An Algebraix® Whitepaper

The ALX Platform

July 2018, Version 1.4

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Overview of the ALX Platform

Abstract/Summary

The time has come for a new advertising model that directly pays consumers for their attention and the use of their data.

The Problem

Over the last 10 years, digital advertising has increasingly relied on the exploitation of an individual's personal data. At the same time, in an ever-increasing attempt to get a user's attention, digital advertising continues to interrupt the user experience, diminishing the value proposition of the media creator.

Advertisers face additional challenges. The cost of a user's attention has continued to rise over time and will continue to do so under the current interruptive ad model. Advertising continues to deliver a lower ROI year after year. 40% of digital ad traffic is reported to be clicked on by digital robots.

All parties involved want a more trusted and equitable environment and are constantly searching for and experimenting with alternatives.

The Algebraix Solution

Our solution is a platform, based on the ALX cryptocurrency, that enables advertisers and content providers to interact directly with their audience and to pay them in ALX for their time and attention.

Individuals will become Members because they will be able to earn from their data. The ALX platform will securely store their data, advertisers with explicit permission will use their anonymized profile data for targeting and they will choose which ads they want to watch. They will be paid for their time and attention.

Advertisers will use the ALX platform because they will have access to a richer collection of targeting data than anywhere else. They will know that every ad viewer is a real person and that they chose to watch the ad, and they will achieve an improved ROI on their ad spend.

The Algebraix Business Model

The ALX platform will act as a commissioned agent for its Members so they can earn from their data by watching ads and promotional content. All advertisers from big brands down to individuals will be able to use the trusted environment that the platform provides. That is the heart of the Algebraix business model.

We will establish a fast-growing ad network and virally-developed audience. In conjunction with this, we will establish a robust and popular cryptocurrency, ALX, which will drive the ad market. It will be secure, easy to use and easy to convert to other currencies including fiat, using the ALX Exchange.

In time we will, through partnerships and the efforts of our own developers add further applications to create an ecosystem of reinforcing activities where consumers maximize the value of their data.

The Components of the ALX Platform

An overview of the ALX network is illustrated in the Figure 2 below, which shows its major components and how they interact.
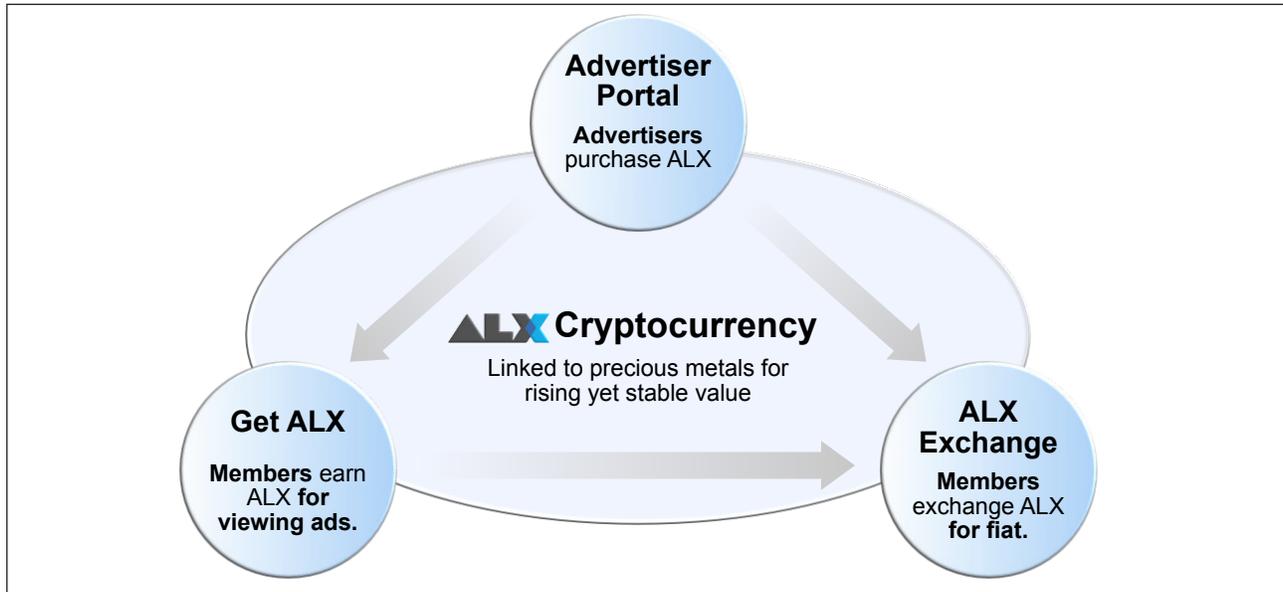

Figure 2. Overview of the ALX Platform

The ALX Member

The primary activity of the ALX member, once they have registered and input some data, is watching ads and other promotional content. They can do this from any device that runs a browser, by accessing GetALX.com. Access is by 2 factor authentication - entering a password and confirming their identity via email. The website is the user interface, displaying images of the content that they may want to watch along with the ALX reward they will earn if they watch it.

As ALX members watch ads the ALX they have earned accumulates. Members will be able to have their earnings transferred to their ALX wallet every day or less frequently if desired. Naturally, all ALX transactions are recorded immutably on the ALX blockchain. Once in the wallet, the ALX can be used. It will be possible to trade the ALX from the wallet on any crypto exchange that accepts it or on the ALX currency exchange once it goes live. Members will be able to add ALX (or other cryptocurrencies) to their wallet whenever they wish.

As a consequence of GDPR, individuals are able to retrieve their data from any business that holds it, including the likes of LinkedIn, Facebook, Amazon and Google. The ALX platform will assist its Members in retrieving their data from all such sources and help them assemble a far richer pool of their own data than would otherwise be available to any advertiser. The initial types of profile data will include but not be limited to, Shopping, Politics, Gaming, Sports, and Fashion. Members will be encouraged to enrich their profile with more and more data, which enable them to get better, more relevant ads and thus maximize the earning value of their data.

Advertisers

As indicated in the diagram there will be an advertising portal for advertisers to build campaigns

targeting ALX members for their ads. Once the campaigns are created and ALX awards assigned to the ad(s) it is passed to GetALX.com to be added to Members' "yet to watch" lists. The advertisers will also provide links to the data store where the ad(s) are stored and pay Algebraix (either in ALX or dollars) for the campaign.

The ALX platform will provide analytics to advertisers on how the ad campaign was received by ALX members (e.g. percentages of who watched, partly watched or didn't watch, compared to averages from other similar campaigns), overall popularity, price sensitivity and so on. The goal will be to create the kind of productive relationship between advertiser and consumer that can only exist in a permission-based environment.

To this end the activity of both Members and advertisers will be monitored by a reputation system to maximize the likelihood that Members respond to ads that genuinely interest them and the ads the network carries please the audience.

Advertiser ROI will be exceptional:

» Targeting will be more precise.

» Every ad viewer will be a real person (never a bot).

» Only ALX members who are interested will watch the ads.

» Advertisers will have a detailed understanding of Members' response to ad campaigns

ALX Platform Management

Always running, it is the engine of the ALX Platform and has many facets.

» It captures ALX member activity and logs every aspect of it: how long they spend using the app, which ads they watch, what referrals they make, how much ALX they have earned.

» When new Members register or existing Members upload new information it updates the Member profile DBMS.

» It manages the information of every ad campaign keeping a log of all activity, updating Members' "yet to watch" lists and reporting results to advertisers.

» It executes all ALX transactions that move ALX into Members' wallets and keeps a log of all ALX transactions that occur on the ALX currency exchange.

» It provides data analytics to Members that assists them to make best use of the ALX platform.

» It provides data analytics to Algebraix which will help it prioritize its development and business activities.

The ALX Advertising Channel

In The Global Advertising Forecast report published in December 2017, Magna estimated revenues from digital advertising to be over $178 billion (36% of the total global spend of $493 billion). Approximately 54% of this was shared between Google and Facebook. Magna expects this 36% figure to rise to 50% of the total by 2021 (i.e. $300 billion of an estimated $600 billion). Digital advertising revenues are thus considerable, averaging about $89 per Internet user, and $287 per US Internet user, and they are projected to grow at 11% per annum.

The expected rise in digital ad spending reflects the fact that digital ads are more effective than any other form of advertising. Digital advertisers are armed with big data and the best analytics. They invest in it heavily to push targeted ads at almost every person who accesses the Internet via PCs, tablets or mobile phones. Digital advertising is thus dominated by an interruptive push approach, which seeks to disrupt our attention and activity while we journey from one web site to another.

What Algebraix will establish is an alternative approach, based on a true permission "publish-subscribe" approach to advertising and promotion, where advertisers publish advertisements to selected groups of prospects (ALX members) and the Member chooses whether to subscribe or not. It is not an interruptive "push" approach. It will give rise to accurate targeting (more accurate, we believe, than analytic approaches to interruptive push advertising). People who want specific products or services will be able to subscribe to relevant published information and may choose to enter into a sales dialogue once they have reviewed the "ads." As part of the process they will be rewarded in ALX cryptocurrency in line with the agreed smart contract.

Most web users resent the attack on their attention that digital advertising exerts. In our view, advertisers that devote large revenues to push advertising will happily direct a good deal of that expenditure to self-selected potential customers.

We envisage the system for creating such interactions will have the following steps:

- ALX Members will choose to expose profile information in a profile database that reveals targeting information (date of birth, gender, zip code, interests, and so on) but not their name or address or any other such identifying data.

- Advertisers will be able to query the profile database to identify targets for their advertisements and thus generate an anonymized target list.

- The advertisers will publish their ads to the target list of ALX members, declaring the details of the reward (in ALX) for those who choose to view or read the ads.

- ALX members who view the ad will be paid for their attention, receiving the specified reward.

- It is expected that in most instances the ad will include a "call to action" and the ALX member may then choose to take the next step and develop an interaction with the advertising business which may involve further rewards.

- Every step up to and including a sale could be governed by smart contract and include an escalating set of rewards for the ALX member.

The rewards to the ALX member can be viewed either as payment for attention or as promotional discounts offered for a product or service, or a combination of the two.

The Reputation Engine

Just as the blockchain enforces immutability, provenance and security, the advertising system will seek to enforce honesty and integrity. Algebraix goal is to build trust into the consumer advertiser relationship in a way that satisfies both. The problem of "How do you keep both sides to this arrangement honest?" will be handled in the following way:

The system will include a sophisticated reputation score for both ALX members and advertisers.

ALX Member's Reputation: The ideal behavior of the ALX member, a behavior the system will incentivize, is that they browse through ads in the same way that they browse the Internet—searching for specific products or services that interest them and, when the mood takes them, making purchases. To be exact, we expect their browsing and shopping behavior not to vary significantly from the current norm.

We will encourage advertisers to provide potential buyers with promotion specific (encoded) vouchers that entitle the buyer to rewards/discounts as they move through each step of the sales process. By doing this we will be able to analyze not only advertising responses, but also sales cycle behavior, "from ad to purchase." Using machine learning data analysis techniques, we will thus be able to identify the normal range of consumer patterns, both for browsing ads and for the "ad-to-purchase" cycle.

For ALX members, the reputation engine will analyze their behavior and calculate a reputation score which advertisers can take into account when creating target lists. Those ALX members who try to game the system by viewing many ads for goods or services in which they have no interest, and hence never buy, will be excluded from the more rewarding advertisements by their reputation score.

ALX members will be advised of this policy. They will be able to read how the reputation algorithm works and will be able to access and know their reputation score. Additionally, we will warn ALX members when their activity is damaging their reputation score.

Advertisers' Reputation: In order to encourage good behavior, advertisers will be accorded a reputation score by ALX members in two ways. ALX members will be able to report advertisers that indulge in misleading advertising or deceptive practices and such reports will be provided as feedback to advertisers and may be published to all ALX members depending on the circumstance. However, we will also be able to report analytically on ALX member ad viewing behavior, providing advertisers with some indication of the reasons why ALX members chose not to view ads.

Data Refinement

As advertisers often wish to know preference details about potential customers that are difficult to discover, the system will include the ability for advertisers to suggest new attributes for (some or even all) ALX members to record and expose. For example, an advertiser of food products may wish to survey ALX members and find who likes spicy food or a sports company may wish to know which ALX members enjoys cycling. We expect ALX members to be willing to provide such information if they believe they will be rewarded for it and knowing that they cannot be individually identified by it.

Dynamic Ecosystem

Once ALX members realize that they have ways to monetize their data, we expect an entrepreneur-ial spirit to arise among some of them. We thus expect, for example, that they will organize economic groups (golfing enthusiasts, stamp collectors, chefs and cooks, and so on) so that they may be able to negotiate for products and services as a group. The system will cater for the forming of such groups, but Algebraix will not seek to organize any such groups – preferring to let them evolve of themselves. We will also support such activity by enabling software developers to build applications that might assist the organization of such groups.

In our view, if we enable individuals around the world to own their data it is incumbent upon us to enable them to monetize their data so that they begin to understand that it has value and begin to appreciate exactly what its value is.

We believe that network effects will naturally develop from many user activities, including using cryptocurrencies to make person-to-person payments, collaboration among groups of users to negotiate discounts and so on.

The Management of Personal Data

Personal Data

We think of an individual's personal data as comprising their full digital footprint. The adjacent table provides a comprehensive list of its possible components.

This is the data that Algebraix will enable ALX members to secure, command and productively use. Note that this inventory of data extends far beyond what the EU GDPR legislation defines as personal data. This is because our intentions and those of GDPR are distinctly different. GDPR hopes to protect personal data, give its owner the right to control it and prevent data exploitation. Our goals are broader: to enable ALX Members to profit from their data..

Even if most people had all their digital data properly secured and under their control, they would find it difficult to extract value from it. Our immediate goals are:

1. To deliver a new ad channel that is permission-based and will enable our Members to monetize some of their data.

2. To deliver a platform for building other apps that enable Members to monetize their data and which enables them to access other blockchains from within the ALX app.

The Personal Data Universe
Personal information. Name, date of birth, address, marital status, etc.
Personal credentials. Driver's license, passport, birth certificate, etc.
Interests and Preferences. Likes and dislikes, hobbies, etc.
Financial Information. Bank accounts, credit cards, investments, etc.
Personal History. Educational record, employment record, certifications, etc.
Memberships. Memberships of societies, air mile programs and so on.
Personal Permissions. All digital permissions, such as login details.
Titles. Deeds, titles, documents that prove ownership of possessions.
Digital Possessions. Photographs, videos, music, sound recordings, data files and so on.
Personal Digital Tracks. The logs of all your digital activity.
Buying and Selling History. Records of everything an individual has bought or sold.

Security, Manageability and Storage

The ALX member gets access to the ALX platform via multi-factor authentication that ensures that only they can access their data. Their data is stored within a personal data vault in the cloud, encrypted using cipher AES-256 encryption , in flight and at rest. It is anonymized in use. Thus when it is made available to advertisers for targeting, it is stripped of all identifying data and exposed only as an aggregated data set. All data activity is logged and auditable by the user.

No-one (including Algebraix) will have access to the data held in the data vault unless they are granted permission by its owner. The owner may confer access to specific data items to others and will grant such access in the context of specific personal or business interactions – for example when visiting a doctor. Algebraix's principles of data security which embrace the European GDPR principles and the use of zero-knowledge processes are discussed later in the Algebraix Ethos section of this paper. All software is designed to involve the minimal exposure of data and to make it uneconomic for any business to attempt to aggregate such data.

As we evolve, the innovative and comprehensive IPFS (the so called InterPlanetary File System) will be our preferred file system layer for storing data. This is a good fit to our algebraic approach to metadata (alternative approaches will be catered for as needed, for example where data is stored on other ledgers). Points worth noting about IPFS are that:

» Every file can be found by human-readable names using the decentralized IPNS naming system.

» Each IPFS file and all blocks it contains are given a cryptographic hash (unique fingerprint).

» IPFS removes duplications (across the network) and tracks version history.

» Each network node stores only files it is interested in along with indexing information that can be used by the algebraic metadata catalog (to figure out what is stored where).

» When looking up files, it asks the network to find nodes storing the content behind a unique hash.

Other Platform Applications

Aside from the new ad channel that we discuss in the next section. The technical details of the ALX platform will be available for developers to build complementary applications to those that Algebraix provide. Many services now offered through the Internet will, over time, become available through blockchain applications, including: every variety of social media application, every kind of data storage, email and messaging, buying and selling new and second hand goods, publishing, banking, investment, mortgages, credit checking, educational services, health services, dating, advertising and more.

Some of these may in our view be developed on the ALX platform. Others will become available achieved through directly linking to other blockchain capabilities that currently exist or are in the process of being created. For example, existing blockchain services include: retail, mobile game playing, competitive eSports, gaming (gambling), document storage, digital asset management and financial services.

Unleashing The "Big Data" Weaponry

We intend over time to deploy tools to provide ALX members with the "Big Data" weaponry (statistical software, machine learning and AI) that the data exploiters have in abundance.

The point is this: Large businesses accumulate large user databases and apply these tools for their own benefit in line with their business goals. There is no reason why ALX members should not be able to apply the same tools to the much large databases that they can jointly create in order to explore collaborative business ideas for their collective benefit.

The ALX Blockchain

The overview diagram in Figure 2 simplified the ALX blockchain, depicting it as a single process whereas, in reality, it is a network of nodes. Before we describe it we need to state that over the past year we have investigated a series of blockchain technologies, eventually concluding that we would need to develop our own blockchain technology from the get go. We had concluded that selecting a robust blockchain technology was a critical success factor to our endeavor. These were our reasons for that:

»	**Scalability.** The ALX blockchain needs to be able to scale to accommodate in the region of 1 million users relatively quickly and up to 1 billion users in the long term. This level of scalability was beyond the capability of most "off the shelf" open source blockchain technology

»	**Functionality.** The ALX blockchain has to be an independent chain, cater for smart contracts and not present developer recruitment problems.

»	**Cost.** It needs to provide a low cost per transaction, which in turn means that the blockchain consensus mechanism needs to involve minimal computer power.

ALX Blockchain Technology Choices

After investigating alternatives, Algebraix chose a blockchain based on Ethereum with the Clique consensus mechanism, as implemented in Geth (Go Ethereum). This technology combination is publicly available for test on the Rinkeby testnet, and since the choice was made, the team has been testing its capabilities. As many readers of this paper will be unfamiliar with the technology described, we will summarize it with the following words:

> It is an Ethereum-based blockchain that uses a Proof of Authority consensus mechanism.

We have taken this combination of technology and are further developing it to suit our longer term needs. At the time of writing it meets all of the requirements we listed above. In particular, it is capable of supporting at least 300 tps under test.

As the technology is derived from Ethereum, it will also be able to take advantage of the various Ethereum performance enhancements that are currently in progress such as Plasma, the Raiden Network, Truebit and the various chain-sharding experiments.

The Clique "Proof of Authority" (PoA) Consensus Mechanism

This is a remarkably simple consensus mechanism which uses a central ring of nodes which compete to create new blocks. On average all are equally successful so it is as if they took turns in a round-robin manner to create the next block. The decision as to which node to choose next is determined by the Clique PoA protocol. The Authority node pool can be extended to include new nodes.

A significant advantage of PoA for Algebraix is that it considerably simplifies network launch since it will be easy to assemble a small number of honest nodes to form the initial Authority pool.

The ALX Network Structure

As illustrated in Figure 3 on the following page, the ALX network has the following components:

»	**ALX wallets:** These are Ethereum-compatible wallets. We will offer our own and other third parties may also provide such wallets.
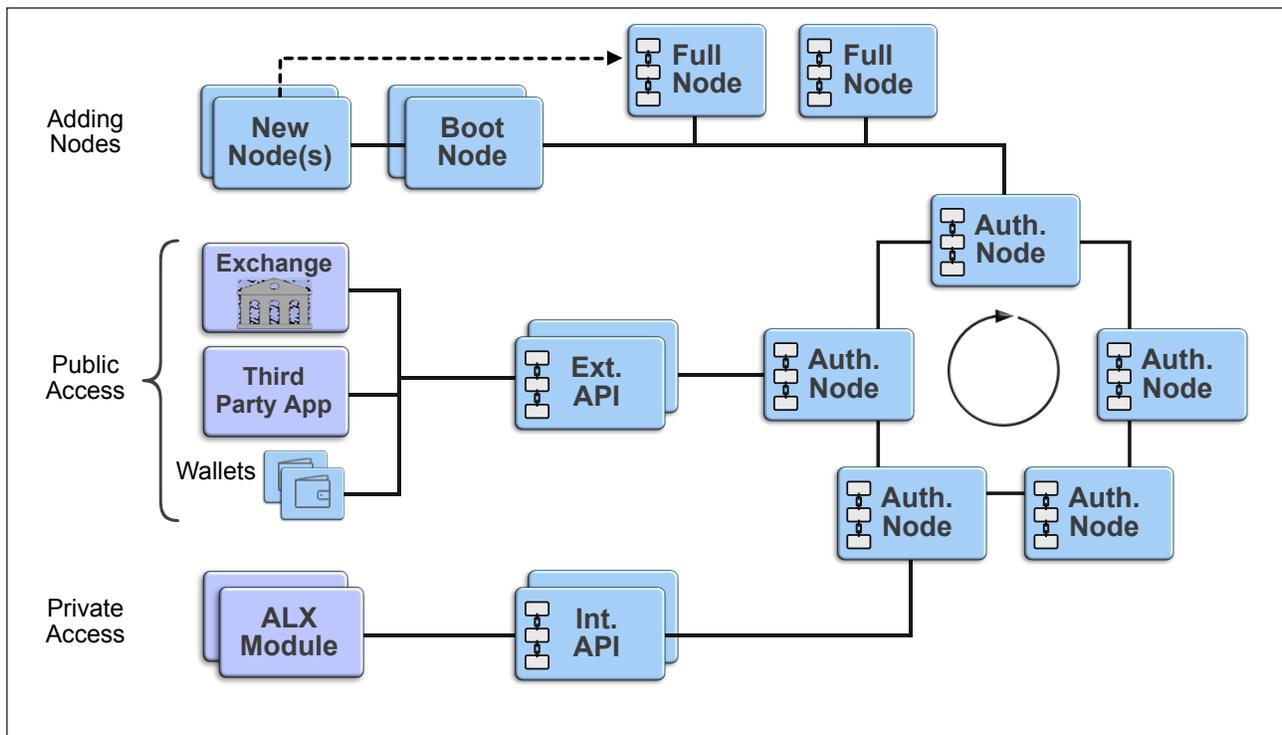
Figure 3. The ALX Blockchain

» **Full node:** Full nodes hold a full copy of the ALX blockchain and can be run by anybody. They could include an ALX wallet.

» **Boot nodes:** These are the entry points into the network for new nodes.

» **Private/Internal API nodes:** These nodes provide blockchain API access to Algebraix's internal services.

» **Public/External API nodes:** These nodes provide blockchain API access to third parties.

» **Authority nodes:** These are the "mining" nodes that create new blocks.

In Figure 3, the "adding nodes" flow shows New Nodes seeking access to the network. The Boot Node provides them with the connection information they require to connect to the blockchain network. They could be a node that wishes eventually become an Authority node or they might become an Internal API node or an External API node or simply a Full Node. The Boot Node (in practice a cluster of nodes fro the sake of load balancing and redundancy) provides them with a list of node addresses. Although all nodes run Geth, the Boot Nodes are distinct in having fixed IP addresses which Algebraix publishes.

Public access to the network for processes that need continuous access is provided by External API nodes. This includes ALX wallets and 3rd party apps—as an example, an Exchange might wish to post ALX transactions. If so, it could build an API node. The internal API nodes are for private access by Algebraix processes that need to post ALX transactions to the blockchain.

Finally there are the Authority Nodes which share the work of adding new blocks to the blockchain as indicated by the circular arrow. At launch Algebraix will provide most of the network nodes. However it will be possible for other nodes to be added by third parties further decentralizing the PoA consensus .

ALX Blockchain Governance and Proof of Authority

The Clique PoA protocol imposes a dynamic randomized weighting scheme. It has the effect of increasing the probability of any node completing the next block when it has not completed a block for a while. The protocol divides the workload fairly evenly although also somewhat randomly between the pool of Authority nodes. As the ALX blockchain is based on the Ethereum blockchain there is the concept of "gas"; gas is used to pay the transaction cost. The Authority node which completes a block is rewarded with the total of all the transaction fees paid by the transactions in the completed block.

The ALX blockchain will have 5 Authority nodes owned by Algebraix, with other nodes owned developers and other third parties. However, the pool of Authority nodes is not static. Aside from the fact that occasionally a node will fail and the pool will be diminished until it is restored, new nodes can be promoted into the pool and nodes can also be relegated.

Governance

Algebraix intends the ALX blockchain to be fully decentralized and will encourage other miners to try to enter the Authority pool. The main risk to the blockchain is that some individual or group could acquire 51% control of the Authority nodes and thus post false transactions (a 51% attack).

For that reason, a fairly complex set of governance rules has been created. The plan is that a four-layer process will be implemented consisting of Governing Nodes, Authority Nodes, Trusted Nodes and Ordinary Nodes, as illustrated in Figure 4.

Nodes may be promoted or relegated within these layers at any time. Only Governing Nodes voting nodes will be able to approve a new version of the software. As the blockchain software will be open source, anyone will be able to propose a new version of the code. If that were done and a majority of the Governing Nodes approve, it would be adopted. New nodes

Figure 4. ALX Blockchain Governance

enter as Ordinary Nodes. For an Ordinary Node to become a Governing Node it has to be promoted through the ranks by the layers above. All nodes including Trusted Nodes vote for its promotion to become a Trusted Node. All Authority Nodes vote to raise a Trusted Node to become an Authority node, when it can then participate in forming blocks on the blockchain.   The Governing Nodes vote to raise an Authority node to become a governing node. Nodes can be relegated by vote or can simply drop out.

Algebraix' goals is to encourage ALX members to configure ordinary nodes. Then ALX members will eventually take control of what will have become a widely decentralized blockchain network.
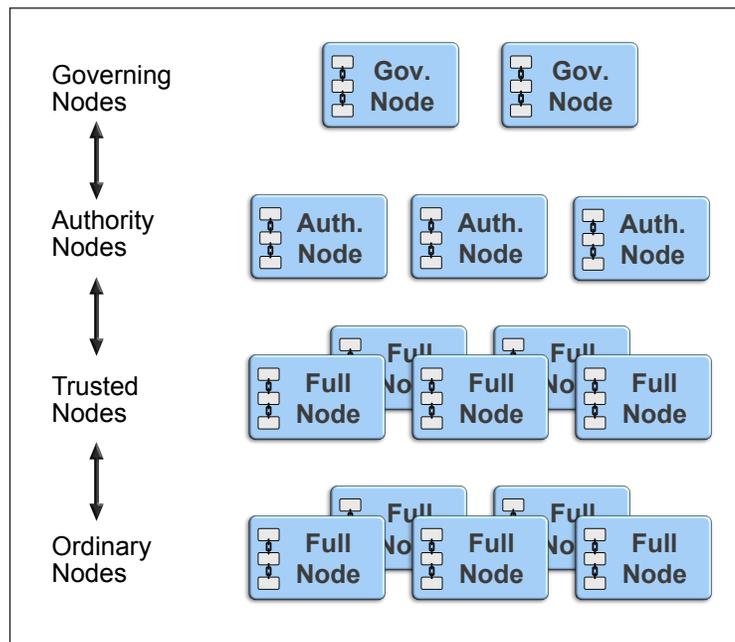
ALX Security

There are two aspects of security to describe here. The first is the management of keys and the second the ensuring that ALX members are real people and that no person can acquire more than one membership of the ALX network.

Key Management

Given that the ALX platform needs to be able to support millions if not hundreds of millions of Members, there is a requirement for a highly scalable key management system. ALX members will be provided with a key (a public and private key pair) when they register. The private key they are allocated will be used for access to their wallet and the data stored in their data vault.
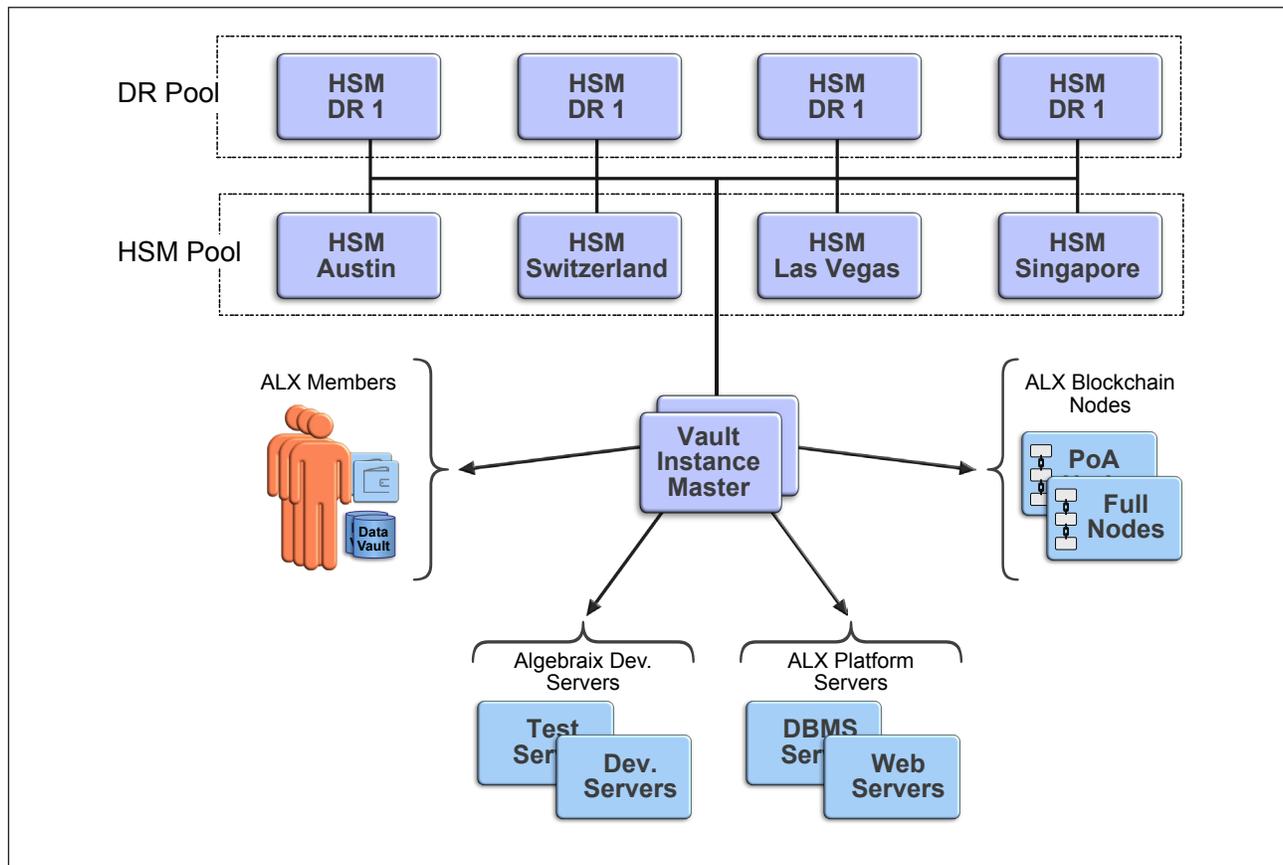

Figure 5. ALX Key Management

The chosen solution is illustrated in Figure 5. Algebraix will be using open source technology similar to manage all keys and passwords. This will be backed by a pool of Hardware Security Module (HSM) servers, back by a disaster recovery pool. The HSM servers will be located in different regions, providing secure high availability and redundancy.

As indicated in the diagram there will be a cluster of Vault Instance Masters interacting with ALX members to provide keys. The same key management capability will be used for all other servers involved in accessing, developing or running the ALX platform. Key management will be an independent system to the ALX platform. As such the ALX platform will never allocate or store the private keys of its users and will have its own security keys assigned to it by the key management system.

Identity Management

From both a security and business perspective, it is vitally important that every ALX member is a genuine person and cannot be a software robot and that no-one is able to establish more than one identity. Our solution to this problem can be thought of as a "Wheel of Trust."
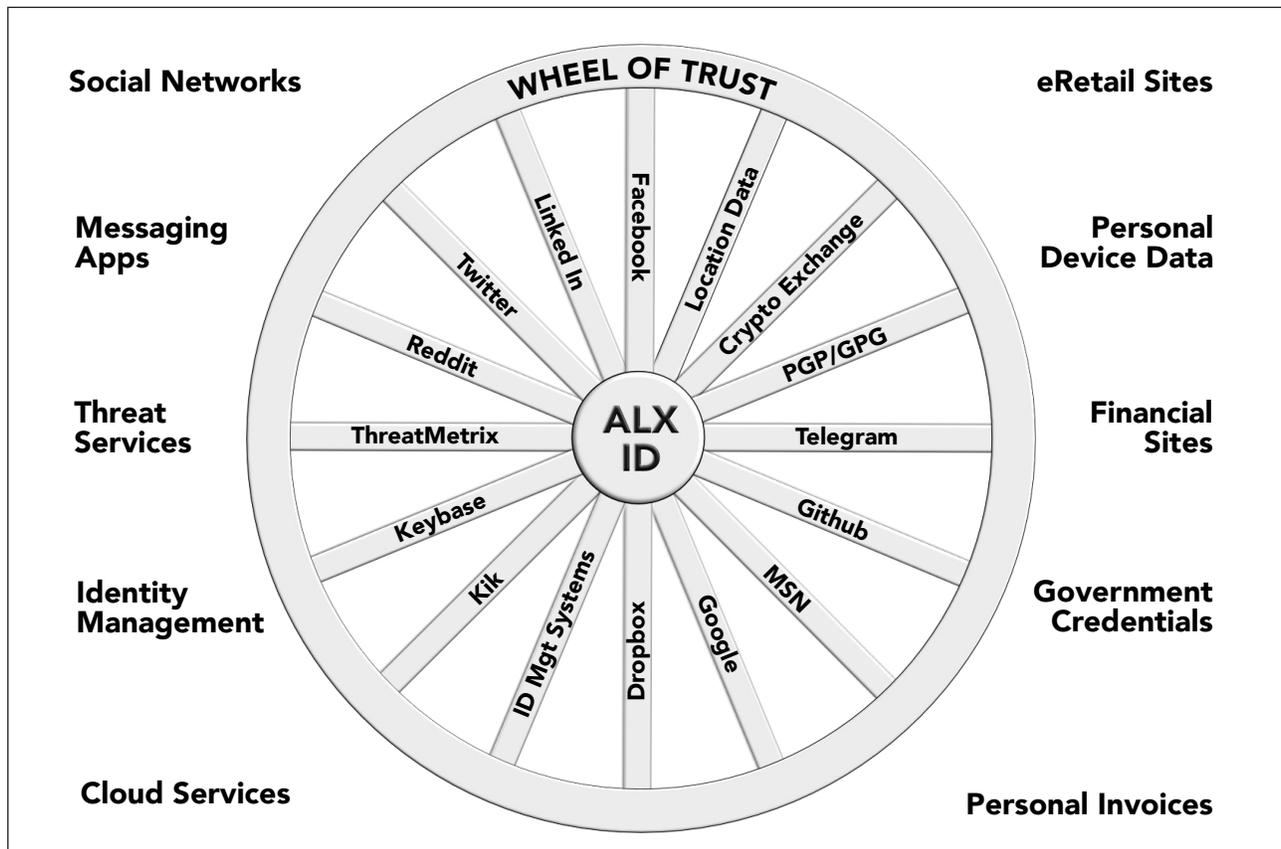

Figure 6. The ALX Wheel of Trust

The reality is that most people already have a fairly large set of declared identity information on social networks, messaging apps, cloud services, eRetail sites and so on. While it is possible to set up fake accounts in a handful of sites, most people are unlikely to go to the trouble of setting up a large number of fake IDs. Each such set of identity details can be thought of as one spoke in a wheel of trust that attests to the reality of the identity's owner.

The ALX Platform will use such data, where members provide it, to help validate a member's ALX ID. We will be able to assign a probability as to whether a given Member is real and we will be able to limit a Member's capability and ability to earn until a believable set of identity data has been uploaded.

We can, and in many instances will, assist the identity validation process by using the services of ThreatMetrix a company that when provided with basic details can attest to a high level of probability whether an identity is valid. However, the principle is still a wheel of Trust and ThreatMetrix is still only one spoke, if a very important one, in respect of speed and convenience.

And in situations where ThreatMetrix is unable to offer an assessment, the Wheel of Trust will provide us still provide us with a high level of certainty of identity.

The DApp and Smart Contract Registry

The Algebraix Platform and its ecosystem of capabilities will grow to become a complex environment of data and associated applications. It will implement multiple remuneration agreements governed by smart contracts. Those remuneration agreements will vary in respect to the parties involved, but may include:

- » ALX members
- » Resource providers (of Authority nodes)
- » DApps linked to other blockchains (for services rendered to users of the Algebraix blockchain)
- » Application authors/software developers, who build applications that leverage the Algebraix blockchain.
- » Payments to software developers may include one-time payments as well as payment by usage, which might mean payment per user or per transaction or per hour. The intention is to be flexible, so that in some instances payment-specific "unique" agreements may be made.

The payment transactions that occur within the ecosystem may need to cater for:

- » Micropayments
- » Batches of payments
- » Off-chain payment channels (e.g. for transactions using fiat currency)
- » Per-unit use of software
- » Custom receipts
- » Time locked payments
- » Escrow payments

The Algebraix DApp and Smart Contract Registry will itself be a smart contract, to which developers can publish their own applications that have been validated and are ready to run on the ALX network. Algebraix will define development standards. The goal of the registry is to:

- » Provide developers a way to publish applications both for vetting by Algebraix and for use within the network.
- » Provide ALX members or external organizations with a directory of applications to use if desired.
- » Provide visibility to all Authority Nodes of all applications (and their source code) that they may agree to run.

The exact process of code review and validation has yet to be formally defined. However, our intention is to exert rigorous security control over all new applications to eliminate the possibility of application-based attacks on the network or on ALX members.

The ALX Token

There will be 100 billion ALX tokens at network launch and that number will never increase. The allocation of ALX tokens at the time of network launch, is illustrated in Figure 6. The percentages shown are approximate, reflecting intentions and commitments rather than actual ALX holdings. The allocations are as follows:

» 5% to investors some of which have been allocated in a SAFT.

» 20% allocated for staff, advisers, agents and suppliers.

» 25% allocated to audience growth.

» The remaining 50% forms the company reserve.

Except for the small percentage of ALX token already committed, these estimated allocations are based on our planned roll out of the ALX Platform. However, in the future we may be allocating a larger percentage for investors.
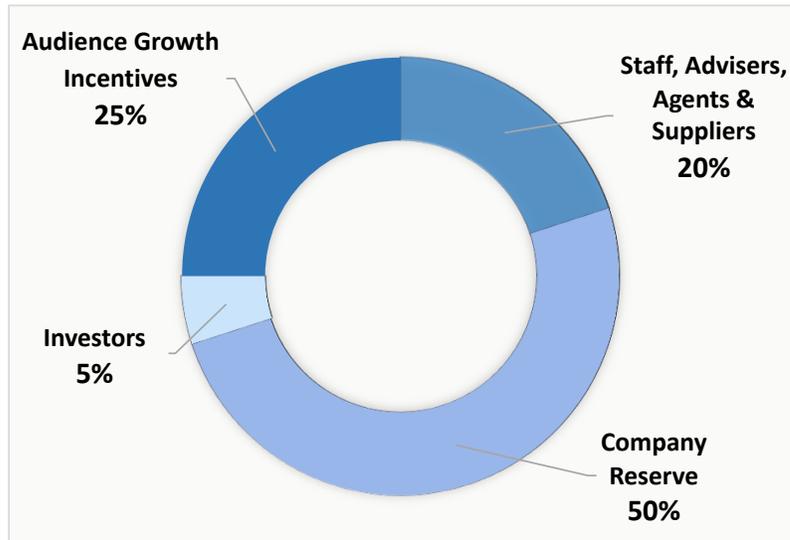

Figure 6. ALX Allocation as of July 2018

The ALX Reserve

In our view the economic ecosystem that will be created, as the population of ALX members grows, bears some resemblance to a national economy. This parallel will become increasingly appropriate as more applications are added to the ALX Platform and its utility and diversity increases. For that reason we intend to use the ALX reserve as a means of stabilizing the value of the ALX token in relation to non-volatile currencies (such as the dollar).

As such, we may in the future hold some of that reserve (possibly as much as 20%) in precious metals. We may also hold some reserves of important fiat currencies and cryptocurrencies, as we expect this may be necessary for our running of an ALX exchange.

The ALX Exchange

We plan for the ALX token to become an easy-to-use mainstream cryptocurrency. Our creating and running a cryptocurrency exchange is part of that plan. It will help us in the following ways:

» We will be able to integrate it into the ALX platform. We intend it to be inexpensive.

» ALX members will be able to move between currencies quickly and inexpensively

» We intend to support fiat currencies. We expect that to be popular with members.

» The will available to anyone who wishes to use it - not just ALX members.

» We will be using ALX tokens as a bridge currency, to encourage users to begin to use ALX as a metric of value.

» We believe we will have more than enough customers to make the exchange successful.

As a general goal we want the ALX token to become the easiest cryptocurrency to exchange into or out of. It is our view that the most fungible cryptocurrencies will become the dominant ones and that many cryptocurrencies, including some for which there is currently great enthusiasm, will wither on the vine because they have a small population of users and they are awkward to own.

Currently we intend only to develop an exchange and not a fully-fledged trading market with margin trading. We expect it will take significant time to build the capability we wish to deliver. It will not be a near-term deliverable.

Product Roadmap

The development of the ALX Platform has been in progress for over a year and many of the capabilities discussed in this paper are in the process of development. At the time of writing we can summarize the state of development as follows:

- The ALX app for watching ads within a browser on any browser-capable device is in beta test.
- Work on the ALX blockchain is in progress and expected to be launched in Q3 2018
- Work on The Web Of Trust is advanced and expected to be available for launch in Q3 2018.

Those are the highlights. The current roadmap is shown below. As the ALX platform is launched in Q3, the roadmap is subject to change from then onwards as we shall be responding to requests from our Members and advertisers once we have launched.

For Q3 2018
- » **GetALX.com (Beta)**
- » Secure Web-based Wallet
- » Secure Web-based Profile
- » ALX Token Distribution System
- » ALX Blockchain (TestNet)
- » Web Based Ad/Content Portal (Internal)
- » Secure User Access (Two-Factor Authentication)

For Q4 2018
- » **ALX Token Launch**
- » Membership Ranking Algorithm (Basic, Silver, Gold etc)
- » Incentivize Virality via Sharing Content
- » Incentivize Virality via Referral Program
- » ALX Blockchain (LiveNet)
- » Integration with ID Management System
- » Open Source (Blockchain)
- » Integration with Hardware Wallets (Trezor, Ledger)

For Q1 2019
- » **Advertiser Portal (External)**
- » Content Producer Rating
- » Permission Based Targeting
- » Enhanced Personal Datasets
- » Ability to run ALX node (3rd-Party)
- » ALX Blockchain Voting System

» ALX Conversion to Other Cryptocurrency

» Open Source (Voting System)

For Q2 2019

» Query Optimization with Data Algebra

» More Personal Datasets

» Federated ALX Node

» ALX Blockchain Governance System

» Advanced Advertiser Portal

» Enhanced Reporting & Analytics

» Open Source (Governance System)

For Q3-Q4 2019

» **ALX Exchange (Intl)**

» Multiple Cryptocurrency Support

» Multiple Language Support

» **Decentralized Blockchain**

  • Decentralized Authority Node

  • Decentralized API Node

  • Decentralized Advertiser Portal

  • Decentralized Service Node

For 2020 Q1-Q2

» **ALX Exchange (U.S.)**

» International Offices

» Network Ads

» Developer API

» 2020 Election Features

Data Algebra and the ALX Platform

Algebraix is the originator of data algebra, a new field of mathematics. It has spent eight years developing it, proving its power to drive high performance data retrieval in many software contexts and to scale out over very large volumes of data. Data algebra is capable of defining and manipulating all possible data structures at any scale.

Software based on data algebra will play a central role in the implementation of the ALX Platform and will be critical to its success. The software being developed requires a highly versatile metadata directory (or data catalog), which will ultimately need to cater to very large volumes of data distributed across multiple blockchains and stored in a wide variety of data structures.

Design work has concluded that the personal data an ALX member may choose to store will include flat files, structured database data, data objects, complex data relationships graphs and semantic metadata structures (ontologies). The data itself will be encrypted and self-defining, in the sense of knowing its origin, its lineage, its ownership and the usage permissions it grants or is able to grant.

Query Acceleration

The unique capability that data algebra can provide to metadata management will be complemented by its effectiveness in other important areas of data management and network performance. Specifically, it will accelerate processing speeds significantly using its proven query acceleration capabilities and it will enable data volumes across the Algebraix network to scale far beyond the petabyte level. Ultimately the software will need to cater for hundreds of millions of data vaults and their frequent individual usage. Data algebra will be key to delivering acceptable performance, irrespective of scale, while ensuring the economic use of resources.

Algebraix has been issued 9 patents that relate to the use of data algebra in data management and database applications. In particular, several specific techniques have been developed to accelerate the performance of queries accessing files or databases.

Most of these techniques work by monitoring query activity and identifying opportunities for data reuse—they enable the precise mathematical caching of results. They have proved to be effective for queries serving BI, analytics and ETL workloads, and for RDF database workloads—often accelerating performance by one or two orders of magnitude.

Aside from query acceleration, data algebra can be usefully employed in monitoring and managing a large data resource. By monitoring all data usage within a given data environment, it can optimize data storage structures and data location in ways that will reduce access times and minimize resource usage (CPU, RAM, etc.).

Open Sourcing of Data Algebra Code

Data algebra will be an integral part of ALX Platform code and an inherent part of the blockchain implementation. As we believe that the benefits data algebra confers need to be available to the whole developer community, source code will be made available on an open source basis. Additionally we intend to create an independent open source project that involves extensive use of data algebra.

Readers who wish to explore data algebra in greater depth can download the free eBook, *The Algebra of Data, A Foundation for the Data Economy* (by Professor Gary Sherman, PhD, and Robin Bloor PhD) at https://algebraix.io/get-book/ It is also available as a paperback on Amazon.com.

The Go to Market Plan in Overview

Algebraix is strongly focused on the goal of attracting millions of users to the network as quickly as possible, while simultaneously engaging with advertisers to provide advertising content. The go-to-market plan following the Network Launch will accomplish this goal by:

- Building brand buzz and PR through celebrity/influencer endorsements
- Running paid and viral audience acquisition campaign, with the intent of seeding a viral ecosystem
- Incenting early adopters to become Members and recruit their networks to the ALX platform
- Incenting sharing of content within and without the ALX platform to drive engagement and word-of-mouth
- Delighting Members through a compelling, simple experience.
- Focus on high-engagement promotional content categories such as movie and TV trailers, gaming videos, adventure and extreme sports, and creative, entertaining advertising

The Algebraix Audience Acquisition Campaign

Our advertising campaign will concentrate on four themes:

- Members can get paid for their time and attention.
- Members can get paid from companies based on their data, not the other way around.
- Members can get paid by consuming and sharing entertaining content.
- Members can join the cryptoeconomy

As part of this marketing push we will run ad campaigns involving celebrities and influencers promoting our app. The intention is to sow the seeds for a viral ecosystem that grows under its own momentum. Concurrently, we will maintain a strong media presence as an advocate for trust and helping consumers maximize the value of their data.

Rewarding Users for Choosing Our App

As stated previously in this paper, 25% of ALX coin supply is reserved for rewarding our customers, particularly early adopters. Members will be rewarded with an amount of ALX cryptocurrency by creating a data profile allowing them to be anonymously targeted with promotional content. It will be possible to earn further rewards by encouraging friends and acquaintances to become Members.

Members will earn ALX by viewing ads and will also be able to earn more by recommending ads they like to other users. They will be rewarded if the ads are subsequently viewed. We have a number of additional initiatives planned which will further create a viral ecosystem that will expand under its own momentum.

Delighting Users by Paying Them To Consume Entertainment

Algebraix will initially focus on the screen entertainment, video gaming, and adventure & extreme sports industries as the first categories to attack.

Early adopters will thus be rewarded for viewing movie trailers, TV trailers, music videos, and games ads. It is our expectation that, by this focus, we will attract the millennial age group, who will be

influential in recruiting both their contemporaries and older users.

Bringing the Cryptocurrency Economy Mainstream

Only a small proportion of the population knows what cryptocurrencies are and how to manage them. Traditionally the young are early adopters of new technologies and services, so Algebraix is deliberately targeting younger age groups both in the initial advertising services it delivers and by delivering a multi-currency wallet and trading capability with the ALX Exchange.

This should have a viral effect, so that the average Joe will see the importance of cryptocurrencies and become adopters. For most, ALX will be the first cryptocurrency they possess and the one that opens the door to the use of other cryptocurrencies.

Company Ethos

Algebraix sees TRUST as by far the most important aspect of a cryptocurrency-based business. In our view, the cryptocurrency world is destined to replace many existing businesses that are based on faith in the ethical behavior of the business owners – a faith that has been violated far too often by government and commercial organizations.

Many people have reached the conclusion that corrupt behavior is an inevitable risk in both government and commerce. Disillusionment has provoked their interest in cryptocurrency businesses where trust is placed in the technology underlying the business operation rather than in the business owners. In its effort to deliver a trusted service Algebraix has adopted a set of principles which it has implemented or it is in the process of implementing.

Algebraix Principles

Transparency. The business will be operated on a transparent basis so that its commercial activities are recorded and open to audit.

- Algebraix will make the majority of its code, including all smart contracts, available on an open source basis. In particular, we will be releasing to open source all software that makes use of Data Algebra.

- Algebraix will have regular independent audits conducted on its operation, particularly in respect of security. All smart contracts will be available as open source.

Self-Sovereign Identity and Self-Sovereign Data Management. Data owners will have full control of their data and the confidentiality of their data.

- Personal identity information will be managed entirely by the data owner on the basis of self-sovereignty. Only the data owner will have access to the data. Only the data owner will be able to give permission for it to be used.

- Other personally stored information will be treated in the same way. Only the data owner will be able to give permission for its use.

Responsiveness to Stakeholders. Algebraix will seek advice from and interact with all stakeholders of the Algebraix network.

- From the Algebraix perspective everyone participating in the network is a stakeholder, including: ALX members, farmers (resource providers), developers, advertisers – and including any category of users that may arise as new applications are added to the network.

- The intention is to enable consensus on the evolution of the Algebraix blockchain. To the extent that consensus is possible, it will be implemented as rules that determine changes to the blockchain and associated software.

Security. Algebraix will implement Defense-in-Depth and Privacy by Design systems for data storage and any needed, minimal logging.

- All local application data will be encrypted when at rest and in motion, with the data owner holding the private key. Any server side data will be encrypted at rest and in motion by following NIST standards.

- Where practical the platform will use zero-knowledge proofs. (In cryptography, a zero-knowl-

edge proof or zero-knowledge protocol is a method by which one party (the prover) can prove to another party (the verifier) that a given statement is true, without conveying any information apart from the fact that the statement is indeed true.)

Regulation. Algebraix will abide by all appropriate regulations in every jurisdiction within which it operates. In particular it will abide by GDPR. (It is already GDPR compliant).

Consumer rights under GDPR can be summarized briefly as follows:

- Individual Unambiguous Consent
- Right to Access
- Right to Change
- Right to Erasure
- Right to Portability
- Right to Complain.

These GDPR principles, where applicable, have been adopted by Algebraix. Some of these principles do not apply directly simply because within the ALX Platform, users have direct control of their data.

In Summary

Consumers have become accustomed to their data being exploited and violated without either their permission or any reward. Algebraix will provide an environment that protects against such data abuse as vigorously as possible. We will provide sovereignty to the data owner, enabling them to put their data to work on their own behalf and realize its value, should they so choose.

In our view, the Algebraix Ethos is the foundation of its business and integral to its operation.

The Algebraix platform will be built on the technologies that ensure trust, it's operation will be transparent to engender trust and it will be regularly audited to prove trust.

Trust, Trust and Trust.

Algebraix Executive Team

Charles Silver, Chief Executive Officer

Charles Silver is CEO of Algebraix Data Corporation and leads the effort to develop the Algebraix Platform. Charles is a career entrepreneur with 30 years of experience of raising capital and building successful enterprises that focus on finance, technology, and media. He was an early visionary in the dot com era as founder and CEO of RealAge.com which was amongst the first companies to use Big Data to connect individuals to relevant advertisers. The company raised capital in the dot com boom, survived the crash by building a profitable business, and was sold very successfully to the Hearst Corporation. He is also a co-founder and board member of Reality Shares, an innovator in the securities industry with 5 publicly traded ETFs.

As an early investor in Algebraix Data Corporation, he recognized the significance of Data Algebra to the entire software field and has financed the applied math R&D for 7 years. With the growth of the blockchain industry he is leading the effort to allow individuals to take ownership and monetize their data.

Andy Shah, Chief Technology Officer

Andy brings more than 18 years of technology leadership and executive management experience to Algebraix Data Corporation. He has grown both emerging and Fortune 500 technology companies. Andy served as AVP of Software & Technology for Westell Inc (NYSE:WSTL), where he innovated and built the patented Homecloud technology-based product and platform, which securely protects, shares and synchronizes end users' personal data with permission-based sharing to various online services. The Homecloud platform also supported building and distributing third-party developer's applications using Homecloud SDK and API. Andy also served as a Director of Engineering & Project Management for Sears Holding Corp (NYSE:SHLD).

He also held the Sr. Software Engineering Manager position in VC-based startup company Cleversafe Inc (acquired by IBM for $1.3 billion dollars). Prior to Cleversafe, he also occupied various technical roles as a Solution Architect, Software Architect and Software Engineer at Motorola Inc. Andy has a dual M.S. degree in Computer Science and Chemical Engineering from Illinois Institute of Technology. He has also published several white papers and holds several U.S. Patents.

Raj Lakhani, Chief Financial Officer

Raj Lakhani is a finance executive with a very strong technology/software background and over 20 years of professional experience. Raj began his career in software development after completing a Masters of Computer Applications and Bachelor of Science in math, physics, and chemistry from the University of Delhi in India. With a keen interest in understanding the business side of the corporations, Raj went on to complete an MBA in finance and accounting at Yale University's School of Management and has since led/influenced financial planning & analysis (FP&A) and M&A growth considerations for highly regarded technology firms including IBM and Microsoft.

Prior to joining Algebraix, he held various financial leadership positions at Wolters Kluwer, including VP FP&A for the Corporate Legal Services division and CFO for their Legal Information Services business. He also served as the principal financial officer for Ensequence, a venture/private equity backed startup adtech software company focused on interactive television solutions.

Robin Bloor, PhD, Chief Strategy Officer

Robin Bloor, Co-founder and Chief Analyst of The Bloor Group, has more than 30 years' experience in software development, IT analysis and consulting. Robin has been an influential and respected IT analyst for two and a half decades both in the U.K. and the U.S., and has detailed expertise in almost all areas of IT both from consultancy activities and his work as an IT analyst.

He has written a multitude of white papers and research reports on many aspects of IT. He has been a presenter and speaker at many IT industry events in the U.S. and internationally. He is a frequent blogger and also a published author, having written a business bestseller on electronic commerce entitled, The Electronic Bazaar, which, among other things, predicted the advent of personal data monetization. He is also the joint author of The Algebra of Data along with Professor Gary Sherman. Robin has a B Sc in Mathematics from Nottingham University and a PhD in Computer Science from Wolverhampton University (in the U.K.).

Steven Wilkinson, CISSP, CBP, Chief Information Security Officer
Steven Wilkinson is a certified cryptocurrency, blockchain and information security professional. He brings more than 10 years of experience in technology leadership, IT and security consulting to Algebraix Data Corporation.

While researching a solution for value transfer across the Internet, Steven discovered Bitcoin in early 2011 and began mining it. Since then, he has been working and advising on a variety of different blockchain projects and startups in this emerging ecosystem, including multiple token crowdsales. In 2013, Steven founded the Bitcoin consulting firm, Austin Bitcoin, which was one of the first BitPay merchant integration partners. He is also one of the co-founders of the Texas Bitcoin Association which produces the Texas Bitcoin Conference.

Steven holds a Certified Information Systems Security Professional (CISSP) certification and a Certified Bitcoin Professional (CBP) certification.

Andy Mikulak, Chief Marketing Officer

Andy Mikulak is a marketing-centric consumer branding executive with over 10 year's experience building and operating with full P&L responsibility high-volume, high-converting consumer digital businesses across a range of industries and verticals.

Andy has been CEO of the online medical education corporation Academy of Integrative Health & Wellness, EVP/GM of a multi-channel, celebrity-endorsed brand, and from 2004 to 2011 he directed all marketing, business development, database and advertising operations for RealAge.com – before, during and after the sale to Hearst Corporation.

Prior to 2004, Andy was an executive at an RFID-based casino technology startup, a children's entertainment start-up, and Director of Marketing for Bad Boy, which helped to establish the sport of MMA and the UFC league.

Professor Gary Sherman, PhD, Founding Mathematician

Gary will act in a consultancy capacity to Algebraix Data Corporation focusing on the application of data algebra to the data catalog and to database functionality required by the system.

Gary Sherman has a long history of studying (PhD from Indiana University, 1971), teaching (Professor Emeritus, Rose-Hulman Institute of Technology, 1971 to 2006) and doing mathematics (29

refereed publications). He was a founder and the Principal Mathematician for Algebraix from 2008 to 2014 where he invented and gradually proved the applicability of Data Algebra.