Cboe Europe

Last Sale

Specification

Version 1.7
2 October 2023

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Contents

1 Introduction

1.1 Overview

This document describes the Cboe Last Sale Feed. The feed disseminates real-time, intraday trade data which includes price, volume and time while specifically excluding order information. It is in the proscribed MiFID II format and includes MiFID II-complaint flags for the purpose of post-trade transparency. The data types used in this feed also conform to MiFID II standards.

The Last Sale feed covers all of the following trade/execution events:

- On-book executions, and their amendments and breaks. This includes both the integrated order book and dark order book.

- Auction uncrossings, both from self-listed symbols on CXE and DXE, and periodic auctions on BXE and DXE.

- Confirmed Exchange Trade Reports ("ETR") on BXE, CXE, DXE and CEDX, and their amendments or cancellations.

- Trade Reports confirmed on TRF (APA), and their amendments or cancellations.

2 Protocol

2.1 Message Format

The Last Sale data feed is comprised of a series of fixed-length sequenced messages. The length of each message is dependent upon the message type. Each message is made up of non-control ASCII bytes. Members familiar with the TCP PITCH protocol should find it very easy to reuse that code to process the Last Sale feed.

2.2 Sequence Numbers

The messages that make up the Last Sale protocol are delivered using SOUP 2.0, which handles sequencing and delivery integrity. Cboe implementation of SOUP 2.0 is the same as other market centres. This includes the implementation of session events, such as login requests, client/server heartbeats, and logout requests.

3 Message Types

The fields within the Last Sale Europe Message have a corresponding data type. The various data types are defined in the following table.

Data Type	Description
Alpha	A string of ASCII letters (A–Z), left justified and space padded on the right.
Alphanumeric	A string of ASCII numbers and letters (A–Z, 0–9), left justified and space padded on the right.
Numeric	A string of ASCII numbers (0–9), right justified and zero filled on the left.
Numeric Price	A string of ASCII numbers(0–9) consisting of 8 whole number digits, followed by an explicit decimal point, followed by 9 decimal digits. Please note this is different from normal PITCH Numeric from Cboe where the decimal point is implicit. MiFID II standard requires an explicit decimal point in the price.
ISO DateTime	A string of ASCII numbers and predefined letters, that represent the ISO 8601 Date and Time Format: YYYY-MM-DDThh:mm:ss.ddddddZ. For example, 2015-12-20T13:00:15.500000Z.
Alpha Flag	A string of four ASCII letters (or fewer, in which case, space padded on the right) with valid values indicated in each flag.
Base 36 numeric	A string of ASCII numbers and letters (A–Z, 0–9), representing base 36 digits, right justified and zero filled on the left.
Timestamp	A string of ASCII numbers (0–9) representing the whole number of milliseconds past midnight London time, right justified and zero padded on the left, with no decimal point.

3.1 System Event Message

Unlike other market centres, Cboe does not send System Event messages.

3.2 Last Sale Europe Message

Last Sale Europe Messages are sent when an order on a Cboe order book is executed in whole or in part, or when a reported trade is submitted to Cboe (Exchange or APA).

When a trade has been called, a Last Sale Europe message is sent out with the original trade details and "CANC" being set in the Modification Indicator.

When a trade has been amended, a Last Sale Europe message with the original trade details and "CANC" being set in the Modification Indicator will first be sent out, followed by another Last Sale Europe message with the new trade details and "AMND" being set in the Modification Indicator.

Following sections describe the current format and the new format applicable from 1 January 2024. The new format support MMT v4.1 flags.

3.2.1 Current format (till 31 December 2023)

Field Name	Offset	Length	Value	Description
Timestamp	0	8	Timestamp	Timestamp
Message Type	8	1	"u"	Last Sale Europe Message
Trading Date Time	9	27	ISO DateTime	Date and time the trade occurred
Symbol	36	12	Alphanumeric	ISIN Code that identifies the financial instrument
Price	48	18	Numeric Price	Price of the trade. This may be zero if the price is pending, as denoted by the "Price Discovery Process" field
Price Currency	66	3	Alpha	ISO 3-letter Currency code
Executed Shares	69	12	Numeric	Number of shares executed
Execution Venue	81	4	Alpha	ISO 10383 segment MIC, and SINT for Systematic internalisers, XOFF for OTC trades
Publication Date Time	85	27	ISO DateTime	Date and time the trade was published
Trade ID	112	12	Base 36 Numeric	Cboe generated day-unique execution/trade identifier. Left padded with zeroes.
Transaction Category	124	4	Alpha Flag	Corresponds to MMT v3 Level 3.1 "RPRI" = Trade that has Received Price Improvement "TPAC" = Package Trade "XFPH" = Exchange For Physical Trade
Negotiation Flag	128	4	Alpha Flag	Corresponds to MMT v3 Level 3.2 "NLIQ" = Negotiated Trade in Liquid Instruments "OILQ" = Negotiated Trade in Illiquid Instruments "PRIC" = Negotiated Trade Subject to Conditions Other Than The Current Market Price "ILQD" = Pre-Trade Transparency Waiver for Illiquid Instrument on an SI "SIZE" = Pre-Trade Transparency Waiver for Above Standard Size on an SI If the Pre-Trade Transparency Waivers of "ILQD" and "SIZE" both apply to the trade, "SIZE" will be published in this field
Agency Cross Trade	132	4	Alpha Flag	Corresponds to MMT v3 Level 3.3 "ACTX" = Agency Cross Trade
Modification Indicator	136	4	Alpha Flag	Corresponds to MMT v3 Level 3.4 "CANC" = Trade Cancellation "AMND" = Trade Amendment
Benchmark/Reference Indicator	140	4	Alpha Flag	Corresponds to MMT v3 Level 3.5 "BENC" = Benchmark Trade "RFPT" = Reference Price Trade
Special Dividend	144	4	Alpha Flag	Corresponds to MMT v3 Level 3.6 "SDIV" = Special Dividend Trade
Price Discovery Process	148	4	Alpha Flag	Corresponds to MMT v3 Level 3.8 "NPFT" = Non-Price Forming Trade "TNCP" = Trade not Contributing to the Price Discovery Process "PNDG" = Price is Pending

Algorithmic Indicator	152	4	Alpha Flag	Corresponds to MMT v3 Level 3.9 "ALGO" = Algorithmic Trade
Post-Trade Deferral Reason	156	4	Alpha Flag	Corresponds to MMT v3 Level 4.1 "LRGS" = Deferral for "Large in Scale" "ILQD" = Deferral for "Illiquid Instrument" "SIZE" = Deferral for "Size Specific" If the Post-Trade Deferral Reasons of "ILQD" and "SIZE" or "ILQD" and "LRGS" both apply to the trade, "ILQD" will be published in this field
Duplicative Indicator	160	4	Alpha Flag	Corresponds to MMT v3 Level 5 "DUPL" = Duplicative Trade Report
Jurisdiction	164	2	Alpha	Corresponds to venue where the trade was executed "EU" = Trade executed on an EU regulated venue or APA "UK" = Trade executed on a non-EU regulated venue or APA

3.2.2 New format (from 1 January 2024)

For fields of the type Alpha Flag, all the values will be applicable to both EU and UK APA unless specified otherwise

Field Name	Offset	Length	Value	Description
Timestamp	0	8	Timestamp	Timestamp
Message Type	8	1	"7"	Last Sale Europe Message
Trading Date Time	9	27	ISO DateTime	Date and time the trade occurred
Symbol	36	12	Alphanumeric	ISIN Code that identifies the financial instrument
Price	48	18	Numeric Price	Price of the trade. This may be zero if the price is pending, as denoted by the "Price Discovery Process" field
Price Notation	66	4	Alpha Flag	"MONE" = Monetary value in the case of equity and equity-like financial instruments "PERC" = Percentage in the case of certificates and other equity-like financial instruments "YIEL" = Yield in the case of certificates and other equity-like financial instruments "BAPO" = Basis points in the case of certificates and other equity-like financial instruments
Price Currency	70	3	Alpha	ISO 3-letter Currency code
Executed Shares	73	12	Numeric	Number of shares executed
Notional Amount	85	18	Numeric Price	Value of the trade, in the major currency. i.e. Price * Executed Shares
Notional Currency	103	3	Alpha	ISO 3-letter Currency code representing the major currency in which the notional amount is denominated.
Execution Venue	106	4	Alpha	ISO 10383 segment MIC, and SINT for Systematic internalisers, XOFF for OTC trades
Third Country Trading Venue	110	4	Alpha	When populated, indicates the trade was executed on a venue not deemed equivalent under ESMA Opinion on determining third-country trading venues for the purpose of transparency under Mifid II/Mifir. The column contains the venue MIC, and the execution venue will contain the value "XOFF". Not applicable to reports from Cboe's UK APA.
Publication Date Time	114	27	ISO DateTime	Date and time the trade was published
Trade ID	141	12	Base 36 Numeric	Cboe generated day-unique execution/trade identifier. Left padded with zeroes.

Market Mechanism	153	4	Alpha Flag	Corresponds to MMT v4.1 Level 1 "LB" = Central Limit Order Book "QB" = Quote Driven Market "DB" = Dark Order Book "OB" = Off Book (including Voice or Messaging Trading) "PA" = Periodic Auction "RQ" = Request for Quotes "AH" = Any Other, Including Hybrid (original ESMA definition in RTSs 1 & 2) "HS" = Hybrid System (revised ESMA definition, replacing 'Any Other, Including Hybrid') "AO" = Any Other, Excluding Hybrid (revised ESMA definition, replacing 'Any Other, Including Hybrid')
Trading Mode	157	4	Alpha Flag	Corresponds to MMT v4.1 Level 2 "AU" = Undefined Auction "OA" = Scheduled Opening Auction "CA" = Scheduled Closing Auction "IA" = Scheduled Intraday Auction "UA" = Unscheduled Auction "OD" = On Demand Auction (Frequent Batched Auction) "CT" = Continuous Trading "AC" = At Market Close Trading "OT" = Out of Main Session Trading "ON" = Trade Reporting (On Exchange) "OF" = Trade Reporting (Off Exchange) "SI" = Trade Reporting (Systematic Internaliser)
Transaction Category	161	4	Alpha Flag	Corresponds to MMT v4.1 Level 3.1 "D" = Dark Trade "RPRI" = Trade that has Received Price Improvement "TPAC" = Package Trade "XFPH" = Exchange For Physical Trade
Negotiation Flag	165	4	Alpha Flag	Corresponds to MMT v4.1 Level 3.2 "N" = Negotiated Trade "NLIQ" = Negotiated Trade in Liquid Financial Instruments "OILQ" = Negotiated Trade in Illiquid Financial Instruments "PRIC" = Negotiated Trade Subject to Conditions Other Than The Current Market Price "ILQD" = Pre-Trade Transparency Waiver for Illiquid Instrument on an SI "NETW" = Negotiated Trade With Pre-Trade Transparency Waiver
Agency Cross Trade	169	4	Alpha Flag	Corresponds to MMT v4.1 Level 3.3 "ACTX" = Agency Cross Trade

Modification Indicator	173	4	Alpha Flag	Corresponds to MMT v4.1 Level 3.4 "CANC" = Trade Cancellation "AMND" = Trade Amendment
Benchmark Indicator	177	4	Alpha Flag	Corresponds to MMT v4.1 Level 3.5 "BENC" = Benchmark Trade "CLSE" = Benchmark Transactions Executed at the Market Closing Price "RFPT" = Reference Price Trade
Special Dividend	181	4	Alpha Flag	Corresponds to MMT v4.1 Level 3.6 "SDIV" = Special Dividend Trade
Off Book Automated	185	4	Alpha Flag	Corresponds to MMT v4.1 Level 3.7 "M" = Off Book Non-Automated "Q" = Off Book Automated
Price Discovery Process	189	4	Alpha Flag	Corresponds to MMT v4.1 Level 3.8 "NPFT" = Non-Price Forming Trade "TNCP" = Trade not Contributing to the Price Discovery Process "PNDG" = Price is Pending "NOAP" = Price is Not Applicable
Algorithmic Indicator	193	4	Alpha Flag	Corresponds to MMT v3 Level 3.9 "ALGO" = Algorithmic Trade
Pre-Trade Transparency Waiver	197	4	Alpha Flag	Corresponds to MMT v3 Level 3.10 "SIZE" = Pre-Trade Transparency Waiver for Above Standard Market Size on an SI "NTLS" = Negotiated Trade Larger Than LIS Brought Onto a Venue
Portfolio Flag	201	4	Alpha Flag	Corresponds to MMT v3 Level 3.11 "PORT" = Portfolio Trade
Contingent Flag	205	4	Alpha Flag	Corresponds to MMT v3 Level 3.12 "CONT" = Contingent Trade
Give-up Flag	209	4	Alpha Flag	Corresponds to MMT v3 Level 3.13 "GIVE" = RFMD Give-Up Trade
Post-Trade Deferral Reason	213	4	Alpha Flag	Corresponds to MMT v4.1 Level 4.1 "NI" = Non-Immediate Publication "LRGS" = Non-Immediate Publication: Deferral for "Large in Scale"

Deferral Or Enrichment Type	217	4	Alpha Flag	Corresponds to MMT v4.1 Level 4.2 For the original trade: "LMTF" = Limited Details Trade "DATF" = Daily Aggregated Trade "VOLO" = Volume Omission Trade "FWAF" = Four Weeks Aggregation Trade "IDAF" = Indefinite Aggregation Trade "VOLW" = Volume Omission Trade, Eligible for Subsequent Enrichment in Aggregated Form For the subsequent enrichment trade(s): "FULF" = Full Details of Earlier "Limited Details Trade (LMTF)" "FULA" = Full Details of Earlier "Daily Aggregated Trade (DATF)" "FULV" = Full Details of Earlier "Volume Omission Trade (VOLO)" "FULJ" = Full Details of Earlier "Four Weeks Aggregation Trade (FWAF)" "COAF" = Full Details in Aggregated Form of Earlier "Volume Omission Trade, Eligible for Subsequent Enrichment in Aggregated Form (VOLW)"
Deferral Illiquid Instrument	221	4	Alpha Flag	Corresponds to MMT v4.1 Level 4.3 "ILQD" = Non-Immediate Publication: Deferral for "Illiquid Instrument"
Deferral Size Specific	225	4	Alpha Flag	Corresponds to MMT v4.1 Level 4.4 "SIZE" = Non-Immediate Publication: Deferral for "Size Specific"
Duplicative Within Jurisdiction	229	4	Alpha Flag	Corresponds to MMT v4.1 Level 5.1 "DUPL" = Duplicative Trade Report
Duplicative Across Jurisdiction	233	4	Alpha Flag	Corresponds to MMT v4.1 Level 5.2 "XBDT" = Cross-Border Duplicative Trade Report
Intra-Group Indicator	237	4	Alpha Flag	Corresponds to MMT v4.1 Level 5.3 "IGRP" = Intra-Group Trade
Jurisdiction	241	2	Alpha	Corresponds to venue where the trade was executed "EU" = Trade executed on an EU regulated venue or APA "UK" = Trade executed on a non-EU regulated venue or APA

4 Support

Please email support questions or comments regarding this specification to `tradedeskeurope@cboe.com`.

Revision History

6 January 2016	Version 1.0 Initial draft version.
19 February 2016	Version 1.1 Updated for new branding.
18 March 2016	Version 1.2 Updated flags based on updated MMT v3 specification
19 July 2017	Version 1.3 MMT v3.04 support for Q4 2017 release.
25 April 2019	Version 1.4 Added the jurisdiction field.
31 May 2019	Version 1.5 Added DXE environment.
28 March 2023	Version 1.6 Added CEDX environment.
2 October 2023	Version 1.7 Added MMT v4.1 Support.