

# CF Cryptocurrency Ultra Cap 5 Index

Methodology Guide

1<sup>st</sup> October 2021

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# 1 Version History

Version	Date Issued	Summary of Change	Owner
V 1.0	19th August 2020	Launch	CF Benchmarks Management
V 2.0	27 <sup>th</sup> November 2020	Changes to <b>Pricing Sources</b> and <b>Rebalance Determination Sources</b> to reflect removal of Bitcoin Cash as an index constituent and inclusion of Chainlink as an index constituent	CF Benchmarks Management
V 2.0.1	23 <sup>rd</sup> June 2021	Correct calculation of divisor at rebalance	CF Benchmarks Management
V 2.1	28 <sup>th</sup> July 2021	Changes to calendar  Changes to <b>Pricing Sources</b> and <b>Rebalance Determination Sources</b> to reflect removal of Litecoin as an index constituent and inclusion of Cardano as an index constituent	CF Benchmarks Management
V 2.2	20 <sup>th</sup> September 2021	Changes to rebalance schedule	CF Benchmarks Management
V 2.3	1 <sup>st</sup> October 2021	Changes to divisor and distribution calculation  Changes to Contingency Calculation Rules	CF Benchmarks Management

## 2 Introduction

### 2.1 Index Aims

The CF Cryptocurrency Ultra Cap 5 Index (the “*Index*”) seeks to track the performance of a free float market capitalisation weighted index of the five largest cryptocurrencies by market capitalisation so as to provide market participants with a reliable measure of “market beta” for the cryptocurrency asset class.

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 cryptocurrencies and 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 assets

### 2.2 Requirements

For the Index to meet its stated aims it must:

- Accurately represent the prevailing price of the constituents in the currency of denomination of the Index (USD)
- Apply a constituent weighting mechanism that accurately reflects the quantity of each constituent available in the open market
- Be able to accurately represent the real-world distribution scenarios for index constituents
- Be replicable without incurring unreasonable costs or unacceptable risks for investors
- 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 5 largest cryptocurrencies by market capitalisation. This is done 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*.

## 3 Index Parameters

### 3.1 Eligible Index Constituents

The Index constituents shall always be the 5 liquid cryptocurrencies with the largest market capitalisation as defined by the ***CF Cryptocurrency Index Family - Multi Asset Series Ground Rules***.

Cryptocurrencies that are, by their design, pegged to the value of other assets such as fiat currency (“stablecoins”), a physical commodity or another cryptocurrency, are not eligible for inclusion. Digital assets whose status as a cryptocurrency 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.

As the Index shall be weighted by free float market capitalisation any cryptocurrencies where the Administrator cannot reliably determine the ***Total Fungible Supply Likely to be Available for Trading*** as defined in the ***CF Cryptocurrency Index Family - Multi Asset Series Ground Rules*** shall also be excluded.

To be able to reliably determine the pricing of any constituent of the Index any cryptocurrency that is not listed on two or more constituent exchanges shall not be eligible for inclusion.

### 3.2 Index Denomination

The Index is denominated in U.S. Dollars.

### 3.3 Index Inception

The Index was incepted on 31<sup>st</sup> August 2018.

### 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 – Treatment of Distributions & Treatment of Deductions***
- **Price Return:** Exclusive of distributions but inclusive of deductions

### 3.5 Calculation & Publication Frequency Types

#### 3.5.1 Spot Rate

The Index shall be calculated and published every second of every day.

### 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:

- Where a cryptocurrency that is not an existing index constituent 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 cryptocurrency that is not an existing index 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 cryptocurrency that is not an existing index 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

### 3.7 Constituent Weighting

The constituents are weighted by **Free Float Market Capitalisation** as defined in ***CF Cryptocurrency Index Family - Multi Asset Series Ground Rules – Section 5 Constituent Weighting***.

### 3.8 Index Constituent Pricing Sources (Input Data)

#### 3.8.1 Spot Rate

The Index Constituent Pricing Sources shall be the CME CF Real Time Indices & CF Spot Rates available on [www.cfbenchmarks.com](http://www.cfbenchmarks.com).

#### 3.8.2 Alternative Sources

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 quarterly as 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

16:05:00 London time on the first business day of each month.

#### 3.9.3 Rebalance Determination Pricing Sources

The Index Constituent Pricing Sources shall be the CME CF Reference Rates & CF Settlement Prices available on [www.cfbenchmarks.com](http://www.cfbenchmarks.com).

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.

### 3.10 Other Parameters

#### 3.10.1 Spot Rate

<b>Index Name</b>	CF Cryptocurrency Ultra Cap 5 Spot Rate
<b>Ticker (Price Return)</b>	UC5_RTI_PR
<b>Ticker (Total Return)</b>	UC5_RTI_TR

#### 3.11 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.



## 4 Index Calculation Method

### 4.1 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 cryptocurrencies 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 determination time. Note that this may be different from the Constituent Pricing Source
$s_{r_i}^c$	Total fungible supply	The total fungible supply of constituent $c$ used for the $i$ th rebalance
$f_{r_i}^c$	Free-float supply factor	The percentage of the total fungible supply likely available for trading (free-float supply) of constituent $c$ used for the $i$ th rebalance
$a_{r_i}^c$	Free-float supply adjustment	The adjustment factor to the free-float supply of constituent $c$ used for the $i$ th rebalance
$g_{r_i}^c$	Adjusted free-float supply	The adjusted free-float 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 $t$

$share_i^c$	Index share	Index share of constituent $c$ at the $i$ th rebalance implementation time
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## 4.2 Usage of Parameters 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
Total Return	TR
Price Return	PR

## 4.3 At Inception

At index inception  $t = k_1$  the index value shall be 1000:

$$I_{k_1} = 1000 \quad (1)$$

If the index is of the fungible-supply market cap variant, both the free-float supply factor and the free-float supply adjustment are fixed at 1 throughout.

$$\forall i, c \in C_i: a_{r_i}^c = f_{r_i}^c = 1 \quad (2)$$

Otherwise, the index is of the free-float market cap variant. There is no adjustment to the free-float supply at inception:

$$\forall c \in C_1: a_{r_i}^c = 1 \quad (3)$$

The initial adjusted free-float supply shall be

$$\forall c \in C_1: g_{r_1}^c = a_{r_1}^c f_{r_1}^c s_{r_1}^c \quad (4)$$

The initial divisor shall be the initial total free-float market cap divided by the initial index value.

$$d_{k_1} = \frac{1}{I_1} \sum_{c \in C_1} g_{r_1}^c p_{k_1}^c \quad (5)$$

## 4.4 At each Index Calculation Time after Index Inception

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

$$I_t = \frac{R_{k_i}}{d_{k_i}} \sum_{c \in C_i} g_{r_i}^c p_t^c \quad (6)$$

#### 4.5 Index Rebalancing

The parameter  $g_{r_i}^c$  for the  $i$ th rebalance is fixed at the Rebalance Determination Point  $r_i$ . The divisor  $d_{k_i}$  and return factor  $R_{k_i}$  for the  $i$ th rebalance are updated based on fixed value from the two previous Rebalance Determination Points ( $r_i$  and  $r_{i-1}$ ) and the prevailing price of the constituents at the  $i$ th Rebalance Implementation Point  $k_i$ .

##### 4.5.1 Adjustment to Free Float Supply

Let  $c$  be some cryptocurrency which will continue to be in the basket at the  $i$ th rebalance, i.e.  $c \in C_{i-1} \cap C_i$ . The change of free-float supply is given as:

$$\Delta = \frac{f_{r_i}^c s_{r_i}^c}{g_{r_{i-1}}^c} - 1 \quad (7)$$

If  $|\Delta| > 5\%$ , a cap is applied to limit the free-float supply change:

$$a_{r_i}^c = \frac{(1 + \min(5\%, \max(-5\%, \Delta))) g_{r_{i-1}}^c}{f_{r_i}^c s_{r_i}^c} \quad (8)$$

Otherwise, no adjustment is needed:  $a_{r_i}^c = 1$ .

For cryptocurrency  $c$  which has just entered the basket at the  $i$ th rebalance,  $a_{r_i}^c$  shall be 1 as well.

The adjusted free-float supply is then given as:

$$g_{r_i}^c = a_{r_i}^c f_{r_i}^c s_{r_i}^c \quad (9)$$

##### 4.5.2 Calculation of Index Divisor

The divisor is also updated for continuity of the index level at the Rebalance Implementation Point according to the following equation:

$$d_{k_i} = d_{k_{i-1}} \cdot \frac{\sum_{c \in C_i} g_{r_i}^c q_{k_i}^c}{\sum_{c \in C_{i-1}} g_{r_{i-1}}^c q_{k_i}^c} \quad (10)$$

##### 4.5.3 Calculation of Return Factor

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 distribution adjustment factor shall be

$$R_{k_i} = R_{k_{i-1}} \left( 1 + \frac{A_{r_i}}{\sum_{c \in C_{i-1}} g_{r_{i-1}}^c q_{k_i}^c} \right) \quad (11)$$

Otherwise  $R_{k_i} = R_{k_{i-1}}$ .

## 4.6 Other metadata

### 4.6.1 Index share

The index share of a constituent is defined as the number of units of a constituent one needs to purchase such that the composition of all constituents reproduces the value of the index. The index share is updated at rebalance implementation time. It is given by:

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

Worked example:

The index value is 1000. Assume a return factor of 1 and divisor of 100.

Constituent	Price	Adjusted supply ( $g_{r_i}^c$ )	Index share
A	\$5	10000	100
B	\$2	25000	250

## 5 Contingency Calculation Rules

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

### 5.1 Delayed Calculation and Dissemination

#### 5.1.1 Constituent Pricing Source

##### 5.1.1.1 Spot Rate

Where any Constituent Pricing Source for the calculation of the index is delayed, missing or otherwise not available for any index calculation time the Administrator shall use the last available value for that Source.

#### 5.1.2 Divisor Adjustment Price

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.

#### 5.1.3 Notification of Delay

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

### 5.2 Calculation Failure

#### 5.2.1 Spot Rate

Where any Constituent Pricing Source for the calculation of the index has no values of less than 60 seconds of age, then the index shall undergo a calculation failure and there shall be no index value for that calculation time and the index shall be represented by the last valid index value.

Where any Divisor Adjustment Price for the calculation of the index is delayed, missing or otherwise not available at a Rebalance Implementation Point, then the index shall undergo a

calculation failure, and there shall be no index value(s) for the Rebalance Implementation Point and subsequent times. The index during the calculation failure period shall be represented by the last valid index value. The index shall exit the calculation failure period when valid Divisor Adjustment Price(s) are published.

### 5.2.2 Handling of Calculation Failure

All instances of an index calculation being subject to this provision shall be recorded by the Administrator and escalated to the CF Cryptocurrency Index Family Oversight Function.

## 6 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.