

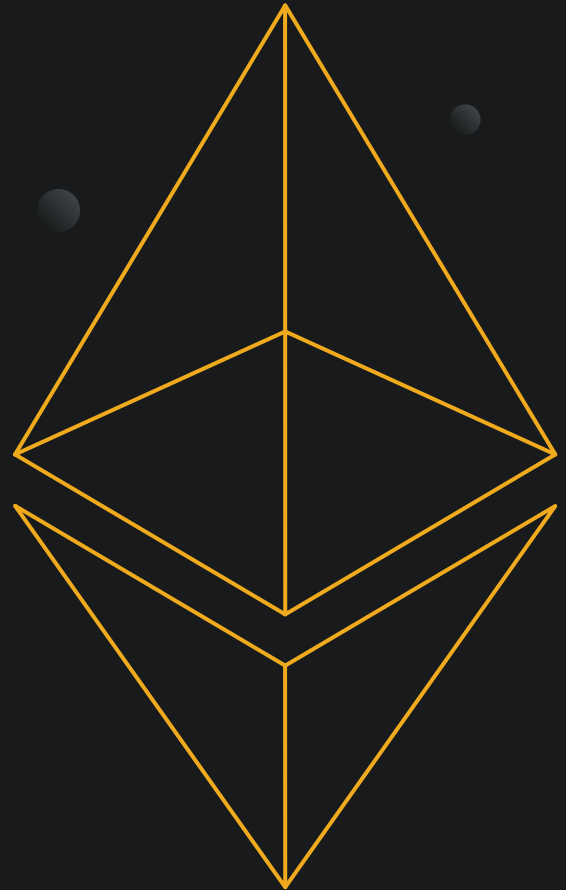
## Research Primer

# Ethereum — Programmable Money

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This research primer will act as a useful guide to understanding why Ethereum is important, how the technology for Ethereum will change over the next decade, how we can value Ethereum, and what the main risks associated with an investment in Ethereum are. We believe that Ethereum presents one of the most unique and potentially lucrative investment opportunities of the decade and this research primer will help you with your investment decisions for the asset.

DATA AS OF JUNE 2020



# Ethereum Research Primer

## Executive Summary

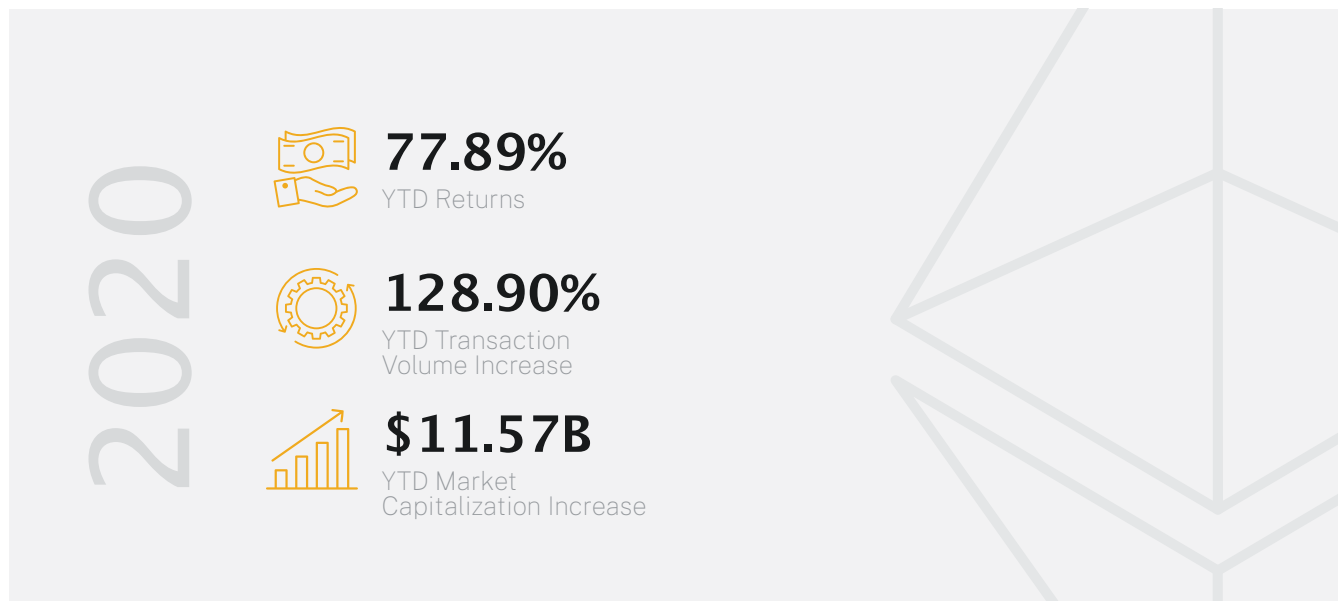
Ethereum presents the largest single innovation within the crypto asset and blockchain industry since the creation of Bitcoin in 2009. While Bitcoin was the world’s first decentralized, peer to peer digital currency and is now considered the world’s first digital gold, Ethereum was the first form of programmable money – that is, a crypto asset which allows developers and entrepreneurs to code financial assets like they would for computer programs. Ethereum’s key feature is smart contracts which are computer programs that exist on a blockchain and allow users to program financial assets.

In this report we will explain why Ethereum is such a promising crypto asset by first concisely explaining how the crypto asset works and exploring the most important areas of Ethereum – including Decentralized Finance (DeFi). Ethereum stands out as the crypto asset with the most promising roadmap due to its developers’ intentions to roll out a new version of its blockchain – dubbed “Ethereum 2.0”. We will show how Ethereum 2.0 will usher in a new era of sustainability through the use of Proof of Stake whilst also providing investors with a way to generate yield from their Ethereum holdings.

Ethereum Key Metrics		As of June 15, 2020
Ticker		ETH
Price (USD)		\$229.93
Circulating Supply (ETH)		111,365,538 ETH
Market Capitalization (USD)		\$25,747,471,930
Block Reward (ETH)		2 ETH

Figure 1: ETH Key Metrics

Figure 2: ETH YTD Historical Performance



# Ethereum Research Primer

## How Ethereum Works

### Smart Contracts

As mentioned, the key innovation behind Ethereum is its smart contracts. Smart contracts are self-executing contracts between different users which represent an agreement over assets on the Ethereum blockchain. This contract is represented as code encoded into the Ethereum blockchain. Smart contracts are important as they allow for users to create complex financial instruments and contracts which are self-enforcing and exist on a decentralized blockchain. As a result of this invention, users and engineers are easily able to make unique financial instruments in the form of tokens, fundraising agreements, lending and market making platforms which exist on the Ethereum blockchain in a public and transparent way. The value of Ethereum in the long-term is likely to be tightly coupled to demand for smart contracts. Since Ethereum's launch in 2015, the platform has seen a pronounced evolution of the types of smart contracts deployed on Ethereum. For example, in 2017 the crypto asset bubble was, to a large extent, driven by the boom in issuance of initial coin offering (ICO) smart contracts, whereas since 2019 a variety of decentralized finance applications, such as stable coins, lending, and market making, have been the primary growth area within smart contract development.

### Ether

Integral to the crypto asset's success is Ether, the underlying currency which drives the Ethereum blockchain. Within this primer we use the terms Ethereum (the network and blockchain) and Ether (the native currency) interchangeably, but Ether is the currency used to pay for transactions on the Ethereum blockchain and used to issue smart contracts. Users who wish to execute smart contracts and engage with financial contracts on Ethereum must pay for such transactions with Ether, which means that demand for smart contracts is closely related to demand for Ether. In addition, a number of smart contracts require Ether to be deposited in order to fulfil their functions — for example, decentralized lending or stablecoin platforms on Ethereum often require investors to deposit Ether as collateral. The crypto asset can be seen as analogous to the role that oil plays within the global economy in that increasing globalization and economic integration led to oil becoming a more demanded resource. As we will discuss later, the role of Ether will change slightly as Ethereum transitions from using Proof of Work mining to using Proof of Stake — where mining uses deposits of Ether rather than hash power and electricity. This fact will positively impact Ether's role in the network.

Figure 3: Number of Smart Contracts Deployed on Ethereum (Source: Google)



# Ethereum Research Primer

## The State of Ethereum

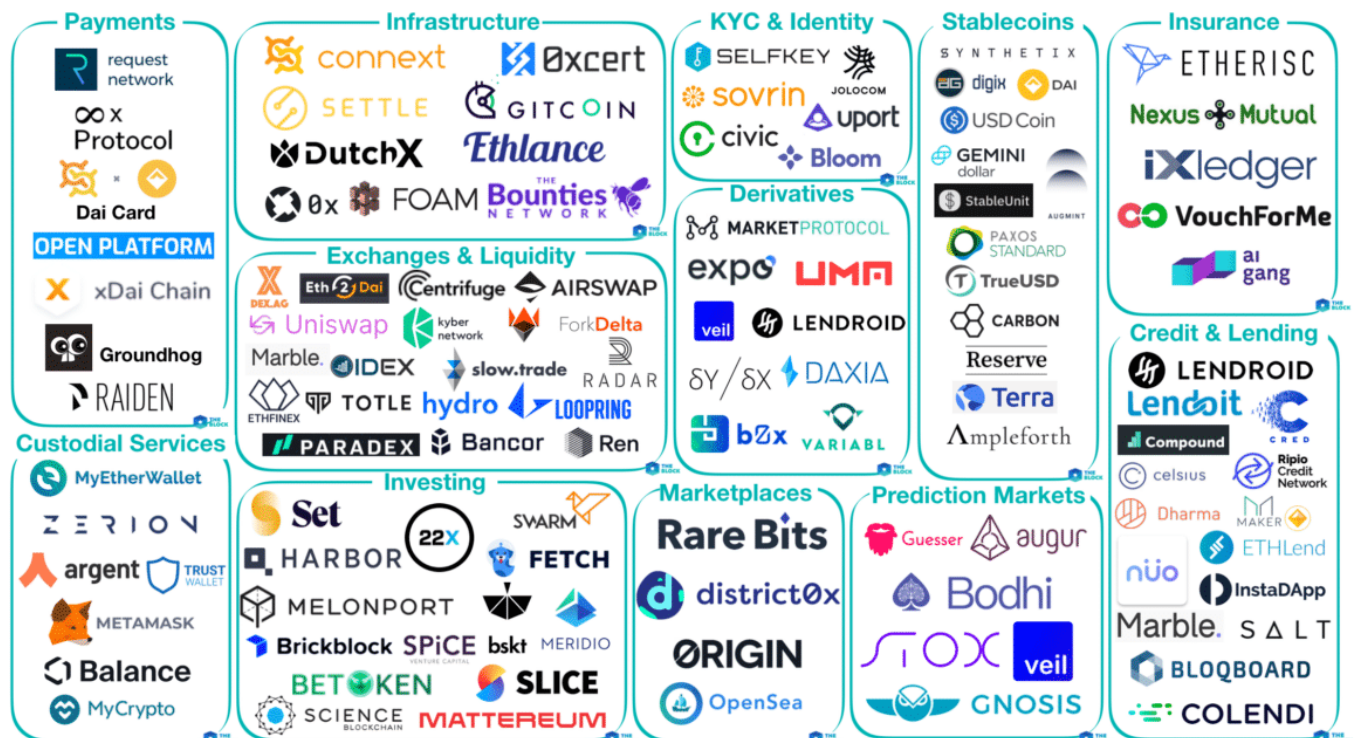
### Tokens

Perhaps the most obvious innovation that Ethereum facilitated was that of tokens. Tokens are crypto assets which are created and managed by a smart contract and exist on the Ethereum blockchain. Tokens allow developers and businesses to create their own crypto asset without having to develop an entirely new blockchain. This innovation was, to a large part, responsible for the crypto asset bull market of 2017 where a large influx of retail investors were drawn to the industry due to initial coin offerings (ICOs). These crypto assets are now used for a variety of things such as stablecoins and tokenized equity; in the future a wider range of assets could be issued as tokens on the Ethereum blockchain.

### Decentralized Finance

More recently, Ethereum's smart contracts have increasingly been used for the creation of decentralized finance (DeFi) applications. DeFi applications are contracts and financial instruments which attempt to replicate existing financial instruments and functions such as derivatives, lending, and automated market making in decentralized ways — such that these can work without the existence of a centralized intermediary or issuer. Some popular DeFi applications include MakerDAO/Dai, Compound, and Uniswap. As of June 15 2020, the total collateral deposited into DeFi contracts is around \$1 billion<sup>1</sup>. DeFi will likely continue to be the primary value driver of Ethereum throughout the 2020s.

Figure 4: Ethereum Decentralized Finance (DeFi) Movement. Source: The Block

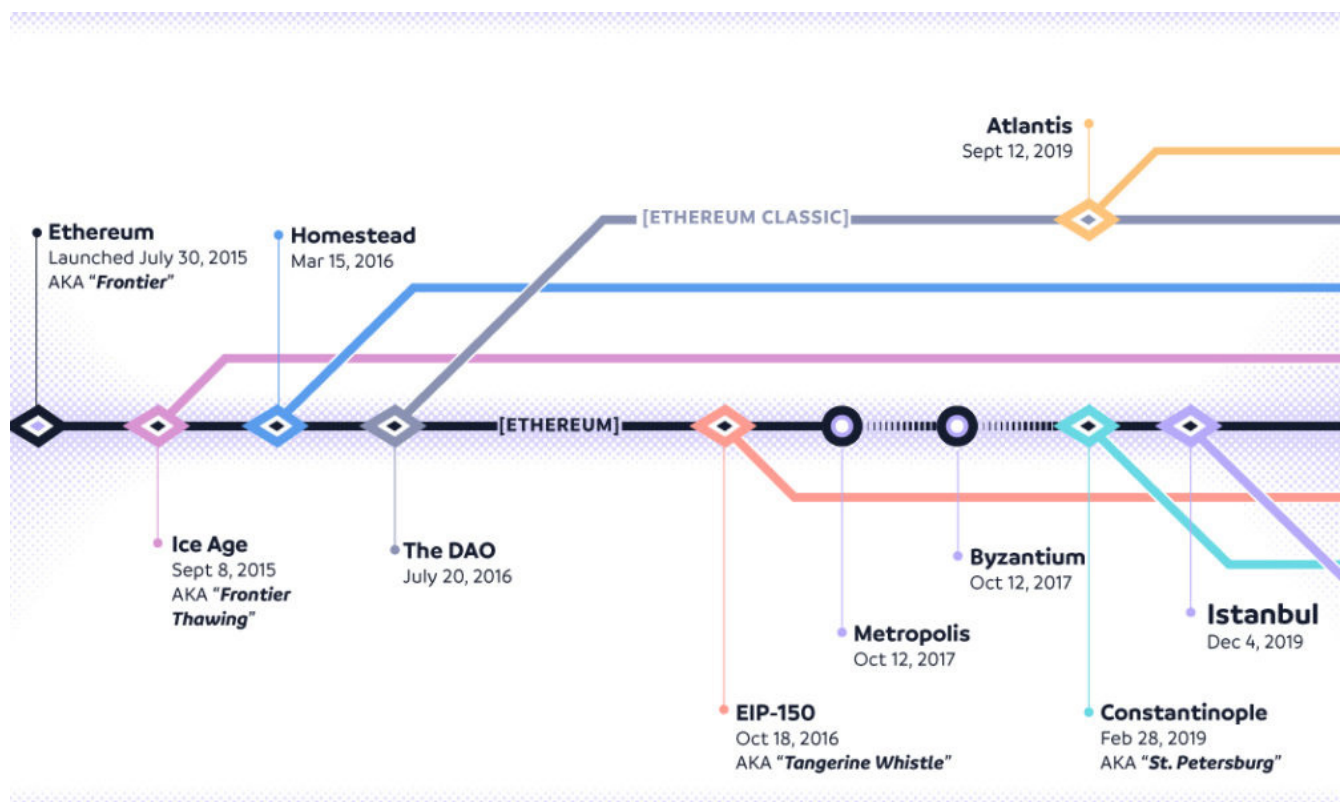


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# The Future of Ethereum

Ethereum stands out in the crypto asset industry for having an especially ambitious roadmap which can be bifurcated into two key developments: Ethereum's transition to Proof of Stake and its roll out of Sharding — collectively dubbed Ethereum 2.0. As we've mentioned, Ethereum uses a similar Proof of Work mining to that of Bitcoin and therefore it has the same environmental issues associated with the energy-intensive mining process for appending new Ethereum blocks to the blockchain. The Ethereum development team has planned an alternative system called Proof of Stake where, instead of miners expending electricity and hashpower to mine blocks, miners are randomly allocated blocks in proportion to the amount of Ether they have deposited into the system. Proof of Stake therefore replaces electricity expenditure with capital (Ether) deposits, a process which is considerably more environmentally friendly. Sharding is an attempt to massively improve Ethereum's transaction throughput (in the order of 1000x) by separating the Ethereum blockchain into separate parts, called shards, and only making a certain number of miners mine blocks in any given shard. This will theoretically allow Ethereum's miners to mine blocks at a much higher rate on average without compromising on security. Ethereum's long-term success is contingent on the successful rollout of Sharding and Proof of Stake, and we can expect the first aspects of both to be launched this year.

Figure 5: Map of Ethereum Fork . Source: The Visual Capitalist



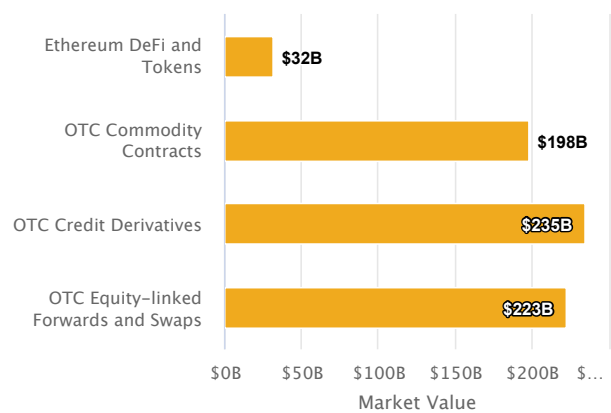
# Ethereum Research Primer

## Valuing Ethereum

### Market Sizing

Given Ethereum’s pre-eminent use case as a platform for the issuance of financial assets and contracts, Ethereum’s upper bound can be understood by considering what the total gross market value of assets and contracts issued on Ethereum could be. We estimate that currently (June 11 2020) the total value of instruments issued on Ethereum (including DeFi contracts and tokens) to be around \$31B; this compares to an estimated gross market value of \$198B in OTC commodity derivative contracts, \$235B in OTC credit derivatives, and \$223B in equity-linked forwards and options, according to data from BIS.

Figure 6: Ethereum Market Sizing

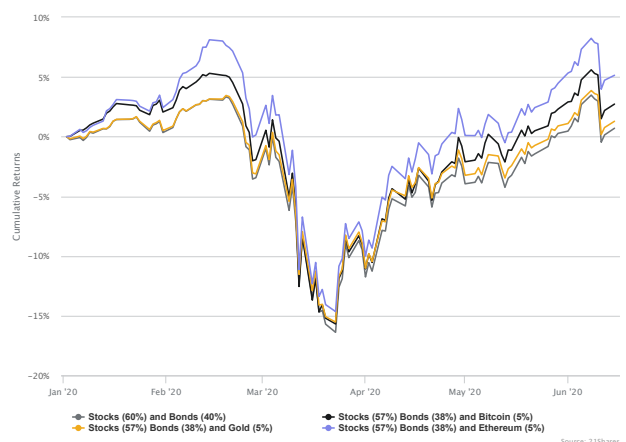


### Portfolio Allocation

In our Bitcoin primer, we showed how a small allocation of Bitcoin to an investor’s portfolio can drastically improve their risk-adjusted returns. Ethereum can also offer similar diversification benefits to that of Bitcoin. The chart shows several monthly-rebalanced portfolios<sup>2</sup> — Stocks (60%) and Bonds (40%); Stocks (57%), Bonds (38%), and Gold (5%); Stocks (57%), Bonds (38%), and Bitcoin (5%); and Stocks (57%), Bonds (38%), and Ether (5%). In a similar way to Bitcoin, Ethereum’s significant diversification benefits to a portfolio whilst helping boost its returns — with as little as a 5% allocation. For example, the portfolio with 5% Bitcoin returned 2.73% between January 2 2020 and June 15 2020, compared to 5.14% for the portfolio with 5% Ether. The ETH portfolio outperformed the other portfolio with 5% Gold (1.29%) and the portfolio consisting of only stocks and bonds

(0.71%). Though Bitcoin and Ether’s returns have a high level of correlation (0.92), Ether is still relatively uncorrelated to most other assets from traditional financial markets — GOVT (-0.17), GLD (0.22) — though it has displayed a heightened level of correlation with stocks (0.57).

Figure 7: Comparison of Portfolio Returns



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## Risks

### Proof of Stake and Sharding (Ethereum 2.0)

One of the primary risks for Ethereum is the potential failure of the development team to execute the project's grand ambitions — mostly represented by Ethereum 2.0. If Ethereum fails to scale sufficiently to support a much larger transaction throughput, it is unlikely the blockchain will ever be able to support the needed number of financial contracts and assets to justify a higher valuation going forward, without significantly impacting Ethereum's economic security. In addition, investors have undoubtedly priced in a non-zero probability of Ethereum successfully executing its roadmap, meaning a failure to

do so would significantly damage its value proposition. Furthermore, on a technical level the viability of Sharding depends on the ability of Ethereum to successfully transition to Proof of Stake. This transition is a significant risk factor due to the long-term risks involved with Ethereum continuing to use Proof of Work mining. For example, it is likely that in the coming year global climate policy will begin to regulate mining due to concerns over fossil fuel and electricity usage. Such a case could present an existential regulatory and public relations threat to Ethereum which must be mitigated.

### Competition

Due to the exceedingly large value proposition of smart contracts, Ethereum has a significant amount of competition from projects and blockchains that have either already launched or are currently in development. For example, some of Ethereum's top competitors include: EOS, Binance Chain, Cosmos and Tezos. In addition, there are a number of well-capitalized smart contract platforms yet to launch such as Dfinity, Polkadot, and Telegram Open Network. While Ethereum undoubtedly is the market leader within the smart contract platform and is the only crypto asset within the ecosystem which can be said to have a truly flourishing developer community and range of usable applications, this lead is not guaranteed to be permanent. Given the open source and dynamic nature of blockchains, it is extremely difficult for Ethereum to develop a sustainable moat.

Perhaps the most likely moat Ethereum currently has is the assets currently deposited within its DeFi ecosystem — these can be argued to accrue network effects and can't simply be 'forked away'. Different Ethereum competitors will continue to compete with the platform along certain verticals such as scalability or user-friendliness and it is likely some may eventually find legitimate use cases, especially if they aim for narrow niches.

Figure 8: Ethereum's main competitors — EOS, Tezos and Cosmos



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### Footnotes

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1) According to data from Defi Pulse — Total Value Locked in USD.

2) 'Stocks' are represented by the SPDR S&P 500 Trust ETF (SPY) and 'Bonds' by the iShares U.S. Treasury Bond ETF (GOVT). All price data is sourced from CoinMetrics and Yahoo Finance. We assume rebalancing fees of 0.1%.





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