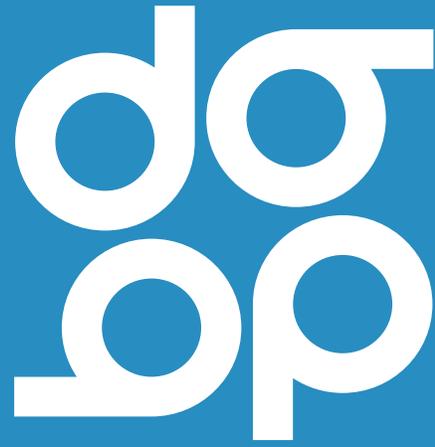# digitalbits

Lightpaper Version 2.3

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DigitalBits

DigitalBits is a protocol layer blockchain designed to help facilitate liquidity of various digital assets and integrate with existing consumer applications to drive mass-market adoption. The built-in decentralized exchanged equipped with multi-hop technology creates a flexible marketplace for digital assets, and the network reaches consensus through a construct of Federated Byzantine Agreement. DigitalBits, a fork of Stellar, shares many of the benefits of Stellar, but differs in key aspects such as not subjecting its native tokens to inflation, developing a token name certification service and an automatic algorithmic token distribution. DigitalBits looks to introduce transferability and portability to new and existing digital assets, facilitating seamless and near instant transfer of value.

State of the Market

A majority of consumers do not understand what a cryptocurrency is or how to obtain it. At the time of writing, less than 1% of the global population utilize cryptocurrency on a monthly basis. Widely used and flagship cryptocurrency Bitcoin sees an average of 223,973 transactions per day.[1] Comparatively, the Visa network experiences an average of 150 million transactions daily.[2]

Most forms of cryptocurrency and blockchain technology face challenges, and are intimidating to those not involved in the industry. As a result, global adoption remains low, as this technology is in conflict with current learned consumer behaviour, reducing its appeal when compared to easy-to-use and familiar legacy systems.

Legacy digital assets currently amount to billions of dollars worth in value. However, many lack transferability and portability, leading to a frustrating user experience and a large amount of these assets going unused. To date, blockchain technologies have yet to drive a mass-market solution to the problems faced by these legacy digital assets

Solution

A substantial portion of society already possesses some form of legacy digital asset. Common examples are loyalty and rewards points (e.g. Starbucks Rewards and Marriott Rewards). Tokenization of these assets on the DigitalBits blockchain increases utility without the need to alter learned behaviour. The protocol allows seamless integration of existing consumer applications, enabling them to leverage blockchain technology to help facilitate mass market liquidity for those digital assets. Through this method, DigitalBits is able to interface society with the benefits of blockchain technology, improving user experience and amalgamating more assets into the cryptocurrency ecosystem.

Built... Already developed Blockchain protocol that can support high-throughput transfer and trading on-chain

Liquid... multi-hop transfer of assets (up to 6 hops apart) to help provide higher liquidity to tokens even if no direct market exists

Integration Ready... integration with existing consumer applications to drive new users into the cryptocurrency ecosystem

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1 https://www.blockchain.com/en/charts
2 https://altcointoday.com/bitcoin-ethereum-vs-visa-paypal-transactions-per-second/

Mission

DigitalBits is a protocol layer Blockchain designed to help facilitate liquidity of various digital assets and integrate with existing apps to drive mass-market adoption

DigitalBits supports an enterprise go-to-market approach. Through the tokenization of an enterprise program's existing digital assets, the active wallets within that ecosystem are instantly transferred onto the DigitalBits blockchain. Millions of consumers will be able to utilize and benefit from blockchain technology without even knowing it. DigitalBits creates an ecosystem in which enterprises and consumers can leverage blockchain technology without having to alter learned behaviour. This effectively brings blockchain to society as oppose to forcing consumers to understand blockchain terminology, and enables a path to drive the mass adoption of cryptocurrencies.

Vision

DigitalBits' vision is a global token economy, in which all entities are able to leverage the benefits of blockchain technology in a decentralized manner, where value moves without borders or friction.

Main Value Proposition & Functionalities

DigitalBits main value proposition is to provide easy asset tokenization using a transaction and trading layer blockchain designed for a wide variety of digital assets. This is achieved through 4 specific sub goals: enact *plugins & apps, tokenize assets, trade assets,* and *pay & remit*. Details of these objectives can be found below:

1. *Enact plugins & apps*
   Applications and plugins have to be registered, prepared for enactment, execution and termination. Moreover, they must be able to interact with various entities in the ecosystem e.g the sending and receiving of tokens.

2. *Tokenize assets*
   Assets represented by tokens that are created on the DigitalBits blockchain. These tokenized assets can be integrated into applications and plugins.

3. *Trade assets*
   The value of digital assets is reliant on the ability to seamlessly transfer and trade them with other parties. Limitations may negatively affect the perceived value of the digital asset. The trading asset objective covers the trade of tokenized assets as well as the administration of on and off chain supply and demand.

4. *Pay & remit*
   This refers to the payment and remittance functionalities of the DigitalBits protocol. Pay refers to the buying/selling to/from merchants. Remit refers to the selecting of a currency and a recipient.

ARCHITECTURE OVERVIEW
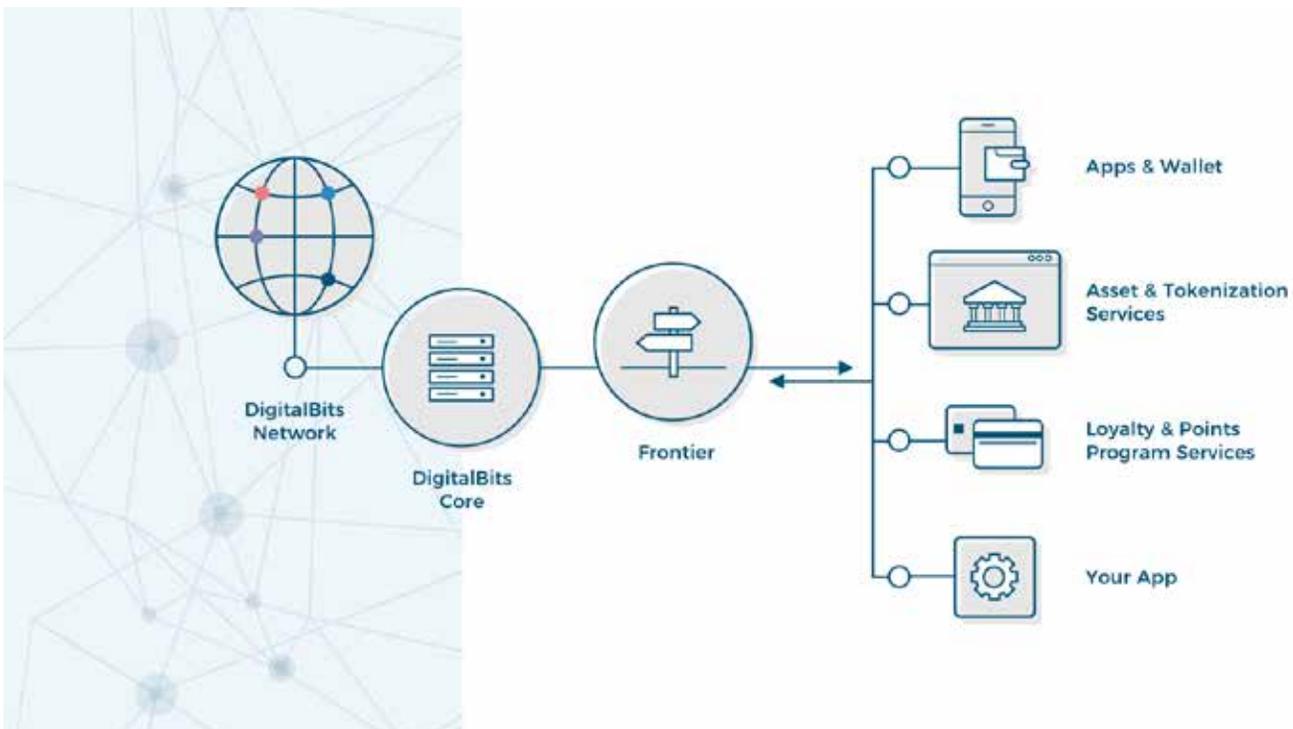
DigitalBits System Design & Architecture

DigitalBits consists of components that perform different but complementary roles in order to maintain the health of the network. The three key components are Frontier, DigitalBits Core and the DigitalBits Network

Frontier

DigitalBits Maintained:	Community Maintained:
Javascript	Ruby
Java	Python
Go-based	C#

Frontier provides a RESTful API for the DigitalBits ecosystem. It acts as the interface to applications that wish to access the DigitalBits network. Frontier facilitates actions such as submission of transactions to the network, checking the status of accounts and subscribing to event streams. It also ingests and re-serves the data produced by the DigitalBits network in a form that is easier to consume than the performance-oriented data representations used in the network.

Application developers interact with Frontier's RESTful API via the web browser, simple command line tools like cURL, or the DigitalBits SDK. The following languages are used to communicate with Frontier.

In addition, Frontier's APIs and SDKs can also be used to build or enhance custom brand specific Apps and clients.

DigitalBits Core - Network Backbone & Consensus

DigitalBits assumes the DigitalBits Consensus Protocol (DCP) in order to reach consensus on the network. This mechanism is an iteration of Federated Byzantine Agreement (FBA).

Quorums, i.e circles of trust formed among DigitalBits core instances (represented as DB core) of various partner institutions and individuals. The DigitalBits core instances can choose to belong to one or more quorums and utilize them in a hierarchical manner or based on the type of transaction that needs to be verified. The nodes belonging to a quorum need not be located close to one another.

Federated Byzantine Agreement allows different quorums (sets of validators) to co-exist. This contrasts with the single list of validators engaged in the Byzantine Algorithm, which raises issues of centralization. The nodes are able to determine the composition of the quorum in a decentralized manner. The more organizations and partners that contribute nodes to the DigitalBits network, the more reliable and robust the network becomes.
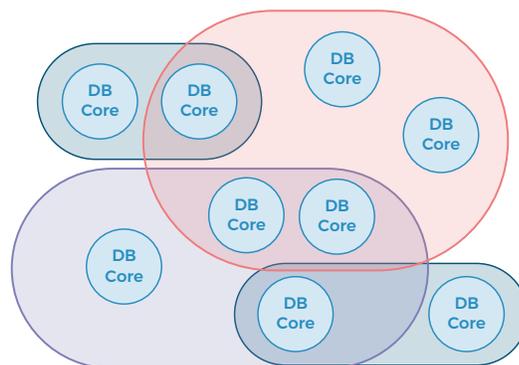
DigitalBits Network

The DigitalBits network itself is a collection of connected DigitalBits cores run by various individuals and entities around the world. Instances of DigitalBits cores add reliability to the overall network. Additionally, they may choose to have a Frontier server for communication in order to access the DigitalBits network. The distributed nature of the network makes it reliable and safe. All these DigitalBits cores within the network eventually agree on sets of transactions. Each transaction on the network costs a small fee: 100 nibbs (0.00001 XDB). This fee works as a deterrent to bad actors who may attempt to spam the network. The DigitalBits foundation also maintains archive servers with live backups of the current state in the network in order to facilitate new DigitalBits cores to come in sync with the current status of the network.

DigitalBits Architecture

Key components of the DigitalBits architecture consist of the following:

Application server

The application server enables applications to be built and integrated with the DigitalBits blockchain, e.g points programs, wallets, explorer etc. This includes DigitalBits first wallet option, the XDB Portal.

Bridge server

The bridge server enables applications to use the federation and compliance servers to send and receive payments. When a sender wishes to send a transaction, the sender's client contacts its bridge server to initiate the transaction. If required, the bridger server then connects the federation server of the receiver and its own compliance server. If all verifications are successfully completed, the transaction is recorded in the DigitalBits network. The bridge server on the receiver's side periodically monitors the DigitalBits network and spots transactions destined for its end-point, connects to the required federation and compliance server, and accepts the transaction. The bridger servers then inform the respective end-points about the result of the transaction.

Federation server

The federation server provides a mapping service between email-like human addresses and public key based addresses.

To enhance consumer experience and ease of adoption, DigitalBits associates an account with an email-like human readable identification in addition to the standard public key based identification. Human readable email-like addresses allow consumers to easily use Apps and clients without having to familiarize themselves with public-key cryptography.

Compliance server

The DigitalBits compliance protocol supports the exchange of compliance information to pre-approve a transaction with another enterprise/institution (EI). The customer information exchanged between EIs via the compliance protocol is quite flexible and typically consist of the full name, date of birth and physical address.
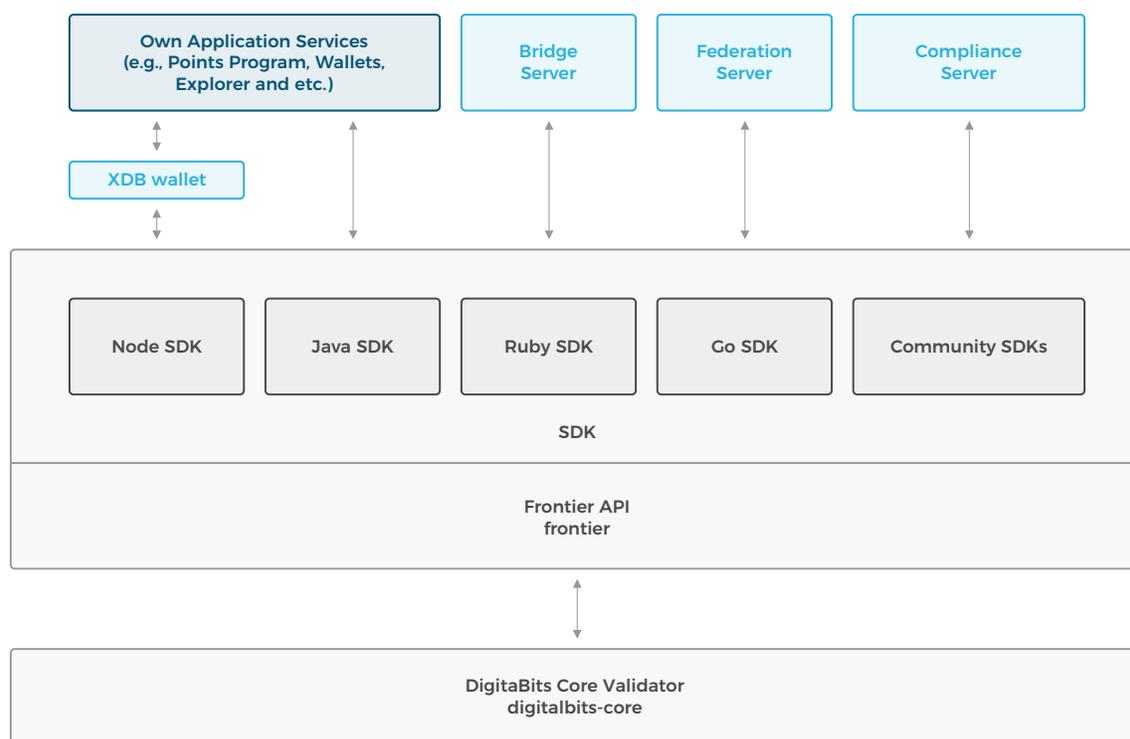
Wallets & Apps

Businesses and third-party developers can easily develop custom Apps by leveraging the Frontier API and DigitalBits SDK. DigitalBits also provides wallet source code that can be directly used or easily adapted to create a brand specific wallet. The bridge server facilitates easy access for the end points to the federation and compliance server.

Stakeholders Engagement & Services Interaction

The following are the underlying processes that enable entities to engage and interact with the DigitalBits blockchain:

On-Boarding Process of Digital Assets

Two different scenarios may be faced when onboarding digital assets. The first entails a new program without any legacy dependency. The second involves porting an existing legacy (non-blockchain) program onto the DigitalBits network.

The asset provider is to choose an identification code for the new asset, a combination of up to 12 letters/numbers that identify the asset in human readable form, after which the asset is ready to be used on the network. In order for other users to be able to receive these new tokenized assets, users have to choose to trust the asset provider, since the DigitalBits asset is a credit. This is done by establishing a trustline with the given asset provider. Each account can create a trustline, or a declaration that it trusts a particular asset.

In instances where an existing program is ported onto the DigitalBits blockchain there are 3 approaches:

1. The issuer creates accounts (consisting of public and private keys) for each legacy user, and loads the account with the respective amount of value held in the users existing account. These accounts may be managed directly via the DigitalBits SDK, or frontier server.
2. The program bridges their existing database via their bridge server to handle on-chain actions. The existing account database is maintained, while the bridge server maintains the blockchain events (sending/receiving tokens).
3. Customers register with a DigitalBits ID. When an account is registered, the issuer transfers the tokens equivalent, or proportional value that the customer possessed in the legacy system. The migration process may consist of different stages (early access program, proof-of-concept and cut-over). Users of the legacy system that wish to continue to accumulate points have to migrate before the cut-over in order to ensure they do not lose their points.

Token Name Certification Service (TNCS)

The token name certification service, currently under development, is suggested for the validation and authentication of asset providers. This is to ensure that malicious entities do not issue tokens representing brands/companies that they are not associated with.

Decentralized Multi-Hop Exchange

The DigitalBits protocol enables the seamless on-chain transfer and trade of assets, targeting non-tokenized assets that suffer from issues such as lack of liquidity, transferability and portability. The two elements to be discussed are matchmaking and cross-asset multi-hop payments.

ON-CHAIN MULTI-HOP PROTOCOL

Consumer Wallet

500 Airlines Points

$10 Coffee Points

XDB

BTC
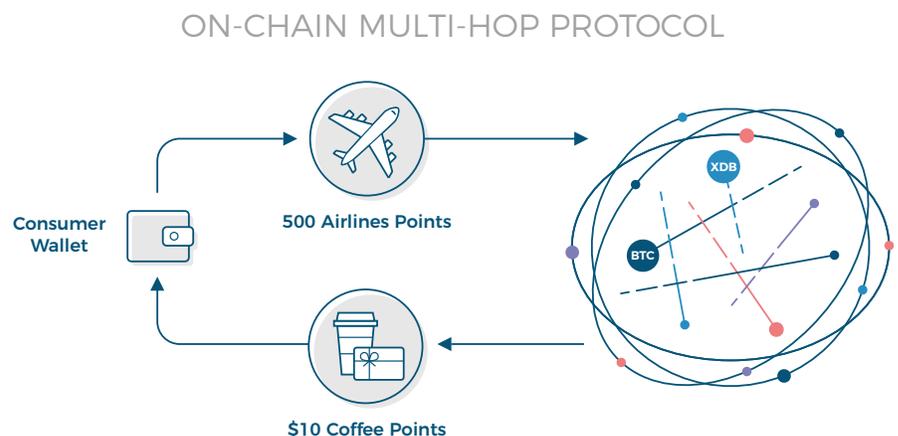
for illustration purposes only

Matchmaking

Users create an offer to buy/sell an asset. In order to make an offer, the account must hold the asset the user wishes to sell. The user must also have a trustline set up with the asset issuer. The offer is checked against the existing order book for that asset pair. If the offer crosses an existing offer, it is filled at the price of the existing offer. If not the offer is saved in the orderbook until it is taken by another offer, taken by a payment, cancelled by the account that created the offer, or invalidated because the account that made the offer no longer has the asset for sale.

Cross-Asset Multi-Hop Payments

Multi-hop technology enables the ability for tokens to have higher liquidity, even if no direct market exists. For example, if assets are up to 6 hops apart, this technology makes it possible for the automatic trading across intermediate order books of other asset pairings in order to fill the user's intended trade. Since cross-asset payments and conversions are simple and seamless, users are not required to hold any unwanted assets just for payment purposes. Instead, they can hold their preferred assets, only converting if necessary. The DigitalBits system thereby creates an ecosystem where users never have to exchange tokens except at the point of sale. Users could, for example, choose to keep their favourite tokens, converting small amounts as needed, such as when an alternative token is required.

First Use Case - Loyalty & Rewards Points

The loyalty and rewards points industry amasses billions of dollars every year. In the United States alone, approximately $48 billion dollars worth in points are generated across retail ($12 billion), travel and hospitality ($17 billion), and financial services ($18 billion). However, over 1/3 of this value goes unused, amounting to an excess of $16 billion dollars of value.[3] Both producers and consumers face friction:

Consumers:

- Unnecessary barriers to accumulate and redeem points

- Changing program rules and/or rewards

- Siloed programs lack transferability and portability - consumers are unable to transfer/trade for points they desire, significantly reducing the freedom with which this value can be allocated

Producers:

- High maintenance costs

- Incompatible program infrastructure limits the interoperability potential with other rewards programs

To address these issues, the loyalty points and rewards industry will be the first digital asset category to leverage the DigitalBits blockchain and its underlying technology. These points sit in the pockets of millions worldwide, and consumers are already familiar with how to earn, interact with, and utilize these assets. Consumers will not have to alter learned behaviour, and will benefit from blockchain integration.

The DigitalBits Blockchain can tokenize assets and serve as a liquidity layer to allow freely trading tokens on-chain up to 6 hops (with multi-hop technology). Consumers will be able to transfer and trade their tokens, and optimize their holdings based on their personal preferences. The DigitalBits Blockchain allows for compatibility across all integrated programs, allowing consumers the freedom to spend their accumulated points value however they want. In addition, enterprises will benefit from significant reductions in development, integration, reconciliation and security costs.

3   Gordon, N., Hlavinka, K.: The 2011 Forecast of U.S. Consumer Loyalty Program Points Value.
         URL: http://www.swiftexchange.com/Content/Documents/2011-COLLOQUY-Liability-Talk-White-Paper.
         pdf (Accessed August 14, 2018)

XDB Token & Distribution

XDB serves three main objectives:

1. **Protective security feature** – each account on the DigitalBits blockchain is required to stake a minimum of 10 XDB to ensure authenticity and to enable the send-function on the network. In addition, each transaction is subject to a minor transaction fee of 100 nibbs, or 0.00001 XDB. These features work to prevent users with malicious intentions from flooding the network.

2. **Enables transactions among non-native tokens** - XDB can act as a bridge to facilitate trades between pairs of digital assets that may not have a large direct market.

3. **Leveraged for fast and low-cost payments and remittances**

The following outlines the proposed token distribution:
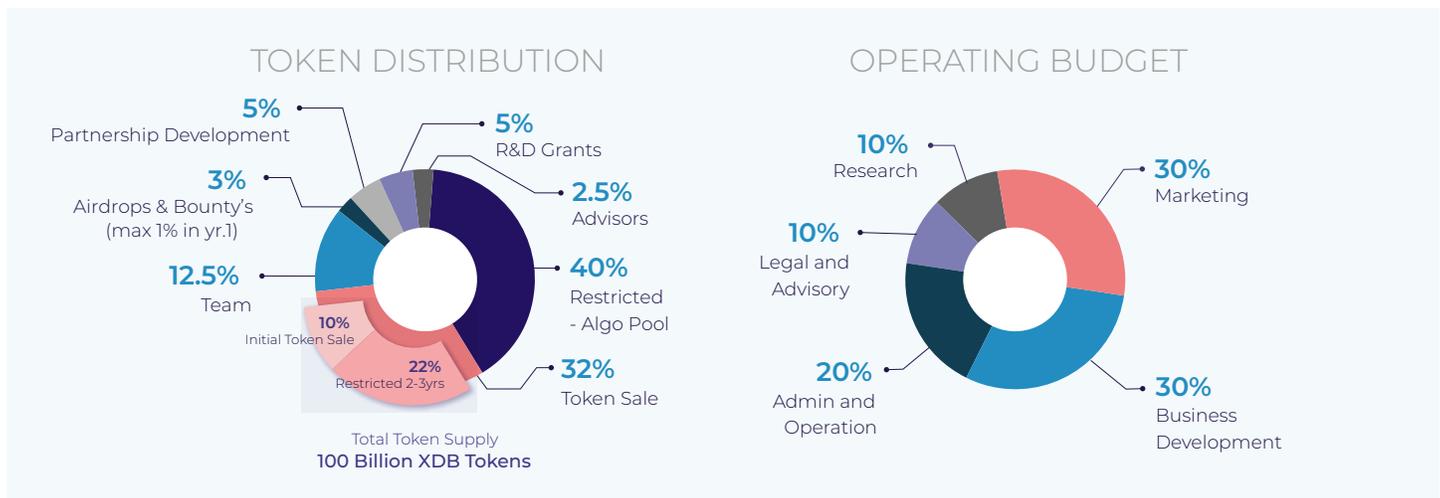
Forecast is for information purposes only and is subject to change based on actual results.

Conclusion

DigitalBits supports the vision of a true decentralized token economy. However, the current state of the market sees a lack of usage and general apprehension towards blockchain and cryptocurrency adoption. In understanding this, DigitalBits' approach is to integrate with existing consumer applications, thus porting millions of existing users onto the DigitalBits blockchain. Both consumers and enterprise adopters will experience the vast benefits of blockchain technology, with no required change in behaviour. Through this approach, DigitalBits will contribute to bringing blockchain and cryptocurrencies to the masses.

Team & Advisors

Leadership Team

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Advisory Board

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Co-Founder of Bloq

Toni Lane Casserly
Co-Founder of Cointelegraph

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Former Director of Loyalty Innovation at Shoppers Drug Mart

Disclaimer

This lightpaper document is for information purposes only and has been created to provide a general overview of the DigitalBits project. It will outline some of the key characteristics of the project, creating a concise vision of what we look to achieve. For further details, please reference our whitepaper.

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