



Worldwide Asset eXchange (WAX)

Global Decentralized Marketplace for Video Game Virtual Assets

White Paper

Version 1.7

December 23, 2017

By Jonathan Yantis, COO, WAX | William Quigley, CEO, WAX | Malcolm CasSelle, President, WAX

From the founders of OPSkins

opskins.com | waxtoken.com

WAX is the onramp for mass market
cryptocurrency adoption.

-William Quigley, OPSkins CEO

Special thanks go to **Jonathan Yantis**, the creator of real money trading for virtual items in 1997 and to **John Brechisci, Jr.**, for creating OPSkins to enable skins to be freely convertible into fiat almost anywhere in the world.

From the founders of OPSkins
opskins.com | waxtoken.com

Market Problem	05
----------------	----

Solution: Worldwide Asset eXchange (WAX)	06
--	----

WAX Value Proposition	07
-----------------------	----

WAX Team	10
----------	----

WAX Functionality	11
-------------------	----

WAX Protocol	12
--------------	----

WAX Tokens	12
------------	----

WAX Accounts	13
--------------	----

Delegated Proof of Stake	14
--------------------------	----

Guilds	16
--------	----

Transfer Agents	17
-----------------	----

Transactions and Messages	19
---------------------------	----

Voting	19
--------	----

Contracts	20
-----------	----

Proposal	20
----------	----

Rating	21
--------	----

Listing of Virtual Goods	21
--------------------------	----

Purchase of Virtual Goods	22
---------------------------	----

Settlement Execution Contract	23
-------------------------------	----

Dispute	24
---------	----

Transfer of Digital Goods	24
---------------------------	----

WAX Applications	25
------------------	----

WAX Connect	25
-------------	----

WAX Node	25
----------	----

WAX Wallet	25
------------	----

WAX Core	26
----------	----

WAX Roadmap	26
-------------	----

WAX Token Sale	26
----------------	----

Token Sale	27
------------	----

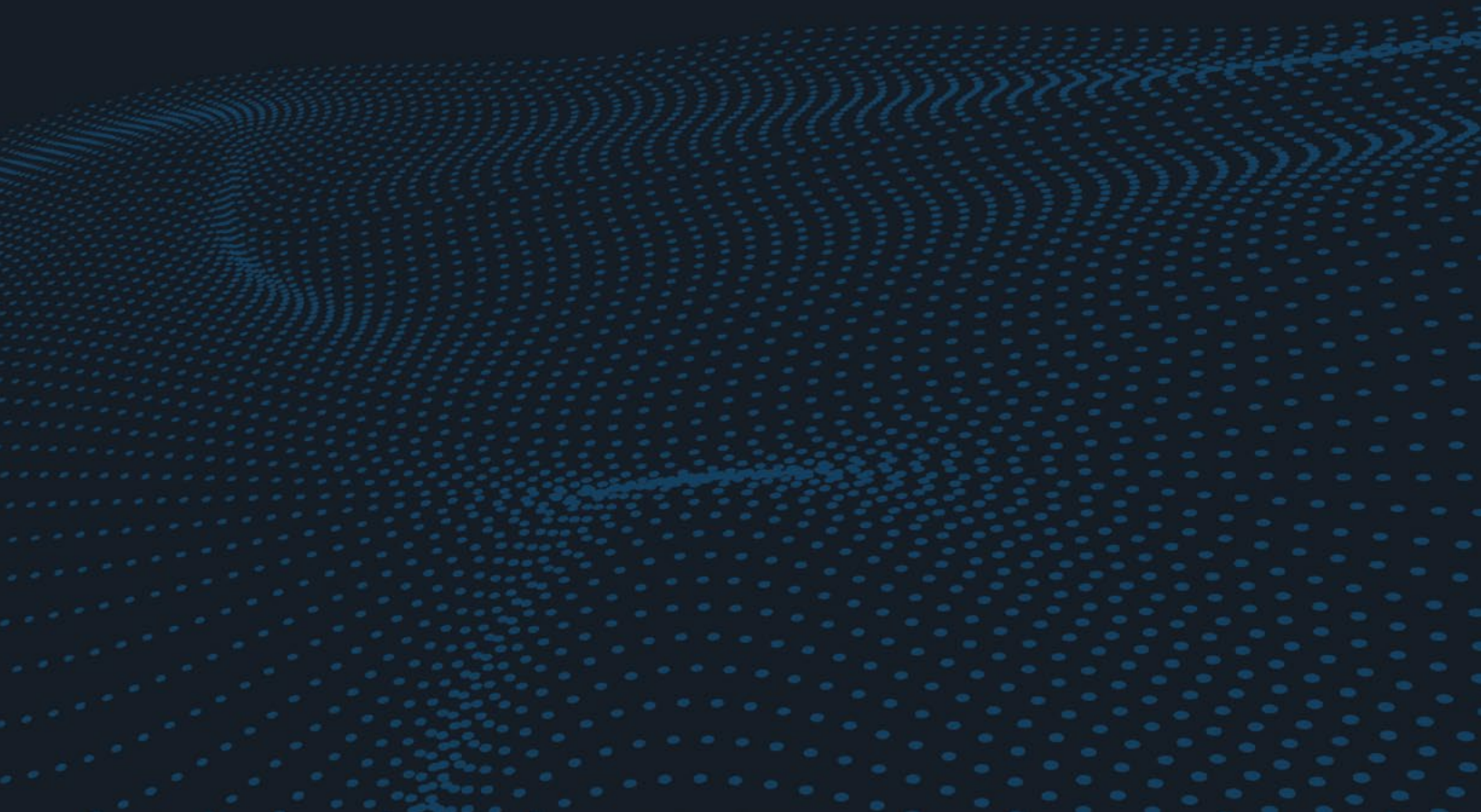
Market Development	27
--------------------	----

Contributors and Advisors	27
---------------------------	----

WAX Team and Founders	28
-----------------------	----

Token Sale Process	28
--------------------	----

Use of Proceeds	29
Legal Requirements	29
Summary & Conclusion	30
Appendix A: WAX Use Case	31
Appendix B: Marketplaces Create Wealth	34
Centralized Virtual Goods Marketplaces	36
Constraints of Centralized Marketplaces	36
Benefits of Decentralized Marketplaces	36
Appendix C: Virtual Goods Trading	38
Virtual Goods Example: Item Skins	39
Table: Key Friction Factors in Virtual Goods Trading	40
Disclaimer	44



Market Problem

Each year, 400M+ gamers purchase \$50B+ in virtual items worldwide. The vast majority of gamers who buy and sell virtual assets today are likely to have their items stolen or pay exorbitant fees through cross-border transactions unless they go to a centralized trading platform. This market friction is the key factor limiting the growth of this \$50+ billion market.

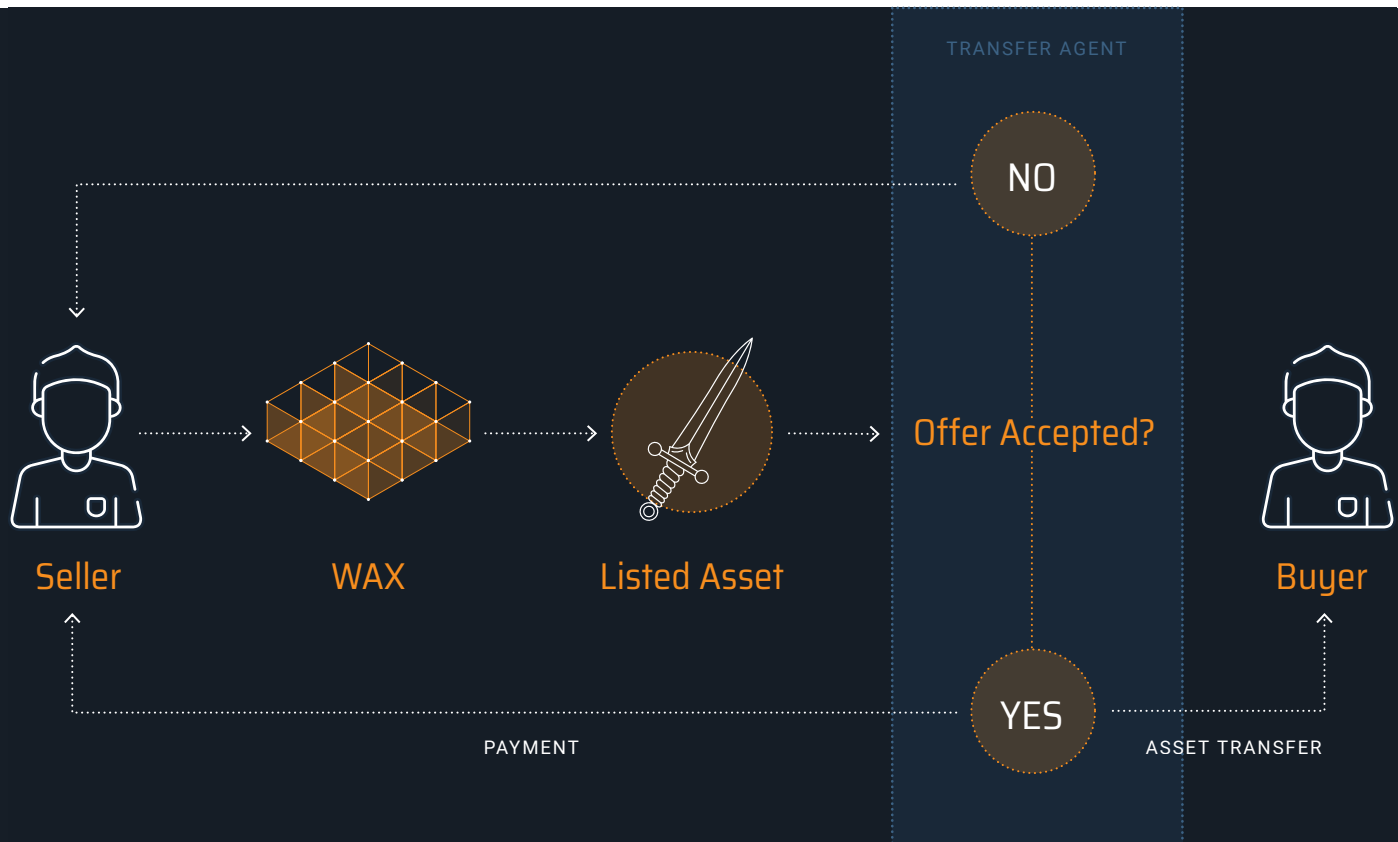
The net effect of the lack of marketplace trust is that the virtual asset trading industry is fragmented across hundreds of competing marketplaces, each utilizing different business practices tailored for their region of the world. This creates significant territorial supply and demand imbalances.

The ideal solution to this problem is a global virtual asset repository, accessible to anyone, which provides a complete catalog of all items available for sale in real time. Such a repository, when coupled with distributed trust mechanisms, and a reliable low-cost settlement network, will vastly improve price discovery and market liquidity, thereby increasing market size.



OPSKins, the world's largest platform for video game virtual goods traders is building a blockchain protocol called Worldwide Asset eXchange (WAX), designed to enable an unlimited number of marketplaces operated by individuals or small businesses to buy, sell and trade virtual goods at scale with just a few clicks.

Solution: Worldwide Asset eXchange (WAX)



The role of the WAX Platform as a virtual goods marketplace is to decentralize exchanges while allowing users to purchase goods with a global token. With this important shift in structure, millions of buyers and sellers will have the power to use their social graphs to buy and sell virtual goods effortlessly. WAX can support a variety of selling structures to maximize liquidity, such as bidding, reserve bidding or fixed price. The cottage industry of buyers and sellers currently served by OPSkins will not have to develop complex backend systems but, instead, will use the WAX Platform to leverage the most powerful aspects of the OPSkins asset exchange.

WAX will enable a new generation of virtual asset traders, in a similar way that modern marketplaces enabled entrepreneurs to become power sellers online, ride share drivers or hosts for travelers (Alibaba, Amazon, Uber, and Airbnb). These platforms enhanced commerce for millions of small business owners and created hundreds of billions of dollars of

new value by making their platforms easy to use and widely available, while simultaneously solving expensive problems like fraud prevention, settlement execution, product and seller reviews, standardized catalogs of product information, supply and demand matching, etc.



A user decides to purchase a virtual good by selecting “buy now” in the WAX widget and is presented with an authentication window. If this is the first time he is interacting with the WAX Platform, he’ll be taken through an onboarding process that creates an identity, allocates a WAX Wallet, and allows him to fund the immediate purchase, all without forcing him to understand WAX, the WAX Platform, or WAX Tokens. From the buyer’s perspective, all that is required is to select an item, provide payment, and, a short while later, the item shows up in his personal inventory without him ever leaving the site he was visiting.

WAX Value Proposition

WAX is a decentralized platform that enables anyone to operate a fully functioning virtual marketplace with zero investment into security, infrastructure or settlement. Developed by the founders of OPSkins, the world’s leading marketplace for online video game assets, WAX is designed to serve the 400+ million online players who already collect, buy and sell. With the inclusion of WAX’s simple exchange widget, gamers will have access to a worldwide market, with blockchain trust and transaction verification.



2004

Peer-to-Peer Transactions

As World of Warcraft grew to 12 million subscribers, a vibrant peer-to-peer secondary market develops to sell in-game goods for cash. For most users, this was risky and difficult.



2015

Centralized Marketplace



WAX

Decentralized Marketplace

The WAX Platform, a decentralized marketplace, allows buyers and sellers to deal directly with each other at low cost.

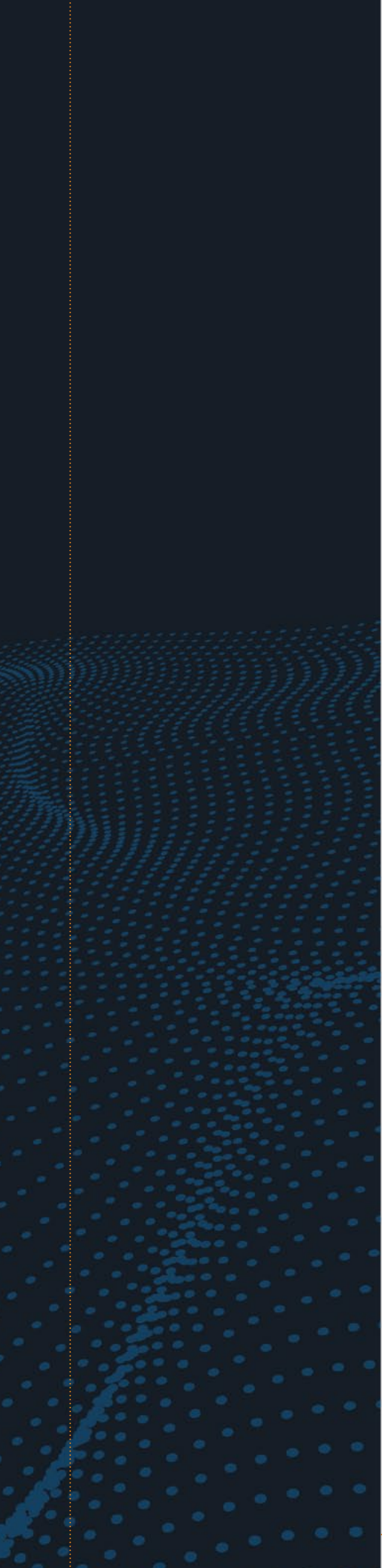
The WAX Platform will allow millions of traders to create their own virtual stores on one decentralized platform. The WAX Platform unites everyone, providing security, transaction, and settlement services that will usher millions of new participants into a growing ecosystem.



OPSKins introduces the WAX blockchain protocol, connecting 2 billion gamers worldwide¹ to a highly sophisticated virtual goods exchange. By decentralizing these exchanges, vastly more trading in the already sizable \$50 billion video game virtual goods trading market is possible.

With massive liquidity, buyers and sellers get the best prices and the quickest settlement, while the global gamer community as a whole receives their own secure virtual asset exchanges on the blockchain with WAX. Similar to how marketplaces such as Amazon, Alibaba, Uber,

¹ See <https://mygaming.co.za/news/features/89913-there-are-1-8-billion-gamers-in-the-world-and-pc-gaming-dominates-the-market.html>



and Airbnb changed commerce for millions of small business owners and created hundreds of billions of dollars of new value, WAX empowers a new generation of virtual asset traders.

400+ million multi-player online gamers are increasingly familiar with buying and selling virtual online game assets. To provide a trusted third party assist, transfer agents are required to facilitate moving items from sellers to buyers. This complicated process is operated by a combination of Application Programming Interfaces (API's) and bots. Virtually all the open source software used in the industry was written by the OPSkins team. OPSkins, a pioneer in the online gaming industry, has developed the method for WAX to empower all key constituents of the ecosystem to earn more by expanding their ability to buy and sell online game assets.

For example, a site attracts someone to list their item for sale, that site owner would get a share of the listing fee. Similarly, if a site attracts a buyer who ultimately buys an item, that site owner would get a share of the transaction fee. Many affiliates working with OPSkins today have already leveraged their participation into small virtual goods businesses. But that process is complicated, settlement takes more than 30 days, and there are problems with transaction verification and accounting.

These and many not-yet-developed silos of activity will work independently and collectively to make the decentralized exchange work. OPSkins runs as a centralized mechanism, and by sort of “exploding those out” and atomizing them, we allow the whole ecosystem to grow, because everyone gets to play a role where they can provide value. Now rather than one market player many times larger than its nearest competitors, thousands of sites can all be just as significant without having to invest tens of millions of dollars in software development and hardware infrastructure.



Normally the place to buy or sell shares in Germany's top companies, Deutsche Boerse is launching a new exchange for people to trade virtual goods from video games, tapping into a multi-billion U.S. dollar market. - FRANKFURT (Reuters)²

WAX Team

Created in 2015, OPSkins quickly became the global marketplace leader for video game virtual assets. The company has facilitated over 100+ million purchases annually for millions of customers across 95 countries. OPSkins built a centralized solution to address the greatest needs of the marketplace, reducing friction between buyers and sellers. These challenges are non-trivial and create a high bar for success: critical mass of buyers and sellers to create liquidity, settlement execution due to lack of trust between buyers and sellers, 100% of fraud loss shifted to the platform rather than the customers, cross-border execution, multilingual offerings, etc.

In building the number one centralized marketplace, OPSkins' founders recognized an even greater potential to grow the market by decentralizing it and giving the power of the marketplace to millions of video game entrepreneurs and influencers who have social graphs, traffic, content, and existing followers. By shifting the parts of the marketplace that are complex and expensive to build to the video gamer ecosystem and by decentralizing those components on the blockchain, the market will grow even faster than it has already, and everyone will be able to benefit from that growth.

² See <http://www.reuters.com/article/us-deutsche-boerse-gaming-idUSKBN13Q4ZG>

WAX Functionality

WAX is a global peer-to-peer marketplace for video game virtual goods trading based on decentralized smart contracts on the blockchain. The WAX platform will allow the global pool of buyers and sellers to access the global supply of virtual goods in a decentralized market while eliminating financial risks they encounter from the prevailing consignment-based marketplace model in use today. Utilizing smart contracts that incorporate the OPSkins team's 20 years and billions of transactions of virtual item experience, WAX supports a platform where all market participants—listing and selling agents, item settlement agents, appraisers, affiliates, buyers, and sellers—will merchandise, apportion fees and settle transactions quickly and securely.



What are the shortcomings in the existing ecosystem of decentralized exchanges? They don't support the specific needs of the online video game asset trading market. Here is a comparison to some of the more well-known offerings.

				
Decentralized Exchange	✓	✓	✓	✓
Multi-Party Payout	✓	✗	✗	✗
Settlement Agent	✓	✗	✗	✗
Asset Agnostic	✓	✗	✗	✗

WAX Protocol

The WAX Protocol is a decentralized blockchain solution that focuses on the transfer and exchange of virtual goods and services. This protocol is focused on serving the rapidly growing gaming industry but is flexible enough to meet a variety of other use cases.

WAX intends to meet the needs of customers who use a huge number of gaming platforms—each with their own exchange model and transfer conditions—while supporting the entire network. To meet the high throughput demand of these markets, a Delegated Proof of Stake (DPOS, further explanation below) consensus algorithm was selected, with selected confirming nodes, or “Guilds”, focusing on a single game.

WAX Tokens

WAX Token (market abbreviation WAX) is the native token of the WAX Platform, and supports all activities and functionality on the WAX Platform.

WAX Token is a platform utility medium that enables users to list items for sale, transact value between each other, settle the transfer of virtual goods, create and service contracts, and propose and vote for WAX

Guilds. The application of WAX Token is entirely focused on these functions, and developed to strongly enforce security during digital exchange.

Virtual goods' sales prices are listed in WAX Token; when a user wants to purchase the virtual good they pay with WAX Token. If the item is listed in a different currency (through a site linking to the WAX Platform), the WAX Token must be converted by the listing agent at the current exchange rate at time of purchase.

The number of votes a user can distribute to one or more Guilds is equivalent to the number of WAX Tokens such user holds. When WAX Tokens are transferred, the vote allocations are diminished by the same amount, so it is important to hold a reserve of WAX Tokens to ensure a user's delegated votes remain sufficiently high.

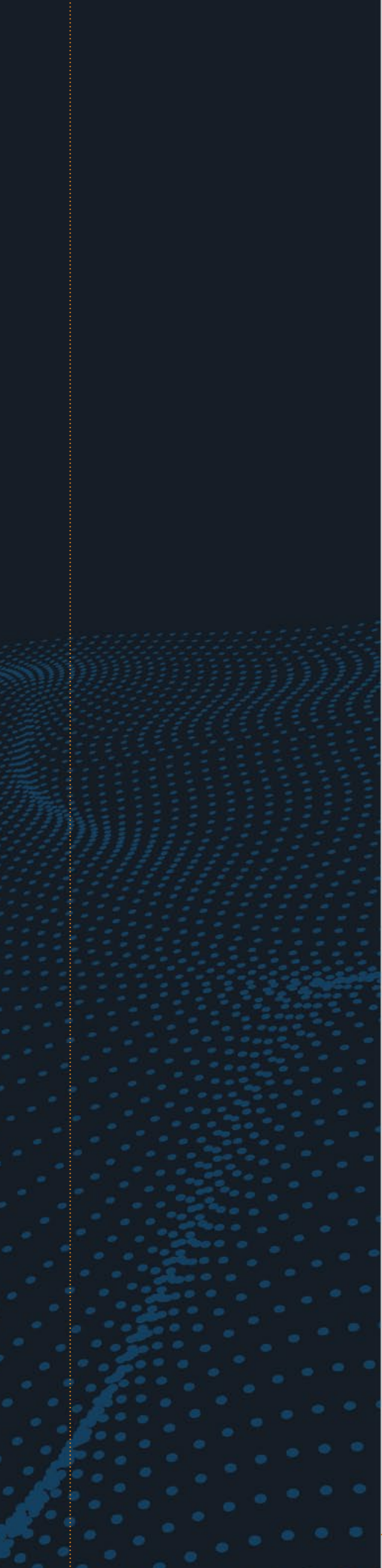
A small amount of WAX Token is also used during transactions and messages, as a fee for using the network. This fee, similar to ETH Gas and Bitcoin Fees, incentivizes Guilds to include transactions into blocks.

All accounts have the ability to transfer WAX Tokens between themselves and other users. This involves the reassignment of asset (X) from one account (A) to another (B), with enforcement that the originating account (A) was in possession of at least that many WAX Tokens (X) before the transaction was approved.

All settlements on the WAX Platform are conducted in WAX Token. Since WAX Token is divisible to 18 decimal places (10⁻¹⁸), the transfer of WAX Token also allows for micro-settlements, a feature likely to be leveraged for future virtual goods.

WAX Accounts

On the WAX Platform there are four types of accounts, three controlled by external agents and one autonomously; Users, Guilds, Transfer Agents, and Contracts. Each of these accounts serves a distinct role in the WAX Platform.



User accounts control a single private key, and corresponding address, with which they create and sign transactions. Users may control WAX Tokens as well as digital goods, and cannot have their control of these goods revoked by any other user. Most User accounts will be proxied by an exchange and listing website (such as OPSkins.com), though it will be possible for a User to directly interact with the WAX Platform.

Guilds are the confirming nodes of the WAX Platform and are elected by DPOS from users. Each Guild is created with a private signing key and corresponding address, as well as a single public encryption key and private decryption key that is used in a multi-party encryption schema for listing assets. Guilds are responsible for forming blocks of transactions and must sign these blocks and transact them to other Guilds on the WAX Platform. For this service, they receive the fees earned within the block, and periodically transfer a percentage of these fees to their pledged stakeholders.

Transfer Agents are responsible for the in-game transfer of digital assets between Users. These accounts control two Hierarchically Derived (HD) Private Keys. The first is used to generate a master address and child addresses for the acceptance and transfer of virtual goods and WAX Tokens. The second is used to create unique public encryption keys to accept messages from Users. Through this channel, Users can securely communicate their in-game contact info to transfer or receive virtual goods. Each time a Transfer Agent accepts a Settlement Execution Contract, the WAX Platform will force the iteration of the HD Key.

Contracts are code stored in the WAX Platform state, that can be executed by external agent accounts. Contracts created on the WAX Platform are executed immediately and return the Contract address and functions. The WAX Platform supports a limited number of Contracts, such as Proposal, Listing, Settlement Execution, Request, and Virtual Good.

Delegated Proof of Stake

The WAX Platform uses a type of Delegated Proof of Stake

(DPOS) consensus algorithm, originally created by BitShares. This system allows for high transaction throughput, with the confidence of network support and trust.

Unlike a traditional Proof of Work system, confirming nodes are elected by users who pledge votes to proposed delegates. Holders of WAX Tokens will be able to submit proposals to the network for the election of a confirming node, called a “Guild” on the WAX Platform. Users will vote on the submitted proposals of potential Guilds, as well as existing Guilds. The WAX Platform will initially support 64 elected Guilds; Guilds are then ranked by the number of votes they receive, weighted by the game they support in their proposal.

Relying on WAX’s user base to elect Guilds (the elected delegates) will create sufficient decentralization to ensure a secure and trusted exchange. Users and Guilds (but not Transfer Agents) may pledge their WAX Tokens to proposals but cannot pledge to themselves.

Users are allowed to pledge only up to a total of eight proposals—and only one proposal per game or game/server—preventing large holders from unduly influencing a single game. As the user base supports many different titles, this will ensure votes are cast across numerous franchises and Guilds.

If users begin to lose confidence in a Guild, they may switch their delegated stake at any point to another Guild or proposal. While this will not force an immediate change in Guild status, it will alert users who support the Guild.

Users are encouraged to keep their WAX Tokens pledged through the earning of pledge rewards. A percent of the Guild’s earned fees will be redistributed to pledged Users, in proportion to their delegated stake amount. This system allows users to support the network through DPOS, while also not limiting the ability to change votes in favor of better Guilds.

Guilds

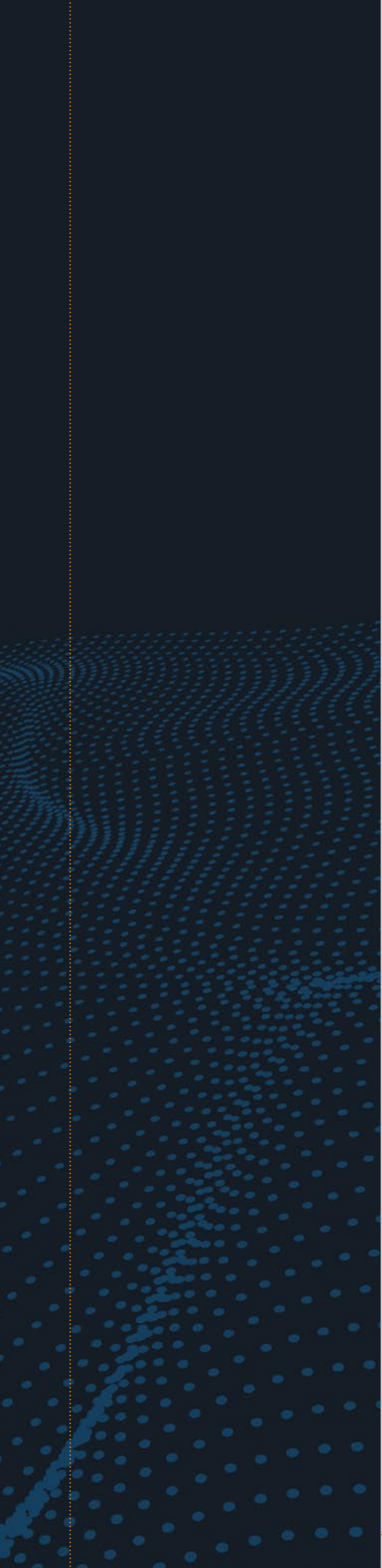
Guilds are the confirming nodes of the WAX Platform. Guilds will confirm transactions in a round-robin order. This ensures that all transactions are confirmed by at least one impartial party and maintain consensus of the network, while also retaining the speed and efficiency of a DPOS consensus.

While the WAX Platform will have 64 Guild positions upon release, this will be increased as new games and servers are released. This is easily signaled by the community presenting proposals for new games and/or servers not currently represented by a Guild. If these proposals receive enough votes during a set time period, the list of Guild positions will be expanded by eight. This balance prevents the number of Guilds from outpacing the WAX Platform's user community, while also prioritizing user demand for new games and servers.

Beyond consensus, Guilds have additional responsibilities to promote network health. For a Guild to be elected, they must first submit a proposal to the network that states the game they will service, the percentage of fees they will share to pledged users, and how they will monitor Transfer Agents. When a Guild proposal is approved, their public encryption key will be added to the multi-party encryption schema used for listing on the game or game/server.

Each Guild will focus on a single virtual good platform game or game/server. For example, a Guild may be formed for World of Warcraft "Aegwynn" server. Players of this game or game/server will therefore be encouraged to support the proposal, while simultaneously supporting the entire WAX Platform. Popular games and servers may have more than a single Guild, providing additional choice in services.

Guilds are responsible for assigning Transfer Agents to a purchased listing and transferring the contact details for users to the transfer agent. When a purchase is made, Guilds that service the items' game or game/server will be assigned the transaction. They will assign a Transfer Agent to the purchase, and the first one confirmed by the network will become the



accepted record. At this point, the Transfer Agent will have their HD keys iterated, and the Guild will encrypt a message of the contact details for buyer and seller to the Transfer Agent. To ensure this process runs smoothly, Guilds will devise systems to select Transfer Agents based on proximity to buyer/seller, time since last transfer assignment and activity level, overall number of current settlement execution contracts assigned, and—of course—Transfer Agent’s reputation score.

The Guild’s overall trust score is based on a combination of its delegated votes from users, as well as the average rating for active Transfer Agents for its game—a rise in dishonest Transfer Agents could lead to users switching their vote and the eventual disbanding of the Guild. As such, Guilds can ban Transfer Agents who have received a number of disputes.

Guilds are incentivized to high-quality service by receiving a percentage of the fees on lists, transfers, and Contracts. These fees are earned on the virtual goods they confirm during their confirmation turn, with additional bonuses paid out on virtual goods from their proposal. This encourages competition in the most popular and expensive marketplaces while providing a fair fee structure for games with a smaller user base.

Transfer Agents

Transfer Agents are users entrusted to accept and transfer virtual goods between users. A Transfer Agent is approved only for one game or game/server, and cannot change its association. It must also put up a bond of WAX Tokens, of which it cannot exceed 25% of total value of currently assigned Settlement Execution Contracts. For settlement execution services, its will be rewarded a percentage of the fee with WAX Tokens.

Transfer Agents may signal to the Guild that they are actively looking for additional settlement execution contracts and are currently on-line. Conversely, if a Transfer Agent no longer wants to participate as a Transfer Agent, it must first complete its

assigned settlement execution contracts, and can then signal its retirement to the Guild. It will then receive its full bond of WAX Tokens back.

Transfer Agents perform a critical function in the WAX Platform. Transfer Agents will be responsible for enacting in-game trades of virtual goods purchased and will be expected to:

1. Communicate with seller and buyer to arrange pick-up and delivery of item
2. Take control of the virtual asset from the seller
3. Verify the authenticity of the virtual asset
4. Digitally sign the Settlement Execution Contract that they have received the virtual asset
5. Deliver the virtual asset to the buyer
6. Digitally sign the Settlement Execution Contract that they have delivered the virtual asset

In addition, Transfer Agents may be called to arbitrate disputes raised by users against other Transfer Agents. These services are rated by buyers and sellers, and they must maintain a high-level of quality service or risk being removed.

Transfer Agents' accounts have two public keys; the first is a HD signing address and is similar to other users. The second is a HD public encryption key, allowing users to send secure messages with their in-game username, location, trade-URL (i.e.: for steam trades), etc.

When a Transfer Agent is selected for a Settlement Execution Contract, the Buyer and Seller will be alerted. They can send encrypted messages to the Transfer Agent to communicate meeting logistics. The Transfer Agent can communicate back (though unencrypted) with clarifying questions or additional details. This allows the Transfer Agent to meet users in-game with minimal risk, while also protecting users from Transfer Agents working with either a buyer or seller to deceive the other.

Transactions and Messages

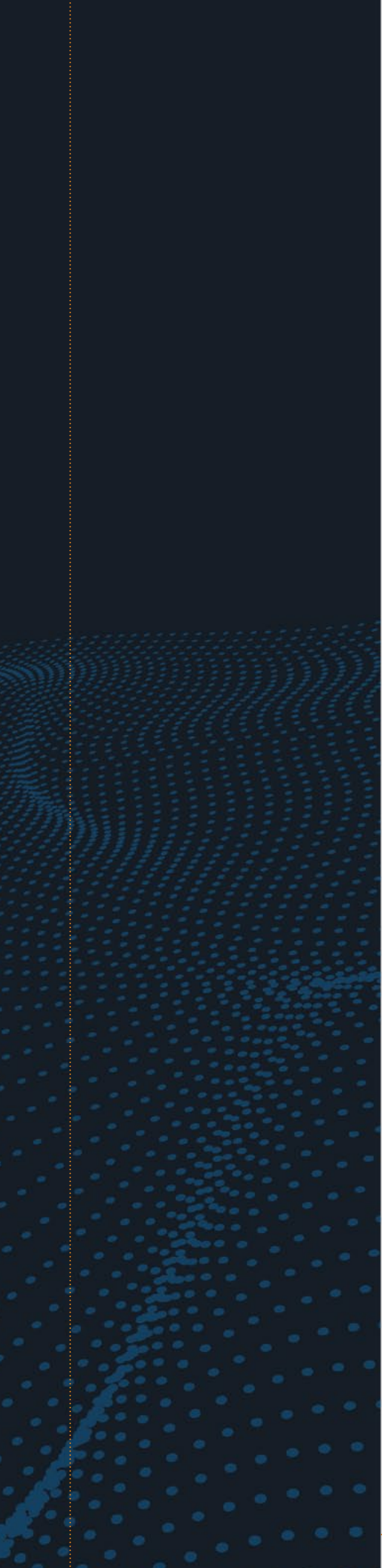
Transactions and Messages on the WAX Platform are any signed data package that is communicated between accounts. A transaction refers to communication originating with an external agent, such as a human user or external bot. Messages are similar to transactions but are executed by Contracts on the WAX Platform. Both transactions and messages incur a small fee of WAX Token when called, used to support the confirming Guilds.

Broadly speaking, there are three types of communications on the WAX Platform: transfer of WAX Tokens, deployment of Contracts, and interaction with Contracts. Each can be called as a transaction or message, depending on the actor. They each are formed as below, with the sender being implicitly named by the state:

nonce	The transaction or message number of the account communicating
waxfee	The fee (in WAX Token) associated with the transaction or message type
to	Destination address of the receiving account
value	The amount of asset being transferred; possible to be blank
data	A call for the WAX Platform to execute the deployment or interaction with a Contract, as well as any variables to be passed; this will indicate which assets (WAX Token, WAXT Tether, Digital Asset) are being transferred
signature	The ECDSA signature of the transaction/message, signed by sending address

Voting

Users who wish to vote with their WAX Tokens to support a Guild or proposals can do so easily from their wallet. From the wallet, a user selects “Proposals” to review the current Guilds and available proposals,



as well as their current allocation of delegated WAX Tokens. Users may vote for up to 8 Guilds or proposals, and their share of votes (held WAX Tokens) will be distributed evenly amongst them. The user will select the delegates it wishes to support and then transact a vote. While voting costs WAX Token fees, the vote cost is the same whether selecting eight new Guilds or only swapping one.

Contracts

Contracts refer to executable code on the WAX Platform; on WAX, there are a limited number of pre-created contracts that can be executed. As the WAX Platform continues to develop, new contracts and control features will be merged into the protocol.

Proposal

The Proposal Contract includes the Guild's application to be a confirming node, as well as the list of delegated stake from users. "Proposal" is a transaction executed by a user, to elect a new Guild as a confirming node to the network.

A proposal message will include; the game or game/server the Guild will provide services for; the fee sharing structure between the Guild and pledged delegates; and address of a user account to serve as the Guild address during execution. Only users who have at least 10 WAX Tokens and are not currently pledged to 8 proposals may call "proposal".

Upon creation, a minimum of 10 WAX Tokens from the creating user's account are automatically delegated to the proposal. The proposal may now receive delegated stakes from other users. The rankings of proposals are ordered by vote count, and guild statuses are awarded or rescinded based on the overall rankings and number of guild spots.

If a proposal for a Guild ever falls below 10 WAX Tokens, the Guild will be dissolved immediately and the remaining assets

transferred to the pledged users. If a Guild wishes to change any of the features of its proposal it must submit a new proposal and can signal to its pledged stakeholders for the change.

Rating

Users, Guilds, and Transfer Agents will each have a rating contract based upon their transaction history and interaction with each other. When two parties have an interaction with each other, such as listing/buying or direct transfer, they will have an ability to rate a user.

The rating is crafted from more than the votes of other accounts: each transaction, dispute, and settlement is aggregated and used to calculate the ability for an account to perform a trustworthy action. Each action type will have a different weight, but the overall metric will be useful to the entire WAX Platform.

As more transactions occur, the rating system will automatically adjust for the account. Long patterns of good behavior will raise an account's ratings, while short periods of bad behavior can plummet a rating.

Listing of Virtual Goods

User accounts may list their virtual goods on the WAX Platform and instantly connect to a worldwide market. When listed, the virtual good is able to be searched by anyone and can be displayed easily on websites through the WAX SDK.

"List" calls a Contract transaction, which will create the listing. To meet this service, a small fee is leveraged in WAX Token for the listing. In addition, a bounty (list_fee) is placed for the facilitator, such as the website where the buyer purchased the virtual good.

A typical list includes the virtual good name, the game or game/server it is located on, the listing medium, and the price. Delivery time for the seller to deliver to the Transfer Agent is

also included, and reflects the overall price of the asset; shorter delivery times incur a higher fee, but have less time to complete before they are found in fault of the settlement execution contract.

The selling user's contact information is encrypted using a multi-party schema which includes the public encryption key of each Guild serving the virtual good's game or game/server. This is also done for the "pick up" URL if available.

The listing user may later invoke this contract's cancel function to end the listing and return the list_fee. The wax_fee is non-redeemable because it was awarded to a Guild for confirming the transaction at the time of the contract creation.

Purchase of Virtual Goods

Purchasing a virtual good is a function of the list contract. All users of the WAX Platform have full access to the entire list catalogue of virtual goods for sale. They can easily browse them and make choices on their purchase by reviewing historical pricing data stored in the WAX Platform blockchain.

When a buyer wants to buy a virtual good, it can then purchase the item listing by sending a transaction to the listing contract with the requested amount, plus a settlement execution fee. This can be transacted easily in WAX Tokens, which can be converted by external parties into other currencies at the time of purchase.

The buying user will also submit their contact information after encrypting it with the multi-party schema comprising the keys of each Guild serving the virtual good's game or game/server. This can also be done for the "drop off" URL if available.

When the purchase transaction is complete, a Settlement Execution Contract is deployed via message.

Settlement Execution Contract

Settlement Execution Contracts will be deployed by message from a list contract following the purchase function being successfully called. The transferred assets used to purchase the listing, details from the listing, and the encrypted contact details will be transferred. At this time the list_fee is transacted to the address of the intermediary through whom the buyer purchased the goods. If no intermediary was used, the list_fee will be returned to the seller.

Guilds for the game or game/server will then compete with each other to select a Transfer Agent from their active list. The Transfer Agent is responsible for acquiring the virtual good from the seller, and ensuring delivery to the buyer. Only one Transfer Agent can be selected for a Settlement Execution Contract.

The Guild will next decrypt the messages containing contact information and securely encrypt a new message to the Transfer Agent with contact details and timestamp. The Transfer Agent will then arrange to meet both buyer and seller in the game or game/server, or transfer the virtual goods via “pick up” and “drop off” URLs.

In either case, the seller must then transfer the virtual goods to the Transfer Agent. When the virtual good has been delivered, the seller will sign a transaction to the Settlement Execution Contract confirming the trade. If the seller fails to deliver the virtual good, it will receive a negative rating: low ratings may be ignored by other users, and if a seller has a rating that is too low, its listings will be removed by the Guild.

When the Transfer Agent receives the item, it will then confirm the virtual good’s authenticity. If the item is as described in the listing, the Transfer Agent will sign a message to the Settlement Execution Contract. If both signatures from the seller and Transfer Agent have been collected, the purchasing funds will be released to the seller.

With the virtual good in its custody, the Transfer Agent next contacts the buyer. When contacted, the virtual good is transferred to the buyer. A second signature from the Transfer Agent confirms the delivery, and the settlement execution fees are released to the Transfer Agent.

Dispute

For disputes against a Transfer Agent, a user creates a contract with a bond equal to half the disputed amount. Additional details such as Transfer Agent address, the listing, settlement execution contract hash, and assigning Guild are also included

Upon receipt, the Guild must select a neutral Transfer Agent to arbitrate the resolution. This Transfer Agent will review the transactions that took place, and may request additional documentation from users and Transfer Agents.

Using this information, the arbiter will make a decision of finding. If the dispute contract is true, the Transfer Agent's bonded WAX will be deducted for the dispute value, plus 10%. No funds will be sent to the arbiter, but its rating will be increased.

Transfer of Digital Goods

Certain publishers may allow the creation and trade of digital goods directly; for these games or game/servers, the WAX Platform will tokenize the virtual goods. These tokens are representations of virtual goods, and are each unique and therefore non-fungible. The WAX Platform achieves this through an asset tokenization smart contract that records the virtual goods information and metadata into each token minted.

For a qualifying digital good, the item will be digitized at the time of listing. When the tokenized good is purchased, this asset will be transferred directly to the buyer, and the seller immediately paid. Services outside of the WAX Platform will transfer the asset between the two parties, to ensure the state of ownership

matches the game or game/server conditions.

OPSkills currently uses a centralized approach to support a dozen games. By implementing the above on the WAX Platform, 65 games would be immediately tradable.

WAX Applications

WAX Connect

WAX Connect will be a browser-based SDK that provides a set of functions to allow building listing widgets, performing wallet transactions on remote wallets, and performing seamless onboarding of new users into the WAX Platform. WAX Connect will perform automatic node discovery based on guild (game or game/server) affiliation and enables retrieval of listings from guild nodes.

WAX Node

WAX Node is the “full node” that will be run by Guilds and other ecosystem participants. A WAX Node is required to function as a Guild and to allow bonding of Transfer Agents.

Additionally, a WAX Node provides a gateway to the overall WAX Platform, including node and Guild discovery, API endpoints for WAX Connect and WAX Wallet, and possibly a naming service. Each WAX Node will hold a complete copy of the WAX blockchain.

WAX Wallet

WAX Wallet allows non-guild WAX users to hold WAX Tokens and participate as a DPOS delegate.

WAX Core

WAX Core will be an SDK that encapsulates the common functions of WAX Node and WAX Wallet. WAX Core will enable forging of delegates, provide blockchain synchronization, and include the complete developer API. WAX Core is for those who intend to build on top of the WAX Platform.

WAX Roadmap



WAX Token Sale

The total supply of WAX Tokens that will ever be created is 1,850,000,000. All WAX Tokens will be generated in a seed block and distributed according to the chart below. The information provided on token creation, process, allocation and use of sale proceeds is the current plan, but is subject to change in WAX's discretion.

Token Sale

64,750,000 WAX Tokens were sold in the WAX Token sale. When WAX Tokens are issued, all contributors will receive 10x the number of tokens they purchased. The reason we're issuing 10x the tokens is because it will be more convenient for users of the token. It will make microtransactions more easily calculable, and since WAX was designed to facilitate the millions of daily microtransactions for digital items, this is an important feature to include for WAX users.

Market Development

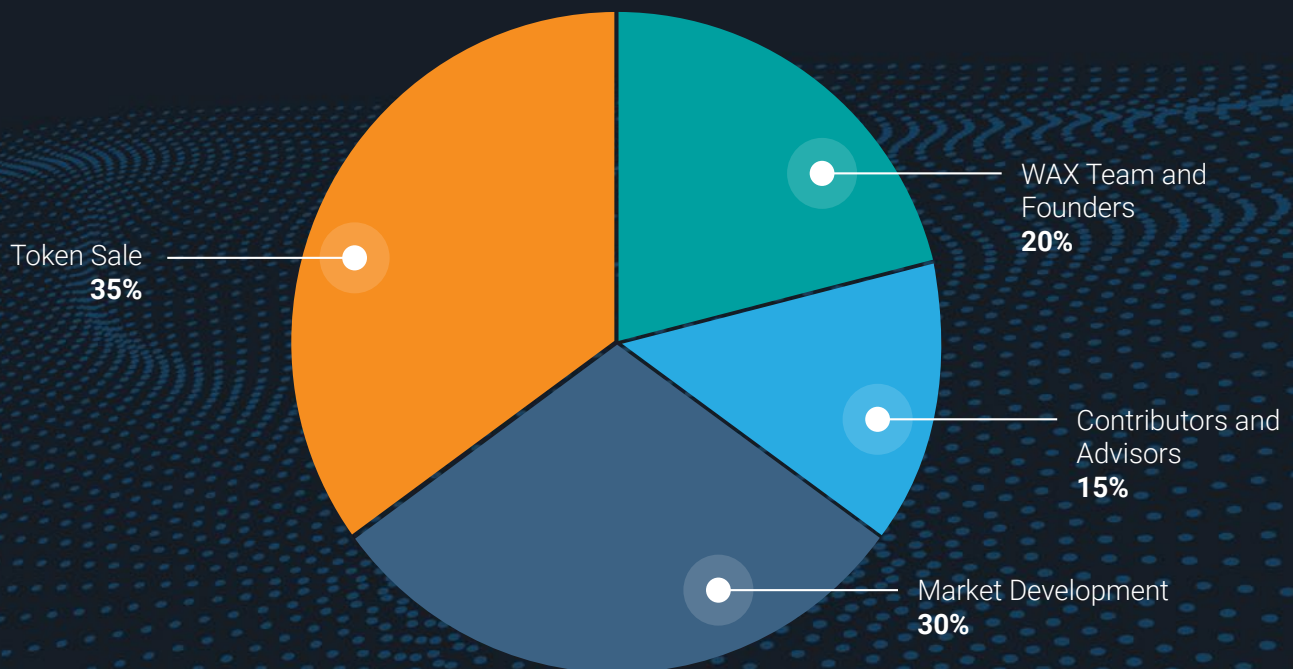
30% of WAX Tokens were, or will be, issued to encourage new developers to take part in the growing marketplace. These tokens will be distributed to new developers and publishers to incentivize them to release virtual goods that can be traded on the WAX Platform. This provides a new indirect distribution channel for game developers while allowing market demand from the gaming community to shape games we love.

Contributors and Advisors

15% of WAX Tokens are, or will be, held by the early contributors and advisors. This group has contributed 16,800 ETH to acquire 5,040,000 WAX Tokens. Some contributors and advisors have received, or will also receive, free bonus tokens for the advisory work they will be doing for WAX. These tokens cannot be immediately transferred due to time-based restrictions on their use.

WAX Team and Founders

20% of WAX Tokens are being, or will be, retained by WAX and reserved for development, team, and founders who will continue to enhance the WAX Platform with valuable updates and their use of these tokens will also be time released.

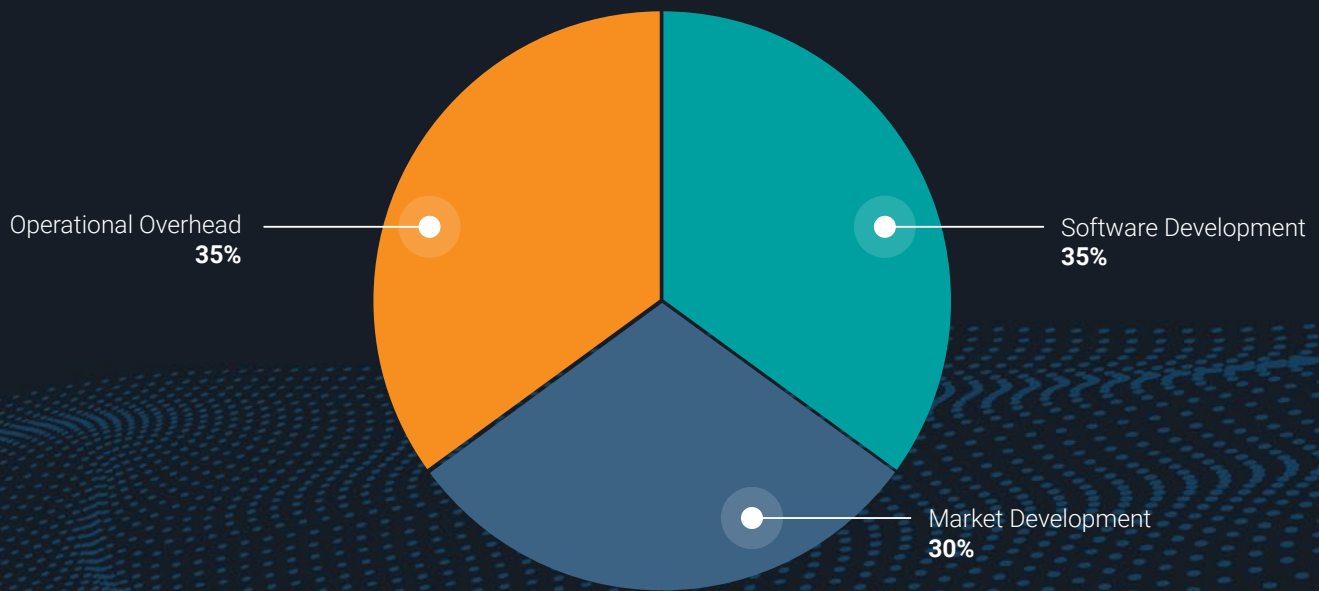


Token Sale Process

The WAX Token sale has concluded.

ERC20 WAX Tokens will be distributed to participants of the WAX Token sale no later than December 29, 2017.

Use of Proceeds



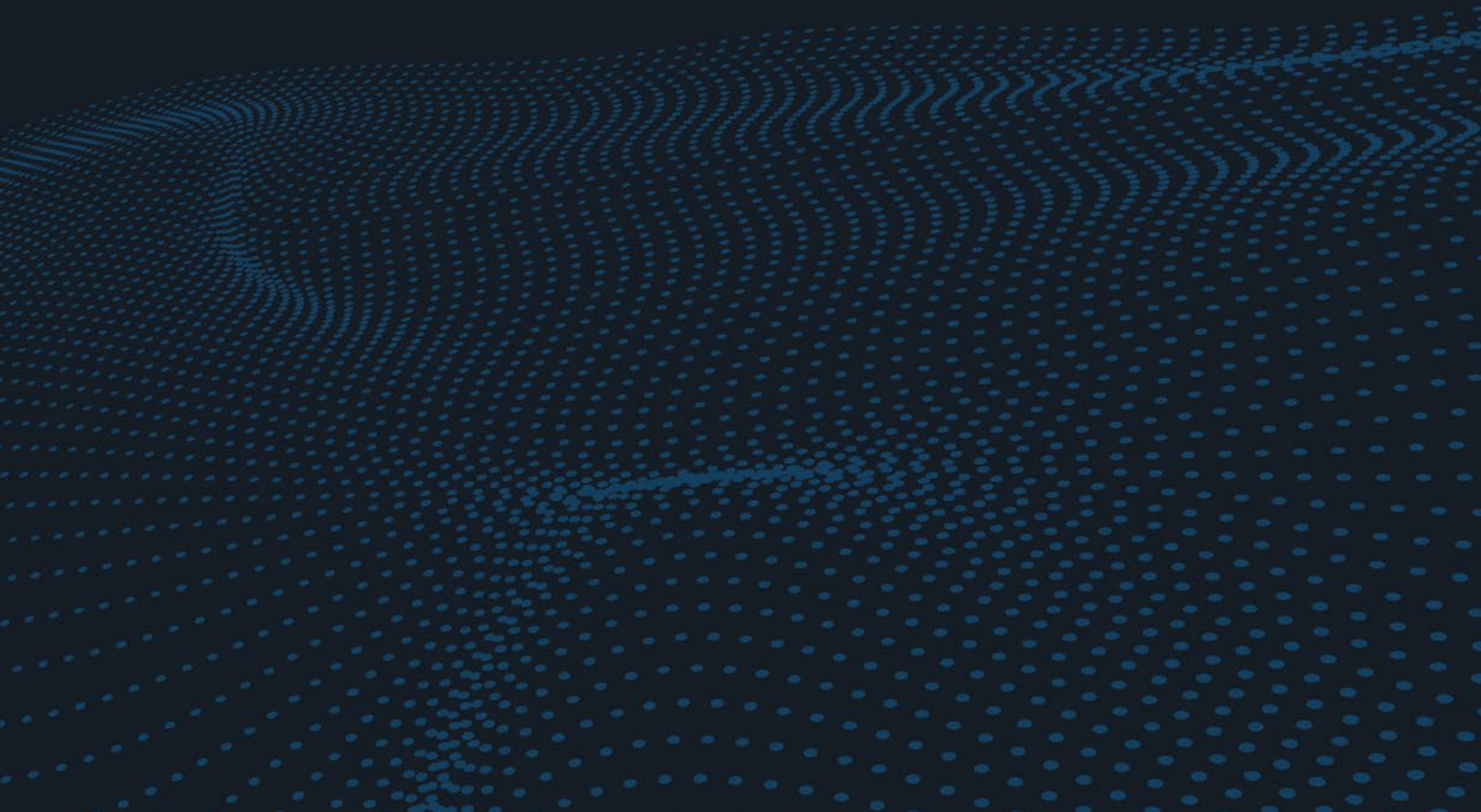
ETH received during the token sale will be immediately leveraged to support WAX's on-going development and operations.

Legal Requirements

Tokens, the blockchain and smart contracts are nascent technologies. The application of existing laws to new technologies is often unclear. The laws that may be implicated by the WAX Platform and tokens are numerous given its worldwide reach. As a result, the legal and regulatory issues surrounding the WAX Platform and tokens are complex and undefined at this time. As these issues are settled, modifications may need to be made to the WAX Platform and WAX tokens to comply with applicable law.

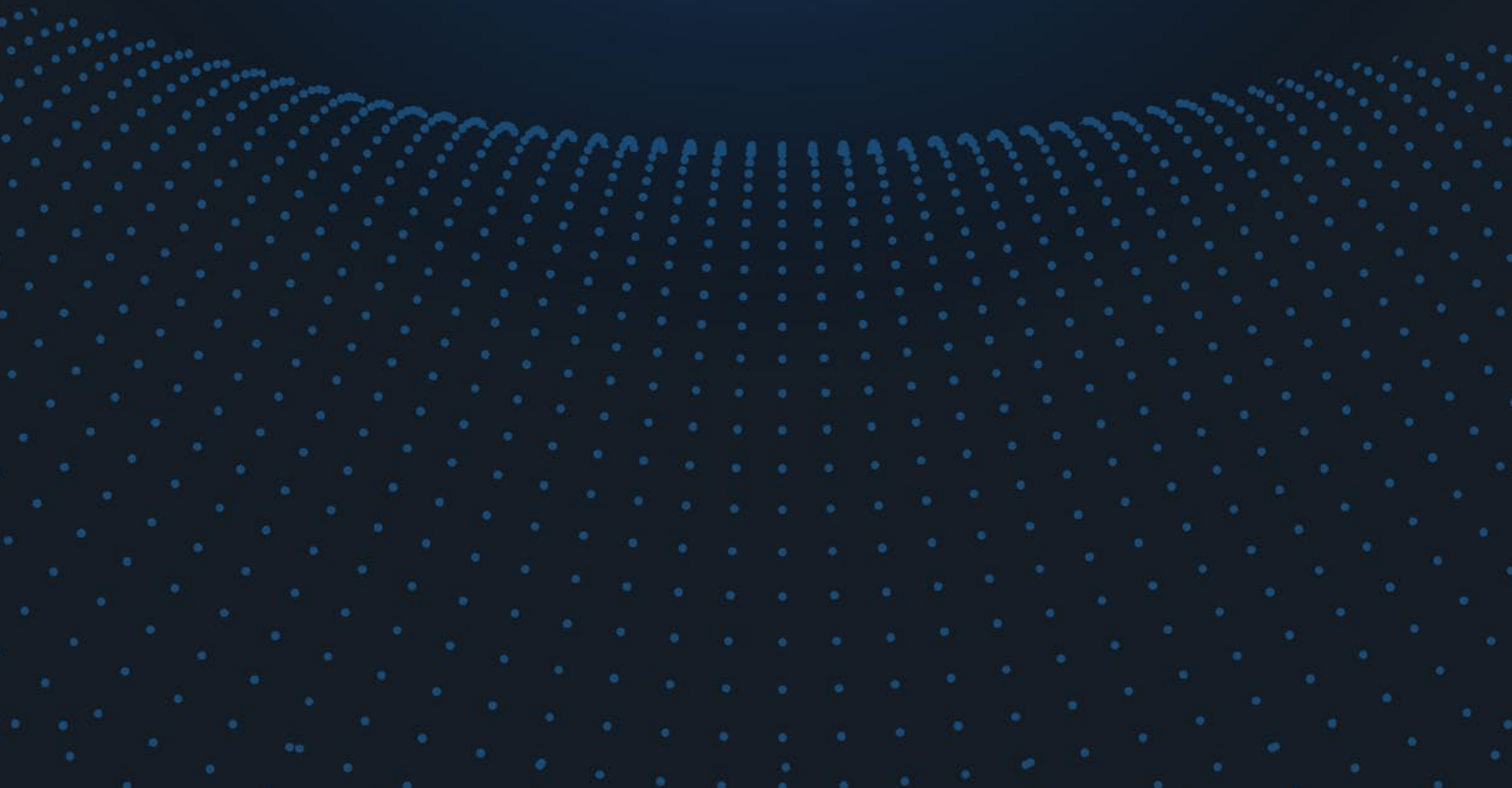
Summary & Conclusion

Current online video game trading of virtual assets for Online Games and other online gaming types is approximately \$50 billion. OPSkins, the world's largest video game virtual goods trading marketplace with millions of registered buyers and sellers, is developing WAX to expand virtual asset trading. As Amazon is to physical goods, OPSkins is to virtual goods. Amazon built the "Amazon Marketplace" allowing millions of entrepreneurs to open up their own trading virtual store. Similarly, OPSkins is building a decentralized "WAX Platform" allowing millions of traders to create their own virtual store, starting with thousands of gaming sites today in the virtual goods ecosystem. With WAX, millions of individuals can create new businesses based on their passion for video games offering buy, sell, rent, or trade capabilities to their social networks, extending the market far beyond what it is today.



Appendix A

WAX Use Case



Appendix A: WAX Use Case

The way gamers interact with their games, and with others playing those games, has evolved rapidly during recent years. Casual streaming services like Justin.tv have given way to professional gamers, a new category of sporting called “esports,” and companies looking to get a foothold in the online gaming world.

Given the global audience and the youth of their fan base, it’s no surprise that many advertisers use esports sites like Twitch, Youtube Gaming, Smashcast, and Mirrativ to help build their brands. These sites push the viewing experience a step further. Unlike traditional sports broadcasting, they offer an interactive experience to visitors who spend money on their favorite video games and other online experiences.

Imagine things from the point of view of the gamer.

He visits his favorite streaming site and interacts not only with the content but also with other gamers. As he watches, he is also chatting with others. Comments fly whenever there is really great action or an incredible kill. Like many of his friends, he’ll be on the site for several hours.

He notices that the players have some unique looking skins. Their guns have a beautiful dragon design that he’s never seen before. He thinks, “Wow, I would love to have a skin like that.”

Before WAX, he had to visit a centralized marketplace or engage in makeshift one-on-one transactions to buy skins and other virtual goods. With WAX, though, getting new skins is as easy as clicking on a listing widget that is easy for any site to implement and that allows painless onboarding to the WAX Platform.

The widget, implemented as a simple set of tags that any site can deploy, is configured to align with a specific Guild. Each game can have one or many Guilds, but no game can be represented on the WAX Platform if it doesn’t have at least one Guild. Most of what a Guild does - running a full WAX node and carrying out certain responsibilities to aid in the functioning of the WAX Platform - is transparent to both the listing site (where the widget appears) and the potential buyer.

The buyer has to know only that he is interested in virtual goods from a specific game and the listing site simply configures the widget to offer items from that specific game. The widget queries the WAX Platform to retrieve items from the global virtual goods database that is maintained by the network of nodes in the platform. Using available information,

the widget then chooses which item to display and the potential buyer can examine the currently displayed item or page through and examine additional items all priced in WAX Tokens.

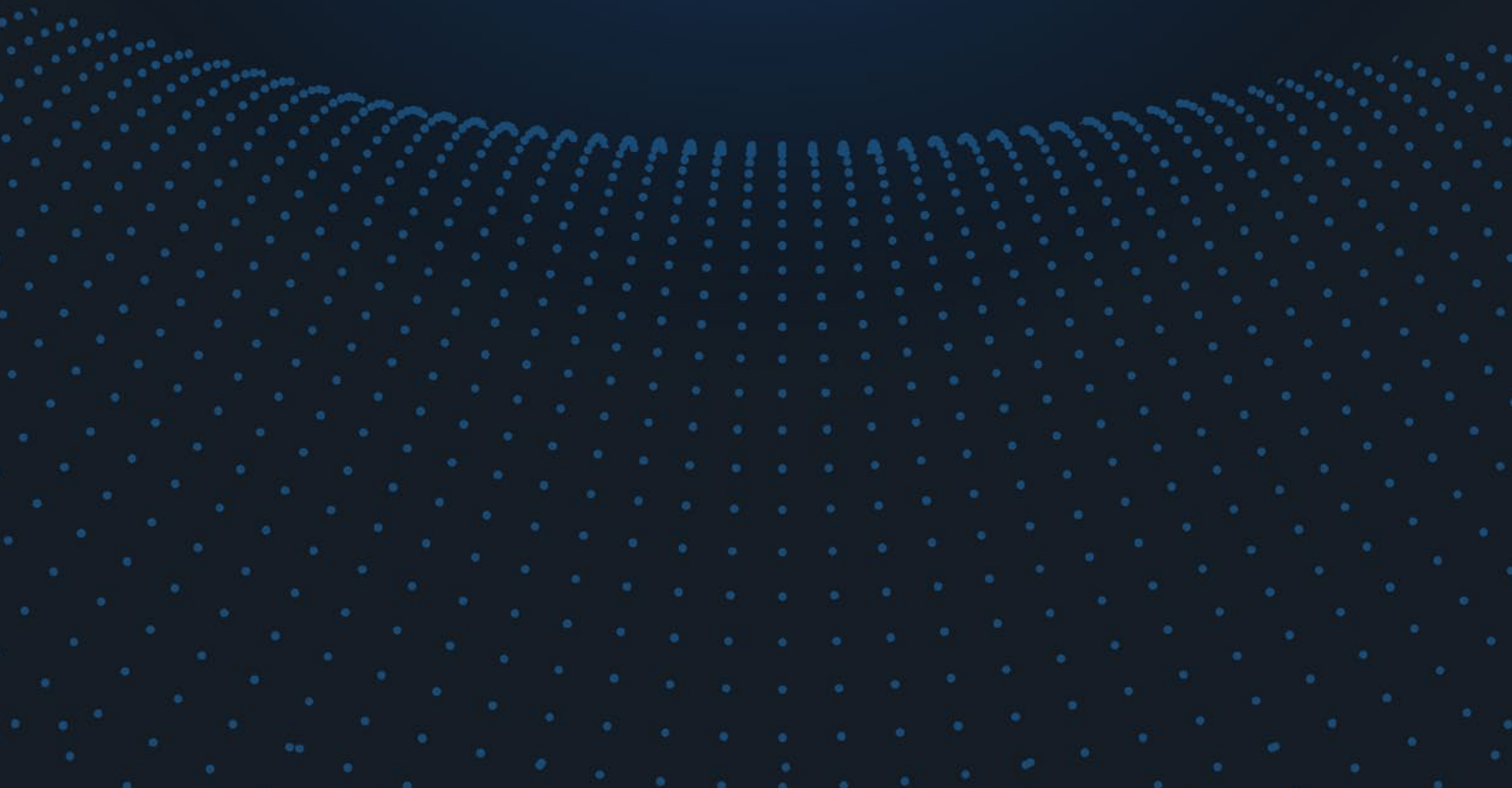
Once the potential buyer decides to purchase, he simply selects “buy now” in the widget and is presented with an authentication window. If this is the first time he is interacting with the WAX Platform, he’ll be taken through an onboarding process that creates an identity, allocates a WAX Wallet, and allows him to fund the immediate purchase, all without forcing him to understand WAX, the WAX Platform, or WAX Tokens. From the buyer’s perspective, all that is required is to select an item, provide payment, and, a short while later, the item shows up in his personal inventory without him ever leaving the site he was visiting.

He is delighted with the experience. Buying skins before meant he had to go to a centralized marketplace service like OPSkins. Going from streaming site to the various fansites he regularly visits, he sees this same widget allowing anyone to search, browse and buy virtual goods.

This ability to buy a virtual item anywhere at any time is what no one else provides today.

Appendix B

Marketplaces Create Wealth



Appendix B: Marketplaces Create Wealth

The rise of the Internet has enabled digital marketplaces to generate hundreds of billions of dollars of wealth for buyers and sellers using nine core principles to create the ecosystem for growth and wealth creation where it would not otherwise exist.

Core Principle	Analog Example	Digital Example
Expanding distribution from local and regional markets to national and global markets	The Silk Road connecting Far East and Europe vs insular trade created new markets and wealth for many	Garage-sale and swap meet entrepreneurs become powersellers on Amazon; homeowner AirBnB hosts selling to a global audience
Making money passively with minimal effort	Income from parking lots or Intellectual Property (IP) rights	Playing video games for a living (eSports); using affiliate marketing or social graph to earn a living (influencer)
Guaranteed settlement to shift counterparty risk when unknown parties transact	Banks providing bank reserve notes redeemable by anyone (origin of currency)	Paypal or internal payment platforms to remove payment risk
Seller or buyer reliability	Bias towards known brands and creditless/cash purchase only	Reputation management rating systems create identity history (Upwork, BazaarVoice, etc.)
Cross-border transaction settlement	Trade zones allowing for foreign trade, foreign currency exchange at banks	Central finance operations allow international buyers and sellers in e-commerce (Alibaba, eBay)
Fraud prevention	Know Your Customer (KYC) rules at finance institutions, credit applications	Expensive but necessary credit card / payment fraud departments
Expanding supply; increasing liquidity	Retailers consolidating inventory (department stores) vs boutiques	Thousands of options in shape, size & quality on eBay; millions of new rideshare drivers
Speed of settlement; price flexibility to increase demand as needed	Shopping malls creating foot traffic, cash and carry, credit cards, print advertising, coupons; discount sales	Search engine optimization and other digital with millions of buyers on Google Play / App Store; Steam for video game downloads; promotion codes
Algorithm-driven platform	Guessing supply and demand, clearance sales to move inventory, discount stores; manual multi-variant testing	Machine learning & a/b testing predict supply & demand, create personalized recommendations; arbitrage pricing

Centralized Virtual Goods Marketplaces

OPSKins is the largest centralized virtual goods marketplace using these core principles, yet OPSkins is largely unknown outside the inner circles of serious game players. This gargantuan marketplace for virtual goods for video games currently exceeds \$23 billion through exchanges and trading platforms. Experts estimate there is another \$23 billion in casual trading between players.

OPSKins has already built and scaled a highly successful centralized platform that addresses the most challenging aspects of a well-functioning marketplace. Though only three years old, OPSkins has millions of users with almost no churn, generating billions of transactions and growing at a rate of 200,000 new registrations per month.

On its centralized trading platform, OPSkins has created trust and eliminated nearly 100% of buyer fraud losses by creating digital settlement services. This has had the effect of successfully shifting the fraud risk from individual sellers and buyers to OPSkins. Since OPSkins collects fiat currency (local currencies such as US dollars, Euros, Chinese Yuan, and many more), it must maintain extensive banking relationships and fraud mitigation processes and personnel as well as disallow many trades from new account holders using PayPal or credit cards in order to avoid excessive losses.

Constraints of Centralized Marketplaces

Because OPSkins and other virtual goods trading platforms are inherently centralized, gamers interested in buying, selling, or trading goods cannot transact outside of the platform in a peer-to-peer fashion with the same safety and efficiency. Reasons include:

- The method for trade can differ dramatically between games without an automated API
- Liquidity is another major obstacle for gamers to operate their own trade sites
- Without a critical mass of buyers or sellers, buyers find prices too high and don't have variety or sellers can't sell quickly because there is not enough demand

Benefits of Decentralized Marketplaces

Demand for a significant increase in trading volumes of virtual goods exists, but is currently restricted due to marketplace centralization on a few large platforms, including OPSkins. OPSkins operates the largest virtual goods marketplace in the world; decentralizing that marketplace would allow all sellers and buyers to set up storefronts to buy, sell

and trade on a peer-to-peer basis. Paralleling the growth realized by small businesses through participation on LinkedIn, Houzz, Upwork, etc., virtual goods trading is poised to experience explosive growth.

Smart Contracts—computer protocols intended to facilitate, verify, or enforce the negotiation or performance of a contract, typically on the Blockchain—are the optimal technical solution to decentralize complex virtual goods trading platforms like OPSkins.

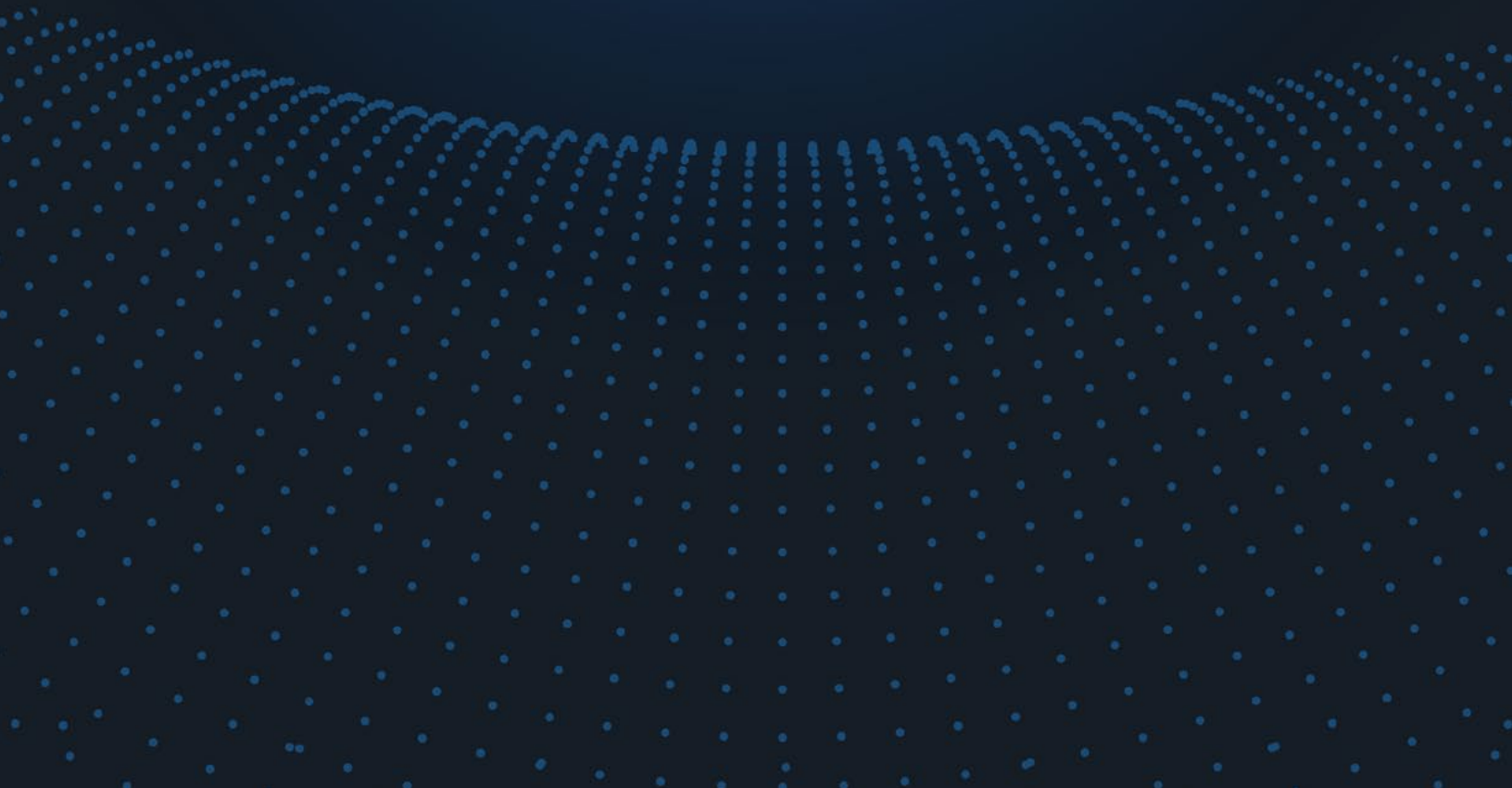
To decentralize Virtual Goods Marketplaces, WAX is implementing smart contracts to establish and maintain an open system that millions of global users can access to build their own peer-to-peer marketplaces. Using the marketplace principles it has already applied, WAX will decentralize OPSkins to work seamlessly to enable billions of trades between its members. This will also afford buyers, sellers, traders, and entrepreneurs the ability to establish storefronts with a few clicks using the WAX Platform, thereby saving significant development dollars when publishing their goods.

By providing all the complexity of the marketplace services including settlement, fraud prevention, scaled supply and demand, and cross border exchanges, WAX anticipates the total market size will increase by \$30 to \$50 billion. This estimate is based on the fact that the current market of nearly \$50 billion is generated by 400+ million online players in the trading ecosystem. These online players represent just 22% of the 1.8 billion gamers worldwide. As virtual goods trading becomes easier and more game publishers embrace it as a revenue stream and a value to their gaming community, the market will subsequently grow.

The role of WAX as a virtual goods marketplace is to provide WAX Tokens to represent ownership of virtual goods in decentralized exchanges. With this important shift in structure, millions of buyers and sellers will have the power to use their social graphs to buy and sell virtual goods effortlessly. WAX Tokens can support a variety of selling structures to maximize liquidity, such as bidding, reserve bidding or fixed price. The cottage industry of buyers and sellers OPSkins currently serves will not have to develop complex backend systems, but instead will use WAX Tokens to leverage the most powerful aspects of the OPSkins asset exchange. WAX Tokens will enable a new generation of virtual assets traders, similar to how modern marketplaces such as Alibaba, Amazon, Uber, and Airbnb changed commerce for millions of small business owners and created hundreds of billions of dollars of new value.

Appendix C

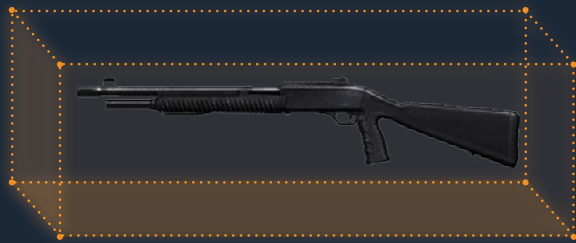
Virtual Goods Trading



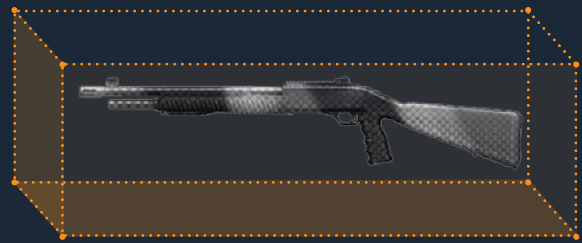
Appendix C: Virtual Goods Trading

Virtual goods are digital assets purchased for use in online communities or games. OPSkins specializes in the enhancement of standard goods found in online games.

Though not all video games enable virtual goods trading between players, the most forward thinking video game publishers have benefited greatly by allowing their in-game trading economy to thrive. The largest single market of tradable assets are called “skins” (also referred to as finishes) for Counter-Strike: Global Offensive (CS:GO). Skins are strictly cosmetic and do not affect game play.



Virtual shotgun without skin



Virtual shotgun with skin

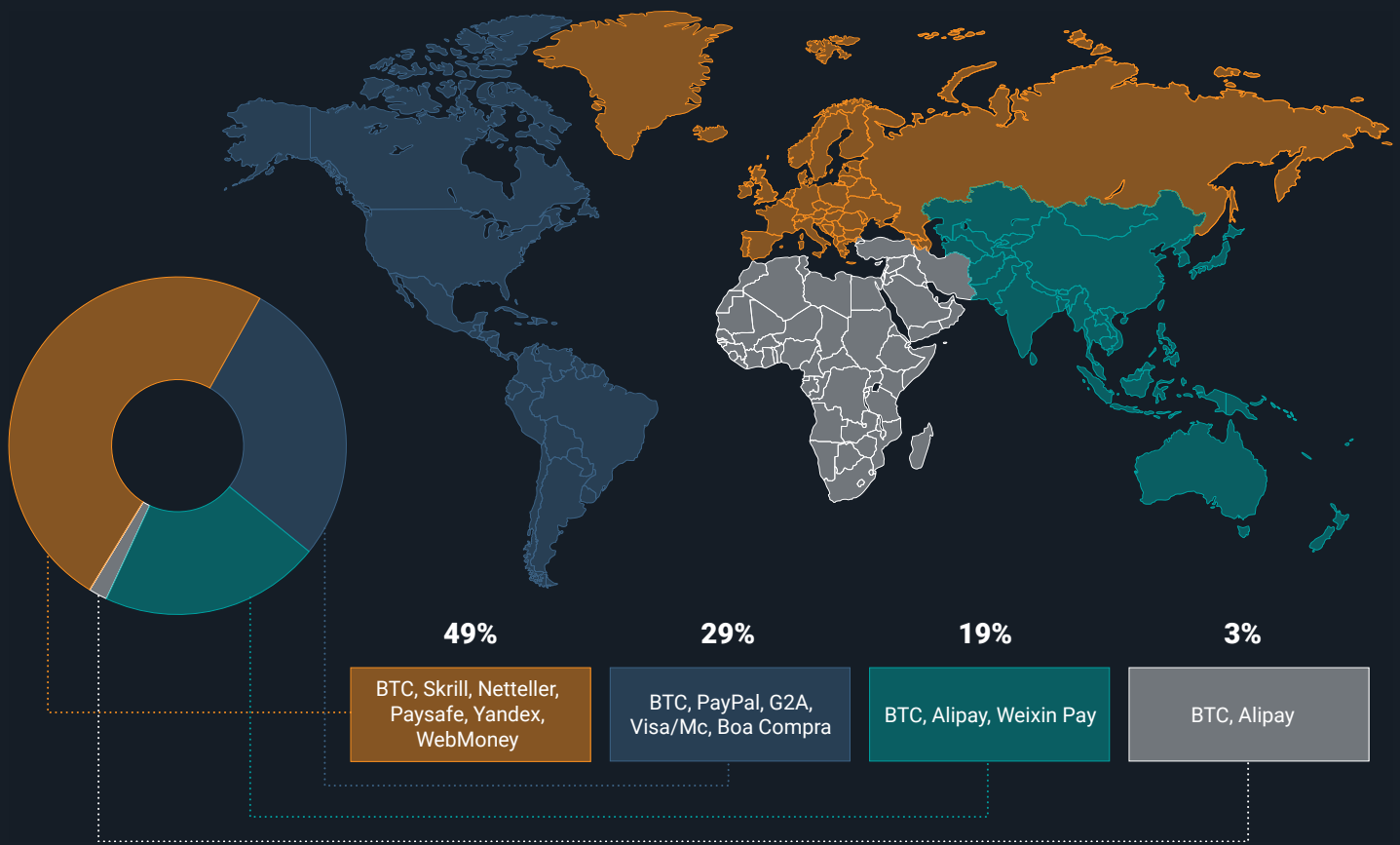
Virtual Goods Example: Item Skins

Currently the estimated market value for CS:GO skins trading is over \$10 billion annually. Skins adorn objects and players in the games with colorful designs. You can see skins on weapons, masks, sunglasses, shoes, and many other goods.

In other major tradable games like the H1Z1 family (Just Survive and H1Z1: King of the Kill), the options go further to include other special movements that do not affect game play (dancing or hand movements).

The most famous game series that started the trading ecosystem was World of Warcraft (WOW). In WOW, virtual gold pieces were acquired by “gold farming”³ and created marketplaces for buying and selling.

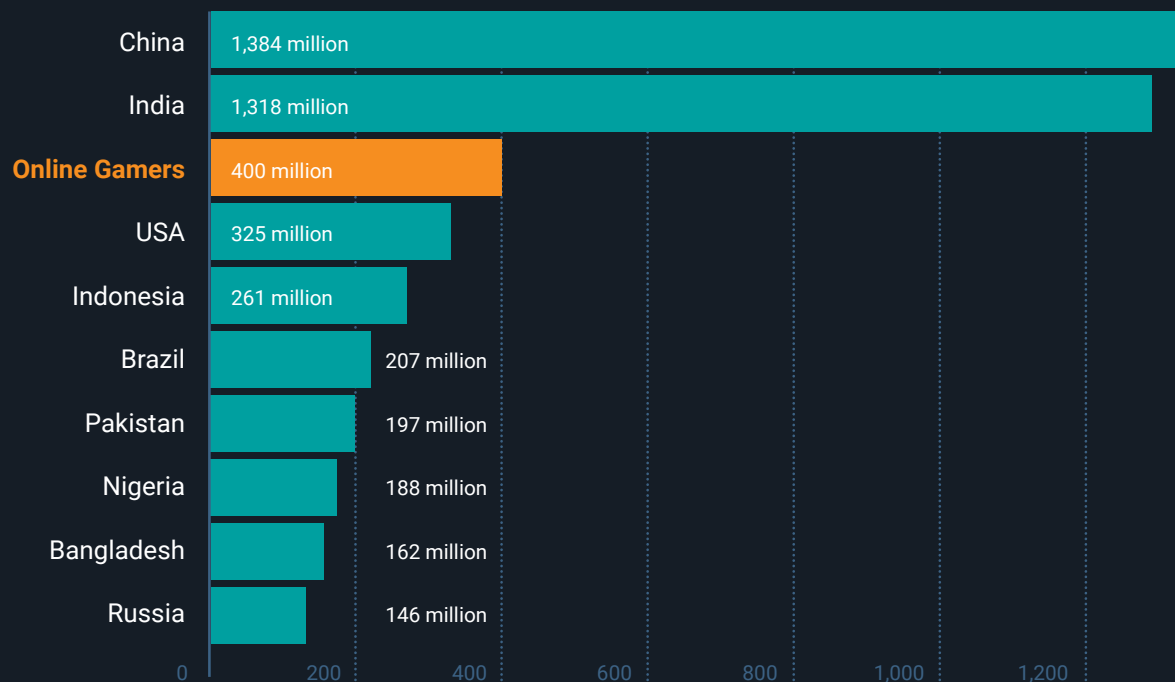
³ https://en.wikipedia.org/wiki/Gold_farming



With ever-increasing value per transaction, billions of virtual goods trades occur between players. Some goods are only worth pennies, while others trade for thousands of US dollars. However, in almost all goods trading, there is enormous friction during buying, selling, and trading of virtual goods. The friction is due to the following key factors:

Key Factor	Issue
Trust	General distrust in the trading environment between unknown players
Fraud	High prevalence of stolen accounts (typically via hacking) and stolen payment methods such as credit cards
Cost	Fiat-based (USD, Euros, Yuan, etc.) transactions are costly and impractical for small amounts
Forex	Foreign exchange in cross-border transactions is typically complicated or impossible
User Interface (UX)	Centralized control of the assets by game publishers or trading platforms can slow down and complicate trading without proper high-volume API's in place
Liquidity	Without sufficient buyers and sellers, marketplaces simply don't work

The trust required for global acceptance of fiat currencies such as US dollars, Euros or Chinese Yuan began with the presumption of reliability, centralized authority, and liquidity. In the past few years, 400+ million players worldwide now regard digital virtual assets with the same level of trust as the rest of the global population does in fiat currency. Millions of players use the virtual goods as stored value. Some of the most popular games with tradable assets include Dota 2 (103 million downloads), Team Fortress 2 (39 million downloads) and Counter-Strike: Global Offensive (30 million downloads)⁴. Each garners a sizable audience and together, these audiences would constitute the third largest country in the world.



Within the world of game play and virtual goods during the last few decades, 400+ million players worldwide now regard digital virtual assets with the same level of trust as the rest of the global population places in fiat currency. **This audience in aggregate would constitute one of the largest countries in the world.**

⁴ <https://www.statista.com/topics/2290/mmo-gaming/>

Through its virtual asset trading platform, www.opskins.com, OPSkins has created trust and eliminated nearly 100% of fraud losses borne by the buyer by creating digital settlement execution services. The fraud risk has shifted to OPSkins instead of individual sellers/buyers. Because OPSkins collects fiat currency such as US dollars, Euros and Chinese Yuan, it must maintain extensive banking relationships and fraud mitigation departments as well as disallow many trades from new account holders using PayPal or credit cards in order to avoid excessive losses. Because OPSkins and other trade platforms are inherently centralized, gamers interested in buying, selling, or trading assets cannot transact off-platform in a peer-to-peer fashion with the same safety and efficiency. The method for trade can differ dramatically between games without an automated API. Liquidity is another major obstacle for gamers to operate their own trade sites. If there is not critical mass of buyers and sellers, prices will be elevated and selection limited. In addition, sales may lag due to a lack of demand.

The majority of virtual goods trading occurs for games published by Valve Software, maker of the Steam⁵ game distribution platform. Steam serves a community of 65 million gamers worldwide. The top six publicly traded game companies have sizable audiences with 2017 revenue of \$41 billion. In addition, Sony, Tencent, Microsoft, Nintendo, Activision Blizzard, and EA use virtual assets⁶.

The market for these tradable assets is estimated at nearly \$50 billion, half of which is through platforms such as OPSkins and through informal interaction between gamers who share social networks. Many of the 400 million world wide multi-player online video game players seek to trade their skins for fiat and cryptocurrency such as Bitcoin and Ethereum. Though cryptocurrency has a relatively small adoption pool for virtual goods trading today, bitcoin and similar currencies are ideal to address cross border currency issues and microtransactions⁷.

Because online video gaming is a global phenomenon, most trades occur between players located in different countries. Accordingly, virtual asset trading users endure high transaction costs (i.e. international payment processing fees and value lost through currency conversion). Simply eliminating these cross border transaction costs between the millions of virtual assets traded every day would be sufficient economic justification for WAX to exist. WAX will immediately benefit the global community of virtual asset traders by lowering costs to get the best prices for buyers and sellers. WAX would also enable microtransactions that would otherwise be infeasible cross border.

WAX will provide the ability to buy, sell, or trade skins and other virtual assets in a peer-

⁵ <http://www.valvesoftware.com/>

⁶ https://en.wikipedia.org/wiki/Video_game_publisher

⁷ <https://en.wikipedia.org/wiki/Microtransaction>

to-peer method that does not require a centralized party. WAX creators believe this will expand the market considerably, allowing hundreds or thousands of online sites to facilitate trades while also accessing a highly liquid marketplace, ensuring that prices are fair and transactions occur quickly and at a low cost, especially across international borders.

Disclaimer

This WAX white paper is for information purposes only. WAX does not guarantee the accuracy of or the conclusions reached in this white paper, and this white paper is provided “as is.” WAX does not make and expressly disclaims all representations and warranties, express, implied, statutory or otherwise, whatsoever, including, but not limited to: (i) warranties of merchantability, fitness for a particular purpose, suitability, usage, title or non-infringement; (ii) that the contents of this white paper are free from error; and (iii) that such contents will not infringe third-party rights. WAX and its affiliates shall have no liability for damages of any kind arising out of the use, reference to, or reliance on this white paper or any of the content contained herein, even if advised of the possibility of such damages. In no event will WAX or its affiliates be liable to any person or entity for any damages, losses, liabilities, costs or expenses of any kind, whether direct or indirect, consequential, compensatory, incidental, actual, exemplary, punitive or special for the use of, reference to, or reliance on this white paper or any of the content contained herein, including, without limitation, any loss of business, revenues, profits, data, use, goodwill or other intangible losses.

All references in this WAX white paper to the WAX platform, regardless of tense, are intended to be references to how the WAX platform will operate when it is fully operational. See the WAX roadmap on page 21 of this WAX white paper for information about the expected development of the WAX platform.