ASX Market Outage

Incident dates: 16-17 November 2020

04 December 2020

1. Incident description

On 16 November 2020, a technical incident occurred relating to a software defect in the new ASX Trade system. This resulted in ASX deciding to close the equity market. The market was closed from 10:24:05 on 16 November 2020.

The software defect resulted from an update to an existing quote in the order book of a Tailor Made Combination (TMC) via a Double Sided Price quote message (MO37), where there were existing orders in both the TMC and one or more legs of the TMC. This caused an erroneous generation of a bait order. The erroneous bait order itself had an incorrect order ID.

2. Identification and management of the incident

ASX implemented an upgrade to the ASX Trade system over the weekend of 14-15 November 2020. The ASX market opened at 10:00 on 16 November 2020. At 10:05, ASX received initial reports from customers and determined that there was a technical incident. Crossed markets (overlapping bid and offer prices) and a divergence in order book and trade prices were observed.

ASX identified that the issue was isolated to instruments in Partition 3 on ASX Trade. The issue resulted from an interaction of TMC orders and quote messages with a software defect using incorrect order IDs.

All markets on ASX Trade were placed in an ENQUIRE Session State at 10:24:05. They remained in ENQUIRE for the rest of the trading day until 18:50, while the issue was investigated and managed.

ASX evaluated moving from the ENQUIRE to ADJUST Session State during the incident. However, it was determined that this could impact message integrity. Therefore, consistent with procedures confirmed with the market following the 2016 outage, ASX maintained the ENQUIRE Session State.

The normal end of day schedule resumed at 18:50, beginning with PURGE_ORDERS Session State, transitioning to CLOSE at 19:00.

To avoid any recurrence of the incident, ASX performed configuration maintenance on ASX Trade to prevent creation of TMCs from the trade date of 17 November 2020.

3. Impacts of the incident

No ASX Trade messages could be entered, amended or cancelled in the order book between 10:24:05 and 18:50 while the ENQUIRE Session State was in place. The only exception to this maintenance of a static order book was in the case of functionality that supports, at the election of a Participant and with pre-configuration, order inactivation on disconnection.

The maintenance of a static order book protected the system and market users from further incidents and potential expansion of incorrect messages, and allowed ASX to investigate the issue and present end of day processing with minimal data integrity issues.

Until systems opened on 17 November 2020, market participants were unable to confirm the status of their orders in Partition 3. At all times orders in Partitions 1, 2 and 4, and all trades, were accurate and complete.

4. Related impacts

eBBO feed

After the market re-opened on 17 November 2020, market participants reported non-execution of anticipated Centre Point trades. ASX identified that the external Best Bid and Offer (eBBO) feed into ASX Trade had stalled and that it was unable to maintain a stable eBBO feed. It was subsequently identified that the eBBO feed application was hung as a consequence of a defect within the interface API that communicates with ASX Trade.

This meant that prices previously used in the National Best Bid and Offer (NBBO) were not being refreshed and had become stale. To correct this, ASX removed all other market operator prices from the NBBO within ASX Trade, so that the ASX Best Bid and Offer (BBO) was used instead of the NBBO for the remainder of the 17 November 2020 trading day.

ASX disabled Centre Point and Centre Point block orders from 18 November 2020 until 24 November 2020 (four business days) while the issue was addressed. The ASX BBO continued to be used for validating trades with meaningful price improvement until a stable eBBO feed was implemented on 20 November at 14:22.

It was subsequently determined that the eBBO feed had failed at 10:10 on 16 November 2020, so that the impact of this failure was also present between 10:10 and 10:24 on 16 November 2020.

Mass order cancellations

On Tuesday 17 November 2020, market participants also reported partially successful mass order cancellation requests. ASX identified that attempts to execute certain complex Centre Point scenarios was creating a truncation of the list of orders maintained for facilitating mass cancellations. The ability to mass cancel orders degraded through the day because the list was repeatedly truncated.

The decision to disable Centre Point and Centre Point block orders from 18 November 2020 until 24 November 2020 removed this issue while the matter was resolved. A system change was made in ASX Trade on 18 November 2020, with a full fix implemented over the weekend of 21-22 November 2020. Centre Point and Centre Point Block orders were re-enabled on 24 November 2020.

Orders could be individually cancelled at all times.

5. Next steps

From the trade date of 17 November 2020, TMCs have been disabled. Information about the resumption of TMC functionality is made available to participants via market notices.

6. General information

This report is based on information and analysis as at 3 December 2020 and the conclusions may change with further information or analysis.

Tailor Made Combinations

A TMC is an instrument that links multiple securities located in a single partition permitting contingent execution of those securities. An order message can be sent for a TMC instrument. TMC instruments are quoted and matched at a net price. An incoming order for a TMC may be executed against another opposing TMC order, or against a combination of the underlying instruments.

Partitions

The ASX Trade platform is logically segmented into four Partitions. The Partitions support load balancing across the platform. Each Partition is broadly aligned to a particular security type:

- Partition 1: Materials
- Partition 2: Financials
- Partition 3: Energy; Industrial; Index; Classification Pending
- Partition 4: Consumer Discretionary; Consumer Staple; Healthcare; Information Technology; Telecommunications; Utilities; Agriculture.

Session states

A description of all session states and their associated attributes is included in the following documentation: https://www.asxonline.com/content/dam/asxonline/public/documents/asx-trade-refresh-manuals/asx-trade-introduction-and-business-information.pdf.

Centre Point

This refers to non-displayed order types that match at the mid-point or other permitted price steps inside the NBBO.

eBBO/NBBO

The eBBO is the external Best Bid and Offer received from other market operators. The eBBO is combined with the ASX BBO to determine the NBBO.

The NBBO is used to validate off-market trades with meaningful price improvement, and Centre Point executions against meaningful price improvement.