TALOS

CMBI Fork Legitimacy Framework

Version 1.5

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0 Change Log

Release	Date	Changes
Version 1.0	December 12, 2019	Finalized CMBI Fork Legitimacy Methodology
Version 1.1	October 6, 2023	Annual Methodology Review
Version 1.2	October 18, 2023	Renamed to "Fork Legitimacy Framework"
Version 1.3	September 23, 2024	Annual Methodology Review
Version 1.4	September 18, 2025	Annual Methodology Review
Version 1.5	July 22, 2026	Annual Methodology Review; updated entity references from Coin Metrics to Talos

1 Introduction

Cryptoasset networks operate programmatically, where transaction validity is determined by the underlying code upon which the blockchain runs. This code is governed by a set of "consensus rules". There are two types of forks that cryptoassets can undergo:

1. If a change in consensus rules does not require nodes to implement software changes in order to be compatible with the new set of rules (i.e. backwards compatibility), this is known as a soft fork.

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2. If a change in consensus rules requires nodes to implement new software in order to remain compatible with the new set of rules, this is known as a hard fork.

This framework only considers forks of cryptoassets with Proof-of-Work consensus mechanisms.

1.1 Soft Forks

Due to the backwards compatibility of soft forks, there is no effect to the integrity of benchmarks as there is no new asset creation during this process.

1.2 Hard Forks

During a change in consensus rules that results in a hard fork, nodes which continue to operate under the previous software are not backwards compatible with the new software, thus the network becomes susceptible to a split, where two versions begin to operate from the moment of the consensus rule change. If any network participants continue to run the previous version of the blockchain's software, a new blockchain with its own native token will be created.

1.3 Proof-of-Staking Forks

Forks of cryptoassets using Proof-of-Stake consensus mechanisms are outside the scope of the quantitative criteria in this framework. Should a Proof-of-Stake fork require evaluation, the Oversight Committee will apply expert judgment in place of Sections 3.1–3.2

1.4 Talos Role in Fork Determination

Talos' mission is to provide transparent and actionable cryptoasset market and network (on-chain) data. With the availability of this data, Talos is uniquely positioned to provide an independent framework for determining the legitimacy of a forked asset.

Often compared to corporate actions in traditional equities, within the crypto ecosystem, forking results in the creation of a new asset that is credited to all holders of the main asset upon which it forked from.

This document is intended to be read in conjunction with other Talos methodologies and documentation that inform the data inputs. These include:

- CM Prices Methodology
- Network Data Metrics in the CM Data Encyclopedia

2 Hard Fork Identification

Most hard forks are well-known and well-advertised far in advance of occurring. In these scenarios, proposed consensus rule changes are communicated within the network's community so that network participants can ingest the relevant information, debate the pros and cons and come to an informed decision as to which set of rules they choose to operate under going

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forward. However, some hard forks can happen with short notice when a faction within a community performs a coup-like attack on the network, or if a critical network event occurs that requires swift action but cannot garner full participant buy-in prior to the fork.

A hard fork is deemed to have occurred if:

1. Two or more distinct blockchains with their own clients are in existence post-fork.

2. Each blockchain shares the same pre-fork blockchain history.

3. Native tokens on each chain are distinct assets and are not interchangeable.

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3 Fork Legitimacy Criteria

Through analyzing on-chain data and market data, Talos has developed a set of criteria by which a fork could be considered legitimate in the eyes of investors and institutions, thus qualifying for consideration in investment and custodial products.

Cryptoassets will be considered for legitimacy on a monthly basis on the final business day of the month. Cryptoassets will be monitored for up to 12 months after the fork event to determine if a fork is considered legitimate.

As the cryptoasset market is still in the process of maturing, the availability and quality of data is still suboptimal. Exchange data lacks the structure and regulation of traditional markets and network data can be subject to manipulation. As such, fork legitimacy is considered in the broader context of both market data and network data metrics presented in this document to provide a more robust perspective on adoption and utility.

3.1 Market Data

Talos' exchange coverage universe consists of 33 exchanges which represent the set of major exchanges where legitimate trading activity takes place. For most exchanges, Talos has every trade since inception of the exchange, but a handful of exchanges do not allow users to query historical trade data. For these exchanges, the data from the exchange begins at the time that Talos began collection. For information on exchange trade availability, refer to the Appendix (Section 5), or the Talos Coverage webpage.

3.1.1 Exchange Support

Critically, Talos requires sufficient data from eligible exchanges in order to determine the fair market value of an asset.

Further, exchange support is an important determinant in a fork's success as it signals acceptance by major market participants. At the time of the fork event, each exchange must independently evaluate the legitimacy of a fork and the demand from its customer base. This information allows exchanges to make an informed decision as to whether or not to credit holders of the parent chain with the forked asset and whether they should or should not add new markets where the forked asset can be traded.

Although few exchanges have publicly disclosed their criteria for deciding whether to support a fork, their collective actions can be examined as a measure of overall support among market participants. The direction of causality can be circular in that an asset's degree of acceptance among market participants partially determines whether an exchange will support the asset, and the action of exchanges also determines an asset's degree of acceptance among market participants.

Newly forked blockchain native tokens will pass the Talos exchange support criteria if there is support from:

1. At least one market on three different exchanges in Talos' exchange coverage universe.
2. At least one exchange with a grade of B or above from the Talos Exchange Scorecard.

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3.1.2 Price

The price and market capitalization of an asset are an important indicator of fork acceptance by market participants (under the assumption that markets are semi-efficient). However, as a consequence of the maturing market, events related to price anomalies, order book quote stuffing, price manipulation, large spreads between markets, and flash crashes can still regularly be observed. This methodology overcomes many of these issues as described below.

Since forks can happen during various market regimes and the size of cryptocurrency assets continue to grow, the price of forked asset as a percent of the price of the parent chain asset is examined. Price is calculated using CM Reference Rates, an independent and accurate price using a robust methodology that is resistant to manipulation. The CM Reference Rates use a market whitelisting approach in which markets are scored using a systematic framework and only the highest scoring markets are selected to serve as sources of input data. This is particularly important in the early stages of a new asset where large spreads between exchanges can be observed.

Historical data demonstrates that forked asset liquidity is often sparse following the fork event, resulting in a volatile period of price discovery in the following weeks. As such, price mechanics of the forked asset relative to the parent chain are assessed over a minimum period of 30 days, or longer if the 7-day volatility is still above 7.5%. By regarding the ratio of the forked asset to the parent chain asset, we remove market-wide volatility against fiat currency.

Newly forked blockchain native tokens will pass the Talos price criteria if the native token trades on whitelisted exchanges with the following characteristics:

1. A new native token will only be considered eligible once its 7-day price volatility (where the price is quoted in units of the parent chain) remains less than 7.5% for 30 consecutive days.

2. The price of the new native token must remain at least 10% of the price of the native token on the parent chain for 30 consecutive days. This assumes that the fork resulted in a 1:1 issuance. If another ratio is observed, the criteria is adjusted accordingly (e.g. 1:2 would require a 5% ratio between new token price and previous chain token price).

3.1.3 Volume

Trade volume of a forked asset can signify its adoption by traders and the cryptoasset community. As a result, supporters of a new fork are especially incentivized to artificially generate market activity early on in a fork's existence to provide the market with the perception of adoption.

The primary mechanism of volume manipulation is the systematic presence of wash trading on certain exchanges. To soften the impact of this, the ratio of forked asset traded volume with parent asset traded volume is assessed across all Talos eligible exchanges. For information on the eligible exchanges, refer to the Appendix (Section 5).

Newly forked blockchain native tokens will pass the Talos volume criteria if the native token trades on eligible exchanges with the following characteristics:

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1. The volume of the new native token must remain at least 10% of the volume of the native token from the parent chain for 30 consecutive days.

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3.2 Network Data

Talos' network data records all the operational and economic activity occurring on a crypto network that can be observed by running a full node.

3.2.1 Fork Uptake

Fork uptake is a measure of the number of native units that appear active on the newly forked blockchain from the time of the fork, making it uniquely resistant to manipulation. Here, activated is defined as being sent to an address post a fork event. This measure demonstrates how many owners of the parent chain are choosing to "activate" their newly forked native units to either unlock their utility or to sell them.

Assuming the parent chain has a sufficiently diluted ownership structure, this metric represents a gold standard for measuring adoption and use by the community, and is relatively resistant to manipulation. A small group of committed actors cannot force owners to claim their forked asset.

Newly forked blockchain native tokens will pass the Talos fork uptake criteria if it meets the following definition:

1. The fork uptake of the new native token must exceed 10% of the supply of the native token from the parent chain at the time of the fork.

3.2.2 Hash Rate

Hash rate is also relatively resistant to manipulation because mining equipment is a scarce asset that incurs high variable costs in the form of electricity. Miner market share is widely distributed, however, there is the presence of significant participants who have an outsized impact. Hash rate is an important metric to examine because it reflects the consensus of miners, an important stakeholder in the ecosystem and a powerful arbiter in a forked asset's fate.

The amount of mining directed to a particular chain is, among other things, a function of profitability. Since prices can be volatile early on in a forked assets' life, the hash rate can be similarly volatile. As such it is important to monitor the volatility of hash rate until a time when it seems hashpower has reached an equilibrium and sustainable level.

Newly forked blockchain native tokens will pass the Talos hash rate criteria if it meets the following definition:

1. If the forked asset shares the same consensus algorithm as the parent chain, the hash rate of the forked chain must exceed 10% of the hash rate of the parent chain for 30 consecutive days. If the forked asset uses a different consensus algorithm, this criterion cannot be applied and is ignored.

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3.2.3 Active Addresses

Active addresses measure the number of unique addresses that were either the recipient or originator of a ledger change. Individual addresses are not double-counted if previously active which makes the active addresses moderately resistant to manipulation and is one measure of the amount of activity occurring on a blockchain.

Newly forked blockchain native tokens will pass the Talos active addresses criteria if it meets the following definition:

1. The active addresses of the forked must exceed 3% of the active addresses of the parent chain at the time of the fork for 30 consecutive days.

4 Governance

As fork methodology continues to evolve, blockchain design continues to adapt, data continues to improve, and monitoring tools continue to increase in sophistication, Talos expects to improve the rigorousness of fork monitoring and legitimacy determination.

The Talos Index Committee provides independent oversight for determining the market and network data metrics that can help to inform the legitimacy of a fork. The Talos Index Committee's responsibilities include regular reviews of the Fork Legitimacy Framework, the selection of data sources and data inputs, any uses of expert judgment or non-standard procedures, conflicts of interest, material changes, the addition or termination of metrics and any complaints or questions regarding the indexes from external stakeholders.

4.1 Fork Legitimacy Determination

The Talos Index Committee will meet physically or virtually on the second to last Friday of every month, or as market conditions warrant, to assess forks that have occurred in the previous month and forks that are predicted to occur in the forthcoming month. Based on a review, if a forked asset passes all the eligibility criteria outlined above, the Talos Index Committee will deem a fork legitimate and disseminate this information through relevant channels.

4.2 Timing of Fork Addition to Indexes

Forked assets of CMBI index constituents 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 criteria outlined herein, the Talos Oversight Committee will determine if the asset is to be credited to the index that the parent asset was a member of at the time of the event.

If a forked asset meets all of the eligibility criteria outlined above between the start of a month and the monthly Talos Index Committee meeting (second last Friday of the month), the forked asset will be 'liquidated' during the following month's rebalance. If a forked asset meets all of the eligibility criteria as outlined above between the monthly Talos Index Committee meeting and the end of the month, the forked asset will not be 'liquidated' during the following month's rebalance, but the one after.

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The 'liquidation value dividend' will be based on the closing price (16:00 ET) on the day of rebalancing (first business day of the month).

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4.3 Contentious Hard Forks

Hard forks can be contentious in nature, meaning that there is no agreement as to which of the two or more blockchains and native tokens is the "true" successor to the previously shared blockchain. This can result from the difference in the levels of community support that each new network achieves or a more ideological indifference as to which is truer to the original vision of the blockchain. This can lead to uncertainty for network participants and in extreme scenarios can become hostile in nature.

Where a contentious hard fork can be foreseen, the Talos Index Committee will consult with the Talos Oversight Committee to deliver a report on potential outcomes, a recommendation as to whether or not a benchmark requires suspension from trading around the proposed time of the hard fork and a proposed customer communication plan.

Where a contentious hard fork cannot be foreseen with a reasonable amount of time, the Talos Index Committee may use expert judgment to determine the required actions.

4.3.1 Original Ticker Ownership

During contentious hard forks there may be uncertainty as to which version of the blockchain will continue to carry the previously shared chain's ticker symbol on spot exchanges. Spot exchanges may be uncertain or in disagreement as to which version of the software they will operate post fork, which can impact benchmark determination and result in a temporary suspension of a benchmark until industry consensus and clarity is achieved.

4.3.2 Hostile Hard Forks

In extreme circumstances, forks can be hostile in nature and result in market distortions, hash rate attacks and transaction spoofing. This can impact the determination of legitimacy as particular market data and network data measures are manipulated, highly volatile and misrepresentative of a steady state.

If market data and network data metrics are deemed to be manipulated or not representative of a steady state, Talos will delay judgment on the legitimacy of a fork.

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5 Appendix

5.1 Eligible Exchanges

Exchange Name	Start of Trade Collection Date	Allows Query of Historical Data
balancer_v2	2021-04-22	TRUE
binance	2017-07-13	TRUE
binance.us	2019-09-04	TRUE
bitbank	2017-02-14	TRUE
bitfinex	2013-01-14	TRUE
bitflyer	2019-05-28	FALSE
bitget	2026-01-23	FALSE
bithumb	2013-12-27	FALSE
bitmex	2014-11-22	TRUE
bitstamp	2011-08-18	FALSE
bullish	2023-04-07	FALSE
bybit	2019-10-01	TRUE

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cme	2017-12-17	TRUE
coinbase	2014-12-01	TRUE
coinbase_derivatives	2024-02-26	TRUE
coinbase_international	2024-03-22	TRUE
crypto.com	2022-06-24	FALSE
curve	2020-02-10	TRUE
deribit	2016-11-29	TRUE
dydx	2025-03-13	TRUE
gate.io	2017-09-29	TRUE
gemini	2018-10-16	FALSE
hitbtc	2013-12-27	TRUE
huobi	2019-03-15	FALSE
hyperliquid	2024-03-15	TRUE
itbit	2019-03-13	FALSE
kraken	2013-09-10	FALSE

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kucoin	2020-04-02	FALSE
lbank	2017-09-29	TRUE
lmax	2021-02-18	FALSE
mexc	2022-10-13	FALSE
okex	2018-12-25	FALSE
poloniex	2014-01-18	FALSE
sushiswap_v1	2020-09-04	TRUE
uniswap_v1	2018-11-02	TRUE
uniswap_v2	2020-05-05	TRUE
uniswap_v3	2021-05-04	TRUE
uniswap_v4	2025-01-23	TRUE
upbit	2019-03-14	FALSE

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