A Permission.io™ Whitepaper

The Permission Marketplace

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Contents

The Permission Marketplace

Permission.io (formerly Algebraix) is creating a new advertising marketplace where advertisers pay consumers for their time, attention and data

The Problem

Over the past decade digital advertising has become increasingly intrusive in an ever-increasing attempt to seize the consumer's attention. The advertising approach is based on interruption, obfuscation and the exploitation of personal data. This damages the advertiser's proposition of the advertiser and diminishes its effectiveness.

Advertisers face additional challenges. The cost of buying a user's attention has risen dramatically over time and we anticipate it will continue to do so under the current interruptive ad model. Advertising continues to deliver a lower ROI year after year. And, reportedly, 40% of digital ad traffic is the activity of digital robots clicking on ads.

This damages trust between the parties and inhibits interactions. All parties involved want a more trusted and equitable environment.

The Permission.io Solution

Permission.io is creating an advertising marketplace that enables advertisers and content providers to interact directly with their audience (our members) and members to receive to pay them in Permission tokens for their time, and attention and data..

Members will be paid for their time and attention. Their profile data will be securely stored and anonymized, and they will give advertisers explicit permission to use it for targeting. They will choose which ads to watch.

Advertisers will be drawn to Permission.io because it delivers trusted interactions with the ad viewer. They will have access to a richer collection of targeting data than anywhere else. Trust is the crucial value for any seller, whether it is a multinational consumer product company or a local retailer. According to a 2017 Ernst & Young survey, 74% of consumers would boycott a brand that they no longer trust.

The Permission.io Business Model

The Permission.io Marketplace serves two sets of customers. Just as Amazon.com serves both the sellers and shoppers by facilitating purchase transactions, Permission.io serves both the advertisers and members by facilitating interactions. Permission.io's overarching strategy is to deliver an experience that continually reduces friction of these interactions to delight both sets of customers.

The Permission token is the currency of the marketplace. There will be a fixed supply of 100 billion Permission tokens, the vast majority of which will be held in the company's treasury, while the remainder is used for building the audience and rewarding employees, suppliers, and strategic partners, as well as SAFT participants. A proportion of this will circulate, purchased by advertisers to fuel campaigns targeting audience members.

The vision is to build a totally decentralized Permission Economy that allows anyone in the world to become a member and any individual or business to become an advertiser.

The Marketplace in Outline

The Permission Marketplace enables interactions between advertisers who can run advertising campaigns and Permission.io members who can choose to watch ads and other promotional content. The marketplace will work in the following way:

The Permission.io member

The primary activity of the Permission.io member, once they have registered and input profile data, is viewing ads. They can do this from any device that runs a browser, by accessing Permission.io. 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 Permission token reward they will earn if they watch it.

As Permission.io members watch ads the Permission tokens they have earned accumulate. Members will be able to have their earnings transferred to their Permission wallet every day or less frequently if desired. Naturally, all transactions are recorded immutably on the Permission.io blockchain. Once in the wallet, the Permission tokens can be used.

Advertisers

The marketplace provides an advertising portal for advertisers to build ad campaigns targeting Permission.io members. Once the campaigns are created and Permission token awards assigned to the ads they are passed to the Permission.io website to be added to members' "yet to watch" lists. The advertisers pay Permission.io (either in Permission tokens or dollars) for the campaign.

Advertiser ROI will be exceptional:

- ■ Targeting will be more precise.
- ■ Every ad viewer will be a real person (advertisers wont be paying to advertise to bots).
- ■ Only Permission.io members who are interested will watch the ads.
- ■ Advertisers will have a detailed understanding of members' responses to ad campaigns

Advertisers will range from the largest global brands to the smallest retailer, and even individuals who wish to promote their content or their services.

Expanding Beyond The Advertising Market

While Permission.io's initial focus is the advertising market, the longer term vision is to establish a fully decentralized global Permission Economy based on the Permission token. We have little doubt that the same fundamental principles of a permission-based environment and its underlying technology are appropriate to many other sectors, particularly the marketing and sale of media. We discuss this in greater detail later (see page 8).

The Permission.io marketplace will attract a global base of users who believe that interruption is bad, and asking for permission first is the right way to build trusted relationships.

The Permission.io Advertising Experience

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 generally more effective than other forms of advertising. Digital advertisers are armed with big data and sophisticated 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 driven by an interruptive push approach, which seeks to disrupt our attention and activity while we journey from one web site to another.

What Permission.io is establishing a refreshingly different environment for both advertisers and their audience. It is based on a true permission "publish-subscribe" approach to advertising and promotion, where advertisers publish advertisements to targeted groups of prospects (Permission.io members) and members choose whether to subscribe or not. It is neither exploitative nor aggressive. It will ensure accurate targeting—far more accurate, we believe, than the sledgehammer approach of interruptive push advertising. Members 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 Permission tokens in line with the agreed smart contract.

Many 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.

Our system for creating such interactions will have the following steps:

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

- Because of recent GDPR regulations, members are able to retrieve their personal data from any business that holds it, including the likes of LinkedIn, Facebook, Amazon and Google. Permission.io 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.

- 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 members, the platform will declare details of the reward (in Permission tokens) for those who choose to view or read the ads.

- Members who view the ad will be paid for their time, attention and data, receiving the specified reward in Permission tokens.

- It is expected that in most instances the ad will include a "call to action" and the 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 member.

The rewards to the 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.

Marketplace Management

Permission.io marketplace management software will run all the time, managing all market interactions.

- It captures Permission.io 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 Permission tokens they have earned.
- When new members register or existing members upload new information it updates the member profile database.
- 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 Permission transactions that move Permission tokens into members' wallets and keeps a log of all such transactions that occur.
- It provides data analytics to members that assists them to make best use of Permission.io.
- It provides data analytics to advertisers on how ad campaigns are received by the 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.
- It provides data analytics to Permission.io which will help it prioritize its development and business activities.

The Reputation Engine

Just as the blockchain enforces immutability, provenance and security, the advertising system will seek to enforce honesty and integrity. Permission.io's 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 members and advertisers.

Member's Reputation: The ideal behavior of the 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 funnel. 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 members, the reputation engine will analyze their behavior and calculate a reputation score which advertisers can take into account when creating target lists. Those 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.

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 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 members in two ways. 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 members depending on the circumstance. However, we will also be able to report analytically on member ad viewing behavior, providing advertisers with some indication of the reasons why 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) members to record and expose. For example, an advertiser of food products may wish to survey members and find who likes spicy food or a sports company may wish to know which members enjoys cycling. We expect 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.

The Long Term Vision

We are working towards a fully decentralized network that host content and data profiles and enables commercial interactions between its members. From Permission.io's perspective, we are creating a marketplace where the initial focus is to enable advertisers and our members to interact productively, by rewarding members who view their content.

From the technology perspective an advertising market and a content market are very similar. Because of this and because we expect it will help to significantly boost our membership growth, the Permission Marketplace will expand to become an ecosystem where musicians, artists, video creators, photographers and other content creators, become both advertisers and retailers. Listening to a song, for example, acts as an advertisement to purchase other music from the artist. Members of the marketplace will then be able to use tokens to subscribe to or purchase content.

In time, the marketplace can and will be suitable for other activities that will broaden its reach. Examples include political campaigns, survey companies conducting auditable surveys, coupon strategies, club memberships and even dating.

The Technology Imperative

Permission.io believes that the technical governance of the Permission marketplace is key to its success. The goal is to provide all participants in the market the possibility of also becoming stakeholders in the operation of the Permission blockchain. The goal is decentralization of the governance of the blockchain and its network. In respect of computer resources, we have a growing need for content storage and for a growth in the Proof of Authority (PoA) computer nodes that implement the Permission blockchain. The storage demands of the network will be very high, since the network will host all the content that is available for members to access—potentially on the scale of Vimeo or Twitch, or even Youtube.

The decentralization of the network will guarantee that its software and its future development is not controlled by a single central authority or a cartel of interested parties. Instead it will be determined by a globally diverse population of stakeholders, including Permission.io members, computer resource providers, developers and businesses that participate in the marketplace. We will encourage all such stakeholders to become providers of storage resource and possibly to participate by running PoA nodes. We discuss how we will achieve this later in this paper (pages 11-14).

A Dynamic Commercial Ecosystem

Once members realize that there a multiple ways to participate in the marketplace, we expect some of them to become imbued with an entrepreneurial spirit. We envisage, for example, that content providers, advertisers and creative individuals will invent innovative ways to augment the marketplace. We expect that some members (sports fans, fishing enthusiasts, chefs, and so on) will form economic interest groups to negotiate the price for products and services as a group. The platform will enable such groups to be established, but Permission.io will not organize them itself – preferring innovators to take the lead.

We believe that network effects will naturally emerge from many member activities, including developers introducing new market capabilities, content providers establishing new channels, contractors marketing their skills—all of it supplementing the advertising interactions that enable members to exploit the value of their data.

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 Permission.io will enable 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 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 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

Members gets access to Permission.io 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 Permission.io) 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. Permission.io's principles of data security which embrace the European GDPR principles and the use of zero-knowledge processes are discussed later in the Permission.io 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 via 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 Permission.io will be made available for developers to build complementary applications to those that Permission.io 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 Permission.io. 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 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 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 Permission.io Blockchain

The Permission.io blockchain and its environment consist of a network of server nodes with specific functions. Before we describe it, we will explain the process that determined its design. Over the past year we investigated a series of blockchain technologies, eventually concluding that we would need to develop our own blockchain technology from the get go. We realized that selecting a robust blockchain technology was a critical success factor to our endeavor. These were our reasons for that:

- » **Scalability.** The 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 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.

Permission.io Blockchain Technology Choices

After investigating alternatives, Permission.io 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 transactions per second (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 Permission.io 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 Network Structure

As illustrated in *Figure 1* on the following page, Permission.io has the following components:

- » **Permission token wallets:** We will offer our own and other third parties may also provide such wallets.
- » **Full node:** Full nodes hold a full copy of the Permission.io blockchain and can be operated by anybody. They could include a Permission wallet.
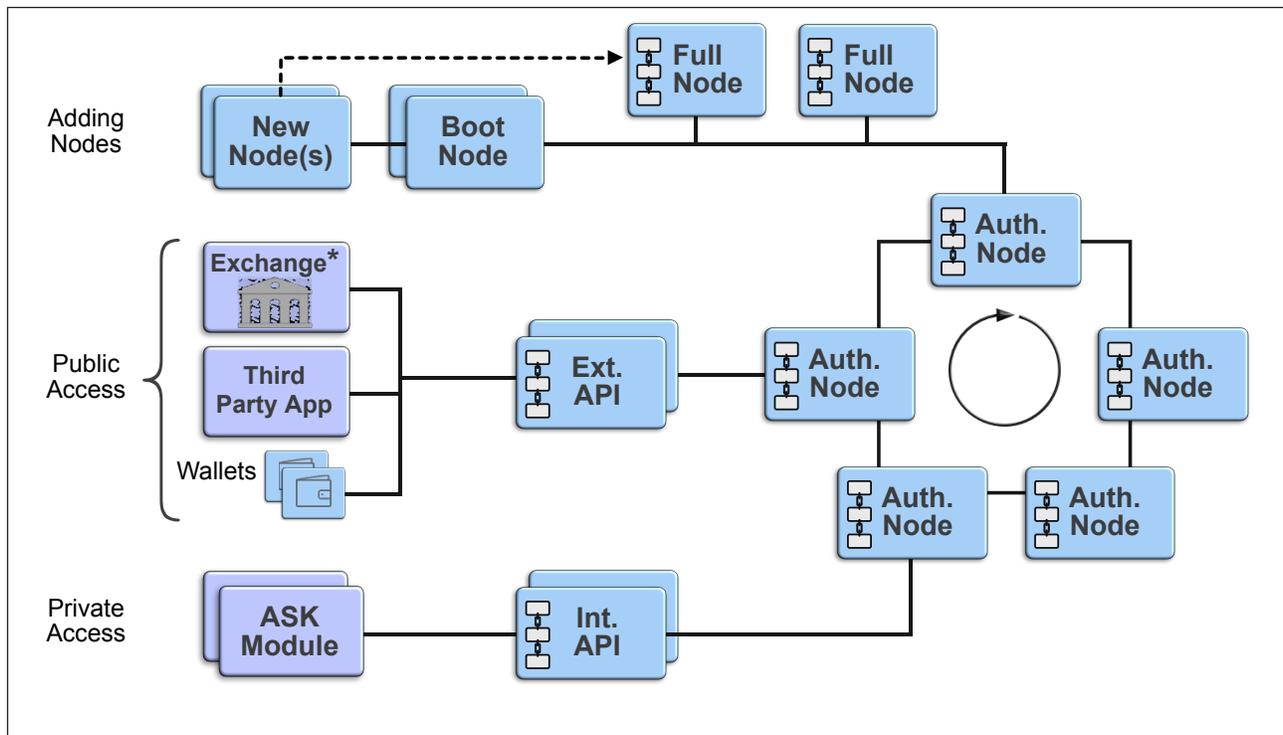
Figure 1. The Permission.io Blockchain

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

» **Private/Internal API nodes:** These nodes provide blockchain API access to Permission.io'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 1*, 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 for 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 Permission.io publishes.

Public access to the network for processes that need continuous access is provided by External API[1] nodes. This includes Permission wallets and 3rd party apps. If so, it could build an API node. The internal API nodes are for private access by Permission.io processes that need to post Permission 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 Permission.io 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.

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1 * *The Company does not intend to seek out exchange or other secondary market listing for the Permission Token. There is no guarantee that the Permission Token will ever be listed on any exchange or secondary market.*

Permission.io 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 Permission.io 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 blockchain will comprise a small number of Authority nodes owned by Permission.io, 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

Permission.io intends the 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 2*.
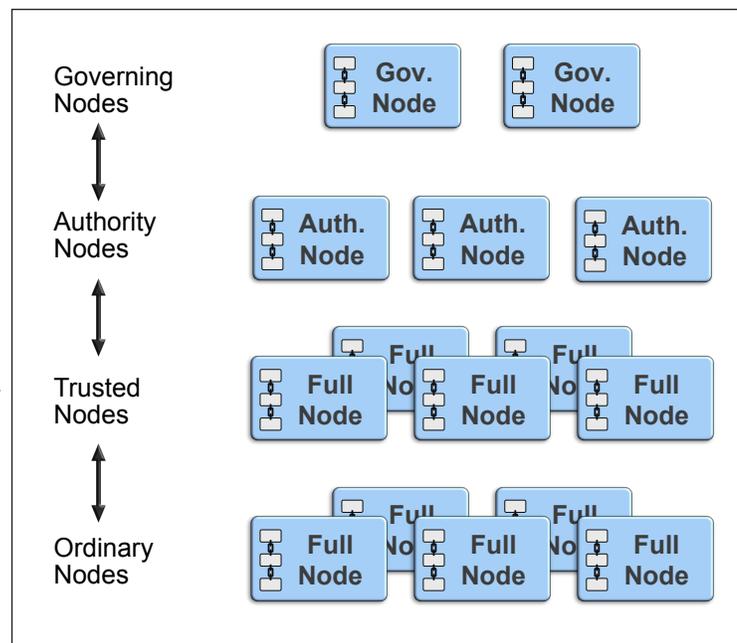

Figure 2. Permission.io Blockchain Governance

Nodes may be promoted or relegated within these layers at any time. Only Governing Nodes will be able to approve a new version of the software. As the blockchain software will be open source, any group of developers able to submit a new version of the code. When such a new version is proposed and a majority of the Governing Nodes vote in its favor, it will be adopted.

Every new node will start out as an Ordinary Node, and will run on the test network for 6 months before there is any possibility of it being promoted. For an Ordinary Node to become a Governing Node it has to be promoted through the ranks by the layers above. The procedure is as follows.

All hierarchically superior nodes, including Trusted Nodes, vote for or against the promotion of an Ordinary Node to a Trusted Node. A Trusted Node can only be promoted to become an Authority Nodes if the Authority Nodes and Governing Nodes vote for its promotion. When it becomes an Authority node, it can participate in forming blocks on the blockchain. The Governing Nodes vote

on raising an Authority Node to become a Governing Node. Nodes can be relegated by vote or can simply drop out. Nodes will be automatically relegated if they fail to meet the reliability and performance requirements of the blockchain.

Permission.io's goal is to encourage its members to configure Ordinary Nodes on a global basis. In time, members will take control of the governance of what will have become a widely decentralized blockchain network.

Storage Nodes

The purpose of Storage Nodes is to store the data, both profile data and content to serve up to members who wish to access it and content providers who wish to upload it. The Storage Nodes are required to meet reliability and performance criteria, but aside from that there are no specific requirements. We will encourage all content providers to run Storage Nodes either individually or collaboratively.

Distributed data storage will be managed through smart contracts that are stored on the blockchain. This will provide a public audit trail of all data storage activity and all associated Permission token payments associated with it. Our current intention, as we have already noted, is to implement IPFS for data storage. Using Permission.io's data algebra technology (discussed on page 21) we will implement a metadata layer to provide a more comprehensive directory of the distributed data resource.

Because of the structure of IPFS, the stored data will automatically be secure, versioned and backed-up. It will also be efficiently located within the network, providing a peer-to-peer access capability to its users.

Permission.io Security

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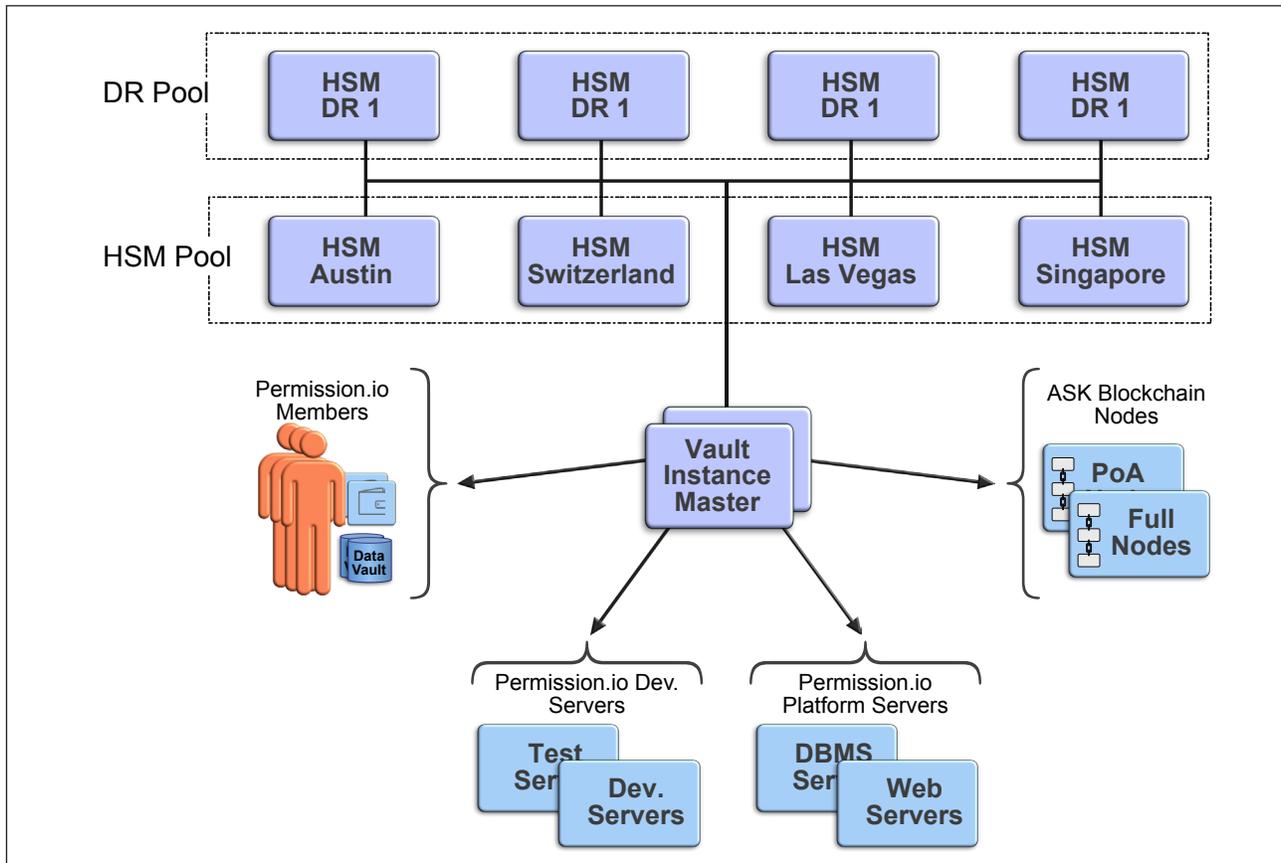

Figure 3. Permission.io Key Management

Key Management

Given that Permission.io 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. 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.

The proposed solution is illustrated in Figure 3. Permission.io 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 members to provide keys. The same key management capability will be used for all other servers involved in accessing, developing or running Permission.io. Key management will be an independent system to Permission.io. As such Permission.io 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 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," as illustrated below.
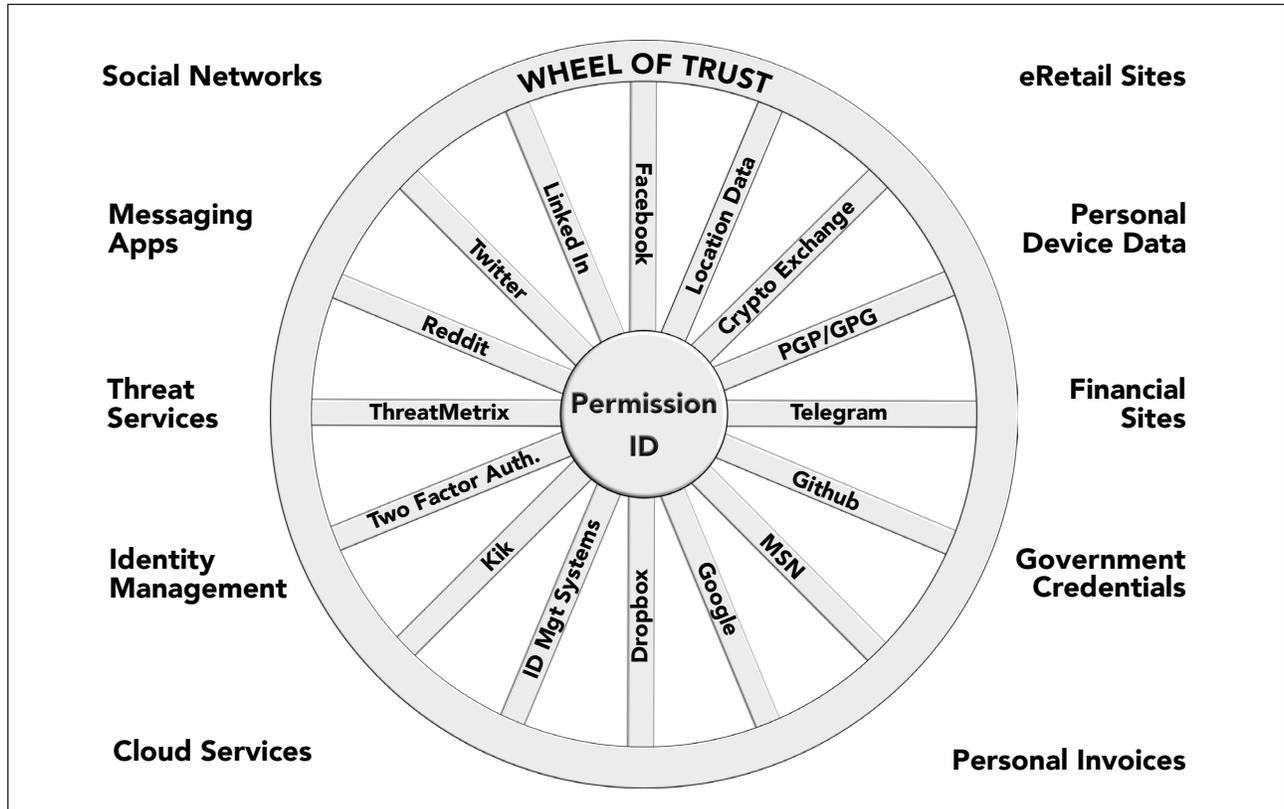

Figure 4. The Permission.io Wheel of Trust

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, including the two factor authentication that Permission.io implements, can be thought of as one spoke in a wheel of trust that attests to the reality of the identity's owner.

Permission.io will use such data, where members provide it, to help validate a member's Permission 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, we predict the Wheel of Trust will still provide us with a high level of certainty of identity.

The DApp and Smart Contract Registry

Permission.io 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:

» Permission.io members

» Resource providers (of Authority nodes)

» DApps linked to other blockchains (for services rendered to users of the Permission.io blockchain)

» Application authors/software developers, who build applications that leverage the blockchain.

» Payments to software developers may include one-time payments as well as payment

Figure 5. Permission token Allocation as of July 2018

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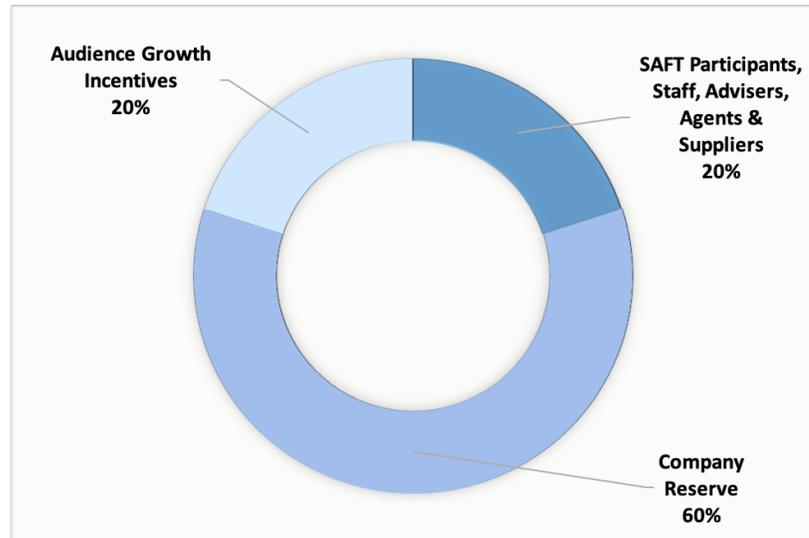
The payment transactions that occur within the ecosystem may need to cater for:

» 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 Permission.io 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 network. Permission.io will define development standards. The goal of the registry is to:

» Provide developers a way to publish applications both for vetting by Permission.io and for use within the network.

» Provide 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 members.

The Permission Token (ticker ASK)

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

» 20% of the supply is allocated for SAFT participants, staff, advisers, agents and suppliers.

» 20% of the supply is allocated to audience growth.

» The remaining 60% forms the company reserve.

Except for the small percentage of Permission tokens already committed to existing SAFT participants and beta testers of the application, these estimated token allocations are based on our planned roll out of Permission.io.

Product Roadmap

The development of Permission.io has been in progress for well 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 app for watching ads within a browser on any browser-capable device is in beta test.
- Work on the Permission.io blockchain is in progress and expected to be launched in Q1 2019
- Work on The Web Of Trust is advanced and expected to be available for launch in Q1 2019.

Those are the highlights. The current roadmap is shown below. Because Permission.io 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 Q1 2019

- » **Permission Token Launch**
- » Membership Ranking Algorithm
- » Permission.io Blockchain (LiveNet)
- » Integration with ID Management System
- » Open Source (Blockchain)
- » Integration with Hardware Wallets (e.g. Trezor, Ledger)

For Q2 2019

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

For Q3 2019

- » Query Optimization with Data Algebra
- » More Personal Datasets
- » Federated PoA Node
- » Permission Blockchain Governance Policy and System
- » Advanced Advertiser Portal
- » Enhanced Reporting & Analytics
- » Open Source (Governance Policy and System)

For Q4 2019 - Q1 2020

- » **Decentralized Blockchain**
  - Decentralized Consensus (DPoS)

- Decentralized Node
- Decentralized API Node
- Decentralized Advertiser Portal
- Decentralized Service Node

For 2020 Q2-Q3

» Network Ads
» Developer API
» 2020 Election Features

Data Algebra and Permission.io

Permission.io (previously known as Algebraix Data Corp) is the creator of data algebra, an entirely 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. We believe Data algebra is capable of defining and manipulating all possible data structures at any known scale.

Software based on data algebra will play a significant role in the implementation of Permission. io and will be critical to its success. The platform 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 a Permission.io 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 can 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 Permission.io 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.

Permission.io 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 Permission.io software 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. 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://permission.io/get-book/ It is also available as a paperback on Amazon.com.

The Go to Market Plan in Overview

Permission.io is strongly focused on the goal of attracting millions of users to the network, 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
- Running paid and viral audience acquisition campaign, with the intent of seeding a viral ecosystem
- Incentivizing early adopters to become members and recruit their networks to Permission.io
- Incentivizing sharing of content within and without Permission.io 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 Permission.io Audience Acquisition Campaign

Our advertising campaign will concentrate on four themes:

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

As part of this marketing push we will run ad campaigns involving influencers speaking to the merits of members getting paid for their time, attention and data. 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, 20% of the Permission token supply is reserved for rewarding our customers, particularly early adopters. Members will be rewarded with an amount of Permission tokens 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 Permission tokens 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 help to create a viral ecosystem that should expand under its own momentum.

Delighting Users by Paying Them To Consume Entertainment

Permission.io 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 Permission. io is deliberately targeting younger age groups. This should have a viral effect, so that the average person will see the importance of cryptocurrencies and become adopters. For most, the Permission token will be the first cryptocurrency they possess and the one that opens the door to the use of other cryptocurrencies.

Company Ethos

Permission.io 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 Permission.io has adopted a set of principles which it has implemented or it is in the process of implementing.

Permission.io Principles

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

- Permission.io plans to make the majority of its code, including smart contracts, available on an open source basis. In particular, we will be releasing to open source software that makes use of Data Algebra.
- Permission.io 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. Permission.io will seek advice from and interact with all stakeholders of the Permission.io network.

- From the Permission.io perspective everyone participating in the network is a stakeholder, including: 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 Permission.io blockchain. To the extent that consensus is possible, it will be implemented as rules that determine changes to the blockchain and associated software.

Security. Permission.io plans to implement Defense-in-Depth and Privacy by Design systems for data storage and any needed, minimal logging..

- 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. Permission.io will abide by appropriate regulations in jurisdictions within which it operates. In particular it will abide by GDPR.

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 Permission.io. Some of these principles do not apply directly simply because Permission.io 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. Permission.io 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 Permission.io Ethos is the foundation of its business and integral to its operation.

Permission.io will be built on the technologies that ensure trust, it's operation will be transparent to engender trust and with plans to submit to regularly scheduled audits.

Disclaimer

This information (the "Information") is not intended to be an offer to sell, or a solicitation of any offer to buy, any security or other financial instrument or to invest in the Permission Token and are for informational, illustration and discussion purposes only. This Information is as of **December 10, 2018** and may not be complete or final, may be estimated, based on predictions and assumptions, subject to change and does not identify all material risks. The offering of the Permission Token has not been registered or approved under any securities, commodity, futures, financial instruments, capital markets legislation, regulation, or ordinance of any jurisdiction. This Information does not constitute an offer, solicitation, or marketing to the retail public in any jurisdiction where such offering is unlawful. Opinions, assumptions, assessments, statements or the like regarding future events are forward-looking statements. These forward-looking statements are expressed in good faith and based upon a reasonable basis when made, but there can be no assurance that these expectations will be achieved or accomplished. These forward-looking statements are subject to known and unknown risks, uncertainties and assumptions that may affect actual results of the Permission Marketplace such as audience growth, user experience, speed of payments to the viewer of advertisements, or achievements expressed or implied by such forward-looking statements. In some cases you can identify forward-looking statements by terminology such as "may", "should", "could", "would", "expect", "plan", "anticipate", "believe", "estimate". The Permission Marketplace

and the Permission Token have inherent risks and uncertainties, both general and specific, many of which cannot be predicted or quantified and are beyond the control of Permission.io . Permission.io does not make any representation or warranty as to the accuracy or completeness of the information contained in this Information. Permission.io has no obligation to update or keep current any material or projections contained in this Information. There can be no assurance that the Permission Token will ever be issued. Permission.io may be subject to complex and evolving laws and regulations, both foreign and domestic; Permision.io may not successfully develop, market and launch the Permission Marketplace and, even if launched the Permission Marketplace may not be widely adopted and may have limited users and could be subject to significant competition.

Permission.io does not intend to predict any value whatsoever for the Permission Token. The Company does not promote expectations for future price increases for the Permission Token. Furthermore, forward-looking statements regarding Permission Token value are not endorsed by Permission.io

Permission.io Executive Team

Charles Silver, Chief Executive Officer

Charles Silver is CEO of Permission.io (formerly Algebraix) and leads the effort to develop the Permission Marketplace. 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 Blockforce Capital , an innovator in the securities industry with 7 publicly traded ETFs, that launched the first blokchain ETF (BLCN) in partnership with NASDAQ.

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 time, attention and 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.

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.

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 Permission.i0.

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.

Professor Gary Sherman, PhD, Founding Mathematician

Gary will act in a consultancy capacity to Permission.io 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 Permission.io from 2008 to 2014 where he invented and gradually proved the applicability of Data Algebra.