GoNetwork

Position Paper | October 2017

A highly scalable, low cost mobile first network infrastructure for Ethereum

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Abstract

Mobile is eating the world[1]. Cryptocurrencies to date have served limited utility in the real world. By our estimation, the adoption of cryptocurrencies by consumer masses hinges on improving transaction latency and providing accessibility to blockchains via mobile platforms.

This paper presents GoNetwork; a highly scalable, low cost,low latency p2p network for Ethereum on mobile platforms. There are many exceptional communities (plasma,raiden) developing tools to overcome scalability limits on blockchains for desktop platforms. GoNetworks contributions address problems related to scalability on mobile platforms, namely, GoNetwork ports state channels transfers to mobile platforms.

GoNetworks first use case, **GoExchange**, aims to deliver a secure decentralized e-commerce platform for the virtual goods marketplace. The mobile app economy is set to grow to $6.3 trillion in 2021, user base to nearly double to 6.3 billion [2] . Advancing at an annualized rate of 37% from $1.3 trillion in 2016. 10% of this revenue comes from in-app purchases and virtual goods which itself is experiencing exponential growth led by a 270 percent growth in mobile app markets — from $70 billion in 2015 to $189 billion by 2020.

To date, the major form of virtual goods that app and game developers offer to their users are localized to the app. Users can't move it out from one app to another or get additional value from these virtual assets other than just spending inside the app. App developers are now struggling in a very cut throat app market where they are competing for users attention[3] .

Moreover, content creators and app developers generate a majority of their virtual goods revenue from selling directly to the users, however; app users want to trade and purchase their items with community members to augment their in-app experience. The demand for a secondary marketplace gives rise to the global virtual goods black market worth $5 billion in 2015[4]. Recent advances in blockchain and years of experience in mobile app ecosystems, GoNetwork implements the first secure decentralized virtual goods marketplace with cross platform support for the $134 billion virtual goods marketplace.

GoExchange provides a platform that unifies app economies across Mobile platforms, allowing users seamless trade and purchase of virtual goods across game ecosystems and between users. GoExhange will leverage the 15m downloads from GoNetworks hit mobile gaming platform Infinidy Corp. including titles such as : Happy Park, 2012 Zombies vs Aliens, Happy Monsters, Flappy Zoo, and Dubsquad to name a few. While most competitors in the space will be seeking

[1] https://www.forbes.com/forbes/welcome/?toURL=https://www.forbes.com/sites/louiscolumbus/2014/11/09/mobile-is-eating-the-world/&refURL=https://www.google.ca/&referrer=https://www.google.ca/
[2] https://techcrunch.com/2017/06/27/app-economy-to-grow-to-6-3-trillion-in-2021-user-base-to-nearly-double-to-6-3-billion/
[3] https://thenextweb.com/contributors/2017/05/28/2017-beginning-end-app-economy/#.tnw_LdfRmEXH

[4] Super Data Research – Virtual Goods Market Size 2014 – 2020E; NEWZOO Study, The Global Games Market 2015 – April 2015

early adopters, GoExchanges unique go to market strategy will allow it to reach **critical mass on mobile.**

GoExchange is designed to solve virtual asset liquidity, and create increased engagement and revenue per user for developers. As stated earlier; the app economy will grow to $6.3 trillion and 10% is attributed to virtual goods. GoExchange, leveraging GoNetworks scalability solution for mobile, is poised to be the dominant player in the space.

Market Assessment

The Ethereum Ecosystem

Ethereum has over 35,000 developers worldwide in addition to more than 500 start-ups developing on its platform.[5] As of writing this paper, Ethereum, is the second largest cryptocurrency with a market cap of $29 billion USD[6]. The Ethereum network is poised to overtake bitcoin in near future[7]. Despite of the massive momentum, the Ethereum blockchain is struggling with scaling issues[8]. GoNetwork plans to solve this problem. If succeeded, GoNetwork has the potential of becoming an important part of the Ethereum infrastructure.

Global Ecommerce and Retail Market

Blockchain has the potential of replacing retail giants like Amazon and eBay[9]. In 2016 the global e-commerce market size was $1.9 trillion USD. By 2020 the market is expected to raise to $4 trillion USD[10]. The global retail payment industry that was worth $16 trillion USD in 2015 is expected to balloon to $21 trillion USD by 2020 - a staggering 31.25% increase in 5 years[11]. The payment revenue globally which was $1.8 trillion USD is also expected to rise by 22.22% to over $2.2 trillion USD by 2020 [12].

According to Boston Consulting Group, the payment industry is about to experience a huge shift towards mobile payments:

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5 https://www.cnbc.com/2017/06/23/ethereum-has-massive-potential-blockchain-expert-william-mougayar.html

6 https://coinmarketcap.com/

7 https://beta.theglobeandmail.com/report-on-business/rob-commentary/poised-to-overtake-bitcoin-this-year-ethereum-is-changing-the-way-we-think-about-cryptocurrency/article35625190/?ref=http://www.theglobeandmail.com&

8 https://www.cryptocoinsnews.com/ethereum-struggling-scaling-despite-lack-actual-user-base/

9 https://thenextweb.com/contributors/2017/08/29/can-blockchains-replace-retail-giants-like-amazon-ebay/

10 https://retail.emarketer.com/article/brief-overview-of-global-ecommerce-market/59690010ebd40005284d5cc5

11 https://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&cad=rja&uact=8&ved=0ahUKEwj6zp2_k5nXAhXpilQKHWbBAKwQFggyMAI&url=http%3A%2F%2Fimage-src.bcg.com%2FBCG_COM%2FBCG-Google%2520Digital%2520Payments%25202020-July%25202016_tcm21-39245.pdf&usg=AOvVaw3nBKnA6eS43ISazLS5gCan

12 https://www.mckinsey.com/~/media/McKinsey/Industries/Financial%20Services/Our%20Insights/A%20mixed%202015%20for%20the%20global%20payments%20industry/Global-Payments-2016.ashx

- Mobile payment volume was USD 8.6 billion in the US. It is expected to increase tenfold by 2021 to reach $274bn only in US.
- Mobile share of total ecommerce is expected to increase to 48.5% of total e-commerce by 2020. It was 23.6% in 2015.
- Merchant mobile payment acceptance network to grow 10X by 2020.

Global Mobile App Economy

The global app economy is on the precipice of rapid growth. By 2021, it will be worth $6 trillion, advancing at an annualized rate of 37% from $1.3 trillion in 2016.

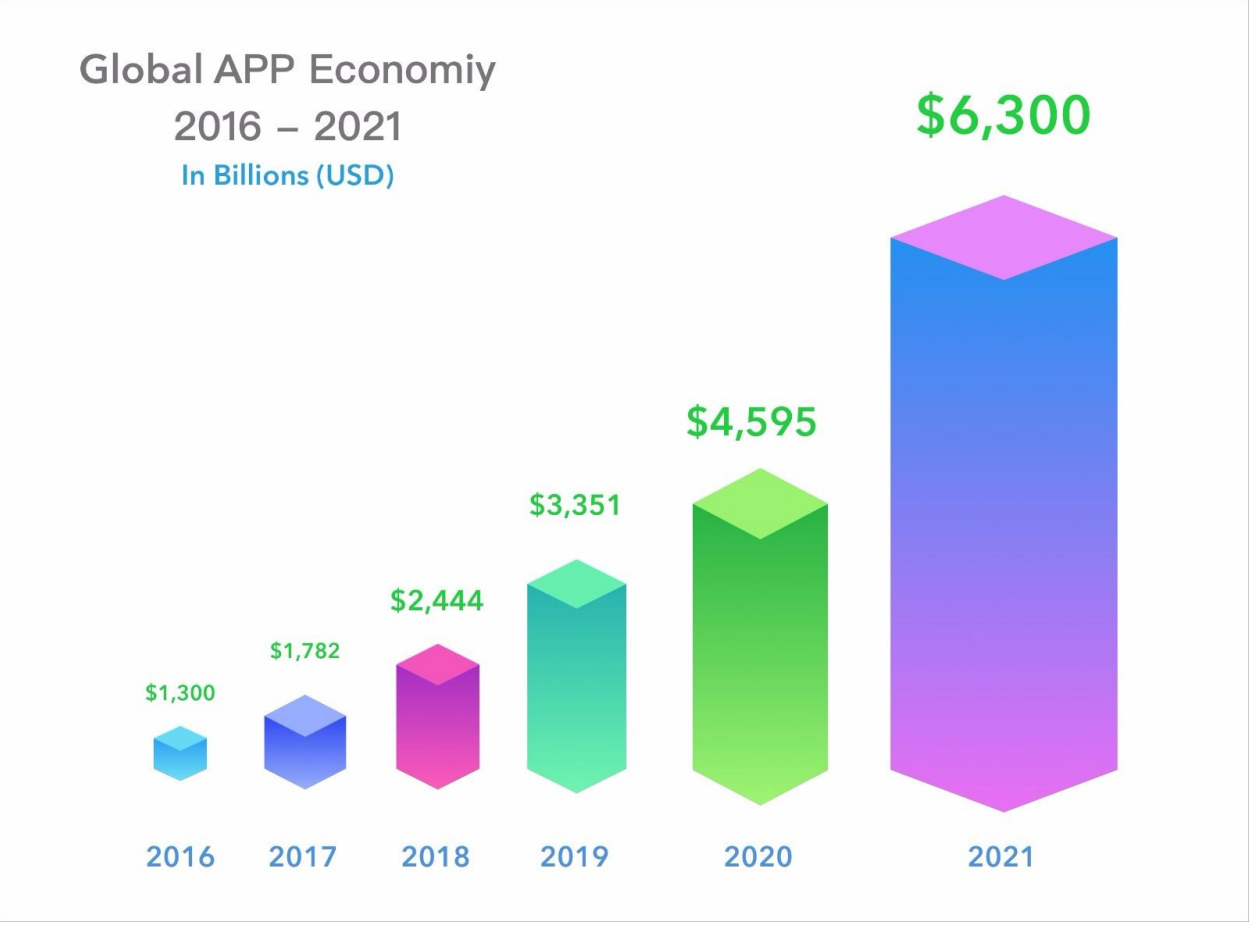

Figure 1: Global App Economy 2016 - 2021

By 2021, the average app user will spend more than $1,000 each year on app-related offerings. In-app purchases of virtual goods is amongst the leading driving forces in revenue.

A Word About CryptoCurrency

Crypto currency is here to stay. The idea of decentralized virtual monetary systems is seeing widespread acceptance amongst global economies and the core underpinning of decentralization is sparking the next web (3.0) revolution. Below we outline the market cap of various cryptocurrencies:

Figure 2: October 2017 global cryptocurrency market capitalization in USD.[13]

The total market cap at the time of writing is **$182,037,168,076 USD**[14].

According to a recent article by Bloomberg, Andrew Sheng, chief adviser to the China Banking Regulatory Commission and Distinguished Fellow of the Asia Global Institute, University of Hong Kong said "Central banks cannot afford to treat cyber currencies as toys to play with in a sand box," he added, "It is time to realize that they are the real barbarians at the gate."[15] Companies like Amazon and Google were created during technological inflection points and booms like what the blockchain market and fintech in general is experiencing today[16].

[13] https://coinmarketcap.com/charts/
[14] https://coinmarketcap.com/
[15] https://www.bloomberg.com/news/articles/2017-08-30/cryptocurrencies-are-new-barbarians-at-the-gate-of-central-banks
[16] https://www.cnbc.com/2017/08/07/cryptocurrency-boom-just-beginning--commentary.html

Problems

One of GoNetworks core observations is mass adoption hinges on cryptocurrencies interoperability with mobile computing platforms. Below we address the major challenges facing the network and its impact on mobile adoption:

Scalability for Mobile Computing

Ethereum transaction latency is measured in the order of of minutes and deviates wildly[17]. There are many approaches and bodies of work related to overcoming the transaction latency, ranging from core architecture updates including sharding, to overlay networks and off-chain transaction networks like plasma[18] and radien networks[19]. These projects will all deliver tremendous value to the scalability of Ethereum on desktop, however, at this point there is limited to no support to bring said technologies to Mobile platforms.

Variable Smart Contract Execution Costs

Any updates to the state of the block chain require gas, including Ether transfers and Smart contract invocation. Opcodes within smart contracts have associated gas costs on the EVM (Ethereum Virtual Machine). Prior to contract invocation, one must consider the cost of execution. These mechanisms are put in place to ensure the network is DDOS resistant. However, this inevitably means, depending on network utilization, the cost to execute a smart contract within a time bounds varies greatly.

Limited Mobile Adoption

At present time, Ethereum remains focused on delivering a stable and scalable blockchain technology on desktop computing platforms. There are abilities to compile full Etherum nodes for mobile platforms[20], however, they apply the same network, storage and computing requirements as desktop platforms. As such, much of the new development is not particularly suited to the nature of mobile computing and dealing with intermittent and threshold networking, limited local storage, and battery preserving computation i.e. running proof of work mining on mobile devices will rapidly deplete battery life. GoNetwork understands the limitations of mobile computing platforms and seeks to adopt technologies and incentives to make cryptocurrencies accessible to the masses.

[17] https://bitinfocharts.com/comparison/ethereum-confirmationtime.html
[18] https://plasma.io/
[19] https://github.com/raiden-network/
[20] https://github.com/ethereum/go-ethereum/wiki/Mobile:-Introduction

GoNetwork Master Plan

GoNetwork is creating a low-cost, low-latency and scalable network for Ethereum that will be used by mass mobile, desktop and web platforms. The technology today, although revolutionary, has some important challenges that need to be resolved in order to serve the mass consumer markets. The number of transactions that most popular cryptocurrencies can handle is minuscule compared to what's needed for the technology to be effectively used at scale. Our goal is to solve these issues by creating a strong team and investing heavily in research and development while considering strong business use cases.

Mobile web browsing has overtaken desktop[21]. Google has said it is now bigger on mobile than on desktop in 10 countries[22]. More than half of Facebook users now connect to the site with just a mobile phone[23]. Mobile has become the primary device for the masses. **GoNetworks belief centers on the fact that Ethereum, ERC20 tokens and cryptocurrencies in general require mobile accessibility and interoperability to gain mass adoption**. Our prime objective is to build a fast, cheap and scalable mobile first off-chain transaction network for Ethereum. We will accomplish this by implementing state channel technology to our network; while focusing on adapting the methods to mobile platforms [24].

To achieve this vision, and bring cryptocurrency to the masses, we will take the following steps:

1. Build the infrastructure that can scale Ethereum to massive transactions per seconds on mobile.
2. Use GoNetwork to deliver a strong use case; GoExchange, a virtual goods commerce platform, that will show the capacity of our infrastructure.
    a. Implement GoExchange in all Infinidy games and dubsquad.me app (cumulative download of over 15 Million)
3. Develop the pocket product to penetrate the commerce market.

While we follow the above steps, we will also evangelize our platform worldwide and look at potential partnerships with governments and organizations interested in applying blockchain to various parts of their infrastructure.

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[21] https://www.theguardian.com/technology/2016/nov/02/mobile-web-browsing-desktop-smartphones-tablets

[22] https://www.theverge.com/2015/5/6/8558535/google-mobile-search-vs-desktop

[23] https://www.digitaltrends.com/web/facebook-mobile-users/

[24] http://www.jeffcoleman.ca/state-channels/

Platform Overview

State Channels

A major limitation of blockchains is the transaction throughput which effectively leads to high latency. A method that is widely studied and the frontrunner to alleviate the scalability issues includes state channels[25]. State channels allows a minimal number transactions on-chain to facilitate a series of balance transfers between parties off-chain effectively at no cost and with high throughput.

State channels involve 2 participants, herein referred to as actors. Actors allocate funds to a smart contract which locks the total balance of transfers that can occur off-chain. The actors are now free to conduct any series of balance transfers with one another. Nobody other than the two actors have access to the deposited tokens in the state channel's smart contract, making the off-chain transactions equivalent to on-chain transactions.

Transactions are serialized and signed by both actors (multisig) such that that neither party can change any of the value transfers contained therein, as long as at least one of the actors decides to present it to the blockchain which enforces the final balance verification. Technically speaking; the balance verification on-chain compares the merkle proof generated by the off-chain transactions which are maintained by both actors in an ordered merkle tree.

In case of dispute, resolution occurs on-chain with a timed window for either actor to present verified transactions. On timer expiration, the channel is closed and the funds disbursed amongst the channel actors based on the last valid balance presented.

Overall, once setup on-chain, state channels allow no fee transactions between actors with sub ms response times.

[25] http://www.jeffcoleman.ca/state-channels/

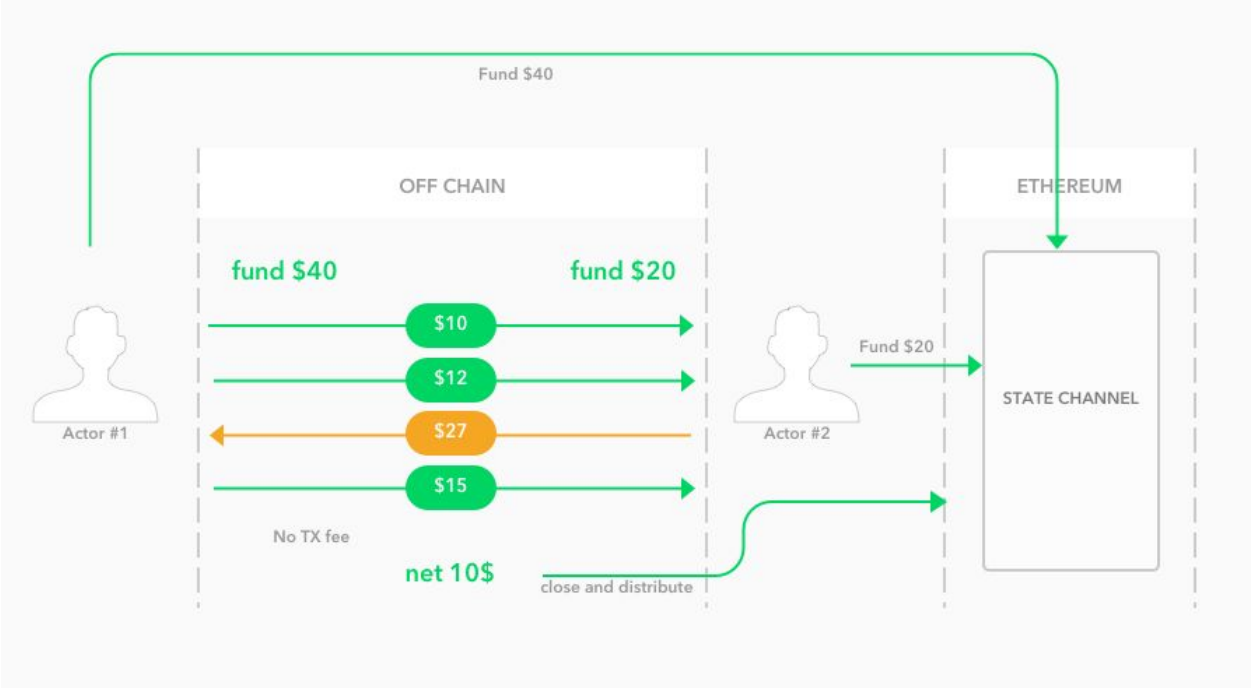

Figure 3: State channel overview diagram

Mediated Transfers

The ability to mediate transfers between parties allows actors to create transfers without having to create a new state channels between every actor in the network (this is totally infeasible). Each in-flight payment along a channel must reserve a portion of that channel's available funds, preventing its use elsewhere until the payment is settled. The sender sends the secret to the recipient and the cascade of locked funds are effectively unlocked in reverse route order. GoNetworks implementation initially focuses on a single hop networks with well established Hash Time Lock Contracts[26].

Further research into the field involves reducing the collateral cost of mediated transfers along a payment path by deploying state of the art Sprites[27] to mobile platforms.

[26] https://en.bitcoin.it/wiki/Hashed_Timelock_Contracts
[27] https://arxiv.org/pdf/1702.05812.pdf

Incentivized Channel Lifetime

Two major challenges face state channels: Firstly; creating a channel suffers traditional on-chain transaction latency. Secondly; actors leveraging a state channel essentially lock their funds until the channel has been settled/closed. Reducing state channel creation is important; Raiden overcomes this with an overlay network with routing systems with online nodes[28]. Mobile p2p Networks have limited network guarantees as individuals move from region to region, as such, implementing a routing scheme such as raiden is not feasible for our network architecture. Instead, GoNetwork implements an incentivization scheme rewarding actors based on the longevity of a state channels and dispute free resolution during channel closing. More so, incentivizing long lived channels allows GoNetwork to effectively redistribute the cost of creating a state channels repeatedly back to participants.

Fees

GoTokens are a utility token leveraged to create and close contracts and are indicative of the underlying gas costs to create a State Channel . As such, as gas price fluctuates, so to will the amount of GoToken required to create and close state channels.

P2P mobile networking

The initial incarnation of our p2p network leveraged Ethereums whisper messaging stack, however; an unnecessary and unrelated amount of chatter would be generated on the network . Currently, we are developing with webRTC for direct p2p connections and transfer of signed balances back and forth. webRTC's implements DTLS (Datagram Transport Layer Secuirty i.e. TLS for UDP) for data channels [29] (referred to as RTCDataChannel in literature). Understanding that the NAT traversal scenario requies a Central signaling server, GoNetwork is researching appropriate methods to enable stun servers whilst maintaining a decentralized and trustless architecture.

[28] https://raiden.network/faq.html
[29] http://webrtc-security.github.io/

Economy Model

GoNetwork uses GoToken, an ERC20 crypto currency, to complete all transactions. Users convert FIAT into GoToken by means of our low cost Integrated Payment Platform backed by Stripe, or purchase GoToken directly with their Ethereum wallet. In the future, we will accept all forms of cryptocurrency.

Token Distribution

In order to finance the GoNetwork roadmap, GoNetwork will conduct a token distribution event that will offer for sale fifty million units out of a 100 million unit total supply of GoTokens. The proceeds of the token distribution event will be used to fund GoNetwork operations.

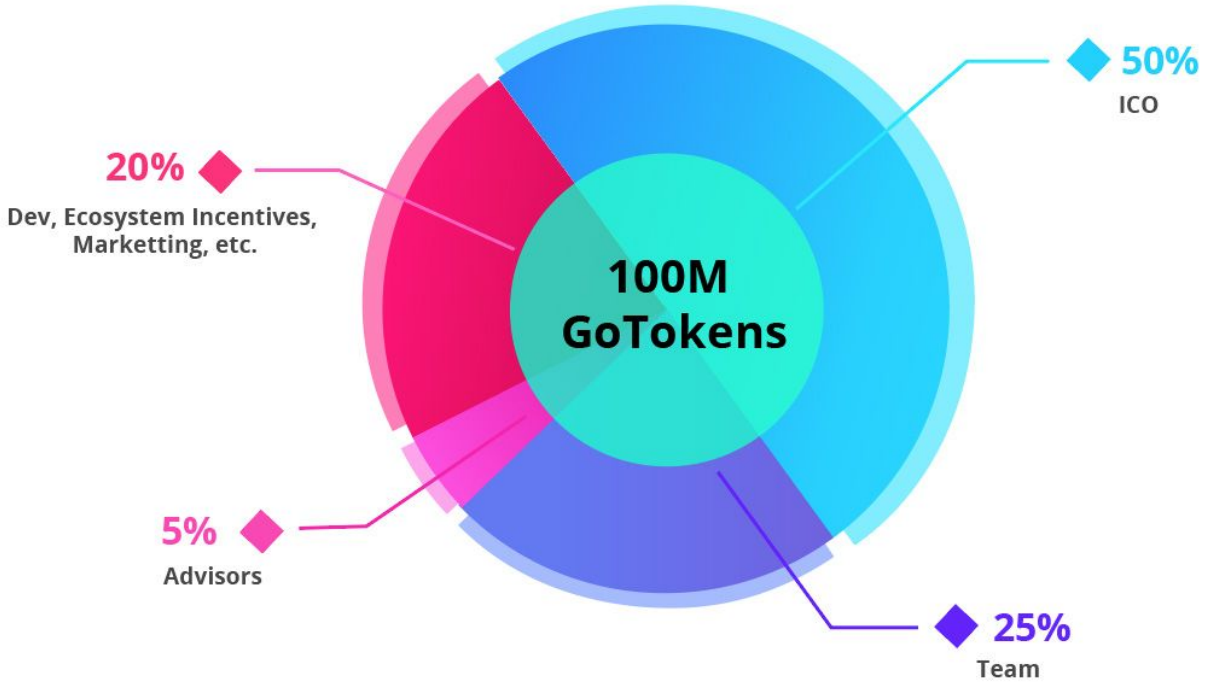

Figure 4: Token distribution diagram

- Total token supply: 100,000,000 GOT
- GOT Token type: ERC20
- Purchase methods accepted: BTC and ETH

GoToken Demand

A major concern with blockchain technology centers on high cost of transactions. Transactions on blockchains like bitcoin are expensive, and with growing usage, Ethereum will fare no differently over time[30]. GoNetworks solution solves this problem by allowing off-chain transactions simultaneously creating demand for GoToken.

Opening or closing a state channel requires a small transaction fee that is paid in GoTokens. State channels amortize the cost of transactions based on the number of off-chain transactions completed off-chain. Thus, in typical high-frequency workflows, the cost of transactions will be several orders of magnitude lower than running the transactions on-chain.

As the cost of transactions rise on-chain due to Ethereums growth, so to will the transactions using GoNetworks state channels to provide better efficiency, and equivalently, so to will the demand for GoTokens. Since there is a cap on the number of GoTokens that will ever exist (100 Million), this will drive the price up.

30 http://www.circleid.com/posts/20160502_are_blockchains_the_most_expensive_database_ever_invented/

Adoption Strategy

To achieve our vision of bring cryptocurrency to the masses, we will first build the infrastructure that can scale Ethereum to massive transactions per seconds on mobile. Then to make sure our platform is ready for adoption, GoExchange, a virtual goods commerce platform, with launch. GoExchange that will show the capability of the GoNetwork infrastructure will leverage the 15 million+ user base from the mobile games and apps created by Infinidy corp. The Pocket platform will be develop to penetrate the commerce market.

We will also evangelize our platform worldwide and look at potential partnerships with governments and organizations interested in applying blockchain to various parts of their infrastructure.

Use Case:Pocket

Pocket, named after pocket change, was 1 of 8 overall winning submissions at EthWaterloo[31]. Pocket aims to solve a problem with financial literacy by implementing gamification, parental controls and transparency for youth leveraging the ethereum blockchain. The offering allows parents to create assignable digital debit cards and claimable rewards for good behaviour such as decreased spending month to month and controlled spending across different categories (food,entertainment, etc.).
Within the 32 hours, GoNetwork managed to deliver a **native mobile functional prototype with a bluetooth tap and pay system**. More information on the project can be found: https://devpost.com/software/pocket-t1fmg5.

As smart mobile payment platform with both a Merchant and User view, Pocket enables ERC20 tokens to be used for day to day commerce rather than just a vehicle for speculative trading.

Use Case: GoExchange

In order for any exchange to reach consumer mass adoption, the problem of microtransaction scaling must be addressed. GoExchange utilises GoNetworks state channel platform to deliver the necessary scalability to virtual asset exchanges to be fully realizable.

[31] https://devpost.com/software/pocket-t1fmg5

Market Adoption Assessment

The alpha version of GoNetwork mobile SDK and GoNetwork platform will be launched in mobile platforms. To kick start the growth we will be integrating GoNetwork into Infinidy corps mobile apps that have been downloaded over 15 million times and integration into dubsquad.me that has over 1 million installs. Users of these apps will be able to purchase GoTokens and start using it within all compatible apps to increase demand.

The launch of gotoken debit card, which lets users spend GoTokens anywhere like fiat currency will also create demand for the coin. This use is expected to be heavy especially among the teen audience which is know to spend heavily on mobile games and apps.

We will also be doing various developer conferences and hackathons where we will sponsor developers who integrate GoTokens within their apps.

GoToken game and app competitions will be held where developers will be rewarded for unique and creative use of GoTokens in apps and games.

Strategic deals will be made with top app developers who have millions of active users for the proliferation of the platform.

Global Game Market

2.2 billion gamers across the globe are expected to generate $108.9 billion in game revenues in 2017. This represents an increase of $7.8 billion, or 7.8%, from the year before. Digital game revenues will account for $94.4 billion or 87% of the global market. Mobile is the most lucrative segment, with smartphone and tablet gaming growing 19% year over year to $46.1 billion, claiming 42% of the market. In 2020, mobile gaming will represent just more than half of the total games market. The PC and console game markets will generate $29.4 billion and $33.5 billion in 2017, respectively.

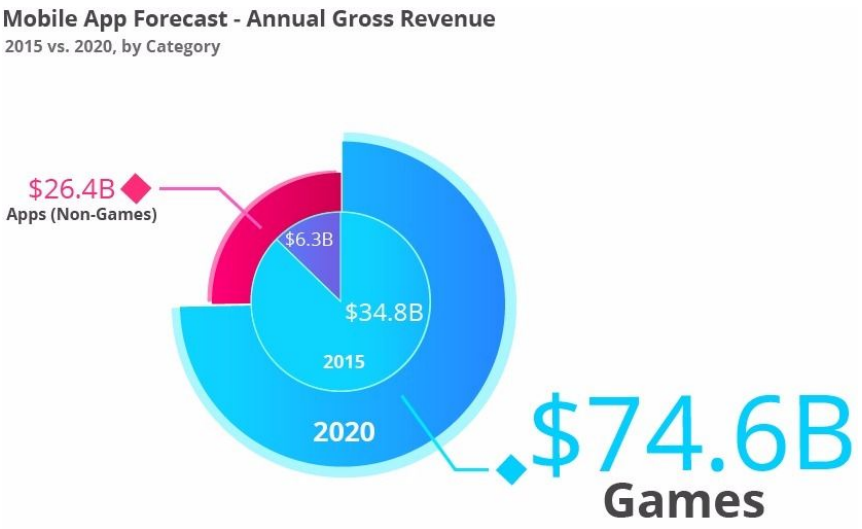

Figure 5: Mobile App Forecast - Annual Gross Revenue

Asia-Pacific is the largest region, with China expected to generate $27.5 billion, or one-quarter of all revenues in 2017. Newzoo expects the global market to grow at a CAGR of +6.2% toward 2020 to reach $128.5 billion. Mobile games performed even better than expected, especially in China.

Games generated approximately 85% of app market revenue in 2015, representing a total of $34.8 billion across the globe. The Games category alone will grow to $74.6 billion in 2020 driven by China, Japan and South Korea.

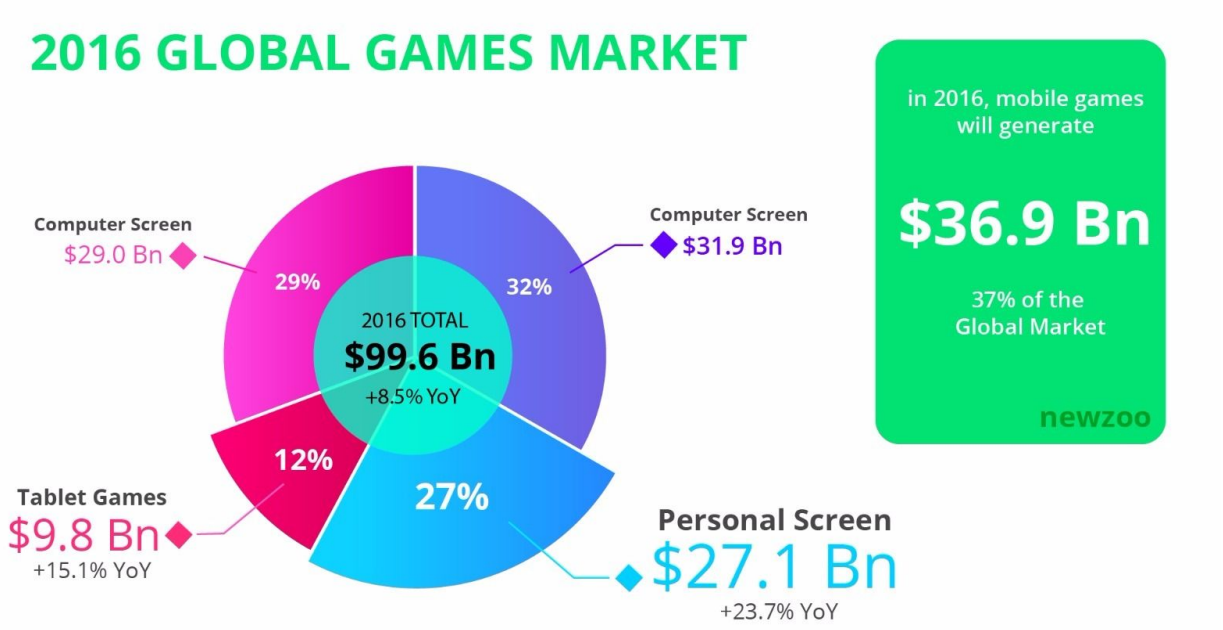

Figure 6: 2016 Global Games Market

On the PC platform, free-to-play games monetizing through virtual goods sales earned $16.4 billion in revenue in 2014 and account for 67% share of the $24.4 billion total revenues[32]. More so, mobile games surpassed console games in terms of total revenue, but they've also grown at 5x the rate. Virtual goods now create more than $15 billion in annual revenue in mobile games[33]. In the largest 2 game markets globally, 38.5% of gamers play across PC,Mobile and console platforms[34].

A majority of virtual goods revenue secured by app developers falls within **primary markets;** the content creator or app developer sells the virtual asset directly to the end-user. However, the emergent behavior of users has them engaging in purchase and trade of virtual items with community members in so called Real Money Trading (**RMT)** or **secondary markets**. Secondary markets are dominated by black markets which also experienced a 200% growth from $2.5 billion in 2009[35] to $5 billion in 2015.

[32] Newzoo, 2014
[33] https://venturebeat.com/2016/12/25/5-lessons-from-the-15-billion-virtual-goods-economy/
[34] https://newzoo.com/insights/infographics/chinese-gamer-2017/ and https://newzoo.com/insights/infographics/the-american-gamer-2017/
[35] https://goo.gl/CLrfzi

Demographics

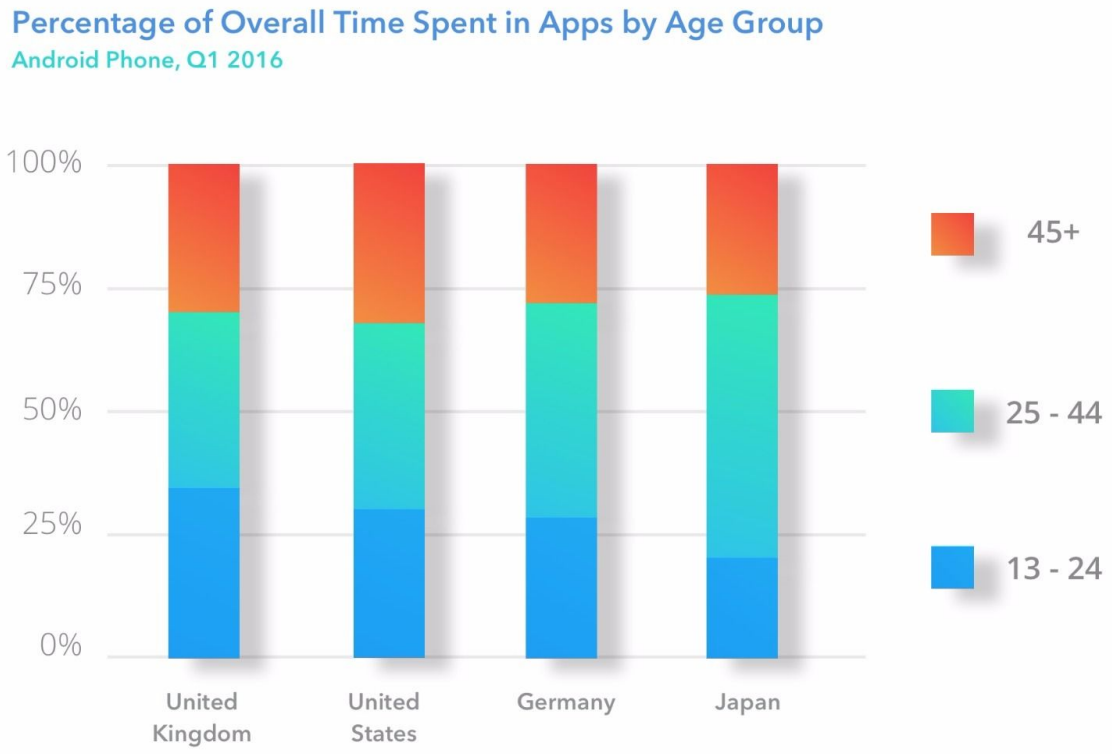

Figure 7: Percentage of overall time spent in app by age group on Android Phones.

On mobile platforms, there is a large underserved market. The 13-24 demographic represents 30% of the total time spent in-apps[36] and this segment has the lowest disposable income. In Gaming, this segment of players with a lower wage rate spend more time playing online games than do players with a higher wage rate using Real Money Trading (RMT or Secondary Markets) to generate revenue for their time commitments [37].

[36] https://www.appannie.com/en/insights/market-data/global-app-consumer-how-understanding-demographics-creates-new-opportunities/

[37] http://ebusiness.mit.edu/research/papers/2011.10_Jung_Lee_Yoo_Brynjolfsson_Analysis%20of%20the%20the%20Relationship_300.pdf

Problems

From PC to Mobile all Virtual goods economies face similar limitations:

Revenue Lost to Black Markets and Fraud

The uprising of black markets for virtual goods include a significant amount of fraud and theft. It is estimated that for every legitimate virtual asset sold and downloaded, there are 7.5 virtual items lost to fraud[38]. China has a much higher rate of fraud; **50-99% percent of all virtual good purchases are illegitimate**[39]. Considering China alone will take one-quarter of all global game revenues, reaching $27.5 billion in 2017[40], revenue losses can be measured in the billions. Mobile apps are not immune either. Pokemon go, which generated $1Billion[41] in a year, suffered from black markets reselling virtual content and accounts[42]. When fraudulent in-app purchases pollute the economics the experience for users is ruined and many abandon the application outright.

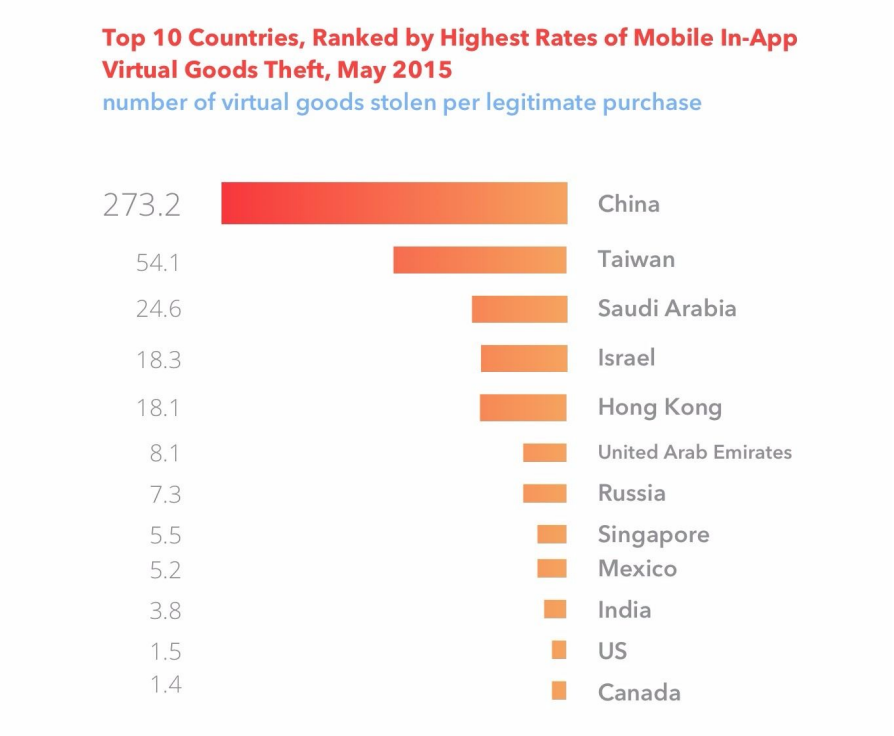

Figure 8: Top 10 countries, ranked by the highest vs. lowest rates of mobile in-app virtual goods theft, May 2015.

Moreover, buyers are unable to distinguish valid and invalid virtual goods, and when deploying them in app ecosystems they are flagged as illegitimate users, face bans and forfeit their inventory [43].

[38] https://www.emarketer.com/Article/Rising-Tide-of-In-App-Fraud/1012731
[39] https://techcrunch.com/2016/01/20/virtual-goods-real-fraud/
[40] https://newzoo.com/insights/articles/the-global-games-market-will-reach-108-9-billion-in-2017-with-mobile-taking-42/
[41] https://techcrunch.com/2017/02/01/report-pokemon-go-has-now-crossed-1-billion-in-revenue/
[42] http://www.mirror.co.uk/tech/pokmon-go-black-market-thriving-8447476
[43] http://kotaku.com/thousands-get-banned-from-pokemon-sun-and-moon-for-chea-1791653289

Disconnect from physical world

Virtual goods and time contributions are not pegged to any real world fiduciary value. As such, user attention and playtime drops significantly[44]. User attention and playtime is a proxy for revenue; **a 10% increase in the playtime causes a 7% increase in revenue**[45].

Centralized and Bounded Ecosystem

Virtual good purchases are limited to a single application. There is no safe and secure method for interoperability between app economies or between app-users. As such, to augment user experience and have virtual asset liquidity, app users are left with no choice but to leverage black markets.

Insecure and Arbitrary Transaction Fees

Currently available marketplaces rely on third-party platforms to process payment transactions. App users encounter slow and opaque fund flow, compounded with arbitrary transaction and commision fees.

Expensive to deploy and Maintain Marketplace Infrastructure

Expertise, time, cost and a lack of availability of technology to bridge between mobile and desktop application platforms have limited accessibility of public blockchains; there are no SDK's available for app developers which restricts adoption

Blockchain Transaction Scalability

Blockchains today are not capable of handling virtaul asset throughput. The latency is on order of magnitude in minutes.

[44] http://flurrymobile.tumblr.com/post/144245637325/appmatrix
[45]http://ebusiness.mit.edu/research/papers/2011.10_Jung_Lee_Yoo_Brynjolfsson_Analysis%20of%20the%20the%20Relationship_300.pdf

Solution Overview

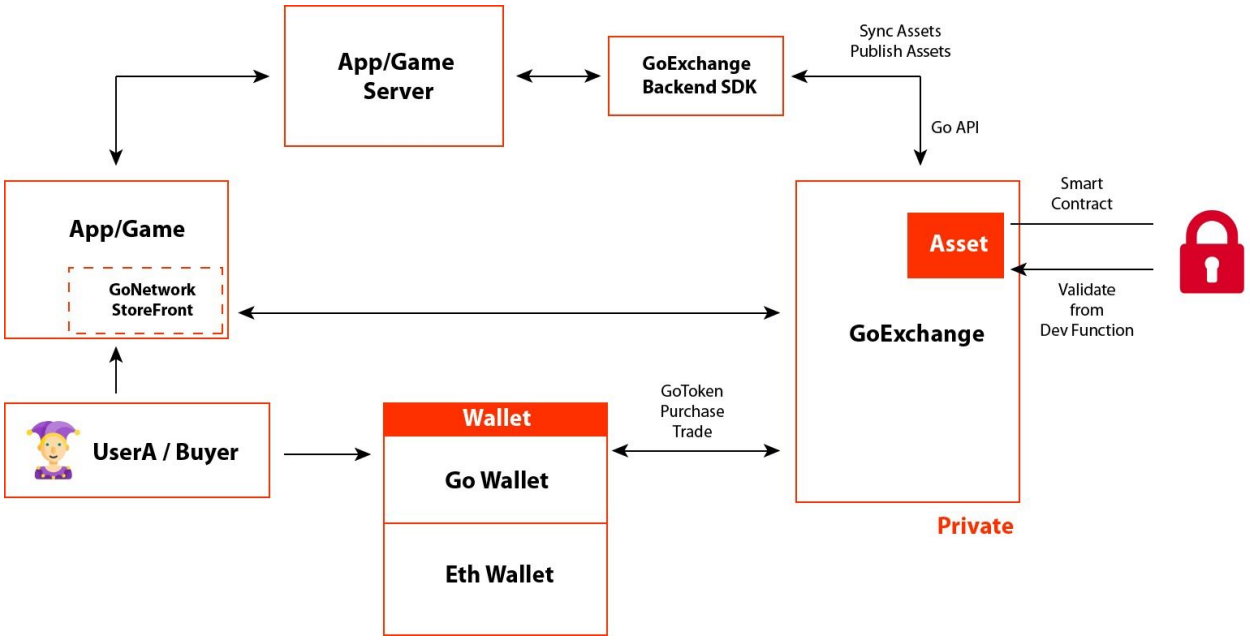

Figure 9: GoExchange high level overview.

API Core

GoNetworks core infrastructure and API are developed with Erlang/OTP; a proven production quality framework for mission critical systems demanding 5 nines (and higher!) uptime. There is already a major initiative to deploy a blockchain solution with Erlang https://www.aeternity.com/. Below we outline companies that currently use Erlang/OTP[46]:

- Amazon uses Erlang to implement SimpleDB, providing database services as a part of the Amazon Elastic Compute Cloud (EC2).
- Yahoo! uses it in its social bookmarking service, Delicious, which has more than 5 million users and 150 million bookmarked URLs.
- Facebook uses Erlang to power the backend of its chat service, handling more than 100 million active users.
- WhatsApp uses Erlang to run messaging servers, achieving up to 2 million connected users per server.
- T-Mobile uses Erlang in its SMS and authentication systems.
- Motorola is using Erlang in call processing products in the public-safety industry.
- Ericsson uses Erlang in its support nodes, used in GPRS and 3G mobile networks worldwide.

[46] https://goo.gl/BtJA2P

Transaction Scalability

Scalability on GoExchange is provided by GoNetworks state channel implementation. Each merchant sets up a state channel with their user base. Users can then easily send direct payments to the Merchant. More so, leveraging GoNetworks Mediated Transfer, users are able to send transfers to other users in the Games Network with the Merchant acting as a mediator for transfer.

Smart Contract API

A suite of open-source Smart Contracts are available for app developers and can be instantiated on the GoExchange via Platform specific SDKs.

Virtual Asset Contract

The creation of a virtual asset is configurable to allow for the following asset properties within the GoExchange:

- Outright ownership (i.e skins, new levels)
- Liquidable (i.e fully resaleable virtual content)
- Non-liquidable or non-fungible (i.e trophies, awards, etc.)
- Recurring (i.e new for virtual goods)
- Time expiring (i.e upgrades and power boosts)

Object Factory Contract

Object factory allows a content creator or developer to initialize a smart contract which mints virtual assets with configurable total supply,cost and periodicity of generation.

Escrow Trade Contract

GoExchange implements a trade contract allowing users to setup their own bartering and exchange agreements which may include any combination of virtual assets, currency, and ERC20 tokens. Asset ownership is not traded until the agreed upon terms are consolidated by both parties.

Cryptographically Verified Virtual Goods; Fraud Prevention Mechanism

To ensure virtual content validity, all assets must include a digital signature using Elliptic Curve Digital Signature Algorithm. The signature is generated off-chain and injected into an immutable property in the virtual good smart contract so as to ensure a content creator's private key is not exposed. Virtual asset validity is verified with the content creator's public key. The signature algorithm is outlined in the next section.

Signature generation algorithm

Suppose Alice wants to send a signed message to Bob. Initially, they must agree on the curve parameters $(CURVE, G, n)$. In addition to the field and equation of the curve, we need G, a base point of prime order on the curve; n is the multiplicative order of the point G.

Parameter	
CURVE	the elliptic curve field and equation used
G	elliptic curve base point, a generator of the elliptic curve with large prime order *n*
n	integer order of *G*, means that $n\,x\,G\,=\,0$ n

Alice creates a key pair, consisting of a private key integer d_A, randomly selected in the interval $[1, n-1]$; and a public key curve point $Q_A = d_A * G$. We use $*$ to denote elliptic curve point multiplication by a scalar.

For Alice to sign a message m, she follows these steps:

1. Calculate $e = HASH(m)$, where HASH is a cryptographic hash function, such as SHA-2.
2. Let z be the L_n leftmost bits of e, where L_n is the bit length of the group order n.
3. Select a **cryptographically secure random** integer k from $[1, n-1]$
4. Calculate the curve point $(x_1, y_1) = k * G$
5. Calculate r = $x_1 mod\ n_{\ 1}$. If r = 0, go back to step 3.
6. Calculate s=k^{-1}(z+ $rd_A) mod\ n$. If s = 0, go back to step 3.
7. The signature is the pair (r,s)..

When computing s, the string z resulting HASH(m) shall be converted to an integer. Note that z can be greater than n but no not longer.

As the standard notes, it is crucial to select different k for different signatures, otherwise the equation in step 6 can be solved for d_A, the private key: Given two signatures (r,s) and (r,s'), employing the same unknown k for different known messages m and m', an attacker can calculate z and z', and since s -s' = k^-1(z-z') (all operations in this paragraph are done modulo n) the attacker can find k = (z-z')/(s-s'). Since s = k^-1(z+ d_A), the attacker can now calculate the private key d_A = (sk - z)/r. This implementation failure was used, for example, to extract the signature key used for the PlayStation 3 gaming-console. Another way ECDSA signature may leak private keys when k is generated by a faulty random number generator. Such a failure in random number generation caused users of Android Bitcoin Wallet to lose their funds in August 2013. To ensure that k is unique for each message one may bypass random number generation completely and generate deterministic signatures by deriving k from both the message and the private key.

Signature verification algorithm

For Bob to authenticate Alice's signature, he must have a copy of her public-key curve point Q_A. Bob can verify Q_A is a valid curve point as follows:

1. Check that Q_A is not equal to the identity element O, and its coordinates are otherwise valid
2. Check that Q_A lies on the curve
3. Check that n x Q_A = O

After that, Bob follows these steps:

1. Verify that r and s are integers in [1,n-1]. If not, the signature is invalid.
2. Calculate e = HASH (m), where HASH is the same function used in the signature generation.
3. Let z be the L_n. leftmost bits of e.
4. Calculate w=s^{-1}mod n.
5. Calculate u_1 = zw and mod n and u_2 = rw mod n
6. Calculate the curve point (x_1, y_1) = u_1 x G + u_2 x Q_A. If u_1 x G + u_2 x Q_A .= O then the signature is invalid.
7. The signature is valid r ≡ x_1 (mod n), invalid otherwise.

Note that using Shamir's trick, a sum of two scalar multiplications u_1 x G + u_2 x Q_A can be calculated faster than two scalar multiplications done independently.[5]

Purchase, Trade, Sale of Virtual Goods

GoToken allows for instantaneous transactions with a micro transaction fee of 1.5%. Rather then requiring multiple currencies to complete a transaction, GoToken for creating GoNetwork state channels and another for purchasing, all items are listed in USD and the transactions are completed with GoToken accounting for variance in the marketplace.

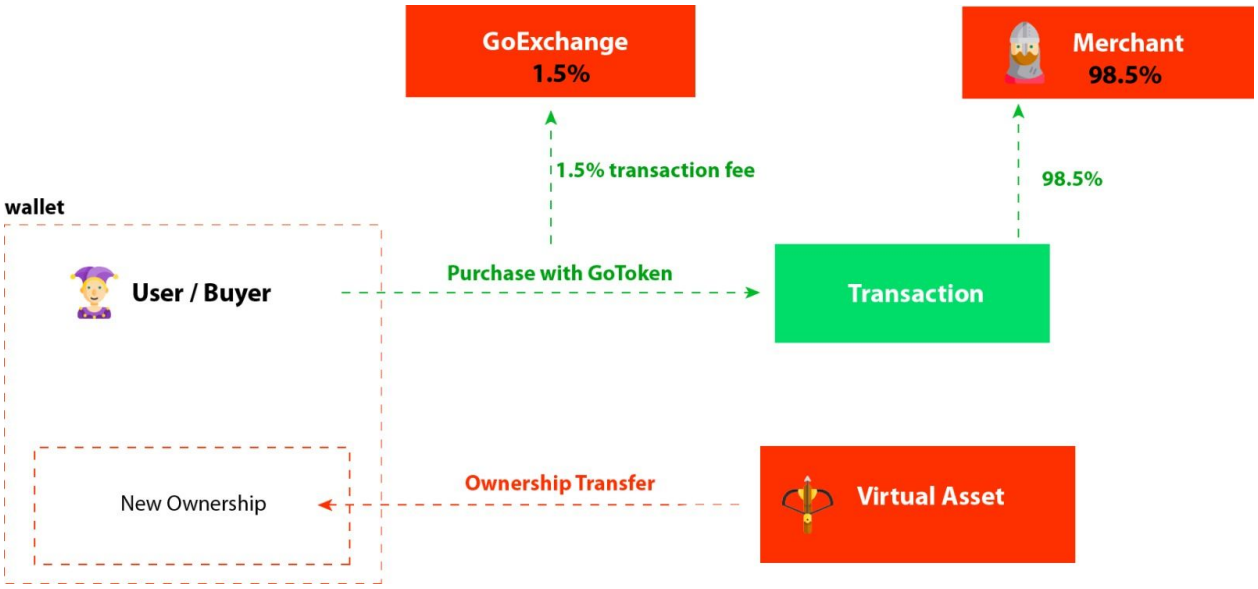

Figure 10: Primary Market transaction: A user wants to buy a Virtual Asset from a Content Creator or App Developer

An app developer or content creator receives 98.5% of a primary (Figure 10: primary market) sale;1.5% constitute GoExchange transaction fees.

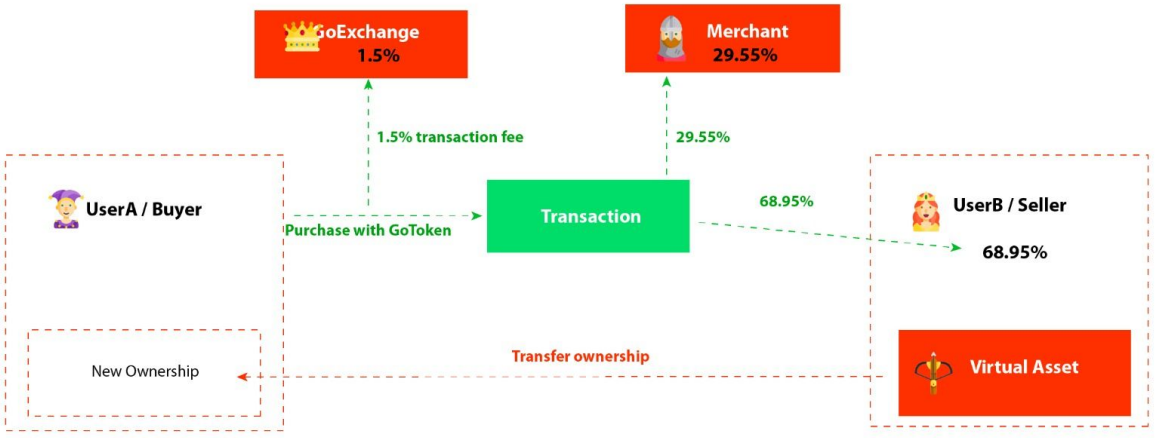

Figure 11: Secondary Market transaction - User A wants to purchase a Virtual Asset from User B

On any resale (Figure 11: secondary market) of a virtual asset, The transaction fee is applied on the sale price and the remainder is distributed as follows;the content creator remains a benefactor collecting 30%, the seller will collect 70%. The quality and demand for a virtual asset will directly affect the market value; A popular app stands to make multiples times the revenue per virtual asset vs traditional app economy implementations.

Platform-specific SDKs and StoreFront

StoreFront is a cross-platform drop-in view which gives app-users access to the GoExchange from within an App or Game. More so, we will offer open source backend SDK's that allow for smart asset creation and management.

User Wallet

GoNetwork implements a stand-alone open source mobile wallet which connects to the GoExchange blockchain to view and complete transactions amongst users. The wallet is a fork of https://github.com/ethers-io/EthersWallet-ios.

GoExchange Benefits

Developer and Content Creator Benefits

- **At least a 10% increase in LTV** of a virtual asset[47] when monetizing from both primary and secondary markets
- Increased Playtime as assets are pegged to real world value; **a 10% increase in the playtime causes a 7% increase in revenue**
- Fine grain control of virtual asset fungibility, life cycle
- Traceability of inventory
    - Can view the distribution of virtual assets amongst user base and prevent monopolies
- New monetization strategies and revenue stream
    - Recurring revenue and subscription for assets
- New In-App Game Mechanics
    - Place bounties on achievements, playtime, etc. that translate to real world value to end users
- Drop in SDK and API's for rapid integration
- Low cost transaction fees (1.5%) and direct payment

User Benefits

- Fraud prevention ensuring all purchased assets are usable in-app
- **Time spent in app equates to real world value**
- Liquidity between app economies
    - If app is no longer supported and maintained, users can move items or "burn" them to retrieve real value

[47] https://techcrunch.com/2010/12/31/the-year-in-virtual-goods-by-the-numbers/ - As of 2010

- Easily use cryptocurrency for in-app purchases

GoExchange Reputation System (Request For Comment)

Any marketplace requires an intelligent and effective reputation system that can signal trust amongst the community members and penalize individuals who behave poorly. Reputation systems deployed in web 2.0 ecommerce sites are severely broken[48].

Feedback systems were crucial to eBay,Alibaba and Uber's success and empirical studies show sellers with higher feedback scores enjoy modest benefits in terms of higher prices and sale rates. Pitfalls in developing effective reputation systems include the fact that **users might not bother to do it** or that the feedback system is not necessarily that informative. On Ebay, for example, over 98% of feedbacks are positive --- the system appears to suffer from **severe grade inflation**. One potential reason why buyers might fail to submit informative negative feedback is that they fear retaliation. In eBay's baseline system, feedback was posted immediately, and sellers who received negative feedback had a strong tendency to respond by giving the buyer a reciprocal negative feedback. On a series of lab experiments, eliminating sequential feedback and allowing for more fine-grained ratings dramatically improved the informativeness of user reports, and improved the efficiency of exchange[49].

Based on the aforementioned drawbacks, a proposal for GoNetworks reputation system was conceived. Below we outline an abstraction of the system.

Reputation System Framework (Draft RFC)

- Reputation will be handled by a secondary token; Reputation Token, which has no fiduciary value, but may be fungible
- As the biggest benefit of rating and comments is for the seller, the proposed system has the merchant pay comment transaction fees in GoToken, and an amount is awarded to the buyer who left feedback. This incentivizes both sides of the reputation market.
- Ensuring only users that received the service comment; Upon purchase p, a user is issued a reputation token that is time bounded
- Anonymity of comments and ratings;This is achieved with ring signature[50]; intuitively thought of as 'plausible deniability', or 'anonymity with respect to an anonymity set'. The anonymity set for GoNetworks reputation system is the public key of the last N buyers from a particular seller. More so, a side channel for information leakage is a users writing style. The reputation system will leverage Natural Language Processing methods; information extraction and word2vec type models to remove style signatures from user comments.

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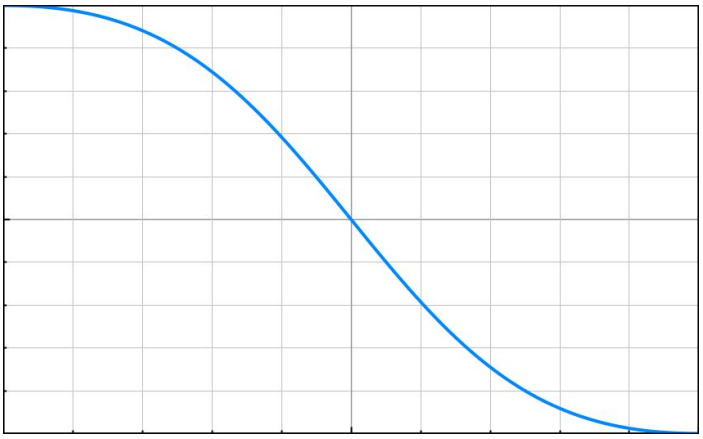
48 https://www.forbes.com/2007/01/02/ebay-smallbusiness-feedback-ent-sales-cx_al_0102smallbizresource.html

49 http://www.nber.org/papers/w16852.pdf

50 https://arxiv.org/pdf/1612.01188.pdf

- Reputation Token Decay; The total reputation a comment can achieve is defined by a parametric curve of degree 2 of the form:

$$Reputation = RepToken * [1 - x(n,t)^2/x(n,t)^2 + (1-x(n,t))^2] \quad where\ x(n,t) = [0,1]$$



The value of x is governed by the number of comments n in a time window t. When a comment is posted, x is increased by a factor of n, and then is reduced back to 0 over time t. This effectively limits the ability of a merchant to upvote themselves by reducing the value of earnable reputation and effectively making consecutive comments over the time window more costly. $x(n,t)$ is also adjusted to consider the throughput of transactions of a merchant so as not to penalize popular stores.

A complete whitepaper detailing GoNetworks reputation system will be published soon and any feedback is welcome.

Roadmap*

What started as a multi-billion dollar platform on internet, is now becoming a reality for the mobile ecosystem and commerce at large. Although we have years of work behind us, there is a long road with clear objectives ahead. We are going through an amazing, transformative period in history — a technological revolution — the opportunities are endless and extremely exciting.

- 2010
  - Zombies vs Aliens & 9000 BC - Feature by Apple Inc.
  - Started understanding the growing mobile app business.
  - Our first products were featured by Apple Inc and covered heavily by the media.
  - Highlights of our achievements:
    - Top 10 app in 8 countries Top 100 app in 37 countries - 148Apps Review 1.5M+ installs: https://goo.gl/8xJJ2n
- 2011
  - Launched Happy Park - A theme park simulation game in June.
    - We started studying the virtual goods market on mobile by launching a series of freemium games.
    - Happy Park became our most successful game. Achieving these heights: #1 App in 23 countries Top 10 grossing app in 31 countries. 10M+ installs - http://goo.gl/J5JEaN
- 2013
  - Partnership with GREE International, Inc.
    - In summer of 2013 GREE International, Inc - Japanese social gaming giant, approached us among other top app developers to launch social games with the integration of their social gaming platform - https://goo.gl/BW1awn This gave us a unique opportunity to expose our large user base to a new social platform and experiment with currency trading in our games.
    - We also made some key relationships with gaming giants and other game studios.
- 2014
  - Happy Park becomes the largest theme park game on Apple's AppStore
  - Crosses Over 10 million users mark! Over $1.2M profit goal reached!
- 2015
  - Launch of Dubsquad.me - video social network
    - Success of social games and strong understanding of virtual economy leads us to launch a video social network.
- 2016
  - Q2
    - GoNetwork experiment starts & Dubsquad.me becomes Top 10 photo and video app!

        - Top 150 app overall in the AppStore charts gaining over 1M+ users - https://goo.gl/uVfTgE
        - Start experimenting with virtual coin systems - enabling a way for creators to earn real income from their fans.
    - Q4
        - Selected by YCombinator (Investors in Airbnb, Reddit) for in-person interview!
            - Co-founders flew to Mountain California to present Dubsquad to YCombinator
            - Out of thousands of applications only 10% get selected!
- 2017
    - Q1
        - R&D Ethereum, BitCoin as development platforms
        - Study ECC and Cryptographic primitives
    - Q2
        - Developed prototype architecture of GoNetwork,
        - R&D Mobile Development and Accessibility to mobile
        - Internal testing of Ethereum private network and solidity contract
        - Testing solidity custom cryptographic primitives
    - Q3
        - GoExchange Alpha Launch
            - Launch of GoNetwork website.
            - Alpha GoNet internal testing starts
            - R&D scalability solutions for micro transaction throughput
            - Start state channel prototype
            - Integrate alpha SDK to test app
        - ICO Pre-Release
            - Launched of GoNetwork ICO website
    - Q4
        - GoNetwork wins ETHWaterloo
            - “We won the world's biggest Ethereum hackathon!” [51]
            - Developed Pocket at ETHWaterloo - judged by Vitalik Buterin (co-founder of Ethereum), Jeff Coleman, William Mougayar, Joseph Lubin, Joey Krug, and Stephan Tual
        - GoNetwork Mobile Tutorials Series
            - First of a series of technical blog posts from GoNetwork - https://keepingstock.net/pocket-tutorial-welcome-to-the-first-of-a-series-of-technical-blog-posts-from-gonetwork-58476c287c91
        - GoNetwork ICO Launch
        - GoNetwork Ongoing Development i.e. iOS KeyChain Services integration, Mobile Balance Verification Proofs,WebRTC P2P

- 2018

[51] https://medium.com/@gonetwork/we-won-ethwaterloo-hackathon-the-worlds-largest-ethereum-hackathon-2322670a7646

- Q1
  - GoExchange Ongoing Development
    - iOS SDK
    - User Dashboard
  - Closed beta Testing
    - GoExchange on Dubsquad.me
    - GoNetwork channel lifetime incentivization metric
    - GoNetwork off-chain transaction metrics
- Q2
  - GoExchange open beta version launch
  - Exploration of partnership opportunities with government and industry blockchain application starts.
- Q3
  - GoNetwork Sponsorship, Developer Meetup & Awareness
  - Explore incentivized developer partnership deals
- Q4
  - GoExchange exposure to over InfiniDy's users!
    - GoExchange SDK integration in all InfiniDy Corp games.
    - GoExchange SDK integration in dubsquad.me.
    - Exposing the GoExchange to InfiniDy's users.
  - GoExchange for Unity launch (Android and desktop).
  - GoNetwork Hackathon & Global Expansion
    - Series of hackathons to be held in Waterloo, Vancouver, San Francisco and New York - awarding the most innovative integrations of GoNetwork in mobile applications.

Team

Rashid Khan

CEO

Founder of Infinidy Corp, one of Canada's leading game development studios. Graduated from the University of Waterloo, Ontario, Canada. Created the biggest iOS theme park simulation game called Happy Park. Over 15 million people have downloaded Infinidy's games! Founded Dubsquad that became one of the largest video social networks among teens worldwide with over 1 million users. Selected by YCombinator for in-person interview at Mountain View, California. Early bitcoin miner.

Amit Shah

CTO

Software architect & Blockchain expert. Graduated from the University of Toronto, Ontario, Canada. Spearheaded research and development while working at BlueRover as Vice President of Software Architecture R&D. BlueRover is a leading Canadian Internet of Things (IOT) technology company. Worked at several Ethereum based open source projects. Etherium Investor.

Xun Cai

COO

Graduated with distinction and honours in Software Engineering from the Universtiy of Waterloo, Ontario, Canada. Xun is the co-founder and CTO of Infinidy Corp. He is a serial entrepreneur who has created products that have been used by millions of people and have acquired a large active user base. Led Infinidy to become one of the first companies to join Communitech, Canada's top digitial media incubator. Infinidy was also a part of Accelerator Center (world-leading tech incubator of Canada - http://acceleratorcentre.com/), sharing the platform with top tech companies like Kik Interactive.

Miao Jiang, PhD

Scalability and Network Security Researcher

Miao worked on core Android application optimization at Google. He holds a PhD Degree from the University of Waterloo where his prime research was on distributed computing.

Harry Peng, MSc.

Scalability Architect

As a Software Engineer at Google, Harry has worked in the Gmail extensibility platform. He has also lead Android development for the Google Fiber project. He worked as a Software Development Engineer at Amazon on their payment platform.

Jesse Guild

Business Development Manager

Jesse has a Master's Degree from the University of Waterloo. With his experience as a senior analyst at Communitech, Jesse knows what the Startup world is like long before getting his hands dirty in it. From day to day he works alongside the marketing team to get GoNetwork's brand into the world, while juggling many other company aspects such as implementing strategies and outbound sales. Constantly following soccer matches and the stock market, it's safe to say he's an expert at multi-tasking.

Maanas Rautela

Legal

Received his doctorate of law from Michigan State University and Master of Laws from York University - Osgoode Hall Law School. Researching legal applications relating with blockchain companies and Initial Coin Offerings.

Advisors

Jeff Morris Jr.

Director of Product Management - Revenue at Tinder, Inc. Founder at Chapter One Ventures

Member of the Tinder Product team, focusing exclusively on revenue products.

Revenue Team:

- Execute roadmap for Tinder Plus and prioritize revenue initiatives with CEO and Head of Product.
- Tinder is the top grossing lifestyle app on the App Store & top grossing social app on the Play Store in less than 18 months of offering a subscription product.
- PM for Tinder Boost: https://techcrunch.com/2016/09/27/tinder-boost-lets-you-pay-your-way-to-the-front-of-the-line/
- PM for Tinder Discounting, first ever discounting product that was released in August 2016.
Zaarly:

Joined Zaarly as a member of the founding team (3 weeks after idea was created and 2 months before public launch).

- Helped grow user base to 400,000+ within 6 months.
- Led paid acquisition efforts
- Opened New York City office and launched multiple cities.

Nenone Donaldson

Director Of Advancement, Faculty of Engineering at University of Waterloo

Nenone manages the Faculty of Engineering development and alumni teams, while overseeing alumni relations in the California, Seattle, New York, Toronto and Kitchener-Waterloo regions. Professionally fundraising since 1998, Nenone has been with Waterloo Engineering since 2004 and has been instrumental in building the dynamic Waterloo Engineering alumni network while helping to establish significant scholarships and endowment funds for Educating the Engineer of the Future.

Laurent Bernardin

COO and Chief Scientist at Maplesoft

Mr. Laurent Bernardin serves as Chief Scientist and Executive Vice-President of Research & Development of Maplesoft(also known as Waterloo Maple, Inc) and served as its Vice President of Research & Development.
http://www.bloomberg.com/research/stocks/private/person.asp?personId=44300778&privcapId=9300910

Paul Allamby

Ex Senior Vice President of Sales and Marketing at Toronto Blue Jays. Managing Principal Consultant at Paul Allamby Consulting

Paul is a maker, collaborator and enabler, who has built a track record of helping brands, businesses and individuals to thrive. He is imbued with a passion for helping brands to successfully connect and engage with customers. Specialties: Brand platform development, brand activation,digital marketing,customer relationship marketing, retail marketing, shopper marketing,new brand or product launch,database marketing, new business development. Has deep luxe, telecom, financial services, retail and sports marketing experience (in UK and Canada).

David Debono

Ex Professor at University of Windsor. CEO at Boom Gaming. Partner at LDS Canada.

David is a serial entrepreneur, innovator, strategic leader, mentor, professor, lifelong student. David has led, founded, acquired and successfully sold a large number of technology related businesses over the past 30+ years.

Legal Disclaimer

Restrictions on Distribution in Singapore

By accessing and/or accepting possession of any information in this Whitepaper or such part thereof (as the case maybe) in Singapore, you:

(a) represent and warrant that you are either an institutional investor as defined under Section 4A(1)(c) of the Securities and Futures Act (Chapter 289) of Singapore (the "SFA"), a relevant person as defined under Section 275(2) of the SFA or persons to whom an offer is being made as referred to in Section 275(1A) of the SFA and

(b) agreed to be bound by the limitations and restrictions defined herein.

Any failure to comply with these restrictions may constitute a violation of applicable securities law in Singapore.

GoNetwork tokens ("Go Tokens" or "tokens" or "Tokens") or the Go Tokens themselves are not securities or similar financial instruments. Further, the Go Tokens do not have any investment interests, are not designed for investment or speculative purposes, and should not be considered as a type of investment or security.

Although GoNetwork does not consider Go Tokens to be "securities" under the laws of any jurisdiction, purchasers of Go Tokens should take note of laws of their respective jurisdictions when considering a purchase or resale thereof, that no securities and exchange commission, bank or monetary authority or other governmental agency of any country has passed on or approved the proposed sale of Go Tokens, and failure so to register may have an effect on the purchaser's ability to purchase and resell Go Tokens.

In addition, citizens, residents and entities of U.S.A, Singapore, China & Canada are restricted from purchasing Go Tokens in the token distribution.

Proceeds from the Go Token distribution will be the revenue of the Go Network. As a private company, proceeds of the Go Token distribution will be utilized by the Go Network in its sole discretion. Go Network intends to use certain of the proceeds for general administration and operating expenses, as well as to build a blockchain consulting business focusing on helping businesses re-imagine or build their businesses on the blockchain, developing more open source software that may be helpful to the community and building decentralized applications using Go Network Software.

GoNetwork does not make or purport to make, and hereby disclaims, any representation, warranty or undertaking in any form whatsoever to any entity or person, including any representation, warranty or undertaking in relation to the truth, accuracy, and completeness of any of the information set out in this Whitepaper.

The information provided herein is not intended to replace or serve as a substitute for any legal, financial or other professional advice, consultation or service. The prospective purchaser should consult with a professional in the respective legal, tax, accounting, or other professional area before making any decision to purchase the Go Tokens described herein.

Anti-Money Laundering & Anti-Terrorist Financing

Measures aimed at preventing money laundering and Terrorist Financing may require a participant in this proposed sale of Go Tokens to verify their identity and/or source of their funds to the Go Network as per the KYC (Know Your Customer) initiative by Go Network. By way of an example, as individual may be required to produce the original passport or government issued identification card or copy duly certified by a public authority such as a notary public, the police or the ambassador in their country of residence, together with two original documents evidencing their residence such as a utility bill or bank statement or duly certified copies. In the case of corporate or other entity applicants this may require production of a certified copy of the related organizational documents, and of the names and residential and business addresses of all directors, officers and beneficial owners. The details given above are way of example only, and Go Network will request such information and documents as it considers is necessary to verify the identity or source of funds of a potential purchaser at the time of the potential sale.

Each purchaser acknowledges that Go Network shall be held harmless by such purchaser against any loss as a result of failure to provide such information and documents as had been requested by the Go Network or if such purchaser provides and information or documentation to Go Network that is false or misleading in any respect. If the purchasers are identified as citizens or residents of one of the countries restricted from participating in the ICO (Initial Coin Offering), the purchaser's token sale will be cancelled and the distributed Go Tokens will be refunded.

No Representation and Warranties

Go Network does not make or purport to make, and hereby disclaims any representations, warranty or undertakings in any form whatsoever to any entity or person, including any representation, warranty or undertaking in relation to the truth, accuracy and completeness of any of the information set out in the whitepaper.

Certain Risks Relating to Purchase, Sale, and Use of Go Tokens

BY PURCHASING AND USING GO TOKENS YOU EXPRESSLY ACKNOWLEDGE AND AGREE THAT THERE ARE RISKS ASSOCIATED WITH PURCHASING AND USING GO TOKENS AND ASSUME THOSE RISKS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING RISKS:

a) You acknowledge that you are aware of the risks of the loss of your private key(s), such as by your forgetting where your private keys are stored, accidental deletion, or other error, which will cause the loss of your Go Tokens.

b) You acknowledge that hackers or other malicious groups may attempt to interfere either with the Company or with you, in an attempt to obtain tokens, such as by obtaining your private key from your computer, by deceiving you into telling them your private key, or by some other method. Hackers may also attack the Go Network blockchain itself, such as by denial of service attacks, consensus attacks, or other hacks, creating a risk of harm arising from cyber-attacks on the network. Go Network is not responsible for lost or stolen private keys, or for private keys you give to hackers, whether by cyber-attack, deception, or some other means.

c) You acknowledge that the Go Tokens may have no secondary market value, or may be extremely illiquid, as their principal purpose is to be used to obtain computation or other network resources from the Go Network blockchain. Even if secondary trading of Go Tokens is facilitated by third-party exchanges, such value may be extremely volatile or near-zero. In the event the Go Token's value decreases, there is no public insurer or private insurance arranged by the Company, to offer recourse to you.

d) As a consequence of this early stage of development, errors or unexpected behavior in smart contracts or due to other unexpected bugs or problems, may cause unexpected behavior, including but not limited to loss of Go Tokens, or the consumption of a greater quantity of Go Tokens than estimated to perform a particular task.

e) You acknowledge that, if you intend to operate a node on the Go Network blockchain, that you may incur costs including but not limited to purchasing or setting up computers and software, and that your fees collected may be small, or nonexistent. You set up your node at your own risk, and the Company is not responsible in the event your node does not collect fees, or for any costs you incur in configuring or operating your node, in any respect.

f) You acknowledge that, if you intend to contribute any code or software development work that any code you write or execute may not function correctly. And that the Company is not responsible for any harm that may result from your code or software functioning improperly, as errors are to be expected so they may be identified and corrected. Go Network is not responsible for any business losses or loss of revenue resulting from either excessive or incorrect use of the network.

g) You acknowledge that you are responsible for your actions using the network, including any transactions, code, or other contributions or commands given to the network. And you acknowledge that the Company is not responsible for the actions of others using the network, which could result in harm to you or others.

h) You acknowledge that Go Tokens confer no governance rights of any kind, and that decisions involving the Company's products or services will be made by the Company at its sole discretion.

The membership and/or the directors of the Company may make decisions which affect the Go Network blockchain and its associated tokens. These decisions may adversely affect the utility of any tokens you own.

i) You acknowledge that the regulatory status of cryptographic tokens is an area of great uncertainty, and that tokens may face significant regulatory change in the future. It is difficult to predict how or whether legislatures or regulatory agencies around the world will treat blockchains and tokens. It is possible regulatory actions will negatively impact the Go Network blockchain and its tokens in a number of different ways, including but not limited to potentially being prohibited or requiring registration or licensing. The Company may cease operations in areas where regulatory or legislative changes make it unviable or commercially undesirable to continue to operate in that jurisdiction.

j) You acknowledge that Go Tokens face uncertain tax treatment. You must seek your own tax advice concerning tokens, and purchase or use of tokens may result in adverse tax consequences.

k) You acknowledge that the Company may, due to any number of reasons in the future, including but not limited to poor demand for its services, failure of commercial relationships, intellectual property challenges, etc., the Company may no longer be viable to operate and may dissolve.

l) You acknowledge that cryptographic Go Tokens are a new and untested technology, and that there may be additional risks associated with your purchase and usage of the tokens, potentially including unanticipated risks.

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Company’s website, roadmap and white paper contain forward-looking statements that involve risks, uncertainties and assumptions. If such risks or uncertainties materialize or such assumptions prove incorrect, the results of this company and its projections may differ materially from those expressed or implied by such forward-looking statements and assumptions. All statements other than statements of historical fact are statements that could be deemed forward-looking statements, including but not limited to statements of the plans, projected timelines, strategies and objectives of management for future operations; any statements concerning expected development, performance and services; anticipated operational and financial results; any statements of expectation or belief; project timelines and any statements of assumptions underlying any of the foregoing. Risks, uncertainties and assumptions include the achievement of expected results and meeting projected timelines described from time to time in quarterly timeline. The Company without assuming any liability or responsibility may at any time in its complete discretion may decide to alter or modify the Company’s objectives and/or strategies, projected timelines, or cease its operation altogether. The Company assumes no obligation and may update these forward-looking statements and projected timelines as and when required.

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Definitions

Primary Market: Refers to the sale of a virtual asset to the user from the content creator or developer

Secondary Market: Refers to the trading of used, second-hand goods between users. When discussing virtual secondary markets, the intention is to always refer to markets where virtual goods that are bought for real money, or more commonly, a virtual currency obtained using real money.