

GO Network

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A secure decentralized virtual goods commerce platform leveraging the blockchain technology.



GO NETWORK

Table of Contents

Abstract	4
Market Assessment	5
Global App Economy	5
Global Game Market	6
Demographics	8
A Word About CryptoCurrency	9
Problems	10
Revenue Lost to Black Markets and Fraud	10
Disconnect from physical world	11
Centralized and Bounded Ecosystem	11
Insecure and Arbitrary Transaction Fees	11
Expensive to deploy and Maintain Marketplace Infrastructure	11
Blockchain Transaction Scalability	12
Vision	13
GoNetwork Benefits	14
Developer and Content Creator Benefits	14
User Benefits	14
GoToken Debit Card	14
Economy Model	16
Token Distribution	16
Passive Income & Bonuses	17
Platform Overview	19
API Core	19
Smart Contract API	20
Virtual Asset Contract	20
Object Factory Contract	20
Escrow Trade Contract	20
Cryptographically Verified Virtual Goods; Fraud Prevention Mechanism	21
Signature verification algorithm	22
Purchase, Trade, Sale of Virtual Goods	23
Platform-specific SDKs and StoreFront	24
User Wallet	24
Network Scalability	24
Governance and Trust	24
GoNetwork Reputation System (Request For Comment)	25

Reputation System Framework (Draft RFC)	26
Adoption Strategy	28
Team	29
Definitions	30

Abstract

This paper presents GoNetwork, a secure decentralized e-commerce platform leveraging the blockchain technology, and its application in the virtual goods marketplace. GoNetwork provides a platform that unifies app economies across Mobile, Web and Desktop platforms, allowing users seamless trade and purchase of virtual goods across the internet ecosystems and between users.

Mobile app economy is set to grow to \$6.3 trillion in 2021, user base to nearly double to 6.3 billion¹. 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.

Till 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 attention².

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 2015³. 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.

GoToken by GoNetwork is the very first virtual currency designed to solve virtual coin liquidity problem for users and give developers a way to increase engagement and revenue per user. As stated earlier; the app economy will grow to \$6.3 trillion and 10% is attributed to virtual goods. With GoNetworks transactional model and token economics, at critical mass \$3 billion dollars in transaction fees will be generated on primary sales alone, with a 2x return on if a virtual asset is resold just once.

¹<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/>

²https://thenextweb.com/contributors/2017/05/28/2017-beginning-end-app-economy/#.tnw_LdfRmEXH

³Super Data Research – Virtual Goods Market Size 2014 – 2020E; NEWZOO Study, The Global Games Market 2015 – April 2015

Market Assessment

Global 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.

Global App Economy 2016 - 2021
In billions (USD)

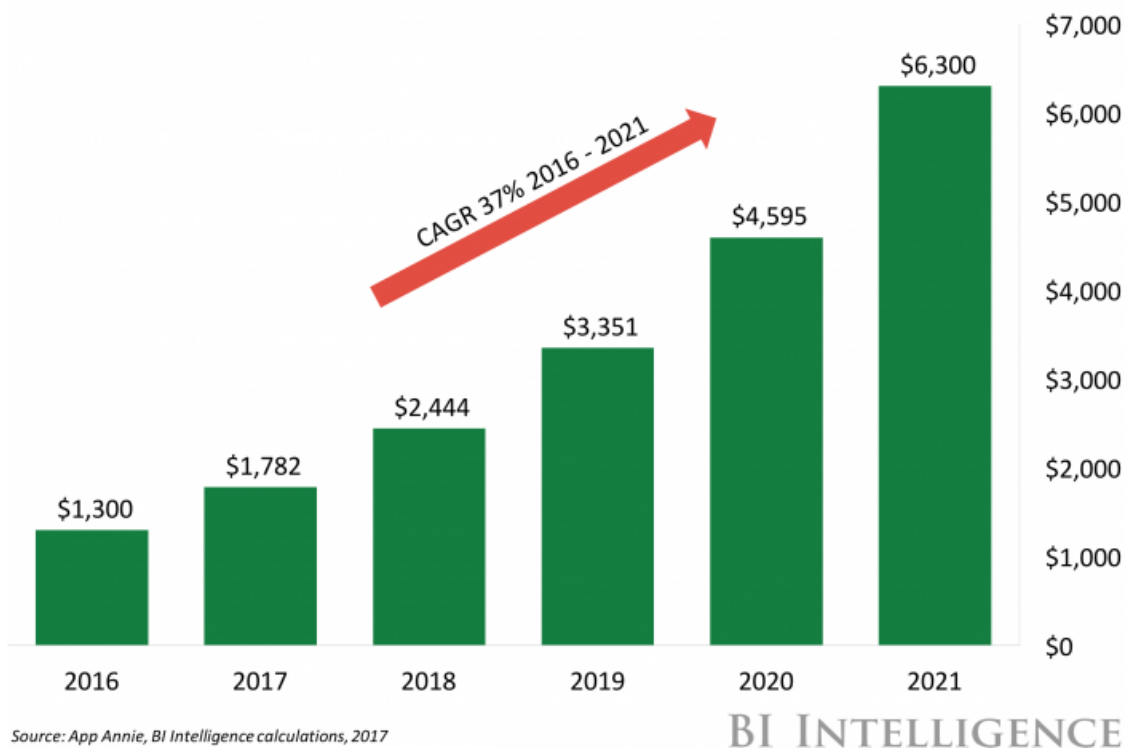


Figure 1: Global App Economy 2016 - 2021

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.

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.

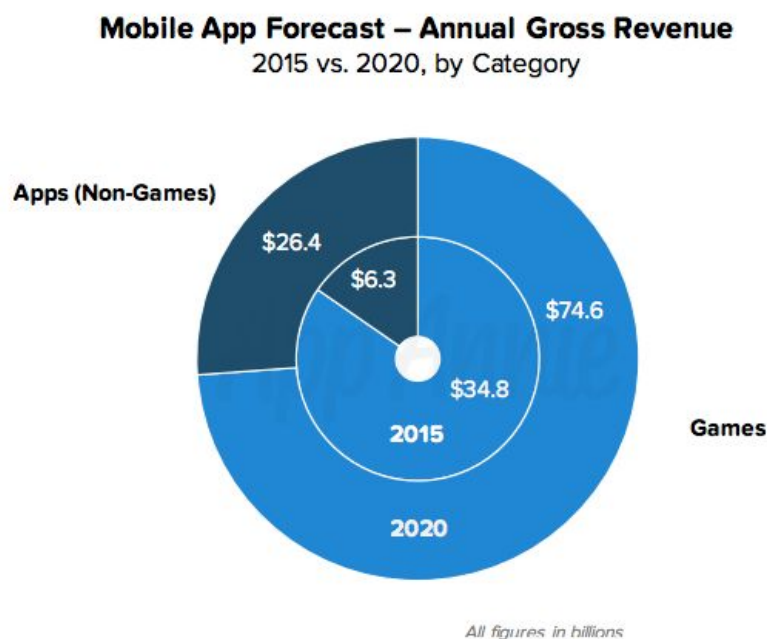


Figure 2: Mobile App Forecast - Annual Gross Revenue

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 3: 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 revenues⁴. 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 games⁵. In the largest 2 game markets globally, 38.5% of gamers play across PC, Mobile and console platforms⁶.

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 2009⁷ to \$5 billion in 2015.

⁴ Newzoo, 2014

⁵ <https://venturebeat.com/2016/12/25/5-lessons-from-the-15-billion-virtual-goods-economy/>

⁶ <https://newzoo.com/insights/infographics/chinese-gamer-2017/> and <https://newzoo.com/insights/infographics/the-american-gamer-2017/>

⁷ <https://goo.gl/CLrfzi>

Demographics

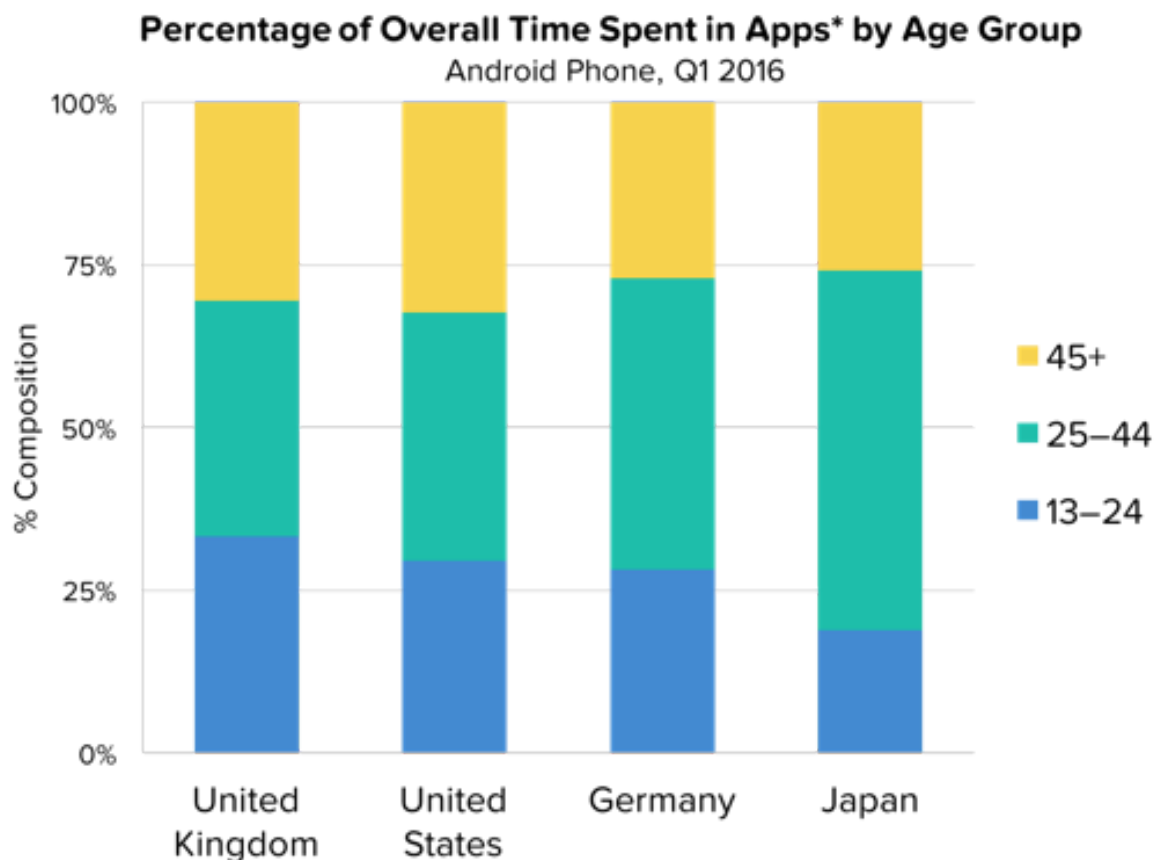


Figure 4: Percentage of overall time spent in app by age group on Android Phones.

On mobile platforms, there is a large underserved market. The 13-24 demographic represents 30% of the total time spent in-apps⁸ 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 commitments⁹.

⁸<https://www.appannie.com/en/insights/market-data/global-app-consumer-how-understanding-demographics-creates-new-opportunities/>

⁹http://ebusiness.mit.edu/research/papers/2011.10_Jung_Lee_Yoo_Brynjolfsson_Analysis%20of%20the%20Relationship_300.pdf

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:

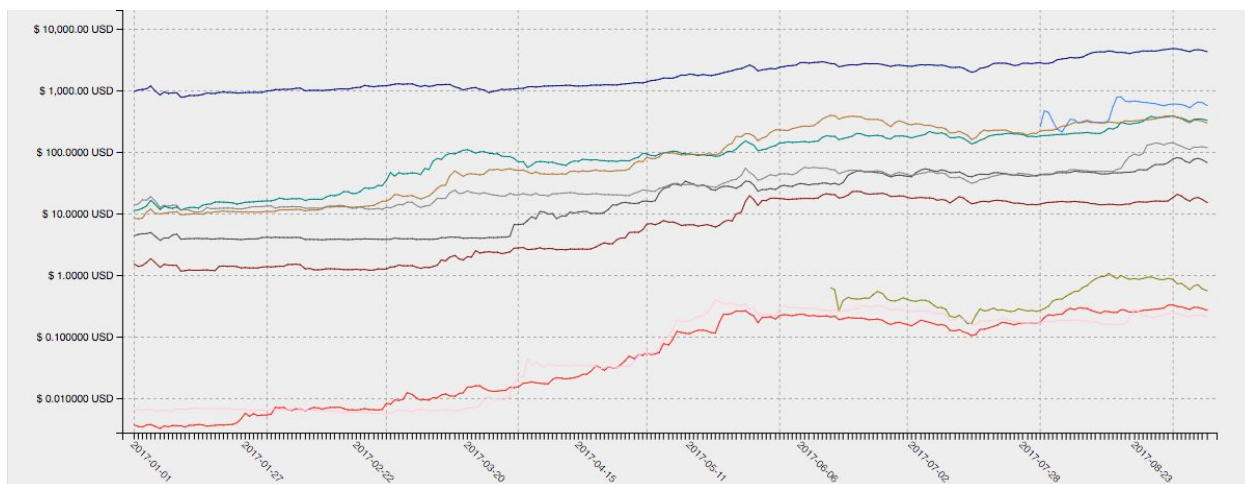


Figure 5: August 2017 global cryptocurrency market capitalization in USD.

The total market cap at the time of writing is **\$142,901,896,594 USD**¹⁰.

¹⁰ <https://coinmarketcap.com/>

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 fraud¹¹. China has a much higher rate of fraud; **50-99% percent of all virtual good purchases are illegitimate**¹². Considering China alone will take one-quarter of all global game revenues, reaching \$27.5 billion in 2017¹³, revenue losses can be measured in the billions. Mobile apps are not immune either. Pokemon go, which generated \$1Billion¹⁴ in a year, suffered from black markets reselling virtual content and accounts¹⁵. When fraudulent in-app purchases pollute the economics the experience for users is ruined and many abandon the application outright.

Top 10 Countries, Ranked by Highest vs. Lowest Rates of Mobile In-App Virtual Goods Theft, May 2015			
<i>number of virtual goods stolen per legitimate purchase</i>			
Highest in-app purchase theft rate		Lowest in-app purchase theft rate	
1. China	273.2	1. Norway	0.2
2. Taiwan	54.1	2. UK	0.4
3. Saudi Arabia	24.6	3. Japan	0.7
4. Israel	18.3	4. New Zealand	0.9
5. Hong Kong	18.1	5. Australia	0.9
6. United Arab Emirates	8.1	6. Switzerland	0.9
7. Russia	7.3	7. Denmark	1.3
8. Singapore	5.5	8. Canada	1.4
9. Mexico	5.2	9. US	1.5
10. India	3.8	10. Sweden	2.3
<i>Note: virtual goods downloads (e.g., game levels or in-game items) that occur with no corresponding transfer of funds</i>			
<i>Source: Apsalar, "Apsalar App Install and Transaction Fraud Index," July 14, 2015</i>			
192777		www.eMarketer.com	

Figure 6: Top 10 countries, ranked by the highest vs. lowest rates of mobile in-app virtual goods theft, May 2015.

¹¹ <https://www.emarketer.com/Article/Rising-Tide-of-In-App-Fraud/1012731>

¹² <https://techcrunch.com/2016/01/20/virtual-goods-real-fraud/>

¹³ <https://newzoo.com/insights/articles/the-global-games-market-will-reach-108-9-billion-in-2017-wit-h-mobile-taking-42/>

¹⁴ <https://techcrunch.com/2017/02/01/report-pokemon-go-has-now-crossed-1-billion-in-revenue/>

¹⁵ <http://www.mirror.co.uk/tech/pokmon-go-black-market-thriving-8447476>

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 inventory¹⁶.

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 significantly¹⁷. User attention and playtime is a proxy for revenue; **a 10% increase in the playtime causes a 7% increase in revenue**¹⁸.

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 commission 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

¹⁶ <http://kotaku.com/thousands-get-banned-from-pokemon-sun-and-moon-for-chea-1791653289>

¹⁷ <http://flurrymobile.tumblr.com/post/144245637325/appmatrix>

¹⁸ http://ebusiness.mit.edu/research/papers/2011.10_Jung_Lee_Yoo_Brynjolfsson_Analysis%20of%20the%20the%20Relationship_300.pdf

Blockchain Transaction Scalability

Current public blockchain solutions including Ethereum do not have the throughput scalability to process the number of transactions generated by mobile microtransactions.

Vision

A secure decentralized e-commerce engine unifying mobile to desktop app economies.

We are creating the first ever cryptocurrency that will be used by mass mobile, desktop and web app consumers.

GoNetwork Benefits

Developer and Content Creator Benefits

- **At least a 10% increase in LTV** of a virtual asset¹⁹ 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
- Easily use cryptocurrency for in-app purchases

GoToken Debit Card

- Anyone who holds GoTokens will be able to connect their GoWallets to GoToken debit card and spend GoTokens as fiat currency anywhere in the world.
- Fees will be minimal and as the card uses Visa infrastructure - can use it almost anywhere in the world.

¹⁹ <https://techcrunch.com/2010/12/31/the-year-in-virtual-goods-by-the-numbers/> - As of 2010

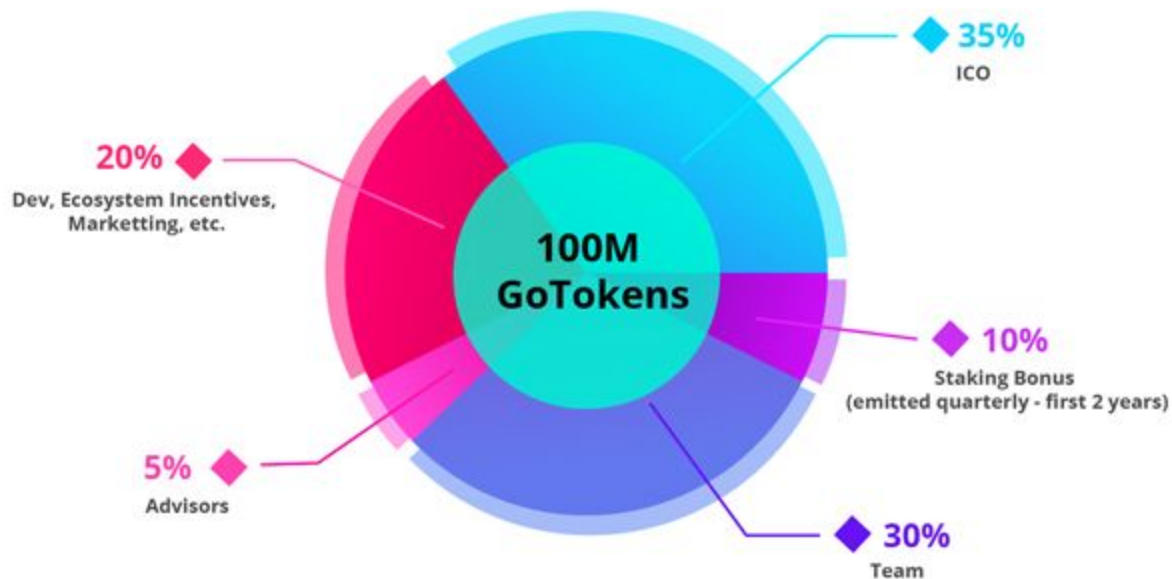
-
- We will use a technique called JITF (Just in Time Funding). Here's a breakdown on how an entire transaction will work using the GoToken debit card:
 - User is issued either a physical or virtual GoToken debit card that is linked to their account wallet
 - Card contains \$0 at all times - user swipes card to pay for a purchase
 - Transaction is sent to our server
 - Server checks which fiat currency is requested (USD, CAD, EUR)
 - GoNetwork checks if user account wallet contains enough GoToken to make the purchase
 - GoToken is then sold for requested fiat Fiat is moved to the debit card
 - Transaction is approved card balance is back to \$0

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 thirty five 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.



- Target on crowdsale: \$30,000,000
- Presale Cap: \$20,000,000
- Total token supply: 100,000,000 GOT
- GOT Token type: ERC20
- Purchase methods accepted: BTC and ETH

Passive Income & Bonuses

Each transaction that happens in the GoNetwork will incur a transaction fee. Part of it will go to the GoToken Foundation for maintenance and proliferation work, part of it will go to the node operators and the rest will be awarded to everyone who is holding GoTokens in their GoToken wallet. This award of GoTokens to everyone who is keeping GoTokens in their wallet is referred as staking.

As a case study; app economies will grow to \$6.3 trillion. 10% of the value is attributed to virtual goods sales and In-App purchases. Considering GoTokens 1.5% transaction fee, a primary market sale will generate **\$1 billion dollars in revenue a year on 17% market penetration**. On average, an asset is resold 3-5 times, so projected transaction fee revenues would amount to **\$3-5 billion a year**. A majority of this is **redistributed to GoToken stakers**.

In addition to staking, during the first two years after the ICO, we will make a limited bonus emission to reward our community members who hold GoTokens. The bonuses will be credited on the last day of each month. Everyone who holds GoTokens will get added GoTokens automatically at the last day of each month. Bonus emission will be active during 2 years. 10 million GoTokens will be emitted in the first 8 quarters moving the total token supply to 40 million tokens. Each month the percent is different: 6.67%, 4.69%, 4.48%, 4.29% etc.



Figure 7: The chart shows the “Estimated Staking Bonus” that will be given back to the users holding the GoTokens in their GoWallet. The Staking Bonus is an estimate based on the usage of the network - we expect annualized bonuses upto 14.8% for the first 5 years - this will change as network usage grows and more nodes are added to the network. The “10M Bonus Tokens Disbursement” is part of the 10 million tokens that will be distributed as additional staking reward to thank the early adopter

token holders as they stake their coins while the GoNetwork gains traction and growth. To sum up, in the first two years upto 59.01% bonus can be earned by staking GoTokens in GoWallet.

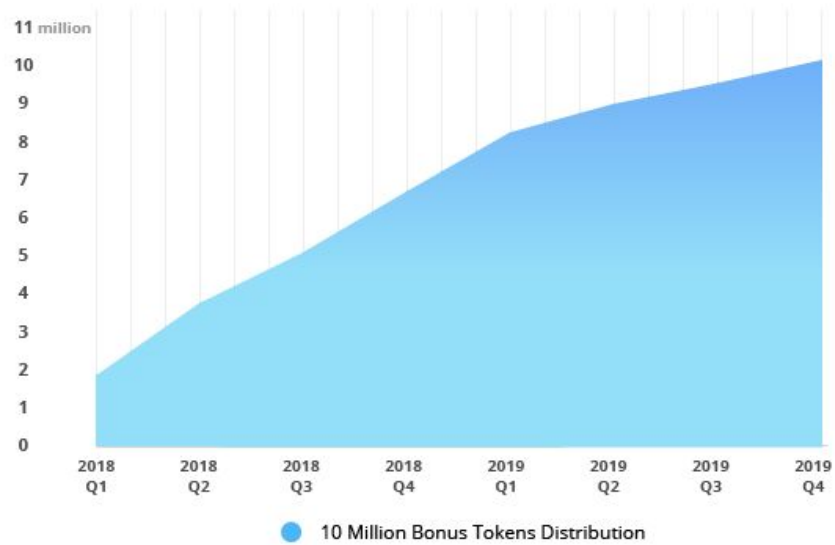


Figure 8: Distribution structure of the 10 million bonus token over time

Platform Overview

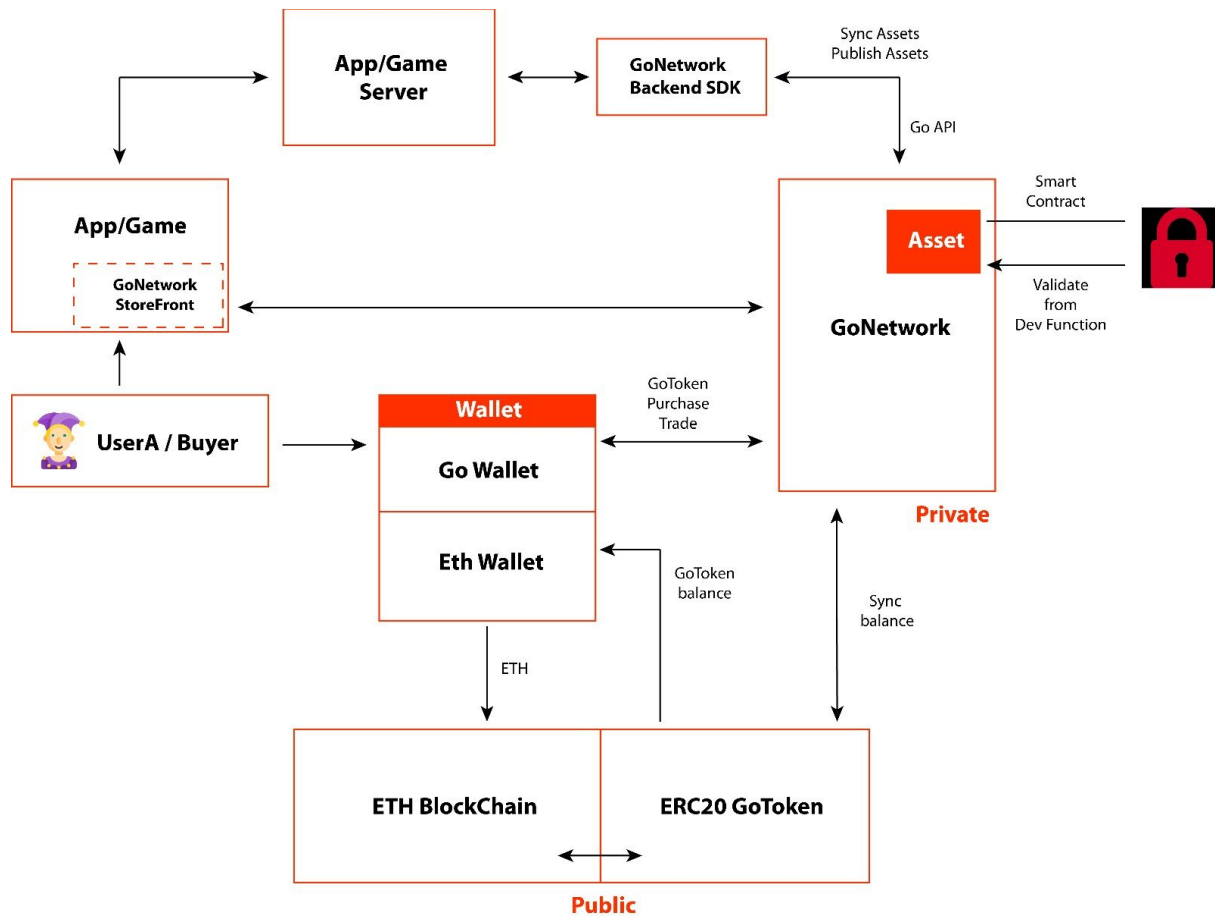


Figure 9: GoNetworks high level overview.

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/OTP²⁰:

- Amazon uses Erlang to implement SimpleDB, providing database services as a part of the Amazon Elastic Compute Cloud (EC2).

²⁰ <https://goo.gl/BtJA2P>

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- 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.

Smart Contract API

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

Virtual Asset Contract

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

- 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

GoNetwork implements a trade contract allowing users to setup their own bartering and exchange agreements which may include any combination of virtual assets and GoTokens. 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 $n \times G = 0$

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 $e = \text{HASH}(m)$, 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 $r = x_1 \bmod n$. If $r = 0$, go back to step 3.
6. Calculate $s = k^{-1} \{z + r d_A\} \bmod n$. 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 $s = k^{-1}(z + d_A r)$, 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 $n \times Q_A = O$

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 $e = \text{HASH}(m)$, where HASH is the same function used in the signature generation.
3. Let z be the L_n . leftmost bits of e .
4. Calculate $w = s^{-1} \bmod n$.
5. Calculate $u_1 = zw \bmod n$ and $u_2 = rw \bmod n$
6. Calculate the curve point $(x_1, y_1) = u_1 \times G + u_2 \times Q_A$. If $u_1 \times G + u_2 \times Q_A = O$ then the signature is invalid.
7. The signature is valid $r \equiv x_1 \pmod{n}$, invalid otherwise.

Note that using Shamir's trick, a sum of two scalar multiplications $u_1 \times G + u_2 \times Q_A$ 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%.

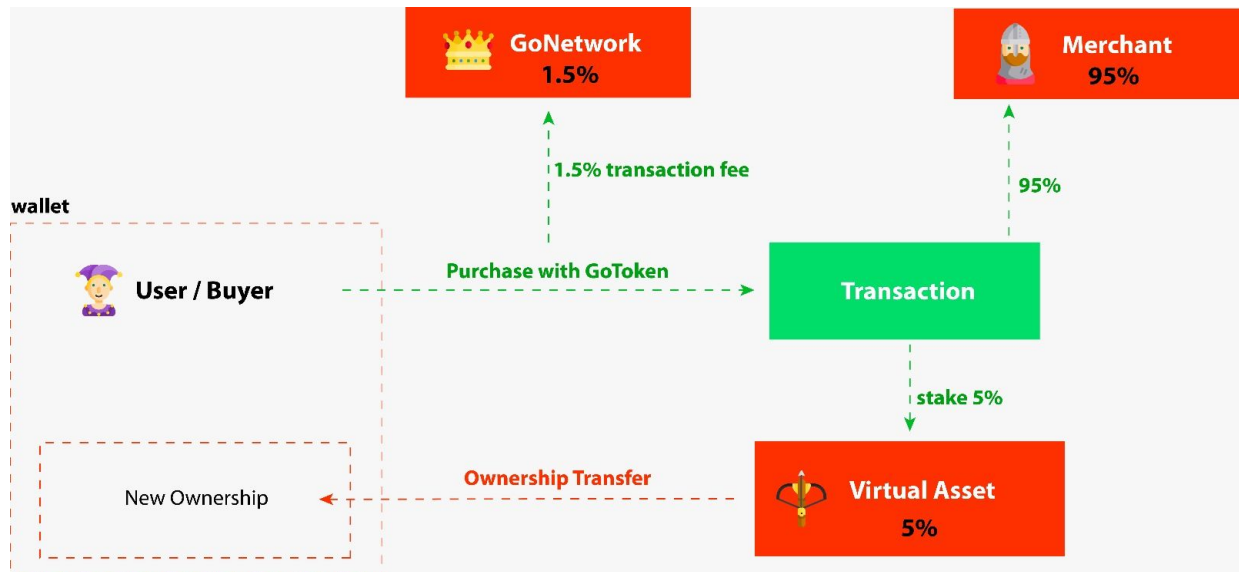


Figure 10: Primary Market transaction: A user wants to buy a Virtual Asset from a Content Creator or App Developer

When an app developer or content creator makes an initial (Figure 10: primary market) sale, up to 5% of the value is tied to the asset and the remainder is collected by the Creator. A percentage is tied to the contract to ensure a virtual asset has a monetary value even if the originating apps economy ceases. This method effectively stakes GoToken with the number of virtual assets generated on the platform.

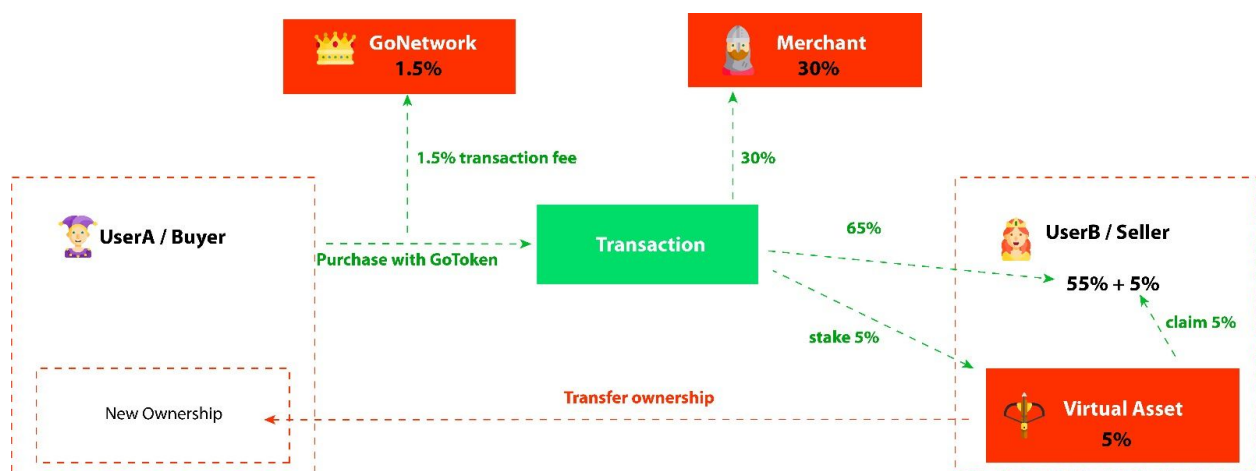


Figure 11: Secondary Market transaction - User A wants to purchase a Virtual Asset from User B

On any resale (Figure 11: secondary market) of a virtual asset, the content creator remains a benefactor collecting 30% of the resale price, 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 access to app-users to the GoNetwork 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 GoNetwork blockchain to view and complete transactions amongst users. The wallet is a fork of <https://github.com/ethers-io/EthersWallet-ios>.

Network Scalability

Ethereum currently depends on proof of work to secure transactions, meaning the transaction throughput of the system is limited to 1TX every 17 seconds. Scaling methods are being proposed by the Ethereum community and GoNetwork will seamlessly deploy solutions as they reach commercial release²¹ including the RAIDEN network.

GoNetworks initial deployment implements an eventually consistent off-chain cache for “unverified” transactions. An app developers backend system registers for push notifications from the GoNetwork. Once the transaction is written to the blockchain, the state of the asset is set to verified and a push notification is sent to registered apps enabling them on the app-users interface.

Furthermore, the initial blockchain will be operated by GoNetwork, however, A network consortium will be established with Developers and Content Creators as the user base grows.

Governance and Trust

When a proposal for a change in GoNetwork is released, A vote is taken. Voting shares are distributed based on GoToken stake.

²¹ <https://github.com/ethereum/wiki/wiki/Sharding-FAQ>

GoNetwork 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 broken²².

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 exchange²³.

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

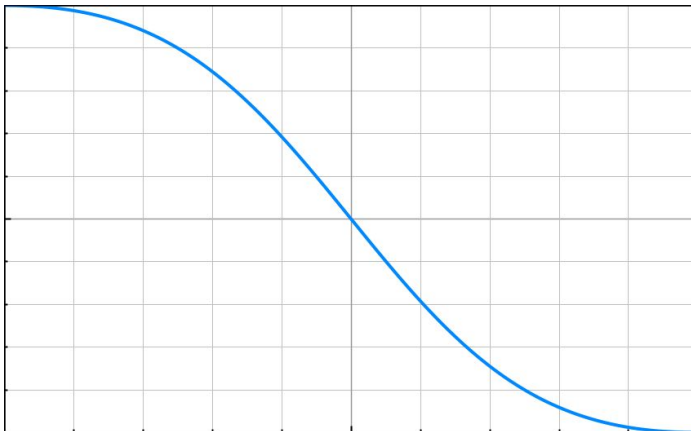
²²

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

²³ <http://www.nber.org/papers/w16852.pdf>

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 signature²⁴; 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.
- Reputation Token Decay; The total reputation a comment can achieve is defined by a parametric curve of degree 2 of the form:
$$Reputation = RepToken * [1 - x(n, t)^2 / x(n, t)^2 + (1 - x(n, t))^2] \text{ where } x(n, t) = [0, 1]$$



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.

²⁴ <https://arxiv.org/pdf/1612.01188.pdf>

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

Adoption Strategy

The alpha version of GoNetwork SDK and GoNetwork platform will be launched in September 2017. We expect strong growth in the value of the GoTokens as its usage grows within various apps on iOS, Android, Amazon, Blackberry and Windows Mobile platforms.

To kick start the growth we will be integrating GoNetwork SDK inside all Infinidy Corp games which has a user base of over 15 million users. GoNetwork SDK will also be integrated in the dubsquad.me app. 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 known 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.

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. Ethereum Investor.

Xun Cai

COO

Graduated with distinction and honours in Software Engineering from the University 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 digital 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.

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.