Cboe Australia

Order Conversion Service

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1. Overview of the Order Conversion Service (OCS)

Cboe Australia (CXA) provides an **Order Conversion Service (OCS)**, an optional service leveraging our existing Port Attribute functionality. Participants can request Cboe systems to 'switch on' pre-defined Cboe instructions, to be applied to certain orders under certain conditions on their behalf.

The OCS applies these pre-defined instructions to orders using **Port Attribute** mechanisms.

The OCS is a platform that provides an expanding library of order handling options to participants, which are listed in the appendices of this document.

What is a Port Attribute? *Port attributes are CXA-defined mechanisms, that participants may request per order entry port, which instruct CXA systems to perform on the participant's behalf.*

A common example of a Port Attribute is ***'cancel on disconnect'*** *where CXA systems will cancel a participant's orders entered by a FIX or BOE port if that port loses connection with CXA systems.*

Participants may choose to use pre-defined OCS instructions by confirming with CXA Trade Desk, who apply the settings with approved participant signoff:

- Order Conversion Service options may be applied per FIX order entry port, and
- Some Order Conversion Service options may also be applied to an inclusion list of symbols per FIX order entry port, assisting participant rollout strategies

The appendices in this document set out the different use cases offered by the OCS. Cboe expects to expand the number of use cases over time.

2. Benefits of the Order Conversion Service

All mechanisms in the Order Conversion Service library may otherwise be developed independently by participants using existing interfaces, however:

- The OCS uses Port Attribute mechanisms, which facilitate the implementation of pre-defined order handling logic without technical interface message updates
- Participants are not imposed with development efforts to implement these new features – the OCS does the work for you
- OCS logic is applied within exchange systems with minimal reaction-time latency
- Ease of setup facilitates a rapid time to market
- All options in the Order Conversion Service Library are available to all participants

3. Appendix OCS01: Timed Expiring Order (TEO) Mechanism

Participants who use Immediate or Cancel (IOC) orders, can choose to utilise the mechanism from the Order Conversion Service Library which converts the incoming order to a Hidden Pegged GTD (with ExpireTime) order for a short duration. This is referred to as a ***Timed Expiring Order (TEO)*** in this document. Participants who currently use Pegged IOC orders can now increase their execution opportunities via the OCS without any development work.

Timed Expiring Order is not a new order type. Participants can emulate this mechanism with existing interfaces, by entering a Pegged GTD with ExpireTime order, which will be automatically cancelled by CXA systems at the ExpireTime.

The Order Conversion Service however facilitates this method with no development effort for existing IOC users, with faster time-to-market.

3.1 Port Attributes relevant to Timed Expiring Orders

Participants may configure their usage of **Timed Expiring Order (TEO)**, per symbol, per FIX order entry port, via a Port Attribute **TEO Symbol inclusion list.**

TEO Symbol	TEO Duration (milliseconds)
BHP	200
CSR	300
WOW	150
NAB	250
ABC	300

In the example specified in the table, for this FIX order entry port, only the five symbols defined in the **TEO Symbol** inclusion list will convert incoming pegged IOC on receipt to a **TEO** (Pegged GTD with ExpireTime). Any quantity that does not trade on entry will rest hidden in the order book until the duration specified unless traded prior.

In the BHP example, a TEO will rest as a GTD with ExpireTime for 200 milliseconds before being cancelled automatically by the system, unless traded prior.

Participants may also set defaults for:

- **TEO duration (milliseconds)**, which can be set at the port level if the participant has no requirement to specify unique durations per symbol. In all cases, the TEO duration must be between 10 milliseconds and 1000 milliseconds (inclusive).

- **TEO FarPoint Pricing**, which can be set to 'ON' to price the TEO at the FarPoint regardless of the participant's incoming 'ExecInst' (NearPoint, MidPoint, FarPoint) setting. If this is set to 'OFF' the participants ExecInst will be retained.

Pegged IOC orders entered for symbols outside the TEO Symbol inclusion list will be entered into the system as normal.

3.2 Order Conversion Service - Sequence for Timed Expiring Orders

IOC orders may be entered as:

- **Limit IOC** orders, where the quantity that does not immediately trade on entry is cancelled. **Limit IOCs cannot be converted to a TEO**, or
- **Pegged IOC** orders (i.e. Mid-point, Near-point, Far-point). **Pegged IOCs can be converted to a TEO on entry**. The order entered into the trading system as a **Pegged GTD (with ExpireTime) order** for a limited duration.

Pricing and eligibility considerations align with existing pegged order mechanisms:

- The TEO will remain in the order book as a hidden Pegged GTD (with ExpireTime) order and will respect normal order queue priority:
  [Price / Visibility (lit then dark) / Time].
- TEOs, like all pegged orders, respect the entered Limit price and are un-booked and ineligible to trade if the Pegged price is less favourable than the Limit price
- A TEO may be involved in one or many trades throughout its duration
- Any untraded order quantity will be cancelled by CXA systems at the end of the Participant's pre-defined duration.

3.3 Order Conversion Service - FIX Tag Reference for Timed Expiring Orders

The tables below demonstrate that the messaging sequence for an TEO is functionally the same as that of a participant that enters a GTD Pegged order which is cancelled after the desired duration, to achieve the same outcome.

1. **Current FIX tag sequence:** Pegged GTD order is entered by the participant, partially trades and is then cancelled by the participant after a short duration.

Event Description	Direction	Message Type	Order Type	Exec Inst	Time In Force	Expire Time	Exec Type	Client's Order ID	Liquidity Indicator
Pegged GTD with ExpireTime order request is entered into the trading system	**Client to CXA**	35=D New Order	40=P Pegged	18=P (Farpoint)	59=6 **GTD**	126=user defined Expiration Time	n/a	11=P001	n/a
Pegged GTD with ExpireTime order **acknowledged**	CXA to Client	35=8 Execution Report	40=P Pegged	18=P (Farpoint)	59=6 **GTD**	126=user defined Expiration Time	150=0 **New**	11=P001	n/a
Pegged GTD with ExpireTime order **partially trades on entry**	CXA to Client	35=8 Execution Report	40=P Pegged	18=P (Farpoint)	59=6 **GTD**	126=user defined Expiration Time	150=1 **Partial Fill**	11=P001	9730=R **Removed Liquidity**
Resting Pegged GTD with ExpireTime order is then partially **traded**	CXA to Client	35=8 Execution Report	40=P Pegged	18=P (Farpoint)	59=6 **GTD**	126=user defined Expiration Time	150=1 **Partial Fill**	11=P001	9730=A **Added Liquidity**
Pegged GTD with ExpireTime order **cancelled acknowledgement**	CXA to Client	35=8 Execution Report	40=P Pegged	18=P (Farpoint)	59=6 **GTD**	126=user defined Expiration Time	150=4 **Cancelled**	11=P001	n/a

2. **TEO FIX tag sequence**: Incoming Pegged IOC order is converted to Pegged GTD (with ExpireTime) order (TEO) on entry into the trading system at Farpoint.

Event Description	Direction	Message Type	Order Type	Exec Inst	Time In Force	Expire Time	Exec Type	Client's Order ID	Liquidity Indicator
Client sends a Pegged IOC order request in a pre-defined "TEO symbol" in their Port Attributes.	**Client to CXA**	35=D New Order	40=P Pegged	18=M (Midpoint)	59=3 **IOC**	n/a	n/a	11=P001	n/a
OCS converts the Pegged IOC to a Pegged GTD (with Expiretime) order (TEO) for entry into the trading system at Farpoint, as per the participant's Port Attribute instructions and intentions									
OCS enters the converted Pegged GTD (with ExpireTime) order (TEO) into the trading system	Client OCS instruction executed by CXA	35=D New Order	40=P Pegged	18=P (Farpoint)	59=6 **GTD**	126=x Calc from TEO Duration	n/a	11=P001	n/a
GTD (with ExpireTime) order (TEO) **acknowledged**	CXA to Client	35=8 Execution Report	40=P Pegged	18=P (Farpoint)	59=6 **GTD**	126=x Calc from TEO Duration	150=0 **New**	11=P001	n/a
GTD (with ExpireTime) order (TEO) **partially trades on entry**	CXA to Client	35=8 Execution Report	40=P Pegged	18=P (Farpoint)	59=6 **GTD**	126=x Calc from TEO Duration	150=1 **Partial Fill**	11=P001	9730=R **Removed Liquidity**
Resting TEO is then partially **traded**	CXA to Client	35=8 Execution Report	40=P Pegged	18=P (Farpoint)	59=6 **GTD**	126=x Calc from TEO Duration	150=1 **Partial Fill**	11=P001	9730=A **Added Liquidity**
Remaining TEO quantity is **cancelled** by CXA systems at the end of the client-defined duration	CXA to Client	35=8 Execution Report	40=P Pegged	18=P (Farpoint)	59=6 **GTD**	126=x Calc from TEO Duration	150=4 **Cancelled**	11=P001	n/a

3.4 Example Scenarios

Example 1. *Limit IOC orders are out of scope.* *IOC Limit bid order entered with quantity 1000 at price 500 and partially trades quantity 200 on entry leaving quantity 800.*	**Qty BID ASK Qty** IOC (D) ~~1000~~ 500 ~~500 200 (A)~~ (C) 200 499 502 1000 (B)
IOC Limit orders are not converted to Timed Expiring Order in this initial implementation. The untraded quantity of the IOC is cancelled as per normal.	**Qty BID ASK Qty** (C) 200 499 502 1000 (B)

Example 2. IOC converts to TEO on entry with Farpoint option on entry and partially trades before cancellation IOC Pegged (Midpoint) bid order request is converted to an TEO on entry with quantity 1000 which is priced at the NBBO Farpoint of 501, with a limit price 502.	**Qty BID ASK Qty** TEO (D) 1000 **501** 502 1000 (A) (C) 500 498 503 1000 (B)
After 30 milliseconds, an aggressive sell with quantity 600 at price 501 partially trades out the TEO leaving 400.	**Qty BID ASK Qty** TEO (D) **400** 501 502 1000 (A) (C) 500 498 503 1000 (B)
After a further 40 milliseconds, another aggressive sell quantity 1000 at 501 trades out the TEO and the remainder of the sell rests accordingly.	**Qty BID ASK Qty** (C) 500 498 **501 600 (E)** 502 1000 (A) 503 1000 (B)

Example 3. IOC converts to TEO on entry and price adjusts with NBBO updates and partially trades before cancellation IOC Pegged (Farpoint) bid order request is converted to an TEO on entry is entered with quantity 1000 which is priced at the NBBO farpoint of 501, with a limit price 505.	**Qty BID ASK Qty** TEO (D) 1000 **501** 502 1000 (A) (C) 500 498 503 1000 (B)
After 30 milliseconds, the NBBO moves to 501 – 502 thus all pegged orders are priced at the half-tick of 501.5 as per standard pegged pricing behaviour.	**Qty BID ASK Qty** TEO (D) 1000 **501.5** 502 1000 (A) (F) 200 501 503 1000 (B)
After a further 40 milliseconds, a sell Mid-point with quantity 500 priced at 501.5 trades against the TEO leaving quantity 500.	**Qty BID ASK Qty** TEO (D) **500** 501.5 502 1000 (A) (F) 200 501 503 1000 (B)
After a further 230 milliseconds, the full 300 millisecond duration has expired and the TEO is cancelled by CXA systems	**Qty BID ASK Qty** (F) 200 501 502 1000 (A) 503 1000 (B)

3.5 Technical Specification Updates

CXA has minimised the technical specification changes to reduce client impact and expedite uptake.

- **Reference Data Files**

  There are **no changes** to CXATSL or CXALSL reference data files.

- **Order Entry FIX and BOE**

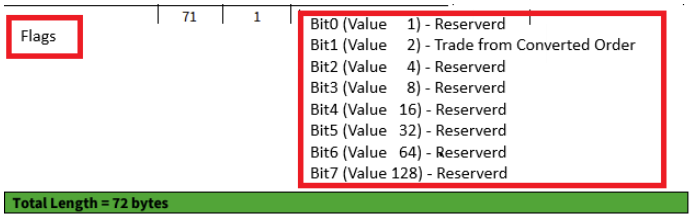
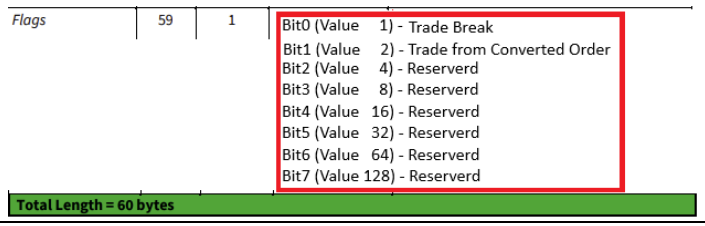
  There are **no changes** to FIX and BOE specification messages for order entry. All configurations for TEO usage are pre-configured in the Port Attributes.

- **Listeners (FIX Drop, ODROP)**

  There are **no changes** to drop copy listener messages.

- **Market Data (PITCH and TOP)**

  Trades that involve a converted order will be indicated in 'Bit 1' of the *Flags* field as follows:

• the **PITCH** Market Data ***Trade*** Message where the prior *Reserved* field is re-purposed as the *Flags* field • Message length remains the same • Cloud PITCH includes an equivalent field	
• the **TOP** Market Data ***TOP Trade*** Message within the existing *Flags* field • Message length remains the same • Cloud TOP includes an equivalent field	

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