Token Generation Event of WOLK for the Wolk Protocol

supporting Decentralized Data Exchanges

July 21, 2017

Wolk Foundation

Abstract

Digital advertising is dominated by Facebook and Google. This centralized oligopoly is sharing consumer data with no one, causing publishers and advertisers to lose revenue and targeting capabilities outside of Facebook and Google, while consumers and businesses are earning nothing despite their direct participation in their network effects. Existing avenues for owners of data to benefit from data have become very limited due to privacy and trust considerations. Ethereum-based smart tokens in conjunction with decentralized data storage, however, can help solve these limitations. The Wolk Protocol supports decentralized data exchange using decentralized virtual currency keyed in by IDs, enabling data buyers and data sellers to exchange information about IDs such as mobile device IDs, emails and phone numbers. Wolk APIs use a new Ethereum-based token called "WOLK". In the Wolk Protocol, data buyers spend WOLK tokens to acquire data about specific IDs via APIs and data suppliers earn WOLK for data delivered to buyers using those APIs. This document outlines the parameters of a Token Generation Event of WOLK for contributors to: evolve the Wolk Protocol to support paid data exchange using decentralized data storage, develop dynamic pricing models for data, develop decentralized token smart contracts for managing reputations of data suppliers and data scientists, and enable consumers and businesses to economically participate in data-driven business models. The Wolk protocol will apply to advertising data to start, but this protocol can be applied to housing addresses, license plates, UPC codes, Ethereum addresses; basically anything where there is data attached to IDs that can be shared publicly.

The attached white paper is meant to describe Wolk's currently anticipated plans for developing its business, its platform, and its WOLK tokens. Nothing in this document should be treated or read as a guarantee or promise of how Wolk's business will develop or of the utility or value of the WOLK; the document outlines our current plans, which could change at our discretion, and the success of which will depend on many factors outside our control, including market-based factors and factors within the data and cryptocurrency industries, among others. Any statements about future events are based solely on our analysis of the issues described in this document, and our analysis may prove to be incorrect. Purchasing WOLK is subject to many potential risks, some of which are described in this paper, and some of which are provided in the FAQ on WOLK and our Token Generation Event and in the WOLK Risk Disclosures. These documents, along with additional information about our business and the WOLK, are available on our website. Purchasers of WOLK could lose all or some of the value of the funds used to purchase WOLK.

1. Wolk Core Value Proposition

The Wolk Foundation introduces the Wolk Protocol, supporting decentralized data exchange among data buyers and data sellers. The Wolk Protocol enables data buyers and sellers to share data tied to IDs. The first use case is to share data about IDs that are commonly used consumer identifiers for digital advertising and marketing:

- device ID (for mobile or other devices)
- email
- phone number

A new ETH-backed WOLK token is used as a key input to fully functional Wolk APIs (http://docs.wolk.apiary.io/) that enable data buyers to obtain data about consumers (e.g. age, gender, app usage, emails, ...) and enable data suppliers to get compensated for the onboarded data. In the domain of digital advertising, Wolk provides the following core value propositions:

- Marketers improve data-driven targeting of mobile advertising, email marketing, telemarketing or texting campaigns. They do so by buying WOLK to obtain data via Wolk APIs and the Wolk Protocol. With improved targeting, advertisers will increase the overall efficiency of their marketing dollars.
- Publishers, while staying anonymous, increase their revenue from appropriate valuation of their data assets. They do so by earning WOLK when supplying valuable data that buyers retrieve via the Wolk APIs.
- Consumers experience more relevant advertisements and personalized messages from marketers. Rather than having their data used to build up massive walled businesses, consumers can support Wolk Protocol and participate in the ownership of WOLK.

The value of all WOLK tokens (and thus typically, the price of the WOLK token), can be proportional to the API demand for all the data stored in the decentralized backend. The WOLK Smart Token Contract makes exchanging WOLK to ETH and ETH to WOLK easy - using a 20% ETH - backed reserve (detailed later). The Wolk APIs make it easy for data buyers and data sellers to buy and sell data. Because WOLK is "burnt" on each API call, and supply of WOLK thus decreases, Wolk anticipates that the internal economics will tend towards increased value of WOLK. Finally, the Wolk Foundation aims to support multiple ID spaces with multiple API service providers following the Wolk Protocol.

While our initial focus is in the domain of advertising, the Wolk Protocol can also be used for other ID spaces (eg Ethereum addresses, domains, location IDs, ...).

This document reviews problems in buying and selling advertising data in Section 2 and motivates the development of the Wolk Protocol and Wolk Ecosystem in Section 3. A review of the advertising data business landscape is presented in Section 4. Parameters for a Token Generation Event of WOLK is described in Section 5, for which all interested parties may participate in August 2017. Please refer to the WOLK Token term sheet and FAQ on who may participate.

2. Problems in Buying and Selling Advertising Data

Google and Facebook have the vast majority of advertising data about consumers across the world. The reason is simple: they have services loved by consumers. Consumers use mobile devices running on Android (with over 80% market share worldwide) to search for information on Google.com, check their email on gmail, and use Facebook, Instagram, Whatsapp, FB Messenger to communicate with the world. Over the last 2 decades, Google and Facebook have used network effects to build massive advertising businesses with targeting data from search and highly detailed information acquired from freely volunteered information. Consumers trust Google and Facebook with their most intimate personal information systematically and regularly. Where Google and Facebook do not dominate (e.g. in China, Korea and Japan), other local companies enjoy similar centralized oligopolies over advertising data.
Publishers and advertisers are now highly dependent on these two companies, for advertising revenue and to reach consumers at scale. However, there is no access to any of the data powering their services. The reason is simple: they do not wish to eliminate their network effects that power their data duopoly. The end result for consumers is a low quality ad experience for services not dependent on Facebook or Google.

Wolk's Advertising Data Exchange is designed to level the playing field of data, to enable a decentralized network of data buyers and suppliers to collaborate and compete collectively with the centralized oligopolies.

2.1 Challenges in Buying Advertising Data about Consumers

Google and Facebook provide very limited access to consumer data. There are few effective methods to access information about how to map a person's IDs such as:

- Email ID: george.washington@gmail.com
- Mobile ID: George Washington's deviceID 0000994B-4C70-4710-85D7-D1D022C7000E
- Phone number: 202-555-9876

to attributes such as:

- other IDs: Emails, Mobile IDs, Phone numbers -- which are critical for cross channel marketing
- demographic data: age, gender, ethnicity, relationship status, number of children, ...
- purchase intent data: auto, mortgage, real estate, ...
- device data, e.g. iPhone 7 plus

Every publisher must re-request the same information from consumers to use this for targeting, leading to wasted cycles of endless re-registering the same attributes over and over -- so many publishers just do nothing. If authentication schemes of Google or Facebook Connect are used, heavy handed policies from them in the name of "data leakage" pose a threat to a publisher's ownership and control of that data -- the publisher can't use "Facebook's data" without restriction, and certainly not for the purpose of advertising and marketing.

In the old days, a marketer could get a phone book and look up George Washington and know that he lived at 2305 Main St, learn that his phone number is 202-555-9876. In the current digital ecosystem, it is not possible to do that easily, because the phone book has been replaced with centralized services of Google and Facebook whose ID of 0000994B-4C70-4710-85D7-D1D022C7000E cannot be mapped to such attributes.

Over the last decade, data services from Oracle (Blue Kai, Datalogix), Salesforce (Krux), Acxiom (LiveRamp) have been developed for marketers to map domain-specific cookies to these attributes, but the coverage is nothing like a phone book and not built for a mobile device ID dominated era: coverage is relatively poor in the US and often non-existent outside the US! From a data advertising point of view, the data business is fraught with problems:

1. datasets are not real-time, not high quality, not well standardized, and therefore require significant amounts of data science to find signals in the noise;

2. datasets utilize impression-based monetization as a business model -- each segment has a CPM and if that segment is used to target consumers, requires data buyers to report usage of the data based on impression counts. This is frequently underreported due to (1), and many data suppliers are wary of supplying actionable data as a result.

3. datasets traditionally have CPMs that are too high for data buyers or CPMs are too low for data suppliers. which leads to data poor advertising campaigns outside of the Facebook and Google universe and buyers having no alternative vendors to rely on.

2.2 Challenges of Selling Advertising Data

Consumers expect to access content (websites and mobile applications) for free using advertiser-supported services. However, consumers also want publishers to respect their privacy with now commonly accepted and mature privacy principles, and consumer data is protected by state and federal privacy laws and regulations. Assuming these privacy principles and laws are respected and basic controls are in place, Google and Facebook have proven that consumers are willing to share vast amounts of data in exchange for valuable services.

However, once the consumer provides data to a publisher (e.g. a web site or mobile application), there are not easily available means for that publisher to monetize that data:

1. Publishers are very wary of violating consumer trust

2. Publishers want anonymity: because of the above, they do not wish to be identified as the seller of consumer data to either consumers or advertisers

3. Publishers do not know how their data should be valued and desire maximum monetization opportunities in a dynamic pricing model.

Very few options exist for publishers wishing to sell their data in a way that addresses the above problems. If publishers provide their data to marketplaces like Oracle (Blue Kai, Datalogix), Salesforce (Krux), Acxiom (LiveRamp) and others, the structure of these exchanges force publishers into dealing with the following problems:

1. Publishers risk violating consumer trust

2. Publishers lose anonymity

3. Publishers risk undercompensation because data buyers under-report and/or have a poorly priced CPMs for their data

Because publishers have few means of sharing data with others anonymously and getting compensated for the value they bring, a better solution is required.

3. Introducing the Wolk Protocol and Ecosystem

3.1 Ecosystems

The Wolk ecosystem is powered by the WOLK token.

The Wolk Protocol, developed by the Wolk Foundation, aims to meet the challenges in buying and selling data using Ethereum-based tokens, working in conjunction with a decentralized data storage mechanism based on Swarm. Blockchains are a powerful distributed ledger running behind a large distributed set of nodes on the Internet all working in concert to verify transactions submitted and stored on that ledger. Many are familiar with the dominant cryptocurrency of Bitcoin, but Wolk uses the cryptocurrency Ethereum for its programmable "smart contracts".

Ethereum smart contracts live on the blockchain permanently and can hold balances not only in ETH but also inETH-based cryptoassets that can be freely traded amongst thousands of participants. This document describes a new ERC20 cryptoasset of the "WOLK" token that works in conjunction with data stored in decentralized data storage. Typical transactions that can be recorded on the public blockchain are e.g. "Data Buyer sends 100 WOLK to Exchange" or "Exchange sends 75 WOLK to Data Supplier" where 100 WOLK represents the settlement of a buyer obtaining a stream of data attached to a set of IDs and 75 WOLK represents the WOLK earned by the supplier in this transaction.

The Wolk Ecosystem consists of:

- Wolk Foundation, a non-profit Swiss Foundation promoting the development of the Wolk Protocol for decentralized data exchange
- Wolk API Service Providers, for profit entities working with data suppliers and data buyers to use the Wolk Protocol in APIs
- Data Buyers, who get data in exchange for WOLK
- Data Suppliers, who get WOLK in exchange for quality data
- Data Scientists, who get WOLK in exchange for analyzing data
- Consumers, who are what the data is about

The basic actors of this ecosystem are shown in Figure 1 (the Wolk Foundation, Data Scientists and Consumers are omitted). Data Buyers exchange ETH for WOLK and Data Suppliers WOLK for ETH via the WOLK Token Contract Functions `purchaseWolk` and `sellWolk`. Data Buyers use the WOLK API to bid on data and Data Sellers use the WOLK APIs to provide data, with the Wolk API Service provider calling `settleBuyer` and `settleSeller` functions regularly to transfer WOLK between Buyer and Seller account. An internal exchange rate is updated by `purchaseWolk`, `sellWolk` and with the goal of maintaining, a fixed 20% reserve following the Bancor formula. Because the `settleBuyer` operation burns a percentage of WOLK (up to 10%), long-term WOLK holders can potentially enjoy the benefits of an increasing ETH-backed exchange rate as Wolk API usage increases.

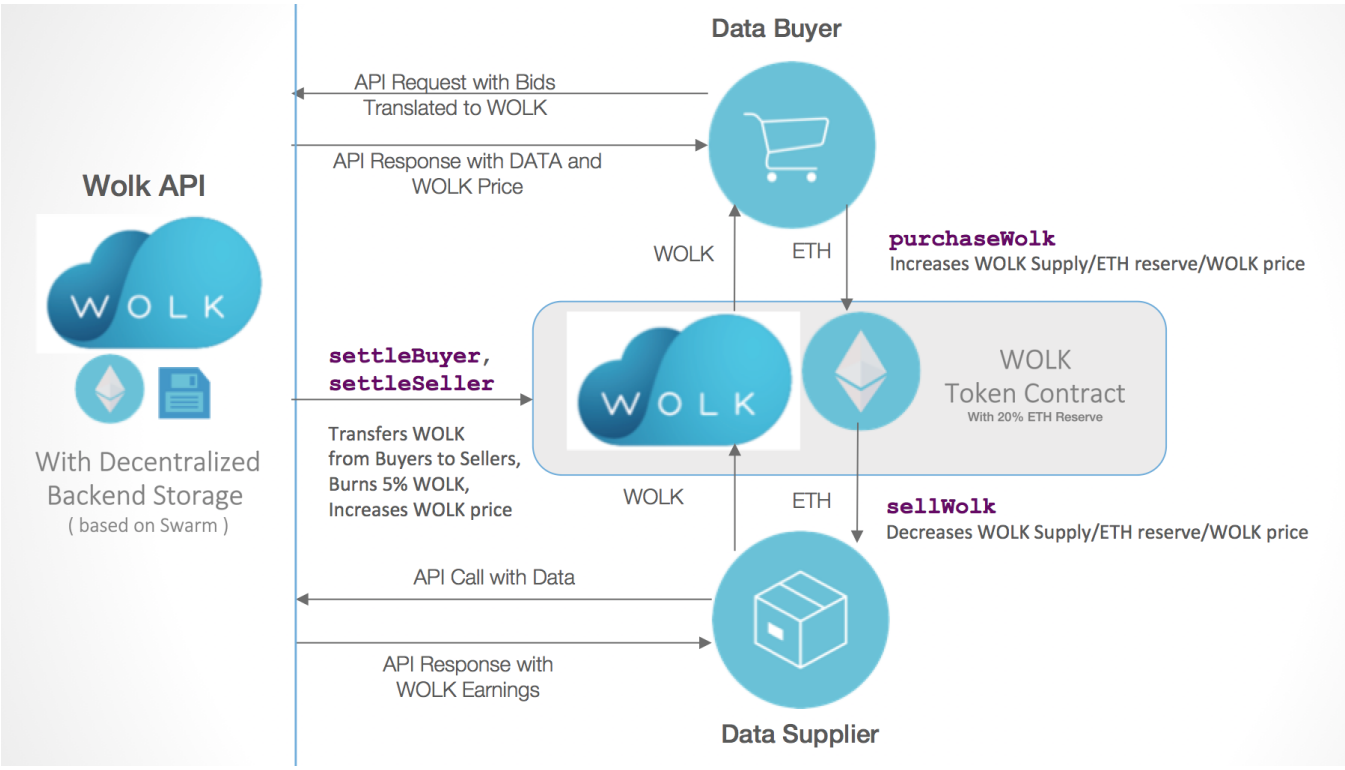

Figure 1. WOLK/ETH flow and Data flow between Data Buyer, Data Supplier and Wolk API Service Provider.

3.2 Wolk Protocol

Data suppliers use open source APIs to onboard and store data in decentralized backends with the WOLK token.

The Wolk Protocol will use decentralized data storage mechanisms based on Swarm to store mappings between IDs and data about those IDs. Data can be onboarded in bulk or point by point with APIs that load data into the decentralized back end in canonical form, e.g. an API call of

https://api.wolk.com/data/1.0/sell?key={APIKEY}&age=45&gender=M&ids=0000994B-4C70-4710-85D7-D1D022C7000E

stores the mapping that deviceID "0000994B-4C70-4710-85D7-D1D022C7DCCE" has "age:45, gender:Male"

As of June 2017, Wolk has on boarded over 400MM mobile deviceIDs with email, age and gender data and over 3B data points with app usage information. Typically, when suppliers provide datasets, the onboarding of data consists of taking files of around 1MM-10MM lines and bringing them into "device", "email" and/or "phone" mappings stored in decentralized backend storage. For high volume throughput and low latency API responses, our current implementation uses Google Cloud's BigTable [HBase] as a cache into this decentralized backend storage.

Data buyers use open source APIs to buy paid data stored in decentralized backends with WOLK tokens.

See Figure 2 for a screenshot of the June 2017 Wolk API documentation for mobile device IDs. An example API call is:

https://api.wolk.com/data/1.0/api?key={APIKEY}&currency=USD&age=4&gender=15&ids=0000994B-4C70-4710-85D7-D1D022C7000E

which returns attribute-value responses as such:


```
{
  "requestID": "52d6ba4e4117fa15899b5a7d4029ae36",
  "deviceID": "0000994B-4C70-4710-85D7-D1D022C7000E",
  "age": {
          "code": 26,
          "description": "Insufficient Bid"
        },
  "gender": {
          "value": "M",
          "p": 0.94965,
          "price": 3.0357,
          "code": 20,
          "description": "Found"
        }
}
```


In the above example, the buyer is bidding $4 per 1000 "age" datapoints and $15 per 1000 "gender" datapoints asking about a specific mobile device ID; the API returns that the age bid was insufficient while the gender bid is settled at $3.0357 per 1000 datapoints, where the "gender" attribute for that mobile deviceID is "M" for male. Each ID space has its own specification of a set of attributes and values that could be returned for requested IDs. In the Wolk Protocol, maximum bids are in WOLK and settled in WOLK internally, but buyers can specify their own currency (USD, EUR, GBP, CHF, JPY etc.) which are mapped into ETH and then WOLK using externally available APIs.

Every 15-20 minutes, on the public Ethereum blockchain, data buyers accounts are debited and data suppliers accounts are credited based on the aggregated WOLK activity with `settleBuyer` and `settleSeller` functions; this can be also done through the use of "payment channel" mechanisms. This flow of WOLK is shown in Figure 1. Data buyers obtain WOLK by sending ETH to the Wolk Smart Token contract address and obtain WOLK with `purchaseWolk`; buyers can then use their WOLK to submit bids for data attributes via the Wolk APIs. If data is available from one or more suppliers, 20% of the WOLK is provided to an API service provider (managed by the Wolk Foundation), up to 10% is "burnt" to compensate the WOLK ecosystem holders at large, and the remaining 75% is shared between data suppliers who supplied the data in the API response.

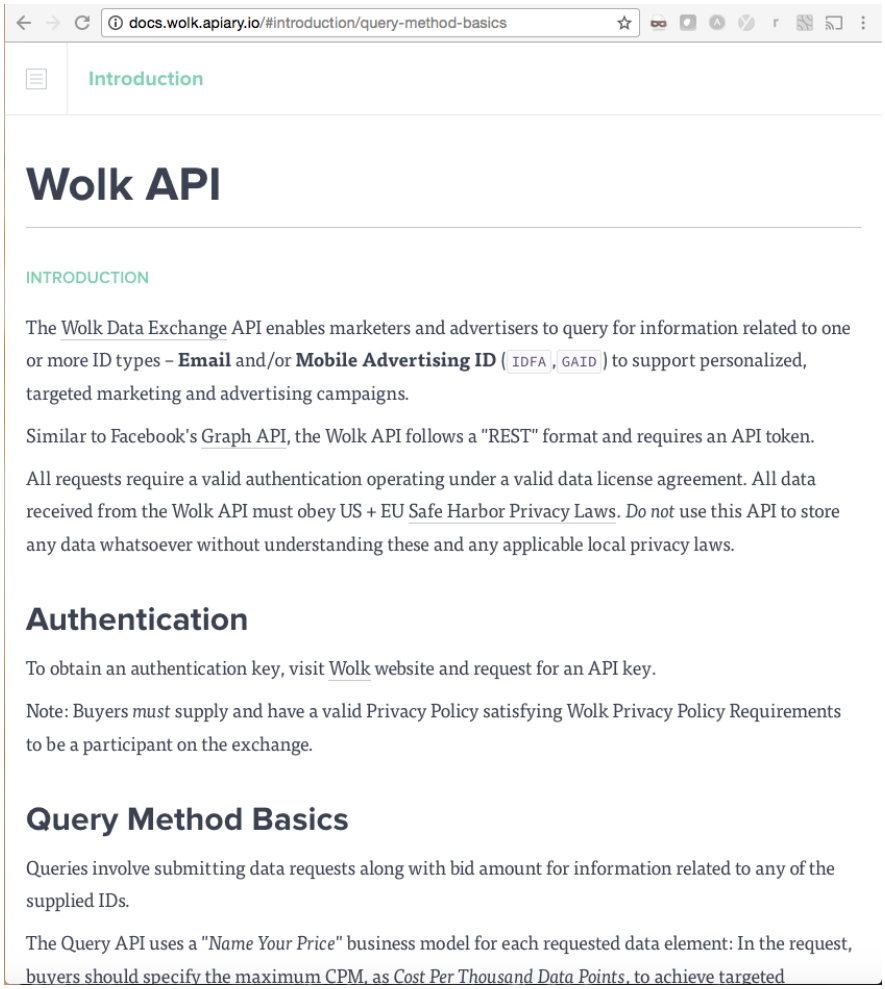

Figure 2. Wolk APIs are publicly available and fully functional.

The Wolk Protocol organizes how APIs exposed by API Service Providers are used by data buyers and data suppliers in conjunction with decentralized virtual currency, decentralized data storage and data scientists.

The Wolk Foundation supports the development of the Wolk Protocol to organize many ID spaces with different structures in conjunction with multiple API Service Providers. For ease of use from API users, the mappings between ID spaces should be coordinated in the API outputs. Here is a small sample of additional ID spaces to consider, all subject to applicable privacy policies:

- residential and business addresses (e.g. "2305 Appleby Ct")
- federal and state government issued IDs (e.g. 447-71-5082)
- vehicle identification numbers
- face recognition IDs / photo URLs
- open social network IDs (Facebook, LinkedIn, ...)
- UPC codes
- … more

For each space, it may be natural to adopt the WOLK token to model the data available in the space or launch separate tokens, e.g. an "ADDRESS" tokens, "GOV" tokens, "VIN" tokens, "FACE" tokens ... It is a broader aim of the Wolk Foundation to expand the scope to include these spaces after the advertising space is proven liquid.

3.3 Wolk Pricing Dynamics and Reputation Model

Dynamic pricing models of different data attributes will be developed to augment current exchange dynamics in the current API designs.

At present, the Wolk Protocol relies on suppliers specifying the price floor they are willing to sell their data and buyers specify the price ceiling they are willing pay for the data, with the above API dynamics enabling settlement with familiar "exchange" dynamics where prices are between a specific buyer's max and a supplier's min. The Ethereum token ecosystem has witnessed rapid innovations in smart contract pricing in token sales and it is likely that smart contract pricing techniques suitable for *automatic* data pricing will be developed in the community. The Wolk Foundation intends to support technical innovation by supporting dynamic pricing models for ID attributes among its API service providers that improve upon this well understood exchange dynamic.

WOLK will be offered in a Token Generation Event and then liquidity of WOLK will be backed by ETH-backed reserves.

WOLK will be provided to contributors via a Token Generation Event described in detail in Section 5. After this "Token Generation Event", 20% of ETH will be kept in reserve to support the liquidity of WOLK:

1. WOLK Token holders may exchange WOLK for ETH and drive WOLK prices down [exactly as much as necessary to maintain the 20% ETH reserve]
2. ETH holders may exchange ETH for WOLK and drive WOLK prices up [again, exactly as much as necessary to maintain the 20% ETH reserve]

In addition, WOLK owners may sell their WOLK to data buyers or others using exchanges listing WOLK.

Reputation and data quality scoring methods will be developed to support decentralized data exchange.

Currently, all advertising data suppliers that have been onboarded have been vetted for having publicly visible data collection methods (mobile app and desktop registration, or mobile SDKs used in applications) and recognizable consumer web/mobile brands. However, the Wolk Protocol and APIs will be open to allow everyone to participate: suppliers only need an Ethereum address and a small amount of WOLK to store their onboarded data onto decentralized storage. Since suppliers have financial incentive to get paid in WOLK without regard to data quality and potentially in fraudulent ways, it is critical to augment the Wolk Protocol to support reputation mechanisms and data quality scoring mechanisms. To balance this financial incentive, we will introduce two core mechanisms:

- data suppliers will be paid or charged storage fees as a function of their reputation and reliability
- data scientists will be compensated in WOLK for determining data supplier reputation and reliability

The intention is to have data suppliers earn good reputation scores and onboard data that is timely and accurate, and not redundant and inconsistent. The Wolk Foundation will support Wolk protocol development along these lines with multiple API service providers and may develop new token models with the above design considerations.

3.4 Uses of WOLK

WOLK is used to buy data.

The initial primary use case for WOLK tokens is to access data about mobile device IDs, raw and hashed emails, phone numbers, where future ID spaces anticipated by the Wolk Foundation. For each ID space, multiple standardized attributes will have their own API design. Because Wolk APIs have WOLK bids for each individual attribute, different kinds of data elements can be priced differently. It is anticipated that additional data models and APIs will be designed, increasing the potential value of WOLK. This increasing array of data attributes for increasing numbers of consumer identifiers will enable increased fine-grained personalization for marketers, increased monetization for publishers, and better experiences for consumers.

WOLK is used to monetize data.

As buyers use the Wolk API, sellers accumulate WOLK tokens. By allowing WOLK to be exchanged for ETH using a 20% ETH-reserve, Wolk intends to provide sellers a liquid market for their data, so long as ETH itself is liquid. In addition, the WOLK token is an ERC20 token, so with sufficient transaction volume, it can be traded on a number of exchanges and supported by multiple cryptocurrency wallets, allowing data suppliers monetize their WOLK token.

WOLK can be used to compensate API service providers for its data value-added services.

Additional Wolk APIs could be used by other API service providers to support data buying and selling.

WOLK can be used to reward early WOLK contributors.

Because a small percentage of WOLK is effectively "burnt" in each API call, WOLK holders may see price appreciation of their WOLK when buyers use the API as this burning drives up the value of WOLK programmatically.

4 Business Landscape - Advertising Data

Because the initial development of the Wolk Protocol is focused on advertising data, we limit our discussion to advertising data only.

4.1 Competition for serving buyers and sellers of advertising data

- Google and Facebook do not provide their data to anyone and use their walled gardens to strengthen their position further. Google and Facebook and other cloud companies will of course explore blockchain technology but are intrinsically disincentivized to release their data to the broader ecosystem. However, collectively the Wolk ecosystem will compete with Google and Facebook for digital advertising ecosystem revenues.
- Existing CRM systems and DMPs from Salesforce/Krux, Adobe, Lotame and many others currently house first-party data and incorporate third-party data keyed in by identifiers of emails, mobile deviceIDs, cookies and phone number. The end point of data from Wolk may be DMPs like this and interfaces between DMP and Wolk may be important to develop.
- Existing Data Exchanges such as LiveRamp/Acxiom and Oracle/Datalogix/BlueKai do not have quality deterministic data available. Their business models are based off of impression delivery, are poorly policed and are underpriced or overpriced, resulting in massive data leakage, low quality control and poor monetization. Buyers use data from these exchanges because they have no other real choice and when they do, the perception is that the data is low scale.

4.2 Wolk Protocol Advantages

With sufficient data supply, Wolk believes the architecture is intrinsically able to compete with Facebook and Google in the mobile advertising ecosystem:

Current Data Exchange Methods	Wolk Protocol Solution
Fixed CPM-based business model	Dynamic Token-based business model
Low data monetization for data suppliers	High data monetization for data suppliers
No Anonymity for data supplier	Anonymous data supplier
Poor Mobile ID Coverage	High Mobile ID Coverage
Unknown Accuracy	Validated Accuracy (p-value) for core attributes
No aggregation of data suppliers	Systematic aggregation of data suppliers
Data leakage	Data secured in Decentralized Storage accessed by API
High trust required	Trustless
Low competence to compete with FB and GOOGL	High prospects to compete with Facebook and Google

4.3 Wolk Background

The Wolk Foundation was created by professionals in mobile advertising that saw a need for decentralized data protocols. Several of the team members came from CrossChannel Inc. Founded in November 2009, CrossChannel is a Mobile Demand Side Platform with 25 people on staff and has placed over $175MM in mobile advertising during its 8 year history.

CrossChannel's specialty has been running performance-based in-app advertising campaigns and through this developed a core expertise in modelling mobile deviceIDs and developing real-time bidding algorithms for the purpose of bidding on exchanges of Google, Twitter/Mopub, Unity, Rubicon, and dozens of other programmatic mobile supply side platforms.

Through experience, CrossChannel has developed deep first hand knowledge of the relative dominance of Google and Facebook in mobile advertising, the lack of real data solutions from existing vendors, and how mobile marketing can be done more efficiently with the benefit of quality data at scale.

In response to this, CrossChannel recognized the need for quality mobile device ID data by the entire mobile marketing ecosystem and recognized how the decentralized Ethereum-based virtual currency and decentralized storage mechanism could be brought together to improve multiple data ecosystems. Thus, the birth of Wolk Protocol and the Wolk Foundation.

The Wolk Foundation aims to develop and promote the Wolk Protocol with multiple Wolk API service companies, starting with Wolk Inc as its first *advertising* data service provider. Wolk Inc is charged to:

- develop relationships with data buyers worldwide, who must be educated about how to use the Wolk API to improve their advertising campaigns or serve clients better
- develop and enhance Wolk APIs for data buyers and suppliers to transact with WOLK, and deliver increasing data quality for data buyers

Under the direction of the Wolk Foundation, the wolk.com web site and Wolk API is developed and hosted by Wolk Inc and enables buyers and suppliers to view their data buying and selling and transact in their fiat currency. Because of the above background, the Wolk Inc team is composed of many people from CrossChannel's mobile DSP and will expand to include others from neighboring marketing ecosystem backgrounds.

The Wolk Core Team consists of:

- Sourabh Niyogi, 45, Wolk Foundation Council President
- Sonia Gonzalez, 38, Wolk Foundation Council Vice-President, Wolk Inc GM
- Harish Thimmappa, 33, Wolk SVP Revenue
- Rodney Witcher, 36, Wolk VP Business Development
- Michael Chung, Wolk Product Manager and Protocol Developer - API+Protocol Designer
- Mayumi Matsumoto, Wolk Data Scientist - API+Protocol Designer
- Alina Chu, Wolk Data Scientist & Quantitative Analyst
- Nitin Chauhan, Wolk Data Engineer
- Bruce Han, Wolk Software Engineer
- Luvsanbyamba Buyankhuu, Wolk Data Engineer
- Scott Salin, Wolk Business Development

For more complete bios of our team, please visit our site team page here: https://wolk.com/app/team.

As the marketplace for multiple data exchanges emerges with maturing decentralized tokens and decentralized data storage models, multiple Wolk API service companies will be supported by the Wolk Foundation in the same way.

5 WOLK Token Generation Event

5.1 Summary

Our goal is to distribute a minimum of 50MM WOLK and maximum of 500MM WOLK tokens in a "Token Generation Event" from August 28, 2017 until September 28, 2017 in the following distributional pattern:

- Token Generating Event: Minimum: 50MM WOLK [50,000 ETH]
  Maximum 500MM WOLK [500,000 ETH]

- Targeted Launch Date : Aug. 28, 2017 00:01am GMT (decided by block number)
- Targeted Closing Date : Sep. 28, 2017 23:59am GMT (decided by block number)

Contributions of ETH sent to the token address will be converted into WOLK.

Token contract address: **TBD [ENS: wolktoken.eth]** (Published on wolk.com at least 3-5 days before token launch date).

Token launch completion: Token launch will end when either the maximum number of WOLK is raised (500MM WOLK) or September 28, 2017 and the minimum number of WOLK has not been achieved (50MM WOLK). If less than the minimum WOLK are raised, ETH will be refunded to the sending addresses.

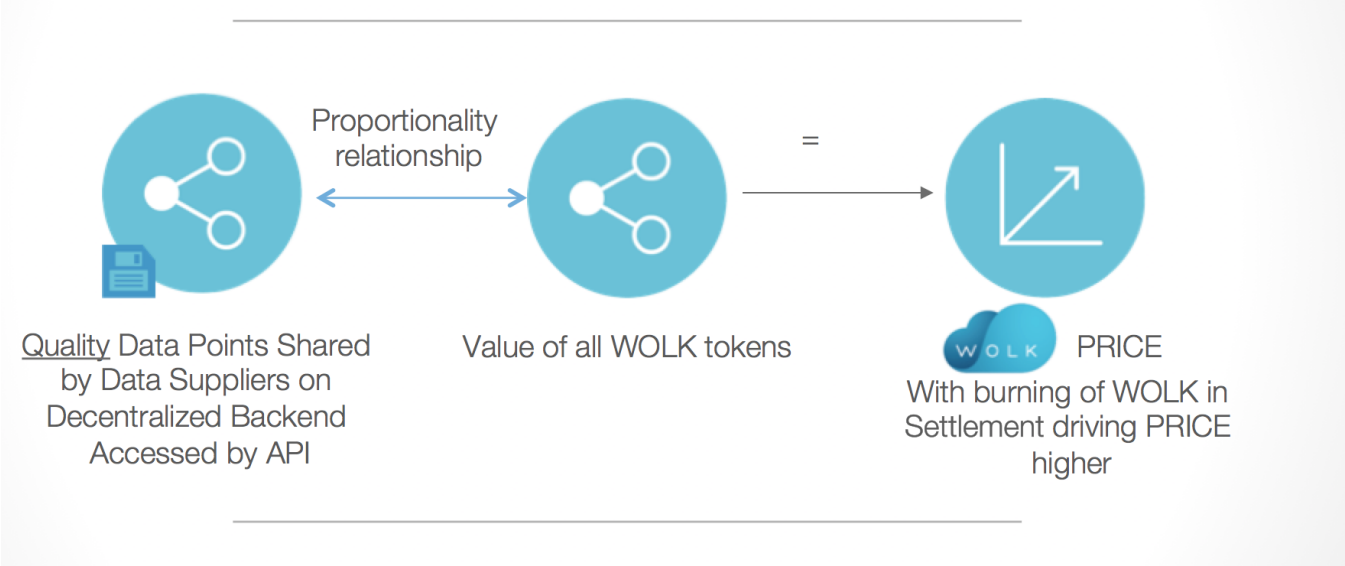

Figure 3. WOLK Token Economics.

5.2 Wolk Token Economics

After the Token Launch, data buyers and suppliers and Buyers may trade tokens freely on the exchanges but may use 2 smart contract functions "`purchaseWolk`" and "`sellWolk`" to exchange ETH for WOLK and WOLK for ETH freely using a 20% ETH reserve:

- data buyers will be able to buy WOLK by interacting with the "`purchaseWolk`" function of the WOLK Token Contract by sending ETH and using the ETH:WOLK exchange rate internal to the contract. The ETH contributed goes into a "ETH reserve" and the prevailing ETH:WOLK exchange rate is automatically updated. Buyers who obtain WOLK then use the API Key (known to the buyer and the Wolk API service provider only) to obtain data from the API;
- data sellers will be able to sell WOLK by interacting with the "`sellWolk`" function of the WOLK Token Contract, specifying the amount of WOLK they wish to sell in exchange for ETH. Using the ETH:WOLK exchange rate internal to the contract, ETH is reduced in the reserve and the ETH:WOLK exchange rate is automatically updated.

The total number of tokens therefore can increase from data buyers calling `purchaseWolk` and can decrease from data sellers calling `sellWolk`: this drives WOLK pricing up (via `purchaseWolk`) and down (via `sellWolk`) programmatically. Furthermore, because up to 10% of the token supply is "burnt" through the settlement operations without any such price changes by the API service provider, token holders can potentially experience gains in the value of their WOLK.

Figure 4 shows the basic economics at a high level: we anticipate that the total value of all the WOLK tokens will be proportional to the amount of quality data that buyers actually transact with via Wolk API. The more the API is used (because of the valuable data), the more that is settled and the value of WOLK can increase. The less the API is used (because of lack of valuable data), the less that is settled out and the value of WOLK can decrease. Because the settlement operations are on the Ethereum blockchain, WOLK holders will have full transparency into the whole operation.

5.3 Use of Proceeds

ETH raised in the Token Generation Event will be distributed as follows:

- 20% - supports liquidity of WOLK directly via `purchaseWolk`, `sellWolk` functions directly in the token contract, which increase this reserve programmatically
- 20% - supports the API Service Provider Wolk Inc - marketing, business development, operations, etc.
- 5% - supports the Wolk Foundation operationally for 3-10 years
- 40% - will support a “Wolk Ecosystem Development Fund,” which will support data supplier onboarding and data buyer onboarding by Wolk Inc. and any future service providers to the platform
- 15% - reserved by the Wolk Foundation for additional API Service Providers following the Wolk Protocol, or for supporting related token based business models.

5.4 Wolk Inc Sustainability / Follow on Offerings

Wolk Inc is the service company charged with developing the data buyer and seller ecosystem of the first ID space (of mobile deviceIDs, emails and phone numbers). Wolk Inc sustainability is derived from:

- the WOLK earned from API calls in the `settleBuyer` and `settleSeller` functions. The Wolk Protocol has API Service Providers earning ~20% of all settled transactions in WOLK.

- the 20% of ETH from the Token Generation Event (see 5.3 above)

- While no follow on offerings will support Wolk Inc, additional Token offerings by the Wolk Foundation may support additional ID spaces and support additional Wolk API service providers.

5.5 WOLK FAQs

What does WOLK represent?

WOLK represents a decentralized virtual currency represented in specialized Ethereum smart contracts following an "ERC20" standard. WOLK enables participants to interact with decentralized data exchanges utilizing the Wolk Protocol. Data is obtained with WOLK as a payment mechanism via the Wolk API. The Wolk Protocol can be used for any shared ID spaces but initial Wolk APIs are specifically focused on advertising data keyed in by mobile device IDs, emails and phone numbers. Data suppliers are compensated in WOLK for their highly valuable data.

Are you distributing WOLK Tokens in the Token Generation Event?

Yes. The Wolk Foundation is offering to distribute a minimum of 50MM WOLK and a maximum of 500MM WOLK.

How do I obtain WOLK in the Token Generation Event?

To obtain WOLK, you must have ETH stored in an Ethereum wallet. Other cryptocurrencies must be exchanged for ETH to obtain WOLK.

What is the value of WOLK? Is WOLK transferable?

During the token generation event, the value of WOLK is proportional to the value of ETH in the fixed schedule shown in 5.1. Afterwards, buyers and sellers of WOLK can potentially exchange WOLK freely on cryptocurrency exchanges. In addition, the 20% ETH reserve held in the WOLK Token Smart Contract should enable systematic exchange of WOLK for ETH and vice versa with publicly visible exchange rates.

WOLK is transferable. It can be sold to buyers who require WOLK to procure data, to suppliers and cryptocurrency speculators. All transactions conducted are verifiable and secured on the public Ethereum blockchain.

Does WOLK represent ownership of Wolk Inc or of the Wolk Foundation?

No. WOLK does not represent any ownership rights in Wolk Inc and does not represent participation in Wolk Inc., nor does it represent any ownership rights in Wolk Foundation and does not represent participation in Wolk Foundation.

When will the token launch happen?

Wolk Token Offering will be conducted between August 28, 2017 and September 28, 2017, with precise block numbers decided based on Ethereum mining rates.

How will Wolk store ETH?

The Wolk Foundation will use the standard Ethereum multisig wallet to store ETH.

For additional information, see our FAQ on WOLK and our Token Generation Event.

5.6Risks and Risk Mitigation

Wolk advises on the following risks:

I. Insufficient Data Supply. While Wolk is optimistic that decreasing CPMs and reduced revenue from competition Google and Facebook motivate publishers to seek new monetization options such as Wolk, the market for data monetization may be slower to develop given uncertainty on revenue potential.

II. Insufficient Data Demand. While Wolk has significant interest from mobile demand side platforms in attributes keyed in by mobile device ID and is in testing, Wolk has not validated other addressable ids of email and phone number. It is anticipated that other identifiers will be at similar demand levels but this has not been validated in the same way as mobile advertising IDs.

III. Insufficient liquidity for WOLK. WOLK is a specialty token for a much smaller B2B community of data suppliers and data buyers. A smaller number of participants implies lower volumes of WOLK transaction, which may result in higher volatility of WOLK.

IV. Privacy and local regulations may pose unforeseen limits on Wolk. While Wolk will abide by industry standard privacy principles and control measures, many local markets operate with different principles and the restrictions may pose limits on what can be done in Wolk APIs or on the blockchain structure.

V. Data copying and fraud protection measures are being actively developed. Data buyers may copy data against API terms of service, reducing the ability for data suppliers to fully monetize their data because of the actions of fraudulent actors. Wolk Inc has developed basic countermeasures for bad actors but there can be no assurances that the measures will be fully complete.

VI. Transaction throughput may be insufficient to support extraordinarily high API demand. The decentralized backend currently has been tested to 100K QPS transaction volumes with a hybrid "cache" architecture. However, but it is possible that higher throughputs will be necessary and significant investments will need to be made.

VII. WOLK Tokens may be regulated in unforeseen ways. Wolk believes the WOLK tokens are not securities because WOLK is used to consume the API. However, local regulatory bodies may decide differently, limiting the availability of API to the widest pool of data buyers.

VIII. Currently, WOLK is an Ethereum backed token. Should further developments in the cryptocurrency ecosystem enable the handling of higher throughput, lower latency software architecture, the Wolk Foundation wishes to remain nimble enough to transition over to better blockchain technology.

Wolk will use all available resources to reduce risks but outside of data buyers and suppliers participating, only accredited investors and investors comfortable with the above openly stated risks should hold WOLK tokens.

For additional information on risks associated with purchasing WOLK, see our FAQ on WOLK and our Token Generation Event and our WOLK Risk Disclosures.

5.7 Communications

A public Slack channel #announcements on Wolk's Slack Channel will be used for all communications concerning WOLK token sales and thereafter.

5.8 Open Source

A draft of the WOLK Token Contract is available on https://github.com/wolktoken/token

A final version of the WOLK Token Contract will be available the week of August 21, 2017.