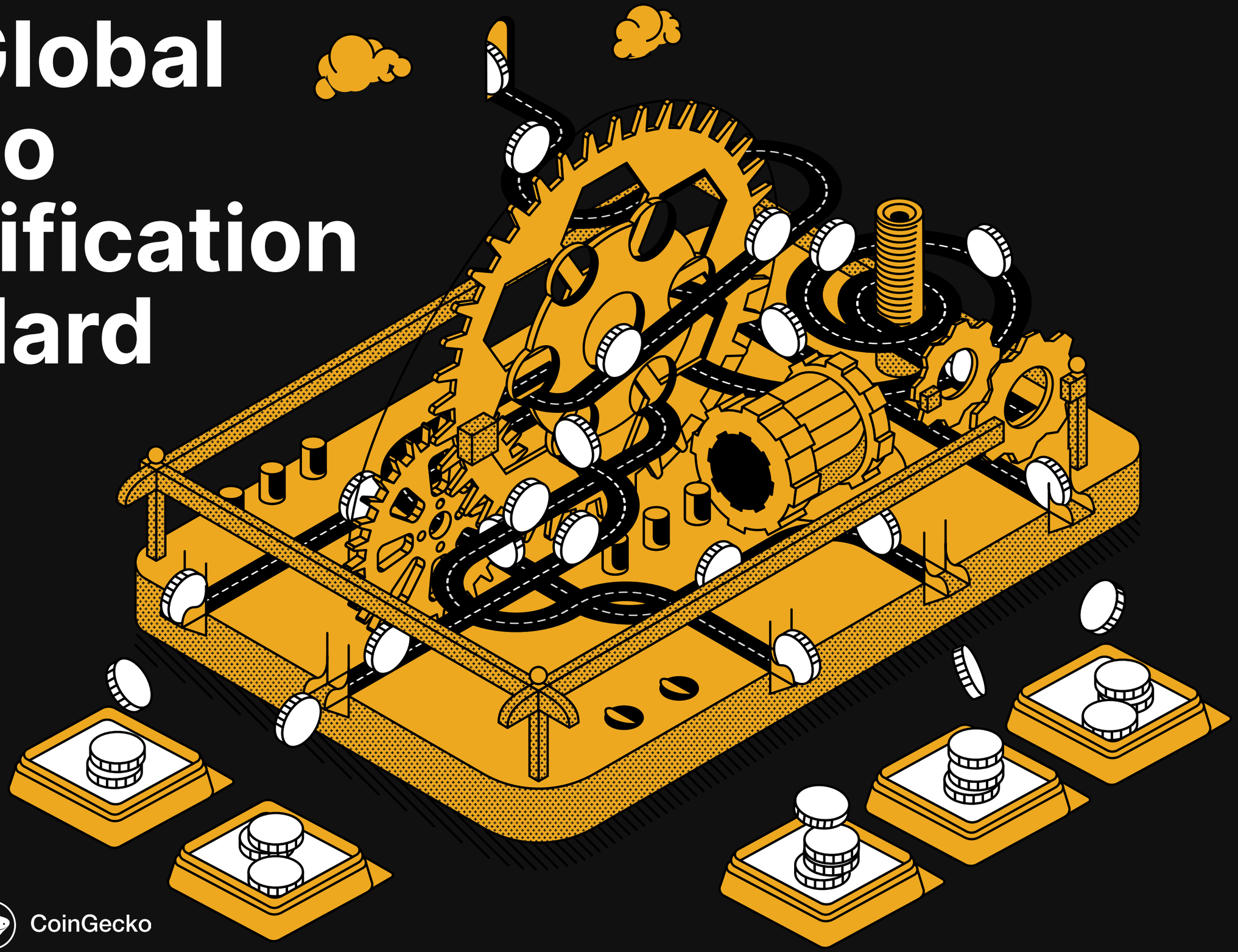
The Global Crypto Classification Standard



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Foreword

We are psyched to release 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, industries, or industry groups. Still, we hope this classification standard will help guide the global tech and financial community.

[1] https://21shares.com/ [2] https://www.coingecko.com/

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.

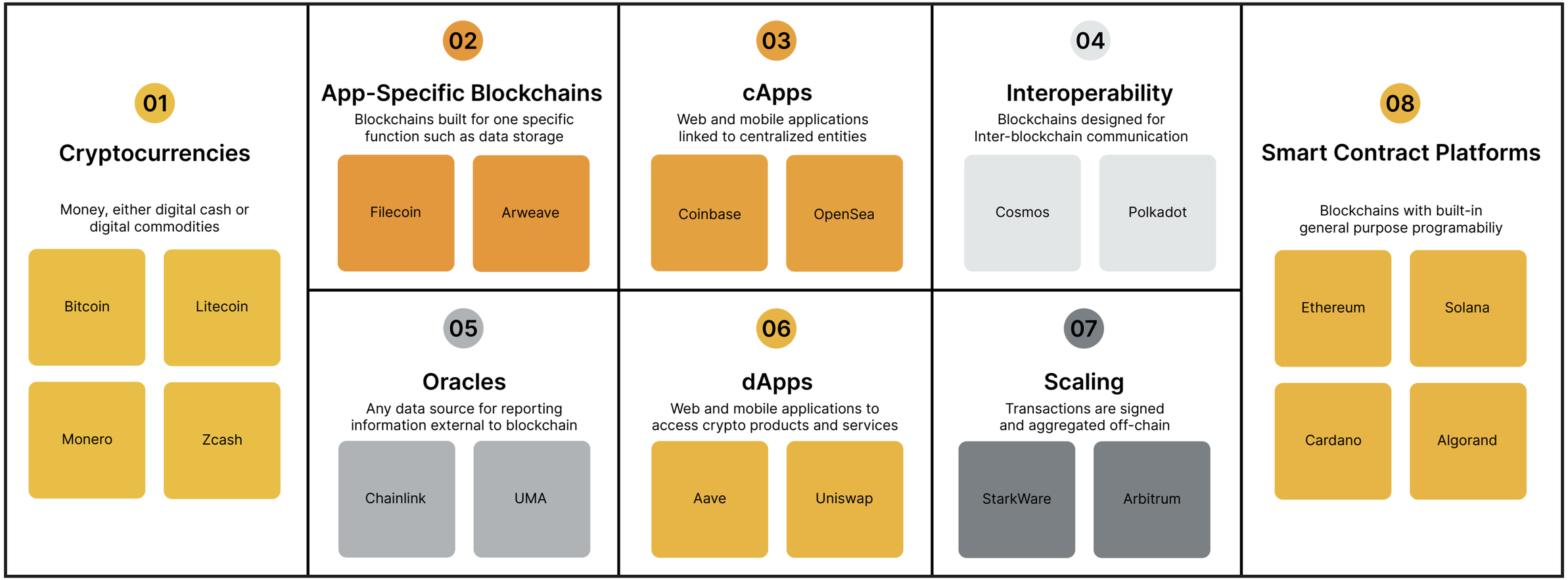
The rationale behind this methodology is to create pick-and-shovel tools to categorize individual protocols and their underlying token(s) along these three levels.

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



Source: 21Shares and CoinGecko

Table 1 - The Crypto Stack

The Crypto Stack Terminology	Definition	Networks or Protocols	Physical World Analogy
Cryptocurrencies / Crypto-commodities	Blockchains or protocols specialized in transferring value. The demand for cryptocurrencies 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.
Scaling Protocols (or Execution Blockchains)	A term describing a specific set of scaling solutions for blockchains. At its core, a scaling protocol 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.	StarkWare, Polygon, Arbitrum	**What?** Scaling protocols 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 size and block rate, similar to how skyscrapers relieve congestion in a city.
Interoperability Protocols	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, Avalanche	**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

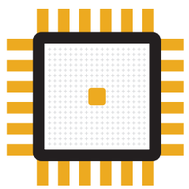
The Crypto Stack Terminology	Definition	Networks or Protocols	Physical World Analogy
Application-Specific Blockchains or Hybrid Layer	App-specific blockchains are standalone blockchains built to serve specific use cases, such as cloud storage and IoT devices. Instead of creating a decentralized application 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, 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



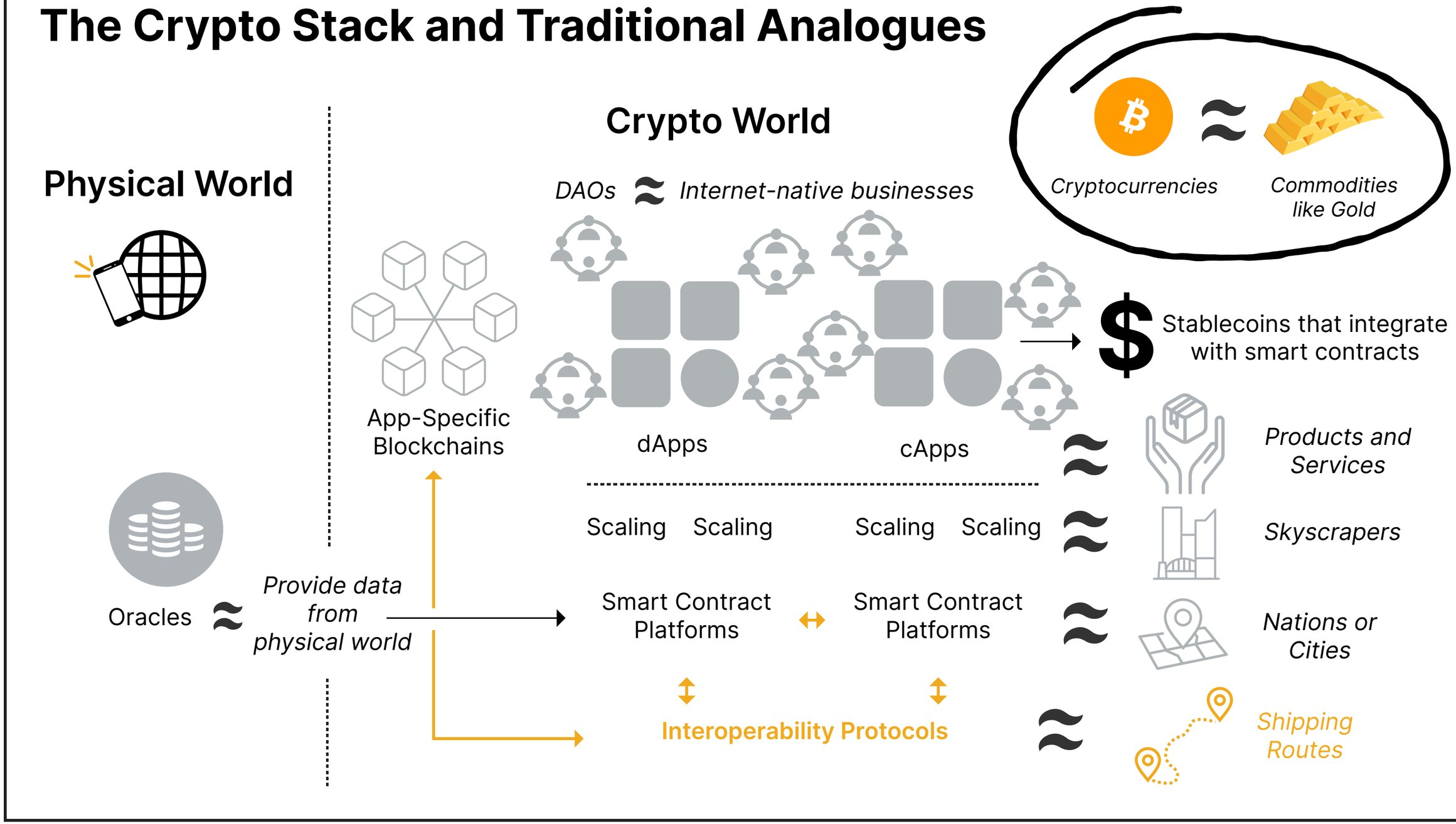
Hardware:
personal computers, smartphones, tablets.

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



Source: 21Shares and CoinGecko

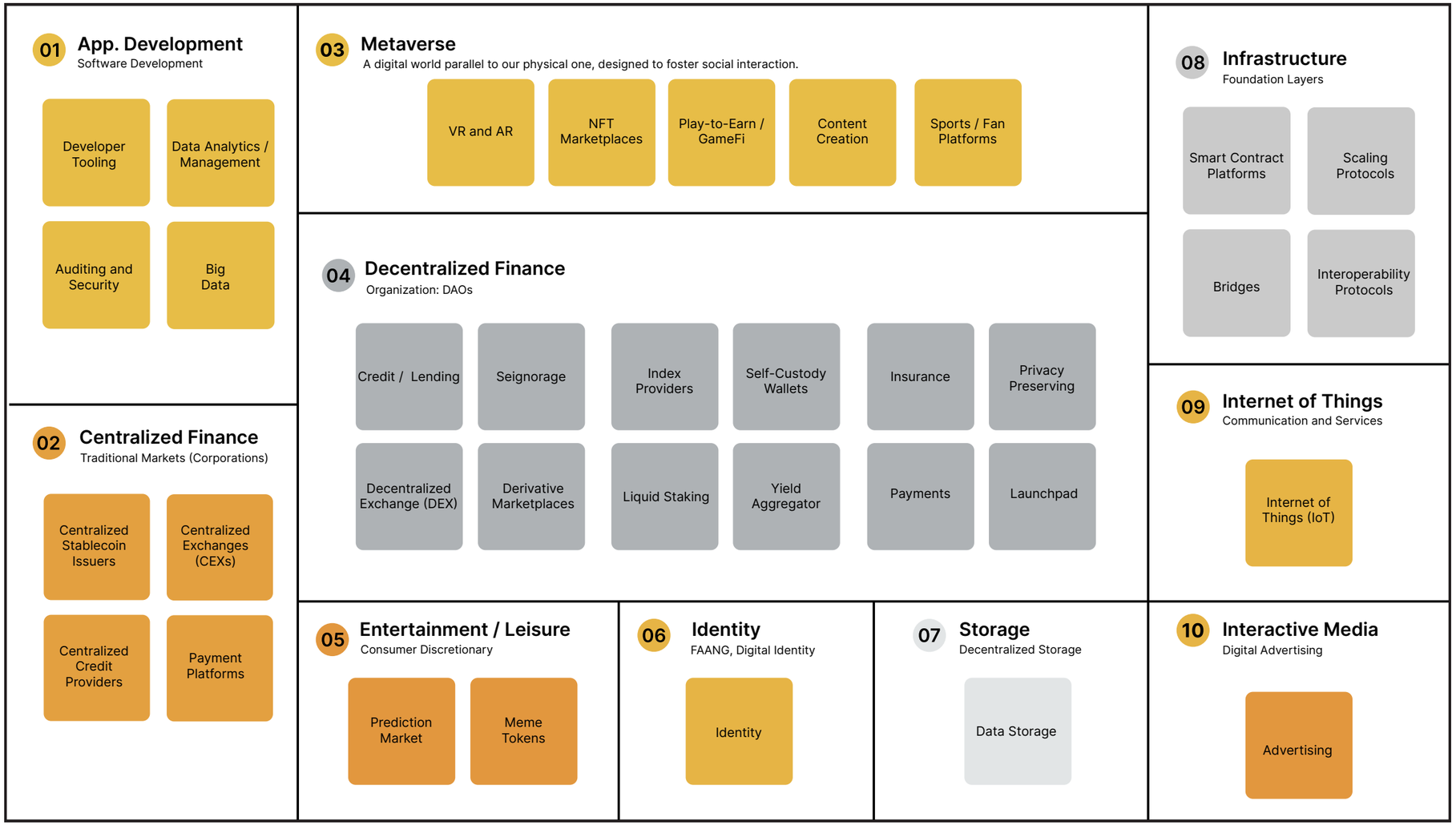
Level 2: Market Mapping by (A) Sectors and (B) Industries

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.

Figure 3 – How Traditional Sectors and Industries Could be Applied to the Crypto-Economy



Source: 21Shares and CoinGecko

Crypto Sectors Market Mapping

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

Crypto-Native Sector	Definition	Traditional Sector
Application Development	Developer tools and protocols to build dApps, 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.	Financials
Decentralized Finance (DeFi)	Internet-native financial infrastructure that does not rely on a centralized institution such as a bank, broker, and similar intermediaries.	Financials
Entertainment / Leisure	A multi-faceted combination of protocols ranging from prediction markets (gambling) to meme tokens.	Consumer Discretionary (Gambling, Entertainment)
Identity	Decentralized 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 or other blockchain-based storage technologies.	Information Technology (Digital Identity)
Infrastructure	The infrastructure sector encompasses Smart Contract Platforms, Scaling Protocols, Interoperability Protocols, and bridges. Some cryptocurrencies, such as Bitcoin, have a rich ecosystem of applications built around them that could add smart contract functionality. In this case, they should be classified in the infrastructure sector.	Information Technology (AWS)
Interactive Media	Interactive media refers to blockchain-based digital advertising that focuses on users' data protection and rewards them for their interaction with ads.	Communication and Services (Digital Advertising)
Internet of Things(IoT)	Decentralized connection and data exchange with other devices.	Information
Metaverse	Protocols that foster a collection of virtual experiences parallel to our physical world, designed to promote social interaction.	Social Networks, Gaming, Gig Economy
Storage	Decentralized storage providers that serve the same functionality as cloud storage providers in Web 2.	Information Technology (Cloud Storage)

Crypto Industry Market Mapping

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

Crypto-Native Industry	Crypto-Native Sector	Definition	Traditional Industry
Developer Tooling	Application Development	Developer tools to build dApps, run tests, and debug code.	**Industry**: Software Development **Example**: Hardhat, Truffle
Data Analytics / Management	Application Development	Includes developer indexing protocols and decentralized API providers.	**Industry**: Traditional Web APIs **Example**: The Graph
Auditing and Security	Application Development	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
Block Explorer	Application Development	A block explorer is a search engine that allows users to view and verify data on the blockchain. Sometimes the platform also offers API services.	**Industry**: Web Browsers **Example**: etherscan
Big Data	Application Development	Big data includes oracles, defined as any data source for reporting information external to the blockchain.	**Industry**: Web APIs **Example**: Chainlink, API3
Centralized Stablecoin Issuers	Centralized Finance (CeFi)	Refers to centralized entities that issue fiat-collateralized stablecoins, i.e., stablecoins backed by an off-chain reserve of US dollars or another target asset. The inherent risk to these tokens is that the entities behind them maintain the right to blacklist accounts, which defeats the censorship resistance ethos of cryptoassets.	**Industry**: Banks or Money Transfer Operators **Example**: Circle and Tether Limited

Crypto-Native Industry	Crypto-Native Sector	Definition	Traditional Industry
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
Payment Platform	Centralized Finance (CeFi)	Payment platforms refer to blockchains that aim to complement traditional payments – such as inter-bank transfers involving regulated financial intermediaries.	**Industry**: Payments **Example**: Ripple, Stellar
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
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
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.	**Industry**: Capital Markets - (Decentralized) Brokerage Trading Platforms **Example**: Uniswap on Ethereum, Orca on Solana

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: Amun Index Tokens
Derivative Marketplaces	Decentralized Finance (DeFi)	Perpetuals or “perps”, which refer to future contracts without an expiration date, are an important innovation of this industry.	Industry: Derivative Marketplaces like Chicago Mercantile Exchange Example: Yield Protocol, dYdX.
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
Tokenization	Decentralized Finance (DeFi)	Tokenization refers to building a wrapper to track the performance of an off-chain asset (often referred to as “real-world asset”) on-chain.	Industry: Fund / Asset Management Example: Wrapped Bitcoin and Mirror tokenized stock.
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 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
Self-Custody or Personal Wallets	Decentralized Finance (DeFi)	Self-custody wallets, analogous to a safe, allow users to interact with a blockchain. The primary function of a wallet is to transfer and store cryptoassets without any third party.	Industry: Private Banking Example: Metamask, Ledger, Argent
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 cryptoassets.	Industry: Foreign Reserves, Reserve Currency Example: Olympus (OHM), Redacted Cartel (BTRFLY), Wonderland (TIME)

Crypto-Native Industry	Crypto-Native Sector	Definition	Traditional Industry
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: Convex Finance, 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
Insurance	Decentralized Finance (DeFi)	Protocols that provide financial protection or reimbursement against losses to users.	Industry: Insurance Example: Armor, Nexus Mutual
Payments	Decentralized Finance (DeFi)	Protocols in the payments industry are designed exclusively to facilitate money transfers in a peer-to-peer fashion.	Industry: Payments Example: Flexa (AMP), Lightning Network
Privacy-Preserving	Decentralized Finance (DeFi)	Privacy-enhancing networks that hide transaction details.	Industry: Offshore and Private Banking Example: Tornado Cash, Aztec, could also include cryptoassets like Monero and Zcash
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
Prediction Markets	Entertainment / Leisure	Refers to protocols where users can trade self-enforced contracts that pay based on the outcomes of unknown future events.	Industry: Traditional Prediction Markets, Online Gambling Platforms Example: Augur, Gnosis
Meme Tokens	Entertainment / Leisure	Tokens that do not hold intrinsic value are often launched on the back of humourous figures or memes copied and spread rapidly by internet users via social media.	Industry: Penny Stocks Example: Dogecoin, Shiba Inu

Crypto-Native Industry	Crypto-Native Sector	Definition	Traditional Industry
Identity	Identity	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
Infrastructure	Infrastructure	The infrastructure sector encompasses Smart Contract Platforms, Scaling Protocols, and Interoperability Protocols.	**Industry:** Cloud, FAANG (AWS) **Example:** Ethereum, Solana, Polygon, Cosmos
Advertising	Interactive Media	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
IoT	Internet of Things (IoT)	Decentralized connection and data exchange with other devices on the Internet.	**Industry:** Wireless Telecommunication Services **Example:** Helium Network
Bridges	Interoperability	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
Cross-chain Decentralized Exchanges	Interoperability	Cross-chain decentralized exchanges provide liquidity and facilitate transfer across different chains in a non-custodial fashion.	**Industry:** Capital Markets - Brokerage Trading Platforms **Example:** THORChain, Osmosis
Virtual Reality (VR) and Augmented Reality (AR)	Metaverse	Protocols that create a simulated experience. VR and AR protocols are crucial pieces of the Metaverse, which entails a collection of virtual worlds parallel to our physical world, designed to foster social interaction.	Industry: Social Networks Example: Decentraland, The Sandbox
Marketplaces (NFTs, Digital Art, etc.)	Metaverse	Apps allowing users to buy and sell digital items such as Non-Fungible Tokens (NFTs).	Industry: Brokers of fine and decorative art, and auction houses Example: OpenSea, LooksRare
Play-to-Earn / Move-to-Earn / Game-Fi	Metaverse	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 Industry Example: Axie Infinity, STEPN
Content Creation (Video and Music)	Metaverse	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: Theta Network, sounds.xyz, Royal.io
Sports	Metaverse	Blockchain-based fan engagement & reward platforms.	Industry: Sports Industry Example: Socios.com, Top Shot, Sorare
Data Storage	Storage	Decentralized storage providers that serve the same functionality as AWS or Microsoft Azure.	Industry: Cloud Storage Example: Arweave, Filecoin, Sia.tech

***Disclaimer:** The list of sectors and industries provided in Table 2 is non-exhaustive, and 21Shares / CoinGecko maintains the right to append, remove, and amend it as appropriate.

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."

Figure 4 – Asset Superclasses

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.

Figure 5 – Level 3: Taxonomy of Cryptoassets

Cryptocurrency	BTC, XMR, ZEC	Fiat Collateralized Stablecoins	USDC, USDT
Native Currency	ETH, SOL, AVAX	Anchored Stablecoins (Exogenous Collateral)	DAI
Staked Currency	staked Ether, staked SOL	Reflexive Stablecoins (Partial or Non-Collateralized)	FRAX
Derivative Token	SOLI, mAPPL, WBTC	Royalty Generating NFTs	Ownership rights to song, video, etc.
Governance Token	MKR, UNI, LDO	Collectibles - NFT	Crypto Punks, Bored Apes
Utility Token	SNX, LINK, ZRX	Consumable or Redeemables NFTs	Deeds to a car, tickets 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
Staked Currency	In Proof-of-Stake networks, validators must lock their capital (the "stake") to gain access to a recurring value stream of native tokens generated by the network. Notably, a staked currency remains in escrow by a smart contract and is subject to slashing to ensure that validators behave honestly.	Capital Assets	staked ether (stETH), etc. Same as above examples but staked.
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.

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

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.

Appendix

In this section, we apply the proposed methodology to the Top 100 cryptoassets on CoinGecko as of June 15, 2022. 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 2: Sector	Level 2: Industry	Level 3: Token Taxonomy
1	Bitcoin	BTC	Cryptocurrencies	Infrastructure	Payments	Cryptocurrency
2	Ethereum	ETH	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
3	Tether	USDT	cApps	Centralized Finance (CeFi)	Centralized Stablecoin Issuers	Exogenous/AnchoredStablecoin
4	USD Coin	USDC	cApps	Centralized Finance (CeFi)	Centralized Stablecoin Issuers	Exogenous/AnchoredStablecoin
5	BNB	BNB	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
6	Binance USD	BUSD	cApps	Centralized Finance (CeFi)	Centralized Stablecoin Issuers	Exogenous/AnchoredStablecoin
7	Cardano	ADA	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
8	XRP	XRP	App-Specific Blockchains	Centralized Finance (CeFi)	Payment Platform	Native Currency
9	Solana	SOL	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
10	Polkadot	DOT	Interoperability	Infrastructure	Infrastructure	Native Currency
11	Dogecoin	DOGE	Cryptocurrencies	Entertainment/Leisure	Meme Tokens	Cryptocurrency
12	Dai	DAI	dApps	Decentralized Finance (DeFi)	Credit/Lending	Exogenous/AnchoredStablecoin
13	Wrapped Bitcoin	WBTC	dApps	Decentralized Finance (DeFi)	Tokenization	Derivative Token
14	TRON	TRX	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
15	Lido Staked Ether	STETH	dApps	Decentralized Finance (DeFi)	Liquid Staking	Derivative Token
16	Shiba Inu	SHIB	Cryptocurrencies	Entertainment/Leisure	Meme Tokens	Cryptocurrency
17	LEO Token	LEO	cApps	Centralized Finance (CeFi)	Centralized Exchanges (CEXs)	Utility Token
18	Avalanche	AVAX	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
19	FTX	FTT	cApps	Centralized Finance (CeFi)	Centralized Exchanges (CEXs)	Utility Token
20	Litecoin	LTC	Cryptocurrencies	DeFi	Payments	Cryptocurrency
21	Cronos	CRO	Smart Contract Platform	Infrastructure	Infrastructure	Utility Token

22	Polygon	MATIC	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
23	Chainlink	LINK	Oracles	Decentralized Finance (DeFi)	Big Data	Utility Token
24	OKB	OKB	cApps	Centralized Finance (CeFi)	Centralized Exchanges (CEXs)	Utility Token
25	Chain	XCN	App-Specific Blockchains	DeFi	Payments	Native Currency
26	Stellar	XLM	App-Specific Blockchains	CeFi	Payment Platform	Native Currency
27	Monero	XMR	Cryptocurrencies	DeFi	Privacy-Preserving	Cryptocurrency
28	Bitcoin Cash	BCH	Cryptocurrencies	DeFi	Payments	Cryptocurrency
29	NEAR Protocol	NEAR	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
30	Algorand	ALGO	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
31	Ethereum Classic	ETC	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
32	Cosmos Hub	ATOM	Interoperability	Infrastructure	Infrastructure	Native Currency
33	Theta Fuel	TFUEL	App-Specific Blockchains	Metaverse	Content Creation	Utility Token
34	VeChain	VET	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
35	Flow	FLOW	App-Specific Blockchain	Metaverse	Content Creation	Native Currency
36	Uniswap	UNI	dApps	Decentralized Finance (DeFi)	Decentralized Exchanges (DEXs)	Governance Token
37	Frax	FRAX	dApps	Decentralized Finance (DeFi)	Seigniorage	Endogenous/Reflexive Stablecoin
38	Hedera	HBAR	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
39	Tezos	XTZ	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
40	Internet Computer	ICP	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
41	Decentraland	MANA	dApps	Metaverse	VR and AR	Utility Token
42	TrueUSD	TUSD	cApps	Centralized Finance (CeFi)	Centralized Stablecoin Issuers	Exogenous/Anchored Stablecoin
43	Theta Network	THETA	App-Specific Blockchains	Metaverse	Content Creation	Native Currency
44	Filecoin	FIL	App-Specific Blockchains	Storage	Data Storage	Native Currency
45	KuCoin	KCS	cApps	Centralized Finance (CeFi)	Centralized Exchanges (CEXs)	Utility Token

46	Axie Infinity	AXS	dApps	Metaverse	Play-to-Earn/ GameFi	Governance Token
47	The Sandbox	SAND	dApps	Metaverse	VR and AR	Utility Token
48	ApeCoin	APE	Cryptocurrencies	Entertainment / Leisure	Meme Token	Cryptocurrency
49	cUSDC	CUSDC	dApps	Decentralized Finance (DeFi)	Credit/Lending	Derivative Token
50	Elrond	EGLD	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
51	EOS	EOS	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
52	Huobi	HT	cApps	Centralized Finance (CeFi)	Centralized Exchanges (CEXs)	Utility Token
53	HuobiBTC	HBTC	cApps	Centralized Finance (CeFi)	Tokenization	Derivative Token
54	Pax Dollar	USDP	cApps	Centralized Finance (CeFi)	Centralized Stablecoin Issuers	Exogenous/Anchored Stablecoin
55	Bitcoin SV	BSV	Cryptocurrencies	DeFi	Payments	Cryptocurrency
56	cETH	CETH	dApps	Decentralized Finance (DeFi)	Credit/Lending	Derivative Token
57	Zcash	ZEC	Cryptocurrencies	Decentralized Finance (DeFi)	Privacy Preserving	Cryptocurrency
58	Aave	AAVE	dApps	Decentralized Finance (DeFi)	Credit/Lending	Governance Token
59	Helium	HNT	App-Specific Blockchains	Internet of Things	Internet of Things (IoT)	Utility Token
60	The Graph	GRT	dApps	App. Development	Data Analytics/ Management	Utility Token
61	NeutrinoUSD	USDN	dApps	Decentralized Finance (DeFi)	Seigniorage	Endogenous/Reflexive Stablecoin
62	BitTorrent	BTT	dApps	Storage	Data Storage	Utility Token
63	DeFiChain	DFI	Scaling	Infrastructure	Infrastructure	Native Currency
64	eCash	XEC	Cryptocurrencies	DeFi	Payments	Cryptocurrency
65	IOTA	MIOTA	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
66	NEO	NEO	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
67	USDD	USDD	dApps	Decentralized Finance (DeFi)	Credit/Lending	Crypto-Collateralized Stablecoin
68	Maker	MKR	dApps	Decentralized Finance (DeFi)	Credit/Lending	Governance Token
69	Klaytn	KLAY	App-Specific Blockchains	Metaverse	Content Creation	Native Currency

70	Quant	QNT	dApps	Interoperability	Developer Tooling	Utility Token
71	cDAI	dApps	dApps	Decentralized Finance (DeFi)	Credit/Lending	Derivative Token
72	Gate	GT	cApps	Centralized Finance (CeFi)	Centralized Exchanges (CEXs)	Utility Token
73	Radix	XRD	App-Specific Blockchain	Decentralized Finance (DeFi)	Decentralized Finance (DeFi)	Native Currency
74	Fantom	FTM	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
75	PAX Gold	PAXG	cApps	Centralized Finance (CeFi)	Tokenization	Derivative Token
76	THORChain	RUNE	App-Specific Blockchain	Interoperability	Cross-Chain Decentralized Exchanges	Native Currency
77	Chiliz	CHZ	Cryptocurrency	Metaverse	Sports/Fan Platforms	Cryptocurrency
78	cUSDT	CUSDT	dApps	Decentralized Finance (DeFi)	Credit/Lending	Derivative Token
79	Zilliqa	ZIL	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
80	PancakeSwap	CAKE	dApps	Decentralized Finance (DeFi)	Decentralized Exchanges (DEXs)	Governance Token
81	BitDAO	BIT	dApps	Decentralized Finance (DeFi)	Crowdfunding	Governance Token
82	Waves	WAVES	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
83	Arweave	AR	App-Specific Blockchains	Storage	Data Storage	Native Currency
84	Loopring	LRC	Scaling	Infrastructure	Infrastructure	Native Currency
85	FLEX Coin	FLEX	cApps	Centralized Finance (CeFi)	Centralized Exchanges (CEXs)	Utility Token
86	Dash	DASH	Cryptocurrencies	DeFi	Payments	Cryptocurrency
87	NEXO	NEXO	dApps	Centralized Finance (CeFi)	Credit/Lending	Utility Token
88	Gala	GALA	dApps	Metaverse	Content Creation	Utility Token
89	Tether Gold	XAUT	cApps	Centralized Finance (CeFi)	Tokenization	Derivative Token
90	Amp	AMP	dApps	Decentralized Finance (DeFi)	Payments	Utility Token
91	Enjin Coin	ENJ	dApps	Metaverse	Content Creation	Cryptocurrency
92	Basic Attention	BAT	dApps	Interactive Media	Advertising	Utility Token
93	Kusama	KSM	Interoperability	Infrastructure	Infrastructure	Native Currency
94	Celo	CELO	Smart Contract Platform	Infrastructure	Infrastructure	Native Currency
95	Synthetix Network	SNX	dApps	Decentralized Finance (DeFi)	Derivatives	Utility Token
96	Fei USD	FEI	dApps	Decentralized Finance (DeFi)	Seigniorage	Algorithmic Stablecoin
97	Stacks	STX	Scaling	Infrastructure	Infrastructure	Native Currency
98	Decred	DCR	Cryptocurrencies	DeFi	Payments	Cryptocurrency
99	STEPN	GMT	dApps	Metaverse	Play-to-Earn/ GameFi	Governance Token
100	Holo	HOT	App. Specific Blockchain	Internet of Things	IoT	Utility Token

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