

CF Settlement Prices

Methodology Guide

Version:

12.0

Version Date:

06th February 2024

Table of Contents

1	Version History	3
2	Overview	7
3	Definitions	8
4	Methodology and Ground Rules	9
4.1	Methodology	9
4.1.1	Qualitative Description.....	9
4.1.2	Mathematical Representation.....	10
4.2	A Note on Properties.....	11
5	Contingency Calculation Rules.....	13
5.1	Delayed Data and Missing Data	13
5.2	Erroneous Data.....	13
5.3	Potentially Erroneous Data.....	14
5.4	Delayed Calculation & Publication	14
5.5	Expert Judgement	15
5.6	Calculation Failure	15
6	Restatement & Republishing.....	16
7	Market Failure Event	17
8	Settlement Price Parameters	18
9	Settlement Price Specifications.....	21
10	Methodology Review and Changes	25
	Contact Information.....	26

1 Version History

Version	Version Date	Changes to Previous
1.0	20 th June 2018	N/A
2.0	15 th August 2018	Addition of Parameters and Specifications for Bitcoin Cash
3.0	5 th June 2019	Amendment to Methodology Parameters for CF Ripple-Bitcoin Settlement Price
3.1	2 nd July 2019	Removal of Bitfinex from CF Ripple-Bitcoin Settlement Price
3.2	16 th July 2019	Move constituent list to separate document
4.0	16 th July 2019	Rebrand for CF Benchmarks
5.0	11 th September 2019	Update legal text with BMR registration
6.0	10 th February 2020	Change potentially erroneous data parameter
7.0	13 th May 2020	Addition of: <ul style="list-style-type: none"> ● CF EOS-Dollar Settlement Price ● CF Stellar Lumens-Dollar Settlement Price ● CF Tezos-Dollar Settlement Price Update ticker symbols
8.0	31 st July 2020	Addition of sections concerning: <ul style="list-style-type: none"> ● Underlying Economic Reality ● Expert Judgement ● Methodology review and Changes
9.0	25 th August 2020	Addition of: <ul style="list-style-type: none"> ● CF PAX Gold-Dollar Settlement Price ● CF Bitcoin-Euro Settlement Price ● CF Ether-Euro Settlement Price
9.1	13 th October 2020	Addition of: <ul style="list-style-type: none"> ● CF Chainlink-Dollar Settlement Price
9.2	28 th January 2021	Addition of: <ul style="list-style-type: none"> ● CF OMG Network – Dollar Settlement Price ● CF Orchid – Dollar Settlement Price
9.3	9 th February 2021	Addition of: <ul style="list-style-type: none"> ● CF Bitcoin – Dollar U.S. Settlement Price

9.4	24 th May 2021	<p>Addition of:</p> <ul style="list-style-type: none"> ● CF Algorand-Dollar Settlement Price ● CF Cosmos-Dollar Settlement Price ● CF Basic Attention Token-Dollar Settlement Price ● CF Dai-Dollar Settlement Price ● CF Ether-Dollar US Settlement Price <p>Removal of contents referencing demised indices and section “A Note on Properties”</p>
10.0	30 th July 2021	<p>Addition of:</p> <ul style="list-style-type: none"> ● Section 5.4 – Delayed Calculation & Publication ● Section 6 – Restatement & Republishing ● Section 7 – Market Failure Event
10.1	4 th August 2021	<p>Addition of:</p> <ul style="list-style-type: none"> ● CF Cardano-Dollar Settlement Price ● CF Compound-Dollar Settlement Price ● CF Filecoin-Dollar Settlement Price ● CF Uniswap-Dollar Settlement Price
10.2	9 th September 2021	<p>Specification changes to:</p> <ul style="list-style-type: none"> ● CF Chainlink-Dollar Settlement Price ● CF OMG Network-Dollar Settlement Price ● CF Basic Attention Token-Dollar Settlement Price ● CF Orchid-Dollar Settlement Price ● CF Algorand-Dollar Settlement Price ● CF Cosmos-Dollar Settlement Price
10.3	8 th October 2021	<p>Addition of:</p> <ul style="list-style-type: none"> ● CF Aave-Dollar Settlement Price ● CF Dogecoin-Dollar Settlement Price ● CF Polkadot-Dollar Settlement Price ● CF Polygon-Dollar Settlement Price ● CF Solana-Dollar Settlement Price
10.4	13 th December 2021	<p>Addition of:</p> <ul style="list-style-type: none"> ● CF Maker-Dollar Settlement Price ● CF TheGraph-Dollar Settlement Price ● CF YearnFinance-Dollar Settlement Price ● CF Synthetix-Dollar Settlement Price ● CF Amp-Dollar Settlement Price ● CF Curve-Dollar Settlement Price ● CF Decentraland-Dollar Settlement Price

10.5	23 rd March 2022	<p>Addition of:</p> <ul style="list-style-type: none"> ● CF Enjin-Dollar Settlement Price ● CF Chiliz-Dollar Settlement Price ● CF Livepeer-Dollar Settlement Price ● CF Sushiswap-Dollar Settlement Price ● CF Sandbox-Dollar Settlement Price ● CF Rarible-Dollar Settlement Price ● CF AxiInfinity-Dollar Settlement Price ● CF Loopring-Dollar Settlement Price ● CF Avalanche-Dollar Settlement Price
10.6	28 th February 2022	<p>Removal of:</p> <ul style="list-style-type: none"> ● CF Bitcoin Dollar US Settlement Price ● CF Ether – Dollar US Settlement Price
10.7	25 th April 2022	<p>Update to observation window and partition size for CF Tezos – Dollar Settlement Price</p> <p>Removal of:</p> <ul style="list-style-type: none"> ● CF Algorand-Dollar Settlement Price ● CF Cosmos-Dollar Settlement Price ● CF Cardano-Dollar Settlement Price ● CF Uniswap-Dollar Settlement Price ● CF Chainlink-Dollar Settlement Price ● CF Polkadot-Dollar Settlement Price ● CF Polygon-Dollar Settlement Price ● CF Solana-Dollar Settlement Price ● CF Bitcoin Cash – Dollar Settlement Price ● CF Litecoin – Dollar Settlement Price ● CF Stellar Lumens – Dollar Settlement Price
10.8	6 th June 2022	<p>Removal of:</p> <ul style="list-style-type: none"> ● CF Bitcoin – Euro Settlement Price ● CF Ether – Euro Settlement Price
11.0	13 th July 2022	Addition of definition of and references to “Accepted Assets”
11.1	31 st October 2022	<p>Removal of:</p> <ul style="list-style-type: none"> ● CF Avalanche-Dollar Settlement Price ● CF Filecoin-Dollar Settlement Price ● CF Tezos-Dollar Settlement Price
11.2	19 th December 2022	<p>Removal of:</p> <ul style="list-style-type: none"> ● CF Aave-Dollar Settlement Price ● CF Curve-Dollar Settlement Price ● CF Synthetix-Dollar Settlement Price <p>Addition of:</p> <ul style="list-style-type: none"> ● CF ApeCoin-Dollar Settlement Price ● CF Ethereum Classic-Dollar Settlement Price ● CF Internet Computer-Dollar Settlement Price
11.3	30 th January 2023	<p>Removal of:</p> <ul style="list-style-type: none"> ● CF Axie Infinity-Dollar Settlement Price ● CF Chiliz-Dollar Settlement Price ● CF Decentraland-Dollar Settlement Price

11.4	29 th March 2023	Update of Dissemination Precision for: <ul style="list-style-type: none"> • CF OMG Network -Dollar Settlement Price • CF Basic Attention Token -Dollar Settlement Price • CF Compound - Dollar Settlement Price • CF Maker - Dollar Settlement Price • CF Enjin - Dollar Settlement Price • CF Sushiswap - Dollar Settlement Price • CF Rarible - Dollar Settlement Price
11.5	09 th May 2023	Update of Dissemination Precision for: <ul style="list-style-type: none"> • CF Livepeer-Dollar Settlement Price
11.6	15 th August 2023	Update of Dissemination Precision for: <ul style="list-style-type: none"> • CF Maker-Dollar Settlement Price • CF ApeCoin-Dollar Settlement Price • CF Ethereum Classic-Dollar Settlement Price • CF EOS-Dollar Settlement Price • CF Internet Computer-Dollar Settlement Price • CF Basic Attention Token-Dollar Settlement Price • CF Dogecoin-Dollar Settlement Price • CF Loopring-Dollar Settlement Price <p>Update to the copyright date and contact information</p>
11.7	10 th October 2023	Update to settlement price parameters for CF Rarible-Dollar Settlement Price
11.8	13 th November 2023	Update to logo & format
11.9	20 th November 2023	Updated logo (AKC v2)
12.0	06 th February 2024	Updates to the Administrator communication procedures for Delayed Calculation & Publication; Calculation Failure; Restatement & Republishing and Market Failure Events

2 Overview

The CF Settlement Prices have been created to facilitate settlement of regulated financial products. The methodology has been specifically designed to ensure that it is fit for this purpose. No further applications of the CF Settlement Prices have been taken into consideration in its design.

Each Settlement Price represents a transparent indicator of the price of an underlying cryptocurrency pair at the point in time stated in the specifications in section 9.

Underlying Economic Reality

The CF Settlement Prices are intended to measure the underlying economic reality of the exchange of the base asset for the quote asset and vice versa. This is accomplished by the use of order input data from markets that facilitate the trading of the base asset for the quote asset, markets where the quote asset is made fungible with Accepted Assets by the Constituent Exchange as a means of transacting for the base asset including markets where the quote asset is fungible with Accepted Assets on a 1:1 basis, , the criteria for eligibility for which are available in the CF Constituent Exchange Criteria.

3 Definitions

Accepted Asset: a digital asset that is a fully reserve backed digital token, commonly referred to as a “stablecoin”, that seeks to peg its value to that of the quote asset, where the stablecoin issuer operates a 1:1 redemption facility that is accessible to all Accepted Asset holders. Furthermore, only digital assets that solely hold reserve assets that are in line with the prevailing regulations enforced for government security money market funds in major jurisdiction such as the US, UK and EU. Accepted Assets are subject to the approval of the CF Cryptocurrency Index Family Oversight Function in accordance with the CF Cryptocurrency Index Family Oversight Function Specifications

Accepted Asset List:

Name	Ticker Symbol
USD Coin	USDC

API: Application programming interface.

Calculation Day: Any day for which a CF Settlement Price is published.

Constituent Exchange: A cryptocurrency trading venue approved by CF Benchmarks Management to serve as pricing source for the calculation of a CF Settlement Price

Relevant Pair: The cryptocurrency versus cryptocurrency or legal tender pair referenced by a CF Settlement Price, as defined in Section 8.

Relevant Transaction: Any cryptocurrency versus cryptocurrency or legal tender spot trade that occurs during¹ the TWAP Period on a Constituent Exchange in the Relevant Pair that is reported through its API to the Calculation Agent.

Retrieval Time: One minute after the end of the TWAP Period on a given Calculation Day, as given by the server clock of the Calculation Agent.

TWAP Period: A period of time equal to the TWAP Period Length leading up to the Effective Time, as defined in Section 8.

¹ Exclusive of start time but inclusive of end time when truncated to millisecond precision

4 Methodology and Ground Rules

4.1 Methodology

4.1.1 Qualitative Description

The CF Settlement Prices are calculated based on the Relevant Transactions of all Constituent Exchanges. Calculation steps on any given Calculation Day are as follows:

1. All Relevant Transactions are added to a joint list, recording the trade price and size for each transaction.
2. The list is partitioned² into a number of equally-sized time intervals, as specified in Section 8.
3. For each partition separately, the volume-weighted median trade price is calculated from the trade prices and sizes of all Relevant Transactions, i.e. across all Constituent Exchanges. A volume-weighted median differs from a standard median in that a weighting factor, in this case trade size, is factored into the calculation.
4. The CF Settlement Price is then given by the equally-weighted average of the volume-weighted medians of all partitions.

² Trades are added to a partition exclusive of partition start time and inclusive of partition end time when truncated to millisecond precision.

4.1.2 Mathematical Representation

The following table shows the symbols used in the mathematical representation of CF Settlement Price.

Symbol	Name	Description	Type
T	Effective time	The time as of which a CF Settlement Price is calculated	Parameter, see Section 8
τ	TWAP period length	The length of the time-period prior to the effective time during which transaction data is collected	Parameter, see Section 8
$\hat{\tau}$ with $\hat{\tau} \leq \tau$ and $\hat{\tau} \mid \tau$	Partition length	The length of the time periods into which the TWAP period length is partitioned	Parameter, see Section 8
K	Number of partitions	The number of partitions, given by $K = \tau/\hat{\tau}$	Output
k with $k \in (1, \dots, K)$	Partition	The k th partition	Output
X_k for $k \in (1, \dots, K)$	TWAP period trades	The price-ordered collection of price / size trade pairs observed in the Relevant Pair on all Constituent Exchanges in the k th partition, i.e. between times $T - \tau + (k - 1)$ and $T - \tau + k$	Input
I_k	TWAP period trades count	The number of trades in the k th partition	Output
$x_{k,i}$ with $x_{k,i} = (p_{k,i}, s_{k,i})$ and $x_{k,i} \in X_k$	TWAP period trade	The i th price / size trade pair of the k th partition	Input

$p_{k,i}$	TWAP period trade price	The price of the i th price/size trade pair of the k th partition	Input
$s_{k,i}$	TWAP period trade size	The size of the i th price/size trade pair of the k th partition	Input
WM_k	Weighted median	The weighted median trade price of the k th partition	Output
$CCRR_T$	CCRR	The CF Settlement Price at time T	Output

For each partition k , the volume-weighted median trade prices WM_k across all Relevant Transactions is calculated as:

$WM_k = p_{k,j} \text{ where } j \text{ satisfies } \sum_{i=1}^{j-1} s_{k,i} < \frac{1}{2} \sum_{i=1}^{I_k} s_{k,i} \text{ and } \sum_{i=j+1}^{I_k} s_{k,i} \leq \frac{1}{2} \sum_{i=1}^{I_k} s_{k,i}$ $\text{If } s_{k,1} \geq \frac{1}{2} \sum_{i=1}^{I_k} s_{k,i} \text{ then } WM_k = p_{k,1}$ $\text{If } \sum_{i=j+1}^{I_k} s_{k,i} = \frac{1}{2} \sum_{i=1}^{I_k} s_{k,i} \text{ then } WM_k = \frac{p_{k,j} + p_{k,j+1}}{2}$	Eq. 1
--	--------------

The CF Settlement Price of the effective time T , $CCRR_T$, is then given by:

$CCRR_T = \frac{1}{K} \sum_{k=1}^K WM_k$	Eq. 2
--	--------------

4.2 A Note on Properties

The calculation methodology immunizes CF Settlement Price to a high degree against price anomalies, while being replicable though spot trading on Constituent Exchanges. This is achieved through the following design choices:

Partitions

The CF Settlement Price is calculated as the equally-weighted average of the intermediate calculation steps for the K partitions. A single large trade or cluster of trades occurring in any one partition will therefore only have a limited effect on the CF Settlement Price.

Weighting of Partitions

Partitions are equally-weighted (as opposed to volume-weighted) to facilitate replication of CF Settlement Price through trading on Constituent Exchanges.

Medians

Spot prices have historically varied considerably across trading venues, in particular during times of high volatility. The use of medians to calculate the weighted median trade price for each partition (as opposed to averages) greatly reduces the CF Settlement Prices' susceptibility to price extremes on one or more Constituent Exchanges.

Volume-Weighting of Medians

Trading is driven to some extent by automated algorithms that may execute a high number of small trades. The use of volume-weighted medians to calculate the weighted median trade price for each partition (as opposed to simple medians) assures that the CF Settlement Price appropriately reflects large trades and that whether an order is executed in parts or in full has no effect on calculation results.

5 Contingency Calculation Rules

5.1 Delayed Data and Missing Data

Delayed data and missing data are treated according to the following rules:

1. Any Relevant Transaction for a given Calculation Day that is not available from a Constituent Exchange's API by the Retrieval Time is disregarded in the calculation of the CF Settlement Price for that Calculation Day.
2. If no Relevant Transaction occurs on a Constituent Exchange on a given Calculation Day or one or more Relevant Transactions occur but for any reason cannot be retrieved by the Calculation Agent, the Constituent Exchange is disregarded in the calculation of the CF Settlement Price for that Calculation Day.
3. If, for any of the K partitions of the TWAP Period, no Relevant Transaction occurs on any Constituent Exchange or one or more Relevant Transactions occur but for any reason cannot be retrieved by the Calculation Agent, the partition remains empty and will be disregarded in the calculation of the CF Settlement Price for that Calculation Day. The denominator in Eq. 2 will then be decremented by the number of empty partitions.
4. If one or more Relevant Transactions occur but for any reason no Relevant Transaction can be retrieved from any Constituent Exchange by the Calculation Agent, a CF Settlement Price calculation failure occurs for that Calculation Day (see Section 5.6).
5. If no Relevant Transactions occur on any Constituent Exchange on a given Calculation Day then a CF Settlement Price Market Failure Event will be deemed to have occurred (see Section 7)

5.2 Erroneous Data

All Relevant Transactions retrieved by the Calculation Agent for a given Calculation Day are subject to an automated screening for erroneous data according to the following rules:

1. If a Relevant Transaction shows a non-numeric or non-positive trade price or trade size, it is flagged as erroneous.
2. If a Relevant Transaction is reported in a format that deviates from the expected format such that it cannot be parsed, it is flagged as erroneous.
3. If a Relevant Transaction shows an execution time more than one minute in the future of the Calculation Agent's clock, it is flagged as erroneous.

Relevant Transactions flagged as erroneous for a given Calculation Day are disregarded in the calculation of the CF Settlement Price for that Calculation Day.

If all Relevant Transactions of all Constituent Exchanges are flagged as erroneous for a given Calculation Day, a CF Settlement Price calculation failure occurs for that Calculation Day (see Section 5.6).

5.3 Potentially Erroneous Data

All Relevant Transactions retrieved by the Calculation Agent for a given Calculation Day are subject to an automated screening for potentially erroneous data according to the following rules:

1. For each Constituent Exchange individually, the volume-weighted median trade price across all Relevant Transactions of that Constituent Exchange is calculated.
2. For each Constituent Exchange, the absolute percentage deviation of the volume-weighted median trade price, as calculated in the previous step, from the median of the volume-weighted median trade prices of all Constituent Exchanges is calculated.
3. If for any Constituent Exchange the absolute percentage deviation, as calculated in the previous step, exceeds the potentially erroneous data parameter for the respective CF Settlement Price, all Relevant Transactions of that Constituent Exchange are flagged as potentially erroneous.

Relevant Transactions flagged as potentially erroneous for a given Calculation Day are disregarded in the calculation of the CF Settlement Price for that Calculation Day. The occurrence of any such flag is reported to the Oversight Function.

If all Relevant Transactions of all Constituent Exchanges are flagged as potentially erroneous for a given Calculation Day, a CF Settlement Price calculation failure occurs for that Calculation Day (see Section 5.6).

5.4 Delayed Calculation & Publication

Where for any reason the Administrator is not able to calculate and publish a CF Settlement Price within the Dissemination Time on any given Calculation Day then the Administrator shall clearly communicate to all licensees via Statuspage that calculation and publication has been delayed. The Administrator will seek to publish the CF Settlement Price for that Calculation Day as soon as it is able to. Should the Administrator not be able to calculate and publish a CF Settlement Price by 23:59:59 London time then the provisions of Rule 5.6 shall come into effect.

5.5 Expert Judgement

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

5.6 Calculation Failure

If a CF Settlement Price cannot be calculated for a given Calculation Day before 23:59:59 London time, for instance because:

- no Relevant Transaction occurs on any Constituent Exchange on that Calculation Day, or
- one or more Relevant Transactions occur but for any reason cannot be retrieved by the Calculation Agent, or
- all Relevant Transactions retrieved by the Calculation Agent are flagged as erroneous or potentially erroneous (see Section 5.2); or
- any other reason or circumstance that prevents the orderly calculation of a CF Settlement Price,

Then the CF Settlement Price for that Calculation Day is given by the CF Cryptocurrency Settlement Price on the previous Calculation Day and this Settlement Price shall be published with a marker of (*).

The occurrence of any CF Cryptocurrency Settlement Price calculation failure is reported to the CF Oversight Function. Any Calculation Failure events will be clearly communicated to all licensees via Statuspage.

6 Restatement & Republishing

The CF Cryptocurrency Settlement Prices are subject to restatement and republishing before 23:59:59 London time of any given Calculation Day due to errors made by the Calculation Agent or its systems. CF Cryptocurrency Settlement Prices will not be subject to republishing after this time.

6.1 Restatement of a CF Cryptocurrency Settlement Price Value with a Replacement CF Cryptocurrency Settlement Price Value

The Administrator shall only Restate and Republish CF Cryptocurrency Settlement Price value if both the below conditions are met:

1. **Timeliness** – where the Administrator can **RESTATE** and **REPUBLISH** a CF Cryptocurrency Settlement Price value before 23:59:59 of the given Calculation Day
2. **Materiality** – where the **RESTATED** CF Cryptocurrency Settlement Price absolute variance is greater than **0.20%** for the respective CF Cryptocurrency Settlement Price for the given Calculation Day

Example:

- If a CF Cryptocurrency Settlement Price on a given Calculation Day is published as **1234.56**
- A CF Cryptocurrency Settlement Price will only be **RESTATED** if it is:
 - Greater than **1237.03**
 - OR
 - Less than **1232.09**

Where the above conditions are met the Administrator shall clearly communicate to all licensees via Statuspage that a restatement and republishing of the CF Cryptocurrency Settlement Price will take place for that Calculation Day.

The Administrator shall restate the impacted CF Cryptocurrency Settlement Price as soon as possible and shall do so by overwriting the previously published CF Cryptocurrency Settlement Price. This restated CF Cryptocurrency Settlement Price will carry no mark when published and will be final and not subject to any further change or republication.

7 Market Failure Event

Where a Market Failure Event has occurred, this shall be clearly communicated to all licensees via Statuspage. The CF Cryptocurrency Settlement Price on a day where a Market Failure Event has occurred shall be given by the CF Cryptocurrency Settlement Price published for the previous Calculation Day. Any CF Cryptocurrency Settlement Price published on a day when a Market Failure Event has occurred shall be marked by a maker (*).

8 Settlement Price Parameters

	Effective Time (T)	TWAP Period Length (τ)	Partition Length ($\hat{\tau}$)	Number of Partitions (K)	Potentially Erroneous Data
CF Ripple-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	10%
CF EOS-Dollar Settlement Price	4:00 p.m. London time every day	90 minutes	10 minutes	9	10%
CF PAX Gold-Dollar Settlement Price	4:00 p.m. London time every day	90 minutes	10 minutes	9	10%
CF OMG Network-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	10%
CF Orchid-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	10%
CF Basic Attention Token-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	10%
CF Dai-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	5%
CF Compound-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	10%

CF Dogecoin-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	10%
CF Maker-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	10%
CF TheGraph-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	10%
CF YearnFinance-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	10%
CF Amp-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	10%
CF Enjin-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	10%
CF Livepeer-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	10%
CF Sushiswap-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	10%
CF Sandbox-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	10%
CF Rarible-Dollar Settlement Price	4:00 p.m. London time every day	90 minutes	10 minutes	9	10%

CF Loopring-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	10%
CF ApeCoin-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	25%
CF Ethereum Classic-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	25%
CF Internet Computer-Dollar Settlement Price	4:00 p.m. London time every day	60 minutes	5 minutes	12	25%

9 Settlement Price Specifications

Administrator	CF Benchmarks Ltd
Calculation Agent	CF Benchmarks Ltd
Calculation Methodology	Aggregation of trade executions occurring on Constituent Exchanges during the Observation Window for the relevant calculation day

	Ticker Symbol	Relevant Pair	Description	Observation Window Timing	Dissemination Precision
CF Ripple-Dollar Settlement Price	XRPUSD_RR	XRP vs. U.S. Dollars	U.S. Dollar price of one XRP as of 4:00 p.m. London time every day	3:00pm to 4:00pm London Time	0.00001 US Dollars
CF EOS-Dollar Settlement Price	EOSUSD_RR	EOS vs. U.S. Dollars	U.S. Dollar price of one EOS as of 4:00 p.m. London time every day	2:30pm to 4:00pm London Time	0.000001 US Dollars
CF PAX Gold-Dollar Settlement Price	PAXGUSD_RR	PAX Gold vs U.S. Dollars	U.S. Dollar price of one PAX Gold token as of 4:00pm London time every day	2:30pm to 4:00pm London Time	0.01 US Dollars
CF OMG Network-Dollar Settlement Price	OMGUSD_RR	OMG Network token vs. U.S. Dollars	U.S. Dollar price of one OMG Network token as of 4:00 p.m. London time every day	3:00pm to 4:00pm London Time	0.0001 US Dollars
CF Orchid-Dollar Settlement Price	OXTUSD_RR	Orchid vs. U.S. Dollars	U.S. Dollar price of one Orchid as of 4:00 p.m. London time every day	3:00pm to 4:00pm London Time	0.0001 US Dollars

CF Basic Attention Token-Dollar Settlement Price	BATUSD_RR	BAT vs. U.S. Dollars	U.S. Dollar price of one BAT as of 4:00 p.m. London time every day	3:00pm to 4:00pm London Time	0.000001 US Dollars
CF Dai-Dollar Settlement Price	DAIUSD_RR	Dai vs. U.S. Dollars	U.S. Dollar price of one Dai as of 4:00 p.m. London time every day	3:00pm to 4:00pm London Time	0.00001 US Dollars
CF Compound-Dollar Settlement Price	COMPUSD_RR	Compound v.s. U.S. Dollars	U.S. Dollars of one Compound as of 4:00 p.m. London time every day	3:00 to 4:00pm London time	0.001 US Dollars
CF Dogecoin-Dollar Settlement Price	DOGEUSD_RR	Dogecoin v.s. U.S. Dollars	U.S. Dollars of one Dogecoin as of 4:00 p.m. London time every day	3:00 to 4:00pm London time	0.0000001 US Dollars
CF Maker-Dollar Settlement Price	MKRUSD_RR	Maker v.s. U.S. Dollars	U.S. Dollars of one Maker as of 4:00 p.m. London time every day	3:00 to 4:00pm London time	0.001 US Dollars
CF TheGraph-Dollar Settlement Price	GRTUSD_RR	TheGraph v.s. U.S. Dollars	U.S. Dollars of one TheGraph as of 4:00 p.m. London time every day	3:00 to 4:00pm London time	0.0001 US Dollars
CF YearnFinance-Dollar Settlement Price	YFIUSD_RR	YearnFinance v.s. U.S. Dollars	U.S. Dollars of one YearnFinance as of 4:00 p.m. London time every day	3:00 to 4:00pm London time	0.01 US Dollars

CF Amp-Dollar Settlement Price	AMPUSD_RR	Amp v.s. U.S. Dollars	U.S. Dollars of one Amp as of 4:00 p.m. London time every day	3:00 to 4:00pm London time	0.00001 US Dollars
CF Enjin-Dollar Settlement Price	ENJUSD_RR	Enjin v.s. U.S. Dollars	U.S. Dollars of one Enjin as of 4:00 p.m. London time every day	3:00 to 4:00pm London time	0.0001 US Dollars
CF Livepeer-Dollar Settlement Price	LPTUSD_RR	Livepeer v.s. U.S. Dollars	U.S. Dollars of one Livepeer as of 4:00 p.m. London time every day	3:00 to 4:00pm London time	0.001 US Dollars
CF Sushiswap-Dollar Settlement Price	SUSHIUSD_RR	Sushiswap v.s. U.S. Dollars	U.S. Dollars of one Sushiswap as of 4:00 p.m. London time every day	3:00 to 4:00pm London time	0.0001 US Dollars
CF Sandbox-Dollar Settlement Price	SANDUSD_RR	Sandbox v.s. U.S. Dollars	U.S. Dollars of one Sandbox as of 4:00 p.m. London time every day	3:00 to 4:00pm London time	0.0001 US Dollars
CF Rarible-Dollar Settlement Price	RARIUSD_RR	Rarible v.s. U.S. Dollars	U.S. Dollars of one Rarible as of 4:00 p.m. London time every day	2:30 to 4:00pm London time	0.0001 US Dollars
CF Loopring-Dollar Settlement Price	LRCUSD_RR	Loopring v.s. U.S. Dollars	U.S. Dollars of one Loopring as of 4:00 p.m. London time every day	3:00 to 4:00pm London time	0.000001 US Dollars

CF ApeCoin-Dollar Settlement Price	APEUSD_RR	ApeCoin vs. U.S. Dollars	U.S. Dollar price of one ApeCoin as of 4:00 p.m. London time every day	3:00 to 4:00pm London time	0.00001 U.S. Dollars
CF Ethereum Classic-Dollar Settlement Price	ETCUSD_RR	Ethereum Classic vs. U.S. Dollars	U.S. Dollar price of one Ethereum Classic as of 4:00 p.m. London time every day	3:00 to 4:00pm London time	0.0001 U.S. Dollars
CF Internet Computer-Dollar Settlement Price	ICPUSD_RR	Internet Computer vs. U.S. Dollars	U.S. Dollar price of one Internet Computer as of 4:00 p.m. London time every day	3:00 to 4:00pm London time	0.00001 U.S. Dollars

10 Methodology Review and Changes

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

Any changes to this methodology are overseen by the CF Oversight Function, and In accordance with UK 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 Oversight Function.

Should the Administrator deem it necessary to cease providing any of the Settlement Prices 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 Oversight Function.

Contact Information

Address	Contact
<p>CF Benchmarks Ltd 6th Floor One London Wall London EC2Y 5EB United Kingdom</p>	<p>Web: https://www.cfbenchmarks.com Phone: +44 20 8164 9900 Email: contact@cfbenchmarks.com</p>
	<p>Formal complaints or concerns regarding any CF Digital Asset Index Family products must be submitted by Email: complaints@cfbenchmarks.com</p> <p>Further details can be found on https://blog.cfbenchmarks.com/about/</p>

Notice and Disclaimer

CF Benchmarks Ltd is registered in England with registered number 11654816 and registered office at 6th Floor, One London Wall, London EC2Y 5EB, United Kingdom. CF Benchmarks is authorised by the UK Financial Conduct Authority as a registered Benchmark Administrator (FRN 847100).

This document and all of the information contained in it, including without limitation all methods, processes, concepts, text, data, graphs, charts (collectively, the "Information") is the property of CF Benchmarks Ltd or its licensors, direct or indirect suppliers or any third party involved in making or compiling any Information (collectively, with CF Benchmarks Ltd, the "Information Providers") and is provided for informational purposes only. The Information may not be reproduced or disseminated in whole or in part without prior written consent from CF Benchmarks Ltd.

The Information may not be used to create derivative works or to verify or correct other data or information without prior written consent from CF Benchmarks Ltd. For example (but without limitation), the Information may not be used to create indices, databases, risk models, analytics, software, or in connection with the issuing, offering, sponsoring, managing or marketing of any securities, portfolios, financial products or other investment vehicles utilizing or based on, linked to, tracking or otherwise derived from the Information or any other CF Benchmarks Ltd data, information, products or services.

The user of the Information assumes the entire risk of any use it may make or permit to be made of the Information. CF BENCHMARKS DOES NOT MAKE ANY EXPRESS OR IMPLIED WARRANTIES OR REPRESENTATIONS WITH RESPECT TO THE INFORMATION (OR THE RESULTS TO BE OBTAINED BY THE USE THEREOF), AND TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IT EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES (INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF ORIGINALITY, ACCURACY, TIMELINESS, NON-INFRINGEMENT, COMPLETENESS, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) WITH RESPECT TO ANY OF THE INFORMATION.

Without limiting any of the foregoing and to the maximum extent permitted by applicable law, in no event shall CF Benchmarks have any liability regarding any of the Information for any direct, indirect, special, punitive, consequential (including lost profits) or any other damages even if notified of the possibility of such damages. The foregoing shall not exclude or limit any liability that may not by applicable law be excluded or limited, including without limitation (as applicable), any liability for death or personal injury to the extent that such injury results from the negligence or wilful default of itself, its servants, agents or sub-contractors.

None of CF Benchmarks Ltd's products or services recommends, endorses, approves or otherwise expresses any opinion regarding any issuer, securities, financial products or instruments or trading strategies and none of CF Benchmarks Ltd's products or services is intended to constitute investment advice or a recommendation to make (or refrain from making) any kind of investment decision and may not be relied on as such.

Any use of or access to products, services or information of CF Benchmarks Ltd requires a license from CF Benchmarks Ltd.