The Global Crypto Classification Standard
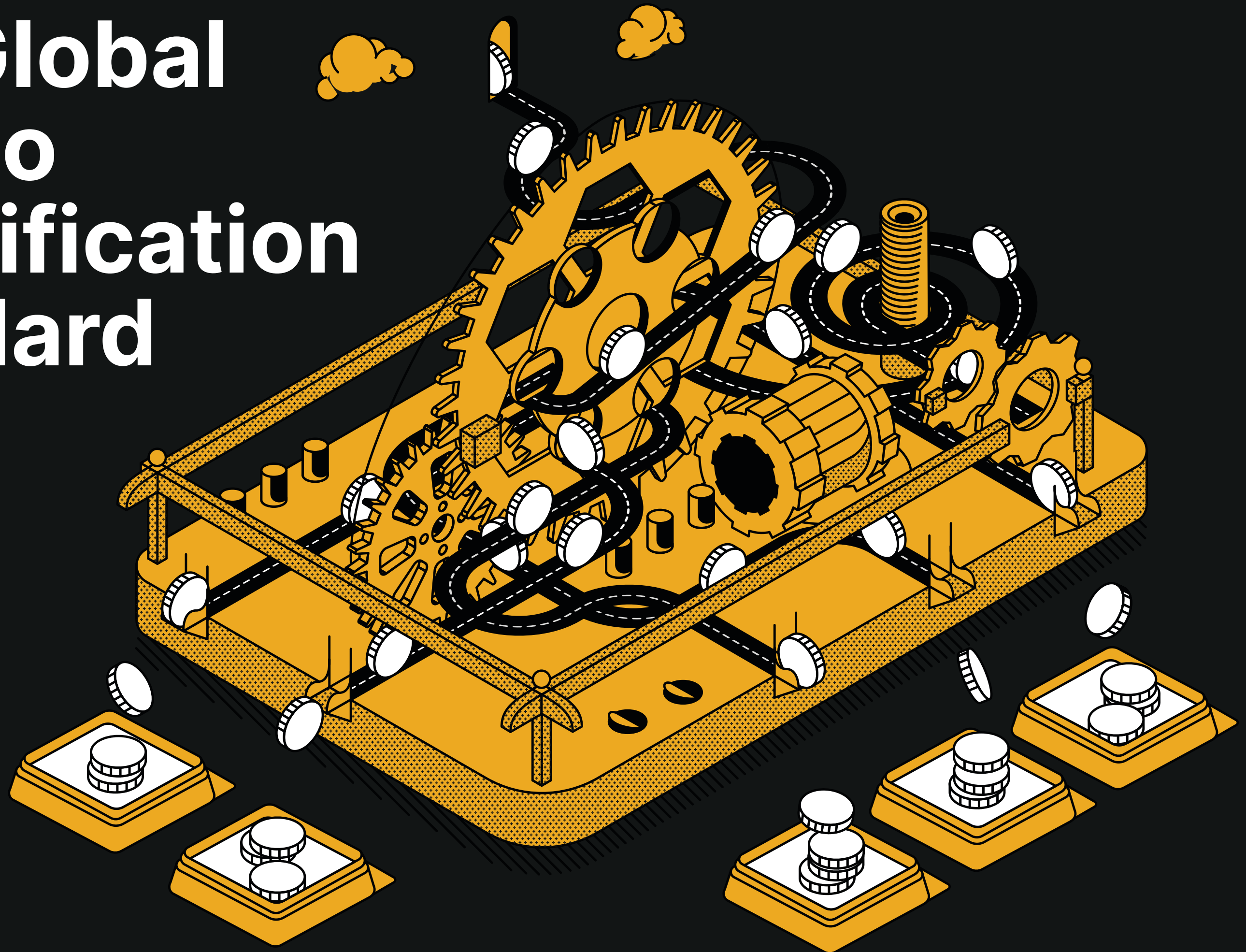
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Foreword

    We are psyched to release the Q3 2024 update of the Global Crypto Classification Standard (GCCS) developed by 21Shares and CoinGecko. This initiative serves as an industry taxonomy to demystify the misconceptions about cryptoassets and shed light on commonalities and differences of this burgeoning asset class. It also helps provide clear categorization of the various projects and cryptoassets within the space so that users and investors can tell at a glance what a project does, and where they sit as part of the larger crypto stack.

    Numerous changes may occur over the years to fine-tune sectors and industries. Still, we hope this classification standard will help guide the global tech and financial community.

[1] https://21shares.com/

Acknowledgments

Executive Summary

There are three levels of categorization: Unlike traditional asset classes, cryptoassets can vary dramatically in nature, both as it relates to the asset (token) itself and the protocol behind it. We propose three levels of categorization to provide a standard classification for the crypto industry.

Level 1 – The Crypto Stack: We only refer to networks or protocols in the first two levels instead of the underlying cryptoasset (token). The first level of categorization refers to the types of cryptoassets that make up crypto's universe. Examples include cryptocurrencies, smart contract platforms, and decentralized applications (dApps).

Level 2 – Market Mapping by Sectors and Industries: The second level of categorization classifies protocols by sectors and industries as introduced by S&P in 1999 and used by the global financial community. "Industry" refers to a more specific group of companies or businesses (protocols or networks), while "sector" describes a large segment of the crypto-economy.

Level 3 – Taxonomy of Cryptoassets: Lastly, we propose a taxonomy of cryptoassets and classify them according to the asset "superclass" to which they belong. For instance, Uniswap is a dApp (Level 1) that falls in the Decentralized Exchange industry under the Decentralized Finance sector (Level 2). On the other hand, the protocol's token UNI is a governance token, which makes it a capital asset (Level 3).

Application and Limitations: The rationale behind our methodology is to create pick-and-shovel tools to categorize individual protocols and their underlying token(s) along these three levels. In the Appendix, we apply the proposed methodology to the top 100 cryptoassets by market cap. It's crucial to emphasize that the list provided in all Levels 1 to 3 is non-exhaustive and subject to change.

Introduction and Methodology

This paper aims to provide a standard classification for the crypto industry. To achieve this task, we introduce three levels of categorization.

At the protocol level:
Level 1: The Crypto Stack
Level 2A: Market Mapping by Sectors
Level 2B: Market Mapping by Industries

At the token level:
Level 3: Taxonomy of Cryptoassets

We only refer to networks or protocols in the first two levels instead of the underlying cryptoasset (token). For instance, instead of referring to ether (ETH), 'the asset,' we will refer to Ethereum, 'the network.' Level 1 – the 'Crypto Stack' refers to the various layers that encompass crypto's infrastructure, while Level 2 – 'Market Mapping by Sectors and Industries' – categorizes the different segments that make up the crypto-economy.

Let us consider MakerDAO as an example. On Level 1, we would categorize MakerDAO as a decentralized application (dApp). On Level 2, it would fit in the 'Credit/Lending' industry under the 'Decentralized Finance' (DeFi) sector. As we can observe, the term industry refers to a much more specific group of companies or businesses (protocols). In contrast, the term sector describes a large segment of the crypto-economy.

Lastly, Level 3 provides a 'Taxonomy of Cryptoassets' that attempts not only to categorize every type of token but classify them according to the asset superclass to which they belong. For example, MakerDAO employs a two-token model composed of MKR and DAI. On Level 3, we could categorize MKR as a 'governance token' and DAI as a 'stablecoin.' As they relate to the three asset superclasses, governance tokens are capital assets, while stablecoins are *store-of-value* assets.
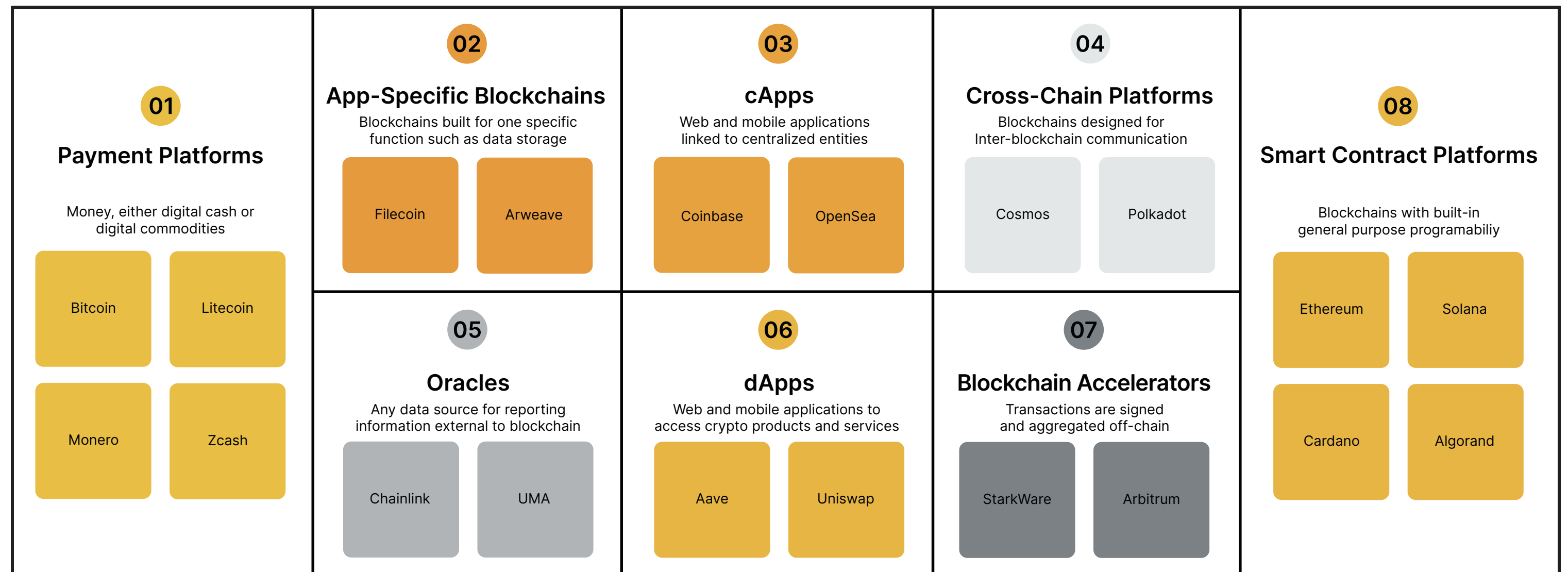
The rationale behind this methodology is to create pick-and-shovel tools to categorize individual protocols and their underlying token(s) along these three levels.

Level 1: The Crypto Stack

The key technology behind crypto is the blockchain. This append-only, decentralized ledger allows multiple parties to store data (such as transaction history) and operate under shared assumptions in a trustless manner. Bitcoin's Genesis Block was mined on January 3rd, 2009. Since then till date, a plethora of other cryptoassets have emerged – each with its unique value proposition – and crypto has grown into a trillion-dollar asset class.

To simplify the segmentation of the Crypto Stack, in Table 1, we identify the various layers that compose it and lay out the terminology. Every layer is compared to a physical world analogy to better understand its scope and nature. As mentioned in the methodology, we only refer to networks or protocols in the Crypto Stack instead of the underlying cryptoasset (digital token):

Figure 1 - Level 1: The Crypto Stack

01

Payment Platforms

Money, either digital cash or digital commodities

| Bitcoin | Litecoin |
| Monero | Zcash |

02

App-Specific Blockchains

Blockchains built for one specific function such as data storage

| Filecoin | Arweave |

05

Oracles

Any data source for reporting information external to blockchain

| Chainlink | UMA |

03

cApps

Web and mobile applications linked to centralized entities

| Coinbase | OpenSea |

06

dApps

Web and mobile applications to access crypto products and services

| Aave | Uniswap |

04

Cross-Chain Platforms

Blockchains designed for Inter-blockchain communication

| Cosmos | Polkadot |

07

Blockchain Accelerators

Transactions are signed and aggregated off-chain

| StarkWare | Arbitrum |

08

Smart Contract Platforms

Blockchains with built-in general purpose programabiliy

| Ethereum | Solana |
| Cardano | Algorand |

Source: 21Shares and CoinGecko

Table 1 - The Crypto Stack

The Crypto Stack Terminology	Definition	Networks or Protocols	Physical World Analogy
Payment Platforms	Blockchains or protocols specialized in transferring value. The demand for cryptocurrencies, the native asset of these platforms can stem from their utility as a means of exchange, unit of account, and store of value.	Bitcoin, Litecoin, Monero, Zcash	**What?** Money, either Digital Cash or Digital Commodities, especially precious metals like gold. **Why?** Despite their minimal base-chain feature set, they may be surrounded by a rich ecosystem of clients, exchanges, miners, scaling solutions, sidechains, etc., to extend the on-chain use cases.
Smart Contract Platforms (or Settlement Blockchains)	A smart contract platform is a base blockchain with built-in general-purpose programmability that allows developers to write smart contracts and launch decentralized applications (dApps). These platforms can also function as a data availability layer, where all transactions are ultimately settled (hence why they're also called settlement blockchains). While the term "distributed ledger" is used to describe blockchains like the Bitcoin blockchain, whose specific purpose is to transfer value (see above), smart contract platforms such as Ethereum are more accurately described as "distributed state machines. " This is because the data structure of these chains holds not only all accounts and balances but a "machine state, " which changes from block to block according to a predefined set of rules. In turn, these rules are defined and executed by a virtual machine.	Ethereum, Cardano, Solana	**What?** From a social point of view, they are like digital nation-states or startup ecosystems. They could also be analogous to Fedwire, the settlement layer of the US financial system. From a technical point of view, they are decentralized app stores. **Why?** From a social point of view, each smart contract platform is like a digital nation with its native currency, which secures the network and drives economic activity. From a technical point of view, they are virtual computers that run on top of networks of physical computers where everyone can build and use permissionless and censorship-resistant dApps.
Blockchain Accelerators (or Execution Blockchains)	A term describing a specific set of scaling solutions for blockchains. At its core, a scaling platform is a separate blockchain that helps augment the network capacity of a settlement blockchain by orders of magnitude while inheriting the security guarantees of the latter. Examples include "rollups", which bundle or 'roll up') hundreds of transactions into a single transaction on the base layer, removing congestion in the settlement blockchain.	Optimism, Polygon, Arbitrum	**What?** Blockchain Accelerators are like skyscrapers that relieve congestion in the settlement blockchain ("digital nation") on top of which they are built. Following the US financial system analogy, scaling protocols are analogous to commercial banks before settling transactions on Fedwire. **Why?** Transactions are signed and aggregated off the base chain (settlement blockchain), which removes the constraints of fixed block.
Cross-Chain Platforms	Networks specialized in inter-blockchain connectivity allow chains to communicate with each other by transmitting states or messages. These networks come in cross-chain bridge networks or hub-and-spoke models where hubs connect spokes of application-specific blockchains.	Cosmos, Polkadot	**What?** They are like Coalitions or Shipping Routes. Another analogy is to consider them as the WhatsApp of value transfer, where any device, in this case, any blockchain, can communicate in one environment. **Why?** On some interoperability protocols, connected blockchains have shared security, hence the Coalition analogy. All interoperability protocols are Shipping Routes because they facilitate the transfer of information or value between connected blockchains.

Table 1 - The Crypto Stack

The Crypto Stack Terminology	Definition	Networks or Protocols	Physical World Analogy
Application-Specific Blockchains or Hybrid Layer	App-specific blockchains are standalone blockchains built to serve specific use cases, such as cloud storage and IoT devices. Instead of creating a decentralized application on top of a smart contract platform like Ethereum, developers build their own customized blockchain from the ground up to operate a single application.	Celestia, Arweave, Filecoin, Helium	**What?** From a social point of view, App-Specific Blockchains are Specialized Cities. **Why?** Some teams may hesitate to build a Decentralized Application (dApp) on top of an underlying smart contract platform like Ethereum because, among other reasons, they have to submit to certain limitations from using a generalized base chain. Instead, developers can build a sovereign blockchain from the ground up, providing more flexibility to perform the intended use case more efficiently.
Oracles	Middleware solutions bring off-chain data directly to blockchains like traditional asset price feeds or the weather. A shortcoming of blockchain protocols is that they are isolated from the world outside their ledger, which reduces the utility of a smart contract platform. This circumstance is known as the oracle problem.	Chainlink, Pyth, UMA	**What?** Oracles are bridging data from the off-chain world onto blockchains. **Why?** Blockchains are isolated from the world outside their ledger; oracles help by reporting external information to the blockchain.
Centralized Applications (cApps)	Centralized web and mobile applications to access Web 3 products and services - cApps are operated by traditional organizational structures (private and public companies, foundations, etc.). cApps have at least one of the following characteristics: (1) users interact with them in a custodial fashion, and (2) centralized entities behind them maintain the right to censor accounts.	OpenSea, Centralized Exchanges and Stablecoin Issuers	**What?** cApps are the end products and services in the crypto-economy. **Why?** cApps are traditional software applications that allow users to interact with the crypto-economy.
Decentralized Applications (dApps)	dApps refer to web and mobile applications to access Web 3 products, services, or data. We also consider Decentralized Autonomous Organizations (DAOs) as a structure for dApps, as their use case is typically to organize communities towards a common goal through blockchain technologies. Many dApps are also run and managed by DAOs.	Uniswap, MakerDAO	**What?** dApps are the end products and services, similar to apps built on an app store, except dApps are permissionless and censorship-resistant. DAOs, in turn, are the structure for crypto-native businesses. **Why?** dApps are like traditional software applications, but they live on a decentralized Smart Contract Platform, which allows users to encode rules of any transaction in a trustless manner and create scarce digital assets with specific functionalities.

Additional to the classification presented in Table 1, other key pieces in the Crypto stack are not necessarily crypto-native:
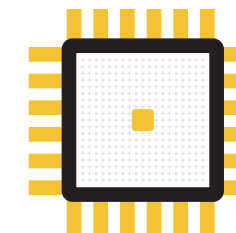
Blockchain Development Environments: developer tools to build dApps, run tests, and debug code.

Internet Protocol Suite: protocols to transfer files, emails, and data over the internet. *Non-crypto native*

Operating Systems: system software that manages computer hardware and resources and provides standard services for computer programs. *Non-crypto native*

Hardware: personal computers, smartphones, tablets.

Miners: operators securing Proof-of-Work-based networks by solving a computationally intensive lottery to determine which block of transactions to add.

*Disclaimer: The list provided in Table 1 is non-exhaustive and 21Shares / CoinGecko maintains the right to append, remove, and amend it as appropriate.
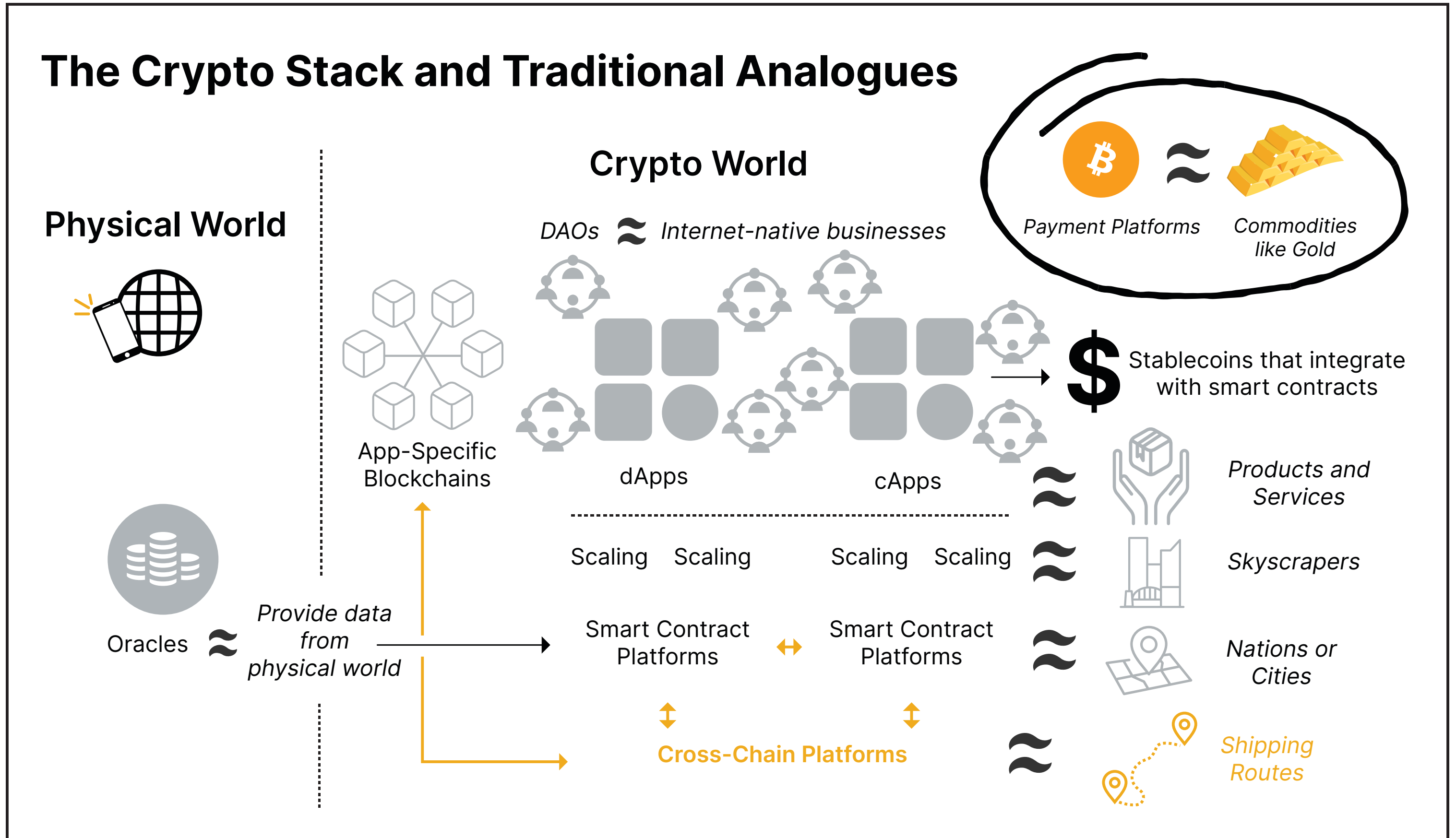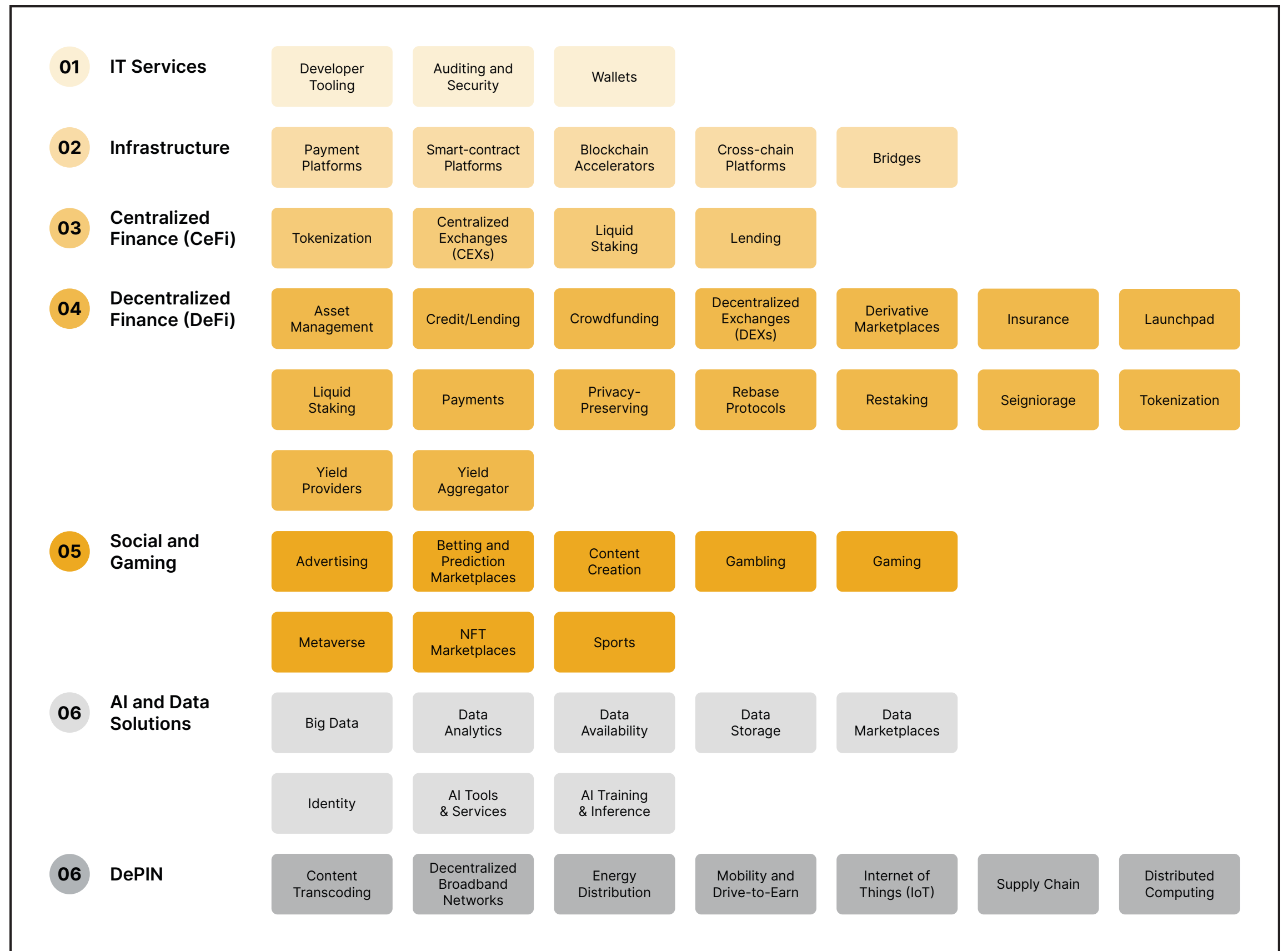
In Figure 2 below, we lay out the Crypto Stack described in Table 1 and its traditional analogues.

Figure 2 – The Crypto Stack and its Traditional Analogues

The Crypto Stack and Traditional Analogues

Physical World

Crypto World

DAOs ≈ Internet-native businesses

Payment Platforms ≈ Commodities like Gold

App-Specific Blockchains

dApps   cApps

$ Stablecoins that integrate with smart contracts

Oracles ≈ *Provide data from physical world*

≈ *Products and Services*

Scaling Scaling   Scaling Scaling

≈ *Skyscrapers*

Smart Contract Platforms ↔ Smart Contract Platforms

≈ *Nations or Cities*

Cross-Chain Platforms

≈ *Shipping Routes*

Level 2: Market Mapping by (A) Sectors and (B) Industries

In the previous section, we laid out the infrastructure of the crypto space. This section categorizes protocols by sectors and industries — and compares them with their traditional peers.

(A) Sector: A large segment of the crypto-economy.
(B) Industry: A specific group of companies or businesses (protocols or networks).

Some protocols might fit into multiple industries. We attempt to place them in the most relevant category in such cases. We only refer to networks and protocols in market mapping instead of the underlying cryptoassets.

01 IT Services	Developer Tooling	Auditing and Security	Wallets				
02 Infrastructure	Payment Platforms	Smart-contract Platforms	Blockchain Accelerators	Cross-chain Platforms	Bridges		
03 Centralized Finance (CeFi)	Tokenization	Centralized Exchanges (CEXs)	Liquid Staking	Lending			
04 Decentralized Finance (DeFi)	Asset Management	Credit/Lending	Crowdfunding	Decentralized Exchanges (DEXs)	Derivative Marketplaces	Insurance	Launchpad
	Liquid Staking	Payments	Privacy-Preserving	Rebase Protocols	Restaking	Seigniorage	Tokenization
	Yield Providers	Yield Aggregator					
05 Social and Gaming	Advertising	Betting and Prediction Marketplaces	Content Creation	Gambling	Gaming		
	Metaverse	NFT Marketplaces	Sports				
06 AI and Data Solutions	Big Data	Data Analytics	Data Availability	Data Storage	Data Marketplaces		
	Identity	AI Tools & Services	AI Training & Inference				
06 DePIN	Content Transcoding	Decentralized Broadband Networks	Energy Distribution	Mobility and Drive-to-Earn	Internet of Things (IoT)	Supply Chain	Distributed Computing

Source: 21Shares and CoinGecko

Crypto Sectors Market Mapping

Table 2A – Level 2A: Market Mapping by Sectors

Crypto-Native Sector	Definition	Traditional Sector
IT Services	Refers to software development. Includes developer tools and protocols to build applications, manage data, run tests, and debug code.	Information Technology
Centralized Finance (CeFi)	Crypto-native financial infrastructure that relies on intermediaries. CeFi protocols fulfill at least one of the following characteristics: (1) users interact with them in a custodial fashion, and (2) centralized entities behind them maintain the right to blacklist accounts.	Financial Services
Decentralized Finance (DeFi)	Internet-native financial infrastructure that does not rely on a centralized institution such as a bank, broker, and similar intermediaries.	Financial Services
Infrastructure	The infrastructure sector encompasses Smart Contract Platforms, Blockchain Accelerators, Cross-Chain Platforms, and Payment Platforms. This category also includes decentralized storage providers that serve the same functionality as cloud storage providers in Web 2.	Information Technology
Social & Gaming	An overlaying sector between blockchain, crypto, and the gaming industries, along with social elements that enhance player interactions and community building. This overlap encompasses VR, AR & ER.	Social Network, Gaming Industry
AI and Data Solutions	Platforms that leverage artificial intelligence and data technologies to enhance various aspects of crypto ecosystems. It also utilizes blockchain technology to create a more transparent, secure, and efficient ecosystem for AI development and deployment.	Artificial Intelligence, Data Centers, Cloud Computing
DePIN	Crypto-native protocols that aim to decentralize and tokenize real-world physical infrastructure and services (like storage, computing power, or bandwidth) that can be maintained and accessed by individuals or businesses.	Telecommunications, Energy Distribution, Mapping and Location services, Transportation, Supply Chain Management

Crypto Industry Market Mapping

Table 2B – Level 2B: Market Mapping by Industries

Crypto-Native Industry	Crypto-Native Sector	Definition	Traditional Industry
Auditing and Security	IT Services	Refers to auditing firms or protocols that help address and mitigate smart contract risk.	**Industry:** Cybersecurity, Audit Software **Example:** Quantstamp, Trail of Bits, Forta Network
Developer Tooling	IT Services	Developer tools to build dApps, run tests, and debug code.	**Industry:** Software Development **Example:** Hardhat, Truffle
Wallets	IT Services	Wallets allow users to interact with a blockchain. The primary function of a wallet is to transfer and store cryptoassets without a third party.	**Industry:** Web Browsers **Example:** Metamask, Ledger
Centralized Exchange (CEX)	Centralized Finance (CeFi)	A centralized exchange (CEX) is a platform that provides fiat on and off-ramps and the ability to swap and store tokens in a custodial fashion.	**Industry:** Capital Markets - Brokerage Trading Platforms **Example:** Coinbase, Binance, Kraken, Crypto.com
Lending	Centralized Finance (CeFi)	Intermediaries that provide access to credit using cryptoassets as collateral.	**Industry:** Banks, Fintech **Example:** NEXO
Tokenization	Centralized Finance (CeFi)	Refers to centralized entities that bring off-chain assets on-chain (i.e., they tokenize "real-world" assets). The most significant example is stablecoins like USDC and USDT, which are backed by an of-chain reserve of US dollars. Other examples include tokenized U.S. Treasury Bills or assets like Gold.	**Industry:** Banks and Asset Management **Example:** Circle and Tether Limited

| Crypto-Native Industry	Crypto-Native Sector	Definition	Traditional Industry
Asset Management	Decentralized Finance (DeFi)	Asset management protocols tokenize a basket or other investment strategies analogous to an Exchange-Traded Fund (ETF) in traditional finance.	**Industry**: Asset Management **Example**: Sommelier
Credit/Lending	Decentralized Finance (DeFi)	Financial infrastructure that does not rely on a centralized institution like a bank. Lending and borrowing occur in a peer-to-peer fashion on a Smart Contract Platform.	**Industry**: (Decentralized) Banks and other Financial Institutions **Example**: MakerDAO, Aave, Compound
Crowdfunding	Decentralized Finance (DeFi)	Crowdfunding protocols focus on funding or supporting startups and non-profit organizations.	**Industry**: Venture Capital, Investment Banking **Example**: BitDAO, ConstitutionDAO, FlamingoDAO
Decentralized Exchange (DEX)	Decentralized Finance (DeFi)	A decentralized exchange (DEX) is a platform that facilitates token swaps on a smart contract platform in a non-custodial fashion. The primary mechanism for DEX liquidity is an Automated Market Maker (AMM), an algorithm where trades are executed in an equal-weighted basket of two tokens called a liquidity pool. This also includes cross-chain DEXs allowing users to trade and provide liquidity across different chains.	**Industry**: Capital Markets - (Decentralized) Brokerage Trading Platforms **Example**: Uniswap, Curve DAO, Osmosis
Derivative Marketplaces	Decentralized Finance (DeFi)	Perpetuals or "perps", refer to future contracts without an expiration date, are an important innovation of this industry.	**Industry**: Derivative Marketplaces like Chicago Mercantile Exchange **Example**: Synthetix Network, dYdX.
Insurance	Decentralized Finance (DeFi)	Protocols that provide financial protection or reimbursement against losses to users.	**Industry**: Insurance **Example**: Armor, Nexus Mutual
Launchpad	Decentralized Finance (DeFi)	Platforms that facilitate the launch of new projects. These protocols usually follow a take-rate-based business model. As a result, new entrants to the industry benefit from the already-established investor base on these platforms.	**Industry**: SPACs or Incubators **Example**: StarLaunch
Liquid Staking	Decentralized Finance (DeFi)	In proof-of-stake networks, validators must lock their tokens to be eligible to confirm transactions on the blockchain and receive a recurrent stream of rewards in the the native token of the network. Liquid staking providers let users stake their crypto - without locking assets or maintaining infrastructure - while participating in on-chain activities such as lending.	**Industry**: Capital Markets **Example**: Lido, Rocket Pool
Payments	Decentralized Finance (DeFi)	Protocols in the payments industry are designed exclusively to facilitate money transfers.	**Industry**: Payments **Example**: Flexa (AMP)
Privacy-Preserving	Decentralized Finance (DeFi)	Privacy-enhancing networks that hide transaction details.	**Industry**: Offshore and Private Banking **Example**: Tornado Cash
Rebase Protocols	Decentralized Finance (DeFi)	Tokens of which the supply is adjusted algorithmically and periodically, for example, once a day to meet a target price or maintain the peg with other assets.	**Industry**: Foreign Reserves, Reserve Currency **Example**: Olympus (OHM), Redacted Cartel (BTRFLY)
Restaking Protocols	Decentralized Finance (DeFi)	Restaking is a process that allows users to leverage their already staked tokens as collateral to participate in additional blockchain networks or protocols security validation, enabling them to earn multiple rewards from a single set of staked assets. The industry also includes the liquid re-staking sector, which like liquid staking, allows users to contribute to the security of other protocols, but in a liquid format.	**Industry**: Capital Markets **Examples**: EigenLayer, Ether.FI

Crypto-Native Industry	Crypto-Native Sector	Definition	Traditional Industry
Seigniorage	Decentralized Finance (DeFi)	Decentralized protocols that issue partially collateralized or non-collateralized stablecoins. These protocols use algorithmic expansion and supply contraction to maintain the peg.	**Industry:** Fractional Reserve Banking **Example:** Frax Finance, Ampleforth
Tokenization	Decentralized Finance (DeFi)	Refers to decentralized entities that bring off-chain assets on-chain (i.e., they tokenize "real-world" assets). The most significant example is stablecoins like Ondo's OUSG, which are backed by an of-chain reserve of US dollars. Centrifuge is another that tokenizes various real-world assets like structured credit, real estate or even carbon credits.	**Industry:** Banks and Asset Management **Example:** Ondo Finance, Centrifuge
Yield Providers	Decentralized Finance (DeFi)	Protocols that pay users a reward for staking or being liquidity providers (LP) on their platform.	**Industry:** Fixed-Income Security Providers **Example:** ConvexFinance, Tokemak
Yield Aggregator	Decentralized Finance (DeFi)	Platforms that aggregate yield from a variety of other applications.	**Industry:** Fixed-Income Asset Management **Example:** Yearn Finance, Rari Capital
Advertising	Social and Gaming	Blockchain-based digital advertising focuses on users' data protection and rewards them for interacting with ads.	**Industry:** Digital Advertising **Example:** Brave's model with BAT
Betting and Prediction Markets	Social and Gaming	Decentralized platforms that allow users to bet on the outcomes of future events using crypto. These markets leverage blockchain technology to create transparent, censorship-resistant, and globally accessible betting systems and are publicly auditable.	**Industry:** Prediction Markets **Example:** PolyMarket, Drift
Content Creation (Video and Music)	Social and Gaming	Content creation protocols allow artists, musicians, and any content creator to distribute their content directly to users by leveraging blockchain technology, especially NFTs.	**Industry:** Video and Music Entertainment (Centralized Platforms like Spotify) **Example:** sound.xyz, Royal.io
Gambling	Social and Gaming	Refers to the use of crypto for gambling activities in online casinos and other gambling platforms. It also includes tokens that do not hold intrinsic value and are often launched on the back of humorous figures or memes copied and spread rapidly by internet users via social media.	**Industry:** Online Gambling Platforms **Example:** Rollbit, Shiba Inu
Gaming	Social and Gaming	Blockchain-based games where players earn a token reward with real monetary value. They combine different components, like NFTs, gaming, and Augmented Reality.	**Industry:** Gaming **Example:** Axie Infinity, STEPN
Metaverse	Social and Gaming	An ecosystem allows users to interact, transact, and experience content in a three-dimensional space that blends the physical and virtual worlds. It combines aspects of virtual reality (VR), augmented reality (AR), and extended reality (ER) with blockchain technology and cryptocurrencies.	**Industry:** VR, AR, ER **Example:** Sandbox, Decentraland
NFT Marketplaces	Social and Gaming	Apps allowing users to buy and sell digital items such as Non-Fungible Tokens (NFTs).	**Industry:** Brokers of Fine and Decorative Art, Auction Houses **Example:** OpenSea, LooksRare
Sports	Social and Gaming	Blockchain-based fan engagement & reward platforms or activity-based games/applications.	**Industry:** Sports **Example:** Socios.com, Topshot
AI Tools & Services	AI and Data solution	Encompasses platforms and tokens that leverage both AI and blockchain technologies to offer enhanced functionalities, improved decision-making processes, and novel use cases in the crypto ecosystem.	**Industry:** Generic AI Services **Example:** Singularity Net, PAAL AI, Zignaly, Spectral, Forta
AI Training & Inference	AI and Data solution	Sector aiming to create more accessible, transparent, and efficient AI ecosystems while addressing challenges like data privacy, centralization, and resource allocation in AI development and deployment.	**Industry:** AI Research and Deployment **Example:** Phoenix, NetMind, Bittensor

Crypto-Native Industry	Crypto-Native Sector	Definition	Traditional Industry
Big Data	AI and Data solution	Big data includes oracles, defined as any data source for reporting information external to the blockchain.	**Industry:** Web APIs **Example:** Chainlink, API3, Space & Time
Data Analytics	AI and Data Solutions	Includes developer indexing protocols and decentralized API providers.	**Industry:** Traditional Web APIs **Example:** The Graph
Data Availability	AI and Data Solutions	Systems designed to ensure that all transaction data within a blockchain network is accessible and verifiable by network participants over a specific period.	**Industry:** Cloud Storage **Example:** Celestia, Avail
Data Storage	AI and Data Solutions	Decentralized storage providers that serve the same functionality as AWS or Microsoft Azure.	**Industry:** Cloud Storage **Example:** Arweave, Filecoin, Sia.tech
Data Marketplaces	AI and Data Solutions	Decentralized platforms that enable the secure buying, selling, and exchange of data using blockchain.	**Industry:** Data Marketplaces **Example:** Ocean Marketplace
Identity	AI and Data Solutions	Protocols that facilitate registration and verification of digital credentials. Instead of relying on a centralized intermediary like Google, users can authenticate and control their digital identity with their self-custody wallet.	**Industry:** Digital Identity **Example:** Ethereum Name Service, login.xyz, Civic, Proof of Humanity, WorldCoin
Bridges	Infrastructure	Middleware solutions allow independent blockchains to communicate with each other to transfer assets by creating a wrapper backed by an asset sitting on another blockchain.	**Industry:** Cross-Border Remittance Payments **Example:** Wormhole, LayerZero
Payment, Smart Contract, Blockchain Accelerators, and Cross-Chain Platforms	Infrastructure	The infrastructure sector encompasses Payment Platforms, Smart Contract Platforms, Blockchain Accelerators, and Cross-Chain Platforms.	**Industry:** Cloud, FAANG (AWS) **Example:** Ethereum, Solana, Polygon, Cosmos
Content Transcoding	DePIN	A specialized segment focused on distributed video processing and streaming services using blockchain's railways. This sector aims to decentralize and democratize the traditionally centralized process of video transcoding.	**Industry:** Streaming Services **Example:** LivePeer, Aioz, Theta

Crypto-Native Industry	Crypto-Native Sector	Definition	Traditional Industry
Decentralized Broadband	DePIN	Projects that aim to create decentralized communication infrastructure using blockchain technology and crypto incentives. It focuses on building community-owned wireless infrastructure that is more resilient and censor-ship resistant and rewards its participants for building more robust connection grids.	**Industry:** Internet Service Providers **Example:** Helium, World Mobile Token, XNET
Distributed Computing	DePIN	Protocols leveraging decentralized networks of computers to provide computational power for AI and machine learning tasks.	**Industry:** Grid Computing **Examples:** Render, Akash, Aethir, Nosana
Energy Distribution	DePIN	Blockchain-powered platforms and protocols that facilitate the creation, trading, and management of energy resources in a decentralized manner, without relying on traditional centralized utility companies.	**Industry:** Energy **Examples:** Energy Web Token, PowerLedger
Mobility, Drive-to-Earn and Mapping	DePIN	Projects that aim to decentralize and transform various aspects of transportation and mobility services. They focus on creating more efficient, transparent, and user-centric mobility solutions by leveraging blockchain and tokenization while maintaining geospatial data and mapping services. They also create new economic opportunities forparticipants that are mainly monetized by centralized companies.	**Industry:** Mobility and Transportation **Example:** HyveMapper (HONEY), DIMO, MapMetrics, GeodNet, SoarChain
Internet of Things (IoT)	DePIN	Decentralized connection and data exchange with other devices on the Internet.	**Industry:** Internet of Things **Example:** Jasmy Network
Supply Chain	DePIN	Sector that aims to create more resilient, efficient, and transparent supply chain ecosystems that benefit all stakeholders involved.	**Industry:** Supply Chain **Examples:** Morpheus Network

Level 3: Taxonomy of Cryptoassets

In his 2019 work "Value Capital & Quantification: Cryptocapital vs Cryptocommodities," Chris Burniske discussed the most appropriate valuation methodologies for cryptoassets. Following Robert Greer's 1997 paper "What is an Asset Class Anyway?", he categorized cryptoassets across three 'superclasses': In Table 3, we propose a taxonomy of cryptoassets and classify them according to the asset superclass to which they belong.
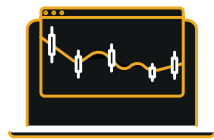
Capital Assets (CA):
"An ongoing source of something of value."

Consumable/Transformable Assets (C/T):
"You can consume it. You can transform it into another asset. It has economic value. But it does not yield an ongoing stream of value."

Store of Value Assets (SoV):
"They cannot be consumed, nor can they generate income. Yet they do have value."

Table 1 - Categorization of Traditional Asset Classes by their Superclass

	Capital Assets "Ongoing source of something of value...valued on the basis of net present value of its expected returns."	Consumable/ Transformable Assets "You can consume it. You can transform it into another asset. It has economic value. But it does not yield an ongoing stream of value."	Store of Value Assets "Cannot be consumed; nor can it generate income. Nevertheless, it has value; it is a store of value asset."
Equities	X		
Bonds	X		
Income-Producing Real Estate	X		
Physical Commodities (e.g., grains or energy products)		x	
Precious Metals (e.g., gold)		x	x
Currency			x
Fine Art			x

Source: 2016 ARK and Coinbase new asset class white paper.

Cryptocurrency	BTC XMR ZEC			
Native Currency	ETH SOL AVAX	Stablecoin	USDT USDC DAI	Fiat Collateralized Stablecoins — USDC USDT
Meme Token	DOGE SHIB PEPE			Anchored Stablecoins (Exogenous Collateral) — DAI
Derivative Token	stETH WBTC cETH	Revenue-Generating NFTs	Ownership rights to song, video, etc.	Reflexive Stablecoins (Partial or Non-Collateralized) — FRAX
Goverance Token	MKR UNI LIDO	Collectible - NFTs	Crypto Punks, Bored Apes	
Utility Token	SNX LINK ZRX	Consumable or Redeemable NFTs	Deeds to a car, tickets to an event, etc.	

Source: 21Shares and CoinGecko

Table 3 - Taxonomy of Cryptoassets

Cryptoasset Taxonomy	Definition	Superasset Class	Examples
Cryptocurrency	Cryptoasset that resembles money in the form of (1) Digital Cash or (2) Digital Commodities (especially precious metals like gold).	Store of Value (SoV) Assets	BTC, XMR, ZEC, DOGE, SHIBA
Native Currency	The native currency of blockchains is similar to a unit of gas or energy. If you want to participate in the Ethereum ecosystem, you need to buy ETH; to interact with the Solana ecosystem, you need to buy SOL, etc. Additionally, the native currency represents a stake in the flourishing economy.	Consumable / Transformable Assets	ETH, SOL, ADA
Meme Token	Tokens with no intrinsic value, but with a strong community that fosters social interaction.	Consumable / Transformable Assets	DOGE, SHIB, PEPE
Fiat-Collateralized Stablecoins (Collateral is the Target Asset)	Stablecoins maintain price parity with a target asset, usually the US dollar. Fiat-collateralized stablecoins are backed by a reserve of the target asset (US dollars) or extremely liquid collateral from the money market, such as treasury bills. The risk of de-pegging is minimal.	Store of Value (SoV) Assets	USDC, USDT (the US dollars and treasury bills backing these stablecoins are exogenous to Circle Pay and Tether)
Anchored Stablecoins (Exogenous Collateral)	Anchored stablecoins are backed by exogenous collateral, i.e., the collateral represents value outside the system via a basket of different assets to maintain the peg to $1. This mechanism ensures that the ability of the stablecoin to maintain the peg is independent of the issuing protocol's native governance token. For example, DAI is backed by an overcollateralized amount of USDC, ETH, and other cryptoassets independent of MakerDAO.	Store of Value (SoV) Assets	DAI (wBTC and ETH are exogenous to MakerDAO)
Reflexive Stablecoins (Partially or Non-Collateralized)	Reflexive stablecoins are only partially backed by exogenous collateral or nothing at all. In other words, no asset is sitting outside the system, reinforcing the value of the stablecoin. For instance, UST maintained the peg to $1 by the monetary dynamics of LUNA, now LUNC, which was endogenous to Terra, which is to say it was backed by nothing at all. Due to their nature, reflexive stablecoins are easier to scale. However, they are very pro-cyclical, meaning they are vulnerable in contraction periods, potentially leading to a "death spiral," such as UST. Other stablecoins have a blended endogenous/exogenous profile, i.e., partially collateralized, such as Frax. There is still much research to be done with these types of stablecoins.	Store of Value (SoV) Assets	UST, FRAX (LUNA was endogenous to Terra, while FXS is endogenous to Frax Finance)
Derivative Token	A derivative token represents either: (a) ownership of an underlying asset, either on or off-chain, with possible fractional ownership, or (b) a composite token with a pool of constituents. An advantage of derivative tokens is that they make fractional ownership a possibility or unlock liquidity were there was previously none. For instance, in traditional finance, one cannot buy a fraction of stock – with a derivative token, this is a possibility.	Capital Assets	Ondo Finance's Tokenized US Treasury Bills and Bonds, Wrapped Bitcoin: WBTC
Utility or Network Token	Utility Tokens drive the economics of a system. In other words, they enable the use of a protocol as its only feature.	Consumable / Transformable Assets	SNX, LINK, ZRX

Cryptoasset Taxonomy	Definition	Superasset Class	Examples
Governance Token	A Governance Token represents voting rights. The owners of a governance token have pro rata voting rights for implementing any change allowed by smart contracts that govern the given platform.	Capital Assets	MKR, UNI, LDO
Collectible NFTs or Digital Art	A Non-Fungible Token (NFT) represents unique or fractional ownership of a unitary asset. In the context of collectibles, they bridge the financial and non-financial world via digital scarcity, allowing users to create, own and distribute a piece of art, video, music, etc.	Store of Value (SoV) Assets	Crypto Punks, Bored Apes, game objects, Proof of Attendance
Consumable or Redeemable NFTs	Redeemable NFTs represent ownership of real (physical) world items.	Consumable / Transformable Assets	Deeds to a car, tickets to an event, legal documents, signatures, etc.
Royalty-Generating NFTs	An NFT that automatically pays out royalties to their creators when they are sold. This way, creators can retain ownership rights over their work and claim resale royalties directly to the user.	Capital Assets	Ownership rights to a song, book, video, etc.

Conclusion

In this paper, we proposed a standard classification of the crypto industry composed of three levels of categorization:

At the protocol level:
Level 1: Crypto Stack
Level 2A: Market Mapping by Sectors
Level 2B: Market Mapping by Industries

At the token level:
Level 3: Taxonomy of Cryptoassets

As crypto is still in the growth phase of its life cycle, it's important to mention that the lists provided in all Levels 1-3 are non-exhaustive, and 21Shares / CoinGecko maintains the right to append, remove, and amend them as appropriate.

*Disclaimer: The list provided in Table 3 is non-exhaustive, and 21Shares / CoinGecko maintains the right to append, remove, and amend it as appropriate.

Appendix

In this section, we apply the proposed methodology to the Top 100 cryptoassets on CoinGecko as of September23, 2024. When there is an overlap between two categories, we attempt to place the cryptoasset in the most relevant one

References
1. Fidelity: https://eresearch.fidelity.com/eresearch/markets_sectors/sectors/sectors_in_market.jhtml
2. International Labor Organization: https://www.ilo.org/global/industries-and-sectors/lang--en/index.htm
3. LinkedIn: https://blog.linkboost.co/linkedin-industries-full-list-analysis-and-rankings-2019-2021/
4. CoinGecko Categories: https://www.coingecko.com/en/categories

#	Top 100 CoinGecko	Ticker	Level 1: Crypto Stack	Level 2A: Sector	Level 2B: Industry	Level 3: Token Taxonomy
1	Bitcoin	BTC	Payment Platform	Infrastructure	Payment Platform	Cryptocurrency
2	Ethereum	ETH	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
3	Tether	USDT	cApp	Centralized Finance (CeFi)	Tokenization	Stablecoin
4	BNB	BNB	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
5	Solana	SOL	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
6	USD Coin	USDC	cApp	Centralized Finance (CeFi)	Tokenization	Stablecoin
7	XRP	XRP	Payment Platform	Infrastructure	Payment Platform	Cryptocurrency
8	Lido Staked Ether	stETH	cApp	Decentralized Finance (DeFi)	Liquid Staking	Derivative Token
9	Dogecoin	DOGE	Payment Platform	Social & Gaming	Gambling	Meme Coin
10	Toncoin	TON	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
11	TRON	TRX	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
12	Cardano	ADA	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
13	Avalanche	AVAX	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
14	Wrapped Bitcoin	wBTC	cApp	Centralized Finance (CeFi)	Tokenization	Derivative Token
15	Shiba Inu	SHIB	dApp	Social & Gaming	Gambling	Meme Coin
16	Bitcoin Cash	BCH	Payment Platform	Infrastructure	Payment Platform	Cryptocurrency
17	Chainlink	LINK	Oracle	AI & Data Solution	Big Data	Utility Token
18	Polkadot	DOT	Cross-Chain Platform	Infrastructure	Cross-Chain Platform	Native Currency
19	LEO Token	LEO	cApp	Centralized Finance (CeFi)	Centralized Exchanges (CEXs)	Utility Token
20	Dai	DAI	dApp	Decentralized Finance (DeFi)	Lending	Stablecoin
21	Uniswap	UNI	dApp	Decentralized Finance (DeFi)	Decentralized Exchange (DEXs)	Governance Token

22	Litecoin	LTC	Payment Platform	Infrastructure	Payment Platform	Cryptocurrency
23	NEAR Protocol	NEAR	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
24	Internet Computer	ICP	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
25	Kaspa	KAS	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
26	Fetch.ai	FET	App-Specific Blockchain	AI & Data Solution	AI Tools & Services	Native Currency
27	Pepe	PEPE	dApp	Social & Gaming	Gambling	Meme Coin
28	Monero	XMR	Payment Platform	Infrastructure	Privacy-Preserving	Cryptocurrency
29	Aptos	APT	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
30	Stellar	XLM	Payment Platform	Infrastructure	Payment Platform	Cryptocurrency
31	Ethereum Classic	ETC	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
32	Ethena USDe	USDe	dApp	Decentralized Finance (DeFi)	Yield Aggregator	Stablecoin
33	First Digital USD	FDUSD	cApp	Centralized Finance (CeFi)	Tokenization	Stablecoin
34	Sui	SUI	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
35	Stacks	STX	Blockchain Accelerator	Infrastructure	Blockchain Accelerator	Native Currency
36	OKB	OKB	cApp	Centralized Finance (CeFi)	Centralized Exchanges (CEXs)	Unity Token
37	Aave	AAVE	dApp	Decentralized Finance (DeFi)	Lending	Governance Token
38	Cronos	CRO	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
39	Filecoin	FIL	App-Specific Blockchain	AI & Data Solution	Data Storage	Native Currency
40	ImmutableX	IMX	App-Specific Blockchain	Social & Gaming	Gaming	Native Currency
41	Render	RENDER	dApp	DePIN	Distributed Computing	Utility Token
42	Optimism	OP	Blockchain Accelerator	Infrastructure	Blockchain Accelerator	Native Currency
43	Hedera	HBAR	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
44	Arbitrum	ARB	Blockchain Accelerator	Infrastructure	Blockchain Accelerator	Native Currency
45	Mantle	MNT	Blockchain Accelerator	Infrastructure	Blockchain Accelerator	Native Currency

46	Injective	INJ	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
47	VeChain	VET	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
48	dogwifhat	WIF	dApp	Social & Gaming	Gambling	Meme Coin
49	Cosmos Hub	ATOM	Cross-Chain Platform	Infrastructure	Cross-Chain Platform	Native Currency
50	WhiteBIT Token	WBT	cApp	Centralized Finance (CeFi)	Centralized Exchanges (CEXs)	Utility Token
51	Maker	MKR	dApp	Decentralized Finance (DeFi)	Lending	Governance Token
52	Fantom	FTM	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
53	Helium	HNT	dApp	DePIN	Decentralized Wireless	Utility Token
54	Polygon	POL	Blockchain Accelerator	Infrastructure	Blockchain Accelerator	Native Currency
55	THORChain	RUNE	App-Specific Blockchain	Decentralized Finance (DeFi)	Decentralized Exchanges (DEXs)	Native Currency
56	The Graph	GRT	dApp	AI & Data Solution	Data Analytics	Utility Token
57	Bitget Token	BGB	cApp	Centralized Finance (CeFi)	Centralized Exchanges (CEXs)	Utility Token
58	Rocket Pool ETH	RETH	dApp	Decentralized Finance (DeFi)	Liquid Staking	Derivative Token
59	Arweave	AR	App-Specific Blockchain	AI & Data Solution	Data Storage	Native Currency
60	FLOKI	FLOKI	dApp	Social & Gaming	Gambling	Meme Coin
61	Theta Network	THETA	App-Specific Blockchain	DePIN	Content Transcoding	Native Currency
62	Mantle Staked Ether	METH	dApp	Decentralized Finance (DeFi)	Liquid Staking	Derivative Token
63	Bonk	BONK	dApp	Social & Gaming	Gambling	Meme Coin
64	Algorand	ALGO	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
65	Quant	QNT	dApp	IT Services	Developer Tooling	Governance Token
66	Pyth Network	PYTH	Oracle	AI & Data Solution	Big Data	Governance Token
67	Bitcoin SV	BSV	Payment Platform	Infrastructure	Payment Platform	Cryptocurrency
68	Jupiter	JUP	dApp	Decentralized Finance (DeFi)	Decentralized Exchanges (DEXs)	Governance Token
69	Gate	GT	cApp	Centralized Finance (CeFi)	Centralized Exchanges (CEXs)	Utility Token

70	JasmyCoin	JASMY	dApp	DePIN	Internet of Things	Utility Token
71	Sei	SEI	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
72	KuCoin	KCS	cApp	Centralized Finance (CeFi)	Centralized Exchanges (CEXs)	Utility Token
73	Ondo	ONDO	dApp	Decentralized Finance (DeFi)	Tokenization	Governance Token
74	Lido DAO	LIDO	dApp	Decentralized Finance (DeFi)	Liquid Staking	Governance Token
75	Celestia	TIA	App-Specific Blockchain	AI & Data Solutions	Data Availability	Native Currency
76	Core	CORE	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
77	BitTorrent	BTT	dApp	AI & Data Solutions	Big Data	Utility Token
78	Paypal USD	PYUSD	cApp	Centralized Finance (CeFi)	Tokenization	Stablecoin
79	Fasttoken	FTN	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
80	Flow	FLOW	App-Specific Blockchain	Social & Gaming	Content Creation	Native Currency
81	Klatyn	KLAY	App-Specific Blockchain	Social & Gaming	Content Creation	Native Currency
82	EOS	EOS	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
83	USDD	USDD	dApp	Decentralized Finance (DeFi)	Lending	Stablecoin
84	MultiversX	EGLD	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
85	GALA	GALA	dApp	Social & Gaming	Gaming	Utility Token
86	Flare	FLR	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
87	Starknet	STRK	Blockchain Accelerator	Infrastructure	Blockchain Accelerator	Native Currency
88	Tokenize Xchange	TKX	cApp	Centralized Finance (CeFi)	Centralized Exchanges (CEXs)	Utility Token
89	Beam	BEAM	App-Specific Blockchain	Social & Gaming	Gaming	Native Currency
90	Axie Infinity	AXS	dApp	Social & Gaming	Gaming	Governance Token
91	NEO	NEO	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
92	Marinade Staked SOL	MSOL	dApp	Decentralized Finance (DeFi)	Liquid Staking	Derivative Token
93	SATS (Ordinals)	SATS	dApp	Social & Gaming	Gambling	Meme Coin

94	Frax	FRAX	dApp	Decentralized Finance (DeFi)	Seigniorage	Stablecoin
95	Tezos	XTZ	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency
96	ORDI	ORDI	dApp	Social & Gaming	Gambling	Meme Coin
97	eCash	XEC	Payment Platform	Infrastructure	Payment Platform	Cryptocurrency
98	Worldcoin	WLD	dApp	AI & Data Solution	Identity Solutions	Governance Token
99	Tether Gold	XAUt	cApp	Centralized Finance (CeFi)	Tokenization	Derivative Token
100	conflux-token	CFX	Smart Contract Platform	Infrastructure	Smart Contract Platform	Native Currency

Disclaimer