TALOS

CMBI Mining Series Methodology

Version 1.4

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0 Change Log

Release	Date	Changes
Version 1.0	June 9, 2020	Finalized CMBI Mining Series Methodology
Version 1.1	October 2, 2023	Annual Methodology Review
Version 1.2	September 23, 2024	Annual Methodology Review
Version 1.3	September 18, 2025	Annual Methodology Review
Version 1.4	August 6, 2026	Annual Methodology Review Corporate rebrand from Coin Metrics to Talos applied to actor references, committee names and the copyright line. Copyright year corrected from 2024 to 2026. Re-produced as an editable Word document with the calculation algorithms rebuilt as native equations and a generated table of contents. No changes to index construction, eligibility criteria, calculation or index policy.

1 Introduction

Talos' 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, Talos 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 the performance of the largest and most utilized global cryptoassets. CMBI products are administered and calculated by Talos and are designed to serve as an independent, transparent, and comprehensive measure of cryptoasset market performance.

One of the key participants in the cryptoasset ecosystem is the miner community. Miners are responsible for providing computing power to process transactions and propagate blocks through the network. Further, hash rate is not only relevant to the mining community but is a critical contributor to the security and robustness of the Bitcoin network. As such, every party with exposure to the asset class has an indirect interest and economic exposure to the hash rate.

The amount of computing power allocated to a cryptoasset's network can be and is often

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highly variable, exposing the mining community to unpredictable profit margins that can potentially impact Bitcoin's security model. Whilst many of the costs of mining are manageable and well understood (such as hardware, electricity, and employment), the revenue (number of Bitcoin mined and the price of Bitcoin) is highly unpredictable, volatile and dependent on external market factors.

The CMBI Hash Rate and Observed Work (collectively the "CMBI Mining Series") described herein have been designed to utilize robust and resilient methodologies that are resistant to manipulation and adhere to international best practices for financial benchmarks, including the International Organization of Securities Commissions' (IOSCO) Principles for Financial Benchmarks. The Talos Oversight Committee (the "Oversight Committee") protects the integrity of CMBI and ensures the indexes serve as a source of transparent and independent benchmarking.

This document is intended to be read in conjunction with other Talos documentation that informs the data inputs. These include the CM Network Data Pro File Spec and the CM Network Data Pro Encyclopedia.

2 Description

Given the early stages and financial immaturity of the cryptoasset market, there are currently insufficient trading infrastructure and tools for participants in the cryptoasset ecosystem to hedge the exposure they have from their operational activities.

This has been the driving factor behind the design of many CMBI products and the methodology outlined below so as to create a suite of investable indexes. As the ecosystem evolves and becomes more sophisticated, it may be deemed that other indexes become investable.

CMBI Mining Series are calculated retrospectively based on the implied hash rate that has been contributed to a cryptoasset's network. CMBI Hash Rate is reflective of the amount of computational power that miners contribute to the network, whilst CMBI Observed Work is representative of the work conducted by miners over the previous 24 hours.

Index levels are quoted every 5 seconds ("real-time").

CMBI Mining Series end of day levels will represent the real-time level at 12:00PM ET daily.

- Given the volatility of hash rate, CMBI Hash Rate close levels will represent the implied hash rate of a network at a point in time.
- The CMBI Observed Work close level will reflect the work that has been conducted within a decentralized proof-of-work protocol over the previous 24

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hours.

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

3 Eligibility Criteria

The sole criterion to be included as a constituent in any specific CMBI Hash Rate universe is that the hash rate contributes to the mining of the underlying cryptoasset of the designated index.

3.1 Bitcoin Miner Index Eligibility

3.1.1 CMBI Bitcoin Hash Rate

The eligible universe is represented by the implied hash rate that is contributed to producing Bitcoin (BTC) blocks at a given point in time. All other digital assets' implied hash rates that do not contribute to the Bitcoin protocol are excluded.

3.1.2 CMBI Bitcoin Observed Work

The eligible universe is represented by the implied hash rate as determined by the CMBI Bitcoin Hash Rate. All other determinations of Bitcoin's or other digital asset's implied hash rates are excluded.

4 Index Construction and Maintenance

4.1 Approach

Cryptoasset transactions and blocks are created 24 hours a day, 7 days a week, 365 days a year. As such, CMBI Mining Series real-time levels will be calculated 24 hours a day, 7 days a week, 365 days a year.

CMBI Mining Series will have one official close, that is subject to human review, daily at 12:00PM ET.

4.2 CMBI Hash Rate

The actual hash rate that is being contributed to a proof-of-work cryptoasset ecosystem cannot be easily verified without understanding the computing power being contributed by every large and small miner that is attempting to solve for blocks. As such, the implied hash rate is derived from the time taken for miners to propagate a valid block.

4.3 CMBI Observed Work

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The work that is being conducted on a proof-of-work cryptoasset cannot be easily verified without understanding the number of hashes being produced by every large and small miner that is attempting to solve for blocks. As such, Talos uses the 48-hour implied hash rate as a proxy for the number of hashes being conducted on a cryptoasset's network at a point in time.

4.4 Currency of Calculation

CMBI Bitcoin Hash Rate is quoted in petahashes per second.

CMBI Bitcoin Observed Work is quoted in petahashes per day (24-hours).

For real-time index determination, CM Network Data Pro, Block-by-Block miner reported timestamp data is used.

4.5 Historical Availability and Base Values

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

Name	Ticker	Return Type	Launch Date	First Value Date	Base Date	Base Value (petahashes)
CMBI Bitcoin Hash Rate	CMBIHASH	NA	2020-06-01	2015-01-01	2015-01-01	310.11
CMBI Bitcoin Observed Work	CMBIWORK	NA	2020-06-01	2015-01-02	2015-01-02	27,863,224.10

First value dates precede the launch date because index history prior to June 1, 2020 is backtested rather than live. **[Confirm whether a backtested-history disclosure should be added here]**.

4.6 Calculation Algorithm

The calculation algorithm of the hash rate index is described below.

4.6.1 CMBI Bitcoin Hash Rate Calculation

The CMBI Bitcoin Hash Rate level is calculated as follows:

$$Index\ Level_t = \frac{(BTC\ Difficulty_t) \times \frac{BTC\ Blocks\ Produced_t}{BTC\ Blocks\ Expected_t} \times Scaling\ Factor}{Index\ Divisor} \quad (1)$$

Where,

- Index Level$_t$ = Index level at time t
- BTC Difficulty$_t$ = CM Network Data Bitcoin Difficulty at time t
- BTC Blocks Produced$_t$ = Bitcoin blocks produced in the 48 hour period prior to time t

- BTC Blocks Expected$_t$ = Bitcoin blocks expected in the 48 hour period prior to time t

$$Scaling\ Factor\ =\ \frac{2^{32}}{10^{12}\times 600} \tag{2}$$

The Index Divisor is calculated as follows:

$$Index\ Divisor_0\ =\ \frac{(BTC\ Difficulty_0)\times\frac{BTC\ Blocks\ Produced_0}{BTC\ Blocks\ Expected_0}\times Scaling\ Factor}{Base\ Level} \tag{3}$$

Where,

- Index Divisor$_0$ = Index Divisor at Base Date
- BTC Difficulty$_0$ = CM Network Data Bitcoin Difficulty on Base Date
- BTC Blocks Produced$_0$ = Bitcoin blocks produced in the 48 hour period prior to Base Date
- BTC Blocks Expected$_0$ = Bitcoin blocks expected in the 48 hour period prior to Base Date
- Scaling Factor = 2^{32} / (10^{12} × 600)

4.6.2 CMBI Bitcoin Observed Work Calculation

The CMBI Bitcoin Observed Work level is calculated as follows:

$$Index\ Level_t\ =\ \sum_{x=t-17280}^{t}(CMBI\ Bitcoin\ Hash\ Rate\ Level_x)\times 5\ seconds \tag{4}$$

Where,

- Index Level$_t$ = Index level at time t
- CMBI Bitcoin Hash Rate Level$_x$ = CMBI Bitcoin Hash Rate level at time x

5 Index Data

5.1 Data Sources

CMBI utilizes Talos products as a means of constructing and calculating indexes for CMBI on-chain data products.

CMBI specifically leverages CM Network Data to source relevant information for the determination of CMBI Mining Series. Talos aggregates on-chain data that is sourced from internally owned and operated nodes that are stored in global locations to ensure multiple

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redundancies and up-time.

Real-time on-chain input data for CMBI products is sourced from Talos Network Data. Refer to the CM Network Data Encyclopedia for more information.

6 Index Governance

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

6.1 Administration

Talos 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 Talos; however, Talos relies on a few third party agreements to obtain data inputs for index calculation.

Talos 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 Talos.

6.2 Index Committees

6.2.1 Talos 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 Talos Governance Committee Charter.

6.2.2 Talos Index Committee

The Index Committee maintains all CMBI Mining Series. Committee members are Talos 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 Mining Series, the Index Committee reserves the right to apply exceptions and make expert judgments 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

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this document or supplemental documents, clients will receive sufficient notice when possible.

At a minimum, the Index Committee will review the CMBI Mining Series Methodology annually to ensure that indexes that follow the process and policies stated within this document continue to achieve their stated objectives.

Talos 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 judgment, 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, Talos 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 Talos product announcements page.

7.2 Holiday Schedule

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

A member of the Talos Index Committee will be readily available to review end of day index levels (as defined in Section 7.5 End of Day Levels) 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 Levels

Real-time index levels will be produced at 5-second intervals. At each interval, CM Network Data Block-by-Block will produce the difficulty and block production information required to

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inform index level determination. Real-time index levels are provided 24 hours a day, 7 days a week, 365 days a year.

7.5 End of Day Levels

Real-time levels are produced every 5 seconds. The end of day index level for each of the indexes reflects the real-time level of the respective index at 12:00PM ET. A member of the Talos Index Committee will be readily available to review the 12:00PM ET end of day index level on business days, Monday to Friday, except for holidays as defined by the New York Stock Exchange (NYSE) holidays and trading hours calendar.

Index licensees may select to utilize and reference an alternate hourly CMBI Mining Series level for the end of day price of their product, that may not be subject to review from a Talos Index Committee member at the time of close.

7.6 Calculation and Pricing Disruptions

Real-time or end of day index values may be recalculated and restated at the discretion of the Index Manager and / or Index Committee. As part of the decision, the Index Manager and/or Index Committee will consider any potential market impact(s) that may arise as a result of the restatement, and may choose to consult index licensees and market participants to inform their decision.

7.6.1 Real-Time Index Calculation

Talos reserves the right to recalculate real-time index levels where data is delayed, missing, or unavailable due to node interruptions, data center connectivity issues, data quality issues, or outside factors beyond the control of Talos.

7.6.2 End of Day Index Calculation

Talos reserves the right to recalculate end of day index levels where data is delayed, missing, or unavailable due to node interruptions, data center connectivity issues, data quality issues, or outside factors beyond the control of Talos.

Incorrectly calculated closing prices are generally corrected and restated.

7.7 Record Retention

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

7.8 Material Changes or Termination

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

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7.9 Conflicts of Interest

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

7.10 Complaints

Complaints about the calculation methodology of the Indexes or the price of a CMBI product should be submitted in writing to cmbi-support@coinmetrics.io. Talos 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.

7.11 Internal Audit

The Oversight Committee appoints 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 for Financial Benchmarks. The frequency of the independent internal audit is once annually.

7.12 Internal Controls

Talos 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, Talos maintains a whistleblowing mechanism to facilitate the reporting of any potential misconduct.

8 Contact Information

Address	Contact
Talos 228 Park Ave. S., Suite 21958 New York, NY 10003-1502	Contact: Head of Product, Indexes Web: www.coinmetrics.io Phone: +1 (617)927 9050 Email: cmbi@coinmetrics.io

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Appendix A Open Items in This Draft

The items below are marked in green brackets in the body text and require a decision or a confirmed fact before publication. A.1, A.5 and A.6 are common to the Total Market and Multi Asset methodologies and should be resolved identically across the suite. A.8, A.9 and A.10 are specific to this document and were identified during this review rather than carried forward.

Ref	Section	Item	Owner
A.3	§1, §5.1	Post-rebrand titles of the referenced input documents. Note §1 cites the "CM Network Data Pro Encyclopedia" and §5.1 the "CM Network Data Encyclopedia" — one document under two names.	Index Team
A.6	§7.10, §8	Index support email address, and confirmation of the telephone number and postal address.	Index Team
A.7	Cover / footer	Legal entity name. The footer reads "Talos, Inc.", consistent with Multi Asset v1.5, Total Market v1.5 and Adjusted Free Float v1.4. The talos.com footer and the Talos Exchange Scorecard disclaimer use "Talos Global, Inc."	Legal and Compliance

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