TL;DR Why you should care about Web3

The Market Size

- Defi has grown to an $80 billion industry in 2021, with expectations to grow 10-fold based on current trends.
- NFT trading volume reached $10.7B in Q3 2021.
- Defi and NFTs are only a subset of what Web3 can offer, with no signs of growth stopping. It's clear Web3 will be a multi-billion $ opportunity, likely a multi-trillion $ opportunity.

The Key Drivers

- **Regulation**: Web3 players want to see more regulation. President Biden signed an executive order to discern how digital assets will be treated.
- **Climate Change**: More tokens are emerging that are moving away from energy intensive Proof of Work to address climate concerns.
- **Scalability**: Blockchain cannot process transactions at the pace Web 2.0 can. Strong infrastructure is imperative for Web3 to scale.
- **Security**: Rug pulls and stolen crypto/assets are a major concern. It is still difficult for users to restore their assets and take legal action.
- **Ease of Onboarding:** Web3 still remains quite technical for the average user and onboarding is not seamless. Tools to help with education and adoption are necessary. Web2.5 will be the bridge from Web 2.0 to Web3.

The Opportunity

- **DeFi**: Cross-border payments that utilize stablecoins makes it frictionless for P2P transactions and companies to pay workers abroad. This results in faster payments and lower transaction fees. Web3 can transform finance.
- **Creators**: Web3 enables users to take ownership of their content like NFTs or social tokens. This drives creators to Web3 since they have a greater upside than relying on Web2 incumbents like YouTube or Instagram to pay them. Creators need more Web3 tools to build and expand their communities.
- **Communities**: DAOs enable community members to take ownership and control over how they want their organization to develop and thrive. This helps align economic and community incentive.
- **Gaming**: Users can play-to-earn and accrue digital assets which can then be converted to fiat currency. Blockchain enables gaming studios to create their own economies on platform, promoting alignment between studios and users.
- **Infrastructure**: To support a large volume and quick transaction speeds, investment in protocol layers are critical. These players will become an integral part of the ecosystem and are already showing high valuations.

A History

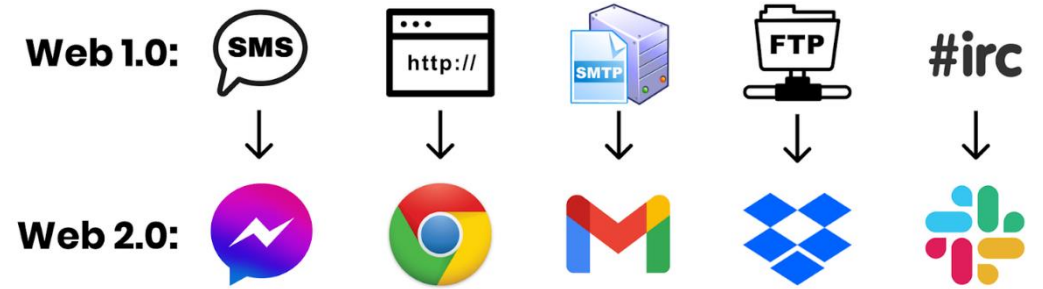Harlem Capital

Looking Back

How Web3 was born

Web 1.0 - Static

- Web 1.0 is the early days of the internet (1980s-Early 2000s). Its main use case was to provide online content and information.
- Building in Web 1.0 required **technical expertise**. Majority of users just **read** online content.
- It was **decentralized and built on open** protocols. HTTP for websites, SMTP for emails, SMS for texts, and so forth.
- It did not capture user data. It was **difficult to monetize** money just building protocols.
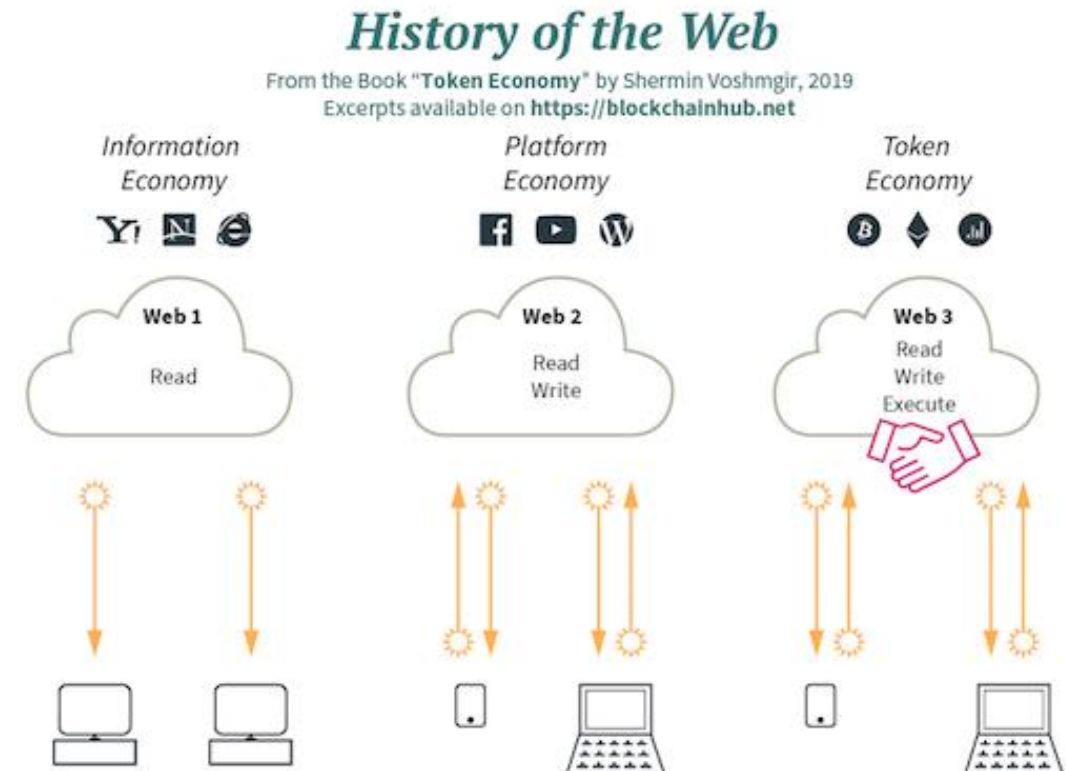
Web 2.0 - Dynamic

- Web 2.0 (mid 2000s-present) gave rise to social media platforms and internet entrepreneurs. Web 2.0 **promoted interactions between creators and users**.
- Web 2.0 companies made it possible for the general public **to easily participate and build** a presence online. One could use Facebook or Squarespace to express ideas instead of coding a website.
- On the flipside, Web 2.0 companies started to develop more control. They started aggregating and leveraging **personal user data to drive revenue**. The web became more **centralized** but also **closed**.

Web 1.0: SMS, http://, SMTP, FTP, #irc
Web 2.0: (Messenger, Chrome, Gmail, Dropbox, Slack)

Idea Source: Stuffed Blocks   Source: not boring

History of the Web
From the Book "**Token Economy**" by Shermin Voshmgir, 2019
Excerpts available on **https://blockchainhub.net**

Information Economy   Platform Economy   Token Economy

Web 1 — Read
Web 2 — Read Write
Web 3 — Read Write Execute

Web3 in Depth

Web3 - Decentralized

Web3 is characterized to be the most decentralized version of the internet built on blockchains like Bitcoin and Ethereum. **You get to own your data and develop digital property rights.**

How does decentralization work?
- Web3 apps (dApps) are smart contracts.
- Smart contracts are self-executing software agreements. These automatically execute when certain criteria are met.
- Smart contracts can verify and perform a transaction between parties. They replace the need for an intermediary to execute transactions.

Benefits
- Revolutionary: Web3 is the natural step to introduce new use cases with limitless potential.
- Ownership: Users who create, maintain, and improve the network itself will be rewarded. They will have ownership over what they build in Web3.
- Cryptographic Proof: Because smart contracts can eliminate the middleman, incentives will be more aligned between suppliers and customers in transactions. Trust will not be an issue.

Limitations
- Lack of accessibility: It is not as easy to build on Web3, nor is it as easy to understand as a user.
- Scalability: Web3 transactions are slower. Web 2.0 can process thousands of transactions in a brief period of time, while Web3 lags behind.
- Cost: Most successful dApps put very small portions of their code on the blockchain as it is expensive. There are also related environmental costs.
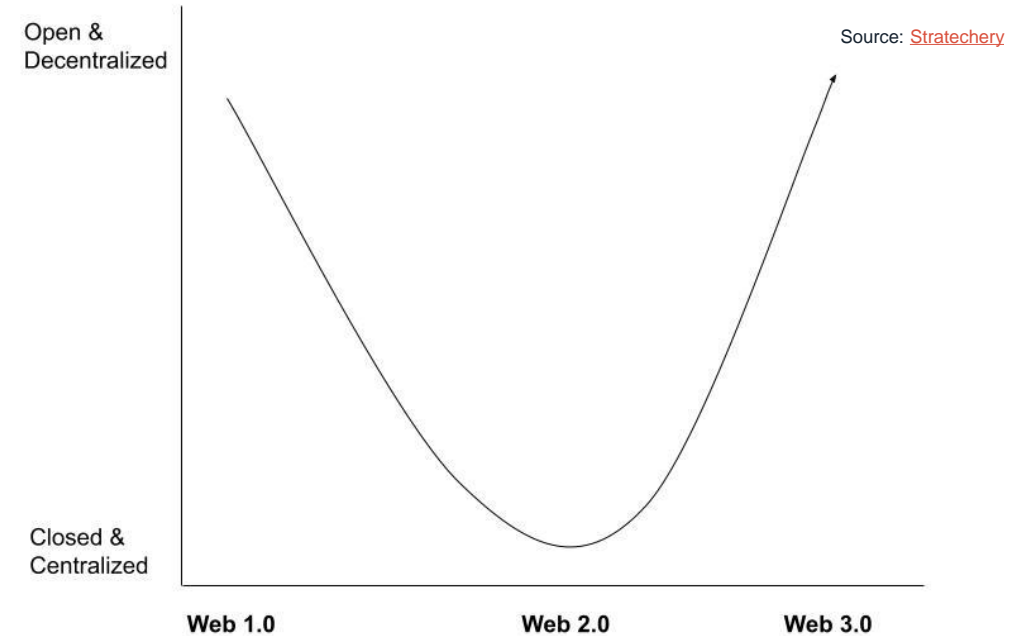
Web 2.0

Control is centralized amongst huge giants like Twitter and Facebook.

Personal data is collected.

Server failure is more of a risk.

Intermediaries are required between suppliers and consumers.

Web3

Content can be uncensorable because control is decentralized.

Web3 does not require personal data.

Web3 servers can't go down as it's a decentralized network of 1000s of computers.

No intermediary needed.

How it Works

Blockchain Visualized

Blockchain is a digital and distributed ledger of transactions that are recorded and replicated in real time across a network of computers or nodes.

1) Transaction

Two parties exchange data which could be money, contracts, medical records, or any other asset in digital form.
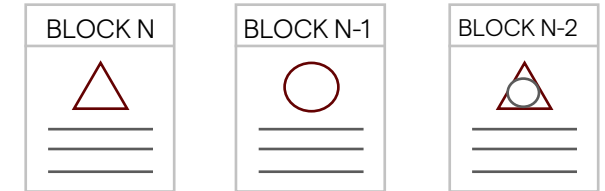
2) Verification

Depending on the network's parameters, the transaction is either verified instantly or transcribed into a secured record and placed in a queue of pending transactions.

The nodes—the network's computers or servers—determine if the transactions are valid based on a set of rules the network has agreed to.
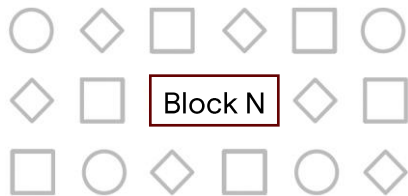
3) Structure

BLOCK N   BLOCK N-1   BLOCK N-2

Each block is identified by a hash, a 256-bit number, created using an algorithm agreed upon by the network.

A block contains a header, a reference to the previous block's hash, and a group of transactions. The sequence of linked hashes creates a secure, interdependent chain.
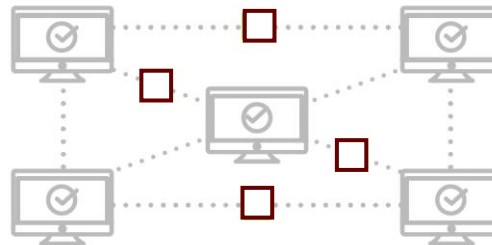
4) Validation

Block N

Blocks must first be validated to be added to the blockchain.

The most accepted form of validation for open-source blockchains is proof of work—the solution to a mathematical puzzle derived from the block's header.

5) The Chain

When a block is validated, the miners that solved the puzzle are rewarded and the block is distributed through the network (proof of work).

Each node adds the block to the majority chain, the network's immutable and auditable blockchain.
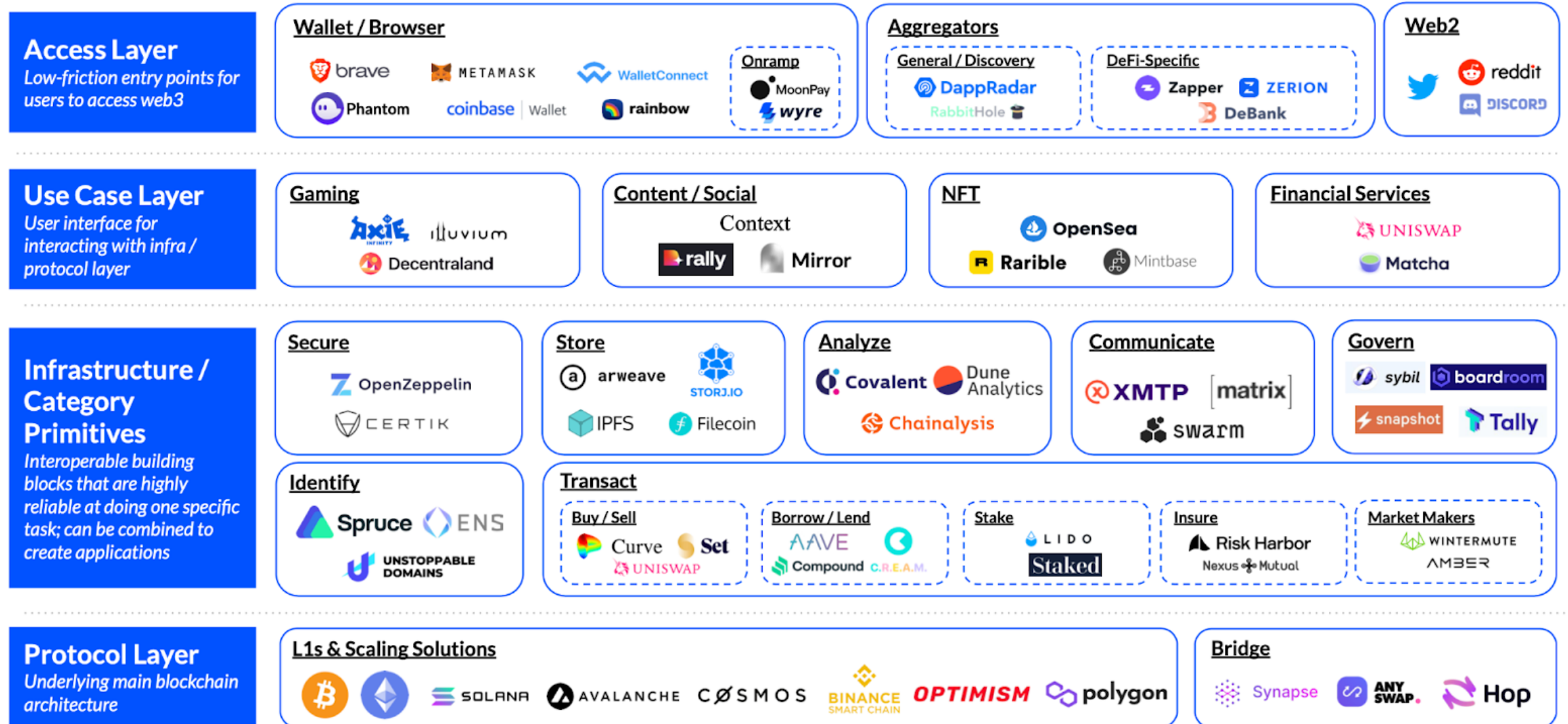
*Built in Defense

If a malicious miner tries to submit a modified block to the chain, the hash function of that block, and all following blocks, would change.

The other nodes would detect these changes and reject the block from the majority chain, stopping corruption.

Web3 Tech Stack

To best understand how blockchain and web3 works, we will explore the layer from the bottom (foundation) to the top (user interface).

Access Layer
Low-friction entry points for users to access web3

Wallet / Browser
- brave
- METAMASK
- WalletConnect
- Phantom
- coinbase | Wallet
- rainbow

Onramp
- MoonPay
- wyre

Aggregators

General / Discovery
- DappRadar
- RabbitHole

DeFi-Specific
- Zapper
- ZERION
- DeBank

Web2
- Twitter
- reddit
- DISCORD

Use Case Layer
User interface for interacting with infra / protocol layer

Gaming
- AXIE INFINITY
- illuvium
- Decentraland

Content / Social
- Context
- rally
- Mirror

NFT
- OpenSea
- Rarible
- Mintbase

Financial Services
- UNISWAP
- Matcha

Infrastructure / Category Primitives
Interoperable building blocks that are highly reliable at doing one specific task; can be combined to create applications

Secure
- OpenZeppelin
- CERTIK

Store
- arweave
- STORJ.IO
- IPFS
- Filecoin

Analyze
- Covalent
- Dune Analytics
- Chainalysis

Communicate
- XMTP
- matrix
- swarm

Govern
- sybil
- boardroom
- snapshot
- Tally

Identify
- Spruce
- ENS
- UNSTOPPABLE DOMAINS

Transact

Buy / Sell
- Curve
- Set
- UNISWAP

Borrow / Lend
- AAVE
- Compound
- C.R.E.A.M.

Stake
- LIDO
- Staked

Insure
- Risk Harbor
- Nexus Mutual

Market Makers
- WINTERMUTE
- AMBER

Protocol Layer
Underlying main blockchain architecture

L1s & Scaling Solutions
- Bitcoin
- Ethereum
- SOLANA
- AVALANCHE
- COSMOS
- BINANCE SMART CHAIN
- OPTIMISM
- polygon

Bridge
- Synapse
- ANYSWAP
- Hop

Web3 Infrastructure

Web3 relies more on P2P connections. Critical aspects of underlying blockchain infrastructure include key management, networking firewalls, and other security considerations.

Blockchain infrastructure providers (IaaS) establish and provide direct infrastructure access to customers.

A blockchain infrastructure platform-as-a-service (PaaS) provider coordinates and maintains the access. It offers the ability to run secure infrastructure on multiple blockchains without having to develop the technological capabilities in-house.

Pros	Cons
Decentralized governance	Difficult to scale, as more transactions slow down the system
Client node owns their data	
Can support multiple clients	Very technical
No single point of failure (relies on 1000s of computers/nodes)	Can require a lot of energy

Infrastructure
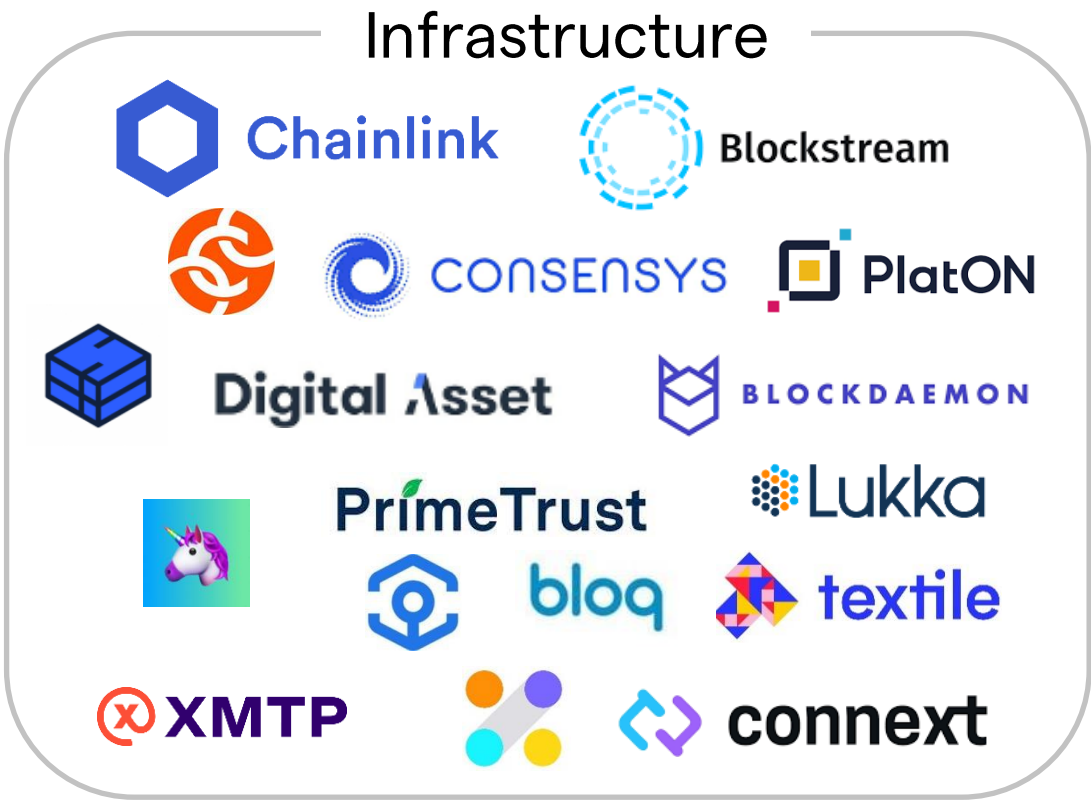
🚀 Alchemy is a developer platform used to build applications on top of blockchains like ETH. NBA Top Shot, Axie Infinity, and OpenSea were built using Alchemy. It raised $200M with a $10B valuation.

🦄 Other unicorns include: Bitmain ($12B), Chainalysis ($4.2B), Blockdaemon ($3.25B), Blockstream ($3.2B), and ConsenSys ($3.2B).

Use Cases

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Web3 Tokens

Web3 digital assets can be fungible or non-fungible. Fungible assets can be exchanged interchangeably like Bitcoin. Non-fungible means that an asset is distinct and unique; non-fungible assets cannot be substituted for one another. Tokens can be both.

Crypto

Cryptocurrency is fungible as it mimics the qualities of traditional currency, except that it's decentralized.

Single-use Case Crypto: BTC
- Bitcoin was created by Satoshi Nakamoto
- Its only use case is to serve as **digital money**

Multi-use Crypto: ETH
- Ethereum was created by Vitalik Buterin.
- ETH can be used for **digital money**, but **also** to create decentralized apps (**dapps**).

Crypto can be bought on exchanges like Coinbase and Binance.
You can also earn interest with crypto by:
- **Staking** – using your crypto as collateral needed to operate blockchain
- **Yield farming** – lending out your crypto to supply liquidity to a Defi protocol

Wallets
In order to access, send, or receive web3 tokens, you need a wallet. Wallets store keys, which provides access to your funds. You can use wallets to make transactions.

Software Wallets – these are the most convenient but less secure.

Hardware Wallets – these are the most secure since it can only be hacked physically.

**Global funding to custody and wallet providers grows to $6.3B in 2021**

Funding $6,319M

Deals 77

Year	Deals	Funding
2017	26	$337M
2018	57	$1,017M
2019	42	$357M
2020	39	$910M
2021	77	$6,319M

Web3 Tokens

Stablecoins are another form of fungible digital currency. They are collateralized by another asset (fiat currencies, gold, etc.). By pegging their value to an external factor, stablecoins are less volatile.

The rise of the stablecoins continues
Media mentions of stablecoins, Q1'17 – Q4'21
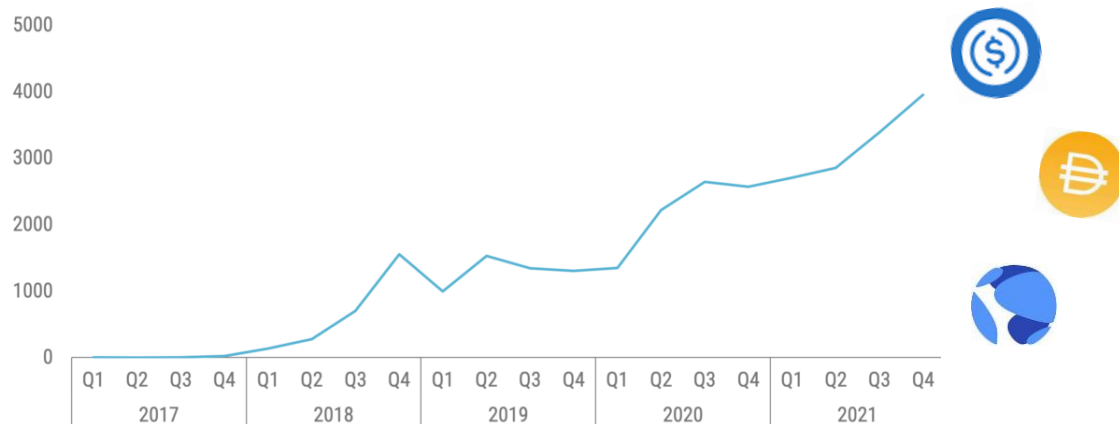
Source: cbinsights.com   CBINSIGHTS

Applications
- P2P Payments/Transfers – quicker, lower fees, can be used globally, and sent over internet
- Minimize volatility
- Daily currency

Considerations
- Regulation
- Less liquidity

💡 The future of stablecoins will depend on whether it can be used for a wide variety of everyday use cases.

Source: CB Insights, Social Tokens Guide

Social tokens can come in three forms: personal, community, and creator. It allows individuals and communities to monetize themselves – a new rewards system. This can change what marketing will look like in Web3.

Personal Tokens
This is created as a mechanism to invest in an individual's personal or professional goals. An example $BOB founded by Bobby Thacker. Certain amounts of $BOB provide these awards.

Community Tokens
These are used to unite people around a common interest. Perks of these tokens are exclusive access and privileges to a community e.g., $FWB, $CHZ, and $DESK.

Creator Tokens
Creator tokens is a combination: creators their unite fans together into a community. The investment is both into the creator's personal success but the audience as well e.g., $WHALE and $RAC.
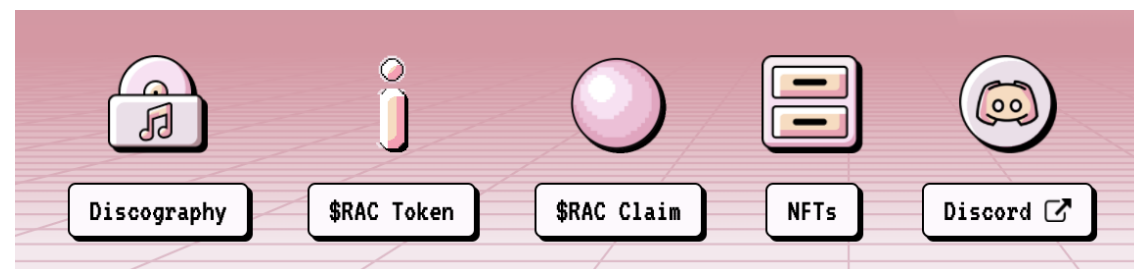
💡 Platforms like Rally enable creators and communities to launch these social tokens to enable transactions and new interactions. More apps will be needed to manage, promote, and discover new use cases.

12

Web3 NFTs

Non-fungible tokens (NFTs) look to completely alter the standard for monetization related to digital assets.
- NFTs function as proof of ownership over a unique asset. It can give owners more **social capital** as possessing a certain NFT can signal status within the crypto community.
- **This creates dual incentives for market actors to promote both the ecosystem and asset ownership.** The NFT market cap is $7B.

Maintaining Provenance
- NFTs are commonly associated with digital artwork.
- Growing numbers of people (especially Gen Zs) are more comfortable placing monetary value on nontangible assets.
- NFTs can be issued for physical works of art as well. This can provide tracking history, provenance, and archival material.

Investing in Favorite Artists
- Fans can share in royalties and support their favorite artists by purchasing NFTs.
- Audius allows artists to own part of the decentralized streaming platform. This provides artists more autonomy over the music they create and release.

Gaming - NFTs are used in Web3 games to represent in-game content like characters, skins, accessories, and more. This is further explored in the next slide.

Gaming and art are just the beginning for NFTs. **Given that NFTs act as certificates of authenticity, they can be used for medical records, credentials, intellectual property, and more.** Other use cases will continue to emerge.

Global funding to NFT startups increased 130x, reaching to $4.8B in 2021
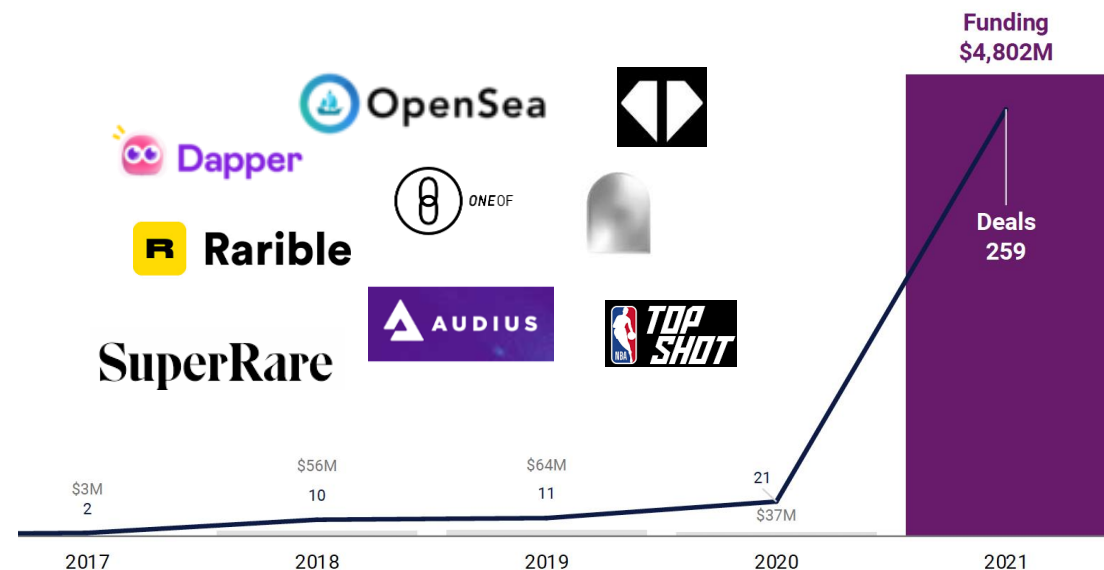
Bored Ape Yacht Club NFT project eclipsed $1B in all-time sales in early January. The floor price is ~111ETH i.e. >$350k.

Web3 Gaming

Blockchain enables gamers to have more chance to compete, earn rewards, and exchange assets across digital universes.

Play-to-earn Model
- Users are being paid to play games. By making an investment to play and compete in games like Axie Infinity, users can make a return.
- Users can also cash out digital assets for real currency.

Ownership and Economies
- Blockchain enables users to own in-game assets (skills, skins, etc.) across digital worlds. This is because blockchain is open and permissionless.
- This makes it easier for users to sell these assets for profit, without an intermediary. These exchanges will be more transparent and secured on blockchain.
- **Marketplaces will naturally arise due to the fluidity of gaming and carrying over assets.**

With a <u>growing gaming market and more freedom in Web3</u>, it is only natural to see the <u>next iteration of game development and play move to blockchain</u>.

🚀 Solana Ventures, Lightspeed, and FTX announced a $100M investment initiative around Web3 gaming.

Game developers are less interested in NFTs and crypto.
According to a survey that polled 2,700 game developers 72% stated they are not interested in crypto as a payment and 70% are not interested in NFTs. 33% believe the metaverse concept won't deliver. EA and Team17 recently scrapped NFT projects due to negative gamer feedback.

NFT market is largely driven by traders, collectors, and gamers. **There is a whitespace for Web3 gaming companies as Web2 incumbents are more wary of the space.**

Gaming Studios

Games to Watch

Web3 Community

A Squarespace survey revealed <u>Gen Zs place more weight on digital life than in person</u>. Gen Zs believe how you present yourself online matters more, too. Gen Zs and Millennials comprise a significant portion of online users.

- Web3 platforms that encourage meaningful engagement and communication will resonate more with users.
- Startups that build tools that make it easier to communicate across blockchain and Web3 platforms will be valuable.

Creator and Follower Engagement
- Hundreds of tools exist for the ever-growing creator community.
- Gen Zs are more likely to idolize creators than traditional Hollywood figures.
- **Web3 gives a chance for creators to interact with followers in new ways**: sharing social tokens, virtual experiences, and exclusive digital merch.
- Followers can have more of a stake in their favorite creators.

Social Community drives Growth
- The first users of Discord were gamers and continue to be a large contributor to the platform's popularity.
- Web3 startups that focus first on gamers may have an advantage as they try to build expansive social communities.

<u>**DAOs (Decentralized Autonomous Organizations)**</u> are internet-native businesses that are collectively owned and managed by their members.

Power in Community
- Since DAOs are based on smart contracts, no one individual can change or control the DAO.
- All members are treated equally.

Inclusion
- DAOs **provide individuals the ability to buy NFTs or invest** in opportunities that they wouldn't be able to afford on their own.
- DAOs can level the playing field so that groups of people can participate, instead of just exclusive individuals.

DAO Components

Communication	Crowd Funding	Governance	Treasury

🚀 Superdao raised $10.5M l(led by SignalFire at $160M valuation) to build a platform that handles the above workflows to ease running a DAO.

Web3 Finance

Web3 provides more financial services especially for under-resourced groups as it can eliminate barriers enforced by traditional institutions. DeFi (decentralized finance) omits third parties involved in financial transactions to reduce bias and increase efficiencies.

Custody with Less Risk
Even though current exchanges like Coinbase still rely on an intermediary, **true custody in Web3** significantly decreases cybersecurity risk as it will no longer rely on humans as middlemen, who are prone to error.

Quicker Payments
Cross-border payments benefit from blockchain as it **reduces the need for verification** from third parties and the **processing time** for traditional bank transfers. This **reduces the fees** associated with payments as it will eliminate a third party. Consequently, crypto could become a preferred way to pay foreign workers.

Loans without Bias
- Historically reporting agencies (Equifax, Experian, and TransUnion) provide data for an individual's credit worthiness. This can be unfair for people with lower financial literacy as they can be prone to damaging their credit score, which is then difficult to restore.
- With Web3, **blockchain can offer more secure and various data to evaluate an individual for loans**. This can provide loans to a broader pool of consumers.

Insurance
- Insurance has high processing time and costs to validate the source of truth for transactions between parties.
- Blockchain can dramatically increase operational efficiency as it would be the **singular source of truth** due to its immutability.

Fundraising
- ICOs (initial coin offerings) are changing the way entrepreneurs access capital.
- Instead of relying on traditional investors or VCs, entrepreneurs raise money by selling tokens or coins.

Finance

Custody

Payments & E-commerce

Lending

🦄 Unicorns include: Fireblocks ($8B), Gemini ($7B), and Circle ($3B).

💡 Moving to DeFi will require time and adjustment. Apps that can bridge CeFi to DeFi will be key like Binance.

Other Web3 Use Cases

Blockchain touches areas that might not immediately come to mind. Cryptocurrency and DeFi are just the beginning. Blockchain's ability to make information immutable and transparent presents use cases across many industries. Below is only a subset of what is to come.

| Industry	Use Case
Aerospace/Defense	• Share and track R&D data • Streamline parts inventory + authentication
Corporate Governance	• Make business accounting more transparent • Easier to track and see ESG initiatives in action • Intersection of policy and blockchain
E-commerce	• Lower transaction costs and increase transaction security • More traceability of purchases
Education	• Securing academic credentials and streamlining verification process • Reduce manual education processes
Energy	Minimize the need for intermediaries for energy exchange processes
Healthcare	Share sensitive information across many platforms and networks
Public Sector	• Infrastructure for secured voting • Reduce paper-based processes • Better mail ops and services
Real Estate	Record, track, and transfer land titles, property deeds, and other docs

Investing in Web3

Harlem Capital

Web3 Key Drivers - PESTLE

	Political	Economic	Social	Technological	Legal	Environmental
Headwinds	• Crypto could circumvent political sanctions • China outlaws crypto	• Asset **bubble** - speculative value of digital assets • Can be subject to high volatility	• **Fraud**: "rug pulls" (majority of token holders cashing out) • Lack of fail-safe measures ($625m Axie Infinity crypto hack)	• Lack of blockchain scalability • Smart contract risks • High **learning curve**	• Fragmentation of local and global regulations • Lack of insurance for assets • Lack of recourse for stolen assets	• High energy usage • Potential climate harm
Tailwinds	• Biden signs executive order on crypto for unified national policy • $63M in crypto assets have been donated to Ukraine	• New **models of monetization** (NFTs) • New biz models e.g. **play to earn** • More incumbents (e.g. Stripe) creating crypto offerings	• Crypto ownership doubled in US, LATAM, and Asia • Cryptocurious is 47% women globally	• **ETH** supports all use cases • ETH 2 - lower transaction fees + more transactions • **Emerging blockchains** that create optionality	• Regulatory clarity around digital assets • Eliminate Barriers to Innovation Act – bill for working group on digital assets	• Moving away from Proof of Work (energy intensive) • Use more environmentally friendly mechanisms like Proof of Stake or Proof of History

2021 Investment Activity

VC Deal Count in Crypto/Blockchain by Stage
Source: Galaxy Digital Research
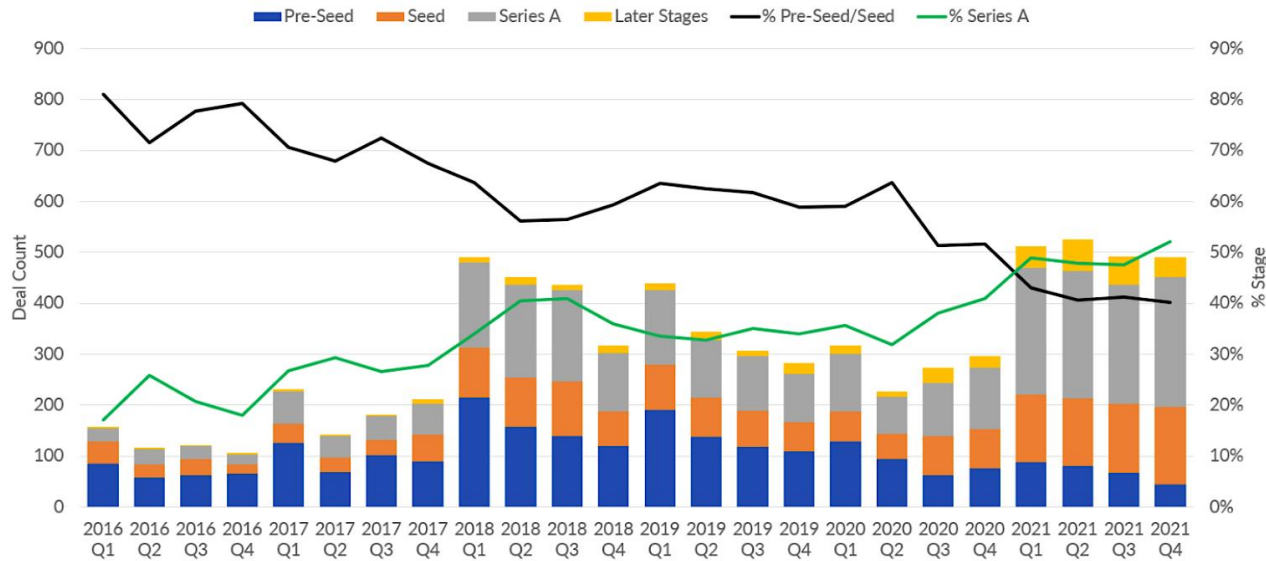
Data: Pitchbook

Conclusions

- At least **43 companies** that raised venture capital in 2021 are **unicorns**.
- **Valuations** in the crypto/blockchain space were **141% higher** than the rest of VC space in Q4 2021.
- Crypto markets and opportunities are expanding across different categories.
- Crypto/blockchain startups received **5% of venture capital** deployed in 2021.

2021 Top Blockchain Investors		Company Count
1	Coinbase Ventures	68
2	AU21	51
3	a16z	46
4	Animoca Brands	45
5	Alameda Research	44
6	LD Capital	36
7	Jump Capital	31
8	ParaFi Capital	30
9	X21	29
10	Pantera Capital	28

New Funds Raised in 2021 by Crypto/Blockchain VC Firms
Source: Galaxy Digital Research

Fund Name	Investor	Date Closed	Amount
Paradigm	Paradigm	November 15	$2.5bn
a16z	Andreessen Horowitz	June 24	$2.2bn
HIVEMIND	Hivemind Capital Partners	November 29	$1.5bn
10T	10T Hodlings	September 8	$750m
PANTERA	Pantera Capital	November 23	$600m
initialized()	Initialized Capital Management	December 14	$530m
BORDERLESS CAPITAL	Borderless Capital	December 1	$500m
JumpCapital	Jump Capital	September 14	$350m
BLOCKCHAIN CAPITAL	Blockchain Capital	April 14	$300m
Z venture capital	ZVC (LINE Ventures + YJ Capital)	April 1	$275m

Data: Pitchbook

Harlem Capital's Areas of Interest

Sub-Vertical	Description
Infrastructure	Platform-as-a-service (PaaS) providers that coordinate and maintain access to the infrastructure that powers blockchains, such as dev tools and nodes, bundled with the underlying infrastructure needed to operate their systems, such as cloud storage and security.
Capital Markets & Financial Services	Refers to companies that primarily develop solutions for financial institutions and intermediaries to address issues of clearance, settlement, and data management, among others, as well as to companies that build new blockchain-based investment vehicles.
Enterprise Services & Currencies	Blockchain services companies primarily develop blockchain operating systems, APIs, and protocols intended for multiple and varied use cases, or companies that act as general-purpose blockchain consultants, typically for enterprises. Blockchain currencies refers to companies that build unique and custom cryptocurrencies and tokens.
Data & Analytics	Companies building powerful tools for blockchain research that provide tools to query, extract, and visualize vast amounts of data from the blockchain.
Content Management & NFTs (Non-Fungible Tokens)	Content companies primarily operate blockchain-based content platforms, whereby publishers and creators establish immutable rights and ownership of content and engage in microtransactions for the usage of content. NFTs are blockchain tokens representing a unique, digital item, that allow individuals to buy and sell ownership.
P2P Marketplaces & P2P Lending	Primarily operate blockchain-based, peer-to-peer marketplace platforms, where users can exchange goods directly and without the use of an intermediary. P2P lending refers to companies that develop blockchain-based, peer-to-peer lending platforms which allow users to engage in lending transactions with peers, as opposed to traditional financial institutions.
Storage, Security & Regulatory	Storage companies that primarily store data with blockchain-secured technology. Security & regulatory companies assess risk from and to blockchains, build secondary security systems, blockchain security applications, or monitor cryptocurrencies for criminal activity by assembling an audit-trail of cryptocurrency addresses.
Cryptocurrency Mining	Companies that primarily build or operate hardware, software, cloud-based pools, and other services for the mining of cryptocurrencies.
Merchant Services	Refers to companies that primarily develop cryptocurrency and blockchain solutions for merchants and sellers. This category includes blockchain-based rewards programs, cryptocurrency point-of-sale kiosks, and merchant-directed blockchain consulting services.
Social & Browsers	Social companies primarily develop blockchain-based social networks. Browser companies primarily build blockchain-secured web browsers, often including microtransaction capabilities.
IoT & Identity	IoT companies primarily assign physical assets blockchain-secured digital signatures and establish trusted networks by which these physical assets can communicate. Identity companies primarily build identity management applications for consumers to record and secure identification data.

Key Area of Interest for HCP

Let's change the face of entrepreneurship, together.

Harlem Capital