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Abstract

Over the past decade, the Internet has become oligarchic and unfair. Dominated by big tech data monopolies, today’s digital economy is driven by an aggressive competition for the collection of individuals’ profile and behavioral data to be sold to third parties for targeted advertising. The tactics that have fueled Web 2.0 - surveillance, interruption, exploitation and monetization of personal data - are now deeply entrenched, with the centralization and cross-party use of data, without the individual’s meaningful consent, firmly built into the web’s business model.

Permission was created to put an end to the interruptive, exploitative economy that has built Web 2.0 and to give individuals back ownership of their time and information. With the creation of Permission Ads and the Permission Coin (ticker ASK), Permission has developed a Web3 advertising system and unit of exchange that allows the value of an individuals’ time and data to be properly priced and permissioned within a transparent market system. In doing so, the company is building a totally decentralized Permission Economy, one that allows individuals all over the world to own, control, and profit from their engagement.

The Permission Platform enables advertisers and other marketplace participants to harness the power of value exchange. Consumers are incentivized and compensated by Permission for their data and engagement in ASK, while advertisers benefit from the “first-party” data that results from obtaining permission to engage. This first-party, permissioned data is foundational for the Permission economy and enables advertisers to build trust, achieve 1:1 engagement, and increase ROI. By transferring value back to the individual consumer, away from big tech’s centralization and exploitation of data, Permission is bringing needed change to the current Internet business model.

Fundamental to Permission’s mission and value creation for all stakeholders is its ability to provide permissioned visibility over an individual’s full dataset. Currently, personal data is trapped in silos and applications, stifling e-commerce advertising and entrenching big tech’s domination. Permission’s proprietary query engine (“PermissionQE”), based on patented technology using Data Algebra, provides a mechanism for making individuals’ data universally accessible and usable in a protected way. Applying innovations in Data Algebra, advertisers can now gain permissioned access to data across different databases, including 3rd party sources, enabling data interoperability. Individuals achieve true data sovereignty and the ability to ‘permission’ and be compensated for their data across the entire digital ecosystem.

The rise of decentralized applications and distributed ledger technologies point to a new web economy that respects and enables the monetization of individuals’ time and data. As these new technologies mature and become scalable, Web 2.0’s economy of Internet kings will be overtaken
by an open, transparent and distributed Permission Economy.

Moreover, the advent of decentralized financial (“DeFi”) protocols afford enormous and exciting opportunities for Permission users. We see Permission as a natural onboarding vehicle for hundreds of millions, if not billions, of mainstream consumers to the extraordinary and disruptive innovation in finance that is DeFi. Indeed, the platform that enables individuals the world over to own, leverage, and earn meaningful yield on their data will capture enormous value. Permission intends to be that platform.

To realize this ambitious vision, we are creating products, applications and incentives that encourage technologists, developers, businesses, and consumers to build, contribute to, and expand the Permission ecosystem. We envision myriad vertical use cases (e.g., e-commerce, entertainment, gaming, health and wellness, market research, etc.), as well as tokenized representations of personal data in the form of NFTs, that are built on top of Permission standards and powered by ASK.

This whitepaper details the journey forward.
Background

The Problem

Since its inception, the Internet has launched a global tech boom and has made unprecedented access to products, services and information possible. With its growth, voluminous amounts of data appeared and so did the opportunity to use it for targeted advertising. An entire data economy emerged, heralded by big data, with those most skilled at leveraging data towering at the top. Today, more and more of our global economy runs on the free flowing of individuals’ personal data, with the biggest companies in the world having been built on its monetization.

If data is the new oil, then tactics used to mine that data - interruption, surveillance, tracking - have become the status quo. Corporate behemoths have witnessed growing resentment over their uncouth practices, and the undercurrents of revolt are growing fast. Consumers have lost trust and the demand for privacy has sparked a proliferation of regulation. Advertisers are also fed up, as they continue to waste time and money in an opaque, inefficient market.

For consumers’ part, they are exhausted by excessive advertising. Chronic interruptions have led to the biggest boycott in history. Ad Blockers (over 1 billion installed) enable 82% of Generation Z’ers and over 60% of millennials to skip or block ads,1 shrinking the market for ad-blocker-free engagement. Surreptitious tracking and harvesting of user data have contributed to a growing and well-deserved mistrust, largely propelled by the 2018 Cambridge Analytica scandal, a watershed moment in the public’s understanding of big tech’s misuse of personal data.

A rising tide of user data regulation has surfaced across the globe—as exemplified by the California Consumer Privacy Act (“CCPA”), the EU’s General Data Privacy Regulations (“GDPR”), Brazil’s LGPD, and most recently, China’s PIPL. Not surprisingly, these regulations have been a boon to the same powerful intermediaries that triggered their existence. “GDPR has tended to hand power to the big platforms because they have the ability to collect and process the data, entrenching the interests of the incumbent, and making it harder for smaller ad-tech companies.”2 Since violators face costly fines, advertisers are forced to consolidate their online ad spend in the industry’s walled gardens, whom they rely on to use their wherewithal to not run afoul of the rules.

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As if compliance with regulations isn’t burdensome enough, advertisers face significant challenges in click fraud. Reportedly, 40% of digital ad traffic is the activity of bots clicking on ads. By 2022, a whopping $44B is estimated to be lost in ad revenue, making click fraud the 2nd biggest organized crime in the world. It gets worse: advertisers aren’t able to assess the authenticity of their conversions and the overall effectiveness of their campaigns, as the dominant platforms use their own analytics products, effectively grading their own homework. All of these factors have contributed to the cost of engaging with users rising dramatically (by a factor of 8) over the past two decades, with digital advertising continuing to deliver a lower ROI year after year.

In response, brands have increasingly adopted loyalty and rewards programs to boost retention and drive down rising acquisition costs. Although consumers have come to expect rewards (nearly 4B rewards accounts in the US alone), only well-capitalized companies - Starbucks, AMEX, Target, Marriott, and the like - can boast successful programs. The overwhelming majority of businesses struggle to implement or maintain them. In fact, 58% of all loyalty accounts are dormant, which by some estimates equates to nearly $100B USD of loyalty points unclaimed each year. The primary reasons for a loyalty’s program failure are lack of liquidity, lack of uniformity, and limited shelf life, yielding little shared benefit.

Individuals are tired of being interrupted and treated like a product, and advertisers are tired of wasting their time and money on an inefficient media supply chain with poor standards. Trust has been damaged between all parties and is inhibiting engagement. Advertisers, e-commerce platforms, brands, retailers, ad agencies & users will all benefit from a transparent permission advertising model that incentivizes engagement, ensures compliance, and distributes value more equally along the journey, away from big tech’s centralization and exploitation.

The Permission.io Solution

Permission.io has created the infrastructure and currency to enable a new advertising model based on consent and value exchange.

Our vision is to build a dynamic, wide-reaching Web3 ecosystem that:

- Transfers financial value directly to the individual (e.g., e-commerce advertising spend) currently captured by centralized platforms.

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4 https://www.hbs.edu/faculty/Pages/item.aspx?num=46132
5 https://www.convenience.org/Archive/News/NACSDailyArticles/2017/ND0630176
Puts individuals back in control and creates a mechanism for monetizing their time and data across global e-commerce platforms and myriad advertising verticals.

Restores Trust by providing an alternative scenario for consumers to receive information about products and services online while avoiding the interruptive, covert tactics that dominate today’s web.

Creates value for businesses by enabling them to instantly tap into permission advertising, achieving 1:1 engagement and a holistic view of users’ needs and desires in real-time. True opt-in and permissioned first-party data results in brand loyalty and increased ROI.

Offers the global advertising and e-commerce marketplaces a trusted and independent identity verification for individuals and vendors to interact on an opt-in basis, creating transparency and eliminating ad spend waste.

Allows advertisers and ad-tech companies to overcome challenges posed by privacy regulations by 1) providing a privacy-compliant, opt-in, permissioned-based platform; and 2) enabling personal data integration that will practically and logically unite an individual’s personal data and present it, with permission, to persons or organizations that wish to interact with it.

Allows brands to instantly adopt an “out-of-box” loyalty program powered by a universal currency that provides a unified means for compensation. Instead of accumulating rewards across a multitude of fragmented programs, this unification allows the consumer to derive significantly greater value and versatility, opening up liquidity, utility, ease of use, trading and spending freedom. The exact opposite of the current global advertising and rewards industries.

Creates new financial opportunities for ecosystem participants that contribute to the growth of the network (e.g. building new technology for Permission, creating apps for new product verticals, and referring new users and businesses).

Allows developers to build empowering apps that solve pain points in the relationship between businesses and consumers and that reach new users who are seeking data ownership and compensation.

Transfers financial value stemming from data currently controlled by centralized repositories to all stakeholders in the entire ecosystem.

Promotes true sovereignty for individuals worldwide by enabling ownership and the ability to control and monetize their most precious resources: their time and data.

The Permission Platform

Permission.io is our core experience and the entry to the Permission Platform. Individuals sign up to become a user and create a wallet to be used on Permission.io and further into 3rd party applications. Users opt-in to register their interests, demographic and other key data. For ongoing
sharing of data and for granting permission to receive invited ads that address their curiosity, desire to learn, and buy, users are rewarded with ASK by Permission. Users may also be rewarded for linking and integrating personal data that already exists in Facebook, Instagram, LinkedIn, Google and, eventually, any other site holding their personal data. Users can HODL, exchange, or spend ASK on the platform and/or on other 3rd-party sites that accept ASK.

A core aspect of the user experience is viewing ads. Users earn for engaging with ads ranging in duration and format, including shorter, gamified ads, rewarded or opt-in value exchange ads, and/or brand films lasting from a couple of minutes to a couple of hours long. Users will be able to directly monetize their data collected for engaging with content, unlike typical platforms that sell their information to third parties. Over time, the platform will feature other opportunities for users to earn from their data while interacting with news, surveys, video games, premium content and more.

As of this writing, Permission’s ecosystem has the ability to compensate consumers for connecting with advertisers from top global brands. Its current community is composed of individuals from 156 countries. The platform successfully exited beta in August, 2020, and has over 600,000 registered ASK wallets. While the foundational elements of the Permission Platform have been developed by our core engineering team, we expect that considerable future development will come from our growing open-source community.

**The Long Term Vision**

We’ve created Permission.io as the initial application for acquiring users and for demonstrating how individuals can earn and spend ASK. We are working towards a fully decentralized network that hosts content and data profiles and allows any advertiser in the world to become a permission advertiser by acquiring ASK and running campaigns. Eventually, third-party websites, mobile apps, and new APIs will be layered on top of the network, allowing for numerous other advertising verticals to be applied that broaden its reach. Examples include entertainment, gaming, travel and tourism, health and wellness, recruiting, coupon strategies, club memberships, and market research.

**Going to Market**

Paramount to our mission to build a Permission Economy is the ability to quickly scale. E-commerce is the primary use case for permission advertising transactions powered by ASK, and, given its staggering growth trajectory, is also the most expedient means of promoting its circulation. By 2040,
95% of all purchases are expected to be made via e-commerce.\(^7\) Indeed, the cross-border selling of products and services is growing exponentially, particularly in Asia. By 2023, retail e-commerce sales in Asia Pacific (APAC) are projected to be greater than the rest of the world combined.

Digital advertising is growing equally fast. Global digital ad spend is projected to reach $435.83B USD in 2021, with its share in overall advertising reaching 50% by 2022.\(^8\) Here again, China is leading the way. By 2021, digital advertising will account for 75.6% of its total spend. Mobile in-app ads are also projected to dramatically increase to $240B USD in 2020, up 27% in 2019, with rewarded video seeing the most significant uptick, surging 245%.\(^9\) E-commerce advertising represents 37 percent of total digital ad spend share.\(^10\) Covid-19 is accelerating the trend, with “E-commerce ad spend doubling as consumers self-isolate.”\(^11\)

Another big business that is only getting bigger is customer loyalty. Last year, the total customer loyalty ecosystem amounted to a whopping $323B USD; of that, $75B USD was devoted to rewards in the form of discounts, merchandise or points.\(^12\) As for return on that investment, “a full 95 percent of companies reported that members spend more than non-members annually, with 60 percent

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7 https://99firms.com/blog/ecommerce-statistics/#gref  
10 http://www.netimperative.com/2019/08/01/40-ad-spend-increase-recorded-in-ecommerce-advertising/amp/  
11 https://insights.digitalmediasolutions.com/articles/ecommerce-ad-spend-doubles  
reporting that members spend two to three times more than non-members.”

The Permission Platform represents and enables the convergence of these powerful macro-trends.

Growing the Ecosystem

The current functionality underlying the Permission Platform is being tested and optimized with a focus on creating simple and delightful ways for users globally to earn and spend with ASK.

To accomplish this, Permission is developing plugins for popular e-commerce platforms like Shopify, Magento, etc. that will allow the over five million independent operators on these platforms to gain new customers and increase their sales by incentivizing customer behavior with ASK. This will include a collection of features to optimize e-commerce properties, including a tiered reward system based on shared data over a period of time, redemption of ASK for discount codes, referral codes, email newsletter opt-in rewards.

The ability to earn ASK from Permission across 3rd-party e-commerce platforms is key to user acquisition. Shoppers on retailer sites that offer the possibility to earn ASK must create a Permission wallet and account. PermissionQE enables advertisers to reach large-scale audiences in a highly targeted way by learning about user interests and shopping behavior across the Permission ecosystem. Advertisers thus have the ability to influence and engage with users as they research, compare, and consider different options available to them.

As such, the plugin distribution will create a network effect of attracting both advertisers and users via a novel channel that will push awareness and adoption of ASK toward becoming a global rewards program working and thriving outside of the Permission Platform.

Permission Browser Extension

Widespread demand for ASK will be further accomplished with the launch of the Permission Browser Extension. The browser extension, currently available via the Google Chrome Web Store, customizes the browser experience by enabling Permission users to earn ASK for viewing advertisements while they traverse and engage with the web as they normally do. Unlike popular browser extensions that interrupt, track, and collect personal data without user consent, Permission users are rewarded with ASK for volunteering or "declaring" their data as they search, shop, and browse. Advertisers benefit from capturing dynamic, actionable insights from permissioned first-party data,

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13 ibid.
including sites visited, clicks, time spent, social media preferences, search intent, etc., all with the expressed consent of the user. Advertisers can serve highly relevant ads - with the user’s permission - in real time, resulting in better performance and a more trusted, transparent relationship between brand and consumer.

Permission Ads: The Crypto Rewards Demand-Side Platform (“DSP”)

Just as Google derives revenue from its AdSense network (publishers), which connects to its Ads network (advertisers), so too will Permission derive revenue from the operation of its own demand-side platform. “Permission Ads” is a DSP that allows for a compliant method to reward end users to engage and supply data to platform clients (e.g. brands, agency trading desks). Advertisers that seek to reach consumers via the Permission DSP, including those that serve ads through the Permission browser extension, will be able to reward consumers on the open web in a decentralized, automated fashion, enabling widespread expansion of ASK across advertising verticals by Permission.

Unlike current DSP alternatives, Permission Ads is compelling because it enables advertisers to offer crypto rewards in exchange for permissioned, first-party data. With consent as a cornerstone of its functionality, advertisers can have confidence they are building and activating opt-in databases in a compliant way. Moreover, Permission Ads enables access to a fully authenticated audience by validating user identities through a comprehensive Know Your Customer (KYC) verification process to eliminate wasted ad spend.

Finally, and most importantly, advertisers that deploy campaigns using Permission Ads derive significant benefits that only the blockchain can provide, i.e., a global, immediate, low-fee mechanism to reward consumers, which would be impossible within the current sphere of centralized, fiat-based financial institutions and ad-tech platforms.

Self-Serve DSP

Today, Permission Ads is a managed service for our advertisers and is an invite-only platform. For each advertiser, we build custom campaigns that oftentimes require creative and engineering work. The mid-term vision is for advertisers globally to independently launch their own advertising campaigns. We are excited to open the platform to all interested advertisers by the second half of 2022 with the launch of our self-serve DSP.

Upon the launch of the self-serve version, the platform will immediately be able to achieve far greater scale and hasten advertiser onboarding. Advertisers will be able to unilaterally create campaigns, target audiences, and deploy their ads on the open web. Similarly, advertisers will be able
to autonomously purchase ASK to fund their campaigns and choose an appropriate allocation to reward users who engage with their ads and share their data. The self-serve platform will streamline and automate many operations, accelerating the protocol’s decentralization. Permission will generate revenue by charging a small transaction fee for media spend through the platform.

The Decentralization Imperative

Permission believes in providing all participants in the market the possibility of becoming stakeholders in the operation of the protocol. In the future, Permission will deploy dApps defining a protocol which will enable advertisers to fund and conduct their own advertising campaigns in a decentralized fashion. They will be able to submit to the dApp the necessary ASK tokens needed to reward users for opting in and sharing data in any given campaign. Developers could also choose to build their own user interfaces to interact with the dApps and thus build their own ASK-permission platform through this decentralized protocol.

ASK token holders will be able to generate and vote on proposals to govern the underlying protocol. Examples of proposals ASK holders may vote on include adding new types of earning opportunities and yield strategies, determining what fees are charged by the protocol, and determining what incentives (e.g. ASK rewards) are offered on an ongoing basis. This will enable holders to contribute to the success of applications and products built on top of Permission’s standards. Revenues generated will directly impact ASK holders via the token’s evolving economic models as ASK-powered applications expand and are informed through the governance process.

Furthermore, Permission has incorporated a Swiss association. The mission of the Permission Association is to develop, empower and expand the Permission Platform in a decentralized, independent way. Therefore, the association assembly of Permission is able to pass resolutions on the core technology governance decisions for the Permission Platform. Users can become Members of the Permission Association and have a voice when it comes to core technology governance decisions for the Permission Platform. Permission’s goal is to further increase the level of decentralization in the future by increasing the number of Members within the Permission Association.

In this way, future development will be determined by a globally diverse population of stakeholders, including Permission.io users, Permission members, advertisers, developers and other participants that make up the Permission ecosystem.

The Permission Community
Users

Permission users enjoy many benefits, the primary being that Permission.io serves as an “agent” for a user’s data; that is, any time an advertiser within the Permission ecosystem wishes to use a user’s information to reach a user, that user is rightfully compensated. The more data a user provides via opt-in engagement, the more personal and comprehensive their “data store.” As the Permission ecosystem grows, and by virtue of the data integration and enrichment made possible by Permission QE, active users can maximize their earning by permissioning their data across the Permission Platform, 3rd party platforms and, eventually, across all permission-based interactions spanning the web. Naturally, all transactions are recorded immutably on the blockchain.

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. Permission.io will assist its users in retrieving their data from all such sources by ingesting and claiming it and help individuals assemble a far richer pool of their own data. Users will be encouraged to enrich their data store with more and more data, enabling them to receive better, more relevant ads and thus maximize the earning power of their data. Advertisers, merchants, governments and others may ask permission to use that revocable data for various purposes, providing them with access to the richest collection of first-party data available.

User Benefits

Users that accrue certain thresholds of ASK coins will be able to participate in exclusive brand promotions, gain access to premium content, and unlock invite-only discounts and programs, including brand loyalty programs that honor ASK in exchange for unique perks. The more data a user shares with a brand, the more potential earnings and exclusive benefits may be unlocked.

Additionally, eligible ASK holders will be able to create and submit proposals to govern the underlying protocol. Examples of community-driven proposals may include directing a certain percentage of fees associated with various campaigns to ASK holders and/or proposals that revise the rewards model (e.g., to reward larger earnings to ASK holders that stake their tokens for longer periods of time).

Eventually, users will be able to “kick back” a certain portion of their ASK to brands and charities while engaging with their ads and content, enabling users to contribute their ASK holdings to the advancement of organizations they would like to support.

The Reputation Engine
Just as the blockchain enforces immutability, provenance and security, Permission apps will create transparency, honesty, and integrity. Permission.io’s goal is to build trust by integrating into its system a sophisticated reputation score (“Permission Score”).

User Reputation

The user’s ideal behavior is to browse, search for and purchase products and services in a similar way to how they currently browse the Internet for what interests them. To be exact, we expect their online behavior not to vary significantly from the current norm.

We encourage merchants and advertisers to provide consumers with relevant product descriptions, as well as promotional and/or exclusive offers, that entitle the buyer to rewards/discounts as they move through each step of the sales funnel. In so doing, we will be able to analyze not only user responses, but also sales cycle behavior, “from search result or ad to purchase.” Using machine learning data analysis techniques, we will be able to identify the normal range of user patterns, both for searching for products and for the sales conversion on partner sites.

The reputation engine will analyze users’ behavior and calculate their “Permission Score” through multiple identity points and behavioral factors. Those users who try to game the system by searching for goods or services in which they have no interest, and hence never buy, will be excluded from the more rewarding opportunities by their low reputation score. Their earning power will be diminished. The natural market forces created between advertiser and advertisee by reputation scoring will support a real-time trusted equilibrium, and will discern the competitive price for giving and receiving ASK.

Building a Developer Community

We believe that a successful developer community should cultivate discussion, emphasize the mission and values, provide tools, resources, and online support, establish a clear code of conduct, and reward participation, loyalty, and success.

A Software Developer Kit (“SDK”) that includes the technical details of the Permission protocol will be made available for developers to harness their creativity and build complementary applications to existing Permission products and apps, including the Permission DSP. In addition to growing our developer community vis-a-vis the building of apps on the Permission protocol, PermissionQE, a query engine that deploys Permission.io’s patented Data Algebra technology, will be the foundation for a global developer community.
PermissionQE: A Query Engine Like No Other

Marshaling Personal Data

In order to maximize the value of personal data for users and advertisers, data needs to be accessible and integrated. To accomplish this goal, Permission.io has conceived and will eventually lead the development of PermissionQE, a query engine deploying Permission.io’s innovations in Data Algebra. PermissionQE makes different data sources queryable as a whole, as a single logical data store, enabling our users to manage and control their full personal data set, including the ability to provide permission to advertisers to use it in targeting.

Part of the PermissionQE project is to create the capability to integrate user personal data that already exists on popular websites such as Facebook, Instagram, LinkedIn, and Google and on any other kind of site that might store personal data. The query engine makes such data accessible, versus stuck in the silos that retailers are currently funneled into by traditional ad networks. The managed integration of such data will form a rich and unique data source for advertisers to directly target Permission users in their campaigns. Advertisers would be able to leverage the most comprehensive set of personal data possible.

In devising the project, the goal was to integrate user data and give users the ability to grant or deny access to it, thus providing advertisers with a rich data resource for targeting. Users benefit from having their own personal “data store” to monetize and permission out to sellers and service providers.

The PermissionQE project thus has the following two components.

- A secure personal data resource for Permission.io users. Their personal data remains distributed but all personal data is associated with an authenticated user ID.
- The creation of a query engine and data analysis capability. Advertisers are provided with a portal through which they can query the data of Permission.io users and apply analytical algorithms for the purpose of targeting.

Personal data will be managed securely via encryption. Data ownership, lineage and usage permissions will be recorded, as will an audit trail of the data’s use.
The query engine will be built to allow access to any collections of data from a wide variety of environments. It will thus include a library of specific API plugins to access common data sources. It will be built so that it integrates with the open source framework and possibly other frameworks.

The provision of a versatile personal data resource will be useful to Permission.io and its users beyond its use in targeting ads. From a security perspective it will help to validate new users as unique; fake sign-ups will not be able to link to multiple data sources. This in itself may prove to be an attractive benefit to users, and thus act as an incentive to sign up. We are providing a foundation for users to monetize their personal data from permission-based advertising. Once users have such a data resource there is no reason not to invent and add new ways for users to monetize their data, such as using their data to participate in research projects and consumer surveys. In the long run, PermissionQE can evolve into a platform for comprehensive personal data monetization.

PermissionQE is made possible by the data integration and management capabilities of Data Algebra. Before discussing the Application of Data Algebra in the PermissionQE Project, it is important to define the technology’s origin and implications.

**Permission.io and Data Algebra**

**The Origin of Data Algebra**

Permission.io Inc (previously known as Algebraix Data Corp) invented Data Algebra following a multi-year research project and a considerable amount of exhaustive testing. It is an entirely new and original field of mathematics that applies directly to data structures and definitions, data manipulation, and data storage. Once Data Algebra had been thoroughly proved to be computationally efficient in multiple environments, a comprehensive definition and explanation was made generally available with the publication of The Algebra of Data, A Foundation for the Data Economy* by Professor Gary Sherman, PhD, and Robin Bloor, PhD.

During the eight years the company spent developing data algebra it was awarded 9 registered patents, primarily relating to techniques that deliver high-performance data retrieval in multiple software contexts and which scale-out over very large data volumes.
## Data Algebra

Data Algebra translates and transforms data from one form to another, making different systems queryable and communicable in any format.

Until its development, no complete means of representing and transforming data (and metadata) existed. Data algebra technology is capable of defining and manipulating all possible data structures in any way at any known scale. Throughout the course of its development, it was applied in multiple contexts to prove its efficacy. Additionally it has been licensed by major enterprise and government agencies.

Permission.io utilizes Data Algebra IP internally to manage its data catalogs and implement Machine Learning algorithms to enhance the services provided to its users and advertisers.

Data Algebra fully represents the spectrum of personal data that Permission.io users might choose to store (or reference) including flat files, database data of every kind, tabular data, data objects, complex data relationships graphs and semantic metadata structures (ontologies).

### A Natural Application for PermissionQE

Data Algebra is particularly effective at translating and transforming data from one form to another.
In creating an interoperable, authenticated ID (and attaching all personal data to it) there is a clear need to maintain a dynamic map of multiple distributed sources of identity data and metadata along with other kinds of personal data and make it available (with appropriate permissions) in any form it is requested (relational database form, document database form, flat file form, triple store form, IPFS or whatever.) Data Algebra will help to achieve this.

The primary goal of the PermissionQE project is to create a query engine that efficiently spans widely distributed sources of data. The environment will empower individual users to define multiple sources of data located anywhere, and query them as a unified whole as if the disparate data sources were a single data store or database. The environment will also enable the querying of aggregations of such personal and identity data.

This is a natural Data Algebra application. Data Algebra is employed in the specification and design of the query environment. It provides a universal data definition language to reflect the structure of any data source whatsoever—whether that be tabular, JSON, XML, key-value store or any esoteric format, such as a blockchain. The algebra is used to create appropriate subqueries for each data source and to combine the results into a single answer. It is also applied to optimize the performance of similar queries and queries with common elements.

The query environment will thus consist of three components:

- A query interface for users to query the data and store the results. We currently consider PartiQL to offer the best option as a query language for this, as it bridges SQL and JSONiq.
- An algebraic query engine that efficiently retrieves data from multiple sources.
- Connectors that provide access to technically different data sources.

Permission.io will make its nine data algebra patents available for use by the project team.

It is possible that in time this will become an open-source project, in which case it will spawn specialized use cases that target specific problems in specific industries, such as retail, health care, banking, real estate, oil & gas, and many more. We suspect that the first use case described (personal data) will itself spawn particular applications, particularly personalized bots (software robots).

**Query Acceleration**

The unique capability that Data Algebra provides in respect of data and metadata management is complemented by its effectiveness in other critically important areas of data management and network performance. Specifically, it will accelerate query processing speeds significantly using its
proven query acceleration capabilities and it will enable the data management of data volumes far beyond the petabyte level.

Ultimately, Permission.io software may need to accommodate hundreds of millions of data records and their frequent individual usage. Data Algebra will be key to delivering acceptable performance in such an environment and ensuring the economic use of resources.

Permission.io’s 9 patents issued by the USPTO relate to the use of Data Algebra in this area of data management. Most of these techniques monitor query activity and identify opportunities for intelligent data reuse—as such, they enable the precise mathematical caching of results. They have proved effective for queries serving BI, analytics and ETL workloads, and for RDF database workloads—often accelerating performance dramatically, by one or two orders of magnitude.

Aside from query acceleration, Data Algebra IP can be used to monitor and manage 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.).

The Permission Platform

Blockchain Technology Choices

When originally conceiving the Permission Platform, we investigated a series of blockchain technologies and concluded that developing our own robust blockchain technology was critical to a successful endeavor. After extensive analysis, we ultimately chose to construct the Permission Blockchain, a protocol based on Ethereum, but which utilized a Proof of Authority (PoA) consensus mechanism.

That decision was largely driven by two critical factors: scalability and cost. The blockchain needed to be able to scale to accommodate immense volumes of users relatively quickly, as well as provide speed and a low cost per transaction. At the time, these crucial factors were beyond the capabilities of Ethereum, which was focused more on maintaining decentralization.

The Permission Blockchain, to date, has served the project’s needs well. We have developed multiple opportunities for individuals to monetize their data in various contexts, our user base has rapidly scaled, and our advertiser ecosystem significantly expanded. However, after two years of building consumer-friendly products, we’ve learned many valuable lessons and have witnessed exciting developments in the blockchain space. Layer-2 platforms have enabled much faster and cheaper transactions, helping to ease the constraints of the blockchain trilemma. Indeed, the technology has finally reached sufficient levels to support Permission’s ultimate vision of ASK on a decentralized,
inexpensive, and scalable blockchain. Moreover, the extraordinary innovations in decentralized finance (“DeFi”), as well as the robust enhancements of Proof of Stake-powered blockchains (not available at the project’s inception), have caused us to strongly consider evolving beyond the Permission chain.

The timing for such a decision could not be better. Over the past year, “we have been in the midst of a Cambrian explosion of smart contract platforms.”14 The growth of Solana, Cardano, Polkadot, etc., combined with the excitement surrounding the launch of layer 2 (L2) Ethereum scaling solutions like Arbitrum and Polygon, have presented us with exciting choices and opportunities for network expansion and ecosystem growth.

We have carefully studied these emerging solutions and are currently evaluating a migration to Polygon blockchain for multiple reasons.

Polygon has emerged as the pinnacle L2 Ethereum scaling solution, even surpassing Ethereum in terms of active users. It is fully interoperable with Ethereum and enables much faster and cheaper transaction processing than Ethereum mainnet, which is crucial for a project like Permission that intends to achieve mainstream adoption.

While this alone illustrates why a Polygon migration is such an exciting opportunity, there are even more compelling attributes which will help Permission to achieve our goals of greater utility, liquidity, and decentralization.

By switching from our proprietary blockchain to the ERC-20 standard, many other benefits can be realized. First, this move would instantly make ASK interoperable with the vast majority of wallets, centralized exchanges, decentralized exchanges, payment processors, and other platforms. This would empower Permission to leverage the expansive Ethereum and Polygon network effects as well as eliminate expensive integrations.

A Polygon-based protocol would also enable the use of ASK within DeFi applications, which collectively already have over $100 Billion in Total Value Locked15, and are expected to grow by orders of magnitude over the next few years. Despite its promise, to access DeFi today, most people still have to use onramps which are tied to their traditional bank account so that they may trade their fiat for crypto on an exchange. It is here that ASK is particularly well suited to bank the unbanked by providing an alternative onramp where disenfranchised individuals can monetize an asset they were never able to before - their personal data. This unique positioning of ASK enables individuals

14 https://messari.io/article/to-evm-or-not-to-evm-that-is-the-question
15 https://defipulse.com/
to truly “bank” themselves, and with Polygon, they can further benefit by turning around and leveraging that value in the rapidly accelerating world of DeFi in ways that can significantly enhance their lives.

Finally, a migration to Polygon would be a significant step toward the decentralization of ASK, which is a cherished characteristic of any blockchain project. And such a move would also free up Permission development resources to focus more on creating killer products that drive utility for ASK. Lastly, this migration and the fact that Polygon is a blockchain-agnostic solution would lay the groundwork for even further expansion of ASK, making a multi-chain future more imminently within our reach.

Permission believes that Polygon’s recent rise to prominence represents the long awaited breakthrough to layer 2 ubiquity, and we intend to position ourselves alongside them as the ecosystem grows. As such, we are assessing the development of an interface for users to transfer their ASK from the Permission blockchain to the Polygon blockchain to take advantage of these benefits.

Permission.io Security

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

**Key Management**

Given that Permission.io needs to be able to support millions if not billions of users, there is a requirement for a highly scalable key management system. Users 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 to manage all keys and passwords. This will be backed by a pool of Hardware Security Module (HSM) servers, backed 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 redundant Vault Instance Masters interacting with users to provide keys for secrets. Similar key management architecture will be used for all other services involved in accessing, developing or running Permission.io. The primary function on this proposed architecture is for managing keys in a zero trust environment with zero knowledge of the stored secrets.

**Identity Management**

From both a security and business perspective, it is vitally important that every user is a genuine person and cannot be a software robot and that no one is able to establish more than one identity.

Permission.io will use certain data, where users provide it, to help validate a user’s Permission ID
and compute their “Permission Score.” We will be able to assign a probability as to whether a given user represents a single, real-world individual and we will be able to limit a user’s capability and ability to earn until a believable set of identity data has been uploaded.

We will assist the identity validation process by using the services of third-parties, such as Auth0’s authentication platform and a third party document verification platform. Third party validation will be a “pro tem” solution that will precede and eventually merge with a formal approach to our native, authenticated ID as such technology becomes available.

**Security, Manageability and Storage**

Users’ permissioned data will be securely stored in a private, self-sovereign method, with the users controlling access. Users gain access to Permission.io via OIDC compatible login credentials and use of multi-factor authentication (MFA) to ensure that only they can access their data. Their data, under their personal control, is stored within an encrypted storage object using AES-256 encryption, in flight and at rest. When any user data is made available to advertisers and merchants for targeting, it is stripped of all identifying data and exposed only as an anonymized, aggregated data set. All data activity is logged and will eventually be auditable by the user.

No third party will ever have access to the data held in the encrypted storage object unless they are granted permission by its owner. The owner may confer specific data access items and grant such access in the context of specific personal or business interactions. The platform 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 (InterPlanetary File System) is anticipated as an ideal file system layer for storing data. This is a good fit within our algebraic approach to metadata (alternative approaches will be catered to as needed, e.g., where data is stored on other ledgers). The following points about IPFS are worth noting:

- 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.

**Permission Coin Economics**

The Permission Coin is designed to provide utility within the Permission Ecosystem and its applications. Individuals earn ASK for their time and data, and as applications are developed, individuals will be able to not only earn and spend ASK on the Permission Platform, they will also be able to connect with and engage other individuals through various “ask-permission-first” applications.

**Coin Supply**

There is a hard cap of 100B ASK for the protocol. Of this 100B, 45% is allocated to ecosystem development, which includes allocations to advertisers, merchants, and publishers for brand and content engagement, and to users for signups, referrals, and other network growth incentives; 15% is allocated to the team to ensure management is aligned; 30% is allocated to purchasers and supporters who intend to participate and further the development of the Permission network; and 10% is allocated for developer incentives to build on top of the platform and for advisors to help drive adoption. Details regarding the allocations and number of tokens projected to be released into the circulating supply are frequently updated and can be found on our [ASK dashboard](#).

*Figure 4: Token Supply Planned Allocation*
Permission Ads: The Power of a Two-Sided Marketplace

As figure Figure 5 illustrates, Permission Ads establishes and enables a true two-sided marketplace for ASK between advertisers and consumers. This creates a virtuous cycle which will propel network growth. The more first-party data that users provide to the platform, the more attractive it becomes to advertisers. The more advertisers that join and expand the scope of their campaigns, the greater the potential for users to earn from their data. And when there is greater ASK earning potential, it will naturally attract more users to the platform who will share their data, feeding the cycle.

Dynamic Incentivization Plan

**Users:** Attracting a large user base is critical for the success of Permission given the protocol features a two sided marketplace of users and advertisers. To achieve this, Permission leverages a proprietary model to incentivize users to sign up on the platform and share their data.

The dynamic user incentivization plan leverages a pool of coins slated for users. The amount of coins granted to users is dynamically adjusted based on the market capitalization of ASK (i.e., higher market capitalization results in less coins and vice versa). Currently, at the base level, 100 coins are granted to new users for signing up. This decreases as ASK’s market capitalization increases to adjust the dollar value of coins granted to users to ensure the pool has enough coins to incentivize 500M users to engage with the platform.

**Comparables:** While the protocol is earlier in its life than its comparables, our team leveraged real user growth rates from comparable platforms (Facebook, Twitter, Snap, and Pinterest) to ascertain a potential number of users on the protocol.
Figure 6: User Growth Projections Based On Comps

Based on an analysis of comparables, Permission could reach 5-25M users by the end of FY22. This is subject to numerous other factors, including attracting users and virality and usage of the platform itself.

While user projections are helpful, most are ultimately impossible to accurately predict given the number of inputs, extended timelines and changes to the models and platform. Instead, the team has focused on optimizing the internal dynamics of our coin model to help drive users to signup and engage with the platform which we believe is more tangible.

Ambassadors: To further drive the user incentivization plan, Permission will also feature an invite-only bonus rewards program for ASK ambassadors who refer high numbers of users. Referral rewards for ambassadors are also dynamic and dependent upon market capitalization, but participating Permission Ambassadors can expect significantly higher referral rewards and other benefits.

Advertisers: The Permission Ads DSP will play a pivotal role in generating demand for ASK by advertisers, and by extension the success of the platform.

By utilizing Permission Ads to reward consumers, advertisers can quickly and easily create opt-in audiences and incentivize brand loyalty. Crucially, to use Permission Ads advertisers must fund their campaigns with ASK to use as a reward. Therefore, as Permission Ads proves its value to brands and attracts more advertisers, demand for ASK will naturally grow.

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**ASK Buybacks And Other Utilities**

Additionally, Permission may from time to time, in its sole discretion, conduct ASK buybacks using revenue generated from the various income streams that are being developed across the Permission Platform (e.g. media purchases, advertising proceeds via Permission Ads, etc.), generating consistent buy pressure for ASK.

We also envision coupling ASK into our self-serve and marketplace products. We intend to experiment with allowing holders to stake ASK for increased revenue share. For example, if an advertiser chooses to fund their media purchases in ASK, we may allocate a percentage of that purchase to staking rewards, such that ASK holders will be able to benefit directly from protocol revenues and fees generated from the DSP and other products built on the Permission Platform.

While this is strictly informational and not a solicitation to purchase ASK, our goal is to better visualize and understand the demand for ASK as the number of users and advertisers on the platform grows.

**The Permission Platform Today**

- Launched Permission Mainnet Blockchain
- Built Platform infrastructure to reward people for sharing their data - over 700,000 unique wallet holders
- Implemented KYC and Advanced Fraud Mitigation Framework
- Integrated Google Ad Exchange and onboarded initial programmatic Ad partners
- Secured Google Tech Cloud Partnership
- Launched Google Chrome Browser Extension V.1
Product Roadmap*

Q1 2022
- Launch Permission Ads Managed Demand-Side Advertising Platform (DSP) Beta
- Onboard advertisers to Managed DSP
- KYC Enhancements
- Grow Executive, Sales and Engineering Teams

Q2 2022
- PoS Consensus Mechanism & Staking Launch (ASK DeFi Yield Farms)
- Increase DSP advertiser use cases
- Implement DSP Optimizations
- Scale DSP advertiser growth
- Cultivate Additional Strategic Partners

Q3 2022
- Android Mobile App
- Enhanced Web App
- Customer Data Platform Integration

Q4 2022
- iOS Mobile App
- Open API for Publishers to offer ASK rewards
- NFT Integration
- Browser Extension V.2

Q1 + Q2 2023
- Web3 Metaverse Advertising
- Consumer Passive Earn
- Self-Serve DSP Beta Launch

*Please note that timelines and roadmap details mentioned are subject to change and not binding at all.
Permission.io Executive Team

Charles Silver, Chief Executive Officer

Charles Silver has been building companies and creating liquidity events for shareholders for 30 years. 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 advertisers on a permission basis. The company raised capital in the dot com boom, survived the crash by building a profitable business, and was sold very successfully to Hearst for over 9 figures.

As an early investor in Permission.io Inc., Charles recognized the significance of Data Algebra to the entire software field and realized important use cases for the applied math. With the growth of the blockchain and big data industries, a natural application for Data Algebra emerged. ASK and PermissionQE were born, enabling individuals all over the world to own and monetize their data.

In addition to founding Permission.io Inc., Mr. Silver is co-founder of LoveStoriesTV, the leading wedding-video platform, and is also co-founder and serves on the Board of Reality Shares (dba Blockforce Capital), an SEC registered investment adviser with five publicly traded ETFs and two cryptocurrency hedge funds.

Prior to his entrepreneurial career, Mr. Silver served for two years as a staff member for a United States Congressman.

Mohammad Al-Albdullah, Chief Technology Officer

Mohammad Al-Albdullah is responsible for translating strategic company goals into deliverable permission-based products. He is a seasoned engineer and team builder with over 20 years of software development experience in multiple technology areas. Since 2001, Mohammad has motivated, directed, and led product teams to release best-in-class software applications for a wide variety of technology companies, including developing operating systems at Microsoft, implementing Ad-Tech software (including an ad exchange) at RhythmOne, and building various Ed-Tech products at Promethean. Mohammad has also worked at startups, including his own medical AI company that created an AI system for detecting multiple diseases from X-Rays.

Lauren Griewski, Chief Revenue Officer

Lauren brings over 15 years of media, advertising, technology, and executive experience with
some of the world’s leading platforms, including Facebook (Meta), Roblox, VEVO, and Viacom. In her role at Facebook, Lauren served as a leader in ad technology, monetization and strategic partnerships. She led the development of Facebook’s B2B advertising business whilst implementing global market strategies, including the establishment of the B2B Center of Excellence. Lauren also served as Co-Chair of Women at Facebook.

More recently, Lauren was Founder and CEO at Soul Expressed, LLC., a tech platform where she led business leaders and organizations to accelerate global growth and transformation.

**Vanessa Harris, Chief Product Officer**

Vanessa has more than 20 years experience building products and leading teams at Google and Microsoft. She founded and launched Google Domains to critical acclaim. She also launched the first version of the Microsoft Office Web Apps and over her career has led product teams in the consumer, enterprise and advertising space.

As a Product Manager and Product Lead, Vanessa has launched more than a dozen high impact technology products to over a billion users. She has filed numerous patents in areas as diverse as multimedia and document collaboration.

Vanessa initially encountered cryptocurrency in 2000 where she explored cryptographic techniques to detect and prevent double-spend as part of her senior year Computer Science degree. Since then she has participated in the crypto community as an investor and educator.

**Jennifer Silver, Chief Operating Officer & General Counsel**

Jennifer Silver has over 20 years of executive experience and brings to Permission an extensive background in law, entertainment and media. As General Counsel, Jennifer manages all legal affairs, including risk assessment, compliance, IP, contract management, and corporate governance. As COO, she is responsible for oversight of business operations, project management, and human relations, as well as assuring that Permission.io’s values are imparted across the organization at every level, aligning cross-organizational strategy, processes and procedures. Prior to Permission, Jennifer began her career at Del, Shaw, Moonves, Tanaka, Finkelstein & Lezcano, one of the most respected entertainment law boutiques in the world. She went on to build a thriving turnaround consultancy focused on leadership reorg and business restructuring. More recently, Jennifer has served as a strategic advisor and business consultant to numerous startups and has held various officer roles on multiple nonprofit boards.
Bobby Petersen, Head of Growth

Bobby Petersen brings a varied range of entrepreneurial and strategic skills to the Permission team. At age 22, he was invited to take over as Co-President of a fledgling promotional event business, which he and his team rescued, grew and eventually exited at a 20x multiple. He then went on to start and run the marketing for an international running race business in which he broke participation records in Sydney and Melbourne. He has since founded 2 thriving product distribution / e-commerce companies and a successful marketing & user acquisition strategy consultancy.

Summary

The era of data centralization and exploitation has peaked. As blockchain and other distributed technologies mature and become a foundation of Web 3.0, the Internet economy will be driven by peer-to-peer, permission-based transactions and communications that eliminate the need and functions of central authorities and monopolistic gatekeepers.

Permission.io is perfectly poised to lead the web toward this new and equitable economy. Our core technologies, values and leadership are bringing needed change by creating a Web3 advertising model that enables individuals to own and profit from their data and that solves pain points for businesses and advertisers. We have devoted a number of years to building technologies that would provide the right infrastructure to support the Permission Economy. We are eager to build upon our foundation and grow our community of technologists, mathematicians, businesses and individuals who believe in our mission to bring evolved formats of trust and transparency to the web.

We invite you to join us on this exciting journey.
Disclaimer

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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 Platform and ASK 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 Inc. or Permission Token Foundation.

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