



CMBI Multi Asset Series Methodology

Version 1.0

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0 Change Log

Release	Date	Changes
Version 1.0	September 22, 2019	Finalized CMBI Multi Asset Series Methodology

1 Introduction

Coin Metrics' mission is to provide transparent and actionable cryptoasset market and network (on-chain) data. As one of the early providers of both market and network data, Coin Metrics is uniquely positioned to provide investors with a high quality suite of crypto indexes.

The Coin Metrics Bletchley Indexes ("CMBI") are designed to provide cryptoasset markets with a diverse range of market capitalization weighted, equal weighted and network data weighted indexes to measure performance of the largest and most utilized global cryptoassets. CMBI products are operated and calculated by Coin Metrics and are designed to serve as an independent, transparent and comprehensive measure of crypto market performance.

Indexes are weighted and calculated using a robust and resilient methodology that is resistant to manipulation and designed to align with international best practices for financial benchmarks, including the International Organization of Securities Commissions' (IOSCO) Principles for Financial Benchmarks. The Coin Metrics Oversight Committee (the "Oversight Committee") protects the integrity of the CMBI and ensures that the indexes serve as a source of transparent and independent benchmarking.

This document is intended to be read in conjunction with other Coin Metrics methodologies that inform many of the data inputs. These include:

- [CM Real-Time Reference Rate Methodology](#)
- [CM Reference Rate Methodology](#)
- [CMBI Adjusted Free Float Methodology](#)
- [CM Network Data Knowledge Base](#)

2 Description

The CMBI Multi Asset Series is reflective of the returns an investor would expect by purchasing all of the cryptoassets at the corresponding weights for each index. Index prices are quoted in real time and assets are rebalanced at 16:00 ET on the first business day of every month to account for the inflation rate of each asset, changes in free float supply, changes in market pricing, changes in network activity and the addition or deletion of index constituents.

Coin Metrics conducts a comprehensive assessment of all cryptoassets to ensure that the Indexes represent the full breadth of investment opportunities in the global cryptoasset market. Coin Metrics formally defines a cryptoasset as any digital asset that exhibit the following characteristics:

1. The use of a distributed ledger to allow remote peer-to-peer transfer of native units of the cryptoasset
2. The state of the distributed ledger is maintained by distributed consensus and does not require a central authority or trusted intermediary to function
3. Ownership of native units of the cryptoasset can be proven by cryptography

Provided these requirements are met, the cryptoasset can be issued on any underlying blockchain architecture and use any distributed consensus mechanism.

Given the early stages and financial immaturity of the cryptoasset market, there is not enough sophisticated trading infrastructure, custody solutions, liquidity or other financial services to support the long tail of cryptoassets. Many of these factors have gone into the design of CMBI products and the methodology outlined below so as to create a suite of truly investable indexes. As the ecosystem evolves and becomes more sophisticated it may be deemed that other indexes become investable.

Index levels are available through the Coin Metrics website (<https://coinmetrics.io/cmbi-indexes/>), major financial quote vendors and print and electronic media outlets.

Detailed index data is provided monthly to licensees of CMBI products.

3 Eligibility Criteria

The index construction process begins by defining the set of cryptoassets that are eligible for inclusion as index constituents. This process involves the creation of the cryptoasset universe, derived by screening cryptoassets against a set of investability criteria. This screen is applied so that market participants can construct a portfolio of the index constituents at their proper weights without undue impediments and track the performance of the Indices with minimal tracking error.

To be included as a constituent in the CMBI Multi Asset Series universe, a cryptoasset must pass each of the criteria outlined below.

3.1 Pricing

Cryptoassets are required to meet the following price criteria to ensure there are reliable and robust sources and trade pairs on which to derive an asset's fair price.

- Cryptoassets must trade on at least one active market on an eligible exchange (as defined in *Section 3.2*) where the quote asset is the U.S. dollar, Bitcoin, or Ethereum.
- Cryptoassets with extremely low prices are susceptible to liquidity and investability issues if the minimum price fluctuation of a cryptoasset represents a meaningful percentage of its price. For this reason, cryptoassets are required to meet a minimum price requirement. A cryptoasset's median price over the past 30 days denominated in Bitcoin must exceed 0.00000010 BTC, as measured by the Coin Metrics Hourly Reference Rates, over the past 30 days to be eligible for inclusion.
- Cryptoassets must have a free floating price (i.e. not pegged to any underlying real or digital asset).

3.2 Markets

Cryptoassets are required to have a listing on an eligible exchange to ensure there are reliable sources and trade pairs on which to derive an asset's fair price. The following criteria are used in determination of eligibility:

- *Technology*: An assessment of whether the exchange's technology infrastructure provides sufficient availability and reliability for input data collection. Evaluates whether the exchange offers a REST API, Websocket feed, or FIX API suitable for data collection. Evaluates the performance of the API in terms of reliability and latency.
- *Legal and Compliance*: An assessment of whether the exchange complies with laws and regulations. Coin Metrics evaluates whether the exchange: has publicly-disclosed trading policies; uses market surveillance technology; complies with national regulatory organizations; enforces KYC and AML requirements; has functioning fiat and cryptoasset withdrawals processed within a normal timeframe; has a data sharing license can be executed with the exchange.
- *Business Model*: An assessment of the exchange with respect to its business model, including its fee structure and asset listing standards.
- *Data Availability*: An assessment of the available data the exchange offers, including the number of markets that the given cryptoasset is the base currency, whether markets are quoted in fiat currencies or other cryptoassets, and the type of markets offered.
- *Price*: An assessment of the quality of the exchange's price data, including testing for the occurrence of price outliers and impactful price deviations from other exchanges, and whether the exchange

operates markets that are anchored by observable transactions entered into at arm's length between buyers and sellers.

- *Volume*: An assessment of the quality of the exchange's volume data, including testing for manipulated volume figures, and implementing tests that determine whether the exchange operates active markets and are anchored by observable transactions entered into at arm's length between buyers and sellers. The size of the exchange's markets are also considered.
- *Order Book*: An assessment of the quality of the exchange's order book data, including tests for manipulated orders, and implementing tests that determine whether the exchange operates active markets and are anchored by observable transactions entered into at arm's length between buyers and sellers. The liquidity of the exchange's markets are also considered.

3.3 Volume

Cryptoassets are required to meet minimum liquidity requirements to ensure that a given cryptoasset has appropriate liquidity to facilitate trading and portfolio management with acceptable levels of market impact. Liquidity is measured by the 30-day and 180-day annualized traded value ratio (ATVR). The ATVR is designed to measure normal levels of liquidity and is robust to outliers where extremely high or low levels of volume may be observed on a given day. The 30-day ATVR and 180-day ATVR are used to evaluate a cryptoasset's liquidity over a short-term and intermediate-term period.

The ATVR is calculated for a given cryptoasset using the following steps:

1. For each day, the daily traded value is first calculated as the sum of the number of units traded of the given cryptoasset from markets traded on the set of eligible exchanges where the base asset is the given asset and the quote asset is the U.S. dollar, Bitcoin or Ethereum multiplied by the price in U.S. dollars of the given cryptoasset at the end of the daily interval. The price in U.S. dollars is obtained from the Coin Metrics Reference Rates.
2. For each day, the daily traded value ratio is calculated as the daily traded value divided by the asset's free float market capitalization.
3. The annualized traded value ratio is calculated as the median of the daily traded value ratios over the given time window and annualizing this figure by multiplying it by 365.

A cryptoasset is required to have a 30-day ATVR and 180-day ATVR of over 5 percent to be eligible for inclusion as an index constituent.

3.4 Supply

Cryptoassets are required to meet minimum free float supply requirements to ensure that a sufficient percentage of the supply is available for purchase in the public markets. A cryptoasset is required to have a free float supply of at least 15 percent of its total current supply to be eligible for inclusion as an index constituent.

3.5 Custody

A cryptoasset is required to be custodied by a regulated third-party custodian to be eligible for inclusion as an index constituent. The list of custodians considered to meet his criteria include: Anchorage, Bakkt Warehouse, BitGo, Coinbase Custody, Fidelity Digital Assets, Gemini Custody, itBit, Kingdom Trust, and New York Digital Investment Group.

3.6 New Token Eligibility

Newly created cryptoassets, by means of an initial coin offering, initial exchange offering, new blockchain launch, or other similar methods are subject to a minimum length of trading requirement. A cryptoasset is required to be traded on an eligible exchange for a minimum of 30 days to be eligible for inclusion as an index constituent.

A newly created asset that is created by means of a fork of an existing cryptoasset are excluded from the minimum length of trading requirement. Forked assets are eligible for inclusion as an index constituent in the following rebalance provided all other investability requirements are met.

3.7 Node Hosting

Coin Metrics must be able to independently rebuild a cryptoasset's ledger, for any point in time, using data provided by the asset's protocol implementation and, using this reconstructed ledger, verify that its supply matches what it should be according to the protocol's specification. This supply data is necessary for index construction.

Coin Metrics evaluates a cryptoasset's full node software and/or accompanying APIs under various dimensions. These dimensions include its ability to synchronize with the current state of the network, the ability for it to remain synchronized under normal operating conditions, the degree of code auditability, and the difficulty required in extracting raw blockchain data and reconstructing the ledger.

Access to a cryptoasset's full historical state is required to meet minimum requirements as determined by the Coin Metrics Index Committee. For certain assets, the Coin Metrics Index Committee may consider this requirement to be satisfied if a third party API can be used to query the ledger and enable us to fully audit historical states in lieu of hosting a full node.

4 Index Construction and Maintenance

4.1 Approach

There are two steps in the creation of the CMBI Multi Asset Series products. The first is the selection of the index constituents; the second is weighting constituents within the index.

At each rebalance, all cryptoassets that meet the criteria outlined in *3 Eligibility Criteria* are selected as the possible investment universe of CMBI Multi Asset Series products.

Market capitalization indexes are rebalanced monthly at 16:00 ET on the first business day of the month (“Effective Date”). The rebalancing reference date (“Reference Date”) is two business days prior to the rebalancing day at midnight UTC. Business days are defined as Monday - Friday excluding public holidays, as defined by the New York Stock Exchange (NYSE) holidays and trading hours calendar.

4.2 Market Capitalization Indexes

4.2.1 CMBI Bitcoin and Ethereum

The rebalancing process is as described below:

1. **Universe:** The eligible investment universe is Bitcoin and Ethereum only.
2. **Constituent Selection:** The only constituents selected are Bitcoin and Ethereum.
3. **Weighting:** Constituents of each index are weighted by their Free Float Market Capitalization. An asset’s Free Float Supply refers to the number of native units of a cryptoasset that are readily available to trade in open markets (i.e., active and not restricted), as defined in the [CMBI Adjusted Free Float Methodology](#). Given the transparency and auditability of supply for Bitcoin and Ethereum, each their adjusted free float supply is determined by rounding their free float percentage up to the closest 1%. This process is conducted monthly and the resulting supply figure as calculated below is considered an assets Adjusted Free Float:

$$\text{Adjusted Free Float Supply} = \text{Free Float Supply Percentage} * (\text{Current Supply} - \text{Lost Supply})$$

The Adjusted Free Float Market Capitalization is then determined as follows:

$$\text{Adjusted Free Float Market Capitalization} = \text{Adjusted Free Float Supply} * \text{Current Price}$$

For more detail on the adjusted free float supply determination process, please refer to the [CMBI Adjusted Free Float Methodology](#).

No additions or deletions are made to the index between rebalancings, except in scenarios as articulated in the Contingency Rules section.

4.2.2 CMBI 10

The rebalancing process is as described below:

1. **Universe:** Assess all the new and existing cryptoassets against the eligibility criteria in *3 Eligibility Criteria* and update the CMBI universe of assets.
2. **Constituent Selection:** As of the rebalancing reference date, cryptoassets that meet the eligibility criteria are ranked in descending order by their expected adjusted free-float market capitalization in 10 years time. This is determined by multiplying the asset's price today by the expected float in 10 years. The top ten largest cryptoassets by their expected 10 year market capitalization are selected as constituents of the CMBI 10. A buffer rule is applied during the constituent selection process of each rebalance to reduce the index turnover.
 - a. Cryptoassets in the top eight are automatically accepted for inclusion in the index.
 - b. Of the other cryptoassets in the top twelve, those that were included during the last rebalance are selected based on expected 10 year market capitalization.
 - c. If the index has not been filled, the highest ranking non-constituents in the top twelve are selected for inclusion.
3. **Weighting:** Constituents of each index are weighted by their Adjusted Free Float Market Capitalization. An asset's Free Float Supply refers to the number of native units of a cryptoasset that are readily available to trade in open markets (i.e., active and not restricted), as defined in the [CMBI Adjusted Free Float Methodology](#). Given the ambiguity and differing reporting standards of cryptoasset supply, an assets supply is then placed into bands to reduce unnecessary index turnover. This process is conducted monthly and the resulting supply figure as calculated below is considered an assets Adjusted Free Float:

$$\text{Adjusted Free Float Supply} = \text{Free Float Supply Band} * (\text{Current Supply} - \text{Lost Supply})$$

The Adjusted Free Float Market Capitalization is then determined as follows:

$$\text{Adjusted Free Float Market Capitalization} = \text{Adjusted Free Float Supply} * \text{Current Price}$$

For more detail on the adjusted free float supply determination process, please refer to the [CMBI Adjusted Free Float Methodology](#).

No additions or deletions are made to the index between rebalances, except in scenarios as articulated in the Contingency Rules section.

4.2.3 CMBI 10 Even

The rebalancing process is as described below:

1. **Universe:** As of the rebalancing reference date, cryptoassets that meet the eligibility criteria are ranked in descending order by market capitalization calculated off of the expected total supply in y+10yrs for each asset.
2. **Constituent Selection:** The CMBI 10 Even constituents are the same as the CMBI 10 constituents.
3. **Weighting:** Constituents of the CMBI 10 Even are equally-weighted during each rebalance using closing prices of each asset on the rebalancing reference date.

No additions or deletions are made to the index between rebalances, except in scenarios as articulated in the Contingency Rules section.

4.2.4 CMBI 10 Excluding Bitcoin

The rebalancing process is as described below:

1. **Universe:** Assess all the new and existing cryptoassets, except for Bitcoin (BTC) which is ineligible for this index, against the eligibility criteria in 3 Eligibility Criteria and update the CMBI universe of assets.
2. **Constituent Selection:** As of the rebalancing reference date, cryptoassets that meet the eligibility criteria are ranked in descending order by their expected adjusted free-float market capitalization in 10 years time. This is determined by multiplying the asset's price today by the expected float in 10 years. The top ten largest cryptoassets by their expected 10 year market capitalization are selected as constituents of the CMBI 10. A buffer rule is applied during the constituent selection process of each rebalance to reduce the index turnover.
 - a. Cryptoassets in the top eight are automatically accepted for inclusion in the index.
 - b. Of the other cryptoassets in the top twelve, those that were included during the last rebalance are selected based on expected 10 year market capitalization.
 - c. If the index has not been filled, the highest ranking non-constituents in the top twelve are selected for inclusion.
3. **Weighting:** Constituents of each index are weighted by their Adjusted Free Float Market Capitalization. An asset's Free Float Supply refers to the number of native units of a cryptoasset that are readily available to trade in open markets (i.e., active and not restricted), as defined in the [CMBI Adjusted Free Float Methodology](#). Given the ambiguity and differing reporting standards of cryptoasset supply, an assets supply is then placed into bands to reduce unnecessary index turnover. This process is conducted monthly and the resulting supply figure as calculated below is considered an assets Adjusted Free Float:

$$\text{Adjusted Free Float Supply} = \text{Free Float Supply Band} * (\text{Current Supply} - \text{Lost Supply})$$

The Adjusted Free Float Market Capitalization is then determined as follows:

$$\text{Adjusted Free Float Market Capitalization} = \text{Adjusted Free Float Supply} * \text{Current Price}$$

For more detail on the adjusted free float supply determination process, please refer to the [CMBI Adjusted Free Float Methodology](#).

No additions or deletions are made to the index between rebalances, except in scenarios as articulated in the Contingency Rules section.

4.3 Currency of Calculation

The CMBI levels are calculated in U.S. dollars and Bitcoin.

For real time index pricing, the Bitcoin price is determined using the CM Real-Time Reference Rate U.S. dollar Bitcoin price.

For the end of day pricing, the Bitcoin price is determined using the closing U.S. dollar price of Bitcoin as represented by the CM Reference Rates.

4.4 Historical Availability and Base Values

Index history availability and values are shown in the table below.

Name	Ticker	Return Type	Launch Date	First Value Date	Base Date	Base Value (USD)	Base Value (BTC)
CMBI Bitcoin and Ethereum	CMBIBE	Price return	2020-09-23	2015-08-08	2015-08-08	100	0.3716
CMBI 10	CMBI10	Price return	2020-09-23	2017-01-03	2017-01-03	100	0.0977
CMBI 10 Even	CMBI10E	Price return	2020-09-23	2017-01-03	2017-01-03	100	0.0977
CMBI 10 Excl BTC	CMBI10EX	Price return	2020-09-23	2017-01-03	2017-01-03	100	0.0977

4.5 Calculation Algorithm

The calculation algorithm of the market capitalization weighted indexes is described below.

The Index level is calculated as follows:

$$Index\ Level_t = \frac{\sum_{i=1} p_{i,t} \times AFFS_{i,t}}{Index\ Divisor}$$

Where,

- Index Level_t = Index level on day t
- P_{i,t} = CM RR 16:00 ET U.S. Dollar price for index constituent i on day t
- AFFS_{i,t} = Adjusted free float supply of index constituent i on day t

The Index Divisor is calculated as follows:

$$Index\ Divisor_0 = \frac{\sum_{i=1} P_{i,0} \times AFFS_{i,0}}{Base\ Level}$$

Where,

- Index Divisor₀ = Index Divisor at Base Date
- P_{i,0} = CM RR 16:00 ET time U.S. Dollar price for index constituent i on Base Date
- AFFS_{i,0} = Adjusted free float supply of index constituent i on Base Date
- Base Level = As defined in section 4.4

Adjustments to Token Supply

CMBI market capitalization weighted indexes are free float-adjusted. This better reflects the number of on-chain native units that are readily available to trade in open markets by reducing: foundation, company, founding team tokens; tokens that have been formally restricted (through legal or smart contracts); tokens staked for governance purposes without any direct monetary incentive to do so; tokens that have been inactive on-chain for 5 or more years; burnt units that are still visible on chain; or provably lost units (if >0.25% of supply).

For detailed information on Coin Metrics approach to determining the Adjusted Free Float, please refer to the [CMBI Adjusted Free Float Methodology](#).

Adjustments to the Index Divisor

Core to maintaining the integrity and accuracy of the index is adjusting the index divisor. Changes to the circulating supply and constituents of indexes should not impact an index's Level. If an index closes at a level of 100, and subsequently a constituent's float increases or the constituents of an index change, the price of the index should open at a level of 100. To determine the required divisor adjustment, asset prices and circulating supply need to remain static during the calculation. As such, it will be assumed that prices and circulating supply at time t-1 and time t remain constant until the new divisor has been determined. To achieve this, adjustments to the divisor are required as described below.

- This process demonstrates the calculations if a constituent is replaced during the monthly rebalance. Expanding the previous equation to show the removed constituent, m, from the index:

$$Index\ Level_{t-1} = \frac{\left(\sum_{i=1} p_i \times AFS_{i,t-1} \right) + P_m \times AFS_m}{Index\ Divisor_{t-1}}$$

- Once constituent m is replaced with constituent n the equation reads:

$$Index\ Level_t = \frac{\left(\sum_{i=1} p_i \times AFS_{i,t} \right) + P_n \times AFS_n}{Index\ Divisor_t}$$

- By definition, since prices and circulating supply are static,

$$Index\ Level_{t-1} = Index\ Level_t$$

- As constituent prices, constituent circulating supplies and Index Divisor_{t-1} are all known quantities, we can calculate the new divisor, Index Divisor_t

$$Index\ Divisor_t = Index\ Divisor_{t-1} \times \frac{\left(\sum_{i=1} p_i \times AFS_{i,t} \right) + P_n \times AFS_n}{\left(\sum_{i=1} p_i \times AFS_{i,t-1} \right) + P_m \times AFS_m}$$

5 Index Data

5.1 Data Sources

CMBI leverages both Coin Metrics products and external data sources as a means of constructing indexes and calculating the index level of CMBI products.

5.1.1 Real-Time Index Pricing

Real time input price data for CMBI products is sourced from Coin Metrics Real-Time Reference Rates (“CM RTRR”). Refer to the [Real-Time Reference Rates Methodology](#) for more information.

5.1.2 End of Day Index Pricing

End of day input price data for CMBI products is sourced from CM Hourly Reference Rates. Refer to the [CM Hourly Reference Rates Methodology](#) for more information.

5.1.3 Adjusted Free Float Market Capitalization

Market capitalization data that informs the weighting of constituents in CMBI market cap products is derived internally at Coin Metrics. CM Network Data Pro supply data provides the number of native units visible on the ledger, which acts as the foundation for the adjusted free float supply. Foundation, company, founding team tokens; tokens that have been formally restricted (through legal or smart contracts); tokens staked for governance purposes without any direct monetary incentive to do so; tokens that have been inactive on-chain for 5 or more years; burnt units that are still visible on chain; or provably lost units (if >0.25% of supply) are removed to determine the adjusted free float supply. Refer to the [CMBI Adjusted Free Float Methodology](#) for more detailed information.

5.1.4 Expected 10-Year Market Capitalization

The Expected 10-Year Market Capitalization that informs the inclusion of constituents in CMBI market cap products is obtained from CM Network Data Pro. Refer to the CM Network Data Pro File Spec and the [CM Network Data Pro Knowledge Base](#) for more information.

6 Index Governance

The Coin Metrics Oversight Committee (the "Oversight Committee") and Coin Metrics Index Committee (the "Index Committee") oversee the integrity of the CMBI products.

6.1 Administration

Coin Metrics serves as the administrator for CMBI products and has primary responsibility for all aspects of the index construction processes, including development, definition, determination, dissemination, operation, and governance. All aspects of index production are carried out by Coin Metrics, however, Coin Metrics relies on a few third party agreements to obtain data inputs for index calculation.

Coin Metrics ensures that transparency in relation to significant decisions and associated rationale are published and made available to external stakeholders. Data contingency and exclusion rules are in place to handle certain extraordinary circumstances and external factors beyond the control of Coin Metrics.

6.2 Governance Committees

6.2.1 Coin Metrics Oversight Committee

The Oversight Committee provides independent oversight over the production of CMBI products. The Oversight Committee's responsibilities include regular reviews of the CMBI production process, the CMBI methodologies, the selection of data sources and data inputs, any uses of expert judgment or non-standard procedures, conflicts of interest, the addition or termination of CMBI products, reviewing the results of external and internal audits, and complaints or questions regarding the indexes from external stakeholders. Additional information regarding the responsibilities and membership of the Oversight Committee can be found in the Coin Metrics Governance Committee Charter.

6.2.2 Coin Metrics Index Committee

The Index Committee maintains all CMBI products. Committee members are Coin Metrics employees. The committee meets monthly to review any significant market events, revise index policies as required and review any ongoing consultation results. In the daily maintenance of CMBI products, the Index Committee reserves the right to apply exceptions and make expert judgements as required to maintain the integrity of the indexes. In such an instance where index determination deviates from the standard methodology or policies as defined in this document or supplemental documents, clients will receive sufficient notice when possible. At a minimum, the Index Committee will review the CMBI product methodologies annually to ensure that indexes that follow the process and policies stated within this document continue to achieve their stated objectives. Coin Metrics considers the content discussed at monthly Index Committee meetings to be potentially market moving or material and as such treats minutes as confidential. For information on expert judgement, please refer to the CMBI Policy Documentation.

7 Index Policy

7.1 Announcements

Index constituent data is analyzed for completeness daily. In the case of any significant foreseeable event for any index constituent, an announcement will be distributed via a monthly index report distributed to all clients. For any anomalies that are detected during the daily quality review process, Coin Metrics will develop a plan to notify, solicit comments from, and consult with external stakeholders via email or another pre-defined communication channel.

Press releases such as new index creation or significant changes to existing index construction will be released on the Coin Metrics publications page, <https://coinmetrics.io/pubs/>.

7.2 Holiday Schedule

The CMBI indexes are calculated 24 hours a day, 7 days a week, 365 days a year.

Rebalances are conducted on business days, Monday to Friday, except for holidays as defined by the New York Stock Exchange (NYSE) holidays and trading hours calendar. A complete holiday schedule is available on request.

7.3 Restatement Policy

For information on the Restatement Policy, please refer to the CMBI Policy Documentation.

7.4 Real-Time Pricing

Real-time index pricing does not update an index's level every time a trade occurs, but rather sources data from CM Real-Time Reference Rates whose methodology stipulates that an asset's price is determined using a volume weighted-median with inverse price variance weighting of the most recent trade from each of the constituent markets. Further, index real-time levels will be produced every 15 seconds. At each interval, the CM Real-Time Reference Rates will produce pricing for each constituent asset of an index which will inform index level determination. Real-time index prices are provided 24 hours a day, 7 days a week, 365 days a year.

7.5 End of Day Pricing

End of day index pricing sources data from CM Reference Rates, which produce 24 rates daily per asset, one rate at the start of every hour. CMBI indexes utilize the 16:00 ET rate for determination of the end of day index level. The CM Reference Rate Methodology stipulates that an asset's price is determined utilizing a time-weighted and volume-weighted median over a 61 minute window of trade data. The 16:00 ET end of day rate is subject to human review.

Index licensees may select to utilize and reference an alternate hourly CM Reference Rate for the end of day price of their product, that may not be subject to human review.

7.6 Calculation and Pricing Disruptions

7.6.1 Real-Time Index Calculation

The CM Real-Time Reference Rates Methodology outlines management of special situations where data is delayed, missing, or unavailable due to periods of illiquidity, extraordinary market circumstances, or outside factors beyond the control of Coin Metrics.

7.6.2 End of Day Index Calculation

The CM Reference Rates Methodology outlines management of special situations where data is delayed, missing, or unavailable due to periods of illiquidity, extraordinary market circumstances, or outside factors beyond the control of Coin Metrics.

7.7 Unexpected Exchange Closures

For information on the treatment of unexpected exchange closures, please refer to the CMBI Policy Documentation.

7.8 Treatment of Forks

For detailed information on the treatment of forks, please refer to the CMBI Fork Legitimacy Policies. Coin Metrics do not deem airdrops as eligible for a liquidation event in any CMBI index.

7.9 Index Contingency

7.9.1 Intra Month Asset Removals

Between monthly rebalances, under exceptional circumstances a cryptoasset can be removed from the index due to network events such as protocol hacks, 51% network attacks, significant blockchain reorganizations or exchange delistings. Such removals are necessary to protect the integrity of the index. At the time of removal, the value of the asset will be held in cash until the next index rebalance.

7.9.2 Intra Month Asset Addition

Between monthly rebalances, a cryptoasset can be added to an index only in the case of a contested hard fork that results in multiple cryptoassets or an airdrop. In these scenarios, if the forked asset meets our eligibility criteria it will be added to the index that the parent asset is a constituent of. During the following rebalance period, the new asset will undergo the eligibility testing as defined in *Section 3* to determine its eligibility in the CMBI asset universe.

7.9.3 Delayed Forked Asset Addition

In the instance where a forked or airdropped asset is not added to the relevant CMBI index intra month due to failing to meet eligibility criteria, the new asset will be monitored for up to 12 months to determine if a 'liquidation value dividend' event is warranted. If during the 12 month period the new asset meets the above criteria, the Oversight Committee will determine if the asset is to be credited to the index that the parent asset was a constituent of at the time of the event. The 'liquidation value dividend' will be calculated from the closing price on the rebalance reference date following the first date on which the asset met the required fork eligibility, as defined in the [CMBI Fork Legitimacy Policy](#).

7.10 Record Retention

For information on record retention, please refer to the CMBI Policy Documentation.

7.11 Material Changes or Termination

For information on material changes to indexes or termination of indexes, please refer to the CMBI Policy Documentation.

7.12 Conflicts of Interest

For information on Conflicts of Interest, please refer to the Coin Metrics Conflicts of Interest Policy.

7.13 Complaints

Complaints about the calculation methodology of the Indexes or the price of a CMBI product should be submitted in writing to cmbi@coinmetrics.io. Coin Metrics will investigate any complaints and respond to the complainant in a fair and timely manner. Any investigation of the complaint will adhere to the following procedures:

1. The personnel receiving and investigating the complaint will be independent of any personnel who may have been involved in the subject of the complaint.
2. All records and documents submitted by the complainant and related to the investigation into the complaint will be retained for a period of at least five years and submitted to the Oversight Committee for review.

7.14 Internal Audit

The Oversight Committee may appoint an independent internal auditor to review the CMBI product's adherence to its stated methodology, compliance with policies, and adherence to the IOSCO's Principles of Financial Benchmarks.

7.15 Internal Controls

Coin Metrics has implemented internal controls to protect the integrity of CMBI products. These controls cover the selection of input data sources, the collection of data from input data sources, and maintaining the integrity of collected data. Staff involved with the design, calculation and dissemination of Indexes have been trained in the proper usage of the data and maintain proper segregation of responsibilities. Any exercise of non-standard procedures is subject to dual approval by staff members, and is logged and reported to the Oversight Committee which periodically reviews any incidents. In addition, Coin Metrics maintains a whistleblowing mechanism to facilitate the reporting of any potential misconduct.