

Horizen (ZEN)

Digital Assets Research
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HORIZEN TL;DR

- Web 3.0 next-generation crypto internet tech platform
- Blockchain cloud computing applications with data privacy
- WeChat 2.0 crypto super app Big Tech disruption potential
- Large market with \$530B in FAAMG revenue under attack
- Fast-growing, relatively undervalued user base opportunity
- **Risks:** Web 3.0 potential may be overstated, competitors may win, users & fees may not grow

Key Statistics

Token Price	\$5.68
Range (52W)	\$3.21 / \$14.91
Market Cap	\$57.1M
Circulating Supply	10.1M
Volume (24H)	\$2.6M

Source: Coinbase (9/30/2020)

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Horizen: Web 3.0 Platform Targeting Big Tech Super App Disruption

Fast-growing decentralized and private fintech and e-commerce cloud app ecosystem with a large market and unicorn potential

Horizen (ZEN) (“Horizen”) is a next-generation internet platform structured as a publicly traded Distributed Ledger Technology (“DLT”) cryptonetwork that was launched in Q2 2017. Horizen gives users control over their online data with its blockchain cloud computing platform for money, messages, media, and third-party decentralized applications (“DApps”). Web 3.0 decentralized internet alternatives like Horizen have the potential to become disruptive over the next decade by solving many issues plaguing Big Tech. Horizen’s fintech imbedded emerging internet application ecosystem offers a glimpse at what an early WeChat 2.0 crypto super app platform may resemble. While material DApp, user and revenue growth is key to reaching such long-term prominence, Horizen’s unique advantages and highly undervalued user-base vs. its crypto peers may already imply unicorn potential.

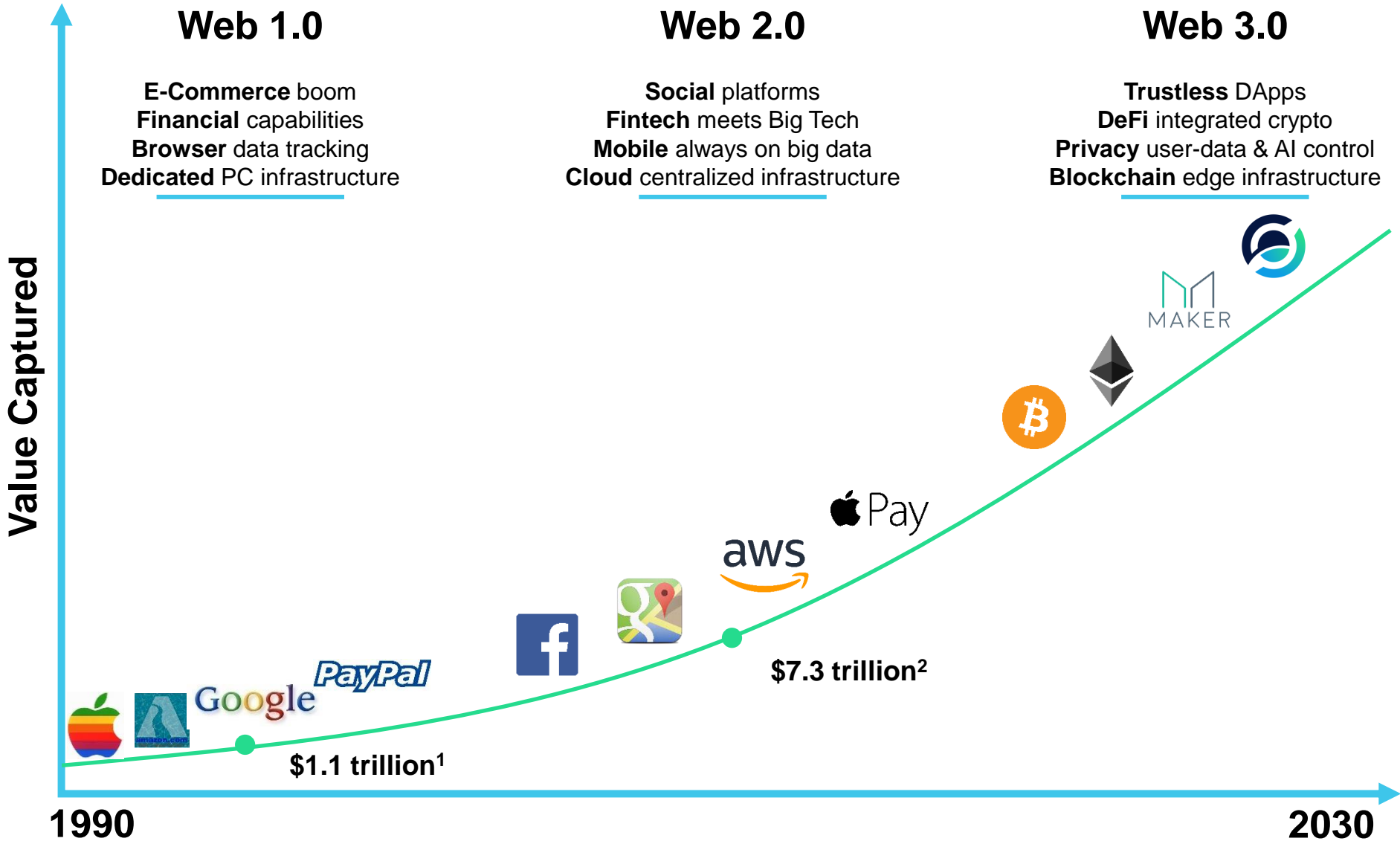
- **Horizen is building a platform for the next era of the web.** A blockchain computing network, analogous to a decentralized AWS, comprised of ~40k nodes, the largest among peers, forms the platform’s infrastructure backbone ([Slide 53](#)). A smart contract capable open network allows any developer to build trustless DApps that aren’t controlled by any organization ([Slide 22](#)). Natively imbedded crypto Decentralized Finance (DeFi) capabilities ([Slide 43](#)) enable an ecosystem of interoperable fintech e-commerce DApps, analogous to WeChat mini programs and WeChat Pay ([Slide 44](#)). Optional privacy features give users control over their data ([Slide 28](#)). Governed as a community-owned-and-controlled cryptonetwork Web 3.0 protocol ([Slide 34](#)).
- **Web 3.0 networks offer Big Tech crypto super app disruption potential.** As FAAMGs (Facebook, Amazon, Apple, Microsoft, Google) have risen to dominance ([Slide 31](#)), cryptonetworks have been rapidly gaining share ([Slide 32](#)) and may offer the next wave of innovation and growth ([Slide 33](#)). Web 3.0 is a vision for a better internet ([Slide 35](#)) where crypto protocols replace application companies ([Slide 36](#)). Cryptonetworks further past business model evolutions ([Slide 39](#)), trends in computing ([Slide 41](#)), and software automation stages ([Slide 40](#)), potentially leaving 56% or \$530B of FAAMG revenue disruptable ([Slide 48](#)). Super app capable crypto platforms are emerging ([Slide 45](#)) alongside DApp ecosystems that resemble tech giants ([Slide 46](#)).
- **Impressive tech, team, backers, and rapid community growth.** Differentiated tech combining ZK SNARK privacy ([Slide 57](#)), security enhancements ([Slide 54](#)), a highly decentralized network ([Slide 69](#)) and a novel sidechain design for scalable, payment-interoperable DApps ([Slide 56](#)). Team continues to execute ([Slide 25](#)). Key investors and partners support Horizen ([Slide 64](#)). Community growth CAGR of 75%-170% ([Slide 67](#)), 2.3k developers ([Slide 70](#)) and 250k monthly active users (MAUs) ([Slide 66](#)).
- **Undervalued user-base vs. peers may imply unicorn potential.** ZEN is an income generating productive asset ([Slide 60](#)), and we believe fee cash flows (ZEN/USD) should drive value long-term, but we see users as a leading metric to watch today. Horizen’s current MAUs are valued in line with Big Tech comps ([Slide 74](#)), while forward MAUs may imply a \$122M to \$440M market cap by 2022 ([Slide 75](#)). Valuing Horizen’s user base against crypto peers may imply a market cap of ~\$1.8B ([Slide 77](#)).
- **Long-term macro and asset specific catalysts unfolding.** Big Tech headwinds offer macro catalysts for Web 3.0 ([Slide 50](#)), while new DApp launches, partnerships, exchange listings, and the November halvening could drive Horizen higher ([Slide 78](#)).
- **What could go wrong?** Web 3.0 disruption, market size or winning solutions may not materialize. Horizen DApps, users, and fee revenue may fail to grow. Competing solutions may win. Investors may value Horizen differently. Crypto related risks ([Slide 15](#)).

Bottom line: Horizen is a new type of internet platform that’s a competitor to watch in the race to replace Big Tech. It offers differentiated tech, a rapidly growing ecosystem and a relatively undervalued user-base, which may create an opportunity. We believe its modest market cap, team culture of execution over hype, and recent transition from a privacy coin to a Web 3.0 network contribute to it being relatively unnoticed, but we see reasons to be bullish on Horizen over the next decade.



EXECUTIVE SUMMARY: Platform for the next era of the web

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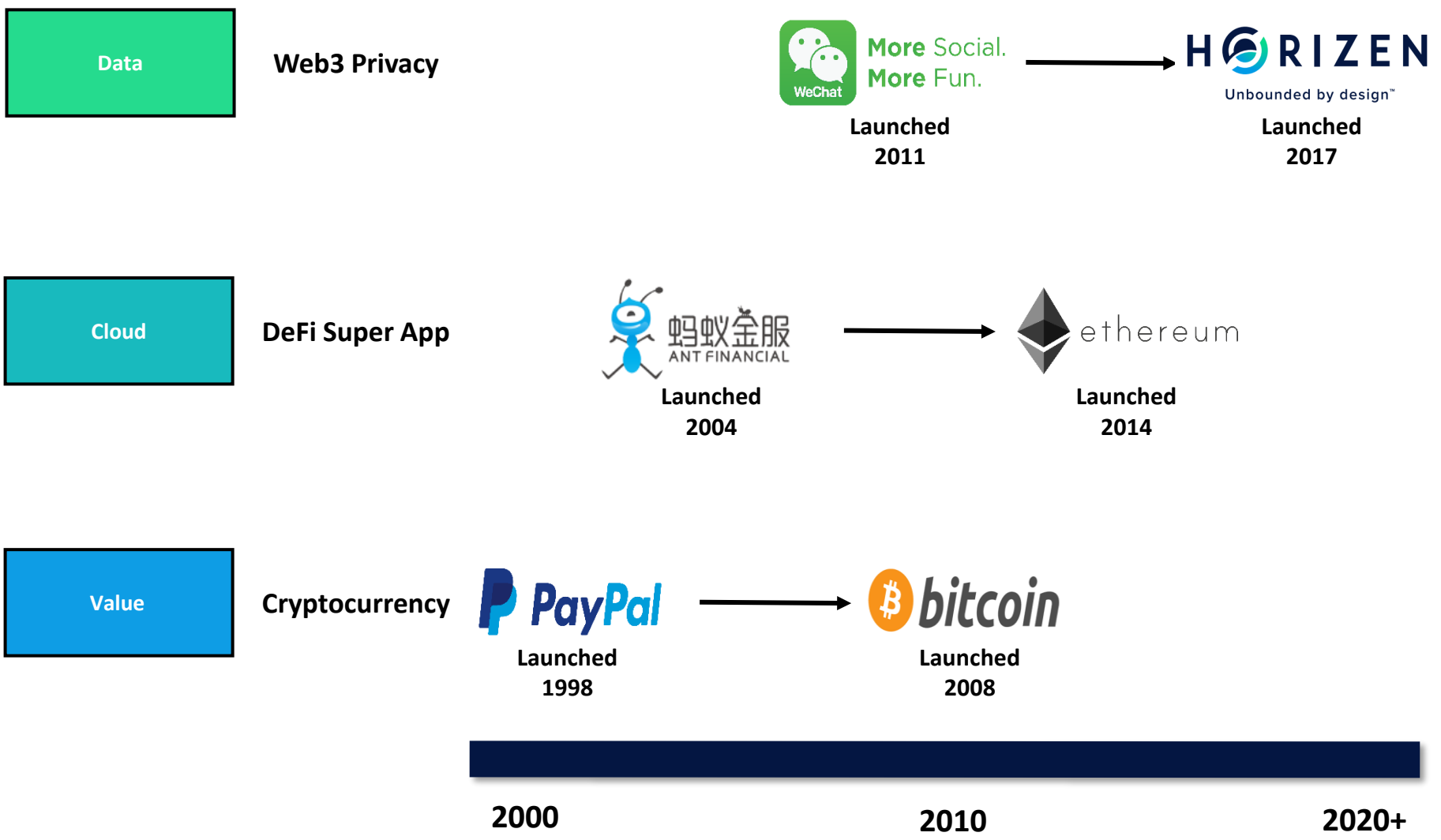


Source: Fundstrat, Fabric Ventures Inspired, (1) Internet companies market cap as of 2000, (2) Big Tech market cap as of 8/25/2020



EXECUTIVE SUMMARY: Technology evolution beyond cryptocurrency

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Source: Fundstrat



EXECUTIVE SUMMARY: Only live privacy focused Web 3 cryptonetwork

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Privacy

Horizen

Web3

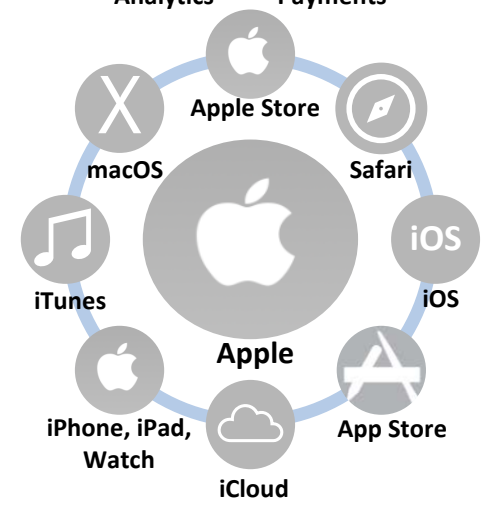
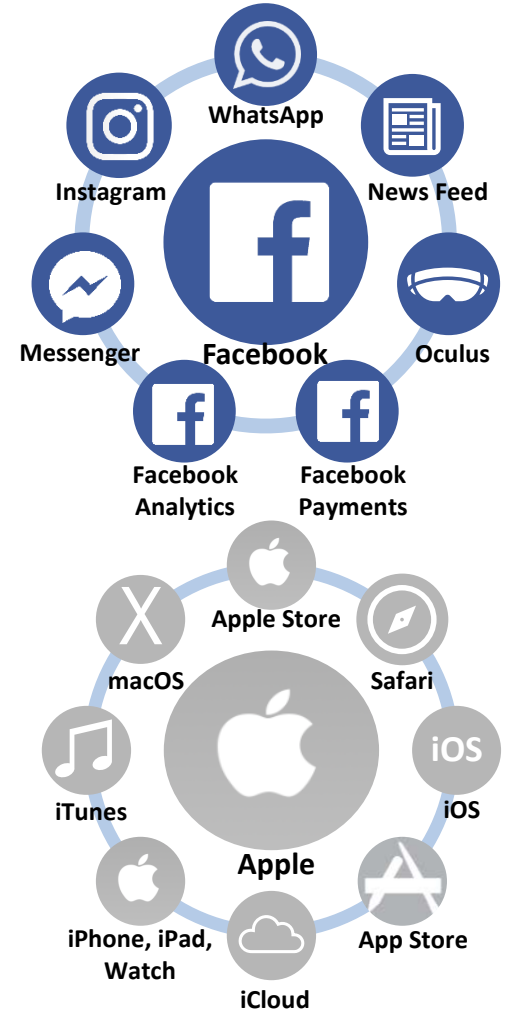
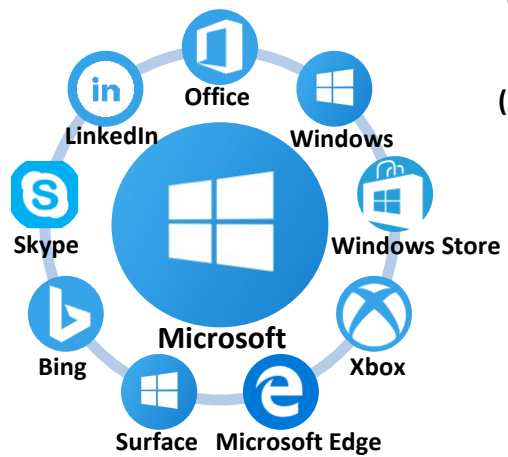


Source: Fundstrat



EXECUTIVE SUMMARY: DApp ecosystem alternative for Big Tech and Big Data

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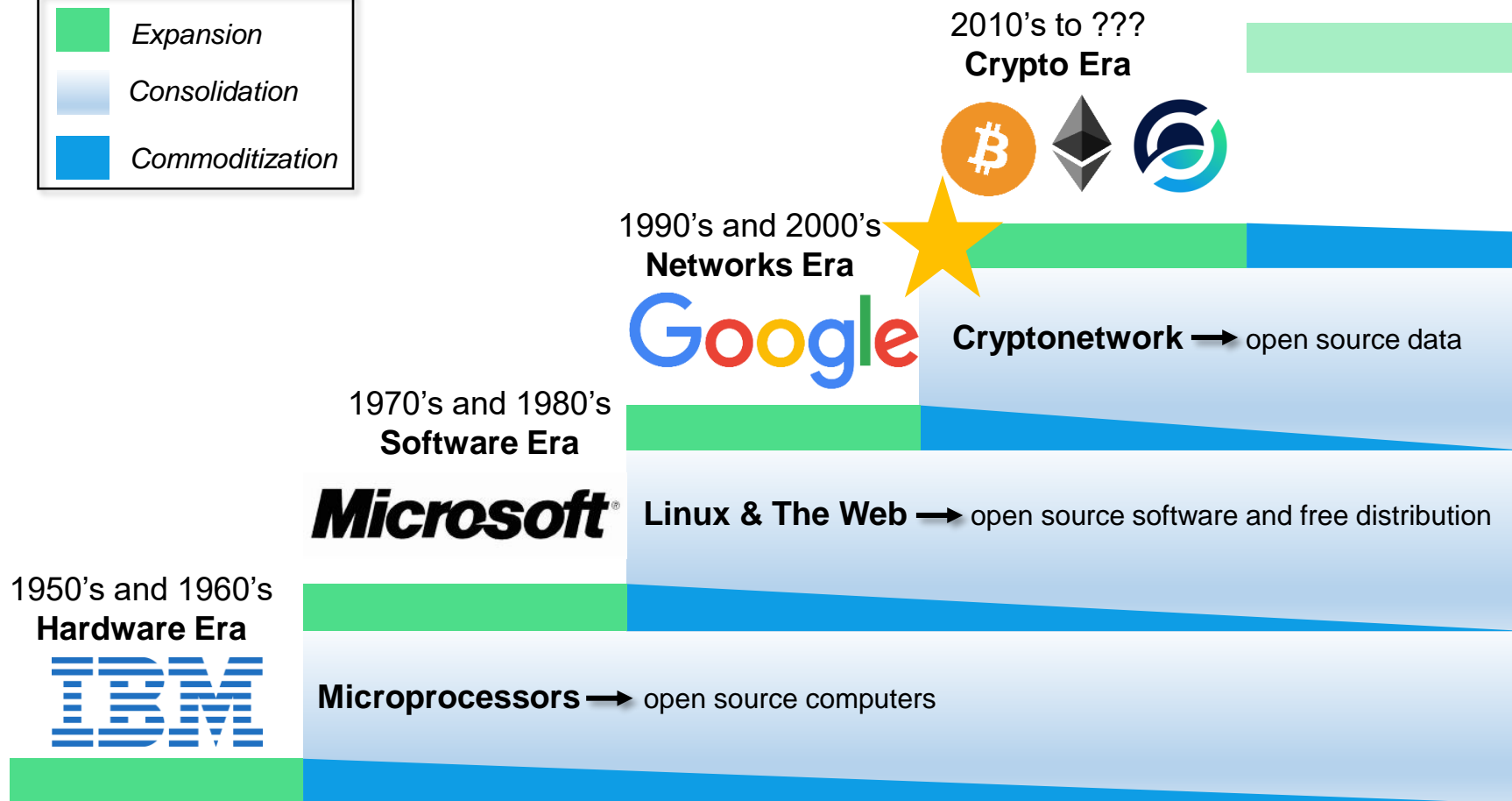
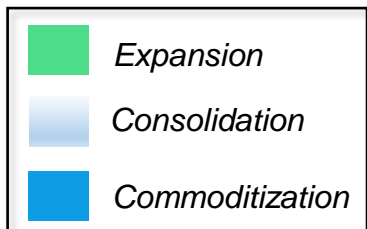


Source: Fundstrat, Horizen, Netherlands Authority for Consumers & Markets



EXECUTIVE SUMMARY: Next wave of tech innovation and growth

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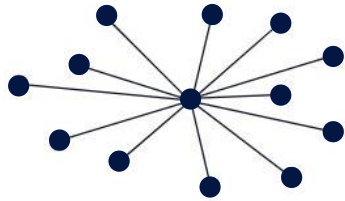
Source: Fundstrat, Placeholder Ventures



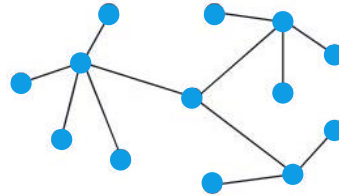
EXECUTIVE SUMMARY: Next generation organizational tech business models

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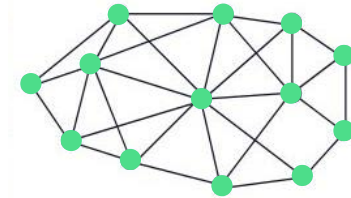
Companies



Platforms



Networks



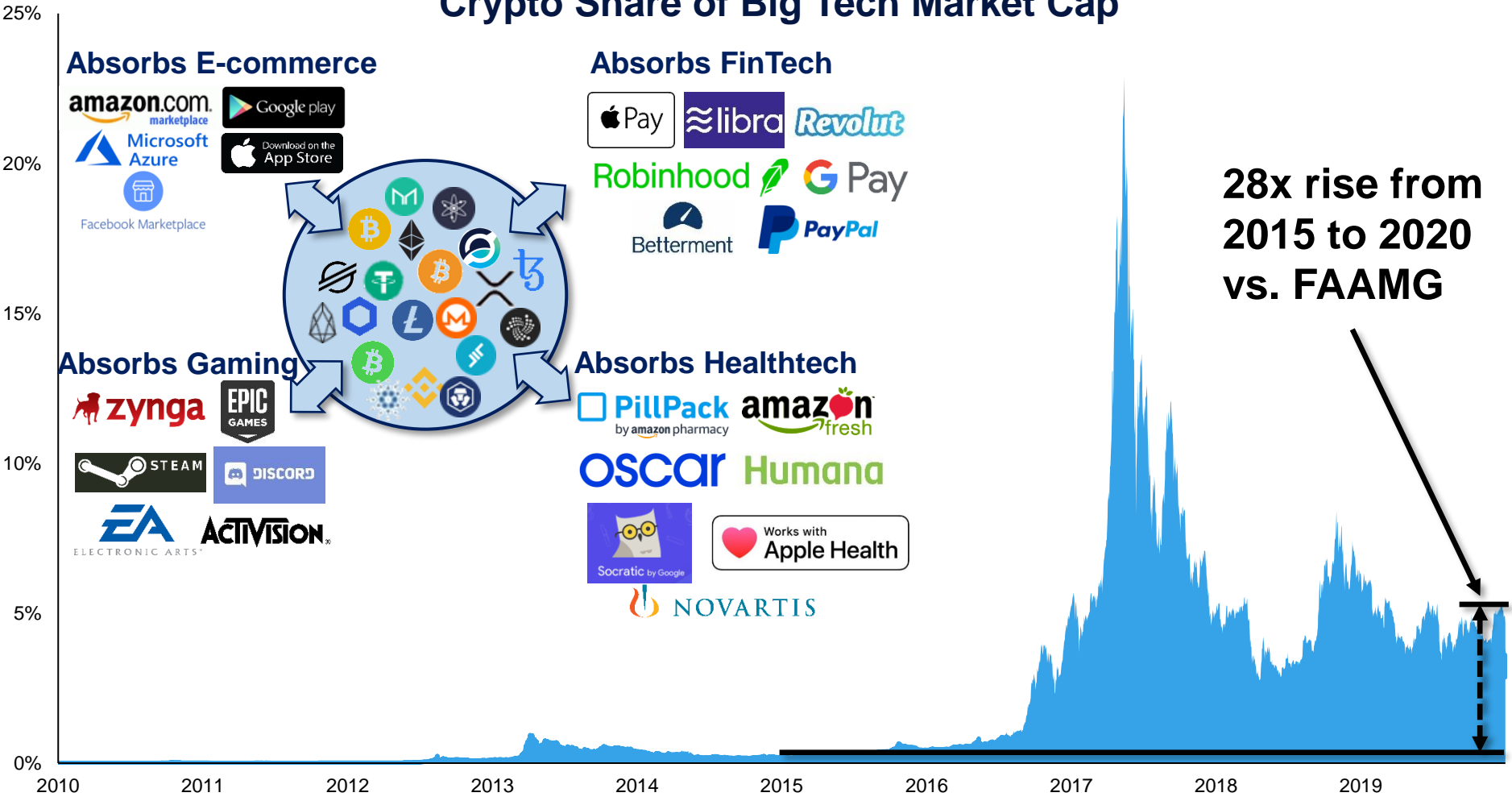
Source: Fundstrat



EXECUTIVE SUMMARY: Early innings of crypto tech absorbing Big Tech

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Crypto Share of Big Tech Market Cap



Source: Fundstrat, Bloomberg



EXECUTIVE SUMMARY: Ecosystems forming that resemble global tech giants

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Businesses Application	Big Tech App Example	Crypto DApp Example	Horizen DApp Future
Digital Media Publishing Messaging Online Games Search Advertising Content Distribution			
E-Commerce App Store Marketplaces			
Cloud Services Developer Training Software Tooling Cloud Infrastructure			
Fintech Services Digital Wallet Digital Payments Saving & Investing Borrowing & Lending Digital Insurance			

Source: Fundstrat, Horizen



EXECUTIVE SUMMARY: 50%+ FAAMG revenue or ~\$500B may be up for disruption

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facebook		Apple		amazon		Microsoft		Google		FAAMG	
Segment	Revenue	Segment	Revenue	Segment	Revenue	Segment	Revenue	Segment	Revenue		
Advertising	73,284	Services (Apps, Music, Maps, Cloud, etc.)	52,624	AWS Cloud	43,232	Server & Cloud Services	36,768	Google Advertising	119,468	More Likely	
				3rd-Party Seller Services	72,780	Office & Cloud Services	33,864	Google Cloud	12,028		
				Subscription Services	24,072	Windows	21,412				
				Other (Advertising)	16,884	Gaming	10,168				
						Advertising	7,964				
						LinkedIn	7,636				
Combined Share%	73,284 98%	Combined Share%	52,624 22%	Combined Share%	156,968 44%	Combined Share%	117,812 89%	Combined Share%	131,496 86%	Combined Share%	532,184 56%
Other	1,464	Products (iPhone, iPad, etc.)	186,116	Online Stores	183,584	Enterprise Services	6,180	Google Other	20,496	Less Likely	
				Physical Stores	3,774	Devices	4,808	Hedging gains	604		
						Other	3,420	Other Bets	592		
Combined Share%	1,464 2%	Combined Share%	186,116 78%	Combined Share%	198,680 56%	Combined Share%	14,408 11%	Combined Share%	21,692 14%	Combined Share%	422,360 44%
Total Revenue	74,748	Total Revenue	238,740	Total Revenue	355,648	Total Revenue	132,220	Total Revenue	153,188	Total Revenue	954,544

Source: Fundstrat, Bloomberg, Estimated Using Q2 2020 Annualized Revenue (\$ millions)



EXECUTIVE SUMMARY: Big Tech headwinds offer macro catalysts for crypto

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Apple removes app used in Hong Kong protests after pressure from China

"This app violates our guidelines and local laws."

By Sam Byford | @345trangle | Oct 10, 2019, 12:32am EDT



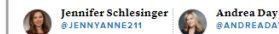
A Twitter bug exposed some Android users' protected tweets for years

By Dani Lee | @dami_lee | Jan 17, 2019, 2:44pm EST



How Snapchat's new Snap Map is stoking privacy and terrorism fears

PUBLISHED SAT, AUG 12 2017 2:46 PM EDT



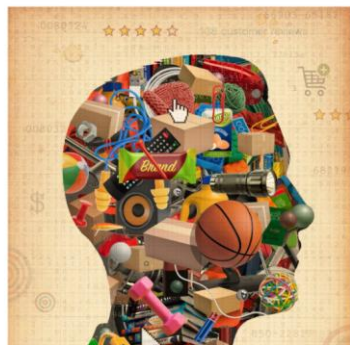
Here's How Google Is Trying To Kill Yelp

China social media: WeChat and the Surveillance State

By Stephen McDonell

The New York Times

Amazon Knows What You Buy. And It's Building a Big Ad Business From It.



Trump Signs Executive Order That Will Effectively Ban Use Of TikTok In the U.S.

August 6, 2020 · 11:21 PM ET



Why everybody is freaking out about political ads on Facebook and Google



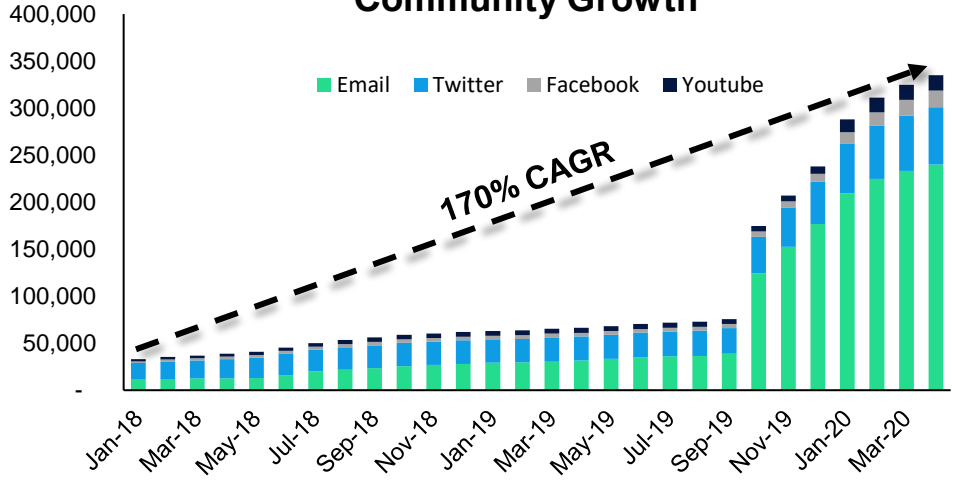
Source: Fundstrat, Internet



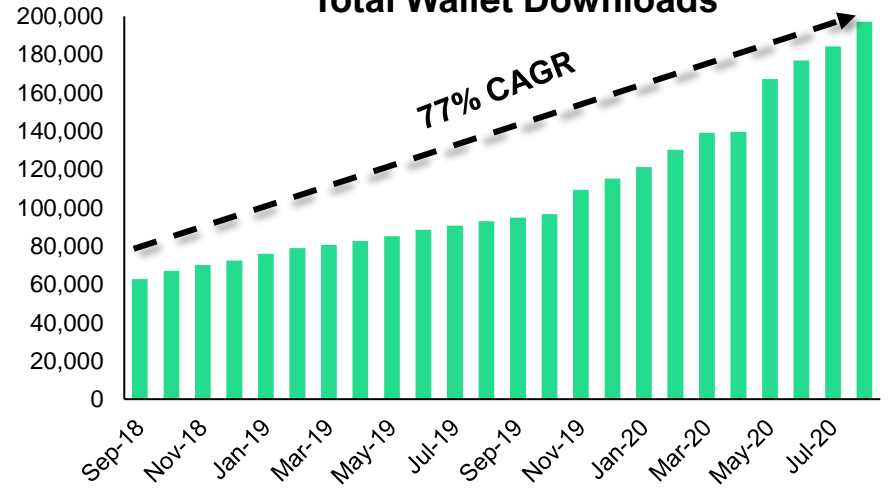
EXECUTIVE SUMMARY: Horizen is experiencing rapid user interest and growth

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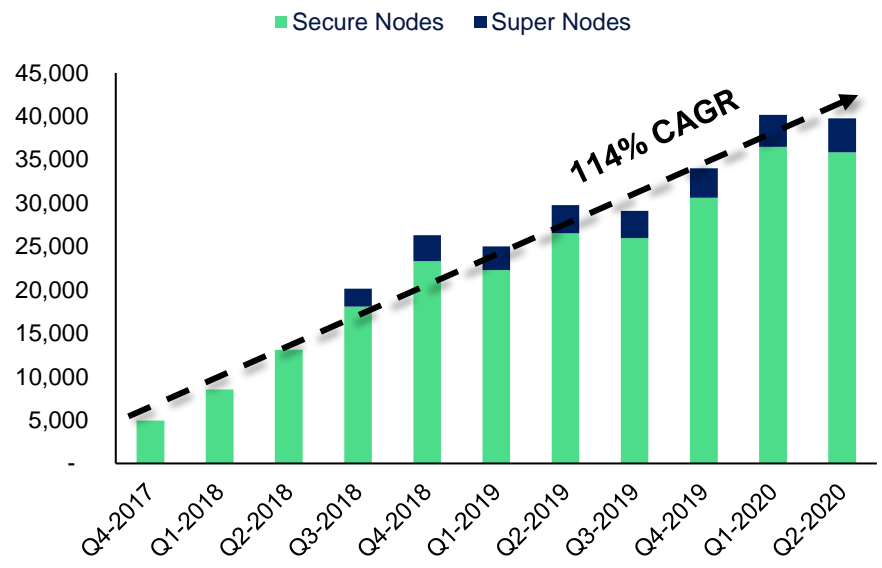
Community Growth



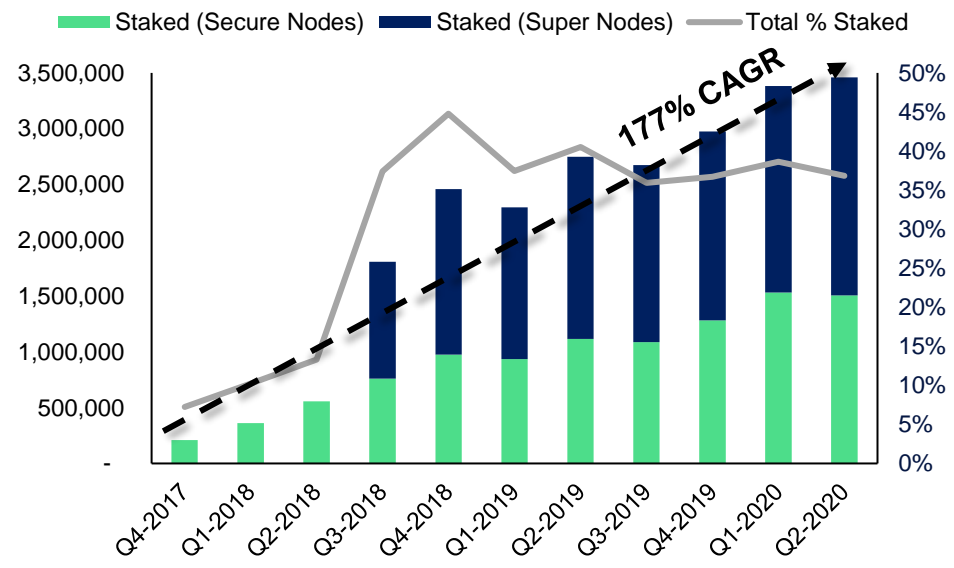
Total Wallet Downloads



Number of Secure & Super Nodes



ZEN Staked/Locked

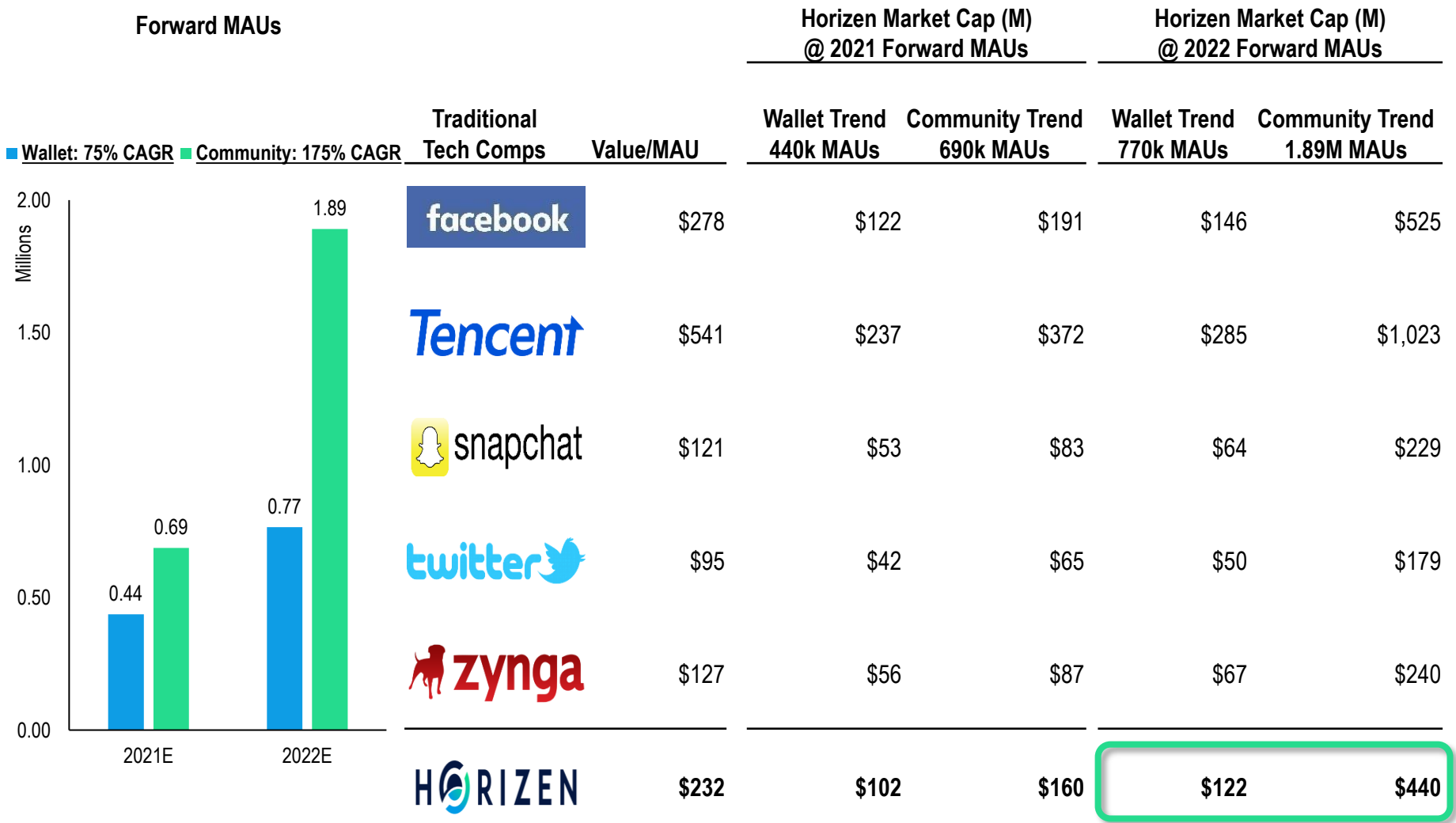


Source: Fundstrat, Horizen



EXECUTIVE SUMMARY: MAU growth trend may imply ~\$125-\$450M value by 2022

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Source: Fundstrat, Company Reports, Bloomberg



EXECUTIVE SUMMARY: Unicorn today if users repriced in line with crypto peers

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Crypto Tech Comps	Category	DAUs	MAUs	Market Cap (M)	Value / DAU	Value / MAU	Horizen Mkt Cap (M) (@ 16k DAUs)	Horizen Mkt Cap (M) (@ 250k MAUs)
Ethereum	DApp Platform	366,076	7,737,902	\$40,740	\$111,288	\$5,265	\$1,781	\$1,316
Dash	Privacy Platform	82,277	1,980,380	\$711	\$8,642	\$359	\$138	\$90
EOS	DApp Platform	40,644	138,694	\$2,538	\$62,445	\$18,299	\$999	\$4,575
Cardano	DApp Platform	7,288	348,742	\$2,892	\$396,797	\$8,293	\$6,349	\$2,073
Zcash	Privacy Platform	11,765	188,778	\$583	\$49,553	\$3,088	\$793	\$772
Tron	DApp Platform	123,449	n/a	\$1,804	\$14,613	n/a	\$234	n/a
Tezos	DApp Platform	10,287	n/a	\$1,803	\$175,274	n/a	\$2,804	n/a
HORIZEN					<u>\$116,945</u>	<u>\$7,061</u>	<u>\$1,871</u>	<u>\$1,765</u>

Source: Fundstrat, CoinMetrics



EXECUTIVE SUMMARY: Downside and upside potential to our thesis

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Downside Risks

- Web 3.0 potential may not materialize, it may be too early to predict how the technology will develop, what impact it will have, what consumer preferences will be, how competition will respond or the addressable market size, which may cause the opportunity to be overstated
- Horizen will likely face intense competition both from traditional technology incumbents and from emerging crypto technology peers, who may offer better solutions, have larger network effects, or other strategic advantages that could result in lower than expected market share
- Horizen may fail to grow DApps on its network, the DApps may fail to attract consumers, user growth may stall, and transaction fee revenue may not materialize, which would negatively impact staking incentives and the price
- Investors may value Horizen using other methods than the user-based model in our report, other comp sets may produce different results, market conditions and value per user rates may change materially
- Crypto technology is still maturing and carries high degrees of uncertainty, volatility and risk, which may cause Horizen to be negatively impacted by unexpected bugs, hacks, political or regulatory scrutiny, industry price declines or other factors that would negatively impact results

Upside Potential

- Web 3.0 potential may prove greater than expected, big tech incumbents may face increasing headwind, crypto alternative internet features may see higher than expected consumer demand, new use cases or markets may emerge, and the size the opportunity may be larger than expected
- Horizen's technology, DApps and network may prove to offer the most desired solution for consumers, user and ecosystem growth may accelerate, transaction fee revenue may grow materially, demand for staking could rise, which would positively impact the price
- Investors may use another method to value Horizen that could result in a higher market price, faster than expected user growth may cause added upside, valuations for comp user bases may rise, market participants may assign a premium to Horizen over its peers
- The opinions expressed in this report are the beliefs of the author at the time of publication. Fundstrat does not commit to update this report and is not responsible for any independent investment decisions made by a reader, based on this and / or any other sources of information.

Source: Fundstrat



Executive Summary

Horizen Introduction

Market Opportunity

Network Technology

Ecosystem Growth

Investment Potential

Appendix Information



Horizen Overview



Co-Founder and CEO:	Robert Viglione
Team Locations:	US, Italy, Israel
Founded:	2017

Summary

- **Horizen** (the “Network”) is a rapidly expanding scalable decentralized application platform that enables businesses and developers to quickly and affordably create their own public or private blockchains on the largest node network in the industry. The network was launched in 2017 as a privacy-oriented digital currency ecosystem built on zk-SNARKs. Horizen’s Sidechain SDK provides all components for easy and fast deployment of a fully customizable blockchain.

Horizen Objectives

- Create an ecosystem with a **ensorship-resistant peer-to-peer network owned by its users, permissionless in participation, and constructed with incentives** for endogenous growth
- Create a **sidechain system** that enables real-world applications to be mapped on a **fully distributed, secure, privacy-preserving blockchain architecture**, and sharing the use of ZEN as a well established and **tradable token with real value**

Origination Architecture

- **DApps, Products & Services** - Bringing blockchain benefits to life through real-world utility
- **Technology Platform** - Scalable sidechain solutions with an open-sourced Software Development Kit
- **Infrastructure** - A powerful foundation supported by the largest and most distributed multi-tiered node network in the industry
- **ZEN**- Cryptocurrency with an optional privacy feature that allows users to take control of their digital footprint

Network Technology

- Horizen’s multi-tiered node network has **~40,000 active nodes**; making the Horizen platform extremely secure and **resilient against malicious actors and power failures**
- Incorporates a scalable general-purpose blockchain system with a novel **Cross-Chain Transfer Protocol** that enables an unbounded and fully decentralized sidechain ecosystem

Source: Fundstrat, Horizen



Leadership with strong business, industry & technology experience



Rob Viglione

Co-Founder & President

- Background is in physics, applied mathematics, and financial economics. PhD Candidate in Finance researching cryptofinance.
- Rob started his career as a military scientist working in space systems where he managed large software development projects.
- Founded Horizen (formerly ZenCash) where he focused on extending zero-knowledge technology into blockchain governance and sidechains



Rolf Versluis

Co-Founder & Executive Advisor

- Experienced business owner in the IT industry and owns a mid-size mining operation.
- Founder of Block Operations, an IT Operations Firm focused on cryptocurrencies.
- Prior experience at Cisco systems, the semiconductor industry, and as a nuclear trained officer in the US Submarine force.



Alberto Garoffolo

Engineering Director

- With more than 15 years of experience Alberto gained a deep knowledge of software design and development in many application fields with a strong expertise in different languages such as Java, C and C++.
- Covered the role of CTO in a startup company, designing the software architecture and selecting the team to create one of the most complete video engagement solutions on the market.



Liat Aronson

Strategy

- Investment Partner at Marker LLC, a leading Israel-New York based venture capital firm, where she continues to oversee their follow-on annex fund.
- Executive Director of the Zell Entrepreneurship Program at IDC.
- Holds a B.A. in political economy of industrial societies from the University of California at Berkeley, an LL.B. and MBA from Tel Aviv University, and an LL.M. in European law from the University of Leiden.



Dean Steinbeck

Operations and Legal

- Senior executive at TigerConnect, leading communication platform in US healthcare market.
- 15 years representing VC-backed software development companies with a focus on data privacy.
- BA in Business Economics, MSc in Accounting & Finance and JD.

Previous Experience

Source: Horizen



Team that's well-run and driving growth across key business functions

Development of the Horizen network is led by a global team of professionals with roughly 50 individuals working across engineering, UI/UX, marketing, operations, legal, finance, and business development functions.

ENGINEERING	 Rob Viglione	 Rolf Versluis	 Alberto Garoffolo	 Allan Dumaine	 Rosario Pabst	 Cronic	 James Cordingley
USER EXPERIENCE	 Sergii Makukha	 Johncarlo Maddalena	 Oleksandr Iozhytsia	 Oleg Aleskandrov	 Daniele Di Benedetto	 Alberto Sala	 Paolo Cappelletti
MARKETING	 Alberto Benegiamo	 Marco Olivero	 Ulrich Habock	 Luigi Varriale	 Gustavo Fialho	 Tuan Ho	 Spencer Whetstone
PROJECT MANAGEMENT	 Lucy Wang	 Jonathan Teplitsky	 Medar	 Linda Bucksey	 Marko Orcic	 Erica Hamilton	 Luca Cermelli
LEGAL & FINANCE	 Liat Aronson	 Rowan Stone	 Dean Steinbeck	 Jordan Bass	 Michelle Finn	 Fenwick & West	 Ruben Elizondo
BUSINESS DEVELOPMENT	 Angie Villarreal	 Vano Narimanidze	 Guan Yin	 Aldo Antinori			

Source: Horizen

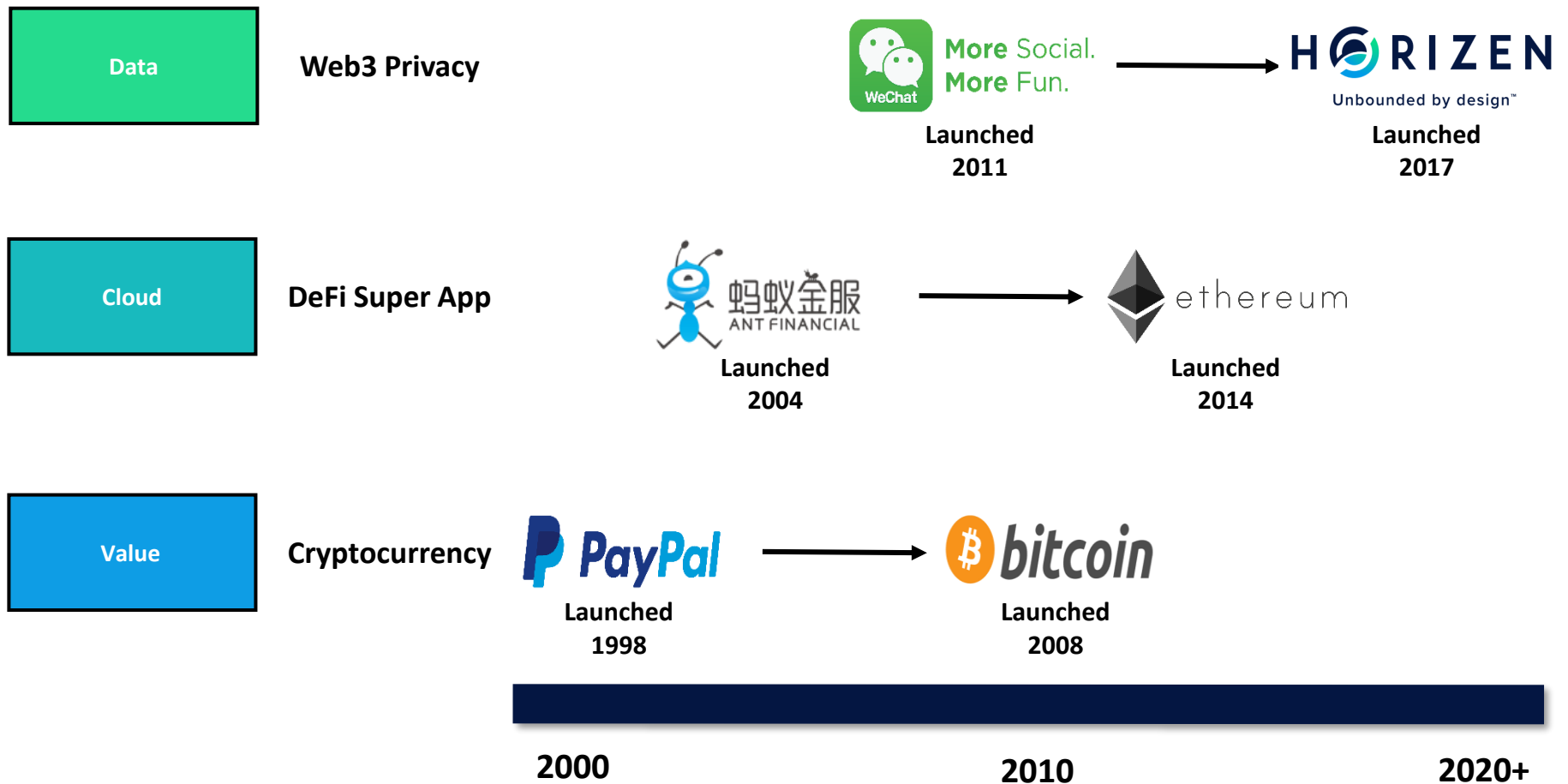


Building a crypto tech platform offering a new evolution beyond currency

cryptonetworks are next-generation, open, global and decentralized versions of internet and financial technology companies. Bitcoin goes beyond PayPal by allowing anyone, anywhere to seamlessly exchange value. Ethereum goes beyond Ant Group by enabling a global ecosystem for broad-based financial services outside of payments (DeFi) on its super app cloud platform.

- Horizen takes past innovations and applies new elements of privacy, user data ownership, and app scalability.
- It's early days, but Horizen offers a glimpse at what a global, decentralized, neutral, permissionless and private version of Tencent's super app platform, WeChat, could look like if successful.

Figure: FinTech transition to decentralized cryptonetworks



Source: Fundstrat

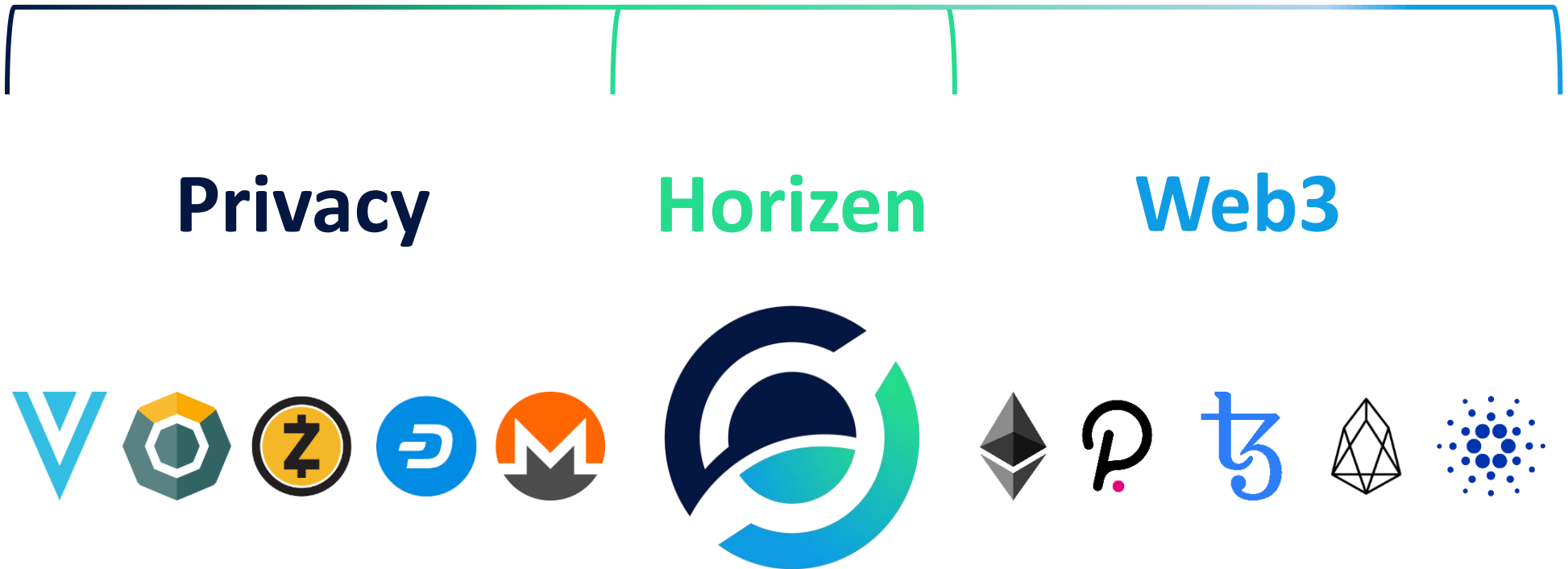


Standing apart as the only live privacy focused Web 3.0 cryptonetwork

Cryptocurrencies have focused on either offering privacy features for payments or distributed computing applications enabling users to build decentralized internet applications (Web 3.0). Horizen bridges both of these worlds.

- **Horizen implements cutting edge zk-SNARKS technology to natively imbed privacy within various layers of the tech stack, while also enabling an open platform of decentralized applications to make use of these privacy features.**

Figure: Privacy and Web3 Platforms



Source: Fundstrat

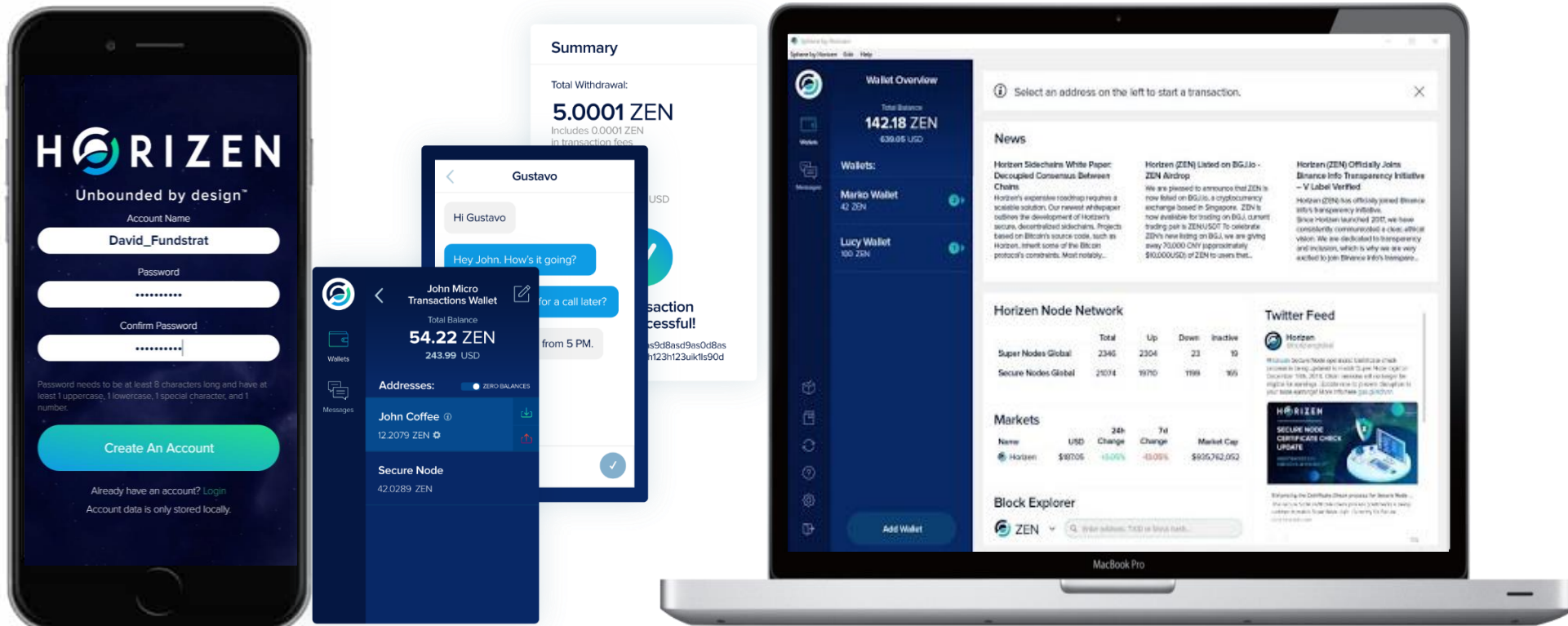


Capable of becoming a crypto super app platform with user-controlled data

Horizen is an end-to-end encrypted application platform through which digital money, messages, and media can be securely and privately transmitted and stored.

- Horizen offers a distributed cloud computing platform for developers to build privacy-preserving applications.
- Horizen is a general purpose, distributed network alternative to the public internet that allows users to control their digital footprint, including how they manage, distribute, and monetize proprietary information and exchange value with one another.

Figure: Horizen Sphere Wallet



Source: Fundstrat, Horizen

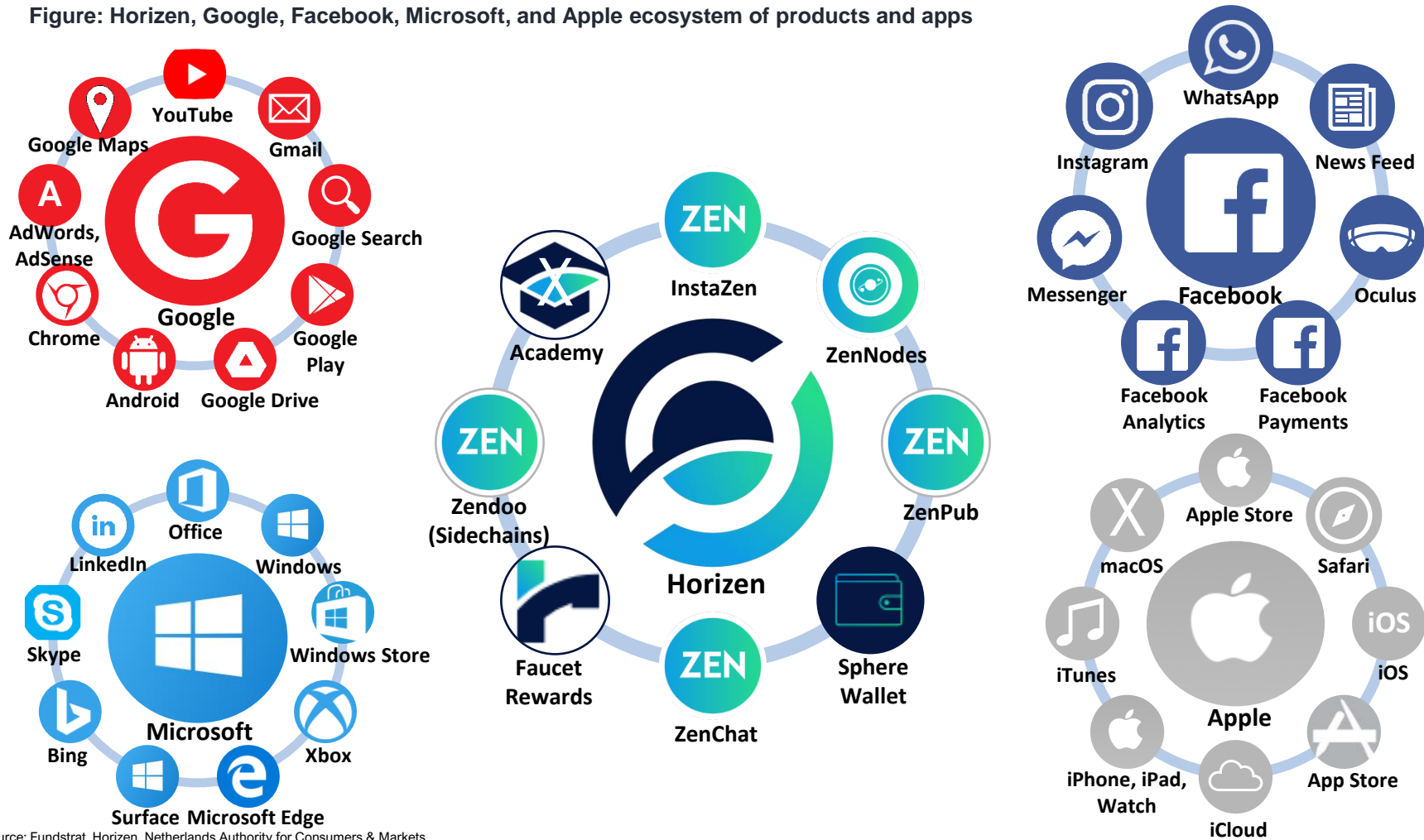


Decentralized application (DApp) ecosystem alternative for Big Tech and Big Data

Google, Facebook, Microsoft, Apple, and other leading tech companies have accrued trillions of dollars in value by building application ecosystems that power our every day lives. By providing many of these services “free” of charge in exchange for our data, leading tech firms have gained competitive information moats that have propelled them to prominence.

- **Horizen’s first cohort of DApps offer secure messaging, developer tools, educational materials, ZEN value transfer, and more. Many more use cases and applications are likely to emerge as the technology matures and ecosystem grows.**

Figure: Horizen, Google, Facebook, Microsoft, and Apple ecosystem of products and apps



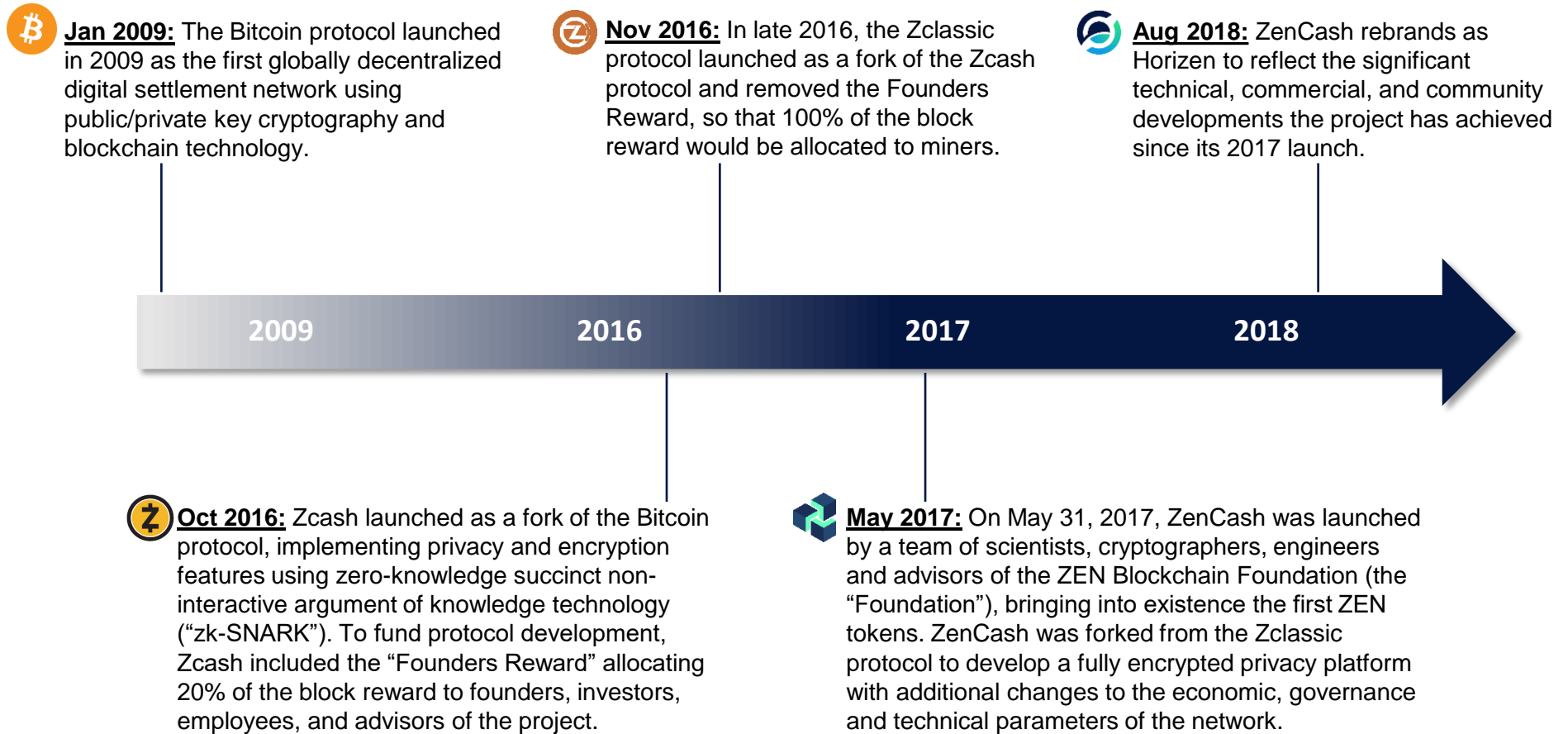
Source: Fundstrat, Horizen, Netherlands Authority for Consumers & Markets



Built on a foundation of cutting-edge privacy enabling cryptographic technology

Horizen evolved and aggregated key elements of the Bitcoin, Zcash, and Zclassic blockchains, preserving the ethos of open source development and privacy but optimizing for unbounded applications.

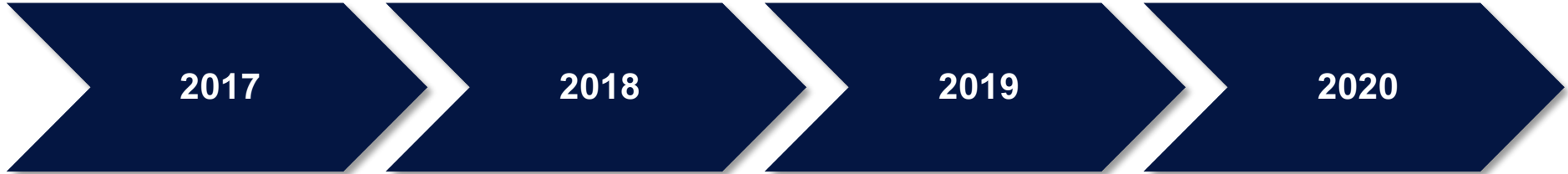
Figure: Horizen network genesis history



Source: Fundstrat, Horizen



Delivering a next generation internet tech platform after 4 years of R&D



Q1

2017

ZenCash Launch

- Forked from Zclassic codebase
- Listed on Bittrex exchange
- Launched full client wallet

Q3

Expanded Privacy Features

- ZenChat Messenger
- TLS/SSL Certificate
- Tor nodes
- Wallets: mobile, web, paper, third-party

Q4

Secure Nodes Live

- First secure & private node system launched
- Block rewards for node operators
- Arizen lite wallet release
- Interim proposal & voting system

2018

IOHK R&D Partnership

- Team expansion
- New website launched and soft rebrand

Transition From Currency To Platform

- Ledger hardware wallet integration
- DAO prototype
- Major blockchain updates

Super Nodes And Brand Expansion

- Expanded brand to Horizen
- Prevention of 51% attack research and development
- Enhanced the Nakamoto Consensus
- DAG scaling prototype
- 30+ partnerships & integrations

Super Nodes Live

- Released flagship app (Radical Usability)
- Began SDK design for sidechains and prototype
- Public Accounting System (Radical Transparency)

2019

Blockchain Improvements

- Successful hardfork – core software upgrade ZEN 2.0.16
- Node tracker & Sphere upgrades
- Sidechain development began
- Launched Horizen Academy

Blockchain Improvements

- Moves to public repository
- Two Sphere by Horizen upgrades
- Merchant directory release

Platform (sidechain nodes lives on testnet)

- Core software upgrade ZEN 2.0.18
- Sphere by Horizen upgrades
- ZEN Faucet upgrades
- Horizen Developer Environment (HDE) began
- Multiple sidechain nodes live on testnet

Sidechain Alpha

- Core software upgrade ZEN 2.0.19
- Sidechain Alpha and began development for Beta
- ZEN Faucet improvements

2020

Sidechain Beta 1Q

- Sidechain Beta 1Q – parallel testnet
- Sphere modifications for sidechains
- Third party ZEN code audit
- HDE beta public testing
- Publish Academy Expert content

Sidechain Beta 2.0

- Sidechain Beta 2.0: mainchain support – parallel testnet
- Block explorer upgrade
- ZEN code audit

Sidechain Beta 2.0

- Sidechain Beta 2.0 move to official testnet
- Academy rewards
- HDE team requests

Sidechain SDK

- SDK + extended model audit
- Publish Voting using ID study
- Academy social badges
- HDE Leaderboard
- HDE proposal system

Source: Fundstrat, Horizen



Offering advanced decentralized computing, privacy and application capabilities

Horizen prioritizes a set of features enabling privacy-preserving decentralized applications, data ownership, scalability, wider stakeholder incentivization, community governance, and developer empowerment & evangelization.

Figure: Horizen key capabilities

<p>Trust & Verifiability</p> <p>Blockchain</p> <p>Open-source, public and immutable technology that replaces the need for many trusted intermediaries</p>	<p>Decentralized Apps</p> <p>Sidechains, Smart Contracts</p> <p>Allow programable decentralized applications (DApps) to be built across a wide range of use cases</p>	<p>Privacy Preserving</p> <p>ZK SNARKS, TLS-SSL Encryption</p> <p>Advanced cryptography techniques allow users to benefit from strong data privacy on and off the network</p>	<p>Data Ownership</p> <p>Private Key Cryptography</p> <p>Users have data ownership and data portability over blockchain apps with private keys ownership</p>
<p>Community Governance</p> <p>DAO Treasury Voting</p> <p>Implementing a community voting protocol to allocate treasury funds</p>	<p>Decentralized & Reliable</p> <p>Secure & Super Nodes</p> <p>Largest decentralized node network among crypto peers offers users a reliable protocol guarantees</p>	<p>Network Security</p> <p>PoW/PoS, Block Delay Penalty</p> <p>Advanced consensus model offers enhanced network security against 51% attacks compared to peers</p>	<p>Interoperability</p> <p>Cross-Chain Transfers</p> <p>Allow for decentralized verification of forward and backward transfers between mainchain and sidechains</p>
<p>Platform Neutrality</p> <p>Open & Permissionless</p> <p>Removes platform risk of building apps on controlled ecosystems with fair app discovery and distribution</p>	<p>Application Scalability</p> <p>Off-Chain Computation</p> <p>Minimal logical is housed on chain using a flexible sidechain approach which allows application scalability</p>	<p>Economic Incentives</p> <p>Stakeholder Monetization</p> <p>Ecosystem monetization incentives for developers, infrastructure nodes and ZEN governance stakeholders</p>	<p>Developer Tools</p> <p>SDKs, Horizen Academy, HDE</p> <p>Resources for abstracting away the complexity of developing and using blockchain apps</p>

Source: Fundstrat, Horizen



Providing an important tool for internet freedom and business DLT adoption

Negative arguments about “cryptocurrency” and “privacy” have been made around illegal activity. However, any technology, back to the development of fire, can be used for good or bad activities.

- **Crypto technology is now being used to empower users with enhanced privacy, internet freedom, and censorship resistant speech, which are requirements for a free, fair and healthy global economy.**
- **Businesses have sensitive data and can only use a public DLT with the optional privacy capabilities Horizen offers.**

Figure: World Wide Web = Web of Worlds Driven by Local Regulation

	Internet Regulation			
	Low			High
	USA	7 Largest EU Economies	India	China
Global Internet User %	8%	8%	12%	21%
Internet Access	<ul style="list-style-type: none"> • Diverse regulatory bodies with varied / distinct powers • Privately-owned telecom infrastructure accessible to nearly all residents 	<ul style="list-style-type: none"> • Diverse regulatory bodies with varied / distinct powers • Privately-owned telecom infrastructure accessible to nearly all residents 	<ul style="list-style-type: none"> • Diverse regulatory bodies, many with power to regulate access • Government initiative to increase internet access & usage as a 'public good' 	<ul style="list-style-type: none"> • Central government bodies with strong regulatory power • High government ownership / control of network infrastructure with ability to regulate access
Content Regulation	<ul style="list-style-type: none"> • Virtually no content filtering & strong free speech protections • No political censorship, strong protection for hosts of user-generated content 	<ul style="list-style-type: none"> • Limited content filtering & free speech protections • Limited political censorship, some liability for hosts of user-generated content 	<ul style="list-style-type: none"> • Event-driven content filtering often without direct public input with some speech protection • Some censorship, generally to remove 'insulting content' 	<ul style="list-style-type: none"> • Strong content regulation & no expectation of speech protection • Regulation to 'create a more harmonious digital society'
User Regulation	<ul style="list-style-type: none"> • Some legal privacy protections related to government collection of user data • Limited regulation on encryption / secure communication 	<ul style="list-style-type: none"> • Strong legal privacy protections related to any collection of user data • Limited regulation on encryption / secure communication 	<ul style="list-style-type: none"> • Some legal privacy protections related to government collection of user data • Required government approval for encryption / secure communication 	<ul style="list-style-type: none"> • Ability to collect user data for regulatory purposes • Required government approval for encryption / secure communication
Legend Limited Regulation Moderate Regulation Strong Regulation				



“If crypto is libertarian, AI is communist. The future of the computer age will be more decentralized or more centralized.”

– Peter Thiel

“I don’t call it artificial intelligence; I call it Alibaba intelligence.”

– Jack Ma



Source: Fundstrat, Bond Internet Trends Report 2019

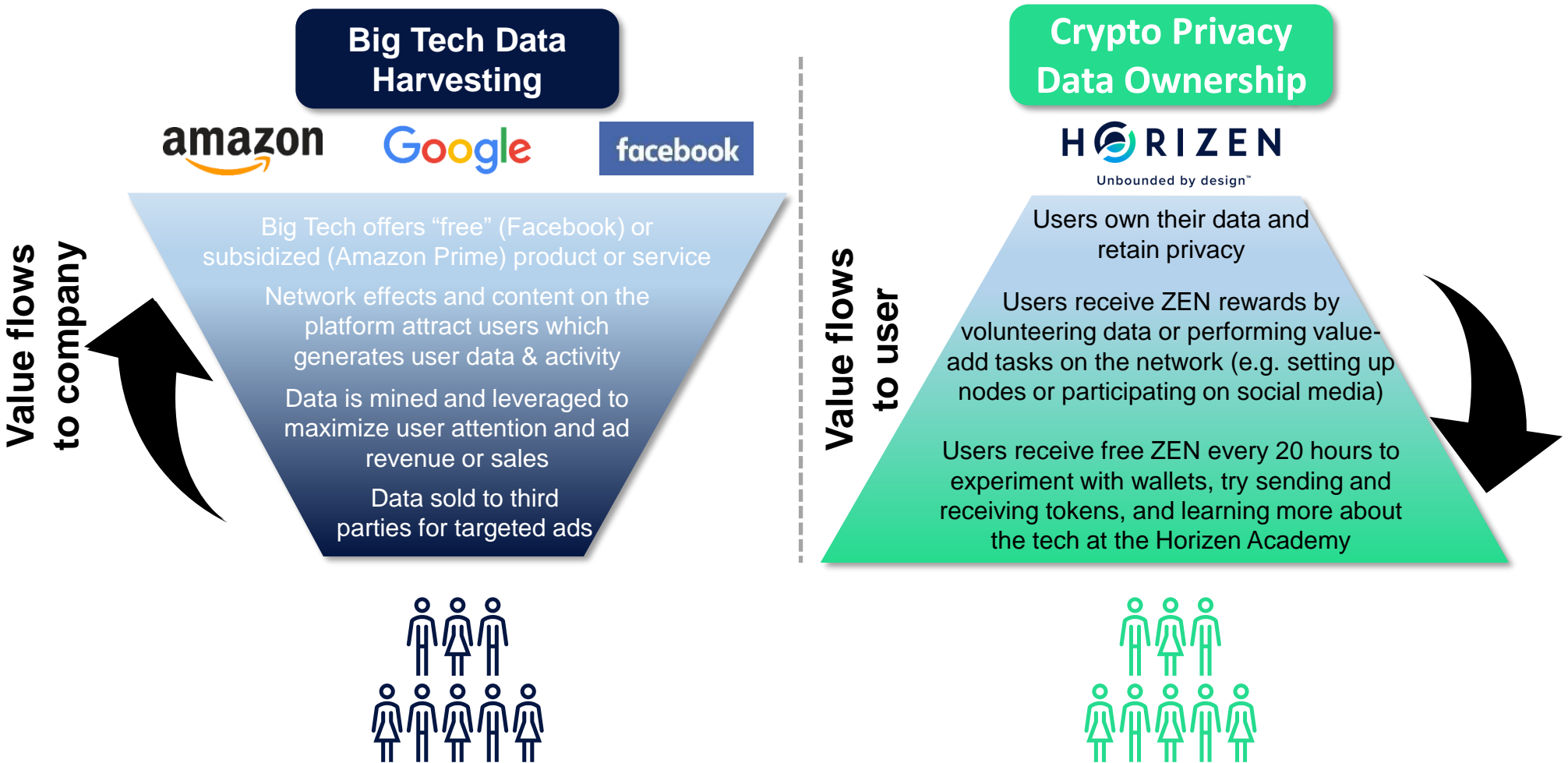


Vision of inverting the platform and user data business model paradigm

cryptonetworks like Horizen have vision of flipping the user value extraction and data harvesting paradigm on its head by rewarding users that volunteer their data or perform value-added functions on the network.

- Horizen is experimenting with new business models enabling users to retain ownership of their data & privacy and get compensated for sharing data and utilizing the network, which would offer a paradigm shift from Amazon, Google, and Facebook profiting by mining user data.

Figure: Big Tech vs Crypto business models and value accrual



Source: Fundstrat, Horizen



Massive TAM that spans old and new information network applications

The internet enabled global communication at light speed, near zero cost and with better service that improved on existing telephone carrier business, but it also delivered a wave of unimagined innovations like Facebook, Uber, Bitcoin and others.

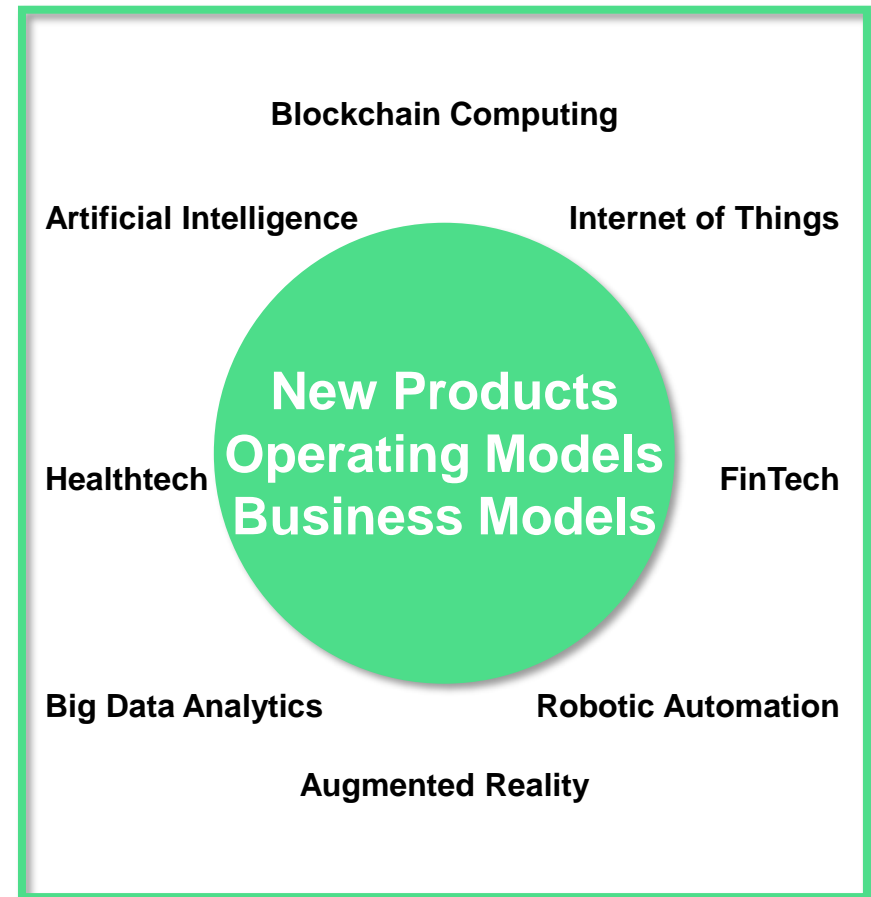
- **Cryptonetworks will likely offer solutions for a wider set of unimagined use cases across AI, IoT, automation, healthtech, Big Data analytics, and others. Ultimately, no one knows precisely what new use cases and novel business models open cryptonetworks will unleash; however, multi-trillion-dollar markets seem likely to emerge.**

Figure: Horizen TAM use case categories

Technology Optimization



Unbounded Innovation



Source: Fundstrat



Executive Summary

Horizen Introduction

Market Opportunity

Network Technology

Ecosystem Growth

Investment Potential

Appendix Information



Big tech has been growing by absorbing legacy industries

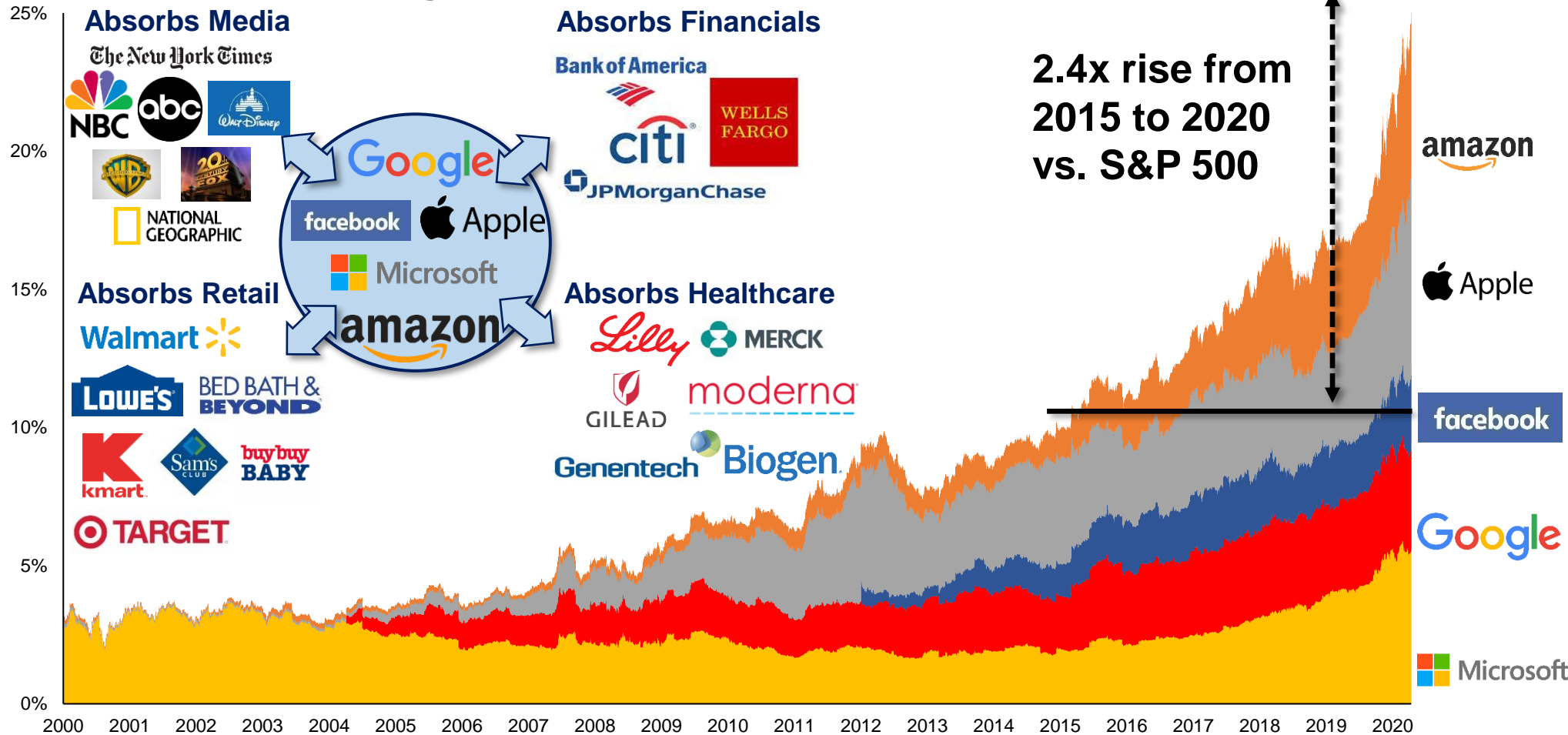
FAAMGs (Facebook, Amazon, Apple, Microsoft & Google) Big Tech stocks have been darling children of investors as they've risen to new heights. The five largest tech companies now comprise 25% of the total S&P 500 market cap, as they expanded into new verticals and gained market share across the economy from media, retail, financial, healthcare and other industries.

- **No business paradigm has lasted forever, and as time goes on, we're increasingly more likely to see a shift. As Big Tech sits at new heights, it's worth asking – will these same platforms remain dominant a decade from now?**

Figure: Top 5 Big Tech companies share of S&P 500 Market Cap

Date: 2000 – 2020

Big Tech Share of S&P 500 Market Cap



Source: Fundstrat, Bloomberg



Early innings of crypto tech platforms absorbing Big Tech

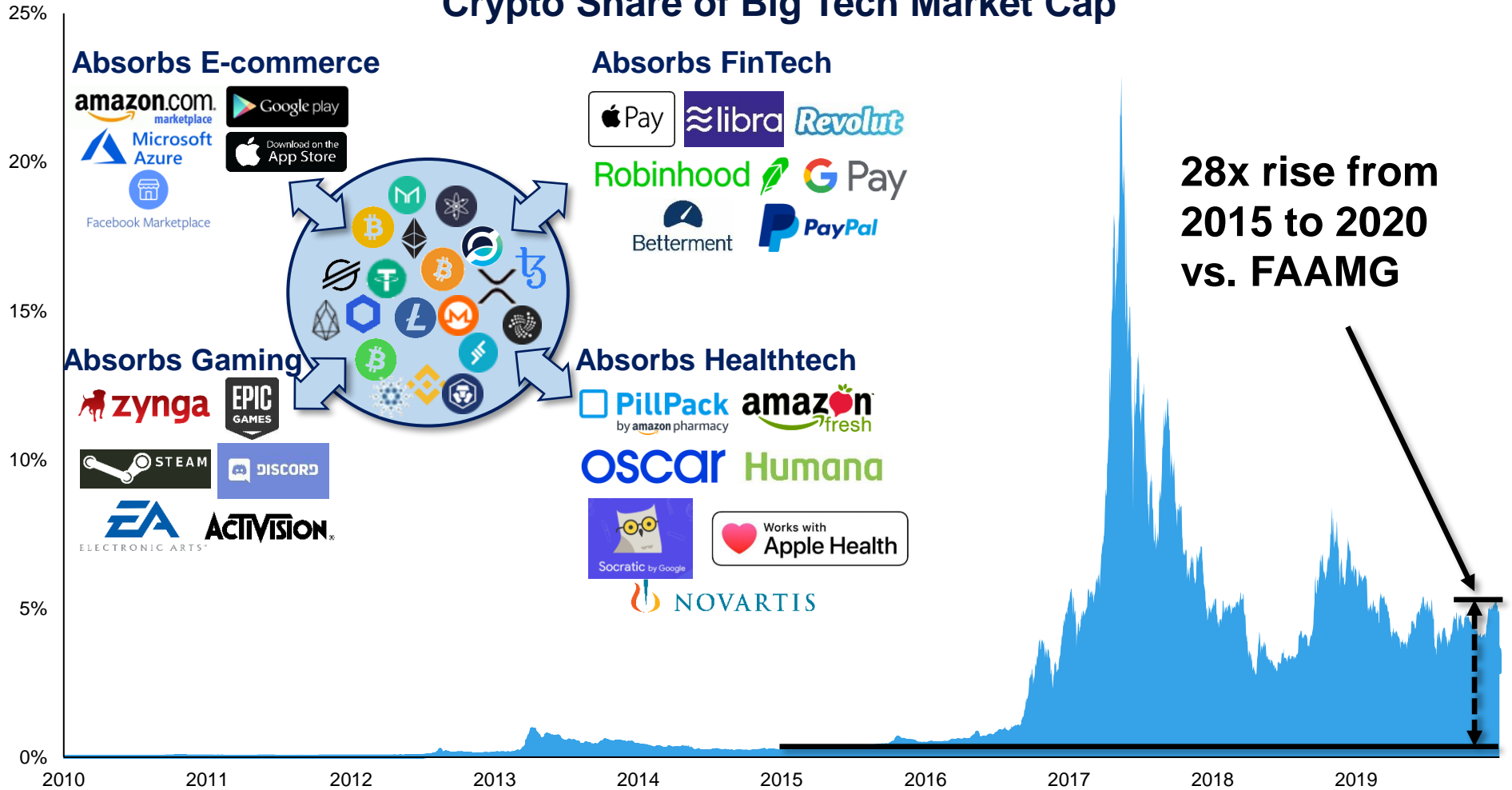
Cryptonetworks today resemble the early days of the internet. Much like the dot.com era, crypto has seen rapid growth and volatility, while innovation continues to accelerate. Over the same time that the largest tech companies grew in dominance, the market cap of public cryptonetworks grew even faster, rising 28x vs. FAAMG Big Tech over the same 5-year time period.

- **Cryptonetworks aiming to disrupt Big Tech have been rapidly gaining in market value and look set to absorb share across e-commerce, fintech, gaming, healthtech, and other technology-related industries.**

Figure: Cryptonetworks share of Top 5 Big Tech Market Cap

Date: 2010 – 2020

Crypto Share of Big Tech Market Cap



Source: Fundstrat, Bloomberg

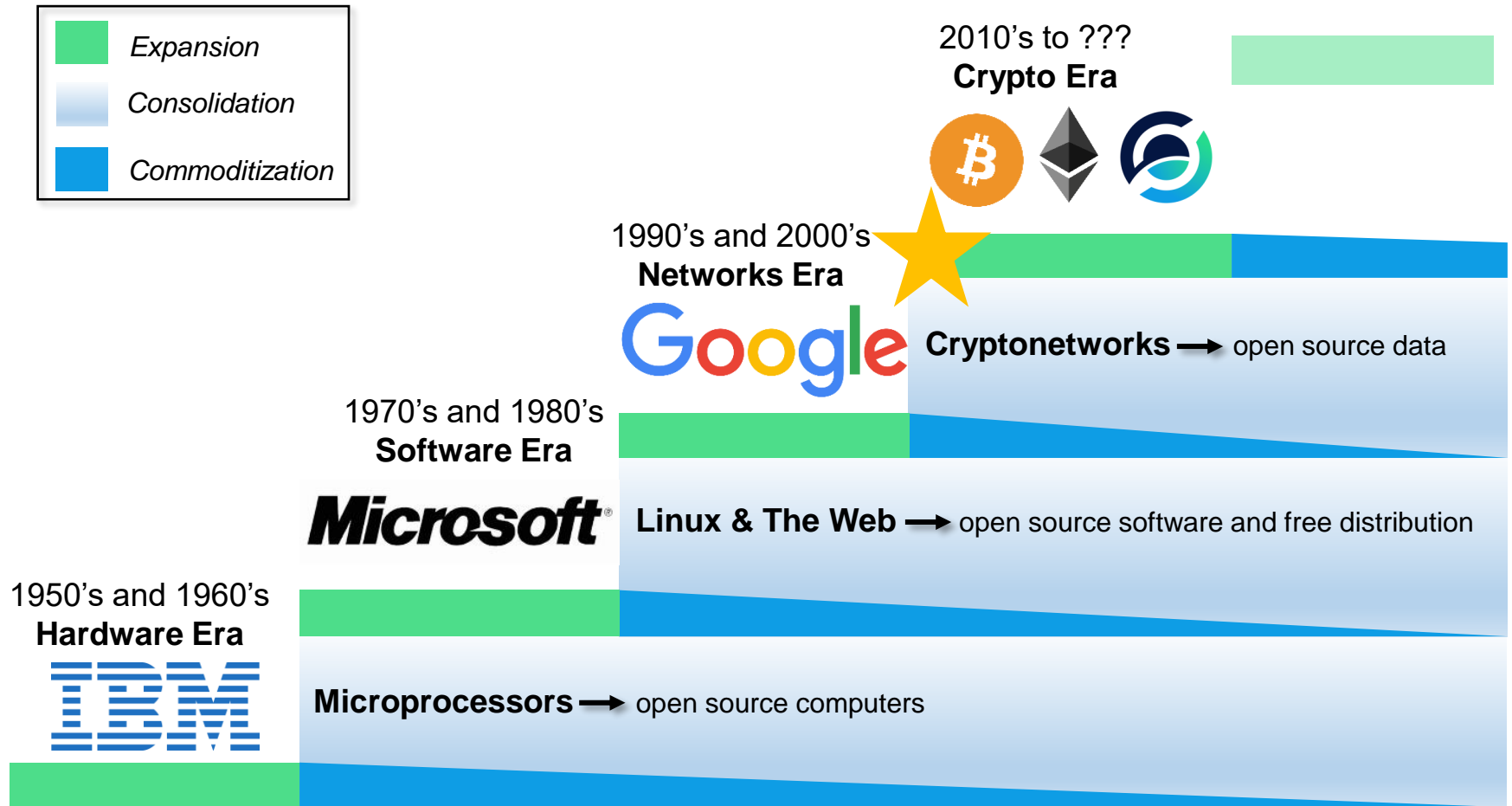


Offering the next wave of tech innovation and growth

Every phase of information technology has experienced periods of expansion, consolidation, and commoditization as new layers of the technology stack were developed and went on to capture value from the layers below.

- **The Crypto Era represents the newest phase of this technological trend as emerging cryptonetworks are challenging incumbent Big Tech companies.**
- **Cryptonetworks are building upon the Networks Era and replacing many applications that fall under the category of “information networks,” which include many of the largest companies, with decentralized protocol alternatives.**

Figure: Evolution of Tech Innovation



Source: Fundstrat, Placeholder Ventures

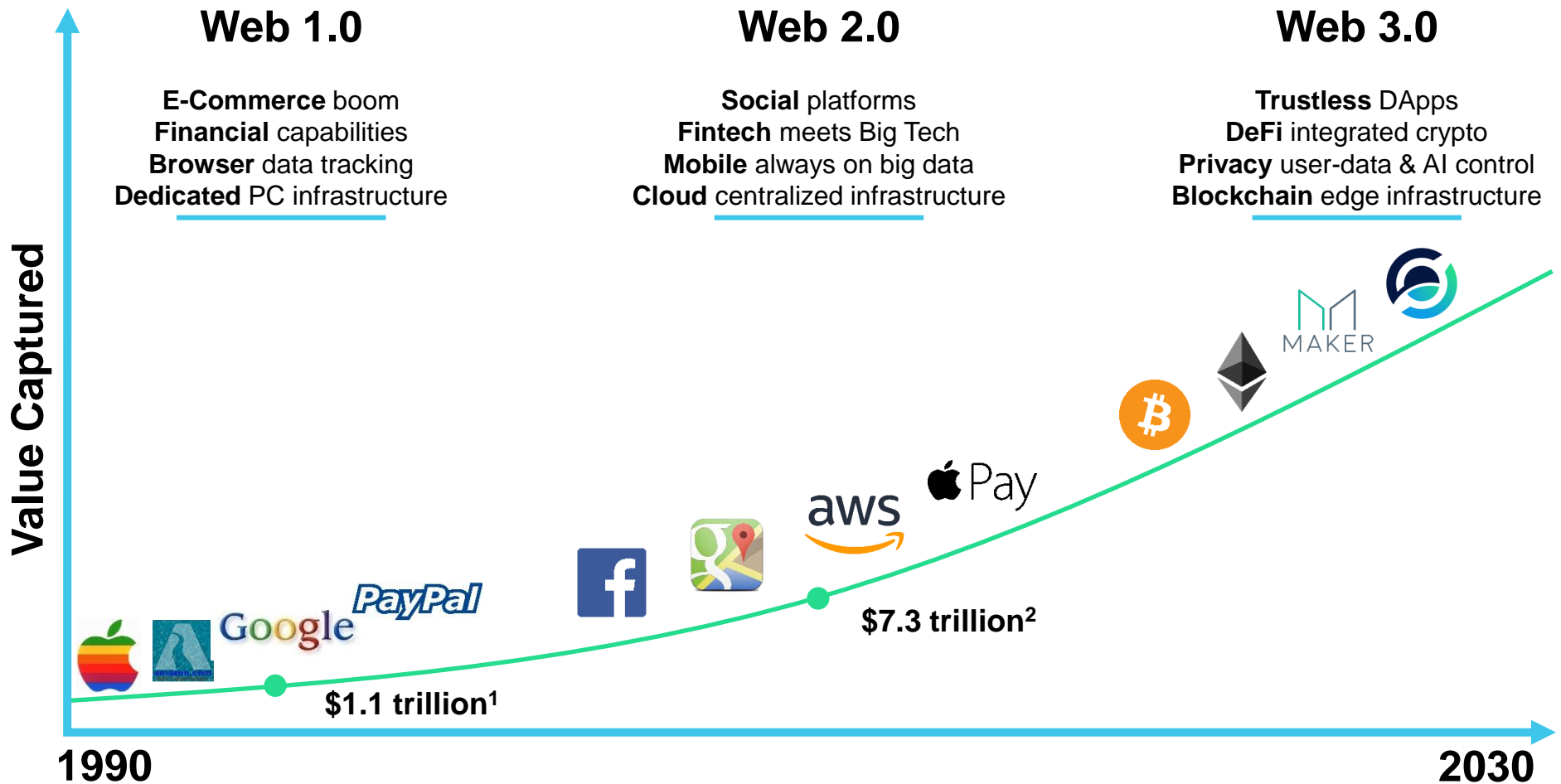


Building platforms for the next era of the web

The internet continues to evolve. Web 1.0 PC networks connected us online, search browsers gave us access to information, e-commerce sites gave us shopping at the click of a button, and payment gateways gave us a trusted way to transact. Web 2.0 social networks connected us into e-commerce communities, mobile devices gave data to us and about us all the time, cloud algorithms analyzed our data to tell us who to listen to and what to buy, fintech and our data got built into every interaction.

- **Web 3.0 blockchain networks give us connected edge computing, trustless protocols give us community-owned platforms, privacy tech gives us control over data and AI, crypto gives us DeFi natively imbedded into the internet.**

Figure: Evolution of the Web



Source: Fundstrat, Fabric Ventures Inspired, (1) Internet companies market cap as of 2000, (2) Big Tech market cap as of 8/25/2020



Web 3.0 alternative internet architecture

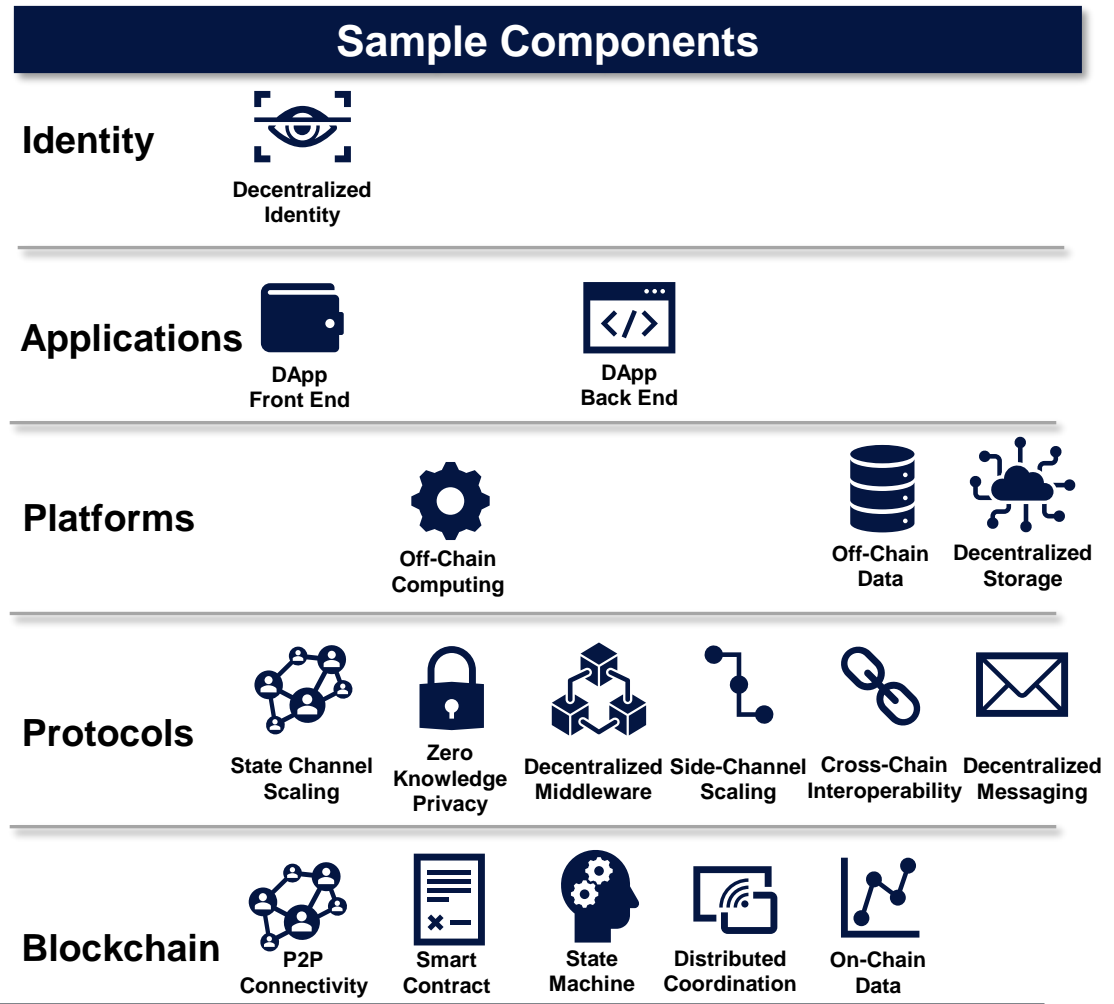
Web 3.0 refers to a vision for a better internet. Many in crypto view this as a future that restructures power and control over the web away from dominant companies to level the playing field for 3rd-party developers, creators, and businesses. Entrepreneurs are using a group of technologies routed around crypto/blockchain computing to extend the internet stack to the application layer, in order to replace centralized companies with decentralized, community-governed, open data protocols (like TCP/IP or HTTP).

- **Web 3.0 is a vision for a better internet that replaces: application gatekeepers with unstoppable DApps on community protocols, dominant cloud providers with an edge computing architecture, data-monopolies with user-owned identity.**

Figure: Example of Decentralized Web Stack

Web 3.0 Internet Features:

- Users are in control of their data & identity
- Displaces platform intermediated interactions (Amazon, Facebook, Google, Uber, etc.).
- Build on blockchain technologies:
 - Trust verification
 - Privacy-preserving and interoperable protocols
 - Decentralized infrastructure and application platforms
 - Decentralized identity



Source: Fundstrat, Gartner

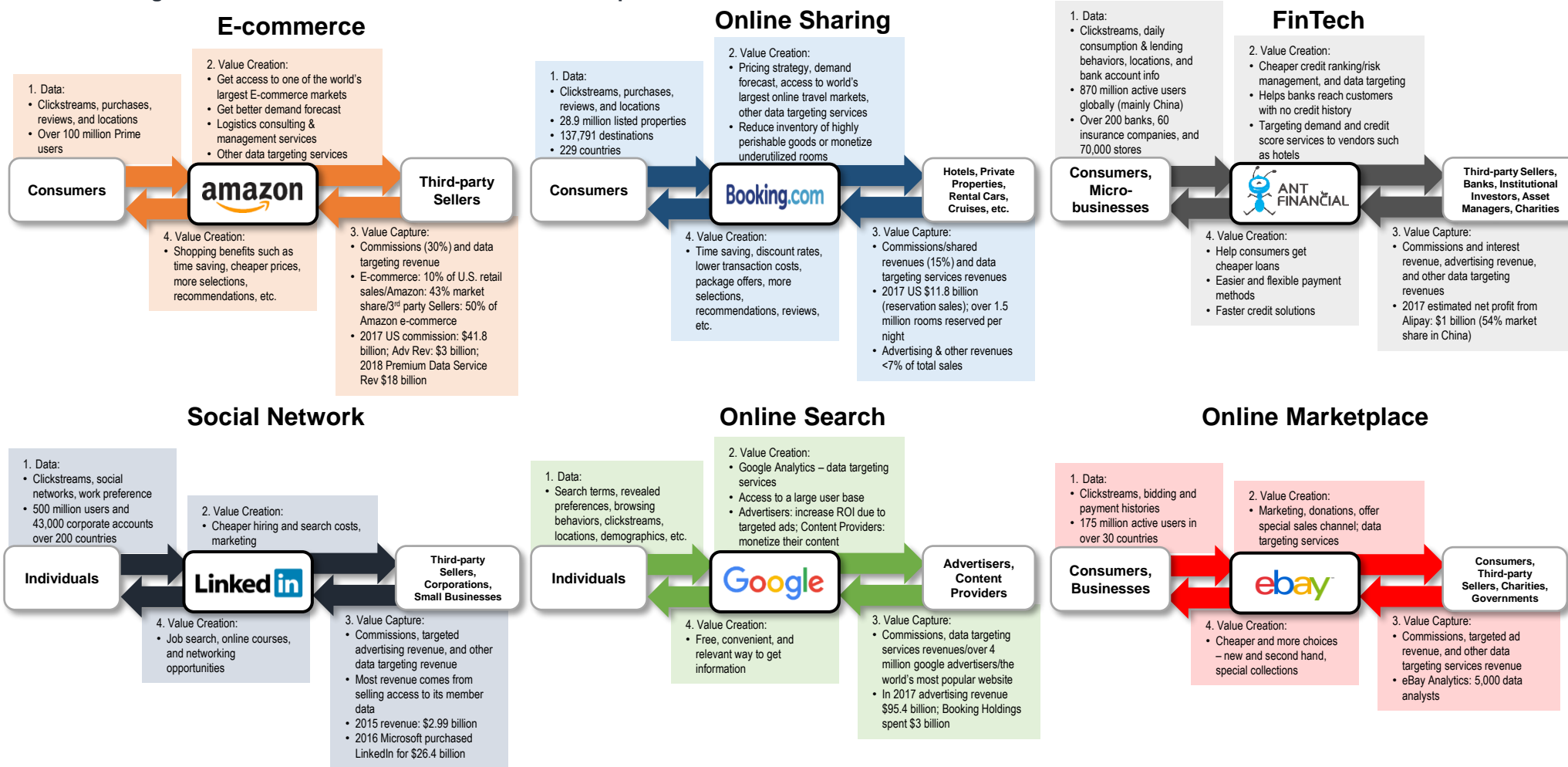


Data-based platform company business models exposed

We're living in an information economy where data is the new oil. Business models for many of the largest companies today across a range of industries involve brokering information. Data platform companies gain an advantage by offering a free/low-cost product/service, acquiring large user bases, gaining large sums of data, and monetizing that data and attention through advertising, hefty third-party seller commissions and sometimes by selling their own products in place of their customers.

- **Web 3.0 cryptonetworks are being built to disintermediate data-based information network application providers.**

Figure: Data-based internet business model examples



Source: Fundstrat, Bureau of Economic Analysis (BEA)



Crypto protocols disintermediating platform providers

Cryptonetworks will provide similar information-based products and services and connect customers with suppliers but remove the need for an intermediating middleman.

- **When the value-extracting middleman is disintermediated, that value flows back to the user in the form of increased consumer surplus.**

Figure: Illustrative simplified example of crypto protocol application flow



Source: Fundstrat



Leading Big Tech platforms see writing on the wall

In 2017, amid the Initial Coin Offering (ICO) frenzy, it may have been reasonable for skeptics to overlook the viability of cryptonetwork business models. However, you'd have to seriously question that view today after some of the most sophisticated Big Tech companies have announced intentions to move in that direction.

- **Moves by Facebook (Libra) and Twitter (Bluesky) offer validation that decentralized cryptonetworks offer viable business models for delivering technology products and services capable of disrupting the existing paradigm.**

Figure: Crypto-related moves by Twitter and Facebook



jack @jack



Twitter is funding a small independent team of up to five open source architects, engineers, and designers to develop an open and decentralized standard for social media. The goal is for Twitter to ultimately be a client of this standard. 🧵

51.4K likes 10:13 AM - Dec 11, 2019

16.5K people are talking about this



Source: Fundstrat, Twitter

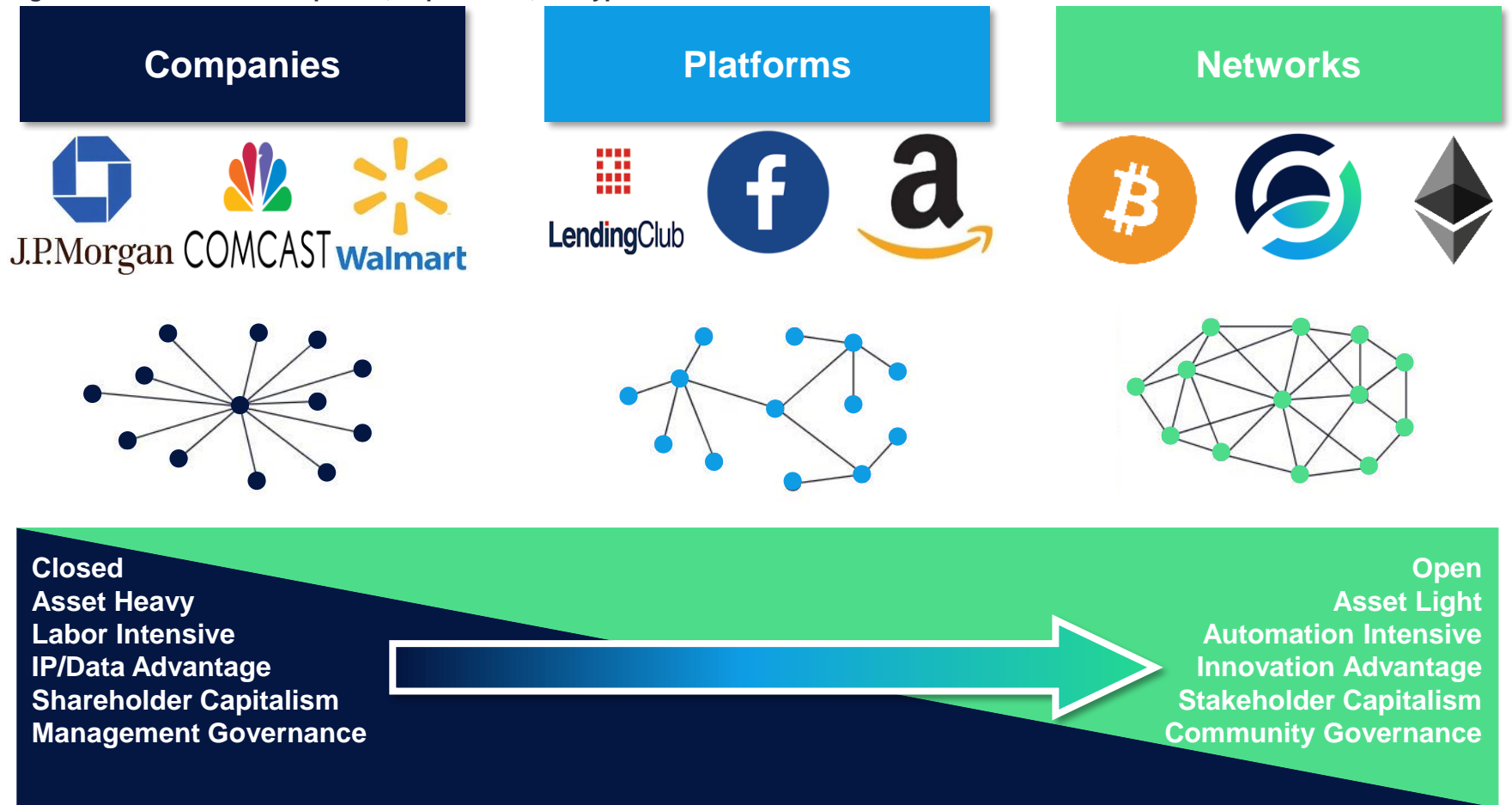


Next generation organizational tech business models

Seen as the progression from companies to platforms and now to cryptonetworks, it's easier to grasp how decentralized organizations without legal employees, physical assets, proprietary IP or hierarchical decision-making is a natural evolution. From balance sheet heavy bank loans, to P2P platforms, to decentralized systems of credit; from content production, to user-generated content, to user-controlled media algorithms; from physical retail, to e-marketplaces, to decentralized exchanges.

- **cryptonetworks are a natural evolution of many tech platform business models today; as Facebook changed media, FinTech-banking, Amazon-retail, Uber-transportation, AirBNB-lodging, we believe cryptonetworks will do the same.**

Figure: Transition from companies, to platforms, to cryptonetworks



Source: Fundstrat



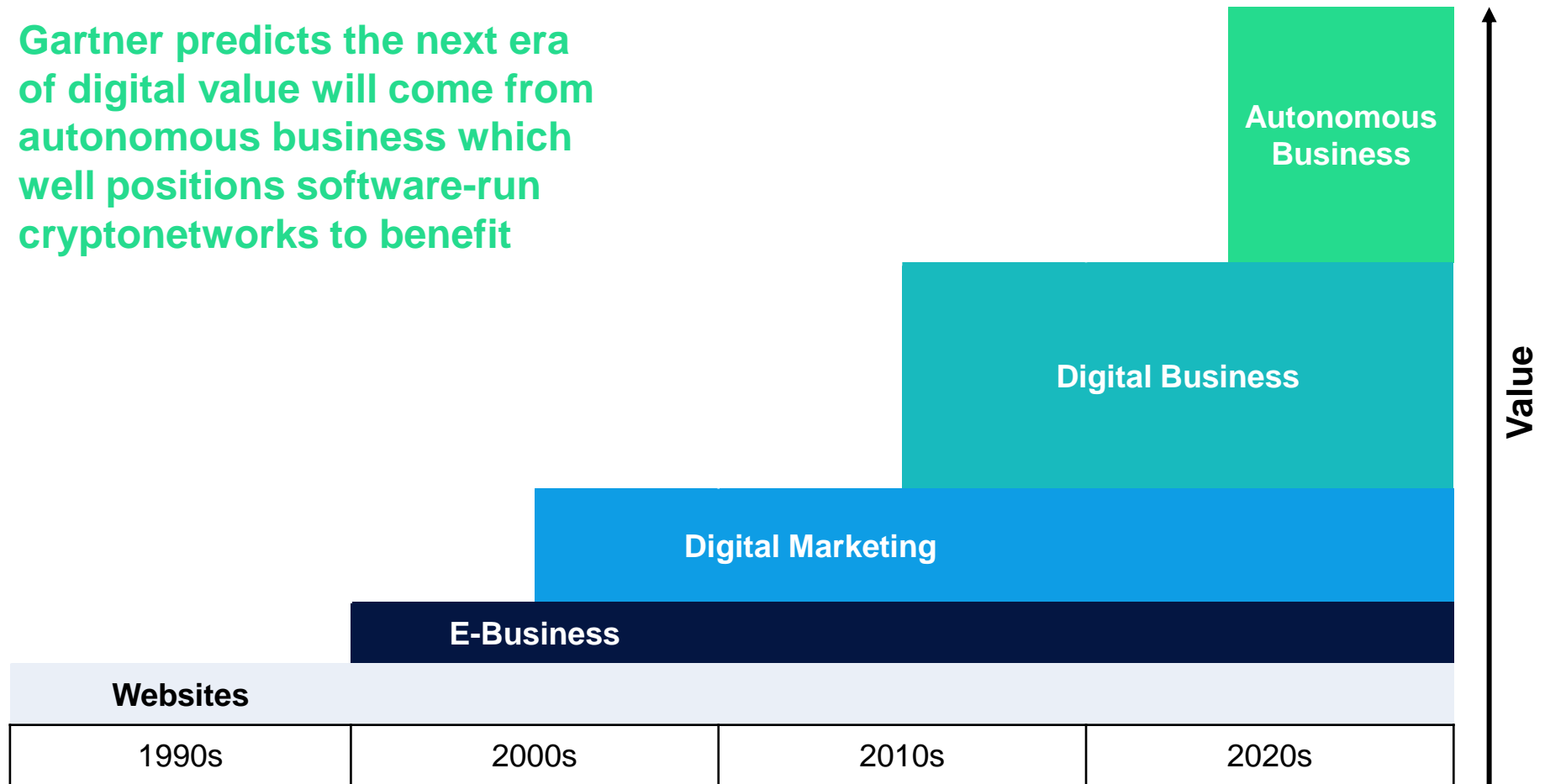
Operating as digital to the core autonomous software businesses

Cryptonetworks are new forms of software enabled tech companies, often called Distributed Autonomous Organizations (DAOs). Using software automation systems for network rules, DAOs enable open and decentralized governance, coordinated management-like decision making, stakeholder value distribution, and the delivery of technology products and services.

- **Cryptonetworks take us from cloud companies to companies in the cloud operating as autonomous software entities.**
- **Processes built into consensus programming of users across the network are what enable them to coordinate in a decentralized permissionless manner and deliver innovative software-based business solutions on a global scale.**

Figure: Gartner Digital Innovation

Gartner predicts the next era of digital value will come from autonomous business which well positions software-run cryptonetworks to benefit



Source: Fundstrat, Gartner

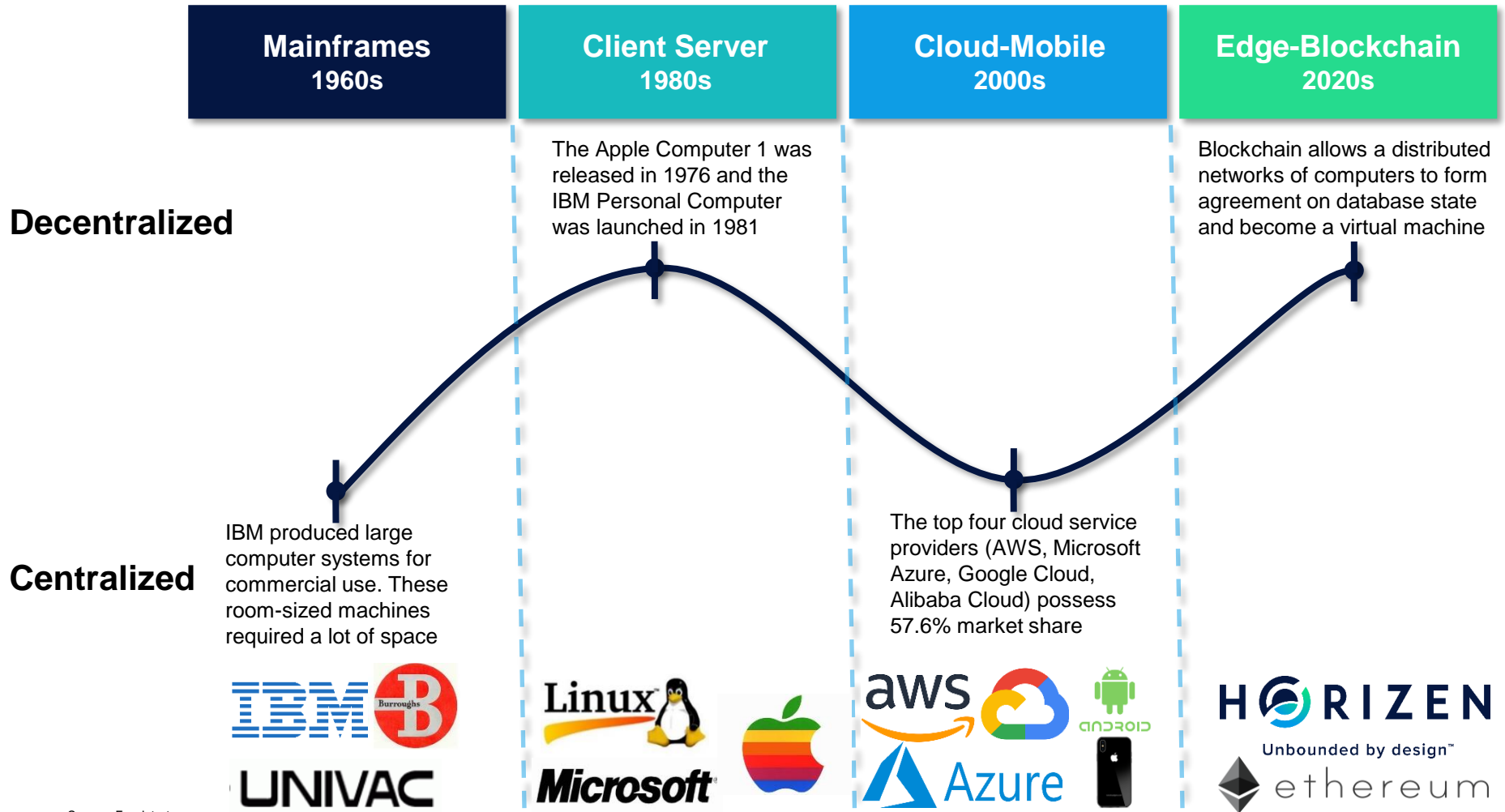


Built on decentralized infrastructure that advances cloud computing

Blockchain protocol software is run atop global networks of computers forming them into a unified distributed autonomous cloud organization for building, hosting and deploying new types of decentralized applications (DApps).

- **Computing platforms have moved in cycles from centralization to decentralization as new innovations emerged, with the dominant platform lagging the prior by ten years; furthering this trend, we are now entering the age of blockchain computing.**

Figure: Computing platform shifts



Source: Fundstrat



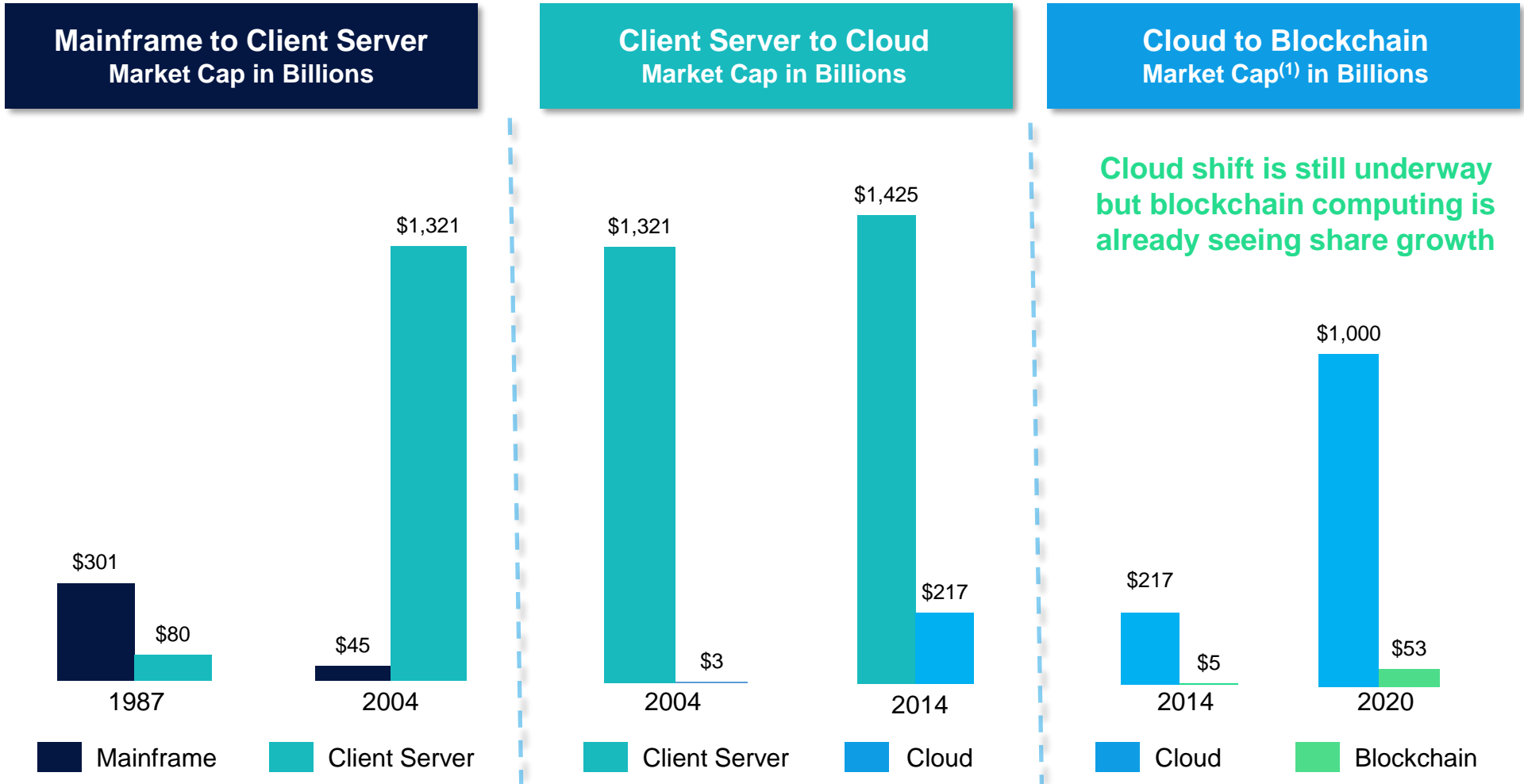
Set to capture cloud application value and the next wave of growth

Many investors today are focused on the meteoric rise of the cloud as COVID has driven economy wide digital transformation. Yet, understanding the past and using those insights to position for the future is important. As computing platforms moved from mainframe to client server to cloud, shifts created value and resulted in value transfer from one generation to the next.

- **Cloud computing remains on the rise (4.6x last 6 years), but blockchain computing platforms are increasing much faster (19x last 6 years), and the trend of capturing share from the cloud looks set to continue.**

Figure: Computing Platform Value Shifts

\$ billions



Source: Fundstrat, Salesforce, Bessemer Cloud Report 2020, (1) 2020 Blockchain Market Cap represents FS Crypto Platform Index Market Cap; 2014 Blockchain Market Cap represents total crypto market cap, Coinmarketcap.

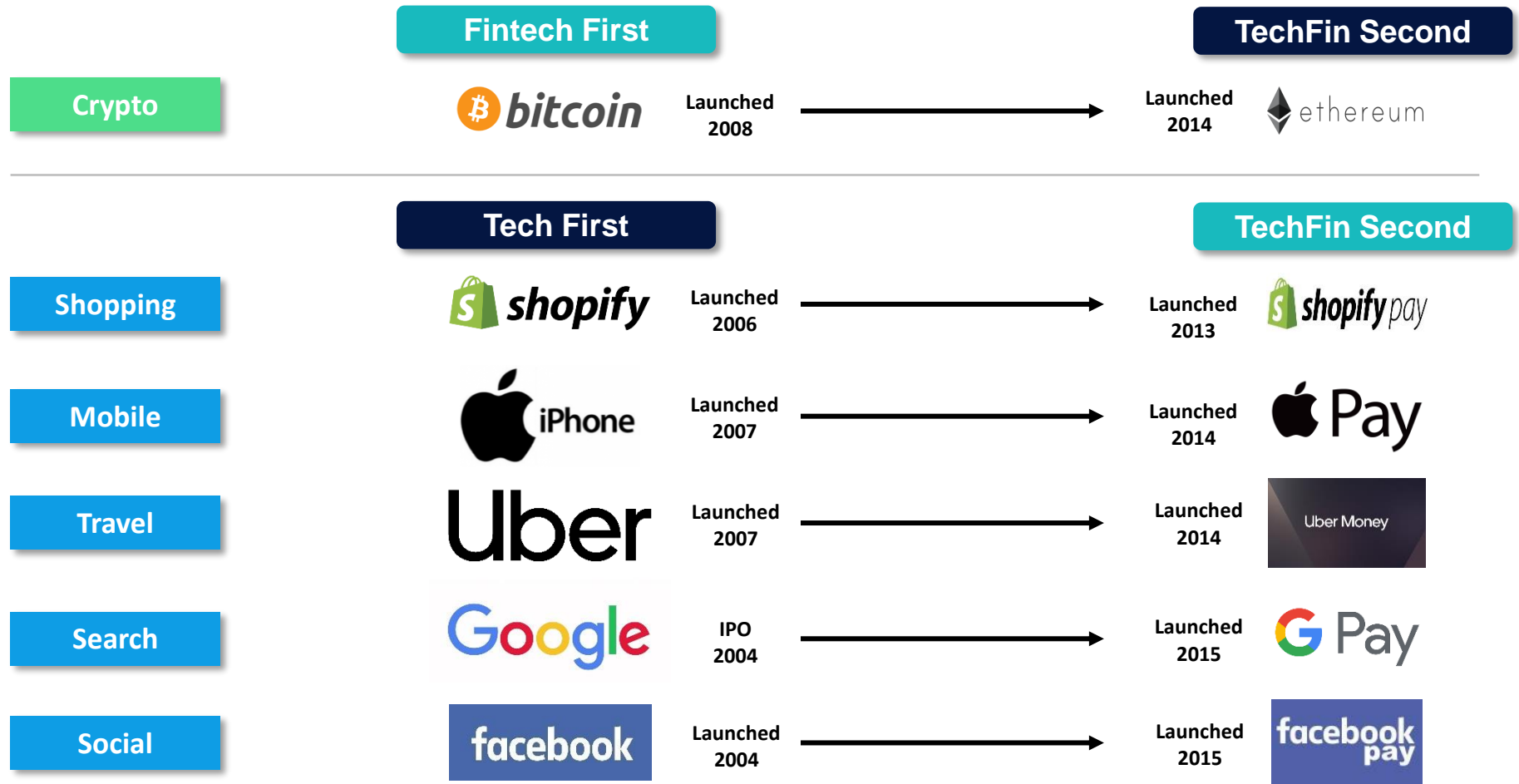


Fintech capabilities natively integrated as crypto's first but not last killer app

At the time Bitcoin launched in 2008, many misunderstood the technological shift towards, and value of financial systems natively imbedded in the internet. From this fintech-first crypto design principle, Ethereum emerged in 2014 as a computing platform for programable applications targeting many traditional tech incumbents. At the same time, we saw a fusion of tech becoming fintech, as companies realized benefits of embedded financial service models for monetizing existing customers.

- **Natively imbedded crypto Decentralized Finance (DeFi) moves legacy fintech beyond “doing radio on TV” and allows internet financial services to reach their full potential through integration within crypto app ecosystems.**

Figure: Tech and fintech convergence



Source: Fundstrat

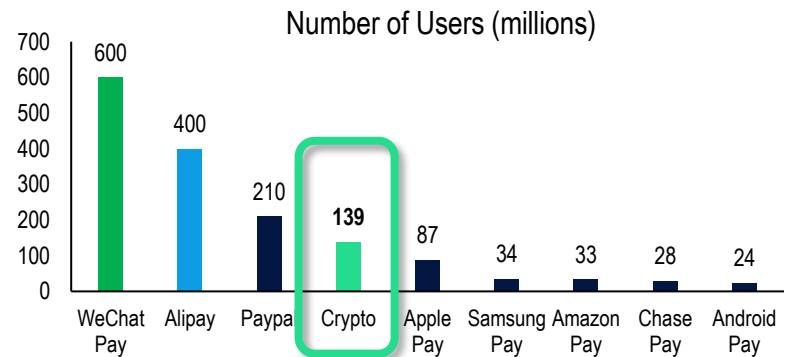
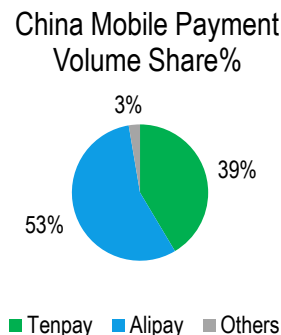
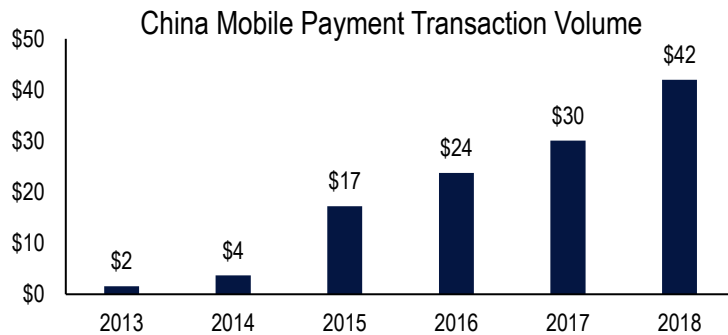


Crypto "currency" becoming Alipay & WeChat Pay internet app ecosystems 2.0

Asian tech giants Alibaba and Tencent have produced powerful all-in-one ecosystems for nearly every part of consumer life. Integrated within their apps are dominant payment business that have made many envious U.S. tech giants follow suit. Many hear "crypto" and misunderstand the "currency" value proposition. cryptonetworks transmit payments, but platforms like Ethereum and Horizen are building ecosystems where value flows seamlessly between apps, like Alipay or WeChat Pay.

- cryptonetworks' imbedded "currencies" offer payment interoperability within their application ecosystems, much like Alipay and WeChat Pay, but using a natively digital form of value tied to that economy.

Figure: Alipay & WeChat Pay ecosystems and payment data



Source: Fundstrat, Financial Times, Octopus Media, iResearch, Bloomberg, Cambridge Global Crypto Benchmarking Study 2018

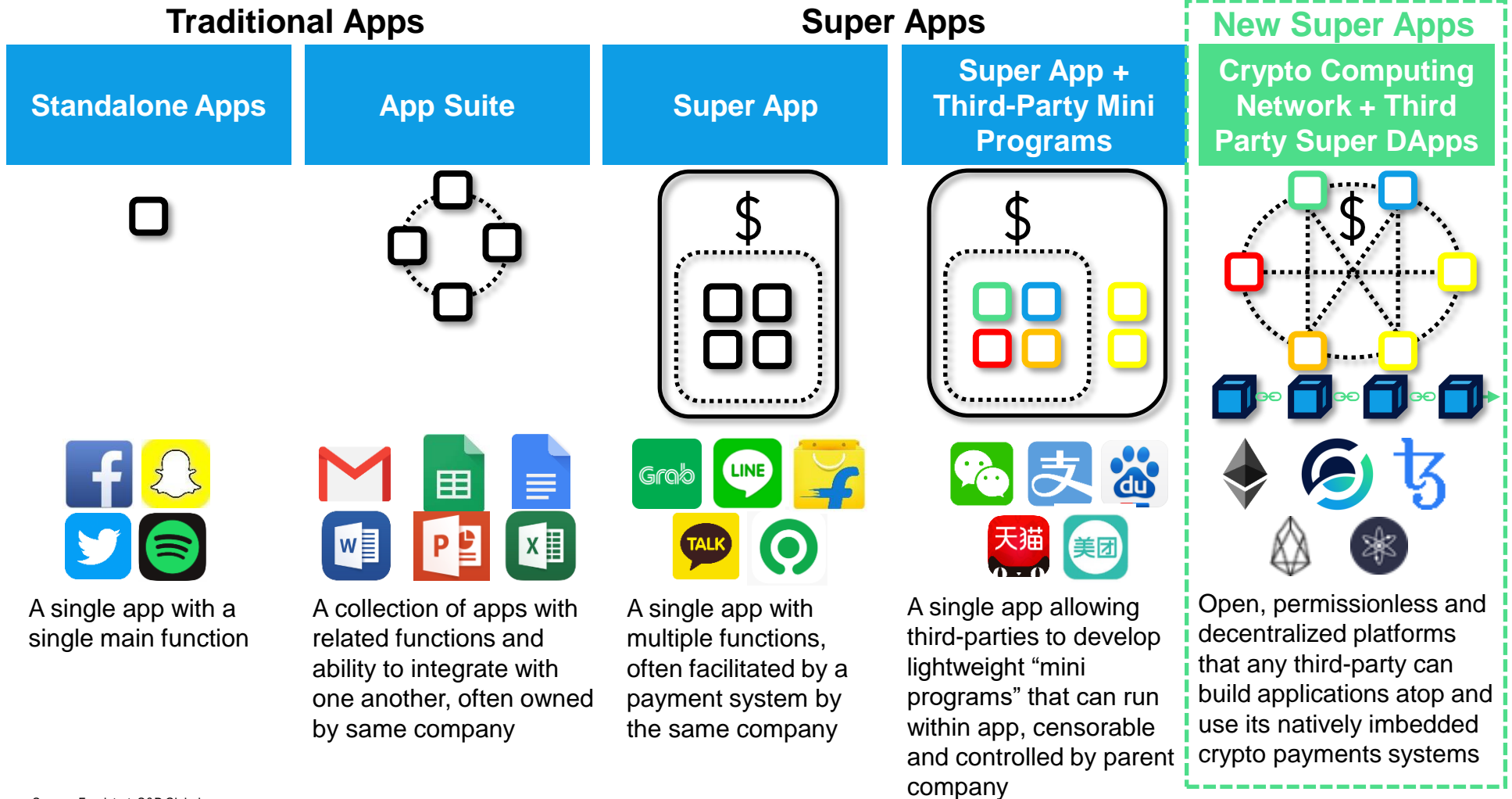


Creating decentralized fintech and e-commerce crypto super app platforms

Chinese tech companies have broken down barriers and have been much quicker than U.S. competitors to offer “swiss army knife” solutions with single apps providing social media, banking, online shopping, food and grocery delivery, taxi hailing, healthcare, and other products and services - cryptonetworks could one day do the same.

- **Crypto computing networks look capable of becoming new super app platforms, enabling versatile app products atop an open, permissionless and decentralized architecture, with natively imbedded financial capabilities.**

Figure: Progression from traditional apps to new crypto-native super apps



Source: Fundstrat, S&P Global



Crypto DApp ecosystems forming that already resemble global tech giants

As with the early days of the internet, crypto challengers to Big Tech are still maturing. Many parts of crypto today are slow and clunky, difficult to use, not feature rich, and only appealing to highly technical users - but so was the early internet. Today, we can already see blossoming ecosystems of innovation emerging across many segments dominated by Big Tech.

- **Distributed Application (DApp) ecosystems being built today by Horizen and others already offer a glimpse at what the future of internet products and services could look like without Big Tech.**

Figure: Big Tech, Crypto & Horizen Super App Product Offerings

Businesses Application	Big Tech App Example	Crypto DApp Example	Horizen DApp Future
Digital Media Publishing Messaging Online Games Search Advertising Content Distribution			
E-Commerce App Store Marketplaces			
Cloud Services Developer Training Software Tooling Cloud Infrastructure			
Fintech Services Digital Wallet Digital Payments Saving & Investing Borrowing & Lending Digital Insurance			

Source: Fundstrat, Horizen








FAAMG enterprise value essentially ~70% users, data & IP

The real value of a blockchain is in its network value – as users on the network grow, the value of the network should rise exponentially. Much of FAAMG value is derived from network value as well given tangible assets represent only ~14% of EV.

- **FAAMG value is approximately 68% intangibles (excluding brand 18%) which one could argue are largely related to users, data & IP, demonstrating the opportunity for disruption and value capture by cryptonetworks.**

Figure: FAAMG Intangibles Ex-Brand
\$ millions

Company	EV	Tangible Assets					Intangible Value Estimates		Users, data & IP value estimates		
	Enterprise Value	PP&E	Prepaid Expenses	Deferred Tax Assets	LT Assets	Current Assets ex-Cash	Intangible Value	Intangibles EV%	Brand Value	Intangibles ex-brand	Intangibles ex-brand EV%
	800,412	44,783	1,852		-	47,146	706,631	88%	189,000	517,631	65%
	1,879,350	37,378			105,341	113,975	1,622,656	86%	352,000	1,270,656	68%
	1,611,458	97,846			-	60,242	1,453,370	90%	220,791	1,232,579	76%
	1,490,813	52,904		6,405	2,965	168,339	1,260,200	85%	119,595	1,140,605	77%
	932,060	84,587		721	13,078	134,080	699,594	75%	324,000	375,594	40%
FAAMG Composite	8,139,826	347,672	15,402	10,914	176,250	560,989	7,028,599	86%	1,487,586	5,541,013	68%

Source: Fundstrat, Bloomberg, Brand Finance: Global 500 Report, Visual Capitalist



Over 50% of FAAMG revenue or ~\$530B could be at risk of crypto disruption

It's possible that \$532B or 56% of total FAAMG revenue¹ could one day be at risk of cryptonetwork disruption. Of that value, advertising comprises \$217B or 41%, with cloud computing comprising \$125B or 24%. Other revenue streams possibly at risk include third party seller services, subscription services, and other digital goods and services more likely to be classified as information network or data-based or software applications.

- As cryptonetworks gain prominence, they may replace many of the digital goods and services Big Tech offers today.

Figure: FAAMG revenue streams at risk
\$ millions

facebook		Apple		amazon		Microsoft		Google		FAAMG	
Segment	Revenue	Segment	Revenue	Segment	Revenue	Segment	Revenue	Segment	Revenue		
Advertising	73,284	Services (Apps, Music, Maps, Cloud, etc.)	52,624	AWS Cloud	43,232	Server & Cloud Services	36,768	Google Advertising	119,468	More Likely	
				3rd-Party Seller Services	72,780	Office & Cloud Services	33,864	Google Cloud	12,028		
				Subscription Services	24,072	Windows	21,412				
				Other (Advertising)	16,884	Gaming	10,168				
						Advertising	7,964				
						LinkedIn	7,636				
Combined	73,284	Combined	52,624	Combined	156,968	Combined	117,812	Combined	131,496	Combined	532,184
Share%	98%	Share%	22%	Share%	44%	Share%	89%	Share%	86%	Share%	56%
Other	1,464	Products (iPhone, iPad, etc.)	186,116	Online Stores	183,584	Enterprise Services	6,180	Google Other	20,496	Less Likely	
				Physical Stores	3,774	Devices	4,808	Hedging gains	604		
						Other	3,420	Other Bets	592		
Combined	1,464	Combined	186,116	Combined	198,680	Combined	14,408	Combined	21,692	Combined	422,360
Share%	2%	Share%	78%	Share%	56%	Share%	11%	Share%	14%	Share%	44%
Total Revenue	74,748	Total Revenue	238,740	Total Revenue	355,648	Total Revenue	132,220	Total Revenue	153,188	Total Revenue	954,544

Source: Fundstrat, Bloomberg, (1) Q2 2020 Annualized Revenue

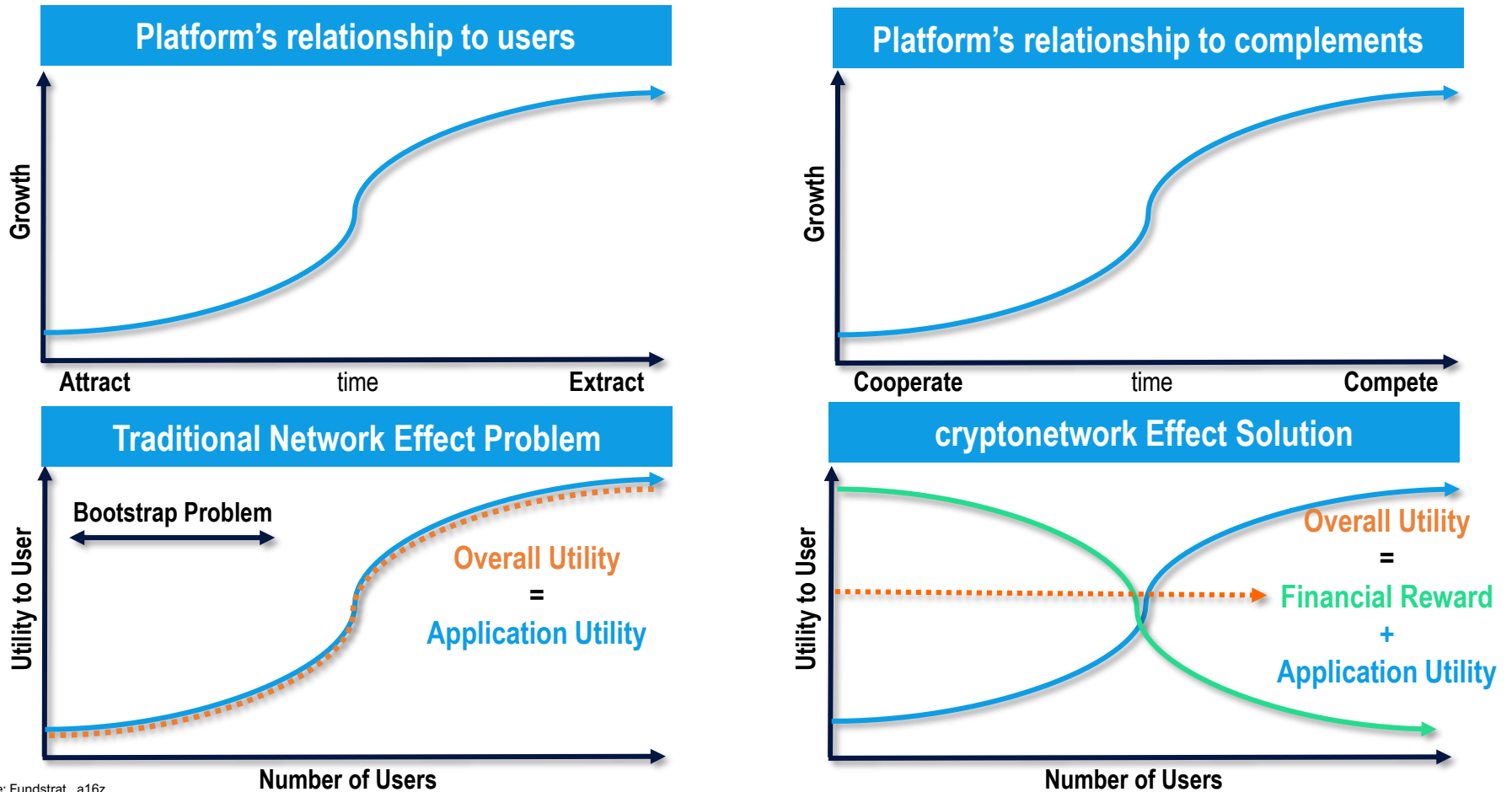


Capturing a tipping point of users is critical but crypto has strong incentives

Network effects are critical for platform businesses. When Facebook launched in 2004, it had to attract a large user base by doing what was best for users, but now that it's reached billions of users, the dynamic has shifted to value extraction. Likewise, Zynga's games attracted users to Facebook, but the platform later changed terms of service and launched Facebook games. Facebook's user base makes it nearly impossible to create a traditional competitor today, but crypto offers a unique solution.

- **Cryptonetworks create network effects by giving users platform ownership and control over its rules; Bitcoin's few early users in 2010 bought BTC at ~\$0.08 and saw the value of their investment increase in tandem with the growth of the network size and its utility.**

Figure: Big Tech vs Crypto business models and value accrual



Source: Fundstrat, a16z

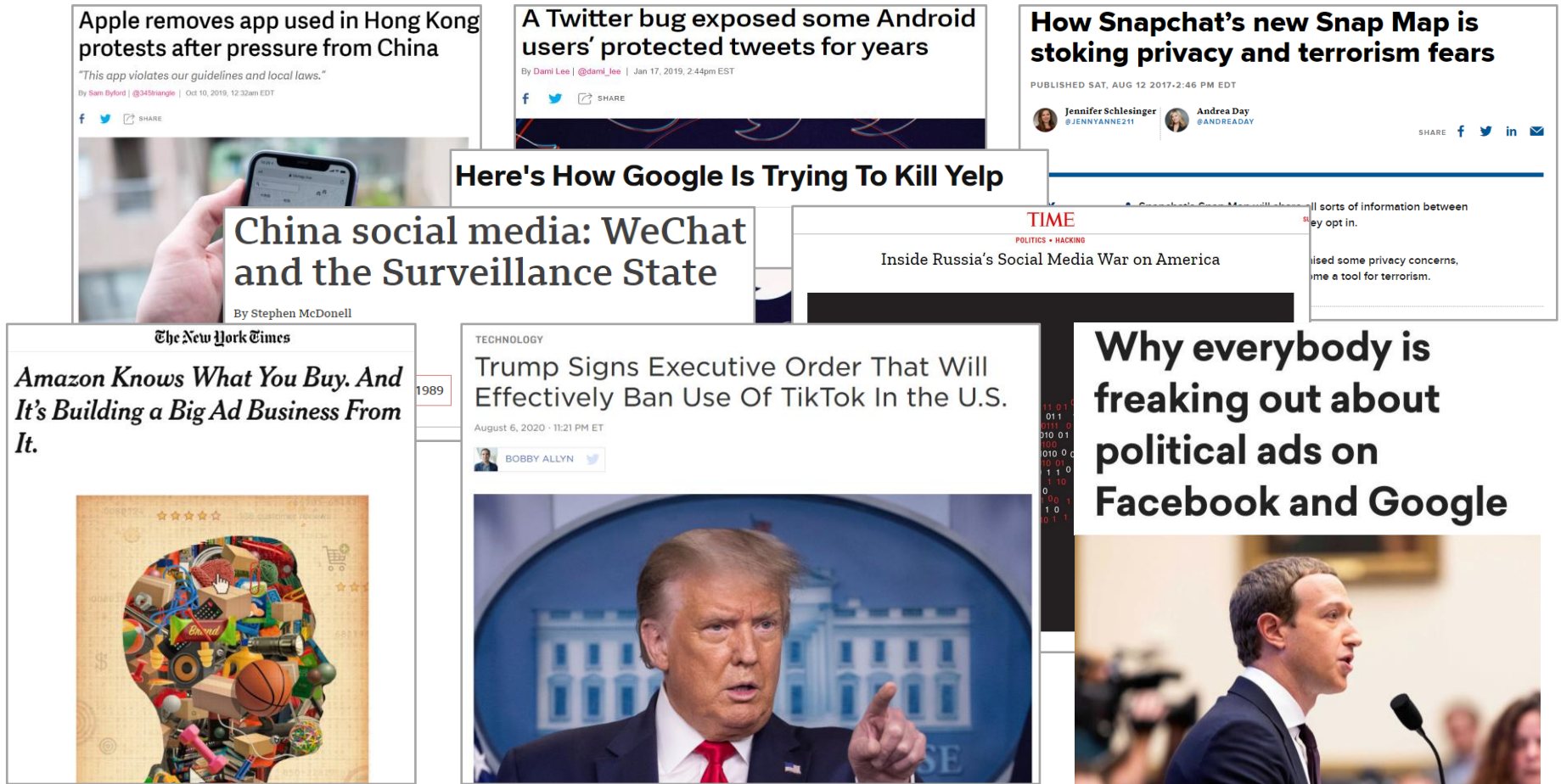


Social headwinds facing Big Tech offer macro catalysts for a shift to crypto

Big Tech platforms are facing several challenges that could act as macro catalysts for crypto adoption and growth. From GDPR data privacy in the EU, to monopoly power hearings on Capitol Hill, to democrat and republican platform politicization struggles, to an intensifying U.S. China tech cold war, to internet freedom globally - Big Tech has big problems that may pay off for crypto.

- **Winds of change are blowing against Big Tech, and cryptonetworks that offer solutions to society's most pressing issues stand ready to benefit by a move: from consumer data intrusion to user-controlled privacy, from tech antitrust to trusted stakeholder capitalist networks, from politically regulated social media to community-controlled platform protocols, from a de-globalizing splinternet to borderless digital economic growth, from web censorship to freedom.**

Figure: Big Tech Controversies

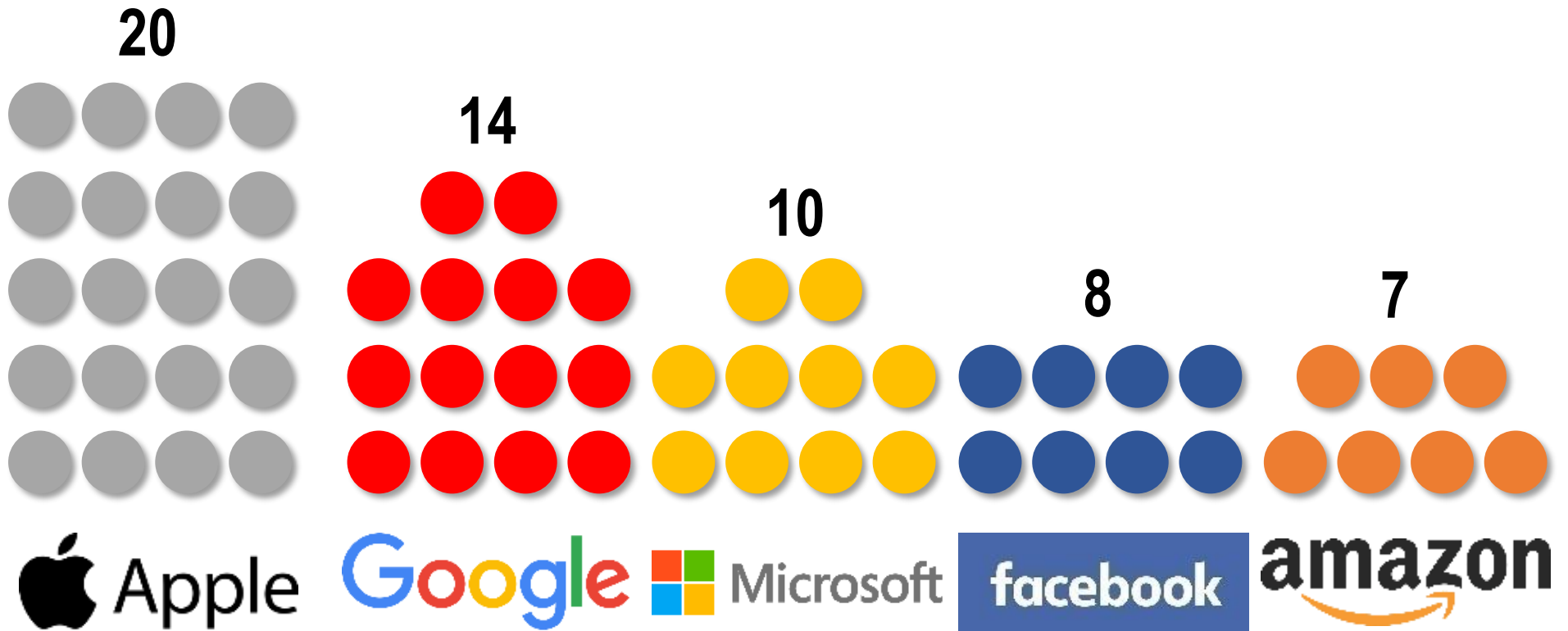


Source: Fundstrat, Internet



Will any of the current U.S tech giants make the leap from big data to crypto first?

Number of Artificial Intelligence startups acquired since 2010



Source: Fundstrat, CB Insight



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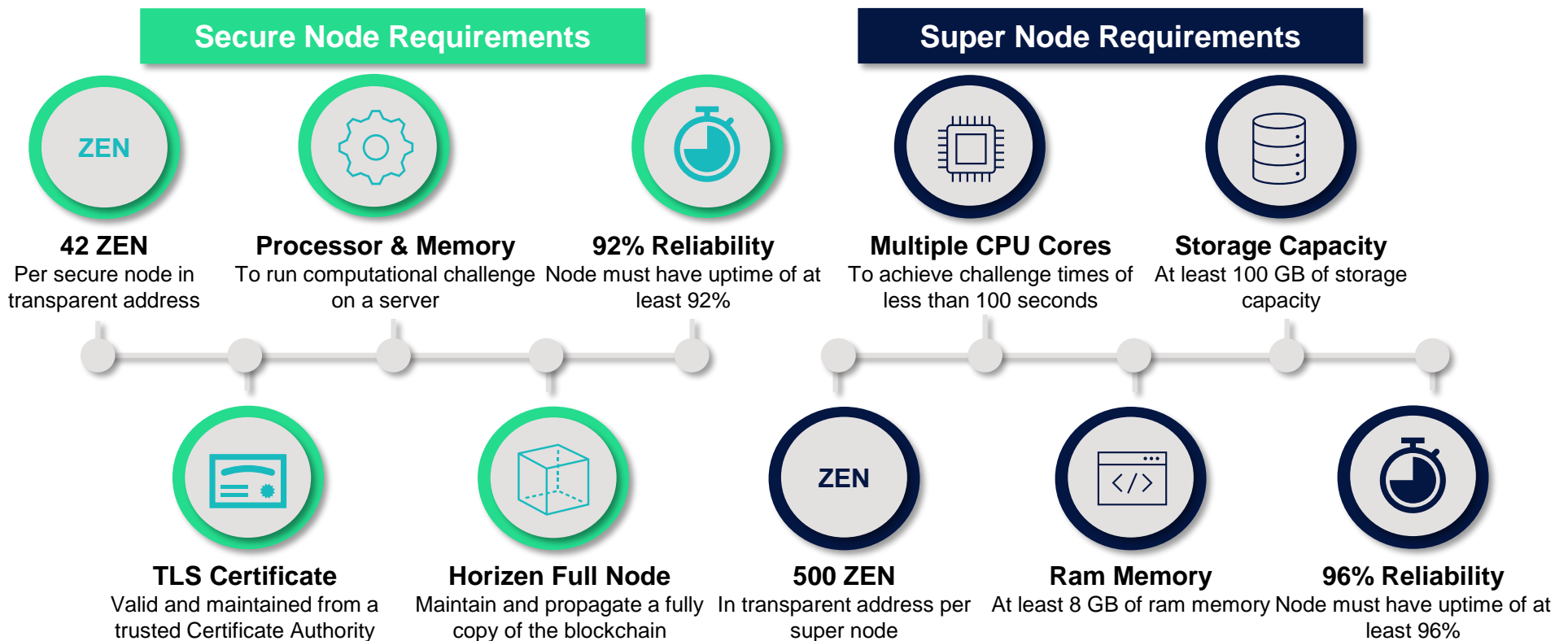


Secure Nodes and Super Nodes form the network's infrastructure backbone

Horizen's node network operates like a decentralized Uber, but for computers, using software to form a single cloud. The node system, comprised of secure nodes and super nodes, forms the basis of a unique compensated blockchain network providing privacy-enhancing encryption and sidechain functionality (for application optimization and customization).

- **Secure nodes ensure security, privacy, and integrity of communication between nodes on the mainchain and super nodes allow for sidechains and platform applications. Horizen's minimum requirements will likely converge towards those offered by traditional cloud providers just as less powerful PCs disrupted mainframes.**

Figure: Secure Node and Super Node requirements



Source: Fundstrat, Horizen

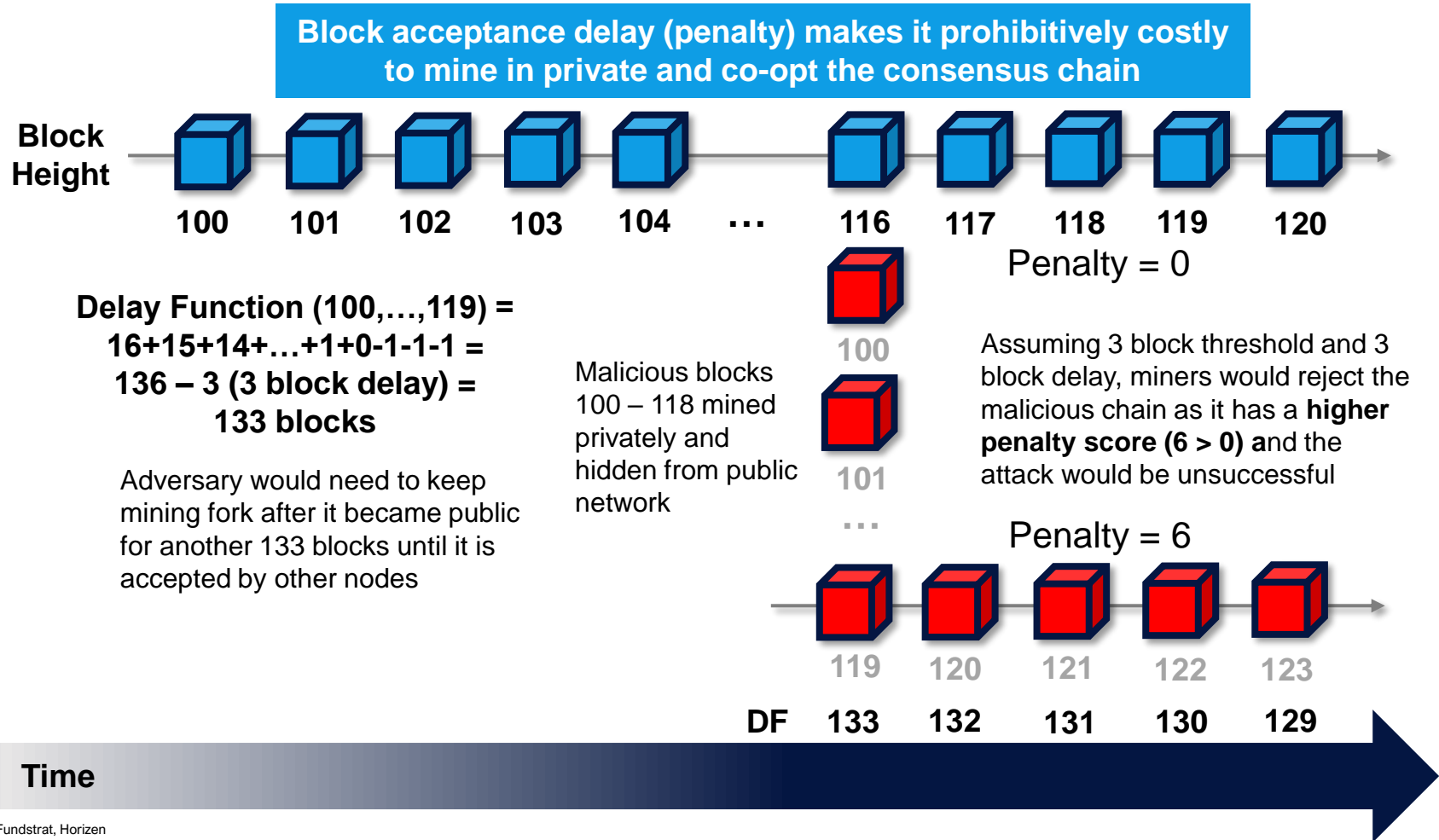


Consensus protocol block delay penalty innovation enhances network security

After experiencing a 51% block reorg attack, Horizen implemented an innovative protective measure in the form of a block acceptance delay penalty to defend against similar attacks in the future.

- The block delay penalty mechanism defends against 51% attacks and solves a critical attack vector of the longest chain rule by making it prohibitively costly for a malicious actor to mine in private and attempt to forge a fraudulent consensus chain.

Figure: Illustration of block acceptance delay defense mechanism



Source: Fundstrat, Horizen



Sidechains offer unbounded software design space and application scalability

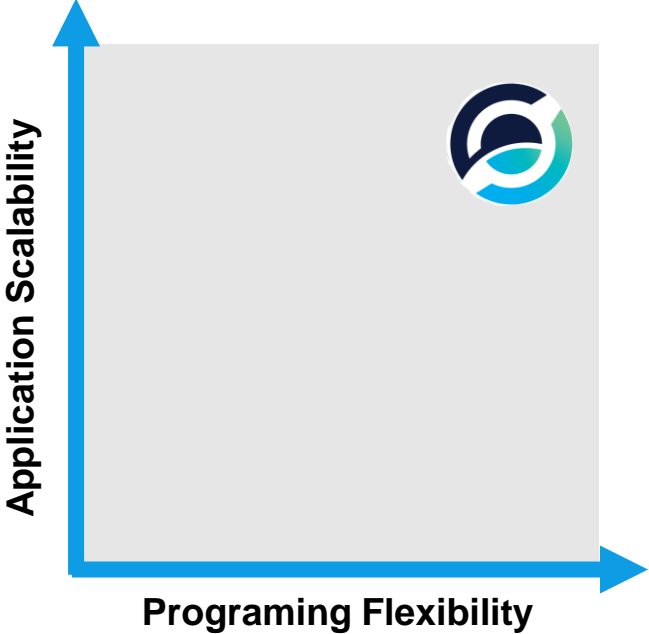
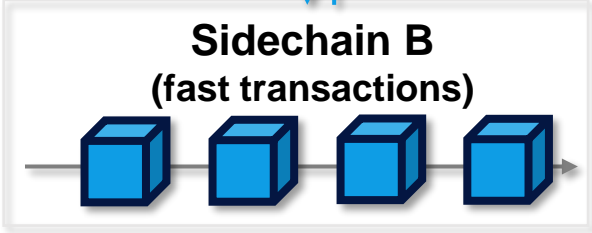
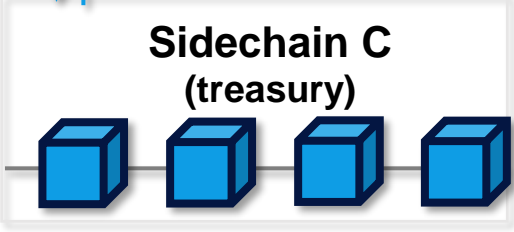
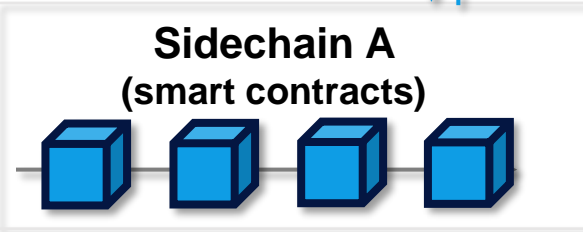
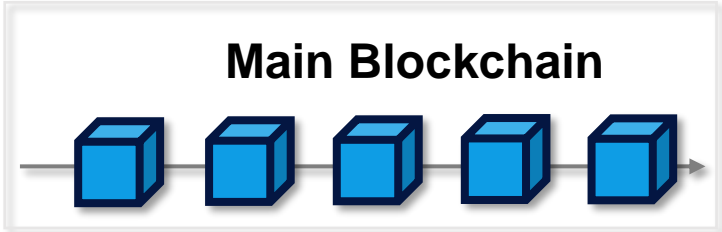
Sidechains offer a mechanism to implement features on top of a first layer protocol without compromising the security or stability of the protocol. Such features may include increasing throughput, enabling new models of governance, and implementing different consensus rules for specialized use cases, supporting a wide set of business applications.

- Using sidechain technology, Horizen plans on including features such as a treasury system for the DAO, handling rewards for super and secure nodes, and developing a block-DAG to enhance transaction throughput.

Figure: Illustration of sidechain functionality

Sidechains enable forward and backwards compatible transfers

Minimal logic on chain for smart contract application scalability



Source: Fundstrat, Horizen

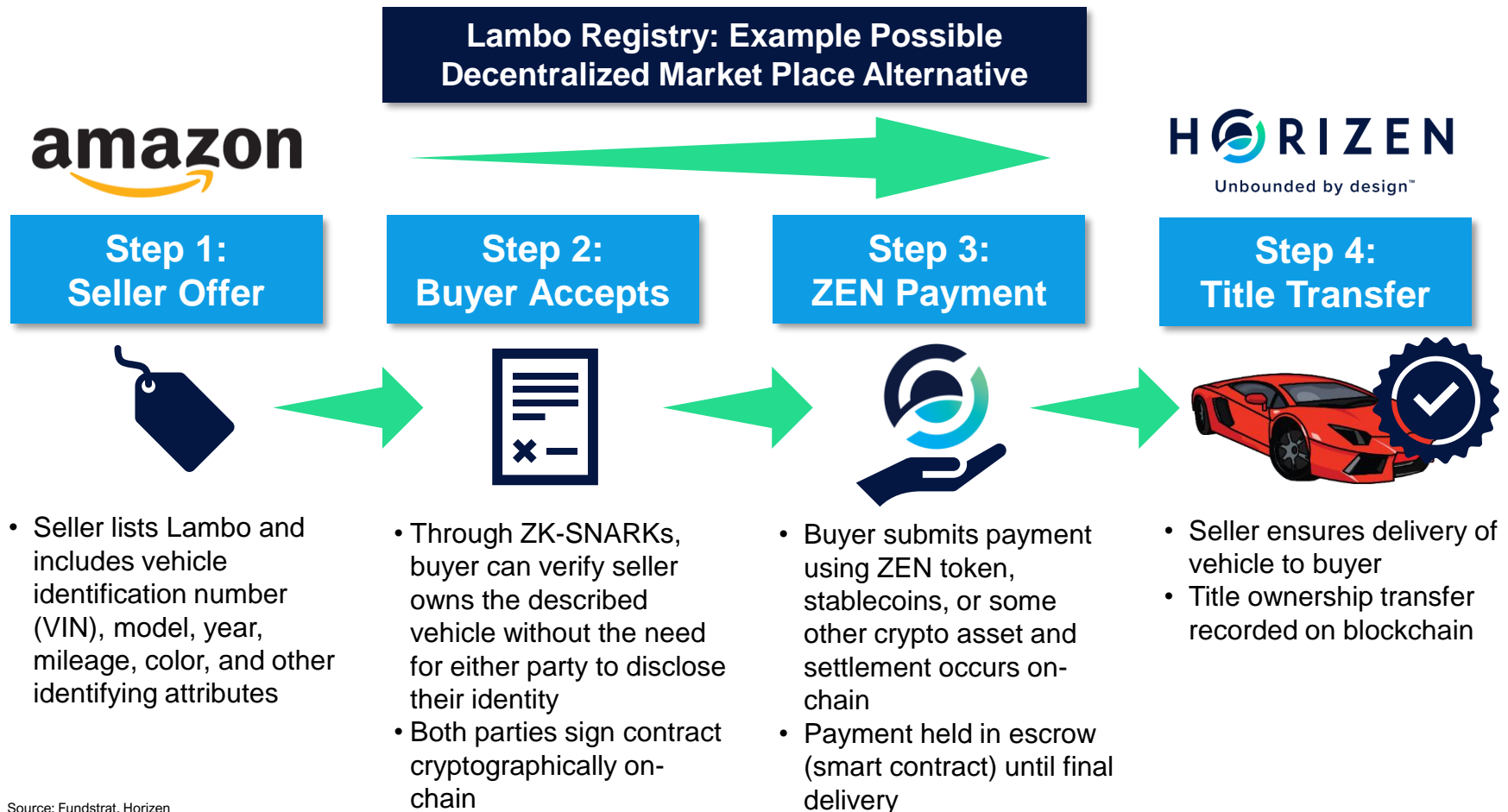


Creating possibility for unimagined innovation in decentralized applications

Horizen's Zendoo sidechain SDK allows developers unbounded flexibility. The Lambo Registry DApp is the first example of the customization capability of the newly released SDK. The purpose of the DApp is to demonstrate the boundless possibilities of the SDK to enable developers to build based on their expertise. Since software is a representation of human thought, it has an unbounded design space for code creativity, and we believe new and more intricate applications will emerge.

- On the DApp, users can store vehicle identifying information such as VIN, make and model, year produced, color, etc. Users can prove vehicle ownership without disclosing their identity and can buy and sell vehicles using ZEN.

Figure: Illustrative Simplified Process of listing and selling vehicle on Lambo Registry DApp



Source: Fundstrat, Horizen



Engineered with cutting-edge zero-knowledge privacy and encryption features

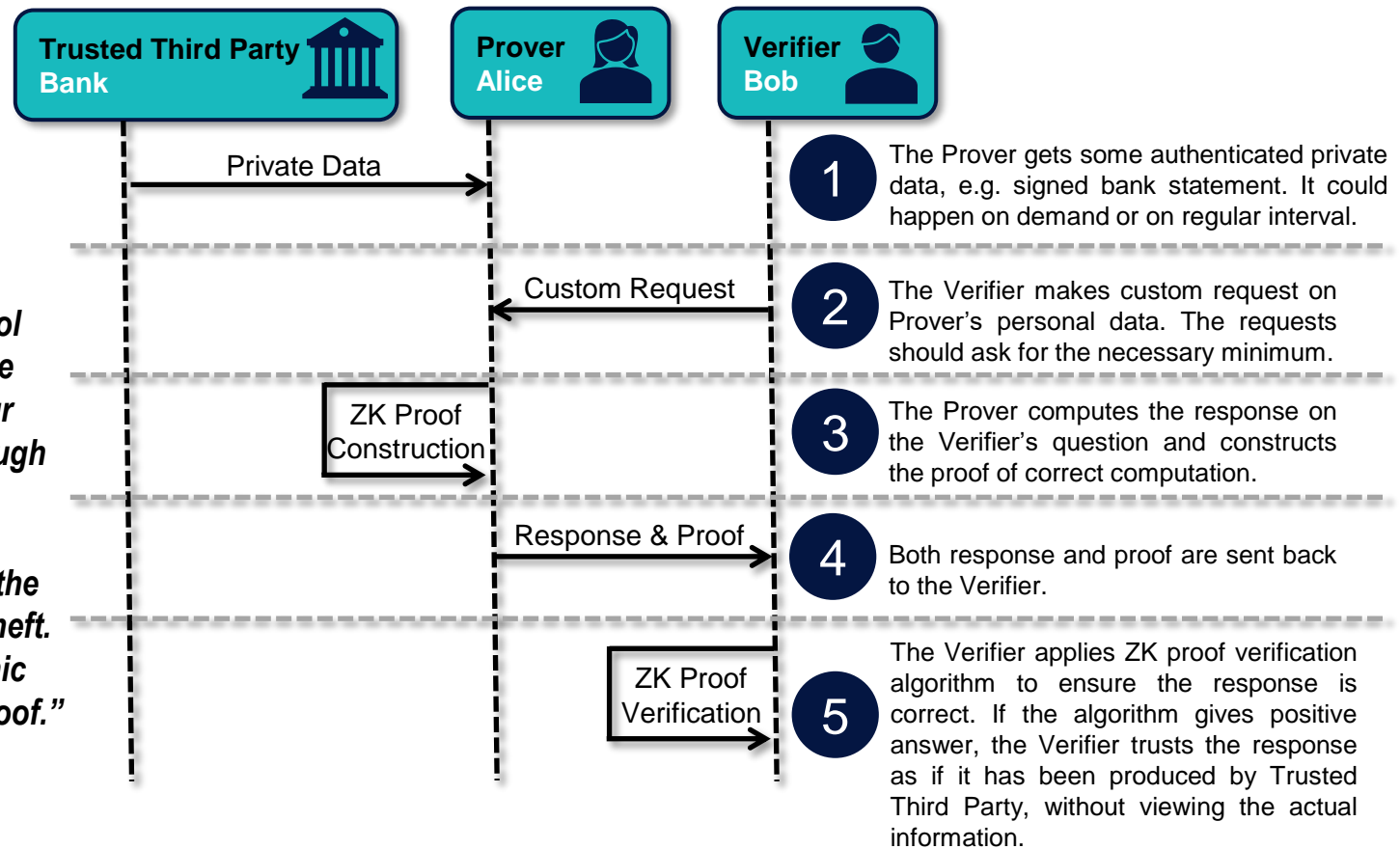
Horizen has implemented zk-SNARKS technology to enable private messaging, publishing, media curation, voting, record-keeping, internet browsing and more, without a “backdoor” that central authorities can access or monitor.

- **Zero-knowledge proof technology has wide privacy-preserving implications enabling a new set of applications as information can be verified without sharing details of either party in the transaction.**

Figure: Simple illustration of zero-knowledge proof for identity verification

MIT Technology Review

“True internet privacy could finally become possible thanks to a new tool that can—for instance—let you prove you’re over 18 without revealing your date of birth, or prove you have enough money in the bank for a financial transaction without revealing your balance or other details. That limits the risk of a privacy breach or identity theft. The tool is an emerging cryptographic protocol called a zero-knowledge proof.”



Source: Fundstrat, MIT Technology Review

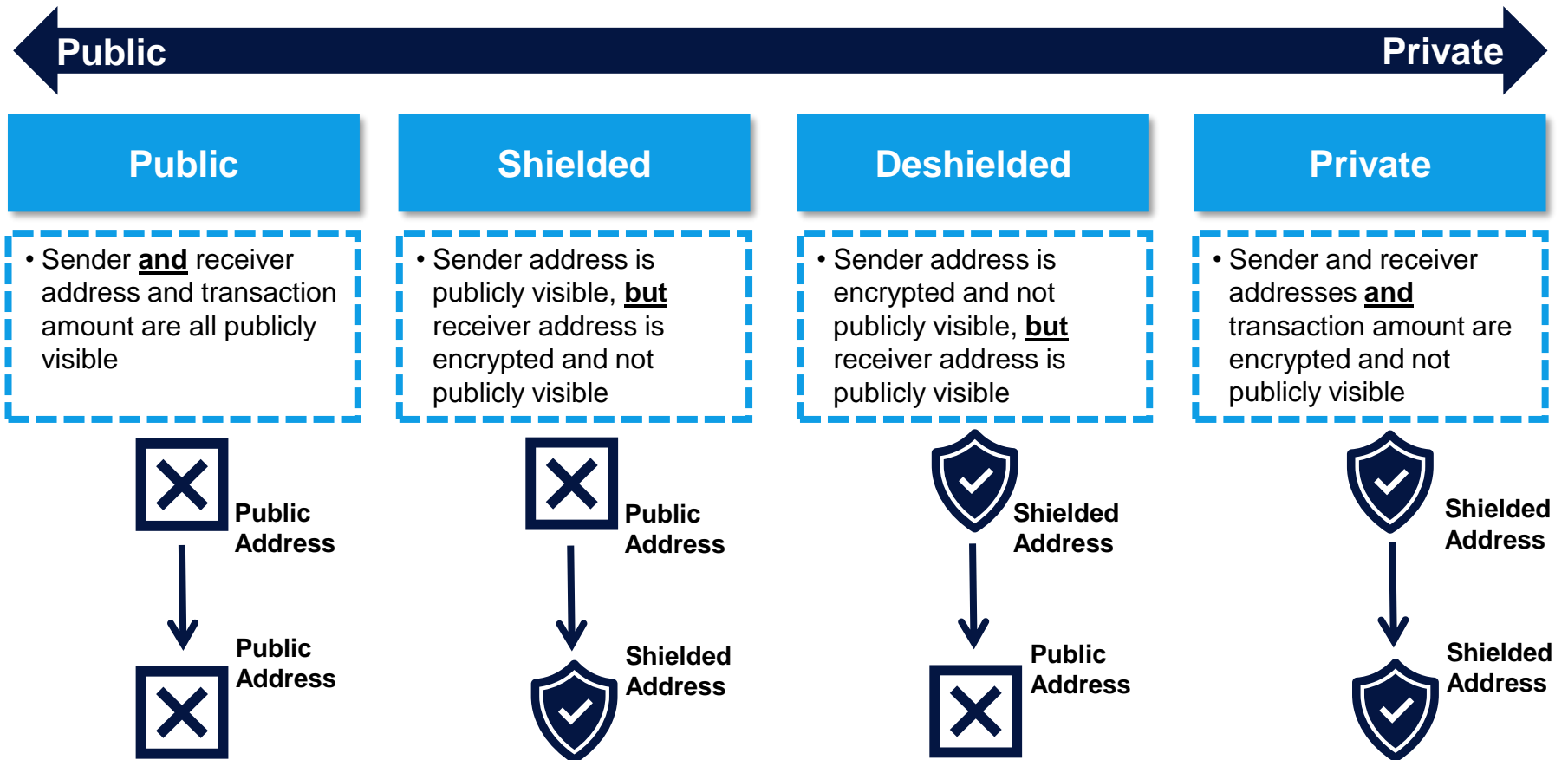


Giving users data ownership and privacy guarantees unmatched by tech incumbents

Horizen natively enables the use of private transactions in which the sender/receiver address, balance, and transaction amounts may optionally remain private from external parties analyzing the public blockchain.

- Many business and consumer use cases demand complete or partial transaction privacy, which Horizen is uniquely optimizing for.

Figure: Illustration of public and shielded transactions



Source: Fundstrat, Horizen



Stable supply model and mining incentives create store of value potential

Horizen implements the same monetary supply and mining characteristics as Bitcoin, having a maximum supply of 21M with a halving event every four years. The first halving event is scheduled for November 2020 in which the block reward, released every 2.5 minutes, will be reduced from 12.5 ZEN to 6.25 ZEN, halving the annual inflation rate from ~26.7% to ~13.3%.

- Mining has been shown to influence store of value incentives and may allow Horizen to accrue a monetary premium.
- The network introduces a new block reward distribution policy that rewards three new beneficiaries in addition to miners (60%): secure node operators (10%), super node operators (10%), and treasury (20%).

Figure: Horizen supply schedule and monetary metrics

Date: 8/21/20

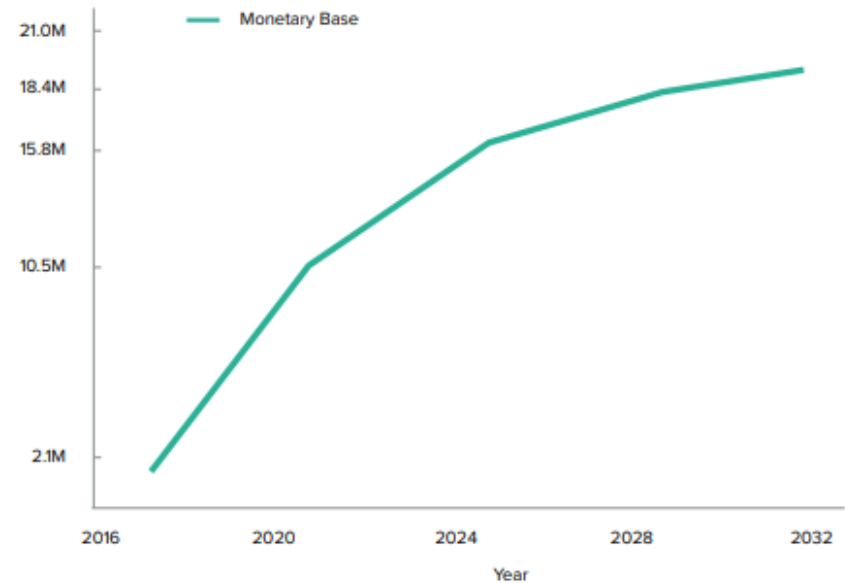
Supply Side Stats

Max Supply		21,000,000
Y2050 Supply		20,865,535
Y+10 Supply		18,822,450
Current Supply	a	9,742,187
New ZEN Issued / Year	b	2,628,000
Current Inflation	a/b=c	27.0%
Post-Halving Inflation	c/2=d	13.5%

Demand Side Staking Stats

Tokens Staked	e	2,865,782
% of Network Staking	e/a=f	30%
Staking Yield ¹	g	22.2%
Real Staking Yield (Post-Halving) ¹	g-d=h	8.5%

FIGURE 2: ZEN MONETARY BASE & SUPPLY SCHEDULE⁴



Horizen's supply curve mimics that of Bitcoin with a supply cap of 21 million and halving event every 4 years

Source: Fundstrat, Messari, Horizen, (1) Implied yield denominated in native ZEN as of 8/21/2020; actual future ZEN and USD results will vary due to price changes and increased or decreases in the staking supply pool.



Stakeholder capitalism model ties ZEN’s fundamental value to network usage

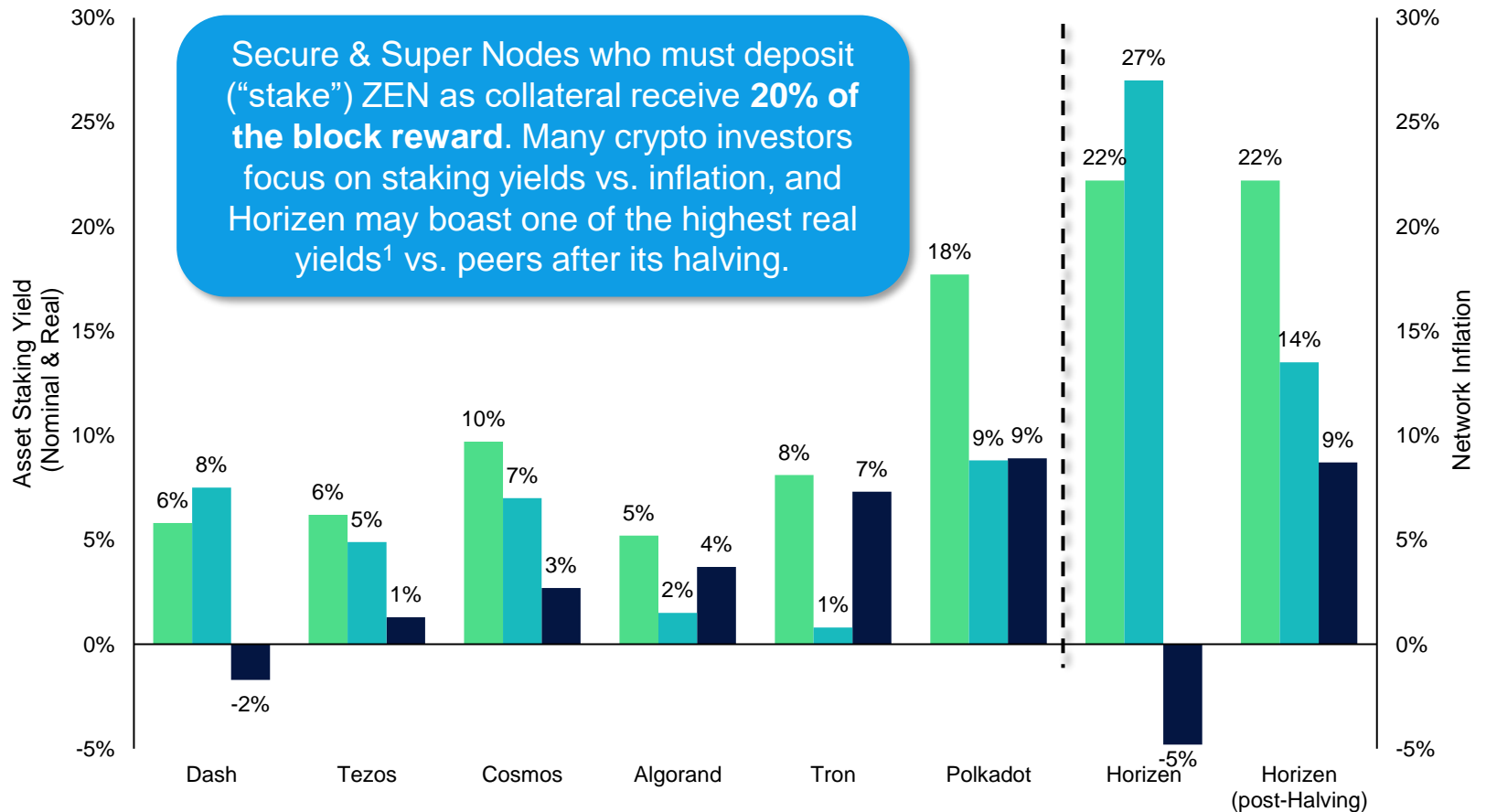
Early Uber drivers provided the infrastructure that made the platform successful but didn’t capture the equity upside that went to founders and VCs. Bitcoin created a solution that gave users ownership of the network, but its currency mining model made it difficult for some investors to understand the link between network usage, fees and BTC fundamental value.

- **Horizen’s staking (“lockup”) requirements for computing providers to host applications and earn block rewards gives ZEN investment value by directly tying network usage, fees and incentives to owning the digital asset.**
- **Most revenue today, like peers, is from new issuance, but as fees grow, they are expected support long-term sustainable value.**

Figure: ZEN post-halving real & nominal yield in relation to its peers

Yields calculated in native crypto asset

■ Nominal Yield ■ Real Yield ■ Network Inflation



Source: Fundstrat, Messari, (1) Yields in native crypto asset terms; Real yield defined as annualized current staking payout – annual supply inflation. Actual crypto native yields will vary with staking pool changes. USD returns vary with price. Data as of 8/21/20

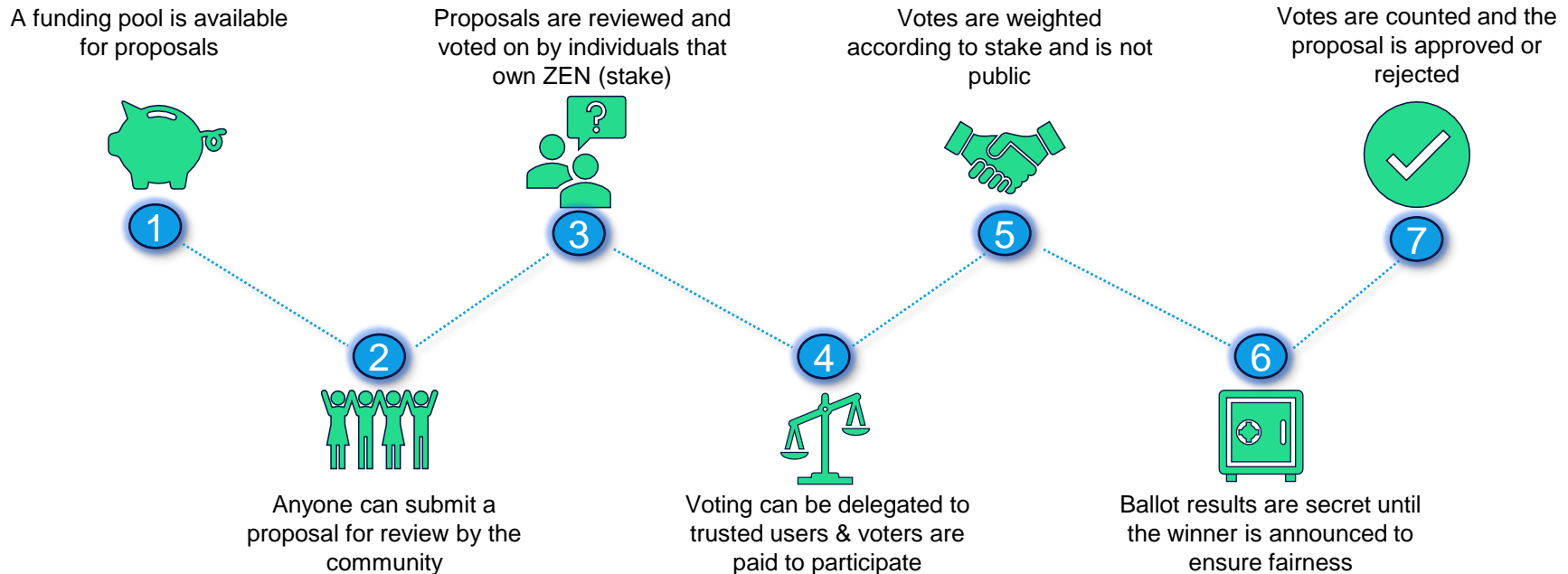


Horizen DAO treasury model planned to offer equitable decentralized governance

Cryptonetworks are community-governed Decentralized Autonomous Organizations (DAOs). Horizen’s DAO treasury model, developed in partnership with IOHK, plans to make development well-funded in a decentralized, censorship-resistant way.

- **Claiming 20% of the block reward, the planned DAO will provide ZEN holders a voice in how funds are used for protocol development.**
- **The voting system will implement quadratic voting to limit the influence of large asset holders and promote more equitable outcomes that represent the interests of the entire ZEN community.**

Figure: Illustration of Horizen DAO voting mechanism



The Horizen DAO will be built as a sidechain on the mainchain and its voting system will support other blockchain projects, nation-states or small governments, and corporations

Source: Fundstrat, Horizen

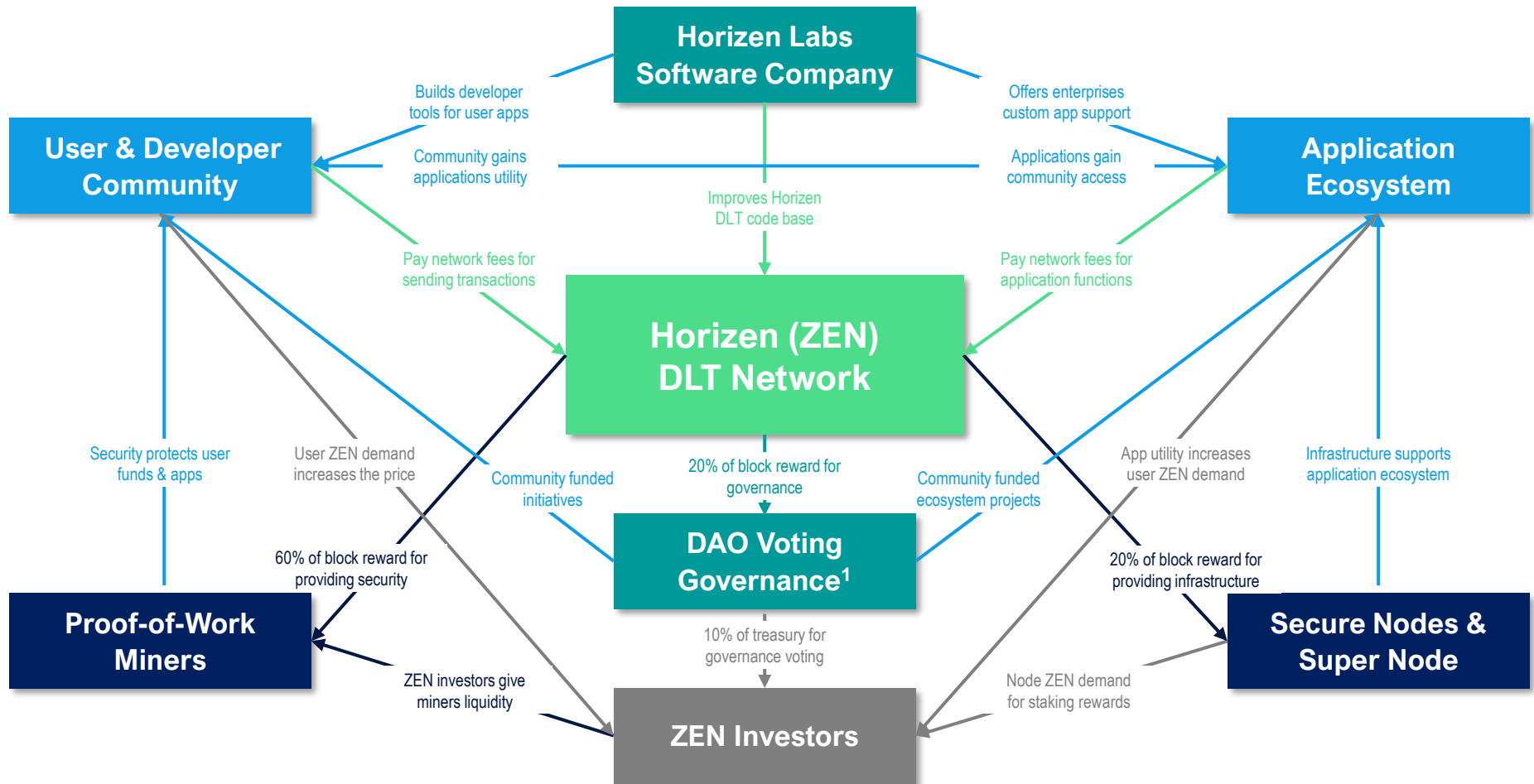


Designed to incentivize network effects, stakeholder value and growth

Horizen's ecosystem structure and block reward distribution policy fosters open source software development and produces unique network effects that drive a value creation feedback loop.

- **The Horizen Labs software company dedicates resources to developing the public Horizen network and provides developer support, and the block reward allocation schema encourages holders to participate in governance and run nodes to operationalize the network.**

Figure: Horizen ecosystem stakeholder value creation feedback loop



Source: Fundstrat, Horizen, (1) DAO Voting system is still being implemented; governance distributions currently go to the ZEN Blockchain Foundation (ZBF)



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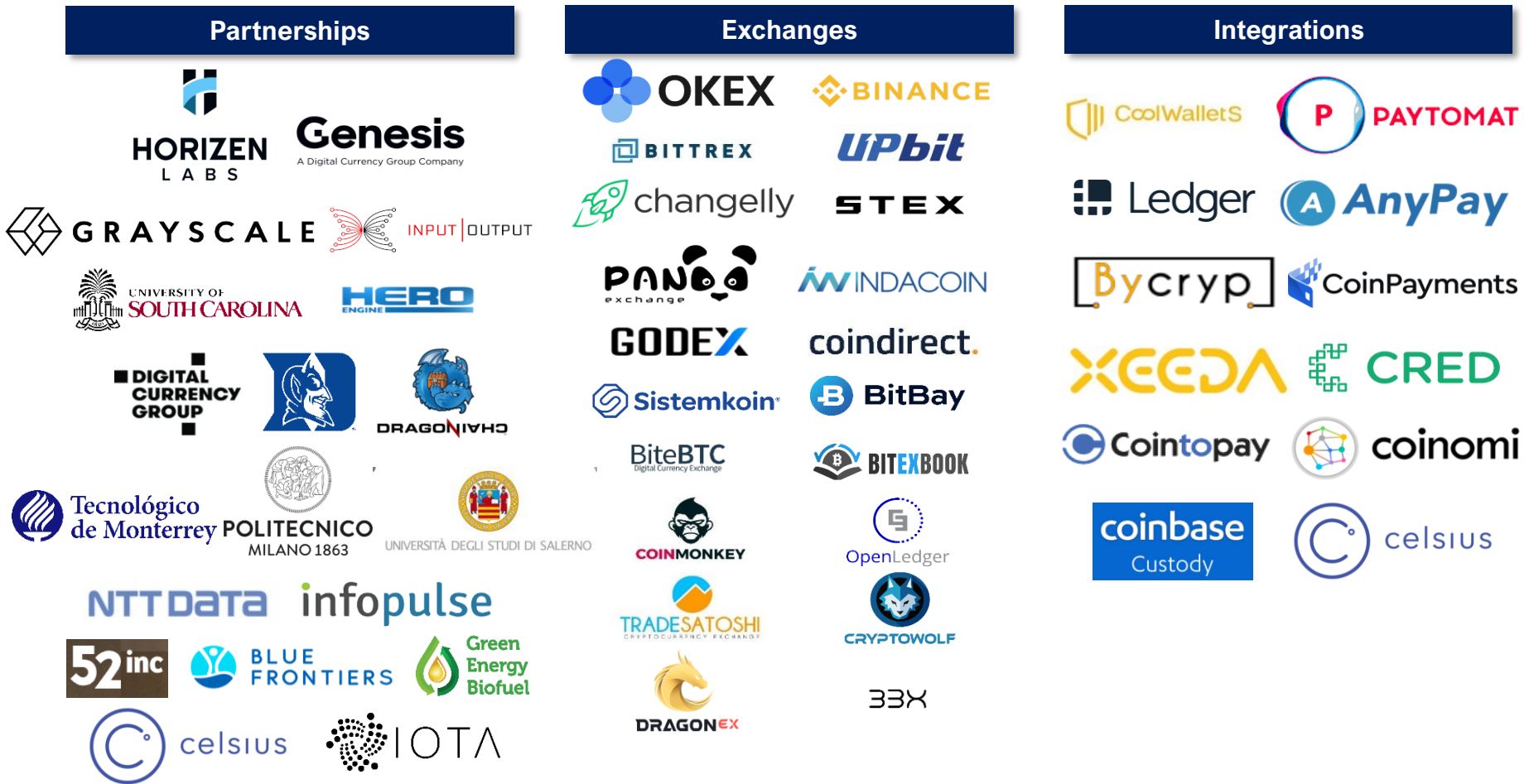


Growing list of industry leading ecosystem partners

The Horizen ecosystem has a growing number of corporate partners, institutional backers, and exchange and wallet integrations, which are focused on increasing global access to ZEN and developing real-world utility for the public blockchain.

- Continued backing from strategic industry players, including Digital Currency Group, evidences smart-money institutional investor commitment in the long-term vision and growth potential of Horizen.
- Horizen’s recent push into the fast-growing Decentralized Finance (DeFi) space with their recently announced Celsius partnership offers an encouraging sign for application growth.

Figure: Horizen partnership and integration ecosystem



Source: Fundstrat, Horizen



Horizen Labs offering valuable Red Hat-like support

Horizen Labs is the software company that launched and is dedicating resources to further the development of the Horizen public blockchain, similar to the relationship between the company Red Hat and the open-source software project Linux.

- **Public cryptonetworks represent the next phase of the open-source movement by better aligning the incentives of all stakeholders involved.**

Figure: Evolution of software business models

Business models for software have evolved from closed to open-sourced and cryptonetworks are the next era



HORIZEN Software Company
LABS &
HORIZEN™ Public-cryptonetwork



Red Hat Software Company
&
 **Linux** Open-Sourced Software



Microsoft Software Company
&
 **Windows 95** Proprietary Software

1990

2000

2010

2020

2030+

Source: Fundstrat



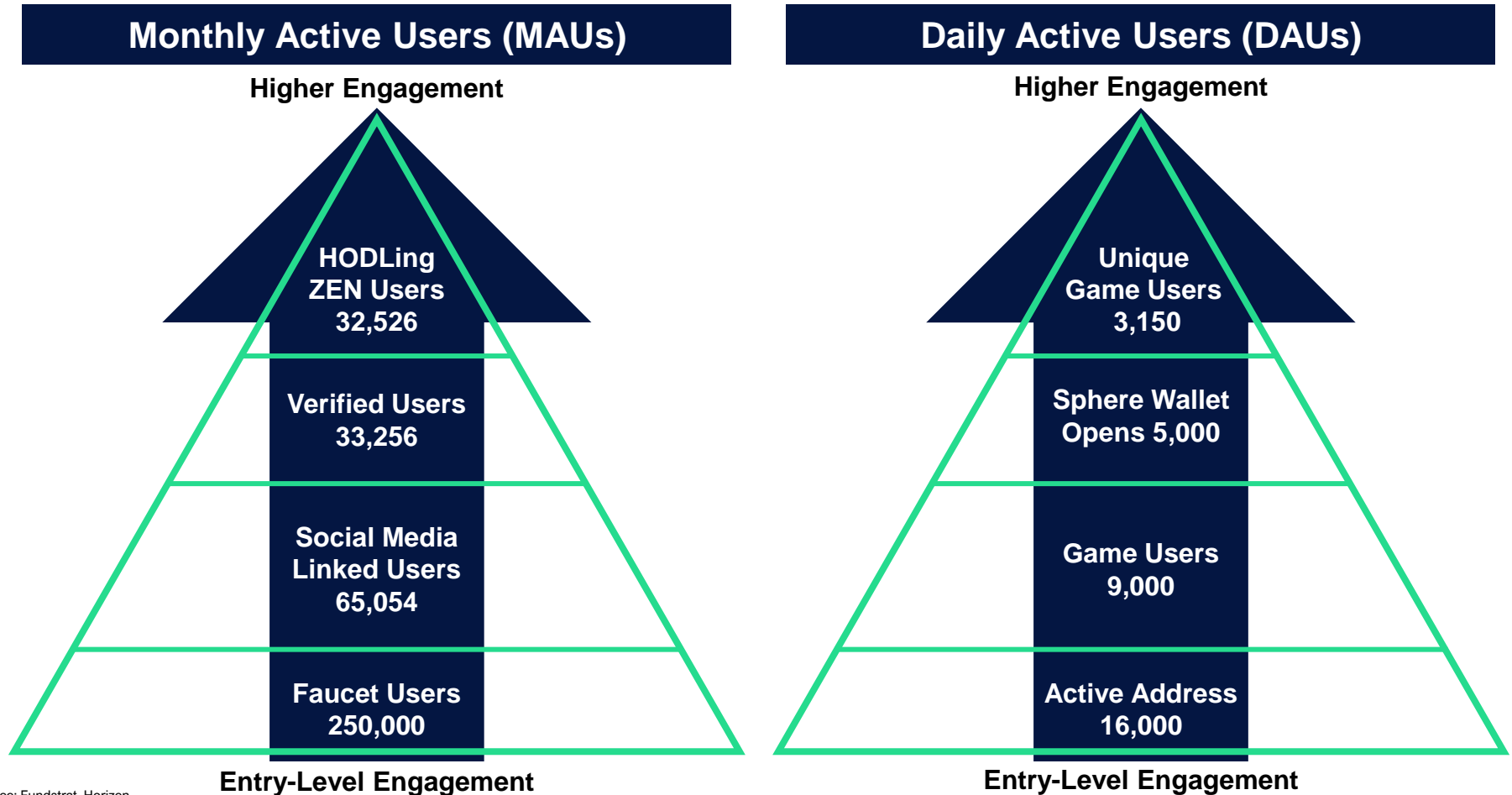
Highly-engaged community of 16k DAUs & 250k MAUs

Horizen has developed a strong community since its launch in 2017. The network currently has approximately 16,000 Daily Active Users (DAUs) and 250,000 Monthly Active Users (MAUs) based on blockchain data and metrics provided by the team.

- **User metrics offer encouraging tangible proof that the network is finding early product-market fit with users.**
- **We have been following Horizen over the last two quarters and have come to greatly appreciate the quality of their leadership, team and community. While this is a soft unquantifiable judgement, we believe it's an important one, especially for decentralized networks, which will play a key role in driving growth going forward.**

Figure: Horizen active user data

Date: Q2 2020



Source: Fundstrat, Horizen

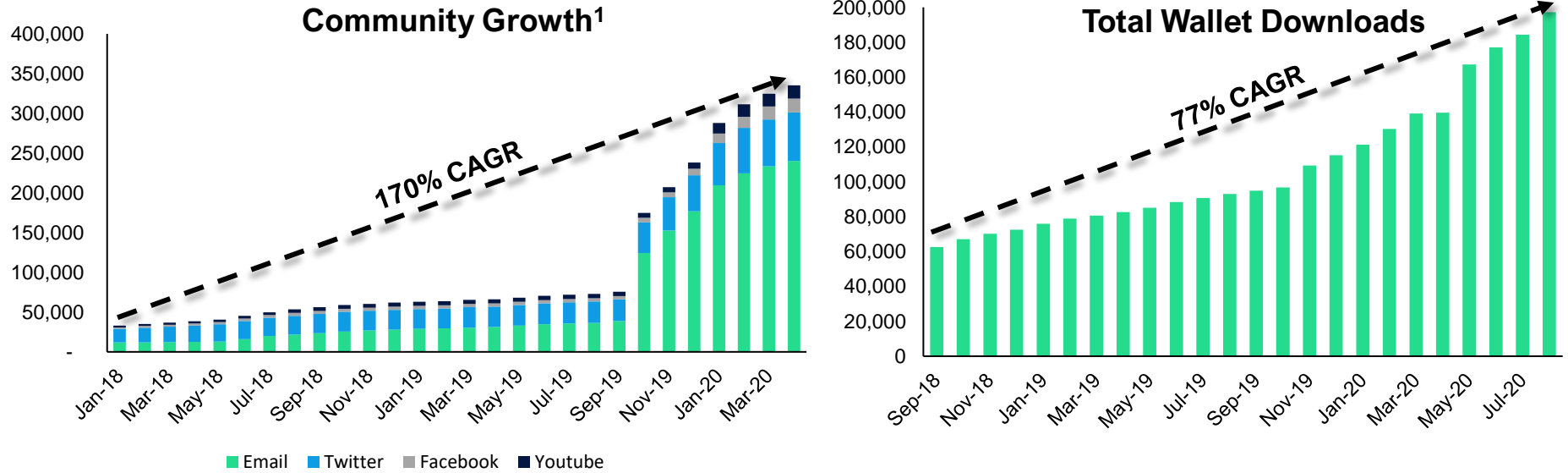


Community centric culture, new tech and targeted marketing fueling user growth

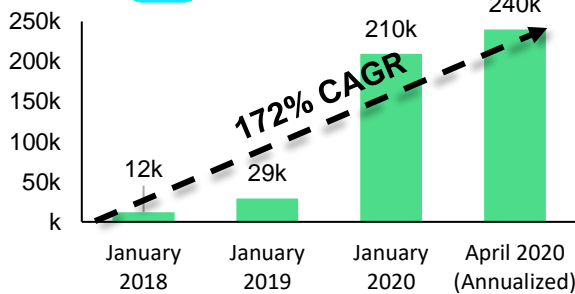
The ZEN community has seen steady growth evidenced by the periodic rise in wallet downloads and increasing engagement across the community's social media channels.

- The Horizen team has been releasing educational content on a regular basis which has driven engagement across its YouTube, Twitter, and Facebook social media channels.

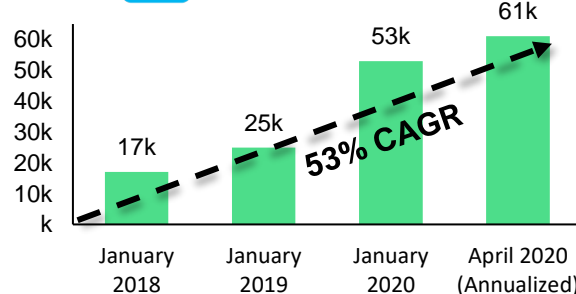
Figure: Horizen community growth metrics



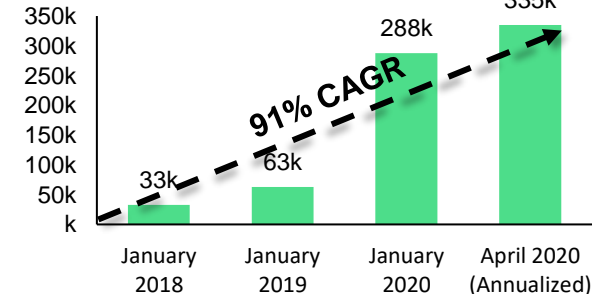
Email Reach



Twitter Reach



YouTube Reach



Source: Fundstrat, Horizen, (1) Cumulative social media and email interactions, Community Growth data as of Q1 2020 and Wallet Downloads as of August 2020



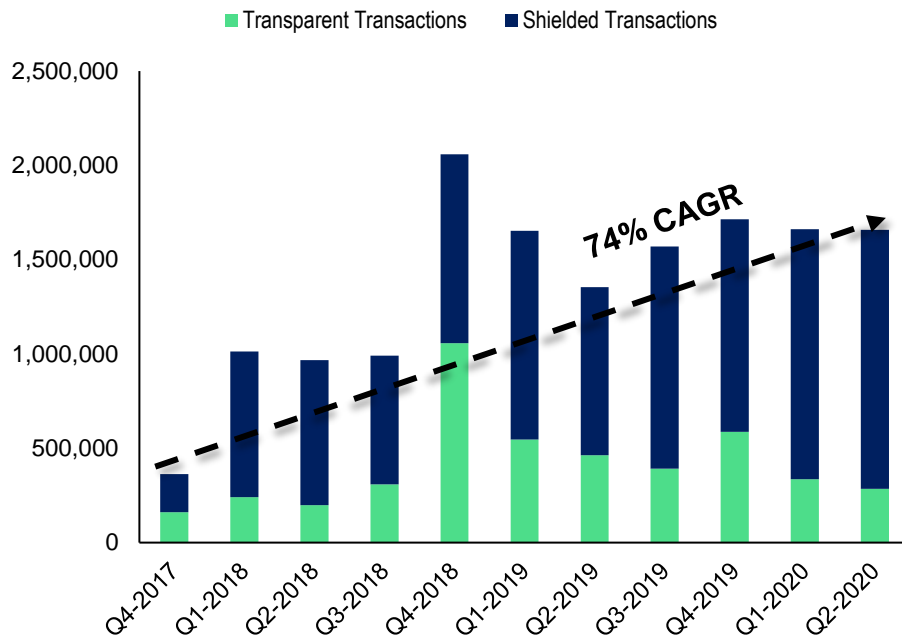
Network blockchain metrics show growing consumer usage and fees

On-chain metrics can be seen as the equivalent of financial statements for decentralized platforms. Horizen's have shown healthy growth in usage, including number of transactions and aggregate transaction fees on the network. While fee revenue is still emerging, we view this as typical for an early growth stage start up. We see the recently released sidechain SDK as a turning point and expect application launches and fees to rise.

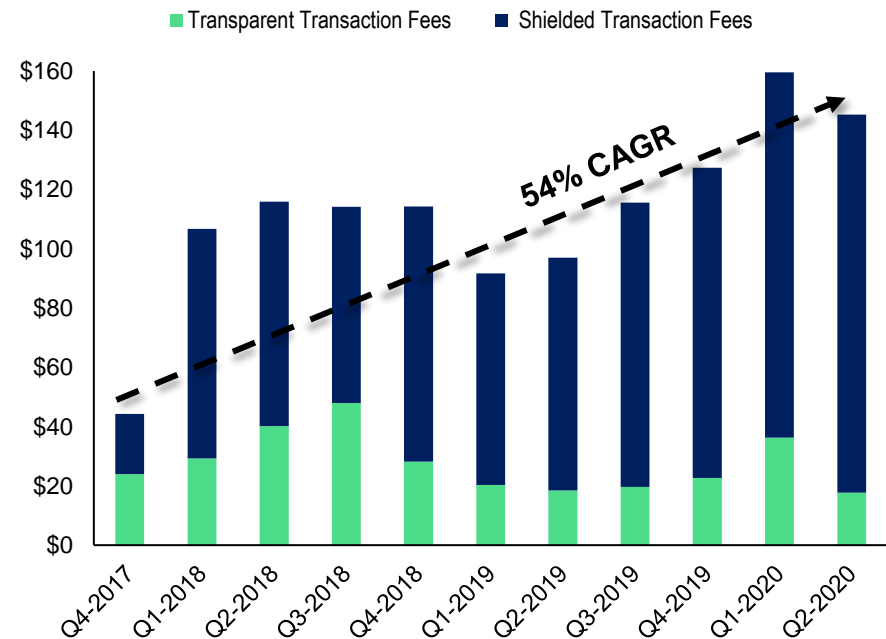
- **The majority (>80%) of all ZEN transactions are shielded, indicating users value their privacy and are primarily using the network for its privacy-preserving features.**
- **Aggregate transaction fees are also increasing, which shows there is demand for block space on the network.**

Figure: Horizen number of transactions and transaction fees

Date: Q2 2020



Since network launch, average transaction growth rate is 74% (CAGR) and shielded transactions make up >80% of the total pool of transactions.



Increasing fees shows greater demand for block space and signifies overall growth of the network. Since network launch, fees have increased by 54% (CAGR).

Source: Fundstrat, Horizen



Increasing demand incentivizing growth of the decentralized node network

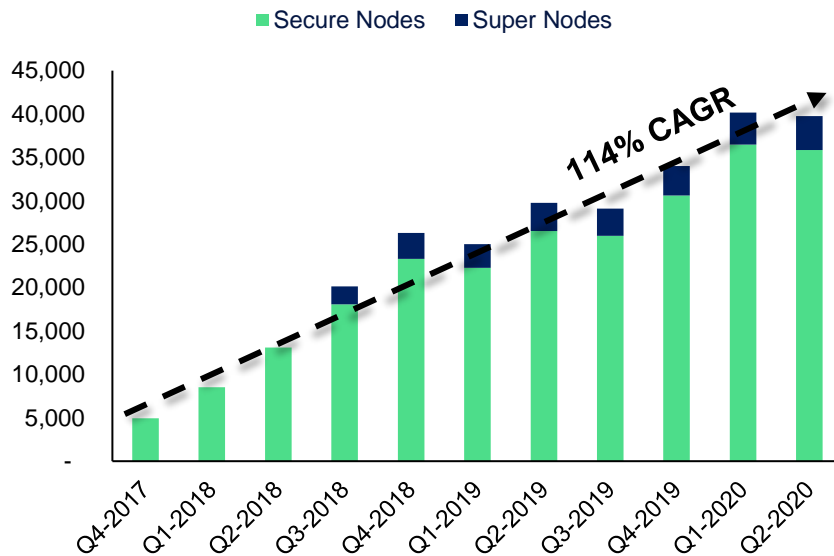
Horizen's computing capacity has been rapidly growing. Like Uber drivers join the app in anticipation of a demand surge, node providers may be joining Horizen in anticipation of growing demand from the sidechain SDK and new DApp deployments.

- **Computing infrastructure providers on the Horizen network have been rapidly adding capacity, signaling future usage expectations, resulting in demand that's caused ~35% of ZEN circulating supply to be locked for staking.**
- **As DApps come online and network usage increases, transaction fee revenue should rise, node staking demand should grow, and a supply/demand imbalance should lead to price appreciation.**

Figure: Horizen number of Secure Nodes and Super Nodes, ZEN staked/locked

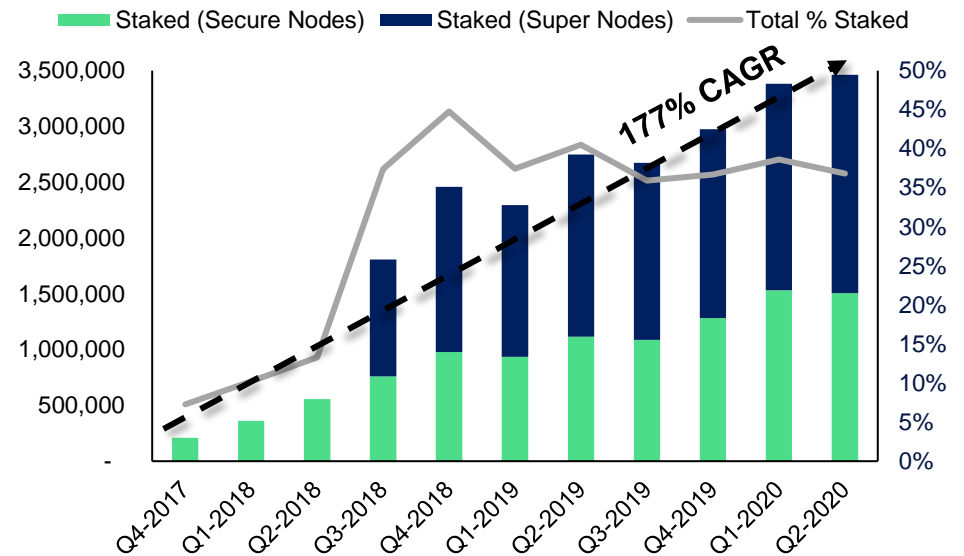
Date: Q2 2020

Number of Secure & Super Nodes



Secure nodes & super nodes serve the vital purpose of enable sidechain DApps by providing the computing infrastructure

ZEN Staked/Locked



ZEN has 36% of circulating supply locked for staking, which should alleviate sell pressure and assist in price appreciation as network demand increases and fee revenue grows

Source: Fundstrat, Horizen



Developer focused initiatives and tooling laying groundwork for application growth

The Horizen Developer Environment (HDE) and Horizen Early Adopter Program (HEAP) are building a community of open source developers by making it easy to identify tasks for contribution, offering bounty incentives, and encouraging Horizen evangelists.

- **Horizen is winning the hearts and minds of developers, which is critical for an open-sourced projects success, by offering developer tools optimizing for scalability and flexibility, ease of deployment, and privacy and auditability.**
- **Macro trends to crowdsourced, freelance, remote, global work, and the passion economy are all growth tailwinds.**

Figure: Horizen developer programs and early metrics



Scalability and Flexibility

Zendoo uses a modular protocol that emphasizes functionality over design. Any type of rule can be deployed as a sidechain with this framework – whether it's a blockchain or other type of data structure.



Easy Deployments

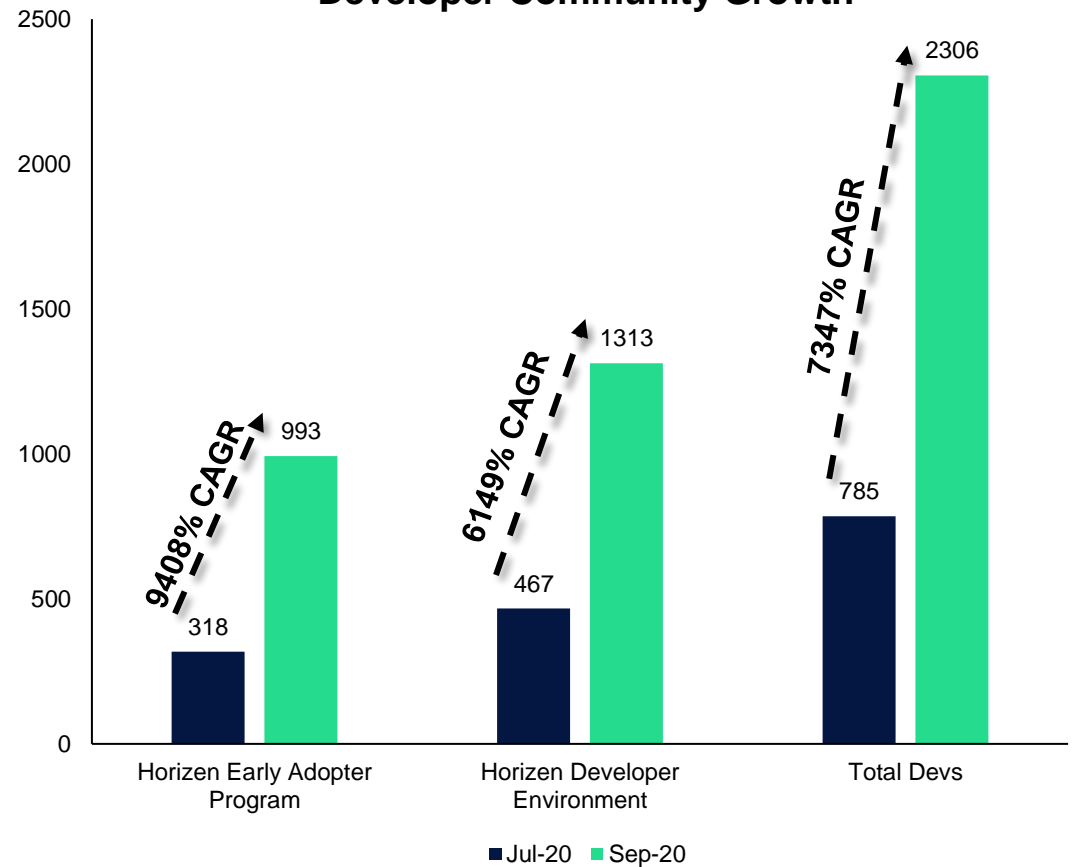
Zendoo comes with an SDK that includes all necessary components required for building a blockchain in a single toolbox. This allows developers to focus only on the specific features of their blockchain instead of low-level tasks, making the deployment of a complete blockchain much easier and faster.



Privacy and Auditability

Zendoo allows the verification of sidechains by the mainchain, without knowing the internal structure of the sidechain. Zendoo SDK provides a set of tools that will enable the creation of auditable and privacy-preserving blockchain applications, a requirement for many real-world applications.

Horizen Open-Source Developer Community Growth



Source: Fundstrat, Horizen, Data as of September 2020



Grayscale Horizen Trust investment offers traditional investors access

Launched in August 2018 and one of ten such products offered by Grayscale, Grayscale Horizen Trust provides qualified accredited investors convenient exposure to ZEN. Grayscale and its service providers handle custody, financial reporting, accounting, and management of the assets in the Trust.

- **Approximately 4% of the total ZEN supply is held within this investment vehicle, which may increase as more institutional capital enters the crypto space and Horizen achieves progressive milestones on its roadmap.**

Figure: Grayscale Horizen Trust overview

Professionally Managed ZEN Exposure	Investment Objective	Titled, auditable ZEN exposure through an investment vehicle
Brokerage & IRA Account Eligible	Fund Structure	Open-end Investment Trust
Audited Financials	Investment Criteria	\$25,000 minimum from Accredited Investors as defined under U.S. securities laws
Secured & Insured Custody	Expense Ratio	2.5% of AUM, annual fee
	AUM / % of Total Supply	\$2.5 million / 4.38%
	Sponsor	Grayscale Investments, LLC (“Grayscale”)
	Auditor	Friedman LLP
	Custodian	Coinbase Custody Trust Company, LLC
	Transfer Agent / Legal Firm	Continental Stock Transfer & Trust Company / Davis Polk & Wardwell LLP

Source: Fundstrat, Grayscale

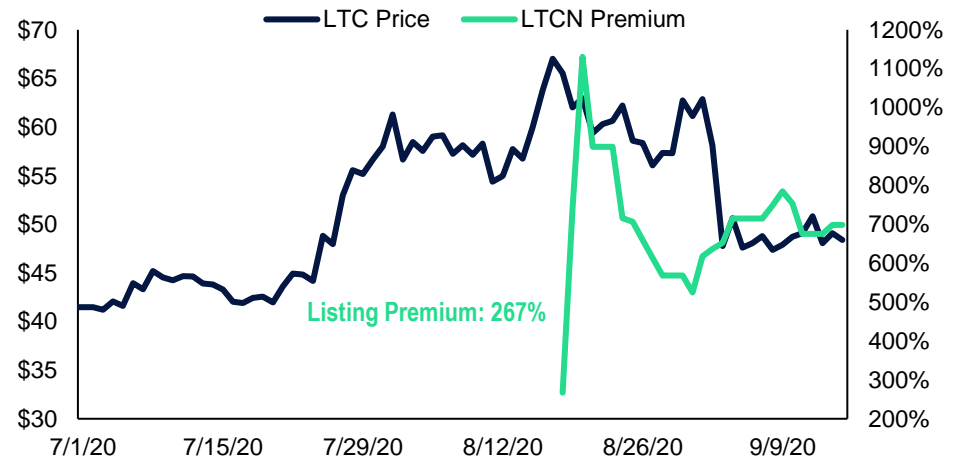
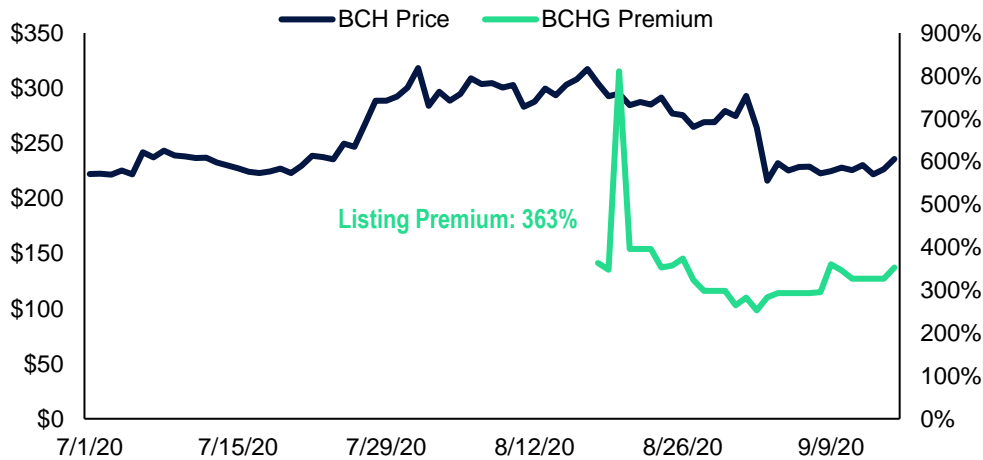
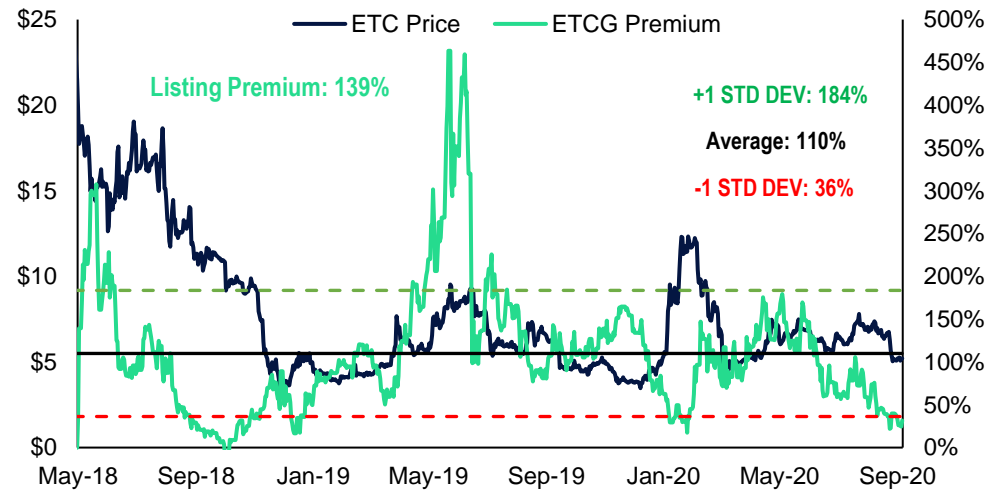
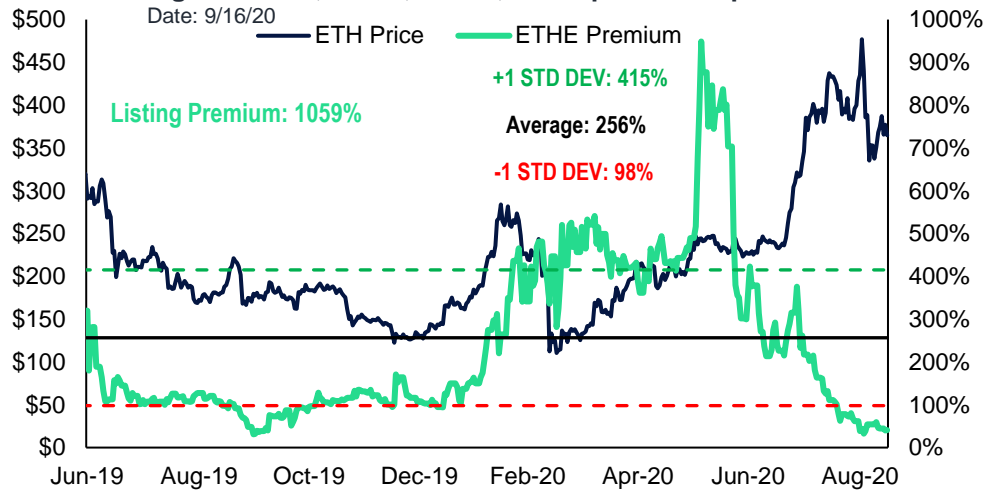


Premiums to NAV on comparable products suggest an opportunity for ZEN investors

Grayscale has listed several similar products on the OTCQX to be publicly quoted and accessible by retail investors. These products have traded at substantial premiums to net asset value (NAV) with the Ethereum Trust (ETHE) and Ethereum Classic Trust (ETCG) averaging 266% and 112% premiums to NAV, respectively.

- **Grayscale may list the ZEN Trust in the future, which could serve as an opportunity for a broad base of investors to gain exposure via a traditional investment vehicle.**

Figure: ETHE, ETCG, BCHG, LTCN prices and premiums to NAV



Source: Fundstrat, Bloomberg



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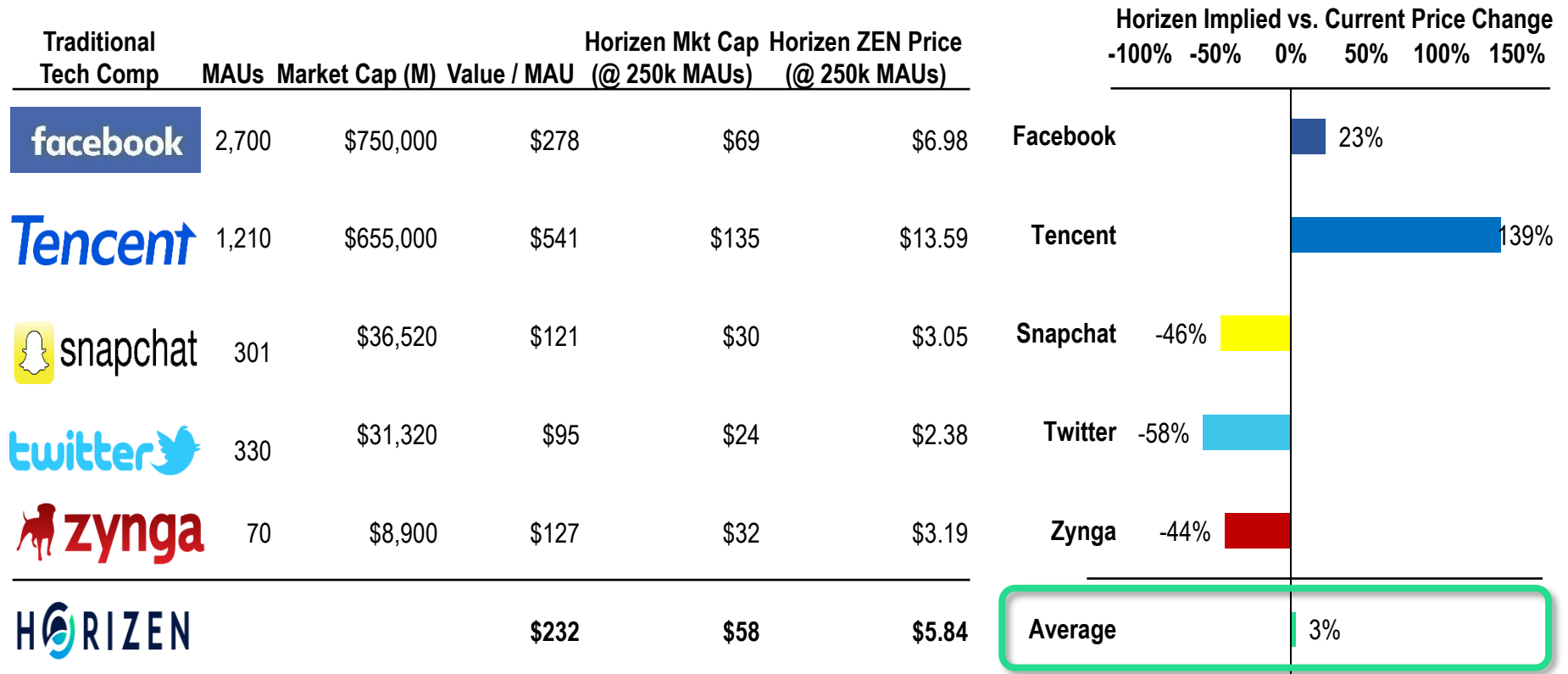
Horizen's current MAU value is priced roughly in line with traditional tech comps

As with traditional tech companies, we believe Horizen's future fundamental value will largely be dependent on the Discounted Cash Flows (ZEN/USD equivalent) that staking node holders receive from network transaction fees paid for usage. At this early phase in the crypto adoption cycle, we believe that users will lead fees, and view them as a key metric for valuation purposes.

- **Horizen's current network value (~\$57M), looks fairly priced based on its current Monthly Active Users (MAUs) when compared to current tech value per user metrics shown below. This should give investors some comfort in the margin of safety at prices today, and the opportunity that Horizen could present if user growth and valuations rise.**

Figure: Horizen MAU Big Tech comp valuation

Millions except per coin price



Source: Fundstrat, Company Reports, Data as of September 2020

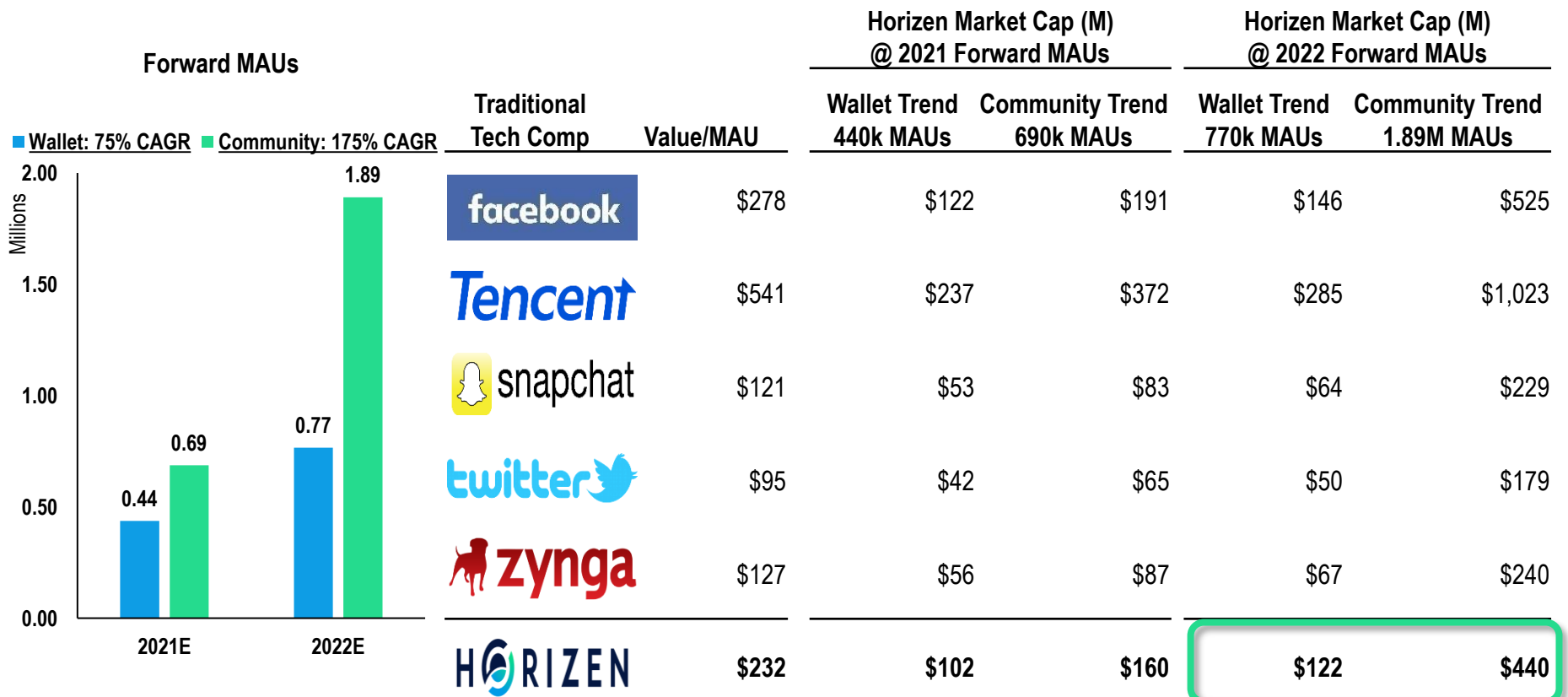


MAU growth trend with traditional tech rates may imply ~\$125M-450M in value by 2022

Horizen's community has seen impressive early growth (75% CAGR for its Sphere Wallet and 175% CAGR across its various community channels) which may serve as a proxy for user growth. We believe given the historic and future growth potential, it's more appropriate to examine Horizen's valuation in the context of forward users.

- Applying an extrapolation of historical growth rates to MAUs and using the traditional tech company per user values below (which we view as more conservative vs. crypto rates) could imply \$122M-440M in network value by 2022.

Figure: Horizen forward MAU Big Tech comp valuation



Source: Fundstrat, Bloomberg, Company Reports

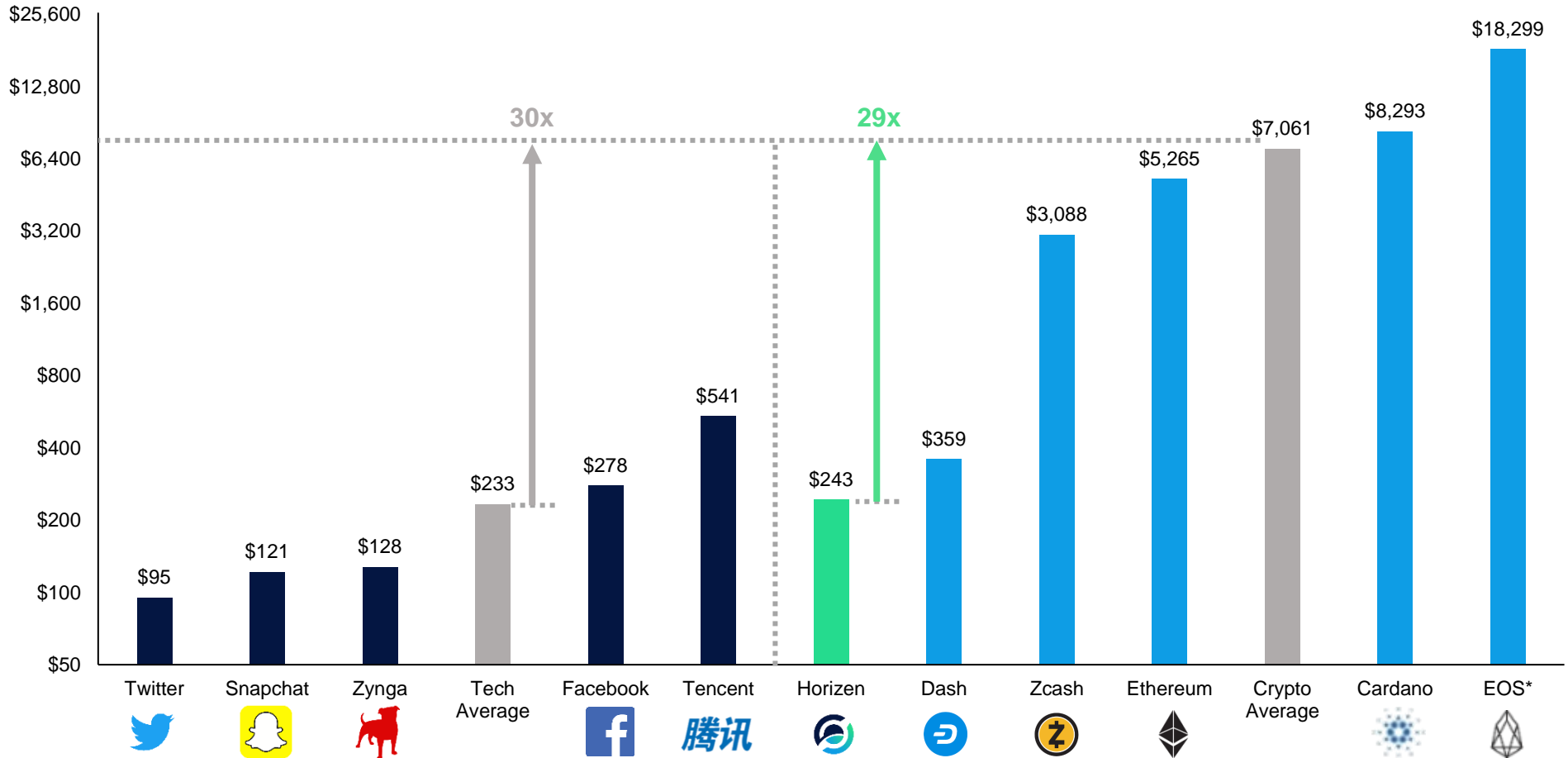


Crypto peers are closer comps for growth potential and are 29x pricier per MAU

Determining users for crypto comps is an imprecise task, but unique active addresses offer a good metric to apply. Dividing market cap (millions) by monthly active users (MAU) provides one methodology for valuing a cryptonetwork in comparison to its peers. Horizen's low value per MAU suggest it may be undervalued compared to its crypto peers.

- Comparing Horizen against crypto peers likely offers a better proxy for growth expectations than prior tech comps.
- Horizen's Market Cap / MAU value is 29x smaller than the comparable cryptonetwork average, indicating it may be undervalued based on network users.

Figure: Horizen value per MAU vs. peers



Source: Fundstrat, CoinMetrics, *EOS MAU calculated average H2 2019 and all others cryptos H1 2020, MC as of 9/16/20



Horizen would become a new unicorn if its users were priced in line with crypto peers

Horizen’s cryptonetwork peers trade at much higher valuations based on both monthly and daily active users. While we note that users are not the only metric that matters, we believe its an important one. The discrepancy may be due to market inefficiencies related to Horizen’s size, leading to relatively less recognition, alongside other factors, which could leave an opportunity for investors if value per user rates converge with peers.

- If Horizen’s current 16k DAUs and 250k MAUs were repriced in line with its crypto peers below, it would imply a network value of ~\$1.7B to \$1.8B.

Figure: Horizen MAU crypto tech comp valuation

Crypto Tech Comps	Category	DAUs	MAUs	Market Cap (M)	Value / DAU	Value / MAU	Horizen Mkt Cap (M) (@ 16k DAUs)	Horizen Mkt Cap (M) (@ 250k MAUs)
Ethereum	DApp Platform	366,076	7,737,902	\$40,740	\$111,288	\$5,265	\$1,781	\$1,316
Dash	Privacy Platform	82,277	1,980,380	\$711	\$8,642	\$359	\$138	\$90
EOS*	DApp Platform	40,644	138,694	\$2,538	\$62,445	\$18,299	\$999	\$4,575
Cardano	DApp Platform	7,288	348,742	\$2,892	\$396,797	\$8,293	\$6,349	\$2,073
Zcash	Privacy Platform	11,765	188,778	\$583	\$49,553	\$3,088	\$793	\$772
Tron	DApp Platform	123,449	n/a	\$1,804	\$14,613	n/a	\$234	n/a
Tezos	DApp Platform	10,287	n/a	\$1,803	\$175,274	n/a	\$2,804	n/a
HORIZEN					<u>\$116,945</u>	<u>\$7,061</u>	<u>\$1,871</u>	<u>\$1,765</u>

Source: Fundstrat, CoinMetrics, DAU calculated average H1 2020, MC as of 9/16/20, *EOS MAU as of 12/13/2019, all others 9/8/2020



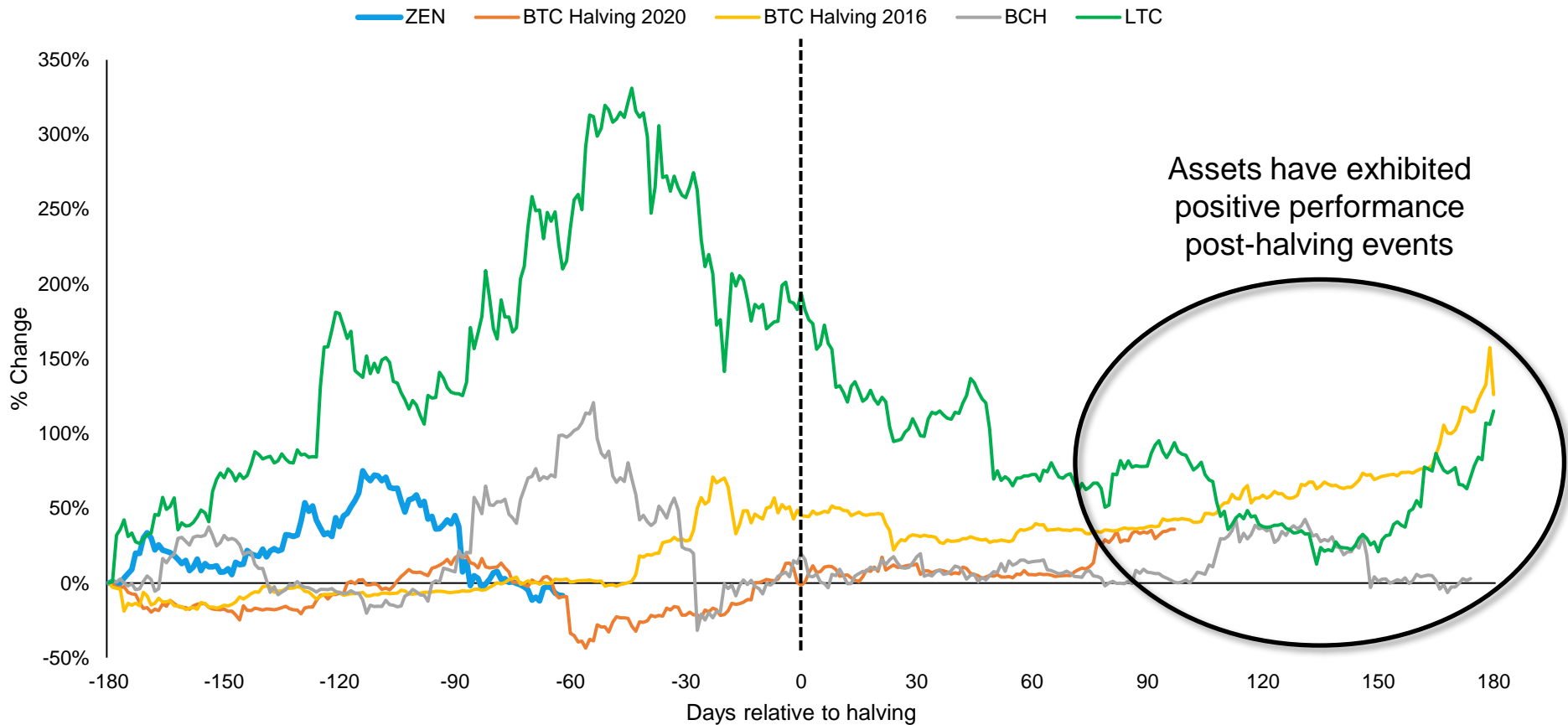
Halving offers a potential catalyst for positive asset performance

Horizen will undergo its first halving event in November 2020, in which the block reward will drop from 12.5 ZEN per block to 6.25 ZEN and the annual inflation rate will reduce from ~26% to ~13%. While we note that new supply scarcity should not be the long-term fundamental driver of value for cryptonetworks (users, usage and eventually fees largely should), the market has tended to treat supply reduction events for other crypto assets as catalysts in the past.

- **Historically, cryptonetwork halving events served as bullish catalysts for several asset both leading up to and after the event.**

Figure: Historical performance before and after asset issuance halving

Date: 6 months prior to and after halving event



Source: Fundstrat, CoinMetrics, Data as of 9/30/20



Downside Potential

- Web 3.0 potential may not materialize, it may be too early to predict how the technology will develop, what impact it will have, what consumer preferences will be, how competition will respond or the addressable market size, which may cause the opportunity to be overstated
- Horizen will likely face intense competition both from traditional technology incumbents and from emerging crypto technology peers, who may offer better solutions, have larger network effects, or other strategic advantages that could result in lower than expected market share
- Horizen may fail to grow DApps on its network, the DApps may fail to attract consumers, user growth may stall, and transaction fee revenue may not materialize, which would negatively impact staking incentives and the price
- Investors may value Horizen using other methods than the user-based model in our report, other comp sets may produce different results, market conditions and value per user rates may change materially
- Crypto technology is still maturing and carries high degrees of uncertainty, volatility and risk, which may cause Horizen to be negatively impacted by unexpected bugs, hacks, political or regulatory scrutiny, industry price declines or other factors that would negatively impact results

Upside Potential

- Web 3.0 potential may prove greater than expected, big tech incumbents may face increasing headwind, crypto alternative internet features may see higher than expected consumer demand, new use cases or markets may emerge, and the size the opportunity may be larger than expected
- Horizen's technology, DApps and network may prove to offer the most desired solution for consumers, user and ecosystem growth may accelerate, transaction fee revenue may grow materially, demand for staking could rise, which would positively impact the price
- Investors may use another method to value Horizen that could result in a higher market price, faster than expected user growth may cause added upside, valuations for comp user bases may rise, market participants may assign a premium to Horizen over its peers
- The opinions expressed in this report are the beliefs of the author at the time of publication. Fundstrat does not commit to update this report and is not responsible for any independent investment decisions made by a reader, based on this and / or any other sources of information.

Source: Fundstrat



Executive Summary

Horizen Introduction

Market Opportunity

Horizen Technology

Ecosystem Overview

Investment Potential

Appendix Information



A general introduction to blockchain

- **Big Tech** is a general term describing unicorn technology companies (including FAAMG) that generate revenue through the collection and selling of users' data.
- **Bitcoin**, the most popular blockchain cryptocurrency, has been evolving into a store of value, while another popular blockchain cryptocurrency, **Ethereum**, is developing use cases in areas such as decentralized applications, smart contracts and token issuance
- **Blockchain** is a distributed database existing on multiple computers at the same time. It is constantly growing as new sets of recordings, or 'blocks', are added to it. Each block contains a series of transactions or other information, a timestamp and a link to the previous block, and a cryptographic hash or signature. Any change to a block changes the signature, which affects the header field for the next and subsequent blocks. Thus, any altered block is immediately identifiable, making the blockchain immutable.
- **Consensus** is the process by which all of the computers reconcile their version of the database and come to an agreement as to which entries to add into their database in the latest block, and to discard their block and replace it with the one a minimum percentage of other computers (typically 51%-67%) all agree is the valid block.
- **Distributed Ledger** is a more general version of a blockchain, and encompasses other constructs, as long as the ledger is independently replicated across multiple computers with no single computer acting as the source of data in the ledger.
- **Proof of Stake** is a validation process by which owners of the token “stake” their holdings on a node to vote on the validity of a given block and have voting rights and potentially receive rewards proportional to their staked holdings.
- **Proof of Work** is the process by which Bitcoin or other token “Miners” process and validate transactions, with the first miner to solve a cryptographic puzzle validating the block and receiving a reward (currently 12.5 bitcoin each); other miners have to then replicate the result to confirm and move on to the next block.

Source: Fundstrat



A Distributed Ledger disintermediates trust providers – for a reduced fee

Traditional Trust Providers

- Trust providers enable transactions as intermediaries vouching for each party and protecting each party from accidental or intentional breach of terms by the other
- They do this by knowing the transacting party or the trust provider representing a transacting party – Know Your Customer (KYC) and Anti Money Laundering (AML) regulations
- Their fees include the cost of creating the knowledge about the transacting parties, operating costs, as well as “insurance” against a particular transaction being invalidated, for example in credit card fraud or in the case of title insurance
- The “insurance” component also covers the expected loss from theft or fraud by insiders

Distributed Ledger

- A distributed ledger maintains immutable records of each party in the transaction
 - Each set of transactions is “signed” through a cryptographic hash process.
 - If a previously validated transaction is changed, the hash signature would be invalid not only on the transaction set that was modified, but also each subsequent transaction set, unless a new hash signature was created for all affected transaction sets
 - Since the identical ledger exists in multiple, unrelated entities, any changes to the ledger and the resulting hashes needs to be reflected in a large number of copies (between 51% and 67% depending on the security protocol being used) before it is accepted as true and replicated in the remaining copies of the ledger
 - This creates trust that the network agrees on all transactions being processed, and the ability of the party to conduct the transaction (e.g. that it actually has the funds it is attempting to spend, and hasn’t spent them elsewhere)
 - The primary cost of the distributed ledger system is the basic KYC / AML provision and the operating cost of the network.
 - A distributed ledger can be slower than centralized processing owing to the time for the transactions to propagate throughout the network
- Protection against fraudulent transactions is built into the system and does not require “insurance premiums” to be charged, reducing the cost of providing trust

Source: Fundstrat



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