CMBI Mining Series Methodology

Version 1.1

Last Revised: October 2, 2023

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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 cryptoasset market performance.

Indexes are weighted and calculated using a robust and resilient methodology that is resistant to manipulation and adheres to 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 CMBI and ensures the indexes serve as a source of transparent and independent benchmarking.

1.1 Description

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.

Detailed index data is provided to licensees of CMBI Mining Series products.

1.2 Administration

Coin Metrics serves as the administrator for CMBI products and has primary responsibility for all aspects of the index construction process, including development, definition, determination, dissemination, operation, and governance. All aspects of index production are carried out by Coin Metrics; however, Coin Metrics may rely on 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.

2 Other Documents

The CMBI Indexes are collectively governed by policies described in CMBI Index Policies, which outline the administration, oversight, conflicts of interest, significant changes and terminations, recalculations, internal controls, complaints, record retention, and compliance policies.

The CMBI Indexes are supervised by the CMBI Governance Committee Charter, which defines the roles and responsibilities of the Oversight Committee and the Index Committee.

3 Data Inputs

3.1 Coin Metrics Network Data

The CMBI Mining Series sources Block Difficulty from CM Network Data. Refer to the CM Network Data Encyclopedia for more information.

3.2 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.

4 Index Calculation Methodology

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

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, Coin Metrics 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 Calculation Algorithm

4.4.1 CMBI Bitcoin Hash Rate Calculation

The Bitcoin Hash Rate level is calculated as follows:

$$IndexLevel_t = \frac{Difficulty_t * \frac{BlocksProd_t}{BlocksExp_t} * \alpha}{IndexDivisor_t} \quad (1)$$

Where,

$IndexLevel_t =$ Index level at time *t*

$Difficulty_t =$ CM Block Difficulty at time *t*

$BlocksProd_t =$ Bitcoin blocks produced in the 48-hour period prior to time *t*

$BlocksExp_t =$ Bitcoin blocks expected in the 48-hour period prior to time *t*

$\alpha = \frac{2^{32}}{10^{12} * 600}$, the scaling factor

4.4.2 CMBI Bitcoin Observed Work Calculation

The Bitcoin Observed Work level is calculated as follows:

$$IndexLevel_t = \sum_{t-17280}^{t} (CMBIHASH)_t * 5\ seconds \tag{2}$$

Where,

$IndexLevel_t =$ Index level at time *t*

$CMBIHASH_t =$ CMBI Bitcoin Hash Rate level at time *t*

5 Appendix A: Coverage Universe

The following table lists the current coverage universe.

Index Name	Index Ticker
CMBI Bitcoin Hash Rate	CMBIHASH
CMBI Bitcoin Observed Work	CMBIWORK

6 Change Log

1. **Version 1.1 on October 2, 2023**: Annual Methodology Review.
2. **Version 1.0 on June 9, 2020**: Finalized CMBI Mining Series Methodology.