



## **CLOSING PRICES Methodology**

Version 1.4

BLOCKSIZE produces the CLOSING PRICES Data Feed as part of its product BLOCKSIZE CONNECT, a collection of rates quoted in U.S. dollars, euros, and various other currencies for an expanding set of cryptocurrencies and other digital asset classes.

The CLOSING PRICES are designed to serve as a transparent and independent pricing source that promotes the functioning of efficient markets, reduces information asymmetries among participants, facilitates trading, and accelerates the adoption of cryptocurrencies and digital assets as an asset class with the highest standards.

The CLOSING PRICES Data Feed is calculated using a robust and resilient methodology that is resistant to manipulation and adheres to international best practices for financial benchmarks.

This methodology is governed by the BLOCKSIZE Data Committee and is part of the BLOCKSIZE CONNECT Manifest (see Appendix A.1) to ensure that the price feeds serve as a source of transparent and reliable pricing.

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# 1 Calculation Algorithm

## 1.1 Definitions

BLOCKSIZE defines the following elementary terminology.

**Trade Event:** We use this term for the data about a trade which is observed by the BLOCKSIZE software on an exchange. In the context of the closing price algorithm below, the data that defines a trade is its price, volume, and its timestamp. To denote a trade event, its price, size, and timestamp, respectively, we use the symbols  $\epsilon, p, v, t$ :

$$\epsilon = \{p, v, t\}$$

**Closing Times:** The closing times considered are 00:00:00 UTC ([hours]:[minutes]:[seconds]) and multiples of 00:30:00 (thirty minutes) thereafter. For example, 00:30:00 UTC, 01:00:00 UTC, 01:30:00 UTC, etc..

**Closing Price Data Interval:** Trade events observed within the 00:30:00 (thirty minutes) interval preceding the *closing times* defined above are taken into account for the evaluation of the Closing Prices that enter the Closing Price Data Feed.

## 1.2 Algorithm

The calculation of the Closing Prices in the CLOSING PRICES product for a given instrument (see Appendix A.2 for an up to date list) are done as follows. Here and in the remainder of this document, we use the *italic font* to signal a reference to our definitions in Section 1.1. .

1. The algorithm is executed 00:00:05 (five seconds) after the *Closing Times*, because some of the accepted exchanges (see Appendix A.3 for an up to date list) report *trade events* with a small delay.
2. For every exchange  $E$  on which *trade events* were observed within the *Closing Price Data Interval*, the last *trade event* before the *closing time* is considered. For every *closing time*  $t$ , a set  $\mathcal{S}(t)$  of prices, volumina, and timestamps is obtained:

$$\mathcal{S}(t) = \{\epsilon^E; E \in \Omega\}$$

Here, we used  $\Omega$  to denote the set of all exchanges with *trade events*.

3. The closing prices  $P_C(t)$  distributed are computed as the volume-weighted average price of the *trade events* in the set  $\mathcal{S}(t)$  as follows:

$$P_C(t) = \sum_{E \in \Omega} \frac{P_E \times v_E}{V}$$

Here, we used the shorthand  $V = \sum_{E \in \Omega} v_E$  to denote the total aggregated size of the *trade events* in the set  $\mathcal{S}(t)$ .

## 2 Data Contingency Rules

The following contingency rules are followed to address situations where data is delayed, missing, or unavailable due to periods of low liquidity such as extraordinary market circumstances or outside factors beyond the control of BLOCKSIZE.

1. If observable *trade events* from an accepted exchange are unable to be collected due to technical problems specific to the accepted exchange during the *closing price data interval* (such as malformed data, cf. Section 3.), the *trade events* are excluded from the calculation of the specific instance of the given CLOSING PRICES Data Feed.
2. If no *trade events* from a specific accepted exchange exist during the *closing price data interval*, the value of the CLOSING PRICES Data Feed will rely on the on various other accepted exchanges for its calculation as described in Section 1.
3. In the highly unlikely event that none of the accepted exchanges in Appendix A.3 report *trade events*, the CLOSING PRICES Data Feed will report the closing price of the previous *closing time*.

## 3 Data Exclusion Rules

All observable *trade events* from accepted exchanges are verified for integrity. If potential errors in the data are detected, the data input is not included in the calculation of the CLOSING PRICES Data Feed. If *trade events* are incomplete – for instance, if a volume or a timestamp is missing – they are not considered. If errors emerge, that cannot reliably be identified by our software implementation, the next steps are to be determined by the expert judgment of the BLOCKSIZE Data Committee to continue including or excluding the data from the accepted exchange until the anomaly is resolved. Any exercise of expert judgment must be approved by staff members.

## Appendix: Current Documents

The CLOSING PRICES Methodology described in here is part of the BLOCKSIZE CONNECT Manifest, which is describing how BLOCKSIZE is dealing with aspects of its BLOCKSIZE CONNECT suite of data subscriptions.

A.1 Current version of the BLOCKSIZE CONNECT Manifest:

<https://www.blocksize.info/blocksize-connect/manifest/>

A.2 Current list of supported instruments:

<https://www.blocksize.info/blocksize-connect/instruments-closing/>

A.3 Current list of supported exchanges:

<https://www.blocksize.info/blocksize-connect/markets-overview/>

A.4 Current version of the CLOSING PRICES Methodology:

<https://www.blocksize.info/blocksize-connect/manifest/closing-prices-methodology/>

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