

DELPHI DIGITAL

Web3.0: The Decentralized Internet Thematic Insights



August 2019
85 Broad Street
New York, NY, 10004
www.delphidigital.io

Table of Contents

Executive Summary	3
Web 3.0: The Decentralized Internet	4
The World Computer	5
Waves of Decentralization	6
The Cloud Is A Data Honeypot	7
Potential Web3 Adoption Drivers	8
Web3 Stack	9
Notable Web3 Foundational Projects	10
Web3 Front-Facing App Categories	11
Mitigating Web3 Hurdles	12
Web3 Goes Mobile	13
Leader Commentary	14
Disclosures	15

Analysts



Tom Shaughnessy
tom@delphidigital.io



Medio Demarco
medio@delphidigital.io



Executive Summary

To understand Web3 it's important to first understand the inherent problems that currently exist with centralized applications. "Web 2.0", or the internet as it exists today, allows users to interact with the web and easily send data around the world. However, it lacks a shared "state" (recorded data layer) tied to user identity.

In the absence of this shared state, centralized service providers (e.g. Google, Facebook) have accumulated user data and accrued all of the resulting value. Some have even referred to data as the new oil. This centralization of data has led to negative consequences for users, evidenced by various hacks and inappropriate sharing (e.g. Cambridge Analytica).

At the core of the internet's next perceived iteration, often referred to as "Web 3.0", is the goal of empowering its users by allowing them to control their data, protect their privacy, and ultimately ensure their freedoms through an open, uncensorable network.

In this report, we'll delve into why the vision of Web3.0 is important, focus on some of the key projects building its foundation (e.g. Ethereum, Blockstack, & Polkadot), as well as the applications/tools looking to onboard users to a new, decentralized internet.

Notable Foundational Web3 Projects:



ethereum



BLOCKSTACK

Polkadot.

Web 3.0: The Decentralized Internet

A public blockchain is nothing more than an encrypted database shared across multiple independent computers instead of being held on the server of a single entity. While there is a trade off for efficiency, this decentralization makes it harder to attack and helps ensure no single party has control. As a result, a blockchain, or similar technology, could act as the backbone of a new internet by providing it a trustless shared state (recorded data layer).

It's important to emphasize what a shared state for the internet truly means. It would break the data silos of centralized service providers and put the users back in control. Google and Facebook would no longer have ownership of their user's sensitive and personal data. Rather, the data is encrypted and decentralized. For the first time, a person on the internet can have a self-sovereign identity, no longer reliant on a corporation or government.



Source: *The Economist*



Gavin Wood
April 2014

"Web 3.0, or as might be termed the "post-Snowden" web, is a reimagination of the sorts of things that we already use the Web for, but with a fundamentally different model for the interactions between parties. Information that we assume to be public, we publish. Information that we assume to be agreed, we place on a consensus-ledger. Information that we assume to be private, we keep secret and never reveal. Communication always takes place over encrypted channels and only with pseudonymous identities as endpoints; never with anything traceable (such as IP addresses). In short, we engineer the system to mathematically enforce our prior assumptions, since no government or organisation can reasonably be trusted."



Brian Armstrong
August 2018

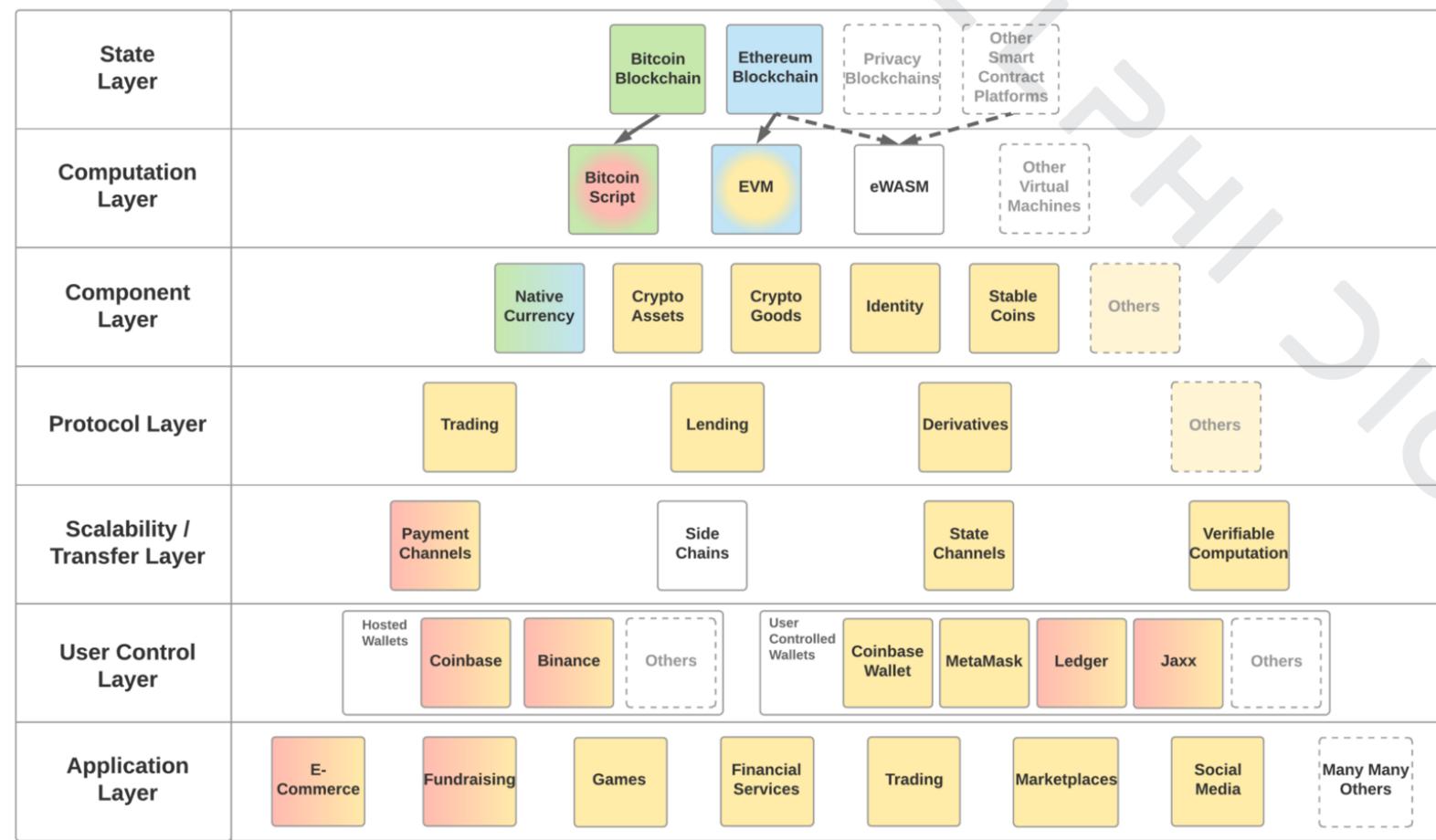
"Web 1.0 was about publishing - anyone can write and have global distribution

"Web 2.0 was about interaction - connect with others, collaborate in real time, data

"Web 3.0 is about value transfer - money can now be programmed and embedded in any app"

The World Computer

Bitcoin was the first to succeed in establishing a self-sustaining, shared database capable of securely transferring value, but its use case was largely limited to just that (this was done on purpose). This lack of functionality is ultimately what drove the creation of Ethereum, which was intended to be a programmable blockchain with a turing complete virtual machine, the "EVM", capable of running smart contracts and decentralized applications ("DApps"). Integrating a native, turing complete virtual machine into the protocol made it possible for applications to run directly on Ethereum, while automatically updating the shared state of the database. While the EVM is not without its faults, this was a game changer and led to an explosion in the development of applications built on top of Ethereum, servicing a variety of different use cases. Not only can these new applications transfer information, as the existing web does, but they can also transfer value. The difference is nuanced but its impact is important by eliminating the need for trusted third-parties (e.g. banks) and rent-seekers. Due to the amount of projects working toward the Web3 vision, it's impossible to say what the winning architecture and applications of the future will look like today. All we can be certain of in the near-term, is that experimentation and the free market will decide.



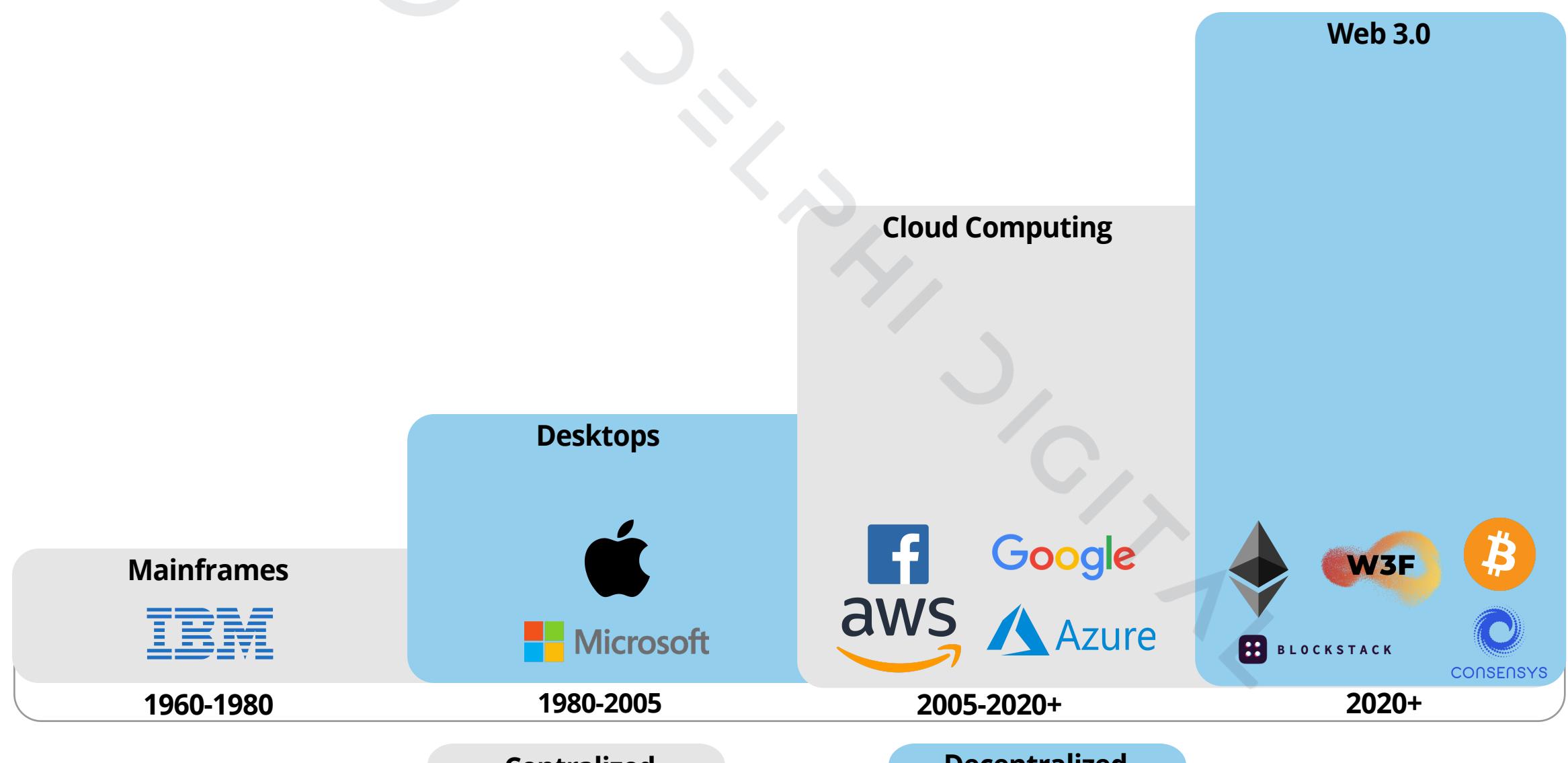
"Ethereum offers a highly generalized platform that allows users to make applications for a very wide variety of use cases with much less effort than it would take to create their own blockchain. The platform's vision is that of "the world computer": to create a system which looks and feels to users as much as possible like a computer, while gaining the security, auditability and decentralization benefits of blockchain technology."



Vitalik Buterin

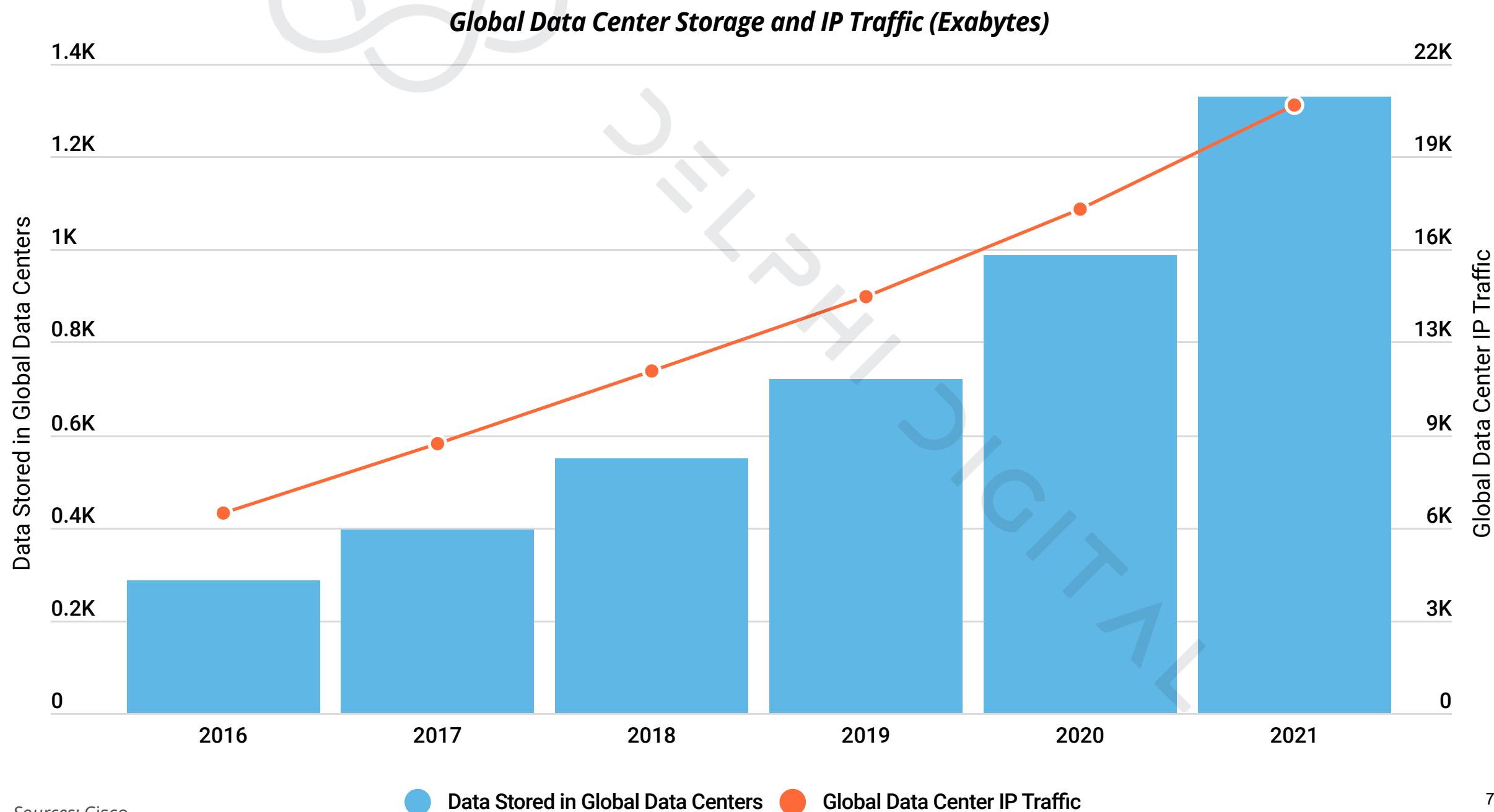
Waves of Decentralization

Historically, computing has fluctuated between periods of centralized and decentralized architectures. In the 1960s, IBM dominated the market with mainframes. These were massive computers that were centralized in a single location. Imagine a machine the size of a car with the computing power to do basic arithmetic. As technology improved, and with the notable invention of the microprocessor, it became possible to build smaller computers. This ushered in the desktop era and the concept of personal computers. No longer were computers exclusive to businesses but now permeated homes across the world. Before long, companies such as Amazon realized that if they centralized server hardware they could attain economies of scale, while providing data storage and compute power on-demand to their users. This approach, referred to as cloud computing, offered client businesses a way to minimize up-front and maintenance costs related to IT infrastructure. This paradigm shift moved the majority of compute/storage away from local devices, with centralized data centers providing the service on-demand. While efficient, cloud computing has helped lead to the centralization of user data and the pitfalls that come with it. The goal of Web3 is to break away from these vulnerable data silos and instead put users back in control of their data and identity.



The Cloud Is A Data Honeypot

While we're on the topic of cloud computing, it's important to provide some context for just how large it has become. The cloud is run through massive data centers featuring redundant high-speed bandwidth and massive arrays of servers to handle large compute and storage workloads. It's projected that by 2021 the amount of data stored in data centers will reach 1,300 exabytes and global data center traffic will reach 20,600 exabytes. For perspective, most mobile phones have ~50-100 gigabytes of storage and an exabyte is 1,024GB to the third power, or 1,073,741,824 gigabytes per exabyte. When all of that sensitive user data is centralized into a single location it becomes a honeypot for would be attackers. As we'll see on the next slide, data breaches have become far too common given the importance of the personal data involved.



Potential Web3.0 Adoption Drivers

Privacy

- Users own their data and are in full control of their on-line lives.
- Data monopolies (e.g. Facebook, Google) would no longer control and profit from user data.

Portability of Data

- Currently, data is locked in silos on a per app basis. Web3 separates the app from user data.
- Users can seamlessly bring their data from one application to another.

Resistant To Censorship

- Users can post their thoughts and ideas without fear of it being taken down by a company or government.
- This is particularly important in countries with authoritarian regimes.

Safety

- Massive data breaches (below) threaten the safety of user data (e.g. social security numbers).
- Web3 would remove data "honeypots" from an architectural standpoint.

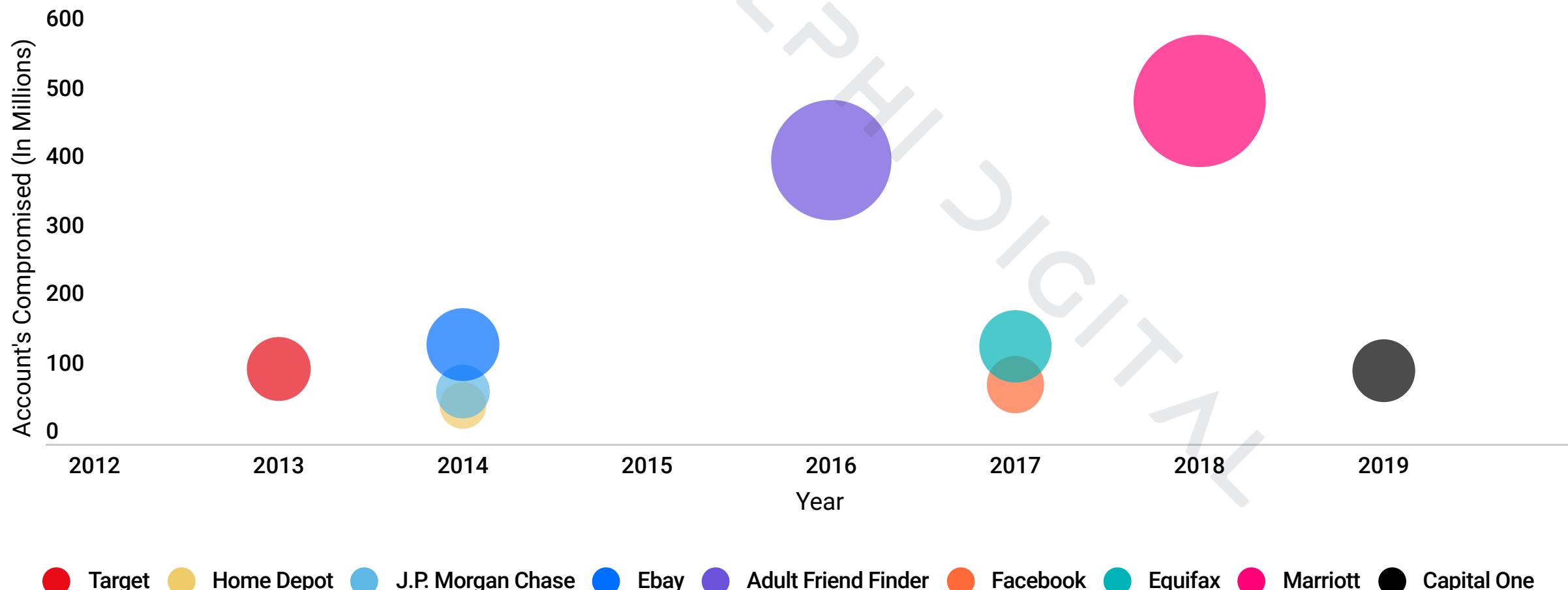
New Incentives & Reduced Barriers

- Developers can incentivize a global user base with token economics.
- Given the open-source nature of the software, the barriers to entry for Web3 development could be lower.

New & Composable Design Space

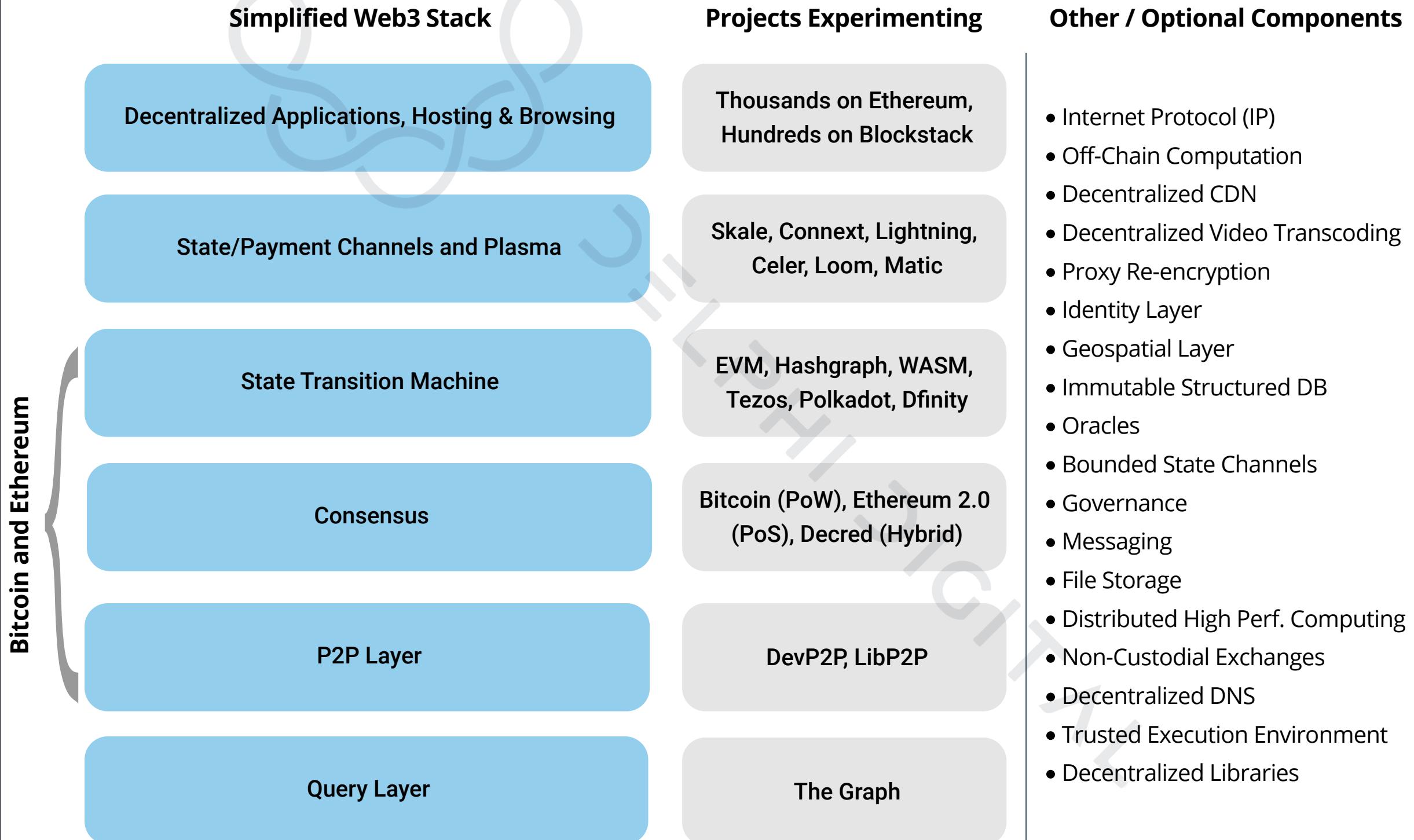
- Developers can experiment with the Web3 stack and offer new features to users.
- I.e. DeFi doesn't require a bank account, Blockstack doesn't require an email

Noteworthy Data Hacks (Excludes 3B Yahoo User Hack In 2013 Due To Bubble Sizes)



Web3 Stack

The infrastructure behind Web3 (aka "the Stack") is in its infancy, is subject to change, and can require combining multiple protocols to build a functioning application. Below we have simplified Multicoin's Web3 stack and provided examples to better understand it.



Notable Web3 Foundational Projects



- Ethereum is a global, open source platform for hosting smart contracts, with its native token ETH.
- Developers can leverage different pieces of infrastructure built by a global developer base to create use cases. For example, Set Protocol (see Delphi [Report](#)) offers tokenized baskets of assets leveraging Maker's DAI (a stablecoin built on Ethereum) and smart contracts.
- The majority of crypto developers are [building](#) on Ethereum; Electric Capital found 18% of all developers work in the Ethereum ecosystem.
- Ethereum currently has ~4x (1,156 monthly average) developers of the next largest [ecosystem](#) (bitcoin) and over 1,500 [tracked](#) DApps that feature varying levels of decentralization.



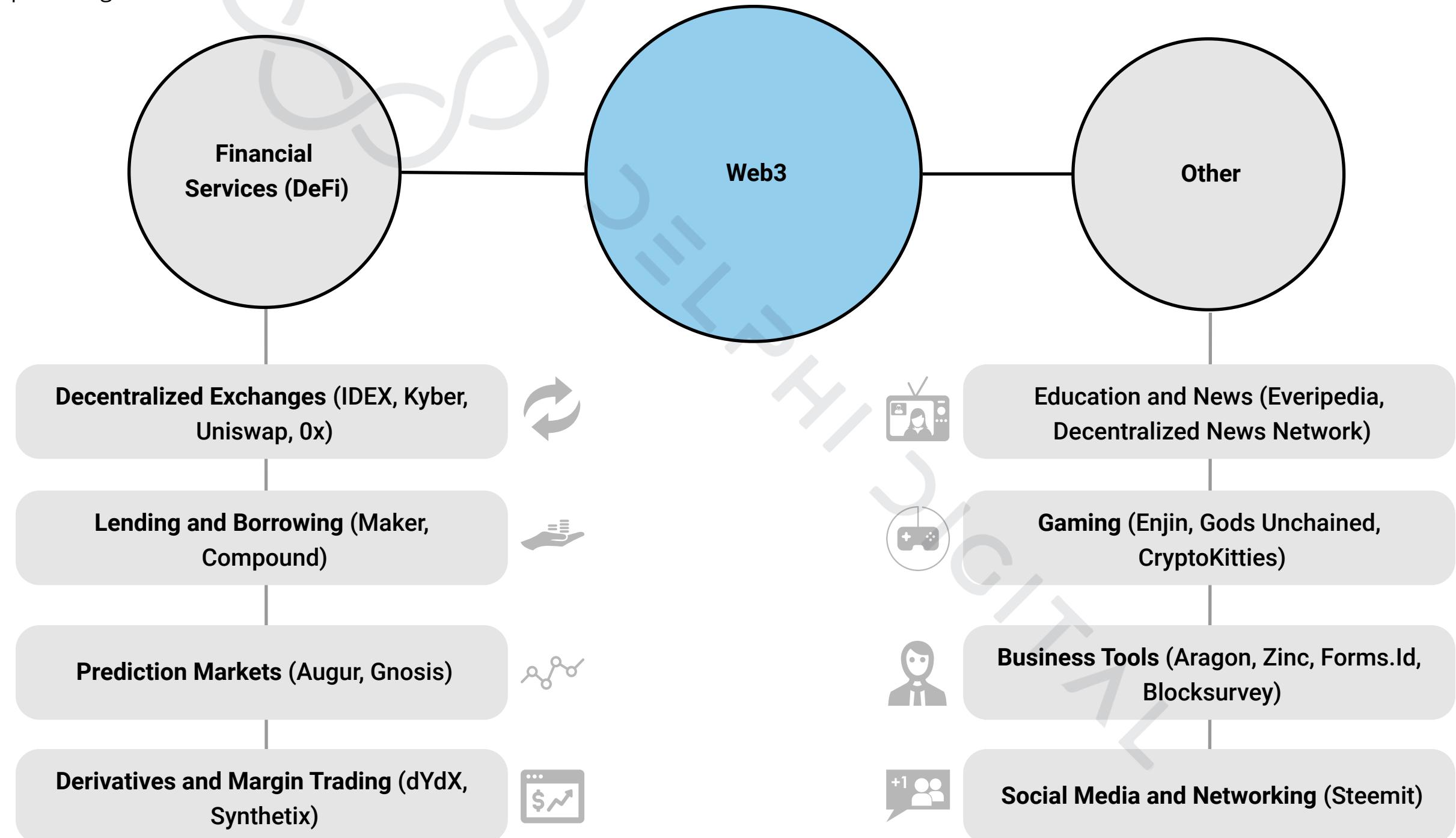
- Blockstack is a decentralized computing network and app ecosystem with the native token STX.
- Blockstack [streamlines](#) the bulk of the Web3 stack by offering developers built-in pieces of infrastructure to leverage when building Web3 apps. For example Blockstack handles Authentication (Blockstack Auth), Storage (Gaia), Distribution (Stacks Publishing), and offering a native Browser (Blockstack Browser).
- Blockstack features a blockchain light architecture where identity and pointers are stored on the blockchain and storage/compute elsewhere.
- While Blockstack may offer a smaller base of developers and tooling vs Ethereum, it allows for easy data portability. Blockstack has 194 [apps](#) built on its platform and is younger vs Ethereum.



- Polkadot is an interoperability project that also allows teams to launch their projects on parachains, or application specific blockchains while leveraging the shared security of Polkadot.
- Polkadot was [founded](#) by the Web3 Foundation, which commissioned 100 developers to build out the platform. DOT is the native token within the Polkadot ecosystem.
- Kusama recently [launched](#), an experimental test network for Polkadot, but its mainnet is planned for late 2019. There are dozens of teams [experimenting](#) with Substrate (a blockchain development platform) but are not fully live as Polkadot's mainnet has not launched.

Web3 Front-Facing App Categories

Development teams are simultaneously building out the infrastructure necessary to support Web3, in addition to the applications that will run on top of it. Due to the nascent nature of the infrastructure, and current scaling limitations, we've yet to see an application gain traction with a mainstream audience. However, there are certain categories that stand out today. DeFi is the most prominent example that's started to see utilization providing P2P financial services. Below, we've provided a non-exhaustive diagram of DeFi services and other Web3 categories that could have a promising future.



Mitigating Web3 Hurdles

In addition to the ongoing development of core infrastructure and DApps, there are also new solutions coming online to help simplify the hurdles to adoption. Two of the main issues with consumers using Web3 applications is the handling of transaction fees and user sign on (key management) across platforms. Gas Station Network and Torus attempt to solve these issues, detailed below.

GSN Gas Station Network



Issue: Users have to acquire ETH to pay transaction fees, which is a major adoption and usage hurdle.

Solution: Gas Station Network is a decentralized solution that allows DApps to pay for their user's transactions costs in a secure way. This could help onboard new users by reducing the initial steps to start interacting with DApps.

Statistic: 90% of users experience friction having to install MetaMask first before using a DApp.

TORUS



Issue: Web3 users have to manage their private keys in a secure way.

Solution: Torus allows users to login to a DApp using their existing social media accounts, such as Google or Facebook. Torus manages the private keys in a decentralized way by encoding them into a smart contract layer.

Statistic: Torus is able to reconstruct a user's private key based on their social media login within a second.

Z OpenZeppelin



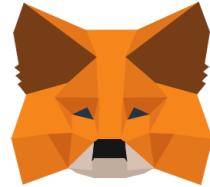
Issue: It can be difficult for developers to build Web3 applications.

Solution: OpenZeppelin offers a library of reusable smart contracts for Ethereum, an SDK to develop, test and deploy smart contracts and starter kits to bundle modules to deploy DApps faster.

Statistic: OpenZeppelin's libraries have been used by over 100k developers to secure over \$4.5B in digital assets

Web3 Goes Mobile

The availability of Web3 applications on mobile is also becoming a reality. Given the prominence that mobile devices play in our every day life, these tools will be an important and necessary part of Web3's maturation.



MetaMask Mobile

- A Mobile bridge to the decentralized web. The application is still in Beta.
- Allows users to manage, send and receive ETH, ERC20 and ERC721 tokens from their mobile wallet
- Multiple Web3 browser functions including DApps can access QR code scanner, choose an IPFS gateway, message signing and more.
- This is significant given that MetaMask has over 1.3M users and this can be their mobile bridge.



Haven

- Haven allows users to shop and sell privately, has a crypto wallet, private encrypted messaging and social networking
- Haven is built using the decentralized network OpenBazaar (a decentralized P2P commerce network) and allows users to interact using cryptocurrencies to transact as a way to increase privacy. All data is hosted on the user's device.
- Haven is available on iOS and Google Play.



Textile

- Textile allows users to store, manage and share their personal photos through its mobile app.
- Every photo is given a universally unique fingerprint and stored in a user's wallet.
- Photos are stored on the decentralized storage network IPFS and secured via private key encryption.
- Available on iOS and Google Play.



Berty

- Berty is a messaging app for secure communications from a smartphone.
- Berty uses an implementation of libp2p, a library that IPFS built on top of for decentralized storage.
- Berty is coming soon to iOS and Google Play

Leader Commentary



Below, we've included exclusive commentary regarding Web3 from leaders in the space



Fred Wilson: Partner at Union Square Ventures

*"We can see glimpses of Web 3 in games and collectibles, where the stakes are not that high, and we can see glimpses of it in financial services that have built up around Bitcoin and other leading crypto assets. But it will be a while before we are keeping our resumes on LinkedIn and our documents on DDocs, our friends and family networks on Facebook, our photos and videos on Instagram, and our President's tweets on Twitter. **But that time will come. I am more sure about that than anything else right now.** **The last few years of Web 2 have shown us what is wrong with the current architecture of the web and what we need to do to fix it.** When this all happens is another thing."*



Gavin Wood, Founder of Parity Technologies and co-founder of Ethereum

"Web 3.0 is an inclusive set of protocols to provide building blocks for application makers. These building blocks take the place of traditional web technologies like HTTP, AJAX and MySQL, but present a whole new way of creating applications. These technologies give the user strong and verifiable guarantees about the information they are receiving, what information they are giving away, and what they are paying and what they are receiving in return. By empowering users to act for themselves within low-barrier markets, we can ensure censorship and monopolization have fewer places to hide. **Consider Web 3.0 to be an executable Magna Carta — "the foundation of the freedom of the individual against the arbitrary authority of the despot."**

Disclosures

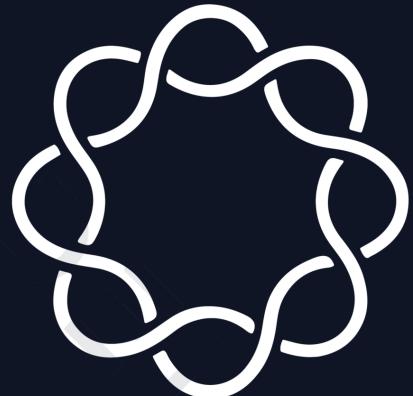
The Research Team may own the tokens represented in this report, and as such this should be seen as a disclosure of any potential conflict of interest. Anyone can contact Delphi Digital for full token disclosures by team member at Team@DelphiDigital.io. This report belongs to Delphi Digital, and represents the opinions of the Research Team.

Delphi Digital is not a FINRA registered broker-dealer or investment adviser and does not provide investment banking services. This report is not investment advice, it is strictly informational. Do not trade or invest in any tokens, companies or entities based solely upon this information. Any investment involves substantial risks, including, but not limited to, pricing volatility, inadequate liquidity, and the potential complete loss of principal. Investors should conduct independent due diligence, with assistance from professional financial, legal and tax experts, on topics discussed in this document and develop a stand-alone judgment of the relevant markets prior to making any investment decision.

Delphi Digital does not receive compensation from the companies, entities, or protocols they write about. The only fees Delphi Digital earns is through paying subscribers. Compensation is not received on any basis contingent upon communicating a positive opinion in this report. The authors were not hired by the covered entity to prepare this report. Delphi Digital did not receive compensation from the entities covered in this report for non-report services, such as presenting at author sponsored investor conferences, distributing press releases or other ancillary services. The entities covered in this report have not previously paid the author in cash or in stock for any research reports or other services. The covered entities in this report are not required to engage with Delphi Digital.

The Research Team has obtained all information herein from sources they believe to be accurate and reliable. However, such information is presented "as is," without warranty of any kind – whether expressed or implied. All market prices, data and other information are not warranted as to completeness or accuracy, are based upon selected public market data, reflect prevailing conditions, and the Research Team's views as of this date, all of which are accordingly subject to change without notice. Delphi Digital has no obligation to continue offering reports regarding this topic. Reports are prepared as of the date(s) indicated and may become unreliable because of subsequent market or economic circumstances. The graphs, charts and other visual aids are provided for informational purposes only. None of these graphs, charts or visual aids can and of themselves be used to make investment decisions. No representation is made that these will assist any person in making investment decisions and no graph, chart or other visual aid can capture all factors and variables required in making such decisions.

The information contained in this document may include, or incorporate by reference, forward-looking statements, which would include any statements that are not statements of historical fact. No representations or warranties are made as to the accuracy of such forward-looking statements. Any projections, forecasts and estimates contained in this document are necessarily speculative in nature and are based upon certain assumptions. These forward-looking statements may turn out to be wrong and can be affected by inaccurate assumptions or by known or unknown risks, uncertainties and other factors, most of which are beyond control. It can be expected that some or all of such forward-looking assumptions will not materialize or will vary significantly from actual results.



DELPHI DIGITAL

85 Broad Street
New York, NY, 10004
www.delphidigital.io