Summary

The cryptoasset universe has grown exponentially since the introduction of platform networks. In 2013, the market was made of just 14 cryptoassets that were largely spin-offs of Bitcoin with similar applications. Now, there are over 1,500 cryptoassets with over half being tokens created on top of other networks.

This is part two of a five-piece series initiating coverage on the cryptoasset market. Our initial note published on June 28, 2018 focused on the **Technical Underpinnings** of cryptoasset networks and associated distributed ledger technologies.

Continuing our coverage initiation, in this note we will explore **Network Creation** through the following topics:

- Networks Created by Genesis Blocks versus on a Platform
- Ethereum, Smart Contracts, and Scaling
- Platform Network Landscape
- Network Structure and Cryptoasset Distribution
- ICO Market: Process, Insights, Quality, and Use of Funds

Key figures:

- Although **half of all cryptoassets are classified as tokens** (built on other platform networks), **nearly 90% of the value resides in coins.**
- Further, **the velocity of tokens is ~4x that of coins**.
- The median platform network **trades at ~4x the total value** of the overlying tokens built on it.
- **~12% (~$5.4B) of the circulating supply of ETH** is held by the **top 115 ICO's,** and ~3% (~$1.3B) is held by the top 20.
- The current ETH balances of the **top 10% of ICO's** is equivalent to **~50% of the total funds raised to-date**, while the top 2% holds ~10%.
- **Over 70% of ICO funding (by $ volume) to-date went to higher quality projects**, although over 80% of projects (by # share) were identified as scams.

Future reports will be released in sequence, covering the following topics:
Market Composition – Network statistics, applications and performance by sector and an overview of the major jurisdictions' approaches.
Valuation – Fundamental and technical/trend-based.
Custody & Trading – Custodial offerings and trading venues.

Name	Market Cap ($MM) Current	Market Cap ($MM) 2050 Implied*	Launch Year	Price	ATH	Days Since ATH	% from ATH
BTC	$109,513	$134,052	2009	$6,388	$20,089	205	(68.2%)
ETH	$44,417	$64,886	2015	$441	$1,432	178	(69.2%)
XRP	$17,620	$44,878	2013	$0.45	$3.84	187	(88.3%)
BCH	$12,051	$14,676	2017	$699	$4,330	202	(83.9%)
EOS	$6,668	$10,863	2018	$7.44	$22.89	72	(67.5%)
LTC	$4,435	$6,487	2011	$77	$375	203	(79.4%)

** Refers to Market Capitalization estimate, calculated using 2050 estimated supply using respective network inflation schedules.*

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Introduction

In our last note, we covered the basics of the technical underpinnings of cryptoassets and the distributed ledger networks they power. This included an understanding of the architecture of the networks, consensus algorithms, hashing algorithms, and network attack vector considerations.

Expanding on the foundation built previously, we will now dive into the creation of cryptoasset networks and markets built around them. This includes the launch of networks from scratch, networks built on top of other networks, network coin distribution methods, and an overview of the process and performance of the Initial Coin Offering (ICO) market.

Network Creation

Genesis Block Distribution

There are multiple methods to launch a new blockchain, with the most traditional (though now less common) method being through the creation of an entirely new, independent chain, which starts with a Genesis Block. The Genesis Block, as the first block in the chain, is unlike every other block in the chain because it does not reference a previous block and there are no outstanding coins in circulation at the time of creation. Instead, it is hard coded within the software and all future blocks will be tied to the Genesis Block. Within a Proof-of-Work (PoW) network, the Genesis Block is "discovered" by someone adding computational power to the network in the form of mining. On a Proof-of-Stake (PoS) network, the Genesis Block is often discovered using PoW mining before switching to PoS (since in PoS, there must be coins already in circulation to create the next block).

Networks that were launched via a Genesis Block include Bitcoin, Litecoin, Siacoin, and Zcash. This method allows the creator of the network a high level of flexibility in designing the network as they intend, since they have full control of the code. However, along with the flexibility comes the responsibility of distributing the network properly during the launch; if the validator/miner network is either too thin or concentrated, users may be wary of using the platform since this implies that the network may not be secure and may be susceptible to influence/manipulation. One major consideration with this type of network launch is that it does not accrue any immediate value to the developers as all tokens can only be earned through mining on the underlying platform.

Built on Platform

As the cryptoasset market has become more mainstream, there has been a significant shift from Genesis Block network creation towards launching tokens on a previously built network. There are many benefits to developing on an established platform, such as Ethereum, because of the network effects created by sharing a common platform. These benefits include, but are not limited to:

- Ease of Development: due to the flexibility of programming, availability of built-in standards and wide developer talent pool
- High Levels of Liquidity (Scaling): builders benefit from not only exchange liquidity but overall platform use, in addition to potential interoperability with other token networks built on the same platform
- Higher Levels of Network Security: the validator network is already matured and less vulnerable to early-stage attacks

Though terminology may differ, for the purpose of our research ***we will refer to "tokens" as cryptoassets built on top of another network (such as Ethereum) and "coins" as cryptoassets that are unique to their own chain and do not rely on another chain***.

Built on Platform, Then Mainnet Swap

In order to simplify a network launch, and raise funds to complete their platform, some developers choose to launch initially with a "placeholder" token built upon a platform (commonly Ethereum), before swapping those tokens for a coin on their own platform at a later date (leaving the placeholder tokens worthless). These swaps most often occur at a 1:1 ratio. Notable examples of placeholder tokens include EOS, TRX, and ADA (which have recently launched their respective mainnets and informed the community of placeholder token swapping procedures) and VEN (which is currently undergoing procedures to swap their Ethereum-based token for coins on their mainnet). The projects will often: 1) issue the placeholder token, 2) launch a "testnet", or beta version of the network (potentially allowing placeholder conversions here, but usually not), and 3) launch the "mainnet", a live version of the network where placeholder tokens are converted for the mainnet's coins.

The decision of which creation method to take revolves around several key characteristics of the potential platforms that can be built on top of. The methods of transactions and codebase systems, smart contract functionality and feasibility, and scaling potential all play important roles in the underlying platforms that lay the foundations for token networks built on top of them.

Ease of Development

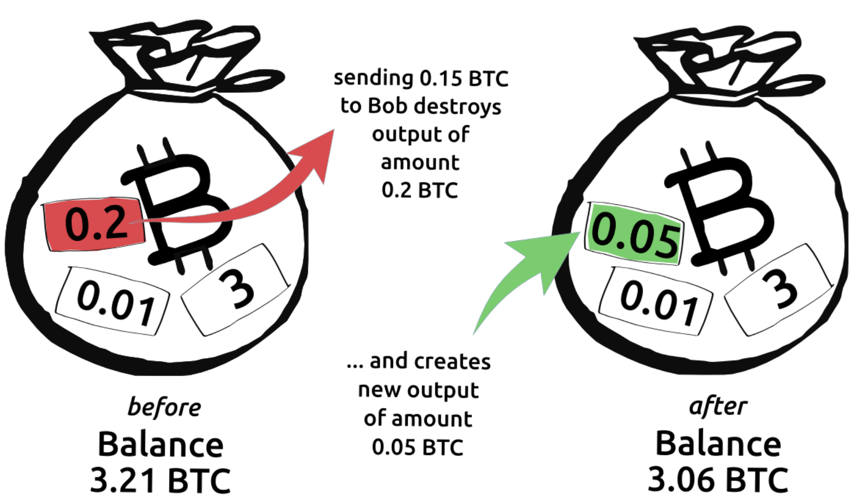
Prior to 2015, the market consisted of Bitcoin and a small number of alternative coins that were spun-off of Bitcoin code. The makeup and applications of these coins were very similar, since the functionality and ability for Bitcoin to be used as a creation platform was limited. Currently, Bitcoin uses a rudimentary scripting language (called Script). Also due in part to Bitcoin's method of recording transactions, advanced scripting that involves exchanges of value, especially between more than two parties, becomes difficult.

The most common approach to recording transaction information within a blockchain was introduced by Bitcoin, which uses a system of Unspent Transaction Outputs (UTXO) for transaction recording and can be thought of akin to cash. If a user wants to spend bitcoin, their balance is unlocked and three separate transactions occur:

1. Amount requested is sent to the corresponding address
2. Transaction fee is deducted and sent to miners as incentive to place it in a block
3. Remainder of the balance is sent back to the spender's wallet

Figure 1: UTXO Dynamic

Spending Consumes UTXOs and Creates New Ones



Source: Venzen Khaosan

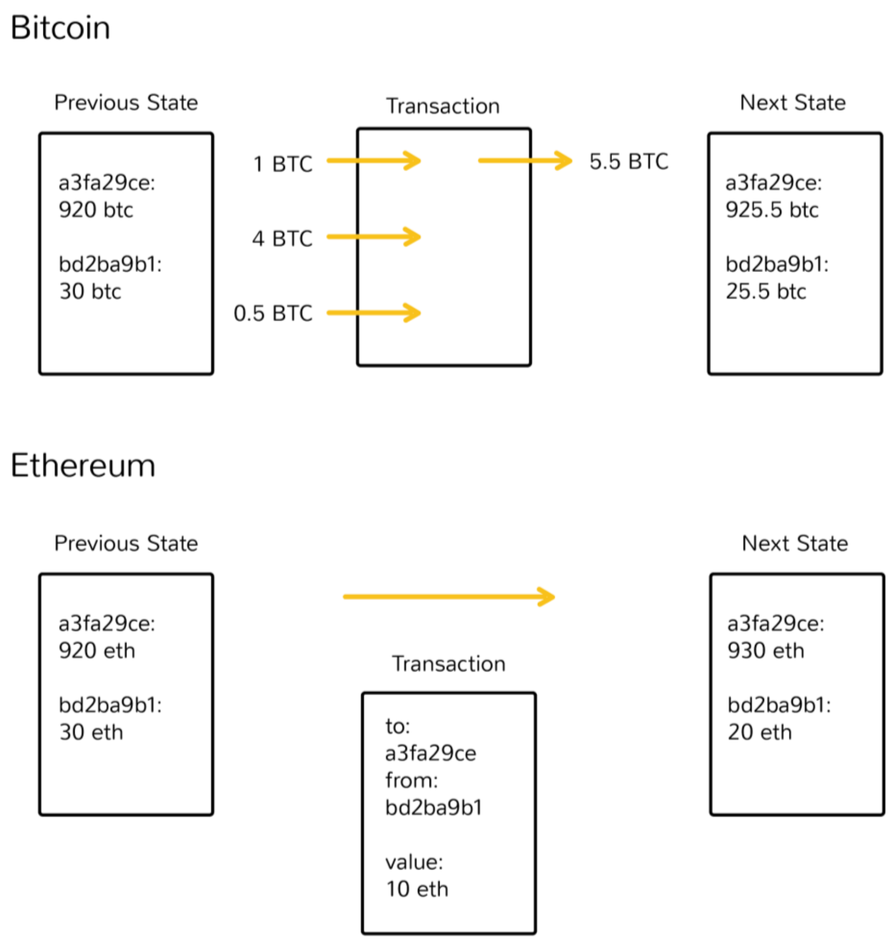
In Figure 1 (above), suppose Bob holds a Bitcoin wallet account balance 0.2BTC, 0.01BTC, and 3.0BTC for a total of 3.21BTC. If Bob wants to send 0.15BTC, he will:

1. Destroy an output amount of 0.20BTC
2. Create a new output of 0.05BTC

0.2BTC - 0.05BTC will result in a net loss of his spent 0.15BTC.

However, in 2015 Ethereum launched with further-evolved scripting abilities (with its Solidity programming language), allowing for different types of applications with a wider variety of features to be built on top of it, aided by a different method of recording transactions on the blockchain. The Account/Balance model, as used in Ethereum, simply checks the user's balance to make sure they have enough currency to complete the transaction, deducts the spent amount, and adds the spent amount to the receiver's balance - akin to a debit card transaction. Overall, these modifications helped Ethereum integrate advanced Smart Contracts.

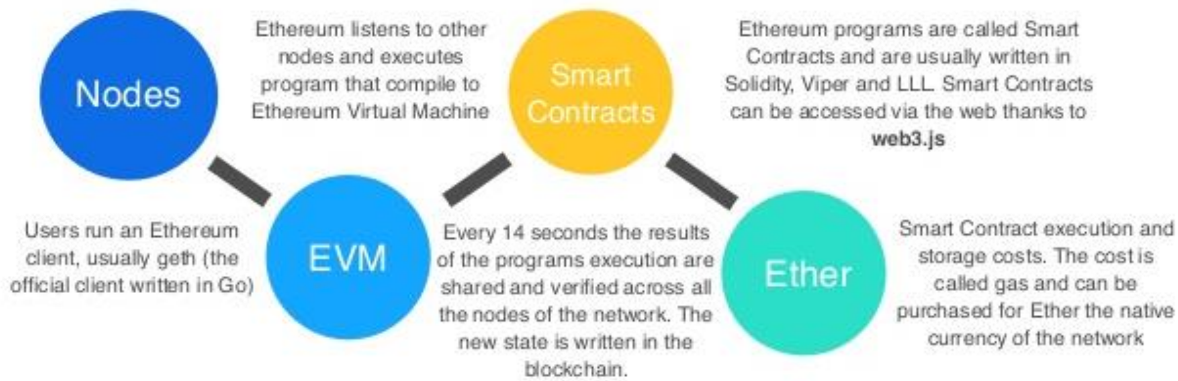
Figure 2: Transaction Documentation Comparison



Source: Alyssa Hertig

Smart Contracts are a feature of Ethereum, along with many other platforms, designed to facilitate digital commerce by providing both the structure and the enforcement of an agreement while preventing either of the parties from reneging on or changing the terms of the agreement. Essentially, it allows the exchange of information (some form of agreement) that executes autonomously once the predetermined conditions are met. In order to use them: users run the network software, action requests are broadcasted and compiled by the network of users, a new state is created, and users pay computation fees (called "gas", a small denomination of the network-native cryptoasset) to execute actions.

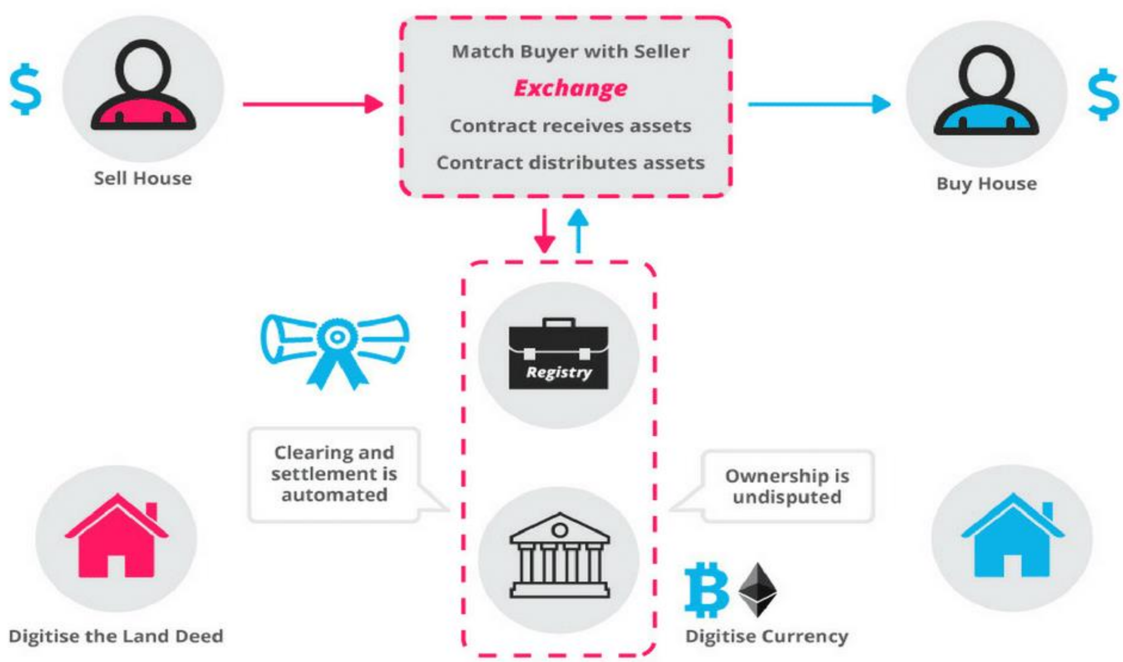
Figure 3: Ethereum Network Dynamic



Source: Greece JS

In Figure 4 (below), a digitized record of ownership of a home is transferred from the seller to the buyer upon automatically executed clearing and settlement. The ownership should remain undisputed as a record of each transaction was created, with few third parties/intermediaries involved.

Figure 4: Smart Contracts, Example



Source: Blockgeeks

Another example of smart contract use is within ICOs, where a smart contract may automatically refund an investor's contribution if the offering did not raise a minimum threshold of capital needed to finance the project. While very basic contracts - the ability to send or receive money if certain conditions are met - are possible on Bitcoin, Ethereum created a framework allowing broader use cases and has brought the capability to mainstream audiences.

Ethereum has become the standard platform for most network launches. The core differentiator between Bitcoin and Ethereum is Ethereum's use of a *Turing Complete* scripting language, which means the language is capable of solving any computational problem and can run through computations in a loop indefinitely. This ultimately allows developers to have significant flexibility to implement Smart Contracts and Decentralized Applications (dApps, which can be consumer or enterprise facing applications) that are built and operate on top of the platform blockchain (like Ethereum).

Many token projects use an Ethereum standard called ERC20, which allows for the standardized construction of tokens. Although ERC20 has been the most popular standard thus far, others are emerging with distinct new features, notably ERC721, which features the ability to create non-fungible assets (individual assets with unique characteristics, where each unit is not the same as others). We believe this will enable large markets like collectibles and more unique digital assets to be tokenized and we will expand on its potential in a future report. Prior to Ethereum, nearly the entire market consisted of coins with code spun-off from Bitcoin. To date, over 700 tokens (of varying utility and quality) are trading and are built on the Ethereum network with a combined market capitalization of $35B+. We set out a comparison between tokens and coins total trading and market cap below. To recap, though terminology may differ, for the purpose of our research we will refer to "tokens" as cryptoassets built on top of another network (such as Ethereum) and "coins" as cryptoassets that are unique to their own chain and do not rely on another chain. "

Figure 5: Cryptoasset Market Share

	Total Trading		Market Cap		Annualized Velocity
	#	%	$bn	%	
Tokens	828	52%	$35.7	13%	39.4x
Coins	764	48%	$231.3	87%	11.6x
Total	**1,592**	**100%**	**$267.0**	**100%**	**15.3x**

Note: Based on all Tokens and Coins currently trading

Source: Satis Research, Coinmarketcap

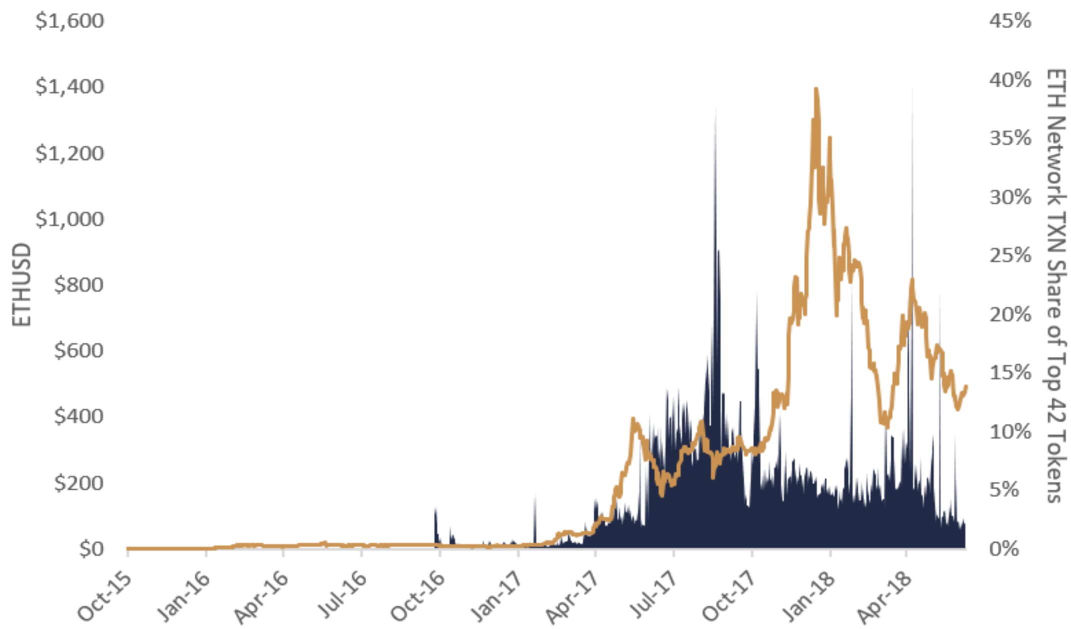
Higher Levels of Liquidity (Trading and Usage)

In addition to technical features like scripting, the ability to scale applications built using those tools for widespread use is incredibly important. Within cryptoasset networks, higher liquidity doesn't only describe the traditional sense of the term (related to trading and markets) but also regular use of the platform. For example, in the case of ETH, the coin is used not only to move between, and trade on, exchanges but also to facilitate decentralized applications (dApps) built on it. Each time code is executed on the Ethereum network, a small unit of ETH is sent by the requestor to pay for a transaction fee ("gas") to incentivize miners to facilitate the activity. Code is not only executed when a dApp is run, but also when users send the overlaying tokens (also built on Ethereum's network) or ETH itself. Any increase in fees (due to congestion) and corresponding slowing of transaction time not only affects tokens being used to trade or transfer value, but also the performance of the dApps built on the network.

As the popularity of cryptoassets grew in early 2017, a compelling use case within Ethereum was found: ICOs (See pg. 18), which initially often took the form of a company building new tokens on top of the Ethereum network and selling an initial allotment to kickstart the platform. Since the network is required to record the transaction volume load of all of the overlying tokens, overall use of the network slowed and transaction fees increased as certain tokens required large capacity to facilitate transactions from their ICO's.

An example of this was when the Bancor Foundation (BNT) launched its ICO on the Ethereum network in June 2017, and buyers rushed to pay higher transaction fees to prioritize their contribution confirmation times. Because the Ethereum network requires both normal payment transactions (like ICO contributions) and companies running their own code on top of Ethereum to pay transaction fees (or "gas"), the lengthy confirmation times and increasing cost of fees impacted the entire network, including the ability of dApps built on it to function. Total network share of transactions has generally continued to grow as more networks launch on top of Ethereum (below, in Figure 6).

Figure 6: Ethereum Network Transaction Share by Top 42 Tokens



Source: Satis Research, CoinMetrics

Tracing down the bottlenecks within the network, two convincing solutions have been focused on:

1. Off-Chain: not settling all transactions of the network on the blockchain itself upon each transaction, and outsourcing activity to off-chain payment channels that periodically settle on the main chain.
2. On-Chain: Ridding the network of its slower Proof-of-Work (PoW) consensus protocol (currently limited to 15 transactions per second (tps)) and opting for a higher throughput and lower latency through another consensus mechanism, as well as more efficient organization of data.

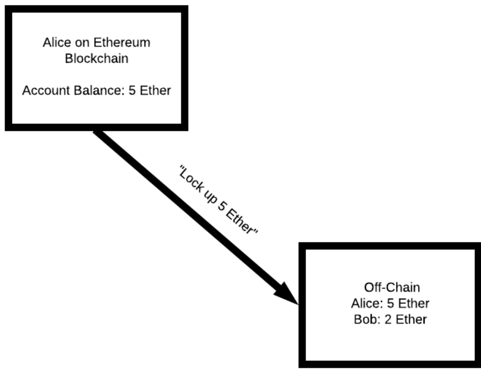
There are currently several large Ethereum scaling developments underway to address some of these issues:

Raiden Network (RDN) is an off-chain scaling solution that is the furthest along in development though not deployed. The Raiden Network functions in a similar way to the Bitcoin Lightning Network, users move coins through channels off of the main blockchain, and periodically settle on the main chain. Since coins aren't settled in real-time on the main chain and global consensus isn't needed for each transfer, transactions are nearly instant and very cheap. However, since the network relies upon outsourced channels, the possibility for corruption and centralization of control by bad actors within those channels cannot be discounted. Unlike other proposed solutions, which typically continue to use the main-chain's native cryptoasset (for example, Ethereum's ETH) the Raiden Network supports its own token, RDN (which streamlines fees), ERC20 tokens built upon Ethereum, as well as ETH itself.

Architecture: Layer-2/Off-Chain, (Supplemental)
Throughput: 100,000,000 tps (est)
Launch: EOY 2018 (est)

Below in Figure 7 (below), Alice and Bob want to move their transactions off of the Ethereum chain and on to a payment channel (perhaps they transact frequently, or the network is a bit congested at the moment and they wish for instant transfer of value). They lock up respective amounts of ETH off of the main Ethereum network.

Figure 7: Opening a Payment Channel



Next, in Figure 8, Bob receives an amount of Alice's locked up balance that she wishes to send him. Bob isn't able to spend this value on the main Ethereum chain for now, since this is off-chain. In Figure 9, Bob owes Alice a net balance, so he transfers the amount he owes her.

Figure 8: Alice Pays Bob

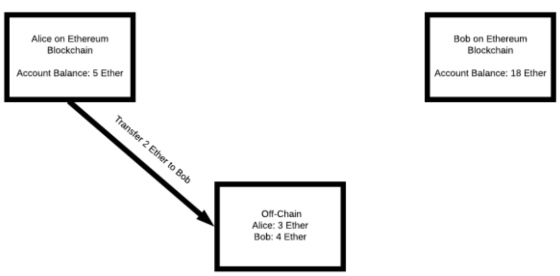
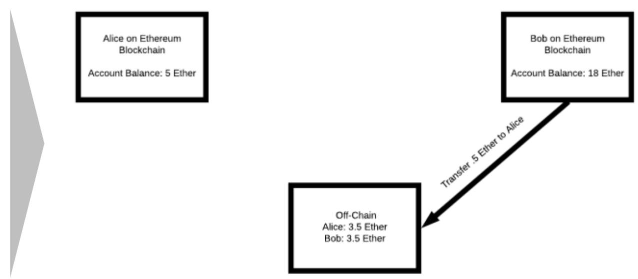
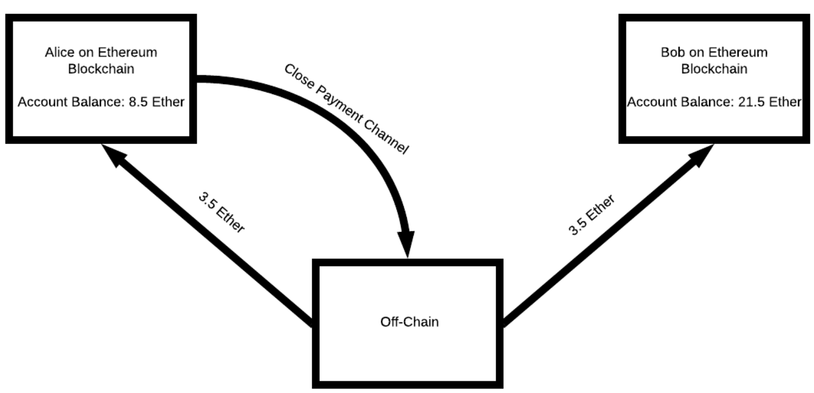


Figure 9: Bob Pays Alice



Finally, in Figure 10, Alice has decided to close the channel (perhaps she needs the money at the moment), and she receives the remainder of the amount she locked in the smart contract off-chain.

Figure 10: Closing the Payment Channel

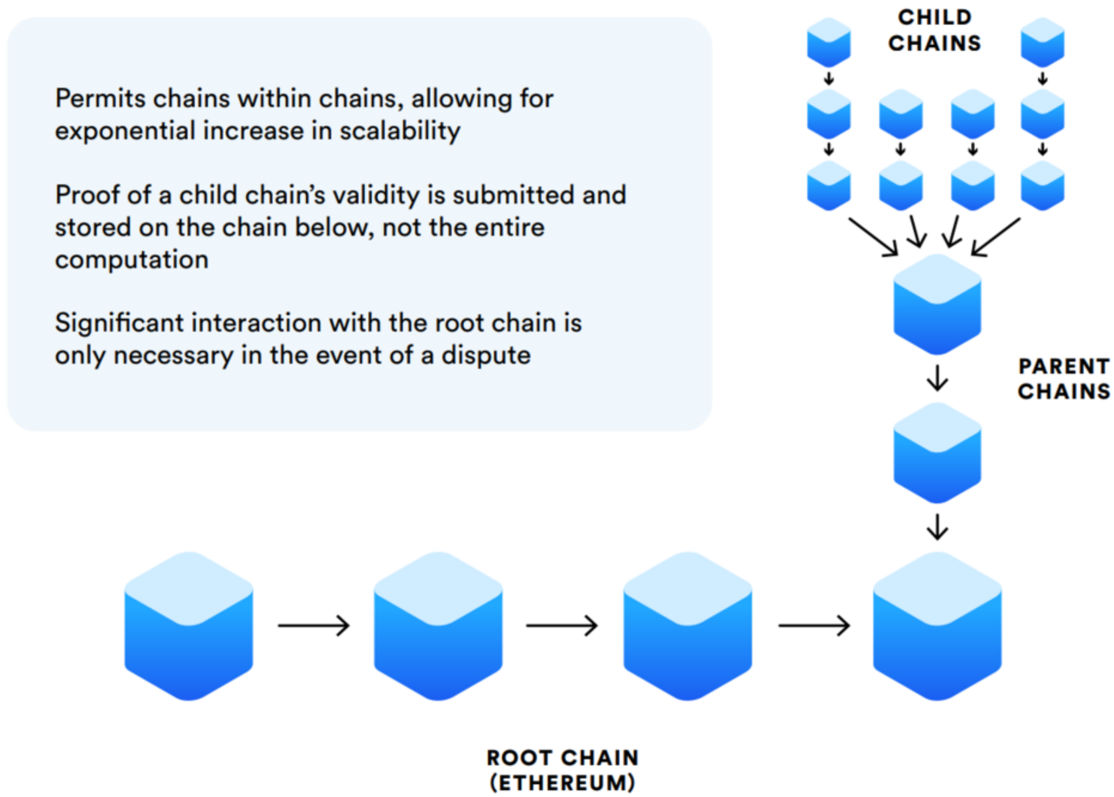


Source: [Justin C.]

Plasma is a proposed off-chain solution for scaling on the Ethereum platform. Plasma works by allowing "child chains", which are separate chains that allow interchangeability of network-native cryptoassets, that branch off the main blockchain. These child chains can utilize different methods for consensus (allowing higher transaction throughput). When a user wishes to exit the high throughput child chain and return to the main chain, they can submit a request to return to the main chain. Along with the request they must post a bounty, which is designed to incentivize others to confirm that all blocks on the child chain are valid. Assuming the exit request is not challenged by a member of the community, the child chain will be confirmed on the main Ethereum blockchain. There are currently several projects working on Plasma development, though none deployed yet.

Architecture: Layer-2/Off-Chain, (Supplemental)
Throughput: +100,000 tps (est)
Launch: 2020 (est)

Figure 11: Plasma, Child Chains

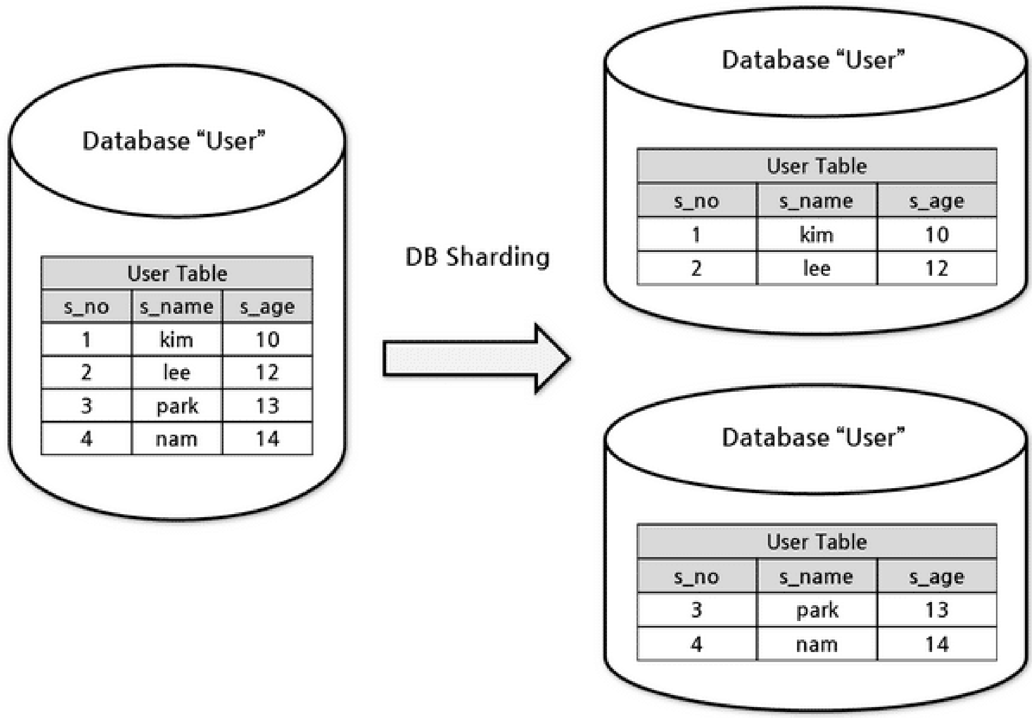


Source: Coinpupil

Sharding is a proposed scaling solution that works to split workloads among network nodes (miners/validators). Recall, in a traditional blockchain structure each user is required to carry certain data attributes that are sequentially kept in a ledger (called the blockchain). Sharding proposes that these same data sets be split into "shards", or essentially micro-chains, with nodes carrying only a fraction of transaction data. Since nodes no longer need to process each transaction, the burden should be cut down and throughput increased. As a result, sharding can theoretically increase the throughput of the network as more miners/validators join and scale horizontally. Rather than vertical scaling, which would entail making each of the blocks in the blockchain larger and able to fit more transactions, sharding allows for horizontal scaling by splitting chains into smaller ones.

Architecture: Layer-1/On-Chain
Throughput: +45,000 tps (est)
Launch: 2019 - 2020 (est)

Figure 12: Sharding, Dynamic



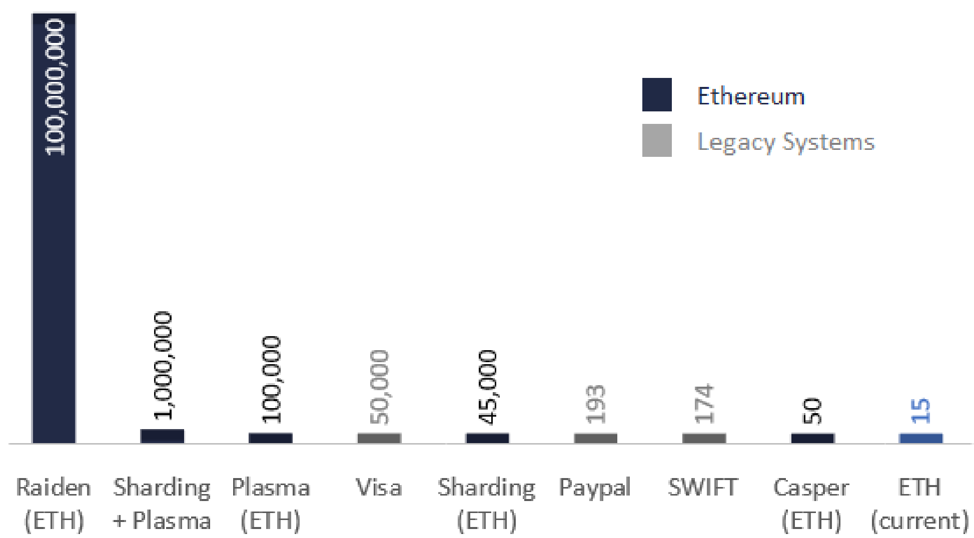
Source: Blockgeeks

In Figure 12 (above), a database is sharded into two separate databases, with both containing trace roots of the data but still far less overall amounts than the original database. Sharding on a blockchain would work in a similar way, with users carrying smaller amounts of data that are spread out in aggregate.

Casper is Ethereum's attempt to move the network from PoW to Proof-of-Stake (PoS, mentioned in the Technical Underpinnings report). Casper will come in two stages; Casper FFG (Friendly Finality Gadget) and Casper CBC (Correct by Construction). FFG will be a transition phase, where 1 out every 100 blocks will use the PoS mechanism (creating a hybrid PoW/PoS model), and CBC will be the full PoS implementation. However, recently Ethereum developers have explored the possibility of skipping FFG, going straight to full PoS, combining it with Sharding (which would be implemented in phases, throughout several years, dubbed "Ethereum 2.0"). For more information on PoS, please see the Technical Underpinnings report, pg. 16.

Architecture: Layer-1/On-Chain
Throughput: +50 tps (est)
Launch: EOY 2018 (est, for FFG - the hybrid), Mid-2019 (est, for CBC - full PoS)

Figure 13: Platform Transactions per Second



Source: Satis Research

While previous estimates have placed Ethereum's theoretical throughput, after implementations such as sharding and plasma being deployed, at 1,000 tps, **recently Vitalik Buterin (Ethereum co-founder and lead researcher) stated that the compounding effects of these solutions could scale network throughput to 1,000,000 tps (compared to ~15 tps at peak capacity currently).**

Higher Levels of Network Security

Projects looking to build on top of platform networks like Ethereum also benefit from a mature validator/miner network. Recall that in PoW networks, miners are required to deploy computational power to compete for the ability to receive a reward and a share of network transaction fees in return for their verification of transactions. Similarly, in PoS networks, validators are required to stake/deposit network-native cryptoassets to receive a share of network transaction fees as compensation for verifying the integrity of transactions.

The larger and more dispersed a network's miner/validator base is, the costlier it is to attack and undermine. Recall in the Technical Underpinnings report the cost to attack a PoW network on pg. 14, while the cost to attack a PoS network would be similar to owning a majority of the outstanding cryptoassets. Often when networks are young (and not built upon an established platform), the relative cost to attack may be significantly less.

When tokens launch on top of platform networks, they pay gas fees (either to execute their own dApp's code or move a token) denominated in the underlying cryptoasset of that network, allowing them to tag along the already established verification layer.

The security and reliability of launching on a more established chain is appealing to many projects, especially when launching dApps or networks that rely upon the uptime and functionality provided by their underlying validator network.

There are also downsides to relying on a platform network, typically around the potential for network congestion from increasing fees and slow transaction times (recall BNT, on pg. 7).

Aside from Ethereum, a number of competing platforms have launched in recent years. These platforms, though currently lacking the network effects enjoyed by Ethereum, offer alternative features to the underlying technologies of Ethereum that make them worth exploring. Below are key statistics behind notable platforms:

Figure 14: Key Statistics on Competing Platforms

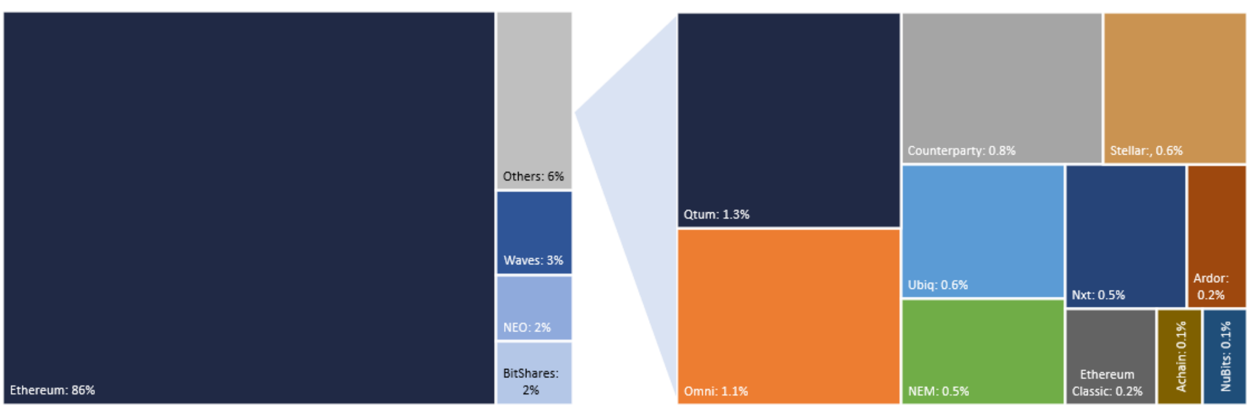
Network	Total Market Share	Consensus	Transactions per Second		Turing Complete	# of Tokens Built-On	Year Since Mainnet	Programing Language	Transaction fee payment
			Current	Future (est.)					
ETH	86.5%	PoW	15	1,000,000	Y	716	3	Solidity	ETH
WAVES	2.9%	PoS	100	1,000	N	24	2	Scala	WAVES
NEO	2.3%	dBFT	400	10,000	Y	19	2	C#	GAS
BTS	2.2%	dPoS	18	100,000	N	18	4	N/A	BTS
QTUM	1.3%	PoS	70	1,000	Y	11	1	Solidity	QTUM
XLM	0.6%	SCP	1,000	10,000	N	5	4	C++	XLM
XEM	0.5%	PoI	2	1,000	N	4	3	JAVA	XEM
NXT	0.5%	PoS	12	100	N	4	5	N/A	NXT
ETC	0.2%	PoW	1	1,000	Y	2	2	Solidity	ETC
ADA	0.0%	PoS	10	250	Y	0	1	Haskell	ADA
EOS	0.0%	dPoS	600	50,000	Y	0	0	C++	N/A
XTZ	0.0%	PoS	40	N/A	Y	0	N/A	Michelson	XTZ
ICX	0.0%	dPoS	1,000	9,000	Y	0	0.5	SCORE	ICX

Note: Selected networks listed by market share of all tokens currently trading

Source: Satis Research

It is worth nothing that several of these platforms are using 20- to 30-year-old languages, such as C#, C++ and JAVA, compared to for example Solidity, which was developed by Ethereum in 2014.

Figure 15: Market Share by Platform



** Tokens currently trading*

Source: Satis Research

It remains to be seen whether any platform will be able to surpass Ethereum's adoption, which has a high degree of first mover advantage (nearly a three-year head start, plus the entire market share of the ICO discovery phase through 2017) in addition to high levels of community support, liquidity, and developer buy in. Emerging platforms have been able to differentiate themselves with higher levels of transaction throughput (transactions per second), which generally comes at the cost of higher levels of centralization.

The most important technical differentiator amongst ICO platforms is the method of consensus (pg. 10). At a high level, the more centralized (fewer people in control) the control, the higher level of transaction throughput possible. Ethereum's Proof-of-Work model ensures a high level of security (similar to Bitcoin), though at the cost of longer transaction times, lower throughput, and high energy consumption.

Alternatives to Proof-of-Work, such as Proof-of-Stake and further variations like Delegated Proof-of-Stake, allow significantly higher transaction throughput, even before off-chain scaling solutions are implemented.

Consider EOS, a platform that raised $4b in their ICO, and is capable of scaling significantly due to its dPoS method of consensus. Block production and verification is controlled by only 21 block producers (who are elected by community members who "stake" their coins in exchange for a vote). It remains unclear whether this trade off will be acceptable to the community.

We now want to turn to an interesting comparison which shows the relative adoption of these platforms. how much value is on the backs of which networks and what is the multiple the underlying trades to how much it carries. A bit like comparing Atlas and sky he held up as punishment by Zeus in the Greek legend. The figures outlined in the chart below are:

1. The underlying value, namely the entire market of the main platform token e.g. for Ethereum the market capitalization of ETH
2. The overlying value, e.g. the sum of the market capitalizations of all ERC20 tokens utilizing the Ethereum platform; and
3. The multiple the underlying platform token trades to how much it "carries" e.g. the overlying value.

Figure 16: Underlying Premium to Overlying Network Value

Platform	Market Cap		Premium Multiple
	Underlying	Overlying	
Counterparty Tokens (XCP)	$20,036,178	$48,647,525	0.4x
Ethereum Tokens (ETH)	$47,244,367,312	$31,285,698,011	1.5x
NEO Tokens (NEO)	$2,419,482,000	$1,112,475,442	2.2x
Ubiq Tokens (UBQ)	$38,613,157	$14,464,061	2.7x
NuBits Tokens (USNBT)	$2,576,759	$908,987	2.8x
Ardor Tokens (ARDR)	$161,115,642	$53,165,036	3.0x
Waves Tokens (WAVES)	$292,945,000	$73,389,306	4.0x
BitShares Tokens (BTS)	$445,793,817	$103,896,651	4.3x
Qtum Tokens (QTUM)	$788,749,781	$102,380,113	7.7x
Omni Tokens (BTC)	$113,326,636,877	$2,829,259,915	40.1x
NEM Tokens (XEM)	$1,635,903,000	$39,874,593	41.0x
Stellar Tokens (XLM)	$3,783,566,299	$60,623,377	62.4x
Ethereum Classic Tokens (ETC)	$1,829,875,560	$564,943	3,239.0x
Achain Tokens (ACT)	$59,734,714	$0	--
Total	**$172,049,396,096**	**$35,725,347,960**	

Note: Tokens currently trading

Source: Satis Research

Figure 17: Velocity of Tokens by Share of Underlying Tokens Market Cap

Token Market Statistics	Market Cap	%	Annualized Velocity
Ethereum	$31,285,698,011	87.6%	22x
Omni[1]	$2,829,259,915	7.9%	238x
NEO	$1,112,475,442	3.1%	27x
BitShares	$103,896,651	0.3%	44x
Qtum	$102,380,113	0.3%	33x
Waves	$73,389,306	0.2%	7x
Stellar	$60,623,377	0.2%	9x
Ardor	$53,165,036	0.1%	13x
Counterparty	$48,647,525	0.1%	19x
NEM	$39,874,593	0.1%	2x
Ubiq	$14,464,061	0.0%	0x
NuBits	$908,987	0.0%	0x
Nxt	$881,547	0.0%	6x
Ethereum Classic	$564,943	0.0%	2x
Achain	$0	0.0%	--
Total	**$35,726,229,507**	**100.0%**	--

Note: Tokens currently trading
(1) Omni's overlying token USDT Tether (a price-stable coin) skews velocity

Source: Satis Research

Figure 18: Platform Share by Total Market

Total Platform Share	%
Ethereum	77.2%
NEO	4.6%
Proprietary	3.8%
Oicon	0.6%
Stellar	0.5%
NEM	0.2%
Qtum	0.2%
Others	*13%*
Total	**100%**

Note: Total tokens - trading and non-trading

Trading Platform Share	%
Ethereum	86.5%
Waves	2.9%
NEO	2.3%
BitShares	2.2%
Qtum	1.3%
Omni	1.1%
Counterparty	0.8%
Stellar	0.6%
Ubiq	0.6%
NEM	0.5%
Nxt	0.5%
Ardor	0.2%
Ethereum Classic	0.2%
Achain	0.1%
NuBits	0.1%
Total	**100%**

Note: Tokens currently trading

Source: Satis Research

Legality

Before diving further into the structure and distribution methods of cryptoasset, it is worth first highlighting that cryptoasset are arguably caught by complex regulation in most jurisdictions and are also subject to subject matter specific developing regulation. Thus far in the US, SEC Chairman Jay Clayton has stated:

- "Tokens and offerings that incorporate features and marketing efforts that emphasize the potential for profits based on the entrepreneurial or managerial efforts of others continue to contain the hallmarks of a security under U.S. law."[1]
- "I believe every ICO I've seen is a security…ICOs that are securities offerings, we should regulate them like we regulate securities offerings."[2]

Certain ICO's in the US now characterize themselves as "security tokens" and rely on exemptions from registration such as Regulation D and Regulation S of the Securities Act of 1933, as amended. Other major jurisdictions have taken a wide variety of approaches and we will address this in a subsequent note.

Fundamental Classifications of Cryptoassets Sold

Fundamentally, ICO tokens are normally categorized as one of the following types (although to be clear in the US this distinction has not been adopted by the SEC):

- **Use/Utility** - These are consumptive tokens that can be used within the ecosystem of the network. In return for financial contributions, investors obtain the rights to a product, service or other utility as part of the network. Though commonly attributed to "tokens" built on other platforms (such as Ethereum), a protocol project (which deploys its own chain) may qualify in this category as well.
- **Investment/Security** - These are tokens that promote or aim to achieve some sort of financial return for the investor, through exposure possibly to a fund or asset backing.

When viewing opportunities associated with ICO contribution, it is important to consider the distinction between the two types of offerings (which may not be clear, upon reading diligence material) and the elements that influence their value.

When viewing a utility token, a contributor may purchase this to use on the network. Ultimately their value will be dictated by demand for the token needed to access functionality within that network and the scarcity by which they are issued, potentially altered by incorporated mechanisms such as staking (collateral/deposits needed to use the network) and burning (redemption and retirement of tokens from existing supply), which alter value-impacting elements such as velocity and supply.

Security tokens are slightly more straightforward, as contributors purchase the token because of conveyed financial incentive; the tokens could be tied to the performance of an investment fund or a crypto-return yielding asset.

Structure

When launching a network, one of the most important aspects to consider is the economic model of the tokens that the platform utilizes. There are a few approaches to token mechanics and design, which can generally be split between 1-token and 2-token structures.

In a 1-token system, tokens generally have "utility" on the platform. By staking a token, users gain access to the services offered on or by the issuer. Some token issuers also burn (buy back tokens from the free market, and destroy them), similar to a stock buyback scheme.

[1] Statement on Cryptocurrencies and Initial Coin Offerings, SEC Chairman Jay Clayton Dec. 11, 2017
[2] Reported quote of SEC Chairman Jay Clayton testifying before the Senate on February 6, 2018

1-Token Model Examples:

- **Binance** - centralized crypto-to-crypto exchange, using the **BNB** token.
  - Used - to pay for trading fees at a heavy discount
  - Bought back and burned - using 20% of the exchange's quarterly trading profits (until half of the fully diluted supply is burned). In the most recent quarter, Binance burned 2.2M BNB (~1.1% of max supply) with ~$30MM.
- **KuCoin -** centralized crypto/crypto exchange, using the **KCS** token.
  - Used - to pay for trading fees, with a 1% discount per 1000 KCS (~$3,000 at current prices) up to a maximum of 30%
  - Dividend/repayment - of 50% of daily trading fees paid (in the form that the coin was traded that day, many different types). At current prices and depressed daily volume of ~$33MM (1/8th of its peak six months ago), holding 1 KCS ($2.9) currently yields ~$0.0003.

2-Token Model Examples:

- **IDEX** - hybrid-decentralized crypto/crypto exchange.
  - ***AURA*** - staked - to run a node and receive a portion of trading fees (paid in ETH) from the IDEX exchange.
  - ***IDXM*** - staked - to receive membership and eliminated/discounted trading fees on the IDEX exchange.
- **NEO** - contract and decentralized application platform (similar to ETH).
  - ***NEO*** - staked - to receive governance rights and GAS dividends.
  - ***GAS*** - used - to pay for computation on the network.
- **Sia** - decentralized cloud storage network.
  - ***SiaFund*** - staked - to receive a percentage of fees on the network (paid in SC).
  - ***SiaCoin*** - used - to pay for storage/network fees.
- **Factom** - data storage layer on top of Bitcoin.
  - ***FCT*** - staked - burned as more users purchased Entry Credits (EC)
  - ***EC*** - used - to pay for data storage

Asset-Backed Token Examples:

- **Digix** - **DGX** tokens are backed by 1 gram of physical gold, held in custody by an independent third-party custody provider, with regular independent audits.
  - Redeemed - exchanged for physical gold at the custodial vault located in Singapore
  - Held - for potential of appreciation of the underlying asset
- **Property Coin** - **PCX** tokens are backed by fractionalized ownership (equity) of an asset within the company's real estate portfolio.
  - Not redeemed
  - Held - for potential of appreciation of the underlying portfolio

Token Distribution

With networks that decide to distribute their own coin through a Genesis Block, a sale is not needed. However, many companies opt to distribute their coins/tokens to get them into the users, who will hopefully use the network and theoretically drive value to the underlying token. Under the intent to sell, companies can either 1) give away their network cryptoassets for free through airdrops, or 2) sell the cryptoassets to fund the development of the network. Below, we will explore both.

Airdrops: Giving Cryptoassets Away for Free

While ICOs have traditionally sold tokens (in both private and public sales) to fund the development of their platforms, an increasingly popular trend relies on airdrops - that is, giving tokens away for free. These airdrops can vary in amount and purpose - occasionally they are used as advertising, where a limited number of tokens are given away to encourage users to learn about or otherwise promote the project. For other projects, airdrops have replaced the traditional ICO sale model altogether, with developers giving away a portion of all tokens from the start and using the rest to sell or pay team members and developers. This model means less risk for token-holders, who have invested none of their own funds. Developers, likewise, are incentivized to improve their platform in order to increase token value (and thus the value of their own stake).

Projects looking to airdrop a token will typically take one of two approaches - either airdropping to a curated selection of addresses (such as those users who have indicated their interest) or airdropping indiscriminately to all users who hold other tokens. Increasingly, projects in tightly-regulated environments are aware of the complex legal environment, with many requiring AML/KYC in order to receive free tokens. For users, an unanswered question is how to handle tax liabilities for airdrops received (which can be sent to users with or without their permission).

ICO's: Selling Cryptoassets

Out of the distributed ledger tokenization movement, a new crowdfunding method has emerged through the use of ICO's. An ICO can be initiated by any company that wishes to receive funding for a project, whether it is for-profit or non-profit (like many open sourced projects). Functionally, a company builds its own cryptoasset that it exchanges for other cryptoassets (or fiat, in some cases) from the public. In terms of risk and maturity, ICO's can be thought of as high-yield debt.

Typically, the company seeking to raise funds will publish several of the following elements on their website:

- An overview of the project
- The project strategy
- The project time table, and duration of time to key accomplishments
- A whitepaper, or technical writing of how the project works
- A distribution table, showing what portion of the coins will be allocated to which entities (the investors, the team, the ecosystem, amongst others)
- An overview of the team and advisors' backgrounds

Upon viewing the prospects of the project, contributors send funds to the company/organization. Subject to legal restrictions enforced by company/organization, contributors can be anyone from an uneducated retail investor, to a large entity. They typically send funds through cryptocurrencies, since these are easier to send through the internet. Some projects also allow contributions of fiat currencies such as USD, by use of crowdfunding platforms (such as CoinList, Indiegogo or Republic). Once the funds have been confirmed as received, the contributor is issued a receipt/ticket for the project's new token (or coin) they are offering, which are typically distributed soon after the end of the sale.

ICO Process

The ICO process contains several key elements, which includes: the sale process, platforms that are used to sell the tokens, the classifications of the various tokens that are sold, and the legality of the tokens.

Sale Process

Within the ICO sale process, a series of investment rounds are typically opened with more exclusivity and higher discounts earlier and tapering out to public trading. In each ICO, there may be discounts offered, based on: sale phase and timing, investment amount, and “proof of care” (or, demonstrative enthusiasm for the underlying technology, such as a video or blog post reviewing the project). There have been fluctuations in offered investment rounds and discounts within the past year; initially companies offered heavy discounts through each pre-sale stage and ultimately a public ICO stage (with little or no discount), whereas now discounts have become lighter in earlier stages and many projects skipping a public sale entirely due to regulatory uncertainty. Though not every ICO follows the same fundraising process, below are common phases and approximate magnitudes of discounts and returns through each.

Figure 19: Approximate ICO Discounts & Returns

Investment Round	Average Discount	Return *(Approx.)*	
Private Pre-Seed	90%	15.0x - 25.0x	Venture Firms Hedge Funds Crypto Whales UHNW Individuals Large Family Offices
Private Seed	85%	10.0x - 15.0x	
Seed	80%	5.0x - 10.0x	
Friends & Family	60%	3.0x - 5.0x	
Syndicate Pre-ICO	50%	2.0x - 3.0x	
Private Pre-ICO	40%	2x	
Pre-ICO	30%	1.0 - 1.3x	
Public ICO	0%	0.7x - 1.0x	Public, Retail Investors
Exchange Trading	0%	0.4 - 0.9x	

Source: Satis Research

Sale Platforms

Companies requesting funding for their projects through an ICO will either build their own methods of token issuance into their website, or use a token issuance platform, where fund gathering and token distribution from and to the buyers will occur. Below are the most notable platforms:

Figure 20: Major Token Issuance Platforms

		CoinList	Republic	TokenSoft	Indiegogo
Age (Years)		1	2	<1	10
Origins		AngelList	AngelList	BitGo	Legacy
Currencies Accepted	Fiat	✓	✓	✓	✓
	BTC	✓	✗	✓	✗
	ETH	✓	✗	✓	✗
	XLM	✗	✗	✓	✗
ICOs	$s raised	$400M	$3M	$54M	$5M
	# Completed	20	3	3	1
Regulatory Compliance	A+	✗	✓	✓	✓
	CF	✓	✓	✗	✓
	D	✓	✓	✓	✓
	S	✓	✓	✓	✓
Countries Supported		Most	Most	50	Most
AML/KYC?		Yes	Yes	Yes	Yes

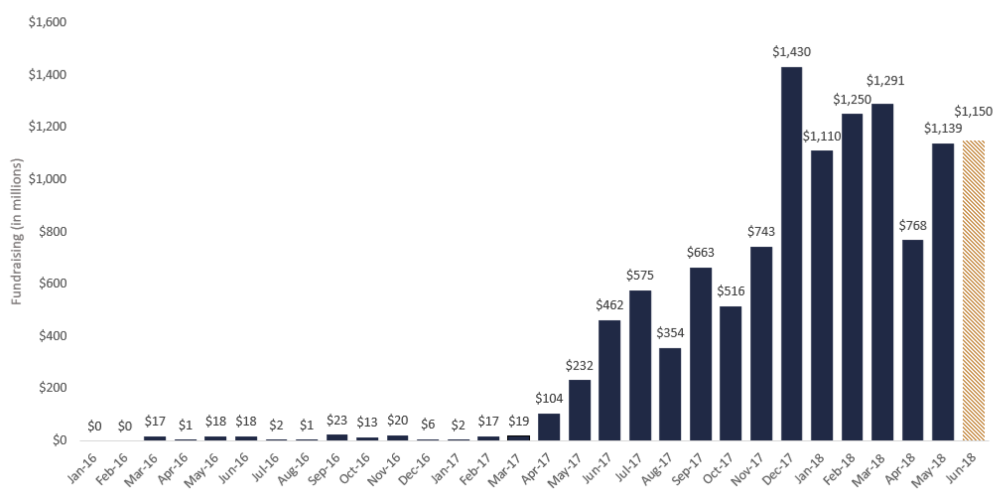
Source: Satis Research

ICO Market Overview & Quality

ICO fundraising for token-operated networks has continued strongly, despite waning market performance and regulatory uncertainty. We estimate $7B+ in global fundraising YTD, nearly 50% of the amount raised in all of 2017 despite a significant reduction of price of BTC/ETH typically used to fund ICOs. **The global ICO market now stands at ~20% of the US IPO market YTD**, which has also had a strong first half (with the highest volume since 2014).

ICO Market Statistics

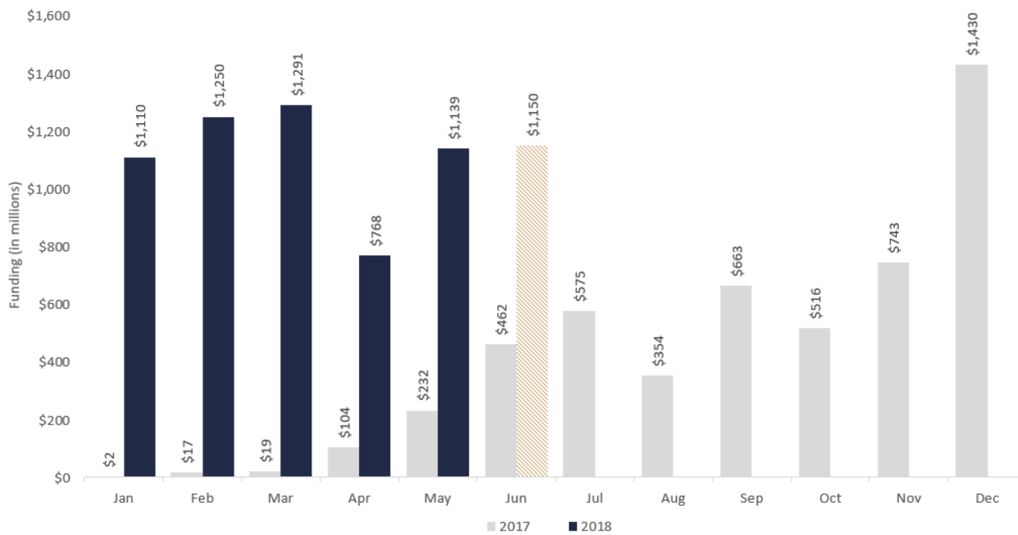
Figure 21: ICO Market Fundraising, 2016 – 2018



Source: Satis Research

Figure 22: YoY Fundraising

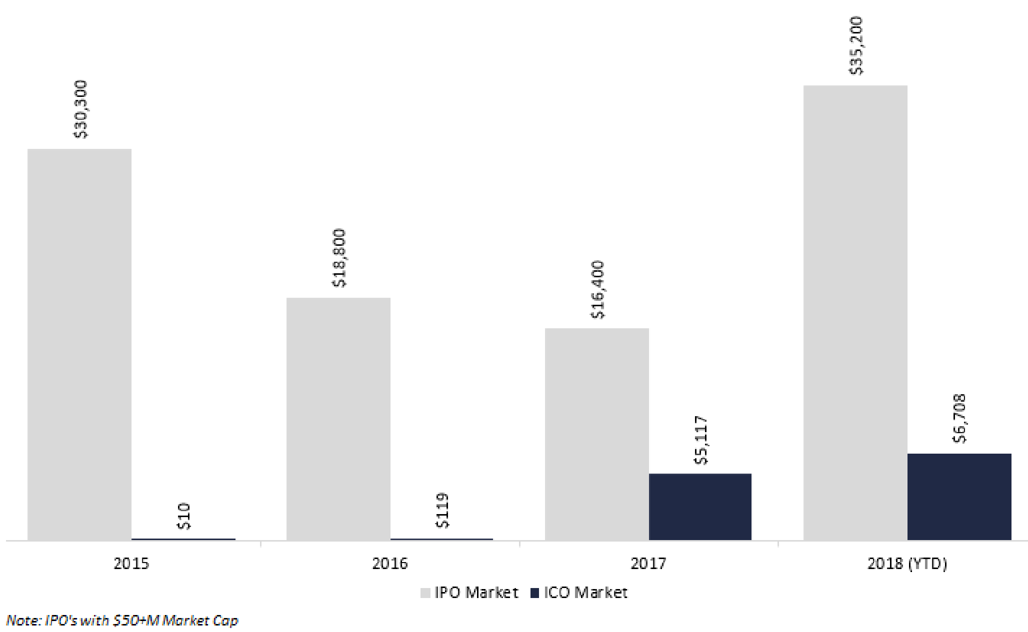
Growth has slowed YoY, which we attribute primarily to: 1) regulatory uncertainty (primarily in the US), 2) concerns about upcoming technical changes on major networks that most ICO's are built on (such as Ethereum), with hesitance around using the few and nascent alternative networks, and 3) lower enthusiasm by retail buyers among others, during the recent six-month broad crypto market decline.



Source: Satis Research

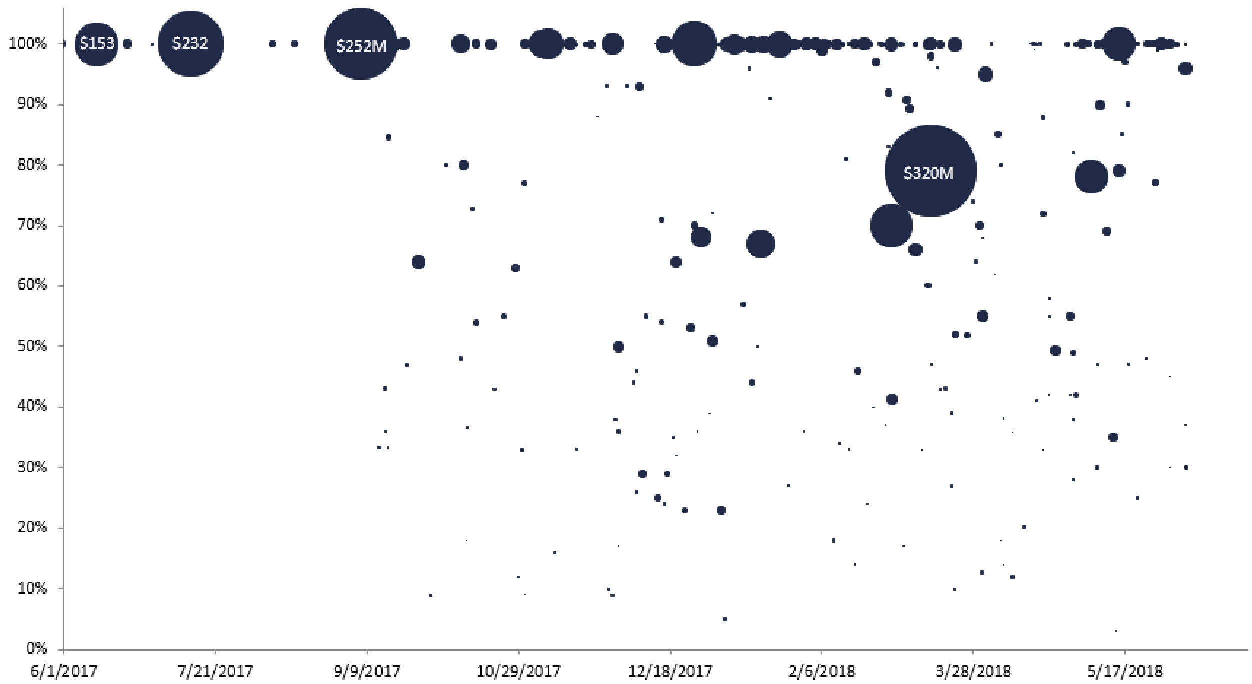
Figure 23: US IPO vs Global ICO Market *($ in millions)*

The ICO market has raised ~20% of the total US IPO market YTD, compared to being nearly non-existent a few years ago.



Source: Satis Research

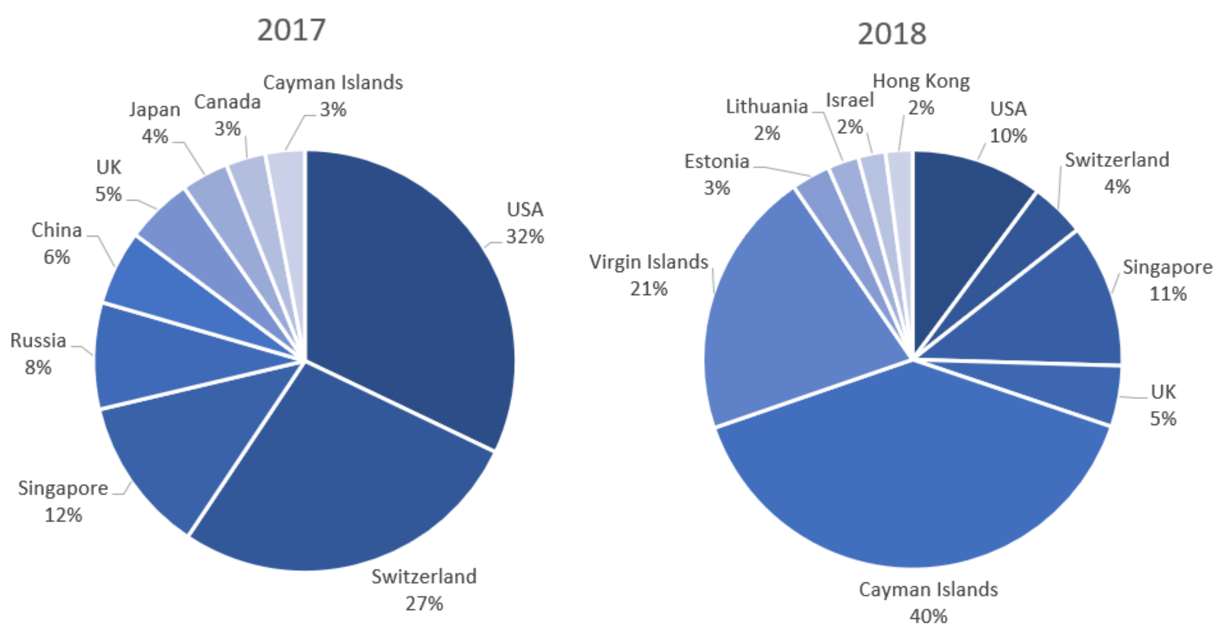
Figure 24: ICO's by Fundraising Goal Achievement



Source: Satis Research, ICODrops

Figure 25: Countries by ICO Fundraising Share

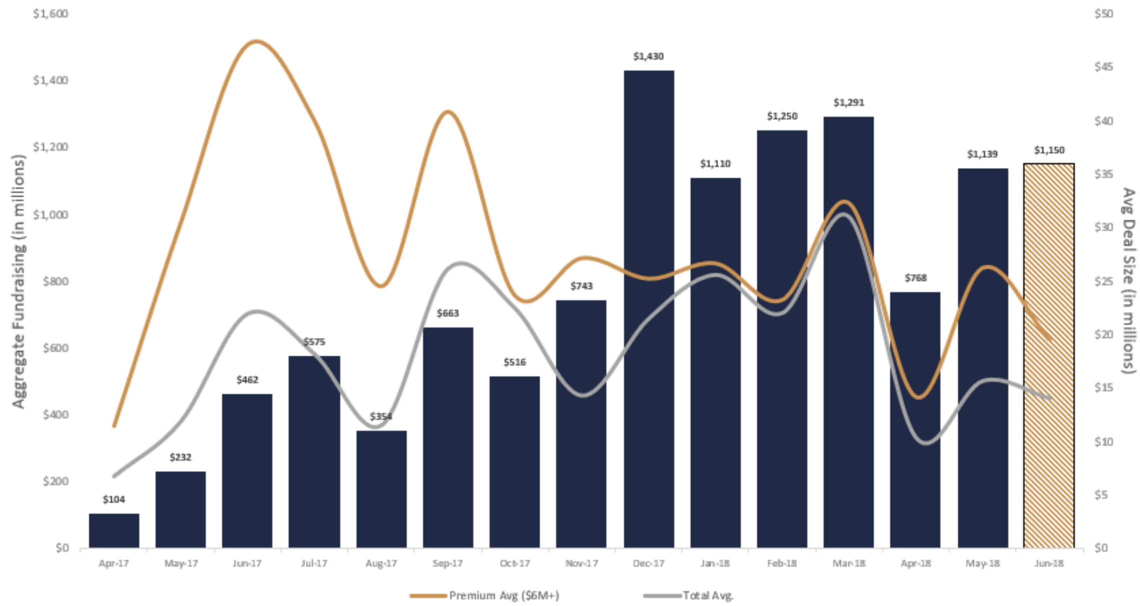
Projects have migrated outside of the U.S to launch ICO's in response to the existing application of the US regulatory regime, with market share loss shifting to countries like Switzerland, Singapore, and the Cayman Islands.



Source: Satis Research

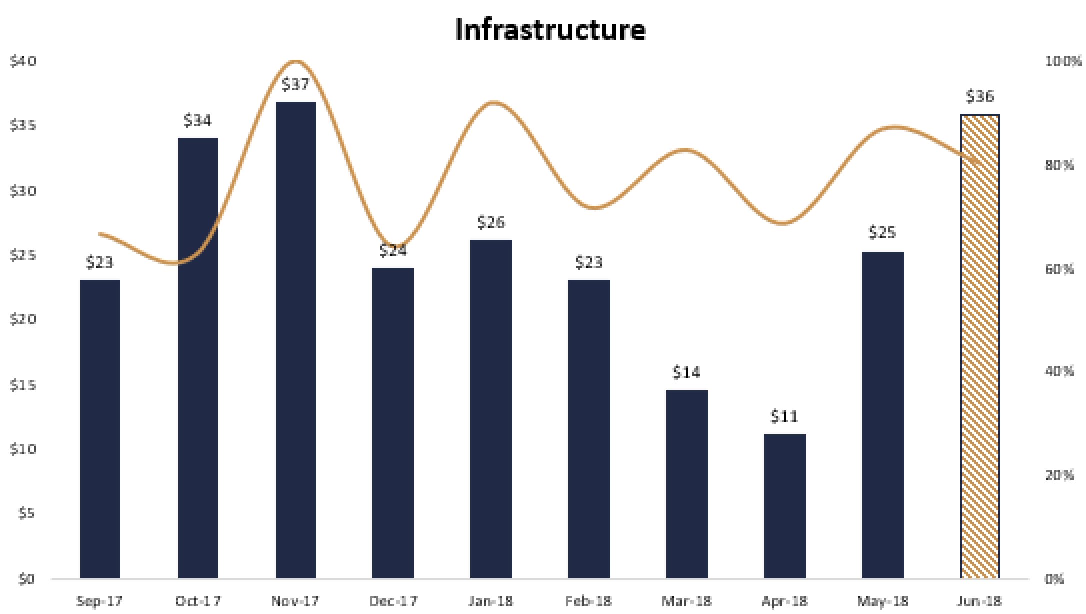
Figure 26: Average ICO Size, in Premium ($6M+) and Total Baskets

Although aggregate fundraising has continued to grow, deal quality (measured by average deal size) in both our premium (projects raising $6M+) and total deal baskets has declined.

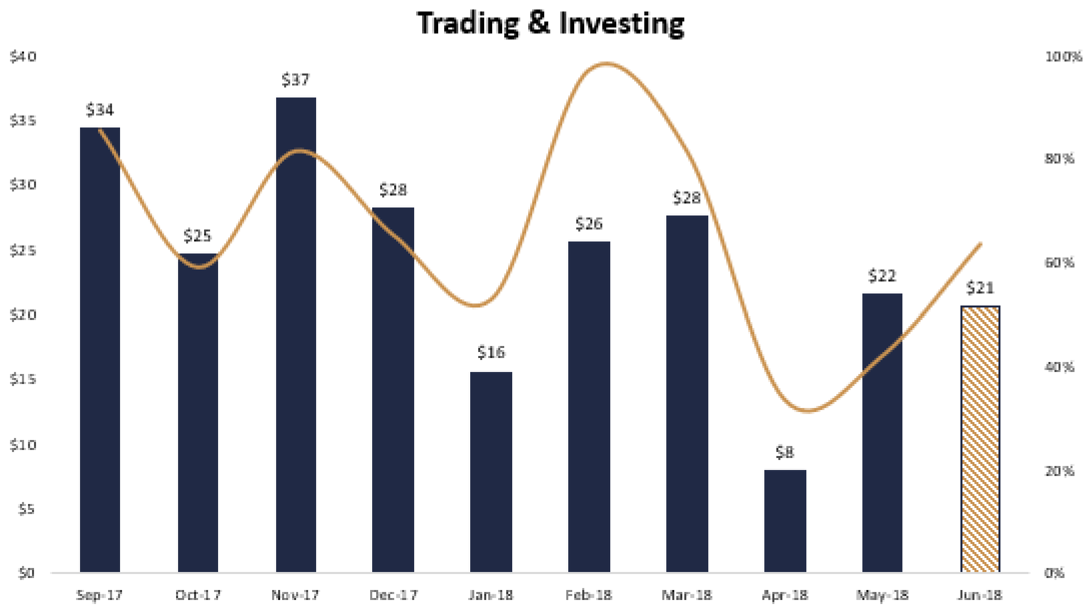


Source: Satis Research

Figure 27 & 28: Performance of Most Popular Sectors



Source: Satis Research



Source: Satis Research

Quality

In recent studies, we attempted to classify ICO's from 2017 by quality. In the first study (summarized below) we analyzed ICOs on a percentage basis derived from the number of ICOs. We have now progressed that research and produced the same analysis on the basis of all ICOs both from the perspective of the number of ICOs and on the basis of US dollars raised and the difference between those two lenses is startling.

Both studies encompass the lifecycle of an ICO, from the original proposal of a sale availability through to the most mature phase of trading on a cryptocurrency exchange (also known as "online trading platforms") ("exchange"). For the purposes of the studies we break down ICO's into groups, with the following definitions;

Identified Scam (pre-trading): Any project that expressed availability of ICO investment (through a website publishing, ANN thread, or social media posting with a contribution address), did not have/had no intention of fulfilling project development duties with the funds, and/or was deemed by the community (message boards, website or other online information) to be a scam.

Failed (pre-trading): Succeeded to raise funding but did not complete the entire process and was abandoned, and/or refunded investors as a result of insufficient funding (missed soft cap).

Gone Dead (pre-trading): Succeeded to raise funding and completed the process, however was not listed on exchanges for trading and has not had a code contribution in Github on a rolling three-month basis from that point in time.

Successful (trading): Succeeded to raise funding and completed the process and was listed on an exchange and began trading and has all three of the following success criteria.

- Deployment (in test/beta, at minimum) of a chain/distributed ledger (in the case of a base-layer protocol) or product/platform (in the case of an app/utility token),
- Had a transparent project roadmap posted on their website, and
- Had Github code contribution activity in a surrounding three-month period ("**Success Criteria**")

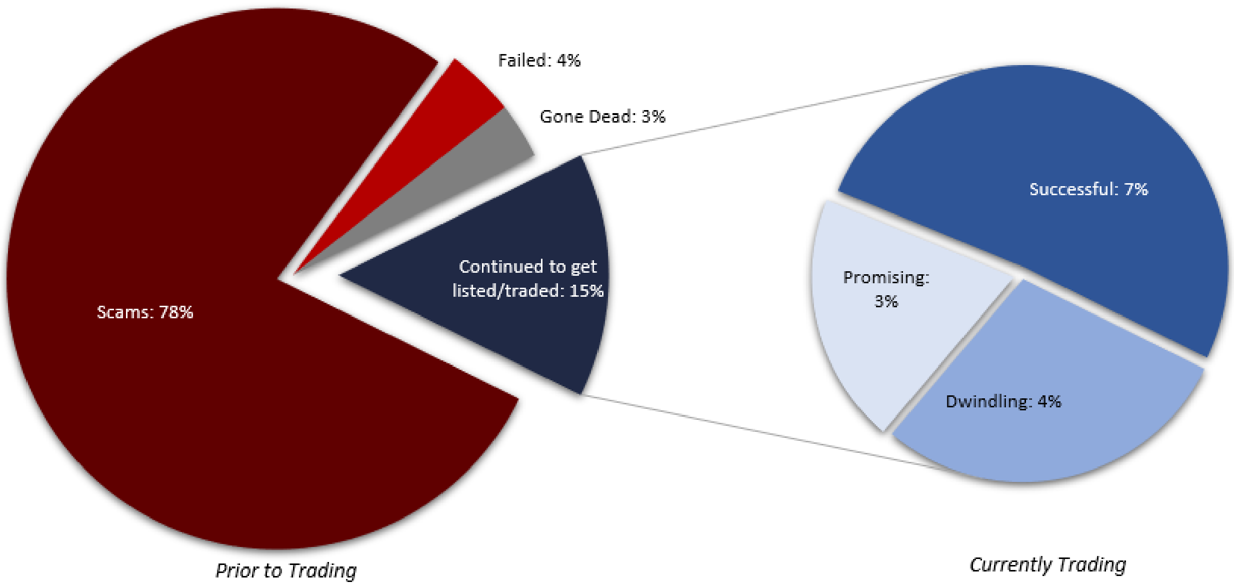
Promising (trading): Same as Successful but has only two, not all three of the above Success Criteria.

Dwindling (trading): Same as Successful but however has one or less of the above Success Criteria.

By the Numbers

On the basis of the above classification, as a percentage of the total number of ICOs, we found that approximately **78% of ICO's were Identified Scams, ~4% Failed, ~3% had Gone Dead, and ~15% went on to trade** on an exchange.

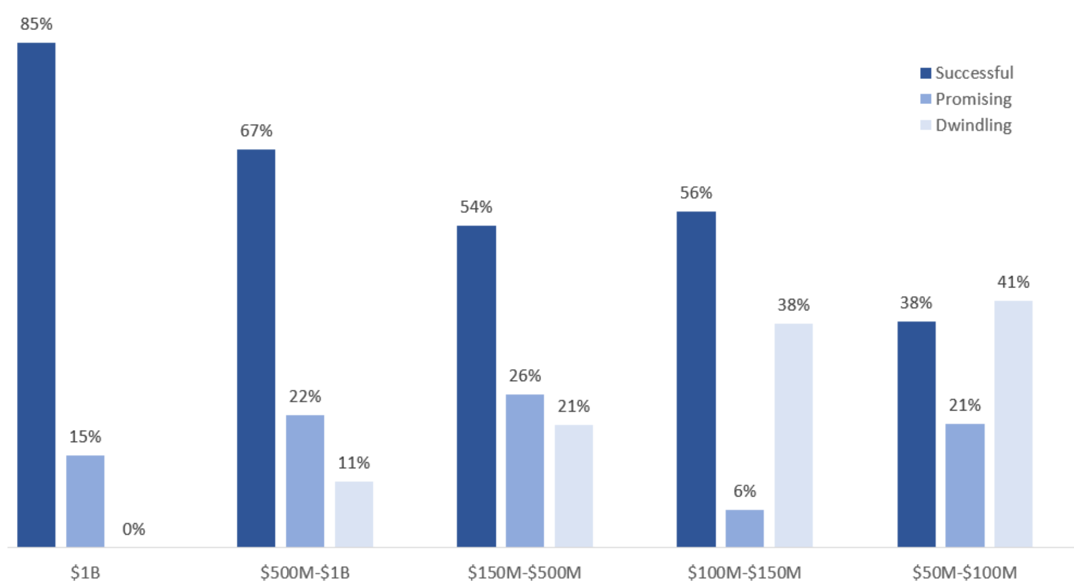
Figure 29: Listed Coins/Tokens (in $M USD), $50M+ Market Cap



Source: Satis Research

Within the 8%, in coins/tokens with an MCap of $50M+: ~51% were Successful, ~20% were Promising, and ~29% were Dwindling. In coins/tokens with an MCap of $50M - $100M (the lowest tier tracked): ~38% were Successful, ~21% were Promising, and ~41% were Dwindling.

Figure 30: Absolute Number of ICO's, Grades by Market Cap



Source: Satis Research

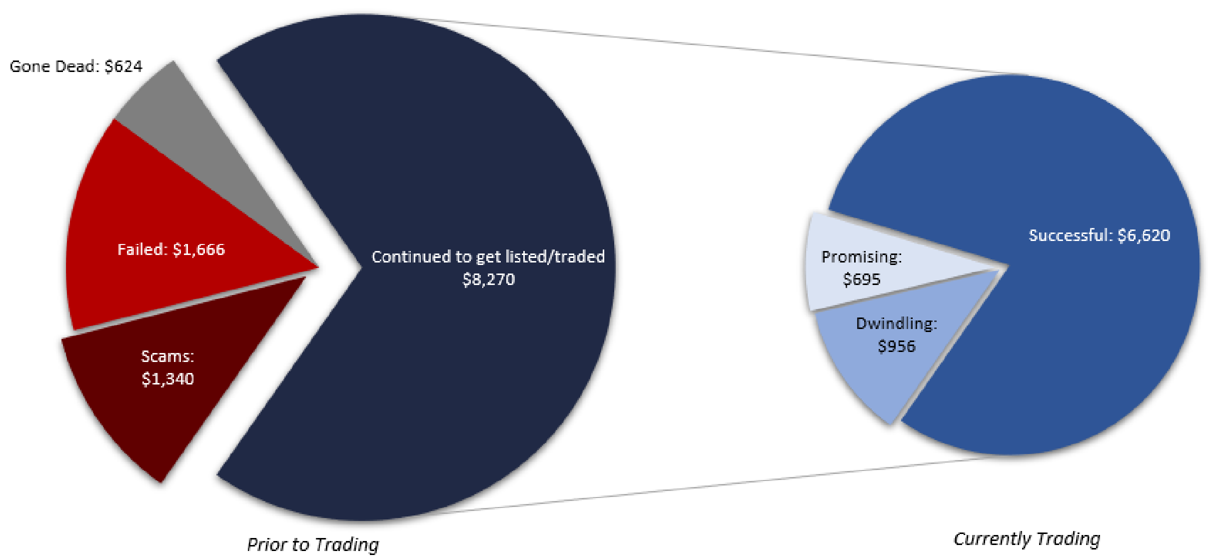
By Dollar Value

In relatively direct contrast, looking at our classifications as a percentage of the US dollars raised to-date (~$12B) we found that only ~$1.3B (~11%) of ICO funding went to Identified Scams, and that number becomes even smaller when you exclude three very large scams (see discussion below) ~$1.7B (~14%) went to the Failed (which does include The DAO, which raised ~$150M that was returned to investors through a hard fork and thus we consider gone Dead), ~$624M (~5%) went to those that had Gone Dead, and **$8B+ (~70% of all time ICO fundraising) went to those that moved on to trade on an exchange.**

Within the $8B, in coins/tokens with an MCap of $50M+: $6.6B+ went to those that are Successful, ~$700M to those that are Promising, and nearly $1B to those that are Dwindling. In coins/tokens with an MCap of $50M - $100M (the lowest tier tracked): ~$535M went to those that are Successful, ~$184M went to those that are Promising, and ~$458M to those that are Dwindling.

Although ~1/10th of all ICO fundraising went to Identified Scams, the vast majority of the $1.3B was from just three projects, which were all relatively old school frauds by no means unique to ICOs (Pincoin ($660M), Arisebank ($600M), and Savedroid (~$50M)). These projects each did raise those amounts we believe but are subject to extensive regulatory action. In particular, Arisebank was brought to a halt on January 25, 2018 by an the SEC obtaining an emergency temporary restraining order, asset freeze, and other expedited relief to halt the ICO[3] and is subject to extensive ongoing proceedings with the SEC. Savedroid, a Frankfurt, Germany based ICO, as of April was said to be subject to a preliminary investigation by the public prosecutor in Frankfurt[4]. Pincoin, also as of April, was said to be subject to an investigation by Vietnamese authorities[5]. Outside these three projects, Identified Scams got away with just $30M in fundraising (or ~0.3% of all time ICO fundraising). We hypothesize this is because the community is relatively adept at discovering scams and adding them to lists. By contrast, the majority of ICO fundraising to date (~54%) has gone to projects that we would classify as Successful and this is a very positive story and a direct contrast to the outcome when you look at the percentage of Successful and Scam projects on a per numbers basis (4% and 81% respectively – see chart above).

Figure 31: Funding of Listed Coins/Tokens (in $M USD), $50M+ Market Cap



Source: Satis Research

[3] https://www.sec.gov/litigation/litreleases/2018/lr24088.htm
[4] https://www.wiwo.de/finanzen/geldanlage/nach-pr-stunt-staatsanwaltschaft-prueft-verfahren-gegen-savedroid/21191180.html
[5] https://www.coindesk.com/vietnam-investigates-ico-fraud-660-million-losses-reported/

Figure 32: Grades by Market Cap

Total

Total	100%	135	$8,270	100%
Successful	51%	69	$6,620	80%
Promising	20%	27	$695	8%
Dwindling	29%	39	$956	12%

$1B+

Total	100%	13	$5,109	100%
Successful	85%	11	$5,021	98%
Promising	15%	2	$88	2%
Dwindling	0%	0	$0	0%

$500M-$1B

Total	100%	9	$381	100%
Successful	67%	6	$221	58%
Promising	22%	2	$155	41%
Dwindling	11%	1	$5	1%

$150M-$500M

Total	100%	39	$1,206	100%
Successful	54%	21	$601	50%
Promising	26%	10	$265	22%
Dwindling	21%	8	$340	28%

$100M-$150M

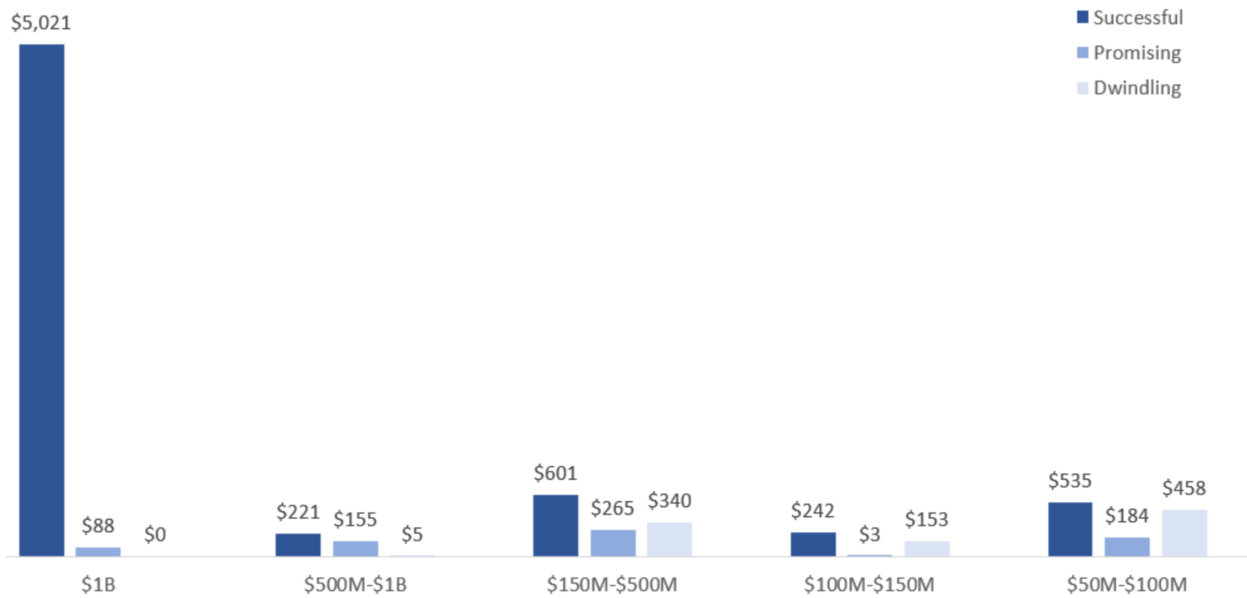
Total	100%	16	$397	100%
Successful	56%	9	$242	61%
Promising	6%	1	$3	1%
Dwindling	38%	6	$153	38%

$50M-$100M

Total	100%	58	$1,177	100%
Successful	38%	22	$535	45%
Promising	21%	12	$184	16%
Dwindling	41%	24	$458	39%

Source: Satis Research

Figure 33: ICO Completions and Funding Grades, by Market Capitalization:



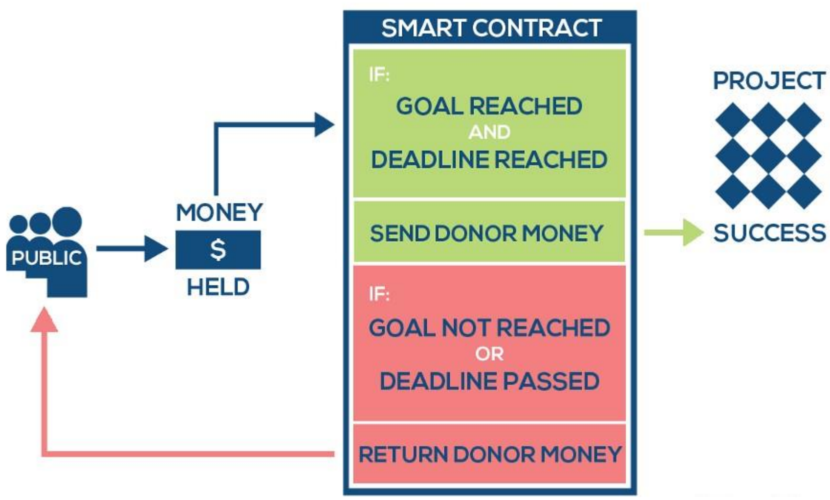
Source: Satis Research

While we generally don't name specific projects, we feel we need to identify that for the purpose of this analysis we have not included Ripple (XRP), because XRP was never sold in a public sale resembling an ICO with a specific duration of sale. Instead XRP has only been sold on exchanges and in individual over the counter transactions. However, we note that it would otherwise arguably be the longest and largest ICO on record, on the basis of having pre-mined (fully generated) nearly 100B XRP in 2013, with a current market cap of ~$18B and approximately 70% still believed to be held by Ripple Labs, Inc.

Use of ICO Funds

In the latest drawdown, correlation among most cryptoassets has been tight. We believe a potential catalyst to the recent selloff has been the liquidation of ICO market fundraising. In an ICO, purchasers send funds (often through cryptoassets) to the company. The company then defines (typically in their offering memorandum/whitepaper) the amounts that will be kept by the company in Treasury, the amounts to be sold to investors, the amounts used for marketing, and the amounts possibly used as incentives to use the network. In many projects, certain parameters are applied to enforce the company's ability to remove the funds, as displayed below in Figure 34 by the use of a smart contract.

Figure 34: Smart Contract Use in an ICO



Source: 3iQ Research Group

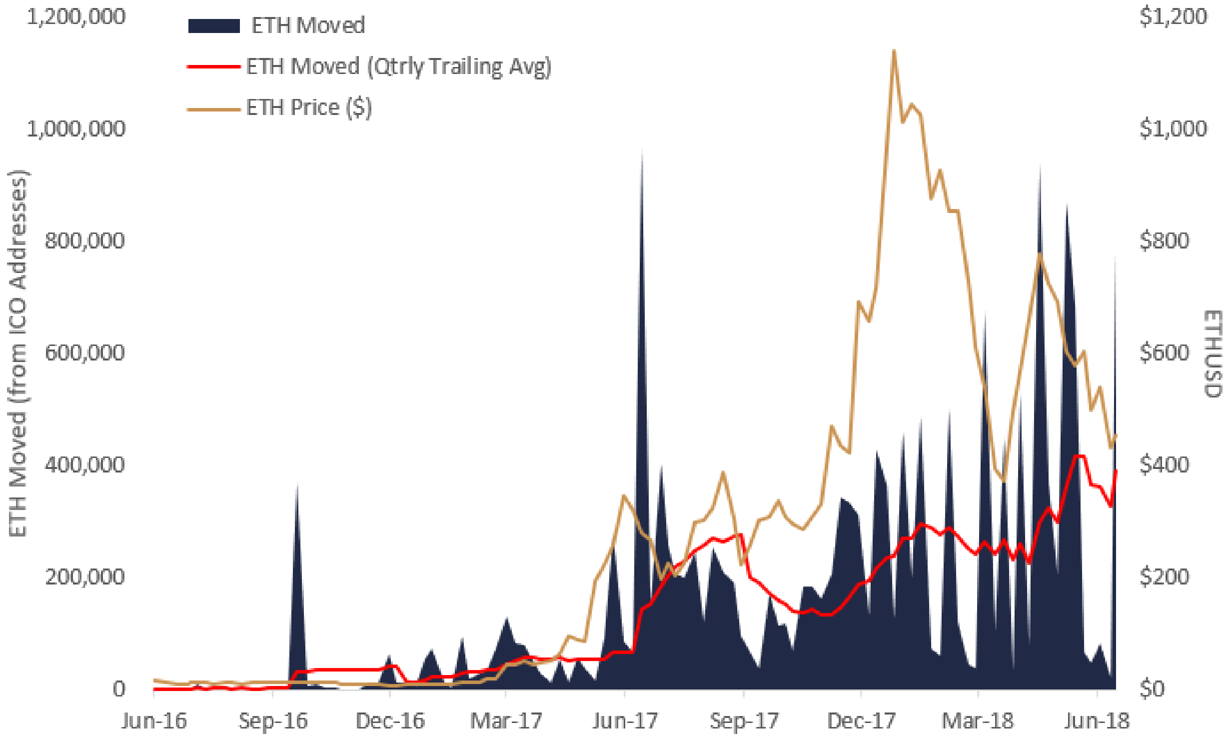
Since many ICO's are tokens built upon Ethereum, they create Ethereum network addresses to be used as their Treasury address (which are completely transparent). Unlike a normal company, which may be required to display some transparency of funds spent on operations periodically, ICO funds can be tracked in real-time. Whether or not the movements and expenditures of the funds from smart contracts leads to success (as the image implies), the amount of funds held and moved can be substantial compared to the entire market.

Although not necessarily guaranteed to mean movement to an exchange, most transactions sent out of the ICO's original treasury address have led to liquidation through exchanges to pay for operational expenses.

We estimate that approximately 12% of the circulating supply (~$5.4B) of ETH is held by the top 115 tokens, and ~3% (~$1.3B) is held by the top 20. The top 115 holds just under half of cumulative ICO market fundraising to-date, while the top 20 holds ~10%.

Below we've tracked historic flows of ICO fundraising, and their correlation to ETH (the fundraising medium that most projects receive funding in).

Figure 35: ETH Price vs. ICO Funds Moved



Source: Satis Research, Santiment

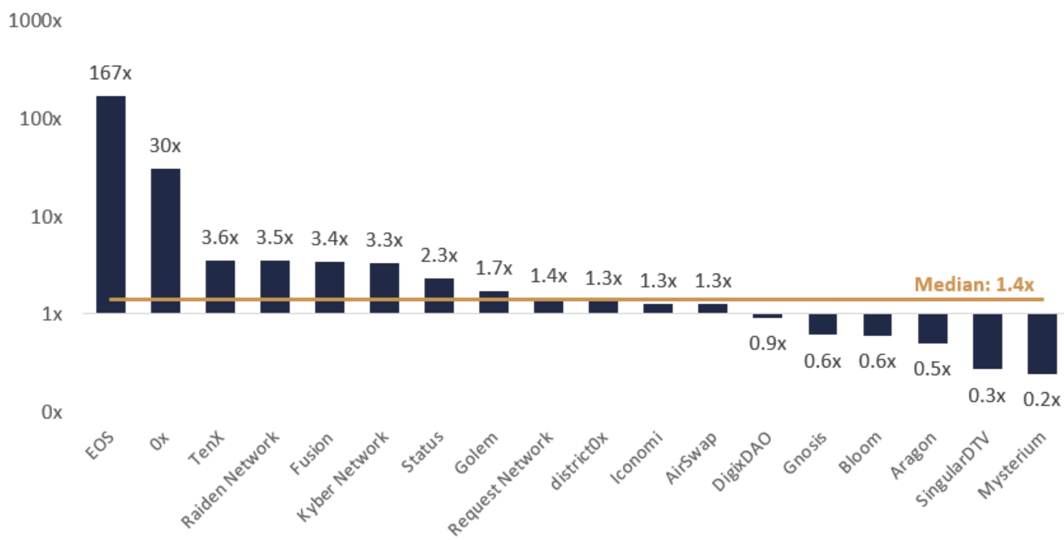
Figure 36: ICO Funds Held and Moved, as a % of Circulating ETH Supply and Days in Volume

		% of Total Circulation	Days in Trading Volume
Total ETH Network		100,522,578	3,746,093
Tokens Held	Top 20	2.7%	0.74
	Top 115	11.9%	3.20
Tokens Moved[(1)]	Top 20	0.7%	0.18
	Top 115	0.8%	0.21

Note: Tokens Held/Spent represent data from ICOs on the Ethereum platform.
ICOs ranked by current ETH holding balance based on data from Santiment.
(1) Tokens spent by ICOs in the last 30 days

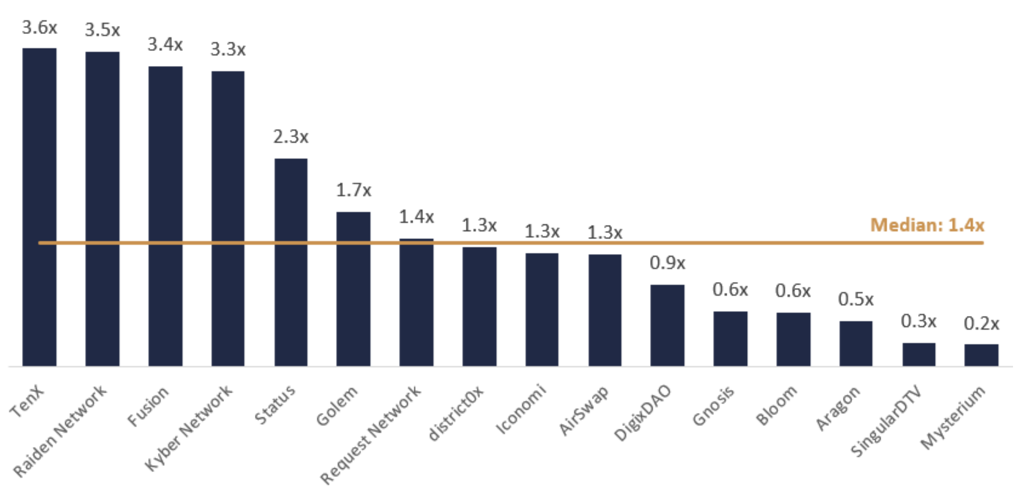
Source: Satis Research, Santiment

Figure 37: Trading Multiples, Market Cap to Treasury Balance *(Top 18 Addresses)*



Source: Satis Research, Santiment

Figure 38: Trading Multiples (Ex-EOS & 0x), Market Cap to Treasury Balance *(Top 16 Addresses)*



Source: Satis Research, Santiment

Conclusion

The expansion of the cryptoasset universe has been led by a number of factors, namely technical developments on major platform networks. In this report, we have gone over methods of network creation such as genesis block origins and platform-launch, the distribution and structure of networks, and an overview of the ICO market.

In our next note, we will explore the outcome of this network expansion, specifically the composition of this new market that has been created. This will include analysis of network applications, network statistics, and performance of the many networks that have been created.

Disclosures and Disclaimers

The data used in the preview table is from 7/10, the market capitalization of tokens and coins within the report is from 7/8, Ethereum address balances holdings from 7/6, platform share statistics from 7/6, ETH supply and volume from 7/6, ICO funding figures from 7/1, ICO quality figures from 7/1 (grade group rankings from the end of 1Q18).

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