

# OneChronos Market Data Feed

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## Version Control

| Version | Description  | Publication date |
|---------|--|------------------|
| v1.0    | Initial version  | 22.09.2025       |
| v1.1    | Terminology clarification: replaced references to “average price” with “intended price” to better reflect auction execution logic. No changes to message schema, field names, offsets, encoding, or feed behaviour.  | 12.01.2026       |
| v1.2    | <ul style="list-style-type: none"> <li>● Currency format updated to ISO 4217 standard throughout message types</li> <li>● Timestamp format updated to ISO 8601 UTC format, with microsecond granularity</li> <li>● New fields added to LastTrade messages:               <ul style="list-style-type: none"> <li>○ Trading System</li> <li>○ Price Notation</li> <li>○ Flags</li> <li>○ TIC</li> </ul> </li> <li>● New fields added to AuctionIndicative messages:               <ul style="list-style-type: none"> <li>○ Trading System</li> <li>○ Trading System Phase</li> <li>○ Price Notation</li> </ul> </li> </ul> | 05.02.2026       |
| v1.3    | Updated Disclaimer   | 27.04.2026       |
| v1.4    | <ul style="list-style-type: none"> <li>● Add “publicationDateAndTime” field to Auction Indicative and Last Trade messages</li> <li>● Reorder fields “isin” and “priceScale” in Last Trade and AuctionSummary</li> <li>● Rename “auctionCallTime” to “executionDateTime” in Last Trade and Auction Summary messages</li> </ul>  | 04.06.2026       |

## Overview

This document outlines the multicast market data interface for OCXL (OneChronos UK MTF) and OCXE (OneChronos EU MTF), collectively referred to as the “OneChronos MTF.” It describes the structure, content, and operational characteristics of the multicast data feeds, which disseminate trades, auction events, and security state changes in real time.

OneChronos publishes two multicast feeds, detailed in this document:

1. **Auction Update Feed** - Publishing real-time messages communicating auction state and timing, pre-trade transparency and summary of the auction outcome.

## 2. Last Trade Feed - Providing post-trade transparency on the executions on OneChronos MTF.

The market data feed message schema uses the SBE encoding protocol. All details of the encoding protocol relevant to the Market Data Specification are included in this document, but an XML schema can be provided upon request. Please reach out to [ops\\_europe@onechronos.com](mailto:ops_europe@onechronos.com) for a copy.

### Definitions

| Term                       | Definition  |
|----------------------------|---|
| <b>Auction</b>             | A periodic process in which buy and sell orders are matched to determine the clearing price of a security.  |
| <b>Execution Date Time</b> | The timestamp that marks the end of the order collection period and the start of the optimisation/uncrossing process in an auction cycle. The date and time the transaction was executed.   |
| <b>Auction ID</b>          | A unique identifier for a specific auction.   |
| <b>Block Length</b>        | The length (in bytes) of a message, excluding the header  |
| <b>Closing Auction</b>     | An auction held at the end of the trading day by the Listing Exchange to determine the closing price of a security.   |
| <b>Currency</b>            | The standardization of money in which a security is traded on the primary listing venue. The following currencies are supported with these ISO 4217 short codes: <ul style="list-style-type: none"> <li>● CHF</li> <li>● EUR</li> <li>● GBP</li> <li>● GBX</li> <li>● NOK</li> <li>● DKK</li> <li>● SEK</li> <li>● USD</li> </ul> |
| <b>Decimal Places</b>      | The number of digits after the decimal point in a price, as specified by priceScale.  |
| <b>Endianness</b>          | The order in which bytes are stored in memory for multi-byte values (e.g., little-endian, big-endian).  |
| <b>Enum</b>                | Short for "enumeration," a data type consisting of a set of named values (e.g., Currency, SecurityStatus).  |

| Term                      | Definition  |
|---------------------------|---|
| <b>Executing Exchange</b> | The MTF trading venue (OCXL or OCXE) where the trade is executed, via the auction that is organised.  |
| <b>Gap Detection</b>      | The process of identifying missing messages in a sequence, typically by monitoring sequence numbers.  |
| <b>Heartbeat</b>          | A periodic message (sent once per second) that advances the feed Sequence Number and indicates the connection is alive. Used by clients to monitor feed liveness and detect message gaps. |
| <b>ISIN</b>               | International Securities Identification Number: a 12-character alphanumeric code that uniquely identifies a security.   |
| <b>Listing Exchange</b>   | The primary exchange where a security is listed, identified by its MIC.   |
| <b>MIC</b>                | Market Identifier Code: a unique four-character code used to identify exchanges and trading venues.   |
| <b>MiFID II</b>           | Markets in Financial Instruments Directive II: a legislative framework instituted by the European Union to regulate financial markets and improve transparency.                           |
| <b>MTF</b>                | Multilateral Trading Facility: a trading system that brings together multiple third-party buying and selling interests in financial instruments.  |
| <b>OCXE</b>               | OneChronos EU MTF: the Netherlands based Multilateral Trading Facility operated by OneChronos.  |
| <b>OCXL</b>               | OneChronos UK MTF: the UK Multilateral Trading Facility operated by OneChronos.   |
| <b>Offset</b>             | The position (in bytes) of a field within a message, measured from the start of the message.  |
| <b>Opening Auction</b>    | An auction held by the Listing Exchange at the start of the trading day to determine the opening price of a security.   |
| <b>Optional Field</b>     | A field that may or may not be present in a message, typically indicated by a sentinel value (e.g., max u64).   |
| <b>Price Scale</b>        | The number of decimal places used to represent a price, allowing the price to be stored as a scaled integer.  |

| Term                   | Definition   |
|------------------------|--|
| <b>RTS</b>             | Regulatory Technical Standards: detailed rules and procedures that implement MiFID II requirements.  |
| <b>Schema ID</b>       | An identifier for the message schema, always 19 in this protocol.  |
| <b>Sequence Number</b> | A unique, incrementing number assigned to each message, starting at 1 each trading day.  |
| <b>Template ID</b>     | An identifier for the message type (e.g., 1 for Heartbeat, 2 for LastTrade).   |
| <b>Timestamp</b>       | Timestamps: ISO 8601 UTC format. This is derived from internal timestamps by truncating to microseconds. OneChronos supports UTC timestamps at nanosecond precision. See the section “ <b>Data Types &amp; Encoding</b> ” for additional detail. |
| <b>UDP Multicast</b>   | A method of sending network messages to a group of destinations simultaneously, used here for distributing market data.  |
| <b>Width</b>           | The size (in bytes) of a field within a message.   |

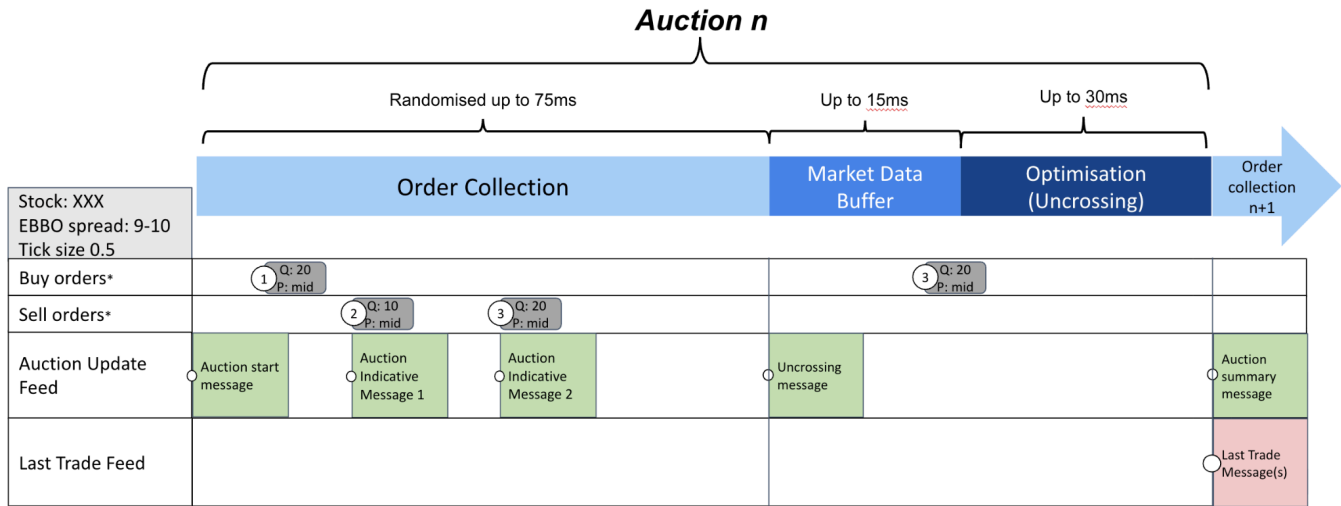
## Connectivity

To discuss connectivity, contact [ops\\_europe@onechronos.com](mailto:ops_europe@onechronos.com).

## Market Hours

- Feed availability: Monday–Friday, 08:00 – 18:30 CET (excluding market holidays).
  - From 08:00 CET, the multicast feed is live and will emit heartbeat messages at 1-second intervals.
- Trading hours: Monday–Friday, 09:00 – 17:30 CET (excluding market holidays).
- Trading commences once the relevant security has opened on its primary listing market. Trading ceases when the primary market enters its closing auction or when the primary reference price becomes unavailable.

## Message Publication Timeline



### Auction Update Feed:

- A venue-wide Auction Start Message communicates the start of the Order Collection phase.
- If and when the order book becomes crossed, the first security specific Auction Indicative Message is published showing what is potentially executable in the auction. Any changes to the order book or EBBO reference that changes this information prior to the transition into the Uncrossing Phase (Market Data Buffer and Optimisation) are reflected by publishing a new Auction Indicative Message - in this example 'Auction Indicative Message 2'.
  - Orders arriving after the transition into the Uncrossing phase do not participate in auction n, and are queued for the start of auction n+1. These orders will also not contribute to the auction indicative messages of auction n.
- A venue-wide Uncrossing message is published when the order book transitions into the Uncrossing Phase. This message communicates the locking of orders in the orderbook when criteria for locking in that security are met.
- A security specific auction summary message is published at the end of the optimisation, only when there has been an execution in the security
  - Both the Auction Indicative Message and Auction Summary Message support two price and quantity fields, as well as an intended price and total quantity. The second price and quantity fields are used when OneChronos requires multiple price points to uncross an auction.
- OneChronos will then immediately start auction+1 (see point 1).
- Security State Change messages are also published on this feed.

### Last Trade Feed:

- After the conclusion of a full auction cycle (end of Optimisation), any execution(s) are published per security to meet post trade transparency requirements on the Last Trade Feed.

## Identifiers

Securities are uniquely identifiable using a combination of:

- ISIN (12 characters)
- Listing MIC
- Currency

No two securities will have the same combination of these fields.

## Sequencing & Recovery

- Each message carries a sequenceNumber (u64), starting at 1 each trading day.
- Heartbeat messages (templateId = 1) are sent every 1 second and always increment sequenceNumber.
- Gap detection: Clients should monitor sequence numbers.
- Recovery model: no replay is available

## Data Types & Encoding

- Character fields (char(n)) are fixed-length ASCII strings.
- Enums are encoded as char values as specified in the relevant enum tables (e.g. SecurityStatus, HaltReason, SuspensionReason).
- Null unsigned integer values are encoded as the max value of the integer (all bits = 1). Null signed integer values are encoded as the min value of the integer.
- Prices are encoded as scaled integers with decimal precision defined by priceScale (number of decimal places).
- Timestamps: Timestamps are encoded as char(27) in ISO 8601 UTC format: YYYY-MM-DDThh:mm:ss.dddZ (microsecond precision, UTC). This applies to all timestamp fields, including transparency event timestamps (e.g., updateDateAndTime, auctionCallTime) and heartbeat timestamps (e.g., sendTime).
- Endianness: Little-endian

## Message Catalogue

### TemplateId Reference Table

| templateId | Message Type        |
|------------|---------------------|
| 1          | Heartbeat           |
| 2          | LastTrade           |
| 3          | AuctionStart        |
| 4          | AuctionUncrossing   |
| 5          | AuctionIndicative   |
| 6          | AuctionSummary      |
| 7          | SecurityStateChange |

## Message Definitions

Detailed field-by-field message definitions for the following message types are included:

- LastTrade
- AuctionStart
- AuctionUncrossing
- AuctionIndicative
- AuctionSummary
- SecurityStateChange

See **Appendix A** for detailed schema tables including offsets and reserved fields.

## Appendix A – Schema Definitions (Full)

### Enums

#### *SecurityStatus*

| Value     | Encoding |
|-----------|----------|
| Trading   | T        |
| Closed    | C        |
| Halted    | H        |
| Suspended | S        |

#### *HaltReason*

| Value          | Encoding |
|----------------|----------|
| Null           | [NULL]   |
| MarketState    | M        |
| StaleReference | S        |
| ManualHalt     | H        |
| Unspecified    | U        |

#### *SuspensionReason*

| Value            | Encoding |
|------------------|----------|
| Null             | [NULL]   |
| NcaSuspension    | N        |
| ManualSuspension | M        |
| Unspecified      | U        |

#### *Optional Values*

Null unsigned integer values are encoded as the max value of the integer (all bits = 1). Null signed integer values are encoded as the min value of the integer.

| Value | Encoding |
|-------|----------|
| 0     | 0        |
| 1     | 1        |
| ...   | ...      |
| Null  | u64 max  |

### Message Header

| Field name     | Type | Offset | Width | Description  |
|----------------|------|--------|-------|--|
| sequenceNumber | u64  | 0      | 8     | The sequence number of the message starting every day at 1         |
| reserved       | u8   | 8      | 1     | Reserved   |
| blockLength    | u16  | 9      | 2     | The length of the message, excluding the header                    |
| templateId     | u16  | 11     | 2     | The template id of the message (Heartbeat=1, AuctionStart=3, etc.) |
| schemald       | u16  | 13     | 2     | Always 19  |
| version        | u16  | 15     | 2     | The version of message, currently 1                                |

### Last Trade Messages (schemald=19)

#### Heartbeat (templateId=1)

| Field name        | Type     | Offset | Width |
|-------------------|----------|--------|-------|
| Header            | -        | 0      | 17    |
| executingExchange | char(4)  | 17     | 4     |
| sendTime          | char(27) | 21     | 27    |

#### Notes:

- Sent every 1 second during trading sessions and idle periods.
- Always increments sequenceNumber.
- Provides a continuous liveness signal for clients and supports gap detection.
- Heartbeat messages are generated even when no auction/trade events occur.

#### LastTrade (templateId=2)

| Field name             | Type     | Offset | Width | Description                                |
|------------------------|----------|--------|-------|--|
| Header                 | -        | 0      | 17    | Message header                             |
| executingExchange      | char(4)  | 17     | 4     | OCXE or OCXL                               |
| tradingSystem          | char(4)  | 21     | 4     | “PATS” – periodic auction trading system   |
| executionDateTime      | char(27) | 25     | 27    | Date and time the transaction was executed |
| publicationDateAndTime | char(27) | 52     | 27    | Publication date and time                  |
| auctionId              | u64      | 79     | 8     | Auction identifier                         |
| listingExchange        | char(4)  | 87     | 4     | MIC of the listing exchange                |
| currency               | char(3)  | 91     | 3     | Currency                                   |
| isin                   | char(12) | 94     | 12    | ISIN                                       |
| priceScale             | u8       | 106    | 1     | Number of decimal places                   |

| Field name    | Type     | Offset | Width | Description   |
|---------------|----------|--------|-------|---|
| priceNotation | char(4)  | 107    | 4     | “MONE” – Monetary value in the case of equity and equity-like financial instruments |
| price         | i64      | 111    | 8     | Trade price   |
| quantity      | u64      | 119    | 8     | Quantity traded   |
| TIC           | char(30) | 127    | 30    | Transaction identification code   |
| flags         | char(4)  | 157    | 4     | “ALGO” – Algorithmic transaction flag<br>“CANC” – Cancellation flag                 |
| reserved      | -        | 161    | 16    | Reserved  |

### ***Auction Update Messages (schemald=19)***

#### ***Heartbeat (templated=1)***

| Field name        | Type    | Offset | Width |
|-------------------|---------|--------|-------|
| Header            | -       | 0      | 17    |
| executingExchange | char(4) | 17     | 4     |
| sendTime          | u64     | 21     | 27    |

#### ***AuctionStart (templated=3)***

| Field name        | Type     | Offset | Width | Description                     |
|-------------------|----------|--------|-------|---------------------------------|
| Header            | -        | 0      | 17    | Message header                  |
| executingExchange | char(4)  | 17     | 4     | OCXL or OCXE                    |
| updateDateAndTime | char(27) | 21     | 27    | Time order entry period started |
| auctionId         | u64      | 48     | 8     | Auction identifier              |

#### ***AuctionUncrossing (templated=4)***

| Field name        | Type     | Offset | Width | Description               |
|-------------------|----------|--------|-------|---------------------------|
| Header            | -        | 0      | 17    | Message header            |
| executingExchange | char(4)  | 17     | 4     | OCXL or OCXE              |
| updateDateAndTime | char(27) | 21     | 27    | Time optimisation started |
| auctionId         | u64      | 48     | 8     | Auction identifier        |

#### ***AuctionIndicative (templated=5)***

| Field name        | Type    | Offset | Width | Description                              |
|-------------------|---------|--------|-------|--|
| Header            | -       | 0      | 17    | Message header                           |
| executingExchange | char(4) | 17     | 4     | OCXL or OCXE                             |
| tradingSystem     | char(4) | 21     | 4     | “PATS” – periodic auction trading system |

| Field name             | Type         | Offset | Width | Description   |
|------------------------|--------------|--------|-------|---|
| tradingSystemPhase     | char(4)      | 25     | 4     | "UDUC" – Undefined Auction  |
| updateDateAndTime      | char(27)     | 29     | 27    | Time indicative price calculated  |
| publicationDateAndTime | char(27)     | 56     | 27    | Publication date and time   |
| auctionId              | u64          | 83     | 8     | Auction identifier  |
| listingExchange        | char(4)      | 91     | 4     | MIC of listing exchange   |
| currency               | char(3)      | 95     | 3     | Currency  |
| isin                   | char(12)     | 98     | 12    | ISIN  |
| priceScale             | u8           | 110    | 1     | Number of decimal places  |
| priceNotation          | char(4)      | 111    | 4     | "MONE" – Monetary value in the case of equity and equity-like financial instruments   |
| price1                 | i64          | 115    | 8     | Indicative price 1 (always set)   |
| quantity1              | u64          | 123    | 8     | Quantity at price1 (always set)   |
| price2                 | Optional i64 | 131    | 8     | Indicative price 2 (if two clearing prices)   |
| quantity2              | Optional u64 | 139    | 8     | Quantity at price2 (if two clearing prices)   |
| intendedPrice          | i64          | 147    | 8     | Where the auction uncrosses at a single price, this field reflects that price.<br>Where the auction uncrosses at multiple price points, this field contains the intended clearing price prior to the adjustments required to adhere to tick-size. |
| totalQuantity          | u64          | 155    | 8     | Total quantity indicated  |
| reserved               | -            | 163    | 16    | Reserved  |

#### ***AuctionSummary (templateId=6)***

| Field name        | Type     | Offset | Width | Description   |
|-------------------|----------|--------|-------|---|
| Header            | -        | 0      | 17    | Message header  |
| executingExchange | char(4)  | 17     | 4     | OCXL or OCXE  |
| executionDateTime | char(27) | 21     | 27    | Date and time the transaction was executed  |
| auctionId         | u64      | 48     | 8     | Auction identifier  |
| listingExchange   | char(4)  | 56     | 4     | MIC of listing exchange   |
| currency          | char(3)  | 60     | 3     | Currency  |
| isin              | char(12) | 63     | 12    | ISIN  |
| priceScale        | u8       | 75     | 1     | Number of decimal places  |
| priceNotation     | char(4)  | 76     | 4     | "MONE" – Monetary value in the case of equity and equity-like financial instruments |
| price1            | i64      | 80     | 8     | Clearing price 1 (always set)   |
| quantity1         | u64      | 88     | 8     | Quantity at price1  |

| Field name    | Type         | Offset | Width | Description  |
|---------------|--------------|--------|-------|--|
| price2        | Optional i64 | 96     | 8     | Clearing price 2 (if exists)   |
| quantity2     | Optional u64 | 104    | 8     | Quantity at price2   |
| intendedPrice | i64          | 112    | 8     | Where the auction uncrosses at a single price, this field reflects that price. Where the auction uncrosses at multiple price points, this field contains the intended clearing price prior to the adjustments required to adhere to tick-size. |
| totalQuantity | u64          | 120    | 8     | Total quantity indicated   |
| reserved      | -            | 128    | 16    | Reserved   |

### ***SecurityStateChange (templateId=7)***

| Field name        | Type     | Offset | Width | Description                               |
|-------------------|----------|--------|-------|---|
| Header            | -        | 0      | 17    | Message header                            |
| executingExchange | char(4)  | 17     | 4     | OCXL or OCXE                              |
| updateDateAndTime | char(27) | 21     | 27    | Time state changed                        |
| auctionId         | u64      | 48     | 8     | Auction identifier                        |
| listingExchange   | char(4)  | 56     | 4     | MIC of listing exchange                   |
| currency          | char(3)  | 60     | 3     | Currency                                  |
| isin              | char(12) | 63     | 12    | ISIN                                      |
| securityStatus    | enum     | 75     | 1     | Trading, Closed, Halted, Suspended        |
| haltReason        | enum     | 76     | 1     | MarketState, StaleReference, Manual, etc. |
| suspensionReason  | enum     | 77     | 1     | NCA Suspension, Manual, etc.              |
| reserved          | -        | 78     | 16    | Reserved                                  |

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