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## CRYPTO FUTURES METHODOLOGY OVERVIEW

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## 1. Mark to market (MtM)

AsiaNext determines the hourly settlements for Bitcoin (BTC) and Ethereum (ETH) futures based on trading activity on AsiaNext between each hour i.e HH:00:00 to HH:59:59.

Tier	Method / Calculation
a	If the contract traded in the last 5 minutes before the hourly settlement run, then the contract settles to the volume-weighted average price (VWAP) of the trade(s) done in the last 5 mins before the hourly settlement run.
b	If there was no trade in the last 5 minutes before the hourly settlement run, then the contract settles to the midpoint of Bid/Ask - calculated based on VWAP - from order book snapshot taken during the hourly settlement run.
C	<p>If neither trade nor Bid / Ask prices are available, then a reference rate is used as below to determine settlement price:</p> <p><b>Calendar Futures:</b> Reference Rate + [(Days to expiration/360) x Interest Rate x Reference Rate]]</p> <p><b>Perpetual Futures:</b> Reference Rate</p> <p>where, Reference Rate = SIX Crypto Spot Index Interest Rate = SOFR term Rates</p>

## 2. Margining

AsiaNext uses a value at risk (VaR) based margin model using filtered historical simulations (FHS/HS). Historical simulations is generated from a rolling time series of historical returns calculated from the appropriate margin period of risk (MPOR), which is in hours given the hourly frequency of margining.

For the VaR-based approach, the initial margin is determined as quantile at a configurable confidence level  $\alpha$ , e.g.  $\alpha = 0.01$  (0.99), for long (or short) positions. Explicitly,

$$VaR_{\alpha} = F^{-1}(r_{sim}, \alpha),$$

where  $F$  is the empirical cdf given by  $r_{sim}$ , the set of historical scenario returns.

If the quantile is between two scenarios the lower (or higher) scenario value is taken for a long (or short) position.

Comparing FHS and HS margins shows that the former is much more reactive and dynamic. Margins derived by pure historical simulations tend to be more stable and move only drastically if periods of financial turmoil move out of the look-back window.

Combining both margins by a weighted average following

$$IM_{Hybrid} = \omega_{FHS} \times IM_{FHS} + \omega_{HS} \times IM_{HS},$$

reaps both advantages and reduces procyclical effects.

Additionally, AsiaNext imposes Margin Add-ons in the form of Liquidity, Concentration, Floor, Margin Factor, and Scaling

### 3. Funding Rate for Perpetual futures

At AsiaNext, the settlement of margins are planned to run on an hourly schedule. By aligning the settlement of funding between payer and receiver via AsiaNext it eliminates the accumulation of funding payment exposure faced by the exchange and its member.

The funding rate is calculated and paid or received every hour. When the funding rate is positive, long position holders pay funding to the short position holders; when the funding rate is negative, short position holders pay funding to the long position holders. The following rules apply to the funding rate:

1.  $P_{BID} < p_{index} < P_{ASK}$ : zero funding rate  

$$r_f = 0$$
2.  $p_{Index} < P_{BID}$ :  

$$r_f = (P_{BID} - p_{Index})/p_{Index}$$
3.  $P_{ASK} < p_{Index}$ :  

$$r_f = (P_{ASK} - p_{Index})/p_{Index}$$

$p_{Index}$  – SIX/BITA index price at the hour

$p_{BID}, p_{ASK}$  – Volume weighted average Bid/Ask price from Perpetual Swap order book up till Impact Quantity.

Calculation of Impact Volume Weighted Average Bid/Ask price is described as follows:

- 1) Set an Impact Quantity on the number of contracts. The Impact Quantity is used to locate the average Impact Bid or Ask price in the order book.
- 2) Calculate  $P_{BID}, P_{ASK}$  where

$$P_{BID} = \frac{\sum(\text{Volume} \times \text{Bid Prices})}{\sum(\text{Volume})}, \text{ where Volume is up to Impact Quantity}$$

$$P_{ASK} = \frac{\sum(\text{Volume} \times \text{Ask Prices})}{\sum(\text{Volume})}, \text{ where Volume is up to Impact Quantity}$$

The Impact Bid and Ask are calculated when both are simultaneously available on the hour, else the next most recent observation is used.

- 3) Determine funding rate based on the above rules. The actual funding payment/receipt is calculated by multiplying the funding rate with the position size.

The resulting hourly funding rate is subject to appropriate cap and floor values. This means that if the hourly funding rate calculated is above the cap or below the floor, it would be adjusted to the cap or floor respectively.

### 4. Minimum Deposit

The risk model is designed to match the continuous trading of crypto assets, which introduces the potential for misalignment with the operation capabilities of selected members. In cases when office closing hours limit clearing operations of certain members, the margin calculated on the basis of the default margin period of risk will be scaled up to account for the additional risk during non-operating hours (e.g. holidays, weekends, overnight). Members will be expected to top-up these additional buffers in the form of Minimum Deposit.

## 5. Reference Rate Crypto Indices

AsiaNext has partnered with SIX to develop the SIX Reference Rate Crypto Indices. The reference rates represent the aggregated, executed trade flow of BTC and ETH on major spot exchanges. SIX Reference Rate Crypto Indices are calculated and disseminated on a hourly basis during a 24-hour a day, 7 days a week schedule. Cryptocurrency futures on AsiaNext are cash-settled to the 16:00 p.m. UTC time reference rates. For details of the methodology, refer to the ‘SIX Crypto Indices – Methodology Rulebook Governing SIX Real-Time Crypto Indices and SIX Reference Rate Crypto Indices’ document (available on request). The most relevant sections for a general understanding of the index methodology are:

- Section 5.2 : Eligibility Criteria for Exchanges
- Section 5.3 : Eligibility Criteria for Crypto Currencies
- Section 6.4 : Calculation formula for the Real-Time Indices
- Section 7.4 : Calculation formula for the Reference Rates Indices

Depending on how much detailed you want the light version to be, there are additional sections that can be referred:

- Sections 6.2, 6.3: For the data Collection and cleansing for the Real-Time Indices
- Sections 7.2, 7.3: For the data Collection and cleansing for the Reference Rates Indices
- Sections 8.1, 8.2, 8.3: For the Correction Policy

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