

# CF Cryptocurrency Index Family - Multi Asset Series

Ground Rules

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# Table of Contents

<b>Version History</b> .....	<b>4</b>
<b>1 Background to Cryptocurrencies</b> .....	<b>5</b>
1.1 Cryptocurrencies.....	5
1.2 Cryptocurrencies as an Asset Class.....	6
<b>2 Liquidity Screening for Cryptocurrencies</b> .....	<b>7</b>
2.1 Determination of the Liquid Universe .....	7
<b>3 Constituent Review</b> .....	<b>9</b>
3.1 Defined Cryptocurrency Constituent Indices.....	9
3.2 Indices that select a fixed number of undefined cryptocurrencies as constituents based on free float market capitalisation rank .....	9
3.2.1 On the Constituent Review Date: .....	9
<b>4 Constituent Weighting</b> .....	<b>10</b>
4.1 Using Free Float Market Capitalisation versus Full Market Capitalisation for weighting of constituents .....	10
4.2 Calculating Full Market Capitalisation for Cryptocurrencies .....	10
4.2.1 Establishing Total Fungible Supply.....	11
4.3 Calculating Free Float Market Capitalisation.....	11
4.3.1 Establishing Total Supply Likely to be Available for Trading.....	11
4.4 Alternative Constituent Weighting Methods .....	14
4.4.1 Mitigating against large swings in Total Supply Likely to be Available for Trading	15
4.5 Capping of Constituent Weights .....	15
<b>5 Constituent Pricing Sources</b> .....	<b>16</b>
5.1 Input Data Hierarchy.....	16
<b>6 Rebalance Procedure</b> .....	<b>17</b>
6.1 Establishing Index Constituents.....	17
6.2 Establishing in scope blockchain and ledger records .....	17
6.3 Querying blocks or ledgers to establish <b>Total Fungible Supply</b> and <b>Total Supply Likely to be Available for Trading</b> .....	17
6.3.1 Index Constituents: Coin Centric Networks.....	17
6.3.2 Index Constituents: Account Centric Networks.....	18
6.4 Determination of Constituent Weights for Rebalance .....	18
6.5 Rebalance Implementation.....	19
<b>7 Treatment of Distributions</b> .....	<b>20</b>
7.1 Price Return Variants .....	20

7.2 Total Return Variants .....	20
7.3 Distribution Scenarios for Cryptocurrency holders .....	20
7.3.1 Fork Events.....	20
7.3.2 Airdrops.....	21
7.3.3 Other rewards .....	22
7.4 Determination of Proceeds of a Distribution Event .....	23
7.4.1 <b>Consolidated Price</b> for non-index constituent cryptocurrencies .....	23
7.4.2 Consolidated price for constituent cryptocurrencies .....	24
7.4.3 Distribution Quantity .....	24
7.5 Re-investment of Distribution Proceeds.....	24
<b>8 Treatment of Cryptocurrency Deductions.....</b>	<b>25</b>
8.1 Deduction Event for Cryptocurrency holders .....	25
8.2 Application of deduction events.....	25
<b>Appendix I – Cryptocurrency Transaction Model Classification .....</b>	<b>26</b>

## Version History

Version	Date Issued	Summary of Change	Owner
1.0	19th August 2020	Launch	CF Benchmarks Management
1.1	28th September 2020	Addition of Assets to Appendix I <ul style="list-style-type: none"><li>• Chainlink</li><li>• EOS</li><li>• Stellar Lumens</li><li>• Tezos</li></ul>	CF Benchmarks Management

# 1 Background to Cryptocurrencies

## 1.1 Cryptocurrencies

Cryptocurrencies are decentralised digital assets supported by digital networks, operated through protocols established and governed by consensus that are implemented through computer software. Transactions in cryptocurrencies are validated and recorded through publicly available distributed ledgers, often utilising mechanisms known as Blockchains. All participants within the distributed ledger system are called nodes and the validation and recording of transactions is undertaken by nodes that satisfy the consensus mechanism that is established for the particular cryptocurrency. Prominent types of consensus mechanisms include:

- “Proof of Work”, the solving of cryptographic problems. The solving of cryptographic problems results in the establishment of a new block – a validated record that is added to the blockchain. Bitcoin is the most prominent cryptocurrency that utilises proof of work and most major cryptocurrencies such as Ether, Bitcoin Cash and Litecoin operate on a proof of work basis
- “Proof of Stake”, a process of selecting a block validator through combinations of factors including; randomisation, age of node and wealth of node. EOS is a prominent example of a cryptocurrency that utilises proof of stake, and it has been proposed for Ether to move to proof of stake.
- “Proof of Correctness”, a process of block validation where specific nodes exclusively take on the validation of transactions. XRP is a prominent example of proof of correctness.

The node that successfully adds new blocks to the chain is rewarded with units of cryptocurrency, this process is commonly referred to as mining. Cryptocurrencies are stored in digital wallets tied to a public deposit address that is secured by encrypted private keys.

The first cryptocurrency, Bitcoin, was established in January 2009 by the release of open source code by a developer or group of developers under the pseudonym “Satoshi Nakamoto”, and the first transaction recorded on the Bitcoin blockchain was on January 12<sup>th</sup> 2009. This software code was the digital implementation of a paper authored by Nakamoto in November 2008 entitled “*Bitcoin: A Peer-to-Peer Electronic Cash System*”. Since that time Bitcoin has seen increasing adoption globally. The blockchain technology pioneered by the establishment of Bitcoin has paved the way for a number of other cryptocurrencies that share the key characteristics of Bitcoin in utilising a public distributed ledger of transactions verified by participating nodes. Prominent examples of other cryptocurrencies include Ether, XRP (Ripple), Dash and EOS.

As Cryptocurrencies operate through protocols governed by consensus, there can be situations where the consensus breaks down and a fork takes place where a new blockchain and ledger is established. Where the fork introduces a protocol that can be reconciled with the protocols of the original blockchain and thus allow interoperability between the two, this is known as a “soft fork”. Soft forks are often temporary in nature and the blockchain maintains one sequential ledger of transactions. Where the fork introduces a protocol that cannot be reconciled with the protocols of the original blockchain thus meaning there is no interoperability between the two, this is known as a “hard fork”. Hard forks usually result in two permanent blockchains where previously there was one and the creation of a new cryptocurrency. The prominent Cryptocurrency Bitcoin Cash is an example of cryptocurrencies that are the result of hard forks, in these cases from Bitcoin.

## 1.2 Cryptocurrencies as an Asset Class

As Cryptocurrencies cannot be easily classified within the existing asset class framework that is familiar to investors it is necessary to establish a new asset class for cryptocurrencies. To allow investors to track the performance, composition and evolution of the asset class a new series of benchmarks with rule sets and treatment appropriate to the asset class will be required.

## 2 Liquidity Screening for Cryptocurrencies

To ensure that the benchmarks in the series can be investible and replicable without undue cost burdens and liquidity risks, eligible constituents are screened for their liquidity. This liquidity screening applies to all multi cryptocurrency asset indices provided by the administrator. The establishment and review procedure is described below.

The process for liquidity screening is conducted by the Administrator at 4pm London time of the first Wednesday in May and November each year and known as the “**Liquidity Determination Date**”.

### 2.1 Determination of the Liquid Universe

1. For each cryptocurrency eligible for inclusion in any index the daily traded volume is calculated for the 180 previous days to the **Liquidity Determination Date**, except for where any of these days is the first 60 days after the listing date of the asset on a constituent exchange where the daily traded volume shall be zero<sup>1</sup>. All markets and trading pairs where a cryptocurrency is listed as either the base asset or quote asset will be included in the calculation. The U.S. Dollar value will be determined as follows:
  - a. Where the cryptocurrency is traded against a fiat currency that is the U.S Dollar the observed USD value will be the value used
  - b. Where the cryptocurrency is traded against a fiat currency that is NOT the U.S. Dollar then the value will be translated into U.S. Dollars using the exchange rate shown on ft.com at 1200 on the **Liquidity Determination Date** to obtain the U.S. Dollar value equivalent
  - c. Where the cryptocurrency is traded against another cryptocurrency the total volume will be divided by 2 and translated into U.S. Dollars by the prevailing rate on the **Liquidity Determination Date**
2. The median U.S. Dollar daily traded value for the previous 180- days is then calculated to determine the **MEDIAN DAILY TRADED VALUE** of each cryptocurrency
3. All cryptocurrencies are then ranked by the **MEDIAN DAILY TRADED VALUE**, the highest first.

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<sup>1</sup> Assets often carry fee free trading during the first 60 days of being listed by cryptocurrency exchanges and as such the volumes observed in this period could be artificially high during this 60- day period.

4. The **MEDIAN DAILY TRADED VALUE** for each cryptocurrency is then divided by the **MEDIAN DAILY TRADED VALUE** of the cryptocurrency ranked first in the previous step. The resultant value is the ***RELATIVE LIQUIDTY RATIO*** of each cryptocurrency.

## 3 Constituent Review

### 3.1 Defined Cryptocurrency Constituent Indices

CF Multi Cryptocurrency Indices that have defined cryptocurrency constituents will not undergo a constituent review process.

### 3.2 Indices that select a fixed number of undefined cryptocurrencies as constituents based on full market capitalisation rank

CF Multi Cryptocurrency Indices that select a fixed number of index constituents based on full market capitalisation rank will undergo a Constituent Review Process on the second Wednesday of each May and November, this is known as the **Constituent Review Date**.

#### 3.2.1 On the Constituent Review Date:

- All cryptocurrencies that exhibit a **Relative Liquidity Ratio** (see Section 2.1) above the **Minimum Liquidity Requirement** for the index on the **Liquidity Determination Date** are selected or retained provided that:
  - A existing index constituent exhibits a **Liquidity Ratio** that is within 80% of the **Minimum Liquidity Requirement**
  - A cryptocurrency that is not an existing index constituent exhibits a **Minimum Liquidity Requirement** that is 120% of the **Minimum Liquidity Requirement**
- For each cryptocurrency selected in the above step the Full Market Capitalisation is calculated (as described in Section 4.2)
- The cryptocurrencies selected to be included as index constituents at the **Constituent Review Implementation Date** shall be:
  - The first cryptocurrency ranked by Full Market Capitalisation
  - All subsequent cryptocurrencies ranked by Full Market Capitalisation (largest first) until the *n*th cryptocurrency (where *n* = **the fixed number of index constituents** in the case of an index with a fixed number of constituents)
- To avoid unnecessary turnover in index constituents each index will employ index **Constituent Review Buffers** at each Constituent Review that will be defined in the respective index methodology

## 4 Constituent Weighting

The Administrator's multi-asset indices will utilise a variety of mechanisms for the weighting of index constituents. For the purposes of measuring market beta index constituents will have their portfolio weights determined by market capitalisation and this can be in the form of full market capitalisation or free float market capitalisation.

### 4.1 Using Free Float Market Capitalisation versus Full Market Capitalisation for weighting of constituents

There are numerous benefits of utilising free float market capitalisation as opposed to full market capitalisation for the purposes of weighting constituents in a capitalisation weighted index. Foremost of these is that a free float market capitalisation weighting of constituent assets is more representative of the behaviour of market participants. The price formation is more representative of the supply-demand dynamics for that asset. A free float capitalisation weighting of constituents will also allow the index to be replicated more efficiently as it minimises the risks of investors being compelled to accumulate assets that are not available to be bought on the open market and hence creating price distortions in the asset.

### 4.2 Calculating Full Market Capitalisation for Cryptocurrencies

The market capitalisation of an asset in traditional assets is widely understood and is generally represented by the below formula:

$$\text{Total Available Supply} * \text{Prevailing Price} = \text{Market Capitalisation}$$

The purpose of market capitalisation is to give investors a view on the prevailing cumulative value represented by all of the outstanding securities of a particular issue or combination of issues. For traditional assets the total available supply represents all of the units of the security that are **available to be exchanged**. Though the number can of course change through buybacks, stock dividends, secondary offerings and other corporate actions it still represents the total amount of a security that is **available to be exchanged**. The key aspect of the market capitalisation calculation is that all of the **Total Available Supply** is fungible.

For digital assets, there are a number of aspects that can mean the **Total Available Supply** is not the same as the **total available to be exchanged or spent**. This varies between different digital assets depending on; the original design philosophy, the manner in which the network the asset is native to has evolved and the operating protocols of the prevailing popular node implementations. we will refer to this as the **Total Fungible Supply** (and this value may change over time).

So in calculating a "market capitalisation" for digital assets a more accurate reflection of this value is:

***Total Fungible Supply \* Prevailing Price = Full Market Capitalisation***

#### 4.2.1 Establishing Total Fungible Supply

Total Fungible Supply is defined as the total units of any digital asset that ***can move from one deposit address to another deposit address*** of the network to which it is native. There are a number of reasons that some specific units of a digital asset cannot be moved from one deposit address to another and hence why the total available supply can differ from the total fungible supply, these include but are not limited to:

- By design for certain units – such as “genesis” units
- User error that results in units that cannot be transferred between deposit addresses
- Consensus rule changes that result in incompatibility with prevailing node implementations
- Coins that are delegated/staked/bonded and cannot be moved for a certain period

It is important to note that not all the reasons why a specific unit or units of a digital asset are not fungible will be immutable. If by design the movement restriction can be lifted by the holder after a certain period, cryptocurrencies that can be unencumbered in less than or equal to 14 UTC days (half the period of one update of the free float market capitalisation calculation for each index constituent) shall be considered fungible. In some cases changes to consensus rules may change the fungibility of specific units of a digital asset. This will be taken into account in the methodology steps describing the ***total fungible supply*** updating process.

### 4.3 Calculating Free Float Market Capitalisation

Capitalisation weighted indices in the equity asset class are now usually calculated using free float market capitalisation instead of full market capitalisation. Free Float Market Capitalisation differs from Full Market Capitalisation in that instead of Total Available Supply it is ***Total Supply Likely to be Available for Trading*** that is multiplied by Prevailing Price

***Total Supply Likely to be Available for Trading \* Prevailing Price = Free Float Market Capitalisation***

#### 4.3.1 Establishing Total Supply Likely to be Available for Trading

Establishing the ***Total Supply Likely to be Available for Trading*** in cryptocurrency and digital asset markets is a much more nuanced task than in traditional securities. In traditional securities, shareholder registers are available and can be searched to establish the proportion of securities that might not be readily available for trading on the open market (and by

deduction, one can work out what is available). For cryptocurrencies no such register of ownership exists due to the bearer nature of cryptocurrencies. The problem of significant proportions of the supply outstanding not being readily available for trading is very much in existence in cryptocurrency.

Some prominent phenomena include;

- Long term strategic holders; often but not always tied to the founding teams
- “Locked” or “escrowed” cryptocurrency, whose operation is often but not always described in the underlying project white paper
- Lost keys: cryptocurrencies are bearer assets, once a private key is lost then access to those cryptocurrency units is lost as well.
- Inaccessible keys: cryptocurrencies are bearer assets, where the keys are stored in hardware devices that have become inaccessible
- Stolen keys: where private keys have been stolen and are likely closely monitored and are not likely to be moved

To consider ways that can allow us to potentially exclude such coins we must also consider the fact that cryptocurrency networks are built on differing architectures and transaction models so any approach to this will have to take into this into account.

In general, we can divide cryptocurrency network transaction models into two types; those that are centred around cryptocurrency units themselves (***coin-centric***) such as Bitcoin, Litecoin, Bitcoin Cash and those that are centred around accounts (***account-centric***) in which the cryptocurrency is held such as Ethereum and Ripple XRP. For avoidance of doubt all coins under consideration in this section must be deemed fungible under Section 4.2.1.

#### 4.3.1.1 Cryptocurrencies that are coin-centric

Coin-centric cryptocurrencies are native to networks that generate UTXO outputs each time a coin is “spent” - moved from one deposit address to another deposit address. Therefore, it is possible to interrogate the network of a coin-centric cryptocurrency to ascertain which coins have been “spent” within a certain timeframe. It can therefore, be inferred that coins that have not been spent for a prolonged period of time are likely not available for trading. Reasons could include:

- Coins residing in wallets where the private keys have been lost/stolen/become inaccessible
- Coins held for long term strategic investment

This being the case we can use the record of UTXO outputs for coin-centric cryptocurrencies as a test for whether any units of cryptocurrencies are ***likely to be available for trading***. Although any period of time that is determined as the start date for the measurement of

UTXO outputs as an approximation for the phenomenon we seek to capture is arbitrary, the price action exhibited by cryptocurrencies can serve as a good guide as to what time period would be most appropriate, especially in regard to lost coins. Given the price history that cryptocurrencies have exhibited it would be reasonable to assume that coins that have not generated an UTXO output since **00:00 UTC September 1<sup>st</sup> 2015** (when the prevailing prices of major cryptocurrencies were around 10% of where they stand today) is very likely due to private keys being lost or relates to coins that are held for a long term strategic investment. However, given this is an approximation by date based on price history it is clear that this date shall need to be revised in the future.

#### 4.3.1.2 Cryptocurrencies that are account centric, applying a discount factor

Account-centric cryptocurrencies are native to networks that centre the messaging of that network around the accounts that are native to that network as opposed to units of the cryptocurrency. Prominent examples include Ethereum and the Ripple Ledger for the Ripple XRP token. As the “spending” movements of specific tokens is not the primary format of the ledger, applying the same test as that which we apply to cryptocurrencies native to coin-centric networks would necessarily be an approximation and difficult to replicate and validate. In its stead we can attempt to establish accounts that are likely to be long term holders, often founders or non-profit organisations closely tied to the founders of the network. Hence this cryptocurrency is **not likely to be available for trading** and its inclusion would have a material impact on the free float calculation.

The simplest way to calculate this is to take all the accounts of an account centric cryptocurrency network and determine the amounts of cryptocurrency contained in each through querying the network. Where any single account contains more than a specific percentage of the Total Fungible Supply then a discount factor is applied to that amount. This approach assumes that a portion of the cryptocurrency in that account is being held for long term strategic reasons with the remainder being **likely to be available for trading**.

The discount factors applied to account centric cryptocurrency accounts are determined to be:

Amount Held in a Single Account	Discount Factor
>=2.5% of the Total Available Supply	100%
>=1.0% of the Total Available Supply	80%
>=0.5% of the Total Available Supply	60%
>=0.2% of the Total Available Supply	40%

<p>&gt;=0.1% of the Total Available Supply</p>	<p>20%</p>
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#### 4.3.1.2.1 Exempting service provider accounts from discounting

By applying the above discount factors we would capture both cryptocurrency that is held by long term strategic holders and also cryptocurrency that resides in “aggregated” accounts. These are accounts where the cryptocurrency is held on behalf of their owners by service providers. Prevalent examples of this would include:

- Cryptocurrency exchanges – where the account balance substantially represents the balances of its clients

Although the identity of account controllers is not available on the cryptocurrency networks themselves there are a number of vendors of blockchain analytics data that can identify some of the more prominent service providers. A suitable blockchain analytics provider is utilised to filter all the accounts that have been identified as subject to discounting and those that are identified by the blockchain analytics provider as any of the below or their equivalents will be exempt from any discounting and have their entire balance be considered as **likely to be available for trading**.

#### 4.4 Alternative Constituent Weighting Methods

It is anticipated that the CF Benchmarks Multi-Cryptocurrency Index Series shall have within it a series of indices with different constituent weighting methods. These ground rules shall be updated to include details of these different constituent weighting methods as they become available.

#### 4.4.1 Mitigating against large swings in Total Supply Likely to be Available for Trading

Cryptocurrency networks are inherently scalable in terms of the number of users that can utilise them. The number of deposit addresses or accounts is unlimited. There are also techniques available that allow holders of cryptocurrency to distribute their holdings across a wide range of deposit addresses and accounts. Although this technique is available to all holders of cryptocurrency it is not very commonly practiced as it adds to the complexity of key storage – each address creates a new key that needs to be stored securely. Nevertheless to mitigate against large swings in the **Total Fungible Supply Likely to be Available for Trading** and hence the weight of constituents within any index caused by fluctuations in this value it would be prudent to apply a limit to the degree of change to **Total Fungible Supply Likely to be Available for Trading** between each rebalance. This is known as the **Monthly Change in Supply Likely to be Available for Trading** and is capped at 5%.

#### 4.5 Capping of Constituent Weights

To facilitate the replication of the Indices within the CF Benchmarks Multi Cryptocurrency Index Series by product providers that wish to satisfy certain regulatory requirements, such as those applicable to UCITS funds In the European Union, Index variants will be offered that cap the weights of constituents. Indices may be offered utilising a number of different capping mechanisms. These ground rules shall be updated as different capped index variants become available.

## 5 Constituent Pricing Sources

Due to the distributed nature of cryptocurrency trading for each cryptocurrency asset that is a constituent of a Multi Cryptocurrency index, a pricing source must be determined for utilisation as input data to the index. The index methodology shall include the pricing source for each index constituent, and this shall be reviewed at each rebalance point by the Administrator. Should any constituent pricing source change then the index methodology shall be updated to reflect the change. In general, the constituent pricing sources utilised will follow the below input data hierarchy.

### 5.1 Input Data Hierarchy

The Administrator provides price benchmarks for a number of cryptocurrencies against a variety of quote assets. The hierarchy of input data sources for any cryptocurrency that is a constituent of the indices shall, in order, be the below with each subsequent source replacing the previous where the previous becomes permanently unavailable:

1. The Administrator's price benchmarks for a cryptocurrency asset in the same quote currency and publication frequency as the index
2. The Administrator's price benchmarks for a cryptocurrency asset in a different quote currency but same publication frequency as the index shall be translated to the index quote currency using a suitably robust fiat currency to fiat currency FX rate
3. The Administrator's price benchmarks for a cryptocurrency asset in a different cryptocurrency quote currency but same publication frequency as the index shall be translated to the index quote currency using an available price benchmark

## 6 Rebalance Procedure

CF Multi Cryptocurrency Indices shall be rebalanced on a periodic basis, the exact frequency will depend upon the individual index in question. The rebalance procedure shall be comprised of the following steps regardless of the rebalance frequency.

### 6.1 Establishing Index Constituents

At the **Rebalance Determination Point** the existing index constituents will be rebalanced. Where the rebalance process takes place in May or November then any potential constituent additions or removals will also be considered and Implemented at the same time.

### 6.2 Establishing in scope blockchain and ledger records

At the Index **Rebalance Determination Time** the Administrator will establish the block height or ledger number of each cryptocurrency asset that is an index constituent. This is done by observing the latest block or ledger that has received sufficient confirmations to be unambiguously the latest block or ledger at the **Rebalance Determination Time** in the dominant chain thus deemed to be permanently irreversible. This shall be known as the **Rebalance Block Height** or **Rebalance Ledger Number**.

### 6.3 Querying blocks or ledgers to establish *Total Fungible Supply* and *Total Supply Likely to be Available for Trading*

Once the **Rebalance Block Height** or **Rebalance Ledger Number** is established for each index constituent then the Administrator shall query the respective blockchain or ledger to establish both the *Total Fungible Supply* and the *Total Supply Likely to be Available for Trading*.

#### 6.3.1 Index Constituents: Coin Centric Networks

UTXO outputs generated by network transactions will be queried for each network of a coin centric index constituent. All coins that have generated an UTXO output since **00:00 UTC September 1<sup>st</sup> 2015** shall be summed to generate the *Total Supply likely to be Available for Trading* for the rebalance month. If there are any cryptocurrency units to be added to the *Total Supply Likely to be Available for Trading* from the previous month due to the **Monthly Change in Supply Likely to be Available for Trading** Cap being met in those months then these shall be added to the **Supply Likely to be Available for Trading** number determined for the rebalance month.

Should the **Change in Supply Likely to be Available for Trading** meet 5% then the remaining cryptocurrency units will be added to the sum for *Total Supply Likely to be Available for*

**Trading** at the rebalance procedure for the following rebalance up to a maximum of 5% with the remainder carried to the next rebalance and repeated for subsequent rebalances until all the cryptocurrency units are reflected in the **Total Supply likely to be Available for Trading**.

### 6.3.2 Index Constituents: Account Centric Networks

All accounts active on the network will be queried for each network of an account centric index constituent. The total sum of fungible cryptocurrency units residing in each account will be computed as a percentage of the Total Fungible Supply. Where any of the accounts show a total amount of cryptocurrency that crosses the threshold of the Amount Held in a Single Account in the below table will be identified. A blockchain analytics provider will be utilised to then identify whether any of the accounts showing balances in excess of the Amount Held in a Single Account are controlled by firm types exempt from discounting as defined in 4.3.1.2.1. These accounts will have their balances be included in the **Total Supply Likely to be Available for Trading**. The corresponding Discount Factor will be applied to all accounts identified that are not exempt from discounting and have their discounted balances summed to generate the **Discounted Amount** for that rebalance.

Amount Held in a Single Account	Discount Factor
>=2.5% of the Total Fungible Supply	100%
>=1.0% of the Total Fungible Supply	80%
>=0.5% of the Total Fungible Supply	60%
>=0.2% of the Total Fungible Supply	40%
>=0.1% of the Total Fungible Supply	20%

**The Total Supply Likely to be Available for Trading = The Total Fungible Supply – Sum of Discounted Amounts for the rebalance period**

### 6.4 Determination of Constituent Weights for Rebalance

The rebalance weight of each index constituent shall be given by the proportion of the divisor that the denominator relevant to that index (**Total Fungible Supply or Total Supply Likely to be Available for Trading**) using the **Rebalance Determination Price Source** of each index constituent.

## 6.5 Rebalance Implementation

At the ***Rebalance Implementation Point*** the Administrator shall rebalance the index constituent weights to those that have been determined in 6.4.

## 7 Treatment of Distributions

CF Benchmarks provides Multi Cryptocurrency indices in either Price or Total Return. In scenarios of distributions the calculation rules will vary for the two different return variants.

### 7.1 Price Return Variants

Price Return index variants will not incorporate any distributions to their calculation.

### 7.2 Total Return Variants

Total Return index variants will incorporate distributions at the next **Rebalance Determination Point** by re-investing the **Distribution Proceeds** into the index constituents proportionate to the weights that are established at the **Rebalance Determination Point**.

### 7.3 Distribution Scenarios for Cryptocurrency holders

There are several scenarios that holders of a cryptocurrency can be entitled to distributions.

#### 7.3.1 Fork Events

Cryptocurrencies and digital assets are built upon networks governed by “consensus rules”. These rules determine whether transactions on their respective blockchains are valid. Any change to these consensus rules must be implemented by all parties for the system to function on a continuous, unified basis. In particular, the entities validating transactions (miners) must conform to any changes to be able to continue to validate transactions and maintain network functionality and stability. When consensus rule changes are proposed they will affect the software code that the blockchain operates on and all the users of the network that are active on the blockchain are expected to implement these changes.

##### 7.3.1.1 Soft Forks

Should the proposed changes mean that there is compatibility with nodes that do not implement the change (backwards compatibility) then this is known as a “soft fork”. Due to this backwards compatibility “soft forks” do not result in major disruptions to the network. These events do not produce distributions for cryptocurrency and digital asset holders and hence do not affect the calculation of indices.

##### 7.3.1.2 Hard Forks

Where the proposed changes break the compatibility with nodes that do not implement the changes then this is potentially a “hard fork”. When any nodes of the blockchain refuse to

conform to the new consensus rules and implement the new software this may cause a hard fork to occur and may result in the creation of a new blockchain and associated new token.

In this scenario a hard fork is deemed to have occurred to an index constituent if:

1. two or more divergent blockchains are in existence post-fork that share the same pre-fork blockchain that underlie the index constituent,
2. the tokens on the post-fork chains are non-fungible across chains, and
3. the respective blockchains are actively mined such that transactions can be processed at reasonable speed.

When a hard fork event occurs to an existing index constituent and a new token is created, holders of the original cryptocurrency will be entitled to “claim” the resultant tokens on a one for one, unit basis (against the original cryptocurrency). The resultant new token will be considered as a distribution to the original cryptocurrency and a **Distribution Event** is deemed to have occurred if it satisfies the below conditions:

1. Immediately after the hard fork event:
  - The new token is immediately fungible with no impediments whatsoever
  - The manner of the hard fork results in the private keys associated with the constituent cryptocurrency to be the only requirement to claim the new tokens
2. On the 7<sup>th</sup> working day after the hard fork event:
  - The new blockchain continues to be actively mined
  - Two or more Constituent Exchanges utilised by the Administrator list the resultant token for trading against the base currency of the Multi Cryptocurrency index to which the constituent cryptocurrency is a member
  - The total trading volume observed for the resultant token conducted on Constituent Exchanges utilised by the Administrator in the preceding 3 days is greater than or equal to 5% of the trading volume observed for the constituent cryptocurrency across all Constituent Exchanges

For avoidance of doubt the **Distribution Event** is deemed to have happened on the day all above conditions are satisfied.

### 7.3.2 Airdrops

Another form of potential distribution for cryptocurrency holders comes in the form of “airdrops”. Airdrops are situations where existing holders of a cryptocurrency, often founders or network foundations, distribute cryptocurrency units to holders of another cryptocurrency. This is often undertaken to stimulate adoption of the cryptocurrency being distributed, as the “target” cryptocurrency is usually more widely held and utilised than the cryptocurrency being distributed.

Where any index constituent becomes the “target” of an airdrop i.e. a token not native to that blockchain is distributed to holders of the cryptocurrency then this shall be considered a **Distribution Event** to the constituent cryptocurrency if it satisfies the below conditions:

1. Where the cryptocurrency that is airdropped is an index constituent cryptocurrency and immediately after the airdrop event:
  - The distributed token is immediately fungible with no impediments whatsoever
  - The airdrop must not be conditioned on the holder taking any action either on-chain or off-chain. This includes but is not limited to: placing a movement restriction on any proportion of funds, sending a transaction (whether the transaction involves funds or not), registering the account or funds for distribution, or running a node.
  - The distributed amount to each holder must be reasonably calculated and be the same of any user holding the same amount of cryptocurrency. This means that two users who hold the same amount of fungible cryptocurrency in any configuration of accounts/UTXOs must receive the same amount of distributed cryptocurrency.
  - The manner of the airdrop results in the private keys associated with the constituent cryptocurrency to be the only requirement to claim the distributed tokens
  
2. If the airdropped token is not a constituent cryptocurrency at the time of the airdrop event and immediately after the airdrop event:
  - The blockchain underpinning the cryptocurrency being airdropped continues to be actively mined
  - Two or more Constituent Exchanges utilised by the Administrator list the resultant token for trading against the base currency of the Multi Cryptocurrency index to which the constituent cryptocurrency is a member
  - The total trading volume observed for the airdropped cryptocurrency conducted on Constituent Exchanges utilised by the Administrator in the preceding 3 days is greater than or equal to 5% of the trading volume observed for the constituent cryptocurrency across all Constituent Exchanges

For the avoidance of doubt the **Distribution Event** is deemed to have happened on the day all the above conditions are satisfied.

### 7.3.3 Other rewards

Some cryptocurrencies may also distribute some amount of the same cryptocurrency to each account/UTXO holder. Where any index constituent has such funds distributed to holders of

the cryptocurrency then this shall be considered a **Distribution Event** to the constituent cryptocurrency if it satisfies the below conditions immediately after the distribution:

- The distributed amount is immediately fungible with no impediments whatsoever.
- The distribution must not be conditioned on the holder taking any action either on-chain or off-chain. This includes but is not limited to: placing a movement restriction on any proportion of funds, sending a transaction (whether the transaction involves funds or not), registering the account or funds for distribution, or running a node.
- The distributed amount to each account must be reasonably calculated and be the same for any user holding the same amount of cryptocurrency. This means that two users who hold the same amount of fungible cryptocurrency in any configuration of accounts/UTXOs must receive the same amount of distributed cryptocurrency.
- The manner of the distribution results in the private keys associated with the constituent cryptocurrency to be the only requirement to claim the distributed tokens

## 7.4 Determination of Proceeds of a Distribution Event

The unit value of the distributed asset will be given by the **Consolidated Price** and this will be multiplied by the **Distribution Quantity** to give the Distribution Proceeds denominated in the quote asset of the index.

### 7.4.1 **Consolidated Price** for non-index constituent cryptocurrencies

When a **Distribution Event** has occurred where the distributed asset is not an index constituent cryptocurrency, then at 1000 London time on the next working day of the Distribution Event the Administrator will determine the value of distributed assets that will be the **Consolidated Price**. For avoidance of doubt the determination of the distributed asset as a constituent cryptocurrency shall happen at the occurrence of the **Distribution Event**.

#### 7.4.1.1 Consolidated Price - Methodology

- Observing all transactions conducted for the distributed token against the quote asset of the Multi Cryptocurrency index on the Constituent Exchanges during the time period 0900 to 1000 London time
- Dividing the observation window into twelve, five-minute partitions of equal length
- Calculating the volume weighted median of transactions conducted in each five-minute partition

- The Consolidated Price is given as the arithmetic mean of the twelve volume weighted medians calculated in the previous step

#### 7.4.2 Consolidated price for constituent cryptocurrencies

When a ***Distribution Event*** has occurred where the distributed asset is a constituent cryptocurrency, then at the next **Rebalance Determination Point** the ***Consolidated Price*** shall be given as the ***Rebalance Determination Price Source*** for that index constituent.

#### 7.4.3 Distribution Quantity

The distribution quantity shall be the full amount of distributed cryptocurrency that satisfies the Distribution Event conditions.

#### 7.5 Re-investment of Distribution Proceeds

The Total Return Variants of any index Distribution Proceeds of shall be re-invested into the index at the next ***Rebalance Determination Point***, proportionate to the index constituent weights.

## 8 Treatment of Cryptocurrency Deductions

Some cryptocurrencies apply deduction of holder funds if the user does not take any “action” within a certain period. This section discusses treatment of such deductions.

### 8.1 Deduction Event for Cryptocurrency holders

A Deduction Event of a constituent cryptocurrency is deemed to have occurred if the below conditions are met:

1. The deduction must be applied to all users who hold positive balances.
2. The avoidance of such deduction (if possible) must require positive action on the part of the user that requires skill and resources that one cannot reasonably expect of the average, typical Investor.
3. The deducted amount must be reasonably calculated and be the same for any user holding the same amount of cryptocurrency. This means that two users who hold the same amount of fungible cryptocurrency in any configuration of accounts/UTXOs must be deducted the same amount of cryptocurrency.

### 8.2 Application of deduction events

If a deduction event is deemed to have happened, the unit value of the deducted asset will be given by the **Rebalance Determination Price Source** for that index constituent and this will be multiplied by the **Deducted Quantity** to give the **Deducted Amount** denominated in the quote asset of the index.

For any index the **Deducted Amount** shall be deducted from the index at the next Rebalance Determination Point, proportionate to the weight of that index constituent.

## Appendix I – Cryptocurrency Transaction Model Classification

Cryptocurrency	Network	Transaction Model
Bitcoin	Bitcoin Blockchain	Coin Centric
Bitcoin Cash	Bitcoin Cash Blockchain	Coin Centric
Chainlink	Ethereum Blockchain (ERC-20)	Account Centric
Ether	Ethereum Blockchain	Account Centric
EOS	EOS Blockchain	Account Centric
Litecoin	Litecoin Blockchain	Coin Centric
Ripple XRP	Ripple Ledger	Account Centric
Stellar Lumens	Stellar Ledger	Account Centric
Tezos	Tezos Blockchain	Account Centric