
HV
CAPITAL

EXECUTIVE SUMMARY

1. In the past, majority of investments into crypto was dedicated towards building the fundamental infrastructure for blockchain applications and was thus often out of scope for generalist VC
2. Crypto assets have reached a total market cap of ~$2 trillion and global VC investments into blockchain startups have reached an all-time high in 2021, making up ~5% of total investment value
3. Out of all verticals, decentralized finance (DeFi) continues to be the most mature in terms of total capital invested (~42%) and the broad range of established and emerging players in the market
4. NFT-based companies and products yield the potential to disrupt major industries and have rapidly caught up in 2021, attracting ~18% of total invested capital within the crypto space
5. Numerous other verticals in the crypto space also yield great promise, yet are still in an emergent phase and have yet to mature and prove themselves

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INTRODUCTION

NOTABLE UNICORNS & DECACORNS

In only a few years the crypto space has witnessed the rapid rise of dozens unicorns and decacorns around the globe. The crypto space has seen increasing maturity with a majority of VC deals being growth stage investments.

Unicorns & Decacorns

OpenSea
coinbase
robinhood
kraken
Dapper
DFINITY
Bakkt
BITMAIN
sorare
BINANCE
BlockFi
Blockstream
bitpanda

Crypto Natives

arweave
NEAR
ripple
1inch NETWORK

CRYPTO MAKES UP 5% OF TOTAL FUNDING, MAJORITY GOING TO GROWTH DEALS[1]

Global VC investments are rapidly growing with increased momentum observable in Series A and later stage investments. Historically, early-stage deals are not typically led by VCs, explaining lower investment counts and value in these stages.

Global VC Investments

VCs invested a record $33b in crypto startups in 2021 biggest year ever, 10.5b in Q4 alone

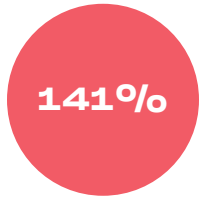
Crypto Share

Crypto makes up about 4.7% of all capital invested by VCs

Deal Sizes

22b (67%) went to fundraising rounds with deal sizes over 100m

Crypto Valuations



Valuations in crypto/blockchain space were 141% higher than the rest of the VC space in Q4 2021

Unicorns

At least 43 unicorns that raised venture capital in 2021 are unicorns

Stage Shift

Pre-Seed deals continue declining while Series A and later stages are growing (~50% growth in Series A since Q1 2020)

Verticals

DeFi continues to be most popular vertical (42% of deals), but NFT/Web3/metaverse quickly catching up (18%)

Funds

500+ funds in the space. 21 first timers joined in 2021

[1] Source: Galaxy Digital Research – 2021: Crypto VC's Biggest Year Ever

A16Z HAS BEEN SPEARHEADING THE CRYPTO-SPACE

A16Z has been investing in crypto since 2013. Since then, A16Z has been betting big on blockchain and web3, spearheading crypto investments among all globally reputable funds, also outraising most blockchain-only funds.

A16Z's Bet on Crypto

a16z Crypto

"We believe that the next wave of computing innovation will be driven by crypto."[1]

- Has been investing in crypto since 2013 and brought out multiple crypto unicorns since then.
- Has more than $3B under management across three funds, dedicated to crypto companies and protocols
- Raised the second largest crypto fund ever in June 2021 ($2.2B). Is looking to raise another $4.5B for crypto investments, which would be the biggest dedicated crypto fund ever.[1]
- Has dedicated a16z crypto investment team and dedicated operating team which provides operational support to entrepreneurs
- Invest at all stages, all geographies, all areas of crypto, including infrastructure, new layer 1s, DeFi, NFTs, gaming, DAOs, social tokens, decentralized social networks, web3 apps and new ideas

Notable Investments

OpenSea, Sky Mavis, Dapper, coinbase, Maker, DFINITY, Uniswap, OpenBazaar, bitcoin, ethereum, ripple

[1] Source: a16z's Chris Dixon, Katie Haun, and Ali Yahya (link here)
[2] Source: Financial Times (link here)

DEDICATED CRYPTO VC FUNDS BETTING BIG ON BLOCKCHAIN

Aside from a16z, there are numerous funds with a heavy focus on or dedicated exclusively on crypto, blockchain, web3 investments.

Fund	2021 Closing	Amount
Paradigm	November 15	$2.5B
Andreesen Horowitz	June 24	$2.2B
Hivemind Capital Partners	November 29	$1.5B
10T Holdings	September 8	$750M
Pantera Capital	November 23	$600M
Initialized Capital Management	December 14	$530M
Borderless Capital	December 1	$500M
Jump Capital	September 14	$350M
Jolt Capital	September 6	$320M
Blockchain Capital	April 14	$300M

Other Crypto Investors

coinbase Ventures

Multicoin Capital

DIGITAL CURRENCY GROUP

POLYCHAIN CAPITAL

DRAPER ASSOCIATES

GRAYSCALE

1confirmation

GREEN FIELD ONE

[1] Source: Galaxy Digital Research – 2021: Crypto VC's Biggest Year Ever

HV'S PEERS ARE ALSO BETTING ON BLOCKCHAIN & WEB3

HV Capital's more proximate German and European peers have embraced the crypto space already or are beginning to invest in the space. However, in contrast to dedicated crypto funds, the majority of investments by HV's peers are not crypto native.

HV Peers	Notable Crypto Investments[1]
Accel	Circle, Chainalysis, Sorare
Atomico	SheeldMarket, StarkWare, Sorare
Cherry	Newly raised Jan '22 fund will include crypto deals
Creandum	Argent, KnCMiner, Scapin'
Earlybird	FQX, Upvest
GFC	Flint
HV	Upvest, Rvvup, Amuzed
Lakestar	Blockchain.com, Zebedee, Aglet
Northzone	3Labs, OpenZeppelin, LivePeer
Point Nine	Bitbond, Chainalysis
Sequoia	Flint, FTS, Fireblocks, Chanalysis, Filecoin

[1] Not exhaustive

FUNDAMENTALS

WEB3 — THE FUTURE OF THE INTERNET

Web 3.0, or "Web3", is the idea of a new era of the internet – a decentralized internet based on blockchain technology and protocols. The vision for Web3 is to create an internet which is more democratic, transparent, fair and innovative.

Past, Present & Future of the Internet

Web 1.0	Web 2.0	Web 3.0
1990 - 2005	2005 - 2020	2020 - Future
"The Open Internet"	"The Internet of Centralization"	"The Internet of Blockchains"
• "read-only" version of the internet (e.g., websites, blogs, etc.) • Fragmented, no large tech companies dominating flows and user data	• "read and write" with focus on user-generated content (e.g. social media, YT, etc.) • Centralized, dominated by large tech players owning user data • Centralization stifles innovation	• "read, write and own" with blockchain and NFTs • Decentralized and distributed through blockchain • Democratizes the internet, allows users to own and control their own data • Decentralization stimulates innovation

The Problem with Centralization — Centralization carries multiple risks: censorship, lack of data security, downtime and power abuse by centralized entities. Web3 solves these risks.

Further Reading & Resources:

Article by A16Z: Why Web3 Matters (Link)
Publication by A16Z: The Web3 Market Landscape (Link)

Potential Web3 Transition

Emergence of web3 companies emulating and challenging their web2 counterparts across sectors

BLOCKCHAIN: WHAT IS IT?

In essence, blockchain fulfills the same function as ledgers and databases: recording and storing data. Blockchains record and store data using cryptography, making them highly secure. Furthermore, they are decentralized and distributed in that they are publicly governed by networks of computers.

Blockchain Explained

Core Concept in 1 Sentence: Essentially, a blockchain is a digital ledger[1] that stores data – but in an extremely secure way using cryptographic principles.

- In principle, a blockchain fulfills the same function as a ledger or database: it stores data. Yet it does so very differently
- A blockchain stores data based on decentralization and cryptography, making them extremely secure: stored data is immutable (i.e., cannot be tampered with; see next slide)
- The blockchain itself is stored in a distributed peer-to-peer network of public computers (i.e., many computers store the same blockchain), making its contents fully transparent to the public
- Blockchain technology gives rise to new types of business models, products (e.g., dApps), organizations (e.g., DAOs) and technologies (e.g., smart contracts, NFTs, etc.)
- Blockchain technology carries the potential to change how the internet, or world, fundamentally works, making it more efficient, transparent and trustworthy

Technological Basis for…

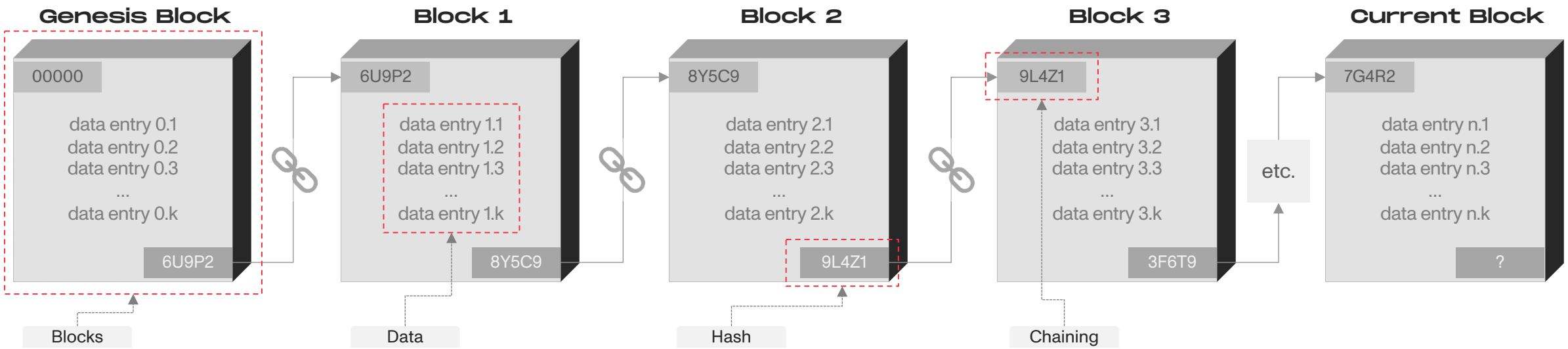
- Cryptocurrencies and tokens
- Smart Contracts
- Decentralized Applications (dApps)
- Decentralized Autonomous Organizations (DAOs)
- Non-Fungible Tokens (NFTs)
- Web3
- “The Metaverse”

Further Reading & Resources:

Video: “How does Blockchain work – Simply explained” (Link)
Article: Blockchain Technology Defined (Link)

[1] Ledger = Buch (Buchhaltung), Register, Kontoblatt

BLOCKCHAIN: HOW DOES IT WORK?



Blocks

Blocks are the fundamental "building blocks" of a blockchain. A block can be thought of as a ledger, transaction book or section within a database. The "Genesis Block" is the 1st block in a blockchain.

Data

Data entries are added and stored in each block. Entries can be transaction data or other types of data (e.g., smart contracts, NFTs, etc.).

Hash

Once a block is "full", a hash (i.e. a cryptographic code) is calculated which "seals" the block, securing its contents. It is this cryptographic sealing process which makes blockchain so secure.

Chaining

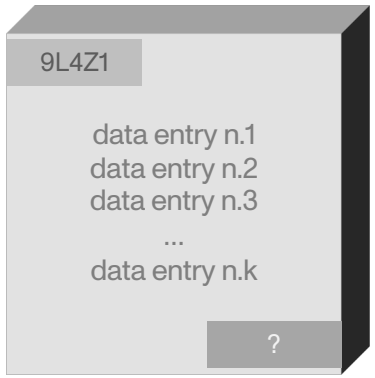
Each block also stores the hash from the previous block, thus creating a link, or "chain" of blocks.

Further Reading & Resources:

Article by a16z: Cryptocurrencies and Blockchain (link)

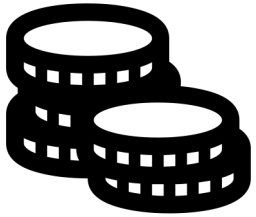
BLOCKCHAIN: CRYPTOCURRENCY & TOKENS

Blockchain uses cryptocurrency or tokens to incentivize network participants (i.e., miners) to maintain the functioning and integrity of the blockchain



As mentioned, hashes are unique codes based on cryptography. Hashes are computed for each new block.

All network participants invest time and computing power in identifying a suitable hash for the block – until one is found.



Network participants get rewarded with blockchain-inherent tokens (e.g. bitcoin, ether, etc.) for successfully hashing a block.

[1] Proof of Work represents only one way of computing hashes. Alternative ways exist, such as Proof of Stake

PROTOCOLS

Different blockchains have different functionalities and capabilities. These functionalities are determined by the protocols they are based on. Protocols are essentially a set of rules that govern how data is communicated within a network.

Protocols Explained

Core Concept in 1 Sentence: A blockchain's protocol determines what that blockchain can and cannot do.

- A protocol is a set of rules which governs how data is communicated within a network. A blockchain protocol thus determines a blockchain's functionalities and capabilities.
- For instance, the bitcoin protocol does not have the capability to store smart contracts. Thus, any applications requiring smart contracts (e.g., NFTs, dApps, etc.) do not work on bitcoin.
- Different blockchain protocols can be designed in such a way to be optimized for certain industries, such as financial services. Some protocols are more industry agnostic.
- Some of the functionalities a protocol determines are the blockchains underlying cryptocurrency, the consensus mechanism (e.g., proof of work, proof of stake, etc.) and smart contract capability
- The Ethereum protocol is the one which is most used with the biggest number of applications being built on the Ethereum blockchain

Famous Examples

bitcoin, ethereum, NEAR, MultiChain, HYPERLEDGER FABRIC, ripple, TRON, eosio, Stellar, Tezos, OPENCHAIN, r3 corda, CONSENSYS Quorum, HYPERLEDGER SAWTOOTH

PROTOCOL OVERVIEW

2021 was the year of smart contract protocols, with Ethereum and many of its competitors concluding 2021 with 5-10x multiples. As a result, the market for major protocols is currently saturated with capital.

	Blockchain	Year	Market Cap	Description	Outlook
SOV[1]	Bitcoin	2009	$827bn	▪ Emphasizes security and decentralization ▪ No outlook for tokens, dApps or smart contracts	▪ Continuing adoption as 'digital gold' on balance sheets ▪ Likely transition to a commodity type asset.
Smart Contracts	Ethereum	2015	$375bn	▪ Largest SC protocol ▪ Suffers from high fees ▪ Majority of TX volume now institutional ▪ Challenged by newer protocols	▪ Strong performer as of now ▪ Future depends on success of scaling solutions
	Alts (Solana, Avalanche, Terra etc.)	2018-present	< $50bn	▪ Class of rapidly evolving protocols challenging the incumbent, Ethereum ▪ Typically fast and near-free to use	▪ Most viable for consumer dApps due to low fees ▪ Often compromises on security and stability

[1] SOV = Store of Value

BLOCKCHAIN INFRASTRUCTURE OVERVIEW

With massive demand on the protocol side in 2021, critical infrastructure such as user-friendly interfaces, interoperability solutions and scalability solutions saw a comparatively slow but continuous increase in investment and development.

	Type	Description	Outlook	Examples
Frontend	Wallets & Interfaces	▪ Equivalent of web browsers for web3	▪ No true "one shop" interface as of now ▪ Required technical understanding remains high	▪ Metamask ▪ Trustwallet
Backend	Interoperability	▪ Enables seamless usage of multiple protocols at the same time	▪ Early solution deployment in late '21 ▪ Necessary technology still immature	▪ Polkadot ▪ Cosmos
Backend	Scalability	▪ Increases speed to the level necessary for mass adoption	▪ Early solution deployment in late '21 ▪ Necessary technology still immature	▪ Solana ▪ Polygon

SMART CONTRACTS

Smart contracts are just like regular legal contracts, only with the key difference that they are digital and based on code. They are stored on a blockchain and are thus immutable. Smart contracts automatically execute, control and document legally relevant events and actions. Thus, the eliminate the need for intermediaries.

Smart Contracts Explained

- In essence, fulfill the same core functions of “non-digital” legal contracts, yet differ in that they work in **fully automated** way
- Are essentially **public computer code**, following simple if-then semantics, **removing need for intermediaries** (e.g., lawyers, etc.)
- Individuals can publish smart contracts on a blockchain. Thus, they are **transparent**, **immutable** (i.e., cannot be modified) and **trustless**
- Different than non-digital contracts, they can **receive, store and send funds** and tokens and thus act like intermediaries
- Since they are automated, they are much **cheaper** (no transaction fees) and **faster** (seconds vs. days) and bear **no fraud risk**
- Can integrate trusted information and data from the physical world through “Oracles” (e.g. climate, economic events, etc.)

Use Cases

- Building blocks for decentralized apps
- DeFi: payments, loans, insurance, etc.
- Crowdfunding
- Supply chain applications
- Ride-sharing
- Real estate and apartment rentals
- Charity
- And many more...

Further Reading & Resources:

Article by IBM: What are smart contracts on blockchain? (Link)

NON-FUNGIBLE TOKENS (NFTS)

Non-Fungible Tokens (NFTs) is a technology based on smart contracts. With the use of NFTs, any digital asset or object can now be made unique and ownable. This gives rise to an array of entirely new applications and business models.

NFTs Explained

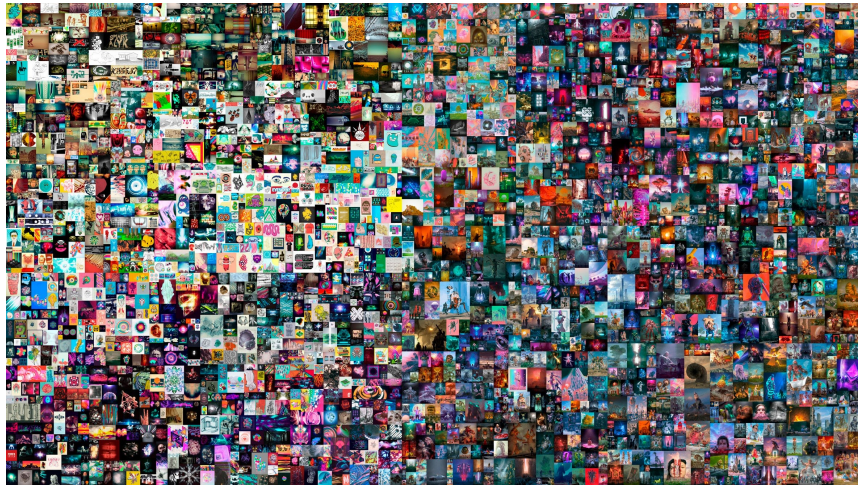
Core Concept in 1 Sentence: Anything that is digital can now be owned – through NFTs, which are verifiable digital property rights.

- NFTs are “non-fungible”, which means they are non-replaceable or unique. A dollar or bitcoin, however, is “fungible”, meaning they are not unique and replaceable by any other dollar or bitcoin.
- NFTs can be minted, or created, to represent any unique digital (or physical) item: for instance, a JPEG, PNG or MP4 file. The newly minted NFT also contains ownership information.
- That NFT is then stored on a blockchain, making sure that ownership information cannot be tampered with. Since blockchain is openly accessible, ownership information can be tracked.
- There is an important distinction between whether you are the creator or owner of an NFT. NFT creator retain copy and reproduction rights. Owners do not. Owners retain “bragging” rights.
- Every time an NFT is bought, a smart contract is executed changing ownership. NFT Creators can earn percentage-based royalties with each ownership transfer.

Further Reading & Resources:

Video: “NFTs Explained in 4 Minutes” (Link)
Article by Ethereum: Non-Fungible Tokens (Link)

Famous NFTs



“Everydays: The First 5000 Days” by Beeple – Sold for $69.3m

First tweet ever – Sold for $2.9m

Nyan Cat – Sold for $632k

DECENTRALIZED APPLICATIONS (DAPPS)

Digital services and products in a blockchain-based future will be decentralized – Those decentralized services are referred to as “decentralized applications” or “dApps”. Decentralized applications are superior to traditional apps, since they are open-source, censorship-resistant and have zero downtime.

dApps Explained

Core Concept in 1 Sentence: Decentralized Apps (dApps) are just like regular Apps – with the key difference that they are based on blockchain.

- Just like how developers can build regular apps for the app store for the IOS operating system, they can also build apps on a blockchain – those apps are thus called “Decentralized Apps” or “dApps”
- dApps may not look or feel any different than regular apps to end users. But their backend differs significantly, in that they are built on smart contracts on a blockchain
- Instead of reporting back to centralized servers, dApps report back to the blockchain. This has numerous advantages
- Thus, dApps are: (1) open-source, making them more trustworthy; (2) censorship-resistant (e.g., governments cannot ban access); (3) always online (i.e., zero downtime)
- In theory, any app or digital service we have today (e.g., ride-hailing, flat rentals, marketplaces, etc.), could be translated into a decentralized alternative

Further Reading & Resources:

Article – What are dApps and how do they work? (Link here)

DECENTRALIZED AUTONOMOUS ORGANIZATIONS

Decentralized Autonomous Organizations (DAOs) are an entirely new category of organizations, changing the way we think about how organizations are managed and governed. DAOs are run by smart contracts (code) and therefore act autonomously and in a decentralized fashion.

DAOs Explained

Core Concept in 1 Sentence: DAOs are an entirely new category of organizations – decentralized and based on blockchain-based governance mechanisms.

- In essence, DAOs are like “regular” organizations – The big difference is that they run on smart contracts and therefore act completely autonomously, independent of any human intervention
- A DAO’s operations and governance are entirely transparent und trustless (i.e., no risk of managerial misconduct), since the smart contracts are based on open-source code
- Decisions within a DAO are performed by code and are thus automated. This eliminates the need for traditional roles such as managers, or even C-level roles
- Ownership of a DAO is represented by tokens, which function like company shares. These tokens bear voting rights.
- Changes and modifications to how a DAO works are voted on by its token holders (i.e., shareholders), making decision-making much more decentralized and democratic

Further Reading & Resources:
Video: What is a DAO? (Link)

Famous DAOs

The DAO
The Dash DAO
ARAGON
GITCOIN
MAKER
MetaCartel
STEEM
UNISWAP

METAVERSE

"We believe the metaverse will be the successor to the mobile internet, we'll be able to feel present — like we're right there with people no matter how far apart we actually are"[1]

Metaverse Explained

Core Concept in 1 Sentence: Virtual worlds emulating various aspects of the physical world.

- There is not one definition for what the metaverse actually refers to, but there are many definitions, some of them being in conflict with each other
- Originating from science fiction, the metaverse refers to a hypothetical iteration of the internet as a single, universal virtual world that is facilitated by VR/AR
- Rather than a single virtual world, the current metaverse landscape consists of many different virtual worlds, often taking shape of games (e.g., Decentraland, The Sandbox, DeFi Kingdoms)
- The ultimate vision for the metaverse is that it will emulate every single aspect of the physical world in that people will be able to live, work, play and interact with others as in the physical world
- For now, this vision remains to be fulfilled

Further Reading & Resources:

Article by Creandum: "Populating the Metaverse – an Overview of the Early 2022 Landscape" (Link)

Examples

[1] Quote by Mark Zuckerberg (Source here)

MARKET LANDSCAPE

OVERVIEW CRYPTO MARKET LANDSCAPE

	Use Cases	Description	Verticals
Established	DeFi Use Cases	Decentralized Finance (DeFi) is one of the most matured and broad fields, encompassing a wide variety of verticals	Exchanges & Ramps, Wallets, Borrowing & Lending, Trading & Prediction, Investments, Payments, Tax & Accounting, Insurance, KYC & Anti-Fraud, Stablecoins, etc.
Established	NFT Use Cases	Business models and applications based on NFT technology	Creator Economy & Digital Collectibles, NFT-Based Games, Other
Emerging	Other Use Cases	Other emergent use cases and verticals which only recently began to emerge, yet no or only few dominant players	Supply Chain & Logistics, Social Networks, Privacy & Identity, etc.

Protocols

Infrastructure

Developer Tools

Primitives

DEFI

DECENTRALIZED FINANCE OVERVIEW

Decentralized Finance (or DeFi) refers to a holistic financial system entirely based on blockchain technology. Applications within the DeFi space are thus, decentralized, eliminating the need for intermediaries such as banks. Most verticals within traditional finance have respective DeFi counterparts.

DeFi Verticals	Vertical Description	Notable Companies
Wallets & Custody	Wallets allow the storage of digital assets. There are custodial and non-custodial wallets. Custodial is favored by institutional safekeepers, while non-custodial is favored by retail.	MetaMask, Fireblocks, Exodus, Binance Wallet, Tangany, etc.
Exchanges & Ramps	Most exchanges offer a range of services, covering a wide range of markets and verticals. Exchanges are also often used as means to convert fiat to crypto, also called "on-ramping".	Coinbase, Binance, UniSwap, Moonpay, FTX, Crypto.com, etc.
Trading & Investments	Investment and trading protocols are often decentralized and offer products ranging from simple swaps, to yield pools, to complex structured strategies.	dYdX, Chainlink, CurveFinance, YearnFinance, Mirror Protocol, Serum, etc.
Legal & Compliance	The blockchain space has experienced a surge of applications related to compliance issues, as well as transaction monitoring solutions as related to state and financial actors.	Chainalysis, CipherTrace, Solidus Labs, Elliptic, Messari, etc.
Tax & Accounting	Blockchain-based software (both B2B and B2C) which increases efficiency through automation of processes related to accounting and tax reporting.	TaxBit, Blockpit, Cointracker, TokenTax, Accointing, etc.
Payments & Stablecoins	Blockchain-based payment systems aiming to replace legacy payment rails, promising more efficient transfers. Stablecoins are cryptocurrency pegged against more stable fiat currencies.	Maker DAO, Celo, Circle, Solana Pay, Tether, Chai, Nano, etc.
Borrowing & Lending	Blockchain-based platforms allowing users to borrow and lend digital assets. Some of those platforms are centralized and some are decentralized.	Aave, Celsius Network, BlockFi, Compound Finance, Nuri, etc.

Further Reading & Resources:
Article by Messari: 2022 Theses (link)

WALLETS & CUSTODY

Wallets are the interface through which digital assets are stored and managed. There are both custodial (permissioned) and non-custodial wallets. Custodial designs are favored by institutional safekeepers, while retail typically favors non-custodial designs.

Spotlight: Fireblocks

- Custody and asset management service which serves over 800 institutions in the crypto space.
- Recently raised $550mn in Series E led by D1 Capital and Spark Capital, total amount raised of $1b.
- Offers full pipeline of services including treasury, active management, access to DeFi, trading and compliance.
- Historically proven to be the most reliable and well-rounded institutional custodian in the space

Fireblocks

Examples

Company	Description	Funding	Investors
Metamask	Permissionless wallet by Consensys for Ethereum based blockchains	$275m	Marshall Wade, Third Point Ventures
Exodus	Multi-blockchain wallet with easy-to-use interface	$60m	ICO
Ledger	Hardware based wallet for additional security	$468m	10T Holdings, Molten Ventures, MAIF Avenir
Tangany	White-label blockchain custody solutions based in Munich, Germany	$200k	HTGF
Binance Wallet	Exchange wallet by Binance aimed at power users	$25m	Black Hole Capital, Funcity Capital, Vertex Futures
WalletConnect	API that allows for integration of multiple wallets	N/A	N/A

EXCHANGES & RAMPS

Exchanges are the central venues on which investment activities take place. Most centralized exchanges offer a range of services, covering a wide range of markets and verticals. Exchanges are also often used as means to convert fiat to crypto (or vice-versa), also called "on-ramping“ (or “off-ramping”).

Spotlight: Binance

- World's biggest exchange with daily spot trading volume of $20-150bn and a full range of services such as staking, lending and derivatives, coin launches, NFTs etc.
- Operates own Ethereum-based chain called Binance Chain, current market cap of approx. $70bn
- Serves broad global audience with few regional restrictions

BINANCE

Examples

Company	Description	Funding	Investors
Coinbase	World's first exchange to be traded on public markets	$547m	Tiger, Institutional Venture Partners, Mitsubishi UFJ
MoonPay	Pluggable fiat-onramp for protocols and dApps	$555m	Coatue, Tiger Global
Bitpanda	Vienna-based crypto trading and exchange platform	$546m	Valar Ventures, Speedinvest
UniSwap	High volume decentralized exchange on Ethereum	$11m	Andreessen Horowitz
Sushi.com	Cross-chain and cross-function decentralized trading protocol	N/A	N/A
FTX	Exchange with highest valuation, focused on derivatives	$1.8b	Sequoia Capital

PAYMENTS & STABLECOINS

Blockchain payments systems aim to replace existing payment rails like Fedwire, Visa and Swift, promising faster and cheaper transfers. Stablecoins are cryptocurrencies that are pegged against stable currencies like the US dollar.

Spotlight: Maker DAO

- Ethereum based protocol that uses digital assets as collateral to issue dollar-pegged stablecoins.
- Users deposit assets into the Maker protocol, receiving DAI in return. Assets are retrieved by repaying the borrowed DAI amount.
- DAI is widely used as collateral, dollar-equivalent money and store of value across crypto applications.

MAKER

Examples

Company	Description	Funding	Investors
Celo	Enables easy payments by using names as wallet addresses	$66.5m	a16z
Circle	Compliant issuer of USD equivalent stablecoins called USDC	$711m	Digital Currency Group, Bitmain, IDG Capital
Solana Pay	Enables merchants to instantly integrate USDC payments	$336m	Multicoin Capital, Andreessen Horrowitz, Polychain
Tether	First dollar-pegged stablecoin. Based out of Cayman Islands	N/A	N/A
Nano	Blockchain which enables instant and free value transfers	N/A	N/A
Chai	Digital payments pipeline which uses Terra as rails	$120m	Softbank Ventures Asia, Nyca Partners

BORROWING AND LENDING PLATFORMS

Borrowing and lending platforms enable users to borrow against their digital assets, or to lend their assets out in order to benefit from receiving interest. They come in both centralized and decentralized flavors. Decentralized platforms are generally smart contract based while centralized ones are not.

Spotlight: Aave

- Decentralized protocol which allows users to lend and borrow digital assets.
- Borrowers pay interest, lenders receive APY[1].
- Enables users to go on margin as well as turn existing assets into productive assets.

Examples

Company	Description	Funding	Investors
Celsius Network	Lending and borrowing protocol offering up to 10% APY on assets	$844m	CDPQ, Westcap
BlockFi	Direct competitor to Celsius, offers similar services	$509m	Tiger Global, Bain Capital Ventures, Pomp Investments
Compound Finance	Competitor to Aave with simplified UX	$33.2m	Andreessen Horrowitz
Nexo	First lending and borrowing protocol with insurance	$52.5m	Arrington Capital XRP
Nuri	EU / Germany compliant protocol, formerly Bitwala	$42.3m	Earlybird Venture Capital, G1 Ventures, Global Brain Corporation...
Crypto.com	Exchange offering integrated lending & borrowing options	N/A	N/A

[1] APY = Average per Year

TRADING AND INVESTMENT PROTOCOLS

Investment and trading protocols specialize in offering specific types of investment opportunities and strategies. They are often decentralized and offer products ranging from simple swaps, to yield pools, to complex structured strategies.

Spotlight: DYDX

- Ethereum-based decentralized spot and derivatives trading protocol with daily volumes between $1-5bn.
- Generates revenue through charging trading fees at rates between 0.2-0.3% per trade. Plans to pay all fees to token holders in the future.
- Entirely smart contract based and permissionless.
- Higher trading volume than Coinbase in September 2021

δY/δX

Examples

Company	Description	Funding	Investors
Chainlink	Uses smart contracts to feed real world data to dApps	$32m	ICO
Badger DAO	Enables transfer of Bitcoin to Ethereum	$21m	N/A
Curve Finance	Dollar-centric swap / yield platform	N/A	N/A
Yearn Finance	Automated yield strategies	N/A	N/A
Mirror Protocol	Synthethic tokenized stocks and financial instruments	N/A	N/A
Serum	Pluggable order book built on smart contracts	$120m	Jump Trading, Genesis Block Ventures

LEGAL & COMPLIANCE

- The blockchain space has experienced a surge of applications as related to business compliance, as well as transaction monitoring solutions as related to state and financial actors. Regulatory risk and AML/CFT concerns continue to block institutional actors from entering the space.

Spotlight: Chainalysis

- Analytics business focused on providing state agencies and businesses with tools to monitor global blockchain transactions and provide anti-fraud.
- Enables easy tracking of assets, addresses, networks and smart contracts on Bitcoin, Ethereum etc.
- Raised a total amount of $367m over multiple rounds, led by investors such as Coatue, Paradigm, Addition and Accel.

Chainalysis

Examples

Company	Description	Funding	Investors
CipherTrace	Blockchain forensics and AML solutions	$45.1m	Aspect Ventures
TRM Labs	Anti-fraud solutions for blockchains and dApps	$80m	Tiger Global, Bessemer Ventures, PayPal Ventures
Solidus Labs	Custom risk and compliance solutions for institutions	$38.5m	Liberty City Ventures, Evolution Equity Partners
Elliptic	AML/CFT solutions for law enforcement	$100m	Evolution Equity Partners, Wells Fargo
Messari	Market intelligence and analyses	$26m	Point72 Ventures, Cork Capital
Merkle Science	Singapore based fraud/AML/CFT solutions provider	$6.6m	Darrow Holdings

TAX & ACCOUNTING

Complex tax regulation has driven innovation in crypto related tax and accounting software. Both retail and institutional users benefit from being able to navigate increasingly complex tax regimes by using software that automates tax estimation and reporting.

Spotlight: Taxbit

- Full range accounting and tax application for investors and institutions in the crypto space.
- Automates accounting and tax across all blockchains and 500+ dApps.
- Raised a total of $236m over 5 rounds, led by Insight Partners, Institutional Venture Partners, Paradigm and Tiger Global.

TAXbit

Examples

Company	Description	Funding	Investors
Blockpit GmbH	Tax and AML-prevention solutions provider	$12.7m	Middlegame Ventures, European Super Angels Club
Cointracker	Seamless crypto portfolio tracking and tax compliance	$102m	Accel
TokenTax	Crypto tax software for investors	N/A	N/A
Accointing.com	Web-based tax optimization tool	N/A	N/A
Cryptio	Cryptocurrency analysis & accounting tool	$1.2m	Draper Associates
Koinly	Tax monitoring and reporting with simple UX	N/A	N/A

NFT USE CASES

OVERVIEW OF NFT USE CASES[1]

The breadth of use cases for NFTs is immense. Two categories of applications have proven fit for market: Business models within the (1) creator economy and collectibles space and (2) blockchain-based games. Yet, countless other use cases are emerging and have yet to prove their feasibility and potential.

	Vertical	Sub-Vertical	Use Case Description	Examples
Established	Creator Economy & Digital Collectibles	Marketplaces	Marketplaces and exchanges for minting, buying and selling NFTs, digital objects and collectibles	OpenSea, SuperRare, Rarible, etc.
		Digital Collectibles	Digital collections of NFTs, artwork, and other types of media	CryptoPunks, NBA TopShot, Cryptokitties, etc.
		Other	Other business models within the creator economy space	Audius, Jamify, MusicArt
	Blockchain & NFT-Based Games	Trade, Play, Collect	Games based on collecting, trading and playing with in-game objects	Axie Infinity, Sorare
		Virtual Worlds & Metaverses	Immersive games based on virtual worlds and ecosystems	Decentraland, SecondLive
		Hybrids / Other	Hybrid games forms combining aspects from virtual worlds, trading-based games, DeFi, etc.	DeFi Kingdoms, Farmers World
Emerging	Other	Real Estate	NFT-based applications in the real estate industry	Propy, Blockee
		Logistics & Supply Chain	NFT-based applications improving the efficiency and transparency of logistics and supply chains	Shipchain, Openport, SyncFab, etc.
		Social Networks & Media	Social and professional networks based on NFTs	Steemit, Nafter, Nifty's, Meritverse

Further Reading & Resources:

Article by a16z: NFT Canon (link)

[1] Overview not exhaustive

CREATOR ECONOMY & DIGITAL COLLECTIBLES

- The Creator Economy refers to emerging communities of creators – artists, musicians, game developers – who connect directly with their supporters and collaborate without intermediaries, enabling them to develop independent income streams.

Spotlight: Bored Ape Yacht Club

- Collection of 10,000 “bored apes”, each with unique traits, some rarer than others. Current floor price: 93 ETH (e.g., $223k)
- Owners have access to “exclusive club” (Yacht Club): access to games, club benefits, NFT upgrades, charitable acts, etc.
- The BAYC demonstrated that value can be created beyond mere ownership. Added value layers can be built on top of NFT ownership

Other Examples

Company	Description	Funding	Investors
Cryptokitties	Game that enables users to collect and breed virtual cats on the blockchain	$23M	A16Z, Union Square, SV Angel
CryptoPunks	Viral NFT collection of 10,000 “CryptoPunk” with total market cap of $5.1bn[1]	n/a	n/a
NBA Top Shot (Dapper Labs)	Marketplace for NBA “moments”, purchasable as NFTs	$607M	A16Z, GV, Union Square, Coatue, Coinbase Ventures
OpenSea	The world’s first and largest NFT marketplace	$427M	YC, A16Z, Coatue, Coinbase Ventures, Blockchain Capital
Sorare	Fantasy football game where players buy, trade and play with digital cards	$739M	Accel, Bessemer, Benchmark, Headline, Softbank
Audius	Decentralized streaming platform for musicians. Monetization w/o labels.	$14M	Coinbase Ventures, Kleiner Perkins, Katy Perry, Steve Aoki

[1] Market capitalization as of November 2021 (source here)

BLOCKCHAIN AND NFT–BASED GAMES AND VIRTUAL WORLDS

Blockchain-based games are games built on blockchain technology. A key difference from regular games is that the games can be bona fide economies in which players actually own the objects they work hard to acquire, giving them the ability to buy or sell these objects, or take them to another game entirely.

Explained: NFT–Based Games

- NFTs allow the tokenization of in-game objects (e.g., characters, items, virtual real estate, etc.), which can be traded
- This gives rise to a new type of gaming model: “Play-to-Earn” where players play with the intent of earning money
- With NFT-based games the line between games and finance is blurring as people are earning their livelihoods with them
- Some NFT-based games are functioning like virtual economies, with some games already larger than small real-world economies

	Company	Description	M. Users[1,2]	M. Volume[1,3]
Trading	Axie Infinity	Trading and battling game, allows players to collect, breed, raise, battle, and trade creatures known as “Axies”	660k	$536m
Trading	Splinterlands	Trading card game based on mystical creatures	604k	$3.1m
Virtual Worlds	Alien Worlds	NFT Metaverse where players can play with unique digital items. They can go on missions, trade, explore planets	1.1m	$50m
Virtual Worlds	DeFi Kingdoms	A play-to-earn game set in a pixelated world. The game has a DEX, a liquidity pool, and utility-driven NFTs.	194k	$1.9b
Virtual Worlds	Decentraland	3D virtual world platform. Users can buy virtual land.	N/A	N/A
Virtual Worlds	The Sandbox	Virtual metaverse where players can play, build, own, and monetize their virtual experiences	N/A	N/A

[1] Source: https://dappradar.com/
[2] Users = active players during past 30 days (as of 18.01.2022)
[3] Volume = total amount of incoming value to the game’s smart contracts during past 30 days (as of 18.01.2022)

OTHER AREAS

SUPPLY CHAIN MANAGEMENT

- Blockchains enable manufacturers, vendors and consumers to track any type of item with precision. Supply chain blockchains specialize in storing variables in manufacturing and supply as blockchain entries and using the results for optimization and transparency.

Spotlight: VeChain

- Uses blockchain to assign unique identifiers to all components along the manufacturing and supply process and custom sensors to track them
- This enables manufacturers and buyers of good to precisely track individual goods along their journey and determine failure points, lossiness and authenticity
- Unique and strong set of partners in BMW, LVMH, Bayer, Walmart among others

Examples

Company	Description	Funding	Investors
OriginTrail	Blockchain-powered data exchange protocol for connected supply chains	$22.5m	ICO
Shipchain	Logistics & freight platform powered by blockchain and smart contracts	$30m	N/A
Provenance	Making supply chain information open and accessible for all	$40m	KittyHawk Ventures
Openport	Mobile platform for enterprise supply chain management	$0.6m	SIG
SyncFab	Transparent capacity and order management secured by blockchain	$1.6m	N/A
Everledger	Helps track the origin of luxury items (diamonds), fraud and risk reduction	$40m	Australian government, Tencent

SOCIAL NETWORKS

- Emerging vertical dominated by experimental business models and novel use cases which seek to compete with and revolutionize incumbents like Linkedin, Facebook, Twitter etc.

Spotlight: Meritverse

- Social media platform for web3 professionals
- Natively integrates Web3 primitives like DAOs with support for popular communications tools such as Discord and ENS
- Enhances hiring experience by including fine grained work accomplishment data

Examples

Company	Description	Funding	Investors
Rally	Web3 social network of the future	$5m	n/a
Hive Blockchain	Blockchain which specializes in social dApps	$286m	U.S. Global Investors, Genesis Mining
BitClout	Open-source social media with proof-of-work rails	$200m	n/a
Indorse	Skill validation and job matching platform	$14m	Brand Capital
Props	Decentralized model for digital media	$27m	Borderless Capital, Union Squatre Ventures

BLOCKCHAIN-BASED DATA STORAGE

Blockchain storage solutions make use of the billions of unused data drives around the globe by making them part of a productive super networks.

Spotlight: Arweave

- Sells permanent storage space using unused drive space from around the world
- Uses novel consensus mechanism to incentivize safekeepers to store data forever, using AR tokens as payment
- Enables additional layers of apps to be built on top, including file sharing, websites, and streaming apps

Examples

Company	Description	Funding	Investors
Dfinity	Uses blockchain to transform internet into combined compute	$167m	Andreessen Horrowitz
Filecoin	Data storage network which uses Bitcoin as infrastructure	$258m	Andreessen Horrowitz
Storj	Decentralized cloud object storage	$35.4m	n/a
IBM Blockchain	Blockchain based enterprise storage solutions	n/a	n/a
BitTorrent	Protocol which allows for p2p data sharing, now featuring blockchain	$43m	Accel
Bluzelle	Offers full stack blockchain solutions including a DB service	$22.3m	n/a

DECENTRALIZED AUTONOMOUS ORGANIZATIONS

DAOs are a new type of organizational governance. Decentralized because of democratic decision-making processes, autonomous because of smart contracts, organizations because of their collective nature. Objectives, methods and verticals vary.

Spotlight 1: The LAO

- Investment DAO which uses smart contracts to govern decision making and manage its $50m treasury
- Invests in crypto-native projects along with traditional VCs
- Currently limited by regulatory environment – can only accept up to 99 accredited US based investors

Spotlight 2: Maker DAO

- Organization behind Maker. Populated by VCs, hedge funds and retail investors
- Uses token-based voting mechanism to determine changes to dApp
- Governs a $2bn dApp completely through smart contracts

Examples

Company	Description	Funding	Investors
 Constitution DAO	Collective effort to purchase US constitution	$47m	ICO
 PleasrDAO	Organization which collects internet artifacts	n/a	Andreessen Horrowitz
 Yearn DAO	Governs and manages Yearn Finance	$910m (MC)	ICO
 Syndicate DAO	DAO tooling to create investment clubs	$20m	Andreessen Horrowitz
 Assange DAO	Collective effort to free Julian Assange	$38m	ICO
GNOSIS Gnosis	Tooling for DAO treasury management and decision making	$12.5m	ICO

PRIVACY & IDENTITY

Blockchain technology enables users to take control of their digital identities, as well as opening up possibilities for completely private asset transfers.

Spotlight: Monero

- Blockchain with completely private transfers of value using the native Monero currency, XMR
- Uses novel consensus mechanism which makes sender-receiver wallet IDs unreadable
- Popular currency on darknet markets

Examples

	Company	Description	Funding / TVL	Investors
Logo	GlobaliD	Enables users to custody their digital identity across services and domains	$6m	Arbor Ventures
Logo	Zcash	Privacy-centric blockchain based on Bitcoin	n/a	Winklevoss Capital
Logo	Enigma	Private date sharing platform	$46m	n/a
Logo	ShoCard	Mobile digital identity using blockchain for verification	$5.5m	AME Cloud Ventures, Morado Ventures
Logo	Ory	Open source identity management	$22.5m	Insight Partners
Logo	Company	Secret Network	$58m	Alameda Research, Defiance Capital, Coinfund

CONCLUSION

CONCLUSION

- Crypto projects are not new (Bitcoin 2008, Ethereum 2015)
- Enthusiasts have spent years developing the underlying infrastructure for a decentralized web
- Few VCs ventures into this infrastructure space, but those who did generated outsized returns
- The first „consumer-ish“ applications are now emerging, especially around DeFi and collectibles/NFTs
- As part of the same wave, VCs have entered the market with vengeance, mostly focused on growth rounds in more established businesses, but also early
- We, as HV, need to be aware of (a) investment opportunities in the space but also (b) how our more traditional companies can profit from this technology
- We (Hugo, Angelo and Jan) hope this primer helps