

BNC : : BMVI

BNC Maker Vault Index

Index Methodology

Version history

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1	2020-26-11	Initial methodology

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1. Introduction

Distributed Ledger Technology (Blockchain) is at the center of the revolution in financial technology and has the potential to cause a large number of sectors, including financial services, peer-to-peer (P2P) and peer-to-pool lending, to change dramatically.

The vital favorable position of utilising blockchain innovation in P2P lending is that it can eliminate intermediaries from the lending process instead of using a conventional bank as an intermediary. The crypto P2P lending markets are already disrupting traditional providers of debt by providing investors an attractive and stable stream of passive income.

One of the largest decentralized applications (dApps) on the Ethereum blockchain providing crypto lending services and gaining significant market share is the Maker Protocol. The Maker Protocol is governed by MakerDAO, an open-source project and a Decentralized Autonomous Organization that was created in 2014.

The Maker Protocol smart contracts that facilitate borrowing and lending are managed by individuals around the world who hold its governance token, MKR. MKR holders govern the Protocol and the financial risks of Dai to ensure its stability, transparency, and efficiency.

The DAI stablecoin is a decentralized, unbiased, collateral-backed cryptocurrency that is algorithmically soft-pegged to the US Dollar and is not issued or administered by any centralized actor, trusted intermediary or counterparty. Users generate DAI by depositing collateral assets into Maker Vaults and destroy DAI when repaying their generated DAI balance.

The Maker Vault Index is a rules-based sector index designed to measure the growth of crypto assets used as collateral and locked in the Maker Vaults.

In the context of the BNC BMVI, the term "Maker Vault" refers to assets available and vetted by the MakerDAO governance body. For a new token to be added to the protocol, it needs to be accepted by the decentralized governance body of MakerDAO. This is done via Executive Voting, Governance Polling, and ensures that 'unstable' crypto-assets cannot be used in the DAI ecosystem.

This institutional-grade index product tracks the market performance of the **8** largest crypto assets in the Maker Vaults at a sub-second frequency. The constituent asset weightings are rebalanced every **three** months based on free float market capitalization with capped at a maximum constituent weight of **25%**.

The index is owned and administered by Brave New Coin under the principles:

Representative	The index should closely follow the target market and represent an adequate sample.
Transparent	The index should be transparent in its design and reproducible in its calculation.
Timely	The index should be computed as frequently as necessary to reflect price changes in the constituent assets.
Robust	The index should be robust to disruptions such as erroneous data or pricing source outages, and be resistant to manipulation.

2. Constituent Assets

2.1 Sector Criteria

For an asset to be considered for the BNC BMVI Index, it must satisfy the following requirements:

Criteria	Details
• Token Standard	Token must be compliant to the Ethereum ERC-20 standard
• Maker Vaults	<ul style="list-style-type: none"> • The token must be included in a Maker Vault. • A Maker Vault is a tool that lets the owner deposit collateral and generate DAI. For a new token to be added to the Maker Protocol Vaults, it needs to be accepted by the decentralized governance body of MakerDAO. This is done via Executive Voting, Governance Polling, and ensures that 'unstable' crypto-assets cannot be used in the DAI ecosystem.
• Counterparty Risk	No need to trust a centralised third-party to custody funds or validate transactions.
• Open Source	Users can develop on or modify the code
• Programmable	Smart contracts can be coded for a specific task and self execute
• Interoperable	Combine different protocols or build on top of other Layer 2 solutions
• Particular exclusions	The index does not consider:

	<ul style="list-style-type: none"> • Native crypto assets including Bitcoin and Ethereum • Privacy-centric tokens • Stablecoins pegged to FIAT currencies <p>as defined by the <i>BNC General Taxonomy for Cryptographic Assets</i>.</p>
<ul style="list-style-type: none"> • Investor Spread 	<ul style="list-style-type: none"> • Tokens are held by “members of the public” that represent at least 20% of the tokens on issue. Therefore, at least 20% of the total supply must be part of the free float supply. For a further breakdown see section 4.4 • Tokens also must be distributed over at least 500 wallet addresses.

The above criteria are maintained within BNC’s *General Taxonomy for Cryptographic Assets* by the BNC Research team. This is a uniform classification system for cryptographic assets spanning over 65 different qualitative data points including sectors, blockchain features and regulatory requirements. Find more information [here](#).

2.2 Constituent Asset Criteria

The above criteria are in addition to BNC’s standard asset criteria. These act to ensure index constituents, and their price indices, will be lasting and stable.

Criteria	Details
1. Coverage	Have active tradable markets listed on at-least 3 eligible pricing sources, across 4 markets, for the last 30 days.
2. Liquidity	Have an average daily trading volume that exceeded \$2 million USD across the eligible pricing sources and markets, for the last 30 days.
3. Data Availability	Access to supply and free-float data.

The assets that meet all of these criteria form the ‘eligible pool’. Prior to rebalancing, this list of assets is updated by the index governance committee and published via BNC communication channels. On ‘Weight Day’ (see section 4.1), asset constituents are selected from this list of eligible assets.

3. Index Calculation

Publication of the index is not at regular time intervals. Rather index calculation is triggered by changes in the price of its constituent assets, which could occur multiple times per second. The index level at time t , is calculated as:

$$index_t = \frac{\sum_{c=1}^C (P_{c,t} \times S_{c,p} \times CF_{c,p})}{\sum_{c=1}^C (P_{c,t-1} \times S_{c,p} \times CF_{c,p})} \times index_{t-1}$$

Where:

$P_{c,t}$ = the USD denominated price of constituent c at time t . Constituent pricing is sourced from BNC's *High Frequency Pricing* (HFP) service (section 5.3)

$S_{c,p}$ = the free float supply of constituent c for period p . Constituent free float supply is calculated by BNC Research (section 4.4)

$CF_{c,p}$ = the capping factor of constituent c for period p (section 4.3)

C = the number of constituents in the basket

$index_{t-1}$ = previous index level

The formula is derived from the widely used "base-weighted aggregative" or 'divisor' method for calculating market capitalisation weighted indices. These compare the current market value (the numerator) to some base market value (denominator) and multiply by the base index value. The base market value and base index value are often combined into a 'divisor'.

$$index_t = \frac{\sum_{c=1}^C (P_{c,t} \times S_{c,p} \times CF_{c,p})}{\sum_{c=1}^C (P_{c,0} \times S_{c,0} \times CF_{c,0})} \times index_0$$

Instead of using a base value that is set at the start of the quarter, our formula uses the previous state for comparison. This reduces the algorithm complexity during rebalancing to remove any disruption and maintain milli-second accuracy.

4. Reconstitution & Rebalancing

The index is reconstituted and rebalanced quarterly on the first Wednesday of February, May, August and November.

4.1 Schedule

- Eligibility Day: After review, assets eligible for inclusion at the next rebalancing are announced, 7 days prior to the *Weight Day*.
- Weight Day: constituent weights are computed and disclosed, 7 days prior to *Implementation Day*.
- Implementation Day: Updated weightings are implemented into index computation on the second Tuesday of the rebalancing month, at 8:00 am UTC.

4.2 Weighting

Free float market capitalization (measured in USD) is used to determine the uncapped weights of each underlying asset. Asset weighting is set at the beginning of each quarter and will remain constant throughout the quarter. Once these uncapped weights are found, the capping process is performed to determine capped weights and capping factors for each constituent. Constituent weightings are computed 5 days before.

4.3 Capping

Asset constituents are capped to a weight of 25%. If any constituents's uncapped weight (free-float market capitalization percentage) is greater than this cap, its weight is set to the cap and the excess weight is distributed proportionally to the other constituents. The capping factor $CF_{c,p}$ of constituent c for period p , is then calculated as:

$$CF_{c,p} = \frac{\text{uncapped weight}_{c,p}}{\text{capped weight}_{c,p}}$$

4.4 Free Float Supply

Constituent selection and weightings are reliant on accurate free-float supply data. Free-float supply represents the assets available to trade, and is calculated as total supply minus non-circulating supply. Examples of non-circulating supply are tokens that have been locked or burned, tokens in a community or founders reserve or those held in a corporate treasury.

Crypto assets have various distribution models and supply metrics. BNC operates and maintains multiple blockchain nodes and infrastructure for all major blockchains in the crypto space. Using this data, we are able to analyse and classify individual transactions, wallets, and entities in order to arrive at a true value for supply.

Once analysis and classification has been completed on transactions and supply movements for a cryptocurrency, a list of wallet addresses and balances are generated which can be subtracted from the total supply in order to compute the free-float supply.

5. Asset Pricing

The constituent assets are priced using BNC's High Frequency Pricing (BNC::HFP) service, which calculates cryptocurrency price indices in real time from the orderbooks of approved pricing sources. Where other BNC price indices rely on executed transactions (trades), due to its high frequency of calculation the HFP service uses only executable transactions (bids and asks).

See the full methodology for BNC High Frequency Pricing [here](#)¹.

5.1 Eligible Pricing Sources

To ensure transactions used in Brave New Coin pricing and indices are formed by the competitive forces of supply and demand, particular attention is applied to the quality of exchange venues from which these transactions are sourced. Qualified pricing sources must demonstrate the existence of an active market, consisting exclusively of bona fide, arms-length transactions.

Criteria
Compliance Show compliance with applicable laws and regulations, including but not limited to client money custody, anti-money-laundering (AML), know-your-customer (KYC) and money transmission regulations.
Trade Surveillance Transparent policies and evidence, such as a 'trading rulebook' and trade surveillance systems that monitor transactions for market manipulation or fraud, and prevent illegal trading practices.
Operations Exhibit a track record of uninterrupted customer deposits & withdrawals, identity verifications, wire transfers & payment methods, wallet maintenance, network upgrades and connectivity issues.
Transparent Data Provision Provide a stable REST and web-socket API for live and historical ticker, raw gapless trades and unaggregated order book data. Proof of solvency or reserves of hot and cold wallet addresses is also required to determine solvency.
Arms-length transactions Show no evidence of wash-trading. This criteria is determined using in-spread & volume sensitivity analysis. Qualified pricing sources must claim some 'cost-to-trade'; for example trading fees; and not employ any trade mining schemes or like practises.

Given that our pricing sources are third-party organizations operating in a volatile marketplace, the Index Governance Committee reviews its pricing sources quarterly to ensure adherence to the above criteria. Orders (bids and offers) are collected from pricing sources in real-time via a secure web-socket subscription. The index does not rely on submission

¹ BNC High Frequency Pricing Methodology: <https://bravenewcoin.com/insights/bnc-high-frequency-pricing-methodology>

5.2 Reference Assets

After the eligible pricing sources have been selected, only markets on these exchanges which are quoted by one of the below reference assets can be used as inputs to our price indices.

Ticker	Name
USD *	United States Dollar
BTC	Bitcoin
ETH	Ethereum
USDT	Tether (USD)

* preferred

6. Governance

6.1 Index Oversight Committee

The BNC Index Governance Committee is responsible for the oversight and transparency of all aspects relating to the provision of benchmarks administered by Brave New Coin Limited.

The primary function of the Governance Committee is to maintain orderly index calculation and management, and to undertake regular review of the methodology to ensure that the index and any modifications satisfy customer needs and comply with applicable regulatory requirements.

The Governance Committee is composed of five voting members with appropriate experience to provide effective review of the processes and procedures related to the creation and management of derivative indices.

6.2 Periodic Review

The BNC Index Governance Committee meets bi-monthly to perform review procedures and ensure sustained and adequate representation of the interest being measured.

Review procedures undertaken at periodic meetings include but are not limited to:

- a. Scoping potential markets for inclusion or exclusion.
- b. The acceptance of reconstituted and rebalanced asset weights, as well as any additions / deletions.
- c. Review benchmark error logs
- d. Motion material methodology changes or advise investigation where a methodology change is required.
- e. Summarise pricing source incidents, for example outages or transaction delays, wire transfers issues, wallet maintenance, withdrawal & deposits issues or security concerns.
- f. Update relevant eligibility criteria concerning pricing sources.

Brave New Coin (BNC) is a leading provider of market data services (aggregated pricing) and institutional grade indices (proprietary and bespoke) that are designed to track the most liquid areas of the cryptocurrency markets. Founded in 2014, BNC has built a strong reputation for independence, objectivity, robust processes and technical innovation.

For further information on BNC Indices please visit bravenewcoin.com.