CF Digital Asset Classification Structure (CF DACS)

Methodology Guide

Version:
3.3

Version Date:
09th April 2024

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1 Version History

Version	Date Issued	Summary of Change	Owner
V1.0	17 January 2022	n/a	CF Benchmarks Management
V2.0	18 May 2023	• Updated the document structure • Updated and introduced new details to Section 4 and Section 5 • Formalised governance structure	CF Benchmarks Compliance Officer
		• Addition of Finance Segments • Renaming & Redefinition of Services sub-categories • Addition of Infrastructure & Utility Segments	CF Benchmarks Management
V3.0	6 July 2023	• Addition of Culture, Industry, Programmable and Non-Programmable Segments • Definition extension of the Services category and sub-categories • Section 4 update	CF Benchmarks Management
V3.1	13th November 2023	• Updated logo	CF Benchmarks Marketing
V3.2	20th November 2023	• Updated logo (AKC v2)	CF Benchmarks Marketing
V3.3	09th April 2024	• Updated CF Digital Asset Classification Structure	CF Benchmarks Compliance Officer

2 Introduction

2.1 Classification Structures

The Digital Asset universe is constituted of a diverse range of Assets with differing characteristics, use cases and applications. The lack of a coherent classification structure by which to segment this universe means that investors can find it difficult to understand the constitution of the universe and how adoption and real-world use of blockchain based applications and functions translates over to piece performance of Digital Assets, if at all. In traditional asset classes, classification systems and structures allow investors to easily reference a group of assets within an asset class – and map them to real world activity. In the "single - name" assets of equities and credit there are GICS and ICB that classify companies into Industry Groups, Sectors and Sub-Sectors as well as the Developed Markets/Emerging Markets distinction. In the macro asset classes of rates and currencies there is the G-4, G-10, Emerging Market and Frontier Market groupings. In the commodities world there are the distinctions of energy, precious metals, industrial metals, agricultural, livestock and rare earths.

In addition, this allows us to compare returns across different asset classes that stem from the same underlying economic activity – for instance Equity versus Bonds from the banking sector, for example. From comparing returns for sectors or individual assets against their peer group in equities to understanding the relative performance of G-10 and EM currencies, investors are constantly using classification systems to analyse and describe asset performance, and ultimately make investment decisions. At the time of publication, the Digital Asset space has a market capitalization exceeding $2.5 trillion, yet investors have no coherent system by which to classify digital assets, and hence analyse returns associated with different digital assets or the provision of products and services on blockchain networks.

2.2 Requirements of Classification Structures

The aim of any classification structure is to give investors a means of dividing a universe of things into categories, sub-categories and segments that allow for any collection of those things to be described by the categorisation, sub-categorisation or segmentation. As much as a means of defining what a thing "is", a classification structure is also a means of defining what a thing "is not". To that end all classification structures must adhere to the principle of ***Mutual Exclusivity*** whereby each individual thing may only be assigned into a single category, sub-category or segment at any given moment in time. If the principle of Mutual Exclusivity is not adhered to, then what we have is a mere set of labels, unable to sufficiently inform investment decisions and provide attribution in a meaningful way.

The second critical principle required for a classification is ***Evolution***; what a thing is when it comes into existence can be subject to radical change during its lifetime, so any classification structure needs to be able to accommodate for movements from one category, sub-category or segment to another. This evolution over time must, however, preclude any object from being in more than one category, sub-category or segment at any point in time. Whilst evolution of a thing is often gradual, any change in a category, sub-category or segment must take place in full at a specific point in time. If this rule is not adhered to, then again all that is produced is a mere list of labels that are unfit to capture the development and progression of the universe we seek to classify. Furthermore, a classification structure should allow for the change of some qualities or characteristics of those things to be measured over time and compared across categories, sub-categories and segments. This makes the rule of mutual exclusivity even more important so that any qualities and characteristics can be measured accurately and without any double counting clouding any attribution data.

For a classification structure to be coherent, the universe that is seeking to be classified must be assessed through the same objective criteria. To that end, all classification structures must adhere to the principle of ***Universality***. This means there can be no carve outs or special cases. The digital asset space is a fast moving and innovative one, where the functionalities and characteristics of digital assets are not known today. However, the definitions that underpin any classification structure must be universal at the point of their application and those definitions must be applied universally. The definitions may change over time but at the point in time of their application, to classify any set of digital assets, they must be applied universally. When the definitions change then so must they be re-applied such that the principle of mutual exclusivity is upheld. This ensures the classification system is comprehensive of all activity within the asset class.

2.3 Means of classification for Digital Assets

When considering a classification structure for the digital asset space there are a multitude of characteristics and qualities of digital assets that can be considered when defining and classifying them. It is important to account for the uniqueness of digital assets, including the technological innovations that they embody and are associated with.

Blockchain Characteristics

Many digital assets are native to specific blockchains. Blockchains have several differentiating characteristics including Technical - such as block size, governance, or consensus mechanism – and economic – such as supply inflation, incentive structures, or fees. Whilst these characteristics are all very important to gaining an understanding of a blockchain and its potential, they are not how investors typically group digital assets together when thinking about whether a certain phenomenon affects a specific group of digital assets and not others. It is also important to note that not all digital assets are native to a blockchain, many are associated with protocols that operate on a blockchain with a different native digital asset. Hence blockchain characteristics in themselves make an unsatisfactory basis for categorising a significant portion of the digital asset universe.

Structural Characteristics

Digital Assets come in many structural forms. Much literature has been written on the subject, with regulatory authorities being particularly active in the area due to their work in analysing whether any Digital Asset is in fact a security and hence subject to securities regulation. The US SEC famously classified Bitcoin as a commodity and not a security due to evaluations against the principles of the "***Howey Test***". Due to Bitcoins' decentralized nature, lack of a central enterprise promoting and developing its network and that there was no "initial offering" of Bitcoin, it was deemed not to be a security. This was followed up by the SEC's analysis of Ether and the Ethereum network where the conclusion was that on the tests that had been applied to Bitcoin, Ether was possibly previously a security, due to its relative centralised state, but that it was no longer a security but a commodity at the time of the analysis due to the fact that the network had evolved and become less centralised. The Bank of England has also weighed in on the structural characteristics of digital assets and has ascribed a number of assets with labels such as "Exchange Token" defined as *"Tokens that are primarily used as a means of exchange – this includes widely known crypto assets such as Bitcoin, Ether and XRP*". The Bank of England went on to define; "Utility tokens: tokens used to buy a service, or access a DLT platform – this could, for example, include access to online cloud storage" – which would seemingly map onto digital assets like Filecoin quite neatly. Since the publications of these descriptive labels the universe of them has grown and there are a group of widely used terms that have entered the lexicon of the Digital Asset markets including; "governance tokens" (tokens that confer voting rights to an associated software protocol), "exchange tokens" (confusingly this is distinct from the Bank of England definition cited above as it refers to tokens that confer incentives tied to the undertakings of specific cryptocurrency exchanges) and "store of value tokens" (tokens that through their supply dynamics and resultant scarcity are perceived to store value).

Whilst these concepts are very helpful in shaping our understanding of different Digital Assets, their structural characteristics and the rights they confer are typically not what an investor would seek from a classification structure. These structural definitions are more analogous to asset classes in the traditional financial asset sense. From an investors perspective the differences between a "governance token" and "store of value token" are related to the rights and participation that token ownership confers, no different from what drives the asset class distinctions of equities and fixed income.

Usage and Adoption

In the traditional equities asset class the means by which companies generate revenue is the key determining factor when classifying a company. That is because revenue is the lifeblood of a company and so it makes sense that the ***nature*** of the revenue becomes the key determining factor when classifying a company. When investors think of the "automotive sector" they envisage enterprises whose revenues are ultimately derived from the sales of automobiles. Their decisions on whether to invest or divest in the sector is ultimately a view of; the sales of automobiles, costs of manufacturing and marketing automobiles and the structural characteristics of the industry such as competition, the ultimate impacts to profitability and the relative upside/downside to this view as informed by the prevailing price.

"Adoption" is the currency of all technologies, and digital assets are nothing if not a technology driven asset class. Therefore, it would hold that a means of categorising digital assets through their real-world usage and adoption is desirable. However, we need to be clear that adoption in this sense is more than just the acquiring and holding of Digital Assets by investors as this would not be a means of differentiation of one Digital Asset versus the next.

If we are to classify Digital Assets via adoption, then we would have to firstly define the "what" that is being adopted.

The majority of Digital Assets at the point of this document being written are associated with a software protocol that is either; the basis of a blockchain, operates on a blockchain whose basis is associated with another digital asset or both. In the case of native tokens it is clearly the blockchain network – Ether to the Ethereum network, Bitcoin to the Bitcoin Network, Tezos to the Tezos network and so on. Where a digital asset is not native to a blockchain network but is settled via another blockchain network, like ERC-20 tokens, ownership of the token can confer voting rights to the manner in which the software protocol underpinning the DApp operates or evolves, or they can be "utility tokens", payment of which allows end users to access the functionality of the software protocol.

In all of these examples the ownership of a Digital Asset ***confers rights to a software protocol***. Software protocols certainly live and die by their adoption. Whilst digital assets are not claims on an enterprise in the manner of equities or credit, when we view a Digital Asset by the associated software protocol there is real-world behaviour underlying its long-term adoption. Investors will have a view of adoption of software protocols and in turn adoption of the Digital Assets that have rights in those protocols due to the rights they confer – whether that be participation in governance, protocol/ network usage or preferential rights to off chain products and services.

Therefore, to classify Digital Assets by the software protocols over which ownership of a digital asset confers rights to would yield an ***adoption-based*** classification. All software protocols will evolve in such a way that seek to deliver outcomes, whether monetary or otherwise, for their users and token owners. Therefore, we can go further and say that Digital Assets can be classified by the functions through which outcomes are achieved. For example, a software protocol that seeks to deliver outcomes in the DeFi space is classified as a DeFi protocol. This rightly puts the focus on the activity and functions in which adoption of the technology is unfolding, regardless of the specific rights that tokens ownership infers. Similarly, a software protocol that proliferates its adoption through usage in Gaming, should be classified as a Gaming protocol as this is how its ultimate measure of success or failure will be manifested.

In fact the very definition of a Digital Asset can be said to be a token that confers to its owner rights in the ownership, utility, rewards, or governance of a software protocol.

Having established that classifying digital assets through the nature of the software protocol associated with it would yield a satisfactory lens by which investors could view the asset class, it is necessary to establish some key principles by which such a classification should be defined and maintained.

3 CF Digital Asset Classification Structure

3.1 Objectives and Principles

A classification structure exists to serve a set of purposes and objectives. It helps illuminate people's understanding of a universe of things, be that an area of knowledge, living organisms or an asset class. The digital asset class is nascent but technically complex, which intensifies the need for a classification structure to be intuitive and understandable. It is equally important that such a structure maintains fidelity to the nature of the asset class and the mechanics of the underlying blockchain economy so that it can help further investors' understanding of the asset class and its evolution. This is as opposed to shoehorning digital assets into unsuitable frameworks that are used in traditional asset classes, tempting though this may be.

A classification structure for Digital Assets will not only allow for convenient ways to group assets together but at the most granular level they define peer groups - what should be directly comparable to what. When viewed in aggregate they will allow for performance measurement and comparison of a category, sub-category or segment against other categories, sub-categories and segments. This in turn allows investors to track the returns associated with the different activities and economic systems the classification systems represent. This top to bottom and bottom to top comparison is referred to as "attribution analysis". Attribution analysis gives investors a granular understanding of the return drivers of their portfolios and decomposes the origins of their returns. This in turn allows for a much higher resolution understanding of market beta and potential sources of alpha.

Having established that a classification structure for digital assets would be best served by classifying through the software protocol that the digital asset is associated with, we must define how this approach is to be implemented. To ensure a coherent structure and one that can be used by investors as intended we must first set out a number of key principles that such an approach must adhere to.

3.1.1 Mutual Exclusivity

As previously stated, any classification structure must apply the principle of mutual exclusivity to the thing that is being classified. This holds true for all classifications structures - be it the Linnean classification structure of the animal kingdom to GICS. Any one thing that is being classified can only live in one category of the same level at any one time.

When this principle is applied to Digital Assets and specifically to the intended means of classifying the software protocol associated with the Digital Asset, then a number of situations can arise and the definitions will need to cater for them.

Protocols can be designed for very specific use cases, many however, can fulfill a myraid of functions. What aspect of the software protocol do we base an evaluation on? How is the protocol ultimately assessed?

As the classification structure aims to aid investors in their understanding of the blockchain economy and support portfolio construction, an analysis process of any software protocol associated with a Digital Asset must be based around the manner of its adoption - as this is the currency by which the success of a technology is assessed. So we can say that any software protocol is evaluated based on its ***usage*** or manner of usage. Just in the same way that GICS utilises a company's source of revenue as the primary factor in determining its categorisation at any point in time, the CF Digital Asset Classification Structure evaluation is based on the manner in which the software protocol associated with a Digital Asset is being used at that point in time.

3.1.2 Evolution

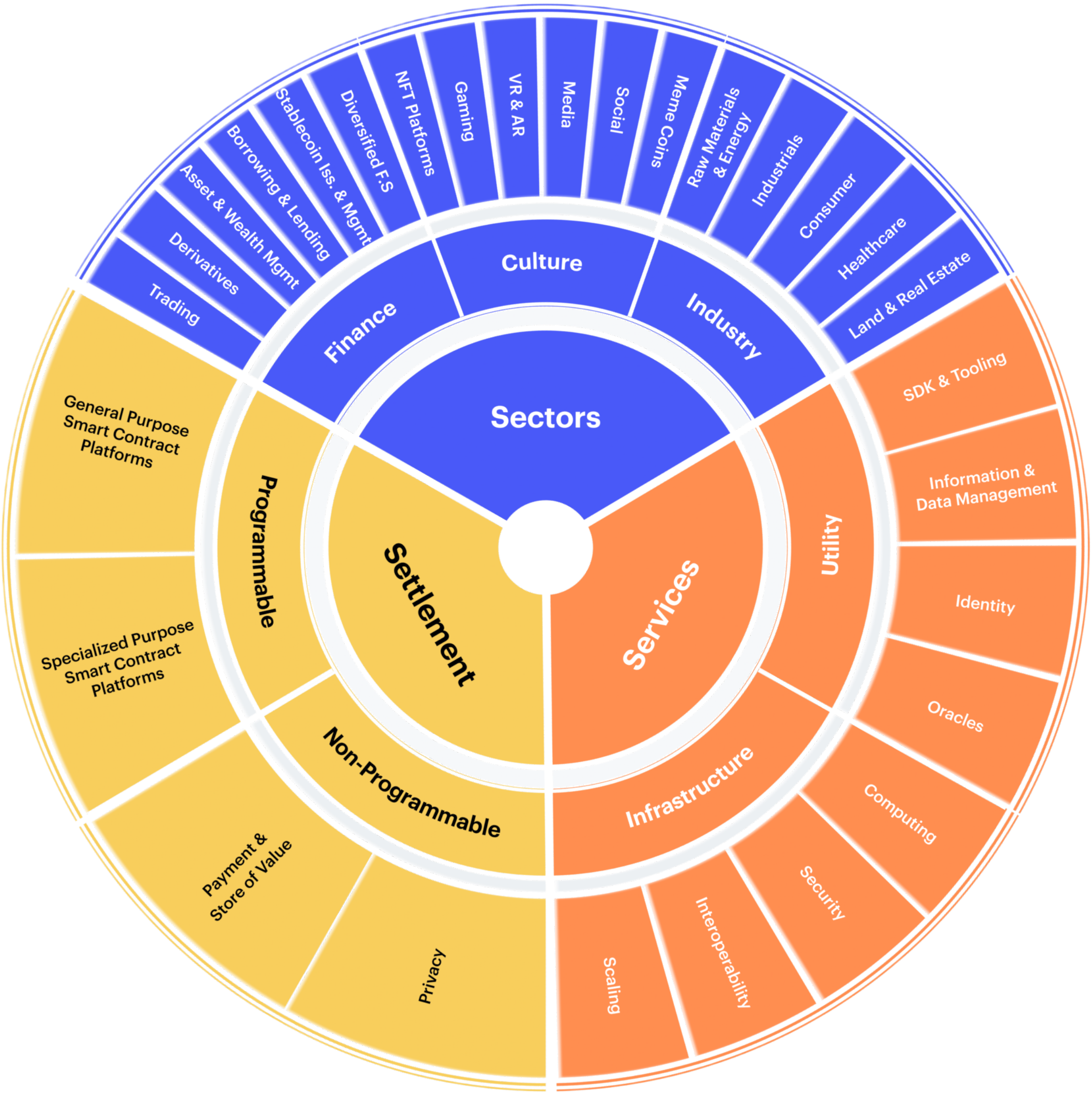
Software Protocols can evolve doing one thing one day and another the next day, how is this catered for?

All classification structures are applications of definitions at the point in time that the classification was undertaken, so that it is true at that point in time. When we reach the next point in time that the classification is re-applied, and all assets are re-evaluated so the classification structure will be true at ***that*** point in time and so on. So should a software protocol be one thing one day and another thing another day then its classification will change from one application of the definitions to the next time the definitions are applied. Furthermore, as explained in the previous point, evaluation of digital assets is undertaken on their ***usage.*** So it can be said that at the point of evaluation the software protocol associated with a digital asset is ***assessed based on what it is used for*** and not ***what it could be used for***.

3.1.3 Universality

For a classification structure to be effective, it needs to be comprehensive in its application. The digital asset space is growing quickly. What used to be a handful of tokens just a few years ago has now grown to thousands of tokens with trillions of dollars in combined market cap. These thousands now rival the count of unique assets in other asset classes such as equities globally. When investors rely on a classification system to guide their investments, they need to know that such classification system is all encompassing and does not exclude an individual or a subset of this asset class. Part of gaining investor confidence and contributing to the reliability of the classification system is not only the knowledge of what is included, but also the knowledge of what’s excluded, if anything is. Complete coverage, or universality of the application of the classification system is also fundamental to its scalability. Scalability relates to the knowledge that such a system works well in today’s world but is comprehensive enough to accommodate and account for tomorrow’s assets. As such, a digital asset classification system is required to adhere to this principle to ensure it captures all things at all times when it relates to this asset class.

3.2 The CF Digital Asset Classification Structure



	Category	Sub-Category	Segment
Digital Assets	Sector Applications	DeFi	Trading
			Derivatives
			Asset & Wealth Management
			Borrowing & Lending
			Stablecoin Issuance and Management
			Diversified Financial Services
		Culture	NFT Platforms
			Gaming
			VR & AR
			Media
			Social
			Meme Coins
		Industry	Raw Materials & Energy
			Industrials
			Consumer
			Healthcare
			Land & Real Estate
	Services	Infrastructure	Scaling
			Interoperability
			Security
			Computing
		Utility	Oracles
			Identity
			Information & Data Management
			SDK & Tooling
	Settlement	Programmable	General Purpose Smart Contract Platforms
			Specialized Purpose Smart Contract Platforms
		Non-Programmable	Payment & Store of Value
			Privacy

3.2.1 Definitions

The CF Crypto Classification shall aim to divide the eligible asset universe into the following categories:

- **Sectors Applications:** Sector Applications are defined as protocols that offer end users; both individuals and institutions, services that deliver outcomes over and above the transfer of a digital asset from one deposit address to another. Most Sector Applications are commonly referred to as Decentralized Applications or "DAPP"s operating as protocols, where the final settlement - actual transfer of value - takes place on a blockchain whose native token is different from that which is associated with that of the Sector Application itself. Sector Applications can be further subdivided into those that offer end users services that are classified as:

    - ***Finance*** - Decentralized applications that deliver a wide array of innovative financial products and services to end-users including retail and institutions. These DApps encompass various sectors, including but not limited to Trading, Asset & Wealth Management, Borrowing & Lending or StableCoin Issuance & Management among others.

        - **Trading**: protocols that provide users with transparent, secure, and user-centric marketplaces that facilitate the trading of assets without the need for intermediaries or central authorities. Also included in this sub-category are protocols that optimise the choice of execution venue for users based on user defined parameters such as price, volume and slippage. By doing so, such protocols elevate the trading experience and grant users complete autonomy over their assets. They frequently utilize established standards like Automated Market Makers, facilitating effortless integration with other DeFi applications and liquidity pools. This nurtures a dynamic ecosystem, empowering users to tap into a broad array of assets, liquidity pools, and cutting-edge trading products that ultimately stimulate wider acceptance and liquidity.
        - **Derivatives**: protocols that allow users to create derivative contracts that derive their value from underlying assets, which can be either on-chain or off-chain. By utilizing these derivative protocols, users can engage in a variety of financial instruments, such as options, futures, and more. These contracts provide exposure to the price movements of the underlying assets, allowing users to hedge against risks, speculate on price fluctuations, and manage their investment portfolios effectively.

- **Asset & Wealth Management**: protocols that aim to generate returns for users by strategically deploying their assets. They provide users with opportunities to invest in various collective asset and user vehicles, which are operated by the protocol itself or other protocols within the ecosystem. By leveraging these asset and wealth management protocols, users can diversify their investment portfolios as well as access a wide range of investment strategies. These protocols often offer features such as risk and return assessment, asset allocation and more, so as to optimize investment performance and manage risk effectively.
- **Borrowing & Lending**: protocols that empower users by offering comprehensive borrowing and lending services, either through a dedicated marketplace or a defined service within the protocol. Users can access a wide range of lending options, including borrowing funds or assets from other participants, or lending their own assets to earn interest. Smart contracts are utilized to automate loan agreements, collateral management, and interest rate calculations, ensuring secure and efficient transactions. Often users have the flexibility to choose lending terms, such as interest rates and loan durations, based on their preferences and risk tolerance. Through these borrowing and lending protocols, they can efficiently allocate capital, unlock liquidity, and explore new opportunities for financial growth and diversification.
- **Stablecoin Issuance & Management**: protocols that enable the creation, issuance, and governance of stablecoins. By providing a framework for the minting, circulation, and management of stablecoins, such protocols ensure their stability and pegging to the targeted value. These protocols often utilize various mechanisms such as collateralization, algorithmic adjustments, and governance models to maintain the aforementioned stability. Overall they enhance financial inclusivity, support the DeFi ecosystem, and offer a vital tool for individuals and businesses seeking stability in a dynamic digital asset landscape.
- **Diversified Financial Services**: protocols that provide users with more than one of the above services or other supplementary services such as payment facilitation, off-chain settlement among others.

- *Culture* – Decentralized applications that enable creation, engagement, and consumption of cultural artefacts, experiences, interactions and other forms of entertainment. By exploiting blockchain technology, these applications empower creators, promote transparency and ownership, and foster vibrant communities in the realms of, but not limited to, Art and NFTs, Gaming, Media or Social protocols among others.

- **NFT Platforms**: protocols that facilitate the creation, trading and ownership of non-fungible tokens (NFTs). These platforms serve as the central hub where artists, creators, and collectors can tokenize and showcase their unique assets, such as artwork or collectibles among others. Such protocols provide the necessary tools to list, discover and transact NFTs in a secure and decentralized manner. They may also include functionalities such as auctioning, bidding, royalties, and secondary marketplaces, allowing creators to monetize their work. Other common features are decentralized storage for hosting the associated digital files or metadata of NFTs, or provenance tracking, allowing users to track the origin and ownership of assets, as all the data is recorded on the blockchain.
- **Gaming**: protocols designed to integrate blockchain technology into the traditional gaming industry. Such protocols facilitate the development, deployment, and operation of decentralized games that leverage the transparency, security, and immutability provided by blockchain networks. By utilizing smart contracts, these protocols enable the creation of verifiable in-game assets, digital ownership, and provably fair gameplay mechanics. In turn, this often allows to incorporate token economies, and hence innovative features such as play-to-earn or move-to-earn models, where players can earn cryptocurrencies and/or unique in-game items that hold real-world value. This further enables players to trade and exchange tokens within the game ecosystem.
- **VR & AR**: protocols that combine the immersive capabilities of Virtual and Augmented Reality with the transparency and security of blockchain networks. By doing so, they enable the creation of a broad variety of decentralized metaverses, offering users a diverse array of immersive features and experiences. Participants within such metaverses can often interact with each other, collaborate or explore immersive virtual worlds in a secure and decentralized environment. Furthermore, users are also typically able to tokenize virtual world assets which can later be traded or exchanged. Overall such protocols open up new possibilities for social interaction, education, and various other applications within the VR and AR space, hence driving innovation and pushing the boundaries of immersive technologies.
- **Media**: protocols enabling the decentralized distribution and management of media content such as, but not limited to, music streaming, video streaming, articles or other forms of digital media. By utilizing blockchain's immutable ledger, these protocols establish provenance, copyright protection, and traceability of media assets, therefore mutually benefiting and

protecting both providers and consumers. In addition to this, blockchain based media protocols often incorporate innovative payment models such as micro-payments, which empowers users with more financial flexibility, or high censorship resistance and data privacy platforms, allowing for a more democratized and inclusive media landscape.

- **Social**: protocols that offer a comprehensive suite of solutions enabling unique social interactions and introduce novel avenues for fan engagement, and social experiences. Through the seamless integration of blockchain's key features, these protocols enable a vibrant ecosystem where individuals can engage in secure and private social interactions while simultaneously empowering fans and fostering social connections.
- **Meme Coins**: coins inspired by popular internet references or virtual trends among others, and that gain popularity primarily due to their meme-like nature. They are typically propelled by strong communities that actively advocate for them across various platforms, including social media, forums, and online communities. These communities play a significant role in driving awareness and adoption of the coin.

- ***Industry*** – Decentralized applications that facilitate, directly or indirectly, traditional sectors of the economy including but not limited to Raw Materials & Energy, Industrials, Consumer Products, Healthcare and Land & Real Estate. These innovative applications bridge the gap between traditional industries and cutting-edge blockchain technology, optimizing and transforming the way we interact with them.

  - **Raw Materials & Energy**: protocols operating in the energy and raw materials sectors by introducing transparency, traceability, efficiency, and decentralization. They empower stakeholders with tools to optimize energy and resource management, promote sustainable practices, and create a transparent and equitable ecosystem for energy and raw materials. Such protocols often facilitate the establishment of decentralized energy networks and grids, enable peer-to-peer energy trading and foster the seamless integration of renewable energy sources. Furthermore, they empower the monitoring of energy generation and consumption, incentivize conservation, and advocate sustainability through the creation of transparent and verifiable frameworks for carbon credits and renewable energy certificates. By leveraging blockchain technology, these protocols drive a paradigm shift towards enhanced streamlined operations, and a fairer distribution of resources.

- **Industrials**: protocols that harness the power of blockchain technology to enhance and transform different facets of industrial operations and procedures. These protocols specifically target the enhancement of efficiency, transparency, and cooperation across industrial domains, including, but not limited to, supply chain management, logistics, manufacturing or outsourcing of commercial and professional services. In addition to this, they commonly empower organizations to amplify visibility, traceability, and responsibility throughout the complete supply chain. By facilitating real-time tracking of products, components, and materials, they ensure adherence to regulations, thwart counterfeiting attempts, and advocate for ethical sourcing practices.
- **Consumer**: protocols that specifically target the consumer industry, and that aim to improve various aspects of consumer goods, services and retail, both discretionary and staples. Such protocols often incorporate innovative consumer services such as decentralized leisure and gambling activities. Other examples, although not limited to, are peer-to-peer trading and decentralized marketplaces allowing consumers to directly procure goods from sellers and providers, therefore eliminating middlemen and reducing total cost. This increases overall efficiency of the industry by providing access to a wider range of products, more competitive prices and establishing a secure and transparent transactional environment.
- **Healthcare**: protocols that provide a foundation for various innovative solutions, including telemedicine, remote patient monitoring, and personalized medicine among others. In addition to this, healthcare protocols facilitate seamless interactions between patients, healthcare providers, insurers, and other stakeholders. By utilizing distributed ledger technology, these protocols ensure the integrity and privacy of patient data, enabling secure sharing and collaboration across different entities. Moreover, by means of streamlining crucial processes like claims processing, such protocols effectively alleviate administrative burdens, enhance operational efficiency, and minimize errors within the healthcare ecosystem. Overall they contribute towards a more efficient and interoperable healthcare environment.
- **Land & Real Estate**: protocols that address challenges related to property transactions, ownership records, financing, and overall industry transparency among others. Such protocols often simplify and automate rental and lease agreements through the implementation of smart contracts on the blockchain. By leveraging these smart contracts, rental agreements are executed and enforced automatically, ensuring timely payments, efficient management of security deposits, and

streamlined resolution of disputes. This transformative approach enhances operational efficiency, reduces administrative costs, and establishes a transparent and auditable rental process for both landlords and tenants. Furthermore, blockchain Real Estate protocols provide the means for the tokenization, fractional ownership of assets and investment opportunities for a wider pool of investors. By representing these assets as digital tokens on the blockchain, these protocols help inject liquidity into traditionally illiquid real estate markets, and facilitate seamless transfer and trading of ownership interests. Other key applications are decentralized property ownership registries, which securely record and verify property ownership, providing transparent and tamper-proof records accessible to all stakeholders. This fosters trust in property transactions, streamlines ownership transfers, and expedites property conveyancing procedures.

- **Services:** protocols facilitating the development, deployment and maintenance of blockchain based Information Technology Infrastructure and Utility. These services incorporate a wide range of blockchains based solutions, decentralized systems and cryptographic protocols, enabling more efficient, secure and transparent transactions, data storage and information exchange. While primarily oriented towards web3, blockchain IT services also extend their benefits to the traditional IT industry, making them versatile and adaptable to a diverse array of technological landscapes.

    - ***Infrastructure*** - Protocols that play a pivotal role in establishing the foundational elements of blockchain networks, while addressing a myriad of challenges that revolve around, but are not restricted to, the blockchain trilemma (decentralization, security & scalability). This also includes traditional IT services albeit blockchain based, such as cloud computing infrastructure catering to both web3 and/or web2 clientele.

        - **Scaling**: protocols aiming to increase the capacity and performance of blockchain networks by increasing transaction throughput, reducing fees and improving overall user experience. These protocols play a vital role in addressing the pressing need to accommodate the ever-growing number of users and transactions on the blockchain, ensuring scalability and usability at a global scale. The ultimate objective is to enable blockchain networks to transcend niche adoption and achieve mainstream acceptance, revolutionizing various industries and sectors. Notable examples of such scaling protocols include sharding, rollups, sidechains, state channels, and plasma, each offering unique approaches to address scalability challenges while preserving the security and decentralization principles of the underlying blockchain network.

- **Interoperability**: protocols enabling different blockchain networks to communicate and interact seamlessly with each other by smoothly sharing data, value and other resources. These protocols significantly contribute to the overall growth and evolution of blockchains by fostering higher connectivity and integration between different networks. By establishing bridges and enabling cross-chain communication, these protocols empower blockchain networks to collaborate, leverage each other's functionalities, and collectively unlock new possibilities and use cases. The implementation of interoperability protocols not only enhances the efficiency and effectiveness of blockchain ecosystems but also promotes innovation and encourages the emergence of robust and interconnected networks.
- **Security**: protocols that provide a wide array of services and techniques that are used to protect the security, privacy and integrity of blockchain networks and its users. These protocols leverage advanced cryptographic techniques, including hashing, digital signatures, and encryption, to ensure the immutability of the blockchain and maintain the confidentiality and integrity of stored data and assets. By employing robust authentication mechanisms, access controls, and other techniques, these protocols protect against unauthorized access, tampering, and fraudulent activities within the blockchain ecosystem.
- **Computing**: protocols or platforms that leverage blockchain technology for secure and transparent execution of computational tasks. These platforms combine the advantages of blockchain, such as immutability, transparency, and consensus, with computing power to create a distributed and trustless environment for running various tasks. Such platforms often play a critical role in the functioning of blockchain networks by providing various network capabilities and functions required to support blockchain transactions and operations, therefore helping such networks to become more efficient and innovative. In addition to their role in enabling blockchain networks, such platforms can be utilized to execute traditional computing tasks, offering secure and transparent computing services beyond the scope of blockchain technology. By providing a decentralized and reliable infrastructure, blockchain computing protocols extend their benefits to both blockchain-based technology and broader computing needs, contributing therefore to the overall advancement of decentralized and trustless computing systems.

- ***Utility:*** Protocols designed to provide ancillary functionality in support of Sector applications. By offering a wide spectrum of utility services such as Oracles or Information & Data Management among others, such services empower developers and users to create and utilize DApps that cater to the unique requirements of different sectors. Furthermore, these protocols facilitate the deployment and management of DApps, ensuring efficient resource allocation, robust security, and seamless interaction between various components. While primarily oriented towards servicing web3 decentralized applications, these protocols can also extend their benefits to traditional web2 users.

- **Oracles**: protocols that bridge the gap between blockchain-based smart contracts and the vast realm of off-chain data. By facilitating the integration of real-world information and events into blockchain networks, oracles empower DApps and associated smart contracts to make informed decisions and execute actions based on external data inputs. These protocols provide a secure and reliable means of retrieving and verifying off-chain data as well as ensuring the integrity and trustworthiness of the information used by decentralized applications. Furthermore, the utilization of oracles expands the capabilities of such DApps, enabling the creation of more intricate and sophisticated applications that can interact with and respond to real-world data.
- **Identity**: protocols that facilitate the creation, management, and verification of user identities on the blockchain in a secure and decentralized manner. These protocols utilize cutting-edge techniques such as public-key cryptography and digital signatures to establish the integrity and authenticity of identity information stored on-chain. By enforcing strong cryptographic measures, identity protocols ensure that unauthorized access and fraudulent activities are mitigated, thereby promoting a trustworthy and reliable environment for decentralized applications.
- **Information & Data Management**: protocols providing solutions that address various aspects of on-chain data storage, transmission, and broadcasting across decentralized applications. These protocols ensure the secure, transparent, and decentralized management of data, allowing at the same time for its efficient collection, storage, and processing in large quantities. This enables the development of innovative decentralized applications that can harness the power of information, data-driven decision-making, and unlock new possibilities across a wide range of industries. Although in most occasions DApps are the target audience of such solutions, they are not exclusively the only one, with some protocols servicing both web3 and web2 clients.
- **SDK & Tooling**: protocols that offer a wide array of development tools, libraries, and code infrastructure services and that

empower developers to efficiently build, deploy, and manage decentralized applications & smart contracts. These protocols provide a robust ecosystem of resources that streamline the development process, making it more accessible and user-friendly. With functionalities ranging from enhanced smart contract development to deployment tools, such protocols simplify complex tasks, enhance code quality, and ensure the efficiency, security, and reliability of DApps. Moreover, these versatile tools are often designed to be platform-agnostic and to support multiple programming languages.

- **Settlement:** Layer 1 blockchains that require usage fees to be paid in-network in the form of the token that is native to the network and network level consensus mechanism. These blockchains can be sub-divided into "programmable" and non "programmable" types - "programmable" blockchains allow for what is commonly referred to as "smart contract" functionality:
    - ***Programmable***: Settlement layer blockchains that support the functionality to execute automated pre-defined transactions involving assets between parties directly on the blockchain through the standard consensus mechanism and parameters of the blockchain, and are observable by all nodes operating on the blockchain. Transaction terms are defined within computer programming language, parameters are defined by users and trigger events are observed through pre-defined mechanisms within the blockchain. Such functionality can be executed without the need for recourse to any third-party authority for verification or execution, and is Turing complete.
        - **General Purpose Smart Contract Platforms**: blockchain platforms that are designed to empower the development and seamless deployment of a diverse array of smart contracts, capable of automating and enforcing the execution of a multitude of agreements, transactions, and business processes. General purpose smart contract platforms are not limited to a specific industry or use case, but rather offer a versatile and adaptable foundation for constructing a wide spectrum of applications across various sectors, such as finance, supply chain, gaming, and more.
        - **Specialized Purpose Smart Contract Platforms**: blockchain platforms that are designed and fine-tuned to cater to the precise needs of executing smart contracts tailored to specific industries or use cases. In contrast to general-purpose smart contract platforms that boast versatility and adaptability across

multiple domains, these specialized purpose platforms diligently concentrate on delivering targeted solutions and functionalities that are optimized for particular industries or applications. By narrowing their focus, these platforms can provide highly efficient and tailored experiences, catering to unique requirements and intricacies that are sector specific. As a result, such platforms often integrate specialized features, protocols, and standards with the objective of simplifying and refining processes, boosting efficiency, and delivering customized solutions.

- *Non-Programmable*: Settlement layer blockchains that do not support the functionality to execute automated pre-defined transactions involving assets between parties directly on the blockchain through the standard consensus mechanism and parameters of the blockchain, and are observable by all nodes operating on the blockchain. Transaction terms are defined within computer programming language, parameters are defined by users and trigger events are observed through pre-defined mechanisms within the blockchain. Such functionality can be executed without the need for recourse to any third-party authority for verification.

    - **Payment & Store of Value**: non-programmable settlement layers whose primary purpose is to facilitate secure and efficient digital transactions while often serving as a trusted medium for storing and preserving value. These protocols enable peer-to-peer transfers of funds or digital currencies, eliminating the need for intermediaries like banks or payment processors. Transactions are safeguarded through cryptographic techniques and consensus mechanisms, ensuring the security and integrity of the network. Additionally, these protocols and their native coins often function as reliable stores of value, providing individuals with a means to safeguard and grow their wealth in the form of digital assets or cryptocurrencies.
    - **Privacy**: non-programmable settlement layers that are purposefully constructed to safeguard the privacy and confidentiality of financial transactions. These protocols give paramount importance to shielding sensitive payment information, including transaction specifics and participant identities, from public exposure or traceability on the blockchain. Their fundamental goal is to achieve such financial privacy and security without depending on centralized intermediaries. To that end, these protocols integrate advanced cryptographic techniques and privacy-centric features, such as zero knowledge proofs, that maintain anonymity. Overall privacy

settlement layers empower individuals and organizations with control over their financial privacy while maintaining the benefits of security provided by blockchain technology.

As the digital asset ecosystem matures, any of the above classification categories, sub- categories or segments may be further sub-divided into more granular distinctions.

3.2.2 Examples

	Category	Sub-Category	Segment
Digital Assets	Sector Applications	**Finance** Uniswap (UNI) Synthetix (SNX) Badger DAO (BADGER) Aave (AAVE) Maker (MKR) AMP (AMP)	**Trading**: Uniswap (UNI) **Derivatives**: Synthetix (SNX) **Asset & Wealth Management**: Badger DAO (BADGER) **Borrowing & Lending**: Aave (AAVE) **Stable Coin Issuance & Management**: Maker (MKR) **Diversified Financial Services**: AMP (AMP)
		Culture Enjin Coin (ENJ) Axie Infinity (AXS) Decentraland (MANA) Audius (AUDIO) Chiliz (CHZ) Shiba Inu (SHIB)	**NFT Platforms:** Enjin Coin (ENJ) **Gaming:** Axie Infinity (AXS) **VR & AR:** Decentraland (MANA) **Media:** Audius (AUDIO) **Social:** Chiliz (CHZ) **Meme Coins**: Shiba Inu (SHIB)
		Industry Powerledger (POWR) Keep3RV1 (KP3R) Augur (REP)	**Raw Materials & Energy:** Powerledger (POWR) **Industrials:** Keep3RV1 (KP3R) **Consumer:** Augur (REP) **Healthcare** **Land & Real Estate**
	Services	**Infrastructure** MATIC (Polygon) QNT (Quant) ARPA (Arpa) STX (Stacks)	**Scaling**: MATIC (Polygon) **Interoperability**: QNT (Quant) **Security**: ARPA (Arpa) **Computing**: STX (Stacks)
		Utility LINK (Chainlink) GRT (Graph) CVC (Civic) BICO (Biconomy)	**Oracles**: LINK (Chainlink) **Identity**: CVC (Civic) **Information & Data Management**: GRT (Graph) **SDK & Tooling**: BICO (Biconomy)

		Settlement	**Programmable** Ether (ETH) Klaytn (KLAY)	**General Purpose Smart Contract Platforms:** Ethereum (ETH) **Specialized Purpose Smart Contract Platforms:** Klaytn (KLAY)
			Non-Programmable Bitcoin (BTC) Monero (XMR)	**Payment & Store of Value:** BTC (Bitcoin) **Privacy:** Monero (XMR)

4 Asset Eligibility & Classification

4.1 Asset Eligibility

CF DACS is intended to assist investors in better understanding portfolio returns and allow portfolios to be constructed that can capture entire value chains or blockchain economic categories. To fulfil these twin aims the CF DACS shall seek to classify any and all Digital Assets for which there is a pricing source calculated by CF Benchmarks. These will include but not limited to:

- Digital Assets which are deemed to be within the CF investable universe and that are eligible for inclusion as constituents in members of the CF Digital Asset Index Family - Multi Asset Series *(determination of the Investible Universe is done in accordance with CF Digital Asset Index Family – Multi Asset Series Ground Rules)*
- Digital Assets which are deemed to be within the CME CF Cryptocurrency Pricing Products Index Family
- Digital Assets which are deemed to be within the CF Digital Asset Index Family

Many Digital Assets are currently not part of any CF Benchmarks products. However, those assets may be considered for inclusion within CF DACS if there is specific interest expressed by market participants or clients to classify those. CF Benchmarks is under no obligation to include any such Digital Assets within CF DACS if the CF Benchmarks Product Management function is unable to determine their classification and re-evaluate those on an ongoing basis through the existing review process. Any such Digital Assets which are deemed eligible for inclusion will be clearly identified.

4.2 Asset Classification Maintenance and Annual Asset Review Process

The scope of each Annual Asset Review covers the review of existing CF DACS definitions as well as relevance and accuracy of CF DACS classification structure and hierarchy.

Classifications for all Digital Assets that have been classified within CF DACS are re-evaluated on a no less than annual basis at the Annual Asset Review, which shall take place around July of each year. Each Annual Asset Review cycle will begin by identifying all Digital Assets for which there is a pricing source calculated by CF Benchmarks and compared against the latest population of CF DACS constituents and may include additional Digital Assets that were not previously considered for classification and inclusion within CF DACS. New Digital Assets that were not previously classified are researched, classified and placed into an appropriate category within CF DACS classification structure and hierarchy.

All Annual Asset Review proposals, including those that were rejected, will be submitted to CF Oversight Function to consider and approve. Subsequently all approved changes which are deemed material will be subject to consultation with users and relevant stakeholders. Any objections will be jointly reviewed by the CF Benchmarks Product Management function and CF Oversight Function. Where consensus cannot be reached the final decision will be referred to CF Benchmarks Board of Directors and cannot be overturned unless new material information, that can be verified and publicly disclosed, is made available to CF Benchmarks Board of Directors to consider.

Annual Asset Review may result in:

- Addition or removal of Digital Assets
- Changes to definitions
- Changes to the existing CF DACS classification structure and hierarchy

More frequent Digital Asset or classification reviews will be conducted should the CF DACS itself undergo significant changes to its categories, sub-categories, segments, new Digital Assets are required to be classified, or other aspects within CF DACS classification structure and hierarchy throughout the year. CF DACS reviews may also occur upon CF Oversight Committee, market participant or client request.

4.3 CF DACS classification structure modification

CF DACS classification structure and hierarchy is reviewed annually and, if necessary, modified to capture the evolution of the Digital Assets definitions, addition of new Digital Assets and removal of existing Digital Assets within the CF investable universe. These changes may lead to:

- Expanding or collapsing the number of CF DACS categories, sub-categories or segments.
- Creating new level(s) between the existing categories, sub-categories and segments.
- Adding additional granular sub-levels to individual segments.
- Creating entirely new sub-levels across all segments.
- Migrating CF DACS categories, sub-categories, segments or other sub-levels within CF DACS classification structure and hierarchy.

5 Classification Structure Review & Governance

CF DACS methodology is subject to an internal review by the Administrator and CF Oversight Functions at least annually or more frequently as Digital Asset evolution dictates to ensure it remains representative of the asset class and fit for purpose.

CF DACS methodology which encompasses structure, definitions and classifications falls under the overall responsibility of CF Benchmarks Product Management function. CF Oversight Function is responsible for the oversight of CF DACS structure, definitions and classifications.

A consultation process with users and relevant stakeholders shall be conducted according to the Administrator's policies and overseen by the CF Oversight Function. Any material changes to CF DACS methodology including but not limited to structure, definitions and classifications shall be announced no less than a month prior to implementation.

Note that CF Benchmarks does not accept any compensation from any market participants; clients; token projects or any other parties in connection to any activities described within this methodology document. All classification decisions related to CF DACS are made independently and exclusively by CF Benchmarks Product Management function based on the requirements outlined in this methodology document. Independent oversight is provided by CF Oversight Function.

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