramount for the evolution of blockchain. This viable solution that allows for seamless interoperability between the XRPL and EVM is of utmost importance to promote the growth and adoption of blockchain technology.

2.4 Conclusion:

With these three main problems in mind, we have developed a 3-part development program to support and expand the current XRPL blockchain with an enhanced XDX sidechain (XDXs).

2.4.1   Problem 1: Energy Consumption.

Program: XDX 'GENYSIS' program. Building GEN (Green Energy Node) Systems. (XRPL/XDXs)

2.4.2   Problem 2: Unbanked and Adoption.

Program: XDX 'SYNAPTRIX' program. Interoperable non-custodial wallet. (XRPL/XDXs)

2.4.3   Problem 3: Blockchain Interoperability.

Program: XDX 'PARADIGM' program. XDXs: a new hyper-chain, connecting XRPL/EVM. (XDXs)

XDX GENYSIS

3. GEN (Green Energy Node) Systems

3.1   Introduction.

The XDX 'GENYSIS' program involving GEN Systems (Green Energy Node Systems) will launch first on the XRPL and duplicate concurrently onto the XDXs and later ETH network. This involves the production of user friendly, easy to set up network node hardware for separate blockchains utilising similar technology, powered solely by solar energy. Gen Systems has already been trialled and tested in the UK for XRPL nodes.

3.2   Sustainable Energy Integration:

In a world where sustainable energy solutions are becoming increasingly vital, the integration of renewable energy sources into blockchain technology is a groundbreaking development. GEN Systems powered by solar energy on any blockchain network represent a significant step forward in the pursuit of a more environmentally friendly and sustainable blockchain ecosystem.

3.3   Solar Energy:

Solar power, a clean and renewable energy source, has gained immense popularity in recent years. By leveraging this abundant energy resource, GEN Systems on the XRPL offer an eco-friendly alternative to traditional energy-intensive blockchain networks. These nodes utilise solar panels to generate electricity, reducing reliance on fossil fuels and minimizing the carbon footprint associated with blockchain operations.

3.4   Gen Systems:

The implementation of GEN Systems on the XRPL, XDXs and later ETH network brings several benefits to the table. Firstly, it significantly reduces the environmental impact of blockchain technology. By utilising solar power, the nodes contribute to the reduction of greenhouse gas emissions, helping combat climate change and promote a sustainable future.

3.5   Decentralisation of Energy Sources:

Secondly, GEN Systems promote decentralisation. By encouraging individuals and organizations to set up their solar-powered nodes, the XRPL, XDXs and ETH network become less reliant on centralized energy sources, creating a more resilient and distributed network. This decentralisation aligns with the core principles of blockchain technology, fostering transparency, security, and trust.

3.6 Economic Advantage:

Moreover, the integration of GEN Systems offers economic advantages. Solar energy is a renewable resource, and once the initial investment into owning a GEN system is made, the cost of electricity generation to run a node becomes significantly lower or none, depending on where in the world you are geographically located. On pilot testing we predict that GEN Systems will have a minimum life expectancy of 10 years. However, this is still in the research/development phase and is subject to change/improve.

3.7 Leading Example with Renewable Energy:

Furthermore, the adoption of GEN systems can serve as a catalyst for the wider adoption of solar energy. By showcasing the viability and benefits of solar-powered blockchain networks, the XRPL and XDXs sets an example for other industries and communities to embrace renewable energy solutions. This ripple effect can contribute to the global transition towards a greener and more sustainable energy landscape.

3.8 The Reliability of GEN Systems on the XRPL Network:

The XRPL network is a decentralised digital payment protocol that relies on a network of nodes to process transactions. These nodes require a stable and reliable source of energy to ensure the smooth functioning of the network. While traditional energy sources are susceptible to power outages and supply fluctuations, GEN nodes offer a promising solution for a sustainable network powering a node on average with 50w/h while the network can remain running on as low as 22w/h. This provides opportunity to store reserve for low light/dark hours.

3.9 Consistency in Energy Supply:

One of the primary advantages of utilising solar-powered GEN Systems is their reliability. Unlike traditional energy sources, such as fossil fuels or electricity grids, solar power provides a consistent source of energy, even on a cloudy day. This consistency ensures that the XRPL network remains operational even during power outages or supply fluctuations. GEN Systems can continue to process transactions and maintain the stability of the network, even in challenging circumstances. This is thanks to its advanced battery unit able to store additional energy through low light/dark hours over a 24hr period consistently, also including a BMS (Battery Management system), preventing damage autonomously in the system.

3.10 Resilience to Power Outages:

Power outages can be detrimental to the stability and functionality of any network, including the XRPL network. Traditional energy sources are vulnerable to disruptions caused by natural disasters, maintenance issues, or infrastructure failures. In contrast, GEN Systems are independent of the power grid, making them less susceptible to such outages. By harnessing energy from the sun, solar-powered nodes can operate autonomously and ensure the continuous processing of transactions on the XRPL network. Furthermore, with the current battery system on GEN Systems for the XRPL the battery can run for 24hrs+ without sunlight from a full charge.

3.11 Environmental Sustainability:

Apart from their reliability, GEN Systems also offer significant environmental benefits. As the world increasingly focuses on reducing carbon emissions and transitioning to renewable energy sources, solar power emerges as a sustainable alternative. By utilizing solar energy, the XRPL network can contribute to a greener future by reducing its carbon footprint and reliance on fossil fuels. This aligns with the growing global movement towards sustainable practices and demonstrates the network's commitment to environmental responsibility.

3.12 Cost Efficiency:

Solar power has become increasingly affordable over the years, making it an economically viable option for powering low energy efficient blockchain networks. While the initial setup costs of solar panels and related infrastructure may be higher, the long-term benefits outweigh the investment. Solar-powered nodes require minimal maintenance and have lower operational costs compared to traditional energy sources. Additionally, solar energy is freely available, reducing the network's dependence on costly energy providers.

3.13 Conclusion:

GEN Systems offer a reliable, resilient, and sustainable solution for powering and adding sustainability to the XRPL network. The consistency of solar energy ensures uninterrupted operation, even during power outages or fluctuations in supply. By embracing solar power, the XRPL network not only enhances its stability but also contributes to a greener and more sustainable future. As the world continues to prioritise renewable energy sources, the XRPL network sets an example by adopting solar power and showcasing the benefits of this innovative approach.

3.14 GEN System models:

GEN System variants (GEN 1-3) are as follows:

1   (Generation 1) GEN 1 – XRPL network infrastructure.

2   (Generation 2)GEN 2 – XDXs network infrastructure.

3   (Generation 3) GEN 3 – ETH Network infrastructure.

3.15 Online and testing now:

Currently we have 5 XRPL network nodes running in the UK with 1 out of the 5 used for future node capability network testing. A total of 10 Pilot GEN 1 nodes have been created and are being trialled and tested in the UK, in preparation to deploy globally for further testing.

3.16 GEN Model order of deployment:

1   GEN 1 models will deploy onto the XRPL network first.
2   GEN 2 models will be deployed after XLS38 protocol live on XRPL, and XDXs going live.
3   GEN 3 models will launch as upgraded variants for the ETH Network after GEN 2.

3.17 GEN Systems overview:

The GEN Systems generation models are independent to each blockchain and calibrated to the network they support (not interchangeable). A GEN Systems website page will exist to categorise each chain where your node will be verified on location and monitored for efficiency. This is particularly important for developers running GEN 2 nodes as your GEN 2 efficiency is rewarded for supporting the XDXs network evidentially through green energy functionality.

XDX SYNAPTRIX

NON-Custodial Wallet

XRPL/XDXs

4.1 Introduction:

SYNAPTRIX is the production program for the non-custodial wallet first launching on the XRPL. The program development consists of smart wallet technology, a self-empowering asset management tool incorporating transaction batching, signing with web 3 identity (allowing anonymity), and a multisignature option. Authorising the user with full custody of their assets providing complete control.

4.2 Smart Wallet Launch:

Initially the smart wallet will be launched on the XRPL with future development and additional smart wallet functionality interoperable on the XDX sidechain. This means you will be able to connect to both chains via one wallet seamlessly. Concurrently having wallet functions operate on both chains in parallel. This wallet will offer a range of smart wallet functions and tools specifically for the XDXs that enable secure management of your digital assets in a completely decentralised / P2P (peer to peer) ecosystem.

4.3 Smart Wallet Private Keys:

One of the key advantages of the smart wallet is its inception onto the already existing decentralised exchange on the XRPL. Employing the high security standards, you will manage your private keys completely responsible for self-asset management. This means you as the account holder will be responsible with full control, eliminating the need for a 3rd party representative to trust your assets.

4.4 Wrapping between Chains:

The smart wallet will provide a user-friendly interface, making it easy for both beginners and advanced users to navigate and utilise its features. You can securely send and receive all supported assets on the XRPL and seamlessly transition to the XDXs. On both chains, including cross chain transition known as 'Wrapping', settlement will be within 3-5 seconds or faster to any location in the world. This high-speed settlement is made possible by the consensus algorithm employed by the XRP ledger and XLS38 protocol.

4.5 Smart Wallet inception, XRPL/XDXs:

The non-custodial smart wallet will be launched as a mobile application with full integration into the XRPL network. Along with basic transaction capabilities, the smart wallet will also provide access to the existing XRPL DEX. This means users can not only perform transactions, but also engage in various types of offers on the order book with multiple assets on the chain. Users will have the opportunity to explore and take advantage of the full potential of the XRPL ecosystem.

4.6 Component Program Launches for XDXs Integration:

In the future, the launch of the XLS38d protocol on the main net XRPL will trigger the launch of GEN Systems and the GEN 2 nodes for the XDX sidechain. This will lead to the development of enhanced functionalities for the smart wallet in conjunction with the neighbouring sidechain XDXs. The enhancement process will be carried out in strategic stages, gradually expanding the capabilities of the smart wallet beyond what is currently available on the XRPL.

4.7 Cross Chain Wallet Functionality (XRPL/XDX):

The 'SYNAPTRIX' program serves as the main development program for the non-custodial smart wallet on the XRPL network. The future functionalities of the smart wallet connected to the XDX sidechain will be activated in synchronisation with the 'PARADIGM' development program. This means the smart wallet will not only operate on a single chain, but will also provide built-in cross-chain functionality, allowing users to seamlessly switch and custody assets between chains for improved decentralised tools and diverse smart contract capabilities.
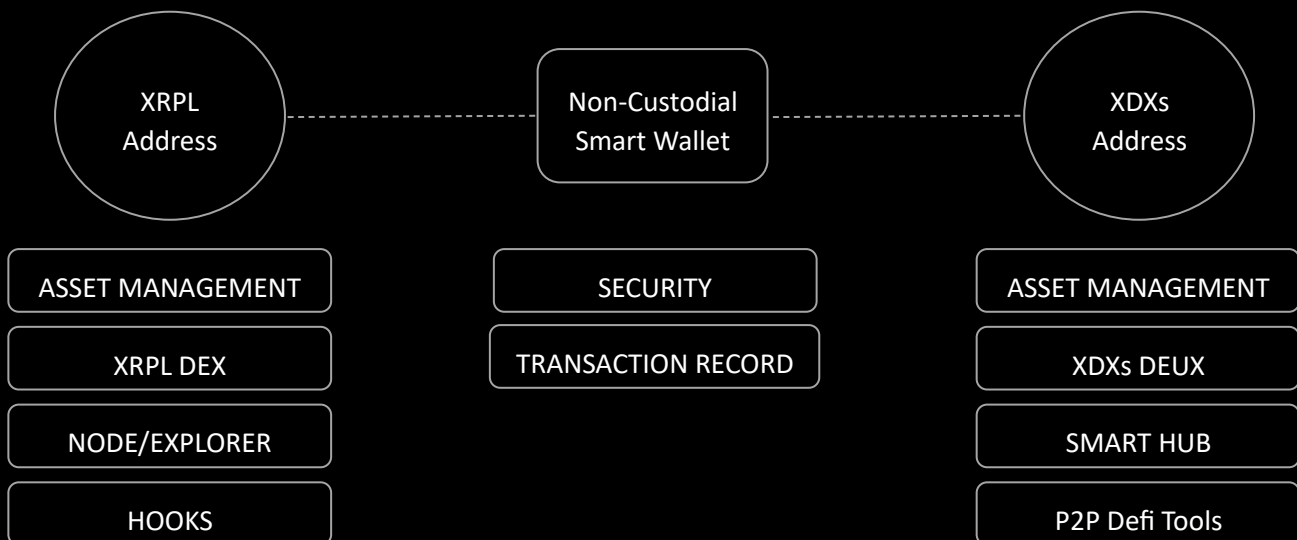
Program SYNAPTRIX: Smart wallet tools, XRPL.

- o Security: Private key generation, encrypted, Sign in biometric/password entry for device. o Asset Management: Trustlines, Transact XRPL DEX, NFT's, Issue Assets. o Node/Explorer. o Transaction Record: Historical record of transactions (Open Ledger XRPL/XDXs). o Hooks, layer 1 smart contract functionality (XRPL).

Program PARADIGM: Additional Smart wallet tools, XDXs.

- o DEUX: Enhanced DEX- Deflationary Economic Utility Exchange (DEUX). o SMART HUB: Automated Financial Smart Hub for borrowing/lending XDX.
- o P2P Defi Tools: Collateralised borrowing/lending.

1 Wallet - 2 Blockchains.

XRPL Address	Non-Custodial Smart Wallet	XDXs Address
ASSET MANAGEMENT	SECURITY	ASSET MANAGEMENT
XRPL DEX	TRANSACTION RECORD	XDXs DEUX
NODE/EXPLORER		SMART HUB
HOOKS		P2P Defi Tools

4.8 Wallet Security:

Our main effort is to ensure the highest security is applied on the non-custodial Smart Wallet from inception, and with each future development we prioritise with security first. Encrypting data to a military grade classification with the safest and most secure protocol placing responsibility and liability to the account user/owner.

4.9 Decentralisation:

Asset management will be in full control of the wallet owner or owners. This decentralised nature ensures that user funds are not held or controlled by any central authority, reducing the risk of single points of failure and potential security breaches. Including connecting to 3rd party dApps and website applications and platforms.

4.10 Non-Custody Wallet Private Keys:

Private Key Ownership: The smart wallet gives users complete control over their private keys. Private keys are generated and stored securely on users' devices, ensuring that only the owners have access to their funds. By eliminating the need to trust third-party custodians, the wallet minimizes the risk of unauthorized access to user assets.

4.11 Encryption and Secure Communication:

The smart wallet employs advanced military grade encryption protocols to secure user data and communication. This ensures that sensitive information, including private keys and transaction details, is protected from unauthorized access or interception.

4.12 Authentication:

Multi-Factor Authentication (MFA): To provide an additional layer of security, the smart wallet supports multi-factor authentication. Users can enable MFA, such as biometric authentication or one-time passwords, to further protect their accounts from unauthorized access.

4.13 Regular Security Audits:

The smart wallet will undergo security audits by us and independent third-party firms to identify and address any potential security vulnerabilities. These audits help maintain a high level of security and ensure that the wallet's infrastructure remains robust and resistant to emerging threats.

The smart wallet offers a highly secure solution for managing digital assets. Its decentralisation, private key ownership, military grade encryption, secure communication, multi-factor authentication, and security audits collectively contribute to its reputation as a secure wallet to be trusted by users worldwide.

4.14 Asset Management:

On the XRPL, The main network currency is XRP, used as a transactional fee for trade, reserve for orders and trustlines. The concept is the same for the XDX currency on the XDX sidechain, however the transaction fee (unlike the XRPL) is not burnt, it is utilised by participating in the DEUX network protocol.

All assets in the smart wallet, and transactions are managed by the wallet owner(s). Assets in the smart wallet will be able to interact with the current chains they are operational on and seamlessly switch chains between the XRPL/XDXs. This will involve the XLS38 protocol, transactionally authorising wrapping assets through a witness server between chains, on and off the XDX sidechain.
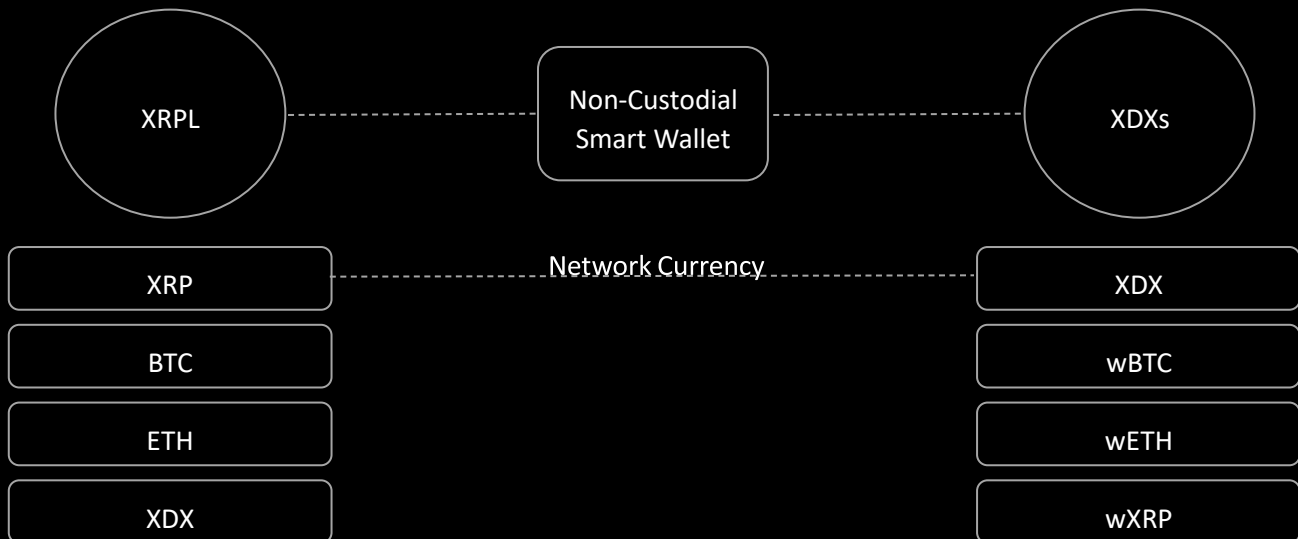
4.15 2-Way Bridge:

The smart wallet will custody assets on both chains but only on the XDXs will assets be able to participate with the financial tools available on the 'PARADIGM' Program. The wallet will act as a 2-way bridge to transact between chains to utilise on relevant networks. The current circulating XDX token on the XRPL will be the transactional fee and reserve for orders and trustlines on the XDX sidechain.

4.16 Node/Explorer:

Switching nodes in the smart wallet within the XRPL/XDXs network ecosystem allows users to connect to different networks or servers (Main/Test/Dev/Custom). This can be useful for various reasons such as accessing different features, exploring alternative transaction validators, or ensuring network redundancy.

When switching clusters, users can choose from a range of options based on their preferences and requirements. These clusters may differ in terms of transaction speed, reliability, and the validators they use.

4.17 Transaction Record:

The XRPL operates on distributed ledger technology, this will also apply for the XDXs. This means that both networks have full public viewable transaction history stored on a network of computers (nodes) for each chain. This information is readily available to anyone with a computer and connection onto the network. The smart wallet will provide personal transaction history relating to the wallet address of the smart wallet and an explorer for each chain to view and analyse the ledgers.

4.18 Hooks (Smart contract function on the XRPL):

The XRPL provides a new and secure way of conducting L1 smart contracts not seen on other chains called hooks. The smart wallet XRPL address will be able to contribute and utilise its use on the XRPL network side of asset custody.

Hooks on the XRPL are custom scripts that allow developers to extend and customise the functionality of the ledger. These hooks can be compiled in any language that can be compiled to web assembly, providing developers with flexibility in their choice of programming language. Hooks can be attached to specific accounts or set as global hooks to apply to all qualifying transactions on the ledger.

When a hook is set onto a XRPL account using a set hook transaction, it can control various aspects of the account's transactions. This includes blocking or allowing incoming and outgoing transactions, modifying, and maintaining internal state and logic specific to the hook of that account, and even emitting new transactions on behalf of the account.

Its worth noting that hooks on the XRPL are intentionally designed to 'not' be Turing-Complete. This is because Turing-Completeness, while powerful, can lead to unpredictable execution and potential security risks. By restricting the general range of computation available to hooks and guarding against arbitrary run-time looping, the XRPL ensures that smart contracts executed through hooks can be determined ahead of time when they will complete execution.

4.19 RHAD (Reward Hyper-chain Airdrop Distribution):

The RHAD token, issued on the XRPL in 2021 by DPMF has a total supply of 10 million tokens. By design it is a network reward protocol token relating to accumulation functionality on the non-custodial smart wallet and XDXs hyper-chain. The function is to deliver fractional amounts of RHAD to smart wallet owners, and later XDXs GEN 2 node operators. The main concept behind this rewards plan is to reward network supporting nodes and bring new users into blockchain technology, more specifically the XRPL and XDXs hyper-chain. The incentive is by owning a smart wallet you can accumulate RHAD rewards daily through ownership of RHAD via the smart wallet. The more RHAD tokens a user owns, the bigger the rewards that reduce in distribution pending remaining supply over time. This is to support the new network XDXs hyper-chain and usher in new users in areas of low economic growth and unbanked locations. Furthermore, the RHAD token will already be available on the RaDical-X NFT Exchange/XION Gallery as a means of currency to purchase NFT's on the XRPL but additional ownership rewards connected to the smart wallet on the XDXs Hyper-chain.

4.20 Snapshot of XDX Wallet Owners:

One week before the SYNAPTRIX program goes live (non-custodial smart wallet) there will be a snapshot of XDX token ownership on the XRPL. The amount of XDX owned on the ledger will be calculated XDX/RHAD 100,000:1 Ratio. There will be an airdrop of RHAD that will take place on launch of the smart wallet that will be conducted first on the XRPL network, however after the airdrop distribution all other rewards will be conducted on the XDXs Hyper-chain smart wallet goes live. After the airdrop to XDX token holders, all RHAD functionality exist only on the XDXs hyper-chain via the smart wallet.

4.21 Airdrop:

It's important to note that only a maximum of 1% of the total supply of RHAD will be airdropped to XDX token holders on the XRPL. The remaining supply will be held in the "RHAD DISTRIBUTION" account, which will be delivered to non-custodial smart wallets on the XDXs hyper-chain.

4.22 RHAD, Distribution Milestone Rate, DMR:

The distribution of RHAD will be gradually reduced over time, triggered by specific Distribution Milestone Rates (DMR) that are relevant to the supply remaining in the RHAD DISTRIBUTION account. The DMR will activate at certain source supply milestones, reducing the number of RHAD tokens being distributed into circulation for rewards. The reduction rates activate after 20% of the initial supply has been distributed and are as follows.

1- Total Supply 10,000,000.
2- Initial distribution to XDX wallet owners (1%).
3- 20% distributed of total, begins halving mechanism every 1,000,000.

20% Distributed/80% Remaining: $DMR = 1 / (2^{(Floor(Distributed\ Tokens\ /\ 1,000,000))})$

Distribution at milestone = DMR * Supply

Owning 0 RHAD tokens in a smart wallet will qualify to earn 0.001 RHAD, this is the minimum reward for each wallet to be collected by the user daily. For each milestone activated the DMR reduces to new users. In this equation 'n' represents the number of milestones reached. There are a total of 8 Distribution Milestone Rates, which activate at 80% distribution.

$DMR = 0.001 / (10^n)$.

$DMR0 = 0.001 / (10^0) = 0.001 / 1 = 0.001$

20% Distributed begins halving levels every 1,000,000 RHAD distributed thereafter.

After the initial 20% distributed, each 1 million distributed after will hit a DMR level, new users will receive one decimal place less.

$DMR1 = 0.001 (10^1) = 0.001 / 10 = 0.0001$

$DMR2 = 0.001 (10^2) = 0.001 / 100 = 0.00001$

$DMR3 = 0,001 (10^3) = 0.001 / 1000 = 0.000001$

$DMR4 = 0.001 (10^4) = 0.001 / 10000 = 0.0000001$

$DMR5 = 0.001 (10^5) = 0.001 / 100000 = 0.00000001$

DMR6 = 0.001 (10^6) = 0.001 / 1000000 = 0.000000001

DMR7 = 0.001 (10^7) = 0.001 / 10000000 = 0.0000000001

DMR8 = 0.001 (10^8) = 0.001 / 100000000 = 0.00000000001

An important point to note, the above results are fractional amounts for all smart wallet owners to receive. These will always be in place regardless to whether the wallet owner owns RHAD tokens or not, gradually reducing distribution through DMR level.

RHAD ownership will qualify to accumulate more RHAD with a separate rewards halving.

DMR Level 0 - 100% - 10,000,000 supply (DMR: 0.001 to each 1 RHAD owned)

DMR Level 1- 80% - 8,000,000 supply (DMR: First halving - 50% reduction (0.0005 RHAD))

DMR Level 2- 70% - 7,000,000 supply (DMR: 25% reduction (0.00025 RHAD))

DMR Level 3- 60% - 6,000,000 supply (DMR: 12.5% reduction (0.000125 RHAD))

DMR Level 4- 50% - 5,000,000 supply (DMR: 6.25% reduction (0.0000625))

DMR Level 5- 40% - 4,000,000 supply (DMR: 3.125% reduction (0.00003125))

DMR Level 6 - 30% - 3,000,000 supply (DMR: 1.5625% reduction (0.000015625))

DMR Level 7 - 20% - 2,000,000 supply (DMR: 0.78125% reduction (0.0000078125))

DMR Level 8 - 10% - 1,000,000 supply (DMR: 0.390625% reduction (0.00000390625)

4.23 RHAD, Accumulation Milestone Rates:

In addition to the Distributed Milestone Rates, there will also be 24-hour Accumulation Milestone Rates (AMR) for users holding RHAD in their smart wallets on the XDXs. You will need to be above each AMR level to receive the representing reward. The AMR levels and their corresponding daily rewards (DR) are as follows:

- Holding 1+ RHAD: 0.01 DR   (Rank: New Accumulator)

- Holding 10+ RHAD: 0.1 DR   (Rank: Basic Accumulator)

- Holding 100+ RHAD: 1 DR   (Rank: Accumulator)

- Holding 1,000+ RHAD: 10 DR   (Rank: Intermediate Accumulator)

- Holding 10,000+ RHAD: 100 DR   (Rank: Expert Accumulator)

- Holding 100,000+ RHAD: 1000 DR   (Rank: ELITE Accumulator)

Users can request to collect their accumulated rewards every 24 hours via the smart wallet. The balance of RHAD above the relevant AMR at the time of collection will determine the amount received. The rank of accumulation will also be available to view in the smart wallet.

In line with the Genysis program for GEN 2 nodes there will also be a rewards protocol for running network nodes for the XDXs. Further information on this will be released in the future.

XDX PARADIGM

XDX sidechain 'Hyper-chain' Functionality

XDXs

5.1 Introduction

The PARADIGM Program is the most important program of the three program phases, which involves development of the XDXs (XDX sidechain) functions and protocols. The specifics of it are subject to change/amend pending the release of XLS38. The XDXs is a Hyper-chain blockchain network with the capability to conduct cross chain functionality via the XLS38 protocol. Seamlessly connecting the XRPL and EVM ecosystems. This innovative solution offers a two-way bridge between blockchains through a specific server known as a witness server, revolutionising cross-chain transactions. At the

heart of this new chain is the XDX currency, which serves both as transaction fee and reserve for trustlines and orders.

Interoperability:

With the XDX sidechain, users can effortlessly transact between the XRPL and EVM, unlocking new possibilities for interoperability and expanding the reach of decentralised applications. By leveraging the XLS38 protocol, we ensure secure and efficient transactions cross chain, providing users with a seamless experience.

The DEUX Protocol:

The XDXs is a Hyper-chain network equipped with a unique transactional feature when transacting XDX. This involves a Deflationary Economic Utility Exchange (DEUX) to an autonomous network hub. The Smart Hub will be a XDX governing, smart contract protocol providing borrowing and lending to users of the network. Every time a user transacts on the network, the fee is sent to the Smart Hub where it is locked to be applied in lending smart contract functions, or voted out via governance of XDX token owners on the XDXs. This means that over time for as long as the network is operational, XDX is transacted and locked for decentralised lending tools and additional governing features, reducing the circulating supply but utilising the locked supply for smart contract functionality.

Smart Hub:

This means that when XDX is locked in the Smart Hub through network transactions, it can be borrowed by users using the smart wallet with a qualifying collateral amount in crypto, stablecoins or NFTs. However, paid back with interest which again is locked into the Smart Hub. This provides a unique network advantage over others by not only reducing circulating supply but utilising the locked supply for borrowing/lending via the Smart Hub while continuing to be deflationary.

Governance:

XDX token owners will be able to vote annually for interest rates applied on the Smart Hub through governing smart contract functionality. Each XDX token will count for voting via the smart wallet and then be fixed through the year after the voting period. This provides true governance to the network and its participants with fair ownership rights.

Borrowing/Lending:

Furthermore, the smart wallet interface on the XDXs will provide a P2P borrowing and lending capability which can be competitive against the smart contract Smart Hub. Users will be able to manage risk with collateral relating to crypto, stablecoins and NFT's, choose a payment plan for borrowing and lending payments separate to that of the Smart Hub

5.2 XDXs Asset Management:

On the XDXs, the main network currency is XDX, used as a transactional fee for trade, reserve for orders and trustlines. The transaction fee on the XDXs is utilised on the network with a new transactional protocol we call a 'Decentralised Economic Utility Exchange' or DEUX. This means transaction fee's instead of being burn are sent to an Smart Hub that is governed by users on the network via XDX ownership and the smart wallet.

All assets in the smart wallet, and transactions are managed by the wallet owner(s). Assets in the smart wallet will be able to interact with the current chains they are operational on and seamlessly switch chains between the XRPL/XDXs. This will involve the XLS38 protocol, transactionally authorising wrapping assets through a witness server between chains, on and off the XDX sidechain.

5.3 DEUX (Deflationary Economic Utility Exchange) on the XDXs Hyper-chain Blockchain Network:

Introducing a new function in blockchain technology, the DEUX, a revolutionary protocol being built on the XDXs Hyper-chain blockchain network. DEUX leverages the native token XDX as a transaction fee within a Deflationary Economic Utility Exchange. In this system, transaction fees are sent to a Smart Hub and can be borrowed or unlocked by users through smart contract functionality. The interest rates associated with borrowing and lending from the Smart Hub are governed by XDX token holders, who vote annually on the smart wallet. This section of the black paper explores the technical aspects, benefits, and potential applications of DEUX, showcasing its potential to reshape the landscape of blockchain-based financial systems.

Blockchain technology has ushered in a new era of decentralised finance, but the existing transaction fee models often lack efficiency and fail to provide tangible benefits to token holders. Addressing these limitations, the DEUX protocol introduces a deflationary economic utility exchange that maximizes the utility of the XDX token within the XDXs Hyper-chain blockchain network.

The DEUX protocol aims to create a transparent, secure, and inclusive financial ecosystem by utilising XDX as a transaction fee and empowering token holders to participate in borrowing and lending activities. The protocol's governance structure, driven by annual voting on the smart wallet, ensures that the interests of XDX token holders are represented.

DEUX utilises XDX as the transaction fee within the network. By adopting XDX as the primary currency for fees, the DEUX simplifies transactions and eliminates the need for external currencies or complex fee structures. This streamlined approach enhances user experience and reduces friction in conducting transactions.

The transaction fees collected by the DEUX protocol are sent to the Smart Hub, forming the foundation of the Deflationary Economic Utility Exchange. Users can borrow or unlock these fees through smart contract functionality, providing a mechanism for liquidity provision and utilisation.

This system encourages active participation and ensures that the XDX token remains an integral part of the network's ecosystem.

To ensure a fair and democratic decision-making process, the smart wallet empowers XDX fee's transacted on the DEUX for XDX token holders to vote on interest rates annually through the smart wallet. This governance structure allows token holders to actively participate in shaping the network's economic policies and ensures that the system aligns with the collective interests of its participants.

By incorporating a voting mechanism on the XDXs, the DEUX protocol, along with the Smart Hub promotes transparency and accountability for all XDX within the XDXs network. XDX holders can monitor the voting process and verify the outcomes on the smart wallet, fostering trust and confidence in the protocol. This transparency also encourages wider adoption and attracts new users to the XDXs Hyper-chain ecosystem.

The DEUX protocol enables individuals and organizations to access borrowing and lending services directly, without relying on traditional financial institutions. This democratization of financial services promotes inclusivity and empowers users to leverage their XDX holdings to generate income and participate in the network's growth. The DEUX protocol leverages smart contract functionality to ensure the security and efficiency of lending transactions. By eliminating intermediaries, the protocol reduces costs, minimizes the risk of fraud or manipulation, and enhances the overall user experience.

The DEUX protocol combined with the Smart Hub fosters a sense of community ownership by allowing token holders to actively participate in governing the network. This community-driven approach encourages engagement, collaboration, and the development of a robust ecosystem that aligns with the interests of its participants.

DEUX represents a significant milestone in the evolution of blockchain-based financial systems. By utilising XDX as a transaction fee within a deflationary economic utility exchange, DEUX empowers token holders and maximizes the utility of the XDX token. The protocol's governance structure, driven by annual voting on the smart wallet, ensures transparency, inclusivity, and aligns the network's economic policies with the interests of its participants. As the DEUX protocol continues to evolve, it has the potential to revolutionise the landscape of decentralized finance and reshape the relationship between token holders and financial systems.

5.4 Smart Hub:

The Smart Hub: Revolutionising Borrowing and Lending on the XDXs Hyper-chain, the Smart Hub emerges as a groundbreaking and important component on the XDXs Hyper-chain. This autonomous smart contract borrowing and lending platform is set to transform the way users engage in financial transactions. With its unique governance feature and innovative approach, the Smart Hub is poised to revolutionise the borrowing and lending ecosystem.

At the core of the Smart Hub lies its autonomous smart contract platform. Leveraging the power of the XDXs Hyper-chain, this platform facilitates borrowing and lending transactions seamlessly. By utilising smart contracts, the Smart Hub eliminates the need for intermediaries, ensuring trust, transparency, and efficiency in every transaction.

One of the standout features of the Smart Hub is its utilisation of XDX fees from transactions. As users engage in various transactions within the network, a portion of the fees generated is directed

towards the borrowing and lending pool. This unique approach not only incentivizes users to participate actively but also ensures a sustainable lending ecosystem.

The Smart Hub takes decentralisation to the next level by incorporating a governance feature through the smart wallet. Users hold the power to shape the platform's future by voting on interest rates annually for borrowing and lending. This democratic approach empowers the community, allowing them to collectively determine the best interest rates that align with their, financial needs.

By leveraging blockchain technology, the Smart Hub aims to enhance financial inclusion on a global scale. Traditional banking systems often exclude individuals with limited access to financial services. However, the Smart Hub eliminates these barriers by providing a decentralised platform that enables users to borrow and lend funds securely and transparently.

The Smart Hub will begin with 10% of the total supply of XDX which is donated by our distribution wallet on the XRPL. XDX on the XDXs will be wrapped across the network from the XRPL network. All assets available in the Smart Hub will be available to all users on the XDXs to borrow at the interest rate provided by the XDXs community. Through the smart wallet users will need to own an amount of collateral in their wallet on the XDXs network in order to conduct borrowing from the autonomous Smart Hub.

5.5 Smart Wallet P2P Borrowing and Lending:

To calculate borrowing and lending XDX between two non-custodial wallets on the XDXs, it would be agreed upon both parties what is suitable risk through smart contract functionality, this will automatically transact the balance of the assets/collateral into the lenders non-custodial wallet.

For Lending:

Lender's Collateral = (Borrowed Amount * Collateral Ratio) + (Borrowed Amount * Interest Rate)

Lender's Interest = Borrowed Amount * Interest Rate

For Borrowing:

Borrowed Amount = (Lender's Collateral - (Lender's Collateral * Interest Rate)) / (1 + Collateral Ratio)

Interest Paid = Borrowed Amount * Interest Rate

Reminder: Please note that the Collateral Ratio and Interest Rate should be agreed upon by both parties involved in the transaction and are fully flexible for reduced/additional collateral amounts.

Example;

The agreed Collateral Ratio is 150% (1.5) and the Interest Rate is 1% (0.01) paid every 4 weeks.

For Lending:

Lender's Collateral = (Borrowed Amount * Collateral Ratio) + (Borrowed Amount * Interest Rate)

Lender's Interest = Borrowed Amount * Interest Rate

Calculate the values for lending 100 XDX:

Lender's Collateral = (100 * 1.5) + (100 * 0.01) = 150 + 1 = 151 XDX

Lender's Interest = 100 * 0.01 = 1 XDX

For Borrowing:

Borrowed Amount = (Lender's Collateral - (Lender's Collateral * Interest Rate)) / (1 + Collateral Ratio)

Interest Paid = Borrowed Amount * Interest Rate

Calculate the values for borrowing:

Borrowed Amount = (151 - (151 * 0.01)) / (1 + 1.5) = 149.49 / 2.5 = 59.80 XDX

Interest Paid = 59.80 * 0.01 = 0.598 XDX

To borrow 100 XDX for 5 years at a 1% interest rate paid every 4 weeks, the borrower would need to provide a collateral of 151 XDX, and the interest paid would be 0.598 XDX.

5.6 Enhancing Financial Inclusion, Addition Borrowing/Lending Token Smart Hubs.

The XDXs Hyper-chain will be positioned to enhance the world of digital currencies by introducing additional Smart Hubs for other various digital assets. This development will empower XDX token holders to actively participate in the decision-making process and contribute to the growth of the ecosystem.

Smart Hubs within the XDXs Hyper-chain act as decentralized applications (dApps) specifically designed to handle a particular currency. These hubs facilitate seamless transactions, smart contract execution, and other functionalities related to the respective currency. By creating multiple Smart Hubs, the XDX Hyper-chain ensures efficient and scalable operations for different digital currencies.

5.7 Voting Mechanism and Decision-Making for other digital assets:

XDX token holders play a crucial role in determining which currencies will be added to the XDX Hyperchain Smart Hub ecosystem. Through a voting mechanism, token holders can express their preferences for incorporating new Smart Hub assets. This democratic approach ensures that the XDX ecosystem remains community-driven and responsive to the needs and demands of its users.

The voting process is conducted on a secure and transparent blockchain network, allowing token holders to cast their votes directly from their Smart Wallets. Each token holder's voting power is proportional to the number of XDX tokens they hold, ensuring a fair and balanced decision-making process. The integration of blockchain technology guarantees the immutability and integrity of the voting results.

5.8 Interest Rates for additional Smart Hub assets:

One of the unique features of the XDX Hyper-chain is the sharing of interest rates for assets beyond XDX within the Smart Hub of donations. This means if an additional Smart Hub is voted for (Any additional asset-XRP/USDT/BTC Smart Hubs etc) activates an additional asset available for borrowing and lending. This mechanism incentivises token holders to actively participate in the ecosystem and contribute to its growth with additional assets.

5.9 Interest Rates:

When users vote to add digital asset tokens into additional Smart Hubs, they earn interest on their contributing qualifying amount. The interest rates are determined by the demand and supply dynamics of each currency. The transparent nature of the XDX Hyper-chain ensures that interest rates are fair and market driven.

5.10 Additional Smart Hub donations:

Optionally, A portion of the interest earned from adding assets to the Smart Hub activities is allocated to a pool of donations. Token holders can choose to donate a portion of their interest earnings to this pool, which is then utilised for various community-driven initiatives. These initiatives could include supporting charitable causes, funding development projects, or promoting financial literacy programs. The voting mechanism for this would be relevant to the additional Smart Hub.

Summary:

This black paper represents a brief layout of three separate projects combined concurrently being built out to produce an efficient XDXs, Hyper-chain network. Utilising the Network protocols of the XRPL and EVM combined into one interoperable Hyper-chain, we aim to add use case to already existing assets.

GENYSIS - GEN Systems (Green Energy Nodes)

GENYSIS is the development program focused on creating green energy nodes. The project's primary goal is to establish a decentralised network of green energy sources that can efficiently generate, maintain, and store renewable energy. This project holds immense potential for reducing carbon emissions and promoting sustainable decentralised energy practices.

SYNAPTRIX - Non-Custodial Smart Wallet

SYNAPTRIX is the development project that aims to provide a secure and user-friendly non-custodial Smart Wallet solution. Unlike some traditional custodial wallets, which involve entrusting private keys to third parties, our Smart Wallet ensures that users have complete control over their digital assets. The wallet employs advanced encryption techniques and multi-factor authentication to safeguard users' funds. Additionally, the Smart Wallet will support a wide range of cryptocurrencies, completely cross chain interoperable with the XRPL and EVM.

PARADIGM - XDXs Hyper-chain Network

PARADIGM is the development project focused on building a hyper-chain network for XDX, the digital currency currently on the XRPL. The PARADIGM program is focused on P2P DeFi tools and interoperability challenges faced by traditional blockchain networks. By utilising a hyper-chain architecture, PARADIGM aims to achieve seamless integration with existing blockchain ecosystems and facilitate the creation of decentralised applications (dApps) on the XDX platform. PARADIGM will provide additional P2P tools through the Smart Wallet interface and Governance to on the XDXs Hyper-chain network.

Our mission is not to compete with already existing digital assets and chains. But to build additional utility in DeFi to make crypto currency and blockchain technology safer and more appealing to international society. To invite new users into this new financial framework comfortably and accelerate adoption while providing a Hyper-chain network that's entirely governed by its community.

Disclaimer: This black paper is for informational purposes only and does not constitute financial or investment advice. Readers are encouraged to conduct their own research and consult with professionals before making any financial decisions.