

CF Market-Wide On-chain Interest Rate Index

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Version History

Version	Date Issued	Summary of Change	Owner
V1.0	29 Jun 2026	N/A	CF Benchmarks Management

1 Overview

The CF Market-Wide On-chain Interest Rate Index (the “Index”) measures the prevailing cost of borrowing a digital asset across the decentralised lending venues on which it is borrowable on-chain. Each Index in the series provides a daily, annualised benchmark of the realised borrowing rate for a single Reference Asset, derived from 24-hour observations of the relevant on-chain lending markets.

By consolidating the borrowing rates of the eligible lending venues into a single standardised benchmark, the Index aims to provide market participants with a representative and replicable measure of on-chain borrowing costs. It facilitates price discovery, risk management, and the development of financial products referencing on-chain interest rates.

2 Definitions

Reference Asset: the crypto asset whose on-chain borrowing the Index measures.

Constituent (Venue): a single lending-protocol deployment on a single chain. The Index treats each (Protocol $\times$ chain) pair carrying the Reference Asset as one Constituent.

Protocol: the lending-protocol family underlying one or more Constituents. A single Protocol may contribute several Constituents across different chains.

Constituent Reference Rate: the time-weighted, annualised borrow rate of the Reference Asset of the Constituent over the Observation Window.

Calculation Day: each day on which the Index is calculated and published.

Eligible Constituent: a Constituent that is a member of the Index for the current quarter, as determined at the most recent Rebalance.

Observation Window: the period over which each Constituent Reference Rate is measured, ending at the final observation time on the Calculation Day. The end-points of the Observation Window are set out in Section 7.1.

Publication Time: the designated time on each Calculation Day at which the Index value is published, as set out in Section 7.1.

Borrow Volume: the size of a Constituent's borrow market for the Reference Asset, measured as the amount of the Reference Asset borrowed (outstanding) at the final observation time on the Calculation Day, expressed in native units of the Reference Asset.

Rebalance: the quarterly process at which the set of Eligible Constituents and their fixed weights for the following quarter are determined.

3 Methodology

3.1 Qualitative Description

On each Calculation Day, the Index is calculated from the Constituent Reference Rates as follows:

1. The Constituent Reference Rate for each Eligible Constituent over the 24-hour Observation Window is collected.
2. Any Eligible Constituent whose absolute percentage deviation from the median of the other Eligible Constituents exceeds the Potentially Erroneous Data Parameter is treated as potentially erroneous and removed from that day's calculation.
3. The Index is calculated as the weighted mean of the contributing Constituents, with the fixed quarterly weights renormalised to sum to 100% over those Constituents.

3.2 Mathematical Representation

The following table shows the symbols used in the mathematical representation of the CF Market-Wide On-chain Interest Rate Index.

Symbol	Name	Description	Type
t	Calculation Day	The day on which the Index is calculated	Parameter, see Section 7
i	Constituent	A single Protocol $\times$ chain venue carrying the Reference Asset	Parameter, see Section 7.2
W	Observation Window	The 24-hour Observation Window on Calculation Day t (specified in Section 7.1)	Parameter, see Section 7.1
T	Window Length	The length of the Observation Window in seconds	Input
$\rho_{i,k}$	Observed Borrow Rate	The k -th distinct annualised borrow rate observed for Constituent i within the window	Input

$\tau_{i,k}$	Effective Duration	The duration (seconds) for which $\rho_{i,k}$ was in effect within the window	Input
$r_{i,t}$	Constituent Reference Rate	The Constituent Reference Rate (CF On-chain Interest Rate Index) of Constituent i on day t	Input
v_i	Median Borrow Volume	The median daily Borrow Volume of Constituent i over the Lookback Window, in native units of the Reference Asset	Input
w_i^{raw}	Raw Volume Weight	Constituent i 's share of total Borrow Volume across the eligible set	Calculated
w_i	Constituent Weight	The fixed quarterly weight of Constituent i , set at the Rebalance (post-cap)	Calculated (Rebalance)
$\tilde{w}_{i,t}$	Renormalised Weight	The fixed weight renormalised over the Constituents contributing on day t	Calculated
$p(i)$	Protocol Map	The Protocol to which Constituent i belongs	Input
W_p	Protocol Weight	The aggregate weight of Protocol p across its Constituents	Calculated
γ	Concentration Cap	The maximum aggregate weight permitted for any single Protocol	Parameter, see Section 7.2
$m_{i,t}$	Comparison Median	The median of the other Constituents' rates used to test Constituent i on day t (Section 4)	Calculated
$d_{i,t}$	Absolute Deviation	The absolute percentage deviation of $r_{i,t}$ from $m_{i,t}$ (Section 4)	Calculated
δ	PED Parameter	Potentially Erroneous Data Parameter: maximum permitted absolute percentage deviation	Parameter, see Section 7.2

D	Rebalance Determination Time	The point as of which eligibility and weights are determined	Parameter, see Section 5.1
I_t	Index Value	The published Index value on day t (annualised borrow rate)	Calculated

3.2.1 Constituent Reference Rate

Each Constituent's input is its Constituent Reference Rate: the CF On-chain Interest Rate Index for that Constituent's asset pool, being the time-weighted average of the on-chain annualised borrow rate over the 24-hour Observation Window, annualised on the UK money-market day-count convention (ACT/365 Fixed). The on-chain borrow rate is a step function that changes only when the asset pool is interacted with; over the window it takes distinct values $\rho_{i,k}$, each in effect for a duration $\tau_{i,k}$, with $\sum_k \tau_{i,k} = T$. The Constituent Reference Rate is each rate weighted by the time it was in effect:

$$r_{i,t} = \frac{\sum_k \rho_{i,k} \tau_{i,k}}{\sum_k \tau_{i,k}} \quad (1)$$

For each Constituent, $\rho_{i,k}$ is the asset pool's on-chain annualised borrow rate, observed as specified for that pool in the CF On-chain Interest Rate Index Series methodology, and expressed as a percentage per year.

3.2.2 Index Calculation

The Index is calculated as the weighted mean of the Constituents contributing on day t — the Eligible Constituents that have an available rate and are not excluded as potentially erroneous data (Section 4) — using the fixed quarterly weights renormalised over those Constituents so that they sum to 100%:

$$I_t = \sum_i \tilde{w}_{i,t} r_{i,t}, \quad \tilde{w}_{i,t} = \frac{w_i}{\sum_j w_j} \quad (2)$$

4 Potentially Erroneous Data

On each Calculation Day, each available Constituent Reference Rate is tested against the rest of the market to avoid a transient single-venue dislocation — for example a utilisation spike that pins an asset pool at its rate ceiling, an oracle failure, or a bad-debt incident — without removing the genuine, persistent cross-venue dispersion the Index is intended to capture.

For each Eligible Constituent i with an available Reference Rate on day t :

Comparison median. Compute the median of the other available Constituents' rates, excluding i itself, so that no Constituent is tested against a centre it is itself inflating:

$$m_{i,t} = \text{median}(\{r_{j,t} : j \neq i, r_{j,t} \text{ available on day } t\}) \quad (3)$$

Absolute percentage deviation.

$$d_{i,t} = \frac{|r_{i,t} - m_{i,t}|}{|m_{i,t}|} \quad (4)$$

Exclusion. Constituent i is deemed potentially erroneous and excluded from the day's calculation if its absolute percentage deviation $d_{i,t}$ exceeds the Potentially Erroneous Data Parameter δ — the methodology's maximum permitted deviation from the median of the other Constituents, expressed as an absolute percentage and set for each Index in the series in Section 7.2:

$$\text{Constituent } i \text{ excluded on day } t \iff d_{i,t} > \delta \quad (5)$$

All breaches are evaluated against the same medians and applied together in a single pass; the weights of the remaining Constituents are then renormalised per Equation (2). Every instance of data excluded from a calculation triggers a Benchmark Surveillance Alert, which is investigated by the Administrator.

Guardrails (applied in order):

- **Minimum PED Constituents Number.** The screen is applied only when the number of Constituents with an available rate on the day is at least the Minimum PED

Constituents Number (Section 7.1). Below that threshold the median of the other Constituents is not meaningful and no Constituent is excluded.

- **Undefined deviation.** If the median of the other Constituents is exactly zero, so that $d_{i,t}$ is undefined as a percentage, Constituent i is not excluded on day t .

5 Constituent Review and Rebalance

The set of Eligible Constituents and their fixed weights are determined quarterly at each Rebalance, conducted by the Administrator separately from the daily calculation. Between Rebalances, the Eligible Constituents and their weights are held fixed.

5.1 Rebalance Schedule

The Index is rebalanced at the Rebalance Frequency specified in Section 7.1. At each Rebalance, the set of Eligible Constituents and their weights for the following period are determined and take effect on the rebalance date.

Constituent eligibility and weights are determined at the Rebalance Determination Time, specified in Section 7.1. Borrow Volume used in the determination is measured over the Lookback Window, specified in Section 7.1.

5.2 Eligibility

A Constituent is an Eligible Constituent for the following quarter if Borrow Volume data for the Reference Asset is available on that venue across the Lookback Window. The Administrator computes the median daily Borrow Volume of the Reference Asset on each Eligible Constituent over the Lookback Window, in native units of the Reference Asset. The resulting Eligible Constituent set and the weights are fixed at each Rebalance and held constant between Rebalances.

5.3 Weighting

For Constituents determined eligible at a Rebalance, weights are computed as follows.

5.3.1 Volume Weight

Let v_i denote Constituent i 's median daily Borrow Volume (in native units of the Reference Asset) over the Lookback Window:

$$w_i^{\text{raw}} = \frac{v_i}{\sum_j v_j} \quad (6)$$

The Index uses a single volume-based weighting basis: each Constituent's raw weight is its share of total Borrow Volume across the eligible set, so that the Index reflects the venues at which on-chain borrowing activity is concentrated.

5.3.2 Per-Protocol Concentration Cap

Let $p(i)$ denote the Protocol of Constituent i , and let $W_p = \sum_{i: p(i)=p} w_i$ be the aggregate Protocol weight. The Index requires:

$$W_p \leq \gamma \quad \text{for every Protocol } p, \quad \sum_i w_i = 1 \quad (7)$$

Where the raw aggregate weight of any Protocol exceeds γ , that Protocol's weight is reduced to γ and the excess is proportionally redistributed across the Protocols that are not capped. The procedure is iterated until no Protocol exceeds γ and the weights sum to 100%. Within each Protocol, the (capped) Protocol weight is allocated across that Protocol's eligible Constituents in proportion to their Borrow Volumes.

The cap controls Protocol-level risk concentration: it prevents the Index value from being dominated by a single Protocol that operates the largest borrow markets across multiple chains, recognising that all Constituents of a Protocol share the Protocol's interest-rate model, governance, and code risk irrespective of chain.

5.3.3 Single-Protocol Indices

If only one Protocol contributes Eligible Constituents (for example, an Index whose Constituents are several chain deployments of a single Protocol), the cap is not feasible: there are no other Protocols across which to redistribute excess weight. In this case the cap does not bind and the single Protocol carries 100% of the Index weight, allocated across its eligible Constituents in proportion to their Borrow Volumes. The Index remains a volume-weighted composite, but the cap-driven risk-concentration control does not apply where the Constituent universe contains a single Protocol.

5.3.4 Single-Venue Reference Assets

Where a Reference Asset is borrowable on only one Constituent over the Lookback Window, that Constituent is assigned a weight of 100%:

$$w_i = 1 \quad \text{when } |C| = 1 \quad (8)$$

The Concentration Cap does not bind given there is only one Protocol present, and the Potentially Erroneous Data screen specified in Section 4 is inactive.

6 Contingency and Calculation Rules

6.1 Missing or Delayed Constituent Input

If a Constituent Reference Rate for a Calculation Day is not available by the Publication Time, the Index is calculated from the remaining available Eligible Constituents, with weights renormalised over the available set.

6.2 Constituent Determined Non-Representative

If a Constituent is suspended, materially erroneous, or otherwise determined by the Administrator to be unrepresentative, the Constituent may be treated as unavailable for the affected Calculation Day(s), with weights renormalised over the remaining Eligible Constituents.

6.3 Expert Judgment

The Administrator does not utilise expert judgement in the day-to-day calculation of the Index. In extraordinary circumstances Expert Judgement may be exercised by the Administrator in accordance with its codified policies and processes which are available upon request.

7 Parameters

7.1 Methodology-Framework Parameters

Parameter	Value
Observation Window	8:00 a.m. London time on day $T-1$ (excluded) to 8:00 a.m. London time on day T (included), 24 hours
Observation Frequency	Once per Calculation Day
Publication Time	Between 8 a.m. and 8:30 a.m. London time
Annualisation convention	Simple, ACT/365 Fixed (UK money-market day-count convention)
Rebalance Frequency	Quarterly — 1st business day of March, June, September, December
Rebalance Determination Time	16:00 London time, 30 calendar days prior to the rebalance date
Lookback Window	30 calendar days immediately preceding the Rebalance Determination Time, $[D - 30d, D)$
Minimum PED Constituents Number	4
Final precision	6 decimal places

7.2 Reference Rate Parameters

7.2.1 CF Market-Wide USDC On-chain Interest Rate Index

Parameter	Value
Ticker Symbol	MWUSDCIR
Reference Asset	USD Coin (USDC)
Constituents	Aave V3 on Ethereum 0x2f39d218133AFaB8F2B819B1066c7E434Ad94E9e
Per-Protocol Concentration Cap (γ)	N/A

Potentially Erroneous Data Parameter (δ)	N/A (inactive while $n < \text{Minimum PED Constituents Number}$)
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7.2.2 CF Market-Wide USDG On-chain Interest Rate Index

Parameter	Value
Ticker Symbol	MWUSDGIR
Reference Asset	Global Dollar (USDG)
Constituents	Aave V3 on Ethereum 0x2f39d218133AFaB8F2B819B1066c7E434Ad94E9e
Per-Protocol Concentration Cap (γ)	N/A
Potentially Erroneous Data Parameter (δ)	N/A (inactive while $n < \text{Minimum PED Constituents Number}$)

7.2.3 CF Market-Wide EURC On-chain Interest Rate Index

Parameter	Value
Ticker Symbol	MWEURCIR
Reference Asset	Euro Coin (EURC)
Constituents	Aave V3 on Ethereum 0x2f39d218133AFaB8F2B819B1066c7E434Ad94E9e
Per-Protocol Concentration Cap (γ)	N/A
Potentially Erroneous Data Parameter (δ)	N/A (inactive while $n < \text{Minimum PED Constituents Number}$)

7.2.4 CF Market-Wide ETH On-chain Interest Rate Index

Parameter	Value
Ticker Symbol	MWETHIR
Reference Asset	Ether (ETH); borrowed on-chain in wrapped form (WETH)

Constituents	Aave V3 on Ethereum 0x2f39d218133AFaB8F2B819B1066c7E434Ad94E9e
Per-Protocol Concentration Cap (γ)	N/A
Potentially Erroneous Data Parameter (δ)	N/A (inactive while $n < \text{Minimum PED Constituents Number}$)

8 Index Specifications

Item	Specification
Index series	CF Market-Wide On-chain Interest Rate Index (one Index per Reference Asset)
Administrator	CF Benchmarks Ltd
Calculation Agent	CF Benchmarks Ltd
Description	Volume-weighted composite annualised borrow rate for the Reference Asset across its Constituent on-chain lending venues, based on the Constituent Reference Rates over a 24-hour Observation Window
Calculation frequency	Once per Calculation Day
Dissemination Time	Once per day, on each Calculation Day, at the Publication Time
Dissemination Precision	2 decimal places
Data Source	Constituent Reference Rates (CF On-chain Interest Rate Indices), as set out in the CF On-chain Interest Rate Index Series methodology

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