Kaiko Indices

Vinter Reference Rates

Index Methodology

www.kaiko.com

About Kaiko Indices

Kaiko Indices offers institutional-grade benchmarks and indices, setting the standard for reliability and transparency in the digital asset market. As a regulated Benchmark Administrator under the EU BMR framework and compliant with IOSCO principles, we empower exchanges, asset managers, and financial institutions with trusted data solutions that support robust settlement and risk management practices.

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Introduction:

Vinter calculates real-time and daily reference rates that are compliant with the UK & EU Benchmarks Regulation (BMR), GAAP and the IOSCO principles for financial benchmarks. The daily reference rates have four different algorithms: VFIX, VAP, and BRR. Each reference rate has a set of identifiers on platforms like Bloomberg, Refinitiv and the Vinter API.

Background:

Vinter's reference rates are developed to provide a rule-based and transparent way to capture the price of crypto assets. Each reference rate accurately tracks the price of a single asset. The reference rates are regulated, industry-adopted, auditable, manipulation-resistant, and frequently reviewed.

The Vinter Single Asset Reference Rates are a family of benchmarks. This methodology clearly determines what constitutes an active market for each reference rate and establishes the priority given to different types of input data. The methodology considers factors like the size and liquidity of the market and the transparency of trading to accurately reflect the economic reality that the benchmark intends to measure.

For questions, comments, and inquiries, please email support@vinter.co

Overview:

All reference rates are calculated from validated transactions on selected exchanges. The time window during which transactions are obtained varies depending on the reference rate and the frequency. There are three possible frequencies with which reference rates are updated: real-time, hourly, and daily. Each index consists of the following parts.

- Trading pair: the base and quote currency.
- Structure: plain or composite.
- Frequency: real-time, hourly or daily.

The default structure is a plain reference rate, which uses transactions from one trading pair.

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Real-time:
The real-time reference rate is the median price across selected exchanges.

To be precise, each Vinter real-time reference rate is updated every 10 seconds and calculated as follows.

- Obtain validated transactions on the trading pair from selected exchanges during the last 60 seconds.
- Select the last transaction from each exchange.
- Take the median price across all select transactions.

Using a median ensures that the reference rates are manipulation-resistant and robust against outliers.

Hourly:
The algorithm for hourly calculations uses Vinter's Average Price algorithm; for details, please see below.

Daily:
We offer four different calculation algorithms: VFIX, VAP, and BRR.

- Vinter's Fixing (VFIX) is the Vinter real-time rate at a specific time, such as 4 p.m. New York or 4 p.m. London time.
- Vinter's Average Price (VAP) is the average of all published Vinter real-time rates in the window e.g. 3-4 pm. The VAP is thus a time-weighted average price.
- The Benchmark Reference Rate (BRR) by Vinter is a Time-Weighted Average Price of twelve 5-minute volume-weighted median prices in the time window.

All are published after 4 pm London time and 4 pm New York time. The default algorithm is VFIX, and the default publication time is 4 pm London time.

The daily frequency is used to settle regulated financial derivatives and to value exchange-traded products. The hourly and real-time frequencies are often used for indicative purposes. To ensure accuracy, the daily calculations must pass exhaustive validation tests.

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VFIX:
The abbreviation for Vinter's Fixing is "VFIX." It is calculated by taking the last real-time rate before a certain time of the day. The following daily fixings are calculated:

- 4 pm London time (the default)
- 4:30 pm London time
- 4 pm New York time

VAP:
Vinter's Average Price is abbreviated "VAP." It is calculated by taking the average of the real-time values during a certain time window. Since the real-time frequency is every ten seconds, each daily value is a Time Weighted Average Price (TWAP) of 360 median prices.

The following time windows are used:

- 3 pm to 4 pm London time (the default)
- 2 pm to 3 pm London time
- 3 pm to 4 pm New York time

BRR:
The Benchmark Reference Rate by Vinter is abbreviated "BRR." It is a TWAP of volume-weighted median prices from 3 to 4 p.m. New York time. This algorithm is designed for US ETFs. The 3 to 4 p.m. window is split into twelve 5-minute slots, each containing the volume-weighted median price.

The following outlier detection is applied to the time window: All trades from a selected exchange are removed if the selected exchange's volume-weighted median price (VWMP) differs more than 10% from the median of all VWMPs.

Identifiers:
Each reference rate is identified by its algorithm (e.g., BRR), the asset (e.g., BTC), and the calculation time (e.g., N for New York 4 pm). In the Vinter API, each reference rate has a unique serial number. Below are the Vinter API, Bloomberg, and Refinitiv identifiers for selected reference rates.

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BRR BTC N:

The parameters and identifiers for the Bitcoin 4 pm New York Benchmark Reference Rate by Vinter are as follows:

- Asset: BTC
- Calculation time: 4 pm New York
- Algorithm: BRR
- Short name: BTC 4 pm New York BRR
- Long name: Bitcoin 4 pm New York Benchmark Reference Rate by Vinter
- Bloomberg name: Bitcoin 4 pm New York Benchmark Reference Rate by Vinter
- Bloomberg identifier: BRRBTCNV
- Refinitiv identifier: .BRRBTCNV
- Vinter API: btc-usd-p-11-d

BRR ETH N:

The parameters and identifiers for the Ethereum 4 pm New York Benchmark Reference Rate by Vinter are as follows:

- Asset: ETH
- Calculation time: 4 pm New York
- Algorithm: BRR
- Short name: ETH 4 pm New York BRR
- Long name: Ethereum 4 pm New York Benchmark Reference Rate by Vinter
- Bloomberg name: Ethereum 4 pm New York Benchmark Reference Rate by Vinter
- Bloomberg identifier: BRRETHNV
- Refinitiv identifier: .BRRETHNV
- Vinter API: eth-usd-p-11-d

VFIX BTC L:

The parameters and identifiers for the VFIX Bitcoin reference rate calculated at 4 pm London time (the standard) are as follows.

- Asset: BTC
- Calculation time: 4 pm London
- Algorithm: VFIX
- Short name: VFIX BTC 4 pm London
- Long name: Vinter Bitcoin 4 pm London Fixing Index
- Bloomberg name: Vinter Bitcoin VFIX value at 4:00 pm London Time
- Bloomberg identifier: VBTCUSD
- Vinter API: btc-usd-p-5-d

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Reference Rates

To get the identifiers for other assets and calculation times, replace the asset name (Bitcoin), the asset ticker (BTC), and the publication time (4 pm London) with the relevant information. Connect to the Vinter API for a full list of tickers and metadata.

Illustration:
This section illustrates the real-time reference rate, VFIX, and VAP.

Assume that the selected exchanges for btc-usd are Kraken, Coinbase, and Bitstamp. The reference rate calculation is illustrated in the table below. The last price on Coinbase during the first and second periods are denoted Pc(1) and Pc(2), respectively. The median of the individual exchange prices during the first and second periods are denoted Pm(1) and Pm(2), respectively. In this numerical example, the first median value is $1002, and the second is $998. Even though Bitstamp's $700 is far from the other exchanges, it does not influence the median of $998.

i \ t	t = 1	t = 2	...	t = T
Coinbase (c)	*Pc(1) = $1001*	*Pc(2) = $998*		*Pc(T) = $991*
Kraken (k)	*Pk(1) = $1002*	*Pk(2) = $999*		*Pk(T) = $992*
Bitstamp (b)	*Pb(1) = $1004*	*Pb(2) = $700*		*Pb(T) = $992*
median	*Pm(1) = $1002*	*Pm(2) = $998*		*Pm(T) = $992*

Vinter's Average price (VAP) is given by Pm(1) + Pm(2) + ... + Pm(T) divided by T. It is thus a TWAP of the median prices.

The real-time index value at time 15:01:00 is calculated as follows:

- Obtain validated btc-usd transactions from the last 60 seconds since 15:01:00 on Kraken, Coinbase, and Bitstamp.
- For each exchange, select the last paid price.
- Take the median of the three prices.

Vinter's Fixing (VFIX) is calculated by taking the last real-time reference rate value before 16:00.

Vinter's Average Price (VAP) is calculated by obtaining the real-time reference rate values from 15:00 to 16:00 and then averaging these values.

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Mathematical Formulation:

Define {d} as a set of trades on a given trading pair where each trade consists of the following information: timestamp, price, volume, and exchange.

A daily index value can then be expressed as a series of aggregation functions on the set trades:

$$f_3(f_2(f_1(\{d\})))$$

where are the first, second, and third aggregation functions - respectively - on suitable chosen information dimensions such as (1) price, (2) exchange, and (3) time.

For Vinter's daily TWAP index value, the trades are grouped by exchange and divided into time partitions (e.g., 10 seconds) inside a time window (e.g., 60 minutes). Once the trades are grouped by these three dimensions, the first, second, and third aggregation functions (as illustrated in the table above) are:

- last paid price at the exchange,
- the median across the exchange,
- average of the exchange-medians.

Other available aggregation functions include mean, median, volume-weighted average, volume-weighted median, and last. Available time partitions range from seconds to 24 hours, and available time windows range from 1 to 24 hours.

Composite Structure:

A reference rate with a composite structure pools transactions from several trading pairs, whereas a reference rate with a plain structure only uses transactions from one trading pair.

Liquid assets (such as BTC and ETH) rarely need a composite structure. Illiquid assets, however, might need to add transactions from several trading pairs to be accurately priced.

The plain bnb-usd indexes measure the price of one BNB in USD using transactions in BNB/USD, whereas the composite bnb-usd indexes measure the same price using several trading pairs. The composite bnb-usd real-time index is calculated as the price of BNB/USDT on Binance and then converted into USD using the Vinter USD/USDT Real-time index.

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Reference Rates

Most reference rates have a plain structure. Some indexes have a composite structure.

The calculation method for a composite index is as follows.

- Obtain the relevant trading pair indexes.
- Convert each trading pair index into USD utilizing the appropriate Vinter index as a conversion pair.
- Apply the same calculation method as described in the previous section (e.g., take the median for a real-time index).

Illustration:

Assume we want a reference rate for PAXG/USD when the PAXG/USD needs to be complemented with transactions from PAXG/USDT and PAXG/BTC. The calculation method for one real-time reference rate (RRR) is illustrated in the table. The calculation steps for paxg-usd-c-h are as follows.

- Obtain the real-time index values for paxg-usdt-p-r and paxg-btc-p-r.
- Convert from PAXG/USDT and PAXG/BTC into USD utilizing the Vinter USD/USDT and Vinter BTC/USD indexes, respectively.
- Take the median of the three PAXG/USD indexes to get paxg-usd-c-r.

Base	Quote	Price	Conversion Pair	Conversion Rate	Price ($)
PAXG	USD	1801	None	1	1801
PAXG	USDT	1820	USDT/USD	0.99	1801.8
PAXG	BTC	0.1	BTC/USD	18001	1800.1
median					1801

The aggregation from real-time reference rate to hourly or daily values works in the same way in a composite structure as in the plain structure, namely to calculate a TWAP over the hour for Vinter's Average Price (VAP) or taking the last RRR for Vinter's Fixing (VFIX).

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Naming Convention:

The index naming convention is based on the trading pair, the structure, and the frequency with which values are updated. The table illustrates the naming convention. Note that the Vinter API might prefix “vntr” and suffix ID number(s) to each Ticker.

btc/usdt	real-time (r)	btc-usdt-p-r
eth/btc	hourly (h)	eth-btc-p-h

The p stands for primary. Certain reference rates also have a complimentary reference rate denoted by a c.

List of Active Reference Rates:

A full list of all active reference rates is available on Kaiko.com

Monitoring:

Daily reference rates are monitored before and after publication time to ensure the accuracy of our published values.

Real-time reference rates are monitored Monday through Friday, 07:00-22:00 London time (equivalent to 02:00-17:00 New York time or 14:00-05:00 Hong Kong time).

Outside monitoring shifts, real-time reference may produce stale prices.

Staking Yield Rates:

A Vinter Staking Yield Index provides the yield of a crypto asset. Yields are updated daily and expressed as an Annual Percentage Rate (APR) and an Annual Percentage Yield (APY).

The yield per asset is calculated by selecting the median yield of the selected providers. The median is robust against outliers and suitable for ensuring a fair yield value for all stakeholders.

Asset managers who stake their crypto assets and want to include all or some of the staking yields in their product can use a total return index from Vinter.

For a list of all assets Vinter is currently calculating yield rates on, visit Active Staking Yields in the API documentation.

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Administration:

The Benchmark Administrator is the central recipient of input data with the ability to consistently evaluate the integrity and accuracy of input. The Benchmark Administrator is responsible for developing the indexes and controls all aspects of the provision of benchmarks. The Benchmark Administrator has established a permanent and effective oversight function, governance processes subject to periodic reviews and audits, policies regarding complaints, ethics, conflicts of interest, and contingency, and has established a clear internal organizational structure with consistent roles and responsibilities to identify, prevent, disclose, mitigate, and manage conflicts of interest.

The Calculation Agent is an individual or entity that is responsible for determining the value of an index and/or a financial instrument. The Calculation Agent calculates the index values in accordance with the index methodology. Upon the request of the Benchmark Administrator, the Calculation Agent shall provide all information available on the composition and details of the calculation of the requested index.

The Publication Agent is an entity responsible for the publication of index values.

Vinter is the benchmark administrator, calculation agent, and publication agent of this index family. Calculation agent services include benchmark development, integration, and technical maintenance. Benchmark administrator services include legal maintenance and oversight of benchmarks. Publication services include the distribution of benchmarks, methodologies, and benchmark statements.

Definitions:

- **Crypto Asset:** A digital representation of value that is cryptographically secured.
- **Base Currency**: The first currency in a trading pair.
- **Quote Currency**: The second currency in a trading pair.
- **Trading Pair**: A pair consisting of a base and a quote currency.
- **Transaction**: A trade between two parties occurring on an exchange that consists of time, price, and volume.
- **Validated Transaction**: a transaction registered and validated by Vinter.
- **Volume**: the quantity of a transaction expressed in the base currency.
- **UTC**: Coordinated Universal Time.
- **Selected Exchange:** An exchange that contributes with input data in the calculation.
- **Eligible Exchange:** An exchange that fulfills all eligibility criteria.

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Reference Rates

Document Versions

Version 1.0

Initial version. June 22, 2020.

Version 2.0

- December 3, 2020.
- Forked from index calculation framework.
- Extended the list of eligibility criteria.
- Removed index universe.
- Renamed introduction to overview.
- Expanded the calculation section by adding frequencies.
- Added indexes with a composite structure.
- Moved governance structure and maintenance into the benchmark statement.

Version 2.1

- February 23, 2021
- Changed notation to Pi(t) where i is an exchange and P is the last price.
- Added Mathematical Formulation.

Indices

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Staking Yield Reference Rates

Crypto reference rates for single assets

Introduction:
Vinter has developed a set of staking yield reference rates to provide a transparent, rule-based methodology for capturing the yield of crypto assets engaged in staking. These rates offer a measure of the yield for individual assets, updated daily and expressed as an Annual Percentage Rate (APR) and an Annual Percentage Yield (APY).

These reference rates are regulated, audit-ready, resistant to manipulation, and subject to regular review. Customers may email support@kaiko.com for questions. For inquiries, please visit **www.kaiko.com/contact-kaiko**

Staking Yield Rates Overview:
The Vinter Staking Yield Reference Rate represents the yield on a crypto asset, updated daily and presented as either APR or APY. Calculating yields per asset involves selecting the median yield from a set of chosen providers, a method particularly robust against outliers. The data sources undergo frequent scrutiny to maintain their currency and accuracy.

The calculation of APY incorporates the compounding effect of reinvesting daily rewards; although theoretically defined for all APRs, not every asset facilitates this reinvestment strategy in practice.

Asset managers benefit from these benchmarks in determining a fair sharing of staking yields with investors.

For a comprehensive list of assets and their yield rates, please refer to the API documentation under "Active Staking Yields."

Data Source Tier System:
Within the framework of Vinter's Staking Yield Reference Rates, various staking rates are offered to cater to the diverse needs of our stakeholders in the industry. As of March 14, 2024, Vinter calculates the following series for staking rates:

Staking Providers (Tier 2):
This category integrates data from entities or Decentralized Autonomous Organizations (DAOs) offering validator services, presenting a blend of direct and managed staking services. These providers usually feature higher-than-average, stable rates extracted from their APIs or websites.

Exchanges (Tier 3):
Rates in this series are derived from exchanges like Kraken, Coinbase, and Binance that offer staking services. This option caters to investors preferring flexibility, with lower reward rates and shorter lock-up periods.

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Staking Yield Reference Rates

Implementation Details

Tier 2 Rates (apr-2-d):

The -2- series in the Vinter API uses data extracted from Staking Providers (Tier 2). All rates are extracted at 10:00 UTC and validated against other sources.

Additionally, all Tier 2 data sources are regularly reviewed for staleness and abnormal values. This series benefits from an anomaly detection system that compares the final median price obtained from Tier 2 Data Providers against third-party sources.

Hence, the list of providers is subject to change to ensure the accuracy and currency of the Staking Yields Reference Rate.

Median:

To illustrate the calculation of staking yield rates, let us consider three staking providers: A, B, and C. These providers offer APRs for a crypto asset like Ethereum (ETH). On a particular day, the APR rates provided are as follows: 5.5%, 6.2%, and 4.8% for providers A, B, and C, respectively. Given these rates, the APR for Ethereum on this day would be 5.5% as it is the median. This value is chosen as Ethereum's daily staking yield rate in the Vinter Staking Yield Index.

APR and APY:

The Annual Percentage Yield (APY) accounts for the compounding effect of reinvesting daily staking rewards over a year. For a given Annual Percentage Rate (APR), the APY can be calculated using the formula:

$$APY = \left(1 + \frac{APR}{365}\right)^{365} - 1$$

Where APR is calculated as described above, and 365 represents the number of days in a year for daily compounding. In the Vinter API, a 5.5% yield is expressed as 0.055.

Eligible Assets:

Assets are eligible as index constituents if they meet the eligibility criteria listed in Vinter's benchmark statement, if their consensus mechanism uses staking, and if staking is permissionless, either directly or through delegation.

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Staking Yield Reference Rates

List of Active Staking Yield Reference Rates:
A complete list of all active reference rates is available on api.vinter.co
The symbol identifying each reference rate consists of the following parts.

- Asset: The symbol, e.g., eth, sol, ...
- Method: The calculation method, i.e., APR or APY
- Series ID: The ID describing the data provider category, e.g., 2
- Frequency: Staking Yields are only offered in the daily (d) frequency.

E.g., eth-apr-2-d

Monitoring:
The Vinter Staking Yield Reference Rates's monitoring process encompasses pre- and post-publication phases to ensure accuracy and currency. Key activities include data integrity verification, anomaly detection before release, and post-publication evaluations for ongoing accuracy and necessary corrective updates.

Furthermore, data providers' performance is assessed to maintain data quality, with adjustments made according to their reliability and relevance. Engaging with stakeholders for feedback is pivotal to enhancing the accuracy and breadth of the rates.

Administration:
The Benchmark Administrator is the central recipient of input data with the ability to evaluate the integrity and accuracy of input data consistently. The Benchmark Administrator is responsible for the development of the indexes and controls all aspects of the provision of benchmarks. The Benchmark Administrator has established a permanent and effective oversight function, governance processes subject to periodic reviews and audits, policies regarding complaints, ethics, conflicts of interest, and contingency, and has established a clear internal organizational structure with consistent roles and responsibilities to identify, prevent, disclose, mitigate, and manage conflicts of interest.

The Calculation Agent is an individual or entity responsible for determining the value of an index and/or a financial instrument. The Calculation Agent calculates the index values in accordance with the index methodology. Upon the request of the Benchmark Administrator, the Calculation Agent shall provide all information available on the composition and details of the calculation of the requested index.
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Staking Yield Reference Rates

Definitions:

- **Staking Yield:** The currency reward one gains when staking an asset to a staking provider/validator. The reward can be compounded (APY) or not (APR) and is given as a percentage of the amount of asset put in staking.
- **Crypto Asset:** A digital representation of value that is cryptographically secured.
- **UTC:** Coordinated Universal Time.
- **Accuracy:** Represents the extent to which the data are free of error and reliable, as well as the degree to which the data map (or are close to) the actual values.
- **Currency:** Refers to the extent to which the data are sufficiently or reasonably up to date for the intended task.

Document Versions:

Version 1.0

- Initial version. March 11, 2024.
- Forked from Reference Rates

Indices

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Universes

Vinter's Full, Institutional and Custom Universe

Introduction:

The asset universe lists all possible index constituents. It is a crucial building block in designing an index or creating an investment strategy. Every Vinter index methodology contains a text on the index construction, and almost every index construction starts with defining the asset universe. This document describes the rules for these universes. The three most commonly used Vinter asset universes are Full, Institutional, and Custom. We created each asset universe for a distinct purpose.

- Full: By virtue of being a regulated Benchmark Administrator under the EU Benchmarks Regulation, we had to create a rules-based asset universe.
- Institutional: It speeds up the time to market for issuers of exchange-traded funds and products (ETFs and ETPs).
- Custom: It simplifies rebalancing for our customers

Vinter Full Universe:

We created the Vinter Full Universe because we had to design strict rules for which assets are eligible in our regulated indexes. By being a regulated Benchmark Administrator under the EU Benchmarks Regulation (EU BMR), our eligibility criteria adhere to this regulation and the IOSCO principles for financial benchmarks. Both of these regulatory frameworks intend to protect investors.

The Vinter Full Universe consists of all assets that meet Vinter's eligibility criteria. These criteria include a minimum market capitalization of USD 500 million, a daily trading volume above USD 20 million, and a price history of at least 90 days. We list all criteria in the Benchmark statement hosted on www.compliance.vinter.co

As of 2023-04-01 crypto assets are eligible as constituents if at the review date, they:

- are a cryptographically secured digital bearer instrument;
- are not index tokens, stablecoins, or pegged to another asset such as currencies or commodities;
- are not an ongoing Initial Coin Offering;
- are not deemed a security, fraudulent, or banned by a public financial regulatory authority with jurisdiction over the constituent or its wrapper;
- are not alleged to be a security or fraudulent by a public financial regulatory authority with jurisdiction where a financial instrument ought to be listed with the constituent as underlying;
- are supported by the industry including market makers, custodians, and regulated exchanges;

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- can be deposited to and withdrawn from at least two eligible exchanges;
- are freely traded and can be freely held for the foreseeable future;
- have a daily trading volume that exceeds USD 20 million;
- have at least 90 days of historical price data;
- allow for cold storage;
- have a market capitalization above USD 500 million;
- trade against a G10 currency (AUD, CAD, EUR, JPY, NZD, NOK, GBP, SEK, CHF, USD);
- are not designed to be private; and
- trade on eligible exchanges.

Vinter Institutional Universe:

We created the Vinter Institutional Universe to speed up the time to market for issuers of exchange-traded funds and products (ETFs and ETPs). Without a pre-defined asset universe, the asset manager must find out which crypto assets (i) are eligible for listing on stock exchanges, (ii) can be safely held in custody by reputable custodians, and (iii) can be quoted by market makers. We have solved the first problem of building an investment strategy by publishing a list of assets with institutional support.

The Vinter Institutional Universe is a subset of the Vinter Full Universe, consisting of assets that have support from a selection of institutional service providers. The Vinter Institutional Universe only contains assets supported by the selected:

- stock exchange,
- market maker, and
- custodian.

For an asset to be in the Vinter Institutional Universe, it must:

- be eligible for listing on the SIX stock exchange,
- be quoted by the market maker Flow traders, and
- be able to be stored in custody by Copper.

We select the service providers using the following rules:

- Among the publicly listed exchange-traded products (ETPs) tracking a Vinter index, select the product with the highest end-of-year assets under management.

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- On the website, factsheet, final terms, or prospectus of said ETP, list which stock exchange(s) where the ETP was listed first. If it was listed on a single stock exchange, select it. If it was listed on multiple stock exchanges, select the stock exchange with the most transparent and simple listing rules (if we cannot distinguish the transparency or the simplicity, we select the stock exchange with the most supported assets).
- List all firm(s) said ETP uses for market making. Select the one with the most supported assets if it's multiple providers. If it's a single provider then select it.
- List the firm(s) said ETP uses for crypto custody. Select the one with the most supported assets if it's multiple providers. If it's a single provider then select it.

As of 2023-01-01, this process resulted in the following selections.

- The HODLX ETP issued by 21Shares, which tracks the HODLX index by Vinter.
- HODLX was first listed on the SIX stock exchange.
- Flow traders is the market maker, according to the product documentation.
- Copper and Coinbase custody are the custodians, according to the product documentation. After comparing their two websites, we select Copper as they had the longest list of supported assets.

We update the list of service providers yearly. We update the supported assets based on this list of providers quarterly, starting in January. Use the Vinter API to see which assets are currently in the Vinter Institutional Universe.

Vinter Custom Universe:
We created the Vinter Custom Universe to simplify rebalancing for our customers. Suppose the custodian that an ETF issuer has contracted cannot custody a certain asset. In that case, this asset should not be an index constituent. For practical purposes, we remove assets lacking support from a custom set of market makers, custodians, and other necessary service providers. Removing unsupported assets simplifies the rebalancing process.

A Vinter Custom Universe starts with the Vinter Institutional Universe as a template, and then it allows for customization. The most common requirement is to customize the service providers. This means that we interpret the rule that an asset is "supported by the industry including market makers, custodians, and regulated exchanges" as the particular service providers the customer has access to. In practice, this often means the service providers they have contracted. Further, Vinter's technology allows for the customization of other requirements, including the thresholds on size, volume, and price history. Rarely, however, do we see a need to edit these thresholds.

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On a technical level, the Vinter Custom Universe is similar to the Vinter Institutional Universe. Both universes are a subset of the Vinter Full Universe. In the custom universe, our customer selects the service providers based on the contractual arrangements. In the institutional universe, Vinter selects the service providers based on the rules in this document.

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Rebalancing Calendar:

Vinter maintains a rebalancing calendar to ensure a smooth rebalancing process. It tracks the actions that Vinter needs to undertake in accordance with the published methodologies.

Event:

The events are any of the following:

- Review Date: On this day, Vinter calculates the new constituents' weights.
- New Weights Delivery Date: On this day after 5 pm CET, Vinter publishes the new weights.
- Rebalancing Date: This day represents the last trading day before an index adopts its new weights and constituents.

Indices

Universes

- Rebalancing Calendar Update: On this day, Vinter performs the semi-annual review described below.
- Market Holiday: A non-weekend day during which markets are closed. By default, indexes follow the SIX Trading & Currency Holiday Calendar.
- Review Date (Indicative Weights): On this day, Vinter calculates indicative weights if the review date happened 5 business days sooner.
- Indicative Weights Delivery Date: On this day after 5 pm CET, Vinter publishes the indicative weights.

Review

There are two types of calendar updates:

- A semi-annual review during which Vinter identifies events for the upcoming 12 months. It occurs twice a year.
- Launch reviews which are triggered whenever a new index is launched. In this case, Vinter adds the new index to the calendar.

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