# CF Cryptocurrency Ultra Cap 5 Index

Methodology Guide

August 19th 2020

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# 1 Version History

| Version | Date Issued | Summary of Change | Owner |
|---------|-------------|-------------------|-------|
| V 1.0 | 19th August 2020 | Launch | CF Benchmarks Management |

# 2 Introduction

## 2.1 Index Aims

The CF Cryptocurrency Ultra Cap 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 largest cryptocurrencies by market capitalisation.

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 Polices 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 by the use of 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.

As the Index shall be weighted by free flat 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 2 (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 Return Types

The index is available in two return variants:

- **Total Return:** Inclusive of distributions (such as forks, airdrops amongst others) - the definition and treatment of distributions are defined in the *CF Cryptocurrency Index Family - Multi Asset Series Ground Rules – Section 7 Treatment of Distribution*s
- **Price Return:** Exclusive of distributions

## 3.4 Calculation & Publication Frequency

The Index shall be calculated every second of the day, 365 days a year.

## 3.5 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 free float market capitalisation rank of *3 or higher* it will replace an existing constituent that is the lowest ranked by Free Float 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

## 3.6 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*

## 3.7 Index Constituent Pricing Sources (Input Data)

The Index Constituent Pricing Sources are:

| Bitcoin (XBT) | CME CF Bitcoin Real Time Index |
|---|---|
| Bitcoin Cash (BCH) | CF Bitcoin Cash-Dollar Spot Rate |
| Ether (ETH) | CME CF Ether-Dollar Real Time Index |
| Litecoin (LTC) | CF Litecoin-Dollar Spot Rate |
| Ripple XRP (XRP) | CF Ripple-Dollar Spot Rate |

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.

## 3.8 Rebalance Frequency

The Index shall be rebalanced monthly as described in the *CF Benchmarks Multi Asset Index Ground Rules – Section 6 Rebalance Procedure*

### 3.8.1 Rebalance Determination Point

1600 London Time on the Wednesday preceding the Rebalance Implementation Point, except where 3.8.3 applies.

### 3.8.2 Rebalance Implementation Point

1600 New York time on the last Friday of each month, except where 3.8.3 applies.

### 3.8.3 Non-Business Day Adjustments to Rebalance Points

If the last Friday of the month is not a business day in the US or the UK, 1600 New York time on the preceding day that is a business day in both the US and UK shall be the Rebalance Implementation Point. The Rebalance Determination Point shall then be 1600 London time on the day that is two days preceding the Rebalance Implementation Point, unless that day is not a business day in both the US and UK in which case the Rebalance Determination Point shall be 1600 London time on the business day immediately preceding the Rebalance Implementation Point.

### 3.8.4 Rebalance Determination Pricing Sources

| | |
|---|---|
| **Bitcoin (XBT)** | CME CF Bitcoin Reference Rate |
| **Bitcoin Cash (BCH)** | CF Bitcoin Cash-Dollar Settlement Price |
| **Ether (ETH)** | CME CF Ether-Dollar Reference Rate |
| **Litecoin (LTC)** | CF Litecoin-Dollar Settlement Price |
| **Ripple XRP (CRP)** | CF Ripple-Dollar Settlement Price |

# 4 Parameter Table

| Index Name | CF Cryptocurrency Ultra Cap 5 Index |
| --- | --- |
| **Ticker (Price Return)** | UC5USD_PR |
| **Ticker (Total Return)** | UC5USD_TR |
| **Inception Date** | September 1st 2018 |
| **Inception Value** | 1000 |
| **Base Currency** | USD |
| **Constituents** | Fixed number; 5 largest cryptocurrencies by full market capitalisation |
| **Constituent Pricing Sources** | CME CF Bitcoin Real Time Index |
| | CF Bitcoin Cash-Dollar Spot Rate |
| | CME CF Ether-Dollar Real Time Index |
| | CF Litecoin-Dollar Spot Rate |
| | CF Ripple-Dollar Spot Rate |
| **Constituent Selection Method** | 5 largest cryptocurrencies by free float market capitalisation |
| **Return Types** | • Total Return<br>• Price Return |
| **Calculation & Publication Frequency** | Every second, 365 days a year |
| **Constituent Minimum Liquidity Requirement** | Liquidity Ratio of 0.05 as defined by the *CF Benchmarks Multi Cryptocurrency Indices Ground Rules* |
| **Constituent Weighting** | Free Float Market Capitalisation as defined by the *CF Benchmarks Multi Cryptocurrency Indices Ground Rules* |
| **Weighting Caps** | None |
| **Weighting Floors** | None |

| Rebalance Frequency | Monthly |
|---|---|
| Rebalance Determination Point | 1600 London time on the Wednesday preceding the Rebalance Implementation Point* |
| Rebalance Implementation Point | 1600 New York time on the last Friday of the Month* |
| Rebalance Determination Price | CME CF Bitcoin Reference Rate |
| | CF Bitcoin Cash-Dollar Reference Rate |
| | CME CF Ether-Dollar Reference Rate |
| | CF Litecoin-Dollar Reference Rate |
| | CF Ripple-Dollar Reference Rate |

* Unless adjusted as per Section 3.8.3.

## 4.1 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 Definitions

| Symbol | Name | Description |
|--------|------|-------------|
| $t$ | Effective time | The time at which the index is calculated |
| $r_i$ | Rebalance Determination Point | The time when the rebalance parameters are determined for the $i$th time |
| $k_i$ | Rebalance Implementation Point | The time when the rebalance parameters are implemented for the $i$th time |
| $c \in C_i$ | 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 index constituent $c$ at time $t$ |
| $\varrho_i^c$ | Rebalance Determination Price | The price of index constituent $c$ used for the $i$th rebalance. Note that the source for this price may be different from that of the Constituent Pricing Source $p_t^c$. |
| $s_i^c$ | Total fungible supply | The total fungible supply of constituent $c$ used for the $i$th rebalance |
| $f_i^c$ | Free-float supply factor | The percentage of the total fungible supply which is likely to be available for trading (free-float supply) of constituent $c$ used for the $i$th rebalance |
| $a_i^c$ | Free-float supply adjustment | The adjustment factor to the free-float supply of cryptocurrency $c$ for the $i$th rebalance |
| $M_i$ | Full market cap | The total market cap at the $i$th rebalance |
| $d_i$ | Divisor | Divisor used for the $i$th rebalance |
| $D_i$ | Distribution adjustment | Distribution adjustment factor for the $i$th rebalance for total-return variant of the index |
| $I_t$ | Index | Index value at time $t$ |

## 5.2 At Inception

At index inception $t = 1$ the index level shall be 1000:

$$I_1 = 1000 \tag{1}$$

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.

$$\forall i, c \in C_i : a_i^c = f_i^c = 1 \tag{2}$$

Otherwise if the index is of the free-float market cap variant there is no adjustment to the free-float supply at inception:

$$\forall c \in C_1 : a_1^c = 1 \tag{3}$$

The initial divisor shall be the initial total market cap divided by the initial basket level. Note that the initial constituent price for rebalancing must be equal to the initial constituent price, i.e. $\varrho_1^c = p_1^c$.

$$d_1 = \frac{1}{I_1} \sum_{c \in C_1} a_1^c f_1^c s_1^c p_1^c \tag{4}$$

The first rebalance determination and implementation is deemed to have happened at inception, i.e.

$$r_1 = k_1 = 1 \tag{5}$$

## 5.3 At each Index Calculation Time subsequent to Index Inception

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

$$I_t = \frac{D_i}{d_i} \sum_{c \in C_i} a_i^c f_i^c s_i^c p_t^c$$

## 5.4 Index Rebalancing

The index is rebalanced monthly according to the *CF Cryptocurrency Index Family - Multi Asset Series Ground Rules – Section 6 Monthly Rebalance Procedure.*

### 5.4.1 Adjustment to Free Float Supply

For each cryptocurrency $c$ which will continue to be in the basket after the rebalance, the change of free-float supply is calculated:

$$\Delta = \frac{f_i^c s_i^c}{a_{i-1}^c f_{i-1}^c s_{i-1}^c} - 1 \tag{8}$$

If $|\Delta| > 5\%$, the cap is applied:

$$a_i^c = \frac{(1 + \min(5\%, \max(-5\%, \Delta)))a_{i-1}^c f_{i-1}^c s_{i-1}^c}{f_i^c s_i^c} \tag{9}$$

Otherwise no adjustment is needed: $a_i^c = 1$.

### 5.4.2 Calculation of Market Capitalisation of Index Constituents and the Index Divisor

The total market cap at rebalance $i$ is

$$M_i = \sum_{c \in C_i} a_i^c f_i^c s_i^c \varrho_i^c \tag{10}$$

The divisor is also updated for continuity of the index level after the rebalancing is implemented.

$$d_i = \frac{M_i}{I_{r_{i-1}}} \tag{11}$$

### 5.4.3 Reinvestment of Distributions at Rebalance

At index inception there are no distributions hence $D_1 = 1$.

Assume at the $i$th rebalance the total price of all such distributions is $P$. Then the distribution adjustment factor shall be

$$D_i = D_{i-1}(1 + \frac{P}{M_i}) \tag{12}$$

# 6 Contingency Calculation Rules

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

## 6.1 Delayed or Missing Input Data

Where any input data 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 input data source.

## 6.2 Calculation Failure

Where there are no input data 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.

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.

# 7 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 any of the Reference Rates 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.