



CM Market Data Feed Methodology

Version 2.0

Last Revised: Monday, December 9, 2019

0 Change Log	2
1 Introduction	3
2 Description	3
3 Coverage Universe	3
4 Data and Calculation Methodology	3
4.1 Trades	3
4.2 Candles	4
4.3 Order Books	4
4.4 Quotes	4
5 Revisions	4
6 Administration	4
7 Conflicts of Interest	5
8 Material Changes or Termination	5
9 Internal Controls	5
10 Complaints	5
11 Internal Audit	6
12 Record Retention	6
13 Compliance	6
Appendix A: Market Coverage	6
Trades and Candles - Spot Markets	6
Trades and Candles - Futures Markets	7
Order Books and Quotes - Spot Markets	7
Appendix B: Market Specific Notes	8
BitMEX Trades	8
Gemini Trades	8
itBit Trades	8
Bitstamp Order Book	9
Coinbase Order Book	9

0 Change Log

Release	Date	Changes
Version 2.0	Monday, December 9, 2019	Developed CM Market Data Feed Methodology from existing internal documentation. Expanded Coverage Universe: Added Futures instruments to Trades and Candles. Added Binance.US markets to Trades and Candles. Added new markets to Order Books and Quotes.

1 Introduction

The CM Market Data Feed provides granular crypto market data metrics across a broad universe of assets and exchanges. The CM Market Data Feed offers trade, candle, and order book data standardized to a common schema across all major crypto exchanges. All assets, markets, and market data metrics are harmonized. Our data will be offered on an exchange-specific or aggregated basis.

The CM Market Data Feed leverages institutional grade infrastructure to ensure data reliability and reduce latency. A systematic data quality control process with automated components combined with human review ensure the feed has minimal errors or artifacts.

2 Description

The CM Market Data Feed provides prospective and historical Trades, Candles, Order Books and Quotes at the market-level. Coin Metrics defines a market as the combination of exchange, pair and instrument type. Markets are assigned a unique marketID using the following convention: [exchange]-[base]-[quote]-[instrumentName]. For example, "coinbase-btc-usd-spot".

For spot markets, asset symbols are harmonized across exchanges by using a unique id for each asset. Assets which have overlapping exchange asset symbols (collisions) are differentiated using using a [symbol-with-collision_full-name-of-asset] convention. For example, assets RED and Red Community Token both have an exchange asset symbol of "red". Coin Metrics uses symbols of "red_red" for RED and "red_redcommunitytoken" for Red Community Token.

For futures markets, contract symbols are exchange-specific.

3 Coverage Universe

Markets included in the CM Market Data Feed are listed in Appendix A.

4 Data and Calculation Methodology

4.1 Trades

CM Market Data Feed includes Trades for each market. Trades currently support two instrument types: Spot and Futures. Trades include the base amount, the price and the side.

For spot markets, the amount field represents the amount of the base asset traded. For futures markets, the amount field represents the number of contracts trades. Note that some futures contracts represent multiple units for the currency that the futures contract size is quoted in (which can be either fiat or crypto). For example, the CME Bitcoin Futures Contract Unit is 5 Bitcoins.

The side field represents the maker order side. "buy" means that an ask was removed from the order book by an incoming buy order, "sell" means that a bid was removed from the order book by an incoming sell order, and "unknown" means that the exchange does not provide side information.

4.2 Candles

CM Market Data Feed includes Candles for the same markets as Trades. Coin Metrics derives candles directly from Trades. Candles currently support two instrument types: Spot and Futures. Candles are generated for 5 minute, 10 minute, 1 hour, 4 hour and 1 day intervals. Candles include the Open Price, High Price, Low Price, Close Price, Volume Weighted Average Price and Volume of the interval.

Candles are only generated if there are trades in the underlying interval. Therefore, gaps in candles data through time are normal and to be expected. To construct gapless candles, the client should fill forward candles through time, setting the open, high, low, and close to the close of the previous candle, setting the vwap to the vwap of the previous candle, and setting the volume to zero.

For spot markets, the volume field represents the amount of the base asset traded during the interval. For futures markets, the volume field represents the number of contracts traded during the interval. Note that some futures contracts represent multiple units for the currency that the futures contract size is quoted in (which can be either fiat or crypto). For example, the CME Bitcoin Futures Contract Unit is 5 Bitcoins.

4.3 Order Books

CM Market Data Feed includes Order Books for select markets. Order Books currently support one instrument type: Spot. Order Books includes at least the top 100 bids and top 100 asks for each market. Each bid and ask price level includes price, order size and number of orders.

Historical Order Book snapshots are available at 5 second intervals on average. Streaming Order Books provide a snapshot upon connection with deltas provided in real time upon receipt from the underlying exchange.

4.4 Quotes

Coin Metrics includes Quotes for the same markets as Order Books. Quotes currently support one instrument type: Spot. Quotes are derived from Order Books by taking the best bid and offer from each market. Quotes include price and order size.

Historical Quotes are available at 5 second intervals. Streaming Quotes are calculated from the full Order Book on every update received from the underlying exchange.

5 Revisions

If errors are discovered in the calculations used to create the CM Market Data Feed data, Coin Metrics will publish revised data. Coin Metrics will alert clients of any such revisions.

6 Administration

Coin Metrics serves as the administrator for the CM Market Data Feed and has primary responsibility for all aspects of the calculation process, including the development, definition, determination, dissemination, operation, and governance. All aspects of the production of the CM Market Data Feed are carried out by Coin Metrics, and Coin Metrics does not rely on any third parties for the determination of the data.

Coin Metrics ensures that transparency regarding significant decisions and associated rationale are published and made available to external stakeholders. Real-time monitoring and alerting are in place to handle certain extraordinary circumstances and external factors beyond the control of Coin Metrics.

7 Conflicts of Interest

Coin Metrics enforces policies and procedures relating to conflicts of interest in connection with the production of the CM Market Data Feed. The conflicts of interest policy addresses the identification, disclosure, management, and mitigation of conflicts of interest. Coin Metrics is committed to disclosing any material conflicts of interest to external stakeholders and to regulatory authorities.

8 Material Changes or Termination

Coin Metrics may initiate material changes to or terminate a market due to certain extraordinary market circumstances or external factors, such as in the event that the liquidity in a market declines to an extent that it no longer function as active market.

Any change or termination will be publicly disclosed to external stakeholders with a detailed explanation of the rationale. In a manner appropriate to the circumstances, Coin Metrics will develop a plan to notify, solicit comments from, and consult with external stakeholders before implementing any material change or termination. Any change or termination will include a timeline explaining the timing of changes or termination and include steps to mitigate any negative effects on external stakeholders.

9 Internal Controls

Coin Metrics has implemented internal controls to protect the integrity of the CM Market Data Feed. These controls cover the collection of data from input data sources, and maintaining the integrity of collected data. Staff involved with the production of the CM Market Data Feed 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. In addition, Coin Metrics maintains a whistleblowing mechanism to facilitate the reporting of any potential misconduct.

10 Complaints

Complaints about the calculation methodology of the CM Market Data Feed or the value of a published data point should be submitted in writing to support@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.
3. Any complaint that results in a change in the determination of the CM Market Data Feed, its calculation methodology, or its policies will be publicly disclosed that explain the action taken.

11 Internal Audit

Coin Metrics appoints an independent internal auditor to review the CM Market Data Feed's adherence to its stated methodology, compliance with policies, and best practices. The frequency of the independent internal audit is once annually.

12 Record Retention

Coin Metrics retains records, for at least five years, on the following items:

1. All market data that is collected and used in the calculation of the CM Market Data Feed data
2. Any use of non-standard procedures in the calculation of the CM Market Data Feed data
3. The identities of staff responsible for the calculation of the CM Market Data Feed data
4. Any responses, questions, or complaints received in connection with the calculation of the CM Market Data Feed data

13 Compliance

Coin Metrics maintains records and has processes in place to comply with requests for information from regulatory authorities. Coin Metrics commits to full cooperation with any regulatory authority in carrying out their regulatory or supervisory duties.

Appendix A: Coverage Universe

A complete inventory of markets available for each data type is available upon request.

Trades and Candles

The CM Market Data Feed provides Trades and Candles for all spot pairs on the following exchanges. A complete list of markets is available upon request.

#	Exchange
1	Bibox
2	Binance
3	Binance.US
4	Bitbank
5	Bitfinex
6	bitFlyer
7	Bithumb
8	BitMEX
9	Bitstamp
10	Bittrex
11	CEX.IO
12	Coinbase
13	Gate.io
14	Gatecoin
15	Gemini
16	HitBTC
17	Huobi
18	itBit
19	Kraken
20	LBank
21	Liquid
22	LocalBitcoins
23	Mt.Gox
24	Poloniex
25	TheRockTrading

26	Upbit
27	ZB.COM

Order Books and Quotes

The CM Market Data Feed provides Order Books and Quotes for the following markets:

#	Exchange	Base Ticker	Quote Ticker	market_id
1	Bitfinex	btc	usd	bitfinex-btc-usd-spot
2	Bitfinex	eth	usd	bitfinex-eth-usd-spot
3	bitFlyer	btc	usd	bitflyer-btc-usd-spot
4	Bitstamp	btc	usd	bitstamp-btc-usd-spot
5	Bitstamp	eth	usd	bitstamp-eth-usd-spot
6	Bittrex	btc	usd	bittrex-btc-usd-spot
7	Bittrex	eth	usd	bittrex-eth-usd-spot
8	CEX.IO	btc	usd	cex.io-btc-usd-spot
9	Coinbase	btc	usd	coinbase-btc-usd-spot
10	Coinbase	eth	usd	coinbase-eth-usd-spot
11	Gemini	btc	usd	gemini-btc-usd-spot
12	Gemini	eth	usd	gemini-eth-usd-spot
13	itBit	btc	usd	itbit-btc-usd-spot
14	itBit	eth	usd	itbit-eth-usd-spot
15	Kraken	btc	usd	kraken-btc-usd-spot
16	Kraken	eth	usd	kraken-eth-usd-spot
17	Liquid	btc	usd	liquid-btc-usd-spot
18	Liquid	eth	usd	liquid-eth-usd-spot

Appendix B: Market Specific Notes

BitMEX Trades

BitMEX Bitcoin contracts is worth 1 USD of Bitcoin. Both the underlying and the swap contract are quoted in USD. Margin and PNL are denominated in Bitcoin. BitMEX contracts for all other cryptocurrencies are quoted in Bitcoin and all margin and PNL calculations are denominated in Bitcoin.

Coin Metrics reports BitMEX trades provided by the exchange as is. However, the BitMEX contract value is calculated using $1 / \text{the trade price}$. In order to save precision and to avoid confusion, Coin Metrics does not perform this transformation. Please refer to the [BitMEX Futures Guide](#) and BitMEX vs [CME comparison blog post](#) for more information.

Huobi Futures

For more information about Huobi Futures, please refer to the [Huobi DM Introduction blog post](#) and the [Huobi Futures Contract Spec](#).

Gemini Trades

In addition to buy and sell, Gemini has two more trade side types: auction and block. Coin Metrics reports Gemini trades with these side types as “unknown”.

itBit Trades

itBit does not report trade side in their API. Accordingly, Coin Metrics reports the side of all itBit trades as “unknown”.

Bitstamp Order Book

Bitstamp is the only exchange which provides timestamps for their Order Book. Timestamps for all other Order Book markets refer to time Coin Metrics collected the messages. This results in the false appearance of a processing delay for Bitstamp Order Book data.

Coinbase Order Book

Order Book data for Coinbase includes only the top 50 bids and 50 asks. For all other exchanges Order Book data includes the top 100 bids and 100 asks.