Qchain is an upcoming blockchain-powered digital marketing, advertising, and analytics platform. Our direct buy advertising application aims to facilitate open, flexible, and inviolable cost-per-conversion, cost-per-action (CPA), cost-per-click (CPC), and cost-per-impression (CPI) transactions between advertisers and publishers through the use of smart contracts. We will especially place emphasis on facilitating cost-per-conversion transactions, which are more resistant to ad fraud, since the increased temporal and financial costs of conversions relative to clicks filters for human interactions. Our other central application, the Qchain Personal Data Management and Marketplace (PDMM) application, will add everyday Internet users as a third participating agent to the traditional advertiser-publisher binary star system. Internet users will be able to monetize, control, and permissionize their data with the PDMM application, advertisers will be able to ethically obtain more detailed and up to date data that helps with targeting, and content publishers will financially benefit from the higher conversion rates that come with more relevant targeting. Thus, the PDMM application offers the advertising industry progress on the fronts of data privacy and data quality.
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1 Introduction

The cultural theorist, Marshall McLuhan, coined the expression “the medium is the message” in his 1964 publication, *Understanding Media: The Extensions of Man*. The phrase signifies that the qualities and properties of a medium dramatically influence the reception and perception of messages transmitted through that medium. Fifty three years later, the phrase has pertinent application to today’s vast umbrella of digital content and media. When we think of digital media, we think of speed, adaptiveness, and responsiveness. Consumers have come to expect those qualities in the messages that are being delivered through the Internet and the products and services that facilitate the digital ecosystems. Qchain aspires to be a platform that embodies those qualities exactly for advertisers, marketers, publishers, and content creators.

**Qchain is open.** Source code for our product releases will be available for all to see on our GitHub, such that potential users can gain further confidence in the security of our code and the fairness of our product. Observers will be able to see that our code does not harvest or siphon off user data to a central source. Rather than profiting off of user data in underhanded means, our open development will reflect our honest intentions to facilitate secure advertiser and publisher connections, where data is only privy between those agents directly participating in the transaction.

**Qchain is decentralized.** There is no central authority. This eliminates centralized overhead such as hosting and server costs and will result in lower fees for advertisers and higher payouts for publishers. Hence, decentralization leads to financial benefits, privacy benefits, and convenience for both advertisers and publishers. Additional benefits include the nonexistence of central mandates on minimum investments in campaigns for advertisers and faster, direct payouts without withdrawal minimums for publishers.

**Qchain is fair.** We offer an excellent value proposition for all three types of capital-exchanging agents that participate in the system: advertisers, publishers, and hosts. We will describe the interactions between these three agents in finer detail in the ensuing sections. The independent host is a new addition to the traditional advertiser-publisher duality that will further the decentralization of digital advertising by eliminating the need for a traditional central host.

The resources being transferred between the agents will come in the choice of two tokens, one for each blockchain technology that Qchain will interface with. The ERC20 Ethereum-based token will be called Ethereum Qchain (“EQC”), and the NEM-based token will be called XEM Qchain (“XQC”). Advertisers, publishers, and hosts can agree on terms over whether they choose to carry out their smart contracts in EQC or XQC, depending on blockchain technology preference. As Ethereum and NEM are both respected and rapidly maturing blockchain technologies, we feel that giving our users the flexibility to choose between two next-generation technologies is beneficial.
2 Market

2.1 Qchain Ecosystem Agents

There are three main classes of token-exchanging agents in the Qchain advertising application ecosystem:

- **The Advertiser.** The Advertiser accumulates a supply of EQC and/or XQC for an ad campaign. The Advertiser creates the media resources and content for the campaign, and then contracts with Publishers to serve the ads to users. The Advertiser can choose to either be automatically matched with compatible Publishers based on the ad criteria each party has specified or personally select particular contracts to enter into with Publishers. The Advertiser offers some amount of payment per conversion, click, impression, or action to be split between The Publisher and The Host.

- **The Publisher.** The Publisher agrees to display media resources and content produced by The Advertiser for a set period of time on its website in exchange for a number of tokens per click, impression, or other factor. Publishers can specify criteria for advertisements that they are willing to serve, including ad type, genre, content, payment range, duration of time, and many more options.

- **The Host.** The Host serves as a member of a decentralized network of transaction verifiers. For a percentage of the token payment, The Host agrees to provide bandwidth and compute capacity to execute checks that verify the legitimacy of the ad activity occurring on The Publisher’s website that pertains to a Qchain ad contract. Thus, The Host serves as a referee of the transaction between The Advertiser and Publisher. If The Host has sufficient resources, they can optionally offer to act as a content delivery server for The Advertiser, mitigating the need for The Advertiser to independently obtain online storage of its media content.

Upon agreement to terms, the Advertiser will use Qchain to encode the agreement into a blockchain smart contract. The Advertiser will then await clicks and impressions from The Publisher’s website. The flow of action between the three agents need not happen in the sequence as described in the above example (for example, a publisher can seek out an advertiser), but no matter the specific order, a successful agreement between the three parties culminates with the deployment of smart contracts reflecting their negotiated terms.

For ad display on publishers’ websites, Google AdSense, the current industry standard, deducts a hefty 25 - 40% of The Advertiser’s payment for playing the role of The Host, with only 68% left for The Publisher.\(^1\) In Qchain’s case, we envision hosts taking a substantially

smaller cut, for example, 5 to 20% of the revenue (advertisers, publishers, and hosts can all specify what commission rates they will accept), and Qchain itself taking a small 1% interchange fee for facilitating the transaction. Publishers receive the entirety of the remaining payment. These terms are financially favorable to both advertisers and publishers, such that publishers receive higher payouts and advertisers can allocate less to their campaign with lower host fees in mind. The host is incentivized to participate in the transaction via a healthy proportion of the revenue stream, with much less overhead cost than a traditional ad network.

2.2 Revenue and Growth

The global advertising market is one that has seen tremendous growth and rapid expansion in the digital age. One only needs to examine the trajectory of Google and Facebook’s advertising revenue to see this fact illustrated profoundly:

![Google's ad revenue from 2001 to 2016](https://www.statista.com/statistics/266249/advertising-revenue-of-google/)

Figure 1: Total Google ad revenue

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As the above figures demonstrate, over the past few years, Google and Facebook have experienced tremendous growth in ad revenue. Google’s 2016 ad revenue of $79.38 billion is larger than the total cryptocurrency market capitalization of $62.25 billion as of May 18th, 2017. These charts provide data through 2016, and the upward trend is projected to stay strong in 2017. The firm eMarketer projects ad spending will increase 32.1% this year on Facebook, 14.8% this year on Google AdSense, and digital ad spending as a whole will jump 15.9%. The digital advertising market appears healthy and robust, with further growth in store as the global population continues to increase and more humans obtain Internet access.

The closest analog to Qchain within Google’s advertising business is the Google AdSense model, where publishers join the AdSense network as Google Network Members and Google serves as the host and distributor of their ads. As can be seen in Figure 3, ad revenue from Google Network Members’ websites is thriving, with revenue from this division occupying a substantial chunk of Google’s total earnings at $15.6 billion, while showing a very healthy rate of growth to boot.

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Additionally, Google itself reports that the total number of ad clicks across its network websites increased by 10% year-over-year from Q1 2016 to Q1 2017. The magnitude and trajectory of both Google’s own revenue and that of its Network Members indicates a prime growth market with room for smaller competitors, such as us, to innovate in the space as well as claim market share.

It is here where Qchain has a chance to shine right off the bat. Our focus will be different from Google’s and significantly more personalized, prioritizing the transacting parties instead of the middle man. In addition to offering a better value proposition for advertisers and publishers, we will facilitate more direct relationships between advertisers and publishers. On our marketplace, advertisers will be able to individually see the websites they can advertise from. Advertisers and publishers will also be able to directly message each other. Thus, in our initial rollout, we opt to trade blind efficiency in favor of transparency, as opening communication channels between advertisers and publishers forwards our goal of empowering and strengthening their relationships and facilitating faster feedback between the two parties.


2.3 Addressing the Publisher’s Dilemma

One of the greatest challenges for publishers in the Internet era is achieving a balance between delivering quality content with a positive user experience and maintaining a sufficient and sustainable revenue stream. In most cases, it is now obligatory for online publishers to run large volumes of ads in order to receive enough revenue to continue their operations. Unfortunately, they are currently given insufficient control over what advertisements are served, which often negatively impact the user experience and egregiously violate the privacy of website visitors, going against the desires of both publishers and their audiences. This dilemma has inevitably manifested in the widespread use of ad-blockers.

However, this is a completely unnecessary problem as well as one with straightforward solutions. Simply, advertisers should have precise control over where their ads are targeted, and publishers should have precise control of exactly what ads are displayed alongside their content. Publishers do not want to alienate visitors with poor ads. On the flipside, advertisers want to ensure that ad space they are paying for is not being directed at demographics who are uninterested in the first place.

This leads us to one of the primary draws of the Qchain platform: it gives back control to advertisers and publishers. This allows advertisers to direct ads to the right audiences and publishers to ensure that ads are context-appropriate and do not degrade the visitor experience. When ads are appropriate and useful, content consumers are simply not incentivized to avoid ads like they are now. This is demonstrated clearly by the success of devices like the ad-supported Amazon Kindle with Special Offers⁸. The fact is that when well-targeted and value-added ads are presented in a non-intrusive way, audiences not only tolerate them but may also like them because they enrich the user experience.

We foresee our publisher clientele to initially be content networks, forums, and blogs – the kinds of websites that have loyal and dedicated followings, which should help advertisers build up more engaged and enthusiastic customer bases through better introductions from publishers. An example of the kind of website that we would love to see adopt our service is the blog Slate Star Codex (no affiliation with Qchain currently), which has built up an active and loyal following through its intellectually engaging and original content that focuses on topics ranging from artificial intelligence to effective altruism. The companies and institutions advertising on SSC display ads that integrate smoothly with the website. They pitch products that are highly relevant to the recurring themes in SSC’s posts and the interests of the technologically savvy and intellectual readership. SSC’s writer, who goes by the pseudonym Scott Alexander, personally introduces each of the ads. Thus, the ads end up complementing the content of website, rather than detracting from it as a distractor.

While publishers like SSC occupy a small amount of real estate on the web, even a small

slice of Google Network’s revenue represents significant earnings. For example, just 0.1% of the Google AdSense Network’s $15.6 billion revenue represents a very sizable return, and collectively, smaller websites represent an appreciable portion of ad publishers. Prefacing the rollout of our product, we will reach out to and get in touch with blogs like SSC to try our product. This would serve as a great start for Qchain and prime our application for expansion.

2.4 Competition

A few other projects related to blockchain advertising have also been announced. Such competitors include Brave Software’s Basic Attention Token (BAT), Synereo’s Qrator, and adChain. To be clear, we are not worried about sharing this space with other platforms. We welcome the addition of other applications, particularly if they enrich the blockchain ecosystem as a whole and provide users with more control and options to best suit their needs. Especially in this rapidly growing market and technology sector, there is room for multiple startups, and we can all learn from each other as we grow.

In day-to-day usage, our application is more akin to Google AdSense than to the aforementioned blockchain startups. Our goal is first and foremost to facilitate ethical, personalizable, and trustless transactions between advertisers and publishers. We aspire to provide the same practical convenience that Google AdSense offers without prompting parties to change fundamental parts of their toolchain such as browsers or server infrastructure and use unfamiliar tools that introduce a steeper learning curve. We are focused on proving ourselves to advertisers and publishers and establishing a network and ecosystem from which we can swiftly expand, and in the process, return control of revenue, content, and user engagement to advertisers and publishers.
3 Advantages of a Decentralized Platform

3.1 The Value of Decentralization in an Advertising Context

More and more, our global economy seems to be dominated by monopolies and monoliths. Our disparate industries are dominated by a small collection of familiar names: Comcast, Disney, AT&T, Google, Amazon, and the like. These large conglomerates have created an environment where we consumers have to depend on their products and systems and have little recourse for alternatives in case of central failure. The desire to resist the consolidation of the global economy by central agents, be they corporations or governments, is certainly one of the factors driving the meteoric rise in the use and adoption of cryptocurrencies and blockchain technologies by people around the world. The drive for decentralization has unified people across the spectrum of creed, culture, and class.

However, the word and concept of decentralization have also become neutered and obscured as more players flock to cryptocurrency for its returns and profits. Decentralization has quickly become a buzzword that is mentioned in association with every product and application being launched in the cryptocurrency space. Hence, before we speak further on it, let us specifically define our usage of the word: we define a decentralized software as a piece of technology that cannot be shut down by a single agent participating in the space.

In the following sections, we will demonstrate our application’s merit as a true representative of decentralization, and that it will be difficult for any single agent (even us) to globally stop or cripple the application once we have set things in motion. For application development, we concede that there are tradeoffs for skewing towards either direction on the decentralization/centralization scale. There are benefits to centralized features, which could include convenience and simplicity, and it is impossible for any application or technology to be platonically decentralized at every feature and facet. But in the case of digital advertising, we certainly believe the advantages of emphasizing decentralization outweigh the disadvantages for the publisher and advertiser.

3.2 Freedom, Flexibility, and Bargaining Power

One of the general advantages for a decentralized and distributed system is that rather than consolidating freedom and flexibility of actions to the whims of a single, central agent, it allots those qualities to all agents participating in the system. This generality extends to the digital advertising system. In the Google AdSense network, Google, the single middle man, holds the vast majority of the negotiating power. Google can increase fees, deploy intrusive data-collecting code, and renege on terms in a manner that is detrimental to publishers and advertisers on their network with little fear of effective resistance. A collaborative boycott by a majority of publishers and/or advertisers would possibly have an effect, but the sheer scale of the network and lack of alternative revenue sources makes such an action prohibitively
difficult to coordinate.

An adverse outcome of unbalanced man-in-the-middle (MITM) dominance for other agents was demonstrated recently when YouTube (owned by Google, of course) abruptly and opaquely tightened its conditions for monetization of videos by content publishers in March of 2017. Google had received some complaints from some of its larger conglomerate advertising clients, including AT&T and Verizon, that their ads were being matched with racist content. Google responded with a heavy hand and introduced stronger filters for advertisers that would prevent their ads from being displayed alongside videos deemed by an algorithm to contain hate speech content. However, the algorithm ended up flagging and demonetizing many videos that did not stray foul of YouTube’s updated hate speech prevention content guidelines. A number of independent content publishers who depended on YouTube ads for their salaries suddenly found that they could no longer receive enough ad revenue to cover their livelihoods because of the algorithm’s decision. To date, there has been little recourse to the affected video publishers. Google has released few details about its hate speech filtering process and has given publishers no opportunity to appeal their demonetization. As a result, many of them have had to consider career changes that they were unprepared to make.

Thus, one of our goals with Qchain is to distribute the control of capital flow in digital advertising so that no single agent or class of agent can dominate the ecosystem. Relaxation from single-agent control redistributes freedom, flexibility, and bargaining power to individual agents and enables smaller-scale negotiation between those individuals. Individual agents can then spend their time and attention on defining tailored deals with each other, rather than worrying about struggling under one-size-fits-all agreements that apply indiscriminantly to whole classes and can change without a moment’s notice. We outline some of the redistributed advantages and added bargaining options that advertisers and publishers will enjoy from using our software over an MITM application like Google AdSense.

For advertisers, advantages will include:

- greater control over the content and websites that ads are displayed with
- greater control over the amount paid per action (CPA), click (CPC), or impression (CPI) in a certain contract
- increased freedom of contract structures to allow greater variability in payment conditions (i.e. advertisers would be able to demand payment after a combination of action, click, and impression counts from a publisher’s site has been met)
- increased freedom of contract structures to allow greater variability in payment conditions (i.e. advertisers would be able to disperse payment after a combination of action,
click, and impression count from a publisher’s site has been met)

• reduced exposure of their revenue and click data to an MITM agent

• increased ability to break contracts and pull their ads from websites without needing to wait for intervention from an MITM agent

• increased freedom of content delivery mechanisms and hosting preferences

• the lack of minimum investments and deposits for ad campaigns

• the ability to hold and maintain control of payout capital in personal storage mechanisms free from the prospect of MITM seizure

For publishers, advantages will include:

• increased payouts from reduced fees

• the lack of a lengthy verification and content approval process from an MITM that may result in days of missed revenue

• the ability to transfer payouts with quicker turnaround times directly to personal storage mechanisms without having to wait on a central MITM agent

• the ability to exit a single contract from a single publisher without severing an entire central source of ads

• more versatility and command over the kinds of ads they can choose to host (e.g. text ads, display ads, native ads, or a combination of the three)

• increased authority over the sourcing of ads displayed alongside their websites and content

• reduced exposure of their visitor data for collection by an MITM

Advertisers and publishers will share the advantages of having access to greater control and flexibility of dictating contracts, faster transactions, improved privacy, increased protection from system-wide censorship, and guaranteed freedom from the opaque whims of an MITM agent in the decentralized digital advertising environment that Qchain will provide. We are confident that decentralization will increase peace of mind for publishers and advertisers.
4 The Direct Buy Application Architecture

4.1 A Unified Interface

The Qchain web application will have a straightforward and unified interface for publishers, advertisers, and hosts. As eBay allows an agent to be both buyer and seller, Qchain will allow an agent to be both publisher and advertiser. An accessible navigation menu within the interface will allow agents to navigate seamlessly between publisher, advertiser, and host functionality of the application. The publisher section will list and sort the active and expired smart contracts in which the user is serving as the publisher. It follows that the advertiser section will list and sort the active and expired smart contracts in which the user is serving as the advertiser along with information detailing total and remaining payout capital balances per contract. In either case, parties can access summary statistics for their contracts and detailed analytics regarding their payments and payouts. Within the publisher and advertiser sections, a simple toggle selection will allow publishers and advertisers to switch between interacting on the Ethereum or NEM blockchains. Located underneath the tabs to access the advertiser and publisher interfaces will be the button to access the smart contract marketplace, where advertisers and publishers list and solicit their offers and proposals.

Figure 4: Easily switch between Ethereum/NEM and advertiser, publisher, and host modes
4.2 Smart Contract Marketplace

Qchain will launch with an advanced and augmented direct buy marketplace. For the marketplace, we take inspiration from Craigslist. Advertisers and publishers will be able to view and filter from a database of available offers, solicitations, and proposals from each other to open negotiations. To allow advertisers and publishers to easily find each other, there will be separate advertiser and publisher subsections within the marketplace; publishers can search specifically for ad content, and advertisers can search specifically for places to display their content. Advertisers will be able to sort publishers by the specific thematic content of the publishers’ website (e.g. American politics or computer science), the type of website (e.g. blogs or forums), and the type of ads publishers are accepting (e.g. banner ads or text ads and display ads or native ads). So, for example, advertisers will be able to filter offers to find all specific ones from blogs that cover environmental issues and are looking for banner ads. Similarly, bloggers will be able to search for all advertisers that are asking to display ads within, say, posts about renewable energy, and then bloggers will be able to adjust their content accordingly to appeal to the offer. Additionally, both advertisers and publishers can specify parameters such as the timespan, price range, and price cap of a desired contract. Once an interested advertiser or publisher has selected an offer listing, they will be able to directly message the other party through the app to gauge interest and begin negotiations. Of course, for advertisers and publishers looking for maximum simplicity, one will also be able to use our automatching functionality. Through this function, advertisers are automatically paired with publishers if they have both submitted contract requests with compatible terms (e.g. content genre, ad type, and price range), without having to engage in any negotiations.

4.3 Network Security

To ensure the integrity of executed code and transferred data, contracts between advertisers and publishers are verified by a pool of randomly selected hosts. The host network is inherently a massively distributed system with automatic failover. This not only makes it robust to occasional hardware failures of a host, but also provides a layer of protection against denial-of-service (DoS) attacks, which are becoming an increasing concern on the worldwide web. This is critical because it protects advertisers and publishers from malicious parties that may wish to suppress unpopular speech or speech that they disagree with.

It is highly unlikely that a malicious or compromised host could compromise the integrity of the data or token transactions. There must be consensus between hosts in a pool to disburse tokens for a contract, and hosts confirm each other using cryptographically secure verifications of transferred data. In order to inaccurately report on a contract, a pool of randomly selected and anonymous host nodes must be compromised in its entirety by a single bad actor.
Additionally, because advertisers have the option to route their ads through the physical content servers of their choice, they can personally ensure that the robustness of their content serving mechanism is to their standards and satisfaction. For example, an advertiser wishing to run ads in China without devoting substantial resources to building out overseas infrastructure could simply establish a contract with Chinese publishers and host their ads on Cloudflare, while taking advantage of Cloudflare’s esteemed DoS protection and extensive content delivery network within China.

4.4 Host Reliability

To ensure that the network maintains reliable uptime, all hosts within a pool will ping each other to mutually check that they remain online by measuring packet loss. For high value or critical ad contracts, advertisers can specify service level agreements (SLAs) with respect to the uptime of nodes managing their content, and hosts will check each other to verify if they are meeting their SLA obligations. Hosts that fail to meet these SLAs will have their commissions deducted according to the contract’s specified penalties for failing to meet the terms of an SLA. The payout structure of an SLA-enabled contract is therefore as follows:

\[
\text{Payment to Publisher} = (1 - \text{Commission}) \times \sum_{\text{ad types}} \text{Count} \times \text{Cost}, \tag{1}
\]

\[
\text{Payment to Host} = \text{Commission} \times \sum_{\text{ad types}} \text{Count} \times \text{Cost} - (\text{Performance}_{\text{SLA}} - \text{Performance}_{\text{Measured}}) \times \sum_{\text{ad types}} \text{Credit}. \tag{2}
\]

This ensures the performance and accountability of the host network. The minimum for a payment to a host is 0, so SLA penalties cannot make a host’s balance negative. If a host does not meet the SLA for 48 hours, it is removed from the pool and replaced by a different randomly selected host satisfying the contract criteria.

4.5 Platform Scalability

Qchain’s back-end architecture is fundamentally designed for effortless scalability from individual virtual server instances to massively distributed cloud infrastructures, and everything in between. Our software is built from the ground up to be portable and efficient, such that smaller scale advertisers, publishers, and hosts do not need to invest in propriety or exorbitantly priced hardware and the staff to administrate it. Additionally, we are developing Qchain with deployment to cloud computing providers in mind (in fact, our prototypes are running on Amazon Web Services). This allows parties to leverage the extensive cloud in-
frastructures of companies like Amazon, Google, and Microsoft, without having to relinquish profits, control, and privacy.
5 Direct Buy Application Roadmap

January 2017  Qchain is founded

March 2017  The Core Team is assembled

October 2017  Phase I: Alpha Release
   In preparation for our token launch, we will release the first demo of our product (codename Bighorn) for user testing and feedback. It will contain many of the features we intend to have in our production release.

Fall 2017  Token Launches on NEM and Ethereum blockchains
   We will launch our XQC token on the NEM blockchain and ERC20-compliant EQC token on the Ethereum blockchain in a crowdsale to accelerate development of Qchain.

Q4 2017  Phase II: Beta Release
   Following user comments and suggestions, we will roll out our beta release (codename Ibex) that integrates with test networks for further rigorous testing and review.

Q1 2018  First Production Release
   In concert with corporate and blogging partners, we will roll out public blockchain transactions coinciding with the release of the first fully functional version of the application (codename Condor).

Continued development and expansion of rollouts
6 The Qchain Personal Data Management and Marketplace Application

The Qchain Personal Data Management and Marketplace (PDMM) application will revolutionize how everyday Internet users and marketing and advertising firms transfer and interact with user data. The application will give Internet users the ability to tokenize and permissionize their own data online, transforming the concept of digital data ownership and essentially allowing users to serve as their own data brokers. Users will be able sell data that they are comfortable with sharing via instantaneous auctions to marketing and advertising firms. Meanwhile, marketing and advertising companies will benefit from having access to an ethical avenue for purchasing and collecting data that users have openly shared. Furthermore, advertisers and marketers will be able to save costs by reducing the need for middlemen data management platforms (DMPs) to harvest and acquire second and third-party data at the behest of those companies. In short, the PDMM application will provide mutual benefit for Internet users and marketing and advertising companies. Functionality for the PDMM application will be integrated with our paid survey and DSP advertising applications.

6.1 Application Front End

As is the case for Qchain’s other applications, the user data marketplace application will first be developed and released as a desktop-only web application. A mobile application may follow later if market conditions deem one appropriate. To access the PDMM application, the Data Seller or Purchaser will visit Qchain’s homepage, www.qchain.co, and then move their cursor to the login field.

Accounts from Qchain’s other modules will not carry over to the PDMM application. If the user has not registered for the PDMM before, they will be prompted to register as a Data Seller or Data Purchaser. Separate registrations and accounts will be necessary is someone wants to both serve as a Data Seller and institutional Data Purchaser. Data Purchasers have to go through additional Know Your Customer (KYC) registration steps to demonstrate that they are legitimate institutions and corporations and not random individuals. Some centralization is necessary here to guard against bad actors.

After registering and confirming their accounts, Data Sellers and Data Purchasers will log into different front ends. Data Sellers have three tabs on their menu bar, Profile, Auction, and Settings. After login, the Data Seller will be transferred to the Profile tab of the Data Seller front end to fill out, edit, and manage their profiles. The Data Seller profile management and data entry screen will appear like a more minimal version of a social media profile in terms of the fields to fill out. Data Sellers will be able to list the their date of birth, present occupation, educational background, present address, favorite sports teams, relationship status, and other personal details. We will provide an extensive and continuously
growing list of organized and clustered fields for people to input personal details into that they are willing to share.

Data Sellers will also be able to check boxes that launch them into steps to provide their variable data, such as location by mobile phone. Constantly updating location data may perhaps be of greatest interest to advertisers working on behalf of retail clients, or retailers themselves. Data Sellers may also like the constant revenue stream they get from retailers paying for constant updates to their location.

Except for name, all fields are optional. (However, a Data Seller will probably not be able to get bids for his or her account without any details.) After filling out their profile, Data Sellers navigate to the Auction tab to manage their auction preferences, such as duration of availability and minimum bid, and initiate the auctioning of their profile data. In the Settings tab, Data Sellers can change their cryptocurrency account addresses, password, and the like.

Data Purchasers have four tabs on their menu bar, Users, Bidding, Data, and Settings. After login, Data Purchasers are transferred to the Users tab, where they set and determine the kinds of Data Seller profiles that they are seeking to acquire. It is in this tab that Data Purchasers create and encode their search nets for marketplace listings. To create a search net, Data Purchasers will click a plus icon (likewise, they can remove search nets by clicking a minus icon, and edit existing search nets by clicking a pencil icon). After clicking the plus icon, Data Purchasers will then be prompted to dictate filters for the particular search net by selecting from dropdown menus for responses corresponding to categorically sorted fields (such as gender and employment status), adjusting sliding bar ranges for responses corresponding to numerical fields (such as age), and listing desired keywords in boxes corresponding to free response fields. In the Bidding tab, Data Purchasers view a list of their search nets with options below each search net entry. Purchasers can see whether a search net is actively capturing profiles to bid on and manually turn nets on or off. Additionally, they can set a duration of time for which they would like the net be active until a certain amount of profiles have been acquired. Purchasers also set their maximum bid for each entry. To access the unencrypted profiles they have acquired, Purchases will navigate to the Data tab. Cursory plotting and statistics based on population data for each group of profiles will be available from the Data section. Purchasers will be able to export data archives for further processing and analysis. Archives will be grouped and separated by search net. In the Settings tab, Data Purchasers can change their cryptocurrency account addresses, password, and the like.

6.2 Data Seller Profiles, Permissioning, and Auctions

Data Seller profiles are the basic item being sold in the personal data marketplace. We will initially only support profiles for humans, but will roll out support for institutional and
organization profiles in the future. We also envision that the PDMM will eventually offer other data structures down the line. When users fill out profile, they list not only data they are selling, but also have the option of listing data from life domains that are off limits to them. Hence, when advertising and marketing firm purchase a profile, they are not only buying data, but are also receiving of set of permissions of data they are allowed to work with from customers, and data that is off limits.

Data Sellers can elect to receive EQC, XQC, or both for their auction and set the period of time during which their profile data is active on the Marketplace and available for auction. Their profiles can be automatically and continuously re-auctioned after a successful auction completion until the period of availability concludes. A summary workflow that a Data Seller goes through to auction their profile data is as follows:

1. The Data Seller is shown the profile tab of the application front end after log in. He or she then is prompted to fill out or update a profile with data from life domains that they are willing to sell. He or she also then also implicitly dictates life domains that are off limits to data collection but not filling in certain fields.

2. The Data Seller navigates to the auction preferences tab in the interface. There, they select their preference to receive EQC, XQC, or both for auctions of their profile data and set the minimum threshold for a Data Purchaser to win their auction if there is no Purchaser competition for the profile. The Data Seller also sets the duration of time for which their Data Profile is available in the Marketplace, awaiting bids. The Data Seller can also choose to blacklist certain Data Purchasers.

3. Once Data Seller starts the auction of their profile, it becomes available in the marketplace for Data Purchasers to bid on. Algorithms will allow Data Purchasers to immediately detect profiles entering the marketplace that fit their demands.

4. Whenever an auction is instantaneously resolved with a successful sale to a Data Purchaser, it is returned to the marketplace for a new round of bids from Data Purchasers that did not succeed in winning the auction in the first go-around. The Data Seller can also choose to only auction their data once or a limited number of times.

5. Upon conclusion of an auction, Data Sellers will instantly receive token transfers from the accounts of Data Purchasers to their own accounts.

6. When the number of auction rounds for a Data Seller profile has reached the maximum number of rounds specified by the Data Seller, or has reached the end of the duration of time specified, the Data Seller’s profile will be removed from the marketplace.

7. The Data Seller can choose to leave his or her profile active on the Marketplace indefinitely without updating it. However, Data Purchasers will be able to filter out
profiles that have not been updated in periods of time, and will likely choose to bid lower amounts for inactive profiles or avoid them entirely.

Data Seller profile data are stored in an encrypted format (we will look to SpiderOak One, SpiderOak’s cloud storage platform, as an inspiration for secured and encrypted data storage) that people within the Qchain organization cannot decrypt or access for security. In fact, when a Data Purchase wins an auction, what they are specifically purchasing is the privilege of gaining access to a Data Seller profile’s private key, and then decrypting that profile. Each time an auction ends, the Data Seller profile data is re-encrypted with the generation of a new private key to await the next round of bids. The encryption algorithm to be used is yet to be determined and will be settled at a later date.

6.3 Automatic and Instantaneous Data Purchaser Bidding

We observe examples of ad and media exchanges that form the backbone of the programmatic marketing, advertising, and media buying flow, and note the exchanges would not be able to function without real-time bidding (RTB) algorithms that allow for the instantaneous resolution of auctions for impressions for the sake of convenience, efficiency, and scalability. Similarly for Qchain’s Personal Data Marketplace, manual listing-by-listing bidding of profiles would be useless for the marketing and advertising firms comprising data purchasers, who are almost always looking to buy profiles at a bulk scale. It is clear that Data Seller profile auctions must be automatically and instantaneously resolved, as they are on programmatic ad exchanges.

For those less familiar with RTB, we will draw some parallels to EBay’s semi-automatic bidding process to describe our automatic bidding implementation. A buyer in EBay can input a highest price threshold that they are willing to pay for an auction listing into a bid field, and then Ebay will automatically raise their bid against the bids of others in default increments until other bids have exceeded that threshold. One can place in their maximum bid and then check EBay again after the auction has concluded to see whether or not they have won without any manual action in the middle. Of course, the initial bid for an item still has to be manually initiated on EBay (without the assistance of a third party bot).

In comparison to EBay’s semi-automatic bidding, bidding in Qchain’s PDM moves towards increased automation. Manual searching and bidding for individual profiles is eliminated to save valuable time for data purchasers such that they are freed from listing-by-listing profile scouting and the monitoring and micromanagement of auctions. Data purchasers automatically bid on any Data Seller profile being auctioned that are captured by the profile search filters specified in the purchasers’ preference settings.

For further clarity, we outline the specific steps that a Data Purchaser follows to bid on available Data Seller profile auctions in the marketplace:
1. The Data Purchaser registers for use of Qchain’s PDMM application with its company details and is approved.

2. It provides necessary financial information in its profile, including its cryptocurrency account addresses and budget.

3. The Data Purchaser defines the groups of profiles that it will filter and place automatic bids for in its preferences. For example, the Data Purchaser can cast nets for Data Seller profiles of female Brazilian Jiu Jitsu practitioners from New York City accepting XQC that have been recently updated. The Data Purchaser can define multiple group search nets that are simultaneously active. Search nets can be narrower with more filters, or wider with fewer filters.

4. The Data Purchaser sets maximum profile bid amounts per search group. Maximum bids can be given as EQC or XQC amounts. Setting a maximum threshold of 0.5 XQC for female BJJ practitioners from NYC would indicate that the Data Purchaser is willing to pay up to 2.0 XQC (not including fees) for profiles fitting that group.

5. If one Data Seller profile auction qualifies for capture by multiple Data Purchasers, the Data Purchaser with the highest maximum threshold bid will instantaneously win the auction at an amount that is no more than 10% above the second highest bid. If there is no competition for bids, the Data Purchaser will win a Data Seller profile auction at the minimum value dictated by the Data Seller.

6. Upon completion of a Data Seller’s auction, the Data Seller will be notified of the Data Purchaser that has purchased his or her profile.

7. The Data Purchaser defines the active periods of time during which its various search nets are active. It will then bid on all available profiles fitting its search net(s) during those periods of time.

8. Until the span of time expires, budget is drained, our source account is drained, the Data Purchaser continuously bids on available profiles in the marketplace. We will ensure that duplicate bids for Data Seller profiles that have re-entered the marketplace will not be made.

9. Data from purchased auctions will be automatically organized into separate downloadable collections corresponding to the various desired profile groups. The file format for those data collections has yet to be decided, and we will consult marketing and advertising firms for that decision.
6.4 Data Seller Profile Validation and Qualification

Data Sellers can contribute junk data, but at their peril. Some self-regulation built into bidding system. If users sell junk and unverified data, they will likely get lower or no bids. This is where centralization is necessary. Data Sellers can provide evidence and some validation for their data. They can link to Facebook, Twitter accounts, and upload documents and screenshots for a pass at substantiation. Data profiles are then flagged as having evidence to various degrees, corresponding to how much of their data they have validated during auction. Obviously, Data Purchasers do not have access to pieces of validation and evidence for a profile, until they have won an auction for that profile. If Data Seller profile not updated in a while, this is also noted. Data Purchasers can filter for Data Seller profiles flagged as updated within the last week, month, or year automatically as part of their preferences that is then deployed in their search net.

6.5 The PDMM Vision

The creation and deployment of the PDMM is obviously a very lofty and ambitious goal that must be executed in steps. We will begin by focusing on implementing the ability for Data Sellers to sell their location data, since we feel that will be of more immediate use and interest to advertising agencies who have retailers and clients (which is a lot of agencies) and retailers themselves.
7 PDMM Application Roadmap

August 2017
Blockchain-based personal data management and marketplace application concept is conceived.

Fall 2017
Qchain launches EQC and XQC tokens powering its marketing and advertising ecosystem in a token sale.

February 2018
Alpha Release (Codename: Zhang Jiao)
We will launch a demo that will showcase many of the features in our eventual production release. This demo will contain testnet functionality for both the NEM and Ethereum blockchains.

Q2 2018
Beta Release (Codename: Dong Zhuo)
Following feedback from our alpha, we will then release a demo that approaches our production release. An application of this scale and requires thorough testing. We will invite advertising and marketing partners at this stage to use and explore our application for further guidance and feedback.

Early Q3 2018
Beta II Release (Codename: Yuan Shao)
We intend this beta release to be close to production ready. It will contain all of the features that will be included in our first production release. The priority of this release will be to uncover remaining critical bugs. Bug bounties will implemented to motivate additional third party testing.

Later Q3 2018
Production Release (Codename: Lu Bu)
After vetting by users and our corporate advertising and marketing partners, we will deploy our first production release of the PDMM application on the Ethereum and NEM blockchains.

Future updates and production releases
8 The Qchain Demand Side Platform

The Qchain demand side platform (DSP) will be a significant expansion of our direct buy application. The first rollout of the Qchain DSP will resemble traditional DSPs in structure and reliable function for advertisers looking to purchase ad units from content creators. We will facilitate the offering and auctioning of not only website display ads, but also video, podcast, native, and mobile app units with the use of our tokens.

Issues of trust, transparency, and openness have long hounded traditional DSPs. Hence, we will differentiate ourselves from traditional DSPs by offering dramatically increased transparency to our users that is made possible by the deployment of our infrastructure on blockchain technology, which allows for the public ledging of advertiser and publisher and supply side platform (SSP) transactions. Transactions will be openly documented and easily searchable, such that advertisers can have a clear sense of how their advertising spending is being partitioned, and publishers can easily track the fees and costs that were deducted to result in their final payout. The accessibility of a public ledger will also allow for easier detection and policing of ad fraud instances by third parties.

Our plans further down the line involve introducing another agent into the ad exchange ecosystem – the everyday Internet user. We intend to incorporate a personal data marketplace where Internet users can directly sell data they are comfortable sharing to advertisers. This will bring mutual benefit to both advertisers and users. Advertisers will be able to ethically access up-to-date consumer data and serve more relevant and attention-grabbing ads, while users can monetize and explicitly permissionize their data. To specifically benefit publishers, our plans also include research and development of SSP services, such as machine learning and statistical algorithms that more efficiently bundle together ad units from a range of publishers and content creators to serve and appeal to advertisers.
9 Tokens and Crowdsale Financing

9.1 Token Allocations

The Ethereum Qchain ("EQC") and XEM Qchain ("XQC") tokens will be used to engage in transactions and access the services on the Qchain application. The EQC token will be ERC20-compliant. A static maximum amount of 125,000,000 tokens will exist for each blockchain after the respective Ethereum and NEM token launch crowdsale, such that there will be a total maximum of 250,000,000 tokens. The crowdsale will be targeted for commencement in late summer or early fall. The allocation of our tokens is presented in the following figure. The proportions will be equivalent for both XQC and EQC token launches.

- 60% of our tokens will be sold in the crowdsale.
- 15% will be earmarked for use in bounties and promotions. Promotions will be used to introduce publishers to our platform to kickstart our adoption.
- 10% will be saved as a contingency reserve in case recovery from an emergency is necessary.
- 15% will be held by the founders and team to be used in the Qchain ecosystem or serve as an additional contingency cache.
9.2 Crowdsale Allocations

The crowdsale will be used to cover our development and infrastructure costs and to invest in a larger team to rapidly expand the capabilities of our project. The crowdsale launch date is slated to start on October 24th, 2017 at approximately 9:15 PM GMT and run for the following 35 days before ending on December 5th at 9:15 PM GMT.

Figure 6: Expected Crowdsale Allocations

- 44% of the funding will be used to compensate team members and incentivize for continued development.
- 20% will be used to hire more developers to support accelerated advancement of our application.
- 11% will be invested in research and development and technological infrastructure costs, such as server expenses.
- 10% will be held as a contingency reserve.
- 5% will be used to cover the costs of our physical working environment.
- 5% will be invested in expanding our marketing capabilities by hiring additional marketers, product ambassadors, and community managers.
- 5% will be reserved for legal costs and counsel.\(^\text{10}\)

\(^{10}\)These figures are based on current estimates and may change over time. The percentage for legal fees could increase if the regulatory environment changes.
9.3 Crowdsale Structure and Details

- A directory of the main website will be created at qchain.co/crowdsale with instructions for participating in the token launch once dates have been announced.

- For the EQC portion of the crowdsale, only Ether (ETH) will be accepted. For the XQC portion of the crowdsale, only XEM will be accepted.

- Contributions will be sent to two multisignature wallet addresses, one for ETH and one for XEM.

- A hard cap maximum of 75,000,000 EQC and 75,000,000 XQC tokens will be sold for each crowdsale, representing 60% of the respective supply for each token.

- The minimum threshold to be met for the ETH portion of the crowdsale is 1000 ETH. The minimum threshold to be met for the XEM portion of the crowdsale is 100,000 XEM.

- The amount of EQC or XQC tokens ultimately sold will represent 60% of the total respective EQC or XQC supply.

- There will be a 15% token bonus for participating within the first three days of the crowdsale, a 7.5% token bonus for the following week (seven days), and a 4% bonus for the next ten days thereafter. After the first 20 days of the crowdsale, there will be no more token bonuses.

- The crowdsale will run for 42 days, or until the entire token supplies are exhausted, whichever occurs first.

- Tokens will be created prior to the commencement of the main crowdsale, and tokens will be transferred to contributor accounts after their contribution is received.

- Untransferred tokens from the initial supply not purchased during the crowdsale will be burned.

- The XQC to XEM exchange rate will be at 4 XQC per 1 XEM. The EQC to ETH exchange rate will be at 4000 EQC per 1 ETH.

- The code for the crowdsale will undergo testing and audit by the Ethereum smart contract development firm Zerion and core NEM developers before launch to ensure the security and integrity of the code.
• Residents from the US State of New York and OFAC-sanctioned countries\(^\text{11}\) will not be allowed to participate in the crowdsale. Thus, IP addresses from countries sanctioned by the US Office of Foreign Assets Control (OFAC) will be blocked from participating the crowdsale interface, and contributors from New York State will be blocked at the KYC level. The OFAC-sanctioned countries to be IP-banned are as follows: the disputed Crimean region, Cuba, North Korea, Sudan, and Syria.

10 Team

The team is encompassed of a growing number of scrappy and resourceful individuals who excel at multitasking, persevering under pressure, and coming through on tight deadlines. Most team members are also skilled programmers with development experience, which will translate to greater team efficiency and productivity. With their multifaceted and complementary skillsets, they are committed to delivering a useful and high-value product that lives up to rigorous enterprise standards. The team follows the ethos of open-source development and vows ethical conduct.

Wally Xie, Co-founder and Chief Executive Officer

Wally has a diverse background that includes vast experience in digital advertising, data analysis, and software development. He has previously worked at several media production and technology companies, including the prominent Chicago startup Sprout Social, where he honed his knowledge and acumen of the digital marketing and advertising. He has also served as a researcher at the United States National Institutes of Health, where he developed software to analyze medical data using cutting-edge statistical algorithms, and is currently pursuing a PhD in mathematical biology at the University of California, Irvine that examines the impact of global warming on soil microbes with climate models and Bayesian inference methods. He combines practical business experience with rigorous analytical insights, which primes him for his role as director of Qchains operations.

Roy Zhao, Co-founder and Chief Technology Officer

Roy has an extensive background in scientific research and software development, with expertise in high-performance and distributed computing and mathematical modeling. He has also served as a financial officer and marketing analyst in the software and education sectors. He has managed software infrastructure, led advertising and fundraising efforts, and conducted novel research at a combination of startups, large organizations, and top-ranking universities, such as Chicago Public Schools, Mac Mix, and the University of Chicago. Additionally, he is presently pursuing a PhD in mathematical biology at the University of California, Irvine, and is a National Science Foundation Graduate Research Fellow. With his broad experience across a range of disciplines and in-depth computing expertise, he is well-poised to lead Qchains technical operations.

Angela Wang, Chief Content Officer

Angela is a writer and multidisciplinary artist with a wide spectrum of professional media experience. She formerly worked at BuzzFeed in New York, serving in roles on both the editorial and business teams. She currently works as a Senior Writer at Gizmodo’s in-house creative agency by day and as a freelancing writer by night. Her pieces has appeared in numerous publications, such as Atlas Obscura, Hyperallergic, Paper Mag, Brooklyn Magazine, and Vice. Her many interests include making blockchain technology accessible and
comprehensible to wider audiences and creating innovative digital art that inspires people to think about the consequences of climate change.

**James Rathmell, Vice President, Business Development**

James has spent years working with companies in emerging industries on operational and regulatory issues. Last year, he worked with the Coinbase legal team for a summer, and most recently, he was a Privacy Fellow at 23andMe. Before that, he was Chief of Staff at urban agriculture startup Lufa Farms, where he streamlined operations, built out business development, and oversaw the company’s growth from 25 to 100 employees. James is currently pursuing a JD/MBA at Stanford Law School and Stanford Graduate School of Business. He brings to Qchain a passion for blockchain technology and a deep understanding of this emerging industry.

**Shiva Kandaswami, Full-stack Developer**

Shiva is a versatile full-stack developer with considerable experience building software, web applications, and machine learning tools across a multitude of domains and languages. He has a keen interest in learning and using new technologies and applying them to novel use cases. He has experience building responsive front-end applications, APIs, and robust and reliable back-end systems. He also spends time working as a volunteer developer at Code4SocialGood and contributes to several open source projects.

**Lingge Li, Data Scientist and Back-end Developer**

Lingge Li is an accomplished computational scientist and statistician with a broad range of prior experience, ranging from technology startups to expertise in applied mathematics, statistics, and machine learning. In the course of his work, he has developed state-of-the-art innovations in neural networks research. Driven by a passion to revolutionize the Internet with blockchain technology, he brings novel insights with his unique approach to data science.

**Dennis Tomberlin, Vice President, International Community Development**

Dennis is a versatile individual who combines education as a scientific research engineer with rich experiences in the private sector. He has entrepreneurial experience from working as a project manager for several international companies, such as Zwook, Delonatelo, and Soundotcom, and has also acquired a host of technical experience from work in IT. He is captivated by the emergence of blockchain businesses and has re-pivoted towards specializing as a blockchain technology consultant. He brings unflagging enthusiasm for technology and attention to detail to his role as our Russian community manager.

**Xiaoxiao Cheng, Chinese Community Manager**

As Qchain’s Chinese community manager, Xiaoxiao will be working to cultivate interest in the platform in mainland China and to inform potential Chinese investors, advertisers, and publishers about Qchain’s utility. Xiaoxiao brings robust and multi-cultural social media
marketing experience to the table, having served as social media and marketing specialist at several companies and firms in China and the United States.
11 Legal Summary

11.1 Legal Disclaimers

NOT AN OFFER TO SOLICIT SECURITIES AND RISKS ASSOCIATED WITH “EQC” AND “XQC” AND THE QCHAIN APPLICATION

This document is for informational purposes only and does not constitute an offer or solicitation to sell shares or securities in Qchain or any related or associated company. Any such offer or solicitation would only be made by a confidential offering memorandum and in accordance with applicable securities and other laws. None of the information or analyses presented are intended to form the basis for any investment decision, and no specific recommendations are intended. Accordingly, this document does not constitute investment advice or counsel or solicitation for investment in any security. This document does not constitute or form part of, and should not be construed as, any offer for sale or subscription of, or any invitation to offer to buy or subscribe for, any securities, nor should it or any part of it form the basis of, or be relied on in any connection with, any contract or commitment whatsoever. Qchain expressly disclaims any and all responsibility for any direct or consequential loss or damage of any kind whatsoever arising directly or indirectly from: (i) reliance on any information contained in this document, (ii) any error, omission or inaccuracy in any such information or (iii) any action resulting therefrom.

The Qchain token, or “EQC” and “XQC”, is a cryptographic token used by the Qchain application. EQC and XQC is not a cryptocurrency. At the time of this writing, (i) EQC and XQC have no known uses outside the Qchain application, (ii) EQC and XQC cannot be exchanged for goods or services, and (iii) EQC and XQC are not listed on any known exchanges. EQC and XQC is not an investment. There is no guarantee indeed there is no reason to believe that the EQC and XQC you purchase will increase in value. It may and probably will at some point decrease in value. Those who do not actually use their EQC and XQC honestly and fairly may lose their right to use EQC and XQC to those that do use EQC and XQC honestly and fairly. EQC and XQC is not evidence of ownership or right to control. Controlling EQC and XQC does not grant its controller ownership or equity in Qchain, or the Qchain application. EQC and XQC does not grant any right to participate in the control, direction or decision making of Qchain or the Qchain application.
11.2 Legal Disclosures

Last Updated: June 10, 2017

1. **Risk of Losing Access to EQC and XQC Due to Loss of Credentials:** The purchasers EQC and XQC may be associated with a Qchain account until they are distributed to the purchaser. The Qchain account can only be accessed with login credentials selected by the purchaser. The loss of these credentials will result in the loss of EQC and XQC. Best practices dictate that purchasers safely store credentials in one or more backup locations geographically separated from the working location.

2. **Risks Associated with the Ethereum and NEM Protocols:** EQC and XQC and the Qchain application are based on the Ethereum and NEM protocols. As such, any malfunction, unintended function, unexpected functioning of or attack on the Ethereum and/or NEM protocols may cause the Qchain application or EQC and XQC to malfunction or function in an unexpected or unintended manner. Ether, the native unit of account of the Ethereum protocol and XEM, the native unit of account of the NEM protocol, may itself lose value in ways similar to EQC and XQC, and also other ways.

3. **Risks Associated with Purchaser Credentials:** Any third party that gains access to or learns of the purchasers login credentials or private keys may be able to dispose of the purchasers EQC and XQC. To minimize this risk, the purchaser should guard against unauthorized access to their electronic devices.

4. **Risk of Unfavorable Regulatory Action in One or More Jurisdictions:** Blockchain technologies have been the subject of scrutiny by various regulatory bodies around the world. The functioning of the Qchain application and EQC and XQC could be impacted by one or more regulatory inquiries or actions, including the licensing of or restrictions on the use, sale, or possession of digital tokens like EQC and XQC, which could impede, limit or end the development of the Qchain application and increase legal costs.

5. **Risk of Alternative, Unofficial Qchain Application:** Following the Crowdsales and the development of the initial version of the EQC and XQC platforms, it is possible that alternative applications could be established, which use the same open source code and protocol underlying the Qchain application. The official Qchain application may compete with these alternative, unofficial EQC and XQC-based applications, which could potentially negatively impact the Qchain application and EQC and XQC, including its value.
6. **Risk of Insufficient Interest in the Qchain Application or Distributed Applications:** It is possible that the Qchain application will not be used by a large number of businesses, individuals, and other organizations and that there will be limited public interest in the creation and development of distributed applications. Such a lack of interest could negatively impact EQC and XQC and the Qchain application.

7. **Risk that the Qchain Application, As Developed, Will Not Meet the Expectations of Qchain or the Purchaser:** The Qchain application is presently under development and may undergo significant changes before release. Any expectations or assumptions regarding the form and functionality of the Qchain application or EQC and XQC (including participant behavior) held by Qchain or the purchaser may not be met upon release, for any number of reasons including mistaken assumptions or analysis, a change in the design and implementation plans and execution of the Qchain application.

8. **Risk of Unfavorable Fluctuation of Ether and Other Currency Value:** The Company team intends to use the proceeds from selling EQC and XQC to fund the maintenance and development of the Qchain application, as described further in the White Paper. The proceeds of the crowdsales will be denominated in Ether or XEM, and converted into other cryptographic and fiat currencies. If the value of Ether or other currencies fluctuates unfavorably during or after the crowdsales, the Company team may not be able to fund development, or may not be able to develop or maintain the Qchain application in the manner that it intended.

9. **Risks from Taxation:** The tax characterization of EQC and XQC is uncertain. You must seek your own tax advice in connection with purchasing EQC and XQC, which may result in adverse tax consequences to you, including withholding taxes, income taxes, and tax reporting requirements.

10. **Risk of Theft and Hacking:** Hackers or other groups or organizations or countries may attempt to interfere with the Qchain application or the availability of EQC and XQC in any number of ways, including service attacks, Sybil attacks, spoofing, smurfing, malware attacks, or consensus based attacks.

11. **Risk of Security Weaknesses in the Qchain Application Core Infrastructure Software:** The Qchain application consists of open source software that is based on other open source software. There is a risk that the Qchain team, or other third parties may intentionally or unintentionally introduce weaknesses or bugs into the core infrastructural elements of the Qchain application interfering with the use of or causing the loss of EQC and XQC.
12. **Risk of Weaknesses or Exploitable Breakthroughs in the Field of Cryptography:** Advances in cryptography, or technical advances such as the development of quantum computers, could present risks to cryptocurrencies and the Qchain platform, which could result in the theft or loss of EQC and XQC.

13. **Risk of EQC and XQC Mining Attacks:** As with other decentralized cryptographic tokens and cryptocurrencies, the blockchain used for the Qchain application is susceptible to mining attacks, including double-spend attacks, majority mining power attacks, selfish-mining attacks, and race condition attacks. Any successful attacks present a risk to the Qchain application, EQC and XQC, and expected proper execution and sequencing of Ethereum contract computations and NEM computations. Despite the efforts of the Qchain team, the risk of known or novel mining attacks exists.

14. **Risk of Lack of Adoption or Use of the Qchain Application:** While EQC and XQC should not be viewed as an investment, it may have value over time. That value may be limited or non-existent if the Qchain application lacks use and adoption. If this becomes the case, there may be few or no markets following the launch of the platform, potentially having an adverse impact on EQC and XQC.

15. **Risk of an Illiquid Market for EQC and XQC:** There very well may never be a secondary market for EQC and XQC. There are currently no exchanges upon which EQC and XQC would trade. If ever exchanges do develop, they will likely be relatively new and subject to poorly understood regulatory oversight. They may therefore be more exposed to fraud and failure than established, regulated exchanges for other products and have a negative impact on EQC and XQC.

16. **Risk of Uninsured Losses:** Unlike bank accounts or accounts at some other financial institutions, funds held using the Qchain application or Ethereum network are generally uninsured. In the event of any loss, there is no public insurer, such as the FDIC, or private insurer, to offer recourse to the purchaser.

17. **Risk of Dissolution of the Qchain Project:** It is possible that, due to any number of reasons, including an unfavorable fluctuation in the value of Ether or XEM, development issues with the Qchain application, the failure of business relationships, or competing intellectual property claims, the Qchain project may no longer be viable as a business or otherwise and may dissolve or fail to launch.

18. **Risk of Malfunction in the Qchain Application:** It is possible that the Qchain application malfunctions in an unfavorable way, including one that results in the loss of EQC and XQC.
19. **Unanticipated Risks:** Cryptographic tokens are a new and untested technology. In addition to the risks discussed in this White Paper, there are risks that the Qchain team cannot anticipate. Further risks may materialize as unanticipated combinations or variations of the discussed risks or the emergence of new risks.