



CF Digital Asset Sector Composite Index

Modified Market Cap Weight Variants

Modified Equal Weight Variants

Methodology Guide v1.11

December 2021

Table of Contents

1	Version History	4
2	Introduction.....	5
2.1	Index Aims	5
2.2	Requirements	5
2.3	Underlying Economic Reality	6
3	Index Parameters.....	7
3.1	Portfolio Composition.....	7
3.2	Eligible Index Constituents	7
3.3	Index Denomination	8
3.4	Index Return Types	8
3.5	Calculation & Publication Frequency	8
3.6	Constituent Reviews	9
3.7	Constituent Weighting.....	10
3.8	Index Constituent Pricing Sources (Input Data)	11
3.9	Rebalance Frequency.....	11
3.9.1	Rebalance Determination Point	11
3.9.2	Rebalance Implementation Point	11
3.9.3	Rebalance Determination Pricing Source	11
4	Parameter Tables.....	13
4.1	Modified Equal Weight Variants.....	13
4.2	Modified Market Cap Variants	14
4.3	Expert Judgement.....	17
5	Index Calculation Method	18
5.1	Sector Composite Index methodology	18
5.2	Methodologies.....	20
5.2.1	Definitions	20
5.2.2	List of Methodologies	21
5.2.3	Weights Calculation.....	21
5.2.4	Capping and Flooring.....	23
5.2.5	Index Calculation	24
5.2.6	Metadata	24
6	Contingency Calculation Rules.....	26
6.1	Delayed Calculation and Dissemination	26
6.2	Calculation Failure	26

7	Restatement & Republishing.....	27
7.1	Restatement and Republishing of the Index Level	27
8	Methodology Review and Changes to the Index.....	28

1 Version History

Version	Date Issued	Summary of Change	Owner
V1.0	1 December 2021	n/a	CF Benchmarks Management
V1.1	9 December 2021	Addition of Brazil time zone variant	CF Benchmarks Management
V1.11	16 December 2021	Section 4 index name typo correction	CF Benchmarks Management

2 Introduction

2.1 Index Aims

The CF Digital Asset Sector Composite Index (the “**Index**”) seeks to track the performance of specific Sectors within the crypto ecosystem through a portfolio of Digital Assets that are native to the protocols, information networks and blockchain networks that constitute the infrastructure necessary to deliver Sector products and services to end-users. To achieve this aim it is necessary to construct a portfolio that will always comprise Digital Assets associated with all the segments of the value-chain that enable the effective functioning of the Sector ecosystem and delivery of products and services.

The Index has been designed to be investible and to be used as a benchmark as defined by **EU Benchmark Regulations** (“**EU BMR**”) including for:

- The performance benchmarking of actively managed portfolios of Digital Assets and to determine relative performance.
- The passive replication in investment funds and financial instruments and products
- The settlement of financial instruments including derivative contracts.
- As a means of valuing or “marking to market” portfolio holdings of cryptocurrency.

2.2 Requirements

For the Index to meet its stated aims it must be:

- Representative

To achieve true representation of the Sector ecosystem it is necessary to construct a portfolio that ensures exposure to all Digital Assets associated with the functionality required to deliver Sector products and services to end-users. Whilst most observers would associate the Sector ecosystem with Sector specific Decentralized Applications (DApps), it is important to remember that Sector Applications cannot deliver their services to end-users in isolation but are reliant on a variety of blockchain and service networks to do so. Given this the index should include Digital Assets native to these blockchain and services as constituents in sub-portfolios.

- Replicable
 - The index portfolio shall utilize a weighting methodology that minimizes transaction costs and liquidity risks.

- Reliable
 - The index aims would be best fulfilled by dividing the index into sub portfolios to gain exposure to the full value chain of the Sector. The weighting of sub-portfolios in the proportion to which they enable the Sector Applications to deliver services and products to end users. However, given the nascent nature of the ecosystem and its rapid evolution a more simplified weighting structure will be employed until such time that the proportionate contribution of the different sub-portfolios can be more reliably determined.
 - The Index shall be capable of calculation and administration in a reliable and robust manner in accordance with all CF Benchmarks Administration Policies and the provisions of **EU BMR**.

2.3 Underlying Economic Reality

The Index is intended to measure the underlying economic reality of the value of the base assets in units of the quote asset as held in a portfolio that seeks to replicate the market beta of the Sector of the Digital Asset ecosystem. This is achieved by observing the exchange of the base assets for the quote asset and vice versa. This is accomplished using transactional input data from Constituent Exchanges, the criteria for eligibility for which are available in the CF Constituent Exchange Criteria. The Index administrator shall undertake the selection process based on Meta Data pertaining to the Sector.

3 Index Parameters

3.1 Portfolio Composition

The Index Portfolio shall be constituted of three sub-portfolios to ensure constant exposure to all the elements of the value chain that are necessary to deliver Sector products & services.

- **Sector Applications** - The sub-portfolio of Digital Assets shall include the primary token associated to the operation or governance of protocols that underpin decentralized applications that are delivering services associated with the sector.
- **On-chain Services** - The sub-portfolio shall also include Digital Assets that are native to systems that enable the Sector applications within the portfolio to interact with and deliver settlement between end-users on a blockchain network. These services include what are commonly referred to as; “Layer 2” blockchains, “Oracle” networks and “scaling solutions” or protocols that enable the value-chain for such decentralized applications by way of scaling, or other services.
- **Settlement Networks** - The sub-portfolio shall also include the Digital Assets that are native to the blockchains where transactions generated by the Sector applications within the portfolio are settled between counterparties.

3.2 Eligible Index Constituents

The Index constituents shall be assets which are eligible under **CF Cryptocurrency Multi-Asset Series** Section 2 for Asset Safekeeping, Liquidity, and Asset Turnover. There shall be a maximum number of total assets to balance the fulfilment of the Index aims without undue burden on investors.

To be eligible for inclusion in the index, Constituents shall have a Full Market Capitalization that is above the **Minimum Full Market Cap** for the Index as defined in the Index Parameters. Full Market Capitalization shall be calculated in accordance with Section 4.2 of **CF Cryptocurrency Multi-Asset Series Ground Rules**.

Digital Assets that are, by their design, pegged to the value of other assets such as, but not limited to, fiat currency (“stablecoins”), a physical commodity or another Digital Asset, are not eligible for inclusion. Digital assets whose status is ambiguous or has been questioned by Regulatory and Supervisory Authorities of major jurisdictions including, but not limited to, the United States of America, the European Union and the United Kingdom are also not eligible for inclusion.

The eligible constituents for a Sector Index shall include:

1. The digital assets associated with software protocols that are classified as part of such sector applications in accordance with the CF Digital Asset Classification Structure (DACS) and they shall form the constituents of the **Sector Applications** sub-portfolio.
2. The digital assets associated with the software protocols that provide on-chain services that are utilised by the software protocols associated with the digital assets that comprise the **Sector Applications** sub-portfolio shall form the constituents of the **On-chain Services** sub-portfolio.
3. The digital assets that are native to the software protocol that is used to settle the transfer of assets, whether directly or indirectly, that are the result of transactions facilitated by the sector applications that comprise the **Sector Applications** sub-portfolio shall form the constituents of the **Settlement Networks** sub-portfolio.

To be able to reliably determine the pricing of any constituent of the Index any Digital Asset that is not listed on 2 (two) or more constituent exchanges shall not be eligible for Inclusion.

3.3 Index Denomination

The Index is denominated in a unique fiat as outlined in the **Index Parameter Table**.

3.4 Index Return Types

The index is available in two return variants:

- **Total Return:** Inclusive of distributions (such as forks, airdrops amongst others) and deductions - the definition and treatment of distributions and deductions are defined in the *CF Cryptocurrency Index Family - Multi Asset Series Ground Rules – Section 7 Treatment of Distributions & Section 8 Treatment of Deductions*.
- **Price Return:** Exclusive of distributions but inclusive of deductions.

3.5 Calculation & Publication Frequency

The Index shall be calculated once a day at a time as defined in the Index Parameter Table and published soon after, 365 days a year.

3.6 Constituent Reviews

Constituent Reviews are carried out twice a year as described In the **CF Benchmarks Multi Cryptocurrency Indices Ground Rules Section 3 - Constituent Review** and employ the below constituent review buffers.

Sector Applications:

- Where a Digital Asset that is not an existing constituent of the **Sector Application** sub-portfolio reaches a market capitalisation rank of **12 or higher** it will replace an existing constituent that is the lowest ranked by market capitalisation.
- Where a Digital Asset that is not an existing index Sector constituent reaches a market capitalisation rank of **16** then it will only enter the index and replace an existing index constituent if an existing index constituent falls to a market capitalisation rank of **28** or lower.
- Where a Digital Asset that is not an existing index Sector constituent reaches a market capitalisation rank of **20** then it will only enter the index and replace an existing index constituent if the existing index constituent falls to a market capitalisation rank of **32** or lower.

Where the number of the **Sector Applications** sub-portfolio's constituents are less than the maximum outlined below, the Index Administrator will modify the buffer parameters proportionately.

On-chain Services:

- Where a Digital Asset that is not an existing constituent of the **On-chain Services** sub-portfolio reaches a market capitalisation rank of **6 or higher** it will replace an existing constituent that is the lowest ranked by market capitalisation.
- Where a Digital Asset that is not an existing index Sector constituent reaches a market capitalisation rank of **8** then it will only enter the index and replace an existing index constituent if an existing index constituent falls to a market capitalisation rank of **14** or lower.
- Where a Digital Asset that is not an existing index Sector constituent reaches a market capitalisation rank of **10** then it will only enter the index and replace an existing index constituent if the existing index constituent falls to a market capitalisation rank of **16** or lower.

Where the number of the **On-chain Services** sub-portfolio's constituents are less than the maximum outlined below the Index Administrator will modify the buffer parameters proportionately.

Settlement Networks:

- Where a Digital Asset that is not an existing constituent of the **Settlement Networks** sub-portfolio reaches a market capitalisation rank of **3 or higher** it will replace an existing constituent that is the lowest ranked by market capitalisation.
- Where a Digital Asset that is not an existing index Sector constituent reaches a market capitalisation rank of **4** then it will only enter the index and replace an existing index constituent if an existing index constituent falls to a market capitalisation rank of **7** or lower.
- Where a Digital Asset that is not an existing index Sector constituent reaches a market capitalisation rank of **5** then it will only enter the index and replace an existing index constituent if the existing index constituent falls to a market capitalisation rank of **8** or lower.

Where the number of the **Settlement Networks** sub-portfolio's constituents are less than the maximum outlined below, the Index Administrator will modify the buffer parameters proportionately.

3.7 Constituent Weighting

The Index is composed of three sub-portfolios with weights as per the **Index Parameter Table**.

The Index constituents within each sub-portfolio are weighted as follows:

- **Sector Applications Sub-portfolio:** Allocated per the weighting method in the Index Parameter Table across Sector protocols with a maximum of 20 assets to ensure adequate index exposure to a wide range of sector activities without hindering replication through the inclusion of small capitalization assets. Sector assets will be ranked by Full Market Capitalization to determine the top indices to be considered for inclusion in the Sector Index. As the crypto ecosystem matures and more meta data that may be used to inform constituent weights becomes available in the future, the Index Administrator may consider additional metrics in selecting assets to ensure the Index adequately represents the category or sub-category activities.
- **On-chain Services:** Allocated across a maximum of 10 protocols in proportion to their usage and relevance to the selected Sector assets. However, until the ecosystem matures and liquidity improves, such weightings shall be allocated per the weighting method in the Index Parameter Table.
- **Settlement:** Allocated across a maximum of 5 Settlement protocols in proportion to their usage and relevance to the Sector assets. However, until the ecosystem

matures and liquidity improves, such weightings shall be allocated per the weighting method in the Index Parameter Table.

3.8 Index Constituent Pricing Sources (Input Data)

The Index Constituent Pricing Source shall be the CF Benchmarks Reference Rates available on www.cfbenchmarks.com.

The respective methodologies for each of these pricing benchmarks is available at <https://www.cfbenchmarks.com/documentation>

Should these sources become permanently unavailable then **CF Cryptocurrency Index Family - Multi Asset Series Ground Rules - Section 6 Input Data Hierarchy** shall be applied after review by the CF Cryptocurrency Index Family Oversight Function.

3.9 Rebalance Frequency

The Index shall be rebalanced per the frequency defined in the Index Parameters per the procedures described in the **CF Benchmarks Multi Asset Index Ground Rules – Section 6 Rebalance Procedure**.

3.9.1 Rebalance Determination Point

16:00:00 UTC on the day which is 6 business days prior to the Rebalance Implementation Point.

3.9.2 Rebalance Implementation Point

At the Index Calculation & Publication time on the first business day of Rebalance month.

3.9.3 Rebalance Determination Pricing Source

The Index Rebalance Determination Pricing Source shall be the CF Benchmarks Reference Rates or Settlement Prices available on www.cfbenchmarks.com.

The respective methodologies for each of these pricing benchmarks is available at <https://www.cfbenchmarks.com/documentation>

Should these sources become permanently unavailable then ***CF Cryptocurrency Index Family - Multi Asset Series Ground Rules - Section 6 Input Data Hierarchy*** shall be applied after review by the CF Cryptocurrency Index Family Oversight Function.

4 Parameter Tables

4.1 Modified Equal Weight Variants

Index Name	CF DeFi Composite Index – Modified Equal Weight - LDN
Ticker (Price Return)	CFDFEWLDN_RR_PR
Ticker (Total Return)	CFDFEWLDN_RR_TR
Inception Date	01 December 2021
Inception Value	1,000
Base Currency	USD
Constituents	Sector Applications: maximum of 20 constituents On-chain Services: maximum of 10 constituents Settlement Networks: maximum of 5 constituents
Constituent Pricing Sources	CF Cryptocurrency Reference Rates
Constituent Selection Method	Sector Applications: Full Market Capitalization rank On-Chain Services: protocols utilized by Sector Applications constituents Settlement Networks: protocols utilized by Sector Applications constituents
Return Types	<ul style="list-style-type: none"> • Total Return • Price Return
Calculation & Publication Time	Between 16:05 and 16:30 London time
Calculation & Publication Frequency	Every day, 365 days a year.
Constituent Minimum Full Market Capitalization	\$1 billion USD
Constituent Minimum Liquidity Requirement	0.05%
Constituent Minimum Monthly Asset Turnover	5%

Buffers for Exclusion of an Existing Constituent at Reconstitution	<ul style="list-style-type: none"> - 50% of the Minimum Full Market Cap - 50% of the Minimum Liquidity Ratio - 50% of the Minimum Turnover Ratio
Constituent Weighting	<p>70% Sector Applications– Equal Weight between assets.</p> <p>15% On-Chain Services – Equal Weight between assets.</p> <p>15% Settlement Networks – Equal Weight between assets.</p>
Weighting Caps	None
Weighting Floors	None
Rebalance Frequency / Month	Quarterly – 1 st business day of March, June, Sep, Dec.
Rebalance Determination Time	16:00:00 UTC on the day which is 6 business days prior to the Rebalance Implementation Point
Rebalance Implementation Time	On the Calculation & Publication time, on the first business day of Rebalance month.

4.2 Modified Market Cap Variants

Index Name	CF DeFi Composite Index – Modified Market Cap Weight - LDN
Ticker (Price Return)	CFDFMWLDN_RR_PR
Ticker (Total Return)	CFDFMWLDN_RR_TR
Inception Date	01 December 2021
Inception Value	1,000
Base Currency	USD
Constituents	<p>Sector Applications: maximum of 20 constituents</p> <p>On-chain Services: maximum of 10 constituents</p> <p>Settlement Networks: maximum of 5 constituents</p>
Constituent Pricing Sources	CF Cryptocurrency Reference Rates

Constituent Selection Method	<p>Sector Applications: Full Market Capitalization rank</p> <p>On-Chain Services: protocols utilized by the Sector Applications constituents</p> <p>Settlement Networks: protocols utilized by the Sector Applications constituents</p>
Return Types	<ul style="list-style-type: none"> • Total Return • Price Return
Calculation & Publication Time	Between 16:05 and 16:30 London time
Calculation & Publication Frequency	Every day, 365 days a year.
Constituent Minimum Full Market Capitalization	\$1 billion USD
Constituent Minimum Liquidity Requirement	0.05%
Constituent Minimum Monthly Asset Turnover	5%
Buffers for Exclusion of an Existing Constituent at Reconstitution	<ul style="list-style-type: none"> - 50% of the Minimum Full Market Cap - 50% of the Minimum Liquidity Ratio - 50% of the Minimum Turnover Ratio
Constituent Weighting	<p>70% Sector Applications – Market Cap Weight between assets.</p> <p>15% On-Chain Services – Market Cap Weight between assets.</p> <p>15% Settlement Networks– Market Cap Weight between assets.</p>
Weighting Caps	None
Weighting Floors	None
Rebalance Frequency / Month	Quarterly – 1 st business day of March, June, Sep, Dec.
Rebalance Determination Time	16:00:00 UTC on the day which is 6 business days prior to the Rebalance Implementation Point

Rebalance Implementation Time	On the Calculation & Publication time, on the first business day of Rebalance month.
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Index Name	CF DeFi Composite Index - Modified Market Cap Weight - BRT
Ticker (Price Return)	CFDFMWBR_RR_PR
Ticker (Total Return)	CFDFMWBR_RR_TR
Inception Date	01 December 2021
Inception Value	1,000
Base Currency	USD
Constituents	Sector Applications: maximum of 20 constituents On-chain Services: maximum of 10 constituents Settlement Networks: maximum of 5 constituents
Constituent Pricing Sources	CF Cryptocurrency Reference Rates
Constituent Selection Method	Sector Applications: Full Market Capitalization rank On-Chain Services: protocols utilized by the Sector Applications constituents Settlement Networks: protocols utilized by the Sector Applications constituents
Return Types	<ul style="list-style-type: none"> • Total Return • Price Return
Calculation & Publication Time	Between 16:05 and 16:30 Brasilia Time (BRT)
Calculation & Publication Frequency	Every day, 365 days a year.
Constituent Minimum Full Market Capitalization	\$1 billion USD
Constituent Minimum Liquidity Requirement	0.05%

Constituent Minimum Monthly Asset Turnover	5%
Buffers for Exclusion of an Existing Constituent at Reconstitution	<ul style="list-style-type: none"> - 50% of the Minimum Full Market Cap - 50% of the Minimum Liquidity Ratio - 50% of the Minimum Turnover Ratio
Constituent Weighting	<p>70% Sector Applications – Market Cap Weight between assets.</p> <p>15% On-Chain Services – Market Cap Weight between assets.</p> <p>15% Settlement Networks– Market Cap Weight between assets.</p>
Weighting Caps	None
Weighting Floors	None
Rebalance Frequency / Month	Quarterly – 1 st business day of March, June, Sep, Dec.
Rebalance Determination Time	16:00:00 UTC on the day which is 6 business days prior to the Rebalance Implementation Point
Rebalance Implementation Time	On the Calculation & Publication time, on the first business day of Rebalance month.

4.3 Expert Judgement

The Administrator does not utilise expert judgment in the day-to-day calculation of the index. In extraordinary circumstances Expert Judgement may be exercised by the Administrator in the calculation, constituent review and rebalance procedure for the index. This will be done in accordance with its codified policies and processes which are available upon request.

5 Index Calculation Method

5.1 Sector Composite Index methodology

The Sector Composite Index is a basket of baskets. The index is fixed weighted, i.e. the weight each constituent basket represent are fixed. Those fixed weights are set in the Index Parameter Table. The weighting methodology within each constituent basket can be either fix weighted or free float market capitalisation weighted. The methodology is specified in the Index Parameter Table as well as the weights if the methodology is fixed weighted.

The Sector Composite Index (SCI) value follows the methodology:

$$\forall k_i \leq t < k_{i+1}, I_t^{SCI} = \frac{1}{d_{k_i}^{SCI}} \left(I_t^{Sector} * g_{k_i}^{Sector} + I_t^{Service} * g_{k_i}^{Service} + I_t^{Settlement} * g_{k_i}^{Settlement} \right)$$

Where I_t^{Sector} , $I_t^{Service}$ and $I_t^{Settlement}$ are independently calculated using Section 5.2.

Where g_t^{Sector} , $g_t^{Service}$ and $g_t^{Settlement}$ are calculated as per below:

The relative supply of the index constituents within the Digital Asset Sector are derived from the input weights:

$$\begin{aligned} \text{At } t = k_1, & \left\{ \begin{aligned} g_{k_1}^{Sector} &= \frac{w_{k_1}^{Sector} * I_{k_1}^{SCI}}{I_{k_1}^{Sector}} \\ g_{k_1}^{Service} &= \frac{w_{k_1}^{Service} * I_{k_1}^{SCI}}{I_{k_1}^{Service}} \\ g_{k_1}^{Settlement} &= \frac{w_{k_1}^{Settlement} * I_{k_1}^{SCI}}{I_{k_1}^{Settlement}} \end{aligned} \right. \\ \text{At } i \geq 2, & \left\{ \begin{aligned} g_{k_i}^{Sector} &= \frac{w_i^{Sector} * S_i}{Q_{k_i}^{Sector}} \\ g_{k_i}^{Service} &= \frac{w_{k_i}^{Service} * S_i}{Q_{k_i}^{Service}} \\ g_{k_i}^{Settlement} &= \frac{w_{k_i}^{Settlement} * S_i}{Q_{k_i}^{Settlement}} \end{aligned} \right. \end{aligned}$$

$$\text{with } S_i = g_{k_{i-1}}^{\text{Sector}} * \varrho_{k_i}^{\text{Sector}} + g_{k_{i-1}}^{\text{Service}} * \varrho_{k_i}^{\text{Service}} + g_{k_{i-1}}^{\text{Settlement}} * \varrho_{k_i}^{\text{Settlement}}$$

Where $d_{k_i}^{SCI}$:

$$\left\{ \begin{array}{l} d_{k_1}^{SCI} = \frac{1}{I_{k_1}^{SCI}} (g_{k_1}^{\text{Sector}} * p_{k_1}^{\text{Sector}} + g_{k_1}^{\text{Service}} * p_{k_1}^{\text{Service}} + g_{k_1}^{\text{Settlement}} * p_{k_1}^{\text{Settlement}}) \\ \forall i \geq 2, d_{k_i}^{SCI} = d_{k_{i-1}}^{SCI} \cdot \frac{g_{k_i}^{\text{Sector}} * \varrho_{k_i}^{\text{Sector}} + g_{k_i}^{\text{Service}} * \varrho_{k_i}^{\text{Service}} + g_{k_i}^{\text{Settlement}} * \varrho_{k_i}^{\text{Settlement}}}{g_{k_{i-1}}^{\text{Sector}} * \varrho_{k_i}^{\text{Sector}} + g_{k_{i-1}}^{\text{Service}} * \varrho_{k_i}^{\text{Service}} + g_{k_{i-1}}^{\text{Settlement}} * \varrho_{k_{i-1}}^{\text{Settlement}}} \end{array} \right.$$

5.2 Methodologies

5.2.1 Definitions

Symbol	Name	Description
t	Effective time	The time at which the index is calculated
r_i	Rebalance Determination Time	The time when the rebalance parameters are determined for the i^{th} rebalance
k_i	Rebalance Implementation Time	The time when the rebalance parameters are implemented for the i^{th} rebalance
$c \in C_i$	Index Constituents	The list of constituents that are determined to be index constituents for the i th rebalance
p_t^c	Constituent Pricing Source	The price of constituent c at time t
$q_{k_i}^c$	Rebalance Determination Price	The price of constituent c used at the i^{th} Rebalance Implementation Time. Note that this may be different from the Constituent Pricing Source
$w_{k_i}^c$	Weight	The weight of constituent c used for the i th rebalance
$g_{k_i}^c$	Relative supply	The relative supply of constituent c used for the i th rebalance
d_{k_i}	Divisor	Divisor used for the i^{th} rebalance.
R_{k_i}	Return factor	Return factor for the i^{th} rebalance
A_{r_i}	Return amount	Return amount used for the i^{th} rebalance
I_t	Index value	Index value at time t

Usage of Parameter between Variants

Parameters q_i^c , p_t^c , R_{k_i} , A_{r_i} and I_t are different between variants of this index family. Each section shall apply to each variant independently, except for those equations which have parameters marked with the variant label:

Type	Label
Spot Rate	RTI
Settlement Price	RR
Total Return	TR
Price Return	PR

5.2.2 List of Methodologies

The index value is some factors times the sum for all constituents of the products of the constituent's weight and price:

$$I_i^B = R_{k_i}/d_i \sum_{c \in C_1} price(c, i) * supply(c, i)$$

Where B is a basket index.

Where R_{k_i} is to account for distributions and deductions.

Where d_i is the divisor needed for the index value to be continuous. More precision on the formula in Section 5.3.5.

The constituents' prices are given by the rebalance pricing source described in Section 3.8.

The Index weighting methodology must be one of the following:

1. Fix weight for all constituents.
2. Free Float Market Capitalisation for all constituents.

5.2.3 Weights Calculation

The relative supply $g_{k_i}^c$ and the weight $w_{r_i}^c$ relation is the following:

$$\begin{cases} g_{k_1}^c p_{k_1}^{c, RTI} = w_{k_1}^c I_{k_1} \\ \forall i \geq 2, g_{k_i}^c q_{k_i}^c = w_{k_i}^c \sum_{c' \in C_i} g_{k_{i-1}}^{c'} q_{k_i}^{c'} \end{cases} (1)$$

The Index initial value is $I_{k_1} = 1000$ if not specified otherwise in the **Index Parameter Table**.

Case 1: Fix Weights

The fix weights are given as inputs. They must respect the capping and flooring and the sum of all weights must be 100%. The relative supply is inferred using the equation (1) above.

Case 2: Free Float Market Capitalisation

The Free Float Market Capitalisation is based on the **Total Supply Likely to be Available for Trading** as detailed in **CF Benchmarks Multi Asset Index Ground Rules – Section 4 Constituent Weighting**.

Note: In both *Case 1* and *Case 2*, the Rebalancing Implementation Time price q_i^c is required to obtain both the supply $g_{k_i}^c$ and the weight $w_{k_i}^c$. Hence both are indicated to be also at Rebalancing Implementation Time, even if one of the two might be known and/or computed at the Rebalancing Determination Time.

Example:

Let's consider a fix weight index composed of two asset A and B with the following parameters:

$$\left\{ \begin{array}{l} W^A = 50\% \\ W^B = 50\% \end{array} \right\}, \left\{ \begin{array}{l} p_{k_1}^{A,RTI} = 50 \\ p_{k_1}^{B,RTI} = 25 \end{array} \right\} \text{ and } I_{k_1}^{RTI} = 1000.$$

At $T=k_1$:

$$\text{using (eq 1): } \left\{ \begin{array}{l} g_{t_1}^A = \frac{W^A * I_{k_1}^{RTI}}{p_{k_1}^{A,RTI}} = \frac{0.5 * 1000}{50} = 10 \text{ (unit A)} \\ g_{t_1}^B = \frac{W^B * I_{k_1}^{RTI}}{p_{k_1}^{B,RTI}} = \frac{0.5 * 1000}{25} = 20 \text{ (unit B)} \end{array} \right.$$

At $T=k_2$:

The suppose the rebalancing price is now:

$$\left\{ \begin{array}{l} q_{k_2}^A = 50 \\ q_{k_2}^B = 40 \end{array} \right.$$

The index value before rebalancing is the following:

$$\sum_{c \in C_1} g_{k_1}^c q_{k_2}^c = 10 * 50 + 20 * 40 = 1300$$

Hence the new relative supply is:

$$\text{using (eq 1): } \begin{cases} g_{k_2}^A = \frac{W^A * \sum_{c \in C_1} g_{k_1}^c q_{k_2}^c}{q_{k_2}^A} = \frac{0.5 * 1300}{50} = 13 \\ g_{k_2}^B = \frac{W^B * \sum_{c \in C_1} g_{k_1}^c q_{k_2}^c}{q_{k_2}^B} = \frac{0.5 * 1300}{40} = 16.25 \end{cases}$$

5.2.4 Capping and Flooring

All methodology can apply a cap and floor on the constituents' weights. The case where no cap and floor are used is equivalent to a floor of 0% and a cap of 100%. Therefore, the following methodology is unique whether a cap and/or floor is applied.

The Capping value C and Flooring value F is given in the **Index Parameter Table**. The minimum capping and maximum flooring are: 1/ number of constituents.

Any constituent whose weight is greater than C is capped at C. Similarly, any constituent whose weight is smaller than F is floored at F. The aggregated weights to distribute is the difference between the weights lost due to capping and the weights added due to flooring.

This aggregate weight is then distributed between the constituent that are neither capped nor floored with respect to their weights.

This process is repeated until all constituents' weights are above or equal to F and below or equal to C.

Algorithm (python language):

Parameters: C, F and W

modified_constituents = []

While len(w for all w in W if w<F or w>C) > 0:

capped = 0

for i, w in enumerate(W):

if w > C:

capped = capped + (w - C)

W[i]= C

elif w < F:

capped = capped + (w - F)

W[i]= F

```

    modified_constituents.append(i)

beneficiaries = [(i, w) for i, w in W if w not in modified_constituents]

sum_beneficiaries = sum(w for _, w in beneficiaries)

for i, w in beneficiaries:
    W[i] = W[i] + capped * W[i] / sum_beneficiaries

```

5.2.5 Index Calculation

The index value at time t where $k_i \leq t < k_{i+1}$ is given by

$$I_t = \frac{R_{k_i}}{d_{k_i}} \sum_{c \in C_i} g_{k_i}^c p_t^c$$

About R_{k_i} :

At index inception there are no distributions or deductions hence $R_{k_1} = 1$.

If the application point of distribution and deduction events is at the i^{th} rebalance, let the Return Amount A_{r_i} be the sum of all Distribution Proceeds and Deductions Amounts from said events. Then the return factor shall be:

$$R_{k_i} = R_{k_{i-1}} \left(1 + \frac{A_{r_i}}{\sum_{c \in C_{i-1}} g_{k_{i-1}}^c q_{k_i}^c} \right)$$

About d_{k_i} :

The divisor is used to scale the index so that the value of the index is fixed at inception and continuous at each rebalancing. The divisor factor shall be:

$$\left\{ \begin{array}{l} d_{k_1} = \frac{1}{I_{k_1}} \sum_{c \in C_1} g_{k_1}^c p_{k_1}^c \\ \forall i \geq 2, d_{k_i} = d_{k_{i-1}} \cdot \frac{\sum_{c \in C_i} g_{k_i}^c q_{k_i}^c}{\sum_{c \in C_{i-1}} g_{k_{i-1}}^c q_{k_i}^c} \end{array} \right.$$

5.2.6 Metadata

The *index share* of a constituent is defined as the number of units of a constituent one needs to buy such that the composition of all constituents reproduces the value of the index.

Example:

The index value is 1000. Assume a return factor of 1.6.

$$share_i^c = \frac{R_{k_i}}{d_{k_i}} g_{k_i}^c$$

Constituent	Price	Weight	Relative supply	Index share
A	\$5	50%	62.5	100
B	\$2	50%	156.25	250

6 Contingency Calculation Rules

There may be instances where the Index cannot be calculated according to the calculation methodology.

6.1 Delayed Calculation and Dissemination

Where any Constituent Pricing Source for the calculation of the index is delayed, missing or otherwise not available for any index calculation time the index value shall be deemed delayed, where no index value will be published. The index shall resume publication when valid Constituent Pricing Source(s) are published.

Where any Divisor Adjustment Price for the calculation of the index is delayed, missing or otherwise not available for a Rebalance Implementation Point, the index values(s) on and subsequent from Rebalance Implementation Point shall be deemed delayed, where no index value(s) will be published. The index shall resume publication when valid Divisor Adjustment Price(s) are published.

Where for the above or any reason the Administrator is not able to calculate and publish the index within the Dissemination Time on any given Calculation Day then the Administrator shall publish a notification on its website at blog.cfbenchmarks.com informing index users that calculation and publication has been delayed. The Administrator will seek to publish the Index for that Calculation Day as soon as it is able to.

6.2 Calculation Failure

If the index cannot be calculated for a given Calculation Day before 23:59:59 London time, for instance because:

- A Constituent Pricing Source for the calculation time is not published, or published but not retrieved by the Calculation Agent before 23:59:59 London time
- A Divisor Adjustment Price for the Rebalance Implementation Point is not published, or published but not retrieved by the Calculation Agent before 23:59:59 London time
- Any other reason or circumstance that prevents the orderly calculation of the index

Then the index value for that calculation day is given by the index value on the previous calculation day and this index value shall be published with a marker of (*).

The occurrence of any index calculation failure is reported to the CF Oversight Function and announced at blog.cfbenchmarks.com

7 Restatement & Republishing

The Index is subject to restatement and republishing before 23:59:59 London time of any given Calculation Day due to republication of underlying Constituent Pricing Sources, or errors made by the Calculation Agent or its systems. The index shall not be subject to republishing after this time.

7.1 Restatement and Republishing of the Index Level

The Administrator shall only Restate and Republish the index on any given Calculation Day if the Administrator can restate and republish the index before 23:59:59 London of the given calculation day. The Administrator shall announce on its website that a restatement and republishing of the index will take place for that Calculation Day.

The Administrator shall restate the index as soon as possible after the restated Constituent Pricing Source has been published or the errors made by the Calculation Agent or its systems are acknowledged and shall do so by overwriting the previously published Index level. This restated index level will carry no mark when published and will be final and not subject to any further change or republication.

The index shall be not restated if any Divisor Adjustment Price is republished.

8 Methodology Review and Changes to the Index

This methodology is subject to internal review by the Administrator and the CF Cryptocurrency Index Family Oversight Function at least annually.

Any changes to this methodology are overseen by the CF Cryptocurrency Index Family Oversight Function, and in accordance with EU BMR Article 13.

All *material* changes to the methodology shall only be implemented after a consultation process with users and relevant stakeholders that shall be conducted according to the Administrator's policies and overseen by the CF Cryptocurrency Index Family Oversight Function.

Should the Administrator deem it necessary to cease providing the Index it shall only do so after a consultation process with users and relevant stakeholders that shall be conducted according to the Administrator's policies and overseen by the CF Cryptocurrency Index Family Oversight Function.