

## Definitions and Outline of Default Rules

### OTC Trade Entry:

Trades are negotiated OTC outside of X-Margin, X-Margin is not involved in the price discovery or quoting of trades, and is merely providing a way to book trades between 2 counterparties who have a bilateral agreement for that asset class and instrument and would like X-Margin to be the calculation agent for these trades, where the trades are active, i.e. not expired or liquidated (Subject Trades).

### Asset Class:

Defined as a set of instruments with the same underlying asset

### Total Margin Usage:

*Total Margin Usage = Margin ÷ Collateral*

Where:

*Margin* = Total Margin in USD used across all Subject Trades with all counterparties agreed to using X-Margin as calculation agent, subject to agreed margin methodology, with netting only applied across agreed upon instruments.

*Collateral* = USD value of Total Collateral user's fund source that has integrated with this X-Margin account

Margin is Calculated using the Risk Engine methodology bilaterally selected, and calculated in USD, unless otherwise specified.

Portfolio margin is only applied to asset classes where this has been bilaterally agreed in the risk engine specifications.

If multiple risk engine methodologies are used for multiple counterparties or multiple trading venues, X-Margin runs portfolio margin calculations using *all* the applicable methodologies, and picks the largest margin amount as the minimum amount of margin required - ensuring all bilateral counterparty obligations are met.

### Liquidation Rule Set 1 ('Liq. Rules 1'):

By agreeing to this set of rules bilaterally, both parties agree to keep their 'Margin Usage' (see above definition) to **95% or less**. This ensures all parties are always over collateralized by at least 25%, and minimizes credit risk and systemic risk. X-Margin is dedicated to providing a technological solution to increase collateral and settlement efficiency whilst reducing counterparty credit risk.

In the event of a liquidation of a user, both parties in the trade involving the user agree the Subject Trades between them will be **cash settled** in USD or USD equivalent. If any other asset being held as collateral in the user's fund source, the appropriate amount of those assets will be transferred at that time, using the current market conversion price based on market data (audit trail available in the user's private dashboard). The client holding the non-USD equivalent collateral will pay for the cost of conversion into USD-equivalent funds. Liquidation amounts in USD are calculated using the **2 minute moving average**

of the mark-to-market price of each instrument at the moment when the user hits 80% overall margin usage (this will be using the first computation when X-Margin detects margin usage exceeds 80% overall margin usage, across all of the users Subject Trades).

In the unlikely event there are not sufficient funds in the user's fund source to settle what is owed upon liquidation, the user will settle what is available in their account. X-Margin will, where data is available, store margin and PnL computations in the user's private database, enabling users to pursue any owed funds bilaterally. As per the X-Margin user agreement and any relevant agreement with the custodian, X-Margin will **not** be liable to settle any funds - X-Margin merely provides calculations to suggest how much each counterparty should settle with one another. In the event there are not sufficient funds in the fund source, X-Margin, the wallet provider or the custodian will **not** be liable to settle any funds. These claims are the responsibility of the users, and are to be pursued bilaterally as per the bilateral trading agreement. Users can do so with the assistance of the audit trail and market data in the user's private database, if indeed there is data available.

### **Settlement Rule Set 1 ('Sett. Rules 1'):**

Settlement of the instrument's outstanding profit or loss will be settled using 'Cash Settlement' as often as the 'Settlement Frequency' dictates. **[The default in the X- Margin Pilot is that all options expire (with auto-exercise) at 8am UTC. However cash settlement takes place weekly, regardless of expiry, at Friday 4pm UTC]**

Settlement amounts are calculated using the unsettled profit and loss for all Subject Trades of the user, at each settlement interval, given the pre-agreed mark-to-market methodology.

The users agree to settle based on the net settlement amounts across all Network Parties, where the amounts are calculated using X-Margin's Zero Knowledge margin and P&L calculator.

'Cash Settlement' is defined as calculating the settlement amounts in USD and will be settled in USD or USD equivalent. If any other asset being held as collateral in the user's custody account or wallet, the appropriate amount of those assets will be transferred at that time, using the current market conversion price based on market data (audit trail available in the user's private dashboard). The client holding the non-USD equivalent collateral will pay for the cost of conversion into USD-equivalent funds.

Order of which currencies will be settled first from a user's funds source:

- 1) USD
- 2) USD equivalent stablecoin (USDT, USDC, TUSD, GUSD, and any other agreed bilaterally)
- 3) BTC
- 4) ETH
- 5) XLM
- 6) XRP

### **Mark to Market Rules 1 ('M2M Rules 1')**

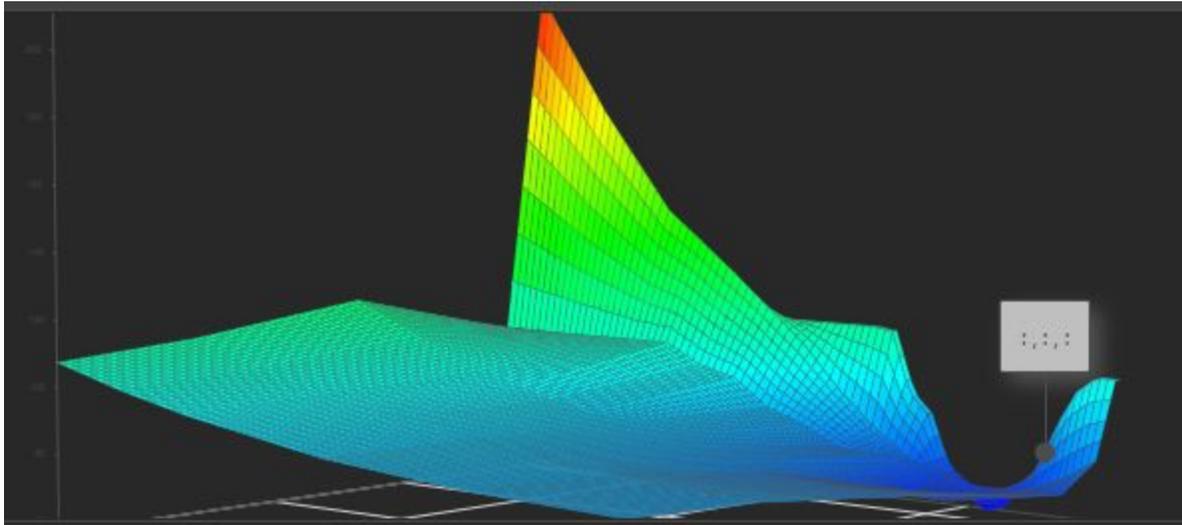
Mark to Market methodology dictates how trades will be valued.

### **BTC instruments**

X-Margin has interpolated live market data from Deribit's Public API.

Live Mark to Market *volatility* numbers are available from Deribit's API for each of the listed expiry. These have been interpolated using X-Margin's mark to market engine. The resultant 3D volatility surface provides a mark to market volatility based on Deribit's public live data that can be used to mark an implied volatility for any option with any expiry date.

For example:



Live mark to market forward prices are interpolated from Deribit's public API also, using a combination of Deribit's Index Price, Futures prices, and option synthetic implied forward prices. Please see [Deribit's website](#) for a better understanding of how their Index price is calculated and how their mark prices are derived.

#### Deribit's BTC Index:

Currently, the Deribit BTC index is made up of the latest prices from Bitstamp, Gemini, Bitfinex, Bittrex, Itbit, Coinbase, LMAX Digital and Kraken.

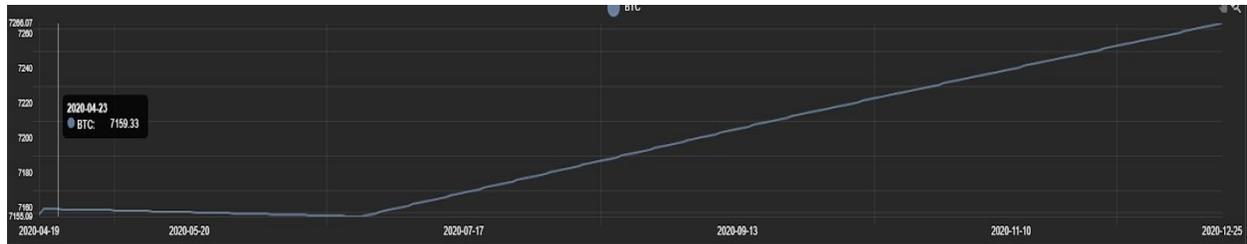
When calculating the Index price, exchanges that are excluded by the system administrator, have invalid data or have delayed order book data will not be included in the final calculation.

The remaining exchanges will be included in the index calculation and will be benchmarked against the median price of the final sample. The values that will fall outside the +/-0.5% range of the median price will be adjusted to the closest bandwidth price limit. Consequentially, the index is calculated as the equally-weighted average of these values.

There is a page dedicated to the price index where you can see at any time which exchanges are actually part of the index at this very moment. Here: <https://www.deribit.com/main#/indexes>.

Note: Currently Bitfinex is disabled and is not part of the Deribit Index.

For options based forward price estimation - the mark to market engine looks at the bid/ask of the calls and puts across a number of strikes for each expiry where there is no futures contract. Consequently, there will be a synthetic forward price derived based on put-call parity and the index price. An example of the resultant forward curve is below:



X-Margin is not liable for Deribit's data feed being available. This mark-to-market methodology involves both parties in the transaction agreeing to use this as a methodology they approve of. In the event of a lack of data due to an outage or some unforeseen circumstances at the exchange where data is coming from, bilateral parties will use available data in the audit trail to resolve any disputes. X-Margin will continue to calculate the margin whenever data sources are available again.

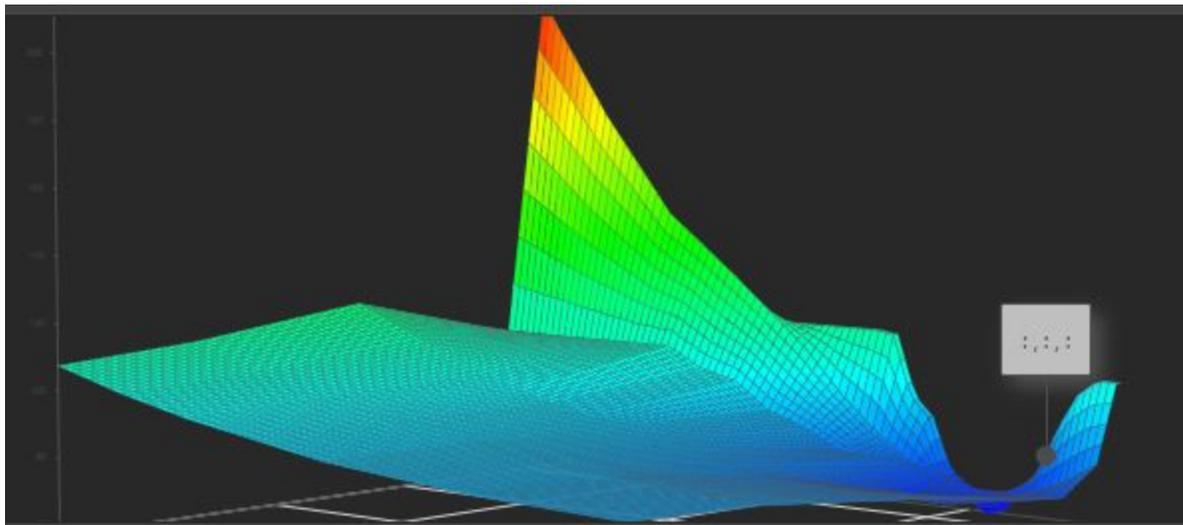
(Coming soon: OKEx equivalent data to provide an average of both data sources)

## ETH instruments

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For example:



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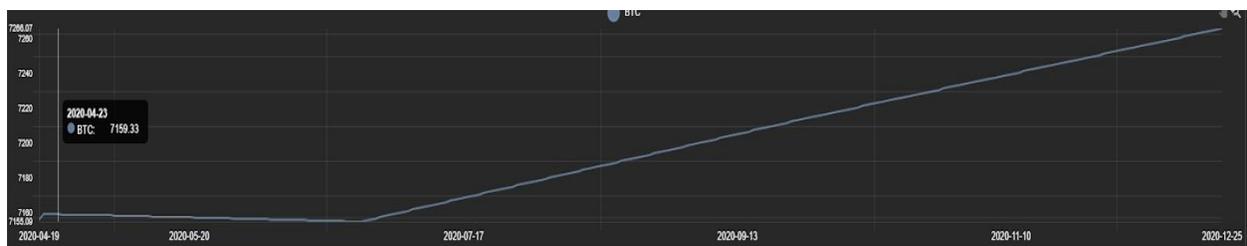
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### XLM instruments

X-Margin uses OKEx's spot price for XLM/USDT [https://www.okex.com/en/spot/trade/xlm\\_usdt](https://www.okex.com/en/spot/trade/xlm_usdt)

This provides us with the underlying price for XLM. In this Mark-to-market methodology, it is assumed this price applies for all points on the forward curve.

By using this methodology, all Network Parties agree to interpolate Volatility numbers from the volatility numbers that have been input by approved users in the table provided in the X-Margin dashboard. An example is seen below:

strike	date0	date1	date2
	2020.05.01	2020.05.16	2020.05.27
0.04		60.5	59
0.06	65		

## XRP instruments

X-Margin uses OKEx's XRP/USDT weekly futures price  
<https://www.okex.com/derivatives/futures/usdt-xrp-weekly>

This provides us with the underlying price for XRP. In this Mark-to-market methodology, it is assumed this price applies for all points on the forward curve.

By using this methodology, all Network Parties agree to interpolate Volatility numbers from the volatility numbers that have been input by approved users in the table provided in the X-Margin dashboard. An example is seen below:

strike	date0	date1	date2
	2020.05.01	2020.05.16	2020.05.27
0.04		60.5	59
0.06	65		

## Risk Engine

X-Margin uses a SPAN methodology to calculate margin where it has been chosen by the bilateral agreement

### SPAN1

SPAN1 is similar to Portfolio Margin methodologies found on cryptocurrency derivatives exchanges (e.g. Deribit). However, it has been enhanced to ensure risk can appropriately be calculated for custom expiries of options and custom expiries of forwards/futures.

Portfolio maintenance margin is determined by calculating the maximum loss that can occur in a portfolio with the following parameters:

- maximum price move of +/- 15.00%
- maximum implied volatility change of  $(30/\text{days to expiration})^{0.30} * 30.00\%$ . Example: options expiring in 30 days: IV change of maximum 30.00%, options expiring in 15 days: IV change of maximum  $(30/15)^{0.30} * 30.00\%$

- Contingency component per option for all net short options per strike.  
For BTC: \$40 per option  
For ETH: \$1.50 per option  
For XLM: \$0.0005 per option  
For XRP: \$0.0015 per option
- Contingency component for offsetting forward exposure :  
Total long position's time weighted expiry date = TL  
Total short position's time weighted expiry date = TS  
Contingency =  $\text{abs}(\text{TL} - \text{TS}) * 0.5\% * \min(\text{abs}(\text{Long\_delta}), \text{abs}(\text{short\_delta}))$
- Contingency component for VEGA's offsetting in different expirations.  
Total long position's time weighted expiry date = TL  
Total short position's time weighted expiry date = TS  
Contingency =  $\text{abs}(\text{TL} - \text{TS}) * 0.5\% * \min(\text{abs}(\text{Long\_vega}), \text{abs}(\text{short\_vega}))$